



POLIS Project on Ecological Governance

watersustainabilityproject

Creating a Blue Dialogue Webinar Summary
Strengthening Monitoring and Reporting for B.C.'s Waters
December 5th, 2016

Attendance

Approximately 100, including First Nations, federal, provincial, and local government staff; students and researchers; private sector professionals; and environmental NGOs.

Introduction

Interest is growing across sectors to identify opportunities to improve watershed monitoring and state-of-the-watershed reporting. The British Columbia *Living Water Smart* policy recognizes that "we can't manage what we can't measure" and makes a commitment to improving monitoring and regular "state of" reporting. There is a real opportunity to collectively explore how to create a robust foundation of shared information for watershed governance in B.C.

In this webinar, Elizabeth Hendriks (VP Freshwater, WWF-Canada) provided an overview of some of the information gaps, and the solutions and tools available to improve watershed monitoring. Katrina Connors (Director, Skeena Programs, Pacific Salmon Foundation) shared her experience in the Skeena region developing collaborative partnerships and the Salmon Explorer tool. Ben Kerr (CEO, Foundry Spatial and Senior Water Scientist) offered a brief look at the data visualization tools his team has developed, such as the *BC Water Tool*.

Guest Speakers

Elizabeth Hendriks (VP Freshwater, WWF-Canada) led the creation of the first national water policy database and has worked with the U.S. State Department on water issues. Prior to WWF-Canada, she worked at the POLIS Project and with Waterlution.

Katrina Connors (Director, Skeena Salmon Program, Pacific Salmon Foundation) has served as the secretariat for a multi-sectoral governance initiative in the Skeena watershed. She is pursuing her PhD, investigating mismatches between the narrow scope of Canadian federal environmental assessments and the broader scales at which the impacts of development are realized.

Ben Foundry (CEO and Senior Water Scientist, Foundry Spatial) leads a team of scientists and developers creating decision support tools. Drawing on a diverse background in multiple resource industries, he connects billions of pieces of data with intuitive and flexible interfaces that let people quickly and easily make sustainable decisions about water.

About the Series

Hosted by the POLIS Water Sustainability Project at the Centre for Global Studies, University of Victoria, *Creating a Blue Dialogue* brings together expert water practitioners and thinkers, as well as emerging water leaders, to engage with innovative ideas on water policy and governance in Canada. By creating an online community of interest, the webinar series serves to strengthen the national capacity to engage with and solve problems, and raises awareness about emerging Canadian water issues, best practices, and policies.

Part 1: Strengthening Monitoring and Reporting

Presented by Elizabeth Hendriks (WWF-Canada)

Although many water reporting tools have been developed and implemented on a provincial scale, Canada lacks a robust national-level dataset describing the health of its major watersheds and the threats they face. WWF-Canada has been working to produce a resource that encapsulates the current state of Canada's 25 major watersheds, and has thus far have completed watershed reports for 19 of these watersheds. These reports aim to assess the current health of freshwater systems and the threat of human activities. They also measure data sufficiency for each watershed based on long-term data sets. Data sufficiency is key to assessing watersheds with certainty, identifying knowledge gaps, and improving freshwater management. Overall, Canada lacks sufficient data to assess its watersheds with certainty, and lacks a robust assessment strategy that is clear, concise, and meaningful to the public. WWF-Canada's watershed reports complement local watershed reports and allow government bodies to collaborate on larger watershed scales.

Three Recommendations for Future Monitoring and Reporting

1. Coordination and Collaboration

While an opportunity exists to expand collaboration across Canada and to build a robust national-level database, thoughtful coordination is important to ensure the aggregation of this data is successful. Challenges include inconsistent protocols (around, for example, indicators, parameters, and temporal reporting), the broad diversity and focus of partners, a varied reliability of data, and the changing nature of data. Standardizing monitoring practices has the potential to lead to greater regional integration and allow for stronger comparative analysis. Several regions in Canada have created a standard monitoring process. For example, Living Lakes Canada has monitoring programs in the Columbia River wetlands and on Lake Winnipeg. The programs train citizens to collect consistent information that is incorporated into established datasets. In Ontario, the Federation of Ontario's Cottagers Associations collaborates with the provincial Ministry of Environment and Climate Change to collect consistent freshwater data across the province.

2. Availability

Government funding for monitoring programs has continually decreased, and community groups have taken on more monitoring responsibilities to support long-term monitoring projects and data collection. Furthermore, established monitoring stations may not be evenly distributed or located in the most opportunistic locations. There are opportunities to build community groups that engage with long-term monitoring projects to ensure continuity. These groups should involve First Nation governments, academics, and communities to ensure a representative coverage of interests. More data is not necessarily better, but there is an opportunity to identify areas of high risk or high data deficiency and extend monitoring coverage to these areas. As an example, the Lake Winnipeg Foundation runs a successful citizen science lake monitoring program that is adaptive to local fluctuations.

3. Communication

Water interactions are transboundary, multi-faceted events. River data alone cannot communicate the health of a watershed: there are many other metrics (e.g. groundwater, wetlands) that should be considered when assessing the health of a watershed. While watershed reports are a medium for communication with the general public, opportunities need to be created that allow for different organizations to communicate with decision-makers. An opportunity exists to expand the indicators of watershed health in a way that both captures these other considerations and communicates this information to the public in a meaningful way. Furthermore, once that data is collected, that information should be translated into proactive policies and regulations. Ideally, a perfect communication system would build a stewardship ethic and convert data into concrete policy and behavioural changes, and create a feedback loop linking raw data, reporting, public awareness, and decision-making. Indigenous water knowledge will also play an important role in advancing our freshwater monitoring programs.

Part 2: Pacific Salmon Foundation: Skeena Salmon Program

Presented by Katrina Connors (Pacific Salmon Foundation)

The overarching goal of the Pacific Salmon Foundation (PSF) is to support the conservation, restoration and enhancement of pacific salmon and their habitat. The Community Salmon Program has distributed \$1.5 million to community organizations that undertake salmon projects, and has recently spearheaded a number of salmon science projects, such as the Skeena Salmon Monitoring Program.

Monitoring in the Skeena Region

The PSF first became involved with the Skeena region in 2007 by convening an independent science review panel. The Panel was tasked with assessing the current management strategy of salmon, recommending a renewed approach to salmon management, and identifying critical monitoring needs for salmon habitat. A number of critical gaps were identified, and the panel recommended the establishment of several new monitoring programs, as well as a governance body to regulate conflicts. The Skeena Watershed Initiative was created soon after to act as a local governance body, however the initiative ended in 2011 due to a lack of data and understanding of Skeena salmon. Since then, the PSF has created the Skeena Salmon Program in an attempt to fill this gap. Guided by Fisheries and Oceans Canada's *Wild Salmon Policy*, the program focuses on expanding baseline data, and uses information to assess the biological status of salmon populations. PSF has been working through the Skeena Salmon Program to expand the baseline data on Skeena salmon, assess salmon and habitat, and make this information freely available. Throughout the process PSF has worked in collaboration with the Nisga'a and Skeena First Nations, as well as various communities in the region. The Skeena Monitoring Program uses the Pacific Salmon Explorer (see next section for more details on this tool) as its online platform to make its data openly available.

Pacific Salmon Explorer

The Skeena watershed is the prototype for the Pacific Salmon Explorer (PSE) tool, and PSF is planning to expand the program to other salmon-bearing regions. The PSE can geographically or genetically distinguish between salmon populations and has data relating to spawn abundance, catch and run sizes, exploitation rates, harvest rates, and spawning habitats. The PSE can be used to look at biological status of salmon populations, and the cumulative or individual pressures facing freshwater ecosystems and salmon habitat. The tool can identify current and future industrial developments within watersheds to highlight exactly where industrial projects intersect with salmon habitats. This gives the PSE the potential to be incorporated into land use planning decisions, and to help to minimize future risks to freshwater salmon habitat. The PSE makes data accessible and users have full accesses to figures, graphs, and reports. During the development of the PSE, a Regional Technical Advisory Committee was formed in collaboration with First Nations communities, the B.C. Ministry of Environment, Fisheries and Oceans Canada, and other experts in the watershed. This advisory committee was critical to ground truthing, guiding project methodology, and providing access to local datasets.

Key Benefits of the Pacific Salmon Explorer & Next Steps

The PSE creates a platform where community members can learn about the geographic extent and intensity of different pressures, the cumulative risks, and the future pressures on salmon habitats. Local communities and decision-makers can use the tool to identify, evaluate, and mitigate current pressures on freshwater salmon habitat. The tool can also play an important role in conversations regarding the placement of future developments. The PSE helps to identify gaps in data and provides easy access to data that that can facilitate management decisions.

Forming the Regional Technical Advisory Committee, composed of local experts and knowledge holders, has been a critical step in the success of the PSE. The process has helped to validate data results and create formal linkages between communities and the data collection process. It has also provided the opportunity to incorporate local datasets. Building relationships and partnerships between government, First Nations, and

local communities is key to securing access to good data. Strong relationships between different parties will also help to ensure that the information is distributed to those who have an interest in it.

Part 3: BC Water Tool

Ben Foundry (Foundry Spatial)

In the past, it has been difficult for governments, industry, NGOs, communities, and First Nations to get access to the information that frames the context of water management decisions in B.C. Foundry Spatial has developed two user-friendly tools to streamline this data acquisition process.

The online *Water Portal*, developed for the B.C. Oil and Gas Commission and the B.C. Ministry of Forests, Lands and Natural Resource Operations, brings together information from thousands of monitoring stations across the province in one accessible location. The *Water Portal* organizes data from monitoring stations across Northern B.C. It helps users understand the water supply and suggests the quantity of water in streams, the temporal variation of stream flows, and the environmental flows needs. The data is displayed with flexible charts and analytical tools to assist analysis and comprehension of stream flow data, groundwater data, and climate data.

The complementary *BC Water Tool* helps users to identify and define watersheds: their characteristics, the total amount of water in them, the existing licences, and environmental stream flows. It was designed to assist statutory decision-makers in evaluating new water licence proposals and to help all stakeholders understand the water supply and demand for watersheds in B.C. In cases where stream flow data does not exist the *BC Water Tool* allows users to access models that suggest the quantity and timing of water and environmental flow needs. The *BC Water Tool* also provides access to a list of existing water licences in given watersheds. It gives users access to raw data and the ability to compare multiple years' worth of stream flow data in graphical form, which can be downloaded.

Currently, the *BC Water Tool* focuses on four specific regions: Northeast, Caribou, Omineca, and Northwest. The *Northeast Water Tool* was the first tool to become fully operational in 2012. It allows users to select specific watersheds and download reports on defining the watershed, including information on total amounts of water within a watershed, how much water is currently allocated, and environmental stream flows. The report also provides information on specific characteristics of watersheds, including topography, land cover composition, historical climate, and the potential future climate scenarios. Reports can range from five to 100 pages depending on the size of the watershed and the number of water licences issued. Reports include maps, hydrographs, and information on individual licences. The *Cariboo Water Tool* also displays individual locations of river monitoring stations, climate monitoring stations, and water licences.

Some Successes and Areas of Improvement

The *BC Water Tool* and *Water Portal* were developed to address specific needs and designed to be good at specific tasks. One of the key successes of both tools is that they are easy to use and don't require users to invest a lot of time into learning the programs. Both tools create documents in minimal time and with minimal effort.

However, several gaps and opportunities for improvement do exist, including:

- Significant amounts of monitoring data exist that have been gathered by communities, industries, and others outside of government. Much of this information is not captured by the *BC Water Tool* or the *Water Portal*, and there is the potential to access these underutilized datasets.
- Groundwater has not historically been a focus in B.C., but a new groundwater tool is being developed for Northeast B.C. The *Groundwater Review Assistant* tool will provide, in one central database, information about groundwater, and will produce high-quality reports, much like the *Northeast*

Water Tool. New tools are also being developed to analyze the effects of groundwater pumping on stream flow in collaboration with hydrogeologists at the University of Victoria.

- There is huge potential for collaboration with open datasets. It takes a lot of financial support to carry out on-the-ground monitoring, and historically sharing and mixing datasets has been limited. Sharing data through open datasets has the ability to multiply returns on the initial monitoring investment, while strengthening partnerships.
- Currently, these tools do not address the impacts and effects of land-based activities on water quality, aquifer recharge, and habitat.
- Most tools are still unavailable in southern B.C.

Question-and-Answer Period

Are there plans to expand the Pacific Salmon Explorer tool outside of the Skeena watershed?

Katrina: There are plans to expand beyond the Skeena and the process is underway. Freshwater habitat assessments have now been completed for the Nass River area, and we are looking to complete and summarize some of the biological information. There are also plans to work with First Nations on the Central Coast of B.C. starting next April. The infrastructure of the tool was designed to allow for the integration of other watersheds with goal of eventually accounting for all salmon-bearing watersheds.

How can we scale out some of these tools?

Elizabeth: Canada is a country of regions, and regions remain relatively isolated in their operations. There are huge opportunities for these tools to facilitate learning across the country. Issues like groundwater mapping and measuring cumulative effects are live issues. The transferring of ideas and technology is highly appropriate but we need to find the outlets.

The Province of B.C. is developing monitoring and reporting regulations as part of the *Water Sustainability Act (WSA)*. What are some of the key considerations that should be articulated in these regulations?

Ben: Monitoring and reporting associated with water usage is a big one. Currently, B.C. has data on how much water we *think* is available through models and monitoring stations. We know how much has been licensed, but we don't know how much water licensees are actually using. This is the most glaring hole in our knowledge about water from the usage side. Furthermore, as a province we need to be able to identify priority regions that require high-quality, on-the-ground monitoring based on, for example, resource development concerns, sensitive salmon habitat, and impacts from climate change.

Katrina: For salmon and ecological flows the real challenge is water quantity. A key observation is that salmon populations are struggling to access spawning habitat in the late summer period. Creating ways to monitor and quantify water levels would be useful from a salmon perspective.

Elizabeth: There is huge potential for solutions to emerge out of open access and allowing people to feel ownership and play around with the data. B.C. is flush with strong, knowledgeable organizations working on water, and an opportunity exists to have more than just government bodies and industry trying to create solutions for today's challenges.

Comment from Celine Davis (B.C. Ministry of Environment): The WSA includes the regulation-making powers to develop a regulation on measuring and reporting water quantity and, in some cases, water quality. The WSA team is currently conducting research into what this regulation could and should include. Comments and thoughts on what should be included are welcomed. The regulation development process will involve engagement similar to that has occurred to date.

What are some challenges and lessons learned with integrating local knowledge into your models?

Elizabeth: It is impossible to help everyone. Indicators used in the Watershed Reports are based on data that is sufficiently available at a national scale. The ground truthing work showed where the gaps are and affirmed the important role of community groups in building long-term monitoring and rigorous datasets.

Katrina: In the Skeena, this has been done through technical advisory committees, which provide a way to identify local datasets. Local datasets can be challenging to integrate because they are taken at a much finer scale and often mismatch with other datasets. The Skeena Salmon Program is intended to be a two-step project starting with a high-level overview and then, from that, identifying priority sub-basins where local groups could incorporate field-monitoring programs. It needs to be an ongoing exercise, and is being treated as a living document to be revisited as new data or technology becomes available. Trying to integrate local information takes a lot of time: There is a lot of great information, but much of it is in hard-copy technical reports.

How are these various tools currently linking to decisions on the ground (e.g. provincial, environmental appeals, Indigenous, or others)? The *Northeast Water Tool* is intended to support provincial staff. Is that happening?

Katrina: Some First Nations communities have used the Pacific Salmon Explorer in their discussions with Fisheries and Oceans Canada. There has been some success in lower exploitation rates when the biological status of salmon populations is suffering. The data available has the ability to create a base understanding of the situation. It can then inform negotiations, help identify risks, and help to advocate for change.

Ben: The *Northeast Water Tool* is meant to be a decision-support tool not a decision-making tool. In the absence of the *BC Water Tool*, there is no easy way to acquire information on water supply and demand in a given watershed. The tool is meant to encourage discussion around decisions and move them forward, and to create a representation of the proposed water use within the estimated water supply. There is a risk when tools exist and people put too much faith in them. The goal of the *Water Portal* was to make monitoring data accessible. To the “casual observer” it could appear that there is very limited data available and that decisions are being made with no data. The goal of the *Water Portal* was to “expose” the data that does exist, and provide a place for people to access it.

Comment from Martin Carver (consulting hydrologist): As we move along in making data more available, our expectations for advanced information products (for decision support) will inevitably rise. Our B.C. ecosystems are complex and the datasets remain fairly sparse. So, in the end, we need to sort out what key analytical sub-products would be useful and reliable. We need to be clear on their assumptions and reliability and ask, “which decisions need which sub-products?”

Resources

Part 1: Strengthening Monitoring and Reporting

The Community-Based Environmental Monitoring Network (CBEMN)

CBEMN supports community-based environmental monitoring and management. CBEMN is involved in CURA-H2O, which is a five-year Community-University Research Alliance (CURA) project funded by the Social Sciences and Humanities Research Council of Canada. CURA-H2O aims to increase community capacity for integrated water monitoring and management in Canada and internationally. <http://cbemn.ca/>

Living Lakes Canada

Living Lakes Canada is part of a global network that strives to enhance the protection and rehabilitation of lakes, rivers, wetlands, and watersheds that works to empower ordinary people to take care of local watersheds.

<http://wildsight.ca/programs/livinglakescanada/>

Watershed Reports: Taking The Pulse Of Canada's Rivers

WWF-Canada is completing the first nationwide assessment of the country's watersheds, which will focus on four indicators of river health and seven key threats.

<http://watershedreports.wwf.ca/#intro>

Part 2: Pacific Salmon Foundation: Skeena Salmon Program

Mackenzie Datastream

Mackenzie DataStream is an open access platform for sharing and exploring water data in the Mackenzie River Basin. The platform works to promote knowledge sharing and advance collaborative, evidence-based decision-making throughout the basin.

<http://mackenziedatastream.ca/#/>

Pacific Salmon Explorer

The Pacific Salmon Explorer presents biological data for distinct salmon populations found in the Skeena River watershed, as well as the current human and environmental pressures on salmon habitats.

www.salmonexplorer.ca

Realizing the Potential of Community Based Monitoring in Assessing the Health of Our Waters

This paper (published September 2016) outlines the opportunities presented by a new wave of monitoring efforts that are driven and led by communities. The paper includes five Canadian case studies of community-based monitoring that illuminate the challenges and opportunities associated with CBM.

http://awsassets.wwf.ca/downloads/realizing_the_potential_of_community_based_monitoring_in_assessing_the_health_of_our_.pdf

Skeena Salmon Program

The Skeena Salmon Program works to strengthen the scientific information available on salmon populations and habitats in the Skeena region.

<http://skeenasalmonprogram.ca/>

Part 3: BC Water Tool

BC Water Tool

This set of tools allows users to access information about natural water availability, existing water users, and stream flow data.

<http://www.bcwatertool.ca/>

Long-term Trends in Groundwater Levels in B.C

Through this website, the B.C. Ministry of Environment provides information on the long-term trends of groundwater throughout the province.

<http://www.env.gov.bc.ca/soe/indicators/water/groundwater-levels.html>

Northeast Water Strategy

The Northeast Water Strategy report, prepared by the provincial Natural Resource Sector and released March 2015, is a proactive, long-term approach for the sustainable use and management of water resources in Northeast B.C.

<http://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-planning-strategies/northeast-water-strategy>

Interested in More Webinars?

To view past Creating a Blue Dialogue webinars visit www.youtube.com/POLISWaterProject. Previous topics include “Aboriginal Co-Governance of Water and Watersheds,” and “Environmental Flows and Healthy Watersheds: Towards Protection in Canada and BC.”

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