

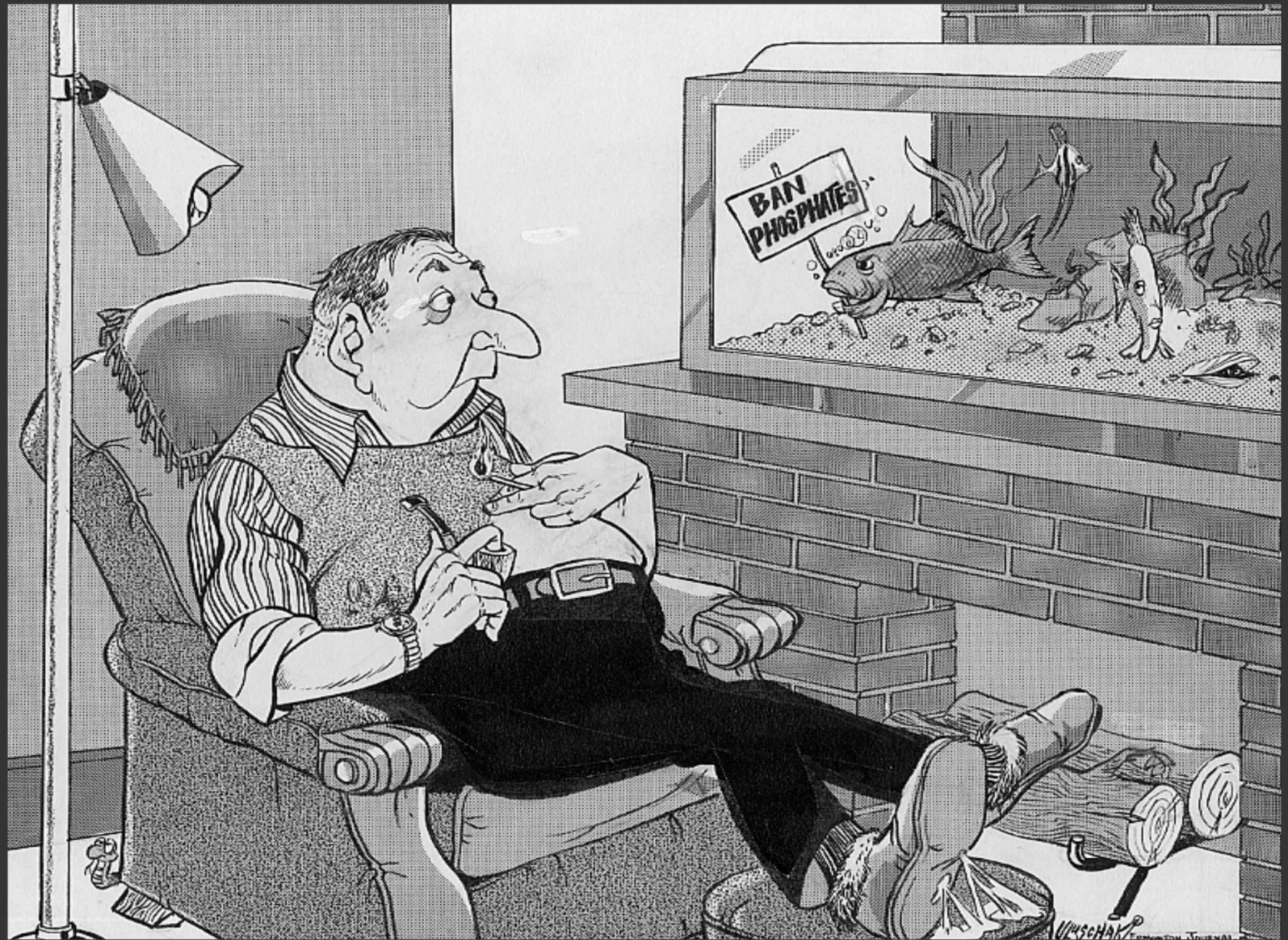
# **Lakes of the Carvel Pitted Delta -Stony Plain Region-**

**Presented to the MLMA  
November 26, 2023  
David Trew**



# Key messages

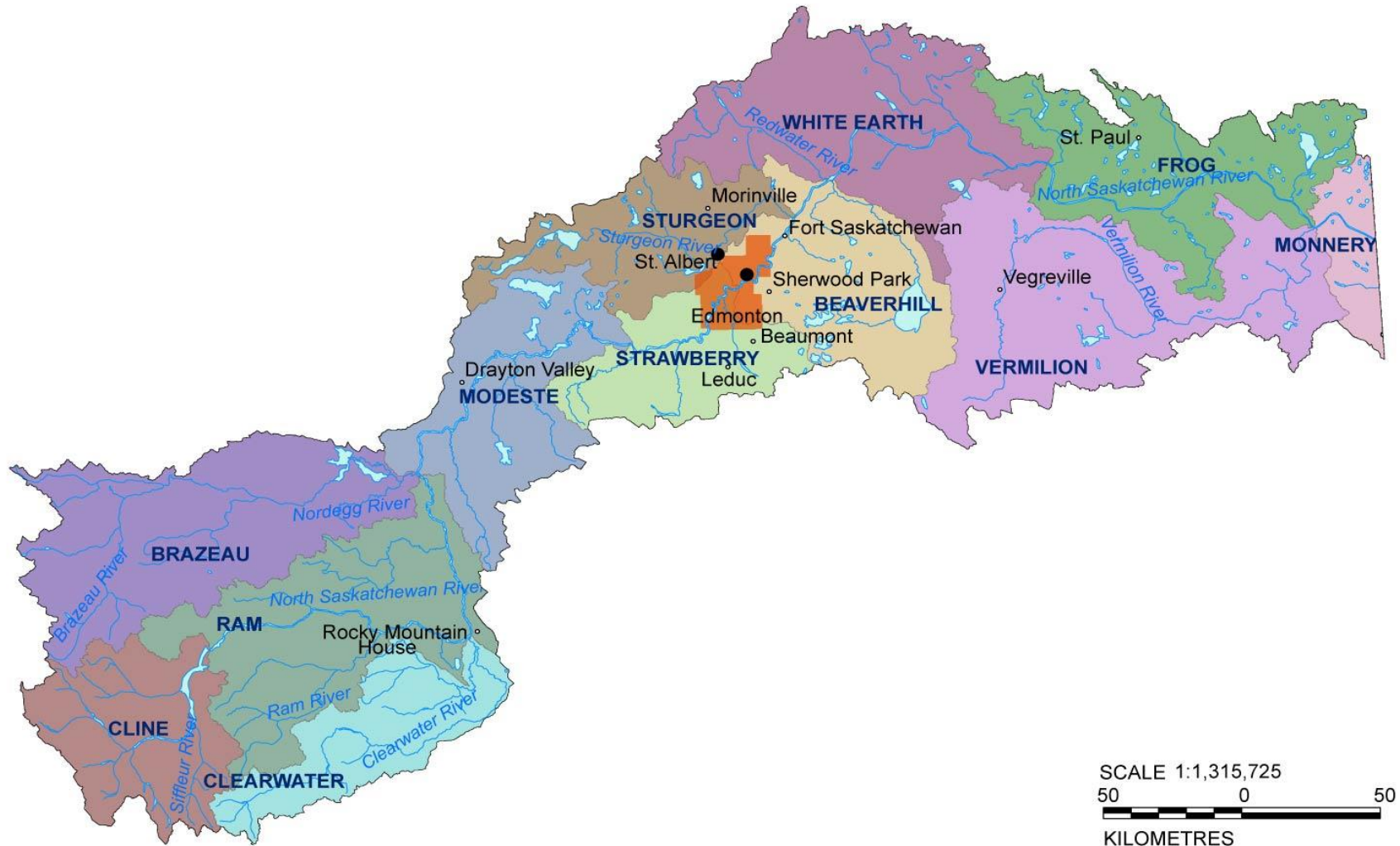
- ◆ We have a unique “small lake district” in Parkland County – promote it, protect it
- ◆ 26 “named” lakes, 70+ “unnamed” lakes
- ◆ Observations on 77 lakes sampled between 2020-2023 indicate a very wide range of water quality conditions, sizes, depths and the degree of human impact – privilege
- ◆ Includes 15 oligotrophic lakes and 13 mesotrophic lakes
- ◆ Landowners (50+) have been very helpful and have been good stewards of the lakes
- ◆ Historic studies acknowledged



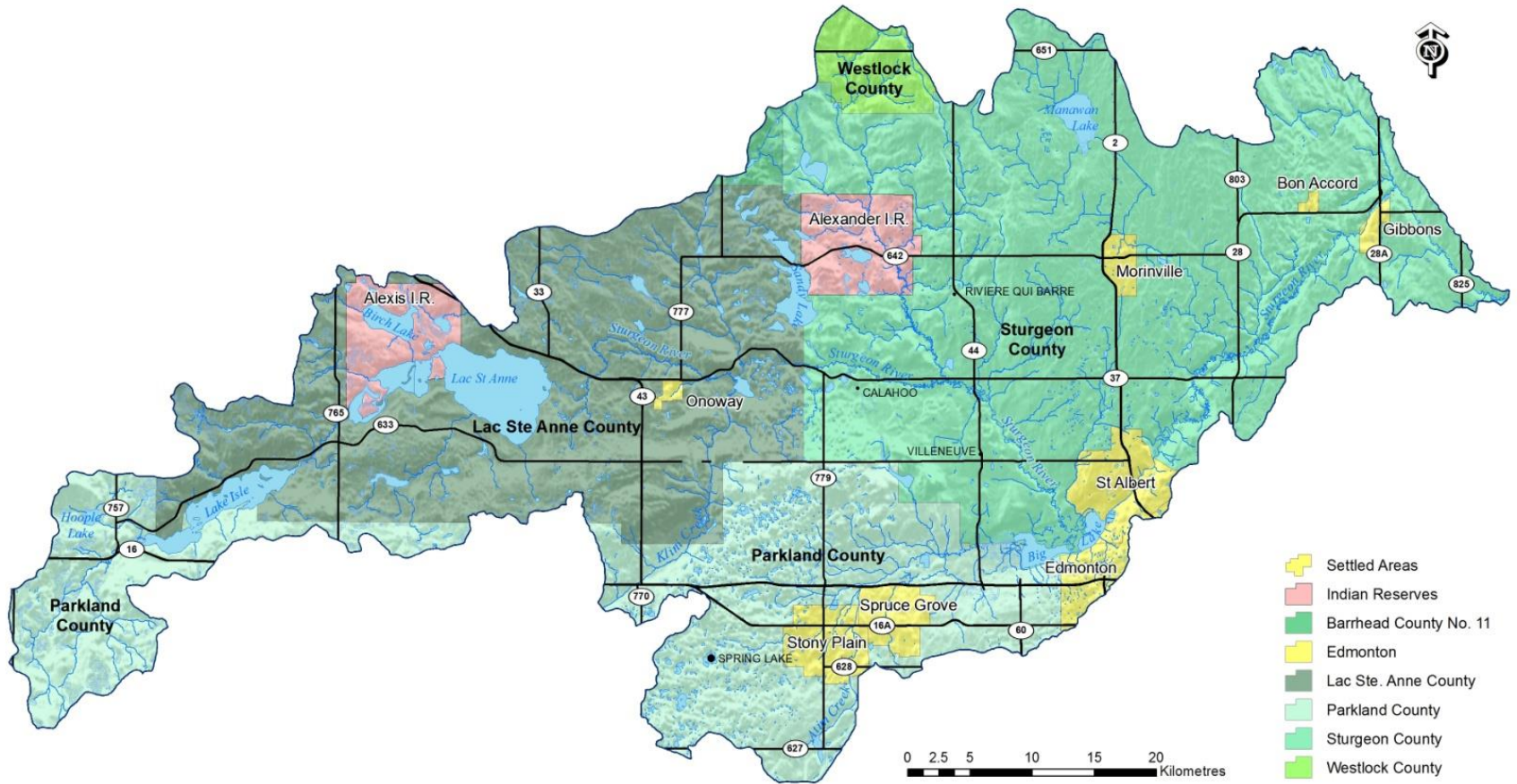
For more information on this project  
please go to the ALMS web site

- Look under “Programs”
- “Lakes of the Carvel Pitted Delta”
- Summary Report - 2021 Lake Survey Project
- Summary Report - 2022 Lake Survey Project
- Photo slideshow of lakes
- Drone video produced by Dave Mussell
- 2023 Report – in preparation
- <https://alms.ca/carvel-pitted-delta/>

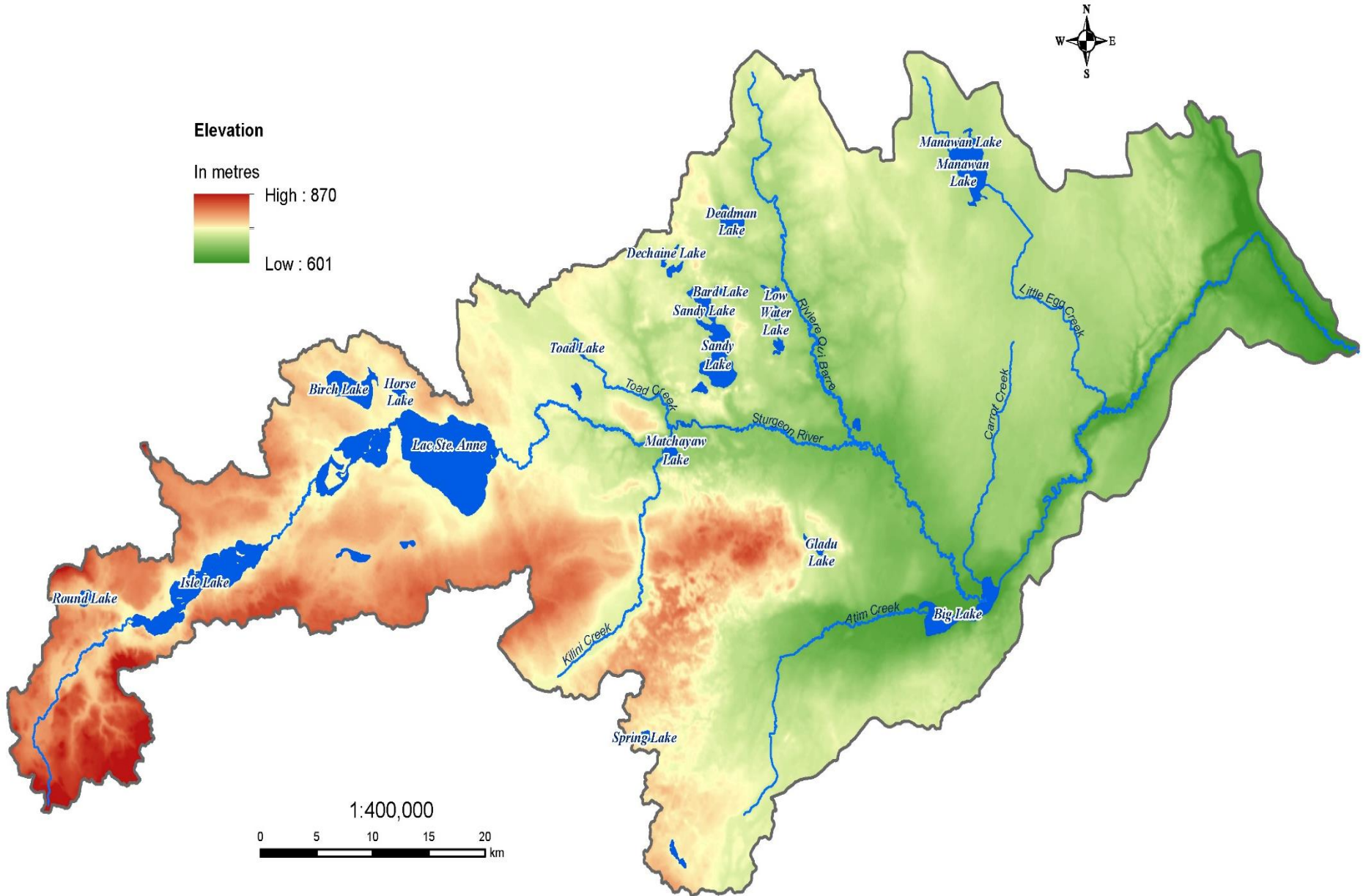
# The North Saskatchewan River Basin: Twelve Subwatersheds



# Sturgeon River Watershed: Municipalities



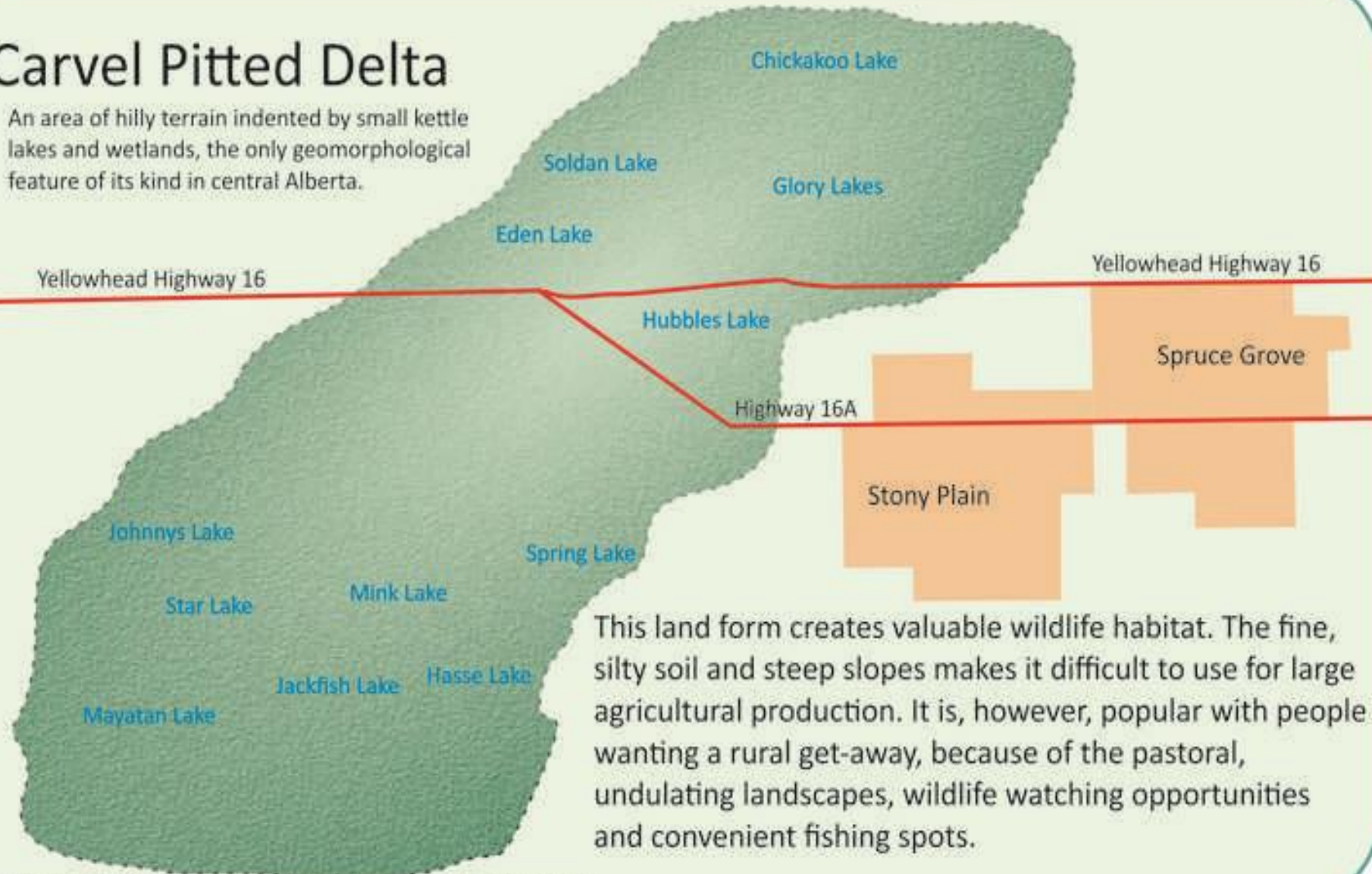
# Sturgeon River Watershed: Topography



# The Carvel Pitted Delta: Local Geography

## 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”

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/>

# 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

# Carvel Lakes: Project Origins

- The collaboration between NSW and local lake communities began in 2011 with a request for assistance from MLMA
- A landowner requested help in assessing a lake on their family property in 2018



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



**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**

June 2018



The Carvel Lakes project began with an introduction to “Lake Idano” in July 2018...

















“Idano Lake” was sampled for the first time in Aug 2019. The nutrient and algal concentrations were surprisingly low

(TP = 7 ug/L)

Oligotrophic

# October 2019: Spring fed?

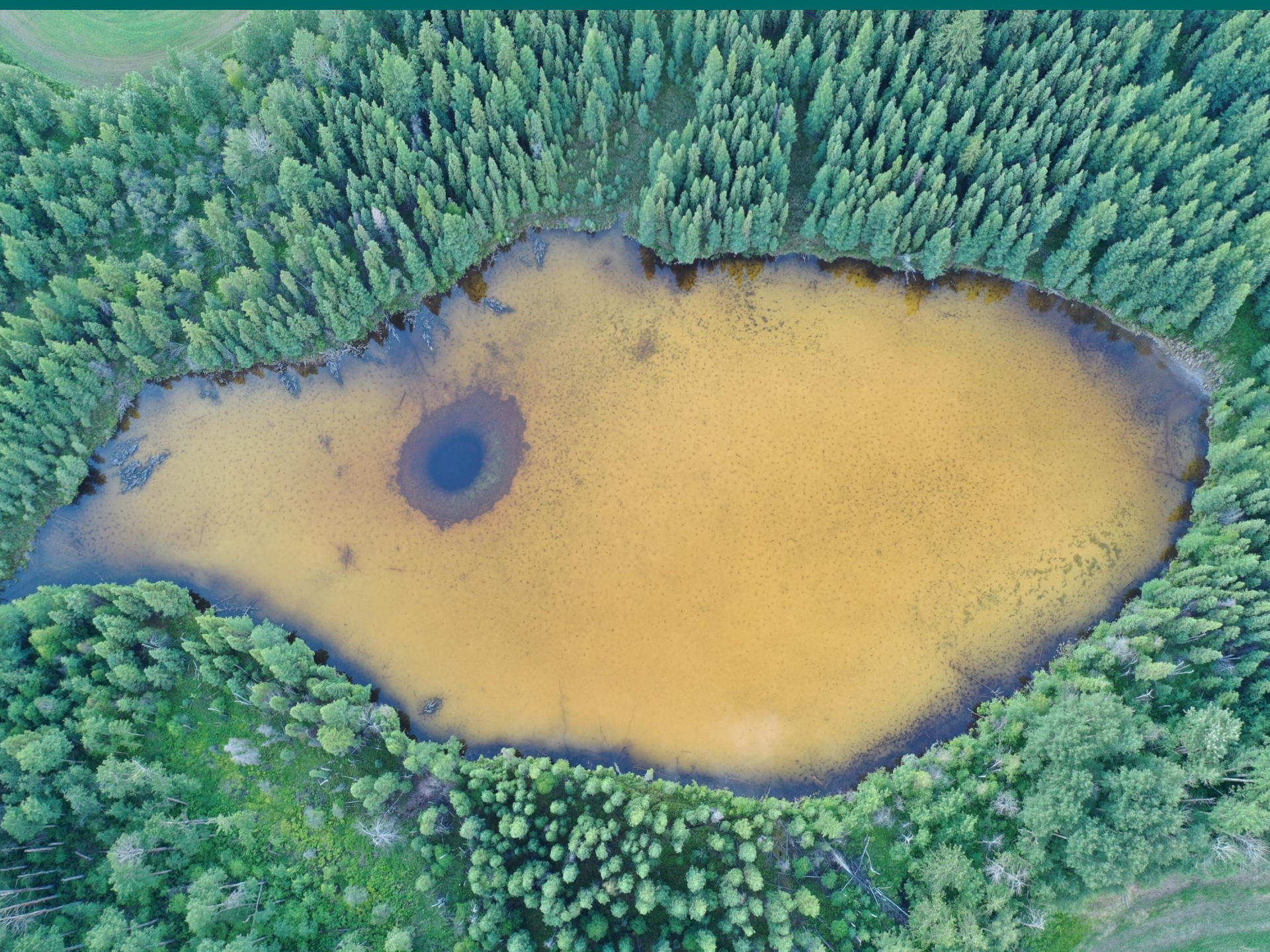






Satellite and 2020 drone images confirmed that the lake was fed by three upstream “fens”









Question:

Are there other similar lakes in the Stony Plain Region?















# The 2020 LakeKeeper Project: (ALMS, U of A) 12 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)

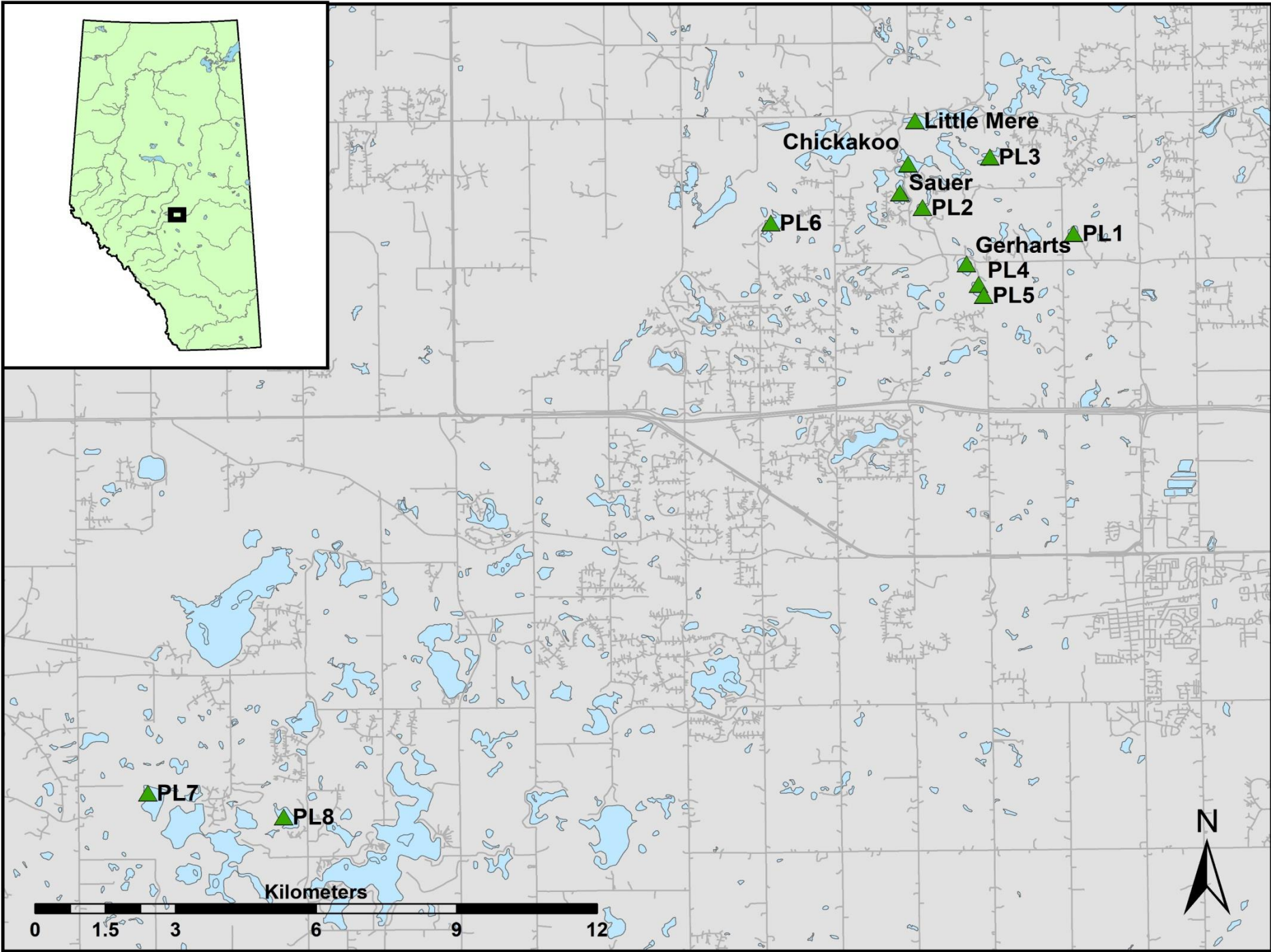
# The 2020 Sampling Team:

Alec MacDonald

Dr. Konstantin Von Gunten

Caleb Sinn

David Trew



















# Photos of the 2020 study lakes

PL1 (Idano)



# PL2 (Pete's Pond)



# PL3 (Troudts Lake)



# Gerharts Lake



# PL4 (Roi Lake Middle)





# PL5 (Roi Lake South)



# PL6 (Kinsey Cove)



# Little Mere Lake (west basin)

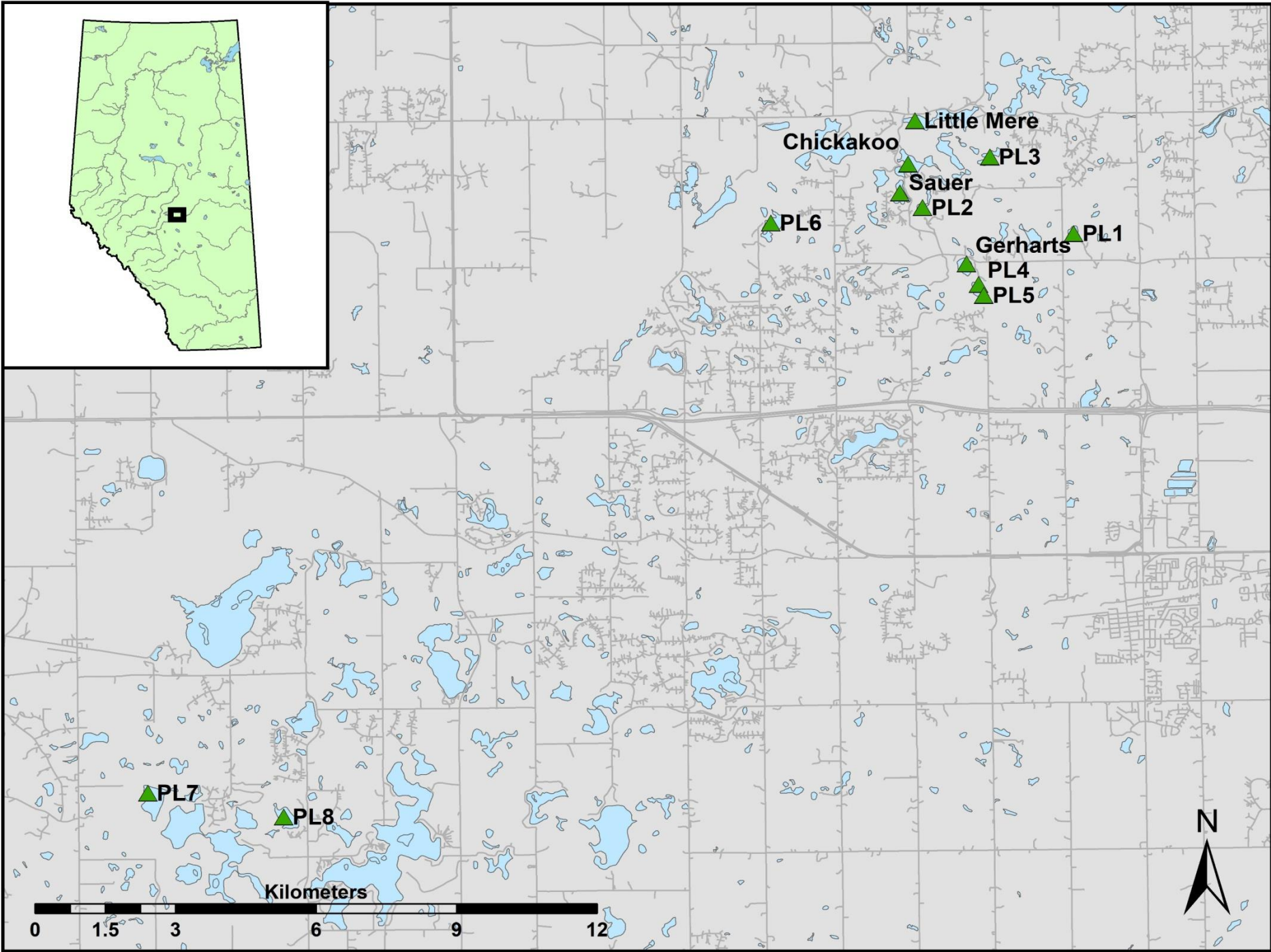


# Sauer Lake



# Chickakoo Lake





# PL7 (McMorran Lake)



# PL8 (Neilson Lake)







## New Scientific Publication:

K. Von Gunten, D. O. Trew, B. Smerdon and D. S. Alessi. (2022). Natural phosphorus controls in small lakes in central Alberta, Canada. *Canadian Water Resources Journal*.

2021

Regional Survey: 44 Lakes

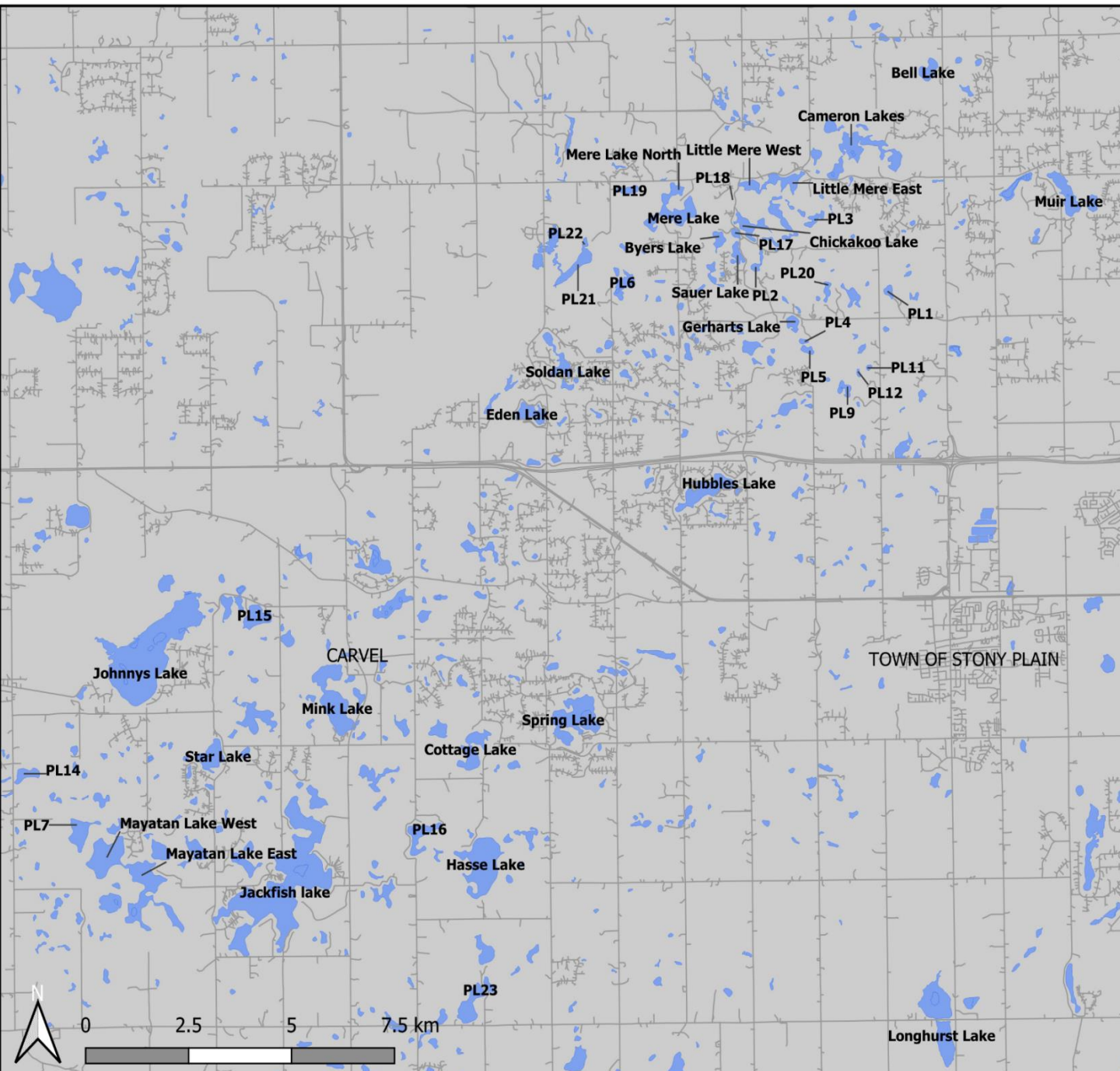
MLMA received support from  
LSCC, SPFGA, ALMS, NSWA,  
U. of A.

# Carvel Pitted Delta Survey 2021 Report

## Sample Sites

### Legend

- Roads
- Waterbodies



NAD83 / Alberta 10-TM (Forest)

# The 2021 Sampling Team:

Pauline Molnar

Walt Neilson

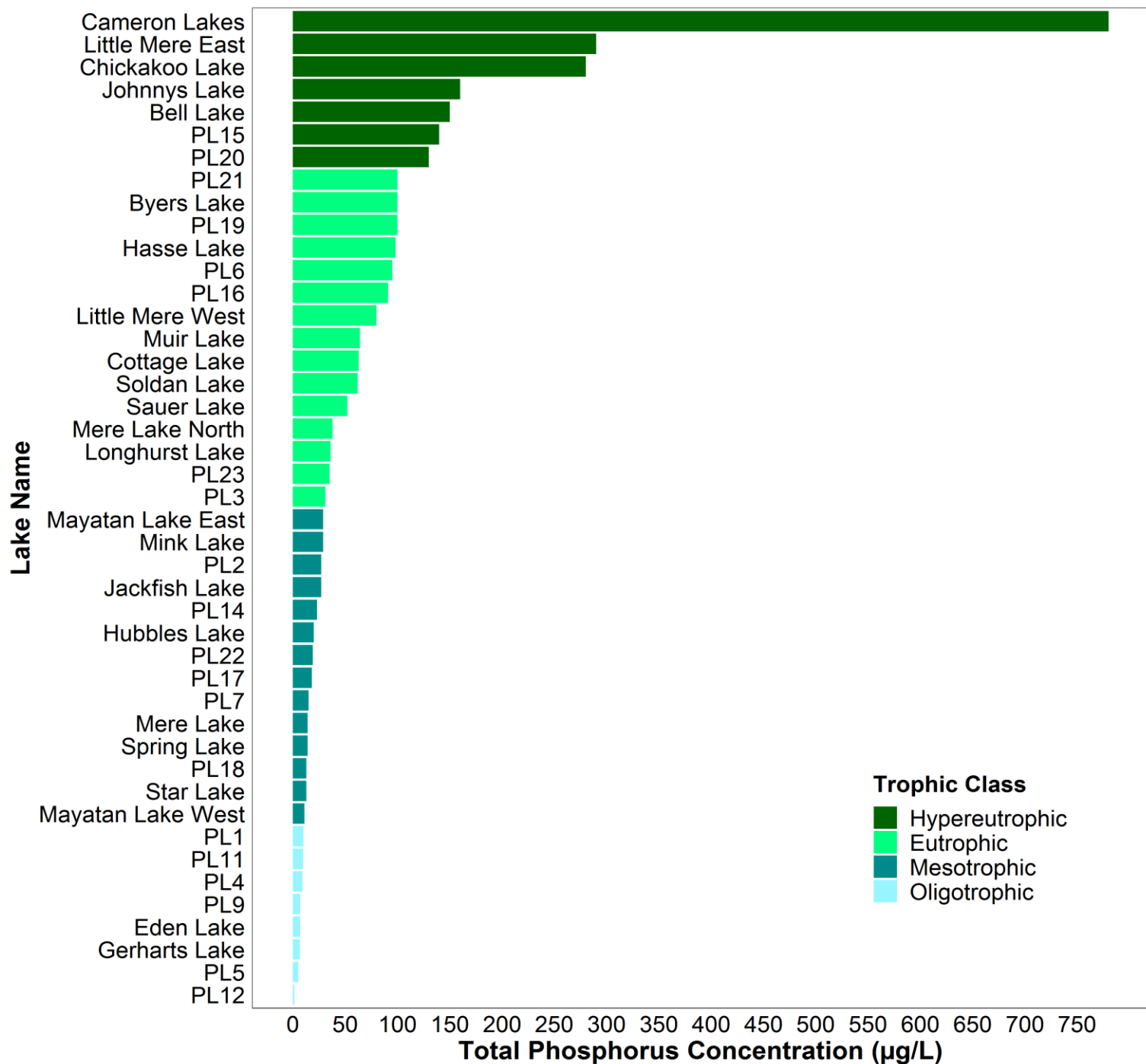
David Trew

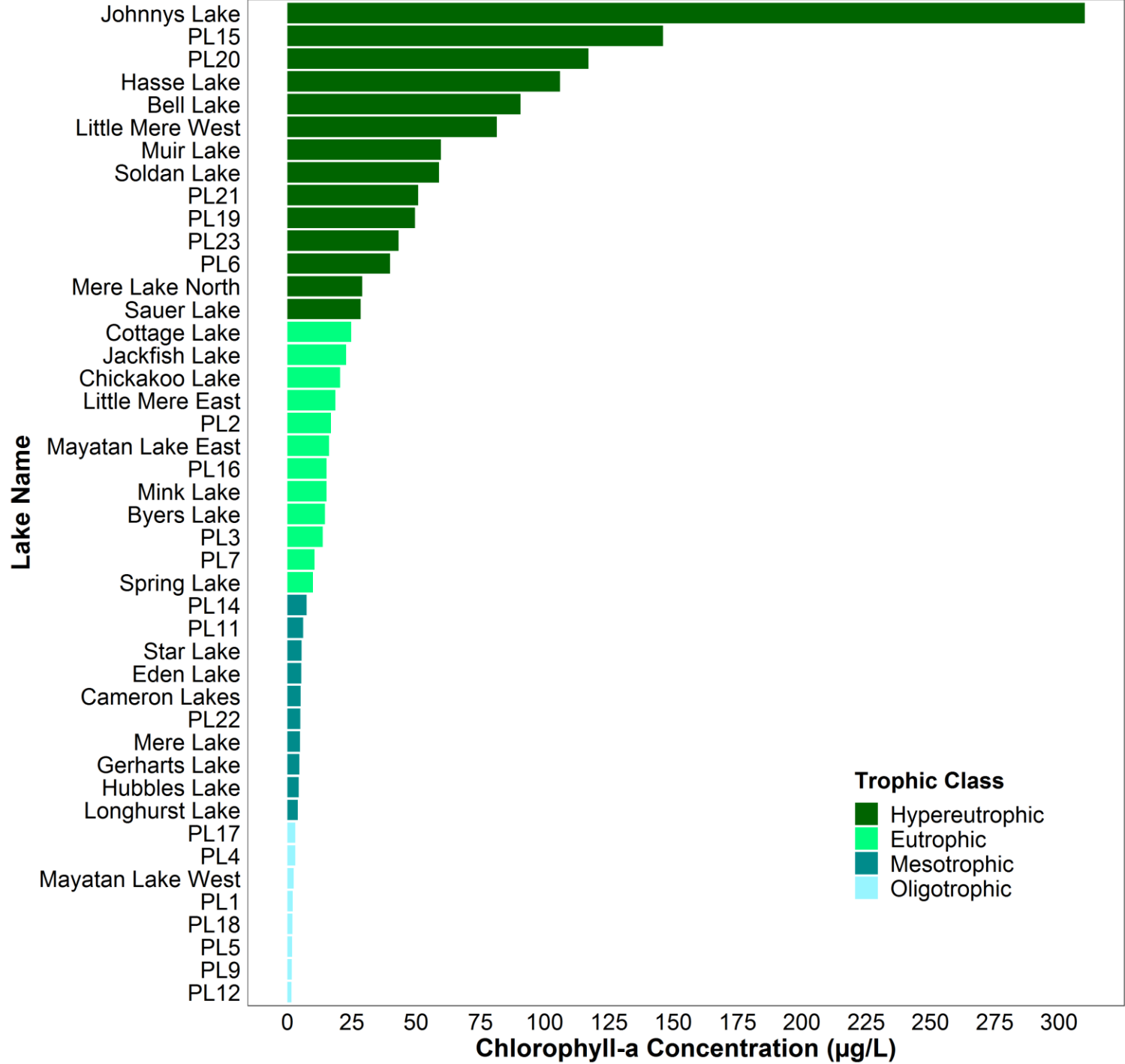












# Carvel Pitted Delta Survey 2021 Report

## Surface Total Phosphorous

### Legend

— Roads

Waterbodies

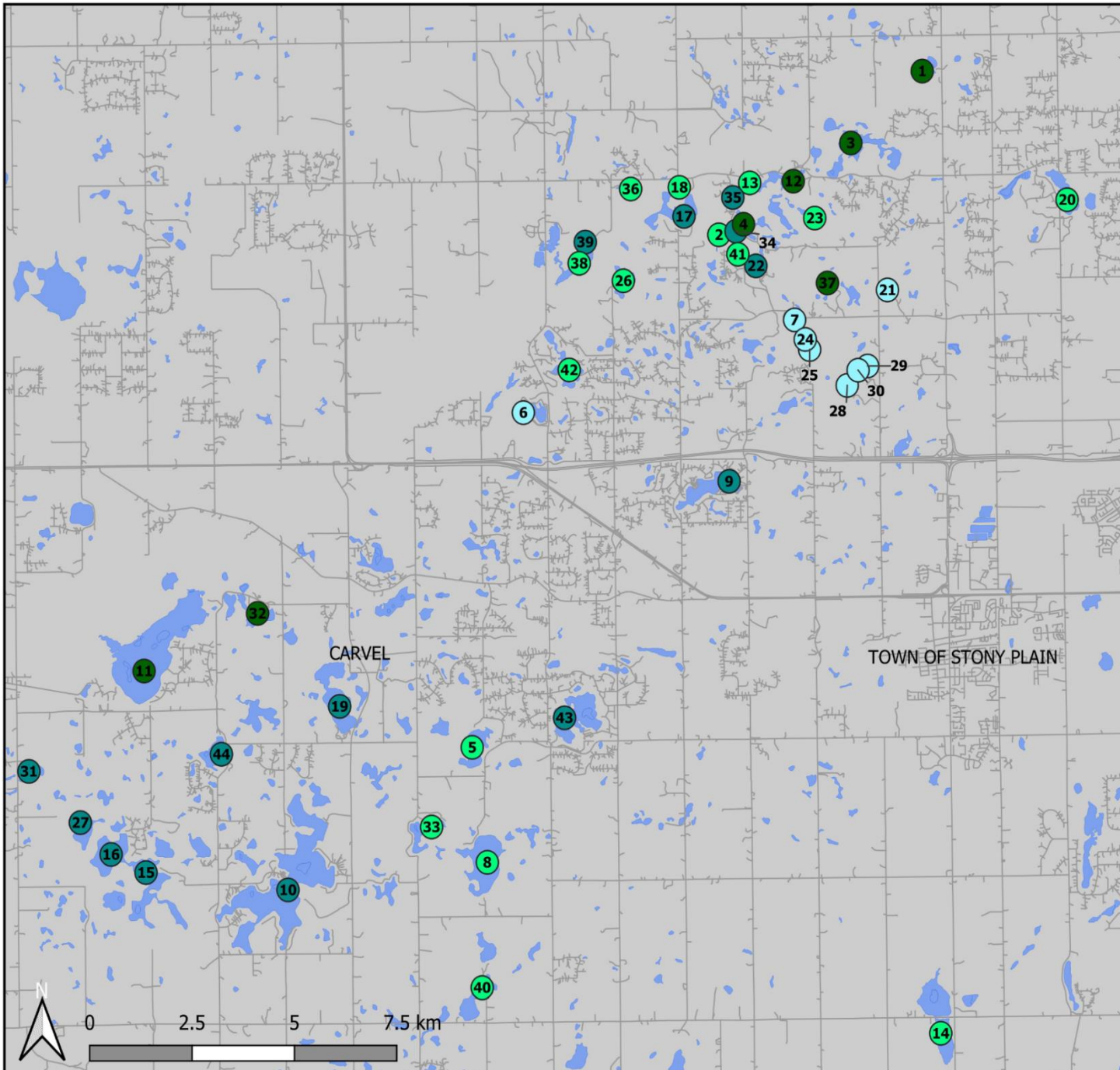
Surface Total Phosphorous ( $\mu\text{g/L}$ )

0 - 10

10 - 30

30 - 100

100 - 780



NAD83 / Alberta 10-TM (Forest)

# Carvel Pitted Delta Survey 2021 Report

## Chlorophyll-a Concentration

### Legend

Roads

Waterbodies

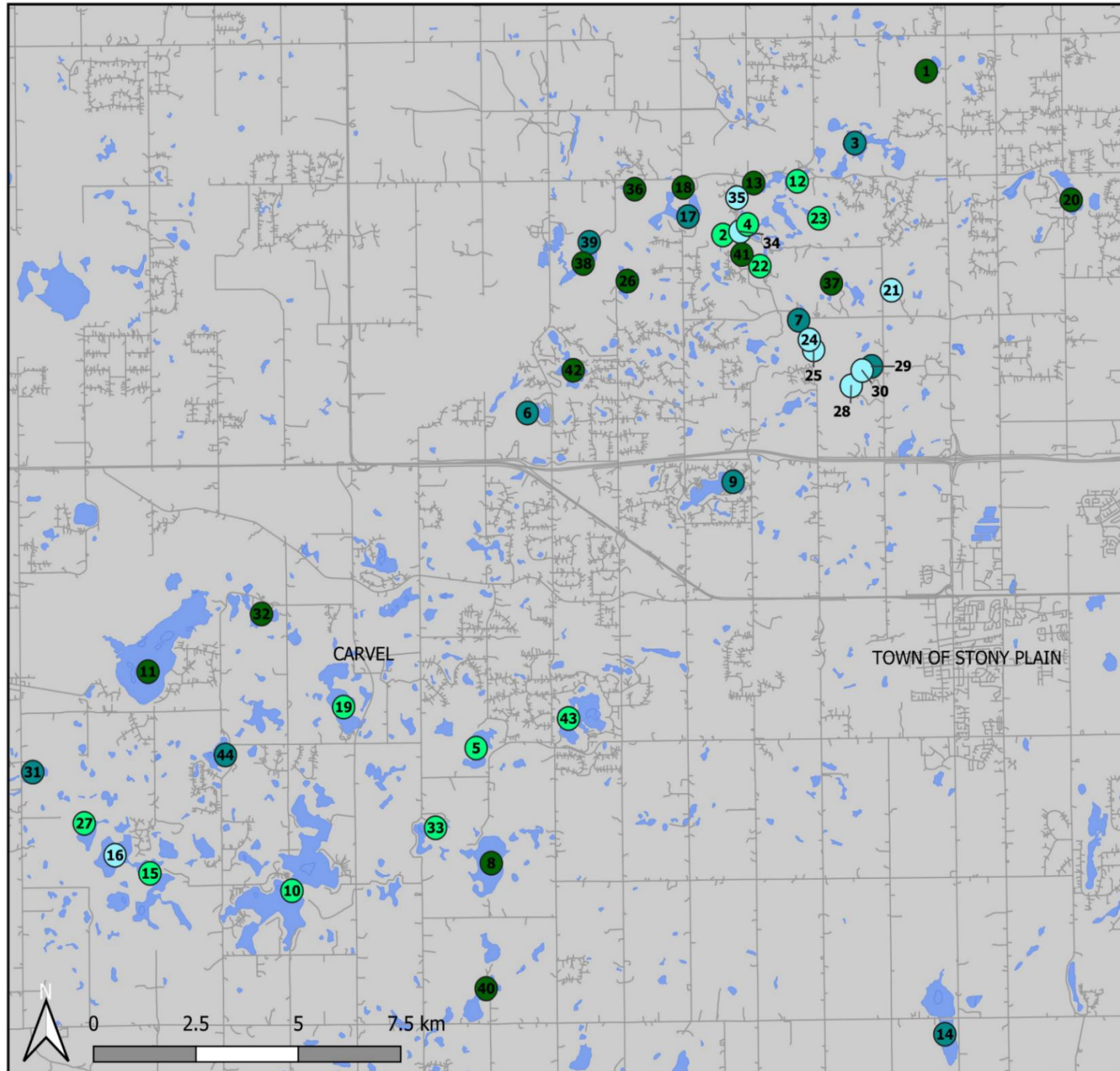
Chlorophyll-a Concentration ( $\mu\text{g/L}$ )

0 - 3.5

3.5 - 9

9 - 25

25 - 310



NAD83 / Alberta 10-TM (Forest)

2022

Expanded Regional Survey:  
50 Lakes

MLMA received support from  
LSCC, SPFGA, ALMS, NSWA.  
Parkland County, U. of A.

# Enhanced Scope of Sampling - 2022

- ◆ Bathymetry
- ◆ Groundwater Study - Isotopes
- ◆ Aquatic Invasive Species
- ◆ Microcystin
- ◆ Light Extinction
- ◆ Composite sampling

# The 2022 Sampling Team:

Walt Neilson

Dave Mussell

Dr. Brian Smerdon

David Trew











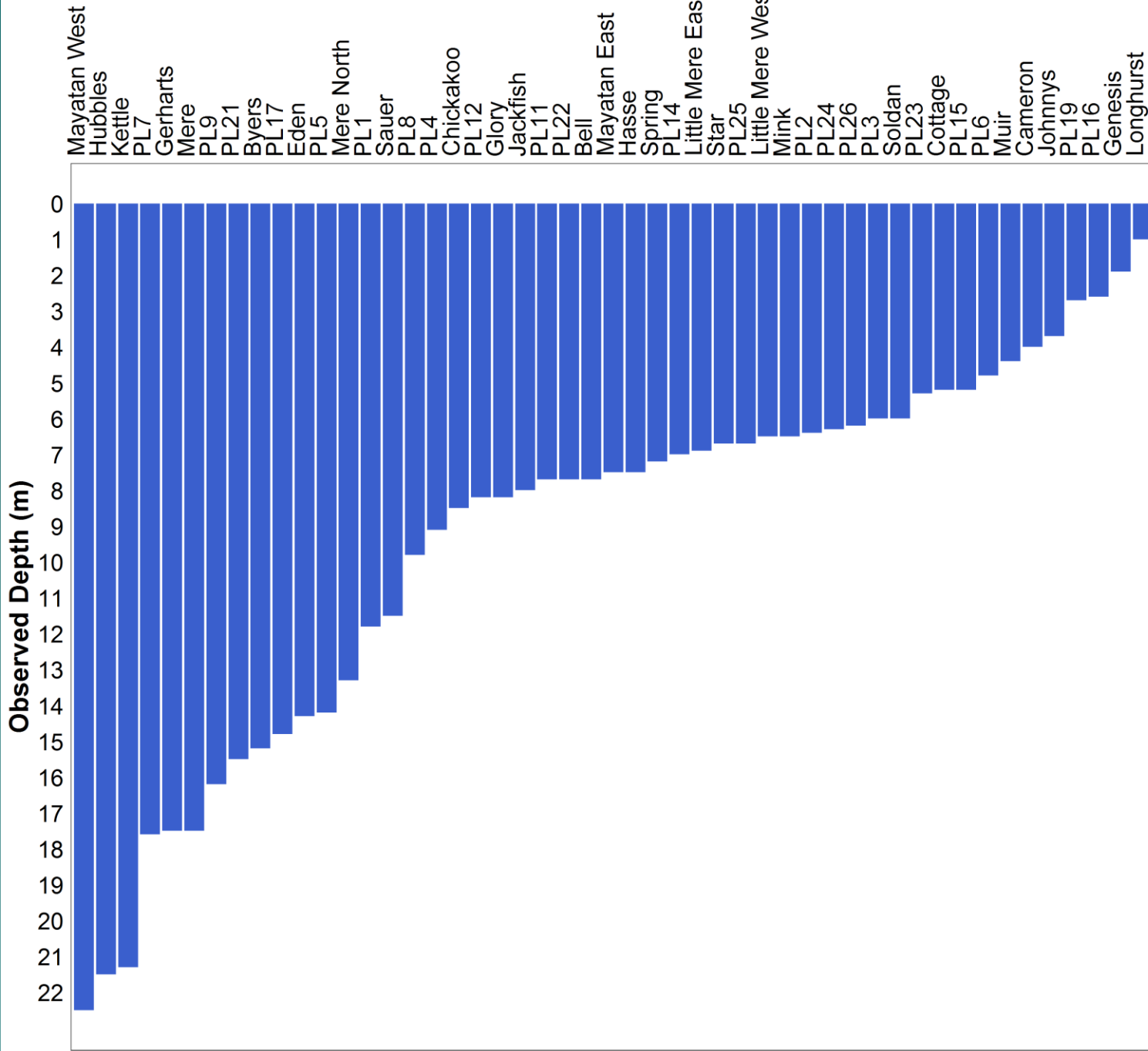








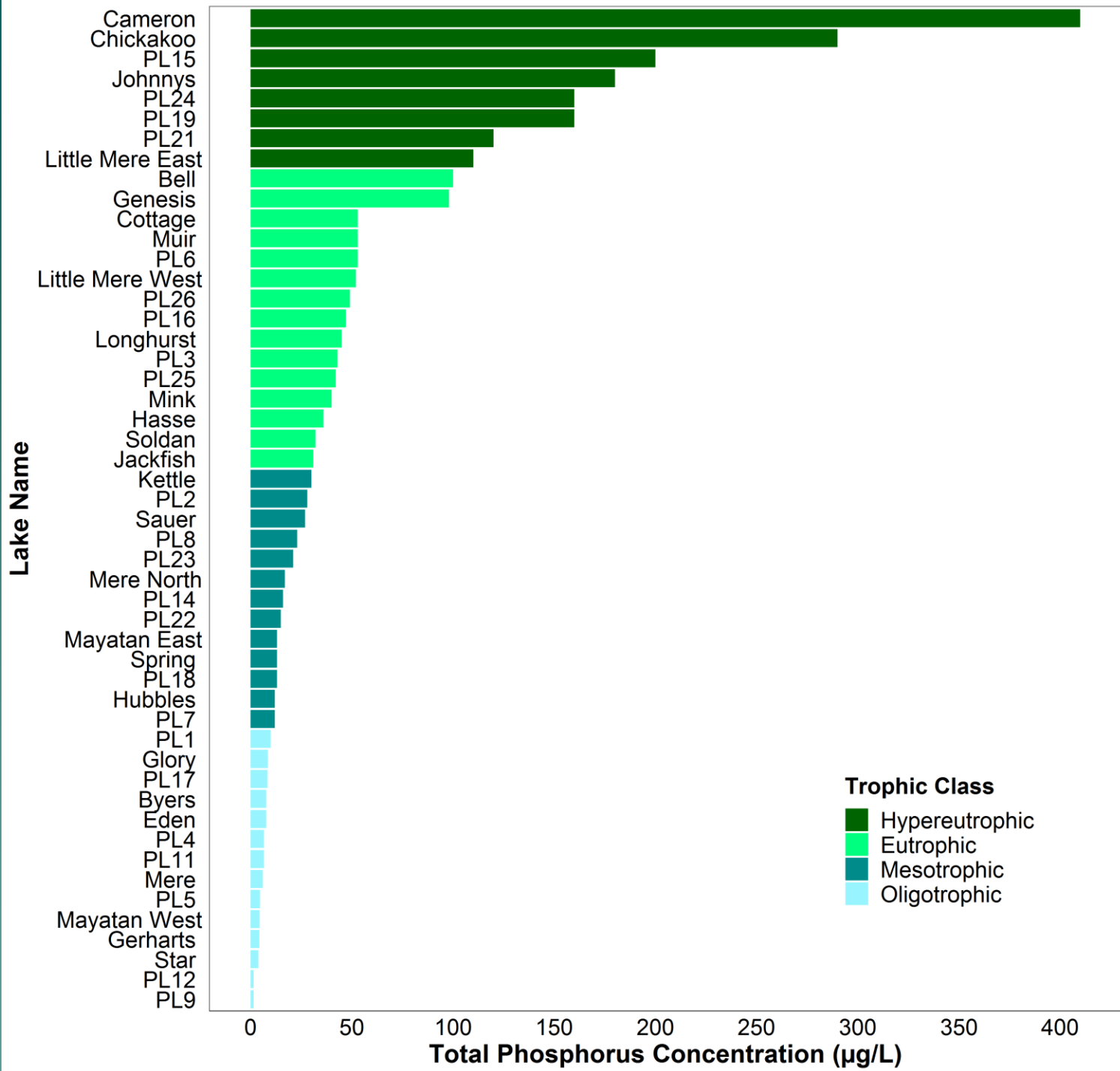
# Lake Name



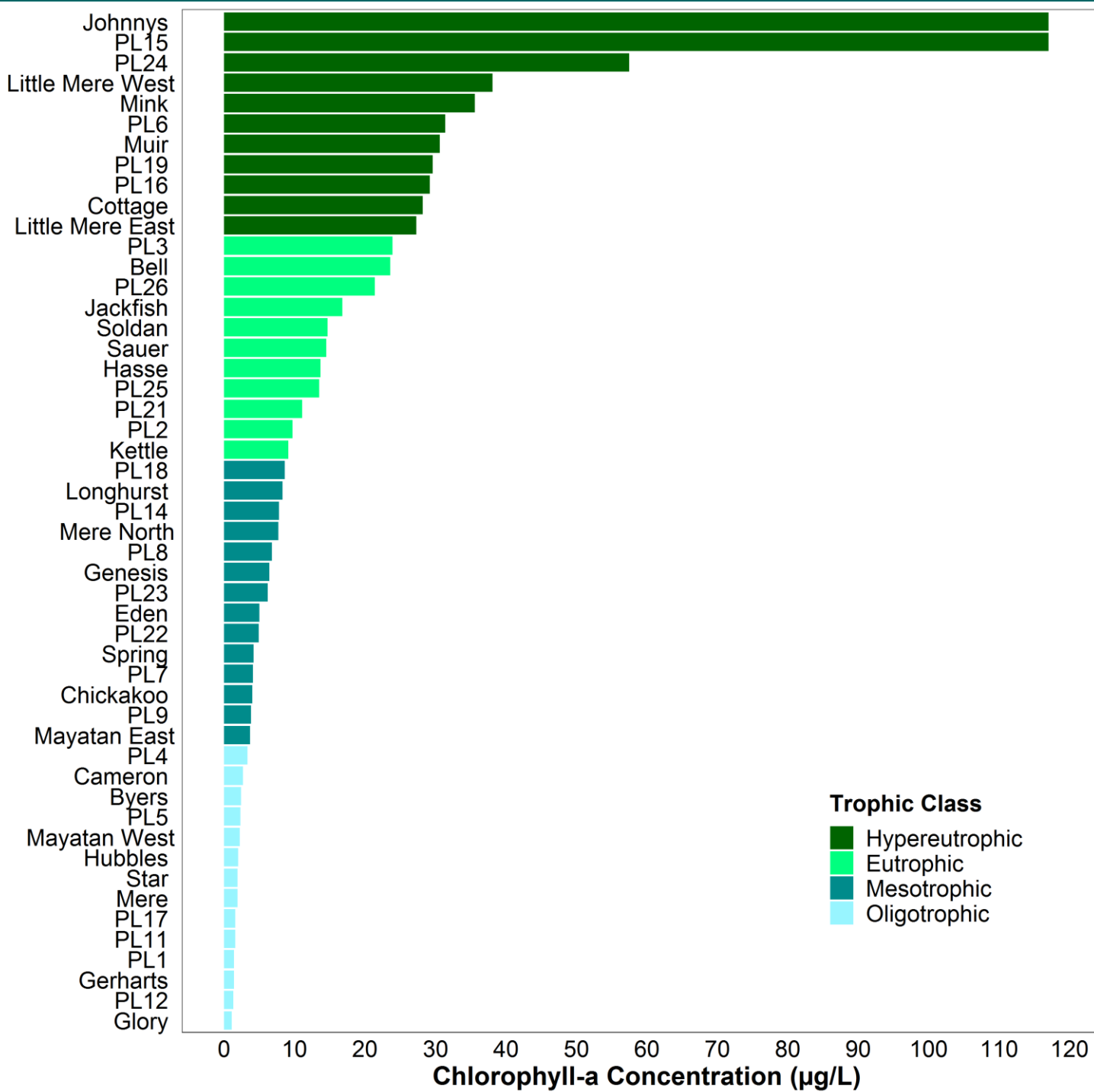








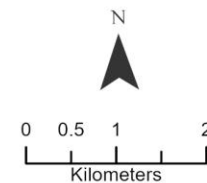
Lake Name



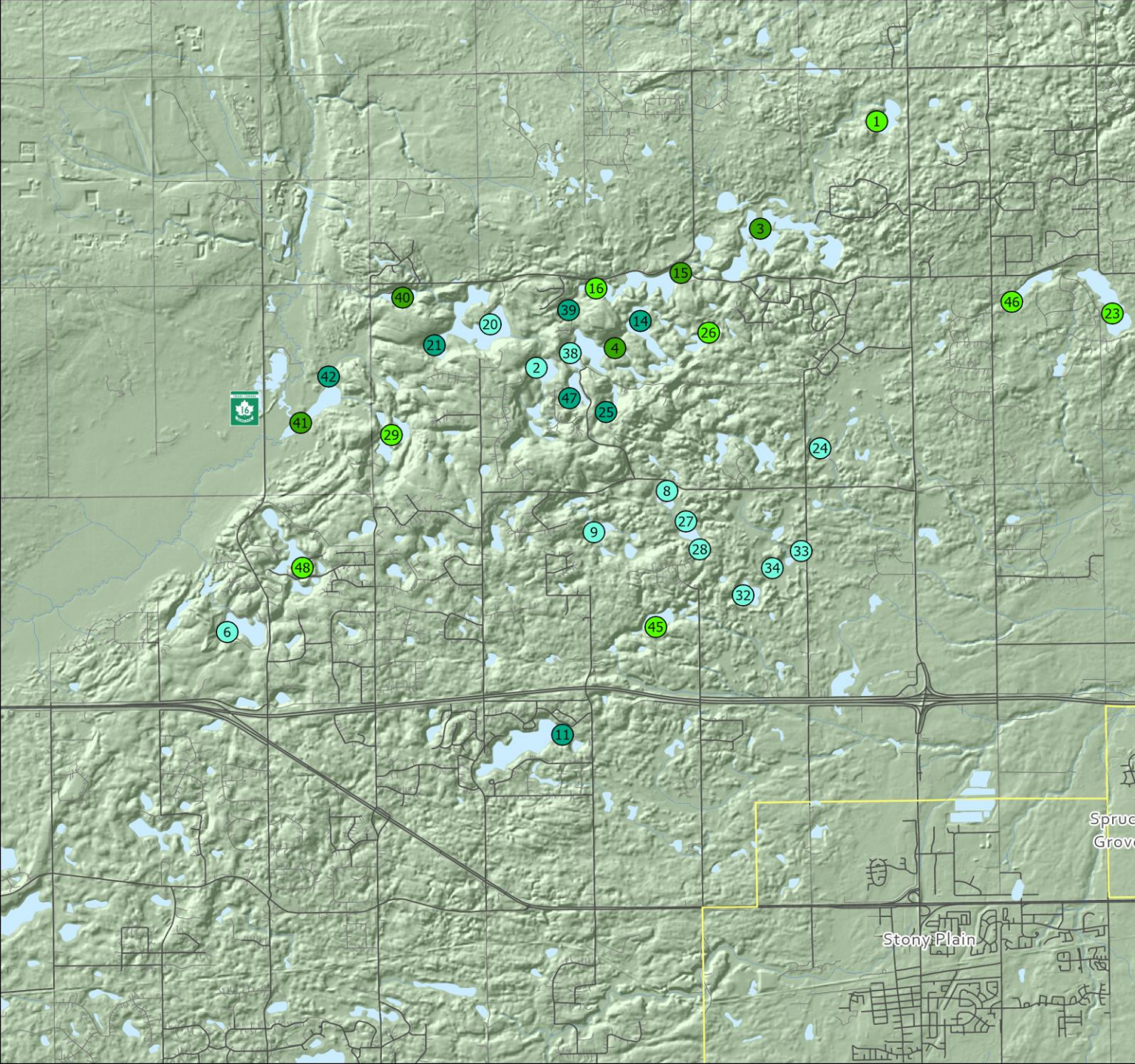
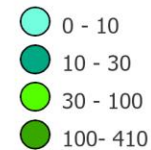
# Carvel Pitted Delta 2022 Survey Report

## Northern Region

Surface Total Phosphorus ( $\mu\text{g/L}$ )



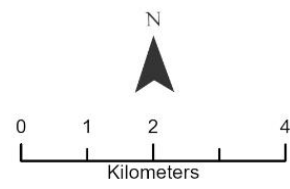
Surface Total Phosphorus ( $\mu\text{g/L}$ )



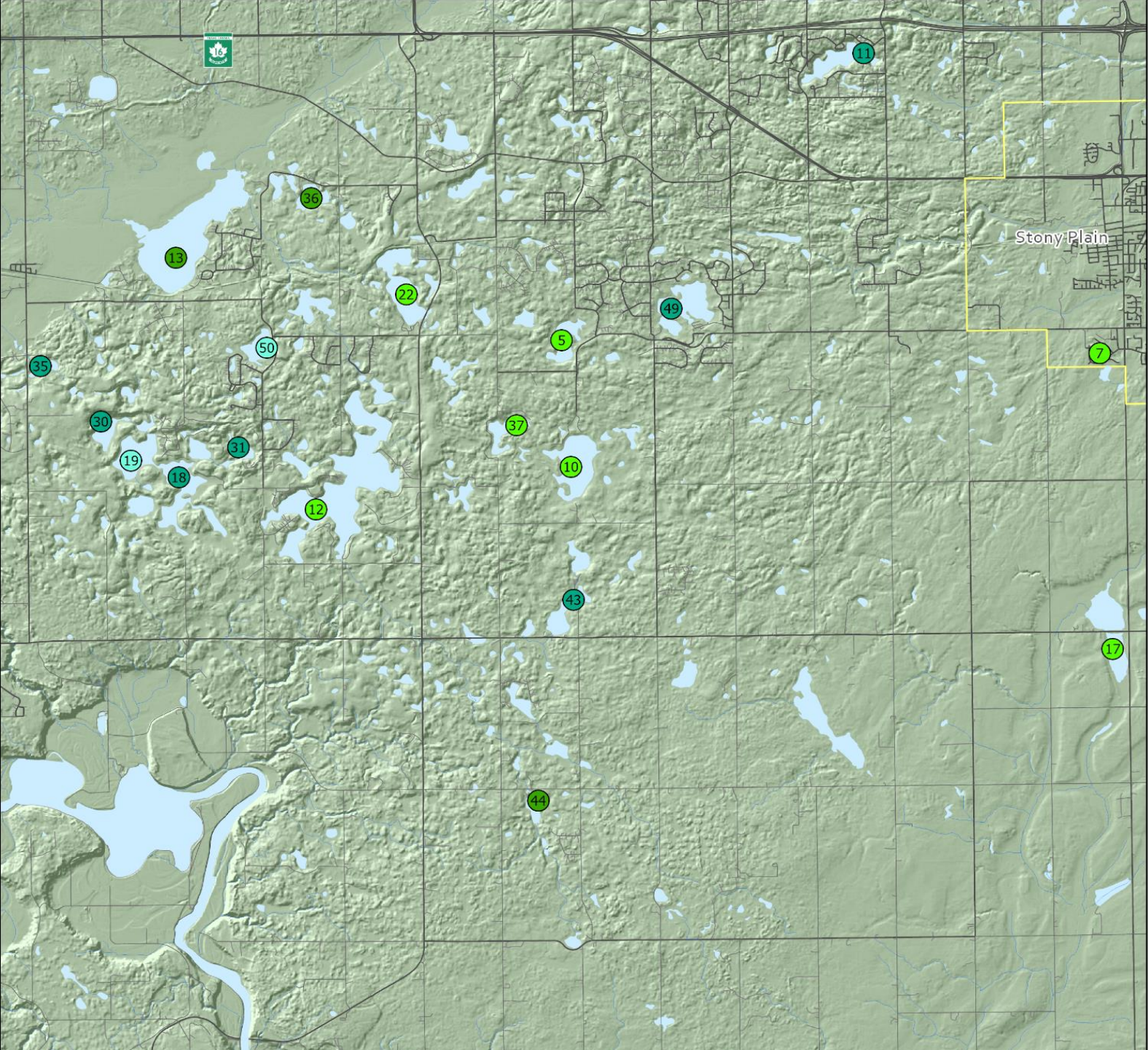
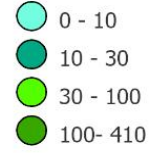
# Carvel Pitted Delta 2022 Survey Report

## Southern Region

Surface Total Phosphorus ( $\mu\text{g/L}$ )

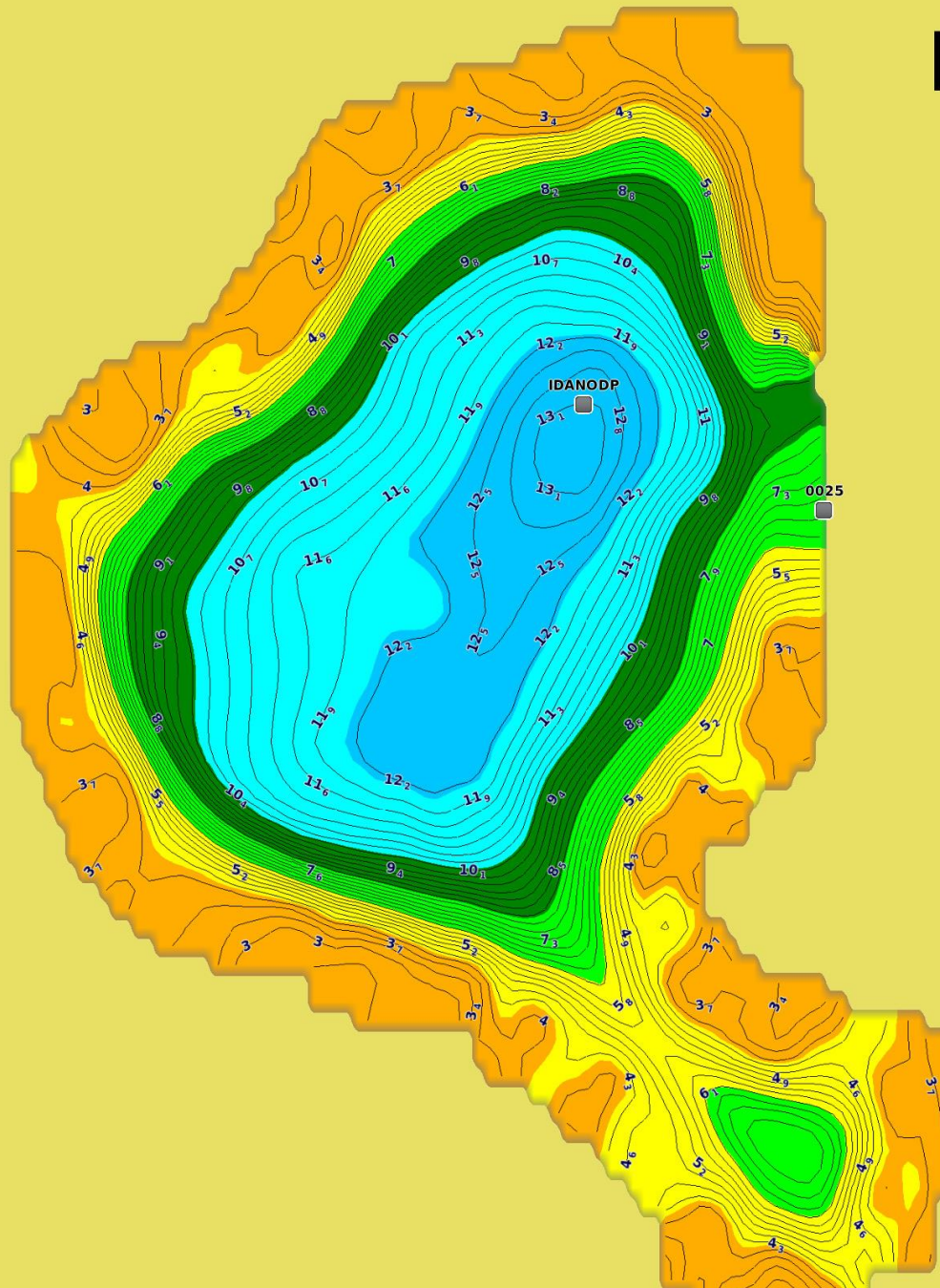


Surface Total Phosphorus ( $\mu\text{g/L}$ )



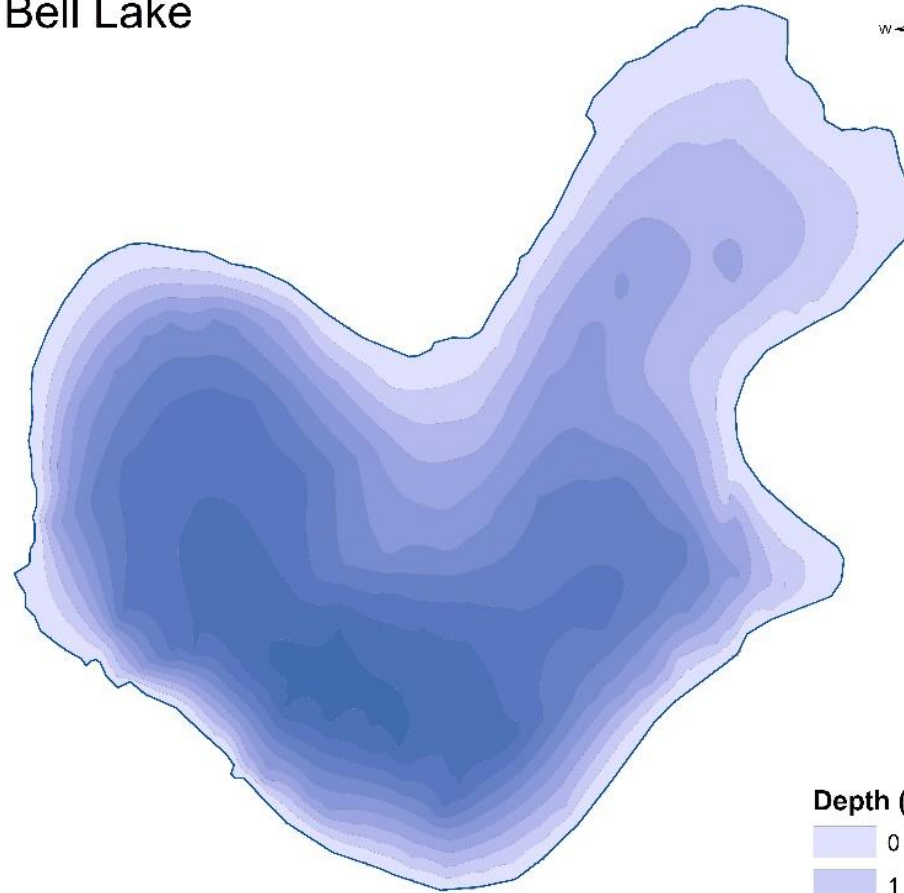
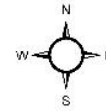
2022 Bathymetry:  
33 Lakes sounded, many for the  
first time

# Idano Lake

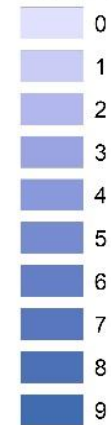




# Bell Lake

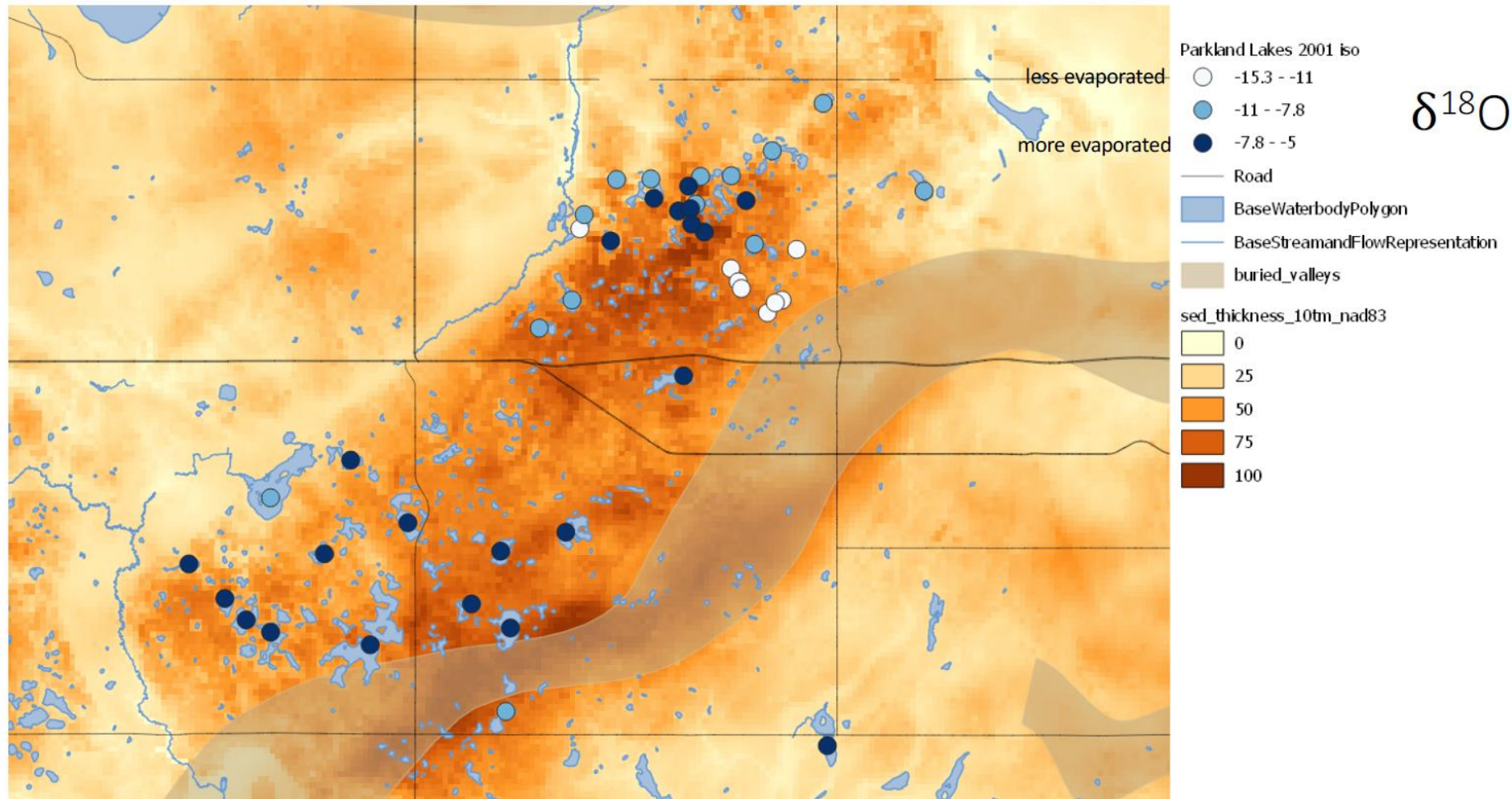


## Depth (m)



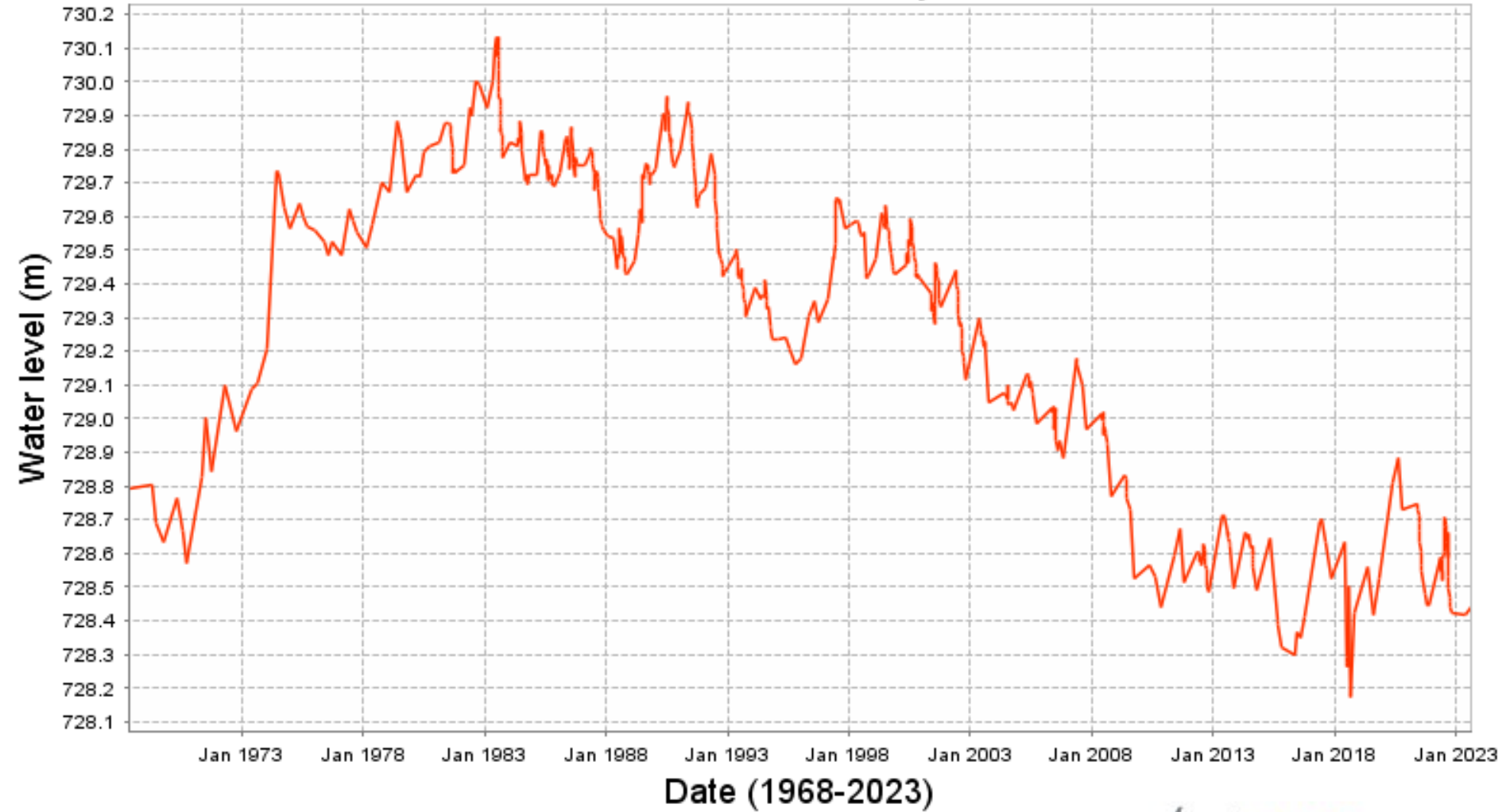
Depth (m)	Surface area (m <sup>2</sup> )	Volume (m <sup>3</sup> )
0	96,488	407,801
1	82,324	319,467
2	70,755	243,311
3	58,496	178,744
4	48,408	125,721
5	39,815	81,996
6	31,279	46,502
7	20,598	20,313
8	9,405	5,387
9	1,727	270

# Groundwater - Lake Connections



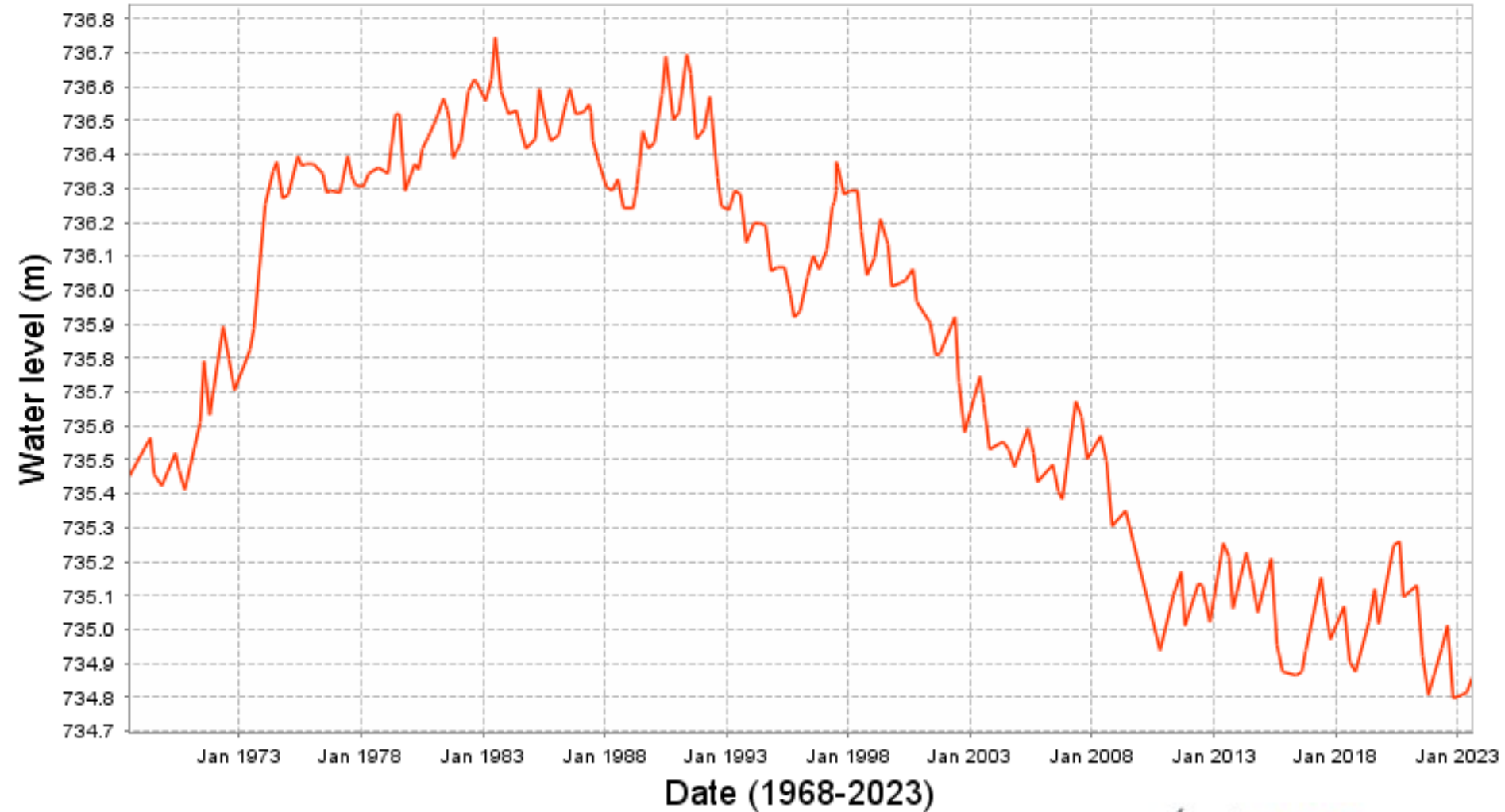


## Measured water level for 05DE902 Jackfish Lake Near Stony Plain



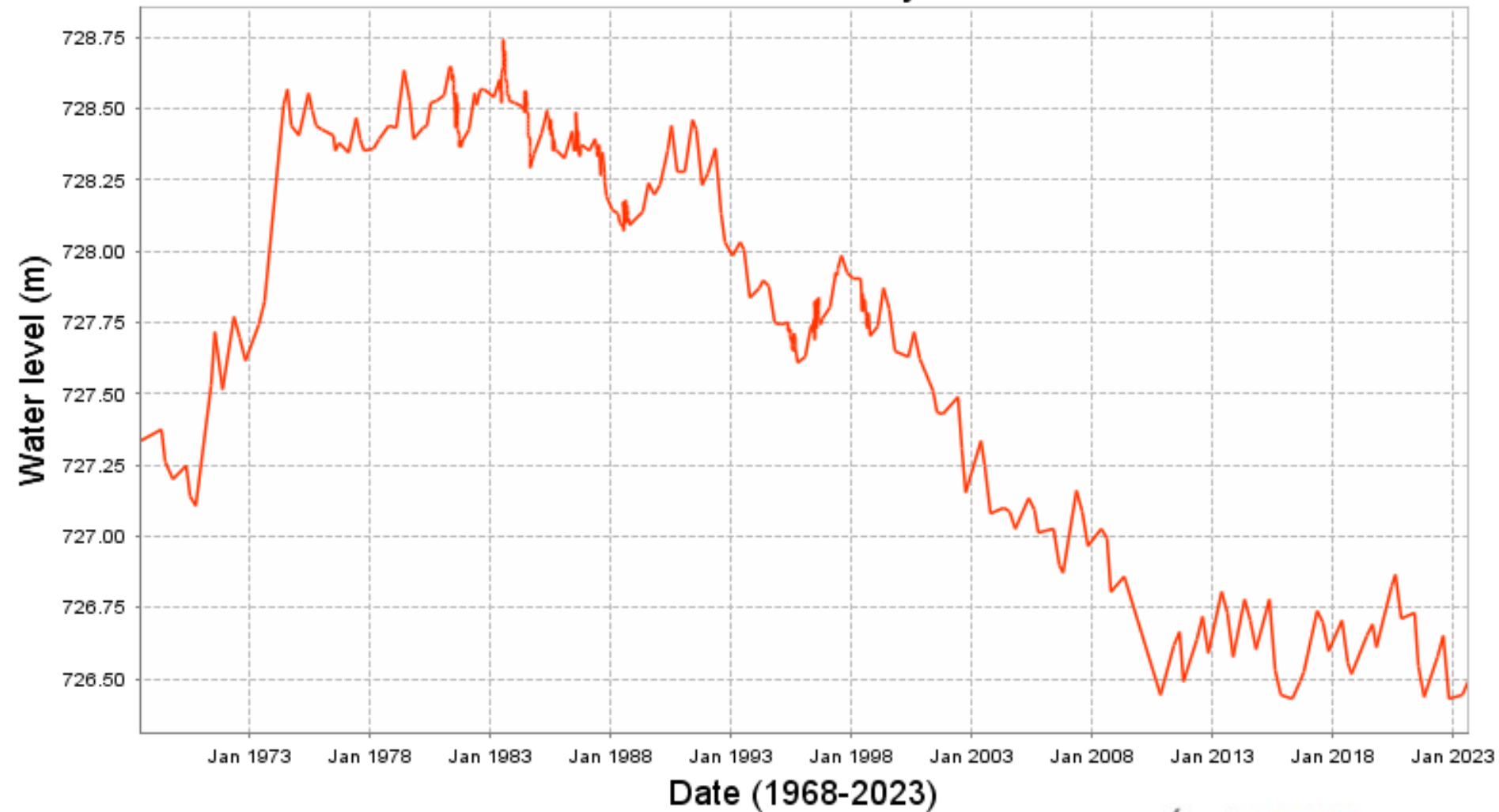
Generated at: 2023-08-31 05:41:12

## Measured water level for 05DE904 Mink Lake Near Carvel Corner



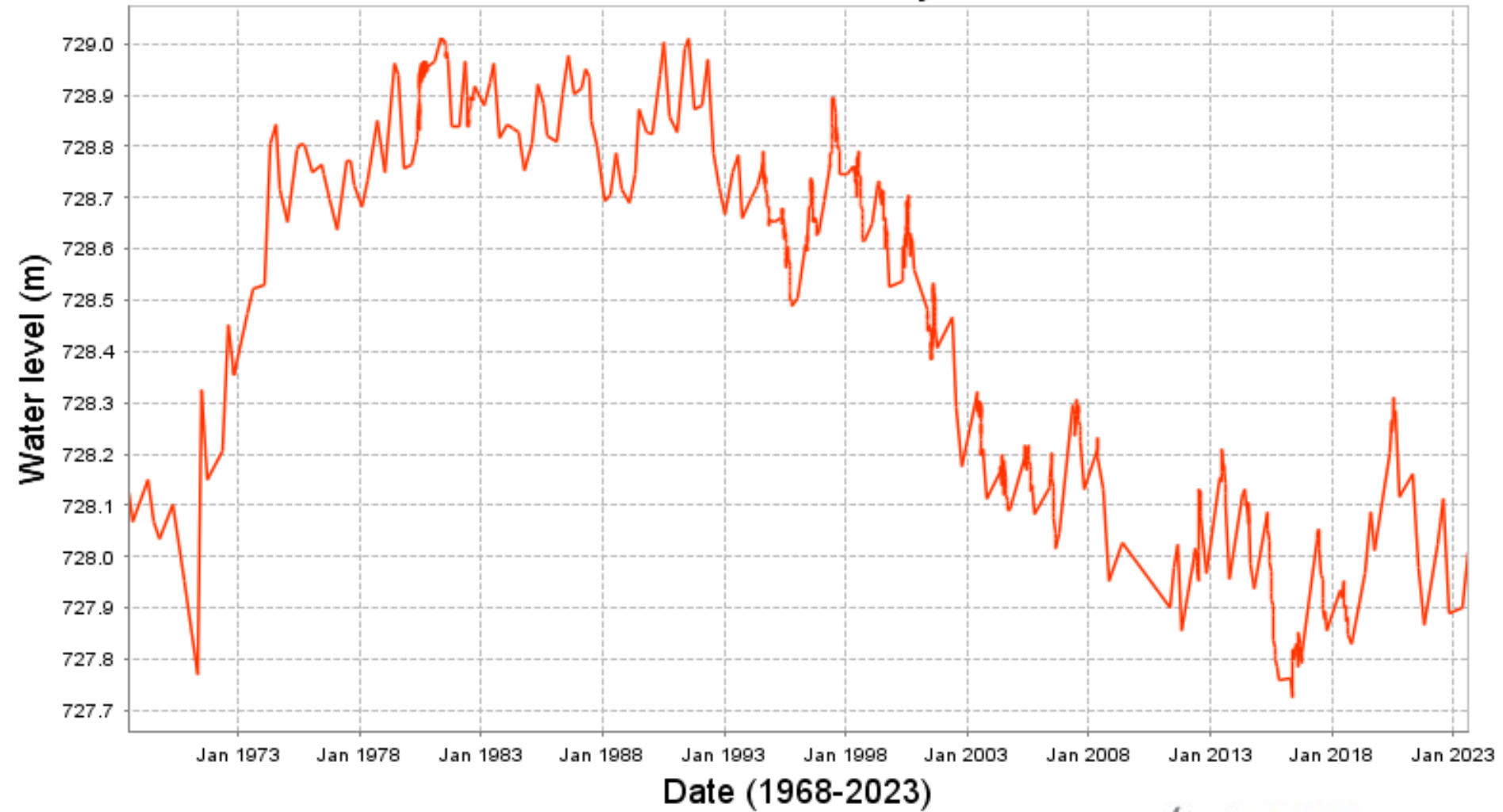
Generated at: 2023-08-31 05:41:13

## Measured water level for 05EA908 Hasse Lake Near Stony Plain



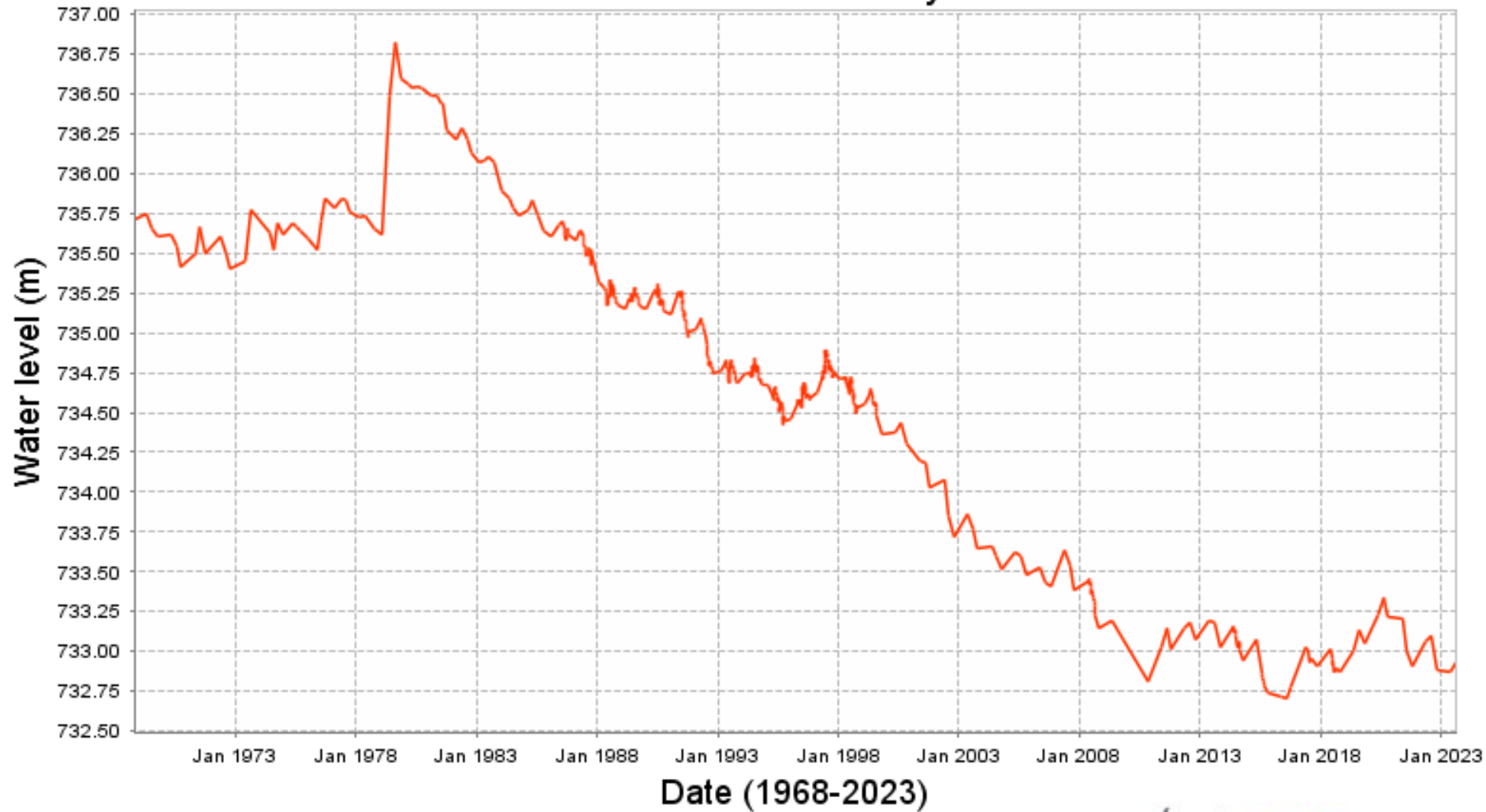
Generated at: 2023-08-31 05:44:05

## Measured water level for 05EA915 Hubbles Lake Near Stony Plain



Generated at: 2023-08-31 05:44:07

## Measured water level for 05EA904 Chickakoo Lake Near Stony Plain



Generated at: 2023-08-31 05:44:03



# 2023 Field Program

27 Additional Lakes Sampled  
(n=77)

Plus 7 Farm Dugouts

-Report in Preparation-

# Acknowledgements

## ◆ Alberta Lake Management Society

- Brad Peter, Caleb Sinn, Brittany Onysyk

## ◆ University of Alberta

- Dr. Dan Alessi, Dr. Konstantin Von Gunten, Dr. Brian Smerdon

## ◆ Field Volunteers, Contributors, Data Assistance

- Alec MacDonald, Walt Neilson, Dave Mussell, Jennifer Regier, Dr. Eric Neilson, Mike Myshak, Alex Oiffer, Dale Loosemore, Tyler Shyry, Pauline Molnar,
- Dr. Steve Craik, Alvin Steinke, Brad Tyssen, Sal Figliuzzi, Dr. Craig Emmerton, Jeremy Plonkowski

# Funding Sources

- Land Stewardship Centre of Canada (LSCC)
- Alberta Lake Management Society (ALMS)
- Stony Plain Fish and Game Association (SPFGA)
- Mayatan Lake Management Association (MLMA)
- North Sask. Watershed Alliance (NSWA)
- University of Alberta/Dept. Earth Sciences
- Parkland County

Thank you!







