



LakeKeepers

Winter LakeKeepers 2025-2026 Field Manual

This project is supported with funding from:



ALBERTA LAKE MANAGEMENT SOCIETY'S LAKEKEEPERS PROGRAM

Welcome to Winter LakeKeepers!

Thank you for your interest in Alberta's aquatic environments and for participating in the Winter LakeKeepers program. Your involvement demonstrates that ecological apathy can be overcome and gives us confidence that Alberta's water resources can remain healthy for generations to come.

As a Winter LakeKeeper, you will help collect and prepare scientific data essential for assessing the health of your lake of interest. This manual serves as your reference for all Winter LakeKeepers sampling protocols.

LakeKeepers aims to address the significant gap in winter lake water-quality data across Alberta. At ALMS, our mission is to promote understanding and effective management of lakes, reservoirs, and their watersheds. Through Winter LakeKeepers, we strive to broaden winter monitoring, education, and stewardship throughout the province.

For field sheets, sample training, and the Winter LakeKeepers quiz, visit:

<https://alms.ca/winter-lakekeepers/>

This manual was prepared by Kurstyn Perrin. For more information, please contact

lakekeepers@alms.ca

Manual last updated: November 17th, 2025





1) BEFORE YOU HEAD OUT:

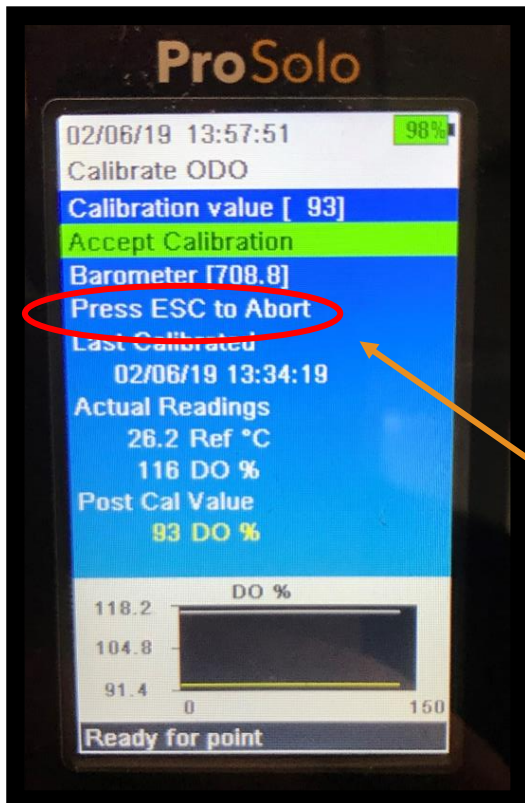
- Complete the online Winter LakeKeepers quiz and sign the informed consent form at www.alms.ca/winter-lakekeepers/
- Confirm with ALMS (lakekeepers@alms.ca) whether you're following **P1 or P2 protocol**; look for P1 or P2 in the step name to know which steps to follow. Check the materials list on Page 13 (Appendix section A2) to make sure you have all applicable materials. Also, **plan a timeline for sample return with ALMS.**
- Make sure your probe is charged (see the battery on the top right of the probe screen).
- Fill your hot water bottle** and place it in your YSI kit. This will protect the probe from freezing.
- If you need help finding your GPS coordinates, follow the steps on Page 12 (Appendix section A1).
- Check the weather. Please **do not sample at a temperature of -20 °C including windchill.**



2) CALIBRATE PROBE FOR DISSOLVED OXYGEN (P1&P2)

Calibrate your probe every sampling trip and in your vehicle to avoid freezing.

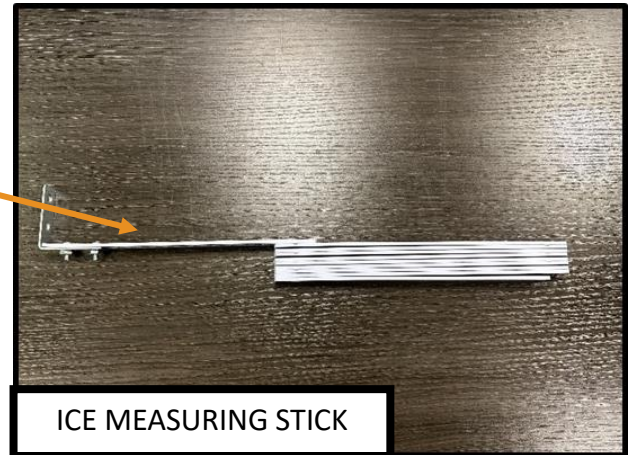
- Remove the **grey sleeve** (b) from your **probe** (d).
- Remove the **metal probe guard** (a) and gently wipe any water droplets from the probe with a Kimwipe (supplied tissue).
- Carefully place the metal guard back over your probe.
- There is a yellow sponge inside the grey calibration sleeve. Using water from the calibration bottle, wet the **yellow sponge** (c) with a couple drops of water.
- Put the metal guard back on and place probe back in grey sleeve (with yellow sponge still inside).
- 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' or 'DO' by pressing Enter.
- Choose 'DO %' by pressing Enter.
- Wait one minute.
- Record the **Barometer value** on the front of your field sheet.
- Choose 'Accept Calibration' by pressing Enter.
- 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.





4) RECORD BOTTOM DEPTH AND PROFILE MEASUREMENTS:

- Fill in the 'Environmental Observations' portion of your field sheet. See Appendix (A5) for **white ice** identification tips. For 'Ice & White Ice Thickness' measurements, use the **ice measuring stick** included in the kit. Record values in **cm**.
- Auger **two separate holes** (one for the probe work and one for collecting bottles).
- Use the 'tape and weight' to determine the bottom depth and record the depth in the 'Approximate Bottom Depth' box on the back of the field sheet. **Measure in meters**.
- With your probe turned on to the 'Log One Sample' screen, remove the grey sleeve, keep the metal guard on, and lower the probe into the water until the 0.1 m marker is at the surface of the water and wait a couple of minutes to acclimate. **The cable is already marked in meters, please don't measure in feet.**
- If your backlight turns off during sampling, press any key to reactivate it.
- Record the **temperature, dissolved oxygen, and conductivity** (if applicable) measurements on your field sheet following the depths indicated in the 'Depth (m)' row (see Appendix: step A3 on Page 14 for guide on cord depth markings). **The cord is already marked in meters.**
- You may need to wait 30-60 seconds for your dissolved oxygen readings to stabilize at each depth.
- Continue this process until you have hit the bottom of the lake.
- Hold the **Power Button** to turn off your probe.
- Place the grey sleeve with the wet sponge inside back over the metal guard. Return the probe to the warm sampling kit ASAP.



ICE MEASURING STICK



Depth (m)	Temp (°C)	DO (mg/L)	Cond. (uS/cm)
0.1			
0.5			
1.0			
2.0			
3.0			
4.0			
5.0			
6.0			
7.0			
8.0			
9.0			



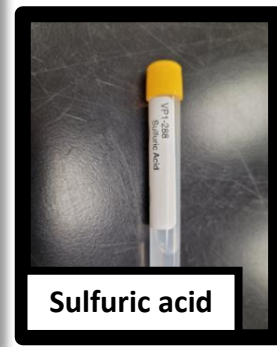
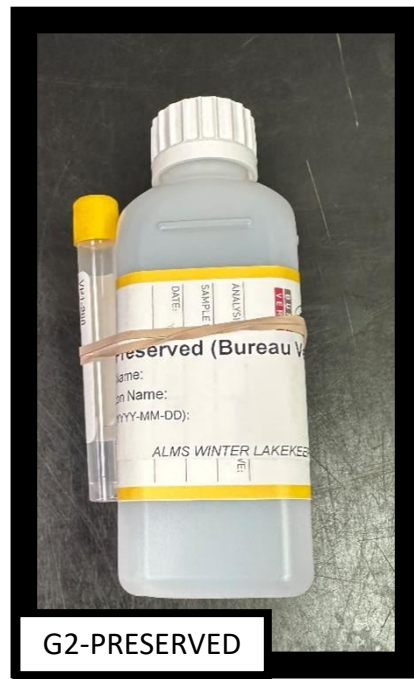
5) COLLECT WATER SAMPLES IN BOTTLES

- Both P1 & P2 will collect samples by filling up the provided bottles. Please note the following P1 or P2 designation for each bottle.
- IMPORTANT: Collection protocols between P1 & P2 are different. Please carefully read through each bottle collection as you go.**
- Do not TRIPLE RINSE any bottles.**

FOR P1 COLLECTION:

5a) FILL **G2-PRESERVED** BOTTLE IN LAKE

- Using a Sharpie, label your **G2-PRESERVED Bottle** with the Lake Name, Location Name, Date, and Time.
- Remove the preservative from the bottle and hold. Fill the **G2-PRESERVED** bottle in the lake until it reaches the line.
- Add one **yellow capped preservative** (b) to your **G2-PRESERVED bottle**. Wear disposable gloves and goggles as this preservative contains **sulfuric acid**.
- Re-attach empty preservative vial to bottle or put into cooler.
- Place the sample into your cooler.



Preservative MSDS information can be found on the ALMS website at:
<https://alms.ca/winter-lakekeepers/>



FOR P₁ COLLECTION:

5b) FILL **PHYTOPLANKTON** BOTTLE IN LAKE

- Using a Sharpie, label your **Phytoplankton bottle** with the Lake Name, Location Name, Date, and Time.
- Fill the **Phytoplankton** bottle up in the lake and leave a little head space.
- Add one **green capped preservative** (Lugol's) to your **Phytoplankton Bottle**. Wear gloves and safety glasses as this preservative contains iodine and glacial acetic acid and easily stains.
- Re-attach empty preservative vial to bottle or put into cooler.
- Place the sample into your cooler.



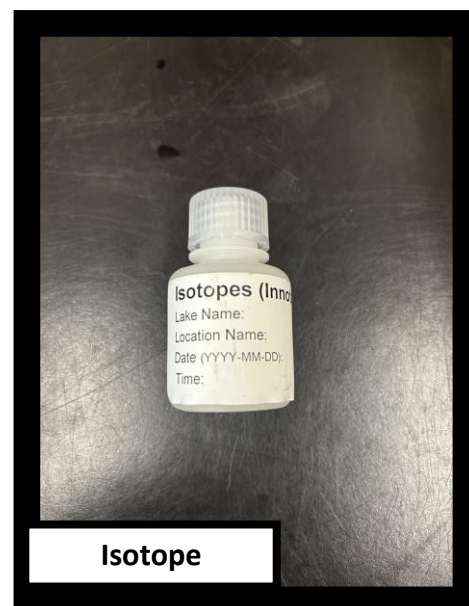
Phytoplankton



Lugol's

5c) FILL **ISOTOPE** BOTTLE IN LAKE

- Using a Sharpie, label your **Isotope bottle** with the Lake Name, Location Name, Date, and Time.
- Fill **Isotope** bottle up in the lake. Make sure the lid is secured tightly.
- Place the sample into your cooler.



Isotope

Preservative MSDS information can be found on the ALMS website at:
<https://alms.ca/winter-lakekeepers/>



FOR P2 COLLECTION:

****LABEL ALL BOTTLES WITH THE SAME TIME RECORDED ON YOUR FIELD SHEET**

IMPORTANT: THE BROWN CHLOROPHYLL- α BOTTLE WILL BE USED TO FILL UP ALL OTHER BOTTLES IN P2. DO NOT PUT ANY BOTTLES IN THE LAKE EXCEPT FOR CHLOROPHYLL- α .

5d) FILL **G2-F** BOTTLE FROM THE CHLOROPHYLL BOTTLE

- Using a Sharpie, label your **G2-F Bottle** with the Lake Name, Location Name, Date, and Time.
- Pour water from the Chlorophyll-a bottle** and fill the **G2-F** bottle until it reaches the line.
- Place the sample into your cooler.



5e) FILL **ISOTOPE** BOTTLE FROM THE CHLOROPHYLL BOTTLE

- Using a Sharpie, label your **Isotope bottle** with the Lake Name, Location Name, Date, and Time.
- Pour water from the Chlorophyll-a bottle** and fill the **Isotope** bottle up.
- Place the sample into your cooler.

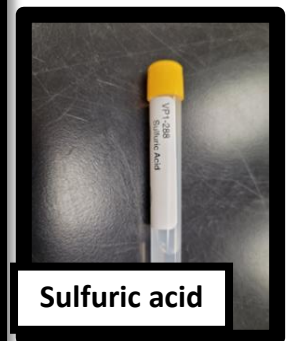
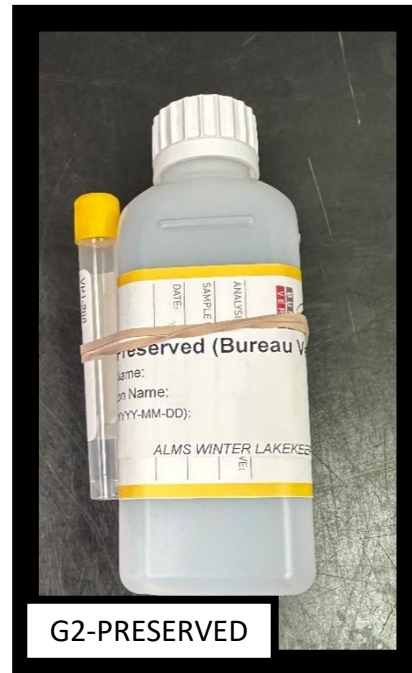


Preservative MSDS information can be found on the ALMS website at:
<https://alms.ca/winter-lakekeepers/>



5f) FILL **G2-PRESERVED** BOTTLE FROM THE CHLOROPHYLL BOTTLE

- Using a Sharpie, label your **G2-PRESERVED** Bottle with the Lake Name, Location Name, Date, and Time.
- Pour water from the Chlorophyll-a bottle** and fill the **G2-Preserved** bottle up.
- Add one **yellow capped preservative** (b) to your **G2-PRESERVED** bottle. Wear disposable gloves and goggles as this preservative contains **sulfuric acid**.
- Re-attach empty preservative vial to bottle or put into cooler.
- Place the sample into your cooler.



****LABEL ALL BOTTLES WITH THE SAME TIME RECORDED ON YOUR FIELD SHEET**

5g) FILL **PHYTOPLANKTON** BOTTLE FROM THE CHLOROPHYLL BOTTLE

- Using a Sharpie, label your **Phytoplankton** bottle with the Lake Name, Location Name, Date, and Time.
- Pour water from the Chlorophyll-a bottle** and fill the **Phytoplankton** bottle up. Leave a little head space.
- Add one **green capped preservative** (Lugol's) to your **Phytoplankton** Bottle. Wear gloves and safety glasses as this preservative contains iodine and glacial acetic acid and easily stains.
- Re-attach empty preservative vial to bottle or put into cooler.
- Place the sample into your cooler.





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5h) FILL **TOTAL AMMONIA** BOTTLE FROM THE CHLOROPHYLL BOTTLE

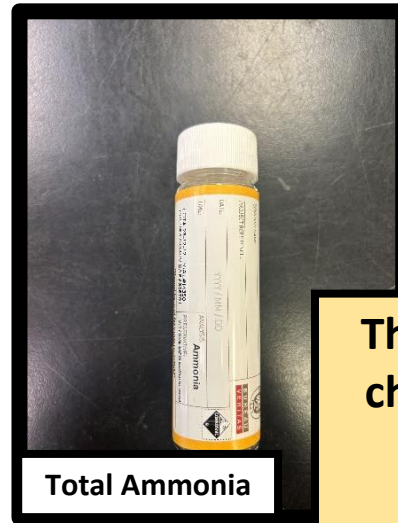
- a) Using a Sharpie, label your **Total Ammonia Bottle** with the Lake Name, Location Name, Date, and Time.

IMPORTANT NOTE: This bottle is pre-charged - meaning the preservative is already in the bottle.

DO NOT put this bottle into the lake.

- b) Pour water from the Chlorophyll-a bottle and fill the **Total Ammonia** bottle up.

- c) Place the sample into your cooler.



Total Ammonia

This bottle is pre-charged with the preservative.

Do not overfill when pouring from the Chlorophyll-a bottle

****LABEL ALL BOTTLES WITH THE SAME TIME RECORDED ON YOUR FIELD SHEET**

5i) FILL **CHLOROPHYLL- α** BOTTLE IN THE LAKE

- a) Using a Sharpie, label your **Chlorophyll-a Bottle** (a) with the Lake Name, Location Name, Date, and Time.

- b) Fill your **Chlorophyll-a Bottle** with water from below the lake surface, as deep as you can reach down.

- c) Place the sample into your cooler.

- d) **FOR FILTERING WATER FROM CHLOROPHYLL-A BOTTLES, PROCEED TO STEP 12.**



Chlorophyll-a

Preservative MSDS information can be found on the ALMS website at:
<https://alms.ca/winter-lakekeepers/>



12a) CHLOROPHYLL-A FILTERING SET UP (P2):

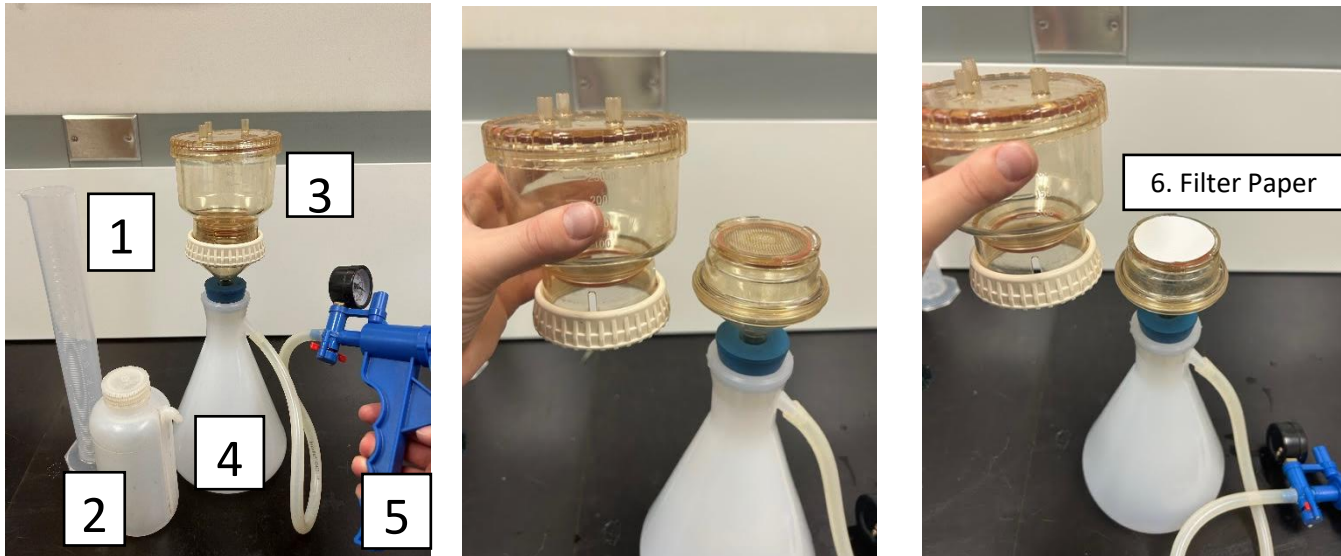
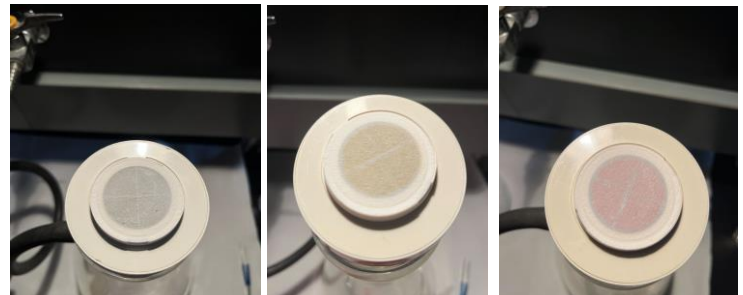


Figure 1. OPTION #1 SET UP: Filtration system including:

1. Graduated cylinder
2. Squirt bottle
3. Filter apparatus with rubber stop
4. 1000 mL Erlenmeyer flask
5. Hand vacuum/pump
6. Filter paper



Colour on the filter papers may vary. Often there may be no colour at maximum filtration.



Figure 2. OPTION #2 SET UP: Screw-on filter set.

12b) FILTER WATER FROM CHLOROPHYLL-A BOTTLES (P2):

Goal: The purpose of filtering is to capture a slight colour on the filter paper for the lab to analyze chlorophyll-a.

- Each chlorophyll-a sample is filtered in **triplicate (3 filters)**. You will use the **first filter** to determine how much lake water to measure for the **second and third filters** — try to match volumes as closely as possible.

-Filtering must be done **within 24 hours** of sampling. Keep the brown chlorophyll-a bottle **in the fridge** until you are ready to proceed with these steps.

*****Please visit the Winter LakeKeepers webpage at www.alms.ca to view our 'Winter LakeKeepers Training Video' which includes a visual step by step of the filtering process*****

1. Set-Up:

- Put on **nitrile gloves**.
- Set up the **filter apparatus (see page 8)** on a level surface **away from direct light**.
- Place **Filter paper #1** on the funnel using tweezers and secure the top.
- Pour some pure water** into the squirt bottle and **wet the filter paper** lightly.

2. Filter #1 (Determine Volume):

- Invert or shake** the brown chlorophyll-a bottle to mix the sample.
- Measure **50 mL** of sample water in the graduated cylinder and pour it onto the filter.
- Use the **hand pump** to gently filter the water through.
- If no colour appears, continue filtering in **50 mL increments**, up to **300 mL total**, until a **faint colour is visible**.
 - If no colour is visible by **300 mL**, **stop** — this is acceptable.
- Record the total volume filtered** for Filter #1 on your field sheet and provided label.
- Rinse** the graduated cylinder and inside of filter apparatus **three times** with pure water.

3. Preserve Filter #1:

- Add **3–5 drops of MgCO₃** directly onto the filter while pumping gently.
- Use tweezers to **fold the filter paper in half twice** (avoid touching the center of the paper).
- Place the filter in a **petri dish**, **wrap in foil**, **fill out provided label information** and stick-on tinfoil

4. Filters #2 and #3:

- Repeat the same steps measuring **approximately the same volume** determined from Filter #1 (i.e, if Filter #1 was 150 mL, measure 150 mL for Filter #2 and Filter #3)
- Record each volume and paper colour on the field sheet.

5. After Filtering:

- Store all **3** wrapped petri dishes **in a Ziploc bag in the freezer** until shipping.
- When shipping, include the petri dishes with the other samples in a cooler with **frozen ice packs**.



13) WHAT TO DO AFTER SAMPLING (P1 & P2)

a. Store Bottles Until Shipment

Please refer to the table below for sample return timelines and shipping/delivery instructions based on your protocol.

Table 1. Shipment timing & bottle storage for Winter LakeKeepers 2025-2026

Protocol	Return Within:	How to store:
P1	2 weeks	-Keep in Fridge: G2-Preserved -Keep in Cooler: Phytoplankton & Isotopes
P2 (If ALMS is filtering the Chlorophyll-a)	24hrs	-Keep in Fridge: G2-Preserved, G2-F, Total Ammonia and Chlorophyll-a -Keep in Cooler: Phytoplankton & Isotopes -Keep in Freezer: Microcystin
P2 (If the Volunteer is Filtering)	3 days	-Keep in Fridge: G2-Preserved, G2-F, Total Ammonia and Chlorophyll-a (until you filter) -Keep in Cooler: Phytoplankton & Isotopes -Keep in Freezer: Microcystin & 3 Chlorophyll-a filters

13) WHAT TO DO AFTER SAMPLING (P1& P2)

b. Dropping off Samples at Office

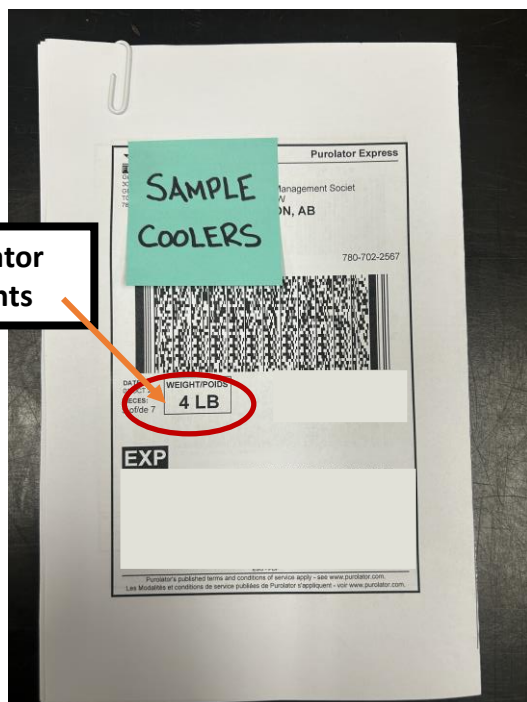
- If you are returning your sampling kit in person to the ALMS office – please contact ALMS at 780-702-2567 or lakekeepers@alms.ca to arrange delivery timing.
- The ALMS office is located at **4816-89 St. Edmonton, AB. T6E-5K1**
- When returning the kit, park anywhere you like in the parking lot and buzz at the front door when you arrive.



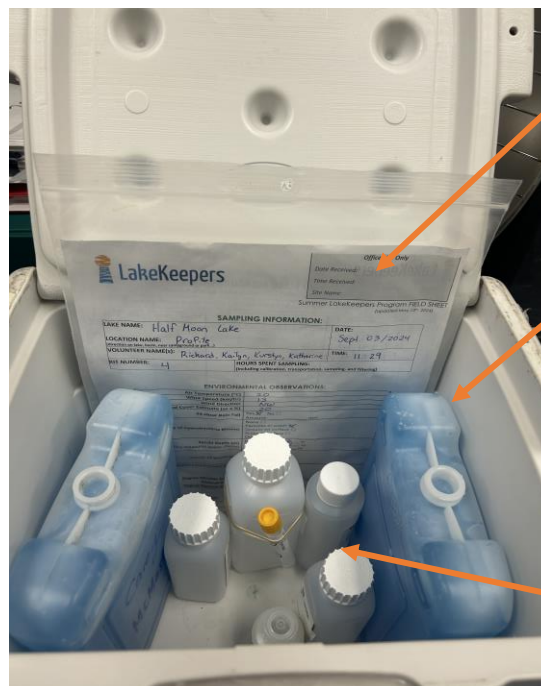
13) WHAT TO DO AFTER SAMPLING (P1 & P2)

c. Shipping Samples

1. Pack all your bottles, including the *frozen* chlorophyll filters from the freezer, into a cooler.
2. Make sure to include a frozen ice pack or two depending on the size of your cooler.
3. Place the field sheet sealed in a **Ziploc bag** into the cooler. Email or text a photo of the field sheet to lakekeepers@alms.ca.
4. Tape the cooler shut.
5. Use the appropriate **provided return label** (i.e., probe kit, filter kit or sample cooler) and place inside the provided sleeves with the barcode visible for scanning. Pull the tabs off the back, close the top of the sleeve and stick the label top of the cooler. Make sure the label is sticking well. Add extra tape if needed.
6. Please send a picture of the **tracking number** to lakekeepers@alms.ca or by text message.
7. Drop off at your nearest Purolator location (see Appendix 6 & 7).



Purolator weights



1. Field sheet in Ziploc bag

2. Frozen ice packs

3. All bottles including frozen microcystin and Chlorophyll filters (if relevant)

Important Reminders:

- Check with your courier for the daily cutoff times for overnight shipments. Samples must be submitted before these times if they are to arrive at our office the next day.
- Sampling any day between **Sunday-Wednesday** is ideal and will ensure samples are received before hold times. Thursday mornings can work if samples can be shipped before the cutoff time or can be dropped off at our office.
- Our office will be closed for holidays from **December 22nd to January 4th and February 16th**. We cannot receive samples during these times.



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KEEPING YOUR KIT FOR FURTHER SAMPLING:

- If you plan on using this probe in another waterbody, ensure it has been cleaned with tap water. It is best if the tap water used to clean the probe is discarded outside and not down your drain.
- Do not use any cleaners on your probe – when storing the probe, ensure the yellow sponge is wet and the grey sleeve is over the probe.
- If you plan on using this probe again in the same waterbody, no cleaning is required.
- Even though you plan to continue sampling, your samples must be sent back to ALMS – see “Shipping Samples” Page 11, and make sure you process and ship your samples according to the timeline and processes outlined in Table 1 on Page 10.

APPENDIX

A1) GPS Coordinates Instructions

1. Go to <https://www.googlemaps.com/maps>, and find your lake (search its name).
2. Using your mouse, right click on the location of the lake where you collected your sample.
3. Choose “What’s Here?”
4. The GPS coordinates will appear at the bottom of your screen in the format of 55.217876, -113.252806. Record these coordinates on your field sheet.

IF SAMPLING THE SAME SITE MULTIPLE TIMES, RECORD THE GPS COORDINATES AND BOTTOM DEPTH ON YOUR FIRST TRIP AND USE THEM TO RELOCATE THE SITE FOR FUTURE SAMPLING.

Table 2. Site GPS log (reference for subsequent sampling events)

SITE (Lake, Location Name) Eg. Moose Lake, Vezeau Bay	Latitude	Longitude	Bottom Depth (m)

¹Degree Minutes Seconds example: 53°29'06.5"N 113°27'54.6"W

²Decimal Degree's example: 53.485127, -113.465178

³Degree Decimal Minutes example: 53°29.1076'N, 113°27.9107'W



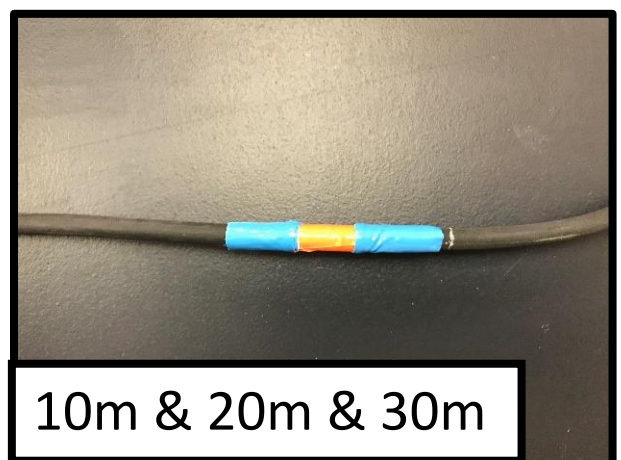
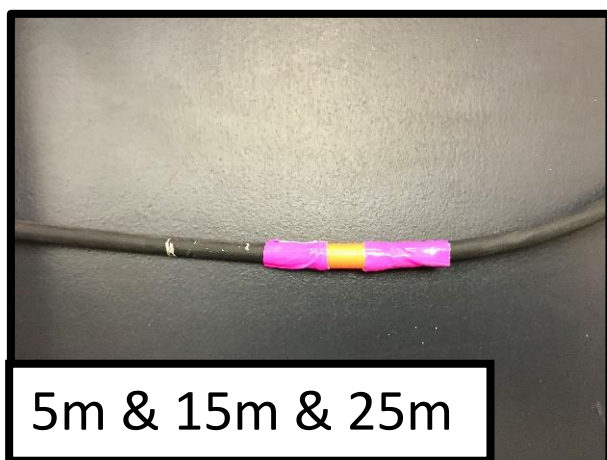
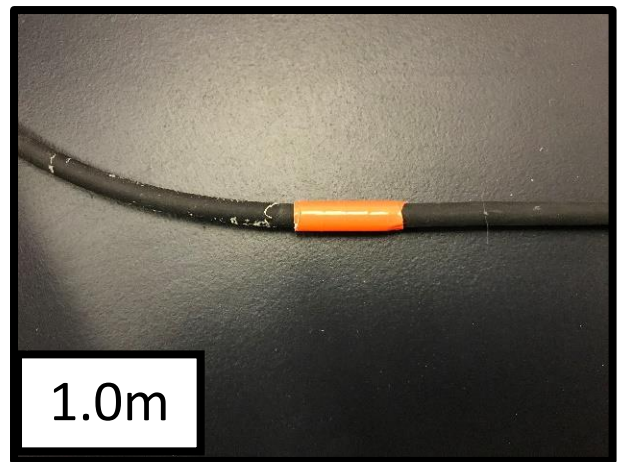
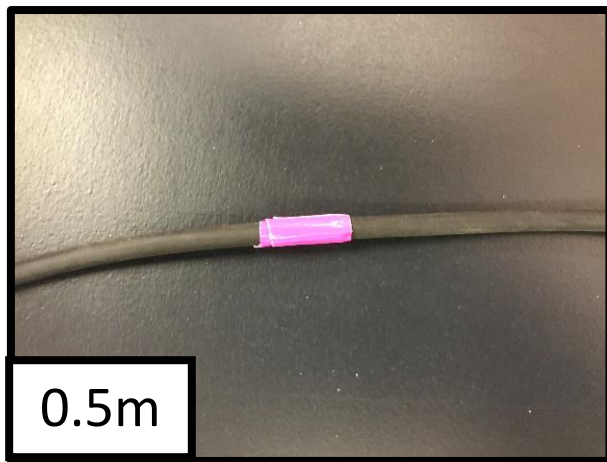
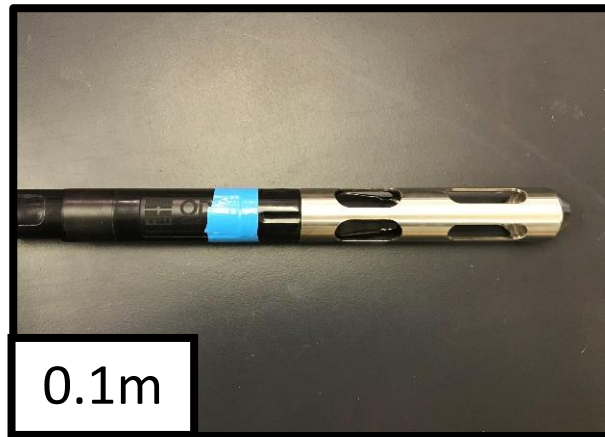
A2) USE THIS TABLE TO MAKE SURE YOU HAVE EVERYTHING YOU NEED FOR SAMPLING

Table 3. Equipment & Material List

P1	P2	Chlorophyll-a Filtering (P2 only)
YSI Solo Probe	*Same as P1 plus...	Filter apparatus or Buchner funnel and rubber stopper
Long yellow or green gloves	G2-F Bottle	Hand pump & tube
G2-Preserved Bottle + yellow cap preservative (2mL sulfuric acid)	*Total Ammonia Bottle* (DO NOT fill in the lake, already has preservative)	Filter flask
Isotope Bottle	One 1L Chlorophyll-a bottle	Graduated cylinder
Phytoplankton Bottle + green cap preservative (3mL Lugol's Solution)		Squirt bottle & pure water
Hot water bottle		Tweezers
Field Sheets on Clipboard		Filter paper
Probe charger		Magnesium Carbonate
Extra disposable gloves, safety glasses		Aluminum foil
Kimwipes (tissues)		Petri dishes & baggies
Tape and Weight		Chlorophyll-a filter & bottle labels
Pure water for calibration		Disposable gloves
Pencils/pens/Sharpies		
Purolator Return Labels		



A3) YSI PROBE DEPTH MEASUREMENT MARKING GUIDE





A4) DATA COLLECTION BACKGROUND

Below are descriptions of what the data and samples collected through Winter LakeKeepers will be used for, and how they relate to better understandings lakes in the winter. Also provided is where the data will eventually be used and reported.

- **Environmental Observations:** 'Total Ice Thickness,' 'White Ice Thickness,' 'Snow Coverage,' 'Snow and/or Slush Thickness,' 'Air Temperature,' 'Water Colour,' 'Odour Present,' and 'Water Clarity' are all collected to put the data collected in context of the winter environment in which they were collected. Ice thickness and snow thickness (if present) can be used to understand how much light may be penetrating the ice. See Appendix section A5 on Page 17 for further description about white ice and clear ice. Recording water colour and the general water clarity can identify algae or cyanobacteria growth, and even the type of algae or cyanobacteria. Seeing how these parameters change may also help contextualize trends in other data collected through Winter LakeKeepers.
- **GPS Coordinates:** Very important to collect, since the particular location on the lake where the sample is collected is used to contextualize all other data collected.
- **Probe Calibration:** Used to ensure probes are reading accurately given local environmental conditions.
- **Lake Measurements:** Temperature, dissolved oxygen, and conductivity are measured through the lake profile to understand lake mixing, fish habitat, and overall water quality. Low oxygen levels in late winter can stress fish and may lead to die-offs. Tracking how oxygen declines over winter also provides insight into summer algae growth, as decomposing algae uses oxygen and can release phosphorus from the sediments. Conductivity readings help identify changes in water quality and water levels over time.
- **G2-Preserved:** Water from this bottle is used to determine total phosphorus and total nitrogen levels, which are important nutrients for algae, cyanobacteria, and aquatic plant growth. High levels of these nutrients may indicate pollution and contextualize the amount and type of algae and cyanobacteria present. Reported on in the ALMS Winter LakeKeepers reports.



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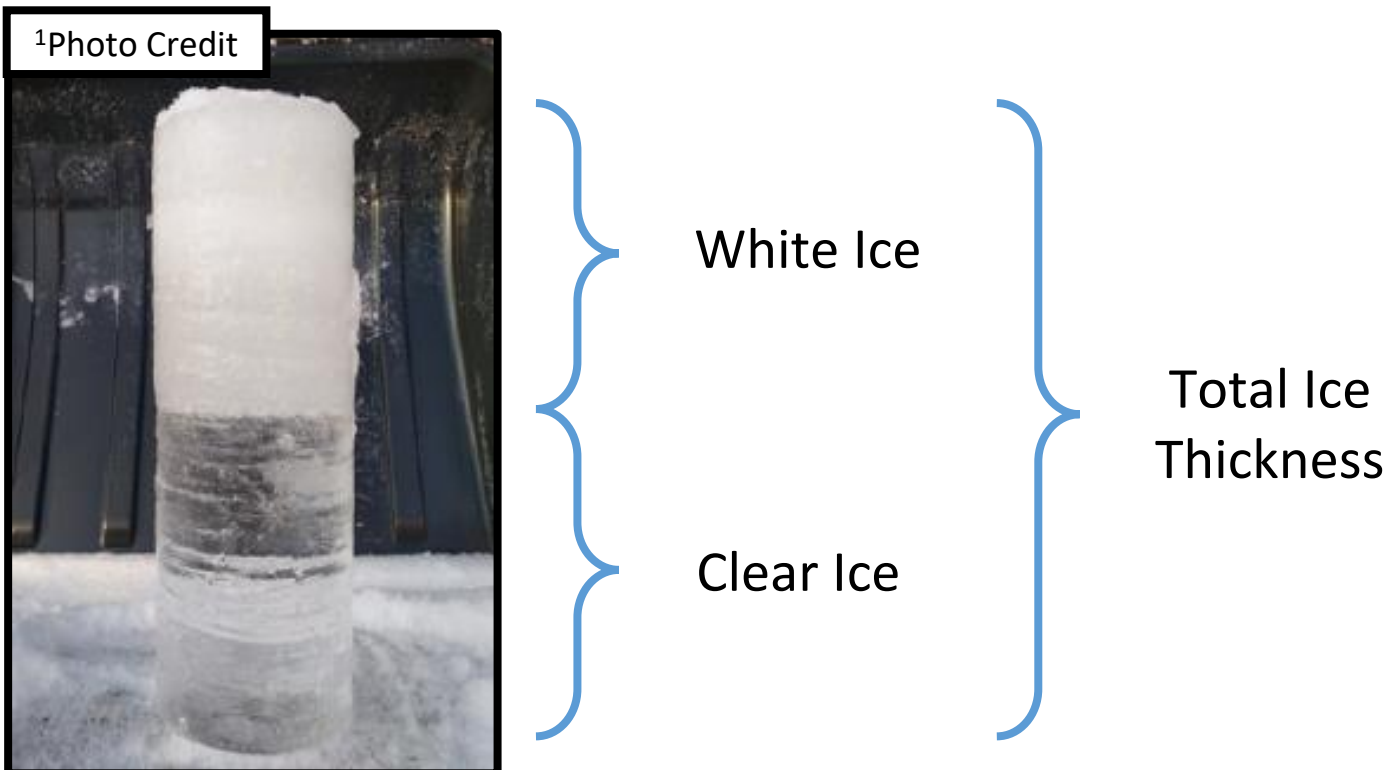
- **Isotopes:** Isotopes of hydrogen and oxygen are used to help understand water balance in lakes including sources (precipitation, inflow, groundwater), losses (e.g. evaporation, outflow), and residency time.
- **Phytoplankton:** This bottle preserves the cyanobacteria and algae species that are present just below the ice, where their levels will be the highest. Knowing which species are present, and in what amounts, will help to understand the biodiversity of algae and cyanobacteria, and their contribution to the winter lake food web. Information will also be used to understand how nutrient levels impact algae and cyanobacteria in the winter. These samples will be archived and may be analyzed later if chlorophyll-a levels are high.
- **G2-F:** Water from this bottle is used to determine total dissolved phosphorus and dissolved organic carbon levels, which are important nutrients for algae, cyanobacteria, and aquatic plant growth. High levels of these nutrients may indicate pollution and contextualize the amount and type of algae and cyanobacteria present.
- **Ammonia:** A nitrogen compound found naturally in water, often resulting from the breakdown of organic matter or human activities like agriculture and wastewater discharge. In lakes, elevated ammonia levels can be toxic to aquatic life, especially in fish, and can contribute to eutrophication, promoting excessive algae growth that depletes oxygen and harms overall water quality.
- **Chlorophyll-a:** Water from this bottle is used to determine the levels of chlorophyll-a in lake water. Chlorophyll-a is a green pigment found in all algae and cyanobacteria and is used in photosynthesis. Chlorophyll-a levels are used to understand the amount of algae and cyanobacteria in lake water. Higher levels, in conjunction with high nutrient levels, may indicate nutrient pollution, or reflect the lake's natural ability to support high levels of algal and cyanobacterial growth. Chlorophyll-a levels compared with ice conditions will also improve the understanding of what influences algae and cyanobacteria growth in Alberta Lakes in the winter.



A5) SNOW, SLUSH, WHITE ICE, AND CLEAR ICE

The quality, or characteristics of the snow and ice that covers lakes in the winter can be extremely variable. One of the major ways that snow and ice can vary on a lake is vertically, where snow, slush, white ice and clear ice can be identified. Snow and slush will be loose, while both white ice and clear ice will be hard. After auguring the hole in the ice, looking down the hole you should see up to two distinct layers of ice. On the top will be opaque or 'white' ice, and below will be clear, transparent 'clear' ice (also known as black ice). If you are sampling early in the season, there is a good chance that there will be little or no white ice, but later in the season, the layer of white ice may grow substantially. White ice is formed when snow melts and refreezes, which can happen during warm spells, rain events, or if the snow layer is heavy enough to force water up through cracks in the ice.¹

How to measure snow, slush, white ice, and clear ice: Before you clear your auger site, measure the snow and/or slush depth, or nearby the auger hole where you have not altered the snow. Next, clear the site where you will auger your hole. Make sure you clear all the way down to the hard layer of ice, if possible. After you auger your hole, measure the total ice thickness. Next, measure the thickness of the white ice layer, which will be from the surface of the ice down to the line where white ice transitions into clear ice. The thickness of clear ice is the difference of total ice thickness and white ice, which is why only total and white ice thickness are required on the field sheet.



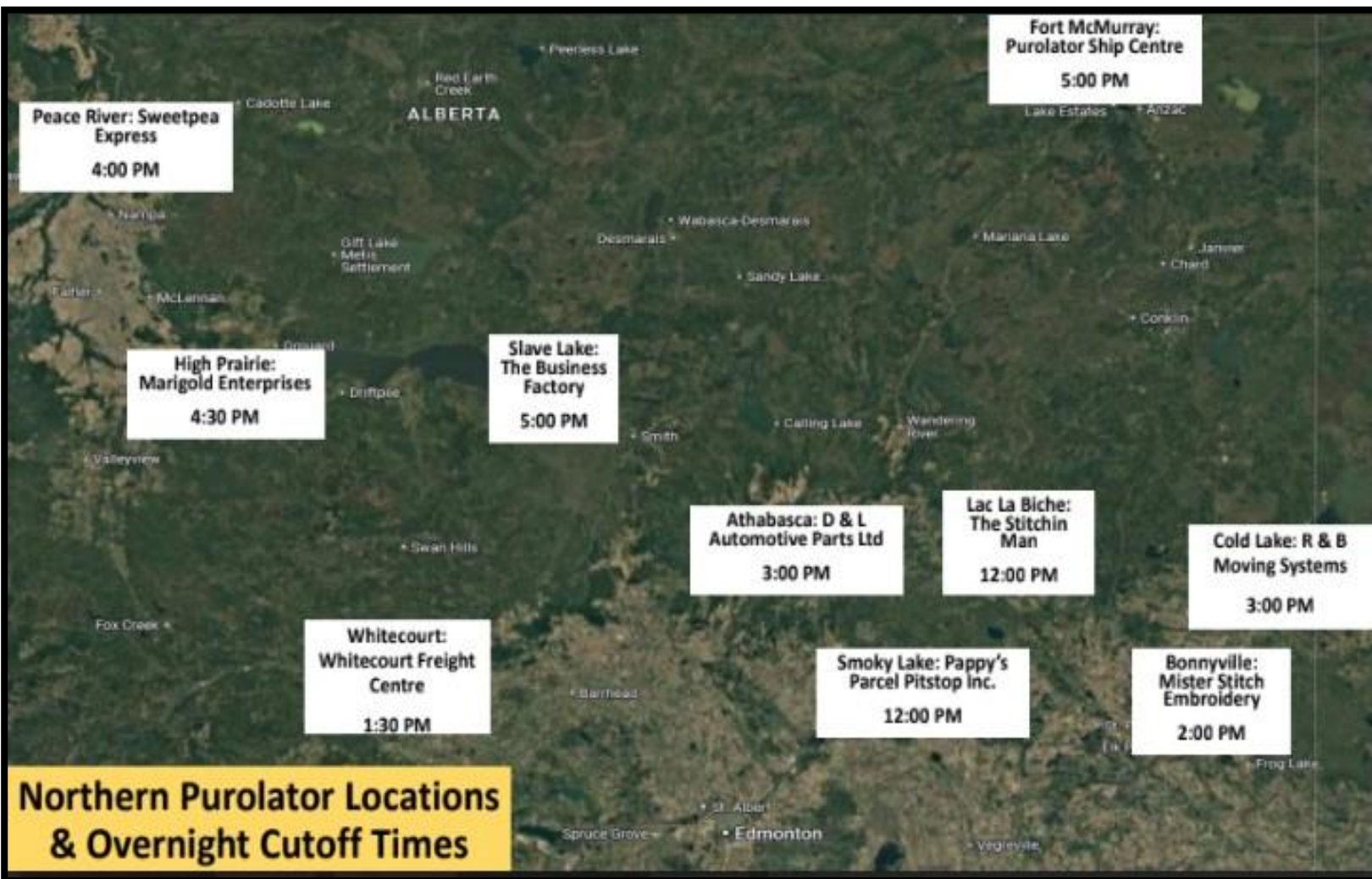
¹Weyhenmeyer, G.A., Obertegger, U., Rudebeck, H. *et al.* Towards critical white ice conditions in lakes under global warming. *Nat Commun* **13**, 4974 (2022). <https://doi.org/10.1038/s41467-022-32633-1>



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A6) PUROLATOR LOCATIONS & OVERNIGHT CUTOFF TIMES



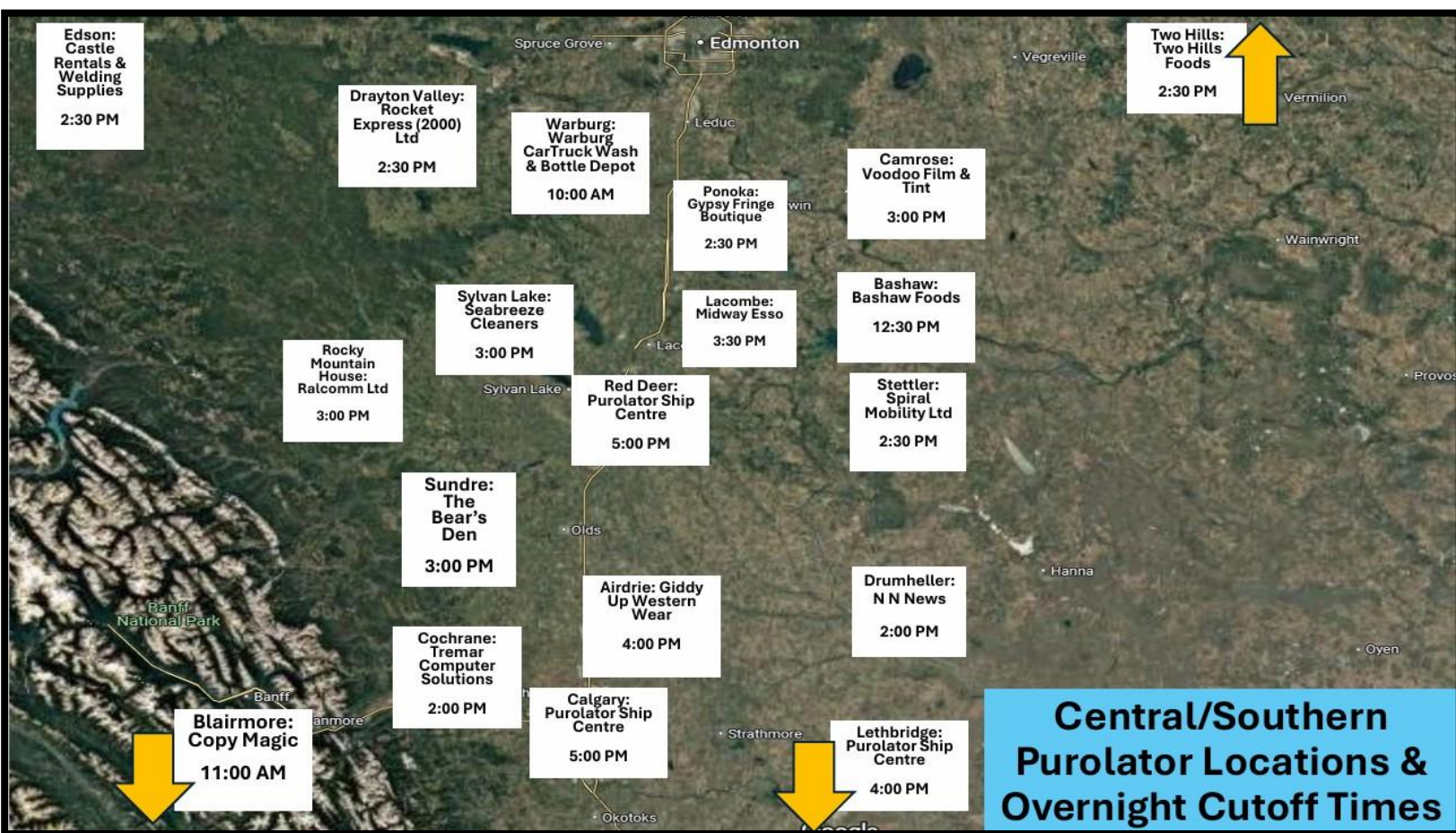
***All these locations offer full Purolator services ***



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A7) PUROLATOR LOCATIONS & OVERNIGHT CUTOFF TIMES



***All these locations offer full Purolator services ***