MUNICIPAL

Water Primer and Discussion Paper

AUMA

Municipal Water Primer & Discussion Paper

NOTE TO READER:

Blue Underlined Text: External Link Green Text: Internal Link *Green Italic Text:* Glossary Terms

Executive Summary

Purpose

No water, no municipality. Water is a finite resource essential to all dimensions of municipal sustainability.

For the past several years, AUMA and its members have been working on developing and implementing a **Water Conservation, Efficiency and Productivity Plan**. This work will continue, but AUMA recognizes that municipalities are facing a broader range of water related issues, many of which are central to municipal viability.

In acknowledgement of these issues, AUMA has written this *Water Primer and Discussion Paper* to:

- Serve as a catalyst for discussion of these broader water issues among AUMA members and other partners.
- Attempt to provide the background information necessary for informed decision making, but not to provide recommendations.
- Ask members questions.

This *WPDP* is just a first step. Over the next year, AUMA will engage its members in discussions about how municipal water issues should be addressed through our policies, programs and business services.

This executive summary provides an overview of the topics covered and questions throughout the paper. (Each section of the summary is hyperlinked to the corresponding section of the *WPDP* that provides more background.)

Water in Context

The first section of this paper outlines the current water context, framing the issues facing Alberta municipalities. Current water issues are driven by concerns about the availability of water for economic and population growth.

For instance, water demand is expected to increase by 50 per cent in developing countries and 19 per cent in developed countries by 2025. At the same time, less than one percent of global water supplies are readily accessible for human consumption and these supplies are unevenly distributed (UN Water, 2011).

In North America, Canada has a relative abundance of water compared to the United States, but Alberta only has two per cent of Canada's freshwater (Vander Ploeg, 2010). There is also a strain on Alberta's water supplies as 80 per cent of this water flows north, while 80 per cent of the population resides in the southern areas of the province. This distribution of freshwater resources has serious consequences for the health of aquatic ecosystems and the reliability of supply required for municipal sustainability.

Executive Summary

Purpose continued...

Jurisdiction

Another important aspect to understanding the Alberta water context is the jurisdictional breakdown of responsibility for water in Canada. Responsibilities are outlined in the following table:

Government of Canada

- Management of boundary waters
- National policies and standards
- Fish and fish habitat
- Navigation

Government of Alberta

- Water ownership
- Regulator control over flow, access, pollution and treatment

Municipalities

- Day to day operation and management of water and wastewater systems
- Bodies of water within the municipality

The section on jurisdiction provides more detail on this breakdown and provides a brief overview of federal and provincial legislation governing water.

DISCUSSION QUESTIONS:

Is this an appropriate breakdown of authority and responsibility? If not, what are the alternatives?

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Figure 1a:

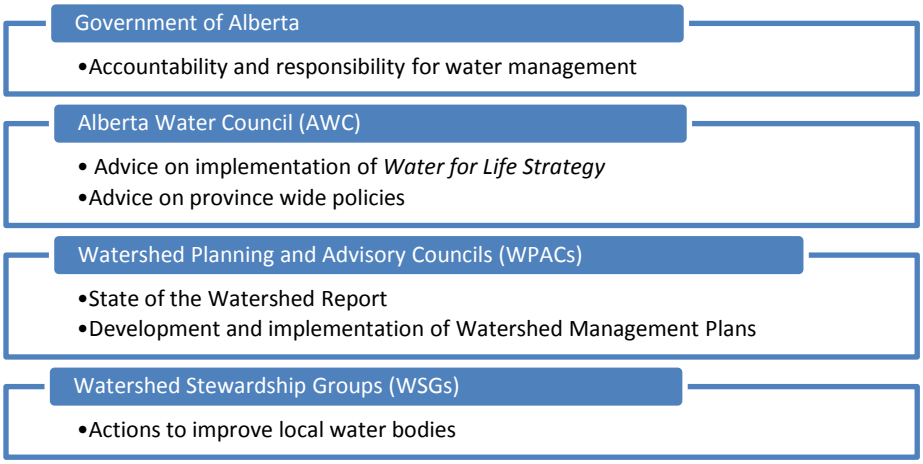
Water for Life Strategy

To understand water management in Alberta, one must be familiar with the *Water for Life Strategy,* which introduced a collaborative, **place-based** approach to water management.

Executive Summary

Purpose continued...

The *Strategy* introduced a water management approach based on the seven major ***watersheds or basins*** outlined in the **Water Act**. It has also moved the province toward a ***shared governance*** model with multi-stakeholder partnerships taking responsibility for various aspects of water management. The governance model is outlined below:



AUMA is a member of the Alberta Water Council (AWC). Individual municipalities can participate in Watershed Planning and Advisory Councils (WPACs) and partner with Water Stewardship Groups on initiatives at the regional and local level. The AWC is currently working to improve communication and coordination among the *Water for Life* partnerships.

At this time, there is no consistent process to facilitate municipal engagement with WPACs or to fund the work that the councils do. This lack of consistency raises the following questions:

- *What are the main barriers to municipal participation in WPACs and watershed decision-making?*
- *Should a more formal system for appointing municipal representatives to WPACs be established?*
- *What role should AUMA play, if any?*
- *Should watershed planning be funded exclusively by the Government of Alberta?*
- *What, if anything, should municipalities be asked to contribute?*

Water for Life and the Land-use Framework

The Land-use Framework is meant to coordinate a collaborative, integrated approach to managing the cumulative effects of development on the province's air, land and water at the regional watershed level. The implementation of the Framework is in its infancy, and it is unclear how existing water management initiatives will be integrated with the Framework.

Municipalities have also expressed uncertainty as to their exact role in the multi-sectoral approach to planning. As implementation of the Framework continues, questions such as the following need to be considered:

Executive Summary

Purpose continued...

- *Are municipalities informed and ready to participate in the cumulative effects management approach to water and other resources ushered in by the Land-use Framework?*
- *If not, how can their capacity to participate be improved?*
- *What should the AUMA do to support its members' engagement in the Land-use Framework cumulative effects management?*

Issues

The second portion of the paper examines the issues municipalities are facing, through the three goals of *Water for Life*. These goals are:

- **Safe, secure supply of drinking water**: Albertans are assured their drinking water is safe
- **Healthy aquatic ecosystems**: Albertans are assured that aquatic ecosystems are maintained and protected
- **Reliable, quality water supplies for a sustainable economy**: Albertans will be assured that water is managed effectively to support sustainable economic development

Goal: Safe, Secure Drinking Water Supply

Many municipalities are struggling to maintain drinking water systems due to:

- Rising standards
- Aging infrastructure
- Limited revenues
- A shortage of skilled water operators.

The way standards are set and implemented is often cited as a source of frustration and confusion for municipalities. This is due to municipalities being responsible for implementing standards that are set and enforced by the Government of Alberta, but derived from national guidelines. These standards and guidelines are meant to take into account operational considerations, while protecting public health.

This *WPDP* first reviews how the **Guidelines for Canadian Drinking Water Quality** are determined and then asks:

- *Are you aware of, or have you participated in, a consultation process for updating the Guidelines that facilitated the input of municipalities?*
- *Should more be done to alert and engage municipalities when consultations are being held on changes to the Guidelines?*

Executive Summary

Purpose continued...

This paper then reviews how these guidelines are translated into the **Alberta Drinking Water Regulations and Standards** and asks*:*

- *Are there any concerns with current drinking water standards or how they are being enforced?*
- *What works well in the current approach to drinking water regulations? What needs to be improved?*

Drinking Water Safety Plans

The Government of Alberta is examining whether the adoption of Drinking Water Safety Plans can resolve some of the issues around the implementation of standards and water safety assurance.

Drinking Water Safety Plans adopt a risk management approach and focus on increasing the knowledge of regulators and operators of the unique circumstances of individual water systems. Key aspects of this approach include:

- System assessment
- Operational monitoring
- Management and communication
- External surveillance for quality verification

Before moving forward, the following questions need to be addressed:

- *Are there potential barriers to implementing Water Safety Plans?*
- *What would be required to overcome these barriers?*

Water Operators

No matter what the standards and protocols in place are, the provision of a safe, secure drinking water supply depends on the people who operate water systems. Concern is growing because smaller municipalities in particular are struggling to attract and retain qualified water operators.

The Alberta Water and Wastewater Operators Association (AWWOA) is leading a number of initiatives to encourage more people to choose water operations a career. Municipalities are also collaborating through operational consortiums to provide backup and support to water operators.

- *Are you using resources supplied by the AWWOA to help attract operators?*
- *If so, are they working well?*
- *What could be improved or added to existing programs to better deal with the labour shortage?*
- *If your municipality is part of an operational consortium, is it working well?*
- *What are the pros and cons?*

Executive Summary

Purpose continued...

Distribution Systems

In Canada, an average of 20 per cent of water leaving municipal drinking water treatment facilities cannot be accounted for. The majority of this loss is attributed to leaks from aging distribution systems.

As a part of AUMA's **Water Conservation, Efficiency and Productivity Plan**, AUMA members are conducting water audits that measure the health of distribution systems. Once these water audits are complete, leaks in the system will need to be found and fixed. This can be challenging because some municipalities are having difficulty accessing the equipment and expertise required to repair leaks.

- *What challenges is your municipality facing in terms of maintaining its distribution system?*
- *What are some potential solutions?*
- *Is there a role for AUMA and/or AMSC to assist?*
- *If so, what should that role be?*

Funding

Issues such as leaking distribution systems are tied to the fact that revenues have not kept pace with the costs of maintaining water systems. Municipalities face a wide variety of funding pressures, including:

- The cost of maintaining large systems built to meet sprawling land uses
- Maintaining systems in the face of population decline or expanding systems in the face of growth
- Meeting increased standards and expectations

The common denominator for most municipalities is that residents and businesses do not pay for the full cost of the water services they use, nor is money put in reserves for future upgrades. To fill this financial gap, municipalities turn to overtaxed general revenues and oversubscribed grants. The resulting shortfall leads to deferred maintenance and upgrades, which in turn contribute to the municipality's overall infrastructure deficit and concerns about the ongoing ability of the system to provide safe drinking water.

Many municipalities have recognized this situation and have begun working toward full cost accounting and recovery. Accounting for all the operational and capital costs involved requires detailed knowledge of water systems and cooperation among various municipal staff.

Once the process of accounting is complete, the challenge becomes establishing a price that covers current costs, builds reserves for future expenditures and is acceptable to rate payers. Alberta Environment and Alberta Transportation have recently agreed to work with AUMA to support greater adoption of full cost accounting and recovery.

Executive Summary

Purpose continued...

Answers to the following questions will help guide this work:

- *What are the biggest obstacles to implementing full cost accounting and recovery in your municipality?*
- *Should certain levels of grant funding remain available to deal with increasing standards?*
- *Should grant funding remain available for very small systems, where users may not be able to cover system costs?*
- *How can land use planning prevent the type of sprawl that requires servicing by costly distribution systems?*
- *What are the most important issues AUMA, Alberta Environment and Alberta Transportation should address in the development of a strategy to support full cost accounting and recovery?*

Regional Systems

Given the challenges facing municipal water systems, an increasing number of municipalities are turning to regional systems to maximize economies and increase access to skilled operators. However, regional systems come with their own challenges including:

- Concerns over governance structures
- Funding
- Long term pricing
- Land use implications.

When it comes to regionalization, what should be done to:

- *Mitigate the concerns of municipalities about regionalization of water services?*
- *Manage the risks associated with regional integration?*
- *Develop tools to achieve effective regional integration?*
- *Reduce the vulnerability of small treatment facilities?*

Related questions include:

- *Is hiring external service providers (including private companies) a good option for individual systems?*
- *Are municipalities getting the right support from Alberta Environment?*
    - *Municipal Affairs?*
    - *Transportation?*
    - *If not, what should be changed?*
    - *How can the departments work more effectively together?*
- *What role should AUMA play?*

Executive Summary

Purpose continued...

Goal: Healthy Aquatic Ecosystems

Aquatic ecosystems provide many essential services to municipalities. They are:

- The source of a safe, secure supply of drinking water
- A buffer against the impacts of extreme weather events
- A place of recreation
- A contributor to the aesthetic appeal of a community

Yet, of all the *Water for Life* goals this is the one for which there has been the least progress.

Efforts are underway to rectify the situation, including:

- Initiatives dealing with land use planning
- ***Non-point source pollution***
- ***Wetland maintenance***
- ***Riparian area management***

Some municipalities have taken actions that can serve as models for others, such as passing sewer use bylaws or partnering with stewardship groups to protect ecosystems.

- *Should AUMA and its members give greater priority to protecting aquatic ecosystems?*
    - *If so, how can AUMA best support its members in protecting aquatic ecosystems?*
- *Is your municipality undertaking programs that could serve as a model for others?*
    - *Are you working with WPACs or WSGs on these initiatives?*
- *How should the Land-use Framework protect aquatic ecosystems?*

Wastewater Regulations

Wastewater treatment is one of the biggest contributions municipalities make to the protection of aquatic ecosystems. The treatment standards municipalities must meet have been the exclusive domain of the provincial government until recently, when the federal government introduced draft *Waste Water System Effluent Regulations* in an attempt to harmonize standards across the country. AUMA supported and facilitated member input in the development of the *Canada-wide Strategy for Management of Municipal Wastewater Effluent* on which the regulations are based.

These regulations will have less impact in Alberta than in the rest of the country as standards in the province are already high, but there are some concerns over the potential impact of increased reporting requirements and aspects of the regulations that may deviate slightly from the original *Strategy*. AUMA is working with

Executive Summary

Purpose continued...

Alberta Environment to advocate for a one-window approach to reporting and with FCM in calling for a federal-provincial funding strategy.

- *Do you support AUMA's approach to working with Alberta Environment and FCM to monitor the potential impact of Federal Wastewater System Effluent Regulations and to collectively advocate for funding within in the broader call for a long-term national plan to eliminate the infrastructure deficit?*

Goal: Reliable Quality Water Supplies for a Sustainable Economy

With growing demands and constraints on supply the allocation of water has become an increasingly contentious issue, particularly in regions of southern Alberta where the market based allocation transfer system is one of the only ways to access additional supply. The Government of Alberta is engaged in a protracted review of the allocation system.

AUMA contributed to this review through its participation in an Alberta Water Council project team that put forward a number of recommendations to improve the current system, including the need to set aside water for environmental purposes and provide incentives for conservation.

- *Do you support the approach AUMA has taken to water allocation system review?*
  - *What else, if anything, should the Association be doing?*
- *Are you comfortable with a market-based system for water allocation? Would you support such a system if:*
  - *There was a higher degree of oversight by the government or a water authority coupled with a higher degree of transparency?*
  - *If licencees could only transfer water that they have conserved? That is, licensees would not be able to transfer water that they had been allocated but never used?*
  - *If protected water was set aside for environmental and non-consumptive purposes as determined by the process established for creating a water management plan?*
- *Do current provisions in the Water Act go far enough in protecting water for human and environmental use?*
  - *If not, how should the Act be changed?*
- *Are there other non-market policy options that should be explored?*
  - *If so, what are they?*

Executive Summary

Purpose continued...

Climate Change Impacts – Expect the Unexpected

Recent floods in southern Alberta and fires in northern regions are reminders of the impact that climate has on municipalities and their citizens. The reliability of water supplies depends a great deal on climate. Alberta has historic experience with costly floods and drought, and climate change makes their occurrence less predictable and their impact more extreme.

Local Governments for Sustainability (ICLEI) Canada has recently released a climate change adaptation guide to help municipalities be proactive rather than reactive when it comes to the changes that are occurring.

- *Does your municipality have a water shortage risk management plan in place to address long-term drought?*
- *Does your municipality have a flood management plan?*
- *Are municipalities provided adequate support to prevent and respond to extreme weather events?*
- *Are additional resources or new approaches needed?*

DISCUSSION QUESTIONS:
The sheer number of water issues is perhaps the biggest challenge for AUMA and its members. A strategic discussion about how to most effectively address the myriad of issues is required. This paper is meant to serve as the foundation for that discussion. As you read it consider:

Does the WPDP accurately capture the diverse reality facing municipal water systems throughout the province?

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Are there key issues and potential solutions missing from the WPDP that need to be explored?

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How can AUMA and its members realistically and effectively address the myriad of issues?

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How should issues be prioritized?

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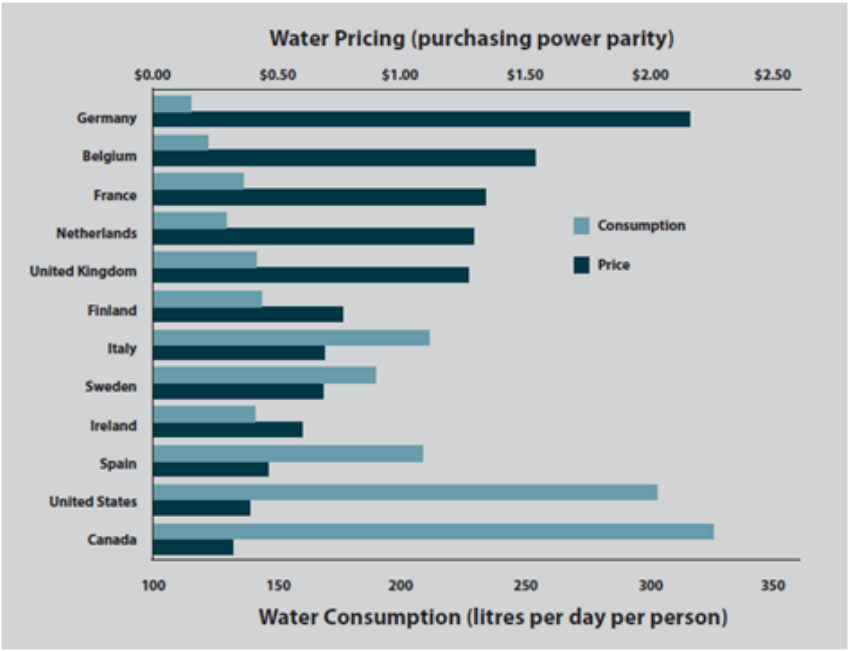
Introduction

"In Alberta, our quality of life, and life itself, depends on having a healthy and sustainable water supply for the environment, for our communities and for our economic well-being." *Alberta's Water for Life Strategy*

No water, no municipality. Water is the lifeblood of municipalities. It is essential to all five elements of municipal sustainability:

- **Economic** viability depends on the availability of water for local residential, commercial and industrial development as well as for large-scale energy projects that fuel the province's economy.
- **Environmental** integrity is dependent on healthy aquatic ecosystems. Aquatic environments provide a source of potable water, a buffer against extreme weather events, and a home for diverse species.
- **Social** wellbeing relies on having a safe, secure supply of water for drinking and other basic needs.
- **Cultural** vibrancy is enhanced by the beauty of healthy aquatic ecosystems and the recreational opportunities they provide.
- **Governance** is defined and legitimized in part by the ability of municipalities to provide water services to residents safely and efficiently.

Figure 1: International Comparison of Municipal Water Prices and Consumption



(Brandes, Steven, & Stinchcombe, 2009)

Water in Alberta: Challenges

Despite its importance, many take the provision of water and water related services for granted. Most of the 90 per cent of Albertans who receive water from municipal systems turn on the tap and expect to receive a seemingly unlimited supply of water so safe that even those with compromised immune systems can consume it without concern. This highly treated water is used for everything from basic household needs to industrial systems. Many municipal water customers do not directly pay the full cost of the water they use. Costs are hidden in:

- Overall tax rates
- Flat service fees
- Transfers from other levels of government.

The seeming abundance of cheap water contributes to Canada's standing as one of the highest per capita water users in the world. (Oliver M. Brandes, 2008)

Introduction

Yet water is finite resource. It may be plentiful in one area and scarce in another at different times and it may take different forms as it cycles through the environment, but overall its quantity remains constant. No more is being produced for a population and economy that is growing both in Alberta and around the world. In addition, thanks to the impacts of human development, once pristine water sources now require increasingly costly treatment to be fit for human consumption.

The dichotomy between the lavish use of water compared to the constraints on availability and the costs involved in water services, has created a number of interconnected challenges for Alberta's municipalities:

- The cost of providing water services is rising as the rigor of standards and regulations increase and looming labour shortages forces municipalities to compete for qualified water operators.
- The degradation of aquatic ecosystems not only increases the amount of treatment required for water to be safely consumed, it also reduces the ability of these ecosystems to provide services such as natural filtration and storage and reduces their ability to serve as a buffer against flooding.
- A number of municipalities are currently exceeding or may exceed their allocation of water in the near future. The situation is particularly critical for municipalities in portions of southern Alberta where there is a moratorium on new water licences and a controversial and cumbersome system to transfer allocations from users who have too much to those who have too little.

Water in Alberta: Potential Solutions

Despite these challenges, Alberta is fortunate compared to other regions of the world where chronic water shortages and rudimentary water systems stifle human and economic development. What's more, Alberta is in a strong position to address the challenges it does face. Alberta's *Water for Life Strategy* and the partnerships created to implement it, provide a solid foundation from which to build solutions. Municipalities have an opportunity through the AUMA to collectively discuss issues and potential solutions and to engage the federal and provincial governments in a strategic and coordinated discussion on the best way to move forward.

There are a number of initiatives already underway in Alberta to try to solve the problems municipal water systems are facing:

- Land-use Planning seeks to reduce the cumulative impact of human and economic development on finite land and water resources.
- New drinking water safety approaches, regional systems, full cost accounting and water operator attraction programs are at various stages of being explored and implemented with the goal of improving the viability of municipal systems and ensuring water safety.
- Partnerships are in place and policies are being developed to protect invaluable water ecosystems.
- Debate is occurring over the future direction of Alberta's allocation management system.

These initiatives are interconnected with the challenges they are trying to address. The depth and complexity of these issues can seem overwhelming especially for municipalities facing a myriad of other urgent priorities.

Introduction

The vast divergence of opinions on topics such as land-use, regionalization, and allocation add to difficulty municipalities have in working through these issues.

Water Primer and Discussion Paper - Goals

The intention of this paper is as follows:

- To serve as a catalyst for discussion among AUMA members and other partners on water issues.
- To provide background in response to members who have expressed the need for more information on the various strategies, regulations and processes with which municipalities must contend.
- To work toward a common understanding of the issues, which will serve as a strong foundation for both developing and implementing solutions.

This paper does not provide recommendations. It is just a first step in a longer process toward developing a water policy to guide AUMA's water related programs and advocacy efforts.

Its length reflects the great number and complexity of the water issues municipalities face. At the same time, AUMA recognizes that this paper likely overlooks many issues and perspectives. The sheer number of water issues is a challenge in itself. Although all issues are interconnected, a degree of prioritization will need to occur for them to be practically and effectively addressed.

Over the next year, AUMA will do a great deal of engagement with members to discuss the questions raised throughout this paper. In addition to specific issue related questions posed throughout the paper, members should also consider broader questions:

- *Does the WPDP accurately capture the diverse reality facing municipal water systems throughout the province?*
- *Are there key issues and potential solutions missing from the WPDP that need to be explored?*
- *How can AUMA and its members realistically and effectively address the myriad of issues?*
- *How should issues be prioritized?*

Water Primer and Discussion Paper - Structure

This paper starts with a high level overview of the global, North American, Canadian and Albertan water context. It goes on to provide background on governance and the main legislation and strategies that guide water management. Issues and a discussion on potential solutions are divided according to the goals of Alberta's *Water for Life Strategy*.

Water in Context

"We live on a planet covered by water, but more than 97 percent is salty and nearly 2 percent is locked up in snow and ice. That leaves less than one percent to grow our crops, cool our power plants, and supply drinking and bathing water for households" - *National Geographic, April 2010*

Global Context

What happens in one part of the world has a ripple effect around the globe.

Understanding the global water context is important because it illustrates the disparities in global water availability and access. It helps Albertans understand how privileged we are to have access to a safe and secure supply of drinking water.

As population growth continues and climate variability increases, the global water system will be put under increasing strain. This could have negative impacts for the livelihoods of individuals around the world, especially in areas that are water poor. Since only a small fraction of global water is potable and available resources are being put under stress, it is essential that we protect and conserve our freshwater resources.

The sidebar provides data from UNWater, which was formed in 2003 to foster greater co-operation and information sharing among existing UN agencies and outside partners **(http://www.unwater.org).**

Drinking Water as a Human Right

In July 2010, the United Nations adopted *access to safe and clean drinking water and sanitation* as a human right through a non-binding resolution. Drinking water was adopted as a right because it is "essential to the full enjoyment of life and all other human rights". Ideally, by making drinking water a human right, more resources will be dedicated to helping developing countries provide clean, accessible and affordable drinking water (UN News Centre, 2010). It is non-binding on member states because there is no codified international law to support the right to water. For more information, visit the **UN News Centre .**

Figure 2: Total volume of water on Earth (1.4 billion cubic km (km3))

Figure 3: Volume of Freshwater (35 million km3)

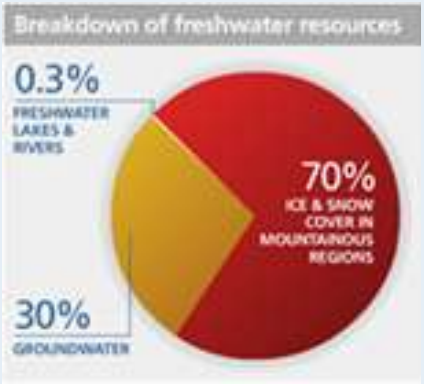


Figure 4: Access to safe freshwater

PREDICTION:

By 2025, water withdrawals are predicted to increase by 50 per cent in developing countries and 19 per cent in developed countries.

By 2025, two-thirds of the world population could be under water stress

Water in Context

Global Context continued...

Further Reading
Alberta Water Portal has collected information on the global water outlook from a variety of reliable sources.
Click here for the information.

DISCUSSION QUESTIONS:
What implications does the global water shortage, have for water conservation in Alberta?

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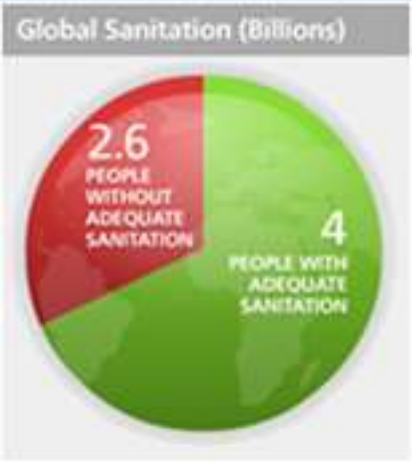
Figure 5: Access to Sanitation



North American Context

The availability of freshwater is unevenly distributed throughout North America. As illustrated by the diagram on the right, the majority of freshwater is located in Canada, whereas many areas in the central United States are under water stress.

Water stress can be a result of little rainfall, an arid climate and/or poor water management practices. Understanding where water stress is occurring is important because the United States is depleting their water reserves faster than they can be replenished.

As illustrated by the diagram to the right in Figure 7, overall, Canada is using its water reserves at a sustainable rate (this is a country average and is not broken down by region). Over the next few decades as water stress in the United States increases, some argue that there could be increased pressure on Canada to sell/export its freshwater resources under the North American Free Trade Agreement (NAFTA). The issues surrounding NAFTA are explored in **Appendix D**.

Figure 6: Freshwater Availability

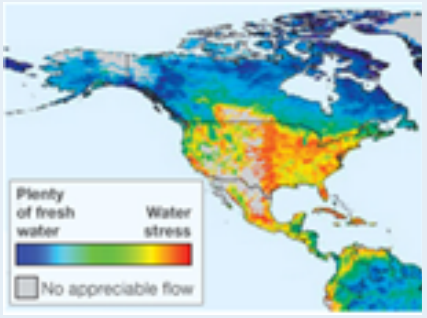


Figure 7: Water Depletion

Figure 7 Source: (WorldMapper, 2003) This map illustrates water rich and water poor areas of the Americas. The size of the country is proportionate to water availability.

Water in Context

North American Context continued...

United States as a Model for Water Conservation

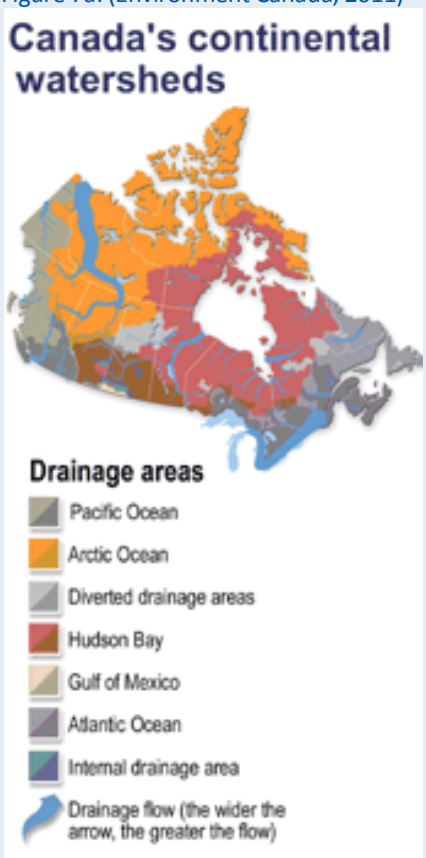
Water shortages in the United States create fears that our southern neighbours will look to Canada as a source of supply. At the same time, efforts are underway in the U.S. to reduce water demand to a more sustainable level that can serve as model. Due to the water shortage facing many municipalities, substantial resources are being put toward municipal water conservation and efficiency programs. Alberta municipalities have an opportunity to learn from what is happening in the U. S. to avoid reaching a crisis point.

For example, the **American Water Works Association** has developed water audit software that allows municipalities to determine how well their water distribution systems are working and how many leaks may be in the system.

AUMA has incorporated water audits into its **Conservation, Efficiency and Productivity Initiative**.

See **Appendix B Glossary of Organizations** for information on U.S. based organizations and the resources they provide.

Figure 7a: (Environment Canada, 2011)



Canadian Context

- Canada has 0.5 per cent of the world's population, but has approximately seven per cent of the world's renewable water supply and 20 per cent of the world's freshwater (Environment Canada).
- The Great Lakes shared with the United States, hold about 18 per cent of all of the world's fresh surface water (Vander Ploeg, 2010).
- The majority of Canada's population lives in the south (200km away from the Canada-U.S. border) but much of the water flows north.
- 26 per cent of Canadians rely on groundwater for domestic use, the rest of Canadians rely on surface water (e.g. lakes, streams).

For more information visit **Environment Canada's Water Site**.

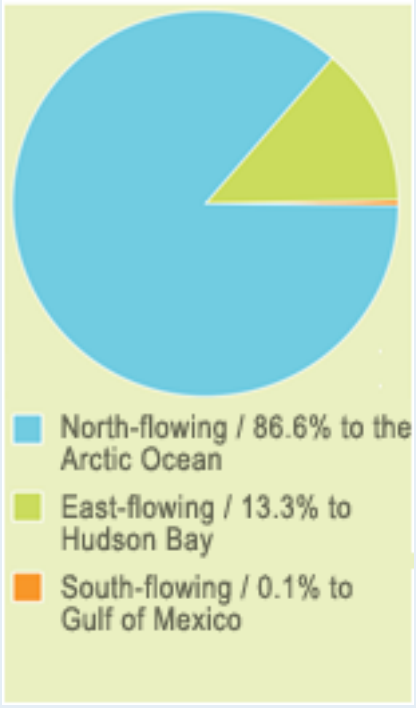
Water in Context

Provincial Context

- Alberta makes up over 10 per cent of Canada's population, seven per cent of its total area, but only has 2.2 per cent of its freshwater. In contrast, Quebec has 19.9 per cent and the Northwest Territories 18.3 per cent (Vander Ploeg, 2010).
- More than 80 per cent of Alberta's water supply is found in the northern part of the province, while 80 per cent of the demand is in the south.
  One reason for the majority of water being found in the north is that 87 per cent of surface water in Alberta flows north (Alberta Environment, 2010).
  23 of the province's 25 largest water reservoirs are located in the south (Vander Ploeg, 2010).
  97 per cent of all water allocation issued by the Government of Alberta is for surface water and only three per cent for groundwater (Vander Ploeg, 2010).
- This natural distribution of water in conjunction with increased population and demand has resulted in areas of southern Alberta, such as those surrounding Lethbridge, Drumheller and Medicine Hat, being water-short over the last number of years. See Figure 9.
- However, moisture trends can change drastically over time, as has been seen in precipitation patterns in 2010, which led to flooding in southern Alberta and drought conditions in the north. See Figure 10.

More information on Alberta water check out:
Alberta Environment's Facts About Water In Alberta Booklet.
Alberta Water Portal.

Figure 8: Distribution of Water in Alberta



Source: (Alberta Environment, 2010)

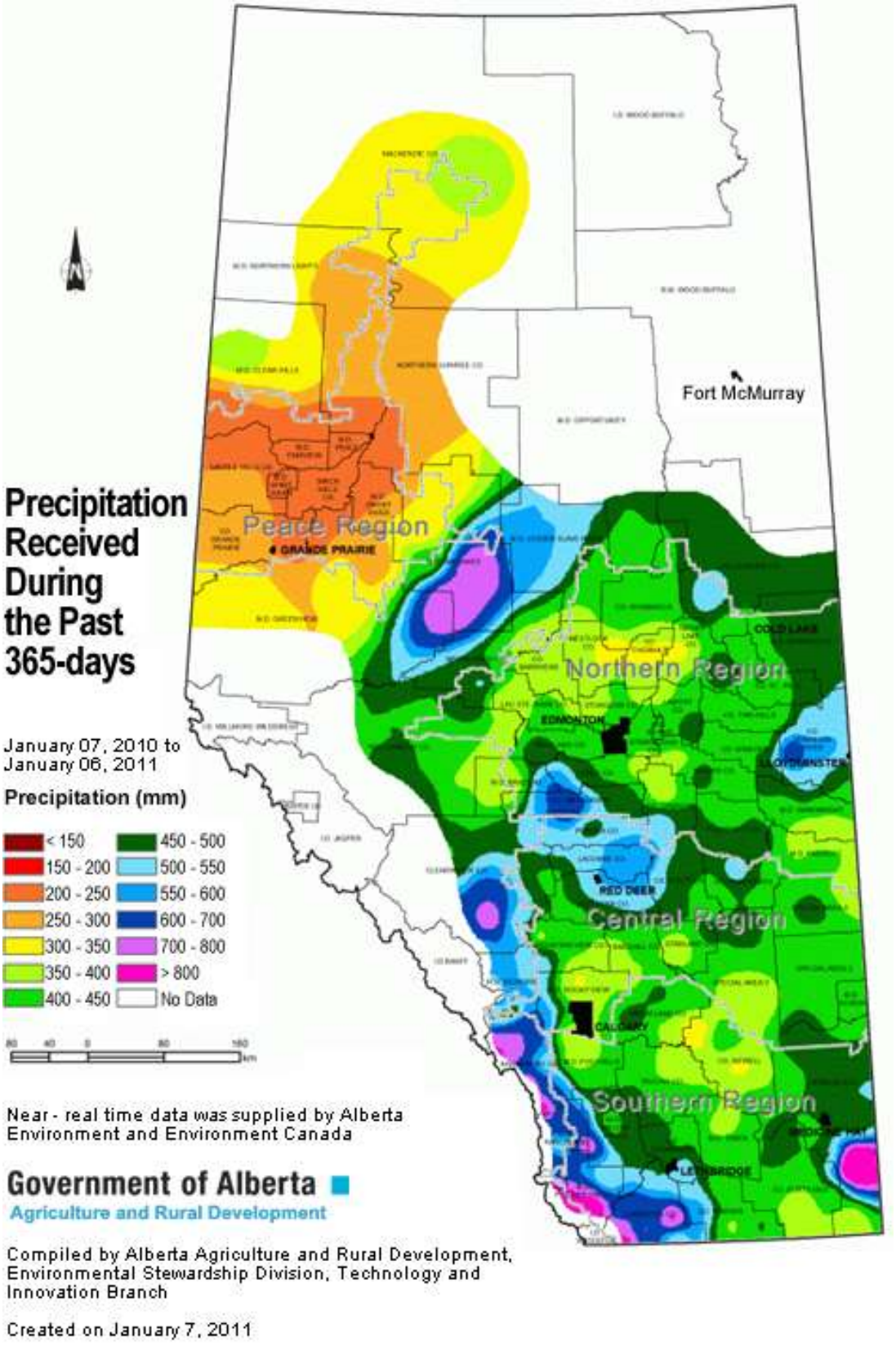
Figure 9: Water Short Regions in Alberta

Source: (Alberta Environment, 2010)

Water in Context

North American Context continued...

Figure 10: 2010 Precipitation



Source: (Alberta Agriculture and Rural Development, Agro Climactic Information Service)

Water Governance

Jurisdiction

Determining the order of government that has jurisdiction over water issues in Canada is complex. Federal, provincial and municipal governments each have a role to play in the management and protection of water and often these roles overlap.

In 1930, the Government of Canada adopted the *Natural Resources Transfer Agreement*, which transferred ownership and ability to manage through legislation most aspects of natural resources, including water, to the provinces. In practice, municipalities own and operate local water and wastewater systems, and the federal government also has a number of water related responsibilities.

The overlap in jurisdiction is illustrated in the following table showing the division of responsibilities between federal, provincial and municipal governments. Overlap can create problems for municipalities who may need to consult and report to multiple government agencies to ensure they meet both federal and provincial requirements.

Jurisdiction	Water Related Responsibilities
Federal Government	Federal responsibilities lie in areas that have the potential for significant national economic impact and boundary/ transboundary waters. • Areas under federal reasonability are: ○ Fisheries ○ Navigation ○ Water on federal lands (e.g. in National Parks); ○ Water located in the territories ○ Water located on the reserves of Canada's aboriginal peoples ○ International relations (management related to boundary waters with the US) ○ National policies and standards relating to environmental and health related issues
Provincial Government	Provincial responsibilities lie primarily in the management of water resources (surface and groundwater). • Areas under provincial reasonability are: ○ Water flow regulation ○ Authorization of water use development ○ Pollution control ○ Thermal and hydroelectric power development ○ The management of natural resources ○ The management and sale of provincial public lands, including timber and wood ○ Property and civil rights in the province and local or private matters ○ Penalties for violating provincial law

Shared federal-provincial responsibilities	Interprovincial water issues are a shared federal-provincial responsibility.
	• Areas that could be subject to federal-provincial responsibility are:
	  ○ Agriculture
	  ○ Significant national water issues
	  ○ Health

Municipal Responsibility	Municipalities have responsibility for the day-to-day operation and management of water and wastewater systems in line with provincial regulations
	
	The *Municipal Government Act* also gives municipalities responsibility for bodies of water within the municipality. This responsibility is subject to "any other enactments", such as the *Water Act*, which limits what municipalities are able to do in reality.
	
	Municipalities are responsible for land use planning within their boundaries, which gives them tools to manage the impacts of land based activities on surrounding aquatic ecosystems. See the section on **Healthy Aquatic Ecosystems** for more details.
	
	Municipalities are also enabled to:
	  ○ Pass bylaws relating to "safety, health and welfare of people"
	  ○ Create environmental reserves to protect drainage courses, flood plains, and land abutting water courses in order to prevent pollution

Adapted from (North Saskatchewan Watershed Alliance, 2008)

The Environmental Law Centre provides a helpful description of the division of authority between orders of government for the *North Saskatchewan Watershed Alliance Municipal Guide*:

Municipal powers are limited to those given to them by the province and the province's powers are limited by federal law. Therefore, generally speaking, when there is a conflict between federal and provincial law, federal law will prevail. However, when the law does not clearly define jurisdiction, both levels of government may be empowered to legislate some aspect of the matter. (North Saskatchewan Watershed Alliance, 2008)

Legislation

Compounding the jurisdictional confusion, there are also a number of different pieces of legislation regulating water in Canada.

What follows is a description of federal and provincial legislation that relate to current and emerging water issues. More detail is provided on provincial legislation as it has more impact on municipalities and needs to be generally understood for any discussion on issues such as water allocation and the viability of municipal water systems.

A comprehensive list of both federal and provincial legislation is provided in **Appendix C Water Related Legislation**.

Water Governance

Jurisdiction continued...

Federal Legislation

Legislation administered by the federal government to regulate water-related activities includes:

Legislation	Responsibility & Administration	Details
Canada Water Act	Environment Canada	The Act contains provisions for formal consultation and agreements with the provinces.
International River Improvements Act	Environment Canada	The Act provides for licensing of activities that may alter the flow of rivers flowing into the United States.
Department of Environment Act	Environment Canada	The Act assigns the national leadership for water management to the Minister of the Environment.
Canadian Environmental Protection Act	Environment Canada	The Act CEPA regulates many of the substances that have negative impacts on water quality such as phosphates found in laundry detergents.
Fisheries Act	Fisheries and Oceans Canada	The Act dates back to Confederation and applies to all fishing zones, territorial seas and inland waters of Canada

For more information on the role of the federal government in water regulation, visit Environment Canada's **Water Governance and Legislation webpage**.

Water Governance

Jurisdiction continued...

Provincial Legislation

As the owner of water resources, the Government of Alberta has a number of pieces of legislation to help manage the resource:

Legislation	Responsibility & Administration	Details
Water Act	Ministry responsible: Alberta Environment Administered by: Alberta Environment	The Act supports and promotes the conservation and management of water, including the wise allocation and use of water to sustain the environment and quality of life in the present and for the future. This legislation regulates all developments and activities that might affect streams, rivers, lakes, wetlands and aquifers. According to Alberta Environment, key features of the *Water Act* are that it: Protects existing water licences in good standing Protects existing traditional agricultural uses of water through a grandfather clause Recognizes the priority of household water use as a statutory right Ensures sustainability of Alberta's water by requiring a provincial water management planning framework Allows for water management plans to be developed to address local and regional issues Recognizes the importance of protecting Alberta's rivers, streams, lakes and wetlands, by requiring that a strategy for the aquatic environment be developed as part of the provincial water management planning framework Provides a streamlined, one-window licensing and approval process for water-related activities and diversions Allows for flexible water management in areas where available water is already allocated, by providing the ability to transfer water licences Prohibits export of Alberta's water to the United States Prohibits any inter-basin transfers of water between Alberta's major river basins Encourages cooperation and proactive measures to resolve water management problems Provides a wide range of enforcement measures Gives Albertans the opportunity to provide advice on, and to understand water management

Water Act continued…		For more details of the legislation, as well as codes of practice relevant to municipalities, visit Alberta Environment's ***Water Act* webpage**.
Environmental Protection and Enhancement Act (EPEA)	Ministry responsible: Alberta Environment Administered by: Alberta Environment, Sustainable Resource Development	The Act outlines an integrated approach to the protection of land, air and water. The Act: Provides a regulatory framework with the aim to identify and address problems before a development is given approval Requires activities to be monitored based on environmental standards Guarantees public participation, including access to information, participation in the Environmental Assessment and Approval Process and the right, when directly affected appeal certain decisions (North Saskatchewan Watershed Alliance, 2008) A number of regulations under *EPEA* set out legislative requirements for municipal water systems: The **Activities Designation Regulation** describes waterworks systems regulated by Alberta Environment The **Potable Water Regulation** details minimum design standards for approved surface and groundwater treatment and distribution systems in Alberta The **Approvals and Registration Procedure** outlines the steps to be followed to acquire and approval or registration for a waterworks facility The **Standards and Guidelines for Municipal Waterworks, Wastewater, and Storm Drainage Systems** provides design, performance and monitoring standards for these waterworks For more information, see **Alberta Environment's Drinking Water Program**.
Public Health Act (PHA)	Ministry responsible: Alberta Health and Wellness Administered by: Alberta Health Services	*The Public Health Act* provides for the protection of public health, including issues related to the protection of potable water supplies. Under the *PHA*, the **Nuisance and General Sanitation Regulation** outlines various requirements associated with domestic water and sewage systems that are outside the scope of *EPEA*. For more information, see **Alberta Environment's Drinking Water Program**.
Safety Codes Act	Ministry responsible:	The *Safety Codes Act* sets out codes and standards in the following areas:

	Alberta Municipal Affairs Administered by: Alberta Municipal Affairs and the Safety Codes Council	• Buildings • Fire • Plumbing • Private sewage systems • Boilers • Etc. The Act includes the **Plumbing Code Regulation**, which applies once water has "moved out of the waterworks distribution system and past the service connection for a residence" (Alberta Environment, 2009). The Plumbing Code Regulation is based on the **National Plumbing Code of Canada**, which specifies minimum requirements for draining systems, venting systems, water service pipes and water distribution systems. The current Code does not include references to water efficiency fixtures or plumbing, though here have been discussions by organizations such as the Canadian Council of Ministers of the Environment, on amending the Code to be consistent with water efficiency provisions elsewhere in North America.
Municipal Government Act	Ministry responsible: Alberta Municipal Affairs Administered by: Alberta Municipal Affairs.	The *MGA* outlines the powers and roles of municipalities in Alberta. Many of these powers and roles relate directly or indirectly to water. The Act sets out that the purpose of a municipality is "to provide services, facilities or other things that, in the opinion of council are necessary or desirable for all or part of a municipality" and to "develop and maintain safe and viable municipalities". Treatment and distribution of water and wastewater has become a core service of most urban municipalities in creating safe and viable communities. The *MGA* also enables municipalities to pass bylaws relating to the "safety, health and welfare of people", services provided on behalf of the municipality and public utilities, among many other issues. Division 3 of the Act provides guidance on public utilities and water commissions that are approved under the Act. Parts of the Act create specific roles and responsibilities for water: Section 60(1) gives municipalities responsibility for bodies of water including rivers, streams, watercourse, lakes and other natural water bodies within the municipality, including the air space above and the ground below subject to any other enactment Section 664(1) allows municipalities to create

Municipal Government Act continued…		environmental reserves to protect drainage courses, flood plains, and land abutting watercourses in order to prevent pollution. More details on how the *MGA* relates to water can be found in Appendix A of the ***Municipal Guide*** developed by the North Saskatchewan Watershed Alliance.
Alberta Land Stewardship Act (ALSA)	Ministry responsible: Sustainable Resource Development Administered by: The Land Use Secretariat	The Purpose of *ALSA* is to provide a means to plan for the future that balances economic, environmental and social objectives and enables sustainable development by taking account of and responding to the cumulative impacts of development. The Act serves as enabling legislation for the Land-use Framework, which divides the province into seven planning regions based on Alberta's major ***watersheds***. Land use affects the quality of water, as the health of water bodies is determined in large part by what happens on the surrounding land. It also impacts the quantity of water, as the amount of activities on the land generally determines the demand on water supplies in the area. Note: At the time of writing, this Act is being amended. For more information on ALSA visit the Government of Alberta's ***Land Use Framework* webpage**.

Water for Life Strategy

In addition to legislation, the *Water for Life Strategy* guides water management in Alberta. *Water for Life* was originally released in 2003 after extensive public consultation. The Government of Albert renewed the Strategy in 2008 based on recommendations from the ***Alberta Water Council***.

Water for Life introduced a new approach to water management based on three interconnected goals:

- **Safe, secure supply of drinking water**: Albertans are assured their drinking water is safe
- **Healthy aquatic ecosystems:** Albertans are assured that aquatic ecosystems are maintained and protected
- **Reliable, quality water supplies for a sustainable economy:** Albertans will be assured that water is managed effectively to support sustainable economic development

Water Governance

Water for Life Strategy continued...

To achieve these goals, the *Strategy* indentified three key directions:

- Knowledge and research
- Partnerships
- Water conservation

Placed-Based Approach

Water for Life also introduced a ***"place-based"*** approach to water management. The Alberta Water Council's report, Recommendations for a Watershed Management Planning Framework for Alberta provides a useful definition of 'place' in relation to water:

This approach asserts that the people in the place are the best ones to identify and find solutions to the issues. For water, the geographically defined place is the ***watershed***. A watershed is an area of land that catches precipitation and drains it to a common point such as a wetland, lake, river, stream or groundwater aquifer. (Albeta Water Council, 2008a)

In terms of how the "people in the place" find solutions to issues, three kinds of partnerships were created under the strategy to allow stakeholders and citizens to participate in water management on a provincial, regional and community basis. They are:

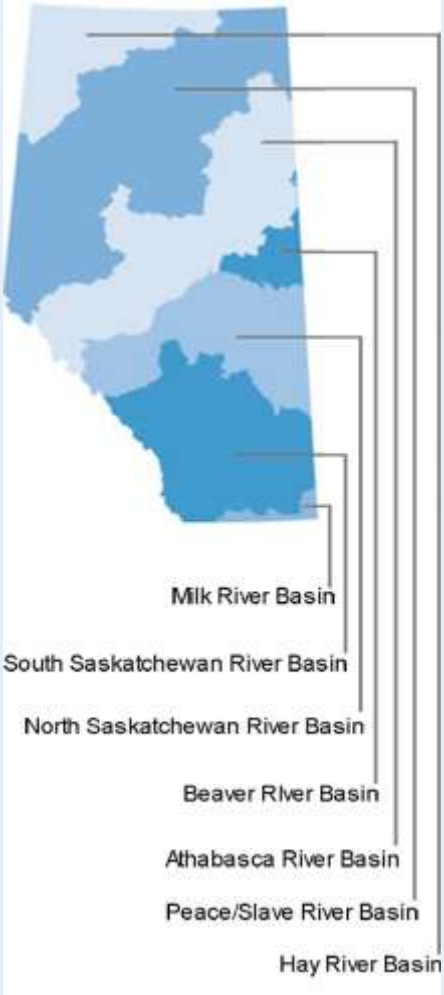
- **Provincial**: The Alberta Water Council
- **Regional/Major Watershed**: Watershed Planning and Advisory Councils
- **Local**: Watershed Stewardship Groups (WSGs)

The creation of these partnerships signalled the beginning of a shared governance approach to water management.

Place-Based Approach: Watersheds

There are seven major watersheds or river basins in Alberta illustrated by the diagram on the right. (Watersheds are also referred to as basins).

Figure 11: Alberta Major Basin/Watersheds



The North Saskatchewan Watershed Alliance has published a ***Municipal Guide: Planning for A Healthy and Sustainable North Saskatchewan River Watershed***. This extensive guide provides a comprehensive description of watersheds and the role that municipalities can play in protecting their health. This section was adapted from that guide. (North Saskatchewan Watershed Alliance, 2008).

Water Governance

Water for Life Strategy continued...

What is a Watershed?

While water bodies immediately come to mind when one imagines a watershed, most of the area that makes up a watershed is in fact land. The size of a watershed is determined by landforms such as mountain ranges, hills and slopes that direct and channel water. Water is constantly moving throughout the watershed and between watersheds in surface water flows (rivers, streams, overland flow), subsurface water flows (just below the surface), groundwater flows and through the ***hydrological cycle***.

Watersheds are the most effective unit for managing water resources because impacts accumulate at the watershed level. At any given time, there are a number of activities going on in the watershed. The impacts of these current activities, along with past activities, result in significant ***cumulative effects***. While the impact of one activity may not be noticeable, the incremental accumulation of many seemingly small impacts can be considerable.

Watersheds are resilient systems that are continually adapting to natural variations such as flooding and droughts. However, there is a limitation to the magnitude of cumulative effects that a healthy watershed can withstand. Understanding and respecting these limitations is part of watershed management and will be discussed in the section on ***Watershed Planning and Advisory Councils*** below.

Shared Governance

As discussed earlier, the *Water for Life Strategy* introduced a shared governance approach to water management. The Alberta Water Council defines shared governance as:

> ...a governance structure where both government and other stakeholders have agreed to share responsibility for the development and delivery of policy, planning, and programs or services, but where the government retains legislative accountability. Shared governance is a collaborative goal setting

Cumulative Effects Explained

Surface runoff from agriculture, urban areas, construction sites and so on carry sediment, nutrients, organic matter and toxic substances to water bodies. As water in a river flows from one municipality to the next, these pollutants accumulate. Considered individually, the impacts of pollutants from one landowner may be small, but by the time river water arrives to downstream municipalities, water quality may be extremely contaminated as a result of cumulative effects.

The same is true for the cumulative effects of the destruction of natural areas. The loss of one wetland, for example, may not noticeably affect the ability of the watershed to collect, store and filter storm water. However, the destruction of a number of wetlands, forests and riparian areas will significantly impact the ability of the watershed to provide these and other watershed services.

Water Governance

Water for Life Strategy continued...

> and problem-solving process built on trust and communication. Shared governance requires clear roles, responsibilities, accountabilities and relationships. (Alberta Water Council, 2008b)

In practical terms, this means that the Government of Alberta still maintains ownership of water in the province and is still ultimately responsible for its protection through legislation, but also relies on partnerships to achieve the outcomes of *Water for Life*.

For example, Alberta Environment is still responsible for granting approvals for water treatment plants under the *Environmental Protection and Enhancement Act* described in the **above section on legislation**. At the same time, the government also works through the Alberta Water Council to encourage major water using sectors such as urban municipalities to do voluntary water conservation plans.

The Alberta Water Council's report, *Strengthening Partnerships: a Shared Governance Framework for Water for Life Collaborative Partnerships* provides recommendations for the operation of the shared governance framework. The report explains that there is no formal hierarchical relationship between the groups in terms of one group reporting to or seeking approval from another. However, there must be communication between groups "to ensure that policy and actions are integrated and support the achievement of shared outcomes" (Alberta Water Council, 2008b). The goals of the *Water for Life* provide these shared outcomes, which each of the groups strive to achieve.

The Alberta Water Council

The Alberta Water Council was established in 2004 by Alberta's Minister of Environment as a Ministerial Committee, and incorporated as a not-for-profit society in 2007. It was created to bring together stakeholders from all orders of government, first nations, non-governmental organizations and industry to discuss provincial scale water management issues and develop recommendations for their solution. The AWC makes decisions by ***consensus***.

Shared governance of water is carried out in Alberta by:

- **Provincial**: The Alberta Water Council
- **Regional (watershed)**: Watershed Planning and Advisory Councils
- **Local**: Watershed Stewardship Groups respectively.

Figure 11a

Water Governance

Water for Life Strategy continued...

AUMA has a seat on the AWC representing "small urbans." Edmonton and Calgary also share a "large urban" designation and the Alberta Association of Municipal Districts and Counties represent "rural municipalities". Together with representatives of the Métis Settlements and First Nations, these municipal representatives form a government caucus, which meets before Council meetings to share information and ideas.

Project teams, sub-groups created by the council to consider a water management issue, examine specific topic areas and report back to the AWC with recommendations and advice. Project teams also operate by consensus and their reports are available to the public following approval by the board. The work done by project teams is intended to support achievement of the goals and key directions set out in *Water for Life.*

AUMA is a participant in these project teams. Projects that AUMA has been involved in or is currently engaged with, include:

- Water Conservation Efficiency and Productivity Sector Planning
- Water Allocation Transfer System Upgrade Project
- Riparian Land Conservation and Management Policy
- Healthy Aquatic Ecosystems

More details on each of these projects will be discussed in the following sections.

For more information on the Alberta Water Council visit: awchome.ca.

Participation in WPACS: The Bow River Example

The municipal representation for the Bow River Basin Council (BBRC), Alberta's longest standing WPAC, is selected by the BBRC Board. The BRBC holds quarterly regional meetings that allow all stakeholders to receive updates on the council's work and provide input.

Figure 12: Watershed Planning and Advisory Councils

Watershed Planning and Advisory Councils

What are Watershed Planning and Advisory Councils?

Watershed Planning and Advisory Councils are multi-stakeholder, non-profit organizations that:

- Engage in watershed assessment, planning and improvements

Water Governance

Water for Life Strategy continued...

- Produce state-of-the watershed reports and watershed management plans
- Seek to have their recommendations endorsed by municipal, provincial and federal authorities
- Promote conservation, best management practices and stewardship activities at the watershed level (Alberta Water Council, 2008b).

Membership and Structure

Membership in WPACs is based on four broad sectors:

- Provincial government
- Industry
- Non-governmental organizations (NGOs)
- Other governments

Each of these broad sectors is broken down into narrower sector or stakeholder groups. For example, the broad sector "other government" includes the federal government, First Nations, Métis settlements, urban municipalities and rural municipalities.

Each of these sectors, including urban municipalities, appoints a sector designate who is expected to:

- Provide input to WPAC initiatives
- Facilitate their sector's review of proposed policies, watershed assessments, plans, and so on
- Ensure there is good communication throughout the sector to ensure that outcomes are acceptable to their same-sector colleagues (Alberta Water Council, 2008b)

It is important for municipalities to be engaged in watershed planning processes as the health of watersheds are determined in large part by surrounding land uses, and in turn, impact the quality of water on which municipalities rely. More on these connections will be discussed in **Water for Life Goal: Healthy Aquatic Ecosystems**.

However, currently there is no formal province-wide method for municipalities in a watershed to select a designate and to disseminate work the WPAC is doing to municipal colleagues or to collect feedback.

Watershed Planning and Advisory Councils in Alberta

Currently, eleven watersheds have organizations formally recognized as WPACs. Alberta has seven major watersheds, but for the planning purposes, many have been divided into sub-basins

- Athabasca Watershed Council
- Battle River Watershed Alliance
- Beaver River Watershed Alliance
- Bow River Basin Council
- Lesser Slave Watershed Council
- Milk River Watershed Council Canada
- North Saskatchewan Watershed Alliance
- Oldman Watershed Council
- Red Deer River Watershed Alliance
- SEAWA South East Alberta Watershed Alliance
- Mighty Peace Watershed Alliance

Information on each of the WPACs, including membership, contacts and links, can be found on the Government of Alberta's Water for Life website.

Water Governance

Water for Life Strategy continued...

Function and Approach

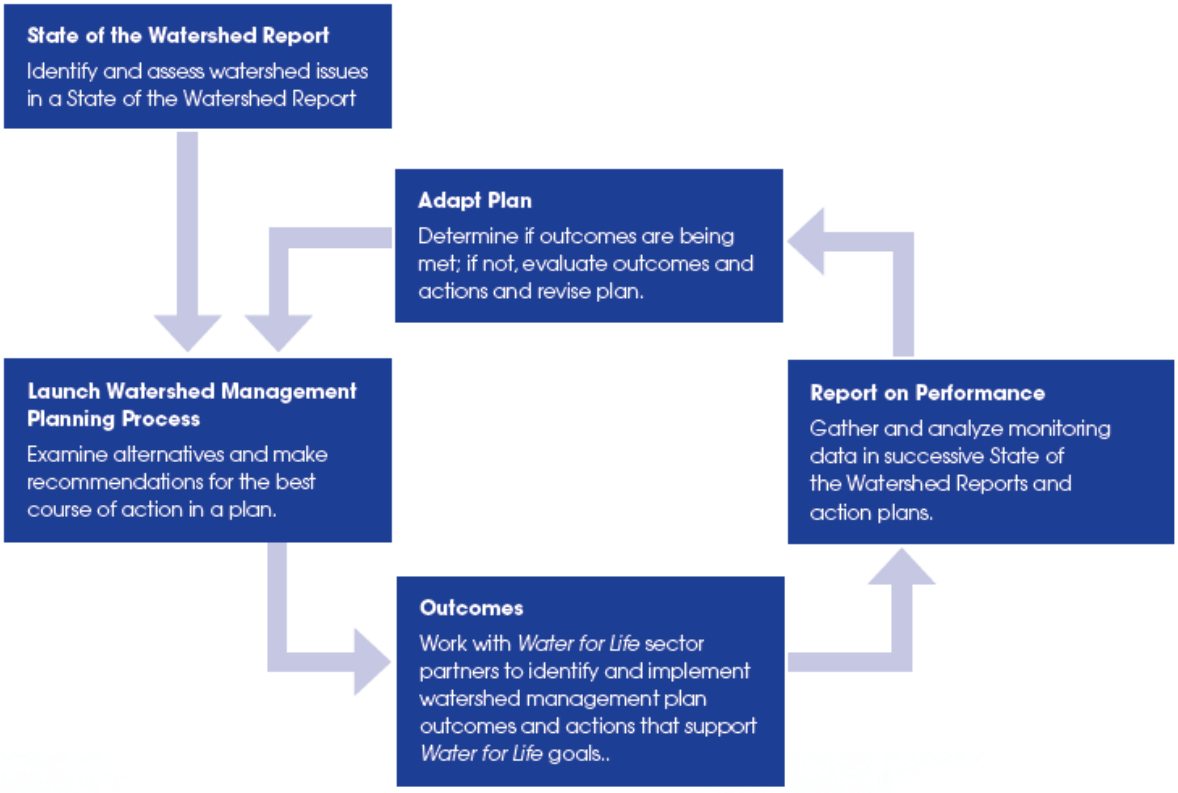
The core function of WPACs is to assess the state of the watershed and develop a watershed management plan that contributes to the goals of *Water for Life*.

Guidance on these activities is provided by the Alberta Water Council's Recommendations *for a* ***Watershed Management Planning Framework for Alberta***. The recommendations set out the key steps for watershed management, which are to:

- Collaborate
- Assess
- Plan
- Do
- Check
- React (Albeta Water Council, 2008a)

As illustrated in the diagram below, these activities form an adaptive management approach, which stresses continual improvement.

Figure 12: Adaptive Watershed Planning



Source (Alberta Water Council, 2008b)

Water Governance

Water for Life Strategy continued...

Challenges

Each of the steps in the adaptive management approach requires significant time, expertise and funding. The AWC has identified in its most recent ***Water for Life Implementation Review*** that there is an increasing need for resources. The review concluded that one of the biggest challenges is making resources available to ensure that necessary actions to complete implementation do not outstrip the capacity of stakeholders to complete them (Alberta Water Council, 2009).

Alberta Environment supplied WPACs with initial funding and varying degrees of operational financial assistance. WPACs also rely on in-kind and cash contributions from their members. In the past year, Alberta Environment has sent signals that they are not going to be able to supply the same level of financial assistance to established WPACS as they have in the past. AUMA has also been hearing increasing complaints from municipalities that demand for both financial and human resources from WPACs is exceeding their willingness and/or ability to contribute.

DISCUSSION QUESTIONS:

What are the main barriers to municipal participation in WPACs and watershed decision-making?

_____
_____
_____

Should a more formal system for appointing municipal representatives to WPACs be established?

_____
_____
_____

What role should AUMA play, if any?

_____
_____
_____

Should watershed planning be funded exclusively by the Government of Alberta?

_____
_____
_____

What, if anything, should municipalities be asked to contribute?

_____
_____
_____

Water Governance

Water for Life Strategy continued...

Watershed Stewardship Groups

Watershed Stewardship Groups (WSGs) are harder to define because they are numerous and are comprised of a diverse group of partners. According to the AWC, there are over 100 WSGs in Alberta. The activities of WSGs are focused on the sub-watershed level:

They improve local water bodies and watersheds by undertaking 'on the ground' actions, such as promoting best management practices, gathering water quality data, organizing shore-line, clean-ups and providing education and awareness opportunities. (Alberta Water Council, 2008b)

The ***Alberta Stewardship Network*** (ASN) was created to connect and support stewardship groups involved in watersheds, air and land. In 2005, the Network collaborated with Alberta Environment and the Land Stewardship Centre of Canada to create a ***Directory of Watershed Stewardship in Alberta***. The *Directory* contains contact information and activity profiles for stewardship groups involved in air, land, water and biodiversity in Alberta's watersheds. In addition to local stewardship groups, it lists NGOs and government departments and agencies.

Funding

Funding for WSGs comes from a variety of sources. ASN provides a Watershed Stewardship Group Grant Program. Often local industries and municipalities will provide funding to groups to address local watershed priorities. However, as is the case with many local organizations, WSGs compete for funding and are chronically faced with demands that can't be met by the resources that are available.

GoA	•Accountability and Responsibility for water management
AWC	•Advice on implementation of *Water for Life* Strategy •Advice on Province-wide Policies
WPACS	•State of the Watershed Report •Development and implementation of Watershed Management Plans
WSGS	•Actions to improve local water bodies

Funding for WPACs: The North Saskatchewan Example

In the past, the North Saskatchewan Watershed Alliance (NSWA) has received funding from a variety of sources including EPCOR, TransAlta, Ducks Unlimited, the City of Edmonton, and Strathcona County.

In addition to these funds, Alberta Environment has contributed core funding for the WPACs operations (Environment Canada, 2004). The ministry has recently indicated that it will be decreasing its financial contributions to WPACs. To make up for this decrease, members of the alliance have been asked to contribute toward operations and initiatives such as Integrated Watershed Management Planning.

The NSWA has requested municipalities to contribute 50 cents per capita. The Town of Rocky Mountain House copied AUMA on a letter it sent to the Minister of Environment in May 2011 calling on the province to provide sustainable funding to the Alliance (Town of Rocky Mountain House, 2011).

Water Governance

The Land-use Framework and Water for Life

Purpose and Structure

Since 2003, *Water for Life* has been the dominant policy guiding water management decisions. The adoption of the **Land-use Framework** in 2008 is a further step in the evolution of water management.[1] The Framework uses a coordinated, regional approach to mitigate the cumulative effects of population and economic growth on the province's water, air, land and biodiversity.

The Framework is meant to complement *Water for Life* and integrate all such strategies on a regional level, as illustrated in Figure 15. Its recognition of the importance of water is evident in the creation of seven land-use regions congruent with the province's major watersheds and aligned with municipal boundaries. The Framework also identifies the need to include representatives from Watershed Planning and Advisory Committees in the development plans for each region. (Government of Alberta, 2008)

The Land-use Framework in Use

The first plans under development for the Lower Athabasca and the South Saskatchewan Regions are at various stages of development and are meant to serve as models for the rest of the regions. Water is a dominant topic in both planning processes.

The ***Draft Lower Athabasca Regional Plan (LARP)*** includes objectives to manage both ground and surface water so that current and future uses (aquatic life, drinking water, recreation and aesthetics, agriculture and industrial) are protected. *Surface and Groundwater Management Frameworks* will be updated and implanted as part of the plan. It is notable that the draft plan does not mention *Water for Life* or the Athabasca Watershed Council. As the Council is one of the newer WPACS to be created and is still working on the first phases of its *State of the Watershed Report*, it can likely integrate the LARP into its work, though it still remains be seen how exactly the work of the LARP and the work of the Council will be coordinated.

Figure 15: Alignment of Provincial Policies

Cumulative Effects Management

The Land-use Framework also operationalizes **Cumulative Effects Management:**
"…an approach that establishes outcomes for an area by balancing environmental, economic and social considerations and implementing appropriate plans and tools to ensure those outcomes are met" (Alberta Environment 2010).

As opposed to looking at developments individually, it is meant to monitor the overall impact that all activities have on the environment and set triggers for action to reduce those impacts. By monitoring the overall health of watersheds, WPACS have already begun to implement cumulative effects management. The Framework is meant to formalize monitoring and responses to any issues with water quality and quantity.

[1] The current debate over the Land Use Framework and its enabling legislation are beyond the scope of this document. The AUMA is reviewing implementation of the Framework to determine how it is aligning with its original intent and AUMA land use policy.

Water Governance

The Land-use Framework and Water for Life continued…

Both planning initiatives (LARP and SSRP) recognize the interplay between land and water. Two of the most dominant connections are:

- Land use patterns determine the amount of demands placed on water sources by economic and population growth.
- Wetlands and riparian areas represent sensitive transition zones between aquatic ecosystems and surrounding land-use. What happens on the land impacts their health, and in turn their health impacts the quality of water available to support various land-uses.

As will be seen in the following sections outlining water issues, projects are underway that seek to address these connections. There is concern however, that there is still not enough integration of the myriad of land use and water initiatives. This is of particular concern to municipalities who don't have the capacity to take on numerous separate initiatives. The AUMA and its members will need to work with other partners to determine how to best coordinate efforts towards common outcomes.

DISCUSSION QUESTIONS:

Are municipalities informed and ready to participate in the cumulative effects management approach to water and other resources ushered in by the Land-use Framework?

_____

_____

_____

If not, how can their capacity to participate be improved?

_____

_____

_____

What should the AUMA do to support the engagement of its members in the Land-use Framework and cumulative effects management?

_____

_____

_____

Figure 16: Land Use Regions

Issues

The *Water for Life Strategy* is meant to provide the overarching framework for water management in Alberta. The following sections examine the current and emerging issues municipalities are facing at the provincial level, based on the goals and directions outlined in the *Water for Life Strategy* (the *Strategy)*. Not every aspect of the *Strategy* can be covered in this paper; rather the following sections focus on topics most relevant to municipal sustainability and the viability of municipal water systems.

Water for Life Goal: Safe, secure drinking water supply

Ninety per cent of Albertans rely on municipal systems for their water supplies. Most of these Albertans have come to expect the provision of a safe secure supply of drinking water and take for granted the amount of effort required to build and maintain these systems. That is until a major drinking water outbreak occurs, as happened in Walkerton, Ontario and North Battleford, Saskatchewan a decade ago. These incidents have shaped drinking water policy over the past 10 years.

Alberta and the rest of Canada responded to these outbreaks by increasing drinking water treatment standards. This approach has worked to an extent - there has not been a significant outbreak since the incident in North Battleford Saskatchewan in 2001 (Hrudey, 2011). Nevertheless, there continues to be significant challenges to providing safe drinking water.

DISCUSSION QUESTIONS:

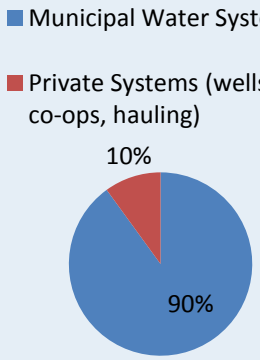
Do residents and businesses in your municipality rely on their own private system for water?

_____
_____
_____

If so, are there any concerns about the safety and viability of these systems?

_____
_____
_____

Figure 16a: Private Water Systems



The main focus of this *Water Primer and Discussion Paper* is on municipal water systems, as they serve the majority of Alberta's population. AUMA recognizes that residents of some member municipalities rely on private systems, particularly in summer villages. Unlike municipal systems, Alberta Environment does not regulate private systems and the responsibility for the safety of water and meeting Alberta Health's water quality guidelines rests with the owner.

Key information sources for municipalities and owners of private systems in Alberta include:

- **The Rural Water Quality Information Tool**: an on-line tool that assesses the quality and suitability of raw water sources for privately owned and operated water supplies
- ***The Environmental Public Health Field Manual for Private, Public and communal Drinking Water Systems*** in Alberta: designed to be used by health agencies for the inspection and investigation of public, private and communal drinking water supplies
- The **Alberta Environments Groundwater Webpage**: compiles basic principles, scientific data, guidelines, standards, policies, frameworks and strategies that are relevant to groundwater in Alberta.

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

Challenges and Solutions

The purpose of increasing regulations is to protect public health, but increasing regulations also create challenges for municipalities. The primary challenge is finding the financial resources to keep systems to up to standard. Expansion and upgrades to treatment facilities are also very costly and funding has not kept pace with expenses. Compounding this issue is a looming shortage of skilled water operators able to manage increasingly complex systems.

Another emerging issue is the state of water distribution systems. Aging systems are leaking water and creating contamination concerns. Municipalities are just starting to come to terms with the expertise, time and costs needed to make improvements.

A number of solutions are proposed to improve the ability of municipalities to provide safe drinking water. These solutions include:

- New risk based approaches to water system management
- Regionalization of water services to leverage expertise and economies of scale
- The development of attraction and retention programs to increase the availability of skilled water operators
- Third party operations and maintenance contracts
- Full cost accounting and recovery to improve the financial viability of systems

Each of these solutions is interdependent and none can be successful on its own.

Drinking Water Quality Guidelines and Regulations

AUMA has heard complaints from some of its members that standards and regulations appear to be arbitrarily and inconsistently applied. The following section seeks to clarify the decision-making process surrounding drinking water regulations.

In Canada, all three orders of government have roles to play in ensuring drinking water is safe. The federal government coordinates the

Boil Advisories and Orders

A national survey found that there were 1,700 boil water advisories issued in 2008. Alberta is fortunate to experience a relatively small portion of these advisories. The following chart shows the number of ***boil water advisories*** and ***boil water orders*** in Alberta between 2006 and 2008:

Table 2: Boil Water Advisories and Orders

2006	8
2007	21
2008	18
2009	11
2010	20

(Source: Alberta Environment)

The occurrence of boil water advisories and orders is not all negative. It demonstrates that monitoring and alert systems are working. However, it also demonstrates that some water systems are struggling to maintain water quality.

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

development of national guidelines via the Federal-Provincial-Territorial Committee on Drinking Water (CDW), of which Alberta Environment is a member (See **Glossary of Organizations** for more information). The province holds legislative responsibility for the safety of drinking water, turning guidelines into regulatory requirements. Municipalities oversee the daily operations of treatment facilitates.

Table 1: Responsibility for Safe Drinking Water in Alberta

Federal-Provincial-Territorial Committee on Drinking Water (CDW)
•Develops Guidelines for Canadian Drinking Water Quality
Alberta Environment
•Provides comprehensive and scientifically defensible standards and guidelines which must be applied in municipal systems
Alberta Health Services
•Implements the Health Act which applies to all water systems where there is concern with health impacts or disease transmission
Municipalities (owners/operators of water systems)
•responsible for: •design, construction and operation of the waterworks and wastewater systems so that they meet, as a minimum, AENV's regulatory requirements; •maintaining water distribution system to the service connection; •assisting home / building owners to identify any water quality issues within building plumbing.
Building Owner Operator
•Responsible for plumbing repairs, system corrections and water quality within their building

(Adapted from Alberta Environments, 2006)

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

Guidelines for Canadian Drinking Water Quality

The *Guidelines for Canadian Drinking Water Quality* are designed to protect the health of the most vulnerable members of society, such as children, the elderly and those with compromised immune systems. They deal with microbiological, chemical and radiological contaminants.

Criteria

The *Guidelines* are based on scientific research related to health effects, aesthetic effects, and operational considerations. They are developed specifically to cover contaminants that meet all of the following criteria:

- Exposure to the contaminant could lead to adverse health effects
- The contaminant is frequently detected or could be expected to be found in a large number of drinking water supplies throughout Canada
- The contaminant is detected, or could be expected to be detected, at a level that is of possible health significance

The CDW sets Maximum Acceptable Concentrations (MAC) for contaminants that meet the above criteria. The ***precautionary principle*** is used in setting MAC values. Breaching the MAC does not mean peoples' lives are at risk, rather limits on concentrations are set at a level where harm may occur if an individual is exposed to that concentration over a lifetime. The limit is a trigger for intervention long before there are adverse effects to human health.

Consultation

For each guideline being considered, Health Canada's Water Quality and Health Bureau prepares a document outlining the latest research into the health effects associated with the contaminant. This document and a proposed guideline MAC value are reviewed by external experts, the CDW, and undergo a public consultation. Public consultation gives municipalities an opportunity to provide input into the *Guidelines*. Proposed guidelines up for consultation can be found on the **Environment and Workplace Health Consultation Page of Health Canada**.

Implementation

The guideline document is then revised based on the feedback received, including feasibility of implementing the guideline. Once all jurisdictions and CDW members are satisfied, the approved guideline and supporting document are published on the **Health Canada Website**. (Health Canada, 2006)

Once a MAC is set, it is automatically adopted by Alberta under the *Environmental Protection and Enhancement Act*. When determining the timeline for integration of the MAC into provincial standards

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

(under the *Environment Protection Act*), the Minister of Environment takes into consideration how easily the changes can be implemented.

A more thorough examination of how guidelines are developed and the various risk factors taken into account can be found in **Appendix D Drinking Water Guidelines Backgrounder**.

The Multi-Barrier Approach

Both the federal and provincial government have adopted a multi-barrier approach to drinking water. It is also often referred to as a 'Source to Tap' approach as it covers all of the components of a drinking water system and identifies safeguards needed to provide quality drinking water. The components include source water protection, drinking water treatment and distribution systems. The safeguards include management, monitoring, research, standards, policy frameworks and public involvement and awareness.

Figure 17 below shows how the various aspects of the approach work together to assure safe drinking water (Environment Canada, 2010).

Figure 17: The Multi-Barrier Approach

DISCUSSION QUESTIONS:

Are you aware of, or have you participated in, a consultation process for updating the Guidelines that facilitated the input of municipalities?

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_____
_____
_____
_____

Should more be done to alert and engage municipalities when consultations are being held on changes to the guidelines?

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_____
_____

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

Alberta Drinking Water Regulations and Standards

In Alberta, municipal water systems are governed by the *Environmental Protection and Enhancement Act* (EPEA), which makes the owners/operators of water systems (mainly municipalities) responsible for the day-to-day operation of treatment plans. EPEA gives the Minister of Environment the power to make regulations that specify all aspects of a system. It also gives both Alberta Environment and Health Services the authority to issue environmental protection orders that can require owners to take action such as repairing or expanding water utility systems when standards are not met. In an emergency situation, the Government of Alberta may step in to take action itself.

EPEA's **Potable Water Regulation** mandates that systems must produce water that meets the Maximum Acceptable Concentration specified in the ***Guidelines for Canadian Drinking Water Quality*** described above. The regulation also requires systems to meet the ***Standards and Guidelines for Municipal Water Works and Storm Drainage Systems*.**

In line with Alberta Environment's, 'Source to Tap Multi- Barrier' approach, the standards and guidelines document prescribes everything from source protection to pressure at customer connections.

In response to the tragedies in Walkerton and North Battleford, standards and guidelines relating to drinking water were updated in 2006. **All waterworks systems must be upgraded to meet the standards before April 1 2012**.

Further Reading

More information on how this approach is applied in Alberta can be found in ***Alberta Environment's Drinking Water Program: A 'Source to Tap, Multi-Barrier' Approach***

The CDW and the CCME have also developed three documents that can help municipalities understand and apply the multi-barrier approach.

1. ***Intake to tap*** - was designed specifically for water operators. It identifies key elements in a comprehensive drinking water program and sets out best management practices for drinking water purveyors.

2. ***From Source to Tap: The Multi-barrier approach to Safe Drinking Water (May 2002)*** – was prepared for a general audience, including elected officials and citizens, to communicate the concept of a multi-barrier approach. It builds upon the information in *Intake to Tap* to include strategies for source water protection.

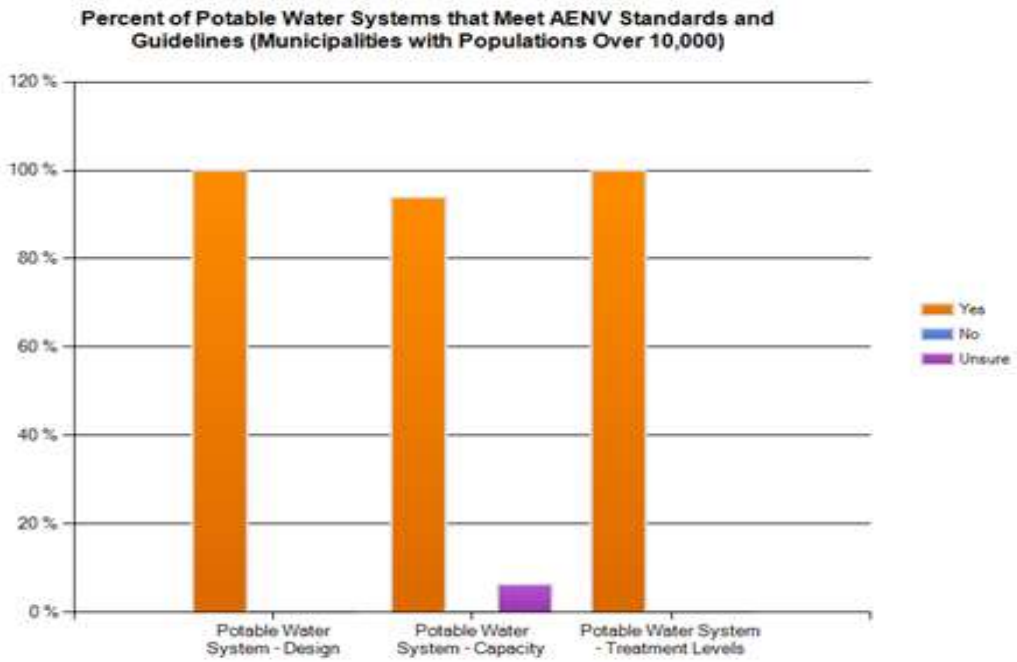
3. ***From Source to Tap: Guidance on the Multi-barrier Approach to Safe Drinking Water*** - provides in-depth guidance to drinking water system owners and operators on how to apply the concept of the multi-barrier approach to drinking water supplies.

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

In February 2011, AUMA's Alberta Municipal Services Corporation conducted a *Water/Wastewater Infrastructure Survey*. One hundred and twelve members responded to the survey and most indicated that their systems are meeting Alberta Environment Standards. The results also indicate that smaller municipalities often have greater challenges upgrading their facilities.

Figure 17a

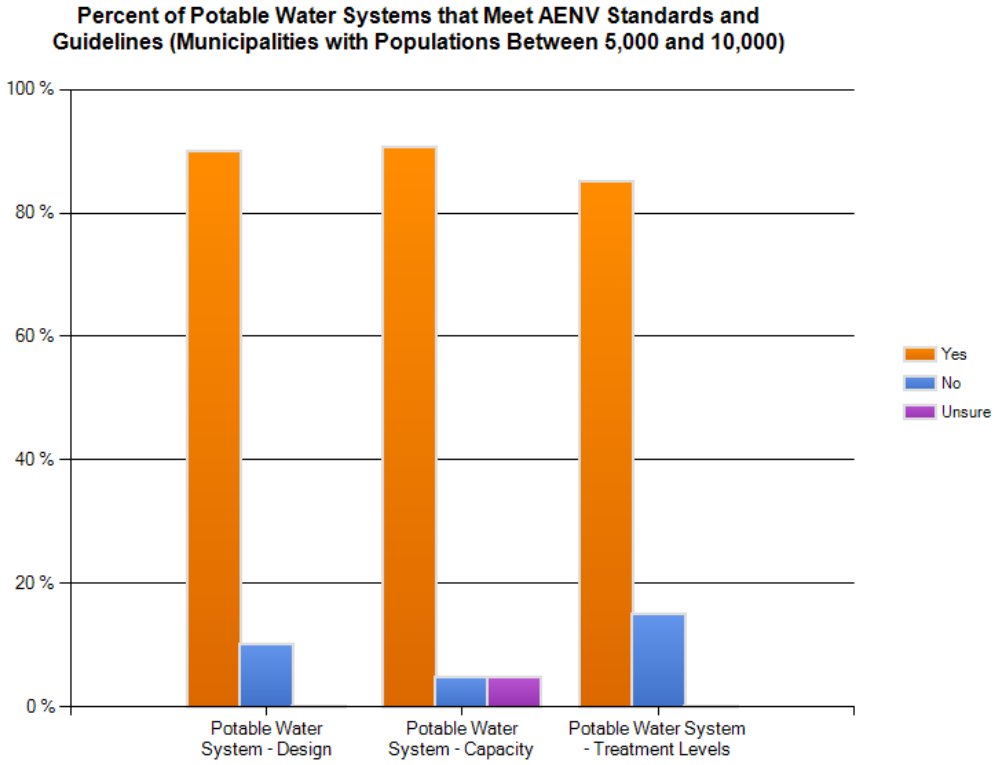


(Alberta Urban Municipalities Association, 2011)

Issues

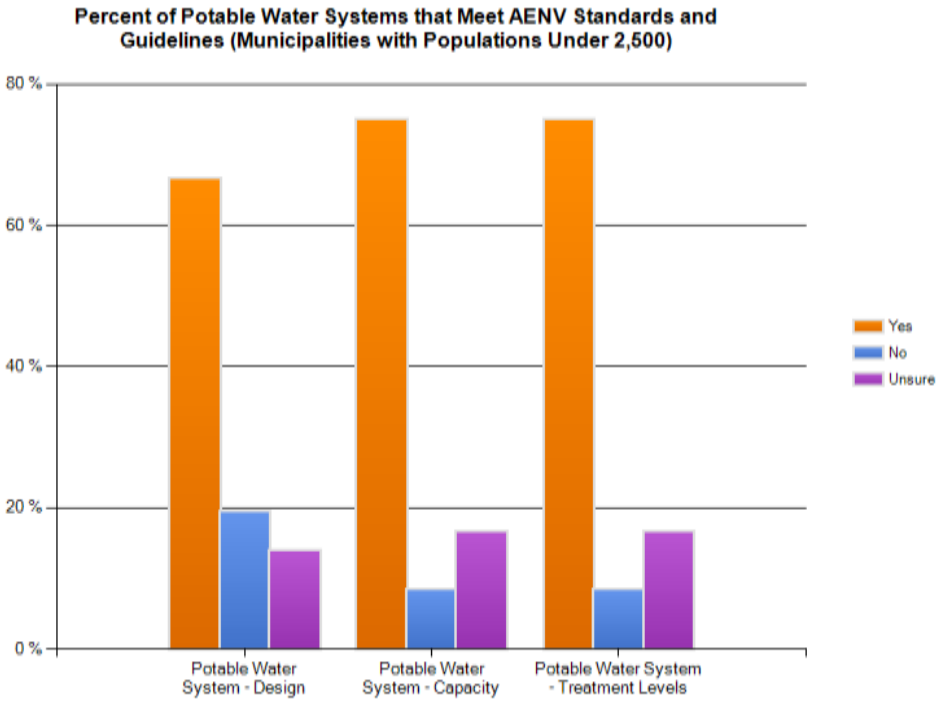
Water for Life Goal: Safe, secure drinking water supply continued…

Figure 17b



(Alberta Urban Municipalities Association, 2011)

Figure 17c



(Alberta Urban Municipalities Association, 2011)

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

Challenges

Many municipalities, regardless of size, struggle to keep up with the financial and human resources that are required to meet current drinking water standards. These issues are exacerbated in smaller municipalities, where it is harder to find economies of scale and to attract and retain qualified drinking water operators. Further discussion on these challenges is covered later in this section.

Representatives of smaller communities have also shared concerns with the AUMA that they feel drinking water standards are too stringent, too prescriptive and are not applied consistently by the regional officers charged with enforcing them. The standards and guidelines municipal systems must follow are extremely prescriptive. However, many standards vary depending on a number of factors including the quality of the source water, the population served, and the type of treatment facilities, among other factors.

In some cases, this can lead to the impression that standards are not applied consistently. In other cases, complaints are made that regulations are not applied with enough flexibility. While the intention is for standards to respond to different circumstances, in practice it appears that there are too many different circumstances for standards to effectively cover them all.

Alberta Environment is aware of these concerns and is examining a new approach to assure water safety that takes the circumstances of individual systems into account. One such approach is the adoption of Drinking Water Safety Plans. These plans will not impact the development of drinking water regulations and standards, but will influence the way potable water systems are managed.

DISCUSSION QUESTIONS:

Do you have any concerns with current drinking water standards or how they are being enforced?

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_____
_____
_____
_____

What works well in the current approach to drinking water regulations? What needs to be improved?

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_____
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_____

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

Drinking Water Safety Plans

What is the Drinking Water Safety Plan Approach?

The Drinking Water Safety Plan approach was developed by the World Health Organization (WHO) in 2004. A Drinking Water Safety Plan aims to ensure the safety of drinking water through a risk assessment and risk management approach. Like Canada's existing approach, Drinking Water Safety Plans are comprehensive and identify risks and hazards throughout all steps of the water supply system - from catchment (source) to consumer (Davison, et al., 2005).

In contrast to the traditional water management approach, which is largely prescriptive and reactive, the Water Safety Plan approach requires continuous self-assessment and a commitment to improvement (Hrudey, 2011). This leads to municipalities and operators having a better understanding of their system, enabling better hazard identification and more appropriate actions to minimize risks. The approach has been incorporated into the regulatory framework of the United Kingdom and New Zealand (Dowswell).

There are three key components to a Water Safety Plan:

1. System Assessment
    - Determine if the drinking water supply chain is capable of supplying water that meets regulatory targets such as the MAC.
2. Operational Monitoring
    - Identify control measures in the drinking water system crucial for securing drinking water safety.
3. Management Plans
    - Document the system assessment and the monitoring and communication plans. They also outline actions to be taken in normal operation and emergency conditions.

In addition to the above, a system of independent surveillance that verifies the system is operating properly should be in place. Surveillance should cover the whole of the water supply system, including sources and activities in the catchment, transmission infrastructure, treatment plants, storage reservoirs and distribution systems (Davison, et al., 2005).

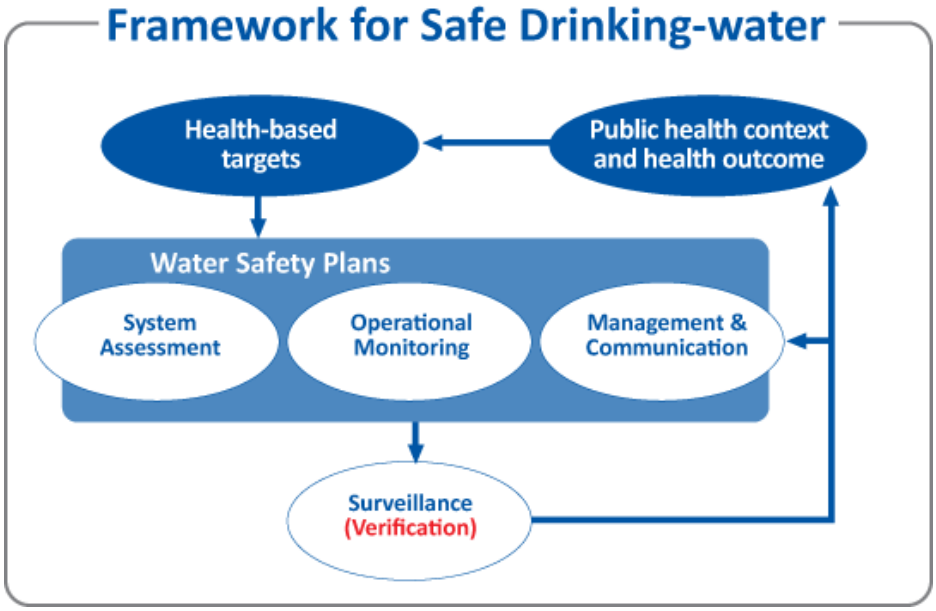
Through following the above steps, this approach attempts to ensure everyone who participates in operating a drinking water system will understand:

- The threats the system faces
- The capability of the system to deal with those threats
- The capabilities to respond if the system fails (Bartram, et al., 2009)

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

Figure 17d: Framework for Safe Drinking-water



Water Safety Plans are a key component in a framework supporting safe drinking water (Kunikane, 2007)

Implementation

There are tangible benefits (as listed in the sidebar) to implementing Drinking Water Safety Plans but for Alberta municipalities to accrue these benefits, the approach needs to be both practical and practicable (Dowswell). To achieve this, implementation plans need to be "applicable to any size of water supply system and capable of being delivered at a local level, with limited resources, without detailed technical support" (Dowswell).

In addition, individuals who manage drinking water need to be provided the proper training and intellectual support to successfully develop and implement water safety plans (Hrudey, 2011). If this occurs, the implementation of a Drinking Water Safety Plan would allow operators to have a greater understanding of how their system functions, have an increased ability to manage risk and be more responsive to changes within their system.

Benefits

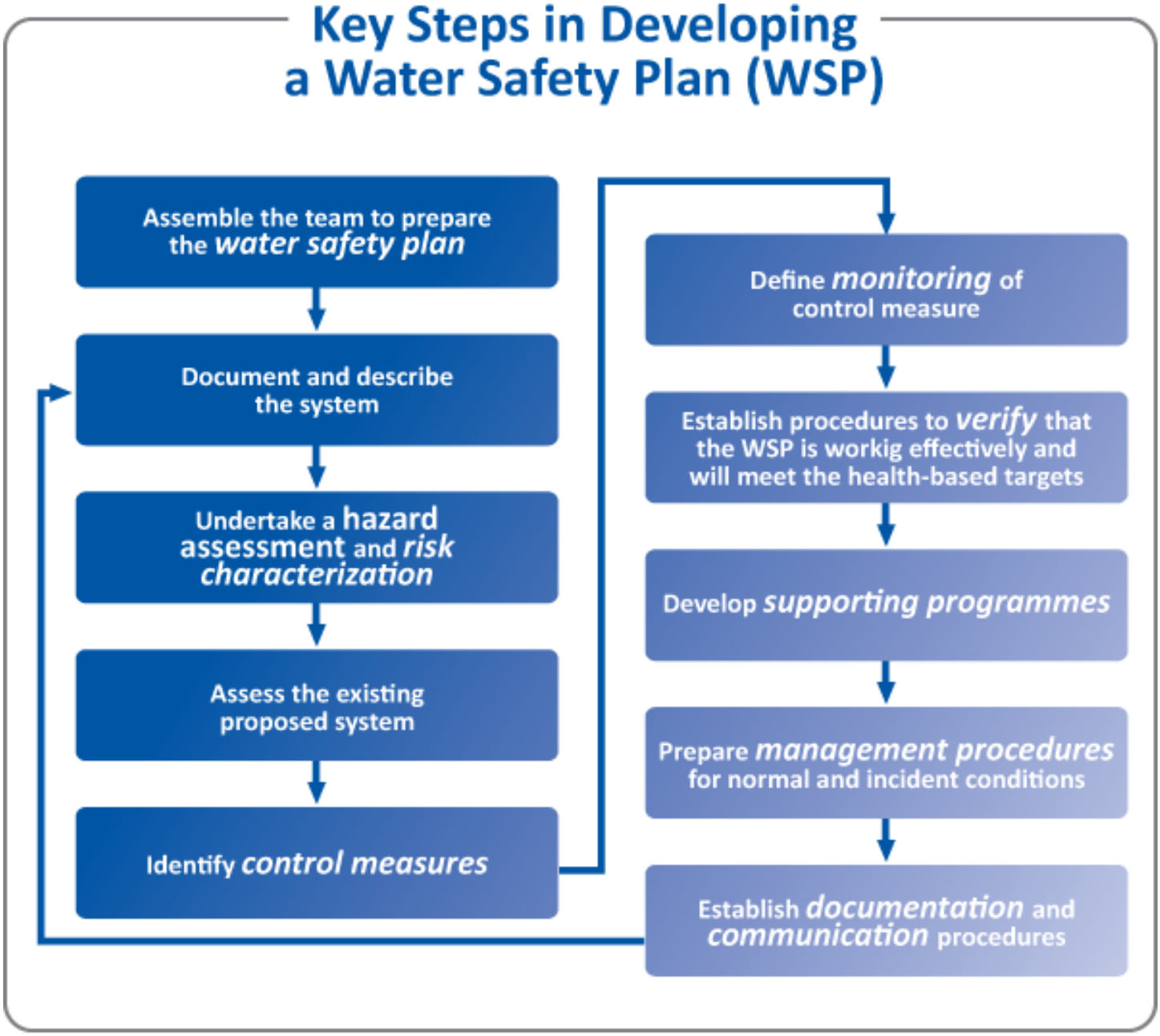
The adoption of a Water Safety Plan can have a number of benefits, including:

- Demonstrating to the public and regulators that the water supplier is applying best practice to secure water safety.
- The prioritization of water related hazards and risks.
- An organized and structured system to minimize the chance of failure through oversight or lapse of management.
- Increased consistency of safe water supplies.
- Contingency plans to respond to system failures or unforeseeable hazardous events impacting the water system.
- Potential for significant improvements in asset management.

The development and implementation of Drinking Water Safety Plans would impact how Alberta's municipal potable water systems are operated. It is important to understand the implications because Alberta Environment is interested in the introduction of a Drinking Water Safety Plan program.

Water for Life Goal: Safe, secure drinking water supply continued…

Figure 17e: Key Steps in Developing a Water Safety Plan



This figure illustrates how all the key components of a Water Safety Plan fit together in the development process. It also illustrates how Water Safety Plans are a continual process to managing a municipal water system (Kunikane, 2007).

For more information see ***Water Safety Plans: Managing drinking-water quality from catchment to consumer*** published by the World Health Organization.

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

DISCUSSION QUESTIONS:

Are there potential barriers to implementing Water Safety Plans?

_____

_____

_____

What would be required to overcome the barriers?

_____

_____

_____

Water Operators

Successful implementation of water quality regulations and processes depends on the availability of water and wastewater operators with up-to-date skills. As source water quality issues escalate and water and wastewater systems become more complex, demands on facilities and operators increase. The Report of the Walkerton Inquiry concluded, "Skilled, properly certified and accountable personnel, with a range of experience and familiarity about the specific facilities in which they work, is a lynchpin of local water security" (O'Connor, 2002).

Unfortunately, many Alberta municipalities, particularly those with small stand-alone systems, struggle to attract and retain qualified water operators (Phillips, Morrison, & Aherne, 2010).

Water Operator Education in Alberta

Alberta is in the fortunate position of having a strong technical training, certification, and continuing education system for operators. In 1983, Alberta was the first Canadian jurisdiction to implement a mandatory certification program for operators, which is regulated by the **Alberta Water and Wastewater Operator Certification Program** within the Water Policy Branch of Alberta Environment. At present, there are approximately 2,400 certified operators in Alberta, working across four disciplinary areas (i.e., water treatment, water distribution, wastewater collection and wastewater treatment).

Labour Shortage

Alberta municipalities are not alone. The challenges faced by municipal water systems across Canada are illustrated in the findings of a 2009 Labour Market Study conducted for the Environmental Careers Organization Canada:

- 40 per cent of facility managers are over 50 years of age in both water/wastewater treatment
- Intermediate operators are the most difficult position to recruit and retain
- Class III and IV facilities struggle to find operators certified to the level of the facility
- Women currently represent less than 20 per cent of the workforce in the water/wastewater industry
- Labour shortage is magnified in smaller and remote communities (Environmental Labour Market Research, 2009)

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

Since 1976, the **Alberta Water and Wastewater Operators Association** has evolved to promote access to safe drinking water and environmental protection through the exchange of current and emerging state-of-the-art technical information, as well as the education of water and wastewater operators. The AWWOA offers extensive continuing education to assist certified operators in maintaining provincial certification requirements as mandated by Alberta Environment.

A **Water and Wastewater Technician Program** is also offered by NAIT in Edmonton, and Calgary. A mobile facility has also been recently added to the NAIT program to support provincial outreach. The program is one calendar year in length. Completion of post-secondary education is not a requirement to practice as a certified water or wastewater operator. However, many larger facility and system operators have added related post-secondary experience as a requirement of employment.

More information on certification requirements and training programs can be found at the **AWWOA's website**.

However, providing training is just the first step. Then the challenge becomes attracting people to access that training and pursue careers where operators are most needed.

Existing Programs

In the past several years the AWWOA has spearheaded initiatives intended to increase the number of people choosing to make a career out of being an operator. There are two programs in particular which may be of assistance to municipalities:

- Since 2009, AWWOA has offered a $50,000 **Training Subsidy for Small Public Facilities** that has been funded, in part, from a $300,000 one-time investment of an Alberta Environment/Alberta Justice Creative Sentencing Project. Thanks to this program, classroom training of operators from smaller communities (< 5,000) has been possible.

- In 2010, AWWOA led an inter-provincial **Career Attraction Project (CAP)**, with peer-associations in Saskatchewan and Manitoba. The CAP provides easy-to-access user guides, wall posters and short career information videos available via YouTube® and/or on DVD. Municipalities can customize the materials to use locally.

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

In 2010, the AWWOA adopted a more strategic approach to workforce renewal and capacity-building to prepare for a large-scale, generational turnover of Alberta's skilled water and wastewater operations workforce. Particular attention was paid to the impact that workforce turnover may have in smaller Alberta centres. The **Closer to Home - Smaller Centres Water and Wastewater Operator Renewal Initiative** is "a proposed collaborative project for strengthening and renewing capacity and expertise for safe drinking water and responsibly managed wastewater systems across Alberta's smaller rural centres". The goals of the project are to:

- Recruit the next generation of operators ideally from local communities
- Increase local retention
- Improve the overall capacity of the sector to promotes safe drinking water and responsibly managed wastewater in alignment with *Water for Life*

To meet these goals the proposed project focuses on three pillars:

- Education
- Engagement
- Empowerment

Further Reading:

For more information on water operator certification programs and requirements visit:

- **Alberta Environments Water Operator Certification Page**
- **Alberta Water and Wastewater Operators Association**

Strategic Approach to Operator Workforce Renewal

Attracting, developing and retaining certified operators is presently complicated by demographics of the current workforce.

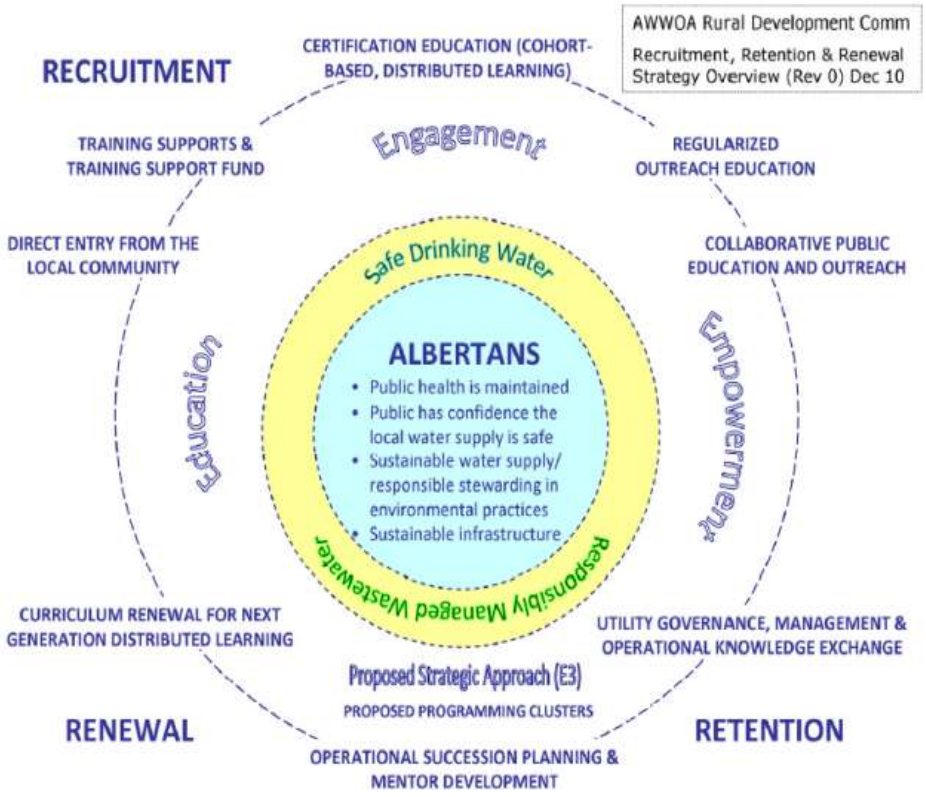
A 2006 study conducted by Alberta Environment revealed that 52 per cent of certified operators responding indicated they planned to retire in the 15 year period between 2006 and 2020, with some 36 per cent of total respondents indicating a plan to retire prior to 2016 (Alberta Environment, 2006).

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

Figure 18 illustrates the various dimensions of Closer to Home (Alberta Water and Wastewater Operators Association, 2011).

Figure 18: Closer to Home Strategic Approach



DISCUSSION QUESTIONS:

Are you using resources supplied by the AWWOA to help attract operators? If so, are they working well?

_____

_____

What could be improved or added to existing programs to better deal with the labour shortage?

_____

_____

If your municipality is part of an operational consortium, is it working well? What are the pros and cons?

_____

_____

_____

Operational Cooperation

Attraction and retention programs are not the only way to ensure municipal systems have sufficient operational capacity. Many municipalities are turning to operational consortiums where a group of municipalities implement an agreement for sharing operators. Thanks to advocacy by AUMA and its members, in 2009 the *Water for Life* funding criteria was modified to include supervisory control and data acquisition systems needed to facilitate remote operations designed to accommodate operational consortia.

Other municipalities have more informal reciprocal agreements to provide coverage when operators are on holiday or off sick.

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

Distribution Systems

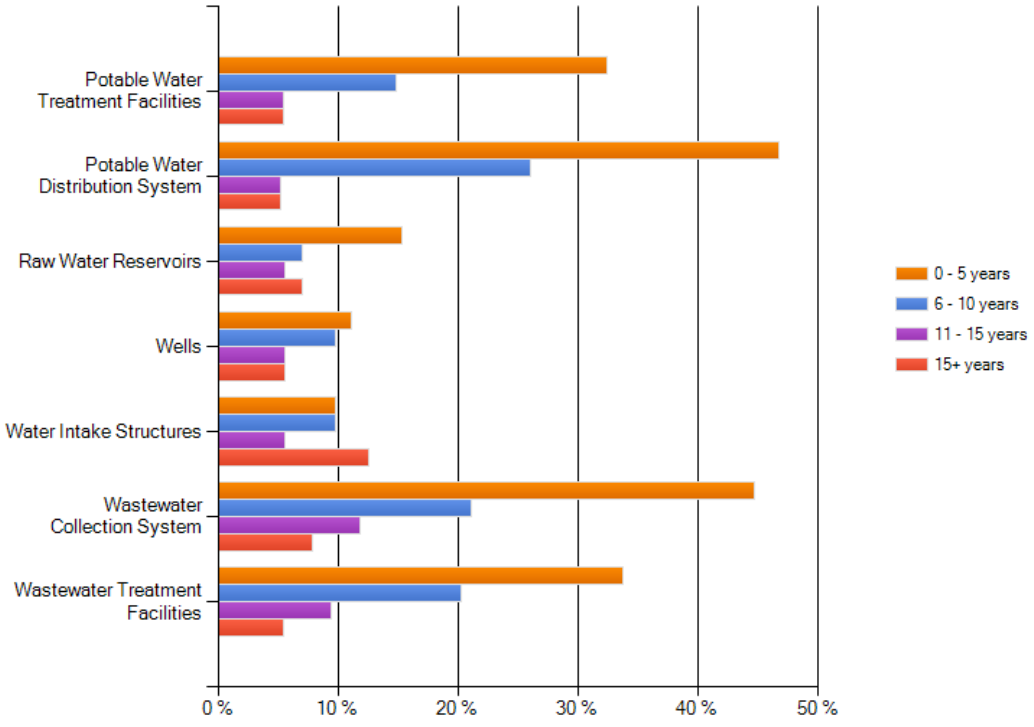
Potable water distribution systems are becoming a major concern for Alberta municipalities as aging infrastructure leads to water leakage and contamination risks.

On average, 20 per cent of water leaving treatment plants is lost due to leaks or otherwise cannot be accounted for (Renzetti, 2009).

Aging infrastructure

Major maintenance upgrades are required in the next five years for almost every aspect of water and wastewater systems. According to the *2011 AUMA/AMSC Water/Wastewater Survey,* water distribution systems are one of the areas with the most pressing infrastructure challenges. Approximately 45 per cent of municipalities indicated that that their potable water distribution system and wastewater collection system will need major maintenance upgrades within the next five years. This is important because major maintenance is capital and time intensive.

Figure 19: Years until Municipalities Believe Major Maintenance Upgrades Will Be Necessary



(Alberta Urban Municipalities Association, 2011)

Issues

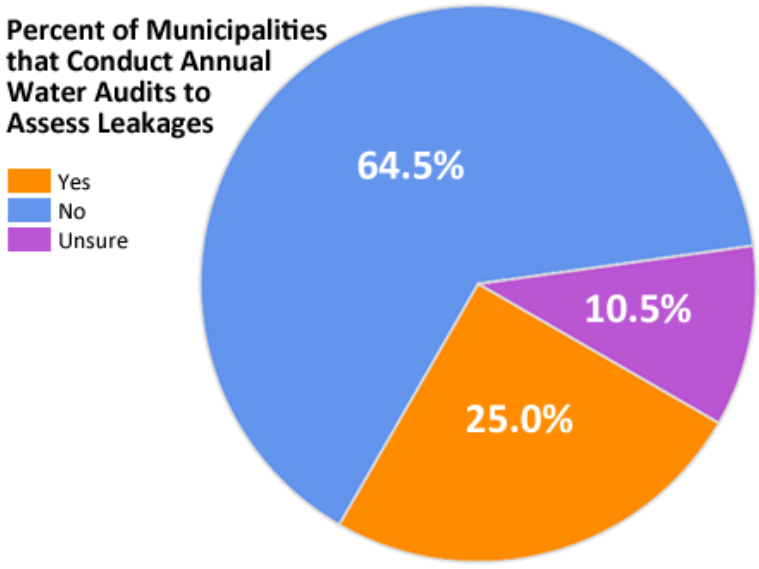
Water for Life Goal: Safe, secure drinking water supply continued…

AUMA members indicated their interest in improving their systems by selecting a target to complete a water audit and identifying ways to reduce leaks as part of **AUMA's CEP Plan**. Now this interest needs to be turned into action.

Water audits trace the flow of water from the site of withdrawal or treatment through the water distribution system and into customer properties. The audit details the variety of consumption and losses that exist in a water system, allowing municipalities to track the performance of their distribution system over time. Seventy-five per cent of municipalities who responded to AMSC's *Water Infrastructure Survey* do not know or are unsure if they conduct water audits. This number increases to 86 per cent for municipalities with populations under 2,500 (Alberta Urban Municipalities Association, 2011).

Water audits are just the first step in any water loss management and/or distribution maintenance program. Audits need to be followed by inspections of the system to pinpoint leaks and complete repairs or replacement. Since distribution systems are not eligible for funding under the Alberta Water/Wastewater Partnership, many municipalities lack the financial resources and technical expertise needed to make improvements. Many smaller communities have difficulty finding contractors to carry out the work.

Figure 20



DISCUSSION QUESTIONS:

What challenges is your municipality facing in terms of maintaining its distribution system?

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_____

What are potential solutions?

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_____

Is there a role for AUMA and/or AMSC to assist? If so, what should that role be?

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_____
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_____
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_____

Quick Fact:

Provincially, 75 per cent of municipalities do not know or unsure if they conduct leak audits (Alberta Urban Municipalities Association, 2011)

For more information on water audits, see the **Water Audits** webpage on **AUMA's Water Microsite**.

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

Funding

Providing a safe, secure supply of drinking water is not cheap. There is no up-to-date, systematic assessment of exactly how much Alberta municipalities spend on water, but there is plenty of evidence to show that revenue is not keeping up with expenditures.

According to Industry Canada, up to 46 per cent of municipal expenditures in Canada are related to collecting, treating and distributing water and wastewater (Industry Canada, 2008). At the same time, most municipalities are not recovering enough money from customers to cover these expenditures and end up subsidizing water services with general municipal revenue or transfers from the provincial and federal governments. In many cases, needed upgrades and repairs are postponed, contributing to a mounting infrastructure deficit and concerns about the ability of systems to provide safe drinking water over time.

Revenue Sources falling short

Municipalities draw on multiple sources of revenue to fund their water systems:

- General municipal revenue
- Provincial and federal transfers or grants
- Offsite levies
- One-time fees for new accounts
- Ongoing charges for connection to the system
- Water pricing

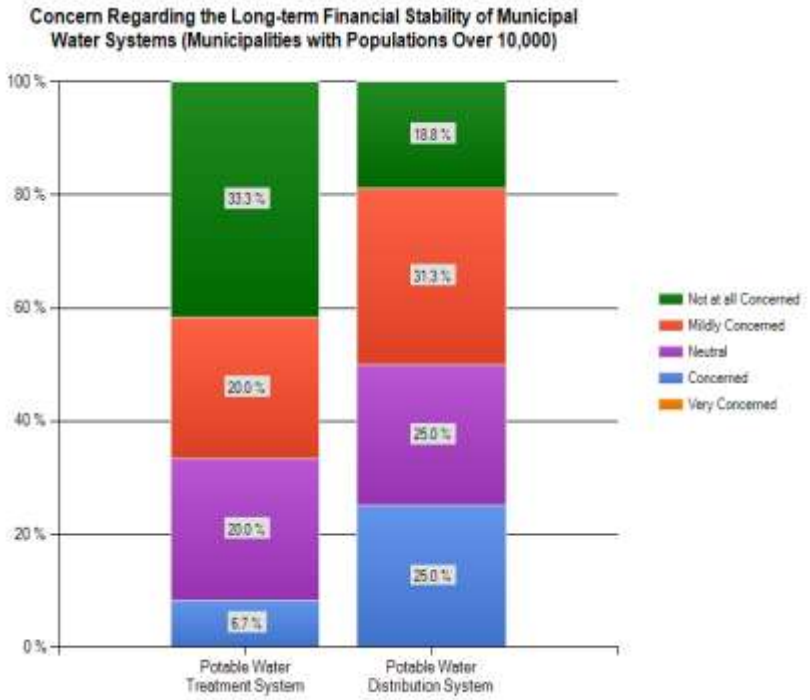
Despite all these sources, a 2009 report by a professor of Economics, Steven Renzetti, for the C.D. Howe Institute, found that current revenues are inadequate, "over the 1988 to 2007 period, except for 2001, revenues earned by all municipal water agencies in Canada consistently fell short of expenditures". Renzetti warned that this trend is increasing with revenues representing only 70 per cent of recorded expenditures in 2007. What makes this more alarming, according to Renzetti, is municipalities often underestimate expenditures such as capital costs and investments in water distribution networks and have not kept pace with need for repair and replacement (Renzetti, 2009).

Renzetti's warnings are echoed in the fears of many municipalities who responded to AMSC's *Water Infrastructure Survey*. Again, as the graphs below illustrate, smaller municipalities are more concerned about the long-term stability of their water systems. It is also notable that there is greater concern about the long-term financial stability of distribution systems than treatment systems.

Issues

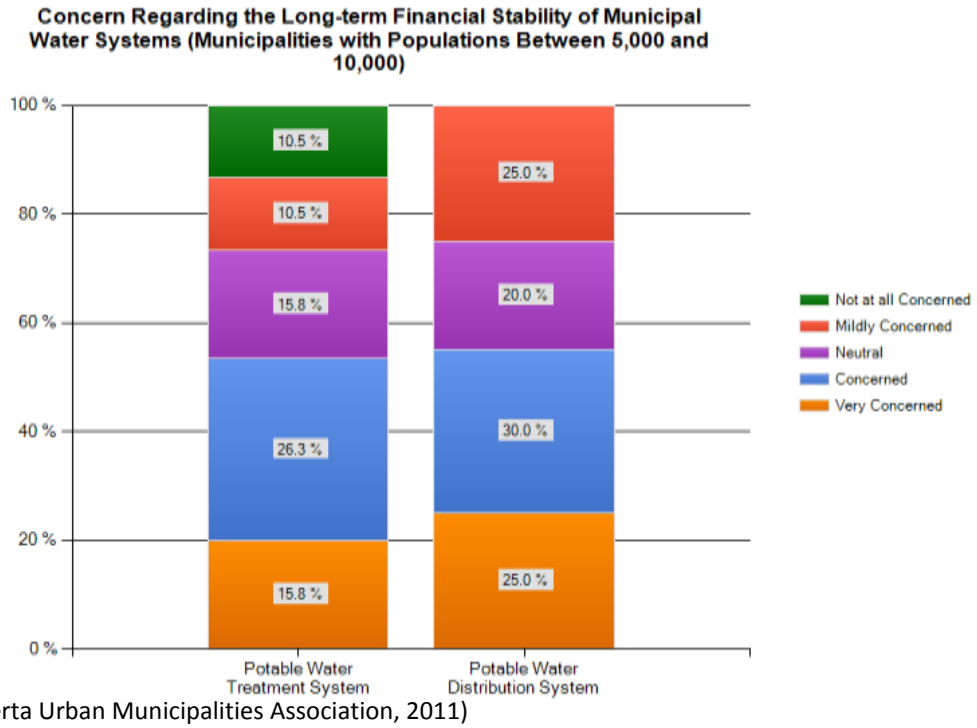
Water for Life Goal: Safe, secure drinking water supply continued…

Figure 21: Financial Concerns



(Alberta Urban Municipalities Association, 2011)

Figure 22: Financial Concerns

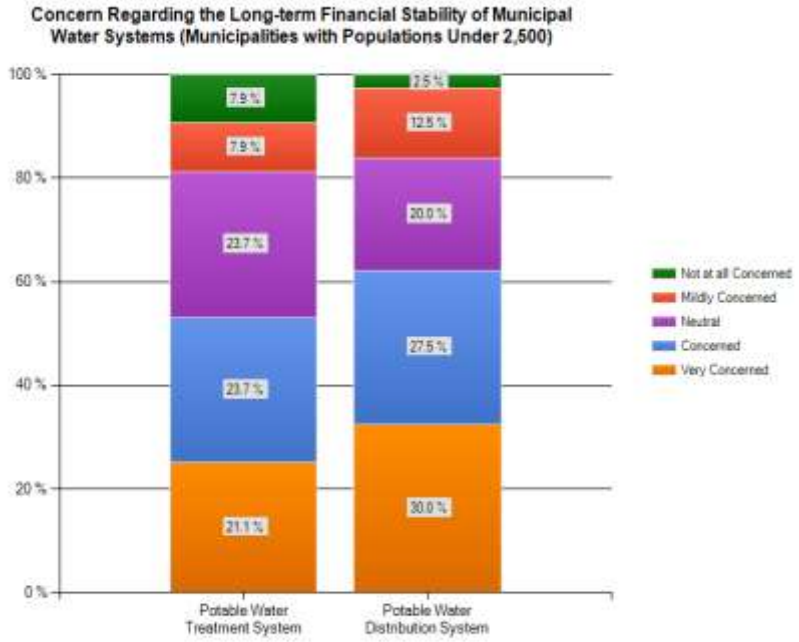


(Alberta Urban Municipalities Association, 2011)

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

Figure 23: Financial Concerns



(Alberta Urban Municipalities Association, 2011)

A big contributor to financial instability is the fact that municipalities have been undercharging customers for water services. According to Renzetti, "of the 916 municipalities that responded to Environment Canada's most recent survey of municipal-water pricing practices [in 2004] slightly more than half (486) employed flat rates" (Renzetti, 2009). On average these were the smaller respondents representing towns and smaller cities. The remaining, mainly larger, municipalities used volumetric charging, with most employing constant prices, a small number employing decreasing block rates and an even small number using increasing (Renzetti, 2009). A breakdown of the different types of water rates is provided in Table 3 below.

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

Table 2: Types of Municipal Water Rates

Type	Description	Comment
Flat Rate	Fee is independent of actual water use	The least effective pricing structure for reducing demand; most common in utilities that are unmetered
One Part Rate	Includes a volumetric charge only	Less common at the retail level but often found at the wholesale level
Two Part Rate	Includes both a fixed and a variable rate	Recommended as best practice by the Canadian Water and Wastewater Association
Components of a Two Part Rate		
Fixed Charge	The portion of the bill that does not vary by volume of water consumed (though it may increase with increase in meter size)	Provides increased revenue stability; some local governments use parcel taxes in a way similar to fixed charges
Variable Charge	The portion of the bill that increases with the amount of water consumed	The most effective rate structure for reducing demand; requires full metering
Variable Rate Formats		
Uniform Rate Constant Unit Charge Single Block Rate	Price per unit is constant as consumption increases	Targets all users equally; simple to calculate bill
Inclining Block Rates	Price increases in steps as consumption increases	Targets high volume users; requires more complex calculating for billing
Declining Block Rates	Price decreases in steps as consumption increases	Charges low volume users the highest rate; typically used where utilities want to provide large industry with a lower cost of service
Excess Use Rate	Price is significantly higher for any consumption above an established threshold	Can be used to target high consumption during peak periods; more effective with frequent (e.g., bi-monthly) meter reading
Seasonal Surcharges	Price is higher during peak periods (i.e., summer)	Targets seasonal peak demand; tied to the higher marginal costs of water experienced during peak periods
Distance Rates Location-based Rates Spatial Rates Zonal Rates	Users pay for the actual cost of supplying water to their connection	Discourages difficult-to-serve, spatially diffused connections
Scarcity Rates	Price per unit increases as available water supply decreases (e.g., during drought)	Sends strong price signal during periods of low water availability; an alternative to outdoor watering restrictions
Lifeline Block	A first block of water is provided a low or no cost beyond the fixed charge in order to ensure everyone has a minimum amount of water to meet basic water needs	Used to address equity issues and ensure that all consumers' basic water needs are met

(Brandes, Steven, & Stinchcombe, 2009)

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

Flat rates, and even many volume based rate structures, do not cover either the capital or operational costs of water systems. Municipalities are then forced to rely on general municipal revenues earned primarily from property taxes. It is well known that the property tax base is overburdened with the multitude of infrastructure and other services municipalities provide. Grants from the provincial and federal government are then sought to fill the gaps.

Grants

AMSC's *Water Survey* found that municipalities access the following grants for their water systems:

- Federal Gas Tax/New Deal for Cities and Communities
- The Federation of Canadian Municipalities' Green Fund
- Federal Building Canada Fund
- Alberta Municipal Infrastructure Program (AMIP)
- Alberta Municipal Sustainability Initiative (MSI)
- Alberta Municipal Water and Waste Water Partnership (AMWWP)

Of these grants, only the AMWWP is dedicated to water systems. Water systems must compete with other infrastructure priorities for a piece of the other grant programs.

Alberta Municipal Water and Waste Water Partnership

Alberta Transportation administers the AMWWP even though Alberta Environment sets the regulations, which are a significant cost driver for municipal systems. Cities with populations under 45,000, towns, villages, summer villages, regional commission and eligible hamlets within rural municipalities can apply to the program on a project-by-project basis.

Eligible projects include construction of "high-priority" water supply and treatment, as well as wastewater treatment and disposal facilities. (Note: the term "high priority" is not clearly defined in information provided on the grant). Water distribution and sewage collection systems are not eligible for assistance. Accepted projects receive grants as a percentage of project costs and calculated with a population-based formula (Alberta Transportation, 2010).

Water for Life Initiative

In 2005, Alberta Transportation introduced the Water for Life (W4L) Initiative to support the development of new regional systems where a regional concept is more cost-effective and environmentally sound than a stand-alone system. Only new regional water or wastewater systems or new extensions to existing regional systems are eligible for the funding of up to 90 per cent. Costs for new operational consortia are also eligible under this program. Existing regional systems are only eligible for funding under the AMWWP, which does not provide the same degree of funding.

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

The introduction of the Water for Life funding signals a clear intent on the part of the Government of Alberta to support greater regionalization of water services and to decrease the number of standalone systems. The hope is, as will be further discussed in the following section on regionalization, that economies of scale will eventually mean that less funding will be required for water and wastewater treatment.

Table 4, below, shows the increases and decreases in Alberta Transportation's water funding since 2000. Information on approved projects is available on the **AMWWP website**. It is not possible to determine how many municipalities applied for funding in comparison to the number of recipients because Alberta Transportation does not keep record of the number of applications it receives each year. Officials from the department indicate that each year there are more applications than there is funding available, but are not able to provide a dollar figure.

Table 4: Water Funding Since 2000

Projects Approved	AMWWP ($)	W4L - Strategic Initiative ($)	Total ($)
2000 as of Dec 31, 2000	43,303,804	n/a	43,303,804
2001 as of Dec 31 2001	28,673,756	n/a	28,673,756
2002 as of Dec 31 2002	40,205,297	n/a	40,205,297
2003 as of March 18, 2003	36,554,280	n/a	36,554,280
2004 as of Dec 31, 2004	15,285,468	25,891,770	41,177,238
2005 as of April 18, 2005	23,471,432	13,003,421	36,474,853
2006 as of April 28,2006	47,711,402	29,420,131	77,131,533
2007 as of April 19, 2007	151,025,562	84,694,000	235,719,562
2008- as of April 30, 2008	28,304,452	n/a	28,304,452
May 1, 2008-August 31, 2009	142,719,572	121,105,687	263,825,259
Budget 2010			113,000,000
Budget 2011			257,560,000

At AUMA meetings and events, members have shared concerns that financial assistance does not appear to be provided equitably, or that it is given out more readily to those who mismanage their systems and then end up in a crisis situation. Alberta Transportation is aware of this issue, and in conversation with AUMA staff, has admitted that an unintended consequence of such grant programs is that some municipalities are rewarded for mismanagement.

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

The Need for Change

There appears to be growing awareness of the need for change. At a more general level, AUMA's member driven **Local Matters** campaign calls for a new provincial/municipal relationship where the two orders of government "work together, to cooperate, and to ensure critical services and infrastructure commitments are properly planned, funded, delivered and maintained." The campaign speaks directly to some of the challenges faced in managing municipal water systems. Aspects of the proposed new relationship which relate most directly to the issue include:

- Restructure a decades-old system of multiple, complex grant processes on a request-by-request basis (this acts like a lottery that picks winners and losers).
- Make planning and delivery of services more sustainable and reliable.
- Improve efficiencies and long-term planning by shortening the distance between the taxpayer and tax collector/spender.
- Make the use of dollars more transparent and enable municipal leaders to be fully accountable to their citizens.
- Make more efficient use of tax dollars - reduce the administration of grants substantially.

Full Cost Accounting and Recovery

Some tentative first steps are already being made toward changing the relationship between the province and municipalities in relation to water funding. There is growing consensus among water experts, economists, the provincial government and even municipalities themselves that full cost accounting and recovery is one of the answers to concerns about the financial stability of water systems. Sixty out of the 122 municipalities who responded to AMSC's *Infrastructure Survey* indicate that they are doing full cost accounting and 45 municipalities indicate that they are in the process. Alberta Environment and Alberta Transportation have responded positively to a request by AUMA's Board of Directors to collaborate in developing a strategy to promote adoption of full cost accounting and recovery.

The Utility Approach

The utility approach is recommended by Alberta Environment as it provides municipalities an understanding of:

- The costs of operating and maintaining the water system (including distribution and administration, which are often overlooked)
- Depreciation, the loss of value of capital assets and facilities that occurs due to their wear and tear, decay and obsolescence
- Return on capital provided to support the water system (Alberta Environment, 2008).

The benefit of the utility approach is that it aligns with requirements related to the **Tangible Capital Assets (TCA)** accounting regime, to which municipalities must adhere. TCA requires municipalities to recognize capital expenditures as capital assets and to amortize them over their useful life.

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

Full cost accounting, coupled with water metering are necessary precursors for recovering the full cost of providing water services. It is estimated that most municipalities are either fully metered or in the process of implementing metering programs. To begin any strategy, it would be necessary to confirm how many municipalities need to be metered or to update old, malfunctioning systems. Another initial step is to provide a common understanding of all that "full cost" accounting entails. Alberta Environment provides a **Guide to Full Cost Accounting** that outlines both a ***utility*** and ***cash needs*** approach.

Although many municipalities indicate they are currently practicing full cost accounting, not all may be truly capturing every cost involved in not only operating a system, but also the capital requirements needed for future repair and upgrades. Full cost accounting requires senior municipal administration to work with water operators and accounting departments to analyze all aspects of a water system. A few years ago, Alberta Environment held workshops that aimed to bring together these staff members in order to work through the requirements of full cost accounting. Currently, the department only knows of six municipalities that have fully implemented the utility approach. This indicates that further education may be required.

Pricing

Once all costs are accounted for, municipalities must look at how to recover the costs. Full cost recovery, is also referred to as ***conservation-oriented water pricing*** because of its role in reducing water use. The Polis Project for Ecological Governance, asserts that water pricing should:

1. Provide enough revenue to water utilities and suppliers to cover the full costs of providing the service, including maintaining and replacing infrastructure
2. Signal the actual cost of supplying water and provide a financial incentive for customers to use it more efficiently (Brandes, Steven, & Stinchcombe, 2009)

Communication Strategies

Municipalities have used a variety of means to communicate the need to start pricing water with their citizens. Some examples are provided in the **Municipal Conservation Initiatives List** available on AUMA's **Water Microsite**. For example, some municipalities have used utility bills to communicate the amount that residents would be charged under a full cost recovery scenario months before the rates came into effect. This gave residents time to change habits and take advantage of water saving tips the municipalities also provided on bill.

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

Setting rates is both a technical and political exercise. The Polis project's ***Primer on Conservation-Oriented Water Pricing*** outlines issues that must be considered:

- Revenue needs
- Likely impact of the price change on the community
- How to communicate the change to residents
- Strengths and weaknesses of the price structure that is currently in place
- Impacts on the organization's existing business systems
- "Buy in" and coordination of finance, human resources, IT, marketing and other parts of the whole municipal administration (ibid)

Water Pricing Challenges and Solutions

There are several technical and political challenges to conservation oriented pricing.

One of the biggest technical challenges is the fact that most water system costs, such as payroll, debt payment and plant costs, are fixed. Polis estimates that fixed costs can account for 75-80 per cent of spending. There are fears that moving to volumetric pricing will lead to a negative spiral: "the price increases, demand drops, revenue drops, correspondingly, the agency is faced with a budget shortfall and must raise prices again, the cycle repeats" (Brandes, Steven, & Stinchcombe, 2009). These problems can be mitigated by a combination of careful planning and forecasting, and the use of pricing mechanisms, such as a rolling average price or a variable two-part rate that includes fixed and variable charges (Brandes, Steven, & Stinchcombe, 2009).

Another concern related to water pricing is the impact it will have on low-income families. One solution is to give a lifeline block. This would provide a volume of water roughly equivalent to the amount a typical family requires to meet basic needs, at a low per unit cost or at no extra cost as part of fixed charge on the water bill. Giveaways or generous rebates can also be used to help families save water (ibid).

Make Pricing Part of your Conservation Plan

As part of adopting AUMA's sector wide *Water Conservation, Efficiency and Productivity (CEP) Plan*, members agreed to develop plans of their own. Full cost recovery (or conservation oriented pricing) is perhaps one of the most effective tools municipalities both large and small can use to reduce water use. When used in combination with education programs and appropriate billing systems, pricing can result in a 30 per cent drop in water use.

Small communities with limited budgets and human capacity, could start with a Water CEP Plan, which simply assesses current water use, sets a target and includes a strategy to introduce conservation oriented pricing. The cost of undertaking further conservation initiatives can be built into the price of water, provided the municipality has the resources to build on its plan over time.

Visit AUMA's **Water Microsite** for more information on the CEP Plan.

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

The biggest challenge perhaps, is politics. Politicians and senior managers worry about pushback from ratepayers who may see increasing rates as a "tax grab". The experiences of municipalities in Alberta and elsewhere emphasize the importance of having a communications strategy in operation long before increasing the price of water. Municipalities should start by communicating the benefits of full cost accounting and recovery, including:

- Improving the management and transparency of water systems by providing clear assessment of all costs and expenditures
- Helping to ensure funding is available when repairs or upgrades are needed
- Reducing water use, which has the additional benefit of:
  - Reducing greenhouse gas emissions as less water needs to be pumped around the system and heated in homes
  - Producing less sewage, meaning less treated water needs to be discharged into aquatic ecosystems
  - Leaving more water in aquatic ecosystems for instream flow needs and maintenance of aquifer levels (ibid)

It is also important to explain that full cost accounting and recovery for water services is not about commodifying or privatizing water. It is about recovering the costs of providing a service from the users of that service. This includes the provision of infrastructure and treatment services that deliver water from source to tap. It is not about pricing the water itself, nor about pricing water rights (ibid).

Full Cost Accounting and Recovery Implementation

AUMA members won't be expected to implement full cost accounting and recovery overnight. Assistance from other levels of government will likely still be needed for the foreseeable future. And, full cost accounting and recovery alone cannot solve all the challenges facing municipal water systems. A full cost accounting strategy must factor in regulations and the role of regionalization, as will be discussed in the next section.

AUMA will look at how to share further information on how to overcome barriers to implementing new pricing structures, as it begins working with the Departments of Environment and Transportation to develop a strategy to promote full cost accounting and recovery. It is important that AUMA members provide input to this process so that the strategy that develops can respond to challenges and opportunities.

Further Reading:

See **Worth Every Penny: A Primer on Conservation-Oriented Pricing** for more information on how to successfully change your municipalities pricing structure.

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

DISCUSSION QUESTIONS:

What are the biggest obstacles to implementing full cost accounting and recovery in your municipality?

_____

_____

What are the most important issues AUMA, Alberta Environment and Alberta Transportations should address in the development of a strategy to support full cost accounting and recovery?

_____

_____

Should certain levels of grant funding remain available to deal with increasing standards?

_____

_____

Should grant funding remain available for very small systems, where users may not be able to cover system costs?

_____

_____

How can land use planning prevent the type of sprawl that requires servicing by costly distribution systems?

_____

_____

What are the most important issues AUMA, Alberta Environment and Alberta Transportations should address in the development of a strategy to support full cost accounting and recovery?

_____

_____

Regional Systems

Over the past decade in Alberta, there has been a trend toward the consolidation and regionalization of small water treatment facilities into larger regional networks and water commissions. Regional water pipelines connect outlying communities to central treatment and supply facilities, while sharing and pooling resources (e.g. operational and technical) (Associated Engineering, 2004). Increased regionalization is supported by Alberta Environment (AENV) and independent research organizations (such as the C.D. Howe Institute's report ***Safe Drinking Water Policy for Canada – Turning Hindsight into Foresight*** because of concerns about the financial viability of smaller water system and the safety of the water supply (Hrudey, 2011).

Issues

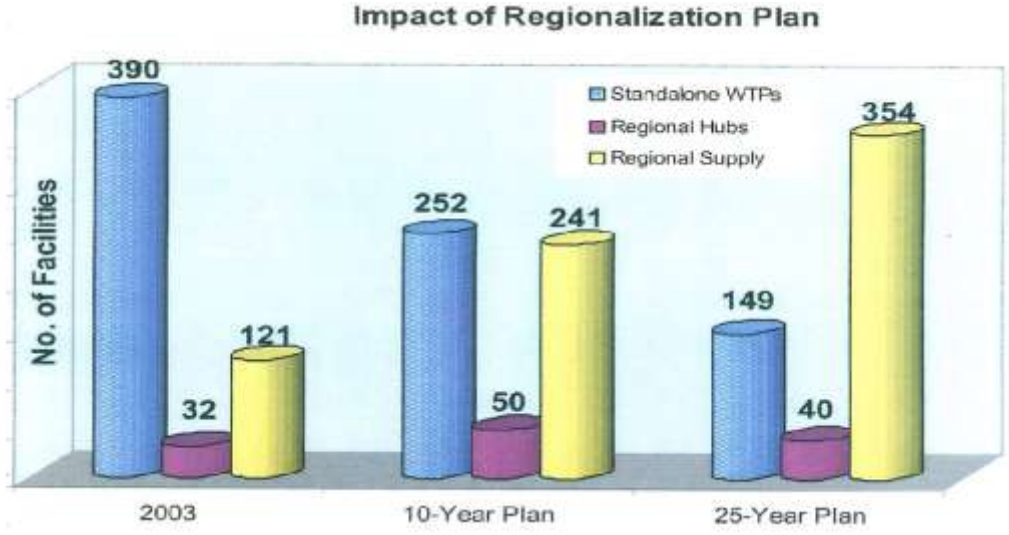
Water for Life Goal: Safe, secure drinking water supply continued…

History

Alberta has a long history of regionalization. Regional water pipelines have been operational in Alberta since the early 1970s, however regionalization did not become a Government of Alberta priority until the early 2000s (AUMA, 2011). In 2004, Alberta Environment Commissioned a **Water Works Facility Assessment** to identify solutions to sources, treatment and operational challenges in the supply of safe, secure drinking water. The Assessment report shared Alberta Environment's belief that, "a reduction in the total number of water treatment facilities in the province would correspondingly reduce the number of systems at risk and through economies of scale improve the level of service to the public" (Associated Engineering, 2004). Therefore, the Ministry intends to transition 233 water treatment facilities from standalone to regional connections by 2028 (Associated Engineering, 2004).

To facilitate this transition, in 2005 Alberta Transportation introduced the Alberta Municipal Water/Wastewater Partnership (AMWWP) Regional Systems W4L Initiative[2] to support the development of new regional systems where regionalization is more cost-effective and environmentally sustainable than independent systems (Alberta Transportation, 2010). New regional water systems or extensions to existing regional systems are eligible for funding of up to 90 per cent, but existing regional systems are not eligible for this funding (Alberta Transportation, 2010). The funding appears to be having its intended effect as in the last eight years the percent of Alberta municipalities connected to regional systems has increased by eight per cent (Associated Engineering, 2004 & AUMA, 2011). Currently, approximately 30 per cent of Alberta municipalities are connected to a regional water pipeline (AUMA, 2011).

Figure 24: Impact of Regionalization Plan



(Associated Engineering, 2004)

[2] Three departments are involved in the regional systems: Establishment and governance of regional service commissions are governed by Municipal Affairs under the Municipal Government Act. Funding for commissions or other types of regional systems comes from Alberta transportation. Regional systems must meet standards and guidelines government operations and water quality regulated by Alberta Environment.

Water for Life Goal: Safe, secure drinking water supply continued…

Reasons to Pursue Regional Integration

Although the provincial government is advocating for regional integration, the decision to maintain independent operation of a water treatment facility or connect to a regional pipeline is that of the governing municipality. Given this fact, it is important to understand the reasons why a municipality may resist (and maintain an independent system) or choose regionalization.

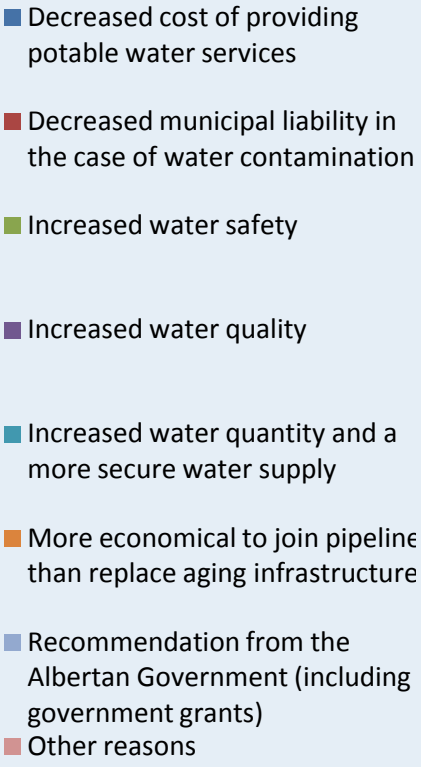
Respondents to AMSC's *2011 Water Infrastructure Survey* cited the following reasons to pursue regional integration:

- Decreased municipal liability in the case of water contamination[3]
- Increased water safety and water quality
- Decreased cost of providing potable water services gained from economies of scale
- Access to qualified operators
- Security of supply to accommodate population growth or the depletion of current water sources
- Provincial policies and funding that encourage regionalization
- Prohibitive costs to maintain, upgrade and/or expand the local water system

For Alberta municipalities, the primary reasons for regionalization are:

- Decreased cost of providing drinking water services
- Increased water safety
- Increased water quality

Figure 25:
Reasons for Regional Integration



(Alberta Urban Municipalities Association, 2011)

[3] It should be noted that there is still liability associated with regional systems. If the system breaks down, municipalities will still need to try to find a way to provide their citizens with safe drinking. More research needs to be done in terms of the liability associated with regional systems

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

Benefits of Regionalization

According to recent studies, regionalization can increase water safety, decrease liability and reduce the costs to each municipality because it consolidates water treatment operations in one central location (McFarlane, 2003). Money, technical expertise and time can be pooled into upgrades, monitoring and repairs at one location. Sharing resources and responsibility amongst municipalities results in fewer water system failures and a safer more secure water supply (EPA, 2009). There is concern that municipalities lack the financial resources to cover municipal water safety requirements, potential liability and the required upgrades to standalone facilities. A lack of financial resources is the primary reason that municipalities are searching for ways to decrease the cost of providing water services.

Regionalization can decrease the cost of potable water services through capitalizing on economies of scale. Rather than each municipality paying to maintain and repair their own water system, resources are pooled in one central location (EPA, 2009). This cost sharing reduces the financial burden on municipalities (Associated Engineering, 2004).

This motivation is stronger once the water system infrastructure deficit is considered. Since many municipal systems need large, expensive repairs or upgrades, paying capital costs to join a regional system rather than building a new water treatment plant becomes an attractive option. This option is often more financially viable because of the capital expenditure subsidies that the Government of Alberta provides for regionalization (Alberta Transportation, 2010). There is comparatively less grant money available for independent systems.

Challenges

Despite advantages to regionalization municipalities have identified some challenges and concerns. These concerns range from political to economic and need to be mitigated. Such concerns include:

Future

The trend toward regionalization is expected to continue. As regionalization proceeds, the advantages and disadvantages of regional integration for municipalities will likely become more apparent. Further research is required to identify which systems are working well and which systems are facing challenges. The findings of such research could be used to improve current systems and inform how future systems are established and operate. Findings could also be used to develop clear metrics to help determine where regionalization is the best option and where a standalone local system remains the best choice.

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

- A perceived loss of autonomy to control their water supply, quality and infrastructure because small municipalities may be underrepresented in the decision-making of regional systems.
    - This could lead to potential unanticipated increases in future water rates
- The initial capital costs of building or connecting to a pipeline may be prohibitive
- Some municipalities feel coerced or pressured to join regional systems
- Some municipalities wish to join regional system but do not meet funding criteria
- Operators are still required to manage some aspects of the water system and for small municipalities, recruitment and retention are difficult.

Capital costs involved in regionalization are location and context specific. The cost to join a regional water pipeline varies depending on the distance the municipality is away from the pipeline. In addition, costs vary depending on how much grant money the government is willing to provide. Without financial support, many of the regional connections would not be financially viable. For at least one municipality, even with the government subsidies, the costs were higher than an independent system. This municipality joined a regional system due to their proximity to the regional pipeline and because they knew that they would not receive any more grant funding to maintain their independent system.

In addition, many AUMA members have expressed particular concerns over the governance and operation of regional systems, including:

- Conflicts between municipalities
- How to set fair price structures:
    - When due to distance it may cost more to provide some municipalities water than others
    - When a municipality wants to join a regional system where existing members have already paid for the cost of building that system
- Regional systems may support unsustainable development in the fringe areas of urban and rural boundaries

Emerging Trend: Hiring External Service Providers to Manage an Independent Municipal System

Some municipalities, such as Okotoks and Canmore, are hiring external contractors to manage their treatment and distribution systems. This arrangement allows municipalities to maintain ownership of the infrastructure while capitalizing on the expertise of the service provider, who typically operates the treatment plants and undertakes infrastructure repairs. Relying on the utility service provider means that the municipalities are not faced with struggling to recruit operators, repair personal and water technicians. Such an arrangement could have potential for municipalities that lack the technical knowledge to maintain their water system. Yet there are still questions regarding costs and the capacity of service providers to support numerous small systems. It will be interesting to see how the relationship between utility service providers, such as EPCOR, Aquatera and ATCO Water, and municipalities evolve over the next decade.

Issues

Water for Life Goal: Safe, secure drinking water supply continued…

Some small municipalities feel "swallowed-up" by the larger regional commissions and feel their needs are subverted by the needs of larger municipalities. Even though all municipalities have voting rights, depending on how the votes are weighted, they may not have enough to impact the decision. This could lead to municipalities being powerless to changes in water rate or water allocations.

DISCUSSION QUESTIONS:

Is your municipality linked to a regional system or does it operate its own facility?

_____
_____

If you are part of a regional system, is this system working well? What could be improved? What advice would you give to a municipality considering regionalization?

_____
_____

If you have a standalone facility, are you interested in joining a regional system? Why or why not?

_____
_____

What should be done to:

- Mitigate concerns of municipalities about regionalization of water services?
- Manage the risks associate with regional integration?
- Reduce the vulnerability of small treatment facilities?

_____
_____
_____

Is hiring external service providers a good option for individual systems?

_____
_____

Are municipalities getting the right support from Alberta Environment, Municipal Affairs and Transportation? If not, what should be changed?

_____
_____

What role should AUMA play?

_____
_____

Issues

Water for Life Goal: Healthy Aquatic Ecosystems

Two of the Water for Life Strategy goals both feature the word "supply": having a "safe secure drinking water supply" and "reliable quality water supplies for a sustainable economy." This supply is not possible without satisfying the other, and perhaps foundational, goal: "healthy aquatic ecosystems".

Table 7, adapted from the North Saskatchewan Rivershed Alliance's (NSWA) ***Municipal Guide***, lists the benefits of these ecosystems.

Benefit	Description
Natural Water Filtration	There are a number of natural and manmade substances that can make humans very sick if present in the water used for drinking, washing, cooking and/or recreation. These include: infectious diseases and waterborne pathogens, heavy metals, household chemicals, hydrocarbons and pesticides. Healthy Aquatic Ecosystems have the ability (although limited) to clean water of these substances. For example, ***riparian areas*** slow surface water runoff and remove sediments and other contaminants. ***Wetlands*** are natural filters whose plants can excrete nutrients (e.g., phosphorus) and contaminants (e.g., heavy metals) from water. Having clean water available for use has many economic gains. These include reduced costs from human illness caused by polluted water (e.g., medical costs, time off work) and decreased water treatment costs. While technology has been developed to clean contaminants out of water, the development of these technologies and the construction of the infrastructure are costly endeavours. Protecting and maintaining healthy watersheds is often the most economical method of protecting water quality. Furthermore, water quality directly affects water availability – if water is highly polluted, its potential uses are limited.
Buffer Extreme Weather Events	Healthy watersheds have a huge capacity to act as water storage areas. Wetlands, floodplains and lakes serve as buffers from the negative impacts of large floods and long droughts. By diverting floodwaters to these areas the undesirable ecological effects of flooding (e.g., erosion of shorelines and riverbanks, and soil) and the destruction of private and public property and infrastructure are decreased. These natural water storage areas release water slowly, which is valuable during times of drought when water is scarce.
Stormwater Drainage	The natural stormwater drainage system in a healthy watershed is often far more effective and less expensive than constructed drainage infrastructure. If constructed infrastructure does not meet stormwater drainage needs, flood damage can result in significant cost to municipalities who may be held responsible.
Recovery from Disruption	Healthy watersheds have an increased capacity to recover from natural and human induced disruptions such as fires and spills. For example, a river with healthy riparian areas, whose instream flow needs are met or a wetland with a healthy functioning ecosystem, will have a higher capacity to filter and/or breakdown substances that are harmful to human and ecosystem life.

Reduces municipal liability	In many cases municipalities are held liable for events that a healthy watershed may have prevented. The destruction of property resulting from flooding and human illness that results from unsafe drinking water are two examples of events for which municipalities may be liable. Protecting watersheds, clean water and the ecological processes that buffer flooding are ways to avoid these potentially devastating and costly events.
Habitat and Biodiversity	Watersheds are home to a great variety of plant and animal species that range from single celled organisms to large mammals. Each of these species has unique habitat needs. Small habitat disturbances can be enough to significantly impact a species' survival. Protecting areas where plants and animals can thrive in their natural environment helps to ensure the survival of many species. Biodiversity is important for the integrity of natural ecosystems and the ecosystem's ability to adapt to environmental changes.
Recreation and Tourism	Natural areas provide havens for recreation that promote active living, which is linked to both physical and mental health. A healthy watershed offers many natural areas where individuals can enjoy recreational activities such as boating, walking, running, biking, camping, wildlife viewing, cross-country skiing, fishing and hunting. This can serve to increase the quality of life of residents, and attract tourists bringing money into the local economy. Furthermore, a clean water body, free of harmful chemicals and pathogens, makes for safer recreation.
Attracting people and business	Healthy watersheds are revered for the aesthetic beauty of their water bodies and natural areas. These areas not only attract people seeking recreation, but also prospective property buyers. Prices for land and buildings are generally higher where property is close to healthy natural areas. Some examples of property value increasing as a result of watershed health include: • A study in four British Columbia urban communities found that a 10 to 15 per cent increase in property values could be attributed to the land's proximity to a riparian greenway system • 81 per cent of residents in Okotoks, Alberta said they would pay $2,000 to $5,000 more for a home in a neighborhood that includes linked open spaces and habitat features • In Boulder Colorado, the presence of a greenbelt was found to add approximately $500,000 in property tax revenue annually

(North Saskatchewan Watershed Alliance, 2008)

The fact that regional water and land management is based on ***watersheds***, demonstrates that the Government of Alberta recognizes the importance of aquatic ecosystems. At the same time, the most recent review of the *Water for Life Strategy*, found that less progress had been made on this goal than the others. To rectify this situation a number of efforts are currently underway.

Healthy Aquatic Ecosystems

AUMA participated in the AWC's Healthy Aquatic Ecosystems Project Team, which developed a working definition: "A healthy aquatic ecosystem is an aquatic environment that sustains its ecological structure, processes, functions, and resilience within its range of natural variability" (Alberta Water Council, 2008). This Team also identified priority action areas to help advance this *Water For Life* goal. These actions are outlined

Issues

Water for Life Goal: Healthy aquatic ecosystem continued…

in the report ***Recommended Projects to Advance the Goal of Healthy Aquatic Ecosystems***. A few of the identified projects are currently underway including:

- Developing criteria to identify areas within a watershed that are significant to maintenance of aquatic ecosystem health
    - In January 2010, the Council released ***Provincial Ecological Criteria for Healthy Aquatic Ecosystems***. The report outlines seven criteria that can be used to identify areas that are significant to the maintenance of aquatic ecosystem health. This work is a first step toward measuring aquatic health. Subsequent steps in the process are: identifying available data, developing "rules" for applying the criteria, and producing a final map of environmentally significant aquatic areas (Alberta Water Council, 2010). AUMA participated in the project team that developed the report.
- Conducting an assessment of non-point source (nps) pollution knowledge and tools and recommend improvements to non-point source pollution management
    - AUMA is currently participating in the **project team** responsible for:
        - Preparing a working definition of non-point source pollution
        - Conducting an assessment of non-point source pollution management in Alberta
        - Assessing the policies, practices and regulatory tools that are used to manage non-point source pollution
        - Evaluating the implementation of policy, practices and regulatory tools for reducing or controlling non-point source pollution and offer recommendations on how to better manage non-point source pollution (Alberta Water Council, 2010)

In addition to the aforementioned projects, AUMA is involved in initiatives relating to riparian area and wetland management that support the Land-use Framework and the *Water for Life Strategy.*

Summer Villiages as Lake Stewards

"Healthy Aquatic Ecosystems are the lifeblood of Summer Village."

This quote from Sylvia Roy, CAO of the Summer Villages surrounding Pigeon Lake, emphasizes the importance of healthy aquatic ecosystems to the communities that have built around their shores. With support from AUMA and the Government of Alberta among other organizations, the **Association of Summer Villages of Alberta (ASVA)** developed a ***Lake Stewardship Reference Guide*** to give councils the knowledge and tools they need to make effective stewardship decisions.

The Guide covers issues including, but not limited to:

- Vegetation control
- Blue-green algae blooms
- Environment reserves
- Planning and development

It describes legislative requirements, along with the jurisdictional authority of other levels of government, and potential resolution of the issues. The Guide also provides examples of activities, plans and by-laws that Summer Villages have implemented to preserve and enhance Alberta's lakes. According to the ASVA, "There are lakes in Alberta that are improving as a result of the concerted efforts of residents. The actions of interested and committed community groups, Summer Village Councils and individual residents, all working together, have a tremendous positive impact on our lakes."

To access the guide, visit the **ASVA website**.

Issues

Water for Life Goal: Healthy aquatic ecosystem continued…

Wetlands

AUMA participated in the Alberta Water Council's **Wetland Policy Project Team**, which developed ***Recommendations for a New Alberta Wetland Policy***. In 2008, it was estimated that Alberta's settled (white) area had lost 64 per cent of its wetlands and was annually losing between 0.3 per cent and 0.5 per cent of remaining wetland area (Alberta Water Council, 2008). The recommendations focus on protecting remaining wetland areas. A central feature of the proposed policy is a Wetland Mitigation Decision Framework.

Proposed Wetland Mitigation Decision Framework

Excerpt from AWC's Recommendations for a New Alberta Wetland Policy 2008:

When development is proposed that affects a wetland, the Government of Alberta, through the Water Act approval process, will require the regulator and proponent to use the following in descending order of preference, considering watershed and regional wetland objectives where they exist:

- Avoid loss or degradation of wetlands.
- Minimize loss or degradation, where avoidance is not fully achieved.
- The proponent must make a reasonable case to the regulator why the proponent cannot achieve avoidance.
- Compensate, as a last resort, for loss of wetland area or for wetland degradation. Compensation, as assessed by the regulator, refers to a suite of options to replace lost wetland area through science-based actions that are consistent with watershed and regional wetland objectives, where they exist.

Listed in descending order of preference, the suite of compensation options is as follows:

- Restoration of wetlands, where they existed previously.
- Construction of wetlands, where they did not exist previously or where their form has been removed through development active
- Enhancement of existing wetlands.

Additional compensation options such as, securement of existing wetlands and research for wetland reestablishment, may be considered as partial compensation by the regulator if an equal area of wetland is replaced and the combination of these options contributes to the policy goal. The policy establishes a number of principles that will be considered when determining compensation, including replacing the highest priority wetland functions; replacing wetlands in the area where the loss has occurred, where achievable; and replacing wetland type-for-type. Their form has been removed through development activities. (Alberta Water Council, 2008)

Issues

Water for Life Goal: Healthy aquatic ecosystem continued…

The Government of Alberta has indicated that it intends to adopt the recommended decision framework. However, instead of using area to measure the maintenance of wetlands, the government plans to use "function" in order to allow greater flexibility in the application of the framework. AUMA is now participating in a working group of experts looking at how to measure the function of wetlands.

Riparian Area Management

AUMA is participating in the **Riparian Land Conservation and Management Policy** Project Team, which is reviewing the current state of riparian land conservation and management in Alberta and making recommendations that would lead to the development of:

- Provincial riparian land conservation and management outcomes
- An education plan demonstrating how riparian land conservation and management meets the objectives of sustainability and ecological landscape planning, which is needed for overall watershed health (Alberta Water Council, 2011)

Municipal Action

The outcomes of projects such as the **Wetland Policy Project Team** will help inform municipal participation in the management of aquatic ecosystems. Municipalities don't have to wait until these projects are completed to improve aquatic health. Many of the activities listed below can be done in partnership with a Watershed Planning and Advisory Council (WPAC) and Watershed Stewardship Groups (WSGs). For further discussion on these groups, see the **Shared Governance** section.

To support municipal action, one WPAC, the North Saskatchewan' Rivershed Alliance has developed a ***Municipal Guide: Planning for a Healthy and Sustainable North Saskatchewan River Watershed***, which comprehensively examines the actions being taken by municipalities throughout the province.

Municipalities can support aquatic health in the following areas:

- Water Conservation - Using less water can leave more water in the environment to support ***instream flow needs***. This is one of the objectives of AUMA's **Water, Conservation, Efficiency and Productivity Plan**.
- Wastewater Treatment - This protects the receiving environment from contamination. For more information on increasing standards, see the following section on **Wastewater Regulations**.
- Land Use Planning – Watershed stewardship can be integrated into intermunicipal development plans, area structure plans and area redevelopment plans. This can protect ecosystems at the regional, municipal and neighbourhood level.
- Reserves and Easements - Municipalities have the ability to protect critical ecosystems through municipal reserves, environmental reserves and conservation easements.

Issues

Water for Life Goal: Healthy aquatic ecosystem continued…

- Bylaws - Municipalities can also enact or revise parks and natural areas bylaws, environmental reserve bylaws and sewer use bylaws to prevent the contamination of aquatic ecosystems. A **Model Sewer Bylaw** is available via **AMSC's Bylaw Library**
- Education and Outreach - Many municipalities are partnering with stewardship groups to increase awareness of aquatic ecosystems and what actions individuals can take to help protect them. For example, the cities of Brooks, Calgary, Lethbridge, St. Albert and Strathcona County have participated in Trout Unlimited Canada's nation-wide **Yellow Fish Road** program. This program helps Canadians understand how to prevent pollutants from entering storm drains, which is critical because they drain directly into rivers, lakes and streams.

These initiatives are critical to protecting the sources of water on which municipalities rely. Currently, when it comes to protecting source water emphasis is predominantly being put on treatment and distribution, but source protection is another important aspect of ensuring a safe and secure supply of drinking water.

DISCUSSION QUESTIONS:

Should AUMA and its members give greater priority to protecting aquatic ecosystems? If so, should AUMA work with Alberta Environment, WPACs and other such groups to compile promising practices Alberta municipalities are already implementing?

_____

_____

Do municipalities have the correct regulatory tools to help prevent pollution? If not, what is needed?

_____

_____

Is your municipality undertaking programs that could serve as a model for others?

_____

_____

Are you working with WPACs or WSGs on these initiatives?

_____

Trend – Low Impact Development

Alberta's Low Impact Development Partnership is championing new and improved development methods to protect ecosystems. Low impact development (LID) uses a variety of practical techniques to manage stormwater runoff close to its source. The source of stormwater runoff is where rainfall occurs. LID designs focus on implementing better site design practices and site-specific stormwater control options such as green roofs, stormwater capture and re-use. In addition, landscape designs that increase the absorption and filtering of rainwater can be used.

The Partnership is made up of municipal and provincial governments, watershed stewardship groups, universities, corporations, and individuals with an interest in promoting low impact development practices. It hosts educational conferences and workshops and provides access to the **Water Balance Model**, "an on-line decision support and scenario modeling tool for promoting stormwater management and stream health protection through implementation of 'green' development practices" (Alberta Low Impact Development Partnership, 2011).

Issues

Water for Life Goal: Healthy aquatic ecosystem continued…

Wastewater Regulations

Across Canada there is currently a patchwork of regulations governing wastewater and many different levels of municipal wastewater treatment, ranging from ***primary*** to ***tertiary***. In 2003, the federal, provincial and territorial governments in Canada, under Canadian Council of Ministers of the Environment (CCME), agreed to work collaboratively to develop a ***Canada-wide Strategy for Management of Municipal Wastewater Effluent*** .

On February 17, 2009, CCME endorsed The *Strategy.*

The ***Canada-wide Strategy for Management of Municipal Wastewater Effluent*** does the following:

- Sets out a harmonized framework to manage discharges from more than 3,500 wastewater facilities in Canada
- Provides an agreed-upon path forward for achieving regulatory clarity for owners of municipal wastewater facilities
- Identifies performance standards for treatment of municipal wastewater that will increase protection for human health and the environment on a national basis
- Promotes bilateral agreements between the federal government and provinces and territories to ensure one-window regulatory delivery and governance

Municipal associations including the AUMA and FCM were engaged and consulted during the development of the CCME *Strategy*. AUMA members also had an opportunity to provide input on the *Strategy* through consultations held throughout its development. Overall, Alberta municipalities and AUMA were supportive of development of a Canada-wide strategy as it appeared that it would raise the rest of Canada up to Alberta's standards. AUMA endorsed the *Strategy*, and joined FCM and other provincial associations in calling for a cost-shared national plan to meet the *Strategy's* requirements.

In Alberta it has been determined that there is no need to change the provincial regulation related to management of municipal wastewater to implement the *Strategy* as it is consistent with Alberta Environment's requirements. The only required modification is to update the *Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems* to include additional monitoring requirements, as discussed below.

To make the federal regulations affecting municipal wastewater treatment consistent with the *Strategy*, the federal government has began preparing *Wastewater Systems Effluent Regulations* that are expected to be ready by summer of 2011.

Issues

Water for Life Goal: Healthy aquatic ecosystem continued…

Onsite Sewage Disposal Systems

Not all municipalities run wastewater collection and treatment facilities. Residents of rural municipalities and many summer villages rely on onsite sewage disposals systems. These systems come in a variety of forms including septic tanks, holding tanks, fields, mounds, sand filters, packaged sewage treatment plants and open discharge.

Private onsite sewage systems handling less than 25 cubic metres per day are regulated by Alberta Municipal Affairs under the *Alberta Safety Codes Act*. Under the Act, the *Private Sewage Disposal Regulations* set out *Alberta Private Sewage Systems Standards of Practices* specifying design standards, installation standards and material requirements.

Despite the current standards, the lakes of many Summer Villages are being threatened by faulty or ill-maintained onsite sewage systems. In April 2011, AUMA appointed two Summer Villages representatives to a Task Force on Alberta Private Sewage Systems Standards of Practice that is looking at how bylaws and other processes can improve private systems. The Task Force is expected to release recommendations in 2012.

An additional challenge is that onsite systems require periodic removal of solids, referred to as septage, which must either be disposed of at an approved wastewater treatment facility, or a Letter of Authorization must be granted by Alberta Environment for land application. There have been ongoing issues with the ability of small municipal treatment plants to process septage hauled in from surrounding onsite sewage systems. Land application is being phased out, with a partial ban implemented in 2010.

AUMA is a member of the **Septage Management Advisory Committee**, which provides advice and recommendations on improving septage disposal. More information on the Committee and the recommendations they have put forward can be found on Alberta Environment's **Septage Management Webpage**.

Another resource for municipalities is AAMDC's Model Process for Subdivision Approval and Private Sewage, which provides a guide for the evaluation of a proposed subdivision that will rely on private sewage. The guide helps determine if private sewage systems are a suitable wastewater treatment method for the proposed subdivision.

The Model Process now consists of three documents, each available at **AAMDC** or by clicking on the titles below:

- **The Model Process for Subdivision Approval and Private Sewage**
- **Model Process Technical Resources**
- **Example Level Three Assessment of Site Suitability**

Issues

Water for Life Goal: Healthy aquatic ecosystem continued…

Concerns have been raised about inconsistencies between the initial draft of the regulation and CCME's *Strategy*. Advocacy efforts around the regulations are focused on ensuring consistency with the *Strategy* and dealing with potential financial implications.

National Monitoring and Reporting Program

The CCME's *Canada-wide Strategy for Management of Municipal Wastewater Effluent* outlines national standards for monitoring and reporting. These standards will also be covered by the federal government's *Wastewater System Effluent Regulations*.

The monitoring goal set in the *Strategy* is for all facilities to begin to monitor effluent quality for compliance with National Performance Standards and Effluent Discharge objectives. The level of monitoring each facility is required to complete will be determined by the size of the facility (amount of discharge) as well as an "Initial Characterization" monitoring process over one year. For more information on monitoring requirements see **Appendix A of the *Strategy***.

Timing of the monitoring requirements coming into effect at a national level is still under discussion by the CCME. Alberta Environment indicates that Alberta municipalities are already monitoring for compliance with the standards and objectives. There will only be a few additional monitoring requirements, depending on the size of the municipality, which will come into effect in 2012.

It is also the goal of *the Strategy* that by 2014 environmental monitoring at a watershed level be better defined in order to improve measurement of how the receiving environment is being impacted. The nature and extent of environmental monitoring is still to be determined. In Alberta, watershed level monitoring is lead by ***Watershed Planning and Advisory Councils***. Many WPACs already have monitoring systems in place, so these groups will need to be engaged in the development of environmental monitoring requirements.

In relation to reporting, the goal of the *Strategy* is that by 2012, "all owners of facilities will meet public reporting requirements as per the requirements established by the jurisdiction." The federal government is leading a coordinating committee in the development of an online national database to house regulatory reporting information.

The CCME has done some initial cost estimates, which put the potential expenditures for monitoring and reporting in the hundreds of millions in the short-term, and up to $13 billion over 30 years. Alberta Environment indicates that it needs to further analyze current practices and the potential impact of additional requirements before it can develop an accurate cost estimate specifically for Alberta.

Issues

Water for Life Goal: Healthy aquatic ecosystem continued…

Financial Impact of Proposed Federal Waste Water Effluent Regulations

In March 2010, Environment Canada released proposed *Wastewater System Effluent Regulations* for consultation. The proposed regulations were supposed to be based on the *Canada-wide Strategy*. However, there were discrepancies between the regulation and the *Strategy*. For example, the proposed regulations contain an effluent quality standard for ammonia, which was not included in the *Strategy*.

Of greater concern to municipalities across the country, including Alberta, was the combination of a cost analysis, which greatly underestimated the cost of upgrading treatment facilities to meet new regulations, with the lack of any plans for a cost-sharing arrangement. The cost estimates provided in the *Regulatory Impact Analysis Statement (RIAS)* suggested that upgrading to meet the regulations would cost approximately $6 billion. In the *Strategy* released just a year before and endorsed by the federal government, the CCME estimated that the cost would around $13 billion.

Recognizing the challenges of the proposed regulations, AUMA once again collaborated with Alberta Environment and the FCM to express concern over the implications of the regulation. FCM coordinated a nation-wide campaign calling for "a long-term, national plan to eliminate the infrastructure deficit. This plan includes a cost-shared strategy to upgrade wastewater-treatment facilities where necessary" (FCM, 2010).

In response to these concerns, the federal government did hold bilateral meetings with each of its provincial counterparts, as well as FCM. At the time of writing, indications are that a new draft of the Regulations will be released shortly.

DISCUSSION QUESTIONS:

Do you support AUMA's approach to working with Alberta Environment and FCM to monitor the potential impact of Federal Wastewater System Effluent Regulations and to collectively advocate for funding within in the broader call for a long-term national plan to eliminate the infrastructure deficit?

_____

Municipal Concerns Regarding Costs

Alberta municipalities have raised concerns that even $13 billion is an underestimation given the cost of upgrading treatment facilities. As an illustration of this point, AUMA was copied on a letter the mayor of the City of Brooks sent to the Government of Canada on May 18, 2010, expressing concerns with the costs. In the letter, the mayor notes that a detailed study would be required to determine any additional costs of the regulations. He states,

"In 2008, the City conducted a wastewater study and it was identified in that report that approximately $25,000,000.00 in improvements would be required to our existing infrastructure spread out over a period of twenty years. Obviously this did not take into account any infrastructure improvements which would be required as a result of these new regulations."

The RIAS estimated that 949 facilities across the country, including 48 in Alberta, would require upgrades. If the cost of upgrades to the treatment facility in Brooks is any indication, the Canada wide costs will far exceed $5.9 billion.

Issues

Water for Life Goal: Healthy aquatic ecosystem continued…

Trend of the Future? Reclaimed Water

Municipalities have expressed interest in the potential of reclaimed water to increase water conservation and efficiency. According to Health Canada, "household reclaimed water is wastewater from residential sources such as sinks, bathtubs, showers, washing machines and toilets that is treated and reused for beneficial purposes (e.g., toilet flushing)" (Health Canada, 2010). Countries such as Australia have incorporated reclaimed water systems into new developments to reduce water use in water scarce areas. In Canada, federal and provincial governments are working to come up with management frameworks to deal with the potential health risk to users. These health risks predominantly arise from pathogens, which can be responsible for severe gastrointestinal illness (Health Canada, 2010).

The Government of Alberta has established a Reclaimed Water Working Group comprised of officials from Alberta Environment, Health and Wellness, the Alberta Health Services Board, Municipal Affairs and Transportation to develop a framework to facilitate the safe use of reclaimed water for domestic applications, such as toilet flushing and landscape irrigation.

According to Alberta Municipal Affairs, the framework being developed by the working group will establish:

- Approved uses for reclaimed water
- Water quality and technical standards or guidelines
- A management system (e.g. approvals, monitoring and reporting requirements) (Alberta Municipal Affairs, 2010)

Nationally, the Federal-Provincial-Territorial Committee on Health and the Environment (CHE) has established a working group comprised of government officials and invited experts to examine various aspects of reclaimed water. Work of the group includes:

- Releasing **Canadian Guidelines for Domestic Reclaimed Water for Use in Toilet and Urinal flushing**. (Alberta's reclaimed working group is currently looking at how to integrate these guidelines into Alberta's standards and regulations)
- Developing technical guidelines for household reclaimed water systems
- Participating in a Canadian Standards Association committee that is developing a testing protocol for the certification of residential non-potable water treatment systems
- Partnering with the Canada Mortgage and Housing Corporation, Ontario Municipal Affairs and a number of municipalities to help the University of Guelph develop guidelines for design, construction and maintenance of residential rain water harvesting

For more information, visit Alberta's **Reclaimed Water Working Group** website.

Issues

Water for Life Goal: Reliable quality water supplies for a sustainable economy

The Alberta water allocation system and global climate change are significant factors impacting the reliability of water supplies. Currently, both of these issues are subjected to controversy and there is great interest in how these issues will impact Alberta water supplies. This section provides background information on the water allocation system and how it has evolved over time. It also presents the different perspectives on the current controversy surrounding how water allocation transfers are addressed. Finally, this section explores climate change and the potential for it to increase the instances of extreme weather events such as droughts and floods.

Water Allocation

Population, economic growth and climate change have increased water demand and altered water supplies. These changes to water supplies have raised the need to review how water in Alberta is allocated. However, there is controversy around which topics should be reviewed and how changes to the system should be made.

Background

Throughout the 1900s, water management in Alberta focused on identifying the portion of annual water required for conveyance and transboundary apportionment commitments (see section on **Transboundary Agreements** for more information). The remaining water was available to allocate through a licensing system (water licences) to water users such as industry, municipalities and irrigators (Alberta Water Council, 2009). Since 1894, water licences have been granted and administered based on the ***First in Time First in Right (FITFIR)*** principle. FITFIR recognizes priority among licensed water users based on the date their licence was first issued.

Licences were and still are required for any diversion of ground or surface water with a few exceptions. Licences are not required for:

- Statutory household use*
- Traditional agricultural use for original landowners*
- Firefighting
- Wells equipped with hand pumps

* These uses are volume constrained, up to 1,250 cubic metres (m^3) for household use and 6,250m3 for agricultural.

Issues

Water for Life Goal: Reliable quality water supplies for a sustainable economy continued…

Water licences identify:

- The water source
- The location of the diversion site
- The volume allowed to be diverted
- The rate and timing of water to be diverted
- The priority of the "water right"
- Any conditions to which the diversion must adhere.

More information on water licences can be found on Alberta Environment's webpage, ***Water Act: Allocation of Water***.

Water Use Reporting: Information for Decision Making

As shown in Figure 26, information is available on water allocation in the province. However, the amount of water allocated does not necessarily equate to the amount of water used. Until recently, there has not been a common, consistent system for water licence holders to report on their water use. In 2005, Alberta Environment developed the online Water Use Reporting (WUR) System to provide:

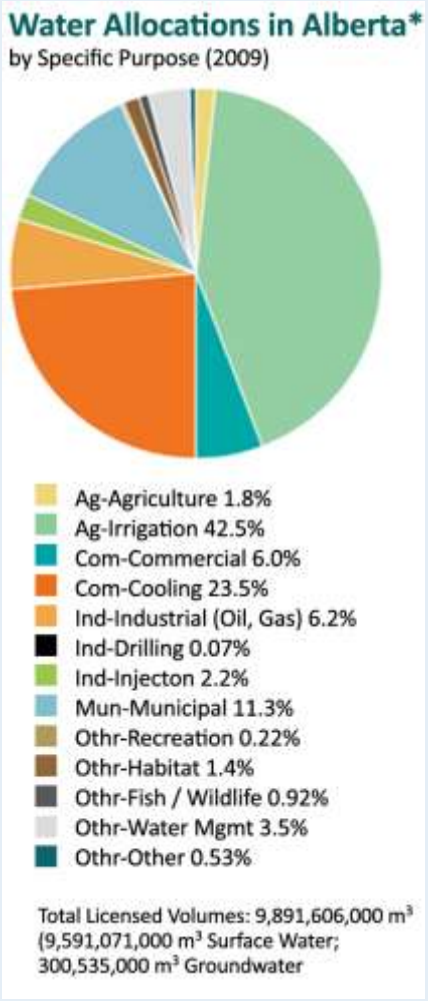
- A common method of reporting for all water users
- Easy to access information on water use
- The ability to measure progress in water conservation

AUMA recognized the importance of water reporting and made the use of the WUR system a target in its Water Conservation, Efficiency and Productivity Plan. Alberta Environment has recently amended all water licences in the province to make using WUR a requirement.

As the quality of decision making is often only as good as the quality of data available, the WUR system is an essential element of water management decisions, including decisions regarding water allocation and conservation.

As of July 2011, only 46 per cent of municipalities with water licences are regularly reporting water use on WUR.

Figure 26: Water Allocation in Alberta



DISCUSSION QUESTIONS:

Is your municipality reporting water information online?

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Issues

Water for Life Goal: Reliable quality water supplies for a sustainable economy continued…

The State of Municipal Allocation

AMSC used its *Water/Wastewater Infrastructure Survey* to try to obtain a better understanding of when members will exceed their current water allocation and how concerned they are about exceeding their allocations. While the Water Use Reporting system will provide a more comprehensive picture of allocation, the survey provides some interesting findings in terms of the degree of variation among when municipalities believe they will exceed their allocation and their level of concern.

The survey found:

- The majority of municipalities north of Edmonton believe that they will not exceed their current water allocations in the next 20 years and are not concerned about future water supplies
- Major cities, including Calgary, Edmonton, Red Deer and Lethbridge have secure water supplies and have no concerns about exceeding their current water allocation
- Municipalities on the Alberta-Saskatchewan border predict they will exceed their current water allocation in the next 10 years, but are not concerned about obtaining additional water supplies
- The municipalities with the greatest level of concern are those that predicted they will exceed their current water within the next 10 years
    - These municipalities are mainly small and medium municipalities in the southern region and are located directly outside cities or are along major transport corridors
    - These locations are under stress because:
        - They have high rates of population growth and population growth is the primary reason municipalities are predicted to exceed their water allocation
        - There is less water available in southern Alberta than in the north
    - The primary reasons for concern are:
        - The complexity and cost of obtaining additional water licenses/allocations
        - The cost of expanding the capacity of treatment facilities

Figure 27: Predictions of when municipalities will exceed current water allocation and concern about exceeding water allocation: Alberta

Issues

Water for Life Goal: Reliable quality water supplies for a sustainable economy continued…

These areas of concern are the major drivers for many members' interest in the government improving the allocation transfer system, as well as the growing trend toward regionalization. As will be discussed in more detail in the section on **Safe Secure Drinking Water Supplies**, many municipalities are looking to regionalization to address concerns over allocation.

The map on the previous page illustrates when municipalities believe they will exceed their current water allocation. The presence of a yellow or red thumbtack indicates the areas of Alberta where there are the greatest levels of concern regarding water supply and security.

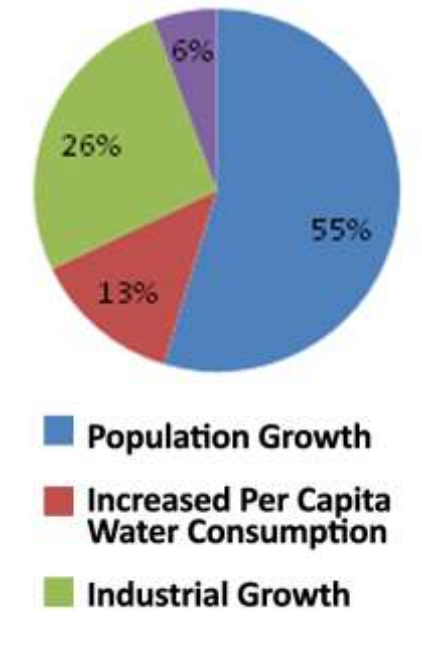
Transfers

Among the many new water management measures the *Water Act* introduced, is the ability to transfer a water allocation "in whole or in part, temporarily or permanently to another party". The *Water Act* stipulates that transfers are only allowed in those basins where an approved water management plan exists that expressly allows transfers and where transfers would have no adverse impacts on the environment or other water users. The *Water Act* adds a statutory right to water for ***riparian*** purposes and gives the Minister of the Environment the ability to hold back 10 per cent of any water transfers for water conservation objectives that support riparian health. Under the *Water Act,* the minister also has the ability to prioritize water for human consumption over all other uses in an emergency.

South Saskatchewan River Basin

In 2002, the first water management plan under the *Water Act* was adopted in the South Saskatchewan River Basin (SSRB). This southern basin was experiencing significant growth pressures and faced a situation where more water was allocated in the region than was actually available after meeting apportionment requirements under the Apportionment Agreement with Saskatchewan. It should be noted that Alberta has always been able to meet its apportionment obligations to Saskatchewan, as not all water that is allocated is necessarily used. However, the fact that more water was allocated than was available did raise significant concerns.

Figure 28: Predicted reasons why municipalities may (or have exceeded) their water allocation



High rates of population growth and industrial growth is the primary reason municipalities are predicted to exceed their water allocation (Alberta Urban Municipalities Association, 2011)

Issues

Water for Life Goal: Reliable quality water supplies for a sustainable economy continued…

In response, Phase I of the SSRB Water Management Plan was developed which, among other things, authorized consideration of transfers and allowed up to 10 per cent of water being transferred to be held back by the Government of Alberta to meet ***water conservation objectives***.

In 2006, Phase II of the SSRB Water Management Plan was adopted, placing a moratorium on new water licence applications in the Oldman and South Saskatchewan sub-basins. The only way to obtain access to water in these sub-basins is through water licence transfers, temporary assignments or through supply from a senior licence holder. In the latter case, the amendment has to be made to the senior licence holder if the licensee is providing a supply for a different purpose than originally allocated. For example, if an irrigation district provides water to a municipality.

In 2007, the Minister of Environment approved the first water allocation transfer in the SSRB. The Municipal District of Rocky View struck an agreement with the Western Irrigation District (WID) to pay $15 million to transfer an allocation of 6,700 cubic meters (m^3) of water per day to supply a proposed mega-mall, horse racing track and casino complex near Balzac. The WID indicated payment would be used to cover a section of open channel canal into a pipeline thereby increasing efficiency and enabling saved water to be transferred to the new use. The Government of Alberta held back 10 per cent of the transfer to improve flows in the Bow River.

There was a great deal of controversy around this transfer. In addition, other water users wanted to gain more allocation through transfers but found the process cumbersome. In response to identified shortcomings in the transfer system and the realization that transfers would be required to meet future needs, Alberta Environment initiated a Water Allocation Management System Review. The review was initiated as part of the renewal of the *Water for Life Strategy* in 2008.

Water Allocation Management System Review

According to Alberta Environment, the review calls for the management and allocation of Alberta's water in a manner that:

- Supports sustainable economic development and the strategic priorities of the province
- Sustains aquatic ecosystems
- Ensures a contribution to Alberta's natural capital
- Ensures Albertans' quality of life is maintained (Alberta Environment, 2010)

Alberta Environment also specifies that the purpose of the review is to develop an allocation management system that:

- Allows licensees to manage in times of scarcity
- Allows government and others to help manage the environment

Issues

Water for Life Goal: Reliable quality water supplies for a sustainable economy continued…

- Allows flexibility so that water can be moved to different uses when needs and values change
- Provides for a competitive economy and quality of life
- Supports regional outcomes
- Adapts to managing extremes (e.g. floods, drought)
- Supports and encourages water conservation (Alberta Environment, 2010)

The government asked two groups to provide initial input to the review:

1. A **Minister's Advisory Group**, was appointed by the minister to:
    - Review Alberta's existing water allocation management system
    - Understand current and future pressures and issues
    - Make recommendations to improve the system.

2. The **Alberta Water Research Institute** examined water allocation policies and practices of other jurisdictions facing water challenges similar to Alberta, including the western United States and Australia.

In addition, the **Alberta Water Council** reviewed the current water allocation transfer system and provided recommendations for improving the system.

Based on the input of these organizations, Alberta Environment indicates that it is currently investigating the potential for changes in five areas:

- Managing risk and providing access to water allocations
- Protecting water for environmental and other purposes
- Diverting water for social and economic purposes, including the use of market-based instruments to allow for efficient reallocation of water resources
- Maintaining legitimate and credible oversight of the system
- Enhancing the information, knowledge and research base to support decision-making. (Alberta Environment, 2010)

For a more detailed explanation of these five areas, visit Alberta Environment's **Considerations under review**.

Issues

Water for Life Goal: Reliable quality water supplies for a sustainable economy continued…

The Government of Alberta has indicated that it wants to do further consultations with Albertans, including municipalities, on these proposed improvements. However, given the current political climate in the province, these consultations have so far been put on hold.

To provide some context for the debate about the water allocation system, this paper will now look at:

- The recommendations put forward by the Alberta Water Council's Water Allocation Transfer System Upgrade Project (WATSUP), in which AUMA participated
- The perspective of environment non-governmental organizations (ENGOs)
- The experience of other jurisdictions

AWC Recommendations for Improving Alberta's Water Allocation Transfer System

In 2008, the Alberta Water Council established a Water Allocation Transfer System Project Team in order to "develop recommendations to better utilize and enhance Alberta's allocation transfer system to contribute to *Water for Life* goals" (Alberta Water Council, 2009). The team was made up of fifteen sectors representing government, industry and environment non-governmental organizations. A member of AUMA's Board of Directors represented AUMA and its members on the project team.

The project team partnered with the Alberta Water Research Institute to host a symposium titled *Water: How Alberta Can Do More with Less*. The symposium brought together experts from across Canada, North America, Europe and Australia. Discussions at the symposium greatly informed the project team in drafting its *Recommendations for Improving Alberta' Water Allocation Transfer System Report*.

A Second Transfer Example

The review is ongoing, but in the meantime, other transfers have taken place under the current system. In June 2010, The Town of Okotoks, located in the SSRB, announced that it acquired a licence for 200,616m^3 of water from a Calgary energy company, CanEra Resources, for $1 million. Money from the transfer went directly to a charitable trust to support local projects because CanEra Resources states that it does not want to profit from something it did not pay for to begin with (Patterson, 2010). Officials from Okotoks note that acquiring the license was a long and arduous process. The license will allow the town to grow, but additional allocation is required for the municipality to reach a population of 30,000. This is the population the town believes the local ecosystem of the Sheep River can support. High rates of population growth and industrial growth is the primary reason municipalities are predicted to exceed their water allocation (Alberta Urban Municipalities Association, 2011)

Issues

Water for Life Goal: Reliable quality water supplies for a sustainable economy continued…

The report summarizes the recommendations into six areas:

1) Protected Water: Before a water allocation transfer system can function effectively, an amount of water must be set aside for environmental and non-consumptive purposes, as determined in the public interest by the process established for creating a water management plan. This protected water will not be traded in the water allocation transfer market. This step is the foundation of, and contributes to certainty in, the water allocation transfer system. Additional activities required to ensure our water sources remain healthy and sustainable for future generation are:

- Setting the amount of protected water as a Water Conservation Objective for each of Alberta's seven major basins
- Developing approved Water Management Plans
- Regularly reviewing and improving such plans

2) A Water Allocation Transfer Market: A robust market must be established to incent the transfer of all or a portion of a water allocation between users. An active water allocation transfer market must be fair to all participants. It must be transparent and administratively efficient with clear objectives, principles and criteria. Once transfers are approved for use in a basin, all existing water allocation licence-holders 'in good standing' can participate in a market, subject to conditions or requirements around participation, specific to each basin.

3) Unused Water for the Market: Certainty about the amount of water available for transfer is also a foundational requirement of the water allocation transfer system. Unused water or water gains made through conservation and efficiency can be made available to meet the needs of new users. Although there are acceptable reasons to hold unused water in a licence, criteria need to be developed to clarify such situations. In addition, a decision tree is proposed for determining if an existing licence is transferable. The principles of 'in good standing' and 'reasonable prospect of use' are used to guide decision-making. Every potential transfer must be assessed to ensure it satisfies the 'does no significant harm' principle.

4) Conserving Water: Water conservation is a cornerstone of the Water for Life strategy. Improved conservation efforts will make more water available to meet ecosystem and economic goals of the province. Hence, an improved water allocation transfer system should promote water conservation, efficiency and productivity and should not be at cross-purposes to such initiatives. Additionally, to manage their risk, all water licence-holders should be prepared for, and develop, a Water Shortage Response Plan.

5) Applying for a Transfer: The water allocation transfer system requires an effective application and approval process. To facilitate this, two classes of applications are proposed based on the level of risk to society and the level of discretion to be exercised by the director in the public interest:

- Simple transfers will be processed relatively quickly
- Transfers that are more complex will come under increasing scrutiny by the director, by directly affected parties, and those who may achieve public interest standing.

Water for Life Goal: Reliable quality water supplies for a sustainable economy continued…

6) Data and Information Platforms: An improved water allocation transfer system will require solid data and sound information to inform decision-making. An information platform must be accessible to all participants – both parties in a transaction must have access to available volumes, prices and other pertinent information (Alberta Water Council, 2009).

Feedback

AUMA used its *Weekly Digest* to share a draft of the *Recommendations* with its members and issued a call for feedback. Few responses were received from members.

One municipality did write expressing its opposition to water licences being used as a commodity (Crowsnest Pass, 2009). The Board sent the letter directly to the Alberta Water Council so that the municipality's concerns would be heard.

Overall the board supported the AWC's recommendations, and sent the following feedback:

- AUMA supports the need to establish Water Conservation Objectives in each basin before establishing a transfer market
- Care needs to be taken to ensure that market mechanisms reward conservation efforts made by municipalities and other sectors and protects water for basic human and ecological needs. In particular, the AUMA supports the following statement in the Recommendation report:
    - "The Water Allocation transfer system should incorporate Conservation Efficiency and Productivity Principles. Recipients of a water transfer should be encouraged to participate in sector CEP planning."
- With reference to the recommendation "that all licences delivering water for 'community water supplies' be required to prepare a water shortage response plan", AUMA's Principal Number Five states: "any new standards or requirements imposed by the provincial or federal orders of government must be fully funded by that order of government".
- Due to the complexity of the issues involved in establishing a market, there is a need to provide licensees, including municipalities, with education in order to receive meaningful input on the development of the system and effective participation in the system once created.

In the end, the Alberta Water Council released its recommendations report with a total of 23 recommendations, most of which were supported by consensus. However, there were two recommendations that did not receive consensus support. These recommendations, which some saw as fundamental to how a transfer system would operate, focused in doing more to protect water for instream flow needs.

You can find the *Recommendations for Improving Alberta' Water Allocation Transfer System Report* on the **Alberta Water Council's website**.

Issues

Water for Life Goal: Reliable quality water supplies for a sustainable economy continued…

ENGO Concerns – Our Water is Not for Sale Campaign

Over the past year, controversy has grown around the water allocation system. Most of the controversy centers on the use of market based instruments for reallocation of water. Opposition to a market based transfer system has coalesced around the "Our Water is Not for Sale" campaign. Public Interest Alberta, the Council of Canadians and Sierra Club Prairie have spearheaded the campaign and a number of other ENGOs, labour groups, and municipal councillors have joined.

The concerns raised by the campaign are summed up in a letter to the Minister of Environment posted on the **Our Water is Not for Sale** website. Overall, supporters of the campaign are "concerned about the government's current review of the *Water Act* and its potential impact on ecosystems, human health, treaty obligations, and the future development and sustainability of our communities and the economy in Alberta".

Concerns the group raises include:

- Lack of public consultation in the review process
- The focus on only water markets as part of the review and not other non-market options for an allocation transfer system
- Water markets allow those who may have been originally over allocated water at no cost to profit of the sale of that allocation to the highest bidder
- Failures in market systems in Australia and Chile (See next section on **Markets Around the Globe**)

In terms of the lack of public consultation, one of the claims of the campaign is that "the Alberta Government has consulted exclusively behind closed doors with its own appointed experts". However, the government has been clear that it will not be making any changes to the allocation system until it has held public consultations. These consultations are still to come. In addition, while the Minister's Advisory Group was indeed appointed by the government, the Alberta Water Council's Water Allocation Transfer System Upgrade Project

Our Water is Not For Sale Survey

During the municipal elections held in October of 2010, Our Water Is Not For Sale conducted an online survey of candidates. One hundred and eleven responses were received from candidates in twelve municipalities. The survey found:

- 95.7 per cent support official legal recognition of water as a human right
- 97.3 per cent said the province's water allocation system should prioritize basic human needs and ecosystem health while respecting treaty obligations to First Nations
- 88.6 per cent said that based on their current knowledge they do not favour the province's direction toward a water allocation system that would allocate water based on ability to pay and allow the market to determine access to water resources

A few respondents submitted written comments indicating that "the Alberta Urban Municipality Association has done a good job of keeping municipal leaders abreast of the allocation review" and that further education and consultation should take place through AUMA (Our Water is Not For Sale, 2011).

The **Our Water is Not for Sale website** contains a breakdown of the results, a backgrounder for municipalities and further comments on the water allocation review.

Issues

(WATSUP) team was made up of individuals appointed by their sector (including AUMA), not by the government.

It should be noted that the government is reviewing changes to the allocation transfer system, not only in terms of markets, but also taking into account the need to manage risk in times of scarcity, protecting water for the environment and other purposes, as outlined in the government's **Considerations under review**.

The Our Water Is not For Sale campaign calls for the creation of an allocation system that prioritizes:

- Sufficient instream flow needs
- Ecosystem health
- Basic human need above all other uses
- Treaty obligations to First Nations People

These priorities do not appear completely out of step with the review of the water allocation system. Disagreement emerges around the details of how these priorities would be integrated and implemented under any proposed changes.

Markets Around the Globe: Experiences in Chile and Australia

"The most common form of water conflict today is not the interstate water wars foreseen by so many international relations prognosticators, but rather the societal based conflicts between the proponents and opponents of controversial ways of manipulating water or the rules controlling it" (Conca, 2006).

The Our Water is Not for Sale Campaign puts forward Chile and Australia as examples of countries where water markets have failed. While the downside of the water market in Chile is clear, the situation is not as clear in Australia.

The Water Market in Chile

The Our Water Is Not for Sale website provides a link to a 2009 Article in the *New York Times*, ***Chilean Town Withers in Free Market for Water***. The article explains that the unfettered water allocation market in Chile has concentrated private ownership of water to such a degree that in one large southern region, a single electricity company from Spain, Endesa, owns 80 per cent of the water rights. Private ownership of water, coupled with a drought, has been disastrous for many communities. For example the town of Quillagua, which holds the Guinness book title "Driest Place on Earth", has to rely on trucks to provide water and all agriculture activity in the area has dried up (Bonnefoy, 2009).

The *Times* article includes an interview with J Bauer, an expert on Chile's water markets from the University of Arizona, who asserts that Chile went too far in deregulating the water market. It is interesting to note that he

compares Chile with Australia and the United States, stating that they have similar systems, but also stronger environmental regulation and conflict resolution mechanisms (Bonnefoy, 2009).

The Water Market in Australia

This more positive view of Australia's market system was echoed at the symposium organized by the AWC and the Alberta Water Research Institute, ***Water: How Alberta Can Do More With Less*** **.** The report on the symposium includes an explanation of how the Australian system works:

> In Australia, water users are entitled to a specific share of the water that is expected to be available, based on the volumes in storage and forecasts for runoff. This allocation can vary from year to year. There is a hierarchy of water use, with communities (critical human needs) having priority over irrigation and the environment. Due to the severity and length of the current decadal drought in Australia and the need to manage reduced supplies to maximum effect there are ongoing discussions and initiatives between the national and state governments regarding how water allocations might move between the states within the same river basins. Each state has slightly different rules in place for water allocation transfers within each state. A number of key initiatives to develop a national strategy to recover water for the environment and improve sustainability are underway in Australia. (Alberta Water Research Institute, 2009)

The Our Water is Not for Sale campaign also draws on a report published by the Conference Board of Canada, ***Going With the Flow? Evolving Water Allocations and the Potential and Limits of Water Markets in Canada*** to argue against a market based approach. However, the report itself takes a more balanced view of the pros and cons of such an approach. In terms of Australia, the report concludes:

> The Australian experience has also been mixed, with some benefits and some concerns. Water trading has been largely among irrigators, especially in the Murray- Darling Basin region. Evidence shows that markets facilitated the reallocation of water (with the associated socio-economic benefits), but also that rural communities declined as a result of drought and policy-induced scarcity. An Australian National Water Commission report found that selling off water helped some dairy farmers avoid foreclosure during the drought, but also confirmed that permanent water trading was encouraging other farmers to leave the land. The report also found that it was difficult to separate the effects of water trading from the effects of the long-lasting Australian drought. (Oliver M. Brandes, 2008)

Water Market Benefits and Limitations

Overall, presenters at the symposium generally agreed that the use of market based systems is beneficial when governments set clear and consistent ground rules for market operation that include protection of water for environmental needs.

Issues

Water for Life Goal: Reliable quality water supplies for a sustainable economy continued…

The Conference Board of Canada also outlines some benefits of market-based systems, including:

- Markets provide flexibility and accountability for individual users as they decide whether to buy or sell
- Prices derived through markets provide incentives for water conservation efficiency of use
- Markets can allow government to meet environmental demands through purchasing allocations from existing users rather than expropriation
  (Alberta Water Research Institute, 2009) & (Oliver M. Brandes, 2008)

Presenters at the symposium also stated that in many places where markets are introduced, there is initial stakeholder reluctance, compounded by lack of knowledge about the system. However, the report on the symposium states, "The collective experience expressed at the symposium was that there is greater acceptance of water markets and other management practices when the public and stakeholders are allowed to participate in the process of setting environmental and water management goals and objectives" (Alberta Water Research Institute, 2009). In Alberta, **Watershed Planning and Advisory Councils** can provide the venue for this participation.

Based on the Conferences Board's review of other jurisdictions within Canada and elsewhere, its report does point to the limitations of market-based systems. These limitations include the fact that markets:

- Cannot compensate for poor management practices
- Cannot solve problems of over allocation
- May create incentives for further withdrawals in already stressed ecosystems
- Have impacts on rural agricultural economics which are unclear
- Have impacts on third parties which are hard to predict (Oliver M. Brandes, 2008)

In response to these limitations the Conference Board recommends, "Continued dialogue, increased understanding of policy options, and established ground rules should be minimum prerequisites to expanding the role of markets in Canadian water allocation regimes."(ibid)

New Proposal: Alberta Water Authority

Just as this paper was being written, the Premier's Council for Economic Strategy released a report entitled, **Shaping Alberta's Future**. The council proposes "flagship" initiatives that they "think have the potential to radically transform the Alberta economy, putting it on a trajectory that will secure future prosperity". One of these initiatives is the creation of a new Alberta Water Authority with the mandate to provide input into policy development and to serve as a single entity for oversight of water management (Premier's Council for Economic Strategy, 2011).

Cont'd on next page…….

Issues

Water for Life Goal: Reliable quality water supplies for a sustainable economy continued…

DISCUSSION QUESTIONS:
Do agree with the Premier's Council recommendation to create a new independent Alberta Water Authority to serve as single entity for oversight of water management?

_____

_____

AUMA's Role: Conservation and Consultation

AUMA's involvement in issues around allocation has taken a number of forms, including its **Water Conservation, Efficiency and Productivity Planning Initiative** and its engagement in the allocation system review. On a go-forward basis, AUMA will likely focus on fulfilling the Conference Board of Canada's recommendation for increased dialogue and understanding.

Some of the reasons that AUMA has taken action on Water CEP include:

- The availability of water and issues surrounding water allocation
- The costs involved in treating and distributing water
- The opportunity to prevent future environmental problems

Conservation can help municipalities extend the life of their allocation. Still, the reality is that population and economic growth can outstrip conservation efforts. The Town of Okotoks is a prime example as it is often cited for its conservation measures, yet it still needs to purchase extra allocation to allow for development.

Recognizing the importance of the allocation system to many of its members, AUMA participated in the Alberta Water Council's WATSUP Project. AUMA has also met with representatives of the Council of Canadians, the Sierra Club and Public Interest Alberta.

New Proposal: Alberta Water Authority continued…

The independent authority would report to the Minister of Environment and be funded through a regulated levy on water allocation. Its work would include:

- Creating and maintaining a fully integrated and accessible water information system to support planning and decision making
- Developing a 25-year infrastructure plan to meet projected demand. For example, on-stream (dams) and off-stream storage facilities (canals, fully depleted aquifers)
- Overseeing an Alberta allocation exchange, tracking trades and advising on policy changes to give water licensees more opportunity to sell, lease or trade some or all of their allocation

The council states, "attaching value to water will provide all users the incentive to store, recycle and safeguard it" (ibid).

Visit the **Premier of Alberta's Website** to read the full report.

Issues

Water for Life Goal: Reliable quality water supplies for a sustainable economy continued…

After much discussion, the AUMA wrote to the Minister of Environment to confirm its support for the Alberta Water Council's *Recommendations for Improving Alberta's Water Allocation Transfer System*. AUMA also emphasized the need to have more direct consultation with municipalities. The letter explains:

> This is a very complex issue that will impact our diverse membership in different ways. This is why we continue to stress the need for Alberta Environment to engage directly with our membership. AUMA is prepared to assist the department not only in consulting our members, but also providing education on current system works and the nature of the proposals being made. (AUMA, 2010)

This *Water Primer and Discussion Paper* serves as part of the education component mentioned in the letter. It can serve as a catalyst for further discussion on the potential impacts of various policy options for water management.

Climate Change Impacts - Expect the Unexpected

At the time of writing, floods are drowning portions of southern Alberta and Manitoba, while fire has destroyed much of Slave Lake, Alberta. These events serve as a reminder that despite all the technological and administrative advances, society is still vulnerable to environmental changes. Regardless of the type of water allocation management system developed, maintaining reliable water quality supplies is dependent on Alberta's ability to adapt to an ever-changing climate.

Research reviewed by Local Governments for Sustainability (ICLEI) has found that Canada has seen a change in the frequency of extreme temperature and precipitation events from 1950 to 2003. It is also predicted that Canada will experience increased temperatures, increased risk of flooding, drought, forest fires and various other extreme weather events. Although there is some debate as to the

DISCUSSION QUESTIONS:

Do you support the approach AUMA has taken to water allocation system review? What else, if anything, should AUMA be doing?

_____

_____

Are you comfortable with a market-based system for water allocation? Would you support such a system if:

- There was a higher degree of oversight by the government or a water authority coupled with a higher degree of transparency?

_____

-If licensees could only transfer water that they have conserved? That is licensees would not be able to transfer water that they had been allocated but never used.

_____

- If protected water was set aside for environmental and non-consumptive purposes as determined by the process established for creating a water management plan?

_____

Are there other non-market policy options that should be explored? If so, what are they?

_____

connections between extreme events and climate change, it is important to consider the consequences of these events and their implications for municipalities (ICLEI, 2011).

Extreme Weather in Canada

Table 6 below lists examples of Canadian extreme events, and their associated costs from 1991 to 2005. Each of these events is related to water – too much, too little, or in a dangerous form. Over half of the most costly events are related to drought.

Drought is something, Kirk Stinchcombe, one of Canada's most prominent municipal water management experts, says Alberta in particular needs to recognize. At the 2011 AAMDC Convention, Mr. Stinchcombe, pointed out that drought is a "normal" condition for Alberta:

- During the past two centuries, at least 40 droughts have occurred with multi-year episodes being observed in the 1890s, 1910s, 1930s, 1960s, 1980s, the early 2000s and in 2009
- A severe drought occurred in southern Alberta that lasted 40 years (1680-1720) according to tree ring analysis
- Severe droughts have generally occurred on 40-to-50-year intervals, but climate change is disrupting this pattern (Stinchcombe, 2011)

Table 6: Most costly natural hazards and disasters in Canada

Disaster	Year(s)	Location	Cost (billions- 1999 $)
Drought	1980	Prairies	5.8
Freezing Rain	1998	Ontario to New Brunswick	5.4
Drought	2001/2002+/-	National	5.0
Drought	1988	Prairies	4.1
Drought	1979	Prairies	3.4
Drought	1984	Prairies	1.9
Flood	1998	Sagueney, Quebec	1.7
Flood	1950	Winnipeg, Manitoba	1.1
Drought	1931-38	Prairies	1.0
Drought	1989	Prairies	1.0
Hailstorm	1991	Calgary, Alberta	1.0

(Etkin, 2004)

Issues

Water for Life Goal: Reliable quality water supplies for a sustainable economy continued…

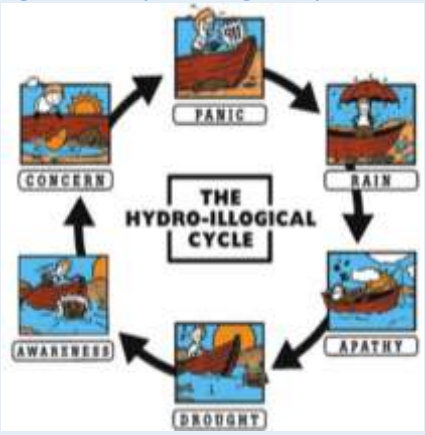
Approach

Water and climate change experts are calling for a change in how weather related emergencies are dealt with. They argue for a paradigm shift from disaster response to risk management, preparation and mitigation. This new approach involves:

- Monitoring, early warning, and prediction
    - Climate indices and indicators, water supply assessments, forecast
- Risk and impact assessment
- Mitigation and Adaptation (Stinchcombe, 2011)

It is hoped a new approach will help break the "hydro-illogical cycle" illustrated to the right. While the figure focuses on drought, the same cycle applies to flooding.

Figure 29: Hydro-illogical cycle



With the increasing awareness of the costs of climate change, ICLEI asserts that municipalities are beginning to assess their vulnerability to climatic changes and developing responses to protect their citizens and economies. While neither adaptation nor mitigation actions alone can prevent significant climate change impacts, together they form a comprehensive climate change response strategy. A comprehensive strategy will prepare communities for climate impacts and work to avoid worse future affects.

The AUMA has partnered with Alberta Environment, Alberta Municipal Affairs and the Alberta Association of Municipal Districts and Counties to develop the Municipal Climate Change Action Centre, which assists municipalities with mitigating climate change.

For more information about the Municipal Climate Change Action Centre, visit **the MCCAC website**.

Issues

Available Resources

The following table outlines the resources available to assist municipalities in adapting to climate change and extreme weather events.

Table 7: Resources for Adaptation

Resource	Organization	Information
Changing Climate, Changing Communities: Guide and Workbook for Municipal Climate Adaptation	ICLEI Canada	A compendium of resources that provide a milestone-based framework to assist local governments in the creation of adaptation plans to address the climate change that could impact their communities.
Flood Hazard Identification Program	Alberta Environment	The program includes: • Flood hazard mapping • Flood hazard studies searchable by community, stream or basin • Flood event documentation
Southeast Alberta Flood Management	Alberta Environment	The government is: • Providing $1 million in funding to assist the region with emergency preparedness efforts • Providing $200,000 in additional funds for flood risk mapping in the region • Working with municipalities to ensure they have the resources to handle a potential flood
Alberta Emergency Management Agency	Alberta Municipal Affairs	Leads the co-ordination of government, industry, municipalities and first responders involved in the prevention, preparedness and response to disasters and emergencies, including the delivery of vital services during a crisis.
Flood Damage Reduction Program	Environment Canada	A partnership with the provinces that aims to discourage future flood vulnerable development. Flood areas are mapped and designated governments agree not to build or support (e.g., with a financial incentive) any future flood vulnerable development in those areas. Zoning authorities are encouraged to zone on the basis of flood risk. New development is not eligible for disaster assistance in the event of a flood. Many communities in Alberta have been zoned based on these maps.
Prairie Adaptation Research Collaborative (PARC)	Partnership of the governments of Canada, Alberta, Saskatchewan and Manitoba	PARC's objective is to generate practical options to adapt to climate change. It also fosters the development of new professionals in the emerging science of climate change impacts and adaptation.

AgroClimatic Information Service (ACIS)	Alberta Agriculture	An interactive tool that provides current and historic maps and access to weather data received from more than 270 weather stations in and around Alberta.
Agriculture Drought Risk Management Plan for Alberta	Alberta Agriculture	A framework for a coordinated, pro-active approach to reduce the short- and long-term effects of drought and climate change on Alberta farmers and ranchers. It will guide government agencies in helping producers be more prepared and less vulnerable to drought and reduce the before, during and after impacts of a drought event.

DISCUSSION QUESTIONS:

Does your municipality have a water shortage risk management plan in place to address long-term drought?

_____

_____

Does your municipality have a flood management plan?

_____

_____

Are municipalities provided adequate support to prevent and respond to extreme weather events?

_____

_____

Are additional resources or new approaches needed?

_____

_____

Is there a need to help standardize the content of drought and flood management plans?

_____

_____

"Water is life. It's the briny broth of our origins, the pounding circulatory systems of the world. We stake our civilizations on the coasts and might rivers. Our deepest dread is the threat of having too little – or too much."
– Barbara Kingsolver 2010

Appendix A Glossary of Terms

Abbreviations – Commonly used in water management

AENV - Alberta Environment

AWWA - American Water Works Association

EPEA - Environmental Protection and Enhancement Act

GCDWQ - Guidelines for Canadian Drinking Water Quality

GWUDI - Groundwater under the direct influence of surface water

Aquatic Ecosystem: Components of the earth related to, living in, or located on water or its shores, including its organic and inorganic matter, living organisms and their habitats, and their interacting natural systems (*Alberta Water Act*).

Boil Water Advisory: A Boil Water Advisory is issued to either private individuals or the public in general advising that a specific water supply is unsafe for human consumption. The advisory will contain specific recommendations that individuals or the public in general may implement to protect public health (Alberta Health And Wellness, 2004).

Boil Water Order: A Boil Water Order is an Executive Officer's Order issued pursuant to Section 62 of the *Public Health Act*. It is issued to the owner and/or the operator of a public or communal drinking water system and includes specific instructions that the owner and/or the operator must follow (ibid).

Consensus decision-making: Bringing together of a group of people in an attempt to address the interests or concerns that underlie each party's position. The focus is on finding solutions to the problems faced by each stakeholder so each participant can agree on a set of recommendations. While participants may not agree with every detail of the overall package, the result of a successful consensus is a set of decisions that everyone can "live with," because it reflects the interests of each stakeholder. Agreements reached through a consensus exercise are likely to be more innovative and longer lasting than ones reached through traditional negotiation processes.

Cumulative effects: The environmental effects of an action in combination with the impacts of other past, existing and proposed actions

Disturbance: A disruption of existing conditions that causes the structure, processes and functions of an ecosystem to change (Alberta Water Council, 2008).

Groundwater: Water located in aquifer(s) that are either isolated from the surface, or where the subsurface soils act as an effective filter that removes micro-organisms and other particles by straining and antagonistic effect, to a level where the water supply may already be potable but disinfection is required as an additional health risk barrier.

Groundwater under the direct influence of surface water: A raw water supply, which is groundwater under the direct influence of surface water, means ground water having incomplete or undependable subsurface filtration of surface water and infiltrating precipitation.

Appendix A Glossary of Terms

Continued…

Hydrological cycle: A process that involves precipitation, evaporation, evapotranspiration (from plants), condensation, infiltration and percolation (through the ground), water storage (in water bodies and in the ground) and surface runoff (North Saskatchewan Watershed Alliance, 2008).

Precautionary principle: Recognizes that the absence of full scientific certainty shall not be used as a reason to postpone decisions when faced with the threat of serious or irreversible harm (Health Canada). Canada has a long-standing history of implementing the precautionary approach in science-based programs related to health and safety, environmental protection, and natural resources conservation.

Primary (wastewater) treatment: Screens and/or sedimentation are used to removes material that will float or readily settle out by gravity. (See also Secondary Treatment and Tertiary Treatment)

Resilience: The ability of an ecosystem to recover from a disturbance so as to retain essentially the same structure, processes and functions. When an ecosystem is disturbed and can still remain within the natural range of variability, it can be described as resilient (Alberta Water Council, 2008).

Return flow: Water that has been removed from a water source under a licence, is used in some way and is expected to be returned in whole or in part to a water body after use and may be available for reuse, although the water quality characteristics may have changed during use. Typical return flows include discharges from sewage treatment plants, run-off from irrigated fields and water discharged from cooling ponds. Return flow is currently an important part of the overall water balance (e.g. 29 per cent of the North Saskatchewan River is allocated, but net use is only about four per cent, thanks in large part to return flow). Return flow is sometimes also referred to as wastewater when contamination levels require approval under the *Environment Protection and Enhancement Act* (EPEA).

Secondary (wastewater) treatment: When bacteria consume the organic matter that escapes primary treatment (e.g. the activated sludge process). This stage removes about 90 per cent of the biochemical oxygen demanding substances and suspended solids. (See also Primary Treatment and Secondary Treatment)

Source Water: Raw/untreated water received for treatment to provide potable water to municipal, industrial or private users. Sources may include high quality groundwater, groundwater under the influence of surface water and surface water from a lake, stream, river or watercourse (South Saskatchewan Regional Advisory Council, 2011).

Tertiary (wastewater) treatment: The advanced cleaning of wastewater. This stage removes nutrients such as phosphorus, nitrogen, and the remaining biochemical oxygen demand and suspended solids.

Stormwater: Managed rain or snowmelt in urban or developed areas that, in pre-development, ran off into lakes/streams and some of which infiltrated into the ground. In a sense, it is a rediverted part of the source of all the water the province licences under the *Water Act*.

Water reuse: The multiple use of water within a licence before return flow is calculated. The reuse of water for a variety of purposes may result in less fresh water diverted under the licence, and may result, but not always, in the reduction of return flow. Reuse is often an issue of health and managed under the *Environmental Protection and Enhancement Act.*

Appendix A Glossary of Terms

Continued…

Water conservation objective: As outlined in Alberta's *Water Act*, a Water Conservation Objective is the amount and quality of water set by a director for the protection of a natural water body or its aquatic environment; the protection of tourism, recreational, transportation or waste assimilation uses of water; or the management of fish or wildlife, arrived at after consideration of science, ecosystems or instream flow needs and socio-economic considerations (Alberta Water Council, 2009).

Water Co-op: An organization formed by the individual lot owners serviced by a waterworks system, wastewater system or storm drainage system (Alberta Environment, 2006).

Water use: The combination of actual water consumption and losses, or the difference between the amount of water actually diverted and the return flow. Water use considerations include: volume diverted in relation to allocation, the proportion of water use that is consumptive (not returned to the source), return flow volumes and seasonal variation.

Watershed: A watershed is an area of land that catches precipitation and drains it to a common point such as a wetland, lake, river, stream or groundwater aquifer (Albeta Water Council, 2008a).

Appendix B Glossary of Organizations

North American

American Water Works Association (AWWA)

The AWWA is comprised of over 55,000 members in over 100 countries. The mission of the AWWA is to be the authoritative resource on safe water while providing knowledge, information and advocacy to improve the quality and supply of water globally and in North America. AWWA advances public health, safety and welfare by uniting the efforts all stakeholders in the water community.

United States Environmental Protection Agency (EPA)

The mission of the EPA is "to protect human health and the environment". To accomplish this mission the EPA develops and enforces regulations, gives grants, studies environmental issues and teaches people about the environment through publishing information.

Programs relevant to Alberta municipalities include:

- Smaller Systems and Capacity Development
- Water Efficiency in the Commercial and Institutional Sector: Considerations for a Water Sense Program - This program brings experts together to discuss how to target the CI sectors. They provide information on CI sectors and programs/approaches that have reduced water use. In addition, Water Sense has started to test protocols and labelling of water using items (e.g. spray valves, urinals). This may offer a starting point for education or incentives.

American Water Works Association

The AWWA has gained an international reputation for providing information on the importance of source water protection, proper water treatment, and the need for state authorities to protect public health. The AWWA is currently the largest association of water professionals in the world, with 57,000 members in 102 countries. Their North American members provide about 85 per cent of the North American population with safe drinking water.

The mission of the AWWA is to be the authoritative resource on safe water while providing knowledge, information and advocacy to improve the quality and supply of water globally and in North America. AWWA advances public health, safety and welfare by uniting the efforts all stakeholders in the water community.

The AWWA has a Canadian Affairs Committee whose purpose is to plan, develop, and coordinate AWWA activities in Canada, with emphasis on the continuing improvement of inter-section liaison and the provision of AWWA services to members

Appendix B Glossary of Organizations

North American continued…

Programs relevant to Alberta municipalities include:

- **Process and Management Tools for small system professionals** - defined by the AWWA as being utilities serving 10,000 people or less
- **Water Wiser** - online clearinghouse of resources on water conservation, efficiency, and demand management
- **Water Audit and Loss Control Program** - provides best management practice tools and guidance to water utilities to help manage their supplies. AWWA's Water Audit Software is the basis for the Water Audit target of AUMA's CEP Plan
- **Free Water Audit Software** - Provides a useful and easy way to compile a basic audit of water supply and billing operations.

Alliance for Water Efficiency

The Alliance is dedicated to the efficient and sustainable use of water. The Alliance acts as an advocate for water efficient products and programs, and provides information and assistance on water conservation efforts. They support water conservation efforts that provide benefits to water utilities, planners, regulators, and consumers.

Programs relevant to Alberta municipalities include:

- **Water Audit Case Studies** –Outlines case studies from agencies that have taken a leading role in implementing utility water loss reduction programs. This helps address the growing trend of regulatory agencies promoting the use of standardized water audits.
- **AWE Resource Library** – AWE provides an extensive collection of information on best practices, technical research and polices searchable through keywords, locations, and topic areas.

Royal Bank Blue Water Project

The RBC Blue Water Project is a wide-ranging, multi-year program to help foster a culture of water stewardship. Under the RBC Blue Water Project, RBC has committed to:

- Provide $50 million in charitable grants to not-for-profit organizations that protect watersheds and provide or ensure access to clean drinking water
- Encourage the growth of North American businesses that develop and commercialize innovative solutions to water issues

For more information on grants see **http://bluewater.rbc.com/grants.php**.

Appendix B Glossary of Organizations

Canadian

Canadian Council of Ministers of the Environment

Canadian Council of Ministers of the Environment (CCME) is the primary minister-led forum for collective actions on environmental issues of national and international concern (CCME, 2009). CCME is comprised of the environment ministers from the federal, provincial and territorial governments and focuses on environmental issues that are national in scope and require cooperation by a number of governments. CCME is not another level of government regulator, but a council of government ministers holding similar responsibilities (CCME, 2009).

Canadian Water and Wastewater Association

Canadian Water and Wastewater Association (CWWA) was established in 1986 to represent the common interest of Canada's municipal water and wastewater systems to federal and interprovincial bodies with respect to policies, programs, national codes, standards, and legislation.

Federal Provincial-Territorial Committee on Drinking Water

Federal Provincial-Territorial Committee on Drinking Water (CDW) is responsible for establishing ***The Guidelines for Canadian Drinking Water Quality*** discussed in the following section. Each province and territory, as well as the federal government, assigns a voting member to the committee. Alberta Environment represents Alberta, because it is the department responsible for drinking water quality. The committee's leadership role (which represents the federal government) is held by Health Canada's Water Quality and Health Bureau, while Environment Canada plays a non-voting role.

Prairies

Western Canada Water

Western Canada Water (WCW) promotes the exchange of knowledge related to water treatment, sewage treatment, distribution of water and collection of sewage for towns and cities in Western Canada. It has approximately 4,000 members who work in this industry and for the cities, towns and governments in Western Canada. The Alberta Water Wastewater Operators Association, along with other provincial counterparts, are constituent members of the WCW.

Alberta

Alberta Water Council

The AWC was created to bring together stakeholders from all orders of government, First Nations, non-governmental organizations and industry to discuss provincial scale water management issues and develop recommendations for their solution. The AWC makes decisions by ***consensus***. Specific topic areas are examined by project teams and then reported back to the AWC with recommendations and advice.

Appendix B Glossary of Organizations

Alberta continued…

Projects in which AUMA has been or is currently engaged include:

- Water Conservation Efficiency and Productivity Sector Planning
- Water Allocation Transfer System Upgrade Project
- Riparian Land Conservation and Management Policy
- Healthy Aquatic Ecosystems

Alberta Water Research Institute

The Alberta Water Research Institute coordinates research to support Alberta's provincial water strategy, *Water for Life: A Strategy for Sustainability*. The Water Institute funds specific research initiatives in support of the *Water for Life* goals and objectives of:

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

This research provides analysis and context for policy-makers, ensuring relevant information is understandable and accessible. In addition, the Water Institute operates a Strategic Opportunities Study Program, which provides advice on emerging and/or urgent water issues. This provides evidence based information and analysis for the development and analysis of public policy options.

Alberta Water Portal

The Alberta Water Portal allows sharing of information on ground and surface water conditions, water management innovations, best practices, news and research, and conservation programs. This is provided because information and knowledge about our water resources is the foundation for engaging sustainable development and effective decision-making.

This comprehensive database provides information and links too:

- The Water Conservation, Efficiency and Productivity (CEP) Project Team and the Alberta Water Council's efforts to improve water use
- Tools & Gadgets which include tools such as Rural Water Quality Information Tool, Water Use Calculator, Modeling and Simulation Tools and historical water records (Alberta Digital Archives)
- A calendar outlining all water related events in Alberta
- Facts and information on Alberta water
- Current water research being conducted in Alberta

Alberta Water and Waste Water Operators Association

The Alberta Water and Waste Water Operators Association promote access to safe drinking water and environmental protection through the exchange of current and emerging state-of-the-art technical

Appendix B Glossary of Organizations

Alberta continued…

information, as well as the education of water and wastewater operators. It offers extensive continuing education to assist certified operators to maintain provincial certification requirements as mandated by Alberta Environment.

Our Water is Not For Sale

Our Water is Not for Sale is a provincial campaign that has raised concern about the Alberta government's plan to implement a province-wide de-regulated market system for water allocation. Their website (**http://www.ourwaterisnotforsale.com**) provides information on the dangers of using a market system to determine water allocation. This campaign is supported by numerous organizations and individuals. A few NGOs that support the Our Water is Not For Sale campaign are:

- **Public Interest Alberta**
- **Council of Canadians' Water Campaign**
- **Sierra Club Prairie**

Watershed Stewardship Groups

Watershed Stewardship Groups (WSGs) can be difficult to define because they are numerous and are comprised of a diverse group of partners. According to the Alberta Water Council, there are over 100 WSGs in Alberta. The ***Alberta Stewardship Network*** was created to connect and support stewardship groups involved in watersheds and air and land. In 2005, the Network collaborated with Alberta Environment and the Land Stewardship Centre of Canada to create a ***Directory of Watershed Stewardship in Alberta***. The Directory contains contact information and activity profiles for stewardship groups involved in air, land, water and biodiversity in Alberta's watersheds. In addition to local stewardship groups, it lists NGOs and government departments and agencies.

Watershed Planning and Advisory Councils

Watershed Planning and Advisory Councils are multi-stakeholder, non-profit organizations that engage in watershed assessment, planning and improvements. The function of WPACs is to assess the state of the watershed and develop a watershed management plan that contributes to the goals of *Water for Life*. Once these reports are completed, they seek to have their recommendations endorsed by municipal, provincial and federal authorities. They also promote conservation, best management practices and stewardship activities at the watershed level. Currently, 11 watersheds have organizations formally recognized as WPACs. Membership in WPACs is based on four broad sectors, provincial government, industry, non-governmental organizations (NGOs) and other governments. Information on each WPAC can be found on the Government of Alberta's **Water for Life website**.

Appendix C Water Related Legislation (in progress)

Issue	Jurisdiction	Legislation (administered and/of enforced by)
Allocation of Water	Provincial	*Water Act* (Alberta Environment)
Conservation Easements	Provincial	*Environmental Protection and Enhancement Act* – Conservation easement registration regulation (AENV- Alberta environment)
Contaminated Land	Provincial	*Environmental Protection and Enhancement Act* (AENV) *Safety Codes Act*- Alberta Fire Code 1997 *Oil and Gas Conservation Act*
Dams (also see Environmental Assessment)	Federal Provincial	*Fisheries Act* (Department of Fisheries and Oceans- DFO) *Navigable Waters Protection Act* (Transport Canada) *Prairie Farm Rehabilitation Act* *Water Act* (AENV) *Hydro and Electric Energy Act*
Drinking (Treated) Water Quality	Federal -develop drinking water policy Provincial – regulate drinking water quality	Guidelines for Drinking Water Quality (Health Canada) *Environmental Protection and Enhancement Act*- Potable Water Regulation (AENV)
Endangered Species Protection	Federal Provincial	*Species at Risk Act* (Canadian Wildlife Service of Environment Canada- EC) *Canada Wildlife Act* *Alberta Wildlife Act* – Wildlife Regulation (*Alberta Sustainable Resource Development* -ASRD, Alberta Conservation Association)
Environmental Assessment	Federal Provincial	*Canadian Environmental Assessment Act* (Canadian Environmental Assessment Agency) *Environmental Protection and Enhancement Act* (AENV) Canada-Alberta Agreement for Environmental Assessment Cooperation (EC and AENV)
Fisheries Management (also see Water Quality)	Federal Provincial	*Fisheries Act* (DFO) *Fisheries (Alberta) Act* (Fish and Wildlife Division of ASRD)
Hazardous Waste Management	Federal – regulates specific types of waste and waste management on federal lands Provincial (primary)	*Nuclear Safety Act* (Nuclear Safety Commission) *Canadian Environmental Protection Act* (Environment Canada) *Environmental Protection and Enhancement Act*- Waste Control Regulation (AENV) *Occupational Health and Safety Act* – Chemical Hazards Regulation (Workplace Health and Safety, a division of Alberta Resources and Employment)
Invasive Species	Federal Provincial	*Fisheries Act* (DFO) *Wild Animal and Plant Protection and Regulation of International and Inter-provincial Trade Act* (EC) *Plant Protection Act* – Plant Protection Regulations

		(Canadian Food Inspection Agency) *Canadian Environmental Protection Act* – New Substance Notification Regulations (EC, Health Canada, DFO) *Pest Control Products Act* (Health Canada) *Fisheries (Alberta) Act* (ASRD) *Wildlife Act* (ASRD)
Landfills	Provincial Municipal - regulate the sitting of landfills	*Environmental Protection and Enhancement Act*- Waste Control Regulation and the Code of Practice for Landfills (AENV) *Municipal Government Act*- municipal bylaws
Protection of Natural Areas	Federal Provincial Municipal	*Canada National Parks Act* (Parks Canada) *Canada Wildlife Act* (Canadian Wildlife Service of EC) *Migratory Birds Convention Act* (Canadian Wildlife Service of EC) *Provincial Parks Act* (Parks and Protected Areas Division of Alberta Community Development- ACD) *Wilderness Areas, Ecological Reserves Natural Areas and Heritage Rangelands Act* (Parks and Protected Areas Division of ACD) *Municipal Government Act*- (Alberta Municipal Affairs)
Recreation Use of Public Lands	Federal – federal lands Provincial – provincial lands Municipal – municipal lands	*Canada National Parks Act* (Parks Canada) *Canada Wildlife Act* (Canadian Wildlife Service of EC) *Canada Shipping Act*- Boating Restriction Regulation (Transport Canada, DFO) *Provincial Parks Act* (Parks and Protected Areas Division of ACD) *Wilderness Areas, Ecological Reserves Natural Areas and Heritage Rangelands Act* (Parks and Protected Areas Division of ACD) *Wildlife Act* (Fish and Wildlife Division of ASRD) *Forest Reserves Act* (ASRD) *Forests Act* (ASRD) *Public Lands Act* (ASRD) *Municipal Government Act*- municipal bylaws (Alberta Municipal Affairs)
Roads (e.g. removal of vegetation, soil erosion, wetland drainage, bridges, road salts)	Federal Provincial Municipal – exercise management and control over most roads	*Canadian Environmental Protection Act*- road salts (EC) *Fisheries Act* (DFO) *Public Highway Development Act* (Alberta Transportation) *Environmental Protection and Enhancement Act*- Conservation and Reclamation Regulation (AENV) *Municipal Government Act*
Sewage	Federal Provincial	*Fisheries Act* (DFO) *Environmental Protection and Enhancement Act* (ANEV) *Safety Codes Act*- Private Sewage Disposal Systems Regulation (Safety Codes Officers)

Waste Management	Federal- regulates specific types of waste and waste management on federal lands Provincial Municipal	*Canadian Environmental Protection Act*- (EC) *Environmental Protection and Enhancement Act*- Waste Control Regulation and the Code of Practice for Landfills (AENV) *Public Health Act*
Water Quality	Federal Provincial Common Law	*Fisheries Act* (DFO) *Canadian Environmental Protection Act*- (EC) *Environmental Protection and Enhancement Act*- Substance Release Regulation, Pesticide Sales, Handling, Use and Application Regulation, Potable Water Regulation and Waste Control Regulation (AENV) Common Law (Riparian Rights)- an owner of land that abuts a natural water course or body is entitled to have the water flow through his or her land without alteration in quality (applies to surface and ground water)
Water Right	Provincial Common Law	*Water Act* (AENV) Common Law (Riparian Rights)- an owner of land adjacent to a natural watercourse or body (or, in some cases, under which groundwater exists), has rights concerning the water; riparian owners are entitled to its access and the water quality

Appendix D Drinking Water Guidelines Backgrounder

Federal/Provincial/Territorial Committee on Drinking Water (CDW), Guidelines for Canadian Drinking Water Quality (GCDWQ) and Maximum Acceptable Concentration (MAC)

1. CDW Mandate

The mandate of the Federal-Provincial-Territorial CDW is to protect public health through the development of scientific, health-based guidelines for safe drinking water. It aims to ensure all Canadian jurisdictions have access to information about drinking water issues, including materials in contact with drinking water.

2. CDW Overview

The CDW is the primary federal-provincial-territorial forum for discussion and decisions on drinking water issues in Canada. The CDW is a well-established national committee that has been active for more than 20 years. Health Canada provides scientific and technical expertise to the Committee, and coordinates its activities. The CDW reports to the Federal-Provincial-Territorial Committee on Health and the Environment (CHE).

CHE, in turn, reports on the environmental side to the Canadian Council of Ministers of the Environment. On the health side, CHE is a liaison committee of the Pan-Canadian Public Health Network. The value of the CDW is to ensure that drinking water policies, programs and other resources are developed in consideration of implications in all Canadian jurisdictions, increasing their relevance across the country. As well, the collaborative development of tools and resources is an efficient use of resources and collective discussion enables jurisdictions to share and learn from the experience of others.

3. Guideline Development and Other Activities

The main responsibility of the Federal-Provincial-Territorial Committee on Drinking Water (CDW) is to establish the Guidelines for Canadian Drinking Water Quality. These guidelines, while not binding, are considered the foremost reference for evaluating the quality of end of tap drinking water in Canada, and are also relied upon by other countries. Provinces and territories can use the guidelines as necessary to manage their drinking water quality programs. Some Canadian jurisdictions have adopted the guidelines as regulated standards.

The Committee aims to establish five to seven guidelines per year based on a priority list that is periodically reviewed. From the initiation of guideline development to completion of publication, the process can take several years in order to insure that the guideline is technically sound and is supported by the Committee.

The CDW has evolved to take on additional roles to protect drinking water quality, including working in collaboration with the Canadian Council of Ministers of the Environment (CCME) to develop the Multi-Barrier Approach to Safe Drinking Water. The CDW sponsors the Canadian National Drinking Water Conference, which

Federal/Provincial/Territorial Committee on Drinking Water (CDW), Guidelines for Canadian Drinking Water Quality (GCDWQ) and Maximum Acceptable Concentration (MAC) continued…

is organized by the Canadian Water and Wastewater Association. This biennial conference provides a forum for the exchange of information on drinking water quality in Canada. It focuses on reviews of scientific data relating to drinking water quality, on assessments of the implications of this data for health and public policies designed to protect the safe quality of the nation's drinking water supplies. The first national conference was held in Ottawa in 1984. In 2000, the national conference was expanded to include a Policy Forum on Drinking Water.

4. Membership and Responsibilities

The CDW meets twice per year and is made up of voting and non-voting members. There are 14 voting members, one for each jurisdiction in Canada (10 provinces, three territories, and the federal government). These members represent the authority responsible for drinking water quality in their jurisdiction, usually either the Department of Health or the Department of Environment. Nonvoting members/observers include representatives from the CHE and Environment Canada. At each meeting, a number of experts are usually invited to make presentations on topics that relate to the quality of drinking water in Canada. The inclusion of observers and external experts in CDW meetings insures that links are made amongst all relevant players in the drinking water domain and insures that CDW's discussions are well informed.

CDW voting members are responsible for representing the views of their jurisdiction for each of the issues discussed by the Committee. In particular, they are responsible for preparing a cost estimate for meeting each proposed guideline for their respective jurisdiction. They are also responsible for bringing forward current and emerging issues of national interest with respect to drinking water. Members are also responsible for ensuring that relevant authorities and stakeholders in their jurisdiction are aware of the implications of CDW work on their area of interest. Liaison members and non-voting observers are responsible for informing their home organization and/or stakeholders of items of interest from the CDW agenda and their implications. As well, observers are responsible for informing CDW of their own drinking water-related initiatives

5. Committee Process

For each guideline being considered, Health Canada's Water, Air and Climate Change Bureau prepares a guideline document that outlines the latest research into the health effects associated with the contaminant, Canadian exposure to the contaminant, and treatment and analytical considerations. This technical document, which generally includes a proposed guideline value, is peer-reviewed by external experts, reviewed by the CDW, and undergoes a public consultation.

The guideline technical document and, where necessary, the guideline value, are revised based on all the feedback received. CDW members provide input on the feasibility of implementing the guideline and discuss any outstanding concerns.

Appendix D Drinking Water Guidelines Backgrounder

Federal/Provincial/Territorial Committee on Drinking Water (CDW), Guidelines for Canadian Drinking Water Quality (GCDWQ) and Maximum Acceptable Concentration (MAC) continued…

Once all the jurisdictions are satisfied with the guideline and supporting document, the members reach consensus that the guideline is ready to be approved. It is then sent to the CDW's parent committee, the Federal-Provincial-Territorial Committee on Health and the Environment, for final approval. The approved guideline and technical document are then published on the Health Canada Web site.

6. What are the *Guidelines for Canadian Drinking Water Quality*?

The *Guidelines for Canadian Drinking Water Quality* are nationally recognized recommendations for maximum concentrations of microorganisms, chemicals and radiological contaminants safely allowed in drinking water. The guidelines also give direction on physical parameters such as temperature, pH, and colour.

Guidelines are based on current, published scientific research related to health effects, aesthetic effects, and operational considerations. Health-based guidelines are established on the basis of careful review of the known health effects associated with each substance. Aesthetic effects (*e.g.*, taste, appearance and odour) are taken into account when these play a role in determining whether consumers will consider the water drinkable. Operational considerations are factored in when the presence of a substance may interfere with or impair a treatment process or technology (*e.g.* turbidity interfering with chlorination or UV disinfection) or adversely affect drinking water infrastructure (*e.g.*, corrosion of pipes).

The *Guidelines for Canadian Drinking Water Quality* are continually evolving, for a variety of reasons:

- New contaminants periodically show up in drinking water supplies
- New methods for detecting and analyzing substances in water supplies leads to new information about known contaminants
- The prevalence of contaminants changes when activities in watersheds change

7. How are the guidelines developed?

The guideline development process involves a series of steps, which fall under the broad, overlapping categories of **risk identification**, **risk assessment**, **risk management**, and **risk communication**. This document describes the development process in broad terms. In reality, the precise path for developing a guideline is unique for each contaminant or parameter. In addition, as our tools for detecting and analyzing contaminants and their health effects evolve, so does the process for developing the guidelines. This document should be read as a dynamic work in progress.

The *Guidelines for Canadian Drinking Water Quality* are developed collaboratively by the federal, provincial and territorial governments through the Federal-Provincial-Territorial Committee on Drinking Water (CDW). Health Canada acts as the Secretariat to the CDW. This committee reports to the Committee on Health and Environment (CHE), which in turn reports to both the Canadian Council of Ministers of Environment's

Appendix D Drinking Water Guidelines Backgrounder

Federal/Provincial/Territorial Committee on Drinking Water (CDW), Guidelines for Canadian Drinking Water Quality (GCDWQ) and Maximum Acceptable Concentration (MAC) continued…

Environmental Planning and Protection Committee (EPPC) and the Federal/Provincial/Territorial Advisory Committee on Population Health and Health Security (ACPHHS).

(i) Identifying Risks

How do we know which parameters to look at?

The CDW identifies new and existing risks to water quality in a number of ways:

- Members bring forward information about substances of concern in their jurisdictions.
- Health Canada reviews scientific studies published in journals and sits on a number of national and international committees that deal with drinking water issues. These activities provide Health Canada with information on new and emerging risks to human health, which it monitors and shares with the CDW.
- Other jurisdictions, such as the U.S. Environmental Protection Agency and the World Health Organization, are also continually developing guidelines. The CDW monitors guideline development in other jurisdictions and may review its own guidelines in light of new evidence from other parts of the world.

(ii) Setting Priorities

How do we decide which parameters are the most urgently in need of guidelines? Aren't they all important?

Priorities for developing or updating specific guidelines are based on several key considerations and vary with the type of contaminant. In general, the highest priority guidelines are those dealing with microbiological contaminants, such as bacteria (*e.g.*, *E.Coli*), protozoa (*e.g.*, Giardia, Cryptosporidium), and viruses. The second level priority is disinfection by-products, followed by other chemical contaminants, and finally radiological contaminants. Each of these categories has its own set of priorities.

Microbiological contaminants are the top priority for the CDW because of the immediate or acute risks they pose to health. Microbiological guidelines are subject to a “rolling revision,” where the Secretariat regularly identifies new and relevant sources of information through a comprehensive review of the literature and through active participation in Health Canada internal committees, as well as national and international committees. As new information becomes available, the documents are updated.

Disinfection by-products (DBPs) are the second priority, for a number of reasons. First, disinfection is essential to protecting public health because it kills or deactivates microbiological pathogens. However, the chemicals used as disinfectants can react with naturally occurring organic matter in the water to create by-products that may pose some long-term health considerations for some people. Therefore, the concentration and health effects of these by-products need to be better understood. Known health impacts from very high levels of DBPs range from physiological disorders to cancers, and may include reproductive effects.

Appendix D Drinking Water Guidelines Backgrounder

Federal/Provincial/Territorial Committee on Drinking Water (CDW), Guidelines for Canadian Drinking Water Quality (GCDWQ) and Maximum Acceptable Concentration (MAC) continued…

The third priority for guideline development is chemical contaminants present in Canadian source waters at levels known or suspected to cause adverse health effects. Because of the large number of chemicals that fit this description, priorities within this category are established by the CDW using information about the latest research on health effects, the frequency and levels at which Canadians are exposed to each chemical via drinking water (when available), and the availability of analytical and treatment technologies to identify and then reduce or eliminate the contaminant from drinking water supplies.

Once the data has been entered into the table and a list of possible priorities is generated, the CDW members review the proposed list to ensure it reflects both the priorities of their own jurisdiction and national concerns. Ideally, the substances of the highest priority for guideline development are those which have the potential to affect a significant number of people and which pose a high risk to human health. Substances that affect few people or pose a less significant health risk are moved lower in the priority ranking.

The priorities for radiological guidelines are determined by the Federal-Provincial-Territorial Radiation Protection Committee (RPC). However, because the health effects of radiological contaminants are due to overall radiation levels rather than to the presence of a specific radiological contaminant, these guidelines are generally established as a group. Guidelines are derived to conform to international radiation protection methodologies and updated on a regular basis. New or revised radiological guidelines are approved by both RPC and CDW and are included in the *Guidelines for Canadian Drinking Water Quality.* Identified priorities are included in the CDW's work plan, updated annually.

(iii) Assessing Risk

How do we know whether a substance is a real concern in drinking water? Health Canada's Water, Air and Climate Change Bureau is responsible for developing the health risk assessments that form the basis of each guideline. The assessments are conducted by scientific evaluators in the Bureau and are based on reviews of the most current, credible, published research on each contaminant. In their assessments, the evaluators review the literature and analyze the findings, focusing on the demonstrated health effects in both human and animal populations. They also evaluate the studies themselves to make sure the data is relevant and reliable. For each contaminant, evaluators also look at available analytical methodology and treatment technology to make sure the substance can be properly analyzed in drinking water and that technology exists to remove it, either partially or entirely.

Based on their findings, the evaluators compile their research and propose a guideline value, giving their rationale. This draft document is reviewed internally by Health Canada staff as well as by external peer reviewers, in order to ensure the decisions made by the evaluators are valid and appropriate.

Appendix D Drinking Water Guidelines Backgrounder

Federal/Provincial/Territorial Committee on Drinking Water (CDW), Guidelines for Canadian Drinking Water Quality (GCDWQ) and Maximum Acceptable Concentration (MAC) continued…

Once the initial reviews are complete, the Secretariat distributes the draft document to CDW members, who share this information with the CHE representative(s) from their jurisdiction. Their comments, questions, and concerns are brought to the CDW table for discussion. Decisions are made at this point about whether the substance in question meets the criteria for developing a guideline and whether enough information is available to justify going forward in the guideline development process.

(iv) Managing Risk

Is it possible to manage the risk posed by these substances in drinking water? If the decision is made to proceed with the development of a guideline, CDW members provide the Secretariat with data from their respective jurisdictions regarding the extent of public exposure to the substance from drinking water supplies and how much it would cost to implement the guideline. These costs are those associated with upgrading treatment plants or changing treatment processes to eliminate or reduce exposure to the substance.

While the CDW members are gathering this information, the Secretariat works to address the comments and questions received from members. Once all this information is gathered and incorporated into the document, it is sent back to the CDW and CHE for review. If the document is considered acceptable, it is distributed and posted on Health Canada's website for public consultation.

(v) Communicating Risk

What happens when a new guideline is published? How are the *Guidelines for Canadian Drinking Water Quality* used? The public consultation period lasts from four to six months. Comments received are gathered by the Secretariat, which compiles them and drafts responses for CDW review. Once approved by the CDW, the comments and responses are posted on Health Canada's website.

After the public consultation, the proposed guideline document is updated again, based on the decisions made by the CDW. If the CDW is satisfied that all questions and concerns raised (by themselves, CHE members and interested parties through the public consultation process) have been adequately addressed, then it approves the document and sends it to CHE for final approval. The final, approved guideline value and supporting document are posted in both official languages on Health Canada's website. Health Canada periodically publishes a booklet of all the current drinking water guidelines. In the interim, an up-to-date summary table of all the approved guideline values is maintained on the website. These guidelines are used by every jurisdiction in Canada and are the basis for establishing drinking water quality requirements for all Canadians. Some provinces and territories have adopted them directly into their regulations while others use them as a reference for evaluating drinking water in their jurisdiction. The guidelines are also used as the basis for ensuring safe drinking water for federal facilities and areas of responsibility.

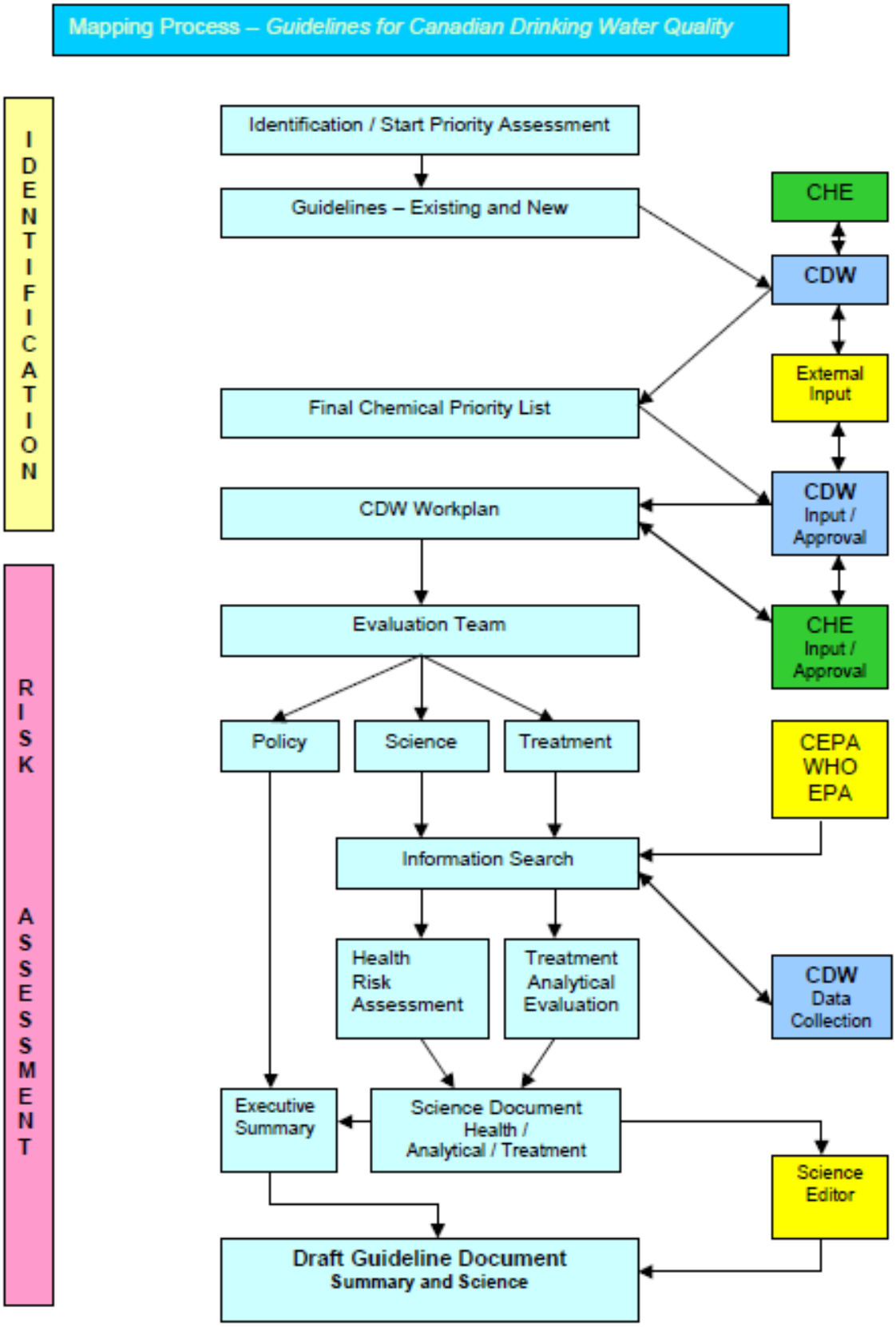
Appendix D Drinking Water Guidelines Backgrounder

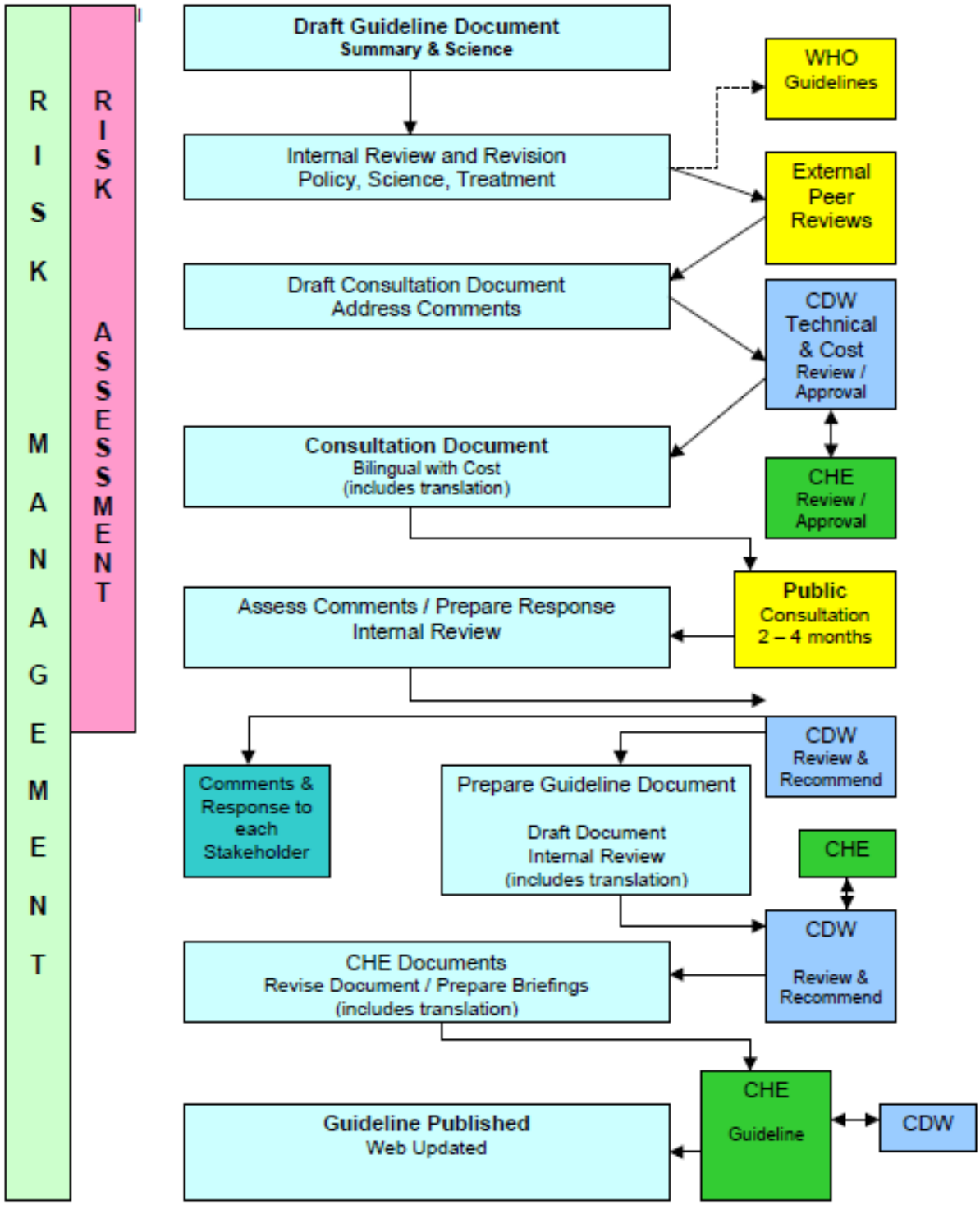
Federal/Provincial/Territorial Committee on Drinking Water (CDW), Guidelines for Canadian Drinking Water Quality (GCDWQ) and Maximum Acceptable Concentration (MAC) continued…

Additional Information

How Maximum Acceptable Concentrations (MACs) are derived:

http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/part_i-partie_i/index-eng.php


Mapping Process – Guidelines for Canadian Drinking Water Quality
IDENTIFICATION
RISK ASSESSMENT
Identification / Start Priority Assessment
Guidelines – Existing and New
CHE
CDW
External Input
Final Chemical Priority List
CDW Workplan
CDW Input / Approval
Evaluation Team
CHE Input / Approval
Policy
Science
Treatment
CEPA WHO EPA
Information Search
Health Risk Assessment
Treatment Analytical Evaluation
CDW Data Collection
Executive Summary
Science Document Health / Analytical / Treatment
Science Editor
Draft Guideline Document
Summary and Science


RISK MANAGEMENT
RISK ASSESSMENT
Draft Guideline Document
Summary & Science
WHO Guidelines
Internal Review and Revision
Policy, Science, Treatment
External Peer Reviews
Draft Consultation Document
Address Comments
CDW Technical & Cost Review / Approval
Consultation Document
Bilingual with Cost
(includes translation)
CHE Review / Approval
Public Consultation 2 – 4 months
Assess Comments / Prepare Response
Internal Review
CDW Review & Recommend
Comments & Response to each Stakeholder
Prepare Guideline Document
Draft Document
Internal Review
(includes translation)
CHE
CDW Review & Recommend
CHE Documents
Revise Document / Prepare Briefings
(includes translation)
CHE Guideline
CDW
Guideline Published
Web Updated

Appendix E North American Free Trade Agreement

Alberta is the first province in Canada to implement a market-based approach to water licence reallocation (Adamowic, Percy, & Weber, 2010). The adoption of this system has been subject to controversy due to fears that a market-based allocation system makes water more vulnerable to legal challenges under NAFTA, therefore reducing the capacity of the government to regulate water use. A broader discussion on Alberta's allocation system can be found in the **Water Allocation section** of this paper.

The Status of Water Under NAFTA

Water in its natural state (e.g. in a river) is excluded from NAFTA, but once water becomes a "commodity" it becomes subject to NAFTA (Campbell, Morin, & Thompson, 2007). A commodity is a good that can be bought and sold in an open market. The status of water under NAFTA is an important issue because under NAFTA, the federal and provincial governments cannot discriminate between Canadian, American and Mexican companies with respect to access to a commodity. If discrimination occurs (e.g. by providing preferential treatment to a Canadian company) or legislation is introduced that impacts a company's profitability (e.g. a chemical additive used in a manufacturing process is banned) the affected company has the right to sue under NAFTA for lost current and future profits (Methanex, 2008)(Campbell, Morin, & Thompson, 2007).

The ENGO Perspective

Some environment non-government organizations (ENGOs), such as Our Water is Not for Sale, The Council of Canadians and Sierra Club Prairie, believe that the introduction of a market-based water allocation system in Alberta has moved water closer to being classified as a commodity under NAFTA [because water licences are now bought and sold in a market environment] (Our Water is Not For Sale, 2011). These groups argue that if water becomes classified as a commodity, any attempt by the provincial government to restrict water use or to revoke a water licence held by an American or Mexican company, would violate NAFTA and the government could be sued for lost profits. This means the government would be unable to prioritize the needs of its citizens and ecosystems over those of American and Mexican companies. As water becomes increasingly scarce, the cost of water licences will increase and access to water will be determined by ability to pay, rather than need. This would threaten Alberta water security because of the government's inability to limit the water extraction of companies that already hold licences without legal challenge.

The Provincial and Federal Government Perspective

Alberta Environment officials have stated that the implementation of the Alberta water market would not change the status of water under NAFTA [water would remain a natural resource and not become a commodity] (Campbell, Morin, & Thompson, 2007). Alberta Environment has also stated that they are not worried about being sued by companies for NAFTA violations in the event that they have to restrict water allocations. From their legal analysis, Alberta Environment is confident the water licences being bought and sold are excluded from NAFTA. In addition, Environment Canada is committed to protecting freshwater through the introduction of legislation such as the ***Transboundary Waters Protection Act***, which prohibits bulk water removals in areas under federal jurisdiction. This legislation along with **provincial legislation** that prohibits the bulk water removal and inter-basin transfers of water, has been implemented without legal challenge under NAFTA (Adamowic, Percy, & Weber, 2010).

Appendix E North American Free Trade Agreement

Continued

What does this mean for the future of Alberta's water?

There is not a definitive answer on the status of water under NAFTA because there has not been a ruling by a court or trade panel on whether water is a commodity. The general legal consensus is that it's unlikely the market system makes Alberta's water more vulnerable to legal action from foreign companies under NAFTA (Adamowic, Percy, & Weber, 2010). Ultimately, Alberta water "is probably not subject to existing trade agreements, but until it is tested in a court or tribunal, the status of water under trade agreements remains uncertain" (Campbell, Morin, & Thompson, 2007). The most relevant piece of Albertan legislation with respect to NAFTA is the ***Water Act***. More information regarding the *Water Act* can be found in the **Provincial Legislation section** of this paper.

Appendix E North American Free Trade Agreement

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