



A monitoring-management framework considerate of cumulative effects for the lower Grand River and nearshore Lake Erie



Monitoring-management framework considerate of cumulative effects for the lower Grand River and nearshore Lake Erie


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Background

This research strives to propose a process framework – i.e. a design guide with potential program components – for water monitoring in the estuary of the Grand River and nearshore Lake Erie. Monitoring program goals include:

- Consider cumulative effects
- Be co-created by diverse stakeholders
- Clearly connect to management and decision-making



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Method

We implemented Community-based Participatory Action Research (CBPAR) in six phases:

- Exploratory research (Jan-Aug 2016): A new criteria-based ranking process for selecting and/or prioritizing indicators was developed and tested.
- Monitoring review (Sep 2018-Aug 2019): Nine programs were evaluated per 22 criteria, based on literature and key informant interviews.
- Key informant interviews (Oct 2018-Oct 2018): Water managers, monitoring personnel

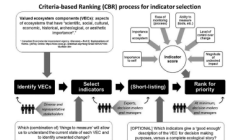
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Research outcomes

Criteria-based Ranking

We redesigned the **Watershed Report Cards** program (communicating water health) produced by Muskoka Watershed Council and created a more inclusive way of selecting monitoring indicators (i.e. 'what to measure').

The Criteria-based Ranking process is a helpful and efficient approach for standardizing indicator selection and incorporating diverse perspectives.



More on this process is described in the engagement presentation found in the box to the right. You can read more about this process in [this Short publication](#).

Monitoring review - manuscript in revision (contact for information)

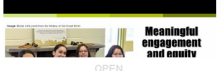
High-level results:

- All programs incorporated Western knowledge frameworks.
- Areas to improve: roles are unclear, community-based monitoring is weak or non-existent and where it is implemented there is little funding.

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Meaningful engagement in research and practice


In addition to research outcomes specific to water monitoring and management, this research provides insight into approaches for meaningful engagement in research and practice. Below is a 10-minute presentation of considerations for creating meaningful engagement in co-created research and practice.




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Moving forward

The complete process framework will be drafted ahead of the water managers meeting. We are currently engaging with potential attendees to determine whether a virtual or in-person meeting is preferred, which will determine when this year the meeting will be held. At this time, the simplified process framework looks something like this (note: this is evolving as analyses are completed and each component will be discussed in more detail at the meeting).



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PRESENTED AT:



3rd Annual Open Science Meeting
GWFF2020



BACKGROUND

This research strives to propose a process framework -- i.e., a design guide with potential program components -- for water monitoring in the estuary of the Grand River and nearshore Lake Erie. Monitoring program goals include:

- Consider cumulative effects
- Be co-created by diverse stakeholders
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Challenges with current monitoring

- Fragmented, uncoordinated monitoring
- Guided only by Western Science
- Community views often excluded from meaningful process engagement
- Multiple jurisdictions (federal in Lake Erie, provincial and/or local in the Grand River... responsibility in the estuary is often unclear).

There are also a number of important treaties to recognize here, which are not acknowledged in current monitoring and management regimes (click on the image to open a downloadable PDF (https://6ff4e7e4-cc7a-4c33-9790-a58aef3bc978.filesusr.com/ugd/536b70_9e0e52258ff54321b716f87444ce8a44.pdf)):



Above: Grand River Watershed (created using Grand River Conservation Authority mapping tool).

Below: The Haldimand Tract. Map adapted by Alternatives Journal from Six Nations Lands and Resources, map data from openstreetmap.org.



(https://6ff4e7e4-cc7a-4c33-9790-a58aef3bc978.filesusr.com/ugd/536b70_9e0e52258ff54321b716f87444ce8a44.pdf)

Shared Spaces?

The Grand River Watershed (outlined above) is Southern Ontario's largest and most populated watershed. However, many of its residents are unaware of historical agreements made between the area's Indigenous peoples and settlers (now Canadian society). The **Two Row Wampum** (beaded belt) is one of the oldest treaty relationships between the Onkwehonweh (original people) of Turtle Island (North America) and European immigrants. The treaty was originally made between Dutch traders and settlers and the Haudenosaunee (Iroquois, or Six Nations) peoples in 1613. According to an interpretation by historian Ray Fadden, the rows:

"...symbolize two paths or two vessels, travelling down the same river together. One, a birch bark canoe, will be for the Indian People, their laws, their customs, and their ways. The other, a ship, will be for the white people and their laws, their customs, and their ways. We shall each travel the river together, side by side, but in our own boat. Neither of us will make compulsory laws nor interfere in the internal affairs of the other. Neither of us will try to steer the other's vessel."

The **Dish With One Spoon** is a treaty between the Anishinaabe, Mississaugas and Haudenosaunee—and later, Europeans and all newcomers—that bound all parties to share and protect territory and its resources. Although commonly referring to the treaty signed in Montreal in 1701, the Dish with One Spoon was an Indigenous covenant dating as far back as 1142. The "Dish" (sometimes called the "Bowl") represents what is now southern Ontario, from Lake Simcoe to the Great Lakes to Quebec's border (including the north shore of St. Lawrence River). The "Spoon" may represent resources within that dish. Since we all eat out of this One Dish with One Spoon (e.g., shared resources), we all have a responsibility to ensure the dish never empties - to take care of the land and preserving the creatures we share it with.

Nearly a century later, Québec governor Sir Frederick Haldimand signed a decree on October 25, 1784 that granted a tract of land to the Haudenosaunee to enjoy forever. This decree—the **Haldimand Proclamation**—designated six miles (~10km) on either side of the Grand River from its source to Lake Erie to the Six Nations forever.

The Six Nations lost their territory in New York due to their alliance with British forces during the American Revolution; the Haldimand Tract was compensation for their loss. However, only about 5% of the Haldimand Tract remains in the hands of the Six Nations peoples. The Six Nations reserve is the only place in North America where all six nations—Mohawk, Cayuga, Onondaga, Oneida, Seneca and Tuscarora—reside.

The treaties described above represent three historical promises to share the Grand River Watershed and surrounding areas with Indigenous peoples:

- (1) To collaboratively maintain the health of lands, waters and animals;
- (2) To recognize distinct but equally valued cultures living together but separately, without interference from each other; and
- (3) A Declaration placing land under the permanent authority of the Six Nations.

To this day, **none** have been fulfilled.

METHOD

We implemented Community-based Participatory Action Research (CBPAR) in six phases:

- **Exploratory research (Jan-Aug 2016):** A new Criteria-based Ranking process (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6205341/>) for selecting and/or prioritizing indicators was developed and tested.
- **Monitoring review (Sep 2018-Aug 2019):** Nine programs were evaluated per 22 criteria, based on literature and key informant interviews.
- **Key informant interviews (Oct 2018-Oct 2019):** Water managers, monitoring personnel and other subject matter experts were interviewed to shed light on how water monitoring can be improved, and how monitoring and management can be better-connected.
- **Public engagement via the arts (Jun 2019-Apr 2020):**
 - Canadian and Indigenous community members were engaged through Great Art for Great Lakes (<https://greatnessglp.com/GAGL/>) program (2019) - five series of public workshops, each teaching a different artistic medium, to collaboratively create a permanent public art installation in each community. Lake Erie is the focus on the 2019 and 2020 program.
 - Youth from Six Nations of the Grand River were engaged through Music for the Spirit and Indigenous Visual Arts program. The youth contributed to the Grand Expressions art exhibit (virtual tour online (<https://www.granderiestudy.ca/tour>)). The collage on this poster provides examples of youth artwork, in addition to an art installation (<https://www.granderiestudy.ca/post/port-dover-has-a-fishy-new-mascot>) (plastic and mosaic sturgeon) from Great Art for Great Lakes.
- **Water managers workshop (TBD 2020):** Current water managers and subject matter experts will be invited to review the research and engage in co-creating the final monitoring-management process framework.

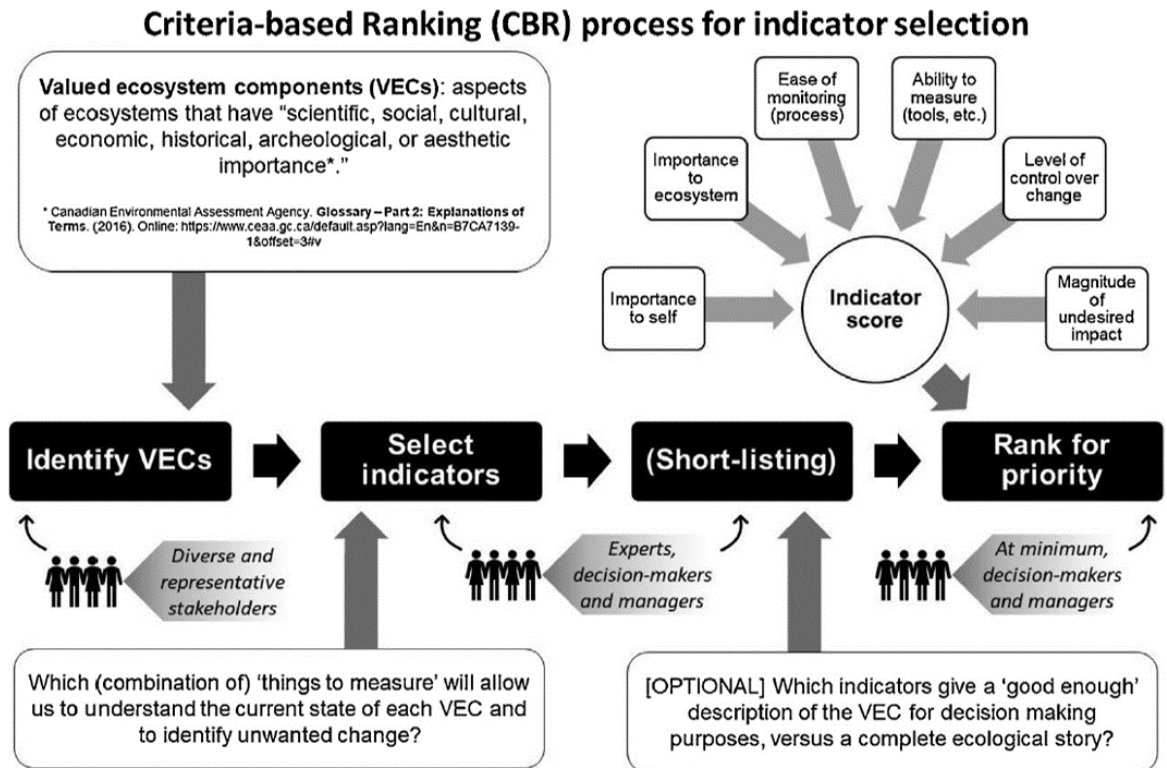
In addition: Participant observation (e.g., water manager meetings, conference workshops – throughout study); document and literature review (throughout study).

RESEARCH OUTCOMES

Criteria-based Ranking

We redesigned the Watershed Report Cards program (<https://www.muskokawatershed.org/programs/report-card/2018-report-card/>) (communicating water health) produced by Muskoka Watershed Council and created a more inclusive way of selecting monitoring indicators (i.e., 'what to measure').

The Criteria-based Ranking process is a helpful and efficient approach for standardising indicator selection and incorporating diverse perspectives.



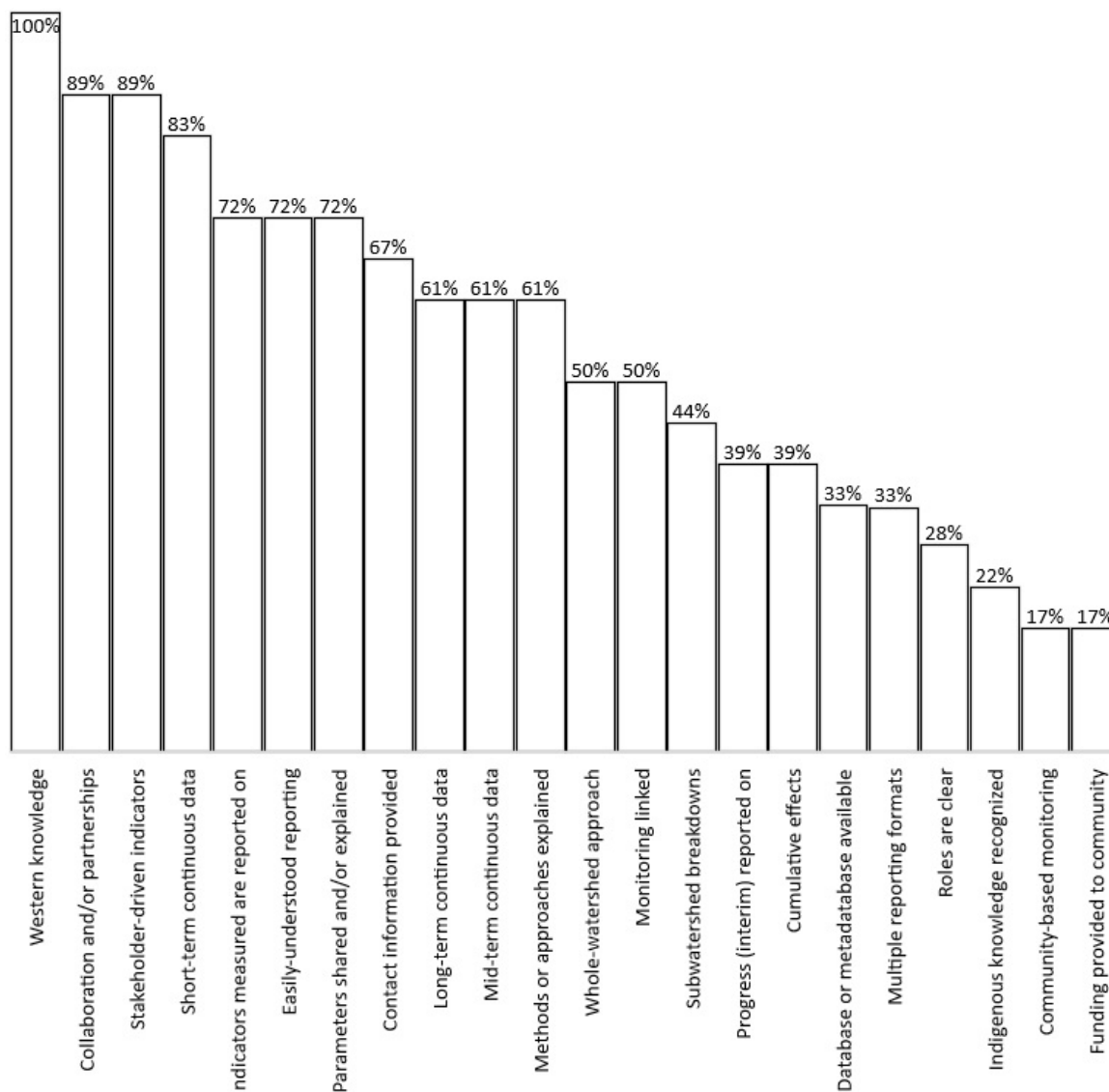
More on this process is described in the engagement presentation found in the box to the right. You can read more about this process in this short publication (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6205341/>).

Monitoring review - manuscript in revision (contact for information)

High-level results:

- All programs incorporated Western knowledge frameworks.
- Areas to improve: roles are unclear, community-based monitoring is weak or non-existent and where it is implemented there is little funding provided to community members to execute it.

Programs that scored on each of the criteria are as follows:



Conclusions:

- Monitoring is generally technically-sound, but socially disconnected
- Design and implementation should be more coordinated and inclusive of diverse views and needs

Recommendations (described in manuscript):

- Recognize different knowledge approaches (especially Indigenous)
- Use multiple reporting formats
- Clarify monitoring and management roles
- Apply a whole-watershed approach
- Improve linkages between monitoring, management and decision-making

Key informant interviews (early conclusions)

- Monitoring and decision-making are not well-connected. Institutional barriers (and approaches to address these) exist.
- Optimized partnerships and coordinated collaboration (increased capacity, decreased redundancy) are imperative.
- Multiple forms of inquiry (e.g., approaches to analysis, integrating Indigenous knowledge) and reporting should be applied to monitoring data.
- Few examples of monitoring programs considerate of cumulative effects exist.

Public opinions (arts programming)

Participants in Great Art for Great Lakes shared their thoughts on priorities, problems and solutions regarding the Grand River and Lake Erie. The summary report is available on the research website (here (https://6ff4e7e4-cc7a-4c33-9790-a58aef3bc978.filesusr.com/ugd/536b70_0866794f920b419baec1e73a67d57da0.pdf)). A high-level summary of results is visualized below; larger boxes are items that had more responses. Overall, these priorities differ from water managers' discussion in that they were largely experience-based and are not as easily quantifiable by traditional water monitoring programs.



Following Great Art for Great Lakes, young Indigenous artists created artwork and wrote accompanying stories to share their perspectives with water managers and the public. These works were compiled into a virtual tour (<https://www.granderiestudy.ca/tour>); the live traveling exhibit was postponed due to COVID-19 (thus, dates in the poster below are obsolete), but we are excited that each of our wonderful venues is eager to reschedule in the upcoming months!

Grand Expressions

Water-themed creations by Indigenous youth

March 20: Ken Seeling Waterloo Region Museum, 10 Huron Road, Kitchener – Water for All/Soupfest, main lobby. Free parking, paid access.



March 23-April 3*: Cambridge Centre for the Arts, 60 Dickson Street, Cambridge – 1st floor, amphitheater hallway. Free parking at City Hall, free access.



April 6-17: Waterloo Indigenous Student Centre, St. Paul's University College, 190 Westmount Road N., Waterloo – room 228. Paid parking, free access.



April 29-May 24: THEMUSEUM, 10 King Street W., Kitchener. Paid parking, paid access.



May 26-28: Ken Seeling Waterloo Region Museum, 10 Huron Road, Kitchener – Waterloo-Wellington Children's Groundwater Festival, Shuh Barn. Free parking, paid access.



June 2-19: University of Waterloo School of Environment, Resources and Sustainability, Environment 2 building – room 2022. Free 15-minute parking/paid longer-term parking, free access.



Artist: Ashley Cotyisse

www.GrandErieStudy.ca/arts



Artist: Thomas Anderson



Artist: Adricano Johnson



Artist: Steve Johnson



Artist: Hannah Wallace-Lund


Organized in partnership between Music for the Spirit & Indigenous Art and Elaine Ho, PhD Candidate, University of Waterloo



GRAND EXPRESSIONS

A self-guided tour of the youths' traveling exhibit

Download the virtual tour




Rogue Wave (Series: *Plastics pollution*)
Painted paddle, 5.5" x 57"
Steve Johnson

Series:
Plastics pollution
Steve Johnson

These works highlight the problem of garbage infested waters around the world.

I wanted both of them to look beautiful enough to draw the viewer in so the message would be perceived and remain in mind. Rogue Wave is inspired by Japanese art while Plastic Beach is from my own style developed after years of practicing neo-traditional tattoo art and design. This is to display the problem is not only an issue across the world but one close to home as well.



Plastic Beach (Series: *Plastics pollution*)
Ink, 11" x 17"
Steve Johnson

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Further information

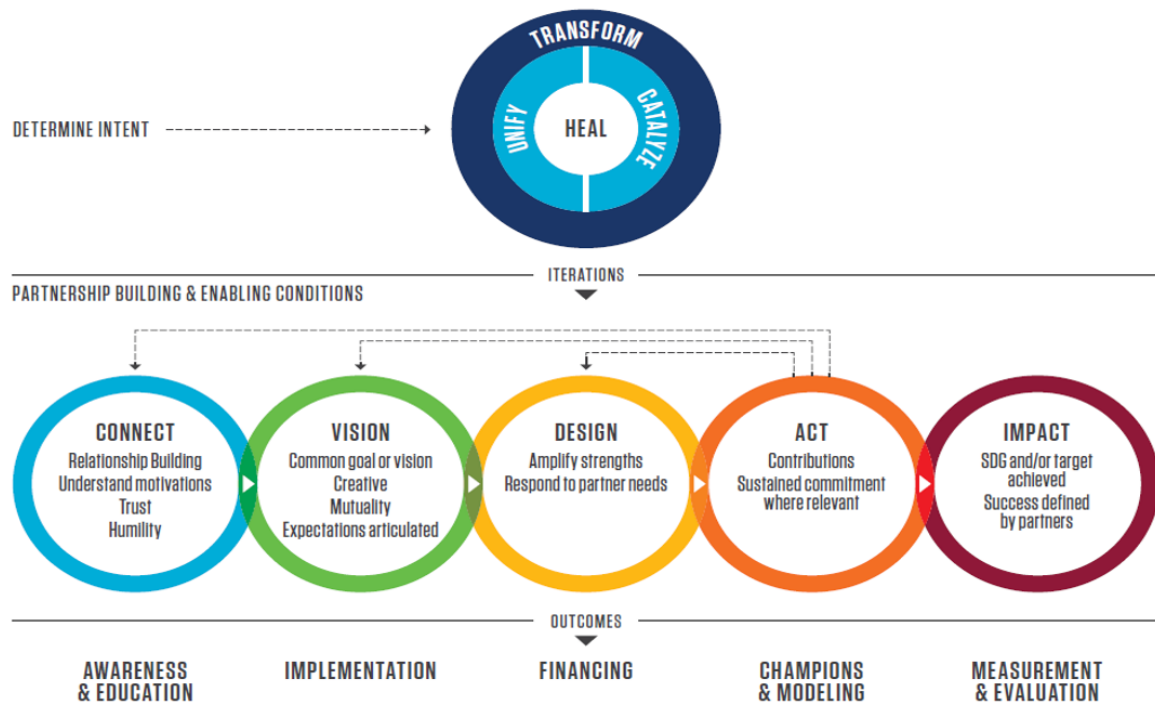
The key informant interview data and stories from Indigenous youth (via the Grand Expressions art exhibit) are currently being analyzed. All information from this study is available on the resources page (<https://www.granderiestudy.ca/study-publications>) of the research website (www.GrandErieStudy.ca).

MEANINGFUL ENGAGEMENT IN RESEARCH AND PRACTICE

In addition to research outcomes specific to water monitoring and management, this research provides insight into approaches for meaningful engagement in research and practice. Below is a 10-minute presentation of considerations for creating meaningful engagement in co-created research and practice.

[VIDEO] https://www.youtube.com/embed/C01G1_uRLGs?feature=oembed&fs=1&modestbranding=1&rel=0&showinfo=0

Complementary to this research, *Generation SDG: a Blueprint* (http://wgsi.org/sites/wgsi-live.pi.local/files/GenerationSDG-Blueprint-WGSI_2018.pdf) for Canada's implementation of the Sustainable Development Goals (SDGs) has a variety of resources that are helpful in this context. For example, below is the Adaptive Partnership Framework found on page 26, which was designed for cooperation regarding the SDGs, but which has many uses in this research context.

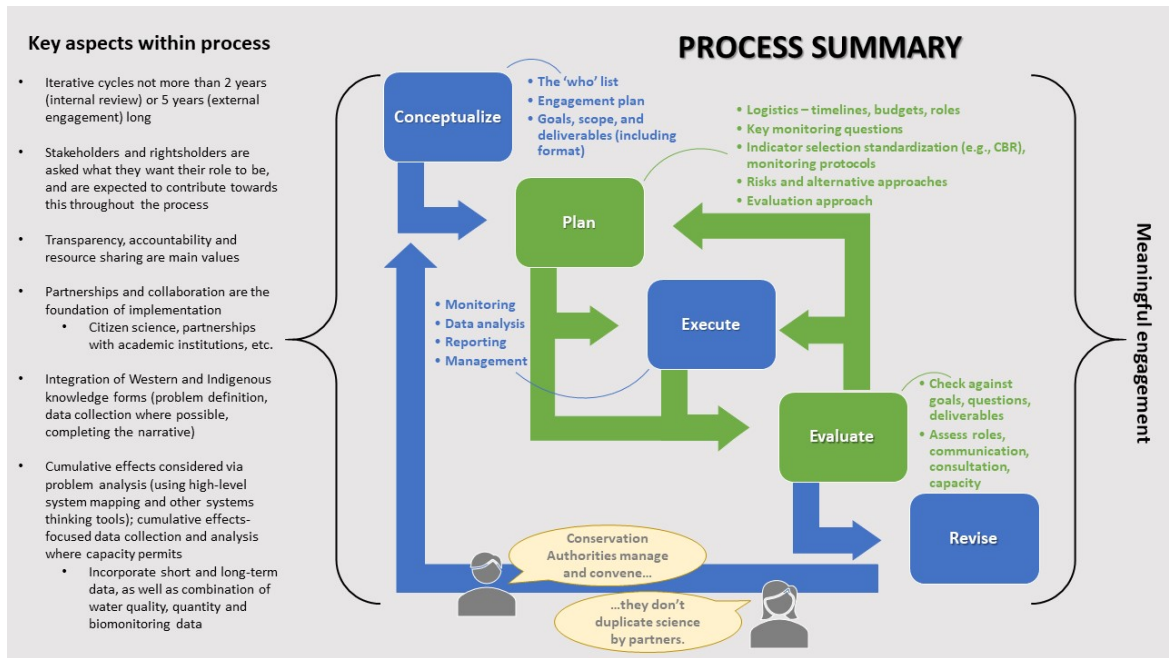


You can watch a video of Elaine's 11-minute talk at the Blueprint launch (November 2018 at the *Together 2018* national conference), which was the foundation of the engagement presentation above:

[VIDEO] <https://www.youtube.com/embed/29O0vCawdr?feature=oembed&fs=1&modestbranding=1&rel=0&showinfo=0>

MOVING FORWARD

The complete process framework will be drafted ahead of the water managers meeting. We are currently engaging with potential attendees to determine whether a virtual or in-person meeting is preferred, which will determine when this year the meeting will be held. At this time, the simplified process framework looks something like this (note: this is evolving as analyses are completed and each component will be discussed in more detail at the meeting):



Coming soon: a more detailed framework! Check back at the end of June. If you have feedback or questions regarding this framework, please contact Elaine (e23ho@uwaterloo.ca).

ABSTRACT

Water monitoring and management can be viewed as endeavors to understand how our interactions with the water system affect the health of the aquatic ecosystem as well as effects on the economic, cultural and biophysical health of our communities. One of the conclusions of our exploratory research – evaluating monitoring indicators in the Muskoka River Watershed – was that current monitoring does not adequately incorporate diverse stakeholder and rightsholder perspectives.

In this research, scientists and water managers were first interviewed to identify opportunities for improving and connecting monitoring and management in Ontario. Second, the Great Art for Great Lakes initiative hosted workshops that engaged with nearly a thousand Canadian and Indigenous community members of all ages to create a permanent art installation while collecting their thoughts on problem areas and potential solutions in their watershed; this study received feedback from 133 individuals. Third, a partnership with Music for the Spirit & Indigenous Arts engaged Indigenous youth from Six Nations of the Grand River to create a traveling exhibit that demonstrates the youths' relationships with water through photography, paintings, drawings and more.

These methods, in addition to participant observation, contribute to the creation of a new monitoring-management framework considerate of cumulative effects in the Grand River/Lake Erie estuary. This presentation highlights approaches for including diverse stakeholder and rightsholder perspectives for water monitoring and management. Results from a monitoring review and engagement via the arts are shared.