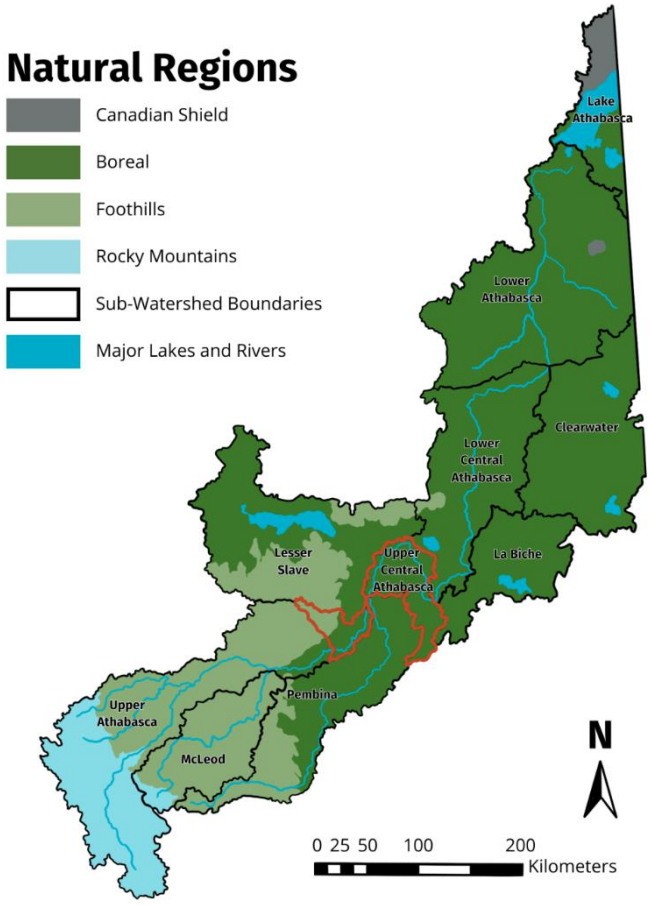
Sub-Basins of the Athabasca Watershed

Upper Central Athabasca River Sub-basin

Introduction

The Athabasca watershed can be broken down into ten smaller units (or sub-basins). This document focuses on the **Upper Central Athabasca sub-basin**.



PART I – GENERAL DESCRIPTION

Sub-basin Description

The Upper Central Athabasca River sub-basin includes a stretch of the Athabasca mainstem river that flows about 250 km through boreal forest from Fort Assiniboine to the Town of Athabasca. It also includes several small but well-known recreational lakes and the Tawatinaw River, a small tributary to the Athabasca.

The lands that drain into this portion of the Athabasca River make up an area of 5982 km² - about 3.97% of the Athabasca watershed's total area. This section of the river, around 600 m elevation at Grizzly Trail just southwest of Fort Assiniboine Sandhills Wildland Provincial Park, is joined by Horse Creek before it continues flowing east along the border of Woodlands County and the County of Barrhead. It is met by Clearwater Creek and Timeu Creek before flowing past Shallow Lake, changing to the border between Woodlands and Westlock counties, around 575 m elevation, just to the west of Hubert Lake Wildland Provincial Park.

Flowing north past Long End and Deep Lake, the Athabasca River moves borders a third time, following the border between Woodlands County and the M.D. of Lesser Slave River No. 124. Here it meets up with the Pembina River (which empties into the Athabasca River) around 570 m elevation. Before meeting up with Lesser Slave River, the Athabasca is met by Chisholm Creek near the hamlet of Chisholm about 1 km east of the river. It then passes by Bruce and Bisset Lakes on the west side of the river.

The Athabasca River continues north until it meets the Lesser Slave River at the hamlet of Smith around 550 m elevation, before flowing east again. At around 520 m elevation the river passes over the border of the M.D. of Lesser Slave River and into the Municipal District of Opportunity for a brief spell before returning to the M.D. of Lesser Slave River at 525 m elevation. It remains in this district for a similarly brief distance before crossing south into Athabasca County, where it is joined by Baptiste Creek before finishing its journey through the Upper Central Athabasca Sub-Basin at the Town of Athabasca (where it is met by the Tawatinaw River) at around 500 m elevation for a total drop in elevation of 100 m.

Brief Human History

The Upper Central Athabasca sub-basin is located on Treaty 6 and Treaty 8 territories, as well as Métis Districts 20 and 21. The Alexander First Nation's Reserve No. 134B is found in this sub-basin, 36 km northwest of Barrhead. The name "Athabasca" is believed to have come from the Cree word meaning "lake" or "the place where waters meet, and reeds grow", reflecting a deep connection between the people and their environment. The Athabasca River has served as a longstanding main conduit for transportation and trade among First Nations and Métis, as well as early European explorers. It also provides a vital source of food, containing large fish populations and attracting other animals, in addition to the rich diversity of flora used for crafting materials and medicine.

The Town of Athabasca resides at the eastern edge of the Upper Central Athabasca sub-basin. The town (initially called Athabasca Landing in the 1890s, then Athabaska 1904, and Athabasca 1948) began as a Hudson's Bay Company seasonal trading post in 1877 during a period when the HBC was searching for alternative routes to reach Fort Assiniboine. .

Traders Leaving Athabasca Landing for the North tourismealberta.ca

Athabasca became a bustling hub for prospectors and an important location on the "All Canadian Route" around 1897 at the beginning of the Klondike Gold Rush. It was the starting point for many and as need for ships increased it spurred the creation of the Northern Transportation Company. As an important trading hub between the Prairies and the far Northwest of Canada, Athabasca saw the launching of a fleet scows and sternwheelers that would travel up as far as Fort McMurray. To learn more about the Town of Athabasca and the Athabasca River see "The Athabasca River Story" compiled by the Athabasca Historical Society (July 11th, 1984).

Today, the Upper Central Athabasca sub-basin sits within several Alberta municipalities including the M.D. of Lesser Slave River No. 124, M.D. of Opportunity No. 17, Athabasca, Woodlands, and Big Lakes counties, Westlock County and the County of Barrhead No. 11.

PART 2 WHAT WE KNOW ABOUT …

Drinking Water

As the largest community in the Upper Central Athabasca sub-basin, the Town of Athabasca (pop. 2759), gets its source drinking water from the Athabasca River. The Aspen Regional Water Services Commission supplies the town, and maintains several distribution lines to surrounding communities as far as Wandering River. Annual Operations Reports are available at Aspen Regional Water Services Commission - Athabasca County. The Hamlet of Smith has a population of 227 and also gets its drinking water from the Athabasca River. The Hamlet of Fort Assiniboine (pop. 158) partially resides in this sub-basin and receives its source drinking water from groundwater wells. Several summer villages on Baptist and Island lakes get their drinking water from a variety of private water systems.

Community Resiliency

Communities in the Athabasca are working to become more resilient to climate change and climate variability, including protecting their source drinking water and mitigating risk from fires, floods, droughts and other climatic events. The Upper Central Athabasca sub-basin is rated medium priority for drought and flood, but high for water quality by the Government of Alberta's Watershed Resiliency and Restoration program. Overbank flooding has occurred in the past and is largely associated with ice breakup, ice jamming and snow melt. The province has undertaken Flood Hazard mapping of the Athabasca River at the Town of Athabasca, as well as of the Tawatinaw River at the Hamlet of Rochester.

Water Quality

Water quality in the Upper Central Athabasca River is affected by both point and non-point sources of pollution. Major point sources in the Upper Central Athabasca are largely municipal and industrial wastewater discharge points. Non-point source pollution comes from diffuse run-off and varies depending on upland cover and land use. Agriculture, in addition to forestry, aggregate mining, and conventional gas extraction, are the predominant land uses in the Upper Central Athabasca sub-basin.

The Upper Athabasca Region surface water quality management framework is used to monitor the cumulative effects that anthropomorphic development has on surface water quality in the upper Athabasca region. At the Town of Athabasca there is a long-term river monitoring station that measures water quality and quantity from this site to inform the framework.

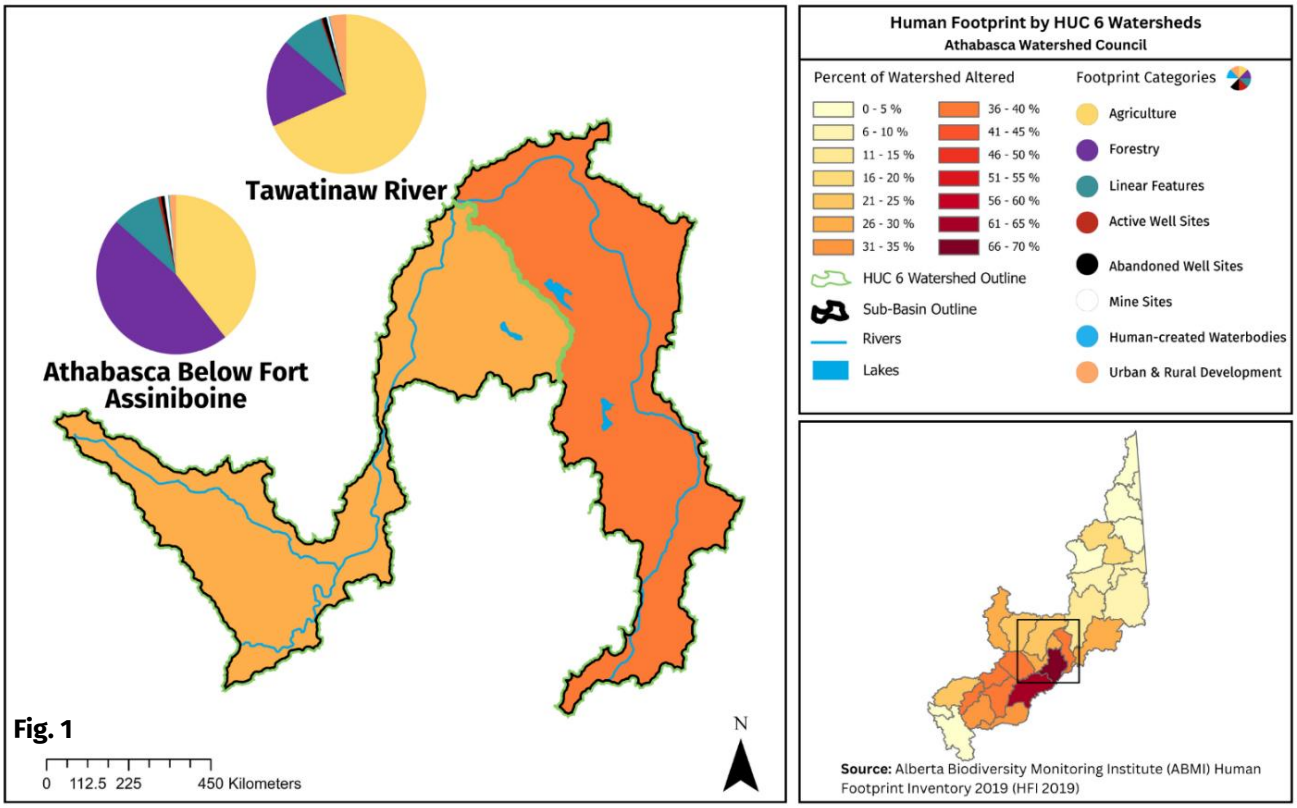


Fig. 1 Human Footprint by HUC 6 Watersheds (Upper Central Athabasca sub-basin) *A localised human footprint map of the Upper Central Athabasca sub-basin (tertiary watersheds 07BD and 07BE) showing the percentage of watershed altered by human activity.*

Instream Flow Needs and Reliable Supplies

Instream flow needs (IFN) include the quantity of water (usually as a measure of river flow, or discharge) needed by fish and other biodiversity, and for functions like scouring and maintaining river channels. Although there is currently no legislated amount set aside for IFN on the Athabasca River (via use of a Water Conservation Objective under the *Water Act*), the area does fall under the advisory Surface Water Allocation Directive which can include requirements on water allocation licences to protect IFN. The oil and gas sector holds the majority of allocations, largely from both surface and groundwater term licences. Other allocations are for 'other' (e.g., lake stabilization), municipal, agriculture, commercial and power sectors.

Biodiversity

The Upper Central Athabasca's most north western tip includes a small portion of Lower Foothills characterised by Lodgepole Pine, White Spruce, and Aspen dominating the upland canopy, Black Spruce and Larch the lowland. Labrador Tea and Low Bush Cranberry are characteristic of the underbrush. However, the majority of this sub-basin is Central Mixedwood often characterized by a mix of conifer and deciduous species, with the exception of where it passes into and through the Town of Athabasca in the Dry Mixedwood. The majority of the Upper Central Athabasca sub-basin landcover is made up of forest and wetlands. For a good description of these regions, see Natural Regions & Subregions of Alberta.)

The Upper Central Athabasca sub-basin is home to many indicator species, such as Arctic Grayling, Athabasca Rainbow Trout, Bull Trout, Burbot, and Northern Pike.

Upper Central Athabasca Watershed Total Area: 5,982 km^2			
Natural Region	Natural Sub Region	Area (km^2)	Area (%)
Foothills	Upper Foothills	53	0.9
	Lower Foothills	582	9.7
	Total	635	10.6
Boreal	Dry Mixedwood	1275	21.3
	Central Mixedwood	4072	68.1
	Total	5347	89.4

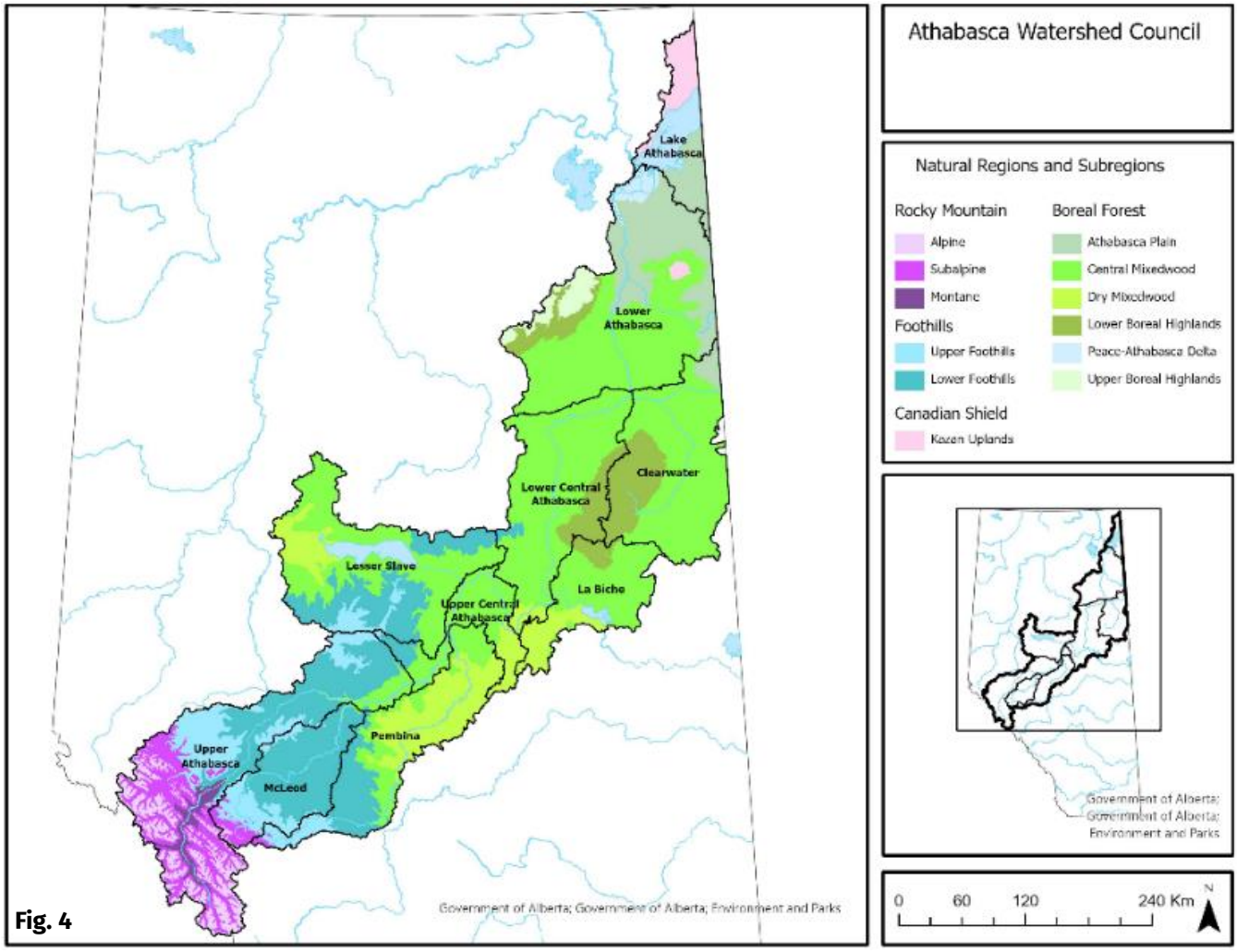


Fig. 4 Map of the Natural Sub-Regions in the Athabasca Watershed. *The Upper Central Athabasca sub-basin is located in the centre of the watershed and includes Lower Foothills, as well as Central and Mixed Forest.*

Upper Central Athabasca Sub-Basin Species Highlight

Northern Pike *iStock.com*

Fun Fact!

Because of their aggressive behaviour, if food becomes scarce, larger pike will feed on smaller members of the species. This causes Pike to have high juvenile mortality and makes recovery from spawning difficult at times.

Northern Pike

Esox lucius

Family: Esocidae	
Description	The Northern Pike is a member of the Esocidae family, which also includes pickerel and mudminnows. Common colouring is dorsally green with white spots moving to ventrally whiteish-yellow. They reach an average length of around 40-55 cm. The largest Northern Pike on record for Alberta was caught in Keho Lake just north of Nobleford at a weight of 17.24 kg.
Distribution & Habitat	These ambush predators prefer shallow, slow flowing streams and lakes with a rich variety of vegetation for shelter and hunting. Northern Pike are found throughout North America and have been introduced to many water courses/lakes as a sporting fish.
Conservation Status	This species has been deemed High Risk due to low abundance. Because of their popularity as a sporting fish, overfishing of this species can out pace their recovery time during spawning, leading to lower populations that can be out competed by rival and invasive species.
What's Being Done?	Since the 1990s, fisheries have placed priority of maximum harvest, which over the years have significantly lowered Northern Pike numbers in some waterbodies. Seasonal bans have been implemented over time in an attempt to allow the species to recover during spawning. In 2017, a Recreational Fisheries Management Framework for Northern Pike and Walleye was completed as part of the Province's Fisheries Management Program. For more information visit the government of Alberta website Northern pike and walleye management frameworks engagement | Alberta.ca

Ecosystem Health

Wetlands

Wetlands are an important component of any watershed, providing services such as water storage, flood attenuation and groundwater recharge. About 20% of the Upper Central Athabasca is made up of wetlands with over half of those being fens. For more information about the wetlands in Alberta (and other parts of Canada) please visit the Canadian Wetland Inventory (CWI) tool Canadian Wetland Inventory | Climate Change Data and Resources.

Wetland Class	Wetland Area (km^2)	% of Upper Central Athabasca sub-basin (5982 km^2)
Fen	810	13.5
Open water	200	3.3
Swamp	140	2.3
Marsh	35	0.6
Bog	6.1	0.1
Total	1191.1	19.8

Riparian Areas

Riparian areas are transitional buffers between terrestrial and aquatic environments along the margins of waterbodies, such as rivers, streams, and lakes. Like wetlands, riparian areas also provide many important functions, such as reducing the amount of sediment discharge into the water to help maintain water quality, providing habitat for wildlife, and slowing flood waters. The southern portion of this sub-basin (the Tawatinaw River Valley) has been assessed for riparian intactness. Additionally, Baptiste Lake has had a shoreline assessment completed. To check out the health of Alberta's riparian areas please visit riparian.info and see an interactive map of Alberta's Watersheds.

Major Lakes or Other Water/Ecological Features of Note

The Upper Central Athabasca sub-basin has a number of lakes, natural areas, campgrounds and other recreational areas to explore! Some key sites include:

- Baptiste Creek
- Baptiste Lake
- Fort Assiniboine Sandhills Wildland Provincial Park
- Hubert Lake Wildland Provincial Park
- Island Lake
- Klondike Trail
- Misty Ridge Ski Hill
- Shallow Lake
- Spotted Horse Lake
- Sunset Beach
- Temu Creek
- Whispering Hills

Knowledge (Research and Monitoring)

Alberta Environment monitors both flow and water quality in the Upper Central Athabasca sub-basin and this information supports the Upper Athabasca Surface Water Quality Monitoring Framework. Both government and non-government organizations have been involved in several decades of fish management in this sub-basin. Additionally, data on species biodiversity, wetlands and human footprint is available through the Alberta Biodiversity Monitoring Institute.

In 2024, the AWC started a water quality sampling program in the Tawatinaw with the aid of volunteers using Water Ranger kits, as well as putting continuous data loggers for water temperature and dissolved oxygen in several locations along the river.

Baptiste Lake and Island Lake lay 16 km west of the Town of Athabasca. Seasonally visited by a large recreational community, these lakes are home to enthusiastic boating, fishing, and other outdoors activities that all contribute the quality of the water and surrounding lands. The Baptiste and Island Lakes Stewardship Society (BAILS) has successfully completed a state of the lake report and a lake watershed management plan (2019). For more information and to view this report visit Watershed Management Plan.

Despite the above activities, data gaps still exist, and further work is needed to better understand pollutant run-off rates, sources /tributary loading of pollutants to the main stem, risks to source drinking water and the future impacts of climate change and cumulative effects in this region.

Partnerships & Other Initiatives in the Upper Central Athabasca Sub-basin

Today, there are a number of agencies working on water and related issues in the Upper Central Athabasca watershed. For more information on their activities, check out their websites:

- Alberta Environment and Protected Areas
- Athabasca Landing Trail Committee
- Baptiste and Island Lakes Stewardship Society
- Crooked Creek Conservancy Society of Athabasca
- Tawatinaw River Watershed Working Group

To see the full network of the Athabasca Watershed Council's partner organisations and WPACs and learn more about collaboration for Alberta water and water related topics please visit their partner organizations webpage.

IN CONCLUSION

The Upper Central Athabasca is an important sub-basin of the larger Athabasca watershed. It is relatively healthy, meeting the social, economic and environmental needs of the area. However, like most watersheds in Alberta and elsewhere, it is subject to several pressures. Continued research, monitoring, and collaboration between interested partners will ensure this watershed remains healthy, today and for future generations.

References and Resources

Literature

Alberta Environment. 2021. Surface Water Allocation Directive. Alberta Environment and Parks, Government of Alberta.

Alberta Parks. 2015. Natural Regions and Subregions of Alberta. A Framework for Alberta's Parks. Alberta Tourism, Parks and Recreation. Edmonton, Alberta. 72pp.

BAILS (Baptiste and Island Lakes Stewardship Society). 2019. Baptiste and Island Lakes Watershed Management Plan. https://bails.ca/BAILS/Baptiste%20and%20Island%20Lakes%20WMP%20FINAL%20May%2030-19.pdf

Fiera (Fiera Biological Consulting Ltd.). 2012. Athabasca State of the Watershed Report: Phase 2. Report prepared for the Athabasca Watershed Council. Fiera Biological Consulting Report #1142. Pp. 100.

Fiera (Fiera Biological Consulting Ltd). 2013. State of the Watershed Report - Phase 3: Water Quantity and Basic Water Quality in the Athabasca Watershed. Report prepared for the Athabasca Watershed Council. Fiera Biological Consulting Report #1234.

BAILS (Baptiste and Island Lakes Stewardship Society). 2019. Baptiste and Island Lakes Watershed Management Plan.

Web Links

Alberta topographic map, elevation, terrain

Alberta Water Tool (alberta-watertool.com)

Athabasca River | The Canadian Encyclopedia

Athabasca Watershed Sub-Basins | Athabasca Watershed Council (awc-wpac.ca)

Canadian Wetland Inventory | Climate Change Data and Resources

Flood Hazard mapping

GeoDiscover Alberta

Northern pike | Alberta.ca

Reports - ALMS

Riparian Management Resources Webpage – AWES | Agroforestry and Woodlot Extension Society of Alberta (awes-ab.ca)

The History Of Athabasca – Canadian History Ehx

Town of Athabasca - Brief History