



**Government of Alberta**

**2024 Agency Report**

**to**

**Prairie Provinces Water Board and**

**Mackenzie River Basin Board**

**Fall 2024**



Photo by J. Browne: Peace River at Shaftesbury Ferry

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## **Transboundary Water Agreements**

Alberta's transboundary water agreements outline Alberta's obligations and entitlements for shared waters with British Columbia, Northwest Territories, Saskatchewan, and the United States.

Alberta works with neighbouring jurisdictions to ensure Alberta and provinces, territories and states receive their water entitlements. Alberta is committed to meeting its obligations under inter-jurisdictional water management agreements.

## Water-Related Legislation / Policy / Regulations / Planning

### Land-Use Plans and Water Management Frameworks / Plans

Alberta's Land-use Framework (LUF) sets an approach to managing the province's land and natural resources to achieve Alberta's long-term integrated economic, environmental and social goals.

The Lower Athabasca Regional Plan (LARP) was established in 2012, and includes associated environmental management frameworks (EMFs) for surface water quality, surface water quantity and tailings. The Government of Alberta continues to work with stakeholders and Indigenous communities and organizations to implement the LARP. Government launched the 10-year review of the plan in August 2022 to assess its ongoing relevancy and effectiveness in supporting the long-term vision for economic, social and environmental needs in the region.

The South Saskatchewan Regional Plan (SSRP) was established in 2014, and its surface water quality EMF continues to be implemented. The South Saskatchewan River Basin Approved Water Management Plan, released in 2006, is referenced in the SSRP and also continues to be implemented. Government launched the 10-year review of the SSRP in August 2024 to assess its ongoing relevancy and effectiveness in supporting the long-term vision for economic, social, and environmental needs in the region.

The Approved Water Management Plan for the Milk River Basin (Alberta) was released on June 5, 2024. The plan supports resilience during droughts and water shortages by enabling the use of water licence transfers.

Further information is available.

- LARP and SSRP progress reports:  
<https://landuse.alberta.ca/ResultsResources/ResultsReporting/Pages/default.aspx>
- LARP 10-year review:  
<https://landuse.alberta.ca/RegionalPlans/LowerAthabascaRegion/10YearReview/Pages/default.aspx>
- SSRP 10-year review:  
<https://landuse.alberta.ca/RegionalPlans/SouthSaskatchewanRegion/10YearReview/Pages/default.aspx>

### **Surface water management frameworks**

Implementation of the surface water management frameworks for the South Saskatchewan, North Saskatchewan, Lower Athabasca, and Upper Athabasca regions is ongoing. These frameworks establish indicators, management thresholds, evaluation, reporting and management responses for the mainstem South Saskatchewan, Bow, Oldman, Milk, North Saskatchewan, Battle, Lower Athabasca, and Upper Athabasca Rivers.

Information about the implementation of the frameworks, including annual reporting, can be found at:

- Lower Athabasca River: <https://www.alberta.ca/lower-athabasca-regional-planning.aspx>
- South Saskatchewan Region: <https://www.alberta.ca/south-saskatchewan-regional-planning.aspx>
- North Saskatchewan Region: [North Saskatchewan Region surface water quality management framework for the North Saskatchewan and Battle rivers - Open Government \(alberta.ca\)](#)
- Upper Athabasca Region: [Upper Athabasca Region surface water quality management framework for the Upper Athabasca River - Open Government \(alberta.ca\)](#)

### **Tailings management framework**

The Tailings Management Framework for the Mineable Athabasca Oil Sands (TMF) was established in 2015, providing direction to manage fluid tailings volumes during and after mine operations to manage and decrease liability and environmental risk resulting from the accumulation of fluid tailings.

The Oil Sands Mine Water (OSMW) Science Team completed its work to inform the development of the regulatory guidance for the potential safe release of treated oil OSMW, as outlined in the published 2022 work plans.

In June 2024, Alberta established the Oil Sands Mine Water Steering Committee to assess options and provide recommendations to the Government of Alberta to inform an accelerated strategy for OSMW management and tailings pond reclamation.

Further information is available.

- TMF: [Lower Athabasca Region : tailings management framework for the mineable Athabasca oil sands - Open Government \(alberta.ca\)](#)
- OSMW Steering Committee: [Oil Sands Mine Water Steering Committee | Alberta.ca](#)
- OSMW ST: <https://open.alberta.ca/publications/oil-sands-mine-water-science-team-final-technical-reports-and-commentary>

## Directives

### **Surface Water Allocation Directive**

The Surface Water Allocation Directive (SWAD) applies to new licences from unregulated water bodies that do not have a watershed management plan or instream flow objective. Alberta Environment and Protected Areas (EPA) and the Alberta Energy Regulator (AER) continue to implement the SWAD by issuing new *Water Act* licences with diversion schedules that set operational diversion limits based on real-time flow conditions at Water Survey of Canada hydrometric stations. The limits are set based on the ecological thresholds identified in the SWAD and the level of water demand required by senior priority water licence holders.

### **Water Conservation Policy for Upstream Oil and Gas Operations**

The Water Conservation Policy for Upstream Oil and Gas Operations (WCP) provides direction to minimize freshwater use in major upstream oil and gas operations by encouraging the use of alternative sources such as wastewater, saline groundwater and non-water technologies.

The AER enhanced regulatory instruments to enable improved water storage and conveyance options for poor quality water within Alberta's oil and gas industry. The AER revised Directive 077: Pipelines — Requirements and Reference Tools (November 2023) to allow for conveyance of a variety of waters through temporary surface pipelines, and to provide transparent regulatory process and structure for temporary surface pipelines. This helps industry achieve the goals of the WCP – i.e., reduce the use of high quality nonsaline water, while making high quality nonsaline water still available where/when appropriate.

Benefits include:

- increased water-security for operators, as poor-quality waters can still be available during times of water restrictions due to low flow (e.g., drought, winter conditions),
- reduced regulatory burden as transparent, consistent regulatory processes are available,
- reduced waste disposal costs as water can be reused before disposing,
- extended lifespan of deep disposal reservoirs by reducing injection volumes and rate (as water can be reused several times before disposal), and
- improved nonsaline water use intensity, a metric used to evaluate water use and reported in AER's Water Performance Report to communicate efforts made by Alberta's energy industry to conserve fresh water.

Water conveyance through temporary surface pipelines can reduce reliance on trucking of poor quality water, which can reduce costs, traffic and congestion, noise, dust, road damage/maintenance, vehicle emissions, and improve road safety. Additionally, such temporary infrastructure can reduce the environmental and landscape footprint of water conveyance as these pipelines can be laid on the surface with minimal preparation/disturbance and can be deployed and removed quickly.

## Regulatory System Compliance Assurance Program and Emergencies

EPA and the AER regularly inspect, audit, and monitor energy and non-energy sites and pipelines to ensure compliance with our requirements. We focus on upholding compliance through education, prevention, and enforcement. The AER publicly reports on energy incidents and enforcement actions through its Compliance Dashboard, [aer.ca](https://aer.ca)

Alberta's *Environmental Protection and Enhancement Act* requires a responsible party to report the release of a substance that may cause, is causing or has caused an adverse effect on the environment, or is a contravention of a term or condition of an approval or registration. Notification of spills or releases to the environment are reported through the Energy and Environmental Emergency 24-Hour Response Line (1-800-222-6514). The 24-hour response line – Alberta EDGE (Environmental and Dangerous Goods Emergencies) – is a multi-ministry emergency and reporting call centre for environmental emergencies and public complaints. It also handles calls for Alberta Transportation and Economic Corridors, Alberta's Natural Resources Conservation Board, and Environment and Climate Change Canada.

Calls that meet environmental emergency criteria are triaged to EPA Support and Emergency Response Team (ASERT) or to the AER's emergency response team, which respond to emergencies 24/7/365, and work with industry, municipalities, first responders, other government departments, agencies, and the public to ensure appropriate outcomes are achieved during emergency incidents. EPA and AER maintain a 24-hour, 7-days-a-week, 365 days-a-year on-call schedule to support incident response. Emergencies are ranked alert or level 1, 2 or 3 based on the risk level to the public or the environment. After the emergency is over, AER and EPA continue to monitor clean-up activities to ensure that requirements are met. If an incident occurs that may affect a neighbouring jurisdiction, notification to the appropriate emergency contact in that jurisdiction as per transboundary agreements is made.

### **Imperial Oil Environmental Protection Order**

An environmental protection order (EPO) was issued February 6, 2023 by the Alberta Energy Regulator (AER) to Imperial Oil in response to two separate wastewater release incidents at the Kearl Oil Sands Project. Kearl is an Imperial owned and operated oil sands operation in the Athabasca Oil Sands Region of Alberta, 45 kilometres northeast of Fort McKay.

- Incident 1: The first incident, reported earlier in 2022, involves industrial wastewater seeping from the External Tailings Area in four locations on and outside the boundaries of the Kearl site.
- Incident 2: In a separate incident at the Kearl site, Imperial reported an uncontrolled release of industrial wastewater from an overflow drainage pond, which occurred on February 4, 2023. The estimated volume is approximately 5300 m<sup>3</sup>. Although a separate incident, provisions in the EPO also address measures for this cleanup effort and require Imperial to submit plans for wildlife protection, environmental remediation, and public notification to mitigate this second release.

The AER has commissioned ongoing third-party water quality testing at the Imperial Oil Kearl oil sands site. This is in addition to ongoing monitoring and reviewing the water testing data provided by Imperial to ensure compliance with the EPO issued in February 2023.

On August 22, 2024, the AER released its first findings, imposed an administrative penalty and terms and conditions on Imperial Oil as a result of two contraventions of its approval conditions.

The findings, administrative penalty, and terms and conditions do not cover all potential contraventions at the Kearl site or all incidents that are being managed under the terms of the EPO; it covers only the shallow subsurface seepage incident. The remaining portions of the investigation, into the overflow of an industrial wastewater storage pond and seepage through deep subsurface pathways, are ongoing. The findings, administrative penalty, terms and conditions, and the third-party sampling are available online at [Ongoing Investigations | Alberta Energy Regulator](#)

To date no impacts to fish, amphibians, or other wildlife have been reported to the AER. The AER is imposing two key projects, outlined in the terms and conditions, on Imperial Oil:

- **Quality Assurance Project:** Imperial must submit and implement a proposal for a Quality Assurance Project for sharing lessons learned with other oil sands operators and develop a plan to ensure tailings seepage mitigation and monitoring processes are completed. The plan must consider tailings dam design for existing and future tailings dams and ensure quality assurance and quality control processes are applied through the design, construction, and operation phases. It must also include a detailed timeline, interim reports, and produce a final report that includes public and industry education. The proposal must also include a preliminary research roadmap outlining planned Indigenous community and stakeholder engagement for inputs, including traditional knowledge, if applicable, to the formulation of the research objectives and methodology development.
- **Industrial Wastewater Release Research Project:** Imperial must submit and implement a proposal to further study and understand the potential impacts of the release of industrial wastewater (including process affected water and coarse sand tails porewater) on the ecosystem. This will include impacts on fish and aquatic ecosystems, soil, vegetation, wildlife, and public safety, with a detailed timeline, regular progress reports, and a final report that includes public and industry education.

Both projects require the publication of final reports to be publicly posted on the company's website.

The AER also reached out to and met with stakeholders, including visiting the work on site at Imperial Kearl and meeting with Indigenous communities to answer questions and hear concerns. The AER will continue to provide updates to potentially affected communities and actively monitor the situation at the Kearl site to ensure Imperial is taking the necessary actions to comply with the EPO. The AER continues to oversee Imperial's compliance with the EPO to ensure public safety and protection of the environment.

### **Fort Chipewyan Working Group**

The Fort Chipewyan Working Group was established to bring government and community representatives together following the unauthorized releases from the Kearl oil sands mine. The group's focus is on keeping drinking water safe and secure for communities by providing a forum for sharing information on government activities in response to the releases. The group also ensures community perspectives are reflected in the government's water quality monitoring activities in areas downstream of the Kearl Oil Sands Project site.

The Government of Alberta conducted independent monitoring in high priority areas to provide an additional level of assurance in response to concerns voiced by communities near the Kearl oil sands site. During the 2023 spring melt, the Alberta government initiated high frequency water quality monitoring of up to four times per week near the Kearl oil sands operation, along the Firebag and Muskeg Rivers, as well as additional sampling in wetlands near Kearl Lake to assure communities that the environmental conditions are well understood.

During the summer of 2023, government continued to support the communities involved. This included targeted water monitoring, which is in addition to the environmental monitoring already in place for the oil sands region and helps to assess if there are ambient impacts to water quality, drinking water, or fish and wildlife. Results of water monitoring continue to be released through the information below.

This is additional monitoring and does not replace other monitoring already in place for the oil sands region or specific monitoring actions performed by Imperial Oil as required in the Alberta Energy Regulator's environmental protection order. Maps showing surface water quality monitoring locations are available at:

- [June to September 2023 monitoring locations](#)
- [April and May 2023 high frequency monitoring locations](#)
- [March 2023 monitoring locations](#)

Government continues to closely monitor the water in the surrounding area. Results from enhanced sampling of surface water quality both upstream and downstream of the Kearl oil sands site continue to be posted on the

Fort Chipewyan Working Group website. Sampling efforts are being transitioned back to routine frequency and long-term ambient monitoring.

## Science, Monitoring and Information

### Environmental Reporting

The Oil Sands Monitoring Program (OSMP) is one of the largest environmental monitoring programs in the world and reflects Alberta's commitment to environmental stewardship. The OSMP is governed and operationalized through a multi-stakeholder, consensus-based process that includes industry, Indigenous communities, and governments. The OSMP conducts ambient monitoring, including fish health.

New features added include instructional videos on data access, regular addition of datasets when made available and improvements to functionality.

Additional information is available.

- OSMP workplans: [workplans](#)
- OSMP products: [OSM Catalogue](#)
- Monitoring data and information: [OSM Program Portal](#) and delivery partners such as [Environment and Climate Change Canada](#), [Wood Buffalo Environmental Association](#), [Air Data Warehouse](#) and the [Alberta Biodiversity Monitoring Institute](#)

### **Oil Sands Monitoring Program - Fish Program**

Fish health monitoring under the OSMP provides a systematic and holistic approach to assessing and predicting the potential impacts of oil sands developments on the environment. The program conducts detailed population assessments include age, growth, condition, relative liver size, relative gonad size, contaminants, and abnormalities as well as levels of liver enzymes as an indicator of exposure.

The program examines fish health within the mainstem Athabasca, Peace and Clearwater Rivers, and within many Athabasca River tributaries. The OSMP also collaborates with communities to monitor fish health using an integrated approach involving western scientific methods and traditional knowledge. OSMP collaborates with communities typically through fish camps, workshops, and participation in field work.

Key outcomes of the Fish Program include: conducting fish health surveillance monitoring on a 3-year cycle to maximize efficiency and inform decision-making; and enabling community participation in fish health monitoring through capacity building and training opportunities as well as field sampling.

Data collected is available at [Water Monitoring in the Oil Sands Region](#).

### **Condition of Environment Reporting**

Alberta's Environmental Science Program (AESP) is a digital platform for reporting on the condition of Alberta's environment and provides access to departmental science publications and articles.

Currently, three water indicators are published on the AESP site, presenting data and information on the condition of water quality and quantity of lakes and rivers across the province enabling Albertans to learn more about the condition of Alberta's surface water, including:

- chloride concentrations in Alberta's rivers from 2016 to 2019,
- trophic status of Alberta's lakes from 1980 to 2019, and
- water yields in Alberta's rivers for 2020 and trends in water yield from 1981 to 2020.

Data for the Condition of Environment water indicators was collected by EPA and partners, including the Water Survey of Canada and the Alberta Lake Management Society. The water indicators use data from Alberta's Long-Term River Network, Tributary Monitoring Network and Provincial Lentic Monitoring Program.

Data is available online at: [Alberta's Environmental Science Program](#)

## Modelling and Forecasting

### **Water Quality Data Portal**

EPA and its partners monitor surface water quality in waterbodies across the province. The Water Quality Data Portal (WQDP) is the primary mechanism for publicly distributing Alberta's provincial surface water quality monitoring results. The WQDP is a spatial tool used to search, view, and download data for:

- the surface water quality stations that form EPA's provincial monitoring program, and
- *Environmental Protection and Enhancement Act* (EPEA)-regulated activities in Alberta.

Information on the WQDP is online at <https://www.alberta.ca/surface-water-quality-data>.

### **Alberta Flow Estimation Tool for Ungauged Watersheds**

The Alberta Flow Estimation Tool for Ungauged Watersheds (AFETUW) was developed for use by government and stakeholders. This web-based application allows:

- watershed delineation at any point along a stream in the province,
- query on water licences issued under the *Water Act* in any user specified watershed, and
- estimation of stream flows in ungauged watersheds to support decisions on new water licence applications and compliance with licence conditions.

Information on the AFETUW is online at <https://afetuw.alberta.ca>,

### **Alberta Modelling Expert System**

EPA developed the Alberta Modelling Expert System (MES), a public-facing, GIS-based web application designed to manage all relevant modelling knowledge, information, and data to help:

- Modellers to effectively and efficiently (1) identify appropriate modelling tools to meet their objectives, (2) determine data availability for models selected, and (3) prepare data input to models selected.
- Decision makers to access information from completed modelling projects.
- Modelling Community of Practice to share modelling-related information and knowledge.
- EPA achieve credible, transparent, consistent, and cumulative effects-based approach to modelling.

Information on the MES is online at <https://mes.alberta.ca>

### **Alberta River Forecast Centre**

Alberta publishes monthly Water Supply Outlooks between February and August for use across the Government of Alberta, transboundary partners, infrastructure operators, irrigation districts, municipalities, and industry users. The Water Supply Outlook contains March to September natural flow volume forecasts at twenty locations in the Milk, Oldman, Bow, Red Deer and North Saskatchewan River basins. River and lake levels, river flows, precipitation, snowpack, flood and water shortage advisories and the Water Supply Outlook are available at <https://rivers.alberta.ca/>.

The River Forecast Centre is testing PyForecast and several Artificial Intelligence techniques to update their current Principle Component Analysis-based water supply model with the goal of achieving higher quality forecasts that meet stakeholder needs.

The Alberta River Forecast System (ARFS-FEWS, Flood Early Warning System), a customized version of the Deltares Delft-FEWS, is the forecasting tool for the centre. The efficiency and value of using a common FEWS platform across multiple forecasting agencies are being realized. A contract was issued to develop the Raven Hydrologic Framework for portions of the province to test along side existing models.

## Groundwater Program

The Alberta Geological Survey (AGS) Groundwater Program has four projects underway in 2024.

- Alberta-Northwest Territories Transboundary Aquifer Project: This is part of the Alberta-Northwest Territories Bilateral Water Management Agreement. There is limited knowledge of groundwater flow and chemical quality in the transboundary region and the project aims to improve our understanding of

groundwater by collecting empirical data, developing conceptual models, and mapping potential aquifers. Work in 2024-2025 focused on hydrogeological conceptual model development and validation, including interpretation of previously collected water sampling results and collection of additional samples from groundwater wells to enhance understanding of groundwater–surface water connectivity in the region.

- **Determination of Baseline Hydraulic Head and Change Detection Analysis for Quaternary Aquifer Systems in Support of the Oil Sands Monitoring Program:** This project was initiated in 2022-2023 with the objective of estimating baseline water level conditions and magnitude of change during oil sands development across northeast Alberta for Cretaceous and Neogene-Quaternary aquifer systems. In 2024-2025, focus was on Neogene-Quaternary aquifer systems across the Cold Lake and Athabasca oil sands areas to support the determination of natural ranges of variability and whether oil sands stressors are changing groundwater levels. The project includes producing digital data sets of water levels compiled from various data sources, conducting surficial and subsurface mapping to develop a new geological framework, and generating maps of baseline water level conditions and estimates of hydraulic head changes.
- **Anthropogenic Impacts on Shallow Groundwater Quality in Southern Alberta:** The project is led by the Applied Geochemistry Group at University of Calgary with the AGS and the Alberta Biodiversity Monitoring Institute. The Geological Survey’s main contribution is to build an integrated groundwater-surface water model of the Medicine-Blindman watershed to evaluate the cumulative effects of climate and land use change on the dynamic availability of high-quality groundwater and potential impacts to surface water. This is the second year of a three-year project in southern and central Alberta to: i) examine historical trends in groundwater quality since the 1950s at the regional scale; ii) investigate potential links between groundwater quality and past changes in land use practices using human footprint, crop inventory, and manure/fertilizer data; iii) explore how climate change and water use scenarios may alter hydrological conditions and groundwater quality; and, iv) assess how past and predicted trends in groundwater quality may affect surface water quality in southern Alberta.
- **Southern Alberta Groundwater Evaluation (SAGE):** The AGS and EPA are working to evaluate groundwater resources in southern Alberta. The SAGE project is undertaking high-resolution geological mapping and modelling in the South Saskatchewan and Milk River basins with an emphasis on the sediments above bedrock (Neogene-Quaternary systems) and bedrock aquifer systems (Cretaceous-aged). A project team – comprising expertise in geology, hydrogeology, geomodelling, GIS and remote-sensing, and geophysics – is established with the objective to inventory groundwater availability and quality to improve access to groundwater for stakeholders. This is a multi-year project focused on improving the understanding and accessibility of groundwater and defining sustainable-use conditions for decision makers using updated groundwater quality and quantity data.

An overview of the AGS Groundwater Program including access to data, maps, models, interactive applications, and technical reports is available at [AGS Groundwater Program](#).

## Research Programs

### **Collaborative research grant with University of Lethbridge**

EPA provided a \$500,000 grant to the College of Natural Sciences at the University of Lethbridge (UofL) in 2024, as a part of a rotating program on Enhancing Environmental Science in Alberta, which previously provided funding to the University of Calgary and the University of Alberta. The three-year research grant with the UofL is supporting eight new environmental research projects, where the following five focus on water.

1. Quantifying and mapping carbon storage and water quality improvement services provided by Alberta’s prairie pothole wetlands - Drs. Matthew Bogard and Sam Woodman (UofL), Drs. Danielle Cobbaert and Vanessa Swarbrick (EPA), and Drs. Lauren Bortolotti and Pascal Badiou (Ducks Unlimited Canada) seek to use a combination of new tools to map the carbon sequestration and nutrient storage capacity of prairie wetlands in Alberta.
2. Response of ecosystem carbon sequestration to variation in water availability associated with El Niño Southern Oscillation and Pacific Decadal Oscillation climate phases - Dr. Larry Flanagan (UofL) and Dr.

Brandi Newton (EPA) will work to improve our understanding of how changing weather patterns affect the productivity and carbon sequestration potential of native grassland and prairie wetlands.

3. A remote sensing-based regional and temporal assessment of Alberta's lake water resources - Drs. Christopher Hopkinson and Laura Chasmer (UofL) and Drs. Danielle Cobbaert, Craig Emmerton, Mina Nasr and Brandi Newton (EPA) will assess and characterize lake water resources across Alberta's natural regions and major river basins using remote sensing products and field validation. This research will contribute to our understanding of potential drivers of lake water storage and resource changes.
4. Combined effects of water temperature and urban runoff-associated contaminants on trouts - Drs. Steve Wiseman and Andreas Eriksson (UofL), Dr. Markus Brinkmann (University of Saskatchewan) and Drs. Andreas Luek and Paul Christensen (EPA) will work to assess the impacts of two stormwater related contaminants – phenanthrene and 6PPD-quinone – on rainbow trout and brown trout. This research will enhance our knowledge on the tolerance of important sport fish to stressors such as increased water temperature, decreased dissolved oxygen, and stormwater-associated contaminants that have the potential to impact the Bow River and other provincial trout fisheries.
5. Sharing the Headwaters: Understanding anthropogenic factors affecting the ecology of the Upper Oldman Watershed - Drs. Jodie Asselin, Jerimy Cunningham and Justin Raycraft (UofL) and Drs. Brian Joubert (Alberta Forestry and Parks) and Andreas Luek (EPA) will assess motivations, beliefs, and resource use patterns of recreational users of the headwaters of the Oldman Watershed. This project will provide a better understanding of the social and cultural factors shaping human impacts on the area.

### **Water Innovation Program**

The Water Innovation Program is focused on advancing knowledge and innovation in four key areas: future water supply and watershed management; healthy aquatic ecosystems; water use conservation and efficiency; and water quality protection. The program is applicable to various watersheds in Alberta, and facilitates collaboration among post-secondary institutions, government bodies, private sector companies, and non-profits.

Alberta Technology and Innovation provided \$28,680,667 in funding support to Alberta Innovates' Water Innovation Program from 2015 to 2024. Alberta Innovates has issued four calls for proposals under the Water Innovation Program, and continuous intake of applications is ongoing. There are 65 ongoing water projects and 101 completed water projects.

Funded project summaries are available online. During the COVID-19 pandemic, water innovation webinars were introduced to disseminate project outcomes and maintain a network of stakeholders. The webinars continue to attract an audience, with more than 300 attending the latest session. The annual in-person Water Innovation Program Forum resumed in May 2024, attended by stakeholders from across the province and where survey respondents consistently (97%) said that they learned something new that could help inform or address challenges they face as a water stakeholder.

Some projects to highlight include:

- Development of a Geospatial Tool for Assessing Watershed Integrity and Aquatic Ecosystem Health (University of Alberta) - Developed a robust tool for the rapid assessment of the condition of watersheds and aquatic ecosystems across the North Saskatchewan River Basin. The tool will help water managers and stakeholders make informed decisions regarding watershed management.
- Centre Pivot Optimization (InteliRain) - Advanced a fully automated pivot irrigation system that can remotely sense soil moisture in real time and deliver a water prescription specific to crop and soil type. Demonstrated increased yields and up to 30% water savings.
- Wildfire and Pathogen Threats to Water in Alberta (University of Alberta) - Addressed knowledge gaps on how wildfires may threaten the sustainability of municipal drinking water systems and evaluated potential treatment/mitigation options. Aimed to improve drinking water treatment resilience and inform land management strategies.

- Integrating DNA-Based Testing into a Community-Based Water Monitoring and Research Program (University of Alberta) - Operationalized and demonstrated effectiveness of Community-Based Water Monitoring using qPCR testing into existing water monitoring programs for health, environmental and invasive species monitoring. Developed and implemented a high school-based curriculum that integrates water literacy and DNA-based testing methods into stormwater surveillance efforts.

## Major Initiatives

### Drought Response

Parts of Alberta are currently experiencing drought. The last three years have brought below normal precipitation in different parts of the province. To prepare and manage drought conditions, since Spring 2023, EPA and other departments and regulators have been working with water licence holders, major water users and other partners on proactive steps to conserve and manage water and be prepared for future shortages. EPA stood up a Drought Emergency Operations Centre (DEOC) to coordinate and manage the Government of Alberta's drought response, including:

- Facilitated the development of collaborative water sharing agreements (WSAs) among 38 major water users in the South Saskatchewan River Basin. There is one agreement for each sub-basin (Red Deer River, Bow River, Oldman River and Southern Tributaries).
- Developed the Alberta Drought Response Plan (DRP) that lays out the tools and resources available to manage a significant drought. The DRP was updated in August 2024 to assign drought conditions by basin so Albertans can access regional-level drought assessments that are most relevant to them and their local community.
- Monitored snowpack, precipitation, river levels and other key data to ensure drought conditions are well understood and has adapted its drought response quickly and agilely as needed based on changing conditions. This response has included working closely with neighboring provinces to keep them informed of current conditions and working to ensure Alberta meets its agreement commitments.
- Worked with 168 of the facilities planning to discharge effluent this year to assess the risk of their release to receiving waterbodies and work to mitigate risk, where needed.
- Conducted compliance sweeps and proactive inspections to check in with water licence holders and manage local drought impacts.
  - As of September 3, 2024, 94 licences were inspected along the Little Bow, 7 along the Milk River, 62 along the Belly River, 5 along Pincher Creek and 3 along Castle River. Only minor non-compliance issues have been detected thus far.
  - In September 2023, inspections began for the Upper Oldman River.
- Made improvements to water monitoring and modelling, including new monitoring stations and sensors, enhanced monitoring and analysis, operational improvements and improvements and enhancements to water resources management models.
- Stood up an apportionment planning team who: ensured active communication with the Prairie Provinces Water Board (PPWB) responsible for monitoring Alberta's apportionment obligation under the 1969 Master Agreement on Apportionment (MAA); and shared regular EPA updates on flows and forecasting with Saskatchewan and the PPWB.
- Temporarily amended 38 water licences along the South Saskatchewan River with an existing instream objective of 42.5 cubic metres per second to 32.5 cubic metres per second as a drought mitigation measure to make more water available for these licensees.
  - As of August 26, 2024, the DEOC has successfully contacted 14 of an identified 38 licensees subject to minimum flow or instream objective conditions on the river. As of August 28, 2024, two licence holders (each holding multiple licenses) have submitted applications to amend the minimum flow or instream objective conditions of their licenses. At this time, a total of 6 license amendments have been approved.
- Engaged with key stakeholders from industries subject to potential impacts from drought and worked with the industry representatives to plan and prepare for and mitigate potential impacts of drought. Key industries include agriculture, forestry, oil and gas, utilities and recreation and tourism. The DEOC continues to work and stay connected with these key industries as needed.
  - This also includes working with Forestry and Parks to put in place a new emergency communications protocol to ensure wildfire and drought response operations are aligned.
- Beginning in September 2024, the DEOC will be undertaking a post-incident assessment to execute a structured review of actions taken under the 2023-24 drought response that will identify best practices, gaps and lessons learned.

More information regarding drought, including current conditions, drought response and support resources is online at [alberta.ca/drought](https://www.alberta.ca/drought).

- Alberta Drought Response Plan: <https://www.alberta.ca/system/files/epa-alberta-drought-response-plan.pdf>.

## Water Infrastructure

### **Alberta Irrigation Modernization**

In 2020-2021, the Government of Alberta, the Canada Infrastructure Bank, and a consortium of nine irrigation districts announced their combined investment of \$932.7 million to modernize irrigation district infrastructure and increase water storage capacity in the South Saskatchewan River Basin. This investment will support the construction or enlargement of up to four off-stream irrigation storage reservoirs and support over 90 infrastructure rehabilitation projects, including converting open canals to underground pipeline systems, thereby eliminating evaporation, seepage and spill. Projects will be delivered by the irrigation districts and the increased water conveyance efficiency will allow more acres to be irrigated with the same water allocation. Projects are located in the South Saskatchewan River Basin.

Fifty of the 92 infrastructure modernization projects have been completed to date, and 23 are currently active. An additional 18 infrastructure modernization projects have been scheduled but have not yet started. The four off-stream reservoir projects are in the early stages of project development. All projects under the investment are scheduled to be completed by 2028. Further information for specific projects being completed by the participating irrigation districts are available at [www.albertawater.com/topics/irrigation](http://www.albertawater.com/topics/irrigation).

### **Irrigation Feasibility Study in East-central Alberta**

Starting in early 2021, Alberta Agriculture and Irrigation (AGI), the Canada Infrastructure Bank, the Special Areas Board, and the Municipal District of Acadia began assessing the technical and financial feasibility of developing a large-scale irrigation project in east-central Alberta in the Red Deer River Basin.

Phase 1, completed in summer 2022, included a high-level assessment of previously cultivated land suitable for irrigation, availability of water, potential financial, economic, social and environmental benefits, capital and operational costs as well as environment and permitting risks. The report indicated 108,000 acres of previously cultivated land in the Municipal District of Acadia and Special Areas region could be developed for an irrigation project and recommended the next phase of work move forward. Phase 2, a more detailed assessment of the project's feasibility, is now underway and is expected to conclude in early 2025. Further information on this project, including quarterly updates, is available at [MD Acadia & Special Areas Irrigation - Special Areas Board](#).

### **Springbank Off-Stream Reservoir**

In 2013, southern Alberta and the City of Calgary were impacted by flooding from the Elbow and Bow Rivers caused by rainfall. Following the flood, Alberta began implementing a systems approach to provide flood mitigation for southern Alberta, including Calgary. This approach includes mitigation measures along both the Bow and Elbow Rivers. The Springbank Off-Stream Reservoir (SR1) is along the Elbow River and is a component of Alberta's flood mitigation measures.

In 2014, after reviewing various flood mitigation options, SR1 was announced as the preferred flood mitigation infrastructure project that government would advance through the regulatory process. Site clearing commenced in February 2022 and project construction began in April 2022.

Key construction activities that have been completed include:

- the relocation of all major utilities,
- the instream service spillway component of the diversion structure,
- the emergency spillway canal outlet structure and the low-level outlet structure in the dam,

- modifications to Springbank Road and Highway 22, and
- construction of the bridges on Highway 22 and Township Road 242 to accommodate the canal crossings.

Work continues on the final components of the diversion structure, diversion canal excavation, and dam construction. Environmental monitoring programs are in place along with Indigenous monitors to oversee construction activities and identify items of cultural significance. Further information on this project is available at [Springbank Off-stream Reservoir | Alberta.ca](https://springbankoffstreamreservoir.alberta.ca).

### **Existing Infrastructure**

AGI operates and maintains approximately \$10.9 billion of provincially owned water infrastructure. The Water Management Infrastructure (capital rehabilitation) Program has been funded at \$30 million per year for the past several years, with an additional \$2.5 million for maintenance activities.

Additional capital rehabilitation program funding totaling \$50 million was provided over three years beginning in 2024 to allow for the delivery of critical projects: \$10 million for fiscal year 2024-25, \$20 million in 2025-26 and \$20 million in 2026-27. The following are examples of capital rehabilitation projects planned for delivery as part of WIOB's capital rehabilitation program for 2024-25:

- Phase 2 Dickson Dam Discharge Capacity Enhancement Project,
- Phase 2 McGregor Shoreline Erosion Mitigation,
- Paddle River Dam Discharge Capacity Enhancement Project,
- Vermillion Dam Seepage and Erosion Control Project, and
- Gregg Lake Weir Rehabilitation.

Additional funding was provided for maintenance activities beginning in 2024.

AGI also works with downstream stakeholders to ensure they have information that will assist them with developing and testing their own emergency response plans related to flood events that could occur as part of the operation of this infrastructure. This includes working with the Saskatchewan Water Security Agency on operational and dam safety issues.

### **Watershed Resilience and Flood Hazard Identification Program**

EPA enables watershed and community resilience through support for flood and drought mitigation efforts, including the:

- Drought and Flood Protection Program (DFPP),
- Bow River Reservoir Options (BRRO) initiative,
- Ardley Dam Scoping and Feasibility Study,
- Community-based Provincial Flood Damage Assessment (PFDA), and
- a strategic review of water storage opportunities in Alberta.

### **Drought and Flood Protection Program**

The DFPP launched in May 2024 to help communities plan, design and construct projects that protect critical infrastructure from drought and flooding and help ensure public safety is protected. Program eligibility, guidelines and application information are public.

In August 2024, the Alberta government announced grant awards totaling more than \$30 million to 14 municipalities, two First Nations and one Metis settlement. Details on the 18 approved grants, including project descriptions, funding totals and disbursements can be found on the DFPP webpage. Future grant application intakes will take place.

More information on the DFPP is available at <https://www.alberta.ca/drought-and-flood-protection-program>.

### **Bow River Reservoir Options**

The BRRO is a multi-phased initiative.

- Phase 1: Conceptual Assessment (completed in spring 2020)
- Phase 2: Feasibility Study (spring 2020 to December 2024)
- Phase 3: Engineering and Regulatory Approval Process
- Phase 4: Procurement, Construction and Commissioning

The Alberta government continues to explore options to build additional flood and drought storage capacity on the Bow River to reduce the impacts of severe weather events on Albertans and the economy.

In September 2024 the Alberta government decided to proceed to Phase 3: Engineering and Regulatory Approval Process with the Relocated Ghost Dam option. The feasibility study findings informed this decision, as it examined the flood and drought mitigation reservoir options identified in the conceptual assessment, with a focus on the technical feasibility of the Relocated Ghost Dam and Glenbow East options as well as the potential impacts and associated benefits, implementation requirements and costs of each reservoir option. (Given the need to move in a timely manner to prevent floods and mitigate drought along the Bow River, EPA ceased advancing the Morley option in spring 2024.) The engineering and regulatory approval process will start in spring 2025.

### **Ardley Dam Scoping and Feasibility Study**

The Ardley dam site is on the Red Deer River, about 40 kilometres east of the City of Red Deer. The feasibility study will look at whether a new dam near Ardley can be designed, constructed and operated for a cost that provides value to Albertans and the economy, including benefits to irrigation, drought management, water security and flood protection. The study will include:

- Desktop technical assessment of the project, study area, and previous studies.
- Development, review and refinement of proposed conceptual dam options.
- Identification of key stakeholders for engagement, and support for engagement and a site visit.
- A detailed site investigation.
- A detailed conceptual design, geotechnical investigation and hydrotechnical assessment.
- A detailed cost benefit analysis.
- An assessment of environmental and regulatory requirements.

The study is expected to be completed in 2026.

More information on the BRRO initiative is available at <https://www.alberta.ca/bow-river-reservoir-options>.

### **Community-based Provincial Flood Damage Assessment**

The PFDA studies are conducted on a cyclical basis for flood prone communities and provide standardized flood damage and economic risk estimates can then be used by the municipal authority to identify and prioritize risks due to flooding, and to assess the effectiveness of their mitigation plans.

EPA continues to undertake community-based PFDA studies, which are designed to provide standardized flood damage estimates for different flood frequencies, generating annualized economic risk values for that community.

Completed PFDA's can be found by searching Open Alberta at <https://open.alberta.ca/publications>.

### **Flood Mapping**

Alberta continues to focus on working with municipalities, Indigenous communities, and the public on development of flood maps for communities at risk. With a target of creating over 3,000 kilometres of new and updated mapping across the province by 2028, Alberta's flood mapping plan reflects new information, recent

events, and the emerging needs of Albertans, with candidate communities for new flood studies identified and prioritized using risk-based factors.

In September 2024, EPA finalized 22 flood mapping studies. These studies include over 1,100 kilometres of new or updated flood mapping through 52 municipalities and four First Nations. In addition, five studies are near finalization, four studies are under local authority review, and 13 studies are currently underway.

Provincial flood maps are available online through the Flood Awareness Map Application at [www.floods.alberta.ca](http://www.floods.alberta.ca). Recent improvements to the viewer include incorporating new flood zones and helping illustrate areas at potential risk of flooding in coordination with advisories and forecasts issued by the River Forecast Centre.

### Environmental Impact Assessments

EPA regulates projects such as water management projects, fertilizer plants, chemical manufacturing, refineries, and hydroelectric power plants. Projects related to upstream oil and gas, as well as coal and oilsands mining are regulated by the AER.

Further information is available online:

- List and status of projects undergoing impact assessment: <https://www.alberta.ca/environmental-impact-assessments-current-projects>
- Impact assessment process: <https://www.alberta.ca/environmental-assessment-process>

## Other

### Water Partners

#### **Alberta Water Council**

Project teams, working groups, or committees are established by the Alberta Water Council to investigate, provide information, and make recommendations on key water management challenges and opportunities.

Active projects include:

- Drought Resistance Simulation Exercise – The project simulated drought conditions enabling communities to assess management responses, including tools and communications. The learnings will assist the Government of Alberta, municipalities, Indigenous communities, and other groups to better plan and prepare for drought. The AWC report was released in February 2024.
- Drought Mutual Support Committee – The committee serves to support communication, collaboration, and coordination on drought mitigation efforts and messaging across water-users, decision-makers, interested and impacted Albertans, and groups involved in the various aspects of water management.
- Source Water Protection Phase I: Risk Assessment Tools and Data – The goal of the project is to develop and enhance access to an online centralized inventory of tools and data, as well as a suite of associated educational resources to assist drinking water providers and local decision-makers in Alberta to understand and assess risks to their drinking water sources.

#### **Watershed Planning and Advisory Councils**

The following provides some highlights from the past year for the Water Planning and Advisory Councils (WPACs), as reported by the WPACs, which includes activities associated with mandate and roles documents; state of watershed assessments and reporting, planning, literacy and education, and convening/collaborating. representatives participate on the Alberta Water Council.

- All WPACs collaborated with the department in hosting drought resiliency workshops throughout the province and reaching out to the public and stakeholders on how the province was managing the drought.
- The Athabasca Watershed Council is in its second year of a major water quality study aimed at better understanding water quality of Pembina River sub-basin, as well as contaminant loading within the Athabasca River mainstem. Results to be shared via Mackenzie DataStream.
- The Bow River Basin Council is finalizing its online state of the watershed report, enhanced by collaboration with stewardship partners. This report, backed by local expertise and data, is more comprehensive and science-based than previous versions.
- The Battle River Watershed Alliance is sharing data and information on the status of the Battle River and Sounding Creek watersheds as part of its State of the Watershed Engagement Program. A Summit was hosted with community leaders including municipalities, Indigenous partners, healthcare professionals, industry/business, and NGOs.
- The Southeast Alberta Watershed Alliance has initiated its state of the watershed report.
- The Lesser Slave Watershed Council focused its activities on watershed and drought resiliency work and continued implementing their integrated watershed management plan.
- The Mighty Peace Watershed Alliance has been supporting drought resiliency work being done by the Government of Alberta and hosted workshops on building drought resiliency.
- The Red Deer River Watershed Alliance provided support to the southern Alberta drought situation by hosting workshops on building resilience to multi-year drought, participating in the water-sharing agreements, and promoting their >10,000 kilometres of riparian mapping work to focus watershed restoration action and increase drought and flood resiliency across the basin and downstream.
- The North Saskatchewan Watershed Alliance is assessing the state of the watershed using the Freshwater Health Index, a peer-reviewed and published approach developed by Conservation International. The index evaluates basin health using three components: ecosystem vitality, ecosystem services, and governance & stakeholders. The index is being adapted to suit the Alberta context and is its first use of the framework in North America.

- The Oldman Watershed Council responded to a significant drought year by creating ABwater.ca as an online resource for insights into the state of water resources and the ongoing drought situation in Alberta, and by supporting 20 drought resilience projects by restoring 20 riparian sites with 5000 willows and 23 beaver dam analogues.
- The Milk River Watershed Council Canada completed the Milk River Transboundary State of the Watershed Report in collaboration with watershed management partners in Saskatchewan and Montana. Over 75 individuals and agencies contributed content for the extensive report that summarizes all research, monitoring, and changing demographics within the watershed.
- The Lakeland Industry and Community Association developed a riparian health campaign in response to the findings from its large-scale riparian intactness assessments, and from recommendations in the Beaver River Integrated Watershed Management Plan.

### **Stewardship Groups**

The Land Stewardship Centre delivers the annual Watershed Stewardship Grant Program to stewardship groups across Alberta. More information is available at <https://www.landstewardship.org/>.

### **Sustainable Canadian Agricultural Partnerships**

The Sustainable Canadian Agricultural Partnership (Sustainable CAP) is a five-year, \$508 million cost-shared federal-provincial investment, supporting environmental programs that help primary producers adopt sustainable agriculture practices and technologies.

Alberta's Sustainable CAP includes the Resilient Agricultural Landscape Program (RALP), which supports producers to conserve and enhance the environmental resiliency of their agricultural landscapes. One component of RALP is providing grants for projects such as fencing off riparian areas and restoring wetlands. RALP opened for applications under Year 2 of the program on February 1, 2024. High interest led to the program closing to new applications for Year 2 on May 17, 2024. The Year 3 (2025) intake cycle opens on February 1, 2025.

Alberta's Sustainable CAP includes the Water Program, which supports producers to adopt better water management practices, including better management of risks to water supplies and quality, adaptation to climate variability and the efficient use of water resources. The Water Program facilitated improvements in agricultural water use by investing \$2.7 million through 356 grants in fiscal year 2023-2024. The grants supported 161 new water source development projects, 31 well decommissioning and well pit removals to protect water resources, benefited more than 49,421 acres and led to water savings of about 5.6 million cubic metres.

More program information is available:

- RALP: [www.alberta.ca/resilient-agricultural-landscape-program](http://www.alberta.ca/resilient-agricultural-landscape-program)
- Water Program: [www.alberta.ca/water-program](http://www.alberta.ca/water-program)