# Assessing Community Need for a Saginaw Bay Harmful Algal Bloom Forecast

## (A case study for stakeholder engagement in research)

Devin Gill Stakeholder Engagement Specialist @gilly\_devin





## Partners

Meaghan Gass MSUE/MISG Mark Rowe

Chiara Zuccarino-Crowe MSUE/MISG Craig Stow NOAA GLERL







# Stakeholder Engagement

#### Who is a stakeholder?

• Anyone with an interest in utilizing research products/outcomes for decision-making

What is stakeholder engagement in research?

- Researchers and stakeholders both produce and consume knowledge
- Outreach is not engagement (although both are valuable!)

Why is stakeholder engagement important?

 Promotes usability of research products to ensure public safety (Morrow et al, 2015)



# Project Goals for Stakeholder Engagement

- 1. Document specific community needs for our research BEFORE investing resources and energy into a new project
- 2. Identify specific questions/concerns held by stakeholders that our proposed research could help answer
- 3. Foster community support and awareness of our research, while working hand-in-hand with stakeholders to develop a communication strategy for introducing our research to the community

# Background: The Water Quality Issue

• Harmful Algal Blooms occur in Saginaw Bay

Ē



# **Background: The Research Questions**

- Can we develop a useful forecast for HABs in Saginaw Bay?
- Do HABs behave differently in Saginaw Bay than in Western Lake Erie?



Ē



# Background: The Stakeholder Questions

- Would a Saginaw Bay HAB forecast be useful for stakeholders?
- How might the information needs of Saginaw Bay stakeholders be different from Lake Erie stakeholders? (Gill et al., 2018)
- Will their perceptions and concerns about HABs be different?





Lands reporter mapping the sponse bulkers in the PAGT trades classed payells than intermentations, as the interm measurements we given here to provide centers. However, the spectra set that company executed with state line PAGs. The synchronized payes in the state context, thereas and a context of a set mentation. Subject to approximately D.2 is many in the state context, thereas consequent with interacting interface. The large trades are provided in the state of the state of the state context of the interface of the provided interaction of the state of the state of the state of the state thereas and the state of the interface of the state thereas and the state of the PAG. Indeed the state of the state intermediate of the state.

3.015 second 4 5-bits were bright torough. The wave bright laws at its produced by the <u>Great Lakes Craship</u> toroughing System (SLC15).

for more efformation on from the FAGT insolar varies, who cancel, and what's man in reasonant and operations, will no about the Late loss MAE Tracker prop. Note: MDAA also provide an operational loss workly HAE forecast and public on the track track track of distance.

Process when the internation's <u>Descinctors and Interfaced and Programs</u> <u>Referent</u>. Hypers exclude the to provide feedback can be 1988. Therefore, are not the <u>second and and and interfaced by</u> the Composition Interface for Const. Laborat Homesonich (CCC), PD, (This is and artiCOCM survey.)

#### Latest satellite derived data used by the HAB Tracker

Senses cluster is selected as provided with a processor with the construction tents, an inductor of the solution of the constant, of the constructions associated with PARA. For the proceed solution tents the property of probability of the <u>School VARD Quantized is interacting Operator</u>. The operation later where notes as sense for the a synchronization of distorphysic states the areas in the PARA Transformation of approximation and approximate and approximate and approximate.

#### inus-tolor satalits maga of Laks bro

NASy actant environm



# Methods: Survey

#### Why conduct a survey?

- Capture initial information to inform design of workshop
- Gather feedback from a greater number of people/allow more to participate

#### Methods

Ę

- Qualtrics online survey distributed via email listservs and social media
- 14 Questions: 6 multiple choice, 1 rank question, 2 open-ended, 5 demographic
- 79 Total Respondents, 85% Completed the Survey

#### Constraints

- Not a representative sample, Exceptionally engaged citizens?
- Target audience not clearly specified, population size unknown



# **Results: Saginaw Bay HAB Forecast Survey**

#### What do stakeholders in Saginaw Bay think about HABs?

- Most respondents reported that they felt knowledgeable about HABs (77%, n=78)
- Most respondents knew that HABs occur in Saginaw Bay (71%, n=70)

Ē

- Most respondents are concerned about HABs in Saginaw Bay (87%, n=76)
- Most respondents said they would use the HAB Forecast (71%, n=70); <u>those who wouldn't</u> <u>believed HABs don't greatly affect the Bay</u>

Some awareness of Saginaw Bay HABs by stakeholders, but the problem isn't clear or broadly acknowledged.

## Results: Open Response Question

What concerns do you have about HABs in Saginaw Bay?



Code	Count	%
Beaches	32	29%
Health Risks	26	24%
Drinking Water	20	
Fishing	20	18%
Environment	17	15%
Management/Research	12	11%
Research	5	
Management	6	
Agriculture	3	3%
Total	110	100%

These are issues to explore further during the workshop discussion.

# Results: Do you think researchers should prioritize the study of HABs in Saginaw Bay?



#### Most respondents support Saginaw Bay HABs research to protect ecosystem services

Those who don't, want researchers to focus on other water quality issues that they think are more damaging to the Bay

# Methods: Workshop

 2 hr long workshop in Frankenmuth, MI

Ę

- Facilitated discussions led by semi-structured responsive interview guide
- Presentations of Saginaw Bay HAB research by NOAA GLERL Scientists
- **13** stakeholder participants recruited via email, identified through networking with key stakeholder contacts



# Results: Potential impacts of HABs on Saginaw Bay and surrounding communities



Code	Count	%
Beaches	37	44%
Management/Research	22	26%
Research	6	
Management	5	
Criticism	6	
Health Risks	9	11%
Drinking Water	6	
Fishing	7	8%
Agriculture	6	7%
Environment	3	4%
Total	84	100%

Drinking water concerns aren't as great; fewer plants draw water from Bay

Saginaw Bay has experienced bad publicity for "muck"; reluctance to add a new water quality concern because of anticipated impact on recreation/tourism/culture.

#### **Beaches**

- Tourists may choose to recreate elsewhere, impacting local economy
- Shoreline property values may decline
- Activities requiring full-body contact with water may decline: swimming, water skiing, jet skiing
- Cultural connection to the water may be tarnished







#### **Management/Research**

- Trust in water quality managers may erode due to decline in water quality
- Poor communication on the state of HABs may create undue concern
- More research is needed before effective management solutions can be recommended. Many information gaps to fill
- Confusion over when blooms may be toxic or not will result in public fear and an aversion to Saginaw Bay





#### **Health Risks**

- Tourists and locals will be at risk when they recreate during the blooms
- Although health risks may be moderate, public concern may become overinflated
- Information about potential health risks associated with the bloom will be exaggerated and citizens will over react
- Confusion regarding short term and long term impacts of exposure to HABs and resulting health impacts will create fear and an aversion to the Bay





#### **Drinking Water**

- Drinking water plants in the Saginaw Bay region may have their water compromised by toxins
- Public Water Systems may be unprepared to effectively treat HABs in drinking water
- People who drink water sourced from Lake Huron may have their health compromised
- Some regions of the Bay may be disproportionately impacted than others depending on the location of the blooms and community preparedness





#### Fishing

- Fishing is key to community culture
- Decline in fishing affects local economy: marinas, charter fishermen, sportsmen's shops, etc.
- HABs will negatively impact the Saginaw Bay Fishery
- Toxins will accumulate in fish making them unsafe to eat



#### Environment

• The affect it will have on our water and the organisms that live in and around it.

#### Agriculture

- Crops irrigated with water from Lake Erie during bloom season may become contaminated with toxins
- HABs in Saginaw Bay may further erode trust in local farmers and managers despite progress in nutrient management
- Additional pressure will be put on farmers to regulate their nutrient management





### Outcome 1: Document specific community needs for research

#### Potential Users and Uses for the Forecast

- Beach Goers: where and when to recreate
- Fishing Community: *where and when to fish*
- Public Water Systems: whether to prepare to adjust water treatment
- Agriculture: whether to irrigate crops with Lake Erie water
- Tourists: whether to visit Saginaw Bay during a particular weekend
- Beach Managers: when to schedule beach maintenance at parks
- Community Groups/Municipalities: *when to plan community activities that involve water recreation*
- Researchers/Natural Resource Managers: when to monitor HABs
- NGOs: Inform watershed management plans

Outcome 2: Identify specific questions research can address

"Which communities and drinking water plants will be affected by the blooms?

"Which areas of the Saginaw Bay are predominantly impacted by the blooms?"

"How much do different sectors contribute phosphorus to Saginaw Bay? Agriculture, urban runoff, golf courses?"

"Is the Saginaw River the primary driver of the blooms?"

#### Outcome 3: Foster community support & collaborative development

#### Stakeholder Usability Recommendations

- 1. Limit initial public release of forecast (research results sensitive to misinterpretation)
  - Emphasize that the forecast promotes continued use and access to clear water
  - Can the HAB Forecast be presented as a way to track improvement of water quality on Saginaw Bay?
- 2. Effective messaging of results
  - Interpret for general audiences
  - Don't overwhelm with too much detail
  - Define HABs and how they differ from other water quality problems
  - Provide guidance on how to interpret forecast for public health risk\*

#### Outcome 3: Foster community support & collaborative development

### Stakeholder Usability Recommendations (cont.)

- 3. Desired information
  - Explain any uncertainty in the data and measures of accuracy
  - Provide concurrent water quality parameters: water temp, winds, currents
    - Create a centralized source of Saginaw Bay Water Quality data
  - Forecast for high-use areas: water intakes, popular beaches, fishing areas, river mouths
  - Integrate forecast data visualizations with google maps
- 4. Access & Timing
  - Access via website or emailed bulletin
  - PWS need 3 days advance notice for forecast, most prefer 24 hr notice

# Conclusions

#### Stakeholder engagement improved our research by...

- Allowing us to identify specific stakeholder information needs
- Identifying specific stakeholder questions that future research can address
- Alerting us to sensitive community issues that should be considered during communication efforts

#### How can researchers engage stakeholders in their science?

• A continuum of engagement based on available resources and information needs (codesign, needs assessment, product evaluation)



# **Questions?**

# Thank you!

