

Integrating aquatic monitoring and management in Ontario, Canada

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1. Research context

About

- Canada monitors water a lot (good methods).
- Programs and practices are disjointed/fragmented.

Question

- How can the monitoring of water resources be implemented to more effectively integrate science and policy in long-term planning, management and decisions?
- How can government manage freshwater resources better, and how can scientists inform that management better, in a rapidly changing world?

Focus

- Dynamics of past and present water monitoring and management/decision making.
- Improve monitoring and reporting to make long-term planning more effective: what changes are needed?

2. Exploratory study

About

- *Partner:* Muskoka Watershed Council
- *When:* Jan-Aug 2016 (follow-up Sept-Dec)
- *Why:* integrating science and management for climate resilience of Muskoka River Watershed
- *How:* document reviews, workshops, conference discussions, and expert discussion.
- *Citation:* Ho, Eger, & Courtenay, 2016.

Main results

1. Monitoring data are used and reported inconsistently;
2. Duplication of research occurs, prioritization and a metadata database are needed; and
3. Stakeholder engagement is inadequate throughout the process.

3. A new way to prioritize monitoring indicators

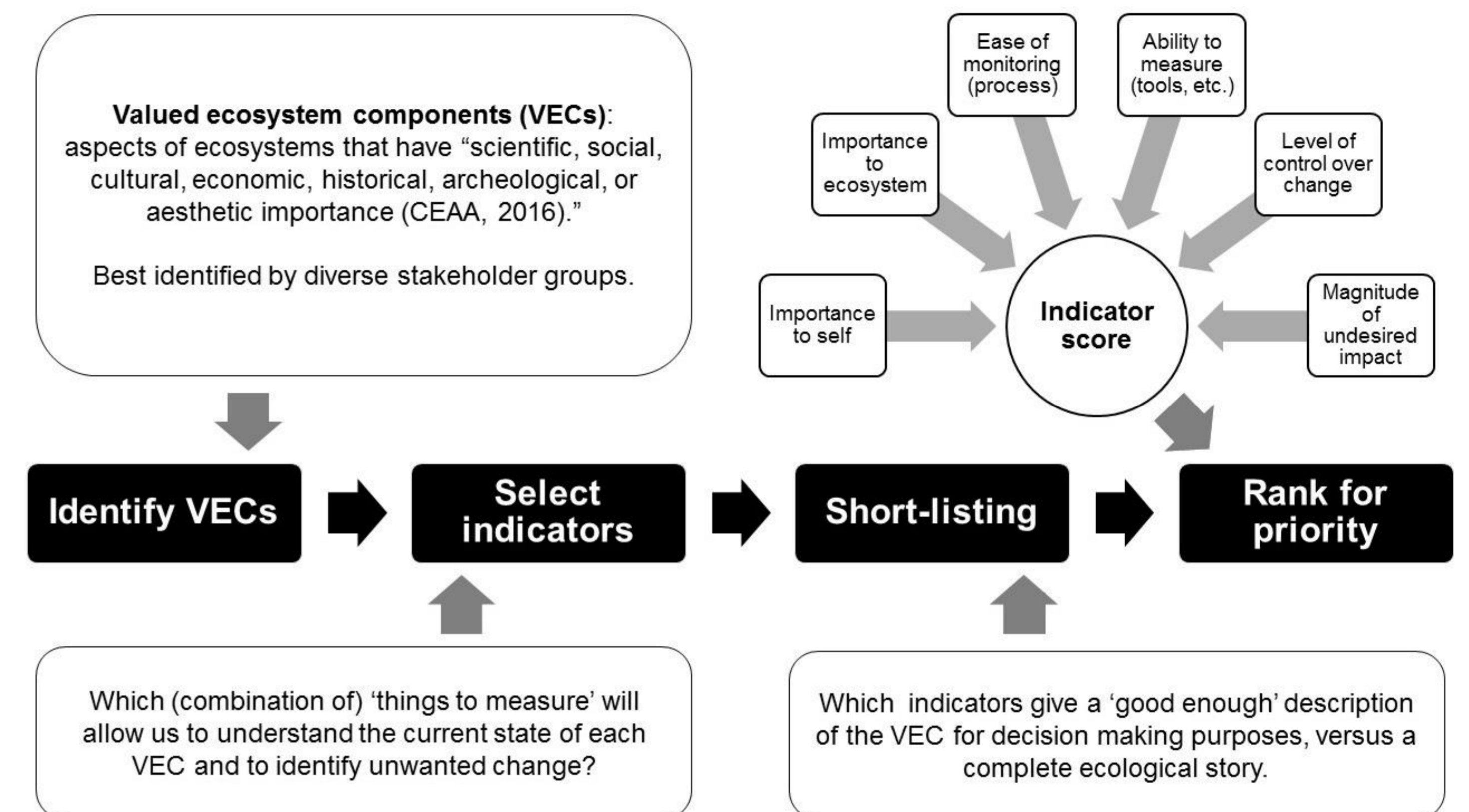


Figure 1. Process for selecting and prioritizing indicators, as tested in a workshop with the Muskoka Watershed Council on August 5, 2017.

4. Determining direction: Integrating monitoring and decision making

- Success of water monitoring linked to ability of decision makers to act on information. When an issue arises, what direction should be taken?
- Goal of monitoring and management: strengthen socioecological sustainability; resilience is often the only feasible option in current systems.

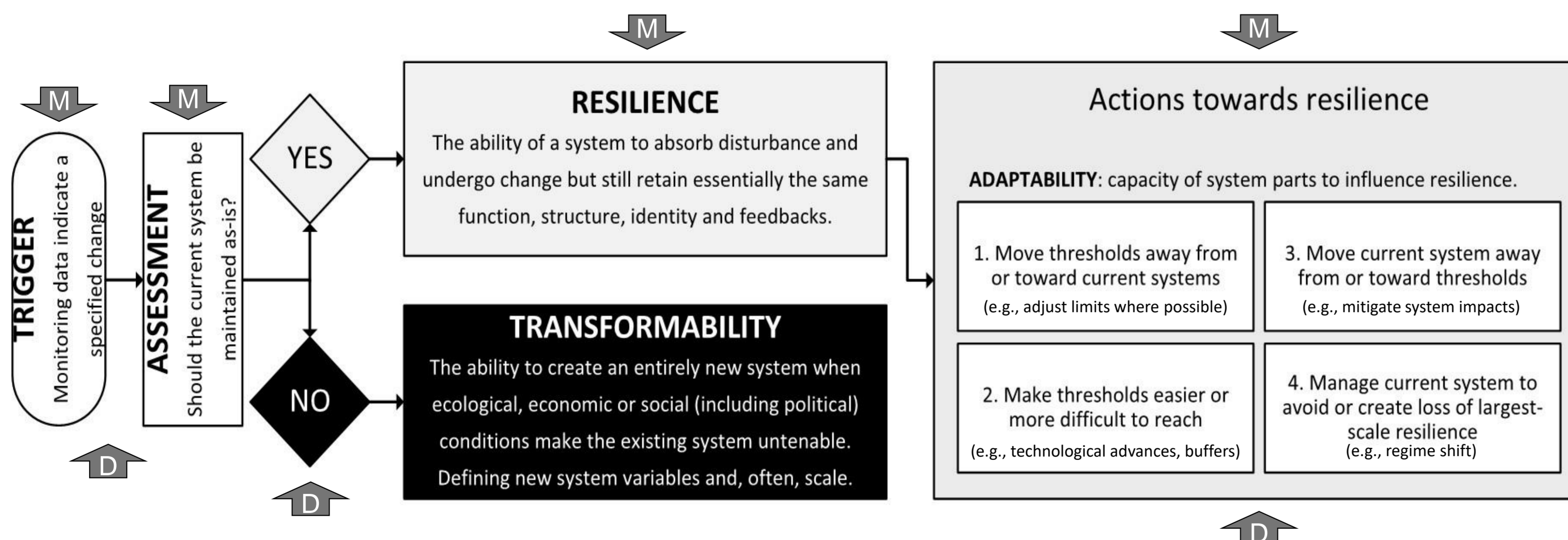


Figure 2. Integration of monitoring and decision making in a sample decision process - in particular, determining the direction to take when considering alternatives - under a sustainability framework. Arrows with "M" indicate monitoring roles, those with "D" are management/decision roles. Adapted from Walker et al. (2004).

5. Conclusion

- The roles of monitoring and decision makers should be explicit at the start of program design. Clarity is required on: purpose, goals, needs, capacity, outcomes, and protocols for issue response.
- Addressing misaligned timelines regarding scientific research, communication to decision makers, and response to issues are opportunities for improvement in monitoring-decision dynamics.
- Critical analysis of the roles of leadership and the way we structure socio-economic interrelationships is needed for systemic transformation towards sustainability.
- Meaningful stakeholder engagement and consideration of stakeholder perception must be improved, from the start and throughout the process.
- Co-creation of the aquatic monitoring and management framework involving decision-makers, technical experts (e.g., scientists), and those who will be affected by the decisions made is needed.

Sources cited

- Canadian Environmental Assessment Agency [CEAA]. (2016). *Glossary*. Retrieved from <http://www.ceaa.gc.ca/default.asp?lang=En&n=B7CA7139-1&offset=3#v>.
- Ho, E., Eger, S., and Courtenay, S. (2016). *Building Stronger Social and Ecological Communities in the Muskoka Watershed*. A report submitted to the Muskoka Watershed Council.
- Walker, B., Holling, C. S., Carpenter, S. R., and Kinzing, A. (2004). Resilience, Adaptability and Transformability in Socio-ecological Systems. *Ecology and Society* 9(2): 5. [online] URL: www.ecologyandsociety.org/vol9/iss2/art5/.