

## Community-Based Monitoring for Water Resource Management

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### Summary

Water resource characterization in Canada is irregular. Urban areas and areas of high economic value are well understood, while water resources in rural areas and in the north, are not as well characterized. There is a need for practical, cost-effective water resource evaluation studies in less populated parts of Canada.

There is growing recognition of the benefits of community-based monitoring (CBM) programs, particularly on the traditional territories of indigenous peoples throughout Canada, who have both a practical and intangible relationship with their resources. In the case of water, CBM includes the collection of western science water quality and quantity data and First Nation traditional knowledge to evaluate the water resource. One of the benefits of First Nation led CBM is an understanding of groundwater and surface water and their connection, based on centuries of use. This comprehensive knowledge of the natural variability and the sustainable use of water is the basis of successful water resource governance and management.

The scientific community can be wary of CBM as a method of characterizing a resource for the purposes of management. Concerns include western science data collection by monitors that lack appropriate training as well as inconsistent data collection and management. The understanding and value of traditional knowledge of water resources is also not well developed in the scientific community.

Western-science derived monitoring programs are generally inflexible and automated. The goal for a CBM is to identify the strengths of the community and design a program that plays to those strengths.

Examples of community strengths include numerous highly engaged stakeholders present on the land year-round as well as traditional knowledge of areas most sensitive to changes in the water resource. Developing a framework for a water resource CBM starts with community engagement to identify water resource concerns and to compile traditional knowledge on the quality and quantity of water resources. Then a purpose-driven and scalable monitoring program is developed that is tailored to the community strengths, maximizes the unique benefits of traditional knowledge and is scientifically defensible. Western sciences metrics are chosen that can be consistently measured and scalable with community capacity. Specific western science metrics are highly community specific and success of the CBM requires careful consideration and evaluation in order to leverage each communities' unique strengths.

We are working with several communities to develop sustainable CBMs that support First Nation led water resource decision making and resource management.