

# Water Conservation Policy for Upstream Oil and Gas Operations



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Water Conservation Policy for Upstream Oil and Gas Operations

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# Introduction

*Water for Life: Alberta's Strategy for Sustainability* has been the vehicle for managing Alberta's water resources since 2003. The strategy has three main goals:

- Safe, secure drinking water.
- Healthy aquatic ecosystems.
- Reliable, quality water supplies for a sustainable economy.

The *Water for Life* strategy also contains three core areas of focus to help achieve the goals; one of them is **water conservation**.



In response to concerns raised during public consultation of Alberta's *Water for Life* strategy in 2003, the Advisory Committee on Water Use Practice and Policy was formed to examine the use of surface water and non-saline (fresh) groundwater for underground injection.

Based on recommendations from the Committee and the outcomes of Alberta's *Water for Life* strategy, the Government of Alberta worked in partnership with representatives of industry, sectoral interest groups, and non-government organizations to develop the 2006 *Water Conservation and Allocation Policy for Oilfield Injection* and the accompanying *Water Conservation and Allocation Guideline for Oilfield Injection*.

The 2006 policy has been used to guide the use and conservation of non-saline water for conventional water flooding and oil sands thermal in situ operations. Overall, performance results have been positive with significant increases in use of saline water and non-saline water productivity improvements.

Building on these positive results, an opportunity presents itself to apply the principles of wise water management to other energy subsectors. Oil sands mining continues to be the largest water user in the oil and gas sector. There has been an increase in use of water to support multi-

stage hydraulic fracturing in horizontal wells to develop emerging unconventional oil and gas resources. Forecasts call for expanding water needs for both these energy subsectors.

The *Water Conservation Policy for Upstream Oil and Gas Operations* provides policy direction for water use in major upstream oil and gas operations where additional water conservation measures are feasible. The policy establishes water conservation direction for guidelines that will be developed for specific subsectors of the upstream oil and gas industry.

This policy replaces the *Water Conservation and Allocation Policy for Oilfield Injection* (2006), incorporating water conservation as a requirement for all major upstream oil and gas operations.

# Part 1

## What's Included in the New Policy?

In comparison to the 2006 policy, this policy places a greater emphasis on the use of alternatives to high-quality non-saline sources<sup>1</sup> such as industrial or municipal wastewater and alternative non-saline groundwater.



The requirement for assessment of environmental net effects, which was included in the 2006 policy, is described in this policy with additional detail. Selection of water sources must consider how the use of various potential sources and technological options might change the overall development plans and resulting environmental impacts of the project. Consideration of various development scenarios must balance and optimize environmental impacts on integrated water, land, air, and biodiversity outcomes, as well as local and regional water conservation outcomes.

The *Water Conservation Policy for Upstream Oil and Gas Operations* introduces specific water policy and direction for:

- oil sands mining operations;
- oil sands thermal in situ operations;
- enhanced oil recovery (water flooding)<sup>2</sup> and “cold bitumen” enhanced recovery operations; and
- multi-stage hydraulic fracturing operations in horizontal wells.

Efforts to develop Alberta’s energy resources with new technology that reduces water use will form an important component of the overall initiative to minimize the use of high-quality non-saline water in the upstream oil and gas sector. These efforts include industry research and development initiatives, initial in-field pilot testing, joint industry-government research programs, and government initiatives to develop effective environmental management systems. Flexible

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1 Defined for purposes of this policy as non-saline groundwater and surface water supplies that support instream and aquatic ecosystem needs and/or are useable with standard treatment technologies for drinking water supplies and livestock watering.

2 Includes secondary and tertiary enhanced recovery through vertical wells in conventional oil pools and application of secondary or tertiary recovery methods in unconventional formations previously stimulated using the multi-stage hydraulic fracturing technology in horizontal wells.

regulatory tools and incentives will be used, where possible, to achieve water conservation improvements and enable adoption of innovative technological solutions.

The policy includes improvements in water use data management and reporting. Place-based approaches to water management and water conservation require timely reporting of water use and water inventories that are accessible to the Government of Alberta, Indigenous peoples, industry, regulatory agencies, Watershed Planning and Advisory Councils, members of the public, and other stakeholders. The increasing number of scientific research reports and environmental assessments also need to be compiled and must be readily available.

## Policy Overview

### Policy Objective

To enhance the conservation and protection of provincial water resources by managing water use for upstream oil and gas operations by recognizing:

- the preferred use of saline groundwater or alternative non-saline water sources;
- opportunities to minimize high-quality non-saline water use;
- that water is needed to continue the development of energy resources in Alberta; and
- that conservation measures will be proportional to regional water availability and demand.

Minimization of high-quality non-saline water use includes efficiency and productivity improvements; replacing high-quality non-saline water use with saline groundwater, produced water, wastewater and/or non-saline groundwater alternatives; and reducing total water use through technological improvements.

Upstream oil and gas projects must consider technological and water source alternatives that minimize or avoid the use of high-quality non-saline water. The water used should match the lower water quality needs of most oil and gas operations and the water treatment and recycling options that are feasible for each project.

Figure 1 demonstrates the project water source selection hierarchy with the most preferred source at the bottom and the least preferred source at the top. The pyramid provides a general overview of the preferred water source selection on the provincial scale; however, the actual source selection for each project may differ based on regional/site-specific circumstances and operational requirements.

Reuse and recycling as well as productivity and efficiency measures should be applied to all projects notwithstanding the predominant water source selected. However, the policy recognizes that different water sources have different technical limits to reuse/recycling and efficiency/productivity improvements.



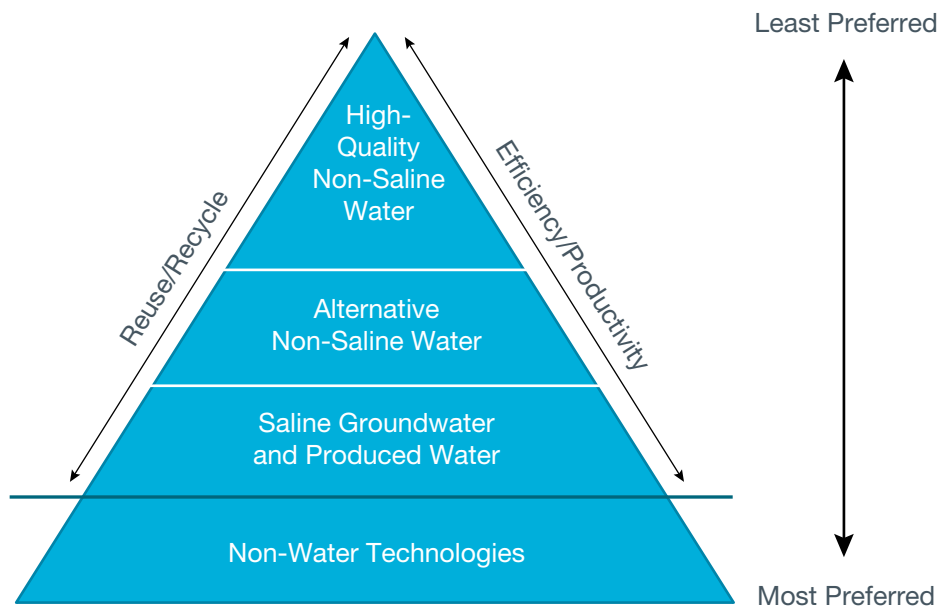


Figure 1: Water Source Selection Hierarchy Pyramid

In regards to water management in water-short areas, the following principles continue to apply:

- New projects within water-short areas that propose to use non-saline water must demonstrate that feasible options have been evaluated in detail to reduce or eliminate (on a case-by-case basis) the use of high-quality non-saline water. Diversion applications must show a risk-based process and environmental net effects evaluation in choosing the water source.
- In circumstances where no feasible alternative exists, consideration should be given to delaying projects until new technology or alternative water sources are available. In some circumstances, non-saline water sources may be available on a seasonal or temporary basis during periods when precipitation and runoff are relatively abundant.

Enhanced monitoring and reporting of industry water use practices and achievement of the policy performance measures will provide assurance that the policy is being implemented effectively.

Indigenous communities have been engaged on various provincial water initiatives and water policy development. In the *Land-use Framework* and associated regional plans, the Government of Alberta has recognized that those Indigenous communities that hold constitutionally protected rights are uniquely positioned to inform land use planning. In accordance with the applicable law and government policy, the Government of Alberta will continue to consult with Indigenous peoples. Planning and development of water management approaches by industry is expected to occur within this context, to the extent it applies to a particular operation at that time.

## Guiding Principles

Table 1 illustrates a set of guiding principles, based on the Water for Life strategy, that apply to all water users in the province and are fundamental to this policy.

Table 1: Guiding Principles

Water for Life Principles	Decisions about water conservation should
All Albertans must recognize there are limits to the available water supply.	Promote and support sustainable development practices.
Albertans must become leaders at using water more effectively and efficiently, and will use and reuse water wisely and responsibly.	Allow transition times for affected sectors to avoid “economic shocks” and impractical technologies.
Citizens, communities, industry, and government must share responsibility for water management in Alberta, and work together to improve conditions in their local watershed.	<p>Respect the expectations of Albertans and Indigenous peoples, who regard water as an important part of their heritage.</p> <p>Consider whether affected stakeholders and knowledgeable experts have been consulted and have had an opportunity to contribute their advice.</p> <p>Consider whether Indigenous peoples have been consulted in accordance with the applicable law and government policy.</p> <p>Ensure fairness to all affected parties.</p>
Knowledge of Alberta’s water supply and quality is the foundation for effective decision-making.	<p>Incorporate the best available science and knowledge, including traditional ecological knowledge, and note gaps or assumptions where improved information is needed.</p> <p>Recognize and build on past efforts.</p>
Alberta must preserve the “first-in-time, first-in-right” principle for granting and administering water allocations, but water allocations will be transferable to ensure societal demands and needs can be met.	Create desirable outcomes for Albertans, including recognition of the benefits of industrial uses of water.
Healthy aquatic ecosystems are vital to a high quality of life for Albertans and must be preserved.	Consider both short-term and long-term effects on society and environment, including cumulative effects and environmental net effects.
Groundwater and surface water quality must be preserved in pursuing economic and community development.	Minimize risks to human or environmental health by ensuring that monitoring and contingency response is in place for unpredictable future risks.

# Policy Goals and Outcomes

## Goal

Ensure reliable and good-quality water supplies to support a sustainable economy, as envisioned in *Water for Life: Alberta's Strategy for Sustainability*.

- outcome** Achieve reductions in existing unused allocations, on a case-by-case basis, in upstream oil and gas operations.
- outcome** Achieve additional improvements in efficiency and productivity of non-saline water used per barrel of hydrocarbons produced (barrel of oil equivalent).
- outcome** Respect water availability for other users and for protection of aquatic ecosystems in areas of high water demand, water-short areas, and areas with supply constraints.
- outcome** Increase understanding and consideration of environmental net effects and full cycle risk implications of alternatives to high-quality non-saline water.

## Goal

Manage provincial water resources allocated for upstream oil and gas operations in a way that achieves the purpose of the *Water Act* and *Alberta Land Stewardship Act*.

- outcome** Contribute to meeting sectoral and river basin targets for conservation, efficiency and productivity of non-saline water use.
- outcome** Enable and encourage water transfers from wastewater sources and other projects as well as the use of the low quality water fit for the purpose.
- outcome** Recognize water-short areas, Government of Alberta water management plans, multi-operator water plans, and regional plans in water allocation decisions.
- outcome** Provide escalating regulatory requirements for cumulative effects management in areas of increasing water demand and escalating development, and areas with supply constraints.

## Goal

Improve data management and information accessibility, with performance reporting and other information easily accessible to the public, stakeholders and Indigenous peoples.

- outcome** Ensure local communities, including Indigenous communities, in areas of new development and increasing water demand are given opportunities to be engaged and have access to water use information.
- outcome** Enhance public access to water licence application information, including water source selection information based on economic and technical feasibility.
- outcome** Expand monitoring, evaluation and reporting of water use and regional water inventory studies.

## Goal

Achieve improvements in partnerships and research initiatives through collaborative actions of government, industry, stakeholder organizations (e.g. Watershed Planning and Advisory Councils), and Indigenous peoples.

- outcome** Support increased research into technology to reduce water use and collaboration and innovation in environmental management.
- outcome** Support water resources research and water use inventory.
- outcome** Facilitate enhanced inclusion of traditional ecological knowledge and Indigenous perspectives in water management by government and stakeholders.

# Part 2

## Policy and Regulatory Relationship

Part 2 describes the key components of the policy. This policy will be implemented through guidelines for *Water Act* licence applications that will be developed for each of the following industry subsectors:

- oil sands thermal in situ operations;
- enhanced oil recovery (water flooding) and “cold bitumen” enhanced recovery operations;
- multi-stage hydraulic fracturing operations in horizontal wells.



The policy direction for oil sands mining operations will be addressed through two key frameworks under the *Lower Athabasca Regional Plan*. The *Surface Water Quantity Management Framework for the Lower Athabasca River* and the *Tailings Management Framework for the Mineable Athabasca Oil Sands* specify regulatory requirements for the management of oil sands mining water withdrawals and management of wastewater in tailings ponds. Development of supplementary guidance beyond the scope of these two frameworks to meet the objective of this policy shall be considered if needed.

Each guideline will provide information regarding:

- expected water conservation practices;
- a risk-based approach to assessing environmental risk in licence applications;
- *Water Act* licence application requirements;
- operational policy relevant to regulation of the subsector;
- additional clarification for key policy components;
- additional outcomes and performance measures;
- additional information relevant to regulation of the subsector.

These guidelines are a fundamental component of the regulatory framework and will be aligned with the objective of the *Water Conservation Policy for Upstream Oil and Gas Operations*.

Further collaboration between the Government of Alberta and the Alberta Energy Regulator will be undertaken to clarify the operational implementation of the various policy components described in Part 2. This will be reflected in the subsector guidelines and/or other regulatory instruments developed by the Alberta Energy Regulator and/or the Government of Alberta.

## Policy Application

The focus of this policy is on upstream oil and gas operations with high or expanding water uses. The policy recognizes that activities such as single-well drilling and exploration stage development, subject to local environmental context and interaction of a project with other projects and water users in the vicinity, may not have achievable water conservation opportunities; and alternative source evaluation requirements under the policy are typically not applicable to these activities. Applications for *Water Act* licences for single-well drilling and exploration stages of development will continue to require evaluation of potential environmental impacts based on considerations set out in Section 51 of the *Water Act*. Regulatory staff may require additional evaluation on a case-by-case basis.

This policy applies to injection and recovery facets of upstream oil and gas operations. It recognizes that certain supplementary activities (e.g. drilling above the base of groundwater protection, dust control, camp water supply) will continue to require high-quality non-saline water and are, therefore, exempt from the provisions of this policy.

This policy applies to the allocation of non-saline groundwater and all surface water resources. It applies to all *Water Act* licence applications and to the renewal of existing term licences.

Holders of permanent licences (issued under the *Water Resources Act*) are encouraged to cooperate with the intent of this policy and its guidelines, and according to the specific conditions of their licences.

## Geographic Area of Policy Application

This policy will apply to all areas of the province where the *Water Act* is administered over upstream oil and gas operations.

The specific requirements of this policy, and the provisions of guidelines developed in accordance with this policy, may vary in some areas of the province subject to the provisions of Government of Alberta water management plans and regional plans under the Land-use Framework, where applicable.

## Evaluation of Water Sources

To achieve the broad objective of minimizing the use of high-quality non-saline water balanced with environmental net effects considerations, applicants must investigate the availability of alternative options prior to applying to develop a non-saline water source.

Information from the investigation of alternatives, environmental net effects evaluation, and other relevant data must be submitted with an application for non-saline water use. The applicants must address any specific restrictions and requirements set out in a guideline relevant to a licence application. Additional requirements or more stringent restrictions may apply on a regional or a site-specific basis.

## Risk-based Assessment

Applicants must assess environmental risks according to a risk classification system (further described in subsector guidelines). A higher risk classification will result in increased requirements for evaluation of alternative sources and considerations of other water conservation measures. This system will require an increased emphasis on water conservation and replacement of high-quality non-saline water sources in water-short areas and in areas where effects on community water supplies and aquatic ecosystems are significant.

Risk assessment may vary between subsectors and according to risk factors that vary geographically.

## Quantity Limitations

In order to ensure the sustainable use of water resources, protection of aquatic ecosystems and water availability to other users, some fundamental quantity limitations are needed to implement the policy. Evaluation of quantity limitations is a key component of all water licence application procedures.

### Surface Water

Quantities of surface water available for licensing may be limited by requirements for conservation objectives, aquatic ecosystem protection, environmental and instream flows, transboundary apportionment agreements, allocations granted to previous licences, or other factors. Surface water licences may contain conditions restricting diversions in flowing water bodies and restrictions on maximum reductions of water levels in non-flowing water bodies. Applicable Government of Alberta water management plans and regional plans under the Land-use Framework as well as other applicable government policy may contain limitations and restrictions on seasonal water flows and diversions in water bodies.

Operators are expected to evaluate the impact of water diversions on aquatic ecosystems, including evaluation of environmental flow needs to protect fish habitat and populations as well as other aquatic ecosystem components. Environment and Parks' Surface Water Allocation Directive and/or other government policy provide a technique for calculating environmental flow requirements in the absence of site-specific assessments or recommendations.

Operators are expected to evaluate and, if appropriate, implement on-stream and off-stream water storage options, taking into account downstream users and ecosystem needs. Water storage projects must ensure that wetlands and other valuable aquatic and terrestrial ecosystems in the watershed are not significantly impacted by the construction and/or operation of these facilities.

## Groundwater

In order to protect long-term aquifer yields and non-saline groundwater availability, water source wells must maintain the pumping intake above the top of a confined aquifer or no more than a two-third drawdown of the saturated thickness at the pumping well of an unconfined aquifer.

In addition, pumping rates and aquifer drawdown at or near the producing well may be limited to ensure that water continues to be available for other water users in the vicinity as specified in the guidelines or other documentation developed to supplement the policy.

In circumstances where groundwater dewatering is required to carry out oil and gas operations safely, the drawdown restrictions may not be applicable. Examples include oil sands mining groundwater dewatering or oil sands thermal in situ operations where non-saline water is in contact with the bitumen resource.

In general, groundwater quantity limitations and evaluation requirements are described in the Environment and Parks' *Guide to Groundwater Authorization* (2011). Additional site-specific requirements may be prescribed during licence application and review.

## Alternatives to High-quality Non-saline Water Sources

This policy recognizes that some sources of non-saline groundwater and surface water are environmentally preferable for upstream oil and gas operations relative to the use of groundwater and surface water of high quality.

Alternative non-saline water sources must be demonstrated to have reduced impact on aquatic ecosystems and existing or potential water users, taking environmental net effects into consideration, in comparison to high-quality non-saline water sources.



Table 2: Alternatives to High-quality Non-saline Water

Alternatives to high-quality non-saline water	
Alternatives that may require a <i>Water Act</i> authorization or other authorization depending on the circumstances.	Recycled or reconditioned industrial and municipal wastewater <sup>1</sup> , taking return flows into perspective.
	Oil sands mining tailings pond water.
	Non-saline water in direct contact with bitumen deposits.
	Naturally occurring non-saline water containing petroleum hydrocarbon compounds (excluding methane) within formations that contain both water and hydrocarbon resources.
	Non-saline groundwater that is technologically impractical to use for drinking water or livestock watering, taking into consideration hydraulic connectivity to surface water in support of aquatic ecosystem needs and the availability of other water supplies for existing and potential users in the area. <sup>2</sup>
Alternatives that do not require a <i>Water Act</i> authorization.	Non-water fluids and methods, where applicable to reservoir and operational conditions.
	Produced water. <sup>3</sup>
	Water or combustion recovered from exhaust streams.

<sup>1</sup> May also require an amendment or letter of authorization for the wastewater *Environmental Protection and Enhancement Act* approval.

<sup>2</sup> More detailed criteria defining non-saline groundwater that is economically and technologically impractical to use for drinking water may be included in the associated subsector guidelines or developed at a later stage to supplement the policy.

<sup>3</sup> May require a water diversion licence if significant volumes of non-saline produced water are available as an alternative water source

Saline surface water is typically not considered an alternative source as it can provide an important ecosystem function and recreational value. *Water Act* authorizations are required for saline surface water sources.

The non-saline alternatives to high-quality non-saline water sources described in this section will continue to be defined as non-saline water under the *Water (Ministerial) Regulation*. All non-saline water is considered a part of the natural hydrologic cycle deserving of conservation and wise use in accordance with the *Water Act* and *Water for Life: Alberta's Strategy for Sustainability*. Productivity measures used in this policy will distinguish between high-quality non-saline water and alternative non-saline water with low quality, however overall non-saline water use will still be measured.

## Environmental Net Effects Evaluation

The fundamental goal of an environmental net effects evaluation is to identify circumstances in which the environmental impacts of a viable alternative source or technology may exceed impacts of a non-saline source, supporting a decision that balances water conservation objectives and overall protection of the environment.

The rigour of the environmental net effects evaluation will differ according to place-based water availability constraints and the overall risk assessment. For instance, for the highest risk projects water conservation measures may outweigh most considerations of environmental net effects.

In circumstances where a *Water Act* licence application is required, applicants must submit an environmental net effects evaluation that may include, but is not limited to:

- greenhouse gas and air emissions;
- land disturbance;
- energy use;
- waste generation (e.g., volumes of solid or liquid waste, deep well disposal);
- impacts on ecosystems and biodiversity (e.g., species at risk, habitat disturbance);
- environmental risk (e.g. pipeline integrity, surface spills);
- increase in long-term environmental risk and liability (e.g. increased tailings pond salinity, long-term leaching from landfills).

The evaluation should contain detailed quantifiable information about the baseline and incremental or proportional environmental net effects of all water source options. The evaluation should identify reductions in environmental net effects of collaborative development activities, as well as document cumulative effects management considerations and options.

In addition to the components described above, other less measurable or socio-based impacts from water management operations (e.g. nuisance, noise) on local communities, including Indigenous communities, must be considered in the environmental net effects evaluation. Factors informed by traditional ecological knowledge must also be considered. These considerations are to be identified and evaluated through interaction with local communities, including Indigenous communities.

Large-scale projects may not require an additional environmental net effects evaluation if the issues are addressed in an environmental impact assessment.

## Cumulative Effects

Evaluation of cumulative effects is a fundamental component of the Government of Alberta's Integrated Resource Management System, an approach that examines the combined effects of multiple activities or projects across all environmental media (water, air, land, biodiversity). For the purposes of this policy, evaluation of cumulative effects is primarily focused on the combined effects on water resources and aquatic ecosystems arising from current and anticipated water users in the same area.

When applying for a *Water Act* licence, proponents may be required to provide information to support cumulative effects evaluation. Information may include combined effects of their proposed water use and other water diversions in the area on all water users, aquatic ecosystems and water resources. Assessment of current and future water supply availability for aquatic ecosystems that may be relevant to continued exercise of treaty rights is encouraged. Traditional ecological knowledge may assist in such assessment.

The extent of time and geographic area of the cumulative effects evaluation depends on the scale of the project and specific interactions of that project and other projects and/or water users in the area. Regulatory staff discretion will be used to determine if cumulative effects evaluation is required and to assess its scope.

In addition, upstream oil and gas operators are expected to engage and collaborate where possible with all water users, within reasonable proximity, in a watershed or aquifer in order to minimize overall impacts on the water source. This may include the establishment of community-industry associations and multi-operator water plans. Monitoring needs of local communities, including Indigenous communities, should be identified, evaluated and addressed through engagement with local communities.

## Water Management Planning

Water management planning is essential in areas of intensive multi-project unconventional<sup>3</sup> oil and gas development where significant increases in water demand are occurring or are anticipated to occur. Two types of water management planning processes are described below.

### Multi-Operator Water Plans

Multi-operator water plans are a key instrument to achieve cooperation and collaboration between industry operators in a sub-regional area in order to minimize cumulative effects on water resources and aquatic ecosystems as well as improve overall water conservation.

Collaborative water management opportunities through integrated management infrastructure for sourcing, distribution, storage, treatment and disposal must be considered by industry operators in order to minimize high-quality non-saline water use in this type of resource extraction. In addition to increased water conservation, water use efficiencies and economies of scale can be achieved through operators sharing water management infrastructure. Additional

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<sup>3</sup> Defined for purposes of this policy as hydrocarbon resources extracted from low permeability and porosity formations through the application of horizontal drilling and multi-stage hydraulic fracturing technologies. These resources include shale gas and oil and tight gas and oil but not oil sands and coalbed methane.

areas of collaboration include assessment of area water resources, sharing of water sources, selection of alternative sources, and others.

This policy recognizes that various stages of unconventional oil and gas development (i.e. exploration, pilot, and full commercial development) have various levels of risk, therefore, water conservation and management requirements will differ according to the development stage. Areas of increasing development and water demand will be subject to escalating regulatory requirements for cumulative effects management and water management planning.

Cumulative effects evaluation on water resources and aquatic ecosystems is expected for multi-operator water plans. Baseline information on hydrogeology and hydrology, existing water uses and ecosystem water needs, and instream flow need evaluation, including steps to improve knowledge in these areas may be required. In addition, evaluation of future supply availability in comparison to allocation forecasts in the relevant watershed or aquifer is expected, as well as a description of how operators will share water resources taking into account various factors including any pertinent environmental limits or thresholds.

Overall environmental impacts to other media (i.e. air, land and biodiversity) and community impacts that are related to water management activities (e.g. trucking water) should also be assessed in multi-operator water plans. This evaluation of impacts on other environmental media is similar to the environmental net effects evaluation in a single licence application but must extend over the entire planning area.

The scale of multi-operator water plans and associated collaborative activities will vary from area to area. Multi-operator water plans must consider all the applicable basin-scale planning and allocation restrictions. In some cases, broader cumulative effects assessment may be conducted through other planning processes and may not be needed for a multi-operator water plan.

Local communities, including Indigenous communities and stakeholders must be well informed and involved in the planning activities through proactive industry efforts. This includes ongoing reporting of development activities. Proponents must proactively contact local community



residents and other local stakeholders at the earliest opportunity to describe their project and discuss community and stakeholder concerns. Effective ongoing community and stakeholder engagement in relation to water management issues is a critical component of a multi-operator water plan and must be maintained throughout the life cycle of development.

For a multi-operator water plan, the Alberta Energy Regulator provides regulatory oversight for the development, review and approval of the plan.

## Government of Alberta Water Management Initiatives

In circumstances where upstream oil and gas water diversions are a small component of the overall water use within a watershed, or where there are significant water management issues, a multi-operator water plan may not be sufficient. In these cases, Government of Alberta water management plans at a sub-basin and basin level may be developed that are relevant to all water users including upstream oil and gas operations. Alternatively, sub-regional and regional plans developed and implemented under the Land-use Framework may include water management frameworks or other management tools.

In cases where a multi-operator water plan is already in place within a watershed where the Government of Alberta proposes to develop a water management plan, the multi-operator water plan and its components will be considered upon the initiation and development of the Government of Alberta water management plan. At the same time, proponents of multi-operator water plans will align their plans with Government of Alberta water management plans and sub-regional and regional plans, where applicable to their development and diversion area. Various components of Government of Alberta water management plans and sub-regional and regional plans, such as water conservation objectives and water management triggers and limits, must be followed during development and implementation of a multi-operator water plan.

For Government of Alberta water management plans, the designated Environment and Parks Director establishes Terms of Reference and the process of plan development in accordance with the Environment and Parks' *Framework for Water Management Planning*.

## Licensing for Large-scale Operations

For areas of large-scale oil and gas development, a more flexible allocation approach may be needed, particularly where precise locations of water use are not initially known. This section outlines a broader approach that remains within provisions of the *Water Act*.

As one of the licensing options, a term licence for a broad geographic area (e.g. area covering several townships) with generally described points of use, becoming specified upon use, may be issued. This option may be appropriate for complex large-scale projects that change according to long-term development plans such as oil sands mines, oil sands thermal in situ projects, and commercial-scale multi-stage hydraulic fracturing operations for unconventional resource development.

A *Water Act* term licence that is appropriate for these large-scale projects must be appurtenant<sup>4</sup> to the point of diversion which must always be specified in the application. Points of diversion are not to be substantially changed; a new licence application is needed to add additional points of diversion to a project. In addition, the application must identify the area of operations in plans established as conditions of the licence. Plans identifying the area of operations, infrastructure, and the overall project description can be amended from time to time as a project evolves, subject to the requirements specified in the licence conditions.

Oil sands mines have complex water management issues related to dewatering and control of surface runoff that will be addressed in licences on a case-by-case basis.

Transfer of water across the boundary of a major river basin is restricted as per the *Water Act*<sup>5</sup>. This includes non-saline water transported across major river basin boundaries for use for underground injection, including multi-stage hydraulic fracturing.

## Economic Evaluation

Economic evaluations of project water conservation options are valuable to constrain considerations to those water sources and recycling options that are economically feasible. Where applicants are reporting that options with superior water conservation outcomes are not feasible, they must include a listing of the economic assumptions used in the analysis. Economic evaluation is not the fundamental basis for water source selection by the regulatory staff in most circumstances. In most circumstances the balance between water conservation considerations and adverse environmental net effects is the fundamental basis for the selection of water sources by the regulatory staff.

Economic evaluation of the overall hydrocarbon recovery project or comparison of the economic parameters of the proposed project to any other project is typically not a requirement of economic evaluation for implementation of this policy. Where a proponent intends to demonstrate that a particular water conservation option is not economically feasible, the water management costs can be compared to publicly reported hydrocarbon recovery costs in the industry and to the projections of the proponent for the project. Other detailed economic evaluations may be provided in an application at the discretion of the proponent (application information is publicly available), or in confidence to the Alberta Energy Regulator if the information is specifically requested by the Alberta Energy Regulator staff.

Achieving economic efficiency is a valuable objective of every oil and gas operator in every project, but it is not within the scope of government water conservation policy to provide specific or general criteria for achieving that objective. Achieving water conservation goals is the main objective of this policy, even in circumstances where the overall profitability of the project is lessened to some degree, provided that a benefit or reduced risk to the environment results.

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<sup>4</sup> Appurtenance – means belonging to; accessory or incident to; adjunct to; appended or annexed to. Section 58(2) of the *Water Act* states licence is “appurtenant to land or undertaking”. A licence is considered appurtenant to both the point of diversion and the point of use.

<sup>5</sup> According to Section 47 of the *Water Act*, “a licence shall not be issued that authorizes the transfer of water between major river basins in the Province unless the licence is specifically authorized by a special Act of the Legislature”.

Although it is a general objective to achieve maximum water conservation without deferring upstream oil and gas projects, development delays may occur in some cases in water-short areas or where local aquatic ecosystems are at risk.

## Water-short and Potentially Water-short Areas

Applicants must maximize efforts to reduce or eliminate (on a case-by-case basis) high-quality non-saline water use in water-short areas of Alberta. Water-short areas occur where natural conditions and/or development pressures limit the availability of surface water and non-saline groundwater. The risk assessment process, described in detail in subsector-specific guidelines, includes all water-short areas as the highest risk. An overview map of water-short areas is shown in Figure 2. The map provides a general overview on the provincial scale; however, site-specific circumstances (i.e. local water shortages, demand on the water resource) will dictate the level of risk assessment required and shall prevail in any licensing decision.

Seasonal or temporary water storage, taking ecosystem needs and downstream users into consideration, may be utilized in water-short areas where practical. Multi-operator water planning at a local watershed scale is an important component of planning for future upstream oil and gas operations in water-short areas of Alberta.

### South Saskatchewan River Basin

All of the South Saskatchewan River Basin is in water-short or potentially water-short areas. New surface water allocations are no longer available in the South Saskatchewan River Sub-Basin, the Oldman River Sub-Basin, and the Bow River Sub-Basin under provisions of the *Water Act* (Alberta Regulation 171/2007: Bow, Oldman and South Saskatchewan River Basin Water Allocation Order), although new allocations are available in the Red Deer River Sub-Basin.

Applications for groundwater licences are currently being accepted in the South Saskatchewan River Sub-Basin, the Oldman River Sub-Basin, and the Bow River Sub-Basin; excluding aquifers that are naturally flowing to and from surface water bodies. Shallow non-saline groundwater is an important component of the hydrologic cycle, due to the hydraulic connection with surface water.

Transfers of existing *Water Act* licences to oil and gas operations can be considered in the South Saskatchewan River Sub-Basin, the Oldman River Sub-Basin, and the Bow River Sub-Basin. Licence transfer applications may be made irrespective of the specific purpose of the existing licence. Transfer applications are subject to the same provisions and criteria for evaluation of licence applications in water-short areas under this policy and subsector guidelines. An evaluation of the potential impacts of a proposed licence transfer on other water users and aquatic ecosystems is required pursuant to the *Water Act* (Sections 81, 82, and 83).

Temporary diversion licences for groundwater or surface water may be available for drilling oil and gas wells and other temporary water uses in the South Saskatchewan River Sub-Basin, the Oldman River Sub-Basin, and the Bow River Sub-Basin. However, restrictions on water availability may occur during low flow periods (e.g. drought, mid-winter low-flow periods).

# Water-short Areas Assessment

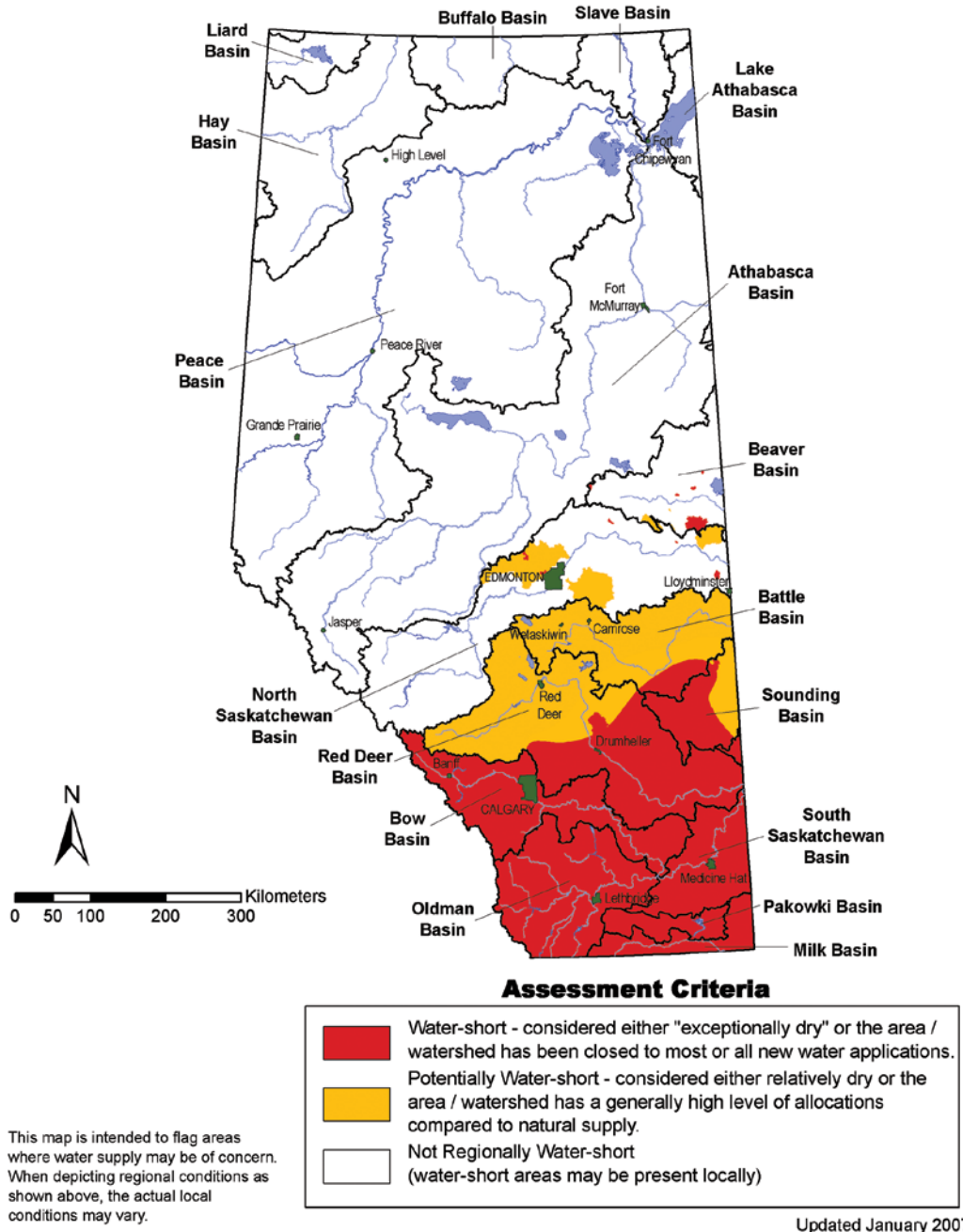


Figure 2: Water-short Areas Overview



## Cold Lake-Beaver River Basin

Five lake watersheds within the Cold Lake-Beaver River Basin are considered to be water-short areas and have water licence restrictions imposed.

### Potentially Water-short Areas

Areas that have lower levels of precipitation and/or higher water demands may be potentially water-short under conditions of expanded water demand in future. These areas have a higher risk of water shortages than areas of the foothills of Alberta with high precipitation and lower water usage. A large portion of the Red Deer River Sub-Basin and Battle River Basin are considered potentially water-short.

All oil sands mining operations and most oil sands thermal in situ projects occur in areas that are not considered to be regionally water-short, although project and site specific as well as seasonal water shortages and sensitive aquatic ecosystems may occur for these projects. For example, limited regional saline groundwater supplies may contribute to potential site-specific shortages due to increased demand on the non-saline water resource. In addition, seasonal water shortage conditions for the Athabasca River may occur due to natural variations in the flow as well as pressure on the water resource. The *Surface Water Quantity Management Framework* for the Lower Athabasca River will manage cumulative oil sands water withdrawals through the identification of weekly management triggers and water withdrawal limits that reflect seasonal variability.

Additional analysis may be required at the watershed and/or sub-watershed scale to identify local water-short and potentially water-short areas, unless already addressed in a Government of Alberta water management plan, water management framework or other management tools under a regional plan, or other assessment initiatives applicable to the diversion location.

## Recognition of Water Conservation Achievements

Under some circumstances, projects that have demonstrated significant progress towards meeting Water for Life conservation goals in the previous licence term may apply for licence renewal based on a simplified evaluation.

Information demonstrating project improvements in water conservation based on performance measures and water management initiatives as set out in the oil and gas industry Water Conservation, Efficiency and Productivity Plan may be considered in licence renewal applications as evidence of progress towards Water for Life goals.

## Subsector Policy

This section describes policy objectives that are specific to subsectors of the upstream oil and gas industry. Subsectors with significant water conservation opportunities and challenges include oil sands mining, oil sands thermal in situ, enhanced oil recovery (water flooding) and “cold bitumen” enhanced recovery operations, and multi-stage hydraulic fracturing in horizontal

wells for unconventional oil and gas development. The technology, geographical area, and water conservation opportunities specific to the different subsectors provide opportunities to maximize the environmental benefits of water conservation measures, while maintaining reasonable and effective regulatory processes and achievable outcomes.

Table 3: Subsector Policy Focus

Policy Focus to Achieve Water Conservation	
Industry Subsector	Policy Direction
Oil Sands Mining Operations	<p>Achieve improvements in water use productivity – based on the volumes of water diverted from the Athabasca River<sup>6</sup> relative to volumes of bitumen produced.</p> <p>Achieve improvements in management of tailings pond water<sup>7</sup>, including increases in reuse and recycling where feasible.</p> <p>Continue research on water treatment options and conduct demonstration projects to achieve additional productivity improvements.</p> <p>Do not apply water conservation provisions of this policy to reclamation and remediation activities in oil sands mining.</p> <p>Enable the transfer of water from tailings ponds and mines to other mining and thermal in situ projects.</p>

6 Oil sands mining cumulative water diversions from the Athabasca River are managed through the Surface Water Quantity Management Framework for the Lower Athabasca River.

7 The Tailings Management Framework for the Mineable Athabasca Oil Sands provides direction to manage fluid tailings volumes during and after mine operation.

Policy Focus to Achieve Water Conservation	
Industry Subsector	Policy Direction
Oil Sands Thermal In Situ Operations	<p>Achieve increased non-saline water use productivity, based on the volumes of non-saline make-up water relative to volumes of bitumen produced.</p> <p>Continue use of alternative sources as well as reuse and recycling improvements.</p> <p>Focus on recovery of additional water from the disposal streams, balanced by consideration of environmental net effects and water use efficiency opportunities.</p> <p>Expand produced water treatment research and evaluate feasible limits of water recovery from disposal operations.</p> <p>Support the use of water from oil sands mining tailings ponds and mines as an alternative source, balanced by consideration of environmental net effects.</p>
Enhanced Oil Recovery (Water Flooding) and “Cold Bitumen” Enhanced Recovery Operations	<p>Minimize high-quality non-saline water use and achieve reductions in unused allocations (on a case-by-case basis).</p> <p>Achieve productivity improvements through continued reuse and recycling, the use of alternative sources, and further technological innovations.</p> <p>Reduce ratios of non-saline to saline water used in “cold bitumen” enhanced recovery operations, and develop technical innovations that reduce overall water use relative to bitumen production.</p>

Policy Focus to Achieve Water Conservation	
Industry Subsector	Policy Direction
Multi-Stage Hydraulic Fracturing Operations in Horizontal Wells	<p>Develop achievable water conservation practices for areas of intensive development, including use of alternative sources and reuse and recycling.</p> <p>Focus on water conservation and allocation through multi-operator water plans within sub-regional areas. Enable and achieve cooperation and collaboration between industry operators and projects in sub-regional areas.</p> <p>Focus on results and practices in sub-regional areas that optimize development outcomes and minimize industry operators' cumulative impacts on water resources and aquatic ecosystems.</p> <p>Focus on multi-operator water planning to minimize overall environmental impacts to other media (i.e. air, land and biodiversity) and community impacts that are related to water management activities of industry operators.</p> <p>Escalate water conservation and water management planning requirements in relation to the stage of development.</p> <p>Enhance scientific knowledge of water resources, including saline sources, and development impacts. This includes baseline monitoring (quantity and quality) of non-saline water sources; monitoring, evaluation and reporting of all water use; and research to enhance technology innovation that reduces water use.</p> <p>Ensure that local communities, including Indigenous communities, are given opportunities to be informed and engaged during all stages of development, including improved access to information about technology and activities.</p>

# Part 3

## Quantitative Performance Measures

Performance measures assess attainment of outcomes established in this policy. The following table includes quantitative performance measures applicable to outcomes established in the *Water Conservation Policy for Upstream Oil and Gas Operations*.

Table 4: Quantitative Performance Measures

Quantitative Performance Measures		
Goal	Outcome	Performance Measure
Ensure reliable and good-quality water supplies to support a sustainable economy, as envisioned in <i>Water for Life: Alberta's Strategy for Sustainability</i> .	Achieve reductions in existing unused allocations, on a case-by-case basis, in upstream oil and gas operations.	Trend lines of allocation volumes and actual usage of non-saline water by basin and subsector on an annual basis.
	Achieve additional improvements in efficiency and productivity of non-saline water used per barrel of hydrocarbons produced (barrel of oil equivalent).	Trend lines of the ratio of non-saline water use to hydrocarbon production by subsector on an annual basis.
	Respect water availability for other users and for protection of aquatic ecosystems in areas of high water demand, water-short areas, and areas with supply constraints.	Trend lines of allocation of non-saline water to upstream oil and gas operations as a percentage of all water allocation by basin on an annual basis.
	Increase understanding and consideration of environmental net effects and full cycle risk implications of alternatives to high-quality non-saline water.	Trend percentage of <i>Water Act</i> licence applications for upstream oil and gas operations that use alternative sources of non-saline water on an annual basis.
Manage provincial water resources allocated for upstream oil and gas operations in a way that achieves the purpose of the <i>Water Act</i> and <i>Alberta Land Stewardship Act</i> .	Contribute to meeting sectoral and river basin targets for conservation, efficiency and productivity of non-saline water use.	Trend lines of non-saline water use for upstream oil and gas operations as a percentage of regional, sectoral and river basin targets on an annual basis.
	Enable and encourage water transfers from wastewater sources and other projects as well as the use of the low quality water fit for the purpose.	Trend lines of the ratios of total water use, alternative water use and saline water use to hydrocarbon production by subsector on an annual basis.

Additional quantitative and qualitative performance measures will be established within the individual subsector guidelines. Detailed evaluation of case studies and innovative water conservation projects will provide additional measures of water conservation improvements over the next ten years.

## Data Management and Information Accessibility

Evaluation of performance measures established in the *Water Conservation and Allocation Policy for Oilfield Injection* (2006) indicated a need to improve public trust by reporting regularly on the policy progress, and a need to make data and other information easily accessible to the public, stakeholders, and Indigenous peoples.

Significant improvements in public access to water use information and the development of databases and reports relevant to water conservation have occurred in the past years. The Alberta Energy Regulator's Water Use Performance Report and the Provincial Groundwater Inventory Program are examples of successful initiatives to improve accessibility of information. Additional information sources are also now available such as the oil and gas industry *Conservation, Efficiency and Productivity Plan*, Canadian Association of Petroleum Producers' Responsible Canadian Energy reporting, and the Alberta WaterPortal.

Data management and information accessibility objectives of this policy include:

- compilation and provision of databases and raw digital data access to stakeholders and research organizations;
- timely and more frequent (annual) public reporting of performance measures evaluations, monitoring results, and evaluation reports, such as environmental assessment reports;
- development of digital evaluation tools that are widely accessible to conduct place-based evaluations and map-based reporting at various planning and reporting scales.



The Alberta Energy Regulator and the Government of Alberta will provide water use reporting to various stakeholders, members of the public, and Indigenous peoples.

## Water Research and Technology Innovation

There is a need to better coordinate partnership and research initiatives where inventory and data is collected, modeled, analyzed, and integrated into planning and decision-making. Reports published by industry partnerships and government research initiatives need to be compiled and made accessible to the public, stakeholders, and Indigenous peoples. There is a need for more education about water resources in Alberta.

Water research and technology innovation objectives of this policy include:

- continued improvements in groundwater and surface water inventory;
- improved knowledge and analysis of groundwater within the hydrologic cycle;
- continued collaboration among the Government of Alberta, industry, academic institutions and other stakeholders on research to demonstrate effective water treatment and water recycling technology;
- compilation of research reports in a readily accessible digital format.

## Cumulative Effects Management and Partnership Initiatives

Managing cumulative effects of development on all aspects of the environment is of increasing importance in Alberta. Regional plans under the Land-use Framework, Government of Alberta water management plans, and multi-operator water plans will incorporate water conservation and water use reporting for all water users, including the oil and gas sector.

Cumulative effects management and partnership improvement objectives of this policy include:

- integration of the objective of the *Water Conservation Policy for Upstream Oil and Gas Operations* with regional plans under the *Land-use Framework* and Government of Alberta water management plans;
- improvements in government, its agencies and industry engagement with Watershed Planning and Advisory Councils, other stakeholders, and Indigenous peoples, regarding water conservation in the oil and gas industry; and
- improvements in information sharing and education initiatives amongst stakeholders, such as Watershed Planning and Advisory Councils (e.g. sharing of basin studies) and Indigenous communities (e.g. sharing of traditional ecological knowledge).

## Industry Water Conservation Initiatives

This policy recognizes significant and ongoing water conservation initiatives by the upstream oil and gas industry over the past years, including development and implementation of the *Water Conservation, Efficiency and Productivity Plan*, developed in accordance with the recommendations of the Alberta Water Council.

The requirements of this policy and the best practices included in the industry *Conservation, Efficiency and Productivity Plan* independently support the water conservation objectives of the Water for Life strategy. The *Conservation, Efficiency and Productivity Plan's* productivity measure of non-saline water use relative to hydrocarbon production is adopted as the fundamental performance measure of water conservation success in this policy.

## Policy Review

This policy replaces the *Water Conservation and Allocation Policy for Oilfield Injection (2006)*. Guidelines for specific subsectors will replace the *Water Conservation and Allocation Guideline for Oilfield Injection (2006)*.

This water conservation policy provides a consistent regulatory approach to water conservation as an essential consideration for upstream oil and gas operations. Achievable water conservation improvements at individual projects are dependent on the technology, water resources available, scale and pace of development in various areas of Alberta, and various subsectors of the industry.

The *Water Conservation Policy for Upstream Oil and Gas Operations* and associated guidelines will be reviewed in 2030 to measure progress in achieving their outcomes, and modified if necessary. At the same time, the policy and associated guidelines may be amended at any time after their implementation to reflect changing priorities in water conservation and management for the upstream oil and gas industry, and to address specific issues.

An evaluation of progress towards policy goals will be conducted in 2025 based on the quantitative performance measures set out in Part 3 of this policy. Water use targets related to regional planning initiatives, regulatory changes, industry productivity targets and conservation, efficiency and productivity planning under the Alberta Water Council will also be used to evaluate whether the policy is successful. A policy review and a process to adopt policy changes will be initiated in 2025, if needed, to ensure that the objectives of the policy are met by 2030.



# Glossary

**Alternative Source** — A source that can replace surface water or non-saline groundwater of high quality. Municipal and industrial wastewater and water that has been contaminated with hydrocarbons in the bitumen extraction process are alternative sources.

**Aquatic Ecosystem** — For the purposes of this policy, “aquatic ecosystem” is synonymous with the definition of “aquatic environment” under the *Water Act*: “the components of the earth related to, living in or located in or on water or the beds or the shores of a water body, including but not limited to: 1. all organic and inorganic matter, and 2. living organisms and their habitat, including fish habitat, and their interacting natural systems”.

**Cold Bitumen Enhanced Recovery** — An enhanced oil recovery method that applies water flooding and/or polymer injection in heavy oil/bitumen extraction.

**Conservation** – Any beneficial reduction in water use, loss or waste, or practices that improve the use of water to benefit people or the environment.

**Cumulative Effects (Water)** – The combined effects on water resources and aquatic ecosystems arising from the combined impacts of several individual projects and/or other users.

**Cumulative Effects Management** — An approach that establishes outcomes for an area by balancing environmental, economic and social considerations; and implementing appropriate plans and tools to ensure those outcomes are met.

**Drawdown** — The reduction in water level in a water well when the pump is operating.

**Efficiency** – The accomplishment of a function, task, process or result with the minimal amount of water feasible. Efficiency is an indicator of the relationship between the amount of water required for a particular purpose and the quantity of water used or diverted.

**Environmental Flow Requirement** – The amount of water flowing through a natural stream course that is needed to sustain, rehabilitate, or restore the ecological functions of a stream in terms of hydrology, biology, geomorphology, water quality, and connectivity at a particular level.

**Government of Alberta Water Management Plan** — A document developed under the *Water Act* that provides broad guidance regarding water conservation and management, sets clear and strategic directions regarding how water should be managed, or results in specified actions. *Alberta’s Framework for Water Management Planning* outlines the process for water management planning and the components required for Government of Alberta water management plans.

**High-quality Non-saline Water Sources** – Non-saline groundwater and surface water supplies that support instream and aquatic ecosystem needs and/or are useable with standard treatment technologies for drinking water supplies and livestock watering.

Instream Flow – Any quantity of water flowing in a natural stream channel at any time of year. The quantity may or may not be adequate to sustain natural ecological processes and may or may not be protected or administered under a permit, water right, or other legally recognized means.

Instream Flow Requirement – The amount of water flowing through a natural stream course needed to sustain instream values at an acceptable level based on appropriate study. Instream values and uses include protection of fish and wildlife habitat, migration, and propagation; outdoor recreation activities; navigation; hydropower generation; waste assimilation (water quality); and ecosystem maintenance, which includes recruitment of fresh water to the estuaries, riparian vegetation, flood plain wetlands, and maintenance of channel geomorphology. Water requirements sufficient to maintain all of these uses at an acceptable level are the instream flow requirements.

Land-use Framework – An approach to manage public and private lands and natural resources to achieve Alberta’s long-term economic, environmental and social goals. It provides a blueprint for land-use management and decision-making.

Multi-Operator Water Plan – A plan developed by industry operators within a defined area (e.g. sub-regional planning area). The plan describes how cooperation and sharing of water resources, infrastructure, management and monitoring would be defined in order to achieve optimal use of water resources with minimum environmental impact/disturbance.

Multi-stage Hydraulic Fracturing – A hydraulic fracturing process in low permeability reservoirs not accessible by conventional vertical drilling techniques. The hydrocarbon resources are being accessed through horizontal wells, with multiple fracture operations occurring along the horizontal leg of the well.

Oil Sands Thermal In Situ – Oil sands steam injection, where steam is injected into heavy oil/bitumen deposits.

Potentially Water-short Area – An area considered relatively dry (low natural runoff) or where the watershed has a high level of allocation compared to natural supply.

Productivity – Refers to the amount of non-saline water required to produce a unit of any good, service, or societal value.

Regional Plan – A provincial planning tool sanctioned under the Alberta Land Stewardship Act. There will be seven regional plans, plus separate plans for the Calgary and Edmonton regions.

Upstream (oil and gas sector) – Exploration, development and production of oil and gas resources.

Water Conservation Objective – As outlined in Alberta’s *Water Act*, a water conservation objective is the amount and quality of water set by a Director for the protection of a natural water body or its aquatic ecosystems; the protection of tourism, recreational, transportation or waste assimilation uses of water; or the management of fish or wildlife.

Water Recycling – The process of using water multiple times for similar purposes.

Water Reuse – The process of using water that has already been used for one purpose, such as produced water, and using the water one or more additional times for other purposes.

Water-short Area — An area where natural conditions and/or development pressures limit the availability of surface water and groundwater for future sustainable development and protection of aquatic ecosystems.

