

MURKY WATERS

Taking a Snapshot of
Freshwater Sustainability in BC

A photograph of a river flowing through a dense forest. The foreground is dominated by large, smooth, grey boulders. The water is clear and flows over the rocks. The background is a thick forest of tall trees. The entire image has a blue tint.

“

Healthy water is
the lifeblood of our
communities.

Opening Letter

You can't change what you can't measure.

That's the premise behind the Real Estate Foundation of BC's series of "BC Snapshot" reports, which introduce a framework and indicators for tracking BC progress towards sustainability goals.

Murky Waters, the first in this series, examines the state of freshwater ecosystems in British Columbia. With an ambitious goal in mind, we worked with a committee of water experts to create a framework that includes desired impacts, impact measures, and conditions for the provincial government.

When we began the process of selecting impact measures, we hoped we'd be able to paint a clear picture of the state of BC's rivers, streams, lakes, and wetlands. Instead, we found data that was incomplete, out of date, or unreliable.

We don't know enough about the health of our most vital natural resource.

There's a huge opportunity here to improve data collection, monitoring, and reporting. Reliable data would help governments, funders, and non-profits to track progress, make better decisions, and coordinate their efforts.

We do know that BC residents care deeply about fresh water.

Four years ago, REFBC commissioned opinion polls to learn more about public attitudes in built environment sustainability, freshwater sustainability, and local and sustainable food systems. We learned that BC residents prize our fresh water, agricultural land, and

built communities, and see them as integral to quality of life.

As a grantmaker, REFBC aims to transform land use attitudes and practices. We envision a BC where land use and real estate activities contribute to resilient, healthy communities and natural environments.

The recommendations from *Murky Waters*, along with findings from the opinion polls and feedback from project partners, has helped to inform REFBC's impact model and theories of change. These tools help us to make better decisions about the work we fund, the projects we take on, and the investments we make.

No one organization can tackle change alone.

Change happens when diverse partners come together, agree on a vision for a better future, and work together to make change possible.

We're grateful to the water experts, academics, and community leaders who have helped us to create a framework for freshwater sustainability. We're also immensely proud of the work our grantees and project partners are doing in communities around the province: establishing watershed governance pilots, translating Indigenous water knowledge into public policy, and engaging citizens in water monitoring projects, to name a few.

Together, we can ensure that freshwater ecosystems in BC are safe, sustainable, and valued by all.



JACK WONG, Chief Executive Officer, REFBC

Acknowledgements

This report was commissioned by the Real Estate Foundation of BC (REFBC). It is the first of a series of three reports that examine fresh water, local and sustainable food systems, and the built environment.

The authors would like to thank all the members of the Freshwater Snapshot Committee for their time and effort in this initiative, and for all their efforts to support healthy fresh water in BC.

The Freshwater Snapshot Committee includes:

- Anna Warwick Sears: Executive Director, Okanagan Basin Water Board and member of the International Osoyoos Lake Board of Control, appointed by the International Joint Commission.
- Coree Tull: Organizing Director, Canadian Freshwater Alliance.
- Oliver Brandes: Co-Director of the POLIS Project on Ecological Governance at the University of Victoria's Centre for Global Studies and lead for the POLIS Water Sustainability Project.
- Tim Morris: Project Director, BC Water Funders Collaborative.

Given the diversity of experiences and backgrounds included, this paper does not necessarily reflect the opinions of any particular committee member, or of their employer.

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Executive Summary

Water is the lifeblood of our communities, and its health is significantly impacted by how we use water and the land around it. The Real Estate Foundation of BC works towards the goal that *freshwater ecosystems in British Columbia are safe, sustainable, and valued by all as a result of progressive leadership in community-driven freshwater protection, governance, and management.*

This report aims to provide a snapshot of our progress on fresh water in BC by developing a framework to measure progress, identifying three conditions that the provincial government should meet to support healthy watersheds, and selecting 10 impact measures to monitor over time.

We learned that there are large gaps in the knowledge and datasets that exist in BC. Findings include recommendations on improvements that can be made to support freshwater data collection, monitoring, and reporting.

Conditions for the BC government to meet

- Current freshwater policy for BC is guided by Living Water Smart, developed by the BC government in 2008.¹ While this document ushered in substantive changes, it is nearly 10 years old and should be updated to provide renewed direction for sustainable water management that reflects the *Water Sustainability Act*.
- The Province should ensure that strong regulations for environmental flow protection exist to safeguard BC's streams and rivers.

Currently, environmental flows are not adequately protected in legislation.

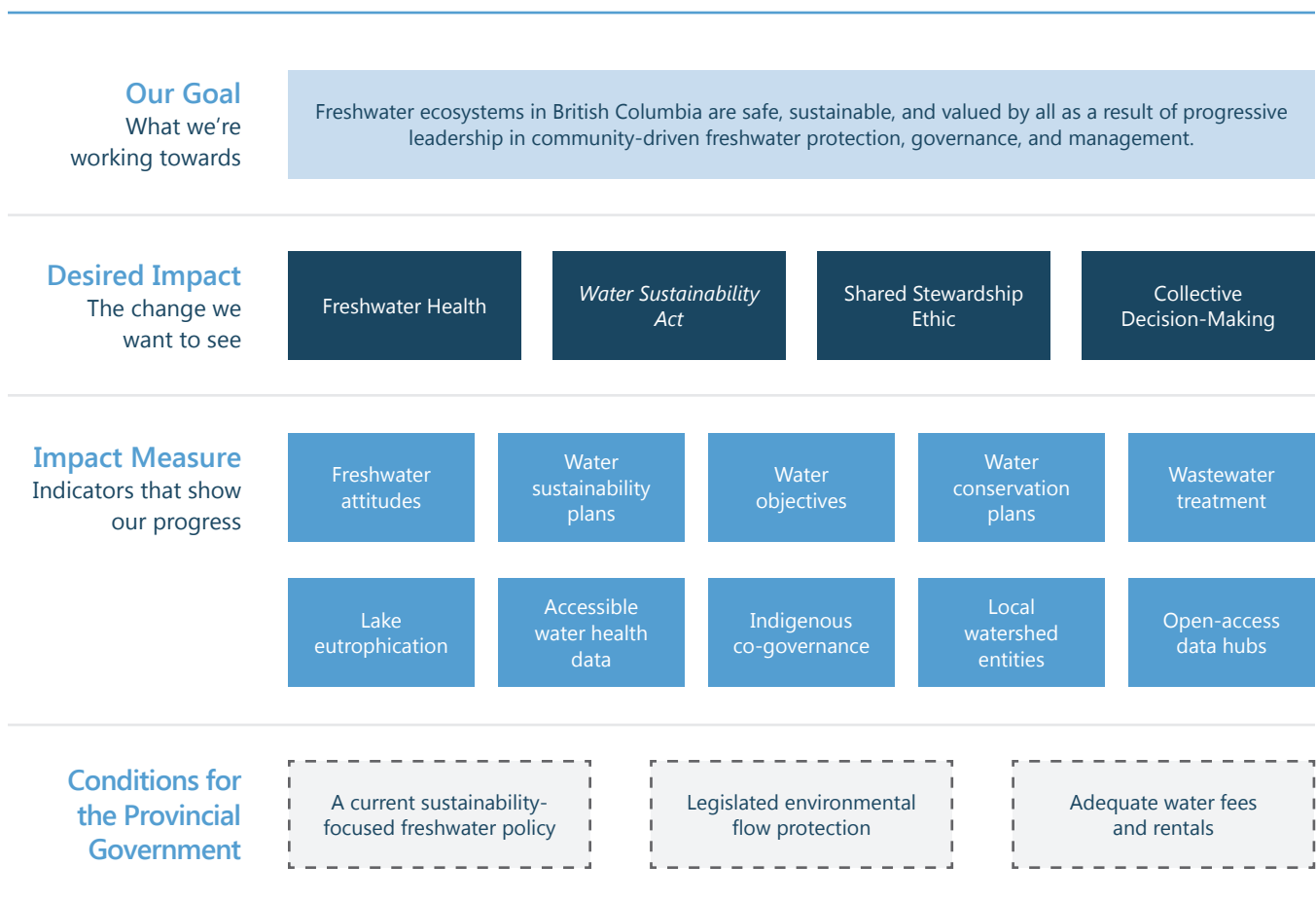
- The Province needs an accurate assessment of water fees and rentals and the allocation of sufficient resources to ensure the full costs of water management and implementation of the *Water Sustainability Act* and associated programs are covered.

Recommendations for data collection, monitoring, and reporting

1. Regular public opinion surveys on freshwater attitudes should be conducted by a cross-section of water partners to “take the pulse” of BC residents’ interests and perspectives.
2. The BC Ministry of Environment and Climate Change Strategy should regularly report on water sustainability plans (both those in development and completed plans) to help illustrate water planning progress and uptake.
3. The BC Ministry of Environment and Climate Change Strategy should regularly publish details of water objectives, including measurable criteria to ensure they are met.
4. The BC Ministry of Environment and Climate Change Strategy, in collaboration with the BC Ministry of Municipal Affairs and Housing and local governments, should annually track and post water conservation plans on a government website.

5. Environment and Climate Change Canada, in collaboration with the BC Ministry of Environment and Climate Change Strategy and local governments, should resume the Municipal Water and Wastewater Survey, or a similar survey, to report on wastewater treatment levels across Canada, broken down by province.
6. The Environmental Protection and Sustainability branch of the BC Ministry of Environment and Climate Change Strategy should report annually on lake data beginning in 2018. Data should include the trophic status of lakes across BC.
7. Diverse groups that gather water data should come together to increase the quantity and quality of data and improve data accessibility.
8. Additional resources should be made available to develop measures to track progress in the areas of Indigenous co-governance, local watershed entities, and open-access data hubs.

Impact Framework



Introduction

Land use and real estate practices have significant impacts on the quality and supply of fresh water. The significance of these impacts is not lost on British Columbians, who rank water as the country's most important national resource.² Healthy water is the lifeblood of our communities. Harmful contaminants in our water compromise the well-being of our environment, the food we grow, and the businesses that allow our communities to prosper.

The Real Estate Foundation of BC (REFBC) has what we call an “**ambitious goal**” for fresh water that provides a broad vision for where we want to be in the future:

Freshwater ecosystems in British Columbia are safe, sustainable and valued by all as a result of progressive leadership in community-driven freshwater protection, governance, and management.

Successfully achieving this ambitious goal requires the collective efforts of many sectors, including civil society; all levels of government, including First Nations; businesses; and academia.

Four **desired impacts** collectively outline the transformational change necessary to reach this goal and describe what a sustainable freshwater future would look like in BC:

- 1. Freshwater Health:** All fresh waters in BC are in good health.
- 2. The Water Sustainability Act (WSA):** A fully implemented, regulated, financed, and enforced WSA.
- 3. A Shared Stewardship Ethic:** A diverse population of individuals, organizations, and communities act with a shared stewardship ethic, ensuring the health of our fresh water and land.
- 4. Collective Decision-Making:** Communities engage in effective collective decision-making and exercise authority towards strong freshwater protection.

This report aims to provide a snapshot of our progress towards meeting these desired impacts and the ambitious goal for fresh water in BC. By developing a framework to measure progress, we identify three conditions that the provincial government should meet to support healthy watersheds in addition to 10 impact measures to monitor over time that quantify the achievement of our desired impacts.

The three **conditions for the provincial government** are:

1. A current sustainability-focused freshwater policy.
2. Legislated environmental flow protection.
3. Adequate water fees and rentals to ensure the full costs of water management and implementation of the WSA and associated programs are covered.

The 10 **impact measures**, including their relationships to the desired impacts, are illustrated in the matrix on the next page, which maps the measures that are directly and indirectly related for each desired impact. These relationships illustrate the extent to which all elements of our framework are interrelated.

Unfortunately, finding adequate data on many impact measures is currently very difficult. We found that data was either moderately developed or not developed at all for our impact measures, with none having well-developed datasets to draw from. The relationship between impact measures, desired impacts, and the degree to which data is available for each impact measure is illustrated on the following page.

While impact measures can signal whether we are achieving our desired impacts, having inadequate data to measure them limits their current effectiveness to monitor progress. Finding consistent data should be a priority so we can track our progress over time. As a result, for each impact measure, we include recommendations on how we may collectively obtain data in the future. These recommendations are intended as a starting point for discussion, recognizing that data gathering and reporting is a complex and often costly endeavour that will require the cooperation of many individuals and organizations.

COMMON LANGUAGE FOR MONITORING PROGRESS

Performance accountability: A system to assess and enhance performance by multiple organizations towards the achievement of an ambitious goal.

Ambitious goal: A picture of a desired future that is hard, but possible to obtain.

Desired impact: The outcomes we look for from the transformational changes we try to facilitate.

Impact measure: An indicator that helps quantify the achievement of our desired impacts.



Impact Measures: Data Quality & Relationship to Desired Impacts

Impact Measure	Relationship to Desired Impacts				Data Availability		
	Freshwater Health	The Water Sustainability Act	A Shared Stewardship Ethic	Collective Decision-Making	Poorly developed	Moderately developed	Well developed
Freshwater attitudes	ⓘ	ⓘ	●	ⓘ		✘	
Water sustainability plans	ⓘ	●	ⓘ	●		✘	
Water objectives	ⓘ	●				✘	
Water conservation plans	ⓘ		●			✘	
Wastewater treatment	●		ⓘ			✘	
Lake eutrophication	●		ⓘ			✘	
Accessible water health data	ⓘ	ⓘ		●		✘	
Indigenous co-governance			ⓘ	●	✘		
Local watershed entities		ⓘ	ⓘ	●	✘		
Open-access data hubs	ⓘ	ⓘ		●	✘		

Legend: ● directly related ⓘ indirectly related





DESIRED IMPACTS

To reach the ambitious goal, transformational change is necessary, as outlined by the four desired impacts.

Freshwater Health

➤ All fresh waters in BC are in good health.

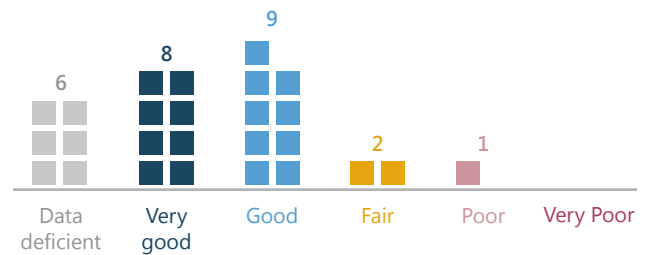
While we all aspire to enjoy clean, living waters in BC, knowing the health of our fresh water continues to be a challenge. On a provincial level, World Wildlife Fund Canada (WWF-Canada) has created watershed reports for 26 sub-watersheds in BC.³ The assessments are based on four areas.

1. **Water flow:** how much water flows in rivers and when.
2. **Water quality:** the levels of pollutants in the water over time.
3. **Fish:** whether the number of native fish has declined over time.
4. **Benthic invertebrates:** whether a river contains a large number and diversity of the right kind of bugs.

Each area is graded from very good to very poor, and an overall score for the health of each sub-watershed is also determined. In some cases, insufficient data was available to determine a ranking.

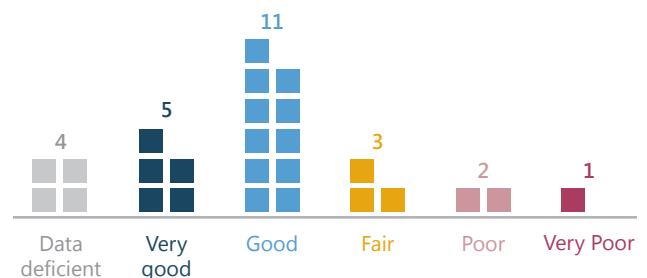
Overall Health

Of the 26 sub-watersheds, 17 (65.4%) are rated as good or very good for their overall health, three are in less than good condition, and six lack data.



State of Water Flow

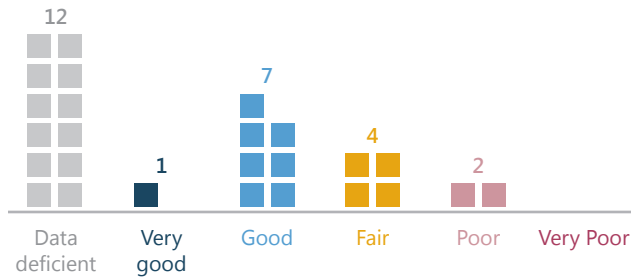
Of the 26 sub-watersheds, 16 (61.5%) are rated as good or very good for water flow, six are in less than good condition, and four are data deficient.



Source: WWF-Canada

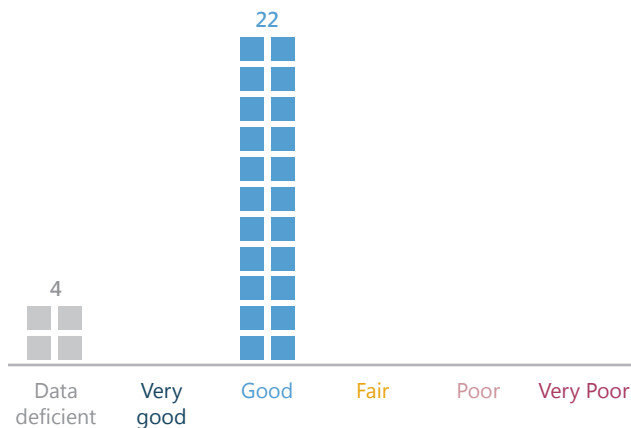
Water Quality

Of the 26 sub-watersheds, eight (30.8%) are rated as good or very good for water quality, six are in less than good condition, and 12 are data deficient.



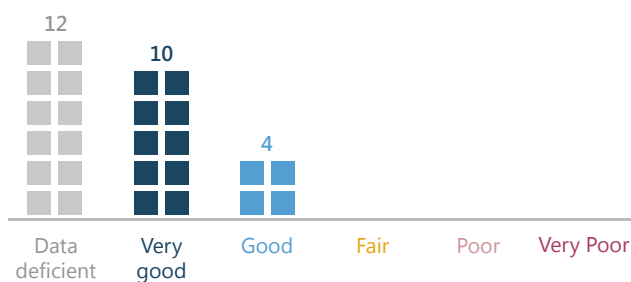
Fish

Of the 26 sub-watersheds, 22 (84.6%) are rated as good for fish, and four lack data.



Benthic Invertebrates

Of the 26 sub-watersheds, 14 (53.8%) are rated as good or very good for benthic invertebrates, and 12 lack data.



Because the data is based on the health of rivers and streams only, the results are somewhat incomplete for a view into the health of BC's freshwater ecosystems. The results do not include other prominent watershed features, such as lakes or wetlands. Most of the 26 sub-watersheds are also exceptionally large, presenting a coarse representation of the state of fresh water within the province. More detailed datasets at a local level would provide a fuller picture of the health of BC's watersheds.

WWF-Canada also assessed the *threats* to BC's sub-watersheds, including pollution, habitat loss, overuse of water, invasive species, habitat fragmentation, climate change, and the alteration of water flows. They determined that many threats to most sub-watersheds exist, particularly in the southern portion of the province. These mounting threats could cause a watershed currently in good health to rapidly deteriorate. They highlight the importance of taking a concerted effort to achieve our ambitious goal for fresh water in BC.



Source: WWF-Canada

Water Sustainability Act

➤ A fully implemented, regulated, financed and enforced *Water Sustainability Act (WSA)*.

The WSA came into effect in 2016, replacing 100-year-old legislation. The WSA enables many valuable tools that can be used to protect fresh water in BC. For example, the act facilitates the regulation of groundwater and the ability to legally require land and resource decision makers to consider the impacts of their decisions on fresh water. The WSA also makes it possible to give decision-making authority to local communities over matters that impact their water.

How well the legislation supports the ongoing health of our fresh water will be largely determined through the regulations and operational policies that the WSA enables — most of which are still in the process of being created. A necessary step for protecting fresh water from current and emerging threats is ensuring a fully implemented, regulated, financed, and enforced WSA.

POLIS Water Sustainability Project

The POLIS Water Sustainability Project, an initiative of the University of Victoria, has championed research and engagement on water law reform in BC, with a recent focus on the opportunity to create and implement a strong *Water Sustainability Act (WSA)* in BC. The group has released numerous publications on the WSA that recommend what needs to be included in a sustainability-focused act, while also recommending solutions to make the WSA stronger.

For more information, see:
poliswaterproject.org/publications



POLIS Project on Ecological Governance
watersustainabilityproject

A Shared Stewardship Ethic

➤ A diverse population of individuals, organizations, and communities act with a shared stewardship ethic, ensuring the health of our fresh water and land.

British Columbian attitudes play an important role in how water is managed. When water is viewed as necessary for life — with lakes, rivers, and wetlands nourishing the landscapes we hold dear — water is more likely to be respected, protected, and cherished.

However, with multiple pressures on the public's time, the focus on water can wane. When freshwater health receives little attention, tools like water conservation plans or water sustainability plans don't get completed, and we can become complicit in adding to major sources of pollution, like poorly treated sewage, that impact the health of our waters.

When a stewardship ethic towards water is missing, false ideas tend to emerge. For example, communities might feel that they have to choose between clean water and resource extraction jobs instead of supporting both clean water and the economy. Regulations and land use planning help create greater predictability for industry and protect our waters. When individuals, organizations (such as businesses, non-profits, and governments), and communities are informed and educated, they can ensure decision makers protect the health of our waters.

Living Lakes Canada

Open-Source Water Data Hub Dialogue

The time for a coordinated, collaborative, innovative, user-friendly, cost-effective, and open water data platform has arrived. Living Lakes Canada works to unite water stewardship groups throughout the country and is convening groups in the Columbia Basin to create a vision for a water monitoring framework and shared data hub.

For more information, see:

livinglakescanada.ca



Collective Decision-Making

➤ Communities engage in effective collective decision-making and exercise authority towards strong fresh water protection.

Governance is about the way decisions are made and upheld. Watershed governance largely informs how well our water is managed. Whether we use terms like “partnership-based,” “collaborative,” or “shared” decision-making, the principle is similar. Decisions that impact people should be meaningfully influenced by those people.

The desire for more local influence is not ours alone. In a recent study survey of 439 people working in watersheds across BC, 74% indicated that fresh water is being managed poorly in the province. Within this group, a consensus exists that our decision-making systems should change from a top-down approach to a more decentralized, collaborative model.

The Cowichan Watershed Board

In January 2010, the Cowichan Watershed Board was created. While it does not have any regulatory authority, the Board promotes water management throughout the Cowichan Basin on Vancouver Island while guiding the implementation of the Cowichan Basin Water Management Plan, which was collaboratively created by local stakeholders.

This innovative arrangement ensures that there is a local watershed group advocating for the well-being of the watershed while providing a series of other important functions such as supplying advice to First Nations, federal, provincial, and local governments; engaging local stakeholders in water management decisions; and securing funding to support water management activities.

For more information, see:
cowichanwatershedboard.ca

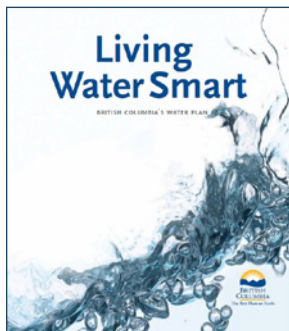
Conditions for the Provincial Government

► To support reaching the desired impacts and ambitious goal, we recommend the provincial government ensure that the following three conditions are met.

A Current Sustainability-Focused Freshwater Policy

Living Water Smart is the current policy document outlining the BC government’s vision for sustainable water management.⁵ While this policy document ushered in many changes, it is almost 10 years old, released in June 2008.⁶

British Columbians require a renewed freshwater policy to provide an updated direction for water management and to recommit to and accomplish outstanding actions from *Living Water Smart*.



Legislated Environmental Flow Protection

Our streams, rivers, and lakes need sufficient water to support healthy fish populations, the environment, and our communities. “Environmental flow” refers to the amount of water needed for an ecosystem to thrive. If we want to have healthy, life-giving waters, we need to maintain healthy amounts of water.

The amount of water required for a river or stream to thrive depends on many factors including, for example, its location. To ensure regionally appropriate environmental flows, standards need to be set regionally and embedded into regulations that have the force of law behind them. In addition, legislation is required to determine regionally appropriate environmental flows.⁷ Currently, environmental flows are written as policy rather than as regulation. This means environmental flow protection cannot be legally enforced.

Adequate Water Pricing

To plan for and manage water, while implementing and enforcing the WSA, the Province supports many programs. Resourcing these programs requires charging adequate amounts for water fees and rentals (the amount of money paid to access public water resources). To ensure there are sufficient resources to cover the costs of water management and planning, the provincial government should consistently review the pricing of these fees and rentals. They should adjust the fees accordingly to ensure they are adequate.

As of 2016, rates vary from \$0.02 per one million litres (1,000 cubic metres) for water storage and for conservation, to the highest rate of \$2.25 per 1,000 cubic metres for most industrial and commercial uses. To put this in context, it costs between \$0.02 and \$2.25 to fill two million 500-millilitre bottles of water, or an entire 25-metre swimming pool!

Compared to other provinces in Canada, BC's rates are among the lowest. For example, in Quebec, rates go up to \$70 per 1,000 cubic metres, and in Nova Scotia, rates are as high as \$140.⁸

It is unlikely that the resources collected by the BC government for fees and rentals will cover the costs to fully implement the WSA and associated programs.⁹ As the costs of implementing the WSA become better understood, the Province should periodically review the fees and rental rates for water to ensure full cost recovery. Paying for proper water planning and management is essential for the long-term health of water in BC. This includes ensuring adequate staffing levels within government for data collection and analysis, monitoring, and enforcement; rigorous science to support water allocation decisions; and meaningful engagement with First Nations.



A hand holding a green spoon over water with a blue overlay. The background is a close-up of water ripples, and a hand is visible on the right side holding a green spoon. The entire image is overlaid with a semi-transparent blue filter.

IMPACT MEASURES

Desired impacts define the conditions we want to see for healthy water conditions. Impact measures help quantify whether we are getting closer to or further away from these conditions. We assess progress and recommend how we could improve data collection. The last three impact measures need to be more fully developed in the future.

Freshwater Attitudes



93%

of British Columbians agree that fresh water is our most precious resource.



89%

of British Columbians favour strict province-wide rules and standards for water protection.



87%

of British Columbians agree that subject to strict environmental standards, local communities should have the right to say "yes" or "no" to decisions affecting their fresh water.

Source: Data comes from a 2013 survey for the REFBC.¹⁰

- Percentage of British Columbians who agree that fresh water is our most precious resource.
- Percentage of British Columbians who favour strict province-wide rules and standards for water protection.
- Percentage of British Columbians who agree that subject to strict environmental standards, local communities should have the right to say "yes" or "no" to decisions affecting their fresh water.

Relationship between impact measure and the desired impacts:

Freshwater Health	The Water Sustainability Act	A Shared Stewardship Ethic	Collective Decision-Making
indirectly related	indirectly related	directly related	indirectly related

Overview:

This impact measure focuses on how much British Columbians value water, how strongly the public favours protecting freshwater health, and how much British Columbians support local community control over decisions that affect fresh water.

Interpretation:

The data shows that a clear majority of British Columbians view fresh water as our most precious resource and favour strict province-wide rules and standards to protect it, and support local community control on decisions impacting water.

Further details:

British Columbians value fresh water, and they strongly support protecting it and ensuring there is local community control in decision-making. Another 2017 poll backs up these findings, showing 91% of BC residents agree that water is an important part of Canada's national identity.¹¹

The extent to which British Columbians value fresh water does not automatically ensure meaningful protection or local control. It does indicate public support for many actions required to ensure these things — many of which are monitored by other impact measures.

Data recommendations:

Data for this impact measure is quickly becoming outdated. The RBC Canadian Water Attitudes Study has been conducted annually since 2008, but is more general in monitoring British Columbian perceptions on Canada-wide water issues.¹²

In the future, a cross-section of water partners should conduct water attitude surveys focused on BC on a regular basis. These surveys should focus specifically on British Columbians and their attitudes related to water protection within the province. Results need to be replicated over time to compare the three questions that yield insightful data.

LEARN MORE

In 2013, the Real Estate Foundation of BC and the Vancouver Foundation commissioned a public opinion study on attitudes toward freshwater issues in British Columbia.



Download the report at:
bit.ly/REFBC-fw-poll

Water Sustainability Plans



No Water Sustainability Plans currently exist.

Several are in progress.

➤ The percentage of sub-watersheds in BC that have an enforceable Water Sustainability Plan (WSP).

Relationship between impact measure and the desired impacts:

Freshwater Health	The <i>Water Sustainability Act</i>	A Shared Stewardship Ethic	Collective Decision-Making
indirectly related	directly related	indirectly related	directly related

Overview:

The presence of enforceable WSPs signals that we are moving towards regionally appropriate watershed-specific plans and away from a piecemeal approach to water planning.

Interpretation:

Due to the recent enactment of the *Water Sustainability Act* (WSA), there are no completed WSPs to date, but several are in progress.

Further details:

The WSA provides an opportunity to improve water planning and governance by enabling regionally specific, watershed-based WSPs. A WSP is a flexible tool that can address multiple water issues for communities, depending on what's needed locally. For example, a WSP could help manage conflict between water users while ensuring that nature's needs are met. A WSP could help shape how regulators make land use decisions that put water at risk, such as where to put waste facilities. They could also identify restoration measures needed for damaged ecosystems.

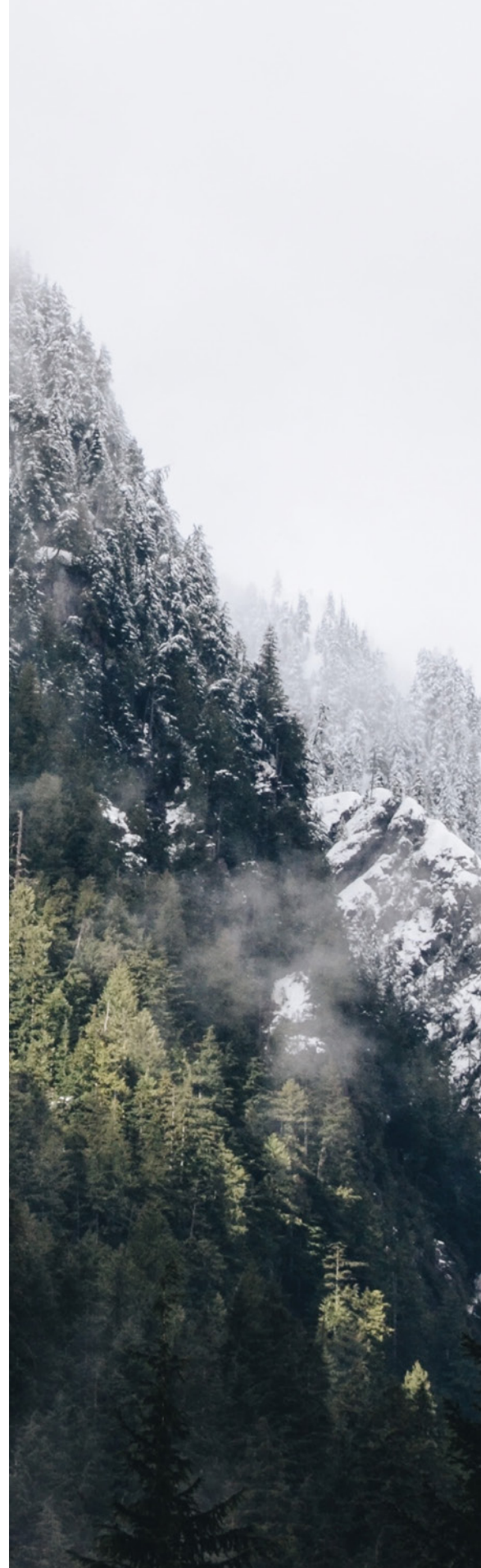
WSPs are a powerful tool because they can be made enforceable through regulation — something that has been missing from previous water-planning exercises. Because WSPs are regionally focused, each plan can meet the unique needs of local communities and watersheds, which is essential in a large and ecologically diverse province.

Creating successful WSPs includes those impacted by water decisions through collaborative approaches. In creating the first plans, the Province should work with First Nations, local governments, water licence holders, and community and stewardship groups, among others.

Decentralized decision-making and regional autonomy can reduce conflicts between users while protecting the health of our waters. More WSPs will signal these approaches.¹³

Data recommendations:

The BC Ministry of Environment and Climate Change Strategy should develop a database of WSPs and regularly report on plans that are completed as well as ones that are in development.



Water Objectives



No water objectives currently exist.

➤ The number of specific, measurable, and ecologically significant water objectives required for consideration by land and resource use decision makers via the *Water Sustainability Act (WSA)*.

Relationship between impact measure and the desired impacts:

Freshwater Health	The <i>Water Sustainability Act</i>	A Shared Stewardship Ethic	Collective Decision-Making
indirectly related	directly related	-	-

Overview:

Water objectives are a new tool enabled by the WSA that require land and resource decision makers to consider freshwater health in their judgements. The more water objectives we see that are specific, measurable, and ecologically significant, the more confidence we can have that the health of our waters is being made legally enforceable.

Interpretation:

Water objectives are still in development, since the WSA is only a year old.

Further details:

Water objectives set out specific criteria to achieve aquatic ecosystem health (such as water quality and quantity) that decision makers must integrate into their decisions.¹⁴ Criteria could focus on sustaining water health for drinking water, recreation, or nature.

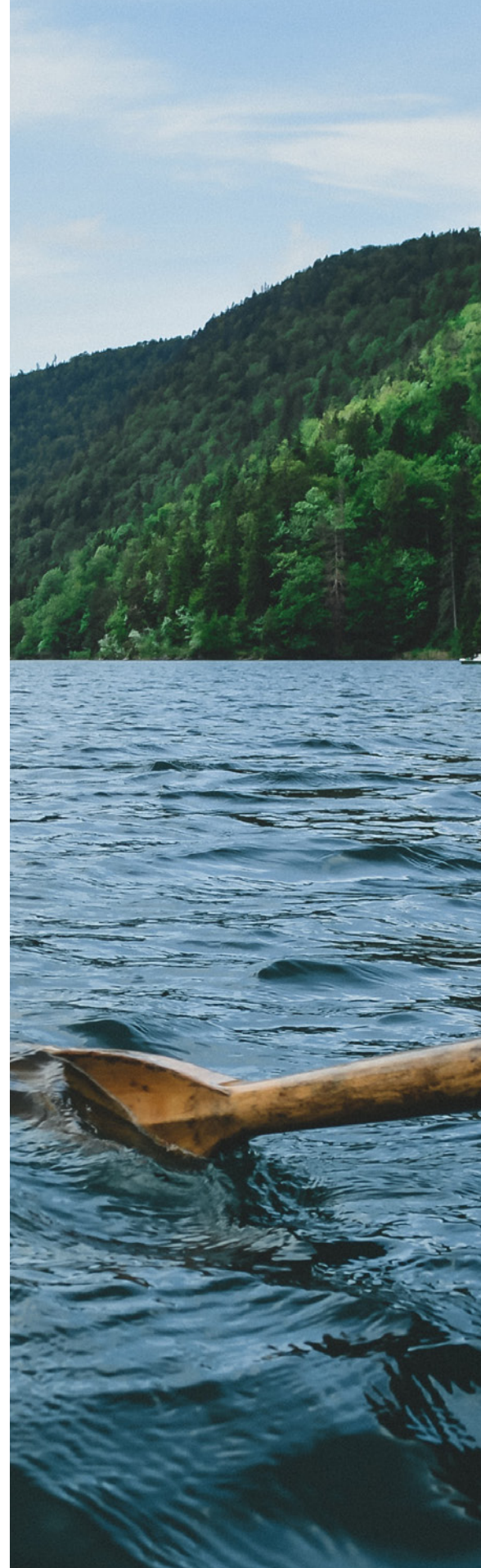
British Columbians want to be assured that the health of their water is considered when decisions are made. Recent decisions resulting in contaminated fresh water have come under justifiable scrutiny, and have emphasized the need for a more careful decision-making process. Public confidence has been shaken by the effects of multiple impacts on water from agriculture, forestry, hydraulic fracturing, and mining activities. For example, in the 2014 Mount Polley mine disaster, a breach in its tailings pond sent 25 million cubic metres of contaminated water and mine waste into surrounding waterways. A thoughtful approach to making resource decisions can bolster public confidence in land use.¹⁵

While water objectives are a potentially powerful tool to protect our freshwater health and increase public confidence, they need to be specific, measurable, and ecologically significant to be effective. If water objectives do not adequately protect ecological health or have objective criteria to judge success, regulators will not make decisions any differently than in the Mount Polley mine disaster.

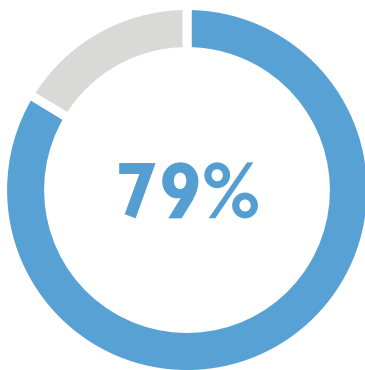
Data recommendations:

The BC Ministry of Environment and Climate Change Strategy should regularly publish details of all water objectives, including:

1. Measurable criteria that help ensure they are being adequately followed, and
2. Specified decision makers that must abide by the objective.



Water Conservation Plans



151 of 190 local governments have a water conservation plan or are developing one to be completed before March 2019.

Source: BC Ministry of Municipal Affairs and Housing.¹⁶

➤ **Number of local governments with water conservation plans.**

Relationship between impact measure and the desired impacts:

Freshwater Health	The Water Sustainability Act	A Shared Stewardship Ethic	Collective Decision-Making
indirectly related	-	directly related	-

Overview:

Water conservation plans are created by local governments and outline strategies to reduce demand on a community’s water supply and save water by using less.

Interpretation:

There are 190 local governments in BC, and at least 151 (79%), have or are developing a water conservation plan.

Further details:

Canadians are among the highest per capita users of water in the world, using 1,025 cubic metres of water per person per year, an amount equivalent to approximately 12,800 bathtubs¹⁷ Many British Columbians still perceive fresh water as virtually limitless. This perception is reinforced when we turn on the tap and water pours out steadily.

Conserving water is a way for communities to make the most out of their existing water supply. Many strategies can be used in a water conservation plan, including watering restrictions in times of low rainfall, conservation-oriented water rate incentives, and rebate programs for low-flow toilets, faucets, and appliances. Plans can focus efforts on leaking infrastructure. Turning off the tap while brushing your teeth encourages water conservation through behaviour change.

Water conservation can save taxpayer money by reducing the wear on local infrastructure, and reducing the amount of water treatment required.

While it is useful to count water conservation plans, having a plan does not guarantee the implementation of the plan. The majority of local governments (80%) have or are in the process of creating a plan. This is a sign that water conservation plans are becoming more widespread.

Data recommendations:

Available data does not reflect the number of water conservation plans in BC. Local governments must have water conservation plans when they apply for infrastructure funding. The BC government, through the Ministry of Municipal Affairs and Housing, currently tracks water conservation plans only through these funding applications. Any local government with a water conservation plan that does not apply for funding is not counted.

In the future, the Ministry of Environment and Climate Change Strategy, in collaboration with the Ministry of Municipal Affairs and Housing and local governments, should track the number of water conservation plans, including when plans are updated, in a public database that's updated annually.



Wastewater Treatment



No current data was found for this measure.

The federal government surveyed all Canadian municipalities with a population over 1,000 on water and wastewater treatment levels from 1983 to 2009.¹⁸

We were unable to access any more recent data.

➤ **The level of municipal wastewater treatment provided to British Columbians broken down by primary, secondary, and tertiary treatment.**

Relationship between impact measure and the desired impacts:

Freshwater Health	The Water Sustainability Act	A Shared Stewardship Ethic	Collective Decision-Making
directly related	-	indirectly related	-

Overview:

Undertreated wastewater is a major source of freshwater pollution. This measure indicates how wastewater is being treated before being dispersed into our waters.

Interpretation:

The lack of recent data implies that British Columbians cannot easily find out municipal water and wastewater treatment levels.

Further details:

Each day, British Columbians flush dirty water down drains and other pipes in our homes, businesses, and industries. This contaminated water enters local sewer systems and, if left untreated, can harm local watersheds and community water supplies.

While most wastewater is collected and treated in BC, the level to which it gets treated before being released into our rivers, lakes, and oceans varies.

Primary treatment is the first level of treatment, where wastewater is screened for large inorganic items — such as plastics and rocks — and then pumped into a large holding tank where heavier organic solids settle to the bottom and are removed for treatment. “Floatables” such as oil and grease are also skimmed off the surface to be treated. The remaining water is pumped into the environment as is.

Secondary treatment uses micro-organisms and chemicals to further break down any dissolved organic solids left behind after primary treatment.

Tertiary treatment involves additional steps that can include biological nutrient removal, extra filtration with sand or activated carbon and chemical oxidation. While tertiary treatment still fails to remove all harmful compounds, it is the highest level of treatment.

In 2012, the federal government passed a law requiring all wastewater systems collecting an average daily volume of 100 cubic metres or more of wastewater to apply secondary treatment by 2020. Several municipalities in BC are currently upgrading their systems to comply with this law.

Wastewater treatment, while clearly valuable, is considered an “end-of-pipe” solution, since it removes contaminants that are already in the water. End-of-pipe solutions should be paired with other strategies that aim to reduce water use and contamination. For example, constructed wetlands, rain gardens, permeable pavement, and other naturally-mimicked features treat rainwater close to where it lands and are more natural and less costly methods of treatment.

Data recommendations:

Environment and Climate Change Canada, in collaboration with the BC Ministry of Environment and Climate Change Strategy and local governments, should resume the Municipal Water and Wastewater Survey, or a similar survey, to report on wastewater treatment levels across Canada, broken down by province.



Lake Eutrophication



While the provincial government is collecting this data, it has not been fully analyzed and made available.

➤ **Percentage of lake sites monitored by the BC Ministry of Environment and Climate Change Strategy with a eutrophic status.**

Relationship between impact measure and the desired impacts:

Freshwater Health	The <i>Water Sustainability Act</i>	A Shared Stewardship Ethic	Collective Decision-Making
directly related	-	-	-

Overview:

Lake eutrophication is an indication of poor water quality and causes an overgrowth of plants and algae that can sometimes be toxic.

WHAT IS IT?

Eutrophication happens when a water source becomes enriched by dissolved nutrients, like nitrogen or phosphorous.

Adding too many nutrients too quickly can change an ecosystem, leading to algae blooms, fish depletion, and reduced water quality.

Further details:

Eutrophication happens when excessive nutrients, especially phosphorus and nitrogen, enter the water of a lake, causing an overgrowth of plants and algae, which can sometimes be toxic. A eutrophic lake is a good indication of poor water quality and is commonly caused by human activities such as undertreated wastewater, agriculture, septic tank seepage, and recreational activities. Monitoring lakes for eutrophication over time can help identify poor land use practices that impact water quality and signal a need for change.

For example, monitoring of Skaha Lake in BC's Okanagan region indicated the lake was eutrophying during the 1970s and 80s, which was eventually linked to a nearby wastewater treatment plant. Once upgrades to the plant were made, the lake water quality improved remarkably.¹⁹

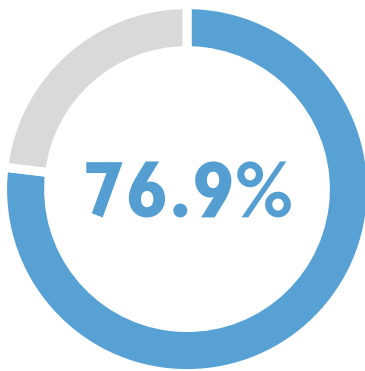
Data recommendations:

There is little long-term trend data on the eutrophication of lakes in BC.²⁰ The BC Ministry of Environment and Climate Change Strategy provided a dataset that included a one-time analysis of 535 lake sites across BC. Data varied tremendously between 1966 to 2014, resulting in a vague representation of lake status.

The good news is we learned that data from hundreds of lakes is currently being collected in a coordinated manner. Results are set to be released in 2018. Given the importance of long-term trends, the Environmental Protection and Sustainability branch of the BC Ministry of Environment and Climate Change Strategy should report annually on lake data, including the trophic status of lakes across BC.



Accessible Water Health Data



of BC's sub-watersheds have accessible data analyzed by WWF-Canada.

Source: WWF-Canada's 2017 watershed reports.²¹

Percentage of sufficient and accessible data analyzed by WWF-Canada to assess the overall health of BC's 26 sub-watersheds.

Relationship between impact measure and the desired impacts:

Freshwater Health	The Water Sustainability Act	A Shared Stewardship Ethic	Collective Decision-Making
indirectly related	indirectly related	-	directly related

Overview:

Is our fresh water healthy at a sub-watershed level? Making informed decisions to support freshwater sustainability begins with understanding how healthy our water is.

Interpretation:

WWF-Canada accessed data to assess the overall health of 20 of 26 sub-watersheds in BC.

Further details:

Many human activities threaten our water, such as pollution, agricultural runoff, habitat loss, the overuse of water, climate change, and oil and gas development. With so much stress, it is essential to have sufficient and accessible water health data to indicate the extent of damage these threats are causing. It is also important to determine if strategies used to reduce threats are working. If we don't measure the health of our waters, work to ensure the health of our water becomes a guessing game.

Data should be collected with sufficient government support and used to drive effective watershed management. Reliable, comprehensive water reporting is not compiled by the government.

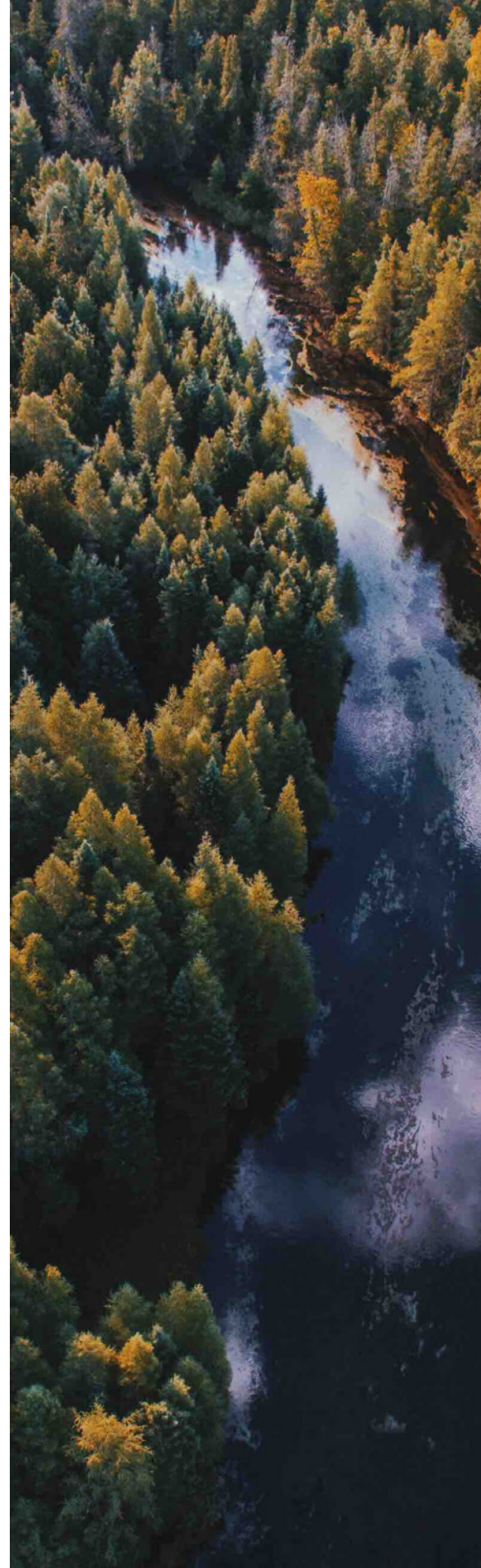
In BC, WWF-Canada assessed data from 20 of 26 sub-watersheds (76.9%). The impact measure is fairly imprecise because each sub-watershed encompasses a large area. For example, Vancouver Island is one sub-watershed, an area that spans more than 31,000 square kilometres, or roughly the size of Belgium. The WWF-Canada methodology currently focuses on rivers only, and drawing conclusions on watersheds relying only on river data is problematic.

Ultimately, effective data collection and monitoring should happen at more detailed scales than sub-watersheds. Unfortunately, we have seen a decrease in local monitoring over time. For example, the Water Survey of Canada, the national agency responsible for water resource data, has a series of hydrometric monitoring stations. In BC there were as many as 2,419 stations in operation over the years, but only 470 stations are active now.

Data recommendations:

Improving data availability requires a coordinated and multi-party approach, as data is collected by governments, industry, academic institutions, and communities. Currently, various approaches collect data in piecemeal fashions. Comparisons are difficult and data is often stored in poorly maintained databases that sometimes cannot be shared for privacy reasons.

A multi-faceted solution involving multiple groups is necessary to effectively monitor and report on watersheds. As a first step, parties that gather water data need to come together and collectively determine potential solutions focusing on increasing datasets and improving data accessibility. For example, initiatives such as the Roundtable on Water Monitoring and Reporting convened by the BC Water Funders Collaborative is a promising example.²²



Measures To Be Developed

➤ **Three impact measures require further resources and discussion to help determine the wording of each measure and the data required.**

Indigenous Co-Governance

Effective land and resource decision-making, including for water, should include Indigenous communities.²³ Development of an impact measure tracking the number of First Nations and provincial government agreements working together on co-governance arrangements should determine the extent and progress of Indigenous co-governance taking place in British Columbia.

Local Watershed Entities

Local watershed entities often refer to multi-party groups with the authority to make and implement decisions about their local watershed. However, watershed groups such as the Cowichan Watershed Board and the Coquitlam River Watershed Roundtable have no formal decision-making authority at this time.

These types of entities will be essential to implement the WSA effectively because of the importance of local decision-making in water management and stewardship.²⁴ A measure that clearly defines a watershed entity and tracks how many possess decision-making authority would be useful.

Open-Access Data Hubs

Many freshwater leaders highlight the need to pool water knowledge into open-access data hubs from multiple sources including government monitoring, academic data, community-based monitoring, industry data, and Indigenous and local knowledge.²⁵ Work remains to determine what constitutes an open-access data hub and the best way to maintain data.

Hubs that integrate multiple sources of information, present data in an understandable, user-friendly, and regularly updated format, and that are financially self-sustainable are important considerations.

To achieve success, groups that collect data should populate data hubs in comparable manners.



CASE STUDY

Our Living Waters

Many organizations work to improve the health of Canada's waters. Coordinated efforts to align strategies are often missing. Our Living Waters (OLW) is a collaborative network, made up of 50 — and increasing — organizational and community members spanning the country. The network has come together to achieve the ambitious goal of *all Canada's waters in good health by 2030* by amplifying the influence and impact of many diverse organizations that make up the country's water community.

The OLW network is guided by a shared measurement system, which outlines how different priority areas of the network's members fit together to support collaborative action towards achieving the OLW's ambitious goal. The system measures progress of the network using six water health indicators and 21 specific impact measures.

The six water health indicators rely on the data from WWF-Canada's watershed reports. The 21 impact measures focus on measuring progress towards a variety of priority areas, including data accessibility and decision makers' use of data; mechanisms to support watershed governance, entities, and plans; a variety of legal standards to protect freshwater health; the human right to water and ability for citizen legal action; fresh water-related policies, including source water protection and green infrastructure; freshwater pollution from various sources; and the state of freshwater advocacy in Canada.

Baseline data for water health indicators and impact measures were collected in 2017. Much like the findings of this report, data for only 11 impact measures were identified, with the remaining 10 impact measures needing additional resources.

For more information, visit ourlivingwaters.ca

Conclusion and Recommendations

Healthy freshwater ecosystems contribute to a high quality of life in our communities, a thriving environment, and a strong economy. Collective efforts of many people and organizations can help ensure safe, sustainable, and valued freshwater ecosystems in British Columbia.

This report aims to provide a snapshot of our progress towards achieving healthy fresh water, by an ambitious goal and desired impacts, and three conditions that the provincial government should meet to support healthy watersheds. Ten impact measures are identified to monitor over time.

Given the largely inadequate datasets that currently exist, we are unable to draw conclusions on our progress. Depending on the impact measure, we have found data that is out of date, housed in inaccessible formats, or unavailable or difficult to access.

While this may be discouraging, gathering and monitoring data is not beyond British Columbia's reach. Leadership and collaboration with the provincial government will be necessary to ensure data is made available. Multiple sectors need to be involved, including local and First Nations governments, academia, industry, and non-governmental organizations.

A summary of recommendations is provided below.

Freshwater attitudes

- Regular public opinion surveys on freshwater attitudes should be conducted by a cross-section of water partners to ensure long-term availability of the data.

Water sustainability plans

- The BC Ministry of Environment and Climate Change Strategy should regularly report on water sustainability plans, both completed plans and those in development.

Water objectives

- The BC Ministry of Environment and Climate Change Strategy should regularly publish details of water objectives, including 1) measurable criteria and 2) decision makers specified to follow the objective.

Water conservation plans

- The BC Ministry of Environment and Climate Change Strategy, in collaboration with the BC Ministry of Municipal Affairs and Housing and local governments, should annually track and publicly post water conservation plans.

Wastewater treatment

- Environment and Climate Change Canada, in collaboration with the BC Ministry of Environment and Climate Change Strategy and local governments, should resume the Municipal Water and Wastewater Survey, or a similar survey, to report on wastewater treatment levels across Canada, broken down by province.

Lake eutrophication

- The Environmental Protection and Sustainability branch of the BC Ministry of Environment and Climate Change Strategy should analyze the data it is currently collecting on lakes across the province and release it in 2018. Annual reports on the trophic status of BC's lakes need to be made public.

Accessible water health data

- A multi-faceted solution is required, involving diverse groups that gather water data to increase the quantity and quality of data and improve data accessibility.

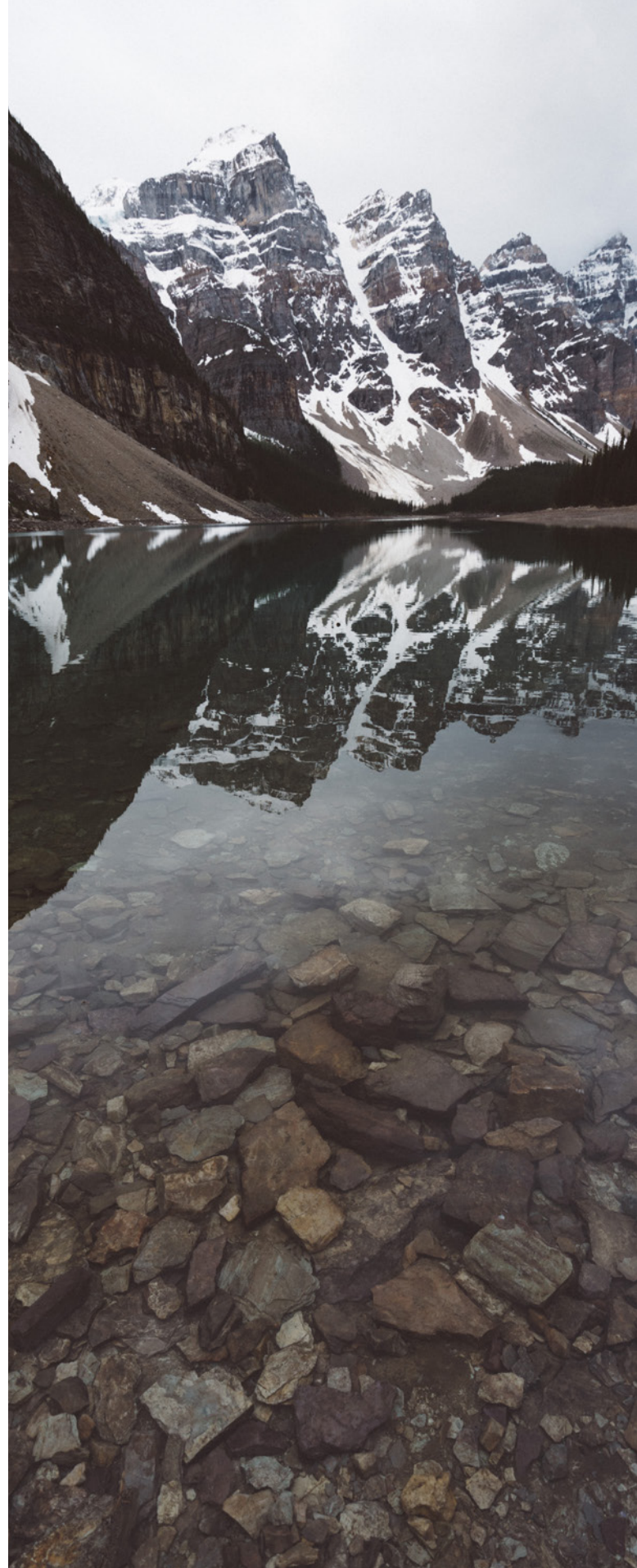
Indigenous co-governance

Local watershed entities

Open-access data hubs

- Additional resources should be allocated to develop impact measures and to track progress in these areas.

This report shows a huge opportunity to convene relevant players and discuss solutions for freshwater sustainability data collection, monitoring, and reporting. If successfully implemented, communities across the province will be more informed and better stewards of BC's most precious resource.



Appendix: Methods

1

Developing the framework to be used in the report.

The framework used was developed to align with both the theory of change developed by the REFBC for fresh water (which defined both their ambitious goal and desired impacts) and the shared measurement system developed for Our Living Waters (OLW), which is a collaborative network of organizations working together to achieve the ambitious goal of ensuring that *all waters are in good health by 2030* across Canada. The OLW shared measurement framework uses 21 impact measures that measure the progress the freshwater community is making at a national level. Using the REFBC theory of change and the OLW impact measures, the Freshwater Snapshot Committee provided input, contacts, and advice.

2

Creating BC-specific impact measures and the conditions for the BC government.

Researchers identified a series of impact measures appropriate for BC through discussions and committee meetings. The committee ranked the impact measures against a set of criteria to determine which were most appropriate.

The criteria were:

- **Communication power:** Would the measure make sense to the public; that is, is it easily

understood by a diverse range of non-technical audiences? Is it common sense and compelling? Will the data from this measure be potentially misleading to people?

- **Proxy power:** Does the impact measure say something meaningful about the priorities of the REFBC; does it represent their theory of change well? Would the impact measure effectively signal whether we were getting closer to or further away from achieving an REFBC-desired impact or strategic intervention? Does the measure tie to multiple REFBC priorities?
- **Data power:** Can we get quality, credible data on this in a timely manner? Is the data easy to get and available? Is the data reliable and consistently available so we can assess trends over time? Do we have data at a country, provincial, municipal, etc., level that can be compared?

After ranking, 10 impact measures and three conditions were identified.

3

Collecting data and drafting the report.

Data collection was completed using online sources, and through personal communications between May and September 2017. A draft report was peer reviewed by the Committee for comment.

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streams, lakes, and
wetlands are healthy:
we're healthy.



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