



Lab SOP – Pre Sampling

Coordinating volunteers and Field Data Sheet Updates (Complete the week *before* the sampling week)

1. Email volunteers reminding them of upcoming sampling week and get RSVPs on who will be able to sample.
 - a. Coordinate with volunteers on how to get sampling equipment to them and who will return it to the lab after a sampling session.
 - b. If only 2 volunteers are able to go out on a given day, the Team Lead should plan on sampling with them.
2. Update field data sheets
 - a. First Page:
 - i. Team
 - ii. Session
 - iii. Date
 - iv. Meter and Probes ID
 - v. Location Name and Sample ID: Sample ID is the combination of the 3-letter site code and date of sampling (YYMMDD). For example, NHP181004 is Haycraft Park, October 4th, 2018.
 - b. Second Page:
 - i. Team
 - ii. Session
 - iii. Date
 - iv. Nutrient Sample ID: Same as “Sample ID” above, plus ‘N-1’ at the end to denote nutrient sample 1. If a nutrient duplicate is taken, it will be ‘N-2’.
 - c. Print field data sheets and bring into lab Monday of the sampling week



Lab SOP - Field Equipment Preparation

(Complete Monday of the sampling week)

GENERAL

Date and Time: Always ensure that the HQ40D and 2100Q meters have the correct date and time. If a battery has been replaced, the date and time information has to be re-entered (mm/dd/yyyy,12hr)

EQUIPMENT VERIFICATION

Perform verification checks before every sampling week, on all probes that were not calibrated that day, and record values in the verification data sheet. If a probe was just calibrated, record the calibration values on the verification data sheet. Perform verifications on ALL probes, regardless of which one/s are planned to be used that week, to have a backup in case something happens.

1. pH

pH probes need to be calibrated every week (see 'Field Equipment Calibration' SOP). After calibration, take a reading of buffers pH 7 and pH 10 and record the values on the verification datasheet.

2. Temperature

Verify the temperature sensor of the salinity probe by comparing its value to the temperature measurement from the digital NIST thermometer, when the probe is used to determine the salinity of tap water (~0.13 ppt in South Maui; ~0.04 ppt in West Maui). If the two measurements are more than 1°C apart, notify the Regional Coordinator.

- a. Connect the HQ40D meter to the wall outlet to save battery life. Connect the salinity probe to the meter.
- b. Place approximately 500ml of tap water in a 1000ml beaker.
- c. Place the salinity probe in the beaker and allow it to sit for at least 2 minutes.
- d. Insert the NIST digital thermometer into the beaker and read the value once it has stabilized.
- e. Record the reading from the NIST thermometer in the Std field on the verification data sheet.
- f. Hit 'READ' on the meter and record the temperature value on the row just under the Std field.
- g. Record the HQ40D instrument number and the probe number in the appropriate columns.

3. Salinity

Since you have just read the salinity value of tap water, record the salinity reading on the verification data sheet under the salinity value area. The salinity value of tap water should be about 0.13 ppt in South Maui or 0.04 ppt in West Maui.



Use the lab made secondary salinity calibration standard to verify the salinity probe. The value of the standard will be written on the bottle with the date of last calibration. Record the standard value on the Std field. The two rows below the standard row allow you to write the values you read when verifying two different salinity probes.

- a. Connect the HQ40D meter to the wall outlet to save battery life. Connect the salinity probe to the meter.
- b. Pour 50 mL of salinity standard into the 60 ml beaker.
- c. Use the stand and clamps to hold the probe in the solution. Wait 2 minutes, so the value stabilizes.
- d. Hit "READ" and record the value in the "Pre" column next to the value for tap water.
- e. When finished, rinse the probe well with tap water and then distilled water to remove any salinity solution.
- f. Tap the salinity probe gently against a Kim Wipe to remove any water that has been lodged between the plastic and the electrode, so the probe is stored dry.
- g. Store the probe in its case.

4. Dissolved oxygen (DO)

- a. Connect the HQ40D meter to the wall outlet to save battery life. Connect the DO probe to the meter.
- b. Place about ¼ inch of distilled water in the bottom of a sediment bottle.
- c. Cap the bottle and shake vigorously for at least 30 seconds.
- d. Allow the bottle to sit for a few minutes while the DO probe is attached to the meter.
- e. Dampen a microfiber cloth with distilled water. Wring out any excess water thoroughly.
- f. Wrap the damp cloth around the probe just above the shroud.
- g. Give the bottle another vigorous shake, remove the cap and quickly place the probe in the bottle so that the damp cloth is closing off the bottle opening, and the probe is not touching the water.
- h. Press the 'READ' key on the meter.
- i. Record the %DO reading on the data sheet.
- j. The standard value for %DO is 100%. Readings between 95% and 105% are acceptable.

5. Turbidity meter

To verify the 2100Q meter, take a reading of distilled water (blank).

- a. Dump the water from the sample cell. Bottle does not need to be rinsed, since the content should be distilled water from the check done at the end of the last sampling week.
- b. Fill the bottle with grocery store bought distilled water (blank) up to the white line.



- c. Clean outside of the bottle: After wiping the cell dry with a Kim Wipe, use the black oil cloth to clean the exterior of the sample cell. Examine it for smudges.
- d. Take a reading of the distilled water. If the reading is 0.09 NTU or less, record the reading on the data sheet. If the reading is > 0.1 NTU, repeat the rinsing process and take another reading. A reading of 0.1 NTU or less indicates that the sample cell is clean. Check that the foam holding the sample cell is dry before returning the bottle.

BOTTLE LABELING

Clear, HDPE, 125 ml, acid-washed bottles are required for nutrient sampling, for each team. Use the lab tape and a sharpie, to clearly label each bottle with the 3-letter site code, date of sampling (YYMMDD), N1 (nutrients, 1 sample). For instance, **NHP180222-N-1** indicates that this sample was taken at Haycraft Park, on February 22nd, 2018, and it's the first nutrient sample. If a duplicate sample needs to be collected, it will be **NHP180222-N-2**.

All the bottles needed for the week should be labeled the Monday prior to sampling week.

READYING THE EQUIPMENT TO GO OUT TO THE FIELD

Follow the Field Equipment Checklist

(To be done before each sampling day)

1. Check the calibration log to ensure that all calibrations are up to date on the meters and the probes.
2. Make sure the battery power for each meter is sufficient for the field sampling session. If necessary, put new batteries in the meters and reset the date and time.
3. Make sure all supplies and equipment are ready for sampling the following morning.
4. Put equipment and probe numbers on the data sheet.
5. Enter turbidity standard information on the data sheet.

EQUIPMENT

The following equipment is necessary for **in-situ measurements**:

1. Hach 2100Q turbidimeter
2. Hach HQ40d meter with the following electrodes:
 - a. IntelliCAL LDO101 DO sensor (thick end)
 - b. IntelliCAL CDC401 conductivity probe for salinity (thin end)
 - c. IntelliCAL PHC101 pH electrode (KCl bottle attached)

SUPPLIES

Amount	Item
2	1 gallon buckets (1 lid)
5	100 ml clear bottles for turbidity samples (no labels)
5	125 ml, HDPE, acid washed bottles for nutrient samples
5	Filters (GF/F, 25mm) in filter holders, OR Disposable 0.2 um syringe filters
5	60-mL Luer lock syringes
1	Distilled water (squirt bottle) filled
2	Bottles for tap water (to be filled by the volunteer the morning of sampling)
1	Field guide and field notebook (inside clipboard)
1	Clipboard with datasheets (only the 1 st page, second page in lab)
1	Volunteer time log (Place in or on clipboard)
1	Cooler with 3 blocks of blue ice
4	Extra batteries for meters (in turbidimeter)
2	Pens for filling in data sheets
1	Sharpie for writing labels
1	Label tape (kept in cooler front pocket)
1	Kim-wipes box
1	Scissors (kept in cooler front pocket)
1	Cell phone (camera) (to be provided by each volunteer)
3	Utility towels
1	First Aid Kit in backpack
2-3	Plastic Bags for trash (optional)

Equipment will either be dropped off with volunteers or a volunteer will pick up from lab.



Lab SOP – Post Collection Laboratory Procedure

(Complete after each sampling day)

SAMPLES

1. Upon return to the lab, place nutrient samples in the freezer (as soon as possible).
2. Return the blue ice bricks to the freezer unless the equipment is going out again the next day.

DATA SHEETS

Check data sheets to make sure all required data is there. Document which meters were used, what samples were collected, and that all comments are legible. Make entries in the field notebook that might be significant but are not required on the data sheet (unusual activity, unusual smells, streams running nearby, etc.)

PLASTICWARE

1. In a dishpan, dissolve a small amount of lab soap (Alconox) in tap water. Wash used syringes, and turbidity bottles in the soapy water.
 - a. Wash syringes first. Place them by themselves in the soapy water, and then rinse them first in tap water, and soak in a bath of distilled water after for five minutes. Set them in a dishrack to dry. Discard disposable filters in the trash.
 - b. Wash turbidity bottles, and place them in the rack to dry. Set the bottle lids to dry on a microfiber towel, and cover them up to prevent contamination.
 - c. Rinse and dry the dishpans.
2. Rinse and dry the two buckets used in field collection to prevent corrosion on the handles.

EQUIPMENT

1. **Perform post-verification check on the turbidity meter.**
 - a. Read standards: Take readings of the 3 gel standards and record the “post” results on the datasheet.
 - b. Read blank:
 - i. Discard the last sample from the sampling cell and rinse it five times with tap water. Rinse both the inside and outside very well, and also rinse the cap.
 - ii. Rinse the sample cell three times with grocery store bought distilled water, and then fill it up to the white line. Be sure to rinse the cap with distilled water as well.
 - iii. After wiping the cell dry with a Kim Wipe, use the black oil cloth to clean the exterior of the sample cell. Examine it for smudges.
 - iv. Take a reading of the distilled water. If the reading is 0.09 NTU or less, record the reading on the data sheet. If the reading is > 0.1 NTU, repeat the rinsing process and take another reading. A reading of 0.1 NTU or less indicates that the sample cell is clean. Check that the foam holding the sample cell is dry before returning the bottle.



2. **Clean pH, salinity and DO probes.**

- a. Fill a 1000ml glass beaker approximately half way with distilled water. Soak the three probes together for 5 minutes to remove any salts, which can affect the accuracy of measurements.
- b. Dry the outside of the probes carefully with Kim Wipes; tap each probe carefully against a Kim Wipe to remove any water droplets that might remain inside. Place them in the case. Make sure the case and the meter are clean and dry before storing them in the cabinet.

3. On the last day of the sampling session, perform **post-verification** checks on **pH, salinity** and **DO probes**, and record values on the verification sheet. See **Equipment Post Verification SOP**.



Lab SOP – Equipment Post Verification

(Complete on the Friday of the sampling week)

pH probe

- a. Connect the pH probe to the meter.
- b. In a 100ml beaker, pour approximately 60 mL of buffer solution, starting with pH 10 (blue).
- c. Take the probe out of the 3M KCl solution and rinse it well with distilled water. Dry the probe with a Kim Wipe and tap it gently to remove any water remaining around the electrodes.
- d. Fasten the probe to the stand clamp, allowing it to sit in the buffer solution for one minute. Make sure that the probe is not resting on the bottom of the beaker but is well immersed in the buffer solution. Slowly move the beaker under the probe to ensure that no bubbles are around the electrodes, which may interfere with the calibration procedure.
- e. At the end of 1 minute, push the 'READ' button (green) and record the value.
- f. Repeat with pH 7 buffer solution (yellow).
- g. Rinse the probe, put it back in the KCl solution and wrap it with parafilm.

Salinity probe - Temperature

Verify the temperature sensor of the salinity probe by comparing its value to the temperature measurement from the digital NIST thermometer, when the probe is used to determine the salinity of tap water (~0.13 ppt in South Maui; ~0.04 ppt in West Maui). If the two measurements are more than 1°C apart, notify the Regional Coordinator.

- a. Connect the HQ40D meter to the wall outlet to save battery life. Connect the salinity probe to the meter.
- h. Place approximately 500ml of tap water in the 1000ml beaker.
- i. Place the salinity probe in the beaker and allow it to sit for at least 2 minutes.
- j. Insert the NIST digital thermometer into the beaker and read the value once it has stabilized.
- k. Record the reading from the NIST thermometer in the Std field on the verification data sheet.
- l. Hit 'READ' on the meter and record the temperature value on the row just under the Std field.
- m. Record the HQ40D instrument number and the probe number in the appropriate columns.

Salinity probe - Salinity

Record the salinity reading of the tap water on the verification data sheet under the salinity value area. The salinity value of tap water should be about 0.13 ppt in South Maui or ~0.04 in West Maui.

Use the lab made secondary salinity calibration standard to verify the salinity probe. The value of the standard is written on the bottle with the date of last calibration. Record the standard value on the Std field. The two rows below the standard row allow you to write the values you read when verifying two different salinity probes.



- a. Connect the HQ40D meter to the wall outlet to save battery life. Connect the salinity probe to the meter.
- h. Pour 50 mL of salinity standard into the 60 ml beaker.
- i. Use the stand and clamps to hold the probe in the solution. Wait 2 minutes, so the value stabilizes.
- j. Hit "READ" and record the value in the "Pre" column next to the value for tap water.
- k. When finished, rinse the probe well with tap water and then distilled water to remove any salinity solution.
- l. Tap the salinity probe gently against a Kim Wipe to remove any water that has been lodged between the plastic and the electrode, so the probe is stored dry.
- m. Store the probe in its case.

Dissolved oxygen (DO) probe

- a. Connect the HQ40D meter to the wall outlet to save battery life. Connect the DO probe to the meter.
- b. Place about ¼ inch of distilled water in the bottom of a sediment bottle.
- c. Cap the bottle and shake vigorously for at least 30 seconds.
- d. Allow the bottle to sit for a few minutes while the DO probe is attached to the meter.
- e. Dampen a microfiber cloth with distilled water. Wring out any excess water thoroughly.
- f. Wrap the damp cloth around the probe just above the shroud.
- g. Give the bottle another vigorous shake, remove the cap and quickly place the probe in the bottle so that the damp cloth is closing off the bottle opening, and the probe is not touching the water.
- h. Press the 'READ' key on the meter.
- i. Record the %DO reading on the data sheet.

The standard value for %DO is 100%. Readings between 95% and 105% are acceptable.

Put away all equipment. A team lead will take the towels home to wash.



Lab SOP – Shipping Procedure

(Samples need to be shipped out Monday, Tuesday or Wednesday of the week following sampling to ensure proper handling at SOEST lab)

PAPERWORK

All templates and forms (including this procedure) are located in the ‘Technical Team Lead Hui O Ka Wai Ola share’ folder (Dropbox).

1. Complete and print the **SLAB Analyses Service Request Form** (pdf). Form is prefilled; however, ensure the amount of samples shipped is correct. Add a signature and the date.
2. Complete and print the **Hui O Ka Wai Ola Chain of Custody form** (Excel). Each page fits 10 samples; use the template you need (2 pages for up to 20 samples, 3 pages for up to 30 samples). The form is mostly prefilled, however there are a few fields that change every time:
 - a. In the “Project Identification” portion, complete the date in which you are filling the form.
 - b. Fill out Client Sample ID, Salinity, Date and Time for each sample.
 - c. Fill out the “Released by” and “Date/Time released” with the correct information.
 - d. Save a copy for our records.
3. Prepare and print the **Fedex shipment labels**.
 - a. Go to Fedex.com, ‘Sign In’ and enter username and password.
 - b. Go to ‘Shipping’, ‘Create a Shipment’.
 - c. From ‘My Shipments Profiles’, select your shipping profile – you will need to create one if first time shipping.
 - d. Boxes 1 (from) and 2 (to) will be prefilled and don’t need to be changed.
 - e. Box 3 (package & shipment details) need to be updated with:
 - i. Date: Shipment date
 - ii. No of packages: 1
 - iii. Weight: 25 lb. for 20 samples
 - iv. Declared Value: \$0
 - v. Service Type: Priority Overnight
 - vi. Package Type: Your Packaging
 - vii. Dimensions: (keep blank)
 - viii. Check the “Include a return label” box, to create the return label.



- f. In Box 4 (Billing Details) the reference needs to be changed with the current session number, as "Shipment SM #". All other fields stay the same.
- g. In "Shipment Notifications" click on 'Edit' to update the message that the SLAB will receive. "This is Shipment # for South Maui and includes a return label". All other fields should remain the same.
- h. Click on "Continue to return shipment".
 - i. Boxes 6 and 7 remain unchanged. Update Box 8 (Package and Shipment Details) as follows: Return label type: Select 'print'
 - ii. Weight: 15 lb.
 - iii. Declared value: \$0
 - iv. Service type: Priority Overnight
 - v. Package type: Your Packaging
- i. In Box 10 (Billing Details), add the reference: "Return Shipment SM #"
- j. Edit the Shipment Notifications: Check 'Estimated Delivery' and 'Delivery' and change the email that appears by default (Amy's) to your email address (add other email address if needed).
- k. In Box 11 (Complete your Shipment), check the box to generate the labels, and click "Ship".
- l. Print out a receipt of the shipment, and both outbound and return labels.

BOX PREPARATION

In a large shipping box, arrange blue ice bricks and samples in a way that will keep them frozen and secure for the duration of the shipment (usually 24 hours). Lining the box with blue ice packs (bottom, sides and top) works fine. Fill all air spaces with paper or packing peanuts (place the peanuts in a Ziploc bag so they're not loose).

Close the box and check the samples are secure by shaking the box a little; samples should not move. If they do, re-arrange the blue ice or filling. Seal the box well, ensuring all sides are securely taped.

In a Ziploc bag, enclose all paperwork including SLAB form, Chain of Custody form, and both Fedex labels, with the outbound Fedex label on top (from NMS to SOEST). Fold the bag and tape it to the top of the box.



SHIPPING

South Maui - Drop the box off at the Fedex office in Kahului (corner of Dairy Rd and Hana Hgwy). Their cut-off time is 11:30am. Request a drop-off confirmation receipt and staple it to the printed receipt from the Fedex website.

West Maui – have FedEx pick up Lahainaluna High School.

COMMUNICATION WITH SOEST LAB

In an effort to minimize errors, after we ship the samples we email the SOEST Lab the full list of samples shipped. Use the template “Session Summary SM #” with the current information.

SOEST Lab: Danielle Hull: dhull@hawaii.edu