



A Cost-Effective Enhancement for Canada's Environmental Monitoring Network:

Community-Based Water Monitoring

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Summary

- CBWM is a cost-effective (>3:1) and scientifically rigorous method to collect medium- and long-term water quality monitoring data at the watershed scale.
- Public sector organizations with responsibilities for water monitoring should develop long-term (5-year), core funding programs for CBWM activities to complement Canada's environmental observation system of systems.
- Federal and provincial investments in CBWM will ensure the continued operation of effective CBWM organizations as well as two-way knowledge and technology transfer between local and public sector experts and ensure monitoring data conform to established standards for collection, analysis, and dissemination.
- The Canada Water Agency is a candidate to coordinate and oversee a horizontal initiative to connect water monitoring organizations at federal, provincial/territorial, and local levels to minimize redundancy and enhance data interoperability.

Current State

According to WWF-Canada (2020), 100 of Canada's 167 watersheds are so poorly understood that a health score cannot be assigned to them. Even for many with a score, understanding of state and trends is limited. Even measurements of water flow are insufficient: since the 1980s,

¹ On behalf of the Community-Based Water Monitoring Collaborative, an Our Living Waters Team. For more information, see [*A Business Case for Community-Based Monitoring in Canada Parts 1 and 2.*](#)



parts of Canada have not met the World Meteorological Organization's guidelines for hydrometric station density, and the past 30 years have, in fact, seen the number flow-gauging stations decline.

The effects of poor water management are measured in billions of dollars and can last for generations. Canada is still dealing with the costs of the collapse of the East Coast cod fisheries, the legacy of mercury poisoning in Asubpeeschoseewagong First Nation (Grassy Narrows), and increasingly toxic cyanobacteria blooms appearing each summer on lakes. A rapidly changing climate across Canada will exacerbate issues of water quality and quantity—it demands an adaptive management approach.

Community-based monitoring is defined by Whitelaw et al. (2003) as “a process where concerned citizens, government agencies, industry, academia, community groups and local institutions collaborate to monitor, track, and respond to issues of common community concern.” It is a bottom-up monitoring strategy driven by local interest and capacity, but has regional impact through networks, shared sampling protocols, and engagement in basin-level management.

In the Federal Sustainable Development Strategy (2019–2022), the Government of Canada has committed to “pristine lakes and rivers” that support economic prosperity and the well-being of Canadians. In addition, it has taken action at a high level to support integrated watershed management planning, support regional water boards, and target action on priority ecosystems. Provincial and territorial governments develop water strategies with common goals, including safe drinking water, understanding threats caused by climatic change and emerging contaminants including microplastics, and preparing for water-related risks like floods, droughts, and fires.

As an actor on the world stage, Canada has also committed to achieving the United Nations' Sustainable Development Goals, which include Clean Water and Sanitation, Climate Action, and Life Below Water. Bill C-15 (2021) is expected to receive Royal Assent to formally acknowledge Canada's commitment to the United Nations Declarations on the Rights of Indigenous Peoples, which, through enabling legislation, may strengthen constitutional duties to consult First Nations, Métis, and Inuit communities when resource development may adversely impact them.

Successful programs like the ACAP used a core funding model for over 20 years, developing over a dozen watershed monitoring organizations in Atlantic Canada. Since the core funding model was ended in the early 2010s, almost all CBWM organizations are funded by competitive grants on a 2–3-year cycle to support time-bound projects. This is incompatible with CBWM and has put pressure on many organizations to scale back monitoring, analysis, and dissemination of their data. This reduces the utility of these programs to government experts, industry, and local communities.

Recommended Option: Long-term investment in CBWM

- **Establishing a 5-year pilot project investing in established CBWM organizations** will enhance local capacity, create high-skill jobs in remote regions, and provide cost-effective water monitoring data to local communities.



- Provincial and territorial investments should be able to leverage these funds to support integrated watershed management activities and monitoring relevant to local priorities (e.g., nutrient loads, biodiversity monitoring).
- Long-term (5-year) core funding programs will require accountability mechanisms to ensure public expenditures are returning value; federal investment may standardize environmental monitoring reporting to recognize the multiple value streams generated by CBWM activities.
- Lessons learned from the Indigenous Guardians pilot program (2017–2022) may be integrated, and that program should be extended to advance reconciliation and help Canada meet Aichi Target 11 (Canada's Target 1) for conserved areas.

Alternative Option: The status quo

- CBWM organizations will continue to operate, but many may reduce long-term monitoring in favour of short-term research projects. This will affect the usability of monitoring data for federal and provincial/territorial business lines.
- High turnover of staff hired on term reduces the efficiency of CBWM organizations.
- Technical capacity of CBWM organizations will suffer, increasing the amounts of “dark data” that cannot be used for governance, policy design, and decision making.
- Many CBWM organizations are only “a few bad years away” from closure when dependent on project-based funding.

Costs of Inaction

- Long-term monitoring is necessary to understand baselines and impacts of climatic change. For the insurance industry, monitoring is incorporated into actuarial models to assess risk. Without water data, areas of Canada may become uninsurable since insurers may avoid the uncertainty of risk (Kovacs, 2020).
- Canadians may not trust the quality of water for drinking or recreation. Governments must demonstrate to the public that water is clean and safe, particularly in light of events at Walkerton or Grassy Narrows, both in Ontario.
- Investment in Canadian companies may be threatened by negative or unknown environment, social, and governance (ESG) scores. Without independent monitoring provided by CBWM, Canadian businesses—particularly those in the resource sector—may find it difficult to attract investment or demonstrate ESG improvement.
- Investments in environmental projects may have less clarity on outcomes, reducing future support.

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