Florida
LAKEWATCH
TRAINING MANUAL AND INSTRUCTION BOOKLET
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This training manual is generated by the Florida LAKEWATCH program, within UF/IFAS. Support for the LAKEWATCH program is provided by the Florida Legislature, grants and donations. For more information about LAKEWATCH, to inquire about volunteer training sessions, or to submit materials for inclusion in this publication, write to:

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Sampling protocols described herein represent water sampling methods used by Florida LAKEWATCH professionals.
Overview

What is the Florida LAKEWATCH program? Florida LAKEWATCH is a team effort in which volunteers, working with researchers at the University of Florida, collect water samples that, when analyzed, will contribute to the understanding of Florida’s water bodies. As a trained LAKEWATCH volunteer, you will help develop a database of water chemistry for your particular water body. These data can then be used to establish trends and develop an overview of how your water body fits into the overall picture of Florida water bodies.

What training will I receive? This booklet contains information you will learn during your training session. In the session, you will receive hands-on training in sampling techniques and use of all equipment. To become a LAKEWATCH volunteer, you must demonstrate proficiency in all sampling and filtering procedures.

What will I have to do to take LAKEWATCH samples? Every month you will sample a number of pre-determined locations, called stations, in your water body. At each station, you will perform the following tasks:

1. Fill a sample bottle with water that will later be tested in the Florida LAKEWATCH laboratory for nutrients (total phosphorus and total nitrogen), color and conductivity.
2. Collect a jug of water that you will filter. This filter will later be analyzed in the Florida LAKEWATCH laboratory to determine the amount of chlorophyll (used to estimate the algae levels) in your water body.
3. Use a device called a Secchi disc to measure water clarity.
4. Measure water depth.
5. Fill out a data sheet with information and observations pertinent to your water body.
6. Freeze all samples (nutrients, algae and data sheet) and deliver your frozen samples to a LAKEWATCH collection center.

Techniques you will use to sample the water at each station are described in detail in this booklet and will be taught during a LAKEWATCH training session at a time and place convenient to you.

How long does it take to do LAKEWATCH sampling? It usually takes about an hour to complete the sampling procedure, exclusive of boating and delivery time.

Do I have to take samples on the same day every month? You don’t have to take your samples on exactly the same day every month. The date of your first sampling will determine your ‘target range’. You will attempt to sample within plus or minus five days of your first sampling. For example, if you first sample your water body on August 14, then in September you would try to sample again between September 9 and 19. Ideally, during this 11-day target range, you will be able to accommodate your personal schedule and allow for adverse weather conditions. However, if you cannot collect samples during the target range, take samples sometime during each month. Please do not skip a whole month of sampling just because you cannot hit your target range. Try to allow some time to pass between sampling dates. For example, if you collect on June 30th, don’t collect on July 2nd; wait until at least July 15th.

How can I remember everything? Collecting LAKEWATCH samples is not difficult, but it does require careful attention to detail. Use this booklet for a review every month before you do your sampling. It contains both a detailed description and a summary of each procedure. Also you will receive a laminated training field guide to carry with you when you sample.
Sampling the water: A detailed description

The Florida LAKEWATCH laboratory will furnish water sample bottles. They are available at your collection center. If you do not know where your collection center is, please call the Florida LAKEWATCH Program. For inland water bodies use the smaller 250 mL bottles packaged with white data sheets. For saline stations use the larger 500 mL bottles packaged with blue data sheets. These bottles have been specially cleaned at the lab to prevent sample contamination. Do not substitute any other containers for sampling.

Water collected in these bottles will be analyzed monthly for total phosphorus and total nitrogen. In addition to total phosphorus and total nitrogen, station 1 bottles will be analyzed quarterly for color and specific conductance. Water sampling procedures described below are the same for both inland water bodies and saline stations. You will be asked to furnish a waterproof marker for labeling the bottles.

If your boat has a gasoline motor, take the sample on a side of the boat that will allow you to avoid picking up any contaminants that could possibly come from the motor. Always take the nutrient sample as soon as the boat arrives at the sampling site. A useful technique is to cut the engine, coast up to your station location, and take the sample from the front of the boat while the boat is still coasting gently into position.

Step 1: Each bottle has a label on it for identification. Using a permanent waterproof marker, label the sample bottle with the following information:

- Water body name
- County name
- Month-day-year
- Station 1, 2, or 3, etc.

You may want to label your bottles before you start out to sample. The labels are very difficult to write on when wet. Be sure your pen is waterproof. Always double check your labels as dates and station numbers are essential to recording your data correctly.

Example:
Water Body: Little Weston
County: Polk
Date: 3-26-01
Station: 3

Getting water for nutrient testing

Step 2: At each sampling location, uncap the appropriately labeled bottle. Because your hands may carry traces of contaminating substances, be careful not to touch the inside of either the bottle or the lid.

Step 3: Swish the lid in the water and set it aside. Give the bottle a thorough rinse by gripping it securely, partially filling it with water and shaking the water out vigorously. Repeat the rinse.

Step 4: After rinsing the bottle twice, change your grip on it. With the tips of your fingers, grasp the bottom rim of your upright sample bottle.
The purpose of this grip is to keep your hand as far away from the mouth of the bottle as possible in order to help prevent possible contamination.

**Step 5:** Turn the bottle upside down. The bottle will be lowered into the water in an upside down position, with its mouth pointing downward as if it were being emptied. This prevents an inflow of debris from the water’s surface.

**Step 6:** Push the upside down bottle down into the water until your arm is elbow deep.

**Step 7:** 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 8:** When the bottle is full, turn the bottle right side up underwater and bring it out of the water.

**Step 9:** Because the sample will be frozen, pour some water out of the bottle in order to allow some space for the water to expand as it freezes. If the bottle is overfilled, it might crack or split open. A good fill level is about one-half inch below the shoulder of the sample bottle. If the bottles bulge after they are frozen, pour out a little more water next time.

**Step 10:** Cap the bottle and screw the lid on tightly.

**Step 11:** If you will be spending more than an hour on the water body, put the bottle on ice in a cooler. Otherwise, just keep it out of the sun.

**Step 12:** When you return home, dry your sample bottles and put them all, along with your data sheet, into a Ziploc bag. Put the bag of water sample bottles in the freezer immediately. Include the data sheet! Be gentle with the frozen bottles. They may become brittle and can shatter if they are dropped.

**Getting water for the algae testing**

You will be provided with ¼ gal jug for each station. You will be asked to provide a dark towel, dark plastic bag, or cooler. To prepare the jugs, simply rinse them in tap water. Never clean them with bleach, any chemical cleaner, or soap. You may use chlorinated tap water to rinse the jugs. Even if recycled milk jugs are being used, rinse them in water only. The same jugs can be used month after month as long as no fungus or mold is growing in them. Store them with the caps off so they can dry out thoroughly between uses.

Using a permanent waterproof marker, write a number on each of the jugs so each station can be identified later.

**Step 1:** Remove the jug lid and rinse it in water body water.

**Step 2:** Rinse the jug by filling it with a couple of inches of water and vigorously shaking the water out. Repeat once.

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

**Step 4:** Once at the proper depth, fill the jug by turning its mouth in the direction the boat is moving. If clumps of vegetation flow into the jug, empty it and start over. If it is too difficult to force the underwater jug into an upright position to fill, smaller bottles may be substituted.

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

**Step 6:** Cover the jug with a dark towel in order to block out light. Intense sunlight can stimulate the growth of algae, resulting in an inaccurate measurement of the algae level in your water body.

**Step 7:** The water should be filtered as soon as possible. Filtering may be postponed several hours if necessary, but the jugs must be stored in a cold dark location, preferably on ice or in a refrigerator. The filtering procedure is explained in detail on page 7.
A Secchi disc will be used to measure water clarity. Florida LAKEWATCH uses a white eight-inch disc with a line marked at one-foot intervals attached to its center. A weight on the bottom of the disc helps it sink quickly. If necessary, more weight can be added. If you need a Secchi with more weight, please contact the LAKEWATCH office.

Lower the Secchi disc over the side of the boat while feeding out the rope. Watch the disc until it vanishes from sight. Measure and record how many feet underwater the disc was when it vanished. To get the most reliable measurement:

**Step 1:** To maximize the Secchi reading, choose a day when there is full sun and minimal wind.

**Step 2:** Sample between 9 a.m. and 3 p.m. if possible. During these hours the sun is at a higher angle, reducing glare and permitting sunlight to penetrate further into the water.

**Step 3:** Do NOT wear sunglasses while taking the Secchi reading.

**Step 4:** If the wind is blowing the boat around, anchor so that the Secchi rope will be vertical when the reading is taken. Anchor carefully to avoid stirring up bottom sediments that may interfere with water samples and water clarity. It is preferable to take water samples before anchoring the boat.

**Step 5:** Put the sun at your back and take the reading from the side of the boat that will allow you to cast your own shadow out on the water. Lowering the Secchi disc in your shadow helps to minimize interference from surface glare.

**Step 6:** taking the Secchi reading from the side of the boat that is downwind may minimize interference from waves.

**Step 7:** After the Secchi disc is lowered into the water to the vanishing point (where it absolutely cannot be seen at all), raise and lower it a few times to determine the exact vanishing point of the disc.

**Step 8:** When the disc is at the vanishing point, clip the clothespin onto the rope at the waterline. Do not put the provided clothespin on the rope where your hand is unless your hand is at the waterline.

**Step 9:** As soon as the clothespin is clipped onto the Secchi disc rope, check to see how much cloud cover there is over the sun. This information will be recorded on your data sheet.

**Step 10:** Pull the disc into the boat and count the rope markings to read how many feet below the surface of the water the disc was when it vanished from sight (the length of the line from the disc to the clothespin). Estimate the Secchi reading to the **nearest quarter of a foot**.

**Step 11:** Write the Secchi reading on your data sheet by writing the whole number in the space provided and circling the appropriate quarter foot increment (if needed). Use a pencil or waterproof pen.

**Step 12:** The very last measurement taken at the station is the depth of the water. Lower the Secchi disc until it rests on the bottom; the rope will go slack. Take up the slack, mark the waterline with a clothespin, pull up the disc and count the feet between the clothespin and the disc. Estimate the water depth reading to the nearest quarter of a foot. Record the depth on the data sheet by writing the whole number in the space provided and circling the appropriate quarter foot increment (if needed). Use a pencil or waterproof pen.

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**Measure the depth last, after taking water samples and measuring water clarity. When the disc hits bottom it may stir up sediments that could affect all other measurements.**
Filling in the data sheet

**Step 1:** To record the Secchi reading, several special notations are used:

a. Check “yes” to indicate that you collected water for total phosphorus, total nitrogen (small 250 ml bottle) and chlorophyll ½ gal jug and “yes” that you took a Secchi depth reading (if you measured the water clarity).

b. Write “B” on the data sheet to indicate that the disc went to the bottom and is still visible on the bottom.

c. Write “W” on the data sheet to indicate that the Secchi disc disappeared into weeds growing in the water body. Also record the depth at which the disc disappeared into the weeds.

**Step 2:** Record the cloud coverage when the Secchi reading was taken in the column headed “Sun Code #” by writing a number between 1 and 5 chosen from the data sheet column headed “Sun Codes.”

Do not indicate how much cloud cover there was in the sky at the time the Secchi reading was taken; record the cloud cover directly over the sun only. For example, if the sky was very cloudy, but the sun popped out from behind the clouds during the time the Secchi disc was being read, a #1 would be entered for the Sun Code #.

**Step 3:** Fill out the remainder of the data sheet. Write comments on the back of the data sheet if necessary. Include anything that might possibly be useful. For example, “limerock washed into water body from torrential rainfall on roads, “grass carp were stocked in water body last week,” or “public beach was closed by Health Department on May 10th.” If you choose to record water levels regularly, please clearly label the type of gauge you are reading. If you do not know the type of gauge then call the LAKEWATCH office to get help determining the type of gauge. A copy of both LAKEWATCH data sheets (inland water and saline stations) is provided in Appendix C on pages 18-19.

Lake Name:  Little Weston  County:  Polk
Sampler:  Jane Doe  Phone:(352)867-5309  Date:  9/15/2015  Time:  10:00 am

Yes___ No___: Surface Water Collected for Total Phosphorus and Total Nitrogen.
Yes___ No___: Surface Water Collected for Chlorophyll and Filtered Within 48 Hours.
Yes___ No___: Secchi Depth Reading Taken

**Secchi Disc Measurements:**

* For **Secchi depth** and **water depth** measurements, please indicate the number of feet and then estimate and circle the appropriate fraction, if needed.

* If your **disc is visible on the bottom** write **B**. If your **disc disappears in the weeds** write **W**, in the **vanishing point** column and the **depth** at which your disc disappears.

<table>
<thead>
<tr>
<th>Vanishing Point</th>
<th>Sun Code Number</th>
<th>Sun Code Key</th>
<th>Water Depth</th>
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<tbody>
<tr>
<td>Sta 1 W 3</td>
<td>ft. 1/4 1/2 3/4</td>
<td>1 = full sun</td>
<td>8 ft. 1/4 1/2 3/4</td>
</tr>
<tr>
<td>Sta 2 B</td>
<td>ft. 1/4 1/2 3/4</td>
<td>2 = haze over sun</td>
<td>8 ft. 1/4 1/2 3/4</td>
</tr>
<tr>
<td>Sta 3</td>
<td>ft. 1/4 1/2 3/4</td>
<td>3 = thin cloud cover</td>
<td>7 ft. 1/4 1/2 3/4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 = medium cloud cover</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 = heavy cloud cover</td>
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Sampling the water: A summary

A. Filling the nutrient bottle
1. Use a waterproof marker to fill in the blanks on the label of each sample bottle.
   • Water body name
   • County
   • Month-day-year
   • Station number
2. Without touching the inside of the bottle and lid, rinse them in the water body twice.
3. Grasp the bottle at its base, turn it upside down and lower it, mouth downward, into the water body to elbow depth.
4. Fill the bottle by turning it to a horizontal position and pointing its mouth in the direction the boat is traveling.
5. Bring the bottle up and pour enough water out to leave a 1-inch space for the freezing water to expand.
6. Cap the bottle tightly and put it in a shaded place or ice chest.

B. Filling the chlorophyll jug
1. Rinse the jug and lid in the water body twice.
2. Invert the jug and lower it into the water body to elbow depth.
3. Fill the jug by pointing its mouth in the direction the boat is traveling.
4. Bring the jug up, cap it, and keep it in the dark, covered with a dark towel or bag or stored in a cooler.

C. Measuring water clarity
1. Without wearing sunglasses, lower the Secchi disc into the water on the shaded side of the boat.
2. At the point when the disc first vanishes from sight, put the clothespin on the rope at the water line (rope should be vertical).
3. Glance to check the sun cover, haul in the disc, and count rope markings to read how many feet under water the disc was when it vanished from view.
4. Record this data and the appropriate sun code on the LAKEWATCH data sheet.

D. Measuring water depth
1. Lower the Secchi disc to the bottom.
2. At the point when the rope goes slack, put the clothespin on the rope at the water line (rope should be vertical).
3. Haul in the disc, and count rope markings.
4. Record this number on the LAKEWATCH data sheet.
5. Fill in the rest of the LAKEWATCH data sheet.

E. Repeat all above steps at remaining stations.
Put all nutrient bottles and data sheets in a Ziploc bag and freeze them immediately. Make a copy of your data sheet before you deliver your samples to the collection center (optional).
Filtering procedure:
A detailed description

Water from the gallon jugs is filtered to obtain samples of algae (microscopic plants). The water may also contain clay particles, stirred-up sediments and other substances, which will be filtered out too. The filters will be tested in the laboratory to determine how much chlorophyll (the green substance in plants) they contain.

Keep the jugs of water cool and protected from sunlight while the filtering equipment is assembled. Filter in a shady place.

**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 flask.

**Step 3:** Assemble the filter funnel. There are two types of filter funnels. The first one uses a magnet between the cup and the base. The second type of filter funnel screws together at the base and cup. The base for both types has a stopper on the end. Grasp the cup base by the rubber stopper and gently twist it downward into the mouth of the flask.

For the filter funnels that have a magnet between the cup and the base: Do not hold the cup base by the top part to twist it, because its delicate stem may snap. Always handle the cup base by the black rubber stopper.

**Step 4:** Using the forceps (tweezers), pick up one of the smaller filter papers. It is sometimes difficult to grasp just one filter paper, because they tend to stick together. Blowing gently along the forceps toward the filter papers will cause them to flutter apart. If two filters are used inadvertently, process them together as if they were one. You must use the small filter papers provided by the LAKEWATCH program. They are glass fibers woven together to trap particles out of the water. You cannot substitute anything for the small filter. If you do not have any filters you can pickup a new supply at your local collection center or you can call the LAKEWATCH office at 1-800-525-3928 so we can mail you more.

**Step 5:** Holding the filter paper with the forceps, place it in the center of the cup base with the ‘rough’ side upwards. This side looks similar to terry-cloth, while the ‘smooth’ side looks more like woven fabric or screening.

**Step 6:** To center the filter inside the rim of the cup base, nudge it from the side with the flat edge of the forceps. Never scoot the filter around by putting the pointed ends of the forceps on it. This might poke holes in the filter paper that could allow algae to pass through. If a filter paper is torn or dropped, discard it.
Step 7: Using tap water, rinse the filter cup. Rinse the cup every time water from a different jug is filtered.

Step 8: After rinsing the cup in tap water, place it on top of the cup base. The cup and base are either held together magnetically or screwed down onto the base to form a watertight seal.

Step 9: Shake the gallon jug that is about to be filtered. This is very important and very easy to forget. Some folks have written, “Shake Me” on their jugs as a reminder. Do whatever is necessary to jog your memory.

Shaking the jug evenly redistributes any algae that have settled to the bottom. The jug must be shaken even before the water is used for rinsing.

Step 10: Using the shaken water body water to rinse the measuring cylinder. To rinse, pour about a cup of water into it. 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 body water from the shaken jug into the measuring cylinder up to the anticipated measure line. The cylinder is calibrated in milliliters, which is abbreviated ‘mL.’ It is very important to keep track of how many milliliters are filtered. This information will be used to calculate the concentration of algae in the water body water.

Note that the line on the cylinder indicating a certain measurement is actually below the number, not beside it. For example, the 450-mL line is below where the number 450 is written on the cylinder.

Step 12: Use a pipette (dropper) to adjust the water level in the graduated cylinder. When water is measured, it will creep up the sides, forming a slightly u-shaped surface. When seen from the side at eye-level, this u-shaped surface is called the ‘meniscus.’ To measure volume accurately, adjust the water level so that the bottom of the meniscus rests on top of the target line on the cylinder. To most people, this alignment looks as if the graduated cylinder is slightly overfilled. Squeeze the pipette dry before using it for the next station.

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 are a lot of algae in the water body, only a small volume of water may be necessary. On the other hand, if there are little algae in the water body that month, a greater volume may be needed. Do not filter more than 3000 mL even if that amount doesn’t produce a noticeable color change.

On some water bodies, the filter may clog before it produces a noticeable color change. Clay and some kinds of slimy algae can quickly clog a filter. To judge how much water to filter, watch the flow of water through the filter. When the flow decreases noticeably or the pump becomes very hard to work, don’t attempt to filter any more water.

If the filter clogs and the water remaining in the filter cup cannot be pumped through, pour out all the water; reassemble the filter apparatus with a clean filter and start over using less water. For example, if 300 mL of water clogged the filter before all the water could flow through, start over using only 200 mL the second time.

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 the filter doesn’t become clogged, check for a noticeable color change. If there is not enough color, 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. If so, add more water in smaller increments (50 to 100 mL), rather than trying to pump a larger volume through. Keep track of the total amount of water filtered.

Step 13: To retrieve the filter paper, either gently tip the empty cup to one side or unscrew the cup so it comes up off the filter paper and base. The filter paper should remain on the cup base. Sometimes the filter paper will stick inside the bottom of the cup. If this happens put a hand under the bottom of the cup to propel the filter paper out. Alternatively, the edge of the filter paper can be carefully loosened and peeled off gently with the forceps.
If the forceps accidentally touch the algae that have accumulated on the filter paper, algae will come off on the forceps and the amount left on the filter paper will not be the proper amount. Any filter paper on which the algae has been touched by fingers, forceps or any other object must be discarded and the filter process for that station must be started over.

**Step 14:** Assuming the cup comes off the base properly and leaves the filter paper 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 paper up off the cup base.

**Step 15:** To enclose and protect the algae, fold the filter paper exactly in half—with the algae side inside. You can touch the back of the filter paper with your fingers. **Do not touch the algae during the folding.** No algae should be peeking out along the edge of the folded filter paper. If the forceps tears off a small piece of filter paper, just encase it inside the folded filter paper and continue processing it.

**Step 16:** Put the folded sample on a paper towel. 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 17:** Prepare an envelope by folding one of the larger filter papers in half. It can be handled with your fingers. Using pencil only (NEVER use any kind of marker or ink to write on the envelopes. The ink might bleed through onto the sample and ruin it), fill in the blanks on the label on the large filter paper:

- Water Body name
- County name
- Month-day-year
- Station number
- Volume filtered

**Example:**

- Water Body: Little Weston
- County: Polk
- Date: 3-26-01
- Station: 3
- Amount Filtered: 600 mL

Always double-check your label. Be sure you have filled out all the required information.

**Step 18:** Tuck the folded sample inside its envelope.

**Step 19:** 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 20:** Put the algae 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. Gently roll the jar to distribute the crystals around the filter papers. Do not shake the jar.

**Step 21:** Store the desiccants jar in the freezer. If the blue crystals turn pink, it indicates that the crystals are saturated with water and not absorbing moisture effectively. Inadequate blotting of the algae samples most likely causes saturation of the desiccant. If your desiccant is turning pink refer to Appendix D: how to refresh your desiccant on page 20.

**Step 22:** Repeat all steps for the remaining jugs of water and put all the filter papers into the bottle of desiccant. Store in the freezer.

**Step 23:** Rinse the equipment with tap water and let it air dry.

**Step 24:** Check the number of bottles, filters and paper clips to assure there is an adequate supply for next month’s sampling.

**Step 25:** Deliver your water bottles, data sheet, and desiccant bottle to your local collection center.

**Step 26:** Pick up new supplies at your local collection center or call the LAKEWATCH office at 1-800-525-3928.
Filtering procedure:  
A summary

A. Assemble the filtering apparatus (out of the sunlight) by inserting the filter base into the flask.

B. Using forceps, center a small filter (rough side up) on the cup base.

C. Using tap water, rinse the filter cup and set or screw it on the base.

D. Shake the jug of water and use some of it to rinse the measuring cylinder. Repeat this rinse for each jug as you prepare to filter from it.

E. Measure water from the jug into the graduated cylinder.

F. 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.

G. After pumping the cup dry, tip or unscrew the cup off the base.

H. Using the forceps to grip the white part of the filter paper, lift it off the cup base.

I. Being careful not to touch the algae, fold the filter in half, algae side in to enclose the algae and blot the small filter thoroughly on a paper towel.

J. Using a pencil, label a large filter paper with
   - Water body name
   - County
   - Station number
   - Month-day-year
   - Amount of water filtered (mL)

K. Fold the large paper filter in half, tuck the small filter inside and fasten with a plastic-coated metal paper clip.

L. Repeat all steps for the remaining jugs of water and put all the filters into the bottle of desiccant. Store in the freezer.

M. Rinse equipment with tap water, let air dry and check to see if there are enough supplies for next month—GOOD WORK!
## Sampling and filtering checklist

### Boat checklist

1. Life Jacket  
2. Sample bottles/one per station, in a Ziploc bag  
3. Waterproof marker*  
4. Chlorophyll jugs/one per station  
5. Dark colored towel, black trash bag, or ice cooler*  
6. Data sheet with pencil  
7. Secchi disc with clothespin  
8. Map of station locations  
9. Laminated reference card  

(*furnished by the volunteer)

### Sampling kit inventory

1. Secchi disc with clothespin  
2. 1000 mL filter flask  
3. Hand pump with tubing  
4. Filter funnel cup  
5. Cup base  
6. Forceps (tweezers)  
7. Pipette  
8. Graduated cylinder  
9. Desiccant bottle  
10. 250 mL sample bottles for inland sites and 500 mL sample bottles for saline sites  
11. One half-gallon Chlorophyll jugs/one per station  
12. Small filters: 47 mm type A/E glass fiber filters  
13. Large filters: 7 cm paper filters  
14. Plastic coated paper clips  
15. Data sheets  
16. Florida LAKEWATCH instruction booklet  
17. Laminated reference card
Frequently asked questions

What do I deliver to the collection center?
Deliver three things: (1) Ziploc bag containing frozen bottles of water; (2) jar of desiccant containing algae filters; and (3) data sheets. Make copies of your data sheets for your future reference.

How long can I keep my samples in my freezer?
You should take your samples to the Gainesville laboratory or to the nearest collection center when it is convenient for you; within a three-month period from the time you take your sample. Some collection centers are picked up monthly, some every two months, and some only quarterly. To find out your collection center pick-up schedule please call the LAKEWATCH office.

Where can I get supplies?
When delivering samples, you can always pick up any supplies you need. You can always pick up replacement bottles, data sheets and a bottle of desiccant. You may also need more filters and paper clips. If you have any difficulty getting supplies, call the LAKEWATCH office.

If I run out of filters, can I use coffee filters or some other kind?
No, there is no substitute for the algae filters (the smaller filters). They are made of glass fibers, not paper, and are specially designed for chemical analysis.

If I have questions, whom do I call?
Call the LAKEWATCH office at 1-800-LAKEWAT (525-3928), or 352-392-4817. Or you can contact us via e-mail. Our e-mail address is fl-lakewatch@ufl.edu.

Is it important to label each station with the same station numbers?
Yes, it is extremely important that, once located, the stations are referred to by their correct number. For example Station 1 is always labeled Station 1, never Station 2 or 3.

How often will I be getting results?
After you have accumulated data for about a year, you will receive a detailed annual report. In this report, we present summary data collected on individual systems that have been part of the LAKEWATCH program. This summary is from the whole period of record for individual systems. The first part of this summary will average the long-term mean nutrient concentrations. The second part of the summary will examine for any long-term trends that may be occurring in the system.

If there is a fish kill, what should I do?
You can report a fish kill, diseased fish, or fish with other abnormalities directly to the Fish and Wildlife Health Group at the Fish and Wildlife Conservation Commission’s (FWC) Fish and Wildlife Research Institute in St. Petersburg. Call: 1-800-636-0511.

My algae filter did not fold exactly in half and some of the algae are showing, like an algae ‘grin’ along the edge. Is this okay?
No. All the algae must be enclosed in the folded smaller filter; otherwise the exposed algae will rub off onto the larger filter into which it is tucked. If the algae touch anything other than the small filter, the measurement will be invalid.

Can I take water in my chlorophyll jug and pour it into the smaller bottles?
No, the small bottles are specially cleaned and the jug is not. If you pour water from the jugs into the bottles, the jug will contaminate the water. Also, you used special collection techniques when you filled the bottle, which are designed to prevent contamination from your body.
You do not take these precautions when you collect water in your gallon jugs.

The crystals in my desiccant bottle are changing color. What is the problem? The blue crystals in your desiccant bottle will change to pink when they become saturated with moisture. Refer to Appendix D on page 20 to learn what to do about it. The probable cause of your problem is that either you are putting too many samples in one bottle or you are not blotting each sample as dry as possible before you put it in the bottle.

What is the most common mistake made while collecting water samples? Usually people forget to rinse their bottles and jugs in the water body before they collect their samples.

What are the most common mistakes made while doing the filtering? Volunteers sometimes forget to write how much water they filtered. If the amount is not recorded, the concentration of algae in the water cannot be calculated. Also, sometimes people forget that they should not use a pen or marker to write on their filter. The ink bleeds into the sample and ruins it. Please only use a pencil to fill in the necessary information on the large filter. Of course, we never know how many volunteers forget to shake their jugs of water before they begin the filtering procedure.

My graduated cylinder seems to be getting dirty. Can I clean it? Yes, simply soak it in hot soapy water. Rinse it thoroughly. Never scrub it with a brush or scrubber. Never put it in your dishwasher.

I pump and I pump, but the water doesn’t seem to go down in my filter cup. What can I do? You shouldn’t have to ‘pump till you slump.’ We have found that a small percentage of our hand pumps break down. Test yours by pulling off the plastic tubing and placing your thumb over the open end of the tubing. Pump the hand pump. Remove your thumb. If there was not noticeable suction, then your hand pump is broken. If your pump is broken, call the LAKEWATCH office. A new one can be sent out to you. Spare replacement pumps are sometimes stocked at collection centers. Please return your broken pump because sometimes the manufacturer will replace it or we can scavenge them for parts. One possible reason for breakage is that people forget to empty their flask. When it becomes filled with more than 1000 mL of water, water will be sucked down through the plastic tubing and will be spit out through the pump, damaging the mechanism. If you find that your pump is okay, check to see if the rubber stopper is fitted tightly into the mouth of your flask. If it is and there is still a problem, your water may contain clay or other substances that clog the filter easily. In this case, pump only as much water as you can in about five minutes. Remember, you have to pump your cup dry, so don’t fill it very full to begin with.

Can I train other people on my water body to take samples? No. Only a designated trainer can certify the LAKEWATCH samplers. In this way we know that every certified sampler has been passed through the same training procedure. It is a quality control provision. We will be glad to train as many folks as are interested; just let us know.

Can I come visit the laboratory in Gainesville? Yes, we would be glad to have you visit between 8:30 am and 4:30 pm on weekdays. Maps are available on the LAKEWATCH website or you can call the LAKEWATCH office for directions.
Appendix A

How to use navigational bearing lines

If you do not have a Global Positioning System (GPS) to get to the location of each station each month (the preferred method), you can use the technique of navigational bearing lines. The use of navigational bearing lines is a simple technique to permit you to return to the same location in your water body every time you sample there.

To master this technique, you merely have to learn to line up two objects on the shoreline so that they appear to be one behind the other. For example, in the picture to the right, the pine tree trunk is lined up exactly with the white chimney. Do you see them?

Notice that if the observer moved to the left or the right, the trunk would not line up in front of the chimney any more.

In the picture to the left below, the utility pole is in front of the building but is not lined up with the corner. In the picture to the right below, the utility pole is lined up with the edge of the building. Can you see the alignment? By just moving your location to the right the two objects (corner of the building and the utility pole) are in alignment.

Take a look at this next one. Do you see the small post lined up with the middle of the ramp/walkway? By moving to the left the small post is now lined up with the right railing of the ramp/walkway.

By changing your position in your water body, you can line up on practically any two objects you want. You can use fence posts, dock posts, trees, antennas, chimneys, doorways, roof peaks, power poles, bird houses, flag poles, windows—any two objects, just so one is closer to the water body than the other. Of course you should use permanently situated objects, not sailboat masts, for example.

Once you have mastered the technique of lining up two objects, you are ready to use it to navigate to your station location.
At station 1 in your water body, examine the shoreline and find two objects you can line up with each other. The first time you do this you may have to shift your boat position a little so that readily identifiable objects actually align with one another. Once you spot two objects that line up one behind the other, you are located on an imaginary line that would connect these two objects. The picture below shows a top view of the line you would be on by aligning a chimney with a palm tree. This is your first bearing line. The problem is that you could be anywhere along this line.

To narrow down your location, examine your shoreline that is at a right angle (90 degrees) from your first bearing line. Again, find two objects that appear to line up with one another. You may have to shift the boat around a bit.

The alignment of these second two objects will form a second bearing line that will intersect the first one at a unique point. Look at the picture below, which shows a top view of how a second bearing line (formed by aligning an antenna with a dock post) will intersect your first bearing line.

Notice that if you drift a few feet, your chosen objects do not appear to line up with each other anymore. That’s good. If you drift off station and your chosen objects still seems to be aligned with each other, choose other objects (the ones you have chosen may be too close together or may be actually touching each other).

Write down a description of the objects you are lining up to define bearing lines. You will use these same bearing lines month after month. Your description should contain enough detail about each object so that you can find the same one every time and so that the description fits one object uniquely.

**A poor example (the wrong way)**

Station 1: flagpole with dock pine with culvert

Station 2: antenna with tree fence

Station 3: sidewalk with door pole with tower

**A good example (the right way)**

Station 1: (a) On north shore, align the Smith’s flagpole with the right front dock post of their dock  
(b) On the west shore, align the tallest pine tree with the stormwater culvert

Station 2: (a) On the north shore, align the TV antenna on the two story grey house with the palm tree closest to their dock.  
(b) On the east shore, align the fence posts on the chain-link fence (to the right of the yellow stucco house) with each other.

Station 3: (a) On the southwest shore, align the lakeshore end of the sidewalk with the front door of the A-frame house.  
(b) On the northwest shore, align the street sign pole with the middle radio tower on the horizon.

Notice that each bearing line utilizes two objects, and that each station must have two bearing lines.

It should be mentioned that many folks have developed a habit of marking spots on a water body by getting in between two objects on the shore. Do not use this technique, because it is not accurate. Using bearing lines may be new to you, but you will get reliable results once you master it.
Appendix B

Additional LAKEWATCH volunteer opportunities.

Angler Diaries

If you, a friend or a neighbor fishes the water body that you are sampling for water chemistry, you may want to participate in the angler fish diary program through Florida LAKEWATCH. Long-term fish data collected on individual water bodies through the use of fishing diaries can be used in a similar way as the LAKEWATCH water chemistry data; it gives us hard numbers to use in identifying patterns or trends that may be occurring in your water body’s fish populations. For example, these data can yield trend analyses of catch per unit effort (number of fish caught per unit of time). If the catch per unit effort decreases significantly over time, this could suggest a problem with the fish population that needs to be looked at more intensely. Additionally if catch per unit effort remains constant through time then the water body and fish populations are probably fine. If diaries are kept on many water bodies, data will be available for LAKEWATCH personnel to examine relationships among other environmental data (like the amount of algae or surface area) and fishing data.

The LAKEWATCH fishing diaries record information from 10 trips or fishing events. It has been designed so that it can easily fit in your tackle box or boat’s dry storage compartment. There is even a convenient ruler that can be stuck onto a cooler or an area on your boat to measure each fish caught.

If you are interested in participating in the LAKEWATCH angler diary program, please call the Florida LAKEWATCH office and we will mail you an angler diary.
Aquatic Bird Survey

Since the inception of Florida LAKEWATCH, there has been a desire to survey bird use of Florida’s water bodies. One LAKEWATCH volunteer collected monthly bird counts for five years when he went out to sample water chemistry. He brought the data to the LAKEWATCH program and it led to a publication in the Journal of Lake and Reservoir Management. The data were used to show that volunteer bird monitoring efforts could provide valuable information on the long-term status of Florida’s aquatic bird populations. Similar sampling protocol was developed and is now being offered to anyone interested in monitoring the monthly occurrence of bird use on a water body. The objective of the Florida LAKEWATCH Aquatic Bird Survey is to establish a standardized, statewide, long-term monitoring program to examine seasonal and yearly trends in Florida’s aquatic birds. This data will offer insights into the effects of shoreline habitat, water chemistry, and broad-scale climatic factors on the foraging, nesting, and roosting of aquatic birds.

A considerable number of bird species are known to utilize water bodies, but few studies have directly quantified their numbers or examined long-term trends in diversity and abundance. As Florida’s wetlands continue to be altered or destroyed, the importance of lake habitat to aquatic bird communities needs to be documented. Monitoring the distribution and abundance of birds associated with Florida water bodies will help us determine which bird species utilize Florida water bodies and develop future management strategies. If you are interested in participating in the Florida LAKEWATCH Aquatic Bird Survey, please call the Florida LAKEWATCH office and we will mail you an aquatic bird survey.
Appendix C

Florida LAKEWATCH Datasheets.

Florida LAKEWATCH Freshwater Data Sheet

Waterbody Name: ___________________________ County: ___________________________

Sampler: ___________________________ Phone: ( ) ___________________________ Sampling Date: ___________________________

Yes___ No___: Surface Water Collected for Total Phosphorus and Total Nitrogen.
Yes___ No___: Surface Water Collected for Chlorophyll and Filtered Within 48 Hours.
Yes___ No___: Secchi Depth Reading Taken

Secchi Disc Measurements:

- For Secchi depth and water depth measurements, please indicate the number of feet and then estimate and circle the appropriate fraction, if needed.
- If your disc is visible on the bottom write B, if your disc disappears in the weeds write W, in the vanishing point column and the depth at which your disc disappears.

<table>
<thead>
<tr>
<th>Vanishing Point</th>
<th>Sun Code Number</th>
<th>Sun Code Key</th>
<th>Water Depth</th>
<th>Sampling Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sta 1</td>
<td>ft. 1/4 1/2 3/4</td>
<td>1 = full sun</td>
<td>ft. 1/4 1/2 3/4</td>
<td></td>
</tr>
<tr>
<td>Sta 2</td>
<td>ft. 1/4 1/2 3/4</td>
<td>2 = haze over sun</td>
<td>ft. 1/4 1/2 3/4</td>
<td></td>
</tr>
<tr>
<td>Sta 3</td>
<td>ft. 1/4 1/2 3/4</td>
<td>3 = thin cloud</td>
<td>ft. 1/4 1/2 3/4</td>
<td></td>
</tr>
<tr>
<td>Sta 4</td>
<td>ft. 1/4 1/2 3/4</td>
<td>4 = medium cloud cover</td>
<td>ft. 1/4 1/2 3/4</td>
<td></td>
</tr>
<tr>
<td>Sta 5</td>
<td>ft. 1/4 1/2 3/4</td>
<td>5 = heavy cloud cover</td>
<td>ft. 1/4 1/2 3/4</td>
<td></td>
</tr>
</tbody>
</table>

Date and Time of Chlorophyll Filtration:

<table>
<thead>
<tr>
<th>Station</th>
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DESCRIBE any unique occurrences since your last sampling date, either in the lake or on the local watershed:

If you wish to record lake levels of your lake, please fill in this last section.

Lake Level Measurements:
Pleas circle or describe the type of gauge located in the lake and then record the lake level.

Type of Staff Gauge: WMD / City / LAWA / USGS / Other (Please describe):

Lake level: __________________ Rain (in.) since last report __________________

Call LAKEWATCH (1-800-LAKEWAT) if you have any questions on how to get started.
Florida LAKEWATCH Saline Data Sheet

Waterbody Name: ___________________________ County: ___________________________
Sampler: ___________________________ Phone: ( ) ___________________________ Sampling Date: _________

Yes ___ No ___: Surface Water Collected for Total Phosphorus and Total Nitrogen.
Yes ___ No ___: Surface Water Collected for Chlorophyll and Filtered Within 48 Hours.
Yes ___ No ___: Secchi Depth Reading Taken.

Secchi Disc Measurements:

- For Secchi depth and water depth measurements, please indicate the number of feet and then estimate and circle the appropriate fraction, if needed.
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<td>ft. 1/4 1/2 3/4</td>
<td></td>
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<tr>
<td>Sta 6 ft. 1/4</td>
<td>1/4 1/2 3/4</td>
<td></td>
<td>ft. 1/4 1/2 3/4</td>
<td></td>
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<tr>
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<td></td>
<td>ft. 1/4 1/2 3/4</td>
<td></td>
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<tr>
<td>Sta 8 ft. 1/4</td>
<td>1/4 1/2 3/4</td>
<td></td>
<td>ft. 1/4 1/2 3/4</td>
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<tr>
<td>Sta 9 ft. 1/4</td>
<td>1/4 1/2 3/4</td>
<td></td>
<td>ft. 1/4 1/2 3/4</td>
<td></td>
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<tr>
<td>Sta 10 ft. 1/4</td>
<td>1/4 1/2 3/4</td>
<td></td>
<td>ft. 1/4 1/2 3/4</td>
<td></td>
</tr>
<tr>
<td>Sta 11 ft. 1/4</td>
<td>1/4 1/2 3/4</td>
<td></td>
<td>ft. 1/4 1/2 3/4</td>
<td></td>
</tr>
<tr>
<td>Sta 12 ft. 1/4</td>
<td>1/4 1/2 3/4</td>
<td></td>
<td>ft. 1/4 1/2 3/4</td>
<td></td>
</tr>
<tr>
<td>Sta 13 ft. 1/4</td>
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DESCRIBE any unique occurrences since your last your sampling date, either in the coastal waters or on the local watershed, on the back of this data sheet.

Call LAKEWATCH (1-800-LAKEWAT) if you have any questions on how to get started.
Appendix D

How to refresh desiccant

Florida LAKEWATCH volunteers put their algae filters into plastic bottles containing blue and white crystals. These crystals are desiccant (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:

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.
2. Pour the crystals out of the plastic desiccant bottle into an ovenproof glass container.
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. It WILL melt, even in a microwave. If you choose to use a microwave to dry out the crystals, a paper plate works well to hold the crystals.
4. Allow the crystals to cool.
5. Pour the cooled crystals back into the plastic bottle. The algae filter samples can now be returned to the desiccant bottle.

Remember to store the desiccant bottle in the freezer whenever it contains algae samples.
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