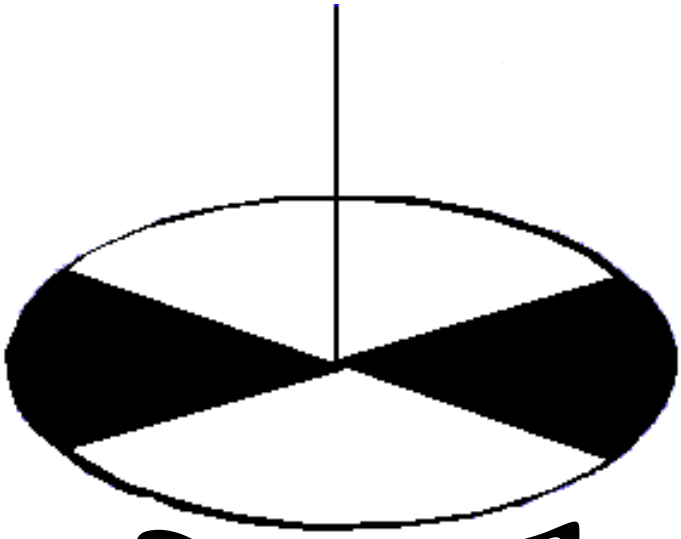

CSLAP Sampling Protocol

New York Citizens Statewide Lake Assessment Program

PHYSICAL AND CHEMICAL CSLAP SAMPLING

Updated for 2018

Questions? Call Nancy Mueller at 800-796-3652
or Stephanie June at 518-402-8179

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

NYSFOLA

New York State Federation of Lake Associations

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Introduction and Contact Information

The New York Citizens Statewide Lake Assessment Program (CSLAP) is a cooperative effort between the New York State Department of Environmental Conservation (NYSDEC) and the New York Federation of Lake Associations, Inc. (NYSFOLA). The goal of CSLAP is to implement scientific research and educational outreach using volunteers to collect information and samples on a representative sample of New York State's 7500 lakes, ponds, and reservoirs. Volunteer monitors collect information every two weeks during the summer during a total of eight sampling sessions. Information collected includes physical and chemical parameters and the perceptions of lake users. In addition, the program provides options for gathering biological information. Volunteers perform some processing on lake samples, freeze them overnight, and then send the samples to qualified NYS labs for analysis.

This program began in 1986 with 25 lakes around the state. Over 200 NYS lakes have participated in CSLAP over the years. Several states have implemented similar programs, and the comparable data, lake assessments and protocols provide the capability to compare some of the results nationally. This stability in labs and sampling protocol enable historical comparisons by lake and within New York State.

To obtain the data necessary to provide an accurate assessment of the water quality of any of the state's lakes, and to allow trends to be determined from data collected over time, it is imperative that water samples are collected **accurately** and **consistently**. This involves commitment from volunteers and an adherence to standard procedures. This protocol documents those procedures and supplements volunteer training. We hope this manual is clear. However, if you have **questions**, please contact Nancy Mueller at nysfolanancy@verizon.net or 800 –796-3652, or Stephanie June at stephanie.june@dec.ny.gov or 518-402-8179. Also, instructional videos are available at http://www.dec.ny.gov/chemical/81849.html

Becoming a CSLAP volunteer or a CSLAP lake

If you are reading this manual, it is likely that your lake association is participating in CSLAP. If you don't know if your lake is sampled in the program, or if you want your lake association to join the program, please contact Nancy Mueller at nysfolanancy@verizon.net Participation is limited to lake associations that are members of NYSFOLA. Financial and lab capacity may limit the number of lake participants each year, so your lake association may be put on a waiting list. However, all lake associations can submit harmful algal bloom samples. All lake associations should be prepared to make

a five-year commitment to the program. More information is available on the NYSFOLA website www.nysfola.org

New volunteers must attend a training session in order to learn how to operate the equipment, process the samples, and fill out the required paperwork. Volunteer training sessions are always held at the annual NYSFOLA conference. If volunteers are unable to attend the conference, contact Nancy Mueller and perhaps a separate training session can be scheduled

CSLAP volunteers sample for physical and chemical parameters, and they can perform plant surveys, invasive species surveys, shoreline surveys, boat surveys, angler surveys, lake level measurements, and ice-on, ice-off surveys. The longest running and most frequently used sampling surveys are of physical and chemical conditions, and that protocol is provided here. Other sampling protocols are available on the NYSFOLA website, www.nysfola.org

Planning to Sample

The Most Important Equipment – Volunteers!

To minimize the potential for errors, the same people should perform the sampling procedure during each sampling session. This program calls for two primary and at least two secondary volunteers—the latter are backups in case the primary volunteers cannot conduct a sampling session. The primary volunteers are expected to perform the sampling procedures every sampling session, and the secondary volunteers are "on-call" to fill in for the primary volunteers.

All volunteers must obtain official training. Ideally, the secondary volunteers should participate in occasional sampling sessions so they know the sampling location and can review the sampling techniques. This ensures consistency if the primary volunteer has to miss a sampling session.

A volunteer should never go on the lake alone in a boat. At least two volunteer monitors, with the appropriate boating safety gear, should be present at each sampling session.

Seasons and Sessions

A sampling season is one year of sampling, for example, the summer of 2018. A session is a single sampling event. We expect that there will be eight sampling sessions during the 2018 CSLAP season. Shoreline samples of suspected Harmful Algal Blooms (HABs) can be submitted at the same time as a CSLAP sampling session or at any time that a bloom is observed.

Sampling Dates and Times

Volunteers can select the sampling dates and times that work best for them, within certain limits. The most important consideration is to choose a day and a time that can be consistent from one sampling session to the next. Therefore, the day and time for sampling should be chosen to fit the schedule of the sampling volunteers. Of course, safety on the water comes first. If a sampling session is scheduled during a heavy storm or very windy conditions, the sampling volunteers should reschedule that sampling session. The sampling session can be conducted earlier (if the storm can be anticipated) or the sampling session should be postponed to a later time or a subsequent day. Resume the regular schedule for the next sampling session.

Lake data and samples are taken every two weeks. Samples must be frozen overnight before they are shipped to the laboratory (with the exception of a few bottles, as described below), and the lab must receive them on a timely basis to assure accuracy. Please try to schedule your **sampling session on Saturday through Tuesday**, so you can freeze the samples overnight and then **ship them on Monday, Tuesday, or Wednesday**. Shipping any later than Wednesday may mean your valuable samples will sit in a warehouse over the weekend and will not be frozen upon arrival at the lab. That could make the laboratory results unreliable. However, consistency is the most important consideration. If the only convenient day for volunteers to sample falls on a Wednesday through Friday, take the samples then and keep them frozen until shipment on Monday.

Plan your sampling schedule in advance to anticipate conflicts. Of course, plans may change, and weather may force rescheduling. In that case, still try to sample on Saturday, Sunday, Monday, or Tuesday. Volunteers should also **keep holidays in mind**, to assure that sample shipment won't be delayed when the laboratory or shipping company is not open for business.

The ideal **time** to sample on your scheduled day is between 8:00 AM and noon, when the lake is usually calm and there is enough light to perform the tests, but consistency and safety are important. Choose a time you can generally repeat, but don't go out on a rough lake or in stormy weather just to stick to a sampling schedule. Since water quality characteristics fluctuate slightly with the time of the day, a regular sampling time will improve the ability to compare readings during the season and year to year.

Sampling should occur between May and September. Volunteers should not collect or ship samples until the package of sampling materials arrives from NYSFOLA. No sampling session should take place before May 1. **No samples will be accepted if the session is after October 1.** All samples must be received by the lab no later than the first week in October.

Sampling Location

Take samples from the **deepest** spot on your lake, since that area tends to be most representative of water quality conditions throughout the lake. If your lake stratifies (as do most lakes deeper than about 20 feet), the deepest location also allows sampling of the cold deep waters. If you are not sure where the deepest area is, check bathymetry maps (available for some lakes on the NYSDEC website at http://www.dec.ny.gov/outdoor/9920.html), ask local anglers, or use a fish finder to locate the spot. It's very important to **return to this location** to sample for every session. If permitted, mark the spot with a buoy (for example, a detergent bottle or a duck decoy tied to a cement block). If you have a GPS unit, take a GPS reading and return to that point each sampling session. If you can't use a buoy or a GPS, triangulate the sampling spot using permanent landmarks on the shores. From this deepest spot, find landmarks that line up at 0, 90, 180, and 270 degrees: imaginary lines from the four landmarks will cross at the deepest location. Remember and use those landmarks to find the sampling location. You will verify the location depth during the first part of the sampling session to be certain that you have returned to the proper location.

Sampling Equipment

NYSFOLA loans most of the sampling equipment to the lake association for use while the lake is in the CSLAP program. Sampling equipment includes equipment that you will use on lake and off the lake. If the equipment in your sampling kit does not match the equipment described below, please contact Nancy Mueller from NYSFOLA at nysfolanancy@verizon.net

On-lake equipment:

Thermometer. Used to take air and water temperatures. This thermometer is marked in **Celsius** degrees. (**°C**) and you should record it to the nearest degree. CSLAP does not use the Fahrenheit temperature scale, so you should expect to see different temperatures from what you hear in weather forecasts. Most readings should be between 6°C and 30°C.

Secchi disk and measuring tape. The Secchi disk is used to measure water clarity and sounding depth (total depth of the lake at the sampling location.) Most volunteers will have a Secchi disk attached to a measuring tape so that it is easy to read the depth of the Secchi disk in the water. For other

sampling kits, a measured line is attached to the disk without a winding reel. Secchi depth is measured in meters. If you have a measuring tape marked with feet on one site and meters on the other, use the **meter** side for measurements. You will record this measurement to the nearest 0.1 meter.

You will use the Secchi disk to measure the transparency of the water. Directions are in the on-lake procedures. If the tape attached to your Secchi disk is long enough, you can also lower the Secchi disk to the bottom to get the sounding depth (the depth of the water in the lake). In that case, the Secchi disk is used just as a weight on the measuring tape. See pages 17 and 19 for more information.

Kemmerer bottle. The Kemmerer is used to collect water from a specified depth in the lake. Some Kemmerer bottles are clear plastic, and others are white. This PVC or acrylic (plastic) bottle is attached to a line which is marked to measure the depth. Most lakes will be sampled at a depth of **1.5 meters**. If your lake is very shallow, you will be given an appropriate sampling depth at the training session. This sampling depth is called the "surface sample" even though it is 1.5 meters under the surface of the water. Do not skim water from the top of the lake!

Thermally stratified lakes—generally those deeper than 20 feet (6 meters) will also be sampled 1.5 meters above the bottom of the lake if the lake association opts for the deep sampling option.

The Kemmerer bottle is the most expensive piece of CSLAP equipment and must be treated with care. The Kemmerer should be stored open and dry. Hang it up between sessions. Never store the Kemmerer where it will be subject to extreme temperature changes. This will cause undue wear and tear on the gaskets and cause them to leak.

The Kemmerer bottle is attached to a rope that is marked in **meters** to allow easy measurement of the depth of the bottle in the water. Make sure that the rope is firmly attached to the Kemmerer bottle by checking the knot on the bottom of the bottle every time you take it on the lake.

There is a weight on the rope, called a "messenger". When the bottle is at the correct depth marked on the rope, the volunteer drops the messenger down the rope, and the bottle will close, getting water from that depth.

Collection bottles: All sampling kits have a large collapsable container with a spigot for storing the shallow water sample when it is collected using the Kemmerer.

Sampling kits for volunteers at stratified lakes that are taking deep samples will also have a collapsable collection bottle. This bottle should clearly marked for deep water samples. In the photo, the deep water bottle is marked with a D. Water that is collected in these bottles will be poured into sample bottles or processed on shore.

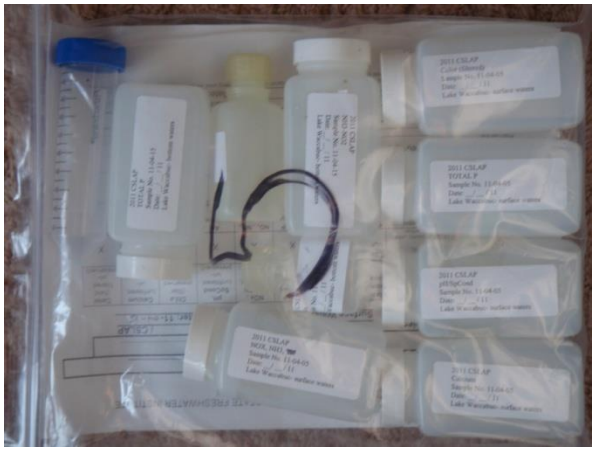
On shore equipment

CSLAP sampling volunteers will also receive equipment to use on shore for processing water samples. This equipment includes a filtering apparatus, a graduated cylinder, filters, tweezers (forceps), and a wash bottle. You will also get a small drop bottle containing magnesium carbonate ($MgCO_3$), a milky-like substance. The filtering apparatus consists of a vacuum pump (a squeeze handle), clear flexible tubing, and a connecting funnel on top, a collecting flask on the bottom, and a two-section centerpiece. The centerpiece will hold the filter. You will have to supply distilled water to use in the wash bottle. You can find distilled water (NOT spring water) at pharmacies and supermarkets.

Sample Bottles

Before each season, NYSFOLA will send to the CSLAP lake contact the sample bottles labeled with the lake name, sampling parameter (the test(s) that the lab will run on the bottle contents), and sampling session. Volunteer monitors should be prepared to add a few items, particularly aluminum foil and distilled water, to the equipment provided by the program. You will use aluminum foil to wrap the chlorophyll a vial, but you will NOT wrap the SUNY ESF HAB sample vial (which will also hold a filter). These steps are described in detail below. Distilled water is required to wash down the inside of the filter apparatus and to clean the equipment. Other items such as a clipboard with an attached pen will make sampling easier. Of course, to get to the sampling location at the deepest spot on the lake, volunteers have to provide a boat with life jackets and other safety equipment as required to comply with NYS Boating Regulations, and an anchor to prevent the boat from drifting during sampling.

Sampling bottles will come in a plastic bag that will look something like the picture below. The bag will be labeled with the number of the sampling session, and will contain labeled sample bottles along with important paperwork for the session.



Your bottles are bagged by sampling round (Bag 1 corresponds to sample session #1). Please use them in the correct order. If you find that you are missing a Chain of Custody Form or bottle from any given round, just make a note of that when you submit your samples. Do NOT use bottles or paperwork from different bags since they are coded for each round of sampling, and it will cause problems with the data. Before you ship, you will make sure the bottles that you ship correspond to the Chain of Custody Form that you send with them.

Please check and make sure you **use the sampling bags in order** during the season, so that #1 is used for the first sample, #2 for the second sample, and so forth. It is very important to make sure that the bottles match the paperwork. However, if you accidentally start filling #4 bottles before #3 bottles, continue with that set of bottles and paperwork. DO NOT MIX BOTTLES OR PAPERWORK from different sessions. If you do make this mistake, please indicate on the Sampling Record Form that bottles from the wrong sampling session were used, so that the lab can compensate.

Meet the Paperwork.

All of these forms will be in with each session bag. Completed forms should be sent with the samples.

The **CSLAP Field Observation - Lake Perception & Health and Safety** form is a two sided form that should be filled out by the lake monitors based upon what they see on the lake, and upon any information that they have received from other lake users. These should ALWAYS be completed before you do any Secchi disk readings to make sure the measurements don't influence your perception. There are no right or wrong answers on this form. See pages 11 and 12.

The **Sampling Record Form** is used during sampling to record the physical observations during the sample period, to record weather, and to document any conditions on the lake. See pages 13 and 24.

The **CSLAP Sample Site Algae Report** will help assess whether there is an algae bloom on the lake based on the appearance of the surface of the lake in open water at the sampling location. Complete this form during every sampling session, even if an algae bloom is not apparent. See pages 14 and 25.

The **Harmful Algae Bloom Shoreline Survey Form** is used to assess whether there is an algae bloom on the lake based on conditions along the shore. Complete this form during every sampling session, even if an algae bloom is not apparent. Send this sheet in with the CSLAP water sample and paperwork. If you collect a shoreline bloom sample during the CSLAP session, you can refrigerate it and include it in the CSLAP cooler that you send to UFI. If you take a bloom sample at a different time, use the small cooler to send the bloom sample and this sheet to UFI. This form has a map of each lake, and you should indicate the location and type of bloom on the form. See pages 15, 25, and 26. The open water and the shoreline forms are used together to help assess the algae conditions on the lake.

The **Chain of Custody / Request for Analysis** form helps ensure quality control. It documents the samples that were collected, by whom, and when, where the sample bottles came from, and when these samples were delivered to the shipping company. This form is the laboratory record of the key information associated with the sample - the name of the lake, the sample ID, and the sample date. See page 16. A second, separate chain of custody form is included for the HABs red labeled bottle.

Online Data Entry Option

We encourage all volunteers to take advantage of the option to fill out these forms online. Your data will be in the system more quickly, and the online system will check for errors and omissions as you fill in the forms, so you can be sure that your lake's information is correct. You can print out the forms to send in with the samples. You can also get "in-season" reports to track how the clarity, temperature, and perception data compares with past sessions and past seasons. To try this out, contact help@CSLAPdata.org . Or you can go to the website https://cslapdata.org/ and click on the Contact US link in the upper left and a message will come to us.

CSLAP Field Observation Form - Lake Perception & Health and Safety

Lake Name_____ **Date** _____

CSLAP FIELD OBSERVATIONS FORM- LAKE PERCEPTION

(A) PLEASE CIRCLE THE ONE NUMBER THAT BEST DESCRIBES THE PHYSICAL CONDITION OF THE LAKE WATER TODAY:

1. Crystal clear water
2. Not quite crystal clear- a little algae visible
3. Definite algae greenness, yellowness, or browness apparent
4. High algae levels with limited clarity and/or mild odor apparent
5. Severely high algae levels with one or more of the following: massive floating scums or streaks on lake or washed up on shore, strong foul odor, fish kills

(B) PLEASE CIRCLE THE ONE NUMBER THAT BEST DESCRIBES THE AQUATIC PLANT POPULATIONS IN AREAS WHERE PEOPLE SWIM AND BOAT TODAY:

1. No plants visible from the lake surface
2. Some plants are visible underwater, but do not grow to the lake surface
3. Some plants grow to the lake surface
4. There is dense plant growth at the lake surface
5. Dense plant growth completely covers the lake surface except in the deepest areas

(C) PLEASE CIRCLE THE ONE NUMBER THAT BEST DESCRIBES YOUR OPINION OF THE SUITABILITY OF THE LAKE FOR RECREATIONAL ENJOYMENT TODAY:

1. Beautiful, could not be nicer
2. Very minor aesthetic problems- excellent for swimming, boating, and overall use
3. Swimming and aesthetic enjoyment slightly impaired
4. Desire to swim and enjoy the lake substantially reduced, although the lake can be used
5. Swimming and aesthetic enjoyment of the lake impossible

(D) PLEASE CIRCLE ALL NUMBERS THAT AFFECT YOUR OPINION OF RECREATIONAL USE OF THE LAKE TODAY:

0. No problems observed
1. Poor water clarity and/or water color, including turbid water
2. Excessive weed growth (circle all that apply: emergent plants, floating plants, submergent plants)
3. Too much algae and/or odor
4. The lake looks bad
5. Poor weather (windy, overcast, water too cold, etc.)
6. Litter, surface debris, other beached or floating material, including foam and pollen
7. Too many lake users (circle all that apply: boaters, swimmers, jet skiiers, other)
8. Other _____

TURN OVER FOR HEALTH AND SAFETY QUESTIONS

CSLAP Field Observation Form - Lake Perception & Health and Safety (Page 2)

Lake Name_____ **Date** _____

CSLAP FIELD OBSERVATIONS FORM- HEALTH AND SAFETY

(F) DO YOU OBSERVE OR HAVE YOU BEEN MADE AWARE OF ANY OF THE FOLLOWING PROBLEMS AT THIS TIME (PLEASE CIRCLE ALL THAT APPLY)?

0. None of the below
1. Complaints about taste or odor in the drinking water (if the lake is used for drinking)
2. Lake residents who use the lake for drinking or swimmers complaining of gastrointestinal (stomach) illness or animals showing signs of illness from drinking lake water
3. Swimmers complaining of itching or redness, particularly in the lower extremities (swimmers itch), or hay fever-like symptoms
4. Observations of algae blooms or other water discoloration (describe _____)
5. Dead fish (approximate number _____)
6. Unusual wildife occurrence (leeches, bryozoans, etc) or behavior (fish gasping for air at surface, etc.) (Describe _____)
7. Other _____

Lake location of these occurrences _____
_____

(G) DO YOU OBSERVE OR HAVE YOU BEEN MADE AWARE OF ANY OF THE FOLLOWING PROBLEMS SINCE YOUR LAST SAMPLING SESSION (PLEASE CIRCLE ALL THAT APPLY)?

0. None of the below
1. Complaints about taste or odor in the drinking water (if the lake is used for drinking)
2. Lake residents who use the lake for drinking or swimmers complaining of gastrointestinal (stomach) illness or animals showing signs of illness from drinking lake water
3. Swimmers complaining of itching or redness, particularly in the lower extremities (swimmers itch) or hay fever-like symptoms
4. Observations of algae blooms or other water discoloration (describe _____)
5. Dead fish (approximate number _____)
6. Unusual wildife occurrence (leeches, bryozoans, etc) or behavior (fish gasping for air at surface, etc.) (Describe _____)
7. Other _____

Lake location of these occurrences _____
_____
Date/Time of observation_____

TURN OVER FOR LAKE PERCEPTION QUESTIONS

Sampling Record

2018 CSLAP SAMPLING RECORD FORM

SECTION 1

LAKE NAME AND SITE # (IF APPLICABLE)	COUNTY	CSLAP ROUND #	DATE

SAMPLER(S)

_____(Sample Collection)

_____ (Secchi Readings)

NAMES OF OTHERS WHO ASSISTED TODAY: **(Please be sure to send a waiver form for every person)**

_____

_____

SOUNDING DEPTH (The total depth of the lake at your sampling location) _____ meters

SECTION 2 - SECCHI DISK

Reading (1) : Disk Lowered Until it Disappears _____ meters (on bottom?) YES NO

Reading (2): Disk Raised Until it Reappears _____ meters (on bottom?) YES NO

The Secchi readings should never be deeper than the Sounding Depth.

SECTION 3 - TIME & TEMPERATURE

TIME (Military Preferred)	AIR TEMPERATURE	WATER SAMPLING DEPTH:	WATER TEMPERATURE
AM ☐ PM ☐	°C	SURFACE SAMPLE _____meters	(surface) _____•C
		DEEP SAMPLE (if applicable) _____meters*	(deep) _____•C

SECTION 4—WEATHER

CURRENT WEATHER CONDITIONS:

WIND TODAY: CALM MODERATE WINDY

SKY TODAY: CLEAR PARTLY CLOUDY OVERCAST RAINY

WEATHER CONDITIONS OVER THE PAST WEEK:

WIND: CALM MODERATE WINDY

SKY: CLEAR PARTLY CLOUDY OVERCAST RAINY

What is the wind direction today? A. No wind B. Variable C. Indicate direction with arrow.

ANY UNUSUAL WEATHER CONDITIONS? (Major storms, record setting temperatures, etc. Please include date.) _____

_____

_____

_____

LAKE LEVEL (CIRCLE ONE) HIGH NORMAL LOW

Comments—Please Print Legibly

Please describe unusual water quality issues; invasive species observations; aquatic plant (or other) management activities taking place on the lake; We also encourage you to take a digital photograph of any unusual conditions and e-mail the photo(s) to fola@nysfola.org & scott.kishbaugh@dec.ny.gov or include a copy with your samples (in a separate plastic bag, please).

_____

_____

_____

_____

_____

_____

_____

_____

_____

*IS THERE A SULFUR ODOR IN YOUR DEEP SAMPLE (if applicable)? _____YES _____NO

Initials: _____ CHECK HERE IF PHOTO SENT ☐

CSLAP Sample Site Algae Report

CSLAP Sample Site Algae Report

Please describe algae conditions at the CSLAP sampling site. Fill in as many circles as apply. Submit one form for each session.

Lake Name: _____ County: _____
CSLAP Filter ID # _____ Date: _____
Description of bloom conditions at CSLAP site (if applicable)
_____
Sampler Name: _____

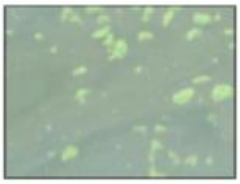
CSLAP Site Description

O A. Spilled paint appearance on surface

O B. Pea soup appearance within the water

O C. Streaks (usually green) on the water

O D. Green dots or clumps on/in the water (may be cyanobacteria)



O E. Bubbling scums on the lake surface (probably not cyanobacteria)

O F. Slight greenish or brownish tint to the water (probably not cyanobacteria)

O G. Duckweed or watermeal (not algae)

O H. Other:_____

O I. No evidence of bloom

Harmful Algal Bloom Shoreline Survey Form –

For shoreline bloom samples and to document shoreline search area and conditions whether or not a bloom is observed. Fill out this form for each sampling session. Submit it with the rest of your CSLAP session paperwork and samples.

Draw a line on the shore to indicate where you looked. Then mark the bloom and HAB sample areas.

Use this form for both HABs surveillance and sampling

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Name: Date: Time: Sample ID:

Percent of Shoreline Surveyed (circle one): <25% 25-50% 50-75% >75%

Description of Bloom:

Extent of Bloom (check one): ☐ No Bloom Present ☐ Small Localized (few properties) ☐ Large Localized (many properties) ☐ Widespread/lakewide

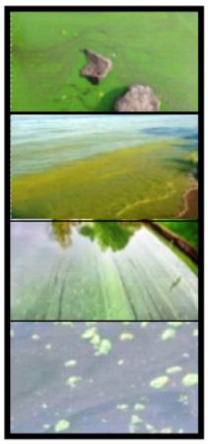
Additional Comments:

CSLAP - Anawanda Lake
Harmful Algal Bloom Shoreline Survey Form

1. Survey as much lakeshore as possible and indicate on the map where you looked.
2. If a bloom is present, collect sample at densest location.
3. Show location and size of bloom on map.
4. Mark an X where sample was collected.
5. Fill out sample information above, then send sample & form to ESF.
6. If no bloom is present, send form in sample box.

HABs

Collect a Sample



Do Not Collect a Sample

Not HABs

Chain of Custody / Request for Analysis Form

CHAIN OF CUSTODY/REQUEST FOR ANALYSIS - UPSTATE FRESHWATER INSTITUTE
224 Midler Park Dr., Syracuse, N.Y. 13214 (315) 431-4962
N.Y.S. ELAP ID# 11462

1. Sampling Date _____

2. Sampled by _____

Sampling Location/Project: Lake George – Basin Bay / CSLAP
Field ID Number Surface Water: 17-199.04-__ Bottom Water: 17-199.04-_____

Sample ID # (for lab use only)	3. Time	Sample container (# / type)	Exact sampling location	Matrix	Total P unfiltered 125ml bottle	NOx , NH_3 unfiltered 125ml bottle	TN unfilt. 60ml bottle	pH, SpCond unfiltered 125ml bottle	Chl.a filter w/ $MgCO_3$, large tube, white cap	Cl Unfilt. 250ml bottle	Ca Unfilt. 30ml bottle	Color field filtered, 125ml bottle	HAB color filter in small tube	Raw Water flat bottom tube, green cap
		1 125 ml plastic, filtered 3 125 ml plastic, unfilt. 1 60ml plastic, unfilt. (1 30 ml plastic, unfilt.) (1 250ml plastic, unfilt.) 2 large tubes, 1 w/filter 1 small tube w/filter	Lake surface	water	X	X	X	X	X			X	X	X
Sample ID # (for lab use only)	**3. Time**	**Sample container (# / type)**	**Exact sampling location**	**Matrix**	**Total P** unfiltered 125ml bottle	**NO_2, NH_3,** unfiltered 125ml bottle								
		2 125 ml plastic unfilt.	Lake bottom	water	X	X								

SAMPLING VOLUNTEERS- PROVIDE INFORMATION IN BOXES
1. Date, 2. Sampled By (Printed), 3. Time (Military Hours), 4. Sample Relinquished By (Signature)

Comments (FOR LAB USE ONLY): _____
_____

4. Sample relinquished by: Date: Time:

Sample bottles prepared by: _____ Date: _____ Time: _____
Received @ UFI laboratory signature: _____ Date: _____ Time: _____

When a container type is listed it is understood that proper preservation techniques and the appropriate containers are being used. Be advised that the field sampler is responsible for the care of the samples collected until they are transferred or dispatched properly

On-Lake Sampling

1. Use the equipment checklist (see page 41) and load everything you need into the boat. Make sure to take appropriate boating safety equipment with you.

2. Go to the sampling site that you have chosen -- the deepest spot on the lake.

    a. If you have a buoy or GPS setting, go to the sampling location. Otherwise, use your triangulation landmarks to ensure you are in the correct place.

    b. Anchor so you don't drift from the sampling spot.

    c. If you cannot use your usual sampling site location, report this information on the Sampling Record Form. (see below)

3. Field Observation Form - Lake Perception and Health and Safety Questionnaires

    a. Fill out both sides of the form with your observations of the lake today.

    b. The first question —Question A, describing the physical condition of the lake—refers to overall conditions of the lake, particularly in the open water away from the shoreline.

    c. The second question—Question B, describing the "aquatic plant populations"—refers to the overall conditions in places where people swim fish, and boat, or generally near the shoreline. Aquatic plant populations should be evaluated in areas where the plants are not actively managed, by hand pulling or matting or other actions, although if the entire lake is managed by a lakewide herbicide or drawdown or extensive hand pulling, this can be reflected in the assessment and should be noted on the form. This question refers to submersed plants, not the floating plants which grow on the surface.

    d. The third and fourth questions—Questions C and D—should include recreational assessments for both the shoreline and open water. On the Lake Perception form, note that for questions A, B, and C, you should circle only one answer, and for question D you can circle as many items as apply.

    e. The Health and Safety form on the back of the Lake Perception form—Questions F and G – has questions for what you observe today, and on the bottom half of the form you can report anything you have noticed or been told since the prior sampling session.

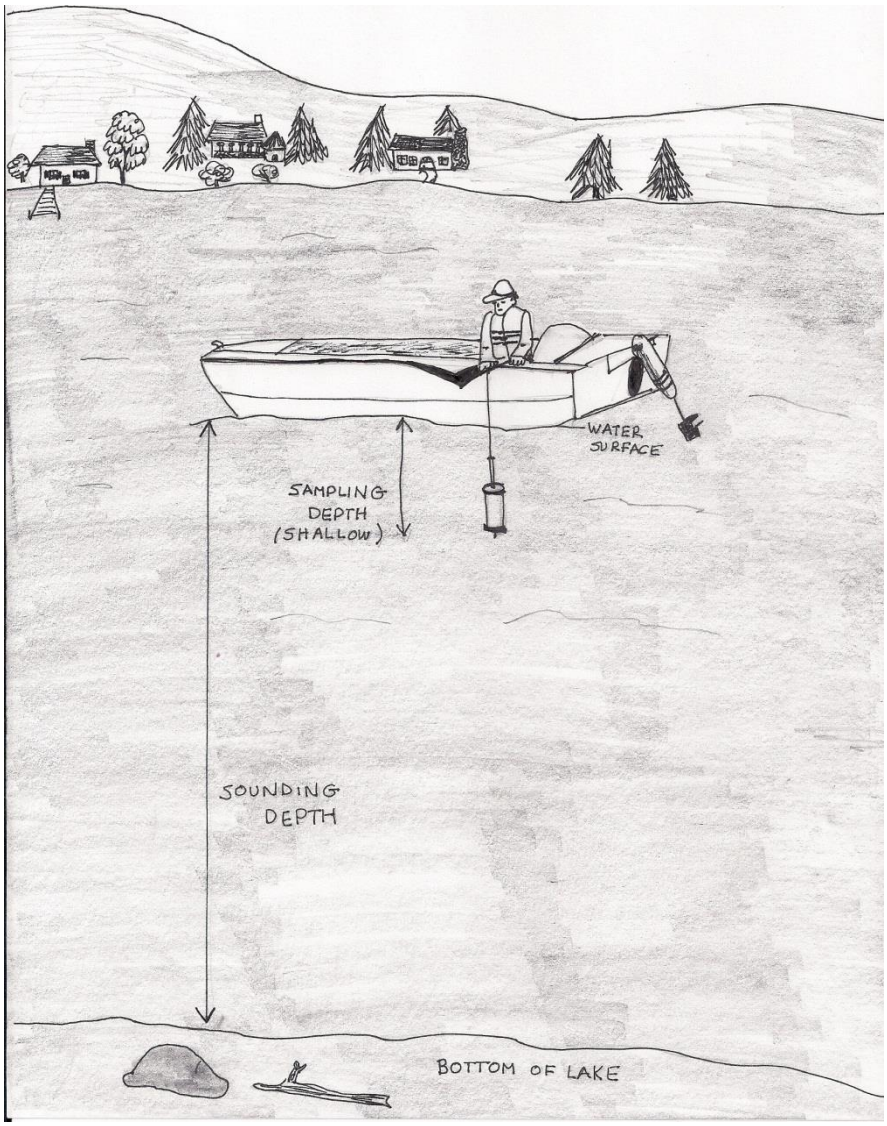
4. Sounding Depth. The Sounding Depth is the depth of the lake (water surface to bottom) of the lake at your sampling location. If your Secchi disk line is long enough, you can lower your Secchi disk to get the depth. Let the Secchi disk down until the tape goes slack. Then pull it gently until the slack goes out, put your fingers where the measuring tape enters the water, raise the tape and read it to the closest tenth of a meter where your fingers are on the tape. This is the

sounding depth – the depth to the bottom of the lake. Enter this depth on the Sampling Record Form in the space for sounding depth. If your lake is very deep, use a depth finder or fish finder, or try to estimate the depth. For example, it is better to write “about 30m” or “>15m” than to leave the space blank.

a. Check! Is this close to the depth you expect at your sampling spot? The acceptable amount of variation will change by lake, but in general, the sounding depth each week should not vary by more than 10-15%. If it’s not close enough, pull up the anchor and try to find the deepest spot again.

b. If your Secchi disk tape has both feet and meters, use the side measured in meters.

c. Record the depth to the closest tenth of a meter on the Sampling Record in in the space after **Sounding Depth**.



5. Sampling Record Form (Section 1)

    a. Fill out the lake name, county, session id (round #), and the date. If your lake samples multiple sites, include the site number and site name as well.

    b. Record volunteers and tasks. Be clear about who did the Secchi depth measurement and who collected the water, in case DEC or NYSFOLA needs to verify any information.

    c. Record the sounding depth (the depth to the bottom of the lake) to the nearest tenth of a meter.

6. Sounding and Secchi Depths (Section 2)

    a. Record the sounding depth in meters on the form.

    b. Take the secchi depth – a measure of water clarity. You will have two readings, one while lowering the disk until it disappears, and then again when it reappears while raising the disk.

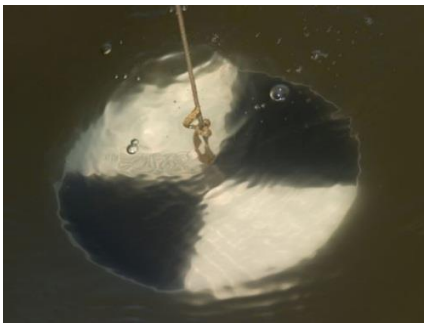
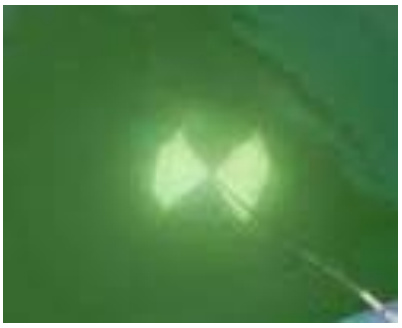
    c. Do not use dark glasses or polarizing lenses while observing the Secchi disk. While these might improve the reading in your lake, it reduces the accuracy of the comparison of your reading with previous measurements from your lake, or readings from other lakes.

    d. Slowly lower the disk into the water on the shady side of boat, watching it continually.

    e. When the disk completely disappears from sight, use the tape to measure the depth from the surface of the water. Record the depth to the nearest tenth of a meter as Secchi Reading 1. If the disk is on the bottom, circle YES, otherwise, circle NO.

    f. Let out an additional length of tape (about a meter) so that the disk won't reappear immediately. Then slowly raise the disk and measure when the disk appears again as you are pulling it up. Record the depth on the tape to the nearest tenth of a meter as Secchi Reading 2 on the sampling form, and again circle whether it is on the bottom.

    g. Secchi Reading 1 and Secchi Reading 2 may not be the same number, but neither should they be far apart. These readings should be within a meter of each other. You can repeat the procedure to double check, but only record one set of readings.

h. **Practicing Secchi disk measurements** can be very helpful and should improve the repeatability of our results. The Maine Volunteer Lake Monitoring Program has a website with a simulation used to certify Maine volunteers and indicates how close you come to the correct sighting. http://www.mainelakedata.org/recertify/disk.php To use the simulator, choose your lake type, press the "Take Reading" button, read the directions and click to start. Raise and lower the disc using the up and down arrow keys on your keyboard. When you reach what you think is the proper depth, press the measure button and then the submit button to check your reading against the correct answer. Practicing on the simulator can help you visualize what you will be doing and seeing on the lake. Note, however, that the Maine simulator only imitates measuring the Secchi disk as it goes down, and you will also take a reading as you pull the disk up.

7. Time and Temperature (Section 3)

a. Record the time of your sampling in military time, and also check AM or PM.

b. Record air temperature – Use the dial thermometer, and record the air temperature in C° to the nearest degree. Do not leave the thermometer in the sun or on a hot surface before you take your reading.

c. Record the depth of the surface sample, usually 1.5 m, and the water temperature. If you take a deep sample, usually it is 1.5 m off of the bottom, i.e. 1.5 meters less than the sounding depth. Record that water temperature as well.

8. Weather and comments (Section 4)

a. Weather – Record the current conditions and circle any weather conditions that lasted at least two days of the prior week. You may circle several choices. Note any unusual weather and add rainfall amounts if you have them. Indicate the direction that the wind is blowing on the compas symbol, or write calm or variable.

b. Comments section – add information about any change from the normal sampling location, unusual sightings, lake management activities, or anything else that may impact lake conditions. If in doubt, record it. It is easier to record events now than to recall if questions arise when data is analyzed months later. Indicate if the deep sample has the smell of hydrogen sulfide (H2S) (rotten eggs) by marking YES or NO. Document the lake level by circling high, normal, or low.

c. Do not put requests for supplies or equipment in the comment space, since this form may not be reviewed immediately. Write any requests for new supplies or replacement equipment on a separate piece of paper and send it in the sampling box.

9. Water Sampling Procedures – shallow sample

a. Check that the knot on the bottom of the Kemmerer bottle is tight. Click open the Kemmerer bottle by gently twisting the Kemmerer and pulling apart the blue or white ends (rubber or plastic stoppers). Try to avoid touching the gray shaft or the inside of the blue or white stoppers. You should hear a "clicking" sound to indicate that the Kemmerer bottle is cocked open. Make sure that the valve at the bottom of the bottle is turned to the closed position. When closed, the valve is at right angles to the spout.

   For those sampling kits with a white PVC Kemmerer bottle, make sure the black valve housing is not stuck in the open position. It should move when you press the valve up toward the bottom of the Kemmerer bottle.

b. Hold the Kemmerer by the rope, and slide the messenger above where you are holding the rope. The Kemmerer should hang straight down from your hand. Lower the Kemmerer bottle until it reaches a depth of 1.5 meters. For most Kemmerer lines, this corresponds to a red line between two black lines, although some lines are only marked in one meter increments. This is the proper sampling depth for ALL "surface" samples. Drop the messenger down the rope to close the Kemmerer bottle. For older Kemmerer bottles, you might need to give a gentle "tug" just as the messenger reaches the top of the bottle. This will help to trip the triggering mechanism.

c. Gently pull the Kemmerer bottle up by the rope until it reaches the surface. Verify that the Kemmerer bottle is closed. If it is not closed, pull up the messenger, ensure the Kemmerer is cocked, and repeat the process. That is, lower the Kemmerer to the 1.5 meter mark again, and then drop the messenger to close the bottle.

d. If the Kemmerer bottle is closed when it reaches the surface, grab it by the gray shaft. Holding the Kemmerer bottle elsewhere may allow the bottle to open. You will sample water through the valve and spigot on the bottom of the Kemmerer bottle.

e. **Acclimate** the collapsible collection container by rinsing with some of the sample water. Fill the container about ¼ full, and shake well. Pour out the rinse water through the spigot to rinse the spigot too. Repeat the rinse. Empty the acclimating water from the collapsible container, and then fill the collapsible container with water from the Kemmerer. With the larger collapsible containers, you will probably need to take two samples with the Kemmerer. You will probably not need to fill the large collapsible container completely. Take the temperature of the water with the dial thermometer. The temperature should stabilize within a minute or two.

f. **Record** the sample depth (1.5 m) and the temperature of the water (in degrees Celsius) on the sampling form.

10. Water Sampling Procedures – Deep Sample

a. If your lake is stratified and your association signed up to sample deep water, you will also collect a deep sample using the Kemmerer bottle. Subtract 1.5 m from the sounding depth, which is the total depth of the lake that you determined when you first arrived at the sample location. That depth, 1.5 m off the bottom to the nearest tenth of a meter, will be the sampling depth for the deep sample. Some lakes may be directed to

take the deep samples at different depths – for example, extremely deep lakes like some of the Finger Lakes.

b. Repeat the steps for the sampling of the shallow sample, but this time drop the Kemmerer to the deep sample depth (1.5 meters less than the sounding depth) using the markings on your Kemmerer line. Although 0.1 meter increments are not included on the line, you can estimate the distance between one meter increments to accurately determine the required sampling depth.

c. Acclimate the deep sample bottle or collapsible container (marked with a D), by rinsing and emptying the collection container as described for the shallow sample. Empty the water from the Kemmerer bottle into the deep sample collapsible container. Use the thermometer to determine the water temperature to the nearest 1C°.

d. Record the depth and the temperature in C° in on the sampling record. See whether there is a hydrogen sulfide (H_2S) smell, the sulfur smell of rotten eggs, and check YES or NO after odor line on the form. If the deep water is colored, note that on the sampling record in the comments area.

Completing the sampling record form.

It is very important to fill out the sampling record form completely and accurately. Remember, if it's not recorded, no one will know what happened. See the form below for more information. If there are lake management activities on the lake that could affect results (for example, herbicide treatments) make sure to indicate what occurred and when in the comments area.

Use the online data entry option

If you use the online data entry option, any errors or ommissions will be flagged, and you will have the opportunity to correct them. We encourage everyone to enter their data online. Contact help@CSLAPdata.org or go to the website https://cslapdata.org/ and use the Contact Us link in the upper left to request information and access.

Sampling Record Form – example of a completed form

2018 CSLAP SAMPLING RECORD FORM

SECTION 1

LAKE NAME AND SITE # (IF APPLICABLE)	COUNTY	CSLAP ROUND #	DATE
LAKE LOVELY	KINGS	5	9/18/18

SAMPLER(S)

NANCY MUELLER (Sample Collection)

SCOTT KISHBAUGH (Secchi Readings)

NAMES OF OTHERS WHO ASSISTED TODAY: (Please be sure to send a waiver form for every person)

SOUNDING DEPTH (The total depth of the lake at your sampling location) 11.2 meters

SECTION 2 - SECCHI DISK

Reading (1) : Disk Lowered Until it Disappears 3.5 meters (on bottom?) YES (NO)

Reading (2): Disk Raised Until it Reappears 3.4 meters (on bottom?) YES (NO)

The Secchi readings should never be deeper than the Sounding Depth.

SECTION 3 - TIME & TEMPERATURE

TIME (Military Preferred)	AIR TEMPERATURE	WATER SAMPLING DEPTH:		WATER TEMPERATURE	
1315 AM ☐ PM ☒	28 °C	SURFACE SAMPLE	1.5 meters	(surface)	26 °C
		DEEP SAMPLE (if applicable)	9.7 meters*	(deep)	11 °C

SECTION 4—WEATHER

CURRENT WEATHER CONDITIONS:

WIND TODAY: CALM (MODERATE) WINDY

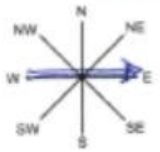
SKY TODAY: (CLEAR) PARTLY CLOUDY OVERCAST RAINY

WEATHER CONDITIONS OVER THE PAST WEEK:

WIND: CALM (MODERATE) WINDY

SKY: CLEAR (PARTLY CLOUDY) OVERCAST (RAINY)

What is the wind direction today? A. No wind B. Variable C. Indicate direction with arrow.



ANY UNUSUAL WEATHER CONDITIONS? (Major storms, record setting temperatures, etc. Please include date.)

NICE TODAY AFTER STORMY WEEK
2.5" of rain this week - brought
lake back up to normal level

LAKE LEVEL (CIRCLE ONE) HIGH (NORMAL) LOW

Comments—Please Print Legibly

Please describe unusual water quality issues, invasive species observations, aquatic plant (or other) management activities taking place on the lake; **We also encourage you to take a digital photograph of any unusual conditions and e-mail the photo(s) to fola@nysfola.org & scott.kishbaugh@dec.ny.gov or include a copy with your samples (in a separate plastic bag, please).**

LAKE IS TURBID & GREEN
LAKE WAS TREATED WITH
AQUATIC HERBICIDE IN SPRING
BUT SOME PLANTS GROWING NOW

•IS THERE A SULFUR ODOR IN YOUR DEEP SAMPLE (if applicable)? ✓ YES _____ NO

Initials: NM CHECK HERE IF PHOTO SENT ☐

11. CSLAP Regular Site Algae Observations Form.

a. Fill in lake name, county (to distinguish lakes sharing the same name), date, and the name of the volunteer on the form. Fill in the circle on the left column of the form that most closely resembles the appearance of the water at the CSLAP sample location. Describe any algae conditions that are apparent at this CSLAP sample location, including bloom size, color, and consistency. If you know the sample ID number- in the form 15-xxx-yz, where xxx is your lake number, and yz is the sample number (see description of the bottle labels on page 27) - fill in that information. If you don't recall that information, you'll fill that on the form before you send your sample to the lab.

b. This should be the last on-lake item for the CSLAP sampling site. Check to make sure you have gotten all your samples and data before raising anchor and leaving the site.

12. Harmful Algal Bloom Shoreline Survey Form and Algal bloom samples

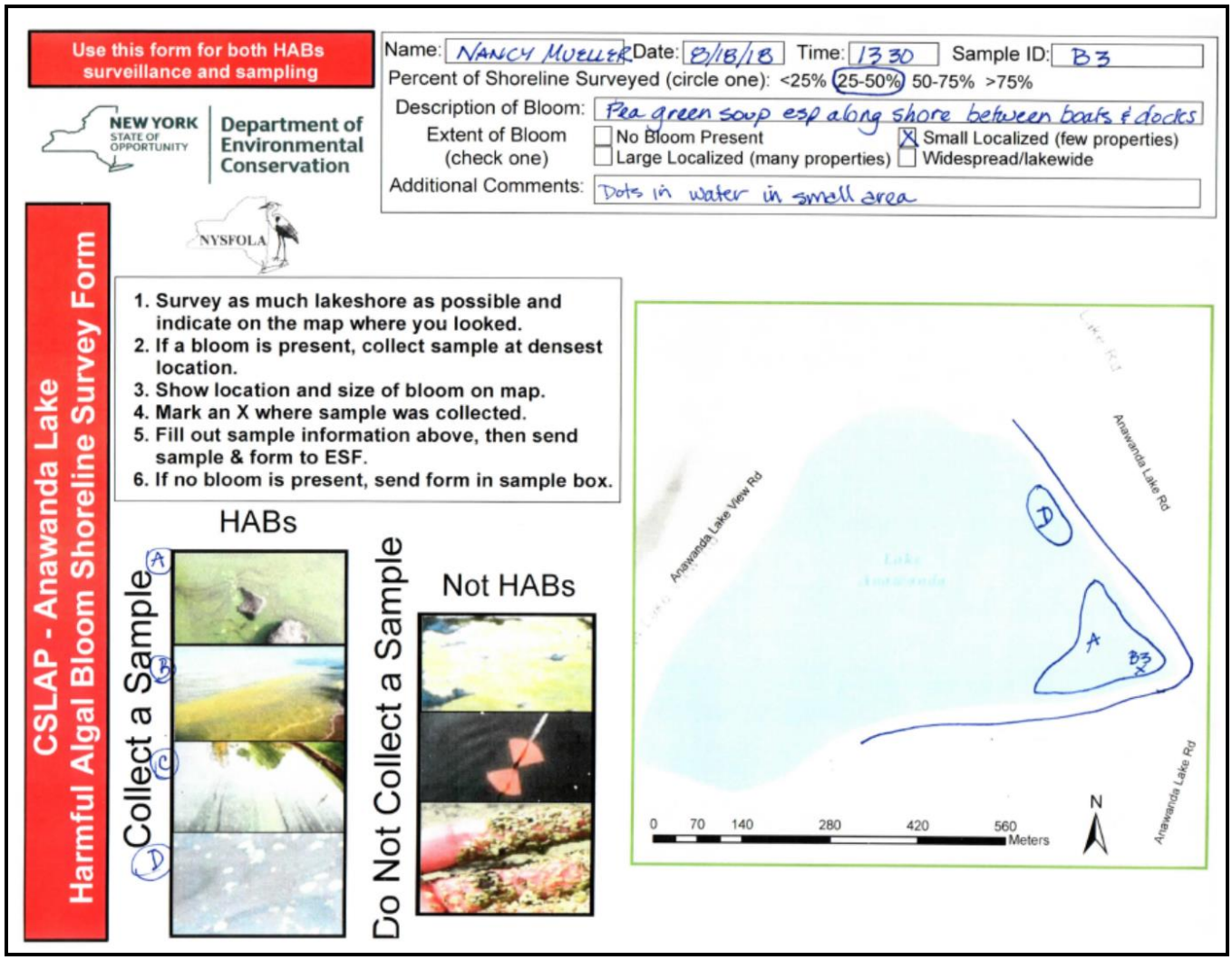
a. Fill out the **Harmful Algal Bloom Shoreline Survey** form, EVEN IF you don't see any blooms on the lake. This will help DEC and FOLA to keep track of bloom conditions (or lack of bloom conditions) on the lake. It will also indicate how much of the shoreline you surveyed for bloom conditions. Send this form with your regular CSLAP sample.

b. Look along the shore for an algae bloom. Use the **Harmful Algal Bloom Shoreline Survey** form which has a map of your lake, complete the lake information, date, and sample bottle number if you take one. Draw a line on the shore to indicate the areas that you looked on the lake. Draw in the location of the bloom on the outline of the lake and label it with the letter that matches the appearance of the bloom. Mark the place you take a sample with an X. Draw a wind direction arrow.

c. Using gloves, collect a sample in the ESF bloom sample bottle with the red label by slowly plunging the inverted bottle into a dense area of algal bloom. Tip the bottle slightly upward to allow air to exit and the bottle to fill up to the neck, leaving an air space at the top for mixing, and then cap the bottle. If possible, rinse the side of the bottle with clean water from the lake to minimize exposure to the bloom. If you took this sample during a CSLAP session, refrigerate this sample until you send it in the CSLAP cooler to UFI (Upstate Freshwater Institute).

d. If possible, use a digital camera or a phone to take a photograph of the bloom. Email the photograph to the HABs program: HABsInfo@dec.ny.gov In the email, include the name of the lake, the date of the picture, and any additional information (bloom location, first date the bloom was observed, whether a water sample was taken, description of area covered, uses affected, etc.). As a reminder, if no bloom is observed during your sampling session, check that no bloom is observed and send the form with your CSLAP sampling.

Harmful Algal Bloom Shoreline Survey – example of a completed form



On-shore Processing

1. Gather the equipment from the on-shore checklist from page 42 and find a sheltered place to work, preferably indoors.

2. **Find the right sample bottles**. Labeled sample bottles are provided for each of the eight sampling sessions. **Check** before you go further! Make sure you use the sampling bottles that are labeled for this sampling session, and make sure that the sample ID number of the bottles matches the ID on the paperwork.

   2018 CSLAP
   Total P
   Sample No: 18-xxx-01
   Date: ___/___/18
   Lake Lovely – Surface Waters

   Label information: Sample No: ww-xxx-yz
   a. ww is last two digits of sampling year (2018 = 18)
   b. xxx is lake number (assigned to each lake by NYSDEC)
   c. y is depth of sample, either 0 for shallow, or 1 for deep
   d. z is number of sampling session 1 to 8

   It is very important to **use the right bottles** and to keep the bottles and paperwork from the same session together. Find the bottles associated with this sampling session, and fill in the date on each bottle. However, if you accidentally choose the wrong bag (#6 for the fifth sample session, for example) and start filling the bottles, keep using the same bottles and paperwork. We will properly match the bottles, paperwork, and sample order back in the lab. But try to be careful to **use the bottles in the right order**.

3. Separate the surface (shallow water) sample bottles, the deep water bottles, the filtered water bottle, and the tubes for the filters. Put on gloves and never touch inside the bottles or caps. Fill in the sampling date on the sample bottle label.

4. Pour off shallow water samples. Start with the collapsible surface water sample. Mix the collapsible container by gently inverting it (make sure the water spigot is closed). Then **pour off** the shallow water samples into the bottles to just at the shoulder (before the neck of the bottle where the cap screws on). It is very important to leave room for the water to expand as it freezes or it will split the bottle. Put the filled bottles into your freezer.

5. One medium plastic vial - labeled “Algae Raw Water” - should also be filled from the collapsible shallow water sample container. This vial has a flat bottom. This vial will NOT be placed in the freezer: place it in the **refrigerator**. Place all the other filled sample bottles in the freezer.

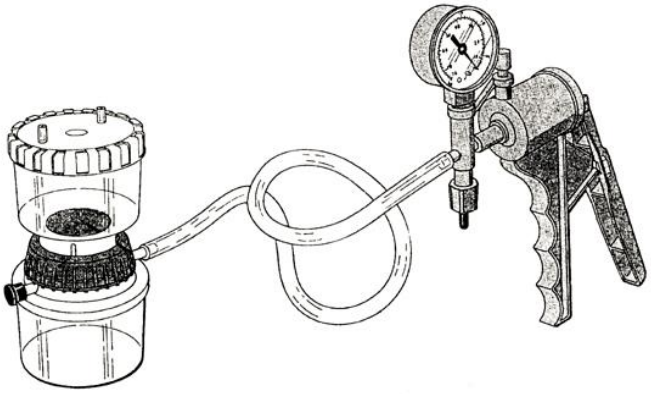
6. Filtered samples. Several CSLAP water quality indicators require filtration of the sample water. Some of these tests use the filtered water, and others use the filter. Water will be filtered twice with two processes that are similar but not exactly the same.

7. Color and ESF-HAB samples. Gather the filtering apparatus. This is the upper funnel, the lower receiver flask, and the two-piece centerpiece that holds the filter. Put distilled water into the wash bottle and rinse the apparatus. Always use the white gridded insert with the “X” shape on it in the center section. Put the center section on the top of the receiving flask.

   a. **Filters** are shipped in a plastic cup in the same box that your sample bottles came in. The filter cup often settles down to the bottom of the box during shipping, so look under the bottle bags to find it. Filters cost over $1 each and can tear easily. Help us keep program costs down by handling them gently. You have several extra filters for the season. Using the forceps, remove a single filter from the storage container, and set the filter on the top of the centerpiece. Be careful that you pick up only one filter, since sometimes they are hard to separate. If there is any moisture left on the centerpiece, you should be able to see the grids through the filter if you only placed one filter on the centerpiece. Make sure the filter lays flat on the centerpiece with no folds, so that the filter covers each of the grid openings on the centerpiece. The filter should fit inside the small raised guides around the outside edge of the centerpiece. Try to use the forceps on the edges of the filter rather than in the center where the filter may tear. There is no top or bottom to the filter, so either side can face up. The filters are white, do not use blue paper separators if present.

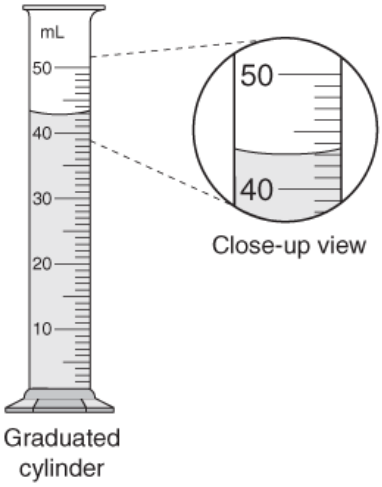
b. **Attach** the funnel to the receiver flask, making sure the funnel is securely threaded to the flask. Hold the flask with one hand, and attempt to rotate the funnel with the other. If the funnel moves easily, it is not threaded properly, so remove it and try again.

c. Connect the vacuum hose line to the vacuum pump and the filter apparatus. Make sure that the ports on the receiver flask are covered with rubber stoppers.



With the spigot closed, gently mix the contents of the collapsible container that contains the shallow sample. If you don't have enough water, use water from the second shallow water collection container.

For the color – ESF HAB sample, a total of **200 ml** of water should be filtered. First, **measure 100** ml of that shallow sample water using the graduated cylinder. The water in the graduated cylinder will rise at the edges and sink in the middle – that sunken part is called the **meniscus**. Measure using the meniscus, or the lowest level of the water in the graduated cylinder. **Pour** the water into the funnel at the top of the filter apparatus.



d. Squeeze the vacuum pump two or three times only. Overpumping may affect the sample results or tear the filter. The water should begin passing through the filter disc at a slow, steady rate. If the water slows, pump two or three more times. Repeat until water is completely filtered.

e. Use the graduated cylinder to **measure the second 100 ml** of the shallow surface water and pour that into the funnel. Continue to filter the water until all of the water has gone from the top funnel into the bottom receiving flask. If the filter consistently clogs and you cannot filter 200 ml of water, please contact Nancy Mueller.

f. When all the water has been filtered, carefully unscrew the funnel from the centerpiece with the filter. Using the forceps, **fold the filter in half**, making sure you do not touch the collected algae. Then curl the filter so that the filter can fit into the very small ESF filter sample container. Put the stopper on the ESF filter container. This small vial and the medium plastic vial labeled "Algae Raw Water" should NOT be frozen! Rubber band these together and place these vials in the **refrigerator**. *Note: please use gloves and forceps with the filter – the photos are not showing proper procedures!*



FOLD IN HALF SO THE ALGAE IS COMPLETELY COVERED.


g. You have water in the receiving flask. Take off the filter assembly and pour the water into the square sample bottle labeled Color – Filtered Surface Water. Fill it only to the shoulder to allow room for freezing, cap tightly, and place in the freezer. Discard the remaining water from the receiving flask.

8. Chlorophyll *a* samples. This is the **second filtered sample** and the steps are similar but not exactly the same as those for color and ESF-HAB samples.

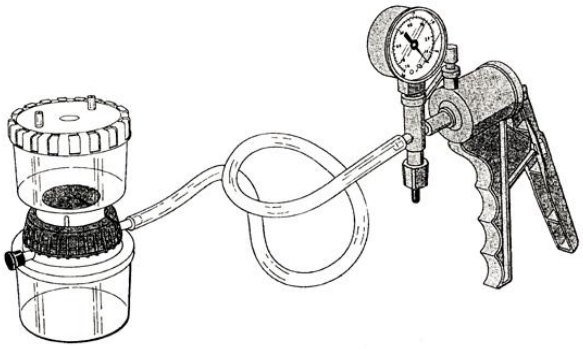
a. **Rinse** the funnel, centerpiece, receiving container, and graduated cylinder with **distilled water** using the wash bottle. Place the centerpiece on top of the receiving flask.

b. Using the forceps, remove a single filter from the storage container, and center on the top of the centerpiece. Be careful that you only get one filter, sometimes they are hard to separate. Make sure the filter lays flat on the centerpiece with no folds, so that the filter covers each of the grid openings on the centerpiece. The filter should fit inside the

small raised guides around the outside edge of the centerpiece. Try to use the forceps on the edges of the filter rather than in the center. There is no top or bottom to the filter, so either side can face up. The filters are white, do not use blue paper separators.

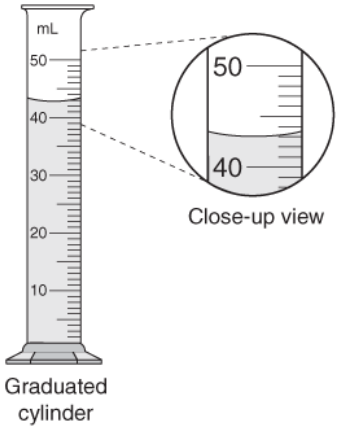
c. Attach the funnel to the receiver flask, making sure the funnel has been securely threaded to the flask. Hold the flask with one hand, and attempt to rotate the funnel with the other. If the funnel moves easily, it is not threaded properly, so remove and try to put the funnel on again.

d. Connect the vacuum hose line to the vacuum pump and the filter apparatus. Make sure that the ports on the receiver flask are covered with rubber stoppers.



e. When filtering the chlorophyll *a* sample, **add magnesium carbonate** to help preserve the algae sample. Shake the contents of the small **$MgCO_3$** dispensing bottle to mix the contents. The mixed solution should resemble dilute milk. Squeeze just enough $MgCO_3$ from the dispensing bottle to cover the filter surface (approximately 6-10 drops).

f. With the spigot closed, gently mix the contents of the collapsible container that contains the shallow sample. If you don't have enough shallow sample water, use water from the second shallow water collection container. For the chlorophyll *a* sample, **100 ml** of water will be filtered. Measure 100 ml of the sample water using the graduated cylinder. Measure using the meniscus, or lowest level of the water in the graduated cylinder. Pour the water into the funnel at the top of the filter apparatus.



g. Squeeze the vacuum pump two or three times only. Overpumping may affect the sample results or tear the filter. The water should begin passing through the filter disc at a slow, steady rate. If the water slows, pump two or three more times and repeat as necessary to filter all of the water.

h. For the chlorophyll *a* sample, we won't send the lab the water that is collected in the receiver flask. Since we want to get an accurate measure of all of the algae or chlorophyll *a* that is in the lake sample, we will use distilled water to rinse the equipment, and then filter that water as well. Use the wash bottle to rinse down the graduated cylinder, and pour that water into the funnel to filter any algae out of it. When most of the water has gone from the top funnel into the bottom receiving flask, wash down the sides of the funnel with distilled water from the wash bottle, and continue to filter that water, pumping again if necessary. When the water has all gone through, wash down the slope at the bottom of the funnel with distilled water, and filter that water too.

i. Carefully unscrew the funnel from the centerpiece so that you can see the filter. Using the forceps, fold the filter in half, making sure you do not touch the algae that has collected on the filter. Then fold the filter in half again so that the filter can fit into the large chlorophyll *a* vial. This vial has a pointed bottom. No water should go in this vial. Close the top of the chlorophyll *a* container, wrap the vial in aluminum foil so that light cannot penetrate it, and store it in the refrigerator. *Note: please use gloves and forceps with the filter – the photos do not show proper procedures!*

FOLD IN HALF SO THE ALGAE IS COMPLETELY COVERED.

The Color-ESF filtered sample and the chlorophyll a filtered sample are handled differently		
	Color Sample and ESF Filter	**Chlorophyll *a* Sample**
Magnesium Carbonate on filter?	Not added	6 to 10 drops added
Amount of water filtered	200 ml	100 ml
Water in bottom receiving container put into a bottle?	Yes, about 125 ml is put into the color sample bottle and frozen	No
Rinse with distilled water & then filter rinse water	No	Yes, graduated cylinder and funnel
Filter is placed in vial	Yes, in small plastic vial	Yes, in large plastic vial
Filter vial is wrapped in aluminum foil	No, it is rubber banded to raw water vial	Yes
Filter vial placement until shipping	Place in refrigerator attached to filled vial labeled "algae raw water".	Place in refrigerator or freezer

9. Deep water samples. If you have a stratified lake and you are participating in deep water sampling, your bag of sampling bottles for the session will contain deep water sample bottles. Deep water sample bottles have light blue labels. Make sure you use the same sampling session bottles as you used for the shallow samples and the paperwork. Write the samples session date on the bottles. Mix the deep water sample by inverting the collection bottle. Then carefully **pour off** the deep water samples into the sample bottles to the shoulder (just before the neck of the bottle where the cap screws on). It is very important to leave room for the water to expand as it freezes so the bottles don't break. Put the filled bottles into a freezer. There are usually fewer bottles for deep water than for shallow water.

10. HABs Bloom samples. If you collected a HABs bloom sample, date the bottle, and then place the sample in the refrigerator. Place the bloom sample bottle in a baggie to prevent exposing any food in the refrigerator to the outside of the bottle. DO NOT FREEZE!

11. Ice packs. Be sure to put ice packs in the freezer overnight so they are frozen for shipping.

12. Check the paperwork. Make sure that the lake number and sampling session information is on the **sampling form**, the **CSLAP Sample Site Algae Report,** and on the **Harmful Algal Bloom Shoreline Survey Form**. The online data entry system will do this automatically for you.

13. Clean up and store. Rinse collection bottles and filtering apparatus with distilled water. If you have a clean place to store the collection bottles, store them with the tops off to make bacteria or mold growth less likely. Discard gloves and any other trash. Pull the Kemmerer bottle open and hang it to dry. Do not store the Kemmerer where it will be subject to extreme temperature

changes, as this will cause the gaskets to wear out prematurely and leak. Make sure you have the equipment and supplies you will need to do the next sampling session. If any supplies are needed, send a note with the samples. See shipping instructions on page 37.

14. Consider online data entry. We strongly encourage you to enter your data on-line. Go to www.CSLAPdata.org to log in and fill out the paperwork online. If you don't yet have a sign on, click on the "contact us" link in the upper left hand corner to ask for a sign on. On-line data entry will help improve the quality of the data, get the information to DEC faster, alert ESF to bloom samples, and save time and costs for data entry. In addition, when you enter the data, you can print in-season reports that will show you how the physical data you collect in the current session compare to other samples in the current year and to prior years. Currently, we are asking you to continue to send in a copy of the paperwork as well. If you wish, you can print out a copy of your online data forms and send that with your samples.

CSLAP Field Sample Collection Checklist

I. Predeparture Equipment Check

① Complete the following checklist ***before departing*** the dock.

◯	CSLAP Field Observation Form – Lake Perception, and Health and Safety Form	◯	Pen or pencil to fill out forms
◯	HAB Visual Assessment Forms- CSLAP Sample Site and Shoreline Survey forms	◯	ESF HABs bloom sample collection bottle (red label) and plastic gloves
◯	Thermometer	◯	Watch, phone, etc. to get time of day, GPS
◯	Secchi disk and tape measure	◯	Boat, anchor and line, and appropriate safety equipment
◯	Kemmerer sampling bottle and marked line	◯	Camera or phone for photos of algae blooms
◯	Collapsible water sample container and cap with spigot	◯	For stratified lakes – deep collapsible water collection container

II. On-Lake Sampling

1.Complete paperwork:

①Go to your sampling site by using GPS or triangulation and anchor
②Determine sounding depth (lake depth) with Secchi disk or depth finder and record in meters
③ Fill out "CSLAP Field Observation Form – Lake Perception and Health and Safety" (page 17 in protocol)
④ Fill out "CSLAP Sampling Record Form" (page 19 in protocol)

- Consult with others if necessary
- Assess wind and sky conditions
- Complete comments section

⑤ Fill out "CSLAP Sample Site Algae Report" to assess open water conditions (page 14 and 25 in protocol)

2.Complete Temperature, Secchi disk and Sampling

① Take the air temperature reading using the provided thermometer, and record to nearest 1 degree Celsius
② Collect Secchi Disk measurement off the shady side of boat to the nearest 1/10th meter **– *do not use sunglasses***
③ Collect Surface sample (at 1.5 m depth). Remember to:

- Keep the Kemmerer line as straight as possible
- Avoid touching inside the Kemmerer while setting the tripping mechanism
- Rinse the collapsible container with sample water- fill ¼ full, shake, and discard completely before filling
- Avoid touching the spigot/sample while discharging from container

④ Take the water temperature reading from the water sample, and record to the nearest 1 degree Celsius
⑤ Record Hydrogen Sulfide ("rotten egg") odor if applicable
⑥ Put collapsible container(s) in a cooler or in the shade to keep cool, out of sunlight prior to on-shore processing
⑦ Repeat ③-⑥ if collecting a Deep Sample

III. On-Shore Observations

①Fill out "CSLAP Shoreline Algae Bloom Form" (page 25 in protocol)

- Inspect portion of the shoreline and note location
- Assess observed shoreline bloom conditions
- Collect a HAB sample by skimming bloom surface if conditions warrant **– make sure to wear gloves**

② Complete macrophyte observations

On-Shore Sample Processing Checklist, CSLAP

I. On Shore Process for the Surface Sample

Remember to mix/invert sample ***before processing*** by gently inverting the collapsible container. Only open the bottle caps one at a time as you fill them and avoid touching the inside of the bottle caps. Date and organize the bottles and chain of custody.

1. Fill the following bottles without filtration:

① TP/TDP ◯ NOX/NH3 ◯ TN/TDN ◯ pH/SpCond ◯ Chloride ◯ Algae Raw Water
◯ Calcium (you may not have all of these bottles for every session)

2. For samples with filtration (HABs, Color Water and Chl-a Samples)

① Put on vinyl gloves
② Rinse entire filtration apparatus with distilled water and discard water
③ Using forceps, place 1 filter paper in the filter holder
④ Secure filter to holder by gently threading the cup onto the holder
⑤ Filter 200 ml water (100ml + 100ml) **– *apply a slight vacuum (a few pumps at a time) to avoid rupturing the filter***
⑥ Fold and roll the Filter Paper and insert into the "HAB" small tube
⑦ Pour Filtered water into Color Water bottle
⑧ Discard remaining water. Rinse equipment with distilled water.
⑨ Place Filter Paper in the Filter Holder
⑩ Cover Filter Paper with 6-10 drops of $MgCO_3$ from bottle (Shake well)
⑪ Filter 100ml of water.
⑫ Wash graduated cylinder and walls of upper apparatus with distilled water to be sure all Chlorophyll a is filtered.
⑬ Fold Filter Paper in 1/4 and place in "Chlorophyll a tube" with tapered bottom.
⑭ Wrap "Chl. A" tapered tube with aluminum foil
⑮ Discard remaining water. Rinse equipment with distilled water.

II. On Shore Processing for the Deep Sample (if applicable)

Remember to mix/invert sample ***before processing*** by gently inverting the collapsible container. Only open the bottle caps one at a time as you fill them and avoid touching the inside of the bottle caps. Label and organize the bottles and chain of custody.

1. Fill the following bottles without filtration: (these bottles have blue labels)

① TP/TDP ◯ NOX/NH3 ◯ TN/TDN

III. Finish Processing

① Verify all paperwork is complete and all bottles are labeled and place paperwork in return cooler
② Did you enter the field data to the online CSLAP data entry system?
③ Samples to Place in Freezer – both top and deep samples
◯ TP/TDP, ◯ NOX/NH3, ◯ TN/TDN, ◯ pH/SpCond, ◯ Chloride, ◯ Chl-A, ◯ Calcium
④ Samples to Place in Refrigerator
◯ Algae Raw Water samples with HAB tubes attached with rubber bands.
◯ If collected, shoreline bloom sample in red-labeled bottle .
⑤ Place freezer packs in freezer with samples
⑥ Rinse equipment with distilled water and set aside to dry until next session. Hang kemmer inside
⑦ Ship samples the following day- don't forget to retrieve samples from the refrigerator and freezer!

- Big cooler box should be shipped to UFI
- If you took a bloom sample, also ship that to UFI in the same cooler box.

Shipping Procedures – CSLAP

1. Ship on Monday, Tuesday, or Wednesday. Samples should not be in transit over a weekend so they must get to the lab by Friday. Samples that thaw and warm may not give accurate results. BEWARE OF HOLIDAYS! Remember that Memorial Day, July 4th, and Labor Day weekends fall during the CSLAP sampling season. You will not be able to ship on those government holidays, and no one will be at the lab to receive samples.

2. Chain of custody. Fill out the Chain of Custody / Request for Analysis form. Record the date of sampling, which should be the same date recorded on the Sampling Record and on the sample bottles. Do not put requests for supplies, notes about the condition of the lake, or other observations on this form. One of the samplers should sign the "sampled by" box. The time of sampling should be recorded in military time. The person who will ship the box should sign in the "sample relinquished by" area.

3. Requests for Supplies. If you need supplies or to replace equipment, place a note on top of the cooler, not inside the cooler, and include the lake name. Do not write this request on the Sampling Record form or Chain of Custody form. If you need filters, make sure to return the empty cup with your cooler. If you need MgCO3, return the empty squirt bottle in the cooler with your samples. If any of your equipment is not working, e-mail Nancy at fola@nysfola.org in addition to your note on top of the cooler.

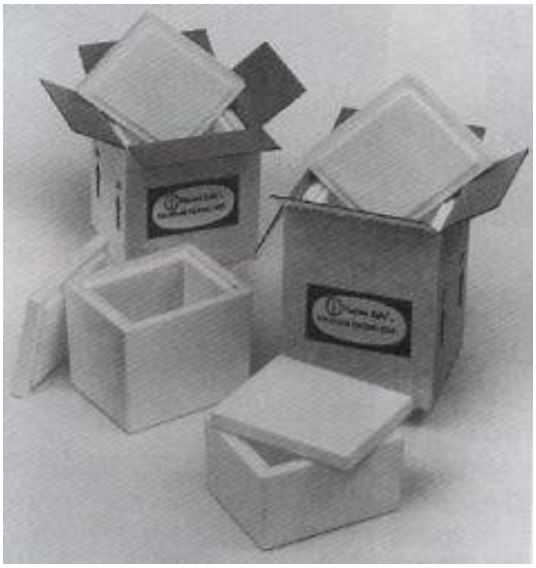
4. Paperwork Review. Make sure that all of the forms are completely and accurately filled out. You should have these forms:
    a. Sampling Record,
    b. CSLAP field observation (Lake Perception / Health and Safety),
    c. CSLAP sampling site algae report form
    d. Harmful algal bloom shoreline survey form (if you did not collect a bloom sample)
    e. Chain of Custody / Request for Analysis form
    f. If you need more supplies, have a change of address, or have any other correspondence for the CSLAP headquarters, add a separate note to that effect with the paperwork. Staple the sampling record, CSLAP field observation form, CSLAP sampling site algae report form, and Harmful algal bloom shoreline survey forms together. Do not staple the chain of custody form or a request for supplies.

5. Remove ice packs and sample bottles from the freezer and refrigerator.

6. Packing. Place the frozen processed water sample bottles, aluminum-wrapped chlorophyll a vial, and two frozen ice packs into a Styrofoam cooler inside a cardboard mailing box. Add the SUNY ESF filter vial and the 'Algae Raw Water' vial to the cooler. Make sure that you have all of

the water sample bottles to match the chain of custody form. If you place these all in a plastic bag, it will make it easier for the lab to handle.

a. If you collected an ESF HABs bloom sample at the same time as the CSLAP sample, include the refrigerated sample in the CSLAP cooler and include the chain of custody paperwork with the other CSLAP paperwork. If you collected the HABs bloom sample when you didn't have a CSLAP session, send the HABs red labeled bottle separately in the small cooler and box to UFI using the provided mailing label. Send the harmful algal bloom shoreline survey and the chain of custody forms with this sample and cooler box.
b. If you collected vegetation samples, place the refrigerated bags in the box, or send directly to Stephanie June at the NYSDEC. (See Aquatic Vegetation Sampling Protocol.)
c. If you took a digital photograph of an algae bloom, please send it to habsinfo@dec.ny.gov In the email, include the name of the lake, the date of the picture, and any additional information (bloom location, first date the bloom was observed, whether a water sample was taken, description of area covered, uses affected, etc.)
d. If you see something on your lake that you want identified or documented, take a digital picture of it and email it to Nancy. Do not send dead snails, fish, or mussels with your CSLAP samples.
e. If there is excess room, use bubble wrap in the empty spaces.
f. Place the lid securely on top of the styrofoam box. Make sure the box has the lake name and address on it.
g. **Don't forget the paperwork!** Place the paperwork and any supply requests on top of the Styrofoam box but inside the cardboard mailing box.
h. Make sure you remove all of the samples from a particular sampling date from the refrigerator and / or freezer and submit them together. Do not hold a round of samples in the freezer until your next sampling session. Some parameters have short holding times at the lab, and they need to be analyzed promptly for accurate results. Later, if you find samples that you forgot to send in, discard them.



7. Seal and label the box. Close and seal the box with packing tape. Place a pre-paid UPS mailing label on top of the box. Place the label on one of the flaps on top of the box, not on the tape covering the gap between the flaps.

    a. You must arrange this with NYSFOLA in advance if you want to mail by USPS instead of UPS. USPS boxes should be taken to the closest Post Office, and sent by Second Day Delivery rates.

    b. If you need the box returned by UPS to a different lake resident, please include this request in the paperwork provided on top of the cooler, inside the cardboard box.

8. Transport the labeled box to the closest UPS or private carrier outlet, or the US Post Office for delivery to the laboratory. You may only use the US Post Office if you have made prior arrangements with NYSFOLA. UPS will not pick up the cooler at your location without charging an additional fee that you will have to pay. Plan to bring your cooler, with the attached prepaid label, to a UPS shipping location.

9. If your cooler does not come back within a week, call or e-mail Nancy, and she will track it down. Do not call the laboratory.

Shipping Procedures – HAB Bloom Sample

If you have collected a bloom sample at the same time as the CSLAP sample, send that red labeled bottle in the cooler with the other CSLAP bottles and paperwork. If you took a HABs bloom sample at another time, send that sample with a separate harmful algal bloom shoreline survey form to UFI (Upstate Freshwater Institute).

Collect the bloom samples as directed on page 25. Fill out a Harmful algal bloom shoreline survey form. (See page 26.) Place the bloom sample into the cooler, put the form on top of the Styrofoam cooler but inside the cardboard box, and seal the box. Mail this sample box to UFI using the pre-printed form or at the following address:

Nancy Mueller
CSLAP
224 Midler Park Drive
Syracuse, NY 13206

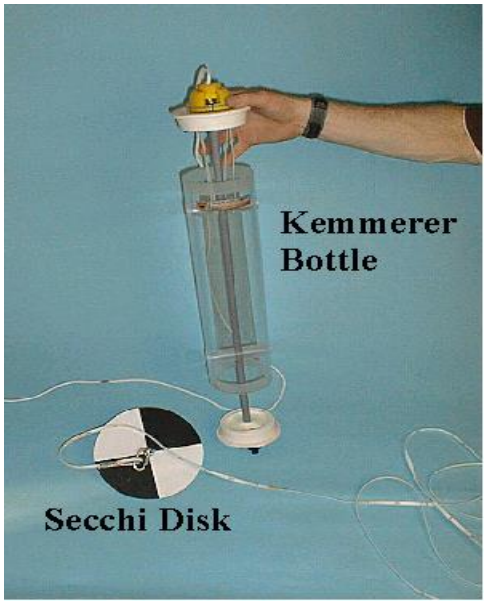
Take the sealed and addressed box to UPS or another shipping provider.

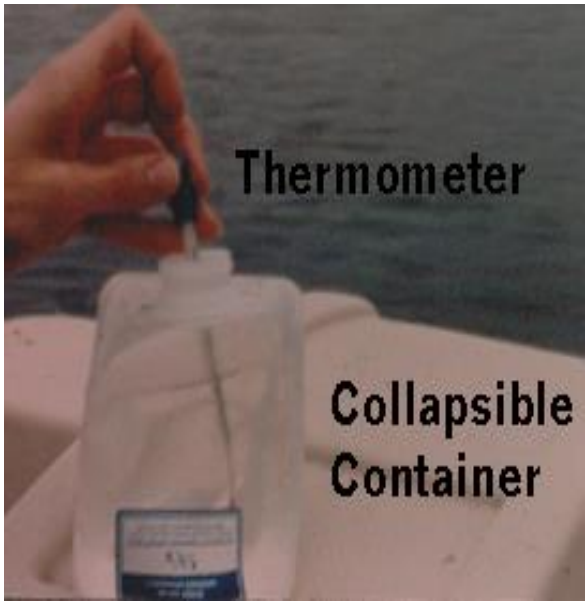
Appendix A – Checklists

ON-LAKE SAMPLING EQUIPMENT CHECKLIST

Equipment to take on the boat

_____Sampling Record Form
_____CSLAP Field Observation Form – Lake Perception, and Health and Safety Form
_____HAB Checklist and Visual Assessment Forms- CSLAP sampling site and Bloom Sample
_____Field equipment:
    _____Thermometer
    _____Secchi disk and tape measure
    _____Kemmerer sampling bottle and marked line
    _____Collapsible water sample container and cap with spigot
    _____Supplemental shallow water collection container
    _____For stratified lakes – deep collection container
_____Pen or pencil for forms. Do not record anything in felt tip pen, which becomes unreadable when wet. This includes the sampling date on the bottles. Fine point sharpie pens work well.
_____Watch, phone, etc. to get time of day
_____Boat, anchor and line, and appropriate safety equipment
_____ Camera or phone for photos of algae blooms
_____In case you observe a bloom, ESF bloom sample collection bottles and gloves





ON-SHORE SAMPLING EQUIPMENT CHECKLIST

Equipment for on-shore processing

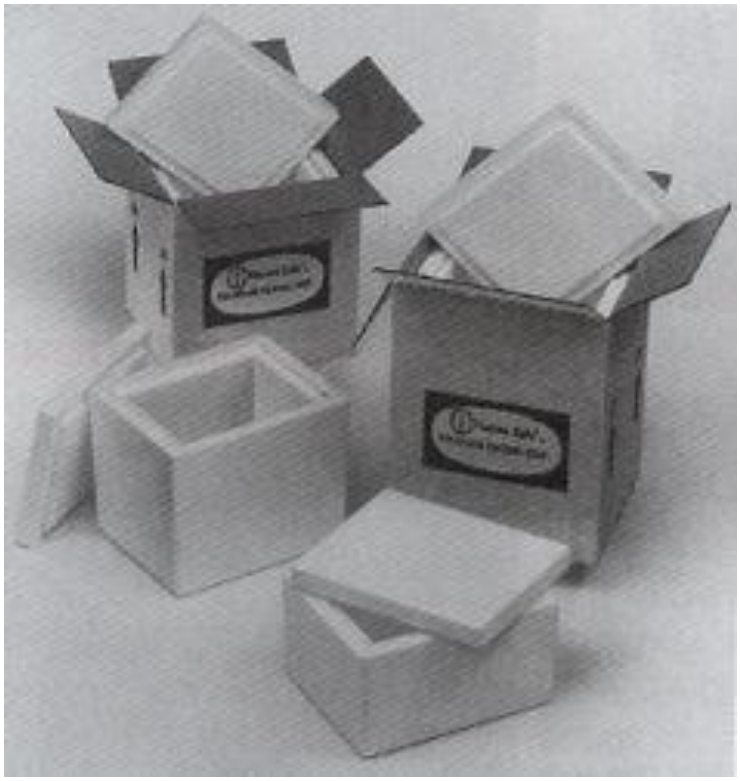
_____vinyl gloves
_____wash bottle with distilled water
_____filtration apparatus
    _____funnel (large top piece)
    _____centerpiece with removable plate – white grid
    _____receiving flask with port holes
    _____rubber hose
    _____rubber stoppers
    _____hand vacuum pump
_____forceps (tweezers)
_____filters
_____large graduated cylinder (100ml)
_____$MgCO_3$ dispensing bottle
_____Sampling session bottles (check to make sure you are using bottles for the right session!)

Paperwork

    _____Sampling Record
    _____Field Observations Lake Perceptions / Health and Safety forms
    _____Chain of Custody / Request for Analysis form
    _____CSLAP Shallow Water Sample – Regular CSLAP Site HAB Form
    _____HABs Shoreline Bloom Sample Data Sheet

SHIPPING MATERIALS CHECKLIST – CSLAP

_____large styrofoam shipping boxes with lids and cardboard mailers- to send samples to UFI
_____small Styrofoam shipping boxes with lids and cardboard mailers- to send bloom sample only if sampled at a different time from the CSLAP sample session. Send to UFI.
_____pre-paid shipping labels (UPS only) for UFI
_____frozen ice packs (2 per shipping box)
_____bubble wrap for packing (supplied by lake association)
_____packing tape (supplied by lake association)
_____ sample bottles and filter vials
_____paperwork:
    _____chain of custody / request for analysis form
    _____ staple together sampling report, lake observation form, HAB visual analysis form
    _____ request for any additional supplies if applicable



Appendix B – CSLAP Sampling Parameters

PARAMETER	SIGNIFICANCE
Water Temperature (°C)	Water temperature affects many lake activities, including the rate of biological growth and the amount of dissolved oxygen. It also influences the length of the recreational season.
Transparency (meters)	Determined by measuring the depth at which a black and white disk disappears from sight, the Secchi disk transparency estimates the clarity of the water. In lakes with low color and rooted macrophyte ("weed") levels, it is related to the productivity of the lake.
Conductivity (µmho/cm)	Specific conductance measures the electrical current that passes through through water, and is used to estimate the number of ions (charged particles). It is somewhat related to the hardness of the water, and may influence the degree to which nutrients remain in the water column
pH	pH is a measure of the (free) hydrogen ion concentration in solution. Most clearwater lakes must maintain a pH between 6 and 9 to support most types of plant and animal life. Low pH waters (<7) are acidic, while high pH waters (>7) are basic. Rapid fluctuations in pH can be stressful to many organisms.
Color (true) (platinum color units)	The color of dissolved materials in water usually consists of organic matter, such as decaying macrophytes or other vegetation. It is not necessarily indicative of water quality, but may significantly influence water transparency or phytoplankton (algae) growth.
Phosphorus (total, mg/l)	Phosphorus is one of the major nutrients needed for plant growth. It is often considered the "limiting" nutrient in NYS lakes, for biological productivity is often limited if phosphorus inputs are limited. Many lake management plans are centered around phosphorus controls.
Nitrogen (ammonia and nitrate, mg/l)	Nitrogen is another nutrient necessary for plant growth, and can act as a limiting nutrient in some lakes, particularly in the spring and early summer. In high concentrations, ammonia and nitrate can result in ecological impairment. Total nitrogen is comprised of ammonia, nitrate (+ nitrite) and organic nitrogen.
Chlorophyll *a* (µg/l)	The measurement of chlorophyll *a*, the primary photosynthetic pigment found in green plants, provides an estimate of phytoplankton productivity, which may be strongly influenced by phosphorus.
Calcium (mg/l)	Calcium is usually a major component of lake buffering capacity (the ability of lake water to neutralize acidic inputs) and is required for zebra mussels to build their shells.
Chloride (mg/l)	Use of chloride compounds in brine, road salt, and water softeners can increase chloride ions in water.
Use Impairment Surveys	Evaluated through the use of field perception forms (four question surveys completed during each sampling session), use impairment surveys link recreational lake use assessments to water quality data

A number of parameters, such as nitrogen, phosphorus, calcium, pH, and specific conductance, can lend much insight to the chemical makeup of a lake. Lakes can also be characterized by physical parameters, such as temperature, water color, and water clarity, or by biological parameters such as chlorophyll *a* (a measure of algae densities).