

Tale of Two Lakes

A comparison of Antler and Hubbles Lakes State of the Watershed Reports

Michelle Gordy, Ph.D., NSWA – Watershed Wednesdays



What is a State of the Watershed Report?



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Hubbles Lake State of the Watershed Report

2018 | Studies/ Reports | Watershed Management | Sturgeon



Great Blue Heron *Ardea herodias*
photo: Roger Kirchen

Hubbles Lake is regionally unique. The lake is small, but very deep. The clear waters are protected from wind, as the lake is surrounded by hills and tree cover.

These conditions have produced very defined, thermally stratified layers, consisting of cooler water, with no dissolved oxygen, at the bottom of lake, and warmer, oxygenated water at the top.

This causes low productivity, resulting in an absence of algal blooms, producing clear, sparkling water, but also creating an uninhabitable environment for most fish species. Only small populations of Northern Pike and Yellow Perch are able to exist in Hubbles Lake.

DOWNLOAD RESOURCE

www.nswa.ab.ca

Gather information

Summarize

Share



Plan

Take Action



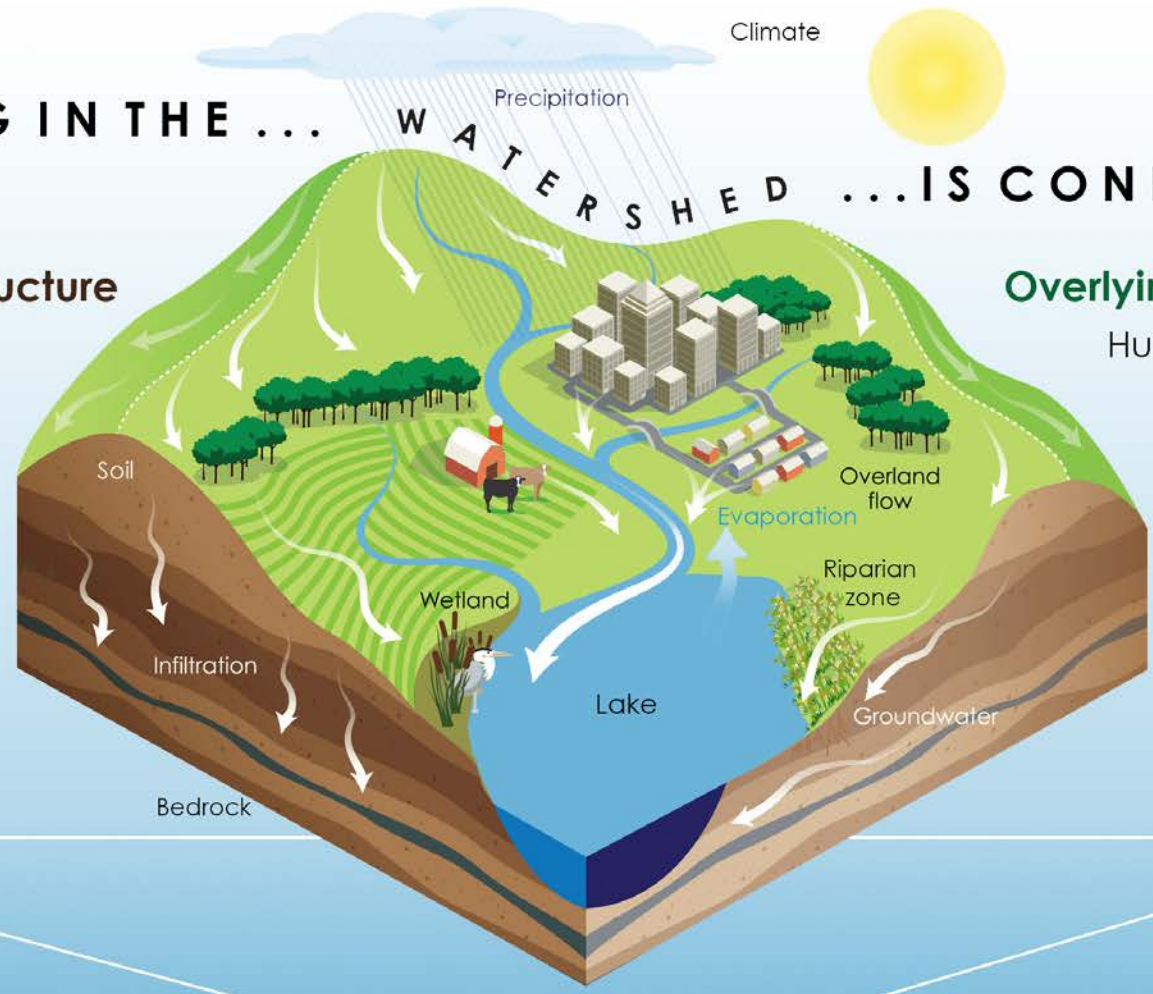
EVERYTHING IN THE ... W A T E R S H E D ... IS CONNECTED

Underlying Land Structure

Bedrock Geology
Landforms
Soil Types

Overlying Land Structure

Human Developments
Riparian Zones
Agriculture
Wetlands
Forests



Groundwater

Surface Water

Lake Water

Influences on Quantity

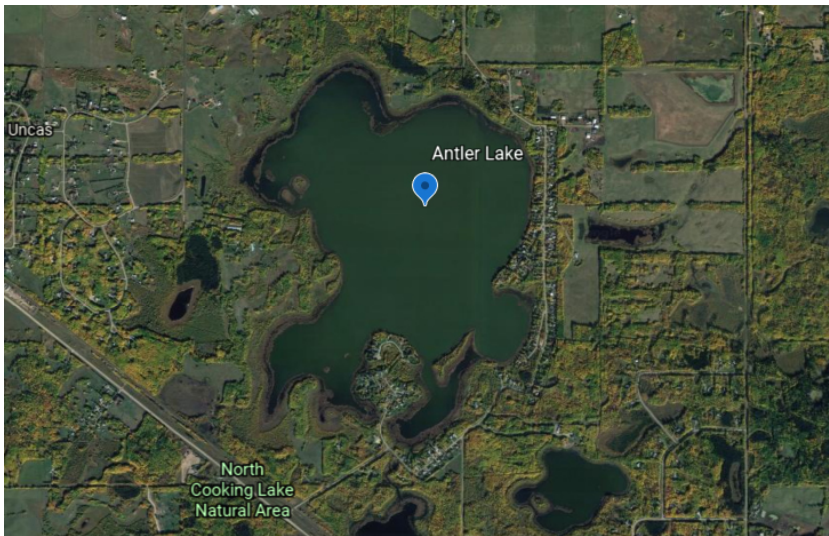
- Water Flow Rates (Ground & Surface)
- Water Sources (Surface, Ground, & Precipitation)
- Water Loss & Use (Evaporation, Infiltration, & People)
- Precipitation & Temperature (Climate)

Indicators of Quality

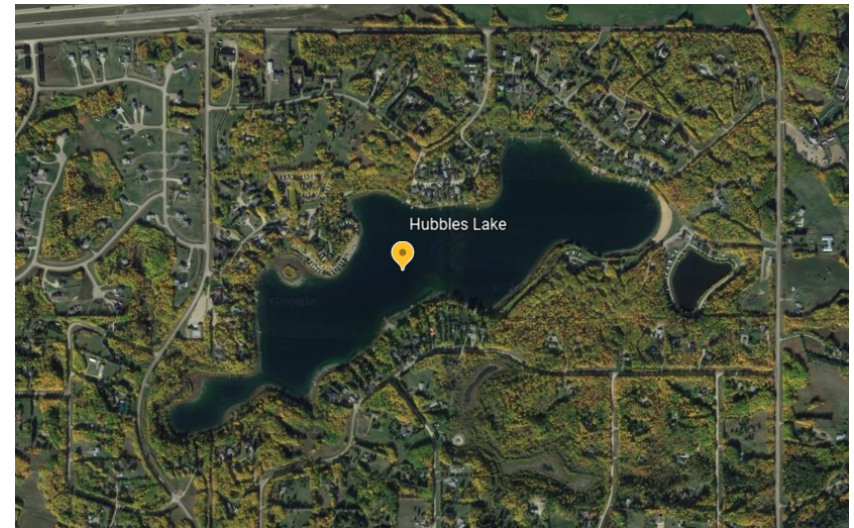
- Temperature
- pH
- Metals
- Nutrients
- Dissolved Oxygen
- Ions
- Clarity
- Bacterial Community

A Tale of Two Lakes

Antler Lake

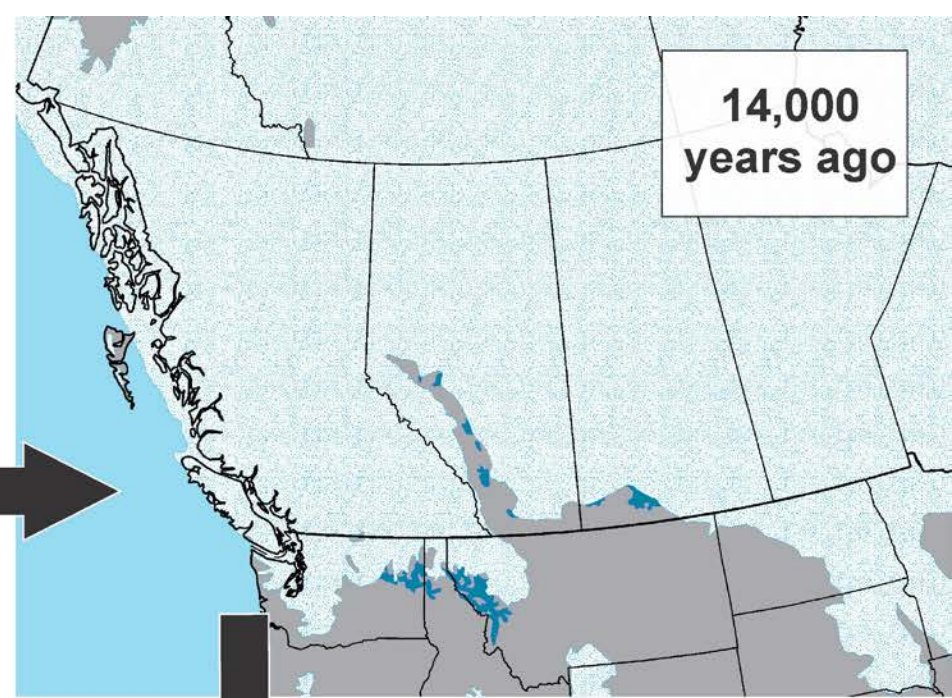
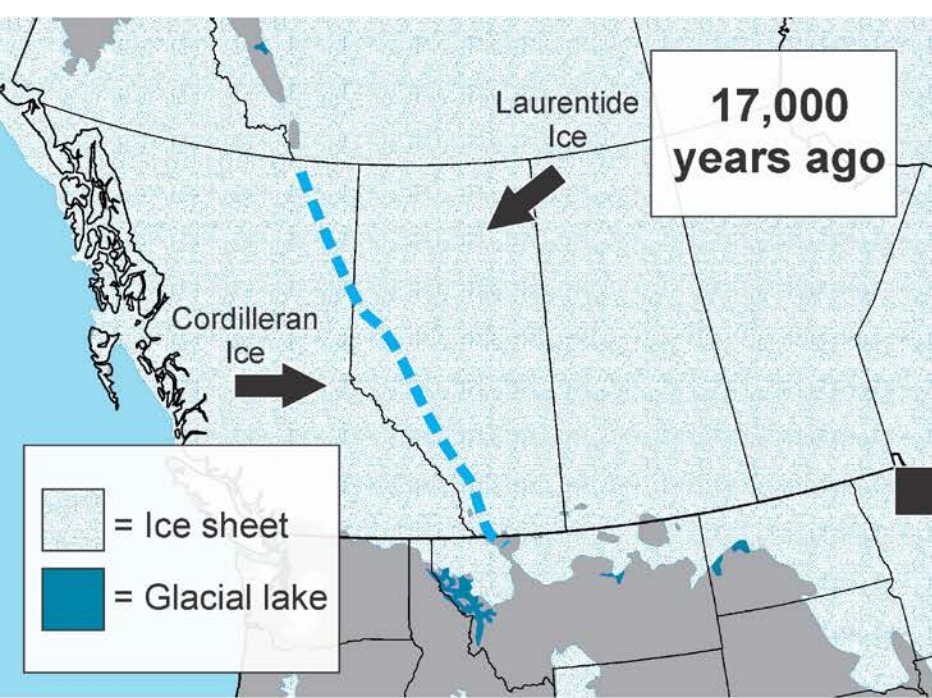


Hubbles Lake



Why these two?





Glacial Till



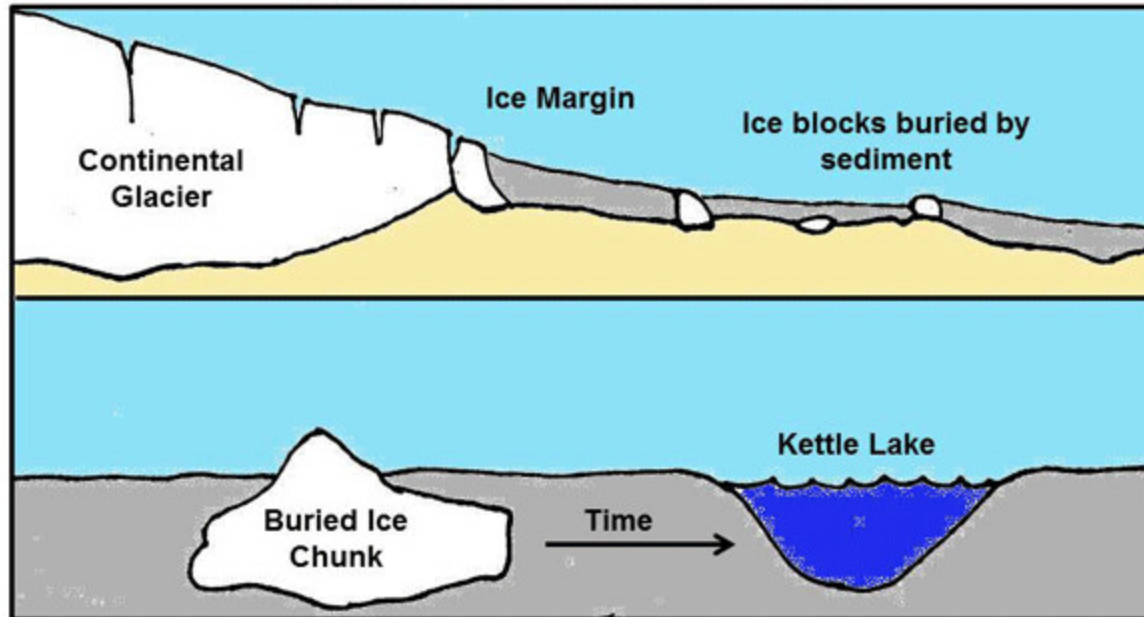
Medium textured



Stony

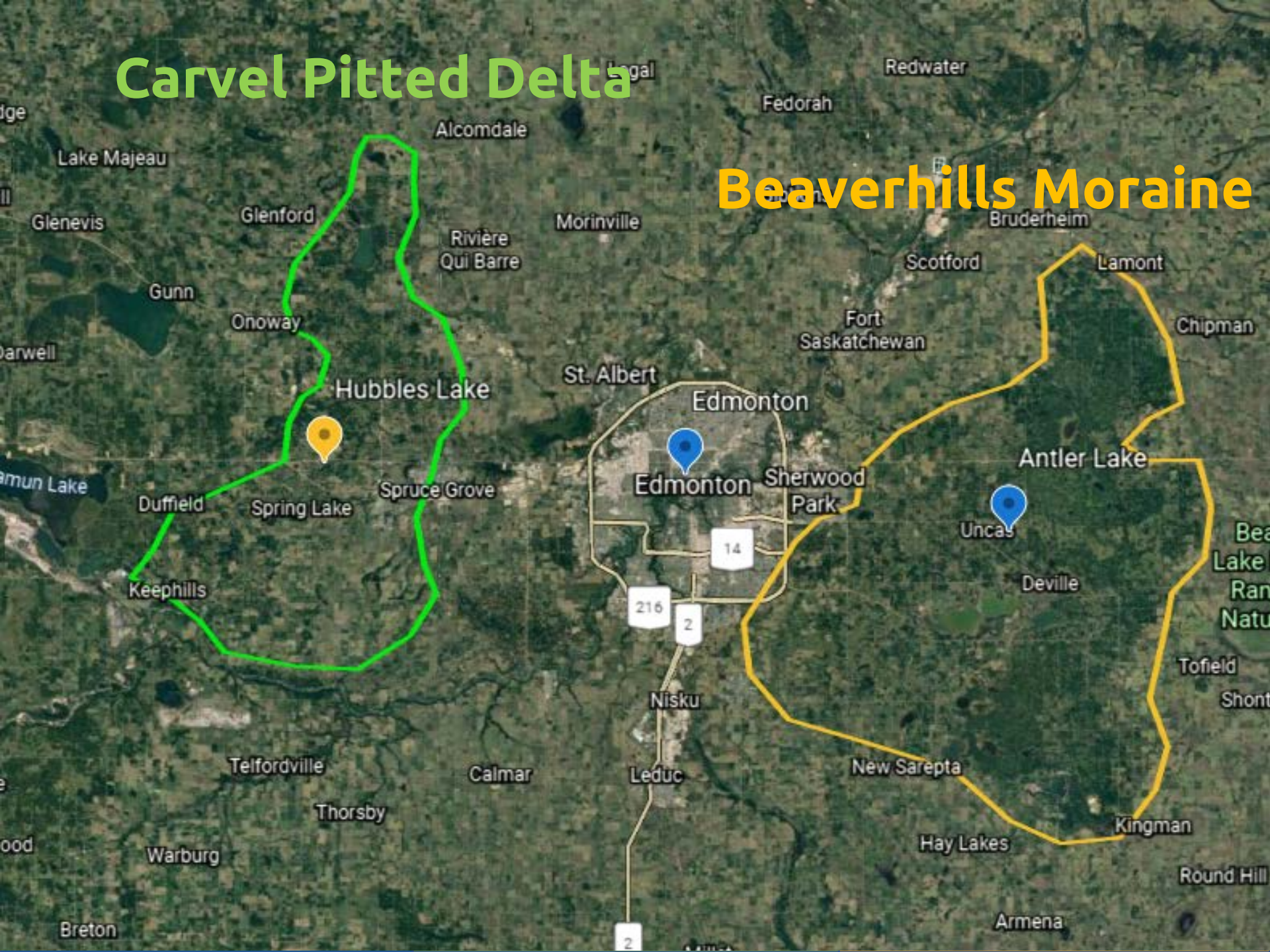


Formation of Kettle Lakes



Carvel Pitted Delta

Beaverhills Moraine



Both lakes lay within the
Dry Mixedwood Ecoregion

Defined by undulating
plains, aspen dominated
forests and fens



Area of Alberta:
662,583 km²

Alberta's Parks
and Protected
Areas network
covers roughly
27,500 km² and
includes nearly
500 sites. [i.e.,
4% of total area
of province]

Map 1: Natural Regions and
Subregions of Alberta

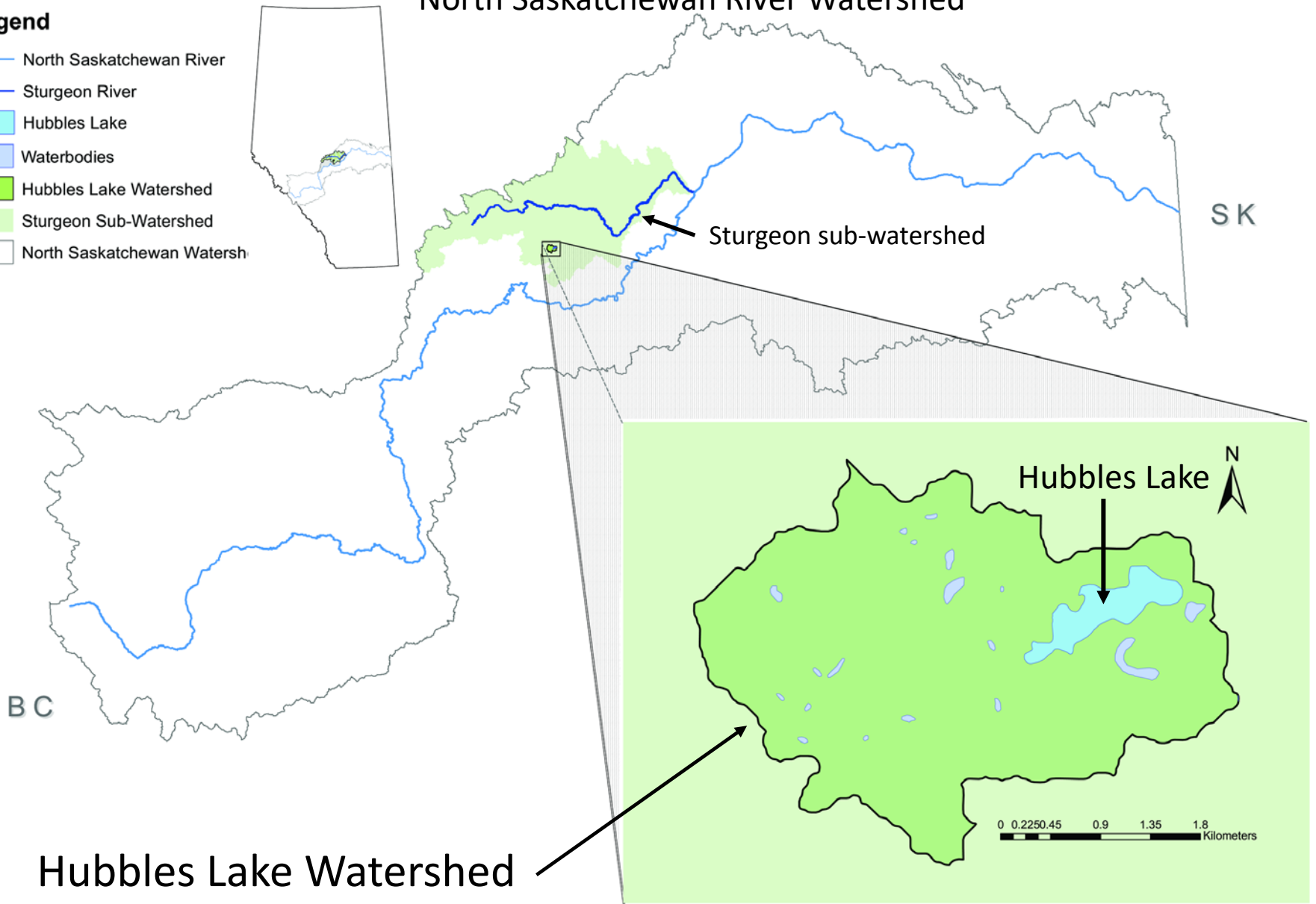
- 2005 Natural Regions
and Subregions of Alberta**
- | | |
|--------------------------------------|---------------------------------------|
| Boreal Forest Natural Region | Foothills Natural Region |
| Central Mixedwood | Upper Foothills |
| Dry Mixedwood | Lower Foothills |
| Northern Mixedwood | |
| Boreal Subarctic | Canadian Shield Natural Region |
| Peace-Athabasca Delta | Kanan Uplands |
| Lower Boreal Highlands | Parkland Natural Region |
| Upper Boreal Highlands | Foothills Parkland |
| Athabasca Plain | Peace River Parkland |
| | Central Parkland |
| Rocky Mountain Natural Region | Grassland Natural Region |
| Alpine | Dry Mixedgrass |
| Subalpine | Foothills Fescue |
| Montane | Northern Fescue |
| | Mixedgrass |



North Saskatchewan River Watershed

Legend

- North Saskatchewan River
- Sturgeon River
- Hubbles Lake
- Waterbodies
- Hubbles Lake Watershed
- Sturgeon Sub-Watershed
- North Saskatchewan Watersh



SK

Sturgeon sub-watershed

BC

Hubbles Lake Watershed
1.6 km²

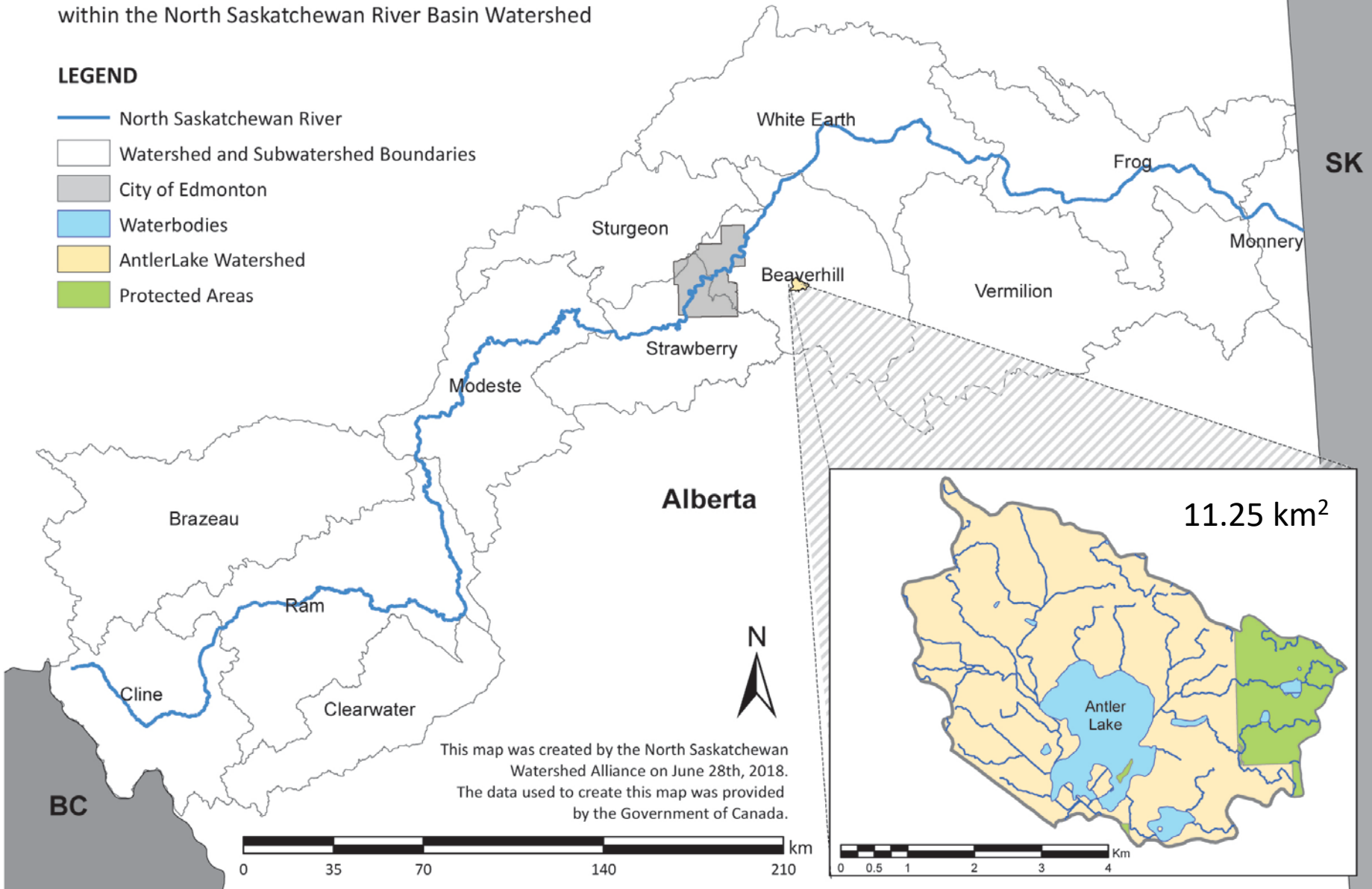


Antler Lake Watershed

within the North Saskatchewan River Basin Watershed

LEGEND

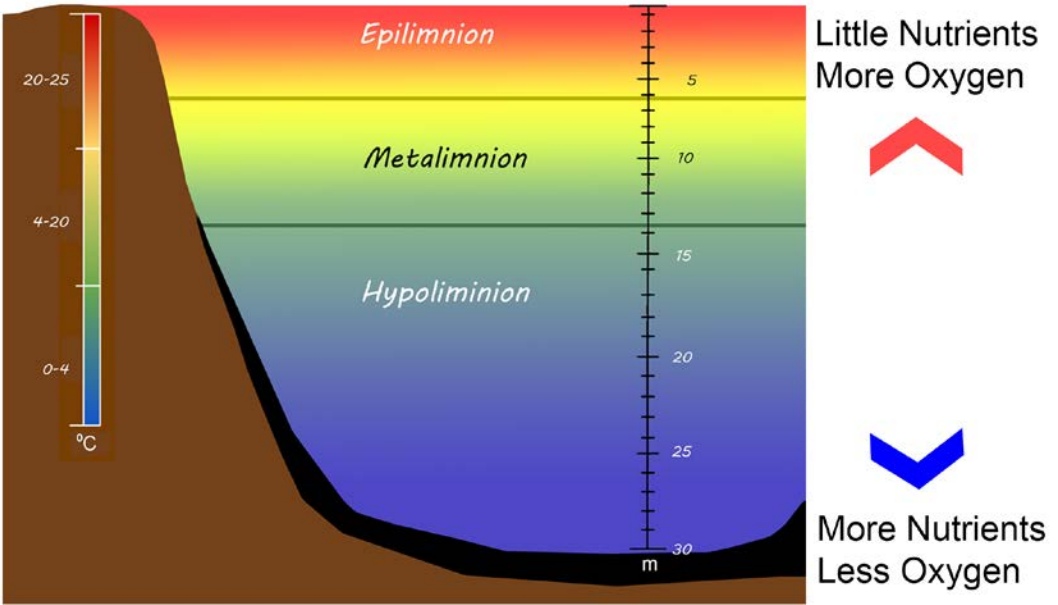
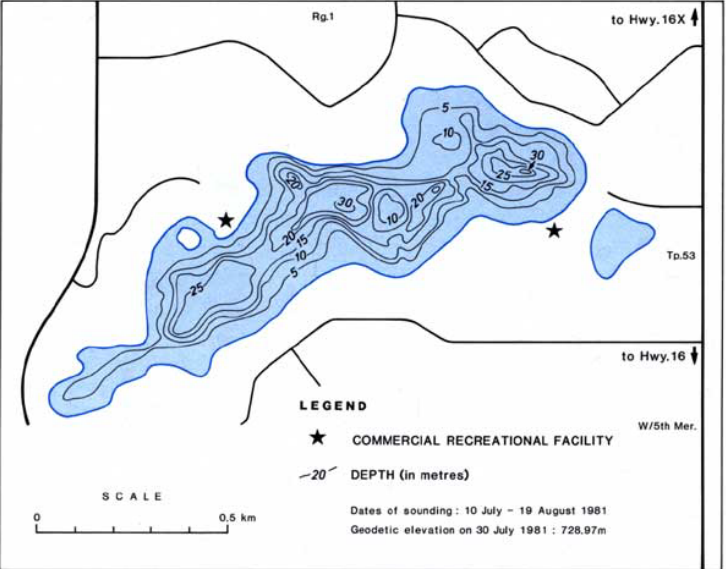
- North Saskatchewan River
- Watershed and Subwatershed Boundaries
- City of Edmonton
- Waterbodies
- AntlerLake Watershed
- Protected Areas



This map was created by the North Saskatchewan Watershed Alliance on June 28th, 2018. The data used to create this map was provided by the Government of Canada.



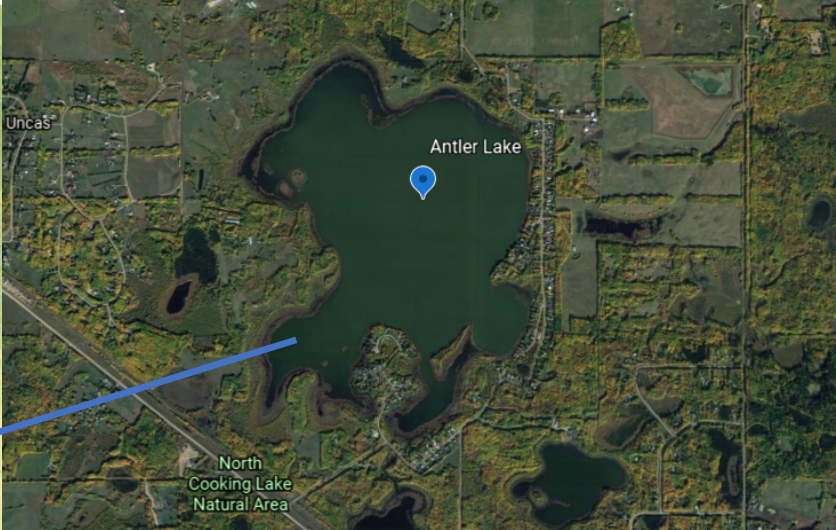
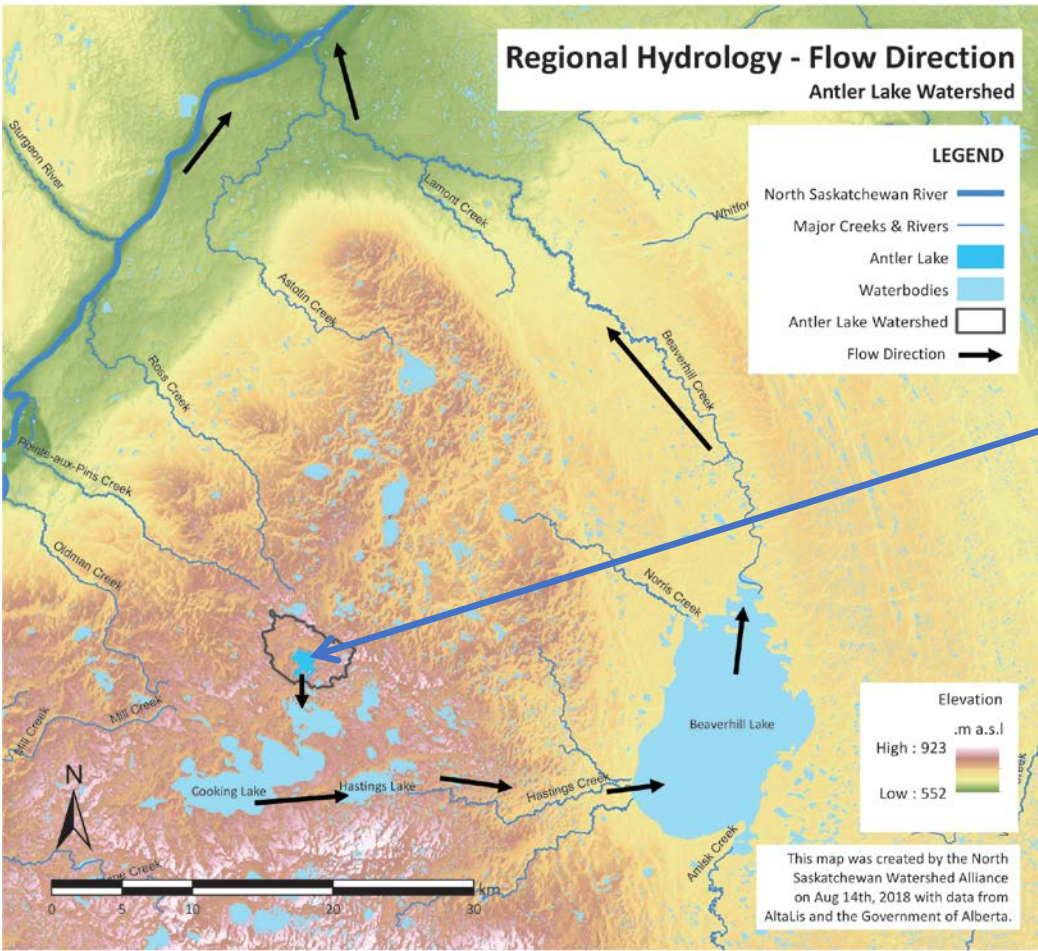
Hubbles Lake is Deep & Thermally Stratified within a Closed Basin



Four deep holes, 25-30 meters deep



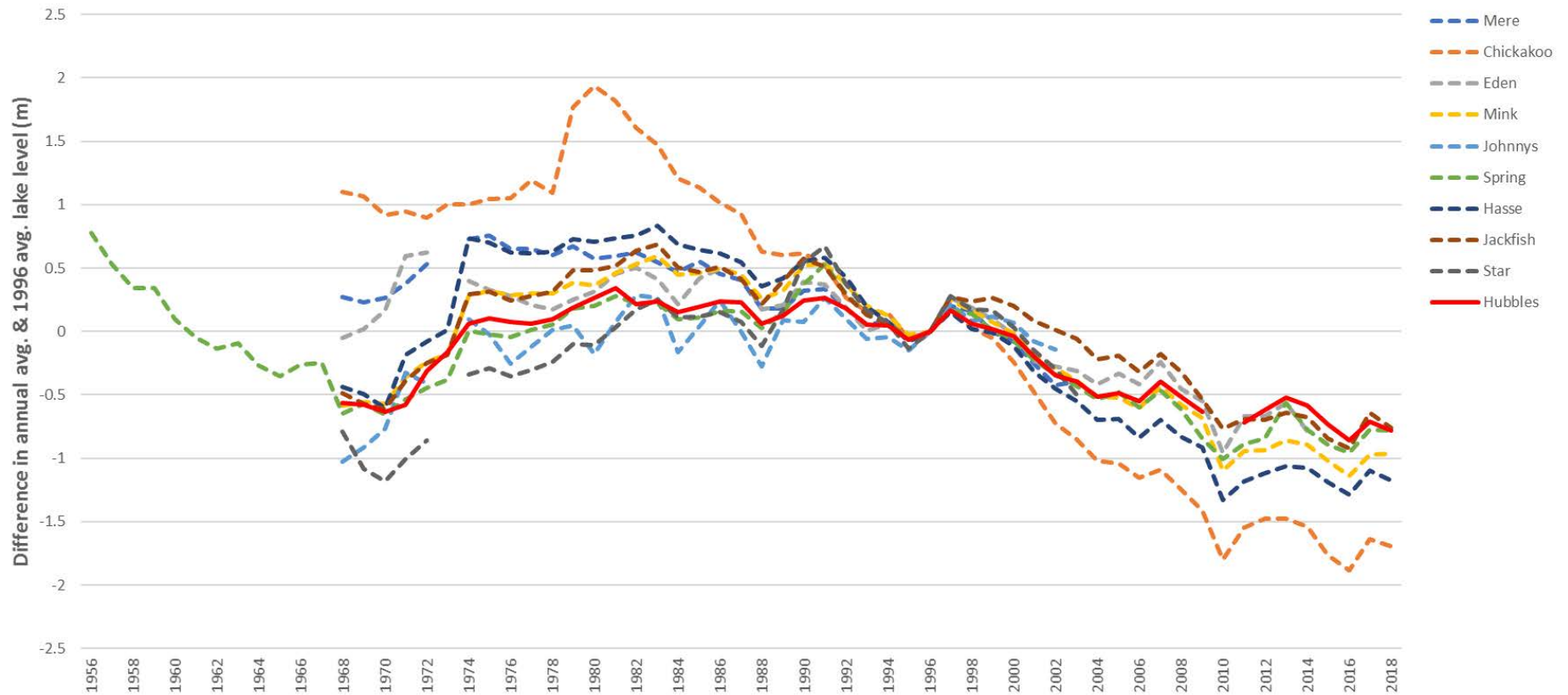
Antler Lake is Shallow and Hydrologically Connected to Nearby Lakes

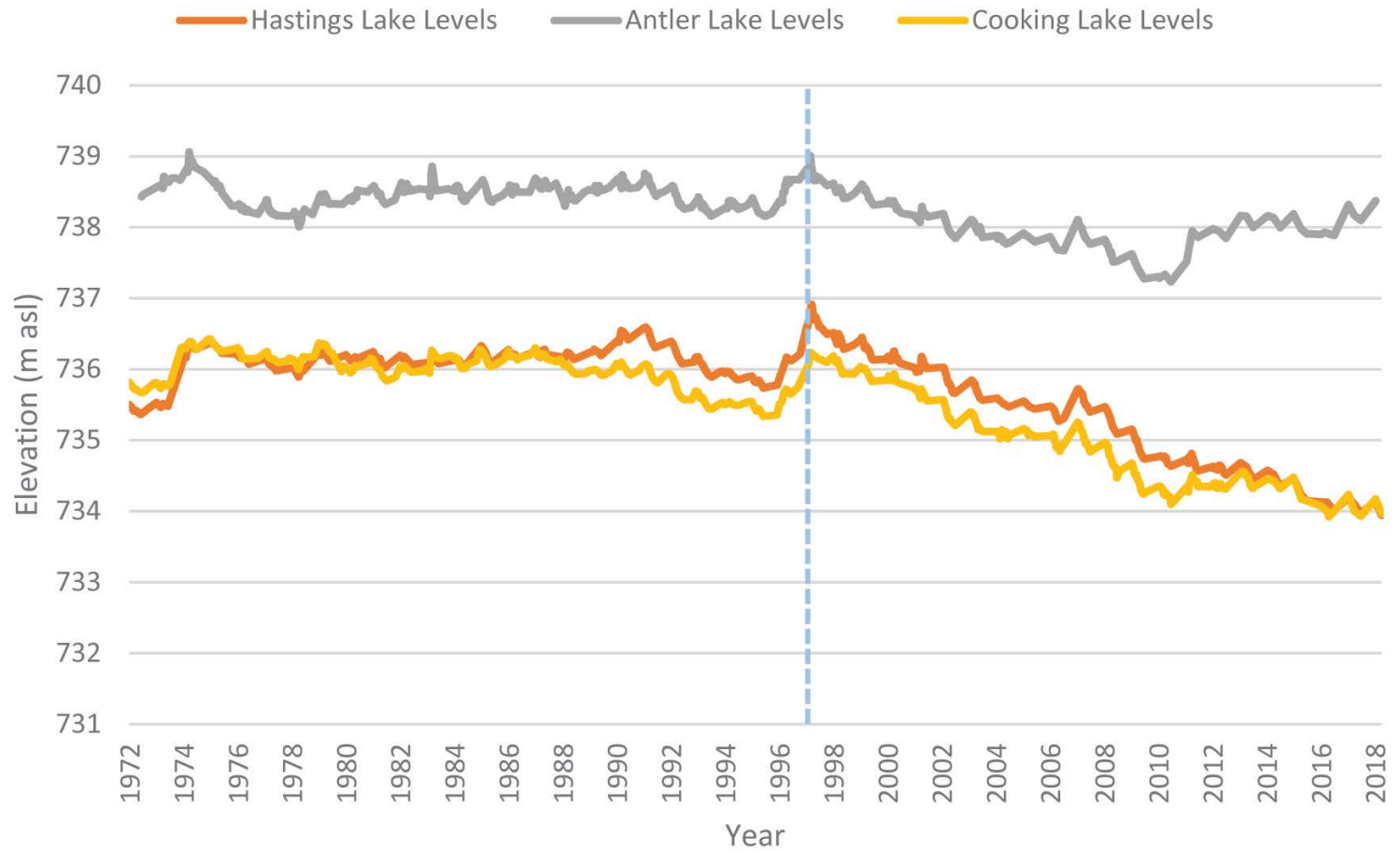


Max depth is 4.69 meters



Lake Levels are Declining





WATER BALANCE EQUATION

CHANGE IN LAKE
WATER STORAGE

ΔS

$$= \text{WATER INPUTS} - \text{WATER OUTPUTS}$$

WATER INPUTS

Precipitation Input

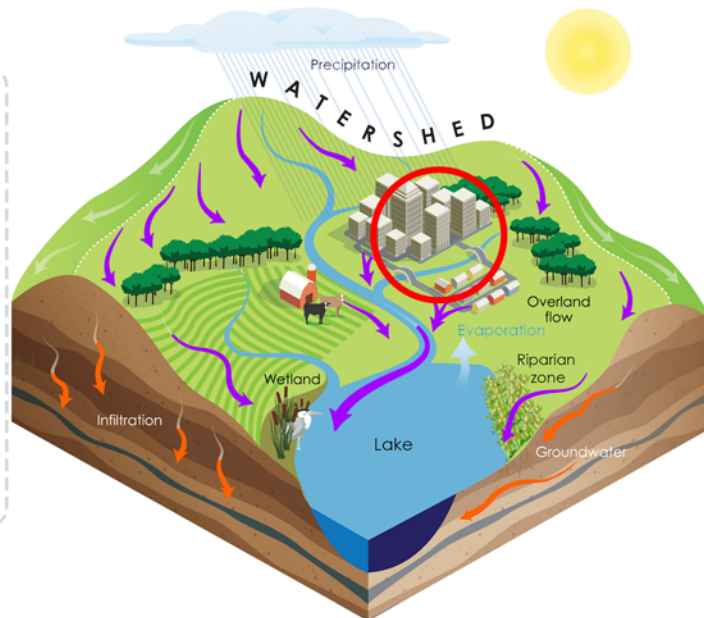
Rain & snow falling directly on the lake

Surface Inflow

Inflow of water on the ground surface in the catchment or drainage area

Groundwater Inflow

Water entering the lake by buried channels and connections to aquifers



WATER OUTPUTS

Evaporation Losses

Evaporation from the lake surface area

Surface Outflow

Water leaving the lake through channels

Groundwater Outflow

Water leaving the lake through the groundwater system

Diversions

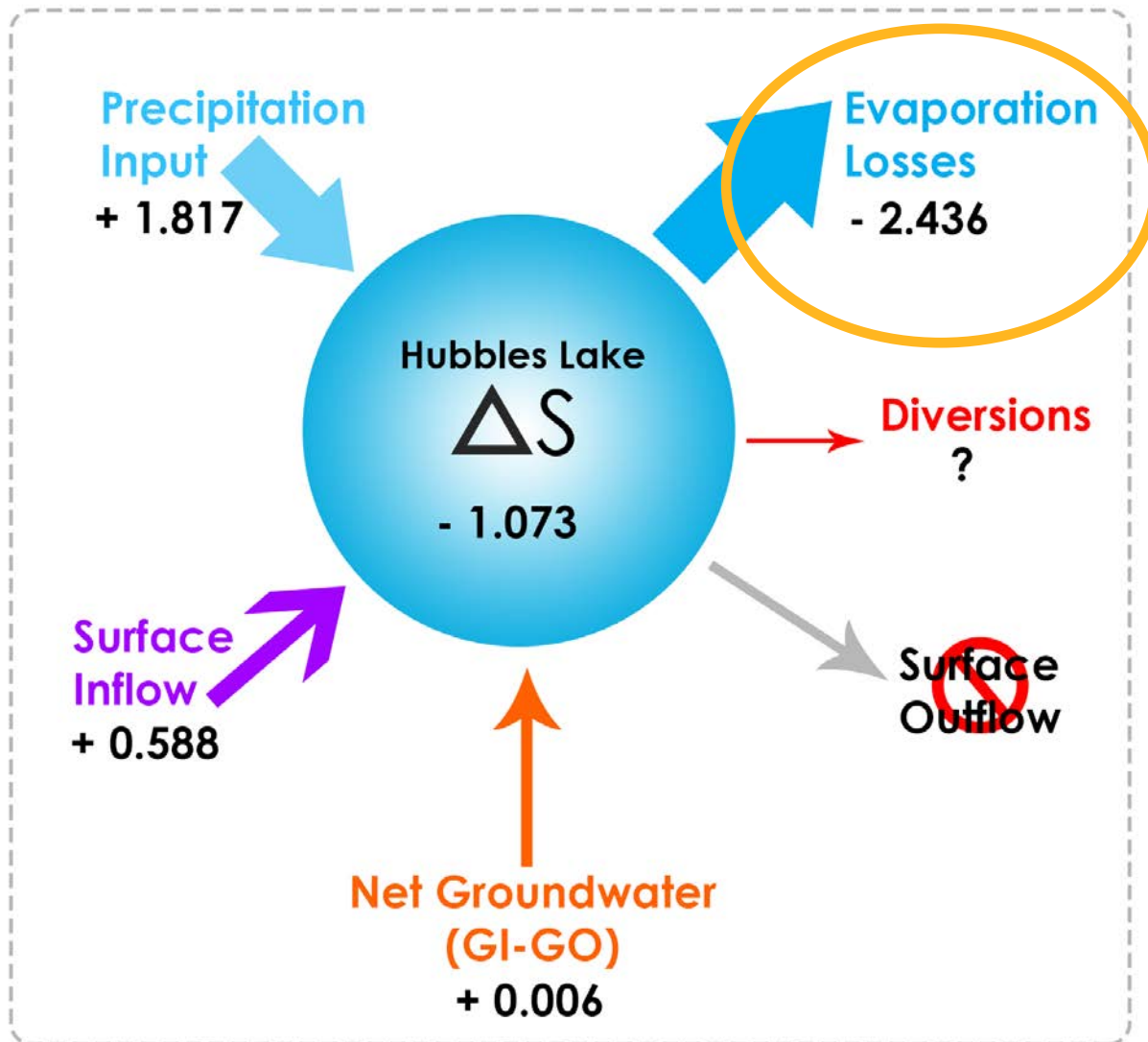
Water diverted into (+) or out of (-) the lake due to human activity

CHANGE IN LAKE
WATER STORAGE

ΔS

= WATER
INPUTS -

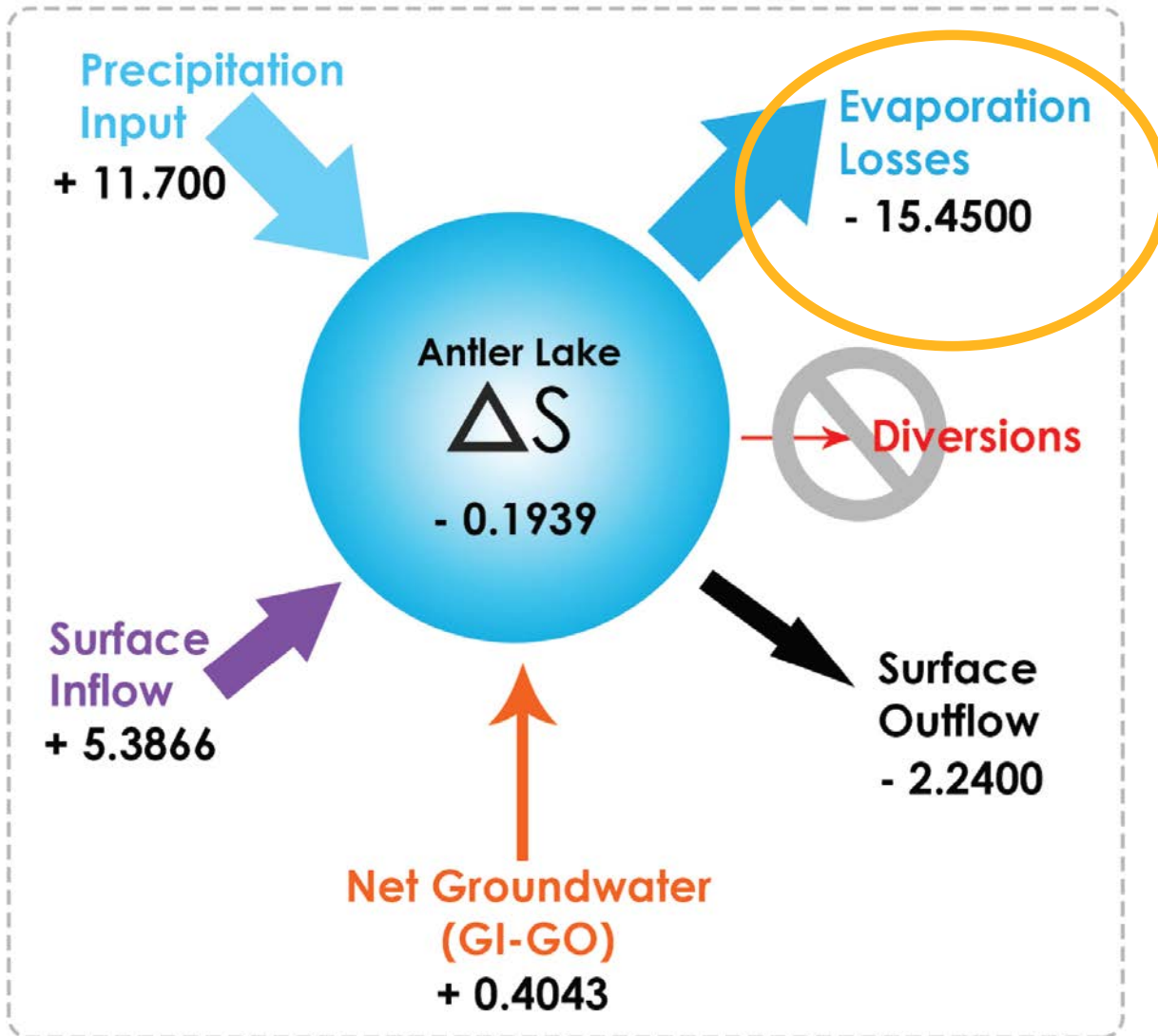
WATER
OUTPUTS



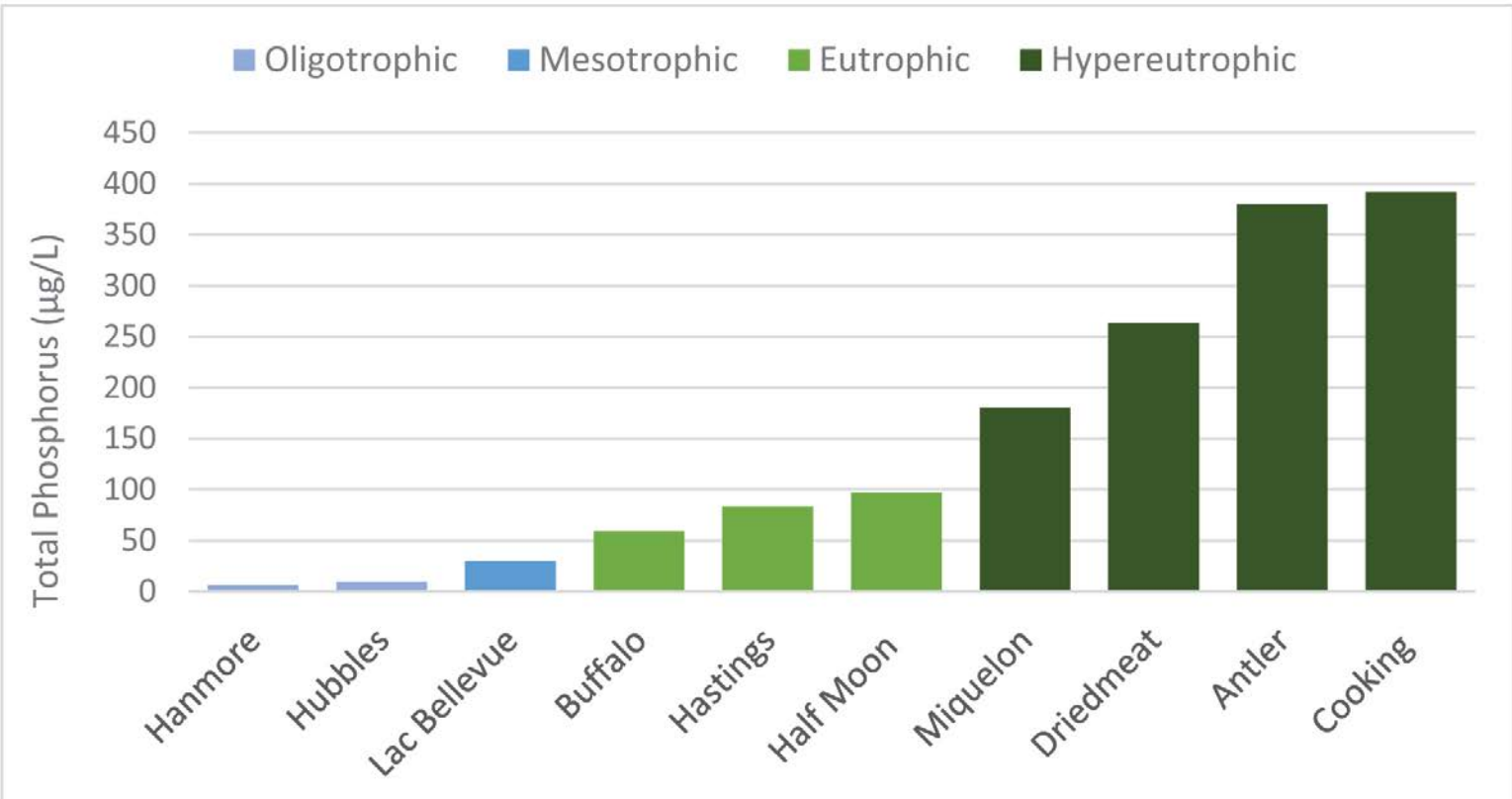
CHANGE IN LAKE
WATER STORAGE

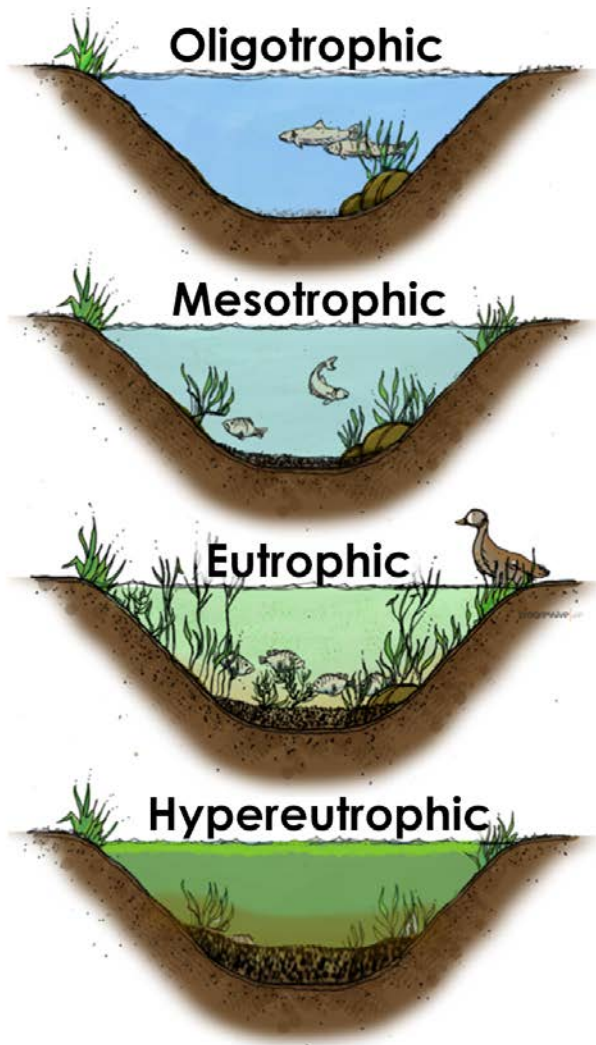
ΔS

$$= \text{WATER INPUTS} - \text{WATER OUTPUTS}$$

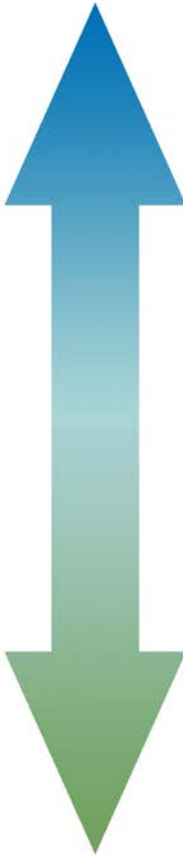


How does a net loss in water quantity affect these lakes?





HIGH clarity, LOW productivity



Low nutrient levels
Good light penetration
High dissolved oxygen
Deeper waters

Intermediate/Moderate
Levels

High nutrient levels
Poor light penetration
High algal growth
Very low dissolved oxygen
Shallow waters

Possible dead zones
due to lack of oxygen

LOW clarity, HIGH productivity

Water Quality

Hubbles

- Excellent water clarity
- No oxygen below 11 meters
- Nutrients low in upper layer and high at lake bottom

Antler

- Low water clarity
- Good oxygen in Summer, none in Winter
- Getting saltier
- High nutrients
- Cyanobacteria blooms

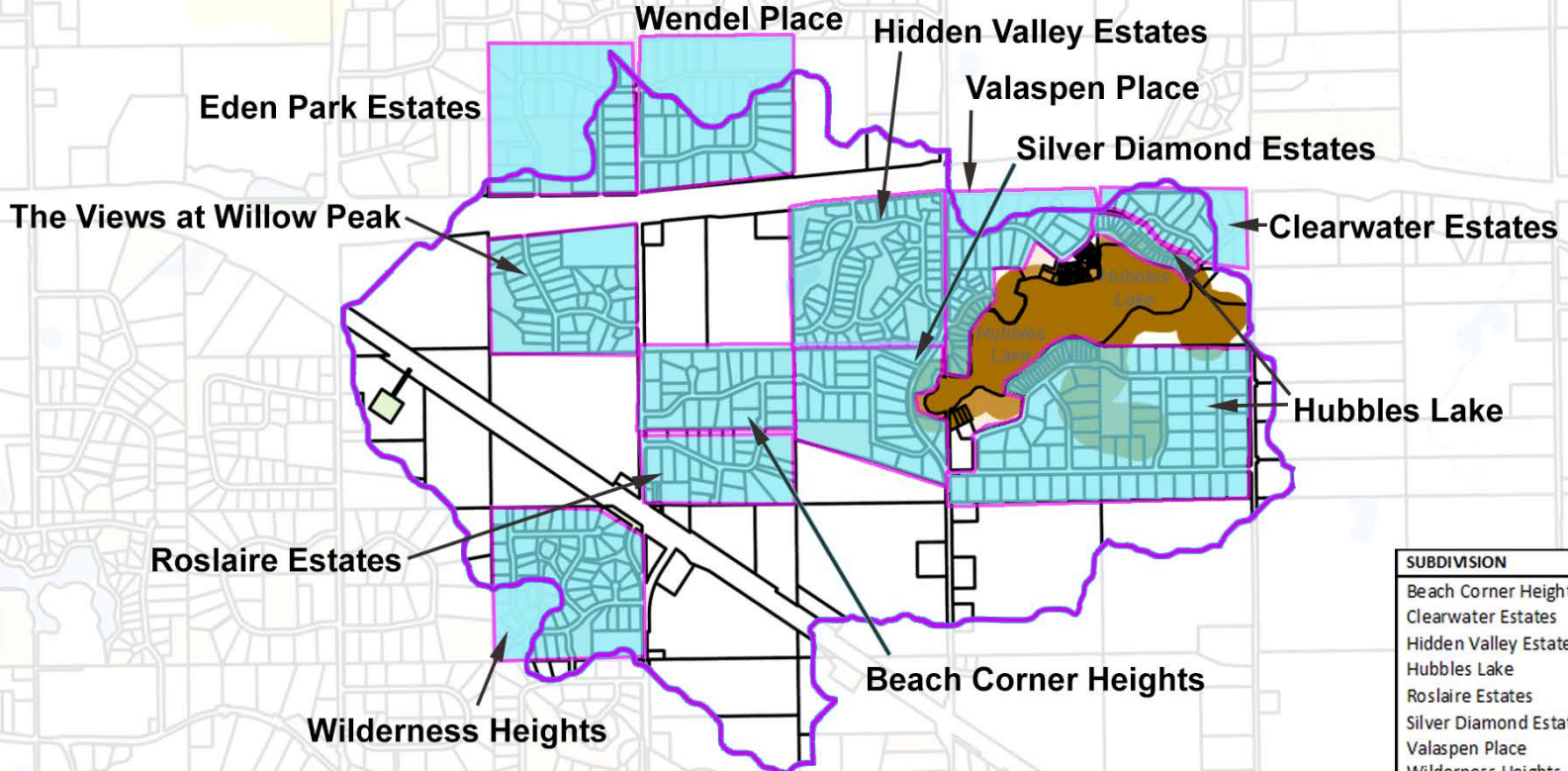




How might land use affect lake
longevity?

Legend

- Subdivisions
- Watershed Boundary
- Ecologically Significant Area
- Land Division Lines



SUBDIVISION	PARCELS
Beach Corner Heights	22
Clearwater Estates	24
Hidden Valley Estate	70
Hubbles Lake	149
Roslaire Estates	25
Silver Diamond Estates	26
Valaspen Place	42
Wilderness Heights	69
The Views at Willow Peak	43
Eden Park Estates	33
Wendel Place	35
11 Subdivisions	538



Subdivisions within the Hubbles Lake Watershed



Notes: Custom notes

Disclaimer: This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION OR LEGAL PURPOSES

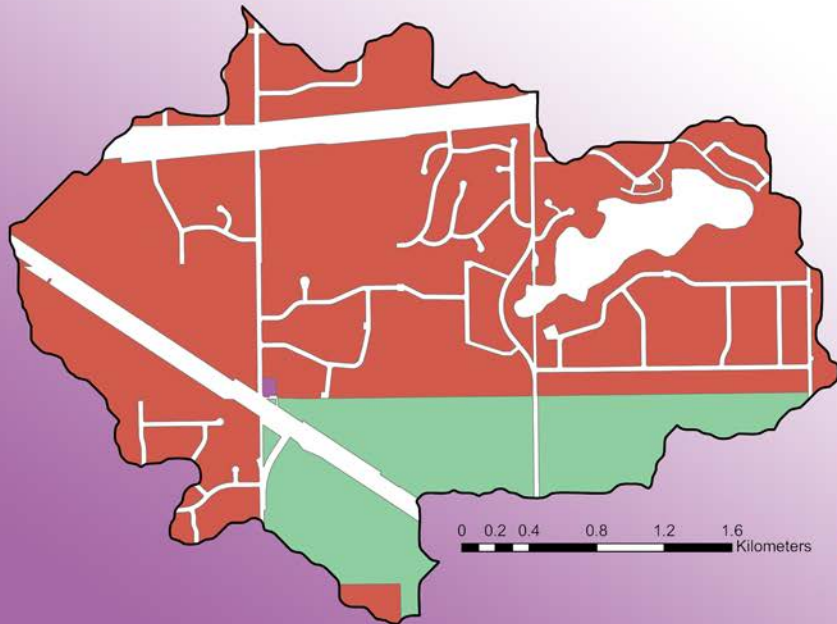
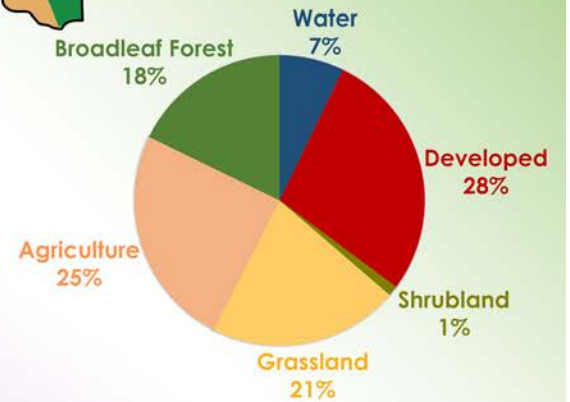
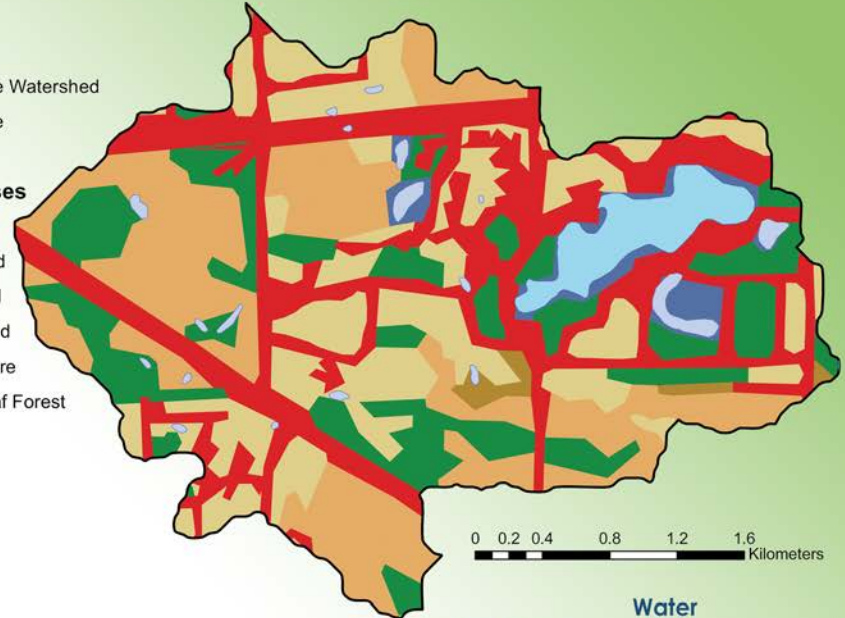
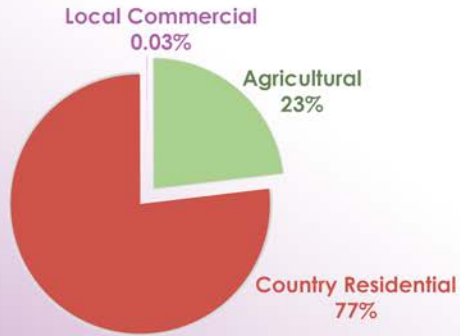


1: 35,707

© Parkland County

Land Cover

Land Use



These maps were made by the NSWA on November 19, 2018.

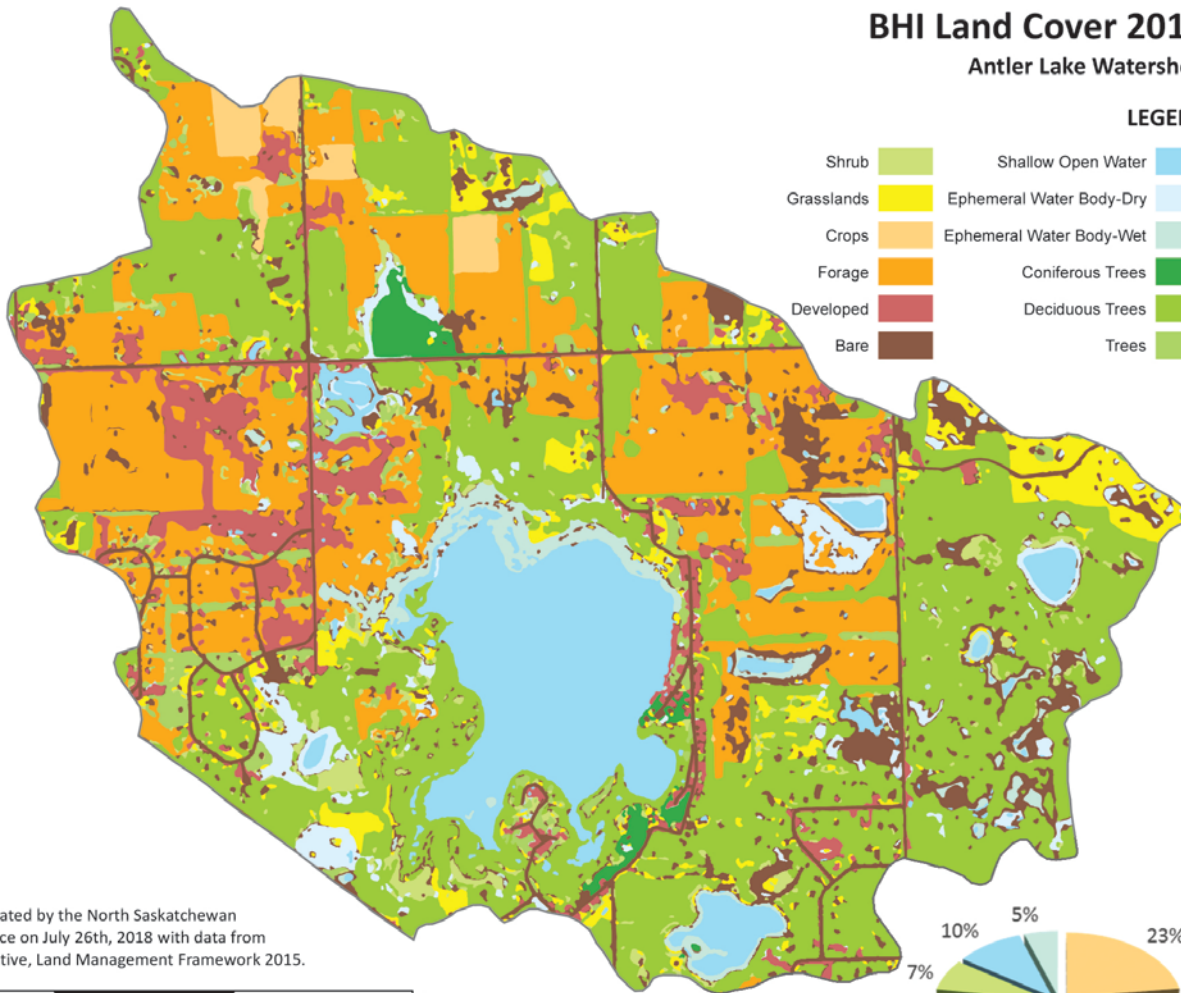
Data used to make these maps were obtained from Parkland County and the Alberta Biodiversity Monitoring Institute.

BHI Land Cover 2015

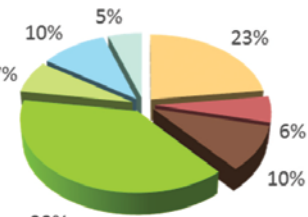
Antler Lake Watershed

LEGEND

Shrub	Shallow Open Water
Grasslands	Ephemeral Water Body-Dry
Crops	Ephemeral Water Body-Wet
Forage	Coniferous Trees
Developed	Deciduous Trees
Bare	Trees



This map was created by the North Saskatchewan Watershed Alliance on July 26th, 2018 with data from Beaver Hills Initiative, Land Management Framework 2015.



- Agriculture
- Developed
- Exposed
- Forested
- Scrub
- Water
- Wetland



ABMI Land Use 2014

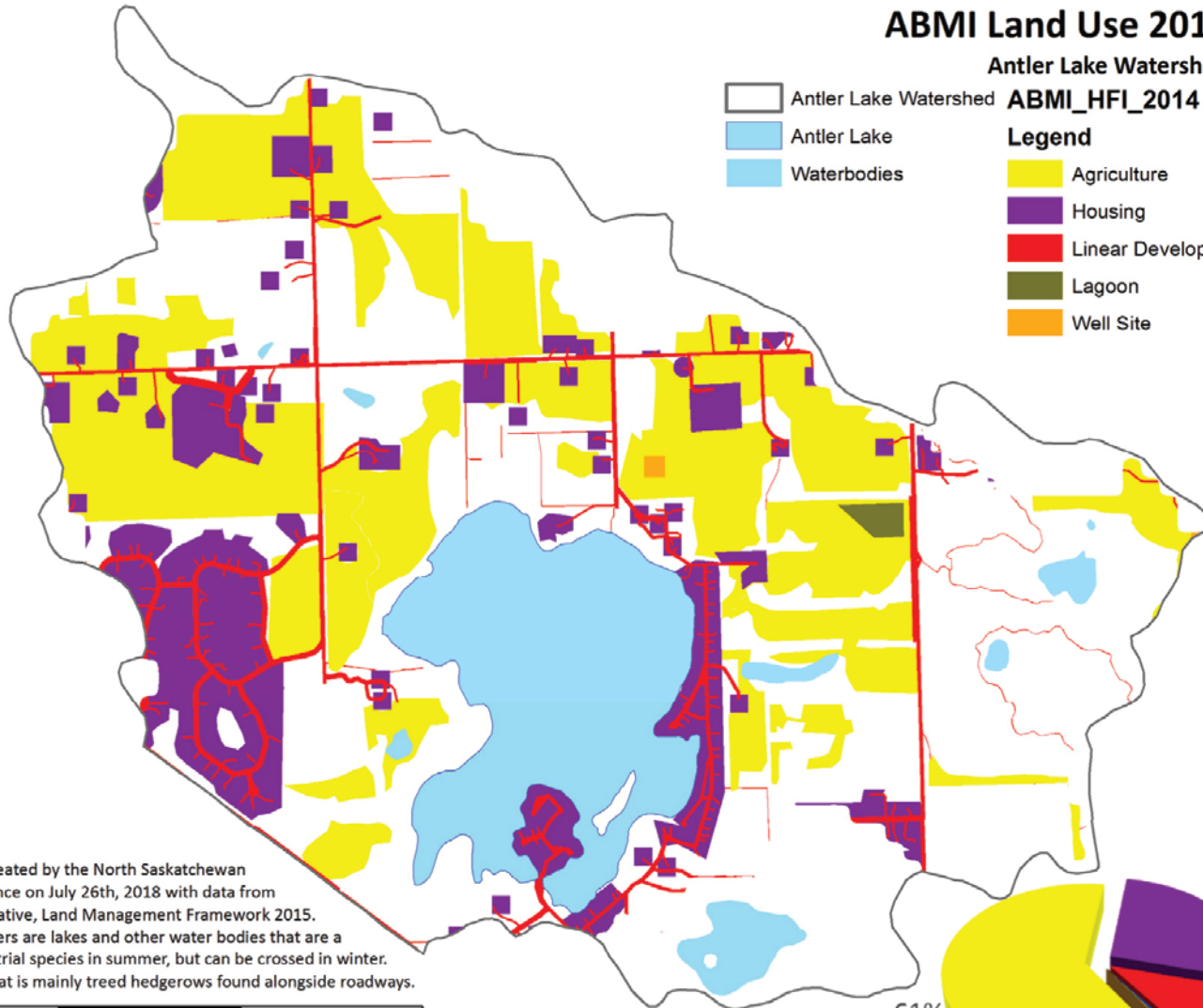
Antler Lake Watershed

ABMI_HFI_2014

-  Antler Lake Watershed
-  Antler Lake
-  Waterbodies

Legend

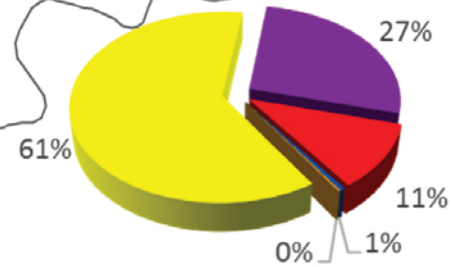
-  Agriculture
-  Housing
-  Linear Development
-  Lagoon
-  Well Site



This map was created by the North Saskatchewan Watershed Alliance on July 26th, 2018 with data from Beaver Hills Initiative, Land Management Framework 2015.

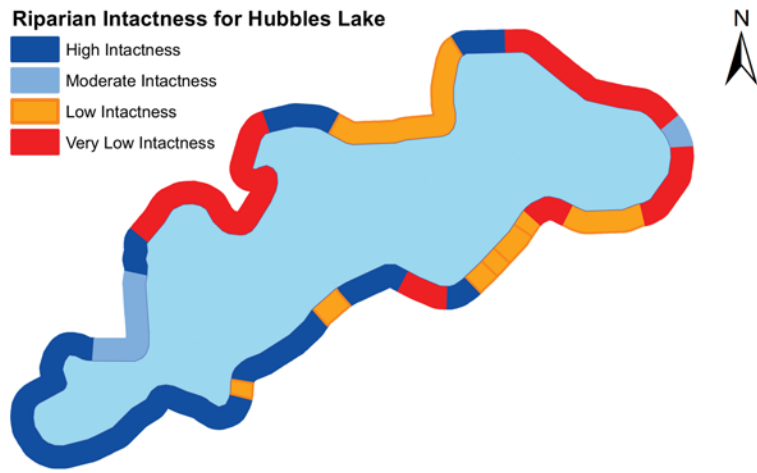
* Seasonal barriers are lakes and other water bodies that are a barrier to terrestrial species in summer, but can be crossed in winter.

** Linkage habitat is mainly treed hedgerows found alongside roadways.



Riparian Intactness for Hubbles Lake

- High Intactness
- Moderate Intactness
- Low Intactness
- Very Low Intactness



These maps were created by the NSWA on October 24th, 2018.

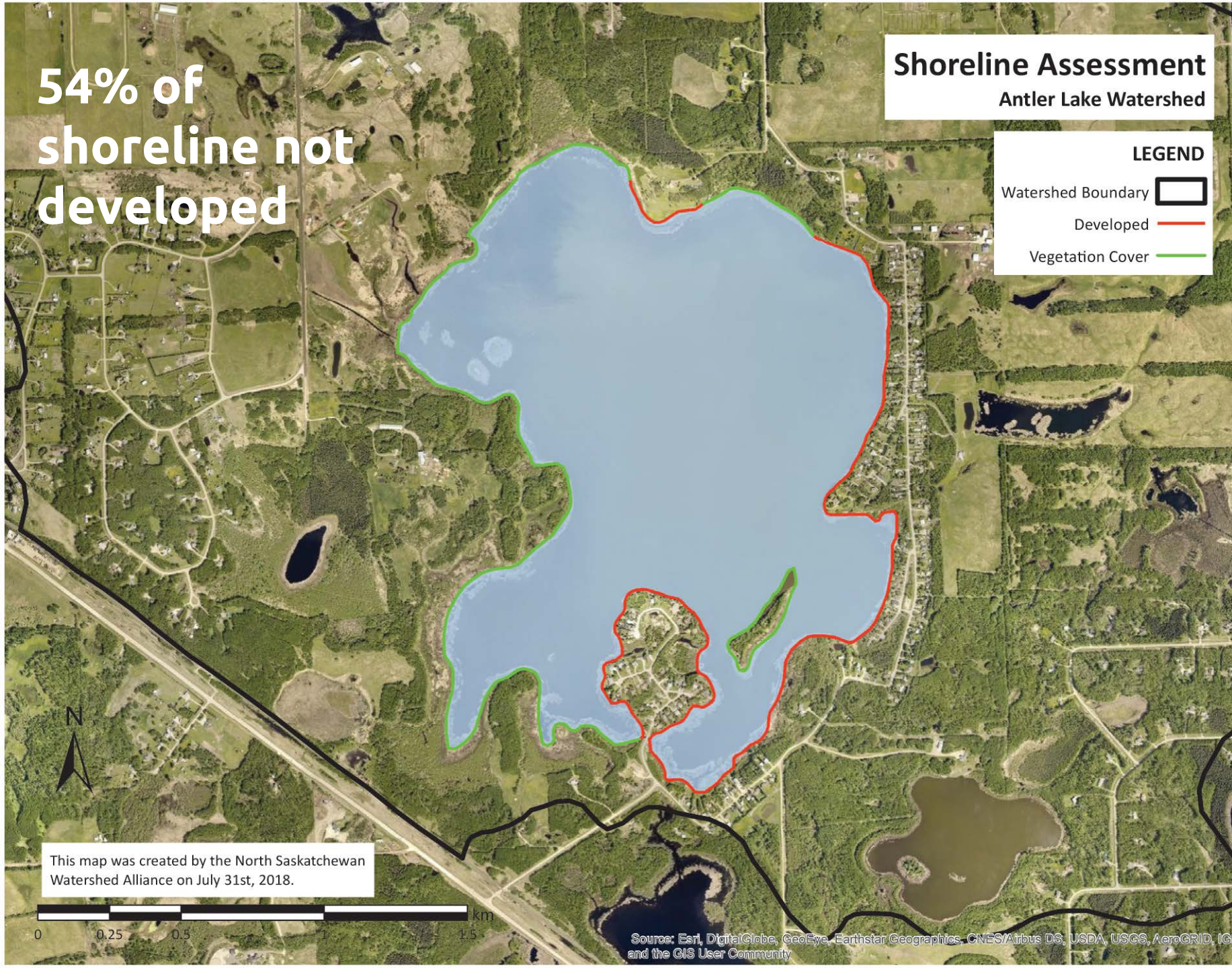
The data used to create the maps and the corresponding bar charts were provided by FIERA Biological Consulting.

54% of
shoreline not
developed

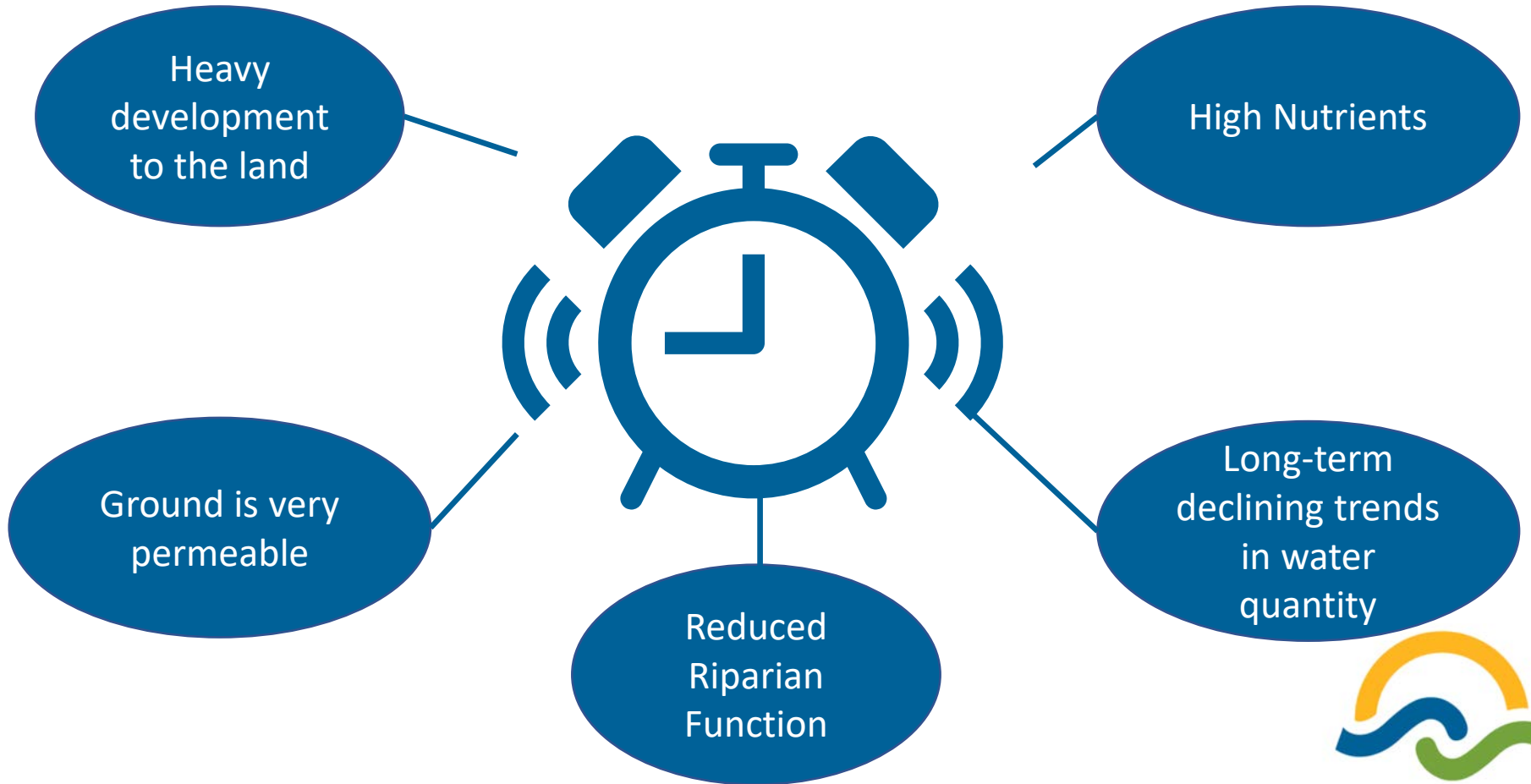
Shoreline Assessment Antler Lake Watershed

LEGEND

- Watershed Boundary 
- Developed 
- Vegetation Cover 



Threats to Lake Longevity



The image features a vibrant blue sky with a few wispy white clouds. In the foreground, there is a dense field of small, light blue flowers. A thick yellow vertical bar runs along the left edge of the frame. A large, solid blue rectangular area is positioned in the upper-middle part of the image, containing the text "Thank You!". Below this blue area, a thick green horizontal bar spans the width of the image.

Thank You!

