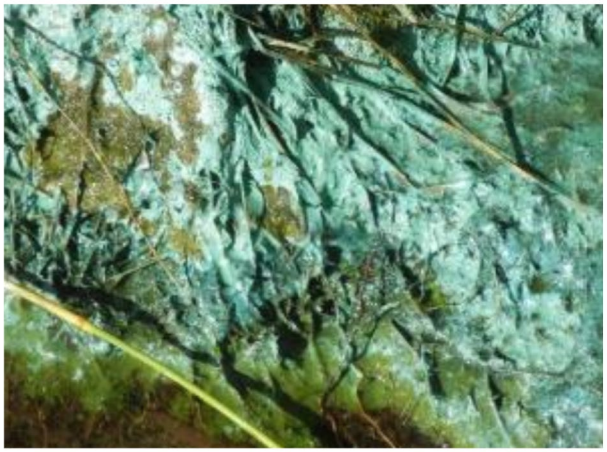
LakeWatch & LakeKeepers: Community Based Monitoring of Alberta Lakes

Bradley Peter, October 23 2019

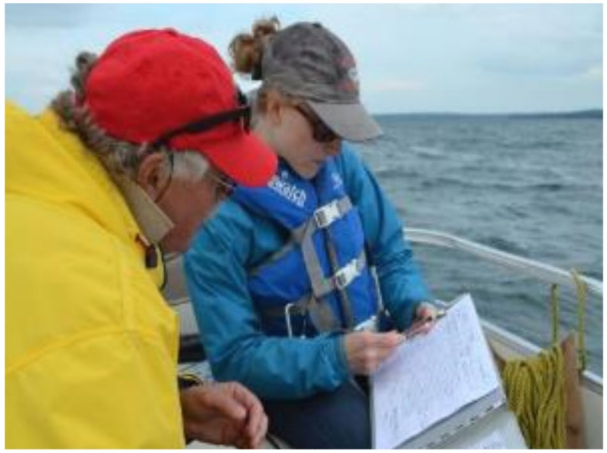


ALMS

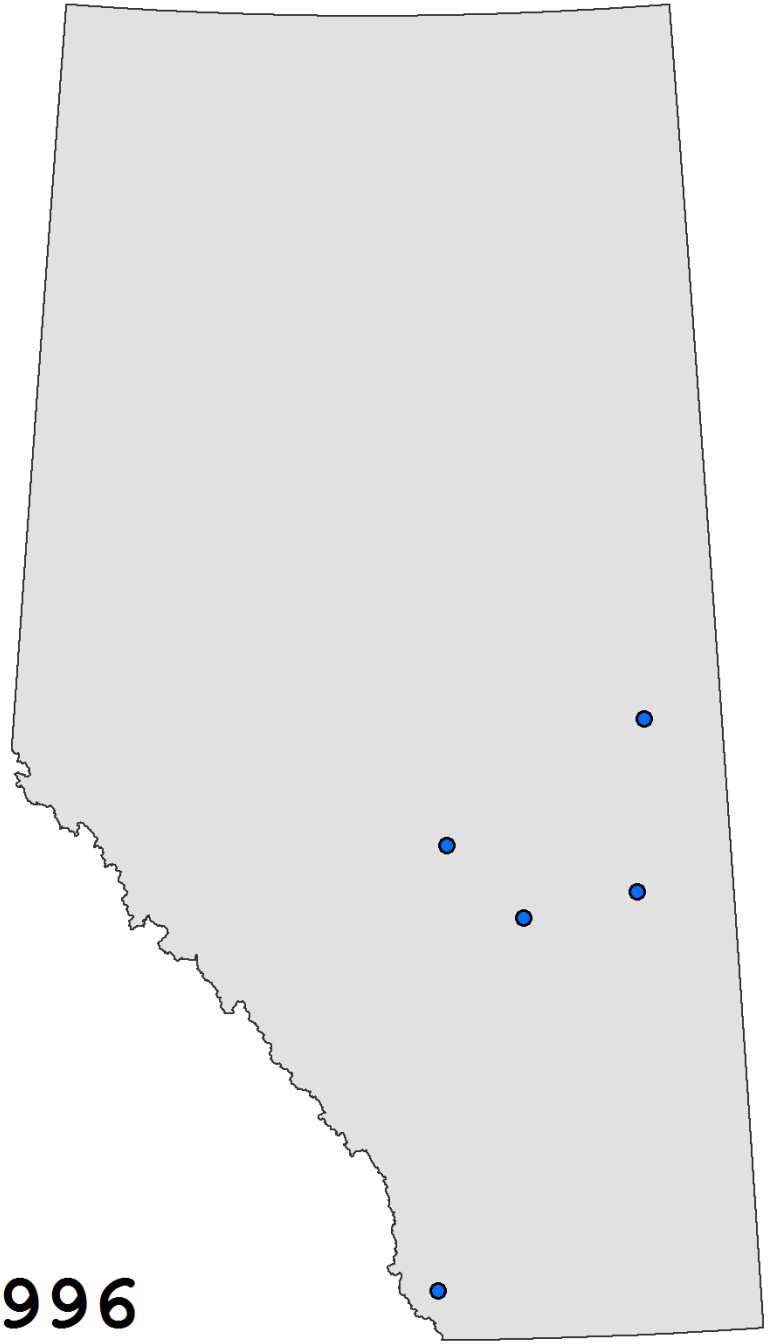

PHOSPHORUS CONCENTRATIONS IN LAKES EXPLAIN THE MOST VARIABILITY IN CYANOBACTERIA COMMUNITIES


JUNE SOLAR RADIATION AND AIR TEMPERATURE
IMPORTANT FOR DETERMINING PHYTOPLANKTON
COMMUNITIES


REGIONAL FACTORS OF CROPLAND AND PASTURELAND ARE IMPORTANT FACTORS INFLUENCING CYANOBACTERIA AND PHYTOPLANKTON COMMUNITIES



Lakewatch

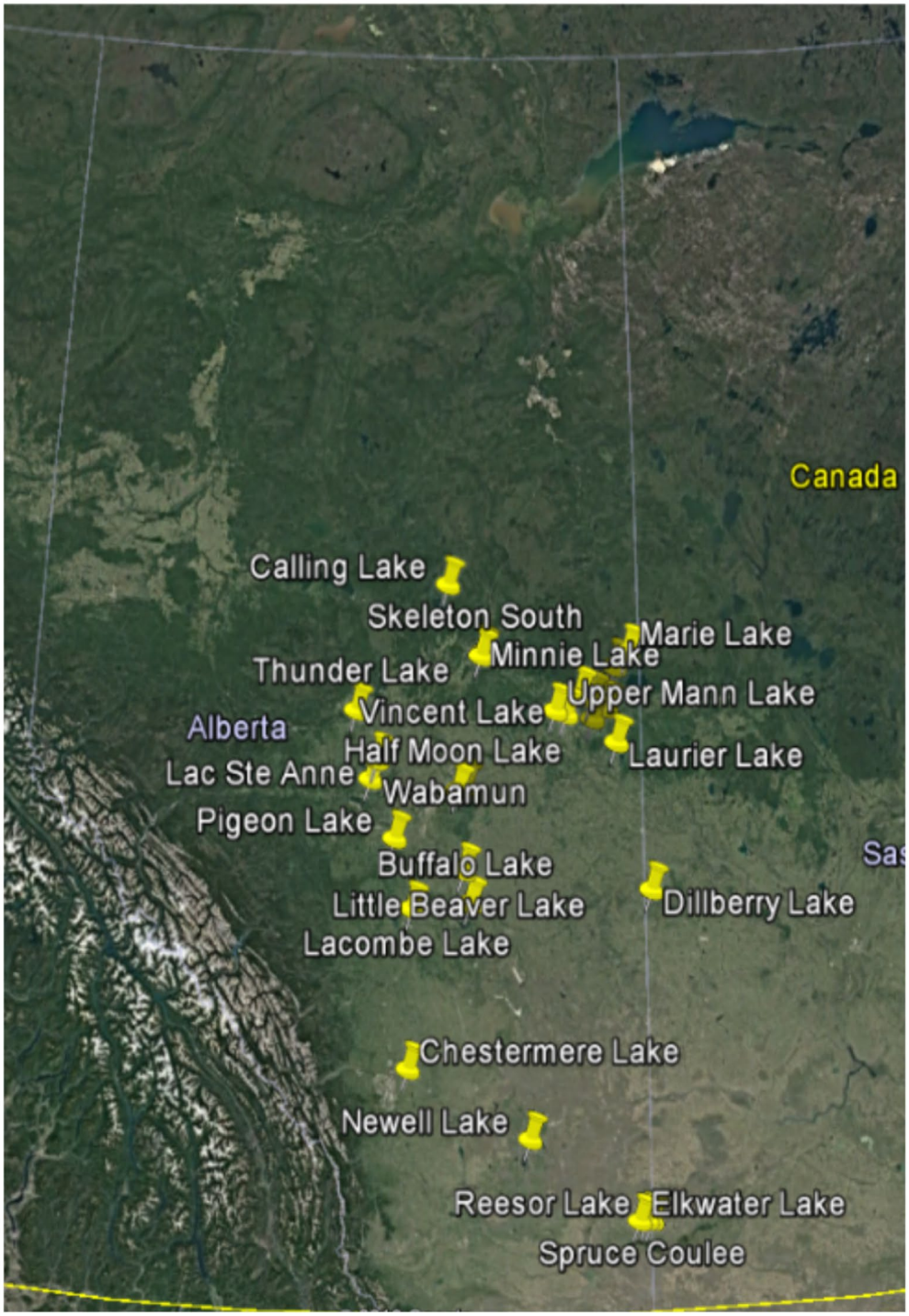


- **2018**
- 593 Volunteer Hours
- 139 Lake Monitoring Trips

Lakewatch

27 LakeWatch Lakes in 2019

108 Planned Trips



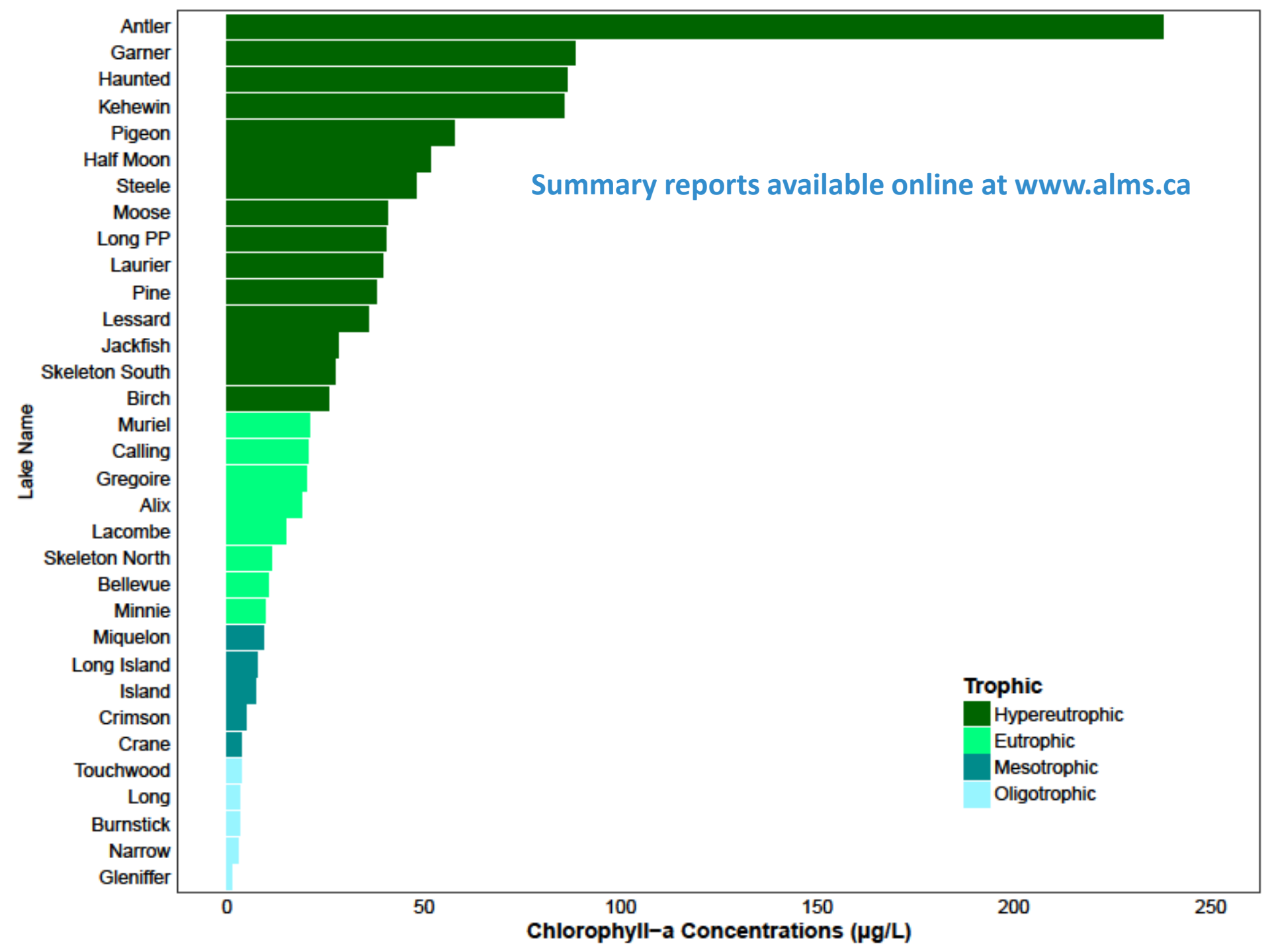

Volunteer Requirements:
• Boat
• Time (4 times/summer)

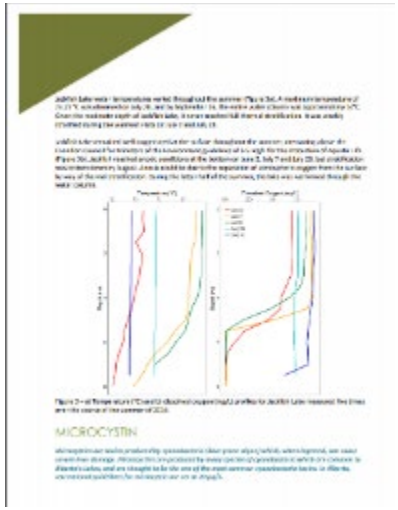
Profile:

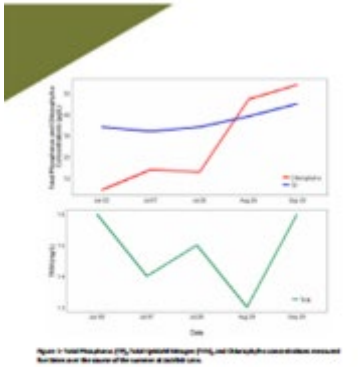
Temperature
Dissolved Oxygen
Conductivity
Redox
pH

Composite:

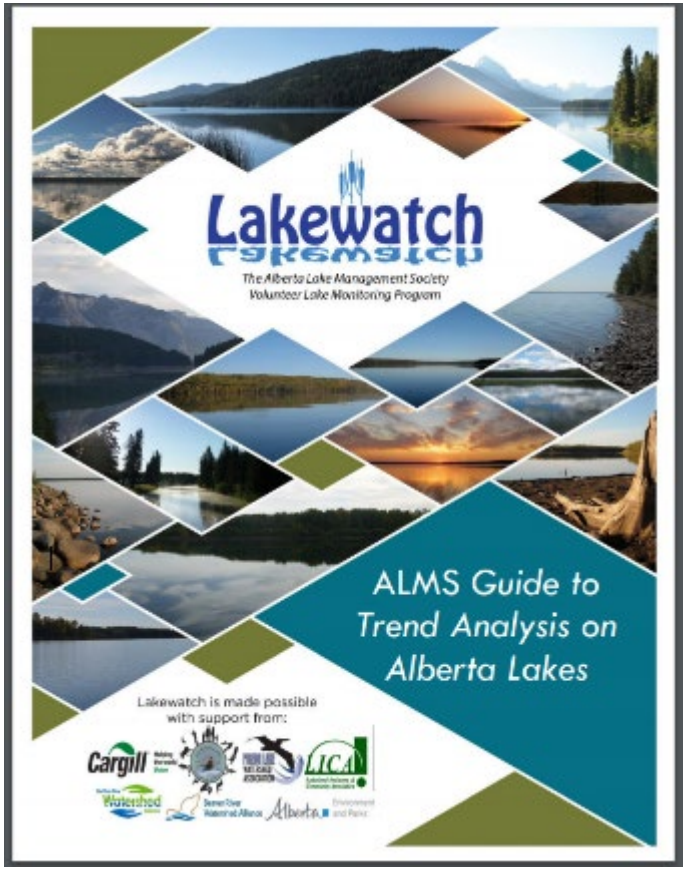
Nutrients (TKN, TP…)
Ions (Ca, Mg…)
Metals (As, Al, Fe…)
Microcystin
Chlorophyll-*a*
Invasive Species

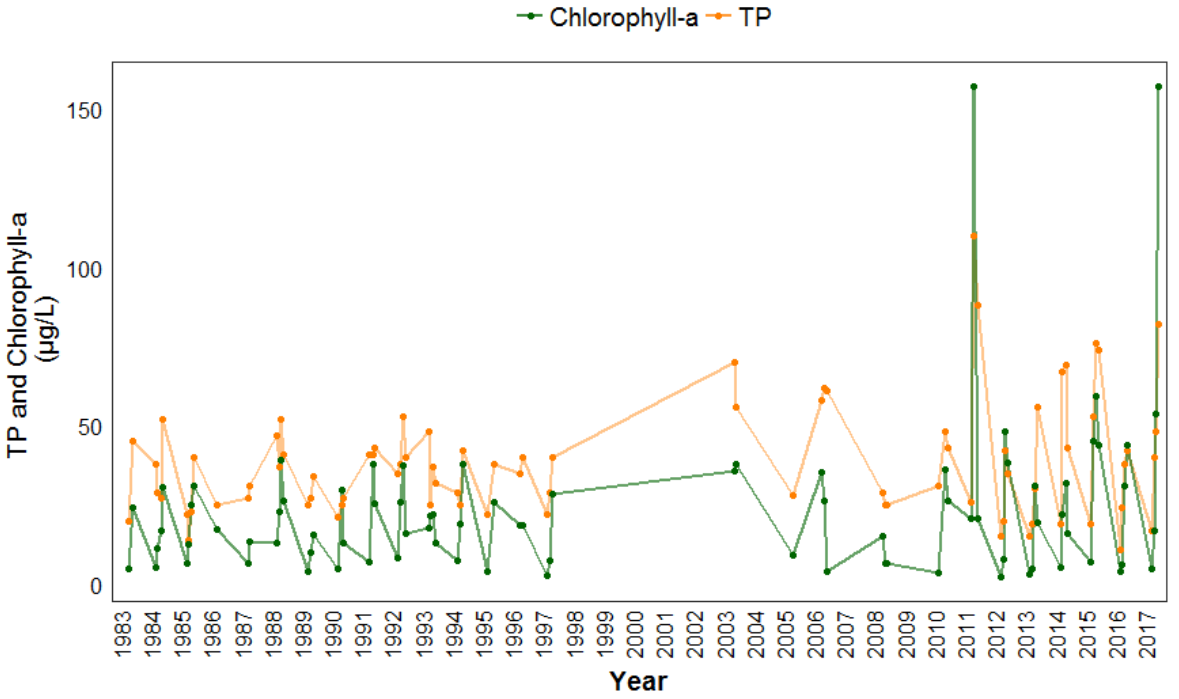

Antler
Garner
Haunted
Kehewin
Pigeon
Half Moon
Steele
Moose
Long PP
Laurier
Pine
Lessard
Jackfish
Skeleton South
Birch
Muriel
Calling
Gregoire
Alix
Lacombe
Skeleton North
Bellevue
Minnie
Miquelon
Long Island
Island
Crimson
Crane
Touchwood
Long
Burnstick
Narrow
Gleniffer
Lake Name
Summary reports available online at www.alms.ca
Trophic
Hypereutrophic
Eutrophic
Mesotrophic
Oligotrophic
0
50
100
150
200
250
Chlorophyll−a Concentrations (µg/L)





Data generally housed with Alberta Environment and Parks


Lakewatch
The Alberta Lake Management Society
Volunteer Lake Monitoring Program
ALMS Guide to
Trend Analysis on
Alberta Lakes
Lakewatch is made possible
with support from:
Cargill
LICA


Chlorophyll-a
TP
TP and Chlorophyll-a (µg/L)
0
50
100
150
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
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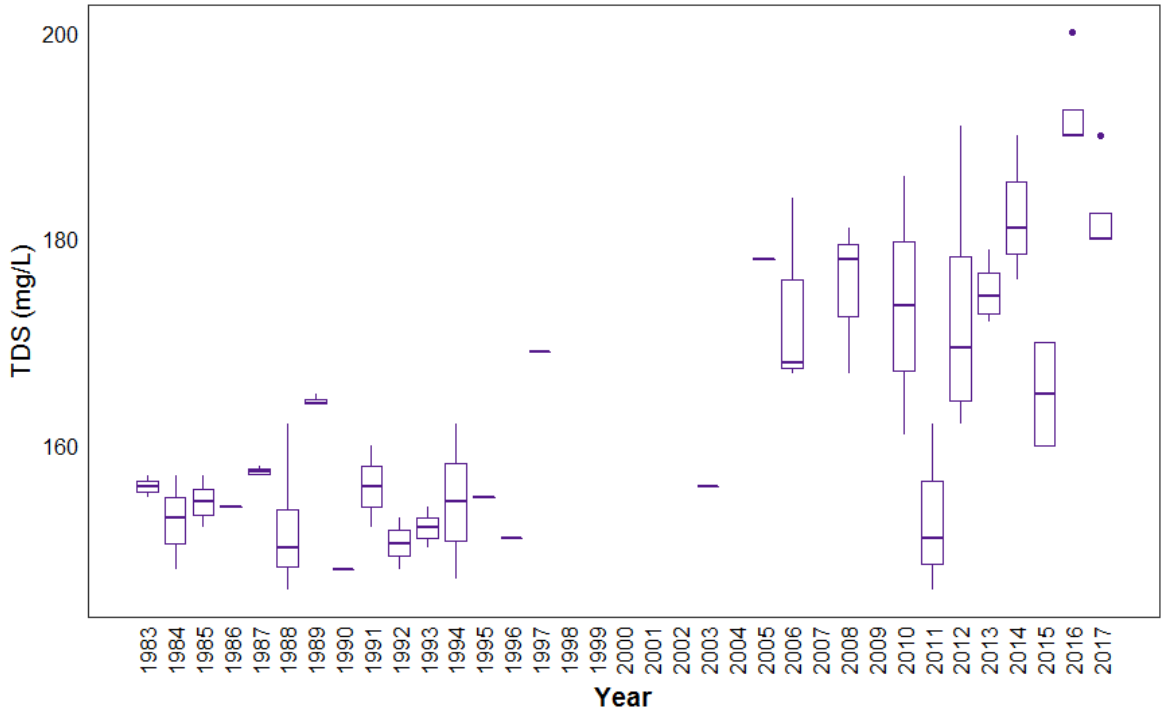
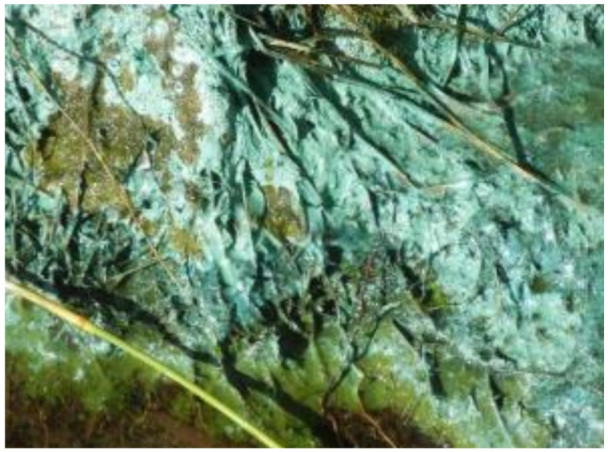
2011
2012
2013
2014
2015
2016
2017
Year


TDS (mg/L)
160
180
200
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Year

Successes?

Challenges?






LakeKeepers




This project supported with funding from

alberta ecotrust

Figure 1. 2018 LakeKeeper Lakes

LakeKeepers

LakeKeepers

Site Selection:

Small, Round, Under-sampled, and Far Away.

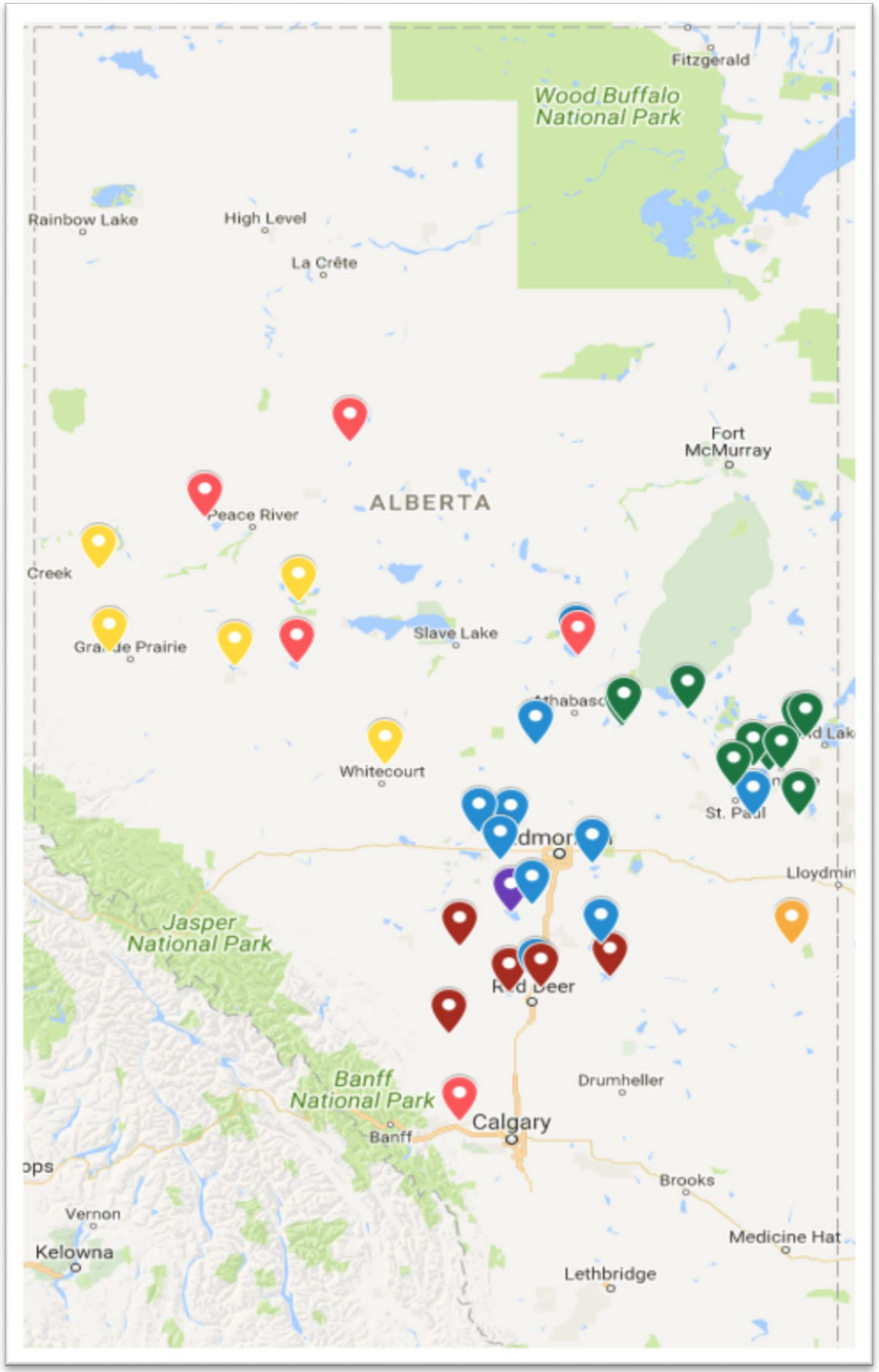
Sample Design:

Three times per year

Deep Spot

1 m Grab

3 discrete temperature readings



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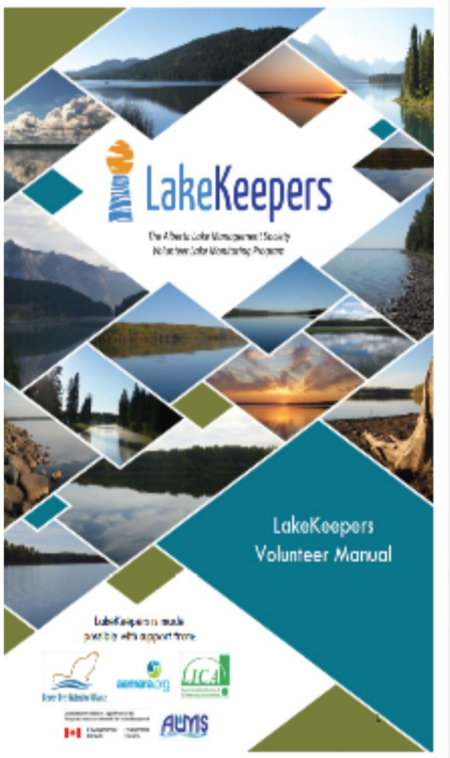


Training & Equipment

Volunteers

Lab Analysis

Reporting


Lakekeeper 2018.mp4
0:00 / 9:53
CC
HD

LakeKeepers

Office Use Only
Date Received:
Sample ID:
Microcystin ID:

FIELD SHEET

LAKE NAME:
KIT NUMBER:
DATE:
TIME:

ENVIRONMENTAL OBSERVATIONS:

Air Temperature (°C)	
Wind Speed (km/h)	
Wind Direction	
Percent Cloud Cover	
24 Hour Rain Fall	YES ☐ NO ☐ Amount:_____mm
Evidence of Cyanobacteria Blooms	None ☐ Particles in Water ☐ Streaks on Surface ☐ Scum on Surface ☐

ON THE BOAT:

Secchi Depth (m)	Disappears:_____m Visible: _____m Average:_____m
Colour of Secchi Disk	Colourless ☐ Brown ☐ Green ☐
Secchi Depth X 2 (m)	

	Depth (m)	Temperature (°C)
Lake Surface	1.0 m	
Lake Mid Depth		
Lake Bottom Depth		

LakeKeepers

Filtering Chlorophyll:

Sample #	Total Lake Water Volume Filtered (mL)
1	
2	
3	

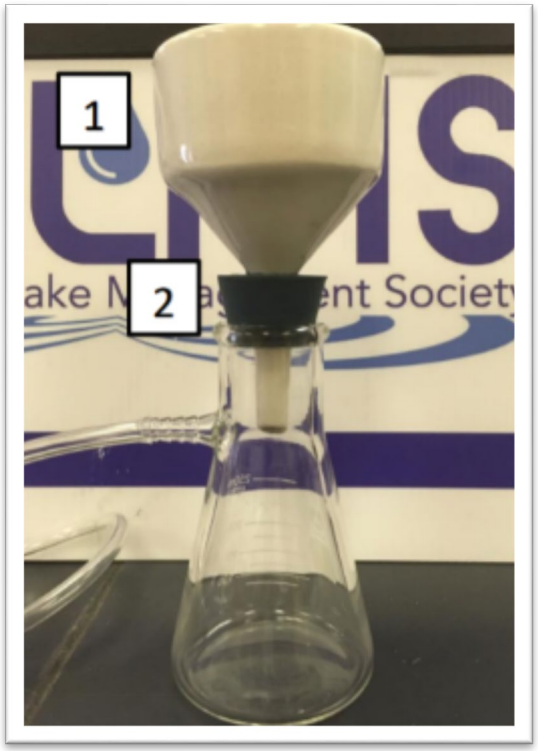
Comments:

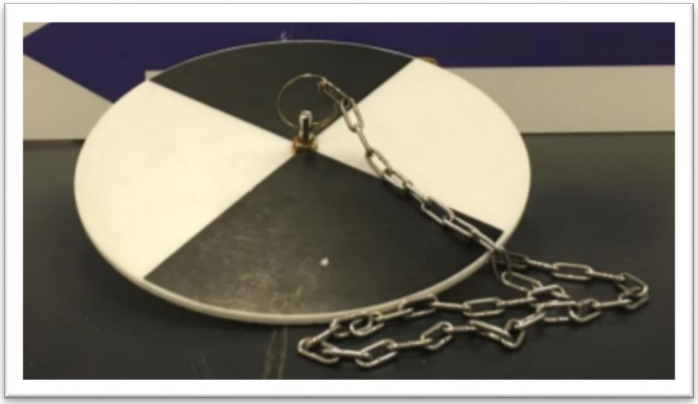
Volunteer Names:

Did You Remember To:

- ☐ Preserve your 250 mL Total Phosphorus bottle?
- ☐ Add magnesium carbonate to your filter paper?
- ☐ Place the correct samples in the fridge and freezer?
- ☐ Complete your volunteer hours spreadsheet?
- ☐ Label your petri dishes?
- ☐ Notify ALMS of your sample completion?

LakeKeepers





TRAINING & EQUIPMENT

LakeKeepers

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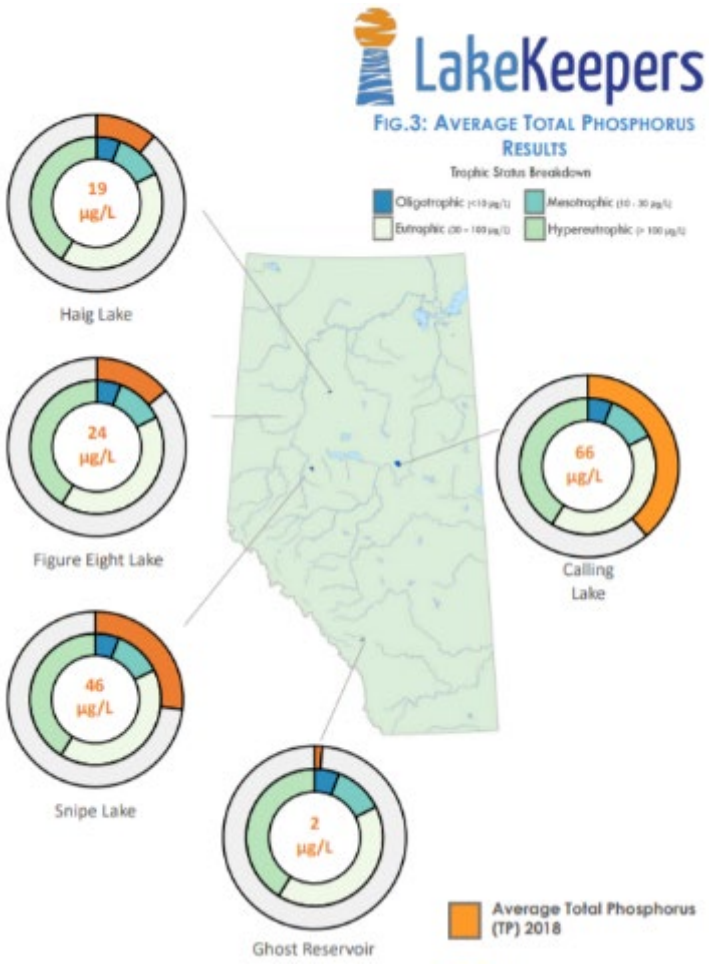
- Total Phosphorus
- Chlorophyll a
- Secchi Depth
- Temperature (3 depths)
- Microcystin
- Observations

Lab Analysis



Mackenzie DataStream

An open access hub for sharing water data.

Our mission is to promote knowledge sharing and advance collaborative water stewardship.

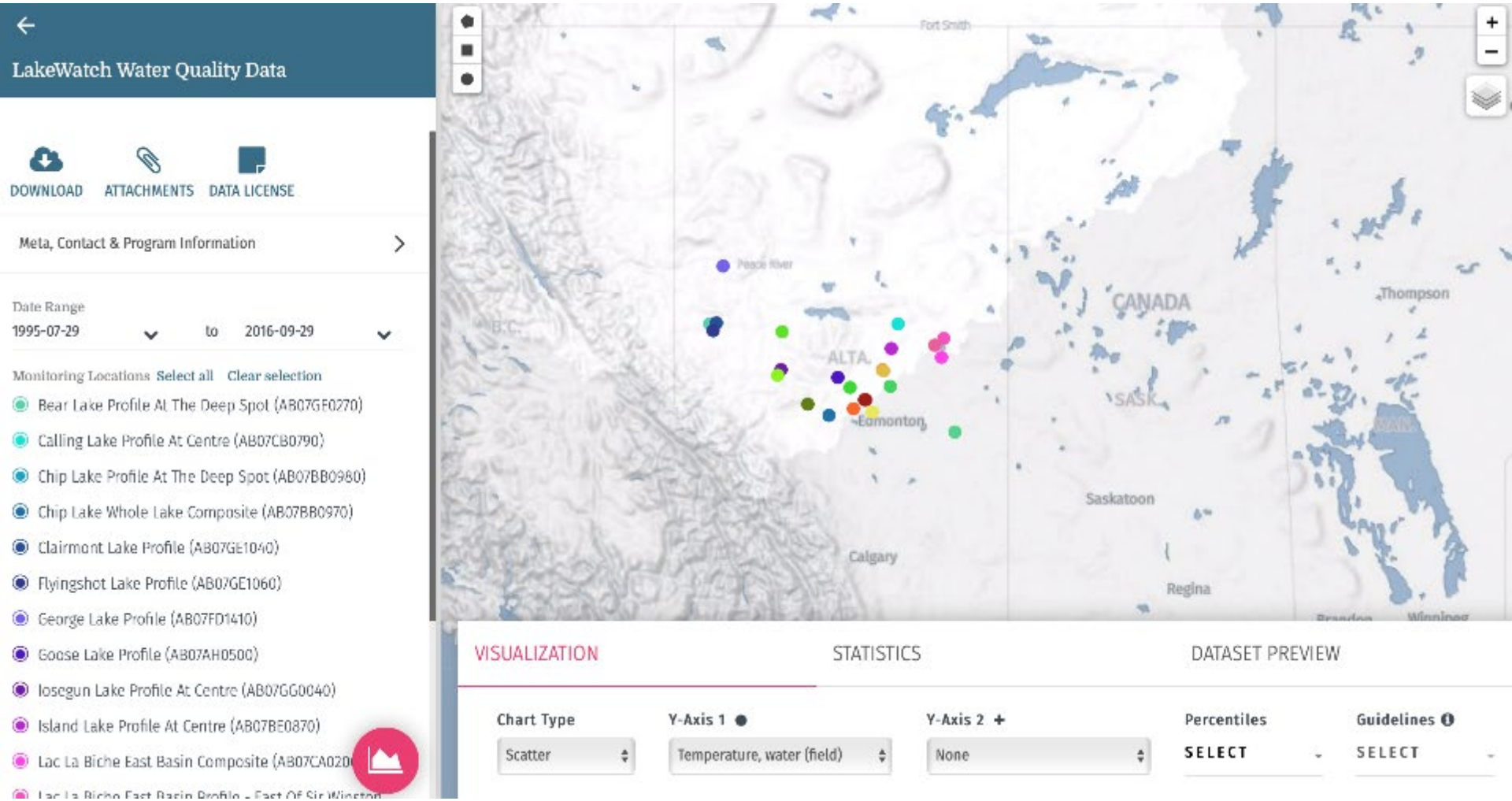
EXPLORE DATA

http://mackenziedatastream.ca

LAKEKEEPERS REPORT AVAILABLE AT WWW.ALMS.CA/RPEORTS

DataStream

An open access hub for sharing water data


LakeWatch Water Quality Data
DOWNLOAD
ATTACHMENTS
DATA LICENSE
Meta, Contact & Program Information
Date Range
1995-07-29
to
2016-09-29
Monitoring Locations Select all Clear selection
Bear Lake Profile At The Deep Spot (AB07GE0270)
Calling Lake Profile At Centre (AB07CB0790)
Chip Lake Profile At The Deep Spot (AB07BB0980)
Chip Lake Whole Lake Composite (AB07BB0970)
Clairmont Lake Profile (AB07GE1040)
Flyingshot Lake Profile (AB07GE1060)
George Lake Profile (AB07FD1410)
Goose Lake Profile (AB07AH0500)
Iosegun Lake Profile At Centre (AB07GG0040)
Island Lake Profile At Centre (AB07BE0870)
Lac La Biche East Basin Composite (AB07CA020
Fort Smith
Peace River
B.C.
ALTA.
CANADA
SASK.
Thompson
Edmonton
Saskatoon
Calgary
Regina
VISUALIZATION
STATISTICS
DATASET PREVIEW
Chart Type
Scatter
Y-Axis 1
Temperature, water (field)
Y-Axis 2
None
Percentiles
SELECT
Guidelines
SELECT


LakeWatch Water Quality Data
DOWNLOAD
ATTACHMENTS
DATA LICENSE
Meta, Contact & Program Information
Date Range
1995-07-29
to
2016-09-29
Monitoring Locations Select all Clear selection
Bear Lake Profile At The Deep Spot (AB07GE0270)
Calling Lake Profile At Centre (AB07CB0790)
Chip Lake Profile At The Deep Spot (AB07BB0980)
Chip Lake Whole Lake Composite (AB07BB0970)
Clairmont Lake Profile (AB07GE1040)
Flyingshot Lake Profile (AB07GF1060)
George Lake Profile (AB07FD1410)
Goose Lake Profile (AB07AH0500)
Iosegun Lake Profile At Centre (AB07GG0040)
Island Lake Profile At Centre (AB07BE0870)
Lac La Biche East Basin Composite (AB07CA020
Lac La Biche East Basin Profile - East Of Sir Winston
VISUALIZATION
STATISTICS
DATASET PREVIEW
Chart Type
Scatter
Y-Axis 1
Temperature, water (field)
Y-Axis 2
None
Percentiles
SELECT
Guidelines
SELECT
Temperature, water (deg C)
0
5
10
15
20
25
1995
2000
2005
2010
2015
Date

LakeKeepers

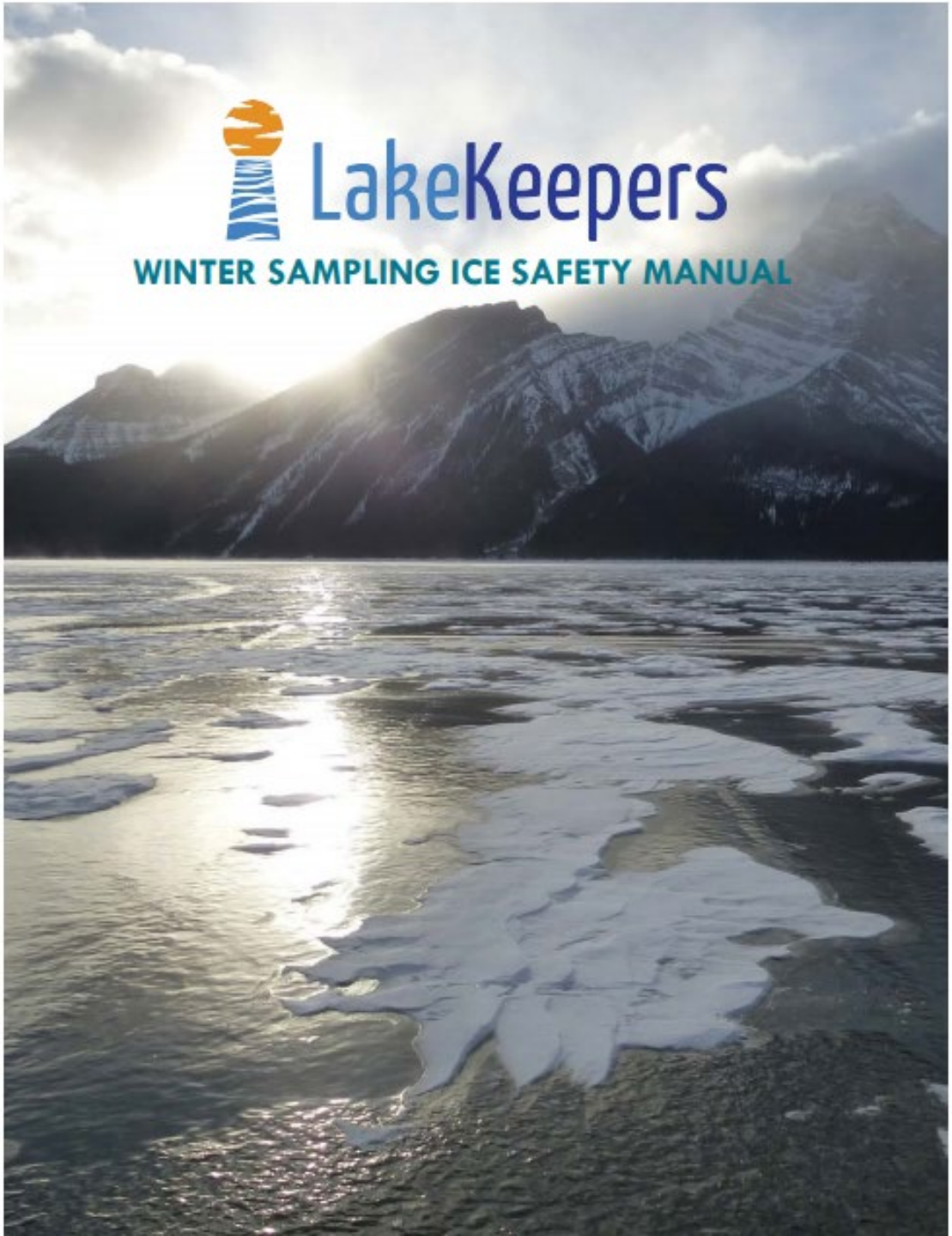
This project supported with funding from alberta ecotrust

Winter Monitoring!

LakeKeepers

This project supported with funding from alberta ecotrust

- Weather issues in 2019
- 10 lakes sampled:
  - Wabasca
  - Bangs
  - Minnie
  - Manatokan
  - Bangs x 2
  - Hope
  - Long
  - North Buck
  - Nakamun
  - Lac Sante


LakeKeepers
WINTER SAMPLING ICE SAFETY MANUAL

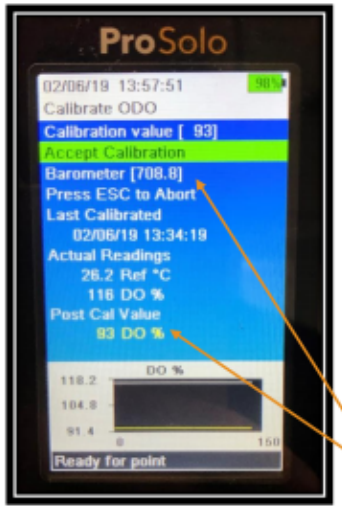
LakeKeepers

This project supported with funding from alberta ecotrust

WINTER INSTRUCTION GUIDE

BEFORE YOU HEAD OUT:

- Fill your hot water bottle and place it in your YSI kit.
- Make sure your probe is charged.
- Complete your online safety form at www.alms.ca/lakekeepers



CALIBRATE PROBE AT THE LAKE:

- Calibrate your probe in your vehicle to avoid freezing.
- Remove the **grey sleeve** (b) from your **probe** (d).
- Remove the **metal probe guard** (a) and gently wipe any water droplets from the probe with a kimwipe.
- Carefully place the metal guard back over your probe.
- There is a yellow sponge inside the grey calibration sleeve. Using water from the calibration bottle, wet the **yellow sponge** (c) with a few millilitres of water.
- Place the grey sleeve (with yellow sponge inside) over the metal guard.
- Wait five minutes to allow the air in the probe to become saturated with moisture from the sponge.
- Connect your probe to your **handheld unit** (e).
- Press the green power button on your handheld unit.
- Press Cal
- Choose ODO by pressing Enter
- Choose DO % by pressing Enter
- Wait 30 seconds.
- Choose Accept Calibration by pressing Enter.
- Record the Barometer and Post Cal Value on your field sheet.
- Press escape until you see the 'log one sample ' screen.
- Keep the probe in its grey sleeve and in the sampling kit until you are ready to collect data.

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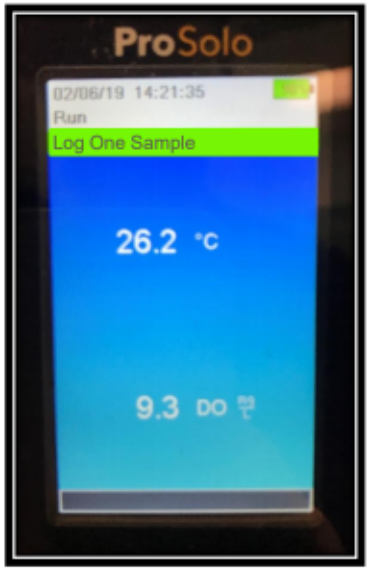
WINTER INSTRUCTION GUIDE PAGE 2

RECORD MEASUREMENTS:

- Fill in the Environmental Observations portion of your field sheet.
- With your probe turned on to the Log One Sample screen, lower the probe until the 1 m marker is at the surface of the water.
- If your backlight turns off during sampling, press any key to reactivate it.
- Record the temperature and dissolved oxygen measurements on your field sheet in the 1.0 m depth row.
- You may need to wait 30-60 seconds for your dissolved oxygen readings to stabilize at each depth.
- Continue this process in meter increments until you have hit the bottom of the lake.
- Record the bottom depth in the Bottom Depth box on your field sheet.
- Hold the Power Button to turn off your probe.
- Place the grey sleeve with wet sponge inside back over the metal guard. Return the probe to the warm sampling kit.



COLLECT A WATER SAMPLE:

- Collect your sample after the water in your fishing hole has settled.
- Using a Sharpie, label your **Phosphorus Bottle** (a) with the Lake Name, Date, and Time.
- Wearing the **sampling glove** (b), rinse the bottle three times with water from below the surface.
- After rinsing, fill your Phosphorus Bottle with water from below the surface.
- Add one **yellow capped preservative** (c) to your Phosphorus Bottle. Be careful as this preservative contains sulphuric acid.
- Place everything back in your warm sampling kit.

LakeKeepers

Office Use Only
Date Received:
Sample ID:

FIELD SHEET

LAKE NAME:
KIT NUMBER:
DATE:
SAMPLE TIME:

ENVIRONMENTAL OBSERVATIONS:

Ice Thickness	**cm/inches**
Ice Covered in Snow?	**Yes** ☐ **No** ☐ **Partial** ☐
Snow Thickness	**cm/inches**
Air Temperature (°C)	
Water Colour You can more easily visualize water colour after your sample has been collected.	**Colourless** ☐ **Brown** ☐ **Green** ☐ **Other:**
Turbidity/Particles in Water	**Yes** ☐ **No** ☐
GPS Coordinates*	**Lat:** **Long:**

*See sampling manual for instructions on how to find your GPS coordinates.

PROBE CALIBRATION

Barometer mmHg	Post Cal Value %

LakeKeepers

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alberta ecotrust

LAKE MEASUREMENTS

Depth (m)	Temp (°C)	Dissolved Oxygen (mg/L)	Depth (m)	Temp (°C)	Dissolved Oxygen (mg/L)
1.0			11.0		
2.0			12.0		
3.0			13.0		
4.0			14.0		
5.0			15.0		
6.0			16.0		
7.0			17.0		
8.0			18.0		
9.0			19.0		
10.0			20.0		

Bottom Depth (nearest half meter)

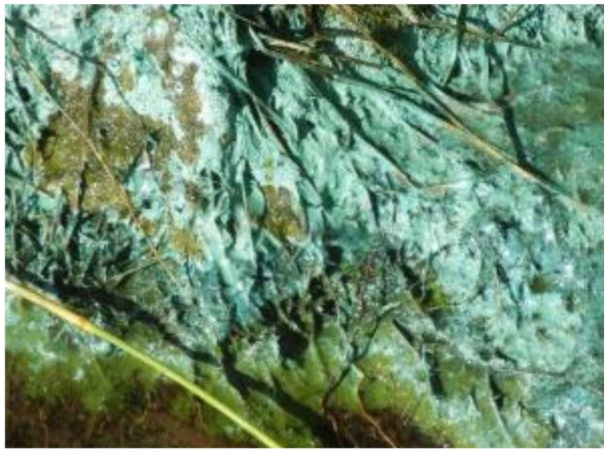
Comments (type of fish caught, ice conditions, water quality, etc.):

Volunteer Names:

Did You Remember To:

- ☐ Preserve your 250 mL Phosphorus bottle?
- ☐ Calibrate your probe?
- ☐ Complete your volunteer hours spreadsheet?
- ☐ Notify ALMS of your sample completion?



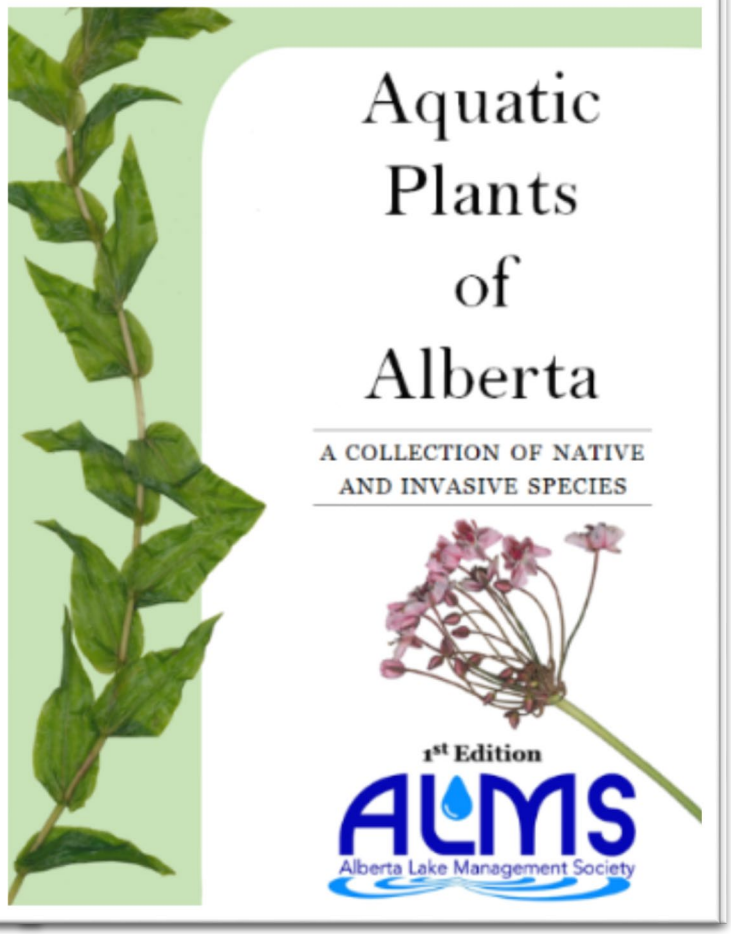



Aquatic Plant Monitoring




Six Plant Bioblitzes

220 Samples Collected



Northern/Eurasian DNA Testing
Alberta Plant Health Lab

Samples from 35 Lakes

No Invasive Species Detected (except for BC)

Summary:

- Opportunities Exist for Involvement in Community Based Monitoring
- LakeWatch & LakeKeepers & Plant Sampling
- Boats and Time Required for Participation
- Data Uploaded Available Via Datastream

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