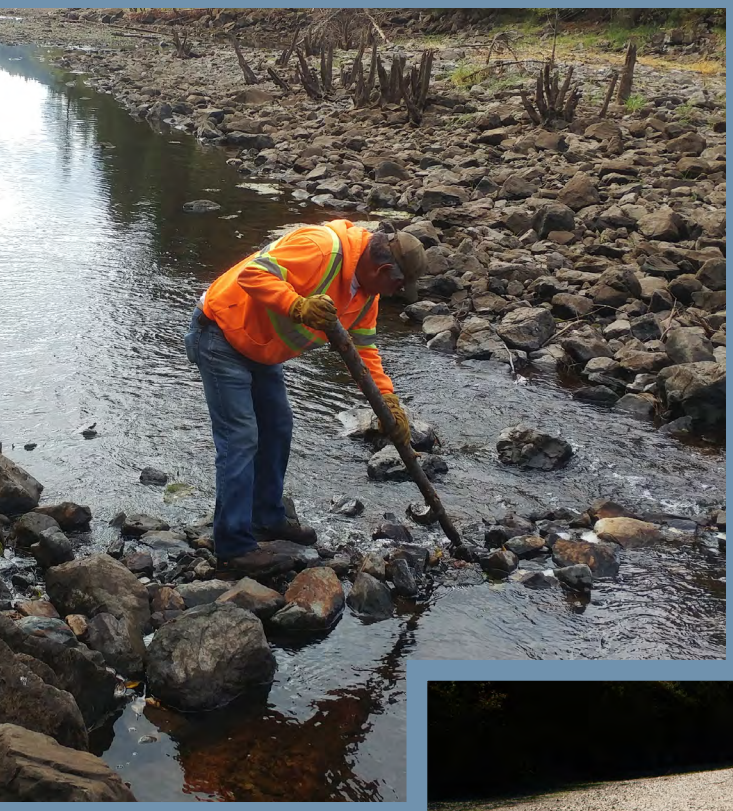
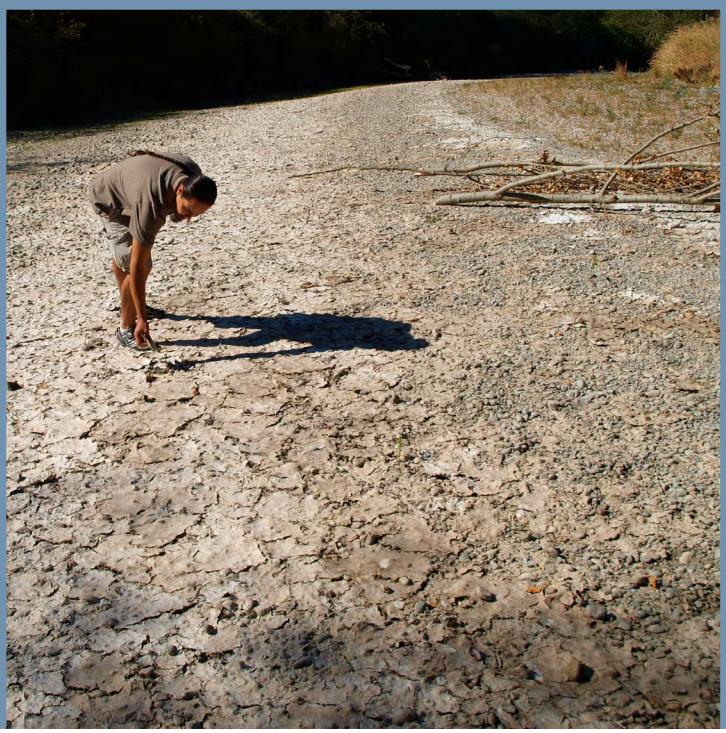
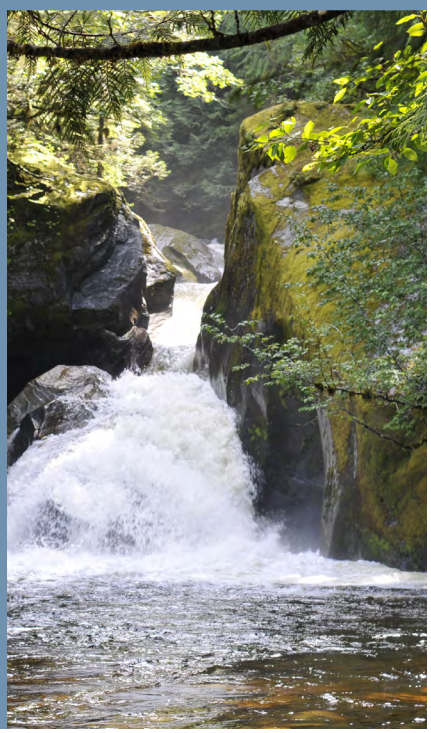
FIRST NATIONS FISHERIES COUNCIL OF BRITISH COLUMBIA

FIRST NATIONS
FISHERIES COUNCIL

ENVIRONMENTAL FLOW NEEDS
A PRIMER FOR FIRST NATIONS







Cover Page: L-R, T-B. Bob Hewitt of Skeetchestn Band working to restore access for kokanee on Upper Deadman River, by Michelle Walsh, Secwepemc Fisheries Commission; A bear fishing for Chinook on the Nakina River in northwestern BC, by Mark Conor; Julius Erickson kokanee fishing at Tsilicoh Falls, by Candace Erickson; Tim Kulchyski on dry Cowichan River, by Parker Jefferson; Duus (Owikeno Lake), by J. Walkus & Wuikinuxv Fisheries.

About the First Nation Fisheries Council's *Water for Fish* Initiative

Through the *BC First Nations Fisheries Action Plan*, British Columbia First Nations have directed the First Nations Fisheries Council of British Columbia (FNFC) to support, protect, reconcile and advance Aboriginal Title, Rights, and Treaty Rights as they relate to fisheries and the health and protection of aquatic habitats. The FNFC's priorities are to develop effective governance mechanisms, form collaborative relationships among First Nations organizations, and work together to build a cohesive voice on fisheries and other aquatic resource matters.

The FNFC's *Water for Fish* freshwater initiative launched in 2012 to advance objectives in the *BC First Nations Fisheries Action Plan* under the theme of "Safeguarding Habitat and Responding to Threats." This initiative works to support First Nations in their activities to advance freshwater governance, habitat protection, and management. The initiative's intended impact is for BC First Nations to be informed, resourced, and united to actively exercise governance and jurisdiction of fresh waters in their traditional territories.

FNFC is not a rights-holding organization. FNFC recognizes and respects the sovereignty and self-governance of all Nations as rights holders and supports their right to make their own decisions. The FNFC's role is to provide information and support First Nations' positions where their collective interests align.

In addition to this guidance document, the *Water for Fish* initiative is supporting a variety of environmental flow needs (EFNs) projects including:

- Profiling case studies of Indigenous water governance in the 2018 *Protecting Our Water Our Way* report;
- Providing seed funding to First Nations for pilot projects to develop EFN thresholds in critical streams in their territories;
- Convening a strategic Environmental Flow Needs Working Group; and
- Analyzing BC's *Water Sustainability Act* (WSA), working to advance an improved WSA First Nations engagement framework, and identifying WSA necessary reforms under the *Declaration on the Rights of Indigenous Peoples Act*.

Acknowledgments

This primer builds on the *Water for Fish* initiative's previous work to compile information on EFNs. We gratefully acknowledge the important groundwork completed by Sarah Alexis and Dawn Machin, by Compass Resource Management, and the guidance shared by advisors, including Deborah Curran, Oliver Brandes, and Michael Harstone. We thank Allison Oliver and Robyn Laubman for providing input on earlier drafts. We thank Elinor McGrath for reviewing the Okanagan case study and Bruce Maclean for reviewing the Athabasca case study. We thank Marci Janecek from Marsupial Design for design.

We acknowledge and thank the *Water for Fish* initiative's core funders:

LUSH FRESH HANDMADE COSMETICS vancouver foundation sitka foundation BC freshwater LEGACY initiative real estate foundation BRITISH COLUMBIA Environment and Climate Change Canada

Outline

We have rights and sacred responsibilities to protect water for our present and future generations. Our rights include the use of water for drinking, irrigation, commercial purposes, transportation, cultural ceremonies, and access for fishing, hunting, trapping and other harvesting and gathering activities. These rights include the right to protect water and the aquatic habitat that supports plants, trees and other life forms with whom First Nations share their territories and depend upon. Finally, these rights include jurisdiction and stewardship over use and access to water and the protection of water and aquatic habitat from both a health and resource management perspective.[1]

[1] First Nations Fisheries Council of British Columbia. (2019). Towards a *Water Sustainability Act* First Nations Engagement Framework: Working Group Recommendations for Collaborative Development of Regulations and Policies. Available online: https://www.fnfisheriescouncil.ca/wp-content/uploads/2019/11/Letter-FNFC-to-BC_July-2019.pdf

Chinook spawning in Robson Valley at the confluence of the Robson and Fraser Rivers, by Gord Sterritt.

1. INTRODUCTION

Water is a sacred relative for First Nations. Clean, abundant surface water and groundwater flowing in rivers, streams, and aquifers is a condition for exercising inherent Indigenous responsibilities, relationships, and jurisdiction. This foundational relationship with water is linked to Indigenous Peoples' rights to healthy waters, fish, wildlife, cultural and ceremonial water uses, and functioning and resilient ecosystems.

The quantity, timing, and quality of water flows needed to sustain healthy ecosystems—called **environmental flow needs** (EFNs)—is also a condition of exercising Aboriginal Rights protected under Section 35 of the Constitution Act (1982). For instance, if summer flows in a river are heavily depleted by water withdrawals, fish and fish habitat suffer, and First Nations cannot exercise rights to fish for sustenance, social, ceremonial and other purposes.

Environmental flow needs are an important part of developing local solutions for sustainable, equitable water use. First Nations in British Columbia are increasingly expressing their own laws and knowledge to establish EFNs to support First Nations-led water governance and management, leverage changes in provincial government water decisions and management, and better protect aquatic ecosystems and culturally important species and sites. For example:

- First Nations can define EFNs and assert expectations for when the provincial government must issue temporary protection orders to reduce or stop water use during drought.[2]
- EFNs provide a basis for First Nations to assess water licence applications and decide whether to give or withhold consent to new proposed withdrawals.
- EFNs can be a cornerstone of collaborative planning processes in which First Nations work with neighbouring non-Indigenous governments, stakeholders, and water users to establish new agreements and decisions about how much water can be withdrawn, stored, or diverted, when, why, how, and by whom.

Experience shows that establishing EFNs can be an intensive process requiring capacity for both upfront and ongoing water monitoring, field studies, and engagement with knowledge keepers and communities. It is important to have a strong sense at the outset of how EFNs will support First Nations in achieving strategic governance objectives and expressing Indigenous laws. Otherwise, important community values and goals can get lost in expensive technical processes.

L-R: Peace River, by FNFC; Cowichan River, by Tim Kulchyski.


L-R: Nass River in Nisga'a territories, by FNFC; Multi-community fishery on the Thompson River, by Michelle Walsh, Secwepemc Fisheries Commission.

Primer Purpose

This primer offers guidance on why and under what circumstances it may be valuable for First Nations to establish and implement EFNs. It is meant as a work-in-progress to be refined as communities share their experiences. It addresses the following questions:

- What are EFNs?
- For what water issues and decisions are EFNs most relevant? Where can EFNs have the biggest impact on decisions about water use and conservation?
- How can First Nations establish and apply EFNs to protect fish, aquatic ecosystems, and culturally important species or sites, help assert Aboriginal Rights and Title, and strengthen First Nations water governance?
- What is the BC provincial government doing to set and manage EFNs?

Methods for establishing EFNs and protocols for working with Indigenous knowledge and western science are not a detailed focus of this primer.

Is this Primer for me?

This primer is intended for First Nations staff and leadership who are involved in land and water decision making and management. It is for you if you have the following concerns and priorities:

- My community is concerned about changes in water flows (and water quality) and impacts to fish, other aquatic species, community water supply, and cultural and ceremonial water use. We want to have a greater say in what happens with water flows and assert our Nation's inherent water rights and responsibilities to improve how water is managed in our territory.
- I am looking for tools that help systematically assess water licences and development applications for potentially significant effects on our community's relationships with and uses of water.
- I want to hold the provincial government accountable to protecting and maintaining healthy aquatic ecosystems because they permit licensees to use water.
- I am seeking ways to develop solutions to complex water problems with non-Indigenous governments, communities, or water users in our territory.

2. WHAT ARE ENVIRONMENTAL FLOW NEEDS?

Environmental flow needs **are the quantity, timing, and quality of water flows needed to sustain healthy aquatic and riparian ecosystems.**[3]

EFNs can also be defined to encompass **social and cultural water values that depend on water flows and healthy aquatic ecosystems** (e.g., flows necessary for navigation to access to a cultural site).

EFNs address the questions: How much water does the river need? How much can flows be altered (e.g., by humans or climate change) before ecosystems are placed at risk? EFNs include surface water flows and the groundwater that feeds them. Flow in aquatic systems is always changing—hourly, daily, seasonally, and annually. Freshwater species and ecosystems require this variability. EFNs, therefore, are a not a single number but **a range of flow thresholds** needed throughout the year to sustain resilient ecosystems and social and cultural water relationships and uses (the figure on page 6 illustrates this variability).

EFNs are different from **critical environmental flow thresholds**, which refer to the **minimum level of water** needed for species to survive during severe low flow periods, such as droughts. Below this level, significant and irreversible harm to ecosystems and fish is likely to occur. Critical environmental flow thresholds have a specific legal definition under colonial law in British Columbia. Provincial government decision makers have the ability to temporarily restrict or stop water withdrawals when critical environmental flow thresholds are reached (see further discussion in the following sections, and details in Appendix A).

First Nations are asserting EFNs as expressions of Indigenous laws and developing EFN thresholds that are protective of First Nations relationships with water, inherent and Constitutionally-protected rights, and traditional, spiritual and cultural practices and uses.

Case studies in Section 5 describe examples of different First Nations-led EFN approaches.

Quick Facts about River Ecology and Flows

From a western science perspective, there are **five elements of a river or stream's ecology** that relate to water flows:

1. **Hydrology:** the natural water cycle and flow regime needed to sustain river ecosystems.

2. **Biology:** the species and habitats in a river that depend on specific flow conditions.

3. **Water quality:** adequate flows help maintain river temperatures, low toxin levels, and dissolved oxygen necessary for fish and ecosystems.

4. **Connectivity:** healthy rivers naturally connect to their floodplains.

5. **Geomorphology:** high flows help construct new habitat required for continued survival of fish and wildlife.

3. ENVIRONMENTAL FLOW NEEDS AND WATER GOVERNANCE

Many Aboriginal and Treaty Rights rely upon healthy and sufficient flows of water to sustain them, such as fishing, hunting, or other gathering rights, and spiritual practices. Indeed, it is nearly impossible to imagine an Aboriginal or Treaty Right that does not depend upon water.

(Union of BC Indian Chiefs, Water Act Modernization Submission, 2013)

What Can Environmental Flow Needs Influence?

Environmental flow needs are primarily relevant for **decisions about water allocation and use and drought management**. EFNs can be used to impact decisions and management actions regarding:

- Water allocation (e.g. surface and groundwater licensing under the WSA; closing basins for withdrawals, requiring reduced water withdrawals at certain times of the year);
- Drought management (e.g. setting drought levels and seeking voluntary water use reductions or requiring water users to stop withdrawals);
- Water storage and release (e.g. dam or weir management);
- Conservation measures (e.g. infrastructure upgrades, community education);
- Fish protection measures (e.g. sensitive stream designations, restoration priorities); and
- Environmental impact assessments for major projects (including water quality concerns, because quality may be adversely affected if a project's water demands will reduce flows).

EFNs are not the only avenue or a silver bullet for addressing water concerns, and may be applied alongside a suite of other actions as one part of a comprehensive water management approach.

L-R: On the shore of Skeena River, by FNFC.; Salute to the Sockeye celebration, Adams River, by FNFC.

Considerations for Establishing Environmental Flow Needs

First Nations are taking a range of approaches to developing EFNs. Common process elements to consider include:

- **Determining when, where, and how disrupted flows are impacting important cultural values.** This involves drawing on Indigenous knowledge and western science to characterize the impacts of changing flows on important community values, like fish species and habitats, cultural sites, navigation, or community water uses. For instance, a community may identify that flows are consistently too low in fall months to protect an archeological site or harvesting area, or that every spring salmon fry die because of inadequate water flows in river side channels.

- **Defining the flow conditions and thresholds required to exercise Aboriginal Rights and protect a community's values.** Flow conditions and EFN thresholds may be expressed in numeric terms (e.g., *the river must have 7 m3/s in the spring to provide adequate rearing habitat conditions for salmon, and 10m3/s in the fall*). It is equally robust to articulate EFNs and critical flow thresholds as descriptions of water flow conditions for important sites, community activities, species, or water uses in a territory (e.g. *flows must not drop below levels at which a particular boulder is exposed in summer*). Regardless of the method a community chooses, EFNs and critical flow thresholds can be understood as expressions of Indigenous authority and law, which First Nations can assert to drive changes in water management and decisions.

- **Considering uncertainty and risk tolerance.** Climate change is affecting fresh water in BC in many ways, including more extreme droughts and floods and warmer water temperatures. There is inherent uncertainty about what will happen to water conditions and what the long-term impacts to aquatic species and cultural values will be under different climate regimes. A community may accept more or less risk to its values, depending on impacts, what is at stake, and how much uncertainty exists. EFNs could be set at very precautionary, conservative levels, where the risk tolerance for any harm occurring is low. Or, thresholds can be set at less risk-adverse, less precautionary levels. Community knowledge and values is what guides these decisions.

Questions to Consider at the Outset of Designing a Community-Led EFN Process

- Which water bodies are most vulnerable or critical in our community? What are the main flow issues? What changes in management and decision making would help address these issues?
- What are our values and laws for stewarding water and its uses today, and for future generations?
- How will Indigenous knowledge and other sources of information inform the process? What is the capacity (and gaps) for monitoring and knowledge gathering?
- Who needs to be involved? What is the role for knowledge keepers, communities, and water users in establishing EFNs, and applying EFNs in decision making?

» **Evaluating trade-offs and considering potential consequences for ecosystems and water users.** EFNs are unable to encompass and protect all values. EFNs that are highly protective of ecosystems (stay as close as possible to natural flow cycles) imply that less water can be withdrawn for human uses. For some First Nations, establishing EFNs may involve a process from the very outset to work with others in the watershed and evaluate trade-offs and consequences to seek a balance across a suite of values. In other cases, a First Nation may choose to first do its own internal work to establish EFNs, and engage with non-Indigenous governments or stakeholders later in collaborative planning and decision-making processes.

» **Learning and adapting.** EFNs may need to be reviewed and refined at regular intervals to make improvements as a community gathers more knowledge and information. Monitoring helps determine if management actions associated with EFNs are effective. Monitoring can range from year-round real-time flow monitoring,[4] to assessments of fish and ecosystem health, to seasonal or event-specific monitoring. In designing a monitoring program, considerations include technical and financial capacity needs, and systems to share, store, and analyze information.

First Nations are drawing on both Indigenous laws and knowledge base and western science to develop and assert EFNs

The Fraser River in winter, by FNFC.

Knowledge about EFNs based on Generations of Indigenous Stewardship

(e.g., when a certain boulder is exposed, ecosystems and cultural values are at risk)

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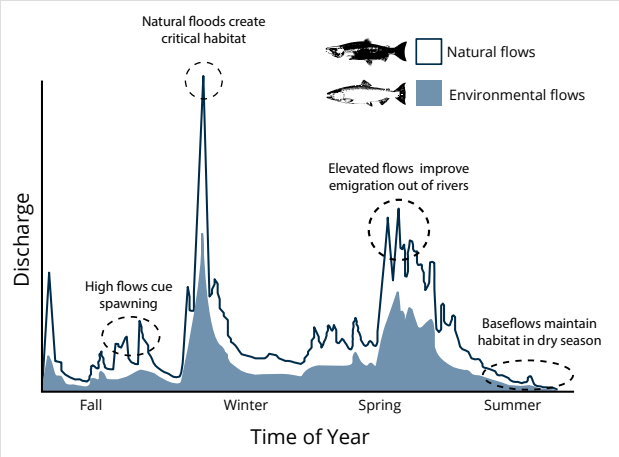


Adapted from Naiman et al. 2008.[5]

Western Science Approach to Illustrate EFNs

(hypothetical example)

A Note on EFN Methods and Approaches

Historically, western science methodologies for establishing EFNs have been relatively narrow, technical, and focused on determining *minimum* flows required to avoid impacts on a particular fish species in a specific location on a stream (referred to as a "reach" of a river).

An abundance of different western-based methods exists for establishing EFNs (200 plus and counting!). This includes both intensive field-based methods and predictive "desktop" models (used to calculate EFNs and assess risks when detailed field work is not possible). EFN methodologies generally fall into one of two categories:

1. Reach-based methods: these methods focus on specific parts of a river or stream; they cost less, take less time and are best for very critical streams.

2. Sub-watershed or watershed-level methods: these methodologies are more holistic and take more considerations and values into account; however, they are also expensive and time consuming.

Incorporating Indigenous or traditional knowledge in a meaningful way is an ongoing challenge and gap. And, while fish are still an important driver for EFNs in many places, it is increasingly clear that many other ecological and cultural values should be considered in establishing EFNs, and that more holistic, transparent, and inclusive approaches are needed.

Indigenous nations are leading new approaches to EFN development that reflect this holistic understanding. For instance, in the Murray-Darling Basin in Australia, Nations are defining cultural flows. Cultural flows are water entitlements (legally and beneficially owned by the Indigenous nations) of a sufficient and adequate quantity and quality to improve spiritual, cultural, natural, environmental, social and economic conditions.[6] A detailed Indigenous-led National Cultural Flows Research Project provides a methodological framework that describes and measures Indigenous cultural water use and values with quantifiable water volumes. Detailed project resources, including discussions about the methodologies used to calculate flow needs, are available at: http://culturalflows.com.au

L-R: First Nations Water Governance Roundtable field trip at Nadleh Koh (Nautley River), by FNFC; Dip netting at Six Mile Rapids Xaxli'p fishing rocks, by Jessica Dan.

Applying Environmental Flow Needs to Water Management and Decision Making

There are a number of ways in which First Nations may put EFNs into action to protect aquatic ecosystems and culturally important species and sites, assert responsibilities and authority, and strengthen First Nations-led water governance. How First Nations decide to apply EFNs depends on the watershed issues, the community's desired changes in water management, community priorities and capacity, and relationships with non-Indigenous governments, stakeholders, and communities.

This section describes **three general approaches to applying EFNs:**

- **Assert EFNs and expectations for action by the provincial government.** Because EFNs are conditions for exercising Aboriginal Rights, this approach is about signaling expectations for management and decisions by the provincial government based on First Nations-defined EFN thresholds.

- **Use EFNs to evaluate water licence proposals and make decisions.** This approach is about using EFNs and flow information as a basis for a First Nation's decision making, planning, and community-led activities.

- **Collaboratively develop and implement EFNs as part of co-governance.** This approach is about collaboratively defining EFNs and co-creating solutions and plans for managing water flows and storage. It involves working with non-Indigenous governments and stakeholders, potentially through a planning process. Important conditions for this approach are positive government-to-government relationships and commitment to reconciliation, collaboration, and long-term co-governance. It involves leveraging provincial government laws, policies, and planning tools (see Section 4).

These three approaches are not mutually exclusive or the only options available. Case studies in Section 5 help illustrate different EFN processes and applications in British Columbia and Canada.

L-R: Dolly Varden trout smolt on Kildala River, by Billie Johnson; Naikoon Provincial Park, Haida Gwaii, by FNFC.

Three Approaches to Put EFNs into Action

1

Assert EFNs & Expectations for Action by the Provincial Government

This approach puts the onus on the provincial government to respond with a solution for better water use. A community could choose to:

- Define EFN thresholds below which Aboriginal Rights are infringed and important values are compromised.
- Assert expectations for management and action that the provincial government must take if the specified thresholds are surpassed. For example, signal that when flows drop below the threshold, Aboriginal Rights are infringed, and the provincial government must issue orders to restrict or curtail water use using its asserted authority under the *Water Sustainability Act.*
- Another strategy is to put the provincial government on notice that First Nations-defined EFNs are minimum expectations that must be considered in all water authorization decisions.

2

Use EFNs to Evaluate Proposals and Make Decisions

This approach is about using EFNs as a basis for a First Nation's decision making, planning, and community-led activities. A community could choose to:

- Define EFN thresholds below which Aboriginal Rights are infringed and important values are compromised.
- Use First Nations-defined EFNs to assess the impacts of new water licence applications and proposed development, decide whether or not to provide consent, or set conditions that must be met for the licence to be approved (such as monitoring or reduced withdrawals at certain times of the season).
- Use EFN information to guide community-led water activities in a territory: for example, to prioritize areas of a territory for restoration work, protection, or monitoring.

3

Collaboratively Develop & Implement EFNs as Part of Co-Governance

This approach is about co-developing EFNs and solutions for managing water flows and storage with non-Indigenous governments, communities, and water users in a watershed. It assumes positive government-to-government relationships and commitment to reconciliation, collaboration, and co-governance. A community could choose to:

- Secure a high-level commitment from government partners that EFNs are a tool for advancing reconciliation and co-governance (e.g., through a Memorandum of Understanding or Terms of Reference).
- Ensure common understanding that the intent of EFN development is to increase First Nations involvement in decision making, ensure cultural values are reflected in water management, and improve ecological conditions.
- Co-develop the scope of the EFN work and process.
- Identify water issues and drivers and the corresponding planning and legal tools that will be used.
- Co-develop and co-lead the EFN planning and implementation process, including deciding if and how authority for decision making will be shared.

These approaches can—and are—being pursued in tandem. For example, EFNs and strategies may be developed collaboratively, if trust and a commitment to government-to-government collaboration exist. If the relationship should deteriorate, a First Nation could still use EFN thresholds to assert expectations for action by the provincial government.

4. Provincial Government Environmental Flow Needs Laws, Policies, and Plans: Options and Gaps

EFNs in the *Water Sustainability Act*

The provincial government asserts exclusive ownership and management authority for water in British Columbia—an assertion that First Nations have long contested and that is inconsistent with the United Nations Declaration on the Rights of Indigenous Peoples. The *Water Sustainability Act* (WSA) is the primary colonial law in BC that regulates water use. Provincial water managers have a variety of EFN requirements and tools in the WSA, most notably:

- **Section 15:** a requirement for statutory decision makers to consider environmental flows when issuing new surface and groundwater licences (for aquifers that are connected to surface water). Provincial water managers and statutory decision makers must consider the provincial Environmental Flow Needs Policy when reviewing applications for new water licences.[7] The policy is not a method or enforceable law for determining EFNs, but instead provides guidelines for assessing risks to EFNs. It sets out different management actions depending on different levels of risk and assists the decision maker in identifying where cautionary measures could be taken or additional analysis may be needed.
- **Sections 86-88:** an ability to require water users to reduce or stop water withdrawals during drought through a critical flow protection order or fish population protection order.[8]
- **Section 43:** an ability to set water objectives (including for water flows and quality) that water and land use decision makers can be required to consider when issuing authorizations.

Appendix A provides further details on EFN provisions in the *Water Sustainability Act.*

Relevant Planning Tools

In addition to specific EFN requirements, different planning tools are available for different types of flow management or water shortage issues:

Water Sustainability Plans. Water sustainability plans in the WSA are the newest and most powerful mechanism for changing licensed water use and acknowledging Indigenous water laws, but none have been completed to date.[9] Water sustainability plans may also be developed to address the impacts of forestry, mining, development and other land activities on flows. These plans could be regulatory or non-regulatory, and encompass a set of different legal tools and management actions (e.g. setting water objectives, prioritizing areas for restoration, or establishing sensitive stream designations). However, water sustainability plans are not the only way to get at planning and improving management of flows and storage: water and land use plans can also be undertaken through government-to-government agreements.

Water Use Plans. Typically, water use plans are developed for regulated rivers (i.e., a river with storage such as a dam or weir). The Comptroller of Water Rights[10] can order these plans under certain conditions, such as if First Nations and water users are advocating

for better management and regulations with that particular system; or, if conditions have significantly changed in the watershed and important values (environmental, social, cultural) are threatened. Depending on the issues at hand, water use planning could involve reviewing and reprioritizing water licences to account for cultural values, or changing how dams are managed to store and release water. For example, twenty-three BC Hydro facilities now have water use plans in place to establish a better balance between competing water uses, such as water for power generation, fisheries, cultural use and heritage values, recreation, and flood control.[11]

There is also precedent in British Columbia for preparing **Water Scarcity or Drought Preparedness Plans.** These plans provide guidance to statutory decision makers. Collaborative drought *response* refers to drought situations where First Nations and the provincial government are effectively preventing a bad situation from getting worse. Water scarcity planning and drought preparedness, on the other hand, involve setting up the systems and mitigation measures needed *before* droughts happen. In both cases, opportunities exist for shared decision making. For example, First Nations and the provincial government could work together at a regional level to develop the EFN thresholds that determine when to move between different drought levels under the BC Drought Response Plan.[12] Or First Nations and the provincial government may jointly decide when temporary protection orders are required to reduce water use by licence holders in order to protect cultural and ecological values.

Challenges and Gaps in Provincial Water Management

The colonial water management regime often fails to sufficiently protect surface and groundwater flows. Many rivers, streams, and aquifers in British Columbia are overallocated,[13] without adequate understanding of how water withdrawals, climate change, and land use are affecting surface water flows, groundwater reserves, and ecosystem health. Among other concerns, key identified gaps in the provincial government's approach to EFNs include:

- There is currently no recognition of Indigenous knowledge and authority in determining EFNs (and the WSA as a whole fails to recognize and respect Indigenous laws, authority, and knowledge).[14]
- When issuing authorizations for *existing* groundwater uses during the groundwater licensing transition period,[15] provincial government decision makers are exempt from the requirement to consider EFNs.
- There has been no publicly-available evaluation of the effectiveness of the province of BC's Environmental Flow Needs Policy. It is unclear how statutory decision makers are considering EFNs in their decisions.
- Some First Nations have identified that the Environmental Flow Needs Policy is not sufficiently precautionary.
- Chronic gaps in water monitoring, data, and information persist, limiting the ability of statutory decision makers to assess risks to flows when considering a new water use licence application.
- First Nations are consulted on individual water authorizations on a licence-by-licence basis, making it difficult (if not impossible) to assess cumulative impacts to EFNs in their territories.

Challenging Provincial Government EFN Decisions at the Environmental Appeal Board

Provincial government water licensing decisions can be challenged at the Environmental Appeal Board (EAB).[16] The EAB recently heard two important cases related to EFNs that underscore the importance of having robust EFN information to make sound water licensing decisions. The cases demonstrate the ability of, and imperative for, provincial government decision makers to give EFNs due consideration in licensing decisions.

First, in 2015, the Fort Nelson First Nation (FNFN) successfully challenged a decision to issue a water license to Nexen Inc. for hydraulic fracturing. The FNFN appealed the Nexen licence on the grounds that the provincial government failed to adequately consult with the Nation before the licence was issued, and that the regional manager failed to adequately consider and assess the licence's impacts on the environment and FNFN's treaty rights.

In its decision to cancel Nexen's water licence, the EAB stated: "[The licence] is fundamentally flawed in concept and operation. It authorizes a flow-weighted withdrawal scheme that is not supported by scientific precedent, appropriate modelling, or adequate field data."[17] The EAB panel found that "the manager's conclusion that the withdrawals would have no significant impacts on the environment…was based on *incorrect, inadequate, and mistaken factual information and modelling results*." In its decision, the EAB recommends that given the uncertainty involved in estimating stream flows and predicting the potential impacts of a licence on the aquatic and riparian environment, a conservative or cautious approach should be taken in making licensing decisions and setting licence conditions.

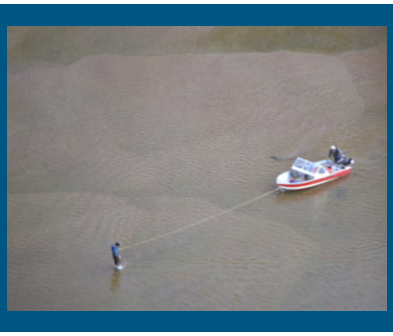
Second, in Halstead vs. Water Manager (2018),[18] the EAB upheld a water manager's decision to refuse a licence application to divert groundwater from an aquifer, on the basis that the creek to which the aquifer is hydraulically connected has insufficient flow to maintain environmental flows for aquatic species. This case is the first time that an appeal has addressed hydrological connectivity between groundwater and surface water and environmental flows in a meaningful way. It demonstrates that in some cases, provincial government decision makers do consider and make decisions based on cumulative impacts to EFNs from groundwater and surface water extraction on aquifers and hydraulically connected streams—and can say "no" to new licences based on EFN impacts.



L-R: Skeena River, by FNFC; Salmon in Henderson River, by Sabrina Crowley.

5. CASE STUDIES

1. Community-Based Water Monitoring by Athabasca Chipewyan First Nation and Mikisew Cree First Nation for the Peace-Athabasca Delta and Lower Athabasca River



Elder Sloon Whiteknife and Community-Based Monitoring Program employee Kevin Courtoreille line boat through Embarras Top End near Cree Cree, by Bruce Maclean.

From its headwaters in the Rocky Mountains to its outlet at Lake Athabasca, the Athabasca River is one of Canada's longest free-flowing rivers, supporting rich boreal ecosystems and sustaining the livelihoods, cultures, and identities of Dene and Cree First Nations and Métis communities in the region.

The territories of the Athabasca Chipewyan First Nation (ACFN) and Mikisew Cree First Nation (MCFN) are centered around the Peace-Athabasca Delta, an area shaped by the complex water dynamics between the Athabasca and Peace rivers. The Nations have had concerns for many years about hydroelectric flow regulations, industry water withdrawals, climate change, and related impacts on aquatic ecosystems, navigation and their rights. Upstream water withdrawals by industry are most concerning at times of the year when water levels are low because of direct negative consequences to traditional-use rights, e.g. navigation rights, fisheries rights, etc.[19]

In 2010, the communities developed a policy to define their rights to water based navigation known as the **Aboriginal Extreme Flow (AXF)**. This suggested that flows of 400 m3/s on the Athabasca River translate into 122cm of water depth at pinch points, which are defined as critical water passageways that are essential for accessing important Traditional Territories or travel routes and are known to be the limiting locations in that they are the first to become impassable when water levels decline, in the Delta. The ACFN and MCFN then launched a joint community-based water monitoring program (CBM) in 2011. The program was "designed to quantify the temporal and spatial extent to which access is being lost to ACFN and MCFN territories and to determine whether there are identifiable thresholds evident in relation to this loss."[20] An analysis of the first five years of field data at more than ten sites was conducted. This work concluded that the AXF was appropriate, although revised slightly higher to 500 m3/s. It also **concluded that the Government of Alberta's 2015 Surface Water Quantity Management Framework[21] (SWQMF) does not benefit Aboriginal navigability**.[22] One of the main issues is that the threshold that triggers a management action by the Alberta Government is much too high to be beneficial for the Nations. Additionally, the Alberta Energy Regulator developed an "Aboriginal Navigation Index" as part of the SWQMF in 2015, but it does not include field studies or protect navigation rights. The CBM findings published in 2016 provide solutions to revise the SWQMF but no changes have yet been made.[23]

Transport Canada began a study in 2011 to establish a navigation profile of the lower Athabasca River and identify impacts of industry water withdrawals on navigation rights. The results were made public in winter 2020, and generally confirm Indigenous knowledge and ten years of community-based water monitoring data.[24] The Nations are now requesting the Federal Government commit to collaboratively identify and implement solutions to address challenges to navigation and fisheries rights using policy tools under the updated *Fisheries Act* and *Canadian Navigable Waters Act*.[25]

2. Collaborating to Develop Target and Critical Flows in the Okanagan[26]

McIntyre Bluff and Okanagan River, by A.M. Bezener.

The Okanagan region in Central British Columbia is the driest watershed in Canada. Climate change is increasingly affecting the region's streams (many of which are already fully prescribed or over-allocated), resulting in lower summer flows and increasing water demand. This is increasing stress on aquatic ecosystems and impacting Syilx Nation members' right to fish.

In 2015, the Okanagan Nation Alliance Fisheries Department partnered with the Okanagan Basin Water Board and the BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development to identify EFNs and critical flows in Okanagan streams to inform water management. A leadership team comprised of representatives from all three entities led project development and implementation. At the beginning of the project they collaboratively identified a list of 19 priority streams.

Phase 1 of the project focused on developing defensible, transparent, and robust methods to determine EFNs for Okanagan streams at a reach level. The process identified a **desktop method to set EFNs for low risk streams** ("Okanagan Tennant Method") and **a field-based method for higher-risk streams** ("Okanagan Weighted Usable Width Method").[27]

The second phase of the project—primarily led by the Okanagan Nation Alliance—applied the methods selected in Phase 1 to identify recommended EFNs and critical flows in 18 specific streams of high cultural significance to Syilx Peoples. Each of these streams was assessed using the **desktop method** with flow data. Funding constraints meant that it was not possible to use detailed field methods for all streams, so the project leadership team identified 10 of the streams for **field-based assessments**.[28]

The Okanagan Environmental Flow Needs Project highlights an exciting collaborative approach to setting EFNs with a leadership role for First Nations in identifying watersheds and species with high values for their communities. It "has produced the most comprehensive estimates of streamflow conditions and both desktop and field-based EFN recommendations ever assembled for the Okanagan Basin."[29] Among a suite of outcomes and recommendations for next steps, the project identifies the opportunity and the need to:

- restore and enhance fish habitats. The project identifies priority streams for restoration, where a relatively large amount of habitat could be gained by restoring heavily depleted streamflows;
- address over-allocation issues, and clarify how provincial and *Syilx* fisheries staff will collaborate in enhanced water allocation decision making in light of both the WSA and the *Declaration on the Rights of Indigenous Peoples Act;*
- quantify groundwater-surface water interactions;
- integrate EFNs in local government water planning; and
- create or update operational plans for reservoirs.

3. Sustaining Flows for Cultural, Ecological, Social, and Economic Purposes through the Cowichan Water Use Plan

Workshop between Cowichan Tribes and Nicola Nation Chiefs, by Barry Hetschko.

From the headwaters of Cowichan Lake to the estuary at Cowichan Bay, the Cowichan River is a world-renowned river on the east coast of Vancouver Island. The Cowichan River is the heart of the Cowichan Tribes First Nation's territory, designated as both a federal and provincial Heritage River, and vital to the culture and economy of the entire Cowichan region. The Cowichan River is treasured for fishing and recreational opportunities, and the underlying aquifer provides the community with drinking water. However, as is the case in many watersheds across BC, the Cowichan River watershed is also facing growing cumulative pressures and climate-related threats.

Low flows in the Cowichan River are an increasing problem. The current Cowichan water management system and weir at the outlet of Cowichan Lake—built in the 1950s—can no longer reliably provide enough water for fish, cultural, and other social and economic uses down the Cowichan River during drier summers and falls. Climate change is the main driver that has resulted in a third less water coming into Cowichan Lake since the 1960s. Eight out of the last 15 years have been drought summers, including three of the last four. This drying

trend is only expected to worsen in coming years with much smaller snowpacks and longer, warmer, drier summers by the 2050s.

For many years, Cowichan Tribes has led and partnered on a range of initiatives to identify EFNs and address low flow issues in the Cowichan River. One of the most recent initiatives was the Cowichan Water Use Planning ("WUP") process.

In 2017, four partners—Cowichan Tribes, Cowichan Watershed Board,[30] Cowichan Valley Regional District, and Catalyst Paper—initiated this community planning process to explore future water use needs alongside a range of different potential water flows, supply, and storage options. The goal was to recommend a revised storage option for Cowichan Lake (higher weir structure to increase water storage), and to establish a new set of rules for how and when flows are released to the Cowichan River. The outcome of the WUP process is a collaborative solution to better ensure water resources are sustainable and available to meet the region's future water use requirements.

The Water Use Plan Process

A public advisory group (PAG) was established to work through the steps of a collaborative planning process. The PAG was comprised of 19 community members representing First Nations,[31] local governments, residents, businesses, industry, lakefront property owners, community groups, and provincial and federal agencies. It met regularly throughout 2017-18 for close to a year. The PAG was not a decision maker. Rather, this multi-party group reached consensus and made recommendations for a water use plan and implementation to the four WUP partners, including the Cowichan Tribes. The PAG's process involved:

- **Clarifying the decision at hand.** The Plan focused on changing lake levels and releases from the weir to ensure sustainable flows and water availability. These actions are possible through orders under the WSA and require new infrastructure to store more water in Cowichan Lake via a new and higher weir structure.
- **Defining different water values, uses, and objectives.** This included First Nations' salmon harvesting rights and other social and cultural water uses. Other values included wildlife and riparian needs, recreation and aesthetic considerations, municipal water supplies, and interests of lakefront property owners.
- **Identifying and evaluating potential solutions.** The PAG considered alternative flow and storage scenarios at different times of the year, including expected consequences, uncertainties, and risks associated with different courses of action.
- **Deliberating important trade-offs**. The PAG learned about how different flows and storage scenarios performed across all the values they had identified and considered trade-offs. In early rounds of deliberations, none of the scenarios were broadly supported, and many PAG members strongly opposed multiple scenarios. A new hybrid alternative scenario was proposed that bridged the main differences. This alternative had direct benefits for salmon, as it would more than double base river flows in most summers, and better support passage flows in the spring and early fall for returning spawning salmon. As a result, salmon would be more resilient to climate change, and their populations would not be expected to reach a threatened status. In this alternative, there were also no anticipated adverse impacts to lake recreation and beach areas, and the impacts to lakefront property rights were considered acceptable given the anticipated benefits.

» **Reaching agreement on a path forward.** The PAG reached consensus on the new alternative scenario for water flows and storage. Among other recommendations to the four WUP partners, the PAG highlighted the need for:

- New infrastructure to increase storage capacity on Cowichan Lake, which includes increasing the height of the weir up to 70 cm, but only operating at 30 cm until a compensation mechanism could be established and agreed to by individual property owners for water level rises that would affect their property rights. The cost associated with this measure was anticipated to be in the tens of millions of dollars, plus additional costs for compensation.
- Temporary pumping as an emergency measure to maintain minimum flows of 5 m3/s down the Cowichan River during severe summer droughts.
- Storage of water and control of outflows to the Cowichan River one month earlier.
- Adjustment of the magnitude and timing of spring flows to meet minimum flow targets and lake level targets.

  The PAG identified a number of conditions alongside their recommendations, such as the need to undertake a more detailed flood risk analysis, and to ensure the WUP is reviewed every 10-15 years.

The four partners are now proceeding with next steps to study and build the weir, and carry out the necessary studies consistent with the WUP recommendations.

The Cowichan Water Use Plan is an exciting recent example of working together on sustainably managing flows. Opportunities also exist to strengthen the process and ensure it is tailored to local context, in particular by providing a more direct First Nations decision making role, seeking broader input and engagement with First Nation community members and leadership, and cultivating a strong sense of community ownership.

6. CONCLUDING THOUGHTS

EFNs are an expression of Indigenous law and a condition for exercising Aboriginal and Treaty Rights. EFNs offer one avenue for First Nations to influence and make decisions about water licensing and water use in their territories. They provide a basis for assessing new water licences and asserting when temporary protection orders should be put in place during times of drought. They are also a core pillar of collaborative planning to establish how much water can be withdrawn, stored or diverted, when, how, and by whom.

Many First Nations are in the process of collaboratively or independently developing and implementing EFNs in their territories. While a diversity of approaches are being taken, it is already clear that these EFN initiatives aim to do a few things differently, including drawing on Indigenous laws and knowledge in the process of developing and asserting EFNs, and in some cases, developing shared decision-making processes. The many different approaches and EFN projects currently underway will offer insights into how EFNs can be developed and applied to assert Indigenous laws, change water management and decision-making, and contribute to advancing sustainable water governance across the province.

Appendix A:
Water Sustainability Act tools for Environmental Flow Needs[32]

Section 15: Decision makers "Must Consider" environmental flows. Section 15 of the WSA requires decision makers to consider the environmental flow needs of streams for new authorizations (including licences and short-term use approvals) for surface water and non-domestic groundwater use that is hydraulically connected. New licences for existing groundwater users are not subject to EFN assessment. The provincial EFNs policy provides guidance to the decision maker and is used to fulfill this requirement.

Section 16 & 17: Mitigation Measures. When a proposed water allocation is likely to cause a significant adverse impact on the water quality, quantity or ecosystem health of a stream or aquifer, the decision maker can require the applicant to propose mitigation measures, to abide by certain conditions for water use and/or to take other compensatory mitigation measures.

Section 86-87: Declaration of Significant Water Shortage and Critical Environmental Flow Protection Orders. If there is a drought or water shortage, under powers granted by the WSA, the Minister (Forest, Lands, Natural Resource Operations and Rural Development) can make a temporary declaration of "significant water shortage." This allows the Comptroller to make a Critical Environmental Flow Order and determine the volume of water flow in the stream below which significant or irreversible harm to the aquatic ecosystem of the stream is likely to occur. This "critical environmental flow threshold" takes precedence over all water use licences issued under the WSA, regardless of their precedence or when they were issued, which means that all water licensees may be required to cease diverting water for a period of time.

Section 88: Fish Population Protection Orders: If the water flow in a stream is or is likely to become so low that it threatens the survival of a population of fish in that stream, the Minister (Forest, Lands, Natural Resource Operations and Rural Development) may make a series of orders that some or all users cease diverting water regardless of the seniority of a water licence.

Section 43: Water Objectives. The WSA creates new authority to set water objectives in regulation for the purposes of sustaining water quality, quantity, and aquatic ecosystems. Water objectives set out criteria for water quality and quantity that land and resource use decision makers can be required to consider when making their individual decisions. Local governments can also be required to consider water objectives in their plans.

Section 128: Sensitive Streams. This section enables government the ability to designate additional streams and hydraulically connected aquifers as "sensitive". Any new authorizations on designated streams or hydraulically connected aquifers may have terms and conditions (e.g. related to mitigation measures, water use, and monitoring and reporting).

Sections 64-85: Water Sustainability Plans. The Minister is able to request or designate an area for the purpose of developing a Water Sustainability Plan to prevent or address conflicts between water users or between the needs of water users and environmental flow needs, or to address risks to water quality or aquatic ecosystem health. Water sustainability plans can include a broad variety of terms, including those that could protect EFNs by reducing the volume allocated under water licences generally or in response to specific ecosystem or community conditions (section 79). Water sustainability plans can also recognize specific elements of Aboriginal Rights to water as part of watershed-based agreements or parallel government-to-government agreements.

Section 124: Area-based regulations. Cabinet or the Minister may make location-specific regulations that designate specific areas and create unique thresholds and requirements for those places.

Appendix B:
Additional Resources

Cowichan Watershed Board. (2020, July 19). Why fish need water [Video]. Youtube. https://www.youtube.com/watch?v=ZsD4X1zPmTw&feature=youtu.be&fbclid=IwAR0TPWoN9XUlvxzcnqfVEEO7_xDcQJudnc8sD3u3tGjC5h0CudtUVXn3l3s

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To receive a copy, please contact info@fnfisheriescouncil.ca

First Nations Fisheries Council of BC. (2019). Fisheries Indigenous Knowledge: Forum Proceedings and Discussion Paper. Vancouver, BC. Available online: https://www.fnfisheriescouncil.ca/wp-content/uploads/2020/05/IK-Forum-Proceedings-and-Discussion-Paper_Oct-2019-FINAL.pdf

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POLIS Water Sustainability Project. (2016, February 1). Environmental Flow Needs in British Columbia (conference materials). WWF-Canada and POLIS Project on Ecological Governance. https://poliswaterproject.org/polis-event-webinar/forum-environmental-flow-needs-british-columbia/

Yucwmenlúcwu (Caretakers of the Land) LLP. (2017). Environmental Flow Needs Methodology and Flow Threshold Development in Secwepemc Territory - Review and Synthesis. Report presented to Secwepemc Fisheries Commission.
To receive a copy, please contact info@fnfisheriescouncil.ca.

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[1] First Nations Fisheries Council of British Columbia. (2019). Towards a *Water Sustainability Act* First Nations Engagement Framework: Working Group Recommendations for Collaborative Development of Regulations and Policies. Available online: https://www.fnfisheriescouncil.ca/wp-content/uploads/2019/11/Letter-FNFC-to-BC_July-2019.pdf

[2] For details on WSA temporary orders, see section 4 and Appendix A.

[3] The international scientific community Brisbane Declaration on Environmental Flows defines EFNs broadly as "the quantity, timing, and quality of freshwater flows and levels necessary to sustain aquatic ecosystems which, in turn, support human cultures, economies, sustainable livelihoods, and well-being." Available online: https://riversymposium.com/about/brisbane-declaration/. The Water Sustainability Act defines environmental flow needs more narrowly as: the volume and timing of water flow required for the proper functioning of the aquatic ecosystem of a stream.

[4] This information is collected via hydrometric stations that continuously monitor water flow conditions. For a map of real-time hydrometric data in BC, see: https://wateroffice.ec.gc.ca/google_map/google_map_e.html?search_type=province&province=BC

[5] Naiman RJ, Latterell JJ, PetitNE, Olden JD. 2008. Flow variability and the biophysical vitality of river systems. Comptes Rendus Geoscience 340: 629-643

[6] Murray Lower Darling Rivers Indigenous Nations. (2019). Cultural Flows, Echuca Declaration of 2007. Available online: www.mldrin.org.au/what-we-do/cultural-flows/

[7] BC Ministry of Forests, Lands and Natural Resource Operations and Ministry of Environment. (2016). Environmental Flow Needs Policy. Available online: https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-licensing-rights/water-policies/environmental-flow-needs.

[8] So far, the provincial government has only issued one temporary order under the WSA—a Fish Population Protection Order for the Koksilah River in 2019. See details at: https://news.gov.bc.ca/releases/2019FLNR0215-001616.

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[10] A senior decision maker in the Ministry of Forests, Lands, Natural Resource Operations, and Rural Development designated to implement the WSA with the support of Regional Water Managers.

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[12] The BC Drought Response Plan articulates 4 drought levels of increasing severity. At each level, there are recommended actions that should be taken by different levels of government and water users. For details, see: https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/drought-info/drought_response_plan_final.pdf

[13] Watershed Watch Salmon Society. (2019). Tapped Out: A Special Report on Water Scarcity and Water Solutions in British Columbia. Available online: https://watershedwatch.ca/wp-content/uploads/2019/09/2019-09-24-Tapped-Out-RGB.pdf

[14] First Nations Fisheries Council of British Columbia. (2019). Towards a Water Sustainability Act First Nations Engagement Framework: Working Group Recommendations for Collaborative Development of Regulations and Policies. Available online: https://www.fnfisheriescouncil.ca/wp-content/uploads/2019/11/Letter-FNFC-to-BC_July-2019.pdf

[15] The WSA introduced a requirement for groundwater regulation in 2016. Existing non-domestic groundwater users have until 2022 to apply for a licence to secure their precedence of use in the First in Time, First in Right system.

[16] The Environmental Appeal Board is an independent agency that hears appeals from certain decisions made by government officials related to environmental issues.

[17] Gale v. British Columbia (Assistant Regional Water Manager), [2015] BCW.L.D. 6811 [Gale v. BC]. Available online: http://www.eab.gov.bc.ca/water/watsm15.htm#2012-WAT-013(c)

[18] Halstead v. British Columbia (Water Manager, Thompson Okanagan Region), [2018] Carswell BC 885 [Halstead v. BC]. Available online: http://www.eab.gov.bc.ca/water/2017wat007a.pdf

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[20] Ibid. 19

[21] Alberta Government. (2015). Lower Athabasca Region – Surface Water Quantity Management Framework for the Lower Athabasca River. Available online: https://open.alberta.ca/dataset/f2ebc2f5-fe78-4dfe-be99-85d1d9fb6fe3/resource/d02751b1-c9e4-4e52-921d-72eda6497981/download/zz-6243941-2015-lower-athabasca-region-larp-surface-water-quantity-management-2015-02.pdf

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[23] Ibid. 19

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[25]UNESCO World Heritage Centre & International Union for Conservation of Nature. (2017). Reactive Monitoring Mission to Wood Buffalo National Park, Canada, 25 September - 4 October 2016. Available online: https://whc.unesco.org/en/documents/156893

[26]Okanagan Nation Alliance. (n.d). Environmental Flow Needs (EFN). Okanagan Nation Alliance. Available online: https://www.syilx.org/projects/environmental-flow-needs-efn/

[27]For details on the process of identifying EFN methods suitable for Okanagan streams, see the detailed phase 1 summary: https://www.obwb.ca/newsite/wp-content/uploads/OBWB_EFN_May2016_mainreport.pdf.

[28]For details on what went into phase 2 including field studies and site-specific technical work, see the detailed phase 2 summary: https://www.obwb.ca/efndocs/EFN_report_2020.pdf.

[29]Associated Environmental Consultants Inc. (2020). Okanagan Environmental Flow Needs Project Phase 1 and 2 Summary Report. Report produced for the Okanagan Basin Water Board. Available online: https://www.obwb.ca/efndocs/rpt_okanagan_efn_summary_FINAL_03042020.pdf

[30]The Cowichan Watershed Board is a co-governance entity led by the Cowichan Tribes and Cowichan Valley Regional District. For more information on the CWB's co-governance approach, see: Pathways and Partnerships: A Framework for Collaboration and Reconciliation in the Cowichan Watershed, https://poliswaterproject.org/

[31]First Nations involved were Cowichan Tribes and Lake Cowichan First Nation, along with Halalt First Nation attending and observing the process and six other neighbouring First Nations being regularly updated on planning progress.

[32]Mattison, J.S. (2017). Environmental Flow Needs in British Columbia. Discussion Paper prepared for WWF-Canada and the POLIS Project on Ecological Governance Forum on Environmental Flow Needs in BC. Available online: https://poliswaterproject.org/files/2017/06/Jim-Mattison_Discussion-Paper-for-the-Forum-on-EFN_0.pdf

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