

Water Management in Alberta

System Overview



Water is both a resource and a life source. We have a shared responsibility to ensure a healthy, secure and sustainable water supply for Alberta’s communities, environment and economy – our quality of life depends on it.

The Water Management System

The water management system in Alberta is a set of provincial laws and public policies foster the wise and efficient use of water while stewarding and protecting aquatic ecosystems in a way that supports the province’s water needs, now and in the future.

The Minister of Environment and Protected Areas’ 2023 mandate letter includes a commitment to “review Alberta’s water management strategy to increase the availability of water and water licences to Alberta municipalities, businesses and agricultural producers while maintaining the highest standards of water conservation and treatment.” This document provides an overview of the current water management system. It is intended to help prepare Albertans and water users for conversations on the opportunities and barriers that could be addressed within the system to better serve Albertans and make more water available for use.

Alberta’s Water Act

Ownership of water is vested in the Crown as a natural resource managed for the benefit and use of all Albertans, whether on public or private land. The first water licence in Alberta was issued in 1894 by the federal government, who managed the water in Alberta until 1930, when responsibility for water in the province was transferred to Alberta. In 1931 the *Water Resources Act* was passed, establishing provincial legislation that continued the existing system of allocation and management. In 1999, the *Water Act* was passed, which updated the legislation and introduced new tools such as water management planning and the option to transfer water licences between users. The *Water Act* supports and promotes the conservation and management of water, including the wise allocation and use of water.

The *Water Act* regulates the diversion of water from surface and groundwater sources through various methods, including statutory rights for household and exempted agricultural purposes, registrations for traditional agriculture uses, and licences. Companies or individuals can apply for water licences to use water for a specified purpose, such as irrigation, energy production, or a municipal water system. A licence identifies the water source, location of the diversion site, quantity, rate, timing of withdrawal, priority date established by the licence and the conditions of the licence.

In Alberta’s water allocation system, the oldest licences have the highest water use priority, or seniority. Some of the oldest and largest water licences in the province are held by irrigation districts and municipalities.

Water For Life

As Alberta's population and industry continues to grow, so has the demand for water. In 2003, responding to these pressures, the province engaged citizens and experts to create the Water for Life strategy. The [Water for Life](#) strategy outlines the Government of Alberta's commitments to manage and safeguard water resources and builds on the principles within the *Water Act*. The strategy's three main goals express the guiding management principles for water management outcomes in Alberta, which are:

- safe, secure drinking water supply,
- healthy aquatic ecosystems, and
- reliable, quality water supplies for a sustainable economy.

Water management planning

The Government of Alberta uses a variety of planning tools to support the thoughtful management of water across the province, including:

- water management plans, and
- land-use plans and management frameworks.

Together, these initiatives consider emerging social, economic, and environmental water related pressures so that shared, desired and balanced water management outcomes can be developed.

Water management plans

Water management plans provide information about how water from a river basin is currently used and establishes shared management objectives through public consultation, including:

- approaches to protect instream flows,
- describing how water may be allocated,
- establishing water management thresholds, or
- enabling licence transfers.

Water management plans apply to streams, rivers, lakes, aquifers, and wetlands. An approved water management plan is a statutory plan and must be considered by a designated Director when making licence and approval decisions. Water management plans are put in place for basins that are prone to low flows, or areas where demand can sometimes outpace supply. Plan development is guided by the [Framework for Water Management Planning](#).

A key component of water management plans are water management objectives and thresholds, which direct how specific uses and needs of water bodies are allocated for water users while protecting the environment.

A water conservation objective (WCO) is a flow or water level threshold that guides the allocation of water for new licences.

Instream objectives (IO) address local and regional concerns on a section of a river.

Neither a water management plan or a WCO is required to set water management thresholds. Licences issued individually have conditions intended to protect the aquatic environment, including where a plan or WCO does not yet provide specific objectives.

Land-use plans and management frameworks

The *Alberta Land Stewardship Act* allows the Government of Alberta, with the input and advice of Albertans, to identify the economic, social and environmental objectives for the province while recognizing regional context and differences. In Alberta, regional plans are aligned to watershed boundaries.

[Alberta's Land-use Framework](#) uses a cumulative effects management system that includes environmental management frameworks. Frameworks establish thresholds for identifying adverse impacts on the land and managed resources, guiding management actions to work within those limits.

The Government of Alberta develops surface water and groundwater management frameworks in collaboration with stakeholders, partners and Indigenous peoples to incorporate traditional ecological knowledge and implement the frameworks. Water management frameworks:

- provide context for decisions about how existing and future activities involving water should be managed, and
- confirm regional objectives and establish ambient environmental limits and triggers.

The [Lower Athabasca Region Surface Water Quantity Management Framework](#) is an example of a framework related to water quantity.

Supporting policies

The *Water Act* provides a series of regulatory tools beyond water licences. Approvals, registrations, exemptions, codes of practices, directives, and other policies can apply in different circumstances when there are impacts to water or water bodies. Examples of supporting policies include:

- Surface Water Allocation Directive
- Water Conservation Policy for Upstream Oil and Gas Operations 2020
- Alberta Wetland Policy

Surface Water Allocation Directive

The [Surface Water Allocation Directive](#) provides guidance for water allocation decisions where specific water management objectives have not been established. The directive guides the allocation of water from rivers, lakes, and wetlands using a sustainable watershed approach that balances ecological and economic needs. It does not replace water management plans and water conservation objectives under the *Water Act*, environmental management frameworks under the *Alberta Land Stewardship Act*, or regional plans.

Water Conservation Policy for Upstream Oil and Gas Operations 2020

The [Water Conservation Policy for Upstream Oil and Gas Operations](#) in Alberta provides policy direction for water use in major upstream oil and gas operations where additional water conservation measures are feasible. The policy, which updates and expands on the original 2006 policy, prioritizes the use of alternative water sources over high-quality non-saline options, such as industrial or municipal wastewater and non-saline groundwater alternatives.

The Alberta Energy Regulator has reported that in-situ oil operations had a 48 percent decrease of non-saline water use between 2013 and 2022. This was due to the high rates of water recycling and the use of other alternatives to non-saline water. The same period shows a 46 percent decrease in water use intensity for enhanced oil recovery.

Alberta Wetland Policy

The [Alberta Wetland Policy](#) was approved in 2013 and implemented in 2015 and 2016. This policy emphasizes the importance of managing wetlands and created both tools and a platform to safeguard wetlands provincially. Mitigation provisions in the policy allow for collecting payment as a way of replacing wetlands, leading to funding to restore wetlands. The Alberta Water Council has stated that between 2015 and 2021, more than \$35 million in dedicated wetland replacement funding has been collected for the approved loss of over 1,000 hectares of wetland.

The [Wetland Replacement Program](#) launched in 2020. In the inaugural year, restoration agencies replaced 158 hectares of wetlands, enabled by more than \$3.7 million of wetland restoration funding. Achievements of the Wetland Replacement Program include:

- Development of technical policy guidance.
- Development of Best Management Practice guides in collaboration with forestry and energy industry companies.
- Delivery of outreach workshops to landowners.

Implementing the Alberta Wetland Policy has stimulated discussions about conserving and restoring wetlands, leading municipalities to forge new relationships with industry, developers and stewards.

Partnerships

One of the key directions in the Water for Life strategy is partnerships. Government of Alberta partners support various initiatives, including making advisory recommendations, hands-on stewardship efforts and integrated watershed management planning. Organizations such as the Alberta Water Council, Watershed Planning and Advisory Councils (WPACs), watershed stewardship groups, and other organizations are foundational to the successful implementation of the Water for Life strategy goals throughout the province.

Under Water for Life, WPACs work at the watershed level to support state of the watershed assessments and reporting, watershed management planning and literacy and education. WPACs also act as a convenor and collaborator for other stakeholders.

Additional partnerships like Alberta Lake Management Society, Land Stewardship Centre, and the Alberta Riparian Habitat Management Society (Cows & Fish) deliver activities like education and outreach, lake monitoring, watershed stewardship grant management and work with landowners.

Environment and Protected Areas also partners on projects, such as the WaterSHED Monitoring Program with the North Saskatchewan Watershed Alliance, EPCOR, and the City of Edmonton. By combining and coordinating resources a comprehensive river monitoring program has been created for the North Saskatchewan River. It encompasses 20 monitoring stations from the headwaters of the North Saskatchewan River to the Saskatchewan Border.

Partnerships help to effectively tackle the challenges of watershed management in Alberta, providing proactive approaches that help guide stewardship and prevent crisis situations.

Storage

An important aspect of managing water effectively is developing infrastructure that improves water availability using management projects such as dams, reservoirs, weirs, and canals or pipes. Dams on most major rivers in Alberta help level the very high fluctuations in natural water supply by storing runoff from melting snow and rains in the spring and early summer to supplement flows for the remainder of the year. They also capture large flows of water to reduce the impacts of floods and release accumulated stored water during periods of drought. Dams help provide consistent year-round water supply for communities such as Calgary, Lethbridge, Medicine Hat, Red Deer, and Edmonton, and for Alberta's irrigators during the warm and dry summer months.

The Government of Alberta owns and operates over \$9 billion dollars of water management infrastructure ranging from major dams to comprehensive canal systems, pumping facilities, and lake stabilization projects. The Ministry of Agriculture and Irrigation is responsible for the safe operations, surveillance, and maintenance of these water management structures. All owners of water infrastructures, including privately owned and operated dams and weirs, must adhere to stringent regulatory requirements under the *Water Act* and the Dam and Canal Regulation and Directives. Public safety is a critical component of the operation, maintenance, and surveillance of major water projects.

Monitoring and forecasting

Our water management system uses knowledge and information metrics that indicate emerging trends and allow progress reporting on water management outcomes. This information is shared with the public to help them understand the state of water throughout the province.

Surface water quantity in rivers and streams is monitored through a network of over 400 hydrometric stations across the province, which are monitored in partnership with the [Water Survey of Canada](#). This network includes stations that operate annually and those that operate seasonally (April to October). Over 60 lakes and reservoirs are monitored continuously, with additional manual monitoring by provincial staff and citizen scientists in more than 200 lakes and reservoirs. The [River Forecast Centre](#) analyzes this data and provides Albertans with:

- short-term river forecasts to help communities prepare for the possibility of high flows or flooding,
- long-term river volume forecasts during the irrigation season, and
- low flow information to water licence holders to help them comply with licence terms and conditions.

Snowpack data is actively collected from over 100 alpine and plains sites as part of the [Provincial Snow Survey network](#). This includes a network of snow pillows that report continuous snowpack data year-round, and a network of snow survey sites where snow depth is measured at monthly intervals throughout the winter and/or spring.

Surface water levels are shared through the [Alberta Rivers](#) webpage. Groundwater levels are monitored through the [Groundwater Observation Well Network \(GOWN\)](#) at over 300 sites, with near real-time information being available at over 50 sites.

Water quality is measured through the Long-term River Network and the Tributary Monitoring Network. Learn more about these networks in the [Alberta's river water quality monitoring programs fact sheet](#).

Water-related risks

Alberta is no stranger to extreme events like floods and droughts. The government uses all available management tools to ensure that the water management system respects the priority licensing system, works with licensees to enable water sharing where possible, and operates provincial infrastructure to optimize available supply and reduce the risks to the greatest number of water users and others downstream.

Flood

The provincial government has worked to improve flood resilience for communities vulnerable to riverine flooding since the 1980s. Alberta has proactively worked to increase the safety of its residents and reduce individual, corporate, and taxpayer costs of flood recovery with the goal of minimizing the overall impacts and costs of flooding.

Alberta uses a multi-layered approach to flood resilience, guided by [Respecting our rivers: Alberta's approach to flood mitigation](#). This includes watershed-level management, flood modelling, and warning systems. The [Flood Hazard Identification Program](#) identifies flood-prone areas across the province through detailed assessment studies along specific river reaches. The information is available through the Flood Awareness Map Application.

Drought

Drought is a period of critically low water supply caused by below-normal precipitation (snow and rain). It results in decreased surface water and groundwater supplies and soil moisture. There are different types of droughts, depending on factors such as precipitation, stream flows, lakes and reservoir levels, groundwater levels, soil moisture, and economic impacts. There are meteorological, agricultural, hydrological, and socio-economic types of drought.

In 2024, to ensure preparedness for the potential of widespread drought, Alberta prepared a Drought Response Plan that describes the preparation, planning, and response activities to address the full range of possible drought conditions. The plan compliments existing regional water shortage response plans and is intended to be proactive and flexible enough to address changing drought conditions as they occur.

Building resiliency

The Watershed Resiliency and Restoration Program was established in 2014 to reduce the intensity, magnitude, duration, and effects of flood and drought through natural watershed mitigation measures. Municipalities, non-profit organizations, Indigenous communities, and other organizations can apply for funding for projects that will enhance communities' ability to withstand future flood or drought and promote the ongoing stewardship and preservation of Alberta's watersheds.

In 2024, the Drought and Flood Protection Program was announced. This is a multi-year grant program to help municipalities and Indigenous communities improve their long-term resiliency to drought and floods events. The program helps fund the design and construction of projects that protect critical infrastructure from flooding and drought and helps protect public safety.

A changing climate

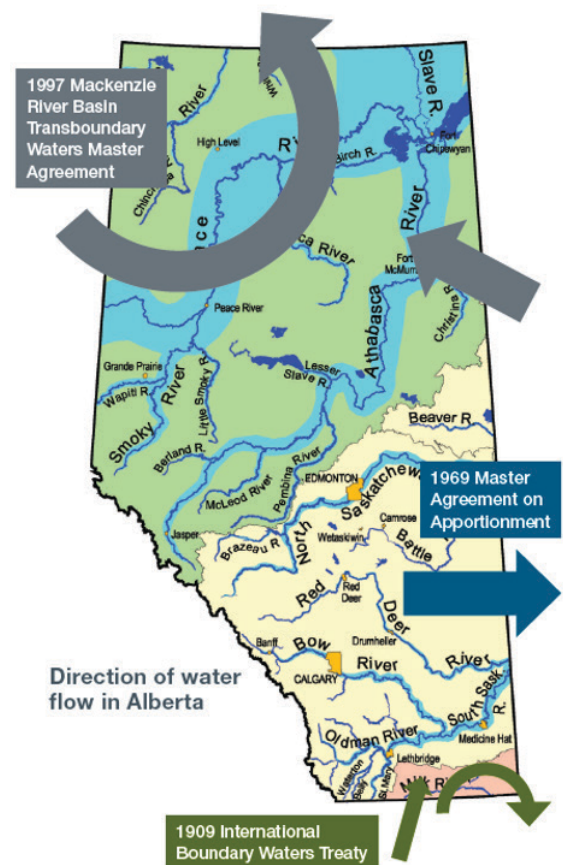
Long term changes in climate can lead to fluctuations in natural water availability. Across much of the province, summer temperatures have increased by +0.1 to +0.3°C per decade since 1950, and some regions have also seen significant increases in the frequency of warm days over 25 and 30°C. Greater changes are projected to occur over the rest of this century. As global temperatures rise, many climate indicators for Alberta are expected to increase but at a faster rate than other areas. The amount of precipitation falling as rain compared to snow is expected to increase, with more precipitation falling September through April.

Long-range forecasts predict a 50 percent increase in the number of very wet days (more than 25mm in 24 hours) and a 20 percent increase in the amount of precipitation on the wettest day of the year. There are several predicted changes in the timing, frequency, and magnitude of the precipitation during the growing season (May through August), with a considerable degree of uncertainty. Additionally, with a changing climate, increased evaporation and reduced soil moisture are expected. Changes will impact Alberta's seasonal water supply year-to-year.

Transboundary commitments

Alberta is required to share water with its neighbouring jurisdictions. Transboundary water agreements outline Alberta's obligations and entitlements for shared waters with Saskatchewan, British Columbia, the Northwest Territories, and the United States.

The [Boundary Waters Treaty](#) was signed in 1909 by Canada and the United States to address cross-border water issues and management within the St. Mary and Milk River basins. For Alberta, this treaty is significant because this water supports a substantial irrigation economy in the south of the province.



The [Master Agreement on Apportionment](#) came into place in 1969 for water flowing east from Alberta into Saskatchewan and Manitoba. The purpose of the agreement is to apportion or share water equitably between the prairie provinces and to protect transboundary surface water quality and groundwater aquifers.

The [Mackenzie River Basin Transboundary Waters Master Agreement](#) was signed in 1997 and affects waters flowing in northern basins and includes waters shared with British Columbia, Northwest Territories, and Saskatchewan. Alberta and Northwest Territories have completed a bilateral agreement for their Mackenzie River basin watersheds.

Conclusion

With increasing water demand from economic and population growth and increased variability considering a changing climate, a resilient and efficient water management system is essential for safeguarding Alberta's community health, environment and economy.

Water is one of Alberta's most precious resources. Every one of us uses it, consumes it, and relies on it. Working together, we can find ways to make the most out of every drop.