

# Small Lakes of the Stony Plain Region -2020 and 2021 Surveys-

Presented by David Trew  
to the Parkland County Community Sustainability Committee  
June 23, 2021



# Presentation Content

- ◆ David Trew – Personal and professional background
- ◆ Origin of current project (2018 and 2019)
- ◆ The Carvel Pitted Delta
- ◆ 2020 project work completed
- ◆ 2021 project proposal and partners
- ◆ Future considerations



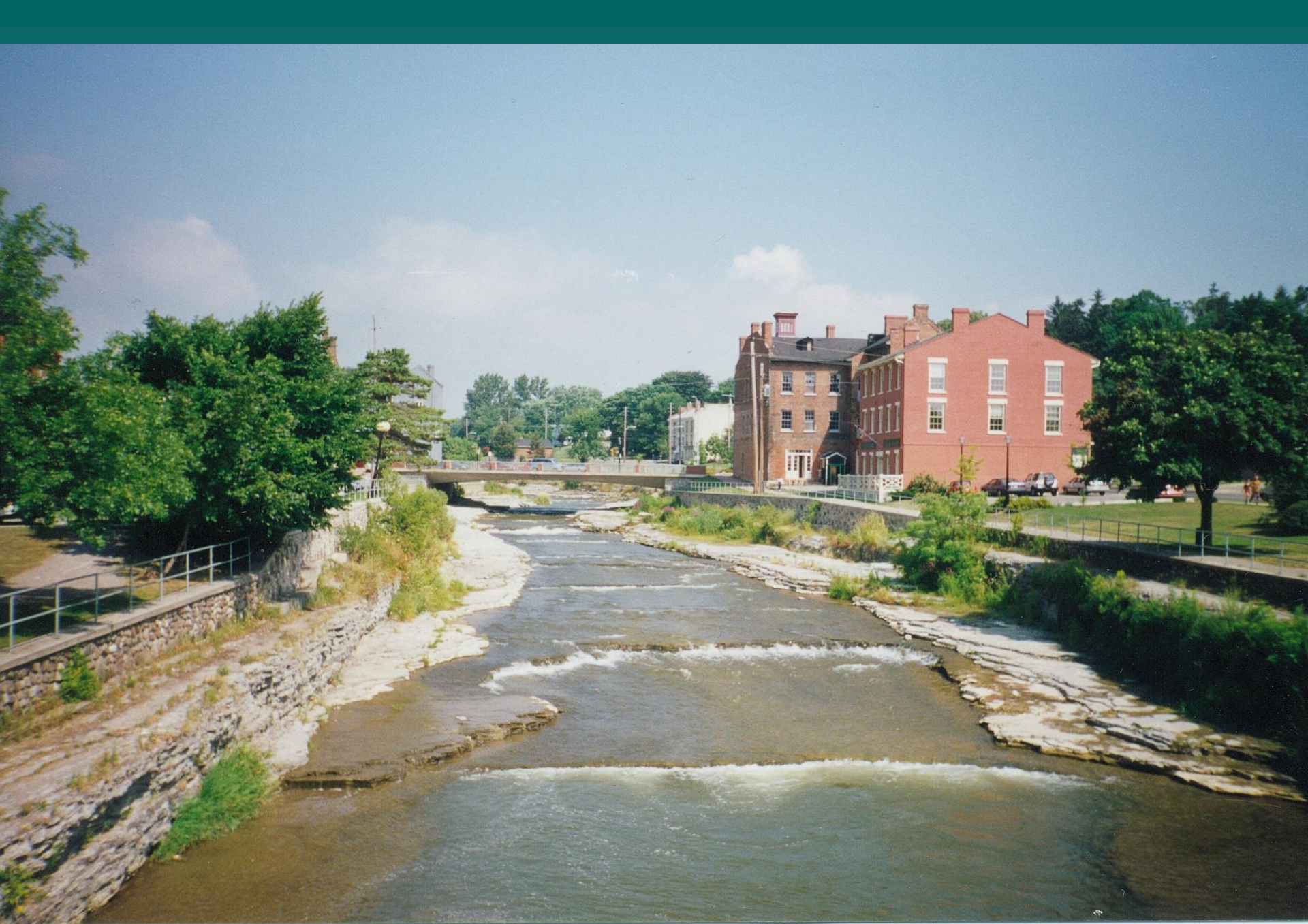
# Background

- ◆ Born and raised in Port Hope, Ontario
- ◆ Education: University of Guelph
- ◆ Ministry of Lands and Forests, Ontario
- ◆ Strathclyde University, Glasgow
- ◆ Scottish Marine Biological Association, Oban
- ◆ Fisheries Branch, Alberta Lands + Forests
- ◆ Water Quality Branch, Alberta Environment
- ◆ North Saskatchewan Watershed Alliance











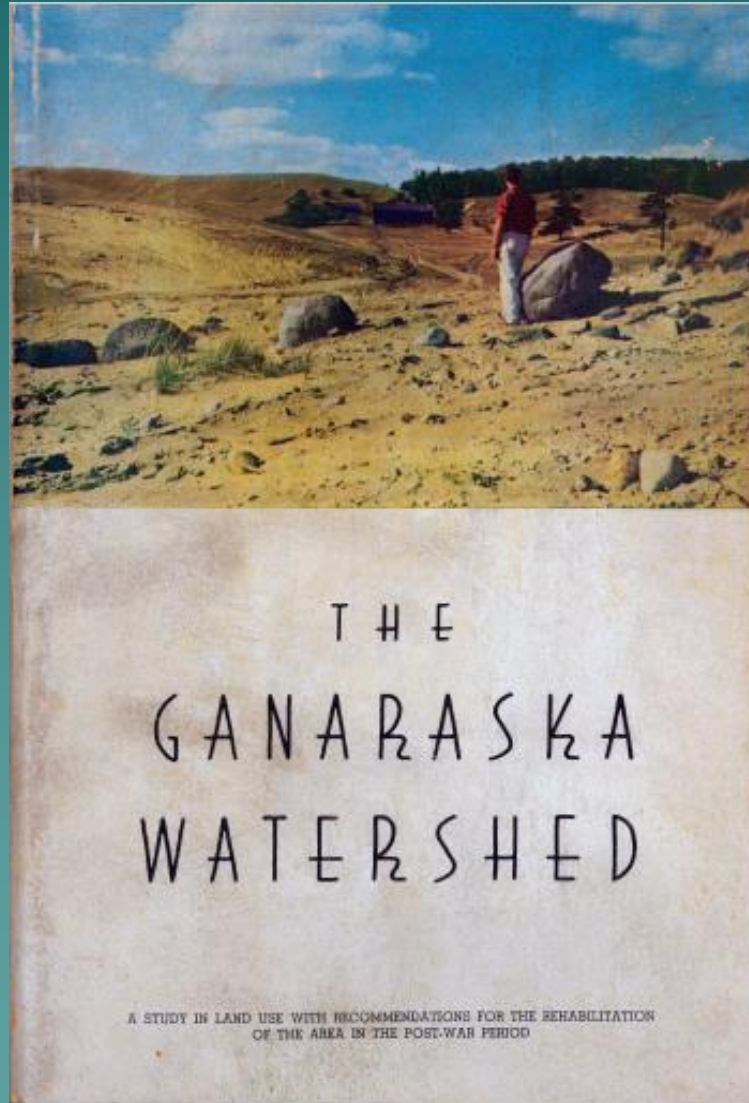




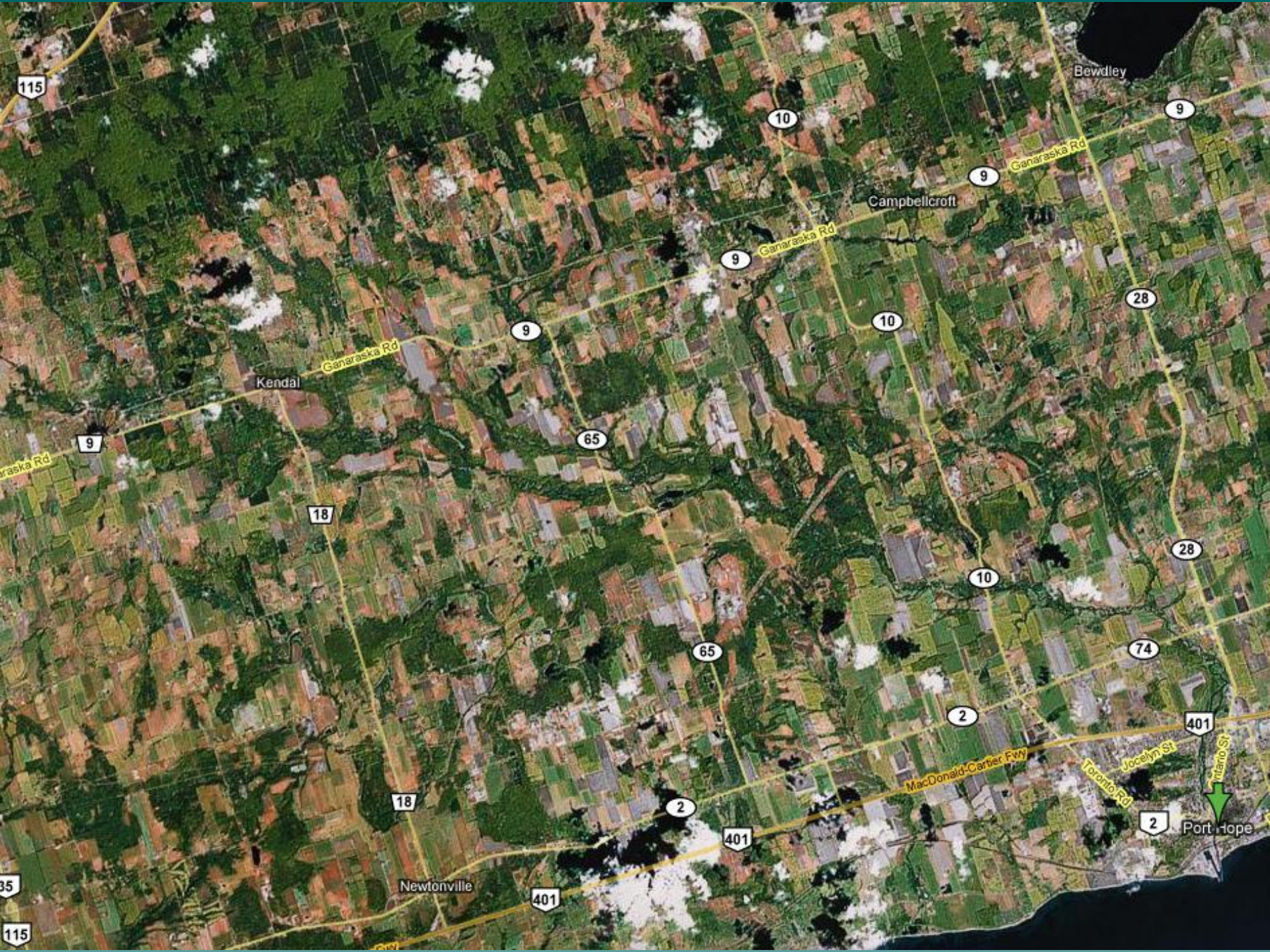
Walton Street  
awash with  
flood water.



# Canada's First Watershed Management Plan (1942)







115

Bewdley

10

9

Ganaraska Rd

Campbellcroft

9

Ganaraska Rd

9

28

9

10

Ganaraska Rd

Kendal

9

65

Ganaraska Rd

18

28

10

65

74

2

MacDonald-Carter Fwy

401

Jocelyn St

401

18

2

Port Hope

Infanto St

35

Newtonville

401

115



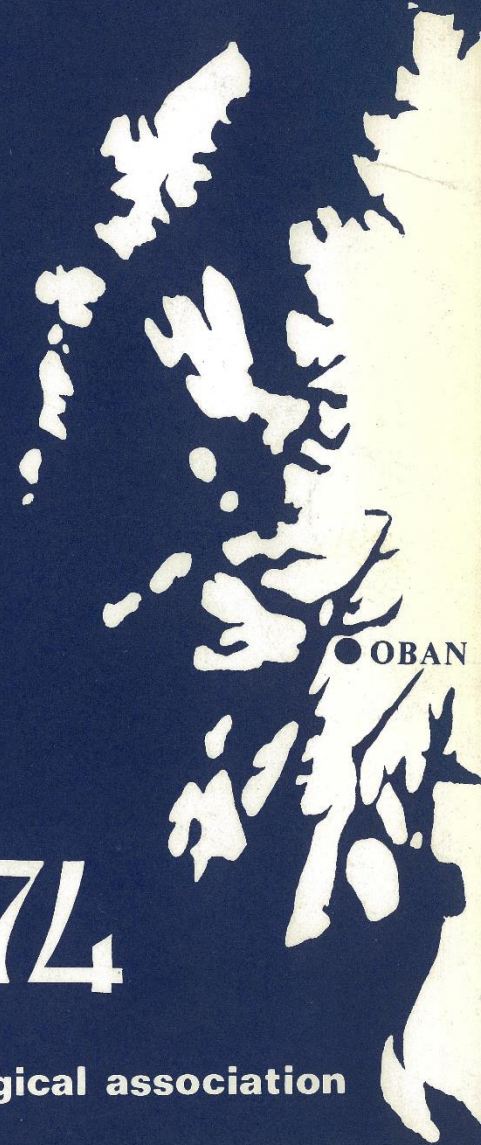
1968







**dunstaffnage marine research laboratory**



# SMBA 74

**scottish marine biological association**





# Alberta Lake Studies – Brief History

- ◆ Dr. R. B. Miller (U. of A.)
  - *"Preliminary Biological Surveys of Alberta Watersheds"* (1949)
- ◆ Dr. M. Paetz (Fisheries Branch), Dr. J. Nelson (U. of A.)
  - *"Fishes of Alberta"* (1970)
- ◆ Provincial fisheries biologists collected basic lake morphometry and water quality data during regional fisheries surveys and as part of the *"CLI-ARDA"* programs (1960s-70s)

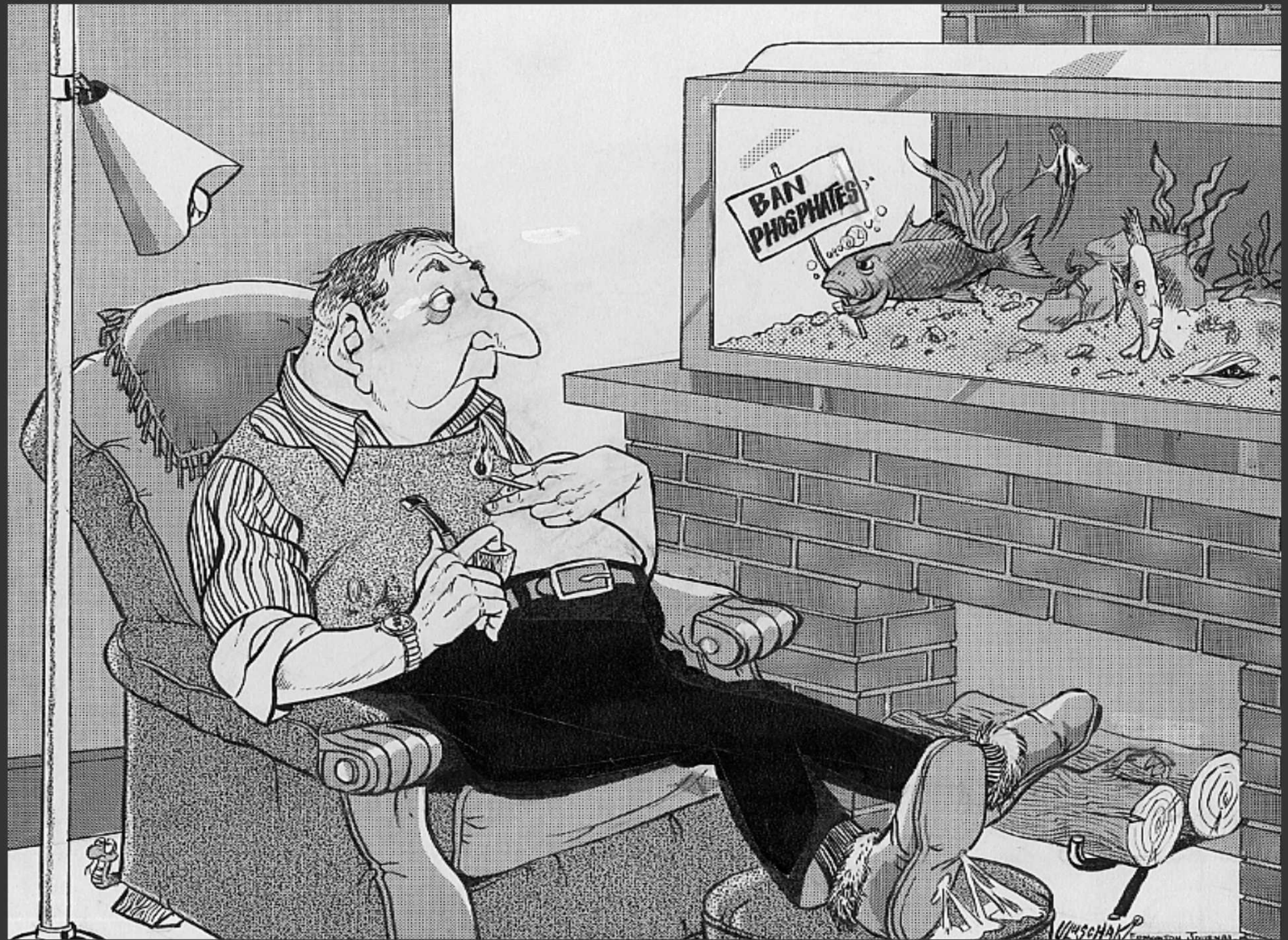


THE FISHES  
OF  
ALBERTA

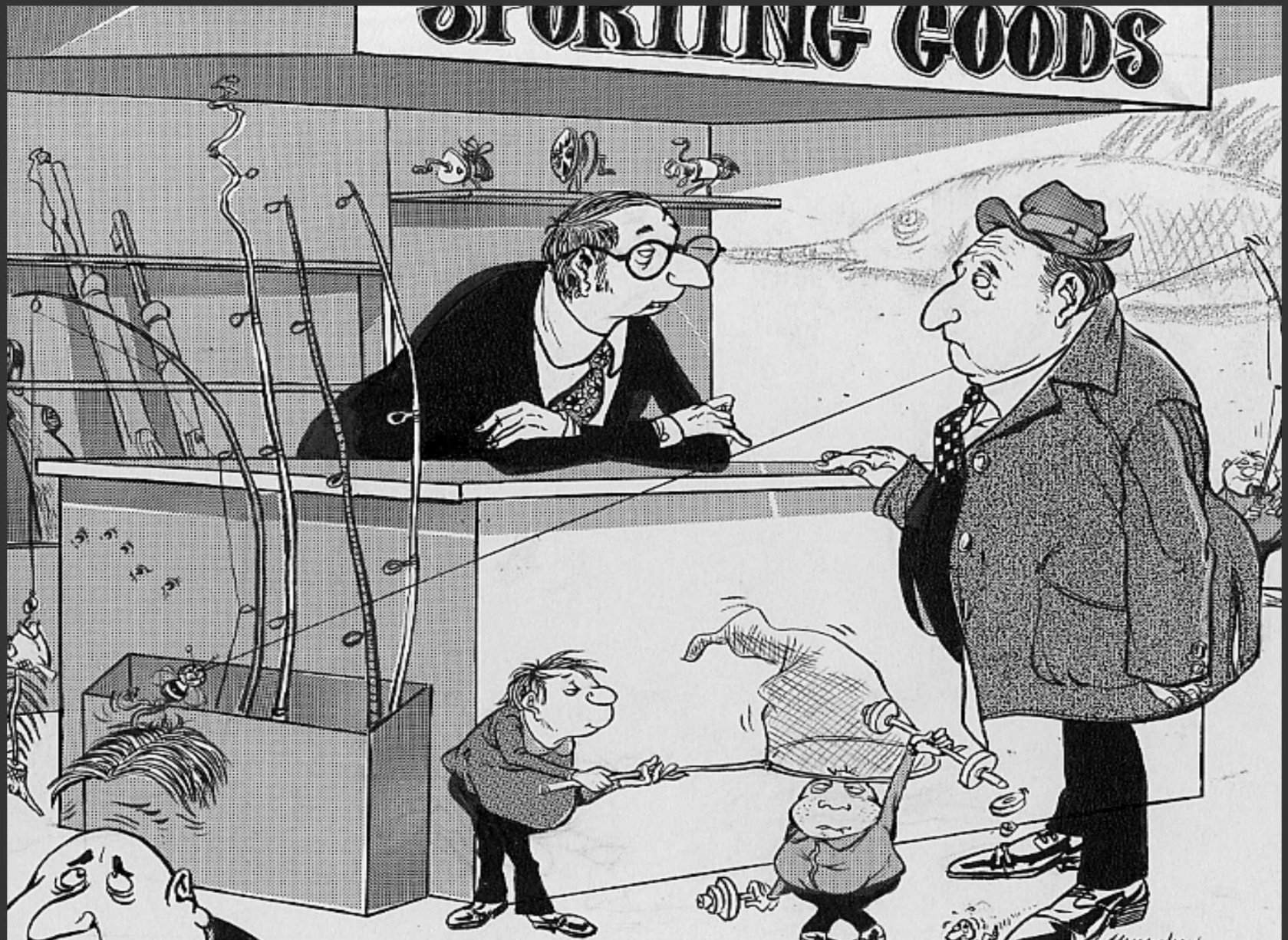
PAETZ  
NELSON

FIRST EDITION









"We carry the latest fishing equipment... Geiger counters, mercury content meters, phosphate level indicators..."



# The Baptiste Lake Study 1976-79



- ◆ Crisis at lake: too much development already
- ◆ GOA needed a "model" to predict effects of watershed development
- ◆ Intensive study of lake and watershed nutrient sources, phytoplankton ecology, hydrology, paleolimnology



Reprinted from

Réimpression du

Canadian  
Journal  
of Fisheries  
and Aquatic  
Sciences

Journal  
canadien  
des sciences  
halieutiques  
et aquatiques

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**Evaluation of the phosphorus–chlorophyll relationship for lakes  
off the Precambrian Shield in western Canada**

E. E. PREPAS AND D. O. TREW

Volume 40 • Number 1 • 1983

27–35

Canada



Government of Canada  
Fisheries and Oceans

Gouvernement du Canada  
Pêches et Océans

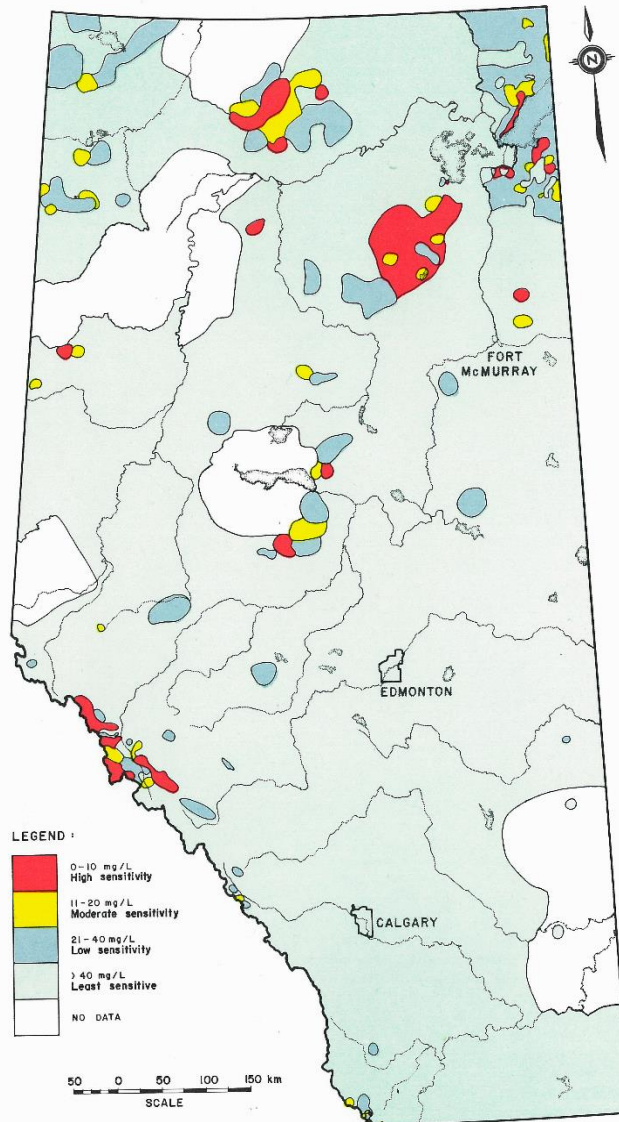
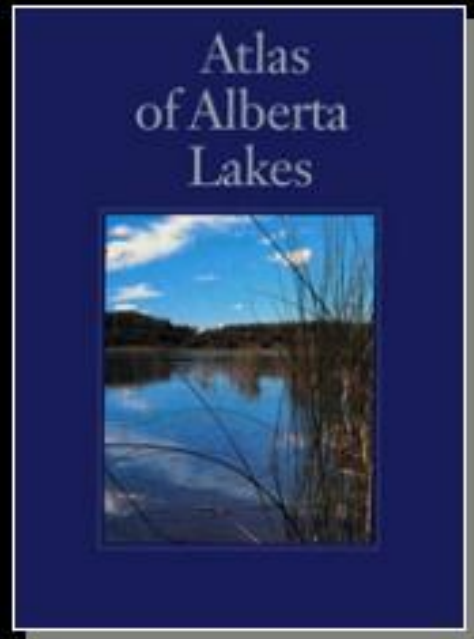


Figure 2 Sensitivity of Alberta lakes to acidification as determined by alkalinity values.







# **Integrated Watershed Management Plan for the North Saskatchewan River in Alberta**



**North Saskatchewan Watershed Alliance**



# Vermilion River Watershed Management Plan

Prepared by the Vermilion River Watershed Management Project Steering Committee  
on behalf of the North Saskatchewan Watershed Alliance



## Mayatan Lake State of the Watershed Report



August 2012



## Mayatan Lake Watershed Management Plan



July 2016

**Jackfish Lake  
State of the Watershed Report**



April 2016



**Isle Lake and Lac Ste Anne  
State of the Watershed Report**



**May 2017**

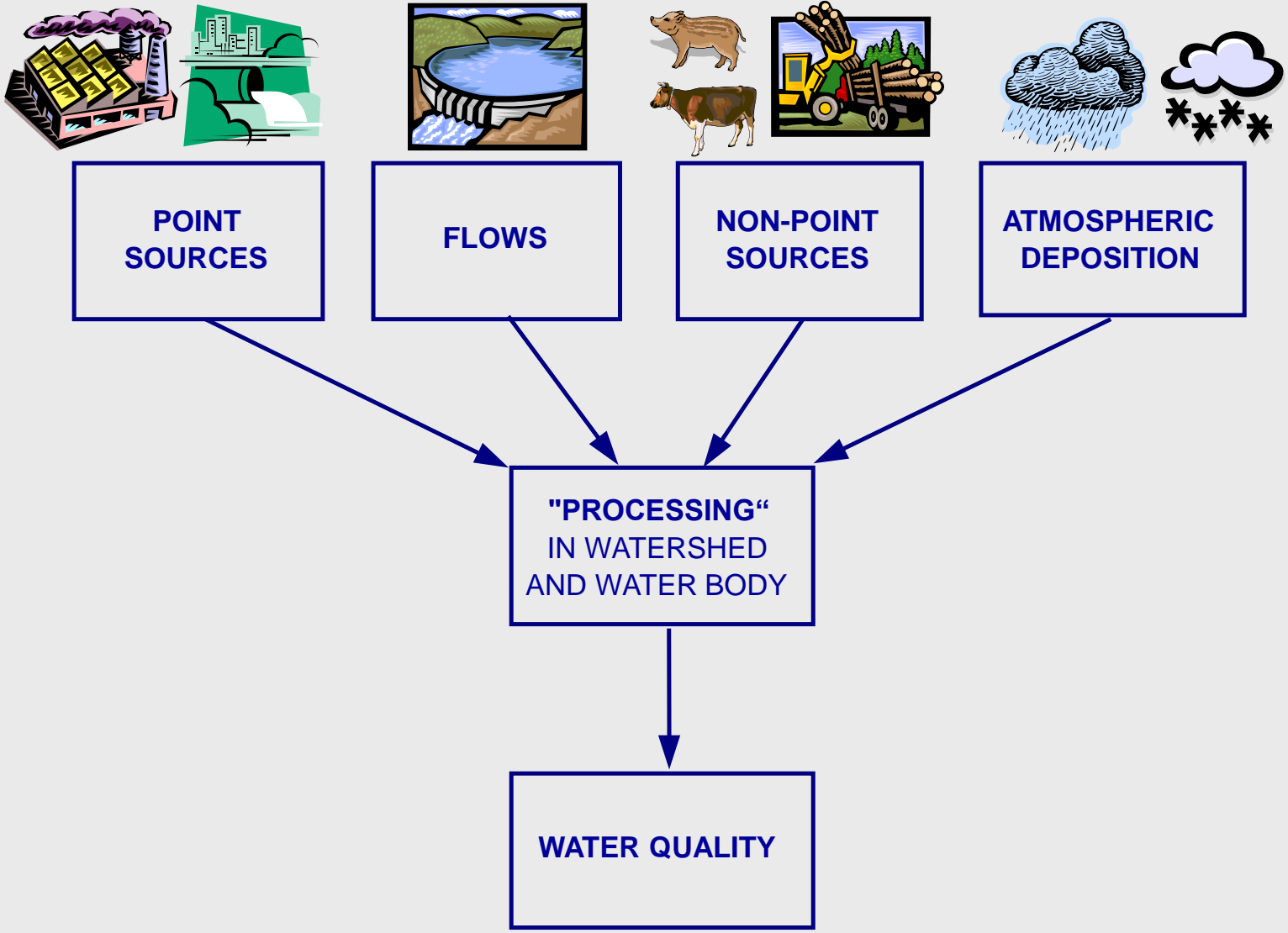
**Hubbles Lake  
State of the Watershed Report**



**December 2018**



# Use the Watershed Approach!



# Retirement - 2018





The 2020 small lakes survey started with an introduction to “Lake Idano” in 2018...









# “Lake Idano”

- ◆ The landowner expressed interest in the protection of this unique, unnamed lake
- ◆ Initial inspections of the lake and its watershed were carried out in summer 2018
- ◆ No previous water quality data were available
  - Preliminary lake sampling was conducted by ALMS in August 2019
  - The unique clarity of the lake and its extremely low nutrient/algal concentrations prompted much further discussion
  - The lake also had a continuous outflow, which suggested a potential groundwater influence































Satellite and 2020 drone images suggested that the lake was also fed by three upstream “fens”



















Preliminary samples taken in August 2019  
with Brad Peter, E/D, ALMS

Fascinating results...


Are there other similar, unstudied lakes in  
the Stony Plain Region?



# Regional Setting

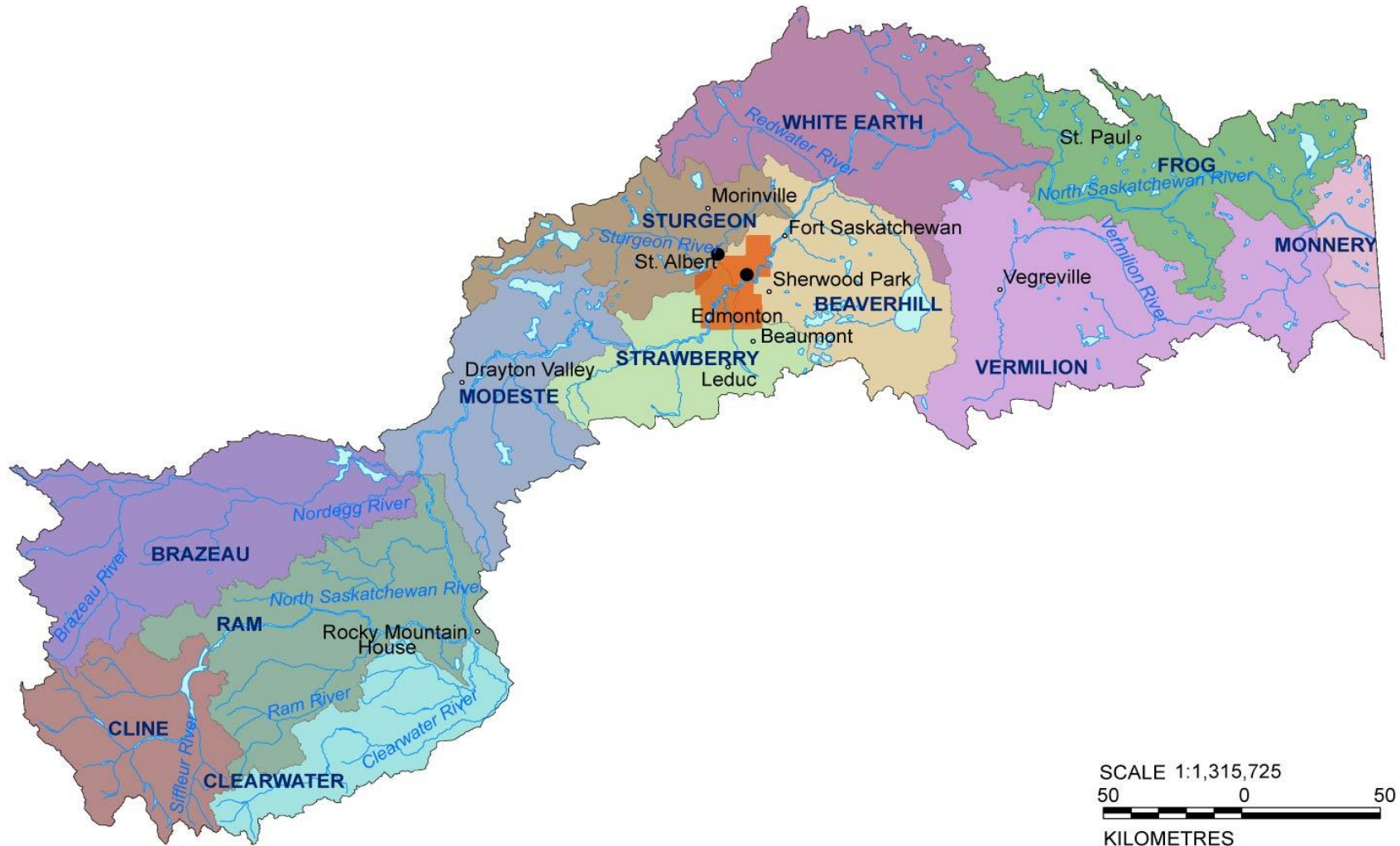
All lakes in this survey are located on the post-glacial landform known as the “Carvel Pitted Delta” which is located north and west of Stony Plain, Alberta

Most of these lakes and their watersheds are also part of the larger Sturgeon River Watershed



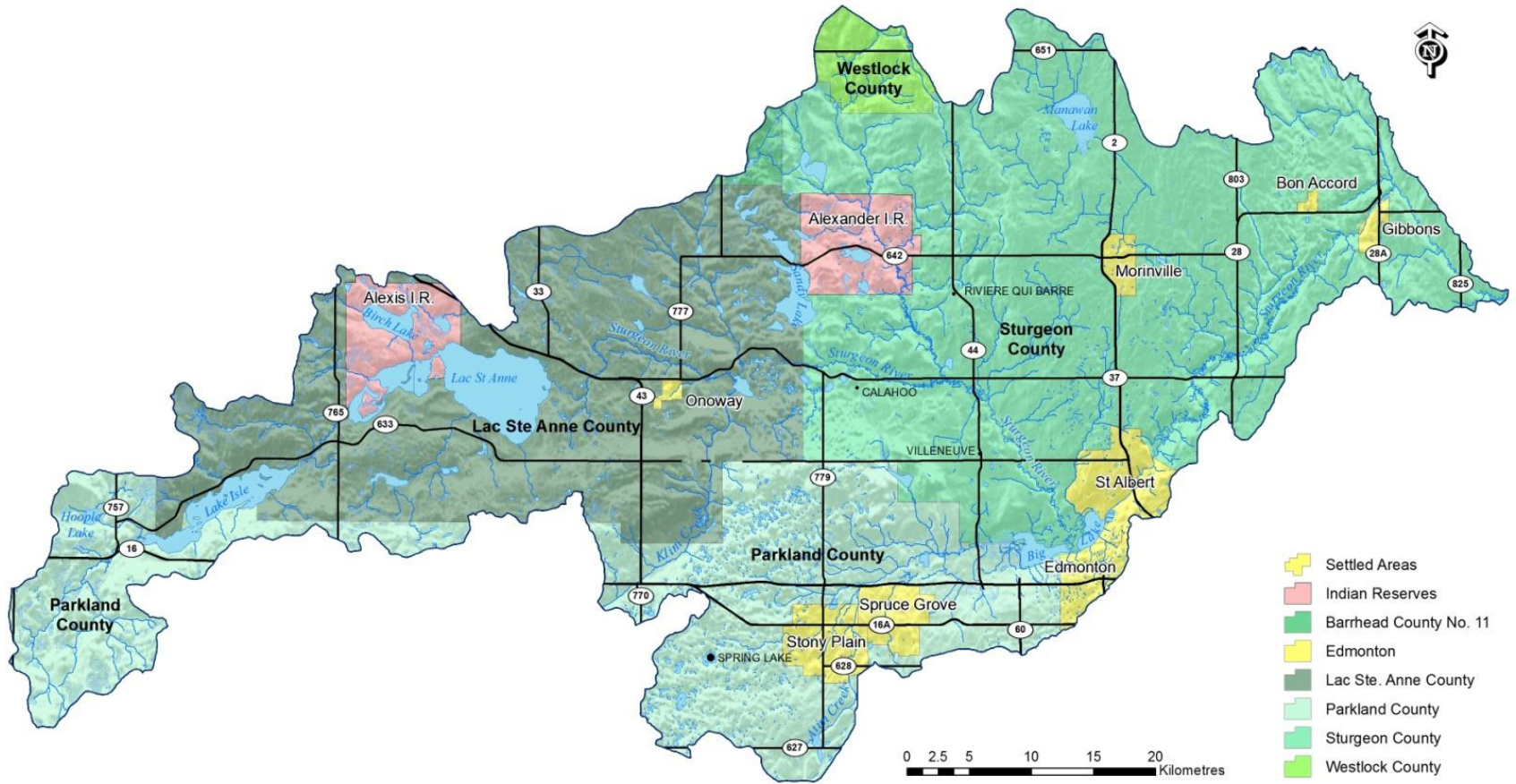


# The North Saskatchewan River Basin: Twelve Subwatersheds



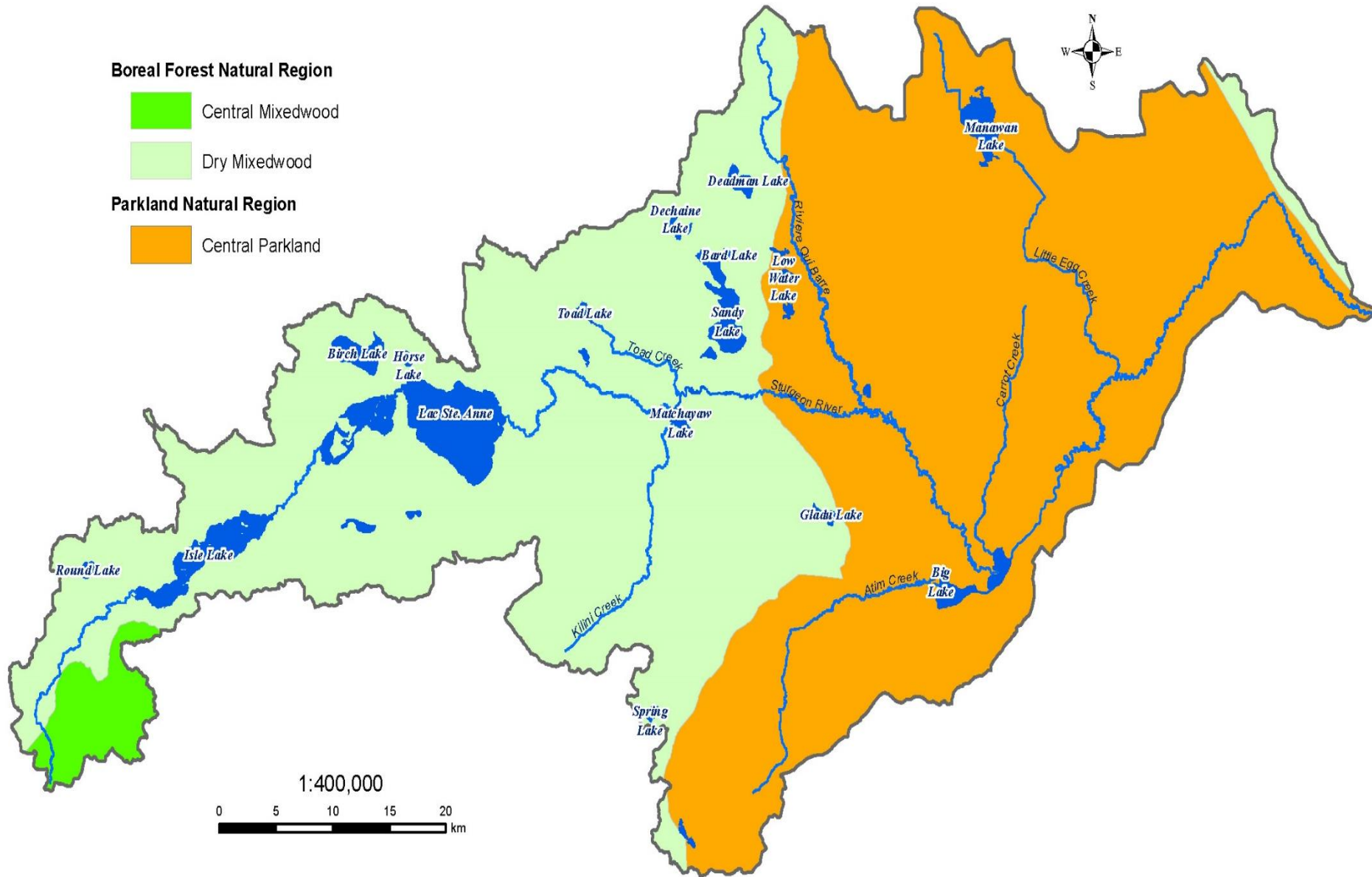


# Sturgeon River Watershed: Municipalities





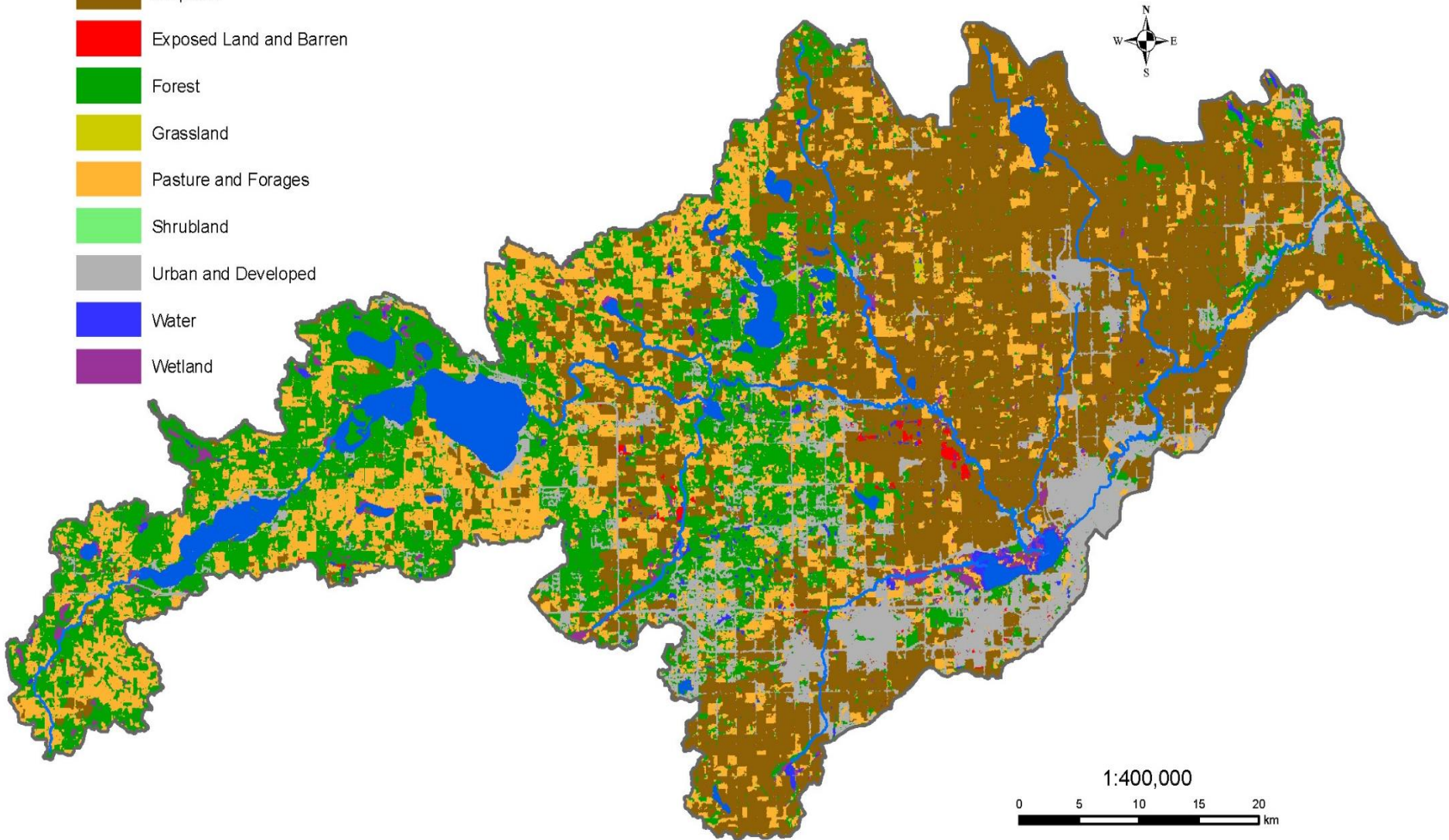
# Sturgeon River Watershed: Natural Regions





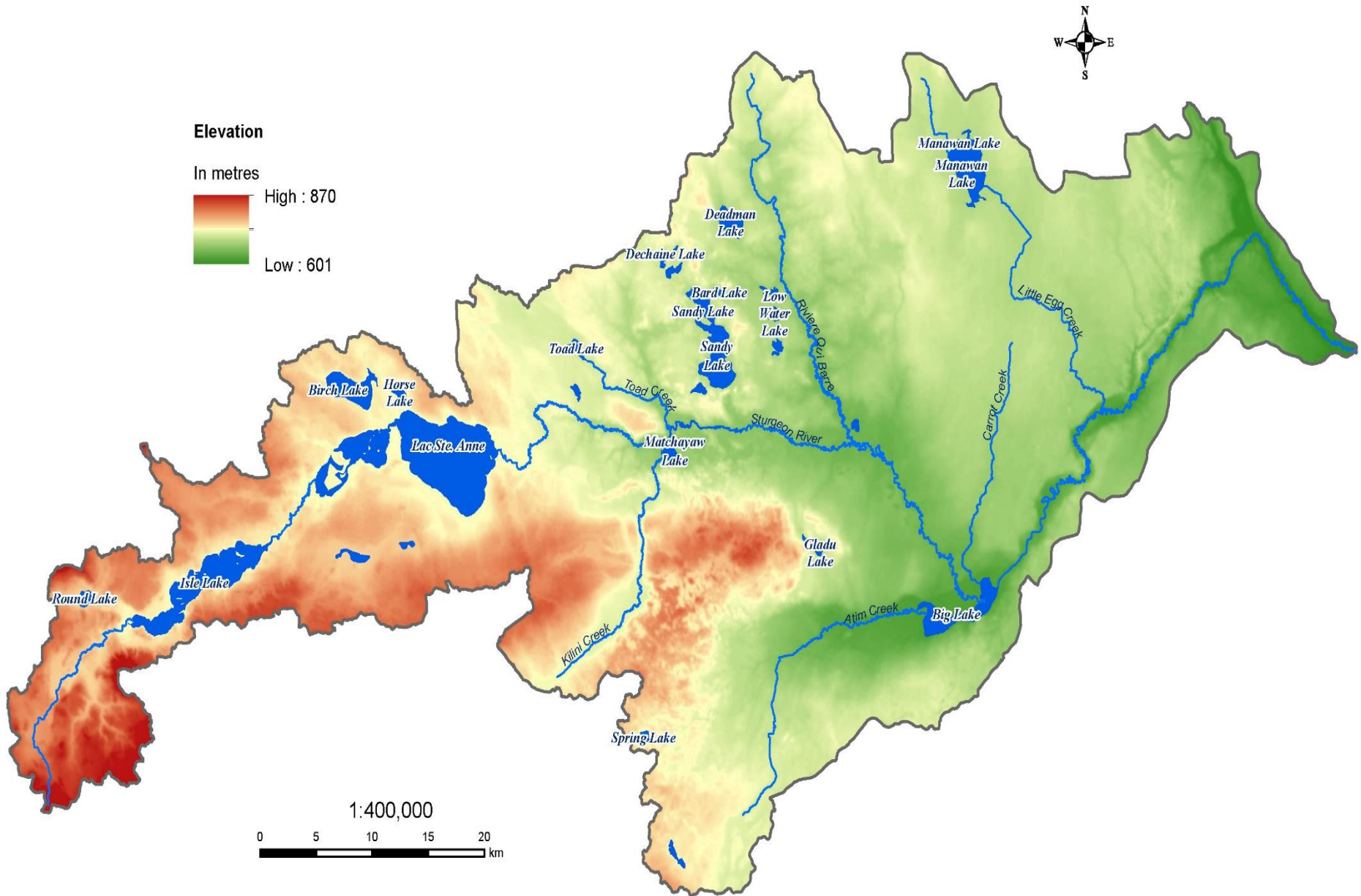
# Sturgeon River Watershed: Land Cover

## Land Cover Class





# Sturgeon River Watershed: Topography

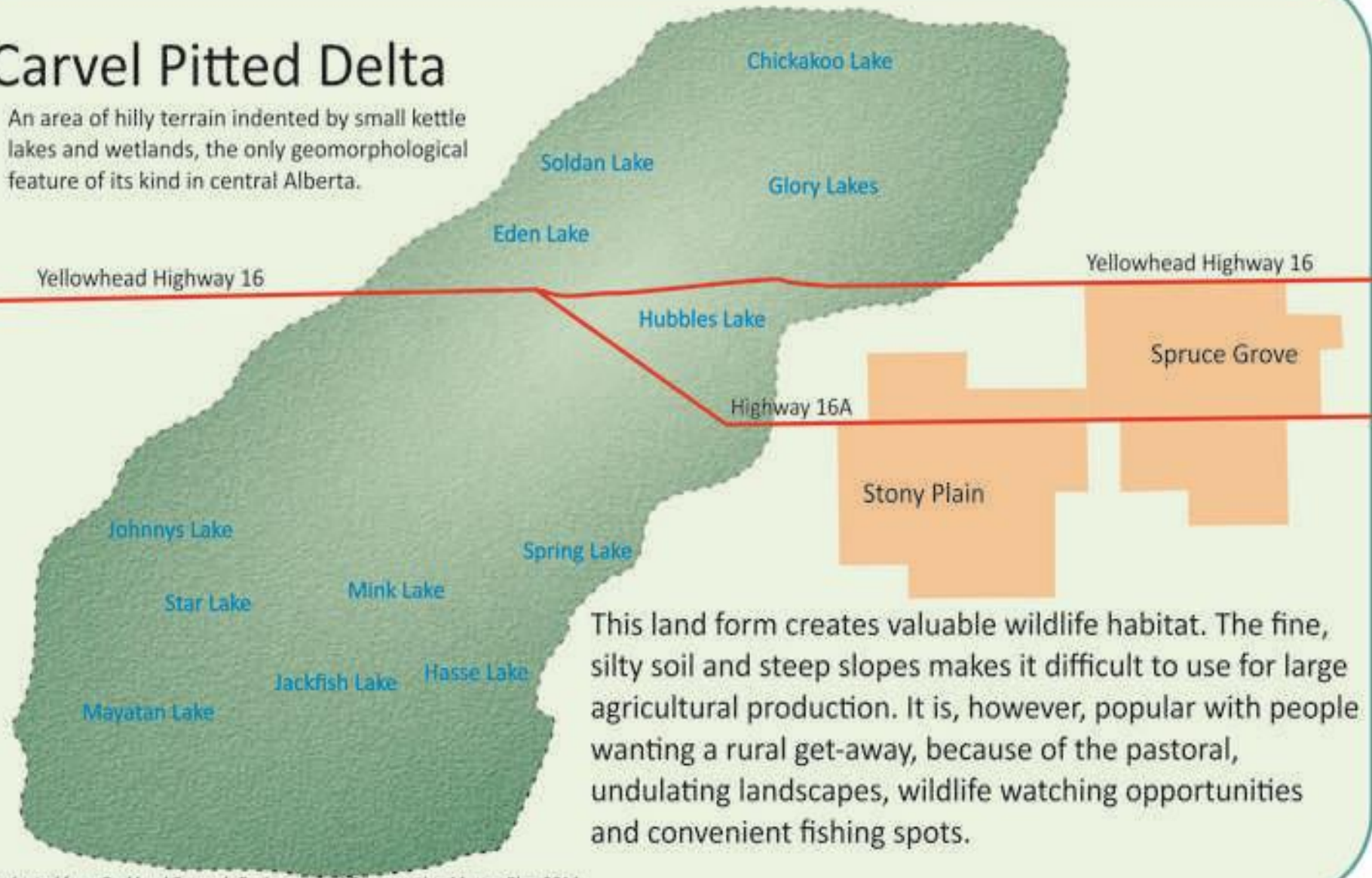




# The Carvel Pitted Delta

## Carvel Pitted Delta

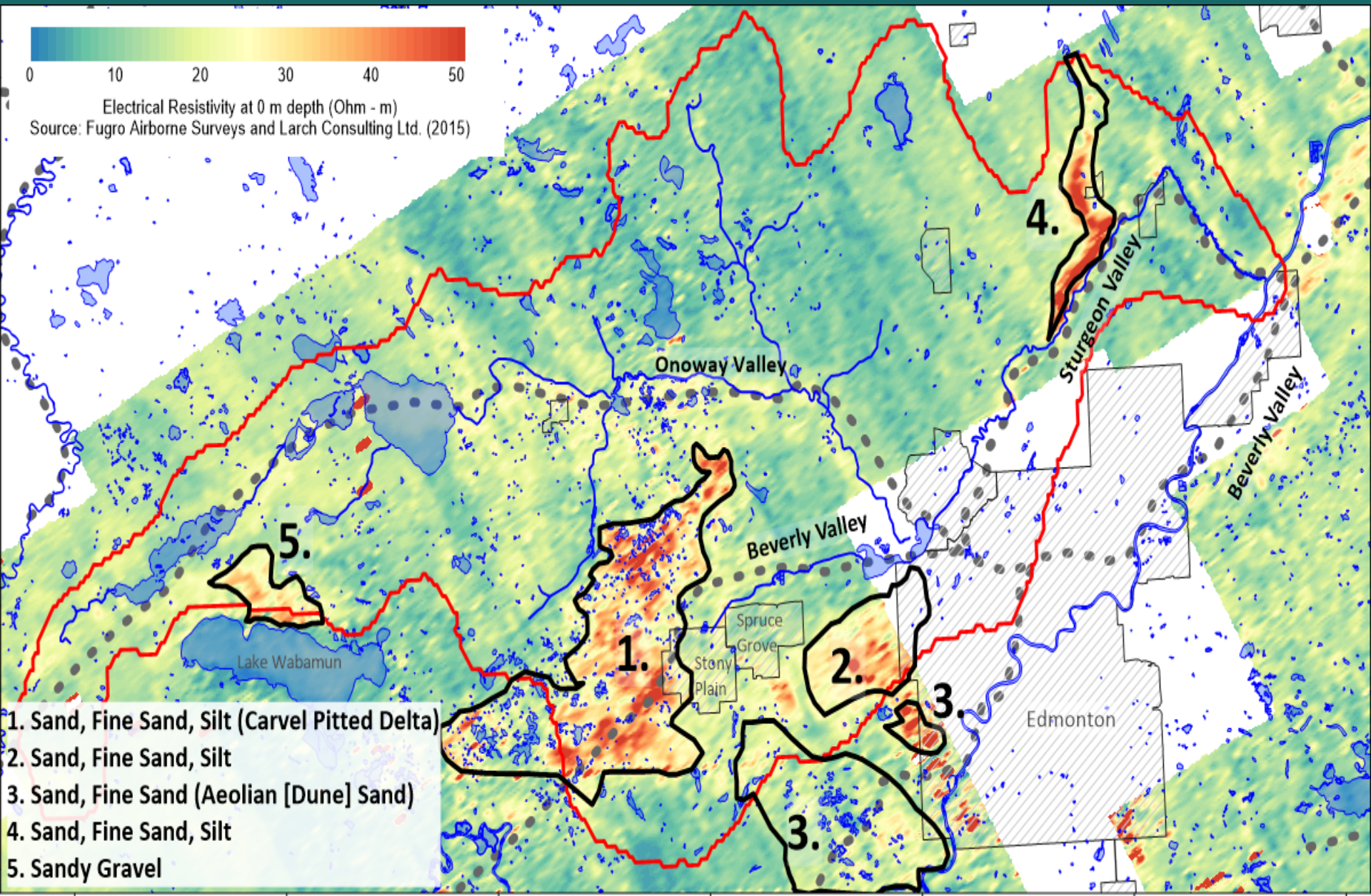
An area of hilly terrain indented by small kettle lakes and wetlands, the only geomorphological feature of its kind in central Alberta.



This land form creates valuable wildlife habitat. The fine, silty soil and steep slopes makes it difficult to use for large agricultural production. It is, however, popular with people wanting a rural get-away, because of the pastoral, undulating landscapes, wildlife watching opportunities and convenient fishing spots.



# The Carvel Pitted Delta





# The Carvel Pitted Delta

More information on this post-glacial landform and its unique hydrogeology can be found in the following NSW technical report:

*Summary of Groundwater Conditions in the Sturgeon River Basin (Alex Oiffer, 2019)*

<https://www.nswa.ab.ca/resource/groundwater-conditions-sturgeon-river-basin/>



# Information Review – Spring 2020

- ◆ The total number of small lakes in the Stony Plain region was estimated from 1:50,000 NTS maps (83 G/9, 83 G/8, 83 H/12)
  - 26 small, named lakes were identified on the maps
  - Over 65 small, unnamed waterbodies were also identified
- ◆ Preliminary review of historic water quality data
  - Data for 7 named lakes were published by Prepas and Trew (CJFAS 1983)
  - Some of these 7 lakes were also investigated by U. of A. graduate students in the mid-late 1980s
  - Five named lakes have been sampled by ALMS in recent years
  - 14 named lakes and 65 unnamed waterbodies may not have any water quality or hydrological information



# Named Lakes (26)

- ◆ Atim
- ◆ Bell
- ◆ Byers
- ◆ Cameron
- ◆ Chickakoo\*
- ◆ Cottage
- ◆ Eden\*
- ◆ Gerharts\*
- ◆ Gladu
- ◆ Glory
- ◆ Hasse\*
- ◆ Hubbles\*
- ◆ Jackfish\*
- ◆ Johnny's
- ◆ Kettle
- ◆ Longhurst
- ◆ Mayatan\*
- ◆ Mere
- ◆ Little Mere
- ◆ Mink\*
- ◆ Muir\*
- ◆ Sauer\*
- ◆ Soldan
- ◆ Spring\*
- ◆ Star\*
- ◆ Whale

\*(various/limited WQ data available)



# 2020 Survey Lakes

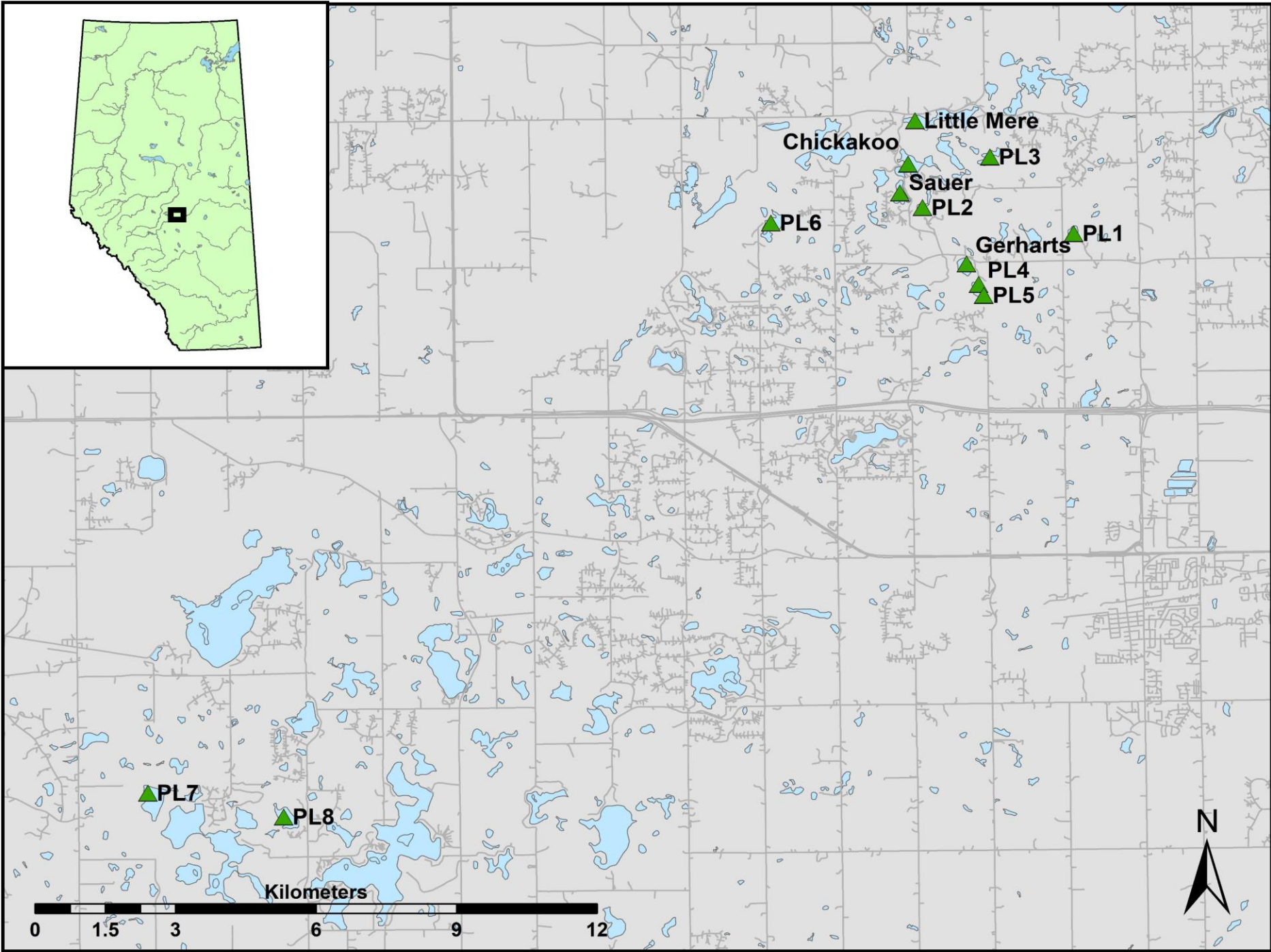
## Named Lakes

- ◆ Gerharts Lake
- ◆ Little Mere Lake
- ◆ Chickakoo Lake
- ◆ Sauer Lake

## Unnamed Lakes

- ◆ PL1 (Lake Idano)
- ◆ PL2 (Pete's Pond)
- ◆ PL3 (Troudt Lake)
- ◆ PL4 (Roi Lake Mid)
- ◆ PL5 (Roi Lake South)
- ◆ PL6 (Kinsey Cove)
- ◆ PL7 (McMorran Lake)
- ◆ PL8 (Neilson Lake)









Sign in

779

Muir Lake Community Alliance Church

Muir Lake Community League & Hall

779

Muir Lake School

779

PL1

779

534

Township Rd 534

Township Rd 534

Township Rd 534

Township Rd 534



Map

Google





Sign in

Byers Lake

Chickakoo Lake Recreation Area

Range Rd 113

Township Rd 535

Township Rd 535

Township Rd 535

Township Rd 535

Township Rd 535

Range Rd 13A

Sauer Lake

Range Rd 13

Mt Carmel Spirituality Centre

Ephphata House

53433-RNG Road 12  
Range Rd 12

PL2

Kathmarcam Estates

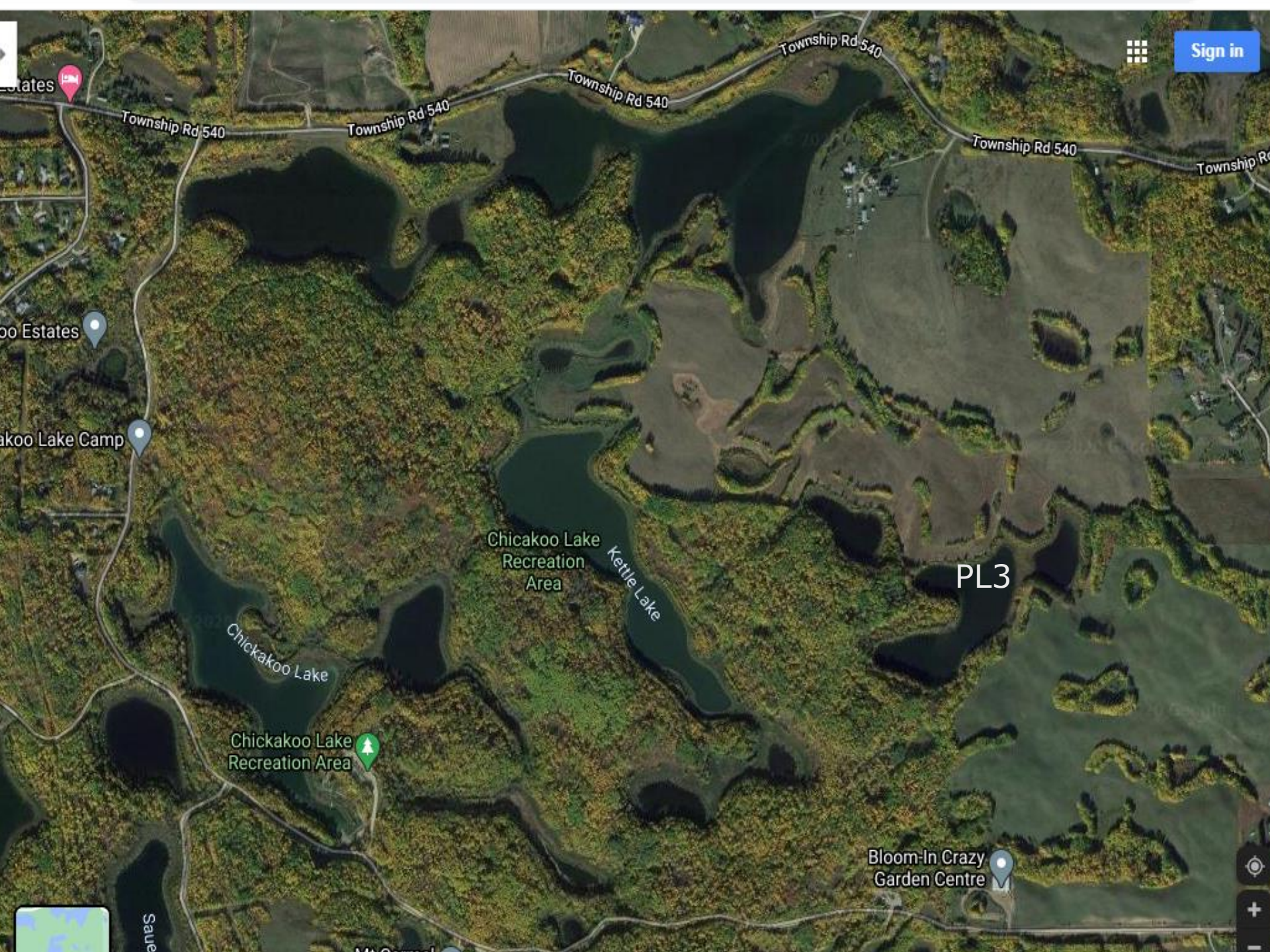
Range Rd 13

Range Rd 13

Google







Sign in

Township Rd 540

Township Rd 540

Township Rd 540

Township Rd 540

Township Rd 540

Township Rd 540

Estates

oo Estates

koo Lake Camp

Chickakoo Lake  
Recreation  
Area

Kettle Lake

PL3

Chickakoo Lake

Chickakoo Lake  
Recreation Area

Bloom-In Crazy  
Garden Centre

Saure

Mo... ..





Sign in

Township Rd 534

Township Rd 534

Township Rd 534

Township Rd 534

Gerharts Lake

PL4

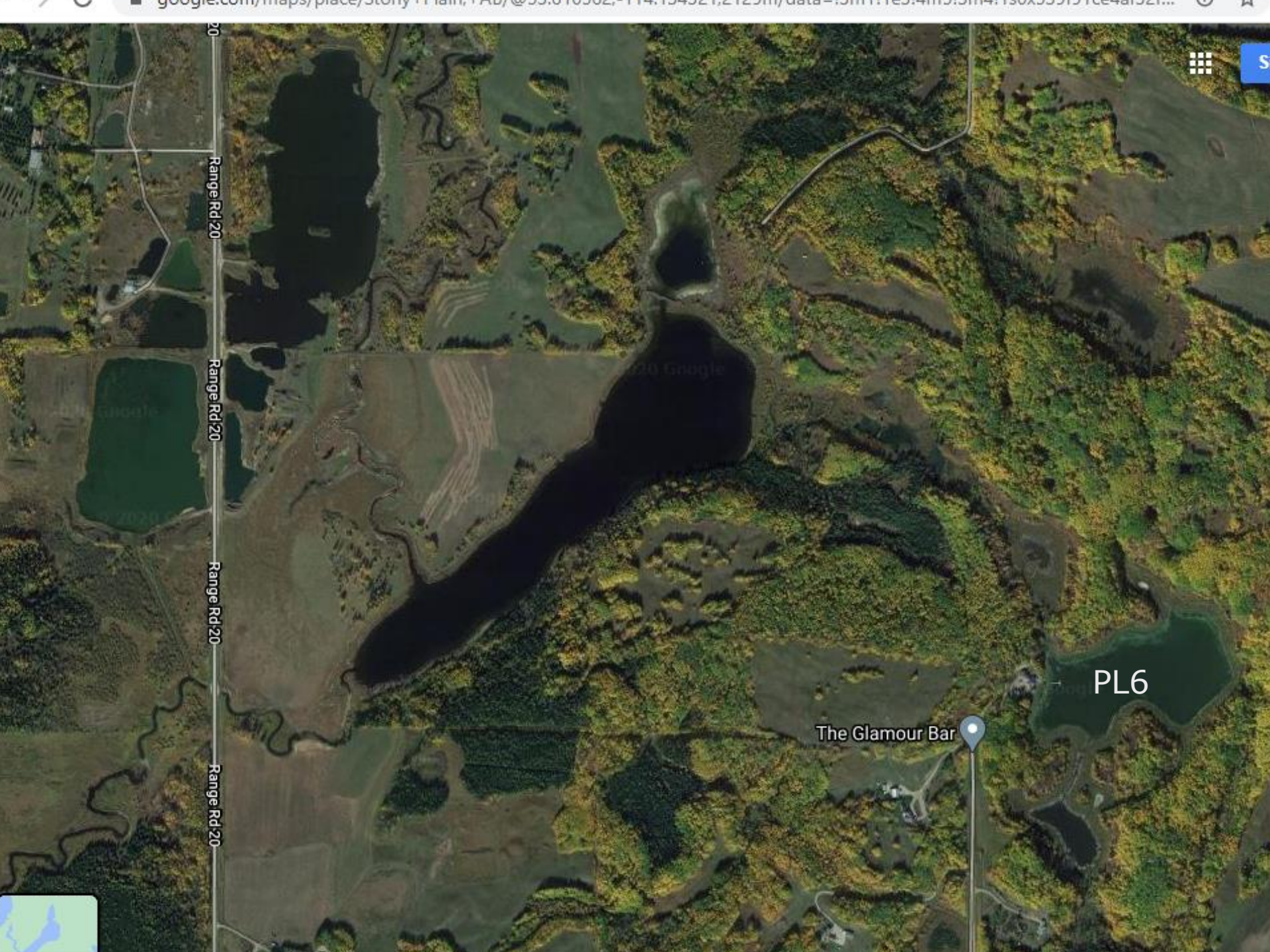
PL5

Google

Map







Range Rd 20

Range Rd 20

Range Rd 20

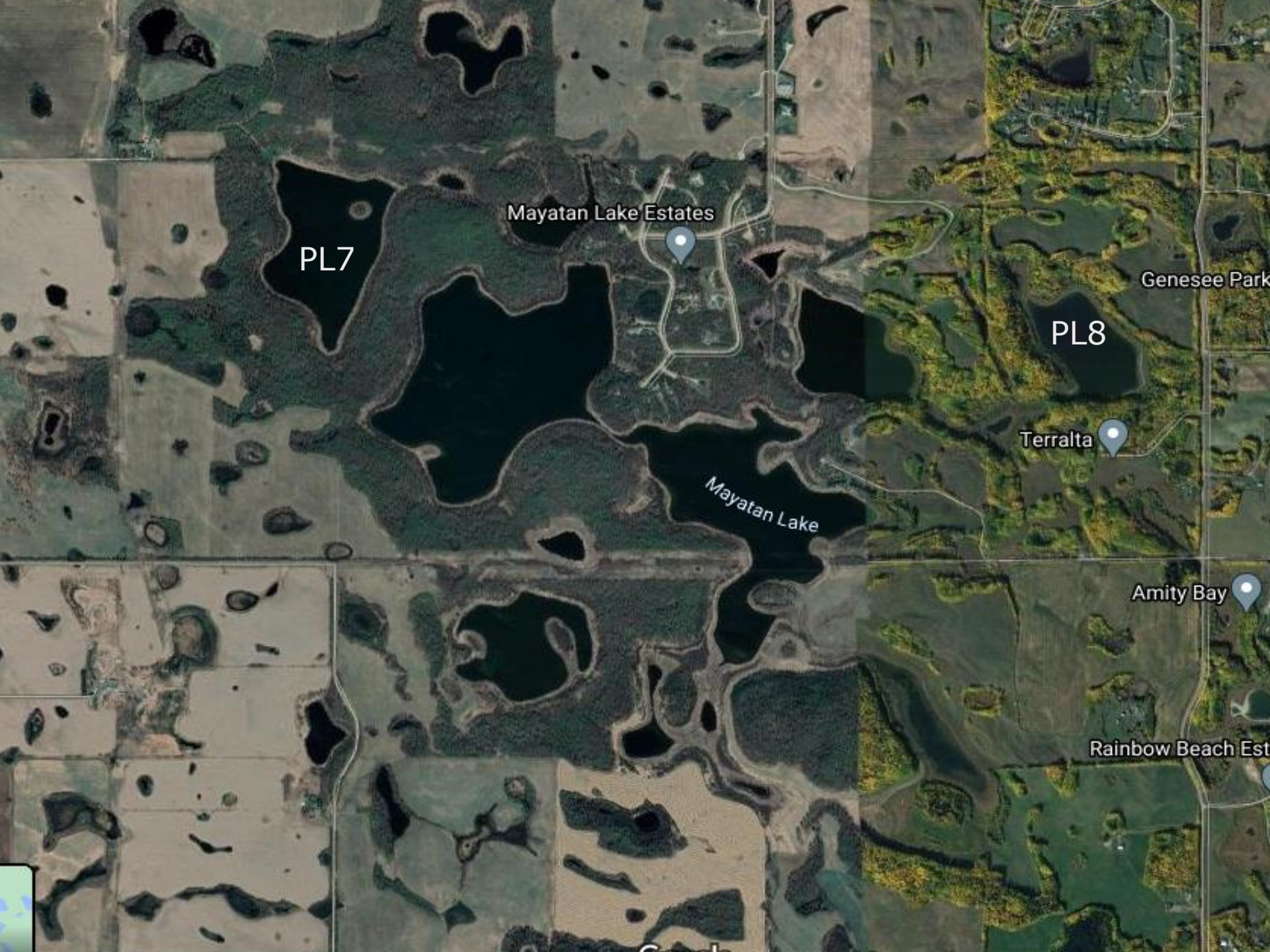
Range Rd 20

Google

The Glamour Bar

PL6





Mayatan Lake Estates

PL7

PL8

Genesee Park

Terralta

Mayatan Lake

Amity Bay

Rainbow Beach Est



# The 2020 Sampling Team:

Alec MacDonald

Dr. Konstantin Von Gunten

Caleb Sinn

David Trew





























 Pelican







Thank you!





# Acknowledgements and Technical Support

- ◆ Alberta Lake Management Society
  - LakeKeepers Program (Caleb Sinn, Brad Peter)
- ◆ University of Alberta
  - Dr. Dan Alessi, Dr. Konstantin Von Gunten
- ◆ Volunteers and Contributors
  - Alec MacDonald, Walt Neilson, Jennifer Regier, Eric Neilson, Mike Myshak, Alex Oiffer
  - Field logistics, data prep, mapping, photos, technical advice



# The 2021 Lake Survey Project

- ◆ Late winter [DO] surveys conducted on 18 lakes
- ◆ Refer to project outline for summer plans (~25 lakes)
- ◆ Funding and in-kind support received from
  - Land Stewardship Centre of Canada
  - Alberta Lake Management Society
  - Stony Plain Fish and Game Association
  - Mayatan Lake Management Association
  - North Saskatchewan Watershed Alliance



# Photos of the study lakes



PL1 Idano









# PL2 Pete's Pond

















# Little Mere Lake (west basin)

















# PL3 Trout Lake













# Sauer Lake













# Chickakoo Lake













# Gerharts Lake





















# PL4 Roi Lake Middle













# PL5 Roi Lake South













# PL6 Kinsey Cove













# PL7 McMorran Lake













# PL8 Neilson Lake













A few local inhabitants































# Preliminary Results and Observations

Please refer to MLMA website for 2020 water quality results:

<https://www.mayatanlake.ca/files/DTrewpres.pdf>



# Historic Lake Level Trends

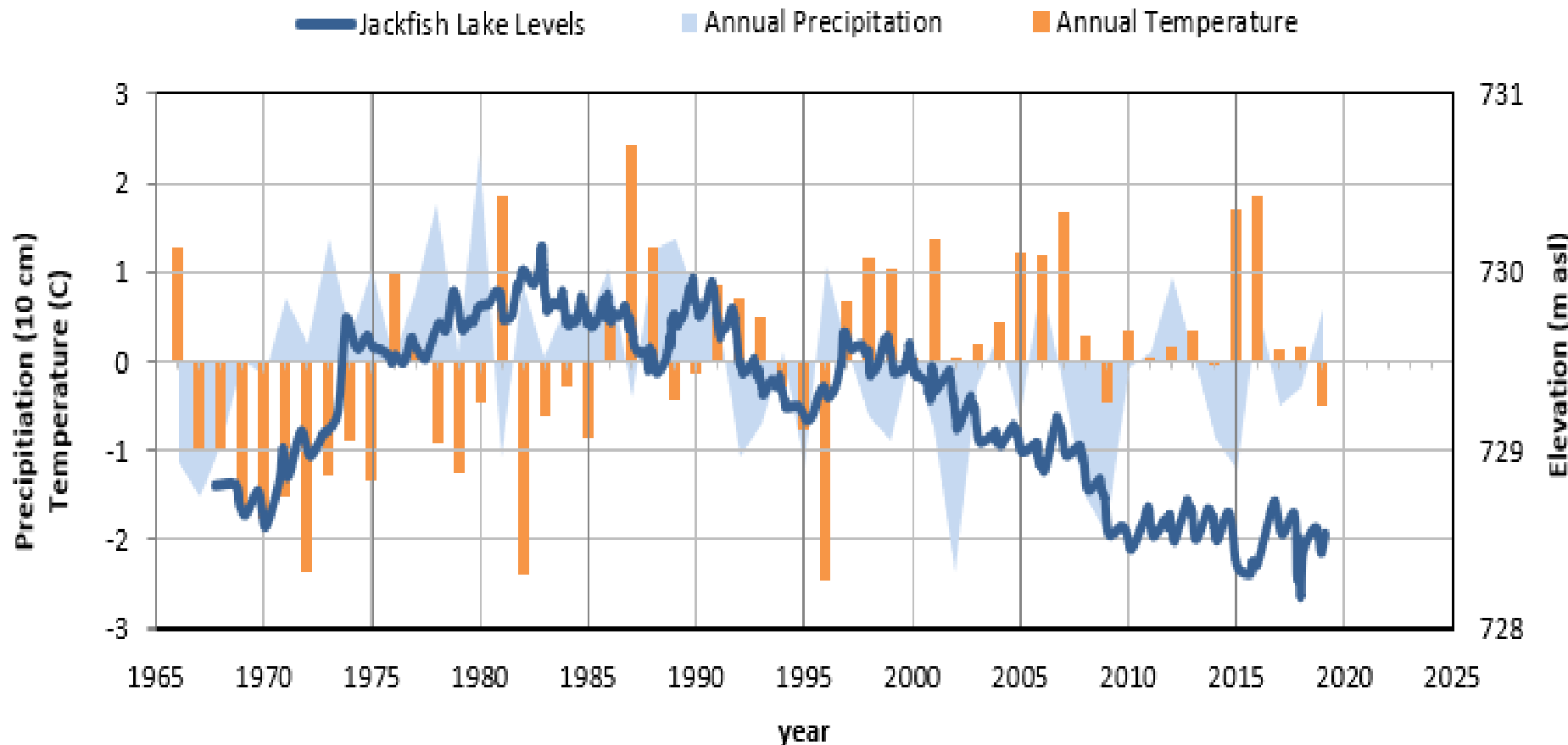
- ◆ Eight small lakes in the region have long-term hydrometric stations (1968-2020) managed by AEP
- ◆ When plotted on a comparative scale most lakes displayed similar trends over the period of record:
  - Lake levels increased from the late 1960s to the late 1980s
  - The 1990s appear to be a transitional period
  - Lake levels have declined since the early 2000s
- ◆ Actual levels (illustrated for Jackfish Lake) also reflect precipitation and temperature data recorded at the ECCC Weather Station in Stony Plain.
  - The 1960s to 1980s were somewhat cooler and wetter
  - The 2000s have been warmer and drier
- ◆ Spring Lake has a longer period of record and shows an earlier decline in lake levels - from the late 1930s to the late 1960s







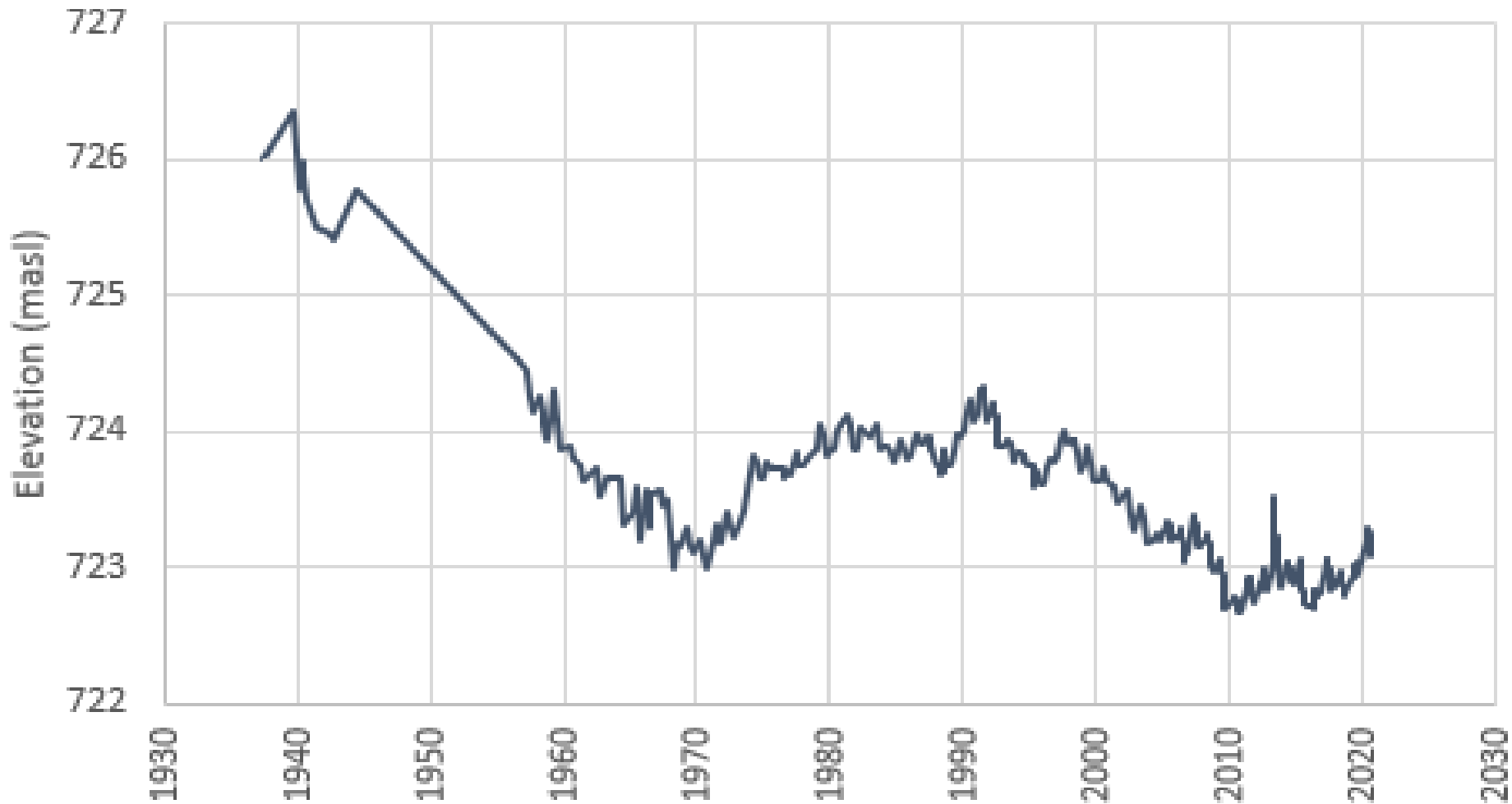
# Lake Level Trends at Jackfish Lake Compared with Climate Data (1968-2020)





# Lake Level Trends at Spring Lake (1937-2020)

Spring Lake





# Suggested Next Steps

- ◆ Sample lakes in February/March 2021 to evaluate oxygen conditions and winterkill risk
- ◆ Expand survey of small lakes during summer 2021 and upgrade the existing water quality data base
- ◆ Summarize available information on watershed conditions and hydrology
- ◆ Continue to promote public education and lake stewardship



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Thanks again!

