

WORKSHOP INFORMATION PACKAGE

Introduction

Thank you for your participation in our research! We strive to bring together known information from different science and management agencies to determine aquatic monitoring indicators for cumulative effects assessment of eutrophication (nutrients) in Lake Erie's nearshore at the Grand River's estuary.



Figure 1. Study focus area on the north shore of Lake Erie's eastern basin. Map created using Grand River Conservation Authority's GIS tool.

This study is being undertaken as a collaboration between Elaine Ho (PhD research) and Denise Ding (undergraduate honours research). This study will:

1. Further develop a new approach for indicator selection and prioritization ([Criteria-Based Ranking](#), initially developed during exploratory work in Muskoka in 2016)
2. Provide a concrete example for application of theoretical principles of cumulative effects assessment from the literature
3. Demonstrate how existing frameworks may be adapted for cumulative effects assessment

We have three objectives in this study:

1. Develop a metadata database of indicators related to *Cladophora*, N, P currently being measured in the area
2. Assess indicators for use in cumulative effects assessment of nutrients

3. Contribute to a proposed estuary working group framework that helps connecting monitoring and management

What you told us

Before the workshop, we asked you to respond to two questions. Here is what we found:

Question 1: How would you assess whether an indicator is a good choice for cumulative effects assessment (i.e., criteria for indicator selection)? Describe qualities indicators should have to contribute to cumulative effects assessment (e.g., the indicator is known to influence at least one other indicator).

- What it measures
 - Measures the status of the aquatic environment
 - Is ordinal (have magnitude and defined units of measurement) or binary
 - Reflects impacts at higher or lower levels of biological organization/ecosystem function
 - Can measure multiple effects coinciding in the same space or time (i.e., multivariate interactive effects)
 - Measures the endpoint of concern directly or, if no direct measurement is possible, influences the direct endpoint (i.e., exposure to stressor or effect of interest/responsive to change)
 - Accurate enough to confidently discriminate stressor-specific effects (i.e., precise, power/replication)
- Related data or information
 - Is measured with other parameters to incorporate stressor (physical/chemical) and effect-based (biological) indicators
 - Processes that determine the condition of the indicator (i.e., influence change in the indicator) are understood
 - Discernible significance to multiple environments (e.g., land, air, water) and/or trophic levels for species of interest (i.e., tied to the health of other organisms or measurable parameters)
 - We have knowledge of normal or desired conditions and variability of the endpoint
 - We have baseline data in the study area: Grand River estuary and/or nearshore of Erie's eastern basin (north shore)
 - Can be used with other indicators to build evidence re: environmental impacts
- Other qualities
 - Responds predictably (for modeling)

- Is related to one or more VECs/priorities (i.e., is relevant) and is backed by research to be a good indicator of each VEC/priority
- Conceptually simple enough for broad dissemination (i.e., interpretable by non-technical audience)
- Dataset that is meaningful (i.e., enough data) and useful (for calculating) is not too onerous/costly to assemble
- Analyses for cumulative effects assessment using this indicator are known/established/feasible
- Influences at least one other indicator
- Specific, measurable, achievable
- Measurable responses and/or mitigation measures are in place
- Timely - can demonstrate change within a management timeframe
- A systems diagram or model, which illustrates cumulative effects throughout the system (from initial drivers to endpoints), has been created or is possible to create with data we have

Question 2: What nutrient-related issue(s) do you manage, and how do you measure it? In other words, what do you currently monitor related to nutrients and eutrophication?

- View the editable metadatabase [here](#).
 - Please do not make any changes except to correct information or to add to the metadatabase
 - This Google Sheet will remain online until December 31, 2020

Logistics

We will meet virtually using Microsoft Teams via [this link](#), following the agenda on page 4 of this package. You should have received an invitation with a link to join the meeting. Please contact Elaine at e23ho@uwaterloo.ca if you have not received this, or if you have any problems accessing the meeting. We will open the meeting at 8:45am for troubleshooting.

The [Chatham House Rule](#) applies: "...participants are free to use the information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed." In other words, anyone can use or share ideas, lessons, or high-level information without any kind of attribution or identifying information.

We will write and share a workshop summary report with you. We will record our meeting in case we need to revisit any part of the conversation as we write the summary report. This

recording is for note-taking purposes only (recordings will not be shared and will be deleted upon report finalization). We will also have a scribe (designated note-taker), who will respect the Chatham House Rule. Please note, all documents and outcomes related to this study will be available on the study website, www.GrandErieStudy.ca, until at least April 2021.

Agenda

9:00-9:10 OPENING (welcome, logistics, purpose, definitions, questions)

9:10-9:55 DISCUSSION 1

- What is currently being measured to understand the issue of nutrients? What do these indicators tell us? What do we still need to learn?
- If someone were to tell you they are assessing cumulative effects of nutrients and algae in the area, what does this mean to you? (i.e., Are we all on the same page?)

9:55-10:15 ACTIVITY (instructions and completion)

10:15-10:45 DISCUSSION 2

- What indicator or set of indicators should be monitored for understanding cumulative effects related to nutrients?

10:45-11:00 BREAK

11:00-11:40 DISCUSSION 3

- How would you measure/use these indicators in cumulative effects assessment? How would you analyze the data? What challenges do you foresee?

11:40-11:55 OPEN DISCUSSION

- Is there anything else anyone wishes to discuss? Any closing thoughts, takeaways, next steps, or other comments?

11:55-12:00 CLOSING

Workshop Activity

Please complete the workshop activity and submit it *by 10:15 am* on December 7. You will have 15 minutes during the workshop to complete this activity, but you will likely need more time (we estimate 20-25 minutes); we recommend completing this ahead of time (which means you can use the 15 minute activity time to take an extra break).

Complete the activity using the excel sheet provided and the instructions below.

General instructions

- Please complete this activity *independently*, based off your own knowledge and/or experience, without consulting with any other persons or materials.
- Do not include your name anywhere in the file. Tables will be copied/merged with other tables for summation, at which point responses must be anonymous.
- Email your completed activity to Elaine at e23ho@uwaterloo.ca *by 10:15 am* on December 7 (she will compile responses and share results, ideally by the end of the workshop but we will see if everyone gets them in on time).

Filling in the table

You will see 22 criteria in the left column and 18 indicators along the top row. Criteria and indicators were gleaned from the collective responses of all participants (including those who cannot make the live workshop). In the intersecting cell, please type in your rating on a scale of 1-5:

- “1” = the indicator does not meet the criterion at all
- “5” = the indicator fully meets the criterion

Rank the indicators using only the criteria you agree should be used in cumulative effects assessment. *If you do not think a criterion is relevant for this exercise, please leave the row blank.*

Thank you for your participation!