Athabasca Integrated Watershed Management Plan

February 2022

Athabasca
WATERSHED COUNCIL

From the mountain headwaters to the delta lowlands… our watershed, our responsibility.

The Athabasca Watershed Council

The Athabasca Watershed Council (AWC) is a multi-sector, consensus-based charity, formed in 2009. As a designated Watershed Planning and Advisory Council (WPAC), the AWC works in partnership with the Government of Alberta, industries, municipalities, non-government organizations, Indigenous communities and residents to achieve the goals of Alberta's *Water for Life* strategy. This work includes building relationships, generating and sharing information, supporting education and stewardship, and undertaking watershed assessment and planning for the Athabasca watershed in Alberta.

Photo: Office of the Athabasca Watershed Council in the Town of Athabasca.

The AWC is governed by a Board of Directors consisting of up to 21 members. This includes seats for federal/provincial (2) and municipal (3) governments, Indigenous communities (3), industry (5), non-governmental organizations (5), members-at-large (2) and the past-chairman (1). The work of the AWC is guided by its vision and mission:

> ***Vision:*** The Athabasca watershed is ecologically healthy, socially responsible, and economically sustainable.
>
> ***Mission:*** The Athabasca Watershed Council demonstrates leadership and facilitates informed decision-making in the Athabasca watershed by bringing stakeholders and Indigenous peoples together to promote, foster respect, and plan for an ecologically healthy watershed that supports social responsibility and economic sustainability.

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Executive Summary

The Athabasca Watershed Council (AWC) was formed in 2009 as a not-for-profit society. In 2019, the organization became a registered Canadian charity, celebrating ten years of engaging others about water issues throughout the Athabasca watershed, as well as working to fill information gaps and share learnings. The AWC is one of eleven multi-stakeholder Watershed Planning and Advisory Councils that have partnered with the Government of Alberta, industries, municipalities, non-government organizations, Indigenous communities, and the public to undertake watershed knowledge-building, education and outreach, state of the watershed assessments and management planning throughout the province.

The Athabasca River is one of North America's longest free flowing (i.e., undammed) rivers. It starts in the Rocky Mountains of Alberta and flows northeast, passing through the urban centers of Jasper, Hinton, Whitecourt, Athabasca and Fort McMurray before entering Lake Athabasca and the Peace-Athabasca Delta (an internationally recognized wetland, a UNESCO World Heritage Site and one of the most important waterfowl nesting and staging areas in North America). The Athabasca River is part of the Mackenzie River system that eventually drains into the Artic Ocean.

For the purposes of this report, the Athabasca watershed includes all of the lands in Alberta that drain into the Athabasca River and Lake Athabasca, making up about 24% of the province's landmass. The watershed includes 37 municipalities and 15 Indigenous communities. It also supports a number of activities including traditional Indigenous land use, recreation, hunting and trapping, forestry, agriculture, oil and gas, mining, transportation, and utilities.

The development of the Athabasca Integrated Watershed Management Plan (IWMP) was a collaborative effort led by the AWC. This plan identifies specific goals that build on previous work including the AWC's own stakeholder engagement initiatives and State of the Watershed Reports (Phases 1-4). As such, it strives to balance the environment, community, and economy with the protection and management of watershed resources. Goals are further broken down into strategies and actions that are specific, measurable, achievable, realistic, and timely. The goals include, in no order of priority:

1. Everyone in the Athabasca watershed has access to safe, secure drinking water supplies.
2. Aquatic ecosystems are healthy and biologically diverse.
3. River flows and lake levels meet social, cultural, economic and environmental needs.
4. Natural land cover is conserved, and cumulative land use pressures on water are mitigated.
5. Traditional Knowledge informs decision-making and planning.
6. Policies and plans are aligned for watershed health.
7. The impacts of climate change on watershed health are known and inform community preparedness.
8. Sub-basin and lake assessment, planning and stewardship initiatives are supported.

The purpose of the Athabasca IWMP is to provide information, guidance and recommendations to the decision-making authorities, municipalities, Indigenous partners, natural resource managers, industries, academia, users, stewardship groups, and residents regarding the Athabasca watershed. In conjunction with Alberta's *Water for Life Strategy* (2003), it addresses the complexity of watershed management issues that transcend landscapes, ecosystems, jurisdictions, and water users in the Athabasca watershed.

Implementation of the IWMP will rely on the commitment of a network of diverse partners, working collectively and independently, to achieve shared goals. Progress will be reported on by the AWC. Working together, the AWC and its partners can ensure *Water for Life* and IWMP goals are achieved in the Athabasca watershed.

Acknowledgements

We respectfully acknowledge that the Athabasca watershed is within Treaty 6, Treaty 8 and Treaty 10 Territories as well as Regions 1 and 4 of the Métis Nations of Alberta. We are grateful for the Traditional Knowledge Keepers and Elders who have lived in and cared for these lands and waters for generations. We respect the histories, languages, and cultures of the many Indigenous people whose presence continues to enrich the Athabasca watershed. We make this acknowledgement as an act of reconciliation and gratitude to those who came before us.

The development of this plan would not have been possible without the in-kind time and effort contributed by the AWC Technical Committee members, AWC board members and the organizations they represent. The AWC also acknowledges Alberta Environment and Parks (AEP), as well as our municipal, industry, individual and other donors, for their financial and technical support. Finally, we thank staff and the many individuals who contributed their input through various forums or by providing feedback on successive drafts. As they say, it takes a village, and we look forward to continuing to gather input on this plan, which will change and evolve over time, to meet the needs of the Athabasca watershed and the people in it.

Photo Credits: All photographs used in this report were provided by AWC staff or members, unless otherwise noted. The IWMP cover photo is by Eva Lechner.

Contents

List of Acronyms

AEP	Alberta Environment and Parks
AER	Alberta Energy Regulator
ASVA	Association of Summer Villages of Alberta
AWC	Athabasca Watershed Council
BMP	Beneficial Management Practices
GOA	Government of Alberta
IWMP	Integrated Watershed Management Plan
km	kilometers
PAD	Peace Athabasca Delta
SOW	State of the Watershed
TSAG	First Nations Technical Services Advisory Group
UNESCO	United Nations Educational, Scientific and Cultural Organization
WPAC	Watershed Planning and Advisory Council

Introduction

In 2003, the Government of Alberta (GOA) released the *Water for Life strategy*, laying out the province's approach to water management including adopting a collaborative, watershed approach. The strategy includes three goals and three key directions as follows:

Water for Life Goals:

- Safe, Secure Drinking Water Supplies
- Healthy Aquatic Ecosystems
- Reliable, Quality Water Supplies for a Sustainable Economy

Water for Life Key Directions:

- Knowledge and Research
- Partnerships
- Water Conservation

In 2009, the Athabasca Watershed Council (AWC) was formed to work towards achieving the *Water for Life* goals in the Athabasca watershed. The AWC, a multi-sector, not-for-profit organization, is one of 11 Watershed Planning and Advisory Councils (WPAC) created by the GOA to give those living, working, and playing in each watershed an opportunity to participate in water and watershed management (Figure 1). In 2019, the AWC became a registered Canadian charity and celebrated ten years of operations and achievements.

Although it may look different in each watershed, all of Alberta's 11 WPACs collaborate with the GOA, other government, industry, non-government organizations, Indigenous communities and other partners to implement an adaptive and iterative cycle of watershed management (Figure 2). To date, the AWC has completed a series of State of the Watershed Reports for the Athabasca watershed. It has also, through education and outreach activities, encouraged those who live, work, and play in the Athabasca watershed, to take a stewardship approach to protecting the watershed and managing the issues that affect it.

Photo: A family of Common Loons by R.G. Holmberg, Athabasca River Basin Image Bank, Athabasca University.

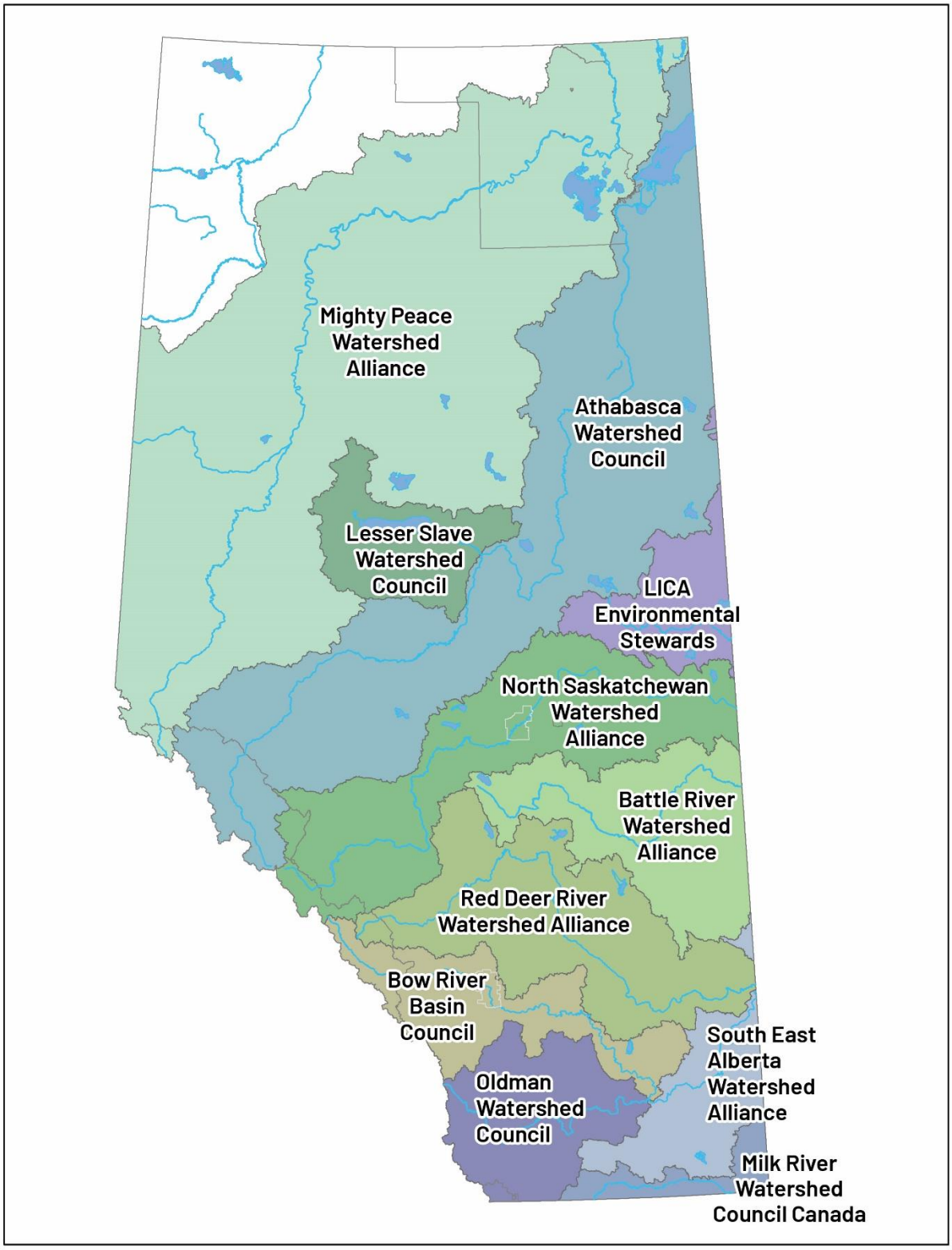

Figure 1: The 11 Watershed Planning and Advisory Councils (WPAC) in Alberta. For planning purposes, the Athabasca watershed includes those portions of the Athabasca River and Lake Athabasca watersheds that occur within Alberta.

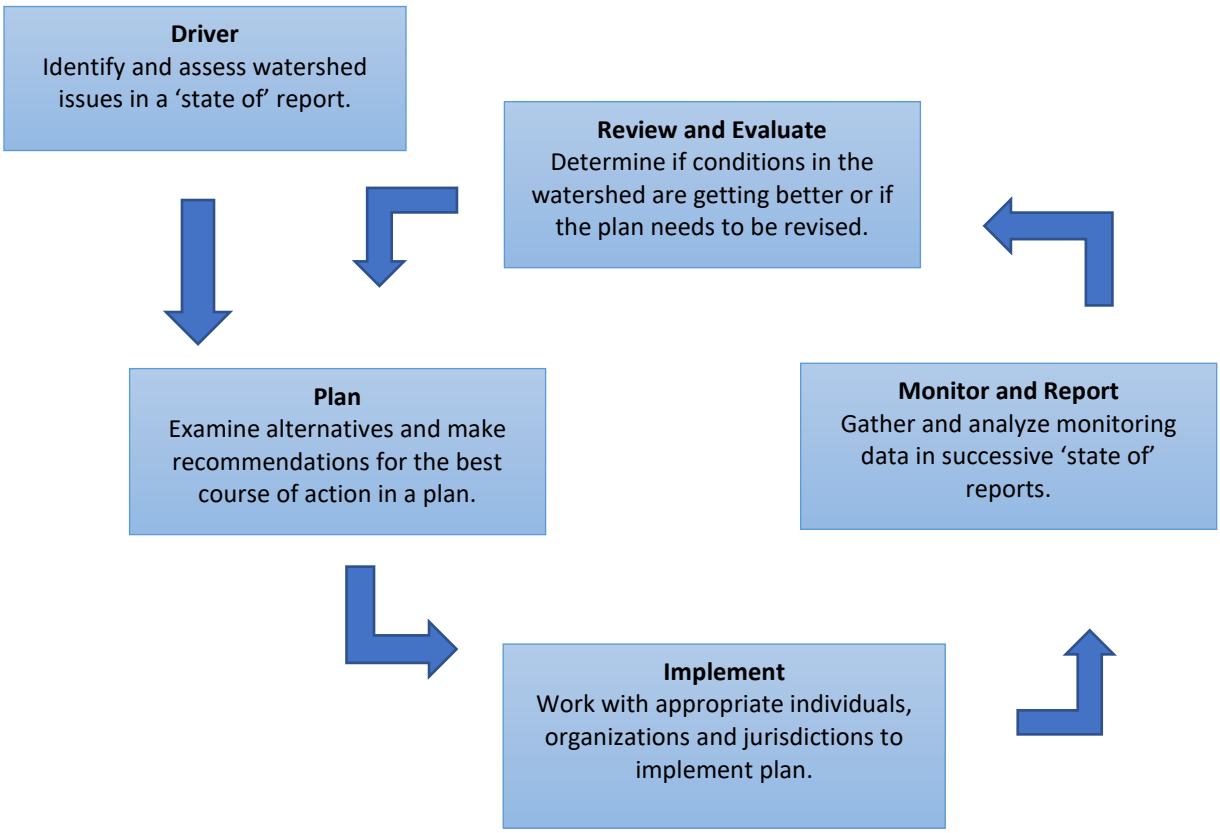

Figure 2. An Adaptive Management Approach to Water and Watershed Management

The Athabasca River

The Athabasca River, about 1240 kilometres (km) long, is the longest undammed river in Alberta.[1] Its headwaters are formed by the melting snow and ice of the Columbia Glacier in Alberta's Rocky Mountains. That portion of the Athabasca River within Jasper National Park, about 168 kilometers (km), was dedicated a Heritage River in 1989 in recognition of its natural and cultural value and importance for recreation. See Table 1 for more statistics about the Athabasca River.

Table 1. Characteristics of the Athabasca River	
Length	1231 km
Maximum Elevation	1520 m
Minimum Elevation	205 m
Annual Discharge	24,000,000 dam^3
Mean Discharge	783 m^3/s
Mean Water Temperature	8.2 °C
Number of fish species	37

[1] Note that the Peace River, at 1,923 km is longer than the Athabasca River, but it is dammed at its headwaters in northeastern British Columbia.

After flowing north through the park, the Athabasca River turns to the northeast, moving through the forested foothills into the Towns of Hinton and Whitecourt. Along its way, the river is joined by several major tributaries including the Berland, McLeod, Pembina, and Lesser Slave rivers. It then turns south and flows by the Town of Athabasca before again heading north (known as the Big Bend reach), gathering flows from the Lac La Biche and Calling rivers as it travels through the Boreal Forest. Further along, the Clearwater River comes from the east, meeting the Athabasca River at Fort McMurray.

Downstream of Fort McMurray, the Athabasca River is joined by several smaller streams (i.e., McKay, Steepbank, Firebag and Richardson rivers) as it flows through the oilsands areas. It then briefly flows alongside the southeast corner of Wood Buffalo National Park as it enters the Peace Athabasca Delta (PAD). The PAD is the largest boreal delta in the world, a UNESCO World Heritage Site, and one of the most important waterfowl nesting and staging areas in North America. The Athabasca River finally turns and flows into Lake Athabasca in Alberta's Canadian Shield Ecoregion. For the most part, Lake Athabasca waters flow, via the Rivière des Rochers and Chenal des Quatre Fourches, into the Peace/Slave River system, a sub-watershed of the Mackenzie River system that drains to Great Slave Lake, the Mackenzie River, and finally, the Arctic Ocean. Note, however, if spring waters are high, flows in these channels can be reversed, with Peace River waters flowing into Lake Athabasca.

The Athabasca Watershed

Note that for the purposes of this document, when we mention the Athabasca watershed, we are including both the Athabasca River watershed as well as that portion of the Lake Athabasca watershed that occurs in Alberta. Together, this drainage area accounts for about 24% of Alberta's land base.

A ***Watershed*** (also known as a *catchment area* or river *basin*) is an area of land that catches precipitation (rain, hail, snow) and drains into a common body of water, such as a river, tributary, lake, or wetland.

The Athabasca watershed can be further divided into ten sub-watersheds (Figure 3). These are smaller watersheds that eventually flow into the Athabasca River (McLeod, Pembina, La Biche, Lesser Slave and Clearwater rivers); riverside land corridors that drain into specific points along the Athabasca River mainstem (Upper Athabasca, Central Athabasca-Upper, Central Athabasca-Lower and Lower Athabasca); and finally, Lake Athabasca itself. Each of these ten sub-watersheds has different characteristics such as population, land uses and specific water issues. Information on the size and common land uses in each sub-watershed is presented in Table 2.

Note that the Lesser Slave sub-watershed has its own designated WPAC, the Lesser Slave Watershed Council (LSWC), which has produced a 'state of the watershed' report and water/watershed management plans for this sub-basin of the Athabasca watershed. Although the work of the LSWC is not included in this plan, their activities are complementary to and support AWC efforts and in the future, Councils may collaborate on issues, where it is beneficial to do so.

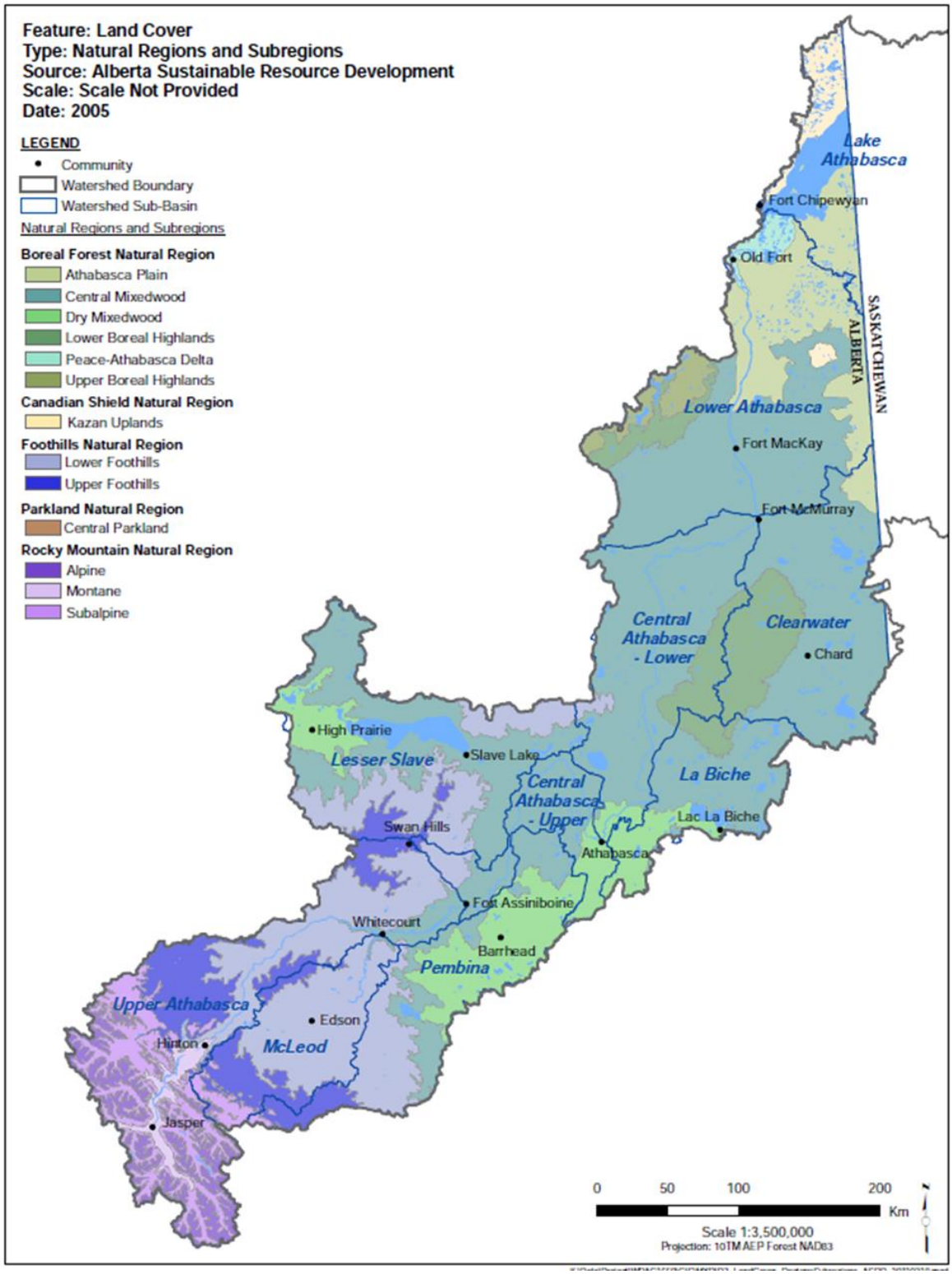

Figure 3. Map of Natural Regions in the Athabasca watershed's 10 sub-basins.

Given its plentiful natural resources, the Athabasca watershed has long been of interest to researchers from government, industries, and academia. As such, it has been the subject of several large research initiatives such as the *Northern River Basins Study* completed in 1996. The broad objectives of this program were to identify and quantify the multiple and diverse stressors acting on the Athabasca, Peace and Slave Rivers and to assess the ecological consequences of exposure to those stressors. This work was followed by the *Northern Rivers Ecosystem Initiative* and many other monitoring and research initiatives since, such as today`s Oil Sands Monitoring Program. Throughout these studies, much has been learned about the Athabasca watershed. Information about the watershed is also found in several provincial, municipal and resource planning documents, such as the Lower Athabasca Regional Plan and its accompanying water management frameworks. While it is a challenge to consolidate this vast amount of information, several links and references are provided in Appendix 1 for those interested in more information.

Table 2. The Athabasca watershed can be further divided into 10 sub-watersheds.

Sub Watershed Name	Total Area Km^2 (% of watershed)	% Contribution to Total Flow	Common Land Uses
Upper Athabasca	25,195 (18)	> 58%	Forestry, Gas Extraction, Recreation and Tourism, Indigenous Traditional Use
McLeod	9,658 (7)	~ 7%	Forestry, Agriculture, Coal and Aggregate Mining, Gas Extraction
Pembina	14, 324 (10)	~ 5%	Forestry, Agriculture, Gas Extraction
Central Athabasca (Upper Watershed)	6,138 (4)		Agriculture, Forestry, Gas Extraction, Aggregate Mining
Central Athabasca (Lower Watershed)	16,412 (12)		Forestry, In-Situ Oil Extraction, Oil and Gas Extraction
Lesser Slave	20,084 (14)	~ 6%	Forestry, Agriculture, Recreation and Tourism
Clearwater	16,893 (12)	18.5%	Forestry, Oil Extraction
Lower Athabasca	27,077 (19)		Forestry, Oil Extraction, Indigenous Traditional Use
Lake Athabasca	6,562 (5)	-	Indigenous Traditional Use

An Indigenous Perspective

In the fall of 2008, prior to formation of the AWC, Alberta Environment held a series of Focus Group sessions with stakeholder sectors and Aboriginal communities in order to get their input on forming a Watershed Planning and Advisory Council for the Athabasca watershed. Meeting with a small group of Indigenous participants in Fort McMurray on October 30, 2008, organizers heard several important messages:

- Many Indigenous communities and individuals have concerns about their local drinking water and the health of local lakes and streams.
- While there is value in collaborating and sharing information with others, it is important that Treaty Rights are recognized first. *'The Treaties name the Athabasca River and others in the region as the guarantee of Aboriginal rights – those who signed the Treaties were promised the right to pursue their usual vocations of hunting, trapping and fishing, "so long as the rivers flow".'*
- To First Nations and Métis, water is life. WPACs must seek to understand this holistic view of water and how it is connected to life and spirit.
- Indigenous communities and individuals can inform WPACs about their traditional lifestyles. However, they bring more to the table than just Traditional Knowledge. They are the eyes and ears on the landscape and can provide information on how such landscapes are changing over time.

Importance of the Athabasca Watershed to the Mountain Métis

"The Mountain Métis are an Indigenous community located in Grande Cache, with community members also residing in Hinton, Brule, Marlboro, Edson, and Grande Prairie. Our community historically homesteaded the upper Athabasca Valley for over a century until their forced eviction by the Federal Government in order to create Jasper National Park in 1910.

Since the early 1800s, the Athabasca watershed has been culturally significant to the Mountain Métis. The Athabasca provides sustenance and life for all living things. With the construction of the Grand Pacific Railway and the increase in resource extraction, industry has significantly impacted our traditional lands. Our Elders express "the environment is interconnected and [you] cannot limit the footprint of the Project to one small area." "Whatever happens downstream affects upstream."

Water is life, and it is our duty as Indigenous stewards of the land to protect and conserve water quality and quantity. For more information about the Mountain Métis, see https://mountainmetis.com/. "

Building on this conversation, AWC formation included three Indigenous seats on its Board of Directors, and in May 2011, as part of its state of the watershed knowledge gathering exercise, the AWC commissioned the report *"Traditional Knowledge Overview for the Athabasca River Watershed"* (Parlee 2011). This report provided a respectful look at what it meant by 'Traditional Knowledge', in particular in relation to aquatic ecosystems; some of the sources of publicly available Traditional Knowledge; and finally, what Traditional Knowledge tells us about potential indicators and metrics that could be used to assess future changes in the biological and physical health of the Athabasca watershed. More recent

studies like the Athabasca River Basin Initiative (WaterSmart 2018) help to ensure Indigenous values, like navigational flows, are incorporated into watershed models, plans and ultimately, water use decisions.

Having only just begun its journey, today, the AWC continues its work to better understand Indigenous knowledge and perspectives about the Athabasca watershed. Working together, we can continue to move forward to ensure all water and watershed values are respected and protected, both for current and future generations to come.

A Healthy Athabasca Watershed is Valued for Many Reasons such as:
Social and Cultural Values
• A source of drinking water • A place for recreational activities (e.g., boating, fishing, swimming) • Quiet enjoyment of Treaty rights; a place for spiritual and inspirational enjoyment • Subsistence and recreational hunting, fishing and berry picking • Water for forest fire suppression (community safety) • A method of public transportation (ice roads, river travel) • Community wastewater Management
Economic Values
• A source of water for economic activities such as irrigation and livestock watering, pulp and paper production, oil and gas development, coal, aggregate and peat mining • A landscape that supports tourism, guiding and outfitting and other recreational activities that in turn support local economies • A means of natural water storage (e.g., wetlands) and conveyance to downstream users • Water for forest regeneration • Commercial / Industrial Wastewater Management • A means of commercial transportation (winter ice roads) • A means of local food (without which there would be a higher economic and social cost)
Environmental/Ecological Values
• Good quality source water • Sustainable surface and groundwater flows • Healthy fish populations and other biodiversity as well as a resilience to invasive species • Healthy forests and productive soils • Mitigation of flood and drought conditions; moderation of local weather and resiliency to climate change

IWMP Purpose

What is an IWMP? Integrated watershed management planning is a comprehensive process to identify and protect shared values associated with water and watersheds. The Athabasca Integrated Watershed Management Plan (IWMP) is a strategic document, providing direction and a roadmap for future AWC and partner activities.

Who is it for? As well as guiding the AWC and its partners in their work, the IWMP provides information and guidance for decision-making authorities including the province, municipalities, Indigenous leaders, non-government organizations, natural resource managers, industries, water users, and residents in the Athabasca watershed. However, the GOA remains accountable for *Water for Life* implementation, as per its mandate of managing water and watersheds throughout the province.

In particular, the IWMP can provide advice to local and provincial governments as they develop and renew policies and land use plans and as they make regulatory decisions. The plan also seeks to align land and water managers, such that management actions, where possible and when taken together, improve watershed health. It also informs stewardship and conservation groups and individuals where there are opportunities to collaborate to make improvements to the Athabasca watershed.

How was information gathered? The AWC has been engaging others and collecting information about the Athabasca watershed since the society formed in 2009. It has also commissioned several reports on various aspects of watershed health (Appendix 1). Using education and outreach activities, the AWC has encouraged all who live, work, and recreate in the watershed to contribute their input on what is working, what

Some of the issues that may be affecting the Athabasca watershed include (but are not limited to) the following:

- At times, safe secure drinking water supplies may not be available to all.
- Drinking water treatment facilities are costly for small municipalities to maintain.
- Some aquifer levels show declines in some years, or have issues with iron, sodium, etc.
- Non-point pollution (run-off) may affect water quality and may increase with increasing growth and development.
- The state of wetland and riparian areas in the Athabasca watershed is not well known.
- There are several species at risk in the Athabasca watershed.
- Water supplies may be at risk with increasing population growth and development, seasonal low flows, climate change, etc.
- Monitoring and benchmarking effort is different in different parts of the watershed and for different watershed elements.
- It is unclear how cumulative effects of growth and development, and climate variability/change will affect water quality and quantity in the future.
- Some lake groups are struggling with managing nutrient rich lakes or variable lake levels.

is not working, and solutions to issues that may directly affect them within the Athabasca watershed. Additionally, there are many relevant policies, legislation, frameworks, management agreements and monitoring initiatives carried out by governments/regulators, industry, non-government organizations and Indigenous communities throughout the Athabasca watershed that inform the work of the AWC.

What's included in the IWMP? From their work over the past decade, the AWC identified eight goals to guide the development of the Athabasca IWMP. These goals reflect the values important to those who live and work in Athabasca watershed. They also build on past AWC projects and activities. These goals also reflect areas where further work (via strategies and actions) is required to address outstanding issues and ensure shared watershed values are maintained, for current and future generations. While the Athabasca watershed is very large and complex, an effort has been made to keep strategies and actions SMART; that is, specific, measurable, achievable, realistic, and timely.

IWMP Goals

Goals include, in no order of priority, the following:

1. Everyone in the Athabasca watershed has access to safe, secure drinking water supplies.
2. Aquatic ecosystems are healthy and biologically diverse.
3. River flows and lake levels meet social, cultural, economic and environmental needs.
4. Natural land cover is conserved, and cumulative land use pressures on water are mitigated.
5. Traditional Knowledge informs decision-making and planning.
6. Policies and plans are aligned for watershed health.
7. The impacts of climate change are known and inform community preparedness.
8. Sub-basin and lake assessment, planning and stewardship initiatives are supported.

Each goal is described in more detail in the following sections.

Goal 1. Everyone in the Athabasca watershed has access to safe, secure drinking water supplies.

Having a secure supply of good quality drinking water is critical to all, as it determines where we will live, work and recreate. Hence, safe, secure drinking water supplies is an important *Water for Life* goal.

The people in the Athabasca watershed receive their drinking water from both private and public drinking water systems that draw from surface and groundwater sources. Both public and private systems need to be maintained to ensure they continue to provide safe, secure drinking water to the people in the Athabasca watershed. To achieve this goal, the AWC has identified the following strategies and actions:

To protect out drinking water supply, we need to protect source waters. ***Source water*** is untreated, raw water from surface or groundwater sources used for drinking water or other uses.

Source water protection planning is a risk management process designed to maintain or improve the conditions of water through proactive collaborative identification, validation, assessment, and management of risk.

Strategies and Actions

1.1 Strategy: *Improve understanding of the state of drinking water quality and quantity, for both private and public ground and surface water systems, in the Athabasca watershed. Potential AWC Partners: GOA, municipalities, utilities, industry, water coalitions, Technical Services Advisory Group (TSAG) Circuit Rider program and Indigenous communities*

Actions	Desired Outcomes
1.1.1 Collect and analyze municipal, provincial, federal and other data and/or conduct a survey of regulated (provincial and Indigenous) and private drinking water systems in the Athabasca watershed to better understand the status of current systems (i.e., number of systems, location, source, treatment methods, infrastructure costs, staffing, etc.).	**1.1.1** A state of drinking water in the Athabasca watershed report is publicly available.
1.1.2 From the review/survey above, identify issues that may cause boil water advisories and drinking water quality guidelines exceedances (e.g., *E. coli*, turbidity, etc.). Build understanding on how these issues can best be mitigated.	**1.1.2** Information about the issues that may cause boil water advisories, with associated mitigation practices, is publicly available (e.g., factsheets posted on the AWC website) and circulated to municipalities and other partners.

1.2 Strategy: *Collaborate to ensure all (urban and rural) residents have access to potable water for drinking and domestic use. Potential AWC Partners: GOA, municipalities, Indigenous communities.*

Actions	Desired Outcomes
1.2.1 Promote regional drinking water and wastewater networks, consortiums and collaborations that are affordable and practical.	**1.2.1** Information on regional drinking water and wastewater networks and consortiums are available on the AWC website.

1.3 Strategy: *Collaborate to improve the understanding of groundwater as a source of drinking water in the Athabasca watershed. Potential AWC Partners: GOA, Alberta Geological Survey, academia.*

Actions	Desired Outcomes
1.3.1 Collaborate with the GOA to synthesize and present the information known about groundwater as a source of drinking water in the Athabasca watershed, and if appropriate, identify and communicate priorities for additional monitoring or study.	**1.3.1** The state of groundwater as a source of drinking water is known and shared publicly.
1.3.2 Encourage research (i.e., via study/modelling) on the size, location, condition, and risks to source groundwater in areas of human activity.	**1.3.2** Research on the size, location, condition, and risk to source groundwater in areas of high use is shared via the AWC website.
1.3.3 Promote private drinking water well system maintenance and testing throughout the Athabasca watershed by co-hosting the GOA's Working Well Program in areas of high well water use.	**1.3.3** Well owners are more knowledgeable about well maintenance and conduct regular testing.

1.4 Strategy: *Encourage the protection of source drinking water through source water protection planning and education and the promotion of beneficial management practices. Potential AWC Partners: GOA, municipalities, Indigenous communities, TSAG, industries and academia.*

Actions	Desired Outcomes
1.4.1 Collaborate with municipalities and Indigenous communities to identify and delineate source waters and to identify risks to these source waters.	**1.4.1** Risks to delineated source drinking water areas are identified and this information is available on the AWC website.
1.4.2 Identify/promote resources available to Indigenous communities and municipalities to develop source water protection plans.	**1.4.2** Increase in the number of source water protection plans in the Athabasca watershed.

Goal 2. Aquatic ecosystems are healthy and biologically diverse.

Just as it is important for people and the economy, water in the Athabasca watershed is an integral component of aquatic ecosystems. An aquatic ecosystem is a body of water in which living and non-living elements interact. This includes the physical, chemical, and biological characteristics of rivers, lakes, riparian areas, wetlands, and the plants, animals and other organisms associated with them. The GOA 2001 Framework for Water Management Planning includes a *Strategy for the Protection of the Aquatic Environment*.

In the Athabasca watershed, aquatic ecosystems include the mainstem and its tributary streams, as well as the lakes, wetlands, riparian lands, and diverse biota that inhabit these areas. This watershed also includes some very unique aquatic ecosystems including Athabasca Falls, Miette Hot Springs, Grand Rapids[2], McClelland Lake Patterned Fen[3] and the Peace-Athabasca Delta (a UNESCO World Heritage Site), to name a few.

> ***Did you know?***
>
> Miette Hot Springs, located in Jasper National Park, features the hottest mineral springs in the Canadian Rockies. Water flows from the mountain at 54°C (129°F). Spring waters have a high concentration of minerals including sulfate, calcium, bicarbonate, magnesium and sodium. Miette's three spring outlets gush at about 1540 litres (about five bathtubs full) per minute.

Given the size of the Athabasca watershed, it is challenging to assess and report on all of its aquatic ecosystems. Information about aquatic ecosystem health in smaller tributaries, non-recreational lakes, and riparian areas and wetlands across the watershed, is limited. However, a growing number of monitoring initiatives by government, industries, Indigenous communities, conservation and stewardship groups is helping to fill the gaps. To achieve the goal of healthy and biologically diverse aquatic ecosystems, the AWC has identified several strategies and actions that focus on four key areas of aquatic ecosystem health: water and sediment quality; riparian and wetland health, and biodiversity are discussed below. The fourth element, instream flow needs, is discussed under goal #3.

Strategies and Actions

2.1 Strategy: *Improve understanding of water and sediment quality in waterbodies throughout the watershed. Potential AWC Partners: GOA, Oil Sands Monitoring Program*

Actions	Desired Outcomes
2.1.1 Provide the public with information that compares actual water and sediment quality data (from academic studies and monitoring agencies)	**2.1.1** The state of what is known about water and sediment quality for the protection of aquatic life is made public and periodically re-assessed and updated.

[2] For a bird's eye view of Grand Rapids, see this YouTube video.

[3] For more information about the McClelland Fen, see this Alberta Wilderness Association webpage.

with federal, provincial, and regional guidelines for the protection of aquatic life.	
2.1.2 Examine how the GOA's Strategy for the Protection of the Aquatic Environment can inform water, land and resource management planning and activities that may affect the aquatic environment in the Athabasca watershed.	**2.1.2** Water, land and resource management planners are aware of the Strategy for the Protection of the Aquatic Environment and how it informs their work.
2.1.3 Continue to work through the AWC Technical Committee and other collaborations with agriculture, industries, municipalities and Indigenous communities to understand existing information on water and sediment; to identify any gaps or opportunities for future work and/or research; and to define concrete actions that minimize impacts on aquatic ecosystems.	**2.1.3** The AWC Technical Committee meets regularly and collaborates on finding and promoting solutions to impacts to aquatic ecosystems such as improved codes of practice, uptake of beneficial practices, restoration and conservation efforts, etc.

2.2 Strategy: *Understand the state of wetlands and riparian areas in the Athabasca watershed and collaborate with others to conserve, and where required, restore these areas. Potential AWC Partners: GOA, Municipalities, Indigenous communities, conservation organizations and stewardship groups*

Actions	**Desired Outcomes**
2.2.1 Review existing inventories and/ or assess the state of wetlands and riparian areas in the Athabasca watershed and share information publicly.	**2.2.1** The state of wetlands and riparian areas is known; riparian data are shared with the riparian web portal project.
2.2.2 Collaborate with partners and landowners to implement mitigation and monitoring plans and to conserve and restore wetlands and riparian lands.	**2.2.2** The amount of restored or conserved riparian areas and wetlands.

2.3 Strategy: *Collaborate with partners to improve knowledge and understanding of aquatic biodiversity, including invasive aquatic species, in the Athabasca watershed. Potential AWC Partners: GOA, Alberta Biodiversity Monitoring Institute, Alberta Invasive Species Council, citizen science initiatives*

Actions	Desired Outcomes
2.3.1 Increase awareness of aquatic biodiversity (particularly aquatic species at risk) in the Athabasca watershed by providing public information (e.g., fact sheets, webpage stores, etc.).	**2.3.1** Information on biodiversity and citizen science programs in the Athabasca watershed is available on the AWC website, newsletters, and social media.
2.3.2 Build awareness of invasive aquatic species by providing links to existing information (e.g., Invasive Species Council of Alberta), using social media, signage, etc.	**2.3.2** Information on aquatic invasive species is available via the AWC website, newsletters, and social media.
2.3.3 Improve knowledge about the distribution of native and invasive aquatic species by encouraging residents to participate in relevant citizen science initiatives that map species occurrences in the Athabasca watershed.	**2.3.3** Links to relevant citizen science initiatives are identified on the website. Distribution/occurrence of species is improved in the Athabasca watershed.
2.3.4 Collaborate with partners to improve knowledge about benthic invertebrates in the Athabasca watershed.	**2.3.4** A 'state of' what is known about benthic invertebrates' report is completed and periodically updated as more is learned.

Goal 3. River flows and lake levels meet social, cultural, economic and environmental needs

Water quantity is an important consideration in the Athabasca watershed. Water managers often talk about instream flow needs – the amount of water flowing through a river or in a lake (measured as lake level) needed to sustain healthy fish and other components of the aquatic ecosystem. Additionally, instream flows and lake levels may also be important for other reasons such as maintaining Indigenous and recreational river transportation, forest fire suppression, water storage and conveyance for downstream users, wastewater dilution and transport, overbank flooding and supplying water to other waterbodies. Indigenous communities have noted several occasions where instream flow needs were not sufficient for traditional activities in some areas and at some times of the year. Recent years have seen flooding become an issue in several communities.

Flow of the Athabasca River mainstem and a number of its tributaries is monitored as part of the GOA Long-Term River Network.[4] water quantity is a major focus of OSM, current monitoring that is being conducted via OSM hydrometric program.

However, many lakes and smaller streams are not monitored. Although individual withdrawals must be permitted, the impacts of cumulative water withdrawals, particularly during low flow or other sensitive periods on these waterbodies may not be well understood. Hence, to achieve this goal, the AWC has identified the following strategies and actions.

Did you know?

The GOA has a long-standing system for water allocation that goes back decades. Currently, this system is administered by the Alberta Energy Regulator (AER) for the oil and gas sector, and by Alberta Environment and Parks (AEP) for all other users.

Before diverting and using surface water and groundwater in Alberta, a Term or Temporary Diversion licence must be obtained under the province's *Water Act*. A licence provides authority for the diversion. It also identifies the source of water supply, location of the diversion site, allocation of water allowed from the source(s) and the conditions under which the diversion and its use must take place. Regulators are also informed by the Surface Water Allocation Directive.

Individual water allocations can be viewed on the GOA Authorization Viewer. Licence data can also be viewed spatially using the Alberta Water Tool. Note that most water licences are required to report their actual water use via the Water Use

Strategies and Actions

[4] To see a map of monitoring stations, see Alberta River Basins.

3.1 Strategy: *Improve understanding of water quantity (including instream flow needs for aquatic ecosystem health) and allocation pressures on the Athabasca River, its major tributaries, and smaller streams and lakes. Potential AWC Partners: GOA, Industries, Indigenous Partners, Researchers, etc.*

Actions	Desired Outcomes
3.1.1 Improve understanding of water quantity in the Athabasca watershed, in particular, understand how allocations are managed via the Lower Athabasca Surface Water Quantity Management Framework, as well as the state of allocations versus flows/levels in major tributaries, smaller streams and lakes that have significant allocations or that may be sensitive during certain periods or for specific reasons (e.g., species at risk habitat).	**3.1.1** Information on the state of what is known about water quantity and water allocations is available for a public audience. (Note: significant work has been done on this via the Alberta WaterSmart Athabasca River Basin Initiative.)
3.1.2 Work with other interests (e.g., Wood Buffalo National Park) to improve shared understanding of the status of instream flow needs for aquatic ecosystem health in the basin by synthesizing the information available.	**3.1.2** Information on how water quantity and instream flow needs are monitored and managed in the Athabasca River and its tributaries is available via the AWC website, newsletters, and social media.
3.1.3 Where required, provide information and advice to the GOA, industries and researchers on information gaps and priorities for flow/level monitoring initiatives, and the establishment of instream flows needs/water conservation objectives throughout the basin.	**3.1.3** Information and advice is provided to the GOA on the priorities for flow/level monitoring initiatives, IFN studies and the setting of WCOs throughout the watershed.
3.1.4 Raise awareness of and encourage and support stakeholders (industries and municipalities), Indigenous communities, non-government organizations and residents to participate in public engagement initiatives such as development and review of the Athabasca Water Management Frameworks.	**3.1.4** AWC members are aware of water management engagement initiatives.

3.2 Strategy: *Collaborate with partners to improve understanding of water supply and demand in the Athabasca watershed now and in the future. Potential AWC Partners: GOA, Municipalities Indigenous Partners, Alberta Energy Regulator (AER), Industries, Utilities, academia*

Actions	Desired Outcomes
3.2.1 Understand current sector water use (allocation, consumptive use and returns) in the Athabasca watershed.	**3.2.1** Information on sector water use is available through social media and website.
3.2.2 Encourage research, modeling, scenario-building and communication tools that improve our understanding of future water use / demand compared to water availability under a climate change regime in the Athabasca watershed.	**3.2.2** An evaluation, synthesis and gap analysis of current research studies, modelling and other reports is conducted on the future water supply and demand in the Athabasca watershed.

3.*3 Strategy:* *Promote innovation, such as water conservation, efficiency, and productivity planning and water re-use, in managing water demand. Potential AWC Partners: academia, GOA, municipalities, industries, utilities.*

Actions	Desired Outcomes
3.3.1 Increase awareness of the Alberta Water Council's water conservation, efficiency, and productivity (CEP) planning initiative, and encourage individual water allocation licensees in the Athabasca watershed to develop such plans.	**3.3.1** Information is available via the AWC Website on the Alberta Water Council's water conservation, efficiency and productivity planning initiative and plans are developed by water allocation licensees in the Athabasca watershed and shared on the AWC website.
3.3.2 Support research/innovation in industry and municipal water reuse, CEP, etc. by highlighting major water using sectors that are making concrete, measurable, and demonstrative improvements in water use.	**3.3.2** Research and innovation information is available via the AWC Website, newsletters, and social media.
3.3.3 Collaborate with municipalities to encourage and promote domestic water conservation.	**3.3.3** Communities with water conservation programs (e.g., water meters, low flush toilet rebates etc.) are highlighted via the AWC website, newsletters, and social media.

Goal 4. Natural land cover is conserved, and cumulative land use pressures are mitigated.

'Land cover' is a term used to describe the natural vegetation or land type, such as forest or grassland, of an area. The Athabasca watershed includes four natural regions (Rocky Mountain, Foothills, Boreal Forest and Canadian Shield), each with a variety of land covers including glaciers and snowpack; coniferous, deciduous and mixed wood forests; lakes, wetlands and other waterbodies; shrub and grassland, bedrock, etc. These land covers have their own intrinsic value but are also important for the ecological goods and services they provide (e.g., water purification and retention). 'Land use' describes how people are using the land. The Athabasca watershed has seen a variety of land uses over time such as trapping, logging, crop and livestock production, transportation, recreation and energy development.

Did you know?

To protect unique areas of natural land cover, the Athabasca watershed includes a number of protected areas. In fact, the river flows through a number of parks including Jasper National Park, five wildland provincial parks (Fort Assiniboine Sandhills, Hubert Lake, La Biche River, Grand Rapids, Richardson River Dunes) and Wood Buffalo National Park. Additionally, there are a number of protected areas adjacent to tributaries (e.g., Pembina River Provincial Park) and lakes (e.g., Cross Lake Provincial Park, Calling Lake Provincial Park) throughout the watershed.

Like other parts of Alberta, the Athabasca watershed experiences periods of increased population growth and economic development. With an increase in land use activities comes a variety of infrastructure and a corresponding loss of natural land cover. If not managed wisely, this growth can result in the loss of natural areas, forests/shelterbelts, wetlands, small streams, associated biodiversity and wildlife habitat, as well as places to recreate in nature, or to enjoy Treaty and Traditional Rights.

Additionally, the removal of natural vegetation can increase runoff from snow melt and rain which increase soil erosion and the transportation of contaminants. If impermeable surfaces replace ground cover, soil infiltration and shallow groundwater may also be affected. To achieve the goal of conserving natural land cover and mitigating the effects of increasing land use on water quality, quantity and aquatic ecosystem health, the AWC has identified a number of strategies and actions:

Strategies and Actions

4.1 Strategy: *Encourage recreational users to limit their impact on natural landscapes.*
Potential AWC Partners: Recreational groups, stewardship groups, hunters and trappers, NGOs.

Actions	Desired Outcomes
4.1.1 Promote programs such as Know Before You Go and Leave No Trace with recreational user groups within the Athabasca watershed.	**4.1.1** Programs promoting limited footprint are identified on the AWC website.

4.2 Strategy: *Encourage agriculture, industries and municipalities to reduce their cumulative 'footprint', in particular, their impacts on aquatic ecosystem health. Potential AWC Partners: GOA, Utilities, Resource Managers, Non-Government Organizations, Municipalities, Agriculture, Industries and Academia.*

Actions	Desired Outcomes
4.2.1 Encourage partners to reduce their footprint, including the density and impacts of linear developments (roads, seismic lines, power lines, pipelines, etc.) on aquatic ecosystems through the use of integrated planning, beneficial management practices (BMP), collaborative road maintenance plans, elimination of hanging culverts, minimization of stream crossings, progressive reclamation, etc.	**4.2.1** Density and impacts of linear developments on aquatic ecosystems are reduced.
4.2.2 Support implementation of Agricultural Beneficial Management Practices to protect source waters (e.g., livestock exclusion fencing for riparian lands, setbacks for manure application near rural groundwater wells) and support shared cost programs to achieve these solutions (e.g., ALUS Canada, Environmental Farm Plan, Ducks Unlimited Canada and Green Acreages programs).	**4.2.2** Agricultural BMPs resources are identified and listed on the AWC website. BMP cost sharing programs and resources are listed on the AWC website and promoted using social media.
4.2.3 Action: Encourage municipalities to use tools such as the environmental reserves and shoreline setbacks, to protect waterbodies and riparian areas within their land use planning jurisdiction and to use green infrastructure solutions (e.g., riparian plantings, willow beds, buffer strips, constructed wetlands, wet ponds, dry ponds, oil/grit separators, vegetative swales, etc.) and low impact development where feasible to address urban source drinking water and stormwater management issues.	**4.2.3** An increase in the number of municipalities using tools such as environmental reserves and shoreline setbacks; Urban green infrastructure and low impact development solutions are identified and listed on the AWC website and promoted using social media.

Goal 5. Traditional Knowledge informs decision-making and planning.

Humans have been using the lands and waters of the Athabasca watershed for thousands of years and many Indigenous groups, like the Dane-zaa, Sekani, Secwepemc (Shuswap), Salish, Ktunaxa, Nakoda/Stoney, Woodland Cree, Chipewyan (Denesoline), and Métis may have hunted and fished along the river before European colonization.[5,6] Today, the Athabasca watershed is comprised of Treaty #6, Treaty #8, and Treaty #10 territories. Additionally, the Athabasca watershed includes parts of Regions 1 and 4 of the Métis Nation of Alberta and several local Métis communities.

Throughout the Athabasca watershed, shorelines and waterbodies are culturally and spiritually significant to individuals and communities. For example, the Peace-Athabasca Delta is one of the most valuable habitats for aquatic waterfowl in North America and Indigenous people have a strong and spiritual relationship to this area. The population and health of waterfowl, fish, muskrat, and beaver are important traditional indicators of watershed health in this area.

The Athabasca River itself is also historically significant to Indigenous people. Those who signed the Treaties were promised the right to pursue their usual vocations of hunting, trapping, and fishing, 'so long as the river flows.' Today, in addition to traditional activities, Indigenous communities are also undertaking monitoring and research initiatives to better understand the state of the watershed and how it is changing over time.

Fort McMurray First Nation and the State of Gregoire Lake

Gregoire Lake is an important waterbody to the Fort McMurray #468 First Nation (FMFN) who reside along its southern shores.

Because of concerns about lake water quality and quantity, FMFN's Industry and Government Relations Corporation produced a State of the Gregoire Lake Watershed report. This initial Phase 1 study provides a preliminary technical assessment of lake health, providing a number of recommendations that will eventually inform a Watershed Management Plan for Gregoire Lake.

To achieve the goal that Traditional Knowledge helps to inform decision making and planning, the AWC has identified a number of strategies and actions:

Strategies and Actions

5.1 Strategy: *Building on the AWC's Traditional Knowledge Report, continue to pursue opportunities to identify, prioritize, and fill gaps in Traditional and local knowledge, particularly as it relates to historical water quality, quantity and aquatic ecosystem health of the Athabasca watershed. Potential AWC Partners: Indigenous partners including First Nations, Métis Settlements, Metis Locals, Alberta Native*

[5] See *Alberta's Lower Athabasca Basin: Archaeology and Palaeoenvironments* edited by Brian Ronaghan, May 2017, University of Alberta Press.

[6] See the AWC *Traditional Knowledge Overview for the Athabasca River Watershed* by Brenda Parlee, 2011.

Friendship Centres, Indigenous Wisdom Advisory Panel (Office of the Chief Scientist), Alberta Environment and Parks (AEP) Indigenous Relations staff, Mackenzie River Basin Board.

Actions	Desired Outcomes
5.1.1 Reinstate the AWC Indigenous Committee and/or host Indigenous Forums in the Athabasca watershed to gain an Indigenous perspective on water quality, quantity and aquatic health of the Athabasca watershed and include this information in AWC state of reports. **5.1.2** Look for opportunities to improve Indigenous participation and input on the AWC board, its committees and its projects.	**5.1.1** An AWC Indigenous Committee is established, or an Indigenous Forum(s) is hosted and Traditional knowledge / Indigenous perspective is included in AWC state of the watershed reports. **5.1.2** All 3 AWC Indigenous board seats are filled and all AWC committees have a mechanism to gather Indigenous input.

5.2 Strategy: *Pursue opportunities to support Indigenous communities with water and watershed stewardship, monitoring, source water protection and other initiatives. Potential AWC Partners: Indigenous Partners including individual First Nations and Metis Settlements/Local, Fort McMurray First Nations, AEP, ECCC, Parks Canada, Mighty Peace Watershed Alliance.*

Actions	Desired Outcomes
5.2.1 Identify and promote Indigenous stewardship, capacity, monitoring, source water protection and other water and watershed initiatives throughout the Athabasca watershed and the Peace-Athabasca Delta (e.g., Source Water Protection Plan for Gregoire Lake). **5.2.2** Promote initiatives that contribute towards recommendations and actions outlined in the Wood Buffalo National Park World Heritage Site Action Plan.	**5.2.1** Information is available via the AWC website, newsletters, and social media on Indigenous water and watershed programs throughout the Athabasca watershed. **5.2.2** Information about the Wood Buffalo Action Plan is posted on the AWC website.

Goal 6. Policies and plans are aligned for watershed health.

As governments move forward with setting policy direction and developing regional and municipal plans, it is important that watershed values are incorporated into these activities, such that water is managed consistently between jurisdictions. In Alberta, there is no one entity solely responsible for water/watershed management. Instead, the authority and responsibility, including the integration of land and water outcomes, rests with a number of jurisdictions and institutions. To achieve the goal that policies and plans are aligned to support watershed health, the AWC has identified several strategies and actions:

Strategies and Actions

6.1 Strategy: *Ensure the Athabasca watershed IWMP is supported by federal, provincial, municipal, and Indigenous jurisdictions and a watershed perspective is incorporated into appropriate statutory policies and plans which are aligned across jurisdictions for watershed health. Potential AWC Partners: GOA, Municipalities, Indigenous partners*

Actions	Desired Outcomes
6.1.1 Encourage federal, provincial, municipal, and Indigenous governments to accept the Athabasca IWMP as information and advice to inform their planning and decision-making.	**6.1.1** The Athabasca IWMP is accepted as information by federal, provincial, municipal and Indigenous governments.
6.1.2 Provide a watershed perspective to provincial, regional and municipal statutory planning and review processes (e.g., Lower Athabasca Regional Plan, water management frameworks and municipal development plans).	**6.1.2** The AWC provides a watershed perspective to other planning processes and ensures its partners are aware of such processes.
6.1.3 Provide opportunities to bring partners together to compare, align, and fill gaps in policies and plans and to showcase/share innovative approaches to policy and plan development.	**6.1.3** A forum for partners is held to align, compare, and help identify potential gaps in policies and plans to showcase/share innovative approaches policy and plan development.

6.2 Strategy: *Ensure policies and plans are informed by good information about watershed health. Potential AWC Partners: GOA, NGOs, Industries.*

Actions	Desired Outcomes
6.2.1 Evaluate water quality, quantity and aquatic ecosystem health information and monitoring needs	**6.2.1** Information and monitoring needs are known and communicated to AWC partners.

from the headwaters to the Peace-Athabasca Delta and Lake Athabasca.	
6.2.2 Work with partners to share existing and commission new reports to identify and fill priority information gaps and to ensure a comprehensive long-term, water monitoring program for the Athabasca watershed with publicly accessible data and research findings shared with decision-makers. Ensure all AWC documents are publicly accessible via the Athabasca River Basin Repository (Athabasca University Library).	**6.2.2** Data gaps are filled, and a comprehensive monitoring program is implemented for the Athabasca watershed with data and research findings shared with the public and decision makers.
6.2.3 Build stakeholder knowledge about the watershed by promoting existing education programs (e.g., Water Literacy, Respect Our Lakes) and providing opportunities (e.g., forum, workshops) for stakeholders to share, compare, align and fill gaps in watershed knowledge that will inform policies and plans.	**6.2.3** Existing education programs are shared via the AWC Website, newsletters and social media and new opportunities, such as forums or workshops are developed.
6.2.4 Improve the Athabasca State of the Watershed (SOW) reporting framework (criteria and indicators) and include up-to-date information on tributaries, lakes, wetlands, and culturally significant indicators in future state of the watershed reports.	**6.2.4** A reporting framework for the state of the watershed is established.

Photo: Muskeg Creek by Marsha Hayward

Goal 7. The impacts of climate change are known and inform community preparedness.

The impact of climate variability and climate change is a concern across Alberta as it is in the Athabasca watershed. To evaluate changes in water quantity throughout the Athabasca watershed, the AWC SOW Phase III looked at several components of surface water for each tertiary watershed including precipitation, evapotranspiration, discharge, and change in surface water storage over 200-year timeframe. Though outdated, this 2014 analysis supports a body of research that shows natural variability, as well as directional climate change, is occurring in the Athabasca watershed. Climatic events such as floods and droughts, can have a severe impact on local communities. To improve our understanding of the future effects of climate change, the AWC has identified several strategies and actions:

Strategies and Actions

7.1 Strategy: *Raise awareness and improve understanding of climate variability and change in the Athabasca watershed. Potential AWC Partners: AEP, academia, Industries, Indigenous Partners, Lesser Slave Watershed Council, Municipalities.*

Actions	Desired Outcomes
7.1.1 Share existing information about climate variability and change in the Athabasca watershed.	**7.1.1** Information about climate variability and change in the Athabasca watershed is available on the AWC website, newsletters, and social media.
7.1.2 Encourage new and existing research and monitoring in the Athabasca watershed, to understand the cumulative effects of growth and development and climate change.	**7.1.2** Research and monitoring on cumulative effects and climate variability/change is conducted with results shared on the AWC website.
7.1.3 Collaborate with partners to share information on and help mitigate the impacts of climate variability (e.g., flood, drought forest fires, etc.) through flood and drought planning, FireSmart programs, etc.	**7.1.3** Communities/industries are resilient to the impacts of climate change.

Goal 8. Sub-basin and lake assessment, planning and stewardship initiatives are supported.

Many residents and visitors to the Athabasca watershed are aware of water and watershed issues. Additionally, a growing number of watershed stewardship groups bring the attitudes, skills and knowledge to take stewardship actions to protect the water resource. Since the AWC formed in 2009, the AWC has provided educational events and materials aimed at stewardship groups. To continue to support stewardship initiatives, particularly around on-the-ground stewardship actions as well as sub-basin and lake assessment and management planning, the AWC will collaborate with partners to address the strategies and actions identified below:

Strategies and Actions

8.1 Strategy: *Increase public awareness of water issues and watershed management in the Athabasca watershed and help build knowledge, awareness, and skills for individuals to undertake stewardship activities. Potential AWC Partners: AEP, AWC, Stewardship Groups.*

Actions	Desired Outcomes
8.1.1 Use the AEP water literacy survey tool to create a baseline and test future improvement of water literacy in the Athabasca watershed.	**8.1.1** The AEP water literacy survey tool has been used to create a baseline of water literacy in the Athabasca watershed.
8.1.2 Develop a Communications and Engagement plan that guides education and outreach activities and aligns with other watershed educators.	**8.1.2** A Communication and Engagement Plan is completed and implemented.
8.1.3 Collaborate with the Alberta Water Council and other WPACs on water/watershed education initiatives.	**8.1.3** AWC collaborates with other WPACs on projects in Alberta.
8.1.4 Collaborate with Athabasca University to promote the Athabasca River Basin Research Institute.	**8.1.4** Information is available on the Athabasca River Basin Research Institute website; partners are made aware of the site via social media, website, and newsletter.

8.2 Strategy: *Collaborate with partners to provide watershed science and outreach activities to students in the Athabasca watershed to increase watershed literacy that compliments the provincial curriculum. Potential AWC Partners: Stewardship Groups, Municipalities, Indigenous communities, NGOs.*

Actions	Desired Outcomes
8.2.1 Facilitate school presentations, field trip opportunities, community events, and day camps to increase watershed literacy in the Athabasca watershed that support the learning outcomes of the Alberta curriculum.	**8.2.1** The number of science and outreach activities for students in the Athabasca watershed has increased.

8.3 Strategy: *Support sub-watershed and lake assessment, planning and stewardship initiatives such that they have the support, tools, and resources they need to be successful. Potential AWC Partners: Stewardship groups, Municipalities, Indigenous communities.*

Actions	Desired Outcomes
8.3.1 Be a conduit for information about stewardship initiatives in the basin via website, social media, newsletters, etc.	**8.3.1** Information about stewardship initiatives is available on the AWC website, social media, newsletters, etc.
8.3.2 Participate in and encourage municipalities, industries, and Indigenous communities to be involved with development and implementation of local stewardship group initiatives including state of reporting and watershed management planning.	**8.3.2** AWC, municipalities, industries, and Indigenous partners support local stewardship group initiatives, which are established in each sub-watershed.

Plan Implementation, Reporting and Review

Alberta's *Water for Life* strategy emphasizes that integrated watershed management planning is a shared responsibility. Collaboration is key, with the participation of stakeholders and community representatives from within the watershed required for successful plan implementation. Although the IWMP will rely heavily on the 11 sectors (Alberta Environment and Parks, Indigenous, Municipal, Members-at-Large, Forestry, Oil and Gas, Agricultural Producer, Mining/Utilities, Non-government Organizations, Stewardship Groups, and Academia) represented on its board, it will also need to engage many other sectors, organizations, and communities for the plan to be successful.

Additionally, to remain relevant and timely, an adaptive management approach is required. Hence the Athabasca IWMP should be considered a 'living' document and its implementation should be reported on annually (within the AWC annual reporting process). The document should undergo a thorough review every threes years to ensure goals and strategies are still relevant. As new issues arise, or as new information is developed, the plan may need to be updated.

Watershed management is complex and there are many activities that can be undertaken to protect watershed health. Resourcing and capacity issues must also be considered and often constrain plan implementation. Hence it is important that:

a) a sound multi-stakeholder, collaborative implementation structure is put in place.
b) priorities are carefully weighed and matched with capacity; and
c) performance measures are used to ensure priority actions are effective within a specific timeline.

A sound governance structure will include the establishment of an Athabasca IWMP Implementation Committee (IC), made up of the AWC Technical Committee expanded to include key partners identified in the plan. Roles and responsibilities of the IC will be spelled out in its Terms of Reference. The IC will also work closely with the AWC Finance and Fundraising Committee to look at how to resource actions.

The IC will work closely with the AWC Communications, Education and Community Engagement Committee (CECE) to flesh out an education and outreach plan and begin implementing this aspect of the IWMP. This work should focus on giving people living, working and recreating in the Athabasca watershed basic knowledge (i.e., water literacy) about the watershed itself, as well as about the eight goals of the IWMP. It should also link people to the tools and resources needed to be good stewards of the watershed. This work will also focus on building the AWC's capacity for being a conduit for the exchange of technical and other information between governments and other stakeholders affecting the watershed (e.g., agriculture, forestry, oil and gas, etc.).

Successful watershed management planning relies heavily on using the best available information in a dynamic and iterative process. With the previous AWC state of reports focusing on the period 2007 – 2011, this information is now dated. Hence, the Implementation Committee will continue to use a

Technical Committee, whose first task will be to design and implement an iterative "state of" reporting process. This may include confirming the suite of performance measures to be reported and determining the format and timing of future state of reports. A phased process, focusing on the state of each of the eight IWMP goals, would be a potential approach.

Finally, a key role of the Implementation Committee will be to report on IWMP progress annually. Reporting can include successes and challenges in implementing the plan, as well as actual improvements to the watershed's ecological integrity. Additionally, the IC should revisit the plan from time to time (e.g., every 5 years) to ensure it is still relevant to prevailing issues or adjusted as new issues arise.

In Closing

The AWC and its partners have built interest and awareness across many sectors in the past decade, improving our understanding of the values important to everyone living, working and recreating in the Athabasca watershed, as well as the issues affecting those values. As we move forward with the next phase of watershed management, the AWC will more than ever need all its partners to participate in the forthcoming work to implement the IWMP.

The success of IWMP implementation will be dependent on the partnerships and collaborations generated to undertake strategies and actions. Sustained efforts by all jurisdictions within the watershed are required. Fortunately, the potential for beneficial partnerships in the Athabasca watershed is endless. Working together, the AWC and its partners can ensure the *Water for Life* strategy is achieved throughout the watershed.

Appendix 1. Links and Documents

List of Athabasca Watershed Council Documents Relevant to the IWMP Project

- AWC Website: http://www.awc-wpac.ca/
- AWC Engagement Documents:
    - *Athabasca Watershed Planning and Advisory Council Development Process: Stakeholder and Aboriginal Community Focus Group Summary* (Dec 2008). Prepared by Alberta Environment.
    - *Stakeholder Perceptions About the Health of the Athabasca Watershed: Results of a Preliminary On-line Survey*. Prepared as Part of Phase 2 of the Athabasca State of the Watershed Report by Fiera Biological Consulting, March 2012.
    - *Final Report on the Four Public Participation Sessions*. Prepared by Human Environment Group, December 2012.
- SOW Technical Reports and Summary:
    - *Athabasca Watershed Council State of the Watershed Report: Phase 1.* Prepared by Hatfield Consultants. March 2011
        - *Traditional Knowledge Overview for the Athabasca River Watershed*. Prepared by Brenda Parlee, University of Alberta, May 2011.
    - *Athabasca State of the Watershed Report Phase 2*. Prepared by FIERA Biological Consulting, March 2012.
        - *Northern River Basin Study Management Recommendations*, Fiera Biological Consulting, March 2012.
    - *State of the Watershed Report Phase 3: Water Quantity and Basic Water Quality in the Athabasca Watershed*. Prepared by Fiera Biological Consulting (April 2013)
    - *Athabasca State of the Watershed Assessment Phase 4: Organic Compounds in Surface Water and Sediments and Trace Metals in Sediment*. Prepared by Hatfield Consultants, March 2014.
    - Athabasca SOW Summary
- Info Sheets
- AWC Annual reports 2009-10 through 2017-18. (NB: no report for 2013-14)
- AWC Three Year Strategic Plan: 2020-2023

Other Documents & Initiatives Relevant to the Athabasca Watershed

National Initiatives

- Canadian Heritage Rivers
- Center for Watershed Protection
- Living Lakes Canada

Federal Government

Agriculture and Agri-Food Canada (AAFC)*

- Canadian Agricultural Partnership in Alberta

Environment Canada www.ec.gc.ca;

- Oil sands monitoring
- Canadian Drinking Water Guidelines

Fisheries and Oceans Canada / Fish Habitat Management: https://www.dfo-mpo.gc.ca/index-eng.htm

Health Canada: Drinking Water

Parks Canada (Wood Buffalo National Park, Jasper National Park)

- WBNP UNESCO Heritage Site reports - https://whc.unesco.org/en/documents/156893

Transboundary

- BC Transboundary Waters
- Mackenzie River Basin Board – Alberta – NWT Transboundary Waters Bilateral Agreement
- NWT Water Stewardship
- Saskatchewan Water Security Agency (Lake Athabasca monitoring, state of)

Provincial Government and Agencies

- Policies/strategies: Water for Life Strategy, Land Use Framework, Wetland Policy
- Legislation: *Water Act*, *EPEA*, *Public Lands Act*, *MGA (See Queen's Printer)*
- Regulators: AER
    - AER Compliance Dashboard
    - AER One Stop Public Map Viewer
    - AER Water Use Report
- Alberta Environment – multiple webpages, reports
    - Alberta Water Well database
    - Alberta Working Well program
    - Fish and Wildlife Internet Mapping Tool https://maps.alberta.ca/FWIMT_Pub/Viewer/?TermsOfUseRequired=true&Viewer=FWIMT_Pub
    - Water for Life strategy
    - WPAC webpage
    - winter synoptic water quality study
- Alberta Agriculture
- Alberta Health
    - Boil Water advisories

    - AEPHIN website
- Alberta Innovates – Water Innovation Program
- Alberta Municipal Affairs www.municipalaffairs.gov.ab.ca
    - Alberta's Economic Dashboard
- Natural Resources Conservation Board (NRCB)
    - Confined Feeding Operations see https://cfo.nrcb.ca/

Provincial Organizations/Initiatives

- Alberta Biodiversity Monitoring Institute
- Alberta Conservation Association
- Alberta Environmental Farm Plan
- Alberta Fish and Game Association
- Alberta Invasive Species Council
- Alberta Stewardship Network / Land Stewardship Centre
- Alberta Water Council (Publications)
- Alberta Water Portal
- Alberta WaterSmart
    - Athabasca River Basin initiative
- Alberta Water Tool
- Association of Summer Villages of Alberta
- Cows and Fish (Alberta Riparian Habitat Management Society)
- Nature Alberta

Surrounding Regions

- Lesser Slave Watershed Council http://lesserslavewatershedcouncil.ca/
- Mighty Peace Watershed Alliance https://www.mightypeacewatershedalliance.org/
- North Saskatchewan Watershed Alliance https://www.nswa.ab.ca/
- Beaver River Watershed Alliance https://www.beaverwatershedalliance.org/
- Northern Alberta Water and Wastewater Needs report produced by the Northern Alberta Development Council https://nadc.ca/Docs/Water-Needs-Survey.pdf
- Northern River Basins Study / Northern Rivers Ecosystem Initiative
- RAC Advice to the GOA on the North Saskatchewan Regional Plan

Athabasca Watershed

- *Alberta's Lower Athabasca Basin: Archaeology and Palaeoenvironments* edited by Brian Ronaghan, May 2017, University of Alberta Press. http://www.aupress.ca/index.php/books/120207

- Alberta WaterSmart The Sustainable Water Management in the Athabasca River Basin Initiative
- Athabasca River Basin Research Institute website online searchable repository
- Keepers of the Athabasca
- Lac La Biche watershed management plan
- Lower Athabasca Regional Plan
- Science Outreach – Athabasca
- Upper Athabasca Regional Plan
- WWF "Securing Environmental flows in the Athabasca River": http://d2akrl9rvxl3z3.cloudfront.net/downloads/wwf_canada_athabasca_report.pdf

Municipal

- ALDIP
- Alberta Urban Municipalities Association
    - Watershed Management
    - Source Water Protection
- Community Conserve Municipal Management of Water Bodies
- Northern Alberta Development Council
    - Northern Alberta Water and Wastewater Needs Assessment Summary Report https://nadc.ca/Docs/Water-Needs-Survey.pdf
    - Water North Coalition https://nadc.ca/our-business/partnerships/water-north-coalition/
- Rural Municipalities of Alberta (Districts 3, 4 and 5)

Indigenous

- Athabasca Tribal Corporation
- Bigstone Cree Nation
- CEMA Traditional Ecological Knowledge database (ARBRI/AU)
- Centre for Indigenous Peoples.
- Circuit Rider Training Program
- Grand Council of Treaty 8 First Nations
- Guardians community-based monitoring project
- Lesser Slave Lake Indian Regional Council
- Northern Contaminants Project
- Northern River Basins Study Traditional Knowledge Study
- UN Declaration on the Rights of Indigenous Peoples

Industry Best Practices

- Wetland BMP Knowledge Exchange

Lake Management

- AEP – Lakes
- Alberta Lake Management Society
- ASVA Lake Stewardship Reference Guide
- Atlas of Alberta Lakes
- Protect our Lakes and Shorelines (Lac La Biche County)
- Respect our Lakes program (AEP)

Research and Monitoring

- Alberta River Basins
- Athabasca River Basin Research Institute
    - Lake reports repository
    - River reports repository
    - Creek reports repository
- Boreal Research Institute (NAIT)
- CABIN
- Canada's Oil Sands Innovation Alliance.
- Environmental Monitoring and Science Program (AEP)
- Foothills Research Institute
- GOWN
- Guardians community-based monitoring project
- Lesser Slave Lake Bird Observatory / Boreal Centre for Bird Conservation
- Mackenzie DataStream
- Northern River Basins Study
- Oil Sands Monitoring Program
    - Federal webpage
    - COSIA webpage
- Peace Athabasca Delta Ecological Monitoring Program
- RAMP (Regional Aquatics Monitoring Program)
- Wood Buffalo Environmental Association