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- Scott Higgins, Lew Molot, Klaus Joehnk, Raoul-Marie Couture, Kateri Salk, Jackson Tsuji, Jenn Mead ++
- HQP: Megan Larsen, Michael Kehoe, Esther McAleer, Lori Bradford, Rachel Henderson, Amir Chegoonian, Eric McQuay, Jared Wolfe.. . ++



HABs




Ecosystems and  
human communities





HABs

**Adaptation strategies in the short-term:**  
HAB forecasts  
Improved risk communications & testing



Ecosystems and  
human communities



HABs


**Management strategies for the medium-  
longer term**

Nutrient control

Physical and chemical interventions

Altered treatment/sources

....



Ecosystems and  
human communities



## **3 year goals:**

### **1) reducing current risk via**

- **improved risk communications (WP1)**
- **and forecasting (WP2)**
- **Remote sensing technology to manage risk (WP4)**

### **2) Understanding triggers of onset and collapse to inform mitigation (WP3).**

### **3) Years 4-7 – testing mitigation options (++ WP5)**

# WP1 – Improved risk communications

Scoping Review: HABs risk communications

Sept. – Dec. 2017

- Review extent of literature on risk communications for HABs
- Summarize literature
- Identify testable communications approaches for HABs in GWF context

Recruitment – Ethics - Training

Jan – April 2018

- Preparation for, and coordination of 2 MPH practicum placements

2 MPH Students: Primary data collection

April – Aug. 2018

- Assess current and planned risk communications strategies for HABs in freshwater systems



# Scoping Review Findings

## Article Characteristics

Total of 26 articles included of 2473 screened; 2002-2017; Review/Case Study/Field Sampling/CBPR/Evaluation approaches; 14 Qual. 9 Quant. 5 Mixed, 0 Decolonizing methods; Europe and USA main sites

## Themes

Key narrative exist about HABs  
Sequencing of risk messages  
Media influences outcomes  
Policy makers prefer in-person  
knowledge sharing

New immigrants and  
tourists present challenge  
Capacity institutionally and  
with social scientists  
Gender-based differences

## Recommendations

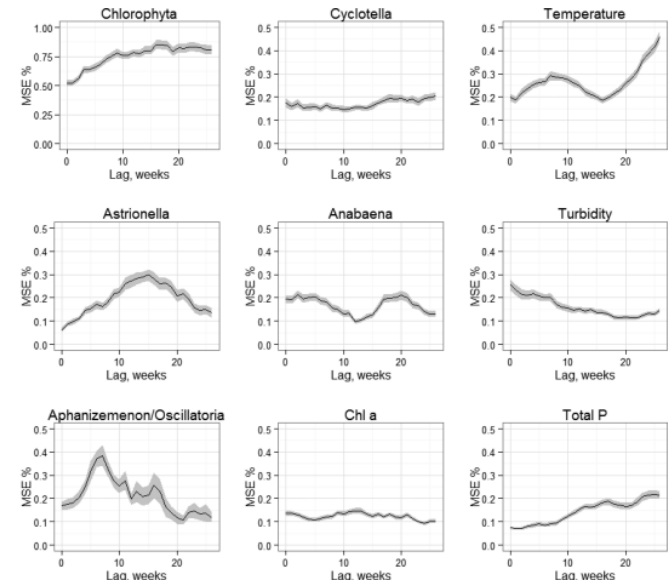
As a part of this GWF project, explore effectiveness of current and planned HABs messaging strategies in Indigenous and non-Indigenous contexts; create message maps to understand information flows; and examine current policy for gaps for freshwater HABs

# WP2 – Forecasting

- Transferrable tools for bloom forecasting, linked to real-time data and weather forecasts.
- Methods – multiple methods (machine learning, neural networks, mechanistic models) to prediction.
- Can we identify key indicators of onset across lakes?
- Best sensor suites for monitoring/prediction?
- Best approaches for prediction?

## WP4 – remote sensing

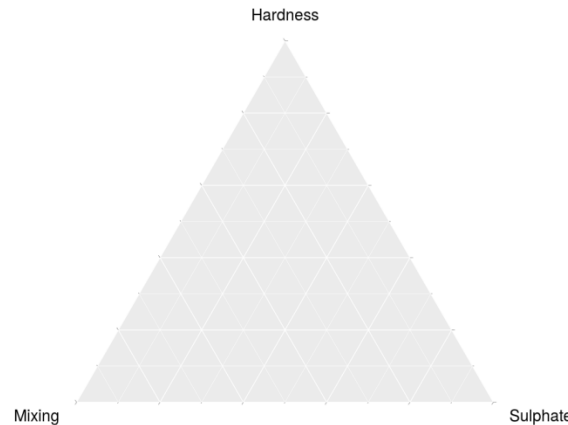
- Develop and assess retrieval algorithms for detection and mapping of blooms in small systems.





# WP3 – Drivers to mitigation

- Antecedent conditions to predict initiation, magnitude, duration and toxicity of blooms.
- Sensor-based, but also high physical intensity of sampling.
- 3 systems:  
Buffalo Pound  
ELA L227  
Conestogo Lake





# WP3 – 2017 had blooms...!



## Flood warning continues for southern Grand River, flood watch for northern Grand River

Though northern portions of Grand River under flood watch, river flows are still higher than normal, said GRCA

CBC News Posted: Jun 25, 2017 12:14 PM ET | Last Updated: Jun 25, 2017 12:45 PM ET



River flow under the Olde Bridge, Township of Westlich. Though northern portions of Grand River under flood watch, river flows are still higher than normal, said GRCA.

## Conestogo Lake being tested for blue-green algae

CBC News Posted: Jul 21, 2017 4:40 PM ET | Last Updated: Jul 21, 2017 4:40 PM ET



Conestogo Lake is being tested for blue-green algae, which can contain microcystin — a toxin harmful to humans and animals.

"Blue-green algae blooms were first noticed this week when small mats of decaying algae started appearing on the shoreline," said the Grand River Conservation Authority in a news release Friday.

"When the algae die, the toxin is released in the water where it naturally breaks down in about five to seven days."

## Swimming OK in Conestogo Lake as algae levels drop

Recreational users again warned not to go near algae mats or scum

CBC News Posted: Aug 01, 2017 3:46 PM ET | Last Updated: Aug 01, 2017 4:29 PM ET



A bloom of blue-green algae as shown by researchers near Edmonton. (University of Alberta)



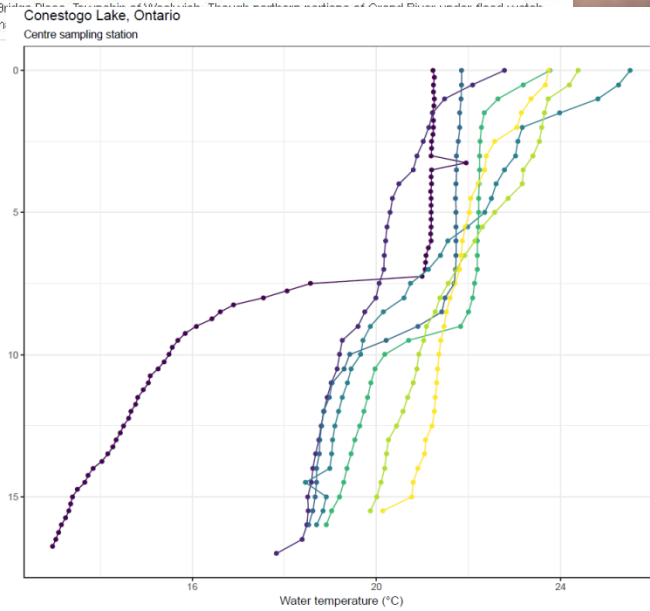
Facebook



Twitter

Test results confirm algae toxins in Conestogo Lake, which means people can once again swim and fish there, the Grand River Conservation Authority says.

The risk is low to recreational users of the reservoir.





# WP3 – 2017 had blooms...!



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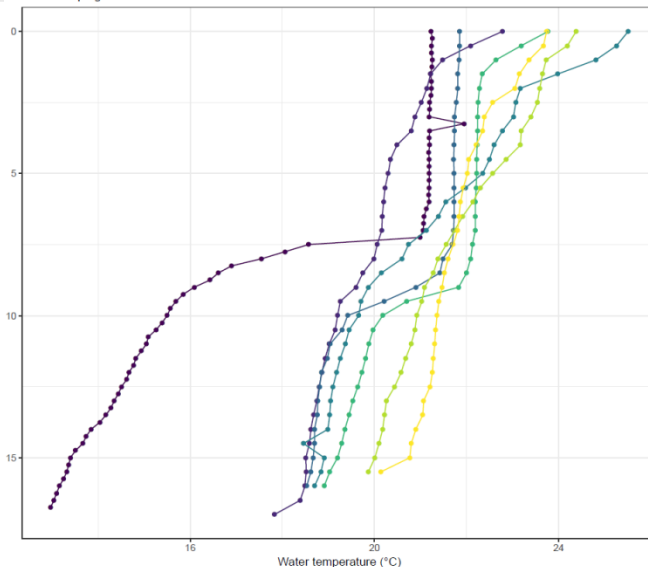
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Conestogo Lake, Ontario  
Centre sampling station



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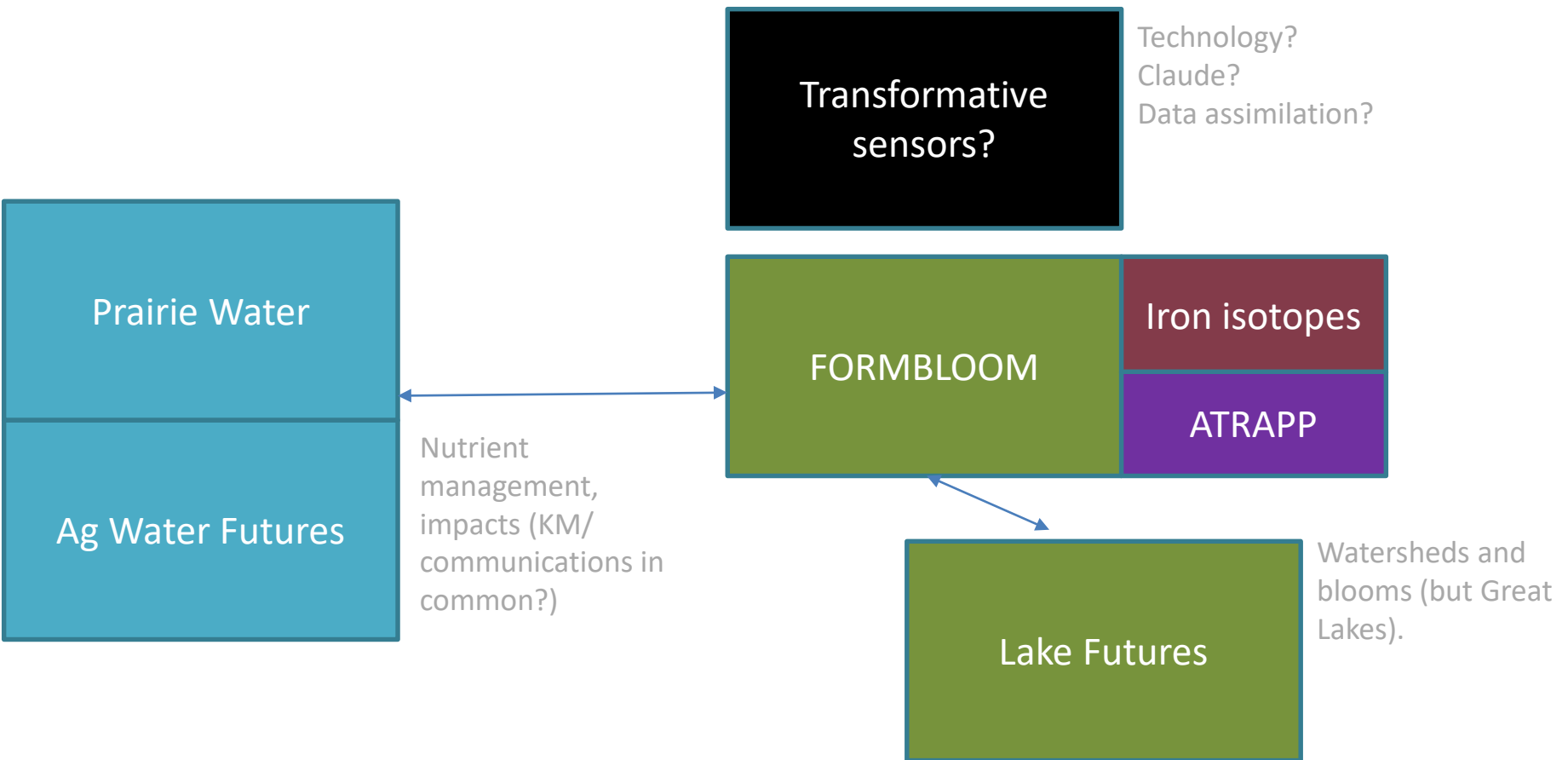
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Captured a lot, but not everything Y1.

# Foreseen collaborations with other projects and potential groupings





# Key users

- IISD ELA
- Provincial water/environment + health agencies
- GRCA
- BP Water Treatment Plant

# Links to core....

## Core support

- Waterloo technician (field– Smart watershed siting?)
- Remote sensing support.
- Prairie technician (field).
- Data
- KM (coordination needs)
- 1D lake modelling...
- Prairie/ELA drone flights?
- Data assimilation