

## Shell Day Total Alkalinity Sampling Protocol

*For Shell Day, there are three methods for water quality monitoring groups to use for collection of Total Alkalinity samples. Samples can be collected by filling a bottle by hand, using a bucket, or using a sampling pole.*

### Bucket Sampling Protocol

- 1) If using a multiparameter datasonde, measure temperature and salinity as per your normal measurements (and other parameters) in the water body ~15cm below the water surface. Record the data and time on the datasheet.
- 2) Fill bucket
  - Fill bucket  $\frac{1}{4}$  full to rinse bucket with site water
    - o Take care not to stir up any sediments if sampling very shallow sites
    - o If wading into your site, take care to fill the bucket upstream of where you are standing
  - Swirl water around in bucket to rinse.
  - Dump rinse water downstream of where you will be sampling
  - Fill bucket with site water,  $\frac{1}{2}$  to  $\frac{3}{4}$  full.
  - Note the time the water was collected from the field site.
  - Set bucket on dock, pier, ground, etc.
- 3) If using another method for temperature and salinity, measure temperature and salinity in the bucket. Record the data and time on the datasheet.
- 4) Rinse sample bottle
  - Keep the cap on the bottle, put sample bottle into bucket until the entire bottle is submerged.
  - Open the bottle underwater with the mouth ~10cm from the surface of the bucket.
  - Dump out half of the water, put cap on bottle, shake bottle to rinse and dump out water. Do not dump the rinse water back in the bucket.
  - Repeat bottle fill and rinse two more times.
- 5) Fill sample bottle
  - Keep the cap on the bottle, put sample bottle into bucket until the entire bottle is submerged.
  - Open the bottle underwater with the mouth ~10cm from the surface of the bucket.
  - Dump out a small amount of water to leave a little headspace at the top of the sample bottle.
  - Cap bottle, place on ice in a cooler.
  - If collecting a duplicate sample, repeat the bottle rinse and fill for the second bottle (#4 and #5).
- 6) Fill out the rest of the data on datasheet: be sure to record time of sample collection, bottle numbers, temperature, salinity, tidal stage, and any other ancillary measurements.

## Hand Sampling Protocol

- 1) If using a multiparameter datasonde, measure temperature and salinity as per your normal measurements (and other parameters) in the water body ~15cm below the water surface. Record the data and time on the datasheet.
- 2) If using another method for temperature and salinity, measure temperature and salinity in the water body ~15 cm below the water surface. Record the data and time on the datasheet.
- 3) Rinse sample bottle
  - Keep the cap on the bottle, put sample bottle into the water body until the entire bottle is submerged.
  - Open the bottle underwater with the mouth ~15cm from the surface of the water.
  - Dump out half of the water, put cap on bottle, shake bottle to rinse and dump out water downstream of where you are sampling.
  - Repeat bottle fill and rinse two more times.
- 4) Fill sample bottle
  - Keep the cap on the bottle, put sample bottle into the water body until the entire bottle is submerged.
  - Open the bottle underwater with the mouth ~16cm from the surface of the water body.
  - Dump out a small amount of water to leave a little headspace at the top of the sample bottle.
  - Cap bottle, place on ice in a cooler.
  - If collecting a duplicate sample, repeat the bottle rinse and fill for the second bottle (#4 and #5).
- 5) Fill out the rest of the data on datasheet: be sure to record time of sample collection, bottle numbers, temperature, salinity, tidal stage, and any other ancillary measurements.

## Pole Sampling Protocol

- 1) If using a multiparameter datasonde, measure temperature and salinity as per your normal measurements (and other parameters) in the water body ~15cm below the water surface. Record the data and time on the datasheet.
- 2) If using another method for temperature and salinity, measure temperature and salinity in the water body ~15 cm below the water surface. Record the data and time on the datasheet.
- 3) Face upstream and into the current.
- 4) Extend the rod. Do not extend the pole too far when sampling high velocity streams. You'd be surprised at how much force there can be on the pole. To avoid damaging (bending) the pole, it is recommended that you leave at least 1-foot unextended. You can mark this limit on the pole with a permanent marker.
- 5) Rinse the clamp end of the rod by dunking it into the waterbody you wish to sample. This will reduce the possibility of contamination from the previous station (or contamination from the trunk of your car!).
- 6) Place a new sample bottle in the clamp and squeeze the clamp closed.
- 7) Remove the cap from the bottle. Place the cap in a secure, clean location where it cannot become contaminated.
- 8) Rotate the rod until the bottle is upside down.
- 9) Proceed to sample rinse the bottle three times.
  - a) Carefully, immerse the bottle in the waterbody and then rotate the rod to fill the bottle (see figure 1). Only partially fill the bottle.
  - b) Remove from the water.
  - c) Gently swirl.
  - d) Discard the water in the bottle downstream and away from where you are sampling.
  - e) Repeat two additional times.
- 10) Collect your sample. Immerse the bottle to the desired depth and then rotate the rod to fill the bottle (see figure 1). Once the bottle is full, remove it from the water. Remove the bottle from the clamp. Pour off a small amount of water to leave headspace at the top of the sample bottle. Cap the bottle.
- 11) Place your sample into a cooler of wet ice. Ensure melting ice water does not contaminate your sample. Keep the ice level below the threads of the cap. Ideally, place your sample into a zip top bag and then into the ice.
- 12) Record the time of sample collection on the Field Data Sheet.
- 13) Repeat for the remaining bottles.
- 14) Fill out the rest of the data on datasheet: be sure to record time of sample collection, bottle numbers, temperature, salinity, tidal stage, and any other ancillary measurements.



Figure 1.

*The following information is modified from the Massachusetts Department of Environmental Protection Division of Watershed Management Quickguide for Sample Pole Collection and was first published in 2007. Methods are applicable to all waterbody types, not just rivers and streams.*

### ***Fabricating a Pole if you don't already have one***

The water levels in rivers are constantly changing. A weekend of heavy rains can turn your ankle-deep stream into a chest-deep torrent. This can be a problem when charged with repeated safe collection of water samples at specific locations. In addition to avoiding unsafe conditions, there is always the need to collect representative samples, which may not be accessible from shore or by wading in. One solution is to recruit volunteers with long legs and arms. Another solution is to attach your sample bottles to the end of a long pole.

DWM has come up with a design that may help with your sampling efforts. It involves attaching a 4" clamp onto a telescoping aluminum pole (see figure 1). All parts are available at most well-stocked hardware stores, or home centers. The telescoping pole (usually used to wash windows) will cost ~\$15.00. The clamp (used by carpenters) will cost ~\$10.00. You will also need two nuts, bolts, steel washers, and neoprene washers (see figure 2). You'll also need a drill, screwdriver, pliers, friction tape and waterproof glue.

#### Parts to Purchase

Aluminum Extension Pole  
Carpenter's Bar Clamp  
2 nuts, 2 bolts, 2 steel washers,  
and 2 neoprene washers  
Friction Tape  
Waterproof Glue

#### Tools to Use

Drill  
Screwdriver  
Pliers



Figure 1

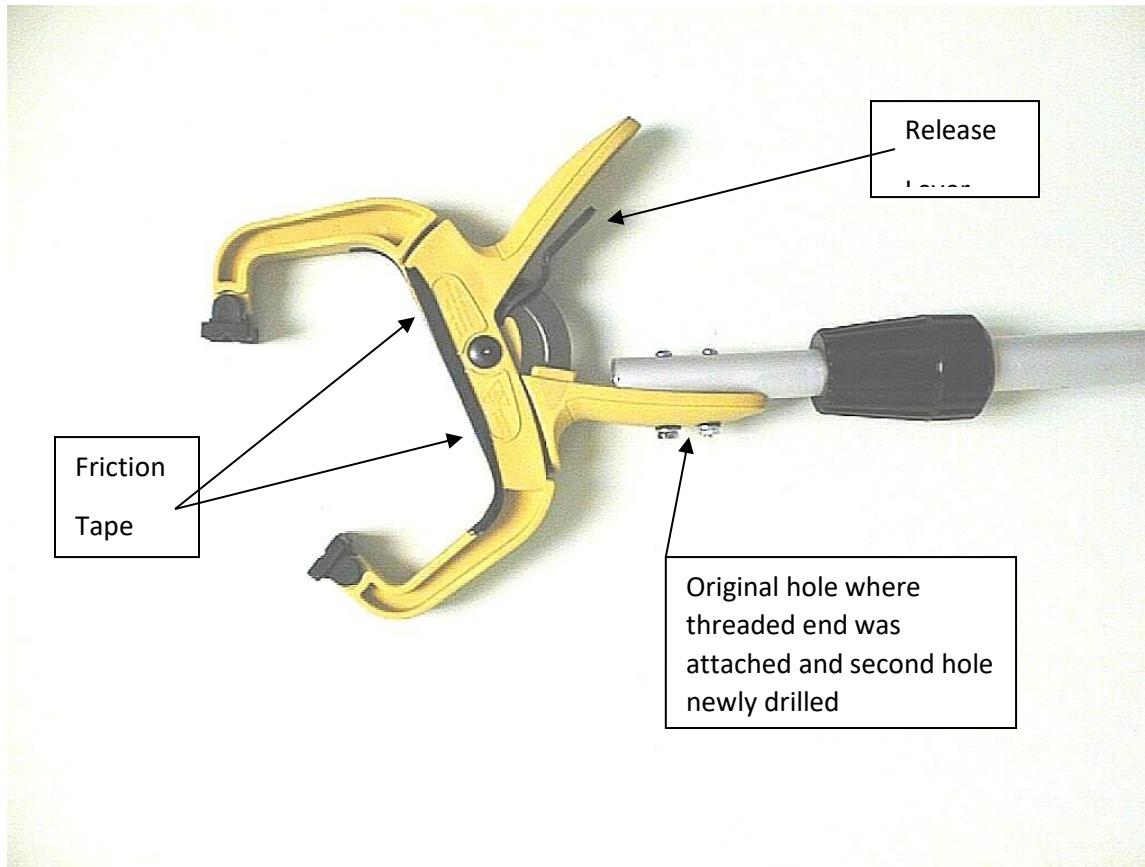


Figure 2

The telescoping pole we selected is aluminum, because it is lightweight and rust-free. It extends from 4' to 8'. The clamp we selected is a 4" bar clamp, as it holds 90% of our bottles. You may wish to bring the bottles you use to the store with you, and find out which clamp size is right for you.

**To construct the sampling pole:**

- 1) Start by removing the threaded end from the pole (most extension poles have a threaded end to attach a window brush or squeegee). Most threaded ends are pop-riveted on, and you can drill them out.
- 2) Next, match up the clamp handle to the hole made by drilling out the rivet. Be sure to use the handle that does NOT have the release lever. You will want access to the lever when the clamp is closed.
- 3) Mark the location of the existing hole, and the location for a second hole.
- 4) Drill the second hole through the pole, and two corresponding holes in the clamp handle.
- 5) Attach the clamp handle with the two bolts, washers and nuts. It's a good idea to use neoprene washers so the plastic clamp handle won't crack due to over tightening. If you're not using lock washers, put a drop of glue on the end of each nut.

6) Next, add some friction tape (bicycle handle bar tape) to the inside of the clamp's jaws. This will prevent the bottle from slipping out of the clamp.

A new design for 2007 using two ratchet clamps is shown below (Figure 3). Because they are adjustable, these clamps allow sampling with a variety of bottle sizes.



Figure 3