

Share the Water

Building a Secure Water Future for Alberta



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Share the Water: Building a Secure Water Future for Alberta

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Introduction

When it comes to water, Alberta is at a crossroads. In the twenty-first century, Alberta faces new challenges. We now know that Alberta's water supplies are not limitless. In fact, they are decreasing. Over the past three decades, Albertans, along with the rest of the world, have come to recognize the environmental values associated with natural watercourses, aquatic ecosystems, fisheries, and wildlife. The Government of Alberta has passed laws to protect water quality from industrial pollutants, but laws to protect instream water quantity have not kept pace.

For the first time in 12 years, the Alberta government is considering whether to update their water allocation system. Increasingly, it has become apparent that there are more and more demands for a resource that is dwindling. By the close of 2005, Alberta had allocated more than 9.5 billion cubic metres of water annually for various uses throughout the province. Today, the South Saskatchewan River is over-allocated and there are strong arguments that the North Saskatchewan River is headed in the same direction.

Alberta's current system to allocate water among all users is no longer able to fully respond to population growth, opportunities for industrial growth, reduced water flows, and the coming challenges of climate change. Without significant changes, the current water allocation system will produce winners and losers without any rational consideration of how we want water to be used for the benefit of Albertans.

Specific recommendations include the following:

1. Legally enforceable water management plans for each basin, developed using the best available scientific evidence;
2. Legally enforceable objectives that protect instream flow needs for each basin;
3. Water entitlements based on water "shares" allocating a percentage of the water available in excess of the water left instream. Water volumes allocated to each share are to be adjusted seasonally, and more often if needed, in response to predicted flows in the basin;
4. Provided water is secured for people and the environment, establish a water allocation and share trading system that facilitates the re-allocation of water from one use to another;
5. The ability of the public to hold water shares for instream purposes;
6. The use of incentives to encourage water conservation and the efficient use of water; and
7. The inclusion of groundwater in the water management system.

The purpose of this paper is to inspire Albertans to participate in the discussion about Alberta's water future in an informed manner. The Government of Alberta has provided its citizens with the opportunity to reform the water allocation system. Albertans should participate in defining a new water future for Alberta.



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I: Purpose and structure of paper

This discussion paper was drafted to inform and stimulate discussion as the Government of Alberta reviews the Province's water allocation and transfer policies.

In September 2008, the Minister of the Environment Rob Renner announced that the Government of Alberta would re-examine Alberta's approach to the allocation, licencing, and transfer of water rights.¹ The Alberta Water Council established a Project Team to review the water transfer system and to provide recommendations to Alberta Environment. In March 2009, Alberta Environment established an expert panel to advise the Government of Alberta on water allocation and licencing policies. It is anticipated that the Government of Alberta will provide an opportunity for the public to provide input to the water allocation system in late 2009.

The purpose of this paper is to outline a proposed blueprint for addressing the growing challenges associated with water demand and supply and associated impacts to people, industry, and the environment. We consider what is possible in Alberta and refer briefly to key issues while providing some general background and context. This paper is not meant to be an exhaustive accounting of all of the water supply and demand challenges facing Alberta.

In general, we argue that any water allocation system must contain three essential features: the recognition and protection of instream flow needs, the integration of water and land use policies, and the equitable distribution of water rights. The recommendations in this paper are intended to address each of these issues.

Part II of this discussion paper places water allocation in the context of broader water management policies. Part III of this discussion paper documents the challenges that Alberta currently faces with respect to water supply as well as the future challenges that will result from population growth and climate change. Part IV identifies the weaknesses in the current Alberta water allocation system. Part V identifies the desirable outcomes of a water allocation system that is responsive to the future water supply challenges. Part VI provides specific recommendations for amending the system of water allocation in Alberta. Part VII summarizes the potential benefits of the proposed system to the water users and the environment.

The purpose of this paper is to outline a proposed blueprint for addressing the growing challenges associated with water demand and supply and associated impacts to people, industry, and the environment.

II: The context of this discussion

While this paper necessarily focuses on the allocation, licencing, and transfer of water rights as elements of Alberta's current water allocation system, it must not be forgotten that water allocation forms but one part of a broader water policy framework. Alberta's *Water for Life* strategy affirms a number of principles with respect to Alberta's water resources, including:

"All Albertans must recognize there are limits to the available water supply."

"Alberta's water resources must be managed within the capacity of individual watersheds."

"Knowledge of Alberta's water supply and quality is the foundation for effective decision-making."

"Albertans must become leaders at using water more effectively and efficiently, and use and reuse water widely and responsibly."

"Healthy aquatic ecosystems are vital to a high quality of life for Albertans and must be preserved."²

While a water allocation system can contribute to the achievement of each of these principles, there are many elements of water policy that are not currently addressed under Alberta's *Water Act* or through a water allocation system. A broader water policy must address other questions such as the following:

"Are our agricultural practices sustainable in the long run given our water limitations?"

"How do our policies with respect to the development of both renewable and non-renewable resources impact our water resources?"

"How do our urban development policies impact our water resources?"

"Do we have policies in place to ensure that our monitoring, interpretation, and forecasting of watershed data provides sufficient information to support our decision making?"

Our focus on water allocation systems, and in particular the role of markets in water allocation systems, must be in the context that our government will govern and set policies that ensure that Alberta's water resources are managed so that environmental values and the interests of future generations are protected.

"Do we have adequate knowledge of the values provided by natural landscapes and aquatic ecosystems including their role in water flow regulation, the protection of water quality, and the mitigation of climate change?"

III: Current context

A. Introduction

While this system succeeded in helping to settle Alberta, it may not be the best system for today at least in its current form.

Before 1894, water allocation in Alberta was based on the common law doctrine of riparian rights that allowed only those owning land adjacent to a watercourse to access water. As settlement and agriculture expanded in Alberta, it was recognized that development would be limited unless the right to access water was expanded beyond riparian owners. In 1894, the *North West Irrigation Act* vested all property in and the right to use water in the Crown and established a system to grant water use rights to non-riparian land owners.³ This system, based on the first-in-time first-in-right principle (FITFIR), ensured farmers had secure access to water and established an orderly allocation of water for those who settled the West. While this system succeeded in helping to settle Alberta, it may not be the best system for today at least in its current form. A system designed to promote orderly development when water supply was abundant relative to the demand for water uses may not address the issues of secure water supplies for all users and environmental protection that we face today. Our current system of water allocation operates in an environment where there are diminishing water supplies, increased conflicts, and threatened aquatic ecosystems.

What exactly are “water rights?”

In discussion of water use, and throughout this report, you’ll see references to “water rights”. “Water right” refers to the authority of a water user to take water from a water body, aquifer or reservoir for their own use. In Alberta, water rights are not, technically speaking, a property right but instead a “usufructuary” right, which may be thought of as the right to use the property belonging to another. In the case of water, it belongs to the Crown (ultimately the public). As the Crown is the owner of the water, it has the ability to grant private rights of use subject to any conditions or terms it deems to be in public interest. Historically, however, in Alberta rights were granted without meaningful protections for the environment, in perpetuity and with limited rights of cancellation. The failure to protect the public interest in the granting of water licences has led to many of the problems Alberta faces and the recommendations of this report are in large part aimed at addressing that situation.

B. Impacts of historical decisions on water supply and resultant impacts to users, public, and the environment

Overview

Water supply in Alberta has always been unbalanced and is now increasingly uncertain. By the close of 2005, Alberta had allocated more than 9.5 billion cubic metres of water annually for various uses throughout the province.⁴ Most of these allocations (97 percent) came from surface water sources from the North and South Saskatchewan Rivers and their tributaries, where most (88 percent) of Alberta's population lives.

In general, 80 percent of the water supply can be found in the far northern half of the province from the Athabasca and Peace watersheds while 80 percent of the demand is on the North and South Saskatchewan river systems. The South Saskatchewan and North Saskatchewan River basins together account for 87 percent of allocated water in Alberta.⁵

1. Southern Alberta

In the South Saskatchewan River basin, where over 20,000 water licences have been issued over the past 100 years, the government made an unprecedented decision in 2006 announcing they would no longer accept surface water licence applications for three of the sub-basins in this major river basin — the Bow, the Oldman, and the South Saskatchewan river systems.⁶ Only the Red Deer sub-basin remains open to new surface water licence applications.

Alberta is considered a relatively dry province. Evaporation and evapotranspiration exceeds precipitation in most of Alberta. The southern half of the province is considered semi-arid, but even in the northern half of the province there are water limitations. In 2001, water users in the Oldman River basin voluntarily agreed to take only 60 percent of their 2000 water appropriation to ensure that junior licencees would not have their water cut off.⁷ The Alberta government recognizes that any new water licences issued in the Bow and Oldman River basins would have “significant risk” of not getting water in drier years.⁸

Finally, drought has already placed considerable uncertainty around annual water availability in Alberta. In 2001–2002, drought swept across the Prairie provinces. During this time crop insurance payments increased fourfold in Alberta. Livestock producer cattle inventories fell by 10 percent either from declining feed supplies or increasing cost of feed.⁹

2. Central Alberta

Even in Central Alberta where precipitation is greater, two basins are under considerable pressure for new surface water diversions largely because of oil and gas development. Demand for water by the City of Edmonton along with new demands by the oil and gas industry for bitumen upgraders is creating challenges around ensuring a reliable supply on the North Saskatchewan river. It is estimated that when all the projected upgraders are operating (between 2015 and 2020), they will consume about 10 times as much water as the City of Edmonton. It is estimated that the upgraders could withdraw nearly 80 million cubic metres of water annually.¹⁰

An analysis of recorded river flows in the City of Edmonton shows a trend of decreasing flow in the river's main stem over the past century. Future projections indicate annual mean flows would decrease by between four percent and nine percent, depending on station location, by the year 2035 compared to the baseline period of 1961–1990.¹¹

3. Northern Alberta

In the far north, the estimated net annual water allocation for planned oil sands mines is 140 million cubic metres. This is in addition to the 359 million cubic metres per year that is already



Water supply in Alberta has always been unbalanced and is now increasingly uncertain.

allocated for existing and approved oil sands projects from the Athabasca River.¹² Combined, this is more than two and a half times the City of Calgary's yearly water consumption for a population of over one million people.¹³

C. Future water availability at even greater risk

According to Alberta Environment, water use in Alberta is predicted to increase 21 percent by 2025. This is due to a number of factors. First, Alberta has the fastest growing population of any Canadian province translating to an increase of 25 percent of municipal water use between 2005 and 2025. In the agricultural sector, it is estimated that water use for cattle operations for stockwatering will increase by 46 percent between 2005 and 2025. In the private and district irrigation sector, which accounts for the majority of water allocations in Alberta, water use is expected to increase by 13 percent. The commercial sector (golf courses, food processing, and water for parks and recreation) is expected to increase water use by 50 percent. Future use of water in the petroleum sector is expected to double largely because of new oil sands mines and new upgraders. Official estimates suggest that water users utilize only 55 percent of the amount of water that is licenced for use.¹⁴

I. Population and economic growth

A key factor in Alberta's future projected water use is Alberta's growing population that is estimated to grow by 37 percent from 3.2 million people to 4.4 million people by 2031.¹⁵ Population growth rates in Alberta have been nearly double the national average.¹⁶ Since 1981 developed urban land in Calgary grew by 59 percent from 273 to 435 square kilometres of land.¹⁷

The majority of the projected population growth will be in the southern region of the province including the cities of Calgary and Edmonton where more than 80 percent of people live and less than 20 percent of the province's water is located.¹⁸

Water demands in many municipalities exceed water supplies. The communities of Okotoks, Strathmore, and Cochrane for example will reach the maximum allocations under their water licences by 2012, 2015, and 2031 respectively; even with a 30 percent water-use reduction, they will have to seek water elsewhere.¹⁹

And the limits on water allocation have already resulted in controversies over water. For example, in 2007 the water-strapped Municipal District of Rocky View requested water for a mega-entertainment complex. Originally, the developers sought to obtain a licence from the Red Deer River, which is currently open to new water licences, with a plan to pipe water to the development based in the Bow River basin where new allocations had been halted by the government. While the water was ultimately secured through a water rights transfer from an existing source in the Bow River basin, the controversy over piping water from the Red Deer to the Bow River basin signaled the potential for increased conflict between river basins.²⁰

In the North Saskatchewan River basin, water allocations total about two billion cubic metres annually, but only 0.19 billion cubic metres are withdrawn. By 2025, however, surface water use is expected to increase by 37 percent (from 0.19 to 0.26 billion cubic metres). Most of this increase is due to increases in the number of bitumen upgraders and coal gasification projects planned for the Capital Region.²¹ These projects will use more water than the City of Edmonton.

Future water use by the petroleum sector is expected to increase significantly over the next few years with the addition of new upgraders in the North Saskatchewan basin and the construction of oil sands mines in the Athabasca watershed. According to the Alberta government, overall demand for water for petroleum sector uses will more than double by as early as 2015.²²

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2. Groundwater

According to the Rosenberg International Forum on Water Policy, there is significant need to improve the management of Alberta's groundwater. In southern Alberta, the closure of three river sub-basins to surface water diversions places new pressure on groundwater that if gone unchecked could result in a loss of river flows, wetlands, and lakes and a loss of a future water resource to users such as irrigation and municipalities.

While surface water diversions make up 97 percent of all water use in Alberta, over 90 percent of rural Albertans rely on groundwater.²³ There are currently 500,000 domestic water wells in the province with approximately 6,000 new water wells being drilled each year—a rate that probably could translate to a proportionate increase in withdrawals from shallow aquifers.²⁴ Because shallow groundwater is connected to surface water, increased water withdrawal from wells can affect surface water levels and water quality. If water is withdrawn faster than the natural rate of recharge (which is much lower during periods of drought), groundwater levels will fall.

3. Climate Change

The southern portions of the Prairie provinces are semi-arid and vulnerable to drought and soil moisture deficits. Projected impacts from climate change are expected to exacerbate water supply challenges in Western Canada significantly causing “a crisis in water quantity and quality with far-reaching implications.”²⁵

The most serious risk to the Canadian plains from climate change is the potential for declining water supply. Together, dwindling glaciers, less precipitation as snow, and more evaporation will decrease the overall supply of water for water users as well as aquatic ecosystems. Recent trends and future projections include lower summer stream flows, falling lake levels, retreating glaciers, and increasing soil and surface water deficits, as more water is potentially lost by evapotranspiration.²⁶

Recent studies based on climate change scenario modelling suggest the South Saskatchewan River basin is considered highly vulnerable. Findings of one study suggest there will be an increase of temperature in southern Alberta ranging from 1.5°C to 2.8°C by 2050. Climate change is likely to reduce water availability by approximately 546 million cubic metres between 1996 and 2046 while the rise in consumption from irrigation could be 440 million cubic metres under a medium growth scenario. Projections indicate that climate change will result in more rain in the spring; higher temperatures will likely result in lower total flows.²⁷

Other projections suggest the impact of climate change on water supply by the year 2050 will result in “serious drying” because of a large increase in evapotranspiration, lower soil moisture, reductions to the recharge of aquifers, drying of private wells, reduced stream flows, and reduced water quality.²⁸



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IV: Reviewing water allocation in Alberta

The current review was initiated within Alberta Environment because of a commitment made by Minister of the Environment Rob Renner in September 2008.

A. Introduction

The increasing pressures on water supply have prompted many to call for a review of the current system of water allocation. The last such review in Alberta was initiated in 1995 and led to the adoption of the *Water Act* in 1996.²⁹ The current review was initiated within Alberta Environment because of a commitment made by Minister of the Environment Rob Renner in September 2008.³⁰

B. Water allocation in Alberta: a critical review

Alberta's system for water allocation gives preference to water licences based on the date of application. Known commonly as a first-in-time first-in-right (FITFIR) system, licences obtained more recently have lower priority than licences obtained in the early 1900s and are not guaranteed water in low or even medium water years. This system of water allocation was instrumental to the settlement of Alberta and the creation of entire communities and businesses that depended on a stable supply of water. For example, entire irrigation districts and massive infrastructure were developed based on an expected water allocation. Supporters of the FITFIR system argue that it provides an orderly way to know who gets water, particularly in low water years.

While there is no doubt that the current system has its benefits, there are some serious drawbacks that may result in more water crises in the future.

I. Ecosystem or instream flows are afforded little protection under the current water allocation system

Volumes of evidence now suggest there is significant economic and social value in protecting the instream water flows required to maintain healthy aquatic ecosystems. In Alberta, research has indicated the province gives only "spotty attention" to the protection of ecosystem flows in Alberta's rivers in its system of water allocation.³¹ In Alberta's southern river basins, water allocations now exceed instream flow needs by a wide margin in the summer and early fall months.³² In those northern basins where ecosystem needs have been identified, there are still no enforceable limits in place to assure environmental flows will not be allocated to other uses.³³ Overall, the legal framework to protect instream flow needs is weak even in regions

where scientific studies have been completed to determine the instream flow needs.³⁴

For example, while instream flow needs identified by government scientists for the South Saskatchewan River basin were upwards of 75–80 percent of natural river flows, the official target set by government for this major river system in the final plan was 45 percent of natural flow.³⁵ And even while the 45 percent target is set far below scientific recommendations, it is unlikely to be met because older water licences are given “priority” making it almost impossible for this target to be met.

Scientific studies have concluded that rivers require 80 to 92 percent of their natural mean flow to maintain vital ecological functions.³⁶ While every river system is different, therefore requiring individualized instream flow assessments, it has been argued that extracting from one-third to one-half of a river’s annual discharge (mean or median) “would almost certainly alter the timing and range of variation of ecologically important flow events.”³⁷ In the Bow and Oldman river systems, between 60 and 70 percent of the natural flows have been allocated for use. While the Red Deer and North Saskatchewan river systems have allocated between 20 and 30 percent of the natural flows, water allocations are expected to increase in the future. Even in the Athabasca and Peace river systems where less than five percent, on average, has been allocated, the concern is less with total allocation than with the impact of water diversions in the winter when river flows are lowest.

Between 1997 and 2006, seven river systems largely located in southern Alberta (or portions thereof) were stressed and aquatic ecosystems were likely negatively impacted.³⁸ Nationally, Alberta ranks highest in terms of allocation of water as a percentage of river flows. A review of water use as compared with stream flow for all of Canada’s major river systems revealed the South and North Saskatchewan river systems in Alberta account for the two highest percentages of water diversions in Canada at 43 percent and 23 percent respectively.³⁹

2. Alberta law does not prioritize water use for basic human water needs leaving many small communities at risk

Several small to medium municipalities in southern Alberta now confront the real possibility they will run out of water because of insufficient water licence allocations or the junior priority of their existing licences. The question is therefore whether special assurances for domestic water security should be established.

According to research conducted by the Calgary Regional Partnership (CRP), even if there were a 30 percent reduction in water use by 2030, the following southern Alberta communities would still face licence shortages within this horizon: High River (2012), Okotoks (2012), Strathmore (2012), and Turner Valley (2016). The communities of Black Diamond, Canmore, and Nanton will face water shortages as early as 2025. The CRP research also suggests that any new developments in the Municipal Districts (MD) of Rocky View, Bighorn, and Foothills, and the County of Wheatland that do not hold a water licence will require water licence transfers or water from other sources.⁴⁰

Across Alberta, other municipalities with smaller licences are projected to reach maximum allocations under increased population scenarios by 2025.

Projected water use in the Bow River basin is expected to be 85 percent of current licenced use under a high population growth scenario by 2025.

- Projected water use in the Milk River basin is expected to reach maximum allocations by 2011 under a high population growth scenario and 2022 under a medium growth scenario. In 2004, municipalities in the Milk River basin already used 94 percent of their water allocations.
- Projected water use in the Oldman River basin may reach maximum limits by 2025 under a high population growth estimate.
- Projected water use in the North Saskatchewan River basin is expected to reach maximum licenced use by 2025 under a low population estimate and would be 17



In Alberta, research has indicated the province gives only “spotty attention” to the protection of ecosystem flows in Alberta’s rivers in its system of water allocation.

percent higher than the maximum allowable under a high population growth estimate.

- Projected water use in the Athabasca River basin is expected to be 93 percent of current licenced allocations under a high population growth estimate by 2025.
- Projected water use in the Red Deer River basin is expected to increase by 47 percent under a high population growth scenario with allocations reaching 99 percent of maximum by 2025.⁴¹

Current Alberta legislation does not recognize or give preference to a human right to water as suggested by the United Nations Committee on Economic, Social, and Cultural Rights.⁴² The *Water Act* adopted in 1996 does not define a preference or priority of use for basic human needs. Under the previous *Water Resources Act* (1931), a priority scheme was established that provided a mechanism for municipalities to seek cancellation of a lower priority purpose such as industry if they needed it.⁴³

3. Most junior licences are not assured water security.

By design, the FITFIR system does not provide a stable and secure supply of water for water licences issued in recent years. While this is the intent of the system, it continues to leave many licencees with a highly uncertain water supply.

While the government has not published a study articulating the risks posed to junior water licences in low water years, anecdotal evidence suggests this issue is present. In addition to the above-mentioned challenges now faced by municipalities, other junior licences are also at risk.

In the North Saskatchewan River system where only 27.5 percent of the natural supply of the river had been allocated by 2006, senior water licences are increasingly considered a more secure supply of water use than new water licences.⁴⁴ As discussed above, in the Oldman River system in 2001, a series of water licences that had been received from the government after 1950 would have been cut off if not for a voluntary water sharing agreement with more senior licencees.

In the Bow River system, municipalities that hold junior licences would find their water needs to be trumped by senior water licences held by irrigation districts, electricity generation, and the City of Calgary.

4. Alberta's water allocation system is premised on the licenced use in contrast with the American system of beneficial use that guards against waste in water use

Alberta's system for water allocation does not encourage efficient use of water. In fact, Alberta's water allocation is very different from the system in the United States that is also based on prior appropriation of water. However, one significant difference between the Canadian system and the U.S. system lies in the doctrine of beneficial use.

Beneficial use is perhaps the most important characteristic in defining a prior appropriation water right in the U.S. The concept of beneficial use is used to determine whether a certain use of water will be recognized and protected by law against later appropriations. Beneficial use by definition includes the requirements of "actual, active use" and that non-use can result in forfeiture or abandonment. The justification for the beneficial use criteria is to prevent waste. Since water is a scarce resource in the West, states must determine what uses of water are acceptable.⁴⁵ Accordingly, the true measure of a water right may not be the amount of water prescribed in the water right records but only that portion that is put to beneficial use.

While there are numerous challenges associated with the application of the beneficial use doctrine, its intent is worthy of note to distinguish it from the Alberta system of allocation. Alberta's system of water allocation is based on government-issued licences that allow licencees to transfer unused water for economic gain. There is no statutory basis in Alberta law requiring water users to maximize the efficiency of water use.

Current Alberta legislation does not recognize or give preference to a human right to water as suggested by the United Nations Committee on Economic, Social, and Cultural Rights.

A related issue is Alberta's approach to the cancellation of water licences. Under the *Water Act*, the Alberta government may only cancel a licence for non-use if there has been no diversion of any of the water allocated in the licence or the rights granted under the licence have not been used for a three-year period and there is no reasonable prospect the licensee will resume diversion of any of this water under a licence.⁴⁶

In March 2008, the Government of Alberta paid the Western Irrigation District \$85 million to compensate for stripping a large share of its water licence in 1963. To outside observers, this appeared to set a precedent for the government's reduction of water rights. In 1963, the province re-issued a water licence to the Western Irrigation District that, according to the Western Irrigation District, effectively reduced their originally allocated share by one quarter. The Alberta Irrigation Projects Association is on record as saying that the reduction of licences cannot be accomplished without compensation. However, this clearly raises the issue of whether the government should be required to compensate licensees who are not using their full allocation of water in a beneficial way.

Source: Renata D'Aliesio. March 17, 2008. Fund to settle water rift hits \$85 million. Calgary Herald.

5. The newly adopted water rights trading system in Alberta provides a mechanism to re-allocate water but still requires significant improvements

The introduction of the "water transfer" in the 1996 *Water Act* legislation was designed to allow for the re-allocation of water between different parties and uses. Effective August 30, 2006, the Government of Alberta placed a moratorium on the issuance of new water licences on the Bow, Oldman, and South Saskatchewan rivers, with certain exceptions for First Nations communities, water conservation purposes, and water storage for the purpose of protecting the environment or improving supply. Therefore, for most users wishing to acquire water allocations, water would have to be obtained by a transfer of all or part of a water licence allocation from an existing licence holder. By 2008, there had been approximately 28 successful water rights transfers under this system.

In theory, the creation of a water transfer system (also known as a water market) was meant to reduce the risk of water shortages, allow for new water users in a system that is closed to new allocations, and encourage water conservation.

The design of the current water transfer system in Alberta has incorporated a number of important public policy protections:

1. A public review of every water transfer allows a level of transparency and an opportunity to ensure third-party water licence rights are not negatively affected.
2. Every water transfer requires a consideration of the potential hydrological impacts of the transfer.
3. The Government of Alberta has the opportunity with every water transfer to hold back 10 percent of the transferred allocation for instream purposes.

Many licensees who have undertaken the water rights trading process have indicated that the transaction costs of completing a transfer, including both the financial costs and the time requirements, are too high. Also, there are concerns that the transfer system does not allow for enough short-term sharing of water.

There is a real concern that the water rights trading market will only increase the use of water as licensees sell or utilize "sleeper" licences or unused water thus compounding the current pressures on river systems.

There is a real concern that the water rights trading market will only increase the use of water as licencees sell or utilize “sleeper” licences or unused water thus compounding the current pressures on river systems.⁴⁷

The water rights trading system in Alberta has had some success. However, a wide variety of stakeholders including licencees have highlighted that other policy reforms may be needed to more fully address the water scarcity challenges facing Alberta’s watersheds. Ultimately, a number of public policy challenges associated with Alberta’s current water market need to be addressed.

A wide variety of stakeholders including licencees have highlighted that other policy reforms may be needed to more fully address the water scarcity challenges facing Alberta’s watersheds.

Alberta’s water market is the first in Canada. As such, there are many questions around whether its existence effectively “commodifies” water to an extent that it opens the door to large scale water transfers to the United States. Some suggest that a more helpful discussion would be to discuss the management of water resources as both a *right* for some users (e.g. human use) and as a *commodity* for others. Such an approach embraces the right to access water for people and the environment as a priority but acknowledges its use as an input for economic activity. Alberta government officials have suggested that Alberta’s *Water Act* is effective to prevent large scale transfers of water outside its boundaries. It would be wise for the government to provide its legal justification to the public so they are reassured that every measure possible has been taken to guard against this event.⁴⁸

V: Building a system for sustainable water use

Building a secure water future has never been more challenging. The current system of water allocation established over 100 years ago is increasingly in conflict with changed conditions both in terms of water supply and water demand. Yet, there are thousands of water users dependent on this current system. Do we continue to tinker with the current system or fundamentally overhaul it?

We suggest that tweaking the system will not be enough. New strategies are needed to provide a solid underpinning for an updated water allocation system, building on key principles from the current system. We begin by outlining what outcomes a future water allocation system might seek to achieve.

I. Any system of allocation or trading should be able to adapt in times of drought as well as predicted climate change impacts

Alberta's water allocation system was built at a time when the region was relatively high in precipitation, and water was considered plentiful. Like many prior appropriation systems in the western United States, water rights were issued with little regard to the supply of water as it was considered virtually unlimited. It has only been within the past few decades that integrated water management, requiring a consideration of both water supply and water demand, has been identified as a more appropriate approach to water management.

New strategies are needed to provide a solid underpinning for an updated water allocation system, building on key principles from the current system.

"If the system is to be robust enough to work no matter what climatic conditions the future brings, the allocation regime must be aligned with hydrological realities and defined in a way compatible with processes such as evaporation, storage and flow across and through land."

Prof. Mike Young and Jim McColl, Research Fellow. 2008. A Future-Proofed Basin: A New Water Management Regime for the Murray-Darling Basin. University of Adelaide.

Any future system should be able to easily adapt when water supply is low, particularly over multiple years. Adaptation is not merely the ability to cut off junior water users in an administratively efficient manner. Rather, it is to embrace more formally into the system itself the assumption that drought will occur on a more frequent basis and that alternative models of water sharing be considered to support the greater public good. This will be discussed below in more detail.

In addition, any future system must confront the growing reality that climate change will produce significant variability in flows that will lead to more intense and prolonged incidences of drought as well as greater incidences of floods. Overall, water supply is predicted to decrease, and we must plan for these events.

2. Basic human water needs should be guaranteed to present and future Albertans

It is clear that water is not a standard commodity. It is essential to life and has been recognized as a basic human right by the United Nations.⁴⁹ South Africa's White Paper on Water Policy suggests three aspects of equity in water management for people: (1) equity in access to water services; (2) equity in access to water resources; and (3) equity in access to benefits from water resources use. It also sets out a reserve, "which consists of two parts—the basic human needs reserve and the ecological reserve."⁵⁰

Basic human needs include water for human consumption, food preparation, and sanitation. Water for basic human needs in Alberta is supplied primarily through municipal water systems in urban settings and through private water systems, including groundwater wells, in rural settings. Not all municipal or private water use is for basic human needs. For example, municipal water systems often supply water for uses such as lawn and garden watering, car washing, golf courses, parks, and commercial and industrial uses. When we speak of guaranteeing water for basic humans needs, we refer only to the protection of water supply for those basic needs of consumption, food preparation, and sanitation.

Significant challenges are associated with the disparity between municipalities that have senior water rights obtained early in Alberta's settlement and municipalities that are facing water shortages because they have junior or small licences. Appropriate land use planning must certainly be part of the broader discussion informing how municipalities grow or attempt to live within their means. However, the challenge emerges with those municipalities that are forced into a position of participating in the water market to obtain water for basic human needs.

Water allocation under the current FITFIR system may run counter to good urban planning. Urban municipalities with unused senior allocations may continue to expand when urban growth may be more appropriate in other communities where growth is limited by an inadequate water supply. This conundrum must be directly addressed in future water allocation systems rather than leaving the water market to work out the problems.

3. The use of water is a factor in allocation decision making

Sound public policy around water resource uses compels decision makers to integrate priority of use into the allocation system at some level. Current water policy in Alberta deliberately avoids prioritizing water uses, instead basing the system largely on priority of licence date. With a few exceptions (e.g., household users, traditional agricultural users), government managers of water are not provided the tools that would allow them to set aside or otherwise assure that water is available for certain uses, such as ensuring a certain amount of water is allocated for basic human use or water for other economic uses such as irrigation.

Any future water allocation system should also address concerns that water rights transfers could result in the wholesale reallocation of water from agriculture to commercial,

Government managers of water are not provided the tools that would allow them to set aside or otherwise assure that water is available for certain uses.

residential, or industrial uses that are better able to absorb the market cost of water allocations.

4. Environmental limits are respected and upheld

In the past few years, there is new recognition that the protection of ecosystem services and basic human water needs are public interest issues best addressed by the adoption of sound public policy.

The management of water in Alberta has followed the historical approach of authorizing freshwater withdrawal for economic development, agriculture, and settlement without consideration of environmental needs for water. In the 1970s and 1980s, new science reflected a transition from establishing static minimum flows to recognizing the variability of the annual or natural flow regime.

The water management paradigm is now shifting from the historical approach through a lens of an unlimited supply of water to ecosystem-based water management (EBWM) that emphasizes leaving a certain amount of water in rivers and restricting water diversions. In contrast with the current water management regime characterized largely by diversion licences (sometimes containing limitations on diversion depending on river flows), EBWM begins with defining the ecosystem requirements to leave water instream as the basis upon which diversions are defined and permitted. Put another way, EBWM is driven by a constrained approach where diversions are defined by the availability of water after ecosystem needs are met—not simply the diversion volume provided in a licence.

5. Any future system should provide a higher degree of water security in the form of secure rights and flexibility

Any water allocation and trading system must ensure that water users participating in that system understand, with a high degree of certainty, their access to a water supply and their ability to augment that water supply through an efficient trading system.

But the natural availability of water resources makes the concept of water security challenging. Watersheds are characterized by a significant land-distribution system from mountains to prairies, surface water and groundwater, a wide range of inter- and intra-annual variability, a diverse set of uses ranging from basic human needs to an economic input for the production of goods, and part of a broader environment providing a wide range of ecosystem goods and services.

The effective re-allocation of water from a current to a future use requires that water users understand their access to water from year to year. A right to use water, however, does not mean that the right must translate to a static volumetric approach. Rather, that right can be proportional, i.e., calculated as a percentage of stream flow. It is clear that water supply is highly variable in Western Canada. While some security can be established technically through storage facilities capturing water during periods of high stream flow, there is a limit to the costs borne by taxpayers to develop new dams and diversion structures. Institutionally, water insecurity can be shared proportionally among all water users by defining water rights as percent of the water available in any given year.

Three conditions must be present for the efficient market system of resource allocation: 1) the user of the resource must be certain of the share, quality, location, and timing of his water entitlement; 2) the resource must be perfectly divisible (e.g., allowing the transfer of some or a part of the resource); and 3) the resource use must not affect or be affected by use by another party.⁵¹

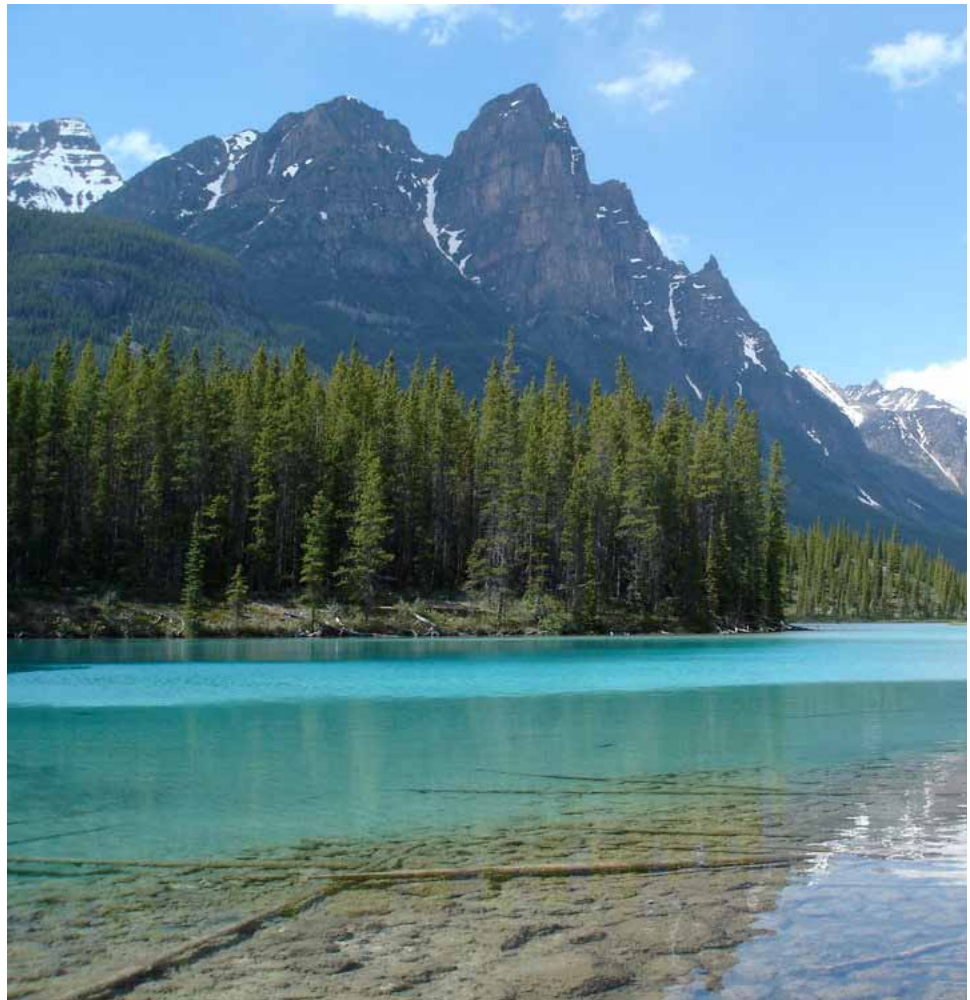
While some security can be established technically through storage facilities capturing water during period of high stream flow, there is a limit to the costs borne by taxpayers to develop new dams and diversion structures.

6. Water allocation decisions should be transparent, accessible, open to public input, and subject to periodic review

Water continues to be a public resource owned by the Crown and managed by the government on behalf of the residents.

Water is unique in terms of its source and distribution and therefore affects a wide range of stakeholders interested in its management. Also, water continues to be a public resource owned by the Crown and managed by the government on behalf of the residents. Water allocation systems do not grant ownership in water but rather only the right to use water for specified purposes.

Given the diverse properties of water and the wide range of parties involved in its use or benefits, there is the high potential for what is defined as a “third-party effect”. In a water rights trading context, “third parties” are those who are not buyers and sellers in a transfer negotiation but are otherwise affected. For example, a third party could be another water rights holder, an interest on behalf of the environment (instream flows, wetlands and other ecosystems, water quality), urban interests, or non-agricultural rural communities. The impacts can be economic, social, or environmental and can be positive or negative. The challenge in considering third-party effects is in determining what they are and how to balance them in the scheme of water transfers and other allocation decisions.⁵²



VI: New system recommendations

The following recommendations suggest the adoption of new strategies for water allocation in Alberta. These recommendations are deliberately not limited to the water rights trading system. While water markets improve the flexibility of an existing allocation system, they are currently poorly designed to address the fundamental underpinnings of who receives the water and for what purpose.

Overall, we suggest a comprehensive update to Alberta's water allocation system premised on an entitlement system or "share system" based on seasonal water availability. The system would provide an entitlement to a "share" of the available water rather than to a fixed volumetric amount. The issuance of "shares" to existing water licencees would be based in part on the current FITFIR system. The issuance of shares would explicitly acknowledge the priority of water set aside for environmental protection, Aboriginal rights, and basic human needs.

The main elements of the proposed water allocation system are as follows:

1. Legally enforceable water management plans for each basin developed using the best available scientific evidence;
2. Legally enforceable water conservation objectives that protect instream flow needs for each basin. For the purposes of this document, we assume that water set aside as a water conservation objective is not subject to use or transfer. Instream flow needs are determined using the best available scientific evidence;
3. Water entitlements based on water "shares" allocating a percentage of the water available in excess of the water conservation objective. Water volumes allocated to each share are to be adjusted seasonally, and more often if needed, in response to predicted flows in the basin;
4. Provided water is secured for people and the environment, establish a water allocation and share trading system that facilitates the re-allocation of water from one use to another;
5. The ability of the public to hold water shares for instream purposes;
6. The use of incentives to encourage water conservation and the efficient use of water; and
7. The inclusion of groundwater in the water management system.

While water markets improve the flexibility of an existing allocation system, they are currently poorly designed to address the fundamental underpinnings of who receives the water and for what purpose.

Such changes will take time to implement and will require amendments to existing laws, regulations, policies, and licences. Therefore, we recommend that the Government of Alberta develop a five-year plan to fully implement these recommendations, including the completion or update of water management plans for all river basins in Alberta.

Recommendation 1: Develop legally enforceable water management plans based on the best available scientific evidence

Legally enforceable water management plans should be developed for every major river basin in the province within five years using the best available scientific evidence. Priority should be given to developing water management plans in those basins where water allocation issues have been identified or are imminent such as the South Saskatchewan River basin, the North Saskatchewan River basin, and the Athabasca River basin. Each major basin plan should meaningfully address major sub-basins to ensure it addresses those unique issues for that region.

Water management plans should be:

1. Integrated with and consistent with land use plans for the watershed;
2. Developed using the best available science and traditional knowledge;
3. Informed by broad public input, including the participation of Watershed Planning Advisory Committees;
4. Able to recognize existing Aboriginal rights to water and developed in consultation with affected First Nations;
5. Take into account apportionment agreements with adjacent jurisdictions.

In addition, water management plans for each basin and sub-basin must include the following:

1. A baseline inventory of the existing water resources, including groundwater.
2. A baseline inventory and classification of water-based (aquatic and riparian) ecosystems.
3. An inventory of existing and predicted water uses within the basin.
4. Identification of the water management objectives for the basin.
5. Issues, challenges, and barriers that limit the achievement of the water management objectives.
6. Established water conservation objectives that are not subject to diversion or transfer (discussed in more detail in Recommendation 2 below).
7. Water requirements to meet Aboriginal rights obligations.
8. Water management strategies that will contribute to the achievement of the water management and water conservation objectives.
9. A revision every ten years or more frequently if there are significant advances in scientific knowledge pertaining to the basin or other significant developments within the basin.

In addition, as discussed in more detail below, water management plans should integrate environmental, social, and economic objectives and identify the water available to domestic, agricultural, industrial, and other needs.

All governmental actions taken within the watershed must be consistent with the approved water management plan. Decision makers must develop regional land use plans in coordination with the water management plans, and decision makers must assess the impact of regional land use plans on the attainment of the water management objectives. In many



Decision makers must develop regional land use plans in coordination with the water management plans.

areas, land use in the water source areas is the primary determinant of water quantity, water quality, and timing of flow. Indeed, land use often has a greater impact on water availability for all purposes than will the water allocation system. The Government of Alberta should more proactively manage land use to achieve water management objectives. The *Water Act* should be amended to require that all governmental actions are consistent with the approved water management plan.

All regional and local land use plans and all government approvals of forestry, mining, energy, industrial, recreational, and urban developments must be assessed for potential impacts on the water management objectives as part of the approval process. All developments that have an adverse effect on water supply must be denied approval, or offset by effective mitigating measures, or compensated by the purchase of allocations for instream purposes.

Recommendation 2: Establish legally enforceable water conservation objectives that are informed by instream flow need assessments using the best available scientific evidence for each basin and sub-basin

Legally enforceable water conservation objectives identified using the best available scientific evidence are essential to provide for sustainable water management and the protection of the aquatic ecosystems. Water conservation objectives should be developed using the principles of ecosystem-based water management (discussed above) and must consider environmental base flows and instream flow needs for the maintenance of aquatic ecosystems and habitat for fish and other species.

In contrast with the current approach to water conservation objectives under the *Water Act*, we suggest that water conservation objectives should be established and effectively take “priority” over all other water allocations. Water may be allocated for withdrawal only above the established water conservation objectives.

Ecosystem objectives for each basin and sub-basin in Alberta must be established based on ecosystem-based water management principles. An independent, expertise-based authority should be tasked with establishing water conservation objectives for each basin and sub-basin in Alberta based on baseline monitoring, historical records, and modeling of each sub-basin. As an interim step, water conservation objectives should be set at precautionary, conservative levels for sub-basins where adequate baseline monitoring and modeling is not available. For example, the Government of Alberta could set interim water conservation objectives at 80 percent of long-term average seasonal flow levels.

The setting of water conservation objectives must recognize the benefits of seasonal flooding in certain aquatic and riparian ecosystems. Floodwater management should be consistent with the principles of ecosystem-based water management, while minimizing damage to property. Floodplain zoning and restrictions to minimize the potential for property damage should be addressed in the water management plans and in regional land use plans.

Recommendation 3: Create a new entitlement system based on a “share system” that recognizes variable annual and inter-annual river flows above the water conservation objective

Similar to proposals adopted in Australia, water licences should be converted to water “shares” that entitle the holder to a portion of the water available for diversion in each time period. While water licences currently provide the right to withdraw a fixed volume of water, a water share would provide the right to withdraw a percentage of the water available on a seasonal basis up to a specified maximum volume limit.⁵³

The Government of Alberta should establish an independent, expertise-based authority responsible for determining on a seasonal (quarterly, or more frequently as necessary) basis the quantity of water that may be withdrawn from each basin or sub-basin. The estimates must be based on predicted water flows for that season and the protection of seasonal water conservation objectives. Each share holder would then be advised of his volumetric allocation

An independent, expertise-based authority should be tasked with establishing water conservation objectives for each basin and sub-basin in Alberta.

limit for that period. If necessary, volumetric allocations could be revised on a monthly basis to respond to unforeseen climatic events.

It has been argued by some that water supply in Alberta is too variable and unpredictable to implement a “share” system. However, the FITFIR system is subject to the same weakness. Under the FITFIR system, Alberta Environment must forecast expected flows and advise junior licencees to not withdraw water in times of low flow. Similarly, under the share system, Alberta Environment will be required to predict flows and establish total diversion limits. The share system simply shares the costs of low flows and the value of higher flows more equitably amongst licencees.

Under either system, the Government of Alberta should invest in more intensive monitoring, data collection, interpretation, and forecasting tools to better predict seasonal flows throughout Alberta. In particular, more monitoring and data collection are required in the mountain regions that are the source of much of the flow in Alberta’s rivers.

Water shares should have a maximum seasonal volume limit based on the identified and documented needs of the shareholder. In addition, all water shares should have defined and enforceable return flows defined as a percentage of the water diversion. Share holders must be required to meter and report both withdrawals and return flows. The government should move toward real-time monitoring of stream flows which, in conjunction with metering of diversions and return flows, would provide the information needed to manage watersheds on a real-time basis.

To recognize the historical rights of senior licence holders, the initial issuance of shares could allocate an increased number of shares to a senior licence than to a junior licence of similar volume. One approach would be to recognize rights based on the date of priority whereby older licences within a certain time period (e.g., pre-1950) would have access to a greater number of shares than a pool of junior licencees who received their licence later.

In the initial issuance of shares, the Government of Alberta should adjust the maximum volume allocated under each share based on the quantity of water actually used on a historical basis with some allowance for projected future use.

In addition, the water allocation system must also recognize the societal priorities for water use identified in the water management plans. The water allocation system must recognize as priorities the reservation of water for environmental purposes, water to meet Aboriginal rights obligations, and water required to meet apportionment obligations to other jurisdictions. After these priorities have been met, the issuance of shares must consider the balance between domestic, agricultural, industrial, and other uses identified in the water management plan for each basin. Therefore, it is recommended that the Government of Alberta establish three “pools” of water shares within each river basin based on the water management plan for that basin. The three pools would be as follows:

1. A “domestic” pool: water for basic human needs (e.g., consumption, food preparation, sanitation). In many cases, this would consist of existing licences for municipal purposes, less any industrial, commercial, and other uses within the municipality;
2. An “agricultural” pool: water used for irrigation and other currently registered agricultural uses; and
3. An “industrial, commercial, and other” pool: water used for all industrial, commercial, and other uses including municipal uses such as lawn watering, vehicle washing, parks, recreational uses, and golf course irrigation.⁵⁴

In basins such as the South Saskatchewan River basin where existing allocations exceed the water available for allocation above the water conservation objective, the share approach would likely result in immediate reductions in allocations. We suggest much of this water could come from “unused” allocations. This adjustment may require a phased approach, for example over a five-year period, to allow users to adjust to the new allocations.

The water allocation system must recognize as priorities the reservation of water for environmental purposes, water to meet Aboriginal rights obligations, and water required to meet apportionment obligations to other jurisdictions.

In other basins where existing licence allocations are less than the water available for diversion above the water conservation objective, currently unused water shares would be held by the Government of Alberta in a water bank and issued in accordance with the existing application, review, and approval process. New water shares would be issued at the current market price to encourage the transfer of existing under-utilized shares and allocations. Also, water shareholders wishing to dispose of unused shares could sell shares into the government-operated water bank at the current market price.

First Nations water uses, unregistered household uses, and traditional agricultural uses as defined in the *Water Act* would continue to be permitted without holding a water share. Unregistered household and agricultural uses would continue to be subject to the existing limitations in the *Water Act*. Water to meet the First Nations, household, and traditional agricultural uses would be considered and included in the water management plans and in setting the water conservation objectives.

Recommendation 4: Provided water is secured for people and the environment, establish a water allocation and share trading system that facilitates the re-allocation of water from one use to another

To direct the available water to its highest and best use within each of the share pools, a water share and allocation trading system must allow for the timely and cost-effective transfer of water and water shares. Some argue the current water licence transfer system in Alberta is hampered by high transaction costs and long time delays. Transaction costs include the time and effort required to draft transfer agreements between the parties and to address information needs such as the assessment of potential adverse impacts on the environment and other users. If environmental protections and basic human water needs are incorporated within the water allocation system as the first priority, then there is an opportunity to introduce more flexibility with respect to the temporary or permanent transfer of water.

The temporary assignment or lease to another party of water allocated under a water share (up to a period of one year) should be permitted without prior approval provided that the receiver of the water holds a water share, the water is withdrawn at or downstream of the diversion point identified in the originating water share, and the other conditions specified in the originating water share, such as return flow, are met. The content of such agreements, including the cost of the transaction, should be made public.

The permanent transfer of a water share should be permitted without prior approval provided that the transfer remains within the same pool of shares (domestic; agricultural; or industrial, commercial, and other), the diversion point remains at the same location or is downstream of the existing diversion point, and all other conditions of the originating share, such as return flow, apply. The construction of the works required to withdraw water at a new diversion point would continue to require an assessment of the environmental impacts and an approval under the *Water Act*.

The current internal government and external public review systems for water licence transfers should be maintained for the permanent transfer of a water share where the proposed transfer is between pools of shares (e.g., from agricultural use to industrial use), the proposed diversion point is upstream of the existing diversion point, the proposed diversion point is in another sub-basin, or there are other proposed changes to the water share conditions (e.g., change to return flow) that could impact the aquatic environment. Approvals of such water share transfers must consider the impacts on aquatic ecosystems, on other users, and on the public interest.

Off-stream storage may be an option where water conservation, efficiency, and other demand management options have been exhausted. Such options would be permitted by a water management plan and subject to a thorough public review and approval process. Off-stream storage may be used to carry forward share allocations to future years.



A water share and allocation trading system must allow for the timely and cost-effective transfer of water and water shares.

The Government of Alberta should establish an electronically accessible water share registry that records and tracks water share transfers. In addition, the Government of Alberta must require that any exchange of compensation for each transfer is reported to the registry in order to provide that information to the public.

Recommendation 5: Allow water shares to be held for instream purposes

Any future water allocation system should allow individuals or organizations to hold water shares for instream purposes. This ability could enhance water conservation objectives and aquatic ecosystem objectives above the baseline water conservation objectives assumed in this paper to be set aside as a first priority allocation and not subject to diversion. However, it must be clear that the achievement of the water conservation objectives described in Recommendation 2 above is a government responsibility. Private participation in the water market is intended to enhance environmental values above those water conservation objectives and to allow the market to determine the value of enhanced environmental protection against other uses.

Individuals and organizations interested in enhancing the protection of aquatic and riparian environments could participate in the water market through the purchase of shares for instream purposes from the agricultural or industrial, commercial, and other share pools. This permits environmental interests to effectively participate in the water market. Further, as discussed under Recommendation 1, parties could purchase allocations for instream purposes to mitigate the adverse impacts of land uses or development.

Shares held for instream purposes would be similar to conservation easements that are currently granted for land areas that are held for conservation purposes. Organizations, such as water trusts could hold water shares directly for conservation purposes or through trust arrangements with individual shareholders, similar to the arrangements that organizations such as the Nature Conservancy of Canada now have for land.

Given that water shares held for instream purposes would be supplementary to the baseline water conservation objectives, water trusts holding such shares could sell or lease such shares back into the diversion pool of shares to generate revenue to support their activities. Further, consideration should be given to providing tax deductions for water shares donated to trusts for instream purposes.

Recommendation 6: Introduce a suite of tools to support water conservation and efficiency of water use

The establishment of a water allocation trading system will act to encourage water use efficiency and conservation. Other provisions that should be considered to encourage water use efficiency and conservation include the following:

1. Per unit charges for all water diverted under water shares. The per unit charges should apply to all water diversions less any return flow amounts;
2. Significant penalties for water withdrawals above permitted allocation amounts;
3. Compensation at market rates for conserved water shares returned to the government;
4. Permission for the water shareholder to freely arrange for re-use of the allocated water as long as the specified return flows and conditions are met. For example, a municipality could direct its treated wastewater to an industrial operation as cooling water before returning the water to the source, assuming that all conditions with respect to temperature, quality, and return flow are met.
5. Tax or other financial incentives for water conservation projects such as the lining or replacement of open irrigation ditches and improvement of municipal infrastructure.

Organizations, such as water trusts could hold water shares directly for conservation purposes or through trust arrangements with individual shareholders, similar to the arrangements that organizations such as the Nature Conservancy of Canada now have for land.

Recommendation 7: Improve management of groundwater and eliminate priority use

While this report does not examine the challenges associated with groundwater use in any significant detail, we recognize it is essential to address this resource within any updated water allocation system.

We re-emphasize the recommendations made in the *Report of the Rosenberg International Forum on Water Policy* submitted to the Government of Alberta in 2007:

1. Manage groundwater more intensively by including registration of all wells, metering, identification and protection of recharge areas, and identification of overdraft areas.
2. Consider increased regulation of activities as required via the modification of existing licences including the adoption of tools such as pumping quotas.
3. Assess the cumulative impacts of groundwater diversion.⁵⁵

In addition, we recommend that groundwater management be considered and integrated into the water management plans required for each basin.

There is an immediate need to identify critical groundwater areas that should be subject to more intense regulation and protection from development. Such areas could be where there is a greater risk of degradation of groundwater quantity and quality. Consequently, any new policy for groundwater management should adopt conjunctive use of ground and surface water.

Also, there is an immediate need to close off any new groundwater allocations in a basin that is closed to surface water allocations such as in the South Saskatchewan River basin to prevent the demand for water being simply transferred from surface to groundwater sources.

In the longer term, the allocation of groundwater should fall within the overall water management scheme, including the allocation of allocation of shares based on maintaining long-term groundwater resources.



VII: Net benefit to all water users and the environment

We suggest that the recommendations above would fulfill the following:

1. Provide better protection of aquatic environments and the environmental services provided by them

The ecosystem-based water management will ensure that the environmental goods and services provided by healthy ecosystems are protected and enhanced. Again, healthy aquatic ecosystems are not well protected by the current management system or by pure market systems. Yet, healthy aquatic ecosystems are essential to the long-term support of environmental services and benefits to communities.

2. Provide for efficient adjustment to short-term drought or long-term climate changes

Current approaches to short-term drought conditions result in uncertainty for junior licence holders who may be cut off in dry years. Both junior and senior licence holders are subject to uncertainty when they must rely on short-term *ad hoc* water sharing agreements in dry years. Longer-term climate change and the predicted reductions in stream flow will result in greater uncertainty for junior licencees and a greater need for *ad hoc* arrangements. The share system formalizes the *ad hoc* water sharing arrangements that have been used in the South Saskatchewan River basin and the lower Athabasca River basin during periods of low flow.

Water shares will allow for greater equity in response to drought and climate change. All shareholders will share proportionately in the natural variability of water supply, both the burdens of scarcity and benefits of abundance. Water shares, in combination with an effective water allocation trading market, will allow all shareholders to participate in the financial benefits of directing water to its highest and best use.

3. Allow water to be directed to its highest and best use

The current licencing system encourages hoarding of unused allocations and the waste of water in order to protect licenced allocations. A more efficient and transparent water allocation system will attach value to unused allocations and direct water to its highest and best use. In place of an arbitrary cut-off of junior licences in times of water shortages, transfers will operate to direct water to its most valuable use.

A more efficient water trading system will allow water users to address risk and

uncertainty by acquiring water shares or allocations on a permanent or short-term basis. At the same time, the creation of water share pools will ensure that basic societal needs such as human needs for water and food production continue to be met. In addition, the proposed changes will reduce the transaction costs and time delays for many water allocation transfers.

4. Provide incentives for water use efficiency and conservation

The value in conserved water allocations that may be assigned or transferred will encourage the efficient use and conservation of water. Further incentives such as compensation for returned allocations and financial incentives for water conservation initiatives will further encourage the wise use of water.

5. Ensure that the impacts of land use changes on water management are considered

The greatest impacts of water management occur not in the streams and lakes but on the adjacent lands. The coordination of water management plans with land use plans and the legal requirement that government approvals are consistent with approved water management plans will ensure that water management objectives are protected.



VIII: Now is the time for change

Alberta's present water allocation system served its purpose of providing secure water supplies for the initial stages of Alberta's agricultural, urban, and industrial development. The pure application of the FITFIR licencing system was developed in a time of abundant water supply and low demand.

The changes to the *Water Act* made in 1996 attempted to address the water supply challenges in over allocated basins through both a moratorium on new water allocations and the ability to transfer water allocations.

The recommendations made in this paper are an attempt to propose a responsive and responsible water allocation system that addresses Alberta's future water needs while recognizing the finite nature of our valuable water resources.

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