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Form 4C-475a (Revised 1/02)

Engaging Citizens in Research:
Assessing Harmful Algal Bloom
Information Needs for Saginaw Bay

Devin Gill, UM-CIGLR

Meaghan Gass, MI Sea Grant

Chiara Zuccarino-Crowe, MI Sea Grant

Outline

- Speaker Introductions
- Proposed Study
- Stakeholder Involvement
- Workshop Details
- Discussion Questions

Intro: MI Sea Grant Focus Areas



- Sustainable Fisheries and Aquaculture
- Environmental Literacy and Workforce Development
- Resilient Communities and Economies
- Healthy Coastal Ecosystems

MICHIGAN STATE UNIVERSITY | Extension

Sea Grant
Michigan



Michigan EnviroImpact Tool

MICHIGAN STATE UNIVERSITY Michigan EnviroImpact ^{Beta} Login
Part of the Regional Runoff Risk Decision Support Tools Network Tutorials
Contact / Help

Runoff Risk | Precipitation | Soil Temperature 2" | Soil Temperature 4" | Soil Sat. | About the Forecast & Instructions

Find address or place

Runoff Forecast (24 hr.)

- Low (Clear)
- Minor
- Moderate
- High
- Severe
- Winter Conditions

The Michigan EnviroImpact tool shows daily runoff risk across Michigan using National Weather Service information about precipitation, temperature, soil moisture, and landscape characteristics. Click on a location on the map to determine the potential risk of runoff from manure application. Click on "Tutorials" at the top of the webpage for detailed instructions on how to use this tool. Questions or Concerns? Click on the "Contact/Help" link at the top of this webpage.

Learn & Alert Information

Partners/Supporters:

MARAP, Sea Grant Michigan, Central Lakes Restoration, MICHIGAN STATE UNIVERSITY Extension

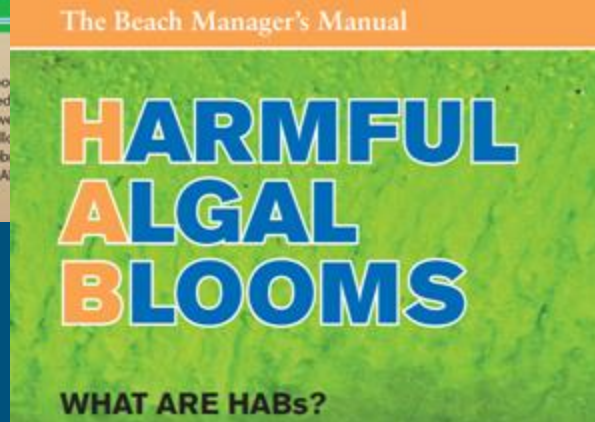
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<https://enviroimpact.iwr.msu.edu>

MI Sea Grant: HAB Communication Tools



<http://bit.ly/MISGHABS>



HARMFUL ALGAL BLOOMS IN THE GREAT LAKES

What they are & how they can affect your health

What are algal blooms? What makes them harmful?

There are many species of single-celled organisms living in the Great Lakes, including algae. When certain conditions are present, such as high nutrient or light levels, these organisms can reproduce rapidly. This dense population of algae is called a bloom. Some of these blooms are harmless, but when the blooming organisms contain toxins, other noxious chemicals, or pathogens, it is known as a harmful algal bloom, or HAB. HABs can cause the death of nearby fish and foul up nearby coastlines, and produce harmful conditions to marine life as well as humans.



Harmful Algal Blooms & Muck

What's the Difference?

Harmful algal blooms and muck, otherwise known as Cladophora, can be mistaken for each other simply because people may associate an algal bloom with either type. However, both represent significantly different species. Unlike green algae such as Cladophora, blue-green algae is technically not an algae, but is a bacteria known as cyanobacteria that photosynthesizes like algae do. Blue-green harmful algal blooms (HABs) and green algae blooms can be found in similar locations. However, the two species differ in appearance and in factors that influence their growth and movement in the Great Lakes.

Harmful Algal Bloom: Microcystis	Muck: Cladophora or Spirogyra
• Blooms tend to stay in water column	• Can wash up on shore in mats
• Can produce liver, skin, or nervous system toxins	• Not known to produce toxins
• Blooms not known to harbor E. coli	• Mats (on beach and in water) have contained E. coli
• Peak growth often occurs late summer	• Peak growth often occurs early summer
• When blooms die, sink to bottom, often responsible for depleted oxygen on bottom	• When blooms die, float to surface, final location depends on wind and water bottom circulation
• Colonial (circular cells)	• Filamentous (end to end), branched
• Grows in response to nutrients, light	• Grows in response to nutrients, light
• Planktonic (passively moves in water)	• Benthic (bottom dwelling)
• Microalgae (microscopic cells)	• Macroalgae (grow up to 3 ft. long)
• Zebra mussels promote by selectively filtering other algae, leaving toxic cyanos and rapidly recycling nutrients that stimulate growth.	• Zebra mussels promote by providing substrate for growth and providing localized nutrient source.



More HABs Communication Tools

What Are Harmful Algal Blooms? ONLINE FACTSHEET

Harmful algal blooms were all over the news after the Toledo drinking water crisis of 2011 and 2014, but what actually causes these algal blooms and why are they problematic? This online fact sheet will provide you with answers about what makes up a harmful algal bloom, why they form, why they're an issue, and what you can do to help prevent them and keep yourself safe.

OVERVIEW VIDEOS Q & A RESOURCES QUIZ

What is this stuff?

A harmful algal bloom (HAB) is the explosive growth of cyanobacteria (also known as blue-green algae) in a body of water such as Lake Erie.

Unlike green algae, which are basically aquatic plants, cyanobacteria have the ability to produce toxins that can cause illness or death in humans and pets who come in contact with contaminated water.

<https://ohioseagrant.osu.edu/products/1h6jc/what-are-habs>

ASK anything...

Ask your own questions

Experts on deck

This feature is coming soon. For now please use the form below. Be sure to include an email where we can contact you and your location to help us better serve you.

Laura Johnson
Chris Winslow
Justin Chaffin
Melinda Huntley

Q

"I thought HABs normally are in the western part of Lake Erie but I just saw a HABs advisory near Cleveland. How did that happen?"

ASKED BY - STEVEN SHEPHERD, COLUMBUS, OH

The blooms off Cleveland, and in the rest of the central basin, are a different type cyanobacteria that blooms in the western basin. The central basin blooms are called Dolichospermum, whereas Microcystis blooms in the western basin. Dolichospermum in Lake Erie produces different toxins called saxitoxins. Low biomass (compared to the western basin) Dolichospermum blooms are typical for the offshore waters of the central basin in early to mid-July, but they have washed ashore where they can turn a beach or marina very green. A Dolichospermum bloom washed into Fairport Harbor in July 2015. Luckily, the July central basin Dolichospermum blooms are usually very short-lived (a week or less). Warm weather has allowed the western basin bloom to begin about 2 weeks earlier.

A

JUSTIN CHAFFIN, PHD
Senior Researcher, Research Coordinator

Intro: CIGLR

- 1 of 16 Cooperative Institutes Across the U.S.
- Conduct research to support NOAA's goals & expand their resources
- Sponsored by the NOAA Great Lakes Environmental Research Lab
- Hosted by the University of Michigan



Cooperative Institute for
Great Lakes Research

CIGLR

Great Lakes Science for Society



Study: Assessing the Need for a Harmful Algal Bloom (HAB) Forecast in Saginaw Bay

Study Goals & Objectives

1. Understand how people may be affected by Saginaw Bay HABs
2. Educate stakeholders about HAB occurrences in Saginaw Bay
3. Explore whether a short-term HAB forecast for Saginaw Bay is needed
4. Build relationships between citizens and scientists
 - a. Increases quality of communication
 - b. Increases impact of research

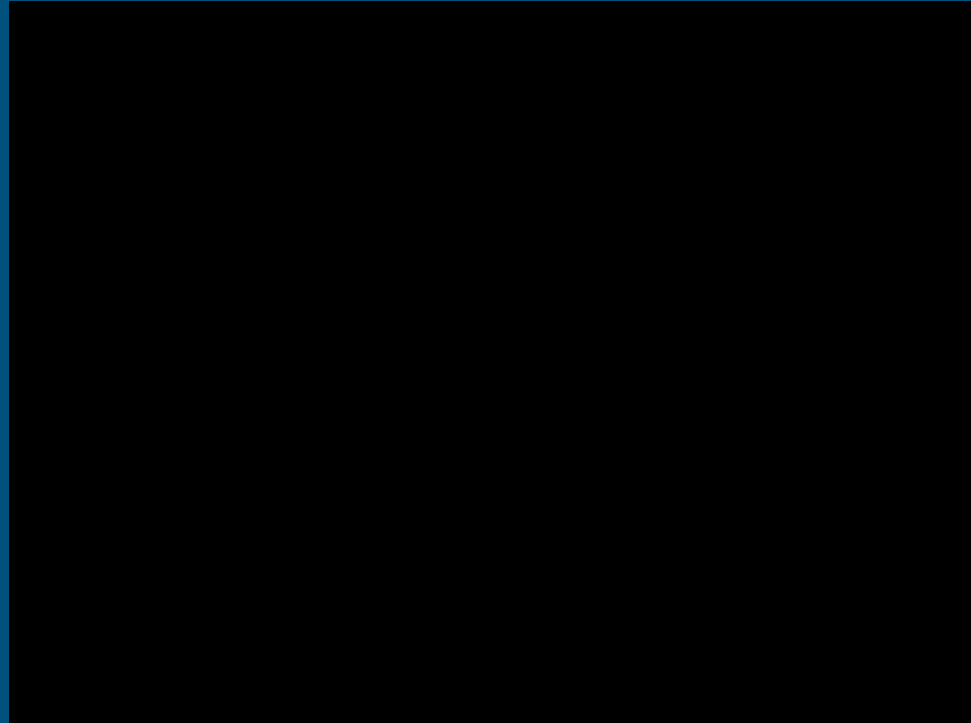
New, Experimental HAB Forecasts

Lead Researcher, Mark Rowe
(NOAA GLERL)

Lake Erie HAB Tracker

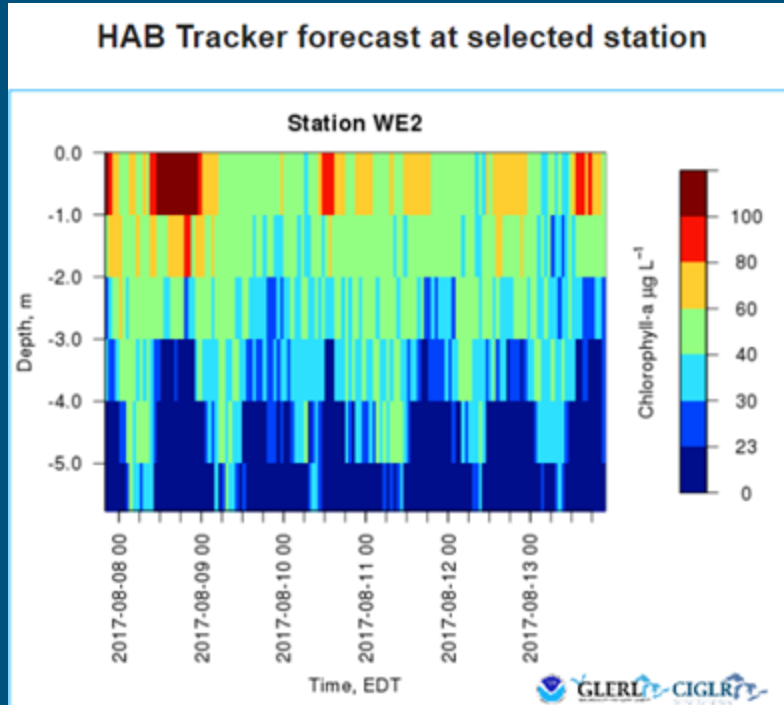
This 5 day HAB forecast can tell you...

- Where are the blooms?
- How big are they?
- Where are they likely headed?
- Are they concentrating at the surface, or mixing throughout the water column?

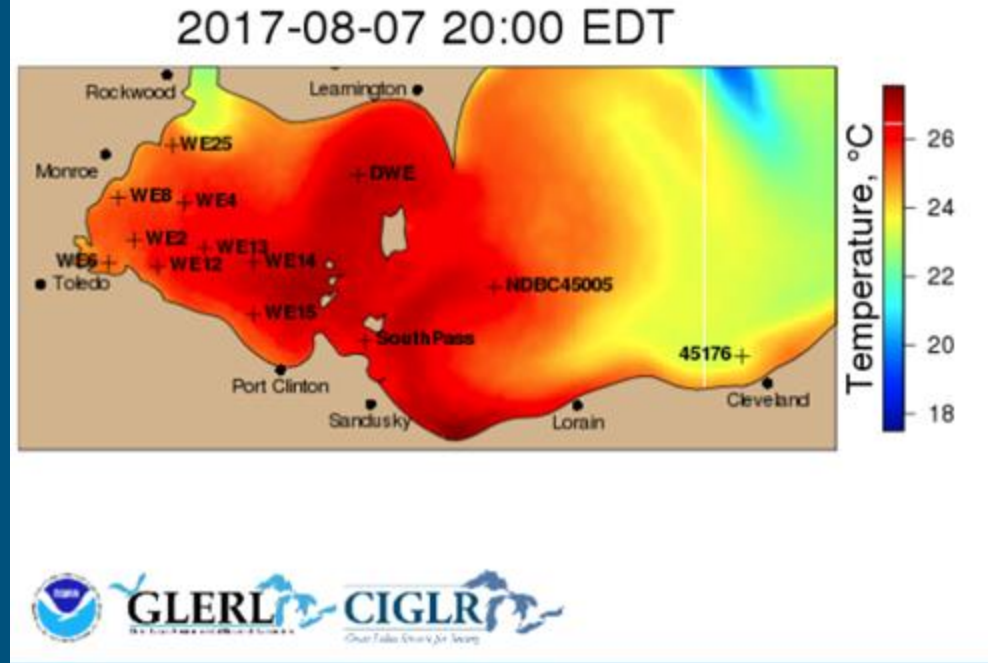


Lake Erie HAB Tracker

Vertical Mixing

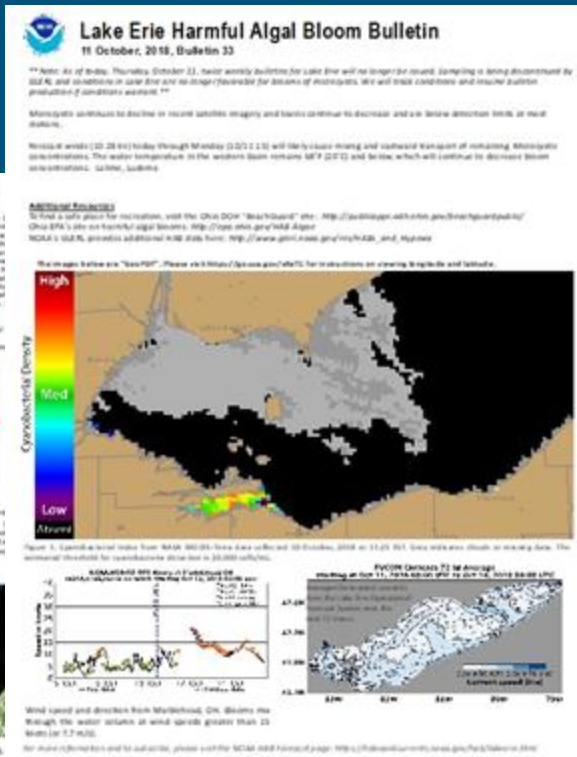
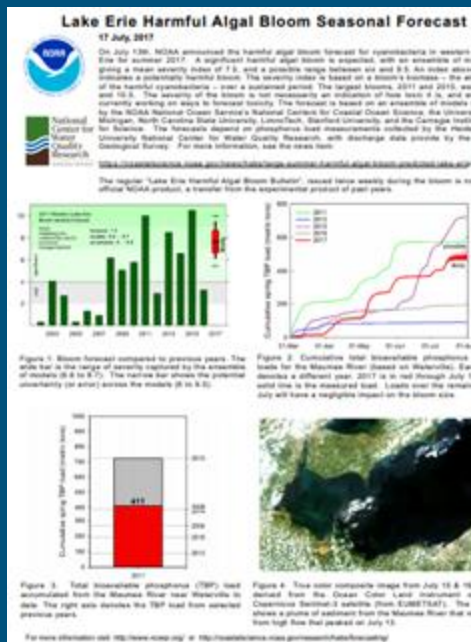


Surface Temperatures/Site Selection



Other NOAA HAB Forecast Products

- Bi-weekly HAB bulletin
- Seasonal HAB forecast
- Pre-season forecast



Why involve stakeholders in forecast design?

- Ensure forecast meets specific user needs
- Ensure forecast is easy to use
- Document stakeholder support for research
- Build partnership between researchers & stakeholders

Stakeholder Engagement Strategy



Lake Erie HAB Tracker Users

Public Water Systems



Charter Captains



Recreational Anglers



Target Stakeholders

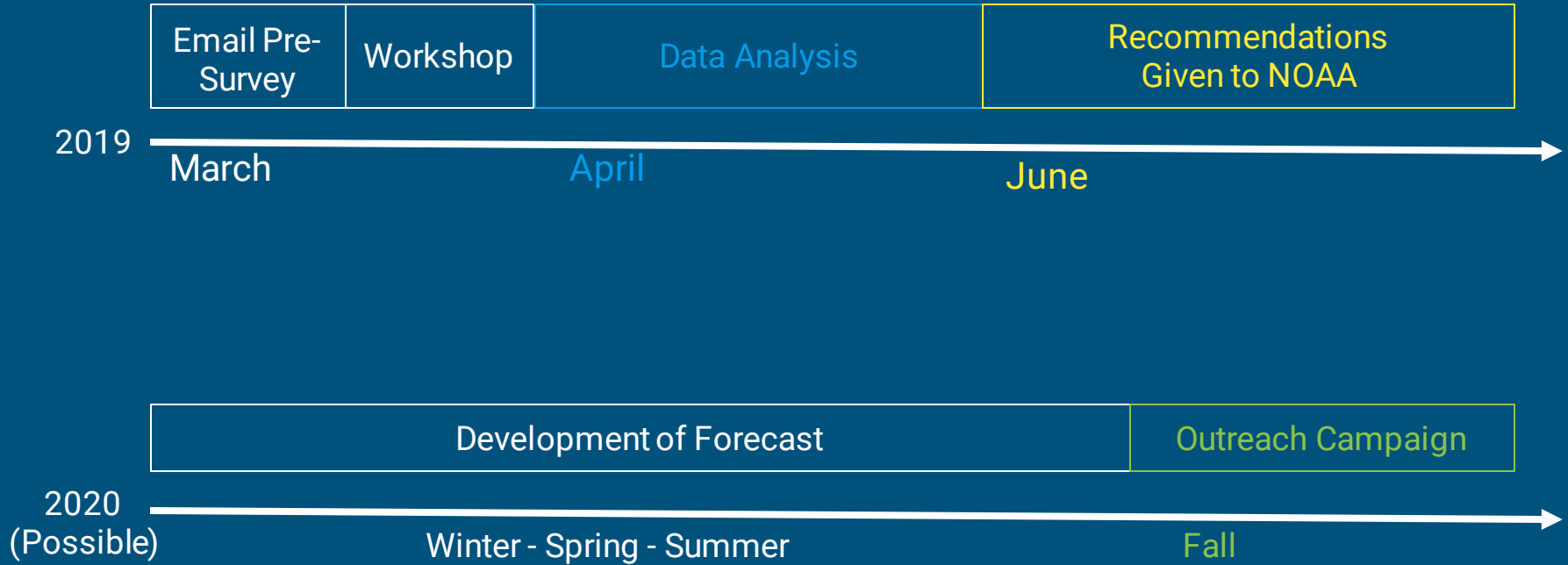
State	Local	Regional	Indigenous
MDNR	Partnership for Saginaw Bay Watershed	East MI Council of Governments	Chippewa Indian Tribe of MI
MDEQ			
MDARD			
	Saginaw Water Treatment Plant	Saginaw Valley Walleye Club	
Federal			Academic
USGS	Bangor Twshp		SVSU
NRCS	Bay County Health Dept.		
USGS			

Are there perspectives that aren't represented?

Stakeholder Workshop & Surveys

- 2 hr Workshop including:
 - Facilitated discussion to understand user knowledge, perceptions, and decision-making about HABs
 - Presentation of research and demonstration forecast model by developer, Dr. Mark Rowe
- Pre and Post Evaluation Surveys
- Late March - Saginaw, MI

Project Timeline



Target Stakeholders

State	Local	Regional	Indigenous
MDNR	Partnership for Saginaw Bay Watershed	East MI Council of Governments	Saginaw Chippewa Indian Tribe of MI
MDEQ		Saginaw Valley Walleye Club	
MDARD		Saginaw public water systems	
Federal			Academic
USGS	Bangor Twshp	The Nature Conservancy	SVSU
NRCS	Bay County Health Dept.	The Conservation Fund	
USGS			

Are there perspectives that aren't represented?

Do you think that there is a need for a HAB
forecast in Saginaw Bay? Why?

Other thoughts on this study?

Thank you!

Devin Gill

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