

# **Bridging the Gap: Exploring the Potential for Community-based Watershed Monitoring to Enhance Ecosystem Health and Watershed Governance in Canada**

Principal Investigator – Dr. Heather Castleden, Queen’s University, 2013-2015

## **Challenge**

Watershed monitoring is an essential component of watershed management; however, widespread federal and provincial decentralization efforts have resulted in reduced government funding for such monitoring. In response, communities are mobilizing to address this deficit in Canada by undertaking a practice called community-based watershed monitoring (CBWM).

Although CBWM is being employed to address this gap, monitoring data collected by CBWM organizations remains underutilized by decision-makers in watershed governance. Moreover, CBWM organizations face significant challenges with knowledge exchange due to a lack of rigorous scientific protocols and high organizational turnover. At the same time, decision-makers are experiencing minimal capacity to utilize CBWM data due to restricted mandates and resources. Nonetheless, research suggests that communities significantly benefit from CBWM, but less evidence exists to confirm effects of CBWM activities on ecosystem health and there is scant literature about successful CBWM data integration. Anecdotal evidence regarding ecosystem benefits provided by CBWM exists in grey literature and on websites; however, more peer-reviewed literature must be established to support these claims. Uncertainty still remains regarding how to track the success of CBWM and watershed restoration efforts.

## **Project**

The purpose of the research project was two-fold: 1) to analyze the socio-political and economic factors that influence uptake of CBWM in watershed management, and; 2) the evaluation of ecosystem health benefits from CBWM. These two tasks have been divided into Political, Social, and Environmental components.

The first objective employed a qualitative case study analysis that focused on watershed organizations engaged in CBWM that contributed to positive influences in Canadian water management decision-making. The Political Component involved four case studies and 29 interviews with government officials and CBWM organization coordinators. Findings revealed that the ability of watershed groups to influence decision-making through sharing CBWM information with government relies on several intersecting factors, including collaboration through multi-stakeholder partnerships, building capacity through diversification of funding and projects, and meeting the needs of government through data quality and standardization. Strong leadership and trust building activities were found to be key enablers for collaborative processes. Participants also highlighted the important roles of both science-focused monitoring and education-focused monitoring, with the latter having potential to help influence local government decisions. Three main CBWM program designs were identified that build on strengths of these different approaches to monitoring.

The Social Component involved surveys that explored the social connections between watershed stewardship groups in Nova Scotia and the interviews elaborated on themes elicited from the survey data. The findings illustrate that constraints exist for stewardship groups to share information and resources, and to conduct activities, such as: (1) the natural 'lifespans' of volunteer groups which compromise the ability to coordinate long term environmental programs; (2) jurisdictional fragmentation that creates political, and; (3) legal, and spatial barriers.

The second objective analyzed activities conducted by CBWM organizations that had the ability to produce positive environmental change within aquatic ecosystems, namely restoration projects. Photographs were used in the interview process to provide a visual representation of the project and act as a guide to explore the planning, implementation, and end result of each project. This is one of the first documented instances where a qualitative photo-methodology was utilized to explore the components of restoration projects with practitioners. The methodology proved to be adept at exploring restoration projects by providing a medium to visually contrast project locations before and after project implementation, and understand the process, challenges, and limitations faced by CBWM organizations in implementing them. The study also identified cases where CBWM organizations were successful in producing positive environmental change that was directly related to their restoration efforts.

## Outputs

This research has resulted in the following anticipated end-user reports:

- Report to Government and Partners.
- Information Pamphlet, distributed at the event "Clean Water Tradeshow" in Bridgewater, NS.
- Castleden, H. (June 2016). "Connecting Community-Based Water Monitoring With Environmental Management and Stewardship in Canada." Plain Language Primer.

The research team hosted a series of webinars and presentations to mobilize research efforts and work to stakeholders, community stewardship groups and government participants.

- HQP presentations on research summaries and preliminary findings delivered to community stewardship groups and government participants through webinars.
- HQP presentations on research to the Sackville Rivers Association (project partner) to the watershed group members.

This research has been disseminated through several conference presentations:

- Blair, J (May 2013) "Bridging the Gap: Exploring the potential for community-based watershed monitoring to enhance ecosystem health and watershed governance in Canada." Annual General Meeting of the Water Economics Policy and Governance Network. Saskatoon, Saskatchewan.
- Blair, J., Buckland-Nicks, A. (2013) "Exploring graduate student research in community-based approaches to water monitoring and management." Canadian Association of Geographers Conference. St. John's Newfoundland and Labrador.

- Buckland-Nicks, A. (2014) "Linking community-based water monitoring with government decision-making." Water Initiatives for the Future Conference. Kingston, Ontario.
- Blair, J. (2014) "Understanding 'Connections' in Nova Scotia Community Based Water Monitoring Programs." Water Initiative for the Future (WatIF) Conference. Kingston, Ontario.
- Garda, C (2014) "Assessing aquatic ecosystem health: Can community-based water monitoring contribute to benefits within the ecosystems it monitors?" Water Initiatives for the Future (WatIF) Conference. Kingston, Ontario.

Poster presentations include:

- Blair, J. (2013) "Understanding Community Connections in Nova Scotia Participatory Water Monitoring Programs." Canadian Association of Geographers Annual Meeting. St. John's Newfoundland and Labrador.
- Buckland-Nicks, A (2013). "Keys to success: Looking at the factors that impact the integration of community-based watershed monitoring in decision-making." Canadian Association of Geographers Annual Meeting. St. John's, Newfoundland and Labrador.
- Buckland-Nicks, A. (2013) "Bridging the Gap: Linking community-based watershed monitoring data with decision-makers in the Nova Scotia Water Strategy." Sustainability and Environmental Research Symposium. Halifax, Nova Scotia.
- Garda, C. "Assessing aquatic ecosystem health: Does community-based water monitoring contribute to benefits within the ecosystems it monitors?" Sustainability and Environmental Research Symposium. Halifax, Nova Scotia.

HQP's have prepared and anticipate the release of the following scholarly journal publications:

- Amy Buckland-Nicks with co-author. "A Call for Collaboration: Lessons Learned from an Exploration of Key Factors for Linking Citizen Science Data with Governmental Decision-Making in Canada." Citizen Science: Theory and Practice.
- Amy Buckland-Nicks with co-author. "Intensive, Balanced, and Basic: Aligning Three Community-based Monitoring Program Designs with Goals for Enhanced Water Management." International Journal of Science Communication, Special Issue on Citizen Science.
- Chris Garda. "It went from a big exposed sand bank to a well vegetated bank: An examination of whether community-based water monitoring leads to benefits within the natural ecosystems being monitored."
- Chris Garda. "Site photos can track your success: Assessing the application of photo elicitation for assessing environmental restoration projects: Planning, process, and implementation."

## Outcomes

Outcomes include:

- Strengthened relationships with end-users. Approximately 15 CBWM organizations in Nova Scotia and 30 CBWM organizations from across Canada have been involved with the research aspects of this project. Organization involvement ranges from participating in the research studies of Highly Qualified Personnel (HQP) to more

direct involvement in the development of the studies, such as providing assistance and guidance to the investigators and HQPs.

- Strengthened relationships with partners. HQP presented their research to the project partner Sackville Rivers Association in July 2014, strengthening relationships with individuals in the group.
- Increased knowledge. Engagement of the research participants throughout the project development has contributed to their increased knowledge of community-based monitoring.
- Increased knowledge. Reports for government and open-access articles available for the public will help to increase knowledge of factors affecting CBWM integration and benefits for ecosystems.
- Strengthened relationships with end-users. Attending the Atlantic Watershed Management Conference hosted by CURA H2O will provide the opportunity for the HQP to build relationships with regional watershed groups and share research results both informally and formally through a presentation or poster.

## **Research Team and Partners:**

### **Research Team:**

Dr. Heather Castleden, Professor, Queen's University

Dr. Cathy Conrad, Professor, Saint Mary's University

Walter Regan, President of the Sackville Rivers Association

### **Partners:**

CURA H2O, Sackville Rivers Association, Health, Environment and Communities (HEC) Lab

### **Highly Qualified Personnel (HQP):**

Jeff Blair

Amy Buckland-Nicks

Chris Garda