

Northern Alberta Water and Wastewater Needs Assessment



Summary Report, 2015



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The Water North Coalition (WNC) is a group of Northern Alberta communities, municipalities, First Nations, Métis Settlements and various partners in water/ wastewater management, working together to advance sustainable water and wastewater systems for all northern communities. The WNC was established in 2014 with the assistance of the Northern Alberta Development Council (NADC), who currently provides the WNC with administrative support.

The NADC champions the cause of Alberta's northern economies and communities by exploring opportunities for growth, and developing programs and services to facilitate this growth.

The following survey and summary report was completed by the NADC on behalf of the WNC members. For more information on the WNC, visit <http://nadc.ca/water-coaliton.asp>

Executive Summary

Purpose

The growth of northern communities depends on reliable and safe water and wastewater systems. Water and wastewater are challenges all northern Alberta communities' face, but by working together strategies and opportunities can be developed. In the fall of 2014, the Water North Coalition (WNC) in partnership with the Northern Alberta Development Council (NADC) prepared a survey on water and wastewater systems in Northern Alberta to collect baseline data for their newly formed coalition.

The purpose of the survey was to:

- Understand the community / municipality's perspective of their current water / wastewater system
- Assess the water /wastewater needs of northern Alberta communities within the NADC boundary in adherence to the WNC's mission.

This survey reflects WNC's objectives, with respect to: recruitment, retention and training, public education, and advocacy. The areas that the survey specifically focused on were: funding for water and wastewater systems, capacity, human resources and water literacy.

Methodology

The water and wastewater survey was developed in partnership with the WNC, vetted through sub-committee meetings, and finally put online for response in April 2015. Each community completed one survey. The communities that completed the survey represented a cross-section of the NADC region with responses from 16 / 21 counties, 11/34 municipalities, and one Métis Settlement. See NADC map below.



Summary of Findings

1. *Demographics*

- 83% of those who participated largely resided upon the Peace / Slave River Basin, which is the largest watershed in the NADC region followed by the Athabasca River Basin. Due to population growth and industrial development in Grande Prairie and Fort McMurray, these two river basins are expected to experience the greatest demand.

2. *Water and Wastewater Infrastructure Capacity*

- 46% of treatment plants are over 20 years old and 79% of water distribution systems are over 20 years old.
- The distribution system is older than the treatment plants in the north, but what is more pressing is that 11% of participants have not completed water systems improvements in the last 10 years. 46% of participants have never completed a water audit to identify leaks within the distribution system. If these two combined factors are found within a municipality, there is a very high probability that valuable water is being lost in the distribution system.

3. *Funding for Water / Wastewater Systems*

- Participants indicated nearly 90% of the time that they received funding for water / wastewater systems operation from municipal revenue and user fees. Given municipalities' heavy reliance on their own revenues, improving cost efficiency and generating revenue to upgrade / replace infrastructure becomes a challenge. 63% of participants do not employ full cost recovery and 21% do not have water meters implemented.

4. *Human Resources*

- Like other areas of the workforce, water operators are aging. Most operators in communities were between the ages of 31-45 or 46-55 years old.
- The greatest barriers to retaining qualified operators are pay grade and rural and remote location, followed by education / training, and retirement attrition.

5. *Water Literacy*

- 36% of participants have engaged in some form of water literacy activity. When it came to rating the level of water literacy on a 7 point scale, participants rated the members of their communities as being less water literate than the leadership in community and the effectiveness of their community at providing water literacy program as extremely low. 63% of participants indicated that they do have a water literacy program.

Concluding Comments and Considerations

The findings in this report are based on the survey leading to the following considerations:

1. **Human Resources:** WNC can develop partnerships to systematically focus on water operators:
 - a. Focus on recruitment, diverse selection of courses, and methods of delivery in alignment with the WNC's Terms of Reference. Increasing and diversifying the number of courses and site of training is only the first step towards enhancing training and education efforts.
 - b. Some suggestions for possible areas of recruitment and partnerships: educational institutions (colleges, trades institutes and high school), gender (increase the number of female operators) and recruit Aboriginal peoples in the north.
 - c. Communities must also work together to enable water operators time to complete courses while ensuring water and wastewater systems are operational.
 - d. The WNC may also want to advocate to the Government of Alberta that operators have the opportunity to cross train and hold dual tickets to improve efficiency and reduce personnel need during labor shortage.

2. **Water Literacy:** WNC can develop partnerships to create water literacy programs that are culturally specific to communities – not a “one size fits all” message. If communities focus on water literacy, it can effectively alleviate some of the water systems' challenges:
 - a. It is the key to decreasing capacity constraints, addressing municipality's number one sector of demand: growing residential usage. Decrease usage will also decrease the pressure on water capacity challenges.
 - b. Collaborate and address industry needs for water by focusing on ways to conserve and protect water sources within municipal boundaries.Water literacy will take leadership and a significant effort to reach both residents and industrial users of water.

3. **Funding and Aging Infrastructure:** Communities have projected that aging infrastructure is and will be a significant cost of municipal budgets. Funding the many upgrades will require long term strategic planning that is within and beyond municipal jurisdiction. As such, funding issues will need to focus on the following:
 - a. Collaborations with neighbors and partners to address common needs.
 - b. Investigations into full cost recovery and implementing water meters to address operational costs.
 - c. Assessing whether there are leaks within the water distribution system.
 - d. Developing emergency preparations for the possibility of water demand outpacing the supply of treated water. This needs to be a part of every community's risk preparation to ensure safe drinking water.
 - e. Budgeting for repair and maintenance.
 - f. Advocating for additional funds for municipal infrastructure.

These considerations are by no means exhaustive, but it will require long term planning, conversations, and most importantly partnerships for inter-jurisdictional matters. Water and wastewater are pressing issues that have vital implications for the economic and social development in northern Alberta.

Summary Report on the Survey of Northern Alberta's Water and Wastewater Systems

Background

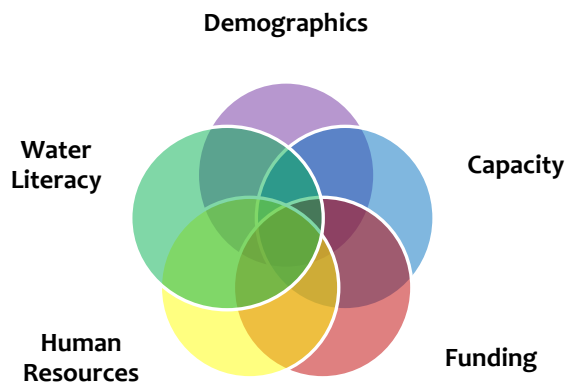
Water governance belongs to all three levels of government: federal, provincial, and municipal. While some lines of responsibilities are clear within each jurisdiction, there are also interconnecting responsibilities. For example, the regulation of water and wastewater (provincial jurisdiction) is connected to day to day operations of water and wastewater (municipal jurisdiction). (See appendix A for more information)

The Water North Coalition (WNC) was formed in 2014 to address northern community's water and wastewater needs. The WNC's mission is to implement northern solutions to water sourcing and water challenges through advocacy, public education, attraction and retention. Some of these objectives are within the municipalities' jurisdictional responsibility while others require collaboration with other levels of government to achieve.

The Northern Alberta Development Council (NADC) is a partner of the WNC and it provided the WNC with administrative support and assistance on this survey, including developing and hosting the survey online, and collecting and analyzing the data. The NADC champions the cause of Alberta's northern economies and communities by exploring opportunities for growth, and developing programs and services to facilitate this growth. The Council is made up of nine public members and the Chair is a Member of the Legislative Assembly (MLA) of Alberta. Council membership reflects the geographic, cultural and vocational diversity of northern communities.

During the initial meeting of the WNC, members agreed that in order to prioritize and move forward on their objectives, the WNC needed to understand the current state of water and wastewater systems in northern Alberta. The NADC collaborated with the WNC to create a survey on water and wastewater systems. This report provides an overview of the findings from the survey on water and wastewater systems within the NADC boundary.

Survey Focus



The survey focused on the WNC's four key areas: water literacy, human resources, funding and capacity needs – all issues within the municipalities' jurisdictional purview.

Method / Methodology

In this survey, the word “community” is used to denote First Nations, Métis Settlements, municipal districts / county and town / village/hamlet.

Communities across northern Alberta were invited to participate in an online survey. Communities were encouraged to invite their neighbors to participate in the online survey at the WNC meetings. The total number and types of communities invited are listed below:

- Counties: 21
- Municipalities / towns: 34
- First Nations: 24
- Métis Settlements: 8

Formal invitations for participation were sent via email to all Mayors, Reeves, and Chief Administrators of municipalities on March 26 and by fax on March 30 to Chiefs of First Nations and Presidents of Métis Settlements. Elected officials were asked to complete one survey on behalf of their community with the suggestion that they may need to seek the input of their water operator.

The deadline for survey completion was extended to May 29, 2015. Email reminders were sent to communities and phone calls were made to counties to maximize response rates.

Survey Findings

1. Demographics: Community Participation

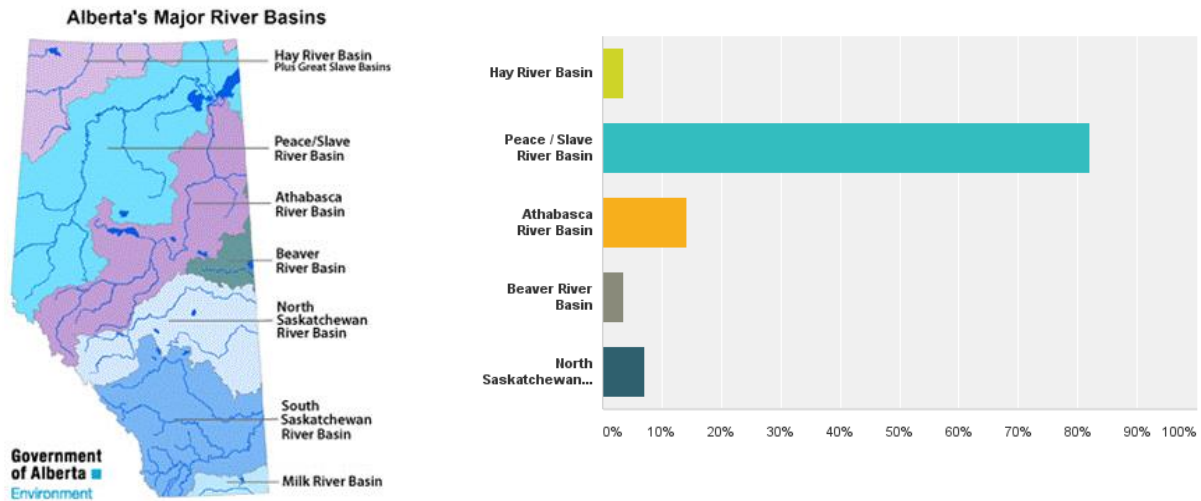
The communities that were invited to participate in northern Alberta are in the NADC region. Below is a chart illustrating the number of communities that participated in the survey:

- 16 / 21 counties
- 12/34 municipalities
- one Métis Settlement

- 16 counties provide water and wastewater service to:
 - 60 hamlets,
 - 3 towns,
 - 5 First Nations and
 - 1 Métis Settlement and supporting services to 10 First Nations and Métis Settlements.

The highest participation rate came from the counties with 16 / 21 representing 76% of the counties in the NADC region and covering a sample of all of NADC’s regions in northern Alberta. The counties that participated provided water and wastewater services to a total of 60 hamlets, 3 towns, 5 First Nations and supporting services to 10 Métis Settlements. Out of all the First Nation and Métis Settlements invited, only one community responded to the invitation to participate.

Of the communities that participated, 83% of communities resided in the Peace / Slave River Basin, 14% in the Athabasca River Basin, 7% in the North Saskatchewan River Basin, and 3% in the Hay River and Beaver River Basin.



The Peace / Slave River Basin is the largest source of water in Alberta. Due to the potential of industrial development around the oil sands and the likelihood of population growth in Grande Prairie and Fort McMurray, the Peace / Slave River Basin and the Athabasca River Basin will likely experience the greatest water demand.

2. Water and Wastewater Infrastructure Capacity

The purpose of this section was to understanding the following:

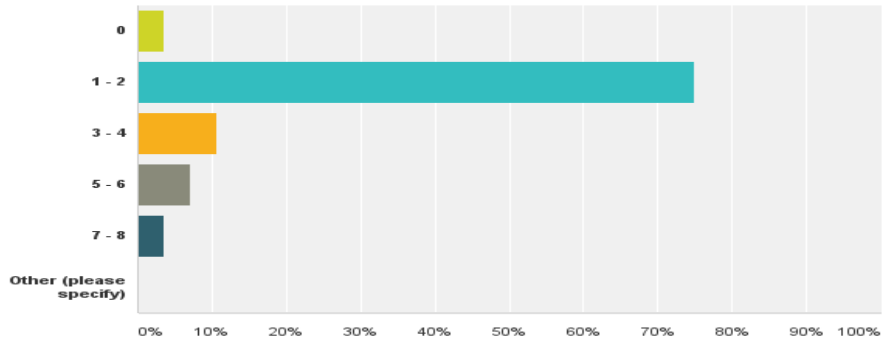
- Reliability of water and wastewater system in communities;
- The source of water for communities;
- An understanding of the future reliability of the water and wastewater treatment in communities; and
- An understanding of the safety of water or wastewater preparation in case of crisis.

Northern communities indicated that they are experiencing a number of capacity challenges due to aging infrastructure, but they indicate that their water source is generally very reliable.

Number and Age of Water Treatment Plants

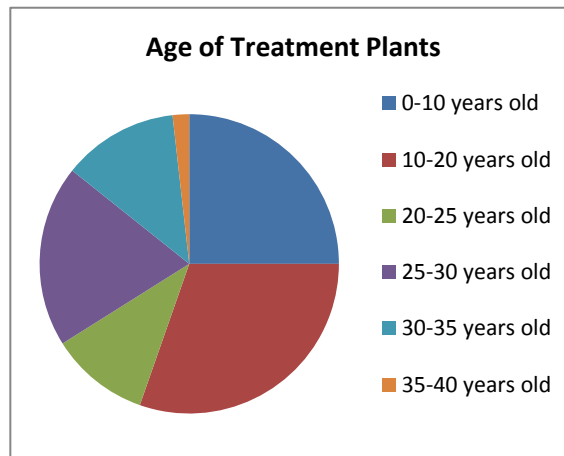
To understand the capacity of the water systems in communities, the WNC wanted to know the number of water treatment plants and distributions systems along with the each of the infrastructures. Of the communities that participated in the survey, 75% had 1-2 water treatment plants.

Number of Water Treatment Plants in Communities



46% of these treatment plants are over the 20 years old. The age of the treatment plants were as follows:

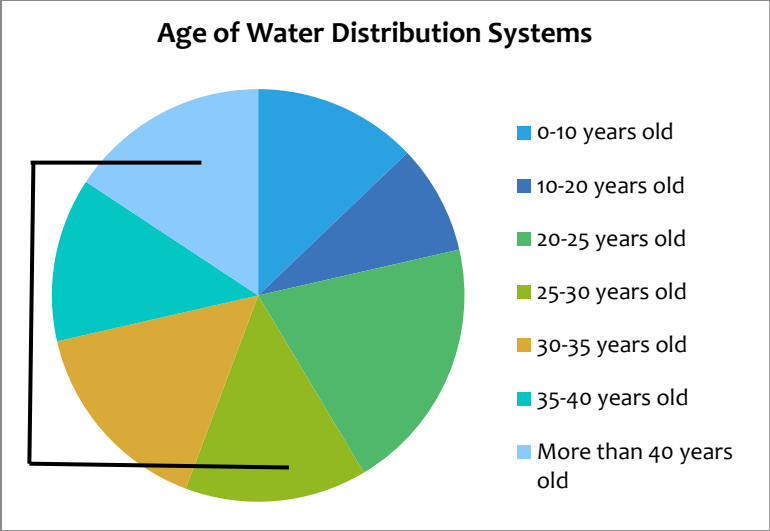
- 0-10 years old = 25%
- 10-20 years old = 31%
- 20-25 years old = 11%
- 25-30 years old = 20%
- 30-35 years old = 13%
- 35 -40 years old = 2%



This may account for participants’ requests for courses on equipment repair and maintenance. The cost for upgrades, repairs and or replacement will place stress on municipal funding, which currently relies heavily on provincial / federal grants.

Age of Water Distribution Systems

55% of the communities surveyed indicated they had 1-2 water distribution systems, 21% had 5-6, 17% had 3-4, 3% had no distribution system and 3% had 7-8. Of those who participated, 79% of the water distribution system is more than 20 years old. 16% of the systems are more than 40 years old. These water distribution systems require the most amount of maintenance and repair due to age.

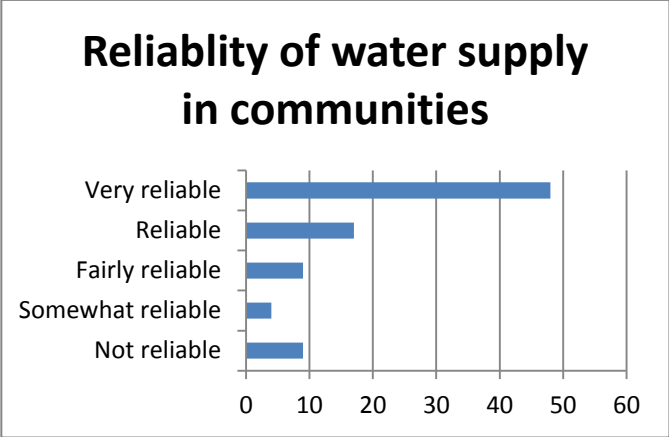


Overall, the age of water distribution systems in the north is older than treatment plants in the north, but what is more pressing is that 11% of participants have not completed water systems improvement in the last 10 years. 46% of participants have never completed a water audit to identify leaks within the distribution system. If these two combined factors are found within a municipality, it means that there is a very high probability that valuable water is being lost in the distribution system. Leaks in the water distribution system will also impact the cost and availability of water to communities, so communities may want to examine their distribution systems for leaks.

Reliability of Water Source for Treatment Plants

There are a total of 39 treatment plants among the participants: 41% access surface water, 59% access ground water.

Source of Water for Treatment Plants	
Type of water	Treatment Plants Access Source
Surface	16
Ground	23



Participants indicated that treatment plants accessing ground water range from very reliable to not reliable. Those that access surface water (lakes, rivers) perceived surface water to be very reliable with some indicating problems with ice jams in the spring. For others, the reliability of their water supply is

tied with the capacity of their water plants to treat water and not to the supply - that is they cannot keep up with the demand for clean water placed on their plants. While treatment plants and water distribution systems are aging, the water supply has, however, remained very reliable for 46% of those who participated.

Unusual weather conditions will also impact the reliability of water sources. For example, this summer the lack of rain fall combined with low moisture in the winter culminated in a very dry summer in northern Alberta. The Government of Alberta issued low flow advisories and the need to reduce water withdrawal in Northern Alberta for the Upper Athabasca River Basin and the Peace Region.¹ Weather conditions along with population growth, industry development and agriculture usage all impact water supplies.

The chart below illustrates the reasons that participants provided for their perceptions of water source reliability.

Category	Reasons for Perceptions of Water Source Reliability
Very Reliable	Trusted provider Trusted source of water: aquifer, lake, river, wells Based on duration of time, relationship, technology implementation (generators), newness of the plants
Reliable	Study was conducted Historical reliability / experience Dependable system Recognize limitations (depth of ground to water, run-off)
Fairly Reliable	Duration of raw water storage to provide reservoirs Reliability dependent on source
Somewhat Reliable	Single intake jams frequently in the spring Limited storage capacity
Unreliable	Declining aquifer and old wells

For 46% of participants who indicated that their water supply was **very** reliable, their response was based on trust: *trusted* provider, *trusted* source, and *trusted* relationship / technology. Conversely, for the 9% of respondents who indicated that their source of water was unreliable, trust is lacking in the source: declining aquifer and old wells. Other respondents who indicated that their water source was reliable depended on some form of assessment either informal (historical reliability based on observation) or formal (based on studies conducted). Some of these individuals recognized the limitation of their water source. However, those in the fairly and somewhat reliable category recognized the limitation of their water source: capacity, storage and source for them are constraints to water supply. The findings suggest that if communities over time experience constraints and water system failures, they will likely distrust access to their water source.

¹ Government of Alberta, July 24, 2015, Upper Athabasca River Basin low flow advisory:

<http://alberta.ca/release.cfm?xID=3834489F59E41-F3C2-027F-523C0BF854597827>

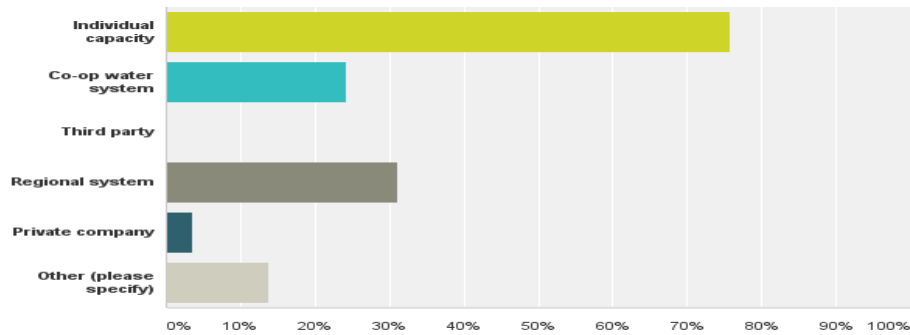
Government of Alberta, July 17, 2015, Peace Region low flow advisory:

<http://alberta.ca/release.cfm?xID=383262C48993D-E0B6-82AC-A0C9A7A421B36CC4>

Type of Water Systems

To understand the capacity of the water systems in northern Alberta, the WNC wanted to know the different types of water systems and size of community they served. 53% of the participants' water facilities served a population ranging from between 1,000 - 10,000.

Types of Water Systems in Northern Alberta

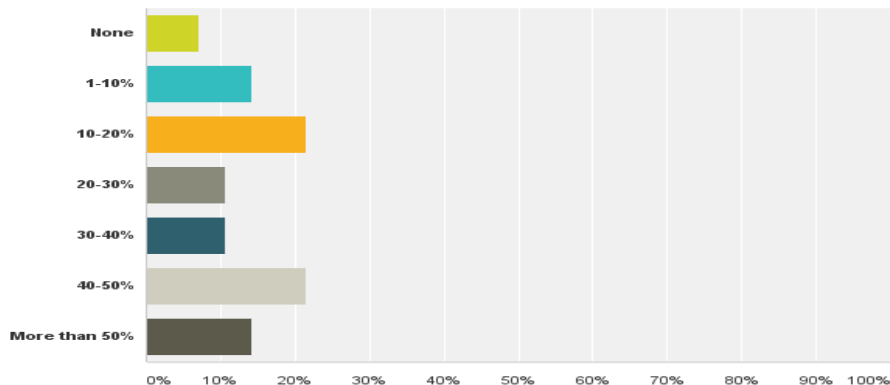


Of the communities that participated, 76% had individual capacity water systems, 24% have co-op water systems, 31% are on regional systems, 4% have water provided by private companies, and 14% indicated they had municipal system, their own system or they trucked their water to cisterns.

Extra Water Treatment Capacity

42% of communities indicated that they had less than 20% of extra water treatment capacity, which means these 42% are at nearly 80 – 100% of treatment capacity. For some communities whose economy is tied to the oil and gas industry, the demand for water will increase when the industry development and population increases. Increases in growth will place more stress on existing water treatment capacity. If communities factor in the age of some of their treatment plants and their chances of malfunction, the need to examine water treatment capacity may even be more urgent.

Community's Extra Water Treatment Capacity



When asked how prepared their community was for an emergency, 27% of participants indicated they were moderately prepared, with almost equal percentage saying they were prepared for a water emergency. Given the overall view of this data, communities may want to investigate whether their emergency preparedness includes demand outpacing the supply of treated water.

In summary, northern communities recognized that aging infrastructure constrains their water distribution and treatment capacity, but they indicated that their water sources are generally very reliable. However, in subsequent sections of the survey below, many participants acknowledged that there is a high demand placed on their source of water. Over time, continued demand and aging infrastructure may challenge the perception of reliability.

3. Funding for Water / Wastewater Systems

The purpose of this section is to understand the following:

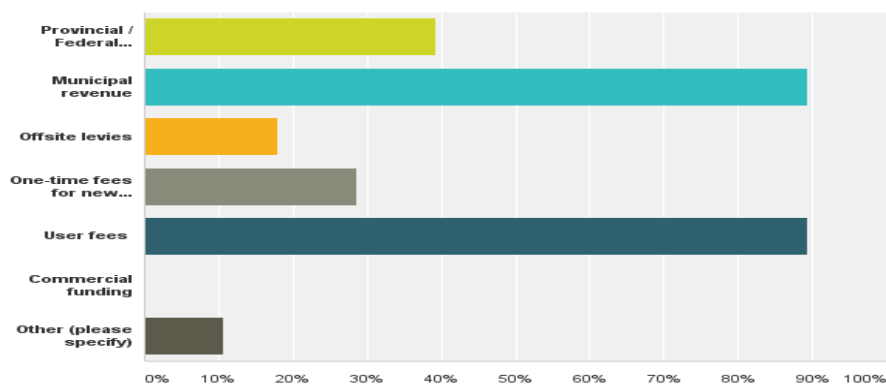
- Source (s) of operational funding;
- Current actions taken by communities for water funding; and
- Areas in the water system needing upgrades (including its cost over time and the length of time since last upgrade).

Many communities indicated that their primary source of operational funding are from municipal revenues and user fees, but the aging infrastructure and the subsequent need for upgrades challenges the communities' ability to pay for continued repairs.

Operational Funding

Participants indicated nearly 90% of the time that they received funding for water / wastewater systems operation from municipal revenue and user fees.

Communities Operational Funding Source



Given municipalities are largely generating their own revenues for funding water and wastewater systems, improving cost efficiency is vital and generating revenue to upgrade / replace infrastructure

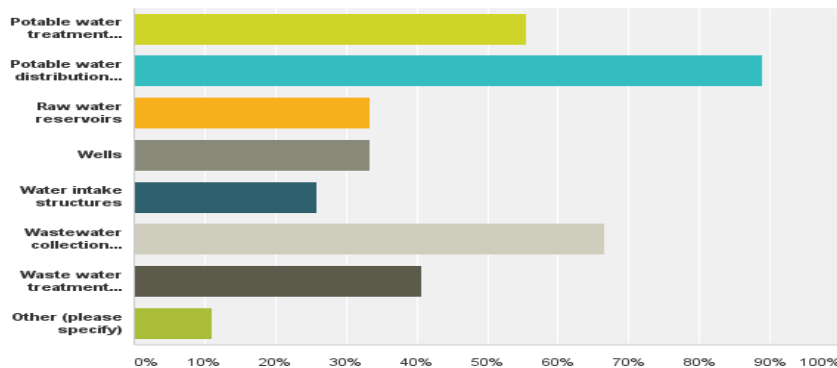
becomes a challenge. However, 63% of participants do not employ full cost recovery and 21% do not have water meters implemented. These aspects of cost efficiency, where possible, within the water system require investigation for municipalities facing increasing operational costs.

In the chart above, other sources of funding include provincial or federal grants accessed nearly 40% of the time, but many have cited these grants are overused. To a lesser extent: offsite levies at 17% and one time fees for new accounts at 26% of the time. New user accounts ties into population growth, mobility, and change. Participants indicated that other sources of funding came from water pricing and county revenue sharing agreements.

Areas of the Water System Requiring Upgrades

Participants indicated that while all aspects of the water system require upgrades, data corroboration suggests that the aging water distribution system is the most in need of upgrading – more than 50% of distribution systems are over 25 years old.

Areas of the Water System Requiring Upgrades



In the graph above, participants indicated 89% of the time that their potable water distribution system and 66% of the time that wastewater collection system needed upgrading, followed by:²

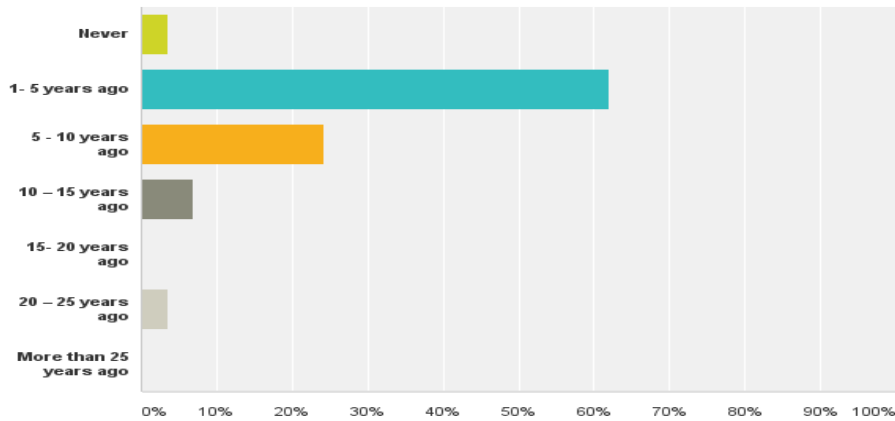
- Potable water treatment facilities at 56%
- Wastewater treatment facilities at 40%
- Wells at 33%
- Raw water reservoirs at 32%
- Water intake structures at 26%
- Others: Potable water reservoir / storage and Raw water supply line

The areas needing upgrades is a direct result of aging infrastructure and the lack of funds.

62% of communities indicated that the last time their communities completed water system improvements was in the last 5 years. These communities are likely keeping abreast of changes in technology and equipment breakdown. However, the greatest concerns are communities who have

² Participants were permitted to select more than one choice on the survey.

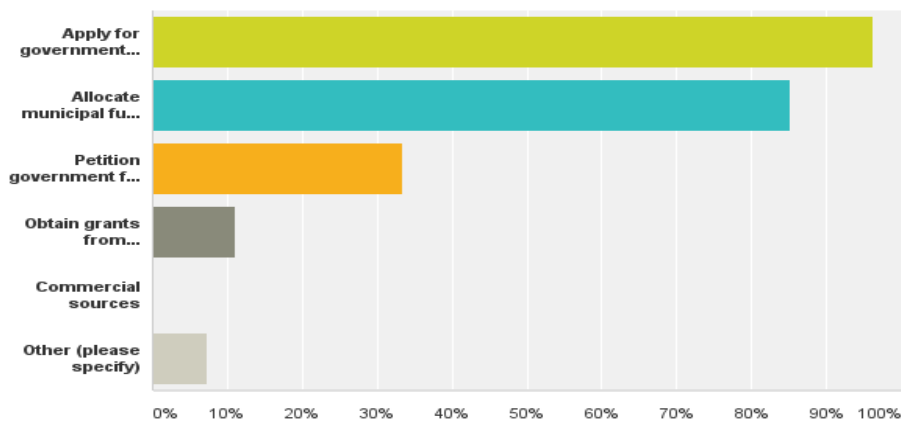
never completed improvements (3%) or if they have, it was 10 or more years ago (10%). Last Time Community Completed Water System Improvements



These communities may be at risk of water system malfunctions, inadequate technology or other operational challenges that may place access to safe drinking water into question.

Funding for Water Systems Improvement

In the chart below, communities' actions to secure additional funding for water system improvements are largely centered on applying for federal and provincial government grants at 96% of the time, followed closely by allocating municipal funds for water facilities 85% of the time.



The activity engaged at a lesser rate was petitioning government for funding (33%) and other grants obtained from non-government organizations (11%). Participants in the other category (7%) indicated that they sought funding from developers. Similar to operational funding, while government grants are applied for, they are dependent on availability.

In summary, given that most communities indicated that the water distribution system is older and communities are in need of upgrades, most communities are anticipating capital costs in the next 5 years to range from \$100 thousand to \$110 Million. These numbers are significant costs to municipal budgets. Concerns arise when municipalities consider factors that may impact the need for water systems improvement such as:

- Technology change / improvements
- Changes to standards of safety
- Population growth / flux
- Other demands place on the water system (industry, agriculture, and seasonal flux).

These challenges will place stress on municipal budgets to improve and expand their water systems.

4. Human Resources

The focus of this section is on water operators. As such they were invited to participate or provide the person completing the survey with their input on the following:

- Number of operators in communities, their age and their gender;
- Operators' highest level of certification, requirement levels to operate within communities;
- Site of certification / training / examinations;
- The future courses that operators would like to access and where or how they should be delivered; and
- The barriers towards certification / training / examinations / and recruitment and retention.

In the sections below, the survey points to the fact that water operators are aging in northern Alberta and the need for recruitment, training and certification will require some innovative approaches to remove barriers associated with distance and time.

Demographics of Operators in the North Alberta

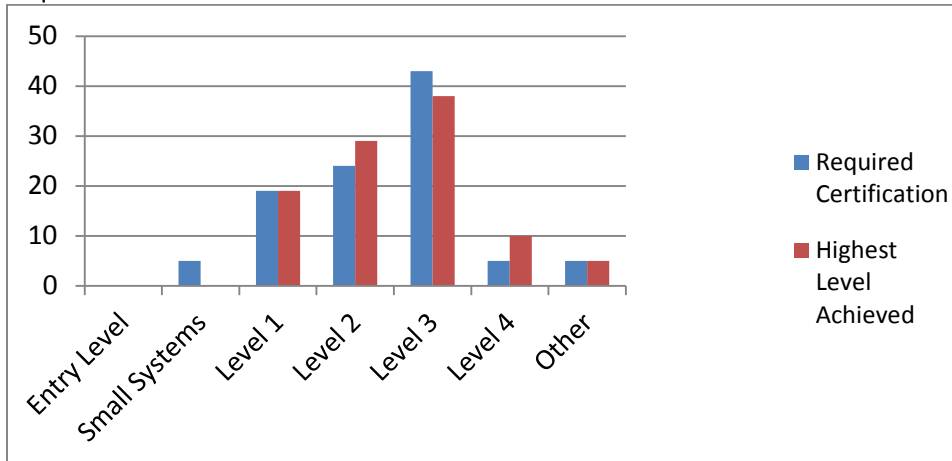
When asked how many water operators their community employed, 43% of communities indicated that they employed 1-2 certified water operators, followed by 25% with 3-4, 11% with 5-6, and 11% with more than 15. However, 7% of communities did not employ any certified water operators. Of the water operators employed, most communities indicated that their water operators were between the ages of 31-45 or 46-55 years old with a few in the 18-30 age group and those over 56 years old. Of the operators working in northern Alberta, 81% are males and 19% are female.

This statistics for the number of women operators is relatively high compared to other trades. In the 2011 Census, women represented 14% of registered trades and 5% of all skilled trades worker in Canada.³ Most trades in northern Alberta are focusing on recruiting women and Aboriginal peoples, communities may want to do the same with water operators. The water operator workforce is aging in northern Alberta and within 5-10 years the demand for this job will be even higher.

³ StatsCan: <http://www.swc-cfc.gc.ca/initiatives/wesp-sepf/fs-fi/es-se-eng.html>

Certification Levels of Water Operators in Communities

Overall the required levels of certification and the highest level of certification achieved for water operators are fairly close. The only discrepancy is at Level 2, 3 and 4 certifications where required certification and highest level achieved do not match exactly. At Level 4, highest level is double the required certifications.



As an example of a possible way to address the need for water operators, the Regional Municipality of Wood Buffalo (RMWB) has attempted to provide cross training to water operators in collection / distribution operators and waste / water treatment. Their rationale is to increase efficiency in providing service while operators are on site without additional personnel and time. The RMWB has proposed and provided incentives to operators to acquire dual tickets by offering an increase in pay. However, the municipality's experiences indicate that the current Government of Alberta's regulatory model does not facilitate cross training or dual ticket operators to work.

The need for cross training may solve some of the human resource needs. As such, WNC may seek to work with the Government of Alberta's Ministry of Environment to explore models that would facilitate cross training / dual ticket while meeting all the required standards of operation.

Barriers to Recruitment and Retention

Communities recognized a number of barriers hindering their ability to retain qualified water operators:

- Rural and remote location
- Uncompetitive pay grade
- Education and training
- Retirement
- Lack of interest in working with wastewater
- Number of work hours
- Competition with oil and gas sector (wages) – most trades in the north find themselves competing against the oil and gas sector

Overall, trades in the north must compensate workers with higher wages to offset the cost of housing and living in the north (this is seen in all sectors of the trades). In some regions such as Wood Buffalo, the compensation can be as high as 18% for high demand jobs such as power engineers.⁴ Communities will need to consider the competitiveness of the labor force and recruitment and retention strategies given the identified barriers.

Education and Training

One of the goals of the WNC is focused on is education and training. When asked what type of courses water operators would like to have, operators requested the following:

- Water Treatment
 - Activated sludge biological nutrient removal
 - Disinfection: UV/ chorline (virus log), chloramination
- CEU accredited courses for water treatment / distribution, wastewater collection, and wastewater treatment
- Level 1
- Equipment and Repairs
 - Courses on distribution and collection repairs & replacement
 - Valve actuator and pump maintenance
 - Equipment operation
 - Water metering Lagoon monitoring

While there are many possible avenues in which education and training can be accessed, the barriers identified in retaining water operators – specifically number of hours worked and rural and remote location – may also hinder water operators from upgrading or continuing their training. Participants identified that classroom attendance was preferred, followed by online course access, direct training onsite and, to a lesser extent, correspondence or attending courses at conferences. Some indicated they could not access any source of training. The preference for classroom attendance, online courses and the inability to access any training are all directly related to training accessibility in rural and remote

⁴ Source: Calculation based on Alberta Learning & Information Services (ALIS), 2013 Alberta Wage and Salary Survey, Jobs, Skills, Labour and Training.

locations. In addition, accessibility coupled with time constraints to complete courses due to limited personnel makes it even more difficult for water operators to sustain continued training.

This is in contrast with where water operators in the north initially received their training. Most indicated that they had received their initial training at conferences in Alberta, followed by a non-profit Alberta organization, at a college or technical school, and, to a less extent, correspondence, and government seminars.

In summary, communities will need to consider methods of reducing time constraints for upgrading, providing incentives for operators to complete the courses they need, and the possibility of leveraging their existing workforce by encouraging cross training.

5. Water Literacy

The focus of this section is on the following:

- Understanding the existing efforts in water literacy;
- Perspectives of the public's level of water literacy;
- The community's level of effectiveness in promoting water literacy;
- Perspective of water literacy among municipal / community leaders; and
- Age of the water literacy programs, how it is communicated and the areas where water literacy is needed.

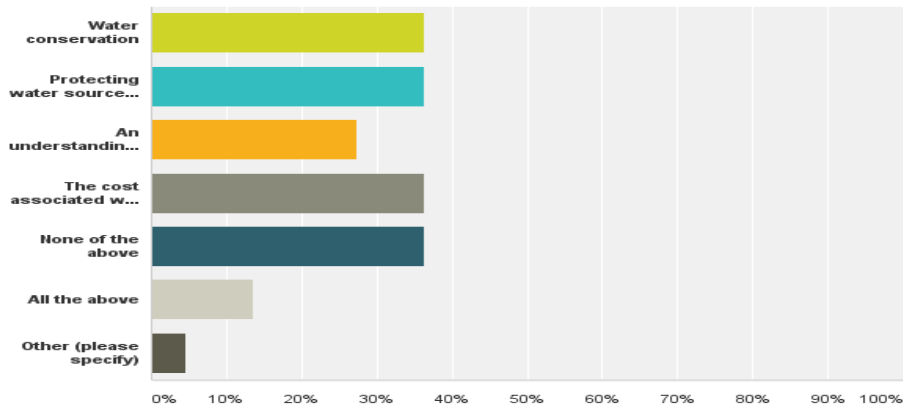
In the sections below, the survey indicates that while some communities participate in some literacy activities, there are also communities who do not. Many communities do not have a water literacy program despite engaging water literacy activities.

Types of Water Literacy Activity

When participants were asked what types of water literacy activities their communities engaged in, participants gave varying answers:⁵ 44% engaged in water conservation, 41% engaged in protecting water source from contaminants, 30% engaged in an understanding of the water system from source to tap.

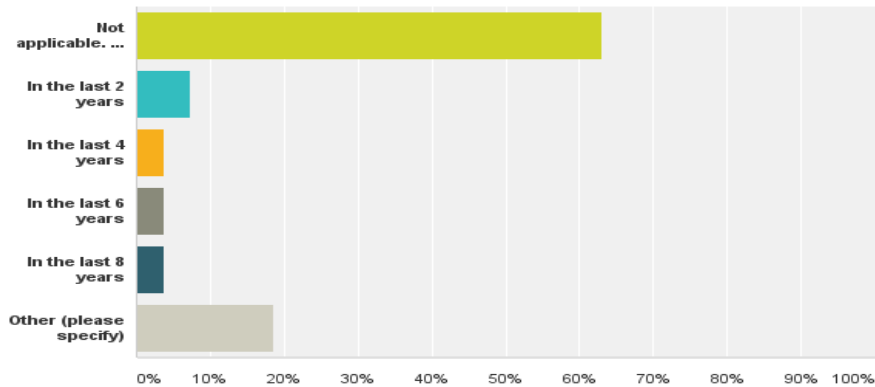
⁵ Participants could choose more than one except those exclude other choices.

Types of Water Literacy Activities



From the chart above, 30% of communities did not engage in any water literacy programs while 15% of communities engaged in all activities. However, when asked when the water literacy program was developed in the community, most participants indicated that this was not applicable to them since 63% of them did not have a program (see chart below).

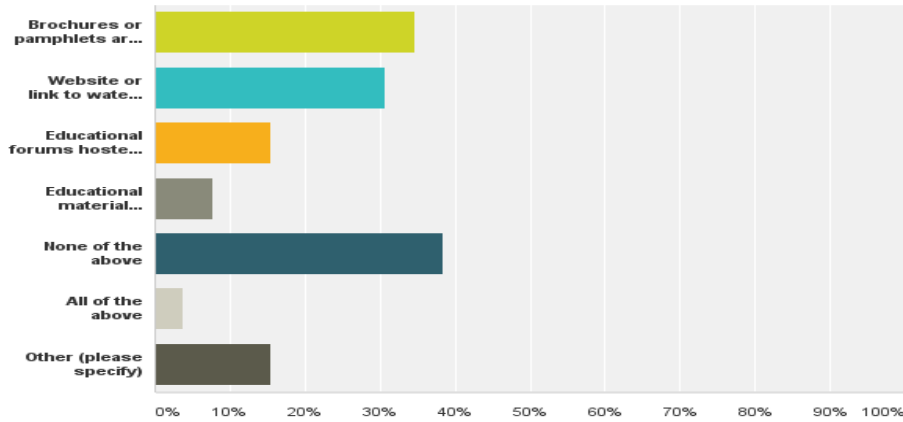
Age of Water Literacy Program



As the chart illustrates above, a handful of communities have developed water literacy programs in the last 8 years and in the other category of the chart, a few have indicated that their water literacy programs are over 10 years old and one community indicated that they have had a water literacy program that is well over 20 years old. Water literacy is an area for growth.

When communities were asked how their community communicated their water literacy efforts, with the option of selecting more than one category, 38% of communities selected none of the above.

Types of Water Literacy Communication

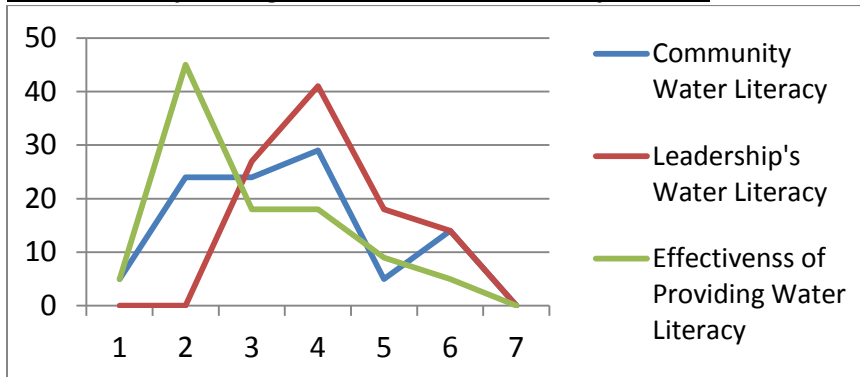


The chart above illustrates that only a small percentage communities used all methods to communicate water literacy.

Rating the Level of Water literacy among the Public and Community Leaders

When participants were asked to rate water literacy in their communities, amongst their leadership, and the effectiveness at which their community provided water literacy programs, participants viewed the general public in their communities to have lower levels of water literacy than leadership in communities. They also perceived that their own communities did not do an effective job of facilitating water literacy.

Water Literacy Among the Public and Community Leaders



*Scale is from 1 to 7, 1 being low and 7 being the highest.

However, over 50% of participants indicated that the primary reason for water literacy ineffectiveness was due to the fact they do not have a water literacy program at all.⁶

When asked what the greatest demand placed on their water source was, communities indicated that the greatest demand was:

- Residents of their communities and surrounding communities
- Commercial industries: oil and gas sector, agriculture, and tourism
- Aging infrastructure: water loss, unreliable operation
- Fire Season
- Temporary Diversion License

These types of demands on water source will continue to be a challenge as industry and population grows while infrastructure ages. However, communities can alleviate some of these challenges through water literacy – particularly educating their residents. The reasons communities provided for not having a water literacy program were:

- Never been brought up / never a priority
- No time / no staff
- No expertise / resources
- Company communicates on behalf of community

This is an area where WNC can develop partnerships with AUMA to reach out to communities and develop partnerships to offset the cost of developing water literacy programs.

Concluding Comments and Considerations

The water and wastewater survey reflects the objectives, and to some extent, the jurisdictional power of municipalities to govern their water. In those areas outside municipal jurisdiction, collaboration with partners and advocacy will be essential. The considerations here are based on the findings of the survey and they are meant to move WNC's objectives forward.

The following considerations are for the WNC and participating communities:

4. **Human Resources:** WNC can develop partnerships to systematically focus on water operators:
 - a. Focus on recruitment, diverse selection of courses, and methods of delivery in alignment with the WNC's Terms of Reference. Increasing and diversifying the number of courses and site of training is only the first step towards enhancing training and education efforts.
 - b. Some suggestions for possible areas of recruitment and partnerships: educational institutions (colleges, trades institutes and high school), gender (increase the number of female operators) and recruit Aboriginal peoples in the north.
 - c. Communities must also work together to enable water operators time to complete courses while ensuring water and wastewater systems are operational.

⁶ The survey indicates that 63% of communities did not have a water literacy program, so the remaining 13% may have thought they were still somewhat effective.

- d. The WNC may also want to advocate to the Government of Alberta that operators have the opportunity to cross train and hold dual tickets to improve efficiency and reduce personnel needed during labor shortages.
5. **Water Literacy:** WNC can develop partnerships to create water literacy programs that are culturally specific to communities – not a “one size fits all” message. If communities focus on water literacy, it can effectively alleviate some of the water systems’ challenges:
- a. It is the key to decreasing capacity constraints, addressing municipality’s number one sector of demand: growing residential usage. Decrease usage will also decrease the pressure on water capacity challenges.
 - b. Collaborate and address industry needs for water by focusing on ways to conserve and protect water sources within municipal boundaries.
- Water literacy will take leadership and a significant effort to reach both residents and industry users of water.
6. **Funding and Aging Infrastructure:** Communities have projected that aging infrastructure is and will be a significant cost of municipal budgets. Funding the many upgrades will require long term strategic planning that is within and beyond municipal jurisdiction. As such, funding issues will need to focus on the following:
- a. Collaborations with neighbours and partners to address common needs.
 - b. Investigations into full cost recovery and implementation of water meters to address operational costs.
 - c. Assessing whether there are leaks within the water distribution system.
 - d. Developing emergency preparations for the possibility of water demand outpacing the supply of treated water. This needs to be a part of every community’s risk preparation to ensure safe drinking water.
 - e. Budgeting for repair and maintenance.
 - f. Advocating for additional funds for municipal infrastructure.

Access to sustainable water and wastewater systems will continue to be a priority for northern communities as they balance the economic and social development in northern Alberta.

Appendix A: Water Governance Structure

Water governance is divided into 3 jurisdictions (federal, provincial and municipal) that work together to manage water and wastewater. See the chart below.

<p><i>Government of Canada</i></p> <ul style="list-style-type: none">• Management of boundary waters (International waters)• National policies and standards relating to environment and health related issues• Fish and fish habitat• Navigation• Water located in the territories• Water located on Aboriginal people’s reserves• Wastewater system effluent regulations (attempt to nationalize regulation standards)
<p><i>Government of Alberta</i></p> <p>Management of water resources (surface and groundwater);</p> <ul style="list-style-type: none">• Regulator control over flow, access / use, pollution and treatment• Thermal and hydroelectric power development
<p><i>Municipalities</i></p> <ul style="list-style-type: none">• Day to day operation and management of water and wastewater systems in line with provincial regulations• Bodies of water within the municipality• Create environmental reserves to protect drainage courses, flood plains and land abutting water course to prevent pollution

Source: (Alberta Urban Municipalities Association (AUMA))

Government of Alberta Water for Life Strategy

The Water for Life strategy was developed in 2003 and renewed in 2008. In 2008, The Alberta Water Council recommended renewing the strategy based on two priorities: safeguarding water sources and accelerating actions.

Water for Life Strategy in Alberta (admin through Transportation) <ul style="list-style-type: none">• Share governance of water
Government of Alberta <ul style="list-style-type: none">• Accountability and responsibility for water management
Alberta Water Council (AWC) <ul style="list-style-type: none">• Advice on implementation of Water for Life Strategy• Advice on province wide policies
Watershed Planning and Advisory Councils (WPACs) <ul style="list-style-type: none">• Regionally based on watershed• State of the Watershed Report• Development and implementation of watershed management plans
Watershed Stewardship Groups <ul style="list-style-type: none">• Actions to improve local water bodies

Source: (Alberta Urban Municipalities Association (AUMA))

Provincial Legislation

1. Water Act: Alberta Environment

- Protects and manages water in Alberta

2. Environmental Protection and Enhancement Act (EPEA): Alberta Environment, administrated by Alberta Environment Sustainable Resource Development

3. Public Health Act (PHA): Alberta Health and Wellness, Administrated 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.

4. Safety Codes Act: Alberta Municipal Affairs, administrated by Alberta Municipal Affairs and the Safety Codes Council

- Water related (Plumbing, Private sewage systems)

5. Municipal Government Act: Alberta Municipal Affairs, administrated by Alberta Municipal Affairs

- 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.

Government of Alberta Ministries involved in Water

- Agriculture and Rural Development
 - Water quality in agriculture (ground water, protection, stream monitoring, treatment, watersheds)
 - Water supply in agriculture (dugouts and dams, livestock needs, wells and springs, water treatment, water systems)
- Environment and Sustainable Resource
 - Water for Life Action Plan
 - [Alberta Soil and Groundwater Remediation Guidelines](#)
 - [Standards and Guidelines for Drinking Water and Wastewater](#)
 - [Potable Water Regulation](#) (regulates water treatment requirements and certification of operators)
- Health and Wellness
 - See above
- Municipal Affairs
 - Alberta Municipal Water / Wastewater Partnership - Water for Life
- Transportation
 - Administers Alberta Municipal Water/ Wastewater Partnership (AMWWP) / Water for Life

Works Cited

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