



**BISCAYNE BAY**  
**WATER WATCH**

**TRAINING MANUAL AND INSTRUCTION BOOKLET**

1. STATION NAME \_\_\_\_\_  
COORDINATES \_\_\_\_\_

2. STATION NAME \_\_\_\_\_  
COORDINATES \_\_\_\_\_

3. STATION NAME \_\_\_\_\_  
COORDINATES \_\_\_\_\_

4. STATION NAME \_\_\_\_\_  
COORDINATES \_\_\_\_\_

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# WELCOME TO BISCAYNE BAY WATER WATCH

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**Biscayne Bay Water Watch** is a community-based water monitoring program consisting of a coalition of trained volunteers who will jointly administer the program managed by the **University of Florida/IFAS Sea Grant Extension Program** in Miami-Dade County. These activities help protect Biscayne Bay's water quality because:

- Regular monitoring provides specific information about the health of Biscayne Bay
- Both long-term trends and immediate changes in water quality can be documented
- Chemical and physical monitoring provides specific information about those parameters which are important to aquatic life--such as dissolved oxygen, pH, temperature and salinity, as well as those that play a role in algal blooms--such as nitrogen, phosphorus and chlorophyll a.

By becoming a **Biscayne Bay Water Watch** partner, trained volunteers from your organization will sample a number of pre-determined stations within Biscayne Bay during the first full week of every month. To become a **Biscayne Bay Water Watch** volunteer, you must attend a training session and receive a quality assurance certification by demonstrating proficiency in all sampling, data collection, and filtering procedures. All materials will be provided to the site coordinator following successful completion of a training session.

## **Quality Assurance Certification:**

1. Volunteers must demonstrate the ability to use chemical kits and equipment within 10% of the trainer.
2. Volunteers must be QA/QC certified annually.
3. Volunteers must sample once a month for one year and submit water samples and data sheets to the UF/IFAS Sea Grant Extension Program in Miami-Dade County.

## ***Biscayne Bay Water Watch* water sample and data collection:**

At every site, chemical and physical testing for **dissolved oxygen, pH, salinity and temperature** will be conducted. Water samples will be collected for laboratory processing of **Total Nitrogen, Total Phosphorus, NOX, Ammonia, Silica, and Chlorophyll a**. The following tasks will be performed at every site:

1. Fill two (2) sample bottles with water that will later be tested in the laboratory for nutrients.
2. Collect two (2) 1000 mL bottles of water that will be filtered on land. This filter will be later be analyzed in the laboratory to determine the amount of chlorophyll, an estimate of algae levels, at your site.
3. Measure dissolved oxygen, pH, salinity and temperature using the provided test kits and probes.
4. Fill out a data sheet with site and data information.
5. Place samples in a freezer until collection by Biscayne Bay Water Watch manager.

Techniques for each sampling task are outlined in detail in this training manual and will be taught during a training session.

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# SAFETY

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*Your health and safety is our priority. If weather or conditions are unsafe for any reason  
DO NOT SAMPLE*

Here are some tips to help keep you safe while monitoring your adopted station(s).

- Check the weather before going to your site. If weather conditions are unsafe do not conduct a survey.
- Please wear a life jacket when taking water samples.
- Complete a float plan and give it to someone on land.
- Do not monitor alone – bring a partner with you.
- Bring a cell phone in case of emergency. Find out where the nearest medical center is and
- keep a list of emergency phone numbers and important medical information (allergies, etc.) with you.
- Be sure to keep a first aid kit with you that includes:
  - Band-Aids
  - Antibacterial or alcohol wipes
  - First aid ointment
  - Gauze pads and a roll of gauze bandage
  - Large compress bandage
  - Acetaminophen and antihistamine

Safety Notes: Read all instructions before you begin and note all precautions. Keep all equipment and chemicals out of the reach of small children. In the event of an accident or suspected poisoning, immediately call the Poison Control Center (1-800-222-1222). Material Safety Data Sheets (MSDS) are enclosed in your test kit. To view or print a Material Safety Data Sheet (MSDS) for these reagents see MSDS CD or [www.lamotte.com](http://www.lamotte.com). Avoid contact between chemicals and skin, eyes, nose, or mouth. Wear safety goggles or glasses and rubber gloves when handling chemicals. After use, tightly close all chemical containers. Avoid long exposure of chemicals to light and heat. Be careful not to switch caps.

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# PARAMETERS: CHEMICAL & PHYSICAL

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*Always run two (2) tests for each parameter.*

## Salinity, pH, and Temperature

Equipment:

- 500 mL bottle
- Refractometer
- OAKTON pHTestr



Procedure: Also see instructions enclosed in OAKTON pH probe.

### Collecting the Water

**Step 1:** Uncap the bottle. Grip the bottle securely, and rinse by partially filling it with water and shaking the water out vigorously. Repeat the rinse twice (2x).

**Step 2:** After rinsing, grasp the bottom of the bottle with the tip of your fingers. This grip keeps your hand as far away for the mouth of the bottle as possible in order to help prevent possible contamination.

**Step 3:** Turn the bottle upside down. Lower the bottle into the water in this upside down position. This prevents an inflow of debris from the water's surface.

**Step 4:** Push the upside down bottle down into the water until your arm is elbow deep.

**Step 5:** Turn the bottle to a horizontal position to let it fill, turning the mouth of the bottle so that it points up stream. This lets the bottle fill with water that has not been in contact with your hand, thereby minimizing the chance of contamination.

**Step 6:** When the bottle is full, turn the bottle right side up underwater and bring it out of the water.



### Taking the Measurements: pH and Temperature

Measurements should occur immediately after water collection.

Temperature readings should be within  $\pm 1^\circ\text{C}$  of each other. pH readings should be within  $\pm 0.1$  of each other. If not, run another test to ensure accuracy.

**Step 7:** Remove the cap from the electrode and press the ON/OFF button to turn the Testr on.

**Step 8:** Dip the electrode about 2 to 3 cm into the water sample. Stir and let the reading stabilize (about 2 minutes).

**Step 9:** Record the pH and temperature readings or press HOLD/ENT button to freeze the reading. Press again to release the reading.

**Step 10:** Rinse electrode with tap water, but do not dry. Repeat. Keep a damp sponge in the cap for storage.

**Step 11:** On land, leave the empty sample bottle and the pH Testr near the water samples. The bottle will be picked up and cleaned by the Biscayne Bay Water Watch manager and the Testr will be calibrated. A replacement bottle will be provided.

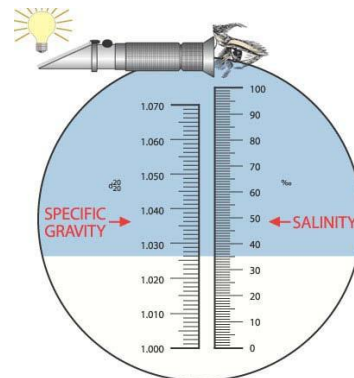
### Taking the Measurements: Salinity<sup>1</sup>

Salinity readings should be within  $\pm 1$  ppt of each other. If not, run another test to ensure accuracy.

**Step 12:** Use pipette to place a few drops of sample water on the lens. Ensure that enough water is added to cover entire the entire lens when the cover plate is closed.

**Step 13:** Hold the refractometer towards a light source and look through the eyepiece. Salinity concentration in parts per thousand (‰) is determined by reading the shadow line with the salinity scale along the right-hand side.

**Step 14:** Wipe lens off with soft cloth and repeat.



<sup>1</sup>Refractometers should be calibrated within 24 hours of using

**Step:** Put enough distilled water to cover the entire lens when the cover plate is closed. Rotate the adjusting screw so that the shadow line evens up with the zero line. Wipe the lens with soft cloth.

## Dissolved Oxygen

*2 samples should be taken; both samples should be within  $\pm 0.6$  ppm of each other*

Equipment:

- LaMotte Dissolved Oxygen Test Kit

Procedure: Also see instructions enclosed in LaMotte kit

### Collecting the Water

**Step 1:** Using a permanent waterproof marker and labeling tape, label the sample bottle with the following information:

- **Station name**
- **Date**
- **Sample # (1 or 2)**

**Step 2:** Uncap the appropriately labeled glass sample bottle. Grip the bottle securely, and rinse by partially filling it with water, replace the cap, and shake the water out vigorously. Repeat the rinse two (2) times.

**Step 3:** After rinsing, tightly cap the bottle and submerge the bottle until your arm is elbow deep.

**Step 4:** Turn the bottle to a horizontal position, remove the cap and let it fill, turning the mouth of the bottle so that it points in the direction in which your boat is traveling.

**Step 5:** Tap the sides of the bottle to dislodge any bubbles and replace cap while bottle is still submerged.

**Step 6:** Retrieve bottle and check that there are no air bubbles are trapped inside.

**Step 7:** Repeat with second glass sample bottle and proceed immediately with Steps 8-10 to “fix” the sample(s).

### Fixing the Sample

*Be careful not to introduce air into the sample(s) while adding the reagents.*

*Wear gloves and protective eyewear when adding the reagents. Reagents marked with an \* are considered to be potential health hazards.*

**Step 8:** Remove the cap from the bottle. Immediately add 8 drops of \*Manganous Sulfate Solution and 8 drops of \*Alkaline Potassium Iodide Azide. Make sure dropper bottles are held vertically upside-down, and not at an angle when dispensing the reagents.

**Step 9:** Cap the sample and invert several times. Wait until the precipitate settles below the neck of the shoulder of the bottle before proceeding.

**Step 10:** Add 8 drops of \*Sulfuric Acid, 1:1. Cap and gently invert the bottle to mix until the precipitate is fully dissolved.

NOTE: The solution will range in color from yellow to orange. At this point, the sample is “fixed” and samples may be held and titrated later.

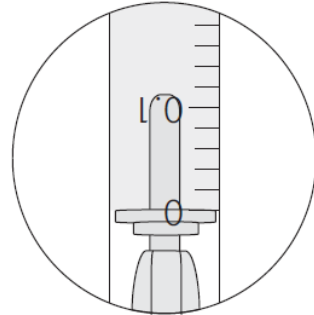


## The Titration

*Swirl titration tube after each drop of titrating solution is added*

**Step 11:** Add 20 mL of the fixed sample into the glass titration tube. Use a pipette for more precise measurements. Cap the tube.

**Step 12:** Depress the titrator plunger and insert into the top of the \*Sodium Thiosulfate. Invert the bottle and slowly withdraw the plunger until the large ring on the plunger is at the zero (0) line. Make sure no bubbles are in the titrator. If an air bubble appears, partially fill the barrel and pump the titration solution back into the reagent bottle. Repeat until the bubble disappears.



**Step 13:** Turn the bottle upright and remove the titrator.

NOTE: If the sample is a very pale yellow, go to Step 16.

**Step 14:** Insert the titrator tip into the glass titration tube and slowly add the \*Sodium Thiosulfate titrating solution until the solution turns pale yellow. Gently swirl the titration tube to mix the contents.

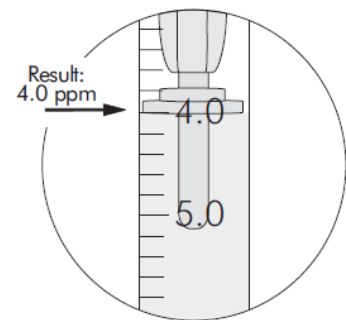
**Step 15:** Remove the cap and titrator carefully. Do not lose any of the Sodium Thiosulfate titrating solution (you will continue titrating in step 17).

**Step 16:** Add 8 drops of Starch Indicator Solution to the glass titration tube. The sample will turn dark blue.

**Step 17:** Cap the glass titration tube and continuing titrating with the \*Sodium Thiosulfate titrating solution one drop at a time until the solution turns from blue to clear.

**Step 18:** Read the dissolved oxygen test result directly from the titrator where the large ring meets the scale. Tick marks are in 0.2 ppm.

**Step 19:** On land, leave the empty bottles near the water samples to be picked up and cleaned by the Biscayne Bay Water Watch manager. Replacement bottles will be provided.



## Sampling for Nutrients

*Water collection bottles have been specially cleaned in the lab to prevent contamination. Do not substitute any other containers for sampling.*

Equipment:

- Two (2) 500 mL Nalgene bottle, pre-labeled (Procedure 1)

or

- One (1) 500 mL Nalgene bottle, pre-labeled (Procedure 2)
- Two (2) preserved 250 mL bottles

### Procedure 1:

**Step 1:** Uncap the appropriately labeled bottle. Be careful not to touch the inside of either the bottle or the lid. Swish the lid in the water and set it aside.

**Step 2:** Grip the bottle securely, and rinse by partially filling it with water, replace the cap, and shake the water out vigorously. Repeat the rinse two (2) times.

**Step 3:** After rinsing the bottle three times, with the tips of your fingers, grasp the bottom rim of your upright sample bottle. This will keep your hand as far away from the mouth of the bottle as possible in order to help prevent possible contamination.

**Step 4:** Turn the bottle upside down and lower into the water. This prevents an inflow of debris from the water's surface. Submerge the upside down bottle until your arm is elbow deep.

**Step 5:** Turn the bottle to a horizontal position to let it fill, turning the mouth of the bottle so that its mouth points upstream. This lets the bottle fill with water that has not been in contact with your hand, thereby minimizing the chance of contamination.

**Step 6:** When the bottle is full, turn right side up and bring it out of the water.

**Step 7:** Pour some water out of the bottle so that the water level is about one-half inch below the shoulder of the bottle. Because the sample will be frozen, this will allow some space for the water to expand as it freezes. Cap the bottle.

**Step 8:** Repeat with second sample bottle.

**Step 9:** If you will be spending more than an hour on the water, put the sample bottles on ice in a cooler. Otherwise, keep it out of the sun.

**Step 10:** On land, dry the sample bottles and put them in a ziplock bag along with the completed data sheet. Put the bag of samples in the freezer immediately. Replacement bottles will be provided.



Procedure 2:

**Step 1:** Uncap the appropriately labeled bottle. Be careful not to touch the inside of either the bottle or the lid. Swish the lid in the water.

**Step 2:** Grip the bottle securely, and rinse by partially filling it with water, replace the cap, and shake the water out vigorously. Repeat the rinse two (2) times.

**Step 3:** After rinsing the bottle three times, with the tips of your fingers, grasp the bottom rim of your upright sample bottle. This will keep your hand as far away from the mouth of the bottle as possible in order to help prevent possible contamination.

**Step 4:** Turn the bottle upside down and lower into the water. This prevents an inflow of debris from the water's surface. Submerge the upside down bottle until your arm is elbow deep.

**Step 5:** Turn the bottle to a horizontal position to let it fill, turning the mouth of the bottle so that it points in the direction in which your boat is traveling. This lets the bottle fill with water that has not been in contact with your hand, thereby minimizing the chance of contamination.

**Step 6:** When the bottle is full, turn right side up and bring it out of the water. Cap the bottle.

**Step 7:** On land, label the two (2) 250 mL preserved sample bottles with the following information:

- **Station name**
- **Date**

**Step 8:** Wearing gloves, remove the cap of the water sample bottle and the pre-preserved bottles. Pour half of the water sample into the preserved bottle labeled N and half into the bottle labeled P. Recap.

**Step 9:** Put the bottles in a ziplock bag along with the completed data sheet for collection at a later date. Replacement bottles will be provided.

## Sampling for Chlorophyll

Equipment:

- Two (2) 1000 mL opaque amber Nalgene bottles

*To prepare the bottles, simply rinse them in tap water. Never clean them with bleach, any chemical cleaner, or soap. The same bottles can be used month after month as long as nothing is growing in them. Store them with the caps off so they can dry out thoroughly between uses.*

*Using a permanent waterproof marker, write the station name on each of the bottles so the samples can be identified later.*

Procedure:

**Step 1:** Uncap the appropriately labeled bottle. Swish the lid in the water.

**Step 2:** Grip the bottle securely, and rinse by partially filling it with water, replace the cap, and shake the water out vigorously. Repeat the rinse two (2) times.

**Step 3:** Turn the bottle upside down and push it underwater to elbow depth.

**Step 4:** Turn the bottle to a horizontal position to let it fill, turning the mouth of the bottle so that it points upstream the flow of water. If clumps of vegetation flow into the bottle, empty it and start over.

**Step 5:** Bring the bottle out of the water and cap it.

**Step 6:** The water should be filtered as soon as possible. Filtering may be postponed several hours if necessary, but the bottles must be stored in a cold location, preferably on ice or in a refrigerator.

The filtering procedure is explained in detail on pages 10-13.

## Filtering Water for Chlorophyll Analysis

Water from the chlorophyll bottles is filtered to obtain samples of algae. The filters will be tested in the laboratory to determine how much chlorophyll *a*, a green pigment, the samples contain.

Equipment:

- 1000 mL filter flask
- Vacuum hand pump
- Tubing
- 500 mL graduated cylinder
- Filter top, base and stopper
- Forceps (tweezers)
- 500 mL bottle with desiccant
- Filter papers
- Pipette (dropper)
- Large filter envelope
- Plastic coated paper clips
- Pencil

Procedures:

**Step 1:** Learn the names of all the parts of the filtering equipment.



**Step 2:** Attach one end of the transparent tubing to the hand pump and the other end to the filtering flask.



**Step 3:** Assemble the filter funnel. Grasp the cup base by the rubber stopper and gently twist it downward into the mouth of the filtering flask.

**Step 4:** Using forceps (tweezers), pick up one of the smaller filters. It is sometimes difficult to grasp just one filter, as they tend to stick together. Blowing gently along the forceps toward the filter papers causing them to flutter apart. If two filters are used inadvertently, they are processed together as if they were one.



**Step 5:** Holding the filter with the forceps place it in the center of the cup base with the 'rough' side up. This side looks similar to terrycloth, while the 'smooth' side looks more like woven fabric.

**Step 6:** To center the filter inside the rim of the cup base, adjust it from the side with the flat edge of the forceps. Never move the filter around by putting the pointed ends of the forceps on it. This might poke holes in the filter that could allow unfiltered water to pass through. If a filter is torn or dropped, discard it.

**Step 7:** Using tap water, rinse the filter cup. Rinse the cup every time water from a different site is filtered.

**Step 8:** After rinsing the cup in tap water, place it on top of the cup base. The cup and base are screwed down onto the base to form a watertight seal. *Be sure not to cross thread the cup and base or water will leak out and the sample will have to be repeated.*

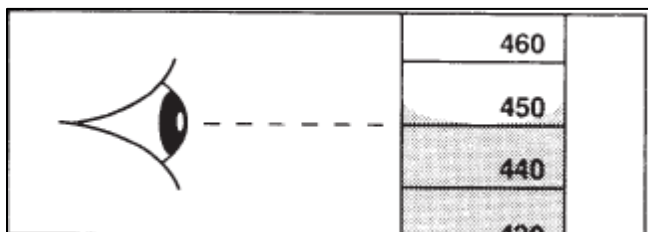
**Step 9:** Shake the bottle that is about to be filtered to make sure the sample is well mixed.

*This is very important and very easy to forget. Some folks have written "Shake Me" on their bottle as a reminder. Do whatever is necessary to jog your memory.*



**Step 10:** Use the shaken water from the bottle to rinse the measuring graduated cylinder. To rinse, pour about a cup of water into the cylinder. Swirl the water around and then twirl the cylinder as the water is poured out so that it rinses the sides of the cylinder.

**Step 11:** Pour water from the shaken bottle into the measuring cylinder up to the 500 milliliter (mL) line. Use a plastic pipette to adjust the water level in the graduated cylinder so that the bottom of the meniscus (the slightly u-shaped surface of the water) rests on top of the target line on the cylinder. Squeeze the pipette dry before using it for the next site.



*It is very important to keep track of how many milliliters are filtered. This information is necessary to calculate the concentration of chlorophyll in the filtered sample. You may want to write down the measurements as you go.*

Use your judgment to decide how much water to filter. There is no pre-determined amount of water that must be filtered. The goal is to filter as much water as necessary to turn the filter paper a noticeable color. If there is a lot of algae in the water body, only a small volume of water may be necessary. On the other hand, if there is little algae in the water, a greater volume may be needed. Do not filter more than 2000 mL even if that amount doesn't produce a noticeable color change.

In general, the approach is to measure out the amount of water thought necessary, pour it into the filter cup and pump it through. If no color is noticed, measure out more water and pump that through too. Pay attention to whether the water is hard to pump and whether the stream of water is diminishing. Either of these observations is a signal that the filter is getting close to the clogging point and no more water is added.

If the filter clogs and the water remaining in the filter cup cannot be pumped through, volunteers pour out all the water, reassemble the filter apparatus with a clean filter paper and start over using less water.

### **KEEP TRACK OF THE TOTAL AMOUNT OF WATER FILTERED**

**Step 12:** To retrieve the filter, unscrew the cup so it comes up off the filter and base. The filter paper should remain on the cup base. Sometimes the filter will stick inside the bottom of the cup. If this happens put a hand under the bottom of the cup and gently blow in the top of the cup to propel the filter out. Alternatively, the edge of the filter can be carefully loosened and peeled off gently with the forceps. However, if the forceps accidentally touch the algae that have accumulated on the filter, algae will come off on the forceps and the sample may be damaged. Any filter on which the algae has been touched by fingers, forceps or any other object **must** be discarded and the filter process for that site must be started over.

**Step 13:** Assuming the cup comes off the base properly and leaves the filter behind on the base, use forceps to remove the filter paper from the base. Grasp the filter paper only by the white outer rim; **do not touch the algae with the forceps**. Peel the filter off the cup base.

**Step 14:** To enclose and protect the algae, fold the filter exactly in half with the algae side inside. You can touch the back side of the filter with your fingers. **Do not touch the algae during the folding**. No algae should be peeking out along the edge of the folded filter. If the algae isn't completely covered by folding, some algae may be lost, making the sample inaccurate. If the forceps tears off a small piece of filter, just encase it inside the folded filter and continue processing it.



**Step 15:** Put the folded sample on a paper towel and fold the paper towel over the sample and blot it as dry as possible. Let the sample sit on the paper towel while you prepare an envelope for it.

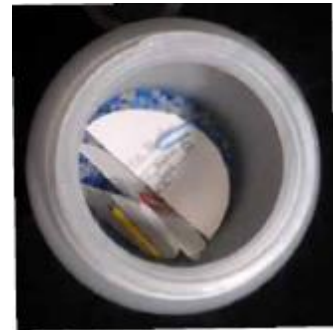
**Step 16:** Prepare an envelope by folding one of the larger filters in half. It can be handled with your fingers. Using pencil only, (**never** use any kind of marker or ink to write on the large filters as the ink might bleed through onto the sample and ruin it), fill in all the following information on the pre-attached label:

- **Station name**
- **Date**
- **Volume filtered**

**Step 17:** Tuck the folded sample filter inside its envelope and fasten the circular edge of the envelope with a plastic coated paperclip, provided in your kit (**never** use metal paperclips; rust may bleed into the sample and ruin it).



**Step 18:** Put the filter sample and its envelope in the jar of desiccant (blue and white silica gel crystals). The desiccant crystals absorb moisture from the filter, drying it out to preserve the algae. **Only use desiccant provided by Biscayne Bay Water Watch.** Gently roll the jar to distribute the crystals around the filter papers. Do not shake the jar.



**Step 19:** Store the desiccant jar in the freezer. If the blue crystals turn pink, it indicates that the crystals are saturated with water and are not absorbing moisture effectively. Saturation of the desiccant is most likely caused by inadequate blotting of the algae samples. If your desiccant is turning pink refer to *Appendix B: How to Refresh your Desiccant* on page or turn in the bottle of pink desiccant. A new bottle of desiccant will be provided for the next month.

**Step 20:** Repeat all steps for the remaining stations and put all the filter papers into the bottle of desiccant and store in the freezer.

**Step 21:** After all samples are filtered, rinse the equipment with tap water and let it air dry.

**Step 22:** Check the number of bottles, filters and paper clips to assure there is an adequate supply for next month's sampling. Contact your site coordinator if you need more supplies.



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# SAMPLING THE WATER: A SUMMARY

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## **A. Filling the Temperature, pH and salinity bottle**

1. Rinse the bottles and lids in the water body three (3) times.
2. Invert the bottle and lower it into the water body to elbow depth.
3. Fill the bottle by pointing its mouth upstream.
4. Bring the bottle up and immediately run the tests.
5. Repeat.

## **B. Filling the nutrient bottle(s)**

1. Without touching the inside of the bottle and lid, rinse the pre-labeled bottle(s) in the water three (3) times.
2. Grasp the bottle(s) at its base, turn it upside down and lower it mouth downward, into the water body to elbow depth.
3. Fill the bottle(s) by turning it to a horizontal position and pointing its mouth upstream.

### Procedure 1

4. Bring the bottle up and pour enough water out to leave a 1-inch space for the freezing water to expand.
5. Cap the bottle tightly and put it in a shaded place or cooler.
6. Repeat.

### Procedure 2

4. Cap the bottle tightly and put it in a shaded place or cooler.
5. On land, label the two (2) 250 mL preserved sample bottles with the following information:
  - a. **Station name**
  - b. **Date**
6. Wearing gloves, pour half of the sample into the preserved bottle labeled N and half into the preserved bottle labeled P.

## **C. Filling the chlorophyll bottle(s)**

1. Rinse the bottles and lids in the water body three (3) times.
2. Invert the bottle and lower it into the water body to elbow depth.
3. Fill the bottle by pointing its mouth upstream.
4. Bring the bottle up and cap it.
5. Repeat.

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# TAKING MEASUREMENTS: A SUMMARY

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## A. Dissolved Oxygen (2 measurements within $\pm 0.6$ ppm)

1. Rinse the bottles and lids in the water body three (3) times.
2. Lower the body into the water to elbow depth and fill by pointing its mouth upstream.
3. Add 8 drops of \*Manganous Sulfate Solution.
4. Add 8 drops of \*Alkaline Potassium Iodide Azide.
5. Cap and mix.
6. Add 8 drops of \*Sulfuric Acid.
7. Cap and mix until reagent and precipitate dissolve.
8. Fill test tube to the 20 mL line.
9. Fill titrator with \*Sodium Thiosulfate.
10. Titrate until sample color is pale yellow, do not disturb titrator.
11. Add 8 drops of Starch Indicator.
12. Continue titration until blue color disappears and solution is colorless.
13. Read result in ppm.
14. Repeat.

## B. pH and Temperature (2 measurements within $\pm 0.1$ and $1^{\circ}\text{C}$ )

1. Turn the Testr on and dip into the water sample.
2. After 2-3 minutes of stabilization record the reading.
3. Repeat.

## C. Salinity (2 measurements within $\pm 1$ ppt)

1. Calibrate within 24 hours using distilled water.
2. Place water sample onto lens.
3. Look into eye piece and read at the line in ppt.
4. Rinse with freshwater, dry, repeat.

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## FILTERING PROCEDURE: A SUMMARY

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1. Assemble the filtering apparatus by inserting the filter base into the flask.
2. Using forceps, center a small filter, rough side up, on the cup base.
3. Using tap water, rinse the filter cup and screw it on the base.
4. Shake the jug of water and use some of it to rinse the graduated cylinder. Repeat this rinse for each bottle as you prepare to filter from it.
5. Measure water from the bottle into the graduated cylinder.
6. Pour measured water from the graduated cylinder into the filter cup and pump it through the filter paper until a noticeable color appears on the filter or it starts to clog.
7. After pumping the cup dry, unscrew the cup off the base.
8. Using the forceps to grip the white part of the filter paper, lift it off the cup base.
9. Being careful not to touch the algae, fold the filter in half, **algae side in** to enclose the algae. Blot the small filter thoroughly on a paper towel.
10. Using a pencil, label a large filter paper with:
  - **Station name**
  - **Date**
  - **Amount of water filtered (mL)**
11. Fold the large paper filter in half, tuck the small filter inside and fasten with a plastic-coated paper clip.
12. Put filters into the bottle of desiccant. Store in freezer.
13. Repeat.
14. Rinse equipment with tap water, let air dry and check to see if there are enough supplies for next month.

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# EQUIPMENT CHECK LIST

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## Boat checklist

1. Life jacket\*
2. 500 mL sample bottles (2 per station), in a Ziploc bag
3. Waterproof marker
4. Sample bottle for pH, temperature and salinity (1)
5. Chlorophyll jugs (2 per station)
6. pH Testr
7. Refractometer and pipette
8. Dissolved oxygen kit
9. Data sheet with pencil
10. Coordinates for station locations
11. Laminated reference card
12. Label tape
13. Gloves and glasses\*
14. Cooler with ice\*

\*furnished by the volunteer

## Sampling kit inventory

1. 1000 mL filter flask
2. Hand pump with tubing
3. Filter funnel cup
4. Cup base
5. Forceps (tweezers)
6. Pipette
7. Graduated cylinder
8. Desiccant bottle
9. 500 mL sample bottles
10. Small filters: 47 mm type A/E glass fiber filters
11. Large filters/envelopes: 7 cm paper filters
12. Plastic coated, metal paper clips
13. Data sheets
14. Biscayne Bay Water Watch instruction booklet
15. Laminated reference card

# APPENDIX A

## Biscayne Bay Water Watch Data Sheet

### SITE INFORMATION

Station Name \_\_\_\_\_ Collector # 1 \_\_\_\_\_  
 Date \_\_\_\_\_ Collector #2 \_\_\_\_\_  
 Time \_\_\_\_\_ Phone \_\_\_\_\_  
 Site Coordinator \_\_\_\_\_

### WEATHER & WATER

*Present conditions (check all that apply)*

Heavy rain       Steady rain       Intermittent Rain  
 Overcast       Partly cloudy       Clear/Sunny

*Water conditions*

Calm       1-2 feet       2-4 feet       4-6 feet       Are you crazy?

*Tide was:*

High       Low       Rising/Incoming       Falling/Outgoing

### VERIFICATION

Yes       No      Surface Water Collected for Total Phosphorus and Total Nitrogen  
 Yes       No      Surface Water Collected for Chlorophyll and Filtered Within 12 Hours  
 Yes       No      Temperature, Salinity, pH and Dissolved Oxygen Measures Taken  
 Yes       No      Refractometer Calibrated Within 24 Hours of Sampling

*Are any reagents expired?*

Yes       No      List any expired \_\_\_\_\_

*Are any replacement supplies needed?*

Yes       No      List all supplies \_\_\_\_\_

### CORE TESTS

	Test 1	Test 2	Units	± Met (Y/N)	If No, Test 3
Water temperature (+/- 1)			°C		
pH (+/- 0.1)			Standard unit		
Salinity (+/- 1)			ppt ‰		
Dissolved Oxygen (+/- 0.6)			ppm		
Water Depth			meters		
Chlorophyll sample volume filtered			mL		

On the back, DESCRIBE any unusual observations regarding your sampling station (water odor, color, clarity, etc) as well as any unique occurrences/events in the coastal waters within two weeks of your sampling date.

Contact the UF/IFAS Sea Grant Extension Agent (305-421-4017) with any questions.

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## APPENDIX B

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### How to Refresh Desiccant

Biscayne Bay Water Watch volunteers put their algae filters into plastic bottles containing blue and white desiccant crystals. The crystals are a material that absorbs moisture. The blue crystals contain a chemical that turns from blue to pink when the crystals become saturated with moisture. This color change signals that the crystals cannot effectively absorb more moisture and need to be 'refreshed.' To restore the crystals to their initial dry condition, follow these steps:

**Step 1:** Remove all algae filter samples from the bottle of crystals. Tweezers are useful for handling the filters. Put the filter samples in the freezer while you refresh the desiccant. Do not let the samples thaw out.

**Step 2:** Pour the crystals out of the plastic desiccant bottle into an ovenproof glass container

**Step 3:** Cook the crystals in an oven until they turn blue again. Alternatively, you can microwave them for several minutes. An average time might be two minutes on high in a 600-watt microwave oven. Regardless of how you cook them, DO NOT leave them in the plastic bottle as it will melt.

**Step 4:** Allow the crystals to cool.

**Step 5:** Pour the cooled crystals back into the plastic bottle. The algae filter samples can now be returned to the desiccant bottle.

# APPENDIX C



**Float Plan**

**BoatU.S.**

## 1. Phone Numbers

Coast Guard: \_\_\_\_\_  
 Marine Police: \_\_\_\_\_  
 Local TowBoatU.S. Company: \_\_\_\_\_

## 2. Description of the Boat

Boat Name: \_\_\_\_\_ Hailing Port: \_\_\_\_\_  
 Type: \_\_\_\_\_ Model Year: \_\_\_\_\_  
 Make: \_\_\_\_\_ Length: \_\_\_\_\_ Beam: \_\_\_\_\_ Draft: \_\_\_\_\_  
 Color, Hull: \_\_\_\_\_ Cabin: \_\_\_\_\_ Deck: \_\_\_\_\_ Trim: \_\_\_\_\_ Dodger: \_\_\_\_\_  
 Other Colors: \_\_\_\_\_ # of Masts: \_\_\_\_\_  
 Distinguishing Features: \_\_\_\_\_  
 Registration No: \_\_\_\_\_ Sail No: \_\_\_\_\_  
 Engine(s) Type: \_\_\_\_\_ Horsepower: \_\_\_\_\_ Cruising Speed: \_\_\_\_\_  
 Fuel Capacity, Gallons: \_\_\_\_\_ Cruising Range: \_\_\_\_\_

### Electronics/Safety Equipment Aboard

VHF Radio: \_\_\_\_\_ Cell Phone: \_\_\_\_\_ CB: \_\_\_\_\_ SSB: \_\_\_\_\_  
 Frequency Monitored: \_\_\_\_\_ Loran: \_\_\_\_\_ SatNav: \_\_\_\_\_  
 Depth Sounder: \_\_\_\_\_ Radar: \_\_\_\_\_ GPS: \_\_\_\_\_  
 Raft: \_\_\_\_\_ Dinghy: \_\_\_\_\_ EPIRB: \_\_\_\_\_ A/B/C/406M  
(Indicate Type)

## 3. Trip Details

Owner/Skipper (Filing Report): \_\_\_\_\_  
 Phone: \_\_\_\_\_ Age: \_\_\_\_\_  
 Address: \_\_\_\_\_

### Additional Persons Aboard, Total: \_\_\_\_\_

Name: \_\_\_\_\_ Age: \_\_\_\_\_  
 Address: \_\_\_\_\_ Phone: \_\_\_\_\_  
 Boating Experience: \_\_\_\_\_

Name: \_\_\_\_\_ Age: \_\_\_\_\_  
 Address: \_\_\_\_\_ Phone: \_\_\_\_\_  
 Boating Experience: \_\_\_\_\_

Name: \_\_\_\_\_ Age: \_\_\_\_\_  
 Address: \_\_\_\_\_ Phone: \_\_\_\_\_  
 Boating Experience: \_\_\_\_\_

Name: \_\_\_\_\_ Age: \_\_\_\_\_  
 Address: \_\_\_\_\_ Phone: \_\_\_\_\_  
 Boating Experience: \_\_\_\_\_

Name: \_\_\_\_\_ Age: \_\_\_\_\_  
 Address: \_\_\_\_\_ Phone: \_\_\_\_\_  
 Boating Experience: \_\_\_\_\_

Departure Date/Time: \_\_\_\_\_ Return No Later Than: \_\_\_\_\_  
 Depart From: \_\_\_\_\_

Marina (Home Port): \_\_\_\_\_ Phone: \_\_\_\_\_  
 Auto Parked At: \_\_\_\_\_  
 Model/color: \_\_\_\_\_ Lic. # \_\_\_\_\_

Destination Port: \_\_\_\_\_  
 \_\_\_\_\_ ETA: \_\_\_\_\_ No Later Than: \_\_\_\_\_  
 Phone: \_\_\_\_\_

Anticipated Stopover Ports: \_\_\_\_\_  
 \_\_\_\_\_ ETA: \_\_\_\_\_ No Later Than: \_\_\_\_\_  
 Phone: \_\_\_\_\_

\_\_\_\_\_ ETA: \_\_\_\_\_ No Later Than: \_\_\_\_\_  
 Phone: \_\_\_\_\_  
 \_\_\_\_\_ ETA: \_\_\_\_\_ No Later Than: \_\_\_\_\_

Phone: \_\_\_\_\_  
 \_\_\_\_\_ ETA: \_\_\_\_\_ No Later Than: \_\_\_\_\_  
 Phone: \_\_\_\_\_

\_\_\_\_\_ ETA: \_\_\_\_\_ No Later Than: \_\_\_\_\_  
 Phone: \_\_\_\_\_

Plan Filed With: \_\_\_\_\_  
 Name: \_\_\_\_\_ Phone: \_\_\_\_\_

Get in the habit of filing a Float Plan. It can assure quicker rescue in the event of a breakdown, stranding or weather delay. Fill out the permanent data in Sections 1 and 2. Then, make enough copies to last for the season. If you file a Float Plan with someone not at your home, such as a harbormaster or boating friend, be sure to notify them as soon as you return. Don't burden friends or authorities with unnecessary worry and responsibility if you are safe.

Check your *BoatU.S. Towing Guide*. Some listed companies will accept a verbal Float Plan via telephone or VHF.

## **Acknowledgements**

Advice and some of the material in this manual were taken from the following documents:

- The Volunteer Monitor's Guide: Quality Assurance Project Plan EPA 841-B-96-003
- Volunteer Estuary Monitoring: A Methods Manual, 2<sup>nd</sup> Edition
- Miami-Dade County DERM Biscayne Bay Surface Water Quality Standard Operating Procedures, May 2010
- Field Sampling Quality Manual Miami-Dade County Department of Environmental Resources Management, Version 1.1
- Florida LAKEWATCH Training Manual and Instruction Booklet (Images pp. 7-13)
- LaMotte Company (Images p. 6)
- OAKTON Company (Image p. 3)
- ExTech Company (Image p. 3)
- Georgia Adopt-A-Stream Biological & Chemical Stream Monitoring Manual
- Florida Keys Water Watch



Biscayne Bay Water Watch  
UF/IFAS Sea Grant Extension  
Miami-Dade County  
305-421-4017

[http://miami-dade.ifas.ufl.edu/environment/sea\\_grant\\_bbww.shtml](http://miami-dade.ifas.ufl.edu/environment/sea_grant_bbww.shtml)

