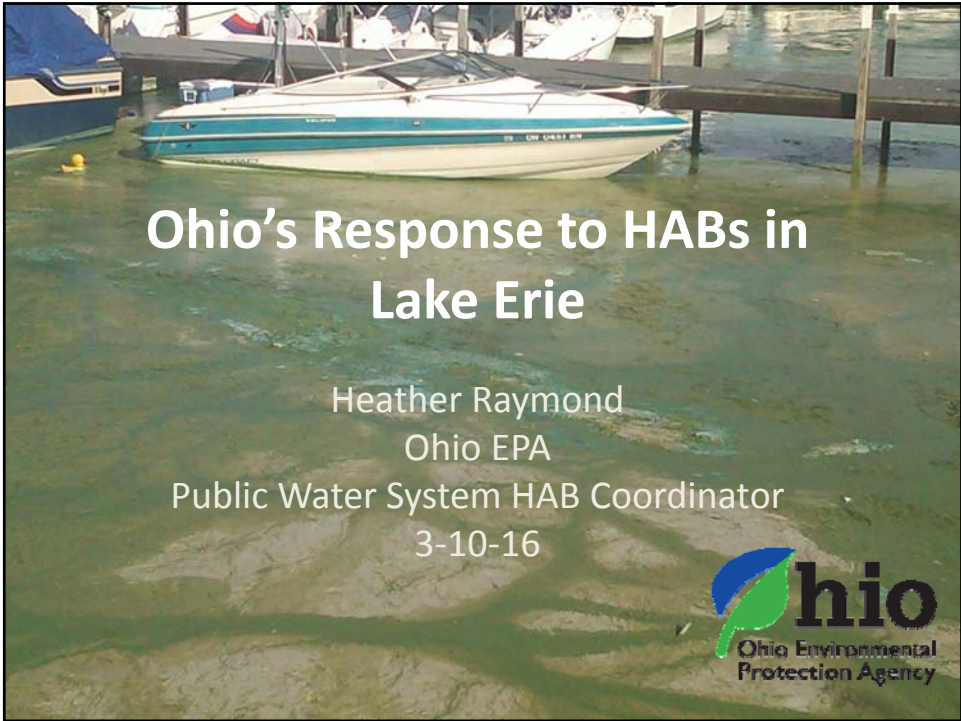



US EPA ARCHIVE DOCUMENT





Ohio's Response to HABs in Lake Erie

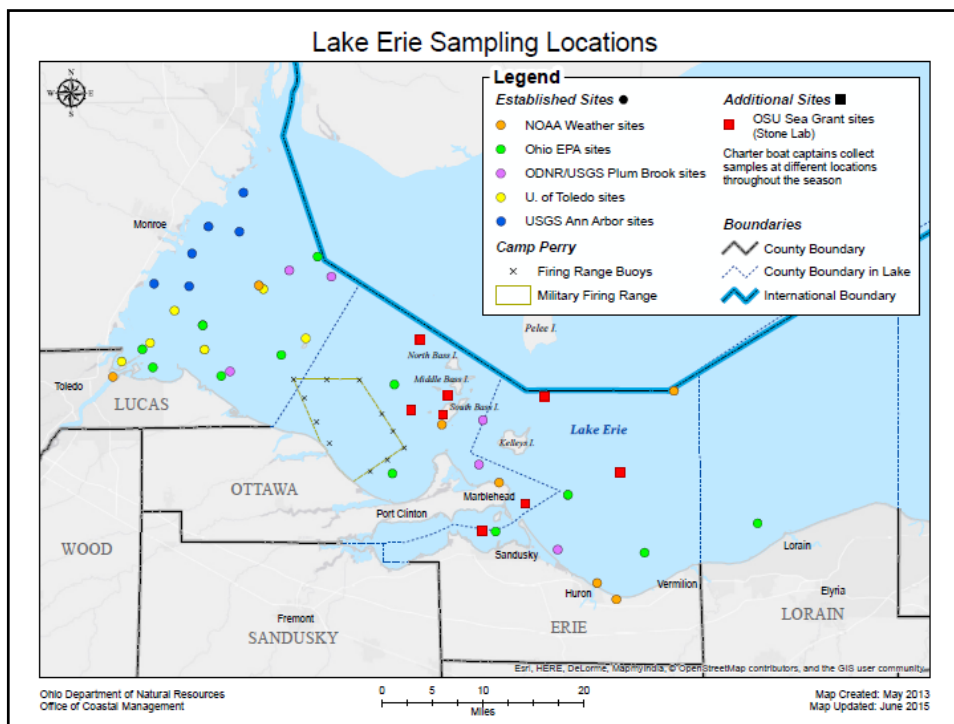
Heather Raymond
Ohio EPA
Public Water System HAB Coordinator
3-10-16



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

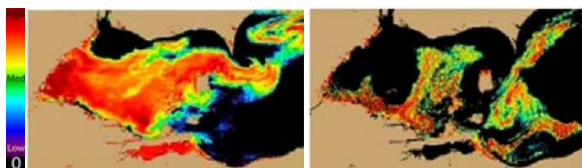




Lake Erie HAB Monitoring – Beaches

- Incident-Response Based Sampling Guided by Recreational HAB Response Strategy
- epa.ohio.gov/portals/35/hab/HABResponseStrategy.pdf

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



Draft HAB Rules - Overview

Draft Rules: 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



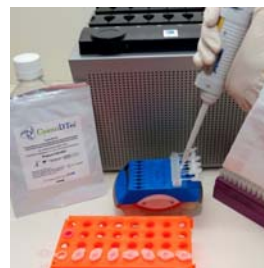
Draft Rules - Monitoring Requirements

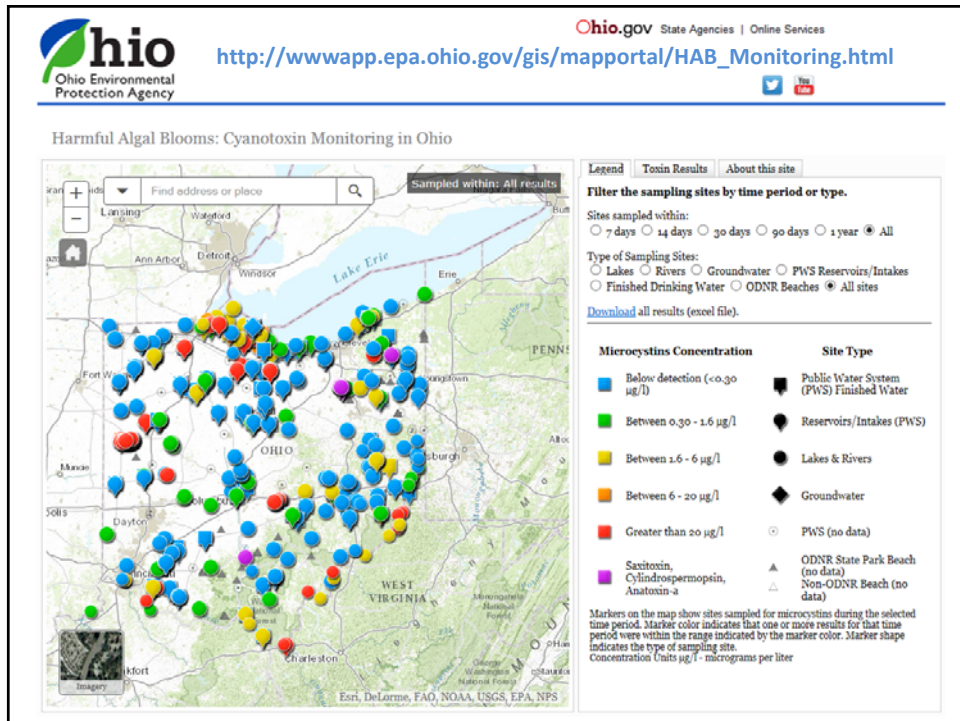
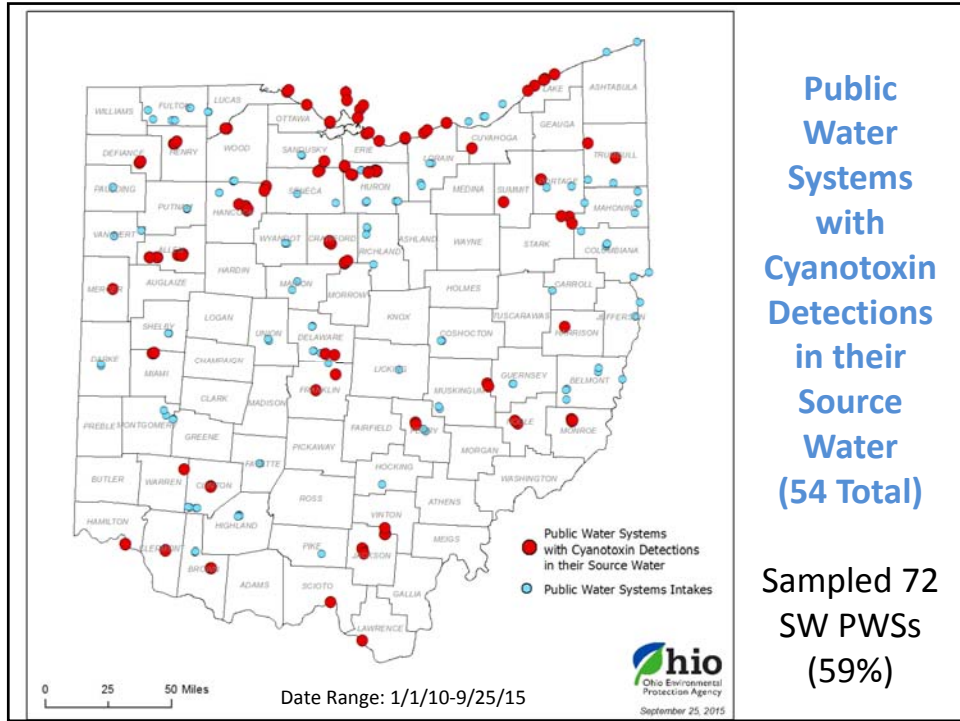
- Apply primarily to surface water systems
- Routine raw water genomic cyanobacteria screening (every other week)
 - Information will be used to determine if monitoring for cyanotoxins other than microcystins needs to be conducted by Ohio EPA (or voluntarily by the PWS)
- Routine monitoring for microcystins
 - 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

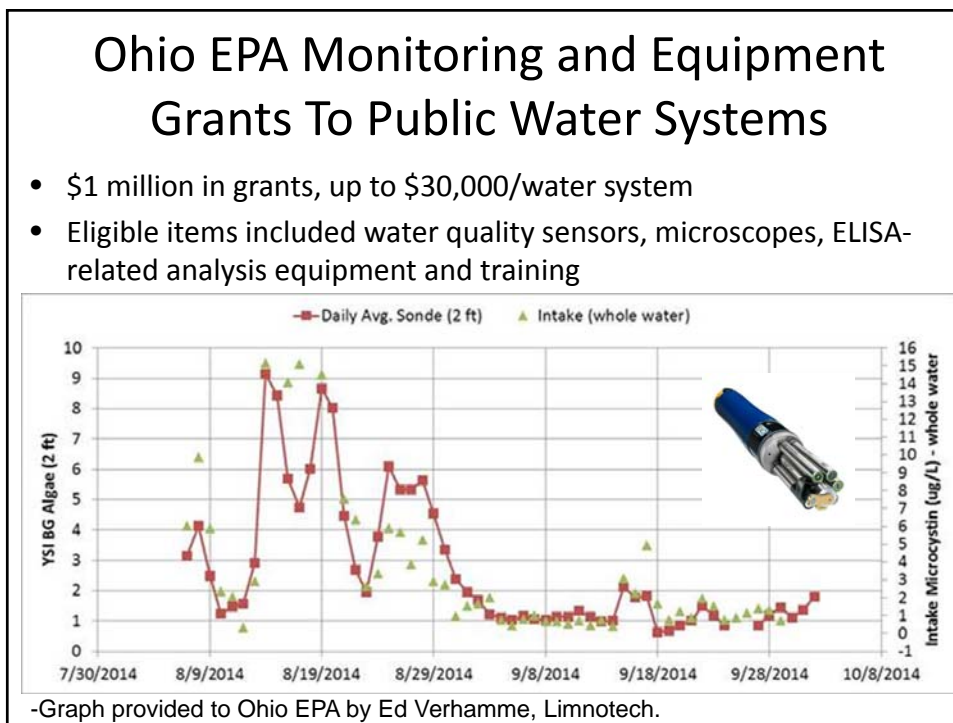
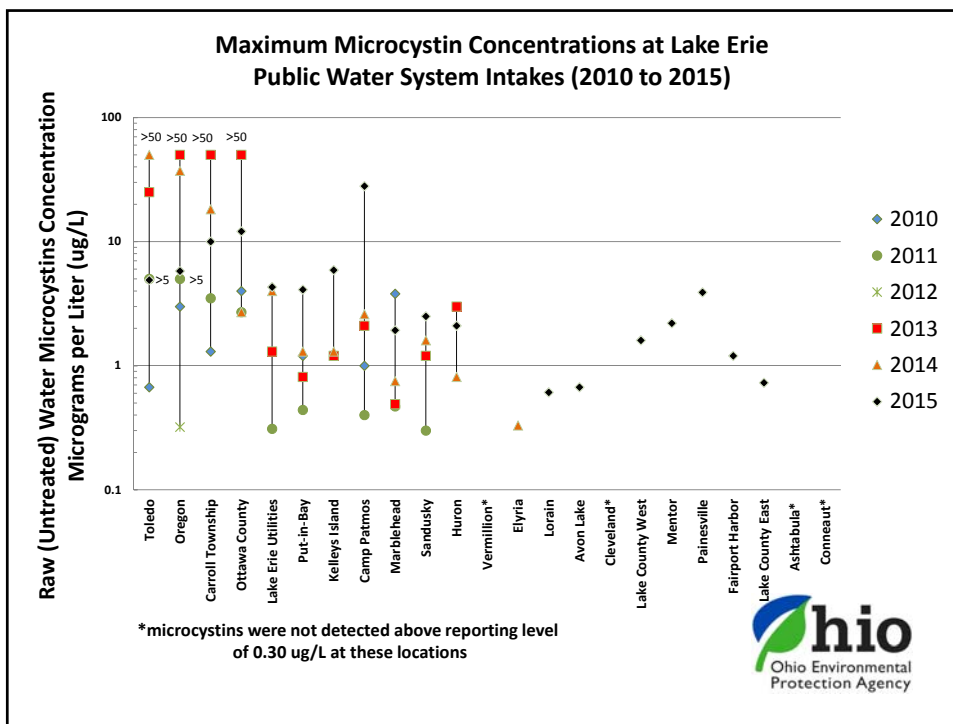


Cyanobacteria Screening: Multiplex qPCR

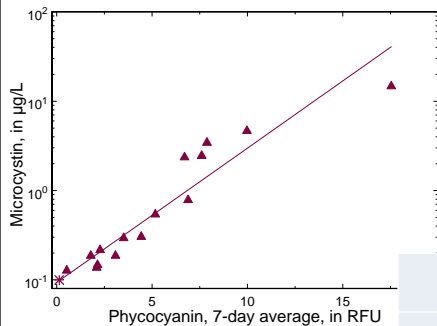
- Cyanobacteria screening
 - Quantitative polymerase chain reaction (qPCR) – identifies and quantifies the presence of genes unique to:
 - Cyanobacteria (16S rDNA, good correlation with cell counts)
 - Microcystin and Nodularin production (mcyE gene)
 - Cylindrospermopsin production (cyrA gene)
 - Saxitoxin 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/





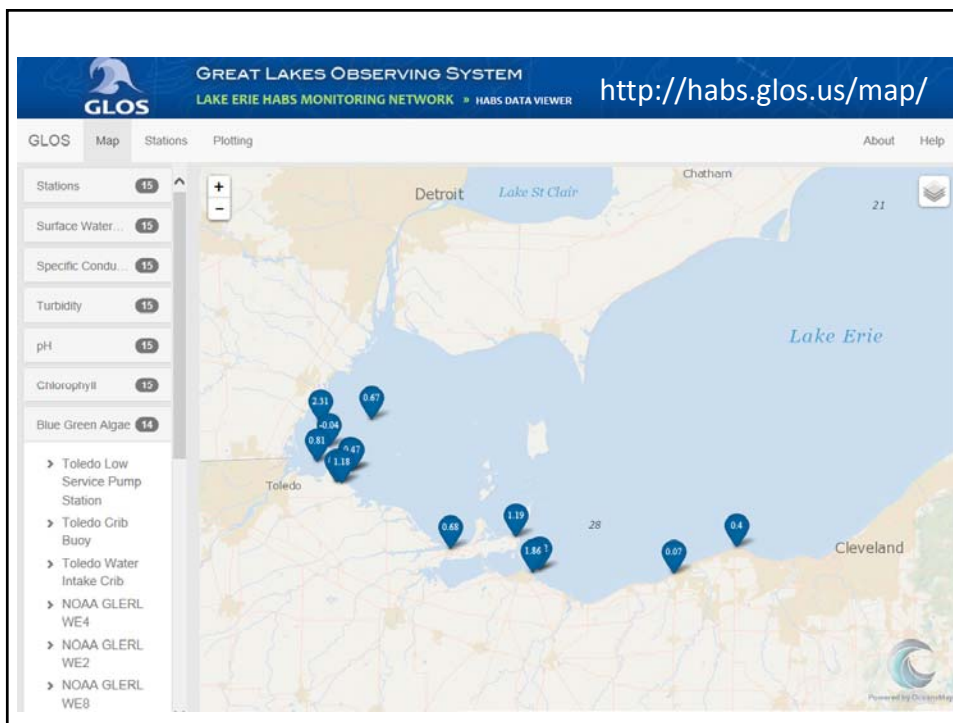


Harsha Main 2014— U.S. EPA Continuous Monitor



| 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

