

**Small Lakes of the Stony Plain Region:
Preliminary Water Quality Results from the
2021 Summer Surveys
Presented to SPFGA and WGC by David Trew
Jan. 10, 2022**



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

- Map: Lakes of the Carvel Pitted Delta
- Project Outline for 2021
- Briefing to Parkland County CSC May 2021
- Photo slideshow of lakes – beautiful!
- Presentation to MLMA - AGM Nov 28 2021

Key messages

- ◆ Many beautiful small lakes....a unique lake district
- ◆ Most lakes have limited development, with intact shorelines and upland areas
- ◆ Preliminary observations indicate a wide range of depths
- ◆ Wide range of water quality conditions observed
- ◆ Limited ecological and fisheries data
- ◆ Limited data on lake depths
- ◆ Landowners are conscientious and helpful – thank you
- ◆ Consider future stewardship opportunities

Many collaborators – thank you!

◆ Alberta Lake Management Society

➤ Brad Peter, Caleb Sinn

◆ University of Alberta

➤ Dr. Dan Alessi, Dr. Konstantin Von Gunten, Dr. Brian Smeardon, Jenna Maccagno

◆ Field Volunteers, Data Assistance

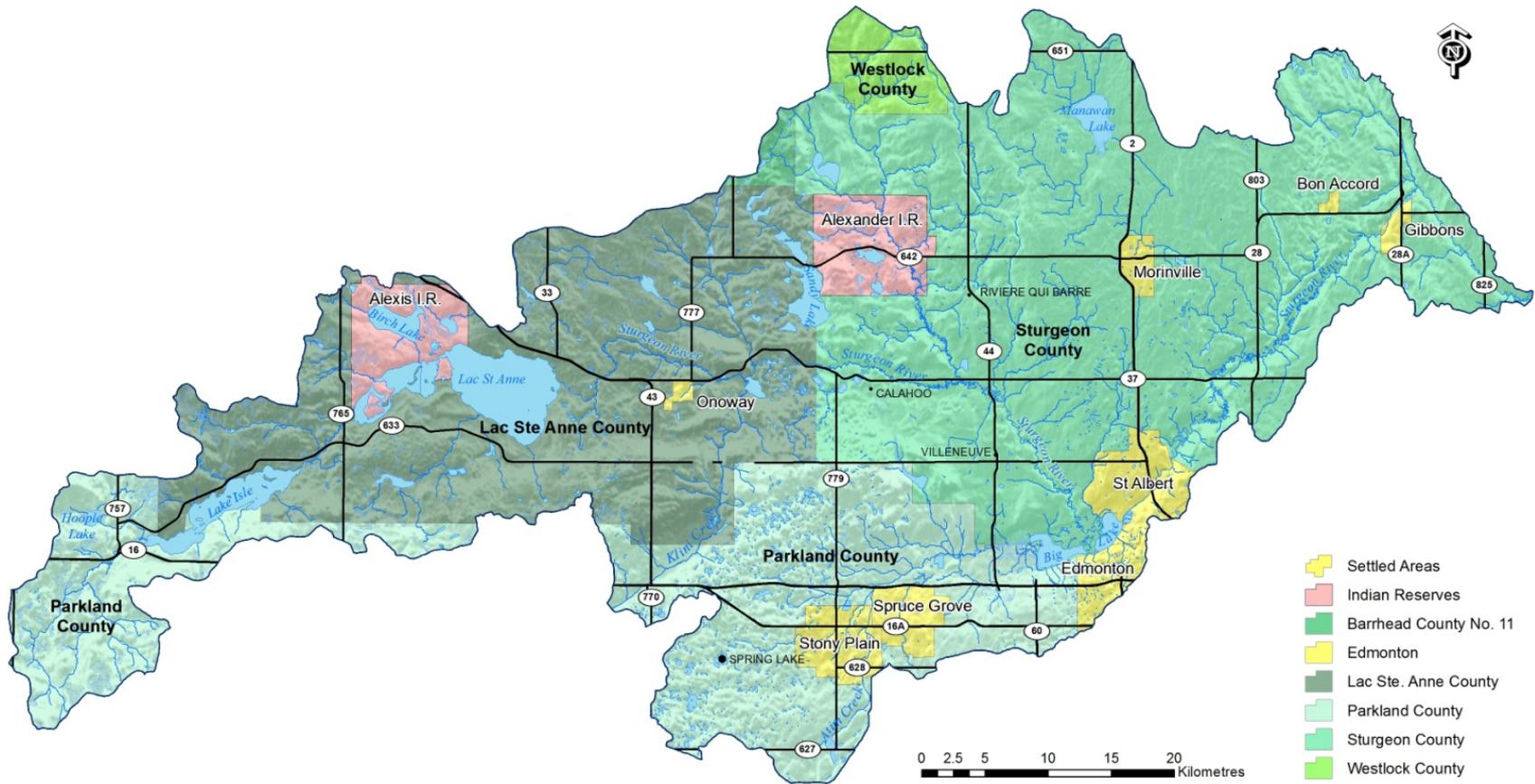
➤ **2020**: Alec MacDonald, Walt Neilson, Jennifer Regier, Eric Neilson, Mike Myshak, Alex Oiffer

➤ **2021**: Dale Loosemore, Tyler Shyry, Walt Neilson, Pauline Molnar, Dr. Steve Craik, Alvin Steinke, MaryEllen Shain

The North Saskatchewan River Basin: Twelve Subwatersheds

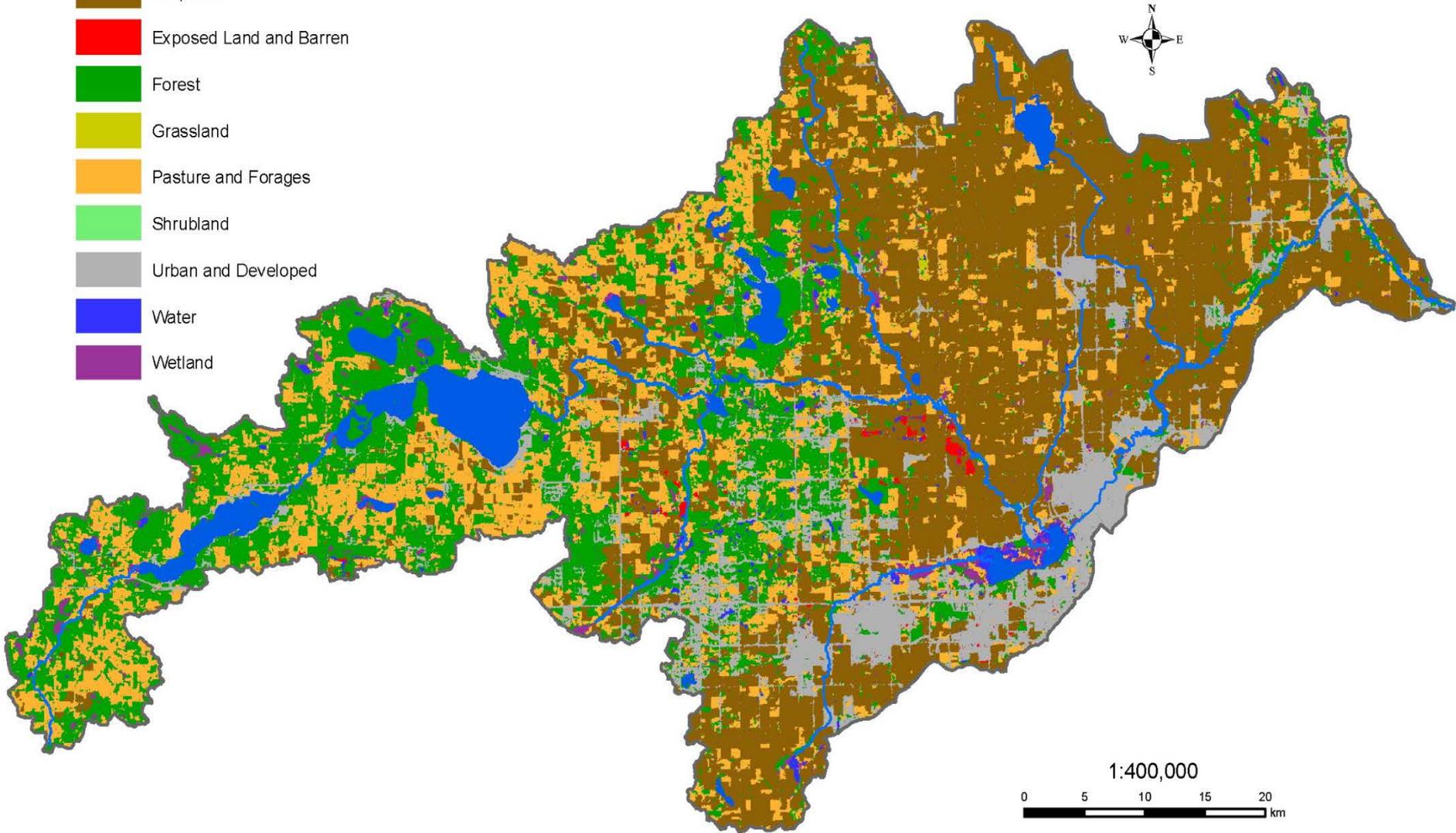


Sturgeon River Watershed: Municipalities



Sturgeon River Watershed: Land Cover

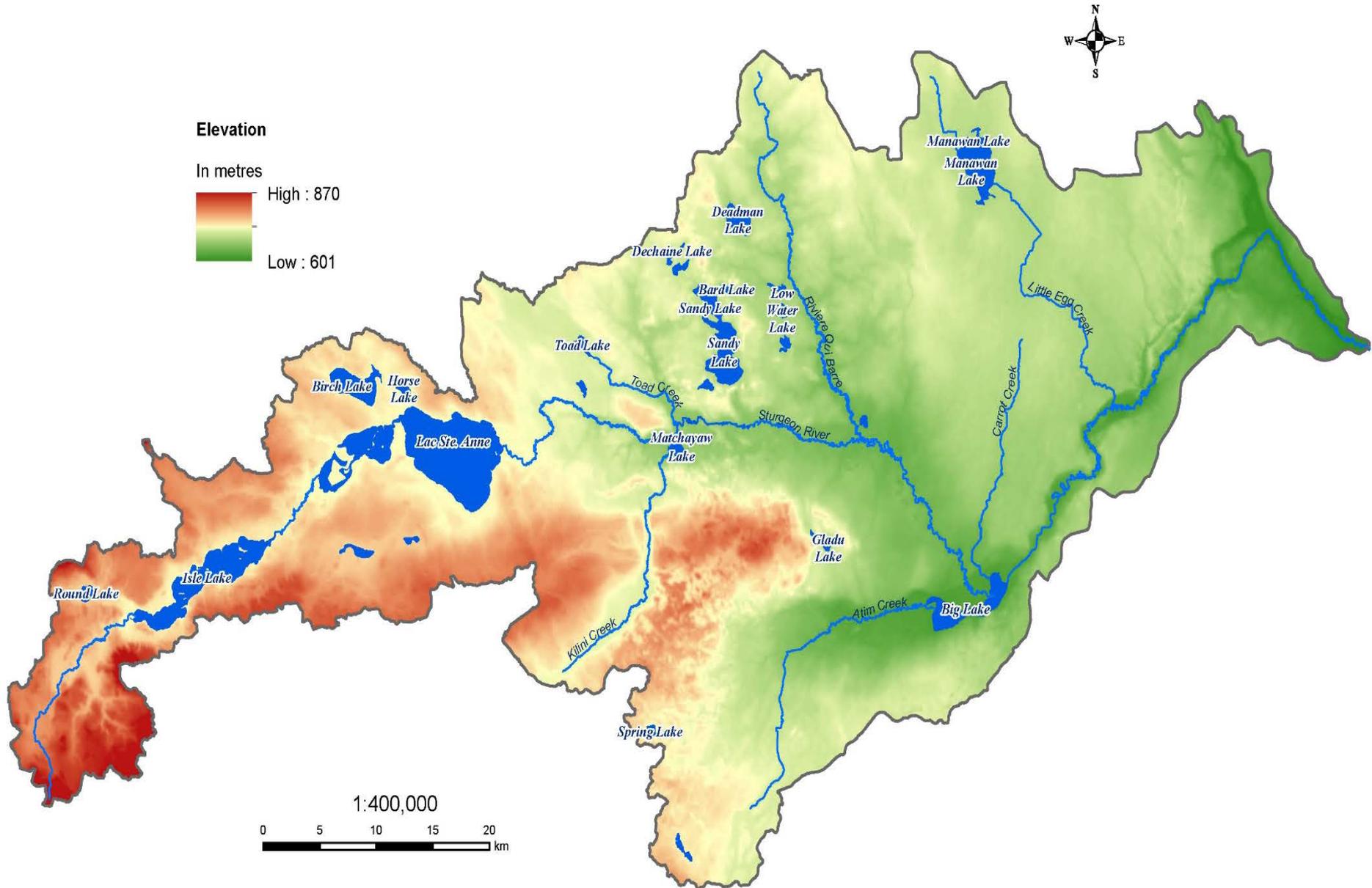
Land Cover Class



1:400,000



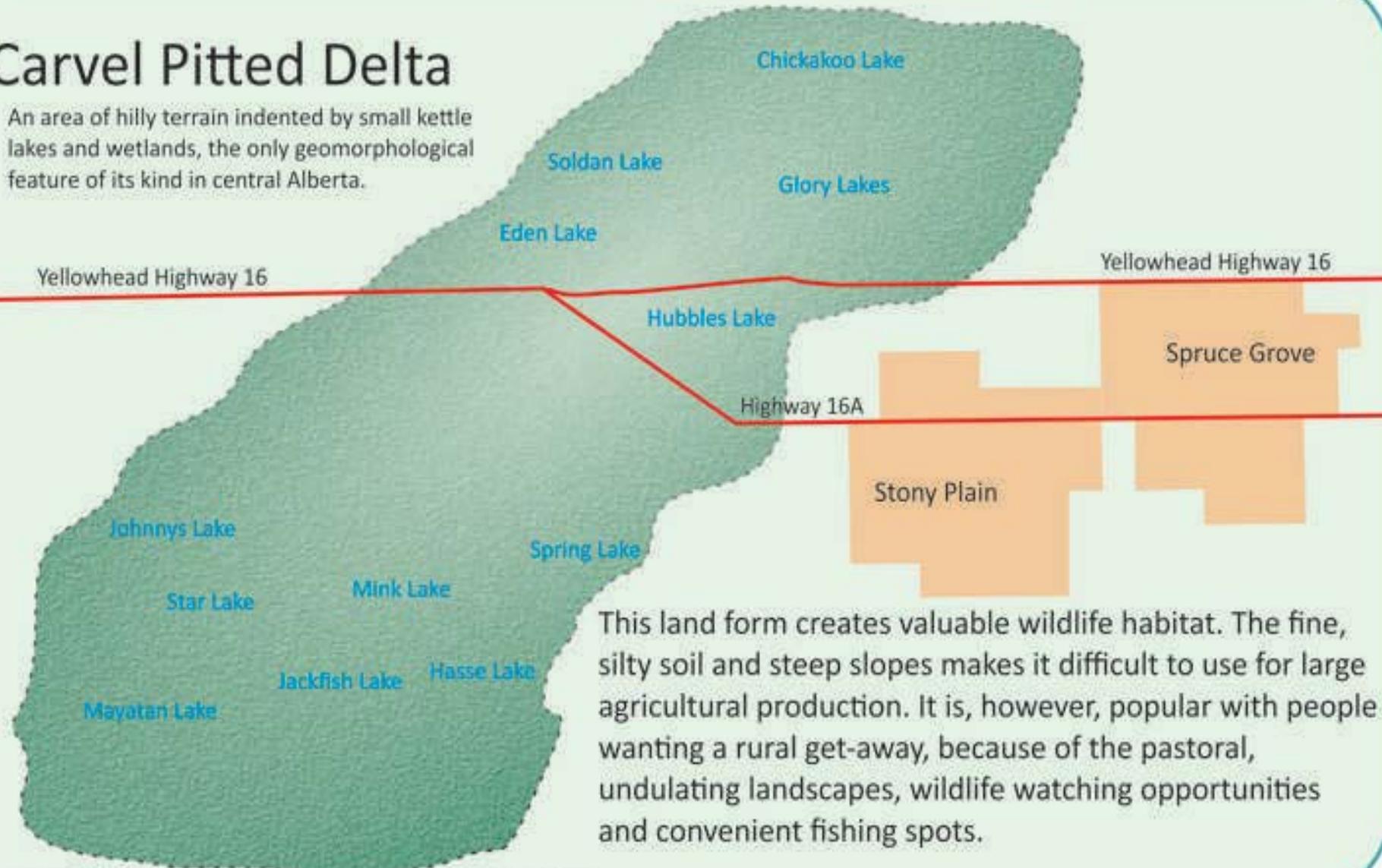
Sturgeon River Watershed: Topography



The Carvel Pitted Delta

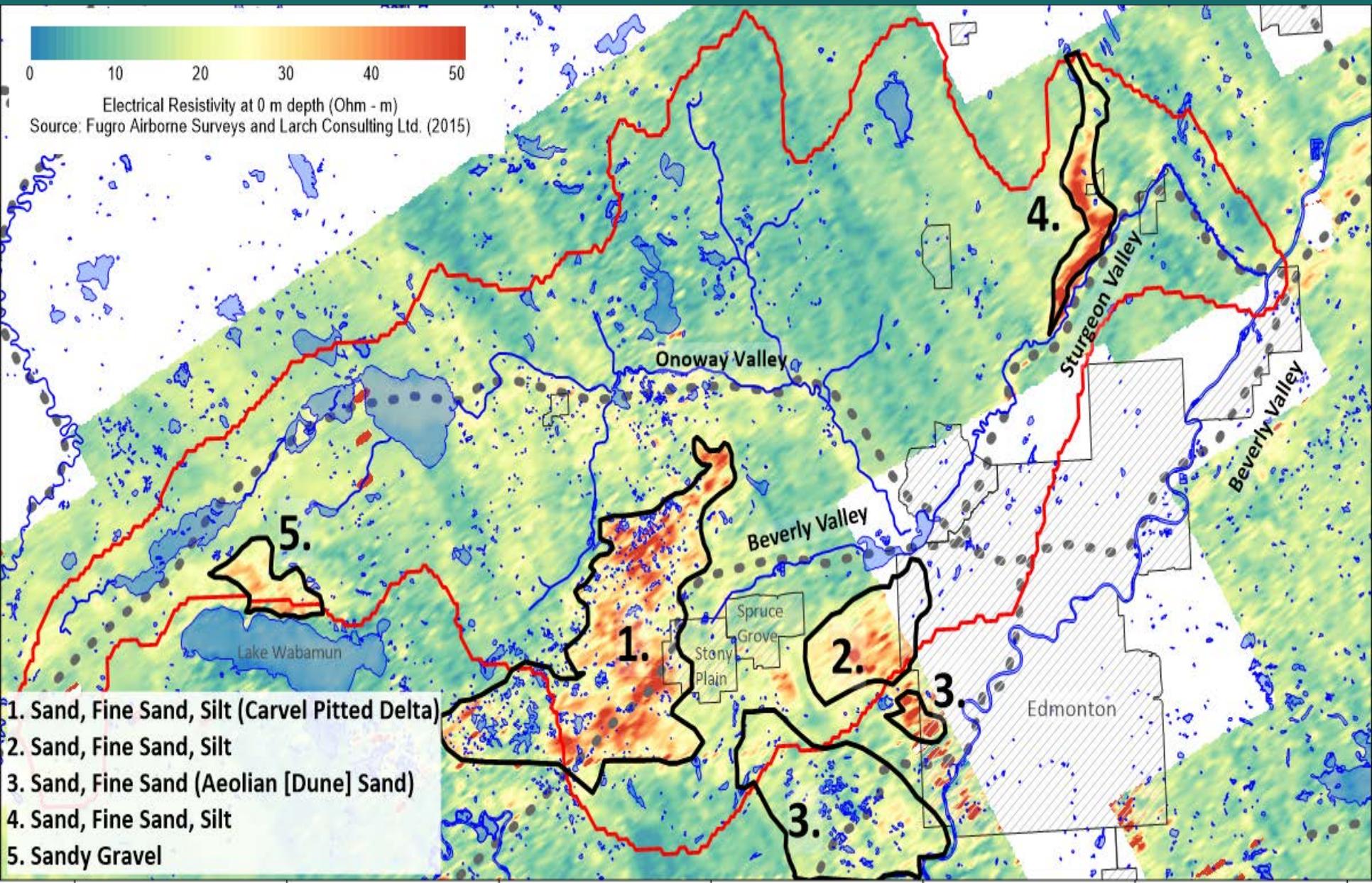
Carvel Pitted Delta

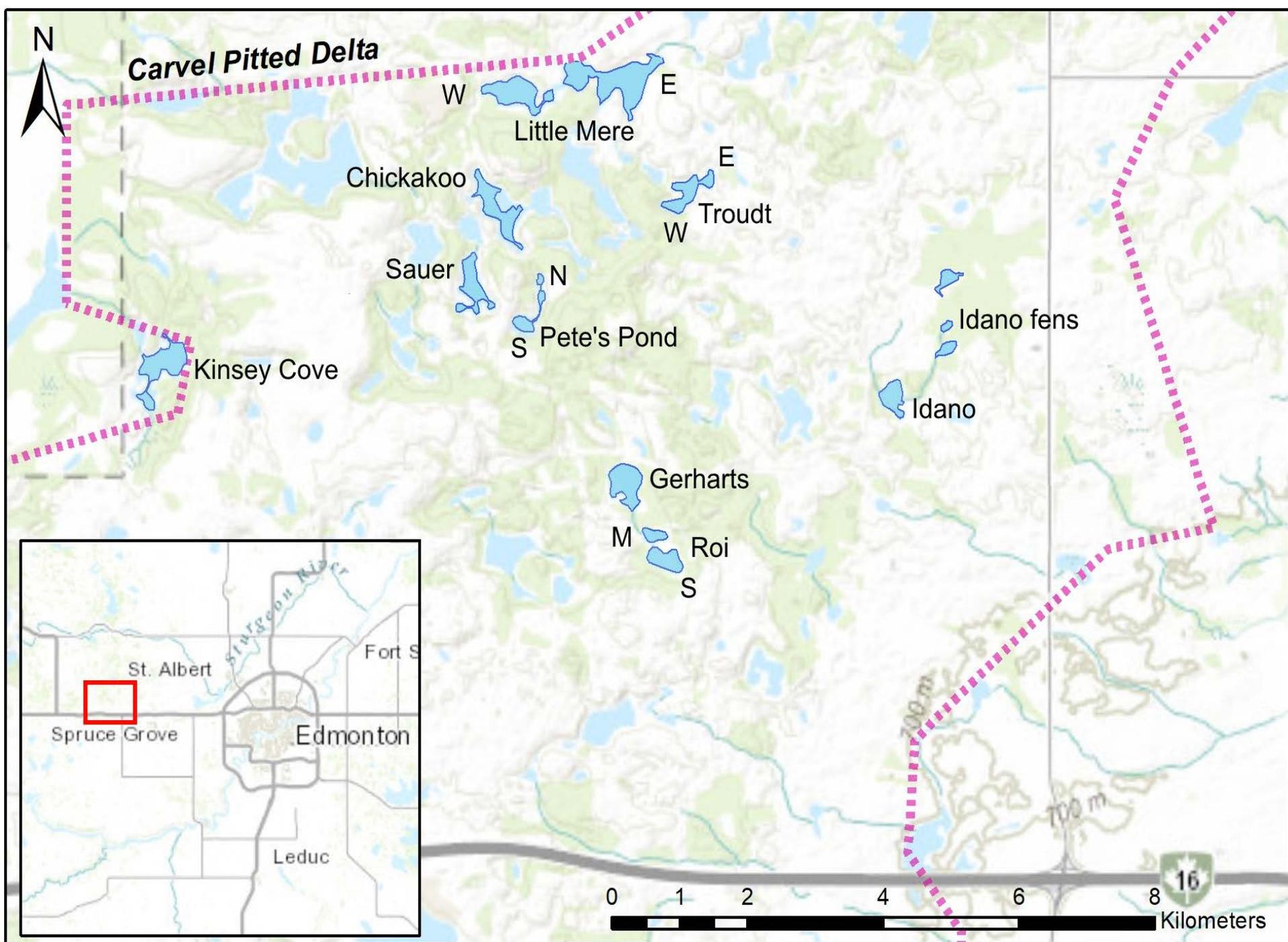
An area of hilly terrain indented by small kettle lakes and wetlands, the only geomorphological feature of its kind in central Alberta.



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:

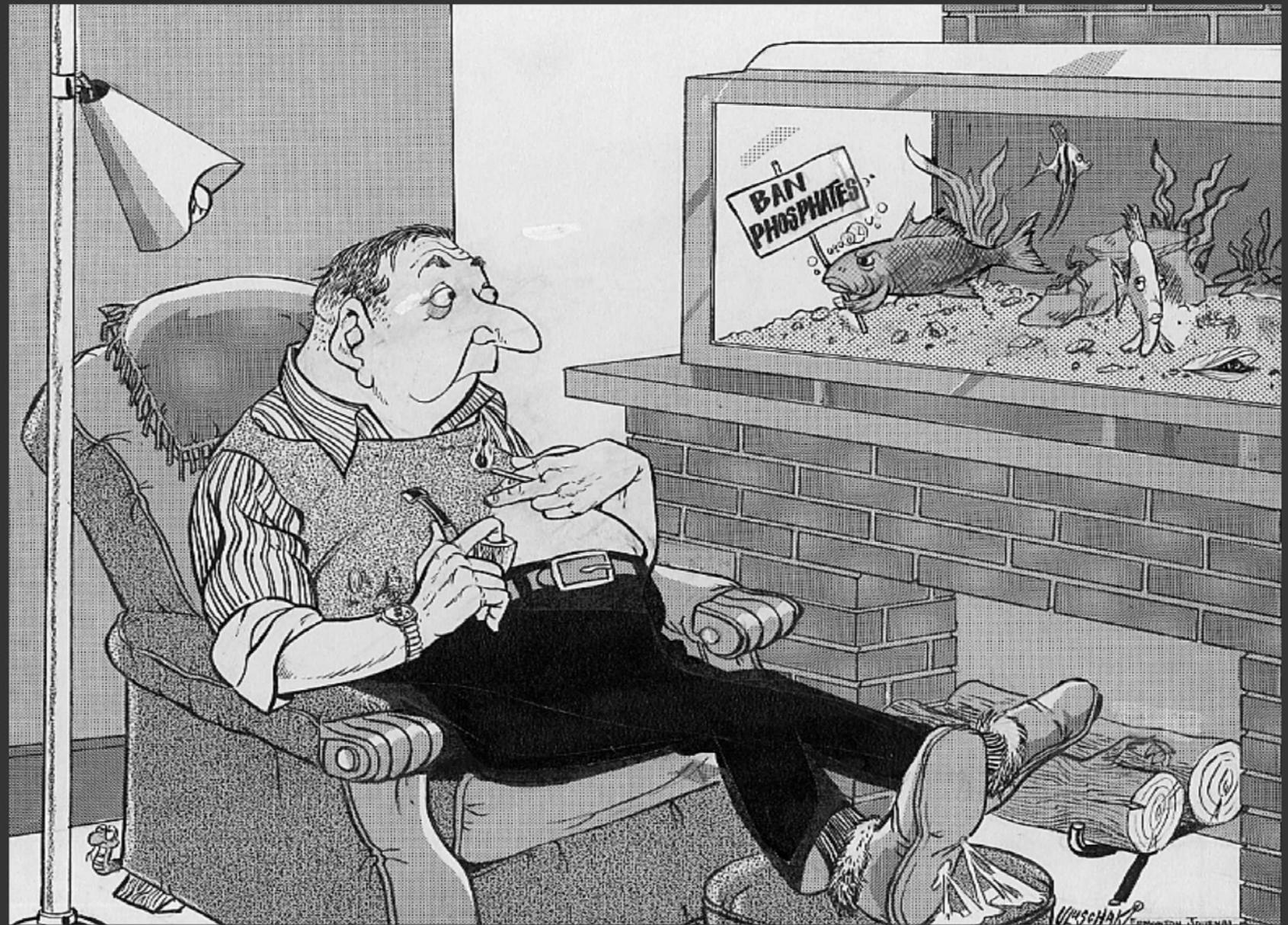
“Summary of Groundwater Conditions in the Sturgeon River Basin” (Alex Oiffer, 2019)

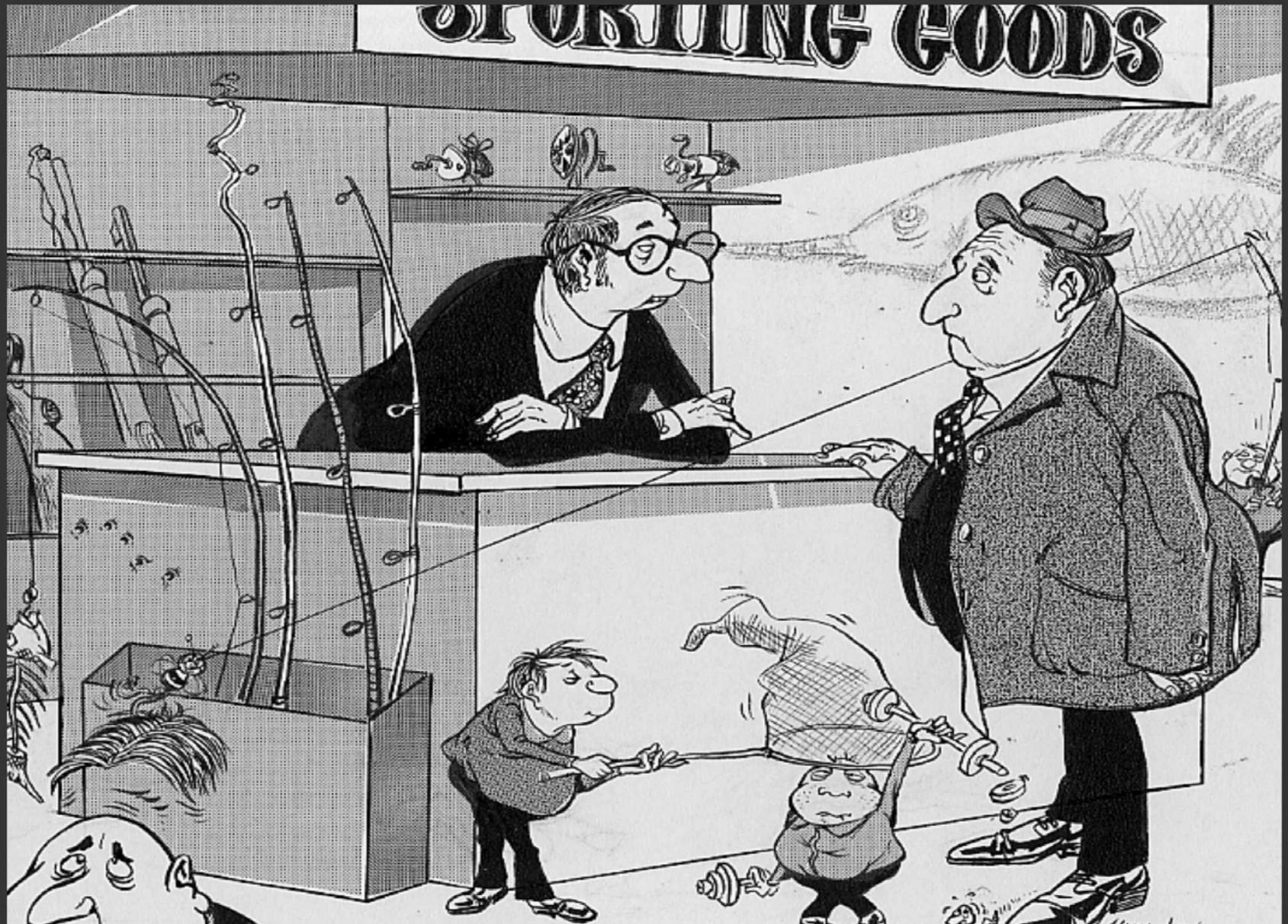
<https://www.nswa.ab.ca/resource/groundwater-conditions-sturgeon-river-basin/>

Alberta Lakes

Alberta lakes have been the subject of much scientific study over the past 70 years. Most of the research has been conducted to support fisheries and water quality management

The following editorial cartoons were published by Ed Ulaschuk (Edmonton Journal) in 1970, and illustrate that lakes and water pollution have been common topics of interest in Alberta for some time!





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

THE FISHES
OF
ALBERTA

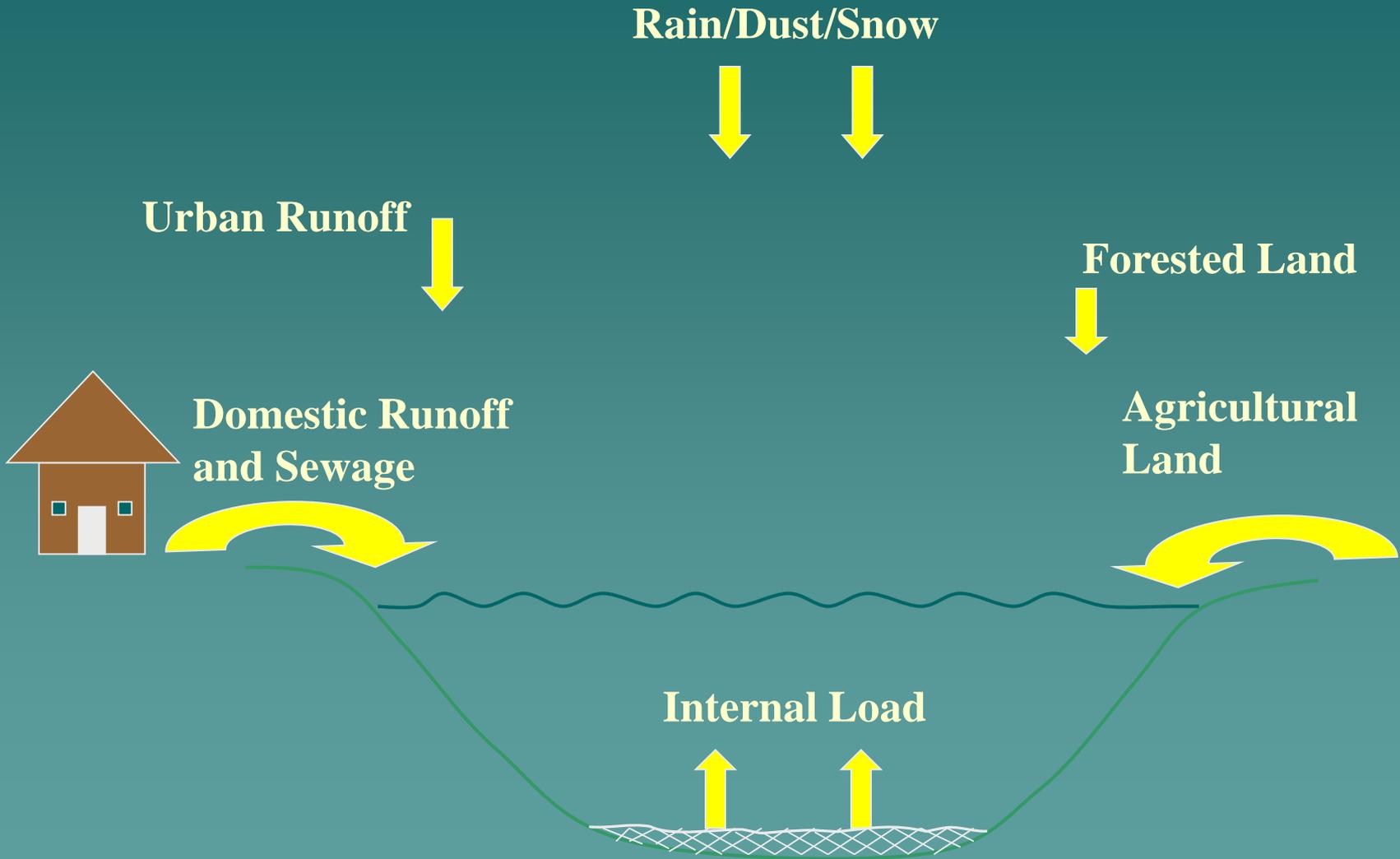
PAETZ
NELSON

FIRST EDITION

Algal growth in Alberta lakes is influenced by nutrient supply (phosphorus, nitrogen)



Phosphorus Sources - Alberta Lakes



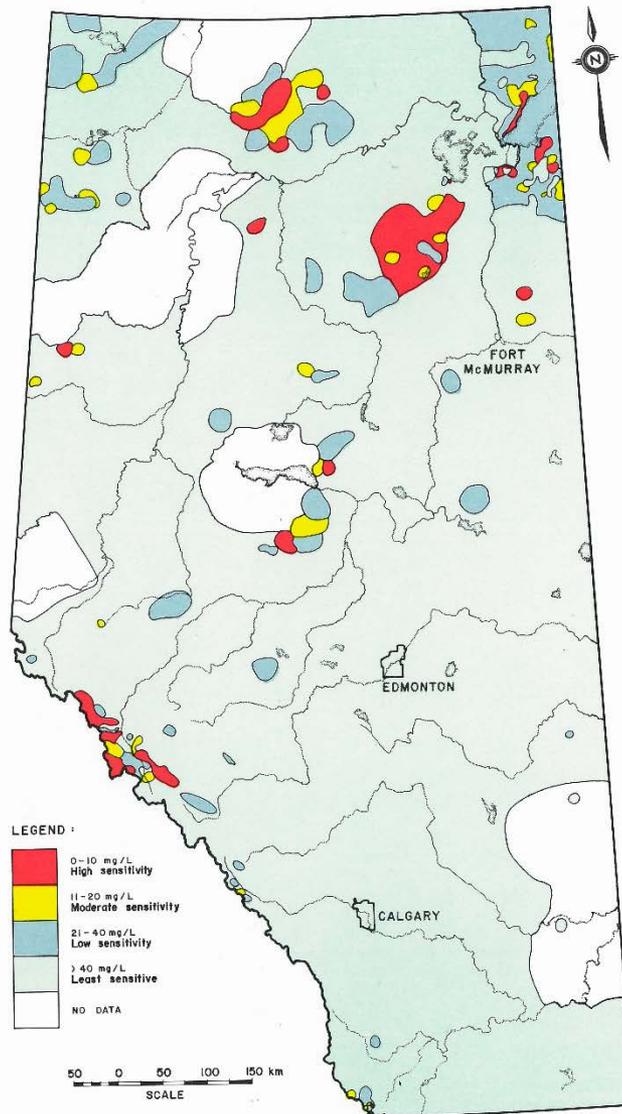


Figure 2 Sensitivity of Alberta lakes to acidification as determined by alkalinity values.







Origins of this lake survey project
go back to 2011

The beginning of collaboration
between NSW and MLMA



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

Retirement – June 2018



The Carvel lakes project started with an introduction to “Lake Idano” in July 2018...















Spring fed?



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















“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 in **August 2019**
 - The unique clarity of the lake and its extremely low phosphorus concentrations prompted much further discussion during winter **2020**
 - The lake had a continuous outflow, which suggested a potential groundwater influence

My initial question:

Are there other similar lakes in the Stony
Plain Region?

Information Review – Winter 2020

- ◆ The total number of small lakes in the Stony Plain region was estimated from 1:50,000 NTS maps
 - 26 named lakes were identified on the maps
 - 65+ 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 published 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

*(lakes with various/limited WQ data)

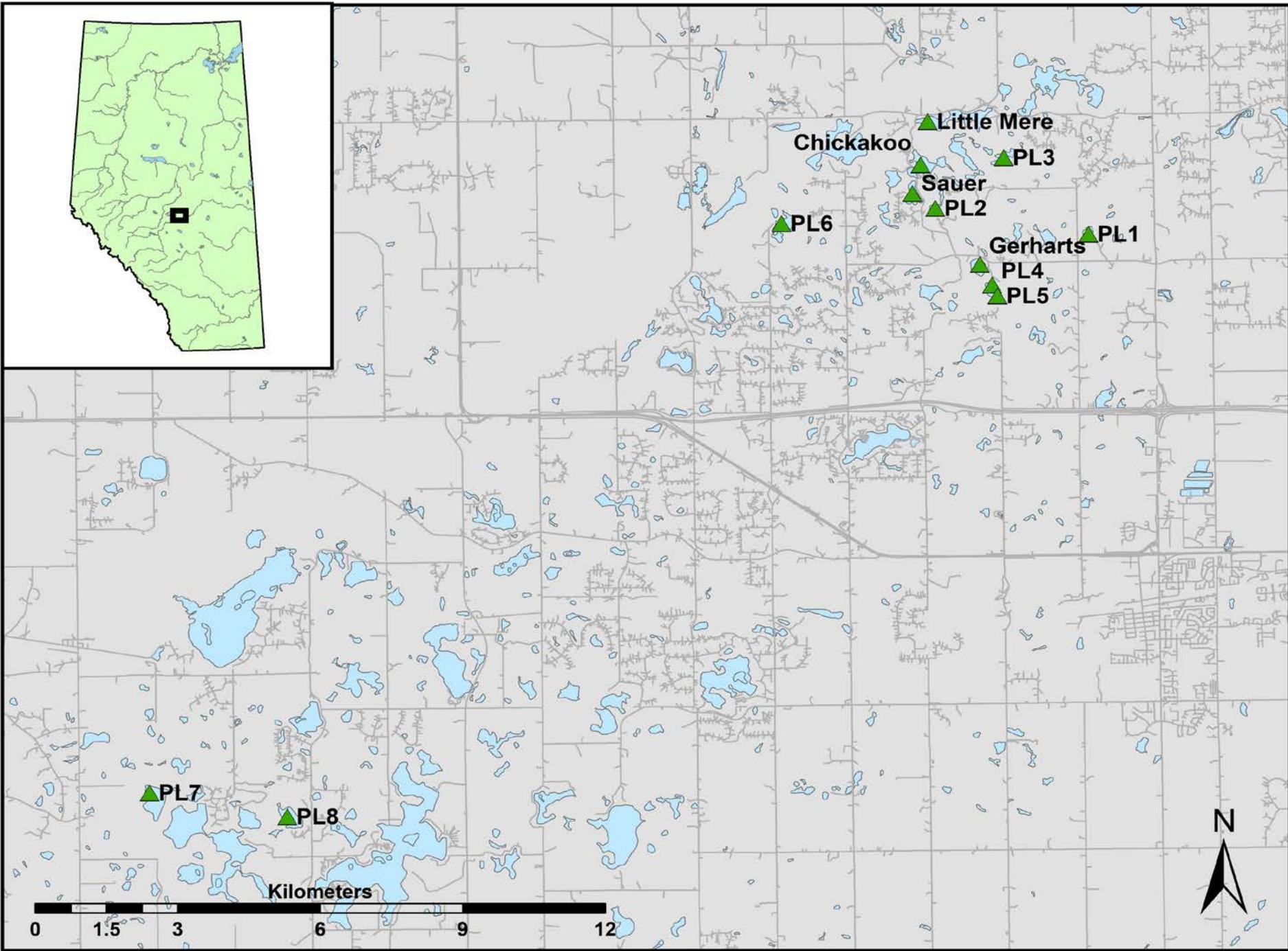
The 2020 Project: 12 Lakes

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)



Chickakoo Little Mere

PL3

Sauer
PL2

PL6

Gerharts PL1
PL4
PL5

PL7

PL8

Kilometers

0 1.5 3 6 9 12



The 2020 Sampling Team:

Alec MacDonald

Dr. Konstantin Von Gunten

Caleb Sinn

David Trew





SAUER
LAKE

INTEX

LAKE
SAUER









WELCOME TO BEACON

Please enjoy it with respect

Photos of the 2020 study lakes

PL1 Idano



PL2 Pete's Pond



PL3 Troudt Lake



Gerharts Lake





PL4 Roi Lake Middle



PL5 Roi Lake South



PL6 Kinsey Cove



Little Mere Lake (west basin)



Sauer Lake



Chickakoo Lake

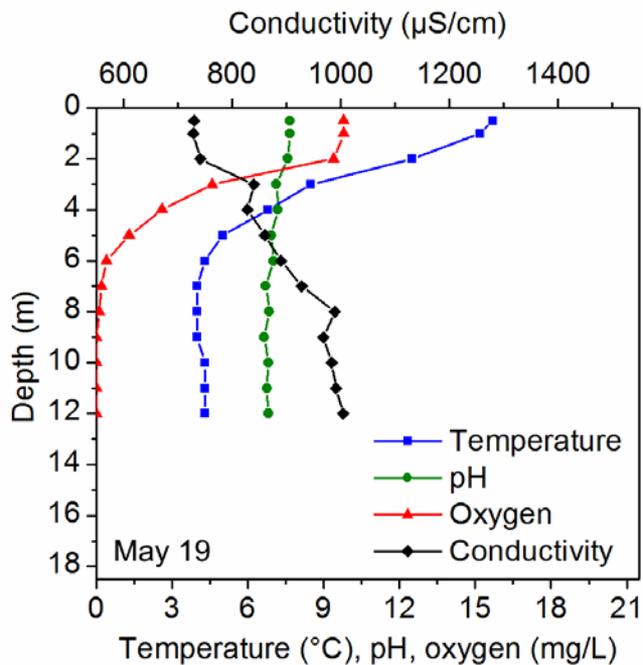


2020 Results

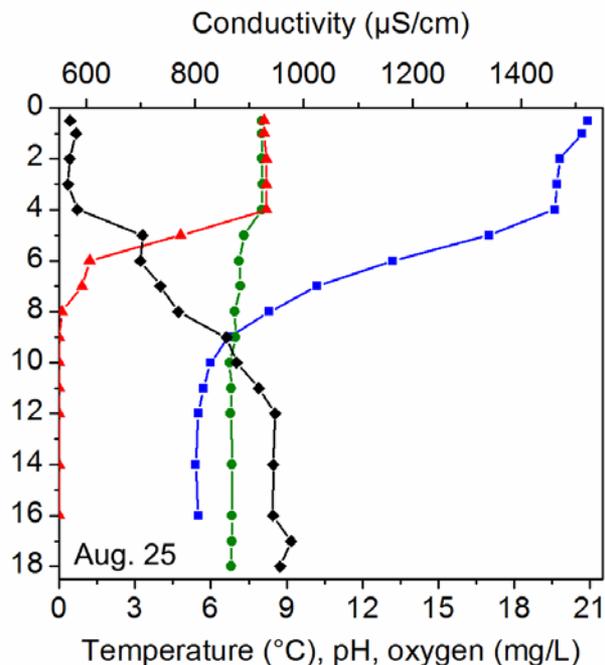
Late summer profile data:
DO, Temp, pH, Cond, Metals

Special thanks to Dr. Konstantin Von Gunten for
lab results and preparation of graphs

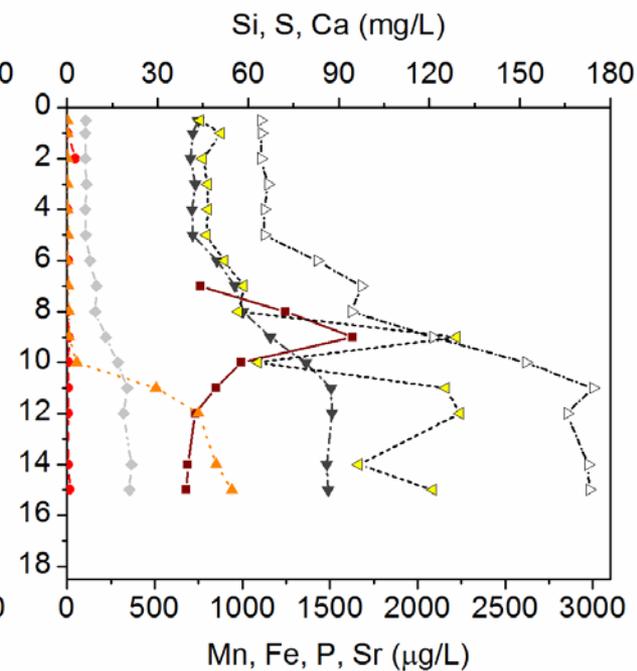
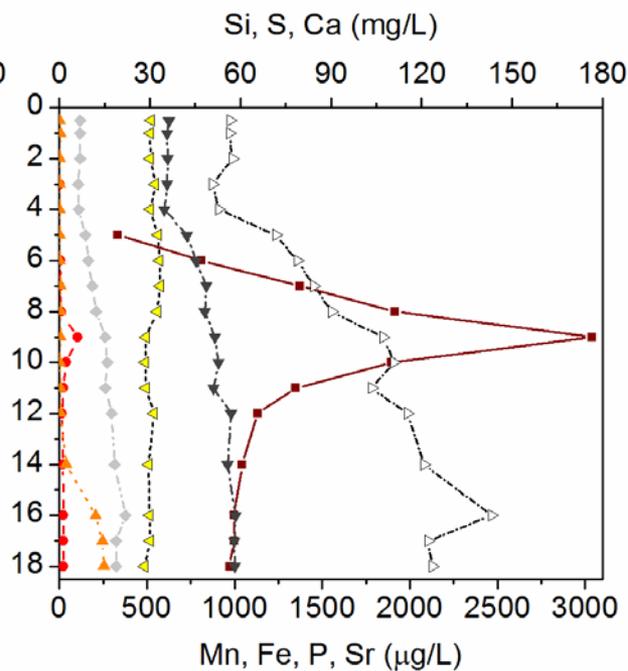
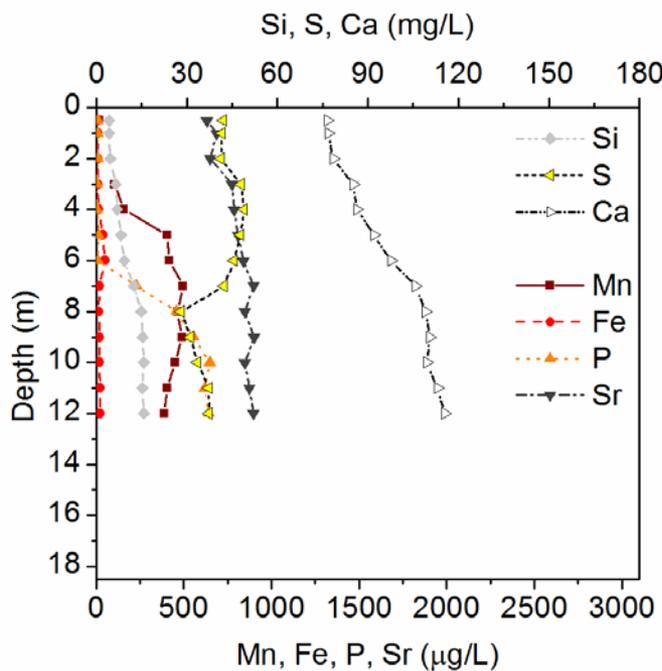
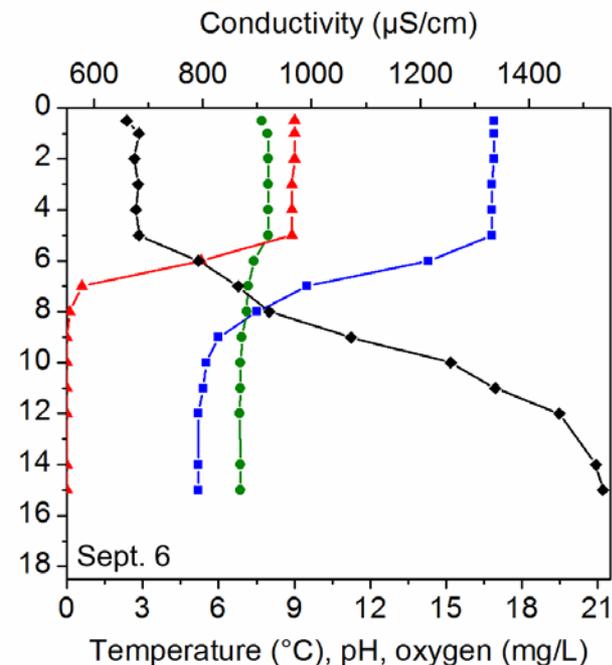
Idano



Gerharts

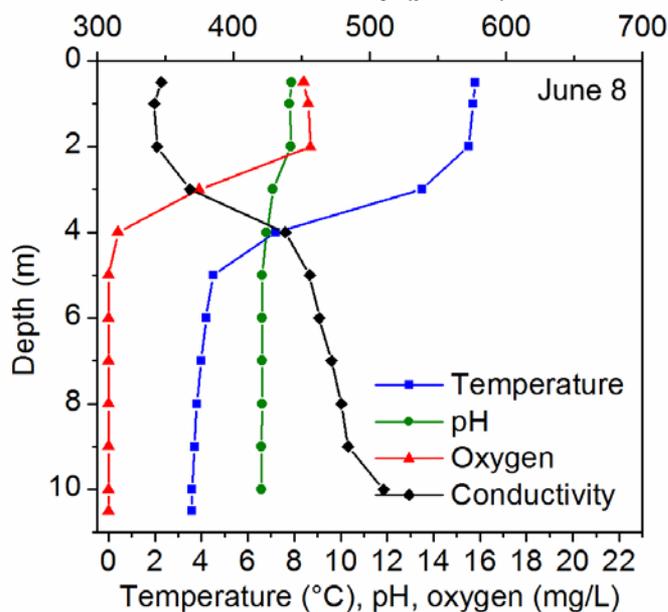


Roi South



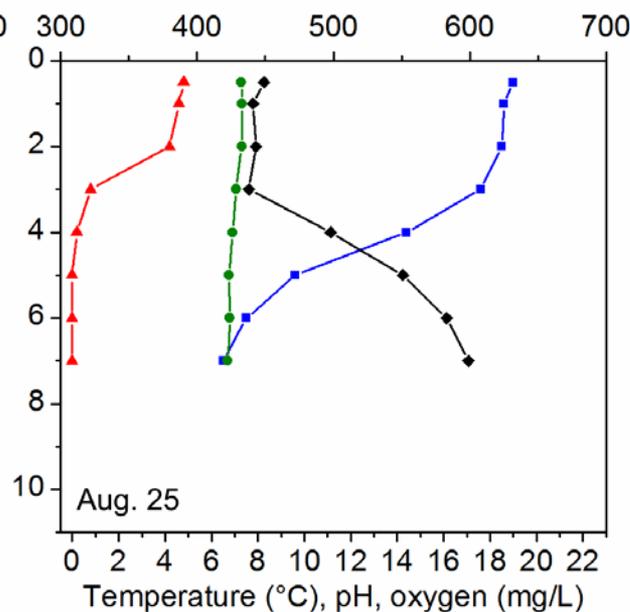
Sauer

Conductivity ($\mu\text{S/cm}$)



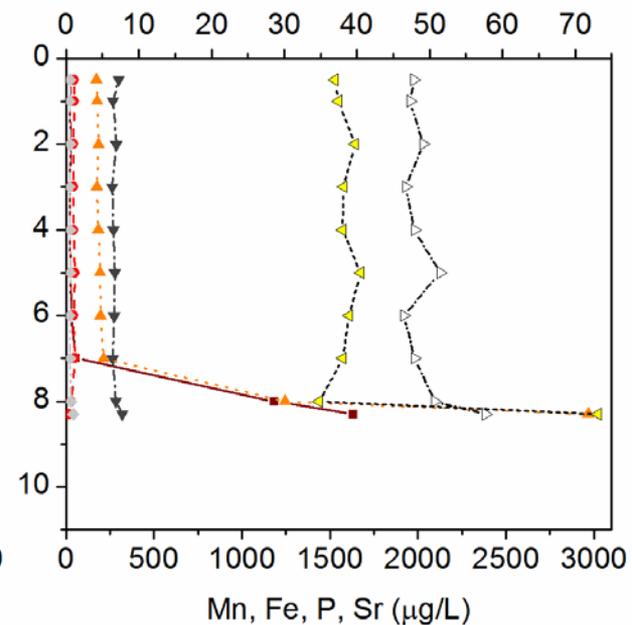
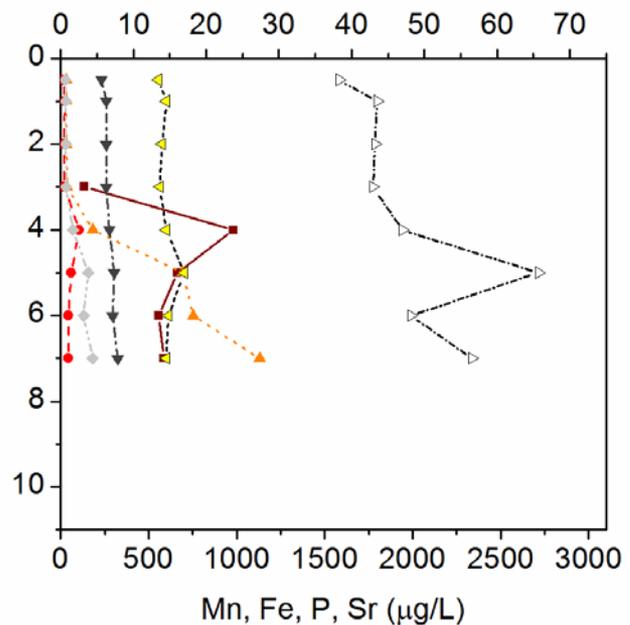
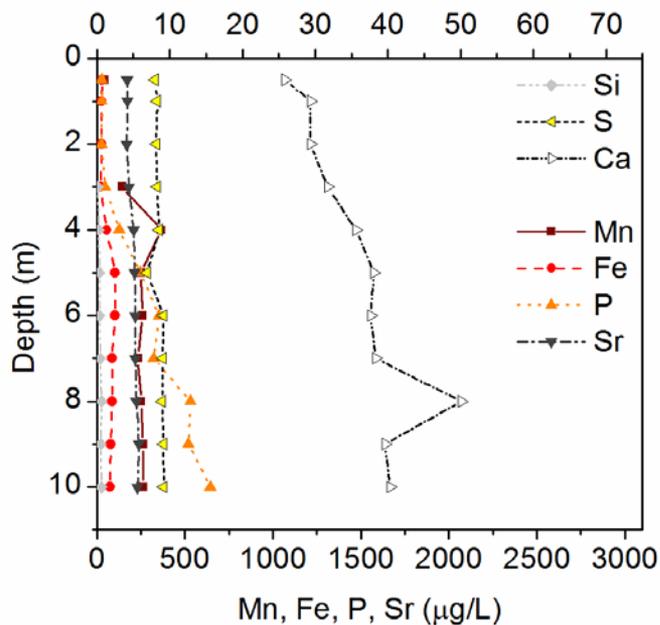
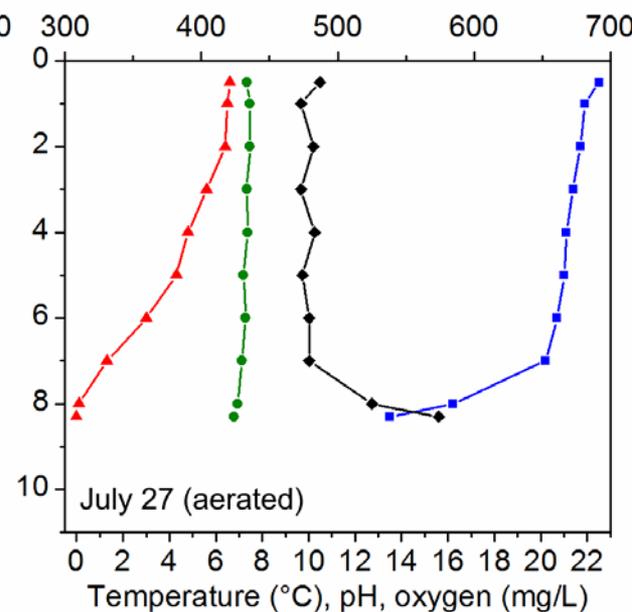
Little Mere West

Conductivity ($\mu\text{S/cm}$)



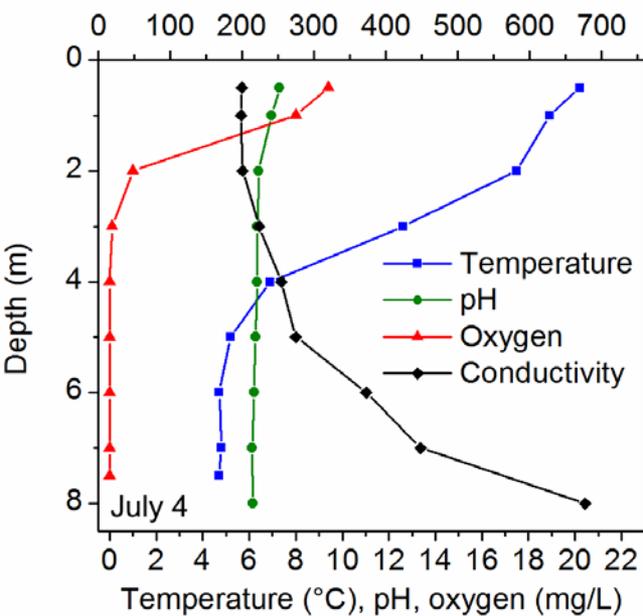
Chickakoo

Conductivity ($\mu\text{S/cm}$)



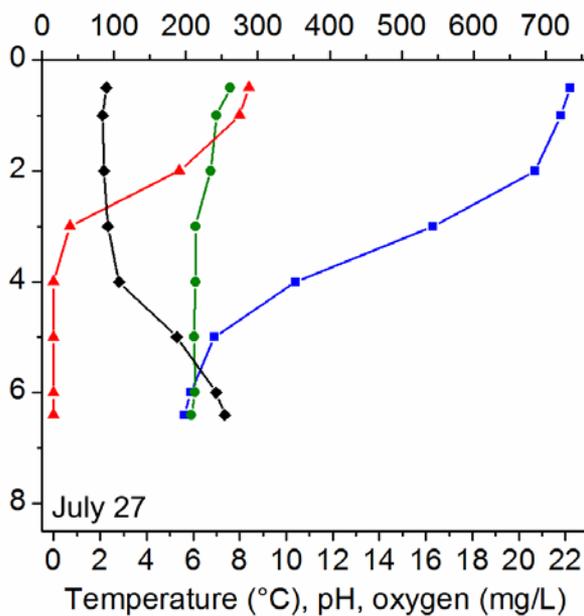
Pete's pond south

Conductivity ($\mu\text{S/cm}$)



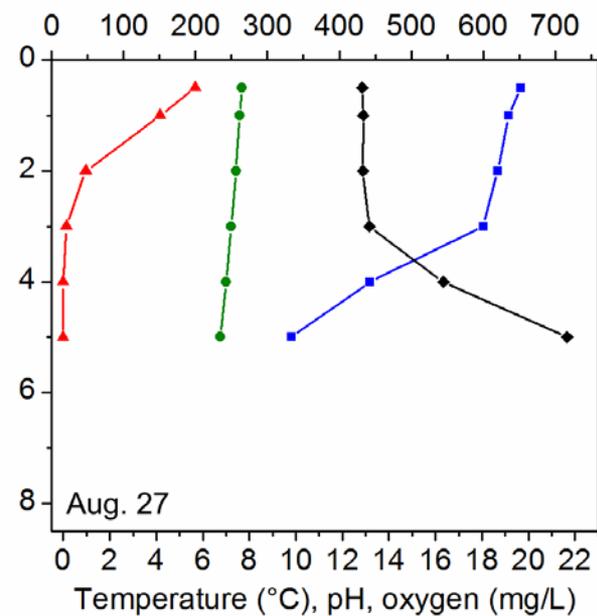
Trout Lake

Conductivity ($\mu\text{S/cm}$)

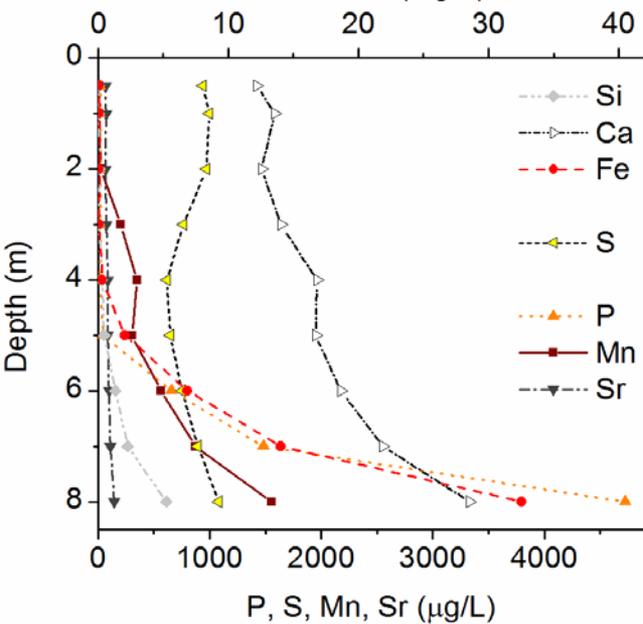


Kinsey Cove

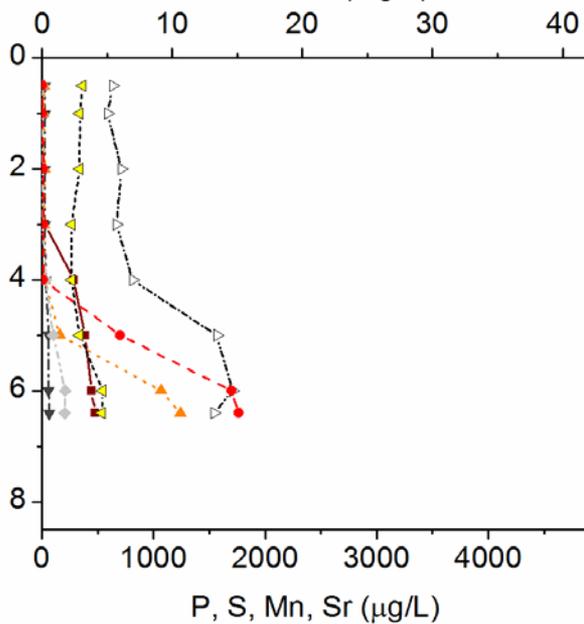
Conductivity ($\mu\text{S/cm}$)



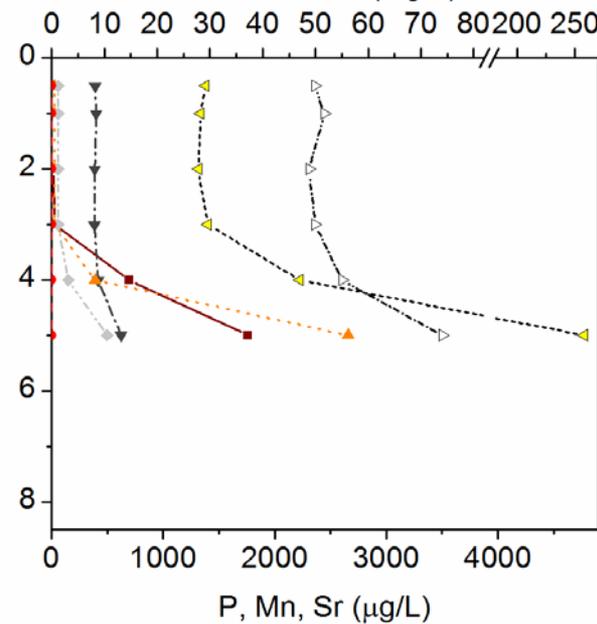
Si, Ca, Fe (mg/L)

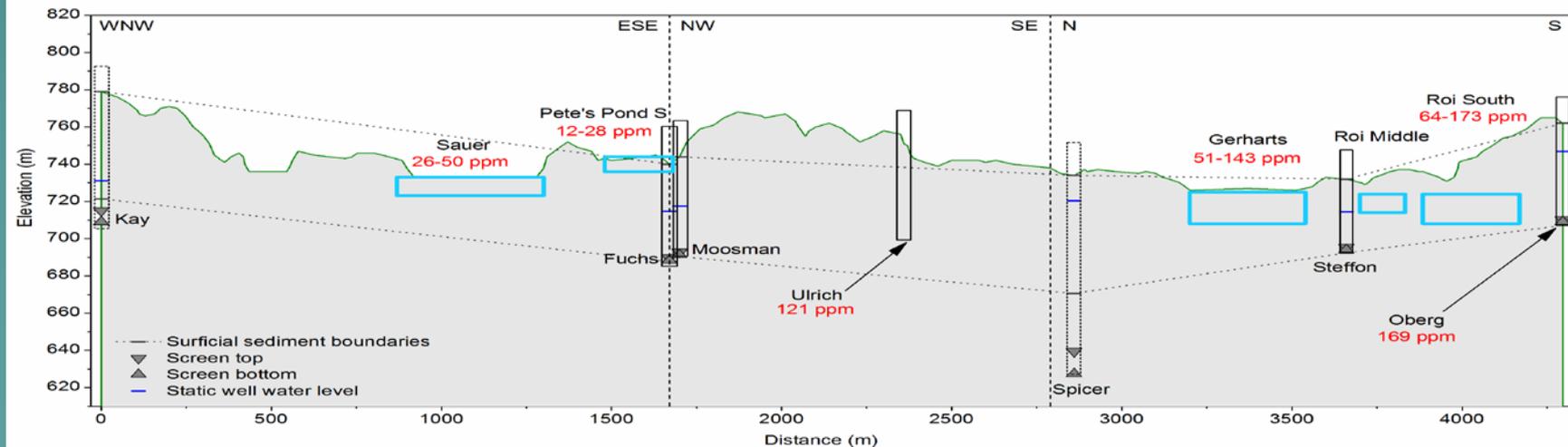
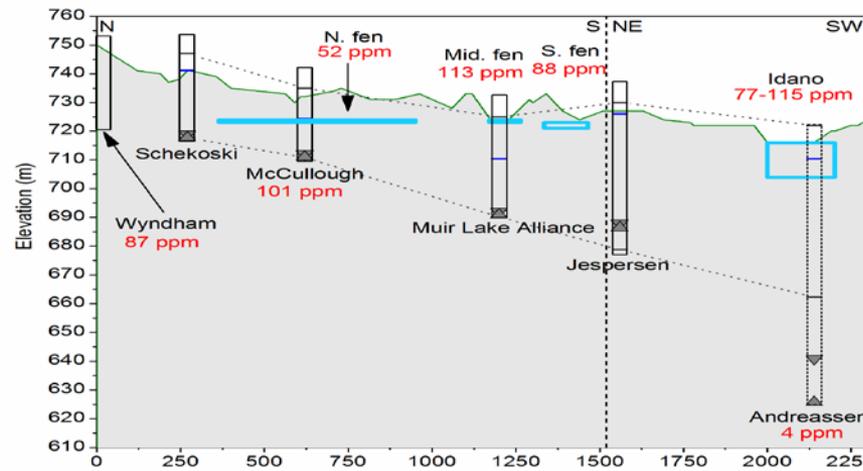
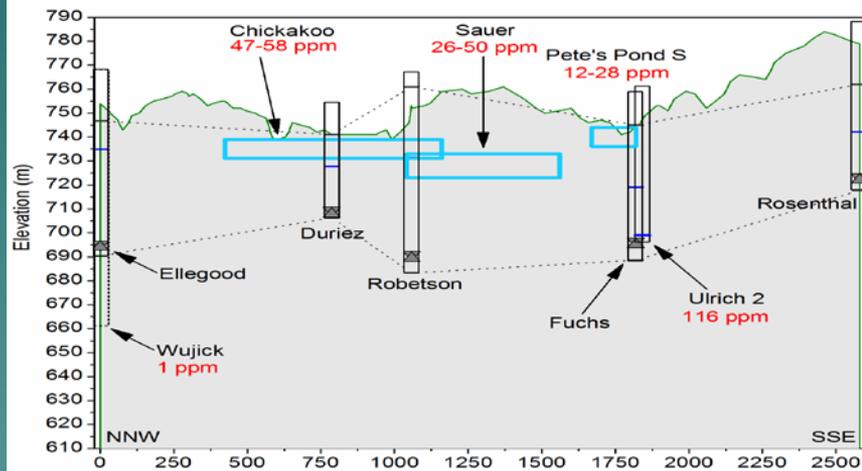
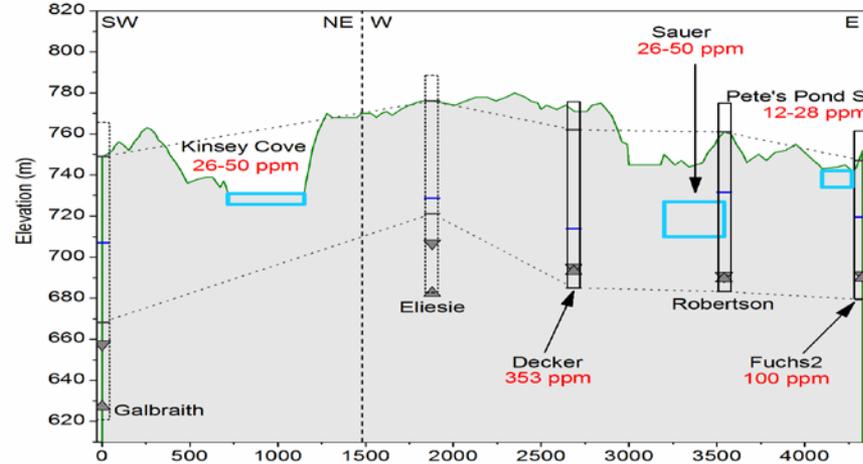
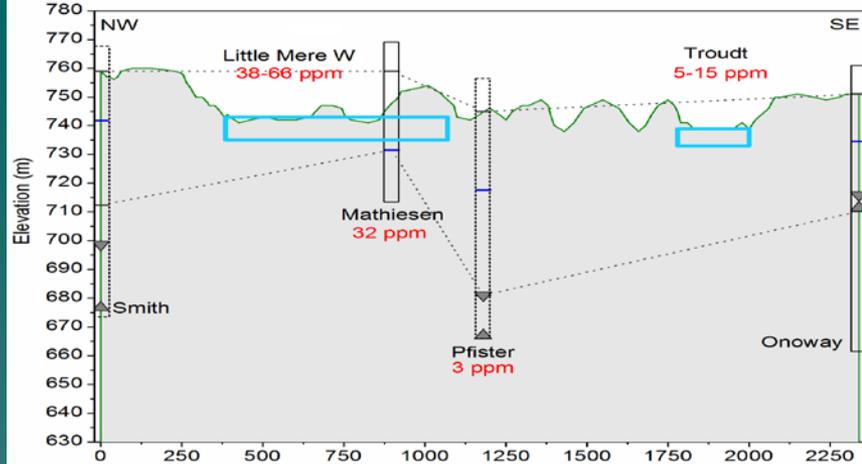


Si, Ca, Fe (mg/L)



Si, Ca, S, Fe (mg/L)





New Scientific Paper

Natural phosphorus controls in small lakes in central Alberta, Canada (2022)

Konstanin Von Gunten, David Trew, Brian
Smerdon, and Daniel S. Alessi

Submitted to Canadian Water Resources
Journal

The Winter 2021 Project

ALMS - 19 lakes tested for late
winter dissolved oxygen conditions
in Feb/March 2021

The 2021 Winter Sampling Team:

Walt Neilson

Dale Loosemore

Tyler Shyry

Alvin Steinke

David Trew





























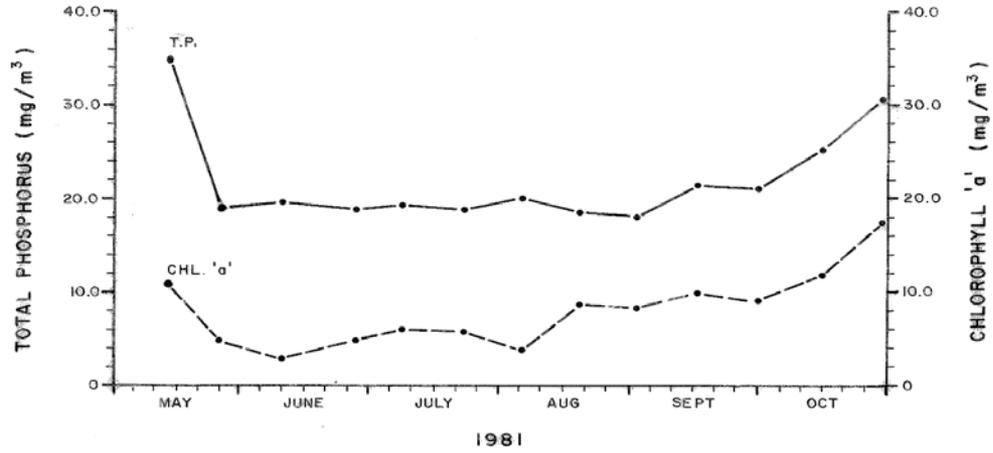


The 2021 Summer Project

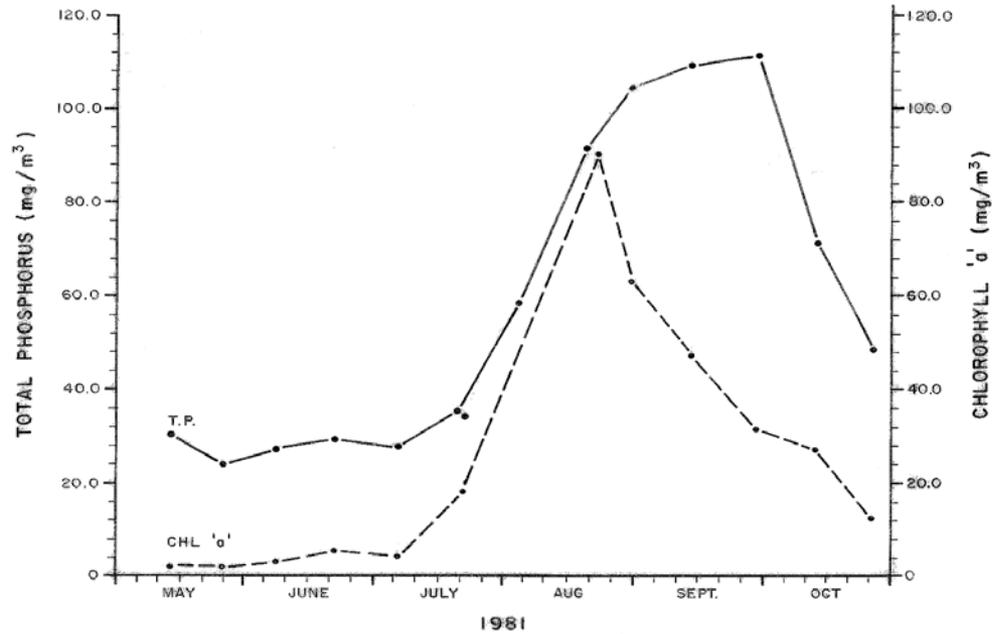
- ◆ Late summer surveys conducted on 44 lakes (including 11 of those sampled in summer 2020)
- ◆ Funding and in-kind support received from
 - Land Stewardship Centre of Canada
 - Alberta Lake Management Society
 - Stony Plain Fish and Game Association
 - Mayatan Lake Management Association
 - North Saskatchewan Watershed Alliance

This survey was designed to sample shallow lakes at peak algal growth and deep lakes at their minimum algal growth-
August/September

ETHEL LAKE



TUCKER LAKE



The 2021 Summer Sampling Team:

Walt Neilson

Pauline Molnar

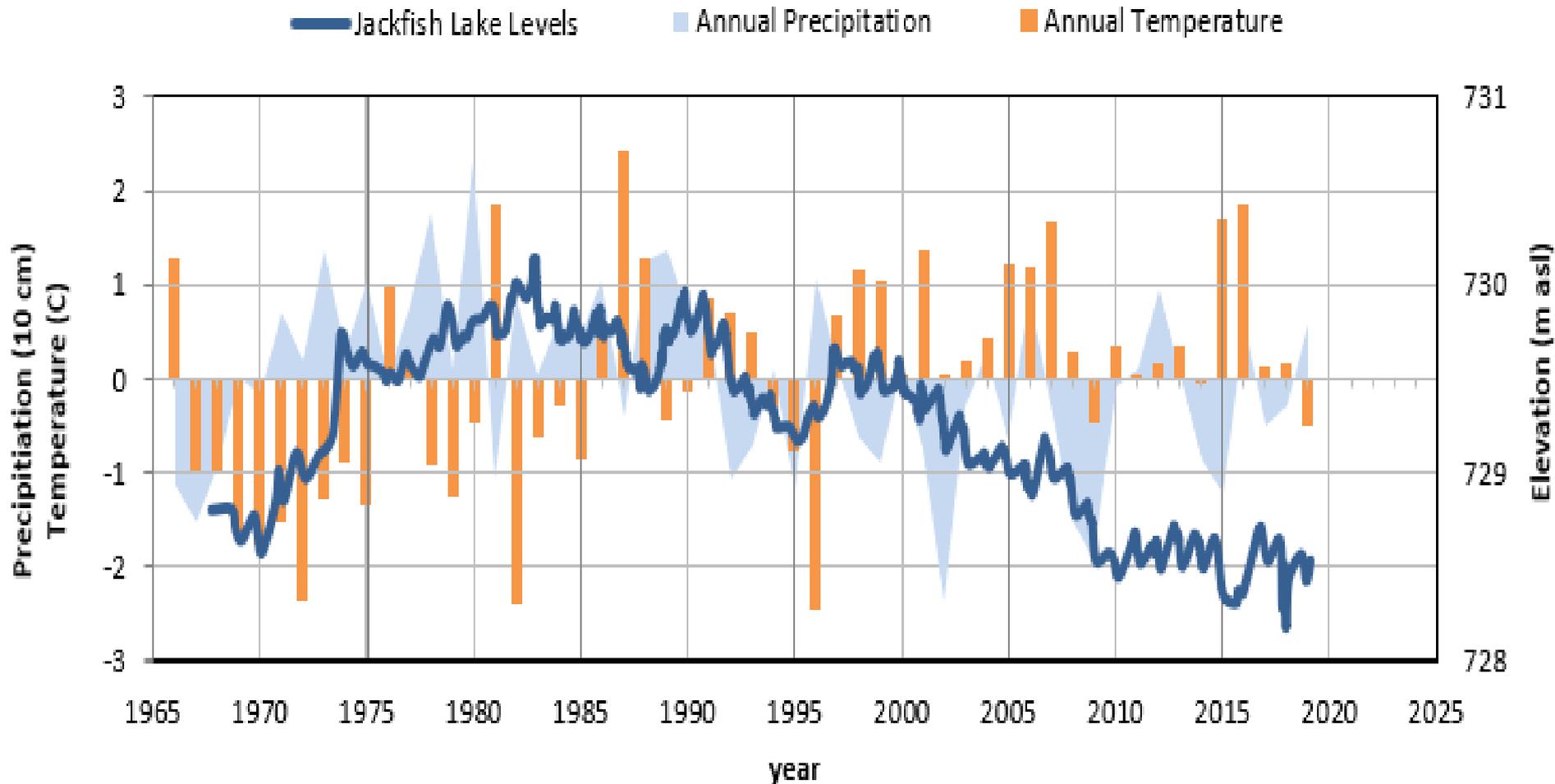
David Trew



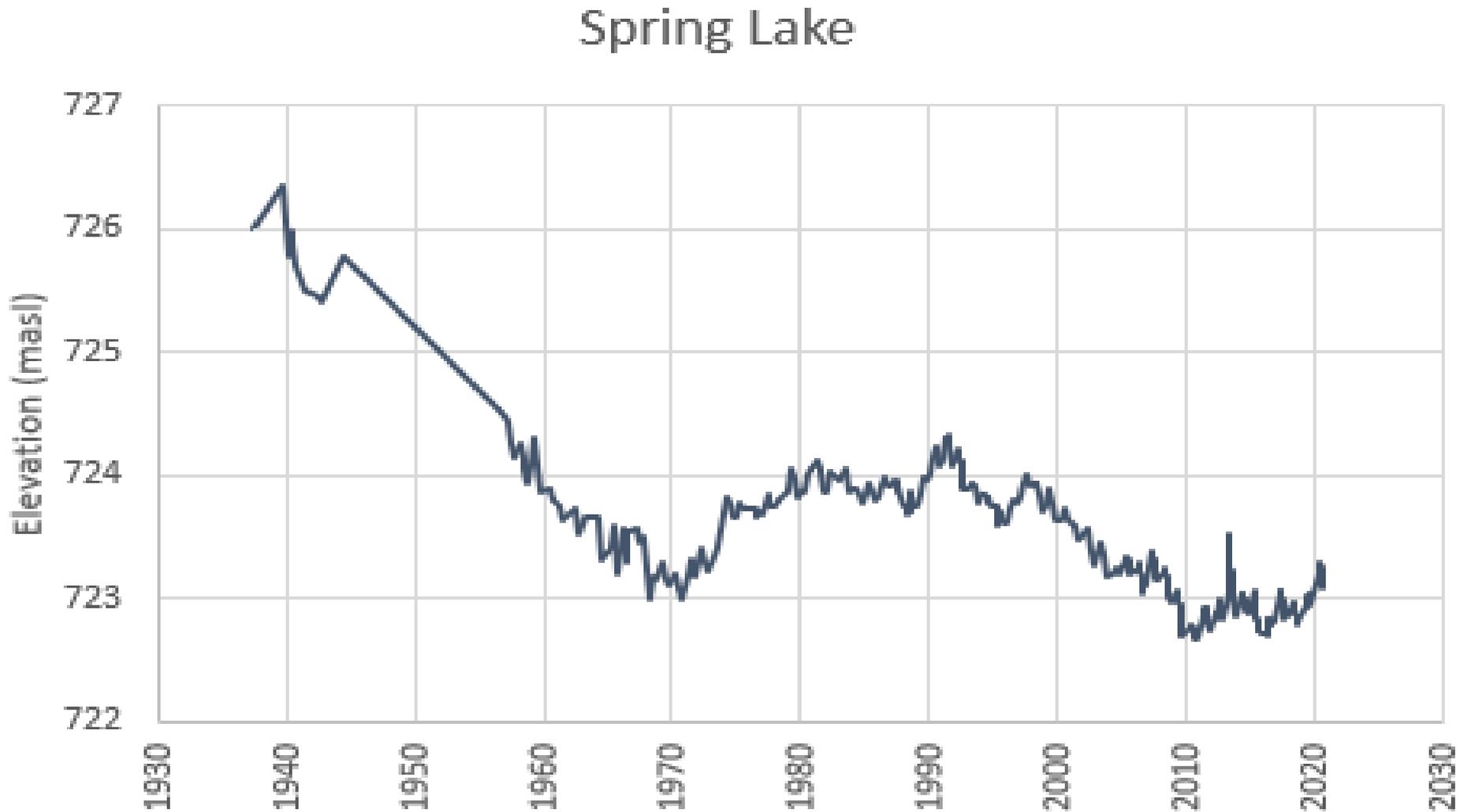




Lake Level Trends at Jackfish Lake Compared with Climate Data (1968-2020)



Lake Level Trends at Spring Lake (1937-2020)



Casual observations on lake levels
- note impacts to cattails from
higher water levels in 2021

PL2 2020



PL2 2020



PL2 2021



PL2 2021



Little Mere 2020



Little Mere 2021





Little Mere 2021
Shoreline trees immersed

PL18 2020



PL18 2021



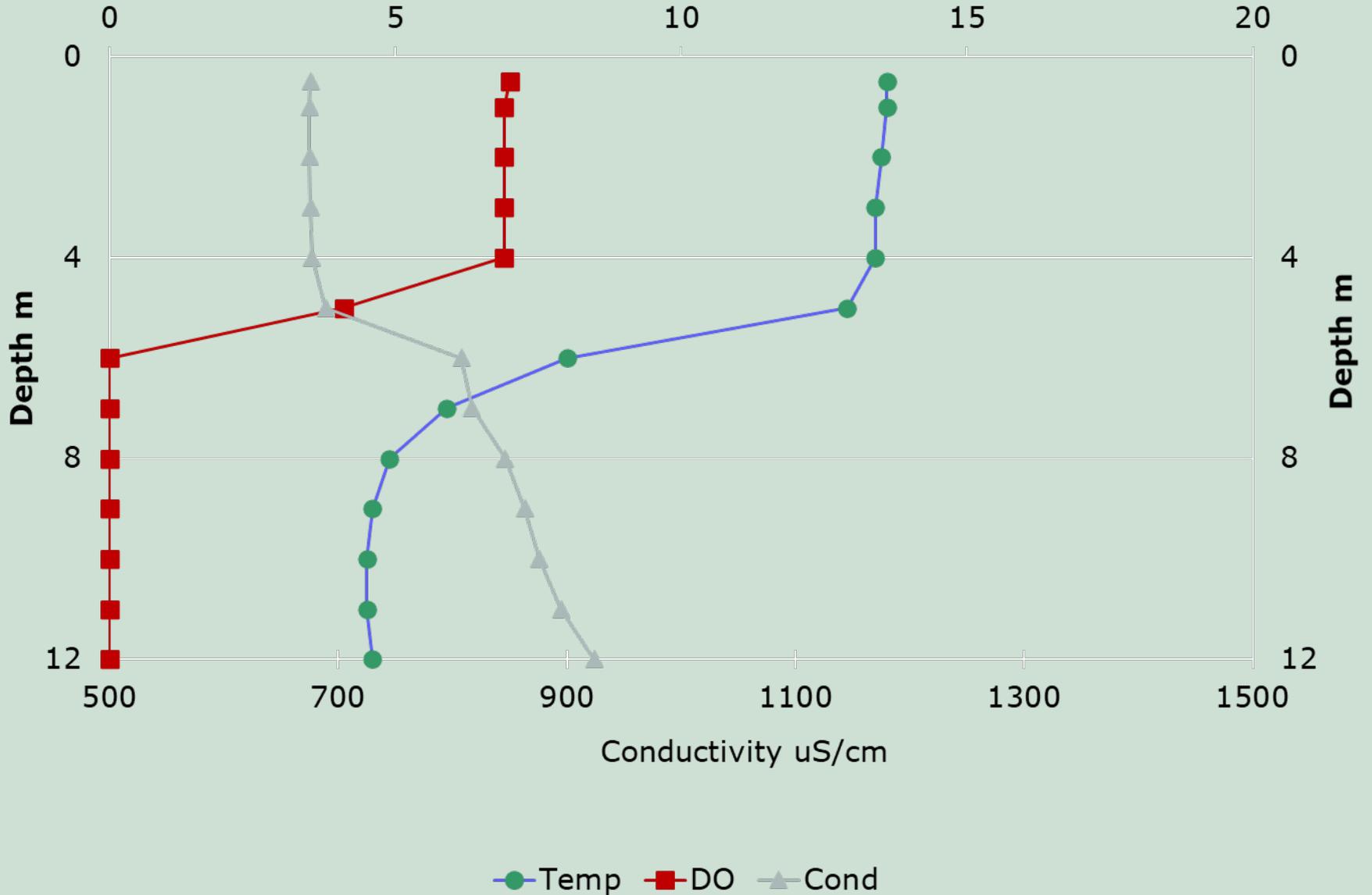
2021 Results

Late summer profile Data:
DO, Temp, Cond

Special thanks to Dr. Steve Craik for
preparing the graphs

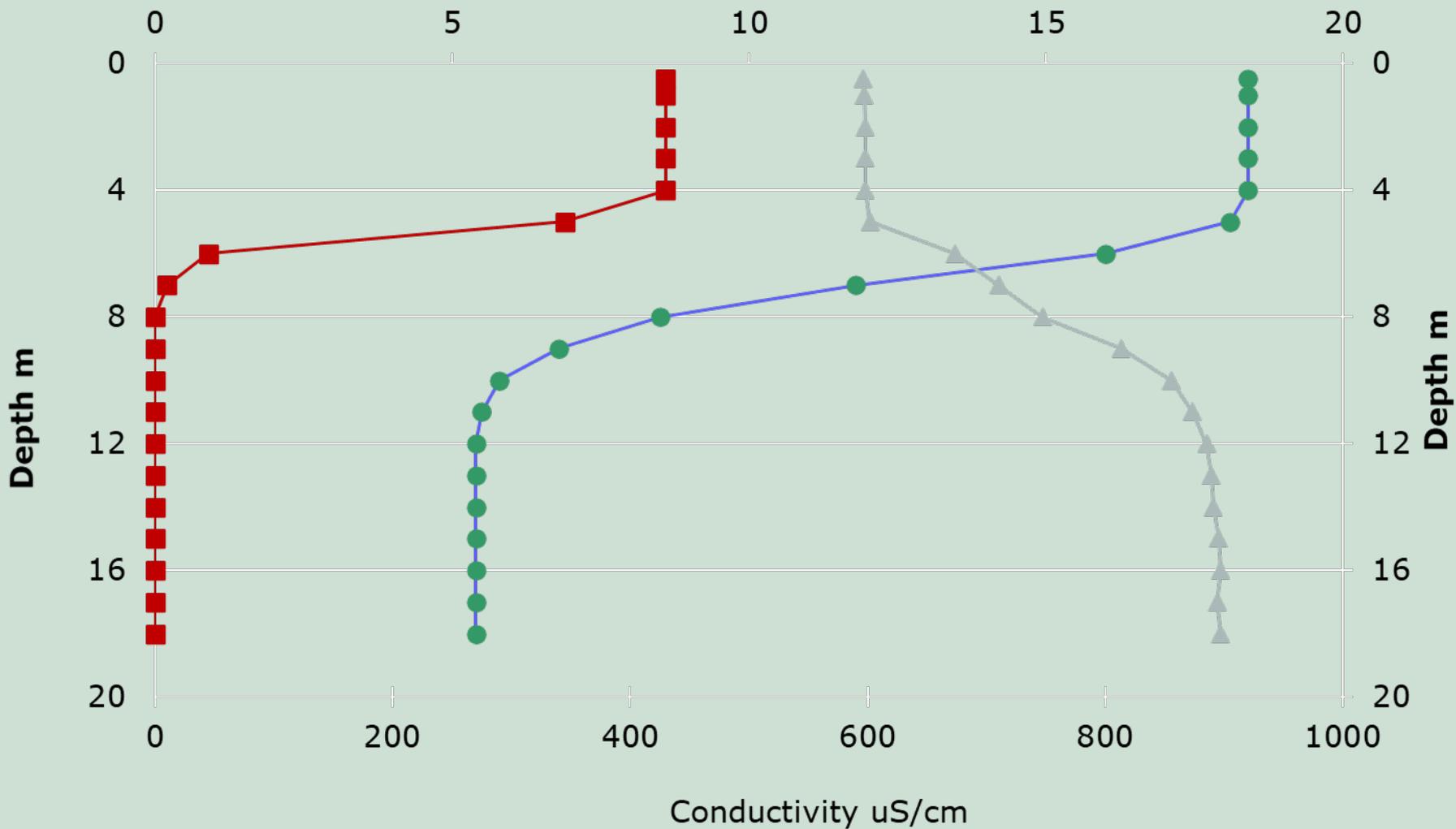
PL1 (Idano) Lake Profile (max depth = 12.1 m)

T °C, DO mg/L



Gerharts Lake Profile (max depth = 18.2 m)

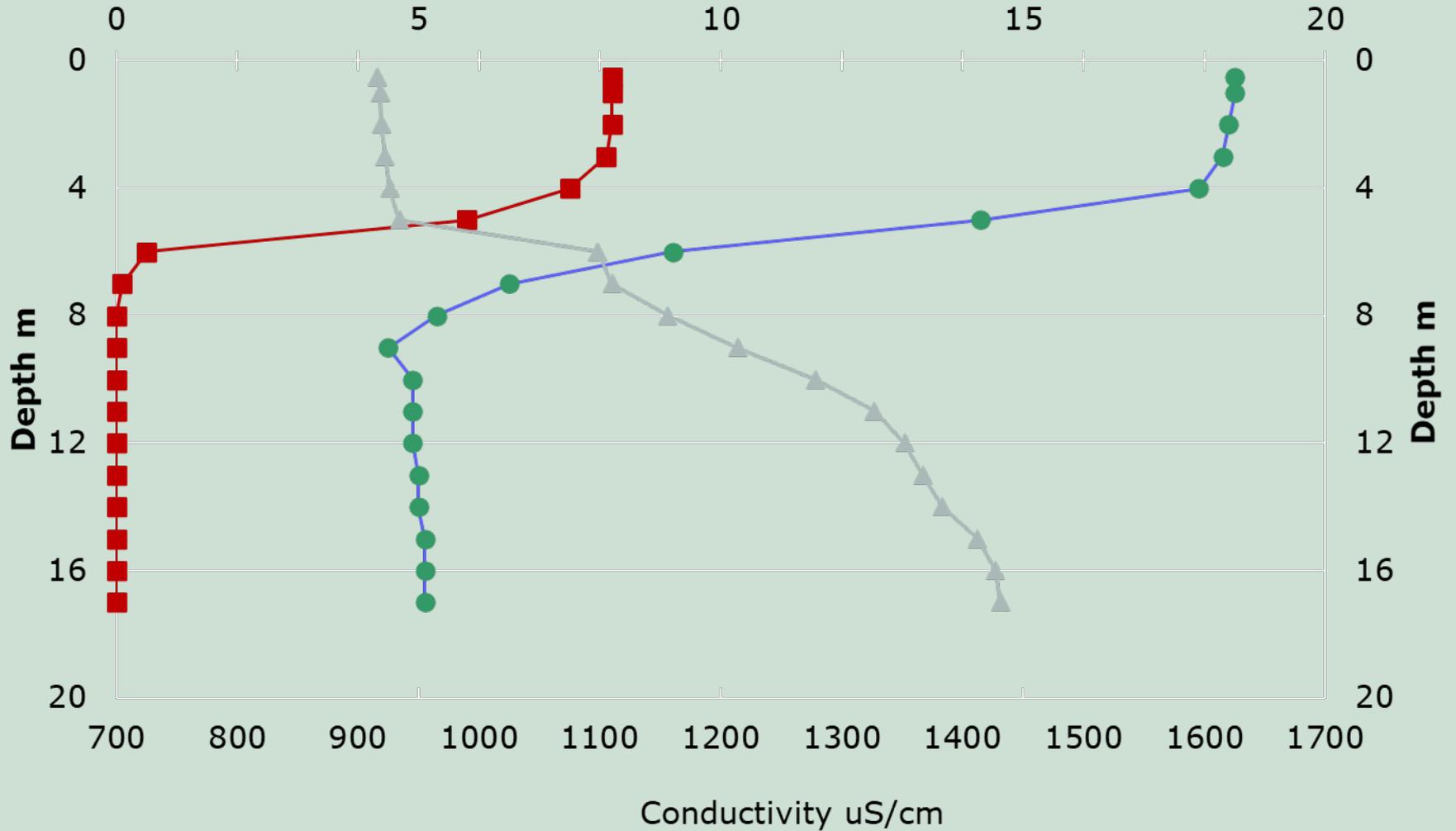
T °C, DO mg/L



● Temp ■ DO ▲ Cond

PL9 (Leo's) Lake Profile (max depth = 17.0 m)

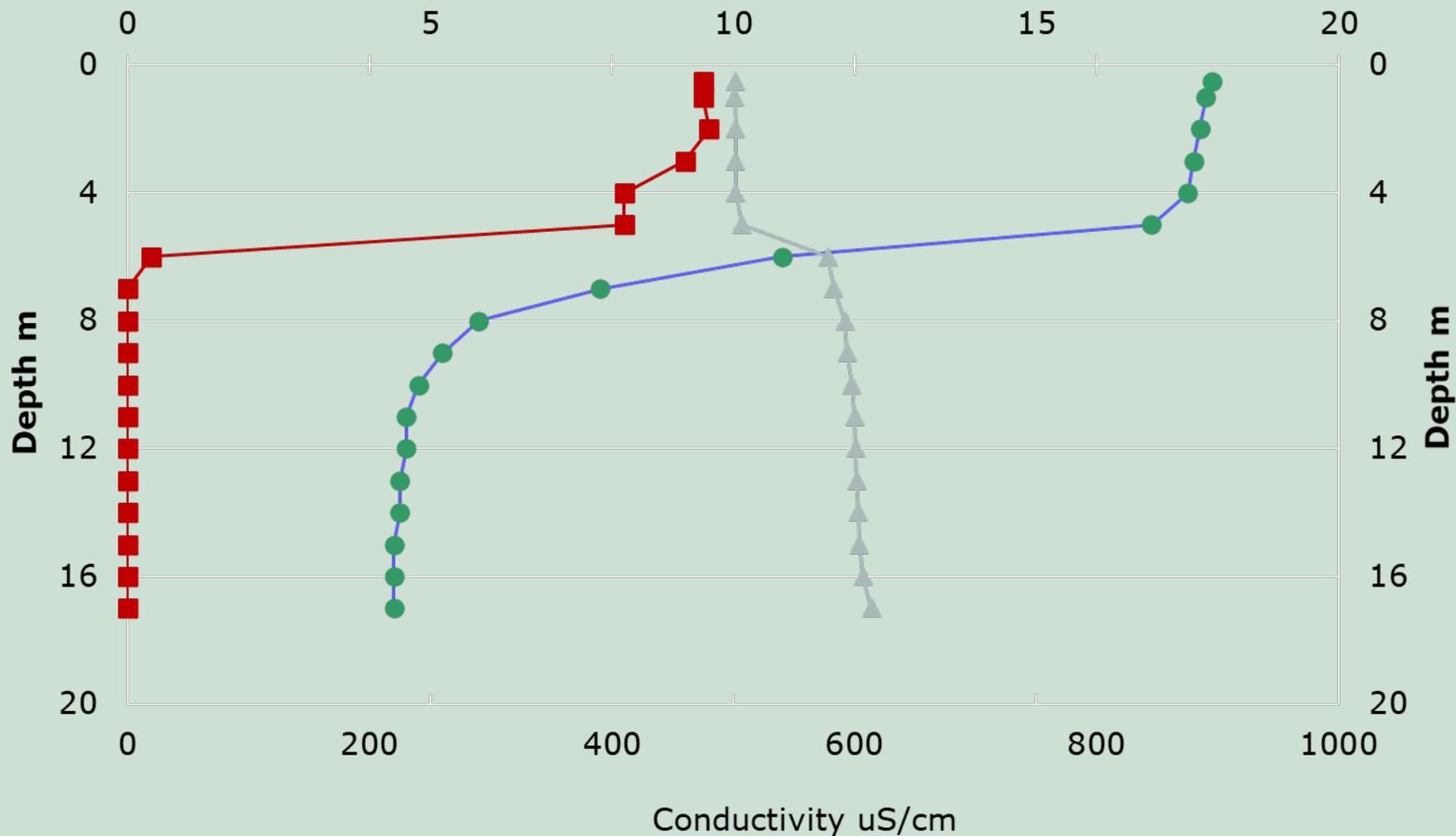
T °C, DO mg/L



● Temp ■ DO ▲ Cond

PL7 (McMorran) (max depth = 17.5 m)

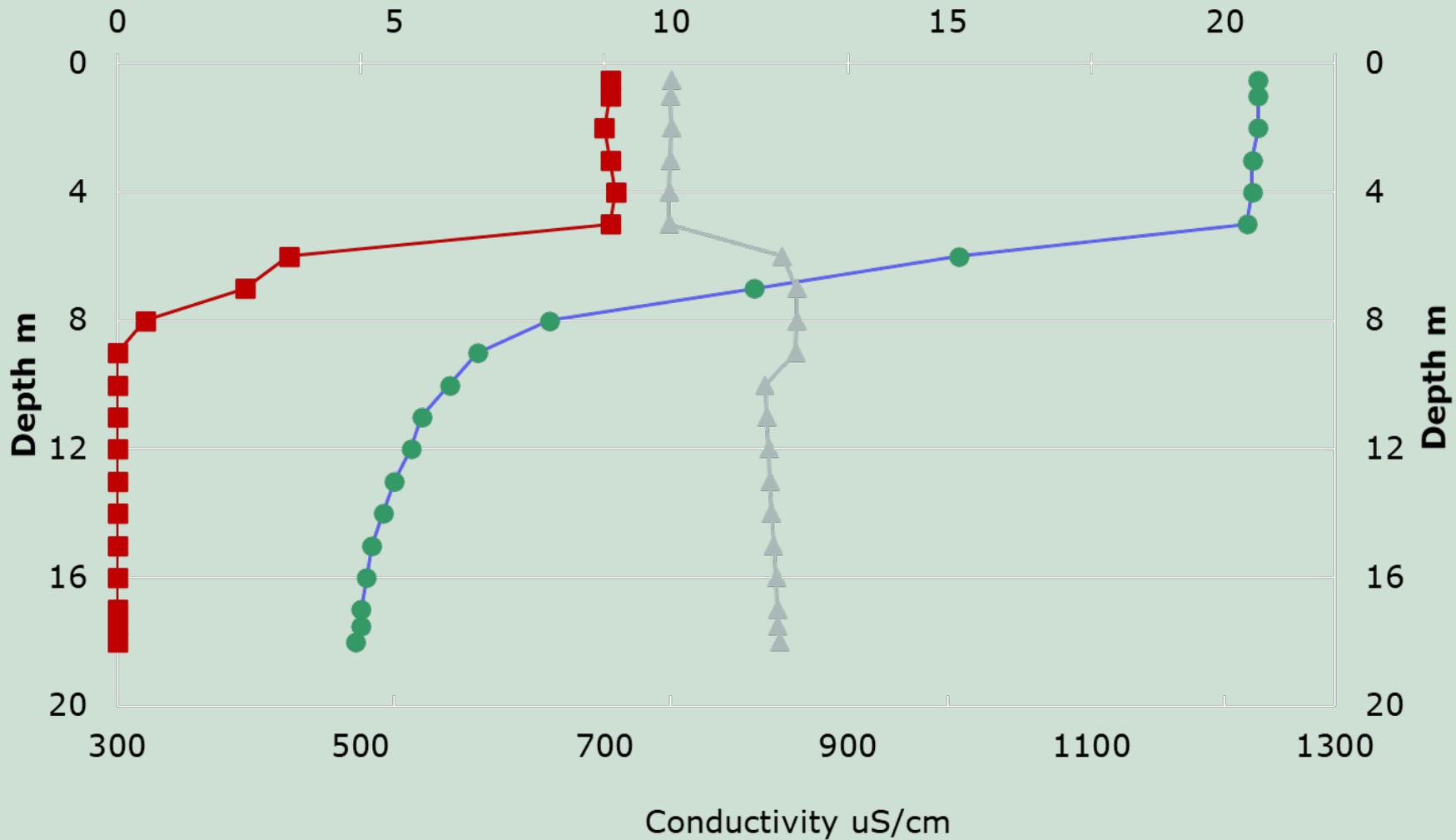
T °C, DO mg/L



● Temp ■ DO ▲ Cond

Mayatan West Profile (max depth = 18.1 m)

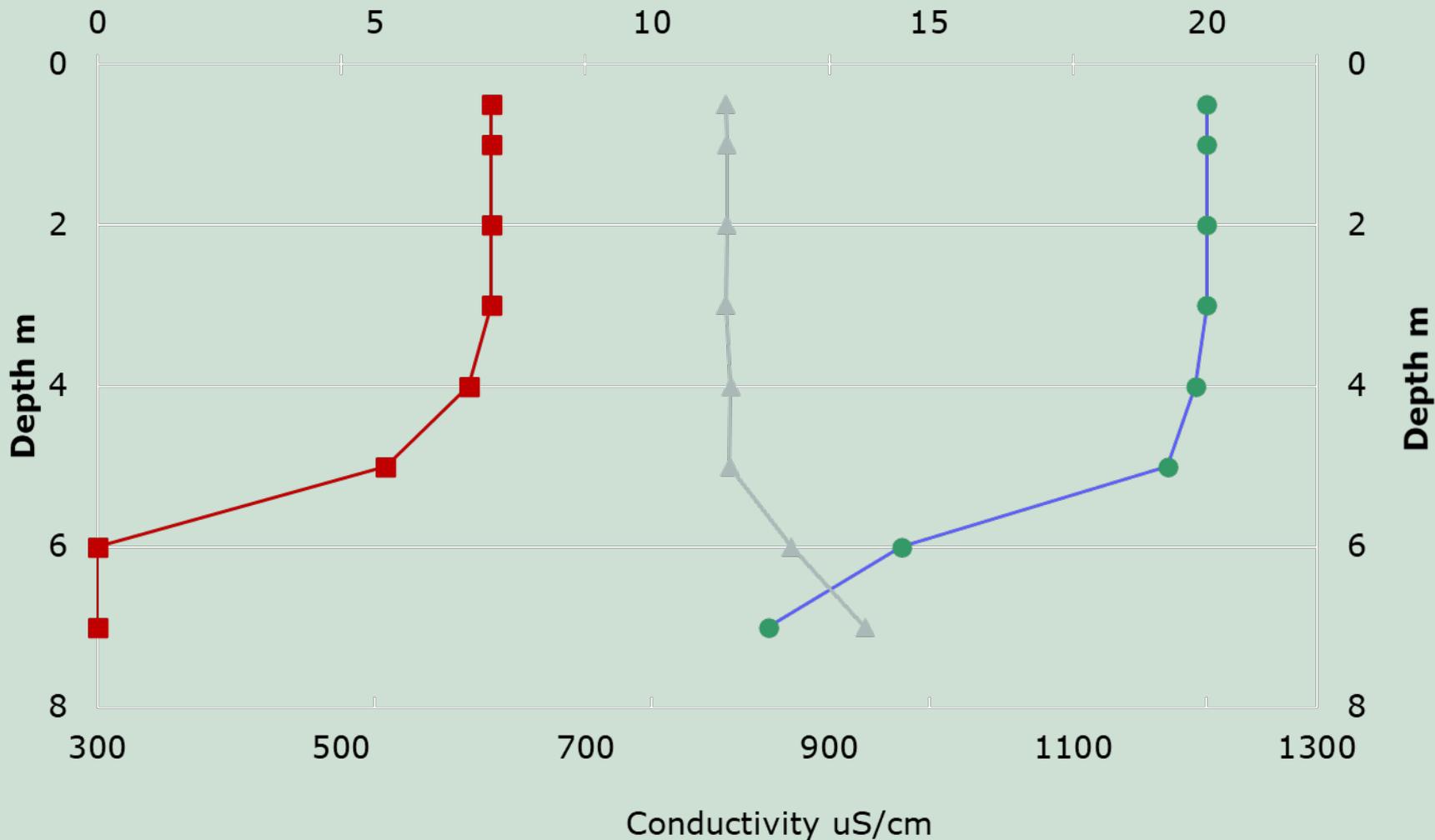
T °C, DO mg/L



● Temp ■ DO ▲ Cond

Mayatan East Profile (max depth = 7.4 m)

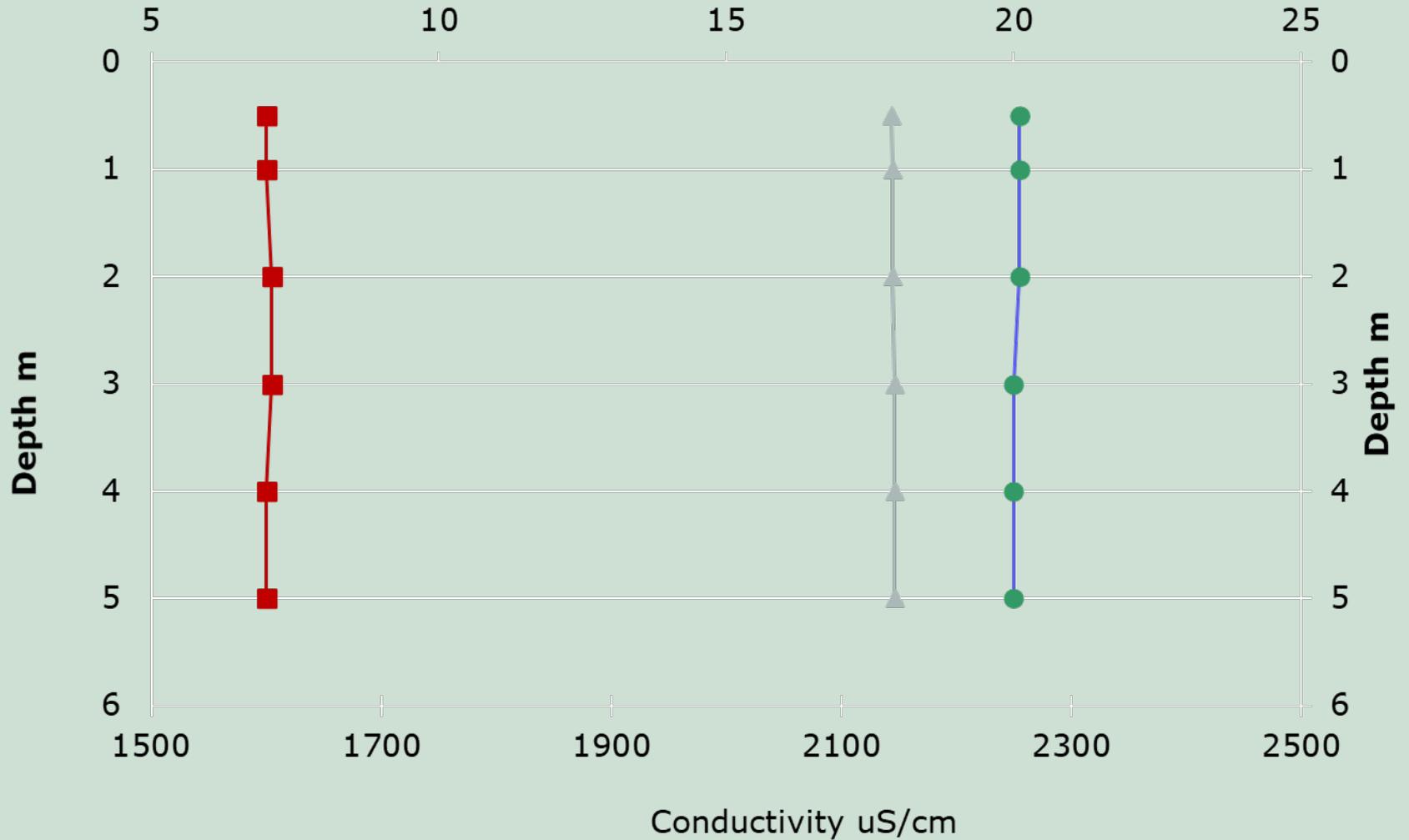
T °C, DO mg/L



● Temp ■ DO ▲ Cond

Mink Lake Profile (max depth = 5.1 m)

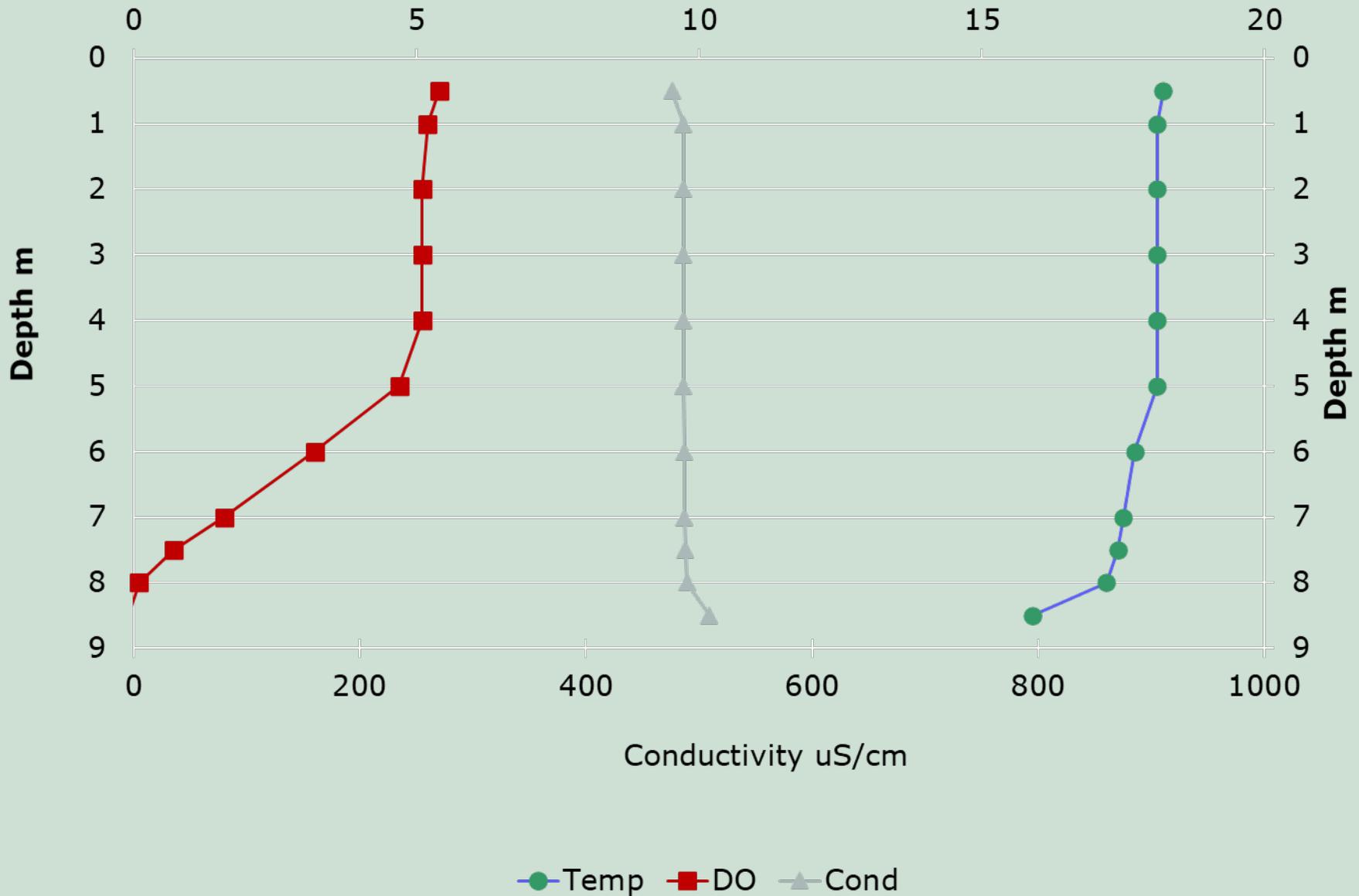
T °C, DO mg/L



● Temp ■ DO ▲ Cond

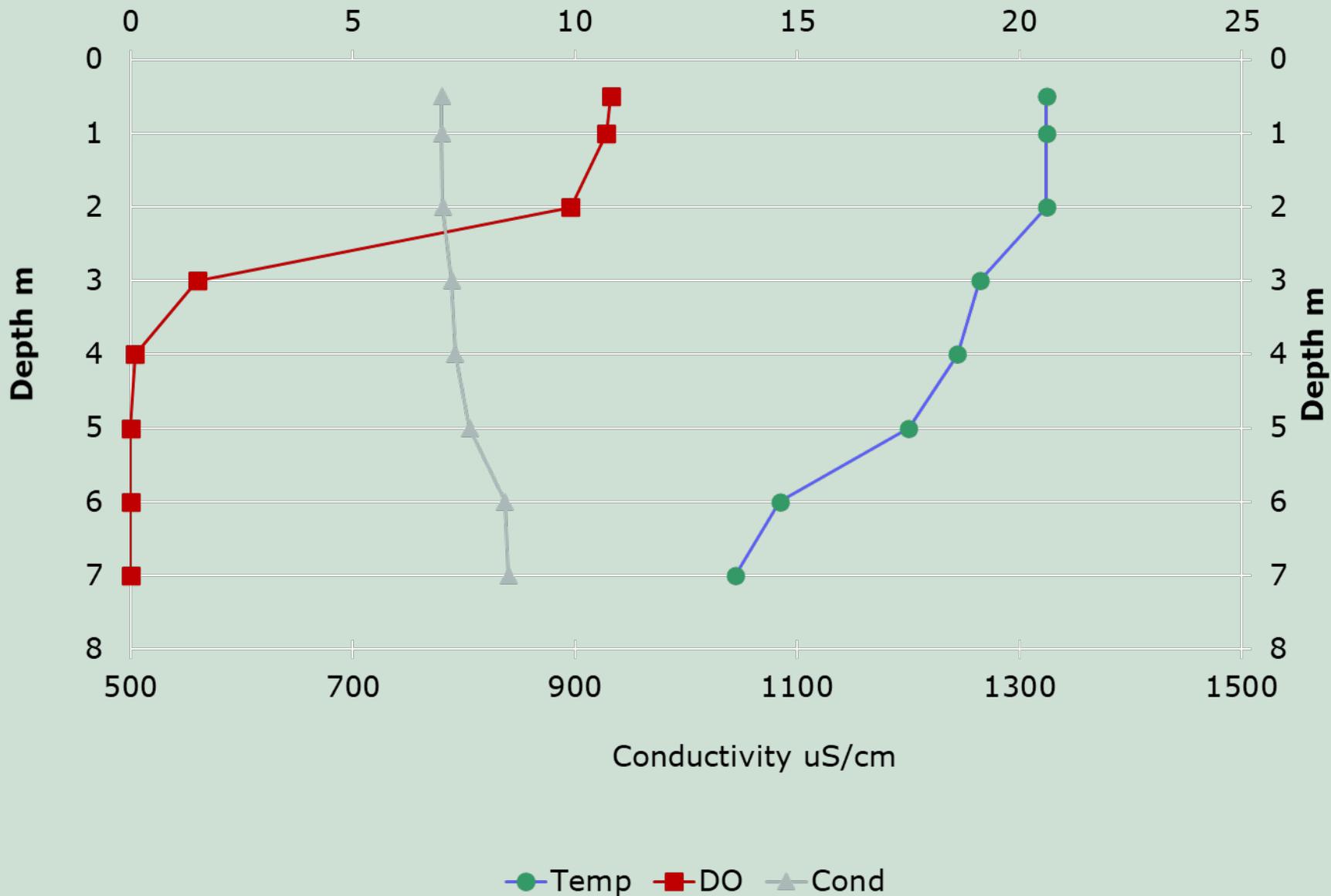
Chickakoo Lake Profile (max depth = 8.8 m)

T °C, DO mg/L



Hasse Lake Profile (max depth = 7.5 m)

T °C, DO mg/L



ALMS/MLMA Technical Report Spring 2022



Thank you!



Thank you!





Thank you!

Thanks again!

