

# Recommendations for Renewal of



## *Water for Life: Alberta's Strategy for Sustainability*

Alberta Wilderness Association  
Bow Riverkeeper  
Bragg Creek Environmental Coalition  
Canadian Federation of University Women AB Council, CFUW Lethbridge  
The Pembina Institute  
Sierra Club of Canada, Prairie Chapter  
Southern Alberta Group for the Environment  
Toxics Watch Society

November 2007

## Acknowledgements

The authors would like to thank the following people for helping us gather information for this submission: Jonathan Thompson of Ducks Unlimited, Shelly Lobay-Minarik and Cam Lane, Carol Thurston and Ian Rudland of Alberta Environment. We would also like to thank the individuals from the groups who collaborated on this report for contributing their insights, knowledge, and valuable editorial feedback.

We would also like to thank the Walter & Duncan Gordon Foundation and Mountain Equipment Co-op for the generous support that made this report possible.



## Authors

This report is a collaborative effort of the Alberta Wilderness Association, Bow Riverkeeper, Bragg Creek Environmental Coalition, the Canadian Federation of University Women (AB Council, CFUW Lethbridge), The Pembina Institute, Sierra Club of Canada (Prairie Chapter), Southern Alberta Group for the Environment, and Toxics Watch Society.



**BOW RIVERKEEPER®**



This report was compiled and produced by Bow Riverkeeper. Digital copies of this report can be downloaded from the Bow Riverkeeper website at [www.bowriverkeeper.org](http://www.bowriverkeeper.org)

Cover photography credits from left to right: The Pembina Institute, Dave Kalbfleisch, James Thibeault.

## EXECUTIVE SUMMARY

*Water for Life: Alberta's Strategy for Sustainability* (2003) is a positive step forward for water management in Alberta. It embraces a watershed approach to water management planning that allows for water and land issues to be dealt with in tandem. It advocates a collaborative multi-stakeholder governance model. If implemented it has the potential to greatly improve the ways Albertans use and think about water and poises Alberta as leader in protecting watersheds. *Water for Life* is a well-designed strategy but unbalanced progress in implementing the strategy's actions has limited its effectiveness to date. Implementation of the strategy requires a renewed focus.

Major barriers that have impeded the strategy's implementation include lack of legal grounding and mechanisms to ensure implementation, lack of mandatory compliance obligations, and insufficient financial, administrative, and political support.

This report reviews four key areas of implementation: healthy aquatic ecosystems, source water protection, watershed plans, and innovative water use for a sustainable economy. Our analysis of successes and failures to date has identified several key actions needed to overcome barriers to these areas of implementation. Funding, value of water, moving water between watersheds, trans-boundary agreements, water-use reporting, climate change, groundwater, and the north and south policy gap are cross-cutting issues that must also be addressed for *Water for Life's* success.

Recommendations addressing issues related to these key areas are found throughout the report. Key recommendations include:

- Identifying and prioritizing critical aquatic ecosystem areas and aquatic ecosystem objectives
- Developing a comprehensive and enforceable source water protection strategy
- Acknowledging and incorporating First Nations water issues into the strategy
- Establishing responsibility, accountability, and authority to roles of stakeholders
- Researching thresholds and incorporating them into watershed plans
- Including mandatory compliance obligations for sectors, sub-sectors, and individual companies
- Using progressive innovative approaches to achieve water conservation objectives and improve water management
- Ensuring sufficient financial and human resources, information, and tools to ensure balanced implementation and progress in all aspects of *Water for Life*

Alberta's *Water for Life* strategy is a progressive water management and policy package. Its success depends on the entire strategy moving forward as a whole. Continuation of unbalanced progress (where some objectives are met while others are ignored) and insufficient implementation of objectives will only impede the success of *Water for Life*. This report offers recommendations for the renewal that will ensure the longevity of the strategy as well as healthy ecosystems, robust economies, and a high quality of life for Albertans now and far into the future.

---

## TABLE OF CONTENTS

LIST OF FIGURES	6
LIST OF ACRONYMS	6
1. INTRODUCTION	7
a. Meeting the goals of <i>Water for Life</i>	7
b. Organization of the analysis	8
2. WATER FOR ECOSYSTEMS: HEALTHY AQUATIC ECOSYSTEMS	8
a. Value of aquatic ecosystems: fundamental to achieving all other goals	8
b. Current Status	9
c. Our Analysis	9
d. Key Recommendations	13
3. PROTECTING OUR SOURCEWATERS: BEYOND INFRASTRUCTURE IMPROVEMENTS TO PROTECT DRINKING WATER	14
a. Value of safe secure drinking water: meeting basic needs, achieving social equity, and protecting the source	14
b. Current Status	15
c. Our Analysis	15
d. Key Recommendations	16
4. THE FOUNDATION OF THE <i>WATER FOR LIFE</i> STRATEGY: WATERSHED PLANS	17
a. Current Status	17
b. Our Analysis	17
c. Key Recommendations	18
5. WATER FOR A SUSTAINABLE ECONOMY: ACHIEVING RELIABLE WATER SUPPLIES REQUIRES DEMAND MANAGEMENT, COLLABORATION, AND INNOVATIVE TOOLS	19
a. Value of water for a sustainable economy: meeting livelihood expectations of Albertans through economic vitality	19
b. Current Status	19
c. Our Analysis: Reliable water supplies will mean adopting new and innovative ways to manage water	20
d. Key Recommendations	22
6. CROSS-CUTTING AND EMERGING CONCERNS	22
a. Dismal funding will act as a barrier to a successful strategy	22
b. What is the value of water?	25
c. Exporting water out of our watersheds	26
d. Transboundary agreements	26
e. Electronic water user reporting	27
f. Climate change	27
g. Groundwater	27
h. The south and north divide	29
7. CONCLUSION	30
SOURCES	31

---

LIST OF FIGURES

Figure 1 - Total water-related expenditures by Government of Alberta 2004/05 - 2007/08	23
Figure 2 - Relative breakdown of Alberta Environment's <i>Water for Life</i> spending for 2007/08	24

LIST OF ACRONYMS

- AENV - Alberta Environment
- AWC - Alberta Water Council
- CEP - Conservation, Efficiency, and Productivity (CEP) Project Team
- DSE - Department of Sustainability and Environment, Victoria, Australia
- EC - Environment Canada
- EPEA - Environmental Protection and Enhancement Act
- EWA - environmental water allocations
- FITFIR - first-in-time first-in-right
- FOC - Fisheries and Oceans Canada
- GOA - Government of Alberta
- IFN - instream flow needs
- SGWF - Shared Governance and Watershed Framework
- SSRB - South Saskatchewan River Basin
- WCO - Water Conservation Objectives
- WPAC - Watershed Planning and Advisory Council
- WSG - Watershed Stewardship Groups

## I. INTRODUCTION

### a. Meeting the goals of *Water for Life*

If implemented *Water for Life: Alberta's Strategy for Sustainability* (2003) would be a significant step forward for water management in Alberta. *Water for Life* offers the opportunity to make Alberta a leader in protecting watersheds. The Rosenberg Forum (2007), for example, commends the Government of Alberta for developing this strategy and recommends the Ministry of Environment (Alberta Environment) and the Government of Alberta “continue to pursue and support the development of an evolving Provincial water strategy based on the *Water for Life* model” (5).

*Water for Life* aims to improve Alberta's current approach to water management. It embraces a watershed approach to water management planning. This approach focuses on ecological boundaries, allows water and land issues to be dealt with in tandem, and encourages place-based decision making. The strategy establishes a collaborative governance model to include multiple stakeholders and members of the public in planning through a “network of partnerships” (GOA 2003). This new model<sup>1</sup> is perhaps the most innovative and impressive aspect of *Water for Life*. The strategy's strong emphasis on research and information-gathering initiatives will help fill current knowledge gaps and thereby support current and future decision making. The strategy itself, the process to its development, as well as the recent round of “renewal” consultation are educational and are a tool to shift attitudes and assumptions around water (Beveridge 2006).

*Water for Life* is a progressive strategy for Alberta and has the potential to improve how Albertans use and think about water. *Water for Life*, however, lacks the mechanisms within either the strategy itself or elsewhere under Alberta law to ensure implementation. Because the strategy lacks this legal grounding, the strategy is not enforceable by law and the government has made no indication that certain aspects of the strategy will be implemented should the Alberta Water Council (AWC)<sup>2</sup> be unable to make progress. Particular examples of this problem are evident by the limited progress of the Wetland Policy Project Team to produce a wetland policy and implementation plan and the unwillingness of the Conservation, Efficiency and Productivity (CEP) Project Team and government to make sector planning mandatory and hold sectors to the 30 percent water conservation objective. The strategy suggests a vision for water use management in the province but lacks sufficient detail for how to achieve that vision.

The strategy's potential will only be realised with full financial, administrative, and political support. Funding has been insufficient and has not fully supported implementation of the strategy. This could be partially attributed to no monetary commitment—specific or otherwise—stated within the strategy. Research and development of decision-support tools has occurred at a slower rate than stakeholders and government anticipated; this could be tied to insufficient funding. The Rosenberg report (2007) warns, “There are numerous examples in the world of well-designed strategic plans that have failed because of inadequate organization and fiscal support” (6). Politicians and administrators are responsible for ensuring Albertans recognize the value of water and have sufficient clean water now and far into the future.

<sup>1</sup> This new model consists of the Alberta Water Council (AWC), watershed planning and advisory councils (WPACs), and watershed stewardship groups (WSGs).

<sup>2</sup> The Alberta Water Council is intended to act as an advisory council to the provincial government regarding *Water for Life* initiatives.

Overall, in our view implementation has been significantly behind schedule. Certain objectives of the strategy are being met and others are progressing slowly, or are seemingly ignored. It appears there is good progress to meet drinking water objectives based on the timelines established in *Water for Life*. Objectives for achieving reliable quality water for a sustainable economy are moving forward, although the scope of the associated actions could widen. Objectives to achieve healthy aquatic ecosystems are lagging far behind their anticipated timeline targets. A number of barriers impede the success of *Water for Life*'s implementation and the success of Alberta being a true leader in water management. Specific gaps in implementation are addressed in fuller detail in subsequent sections.

*b. Organization of the analysis*

We have organized our analysis of *Water for Life* and recommendations for further implementation around five issues:

- 1) Insufficient emphasis on healthy aquatic ecosystems
- 2) The need for source water protection
- 3) Watershed governance
- 4) Integration of land use and water use
- 5) The need to transition from supply-side to demand-side management.

Our analysis then addresses these cross-cutting issues:

- Funding
- Value of water
- Moving water between watersheds
- Transboundary agreements
- Water-use reporting
- Climate change
- Groundwater
- The north and south policy gap.

Analysis of the three directions outlined in *Water for Life*—knowledge and research, partnerships (i.e., water governance), and conservation—are subsumed within this discussion.

## 2. WATER FOR ECOSYSTEMS: HEALTHY AQUATIC ECOSYSTEMS

Healthy aquatic ecosystems are fundamental to Albertans' social and economic health and a goal under *Water for Life*. Unfortunately, the basic commitment to protect aquatic ecosystems is far behind schedule. Already, existing Alberta law does not provide sufficient protection for aquatic ecosystems against encroaching growth and development and existing operations. Lack of political will and human and financial resources has meant measures to protect and restore aquatic ecosystems have not materialized and the knowledge to back that protection and restoration has not been fully supported. Government must provide strong and protective policy and legislation because multi-stakeholder bodies, especially industry, are less likely to voluntarily provide aquatic ecosystem protection without clear, specific, and strong policy and legislation for aquatic ecosystem protection.

*a. Value of aquatic ecosystems: fundamental to achieving all other goals*

Aquatic ecosystems are living systems in and around water. They have immense value to both human

and nonhuman systems and beings. They provide drinking water and water for social and economic purposes, assimilate our waste, and provide the setting for recreational activities. They provide water for vegetation and habitat for fish and wildlife. Water flow influences water quality, temperature, nutrient cycling, oxygen availability, and geomorphic processes that shape river channels and flood plains. Without sufficient water the ecosystem can collapse (Bow Riverkeeper 2005). Aquatic ecosystems are essential to maintain functioning natural systems, and they are foundational for human needs. Aquatic ecosystems support the intrinsic value of all life.

Albertans place significant value on aquatic ecosystems—for their connection to the land and natural areas, for recreation, for their livelihoods, and not least for their source of drinking water. In a telephone survey conducted by Alberta Environment, 87 percent of Albertans agreed or strongly agreed with the following statement, “If there are water shortages in the future, the Province should put a higher priority on preserving natural aquatic environments, even if this limits economic growth and jobs” (Equus 2002, 18).

#### *b. Current Status*

Of the three areas of effort in *Water for Life*, efforts toward healthy aquatic ecosystems have made the least progress. Efforts are underway to assess Alberta’s surface water quality and the current status of ecosystems – including a provincial synthesis of water and sediment quality, consolidation of fisheries and non-fish biota information, collection of riparian health inventory information, and assessment of water quantity and instream flow information (AWC 2007). To achieve the short-term action, “develop systems for monitoring and assessing healthy aquatic ecosystems”, government is reviewing techniques used in other jurisdictions, developing standardized approaches for monitoring, assessment, and reporting, and collecting existing information (AWC 2007).

To replace the interim wetland policy of 1993, the AWC Wetland Policy Project Team is now drafting a wetland policy and implementation plan. The adoption of a wetland policy, an objective under *Water for Life*, was meant to be completed by 2007. Unfortunately, it appears that a lack of consensus among Wetland Policy Project Team members and government indicates key issues such as no-net loss of wetlands may not be resolved. The policy has gone out for public consultation.

Critical areas have not been identified and efforts to protect them, as far as we know, are not underway—thus failing this short-term outcome of *Water for Life* and the interests of Albertans.

The government has also yet to achieve the short-term action to establish science-based methods to determine the ecological requirements of healthy aquatic ecosystems. AWC (2007) suggests insufficient resources have hindered completion of this task. The achievement of healthy aquatic ecosystems hinges on development of these tools.

#### *c. Our Analysis*

*Water for Life* lacks an implementation plan for achieving the goal of healthy aquatic ecosystems. Alberta Environment’s emphasis appears to be solely on establishing science-based methods for determining healthy aquatic environments not on developing action plans. Thus implementation of specific and concrete actions to achieve healthy aquatic ecosystems has stalled as government gathers information and knowledge. Decision-support tools based on this knowledge are necessary for planning and setting priorities and objectives within watersheds and to achieve medium- and long-

term actions outlined in *Water for Life* (AWC 2007). However, slow progress on gathering additional information should not become a barrier to decisive actions to protect aquatic ecosystems in the meantime. Using a precautionary approach, government should be prepared to provide interim policy for aquatic ecosystem protection in absence of sufficient knowledge. While action by non-governmental stakeholders (e.g. WPACS, WSGs) should be contemplated, the immediate control over decisions that could protect critical ecosystems lies with government agencies.

The most concrete action *Water for Life* offers to achieve healthy aquatic ecosystems is the development of a provincial wetland policy and implementation plan. This short-term action is meant to be complete by 2007. This action will likely fail to meet its deadline largely due to resistance from some government ministries. The current policy used by the Alberta government (1993 interim wetland policy) is 14 years old and woefully inadequate in addressing the broad goals of *Water for Life*. It sets out a mitigation/compensation process to avoid, minimize, or compensate for wetland loss. This policy, however, only applies to the “white zone”<sup>3</sup> area of the province, where 64% of slough/marsh wetlands have already been lost (AENV 2005). Alberta’s green zone has no wetland policy and thus no mitigation process for wetland loss. Given the current population and economic growth in the province, wetlands are being negatively affected at an alarming rate—in the white zone (e.g. sprawling urban areas) and the green zone (e.g. areas being developed for oil sands).

The lack of consensus should not be a barrier to adopting a wetlands policy and government should take a leadership role in assuring this moves forward. The lack of a unified government position on this matter has been a significant factor in this lack of consensus. A new wetland policy and its implementation plan must be delivered from the Alberta Water Council and released and implemented by government by May 2008. A new provincial-wide policy has the opportunity to improve implementation consistency and restoration and protection of wetlands across the province. The following list proposes ways in which the policy should be improved:

- New policy must apply to the entire province and include a mitigation/compensation process for both zones of the province.
- New policy must prioritize avoidance and then, where impacts occur, focus on mitigation and restoration.
- New policy must include outside groups to guide implementation of the policy.
- All current wetland loss should be compensated, not grandfathered.
- Wetland objectives should be set on a watershed basis by WPACs and be integral to the watershed planning process, both to support healthy aquatic ecosystems and to protect drinking water sources.
- Setting wetland objectives should be supported by wetland mapping (now underway but requiring quicker progress) to visualize the current and potential situations and by broader public education to improve understanding of the importance of wetlands (including ephemeral wetlands) and broader ownership of the impacts.
- Successful implementation of new province-wide wetland policy will require not only the cooperation of stakeholders, but also cooperation and policy alignment among government ministries, such as Sustainable Resource Development, Agriculture, Energy, Transportation, and Environment.

<sup>3</sup> The white zone is the settled areas of Alberta, including much of Alberta south of Edmonton, Edmonton, just north of Edmonton, and the area around Grande Prairie. The green zone is the unsettled area, primarily northern Alberta and the boreal forest.

- To successfully implement the policy, ongoing evaluation and enforcement of the policy is essential and should be consistent across the province, unlike the current white zone policy.

Because environmental values are a public good, government is responsible for protecting these values. Because environmental values are often not construed to be of direct interest to human water users, environmental bottom lines (or sustainability limits) need to be established and be legally binding. Models from other jurisdictions that, for example, establish environmental water allocations (EWAs) are informative in guiding how to balance the needs of society with those of ecosystems. Because Alberta continues to develop its knowledge base to allocate water to aquatic ecosystems, precautionary interim actions are necessary. These include halting further allocations in many watersheds—as has been done in the South Saskatchewan River Basin—and allocating interim EWAs on a precautionary basis.

**Precautionary principle** means a lack of knowledge and understanding should not be used as a reason for allowing action that risks serious or irreversible harm to the public good, including the environment, and the burden to prove no harm falls on those advocating the action (Mitchell 2002; EC 2001; Montague 2005).

Some guiding principles include:

- Increase coherence and consistency of the process
- Provide an appropriate balance of flexibility and predictability
- Be adaptable to various functional areas
- Include value-added as a complement to tools for risk management (EC 2001).

Adoption of the precautionary principle means that those responsible for water management,

- Appreciate uncertainties such as climate change implications for water resources (Harremoës 2002)
- Do not irreparably damage water resources through over-withdrawal or pollution
- Err on the side of over-allocating water to ecosystems until we know what amount or component can be removed (Postel and Richter 2003).

To achieve aquatic ecosystem protection, *Water for Life* envisions “water management objectives” and priorities will be established through watershed plans to sustain aquatic ecosystems (GOA 7) but fails to define “water management objectives”. The term does not have legal basis, unlike the environmentally protective “water conservation objectives” under the *Water Act*. To further confuse matters, “water management objectives” are also to be established through watershed plans to support sustainable economic development (GOA 8). To be able to set water management objectives for aquatic ecosystems, this term requires definition and should be broadly interpreted to include quantity and quality objectives as well as be precautionary in nature.

Unfortunately, even when measures are taken to protect instream flow needs (IFN), they may be inadequate. For example, the recent Alberta Environment plan to protect the instream flow needs of the Athabasca River depends on the voluntary compliance of industry and allows water to be withdrawn from the river even during extremely low flow conditions (AENV and FOC 2007).

#### **Current tools under the Alberta Water Act**

The *Water Act* provides some direction to protect aquatic ecosystems. Indeed, the *Water Act* directs that a strategy to protect aquatic environment be developed in conjunction with the *Framework for Water Management Planning* (WA. s.7(1) 2003). Both this *Strategy for the Protection of the Aquatic Environment* and the *Framework* were produced as one document by December 31, 2001. The *Strategy*, however, does little to push existing law and merely reaffirms effluent limitations outlined in *Environmental Protection and Enhancement Act* (EPEA) (Droitsch et al 2007). Other mechanisms are discretionary in nature and do not guarantee sufficient protection.

#### **Opportunities under the Water Act: A Cautionary Note**

The *Water Act* offers a few tools to protect aquatic ecosystems: conservation holdbacks and water conservation objectives (WCOs). Conservation holdbacks on water allocation transfers and WCOs are the most concrete mechanisms to ensure sufficient water for aquatic ecosystems (Beveridge 2006). Conservation holdbacks, however, are unlikely to be sufficient in fully or over-allocated watersheds, especially as transfers will remove unused portions of licences that had remained as natural flow. Conservation holdbacks are discretionary, meaning the Director has the option to allow the entire transfer to be reallocated for use rather than holding back up to 10% of the transferred amount for natural flow.

We caution that the current approach to Water Conservation Objectives not only fails to protect aquatic ecosystems but WCOs are currently applied in such a way that will degrade at least one river environment. WCOs do not add new water for the environment in already fully allocated watersheds. Under the *SSRB Water Management Plan* (2006), WCOs that were established for the Bow and Oldman Rivers had are unable to protect or restore heavily impacted ecosystems. Because the WCOs were assigned a “priority” as of the date they were established – October 2006 – they will not restore over-allocated water to these two river systems. Furthermore, it was fully acknowledged by the government that the WCOs established in the Red Deer River sub-basin would lead to an overall degradation of the river. Droitsch et al (2007) go so far as to state, “the setting of minimum [WCO] levels below what is needed to accomplish this [protection of aquatic environment integrity] perverts the statutory intent” (163). It is entirely possible that WCOs can be a positive tool for the protection of aquatic ecosystems but, in its current format, they are undermining progress toward this *Water for Life* objective.

d. Key Recommendations

**Recommendation: Immediately identify<sup>4</sup> and prioritize critical aquatic ecosystem areas across Alberta followed by development of a long-term plan to systematically establish aquatic ecosystem objectives to ensure protection of our watersheds. Directions to protect aquatic ecosystems should have teeth—clear and concise directives that are legally binding.**

To help achieve this protection, the Alberta government and others should:

\*Ensure aquatic ecosystem plans are action-based and hold the government accountable for reaching outcomes (revisited every two years). Such a plan should be accomplished through an update of the current *Strategy for the Protection of the Aquatic Environment*.

\*Criteria for measurement should be drawn from existing measurements. Additional criteria under development should be added as needed but not at the expense of setting criteria immediately.

**Recommendation: Adopt a province-wide wetland policy based on no-net-loss principles and develop an accompanying implementation plan by no later than May 2008 if the Alberta Water Council does not reach consensus. Complete inventories of all wetlands.**

**Recommendation: Protect the natural flow regime of Alberta's rivers for healthy aquatic ecosystems by defining an overall sustainability limit for each river.**

To achieve this, the Alberta government and others should:

\*Develop protective Water Conservation Objectives (WCOs) that mimic a natural flow regime and protect aquatic ecosystem needs particularly for the remainder of Alberta river systems. The WCOs for these rivers should be guided by instream flow needs (IFN) assessments because they are currently not fully allocated and setting aside water to meet IFN would not affect existing licence holders. Allocate precautionary levels of water to protect instream flows in rivers that are not over-allocated.

\*Use scientifically-modelled forecasts of future flows when determining instream flow needs should incorporate scientifically modelled future flow forecast analyses. Analysis should not be based solely on historical data for a time period that is widely accepted to be a relatively “wet” century.

\*Interpret “water management objectives” broadly to include water quality and quantity and flow regime objectives.

\*Find measures in addition to Water Conservation Objectives to restore and protect instream flow, particularly in the South Saskatchewan River Basin. Other measures include cooperative measures among users, maximum conservation holdbacks under water allocation transfers, licensing private users for instream preservation purposes in specific stream reaches, and management of storage

---

<sup>4</sup> Identification of areas should include not only the mainstem river systems but their tributary systems as well. Indeed, this recommendation is supported by AWC (2007): “there is a need to develop initiatives for the immediate protection of critically sensitive aquatic ecosystems” (3).

facilities for flow purposes (AWC 2007).<sup>5</sup>

\*Apply full conservation holdbacks to both water allocation transfers *and* temporary assignments of water allocations to restore river flows. Doing so would protect the intent of conservation holdbacks: making sure some of the allocated but unused water remains in the river when transferred to a new water user, even on a seasonal basis.

**Recommendation: Pass new and upgrade existing legislation that assures protection of riparian zone functionality along Alberta’s waterways.**

\*There are several options for specific mechanisms including but not limited to fixed riparian buffer widths. Sustainable Resource Development (ASRD) already has environmental reserve setback guidelines that could be adapted into binding legislation.

**Recommendation: Assure sufficient financial and human resources, information, and tools to fully support *Water for Life’s* goal to achieve healthy aquatic ecosystems.**

To achieve this, the government should:

\*Dedicate adequate resources and capacity to develop and implement science-based methods to determine ecological requirements.

\*Expand and strengthen monitoring networks to assess surface water and groundwater quality and quantity. This will support not only the healthy aquatic ecosystem goal but also ensure safe secure drinking water and reliable water for economic use (Rosenberg 2007, 10).

### 3. PROTECTING OUR SOURCE WATERS: BEYOND INFRASTRUCTURE IMPROVEMENTS TO PROTECT DRINKING WATER

#### *a. Value of safe secure drinking water: meeting basic needs, achieving social equity, and protecting the source*

The Alberta public wants assurance for a safe and secure source of drinking water. Without sufficient good quality water, life is impossible or riddled with illness. Safe secure drinking water is about meeting basic human needs for drinking, cooking, and sanitation and about doing so in an equitable manner to achieve social equity. To fully guarantee safe drinking water, the source of water (i.e., groundwater, lakes, and rivers) must also be protected in terms of quality and quantity through source water protection. Focusing on end-of-the-pipe treatment is costly and some contaminants are not easily or feasibly removed. Source water protection has been identified as a very effective method to achieve safe secure drinking water.

---

<sup>5</sup> Application of conservation holdbacks to water allocation transfers should be mandatory rather than discretionary—thus applying to all transfers—because the original intent of creating this tool was to return some of the over-allocated water back to natural flow.

**Source water protection** seeks to protect surface water and groundwater sources of drinking water from contaminants and excessive withdrawal. This is a preventative and more comprehensive approach than the traditional water treatment options that focus on treating specific contaminants. In combination, protection of the source of drinking water and the treatment of the water can guarantee safe secure drinking water.

*b. Current Status*

The Government of Alberta has made the most progress toward this *Water for Life* goal, completing the following tasks (AWC 2007):

- An assessment of all drinking water facilities in the province, with short-term, site-specific recommendations
- 10- and 25-year roadmaps for water supply developments
- A significant financial commitment from government of \$200 million in capital over next two years to upgrade infrastructure
- An independent review of Alberta's drinking water program and government following up with its recommendation; the Office of Auditor General of Alberta also reviewed Alberta's drinking water program; the government intends that there to be a review every five years
- A framework for municipal grant criteria to support of regional water systems
- Funding for new municipal infrastructure (90% funding) and upgrades of existing hub suppliers for new customers (100% funding); the government has committed \$100 million for each of next two years (2007/8 and 2008/9 fiscal years)
- Drinking water specialists assigned to each region; expertise pools have been established to assist municipalities in emergencies
- Funding has been allocated to regional health authorities to develop and implement an audit tool for public and private drinking water systems throughout the province
- Scheduled expansion of provincial laboratory capacity.

*c. Our Analysis*

While government is improving Alberta's drinking water infrastructure, it has made little progress in developing a comprehensive "Source-to-Tap/Multi-Barrier Approach" to ensure source water protection. To achieve this medium-term action, Alberta Environment has initiated online reporting of all drinking water facility test sample results, and Alberta Health has developed a manual for private water users outlining design, operation, and maintenance procedures for private water systems. But Alberta has a long way to go. The focus in the last half century has been more on water treatment and far less on protecting the source of water.

The government must take the lead and integrate land-use and water planning to protect key drinking water source areas. Land-use activities threaten surface water and groundwater quality and the integrity of water source systems. To fully embrace source water protection, threats to source water quality, such as agricultural chemicals and livestock manure runoff, oil and gas activities (including conventional and unconventional sources), and industrial forestry, must be addressed through inte-

gration of land and water policy and management at all levels (i.e., provincial and municipal).

The government has a strong obligation to address the effects land-use activities have on private water supplies and to educate Albertans about these effects. Because private water users rely on raw water sources—usually groundwater—and have less capacity to treat water compared to municipalities, they are particularly vulnerable to source water threats. Lack of source water protection means the Alberta government has done little to truly prevent drinking water emergencies, particularly for private users. This situation creates inequity among Albertans.

#### **Clean and safe drinking water for First Nations**

Good quality water is not equally available across the province, particularly in First Nations communities. Jurisdictional ambiguities over water appear to be a major cause of compromised water security in First Nations' communities, erecting a barrier to social equity in the province. *Water for Life* fails to explicitly address this issue. Absence of First Nations' participation is a barrier to ensuring First Nations influence water policy and management in the province. While this component of social equity was missing in the strategy, AWC (2007) notes "Alberta-First Nations Drinking Water Partnership" as a new short-term action towards which the government is making efforts. Alberta Environment is collaborating with other ministries to develop an agreement with Chiefs of Treaty 6, 7, and 8 First Nations around facility operational capacity and training, participation in regional systems, and the operation and maintenance of private systems (AWC 2007). We hope this partnership will take a step toward addressing this entrenched social equity issue in Alberta.

#### *d. Key Recommendations*

**Recommendation: Develop a comprehensive and enforceable source water protection strategy with particular emphasis on headwaters, particularly Alberta's Eastern Slopes.**

A source protection strategy should:

\*Identify critical areas requiring protection and strategies to ensure that drinking water protection takes priority and is not affected by harmful changes in land use.

\*Integrate land-use and water-use planning, including watershed planning and alignment of government-wide policy. The Land Use Framework should reflect this integration and the concept of source water protection.

**Recommendation: The province of Alberta, as the primary manager of freshwater in Alberta, needs to explicitly acknowledge and incorporate into *Water for Life's* goals water issues in First Nations communities, as well as develop a plan towards improving their supply and quality of water, in cooperation with federal and First Nations governments.**

#### 4. THE FOUNDATION OF THE *WATER FOR LIFE* STRATEGY: WATERSHED PLANS

The foundation of *Water for Life* is the development of watershed plans. Watershed plans must integrate land and water use and impacts, while watershed planning must involve clearly outlined accountability, responsibility, and authority roles among parties in the new governance structure established through *Water for Life*.

##### a. Current Status

*Water for Life*'s "network of partnerships" is the strategy's strongest element (GOA 2003, 15). It recognizes multiple scales of water issues—provincial, watershed, and local—and allows for issues to be addressed at the most appropriate scale. This new governance model<sup>6</sup> brings together multiple perspectives to discuss specific issues.

While many of the partnerships have been established, roles, responsibilities, and relationships are only vaguely outlined in the document *Enabling Partnerships*. The relative authority, responsibility, and accountability for each group (including government) remain unclear. The Shared Governance and Watershed Framework (SGWF) Project Team under the Alberta Water Council has been charged to address this key issue.

A number of the watershed councils (WPACs) have been set up and are at various stages, some of which are completing state of the basin reports. A few have started to develop watershed plans. No watershed plans have been produced to date.<sup>7</sup>

There is considerable uncertainty regarding how Alberta's *Water for Life* strategy will be reconciled with the Alberta government's proposed Land Use Framework. The integration of these two strategies could address how integration of land-use and water-use policy and management could proceed.

##### b. Our Analysis

While watershed planning is the foundation for water management in Alberta, there is still no specific governance structure or a plan to address substantive issues. The current *Framework for Water Management Planning* is far too vague to be useful and the *Water for Life* strategy fails to define implementation responsibilities. A significant component of any governance structure must be an overt commitment by the provincial government outlining their accountability to protect the public good both for human health and environmental protection.

The strategy does not clearly define responsibilities and accountabilities of WPACs within the partnership network and in relationship to the Government of Alberta. The government has failed to make any commitment that watershed plans will play a direct role in the day-to-day decisions of government ministries. Without these guarantees, watershed plans will have little influence on government decisions that impact a watershed and will rely solely on cooperation among stakeholders.

<sup>6</sup> This new governance model is comprised of the provincial Alberta Water Council, watershed-based Watershed Planning and Advisory Councils, and local Watershed Stewardship Groups—all multi-stakeholder bodies (GOA 2003).

<sup>7</sup> The South Saskatchewan River Basin has a water management plan, approved August 2006. But this plan is not a watershed plan. It restricts new water use in 3 of the 4 SSRB sub-basins, allows water allocation transfers, and sets out added considerations for licensing decisions. It does not address water quality, or land-use issues, for example, which should also be central components of watershed plans. Nor does it adequately address water for the instream flow needs.

The government has made a weak commitment to consider the recommendations of WPACs, but this provides little certainty and encouragement for the volunteer efforts of these multi-stakeholders groups. Ultimately, meaningful cooperation and agreement among all stakeholders for on-the-ground action will require an incentive from a regulatory authority.

Government must provide specific, comprehensive guidelines for watershed planning to support the strategy's goals and enable efficient and measurable implementation. Specifically, government must set strong minimum standards to be met by every watershed management plan. For example, should a WPAC choose not to develop aquatic ecosystem objectives within a specified time, government should undertake this role. A commitment to undertake the establishment of meaningful aquatic ecosystem objectives (should a WPAC fail to do so) will provide the necessary backstop.

The SGWF Project Team should create a watershed planning framework (to update the *Framework for Water Management Planning*) that includes minimum specific standards or criteria for every major watershed plan in the province. Guidelines must be available to guide WPAC decision making and formulation of indicators and desired outcomes. Guidelines might also minimize conflict among stakeholders.

Watershed planning guidelines must encourage substantive connections (between surface and groundwater, land and water, water quality and quantity); these connections are not well-developed in *Water for Life*. A central challenge is integration of water and land-use policy and management. This integration will allow the province to balance its priorities, its activities on the landscape, and equity considerations necessary to sustain a healthy functioning ecosystem (Beveridge 2006).

The government itself (its ministries and different levels of government) must coordinate its efforts and cooperate to achieve common goals—first, goals must become aligned so that government departments and levels are not working at cross-purposes. Alignment must go beyond those ministries with responsibilities for water, and many government ministries must acknowledge their roles in impacting water and land and “include appropriate provisions for the protection of water quality and availability. This recommendation will require commitment and support from the highest levels of the Provincial government” (Rosenberg 2007, 11).

It is not sufficient to establish common goals among stakeholders and government and to create a watershed plan: watershed planning is not simply the identification of objectives but more critically involves the development of an implementation plan that requires action. Complementary implementation plans and identification of parties responsible for each action are essential for successful enactment of these plans.

*c. Key Recommendations*

**Recommendation: Establish clear roles for government, industry, Watershed Planning and Advisory Councils, Watershed Stewardship Groups, and non-governmental entities. Most importantly, the roles must establish clear responsibility, accountability, and authority.**

To establish a clear governance model, government and the Alberta Water Council should:

\*Establish membership and procedural guidelines in the Watershed Planning Framework to ensure

WPACs are effective, consistent, and successful. Sustainable funding for WPACs is essential to guarantee this success.

**Recommendation: Create clear guidelines and mandatory requirements that result in high quality and effective watershed plans to protect environmental value, social equity, and economic vitality.**

To ensure high quality watershed plans, government should:

\*Provide a backstop: If a WPAC does not complete a watershed plan by a specified date—perhaps in a staged process—the government must create the plan.<sup>8</sup>

\*Ensure every watershed plan has scientifically based objectives, priorities, and an implementation plan for achieving these priorities approved by government.

**Recommendation: Manage land and water interaction on a watershed scale, including the integration of groundwater. Watershed planning should set limits and thresholds that deliberately determine activities on the landscape.**

To effectuate this integration in watershed management, government should:

\*Align policies among all provincial ministries towards clear environmentally and socially sound goals through legislation, cooperation, and coordination.

## 5. WATER FOR A SUSTAINABLE ECONOMY: ACHIEVING RELIABLE WATER SUPPLIES REQUIRES DEMAND MANAGEMENT, COLLABORATION, AND INNOVATIVE TOOLS

### *a. Value of water for a sustainable economy: meeting livelihood expectations of Albertans through economic vitality*

Economic vitality is essential to individual well being and Alberta's social fabric. While the relationship between ecological integrity and a healthy economy may seem competitive, a healthy economy relies on healthy terrestrial and aquatic ecosystems, particularly a natural resource-dependent economy like that of Alberta.

### *b. Current Status*

Work completed toward this *Water for Life* goal includes:

- A cost accounting study of government-owned water infrastructure to determine the full cost of water provision, as well as an additional study for drinking water treatment facilities and irrigation district works
- An inventory list of potential water storage sites, criteria for ranking sites, and a demand and supply study to provide support for prioritisation criteria
- An evaluation of economic instruments such as water allocation transfers, wetland compensation, water pricing, rebates, and incentives/ penalties

<sup>8</sup> Other jurisdictions have approached watershed planning in this way (e.g., Ontario and Washington State grant funding for specific stages of watershed planning but require the return of the funds if that stage of the plan is not complete by the set date).

### **Economic Instruments**

A cross-ministry group has begun assessment of economic instruments currently in use in Alberta (i.e., water allocation transfers, wetland compensation) and will take a closer look at potential economic instruments for conservation, efficiency, and productivity (e.g. water pricing, rebates, and incentives and penalties) (AWC 2007). Water allocation transfers are already authorized for use in the South Saskatchewan River Basin (SSRB) (AWC 2007; AENV 2006). Transfers create flexibility in the currently inflexible allocation system by moving water rights among existing and aspiring water users.

### **Water Conservation**

Significant attention has been paid to *Water for Life's* target to improve overall efficiency and productivity of water use in Alberta by 30% from 2005 levels by 2015 (firm targets to be determined by the AWC). Under the Alberta Water Council, the Conservation, Efficiency, and Productivity (CEP) Project Team is meant to define the firm target and is currently developing a framework for water-use planning by economic sector.

c. *Our Analysis: Reliable water supplies will mean adopting new and innovative ways to manage water*

To achieve the goal of reliable water supplies for a sustainable economy, implementation of a broad range of innovative water management tools and techniques will be required particularly given the current system of allocating water based on the first-in-time, first-in-right principle.

The 2007 Rosenberg report recommends “a balanced portfolio of measures for managing water scarcity”, including water conservation, storage—both surface and ground—conjunctive use of ground and surface water, water re-use, and other appropriate measures (6).

The water allocation transfer system is one tool that attempts to redistribute water as a limited and, in some cases, over-allocated resource. Although less than 30 transfers of water rights have occurred so far, they will be an important mechanism for reliable water supplies, particularly with the decision to not allow new licences in the Bow, Oldman, and South Saskatchewan River sub-basins.

Innovative tools to address economic use of water in times of water shortage include water sharing agreements, voluntary restrictions in critical periods, modified dam operations, changed operation of irrigation dams, and use of *Water Act* provisions and amendments to maximise water availability (AWC 2007, 18).

### **Evaluating the potential for new dams: A look in the wrong direction**

Current efforts by the *Water for Life* strategy to evaluate new dams and “storage” opportunities for industry are of concern. Rather than focus on creating new “supply” of water through development of costly infrastructure, we strongly recommend a focus on water conservation tools to address water scarcity in the province. The view that water storage is a conservation measure is misguided. Should storage be unavoidable, off-stream storage might be acceptable to take advantage of high-flow periods and reduce diversion during low-flow periods. Existing storage should be operated to mimic natural flow regimes as much as possible. Supply management tools seek to increase supply as a way to adapt to water scarcity; however, more storage will not create new water (DSE 2004).

### **Water for Life's water conservation target**

We are very concerned that the Alberta government appears to view the 30 percent conservation

target as voluntary in nature. Recognizing that the Alberta government has freely allocated for over 100 years, the strategy sets a water conservation target to discourage wasteful water use practices. Unfortunately, it appears the government will refuse to make this target mandatory. Effectively, the government has indicated it will require plans but not require any specific targets for water conservation. This will inevitably lead to weak water conservation plans.

If implemented, the strategy's overall target to achieve a 30% improvement in efficiency and productivity would drive progress by changing how the economy uses water. While the CEP Sector Planning Project Team has evaluated possible guidelines for the water conservation plans, no broad target has yet been confirmed, nor have there been decisions about how this target would be applied across sectors.

#### **Consider the Soft Path Approach**

- Recognize local ecological limits and reconcile human demands within these limits
- Focus on the services water provides rather than the water itself and maximize productivity per unit of water
- Match the quality of water used to the quality of water required by the use
- Strive for open, democratic, participatory planning
- Plan for a desired future and consider how to change present conditions to meet that future.

*Adapted from Brandes et al. Thinking beyond Pipes and Pumps.*

#### **First in time, first in right**

While water is a scarce and precious resource, particularly in southern Alberta, the current first-in-time first-in-right system (FITFIR) continues to act as a barrier to protect the ecological water requirements of rivers. The lack of willingness by large license holders to identify alternatives for protecting instream flows leads us to question the FITFIR system. This water allocation system is also relatively inflexible to changed water availability from year to year. Entrenched historical priorities and licences held in perpetuity fail to recognize changing priorities or to ensure the best use of a shared resource. FITFIR means that newer industrial, commercial business, and agricultural users may not have a reliable water supply--unless these newer users are able to purchase a water allocation transfer which holds the original licence's priority date. Under the FITFIR system, all new licence applications are considered equal and purpose of water use gains little consideration. Growing relative water scarcity means purpose of use is highly relevant.

Finally, there has been little progress toward defining what is meant by a "sustainable economy" with respect to reliable water supplies. While the government recognizes limits of water availability, it does not specify how to balance the economy's use of water with environmental requirements. AWC feels "the scope of actions falls short of the potential strategic intent of this outcome"; implementers should be more innovative rather than simply enhance existing tools (AWC 2007, 18).

d. *Key Recommendations*

**Recommendation: Uphold *Water for Life*'s goal for a 30 percent conservation target. Firm targets need to be set for each sector and sub-sector. Fulfillment of these targets by the sectors, sub-sectors, and even individual companies should be mandatory—not voluntary.**

To achieve the conservation target, sector plans should:

\*Result in a measurable benefit for the environment. For example, water recovered by conservation measures should be used to restore flows in aquatic ecosystems or to maintain IFN. Only when IFN is met should conserved water be used to provide for growth or new users.

\*Integrate the use of economic instruments and encourage the most progressive and environmentally sound approaches, mechanisms, and tools. The Alberta Water Council (2007) supports regulation of conservation, efficiency, and productivity activities (e.g., compulsory conservation plans by licence holders, amend building codes, and riparian protection standards).

**Recommendation: Allow for the use of progressive innovative approaches to achieve water conservation objectives and improve water management for water security, environmental protection, and safe and secure drinking water supplies.**

To achieve water conservation objectives, the government should:

\*Use demand management and other mechanisms such as the water rights transfer system to change or satisfy demand rather than rely on supply management approaches. Mechanisms should be adaptive and allow for change.

**Recommendation: Conduct a critical analysis of Alberta's water allocation system and the priorities to which it subscribes.**

This re-evaluation is necessary to truly address water's nature as a limited, variable, and shared resource and the concepts of equity for current and future generations and consideration of ecological needs.

**Recommendation: Use the water allocation transfer system to reallocate water rather than continuing to move water among sub-basins and sub-sub-basins.**

The province needs to redefine river basins in the *Water Act* to a smaller scale. This redefinition will allow for stronger criteria to be applied to applications asking to move water between sub-basins and sub-sub-basins. Because water is a shared resource and necessary for life, a number of conditions should be placed on the water allocation transfer market.

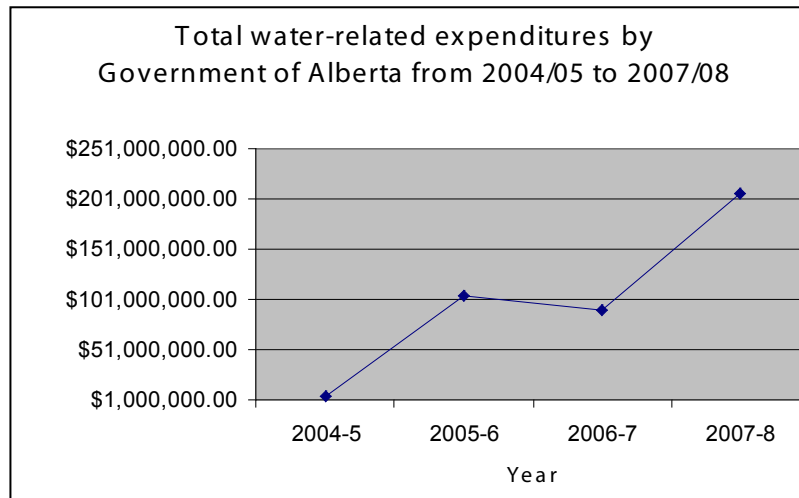
## 6. CROSS-CUTTING AND EMERGING CONCERNS

a. *Dismal funding will act as a barrier to a successful strategy*

The success of *Water for Life* depends upon adequate funding. On the surface, it appears funding for the *Water for Life* strategy is sufficient. However, a closer look reveals that the vast majority of spending is for capital improvements for wastewater and water supply systems. A more accurate financial

picture suggests that key *Water for Life* programs (including its key partners such as Watershed Planning and Advisory Councils) are significantly under funded.

According to Government of Alberta (GOA), expenditures attributed to the *Water for Life* strategy have been increasing. However, *Water for Life* funding now incorporates capital improvements (such as the building of wastewater treatment facilities) which artificially inflate overall strategy expenditures.<sup>9</sup> See below for a comparison of water-related expenditures from budget years 2004/05 to 2007/08. A more accurate assessment of *Water for Life* funding should evaluate the relative contributions of the Government of Alberta to its multiple activities.



**Figure 1**

Total water-related expenditures by Government of Alberta 2004/05 - 2007/08

In summary, 2004/5 = \$4,446,000; 2005/6 = \$104,551,000; 2006/7 = \$90,933,000; and 2007/8 = \$206,429,000 (Thurston 2007). As explained above, the apparent increase is due to a change in the classification of expenditures in 2005/6 to include capital expenditures.

Based on Alberta’s 2007 budget, government will invest \$679 million in water management over the next three years—thus on average \$226.33 million per year (GOA 2007a). It is important to note that these expenditures relate to water infrastructure and municipal activities, not any other *Water for Life* activities. The \$679 million budget includes:

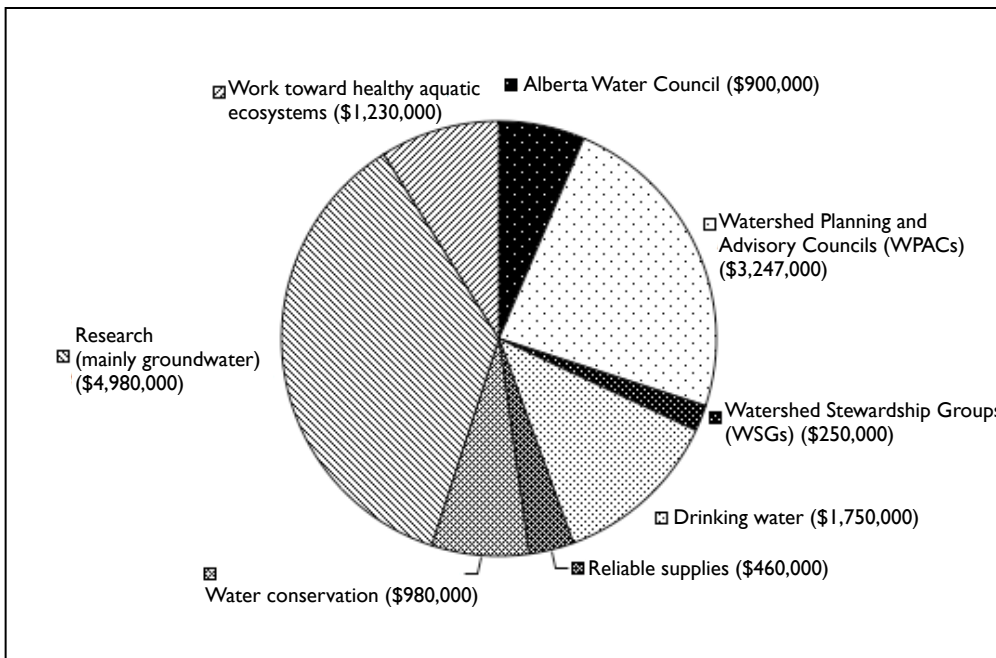
- \$170 million for regional water projects
- \$148 million in other grants to municipalities under the province’s *Water for Life* program
- \$100 million to municipalities through the new Municipal Sustainability Initiative
- \$103 million to complete water treatment plant and wastewater facilities in the Regional Municipality of Wood Buffalo
- \$53 million for irrigation rehabilitation
- \$105 million for government dams, canals, erosion-control infrastructure and other support.

<sup>9</sup> GOA started to count regular capital expenditure in 2005/6 as part of *Water for Life*, where prior to that they only counted the strategy’s core expenditures.

In 2007, GOA expenditure on specific *Water for Life* programs totalled \$206,429,000. This allocation, however, funded not only Alberta Environment but also other ministries, including:

- Advanced Education and Technology received \$25,000,000 for research
- Agriculture and Food received \$5,741,000 to study the value of water and economic instruments and to implement best management plans for agriculture
- Health and Wellness, Parks received \$2,100,000 (\$400,000 for provincial lab capacity; \$700,000 for education and support for private systems; and \$1,000,000 for a public health surveillance system)
- Infrastructure and Transportation received \$159,300,000 for capital costs (municipal and wastewater systems)
- Tourism, Parks, Recreation, and Culture received \$375,000 for provincial park water supply improvement.

Of that total, \$45,670,000 was for operating costs and \$160,759,000 was for capital costs. Alberta Environment’s share for *Water for Life* activities for 2007/08 year is \$13.8 million or less than 7% of the total *Water for Life* budget.<sup>10</sup> The figure below illustrates the distribution of the \$13.8 million.



**Figure 2**  
Relative breakdown of Alberta Environment’s *Water for Life* spending for 2007/08.<sup>11</sup>

In addition to the allocated funding from Alberta Environment (AENV), WPACs and WSGs also receive funding from other organizations and agencies (Lane 2007). AENV funding for WPACs is divided between eight WPACs (approximately \$405,875 for each WPAC). Each WPAC is expected to

<sup>10</sup> This *Water for Life* project funding is based on Alberta Environment’s environmental business plan and the Alberta Water Council’s operations plan. It does not include in-kind staff support or core program funding for day-to-day operations.

<sup>11</sup> Research for aquatic ecosystems includes initial assessment of aquatic ecosystems = \$270,000; decision support tools for watersheds = \$275,000; monitoring and assessment = \$135,000; and wetlands inventory and policy = \$550,000.

complete state of the basin reporting followed by facilitating watershed planning over the period of several years. The core work of each watershed council includes hiring staff to support comprehensive multi-stakeholder processes. Capacity and resources of the watershed councils will determine how well these councils function to produce watershed management plans, function as part of an ongoing planning process, and relate to the rest of the partnership network and government.

The \$13.8 million to be spent by Alberta Environment on *Water for Life* activities is approximately 0.0417% of the \$33.1 billion estimated expenses for Government of Alberta's total 2007/08 budget (GOA 2007b) and 8.41% of the Ministry of Environment's 2007/08 \$164 million budget (GOA 2007a). Total *Water for Life* expenditure by all Ministries, including Alberta Environment, of \$206,429,000 is almost 0.624% of the total Government of Alberta 2007/08 budget.

**Recommendation: Increase spending to core strategy activities to improve and prioritize water protection over short-term gain for long-term quality of life.**

The Rosenberg report (2007) suggests that Government of Alberta needs to renew its commitment to *Water for Life*—a good strategy—or risk failure of its intent. As Rosenberg (2007) warns, many good water strategies have failed due to lack of political and financial will.

**Recommendation: Define sources of sustained funding that can be based on a task-by-task or staged process in the watershed planning process.**

*b. What is the value of water?*

*Water for Life* aims to help Albertans understand the value of water to the economy and quality of life (short-term outcome). To determine and report on the true value of water in relation to the provincial economy, Government of Alberta has completed phase one "Value of Water to the Alberta Economy" (led by Alberta Employment, Immigration, and Industry). Phase one valued surface water (environmental, economic, and social) in South Saskatchewan River Basin (SSRB). Phase two will expand the project to the rest of the province (AWC 2007).

It is our understanding that the study to value water is primarily economic in nature and does not incorporate the environmental and social value of water in Alberta. While one can give these values an economic price tag, these values are really beyond a price. The report entitled *Ecosystem Goods and Services Assessment – Southern Alberta, Phase Two Report: Conceptual Linkages and Initial Assessment* (Scott-Brown et al 2007) takes cultural and social and environmental value into overall calculations. The report was developed in collaboration with AENV, consultants, and academics could assist in understanding the value of ecosystems overall to the economy and quality of life.

To fully capitalize on such reports and studies, educational initiatives need to bring this new information to the broader public and decision makers. AWC (2007) promotes broad raising awareness and broad stakeholder involvement to behaviour and attitudes around water; this will "be at the core of moving forward on this direction" and will help Albertans "to evolve from a consumption to a conservation ethic" (28).

**Recommendation: Consider the environmental, social, and economic value of water in Alberta.**

**Recommendation: Strongly and broadly demonstrate the value of water and ecosystems to Albertans' quality of life in educational initiatives.**

This education is part of creating a stewardship ethic—an ethic focused less on anthropocentric needs and more on recognizing the value of natural systems in our day-to-day lives and protecting that value.

*c. Exporting water out of our watersheds*

Water diversions within major river basins<sup>12</sup> but between the sub-basins of the major river basins (i.e. intra-basins transfers) have long been standard practice. Yet growing relative scarcity<sup>13</sup> in southern Alberta and the recent moratorium on new water allocations in all but the Red Deer sub-basin in the South Saskatchewan River Basin mean more water seekers are looking north to the Red Deer River sub-basin, for example. Moving water between these watersheds contravenes the concept of watershed management and planning. Due to relative scarcity and the importance of ecological integrity, Albertans need to live within the capacity of the watershed they live in.

**Recommendation: Ban further movements of water between watersheds within river basins, unless extenuating circumstances arise (e.g., water shortage emergencies for basic domestic purposes).**

*d. Transboundary agreements*

While transboundary agreements between Alberta and adjacent jurisdictions are generally well established, new pressures and conditions mean these agreements should be re-evaluated by guiding principles. The Rosenberg report (2007) suggests principles for sharing water should include, in addition to equitable and reasonable use of water:

- a. Development of a prioritized list of uses
- b. Practices that ensure aquifers remain sustainable over the long term
- c. Joint apportionment of surface water and groundwater
- d. Specification of pumping locations and amounts.

Such evaluation should also ensure ecological requirements are being met by transboundary agreements. The report also suggests institutional arrangements should reconcile and ensure compatibility of watershed and aquifer management plans. Agreements should be legally binding and enforceable, while maintaining the ability to be flexible to changing circumstances.

**Recommendation: Ensure inter-jurisdictional agreements recognize new circumstances, such as added population growth, changing types of water use, potential climate change impacts, and the necessity to protect aquatic ecosystems on both sides of the border.**

<sup>12</sup> Alberta's *Water Act* defines 7 major river basins: the Peace/Slave River Basin, the Athabasca River Basin, the North Saskatchewan River Basin, the South Saskatchewan River Basin, the Milk River Basin, the Beaver River Basin, and the Hay River Basin (s.(1)(ff)).

<sup>13</sup> Relative water scarcity is reduced water availability relative to population and demand.

e. *Electronic water user reporting*

Without accurate and timely data on the volume of water that is actually used, improving water use in Alberta's economy is impossible. Alberta Environment (AENV) is considering a web-based system for collecting and communicating province-wide data on water supply and usage, and an electronic water-use reporting system became operational in 2006. The majority of large users have been asked to input their use voluntarily; however, AENV received only about 30% of requested data (AWC 2007).

No system is in place to determine how much groundwater is withdrawn for household use or by traditional agricultural users. Water-use baseline data would drastically improve water allocation decisions, policy making, and measurability of changing behaviour because Albertans would know how much water is actually being used. As suggested by the Alberta Water Council, information systems should provide automated assessments of water availability and demand (AWC 2007), and should have real-time data from water users and for water users.

**Recommendation: Ensure collection and submission of water-use data is timely and mandatory. Voluntary reporting is ineffective and does not provide data for all water uses and water-using sectors in the province.**

**Recommendation: Collect general water-use data, not only from large water users, but household and traditional agricultural users, especially to measure groundwater use.**

f. *Climate change*

Because climate change could have serious ramifications for southern Alberta's naturally semi-arid landscape, *Water for Life* was remiss in not clearly identifying climate change as an issue to be addressed. Climate variability was mentioned, only alluding to climate change. Alberta's government—likely in partnership with the federal government and private data sources—needs ongoing research to monitor, analyse, and project from current conditions. Government needs to act upon possible scenarios beyond the current limits to what further limits might inhibit quality of all life in the province.

**Recommendation: Specifically address the implications of climate change in all water-related policy and suggest appropriate action to mitigate and adapt to its impacts.**

g. *Groundwater*

There is no comprehensive provincial strategy to assure the long-term protection of our groundwater resources.

Traditionally, surface water has been the primary source of water for large municipalities and many large-scale licences, but 90% of those living in rural Alberta use private wells as their source of water (Griffiths 2007, 1). As surface water becomes over-utilised and watersheds close to new licences (i.e., Bow, Oldman, and South Saskatchewan watersheds), groundwater as a source of water is increasingly important. Groundwater will become particularly important as surface water availability becomes less reliable if climate change predictions are correct. Yet relatively little is known about groundwater

– its location around the province, rates of recharge, its connectivity to surface water, rate of use by users, the effect of land uses on groundwater quality, and so on. Communities such as Exshaw are looking to groundwater to meet community growth projections. Many developments, including the Horseshoe Lands Area Structure Plan and the Carraig Ridge Area Structure Plan in the Municipal District of Bighorn, require better knowledge of groundwater to enable good land-use decision making.

*Water for Life* contemplates better understanding around groundwater and its connectivity to surface water. The *Water for Life* strategy declared the understanding of the state of the quality and quantity of groundwater as a long-term priority for completion in the 2010 to 2014 timeframe. The rapid expansion of coalbed methane development and the use of groundwater as a major source of water for the steam required for the *in situ* recovery of bitumen have made it essential to speed up this work. For example, the use of non-saline groundwater for *in situ* recovery of bitumen was nearly 50% higher in 2006 than in 2002 when *Water for Life* was introduced. Thus, despite the decline in non-saline groundwater used for enhanced conventional oil recovery, the total use of non-saline groundwater increased over the four-year period.<sup>14</sup>

Recent government work on groundwater has involved some study of aquifers that could be affected by coalbed methane development as well as risk assessment and contamination pathways studies; but work on understanding of groundwater needs to be greatly improved. It requires a long-term, dedicated budget to enable Alberta Environment to build up a dedicated staff of hydrogeologists who can ensure the sustained, integrated management of Alberta's groundwater (Griffiths 2007, 99).

The *Report of the Rosenberg International Forum on Water Policy (2007)* offers a detailed analysis of the state of groundwater research and management in Alberta. Overall, groundwater management and governance structures are inadequate to cope with new pressures (Rosenberg 2007). Based largely on the Rosenberg report, broad recommendations to improve groundwater management include:

- Address specific threats (coalbed methane, oil sands, and agricultural activities).
- Avoid fragmented regulation (i.e., on a site-by-site basis).
- Overcome the challenges of insufficient financial resources and qualified staff.
- Integrate water policies into land-use policies.
- Ensure stakeholders and licence and permit holders are held accountable for achieving agreed-upon environmental outcomes—and encourage accountability through good management and protection program with pumping quotas, taxes, and extraction fees are examples of economic instruments to protect groundwater resources. Ensure those who affect groundwater are held accountable for the effects of their activities on groundwater.
- Better understand and monitor, on an ongoing basis, groundwater dynamics, threats to groundwater, their cumulative impacts, and groundwater's relationship to surface water and aquatic ecosystems.
- To better manage groundwater, especially into the future, redefine base of groundwater protection to greater than 4000 mg/L to up to 10 000 mg/L and regulate groundwater to that level. At present Alberta Environment does not require a company to obtain a licence to use saline groundwater and there is no restriction on the type of substances that can be

<sup>14</sup> From 11.7 to 13.2 million m<sup>3</sup>. N.B. Alberta Environment indicates that a small adjustment may occur during the confirmation of the 2006 data.

- used for drilling or fracturing oil and gas wells below the base of groundwater protection.<sup>15</sup> Since droughts are likely to become more frequent and severe as a result of climate change, it would be prudent to protect deeper groundwater resources from contamination, so they can be used during long-term drought periods, especially as treating saline water has become more feasible.<sup>16</sup>
- Improve management with such ways as total registration of all wells; quantitative metering; identification and protection of recharge areas; identification of overdrawn areas; and/or regulation of activities in those areas via modification of existing licences; assessment of cumulative impacts on groundwater where assessments are open and transparent.
  - Develop a data centre and comprehensive system to manage and interpret data.
  - To improve groundwater governance, establish groundwater management areas in critical areas for government regulation, where critical is determined based on intensity of development pressures, groundwater quality degradation, persistent groundwater overdraft, and threats to ecosystem integrity.
  - Because the first-in-time first-in-right principle is not adequate to use for groundwater management, consider other management mechanisms such as conjunctive management which might be more appropriate (see state of Idaho).
  - Educate the public to ensure the public understands their role in and impact on groundwater.

**Recommendation: Speed up efforts to acquire comprehensive data on groundwater and implement a long-term plan for the sustained, integrated management of Alberta’s groundwater resources, using the Rosenberg report as a guide.**

*h. The south and north divide*

Relative water scarcity in southern Alberta has historically driven water policy and regulation in Alberta. Both the sparse and variable precipitation of the area and the consequent need to allocate water between competing demands have been and continue to be significant factors shaping Alberta water policy and legislation development. For example, the water allocation licencing system based on the first-in-time first-in-right principle was developed to encourage settlement in southern Alberta in the late 1800s. Northern Alberta has not historically had water issues; but water quality and quantity, due to natural resources extraction and processing, are growing concerns (Griffiths *et al.* 2006), particularly in northern Alberta’s oil sands region. Greater attention to new pressures on water quantity and declining water quality require immediate, precautionary, and potent policy and management to mitigate the challenges facing northern Alberta’s landscape and the water integral to it.

<sup>15</sup> The base of groundwater protection in Alberta refers to a depth of 15 metres below the deepest non-saline aquifer. Water in a non-saline aquifer contains less than 4,000 mg/L total dissolved solids.

<sup>16</sup> See also Griffiths 2007, 98.

## 7. CONCLUSION

The *Water for Life* strategy remains a plan of action. Its promise is a good beginning to improve water management and policy in Alberta. However, its success depends entirely on implementation. To successfully achieve *Water for Life's* outcomes and goals, political and financial commitment is necessary to expand government and public capacity and to ensure Alberta Environment and other government ministries coordinate their decision-making. Specific attention, potentially in the form of specific and non-discretionary legal tools, needs to be paid to land and water integration and source water protection, groundwater, climate change, governance arrangements both in government and in the multi-stakeholder processes, prioritization of aquatic ecosystems, social equity in the province at the drinking-water, land-use and water-use, procedural, and regulation levels. All decisions should be geared to adopting approaches that offer long-term benefits and not just short-term gain to maintain options for Albertans' future.

## SOURCES

Alberta Environment. 2005. Provincial Wetland Restoration/ Compensation Factsheet. [Online] [http://www3.gov.ab.ca/env/water/reports/Prov\\_Wetland\\_Rest\\_Comp\\_factsheet.pdf](http://www3.gov.ab.ca/env/water/reports/Prov_Wetland_Rest_Comp_factsheet.pdf)

Alberta Environment. 2006. Approved South Saskatchewan River Basin Water Management Plan. Government of Alberta: Edmonton.

Alberta Water Council (AWC). 2007. Review of Implementation Progress of *Water for Life*, 2005-2006. Alberta Water Council: Edmonton.

Alberta Environment and Fisheries and Oceans Canada. 2007. Water Management Framework: In-stream Flow Needs and Water Management System for the Lower Athabasca River. [Online] [http://www3.gov.ab.ca/env/water/Management/Athabasca\\_RWMF/pubs/Athabasca\\_RWMF\\_Technical.pdf](http://www3.gov.ab.ca/env/water/Management/Athabasca_RWMF/pubs/Athabasca_RWMF_Technical.pdf)

Alberta Environment (AENV). No year. *Enabling Partnerships: A Framework in Support of Water for Life: Alberta's Strategy for Sustainability*. [www.waterforlife.gov.ab.ca/](http://www.waterforlife.gov.ab.ca/)

Alberta Environment (AENV). No year. Framework for Water Management Planning.

Beveridge, Meghan. 2006. Proposing a Water Ethic: A Comparative Analysis of *Water for Life: Alberta's Strategy for Sustainability*. M.E.S. Thesis. University of Waterloo: Waterloo, Canada. [Online] [http://etheses.uwaterloo.ca/display.cfm?ethesis\\_id=939](http://etheses.uwaterloo.ca/display.cfm?ethesis_id=939)

Bow Riverkeeper. 2005. Water Scarcity and the Bow River: Preserving Water for River Ecosystems. [Online] <http://www.bowriverkeeper.org/bbf/downloads/water-scarcity-fact-sheet-2005-07.pdf>

Brandes, Oliver, Tony Maas, and Ellen Reynolds. 2006. *Thinking beyond Pipes and Pumps: Top 10 Ways Communities Can Save Water and Money*. University of Victoria.

Department of Sustainability and Environment (DSE). 2004. *Securing Our Water Future Together*. White Paper Victoria Government Department of Sustainability and Environment: Melbourne.

Droitsch, Danielle, Linda Duncan, and Arlene Kwasniak. 2007. Water saturates Alberta's public and political agendas. In: Stanley Berger and Dianne Saxe (eds.) *Environmental Law: The Year in Review 2006*. The Cartwright Group Ltd.: Aurora, ON. Pp. 159-176.

Environment Canada (EC). 2001. A Canadian perspective on the precautionary principle/ principle proposed: guiding principles. [Online] [http://www.ec.gc.ca/econom/booklet\\_e.htm](http://www.ec.gc.ca/econom/booklet_e.htm)

Equus Consulting Group Inc. (Equus). 2002. *Water for Life: Pooling Your Ideas: Summary of Consultation Results*. Government of Alberta: Edmonton.

Government of Alberta (GOA). 2003. *Water for Life: Alberta's Strategy for Sustainability*. Alberta Environment: Edmonton.

Government of Alberta (GOA). 2003. *Water Act*. Alberta Queen's Printer: Edmonton.

Government of Alberta (GOA). 2007a. Budget 2007 managing our growth: environment. <http://www.gov.ab.ca/budget2007/index.cfm?page=1651>

Government of Alberta (GOA). 2007b. Budget 2007 Managing Our Growth: Highlights. [Online] [http://www.finance.gov.ab.ca/publications/budget/budget2007/fact\\_card.pdf](http://www.finance.gov.ab.ca/publications/budget/budget2007/fact_card.pdf)

Griffiths, Mary, Amy Taylor, and Dan Woynillowicz. 2006. *Troubled Waters, Troubling Trends: Technology and Policy Options to Reduce Water Use in Oil and Oil Sands Development in Alberta*. The Pembina Institute. <http://www.pembina.org/pub/612>

Griffiths, Mary. 2007. *Protecting Water, Producing Gas: Minimizing the Impact of Coalbed Methane and Other Natural Gas Production on Alberta's Groundwater*. The Pembina Institute. [http://pubs.pembina.org/reports/Water\\_Gas\\_Apr07\\_Final.pdf](http://pubs.pembina.org/reports/Water_Gas_Apr07_Final.pdf)

Harremoës, Paul. 2002. Water ethics—a substitute for over-regulation of a scarce resource. *Water Science and Technology* 45:113–124.

Lane, Cam. July and August, 2007. Personal communication. Alberta Environment.

Mitchell, Bruce. 2002. *Resource and Environmental Management*, Second edition. Pearson Education Limited: Harlow, Essex.

Montague, Peter. 2005. The precautionary principle in a nutshell. [Online] [http://www.precaution.org/lib/pp\\_def.htm](http://www.precaution.org/lib/pp_def.htm) Environmental Research Foundation.

Postel, Sandra and Brian Richter. 2003. *Rivers for Life: Managing Water for People and Nature*. Island Press: Washington.

Rosenberg Forum (Rosenberg International Forum on Water Policy). 2007. *Report of the Rosenberg International Forum on Water Policy to the Ministry of Environment, Province of Alberta*. University of California: Berkeley.

Scott-Brown, Miles, Scott Truswell, Greg Sauer, Doug Olson, and Christina Rehbein. 2007. *Ecosystem Goods and Services Assessment – Southern Alberta, Phase Two Report: Conceptual Linkages and Initial Assessment*. Integrated Environments Ltd. And O2 Planning and Design Inc.

Thurston, Carol. June, July, and August, 2007. Personal communication. Alberta Environment.