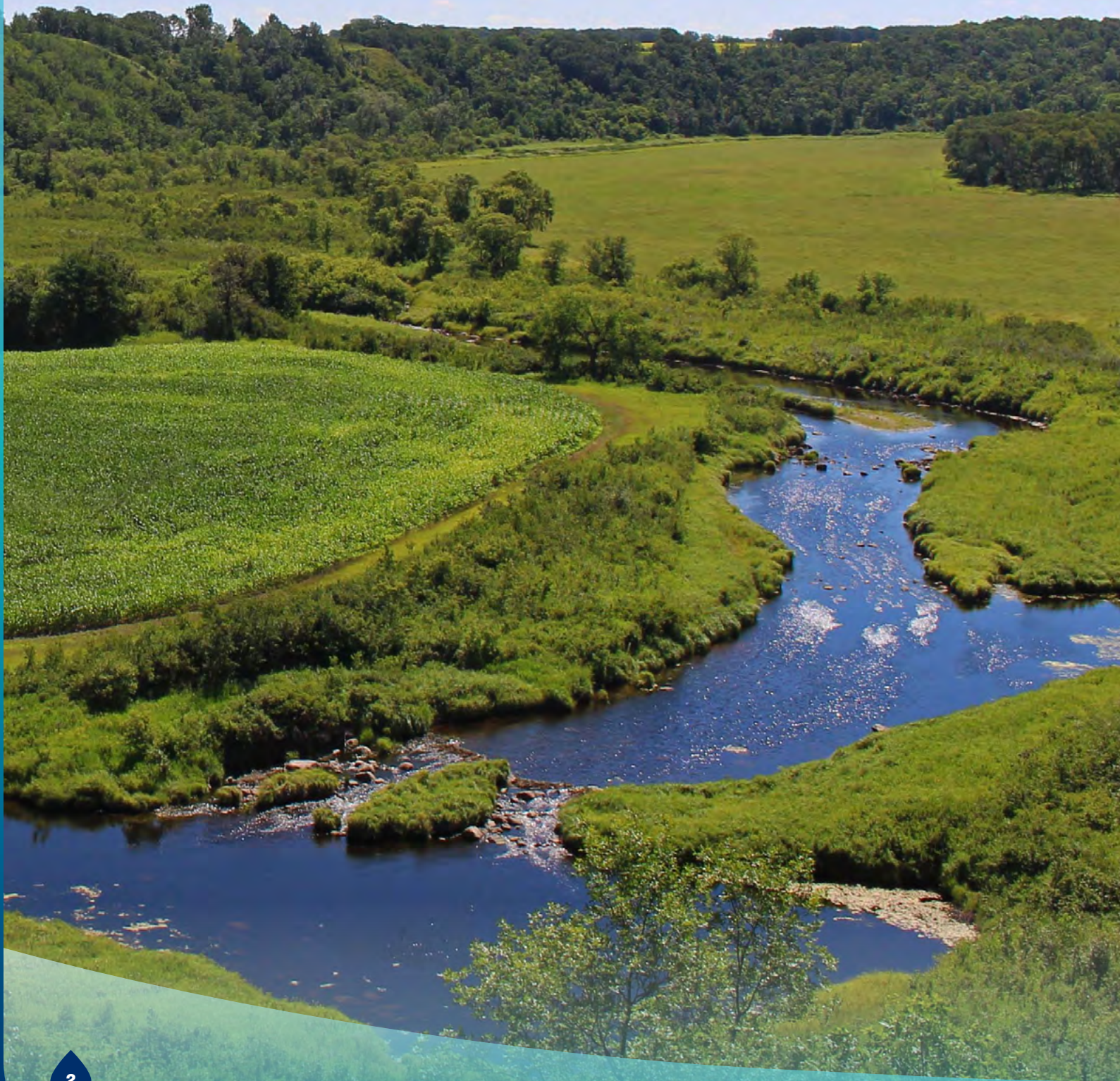


Manitoba's  
**WATER  
MANAGEMENT  
STRATEGY**

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November 2022

“ Water is central to the well-being of our natural environment, our families and our communities.”



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# Executive Summary – Water Management Strategy At A Glance

Manitoba's Water Management Strategy sets a direction for Manitoba's water future and provides a framework for co-ordinated action by the Manitoba government, in partnership with communities and governments across the province, with stakeholders and with all Manitobans.

As Manitoba's first whole-of-government water strategy since 2003, the new Water Management Strategy provides a comprehensive framework to conserve and protect our environment, enhance resiliency, improve water quality and availability, and sustain economic development.

At a glance, the Water Management Strategy includes:

**One Vision:** Healthy waters that support resilient, thriving ecosystems, communities and economies for generations of Manitobans.

**One Mission:** The stewardship and protection of Manitoba's waters to meet environmental, social and economic needs, today and tomorrow.

## **Eleven Focus Areas:**

- Make every drop count through conservation and efficient water use
- Protect biodiversity and aquatic ecosystem health
- Build our preparedness and resilience to a variable and changing climate
- Address our water infrastructure challenges and opportunities
- Meet the water supply needs of current and future generations sustainably
- Protect the quality and quantity of groundwater
- Protect and improve surface water quality
- Advance Indigenous inclusion in water management
- Improve coordination of water management and governance across watersheds, basins and aquifers
- Improve data, information and knowledge available on water
- Enhance engagement and participation of Manitobans in water stewardship

**Forty-seven Strategic Objectives:** Strategic objectives under each focus area are the bridge from the Water Management Strategy to the Water Action Plan, which will be released in spring 2023. The Water Action Plan will include specific actions and initiatives, informed by engagement with Manitobans, to achieve the vision and objectives in the strategy.

Through the work, collaboration and investments under the Water Management Strategy and the Water Action Plan, we will become more resilient to water variability; we will conserve our water resources through innovation and efficiency; we will protect aquatic ecosystems; we will enhance our water knowledge; and we will position our communities and our economy to make the most of water opportunities in the future.

Together, we will chart a path to meet the water needs and priorities of Manitoba's communities and economy in a way that will be resilient and sustainable for generations to come.

## Land Acknowledgement

We recognize that Manitoba is on the Treaty Territories and ancestral lands of the Anishinaabeg, Anishininewuk, Dakota Oyate, Denesuline, and Nehethowuk peoples.

We acknowledge that Manitoba is located on the Homeland of the Red River Métis.

We acknowledge northern Manitoba includes lands that were and are the ancestral lands of the Inuit.

We respect the spirit and intent of Treaties and Treaty Making and remain committed to working in partnership with First Nations, Inuit and Métis people in the spirit of truth, reconciliation and collaboration.

# Manitoba's WATER MANAGEMENT STRATEGY

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## Introduction

Water is central to the welfare of our natural environment, our families and our communities. It defines and connects the towns, villages, cities and landscapes where we live. It is the foundation of our economy and of our hopes for future prosperity and development. It is woven into the fabric of our identity. Water has significant cultural importance to Indigenous Peoples, and is not only sacred spiritually, it is also valued for enabling community connectedness and supporting traditional activities like fishing, wildlife and harvesting medicines. Water is at the heart of the health and well-being of all living things.

Manitoba's last water strategy was released in 2003. A lot has changed over the past 20 years and our province needs a new strategy to address the water challenges and opportunities of today and tomorrow. Challenges and opportunities include the impacts of a variable and changing climate, growing economic and social needs for water, and advancing Indigenous inclusion in water management. Since 2003, we have gained new understandings and insights from research, data, technologies and enhanced knowledge that offer new opportunities to improve our management of this critical resource for current and future generations.

## What to Expect from the Strategy

Manitoba's new water management strategy aims to address the water needs and interests of all Manitobans, including local and Indigenous governments, communities, stakeholders and the diverse sectors of our economy. The strategy will set the stage for work and decision-making on water for the coming decade and beyond.

The water management strategy is aligned to other priorities, strategies and initiatives across government related to climate, environment, land use and development, agriculture, energy, economic development, tourism and recreation. In addition to protecting and conserving water, work under the strategy will address the water needs and challenges associated with Manitoba's broader community and economic development priorities.

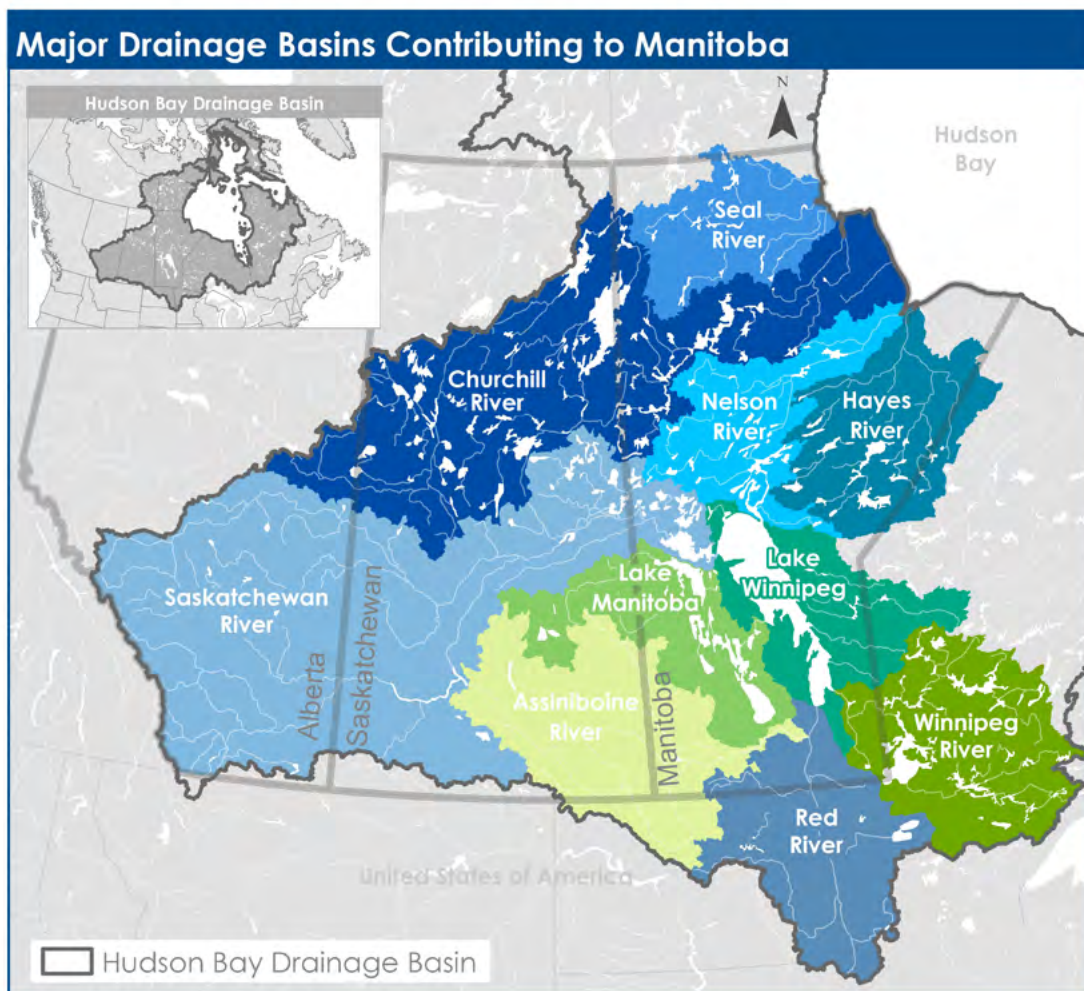
There are two main components to our water management strategy. This document is a **water management strategy framework**, a durable guiding document for Manitoba's water management for many years to come. The framework provides high-level strategic direction and guidance on water, and comprises a vision, mission, guiding principles and key focus areas with corresponding strategic objectives. The second component of the strategy is a **water action plan**, intended to be a focused near-term guide to specific and time-bound actions that government is taking to implement the framework. The action plan will be iterative and updated regularly to reflect work completed and to provide clarity on next steps and future initiatives.

The strategy signifies a continued commitment to build Manitoba's water future, and not an end to this work.

## Setting the Stage for Water Management in Manitoba

Manitoba is situated within the Hudson Bay **drainage basin**, where surface waters within this defined boundary flow into Hudson Bay.

The headwaters of the basin originate along the **Continental Divide of the Americas** and drain an area of over 3.8 million km<sup>2</sup>. The Hudson Bay drainage basin spans five Canadian provinces from Alberta to Quebec, extending northward into the Northwest Territories and Nunavut, and southward towards Montana, North Dakota, South Dakota and Minnesota. Within the greater Hudson Bay drainage basin are a series of smaller drainage basins that contribute waters to Manitoba, such as the Red, Winnipeg and Churchill river basins. Each of these drainage basins is composed of relatively smaller sub-basins, or **watersheds**. It is at this watershed scale that much of Manitoba's water management programming takes place, including the **Watershed Districts** Program.



Drainage basins contributing to Manitoba. All images in this document have been supplied by the government of Manitoba unless noted otherwise.



Manitoba's vast geographic drainage area and cold continental climate create great variability in our waters. Streamflows and water levels in Manitoba's rivers, lakes and aquifers vary greatly throughout the year and from year to year. Wet or dry cycles can last for years, yet they may transition quickly from one to the other within a single season. This incredible variation is one of the principal challenges in water management in Manitoba.

The natural variation in wet and dry cycles is overlaid by **anthropogenic** changes to the landscape and climate that affect the quality and quantity of water flowing through Manitoba's lakes, rivers and aquifers. Many of these anthropogenic changes help to support our activities on the landscape. For example, drainage can enhance crop production and help provide food security. Yet examples of human-caused impacts to Manitoba's waters are numerous and widespread. Road networks and artificial drainage channels to accommodate settlement and agricultural production have increased runoff from watersheds, resulting in more frequent and severe flooding and increased nutrient loading. Large water infrastructure projects can significantly alter flows and levels from their natural fluctuations to a more regulated **water regime**, impacting surrounding communities and ecosystems.

Across the globe, human activities have contributed substantially to climate change through increased **greenhouse gas emissions**, and Manitoba is facing warmer temperatures, changes in the timing and amount of streamflow and a higher frequency of extreme events including storms, floods and droughts. Populations in Manitoba and globally continue to grow, driving increased social and economic needs, and in turn increasing the demand for water and the negative impacts inflicted on ecosystems.



Historically, decisions regarding the management of water resources have not always helped Manitoba to become more water secure or **sustainable**. While some decisions have proven foresighted and beneficial, others have satisfied narrower goals without meaningfully considering the impacts to current and future generations and the environment. Although we cannot change history, we can move forward with a commitment to a more sustainable and desirable water future for Manitoba.

You can learn more about water management in Manitoba here: [www.manitoba.ca/water](http://www.manitoba.ca/water).

## What We Heard: Advice, Recommendations and Input to Water Strategy Development

Manitoba is committed to engaging the public in a relevant, consistent, respectful, transparent and inclusive manner. Input and feedback from Manitobans are integral to building a comprehensive and effective water management strategy, as all Manitobans have a role to play.

Throughout the strategy development process, we have engaged hundreds of Manitobans, including governments, communities, organizations, agencies and businesses to understand their water priorities and needs, and how a water management strategy can help to address them.

The following paragraphs provide a brief overview of the engagement that has informed the water management strategy framework.

### Manitoba's Expert Advisory Council

In 2017, Manitoba released a Made-in-Manitoba Climate and Green Plan. The Climate and Green Plan was developed through extensive engagement with Manitobans and established the strategic framework for Manitoba to achieve the vision to be “*Canada's cleanest, greenest and most climate resilient province.*” The Climate and Green Plan includes foundational pillars focused on Climate, Jobs, Nature and Water.

Established under The Climate and Green Plan Act, Manitoba's Expert Advisory Council (EAC) is an independent group of experts who provide advice and recommendations to government on items relating to the Climate and Green Plan. In their January 2020 mandate letter, the EAC was tasked with “*providing advice and recommendations regarding the scope and elements of a modernized, coordinated provincial water management strategy for Manitoba that builds on approaches enacted by this government*”.

The EAC's advice to government was supported by engagement with stakeholders and selected Canadian water experts. Participants provided insights and perspectives from various types of organizations, including the business community, industry, municipalities, watershed districts and non-government organizations. The EAC's advice and recommendations were informed by research on water management across Canada, including past and present efforts in Manitoba, and considered historical trends and future forecasts, particularly with respect to a changing climate and its impacts on water.

The EAC submitted their advice to government in January 2021. You can access their report at: [www.manitoba.ca/water](http://www.manitoba.ca/water).

“ Input and feedback from Manitobans are integral to building a comprehensive and effective water management strategy.”

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## Public Engagement including through EngageMB

Building on the advice and recommendations of the EAC, Manitoba released a preliminary water management strategy framework in summer 2021 that included a draft vision, guiding principles and eleven key focus areas for the strategy.

Public engagement on the preliminary framework was completed through the EngageMB platform and included a survey and idea board that were open for feedback from July 13 to Aug. 23, 2021. The survey sought feedback on the draft strategy framework, while the idea board asked participants to share how a made-in-Manitoba water management strategy could reflect the unique needs of their community or industry.

More than 450 people participated in the survey and more than 100 ideas were shared on the idea board. A What We Heard Report summarizing the input and feedback is available at: <https://engagemb.ca/water-strategy>.

In addition to the engagement through EngageMB, Manitoba leveraged opportunities for further stakeholder engagement including through the Manitoba Association of Watersheds annual conference and the Northern Association of Community Councils Annual General Meeting. Focused discussions and surveys during these two events provided more ideas and input for development of the strategy.

## The Water Strategy Fund and Stakeholder Engagement

In May 2021, the Manitoba government invested \$1 million in a Water Strategy Fund to support the development and implementation of Manitoba's provincial water management strategy. The fund was administered by the Enterprise Machine Intelligence and Learning Initiative (EMILI), and an oversight committee was established to review and approve projects and activities under the fund and to guide EMILI in this work.

The fund supported stakeholder engagement for the strategy, including a series of virtual engagement sessions and more than 35 in-depth interviews with key stakeholders and water experts. Three strategic projects were administered by EMILI and financed through the Water Strategy Fund, including: a predictive water supply and demand tool; a study investigating the return on investment in irrigation expansion in Manitoba; and a study on improving water conservation and efficiency in the province. Finally, the fund supported foundational research and analysis on best water management practices from other jurisdictions and how they could be applied in Manitoba.

The culmination of this work was a report from EMILI to government that summarized key findings and recommendations based on feedback and insights gained through engagement with stakeholders, research into best practices in other jurisdictions, and the findings and expert analysis contained within the three strategic water projects. You can view the report at: [www.manitoba.ca/water](http://www.manitoba.ca/water).

## Indigenous Engagement

Some Indigenous organizations and individuals have participated in the engagement for this strategy. It is recognized that more direct and collaborative work with Indigenous governments and **rightsholders** is essential, and this is a central commitment in the water management strategy framework. Indigenous Peoples have a unique and immensely important relationship with water. Ensuring Indigenous perspectives, knowledge and expertise are captured and reflected within the strategy is essential for the strategy to be a success.

Manitoba has initiated this outreach and will build future steps for Indigenous engagement in partnership with Indigenous governments and rightsholders. The strategy represents an extremely important opportunity for partnership on shared priorities in water management, now and into the future.



# The Water Strategy Framework

The water management strategy framework was developed through a whole-of-government approach, based on Manitoba's water priorities, related strategies and initiatives, incorporation of best practices from other jurisdictions, and past experience and lessons learned. The framework also builds on the advice and guidance of the EAC, public and stakeholder engagement and the work of EMILI and the oversight committee.

The framework consists of a vision and mission statement, a set of guiding principles, eleven key focus areas and corresponding strategic objectives for each focus area. All components of the strategy framework connect, reinforce one another and support progress towards achieving our vision for water management in Manitoba.



## Vision and Mission

The vision statement conveys Manitoba's future aspirations for water management and the mission describes our role in how we plan to get there.

The vision for Manitoba's water management strategy is *healthy waters that support resilient, thriving ecosystems, communities and economies for generations of Manitobans.*

The Manitoba government's mission in support of the vision is *the stewardship and protection of Manitoba's waters to meet environmental, cultural, social and economic needs, today and tomorrow.*

## Guiding Principles

Guiding principles provide the foundation for water management in Manitoba. The principles will guide the Manitoba government's decision-making as we implement the strategy and work towards our common vision.

Water management decisions will be made with the guiding principles of:

- **Intergenerational Equity:** recognize and consider the needs of current and future generations.
- **Indigenous Inclusion:** collaborate with Indigenous Peoples to incorporate their perspectives and establish meaningful roles for Indigenous Peoples in water management.
- **Social Responsibility:** recognize diverse needs and environmental equity.
- **ESG Values-Driven Economic Development:** deliver sustainable economic growth based on environment, social and governance (ESG) values.
- **Ecological Resilience:** maintain and restore ecosystem integrity and health.
- **Commitment to Knowledge:** grounded in best available scientific, Indigenous and local knowledge.
- **Continual Improvement:** open to innovation and better approaches.
- **Good Governance:** an approach to achieving the vision and mission that is principled, accountable, co-ordinated and collaborative.

The guiding principles, mission and vision, and the commitments they inspire, will contribute to the long-term success of Manitoba's water management strategy.

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## Key Focus Areas

The eleven key focus areas represent the high-level, overarching goals that the water management strategy aims to achieve, each with its own set of strategic objectives that identify more detailed priorities. The focus areas, strategic objectives, and explanatory preamble provide the “what” and “why” of future water management in Manitoba.

The focus areas and strategic objectives will act as the bridge from the strategy framework to action plans, where specific and time-bound actions will be developed for each focus area. The action plans will address “how” we will achieve our strategic objectives.

The eleven key focus areas for Manitoba’s water management strategy are:

- 1. Make every drop count through conservation and efficient water use**
- 2. Protect biodiversity and aquatic ecosystem health**
- 3. Build our preparedness and resilience to a variable and changing climate**
- 4. Address our water infrastructure challenges and opportunities**
- 5. Meet the water supply needs of current and future generations sustainably**
- 6. Protect the quality and quantity of groundwater**
- 7. Protect and improve surface water quality**
- 8. Advance Indigenous inclusion in water management**
- 9. Improve coordination of water management and governance across watersheds, basins and aquifers**
- 10. Improve data, information and knowledge available on water**
- 11. Enhance engagement and participation of Manitobans in water stewardship**

The following pages dive deeper into each of the eleven focus areas, providing important background information, explaining the challenges and opportunities and presenting Manitoba’s strategic objectives for water management.



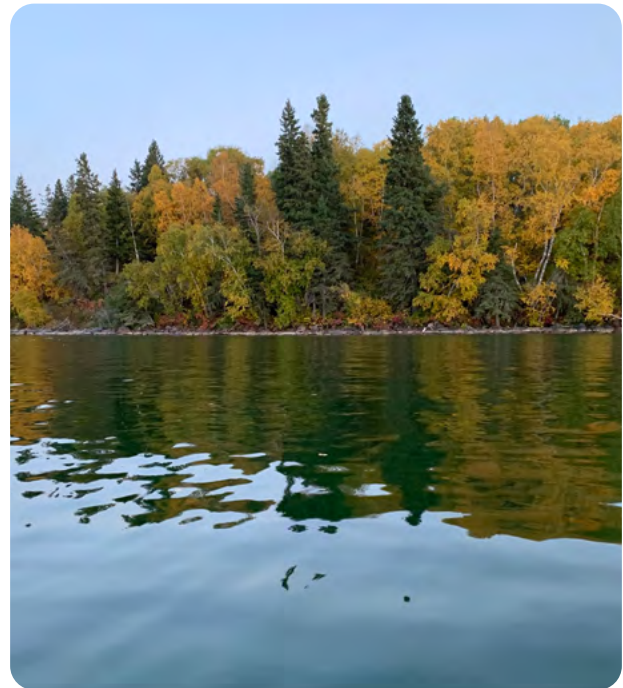
## Make every drop count through conservation and efficient water use

Water is life. It is necessary for the survival of all living organisms on Earth; is the basis of many economic activities, including food production and agriculture; and is a key component of many cultural, spiritual and recreational activities.

Despite how valuable water is to humans, the environment and our economy, we often take it for granted, use it inefficiently and waste (overuse) it. Although Manitoba is often thought of having an abundance of water, the province is facing **water scarcity** in some regions where water supply no longer meets the demand. Manitoba's population is expected to increase by approximately 26 per cent (~360,000 residents) from 2020 to the early 2040s. Manitoba's water supplies are not unlimited, and both population and water-intensive uses will continue to grow. Without a concerted effort, there is an increasing risk that available water supplies will not meet this growing demand. In addition, during times of severe drought, the amount of water available for human use decreases and water users are forced to get by with less. Climate change is expected to make extreme heat and drought-driven water shortages more frequent and severe.

To address these challenges, a shift in our mindset about how we use water is needed. To ensure sufficient water supplies to meet the needs of current and future generations, water must be treated as the precious and at times scarce resource that it is.

Manitobans and all water users must respect the value of water, use only what is needed, and find ways to stretch limited supplies further. The focus



needs to shift from **supply-side management** solutions to approaches that reduce how much water we use. Water conservation and water efficiency practices can help us reach this goal. **Water conservation** refers to decreasing the total amount of water use, whereas **water efficiency** is reducing water waste through water-saving technologies and behavioural changes. Water conservation and efficiency measures can be either short-term (e.g., conservation measures in response to a drought event) or long-term (e.g., decreasing water intensity of a processing plant or shifting to water efficient appliances).



Water use in Manitoba is driven by many different factors, including population growth, development trends, economic conditions, soil and crop types, climate and weather. To reduce water use and waste, stronger water conservation and efficiency measures for Manitoba are needed across sectors, including municipal (e.g., household, commercial), agricultural (e.g., irrigation, livestock) and industrial (e.g., food processing, mining). There are numerous **best management practices** from other jurisdictions that could be successful in Manitoba. For example, **demand-side management** approaches such as new water pricing structures, updating leak detection and repair, and **xeriscaping** and rainwater capture programs can all be instrumental in reducing the amount of water being used by Manitobans. Working with industry and across sectors to

research and implement innovative water use ideas, technologies and approaches, including the reuse and recycling of non-potable water and efficient irrigation techniques, is also a priority for Manitoba.

The benefits of water conservation and efficiency programming are numerous, and include increased water and food security, accommodation of population and industry growth, climate resiliency, and reduced water system and environmental vulnerability. Because of these benefits and others, Manitoba aims to be a leader in the promotion and implementation of water conservation and efficiency programming. Education and building awareness with the public and across sectors will be a key contributor to achieving public buy-in and implementing successful water conservation and efficiency practices in Manitoba.

## Strategic Objectives:

1. **Value water and use it efficiently.**
2. **Embrace innovative water use ideas, technologies and approaches.**
3. **Reduce waste of water.**
4. **Advance water recycling and reuse.**

## What is a circular economy?

A circular economy is an alternative to a traditional linear economy (make, use, dispose) in which we keep resources in use for as long as possible, extract the maximum value from them while in use, then recover and regenerate products and materials at the end of each service life.

In a circular economy, production and consumption create the smallest possible amount of loss and waste. In the context of water, a circular economy avoids using water when possible and closes loops at several levels by improving water efficiency, minimizing waste and focusing on reduce, reuse, recycle, replenish, recover, and retain.

Connections between the water management strategy and the innovative ideas associated with development of a circular economy can be further explored as we develop and implement conservation and efficiency measures for Manitoba. For example, institutions like [Manitoba Agriculture's Food Development Centre](#) are committed to conducting research into finding innovative ways to reduce the use of water in food processing.

## Protect biodiversity and aquatic ecosystem health

Healthy **aquatic ecosystems**, including wetlands, rivers, lakes, and riparian zones, provide vital ecological functions to sustain **biodiversity** while also delivering significant **ecological goods and services** (sometimes referred to as EGS) to Manitobans.

Ecological goods and services from healthy aquatic ecosystems can include food and water supplies, flood and drought mitigation, aquifer recharge, navigation, carbon sequestration, improved water quality and reduced nutrient loading, and cultural and recreational opportunities like fishing, boating and swimming.

Healthy aquatic ecosystems will also be more resilient to the impacts of climate change than degraded ecosystems. However, despite the benefits of healthy aquatic ecosystems, some systems have been undervalued, resulting in a loss of biodiversity and deterioration of Manitoba's environment. For example, wetlands are one of the earth's most productive ecosystems. Although there have been some recent advancements, southern Manitoba has lost or degraded approximately 70 per cent of its wetlands since the early 1900s due to human development.

One tool to protect biodiversity and aquatic ecosystem health is the determination of environmental flows, also known as **instream flow needs** (IFN). IFN studies help us to understand how much water is required to maintain healthy river systems and to help minimize the impacts of water withdrawals for human uses. In Manitoba, water is allocated under The Water Rights Act. Site-specific **hydrology assessments** are used as part of The Water Rights Act licensing process to determine how much water is available for human allocation. However, more complex

IFN approaches that consider other aspects of river structure and function, such as **connectivity**, **biology** and water quality, are needed for key rivers and streams that are considered particularly vulnerable to the impacts of human interference. Examples include heavily-allocated systems and water bodies affected by the operation of water infrastructure like dams and diversions. In general, many Manitoba streams are robust and resilient to altered flows, thereby maintaining biodiversity. However, that resilience is not unlimited and overtaxing resiliency could lead to a substantial loss of biodiversity. Canada has agreed to protect biodiversity as a signatory to the United Nations [Convention on Biodiversity](#), with specific commitments for Manitoba.

**Aquatic invasive species** (AIS), such as zebra mussels, spiny water flea and black algae, are another threat to biodiversity and aquatic ecosystem health. AIS are organisms not native to a region that, when introduced, may out-compete native species for available resources. AIS may become successful in their new environments due to their high reproductive rates – a single female zebra mussel can produce up to one million eggs per year – and the absence of native predators and diseases. AIS can also result in negative economic, social, environmental and human health implications. Zebra mussels, in particular, are a concern for Manitoba because they can adversely impact fish populations, clog water intakes and drinking water systems, contribute to larger and more frequent algal blooms and litter shorelines and beaches with sharp shells.

Because water does not recognize jurisdictional boundaries and flows across borders, activities and developments in upstream jurisdictions can impact downstream water quantity, quality and aquatic ecosystem health in Manitoba. Since the 1960s, Manitoba has opposed inter-basin water transfer projects, including from North Dakota, due to the inherent risks of such transfers, including the introduction of AIS into Manitoba's

waters. **An inter-basin transfer** is the diversion of untreated water across the Continental Divide – either into or out of the Hudson Bay drainage basin. Transfers between watersheds within the Hudson Bay drainage area should be minimized, and only considered after a complete assessment of the environmental, social and economic impacts on both the donor and receiving watersheds.

## Strategic Objectives:

1. **Protect and restore aquatic ecosystems.**
2. **Develop and implement ecosystem-based instream flow needs.**
3. **Prevent the introduction of aquatic invasive species and mitigate their impacts.**
4. **Oppose inter-basin transfers of water.**
5. **Meet Manitoba's commitments to the United Nations Convention on Biological Diversity.**

## Fisheries management in Manitoba

Ensuring the sustainable use of the fisheries in Manitoba for Indigenous, recreational and commercial use is a priority for Manitoba.

Fishing is an important part of Indigenous culture and identity, and also provides sustenance and economic benefits.

The right to fish for food, social and ceremonial purposes is constitutionally protected in inherent **Aboriginal and Treaty rights**, as defined in [section 35 of the Canadian Constitution](#).

Commercial net fishing is a valued industry in Manitoba, providing employment to many communities and significant economic value to the province. Manitoba continues to work towards securing the sustainability and certification of Manitoba's commercial fisheries. You can learn more about the management of Manitoba's commercial fisheries [here](#).

Manitoba's progressive fish management, combined with strong conservation and selective harvest programs, make it a world leader in sport fishing.



## Build our preparedness and resilience to a variable and changing climate

Water regimes in Manitoba are characterized by variability and extremes. The province has experienced severe floods and droughts recently and throughout history, resulting in substantial impacts to communities, infrastructure, the economy and the environment.

Climate change will exacerbate the frequency and severity of extreme events, such as floods and droughts, posing real and potentially significant risks to the province. Manitoba is expected to experience warmer overall temperatures, changes in precipitation and more unpredictable weather with a greater frequency of extreme events. Changes in climate are also expected to shift the timing and availability of water, with an increased risk of water supply shortages in the summer and excess moisture in the spring. The occurrence of such changes to climate are likely to have significant implications on water quantity and quality, infrastructure, aquatic ecosystems, and across economic sectors, including agriculture. However, the impacts are currently not well understood.

**Adaptation** refers to taking action now to reduce the impacts of current extremes and future water regimes brought on by climate change or other hazards. Communities, businesses and landowners need clear guidance, resources and support to take adaptation actions. Adaptation begins with knowledge about how Manitoba's climate is changing, identification of the potential risks and understanding how those risks might impact our communities, economy and the environment.



Only then can we begin to build **resiliency** at all levels – ranging from the watershed scale down to the individual farm or household scale – through a suite of adaptation measures. These can include infrastructure solutions, but also changes to policies, programming and planning approaches. Education is also an important tool in the fight against climate change. Manitobans must understand how each of us contributes to climate change and how we can **mitigate** and adapt. You can learn more in Manitoba's [Manitoba's Climate and Green Plan](#).

Improved **surface water management** planning at the watershed scale can help Manitobans adapt and build resilience to extreme events. Surface water management planning can improve understanding of the **cumulative impacts** of surface and tile drainage, natural and human-built retention, and other infrastructure at the watershed scale. Improved surface water management has multiple beneficial outcomes that extend beyond increased resiliency to floods and droughts, such as improved water quality and other ecological goods and services, and enhanced coordination and collaboration amongst infrastructure owners.



## Strategic Objectives:

1. **Enhance our understanding of how climate change affects water and aquatic ecosystems.**
2. **Assess climate vulnerability, risks and opportunities for Manitobans.**
3. **Implement climate adaptation measures and actions to strengthen Manitoba's resilience to a changing climate and extreme events, including floods and droughts.**
4. **Improve surface water management at the watershed scale, including retention and drainage.**

## What is climate resilience?

Resilience in the context of climate is the capacity of social, economic and environmental systems to avoid, reduce or recover quickly from a climate impact.

However, the concept of resilience is not limited to climate. It can apply to any hazardous event including wildfires, contamination, cyber attacks or a pandemic.

By making our systems more resilient for the impacts of climate change, we are often making them more **redundant** and building collateral benefits. For example, enhanced interconnectivity between water distribution systems – such as having systems provide “back up” for each other, regional water service models like co-operatives and access to multiple sources of raw water – builds both resiliency and redundancy of the system for both climate and other hazards.

## Address our water infrastructure challenges and opportunities

**Water infrastructure** is a critical component of water management and encompasses all of the engineered and natural features that move, store, treat and distribute water.

Infrastructure plays an invaluable role in flood protection, delivery of safe and reliable drinking water and wastewater treatment, and generation of electricity from hydropower, in addition to providing other beneficial outcomes. Much of Manitoba's water infrastructure is owned and operated by provincial and municipal governments. However, other entities, including co-operatives, enterprises, watershed districts and others may own and/or operate water infrastructure. Some types of water infrastructure balance several objectives to meet multiple outcomes. An example is Shellmouth Reservoir, which provides flood protection, water supplies and recreational opportunities. These types of multi-purpose infrastructure are complex to operate given diverse and often conflicting stakeholder needs. While Manitoba's water infrastructure provides tremendous benefits, we also need to consider effects on the environment and the communities within impacted areas.

Water infrastructure can be human built or naturally occurring with some projects incorporating both aspects into their design.

Engineered or **grey infrastructure** includes human-built structures such as: dams, reservoirs, dikes, diversions, drains, sewers, pumping stations, culverts, crossings, aqueducts, drinking water and wastewater treatment systems and their distribution networks. However, there is a growing recognition that healthy ecosystems and naturally occurring ecological processes can play a significant role in helping to efficiently and reliably achieve water management objectives that have traditionally been attained through engineered water infrastructure. This is referred to as **natural infrastructure**, or green infrastructure, which is a type of **nature-based solution**. For example, incorporating restoration of wetlands into the planning and design of a drainage system may reduce the size and costs of constructed drains while also yielding environmental benefits, such as improvements to biodiversity and water quality.

Manitoba is facing numerous and pressing water infrastructure challenges, but the foremost challenge is our **infrastructure deficit**. Accessing the necessary funding and resources to rehabilitate or replace and adequately maintain aging water infrastructure is an issue that infrastructure managers are facing more frequently, not just in Manitoba but across Canada. Community growth and development of **wet industry** are



also driving the need to sustainably finance and build new or upgrade the capacity of existing water and wastewater infrastructure. We must also consider the significant investment in infrastructure from wet industries and others users of water, including irrigators, to ensure that these investments are optimized. Taken as a whole, Manitoba is at a critical juncture for water and wastewater capacity and infrastructure.

Manitoba continues to build its approach to water management and economic development with a focus on sustainable growth. There is an

opportunity to collaborate with stakeholders to help develop water infrastructure priorities, including alternative and innovative financial instruments, and to enable short and long term growth opportunities, reflecting community and industry needs.

Climate change is expected to put additional strain on aging infrastructure systems, further reducing their effectiveness. There is a need to understand better the current state of water infrastructure in Manitoba, including its vulnerability to a changing climate and extreme events.

## Strategic Objectives:

1. **Understand the current state of water infrastructure in Manitoba, including identifying key vulnerabilities to a changing climate.**
2. **Focus investments in water infrastructure on environmental protection, human health and public safety, building resilience and regional capacity, and economic development.**
3. **Plan transparently for investments in water infrastructure.**
4. **Leverage new and innovative financial instruments and sustainable funding models for water infrastructure projects.**
5. **Prioritize incorporating natural infrastructure and nature-based solutions to water management challenges.**

## Lake Manitoba and Lake St. Martin Outlet Channels Project

Widespread flooding in 2011 resulted in unprecedented inflows into Lake Manitoba and Lake St. Martin. This resulted in the long-term evacuation of communities surrounding Lake St. Martin and the Dauphin River, thousands of acres of farmland flooded, and damage to many bridges, highways, homes and cottages. Manitoba Transportation and Infrastructure is developing permanent flood control measures for the region through construction of the Lake Manitoba and Lake St. Martin outlet channels.

The outlet channels will improve water regulation of Lake Manitoba and Lake St. Martin, reduce the likelihood of flooding on both lakes and lower the risk of flood-related damages and disruption to communities in the area. For more about the project, visit [www.manitoba.ca/mit/wms/lmbismoutlets/](http://www.manitoba.ca/mit/wms/lmbismoutlets/).

## Meet the water supply needs of current and future generations sustainably

Reliable, high-quality water supplies are essential for meeting basic human needs, maintaining healthy ecosystems, producing and ensuring food security, generating energy and sustaining economic growth.

However, development of reliable water supplies to meet current demands must not come at the expense of environmental needs and water for future generations. To ensure a sustainable approach, Manitoba has a **water allocation framework** in place that determines who is able to use the water, how, when, and where. Limits are placed on how much water can be allocated from a given aquifer or stream to protect aquatic ecosystems, ensure water supplies for future generations and reduce the risk of a water shortage for users. These limits are referred to as **sustainable allocation limits**. When the licensed water use from an aquifer or stream reaches the sustainable allocation limit, that source is considered to be **fully allocated**, and no further water is licensed from that source.

Although Manitoba as a whole has an abundance of high-quality surface water and groundwater supplies, several water sources in southern Manitoba are fully or near fully allocated. In these regions of water scarcity, the potential for economic development and community growth have become limited – particularly in the potato irrigation and agricultural-processing sectors, which are major contributors to Manitoba's economy. As industrial and social needs continue to grow, Manitoba will face increased pressure to develop further existing water supplies or risk limiting future growth. New technologies and innovations can be explored to make best use of existing water supplies. However, Manitoba cannot bring more water to all places



where demand outstrips supply, and plans for economic and community development must reflect this reality while recognizing where opportunities do exist. Projected changes in future climate and hydrology will also have impacts to water supply and demand. However, water availability under a changing climate and future demand across sectors are not well understood. An enhanced understanding of these needs is required for effective regional planning moving forward.

Extreme weather conditions and variability in water levels and flows also present major challenges to water supply management. These challenges may worsen in the future as the severity and frequency



of extreme events are expected to increase with climate change. Constructing new and upgrading existing water supply infrastructure is required to ensure reliable treatment and delivery of safe and clean potable water for communities and industry across Manitoba. Regional-based systems such as water co-operatives, enhanced interconnectivity between water distribution systems, access to

multiple sources of raw water, and raw water storage ponds or reservoirs are examples of water infrastructure upgrades that support **water supply resilience** in the face of a changing climate. Infrastructure funding must be carefully prioritized to meet the goals of environmental protection, human health and public safety, building resilience and regional capacity and economic development.

## Strategic Objectives:

1. **Assess current and future water supply and demand in Manitoba.**
2. **Ensure water allocations reflect a long-term sustainable approach that includes ecosystem needs, considers current and future climate and identifies risks for water users.**
3. **Increase the reliability and accessibility of water supplies for communities, agriculture, industries and other water uses, including recreation and tourism.**
4. **Continue to address long-term drinking water quality advisories, including boil water advisories.**

## Equitable access to clean, safe, reliable, and affordable drinking water

Ensuring all Manitobans have equitable access to clean, safe, reliable and affordable drinking water is a provincial priority. Manitoba's [Office of Drinking Water](#) regulates more than 1000 drinking water systems and provides guidance, technical expertise, information and educational materials about drinking water safety to water suppliers and the public. The [Manitoba Water Services Board](#) also plays an important role in supporting communities in the provision of drinking water through funding and technical engineering support.

Although progress is being made, there is still inequity occurring within Manitoba's borders as some communities and municipalities do not have the financial means to build or upgrade water treatment and distribution systems. There are numerous public and semi-public water systems on short-term, medium-term and long-term boil water advisories across Manitoba. Short-term advisories are due to minor problems that can be easily addressed in a timely fashion. However, long-term advisories often require significant capital funding to address major operational and treatment challenges.

Drinking water on First Nations lands is the responsibility of the federal government. To that end, the Government of Canada is working with First Nations communities to end long-term drinking water advisories and improve water and wastewater systems on reserve. Manitoba's work on source water protection, drinking water system operator training and water sample analysis also helps with the provision of clean drinking water for both Indigenous and non-Indigenous communities across Manitoba.

## Protect the quality and quantity of groundwater

Groundwater is a vital resource in Manitoba, although it is often forgotten or undervalued as it is hidden underground.

Groundwater exists everywhere, with usable quantities stored in porous sediments and rocks called **aquifers**. Manitoba is fortunate to have an abundance of high-quality, high-yielding bedrock and sand-and-gravel aquifers that provide reliable sources of water supply.

Outside of Winnipeg, most Manitobans rely on groundwater from private wells or municipal water systems for their domestic needs, including for drinking, bathing, sanitation and cooking. Groundwater is also commonly used for irrigation, livestock watering, industrial processing and heating

and cooling. It plays a key role in sustaining many ecosystems, including providing baseflow to rivers and streams and contributing water to wetlands.

Some areas of the province have issues with groundwater quality, due to either natural (e.g., salinity) or human-caused factors (e.g., poor well management). Groundwater resources can also become depleted if the rate at which the water is used is greater than the rate of natural replacement. This can occur due to dry conditions resulting in a lack of recharge or overexploitation from human use.



Manitoba manages several major aquifers, such as the Assiniboine Delta Aquifer and the Oak Lake Aquifer. These major aquifers have defined sustainable withdrawal limits, and some have local **aquifer management plans** in place to identify issues relating to the protection, management, conservation or restoration of groundwater.

Aquifers are studied and monitored to understand the resource, including assessing groundwater quality to determine the suitability for human use and the amount of water supply available for human withdrawal. New technology and information is available that could be used to refine further our understanding of aquifers.



## Strategic Objectives:

1. **Protect drinking water sources.**
2. **Value groundwater and sustainably manage and protect the resource.**
3. **Identify, communicate and mitigate groundwater quality and quantity issues.**
4. **Increase our understanding of groundwater availability and its relationship with other parts of the environment.**

## The importance of Manitoba's wetlands

Wetlands are one of the province's most precious resources and one of the most productive ecosystems on Earth. Marshes, bogs, fens, swamps, sloughs and prairie potholes are all considered wetlands.

Wetlands are valuable in part because of the diverse functions they perform – many of which are beneficial to Manitobans. Some examples of the benefits that wetlands provide include:

- habitat to an incredible abundance and diversity of aquatic plants, insects and wildlife.
- recharge to underlying aquifers, helping to replenish groundwater supplies for municipal, irrigation and other uses.
- collection and storage of seasonally high waters and a natural buffer against flooding.
- enhanced water quality through filtering and purifying water as it passes through them.
- scenic and recreationally valuable areas, including opportunities to view and enjoy wildlife.
- carbon sequestration.

Wetlands have tremendous economic value to Manitoba. It is estimated that the ecological goods and services derived from Canadian wetlands are worth billions of dollars each year. In settled areas of Canada, up to 70 per cent of our wetlands have already been destroyed or degraded. Fortunately, conservation efforts and increasing awareness of the value of wetlands has led to the protection, maintenance and enhancement of many wetlands in Manitoba.

## Protect and improve surface water quality

All visible above-ground water, including lakes, rivers, streams, and wetlands, is termed **surface water**. Protected and clean surface waters are essential to sustaining important water uses, including for drinking, recreation, irrigation, watering livestock and to protect **aquatic life**.

**Water quality** depends on watershed characteristics including climate, drainage systems, soils and vegetation. Land use practices, such as fertilizer and pesticide application, and municipal and industrial wastewater point sources also influence water quality in lakes and rivers. Many of these drivers of water quality will be intensified by a changing climate. Broadly speaking, water quality data indicate that surface water quality is generally better in northern Manitoba as compared to southern Manitoba where the impacts of development have led to degraded water quality in some regions. However, water quality has also been affected in northern Manitoba through the creation of reservoirs and water diversions. These projects have led to increased or decreased flows, flooding and changes in source water.

A key water quality issue in Manitoba is **excess nutrient loading**, which is one of the major factors contributing to algal blooms on waterbodies across Manitoba including Lake Winnipeg. Actions to improve water quality in Lake Winnipeg are challenging due to the large scale of the Lake Winnipeg watershed, over one million square kilometres, and the many small sources of nutrients (phosphorus and nitrogen) across the basin,

including runoff from the land. Approximately 70 per cent of the water and 50 per cent of the nutrients in Lake Winnipeg originate from outside Manitoba, and Manitoba continues to work closely with both Manitobans and neighbouring jurisdictions to take action to improve water quality and reduce nutrients.

Manitoba's surface water quality is also impacted by contaminants of concern. **Contaminants of concern** are natural and/or man-made chemicals and other substances detected in the environment at concentrations that may cause adverse effects to aquatic life, wildlife and human health. Naturally-occurring substances such as mercury can reach toxic levels as a result of human activity. Examples of contaminants include pharmaceuticals and personal care products, endocrine disrupting compounds, persistent organic pollutants, flame retardants, surfactants, nanomaterials, microplastics and mercury, among others. Contaminants of concern are released to aquatic environments from a variety of point and non-point sources. Wastewater treatment facilities cannot fully remove these contaminants during the treatment process and these contaminants can be discharged directly to surface waters.

### Strategic Objectives:

1. **Protect drinking water sources.**
2. **Manage water quality to protect aquatic life and human uses.**
3. **Reduce excess nutrient loading to Manitoba's waterways.**
4. **Improve our understanding and management of contaminants of concern.**

## Lake Winnipeg

With its beautiful beaches and wide open waters, Lake Winnipeg is one of Manitoba's greatest freshwater resources. Lake Winnipeg, the world's 10th largest freshwater lake by surface area, plays a critical role in tourism, recreation, commercial and sport fisheries and hydroelectric generation in Manitoba. Over 23,000 permanent residents live in 30 communities along the shores of Lake Winnipeg, including many First Nation and Métis communities. Lake Winnipeg's world-class beaches attract many visitors to the province and offer opportunities for swimming, paddling, sailing and windsurfing on the east and west shores of the south basin. Each year, approximately 800 commercial fishers operate on Lake Winnipeg, catching a variety of species including world-class walleye, goldeye, sauger, whitefish and others. Sport anglers find many places to fish while enjoying the lake's beauty. Lake Winnipeg is also the world's third largest reservoir, generating hydroelectric power for all Manitobans.

Over the past several decades, the frequency and severity of algal blooms in Lake Winnipeg have been increasing, in part in response to excess concentrations of the plant nutrients, nitrogen and phosphorus. Phosphorus and nitrogen are contributed by virtually all of our activities across the 1,000,000-square-kilometre Lake Winnipeg watershed that stretches across two countries, four provinces and four U.S. states. Work is underway across the transboundary Lake Winnipeg watershed to reduce nutrient contributions from all sources. You can learn more by visiting [www.manitoba.ca/lakewinnipeg](http://www.manitoba.ca/lakewinnipeg).

## Advance Indigenous inclusion in water management

As laid out in The Path to Reconciliation Act, Manitoba is committed to advancing reconciliation and will be guided by the calls to action of the Truth and Reconciliation Commission and the principles set out in the United Nations Declaration on the Rights of Indigenous Peoples.

To advance reconciliation, Manitoba must have regard for the principles of respect, engagement, understanding and action. This involves continuous engagement and ongoing collaboration with First Nations, Inuit and Métis leadership and peoples, including Elders and knowledge keepers, youth and Indigenous organizations. Collaboration and ongoing engagement will provide an opportunity to establish further and maintain respectful relationships between Indigenous and non-Indigenous Peoples to build trust, affirm historical agreements, address healing and create a more equitable and inclusive society.

Opportunities for inclusion are expanding, and there is much room for greater collaboration. The Province of Manitoba is committed to meaningful partnerships with First Nations, Métis and Inuit governments on shared priorities related to water management. This strategy is just the beginning of the important work needed on water in Manitoba, and there will be significant opportunities for working together.

This will include working with Indigenous governments and communities to define the strategic objectives in this focus area.

### Strategic Objectives:

- 1. Engage respectfully with Indigenous communities to learn from and incorporate Indigenous perspectives on water and Indigenous communities and peoples needs and expertise into the water management strategy's focus areas, strategic objectives and action plans.**
- 2. Establish a process between the provincial government and Indigenous governments and communities to advance mutual understanding of the respective roles of each in water management.**
- 3. Promote stronger linkages between Indigenous communities and non-Indigenous local governments, watershed districts and other organizations involved in water management at the watershed scale.**

## Shoal Lake First Nation #40 and Winnipeg's Drinking Water

The City of Winnipeg's drinking water comes from Shoal Lake, located in the southeast corner of Manitoba at the Manitoba-Ontario border in the Lake of the Woods watershed. Water is diverted from Shoal Lake to the City of Winnipeg through the Winnipeg Aqueduct. Construction of the Winnipeg Aqueduct began in 1915 and was completed in 1919.

The diversion of water from Shoal Lake for use by the Greater Winnipeg Water District was authorized in the [International Joint Commission's Order of 1914](#). To build the Winnipeg Aqueduct, a portion of Shoal Lake First Nation #40's land around Indian Bay was expropriated and its residents were displaced and moved to a peninsula across the lake. As part of the project, a diversion canal was constructed that cut the community off from the mainland, isolating the First Nation. The community relied on a barge ferry and ice road to cross the lake until the completion of Freedom Road in 2019 permanently connected Shoal Lake First Nation #40 to the rest of Canada.

In 1989, Shoal Lake First Nation #40 entered the [Shoal Lake Tripartite Agreement](#) with Manitoba and the City of Winnipeg. The 60-year agreement was designed to recognize the Aboriginal and jurisdictional rights of Shoal Lake First Nation #40, to protect and enhance the water quality of Shoal Lake and to promote sustainable development opportunities for the Shoal Lake community.

Shoal Lake First Nation #40 is a key partner in water source management in Manitoba, protecting the quality of Shoal Lake for the benefit of the hundreds of thousands of Winnipeggers who rely on it.

## Water Power Act Licensing

The origins of water power licensing trace back to the early 1900s. It is one of Manitoba's oldest forms of natural resource management, made possible through The Water Power Act and its Regulation that came into existence in 1930. Licensing allows the province to allocate its vast water power resources sustainably and ensures clean, reliable and affordable electricity for all Manitobans.

Nearly all of Manitoba's electricity comes from water power generation. As of 2022, 19 water power projects were licensed under the Act. Manitoba's approach to water power resources is evolving with public expectations for environmental stewardship, energy security and social and economic growth. Manitoba recognizes that it must do more to address the historical impacts of legacy hydro-generating stations and has embarked on this journey.

In 2021, Manitoba issued Water Power Act licences for Manitoba Hydro's Churchill River Diversion, Lake Winnipeg Regulation and Jenpeg Generating Stations. The licences involved extensive consultation in addressing these projects' social, environmental, and economic impacts. For the first time, licences require Manitoba Hydro to engage Indigenous communities, use traditional knowledge in day-to-day operations and expand the [Coordinated Aquatic Monitoring Program](#) to better understand the environmental effects of hydro-generating stations on fish and aquatic habitats, shorelines and other aspects of our water systems. Manitoba is committed to reconciliation and partnering with communities to transform water power licensing. Manitoba will work with Indigenous communities on future water power decisions to advance the health and well-being of all Manitobans and their communities.

## Improve coordinated water management and governance across watersheds, basins and aquifers

Manitoba has many key partners and stakeholders who all have important roles in water management.

This includes federal, municipal, and Indigenous governments, Manitoba Hydro, watershed districts, aquifer and resource management boards, planning districts and the Capital Planning Region, water providers, producers, industry, academia, the business community and others. Clear and effective water governance is needed to define water management roles and responsibilities for all Manitobans and to lay the foundation that enables us to meet our strategic objectives.



**Water governance** refers to the various systems we have in place to manage water at all levels (e.g., federally, provincially, locally) including the delivery models in place to provide water-related services to clients. Water governance encapsulates the structures that define who is responsible for what aspects of water management, such as departments, municipalities, agencies and boards, and their respective mandates. It lays out the legal framework for water through legislation, regulations and enforcement approaches. It also encompasses the strategies, policies and programs in place to manage water. Existing water governance systems should be regularly reviewed to ensure they are accountable, coordinated and collaborative, and to determine if new and improved ways of managing water are needed.





A watershed-based approach for delivery of water and land management activities is one way to improve co-ordination and collaboration and to foster a more integrated and adaptive approach to water management. Water does not recognize jurisdictional boundaries and it is important to work across watersheds, basins and aquifers to ensure co-ordinated management. Manitoba has a number of watershed-based programs in place, including through the Watershed Districts Program.

Manitoba also shares a number of **transboundary watersheds** with upstream jurisdictions including

Alberta, Saskatchewan, Ontario, North Dakota and Minnesota. Because water flows across borders, activities and developments, including drainage, water withdrawals, dams and diversions across these shared transboundary watersheds can have significant impacts on the waters entering Manitoba. Manitoba must continue to collaborate with upstream jurisdictions to manage surface water and groundwater quality and quantity in transboundary watersheds and strengthen interprovincial and international mechanisms as needed.



## Strategic Objectives:

1. **Manage water on a watershed basis.**
2. **Collaborate with neighbouring jurisdictions to manage transboundary waters.**
3. **Ensure clear and effective water governance that aligns with Manitoba's strategic water objectives.**
4. **Coordinate funding investments to meet defined watershed goals.**
5. **Enhance and streamline the delivery of client-centred services for water.**

## Client-centered services for water in Manitoba

Manitoba's [Economic Opportunities Navigation Branch](#) actively supports industry operating, expanding or looking to invest in Manitoba. The branch provides a single-point-of-contact concierge service for businesses within all sectors and provides companies and stakeholders with relevant program and policy supports needed to address business needs in a one-stop approach to connecting with government. The navigation team supports industry in understanding requirements linked to water availability and servicing in Manitoba, makes appropriate connections to enable education and reduce red tape, and provides guidance and supports to troubleshoot issues and enable positive growth for industry in Manitoba.

## Improve data, information and knowledge available on water

Water data, information and knowledge are essential to water management, including for real-time decision-making and long-term planning.

**Water monitoring networks** provide key data that are used as the basis to guide actions and responses to water management challenges. Manitoba maintains a number of monitoring networks to help track and understand water quality and quantity. For some data collection programs, Manitoba relies on partners such as the federal government, Manitoba Hydro, watershed districts, universities, cottage associations and other stakeholders as partners. Sharing of data and information between collection agencies is an important outcome of the monitoring programs. Open access to provincial water data and information is needed as input to research and to inform local or regional approaches to water management.



Although the terms data, information and knowledge are often used interchangeably, they represent different things. “Data” in its simplest form are the raw alphanumeric values collected through acquisition methods such as water monitoring networks (for example, long term water quality monitoring data for rivers or soil moisture data collected through the Ag Weather Network). “Information” is created as data are processed in a way that provides meaning and makes data useful (for example, flood risk maps and water availability and drought condition reports). “Knowledge” is what we know and is an accumulation of past experience and insights that are unique to each person. As an example, water level data are captured by water monitoring stations and these data can be analyzed along with **topographic data** to produce information such as flood risk maps. The resulting knowledge of flood risk can then be used by local governments when making land use zoning and planning decisions.

Acknowledging the importance of **local and Indigenous knowledge** and including it in respectful and appropriate ways will expand current water management approaches beyond those based in **Western science**.

Continued investments in research are needed to help address existing and emerging water resources challenges through filling data, information and knowledge gaps. Targeted research could focus on more efficient use of resources and embracing new and emerging technologies and methodologies. Improving, modernizing and expanding research and data collection efforts in Manitoba presents an opportunity for the active inclusion of new

data and information in decision-making in a more formal way. This can be achieved in part through embedding **adaptive management** principles into Manitoba's water management approaches. Adaptive management is an iterative process for flexible decision-making where the knowledge gained through monitoring of outcomes is used to evaluate and refine tools and approaches and to capture and share lessons learned.

## Strategic Objectives:

1. **Ensure that monitoring programs support water management decision-making.**
2. **Enhance sharing of data and information about water.**
3. **Incorporate adaptive management into water management in Manitoba.**
4. **Incorporate Indigenous knowledge in a respectful and appropriate manner.**
5. **Integrate local and historical knowledge about water.**
6. **Increase collaborations, partnerships and investment for water research and innovation.**

## Water and Agriculture

Water is essential for agriculture and agri-processing. These industries depend on a reliable water supply to grow and irrigate crops, water livestock and create value. A changing climate will affect agriculture, but agriculture can also be an environmental solution provider.

Sustainable agricultural practices provide multiple environmental, social and economic benefits, including improved resiliency to a changing climate. Adoption of sustainable agricultural practices helps improve water quality, while increasing water retention capacity of agri-ecosystems and reducing flooding risk. Agricultural producers are contributing to water resource protection through practices to maximize water use efficiency, enhance soil moisture conservation, improve irrigation efficiency and reduce nutrient loss via runoff and soil erosion.

Manitoba is implementing a number of actions aimed at improving climate resiliency efforts including targeted incentive programming for agricultural producers to advance the adoption of on-farm Beneficial Management Practices (BMPs). These BMPs improve agri-ecosystem resilience to climate change, deliver ecological goods and services such as improved water quality, and enhance the environmental sustainability of farm operations in Manitoba. Through the development of individual [Environmental Farm Plans](#) and participation in planning activities such as for Integrated Watershed Management Plans under The Water Protection Act, the agricultural sector focuses on a holistic approach to land and water management.

## Enhance engagement and participation of Manitobans in water stewardship

Manitobans increasingly expect the opportunity to provide input to government decisions that affect their lives, especially on a topic as important and far-reaching as water.

The Manitoba government manages water for the benefit of all Manitobans, and we are committed to engaging the public on this important resource in a relevant, consistent, respectful, transparent and inclusive manner. Enhanced participation of Manitobans in water management can lead to improved decision-making and increased accountability, transparency and public buy-in of water management issues and solutions. The strategy provides an opportunity to increase the meaningful involvement of partners and the public in water management planning and decision-making, potentially through new and enhanced engagement approaches such as **co-development**.

Water education at all levels is critical to build a public that understands the importance of water and the impact that their actions can have on the larger system. As part of the water management strategy, Manitoba aims to build a community of

water stewards through increased education and awareness on water. A public that is informed on the value of water and the current state of our water resources will be better prepared to engage on water, and will also protect and use water more sustainably in their day-to-day lives and within their businesses. Targeted yet widely available communications and information resources, including on topics like water conservation and efficiency, will be an important tool to achieve this goal.

One way to facilitate and encourage public involvement in water is through the support of local organizations in their water initiatives, including **community-based monitoring** and **citizen science** programs. These types of programs can generate valuable water datasets while also providing important education and engagement opportunities, helping Manitobans contribute to water management.

### Strategic Objectives:

1. **Increase Manitobans' awareness about water.**
2. **Involve Manitobans in water management planning and decision-making.**
3. **Support engagement and participation of local organizations in water initiatives, including community-based monitoring and citizen science.**

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# Strategy Implementation

## Roles and Responsibilities

Water management in Manitoba is a shared responsibility with important roles for the Manitoba government along with the federal government, Indigenous governments, local governments, planning districts and the Capital Planning Region, Crown corporations and partners such as watershed districts and resource management boards. There is also a responsibility for all water users, including industry, to be good stewards of our precious water resources.

This water management strategy describes the vision, mission, guiding principles and strategic objectives of Manitoba's provincial government related to water. Implementation will occur across various provincial government departments and must be aligned to support success. However, achieving the vision of this strategy will also require cooperation and collaboration with others who share responsibility for various aspects of water management. In some cases, other governments and partners will need to implement actions if we are to achieve the strategic objectives. Action plans developed under the strategy will establish clear responsibilities including for leads and those who will support implementation. Finally, for some aspects of the strategy, all Manitobans must play a role if we are to be successful. For example, the support of all Manitobans is needed to achieve a culture shift related to the value of water.

## Monitoring, Evaluation, and Indicators

Manitoba's new water management strategy will set the stage for future work and decision-making on water for the next decade and beyond. Ongoing monitoring and evaluation will be required to determine if the strategic objectives are being achieved through implemented actions. Indicators will provide a helpful way to measure progress towards our vision for water management in Manitoba and will be established as part of development of the initial action plan.



## Conclusion

Manitoba is a place defined by water. Here is where diverse and distant headwaters – in the Rocky Mountains to the west, in the Great Plains to the south, and in the boreal forest to the east – are connected to the sea on the shores of Hudson Bay. The magnificent rivers and lakes of our province have linked and sustained generations of people. So too have the streams and wetlands, and the water out of sight beneath us. Just as water has formed and reformed the land where we live, it has moulded the cultures and lifeways we share, by its presence and its absence, by its power to sustain and to damage, and by its predictability and its changeability.

However, as is true everywhere humans live, we have changed water, even as it has changed us. We drain it, store it and pump it to grow our food and sustain our communities; we harness it for energy; we divert it and store it to protect our homes and communities from floods and droughts. Our ability to manage water reflects the power and ubiquity of water in the natural world; almost every human activity depends on water resources, but also changes those resources in ways that can be difficult to foresee. Understanding this dynamic, between water as a natural force and the consequences of human use for the water regime, is a global challenge, one made all the more urgent by the effects of a changing climate. By working together – as individuals and landowners, as residents of our communities and of this province, and across jurisdictional boundaries with our neighbours – we endeavour to ensure that our actions and decisions about water reflect all of the knowledge and perspectives that we can bring to bear on the most important natural resource we have, for all Manitobans today, and for future generations.



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## Glossary

- **Aboriginal rights** – Aboriginal rights (commonly referred to as Indigenous rights) are collective rights of distinctive Indigenous societies flowing from their status as the original peoples of Canada. These rights are recognized and affirmed by Section 35 of the Constitution Act, 1982. Indigenous rights under Section 35 vary from group to group depending on the customs, practices and traditions that have formed part of their distinctive cultures.
- **Adaptation** – adjustment or preparation of natural or human systems to a new or changing environment which moderates harm or exploits beneficial opportunities.
- **Adaptive management** - an iterative process for flexible decision-making where the knowledge gained through monitoring of outcomes is used to evaluate and refine tools and approaches and capture and share lessons learned.
- **Anthropogenic** – refers to environmental change caused or influenced by people, either directly or indirectly.
- **Aquatic ecosystem** – the minimum system of living and non-living things that includes and can sustain life within a primarily wetted environment.
- **Aquatic invasive species** – a species that is not native to Manitoba, lives in or near water and has negative effects on aquatic ecosystems in Manitoba or is likely to have negative effects of aquatic ecosystems in Manitoba.
- **Aquatic life** – any plant or animal life that uses water as its primary habitat for at least a portion of its life cycle, but does not include birds or mammals.
- **Aquifer** – a body of rock and/or sediments that holds groundwater. Aquifers can be confined or unconfined and can be formed by many types of sediments such as sand and gravel or limestone.
- **Aquifer Management Plans** – a plan that identifies issues relating to the protection, management, conservation or restoration of groundwater within an aquifer management zone.
- **Best management practices** – a set of practices, measures or procedures that are beneficial, cost-effective and widely accepted by the professional community.
- **Biodiversity** – generally meaning the variety of life on earth, but more specifically, biodiversity is the sum of the genetic diversity, the species diversity and the ecosystem diversity on earth.
- **Biology** – in the context of in-stream flow needs, refers to the measured determination of what lives in a stream under various flow conditions and the consequent habitats of those flows. Biological assemblages are known to exist in a dynamic equilibrium.
- **Capital Planning Region** – The Capital Planning Region is comprised of 18 municipalities, including the City of Winnipeg, that have a mandate to enhance economic and social development by improving and coordinating sustainable land use and development in the region.
- **Circular economy** – an alternative to a traditional linear economy (make, use, dispose) in which we keep resources in use for as long as possible, extract the maximum value from them while in use, then recover and regenerate products and materials at the end of each service life.
- **Citizen science** – the practice of public participation and collaboration in scientific research to increase scientific knowledge.

- **Climate Change** – refers to any significant change in the measures of climate lasting for an extended period of time, including major changes in temperature, precipitation or wind patterns, among others, that occur over several decades or longer.
- **Co-development** – a structured process where several parties come to a table to work through an issue or develop a new way forward, openly and transparently. Each party shares their views – including the views of their stakeholders or constituents (if applicable) - and then meaningfully collaborate to arrive at a place where an acceptable option has been agreed to that addresses the interests of all parties at the table.
- **Community-based monitoring** – a component of citizen science that involves the collection and analysis of data relating to the natural world by members of the general public.
- **Connectivity** – in the context of in-stream flow needs, refers to the lateral, vertical and longitudinal continuity of a stream. Lateral connectivity is an assessment of how permeable (or not) the streams banks are and what wetted habitats are possible within the riparian area. Vertical connectivity is an assessment of the connection between ground water and surface water, while longitudinal connectivity is the determination of how much uninterrupted flow a system has along its length.
- **Contaminants of concern** – natural and/or man-made chemicals and other substances detected in the environment at concentrations that may cause adverse effects to aquatic life, wildlife and human health. Examples include pharmaceuticals, personal care products and endocrine disrupting compounds.
- **Continental Divide of the Americas** – is the principal hydrological divide of the Americas, extending from the Bering Strait to the Strait of Magellan. The Continental Divide separates the watersheds that drain into the Pacific Ocean from those that drain into the Atlantic and Arctic oceans, including those that drain into the Gulf of Mexico, the Caribbean Sea and Hudson Bay.
- **Cumulative impacts** – changes to the environment (positive or negative, direct and indirect, long-term and short-term) that are caused by an action in combination with other past, present and reasonably foreseeable future human actions. Each individual impact may not be significant if taken in isolation, but can be significant when considered as a whole.
- **Demand-side management** – the practice of systematically reducing water use for a broad spectrum of utility customers through efficiency measures and conservation; often an alternative to supply-side management.
- **Drainage basin** – an area of land where all flowing surface waters converge to a single outlet. A drainage basin is separated from adjacent basins by a drainage divide, comprised of a series of elevated features, such as ridges and hills. A drainage basin consists of smaller sub-basins, often termed watersheds, which join the larger drainage basin through merging at river confluences, forming a hierarchical pattern.



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- **Ecological goods and services** – the environmental benefits resulting from physical, chemical and biological functions of healthy ecosystems, including market goods produced from ecosystems (e.g., water, food, fuel, fibre), the benefits from ecosystem processes, (e.g., nutrient cycling, climate regulation, water purification, waste treatment, pollination) and non-material benefits (e.g., aesthetic value, recreation). Dis-services, such as loss of wildlife habitat and biodiversity, can impair the production of ecological goods and services.
  - **Environmental equity** – the equitable treatment and meaningful inclusion of all people in environmental laws, regulations and programs, regardless of their income or identity. Environmental equity represents achieving fairness and balance in access to environmental resources and benefits (e.g., clean drinking water), in bearing environmental burdens (e.g., flooding, pollution), and the ability to participate in environmental decision-making.
  - **Environment, social and governance (ESG) values** – non-financial performance indicators that can be used to evaluate economic development opportunities to ensure they consider the environment (e.g. green house gas emissions, energy efficiency, water use), social issues (e.g. human rights, labour standards, health and safety) and governance (e.g. rights, responsibilities and expectations for good governance).
  - **Excess nutrient loading** – nitrogen and phosphorus are nutrients that are natural parts of aquatic ecosystems, but when too many nutrients enter the environment (usually from a wide range of human activities), the water can become polluted with excess nutrients resulting in diverse and far-reaching impacts on public health, the environment and the economy.
  - **Fully allocated system** – when the licensed water use from an aquifer or stream reaches the sustainable allocation limit and no further water can be licensed from that source.
  - **Greenhouse gas emissions** – the release of a greenhouse gasses into the atmosphere. Examples of greenhouse gases include carbon dioxide, methane, nitrous oxide, ozone and others.
  - **Grey infrastructure** – refers to the human-engineered infrastructure for water resources management, such as water and wastewater treatment plants, pipelines and reservoirs.
  - **Groundwater** – water that comes from an aquifer and is accessed by a well, spring or groundwater-fed dugout.
  - **Hydrology assessment** – in the context of licensing water under Manitoba’s water allocation framework, is the determination of the volume of water available for human allocation during a specified timeframe at a pre-determined risk level (e.g., risk of a water shortage is one in five years, or a 20 per cent chance). Hydrology assessments incorporate instream flow needs within the calculation.
  - **Infrastructure deficit** – the amount of money needed to maintain, rehabilitate and expand the infrastructure network to meet demand versus the amount of money available for investment.
  - **Innovative financial instruments** – in the context of water infrastructure funding, refers to the range of approaches that provide a means to avoid the sole reliance on public sector expenditure by leveraging private sector financial support on water related infrastructure and the circular economy. Potential options include offsets, green bonds, green financing, innovative pricing regimes, water quality credit trading, public-private partnerships and other potential investment opportunities focused on nature-based solutions.

- **Inter-basin transfer** – in the context of Manitoba's geographic setting, is the diversion of untreated waters across the Continental Divide into or out of the defined boundary of the Hudson Bay drainage basin.
- **Instream flow needs** – the instantaneous flow required by a flowing water system (such as a river) that provides functional geomorphological processes; riverine connectivity, (including lateral; longitudinal and vertical connectivity); functional water quality outcomes and aquatic habitats to support the highest trophic level of life that would be expected in that system in its natural state.
- **Local and Indigenous knowledge** – are the important understandings, skills and philosophies developed through long histories of interaction with the natural surroundings. It is knowledge based on the social, physical and spiritual understandings which have informed survival and contributed to a sense of being in the world.
- **Mitigation** – in the context of climate, mitigation is a human intervention to reduce the human impact on the climate system; it includes strategies to reduce greenhouse gas sources and emissions and enhancing greenhouse gas sinks.
- **Natural Infrastructure** – is the use of preserved, restored or enhanced elements or combinations of vegetation and associated biology, land, water and naturally occurring ecological processes to meet targeted infrastructure outcomes. Natural infrastructure can be differentiated from nature-based solutions as it is exclusively natural ecosystem features and materials, while nature-based solutions are measures that protect, restore and sustainably manage natural or modified ecosystems, with the aim of maintaining or enhancing the services provided to communities and benefits to biodiversity.
- **Planning Districts** – two or more adjoining municipalities can join to form a planning district by regulation under The Planning Act. In so doing, the member municipalities gain significant benefits from working together to coordinate their policies and programs relating to land use, development and the provision of public facilities.
- **Redundancy** – in the context of engineered systems (such as grey infrastructure), is the intentional duplication of critical components or functions of a system with the goal of increasing reliability of the system, usually in the form of a backup or fail-safe, or to improve actual system performance.
- **Resilience** – in the context of climate, is the capacity of social, economic and environmental systems to avoid, reduce or recover quickly from a climate impact. The concept of resilience is not limited to climate, it can apply to any hazardous event.
- **Rightsholders** – Indigenous Peoples are rightsholders, not stakeholders, because they have Aboriginal and Treaty rights recognized and affirmed by Section 35 of the Constitution Act, 1982. Manitoba is legally required to consult with Indigenous communities whenever it is contemplating a decision or action that could adversely affect the exercise of Aboriginal or treaty rights.
- **Supply-side management** – refers to increasing the amount of available water supply. This can be accomplished through a variety of approaches, including: finding new sources, increasing storage capacities, diverting water to increase supply at a particular location or using technology to create potable water from a previously unusable source.
- **Surface water** – water that comes from a river, lake, creek, etc. or spring runoff. It is water that is located on the ground surface.

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- **Surface water management** – a subset of water management that focuses specifically on the management of surface waters (e.g., rivers, lakes, creeks).
  - **Sustainable development** – is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It is not a fixed state of harmony, but rather a process of change and is often applied through consideration of the three sustainability pillars: environment, social and economic.
  - **Sustainable allocation limits** – refers to the upper thresholds on how much water can be withdrawn from individual surface water and groundwater sources in a way that meets current, ecological, social and economic needs without compromising the ability to meet those needs in the future.
  - **Topographic data** – data providing detail on the terrain, elevation and land features of the Earth's surface.
  - **Transboundary waters** – any surface waters or groundwater which mark, cross or are located on boundaries between for example, two or more countries, provinces or states.
  - **Treaty rights** – Treaty rights are rights set out in either a historic or modern treaty agreement. These rights are recognized and affirmed by Section 35 of the Constitution Act, 1982. Treaties define specific rights, benefits and obligations for the signatories that vary from treaty to treaty. Treaties and treaty rights also vary depending on the time and circumstances in which they were negotiated.
  - **Water allocation framework** – a set of legislation, regulations, policies and procedures that specify who is able to use water, how, when and where. The allocation framework aims to allocate water for human use while protecting aquatic ecosystems, ensuring water supplies for future generations and reducing the user's risk of a water shortage.
  - **Water conservation** – the policies, strategies and activities to manage fresh water as a sustainable resource, to protect the water environment and to meet current and future human demand. This term also refers to the implementation of measures to decrease the total amount of water use.
  - **Water efficiency** – reducing water waste through water-saving technologies and simple behavioral changes.
  - **Water governance** – refers to the various systems we have in place to manage water at all levels. This includes delivery models to provide water-related services to clients, structures defining who is responsible for what aspects of water management, the legal framework for water, and the strategies, policies and programs in place to manage water.
  - **Water infrastructure** – is the broad term encompassing all of the engineered systems (e.g., grey infrastructure) and natural features that provide beneficial outcomes (e.g., flood protection, hydropower) through moving, storing, treating and distributing water.
  - **Water management** – the activity of planning, developing, distributing and managing the optimum use of water resources under defined legislation, regulations and policies. Surface water management is a subset of water management that focuses specifically on the management of surface waters (e.g., rivers, lakes, creeks).
  - **Water monitoring networks** – sampling and analysis or automated recording and transmission of water-related datasets through manual collection methods or captured by a system of instrumentation, such as a hydrometric gauging station.

- **Water quality** – refers to the chemical, physical, and biological characteristics of water based on the standards of its usage. In Manitoba, the Water Quality Standards, Objectives and Guidelines are used to protect the quality of water for domestic consumption, aquatic life and wildlife, industrial consumption, irrigation, livestock watering and recreation. The standards, objectives and guidelines specify the acceptable concentrations of over 80 substances - including mercury, fecal coliform bacteria, organochloride pesticides, phosphorus and dissolved oxygen - for specific water uses.
- **Water regime** – refers to water levels and flows and their fluctuations throughout time. Oftentimes water regimes are used to describe a pre- and post-state of hydrological fluctuations before (i.e., natural state) and after the construction or modification of water infrastructure or another project that affects water levels and flows within a water body.
- **Water scarcity** – refers to when the demand for water cannot be met. Water scarcity can happen for a variety of reasons, including a lack of water supplies or inadequate infrastructure.
- **Water stewardship** – responsible planning and management of water resources that uses water in a way that is socially equitable, environmentally sustainable and economically beneficial.
- **Water supply reliability** – the probability (i.e., percent of time) that the available water supply meets a given water demand; reliability answers the question “how often” and is usually defined as the probability of a system being in a satisfactory state.
- **Watershed District** – formed as a partnership between the province and local municipalities, the goal of watershed districts is to protect, restore and manage land and water resources on a watershed basis. Watershed districts are established under the authority of The Watershed Districts Act. Districts are responsible for developing and implementing programming to improve watershed health, while some districts also have a surface water infrastructure mandate to maintain provincial waterways within their boundary.
- **Western science** – is the system of knowledge which relies on certain laws that have been established through the application of the scientific method to phenomena in the world around us. Scientific method begins with an observation followed by a prediction or hypothesis which is then tested. Depending on the test results, the hypothesis can become a scientific theory or ‘truth’ about the world.
- **Wet industry** – industrial developments that utilize significant volumes of water to process or arrive at an end product. Examples of wet industry include agricultural processing (e.g., potatoes, canola), mining and pulp and paper mills.
- **Xeriscape** – landscaping that involves the selection, placement and care of low water use and native ground cover, turf, plants, shrubs and trees.









