

Prioritizing Ecological Stewardship in Water Planning & Policy

Spring 2021

This policy brief is part of a series developed for the Okanagan Bioregion Food System Project. Each policy brief is connected to an area of local food policy development identified based on a review of local government comprehensive plans in the Okanagan bioregion. These briefs are designed to give context to the policy challenge and bring forth instructive examples to support local-level decision making.

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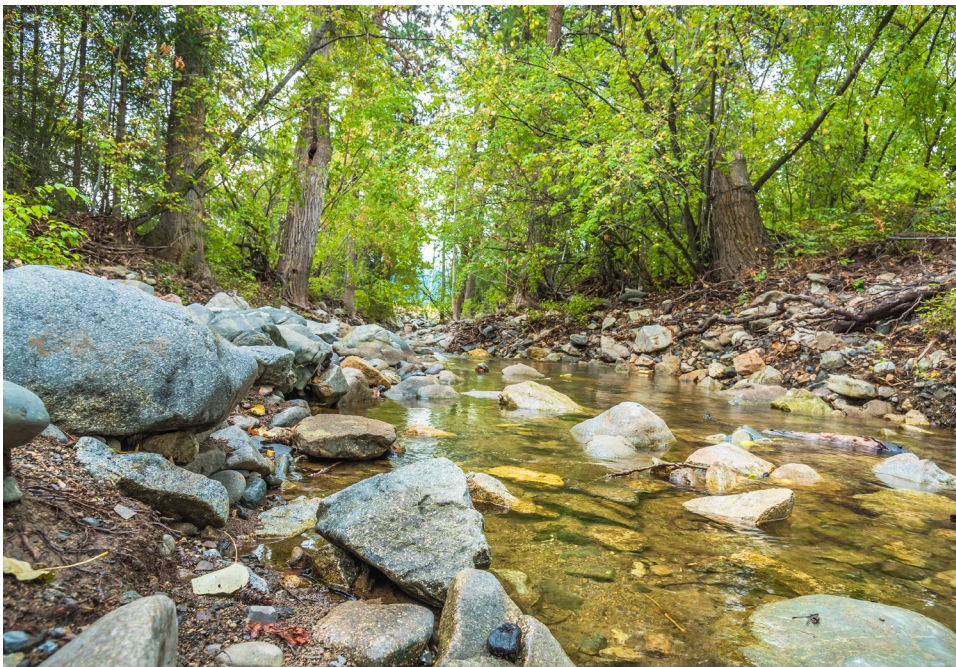
Author:

Naomi Robert
Research Associate, ISFS
naomi.robert@kpu.ca

Introduction

Freshwater ecosystems are experiencing increasing challenges and stress across BC. A history of disconnected planning and decision-making, unmanaged cumulative impacts, and poor data collection are impacting aquatic ecosystem health, human livelihoods and community wellbeing. Climate change is amplifying these pressures, and communities are increasingly undertaking emergency measures to address freshwater crises.

For example, in 2009, the Province issued a [Fish Protection Order in the Nicola Watershed](#), the first of its kind in BC. The order reduced and suspended water use for agricultural users after instream flows became dangerously low and severely degraded fish habitat. Another protection order was issued in the same watershed in [2015](#). A similar order was again issued in 2019 on the [Koksilah River](#), suspending water use for industrial purposes and forage crop irrigation. In 2015, summer drought conditions brought the Sunshine Coast Regional District within 30 days of running out of water (Honey-Roses et. al., 2016).



The resulting risks to ecosystems and livelihoods are anticipated to intensify as climate change reinforces existing ecological, social and economic tensions. There is a need to prioritize the integrity of freshwater ecosystems in policy and planning and to adopt proactive approaches to water management. The Province's [Strategic Climate Risk Assessment](#) identifies seasonal water shortages among the three greatest climate risks to BC.

While the provincial government is the primary Crown authority responsible for fresh water law and regulation, local governments have significant impact on freshwater systems. Local governments influence fresh water management through the delivery of water utilities, the maintenance of related infrastructure and services, the establishment of water prices and metering and, importantly, through land use planning including growth planning and zoning. This policy brief highlights local government initiatives from BC and beyond to prioritize ecological stewardship in water policy and planning. Given the influence of provincial planning tools and regulations on freshwater systems, provincial context and a selection of provincial policy initiatives and tools are also highlighted.

Local Government Initiatives

- [Emphasizing aquatic ecosystem health in comprehensive planning](#)
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Policy and Planning Initiatives

Local Government Initiatives

Emphasizing aquatic ecosystem health in local government comprehensive planning

Comprehensive planning initiatives, such as Regional Growth Strategies and Official Community Plans are responsible for setting goals and priorities for communities on mid-to-long term scales. In these plans, emphasizing the importance of maintaining aquatic ecosystem health, and recognizing the impact of land use practices on these ecosystems, can provide important high-level support for future initiatives.

The [King County \(Washington\) Comprehensive Plan](#) integrates policy directives that acknowledge the role of development, including agriculture, in maintaining healthy watersheds. The plan explicitly recognizes the link between terrestrial and aquatic systems, and that development should “*maintain base flows, natural water level fluctuations, unpolluted groundwater recharge...and fish and wildlife habitat.*” The [RDOS Regional Growth Strategy](#) also includes language that supports the maintenance of environmental flows in support of ecological functions and groundwater recharge.

Watershed planning to connect land and water decision-making

Watershed planning aims to embed aquatic ecosystem impacts into land use planning and practices. At a high level, watershed plans identify key concerns in a watershed and develop coordinated strategies to address them. This can include source water protection, groundwater recharge, water supply-demand analyses, urban development

Climate Change and Future Water Availability

The resulting risks to ecosystems and livelihoods are anticipated to intensify as climate change reinforces existing ecological, social and economic tensions.

By 2050, water shortages could happen about once every two years or more frequently. The impacts can be wide-ranging and affect drinking water quality, ecosystem health, and water-dependent industries, including agriculture and tourism (Ministry of Environment and Climate Change Strategy, 2019. Pg 10).

Environmental Flows

Environmental Flows describe the quantity, timing and quality of water needed in aquatic systems to support the wellbeing of the ecosystems and human livelihoods that depend on them. The health of aquatic ecosystems relies on certain types of flows at certain times. Diverting water for human uses changes these flow patterns. The more natural flows change, the higher the risk to ecosystems and human livelihoods (POLIS & WWF-Canada, 2016).



strategies, environmental flow maintenance, drought management etc.). Examples of watershed plans in BC include the [Kettle River Water Management Plan](#), the [Lower Coquitlam River Watershed Plan](#), and the [Elk Valley Water Quality Plan](#). While a [patchwork of watershed plans](#) have been developed in BC, they are not legally-binding and can be difficult to implement, enforce and sustain (McFarlane et. al., 2014). However, the effectiveness of purely regulatory-based approaches is limited when these focus on minimum compliance rather than adopting best practices (McFarlane, 2014).

Using a collaborative and voluntary approach, the [Nisqually Watershed Management Plan](#), Washington State, USA (2004) assesses current water resources and demand, and provides an allocation plan to balance future demand for extractive and ecological use. Representatives from the Nisqually Tribe, county and municipal governments, water purveyors, stewardship groups, the state Department of Ecology and industry all participated in the planning team. The plan is subject to ongoing review and adaptation. For example, a recent [amendment to the plan](#) (2019) estimates demand from future domestic well connections and outlines strategies to offset these and ensure adequate streamflow. Activities include restoring wetlands to help regulate water flows, transferring select water rights into the state's trust to benefit streamflow, and decommissioning select wells (State of Washington Dept of Ecology, 2019; Nisqually River Council, n.d.). These strategies were developed in response to [Washington's Streamflow Regulation Act](#).

Nation-to-Nation watershed governance models

For thousands of years, Indigenous peoples have been stewarding the land and waters in their territories according to Indigenous laws and governance structures. Watershed governance must recognize the inherent rights and authority of Indigenous peoples in their traditional territories and pursue Nation-to-Nation co-governance models. This is in line with the [United Nations Declaration on the Rights of Indigenous Peoples](#), as stated in Article 32: "Indigenous peoples have the right to determine and develop priorities and strategies for the development or use of their lands or territories and other resources" (UNDRIP, 2007) and the Section 35(1) of the Canadian Constitution, which recognizes and affirms aboriginal and treaty rights for Indigenous peoples.

The [Cowichan Water Board](#) (CWB), co-chaired by the Cowichan Tribes and the Cowichan Valley Regional District, implements a number of [programs](#) addressing water quality, estuarine health, riparian habitats, aquatic species health and public education. The CWB recognizes the inherent rights of the Cowichan Tribes in their territories, including authority and responsibility for the watershed. The CWB strives to embody this value by ensuring Indigenous voices are at the decision-making table, including Traditional Knowledge into technical working groups and membership, integrating Cowichan culture and language into meetings and events, and striving to adopt Cowichan Tribes' principle into the organization's governance. Specifically, the water board's governance manual includes the Cowichan principle of Nutsamat kws yaay'us tth qa' (We come together as a whole to work together to be stronger as partners for the watershed.) and a commitment to work to understand and integrate the principle into the CWB's operations (Hunter et al., 2014; CWB, 2018).



The BC Waster Sustainability Act

In 2016, BC adopted the [Water Sustainability Act](#) (WSA), overhauling the existing water law, to provide more regulatory tools and guidance for addressing rising water concerns in the province. The WSA provides a [number of regulatory tools](#) that can collectively address key water challenges, such as groundwater licensing, legal protection for environmental flows, and water sustainability plans, however further regulations are needed to ensure these tools can be effectively applied. Local governments have a key role to play to drive, support and inform WSA implementation.

"While the WSA introduces a range of possible new tools to improve water management, it also extends a number of the problematic colonial features of the 1909 Water Act. For instance, it carries forward provincial government ownership of water and the 'first in time, first in right' licensing system, which continues to ignore First Nations as the first water users (First Nations Fishery Council of British Columbia. pg 5)."

In the spring of 2018, the Nicola Valley’s five First Nations and the government of British Columbia signed a government-to-government [memorandum of understanding](#) (MOU) to collaboratively address increasingly complex water management issues in the region. The MOU outlines the commitment of the Nicola First Nations and Province to jointly and sustainably steward water resources. Potential results could include the development of environmental flow protection regimes, Water Sustainability Plans and/or drought response (POLIS, 2019; Nicola Bands and Province of British Columbia, 2018).

Funding coordinated watershed management

Securing sustainable, long-term funding to ensure the coordination and longevity of watershed stewardship activities is an important avenue to strengthening watershed governance. Parcel taxation and water fees have been adopted in a number of jurisdictions to ensure stable funding for watershed management. The Okanagan region was a pioneer in leveraging property taxation for coordinated watershed stewardship. The [Okanagan Basin Water Board](#) (est. 1970) is a regional partnership that works to improve water management across the Okanagan Lake watershed and improve coordination between regions and levels of government. The partnership is partially supported through property taxes.

Parcel taxation for watershed management has also been implemented at the regional district level in Nanaimo, Cowichan Valley and Kootenay Boundary after the electorate approved referendums. The City of Raleigh, North Carolina, levies water fees from users to support specific watershed protection restoration projects.

Water metering and conservation water pricing

Tracking water use is a critical first step toward conservation pricing. In recent years, water suppliers in the Okanagan have made significant efforts toward universal water metering. A 2015 survey of water purveyors indicated that approximately two thirds of suppliers with agricultural connections will have universal metering (OBWB, 2017).

Water pricing structures vary across the Okanagan. Approximately 70% of water suppliers with agricultural customers charge users a flat rate for water use, based on the irrigated area. This pricing structure is particularly common among smaller water

Whats is Watershed Governance?

Fundamentally, watershed governance involves reorganizing our decision-making approaches to align with the ecological boundaries associated with watersheds, instead of political or jurisdictional boundaries (Hunter, Brandes & Brandes, 2014. p1).

Parcel Tax or Water Fee	Description
Cowichan Valley Regional District Drinking Water and Watershed Protection Service	Levies the greater of \$750,000 or \$0.045 per \$1,000 of net taxable value of lands and improvements in the service area. Funding is dedicated to initiatives that improve collaborative management of water across the watershed, including water conservation, public education, water management plans and obtaining water licenses.
Regional District of Nanaimo Drinking Water and Watershed Protection Service	Requisitions a maximum of the greater of \$522,000 or \$0.067 per \$1,000 net taxable value of lands and improvements in the service area for watershed protection programs. The Regional District of Nanaimo recently completed a 10-year review of the program and funding model (POLIS 2020).
Kootenay Boundary Integrated Watershed Service	Requisitions \$0.0485 per \$1000 net taxable value of lands and improvements, up to a maximum of \$160,000. Need for coordinated management efforts highlighted after severe flooding in the region in 2018. See also Kettle River Water Management Plan and the Sylix Okanagan Discussion Paper .
City of Raleigh Watershed Protection Fee	The City of Raleigh collects a fee of \$0.11 per 100 cubic feet of water for select service areas to fund the Upper Neuse Clean Water Initiative, drinking water quality improvements to the treatment system, and/or for protective restoration projects.

Table 1: Examples of local government parcel taxes and water fee structures

suppliers (OBWB, 2017). Approximately 15% of water suppliers with agricultural connections use volumetric rates, charging users a fixed amount per volume of water. Water price structures can also be a combination of these structures. For example, in 2016 the District of Summerland [implemented a new water rate for agricultural users](#) to promote responsible water use. Agricultural water users are charged a flat base fee per acre of arable land and water use in excess of 800mm is charged additionally based on an increasing tiered volumetric rate.

The Tarabina District, Italy, adopted a trinomial tariff system to incentivize efficient agricultural water use, address equity between users by establishing fees proportionate to water use, and recover costs. The tariff comprises flat (/ha), volumetric (/m³) and variable (/ha) components. The variable rate recovers remaining maintenance and operation costs not captured by the first two components (Vollaro et. al., 2015). Water pricing in agriculture must be carefully implemented to incentivize responsible use without compromising farm viability, or the viability of operating irrigation services.

Provincial, State and Federal Initiatives

Water sustainability plans for BC

The Water Sustainability Act (WSA) introduces [Water Sustainability Plans](#) to provide a legally enforceable watershed planning approach to link land and water management. Water Sustainability Plans are innovative tools to integrate local solutions to watershed issues such as over allocation, ecosystem degradation, and conflict among water users. Among other possibilities, these plans can address linkages between land and water use planning, environmental flows, licensing and management, and drought response.

BC has yet to develop its first Water Sustainability Plan. However, in early 2020, the Cowichan Water Board, Cowichan Tribes and the Province signed an [agreement to scope the development of a Water Sustainability Plan](#) for the Koksilah River watershed, which has been experiencing extreme low summer flows that threaten fish populations.

Environmental Flows in British Columbia

The Water Sustainability Act, adopted in 2016, provides the first legal protection for environmental flows, requiring decision makers to consider environmental flow needs (EFNs) when issuing new licenses for surface and groundwater. However, integrating EFNs into decision-making requires further work to set and implement watershed-specific standards.

For example, in 2015, the Okanagan Nation Alliance Fishery Department, in collaboration with the Okanagan Basin Water Board and the Ministry of Forests, Lands, Natural Resource Operations and Rural Development, developed a transparent, defensible and robust method for defining EFNs in the Okanagan. The Okanagan Nation Alliance then led the development of EFNs and critical flows for 18 streams in the watershed with high cultural importance for the Sylix Okanagan People. The Okanagan Environmental Flow Needs Project has resulted in the most comprehensive assessment of streamflow conditions and EFNs for the Okanagan Basin to date. This information can be applied toward land and water management that prioritizes ecological integrity by integrating EFNs into local government planning, operational plans for reservoirs, and other future water governance initiatives.



Development and application of presumptive environmental flow thresholds

Robust environmental flows are location-specific, and their development often requires considerable resources and data collection. However, data needs should be balanced with the immediate need to protect freshwater systems amidst growing water management challenges in BC. As such, there have been numerous calls to implement presumptive standards while location-specific standards are being developed (POLIS & WWF-Canada, 2016). Since determining site-specific environmental flows is a research-intensive process, applying presumptive environmental flow thresholds provides urgent freshwater ecosystem protection when location-specific environmental flow rates are not readily available. The following examples demonstrate linking of presumptive water standards to water management policy at the state level.

Between 2006-2010, Michigan developed presumptive environmental flow standards with the goal of protecting freshwater ecosystems while streamlining the license application process. Maximum withdrawals were established based on percentage of flow in the month, typically August/September. This approach establishes conservative maximum withdrawals that are likely to protect aquatic habitats in low flow months, when conditions are most stressful (Richter, 2011). [Michigan's Water Withdrawal Assessment Tool](#) integrates these flow standards into licensing decisions. The modeling tool adds proposed withdrawals to cumulative upstream withdrawals to determine the acceptability of additional licenses. Proposed licenses with higher risk of reaching maximum withdrawal thresholds require further review with site-specific data. In this way, the tool aims to cap water withdrawals within acceptable ranges of fish habitat impact and prioritize the use of government staff resources in reviewing high risk proposals (Kendy et al., 2012). While this example demonstrates the development and application of presumptive environmental flow thresholds, it applies to future water withdrawals and does not address challenges associated with existing licenses, such as over-allocation.

In Northern Territory, Australia, discharge from the Tindall Aquifer is the only inflow to the Katherine and Daly Rivers in the dry season. Aquifer recharge is dependent on rainfall and is highly variable from year to year (Water Quality Australia, 2012). The [Tindall Water Aquifer Water Allocation Plan](#) was developed to sustainably manage water allocations from the aquifer and ensure an equitable distribution of water between extractive, environmental and cultural (particularly Indigenous cultural) uses. The plan first reserves aquifer discharge for environmental flows to ensure ecological and cultural flow needs are met. If residual aquifer discharge is calculated to be less than the sum of annual water licenses, water licenses are reduced to meet extraction limits. Water licenses are assigned a security category, which communicates to users the percentage of years that they can expect to withdraw their maximum annual license volume.

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Aligning the Water Sustainability Act with the Declaration on the Rights of Indigenous Peoples Act

In 2019, the Province passed the [Declaration on the Rights of Indigenous Peoples Act](#) to set out a process to align BC's laws with the UN Declaration on the Rights of Indigenous Peoples. There are a number of [reforms needed](#) to align the Water Sustainability Act with UNDRIP in order redress the ongoing dispossession of First Nations of their land and waters as well as enable Indigenous people to exercise their inherent rights and authority through water governance.

Funding for coordinated watershed governance

A diversity of groups across BC are calling for the Province to establish an independent water security fund to address the growing need for comprehensive watershed planning and coordinated governance. The [BC Water Security Fund](#) could provide stable funding to support community resilience to climate change, support local economies and steward aquatic ecosystems. Importantly, a co-governance structure that enables Indigenous communities to implement Indigenous water laws and governance practices can provide concrete ways to implement commitments to reconciliation. Proposed funding sources include investment from the government of British Columbia into an endowment fund, with annual returns complemented by resource revenues (POLIS, BC Freshwater Legacy Initiative, First Nations Fisheries Council, BC Wildlife Federation, 2019). The 2020 [mandate letter](#) to the Ministry of Environment and Climate Change Strategy makes a commitment to create this fund and an associated Watershed Security Strategy.

Financial support for improved water management practices

Incentive programs have been used in a number of jurisdictions to influence land use practices and improve freshwater outcomes. The following examples illustrate different approaches to incentive programs to promote land management practices for improved watershed health. New York's Watershed Agricultural Program was implemented to advance source protection and avoid the costly construction and operation of a water treatment plant. The program established the [Watershed Agricultural Council](#), a farmer-run non-profit. The City of New York provides funding to the council to support farmers who voluntarily implement best management practices on their land, and contribute to the protection and enhancement of New York City's water sources (Kousky. 2015).

[Alberta irrigation efficiency program](#) helps producers purchase and install irrigation systems that increase water savings. The program is a joint federal - provincial initiative under the [Canadian Agricultural Partnership](#). [BC's Environmental Farm Plan](#) program provides producers with an assessment of environmental risks and cost-sharing incentives to address actions identified in their farm plan.

Conclusion

The 21st century brings with it increased uncertainty about and elevated risk to aquatic ecosystems and communities. Local, provincial and First Nation planning and policy initiatives all have a critical role to play in stewarding ecological integrity and community wellbeing. This report highlights a selection of precedents that can be used to inform and inspire action to prioritize ecological stewardship in water policy and planning.

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About the Okanagan Bioregion Food System Project

These research briefs were developed as part of the Okanagan Bioregion Food System Project. Communities and governments are increasingly looking to strengthen regional food systems as a way to address many complex agriculture and food challenges. This multidisciplinary research project, initiated by ISFS and regional partners, can guide conversations among communities and decision-makers seeking to advance their regional food system.

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