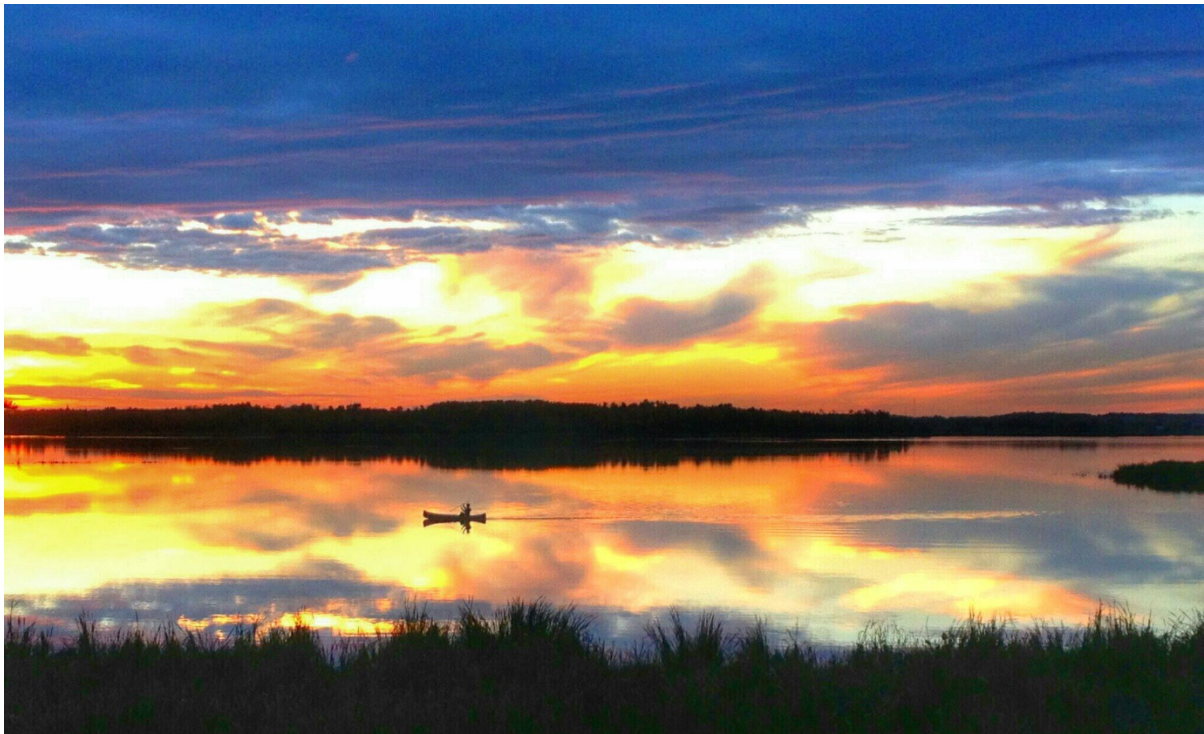




NORTH SASKATCHEWAN WATERSHED ALLIANCE

Antler Lake State of the Watershed Report



October 2019

Antler Lake State of the Watershed Report

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The NSWA gratefully acknowledges operational funding support received from the Government of Alberta and many municipal partners.



The North Saskatchewan Watershed Alliance (NSWA) is a non-profit society whose purpose is to protect and improve water quality and ecosystem functioning in the North Saskatchewan River watershed in Alberta. The organization is guided by a Board of Directors composed of member organizations from within the watershed. It is the designated Watershed Planning and Advisory Council (WPAC) for the North Saskatchewan River under the Government of Alberta's *Water for Life Strategy*.

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Executive Summary

The Antler Lake Stewardship Committee (ALSC) formed in 2015 to address issues related to lake health. Residents at the lake expressed concerns about deteriorating water quality, blue-green algal ([cyanobacteria](#)¹) blooms, proliferation of aquatic vegetation, and low lake levels. In 2016, the Antler Lake Stewardship Committee approached the North Saskatchewan Watershed Alliance (NSWA) to prepare a State of the Watershed report. The NSWA initiated work in 2017, with collecting a variety of land, water, and ecological information from government and non-government sources. The purpose of this report is to assess the environmental conditions of the lake and its [watershed](#) (land contributing runoff into the lake) through the evaluation of biophysical information and watershed stressors. A new [water balance](#) was prepared to provide basic [hydrologic](#) context, many land attributes were mapped, and water quality data were reviewed. By providing a current state of the watershed, and identifying knowledge gaps, this report establishes a benchmark from which future stewardship and planning initiatives can proceed.

Antler Lake is located within the Beaverhill sub-watershed, one of twelve hydrologic sub-watersheds in the North Saskatchewan River [Basin](#). The Antler Lake watershed covers an area of approximately 21.10 km², with 29% of the watershed designated as agricultural or developed land, 39% designated as forest, and the remaining 32% divided among [scrublands](#), grasslands, bare earth, [wetlands](#), and open water classifications. Agricultural activity accounts for the greatest [land use](#) in the area, followed by the development of housing and roads. Over 450 permanent, year-round residents have made the Hamlet of Antler Lake their home. Lakeshore development is significant, covering almost one half of the 10-kilometer shoreline. Development around the lakeshore has negatively impacted the [riparian](#) area and could place the shoreline at risk for [erosion](#) or poor water quality. There has been significant pressure on this area due to the increasing demand for recreational opportunities, as well as urban and country residential development.

The Antler Lake watershed lies within the heart of the Beaver Hills [Moraine](#), a designated [Biosphere](#) under the United Nations Educational, Scientific and Cultural Organization (UNESCO). The Moraine is a valuable source of surface and ground water, and supports a high diversity of rare species, including large numbers of migratory birds. Due to its proximity to several protected areas and extensive forested land, the Antler Lake watershed is considered an important wildlife [corridor](#) in the Moraine and plays a key role in ecological linkages.

Antler Lake is very shallow, with an average depth of 1.76 meters, and is surrounded by emergent and submergent vegetation. The lake water is well-mixed during the open water season, resulting in uniform daytime temperature and oxygen levels throughout the water column. The lake most likely becomes [anoxic](#) soon after ice formation due to its shallow depth, and because of this, does not support a large fish population. The shallow water and large amounts of vegetation make it difficult for many common recreational uses, such as swimming and using motor-bound boats. However, kayaking and nature watching are common uses of the lake by residents and visitors, taking advantage of the natural features and [biodiversity](#) around the lake.

Water levels in Antler Lake have been declining since the mid-1990's, concurrent with warming climate trends and less [precipitation](#). Current water quality conditions are poor compared to other central Alberta

¹ Terms in blue can be found in the Glossary

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lakes, due to high nutrient, [ion](#), and metal concentrations. Water quality data are limited and only available for 1987 and 2016-2017. In recent years, the lake was very nutrient-rich and had an exceedingly high mean total phosphorus (TP) concentration (380-410 µg/L) and was classified as [hypereutrophic](#). Major ion concentrations of bicarbonate, chloride, sulphate, potassium, sodium, magnesium, and calcium have also increased significantly over this time period, indicating the water is becoming more saline as water levels decline.

Most metal concentrations reported were below Canadian Council of Ministers of the Environment (CCME) Protection of Aquatic Life (PAL) Guidelines. However, the mean dissolved aluminum and iron concentrations have been hovering around the recommended guideline during recent measurements (2016-2017). Though natural elements within the ground and groundwater of the area, high levels of aluminum and iron may be indicative of sediment resuspension in the water column, which is commonly observed in shallow lakes. The high levels of nutrients may also be due to [internal loading](#) from lake bottom sediments, resuspended during mixing events, as the [phosphorus budget](#) indicates.

Antler Lake is hydrologically connected to several other nearby lakes, such as Cooking and Hastings lakes, within the Beaver Hills Moraine, and the water flowing through this system eventually drains into the North Saskatchewan River. The water balance developed for Antler Lake indicated that, on average, the lake experiences greater [evaporation](#) than precipitation. Therefore, the combination of changes in climate, a shallow basin, and changes to the landscape through human developments can all work together to negatively affect the water quality of Antler Lake and impact the hydrological connectivity of the region. Little is understood about the connections of lakes to groundwater in the region, but the ground is very permeable, and much of the Antler Lake watershed is at risk for groundwater contamination because of this characteristic.

Overall, Antler Lake is becoming more indicative of a wetland, as vegetation continues to grow, and water levels drop. The lake and its surrounding watershed are sensitive to further encroachment and a changing climate. Though several data limitations still exist, such as the understanding of hydrological connectivity, a detailed riparian assessment and phosphorus budget, and biodiversity surveys, there are several opportunities for both the ALSC and Strathcona County to protect and improve the state of the watershed. It is recommended first and foremost to enhance stewardship activities around the lake and watershed, to provide information and opportunity for involvement in watershed conservation activities by residents. Furthermore, the ALSC should collaborate with local environmental NGO's such as the Alberta Lake Management Society (ALMS) and the Alberta Invasive Species Council to continue monitoring the water quality of the lake and to assess the watershed for potential invasive species. Finally, it is recommended that the ALSC work with Strathcona County to review county bylaws and ensure that future development within the watershed considers the sensitivity of the area and the need to conserve the natural qualities and benefits Antler Lake provides.

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1.0 Introduction

1.1 Purpose of Report

The purpose of this report is to summarize all available environmental information for Antler Lake and its watershed¹. Information on Antler Lake is limited, and as such, this report will provide an initial benchmark upon which to direct future watershed stewardship initiatives and monitoring efforts aimed at improving lake and watershed health. Preparation of this report is made in fulfillment of a request made by the Antler Lake Stewardship Committee to NSWA in 2016.

1.2 Scope of Report

This report examines the current and historical condition of Antler Lake and its watershed. The scope of this report spans the local-to-regional context of environmental trends and policies that govern changes within the watershed. This report will discuss many technical and contextual aspects of watershed characteristics that play important roles in the health of Antler Lake and its watershed, including climate, geology, hydrology, land cover and use, water quality and quantity, riparian health, wildlife, and aquatic biology. This report also contains information on local history and public perceptions and concerns for the watershed. Finally, the report is summarized with addressing specific, public concerns, providing recommendations for future planning and stewardship activities, and general recommendations for improving watershed health and stability.

1.3 History of the Area

Antler Lake is located in the heart of the Beaver Hills Moraine, now the Beaver Hills Biosphere (**Figure 1**). This area was originally established as a forest reserve by the federal, Department of the Interior, in 1892. It was formally designated as the Cooking Lake Forest Reserve in 1899. Further protection was given to Elk Park in 1906, when it was designated as an Elk sanctuary. Management of certain crown lands and natural resources in Alberta were transferred from federal jurisdiction to the provincial government in 1930. Elk Park became formalized as a National Park, later named Elk Island National Park, while the rest of the Cooking Lake Forest Reserve fell under provincial responsibility, losing the protected status (Parks Canada, 2017). Several other small federal and provincial protected areas exist within the Moraine, including the Ministik Game Bird Sanctuary, the Cooking Lake – Blackfoot Recreation Area, and Miquelon Lake Provincial Park.

In the early 1950s, approximately 2.4 km of shoreline along the eastern and southern shores of Antler Lake, including Hazelnut Island, was developed into the Hamlet of Antler Lake. This development pressure originated from the expanding population base around Edmonton. The Antler Lake Community League was established in 1975, and the Antler Lake Community Hall was built in 1981. In the early 1990s, the Uncas Community League disbanded and joined forces with the Antler Lake Community League. Renamed the Antler Lake/Uncas Community League, it remains active in the community today (Donald Luxton & Associates, 2008). This volunteer organization exists primarily to serve the residents of Antler Lake, Uncas,

¹ Terms in blue can be found in the glossary.

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and surrounding communities by providing programs, services, and infrastructure, and by acting as an advocate to represent the needs and interests of the community.

In keeping with the long history of conservation efforts in the Beaver Hills Moraine, the Beaver Hills Initiative was formed in 2002 to encourage coordinated land-use planning by municipalities in the areas outside the protected parks. This collaborative organization has the involvement of many stakeholders, including five municipalities, federal and provincial protected areas agencies, plus other government, and non-governmental organizations with interests in the area. With an overarching acknowledgement of the Moraine's unique landscape character, these partners work together to promote a regional approach to land management (BHI, 2015).

Since its establishment, the Beaver Hills Initiative has developed several valuable projects and shared knowledge to encourage a sustainable balance between economic development and environmental conservation (BHI, 2018). One of these initiatives included recognition of the Moraine as a dark sky preserve by the Royal Astronomical Society of Canada in 2006 (RASC, 2018), as well as its designation as a UNESCO Biosphere Reserve in 2016 (UNESCO, 2016) (**Figure 1**). As a result of the Biosphere designation, the BHI has determined the need for a review of its governance model in support for an application to be a society registered through the Alberta Societies Act. The Biosphere designation triggered a discussion on the sustainability of the current organization. The time has come for the collaboration to evolve from a partnership built on a common vision and mission to a legal entity with clear bylaws and policies.

In 2015, concerned residents, living around Antler Lake, formed the Antler Lake Stewardship Committee (ALSC), a not-for-profit organization. The ALSC formed to place proactive effort into maintaining the health and stability of the Antler Lake watershed (ALSC, 2019). The ALSC has been working with Strathcona County in efforts to gain a knowledge base from which future stewardship efforts are prioritized, and this collaboration has led to the development of this report. A request for the completion of the State of the watershed report was made by the ALSC and Strathcona County to the NSWA in 2016.

1.4 Public Perception and Concerns

On April 13, 2017, the Antler Lake Stewardship Committee hosted an open house for all residents of Antler Lake to provide information regarding the state of the watershed reporting project and to gather insights and anecdotal information about the lake from local community members (ALSC, 2017).

The main concerns that were brought up at this meeting included:

- The high levels of phosphorus identified during the 2016 water quality testing by the Alberta Lake Management Society (ALMS);
- Large, blue-green algal blooms and the potential toxicity of these events;
- Some residents believed that there were fish in the lake, historically, and wanted to know more about the status of the fishery;
- Community members wanted to learn how they can help to mitigate some of the observed issues with the lake;
- The possibility of lake dredging; and,
- Identification of harmful land-use practices.

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In addition, it is generally recognized that shoreline development pressures have impacted environmental conditions at many lakes in the province. Lakeside landscaping activities frequently impact riparian habitat. Another common challenge is that shoreline, environmental reserves are often accessed by

adjacent landowners for their personal use or benefit. These environmental reserves are municipally owned and were created during the land subdivision process to protect riparian areas and provide access points to the lake.

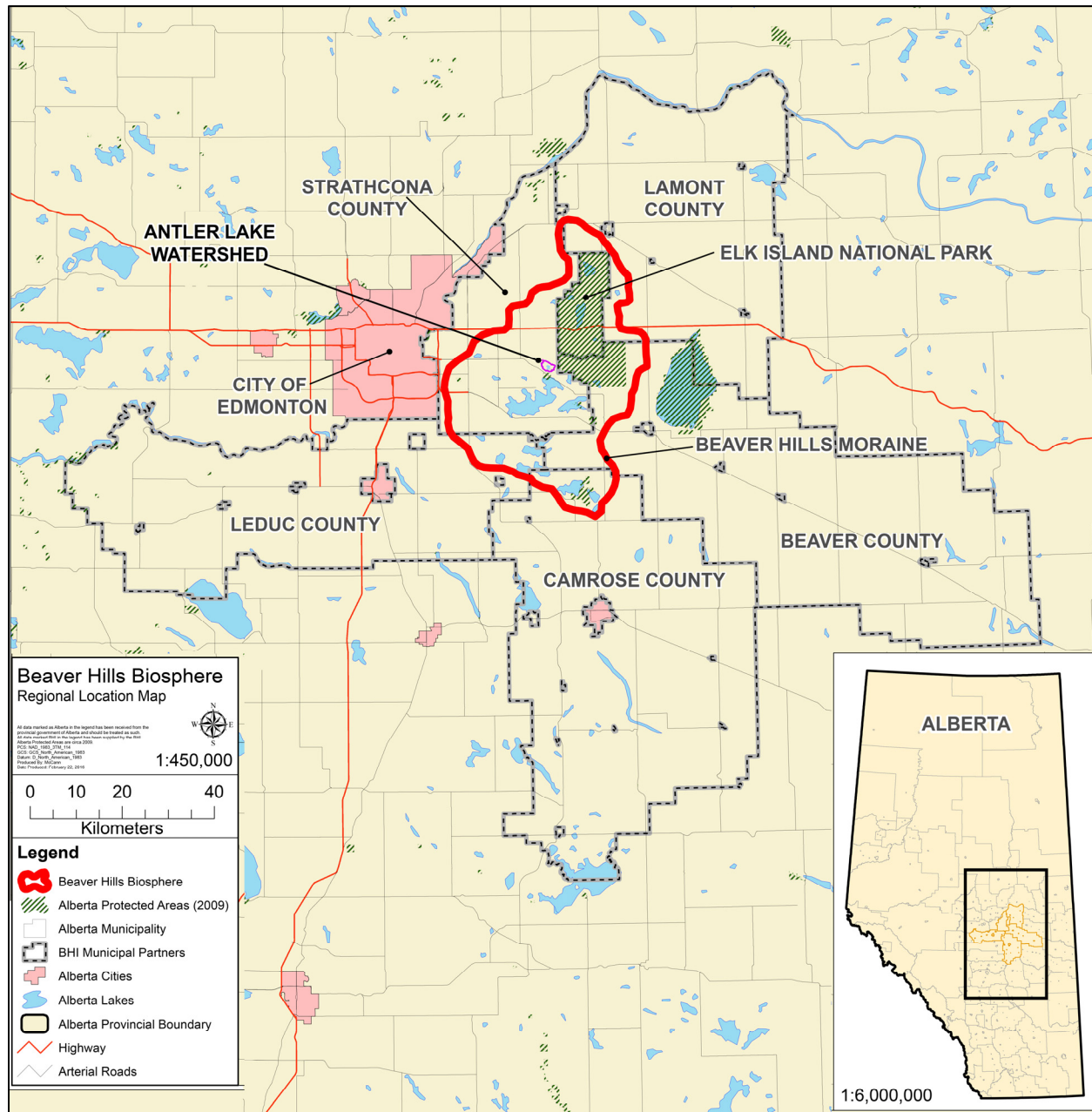


Figure 1. Beaver Hills Biosphere. The Antler Lake watershed is highlighted in pink in the center of the Beaver Hills Biosphere region, outlined in red. Image modified from the Biosphere Regional Location Map (Beaverhills.ca).

2.0 Guiding Policies

2.1 Policy Introduction

By definition, a watershed is the land that collects and contributes water to a waterbody (**Figure 2**). Policies that govern land-use and guide future development to that land are just as important, if not more, than the policies that govern and protect our precious water resources. Because watershed boundaries do not form to political boundaries, it is necessary for multiple stakeholders across levels of government and land users to work together to form policies that achieve the goals of all parties and maintain watershed health. There are many layers of policy in place to structure and govern different pieces of the watershed.

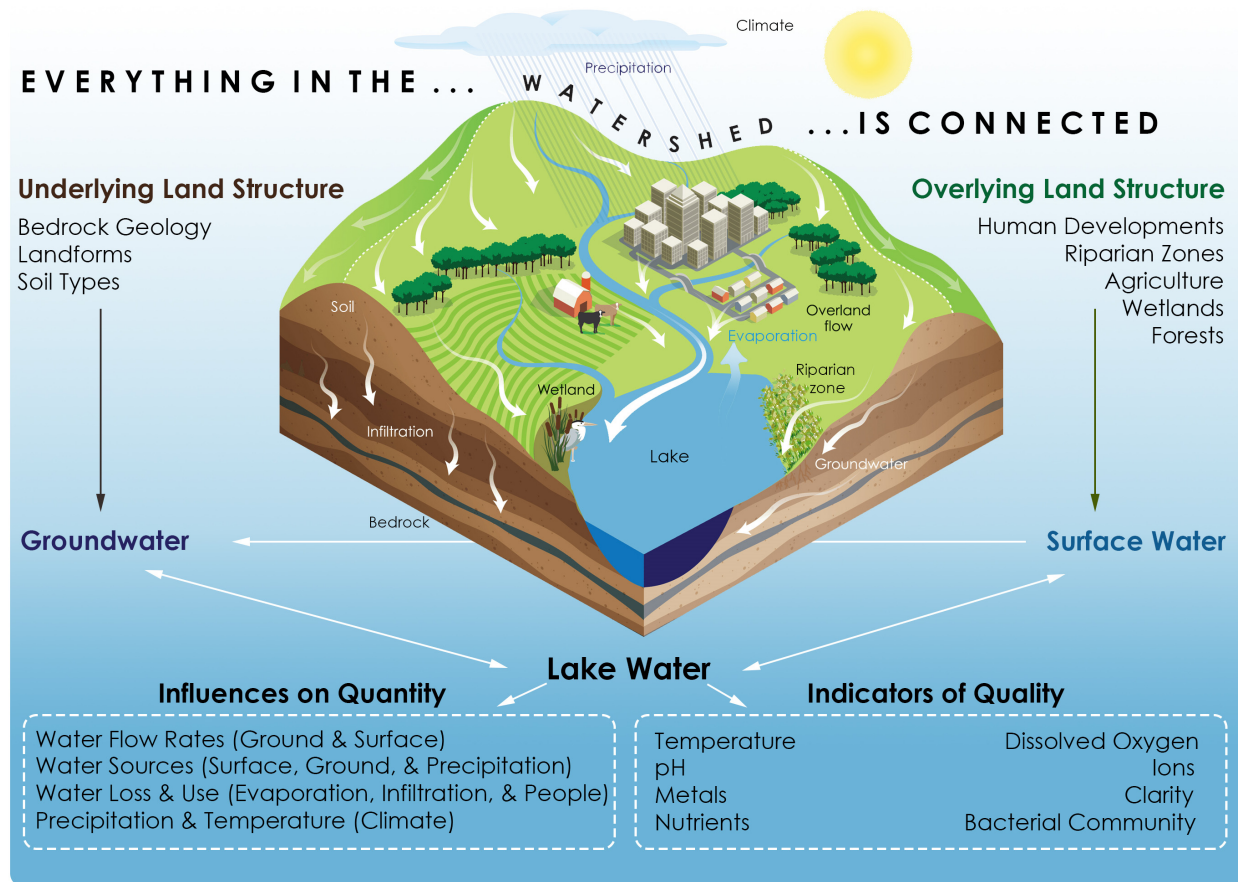
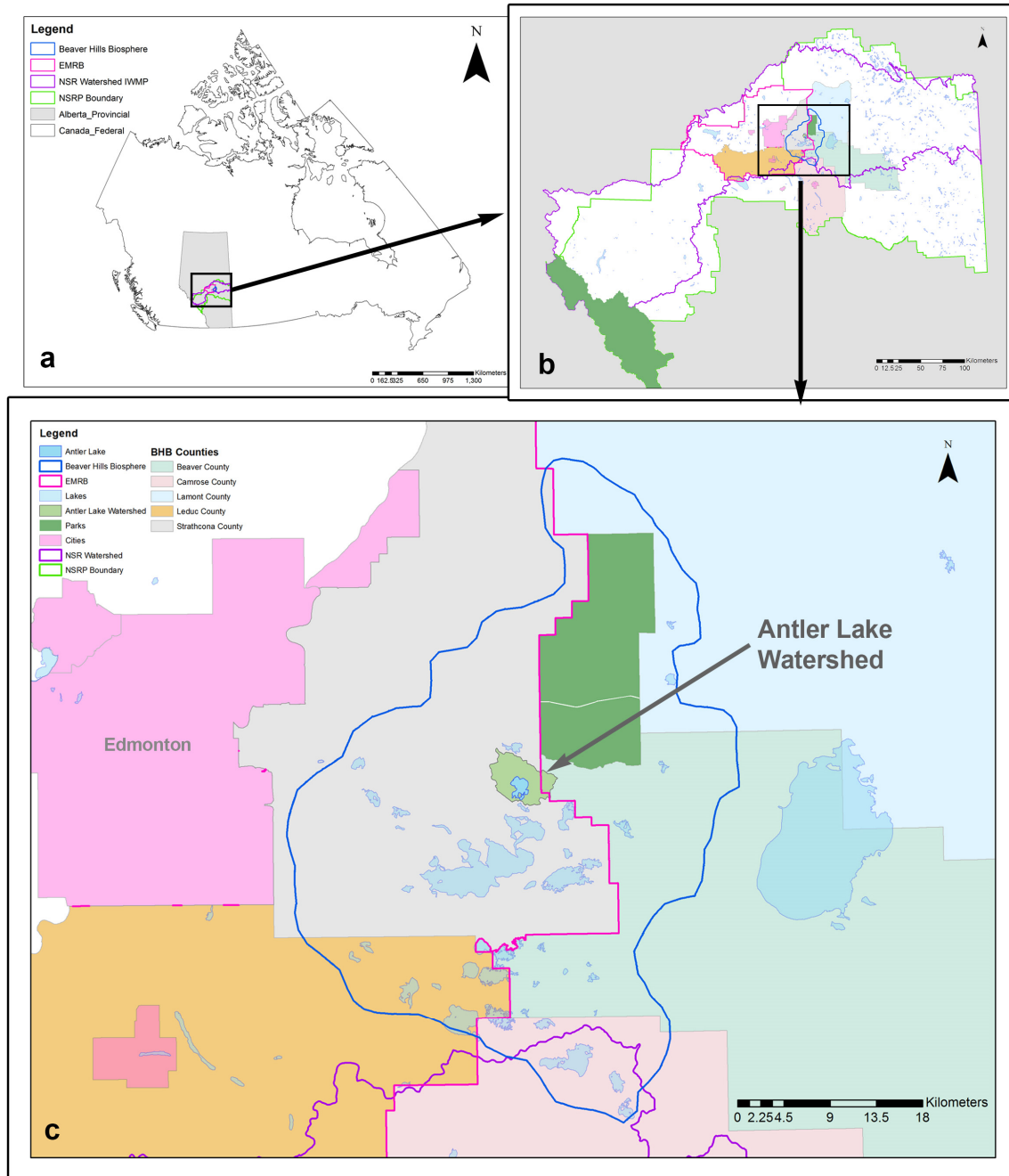


Figure 2. Watershed Connectivity.

The Antler Lake watershed, because of its location, has many overlapping development plans from municipalities and non-government organizations. Below, we attempt to summarize these development plans (**Figure 3**) and discuss, generally, their primary goals regarding relevant policies to the Antler Lake watershed. We start by looking at federal and provincial policies that affect land, water, wildlife, and culture. Then, we move inward to provincial sectors, particularly examining the North Saskatchewan River watershed and its sub-watersheds, followed by municipalities and regional development plans that

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attempt to work across boundaries. Then, we will discuss some problem areas within the Antler Lake watershed and highlight policies that have been made to address them specifically.



2.2 Federal and Provincial Policies

For watersheds, there are different “owners” of the land versus the water. The Crown owns all the water in Canada, but it is managed by the individual provinces. In Alberta, the provincial government manages all the water above and below ground. They also own the bed and shore of all permanent, naturally occurring waterbodies. Therefore, federal, and provincial policies would govern use and allocation of water and waterbodies (Government of Alberta, 2010). The land, on the other hand, can have many different owners including individuals, industry, the public, and government. Decisions surrounding land-use policies are in the hands of the municipalities, whom must abide to a hierarchical framework of policy structure laid out by provincial and federal policies. Because there are many federal and provincial policies that govern different aspects of the watershed, these have been summarized in **Figures 4a-b** and **5a-b**.

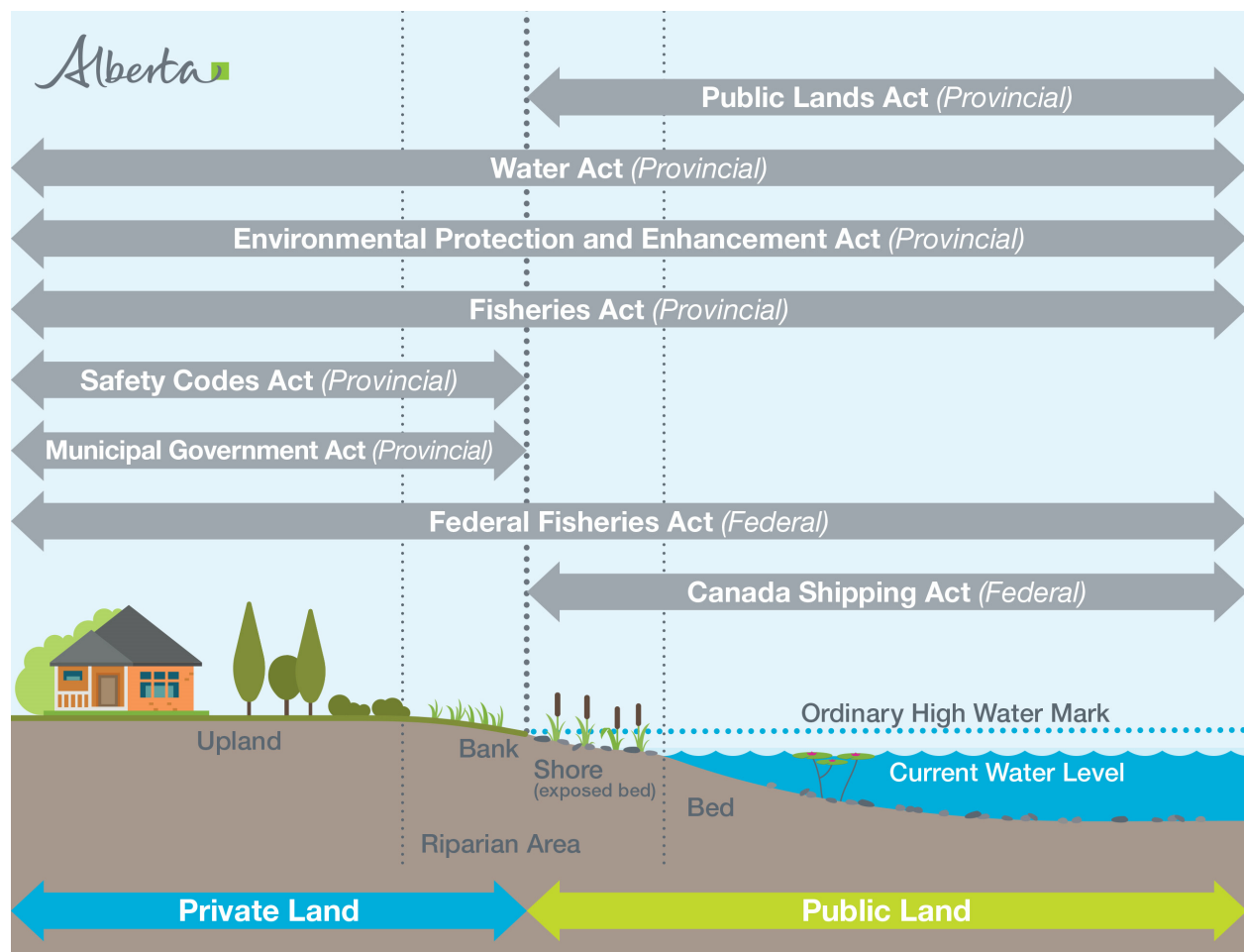


Figure 4a. Lake Legislation in Alberta (GOA, 2019).

Lake Legislation in Alberta

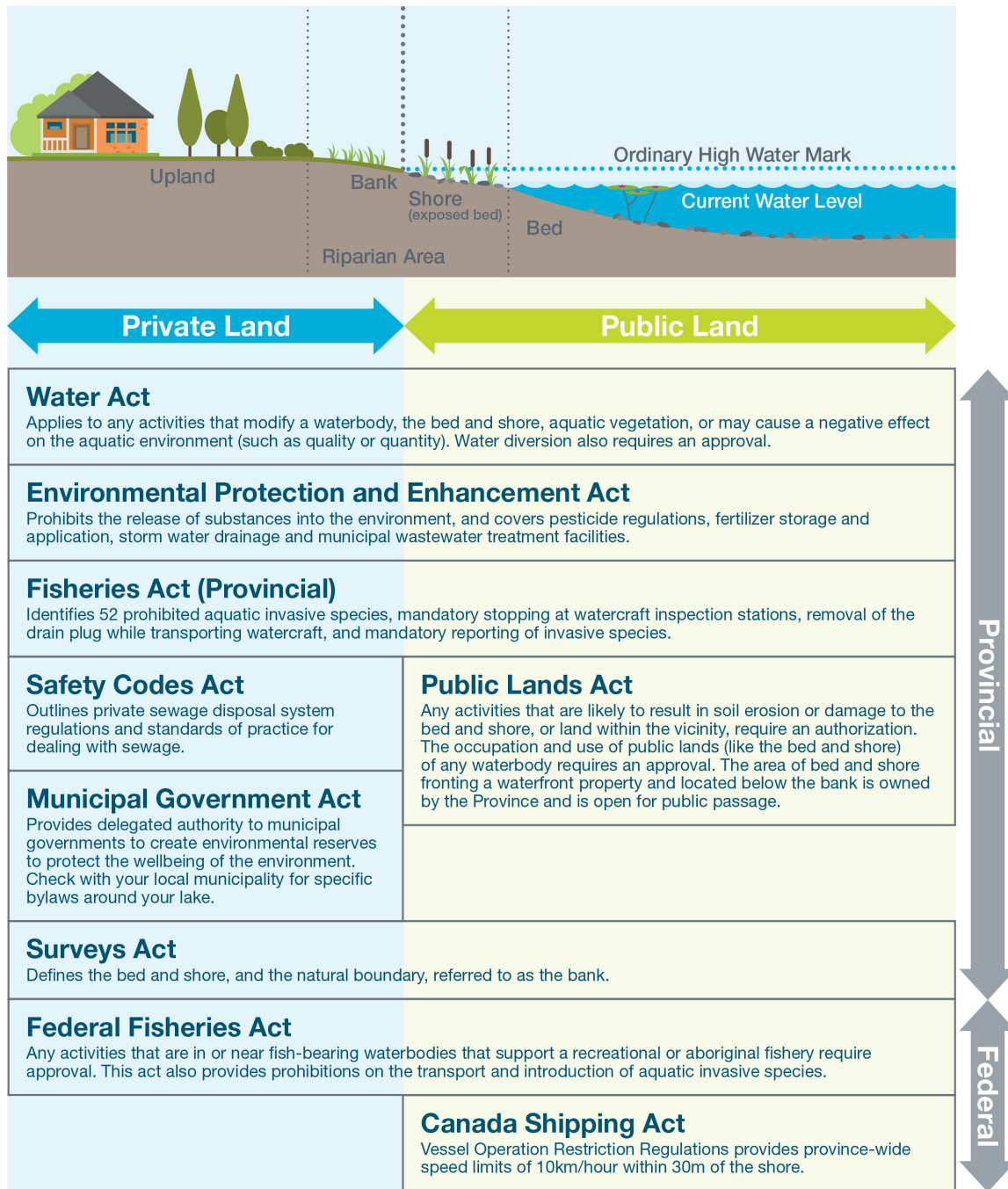
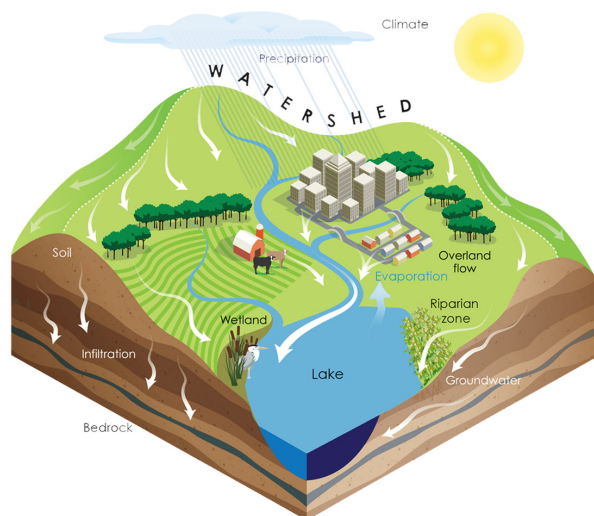


Figure 4b. Lake Legislation in Alberta (GOA, 2019).



POLICY

WATER

Canada Water Act, R.S.C. 1985, c.C-11 To enable joint flood control and agricultural water projects.

Canada Shipping Act, 2001, 2001, c.26

Provincial Water Act, R.S.A. 2000, c.W-3 Governs the diversion, allocation and use of water. Regulates and enforces actions that affect water and water use management, the aquatic environment, fish habitat protection practices, in-stream construction practices, storm water management.

LAND (Continued on next page)

Provincial Environmental Protection and Enhancement Act (EPEA) R.S.A. 2000, c.E-12 Management of contaminated sites, storage tanks, landfill management practices, hazardous waste management practices, wastewater management, and enforcement.

Provincial Alberta Land Stewardship Act, S.A 2009, c.A- This legislation supports implementation of the Land-use Framework. It creates the seven land-use regions, establishes the Land-use Secretariat and gives authority for regional plans, creation of Regional Advisory Councils and addresses the cumulative effects of human and other activity.

Provincial Municipal Government Act R.S.A. 2000, c.M-26 Provides municipalities with authority to regulate water on municipal lands, management of private land to control non-point sources, and authority to ensure that land use practices are compatible with the protection of aquatic environment.

Provincial Public Lands Act, R.S.A. 2000, c.P-40 Regulates and enforces activities that affect Crown-owned beds and shores of water bodies and some Crown-owned uplands that may affect nearby water bodies.

WILDLIFE

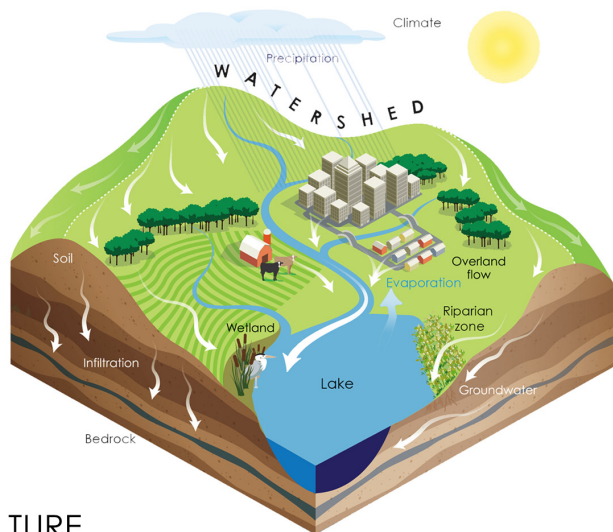
Federal Fisheries Act - Regulates and enforces on harmful alteration, disruption and destruction of fish habitat in Section 35. Fisheries and Oceans Canada (FOC) R.S.C. 1985 cF-14

Migratory Birds Convention Act 1994, 1994, c.22 Regulates activities that could harm migratory birds or their nests, and prohibits deposits of certain materials that might be harmful in water frequented by migratory birds.

The Species at Risk Act, S.C. 2002, c.29 Prohibits the destruction of critical habitat for species at risk. Prohibits killing, harming or harassing endangered species as defined.

Wildlife Act, R.S.A. 2000 c.W-10 Regulates and enforces protection of wetland-dependent and wetland-associated wildlife, and endangered species (including plants).

Figure 5a. Federal and Provincial Policies Affecting Lake Watersheds in Alberta.



CULTURE

Federal Navigable Waters Protection Act - FOC R.S.C.1985 c.N-22

Protects the public's right of navigation in Canadian waters, by prohibiting the building, placing or maintaining of any work whatsoever in, on, over, under, through or across any such navigable water, without the authorization of the Minister of Fisheries and Ocean Canada.

Historical Resources Act – Culture and Community Spirit

Concerns any work of humans that is primarily of value for its prehistoric, historic, cultural or scientific significance, and is or was buried or partially buried in land or submerged beneath the surface of any water-course or permanent body of water.

Regional Health Authorities Act – Alberta Health

RHA have the mandate to promote and protect the health of the population in the region and may respond to concerns that may adversely affect surface and groundwater.

POLICY LAND (Continued)

Provincial Safety Codes Act- Municipal Affairs

Regulates and enforces septic system management practices, including installation of septic field and other subsurface disposal systems.

Weed Control Act, R.S.A. 2000, c.W-5

Municipalities are delegated authority to pass local bylaws to control restricted, noxious and nuisance weeds on municipal lands and on certain public lands such as highway corridors.

Both Acts can be used to minimize the harmful effects of land use activities on water quality and aquatic resources in and adjacent to parks and other protected areas.

Provincial Parks Act & Wilderness Areas, Ecological Reserve and Natural Areas Act – ASRD and Community Development

Provides for boundary changes when the "natural boundary" changes through erosion or accretion when the title to lands is a "natural boundary". Public lands are excluded from titles; also see Law of Property Act, R.S.A. 2000, c.L-7

This policy will be used to protect wetlands and mitigate losses through a "No Net Loss" policy.

Land Titles Act, R.S.A. 2000, c.L-4

The plan adopted by Council as a municipal development plan pursuant to the Municipal Government Act.

Provincial Wetlands Policy

Adopted by Council as a bylaw pursuant to the Municipal Government Act that provides a framework for future subdivisions, development, and other land use practices of an area, usually surrounding a lake.

Municipal Develop-

The bylaw that divides the municipality into land use districts and establishes procedures for processing and deciding upon development applications. It sets out rules that affect how each parcel of land can be used and developed and includes a zoning map.

Figure 5b. Federal and Provincial Policies Affecting Lake Watersheds in Alberta.

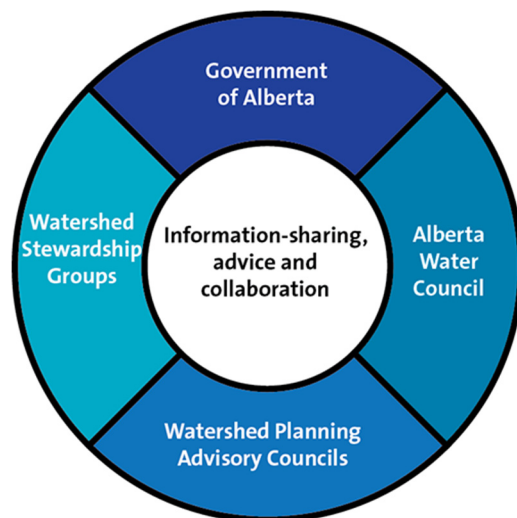
2.3 Regional Policies

2.3.1 Alberta Watershed Planning and Advisory Councils (WPACs)

In 2003, the Government of Alberta laid out the *Water for Life Strategy for Sustainability* (Government of Alberta, 2003). Four partners were formed to implement this strategy (**Figure 6**): Government of Alberta, Alberta Water Council, Watershed Planning and Advisory Councils (WPACs), divided among 11 river basins (**Figure 7**), and Watershed Stewardship Groups.

2.3.1.1 North Saskatchewan Watershed Alliance Integrated Watershed Management Plan

In 2005, the North Saskatchewan Watershed Alliance (NSWA) was appointed by the Government of Alberta to serve as the Watershed Planning and Advisory Council (WPAC) for the North Saskatchewan River (NSR) basin (**Figure 7**). The NSR watershed stretches across central Alberta, from the Rocky Mountains in the west to the border of Saskatchewan in the east. As one of the partnerships under *Water for Life: Alberta's Strategy for Sustainability* (2003), the NSWA was given a mandate by the government to prepare an *Integrated Watershed Management Plan* (IWMP) for the basin.



The IWMP was completed in 2012 (NSWA, 2012). It provides watershed management advice to address numerous issues raised by stakeholders, and to achieve the three overarching goals of the *Water for Life* strategy: safe, secure, drinking water; healthy, aquatic **ecosystems**; and reliable, quality, water supplies for a sustainable economy (AEP, 2018a).

The IWMP contains five specific goals, along with detailed watershed management recommendations and identified responsibilities for implementation. The goals of the IWMP are as follows:

Figure 6. Alberta Water for Life Partnerships.

- Water quality in the North Saskatchewan River watershed is maintained or improved;
- Instream flow needs of the NSR watershed are met;
- Aquatic ecosystem health in the NSR watershed is maintained or improved;
- The quality and quantity of non-saline groundwater is maintained and protected for human consumption and other uses; and,
- Watershed management is incorporated into **land use** planning processes at all scales, in accordance with the recommendations in the report.

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The NSWA is facilitating implementation through multiple initiatives, including the development of a network of intermunicipal watershed alliances, and via collaborative projects with the provincial government, local watershed stewardship groups, industry, and other organizations. In addition, the NSWA has supported several lake stewardship groups in their efforts to undertake State of Watershed assessments and to develop Lake Watershed Management Plans.

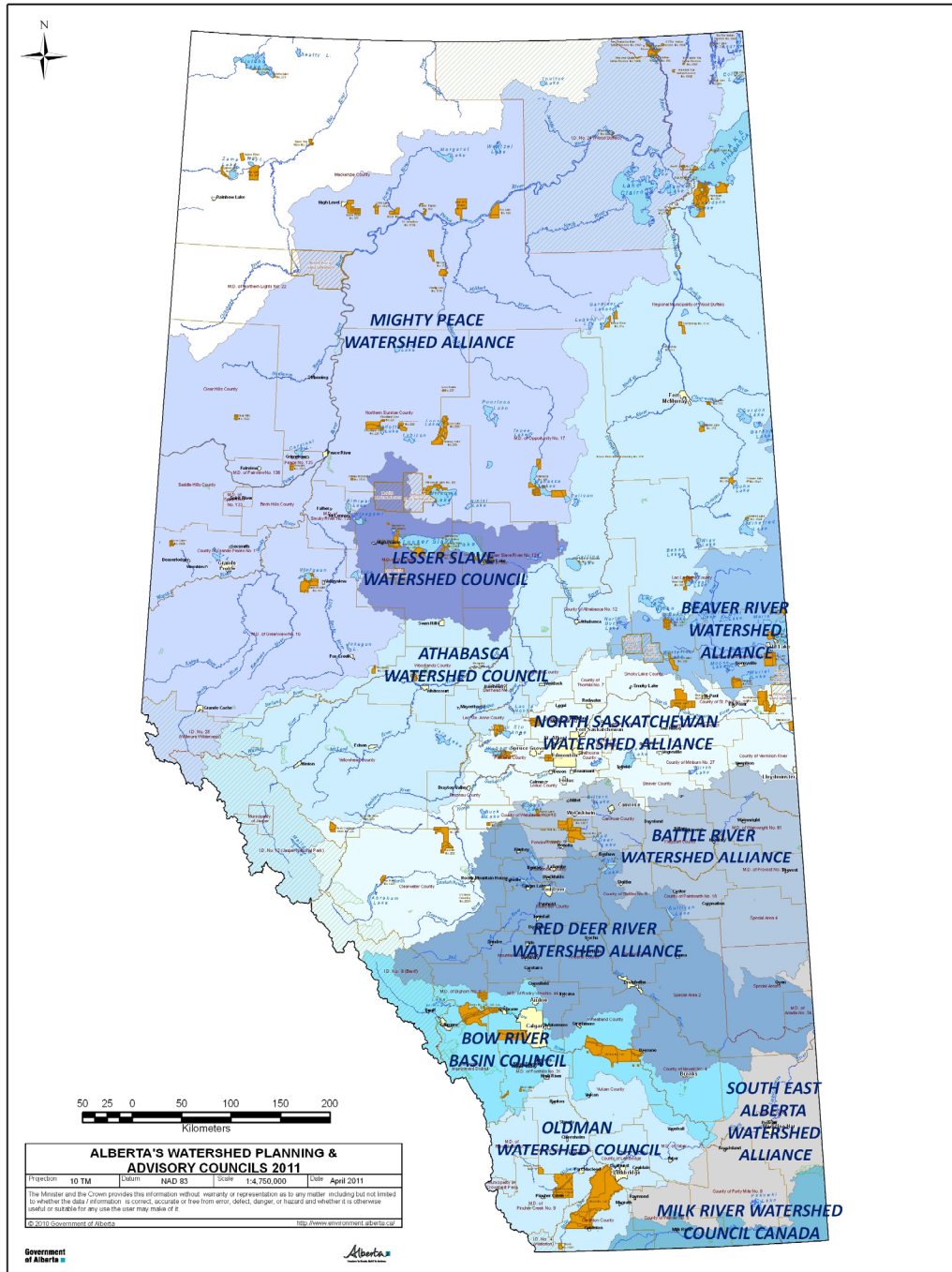


Figure 7. The Eleven Watershed Planning and Advisory Councils (WPACs) in Alberta (AEP, 2017).

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2.3.2 North Saskatchewan Regional Plan

The *North Saskatchewan Regional Plan* (NSRP) is intended to integrate numerous policies and strategies surrounding natural resource development, economy, and the environment. It will be one of several regional plans that will be developed by the Government of Alberta to provide direction for policy and decision-making. The designated area for the NSRP follows county boundaries which cover most of the NSR watershed and a portion of the Battle River watershed (**Figure 8**).

In May 2014, the Provincial Government released a report entitled *Profile of the North Saskatchewan Region* (ESRD, 2014a). In July 2014, a Regional Advisory Council (RAC) was appointed by Cabinet to provide advice for the NSRP based on the *Terms of Reference*, a document that guides the scope of the Regional Plan (ESRD, 2014b). The RAC report was released in 2018 (NSRAC, 2018). The need for improved lake management policies and procedures was a key theme in the RAC report.

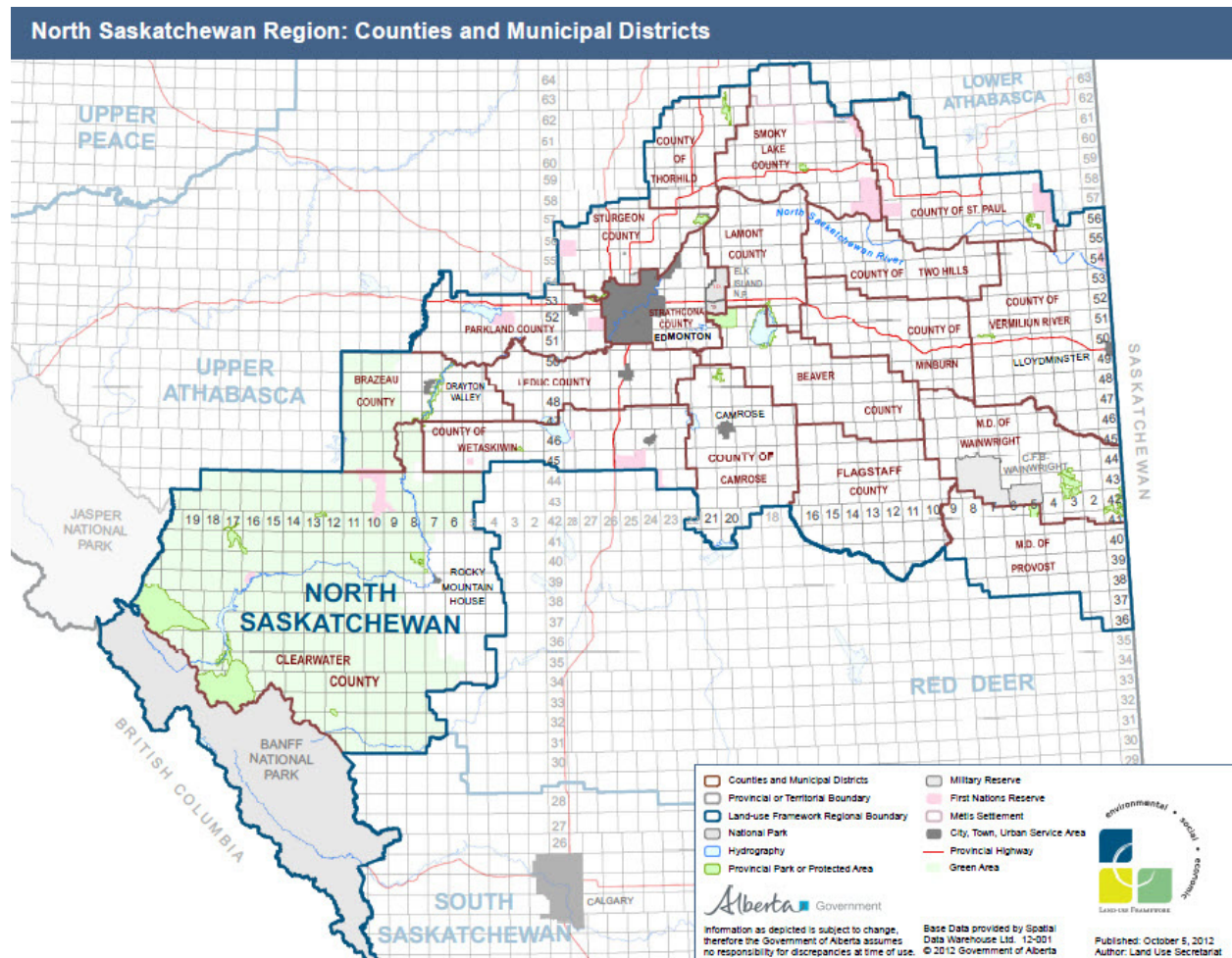


Figure 8. Counties and Municipal Districts Included in the North Saskatchewan Regional Plan (GOA, 2012).

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2.3.3 Edmonton Metropolitan Region Growth Plan

In 2008, the Alberta Government created the Capital Region Board (CRB) and called upon the Board to develop a regional growth plan. The CRB was composed of 24 municipalities in the greater Edmonton area. In 2009, the CRB released a 35-year plan (termed *Growing Forward*) which identified four main priority areas: regional land use planning, inter-municipal transit, information services, and affordable housing (Capital Region Board, 2009). Following a review of *Growing Forward* an updated plan was submitted to the Government of Alberta in October 2016.

The new 50-year plan, termed *Edmonton Metropolitan Region Growth Plan: Re-imagine. Plan. Build*, expanded on existing priorities from *Growing Forward* and identified six new, or updated, policy areas (EMRB, 2017). The Plan was approved by the Government of Alberta in October 2017. The new *Edmonton Metropolitan Regional Board* was also created in 2017, now consisting of 13 municipalities each with populations over 5,000 (**Figure 9**). Perhaps the most important policy area in this plan concerning the future of lakes in the region is *Policy Area 2: Natural Living Systems*. As stated in the plan, “This policy area updates and incorporates the principles and policies in the 2010 Land Use Plan to protect the environment and resources, with a broader focus on natural living systems and **ecological networks**” (EMRB, 2017).

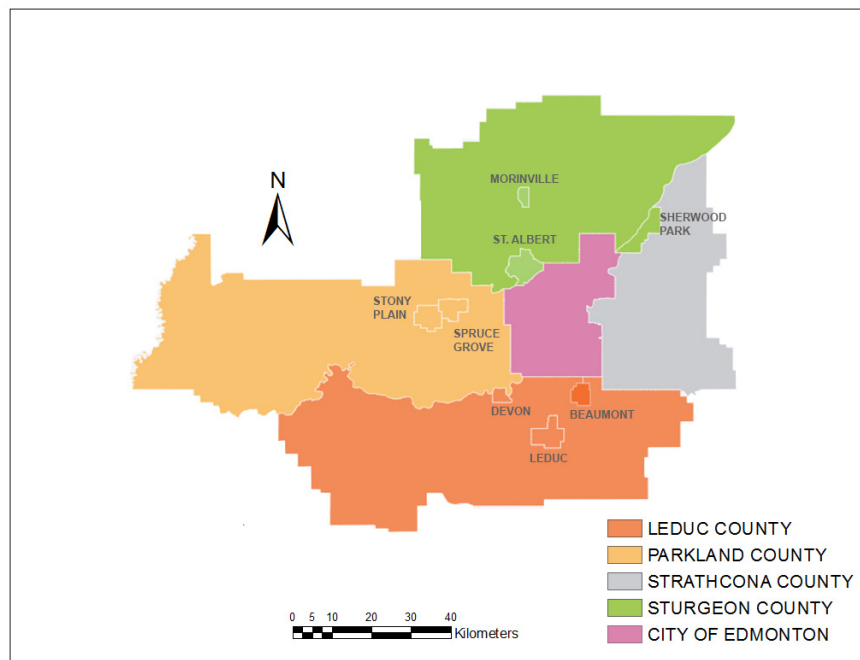


Figure 9. Municipalities on the Edmonton Metropolitan Region Board

They identified four objectives:

1. “Conserve and restore natural living systems through an ecological network approach;
2. Protect regional watershed health, water quality and quantity;
3. Plan development to promote clean air, land and water and address climate change impacts; and,
4. Minimize and mitigate the impacts of regional growth on natural living systems.” (EMRB, 2017).

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2.3.4 Beaver Hills Initiative Land Management Framework 2014

The Beaver Hills Initiative (BHI) *Land Management Framework* was designed to assist partner municipalities within the Beaver Hills area in considering the natural features of the Moraine during the planning process (BHI, 2015). In general, the *Framework* is a systematic approach to identify and manage key environmental resources in an area under consideration for development. The *Framework* is based on current information regarding the environmental resources that contribute to the essential landscape character of the Moraine. In addition, a checklist has been included to aid planners in identifying potential concerns and the appropriate Best Management Practices to apply as approval conditions to ensure development is sustainable (BHI, 2015).

2.3.5 Beaver Hills Initiative Strategic Plan 2016-2019

In 2016, the Beaver Hills Moraine was designated as a Biosphere by UNESCO. As a requirement of this designation, *The Beaver Hills Initiative Strategic Plan* (2016-19) was created by the Beaver Hills Initiative (BHI). The BHI is a collaborative group of municipal, provincial, and federal governments, industry, non-government organizations, and academia, formed in 2002. The goal of the BHI is in helping decision-makers balance the social, economic, environmental, heritage, and cultural goals of the Beaver Hills area. The plan highlights strategies aimed at ensuring long-term sustainability of the Beaver Hills Biosphere. Goals, objectives, and intended activities listed within this plan align with UNESCO's four main objectives:

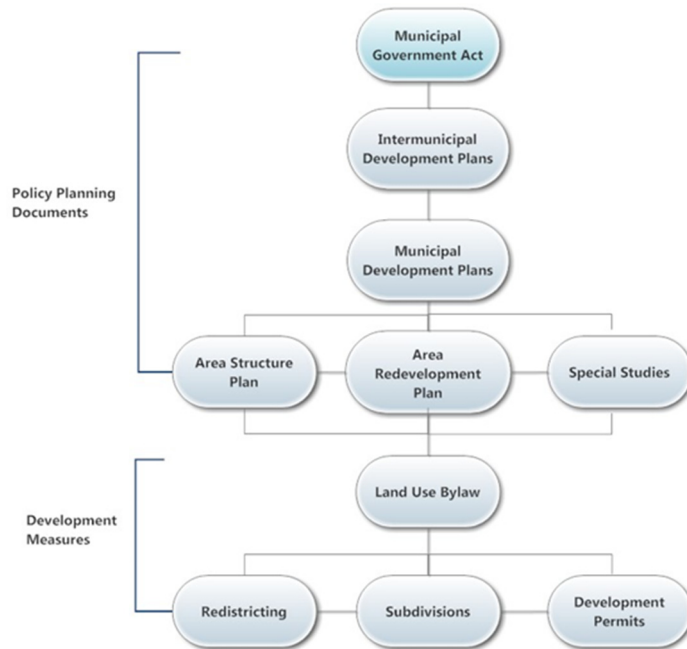
- *Healthy Environments*: Conservation of **biodiversity**, restoration and enhancement of **ecosystem services** and fostering of the sustainable use of natural resources;
- *Healthy Communities*: Contributions toward building sustainable, healthy and equitable societies, economic and thriving human settlements;
- *Capacity Building*: Facilitate sustainability science and education for sustainable development; and
- *Climate Change*: Support mitigation and adaptation to climate change and other aspects of global environmental change.

Within the *Healthy Environments* objective, their goal is to maintain the ecological integrity and landscape character of the Beaver Hills by:

- “Monitoring - Scientific and traditional knowledge is collected for an effective bioregional approach to conservation;
- Evaluation - Scientific and traditional knowledge is evaluated and provides the basis for an effective bioregional approach to conservation;
- Reporting - Scientific and traditional knowledge is reported to members and public to provide awareness of the ecological integrity of the Beaver Hills;
- Active Conservation - Partnerships are leveraged to facilitate environmental stewardship projects; and
- Collaboration- Collaboration provides the basis for knowledge and information sharing for conservation and stewardship” (BHI, 2016).

2.4 Municipal Policies

This section summarizes the statutes and procedures currently used to guide municipal planning in Alberta. They are part of a network of bylaws and policies recommended under the Municipal Government Act (Figure 10).



Municipal Development Plans (MDPs) are required for large municipalities and Intermunicipal Development Plans (IDPs) are required between neighboring municipalities. Area Structure Plans, Area Redevelopment and Special Studies are adopted as bylaws under MDPs. Area Structure Plans are developed for specific areas in a municipality and provide a framework for future subdivisions, development, and other land use practices in the area. Land Use Bylaws divide the municipality into land use districts and identify parameters for zoning, redistricting, subdividing, and permits (for details relevant to Antler Lake, consult Strathcona County planning documents).

Figure 10. Municipal Policy and Development Flow Chart

2.4.1 Strathcona County

Antler Lake lies completely within Strathcona County, which is a specialized municipality encompassing both the urban Sherwood Park area and rural areas including hamlets, such as the Hamlet of Antler Lake. The incorporation of both rural and urban areas within one county is unique and comprises competing interests that must be balanced to consider the different effects each area may have on the environment. Below, Strathcona County’s key environmental frameworks, development plans, policies, and bylaws are discussed.

2.4.1.1 Strathcona County’s Environmental Sustainability Framework (ESF) 2009

Strathcona County’s *Environmental Sustainability Framework (ESF)* is an administrative guide designed for county operation, which sets municipal priorities in planning and decision-making. It is also a guide to be used for responding to environmental issues, assessing the impact of changes in the environment on residents and municipal operations, and planning for future environmental concerns. In addition, the document helps guide new policies by strengthening the County's commitment to integrated planning (environmental, social, economic). Within the *ESF*, a decision support tool was designed for Council and County staff to offer a high-level assessment of initiatives and projects in relation to achieving environmental sustainability principles and goals (Strathcona County, 2009a).

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The Guiding Statement for water under the ESF states that “Strathcona County’s watersheds provide an adequate supply of quality freshwater for public and private use, while sustaining a healthy ecosystem for future generations”.

2.4.1.2 Strathcona County Municipal Development Plan 2017 (BYLAW 20-2017)

A 20-year *Municipal Development Plan (MDP)* was released by Strathcona County in 2017 to guide land use decision-making, replacing the former 2007 MDP. This document provides a comprehensive, long-term, land-use policy framework within which present and projected growth and development may take place. This document describes a vision and goals for the future of the County and includes objectives and policies for how the County will achieve that vision through land-use decisions, development, management, and investment in infrastructure and programs. Several policy areas have been established within the *MDP* including the *Hamlet Policy Area* and the *Beaver Hills Policy Area*, both of which govern development within the Antler Lake watershed.

Regarding environmental management, the *MDP* identifies several strategies in which Strathcona County will ensure responsible use of the natural landscape across the County as a whole. The *MDP* requires that the conservation of [environmentally significant areas](#) is prioritized and that the use of environmental reserves and environmental reserve easements, in accordance with the *Municipal Government Act*, will be used as means of conserving environmental features. The boundaries of these reserves are dependent on site-specific characteristics and are established through a combination of applicable technical studies such as top-of-bank surveys, slope stability reports, floodplain/flood hazard analyses, geotechnical assessments, and biophysical assessments. The *MDP* also prescribes minimum development setbacks from unstable slopes, floodplains, flood plain hazard lands, and waterbodies. The *MDP* also ensures compliance with the County’s *Wetland Conservation Policy* (Strathcona County, 2018a).

Along with the environmental requirements stated above, the County encourages several additional strategies to promote responsible land use, including the use of current pollution prevention and control technologies, continued implementation of the County’s *Legacy Lands Policy*, and considering the location of environmental features when establishing the location of municipal reserves (Strathcona County, 2007b).

Conservation easements, donations and bequests, and acquisition through purchase or land trades are the three methods used by Strathcona County for conserving environmental features. The County ensures the restoration of disturbed natural systems by requiring the continued monitoring and management of nuisance grounds and public service sites through the County’s *Environmental Management Program* (Strathcona County, 2019).

Stewardship of watersheds, in cooperation with the NSWA, is an environmental policy explicitly identified in the *MDP* to “Promote actions or initiatives that work toward creating a more environmentally responsible community by encouraging: stewardship of the watersheds in cooperation with Watershed Planning and Advisory Councils such as the North Saskatchewan Watershed Alliance” (Strathcona County, 2018a: pg. 20). Sustainability Principle 1, under the *MDP*, states that “Strathcona will move towards and ultimately achieve solutions and activities that conserve, enhance and regenerate nature and life-sustaining ecosystems” (Strathcona County, 2018a).

Pertinent policies for the protection and conservation of Strathcona County’s natural assets:

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- *Biophysical Assessment Policy* SER-009-032
 - Requiring all new development areas to complete “an assessment of all biological and physical elements of an ecosystem, including geology, topography, hydrology, and soils.” (Strathcona County, 2010)
- *Tree Conservation During Development Policy* SER-009-034
 - Requires a Tree Conservation Report and Plan in place to protect the trees in Strathcona County urban and rural areas during the process of developing land (Strathcona County, 2007c).
- *Tree Management* SER-009-035
 - Protects the county’s trees after development, and in all urban and rural areas for safety and forest conservation (Strathcona County, 2007d).
- *Encroachments onto County Lands in which the County holds an interest* SER-012-008
 - Protects County lands from illegal intrusions, including built structures, use, or improvements (Strathcona County, 2011a).
- *Stormwater Management Facility Easements* SER-012-009
 - Protects County Stormwater Management lands, wetlands, and facilities from encroachments (Strathcona County, 2011b).
- *Legacy Lands* SER-012-010
 - “Strathcona County shall have in place a framework for the identification and acquisition of land with the goal to use the best available conservation science to protect areas of essential biological diversity and to provide a network of linkages across Strathcona County. The conservation of natural resources will create a legacy of places of importance to Strathcona County for the benefit of its present and future generations.” (Strathcona County, 2007e)
- *Land Management* SER-012-011
 - This policy guides the management, acquisition, development, and disposition of lands owned by the County, ensuring the conservation of ecologically important lands and considering agricultural needs (Strathcona County, 2018b).

2.4.1.3 Hamlet Policy Area

There are eight (8) hamlets dispersed throughout Strathcona County’s Rural Service Area which include Antler Lake. Hamlets of Ardrossan, Josephburg, and South Cooking Lake have been identified as growth hamlets, while Antler Lake, Collingwood Cove, Half Moon Lake, Hastings Lake, and North Cooking Lake will remain as small residential communities with limited services. Within the growth hamlets, the County has committed to prioritizing investment in commercial and business development to increase access to jobs and to improve access to quality services for rural residents (Strathcona County, 2018a). The County has stated its commitment to maintaining existing levels of service for the small hamlets; however, any future development or growth will be contained within existing boundaries.

2.4.1.4 Beaver Hills Policy Area

The overarching goal of this Policy Area (**Figure 3**) is to ensure the long-term conservation of the Beaver Hills Biosphere (Strathcona County, 2018a). The policy area is also intended to support agricultural operations, recreation, tourism, and limited rural residences. The natural landscape of the Beaver Hills Policy Area is home to a diverse range of wildlife, which depend on the resilience of the abundant

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wetlands, lakes, and other **environmentally significant areas** within the Biosphere. This unique and thriving environment requires careful management to ensure long-term, environmental sustainability.

2.4.1.5 Wetland Conservation Policy

In response to the severe **wetland** loss throughout the region, Strathcona County has developed a *Wetland Conservation Policy* which has the goal of “No Net Loss” of wetlands within the urban and rural areas of the County. The policy aims to balance the loss of wetland functions, through rehabilitation of former degraded wetlands or enhancement of healthy, functioning wetlands (Strathcona County, 2009b).

2.4.1.6 Strathcona County Land Use Bylaw 6-2015

The County’s *Land Use Bylaw (LUB)* regulates type, location and intensity of land uses and buildings within County boundaries (Strathcona County, 2015). In addition to regulating the development permitting process, the *LUB* provides zoning and regulation that is used to implement the objectives and policies of either the *Municipal Development Plan*, the applicable *Area Concept Plan* or the *Area Structure Plan* to regulate the use and development of land and buildings within the County. For details on land uses around Antler Lake, see **Section 3.6** of this report.

Other pertinent Strathcona County Bylaws are in place for conservation of the natural ecosystem:

- *Environmental and Conservation Easements Bylaw 68-2005* (Strathcona County, 2005).
- *Unauthorized use of County Property Bylaw 8-2007* (Strathcona County, 2007a).
- *Sewage System Bylaw 38-2017* (Strathcona County, 2018c).

2.5 Special Considerations

2.5.1 Agriculture

Agricultural practices across Alberta have improved over the last few decades to maximize efficiency and productivity while minimizing environmental impacts. Alberta Agriculture and Forestry have created a *Guide for Beneficial Management Practices for Alberta Farmers*, which includes improved practices for manure applications, soil **erosion** control, and reduced nitrogen and phosphorus losses (AAF, 2004). There are also regulations in place to minimize nutrient runoff from farm operations. The *Alberta Operation Practices Act* regulates manure management in the province by setting standards and regulations for manure collection, storage, and application (AAF, 2017). New programs implemented at the municipal level, such as agricultural stewardship, promoted through ALUS Canada (<https://alus.ca/>), will also help to reduce agricultural impacts in Albertan watersheds.

2.5.2 Wetlands

In 2013, the Government of Alberta released the *Alberta Wetland Policy*, which identified goals to conserve, protect, and manage wetlands for sustainability of their functional benefits (i.e. **ecosystem services**). A management hierarchy was set that first avoids impacts on wetlands, then minimizes impacts, then resorts to replacing wetlands when the other two cannot be justifiably implemented.

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While avoiding and minimizing impact on wetlands is quite straight forward in concept, replacing wetlands is more open to interpretation. Identified in the policy are two different strategies for replacing wetlands, which includes restorative and non-restorative actions. Restorative replacement refers to either restoration projects, enhancing current functioning, or constructing a new wetland; whereas, non-restorative actions have many different options that equate the wetland's value with a corresponding action, like research, monitoring, or education, for example. This policy also includes the development and implementation of tools for monitoring, evaluating, and reporting on wetland status, as well as encouraging conservation of wetlands through stewardship (Government of Alberta, 2013).

2.6 Policy Conclusions

The history of policy for the region encompassing the Antler Lake watershed clearly portrays a shift in forward thinking that supports the unique wealth of the ecosystems that make up the landscape. With close-neighboring provincial parks and protected areas, [landscape connectivity](#) is an important concept to engrain within policies that guide responsible land use decisions. This is particularly important, considering that Antler Lake is surrounded by residences within the Hamlet of Antler Lake and close to a large metropolitan area. The goals of both Strathcona County and the Beaver Hills Biosphere are in line with policies that consider the necessities of protecting the environment, while supporting responsible land use within the county.