Ministry of Environment and Climate Change Strategy

SURFACE WATER QUALITY STEWARDSHIP TOOLBOX

Grab Sampling (Analytical and QA/QC)

This is an information checklist template for a water quality monitoring project where grab samples (filling bottles with water to send to a laboratory) are collected at the same time as field data (collected with handheld instruments). Grab samples are used for additional water quality parameters that are not measurable using a field instrument, or for quality assurance/quality control (QA/QC) sampling.

QA/QC sampling allows lab and field meter readings for specific conductance and turbidity data to be directly compared to one another; ideally QA/QC will occur on 10% of samples (i.e., one in every ten). Replicate (taken at the same time, one directly after the other) grab samples can also be taken to QA/QC grab sample procedures. The grab sample QA/QC and field data results should be within 25% of one another. If not, it could indicate sampling protocol drift or an instrument malfunction. When/if this happens, seek guidance from a water quality specialist.

Collecting water samples properly for lab analysis is necessary to ensure that lab analysis is accurate. Errors in sampling technique can lead to sample contamination. Standard procedures for sample collection can be found in The BC Field Sampling Manual (found here: https://www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/monitoring/laboratory-standards-quality-assurance/bc-field-sampling-manual). Below is a summary guide for water quality stewardship group grab sampling.

This template is based on taking five weekly samples within a 30-day period, also called "5 in 30s", which are used to compare these results to the chronic BC Water Quality Guidelines. It is very important that none of the five sample dates are missed, or the data cannot be directly compared to chronic guidelines/objectives. **Note, your project may vary depending on project goals, additional sampling parameters, and partnership agreements.**

The following items can either be directly requested from the laboratory or, if a partnership with ENV is supported and the project plan includes ensuring data are entered into the provincial database, ENV may provide these items:

- 5 coolers labelled by week
    - 1 cooler per week
        - To send to local lab (drop off at courier prior to closing time on the sample day) once sampling is completed. Avoid sampling on Thursdays or

Fridays as courier and lab opening times my be restricted on weekends and hold times for samples may be exceeded

- Sample bottles in the coolers labelled by site and parameter to be sampled
  - Write sampling date and time on each bottle (best done just prior to sample collection)
- Ice packs or bottles in the coolers (send as much as possible)
  - Fill with water (if bottles) and freeze at least one day before the sample day
- Requisition forms (ENV partnership)/chain of custody forms (direct from lab) in coolers
  - In each cooler there will be a general chemistry form (in duplicate) for the sites you will be sampling
  - At each site, fill in required information on both copies, then separate the copies. Keep one copy for your records (to submit to ENV at end of sample period), and send the other, sealed in the plastic bag, inside the cooler with the samples to the lab
  - When filling in the form, fill in date in the format YYYY-MM-DD HH:MM (24 hr). For stream samples just below the surface, record depth as 0m

Ensure you have the following miscellaneous small items (ENV partnership provides):

- Roll of packing tape for taping cooler closed during shipping
- Permanent ink pen
- Waybill for shipping, labels with lab address on them

If this is part of ENV partnership sampling, your ENV water quality contact in the partnership will give field sampling instructions on:

- Preparing for field day
  - Preparing sample bottles and requisition forms for all sites (as above). Note some labs have special bottle/sample procedures such as triplicate bottle rinsing prior to taking a sample, filtering a sample or addition of preservatives – always confirm with the lab if there are any special requirements
- Taking samples
  - When taking any samples, avoid crossing the stream whenever possible. Disturbing sediments will alter lab results and field test results. If you must cross a stream, cross **downstream** of the sampling site to avoid influencing results.
  - Sample bottles should be held into the upstream water flow (i.e., with the hand on the downstream side of the bottle, with flow going into the bottle) to avoid pollutants on the hands being collected in the bottle. Skin oil, hand sanitizer, and other such chemicals can influence lab results. Wear laboratory grade gloves (powder-free latex or nitrile gloves)

    - Submerge the mouth of the bottle entirely, keeping the mouth higher than the base of the bottle, in case there are preservatives in the bottle
    - Most bottles have a level to be filled to. Avoid overfilling, especially if your samples require a preservative
    - Do not place the bottle lid on the ground or touch the inside the bottle. This will contaminate the sample and the readings will be unreliable. If possible, use powder-free latex or nitrile gloves
    - Some samples require preservatives. Always attempt to put the preservative into the sample as close to collection as possible
        - Preservatives may be corrosive (e.g., acids), follow recommended safety precautions as applicable (e.g., wear gloves, safety goggles)
    - If you are collecting field parameters at the same time, make sure this is done as per the Field Meter Stream Sampling procedures (separate Toolbox information sheet)
- Notetaking (recording relevant information about sample site and surrounding area)
    - See Field Observation procedure document (separate Toolbox information sheet) for the most common factors to record
    - Notes should only be completed at the sampling site. Record any changes in conditions like weather as you arrive at each site
    - Always record any potential collection errors that occur while sampling (e.g., dropping bottles, animals crossing upstream of sample site, deviations from protocols) so that any discrepancies in lab results caused by such errors can be explained
- Store samples for transport/shipping
    - Cooler should be filled as much as possible to prevent bottles from moving excessively inside the cooler. Bottles are always stored upright. Some samples are collected in glass bottles and immobilizing them or surrounding them with soft packing material such as bubble wrap is important to keep the samples from breaking. Use ice bottles (loose ice is messy) to maintain temperature ($4^{o}C$) and limit bottle movement. In summer heat, approximately half the cooler should be filled with ice bottles
- Before taping up a cooler, ensure the filled in requisition forms (remember to retain duplicate for ENV records) are in a resealable plastic bag, and in the cooler with the samples. Tape an address label onto the cooler and tape the cooler closed
- Ship cooler the same day sampling occurred, if possible. Most samples can be shipped overnight and not exceed laboratory hold times. For parameters with very short hold times or in more remote areas where shipping time may take longer, consider if expedited courier service needs be requested
- Upon dropping off cooler at courier, retain a copy of the waybill to submit to ENV for invoicing records (ENV partnership)