POLIS Project on Ecological Governance

watersustainabilityproject

FORUM ON ENVIRONMENTAL FLOW NEEDS IN BRITISH COLUMBIA

HOSTS' STATEMENT AND SUMMARY

MORRIS J. WOSK CENTRE FOR DIALOGUE, FEBRUARY 1-2, 2016

A RIVER FLOWS THROUGH A TEMPERATE RAINFOREST IN NORTHERN B.C. © MIKE AMBACH / WWF-CANADA

COLLABORATING ON SOLUTIONS FOR ENVIRONMENTAL FLOW MANAGEMENT

In February 2016, the POLIS Project on Ecological Governance and WWF-Canada convened a Forum on Environmental Flow Needs in British Columbia. This Forum brought together professionals working in water and watershed management, including government, First Nations, NGOs, water users and leading experts and practitioners, to discuss the need for and steps required to implement an effective environmental flow management regime for British Columbia. The Forum goals were to:

1. Ensure all participants have an appreciation of global efforts to improve the management of water and aquatic resources and the attributes of world-class governance for environmental flows management;
2. Identify and examine the challenges and opportunities for the management of environmental flows in British Columbia from various perspectives, including the introduction of the *Water Sustainability Act*;
3. Identify key elements of an effective, world-class regime for the management of environmental flows in British Columbia; and
4. Determine actions that could be taken – together or individually – by Government, First Nations, stakeholders, non-governmental organizations, communities or others to establish a world-class management regime.

In his opening keynote address, Brian Richter (Chief Scientist, the Nature Conservancy) posed the fundamental challenge of environmental flows management: ***"How do we maintain essential flow patterns to ensure that we sustain ecosystem health, while meeting other societal and economic water needs?"*** This Forum was designed to specifically address this question in the B.C. context: presentations provided an overview of environmental flows science and governance, as well as sectoral perspectives on environmental flow management. This foundation enabled participants to discuss the opportunities and challenges of developing a world-class environmental flows management regime for British Columbia.

This document summarizes the context for environmental flows management in British Columbia, offering key insights and Forum organizers' perspectives on priorities and emerging opportunities.

ENVIRONMENTAL FLOWS AND WHY THEY MATTER

Environmental flows[1] describe the quantity, timing and quality of water flows required to sustain freshwater and estuarine ecosystems and the human livelihoods and well-being that depend on these ecosystems. Flow in aquatic systems is always changing – hourly, daily, seasonally and annually. Freshwater species and ecosystems have adapted to this variability and depend on it; it keeps them healthy and resilient. When water is diverted for human uses, the natural flow regime is altered. The greater the alteration of natural flows, the greater the risk to freshwater species, ecosystems and the sustainability of human water use.

[1] The Brisbane Declaration: Environmental Flows are Essential for Freshwater Ecosystem Health and Human Well-Being (proclaimed at the 10th International River Symposium and Environmental Flows Conference, Brisbane, Australia, 3-6 September 2007).

Environmental Flows

Environmental flows describe the quantity, timing, and quality of water flows required to sustain **aquatic ecosystems** and the **human livelihoods** and **well-being** that depend on these ecosystems.

Water for people

Humans use water to sustain communities, altering natural river flow.

Flow regulation
Dams and other structures alter the timing and magnitude of flow to produce energy

Climate change is changing river flow

Water taking
From rivers to use in agriculture, forestry, oil and gas industries, sewage treatment, and for drinking water

Recreational use
Such as canoeing, swimming and fishing

Increased flow
Due to urban infrastructure and stormwater

Water for nature

The seasonal high and low flows of rivers are important to sustain ecosystems and species that have adapted to the river.

During floods, gravel, logs and nutrients are moved across the floodplain making more available habitat for species

Reservoirs and groundwater are replenished

Birds can feed on exposed mudflats and fertile land allows plants to sprout after the waters recede

Dry periods can help purge aquatic weeds

Unsaturated Zone

Saturated Zone

Groundwater

Flow events

Overbank flow
A high flow event that breaches river banks
Annual/Biennial

High flow
Occur during or after rainstorm events
Short-duration

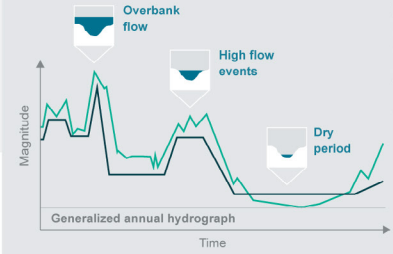
Base flow
Sustained mostly by discharge from groundwater, lakes, or from snowmelt
Most of the time

Natural low flow
Occur naturally and allow plants to grow on exposed land, creating complex habitats
Infrequent

Mimic natural flows

Environmental flows mimic the natural flow of a river, which supports ecosystem functions and allows for human water consumption.

Environmental flow patterns

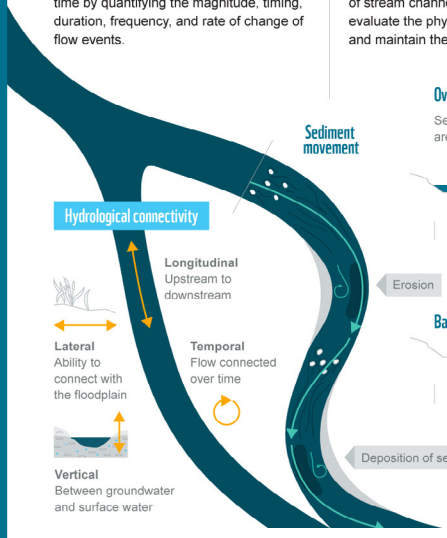


Ecosystem base flow
A low-flow threshold below which all water withdrawals should cease. Below this threshold aquatic life requires all of the available water in a river. This occurs very infrequently, in very, very dry years.

Five key components of environmental flow

Hydrology

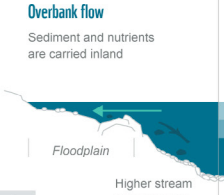
To describe the movement of water over time by quantifying the magnitude, timing, duration, frequency, and rate of change of flow events.



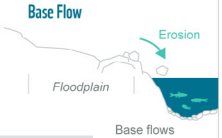
Geomorphology

To document the composition and shape of stream channels and floodplains and evaluate the physical processes that form and maintain them.

Overbank flow
Sediment and nutrients are carried inland



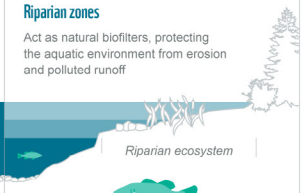
Base Flow

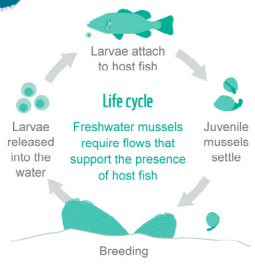


Biology

To consider the interaction between river flow and the number and type of species found in the aquatic environment.

Riparian zones
Act as natural biofilters, protecting the aquatic environment from erosion and polluted runoff





Water quality

To study the physical, biological and chemical attributes of water and the connections to hydrological and biological aspects.

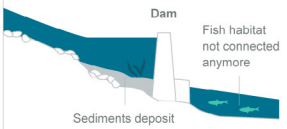
Nutrient cycle

Physical	Biological	Chemical
Temperature	Viruses	Dissolved oxygen
Clarity	Bacteria	Carbon dioxide
Odour	Algae	Nutrients
Taste	Zooplankton	Heavy metals
		Other chemicals

Connectivity

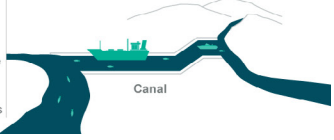
To analyse the movement of organisms, energy and matter through the river system, as well as the impacts of natural and artificial barriers by considering connections among hydrologic, geomorphic, biological and chemical aspects.

Loss of connectivity



Altered Connectivity

Flows and connectivity can be altered through manmade infrastructure promoting the spread of invasive species



FORUM DRIVERS: URGENCY & OPPORTUNITY

British Columbia is at a critical juncture for environmental flows management: threats to environmental flows are escalating and new opportunities exist to implement a suite of environmental protections under the *Water Sustainability Act* (*WSA* or "Act").

URGENCY: Fresh water in British Columbia faces growing pressures: with projected population growth and climate change impacts, there will be increasing demands to divert water to nourish more crops, generate more power and provide drinking water for more people. Several specific threats to environmental flows exist in the province:

Water diversions: surface and groundwater withdrawals reduce the amount of water flowing through a system.

Flow regulation: dams and diversions alter many aspects of the flow regime, including flood pulses, water temperature and habitat structure and connectivity.

Land use change: changes on the landscape alter how water moves through and over land, impacting water quality, flow patterns and quantity.

Climate change: a changing climate is projected to increase the frequency and severity of storms and droughts, change precipitation patterns and alter thermal regimes.

Last summer's drought demonstrated some of the consequences of depleted flows, with creeks falling below critical flow levels and breached lethal temperature thresholds for fish. This spring, the Cowichan watershed has already faced record low water levels, leading to emergency measures to conserve the water supply for summer and fall flows.

OPPORTUNITY: A new regime is being implemented to protect B.C.'s freshwater ecosystems. The Province's *Water Sustainability Act*, which came into force on February 2016, provides new opportunities to implement a comprehensive environmental flows management regime. The Act offers a suite of different mechanisms to consider and manage for environmental flows. The two primary mechanisms now in effect are:

- A requirement for decision-makers to consider environmental flows in new non-domestic licensing decisions for surface and groundwater (*WSA* section 15).
- Temporary protection orders to address critical low flows and protect fish populations during low flow periods (*WSA* sections 86-88).

Additional mechanisms related to environmental flows in the Act include:

- Water objectives, which can be established in regulation to protect water quality, quantity and aquatic ecosystem health (*WSA* section 43); and
- Water sustainability plans, which can be developed to prevent or address conflicts between water users and environmental flow needs. Water sustainability plans can, among other things, reduce licenced water withdrawals (*WSA* sections 64-85).

This Forum was convened in the context of growing threats to environmental flows and this window of opportunity to use policy to proactively protect water for nature.

TUCHODI RIVER B.C. © TIM STEWART / WWF-CANADA

FORUM INSIGHTS

Forum presentations and discussions were wide-ranging, yet several important themes began to emerge, such as the need to understand how the *WSA* will be implemented, government's capacity constraints and First Nations' concerns about the *WSA's* consultation process.

RECURRING THEMES AMONG FORUM PRESENTATIONS AND DISCUSSIONS

The WSA offers a suite of mechanisms to protect environmental flows, but uncertainty exists about how these different tools will be implemented in an integrated way. A world-class environmental flows management regime goes beyond just considering environmental flows in licensing decisions. However, significant gaps exist in the understanding of how the *WSA's* various mechanisms will work together to provide comprehensive ecosystem protection.

B.C. is hydrologically diverse and needs region-specific thresholds and standards for environmental flows, but this must be balanced against the need to implement environmental flow protections now without "paralysis by analysis." Establishing a presumptive standard to guide water allocation decisions is an effective placeholder for environmental flows thresholds until more detailed regional or stream-specific studies are done.

It is not enough to "consider" environmental flows. Overarching objectives describing the desired state for freshwater ecosystems and human water use need to guide "consideration" of environmental flows in decision-making.

Limited mechanisms exist to address current licences and over-allocation. The *WSA*'s main tools to consider environmental flows apply only to future licensing decisions. Few opportunities exist to amend existing licences. British Columbia must avoid over-allocating water and the claw-back scenarios experienced by Australia and other jurisdictions.

Government faces capacity and implementation challenges in operationalizing the WSA. The moment the Act came into effect, decision-makers were mandated to consider environmental flow needs for non-domestic licences, despite facing significant training and capacity challenges. Government leadership acknowledged these challenges and is working to build capacity to fully implement the *WSA*.

First Nations have ongoing and outstanding concerns about the WSA's consultation process. Specifically, First Nations rights are not sufficiently addressed under the Act. First Nations rights are likely to be affected in cases where water use is over-allocated. Substantial effort is urgently required to engage with First Nations on how to address their rights and the management of environmental flows.

"Don't let the perfect be the enemy of the good": reliable data are sparse in many areas of the province, but uncertainty and lack of data should not prevent precautionary action. British Columbia can begin developing environmental flows pilots and taking an adaptive, iterative approach to environmental flows management. Novel sources of community-based monitoring and citizen science can help fill data gaps and inform management.

Actors outside government (e.g. experts, communities, water users, etc.) need clarity on how they can engage in the development and implementation of environmental flows thresholds and management regimes. The *WSA* enables the creation of advisory boards to provide advice on methods for determining environmental flow needs or critical environmental flow thresholds. These boards' terms of reference and scale and scope of influence have yet to be determined. There is also a lack of clarity on other opportunities for communities to engage in environmental flows management.

IMPLEMENTING AN ENVIRONMENTAL FLOW MANAGEMENT REGIME: RECOMMENDATIONS

As Forum hosts and organizers, POLIS and WWF-Canada commend the Province's progress towards implementing the *WSA*, recognizing that establishing an environmental flows management regime is a long-term process. However, the drought of 2015 and emerging concerns in 2016 underscore the urgency of implementing an environmental flows management regime now and refining the approach through time. With climate change and an increasingly variable hydrological regime, there is never going to be "more certainty" as baseline conditions continue to shift. Given this reality, we offer perspectives on next steps and priority actions for the Province to advance environmental flows management.

GET STARTED NOW

- Set provincial environmental flow thresholds using a precautionary presumptive standard until more regional information is available.
- Implement regional environmental flows pilots in high-priority areas in the next year, including development of water sustainability plans that incorporate several approaches to managing environmental flows (e.g.: area-based regulation; water objectives; sensitive stream designation).
- Advance both the policy and regulation frameworks for environmental flows management.

ESTABLISH CLEAR DEFINITIONS AND MANAGEMENT TARGETS

- Define overall management objectives: what is the desired state of the rivers, streams, lakes or aquifers that decision-makers are aiming to achieve?
- Define what is meant by "volume and timing of water flow required for the proper functioning of the aquatic ecosystem of the stream."
- Establish and implement a formal, transparent framework for making trade-offs between instream and out of stream values, which interfaces with the provincial cumulative effects framework.

CREATE A TRANSPARENT DECISION-MAKING FRAMEWORK

- Require decision-makers to establish a process to identify and use a method for establishing environmental flow thresholds.
- Set criteria for what *must be* considered in licensing decisions in relation to "the proper functioning of the aquatic ecosystem of the stream," including cumulative impacts.

COMMIT TO ROBUST ENGAGEMENT PROCESSES

- Work with First Nations to co-create engagement processes around environmental flow needs, recognizing that First Nations engagement requires adequate funding and capacity.
- Clarify the process for establishing advisory boards.
- Engage with different sectors and water users in developing practical solutions to environmental flows issues that suit their economic viability while also ensuring sufficient water for aquifers, rivers and streams.

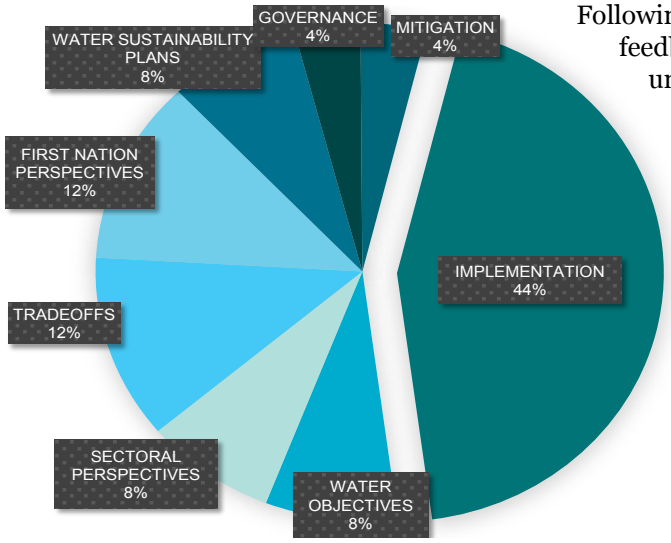
ENSURE ADEQUATE MONITORING

- Increase the spatial coverage of water monitoring and develop systems to compile data from multiple sources in a transparent, accessible way.
- Regularly monitor and verify that environmental flow standards are successfully protecting fish and watershed health.

NEXT STEPS

The February 2016 Forum on Environmental Flow Needs demonstrated a strong and engaged constituency of First Nations, water leaders, environmental non-governmental organizations, practitioners and industry representatives in B.C. Collectively, these individuals and groups have expertise and knowledge to contribute to the development of an effective environmental flows management regime. This Forum was a first step in engaging this wider community and demonstrated the Province's willingness to participate in a collaborative dialogue.

WHAT PARTICIPANTS WANT TO KNOW MORE ABOUT



Following the Forum, participants were asked to complete a feedback survey describing how the Forum had improved their understanding of environmental flows management in B.C. and of the *WSA*. Participants were also asked what they would like to learn more about in the context of environmental flows management. Overwhelmingly, participants wanted to know more about how environmental flows management will be implemented though the new mechanisms provided in the *WSA*.

Given the appetite and interest for ongoing engagement, the Forum conveners are exploring next steps to continue progress on the recommendations that emerged throughout the Forum.

Select Forum materials available at: poliswaterproject.org/environmentalflowsforum

SPECIAL THANKS TO OUR CORE PARTNERS AND SUPPORTERS:

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CONTRIBUTING AUTHORS

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WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature by:

- Conserving the world's biological diversity
- Ensuring that the use of renewable natural resources is sustainable
- Promoting the reduction of pollution and wasteful consumption