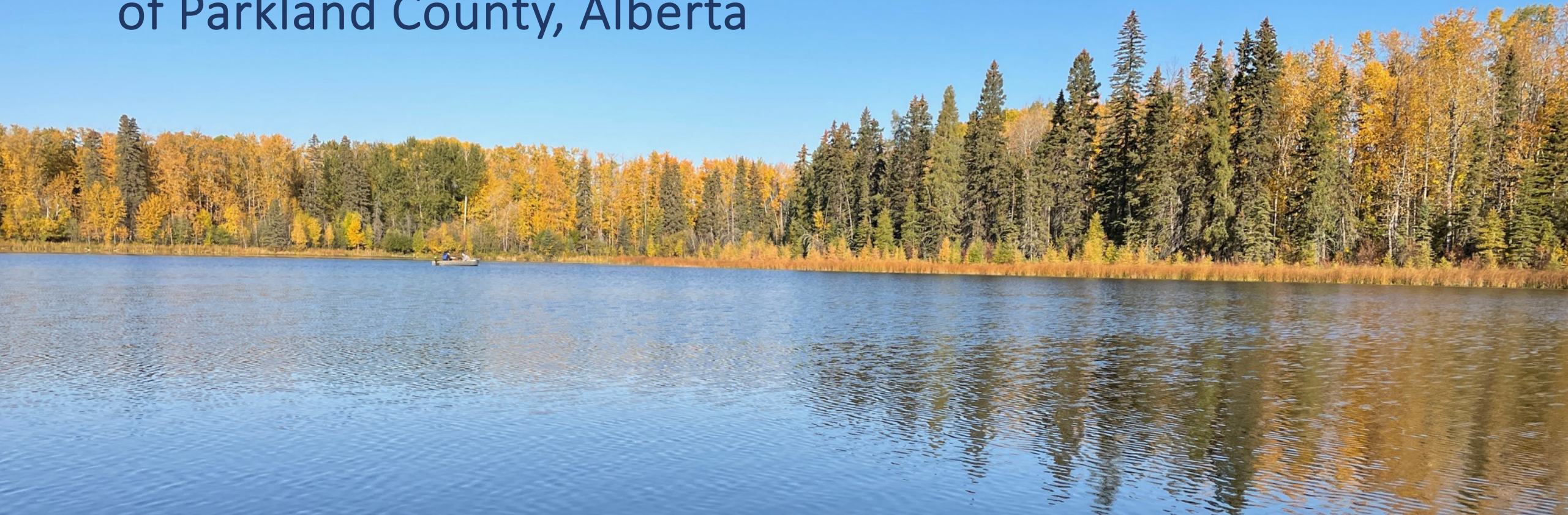


A citizen-led water quality survey to update knowledge and stimulate community interest in protecting the lakes of Parkland County, Alberta



Brian Smerdon

David Trew, Walter Neilson, Dave Mussell

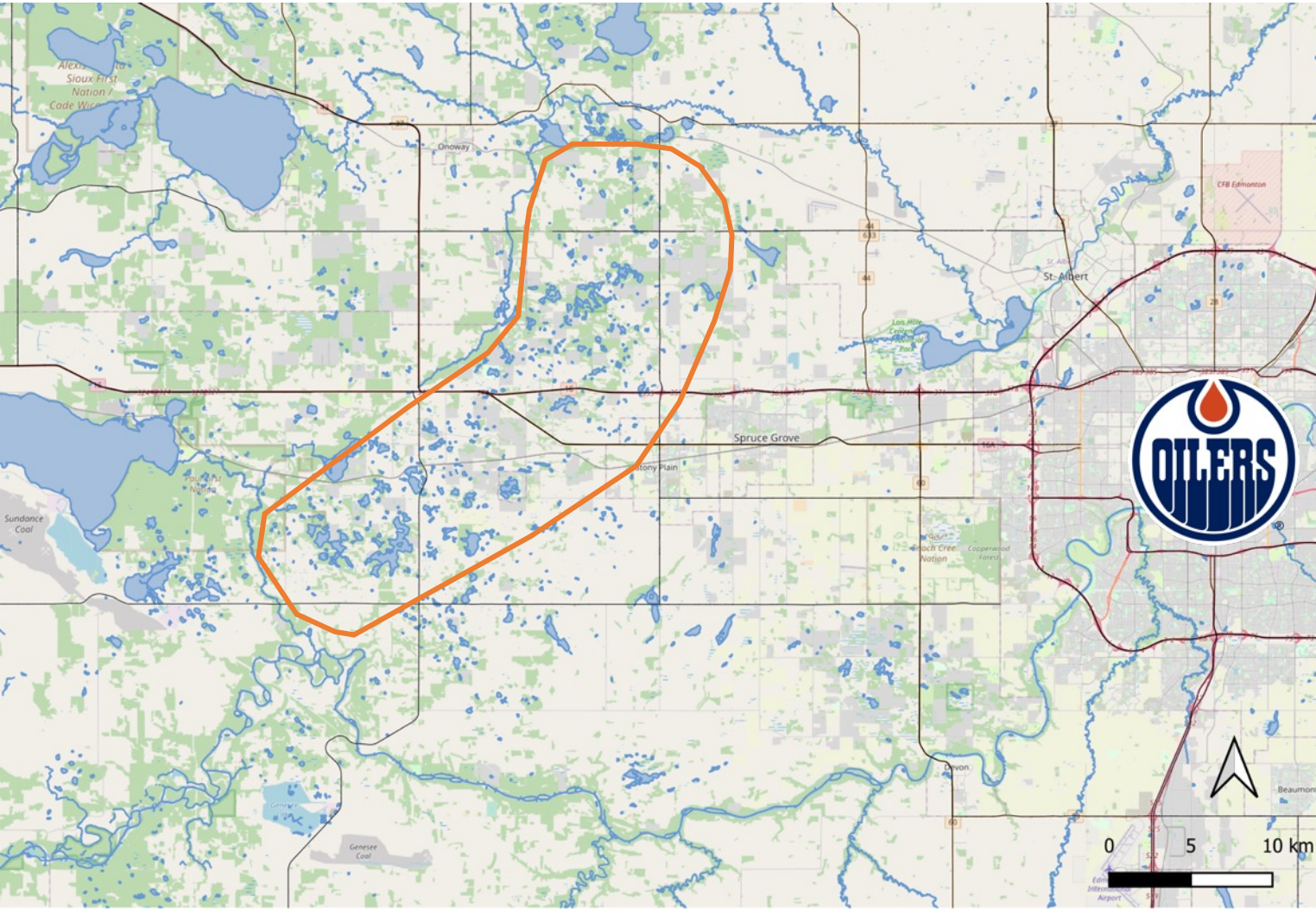
Bradley Peters



**UNIVERSITY
OF ALBERTA**



Lakes of Parkland County, Alberta



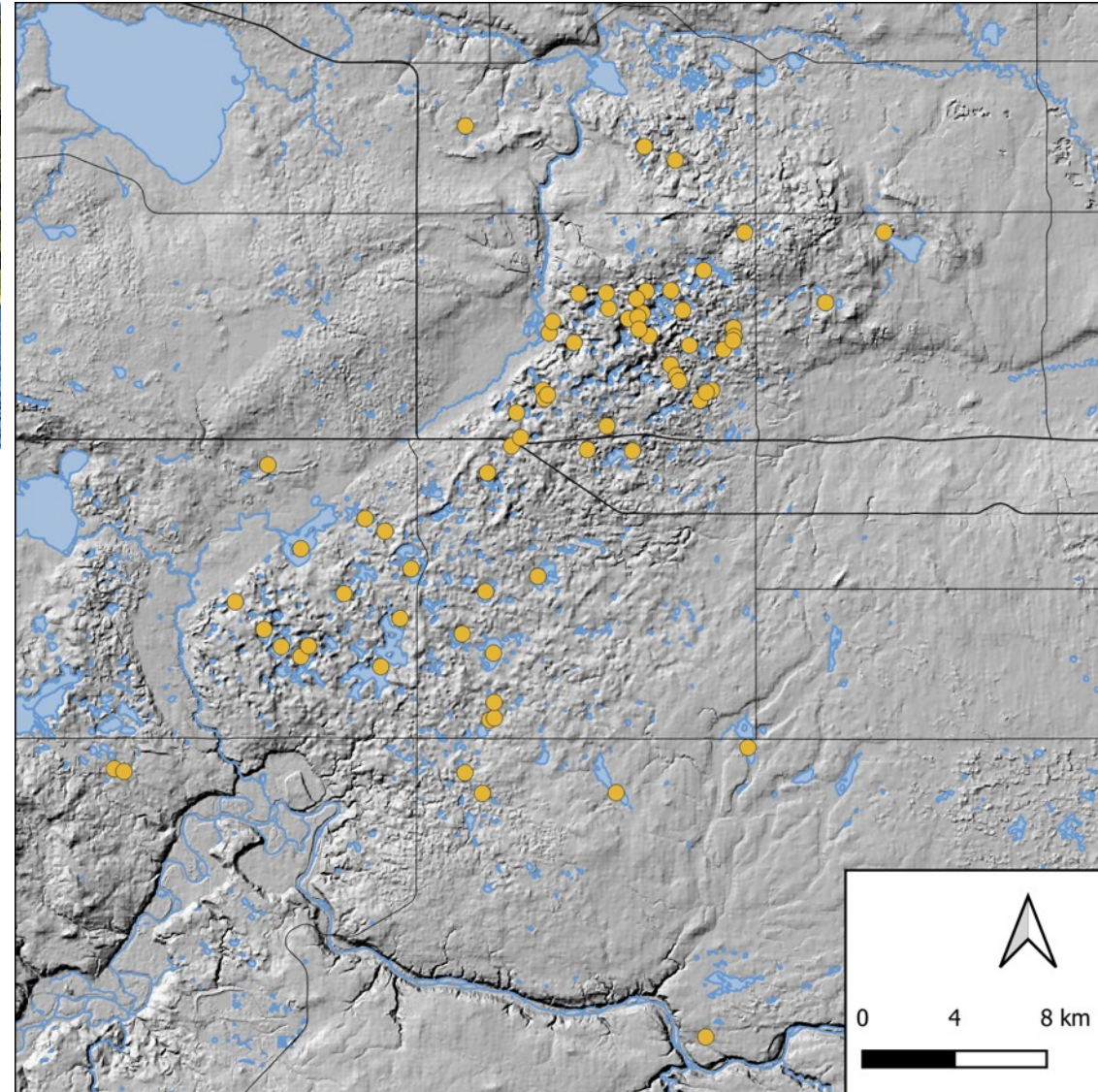
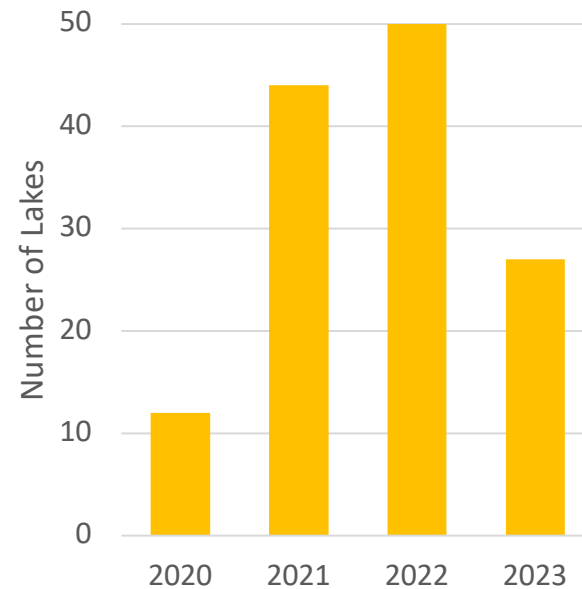
- Dozens of small kettle lakes with unique ecological value
 - Support fish, wildlife and waterfowl
 - Recreation
- Threatened by a changing landscape
 - How are they responding to anthropogenic development?
- Small lakes rarely investigated systematically or managed as a collective

Citizen-led Water Quality Survey



Goals:

- Develop a regional overview of lake quality
- Connect with landowners
- Raise awareness in the County



Citizen-led Water Quality Survey

*

Landowners

- Access to private property
- Dock, boat (sometimes)

North Saskatchewan Watershed Alliance

- Community interest
- Outreach

*

Mayatan Lake Management Association

- Lead organization
- Field volunteer coordination
- Landowner contact

Alberta Environment and Protected Areas

- Invasive species

University of Alberta

- Groundwater research
- Microbiology research

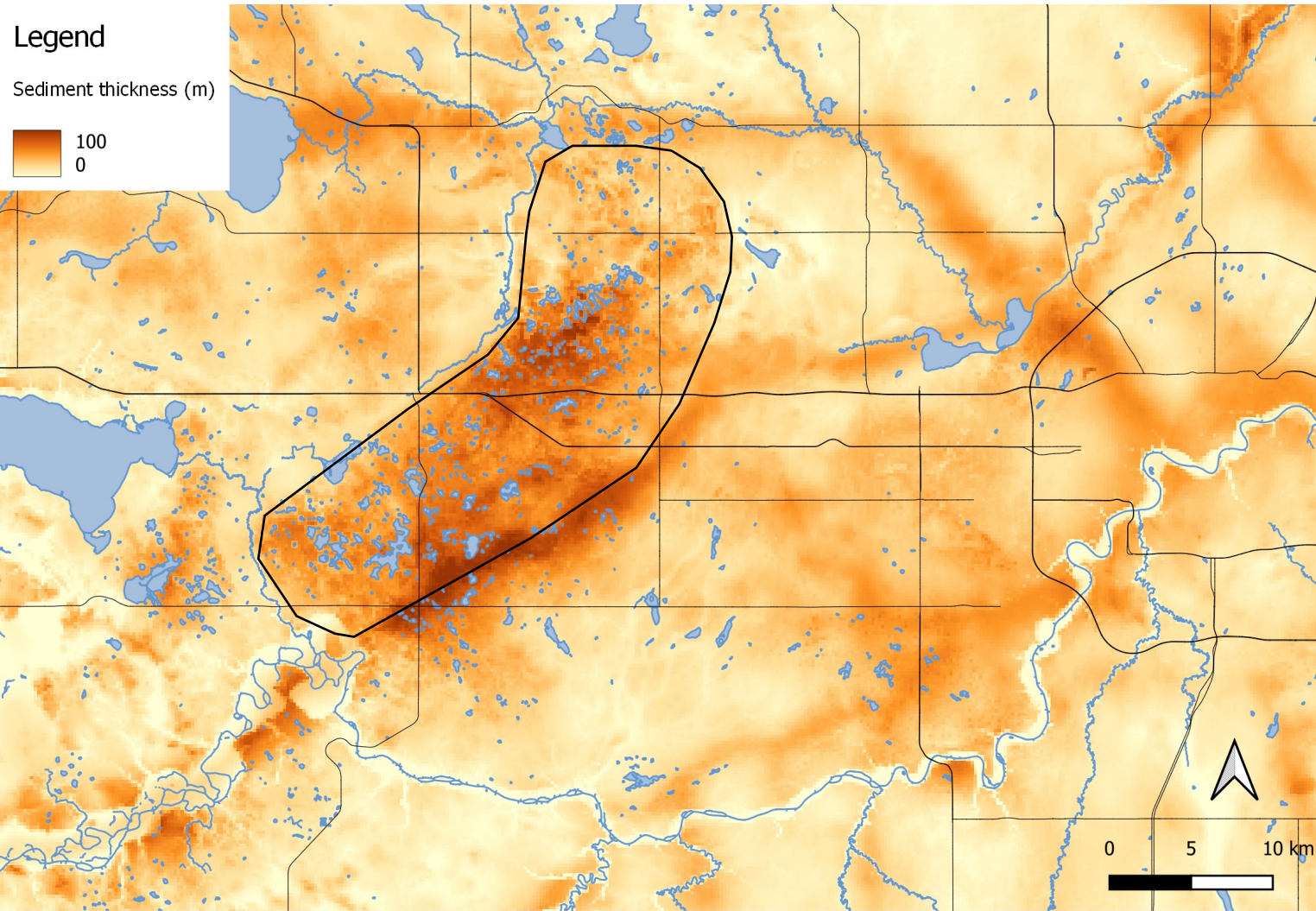
Alberta Lake Management Society

- LakeKeepers program
- Data compilation and upload to DataStream

- August to October
- Lakes would be thermally stratified
- Water clarity, light extinction depth
- T, DO, EC
- Total P, Chlorophyll-a, nutrients
- Microcystin, phytoplankton and zooplankton taxonomy, invasive species
- Major ions, dissolved metals, stable isotopes
- Bathymetry, drone and underwater imagery

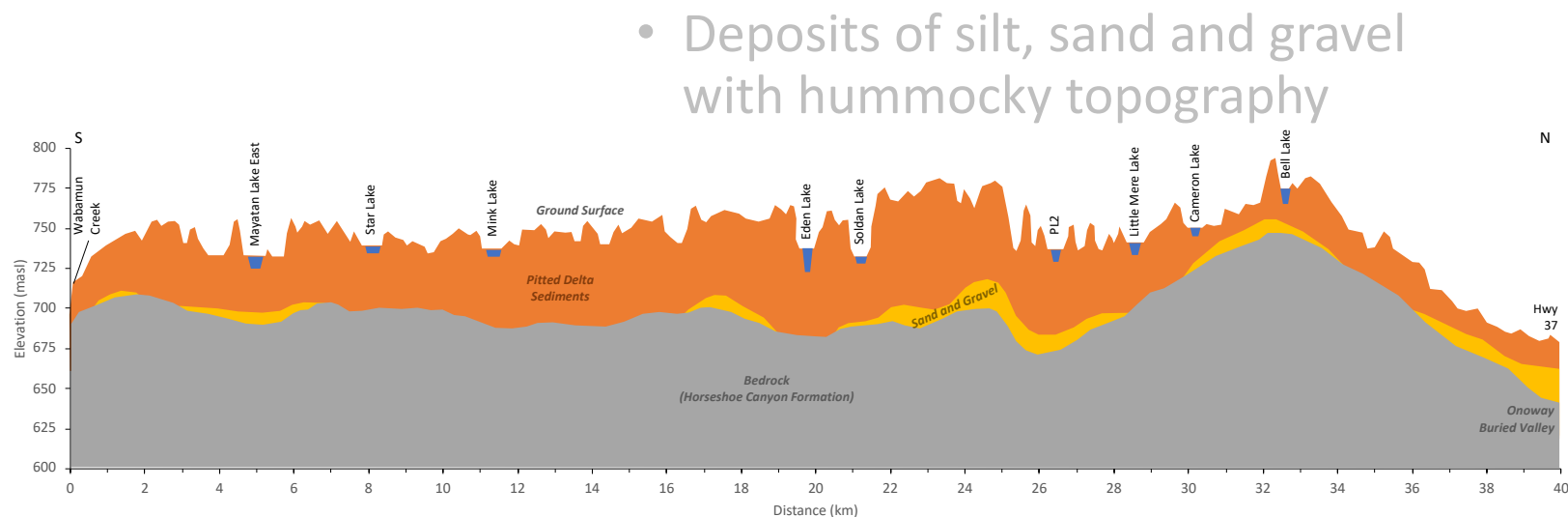
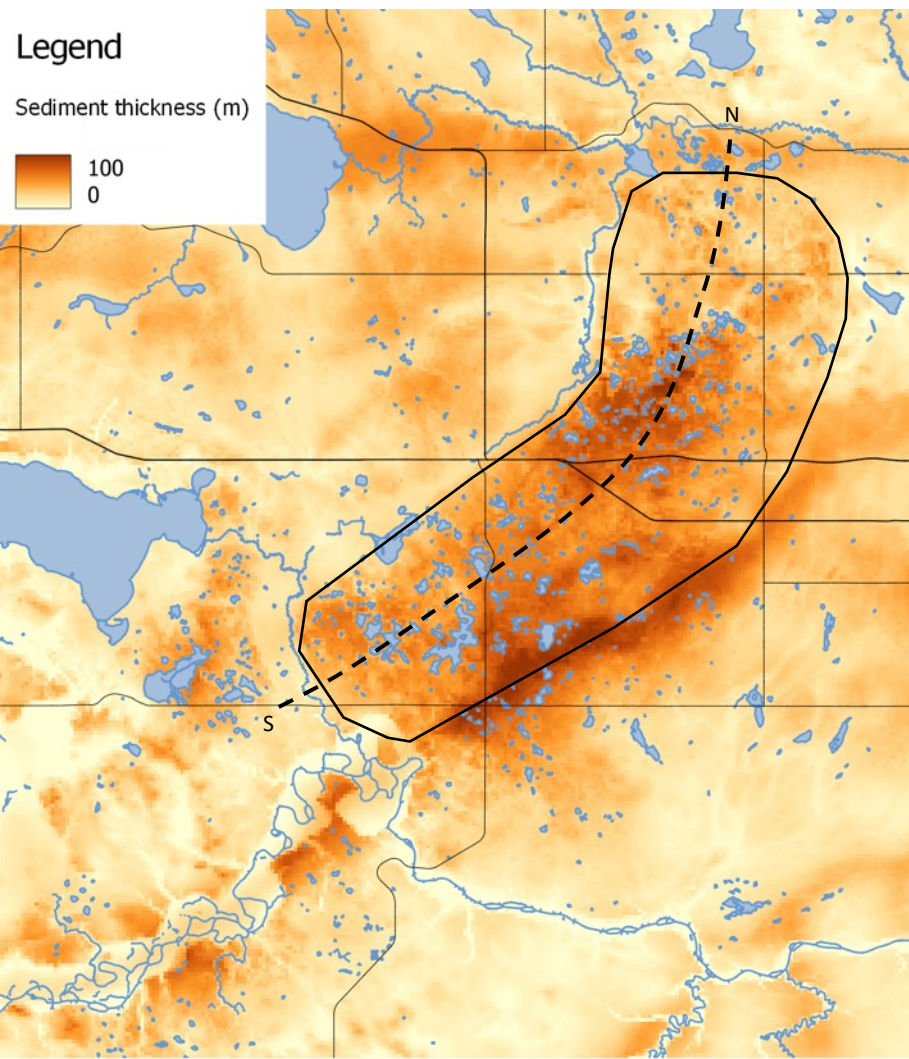
Members from each group participated in fieldwork!

Small kettle lakes nestled in a pitted delta



- Deposits of silt, sand and gravel with hummocky topography
- Formed where rivers flowed off glacial ice into Glacial Lake Edmonton
- Sitting on bedrock
 - Horseshoe Canyon Formation
- Sediments are up to 100 m thick

Small kettle lakes nestled in a pitted delta



- Deposits of silt, sand and gravel with hummocky topography

- Sitting on bedrock
 - Horseshoe Canyon Formation

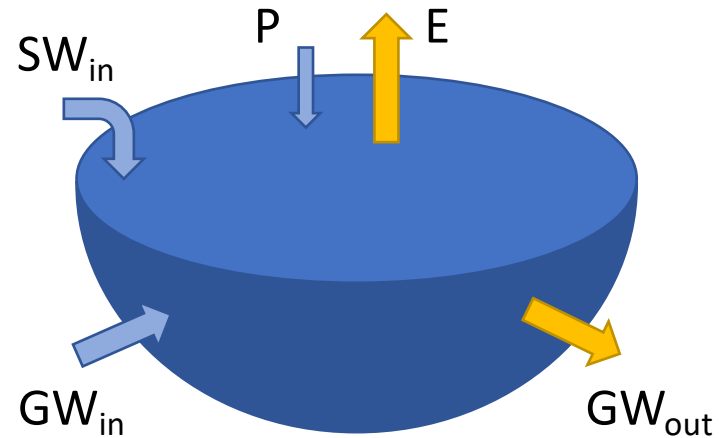
- Sediments are up to 100 m thick

Alberta Geological Survey data




Hartman et al., 2020

What is the role of groundwater?




Drivers of hydrologic budgets in small terminal lakes in the Alberta prairies

Katherine N. Snihur^a , Julia Valentina Soares^{a,b}, Alex Oiffer^c, Alberto V. Reyes^a, Shannon L. Flynn^{a,d}, Brian D. Smerdon^a, Kurt O. Konhauser^a, Duane Froese^a and Daniel S. Alessi^a

^aDepartment of Earth and Atmospheric Sciences, University of Alberta, Edmonton, Canada; ^bDepartment of Earth, Ocean and Atmospheric Sciences, University of British Columbia, Vancouver, Canada; ^cPolicy and Planning Division, Edmonton, Alberta, Canada; ^dSchool of Natural and Environmental Sciences, Newcastle University, Newcastle upon Tyne, United Kingdom

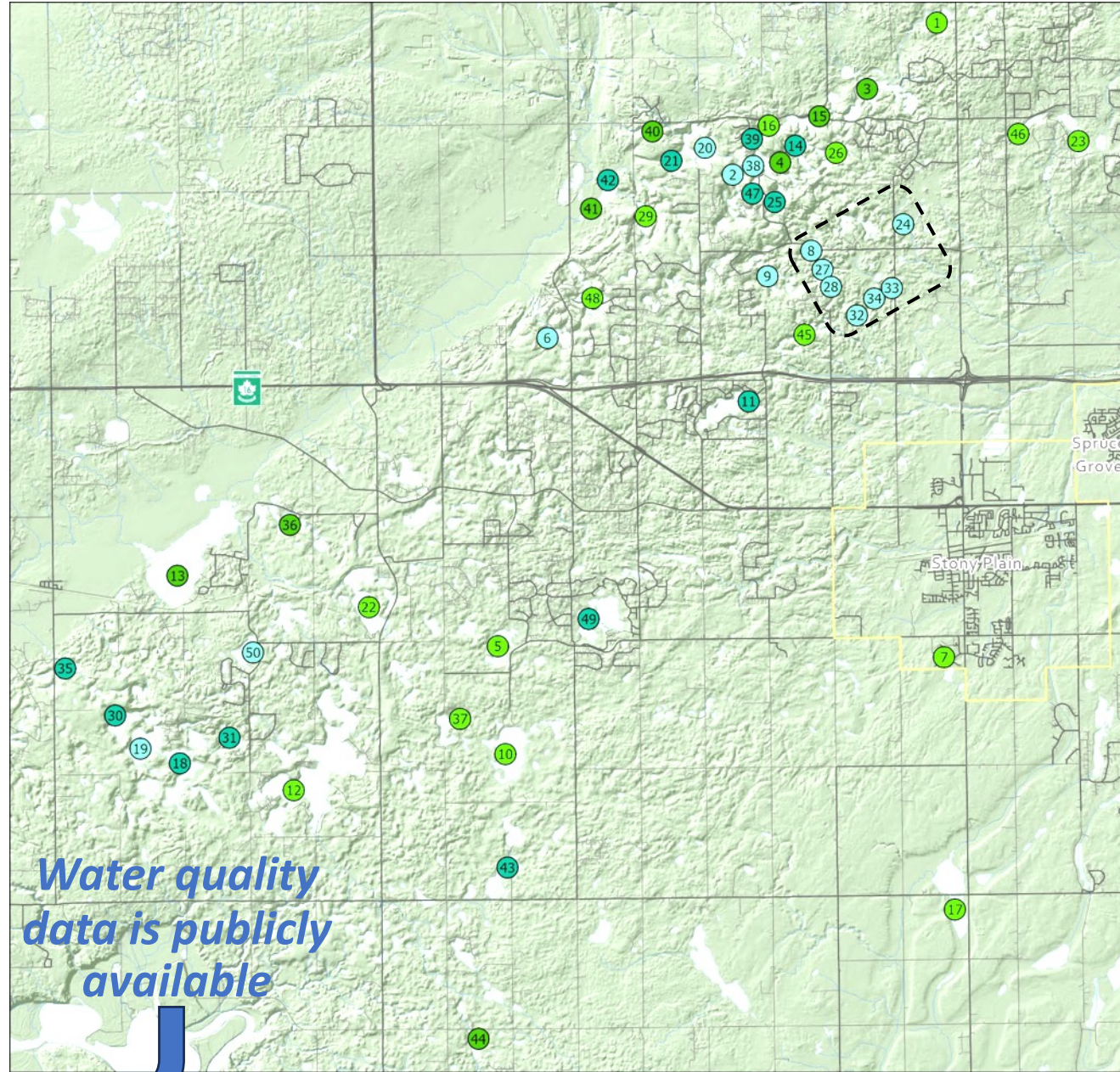
Natural controls on phosphorus concentrations in small Lakes in Central Alberta, Canada

Konstantin von Gunten^a , David Trew^b, Brian Smerdon^a and Daniel S. Alessi^a

^aDepartment of Earth and Atmospheric Sciences, University of Alberta, Edmonton, Alberta, Canada; ^bNorth Saskatchewan Watershed Alliance, Edmonton, Alberta, Canada

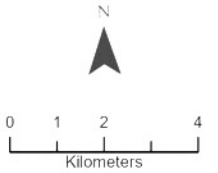
P Results

- Wide range in Total P
- Heterogeneous trophic conditions in SW
- Higher quality in NE?

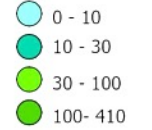


Carvel Pitted Delta 2022 Survey Report

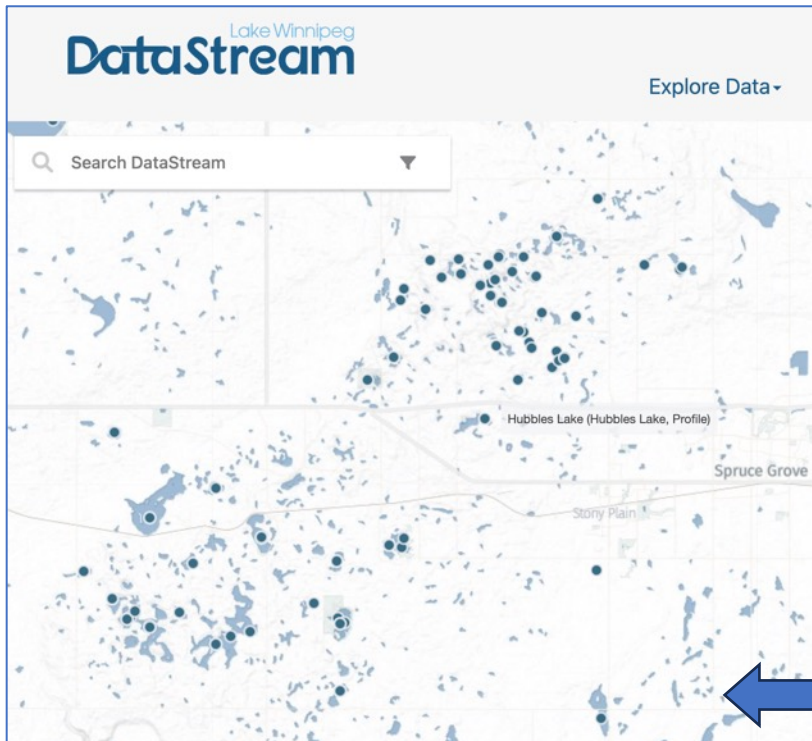
Surface Total
Phosphorus (µg/L)



Surface Total
Phosphorus (µg/L)

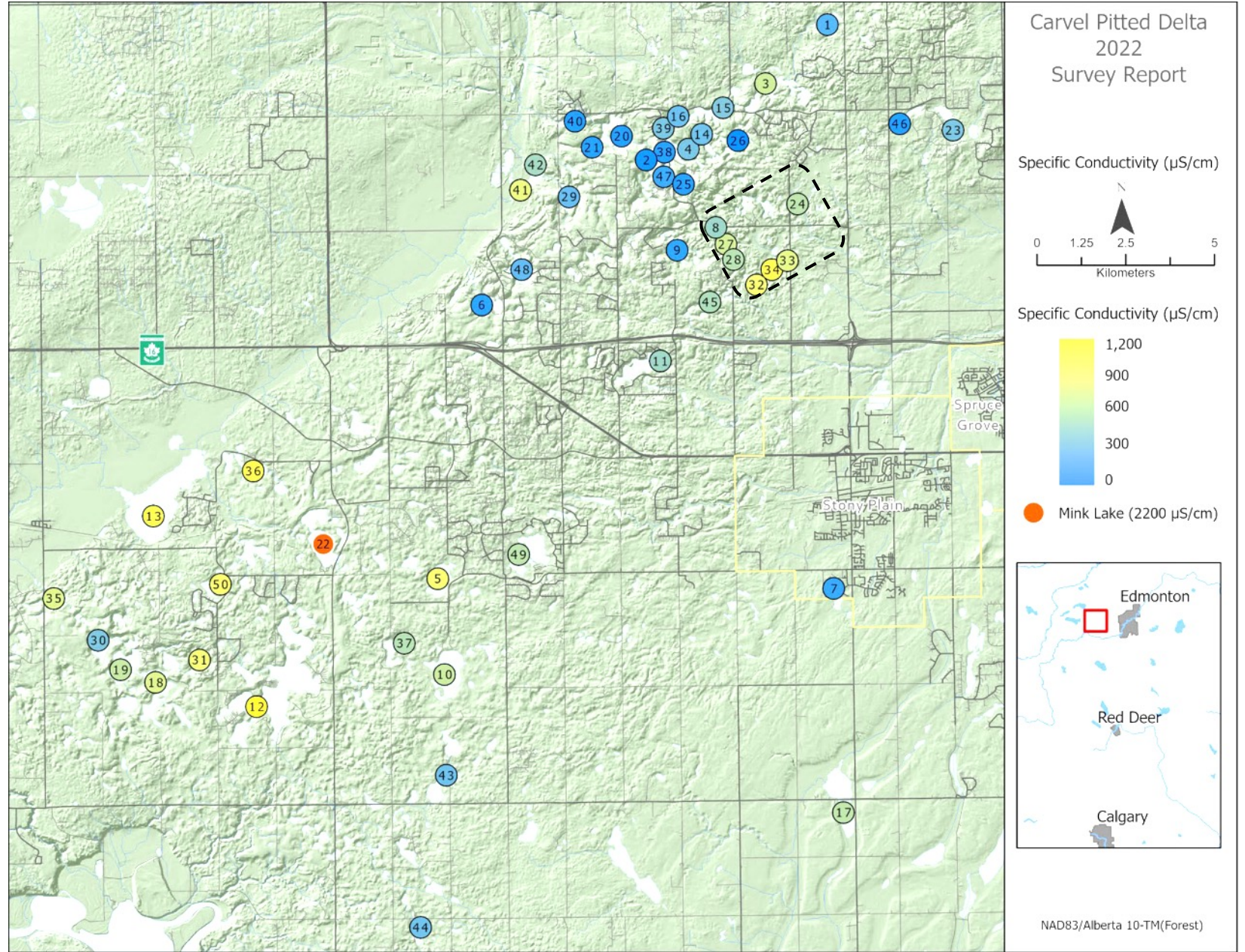


NAD83/Alberta 10-TM(Forest)



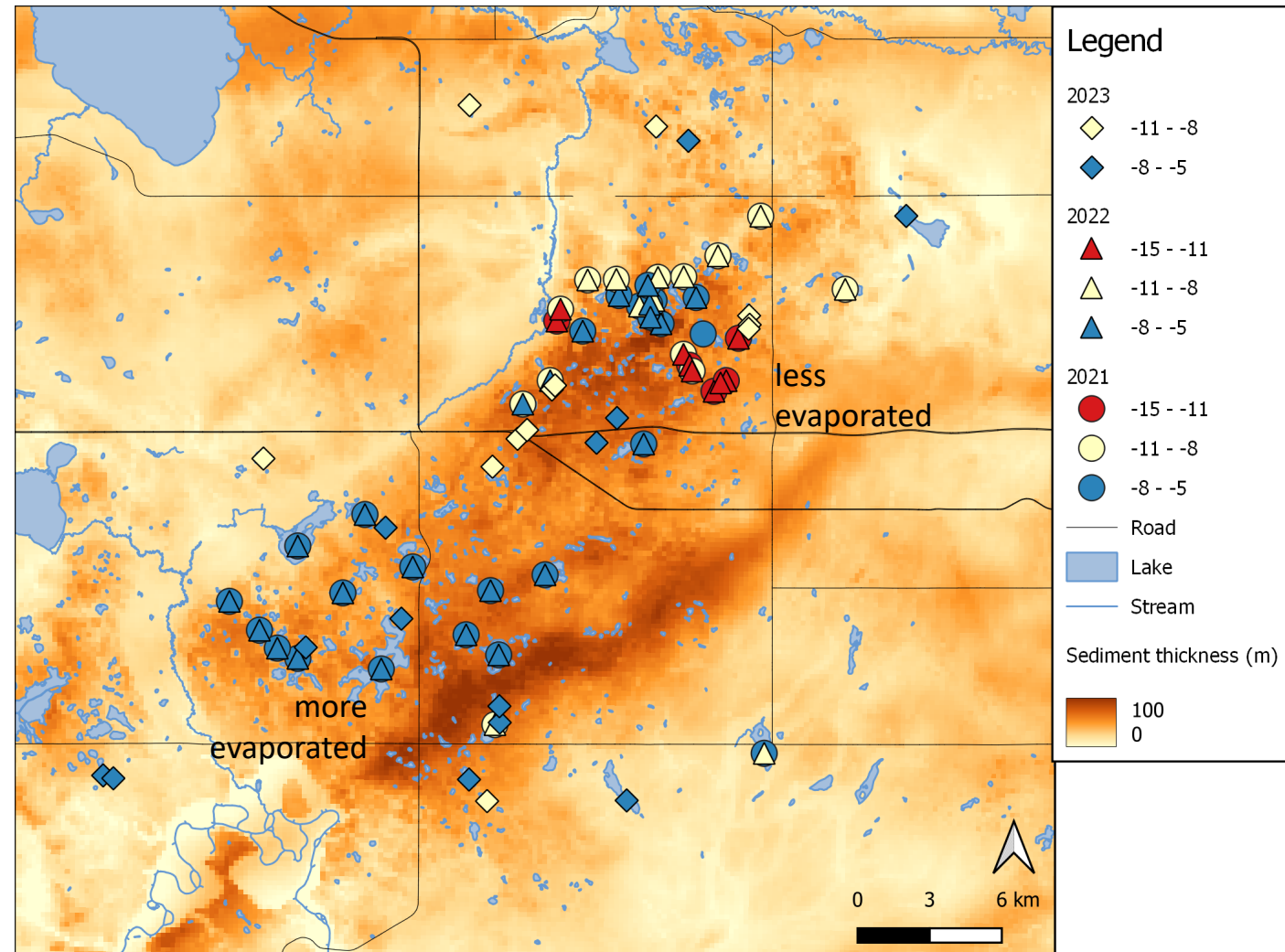
Cond. Results

- An indicator of total dissolved solids
- Lower conductivity in NE compared to SW
- Nutrient-poor lakes have high conductivity



Stable Isotopes have a similar pattern

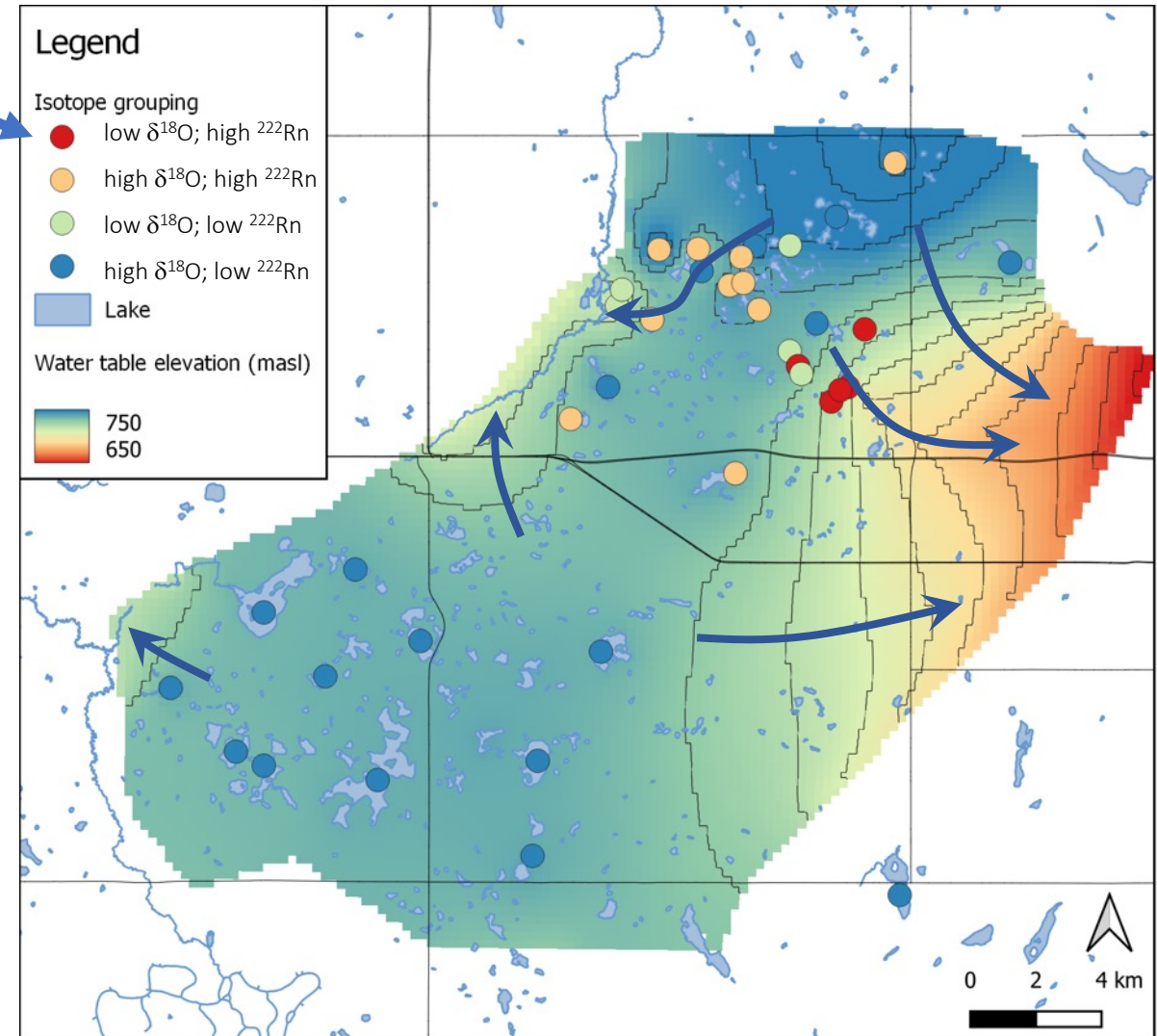
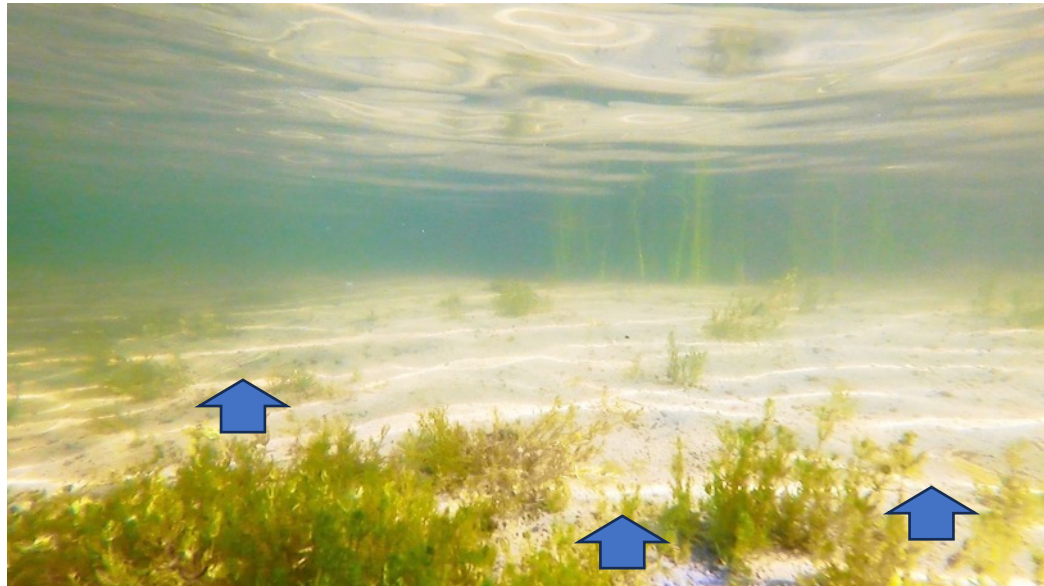
- Lake-to-lake variability appears to have a spatial pattern
- Productivity class may depend on the degree of groundwater connection



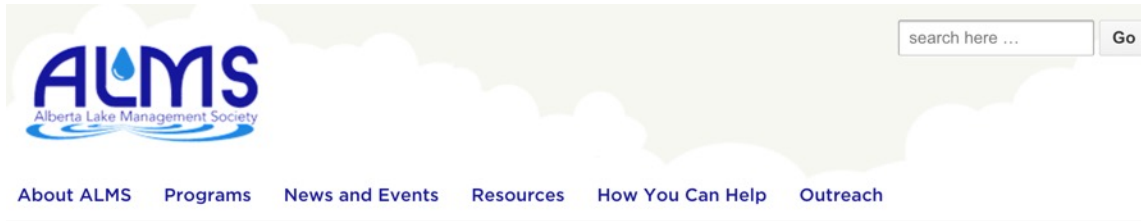
Groundwater influences some lakes

Lakes with a GW contribution

- Groundwater flow direction radiates from upland area
- Nutrient-poor also have radon
 - Travels with groundwater



Building Community Awareness



alms.ca

Lakes of the Carvel Pitted Delta

There are several dozen small kettle lakes located on the post glacial landscape of Parkland County known as the Carvel Pitted Delta. There are approximately 25 named and 70 unnamed lakes in this area. These small lakes and their associated landscapes are considered to have unique ecological value by local and provincial governments, as well as conservation agencies.



A drone view of PL1. Photo provided by M. Myshak.

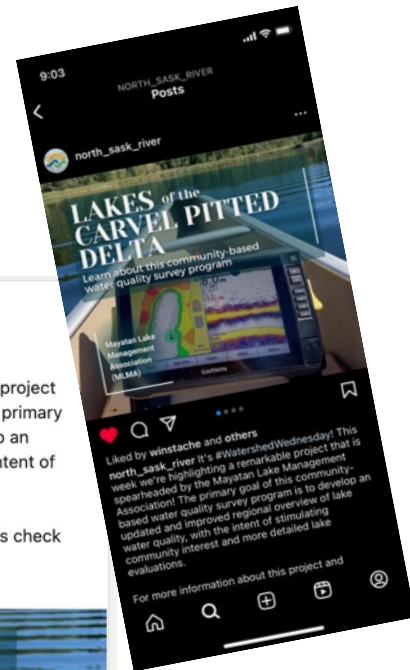
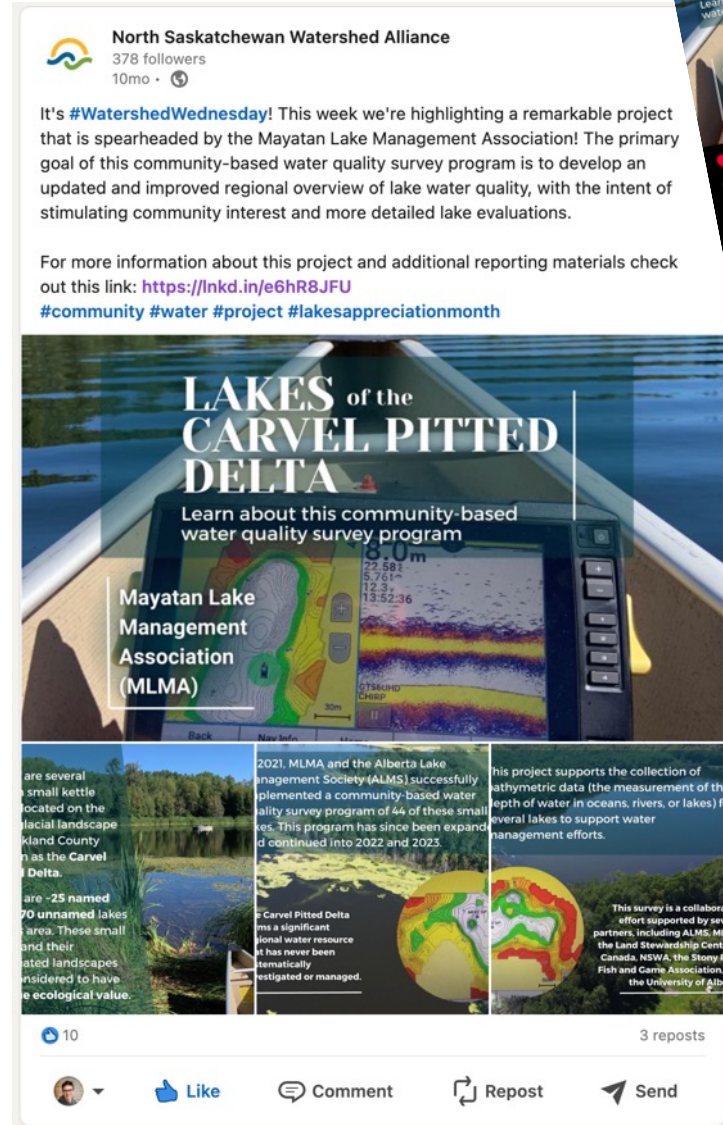
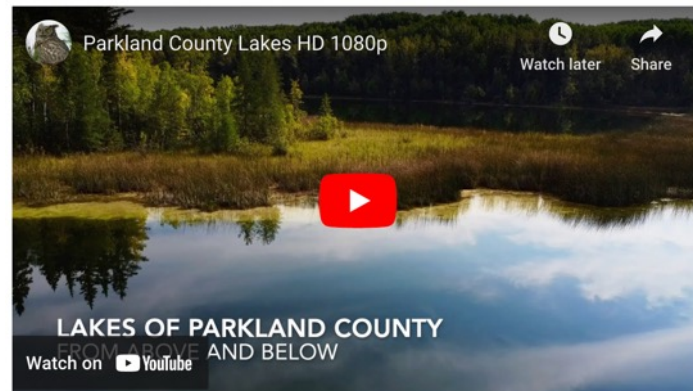
search here ... Go

RECENT COMMENTS

CATEGORIES

- Education
- Monitoring
- Outreach
- Policy

search here ... Go



- Findings are freely available
- Facilitating communication, education, and discussion

Final Thoughts



- Citizen-led approach has many benefits
 - Inherent passion and stewardship
 - Local communication and connection
 - Aligns with experience of volunteers
- Knowledge generated
 - Wide range in water quality; connection with groundwater system
 - On private property, shorelines and uplands had limited development
 - Helpful to consider the area as a lake district

Thank You!



STONY PLAIN
Fish & Game Association



Brian.Smerdon@UAlberta.ca

