Government of
Northwest Territories

NWT-WIDE
COMMUNITY-BASED
WATER QUALITY MONITORING PROGRAM (CBM)

PROTOCOLS FOR COLLECTING WATER QUALITY SAMPLES

Photo Credit: Cole Dupuis,
Escarpment Creek, Hay River

Cole Dupuis

Contents

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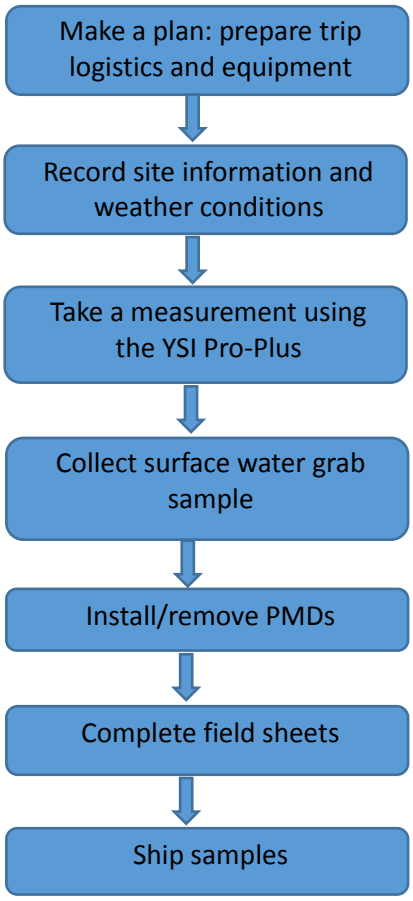
INTRODUCTION

The NWT-wide Community-based Water Quality Monitoring (CBM) Program was designed and implemented to help build community capacity for water quality monitoring and to answer community questions and concerns about the health of aquatic ecosystems in the Northwest Territories (NWT). The program follows a defined sampling protocol to carry out water quality sampling in an effective and safe manner. This document was developed to educate community monitors and the public on the NWT-wide CBM Program sampling protocol.

The *Protocols for Collecting Water Quality Samples* outlines the following important steps for water quality sampling:



If you would like more information on the CBM program, or more detailed protocols on any of the techniques/types of equipment used to monitor water quality in this program, please email: **nwtwaterstrategy@gov.nt.ca**.

GENERAL INFORMATION ABOUT TYPES OF SAMPLES

The program uses four techniques/types of equipment to monitor water quality:

1) Surface Grab Water Samples – these measure over 70 parameters, including a variety of nutrients, major ions, and dissolved and particulate metals.
2) YSI Sondes – these stay in the water for the duration of the open water season and take measurements every two hours for sample depth, temperature, pH, turbidity, chlorophyll a, conductivity, dissolved oxygen and oxidation/reduction potential.
3) Polyethylene Membrane Devices (PMDs) – these stay in the water for 30 days at a time and measure dissolved hydrocarbons.
4) Diffusion Gradients in Thin-Films (DGTs) – these stay in the water for 3-7 days and measure dissolved metals.

In addition to using YSI sondes that stay in the water for the duration of the open water season, the CBM also uses smaller versions of this piece of equipment to take "spot samples" or "local samples." These spot samples are taken with a YSI Pro-Plus or an EXO1 Sonde, which is a hand-held piece of equipment that measures sample depth, dissolved oxygen, conductivity, temperature, pH,oxidation-reduction potential (ORP) and Turbidity (EXO1 only).

MAKE A PLAN: PREPARE TRIP LOGISTICS AND EQUIPMENT

Before heading out onto the water, it is important to organize all details of your trip. Special consideration should be given to planning and organizing trip and safety details and preparing your equipment. Setting a plan will help make sure your trip goes smoothly.

Safety and Logistics

- Fill out your trip itinerary: carry a trip itinerary with you at all times and leave copies with your office contact
- Outline your call-in procedures and identify a call-in person (office contact)
- Understand the steps of the emergency response plan (should be part of the trip itinerary)
- Review your safety gear checklist and complete a Site/Trip Hazard Assessment tailgate meeting form (Appendix 1 and 4)
- Organize transportation to and from sampling site
- NEVER work alone!

Sample collection should not lead to contamination of other monitoring or sampling in progress. When planning your sampling trip, take samples starting at downstream sites and moving upstream to ensure quality control.

Prepare the equipment

- Determine the number and type of sample(s) that will be collected
- Select the equipment needed from the equipment list (Appendix 1)

- Pack the field sheets (Appendix 3)
- Calibrate YSI Sonde. If you have not been trained to calibrate:
    - Check with ENR that the Sonde has undergone calibration
    - Check that the calibration record forms are complete
- Label the grab sample bottles (see page 11 for instructions)
- Pack extra sample equipment (grab sample, travel blank, field blank, or replicates):

  A travel blank is a sample that goes with you to and from the sampling site but never leaves the cooler. **Do not** open the sample. All travel blanks need to be returned to the lab with the rest of the field samples collected.

  A field blank sample is used to identify any contamination from the atmosphere. It is important that they are exposed to the air the same amount and number of times as the regular field sample.

- Pack 2 to 5 litres deionized water
- Pack frozen freezer packs

If not returning with samples:

- Choose a person in Yellowknife for pick up, delivery or storage of samples
- Do not ship samples on Friday, Saturday or Sunday (unless contact person can store samples over the weekend)

It is important that you do not smoke for a minimum of 4 hours before working with the samples: please plan accordingly. Also, make sure everyone on the boat, even those not handling the samples, does not smoke while samples are being taken. The smoke in the air can contaminate samples, especially the very sensitive PMDs.

RECORD SITE INFORMATION AND WEATHER CONDITIONS

It is important to record all site information and weather conditions. The more information the better! If you see something you think might be important, especially if you think it could affect the water quality, record it. This information could help interpret the water quality data.

Record the following information in the top section of your field sheet (Table 1):

Site information

- General site information: Date of sampling trip, name of sample site, site code, and the time you started and stopped sampling at that site.
- Record the names of everyone involved in sampling that day (e.g., community monitors, boat driver and any ENR/AAROM/CIMP staff).
- Record GPS coordinates (Decimal Degrees, e.g., N62.408917°, W-114.326472°)

Weather conditions

- Use the thermometer to determine air temperature. When reading the temperature, make sure it is

not exposed to direct sunlight.
- Record wind direction and amount/type of precipitation (rain, snow, hail).
- Record weather events that happened during the week before sampling that could affect water quality. Record type of event, how long it lasted and when it ended (e.g., 2 days of heavy rain).

Water conditions
- Record observations of the water (e.g., fast flow, slow, clear, choppy, dead leaves/branches, brown, green).
- Use a thermometer or your YSI Pro-Plus (see next section for instructions) to determine the temperature of the water. Record this information on your field sheet.
- Use a hand-held depth sounder to determine water depth at your site. Hold top of the depth sounder just below the surface of the water, pointing it directly at the bottom, and flick the button on it. The small screen on the side will tell you what the water depth is. Record this number on your field sheet.

TABLE 1: Site information and weather section of the field sheet

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ENVIRONMENT AND NATURAL RESOURCES – COMMUNITY-BASED MONITORING FIELD SHEET

Date:	Site Name:	Weather Conditions:
Latitude:	Site Code:	Air Temp (°C):
Longitude:	Time On Water:	Water Conditions:
Boat Operator:	Time Off Water:	Site/Debris Conditions:
ENR/AAROM/CIMP Names:	Community Members:	Wind Direction:
		Wind Speed: (Calm, breezy, gusting, etc.)
		Water Depth:
		Water Temp (°C):

Any situation that might contaminate the sample should be recorded in the "Notes" section on the back of the field sheet.

For example:
- oil or gasoline on the water surface
- forest fire smoke in the air
- dirty equipment
- dirty hands that touched sample

TAKE A MEASUREMENT USING YSI PRO-PLUS

The YSI Pro-Plus contains sensors to measure different parameters: dissolved oxygen, conductivity, temperature, pH and ORP. Taking a measurement of the local conditions is important because the readings gathered from the YSI Pro-Plus will help support the water quality data.

Check that the sensor ports are filled either with sensors or a plug (Figure 1). Ports are not waterproof and will be damaged if water gets into them.

FIGURE 1: Close up of sensor plugs (source: www.ecoenvironmental.com)

1. Make sure your YSI Pro-Plus is calibrated prior to using it. If you are not sure, check to see if ENR staff calibrated the unit recently or calibrate it yourself.
2. Turn the power on.
3. Remove the protective cup and then put on the probe guard.
   Probe guard must be on when taking measurements
4. Place probe into the water below surface, with the sensors facing down, and shake to release any air bubbles. When taking dissolved oxygen measurements from standing water samples it is important to stir the probe in a circle until the value for dissolved oxygen has stabilized (approximately one circle per second). For sampling in moving water, hold the probe below the surface of the water, with the sensors facing downstream.
5. Allow temperature readings to stabilize. Wait for the value of the parameter you are interest in to stabilize and then record this value in the appropriate section of the field sheet (Table 2). Also record the Identification number of the YSI Pro-Plus unit in the "ID #" section.
6. If readings take too long to stabilize, sensor could need cleaning or may need to be replaced. Make note of any issues that arise on your field sheet.
7. When done, remove the probe guard and fill the protective cup ¼ to ½ full with a pH 4 buffer solution (enough to cover tops of all sensors). Put the cup back on the meter. (If pH4 buffer is not available, place small amount of water, 1cm, or a moist sponge in the bottom of the Cup to prevent sensors from drying out).

TABLE 2: Local conditions section of field sheet

Local Conditions -YSI Pro-Plus/EXO1	
ID#	
Time	
Temp (˚C)	
Sp Cond (µs/cm)	
pH	
ORP	
Turbidity (NTU)	
ODO mg/L	

COLLECT SURFACE WATER GRAB SAMPLES

A surface water grab sample is collected just below the surface of the water and tells us what is in the water at the time it is collected. These samples are analyzed at Taiga Environmental Laboratory in Yellowknife for a wide variety of parameters. Parameters include: physicals, nutrients, major ions, organics, dissolved and trace metals, ultra-low dissolved and total mercury, and bacteriological parameters.

Ten bottles (Figure 2) are used when collecting surface water grab samples in the CBM program:

- One bottle with a "Sterile" sticker taped across the lid and bottle (confirming bottle has not been opened) and a small pill inside the bottle:
  For bacteriological parameters
- Four small clear glass vials that come in pairs in clear Ziploc bags, with no dots on lids:
  Two for ultra-low dissolved mercury
  Two for ultra-low total mercury
- Two bottles with a red dot on lid:
  One for total metals and one for dissolved metals
  Plus additional small vial with red dot on lid (preservative to add to the total metal sample once collected)
- One bottle with a green dot on lid:
  For routine parameters
- One tall bottle with no dot on lid:
  For chlorophyll
- One bottle with a black dot on lid:
  For nutrients

It is good practice to bring extra sample bottles to replace any dropped/contaminated/damaged bottles.

FIGURE 2 – Complete set of water sample bottles.

When taking surface grab water samples:

Do not put anything inside your sample bottle except the water you are sampling and, if needed, preservative. Usually the water you are sampling is site water; however, if you are taking a field blank, only deionized water should be in the sample bottle.

Do not touch the inside of the bottle or the inside of the lid.

When taking samples from a boat:

- If safe to do so, take samples from the bow (front) of the boat because it is the most upstream location. If it is not safe at the bow, take samples from the side of the boat – as close to the bow as possible – or use a dip pole to collect surface grab water samples if working from a tall boat.
- Collect water from a sampling depth of 15-30 cm (6-12 inches) below the water surface.
- Take the water sample from flowing water rather than still water. If the water is not moving, create an artificial current. To do this, move the bottle through the water in a direction away from the person sampling.
- Work in pairs:
    - One person will be *Dirty Hands*: After putting on your gloves, take the empty sampling bottles out of the cooler, finish labelling them with a marker, and hand the labelled bottle to the *Clean Hands*. *Dirty Hands* is also there to hold on to *Clean Hands* as he/she leans over the bow/side of the boat.
    - The second person is *Clean Hands*: This person will collect the water sample. Try not to touch anything other than the sampling bottles and site water once you have put on your gloves.
- Do not use bug spray before or during sampling. The chemicals could contaminate the samples. A bug jacket is a good alternative.

For collecting grab samples, you will need:

- ☐ The correct number of sets of grab sample bottles (e.g., you may need 1-3 sets depending on whether you are taking replicates or a field blank)
- ☐ Powder-free clear vinyl gloves (Figure 3)
- ☐ Grab sample bottles (listed above)
- ☐ Cooler with frozen icepacks
- ☐ Marker to complete labels
- ☐ Deionized Water
- ☐ Set of Travel Blank grab sample bottles (these bottles will come already filled with water and say "TB" somewhere on them. The Travel Blanks will go to and from site with you but don't leave the cooler.)

FIGURE 3 – Powder-free clear vinyl

1. Pre-label sample bottles (Figure 4):
   If possible, label bottles before heading out onto the water. This will save you time on the water and avoid potential sample mix-ups. Each set of surface

water grab sample bottles taken as part of the CBM program will have specific Chain-of-Custody (CoC) identification number. ENR will provide labels that will have:

- The Chain-of-Custody identification number (CoC ID#)
- Space to fill out the date the sample was taken
- Name of person taking the sample
- ENR Water Resources

FIGURE 4 – Labeled Grab water sample

2. Labels can get damaged during sampling, storage and shipping. Write site information on the lid or a second label as a backup. Put on your powder-free clear vinyl gloves (see Figure 3) – both *Clean Hands* and *Dirty Hands*.

3. *Dirty Hands*: Finish labelling the bottle with the sampling date and hand the bottle to *Clean Hands*.

4. *Clean Hands*: **Triple Rinse** (following Taiga Lab procedures summarized below) each sample bottle before collecting sample:
   - Take the cap off, fill the bottle ¼ full with water you are sampling, replace the cap, and shake the partially-filled bottle. Remove the cap and empty bottle contents downstream.
   - Do this three times for each sample bottle. **(Except for Bacti Bottle with pills inside, just fill with sample water and do not rinse.)**

     Never touch the inside of a cap or bottle when handling sample bottles.

   - After rinsing three times, insert the bottle upside down and hold the sample bottle under the water surface approximately 15-30 cm (6-12 inches). Tip sample bottle upward, allowing air to exit and the bottle to fill to the top with your sample water.
   - Cap the sample under water if possible.
   - If the sample needs to be preserved (total metal sample), pour a small amount of the water out of sample bottle (red dot on lid) and add preservative (small vial with red dot). Cap the sample. Invert the bottle once or twice to mix in preservative.
   - Hand completed sample back to *Dirty Hands*.

5. *Dirty Hands*: Put completed sample into a cooler with frozen ice packs.

6. Complete the surface grab water sample section of the **Field Sheet** (Table 3). Make sure you record the CoC ID number.

   If you are taking a grab sample Field Blank, complete steps 1-6. Do not use site water. Instead, use deionized water to do the triple rinse and then fill up the bottle with deionized water. (deionized water is labelled as DI)

7. Record the CoC ID number for your travel blank in the travel blank section of the field sheet (Table 3).

TABLE 3 – Grab sample checklist

Grab Samples (Collect in order listed below)	
Time:	
CoC ID #:	
Checklist	
Bacti (sterile bottle)	
L.L. Total Hg	
L.L. Dissolved Hg	
Dissolved Metals	
Total Metals	
Add preservative to Total Metals	
Routine	
Nutrients	
Chlorophyll	
Quality Assurance/Quality Control Samples	
Did you take a Field Blank? ☐ Yes ☐ No	
If yes - Field Blank CoC ID #:	
Did you take a Travel Blank? ☐ Yes ☐ No	
If yes - Travel Blank CoC ID #:	
Did you take replicate samples? ☐ Yes ☐ No	
If yes - CoC ID # (2):	
If yes - CoC ID # (3):	

8. Store samples after collection:
   - Keep the samples cool in a fridge or cooler with freezer packs until you can ship the samples to a lab. **Do not freeze samples**.
   - Keep the samples in darkness. This reduces any chance of chemical breakdown in the samples caused by exposure to sunlight. **Ship the sample as soon as possible**.

9. Ship Samples:
   - Label the cooler with the Taiga Lab shipping label found in Appendix 4. Make sure to include the Taiga Lab contact phone numbers.
   - Label the cooler with “Keep Cool” and “Do Not Freeze” stickers. The shipping company should provide these stickers.
   - Ship the samples in a cooler with frozen ice packs and lots of packaging to keep samples from

moving around during shipping.

- Contact the ENR-CBM coordinator and let them know that samples have been sent to Taiga Lab as part of the CBM program.

INSTALL/REMOVE PMDs

Polyethylene Membrane Devices (PMDs) passively sample for dissolved hydrocarbons (oil and gas products) for approximately 30 days. PMDs (Figure 5) get installed within the top 2 metres (m) of the water column on a stainless steel sampling line. PMDs are sensitive equipment and can be easily contaminated.

FIGURE 5 – Open PMD canister

PMD Installation

Transporting PMDs:

- Always transport PMDs in a cooler with ice packs. PMDs should stay frozen until they get installed at the site.
- When transporting PMDs by vehicle, always place the PMD cooler inside the vehicle to avoid contamination. Never transport the PMD cooler in the back of a truck box or near gas.

For installing PMDs, you will need:

- ☐ Powder-free nitrile gloves (Figure 6)
- ☐ Stainless steel clip (Figure 7)
- ☐ Flat head screw driver (to open PMD storage tin can)

FIGURE 6 – Powder-free nitrile gloves

FIGURE 7 – Stainless steel

Before removing the PMD from the cooler and installing:

- Turn boat engine off and let air clear for at least 5 minutes before working with PMD.
- Do not smoke for a minimum of 4 hours before handling PMD.

Installing the PMD:

1. Put on your powder-free nitrile gloves (Figure 6) and remove the PMD can from the cooler. Each prepped PMD is kept inside what looks like a small paint can (Figure 10). The can has a label on the lid with the PMD's serial number. The PMD is wrapped in heat-treated foil and sealed inside a plastic bag.
2. Record the PMD serial number in your field sheet (Table 4).
3. Open the can with a flat head screwdriver and remove the PMD – leave the PMD inside the plastic bag.
4. Fully submerge the PMD (still in the sealed plastic bag and tin foil) underwater and then remove

the plastic bag and two layers of tin foil **while still underwater**. Try not to expose the PMD to air once the bag and tin foil have been removed.

5. Do not let any garbage float away.
6. Hook the stainless steel clip to a ring on the outside of PMD housing.
7. Attach the PMD to the sampling line with the same stainless steel clip. If possible, try to determine how deep the PMD will be once you let it go and it is hanging off the sampling line (underwater).

If it is not possible or safe to complete steps 4-7 with the PMD fully submerged underwater, these steps can be completed above the water. Once the PMD is attached to the sampling line, place it in the water and make a note in your field sheet that the PMD was exposed to air.

8. Fill out the PMD section of the field sheet (Table 4) with:
   Serial number
   Date of installation
   Time installed
   Depth under water

TABLE 4 – PMD Deployment section of field sheet

PMD Deployment				
	PMD Serial #	Date	Time	PMD Depth
Deployment				
Did you deploy a Duplicate? ☐ Yes ☐ No (If yes, fill out below)				
Deployment				

PMD removal from the water (no more than 30 days after installation):

PMDs are sensitive equipment and easily contaminated. Before removing the PMD from the river or lake, prepare your work area and PMD retrieval kit. Make sure everything is clean and handy. Observe and record wind direction to avoid exposing the sample to any contamination.

Before removing the PMD from the water:

- Turn boat engine off and let air clear for at least 5 minutes before working with PMD.
- Do not smoke for minimum of 4 hours before handling PMD.
- Determine if you need to take a PMD Field Blank (see note below).

For removal, you will need:

- ☐ PMD Travel Blank (this is a regular PMD that will travel to and from the site with you but remain in its packaging and in the PMD cooler the entire time)
- ☐ If required, PMD Field Blank
- ☐ Deionized water
- ☐ PMD Retrieval Kit Cooler that contains:
  - Powder-free nitrile gloves (Figure 6)
  - Poly-bag (clear garbage bag) and tape
  - Sealed iChem jar (brown glass jar with a white plastic lid)
  - Heat-treated tin foil (provided by ENR – leave in the bag to avoid contamination)

- Two pairs of clean and dry stainless steel forceps
- Stainless steel ¼-inch nut driver
- Fine-tipped marker for labeling
- Frozen ice packs
- Small and large Ziploc bags

1. Create a clean work surface (Figure 8). Tape a plastic poly-bag (1) over a large cooler or to a seat at the front of the boat (as long as no gas has come in contact with the seat). This space will act as a table and will help prevent contamination. The PMD canister (2) should not come in contact with anything in the boat except the covered work area.

2. Using Deionized water (or site water if not available), rinse off the stainless steel forceps (3) and nut driver (4), let them air dry, and place them on the work surface. Also place a new iChem jar on the work surface and have a small piece of the heat-treated tin foil ready in your tin foil bag (5).

FIGURE 8 – Poly-bag covered work surface.

If you are taking a PMD Field Blank:
Take out the PMD field blank from the cooler, open up the PMD can, remove the PMD from the can, and then remove the PMD from the plastic bag and heat treated tin foil. Place the exposed PMD on top of your clean work surface. Make sure you note what time you exposed the PMD to air. Once the field blank is exposed to air, move on to step 3 of retrieving your regular PMD from the water.

FIGURE 9 – Removing top of PMD canister.

3. If needed, put on a fresh pair of powder-free nitrile gloves.

4. With the PMD still underwater, carefully detach it from the loop on the line and place it on the plastic-covered work station.

5. Open the top cover of PMD by removing the six screws with the nut driver (Figure 9).

6. Open iChem jar and have the heat-treated tin foil handy.

7. Take a photo of the open canister.

8. Using the two pairs of stainless-steel forceps, remove the polyethylene tape (looks like a long piece of clear tape or a freezie wrapper) from the PMD canister. DO NOT touch the polyethylene tape with anything except the clean and dry stainless-steel forceps (Figure 10).

FIGURE 10 – Removing polyethylene tape from PMD

9. Carefully place the polyethylene tape into the iChem jar. Cover the top of the iChem jar with the heat-treated tin foil and put the lid back on the jar (Figure 11).

   Never touch the inside of the iChem jar or the iChem jar lid.

FIGURE 11 – Properly covered iChem jar with polyethylene tape inside.

10. Fill out the label on the lid of the iChem jar with date, time, site code, site name and PMD serial number. The PMD serial number will be etched into the side of the metal PMD canister.

11. Put the iChem jar into a small Ziploc bag. Label the Ziploc bag with the same information as above. Place the iChem jar into a cooler with ice-packs.

    If you are taking a PMD Field Blank: Once you are finished retrieving your regular PMD (i.e., you have put the polyethylene strip inside iChem jar and have labelled the iChem jar), you will need to complete steps 3-10 for your field blank.

12. Fill out PMD Recovery section of the Field Sheet (Table 5). Include the PMD serial number, Date, Time (i.e., when you pulled the PMD out of the water), and the amount of time the PMD was exposed to air. In the comment box, rate the amount of sediment in the canister (scale 1-5).

TABLE 5 – PMD Retrieval section of field sheet

PMD Retrieval				
	PMD Serial #	Date	Time (when pulled out of water)	Time Exposed to Air
Recovery				
Did you retrieve a Duplicate? ☐ Yes ☐ No (If yes, fill out below)				
Recovery				

If you are taking a PMD Field Blank: Fill out the PMD field blank section of the Field Sheet (Table 6).

TABLE 6 – PMD Field Blank section of field sheet

Did you take a Field Blank? ☐ Yes ☐ No (If yes, fill out below)			
	PMD Serial #	Date	Time
Field Blank			
Did you take a Travel Blank? ☐ Yes ☐ No (If yes, fill out below)			
	PMD Serial #	Start Date	End Date
Travel Blank			

13. Fill out the PMD Travel Blank section of the Field Sheet (Table 6). The Travel Blank is an extra PMD that will travel to and from the site with you but never leave the PMD cooler. You should use a marker to label the PMD can as "Travel Blank" and include the start and end dates of your trip as well as the location or region (e.g., Travel Blank – Sahtu Region, Sept. 5-8, 2016).

14. Store the iChem jars with retrieved PMD samples in a freezer until shipped to ENR in Yellowknife. Retrieved samples can be kept in a freezer for long-term storage for future analysis if needed.

15. For shipping procedures, see Shipping Samples section (pg. 16).

Field work conditions are unpredictable and you need to be flexible. At times it is not possible, or best practice, to open the PMD after removing it from the water (e.g., forest fire smoke, gas fumes, or if someone in the boat has smoked). You want to limit the amount of time the PMD gets exposed to the air and

contaminants in the area.

If conditions are not favourable (e.g., there is forest fire smoke in the air):

After you take the PMD off the sampling line and out of the water, write down the serial number. Immediately wrap the entire canister in heat-treated tin foil provided. Wrap it in two layers of tin foil to make it as air-tight as possible. Put the wrapped canister into two sealed Ziploc bags. Label the outside of the bag with the serial number, date of removal, site name and sampler. Finally, fill out the Field Sheet and make a note that the PMD was not fully retrieved and explain why (e.g., forest fire smoke in the air).

COMPLETE THE FIELD SHEET

Before leaving the site, complete all sections of your field sheet. It is important to have as much information available as possible. This information helps the people who analyze and interpret the data. Make a note on the field sheet if there are sections you cannot fill out because you did not take those samples or do not have the information. This information helps later in the season to know exactly which sample types you did and did not take.

Try to take photos of your site each time you visit. This information will help to visually track any changes (e.g., if a river bank is washed away during a big storm).

SHIP SAMPLES

Samples are time-sensitive and should be shipped as soon as possible, preferably within **24 hours** of being taken.

Grab water samples

- Store the samples in a dark and cool environment (fridge or cooler). The ideal temperature for storing and shipping is 4°C. It is best to maintain this temperature by keeping the samples in a fridge or in a cooler with freezer packs until you can ship the samples to a lab. **Do not freeze grab samples.** Ship the samples as soon as possible!
- When shipping, make sure that you state your grab samples are part of the ENR-CBM program.
- Ship the samples in a cooler with frozen ice packs and lots of packaging to keep bottles stable. Get stickers from the shipping company that say **KEEP COOL** and **DO NOT FREEZE**. Put stickers on the coolers to ensure that the cooler is well-labeled.
- Tell the shipping company that the samples need to be shipped "priority" or "guaranteed" and have them delivered to the Taiga Lab in Yellowknife.
- Contact a Taiga Lab staff member and/or an ENR staff member in Yellowknife. Let them know the samples were shipped to Taiga Lab as part of the CBM program. (See Appendix 3 for Taiga Lab Shipping label and ENR contact information.)

PMDs

- Keep the samples frozen. Ship the samples in a cooler with ice packs and lots of packaging. Pack the glass iChem jars in a secure way to make sure they do not break in transport.
- Tell the shipping company that the PMD cooler needs to stay frozen and is fragile. Label the cooler

FRAGILE and **KEEP FROZEN** and ensure the address for ENR in Yellowknife is indicated on the cooler. Tell the shipping company to hold and call for pickup; this way an ENR staff member in Yellowknife will be contacted when the package arrives.

- Contact ENR staff in Yellowknife. Tell them you are shipping a PMD sample for pick up. Let them know when they should expect the sample to arrive. (See Appendix 3 ENR shipping and contact information.)

APPENDIX 1: WATER QUALITY FIELD SAMPLING EQUIPMENT LIST

Safety Gear:

- ☐ Bear Deterrents
- ☐ PFDs or Floater (survival) suits
- ☐ Travel itinerary/Call in procedures
- ☐ Boat Safety Kit
- ☐ Site/Trip Hazard Assessment and Tailgate meeting forms
- ☐ Survival kit/First Aid Kit
- ☐ Communication device (like a satellite phone or InReach)

General site gear to take on all trips:

- ☐ Hand-held depth sounder/probe
- ☐ Calibrated YSI Pro-Plus or EXO 1
- ☐ Camera
- ☐ GPS
- ☐ Thermometer
- ☐ Water sample locations (latitude/longitude) and site description
- ☐ Water sample CoC ID#s
- ☐ GPS
- ☐ Watch or Cell Phone, for time
- ☐ Day pack (to carry multiple bottles when wading into river)
- ☐ Markers (Large and fine tipped)
- ☐ Water quality sampling protocol
- ☐ Field sheets and pencil
- ☐ Spare stainless steel marine clips
- ☐ Extra tools: Cable cutters, pliers, wrench, screw drivers
- ☐ Chest waders with belt and suspenders (if needed)

Surface Water Grab Samples:

- ☐ Water sample bottles from (10 bottles per sample set)
- ☐ Preservative (for use in the total metals water sample only) – mark on label if preservative has been added
- ☐ Frozen ice packs
- ☐ Marker/pencil to write date on bottle labels
- ☐ Powder-free clear vinyl gloves
- ☐ Bubble wrap – the low level Hg bottles are glass and need to be packaged carefully before and after collecting the samples
- ☐ Large cooler for storage and transport

PMD Installation/Removal:

- ☐ Prepped PMDs
- ☐ Stainless steel marine clip
- ☐ PMD Retrieval Kit Cooler containing:
    - Frozen ice-packs
    - Powder-free nitrile gloves (purple, blue or green gloves)
    - Large Ziploc bags
    - Poly-bag (clear garbage bag) and tape
    - Sealed iChem jars
    - Heat-treated tin foil (provided by ENR. Leave in Ziploc bag to avoid contamination.)
    - Two pairs of clean and dry stainless steel forceps
    - Stainless-steel nut driver (¼")
    - Fine-tipped marker for labeling the iChem jar
    - Small Ziploc bag

APPENDIX 2: FIELD TRIP ITINERARY AND CALL-IN PROCEDURE

Prior to leaving on a field trip, you should complete a **Field Trip Itinerary**, which outlines where you are going, where you are staying, who you are going with, and call-in procedures for the duration of your time in the field.

This field trip itinerary should be:

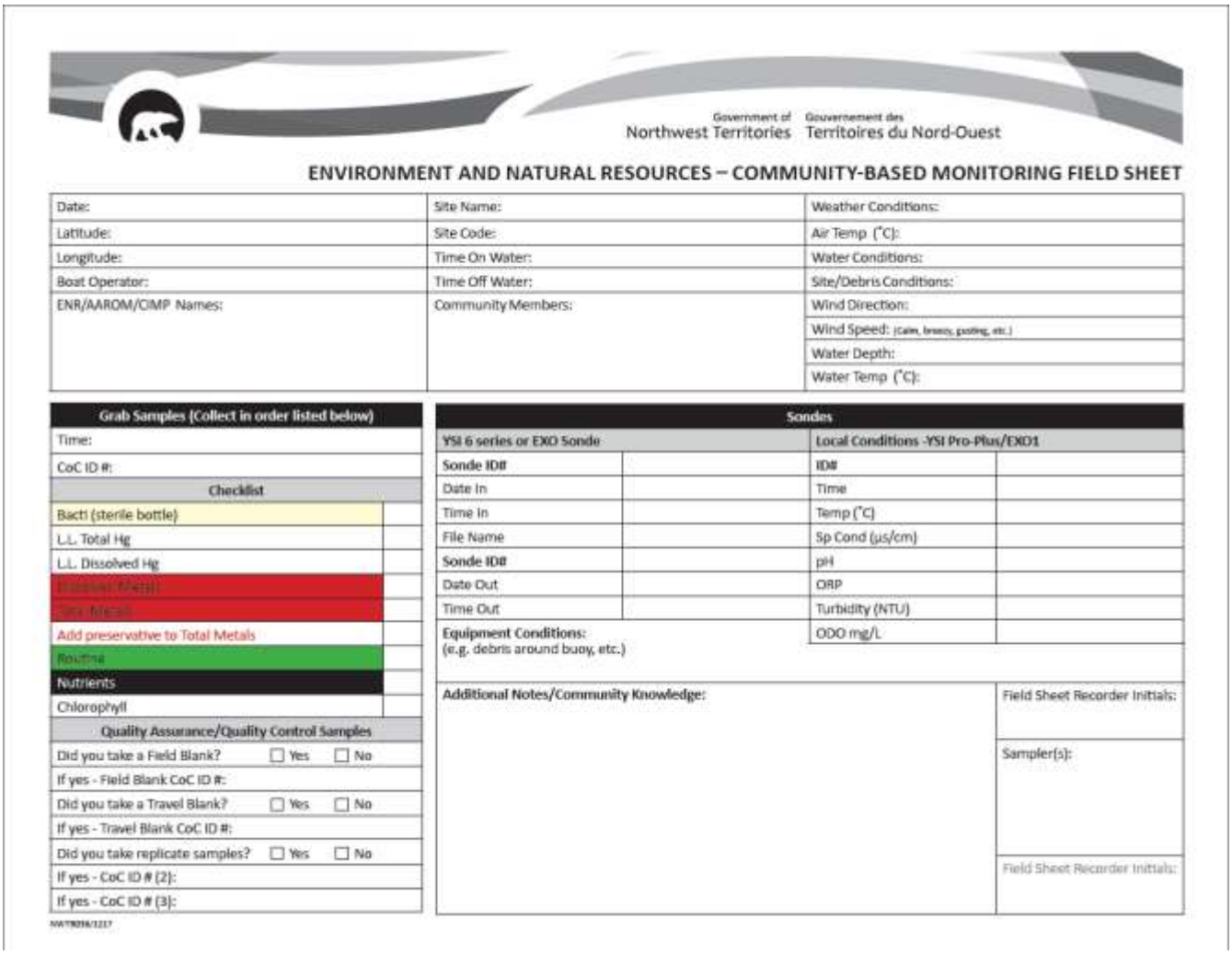
- ☐ Posted outside the supervisor's office
- ☐ Given to your call-in person
- ☐ Sent to the regional ENR Superintendent
- ☐ Taken with you into the field
- ☐ Posted on tent wall if in a camp situation

Expected call-in times while in the field are at 8:30 am, 12:00 pm and 5:00 pm unless alternative times have been arranged prior to trip departure. Alert time is 2 hours after scheduled check in time; this is when a supervisor will take action if contact is not made.

EMERGENCY RESPONSE CONTACT NUMBERS (Area Code 867):

Community	RCMP	Health Center Phone
Inuvik	777-1111	777-8000
Aklavik	978-1111	978-2516
Fort McPherson	952-1111	952-2586
Tsiigehtchic	952-1111 (Fort McPherson)	953-3361
Norman Wells	587-1111	587-3333
Tulita	588-1111	588-3333
Fort Good Hope	598-1111	598-3333
Fort Smith	872-1111	872-6205
Fort Resolution	394-1111	394-4511
Fort Providence/Kakisa	699-1111	699-4311
Hay River	874-1111	874-7100, or Medical Clinic: 874-7190
Trout Lake	770-1111 (Fort Liard)	206-2838
Fort Simpson	695-1111	695-7000
Jean Marie River	695-1111 (Fort Simpson)	809-2900
Fort Liard	770-1111	770-4301
Nahanni Butte	770-1111 (Fort Liard)	602-2203
Wrigley	695-1111 (Fort Simpson)	581-3441
Behchoko	392-1111	392-6075
Yellowknife	669-1111	Stanton Territorial Hospital: 669-4111 Advanced Medical Solutions (Medevac): 669-9111

APPENDIX 3: SAMPLE FIELD SHEET



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ENVIRONMENT AND NATURAL RESOURCES – COMMUNITY-BASED MONITORING FIELD SHEET

Date:	Site Name:	Weather Conditions:
Latitude:	Site Code:	Air Temp (°C):
Longitude:	Time On Water:	Water Conditions:
Boat Operator:	Time Off Water:	Site/Debris Conditions:
ENR/AAROM/CIMP Names:	Community Members:	Wind Direction:
		Wind Speed: (calm, breezy, gusting, etc.)
		Water Depth:
		Water Temp (°C):

Grab Samples (Collect in order listed below)	
Time:	
CoC ID #:	
Checklist	
Bacti (sterile bottle)	
L.L. Total Hg	
L.L. Dissolved Hg	
[illegible]	
[illegible]	
Add preservative to Total Metals	
Routine	
Nutrients	
Chlorophyll	
Quality Assurance/Quality Control Samples	
Did you take a Field Blank? ☐ Yes ☐ No	
If yes - Field Blank CoC ID #:	
Did you take a Travel Blank? ☐ Yes ☐ No	
If yes - Travel Blank CoC ID #:	
Did you take replicate samples? ☐ Yes ☐ No	
If yes - CoC ID # (2):	
If yes - CoC ID # (3):	

NWT8016/1217

Sondes			
YSI 6 series or EXO Sonde		Local Conditions -YSI Pro-Plus/EXO1	
Sonde ID#		ID#	
Date In		Time	
Time In		Temp (°C)	
File Name		Sp Cond (µs/cm)	
Sonde ID#		pH	
Date Out		ORP	
Time Out		Turbidity (NTU)	
Equipment Conditions: (e.g. debris around buoy, etc.)		ODO mg/L	

Additional Notes/Community Knowledge:	Field Sheet Recorder Initials:
	Sampler(s):
	Field Sheet Recorder Initials:

ENVIRONMENT AND NATURAL RESOURCES – COMMUNITY-BASED MONITORING FIELD SHEET

Notes

Diagrams

Photos

Photo numbers for this site:

Photo descriptions:

- Take photo of completed field sheet
- Get photo consent

Additional location information (recent events in the area, e.g. forest fires, heavy rain, etc.):

PMD Deployment

	PMD Serial #	Date	Time	PMD Depth
Deployment				
Did you deploy a Duplicate? ☐ Yes ☐ No (If yes, fill out below)				
Deployment				

PMD Retrieval

	PMD Serial #	Date	Time (when pulled out of water)	Time Exposed to Air
Recovery				
Did you retrieve a Duplicate? ☐ Yes ☐ No (If yes, fill out below)				
Recovery				

Did you take a Field Blank? ☐ Yes ☐ No (If yes, fill out below)			
	PMD Serial #	Date	Time
Field Blank			
Did you take a Travel Blank? ☐ Yes ☐ No (If yes, fill out below)			
	PMD Serial #	Start Date	End Date
Travel Blank			

Capacity Observations (information about community monitor strengths, and areas to improve):

Sampler(s):	Field Sheet Recorder Initials:
	Supervisor Signature:

APPENDIX 4: SITE/TRIP HAZARD ASSESSMENT AND TAILGATE MEETING FORM

Conducted by: _____ Attendees: _____
Site Location(s):_____
Date(s): _____ Duration of work (time): _____
Weather Conditions: _____

Transportation: (Check 1 or more)
Travel Conditions: Snow___, Ice___, Mud___, Water___, Land___, Air___, Off Road___
Travel Method: Truck___, Boat___, Canoe___, Hiking___, Snowmobile___, ATV___, Other? _____

Use Hazard Assessment Priority Rating (1, 2, 3, 4 or 5) for each of the following:
(Conditions: 1 = Very Hazardous, 2 = Moderate Risk, 3 = Low Risk, 4 = O.K., 5. Not Applicable)
Hazards: Water Conditions___, Extreme Weather/Temp.___, Remote Areas___, Wildlife___, Terrain Conditions___,
Working Alone ___, Noise___, Housekeeping ___, Hazardous substances___, Heavy Lifting ___, Fatigue ___,
Medical___, Public___, Other? ___, (Other Hazard description) _____

Details of Hazards with Corrective Actions: *(Review Job Hazard Analysis (JHA) Recommended Control Measures/Safe Job Procedures, in the Water Resources Safety Manual)* ***Note details of each corrective Action Taken***

_____
_____
_____
_____
_____
_____

Emergency Response: (check 1 or more)
___ Field/Trip Itinerary with Emergency Response Plan & Call-in Procedures
___ Water Resources Safety Manual with Job Hazard Analysis (JHA)
___ First Aid Kit, ___ Survival Equipment, ___ Boat Safety Kit, ___ Fire Extinguisher, ___Flares
___ Cell phone, ___ Satellite phone, ___ in-Reach
___Firearm with Proper Ammunition, ___ Bear Bangers, ___ Bear Spray

Training and Equipment Check: (check 1 or more that applies)
___ Equipment, tools, boat, vehicle (meet manufacturer's specifications and are safe for use)
___ Personal Protective Equipment (PPE) (Inspected and available on site)
___ Life Jackets, ___ Helmet, ___, Safety Glasses___, Ear Muffs/Plugs___, Gloves___, Survival Suit___, Appropriate Clothing___
___ Standard First Aid Training (at least 1 person _____
___ Predator Defense Training (at least 1 person) _____
___ WHMIS Training (at least 1 person) _____

Additional Notes: (Discussions, training/orientation, unusual issues, changes to hazards)
_____
_____
_____
_____

Signatures of attendees: (You are ready willing and able to work under the conditions stated above.)
_____
_____
_____

Field Supervisor/Manager Review: _____Review Date: _____

APPENDIX 5: SHIPPING LABELS AND CONTACTS

Deliver to:
Taiga Environmental Lab
4601-52nd Avenue
Yellowknife, NT X1A 2L9

****TIME SENSITIVE WATER SAMPLES KEEP COOL**

CONTACT:
Taiga Environmental Laboratory
Environment and Natural Resources
Government of the Northwest Territories
4601 - 52nd Avenue
Yellowknife, NT, X1A 2L9
Phone: (867) 767-9235 ext. 53151
Fax: (867) 920-8740
Email: taiga@gov.nt.ca

Deliver to:
Community-based Monitoring Program Coordinator
WATER RESOURCES DIVISION
ENVIRONMENT AND NATURAL RESOURCES
GNWT - YELLOWKNIFE, NT
Contact: (867) 446-3339

HOLD AND CALL FOR PICK UP