WATER FOR ECONOMIC DEVELOPMENT IN THE SOUTHGROW REGION OF ALBERTA

Final Report
For
SouthGrow Regional Initiative
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Lorraine Nicol, Henning Bjornlund, and K. K. Klein
Department of Economics
University of Lethbridge
Lethbridge, Alberta T1K 3M4

EXECUTIVE SUMMARY

One of the keys to the economic well being of the SouthGrow region is knowledge of the opportunities and constraints of working with water in southern Alberta. The purpose of this study was to compile the necessary information that would provide SouthGrow members with an understanding of how water provides opportunities for economic growth of the 27 SouthGrow communities in the Oldman and Milk River Basins while appreciating the constraints to water usage. In this region, the social, environmental and economic demands placed on the limited water resource must be balanced within a policy, legal and institutional framework that is undergoing significant change. The enormous demands that exert pressure on the water resource have changed the way water is being managed. The key conduits of change are: (a) legislation: the Water Act, 1999 and Irrigation District Act, 2000; (b) policy: the Water for Life Strategy and resource-based policies such as the Land-Use Framework; and (c) community input: the Watershed Planning and Advisory Councils. Ultimately, an understanding of this water management framework will assist SouthGrow in not only accessing water but influencing water policy and management.

Several opportunities to access water are detailed in this report. These include tapping into "unused" licensed water, such as water that might become available with amendments to existing water licenses, and greater use of available groundwater. Longer-term increases in water availability may occur through interbasin transfers, increasing storage capacity, retaining a greater percentage of the water flowing to Saskatchewan under the Alberta-Saskatchewan apportionment agreement, increasing the supply of recycled water from municipal and industrial users and uses, and Alberta Environment's cancellation of existing licenses that are not being used.

There are several important constraints to water availability in southern Alberta. The first (and most important) is the restriction on the issuing of new water licenses within the two river basins. Second, certain procedures impede the operation of water markets. Third, there are potential long-run negative effects on water supply from climate change and possible water exports. Fourth, several policy and legislative uncertainties remain, including how implementation of the Water for Life strategy will unfold, especially the possibility of implementation of economic instruments; whether, given the recent announcement of the review of the first-in-time, first-in-right system, that system will remain intact; whether the watershed planning and advisory councils will be able to achieve their objectives; and the outcome of the International Joint Commission response on apportionment of flows of the St. Mary and Milk Rivers between Canada and the United States. Finally, as water becomes more scarce and valuable in Alberta, a cultural and political divide seems to be intensifying between urban, agricultural and conservation interests in Alberta that recently were manifested in an outcry over amendments to irrigation district licenses and the sale of an irrigation water license to an urban development.

There are both immediate and longer-term steps that SouthGrow can take to obtain water for economic development. The organization should identify potential sellers of water licenses within the region, especially irrigation districts. Initiatives that can have an impact on longer-term policy development include SouthGrow communities becoming active participants in the watershed planning process and lobbying politicians for changes that will improve rural to urban transfers. A third set of measures relate to promoting practices for enhanced water conservation on a day-to-day basis.

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PREFACE

Alberta, and especially the semiarid area of southern Alberta, has over recent years started to feel the impact of enormous demands for water, exerting pressure on an already scarce resource. The province now finds itself at a crossroads in water management. It is actively searching for solutions to ever-increasing demands for water in the face of possibly declining supply. The urgency of the situation became apparent when, in 2005, Alberta Environment stopped accepting applications for new allocations for the Bow, Oldman and South Saskatchewan River sub-basins until the Minister of Environment specifies how water not currently allocated should be used. As a consequence, the extraction of water for consumptive use has now been fixed within nearly every river system in southern Alberta. In addition to immediate decisions such as this, the province also has taken some steps to change the way water is managed within a broad framework.

This long-term framework, entitled Water for Life, starts with the premise that current and future demand for water to ensure economic growth, support a growing population, and secure healthy rivers and lakes, combined with an increased uncertainty related to the variability of future water supply, will result in water demand exceeding water supply. The foundation of the strategy is therefore based on the need to implement a major shift in Alberta's approach to managing water. A set of three principles provides the strategy's framework. These include the preservation of a healthy aquatic ecosystem, groundwater and surface water quality, and the first-in-time, first-in-right principle for granting and administering water allocations. Central to the strategy is an assurance that existing water entitlements will not be reduced and reallocation of water away from existing users to new users will be based on voluntary actions. The strategy proposes the use of economic instruments, best management practices and public involvement in water planning processes to direct the voluntary actions to achieve the strategy's objectives.

The new water management principles and instruments are part of a world-wide recognition of increased water scarcity, the shortcomings of existing policies to manage the process of reallocating water among competing users and the shift in water management from increasing supply to managing demand. This change in thinking gained academic and political credibility through the 1980s and ultimately was incorporated into international policy at the Rio Convention in 1992. New policy instruments were embedded in the two key documents that emerged from that convention - the Rio Declaration and Agenda 21. The main policy changes were the recognition of water as an economic good, the use of economic instruments such as water trading and water pricing, water planning and public participation in water management processes, and recognition of the environment as a legitimate water user.

It is within this context that this report was prepared. SouthGrow seeks to understand water's availability for future economic development in the southern Alberta region. SouthGrow communities lie within the Oldman River and Milk River basins, two basins which, while they have many unique characteristics, share a common feature – restrictions on water availability. It is important that decision makers within the SouthGrow region understand the nature and scope of these restrictions so that they can make the best use of the water that is available, while being mindful of the balance between the societal, environmental and economic value of water.

I BACKGROUND

1. SouthGrow Regional Initiative

SouthGrow Regional Initiative is an umbrella organization of 27 communities united with a common mission of: "Creating Opportunities….to accelerate and enhance quality of life, development and sustainability for the communities of the SouthGrow Region of Alberta". The organization was created in 2004 and encompasses a region with a population of approximately 140,000 people.

The 27 member communities are represented by a 10 member elected management board. Reporting to the Board are three committees: the Strategic Collaboration Committee, Marketing and Communications Committee and the Economic Development and Innovation Committee. A project coordinator assists the committees to carry out project initiatives.

Core businesses of the organization are: strategic collaboration, marketing and communication, economic development and innovation. The organization's goals are to:

- foster a southcentral Alberta shared vision for regional economic development;
- create new economic development opportunities in the region;
- encourage and enhance shared services among communities through cooperation; and
- provide southcentral Alberta with a unified voice on regional priorities.

SouthGrow is active in both fostering new economic developments and supporting existing ones. It carries out these functions in several ways. First, it seeks out economic opportunities. Current initiatives include, for example, bio-fuel opportunities being explored under the Southern Alberta Alternative Energy Partnership. A study spearheaded by the organization's Economic Development and Innovation Committee aims to create industry profiles and highlight potential opportunities in the region. Aside from bio-energy production, opportunities already identified and profiled include wind energy, sugar-confectionary production, solar energy, and carbon credits. Second, the organization works to educate and train members in areas such as workforce issues, pursuing economic opportunities, attracting business and investment. Third, the organization supports existing enterprises. Success in obtaining an Alberta Finance and Enterprise grant, for example, makes it possible for the organization to investigate new productivity improvement strategies in the face of rising costs and labour shortages. The "SouthgrowN Savours" initiative actively promotes locally grown produce in the region.

With economic development at its core, SouthGrow is mindful of the need to access a key resource necessary to all development: water. As noted in a recent newsletter: "Understanding and ensuring the capacities of the sustainable water supply is key to the economic well being of our region's agriculture and processing sector" (SouthGrow, 2008). Ultimately the organization hopes to "…make communities better aware of water's impact on economic development and investment attraction, now and in the future, and the balance required to achieve optimal societal and economic use of water in the region" (SouthGrow, 2008)

2. SouthGrow Region – Existing Water Usage

The SouthGrow region is located within two water basins– the Oldman River Basin, one of four subbasins within the huge South Saskatchewan River system, and the Milk River Basin. Water allocation and water use within these basins has been documented in Alberta Environment's 2007 publication "Current and Future Water Use in Alberta" (AENV, 2007). Selected historic and recent (2005) data (AENV, 2007) demonstrate some key features of this region. First is the prominence of irrigation agriculture in water allocation and use in both basins. Second, it is worth noting the significant increase in licenses issued during the 1980 to 1990 period that were then followed by virtually no issuing of licenses since then. The other phenomena is how old some licenses are, some dating back to 1890. Finally, groundwater seems to be of more significance in the Milk River Basin than it is in the Oldman River Basin, at least in terms of the number of groundwater licenses issued.

The following discussion is based on the AENV (2007) report, unless otherwise referenced.

a. Oldman River Basin:

The Oldman River Basin is about 26,000 km^2, which represents approximately four percent of Alberta's total land base. Population in the basin is approximately 158,000 (Rush et al., 2008). The Oldman River Basin comprises all or parts of 26 urban municipalities, 11 rural or regional municipalities, and two First Nations, the Blood Tribe and Peigan Nation. Twenty-one of the SouthGrow municipalities are located within the Oldman River Basin. Although the Town of Raymond and the Village of Stirling are located within the Milk River Basin, they draw most of the water from the Oldman River Basin through the works of the St. Mary River Irrigation District (SMRID).

Table1 provides a summary of licenses and registrations and allocated, licensed and estimated actual use in the Oldman River Basin by sector. In total, existing license and registrations allow a maximum of 2,292,401 dam^3 of water to be withdrawn for use and distributed among almost 11,000 licenses and registrations.

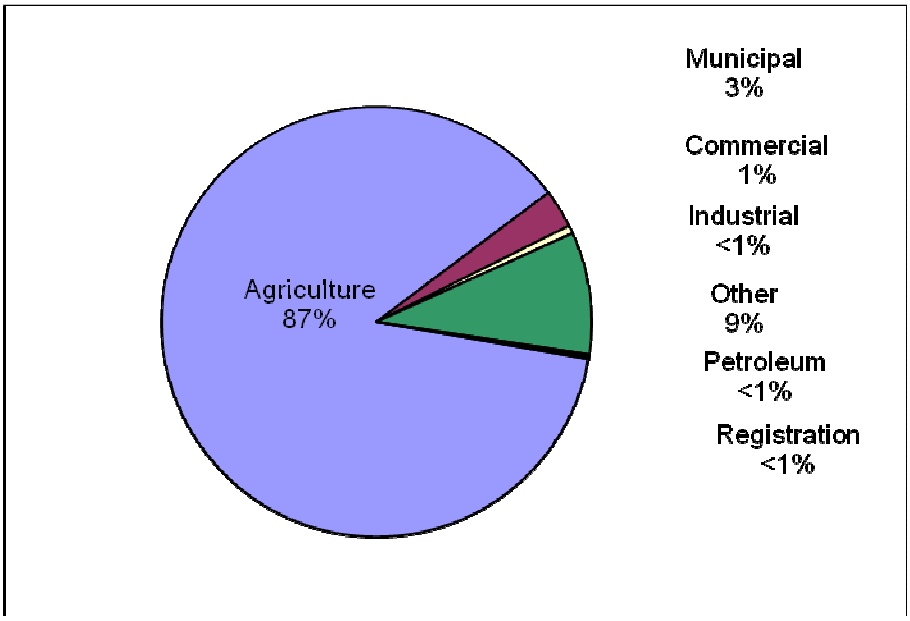
Table 1
Oldman River Basin
Selected Water Data

Sector	Licenses and Registrations	Allocated (Dam^3)	Licensed (Dam^3)	Estimated Actual Use (Dam^3)	Percent of Allocation Used
Municipal	244	64,149	27,768	16,568	25.8
Stock watering	9,587	25,810	25,810	19,558	75.8
Irrigation	845[1]	1,972,943	1,837,350	942,701	47.8
Commercial	100	14,094	10,330	10,330	73.3
Petroleum	18	4,270	3,530	993	23.3
Industrial	3	11	11	11	100.0
Other	105	211,124	150,821	150,821	71.2
Total	**10,902**	**2,292,401**	**2,055,620**	**1,140,982**	**49.8**

[1] Comprising 42 district licenses and 803 private licenses
Source: AENV, 2007

An overview of surface and groundwater allocations is provided in Figure 1. It shows that agriculture accounts for 87 percent of total water allocations, which totaled 2,290,851 dam^3 in 2005. The other 13 percent of water allocations consisted mainly of municipal, industrial and other uses.

Figure 1: Distribution of Active Water Allocation in the Oldman Basin

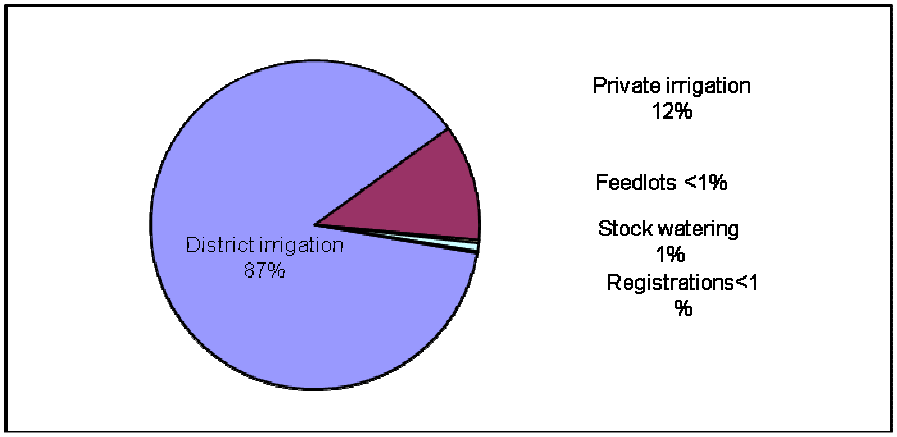


Source: AENV, 2007

Agriculture

Figure 2 shows how water allocated to agriculture is distributed among the different agricultural uses in the Basin. The largest allocation by far is for district irrigation (87 percent). Private irrigation accounts for 12 percent, registrations and licenses for stock watering and feedlots together account for about one percent of the total allocation.

Figure 2: Water Allocation by Volume for Agricultural Activities in the Oldman River Basin



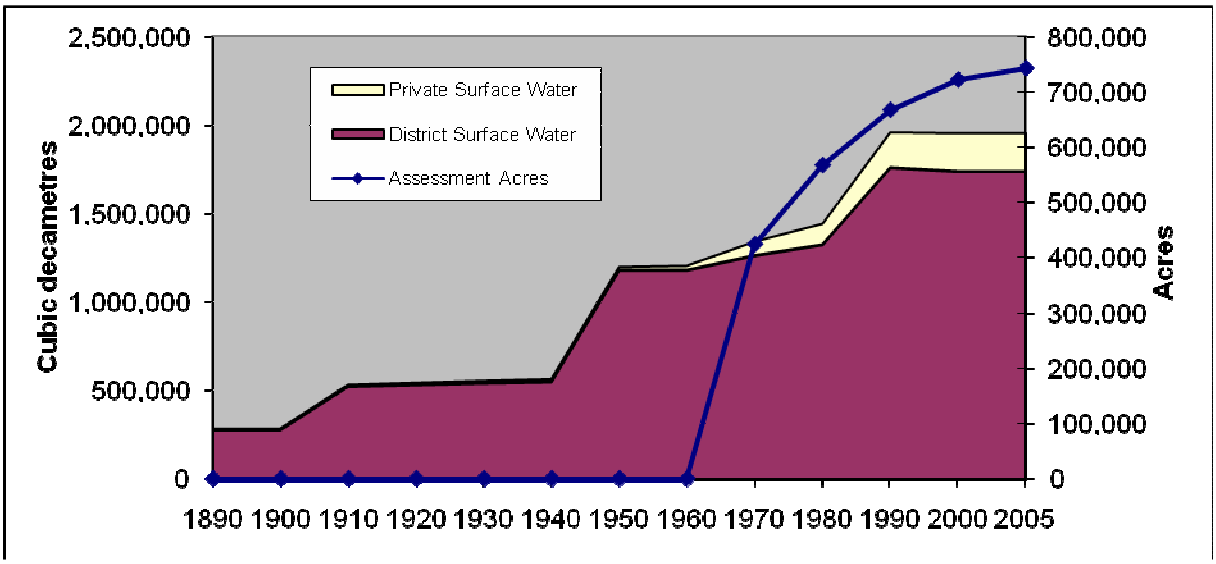
Source: AENV, 2007

Irrigation:

Overall, 845 licenses, accounting for 1.97 million dam^3 of water licenses have been issued for irrigation in the Oldman River Basin. Nine of the 13 irrigation districts in the province are located in the Oldman River Basin. The vast majority of this allocation (1.7 million dam^3, about 90% of water allocated for irrigation) goes to supply 42 licenses held by irrigation districts. Almost all of this allocation is from surface water licenses. There are 803 private licenses that are allocated approximately 0.2 million dam^3, representing about 12 percent of the total allocation for irrigation.

A historical perspective on water allocation for irrigation is provided in Figure 3. Some of the earliest licenses for district irrigation have priority dates from the 1890s. Allocations for irrigation districts have been increased periodically followed by periods of relative stability, often a result of completion of major water management projects that provided additional water for irrigation and other use. The most recent increase in allocation occurred during 1980 to 1990. Since 1990, the allocations have remained virtually unchanged.

Figure 3: Historical Trends in Surface Water Allocation for Irrigation in the Oldman River Basin



Source: AENV, 2007

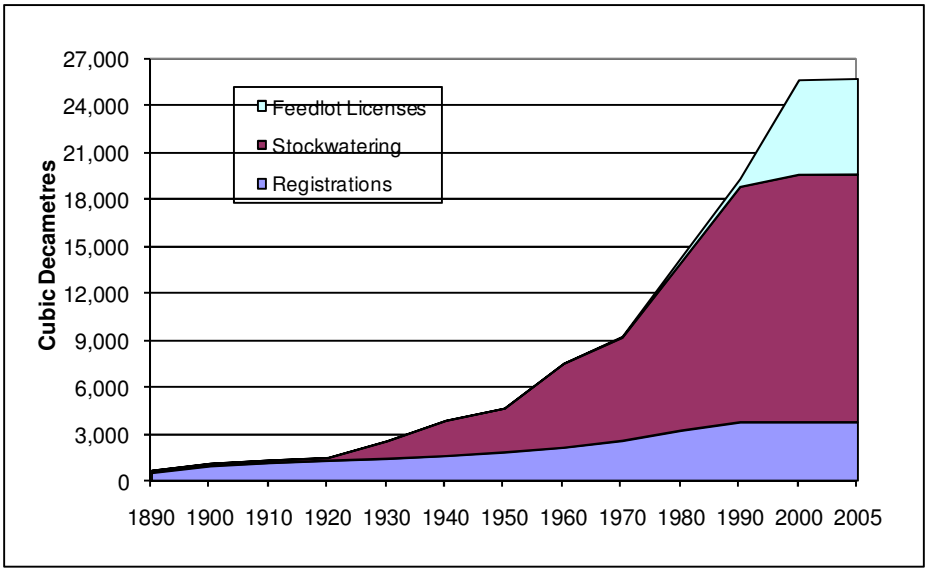
Livestock:

Overall, 9,587 licenses and registrations have been issued for livestock watering with total allocation amounting to 25,870 dam^3. In addition to these allocations, farmers are able to obtain up to 1,250 m^3 of water for household purposes. The number of such household allocations in the Oldman River Basin is not known.

A historical perspective on water used for livestock is provided in Figure 4. Some licenses were issued as early as the 1890s while licenses for stock watering began to be

issued around 1920. Since that time, allocations have risen steadily, mostly from licensed surface water. The allocations from registrations have remained relatively unchanged. The current total allocation of about 26,000 dam^3 is unchanged since 2000. Over the last few decades there has been a trend toward livestock intensification in the region, resulting in an increase in the number of feedlots and water allocations for feedlots. Figure 4 shows that most of the water allocations for livestock issued since the 1990s have been for feedlots, although total allocations have remained constant since about 2000.

Figure 4: Historical Trends in Water Allocation for Feedlots in the Oldman River Basin



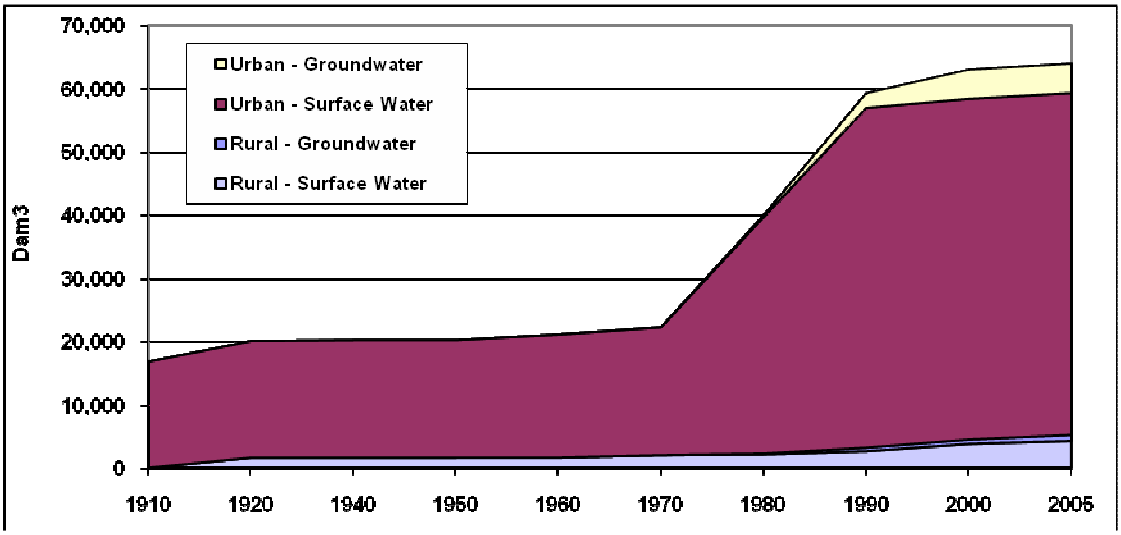
Source: AENV, 2007

Municipal:

In 2005, there were 244 active municipal water licenses for 137 licensees in the Oldman River Basin. These licenses allow withdrawals of up to 64,149 dam^3, which represents 2.9 percent of licensed water allocations in the Oldman River Basin. Urban communities account for 92 percent of total municipal allocations. Rural communities, including water cooperatives, farmsteads, single-multi homes and Hutterite colonies account for eight percent of licensed withdrawals. Other municipal uses account for less than 0.1 percent. The licenses allow withdrawals of up to 58,425 dam^3 of surface water, representing 91 percent of total municipal water allocations. Urban users can withdraw up to 54,129 dam^3 of surface water with 68 licenses. The City of Lethbridge has a license for 30,857 dam^3, which is the largest allocation of surface water of all the municipalities in the basin. Rural users have been allocated 4,247 dam^3 of surface water with 58 licenses.

Figure 5 shows how allocations for municipal water use in the Oldman River Basin have changed since 1960. Prior to 1960 all municipal allocations were for surface water. The first municipal licenses for groundwater allocations were issued in the 1980s, but allocations from this source have remained very small. Most of the growth in municipal water allocations occurred in the 1980s and 1990s, and were primarily for surface water.

Figure 5: Historical Water Allocations for Municipal Purposes in the Oldman River Basin



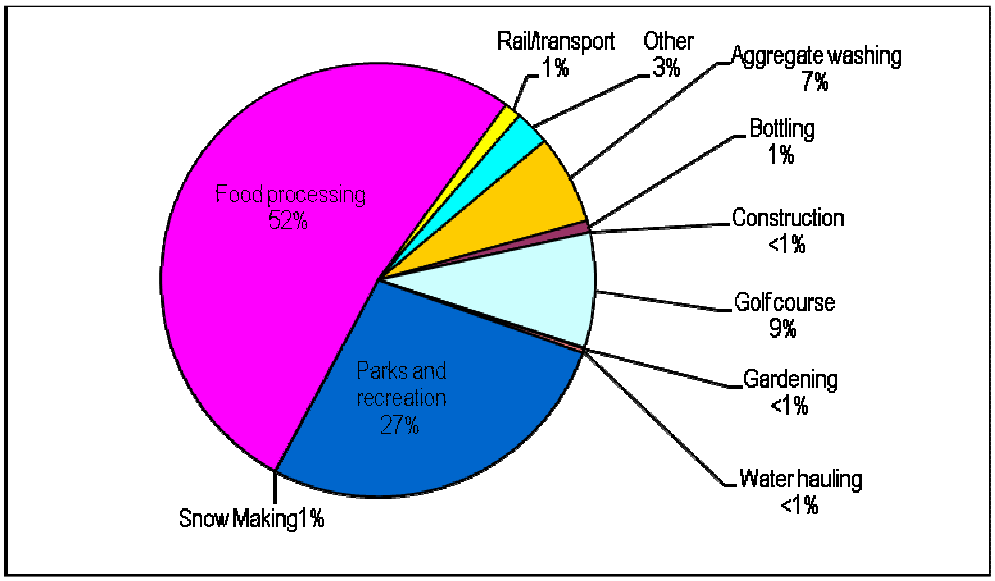
Source, AENV, 2007

Actual municipal water use is estimated to be 60 percent of the municipal allocation within the Oldman River Basin.

Commercial

There are 100 licenses that allow diversion of about 14,000 dam^3 of water in the Oldman River Basin. As shown in Figure 6, the largest allocations are for food processing (52 percent) and parks and recreation (27 percent) which, combined, account for about almost 80 percent of the total allocation for commercial purposes.

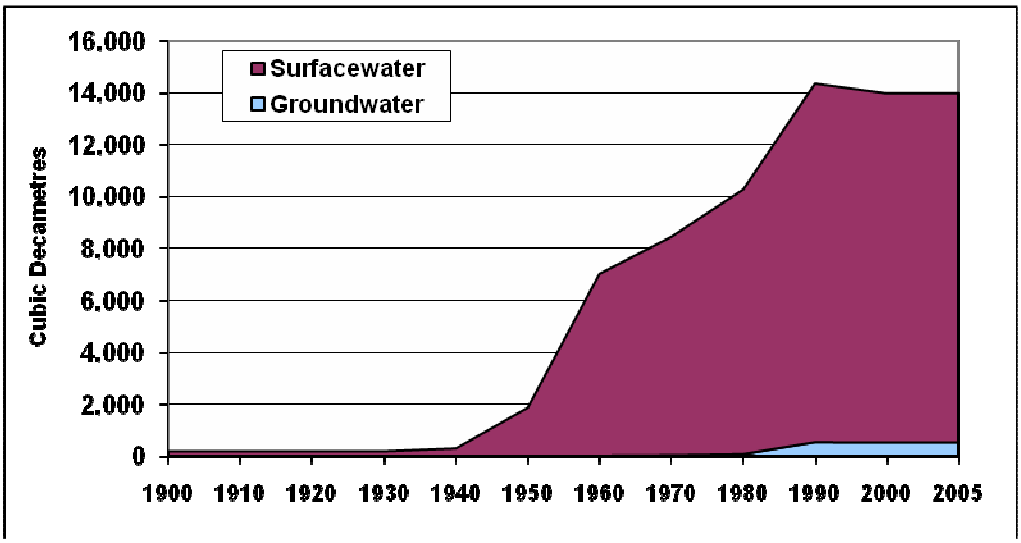
Figure 6: Water Allocation for Commercial Activities in the Oldman River Basin



Source: AENV, 2007

The historical trend of water allocation to the commercial sector in the Oldman River Basin is provided in Figure 7. It shows that the earliest allocation began in the early 1900s and consisted only of surface water allocations. Commercial allocations remained constant until the 1930s but began to increase rapidly in the 1940s. Since that time surface water allocations have increased steadily, peaking in 1990 and declining slightly to 2005. Groundwater allocations began in the 1970s and increased until 1990 but have remained constant since then. Historically, groundwater allocations always have accounted for a small proportion of water allocations for commercial purposes.

Figure 7: History of Commercial Sector Water Allocation in the Oldman River Basin



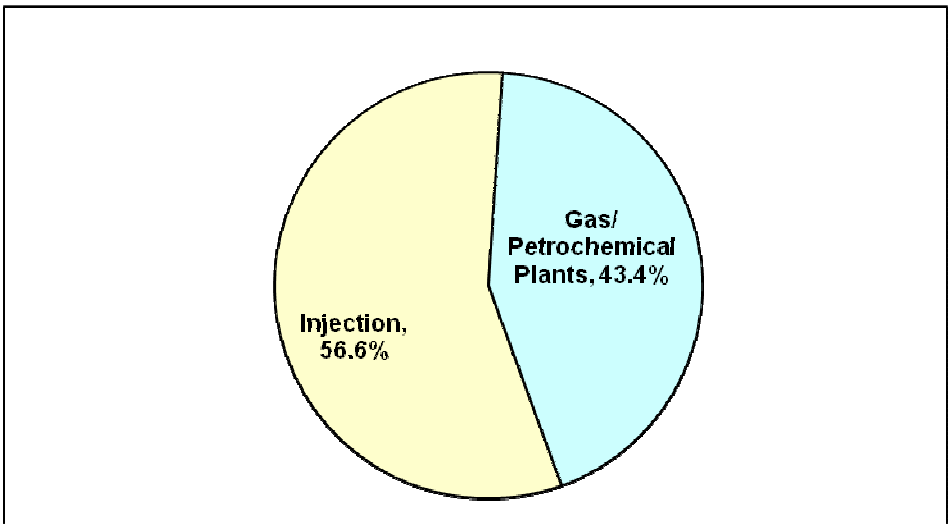
Source: AENV, 2007

Based on the water license data, about 73 percent of the allocation is expected to be used (i.e., consumed or lost) with 27 percent returned to the basin.

Petroleum

In the Oldman River Basin, there are 18 active licenses that allocate 4,270 dam^3 of water to the petroleum sector. Within the basin, allocations to the petroleum sector account for less than one percent of total allocations. Almost all of the licenses are for surface water (4,267 dam^3). As shown in Figure 8, the petroleum sector includes water allocations for oilfield injection and gas and petrochemical plants.

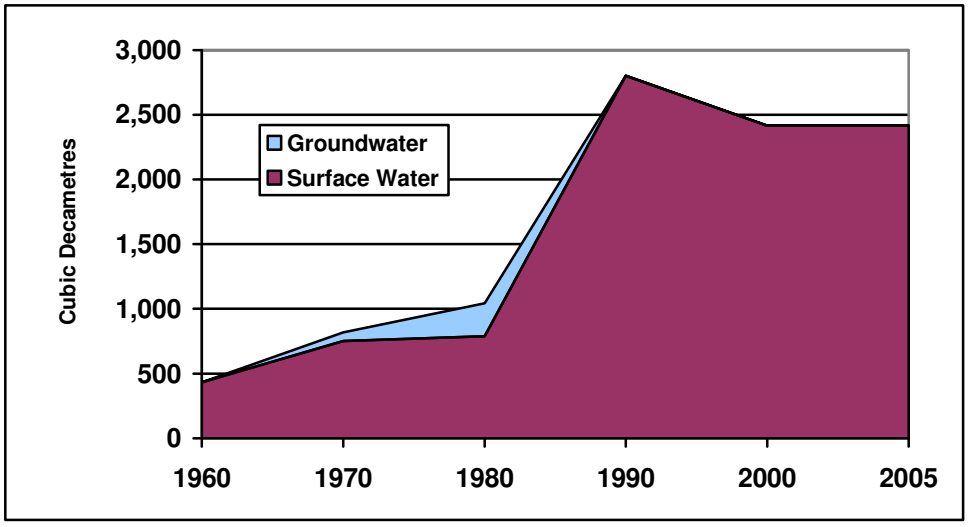
Figure 8: Petroleum Water Allocation by Use in the Oldman River Basin



Source: AENV, 2007

Figure 9 shows that allocations of water for injection commenced in the 1960s and grew rapidly in the 1980s. However, in the last few years the allocation has declined slightly.

Figure 9: Historical Trends in Water Allocations for Injection in the Oldman River Basin

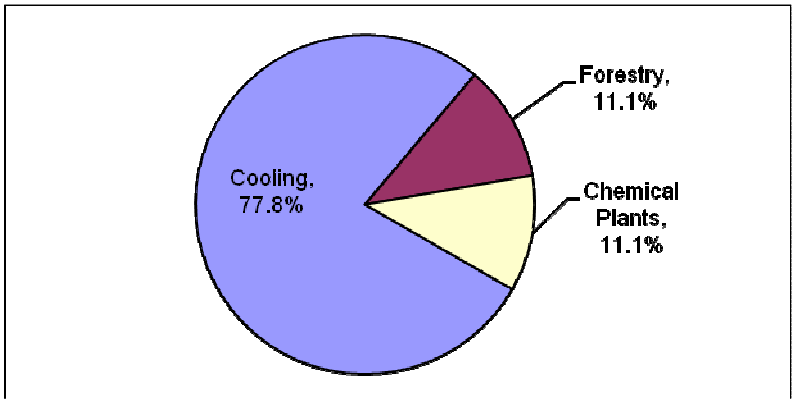


Source: AENV, 2007

Industrial

There are only three active licenses that allocate 11 dam^3 of water to the industrial sector in the Oldman River Basin. These industrial water licenses account for less than one percent of the total allocation in the basin. All of the water licenses are for groundwater. This sector is assumed to be using the full capacity of its licenses.

Figure 10: Industrial Water Allocation by Use in the Oldman River Basin

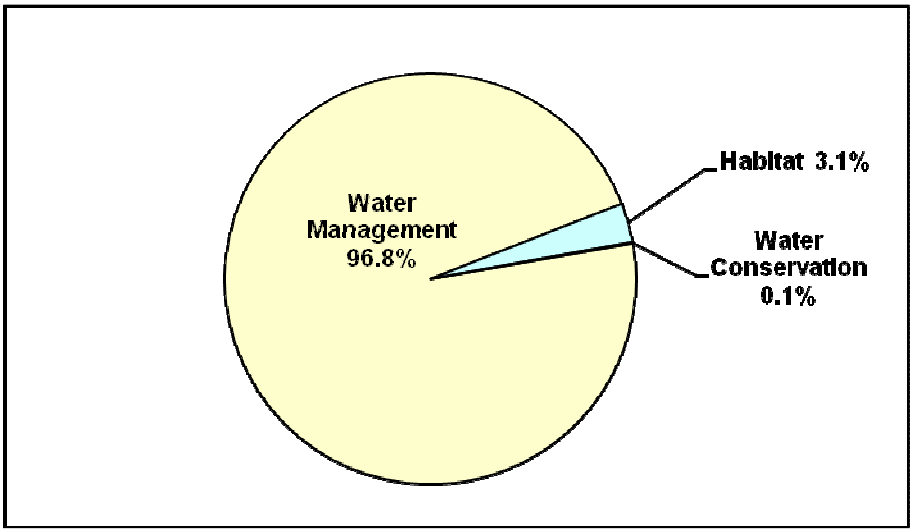


Source: AENV, 2007

Other

The Oldman Basin has 105 active licenses that allocate 211,124 dam^3 of water to the other uses. Seventy-nine percent of the water licenses are for surface water (161,243 dam^3 in total). Figure 11 illustrates the mix of water use by other sector activities in the Oldman River Basin. It shows that 97 percent of the water allocated for other uses is for water management (35 licenses for a total of 204,402 dam^3). Fish, wildlife and habitat enhancement accounts for three percent of the allocations (60 licenses for a total of 6,485 dam^3). There is also a small amount of water allocated to water conservation (five licenses for a total of 229 dam^3), and others uses specified by an Alberta Environment director (five licenses for a total of eight dam^3).

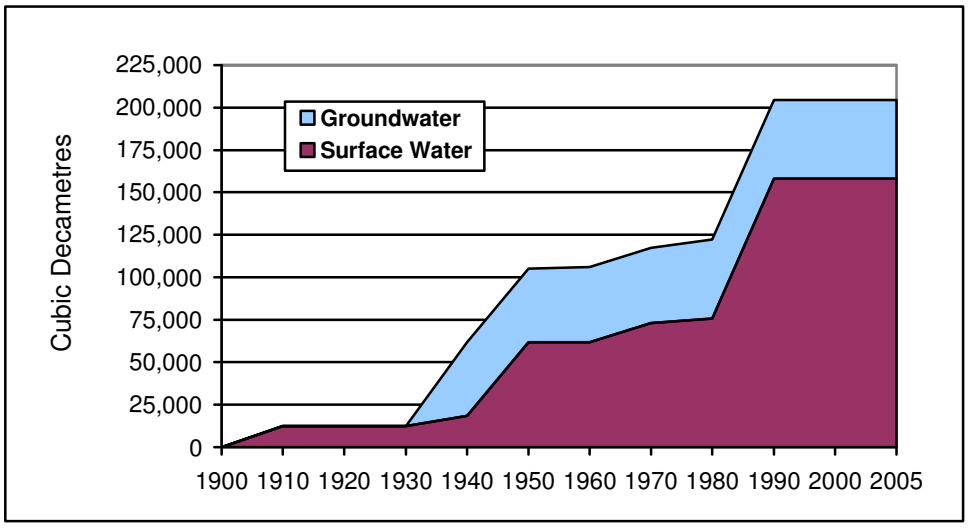
Figure 11: Other Sector Water Allocation by Use in the Oldman River Basin



Source: AENV, 2007

As Figure 12 shows, allocations of surface water for water management commenced in the early 1900s but grew rapidly from the 1950s to the 1990s. A sizeable amount of groundwater has been allocated to water management beginning in the 1940s and this amount has increased slowly over time. Allocations from both water sources for water management purposed have remained the same since the 1990s.

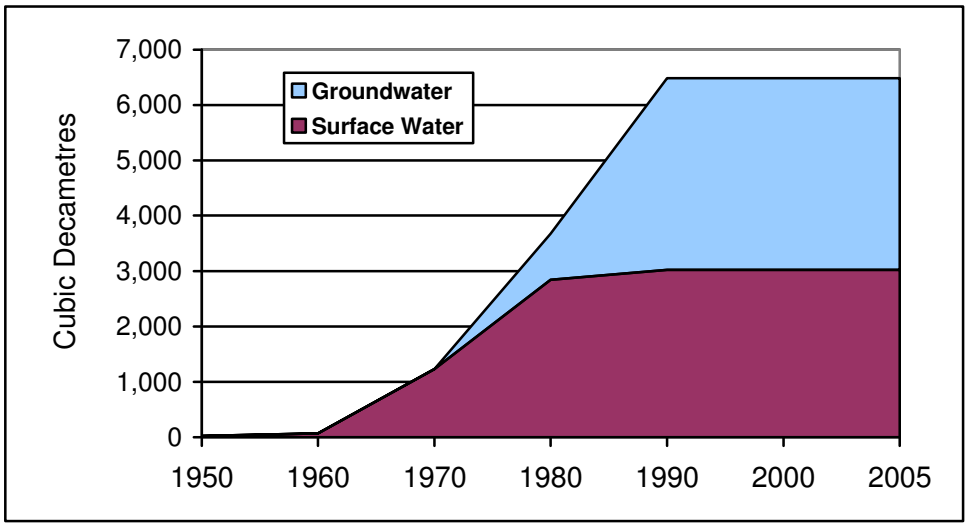
Figure 12: Historical Trends in Water Allocations for Water Management in the Oldman River Basin



Source: AENV, 2007

Figure 13 shows that allocations of surface water for habitat commenced in the 1950s and grew between the 1970s and 1990s. Groundwater use for habitat commenced in the 1980s and grew throughout the 1990s. There have been no new allocations issued for habitat since the 1990s.

Figure 13: Historical Trends in Water Allocations for Habitat Enhancement in the Oldman River Basin



Source: AENV, 2007

b. Milk River Basin:

The Milk River Basin is about 11,860 km^2 in area, which represents 2.0 percent of Alberta's land base. The Milk River Basin is comprised of all or parts of the counties of Cardston, Forty Mile No. 8. Lethbridge, and Cypress. The total population in the basin is about 2,400 of which about half are rural residents (MRWC, 2008). Major urban centres include the towns of Milk River and Raymond and the villages of Coutts, Stirling and Warner. There are no Aboriginal Reserves or Métis Settlements within the Milk River Basin nor are there any irrigation districts.

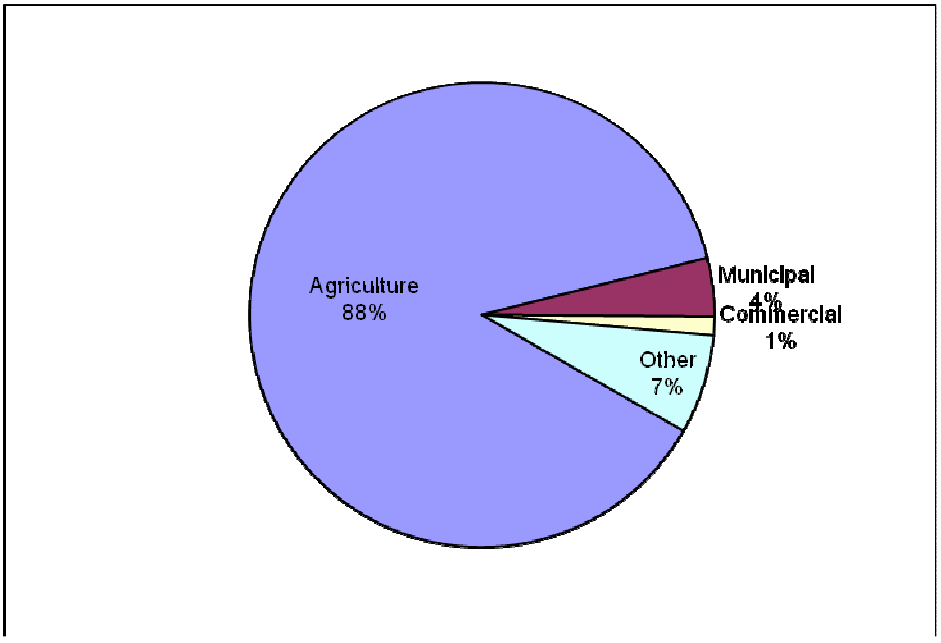
An overview of water licenses, registrations and estimated actual use is provided in Table 2. Existing licenses and registrations allow a maximum of 62,361 dam^3 of water to be withdrawn for use. Of this, up to 59,946 dam^3 are expected to be used and 2,415 dam^3 returned to surface water. The largest amounts of water have been allocated to the agriculture sector, particularly irrigation.

Table 2 Milk River Basin Selected Water Statistics					
Sector	**Licenses and Registrations**	**Allocated (Dam ^{3})**	**Licensed (Dam^3)**	**Estimated Actual Use (Dam^3)**	**Percent of Allocation Used**
Municipal	15	2,539	2,195	2,060	81.1
Stock watering	2,133	10,062	10,020	5,051	50.2
Irrigation	281	44,641	43,178	22,150[1]	49.6
Commercial	9	809	809	809	100.0
Petroleum	0	0	0	0	n/a
Industrial	0	0	0	0	n/a
Other	13	4,310	3,744	3,744	86.9
Total	**2,451**	**62,361**	**59,946**	**33,814**	**54.2**

[1] For the Oldman River Basin, the estimated amount of licensed water used for irrigation is 51.3%. This figure is applied to the amount of water used for private irrigation in the Milk River Basin as data on actual use is not available.
Source: AENV, 2007

An overview of existing surface and groundwater allocations is provided in Figure 14. It shows that agriculture accounts for 88 percent of total allocations. The other 12 percent of water allocations consisted mainly of municipal and other uses.

Figure 14: Distribution of Active Water Allocation in the Milk River Basin



Source: AENV, 2007

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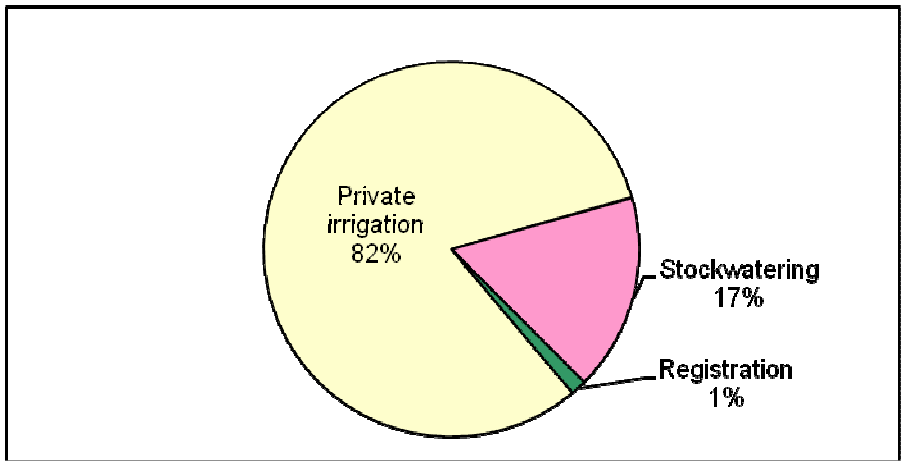
Agriculture

As of October 2006, a total of 54,703 dam^3 had been allocated to agricultural water use in the Milk River Basin. This includes 1,546 registrations representing an allocation of 737 dam^3 and 1,306 licenses that allow diversion of 53,966 dam^3 of water. Figure 15 shows how this water is distributed among the different agricultural uses in the Milk River Basin. The majority of water allocations are for private irrigation (82 percent). Stock watering accounts for 17 percent while registrations accounts for about one percent of the total allocation.

Figure 15: Water Allocation by Volume for Agricultural Activities in the Milk River Basin



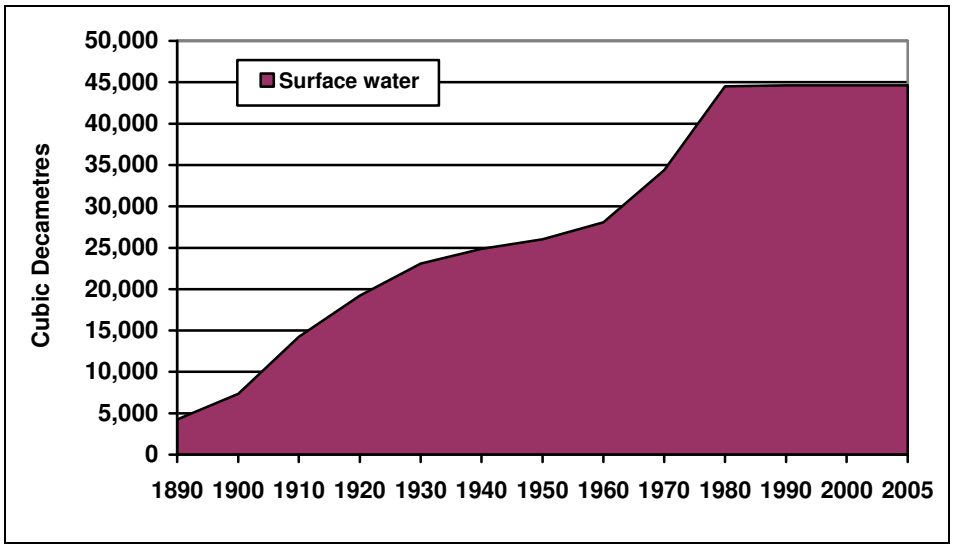
Source: AENV, 2007

Irrigation

In the Milk River Basin, there are 281 licenses that allow withdrawals of up to approximately 44,641 dam^3 for private irrigation purposes. All of these allocations are for diversions of surface water. This basin accounts for about seven percent of total private allocation and about 10 percent of the private licenses issued in the province.

A historical perspective on water allocations for private irrigation in the Milk River Basin is provided in Figure 16. It shows that the oldest licenses for crop watering or irrigation date back to the 1890s. The allocations for irrigation have increased over time from about 7,000 dam^3 in 1890 to 44,000 dam^3 in 1980. The amount of water allocated to irrigation has remained about the same since then.

Figure 16: Historical Trends in Allocations for Irrigation in the Milk River Basin



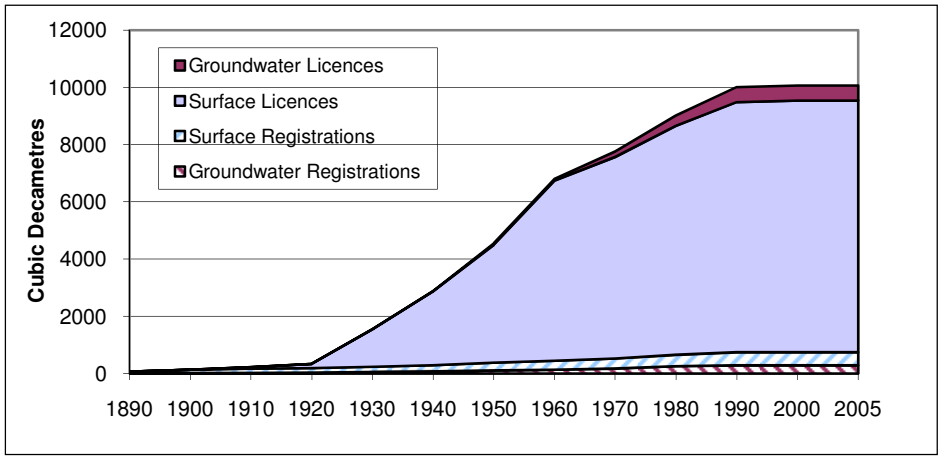
Source: AENV, 2007

Livestock

Overall, 2,133 licenses and registrations have been issued for livestock watering, with total allocation amounting to 10,062 dam^3. Registrations account for seven percent of this amount. In addition to these allocations, farmers are able to obtain up to 1,250 m^3 of water for household purposes, which include water for some livestock. The number of such households in the basin is not known.

A historical perspective on water used for livestock is provided in Figure 17. Some registrations were issued in the 1890s while licenses for stock watering began to be issued in the 1910s. Since 1920 allocations for stock watering have risen steadily, with the vast majority of the increase occurring through surface water licenses. Since 2000, allocations have remained constant and no new licenses or registrations have been issued.

Figure 17: Historical Trends in Water Allocation for Livestock in the Milk River Basin



Source: AENV, 2007

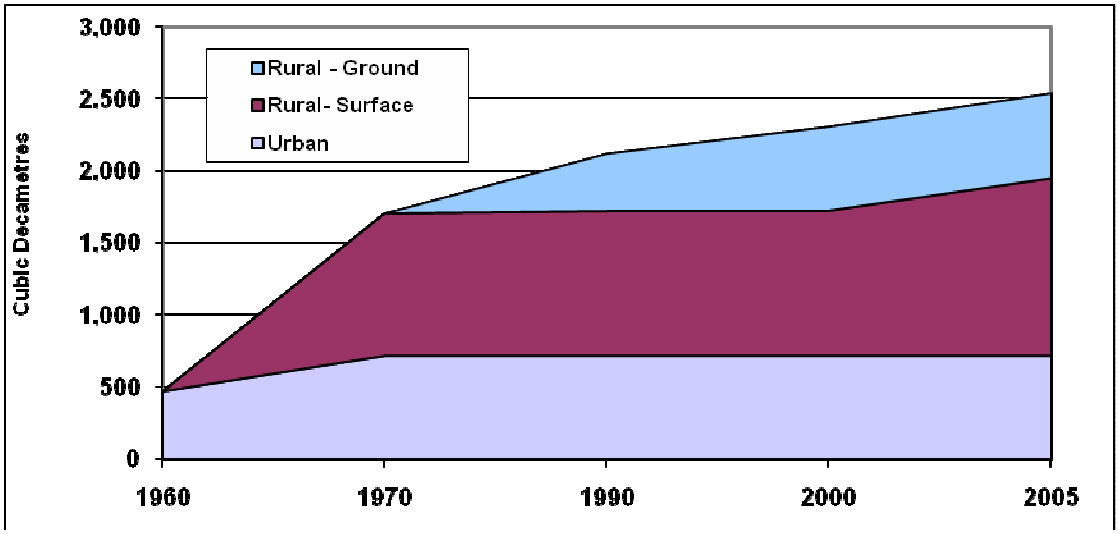
Municipal

In 2005, there were 15 active municipal water licenses granted to 13 licensees or users in the Milk River Basin. The allocation for these licenses is 2,539 dam^3. Municipal water allocations account for 5.7 percent of licensed water allocations in the Milk River Basin. Municipal uses in the Milk River Basin include water for camps, cooperatives, farmsteads, single- and multi- family homes, Hutterite colonies, and urban municipalities including villages, summer villages, towns, cities and hamlets.

The maximum amount of surface water that can be withdrawn in the Milk River Basin by the municipal sector is 1,949 dam^3. Surface water licenses represent 76.8 percent of total municipal water allocations.

Figure 18 shows how allocations of water for municipal water in the Milk River Basin have changed since 1960. The initial allocations were for surface water but, starting in the 1970s, groundwater has become increasingly important. Allocations for the urban communities that draw on surface water have remained constant since 1970. Nearly all of the increased allocations of water for municipal purposes since the 1960s have been for rural use. And most of the allocations since the 1970s have been for groundwater use in the rural parts of the basin.

Figure 18: Historical Water Allocations for Municipal Purposes in the Milk River Basin



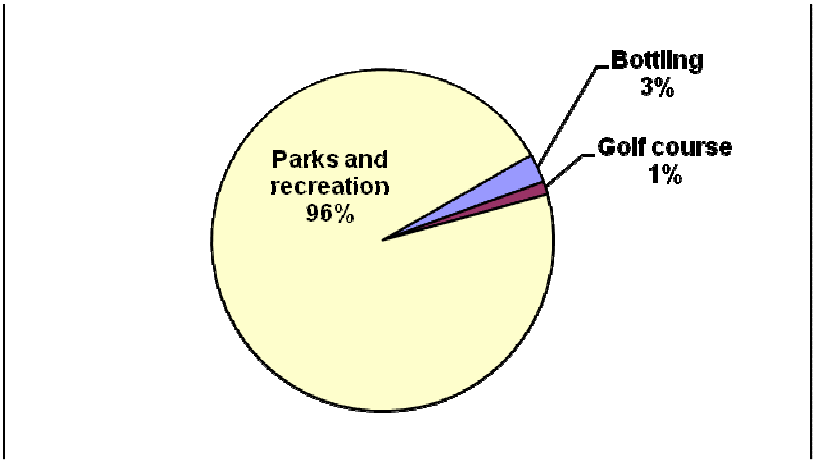
Source: AENV,2007

Commercial

There are nine licenses that allow diversion of 809 dam^3 of water in the Milk River Basin. This accounts for 1.8 percent of total allocations in the basin.

As shown in Figure 19, water allocated for parks and recreation (seven licenses with a combined allocation of 777 dam^3) accounts for about 95 percent of total allocation of water for commercial purposes. The remainder consists of water allocated for bottling (3%) and for golf courses (1%).

Figure 19: Water Allocation by Volume for Commercial Activities in the Milk River Basin

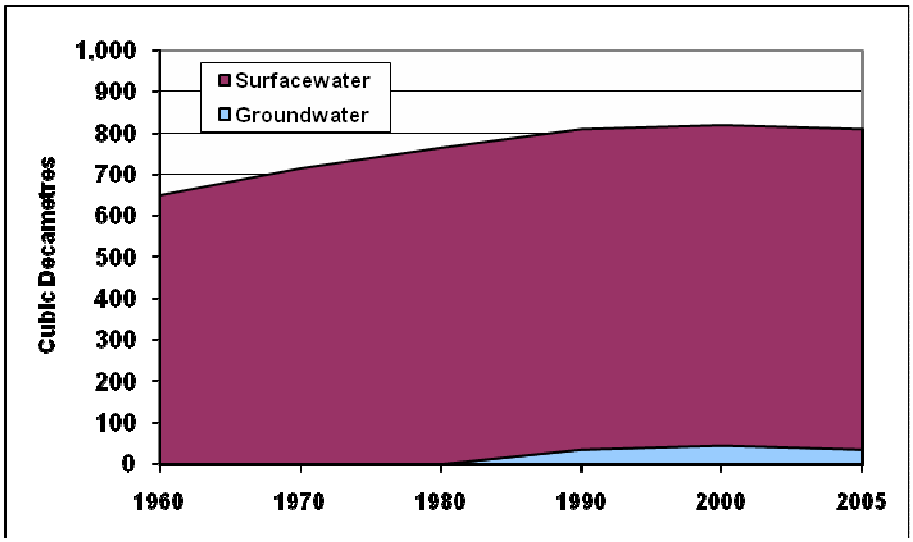


Source: AENV, 2007

Licenses issued for the commercial sector allow maximum withdrawals of about 775 dam^3 of surface water and about 35 dam^3 of groundwater. Water licenses issued for parks and recreation account for 99 percent of the total surface water allocation. Bottling accounts for about 70 percent of the groundwater allocation.

The historical trend of water allocation to the commercial sector in the Milk River Basin is provided in Figure 20. It shows that water licenses for commercial purposes consisted entirely of surface water in the 1960s. Since then, allocations of surface water grew slightly in the 1970s and 1980s, but have remained constant since the 1990s. Allocations from groundwater began in the 1980s, increased slightly during the 1990s, but have declined slightly since 2000.

Figure 20: History of Water Allocation to the Commercial Sector in the Milk River Basin



Source: AENV,2007

Petroleum

There are no active petroleum water licenses in the Milk River Basin. Although one license for withdrawals of 37 dam^3 of groundwater had been issued for injection purposes, its license expired in 2003.

Industrial

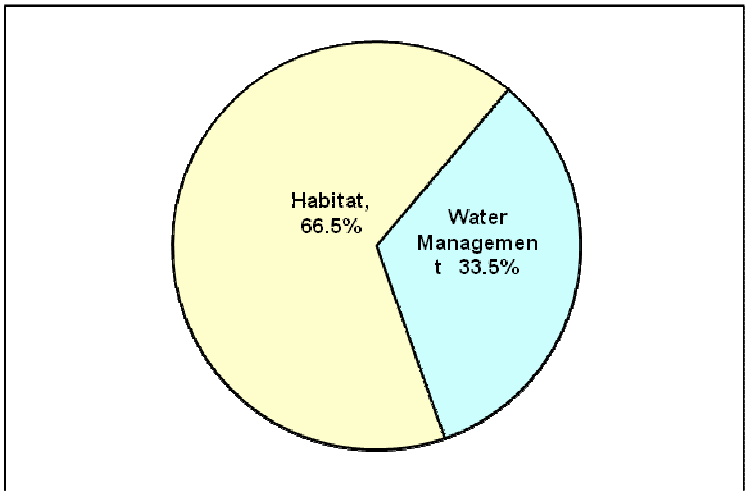
There are no industrial water licenses in the Milk River Basin.

Other

In the Milk River Basin, there are 13 active water licenses for other sector activities. These licenses allocate 4,310 dam^3, 13 percent of which must be returned to the source. Other sector activities account for about 10 percent of licensed water use in the Milk River Basin. All the water allocated for other uses is surface water. Other sector uses

include water management (flood control and lake stabilization), and fish, wildlife and habitat enhancement (Figure 21).

Figure 21: Water Allocation to Other Sectors in the Milk River Basin



Source: AENV,2007

The main use of water for other uses in the Milk River Basin is for habitat enhancement. These projects account for 66 percent of water allocation and 77 percent of the licensed water use in this category.

II WATER POLICY FRAMEWORK

1. Alberta Water Management in the National Context

Managing Canada's water resources is complex. Under the Canadian constitution, water management falls under the provincial governments' authority with the exception of some very specific areas such as fisheries, navigation and the regulation of inter-provincial and international trade. On a day-to-day basis, the province regulates water quality and quantity (Percy, 2000).

Federal and provincial governments are organized along sectoral lines and responsibility for water management is shared among different levels of government and among several agencies and departments, directed by different and sometimes conflicting mandates (Ramin, 2004). Water supply and demand conditions vary significantly across provinces, causing provinces to pursue very different policy objectives in their water management and policy. This has resulted in significant jurisdictional differences, as has been witnessed in other federal states such as the United States and Australia. As noted:

> Given the different social and economic histories of Canada's provinces and territories, and the enormous variability in the distribution of water resources across the country, it should not be surprising that there is considerable variation in the allocation systems from region-to-region, and that governance is extremely complex and context-specific (WDGF, p. 2).

At the basis of all provincial water management systems is their water allocation framework. Alberta is among six jurisdictions (including British Columbia, Manitoba, North West Territories, Nunavut and Yukon) that have their roots in the "prior appropriation" doctrine, which assigns rights to fixed amounts of water to license holders for particular beneficial uses (WDGF, 2007). Prince Edward Island and Newfoundland and Labrador have water allocation systems based on the riparian rights doctrine in which those who own lands adjacent to a flowing watercourse have rights to use the water (WDGF, 2007). In Ontario, the rules for allocation vary according to the category of water, in Nova Scotia timing and priority are combined, and in Saskatchewan, Quebec and New Brunswick water allocation rules are not clearly defined (WDGF, 2007)

In recent years, several provinces have developed broad long-term water management strategies - Alberta's is called "Water for Life – Alberta's Strategy for Sustainability", Quebec's is called "Quebec Water Policy: Water Our Life, Our Future", and British Columbia's is called "Living Water Smart". Public participation in the planning and implementation process distinguishes this new era of water management. Public participation involves, for example, stewardship groups, watershed planning organizations and conservation groups being involved at various stages of the planning and implementation process. This is the approach taken with the development and implementation of Alberta's Water for Life strategy. As one study notes:

> "The development of these formal partnerships has had a significant effect on water management in Alberta in recent years and reflects a shift towards shared water governance through a process of decentralization (Poirier, 2008, p. 83**)**

As has been observed, this shift in water management is: from process to outcomes, water management to watershed management, regulating to shared responsibility, and government to governance (Pollution Probe, 2008).

2. Alberta's Water for Life Strategy

Alberta's response to its water challenges has been described in the document entitled Water for Life: Alberta's Strategy for Sustainability. Development of the strategy was based on a public review process that occurred between November 2001 and June 2002. The document was released in November 2003.

a) The Strategy:

The Water for Life strategy outlines three main objectives (AENV, 2003a):

1. safe, secure drinking water supply;
2. healthy aquatic ecosystems; and
3. reliable quality water supplies for a sustainable economy.

The strategy defines three directions within which Alberta water management needs to concentrate in order to achieve a number of specific goals, which they believe will ensure that the strategic outcomes are achieved:

1. knowledge and research - all initiatives will be based on sound science and facts;

2. partnerships - solutions to water issues need to be based on the effective management of watersheds through partnerships with stakeholders and the public; and,

3. conservation - usage and storage of water must be improved through conservation efforts, and increased productivity and efficiency in water use and management.

Some of the specific goals of the strategy are quite ambitious, have narrow timelines, and include:

a. to evaluate the merits of using economic instruments to meet water conservation and productivity objectives by 2007;
b. to ensure that Albertans understand the value of water to the economy and quality of life by 2007;
c. to prepare water conservation and productivity plans for all water using sectors (best management practices) by 2010;
d. to implement economic instruments as necessary to meet water conservation and productivity objectives by 2010;
e. to complete watershed management plans by 2015; and,
f. to improve the efficiency and productivity of water use by 30 percent by 2015 (relative to 2005 levels).

The strategy document concludes that current and future demands for water to ensure economic growth, to support a growing population, and secure healthy rivers and lakes, combined with an increased uncertainty related to the variability of future water supply, will result in water demand exceeding water supply. Under the strategy the solution to this problem is water conservation, achieved through a 30 percent increase in water use efficiency and productivity. The conserved water should then move to satisfy the increased demand from other sectors of the economy and the environment by voluntary reallocations.

At the centre of the water strategy is the management of water at the watershed level through a network of partnerships, consisting of three facets (AWC, 2008d):

i. Alberta Water Council (AWC) – responsible for the development of strategic policy at the provincial level

ii. Watershed Planning Advisory Councils (WPAC) - responsible for planning at the watershed or basin level. Each WPAC is a stand-alone, incorporated society with a mandate for effective water management in its watershed (AWC, 2005). Their principle mandates are to develop a state of the watershed (SOW) report and a watershed management plan (AWC, 2008d).

iii. Watershed Stewardship Groups (WSG) – perform a combination of grassroots work, public education and engagement activities.

By late 2008, along with the Alberta Water Council, eight Watershed Planning and Advisory Councils and over 140 Watershed Stewardship Groups have been established in Alberta (AWC, 2008b).

b) Implementation Progress:

In October 2005 the Alberta Water Council released its first update on implementation progress entitled "Review of Implementation Progress of Water for Life, 2004/2005" (AWC, 2005). In it, the Council reported that progress has occurred under all elements of the strategy. However, they note there has been only preliminary progress in meeting the objective to manage water more effectively in support of economic development. Although the objective is complex and challenging, involving many stakeholders in the province, the assessment and implementation of water management tools and techniques needed to be accelerated (AWC, 2005).

Just over two years later, the next progress report of the Water Council was released. The January, 2008 report entitled "Water for Life Recommendations for Renewal" was decidedly less positive and emphasized the need to energize implementation of the strategy. The report's recommendations did not focus directly on any one of the strategy's main goals or directions but on two key themes: safeguarding water sources and accelerating action. The Council stressed that the rapid pace of social, economic, and environmental change in Alberta has caused an "immediate" need to safeguard water sources (AWC, 2008c, p.9) and "…take action to address aquatic ecosystem degradation", p. 11). Progress in implementation has been hampered by the fact that, despite improvements in water knowledge and research, the "availability, quality and accessibility of data continue to be of concern" (p. 16). The report also emphasizes:

> The concept of shared responsibility – a core principle of Water for Life – requires that everyone understand how his or her actions impact the watershed (AWC, 2008c, p. 17).

The latest update, issued in November 2008, reaffirmed the objectives of the strategy but emphasizes greater integration of land management and water and the need to continue to create, enhance and use "innovative" tools and best practices" (AWC, 2008b, p. 6). The 30 percent efficiency and productivity targets also still stand. The update spoke of the importance of the leadership provided by the watershed planning and advisory councils, which have been receiving greater financial support. The Council committed to an annual report on the implementation of the water strategy. Citing "lots of progress and not enough action", critics note the lack of concrete measures taken so far (Cryderman, 2008).

3. <u>Water Management Plans</u>

a) Purpose:

The overarching purpose of watershed planning is to "resolve water management issues such as the availability of water for future allocations and river flows needed for protection of the aquatic environment" (AENV, 2002, p. i). It is not uncommon in Canada for provinces to establish water allocations for environmental purposes. Different types of environmental allocations exist in the legislation and policies of eight jurisdictions including aquatic reserves, instream flow needs and groundwater extraction limits (WDGF, 2007). At the outset of the Alberta planning process, it was determined that

there were high priority issues that should be addressed immediately, especially the high degree of allocation in the Bow and Oldman River Basins, increasing demand for water, and evidence of negative impacts on aquatic ecosystems (Ohrn, undated).

Due to the scale of the South Saskatchewan River Basin, and the complexities involved, Alberta Environment decided to develop water management plans in a phased process (Ohrn, undated)[1]. Phase I (approved in June 2002) ushered in fundamental changes to water management in the SSRB by authorizing the use of water allocation transfers. It also led to the interim closure of the southern tributaries of the Oldman River – the St. Mary, Belly and Waterton Rivers to new applications for water allocations, pending the outcome of Phase II which still is under development. In August 2006 Alberta Environment released the Approved Water Management Plan for the SSRB which was intended to "provide guidance to decision makers and act as a foundation for future watershed management planning of sub-basins in the SSRB by WPACs as well as stewardship groups"[2] (AENV, 2006, p. v). An important provision of the Plan was establishment of the water conservation objective for the Bow, Oldman and SSRB sub-basins at 45 percent of the natural rate of flow[3] (deemed more of a policy instrument and not a licensed allocation). The main objective of the forthcoming Phase II is to determine an acceptable balance between water consumption and protection of the aquatic environment[4]. The WPACs are responsible for developing recommendations for watershed management plans given this objective.

Since the Milk River Basin is a separate watershed, it will have its own plans, separate from the sub-basins of the SSRB. As detailed below, the Milk River Basin WPAC recently has released its State of Water (SOW) report (MRWC, 2008) and has initiated work on the water management plan.

b) Planning Progress:

The planning progress of the WPACs within the Oldman River and the Milk River Basins has been slow but, given the complexities involved in the task and the need for consensus among a very wide and sometimes conflicting diversity of interests, this perhaps is not unexpected.

i) Oldman River Basin

The Oldman River Basin's inclusion in the SSRB has meant that restrictions within the SSRB, starting as early as 1991, have affected water availability in this basin. In 1991, strains on water resources prompted the Alberta government to establish guidelines that set maximum amounts of water that could be allocated for irrigation in the South Saskatchewan River Basin. In 2001, the year of a severe drought, a moratorium was imposed on additional allocation of surface water from the Belly, Waterton and St. Mary Rivers. In late 2005, Alberta's Minister of Environment announced that Alberta Environment will stop accepting applications for new licenses for the Bow, Oldman and

[1] It is also not uncommon for there to be "sub-plans" involving individual rivers. An example is the Nose Creek Watershed Management Plan and the Elbow River Water Management Plan.
[2] Considered an amendment of the Phase One Approved Water Management Plan for the SSRB.
[3] Or the existing instream objective plus 10%, whichever is greater at any point in time.
[4] The basin advisory committees served as "antecedents", and to some extent "training grounds", for the Watershed Planning and Advisory Councils (Ohrn, undated).

South Saskatchewan River Basins until the Minister of Environment specified how water not currently allocated should be used (AENV, 2005).

It is within this context that the Oldman Watershed Council has conducted its work. Its State of the Watershed report is expected to be released in 2009 (Hurly, 2008).The watershed management planning process has been initiated but a completion date has not been identified. As one participant noted, this stage will "involve(e) a great deal of consultation with stakeholders and with as many members of the public as possible….I expect that the plan will include recommendations for both storage and for conservation, and perhaps guidelines or recommendations on development and types of water use encouraged and discouraged." (Hurly, 2008).

ii) Milk River Basin

Similar to the Oldman River Basin, restrictions on water allocated from major rivers within the Basin have affected water availability. The closure of the St. Mary River to further allocations was noted above. In addition, the Milk River, in effect, also has been closed for two reasons: as noted by an Alberta Environment official "The Milk River is being managed under the terms of a 1986 moratorium on new water licenses and a little stricter due to the current discussions with the U.S (on U.S. – Canada water allocations from the St. Mary River and Milk River). In effect it is closed." (McGee, 2008).

The Milk River Basin SOW report (released in October, 2008) made the following key points (MRWC, 2008, p.144-148):

- available water supplies display a high degree of variability within each year and among years;
- the level of water allocation for human use exceeds the water supply during extremely dry years throughout the watershed;
- the impact of the International Joint Commission apportionment rules regarding the Canadian share of the river needs to be fully understood by all concerned as well as the significance of a failure of the St. Mary Milk River diversion works; and
- many residents in the watershed rely on groundwater for household use from two main aquifers – the Whisky Valley and Milk River Sandstone…..Future efforts should focus on implementing a management protection plan for the Whisky Valley Aquifer and other shallow aquifers in the watershed. …In the Milk River Aquifer, wells should be surveyed to determine whether they are in use, inactive or flowing. A program should be re-established to plug or control flowing wells.

Preparation of the water management plan is just beginning and the completion date has not been established.

4. Related Policy Initiatives

As part of the implementation process of the Water for Life strategy, the AWC established the Wetland Policy Project Team to examine wetland issues in Alberta, acknowledging how integral wetlands are to watershed health (AWC, 2008a). The team was asked to develop a new wetland policy and implementation plan. In September, 2008, the AWC released the proposed policy and implementation plan that is intended to act as a single comprehensive policy for the entire province's wetland management.

Directions include encouraging all Albertans to increase wetland area through voluntary stewardship and establishing watershed and regional wetland objectives (AWC, 2008a)

Various other policy initiatives by the Alberta government are beginning to reflect the integrated nature of natural resources, with the result that water resources will be included in multiple levels of planning[5]. Most notable is the recently released Land Use Policy (Government of Alberta, 2008b). Currently, eight Alberta government departments have authority over parts of the Alberta land base and, in some cases, their jurisdiction overlaps. The new policy would create seven regions based on the major watersheds in Alberta and develop a regional plan for each. The Land Use Framework is designed to complement the provinces water and air policies including the Water for Life strategy (Government of Alberta, 2008a). The policy leaves final decision-making authority with the same local officials who currently exercise it but, in the future, these decisions will have to be "consistent with provincial policies and guidelines" (Government of Alberta, 2008a, p. 11). The plan also calls for the creation of a Land-use Secretariat to support implementation of the framework. The November, 2008 update by the Alberta Water Council specifically noted that it is critical that the Water for Life strategy support the land-use framework (AWC, 2008b).

III INSTITUTIONAL AND LEGAL FRAMEWORK

1. Acts

In 1991, the Alberta government initiated a review of its water management policy and legislation. By that time, the Water Resources Act was a 60 year old piece of legislation and it was clear that the Act did not provide the tools required to cope with the water management challenges that were looming. The government's review culminated in the passage of the Water Act in 1999 and the Irrigation Districts Act in 2000.

The Water Act has a much broader mandate than the management of water allocation, as was the case with the former Water Resources Act. The intent of the new Water Act (1999) is to support the conservation and management of water, to sustain the environment and support economic growth. And the management paradigm is to be integrated, shared and cooperative (Water Act, 1999). The Act also protects the seniority of existing water license holders that are in good standing, prohibits the export of Alberta's water to the United States, and prohibits inter-basin transfers of water between Alberta's major river basins. (Subsequent sections of this report discuss how these provisions may change in the future). The Act is administered by Alberta Environment. In Alberta, licensees are entitled to compensation for losses incurred from amendments, suspensions, and cancellation of water licenses (WDGF, 2007). New water licenses issued under the new Act are for a fixed period.

2. Apportionment Agreements

The International Boundary Water Treaty between Canada and the United States governs the apportionment of the water of the St. Mary River and Milk River between Alberta and Montana. The International Joint Commission (IJC) Order of 1921 provides the basis for apportioning the flows of the two rivers. During the irrigation season (April

[5] Other plans include, for example, the Integrated Resources Plans, Forest Management Plan, Wildlife Management Plan and Species at Risk Recovery Plan, Management Plans for Parks and Protected Areas. For more detail of numerous initiatives see AENV, 2006.

1 to October 31) Canada is entitled to three-fourths of the flow of the St. Mary River with the flow being divided equally in the non-irrigation season. The United States is entitled to three-fourths of the Milk River during the irrigation season with the flow being divided equally in the non-irrigation season.

The Prairie Province Master Agreement on apportionment governs the share of water that must flow from the South Saskatchewan River to Saskatchewan. The Oldman River, Bow River, and Red Deer River become the South Saskatchewan River before it enters Saskatchewan. Under this agreement, Alberta is entitled to divert from each river a quantity of water equal to one half of the natural flow originating in or flowing through the province.

3. Water Allocation and Rights Transfers

a) Provisions

Alberta is the only province that allows water to be transferred independently of the land. It also stands out because water transfers are seen as a "mechanism to provide economic efficiency and flexibility in basins where water resources are fully allocated" (WDGF, 2007, p. 16). In provinces like Ontario and New Brunswick, water licenses and permits are not transferable under any circumstances while in provinces like Manitoba, transfers are allowed only if the water is used for the same purpose, at the same rates, in the same amounts, and in accordance with the same conditions as the former license (WDGF, 2007). Under Alberta's Water Act (1999), potentially large amounts of water could be permanently transferred between very different users (an irrigation district that sells water to a municipality, for example), involving more extensive water movement than off-stream re-allocation. Therefore, third party and environmental effects may occur.

Sections 81 and 82 of the Water Act provide the legal basis to transfer water licenses on a permanent basis. These sections establish the conditions under which a transfer will be approved and provides the basis for many of the procedures required in the process. The authority to approve transfers lies with the Director (an Alberta Environment official). An application for a transfer of an allocation of water must first be made to the Director. Under his/her authority, the license considered for sale must be deemed to be in good standing. As the Act states, this means the license has not expired, is not under suspension, considered for cancellation, or subject to an investigation. The license cannot be a temporary diversion of water or the result of a previous transfer where the allocation was to revert back to the original owner. Water conservation holdbacks are also permitted under the Act. Up to ten percent of a water license transfer can be withheld to protect the aquatic environment or to implement a water conservation objective.

The permanent transfer of a water license must be permissible under an approved water management plan. For transfers within the South Saskatchewan River Basin, this refers to *The South Saskatchewan Water Allocation* (AENV, 2002) document and the *South Saskatchewan River Basin Water Management Plan (Phase One- Water Allocation Transfers)* (AENV, 2002). Until a water management plan is developed and approved for the Milk River Basin, water right transfers will not be permitted there.

The SSRB management plan, which focuses specifically on the water allocation transfer process, provides the Director "with guidance on factors that must be considered in making certain decisions" (AENV, 2002, p.1). The list consists of twelve factors, among

them the potential and cumulative effects on the aquatic environment, household users, traditional agriculture users[6] and other higher and lower priority licensees; the effect on operations of reservoirs and other water infrastructure; the suitability of land for irrigation; linkages between surface and ground water; and effects on the *Master Agreement on Apportionment* (AENV, 2002, p. i, ii). Provisions for the consideration of environmental effects are addressed specifically in the Water Act. If the Director is of the opinion that withholding water is required to protect the aquatic environment, he/she may withhold up to ten percent of the allocation.

The Water Act also provides for the cancellation and reduction in size of licenses. These provisions, under Sections 54 and 55 of the Act, provide for cancellation of a license if the license has not been used for a period of three years and if there is no reasonable prospect of the license being used. The Act also provides for a reduction in the size of a license by any unused portions. Although some view this provision as being very loosely enforced (Campbell, 2007), since 1894, 1.85 million dam^3 of license has been cancelled in the province, mainly in the southern area (McGee, 2004).

b) Transfer Process under the Water Act (1999)

Transfer application and approval procedures are outlined in the *Administrative Guideline for Transferring Water Allocations* (AENV, 2003b). The approval process is divided into three stages. Stage one involves the preparation of an application form and the preparation and submission of required documents. These include:

1. Submission of the "Application under The Water Act For Transfer of an Allocation of Water Under a License". This form requires information on the name and address of the buyer and seller, quantity of water to be transferred, whether the transfer is permanent or temporary, the point of diversion, water source, quantity to be transferred, new rate of diversion and purpose of use, whether the license is in good standing and whether the transfer has been authorized by an approved water management plan.

2. A recent certificate of title for all parcels of land involved in the transfer.

3. Written consent from the landowner if the transferee is not the owner of the new land.

4. Written consent from the landowner if the existing license is in a different name.

5. A copy of the license from which the transfer is being made.

6. A plan showing the layout of the new works, including: point of diversion, point of use, description of the works and water requirement, and an irrigation feasibility report if irrigation water use is involved.

Stage two includes a public review process, which can vary depending on the transfer. The administrative guidelines state: "(t)he Director determines the form and manner of review with consideration of the scope of impacts and issues within the proposed transfer" (AENV, 2003b, p. 8). At a minimum, this process requires the parties to place a notice in the local and in some cases, regional newspaper(s). This may be sufficient for

[6] The Water Act (1999) defines a traditional agricultural user is a person who owned or occupied farm land on January 1, 1999.

less extensive transfers. The guidelines state: "an open house may not be required … (for) small projects involving moving a short distance on the same stream without a change in ownership or purpose or diversion timing" (AENV, 2003b, p.16). Where the scope of impact and issues are deemed more extensive, the Director may require an open house to be held where discussions about the impact of the water license transfer can take place. The costs of stage one and two are the responsibility of the buyer and seller.

The third stage, Alberta Environment's assessment and review, is usually carried out at the same time as the public review and public notice process and is paid for by the provincial government. (For more detail on the transfer process, see Nicol, 2005)

Material submitted to Alberta Environment to support a water license transfer is considered in the public domain and can be viewed by the public. If the license is in good standing and is within an area managed under an approved water management plan, the application will be reviewed by Alberta Environment. If the license transfer is approved, the buyer is subject to a one-time license fee that is based on transfer volumes. The license retains the priority date originally assigned to it. Decisions made on transfer applications can be appealed before the Environmental Appeal Board.

c) Transfer Process under the Irrigation Districts Act (2000)

Under the Irrigation Districts Act, the owner of irrigated land (or "assessed acres"[7]) can transfer water licenses to other irrigators within the same irrigation district. Transfers of all or a portion of a license outside the district is possible, but only if a plebiscite is held and a majority of irrigators agree. Therefore these transfers are rare, occurring on occasion when blocks of unused water rights are sold and the funds are used for infrastructure upgrades. Water license transfers involving a portion of a water license from the United Irrigation District and the Western Irrigation District are the only two examples of such a practice to date. Individual transfers outside the district have not been exercised to date.

Unlike transfers under the Water Act, transfers within irrigation districts do not involve water moving among vastly different users, over long distance, or involving more extensive water movement than off-stream allocation. Third party effects and environmental effects of water transfers under the Irrigation Districts Act generally are not as problematic as transfers under the Water Act. This significantly simplifies the approval process. (For more information on various additional water allocation arrangements with irrigation districts see Bankes, 2006).

d) Experience in Other Jurisdictions

The sale of temporary water allocations generally has been far more acceptable and more widely practiced in the world than has been the sale of permanent water rights (Bjornlund, 2006). Markets for water rights (i.e., licenses) have been slow to develop in most countries (Bjornlund & McKay, 2002) because of the high costs of the bureaucratic structure required to manage the trades, the nature of the supply system, water rights systems that were developed in some countries a century or more ago when water markets were not anticipated (Kanazawa, 2003), high social costs experienced by some communities from which water rights have been sold (Colby et al., 1993, Bjornlund, 2003) and transaction costs that can be so onerous that they exceed the potential gains

[7] "Assessed acres" refers to the acres that are legally entitled to receive water for irrigation purposes.

from trade (Thobani, 1998). Despite these factors, however, the increasing need for long-term security of water is expected to advance the importance of markets for water rights in many jurisdictions (including Alberta) in the future.

Most water trades in the United States involve transferring water from agriculture to urban or industrial uses such as mining and power generation. This usually involves significant volumes of water, and therefore causes serious concerns about the long-term impacts on community cohesion and culture, impacts on the future sustainability of local farming and environmental impacts of such transfers. These early experiences have had a considerable influence on the perception of water trading when introduced in other jurisdictions such as Alberta.

In Australia most water transfers are between agricultural users, but this practice is not without considerable community concern (Bjornlund, 2008). There are two major concerns associated with export of water out of certain communities. The first concern is the impact on farmers who are not selling. These impacts are associated with an anticipated increase in the cost of maintenance of the supply infrastructure per irrigated hectare as well as the potential spread of pests and weeds from abandoned farms. The second concern is the possible impact on the wider local community if it suffers a decline in economic activity caused by a reduction in irrigation activity and this results in declining populations, business closures and reductions in private and public services Permanent transfers of water licenses therefore have been associated with significant and persistent opposition both among irrigators and within the communities that are dependent on the irrigation industry and have been slow to emerge.

4. Amendments to Irrigation District Licenses

In October, 2003, Alberta Environment approved an application from the St. Mary River Irrigation District to amend one of its water licenses. The license, with priority date 1991, authorizes diversion of 178,000 dam^3 for irrigation purposes. The amendment allows the district to use about 9,700 dam^3 of water annually for purposes other than irrigation including municipal, agricultural, commercial and industrial uses as well as other purposes that might enhance ecological values (Bankes & Kwasniak, 2005). Similar amendments to licenses held by Lethbridge Northern, Taber and the Raymond Irrigation District were completed in 2006 (McGee, 2008). Under this type of water arrangement, there would be a water use which sets an up-front capital fee and an annual fee for delivery (Bradley, 2008).

The practice of amending irrigation district licenses came to halt when, in August, 2007, the Eastern Irrigation District applied to Alberta Environment for a similar amendment to two of its licenses, involving almost 940,800 dam^3 diverted at the Bassano Dam in Bassano, Alberta. Concerns about the health of the Bow River and about the policy ramifications of the amendments prompted Alberta Environment to put the application on hold and not accept any further amendment requests while an internal review of the suitability of this type of amendment is conducted (Ecojustice/Bow River Keeper, 2008). The Minister of Environment has directed that a policy regarding such amendments be developed. A draft of the policy is now in circulation, which would limit water volume sales to two percent of the total volume of a water license and make applications subject to government approval (Cotter, 2008). The province is expected to make a decision on the proposed changes early in 2009.

IV OPPORTUNITIES AND CONSTRAINTS – WATER AND ECONOMIC DEVELOPMENT

This is a very uncertain time for water management in Alberta. There are a number of opportunities that potentially could increase water availability such as: increased use of "unused" water; greater use of available groundwater; inter-basin transfers; increasing storage capacity; retaining a greater percentage of the water flowing to Saskatchewan under the Alberta-Saskatchewan apportionment agreement; increased supply of recycled water from municipal or industrial users and uses; and cancellation of existing licenses. At the same time, there are a number of serious constraints to water availability in southern Alberta. These include: water license restrictions; impediments to the operation of water markets; potential negative long-run effects on water supply from climate change and water exports; several policy and legislative uncertainties; and several cultural issues. These opportunities and constraints are discussed below.

1. Opportunities

a) "Unused" Water

Estimating the amount of water that could be available for economic development in southern Alberta is difficult. The amount of water allocated under existing licenses is known but the amount the license holders actually use each year is difficult to quantify due to the variability in use year-by-year as a result of weather conditions and also because water use data is very limited. While major water users like the irrigation districts and the City of Calgary have good records of how much water they withdraw and how much is returned (AIA, 2005), very little is known about the actual usage of other licensees, especially by private irrigators.

Because very few water users report actual water use, Alberta Environment uses a variety of indicators to estimate water use. Table 3 provides estimates of water use for the Oldman River and Milk River Basins in the year 2005 (detailed in the first section of this report). By estimating the amount of water used, an indication of the water not used by license holders across all sectors can be determined. Although one must be careful in interpreting these data, it appears that almost one million dam^3 were unused in the Oldman River Basin in 2005. Estimated unused water in the Milk River Basin was significantly less, about 26,000 dam^3.

Table 3
Allocated, Licensed, Actual Water Use by Basin and Sector[1]

Basin	Sector	Licensed (Dam^3)	Actual Use (Dam^3)	Estimated Unused Licensed Amount (Dam^3)	Percent of Allocation Used
Oldman	Municipal	27,768	16,568	11,200	25.8
	Stock watering	25,810	19,558	6,252	75.8
	Irrigation	1,837,350	942,701	894,649	47.8
	Commercial	10,330	10,330	0	73.3
	Petroleum	3,530	993	2,537	23.3
	Industrial	11	11	0	100.0
	Other	150,821	150,821	0	71.2
	Total	**2,055,620**	**1,140,982**	**914,638**	**49.8**
Milk River	Municipal	2,195	2,060	135	81.1
	Stock watering	10,020	5,051	4,969	50.2
	Irrigation	43,178	22,150[1]	21,028[1]	49.6
	Commercial	809.17	809.17	0	100.0
	Petroleum	0	0	0	n/a
	Industrial	0	0	0	n/a
	Other	3,744	3,744	0	86.9
	Total	**59,946**	**33,814**	**26,132**	**54.2**

[1] For the Oldman River Basin, the estimated amount of licensed water used for irrigation is 51.3%. This figure is applied to the amount of water used for private irrigation in the Milk River Basin as data on actual use is not available.
Source: Adapted from AENV, 2007.

The options available to access "unused" water differ between the two river basins because of their different circumstances. The process of accessing unused water is outlined in Sections VII and VIII.

Municipalities may be a potential source of unused water. For example, the City of Lethbridge has within its diversion license about 7,500 dam^3 that currently are not being used. This is expected to accommodate 20 to 25 percent growth, including industry growth (Kaupp, 2008). However, not all municipalities are in a position to supply additional water for commercial and industrial purposes, especially fast growing municipalities near Calgary. A survey of municipalities in the Bow River Basin showed that out of 19 municipalities, 12 face conservation measures and, without such measures, some will reach the maximum allocation of their existing licenses by as early as 2012 (D'Aliesio, 2007a), .

b) Groundwater Availability and Access

In the future, groundwater could become the least cost alternative source of supply for urban and industrial users. Groundwater is estimated to currently make up only 2% of the water used for domestic, agricultural or industrial activity (Canada West Foundation, 2005). It is estimated that there are approximately 500,000 domestic wells in the province and an additional 7,000 are added every year (Ecojustice/Bow Riverkeeper, 2008). However, groundwater is not adequately monitored, its availability and the quantities of water extracted are not carefully measured or recorded, and the regulation and control of groundwater exploitation could be improved (Rosenberg Forum, p.12). In the Milk River Basin, there are 2,087 well records on file with Alberta Environment but it

is unknown how many of these wells are still active. The status of only 318 wells has been verified (MRWC, 2008). The use of groundwater will increasingly be monitored and regulated as the need to consider both surface water and groundwater sources is increasing. The November, 2008 update on the Water for Life strategy specifically states that groundwater is gaining importance (AWC, 2008b)

c) Interbasin Transfers

The current Water Act, 1999 explicitly prohibits transfers between major basins. The Minister of Environment has also gone on record, saying that: "The legislature has been pretty clear, as have Albertans. Interbasin (river) transfers of any magnitude are not acceptable" (D"Aliesio, 2007c, p. A7). Indeed, Section 47 of the Act states: "A license shall not be issued that authorizes the transfer of water between major river basins in the Province unless the license is specifically authorized by a special Act of the Legislature". While this would appear to provide a very black and white statement that such water movement will not be allowed, the Act contains two elements that add some ambiguity to the situation (AIA, 2005). The first is that the Act defines the seven major river basins in such a way that diversions between the Red Deer, Oldman or Bow River Basins might be possible because they are considered to be part of the SSRB (definitions Section (1)(ff) of the Water Act) (AIA, 2005). Second, the Legislature can decide to override this prohibition when it is determined to be in the public interest to do so (AIA, 2005). Some observers have indicated that the ecological and financial costs of inter-basin transfers could be high but accurate and reliable estimates have not been made (Canada West Foundation, 2005).

d) Other Water Sources:

Three additional initiatives can increase water resources. The first is increased storage, an option that is considered the primary approach to increase water availability (Rush et al., 2004; AAFRD, 2008). Indeed, a list of potential storage sites and diversion scenarios recently has been developed (AENV, 2008b) and the option was emphasized in the November, 2008 update on implementation of the Water for Life strategy (AWC, 2008b). A second option is retaining more water under the Alberta-Saskatchewan Water Allocation Agreement, closer to the 50% mark than commonly has occurred. This is an option that the government began to publicly ponder during the last drought (D'Aliesio, 2007b). Third, water savings would increase through the cancellation of unused licenses (under the three year use it or lose it rule) and when the expiration dates of licenses are reached on licenses issued since the Water Act, 1999 was implemented. Fourth, wastewater from sources such as households and industrial processes can be treated and reused. No estimates are available on the increased amount of water that could be available from these methods.

2. Constraints

Three different groups of issues either already do, or potentially can, impose constraints to water access. The first set of constraints are related to water availability; they include license restrictions, impediments to water markets, effects of climate change on water supplies in the future, and whether or not exports of water will be permitted in the future. The second set of potential constraints encompasses a list of policy and legislative unknowns. These include unknown policy, legislative or regulatory changes as part of

the implementation of the Water for Life strategy, the ability of WPACs to develop watershed management plans, the pending response of the International Joint Commission negotiations and general management of water in the Milk River Basin, and the outcome of the recently announced review of the first-in-time, first-in-right system and water markets. Finally, cultural issues are causing considerable conflict over water allocation in the province. This conflict is based on divided interests and has manifested itself in recent conflicts over amendments to irrigation district licenses and free markets for water. These issues are discussed briefly below.

a) License Restrictions

The most significant constraint to water access is the moratorium that was placed on additional allocation of water in the Oldman River Basin, including the Belly, Waterton and St. Mary Rivers in 2001. Then, in 2005 it was announced in the Summary document of the Draft SSRB Water Management Plan that Alberta Environment would stop accepting applications for new allocations for the Bow, Oldman and South Saskatchewan River Basins until the Minister of Environment specified how water not currently allocated should be used (AENV, 2005). These restrictions are having a bearing on economic development (D'Aliesio, 2007c)

There is no indication of when, or even whether, these restrictions will be lifted in the future. This means that development initiatives in the SouthGrow region will need to obtain their water requirements through the mechanisms permitted in the Water Act, 1999 (discussed in more detail below).

b) Impediments to Operation of Water Markets

Water markets have been slow to develop in Alberta, with fewer than a dozen transactions having been completed in southern Alberta by autumn 2008. Several factors have made it difficult for buyers and sellers of water rights to negotiate and complete transactions. Administrative procedures are cumbersome, involving several stages of approval with decisions typically taking between four and 12 months to complete (Bankes & Kwasniak, 2005) while some have taken up to three years (Nicol, 2005, Nicol et al., 2008a). Second, the mechanisms for buyers and sellers to locate each other have not been well developed. Third, there is no publicly available information on prices of water, making it difficult to determine its value among various uses. Fourth, highly public opposition to certain water trades has surfaced, involving urban, conservation and environmental groups.

The amount of water that has been transferred between users on a temporary basis is difficult to quantify but anecdotal evidence suggests it has happened rarely in years when rainfall has been near normal or higher. This mechanism has proved useful during the 2001 drought year when water allocations were relatively easy for farmers to access within the SMRID (Nicol, 2005, Nicol and Klein 2006)

c) Climate Change

Climate change is expected to result in longer growing seasons and warmer annual surface temperatures. This would create opportunities in southern Alberta for new crops, management strategies and resource uses. However, climate change also may mean more extreme weather, drier conditions, increased pest pressures and increased erosion risk (AENV, 2008a).

A study of the effect of climate change on the Oldman River watershed concluded that:

> "……. precipitation in winter and spring will fall as rain rather than snow, changing the seasonal distribution of water availability, and resulting in decreasing soil moisture in the summer and fall. It is also likely that stream flows will reach maximum discharge earlier, and there will be less flow during critical irrigation periods (Rush et al., 2004, p.1).

These effects ultimately would make water management more challenging. Unfortunately, "…climate change will likely exacerbate existing conflicts and challenges among human water users and instream needs for the environmental systems" (Rush et al., 2004, p.8). The most recent update on implementation of the Water for Life strategy notes "…the effects of climate change are front of mind…" (AWC, 2008b, p. 5)

d) Water Exports

The Water Act, 1999 states that "a license shall not be issued for the purpose of transferring water from the Province outside Canada by any means, unless the license is specifically authorized by a special Act of the Legislature (section 36(2) of the Water Act). However, one report notes this prohibition does not apply to processed water or municipal water (AIA, 2005). Water also may fall under NAFTA. Although this is a very complex issue and beyond the scope of this report, the question will not be formally answered unless there is a legal challenge by another country (Government of Canada, 2006)

Ultimately, as with transfers between major basins:

> "In legislation and in policy, the Government still retains the right to move water between basins and across borders, as long as this is determined to be in the public interest" (AIA, 2005, p.7)

e) Policy and Legislation Uncertainty

i. Implementation of the Water for Life Strategy

The Water for Life strategy was released in November 2003 and renewed in November 2008. While there have been numerous studies and significant consultations at various levels, little concrete action has taken place towards meeting the goals by autumn 2008. Certain goals, including evaluating the merits of using economic instruments to meet water conservation and productivity objectives, and ensuring that Albertans understand the value of water, were planned to be met by 2007. Although the Alberta government may impose new management structures on the water resource at any time, it has exhibited caution and appears to want to wait until public consultations reach a negotiated consensus. It is obvious that the target dates set out in the Water for Life document have not, and likely will not, be reached in most cases.

The Water for Life document was provocative and made many bold proposals that, if implemented, certainly could affect the rate of economic development in the SouthGrow region. First, the document suggested the use of economic instruments to achieve water conservation goals. These could potentially include water pricing, subsidizing water saving initiatives, and levying taxes on water use. Second, the document was emphatic that the first-in-time, first-in-right system would be retained but was unclear on the extent to which water markets will exist and be utilized. Third, the document sets the very

ambitious goal of achieving 30 percent increases in efficiency and productivity of water use, which would "save" water for sectors with pressing water needs. How that goal could be achieved is unclear as is the actual ability to do so. The large irrigation sector in southern Alberta already has achieved significant efficiency gains in their use of water, dampening the prospect of large gains in the future (Nicol et al., 2008b, Bjornlund et al., 2007, 2009). Studies have found there is great variability in efficiency and productivity across irrigation districts and between irrigation districts and private irrigators (Nicol et al., 2008, Bjornlund et al., 2007, 2009). All major sectors that use water, including the irrigation and municipal sectors, are required to devise plans to increase their efficiency of water use and are in the process of doing so.

ii. Water Allocation System and Water Markets

In September, 2008 the Alberta Government announced that it will begin public consultations to decide whether or not it needs to change the way Alberta's water licenses are allocated (Alberta Government, 2008). The public review is expected to occur over an 18 month period. The Minister of Environment is questioning whether a market for water should develop and to what degree the government should be involved.

iii. Watershed Planning and Advisory Councils

Concerns over the effectiveness of the WPACs and the ability to achieve their objectives have been raised. The Alberta Water Council received in February, 2008 the results of a workshop seeking feedback on the effectiveness of the AWC, WPACs and WSGs. A number of issues were identified including: lack of resources, confusion over roles and responsibilities, volunteer burn-out, and variance in expertise and knowledge among WPAC members. One study also stressed the importance of issues over accountability:

> ... four years into the Water for Life implementation process, considerable confusion still exists as to the extent to which these watershed plans will ultimately be adopted and implemented by government. Although the Water Act states that approved watershed plans must be considered by the Director when making water allocation decisions, the extent of such consideration remains unclear (Poirier, 2008, p.84).

One report noted that setting in-stream flow levels has proved to be a controversial aspect of implementing local basin management plans (Conference Board of Canada, 2008). Another noted, "… it remains to be seen how effective the WPACs will be in accomplishing their functions" (Rush et al., 2004 p. 14).

iv. International Joint Commission Agreement Ruling and Milk River Basin Management

An International Joint Commission (IJC) on water allocations was established between the Canadian and United States governments in 1921. Since that time, the IJC has moderated disputes that have arisen between users of water on both sides of the border. In April, 2003, the Governor of Montana wrote a letter to the IJC asking it to investigate the apportionment of flows of the St. Mary and Milk Rivers between the two countries and, if they were found to not be apportioned equally, to determine how the flows could better be apportioned (IJC, 2006). The matter still is under investigation. A potential ruling that awards more water to users in Montana would be a severe blow to water users in the Milk River Basin.

According to the Task Force established to "examine opportunities to improve the administrative procedures for the apportionment of the St. Mary and Milk Rivers …" (IJC, 2006, p. 4), the dispute hinges on "fundamentally different" views Alberta and Montana hold on the application of administrative procedures relating to calculations of volumes of water – Alberta believes the apportionment should be based on the instantaneous flow at any given time while Montana believes flow should be measured over a period of time (IJC, 2006).

Based on its review of records dating back to the 1950-2004 period, the Task Force determined the United States received more than its annual entitlement of the Milk River and Eastern Tributaries while Canada received more than its annual entitlement of the St. Mary River. This inability of both countries to obtain their apportioned share is due partly to logistics - Alberta's lack of storage capacity and Montana's antiquated diversion system (IJC, 2006). The members of the Task Force could not find a resolution to this issue but did make several recommendations for improvement to administrative procedures (IJC, 2006). The IJC is required to reply to Montana's initial letter but there is no time limit to the IJC's deliberations.

In addition to the uncertainty over the IJC ruling, a recent study of the Milk River Basin argued that there is too little management of the water resources on the Milk River (Elliott, 2007). The study noted the lack of storage facilities off the river, the lack of a water management plan for the basin that results in the absence of a comprehensive framework on water issues, and very little interaction and coordination between Canadian and American water users that results in a "a paucity of cooperative arrangement on water issues" (Elliott, 2007, p. iv). As a result of the absence of a water management plan, water right transfers are not permitted. Closure of the Milk River and St. Mary River to additional water allocations imposes an additional constraint. Finally, groundwater levels in the Basin are deemed to be in a "precarious state" (Elliott, 2007, p. 57).

f) Cultural Issues

i. Divided interests

As water becomes more scarce and valuable in Alberta, a cultural and political divide seems to be intensifying between the urban, agricultural and conservation interests in Alberta. The large volumes of water held through licenses by the irrigation districts in southern Alberta gives them an enormous stake in the outcome of any change in water management structure. Seventy-four percent of water allocated in Alberta's southern river systems is contained in 20 licenses held by irrigation districts (Ecojustice/Bow Riverkeeper, 2008). Increasing objections to the dominant position that irrigators occupy is being expressed by many urban dwellers and environment and conservation groups. Some view irrigators as greedy farmers who are misusing land and water resources and often just waste water out of ignorance or greed. Some extreme opinions have been expressed, proposing that the irrigation sector be severely reduced or even closed entirely to achieve environmental objectives. On the other hand, most irrigation farmers are of the belief that they have a secure right to water through their licenses and already have done a lot to use their water as efficiently and effectively as possible. They feel that it would be unreasonable to have to give up water for their crops (that go to feed hungry people in the world) when people in the cities are watering gardens, cleaning their cars, and enjoying manicured parks and golf courses.

ii) Amendments to Irrigation District Licenses:

Since 2006, four amendments to irrigation water licenses have allowed irrigation districts to use or sell water annually for purposes other than irrigation, including commercial and industrial activities. These amendments have been made to licenses held by the Taber, Raymond, Lethbridge Northern and St. Mary Irrigation Districts. When in August, 2007, a request by the Eastern Irrigation District to amend a very senior (1903) license for a significant quantity of water (about 940,800 $dam^{3)}$ was filed, a public backlash ensued. Critics argued that the amendments would result in reduced river flows to such an extent that the environmental health and recreational opportunities on the river could be affected (Rosenberg Forum, 2007). In addition, the amendments were seen by some to circumvent processes under the Water Act which, in the instance of a water license transfer, provide for a formal review process that examines impacts of the water use on other users or on the environment. It also allows for public input. Under license amendments, these steps are not required.

Ultimately, Alberta Environment put the application on hold and declared its intention not to accept any further amendment requests while an internal review of the suitability of this type of amendment is conducted (Ecojustice/Bow Riverkeeper, 2008). In late 2008, a draft proposal was released that would restrict water sales to quantities of no more than two percent of the volume of a water license and make applications subject to government approval. Environmental groups are "cautiously supporting" the policy: "They say they would prefer the province to stop water licenses from being amended at all for non-agricultural uses, but tougher restrictions are also welcome" (Cotter, 2008).

iii) Free Markets for Water

Environmental and conservation groups, in particular, oppose the use of water market instruments because they believe the social and environmental needs are too important to be left to market forces. Under the current structure, environmental interests are not able to compete in the market as Alberta Environment in the Water Act specifies that only the Government can hold licenses for water conservation purposes (AIA, 2005)[8]. In addition, they argue, there are potential environmental impacts of the transfers themselves including such factors as potentially reduced return flows, changes in timing of diversion to high demand periods, and changes in water quality (Ecojustice/Bow Riverkeeper, 2008). A potential solution is establishing instream flow requirements that would be fulfilled first and foremost:

> There is a trade off between the degree to which the market alone is allowed to signal the scarcity value of water and the degree to which criteria such as environmental concerns, third party effects and equity concerns are addressed. It seems that an effective tradable rights scheme needs to be preceded by a river basin plan outlining minimum instream flow requirements and defining the amounts of water available for diversion and consumption (Adamowicz & Horbulyk, 1996**,** p.343)

[8] Alberta Environment, in its Approved Water Management Plan for the SSRB (2006), recommended that the Water Act be amended to allow private parties to hold licenses for water conservation objectives under the transfer provisions of the Act (AENV, 2006).

A high-profile case involving development of a race track, mall and casino north of Calgary demonstrated the degree of conflict that can occur. The case involved the Municipal District of Rocky View's bid to obtain a permanent license to approximately 2,500 dam^3 of water. Access to water was constrained by the moratorium on new water licenses on the Bow River. Another plan to take water from the Red Deer River was met by opposition due to concerns over increased pressure on water resources in the Red Deer River Basin and environmental degradation (Ecojustice/Bow Riverkeeper, 2008). Ultimately, water was secured from the Western Irrigation District. In return for $15 million to convert a leaky canal into a 50-kilometer pipeline, the developers received access to a portion of the saved water; (the district expects to save more water than it was selling) (D'Aliesio, 2007a). As reported in the Calgary Herald, the plebiscite held in the Western Irrigation District was narrowly passed with 57% of the 328 voters approving the transaction, a difference of only 46 votes (p. A22). The price of this transaction (at about $6,000 per dam^3) is the highest price yet paid for water in Alberta. The newspaper also reported that the WID likely will not soon entertain another water rights trade because that deal created a lot of concern among its 400 farmers – the sale of water was considered to be too final (D'Aliesio, 2007a). In December, 2007, Westridge Utilities appealed the decision to allow the deal to the Environmental Appeals Board. With the filing of the appeal, the Municipal District of Rocky View put its plans for a pipeline and treatment facility on hold until the objection was resolved. The Board has since ruled against the appeal. Given the level of conflict and uncertainty, opponents contend the market lacks liquidity and isn't transparent enough. They want firmer rules and certainty on how the government decides which deals to approve. Put bluntly: "Rocky View….is the poster child of worse water clashes to come" (D'Aliesio, 2007a, p. A22).

V WATER REQUIREMENTS FOR ECONOMIC DEVELOPMENT

The economy in the SouthGrow region is dominated by agriculture and its related industries. Businesses wishing to establish or expand in this area may be in the agri-food industry that involves secondary processing of locally grown produce. However, SouthGrow's economic objectives extend much further than agriculture related enterprises and could potentially include tourism product development, building products, architecture, engineering and construction, health services, metal fabrication, machinery and equipment, and retirement living (SouthGrow, 2008). Potential business initiatives could vary significantly in the amount of water they would require so a determination of water requirements would have to be made on a case-by-case basis.

The data in Table 4 provide a sense of the volumes of water that existing business enterprises have at their disposal through water licenses. The table lists license volumes for many of the major industrial and commercial water license holders in the Oldman River Basin. The data was obtained from the

Table 4
Selected License Volumes by Industry, Southern Alberta, (Dam^3)

Industry (number of licenses)	License Volume
Old Dutch Foods (2)	9.8
City Packers Ltd. (2)	67.8
Rogers Sugar (2)	3,992
Husky Oil (6)	1,372.8
Paradise Canyon Golf Course Resort Co. (1)	246.8
Keho Park Golf Club (1)	74.0
Southern Alberta Processing Co. (1)	30.8
Lethbridge Concrete Products (1)	308.7
Burnco Rock Products Ltd. (1)	65.0

Source: www.envinfo.gov.ab.ca/LicenseViewer/.

Alberta Environment license registry. Noticeable is the significant range of licensed volumes, from as little as less than 10 to over 1,000 dam^3. There is also noticeable variance in the licensed volumes within commercial enterprises such as golf courses, with over three times the licensed volume for Paradise Canyon Golf Course Resort compared to the Keho Park Golf Club.

Rather than holding their own licenses, some businesses obtain their water from municipal sources. Table 5 provides the amounts of water for seven select food processing industries, including meats, vegetables, cooking oil, salty snacks and spirits in the City of Lethbridge. All seven industries are located within the city limits.

Table 5
City of Lethbridge Water Provision, Select Food Processing Industries (Dam3)[1]

707.0
466.0
397.5
321.5
222.5
184.0
120.0

These numbers reflect actual treated water consumption. Volume equivalent to diverted raw river water would constitute an extra 10% of the volume.
Source : Kaupp(2008)

VI Balancing Economic, Environmental and Social Values - Existing Studies

Balancing social, economic and environmental uses of water is often referred to as the "triple bottom line". The importance of integrating these three values into resource management is only beginning to be recognized in countries like Canada but achieving such a balance is difficult. As a senior Alberta Environment official notes, it is the "billion dollar question" with as many answers as there are societal values (McGee, 2008). Yet, in some countries, progress is being made, especially in ensuring adequate water for environmental purposes. In the western United States, for example, there is a trend towards using water transfers for environmental purposes. Between 1998 and 2005, nearly 7.5 million dam^3 of water were acquired for instream use, almost 2.5 times the amount acquired between 1990 and 1997 (Conference Board of Canada, 2008). Most of this activity was driven by efforts to restore flow for endangered species (Scarborough and Lund, 2007). This kind of state intervention also is increasingly common in Australia where governments have devoted significant funds for environmental water purchases (Bjornlund, 2008).

In Alberta, the Water Act provides for ecosystem protection in several ways. First there is the required development of water management plans within which instream flow needs are set to maintain a river's ecology and water conservation objectives. In principle, instream flow needs are to be based on hydrology, biology and ecology as well as the community's economic and other needs (Conference Board of Canada, 2008). Other mechanisms to assist with ecological water management are license cancellations of those not in good standing, and the ten percent holdback mechanism that can be exercised when approving water license transfers.

Alberta Environments commissioned a major study on the value of water but it is not expected to be released until sometime in 2009. This study should provide useful data that will assist in understanding the relative values of water and balancing the triple bottom line. In 2007, preliminary data on the value of water in Alberta was developed by a private consultant (Gardner Pinfield, et al., 2007). Table 6 provides the preliminary estimates for the province. The total value of water was estimated at about $1 billion. Although these figures have to be interpreted with great caution, the social and environmental value of water outweighs its economic value - domestic, recreation, passive and ecoservices comprise 57% of the total value and economic about 43 percent. Is this an appropriate balance? To some extent, that is the task of the individuals involved in the development of watershed management plans and is undoubtedly why so much emphasis is given to the approach which is consensus-building based on local input.

Table 6
Value of Water in Alberta by Sector, (Million $)

Category	Value
Thermal Power Generation	1,829.0
Domestic	745.2
Industrial	254.0
Commercial	231.7
Agriculture	206.0
Recreation	135.0
Eco System Service	118.0
Hydro Generation	63.1
Oil, Gas and Mining	45.1
Passive Uses[1]	40.9
Marine Transportation	0.5

[1] Valued as peoples' pleasure gained from knowing that a stock of water exists for others to enjoy and to be passed on to later generations.
Source: Gardner Pinfield, et al., 2007

VII WORKING WITHIN THE EXISTING POLICY FRAMEWORK

This is a time of considerable uncertainty in future water management in Alberta. In the past, a business operation that requires water could apply for and, generally, obtain a water license. Current restrictions within the Oldman River Basin and Milk River Basin make this impossible. Potentially, water could become available through purchases in a water market given the very general estimate of "unused" water discussed earlier. The next section outlines the mechanisms to obtain such water through water markets for permanent water rights and also long-term lease arrangements. However, this mechanism is available only in the Oldman River Basin, permissible under the SSRB water management plan. The absence of a water management plan for the Milk River Basin precludes this avenue for accessing water in that basin at the present time. Accessing water through municipal water licenses might hold some potential but that varies by municipality. Within most municipalities, there is room for expansion of water supplies by the introduction of water reuse and conservation schemes by municipal and industrial users.

Over the longer term, completion of basin water management plans is fundamental to decisions concerning future water allocation (for the SSRB this would involve completion of Phase II of the water management plan). Until these plans are complete, it is difficult to determine water availability for economic development in the future. Unfortunately, those plans are not likely to be ready soon - the deadline for those plans is not until 2015. While there could be potential for "saved" water to be available through the targeted 30 percent productivity and efficiency gains, as outlined in the Water for Life

strategy, that initiative is still in an early stage. One study has concluded that in the irrigation sector, most of the cost-effective efficiency gains already have been made and little more can be expected in the future (Bjornlund et al., 2007, 2009). Consultation as to how to achieve those targets is proceeding with irrigation and municipal groups but no specific measures have been implemented. Exactly where any water "savings" would be reallocated, and how they would be reallocated, also is unclear.

In the meantime, numerous other factors will have a bearing on water availability in the more distant future. These have been highlighted in the previous sections and include the impact of climate change and future availability of groundwater. Pertinent to the Milk River Basin is the outcome of the St. Mary River and Milk River IJC Agreement response. Even further down the time horizon is the question of whether or not interbasin transfers will be allowed, which, if permitted, could potentially increase water availability in southern Alberta to a significant extent. Water export is a highly contentious issue and is not anticipated to be allowed, at least not in the near term. Retaining more water, closer to its 50% share under the Alberta-Saskatchewan apportionment agreement, is possible. Increasing storage facilities to capture more runoff also might be feasible. A final source of additional water availability is through Alberta Environment's license cancellations under their "use it or lose it" policy. Also, licenses issued since 1999 have not been issued in perpetuity; hence, these licenses eventually will expire, freeing some water in that manner.

Working within this policy framework is difficult, given the many unknowns. However, there is a legal and institutional framework to work within to access water. The steps necessary are detailed in the following section.

VIII WORKING WITHIN THE EXISTING LEGAL AND INSTITUTIONAL FRAMEWORK

In this section, it is presumed that some new business in the SouthGrow region would require water under either a permanent or long-term arrangement. Under the current legislative and regulatory system, there are three ways to obtain water on such a basis: (a) obtaining a water license or portion of a water license from an existing license holder through the water market; (b) seeking water from irrigation districts that appear to potentially be able to amend their existing licenses that would allow them to sell water for non-agriculture purposes up to two percent of their water licenses, which could include a long-term lease arrangement; or (c) obtaining water from a municipality via their own licensed water supplies. As described in previous sections, the circumstances in the Oldman River Basin and the Milk River Basin differ, making the number of options for accessing water greater for the Oldman River Basin than in the Milk River Basin.

For the Oldman River Basin the options include obtaining:

a. a license or portion of a license from an existing license holder through the water market;

b. water from an irrigation district under an amendment to their existing licenses, subject to the two percent provision;

c. water from a municipality through their own licensed supplies.

For the Milk River Basin the only option is obtaining:

d. water from a municipality through municipal licensed supplies.

The highest degree of security of water supply, also involving the most time consuming and complicated process, is through the purchase of a water license or portion of a license. The initial step is to find a potential seller of a water license with a suitable volume of water and seniority. All water licenses within the SSRB can now be found on-line through the Alberta Environment link www.envinfo.gov.ab.ca/LicenseViewer/. The system allows the user to search surface and well diversions by water management areas and, if the user wishes, by category (agriculture, commercial, or industrial, for example). By using the "show report" prompt, the user will be provided with a list of licenses in that water management area including: approval identity, priority, licensee, point of diversion, source, volume, diversion rate, type and purpose. Individuals or companies named on the license can then be contacted.

Contacting a water broker to facilitate location of a potential water license seller is another option. During the 2001 drought there is anecdotal evidence that real estate agents were involved in water sales. An advertisement in the Calgary Herald recently advertised the services of a water broker (McGee, 2008).

If purchasing a water license is pursued, the approval process can be lengthy, involving a number of steps as outlined in section III (3) (b) It is important to remember that Alberta Environment may wish to exercise the 10% holdback provision in which case the buyer would obtain only 90% of the licensed volume. Note that the original priority date of the license remains unchanged.

Irrigation districts hold the licenses to the vast majority of water in the Oldman River Basin. On two occasions, irrigation districts have sold part of a water license. This involved the United Irrigation District selling a portion of a license to the Foremost Co-op and the Western Irrigation District selling a portion of a water license to the M.D. of Rocky View (for more detail on the permanent trade of water rights see Nicol, 2005 and Nicol et al., 2008). The buyers and sellers were required to carry out the steps outlined above. In addition, as irrigation districts, they were required to hold a plebiscite among the district irrigators. Lethbridge Northern, St. Mary River, Raymond and Taber Irrigation Districts currently have amended licenses that allow them to sell some water to users outside of agriculture. However, as noted earlier, these types of amendments recently have been stopped and a policy proposal would restrict future sales to two percent of the volume of a water license and make applications subject to government approval. If this proposal is implemented by the Alberta Government, the process of obtaining water from an irrigation district may become more administratively time-consuming, but still possible. At the same time, this new process should make the transfer of water more socially acceptable and less controversial as the applications would be subject to government approval. Some irrigation district licenses are large and two percent constitutes an amount that would allow quite a lot of economic development endeavors. Appendix A provides a list of irrigation districts with licensed water volumes, priority dates and contact information.

For businesses located within a municipality, there may be water available through municipal water licenses. As noted earlier, the City of Lethbridge, for example, has water supplies available in the form of unused licensed quantities, in anticipation of commercial and industrial expansion.

IX POTENTIAL CHANGES TO WATER MANAGEMENT – WATER FOR LIFE STRATEGY

The three goals of the Water for Life strategy are safe, secure drinking water supply, healthy aquatic ecosystems, and reliable, quality water supplies for a sustainable economy. Especially pertinent to the focus of this report are the latter two objectives – healthy ecosystems, and water availability for a sustainable economy – because balancing these two objectives will be the foundation of water's availability for future economic development.

The Water for Life strategy is vague on detail, generalizing many of the potential actions that may be implemented. It states that in order to ensure reliable, quality water supplies for a sustainable economy, a broad range of water management tools and techniques will be implemented. Two actions that support this strategy are: (a) that all sectors demonstrate best management practices and improved efficiency and productivity associated with water use and (b) that the province will implement economic instruments as necessary to meet water conservation and productivity objectives.

It is hoped that voluntary action prompted through the introduction of economic instruments, best management practices, and public participation will achieve increases in water use efficiency and productivity as well as allow a reallocation of water from existing users to meet anticipated significant increases in demand from industry, urban users and the environment. However, the strategy is vague on process. In addition, little is known about the potential outcomes of possible approaches.

Best management practices vary by industry. For the irrigation sector, by far the largest water consumer, such practices include greater use of soil monitoring instruments and computer programs to determine optimal water application, for example. Economic instruments change the incentives for irrigators and, because they can have unanticipated consequences, caution needs to be used in their application. Such instruments encompass a variety of mechanisms including water pricing, subsidizing various activities, taxing water use, fees or levies. Whether implementation of economic instruments will occur remains unknown. Also, it appears unlikely that anywhere near a 30% increase in efficiency and productivity of water by 2015 can be attained.

The province also intends to pay much closer attention to actual water use. The Water for Life strategy indicates that the province will "establish a system to monitor and report actual water use by all sectors on an on-going basis" as well as "establish an on-going monitoring program to ensure all sectors are achieving water conservation and productivity objectives" (AENV, 2003a, p. 25).

X BALANCING ECONOMIC AND SOCIETAL VALUES OF WATER IN THE SOUTHGROW REGION

1. Additional changes necessary to water management – what is possible?

Irrigation agriculture is undoubtedly the major player in water allocation and management in southern Alberta. These water license holders are very rapidly realizing that persistent and growing urban, industrial and environmental demands for water mean they must be prepared to share in the water supply. A new water management paradigm is arising. As recently noted by a senior government official "…an integrated multi-use water system is the wave of the future" (Swihart, 2008). Since the Water for Life

strategy in 2003 places so much emphasis on voluntary reallocations of water, which again was confirmed in the renewed strategy released in November, 2008, policies are being examined and revised to make this system fair and transparent while attempting to balance the economic as well as social and environmental requirements of water. The water transfer framework was established in the Water Act of 1999. Opposition to case-by-case amendments to irrigation licenses that permitted the sale of water for non-agricultural purposes has resulted in standardizing the process and potentially placing a cap on water sales to two percent cap of irrigation district water licenses. This cap is very large in terms of water supply to non-agricultural users. Two percent of the St. Mary River Irrigation District licenses, for example, could satisfy new potential demand from industry or urban uses for many years. It is also likely that such caps will be revised if they are being reached. Voluntary reallocations are, and likely will continue to be, the preferred political solution now and in the future.

There are still many unknowns to water management in the province. The use of economic instruments, especially water pricing, is unlikely, given that the imposition of such a charge to agriculture water users would deal a blow to an economic sector that has recently suffered through years of poor commodity prices and the recent BSE crisis. However, there are other forms of economic instruments that could be implemented and these are being studied by government officials. Also, opening up for review the first-in-time, first-in-right water allocation system could mean changes to this fundamental principle; however, these changes are difficult to predict. Finally, a major study on the value of water has been commissioned by Alberta Environment. That study has not been released but it may also provide a framework for future government direction on water allocation, aimed at balancing social, environmental and economic water requirements under a multi-use water system.

2. SouthGrow – next steps and potential role of SouthGrow in initiating change

This time of change in water management in Alberta provides uncertainty as well as opportunity. SouthGrow members can undertake the following steps:

A. Identify potential sellers of water licenses within the Southgrow region so that when the region wants to attract new industries or other water users they can assist such water users in the transfer process. This can include exploring the possibilities of taking out options to buy water licenses to meet new demand from desired activities. Municipalities with limited extra water could start buying water now from irrigation districts that have amended their licenses so as to obtain water reserves to accommodate new users. In that way, new water demands can be met immediately rather than leaving it to the new users to sort out, a process which can take considerable time and might be an impediment to attracting new businesses that require water for their activities.

B. Become active participants in the watershed planning processes to influence policy and lobby politicians for changes that could improve rural to urban transfers;

C. Initiate water recycling, water re-use, and other conservation measures in municipalities, thereby releasing water from municipal licenses to meet new demands to promote economic growth. Also, best management practices for industrial, commercial and municipal users can be promoted.

Appendix: Water Licenses for Irrigation Districts in Oldman River Basin

District	Water Source	Priority Date	License Volume	Contact
Aetna	Belly River	1945	6,784	Dr. Andy Strand (403) 653-4411
		1991	1991	
Leavitt	Belly River	1939	9,560	Jason Comin (403) 653-4441
		1991	5,242	
Lethbridge Northern	Oldman River	1917	185,025	Alan Harrold (403) 320-3302
		1974	82,645	
		1982	61,675	
		1991	61,675	
Macgrath	St. Mary River	1899	11,324	Low Hansen (403) 758-3400
	St. Mary River	1950	5,329	
	Waterton River	1950	16,652	
	Belly River	1950	3,701	
	St. Mary, Waterton, Belly Rivers	1991	4,934	
Mountain View	Belly River	1923	9,251	Ed Mackenzie (403) 653-2129
		1991	617	
Raymond	St. Mary River	1899	15,098	Gordon Zobell (403) 752-3511
	St. Mary River	1950	15,431	
	Waterton River	1950	30,529	
	Belly River	1950	6,784	
	St. Mary, Waterton, Belly Rivers	1991	32,071	
St. Mary River	St Mary River	1899	207,441	Ron Renwick (403) 328-4401
	St. Mary, Waterton, Belly Rivers	1950	409,309	
		1991	273,837	
Taber	St. Mary River	1899	41,939	Kent Bullock (403) 223-2148
	St. Mary River	1950	41,322	
	Waterton River	1950	83,261	
	Belly River	1950	18,503	
	St. Mary, Waterton, Belly Rivers	1991	9,868	
United	Belly River	1919	62,909	Kirt Woolf (403) 626-3255
	Waterton River	1993	20,970	
Column 1-4 Source: AIPA, 2002.				

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