

Workshop
on
Regional & Local
Collaborative Water Monitoring
in
British Columbia

November 29th, 2018

Summary Report

Executive Summary

Monitoring of freshwater quality and quantity is necessary for effective water management and protection. In British Columbia water monitoring is conducted at different scales for different purposes by a variety of organizations. However, there is no “one size fits all approach” and there is limited sharing of knowledge and data across sectors and regions. The BC Water Funders Collaborative Working Group on Water Monitoring (*the Working Group*) has been working on several initiatives to:

- *Improve water data availability, accessibility and integration;*
- *Include both western science and traditional knowledge; and*
- *Facilitate knowledge building across geographic regions and sectors.*

On November 29th, 2018, the Working Group hosted a workshop for representatives from regional water monitoring programs to articulate how government, water funders, and regional initiatives can work together more effectively on water monitoring and reporting to advance freshwater management and protection. Twelve participants attended the workshop representing local and regional monitoring programs from different geographic areas across British Columbia that are conducted by municipal, regional and First Nation Governments, non-government organizations, monitoring trusts, and community-based monitoring organizations. In general, the goals of the monitoring programs represented are to: inform decision making (e.g. watershed and resource management); engage communities; and/or increase water literacy. The Programs are funded by a variety of funding mechanisms including: grants, parcel taxes, and funding from foundations, industry and higher levels of governments. At the workshop, the majority of organizations indicated that uncertainty around funding presents some of the most pressing operational challenges.

The workshop was focused on three main sessions: (1) sharing successes and challenges and identifying support needed for existing programs; (2) identifying roles and functions; and (3) identifying priority needs, opportunities, and recommendations for funders and provincial and federal governments. Participants discussed examples of effective collaborations; the benefits of local and regional monitoring for provincial and federal governments; and the roles that provincial and federal can play to better support local and regional monitoring. Many respondents indicated that learning from others was one of the most useful parts of the day. Priority needs identified include:

- ***Clarity on roles, functions, and responsibilities within and outside of government***
 - We need a full understanding of who is doing what where (First Nations, industry, local/regional water monitoring initiatives, government);
- ***Increased capacity***
 - There is a need for increased and more flexible funding;
- ***Increased number of monitoring stations (including climate and hydrometric)***
 - *Under a climate change imperative, more data are needed; and*
- ***Guidance on accessing and applying resources and tools.***

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This workshop was made possible through contributions from:



Acknowledgements

This workshop was designed and facilitated by Carol Luttmmer. The workshop report was written by Carol Luttmmer with contributions from Megan Spencer and the workshop participants. Many thanks to Jennifer Archer and the Workshop Steering Committee (Anna Warwick Sears, Okanagan Basin Water Board; Ian Rogalski, Environment and Climate Change Canada; Kat Hartwig, Living Lakes Canada; and Leanne Sexsmith, Real Estate Foundation of BC) for making this workshop possible.

Background & Context

Effective freshwater management and protection in British Columbia is essential for maintaining water supplies and functioning ecosystems - especially given current pressures such as climate change and cumulative effects on the landscape. However, we can't manage what we don't know. Monitoring of freshwater quality and quantity is a fundamental component of effective water management and protection. In British Columbia water monitoring is conducted by many different organizations and jurisdictions for many different purposes (e.g. to make resource management decisions; to manage water supplies; and to ensure laws and regulations are upheld and policies are having their intended effects). There is no "one size fits all approach" to water monitoring, but there are opportunities to collaborate on water monitoring and share data across organizations and jurisdictions in order to better support freshwater management and protection.

To gain a better understanding of the water monitoring and reporting landscape in British Columbia - in particular who is collecting which data and where - several members of the BC Water Funders Collaborative Working Group on Water Monitoring commissioned a [landscape scan](#) and a roundtable of water leaders and funders in 2017. Arising from this scan and roundtable were questions such as:

- *how can we support and learn from efforts to improve water data availability, accessibility and integration;*
- *how can we include both western science and traditional knowledge; and*
- *how can we facilitate knowledge building across geographic regions and sectors?*

The BC Water Funders Collaborative Working Group on Water Monitoring current objectives include:

1. Supporting and learning from regional bottom-up water monitoring efforts, and
2. Supporting a shared understanding and alignment of roles and responsibilities around water monitoring and reporting at local, regional, provincial and federal levels; and
3. To identify gaps.

The Provincial Government is currently working on improving the provincial water monitoring program and would like to collaborate with communities and First Nations on local monitoring initiatives. In a [letter](#) to the Vancouver Island Water Watch Coalition, Minister of Environment and Climate Change Strategy, Hon. George Heyman states that the provincial government will...

"continue to improve the provincial water monitoring program; recent enhancements include the open release of data and a third-party data-sharing agreement. We are currently looking at a broader water monitoring strategy for the province that would include enhanced data integration and collaboration and would guide coordinating monitoring activities; developing and assessing water quality objectives; permitting, attainment and compliance evaluation; and collaborating with communities and Indigenous Nations on local monitoring initiatives."

Workshop Design & Agenda

This workshop was designed to help achieve the current objectives of the BC Water Funders Collaborative Working Group on Water Monitoring and to create an **opportunity for representatives from regional water monitoring programs to articulate how government, water funders, and regional initiatives can work together more effectively on water monitoring and reporting to advance freshwater management and protection.**

Participants

Participants were selected from the list of water monitoring initiatives that was generated as part of the research for the BC Water Monitoring Landscape Scan, targeting successful programs and leaders with a broad range of experiences. Initiatives were selected in order to have representation geographically from across British Columbia and to include a range of types of organizations including municipal, regional and First Nation Governments, non-government organizations, monitoring trusts and community-based monitoring organizations.

Twelve participants attended the workshop (Appendix A). Invitees that were unable to attend due to travel delays or other circumstances participated in the pre-workshop survey and were given the opportunity to provide feedback on this Workshop Summary Report. The list of participants, descriptions of their organizations, and their biographies are provided in Appendices A, B, and C, respectively.

The majority of programs represented at the workshop are conducting baseline, status and trend and applied research monitoring (e.g. to inform resource management) and some are compiling data collected by others. In general, the program goals represented in this workshop fall under two main categories: (1) to inform decision making (e.g. watershed and resource management) and (2) to engage community and increase water literacy.

The Programs represented at the workshop are funded by a variety of funding mechanisms including: grants from private foundations; endowments from provincial government; parcel taxes; federal government, provincial government, research, First-Nation specific, private sector, and community grants; and direct funding from the Provincial Ministry of Environment and Climate Change Strategy and Ministry of Agriculture. In their presentations, most organizations indicated that uncertainty around funding presents some of the most pressing operational difficulties.

The workshop was designed using input from participants in a pre-workshop survey (see Appendix D), guidance from the workshop Steering Committee (see Appendix A for list of members) and meetings the facilitator had with Provincial Government staff. The agenda (Appendix E) was designed to facilitate peer-to-peer learning and to generate lists of priority needs, opportunities, and recommendations for funders and government to better support local and regional water monitoring initiatives.

Workshop Objectives

- Facilitate peer to peer learning among regional collaborative water monitoring initiatives;
- Identify capacity gaps, information needs, barriers, and opportunities based on leading representative initiatives;
- Identify lessons learned and best practices; and
- Strengthen relationships and create a community of practice within the freshwater monitoring and reporting community across sectors.

Expected Workshop Outcomes

- Summary report of workshop outlining needs assessment and opportunities identified by participating regional collaborative initiatives.
- Appendix profiling each initiative represented at the workshop.
- Actionable recommendations and suggested next steps on how regional water monitoring initiatives in BC can be supported.

This workshop summary is not a comprehensive assessment of the needs and challenges experienced by local/regional water monitoring initiatives in BC. Rather, it provides a snapshot of the perspectives shared by leading representatives from the water monitoring programs or initiatives that participated in this workshop.

Workshop Outcomes

Peer to Peer Learning

Participants had the opportunity for peer-to-peer learning through presentations, activities, and during breaks throughout the day. Participants came to the workshop prepared to present their programs in three minutes focusing on their program's: (1) vision, (2) funding model, and (3) activities. However, due to the small workshop size, and the interest among participants, presentations were not restricted in length and questions followed each presentation.

In the workshop feedback forms, one hundred percent of the respondents (10 of 12 participants submitted feedback forms) indicated that the workshop was a good use of their time, and many respondents indicated that learning from others was one of the most useful and productive parts of the day.

Workshop Session - Sharing Successes & Challenges

Activity #1 – Sharing Challenges and Solutions

Participants were asked to write down the three main challenges facing their water monitoring programs/initiatives and share these with their peers to find potential solutions. These challenges were then categorized and challenges without solutions were identified and used to

to inform key themes and priority needs for improving the water monitoring landscape in BC (see *Workshop Session- Priority Needs, Opportunities and Recommendations*).

Summary of challenges identified by participants:

- Staffing/maintaining volunteers/accessing support
 - Develop capacity for training, support from government
- Sustained long-term funding needed
- Relationship building
 - Provide more capacity for organizations to engage First Nations, and more support for First Nations to increase their capacity to engage
- Translating monitoring results into actions and decisions
 - Increase understanding of who is making decisions and how decisions are implemented
- Data handling/management
 - Need guidance for data management and QA/QC
- Dealing with multiple layers of responsibilities
 - Develop capacity and break down silos among local governments (including First Nations), provincial government, provincial government ministries and crown corporations (e.g. Oil & Gas Commission), academia, and industry
- Justifying being proactive versus reactive
 - Support assessment of cumulative benefits as well as cumulative effects
- Developing governance mechanisms
 - Build cohesiveness across partners/jurisdictions
- Increasing water literacy
- Other challenges:
 - Equipment management, guidance and share best practices
 - Reduce barriers to funding such as requirements for audited financial statements

[Activity #2 – Gaps/Support Needed in Knowledge Management Framework](#)

Monitoring programs involve various tasks, and not simply the physical data collection and acquisition. Other important tasks include:

- developing a vision;
- planning (e.g. planning and implementing an adaptive management or systems design approach);
- data storage, organization, and management;
- accessing and distributing data (especially if programs are designed to inform decision making outside of the organizations that are collecting the data);
- analyzing and interpreting data; and
- communication, reporting and effective business use (e.g. making use of data to support an organization's mandate or goals).

The Provincial Government includes these tasks in its Knowledge Management Framework and has observed that tasks other than data collection and acquisition are often under-resourced, both within government and non-government organizations¹.

Participants were asked to identify the tasks that are under-resourced in their programs, and in general. Participants voted for which tasks their programs, or water monitoring in general, need the most support. The top three tasks requiring support are: **Data Analysis & Interpretation; Data Storage, Organization & Management; and Business Use, Communication & Reporting** (Table 1).

Participants were then asked to identify what tools/resources are needed to support these tasks, and where those tools/resources might come from. From the break-out group sessions the priorities tools and resources needed are:

- o Core funding (especially for staff salaries), otherwise other areas are unsustainable;
- o Support for data governance principles (e.g. OCAP²); and
- o Increased Provincial funding and technical support to local-level initiatives (e.g. program/project-specific support: in-kind advice on establishing protocols for data collection, auditing for QA/QC, access to expertise, expert review of programs and data).

Table 1: Prioritization of tasks requiring support

Task	# of votes
<i>Data Analysis & Interpretation</i>	9
<i>Data Storage, Organization & Management</i>	6
<i>Communication, reporting & Business Use</i>	6
<i>Governance</i>	3
<i>Planning</i>	3
<i>Data Collection & Acquisition</i>	3
<i>Vision</i>	2
<i>Data Access & Distribution</i>	2

¹ Tesch, David. Executive Director, Knowledge Management Branch, BC Ministry of the Environment. (2017). "Provincial Data Systems and Monitoring Collaborations" presented at the Water Data Hub Conference, Invermere. November 29, 2017.

² First Nations Information Governance Centre principles of data ownership, control, access and possession.

Workshop Session - Roles & Functions

In a round-table discussion, participants were asked to share good examples of collaboration experienced in their water monitoring programs/initiatives. Some examples that were discussed included:

- Environmental Stewardship Initiative (ESI) funding³ – collaboration among the Province, First Nations, lots of resources/funding available.
- Shuswap Watershed Council biannual meetings – water monitors from local, provincial and First Nations governments and health authorities meet twice annually to discuss monitoring efforts and determine any monitoring gaps and request funding from Shuswap Watershed Council to fill those gaps.
- Regional District of Nanaimo (RDN) Community Watershed Monitoring program – stakeholders, decision-makers, volunteers are engaged in monitoring. Spin-offs from this program include: more work/capacity among local stewardship groups; seed funding from RDN for ecological restoration and other programs; tool lending library; and RDN partnering with Vancouver Island University and BC Wildlife Federation to map and monitor wetlands within the regional district.
- The City of Dawson Creek has had success increasing good hydrometric data in its watershed through partnerships. These include: (1) a partnership with the Water Survey of Canada (WSC) to move and reactivate an abandoned WSC station whose operation is now cost shared between the City and WSC and WSC handles the field work and the data QA/QC; and (2) a partnership with FLNRO and GeoScience BC for the installation of a new hydrometric station where GeoScience helped fund the initial equipment cost, the City collects and performs QA/QC on the data, and FLNRO uses the [BC Real-time Water Data Portal](#) to display the data and updates the stage discharge curves.⁴

In small groups, participants discussed the potential roles for the provincial and federal governments in local/regional water monitoring programs and identified the potential benefits to Government of local/regional monitoring initiatives.

Key Workshop Outcome: Workshop participants identified that local and regional monitoring programs provide significant benefits to provincial and federal Governments.

³ ESI grants are available for First Nations in northern BC to fund environmental management-related projects, with an explicit purpose to enhance reconciliation and relationship-building between Province and First Nations.

⁴ Because the City of Dawson Creek was unable to attend the workshop, they shared information via email following the workshop.

Benefits of Local/Regional Monitoring Program to Provincial/Federal Governments

- Return on investment (ROI) and cost effective – local/regional groups could articulate this value (e.g. highlight value of citizen science/volunteer model)
- Laying the groundwork for collaboration by establishing partnerships, relationships, engaging local residents, building trust (e.g. Government does not have to start at ‘square one’)
- Opportunity to be proactive rather than reactive (e.g. proactive monitoring can identify localized issues in water quality/quantity before they escalate to crises)
- Opportunity to demonstrate stated commitments to First Nations (e.g. reconciliation, capacity-building, Indigenous-led initiatives)
- Decrease spatial data gaps apparent at the provincial scale by incorporating data from local/regional levels
- Links to provincial water policy (e.g. generate data to establish water objectives, environmental flows to support Water Sustainability Act) and regulatory requirements
- Local knowledge has value (opportunity to draw on knowledge and experiences of First Nations and non-First Nations local residents, who know their watershed)
- Assists in building a water-literate constituency

Potential Roles for the Provincial/Federal Governments

Provincial Government

- Establish Provincial Water Monitoring Liaison role(s) that act as an interface between Province and local/regional water monitoring groups, similar to the previous Provincial Water Stewardship Positions
- Establish a Provincial Water Monitoring Advisory role to provide expertise/review of implementation of monitoring guidelines and protocols and provide guidance on data QA/QC

Provincial & Federal Governments

- Assist in capacity building (First Nations and non-First Nations local residents) to engage/lead local/regional water monitoring initiatives and support training in community-based water monitoring
- Ensure meta-analyses on water monitoring data and provide guidance on analyses and interpretation (e.g. reports are reviewed provincial staff which provides independent review compared to using consultants and relying on professional reliance model.)
- Provide more funding specific to local/regional monitoring

Workshop Session - Priority Needs, Opportunities and Recommendations

The final activity of the day was to identify the priority needs, opportunities and recommendations to better support local and regional water monitoring initiatives. Table 2 below highlights the main themes that re-occurred throughout the workshop and that were discussed in the final roundtable.

Table 2: Priority Needs, Opportunities, and Recommendations

Priority Needs	Opportunities	Recommendations ⁵	
		Funders	Government
<p>1. Clarity on Roles, Functions, and Responsibilities within and outside of Government</p> <p>-Need a full understanding of who is doing what where (First Nations, industry, local/regional water monitoring initiatives, government)</p>	<p>-Local and regional monitoring programs provide benefits to government</p> <p>-There is a broader role for industry (e.g. facilitate access to industry data; include industry representatives in establishing Canada-wide community-based water monitoring programs)</p> <p>- Align water monitoring programs with Indigenous-led monitoring initiatives (e.g. Guardian Watchmen Monitoring Program, Territorial Patrols)</p> <p>-Better understanding of who does what within government will enhance relationship building and break down silos</p>	<p>-Create an interactive, web-based BC Water Monitoring Map which shows where monitoring is active across the province and includes contact information for monitoring organizations/initiatives (Could build on the inventory of 200+ initiatives identified in the Water Monitoring Landscape Scan and make this publicly available)</p> <p>-Develop a cost estimate and funding plan for a comprehensive inventory of water monitoring initiatives and maintenance costs for an online map and contacts database</p>	<p>-Share information about who is doing what within government (e.g. develop a provincial registry of government programs)</p> <p>-Develop a strategy/plan to support local/regional water monitoring initiatives, including those that are First Nation-led, and how 3rd party data can be operationalized into government policies, actions, and decision making</p>

⁵ Recommendations are divided here between funders and government. However, it is recognized that funders and government could collaborate on many of these.

Priority Needs	Opportunities	Recommendations ⁵	
		Funders	Government
<p>2. Build Capacity (including increased and more flexible funding)</p>	<ul style="list-style-type: none"> -Increase impact of funding by having more flexible funding -Capitalize on existing knowledge by increasing opportunities for peer-to-peer learning -Make existing resources more readily accessible -Opportunity for “in-reach and outreach” model to share information 	<ul style="list-style-type: none"> -Ensure funding is more flexible (e.g. re-evaluate funding criteria to ensure broad range of tasks can be funded including funding programs and not just projects) -Increase funding for core functions and develop more long-term sustained funding⁶ -Reduce restrictions on funding (e.g. requiring audited financial statements is unrealistic for small grants and small groups) -Host workshops for monitoring groups and funders to showcase monitoring programs, and share impact goals and assessments, and challenges, and identify priorities. -Host webinars and workshops for water monitoring initiatives with an issue, jurisdiction (e.g. workshop specific to local government), and/or region-specific focus. 	<ul style="list-style-type: none"> -Reinstate Provincial Water Stewardship position(s) or community liaisons/advisory roles or develop new similar positions -Ensure expert guidance is available to groups including information on: protocols; standards for testing different parameters; data analyses and interpretation (guidance from government would create more consistency rather than groups hiring independent consultants)

⁶ Some recommendations for sustained funding for collaborative water monitoring are available here: http://gordonfoundation.ca/app/uploads/2018/11/Roundtable-Discussion-Paper_Final-1.pdf

Priority Needs	Opportunities	Recommendations ⁵	
		Funders	Government
<p>3. Increase number of monitoring stations (including climate and hydrometric stations) <i>Under a climate change imperative, more data are needed</i></p>	<ul style="list-style-type: none"> -Measure “cumulative benefit” versus “cumulative effects” -Sufficient monitoring will help identify issues and problems before they become crises -Use monitoring data to inform climate adaptation -Local and regional water monitoring programs, including those that are First Nation-led provide more “boots on the ground” = more data 	<ul style="list-style-type: none"> -Support gap analyses on various scales -Fund programs that collect data 	<ul style="list-style-type: none"> -Support gap analyses on various scales -Install more climate and hydrometric monitoring stations to increase the information base for the Province’s data collection network (which would also inform better local-regional scale monitoring, planning etc.) -support local/regional water monitoring initiatives
<p>4. Guidance on Accessing and Applying Resources/Tools</p>	<ul style="list-style-type: none"> -Open source data would help inform First Nations’ responses to referrals -Reduce costs and increase use of existing data, databases, tools and resources (e.g. costs for laboratories to upload water quality data into Provincial Environmental Management System inhibits use of system) 	<ul style="list-style-type: none"> -Host webinars and peer-to-peer workshops -Fund a survey and/or research to determine what open source data analysis tools are available -Fund the development of freely available apps/tools for data analyses -Increase awareness of existing tools 	<ul style="list-style-type: none"> -Develop (or make more accessible) monitoring protocols, tools, and templates for data handling, storage and analyses. -Integrate data analyses into existing systems (e.g. include guidelines, thresholds, and/or water quality objectives in the Environmental Management System’s Surface Water Monitoring Map) -Increase awareness of existing tools

Update on Community-Based Monitoring Roundtable in Ottawa

Two of the participants at the workshop had recently attended the national roundtable discussion “[Elevating Community-based Water Monitoring in Canada](#)” in Ottawa on November 27-28th, 2018 and provided participants a summary of the roundtable. The roundtable was convened by Living Lakes Canada, WWF-Canada and the Gordon Foundation and focused on identifying steps the federal government can take to support community-based water monitoring (CBWM) across Canada. With federal recognition of CBWM, it is hoped that both the need for and legitimacy of CBWM becomes established and that funding/program support begins to flow at both the federal and provincial/territorial levels. The roundtable agenda and draft discussion paper are [available online](#) and the draft summary proceedings are available [here](#).

Key findings of Roundtable Discussion in Ottawa:

- o Increasing numbers of First Nations-led CBWM initiatives.
- o Window of opportunity for federal CBWM funding: need to increase collaboration and communication among CBWM groups and amass high-quality data to ‘make the case’.
- o Ensure that CBWM is co-designed by partners: e.g. decision-makers, First Nations, community groups. Collaboration can help find leverage points and amass collective knowledge.
- o Recognition that some types of data (e.g. data informed by traditional knowledge) cannot be shared in open source platforms.

Appendix A: Lists of Participants & Workshop Steering Committee Members

Participants

1. Allison Oliver, Skeena Fisheries Commission
2. Ian Sharpe, Morice Water Monitoring Trust trustee
3. Julie Pisani, Regional District of Nanaimo
4. Kat Hartwig, Living Lakes Canada
5. Katherine Capot-Blanc, Fort Nelson First Nation
6. Lara Hoshizaki, Coastal First Nations-Great Bear Initiative Society
7. Lauren Fagen, Regional District of Nanaimo
8. Laura Duncan, Mainstreams
9. Mike Simpson, Fraser Basin Council
10. Norm Zirnhelt, BC Lake Stewardship Society
11. Patti Meger, District of Lake Country
12. Sarah Dal Santo, Tsleil-Waututh Nation

Regrets

1. Alya Bennett, Elk River Alliance
2. Chelsea Mottishaw, City of Dawson Creek
3. Ekaterina Daviel, Skeena Knowledge Trust
4. Jennifer Yeow, Slokan Streamkeepers/Passmore Laboratory
5. Michelle Tung, Upper Fraser Fisheries Conservation Alliance

Workshop Facilitators

1. Carol Luttmer, Carol Luttmer Consulting
2. Megan Spencer, POLIS Water Sustainability Project (Notetaker)

Workshop Steering Committee

1. Anna Warwick Sears, Okanagan Basin Water Board
2. Ian Rogalski, Environment and Climate Change Canada
3. Kat Hartwig, Living Lakes Canada
4. Leanne Sexsmith, Real Estate Foundation of BC
5. Jennifer Archer, BC Water Funders Collaborative (staff support)

Appendix B: Organization/Program Descriptions

(in alphabetical order)

BC Lake Stewardship Society www.bclss.org

BC Lake Stewardship & Monitoring Program (BCLSMP)

The BC Lake Stewardship Society (BCLSS) provides training and support to the volunteer lake stewardship and monitoring sector as well as monitoring and other related support to the Ministry of Environment and Climate Change. Data collected by volunteers is summarized and interpreted in reports following 3 years of data collection. To date, 86 reports have been completed and can be found [here](#). Core funding was provided by the Ministry of Environment from 2003-2013 for the BCLSMP and was reinstated in 2018. In addition, on occasion BCLSS has secured funds from other funders for the completion of other lake related projects.

The BCLSS board and staff has considerable expertise in limnology (lake science) and developed and delivers LakeKeepers training. The course covers forming and operating a stewardship group, the fundamentals of limnology, as well as safety and technical training for volunteers collecting water quality data. In 2018, BCLSS and Living Lakes Canada conducted a review of lake monitoring in BC and developed an *Integrated Lake Monitoring Framework for BC* for the Ministry of Environment and Climate Change. The goal was to better align the volunteer lake monitoring sector with the Province of BC Lake Monitoring Network. The report also reported on the potentially expanded role of BC First Nations to provide traditional environmental knowledge (TEK) on water, monitor water, as well as collaborate on water related issues. The report summary can be found at <https://www.bclss.org/news>.

City of Dawson Creek

Kiskatinaw Watershed Stewardship Program

- Municipal Flood Mitigation Work Plan for Hydraulic Mapping and Geomorphic Modelling support; including 4 real-time hydrometric stations, and 10 water level stations.
- Kiskatinaw Watershed hydrometric monitoring for flood and drought management:
 - Maintain hydrometric station at the City's Intake (Arras)
 - Partnership with Water Survey of Canada (Noel)
 - Partnership with FLNRORD for uploading data to Aquarius (West Headwater)
- Bearhole Lake Waterbalance and inflow research
 - Three hydrometric stations on the inflows to Bearhole Lake
 - Monitor the Bearhole Lake outflow- downstream of a control weir
- Bi-annual water quality sampling
 - 17 sites within the watershed (Hydrocarbons, metals, routine, mercury, poly aromatic hydrocarbons, giardia, cryptosporidium, coliforms, total organic carbons, herbicides, fertilizers)
 - Field screening
- Waste Water Outfall
 - Maintain a real-time hydrometric station
- Climate Monitoring Network (4 stations) in partnership with FLNRORD and the Fire Centre

District of Lake Country

The District of Lake Country (DLC) local government water utility is committed to the delivery of safe drinking water through the [Source to Tap Approach](#) under the [Drinking Water Protection Act](#), [Drinking Water Protection Regulations](#) and [Water Sustainability Act](#). Sampling plans are developed from the District's Permit to Operate and direction of Interior Health Authority. The DLC water sources are located in multi-jurisdictional crown land. Sustainable watershed planning and implementation in the District's community watershed (CWS) requires funding and collaboration from all stakeholders and aims to recognize a balance of social, economic and environmental values. With full funding and stakeholder involvement, the District developed source to tap assessments on lower elevation lakes, [Kalamalka](#) and [Okanagan](#) intakes, as well as source water assessment (SWA) and [Implementation plans](#) for the upland [Beaver and Oyama](#) CWS. The SWA's mapped vulnerability zones were provided to major forest licencees for their planning and work is being done to have SWA's recognized by the Province. Communication with stakeholders is maintained to address new situations and recommendations within the plans. Primary stakeholders include various divisions of the Province, First Nations, forestry licencees, range tenure holders, Ministry of Transportation and Infrastructure, lease lots, recreation and Interior Health. The DLC communicates regularly with the forest and range sectors and responds to referrals, completes block walks and provides comments and recommendations on the larger landscape planning with range use, forest development, forest stewardship, timber supply and associated intention papers issued by the Province. The District relies fully on funding and in-kind contributions from Federal/Provincial government, Okanagan Basin Water Board, neighbouring purveyors, and other partnerships or subsidizing opportunities. Currently DLC has made funding application to [Forest Enhancement BC](#) for landscape level wildfire reduction planning and operations that cover five community watersheds and requires collaboration from four different purveyors, two Regional Districts and the Province.

Fraser Basin Council

Shuswap Watershed Council

The Shuswap Watershed Council (SWC) is a collaborative program of three regional districts, the Secwepemc Nation, two municipalities, and two provincial government agencies. Its mandate is to protect and enhance water quality in the Shuswap watershed for the long term through collaboration. The SWC facilitates a working group of water quality monitors in the watershed; the purpose of this group is to share information about monitoring and water quality data, discuss arising issues, and provide technical support to the SWC. The SWC has also supported additional water quality monitoring, over and above what is done by various agencies and organizations in the watershed. In 2017, it facilitated a short-term monitoring project to test Shuswap Lake for the presence of nonylphenols. The SWC is also supporting a three-year research project in partnership with UBC-Okanagan to determine the sources and loadings of nutrients (P and N) in the Shuswap and Salmon Rivers, two main tributaries to Shuswap Lake. The SWC also leads the development of an annual regional water quality report. It receives water quality data from various monitors in the watershed and prepares a short report suitable for a lay audience. This document is made readily available to residents and visitors in the

Shuswap.

Fort Nelson First Nation

Liard Basin Monitoring Initiative

Fort Nelson First Nations owns and operates a number of climate and hydrometric stations in the far NE of BC. We have been collecting information on water quality and quantity, snow quality, snowpack information and a number of terrestrial monitoring data values as well.

Living Lakes Canada

Various Community-based monitoring programs and the National Roundtable on Community-based monitoring

Living Lakes Canada facilitates collaboration in education, monitoring, rehabilitation, and policy development initiatives for the long-term protection of Canada's lakes, rivers, wetlands and watersheds. Living Lakes Canada facilitates CABIN trainings; eDNA testing for CABIN, Sensitive Habitat Inventory and Foreshore Inventory Mapping; Brilliant Headpond Community Initiative; BC Lake Monitoring; Columbia Wetlands Stewardship Partnership; Columbia Water Monitoring Framework and Open Source Data Hub; and the Columbia Basin Groundwater Monitoring Program.

Mainstreams

Columbia Basin Water Quality Monitoring Project

Mainstreams coordinated and participated in the citizen-scientist based Columbia Basin Water Quality Monitoring Project (CBWQ) from 2007-2018. Over those years, a total of 14 community groups in the East and West Kootenay have monitored local streams. The groups used the Canadian Aquatic Biomonitoring Network (CABIN) protocols as its foundation, supplemented additional water chemistry, water temperature and flow measurements. Consultants were engaged to analyze and interpret the results gathered by the groups. Data from CABIN monitoring were entered into the Environment Canada CABIN database while CABIN reports, temperature, water chemistry, flow data and summary reports are placed on the CBWQ website (www.cbwq.ca). Each participating community group chose how to present and use their collected data to their communities. Mainstreams also delivers a number of water education programs to both schools and communities.

Morice Water Monitoring Trust

Upper Morice River Water Monitoring Program

The vision of the Morice Water Monitoring Trust (MWMT) is a collaborative, long-term, science-based program to collect and disseminate water quality and water quantity information for the Morice Water Management Area (MWMA). By defining existing conditions, and identifying where water-related issues exist, information can be provided to all those involved in natural resource management decision making, resulting in better decisions based on collaboration, that protect aquatic values in the Morice watershed. The vision also includes educating the community about water values that may be influenced by natural resource management and influencing the implementation and effectiveness of plans within the MWMA. The vision of the

MWMT will be fulfilled by water monitoring that provides the information necessary to assess the implementation and effectiveness of British Columbia / Wet'suwet'en government to government agreements, and related natural resource management activities, plans, and policies in the MWMA. By using scientifically rigorous methods to collect time series data on fish habitat, water quality and hydrologic integrity, information gaps can be filled to reduce information uncertainty. Also, by using scientifically rigorous indicators of natural resource sustainability and ecosystem health, monitoring efforts can be made more efficient and effective. This approach provides credible results that support continuous improvement of Morice Plans and land and water use activities, resulting in better management of environmental values in the MWMA. It is also intended that the lessons learned in the MWMA will be extended to the rest of Wet'suwet'en traditional territory, and that other neighboring First Nations and governments will benefit by examining the successes and failures of the Trust's monitoring efforts.

Regional District of Nanaimo

Drinking Water and Watershed Protection Program

The Drinking Water and Watershed Protection (DWWP) program administers education, science and planning/policy support initiatives to support the region's water sustainability goals. Two of the key water monitoring initiatives include:

1) Community Watershed Monitoring Network - started in 2011- surface water quality sampling, with trained volunteers from 13 different stewardship groups, monitoring at over 60 sites in over 25 watersheds within our region. We train the volunteers annually, using Provincial protocols handed down to us from the MoE. We then enter the data into the Provincial EMS database. Sampling is done for temperature, dissolved oxygen, turbidity and conductivity in the summer low flow and the fall flush periods.

2) Volunteer Observation Well Network - started in 2014- to fill gaps in the Provincial Groundwater Observation Well Network, we have instrumented over 30 wells in our region to measure groundwater levels, temperature and sometimes conductivity. This covers aquifers across our region. The data is shared with the Province and displayed in their Aquarius Water Data Portal (for the wells where owners have agreed to make the data public).

This data is reported to the public, used to track trends over time and analysis of these datasets is being developed to support planning and decisions at the local and provincial levels.

Skeena Fisheries Commission

Morice Water Monitoring Trust, Upper Bulkley Water Monitoring, Gitanyow water quality and quantity planning initiative, etc.

The Skeena Fisheries Commission (SFC) is an aboriginal organization that focuses on fisheries management, science, and conservation in the Skeena River watershed and north coast. The SFC Technical Committee is largely composed of fisheries biologists and watershed-centric scientists. The SFC works within a wide variety of projects focused on different objectives and encompassing a range of collaborative frameworks. Examples include development of water monitoring programs aimed at developing specific water quality guidelines to advance watershed governance, identifying the best scientific approach for maximizing efficiency and

collaboration between a variety of stakeholder groups, research, and data analysis and data interpretation for watershed-specific problems.

Skeena Knowledge Trust

Skeena Salmon Data Centre

The Skeena Knowledge Trust (SKT) is a charitable organization formed in September 2017 following a multi-year collaboration between the Bulkley Valley Research Centre, Office of the Wet'suwet'en, SkeenaWild Conservation Trust, and the Pacific Salmon Foundation to address the need for improved knowledge management and more informed decision-making pertaining to salmon and salmon habitat within the Skeena River watershed and estuary. In order to maximize the accessibility of data relevant to Skeena salmon, the SKT has developed the Skeena Salmon Data Centre (SSDC, <https://data.skeenasalmon.info/>), a publicly-accessible, online data warehouse and library based on open-source CKAN software, and provides users with access to a comprehensive collection of relevant reports, data, and spatial files. Water quality (water chemistry, sedimentation, and temperature) and water quantity (hydrology) are important indicators of freshwater salmon habitat and are included as a principle category in the SSDC. Water quality and quantity within the Skeena River watershed is currently monitored by numerous community, First Nations, industry, and government organizations, and the information collected is often project-specific and not accessible for integration into larger studies. The SKT is working towards developing the SSDC as a platform where water quality and quantity information may be shared among organizations and made publicly accessible where possible in order to provide a clearer picture of freshwater salmon habitat in the Skeena River watershed, promote synergies in data collection and data management, provide public education on water quality concerns in the Skeena watershed, and support more informed land use decision-making.

Slocan Streamkeepers/Passmore Laboratory

Four local community water monitoring programs

The water monitoring programs for small mountain creek consists of regular testing of turbidity, conductivity, suspended solids and coliform bacteria. In addition, creeks are monitored for flow using automated sensors, gauges and instream measurements for calibration. Approximately 50 samples a year are collected for physical tests and 5 microbiological tests over a month are done in late summer.

Tsleil-Waututh Nation

Burrard Inlet Water Quality Objectives Update

The number one priority in the Burrard Inlet Action Plan is to revise the water quality objectives (WQOs) for Burrard Inlet. Provincial Water Quality Objectives (WQOs) set limits within which various parameters should remain to enable sensitive uses of the waters within Burrard Inlet. Tsleil-Waututh Nation, the BC Ministry of Environment and Metro Vancouver had all identified a need to update the provincial WQOs for Burrard Inlet. The current water quality objectives for Burrard Inlet were created in 1990 by the BC Ministry of Environment as provisional ones. They were developed to protect aquatic life, wildlife, and human recreation from pollution in the inlet,

but they are outdated. They do not include all contaminants of concern, and do not reflect new monitoring data, current detection limits or First Nation uses. These objectives are a very important component of environmental stewardship because they define what can be considered clean, safe, or within the range of natural conditions. They set a level of tolerance for pollution. If water quality data fall outside the objectives, changes to environmental management practices may be warranted. The process of updating the WQOs will enable a better understanding of the levels of various contaminants in Burrard Inlet and the trends over time, identify data gaps and opportunities for coordinated monitoring, and lay the groundwork for collaborative efforts to reduce pollution. The WQOs essentially set the standard for water quality in Burrard Inlet. Tsleil-Waututh has been working with the BC Ministry of Environment to develop a collaborative and inclusive process for the update. This multi-year project began in earnest in the fall of 2016 with the establishment of a multi-sector Roundtable and Technical Working Group to guide the gathering of data and development of updated WQOs.

Coastal First Nations' Regional Monitoring System

The Regional Monitoring System was developed because Coastal First Nation communities have a strong desire to know more about what is going on in their territories and the region and work toward common goals. The Regional Monitoring System supports this by providing:

- a standardized approach to monitoring priority issues at the regional scale;
- tools for communities to collect, store, and retrieve their data;
- coast-wide data to compile and compare for use by communities; and
- support to communities to use the information in planning and decision-making.

The issues currently being monitored reflect priority concerns expressed by communities regarding damage to cultural sites, over-use and over-fishing, declining populations of fish and wildlife, and the inadequate presence and response of enforcement agencies. Coordinated monitoring efforts mean that First Nations have stronger relationships with resource users, an enforcement presence in the region, a solid baseline of data for planning, management, and decision-making, and a clear case for conservation.

Appendix C: Workshop Participant Biographies

(in alphabetical order by first name)

Allison Oliver

Skeena Fisheries Commission

I am an aquatic ecologist and biogeochemist based in Hazelton, B.C. I have a M.Sc. and Ph.D. in aquatic ecology from the University of California, Davis, and then spent 4 years as a post-doc researching coastal carbon processes with the Hakai Institute and the University of Alberta. My background includes research in the field of aquatic ecology, including water quality monitoring and analysis, limnology, hydrology, soil-freshwater-marine linkages, aquatic community analysis, benthic macroinvertebrate ecology, coastal estuarine processes, constituent flux modelling, and wild fish conservation. I have spent much of the last 10 years of my career in academia, while simultaneously dabbling in consulting. I have been working as an aquatic ecologist with the Skeena Fisheries Commission since spring, 2018.

Carol Luttmmer - Facilitator

Carol Luttmmer Consulting

Carol Luttmmer is an independent consultant with 15 years of experience in environmental research, monitoring, and project management with a focus on water monitoring, land-use and watershed planning, environmental assessment and remediation, and biodiversity conservation. She has extensive field work experience in Arctic, arid and semi-arid, and mountainous environments. She has worked on complex projects engaging diverse stakeholders including academia, government, non-government organizations, Inuit, First Nations, and private industry. Carol researched and prepared the report, [Water Monitoring in British Columbia: Scanning the Data Landscape](#). She has a Bachelor of Science in Water Resources Engineering and a Master of Science in Geography (geomorphology).

Chelsea Mottishaw

City of Dawson Creek

Chelsea Mottishaw is a mother, a nature enthusiast, and a yogi focused on aligning her passion for the environment with policy and water security. She holds a degree in Geography and Environmental Sciences from the University of British Columbia (Okanagan), and she obtained Professional Agrologist status in 2016. Over the past six years, in her role as Watershed Coordinator at the City of Dawson Creek, her work has focused on flood and drought management, water quality, and managing research regarding freshet timing and water balances. Her current work is focused on municipal flood mitigation planning, climate change adaptation, and dam safety programs while aligning stakeholder goals and challenges with the strategic priorities for the Watershed Stewardship Program. In 2019, Chelsea is committed to establishing the Kiskatinaw Advisory Group to better address the array of challenges facing Dawson Creek's sole water source.

Ekaterina Daviel*Skeena Knowledge Trust*

Ekaterina Daviel holds a B.Sc. in Environmental Science from the University of Northern BC and a master's in Environmental Science from the University of Toronto. Ekaterina has over four years of experience working as an environmental consultant on contaminated site assessment, remediation and environmental risk assessment projects primarily within the upstream oil and gas sector. In addition, Ekaterina had the opportunity to join the City of Dawson Creek's Watershed Stewardship Program, where she worked on a variety of projects including water quality characterization, streamflow monitoring, and stakeholder education and engagement around the Kiskatinaw River Watershed. Ekaterina currently works with the Skeena Knowledge Trust as a Data Management Specialist.

Ian Sharpe*Morice Water Monitoring Trust*

Ian Sharpe BSC, MSc, RPBio (ret.) has worked in various disciplines related to aquatic ecology and environmental management over the last 35 years. Since 1992, Ian has worked in Smithers for the BC Ministry of Environment, Environmental Protection Program as a biologist, supervisor and regional director. Much of this work has involved promoting and enabling citizen and First Nation participation in aquatic monitoring and impact assessment. Highlights of this work have included forming and supporting numerous lake and watershed stewardship groups, creating and maintaining a First Nations biologist-in-training program, pioneering the Canadian Aquatic Biomonitoring Network system in the region and the creation of the Morrice Water Monitoring Trust (MWMT) in partnership with the Wet'suwet'en First Nation. Ian has also taken a leadership role in setting site specific water quality objectives for use in regulatory decision making, developing new landscape level aquatic impact monitoring tools for the forest industry (lake sediment coring, automated water sampling and various kinds of biomonitoring), using biomonitoring tools in marine spill damage assessment, and most recently, assisting researchers in the development of new genomics based aquatic biomonitoring tools. Currently, Ian is a volunteer trustee for the Morrice Water Monitoring Trust, with a focus on improving efficiencies and scientific rigor of the Trust's water monitoring program. He is also a contracted advisor as part a new multi-stakeholder initiative to create BC Water Sustainability Act Water Objectives for the Upper Bulkley river area. His future plans include assisting in developing collaborative approaches to aquatic monitoring, assessment and decision making, and open source environmental data hubs.

Jennifer Yeow*Slocan Streamkeepers/Passmore Laboratory*

I was trained as a microbiologist and worked for many years in industrial analytical laboratories. After moving to the Kootenays, my husband and I began working with local community groups to monitor water quality and quantity on small streams using RISC criteria. With the help of scientists and forest hydrologists, we developed a program to assess and monitor changes in creeks due to development activities - notably road building and logging. To enable this work, we established a laboratory and currently test drinking water for local cities and improvement

districts. The lab participates in proficiency testing (CMPT) and is certified through the Provincial Enhanced Water Quality Assurance (EWQA) Program. Over the years we have worked with many local groups, done outreach in schools and participated in the CABIN Benthic Invertebrate monitoring program through the Columbia Basin Watershed Network.

Julie Pisani

Regional District of Nanaimo

Julie is program coordinator for the Drinking Water and Watershed Protection (DWWP) program at the Regional District of Nanaimo (RDN) on Vancouver Island. She has been with the RDN since 2011, and through the DWWP program implemented initiatives in water outreach, water monitoring and water policy. Her background is in Environmental Studies and Writing (UVIC, 2010) and Watershed Management (UBC, 2016) and she is currently working on her Masters of Environment and Management (Royal Roads, 2020). Julie has facilitation training through Waterlution and a background in environmental interpretation with Parks Canada. The DWWP Action Plan that guides the program just completed 10 years of implementation, and in 2019 an Action Plan Update will be completed to set the stage for the next decade. Collaboration with the Province, stewardship groups and industry as well as having a long-term funding model for program delivery were two winning conditions that led to the many successes of the DWWP program in the first decade. Looking ahead, the focus for the DWWP program is in operationalizing the data collected to better inform water management and land use planning in the region, while continuing to foster strong working relationships across sectors, levels of government and with First Nations.

Kat Hartwig

Living Lakes Canada

Kat grew up in southeastern BC where she managed her 10,000-acre family ranch for 10 years. She has been involved in international, national and regional environmental advocacy relating to sustainable tourism, endangered species, corporate social responsibility and water-based ecosystem health since 1983. As co-founder and executive director of Living Lakes Canada since 2010, Kat continues to advocate for land and water policy and protection mechanisms necessary to support biodiversity, source water protection and climate resilient communities. She participates in the BC Water Leaders consortium and is an advisor for the Columbia River Wetlands Stewardship Partnership, Small Change Fund, the Vancouver Foundation Environmental granting program, the Canadian Freshwater Alliance, and the Columbia Basin Trust Climate Resilience Advisory. Kat is currently on the Board of the Columbia Basin Water Stewardship Network and German based, Global Nature Fund. She continues to facilitate water stewardship with all levels of government and First Nations through cross-sector corporate, academic and NGO partnerships and collaborations. She lives with her family near the headwaters of the Columbia River. Kat's current work includes: developing a comprehensive water monitoring framework to fill data the water data gaps in the Columbia Basin in order to support informed decision making; Open source data and data portal to connect all water related data for the Columbia Basin; a national round table for Community Based Water Monitoring to advocate Federal acknowledgement and or support for CBWM in Canada; co –

coordinating and facilitating the logistics of, and fundraising for Living Lakes Canada's water programs (e.g. groundwater monitoring; surface water monitoring; snowpack monitoring; CABIN training; Sensitive Habitat Inventory Mapping; Columbia Wetland Stewardship Partnership).

Lara Hoshizaki

Coastal First Nations - Great Bear Initiative Society

Lara coordinates the Regional Monitoring System used by First Nations' Stewardship Offices along the Central Coast, North Coast and Haida Gwaii. She brings a passion for data and technical details to the Coastal Stewardship Network and delights in telling stories with the data collected by Coastal Guardian Watchmen as they patrol their territories along the coast. Lara holds a Msc. in Resource Management and Environmental Studies from the University of British Columbia and has worked across sectors, including the provincial government, non-governmental organizations and in private consulting. Throughout her academic and professional career, Lara has developed expertise in geographic information systems, conservation planning, environmental impact assessments, and community-based monitoring.

Laura Duncan

Laura was co-founder of the East Kootenay Environmental Society which is now known as Wildsight and is also a co-founder of Mainstreams. The impacts of mining on land and water were a major focus for many years, leading to a diploma in Restoration of Natural Systems and in Permaculture. These have led to a focus on water monitoring and water education within Mainstreams. As Program director for Mainstreams, she coordinated the Columbia Basin Water Quality Monitoring Project and plays a lead role in the Water Education Programs.

Lauren Fegan

Regional District of Nanaimo

After completing a BSc from University of Calgary (2006), Lauren began volunteering for central Vancouver Island environmental organizations completing projects in stream restoration, water quality sampling, smolt counting, and community outreach. As part of her volunteer work, she created, organized, and presented water education to classrooms across SD 69. Lauren worked for the non-profit Nanaimo & Area Land Trust (2010 – 2011), assisting on many of their projects including, the Nanaimo River Symposium, NALT Native Plant Nursery, and Nanaimo River Watershed Baseline Report. She started with the RDN's Team WaterSmart under the Drinking Water & Watershed Protection program in 2012, continuing water education and outreach in the community. She completed her Resource Management Diploma from Vancouver Island University in 2013, expanding her knowledge in environmental legislation, monitoring procedures, and ecology in BC. Currently, her role at the RDN includes project lead on the Community Watershed Monitoring Network, the Well Water Testing Rebate, and the Volunteer Observation Well Network. Lauren looks forward to continuing to grow and refine these programs at the RDN in partnership with community organizations, first nations, local stakeholders, and municipal and senior governments.

Mike Simpson

Fraser Basin Council

Mike Simpson facilitates multi-stakeholder initiatives addressing complex environmental and natural resource management issues involving all orders of government (local/municipal, provincial, Aboriginal, federal), the private sector and civil society. Experienced in dealing with various issues including forestry, interface fire, agriculture, mining, trails, recreation, watersheds, water quality, wildlife, Aboriginal title and rights, economic development, fisheries, invasive species, air quality, sustainable development, flood and debris flow. He also provides governance and strategic planning support to small organizations and collaborative initiatives.

Mike has a BScF from University of Toronto (1994), an MA in conflict resolution Royal Roads University (2004) and has been a professional forester in BC since 1996. He is currently Senior Regional Manager with the charitable non-profit society Fraser Basin Council based in Kamloops. The primary mandate of the Fraser Basin Council is to advance environmental, economic and social sustainability in British Columbia with a core focus on the Fraser River Basin, using a collaborative, inclusive, impartial approach. Before joining Fraser Basin Council in 2006, he consulted in the forest industry to forest products companies, provincial governments, woodlot licensees, private landowners and other tenure holders predominantly in the area of pre-harvest planning at the stand and forest level, but also in logging supervision, log sales and silviculture in the Cariboo-Chilcotin.

Norm Zirnhelt

BC Lake Stewardship Society

Norm Zirnhelt is a Registered Professional Biologist with over 35 years experience in water and air quality. Norm was head of the BC Ministry of Environment's Air/Water Quality Monitoring and Impact Assessment Section for the Cariboo Region from 1989-2010. Norm has been Principal Consultant at his consulting firm, Cariboo Environmental Quality Consulting Ltd. (CEQC) since 2010. CEQC has completed projects on lakeshore protection in sensitive areas, aquatic benthic biology, fish tissue & water chemistry assessment in the mining sector, analysis of aquatic benthic data from a range of sites for the Ministry of Environment, and has developed & conducted training courses for impact assessment biologists for the MOE, as well as Ducks Unlimited staff. Norm instructs a course for Vancouver Island University on Water Quality Monitoring and Design. Norm is currently conducting lake monitoring for the BC Lake Stewardship Society (BCLSS), a non profit society dedicated to the preservation and protection of British Columbia's lakes. In addition, since 2011 Norm has conducted Lakekeepers training for lake stewardship groups in the interior of BC. In 2018 Norm was lead author on a collaborative analysis of how to integrate lake monitoring programs in BC. Participants were the BCLSS, the Ministry of Environment and Climate Change, and Living Lakes Canada.

Patti Meger

District of Lake Country

As a passionate environmentalist with a Bachelor of Science, Patti Meger works as a local government Water Quality Technician in the Central Okanagan and is involved on various water use and protection boards. Patti undertakes many duties in the process of fulfilling obligations

of the District of Lake Country's Water Master Plan, with the goal of attaining water treatment over the next 10 years. She has been involved in initiating monitoring programs for Lake Country's distribution systems, intakes and watersheds and willingly shares these with neighbouring purveyors. One of her primary responsibilities is implementing protection plans for community watersheds. She recognizes the importance of grants and partnerships with various stakeholders to develop and implement sustainable management plans to protect the Okanagan valley's water resource. Patti's current priority is working with other local governments, First Nations, forest professionals, ranchers, various branches within the Province and the BC Wildfire Service, to develop a strategic landscape level wildfire plan. Establishing and maintaining these and other collaborative partnerships is essential to successfully managing and protecting our most important natural resource.

Appendix D: Summary of pre-workshop survey results

Participants were asked to complete a pre-workshop survey in order to help design the workshop agenda and ensure the most effective peer-to-peer learning during the one-day workshop. Below is a summary of the pre-workshop survey results.

What is the goal or main objective of your program?

The majority of programs represented at this workshop are conducting baseline, status & trend and applied research (eg. to inform resource management) monitoring. Some are compiling data collected by others and some are collecting data for regulatory and compliance purposes. In general, the program goals represented in this workshop fall under two main categories- to inform decision making (e.g. watershed and resource management) and to engage community.

Program Successes & Challenges

Survey respondents were asked to list their top three program challenges and top three success. In general, the challenges could be grouped into several themes including:

- *Staffing/Maintaining volunteers/Accessing support;*
- *Sustaining long term funding;*
- *Relationship building;*
- *Translating monitoring results into action and decisions;*
- *Data handling/management;*
- *Ensuring data quality,*
- *Challenges associated with multiple layers of responsibilities (different responsible jurisdictions); and*
- *Justifying being proactive versus reactive.*

Interestingly, many survey respondents reported successes in same theme areas including:

- *Staffing/Maintaining volunteers/accessing support;*
- *Relationship building;*
- *Securing funding;*
- *Data handling/management; and*
- *Ensuring data quality.*

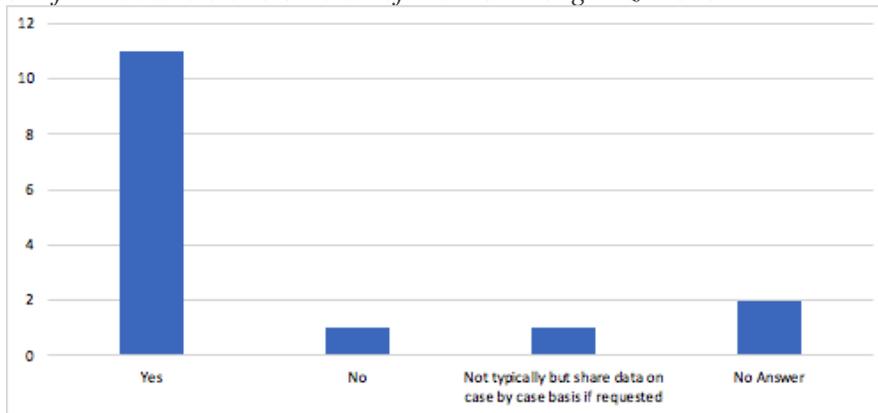
Program successes also included developing governance mechanisms and increasing water literacy.

Is there anything that you are currently not doing in your program that you would like to do?

In general, programs want to see increased collaboration/monitoring, training/education, influence on decision making, and more sustained funding.

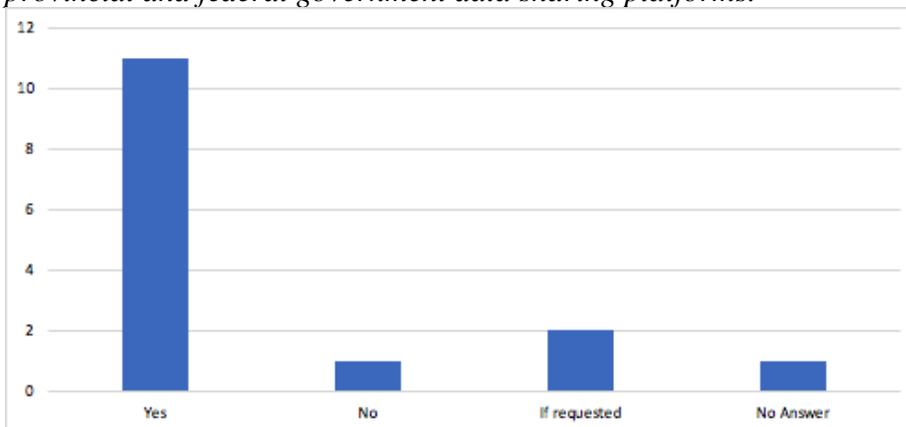
Are you collecting data to inform or influence decisions outside of your own organization?

The majority (11 out of 13 of survey respondents that answered the question) are collecting data to influence decisions outside of their own organizations.



Are you sharing data outside of your own organization? If so, how?

The majority (11 out of 15) of survey respondents are sharing data outside of their own organizations, and two reported that they share data if requested. Data are being shared in a variety of ways, including through direct requests, in reports, and on non-government and provincial and federal government data sharing platforms.



How would you rate your organization's current capacity to achieve your program goal?

Survey respondents were asked to rate the current capacity of their organizations to achieve their program goals. Results are biased as the survey was targeted at "leaders/successful programs" and only includes those that filled out the survey. Eight out of 14 respondents had below "moderate" capacity (at or below 50 on a scale of 0 - 100 where "0" was high need for increased capacity and "100" was significant capacity).

What would you like to see as outcomes from the workshop?

Survey respondents want to learn from others, influence funders to broaden recognition for the need for support and to refine funding models, and to develop networks and collaborations.

What would you like to learn from other programs?

Survey respondents indicated they would like to learn how to:

Build partnerships

- How they profile their work/accomplishments/achievements outside of their own organization*
- How to meaningfully engage a complacent public audience WITHOUT having a crisis to grab their attention*
- How other programs were able to engage/collaborate with government regarding needs such as hydrometric station development, online tools, etc.*
- How they involve community/ elders*
- What were successful approaches to working with First Nations or supporting First Nations communities in water monitoring.*

Maintain staff

- How to deal with turn-over of volunteers*
- Techniques of keeping volunteers or people being paid small amounts of money*

Achieve long-term funding

- Learning more about other program funding models*
- How to achieve on-going funding*
- Funding models*

Field techniques/Program development/Data

- Appropriate choices of protocols and equipment*
- What documentation are you ordered to do from health authority?*
- What sorts of programs/tools exist to support community-led monitoring?*
- Successes and challenges of other groups/programs*
- Their objectives, activities and what their challenges are*

- *The challenges facing other water monitoring initiatives in BC, what kind of information is being collected by other programs, how they are managing and sharing their information, and how they are using it to further their objectives.*
- *Current strategic goals and how they are determined.*
- *Influence of climate change. Have the groups witnessed it in their region, if so, how, and how are they looking to convey that information to policy makers.*
- *Where others are at in similar programs.*
- *Data to policy; data storage; costs and collaboratives; data gaps and timelines and budgets required to fill them*

Influence decision making

- *How they are able to continue and, integrate findings in management decisions.*

What would you like to see in the workshop summary report?

What would like to see in workshop summary report?	Proposed Action
<i>Summaries of the success and challenges of representatives at meeting - a sense that there is a way to link individual groups and perhaps different regions so that data collected is at least complementary and comparable - are there common goals & objectives?</i>	Include summary of pre-workshop survey results (successes and challenges) in workshop report
<i>How to move forward Clear outcomes and next steps.</i>	Make recommendations in workshop summary report on how water funders and province can amplify regional/local efforts
<i>Review of monitoring approaches, resources, new and upcoming tools, and collaboration/engagement opportunities.</i>	-Could make as recommendation to funders for next steps.
<i>Review of individuals projects and what they are doing, challenges and accomplishments, etc.</i>	-Include summaries of projects represented at workshop. -Could make as recommendation for water funders as next steps to summarize all programs
<i>Contact information for participants</i>	Ask participants.
<i>A summary of water monitoring initiatives in BC with a listing of websites and/or</i>	-Have a start from previous work. Could make as recommendation for water funders as next

<p><i>contact information, a summary of common challenges and solutions to those challenges, and a summary of potential funding sources for water monitoring and data management.</i></p>	<p>to improve and make public.</p>
<p><i>Opportunities for growth; A list of funding mechanisms</i></p>	<p>Could make as recommendation for water funders as next steps. See- http://cbwn.ca/resources/grants-database/</p>
<p><i>The importance of local governance for water sustainability</i></p>	<p>-See papers and reports from POLIS including upcoming “A Handbook for Water Champions: Strengthening Decision Making and Collaboration for Healthy Watersheds” (waiting publication) -this workshop may identify governance as priority; include in workshop summary report</p>
<p><i>Enactment of a program by the Province or other Institution whereby community groups could continue monitoring and have the findings/recommendations supported</i></p>	<p>Make recommendations in workshop report on how this could be done.</p>
<p><i>State of the art and science of collaborative water monitoring Provide examples of best practices; where there are already synergies and collaborations ready to be funded and will provide significant outputs and based on readiness</i></p>	<p>Make recommendations in workshop report.</p>

Appendix E: Agenda

- 8:30-9:00** **LIGHT REFRESHMENTS & COFFEE**
- 9:00-9:15 Introduction - Workshop Objectives & Context and Roundtable intros
- 9:15-10:30 Participant Presentations- Program Descriptions
- 10:30-10:45** **HEALTH BREAK**
- 10:45-11:15 Participant Presentations- Program Descriptions cont'd.
- 11:14-12:15 **Workshop Session- Sharing Successes & Challenges: Part 1**
Activity: Sharing Challenges & Solutions; categorizing challenges into themes
- 12:15-1:00** **LUNCH (provided)**
- 1:00-1:30 **Workshop Session- Sharing Successes & Challenges: Part 2**
Activity: Assessing programs in context of Knowledge Management Framework; identify which activities need more support, identify tools and resources to support those activities and who can provide those tools and support.
- 1:30-1:50 Update on Community-Based Monitoring Roundtable in Ottawa
- 1:50-3:00 **Workshop Session- Roles & Functions**
- Activity: Roundtable discussion of examples of effective collaboration
- Activity: Break out groups: What role do you see for the provincial government in your program?
- 3:00-3:15** **HEALTH BREAK**
- 3:00-4:30 **Workshop Session- Opportunities and Recommendations**
Activity: Roundtable discussion to identify priority needs, opportunities and recommendations
- 4:30-5:00** **Wrap-Up & Feedback Forms**

This workshop will be held under Chatham House Rule: "participants are free to use the information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed".