



Government of Alberta

Agency Report to the Mackenzie River Basin Board 2021

**Meeting #70 of the
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1 Bilateral Water Management Agreements

BC-Alberta Bilateral Water Management Agreement

British Columbia and Alberta are working to update Appendix I. Andrew Wilson (AB) and Ted Zimmerman (BC) continue to meet regularly to discuss advancing the agreement.

Saskatchewan – Alberta Bilateral Water Management Agreement

Alberta and Saskatchewan have committed to resuming negotiations once the team contacts have been confirmed for both jurisdictions.

Alberta-Northwest Territories Bilateral Water Management Agreement

Alberta and the Northwest Territories signed an agreement in March 2015. The AB-NWT BWMA applies to all shared transboundary waters in the Mackenzie River Basin including the Hay and Slave River Watersheds. The Parties have established a BMC to administer the agreement as well as a technical committee to support the agreement.

Three annual reports have been released to-date. The latest annual report for 2017-18 was released in September 2020 and is available online. A report that covers two fiscal years (2018-19 and 2019-20) is near completion and should be released before the end of 2021.

2 Water-Related Legislation / Policy / Regulations / Planning

Regulatory Transformation

Background

Alberta Environment and Parks (AEP) is modernizing its regulatory system to make reviewing approvals more transparent and efficient—all while maintaining high environmental standards.

Status

- The new regulatory assurance process seeks to achieve higher levels of regulatory efficiency by:
 - implementing an enhanced regulatory assurance system
 - addressing application backlog by assessing risk and current practices
 - reducing red tape by eliminating regulatory redundancies
 - supporting and stimulating the economy by reducing regulatory burdens
 - increasing regulatory efficiency and leveraging technology
- A digital platform is being built for the management, conservation and preservation of Alberta's natural resources through the administration of the *Water Act*, the *Environmental Protection and Enhancement Act* and the *Public Lands Act*.
- This platform (the Digital Regulatory Assurance System or DRAS) will allow applications to be submitted, reviewed and managed digitally, significantly improving approval timelines and transparency.
- DRAS takes into consideration the whole project lifecycle of an application, from its initial submission, monitoring considerations, compliance requirements, to closure and remediation needs.
- This digital system will be user-friendly and will lead to consistent and transparent reviews, without compromising environmental outcomes. This will result in timely decisions.
- For applicants, DRAS will provide:
 - The ability to apply for one project with multiple activities via an integrated application, which the system will walk the user through.
 - Clear, up front application standards and requirements.
 - A clear decision-making process.
 - The ability to track the status of their applications in real time.
 - Clear compliance expectations and ownership of compliance infractions.
 - Increased province-wide consistency in application processes.

Further Information

- The first information technology (IT) release of DRAS was on June 21, 2021. It included the functionality to accept, review and track Water Act approvals, and codes of practice notices.
- Additional modules for activities like landfills, drinking water facilities and other related approvals will be added regularly until 2023.

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Water Conservation Policy Implementation

Background

The Water Conservation Policy for Upstream Oil and Gas Operations (WCP) was released in December 2020. It provides policy direction for water use in major upstream oil and gas

operations, where additional water conservation measures are feasible. This policy recognizes the preferred use of alternative sources (e.g., wastewater, tailings pond water) in place of surface water and high-quality non-saline groundwater to reduce the reliance on freshwater.

Status

The Alberta Energy Regulator implements the WCP and is developing guidance documents regarding implementation for oil sands thermal in situ operations, enhanced oil recovery and cold bitumen enhanced recovery operations, and multistage hydraulic fracturing in horizontal wells.

Additional work to support the implementation of the WCP includes the development of a regulatory framework for the conveyance, storage, and reuse of fluids for hydraulic fracturing.

Further Information

[Water conservation policy for upstream oil and gas operations - Open Government \(alberta.ca\)](https://www.alberta.ca/water-conservation-policy-for-upstream-oil-and-gas-operations-open-government.aspx)

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Regional Planning and Environmental Management Frameworks

Background

The Government of 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 LUF includes establishing regional plans for seven land-use regions, which are given legislative authority through the Alberta Land Stewardship Act (ALSA). Environmental management frameworks (EMFs) are a key strategy to achieve the environmental outcomes established in a regional plan.

Status

The Government of Alberta remains focused on commitments and priorities of implementing the LUF, ALSA, and its various elements such as regional and sub-regional planning and land stewardship tools.

The Lower Athabasca Regional Plan (LARP) was released in 2012 and its associated EMFs for air quality, surface water quality, surface water quantity and tailings continue to be implemented. The Government of Alberta remains committed to implementation of the plan by working together with stakeholders and Indigenous Peoples. The Alberta government will meet the deadline required by ALSA to start the LARP review by September 2022. The scope of the review is still being determined.

The South Saskatchewan Regional Plan (SSRP) was released in 2014 and its associated EMFs for air and surface water quality continue to be implemented.

The development of the North Saskatchewan Regional Plan (NSRP) was initiated in 2014, though the plan has not been completed. The timing of the NSRP and sequencing of the remaining regional plans in the province has not been determined.

New Surface Water Quality Management Frameworks are being developed for the North Saskatchewan and Upper Athabasca regions in advance of the associated regional plans. Public, stakeholder and indigenous engagement processes occurred in the summer and fall of 2021, with the final frameworks intended to be released in spring 2022. These frameworks will put in place a system of indicators, thresholds, evaluation, reporting and management responses for the upper Athabasca, North Saskatchewan and Battle rivers. It is intended that new Surface Water Quality Management Frameworks will be included in approved regional plans in the future.

Alberta Environment and Parks continues to advance the development of biodiversity indicators for Biodiversity Management Frameworks. The methodology of a stream connectivity indicator and data layers showing the evaluation of the indicator across the province is available on GeoDiscover.

Further Information

Information about the ongoing implementation of the LAR and SSR air and surface water management frameworks, including annual reporting on ambient condition and status of management response, can be found at:

LAR: <https://www.alberta.ca/lower-athabasca-regional-planning.aspx>

SSR: <https://www.alberta.ca/south-saskatchewan-subregional-planning.aspx>

Information about the first biodiversity indicator to be published can be found at:

<https://geodiscover.alberta.ca/geoportal/rest/metadata/item/7025fe90840a4680b4011b7100c21644/html>

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Tailings Management Framework Implementation

Background

The Tailings Management Framework (TMF) for the Mineable Athabasca Oil Sands was released in March 2015, as a commitment under the Lower Athabasca Regional Plan. This framework provides direction to manage fluid tailings volumes during and after mine operations in order to manage and decrease liability and environmental risk, resulting from the accumulation of fluid tailings. A major goal of the framework is to have all tailings ready to reclaim within 10 years of the end of mine life.

Status

Additional work to support implementation of the TMF is underway through two external forums alongside internal work and analysis. The Oil Sands Reclamation Interest Group (OSRIG) provides strategic policy advice on a broad range of reclamation topics, while the Oil Sands Mine Water Science Team provides technical expertise to inform the development of regulatory guidance documents.

Further Information

The Government of Alberta's Lower Athabasca Region: Tailings Management Framework for Mineable Athabasca Oil Sands (TMF). <https://open.alberta.ca/dataset/962bc8f4-3924-46ce-baf8-d6b7a26467ae/resource/7c49eb63-751b-49fd-b746-87d5edee3131/download/2015-larp-tailingsmgtathabascaoilsands.pdf>

Alberta Energy Regulator's Directive 085: Fluid Tailings Management for Oil Sands Mining Projects. <https://www.aer.ca/documents/directives/Directive085.pdf>

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Tailings Management Framework—Alberta Energy Regulator

Background

The Alberta Energy Regulator (AER) works to ensure that the oil sands are developed within government policy and in an environmentally responsible way. We are committed to protecting what matters to Albertans—public safety and the environment—ensuring the rules are followed at every stage of energy development.

Under the Government of Alberta's Tailings Management Framework (TMF), operators must progressively treat and reclaim their tailings so that they are ready to reclaim within 10 years after mining has stopped.

Under the TMF and the AER's Directive 085: Fluid Tailings Management for Oil Sands Mining Projects, operators are required to submit tailings management plans to the AER. These plans list the actions that operators will take over the next several decades to ensure their tailings are progressively reclaimed when the life of the mine ends.

To ensure an operator's tailings management activities remain on track, the AER has set thresholds for fluid tailings volumes that operators must maintain (i.e., limits and triggers). These thresholds will remain in place for the approved life of a mine.

The TMF and Directive 085 do not address waterfowl protection, dam safety, or emissions from tailings ponds. These issues are addressed through other AER regulatory requirements.

The AER continues to work with all stakeholders, including industry, environmental groups, and indigenous groups to ensure all tailings management and operational plans meet Government of Alberta policy and AER requirements.

Status

The AER has approved tailings management plans for all eight of Alberta's oil sands mines. Decision reports are posted to the Tailings Notices and Decisions page on aer.ca.

In September 2021, the AER published 2020 State of Fluid Tailings Management for Mineable Oil Sands. The report shows that the volume of fluid tailings increased by approximately seven per cent in 2020 compared to 2019, while bitumen production declined by approximately five per cent during the same period, which occurred during the COVID-19 pandemic and related drop in global oil demand.

From 2015 to 2020, the reported total volume of fluid tailings in the Athabasca oil sands region was below the aggregate of approved tailings profiles, for all operators combined. Each company's tailings management plan has one or more profiles that track the volume of tailings that must be treated and reclaimed over the lifecycle of the mine.

Based on the volumes reported in 2020 annual reports submitted to the AER, all oil sands mine operators remained in compliance with Directive 085.

Further Information

Additional information about the AER's approach to tailings management is available at aer.ca

Contact

Contact the AER at inquiries@aer.ca

Surface Water Allocation Directive

Background

Alberta released the Surface Water Allocation Directive (SWAD) in 2019 (<https://open.alberta.ca/publications/9781460143339>) to provide consistent water allocation decision guidance for rivers, lakes and wetlands where planning processes have not established water management objectives. The Directive uses a sustainable watershed approach to balance ecological needs and economic considerations.

Status

The AER and AEP are implementing the SWAD by issuing new 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. The diversion schedules include conditions requiring a user to stop diverting when all the remaining flow is required to meet ecological and senior priority needs.

Contact

Contact the AER at inquiries@aer.ca

Code of Practice for Wetland Replacement Works

Background

- Alberta's codes of practice regulate activities that would otherwise be authorized using approvals required by an act. These low-risk activities are defined and managed separately to simplify and streamline the authorization process. Codes of Practice have equal force of law as they are referenced in acts, or associated regulations.

- The Code of Practice (COP) for Wetland Replacement Works regulates wetland restoration and wetland construction activities as defined in the COP by replacing Water Act approval requirements. Wetland restoration applies to wetlands that have been partially or completely lost by re-establishing the pre-disturbance area, natural drainage pattern, hydrology, and natural processes. Wetland construction involves creating a wetland at a previously non-wetland location.

Status

- The COP came into force on December 23, 2020. A copy of the COP is available in the Open Government Portal (Open Alberta) at: <https://open.alberta.ca/publications/code-of-practice-for-wetland-replacement-works>
- Notice under the COP can be submitted through the Digital Regulatory Assurance System (DRAS) at <https://regulatoryassurance.alberta.ca/dras>

Further Information

The COP applies to specified wetland replacement activities including:

- Wetland construction - the manipulation of the physical, chemical, biological or hydrological characteristics of a site with the goal of creating a wetland replacement area at a location that was non-wetland, and where the wetland replacement area created has a specific storage, depth, and hydrologic profile.
- Wetland restoration - any manipulation of the physical, chemical, biological or hydrological characteristics of a wetland, that has been partially or completely lost by drainage, infilling or other forms of degradation or impairment, with the goal of re-establishing the pre-disturbance area, natural drainage pattern, hydrology and natural processes but only applies to wetland sites with a certain catchment area and hydrological profile.
- A Water Act approval is required for any activities related to wetland replacement that fall outside of the COP scope.

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Alberta Wetland Policy: Wetland Replacement Program

Background

Wetlands are a vital part of Alberta's ecological landscape and are necessary for a sustainable economy and healthy communities.

The Wetland Replacement Program (WRP) aims to re-establish wetlands in partnership with Albertans by providing resources for collaborative restoration projects across the province. Under the Alberta Wetland Policy, the WRP will offset wetlands lost due to approved development activities. A priority of the Alberta Wetland Policy and the WRP is to replace wetlands in watersheds and municipalities, that have had the highest amount of lost wetland area and value since 2015, as well as areas of high historical loss.

Under this program, wetland replacement includes the following activities:

- Wetland Restoration: Returning natural/historic functions to a former or degraded wetland; and
- Wetland Construction: Creating a wetland on a site that was historically non-wetland.

Participants in this program will undertake wetland restoration or construction projects in order to achieve specific environmental outcomes, including but not limited to flood attenuation, drought resiliency, groundwater recharge, water quality improvement, habitat for wildlife and biodiversity, and for social, recreation and education value to the public.

Status

In 2020, the WRP and its participants replaced over 150 hectares of wetland area within the Peace / Slave River watershed, North Saskatchewan, South Saskatchewan, and Milk River basins. The WRP is currently accepting proposals for replacement projects from participants in the Peace / Slave River watershed, Athabasca, North Saskatchewan, South Saskatchewan, and Milk River basins.

Further Information

More information about the Alberta Wetland Policy and the Wetland Replacement Program can be found at <https://www.alberta.ca/alberta-wetland-policy-implementation.aspx>.

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Water Act Licence Exemptions for Wetland Replacement

Background

- Wetland replacement includes wetland restoration, retention, and construction. Wetland restoration is applied to wetlands partially or completely lost by re-establishing the pre-disturbance area, natural drainage pattern, hydrology, and natural processes. Wetland construction involves creating a wetland at a location that was previously non-wetland. Wetland retention refers to maintaining the quantity, flow rate, and timing of water to an existing wetland. Retention activities typically occur during urban developments.
- The Water (Ministerial) Regulation amendments exempt the need for a Water Act licence to restore, retain or construct a wetland, within specified thresholds. This enables wetland replacement to occur in closed basins (e.g., Bow, Oldman, and South Saskatchewan River Basins) without a Water Act licence transfer.

Status

The Water (Ministerial) Regulation was amended in 2020 to exempt the following diversions of water and any operations of works associated with those diversions, from requiring a *Water Act* licence:

- (i) a diversion of water for the purpose of wetland restoration, as defined in the Code of Practice for Wetland Replacement Works;
- (ii) a diversion of water for the purpose of maintaining all of the following with respect to an existing wetland:
 - a. the quantity of water in that wetland;
 - b. the flow rate of water in or to that wetland;

- c. the timing of the flow of water to that wetland;
- (iii) a diversion of water for the purpose of wetland construction, as defined in the Code of Practice for Wetland Replacement Works, except where the total diversion of water is greater than 6,250 cubic metres per year.

Further Information

- The Water (Ministerial) Regulation is available in the in the Open Government Portal (Open Alberta) at: https://open.alberta.ca/publications/1998_205
- The Code of Practice for Wetland Replacement Works came into force on December 23rd, 2020. A copy of the COP is available in the Open Government Portal (Open Alberta) at: <https://open.alberta.ca/publications/code-of-practice-for-wetland-replacement-works>

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Groundwater Protection Initiatives

Background

Alberta Environment and Parks (AEP) developed two directives that introduce additional groundwater monitoring requirements to Alberta's *Environmental and Protection Enhancement Act (EPEA)* approval process. These directives outline requirements for the assessment and management of groundwater pertaining to two separate and specific issues:

- Directive for the Assessment of Thermally-Mobilized Constituents in Groundwater for Thermal In-Situ Operations.
 - Thermally-mobilized constituents are chemical constituents naturally present in surrounding sediments that have the ability to be released into groundwater and mobilized by subsurface heating.
- Directive for the Assessment of Non-Saline Groundwater in Direct Contact with Bitumen for In-Situ Operations.
 - Non-saline groundwater is groundwater that has total dissolved solids less than or equal to 4000 milligrams per litre.
 - Direct contact means the bitumen resource is immediately above, below and/or beside the non-saline groundwater resource.

The first directive outlines the requirements to address the situation of thermally-mobilized constituents and the second to address the situation where non-saline groundwater may be in direct contact with bitumen. It is recognized that in-situ operations may disturb the surrounding non-saline aquifers and potentially release constituents into the groundwater. To address this, a risk-based management approach for assessing effects to groundwater pathways and receptors has been developed.

Status

The two directives were released in 2018 and 2021, respectively and are implemented by the Alberta Energy Regulator (AER).

Further Information

- [Assessment of thermally-mobilized constituents in groundwater for thermal in situ operations - Open Government \(alberta.ca\)](#)

- [Directive for the assessment of non-saline groundwater in direct contact with bitumen for in situ operations - Open Government \(alberta.ca\)](#)

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Watershed Resiliency and Restoration Program

Background

The Watershed Resiliency and Restoration Program (WRRP) was established in 2014 in order to build long-term resiliency to flood and drought in priority areas around the province.

The primary objective of the WRRP is to increase the natural ability of the province's watersheds to reduce the intensity, magnitude, duration and effects of flooding and drought through natural watershed mitigation measures.

Additionally, the program aims to address impacts of past flooding and/or droughts through the restoration of degraded areas in priority watersheds, which will enhance communities' ability to withstand future flooding or droughts.

Finally, the program seeks to promote the ongoing stewardship and preservation of key components of Alberta's watersheds.

Status

Alberta Environment and Parks allocated \$36 million in WRRP grants over seven years from 2014 through 2021. In Budget 2021, an additional \$10.5 million was allocated to WRRP over three years through the Technology Innovation and Emissions Reduction (TIER) program.

Approved grant projects are focused on the conservation, restoration and enhancement of watershed features, such as riparian areas and wetlands, as well as education, outreach, data collection and research, to increase community capacity and environmental stewardship.

The program has engaged one-on-one with thousands of Albertans in training workshops, and on-the ground restoration projects, leading to over 2,400 hectares of riparian area and 760 hectares of wetlands restored to date.

Further Information

The Watershed Resiliency and Restoration Program is accepting applications from organizations for funding in 2021-22. See the website <https://www.alberta.ca/watershed-resiliency-and-restoration-program.aspx> for application deadlines, applicant eligibility, and past approved projects.

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Selenium Management Review

Background

In June 2021, Alberta Environment and Parks (AEP) launched a Water Action Plan that demonstrates Alberta's leadership in managing water resources and addresses concerns about water quality and resource development. The plan includes public engagement on two new water quality management frameworks for the North Saskatchewan and Battle rivers, and the upper Athabasca River.

As part of the Water Action Plan, AEP has also initiated a selenium management review, which will be carried out with the support of the Alberta Energy Regulator. This review will examine regulatory requirements for coal projects to ensure water quality remains protected now and in the future.

Status

The selenium management review is underway. AEP will work with impacted groups, including the coal industry and others, on necessary actions required to address any policy concerns identified once the review is complete.

Further Information

The selenium management review will cover the full regulatory lifecycle of a coal project from application, construction and operation, to decommissioning and reclamation.

The scope of the selenium management review will include:

- *Environmental Protection and Enhancement Act* (EPEA) approval conditions relating to selenium.
- Selenium management plans developed by mining operations.
- Best management practices in Alberta and comparable jurisdictions.
- Compliance or enforcement procedures for the construction, operation and reclamation of mines.

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3 Science, Monitoring and Information

Alberta River Forecast Centre

Background

River Conditions

As of mid-October, flows in the Peace River basin are generally within the normal to above normal range for this time of the year.

Throughout the year, flows in the Peace River itself have been mostly within the normal range. There were some periods of low flow in the late summer and fall, that were below the lower quartile. BC Hydro has been in communication with the River Forecast Centre, and the public. The periods of reduced outflow were due to Site C construction activities. In addition, there was a scheduled spill at the end of June due to greater than anticipated inflows to Williston Reservoir, and reduced discharge capacity through the powerhouses, due to maintenance activities. Flows were above the upper quartile at the time of the spill.

Flows in the Athabasca River basin are generally within the below normal to normal range for this time of the year. The Athabasca River below Fort McMurray flows were around the upper quartile in the spring and have been around the lower quartile through the summer and fall.

Detailed preliminary water levels, flow information and automated station camera photos for rivers in Alberta can be found at the following webpage: <https://rivers.alberta.ca/>.

River Forecast Centre Upgrades

The Alberta River Forecast System (ARFS-FEWS), a customized version of the Deltares Delft-FEWS (Flood Early Warning System) system, became operational in 2021. Enhanced functionality included ingesting and visualizing RADARSAT-2, RADARSAT Constellation Mission, Sentinel 1 and 2 satellite imagery for ice monitoring and forecasting.

Work is continuing within the forecasting program to upgrade <https://rivers.alberta.ca/>, review and updated the existing Water Supply Outlook models, investigate new modelling technologies to support the Water Supply Outlook and the ongoing review of flood forecasting hydrological modeling tools.

Status

Alberta's River Forecast Centre ran ARFS-FEWS for the 2021 ice and open water seasons. Delft-FEWS 2020.02 base version beta testing is ongoing through the fall. Additional ARFS-FEWS enhancement and upgrades are planned for 2022. Updates are being made to <https://rivers.alberta.ca/> website include adding smaller river basins and colour-coded lines for larger rivers to help users narrow down the areas with active flood advisories. The flood forecasting hydrological model test builds are complete. The model run results are being compared and evaluated for accuracy, performance and suitability. Summaries of the model test results are expected in early 2022.

Further Information

Further information can be provided by Peter Bezeau and will be made available to the Committee on Flow Forecasting.

Contact

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Water Shortage Updates

Background

In April 2021, Alberta Environment and Parks (AEP) undertook the routine activation of the Water Shortage Core Committee to monitor, and prepare for response to, potential water shortage conditions.

Over the summer months, drought and water shortage conditions were experienced across Alberta. In June 2021, in response to the water shortage conditions, AEP's full Water Shortage Management Committee was activated as per departmental water shortage plans. AEP's Department Coordination Centre was activated from August 6 to September 16, to coordinate the department's activities related to the drought response, anticipate and support the needs of business units impacted by, or responding to, the drought conditions, and to consolidate communications.

By September 23, 2021, 43 rural municipalities had declared agriculture disasters.

AEP actively managed the water shortage situation by taking the following actions:

- Protecting aquatic life by taking management actions including issuing advisories, suspending temporary diversion licenses and directing licence holders to follow low flow conditions.
- Allowing temporary grazing or haying on vacant public lands, and allowing existing grazing disposition holders with additional grazing capacity to accept livestock from other producers.
- Assisting livestock and poultry producers in drought stricken areas by locating alternative sources of water.
- Assessing how municipal and industrial wastewater discharges might affect water quality on watercourses experiencing low flows.
- Increasing drought and water shortage awareness through a [new Drought webpage](#).

Status

- In comparison, the droughts of 2001 and 2002 were not as widely spread as the conditions experienced in 2021; however the total water supply for the 2001 season was approximately 50 per cent of the long-term median, whereas the total water supply in 2021 was around 70 per cent of the long-term median.
- Alberta is on track to meet the 50 per cent flow requirement on the South Saskatchewan River at the Alberta-Saskatchewan boundary, as per the Master Agreement on Apportionment.
- Learnings from this year's event and the upcoming Alberta Water Council drought simulation exercise will be used to inform AEP's drought and water shortage plan and enhance drought resiliency.

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Low Flow Wastewater Discharge Assessment

Background

Due to low precipitation and high temperatures, measured flows in many of Alberta's rivers were at low levels in 2021. This represents a potential risk for wastewater discharges for which water quality limits were developed around more normal flow conditions. Wastewater discharges may have unintended impacts to receiving stream biota as a result of low flow conditions.

To avoid the above scenario, both AEP and AER identified high risk discharges. For AER facilities, these included ones which are approved under *Environmental Protection and Enhancement Act* (EPEA) to discharge treated industrial wastewater and/or treated domestic wastewater (e.g. industrial camps). Industrial runoff was considered lower risk and not included. High risk facilities were issued letters requesting that, prior to discharge of wastewater, an assessment of flow conditions and water quality is to be conducted to ensure the release minimizes the potential for impact to the receiving stream.

Status

A total of 22 letters were issued by the AER the week of September 6, 2021 to facilities that are allowed to discharge wastewater as per EPEA approvals. This included two oilsands mines; Syncrude Mildred Lake (which includes domestic wastewater from the Syncrude Aurora mine) and Suncor Base Mine. Both operators acknowledged receipt of the letter and the need to assess wastewater discharges under current flow conditions prior to discharging.

Further Information

Drought conditions as experienced in 2021 are typically cyclical and may last for several years. It is anticipated that a similar exercise of issuing letters to companies discharging wastewater may need to be conducted in future years. Long-term solutions may also include developing conditions requiring assessment of low-flow discharges as part of EPEA approvals.

Contact

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Low Flow Management Actions – Alberta Energy Regulator

Background

Over the summer and early fall of 2021, the Province of Alberta experienced hot weather combined with low precipitation that resulted in low flows and low water levels in many streams and lakes across the province. The AER actively collaborated with AEP staff to manage the low flow situation.

Status

Management actions resulted in temporary closure of some watersheds to new Temporary Diversion Licences (TDLs). With higher presence of industrial activity in the northern part of province, the AER contacted existing licence holders for updates on the need for active TDLs, and to cancel those that were no longer needed. Table 1 shows the number of companies contacted and the number of TDLs that were voluntarily cancelled.

Table 1: Temporary Diversion Licence Management

Four Character Watershed	Major Basin	Number of Companies contacted	Number of TDLs	Voluntary Cancellation
Red Deer River to below James River confluence (05CA)	South Saskatchewan	3	5	0
Reach of Red Deer River / James R to above Medicine R confluence (05CB)	South Saskatchewan	4	6	1
Reach of Red Deer River / above Threehills Ck to below Rosebud R confluence (05CE)	South Saskatchewan	4	5	3
Clearwater River to the mouth (05DB)	North Saskatchewan	1	1	0
Reach of North Saskatchewan River / Lake Abraham (Windy Point) to Brazeau R confluence (05DC)	North Saskatchewan	6	13	0
Brazeau River to the mouth (05DD)	North Saskatchewan	7	16	0
Reach of North Saskatchewan River / Brazeau R to above Strawberry Ck confluence (05DE)	North Saskatchewan	3	4	1
Reach of Smoky River / Wanyandie Ck to below Wapiti R confluence (07GB)	Peace/Slave	8	13	4
Wapiti River above Redwillow River confluence (07GC)	Peace/Slave	1	1	1
Redwillow River to the mouth (07GD)	Peace/Slave	1	1	0
Reach of Wapiti River / Redwillow R confluence to the mouth (07GE)	Peace/Slave	4	7	0
Simonette River to the mouth (07GF)	Peace/Slave	4	6	5
Little Smoky River to below Goose River confluence (07GG)	Peace/Slave	6	7	5

Further Information

The AER recently conducted an audit in the Little Smoky River basin because of low flows that were below Instream Objectives (IOs) from June 13 to August 27, 2021. The audit asked companies to submit detailed diversion data, which were compared to recorded flows and IOs, to see if companies diverted when the IOs were not met. While the audit was only conducted for the Little Smoky River basin; conversations are underway to expand the audit, such as to the upper North Saskatchewan and Battle River basins.

From the Little Smoky River basin audit, the AER found a high rate of compliance with respect to meeting conditions of IOs, in part due to many companies not diverting water this year. Only two companies were found to be in noncompliance, and the AER is following up with further actions. The key issues learned from the audit are given below:

1. For the most part companies follow Instream Objective conditions as described in their licences.
2. Companies see that AER is constantly managing flow situations across the province.
3. The audit was an educational opportunity for companies to learn the need to follow conditions all the time.
4. The process built relationships with companies to help manage the low flow situation together.

Contact

Contact the AER at inquiries@aer.ca

High Resolution CMIP6 Climate Change Data for Alberta

Background

Climate change is a significant threat, and there is strong evidence that climate in Alberta is already changing. In the last decade, we have witnessed severe storms, floods and forest fires in Alberta. Apart from extreme events, climate change is also causing changes in the availability of fresh water supplies in the province by altering timing and magnitude.

Since 1995, a working group of Climate and Ocean: Variability, Predictability, and Change (CLIVAR) has established the Coupled Model Intercomparison Project (CMIP) to provide multi-model outputs and examine the climate predictability and difference of model responses. Recently, CMIP6 (Coupled Model Intercomparison Project Phase 6) has released a set of up-to-date climate change projections derived from multiple global climate models (GCMs) under various socio-economic and emission scenarios). Although GCMs provide reasonable estimates of climate change in future at regional/global scale, direct applications of GCMs' outputs have been impeded at basin or local scales due to considerable biases, mainly driven by a coarse resolution (~ 100km) and imperfect physical parameters and processes and their inability to capture climate variability at a local scale. To overcome these challenges, data downscaling techniques are often applied, not only to refine spatial resolution, but also to remove biases in GCMs' outputs. Among two main downscaling categories (i.e., dynamical and statistical techniques) in literature, many studies have actively applied statistical downscaling techniques that have advantages in computational efficiency and ability to reproduce important statistics of locally observed climate data. Further, as a large number of climate change projections (over 50) are available (i.e. from multiple GCMs under various socio-economic and emission scenarios), any climate change impact study would require use of all available climate projections (ensembles) to fully capture future climate variability, which is certainly not practical, if not impossible. To overcome this challenge, many studies have applied algorithms to systematically select a subset of representative climate projections that capture a full range of simulated future changes.

Status

AEP has developed (i) a state of the art statistical downscaling technique called multivariate bias correction combined with a distribution-free shuffle approach (MBCDS) that preserves GCM-driven long-term trends and the inter-dependence between hydro-climate variables, and (ii) a novel geometric algorithm to select representative CMIP6 GCM projections at various spatial scales, i.e., sub-continental, regional, and local scales.

Recently AEP has generated high resolution climate change data for Alberta by using 41 available CMIP6 climate projections (from multiple GCMs under various shared socio-economic pathways). The developed geometric algorithm was used to select a sub-set of 12 representative CMIP6 climate projections for Alberta that capture the climate variability in available GCM projections. Further, the historical hybrid climate dataset was used as reference data for bias correction, and the multivariate statistical downscaling method (MBCDS) was applied to produce 12 high-resolution CMIP6 climate projections at a 10 km resolution over entire Alberta.

The downscaled high resolution CMIP6 climate projections will be used in various climate change impact assessment projects, mainly to understand the impact of climate change on freshwater supplies in major watersheds of Alberta. The developed methods (i.e. MBCDS downscaling technique and geometric algorithm for selection of sub-set) and standardized set of 12 high-resolution climate change projections (10 km resolution) are available from Alberta Environment and Parks.

Further Information

For more details on the hybrid climate dataset, the algorithms for selection of representative climate projections and multivariate statistical downscaling method, please refer to:

Eum, H.-I., Gupta, A., 2019. Hybrid climate datasets from a climate data evaluation system and their impacts on hydrologic simulations for the Athabasca River basin in Canada. *Hydrol. Earth Syst. Sci.* 23, 5151–5173. <https://doi.org/10.5194/hess-23-5151-2019>

Eum, H.-I., Gupta, A., Dibike, Y., 2020. Effects of univariate and multivariate statistical downscaling methods on climatic and hydrologic indicators for Alberta, Canada. *Journal of Hydrology* 588, 125065. <https://doi.org/10.1016/j.jhydrol.2020.125065>

Farjad, B., Gupta, A., Sartipizadeh, H., Cannon, A.J., 2019. A novel approach for selecting extreme climate change scenarios for climate change impact studies. *Science of The Total Environment* 678, 476–485. <https://doi.org/10.1016/j.scitotenv.2019.04.218>

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Regarding selection of representative climate projections

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Historical Hybrid Climate Data for Alberta

Background

Long-term reliable climate datasets are the backbone to assess temporal and spatial changes in ecological and hydrological systems in a watershed. Although climate monitoring networks have advanced over the last decades, poor network density still exists, especially in western mountainous and northern regions of Alberta. Station-based climate observations are often spatially interpolated to cover ungauged regions, which may cause unexpected erroneous

results as a consequence of the sparse measurement network, especially for mountainous areas affected by orographic effects. Although a number of gridded climate datasets are available for North America (including Alberta) which provide reasonable estimates of climatic conditions in the region, there are inherent inconsistencies in these available gridded climate datasets (e.g., spatially and temporally varying data accuracies, available meteorological parameters, period of records, spatial coverage, temporal resolution). Due to these inherent inconsistencies, often there is a need to combine multiple climate datasets to cover the larger spatial and temporal domain (i.e. 50+ years of historical data for the entirety of Alberta). Combining data from different sources requires a systematic data evaluation framework to produce a consistent long-term historical data for a larger spatial domain like Alberta.

Status

AEP has developed a framework, called REFERENCE Reliability Evaluation System (REFRES), that systematically ranks multiple climate datasets available in a repository based on various performance measures and generates a hybrid climate dataset for a region by extracting the best data (based on the ranking) from multiple sources. AEP has produced a historical hybrid climate dataset for the province of Alberta by applying the developed REFRES with five commonly used climate datasets, including the station-based gridded climate datasets: ANUSPLIN (Australia National University Spline), Alberta Township, and the Pacific Climate Impacts Consortium's (PCIC) PNWNAmet (PCIC NorthWest North America meteorological dataset); a multi-source gridded dataset: Canadian Precipitation Analysis (CaPA); and a reanalysis-based dataset: North American Regional Reanalysis (NARR). The developed historical hybrid climate dataset covers the period between 1950-2019 and contains four climate parameters (i.e. precipitation, minimum temperature, maximum temperature and wind speed).

Further Information

For more details on the hybrid climate dataset, please refer to following publication:
Eum, H.-I., Gupta, A., 2019. Hybrid climate datasets from a climate data evaluation system and their impacts on hydrologic simulations for the Athabasca River basin in Canada. *Hydrol. Earth Syst. Sci.* 23, 5151–5173. <https://doi.org/10.5194/hess-23-5151-2019>

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Alberta Flow Estimation Tool for Ungauged Watersheds (AFETUW)

Background

Alberta Environment and Parks (AEP) developed a new web-based application, Alberta Flow Estimation Tool for Ungauged Watersheds (AFETUW), for both government and external stakeholders. This user-friendly tool allows watershed delineation (at any point along a stream in the province), querying of 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.

AFETUW automates many computational and time intensive processes and provides a practical province-wide approach for management of water resources in the province. It is anticipated that AFETUW will result in significant cost and time savings to government,

industry, academia, Watershed Planning and Advisory Councils, engineering consulting companies and other non-government organizations.

Status

The AFETUW has been available to the general public since May 2021.

Further Information

AFETUW can be accessed online at <https://afetuw.alberta.ca>. A comprehensive user's guide is available on the website.

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Groundwater Initiatives between Alberta and the Northwest Territories

Background:

- A bilateral agreement between Alberta and NWT, signed on March 2015, lays the foundation for long term cooperative management of the water shared between the province and territory. The agreement describes how groundwater may be shared reasonably and equitably.
- There is limited knowledge available about the quality, quantity, and location of groundwater shared between Alberta and NWT.
 - Under the Alberta-Northwest Territories Bilateral Water Management Agreement, Groundwater Work Plan for 2021-22, Alberta and NWT have started an inventory of existing groundwater information to delineate transboundary aquifers between the two jurisdictions, and to model groundwater flow in the aquifers.

Status:

- Alberta Environment and Parks (AEP) and NWT have been working with the Alberta Geological Survey (AGS) to collect groundwater information spanning the border. The AGS has summarized their findings in a report titled "State of Subsurface Knowledge to Support Aquifer Mapping across the Alberta–Northwest Territory Border".
 - Communication with AGS is continuing for mapping transboundary aquifers along the Alberta-NWT boundary (e.g., in the Hay, Kakisa, and Petitot River basins). This work occurs under a Memorandum of Understanding signed between AEP and AGS.
- The data acquisition process includes sampling of Hay River for naturally occurring isotopic tracers to better understand the hydrogeology of the Hay River corridor.
- To supplement this work, a literature review on permafrost and hydrology in Alberta-NWT transboundary basins has been completed in collaboration with University of Alberta and Wilfrid Laurier University (Phase 1). The aim of the literature review was to understand the current state of permafrost in the transboundary area and its potential impact on groundwater.
- AEP and NWT are planning a workshop to get expert opinion on developing a joint AB-NWT groundwater management framework, based on the draft Guideline for Groundwater Management Frameworks developed by AEP.

Further Information:

The transboundary work is ongoing, more information can be obtained from Alberta's groundwater representative for the bilateral agreement, Guy Bayegnak.

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4 Major Initiatives and Projects

Source Water Protection Risk Assessment and Web-Based Platform Project

Background

In 2020, the Alberta Water Council, in partnership with Alberta Environment and Parks, established a multi-stakeholder working group to develop a web-based platform and risk assessment tools to assist small municipalities and utility operators. The purpose of this work is to develop increasing access to a web platform, educational tools and resources to assist drinking water providers and local decision makers in Alberta to understand and assess risks to their drinking water sources.

Status

- Project terms of reference was approved by Alberta Water Council in February 2021
- Funding was also approved by the Council
- Due date for this project is September 2022.

Further Information

The Alberta Water Council's website provides additional information about this project:

www.awchome.ca/projects/protecting-sources-drinking-water-alberta-2/

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Irrigation Infrastructure Investment and Feasibility Study

Background

Alberta Irrigation Modernization

In late 2020, the Government of Alberta, the Canada Infrastructure Bank, and a consortium of eight irrigation districts announced their combined investment of \$815 million to modernize irrigation district infrastructure and increase water storage capacity in southern Alberta. This investment will go toward four off-stream reservoirs (two new and two expansions of existing reservoirs) and 56 modernization projects, including converting open canals to underground pipeline systems. Projects will be delivered by the irrigation districts and are focused on increasing water conveyance efficiency and allowing more acres to be irrigated within the same water allocation.

Irrigation Feasibility study in east-central Alberta

In early 2021, Agriculture and Forestry, with the Canada Infrastructure Bank, the Special Areas Board, and the MD of Acadia, reached a memorandum of understanding to assess the technical and financial feasibility of developing irrigation in east-central Alberta.

Status

Construction has started on the infrastructure modernization projects and are anticipated to be complete by spring of 2025. Off-stream reservoir projects are scheduled to be completed by spring 2028.

The feasibility study will assess the technical and economic aspects of developing a large-scale irrigation project in the east-central Alberta region, and will include conceptual design, governance, and financial components. The study is scheduled to be completed in fall 2021.

Further Information

Further information for specific projects being completed by the participating irrigation districts can be found at the following external link: <https://www.albertawater.com/topics/irrigation>

Contact

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Irrigation District Water Quality Project

Background

Alberta has the largest irrigated area in Canada, with nearly 720,000 hectares of irrigated land. More than 80 per cent of this area is held within 13 irrigation districts, and includes 56 reservoirs and over 8,000 kilometres of conveyance works. This irrigation infrastructure provides water, not only for crop and livestock production, but also supports rural municipalities, domestic users, wildlife habitat, and recreational activities.

Status

Data collected in 2006-2007 and 2011-2019 are currently being compiled into a series of reports due for publication in 2021, which will provide a baseline of water quality that will allow long-term evaluation of change in southern Alberta's irrigation water. The first three reports are now complete and available. These reports are titled:

- Long-term patterns of pesticides in irrigation water in southern Alberta
- Water quality indices of irrigation water in southern Alberta
- Water quality trends in irrigation water of southern Alberta

The results show that irrigation water in southern Alberta generally achieves excellent or good water quality index scores, which is an aggregated measure of the number and magnitude of water quality guideline exceedances. In most irrigation districts, the quality of the irrigation water is found to degrade as it moves through the irrigation infrastructure, with return water having poorer quality than source water. Most parameters do not exhibit regional or local temporal trends, but moderate to weak negative trends (i.e. decreasing concentrations) were found for total nitrogen, total dissolved solids, and several pesticides (2,4-D, Dichlorprop, MCPA, Dicamba, Mecoprop, and Simazine).

Further Information

Project data, information and reports may be accessed at the project website: www.idwq.ca

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Alberta's Water Research and Innovation Strategy (AWRIS)

Background

"Alberta's Water Research and Innovation Strategy 2014: A Renewal" (AWRIS) was released in 2014. AWRIS directly guides the six-year, \$28.3 million provincial investment in Alberta Innovates Water Innovation Program (WIP). AWRIS also guides Alberta's post-secondary institutions and other research organizations in response to the challenges faced by the province's water resource system, and supports the knowledge needs of Water for Life (WFL): Alberta's Strategy for Sustainability. AWRIS supports the WFL knowledge and technology gaps, and Alberta's Our Water, Our Future: A Plan for Action.

AWRIS has three key outcomes:

- Innovation Focus: Investments in water research and innovation generate relevant, credible, and reliable knowledge that supports the strategic needs of Alberta's water resource system.
- Innovation Platforms: Technological and organizational environments are conducive to discovery and application, fueling innovation in Alberta's water resource system.
- Innovation Capacity: Water knowledge is effectively mobilized to create innovative solutions to Alberta's water resource system.

The provincial investment in WIP has been a key implementation tool to achieve the AWRIS outcomes and provide guidance to make knowledge-based decisions for water-related challenges. WIP is managed by Alberta Innovates to achieve the outcomes of AWRIS and the knowledge needs for the goals of the WFL Strategy: (1) safe, secure drinking water; (2) healthy aquatic ecosystems; and (3) reliable, quality water supplies for a sustainable economy. WIP projects are leveraged with other funding sources, including municipal and federal governments, post-secondary institutions (PSIs), industry, and other national and international partners.

Status

- The WIP grant offers funding through continuous intake and competitive, time-limited calls to support the creation and application of relevant scientific knowledge and innovative technology solutions needed to address the goals of WFL/AWRIS strategies.
- WIP has project allocations to 2024-25, with some funding remaining as unallocated.
- WIP recipients include PSIs, government organizations, private sector companies, and not-for-profit organizations.

Contact

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Alberta Innovates Water Innovation Program (WIP)

Background

Alberta Innovates is a provincially funded corporation that invests in research, innovation and entrepreneurship to drive provincial economic growth and diversity. Alberta Innovates provides technical expertise, entrepreneurial advice and support, opportunities for partnerships and funding to advance the best ideas. Programming supports a broad range of

research and innovation activity from discovery to use. Collaboration is at the heart of what Alberta Innovates does, bringing together bright minds and great ideas.

The program builds on a history of world-class research and innovation, and helps create and apply relevant, reliable and credible knowledge and information that will lead to a high-performing, innovative and responsive water system for the province of Alberta, as called for in AWRIS. The priority is to make certain Alberta has the quality and quantity of water, when and where it is needed into the future.

The WIP research portfolio supports investments that advance knowledge and innovation in four key themes: (1) future water supply and watershed management, (2) healthy aquatic ecosystems; (3) water use conservation, efficiency, and productivity; and (4) water quality protection.

The WIP grant offers funding through continuous intake and competitive, time-limited calls to support the creation and application of relevant scientific knowledge and innovative technology solutions needed to address the goals of WFL/AWRIS strategies. Recipients include post-secondary institutions, government organizations, private sector companies, and not-for-profit organizations. High level results from 2020/21 WIP grant activity include:

- 35 ongoing projects and 40 completed projects.
- 352 HQPs supported by projects to date with 158 jobs created and 164 collaborations.
- Program leverage of 2:1 with other funding sources.
- Completion of expert panel program review
- Continuation of Water Innovation Connect Series.

Status

The WIP grant is currently in effect with the current phase ending in 2024 (extended from 2022). To date, Alberta Innovates has held three WIP calls: one in October 2015, a joint Water Technologies call in partnership with Sustainable Development Technologies Canada (SDTC) in 2016, and a third call in August 2018. All grants from the 2018 call have been executed with projects well underway. Brief summaries for funded projects are available online at: <https://albertainnovates.ca/focus-areas/clean-resources/project-library/>.

The annual WIP Forum, normally held in May each year, was again cancelled in 2021 due to the COVID-19 pandemic. A monthly Water Innovation Connect Series was established to continue efforts to share outcomes of projects funded through WIP and maintain a network of water stakeholders in the province. Recordings of the monthly sessions can be found at: <https://albertainnovates.ca/programs/water-innovation/water-innovation-webinar-series/>

Four ongoing or recently completed projects are highlighted below.

Agriculture's Water Future (AWF): Advancing the Uptake of Water Stewardship in Agri-food Supply Chains

The Agriculture's Water Future (AWF) project will deliver a business case, a water stewardship plan, and support water stewardship plan implementation across one full agri-food supply chain. The project will establish an approach to, and a framework for, water stewardship that meets the needs of the supply chain. Furthermore, throughout the project the economic value, environmental value, and value-based collaborative understanding of water stewardship to supply chain members will be measured and documented. The water stewardship approach will be applied across the potato supply chain.

The successful implementation of this technology or use of the knowledge generated could:

- Result in reductions in water-related risks in a potato supply chain in southern Alberta.
- Position Alberta agri-food products as leaders in water stewardship planning and implementation, and position Alberta as a leader in new and innovative water stewardship practices.
- Improve water stewardship in the South Saskatchewan River Basin. Water is the constraining resource in this basin, making it financially attractive for farmers to improve their practices, benefiting both farmers and the watershed. Improved water stewardship has enormous potential to benefit Alberta's economy, its environment, and to support its future innovation, and training and retention of skilled personnel.

Using Passive Samplers for Ecological Hazard Assessment of Oil Sands Process-Affected Water

Oil sands process-affected water (OSPW) is typically comprised of a complex mixture of organic and inorganic constituents generated during the bitumen extraction process used by the oil sands industry. Currently, oil sands operations utilize large, on-site tailings ponds for storage of OSPW, with over 92.7 km² being used to hold process water for recycling and reuse. Recent work by Redman et al. (2018) demonstrates that solid phase microextraction (SPME)-based passives samplers may be useful tools for hazard assessment of OSPW, as these devices can effectively provide a surrogate measure of dissolved organic contaminant residues that can bioaccumulate and cause adverse effects in aquatic organisms. This work has been led by industry researchers and supported by Canada's Oil Sands innovation Alliance (COSIA). However, before this approach can be deployed under the Oil Sands Monitoring (OSM) program, several laboratory and field-based studies are required to establish effectiveness. The overall goal of this proposed project is to demonstrate the efficacy of SPME-based passive samplers for robust, cost-effective hazard assessment of OSPW.

Ecological Controls on the Hydrologic Response to Climate Change and Extreme Events in the Canadian Rockies

This study will provide: 1) an improved understanding of wetland, forest and high mountain hydrological function (evapo-transpiration, mountain forest-snow interactions, groundwater – surface water interactions, subsurface storage); 2) benchmarks for assessment of landscape change that can influence the resilience of Rocky Mountain water supply; and 3) hydrological datasets, along with the CRHM and MESH models, to determine the effects of climatic variability/change and anthropogenic disturbance on southern Alberta's water supply. This will allow for the establishment of climate and land cover change tipping points that will help quantify the resilience of alpine water supplies.

The key goals of this project include:

- to advance our knowledge of the hydrological functioning of mountain basins by building on recent and ongoing enhanced mountain hydrometeorological observations of snow, soils, wetlands, forests, lakes, streams and groundwater, and recent advances in cold regions mountain hydrological modelling;
- to acquire a better physical understanding of the whole suite of mountain wetland and forest hydrological processes that control snowmelt, water storage, evapotranspiration and runoff generation; and
- to incorporate new advances from this understanding into the CRHM and MESH models across a range of scales, and explore the water-storage role of wetlands and the hydrological impact of current and future scenario forest covers, soil disturbances,

changing mountain forest-snow interactions, due to changing land-use and climate, on mountain wetlands.

Improving Resilience to Drought in Alberta through a Simulation

A drought evolves slowly, and its beginning and end tend to be unclear. Managing a drought involves complex monitoring, decision-making, and communication before, during, and after its occurrence to mitigate the impacts proactively and respond effectively. Droughts are often difficult to anticipate and strategize for when not in a time of drought. Simulation exercises provide an opportunity to work through one or multiple scenarios that closely mimic real-life acute and/or chronic drought events and can be a powerful tool to test management structures and communication strategies. The purpose of this work is to use appropriately scoped and scaled simulation(s) to assist the Government of Alberta, municipalities, Indigenous communities and other groups (e.g., WPACs, Alberta Irrigation Districts Association) to understand and plan for drought preparation and response. This includes mitigation, monitoring, decision-making, and communication before, during, and after a drought. Further information on the project can be found at:

<https://www.awchome.ca/projects/improving-drought-resilience-alberta-through-simulation-24/>

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Further Information

Water Innovation Program (WIP): <https://albertainnovates.ca/programs/water-innovation/>

Major Projects

Background

For this update, major projects are characterized as projects where an environmental impact assessment (EIA) report is required under the Environmental Protection and Enhancement Act (EPEA).

The status provided does not include phases that are outside of the jurisdiction of Alberta Environment and Parks and the Alberta Energy Regulator, such as Joint Panel decisions. The Alberta Board Member will seek to integrate this status in future agency reports.

Status

AHP Development Corporation Amisk Hydroelectric Project

- Regulator: Environment and Parks
- Activity Type: Power Plant
- Proposal for a 330 megawatt hydroelectric project located on the Peace River, approximately 15 kilometres (km) upstream of Dunvegan, Alberta, in northwestern Alberta. Project components would consist of a powerhouse, spillway, headpond, fish passage, access roads,

connecting transmission line and substation and other construction-related components (for example: cofferdams, quarries, camp, laydown areas, etc.)

- Location: on the Peace River, approximately 15 km upstream of Dunvegan Township 80, Range 6, W6M, Saddle Hills County, Clear Hills County, MD of Fairview No. 136, and MD of Spirit River No. 133.
- Project Stage:
 - Final Terms of Reference were issued for this project on February 3, 2016.
 - Awaiting submission of the EIA/Application.

Alberta Transportation Special Areas Water Supply Project

- Regulator: Environment and Parks
- Activity Type: Water Management
- The Special Areas Water Supply Project is a multi-purpose water supply project that would divert water from the Red Deer River to a large area in east-central Alberta, including the Special Areas. The proposed project consists of a pump station and pipeline to divert water from the Red Deer River southwest of Stettler through a 97.5 kilometre pipeline to a storage reservoir at the headwaters of Sounding and Berry creeks at the north-western boundary of the Special Areas. Water would be distributed within the Sounding and Berry Creek basins through existing streams, improved natural channels, and canals. A number of multi-purpose reservoirs would store and release water throughout the system.
- Location: east-central Alberta, Townships 27-38, Ranges 1-22, W4M, County of Stettler, County of Paintearth, and Special Areas 2, 3 and 4.
- Project Stage:
 - The final terms of reference were issued for this project on March 22, 2018.
 - Awaiting submission of the EIA/Application.

Alberta Transportation Springbank Off-Stream Reservoir Project

- See “Springbank Off-Stream Reservoir” below.

Benga Mining Limited Grassy Mountain Coal Project

- Regulator: Alberta Energy Regulator
- Activity Type: Coal
- Proposal to construct and operate an open-pit metallurgical coal mine with production capacity of a maximum of four million tonnes of clean coal per year, over a mine-life of about 25 years.
- Location: approximately 7 km north of Blairmore, Townships 8 & 9, Ranges 3 & 4, W5M, Ranchland, Crowsnest Pass.
- Project Stage:
 - The EIA report and applications were originally submitted in November 2015.
 - The AER completed a preliminary review of the environmental assessment report and determined on January 25, 2016, that Benga needed to address a number of major deficiencies before the review could continue.
 - On October 25, 2017, Benga Mining Limited submitted updated applications and the EIA report. An addendum was also submitted on November 9, 2017.
 - Requests for supplemental information were sent by the AER on December 20, 2017, and August 10, 2018.
 - A Joint Review Panel was established on August 16, 2018. Requests for further supplemental information were sent by the Joint Review Panel between March 2019, and May 2020. A total of 12 addenda were submitted by Benga.
 - On June 25, 2020, the Joint Review Panel notified the company that the EIA report is complete pursuant to section 53 of EPEA.

Canadian Natural Resources Limited Horizon North Pit Extension

- Regulator: Alberta Energy Regulator
- Activity Type: Mine
- Proposal to develop a northeast mine pit extension (NPE Project) to sustain production rates of the approved North Mine Pit at the Horizon Oil Sands Processing Plant and Mine. The project is expected to include the following changes to the Horizon Mine: extension of the approved north mine pit to include the NPE Project area (1,015 ha); additional overburden storage areas (2,396 ha); and updated closure and reclamation plans.
- Location: 70 kilometres north of Fort McMurray and approximately 20.5 kilometres north of Fort McKay, Townships 96 & 97, Ranges 11 & 12, W4M, Wood Buffalo.
- Project Stage:
 - The EIA report was submitted on April 30, 2018.
 - Requests for supplemental information were sent on August 30, December 18, 2018, and February 3, 2020. The company submitted supplemental information on October 20, 2018, January 31, July 4, November 29, 2019, and March 3, 2020.
 - On April 7, 2020, the designated Director of Environmental Assessment notified the company that the EIA report is complete pursuant to section 53 of EPEA.

Canadian Natural Resources Limited Pike 2 Project

- Regulator: Alberta Energy Regulator
- Activity Type: In-Situ
- Canadian Natural Resources Limited (CNRL) is proposing a new in situ oil sands project in the Southern Athabasca Oil Sands region. To recover bitumen resources from the McMurray formation, steam assisted gravity drainage (SAGD) technology and diluent co-injection and cogeneration will be employed. The project will include a central processing facility (CPF), well pads, source water and disposal well sites, pipelines, roads and power lines. The Project is expected to produce up to 70,000 barrels per day (bpd) of bitumen.
- Location: approximately 40 km southeast of Conklin, Townships 73 & 74, Ranges 4-6, W4M, Lac La Biche County.
- Project Stage:
 - The EIA report was submitted by Devon Canada Corporation on December 19, 2018.
 - On June 27, 2019, CNRL acquired the assets of Devon Canada Corporation.
 - Requests for further information were sent to the company on March 22, July 10, August 26, and December 6, 2019. CNRL submitted supplemental information in May 6, July 30 and August 29, 2019, and on January 24, 2020.
 - On March 5, 2020, the designated Director of Environmental Assessment notified the company that the EIA report is complete pursuant to section 53 of EPEA.

Castle Mountain Resort Inc. Future Development

- Regulator: Environment and Parks
- Activity Type: Recreation
- Castle Mountain Resort Inc. is proposing an expansion of their winter ski and snowboard resort to include summer activities, increase their winter activities and develop additional base area facilities to accommodate a larger number of visitors.
- Location: Approximately 45 km southwest of Pincher Creek, Township 4, Range 4, W5M, Pincher Creek #9.
- Project Stage:
 - The Director has considered advice received from government agencies and statements of concern received from the public, and has issued a screening report

outlining the decision to require Castle Mountain Resort Inc. to prepare an EIA for their Master Development Plan.

Coalspur Mines (Operations) Ltd. Vista Coal Mine Phase II Project

- Regulator: Alberta Energy Regulator
- Activity Type: Coal
- Coalspur is proposing an expansion of their approved Vista Coal Mine and would operate the mine as one complex with the potential to increase the average annual production by approximately 4.2 million tonnes. The Vista Coal Mine – Phase II would be a westward continuation of the existing open pit surface coal mine to recover the same Val d’Or, McLeod and McPherson seams, using the same methods and infrastructure.
- Location: 3.5 km east of Hinton, Township 51, Ranges 23 and 24, W5M, Yellowhead County.
- Project Stage:
 - Final terms of reference were issued for this project on June 18, 2019.
 - Awaiting submission of the EIA/Application.

Montem Resources Alberta Operations Ltd. Tent Mountain Project

- Regulator: Alberta Energy Regulator
- Activity Type: Coal
- Montem Resources Alberta Operations Ltd. (Montem), a wholly-owned subsidiary of Montem Resources Corp., is proposing to develop the Tent Mountain Project (the project). The project would include a surface coal mine, a coal preparation plant and associated infrastructure including a coal conveyor system and a rail load-out facility. The total project area would be confined to the existing Mine Permit area of 750 hectares and the mine production would average 1.2 million tonnes of metallurgical coal per year.
- Location: approximately 16 km west of Coleman, Crowsnest Pass.
- Project Stage:
 - Final terms of reference were issued for this project on May 26, 2021.
 - Awaiting submission of the EIA/Application.

Pembina Gas Services Ltd. Two Lakes Sour Gas Processing Facility

- Regulator: Alberta Energy Regulator
- Activity Type: Sour Gas Processing Facility
- The project is a sour gas processing facility capable of processing up to 200 million cubic feet per day of raw sour inlet gas containing up to 8% H₂S. The proposal is to take in sour gas from the surrounding area and produce sales gas (methane), natural gas liquids (NGLs – used to make ethane, propane and butane), and condensate. The project includes a raw gas, hydrocarbon liquids inlet; produced water separation and handling processing unit; an amine sweetening unit; a gas processing and NGL recovery unit; a sulphur recovery unit to create liquid sulphur from recovered H₂S; a condensate stabilization processing unit; and natural gas compression for sweet sales gas.
- Location: Approximately 45 km southwest of Grande Prairie, Township 68, Range 9, W6M, Municipality: Municipal District of Greenview No. 16.
- Project Stage:
 - The EIA report and applications were submitted on October 2018.
 - Requests for supplemental information were sent on January 28, and April 26, 2019. The company submitted supplemental information on February 15, March 15, and May 3, 2019.
 - On June 7, 2019, the designated Director of Environmental Assessment notified the company that the EIA report is complete pursuant to section 53 of EPEA.

Suncor Energy Inc. Base Mine Extension Project

- Regulator: Alberta Energy Regulator
- Activity Type: Mine
- The Project consists of an oil sands mine and associated activities as an extension of the Base Plant operation near Fort McMurray, Alberta. The project includes an open pit mining operation supplying oil sands to new bitumen froth production facilities (primary extraction). Bitumen froth would be delivered by pipeline to the Base Plant for further processing, including secondary extraction and upgrading into various product blends for market. Further integration between the project and Base Plant includes utilities and water systems. There would be external and in-pit tailings areas on the project footprint. These facilities would be constructed with a combination of overburden and coarse tailings deposits. These areas, which provide off-stream storage of water that is recycled, would be the final location for coarse tailings deposits and treated fluid tailings deposits. The project is expected to produce up to 80 million barrels per year (nominally 225,000 barrels per day) of bitumen froth during its estimated 25-year operational life.
- Location: adjacent to Base Plant and north of the city of Fort McMurray, Townships 90-92, Ranges 9-11, W4M, Wood Buffalo.
- Project Stage:
 - Final terms of reference were issued for this project on June 7, 2021.
 - Awaiting submission of the EIA/Application.

Suncor Energy Inc. Lewis Project

- Regulator: Alberta Energy Regulator
- Activity Type: In-Situ
- Proposal for in situ extraction with an estimated total bitumen production of 160,000 bpd and an operational life of up to 40 years. The project would be developed in four phases, supported by cogeneration of electricity to be constructed within the first two phases. Project components include gas-fired steam generation including some cogeneration, water treatment and recycling, bitumen treatment, multi-well production pads, steam delivery pipelines, product recovery pipelines, local access roads, and borrow pits.
- Location: approximately 25 km northeast of Fort McMurray and 18 km southeast of Fort McKay, Townships 91-93, Ranges 5-8, W4M, Wood Buffalo.
- Project Stage:
 - The EIA report and applications were submitted on February 2018.
 - Requests for supplemental information were sent on June 18, December 17, 2018 and March 21, 2019. The company submitted supplemental information on October 31, 2018, February 4, and May 24, 2019.
 - On March 6, 2020, the designated Director of Environmental Assessment notified the company that the EIA report is complete pursuant to section 53 of EPEA.

Value Chain Solutions Inc. VCS-Heartland Complex Expansion

- Regulator: Alberta Energy Regulator
- Activity Type: Upgrader
- Value Chain Solutions Inc. ("VCS"), a wholly owned subsidiary of Value Creation Inc., is proposing an expansion to the previously approved Value Creation Inc.'s Heartland Oil Sands Processing Plant (Bitumen Upgrader and Refinery), named Value Chain Solutions-Heartland ("VCS-H") Complex, formally Heartland Upgrader Project. The expansion will increase the capacity of the approved VCS-H Complex in total of up to ~119,240 m³/day (~750,000 bpd).
- Location: northeast of Edmonton in the Industrial Heartland, Townships 56, Range 21, W4M, Strathcona County.

- Project Stage:
 - Final terms of reference were issued for this project on March 10, 2020.
 - Awaiting submission of the EIA/Application.

Further Information

- Alberta maintains a list of current projects that are in the environmental assessment process on the AEP website: <https://www.alberta.ca/environmental-impact-assessments-current-projects.aspx>
- To view current or historical environmental impact assessments (EIAs), please see the Environmental Impact Assessments webpage at <ftp://ftp.gov.ab.ca/env/fs/EIA/> or contact the respective company directly.

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Springbank Off-Stream Reservoir

Background

In 2013, southern Alberta and the City of Calgary were impacted by flooding from the Elbow and Bow Rivers caused by rainfall. The floods resulted in more than \$5 billion in damages and recovery costs. Five people died, 100,000 people had to be evacuated, 4,000 businesses were impacted, and 3,000 buildings were flooded.

Following the flood, Alberta began implementing a systems approach to providing flood mitigation for southern Alberta, including the city of Calgary. This approach includes flood mitigation structures along both the Bow and Elbow Rivers. The Springbank Off-Stream Reservoir (SR1) is a critical component of Alberta's flood mitigation objectives along the Elbow River.

SR1 will be a dry reservoir that temporarily stores floodwater and, in conjunction with the capacity of the permanent Glenmore Reservoir in Calgary, would accommodate floodwaters at the levels generated in the 2013 flood. SR1 covers more than 3,600 acres and will be located 15 kilometres west of Calgary (near Springbank Road, north of the Elbow River, and predominantly east of Highway 22). It would be completely filled during a 1:200-year flood event, and will release the water back into the river in a controlled manner once the flood subsides. As an off-stream reservoir, it is non-obtrusive to the Elbow River. No water will be held in the reservoir on a permanent basis. Although it is not possible to predict future floods, historical flood events indicate SR1 could be expected to operate approximately once every 8 to 10 years.

Without flood mitigation every spring, Calgary is at risk of another flood on the Elbow River similar to the one experienced in 2013. In September 2014, after reviewing various flood mitigation options, SR1 was announced as the project that government would advance through the regulatory process as the preferred flood mitigation infrastructure along the Elbow River. In order to proceed, regulatory approval was required through both federal and provincial governments. SR1 was reviewed by the Impact Assessment Agency of Canada (IAAC) under the *Canadian Environmental Assessment Act, 2012*.

On July 8, 2021, IAAC released its decision that the project is not likely to cause significant adverse environmental effects, and the project was approved by the Minister of Environment

and Climate Change Canada. SR1 was also reviewed provincially by Alberta Environment and Parks and the Natural Resources Conservation Board (NRCB). Alberta Environment and Parks deemed the SR1 Environmental Impact Assessment (EIA) complete on February 3, 2021. The NRCB conducted a hearing to determine if the SR1 project was in the public interest from March 22 to April 7, 2021. On June 22, 2021, the NRCB approved the SR1 project, concluding that it is in the public interest.

In addition to design and regulatory review, Alberta Transportation has been engaging with landowners to secure land needed for SR1. Alberta has sought voluntary acquisition wherever possible. Expropriation would be used only in the event that voluntary acquisition was not successful once the project had been approved. Through the negotiation process for lands acquired to date, Alberta Transportation has upheld the principles of the *Expropriation Act*; these include ensuring that landowners receive the fair market value of the lands as well as reasonable damages and any other compensation to which a landowner may be entitled under the *Expropriation Act*. Alberta Transportation also engaged with stakeholders and Indigenous groups throughout the project to understand and address any concerns, provide project information, and respond to questions. This work is ongoing throughout the life of the project.

Status

Following the decisions by ECCC and the NRCB, Alberta Transportation has been working to conclude the land acquisition for SR1 and has been undertaking procurement so that construction could begin in early 2022. The procurement process involves a Request for Quotation, which was issued in early August 2021, as well as a tender which was issued in October 2021. Alberta Transportation will assess the tenders received and select a prime contractor for the SR1 project prior to construction. Following conclusion of procurement and land acquisition, Alberta Transportation will begin construction, which will take three construction seasons to complete.

Through Alberta Transportation's consultation and engagement efforts, the project has been able to address or respond to concerns or questions raised by Indigenous groups and stakeholders. Alberta Transportation has concluded consultation on the SR1 project; however, engagement on the project is ongoing and will continue for the life of the project.

Further Information

Alberta Transportation provides regular updates on SR1 through the project website and regular email updates to stakeholders who have registered for the email distribution list. For more information, interested stakeholders can contact the project team through the SR1 project inbox (springbank-project@gov.ab.ca) or visit the project website (www.alberta.ca/about-springbank-off-stream-reservoir.aspx).

Contact

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5. Other

Watershed Partnerships

Background

Water for Life, Alberta's Strategy for Sustainability, embraces a philosophy of shared responsibilities, partnership and collaboration with other governments, stakeholders, Indigenous people and local volunteer groups to manage watersheds.

Watershed Planning and Advisory Councils (WPACs) continue collaboratively working on preparing and implementing Integrated Watershed Management Plans and supporting sub-basin plans across Alberta.

Status

- Sturgeon River Watershed Management Plan – completed by WPAC-led municipal alliance
- Wabamun Lake Watershed Management Plan – completed by WPAC-led steering committee
- Lac La Biche Watershed Management Plan – completed by municipality
- Heart River Watershed Management Plan – led by the County of Sunrise – in progress
- Moose Lake Watershed Management – led by MD of Bonnyville – in progress
- Wapiti River Source of Drinking Water Protection Plan – completed in partnership between local municipalities, utility operator, Mighty Peace Watershed Alliance and AEP

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Watershed Planning and Advisory Councils (WPACs)

Background

Watershed Planning and Advisory Councils (WPAC) are non-government, multi-stakeholder organizations designated by the province under *Water for Life - Alberta's Strategy for Sustainability* (2003), renewed in 2008. Their precise membership varies, but they generally include regional industries, environmental non-government organizations, provincial government departments, municipal and federal government representatives, First Nations, and Métis. Their roles include watershed assessment and state of the watershed reporting, integrated watershed management planning and education. They bring interested parties together to address watershed issues and encourage collaboration.

There are eleven WPACs in Alberta with one designated for each of Alberta's major river basins. Three WPACs are found in the Mackenzie River basin;

- Mighty Peace Watershed Alliance
- Athabasca Watershed Council
- Lesser Slave Watershed Council (This is the only lake-based WPAC. Lesser Slave Lake is in the Athabasca River basin.)

The Alberta Government provides funding for the 11 Councils' core operations (\$2.72 million in 2021 -22) and has representatives on their boards of directors. The government also provides funding, staff resources and information to support specific WPAC projects. There is

considerable collaboration between the government and its WPAC partners and there is ongoing communication to encourage alignment with current government objectives.

Status

The following provides highlights from the past year for each of the WPACs.

Lakeland Industry and Community Association (LICA)

LICA serves as the WPAC for the Beaver River watershed.

Integrated Watershed Management Plan (IWMP)

LICA is working collaboratively with stakeholders and Indigenous peoples to develop an Integrated Watershed Management Plan (IWMP) for the Beaver River watershed. The Beaver River watershed is within the traditional lands of the Dene, Cree, and Métis. This recognition represents respect and gratitude to share in the land and honours our responsibility to truth and reconciliation as members of Treaty 6, 8, and 10 territories and the Métis Homeland. An IWMP is a guidance document and planning tool for resource managers, including governments, planners, Indigenous communities, other stakeholders, and landowners who manage water and land resources. The plan will identify goals for improving and/or maintaining watershed health and will make recommendations on how to reach those goals. A watershed is the area of land where all rain and snow melt flow to a common waterbody, in our case, the Beaver River.

X-Stream Science Programs

Programs were modified and delivered to summer day camps and the Muriel Lake Basin Management Society (MLBMS). A total of 10 X-Stream Science sessions were provided to multiple summer day camps at lakes, ponds, and other wetlands. As participation was from younger age groups than what the program is designed for and accommodating COVID-19 guidelines, a modified version was used to teach kids about bioindicators, benthic macroinvertebrates, healthy water bodies, and ecosystems. An additional program was delivered to MLBMS volunteers who completed field work and sampled water in creeks to determine local water quality

Alberta Lake Management Society – Lake Watch 2020

LICA partnered with the Alberta Lake Management Society (ALMS) to fund water quality monitoring in 5 lakes as part of the LakeWatch 2020 program. The program enlists volunteers to help collect water quality data such as water temperature, clarity, and chemistry; nutrient levels; and invasive species. Lakes sampled in 2020 included: Crane, Jessie, Moose, Muriel, and Skeleton (north and south). ALMS compiles analyzed data into summary reports and conducts long-term trend analysis for lakes with 10 or more years of data. To see the individual lake reports, please visit our website www.lica.ca/resources/ or visit the ALMS website www.alms.ca/reports. Results can help determine if and what kinds of management efforts need to be taken to improve or sustain water quality. Since every lake is different, examining changes in parameters at a single lake over time is more valuable than comparisons between lakes to understand water quality and management needs.

Riparian Health Assessment

LICA is involved in several programs aimed at promoting riparian health:

Tree Planting: Jessie Lake Restoration Project -The Jessie Lake Restoration Project has been ongoing since 2016 in partnership with the Town of Bonnyville to help improve lake aroma and quality. Since a 2019 riparian assessment indicated a need for more woody

vegetation, a total of 5,000 red osier dogwood seedlings were planted in the riparian area along the Jessie Lake trail between 42nd and 55th streets, and 7,500 willows between 55th and 58th streets near the rodeo grounds.

Riparian Assessment I - information about current riparian condition is valuable to help guide management planning strategies. LICA has contracted Fiera Biological Consulting (Fiera) to conduct a riparian assessment of the Jackfish-Muriel Creeks sub-watershed. This assessment examines riparian intactness and pressure and combines the results to develop a prioritization assessment. Riparian intactness is a relative scale-rating assessed within 50 meters of the shoreline. Areas dominated by natural vegetation are considered highly intact, and areas dominated by human-created features (e.g. roads, houses, agricultural crops) are considered to have very low intactness. Pressure considers natural and human caused factors in the greater watershed that may place additional pressure on riparian areas.

Mighty Peace Watershed Alliance

Wapiti Watershed Source Water Protection Plan

Background – The Wapiti Watershed has the largest population in the Peace Watershed and a Water Management Plan was completed. This Water Management Plan was triggered by a request from the main water utility operator to have its licenced withdrawal allocation increased. This Watershed Management plan focussed on water quantity and identified the need for a follow-up process to address water quality (i.e. a source water protection plan).

Status – The Wapiti Watershed Source Water Protection Plan was completed in February 2021 by a project team. Work on this plan was led by the Mighty Peace Watershed Alliance (MPWA) in collaboration with local municipalities, industry stakeholders and agriculture producers. The completed plan employed risk assessment to identify the greatest risks to source water in the Wapiti watershed. Cumulative effects were identified as the greatest risk. Mitigative strategies were identified and as part of the implementation process, MPWA engaged decision makers on these recommendations.

Further Information - [Wapiti Watershed Source Water Protection Plan - Mighty Peace Watershed Alliance](#)

Smoky Headwaters Initiative

Background – The Smoky River headwaters are located in the Alpine, Subalpine, Upper and Lower Foothill natural regions of Alberta and provide habitat for coldwater fish, including Bull Trout (*Salvelinus confluentus*) and Arctic Grayling (*Thymallus arcticus*) which are listed on provincial and federal Species-at-Risk lists. Increasing development has created a road network that is delivering more sediment to the Smoky Headwaters. With the additional stressor of climate change, coldwater fish are going to need habitat refugia with low turbidity and temperatures.

Status – Mighty Peace Watershed Alliance is leading a project to improve Coldwater fish habitat in the Smoky Headwaters. The READI model was run to identify high-sediment road segments with 2 sets of small, paired watersheds in the Smoky Headwaters. Field verification confirmed that the model had identified the key points of sediment delivery in the watershed. A riparian shading model is also being run to identify potential opportunities to enhance riparian shading. Based on the results of this work, workplans to mitigate sediment delivery and enhance riparian shading will be completed. Education and Outreach is an ongoing

component of this project and focuses on sharing knowledge around aquatic species at risk, their habitat needs and stewardship of this habitat.

Further Information - [Smoky Headwaters Initiative - Mighty Peace Watershed Alliance](#) and the Facebook page for Mighty Peace Watershed Alliance.

Lake Keepers

Background – Alberta Lake Management Society (ALMS) has created a program for volunteers to gather baseline information on lakes that they visit. This program serves to add to baseline data on a range of lakes and to foster a stewardship ethic among lake users.

Status – In partnership with ALMS, MPWA has coordinated and trained volunteers who sampled 3 lakes in the winter of 2020 and 6 lakes in the summer of 2021 – Lac Cardinal, Snipe Lake and Wadlin Lake (winter); Graham Lake, Haig Lake, Snipe Lake, Swan Lake, and Wadlin Lake (summer). The winter program also included chlorophyll monitoring aimed identifying algal species.

Further Information - [Healthy Lakes for Alberta's Future - ALMS](#)

Flood and Drought Resiliency Projects

Background – Human activity on the landscape has impaired how watersheds function and the ecological goods and services that accrue to humans. A range of projects has been undertaken with partners in order to initiate restoration of particular degraded components within the watershed that are critical for flood and drought resiliency.

Status – Three projects funded through the Watershed Resiliency and Restoration program have/are increasing flood and drought resiliency by restoring banks, inducing meandering, restoring riparian zones, increasing wetland retention and re-establishing flood plains. Streambank Stabilization and Extension was completed in December 2020, although ongoing monitoring continues. The Improved Livestock Crossing project will finish in December 2021 with the installation of 5 improved crossing structures for livestock and equipment. The Wapiti Watershed Bank Stabilization project is still ongoing, with multiple sites on the Beaverlodge River that underwent bioengineering being monitored. A site on the Bear River will create a floodplain, retain a wetland and re-establish riparian zones.

Athabasca Watershed Council (AWC)

Integrated Watershed Management Plan (IWMP)

The IWMP is to provide recommendations in a plan with the intention of integrating watershed management in the Athabasca River Watershed, taking into consideration the *Water for Life* strategy, AWC goals, and other water and land initiatives. The goal of this document is to ensure the Athabasca River Watershed remains healthy and resilient, within its range of natural variability, for current and future generations. The technical committee released the plan in June 2021 to the public for feedback and input. It is available on the AWC website (<https://awc-wpac.ca/iwmp/>). The AWC has applied for funding to bring the document to indigenous partners and stakeholders for discussion and input. The plan is expected to be completed March 2022.

Pembina River Watershed Shorelines Project

The AWC received grant funding from the Watershed Resiliency and Restoration Program (WRRP) to mitigate the effects of flood and drought in the Pembina River Watershed. This sub-watershed has been identified as a high priority in the AWC's State of the Watershed

Reports ([2011-2014](#)) and the WRRP [priority areas](#) for flood, drought, and water quality, relative to the other sub-watersheds in the Athabasca River Watershed. The goal of this project is to increase watershed resilience through wetland and riparian habitat assessment, education, restoration, and conservation. Financial support from Transmountain Pipeline and Plains Midstream also assists this project.

Fiera Biological Consulting (Fiera) has developed four reports on the state of riparian areas in the Pembina River Watershed that are available on the AWC [website](#). A [presentation](#) on the state of riparian areas was held for partners in June 2021. Guest speakers attended from Fiera, the North Saskatchewan Watershed Alliance (NSWA), and Highway 2 Conservation. In collaboration with the NSWA, the AWC has made the data from the Fiera Riparian assessment available on the [Riparian Web Portal](#). The AWC is directly working with not-for-profit organizations and local landowners to restore areas in the Pembina River Watershed. An advisory committee for the watershed is also in development to share resources, partnership opportunities, and initiate the development of a state of the watershed report for this sub-watershed.

Education and Outreach

The AWC's Children's Program has been directed virtually to youth through presentations. Presentations to classrooms and students throughout the watershed have been to discuss the Athabasca River Watershed, watershed science, and how to highlight a specific area in the watershed to enter the AWC's annual [calendar contest](#). The AWC has also started a NatureLynx group to encourage more citizen science participation across the watershed.

Upper Athabasca River Watershed Biomonitoring Project

The AWC is in the first year of a biomonitoring [project](#) in collaboration with the Eastern Slopes Community-Based Aquatic Monitoring [Collaborative](#). The goal of the collaborative is to collect benthic invertebrates and test water quality parameters over time along the Eastern Slopes of Alberta's Rocky Mountains. The collection of this information will enable the AWC to be knowledgeable about water quality and benthic invertebrate communities in this region to be able to respond to changes over time. August 2021, the AWC has completed necessary training and identified local study objectives and monitoring sites. In October 2021, the AWC staff will collect data from tributaries in the Upper Athabasca River Watershed using the national [CABIN](#) sampling protocol and [STREAM](#) eDNA metabarcoding analysis. This project is financially supported by Alberta Ecotrust and Alberta Conservation Association.

Lesser Slave Watershed Council (LSWC)

Tributary Water Quality Monitoring

- Due to limited and dated water quality information for the watershed, and recommendations out of the Lesser Slave Integrated Watershed Management Plan, the LSWC began a Tributary Monitoring Program in 2017 and collects samples and measurements at 15 tributary sites, and one site on the Lesser Slave River. The program costs are funded by forest and oil and gas sector contributions.
- The LSWC will be wrapping up year five, and once the five-year summary is complete, will be evaluating and tweaking the program for Spring 2022.

Supporting Watershed Resiliency

- Since 2015, with support from the Provincial Watershed Resiliency and Restoration Program, the LSWC has built partnerships and increased capacity to deliver and support on the ground projects that improve watershed resiliency. To-date we have had success in working with agricultural landowners to implement best management practices such as riparian fencing, off

stream watering solutions, and sediment reduction activities like small crossings, and revegetation of riparian areas. The LSWC along with partners also plan and deliver educational events, and support the completion of Environmental Farm Plans.

- The LSWC has WRRP support until the end of 2023.

Riparian Assessments

- With support from the Federal Environmental Damages Fund in 2020, the LSWC hired Fiera Biological to conduct a riparian intactness and risk assessment for the West Prairie River and its 2 major tributaries. The West Prairie River is the source water for the Town of High Prairie and part of Big Lakes County, and the watershed sees an array of land use including forest harvest, oil and gas development, agriculture, the community of High Prairie and many acreages. Past water quality monitoring has shown high fecal coliform counts, and high suspended solids. This report will enable the LSWC and local partners to focus in on areas of high priority and plan restoration work with landowners. The project information is shared on the Alberta Riparian Web Portal, where it is viewable.
- This project has been completed.

Further Information

For further information about Watershed Planning and Advisory Councils, see <https://www.alberta.ca/watershed-planning-and-advisory-councils.aspx>

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