


# Ohio's Response to HABs in Lake Erie

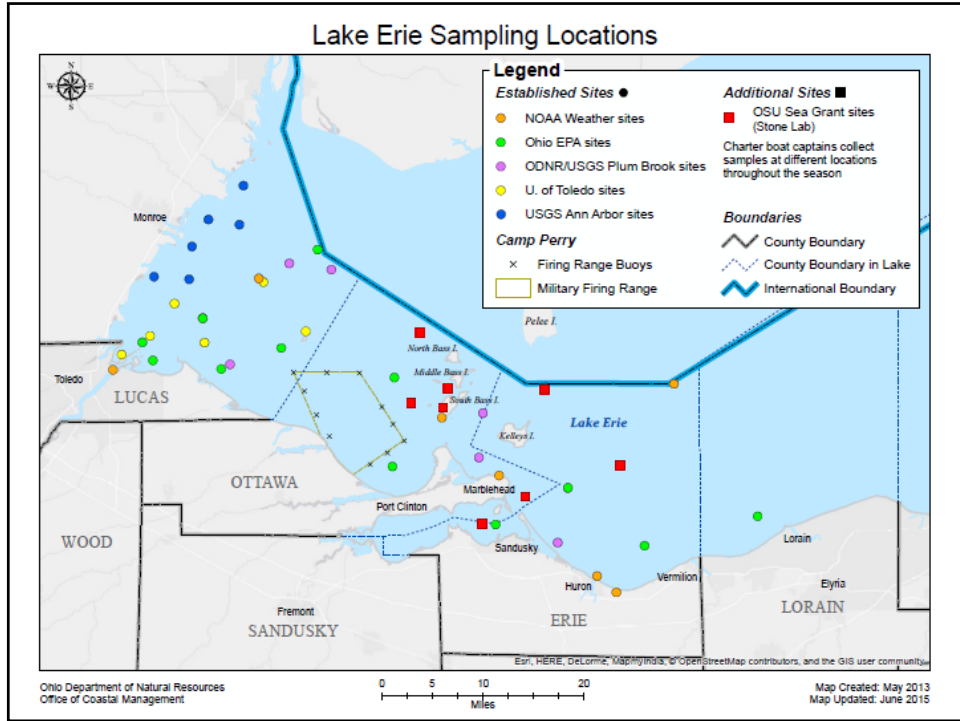
Heather Raymond  
Ohio EPA  
Public Water System HAB Coordinator  
3-10-16



## Overview

- Lake Erie HAB Monitoring
  - Nearshore Monitoring
  - Beaches
  - Public Water Systems
- PWS Monitoring Grants and GLOS Partnership
- Research Grants
- Other Efforts to Improve Lake Erie

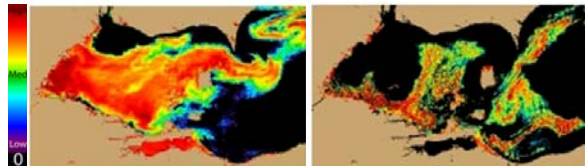




## Lake Erie HAB Monitoring – Beaches

- Incident-Response Based Sampling Guided by Recreational HAB Response Strategy
- [epa.ohio.gov/portals/35/hab/HABResponseStrategy.pdf](http://epa.ohio.gov/portals/35/hab/HABResponseStrategy.pdf)

 Experimental  
Lake Erie Harmful Algal Bloom Bulletin  
2011-014  
08 September 2011  
National Ocean Service  
Great Lakes Environmental Research Laboratory  
Last bulletin: 01 September 2011



## Lake Erie HAB Monitoring – Public Water Systems

- Ohio EPA Incident-Response Based Sampling Initiated in 2010.
- City of Oregon starts routine monitoring in 2011, expands to include Toledo, Carroll Township and Ottawa County in 2012.
- Ohio EPA initiates routine monitoring at remaining five Western Basin water systems in 2014. Other Lake Erie public water systems either voluntarily monitor or Ohio EPA samples in response to a HAB.
- Draft rules will require mandatory monitoring and reporting by all surface water public water systems.
  - Anticipated effective date: June 1, 2016
- Ohio EPA PWS HAB Response Strategy: [epa.ohio.gov/ddagw/HAB.aspx](http://epa.ohio.gov/ddagw/HAB.aspx)



## Draft HAB Rules - Overview

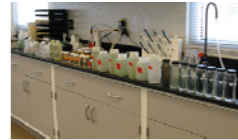
Draft Rules: [epa.ohio.gov/ddagw/rules.aspx](http://epa.ohio.gov/ddagw/rules.aspx)

- PWS requirements - new rules in OAC Chapter 3745-90
  - Microcystins action levels in drinking water
  - Monitoring requirements
  - Treatment technique requirements
  - Public notification and Consumer Confidence Report (CCR) requirements
  - Recordkeeping requirements
- Laboratory Certification requirements –  
New OAC rule 3745-90-04 and amended rules in Chapter 3745-89
  - Laboratory certification
  - Analytical techniques
  - Reporting deadlines



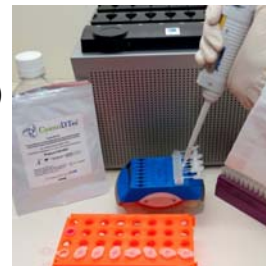
## Draft Rules - Monitoring Requirements

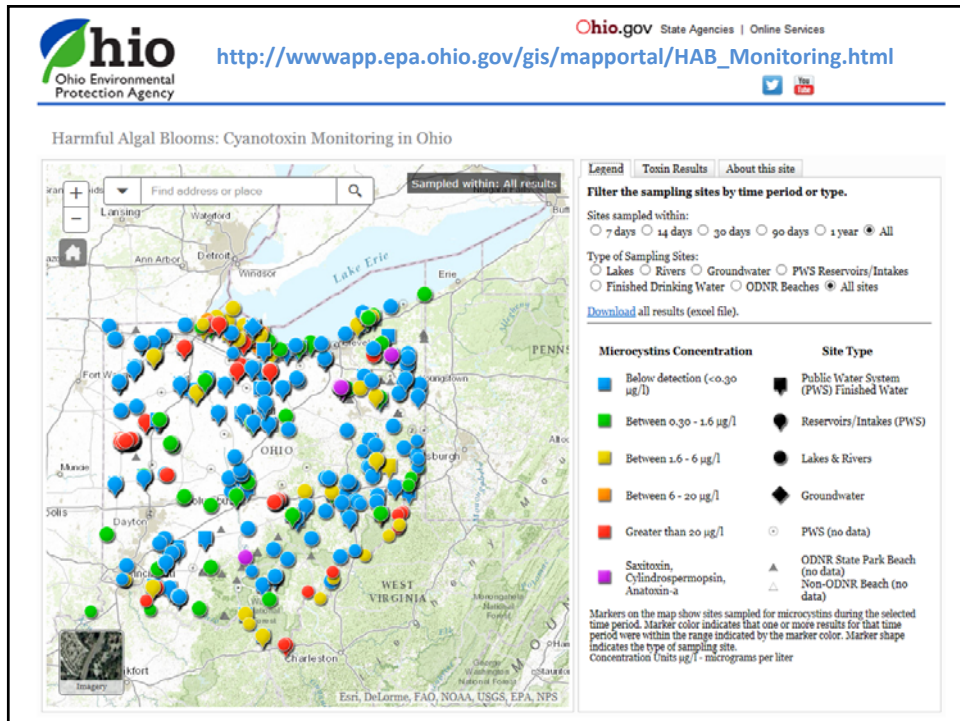
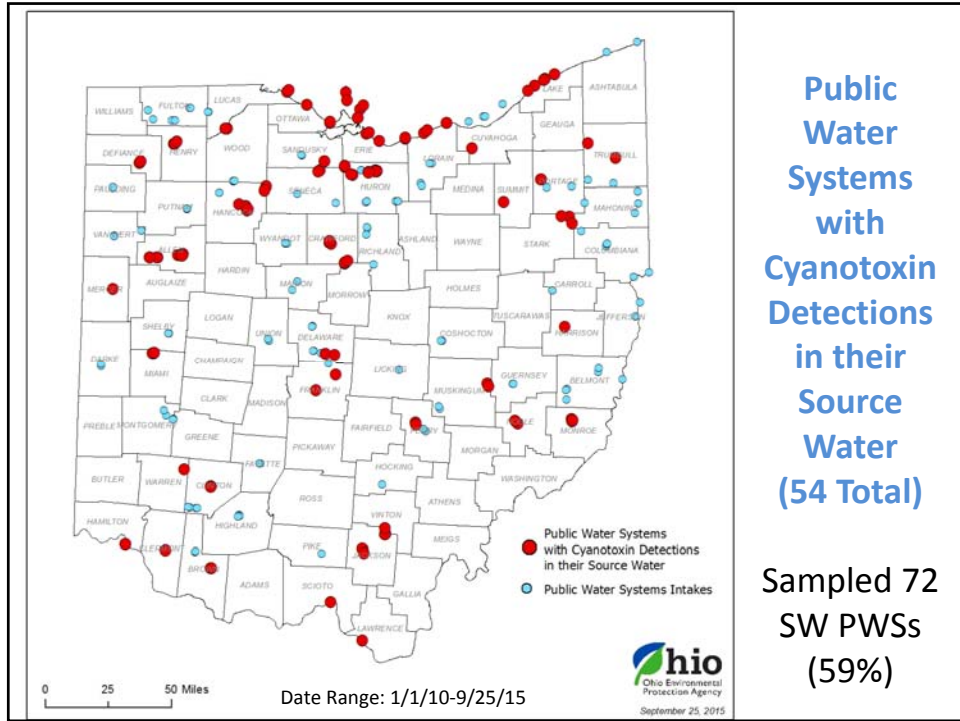
- Apply primarily to surface water systems
- Routine raw water genomic cyanobacteria screening (every other week)
  - Information will be used to determine if monitoring for cyanotoxins other than microcystins needs to be conducted by Ohio EPA (or voluntarily by the PWS)
- Routine monitoring for microcystins
  - May – October:
    - Weekly raw and finished water monitoring
    - Raw water detections >5 ug/L and any finished water detections trigger additional sampling.
  - November – April:
    - Raw water only every other week
    - Detections trigger additional monitoring
- Option for a decreased monitoring schedule



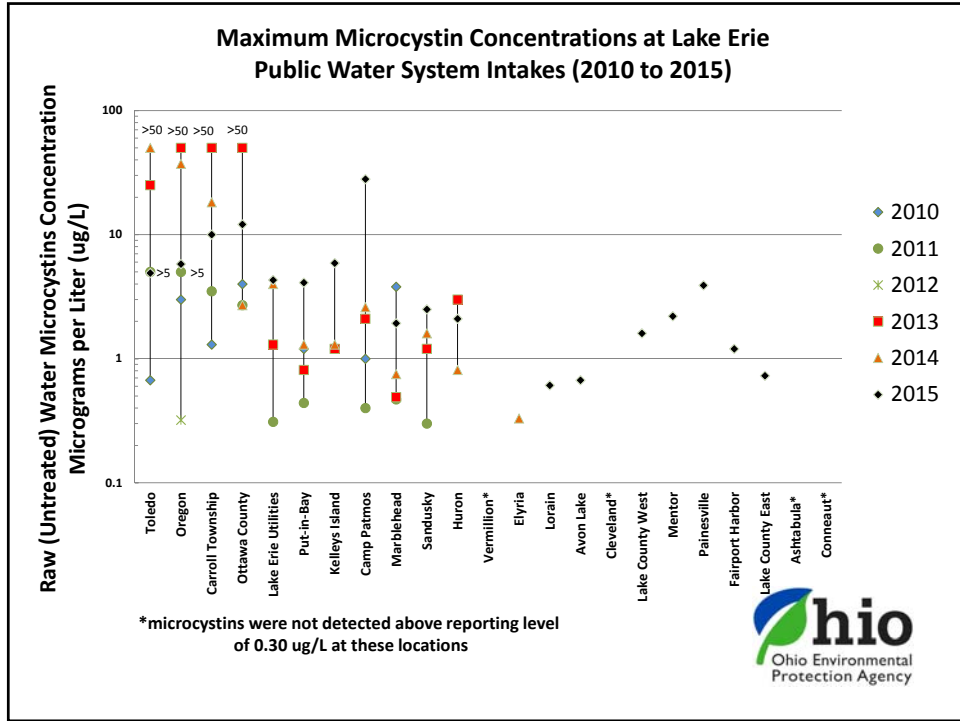
## Cyanobacteria Screening: Multiplex qPCR

- Cyanobacteria screening
  - Quantitative polymerase chain reaction (qPCR) – identifies and quantifies the presence of genes unique to:
    - Cyanobacteria (16S rDNA, good correlation with cell counts)
    - Microcystin and Nodularin production (mcyE gene)
    - Cylindrospermopsin production (cyrA gene)
    - Saxitoxin production (sxtA gene)
  - Test completed within 2-3 hours (includes extraction)
  - Scalable
  - Cost-effective
  - Utilizes certified reference material
  - Specific: no gene, no toxin
- Method and certification beginning in 2017
- Until there is sufficient capacity at certified laboratories to perform this method, DES will conduct these analyses
- Samples must be analyzed within seven days of collection
- [www.phytoxigene.com/products/](http://www.phytoxigene.com/products/)



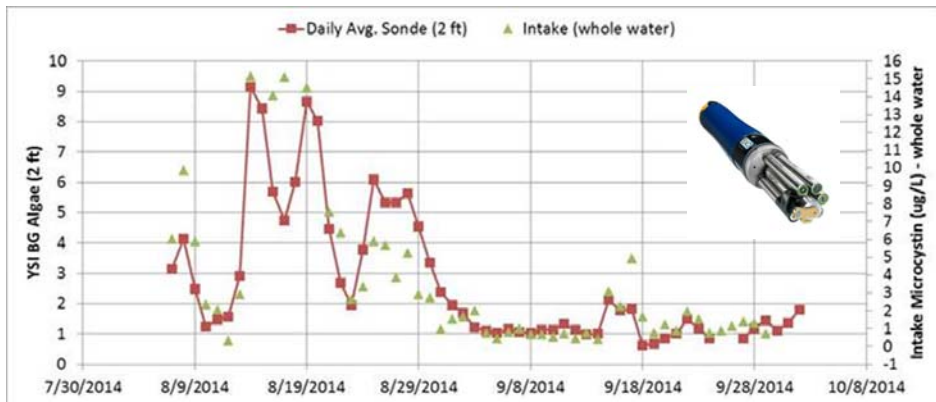






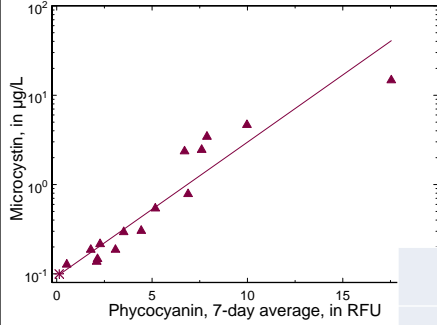
## Ohio EPA Monitoring and Equipment Grants To Public Water Systems

- \$1 million in grants, up to \$30,000/water system
- Eligible items included water quality sensors, microscopes, ELISA-related analysis equipment and training



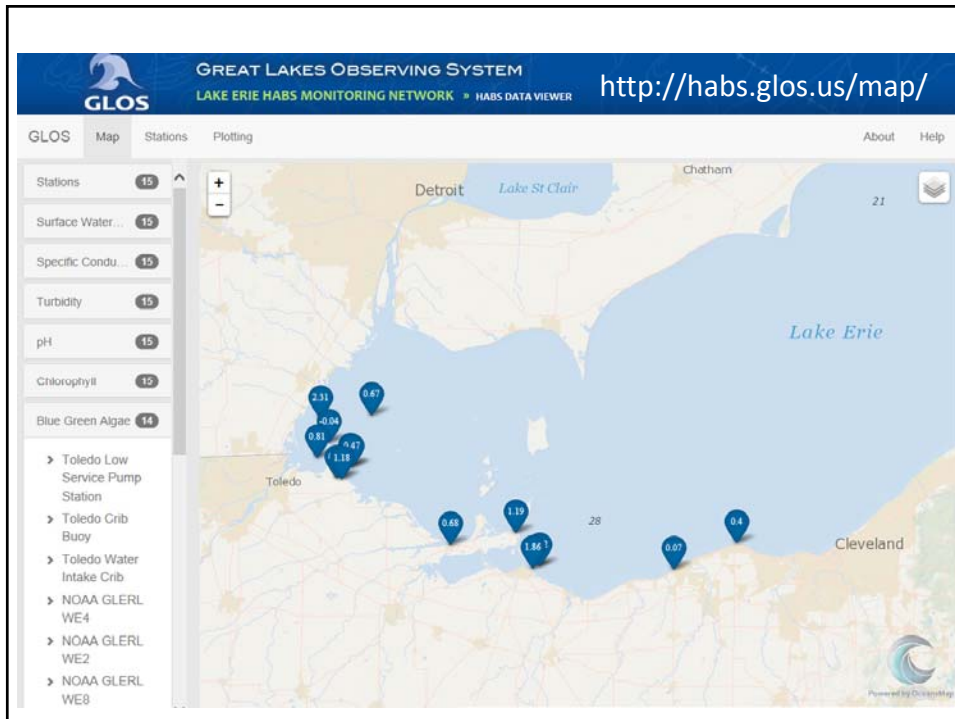
-Graph provided to Ohio EPA by Ed Verhamme, Limnotech.

## Harsha Main 2014— U.S. EPA Continuous Monitor



Spearman's correlation to microcystin concentrations	rho	p
Phycocyanin, 7-day average	0.98	<0.0001
Dissolved oxygen, 14-day average	0.88	<0.0001
pH, 7-day average	0.83	<0.0001
Temperature, instantaneous 10 a.m.	0.73	0.0031
Chlorophyll, 24-hour average	0.53	0.0358
Specific conductance, 3-day average	-0.20	0.4473

Data Courtesy:  
Donna Francy, USGS



## Applied HAB Research Grants

<http://ohioseagrant.osu.edu/archive/research/bor/>

- Ohio Board of Higher Education Provided \$3.9 Million in Funding to State Universities across five Focus Areas:
  - Lake Erie HABs and Lake Water Quality
  - Producing Safe Drinking Water
  - Land Use Practices, Sources of Enrichment, Water Quality and Engineered Systems
  - Human Health and Toxicity
  - Economics and Policy



## Bi-national Efforts to Improve Lake Erie Water Quality

- Great Lakes Water Quality Agreement (Annex 4)
  - P loading targets finalized (February 2016)
  - Binational Nutrient Management Strategy (June 2016)
  - Domestic Action Plans (April 2018)
- W. Basin of Lake Erie Collaborative Agreement
  - OH, MI and ON signed June 2015
  - Implementation Plan (Spring 2016)
    - proposed actions and timelines toward phosphorus reduction goal
  - Reduce Total P loads: 20% by 2020 and 40% by 2025





## Ohio's Recent Efforts to Improve Lake Erie Water Quality

- More than \$2 Billion invested since 2011
  - Improve drinking water and wastewater facilities, fix faulty septic systems
  - Plant cover crops and install controlled drainage systems on fields
  - Monitor water quality
- Historic reforms
  - Bans manure/fertilizer application (frozen, snow covered or rain soaked ground)
  - Requires major WWTPs to monitor their discharge for phosphorus
  - Requires other WWTPs to determine the feasibility of limiting phosphorus
  - Bans open-lake placement of dredged material by 2020
- Statewide program to certify farmers applying fertilizer in Ohio (4Rs)
- TMDLs for Lake Erie Watershed

