



CANADIAN WATER NETWORK  
RÉSEAU CANADIEN DE L'EAU



*Muskoka*  
WATERSHED COUNCIL

# Monitoring and Reporting in Canadian Watersheds: Recommendations from a Muskoka, ON Case Study

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A presentation to South Nation  
Conservation

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# Introduction: The Muskoka Watershed Council

- MWC: non-regulatory, multistakeholder
- Main documents reviewed in our study:
  - 2003 Indicators of Watershed Health (Executive Summary and Full Report)
  - 2004 WRC and 8 Background Reports
  - 2007 WRC and Background Report
  - 2009 Progress Report Card and Background Report
  - 2010 and 2014 WRCs, Background Reports, and Subwatershed Report Cards

# Who makes up MWC?





# What did we do?

- **Elaine**: Report Cards and Background Reports
- **Sondra**: Canadian Water Network's (CWN) Canadian Watershed Research Consortium (CWRC)
- **Both**: case studies and literature



# Vocabulary

**Cumulative Effects:** changes to all aspects of the environment by past, present and reasonably foreseeable future actions (both natural and human).

**Cumulative Effects Assessment and Monitoring (CEAM):** process of monitoring, tracking and predicting accumulating change relative to established limits.

# Vocabulary

**Trigger:** the point at which some action is required; an indication that a predefined course of action (a response) is needed.

**Threshold:** a tipping point outside of which the state of a system or organisms changes. Could simply be defined as a change in the system, or a shift from the normal baseline.

**Resilience:** ability to function in a healthy or normal way despite a disturbance.





# Lessons from the CWRC

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- **Integrated, adaptive monitoring:** multiple forms of data; iterative approach
- **Data management:** fewer indicators and locations; standardize approaches
- **Leadership capacity:** administrative responsibility remains a challenge
- **Use of results:** triggers; indicators and goals; connect locally

# CWRC summary

- **Stakeholders** must agree on what and how to measure
- Administrative challenges remain (who owns and manages **data**)
- Compare results with **limits** or **benchmarks**
- See our **Report Summary** for learnings from Ontario case studies



# Monitoring in the Muskoka Watershed

- **Some indicators:** phosphorous, calcium, E.coli, dissolved organic matter, species composition, shoreline development, road salt runoff, and the amount of recreational and industrial development (Eimers, 2016)
- **New priority:** understanding long-term trends and identifying upcoming issues (climate change); CEAM considered

Source: Eimers, C. (2016). *Cumulative effects assessment and monitoring in the Muskoka Watershed*. Report to the Canadian Water Network.



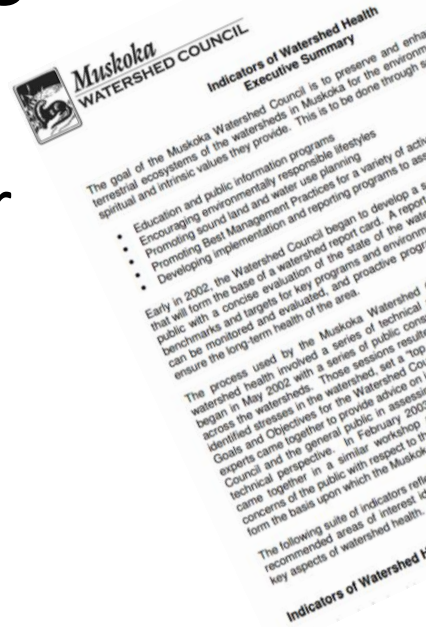
Summary of indicator ratings on a scale of 0 (least agreement) to 35 (strongest agreement) based on seven respondents. Results from a workshop on August 5, 2016, with the Muskoka Watershed Council.

Criteria	Secchi Depth	Algae	Calcium	Land Use	Wetland cover	Footprint (new)
I would include this indicator, by this or other name, in the Report Card (e.g. not just in the Background Report)	17	31	23	33	32	27
This indicator is measurable given reasonably expected resources (tools, people, funds, time...)	33	22	25	30	25	20
We have control over changes to this indicator	18	20	18	27	24	23
We have effective mechanisms for correcting CURRENT unwanted changes to this indicator	16	19	16	25	19	20
We have effective mechanisms for correcting FUTURE unwanted changes to this indicator	20	21	17	27	21	20
Unwanted changes to this indicator would result in serious impacts (directly or indirectly) on ecological and human systems.	22	31	27	31	28	30
This indicator is important to me	24	31	25	34	31	28

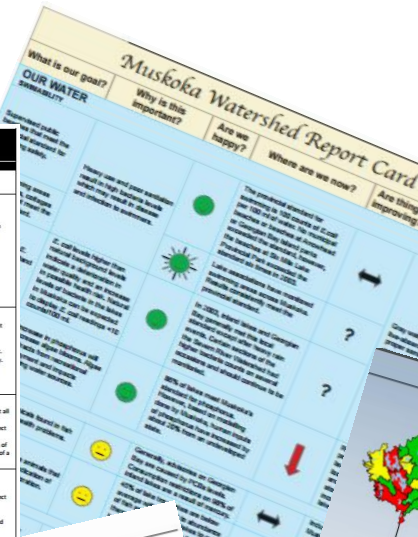
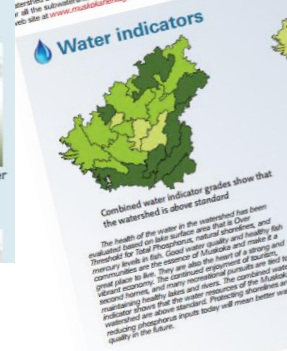


# MWC Report Cards Conclusions and Challenges

- Not enough congruence or continuity in Report Card
- Background Reports more consistent but overwhelming to average citizen



Goal	Why is it important?	Current Situation	Are things improving?	Required Action
Protect Shoreline Vegetation	Shoreline vegetation: Promotes lakes from erosion and trees chemicals. Provides wildlife habitat and protects water quality. One municipality adopted a development permit for shoreline vegetation. However, many shorelines are still vulnerable to clear cutting.	Since 2007: Stronger development policy has been adopted. Two municipalities have adopted tree-cutting and site alteration bylaws. One municipality adopted a development permit for shoreline vegetation. However, many shorelines are still vulnerable to clear cutting.	⊖ - Cautiously optimistic	• More tree-cutting and site alteration bylaws. • Education to protect shorelines. • Greater involvement by property owners. • Additional resources for bylaw enforcement.
Control Stormwater Runoff	Stormwater: Carries nutrients and toxins to lakes and rivers. Excess stormwater used to protect walls, streets and roads. Increases flooding.	Since 2007: Muskoka-wide Stormwater Management Strategy is being developed. Larger new development is using new techniques. Stormwater in urban areas is not treated.	⊖ - Concerned	• Implement Stormwater Management Strategy. • Immediate urban area areas. • Develop implementation plans to protect all watersheds. • Monitor compliance more vigorously. • Develop education and awareness programs.
Protect Wetlands	Wetlands: Are the lifeblood of the watershed. Protect water quality, water quantity and base flow.	Since 2007: There have been no new programs to evaluate or protect wetlands. Protection of wetlands on agricultural development is often not supported.	⊖ - Concerned	• Evaluate more wetlands. • Implement stronger policy to protect all watersheds. • Adopt implementation plans to protect all watersheds. • Educate individuals about the value of wetlands and the negative impact of a "swamp".
Maintain Large Natural Areas	Natural Areas: Provide habitat for plants and animals. Moderate climate and clean our air. Are the basis of our tourism and recreation economy.	Since 2007: Muskoka has initiated background studies that will be incorporated into a natural areas strategy. All municipal highlands have initiated the Water Trails program.	⊖ - Concerned	• Develop a natural areas strategy. • Adopt implementation plans to protect large natural areas. • Track the cumulative effect of development decisions to understand watershed needs of all watersheds.
Remediate Degraded Areas	Degraded Areas: Visually detract from a "natural Muskoka". Do not provide the ecological values needed for a "healthy" watershed.	Since 2007: Several Area Municipalities have remediated shorelines. Do not provide the ecological values needed for a "healthy" watershed.	⊖ - Concerned	• Develop a natural areas strategy. • Adopt implementation plans to protect large natural areas. • Track the cumulative effect of development decisions to understand watershed needs of all watersheds.
Encourage New Development to Locate in Urban Areas	Urban Areas: Concentrate population and services. Increase the use of vehicles that emit carbon.	Since 2007: Several Area Municipalities have remediated shorelines. Do not provide the ecological values needed for a "healthy" watershed.	⊖ - Concerned	• Develop a natural areas strategy. • Adopt implementation plans to protect large natural areas. • Track the cumulative effect of development decisions to understand watershed needs of all watersheds.
Reduce Carbon Emissions	Carbon Emissions: Lead to climate change and contribute to global warming. Contribute to global warming and ecological impacts across the watershed.	Since 2007: Several Area Municipalities have remediated shorelines. Do not provide the ecological values needed for a "healthy" watershed.	⊖ - Concerned	• Develop a natural areas strategy. • Adopt implementation plans to protect large natural areas. • Track the cumulative effect of development decisions to understand watershed needs of all watersheds.







# Report Cards Recommendations

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- Easily understood, consistent units and fewer indicators
- ‘What Can I Do’ sections: concrete action items
- Use of web or other tech communication

## Component of a robust monitoring program

- Triggers and thresholds (actionable monitoring, implies **response**)
- Data management (standardized **collection** and accessible **storage** or access to owner of information)
- Communication and dissemination (publicly **accessible** way)
- Frequent evaluation of program is important (**relevance** and **efficacy**)



# Some notes on process...



EVERGREEN

## Starting Your Own Water Monitoring Program

- ▶ **Educational purposes** and community engagement in stewardship
- ▶ An **early warning system** for pollution events in urban environments
- ▶ An open access **historical record** of how waterways have changed for use by local communities, municipalities, landowners and other land managers
- ▶ A mechanism to **evaluate the effectiveness of restoration** projects and identify local issues so that action can be taken

Source: [Evergreen](#)

## Know your **purpose** and **goals**

- Awareness and education?
- Influence decisions (management)?
- Influence behaviour (community)?
- Prevention of issues (warning system)?
- Retrospection and baselining?
- Evaluating responses to a change in management?

Know if these will **change**, and be prepared to **adapt** practice (monitoring and communication) accordingly

# Summary points

- **Iterative processes** are best for addressing change (e.g. CEAM)
- **Data management** needs to be improved (collection and storage; metadata repository at minimum)
- **Report Cards indicators** should be fewer and more consistent
- **Evaluating** program is important

**Thank you!**

# Discussion: some questions to start...

We have identified a need to reassess whether current monitoring programs are still achieving what they had set out to accomplish, and whether the information from them is actually being used (or even reached) by the target audience.

- Why does SNC monitor (purpose, goals)?
- Who is your target audience (decision makers, public, etc.)?
- Do your monitoring indicators directly contribute to your purpose and goals? If not, what needs to change?

# Thank you for your participation!

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