Association to Preserve Cape Cod 2023 Guide to Monitoring Cyanobacteria

This guide was developed by the Association to Preserve Cape Cod (APCC) and is based on monitoring protocols developed by the Cyanobacteria Monitoring Collaborative (CMC). This methodology will serve to guide and inform APCC staff, interns, and volunteers to assure consistency and quality of work throughout the 2023 cyanobacteria monitoring season.
Data resulting from this project will be managed by APCC and will be shared with volunteers throughout the season by means of email updates and through summary reports to follow shortly after the end of the season. Findings will be regularly updated on APCC's Cyano-Map, which will be publicly accessible at www.apcc.org/cyano. When conditions warrant, APCC will notify appropriate towns and state agencies to share data and to encourage posting of signage to improve public safety when warranted.
Throughout this document we have included notes in bold type that are important to follow while completing each step in the monitoring process to assure we are collecting high quality data using consistent methods. If you have any questions about specific details of these notes or any other details of the methodology, please contact cyano@apcc.org, or Lynn Francis APCC's Pond and Cyanobacteria Operations and Logistics Coordinator at (774) 238-0122.

I. Preparing

1. Plan to collect samples in the morning (**no later than 9:00 am is best.**) Cyanobacteria photosynthesize during the day and the cells move downward in the water column. You are most likely to witness a surface bloom in the early morning when cyanobacteria are closest to the surface and before the wind has moved or mixed the plankton.

2. Check the weather forecast and plan accordingly. If you decide conditions are unsafe and prevent you from collecting samples, please contact APCC as soon as possible via email at cyano@apcc.org or phone (774) 238-0122.

3. Gather and prepare equipment needed for all sampling dates:

a. Plankton tow net
b. 5-gallon bucket -to carry equipment
c. 2-500-mL sample bottles per sample site (pre-labeling is recommended)
d. 1 extra 500-mL sample bottle for scum sample
e. 1 glass toxin testing bottle called "Grab" per sampling site
f. 1 meter tube with a weight at the end (IT = Integrated Tube)
g. Digital thermometer
h. Clip board with a pencil and field data sheets
i. Cooler with frozen ice packs
j. Boots or waders
k. Personal safety equipment (sunblock, insect repellent, hat, rubber gloves, etc.)

4**.** Be sure to pre-label sample bottles with a piece of tape secured to each bottle. Information on the plastic sample bottles labels should include **pond name, town, date, and sample type "NET" or "WLW."**

5**. The glass bottles are labeled with the pond name, town, date and "GRAB."**

6. **SAFETY FIRST:** If you observe a visible surface bloom when you arrive at the pond, and you are concerned about exposure to bloom material, evaluate the situation and determine how you wish to proceed. One option is to fill out the data sheet, take pictures and wear gloves to take a grab sample of the surface scum. (Wearing gloves is recommended whenever sampling cyanobacterial material.) Please take multiple pictures of the scum to show the size and color. Send the photos to cyano@apcc.org with the pond name, town, and date in the subject line of the email.
If you feel you can safely collect other samples proceed with the next paragraph.
Be sure to rinse off with clean water after any contact with cyanobacterial scum. Soap and hand sanitizers are not needed and may release toxins from intact cyanobacterial cells. If you do not have access to clean water- wipe with a towel until you can rinse off.

II. Collecting Samples

1. When you arrive at each sampling location, complete a Field Data Sheet, which includes general observations and entails taking an air temperature and a water temperature reading. Then take a few photos to show what the pond looks like while you are sampling. Please send the photos to the cyanobacteria team at cyano@apcc.org with the pond name, town, and date in the subject line of the email.

2. Before collecting the "WLW" or "NET" samples, please take a scum sample, if present. Wearing gloves, scoop up 100 mL of the scum into the extra plastic 500 mL sample bottle.

3. At every visit, before taking the "WLW" or "NET" also collect the "GRAB" sample in the 100 mL glass bottle. Stand facing the center of the pond. Insert the glass toxin bottle into water to collect about 50 mL (1/2 the bottle) of water from 1 foot below the surface and 1 foot from the bottom. Immediately put these samples on ice. **Note: When handling the glass toxin bottles, be extra careful not to touch the mouth of the bottle or the inside of the cap.**

4.Take the sample bottle labeled "WLW" and IT plastic tube (Integrated Tube.) Walk out into the pond to a depth where you can scoop a bottle full of water without disturbing any sediment from the bottom (about 1 m or 39 inches) Fill the bottle to the top, cap the bottle, shake, and dump to "condition" the bottle. Repeat this **three times** in total. Condition the tube by inserting it into the water until it is fully submerged, then empty it of water. Repeat 3 times total.

Note: It is important to condition all sampling equipment by triple rinsing in ambient pond water before collecting a final sample to assure foreign substances do not contaminate the Sample.

5. To take the “WLW” sample, move to an area where the sediment has not been disturbed. Take the 1-meter tube and lower the weighted end into the water until it is a few inches above the bottom sediment. Cover the end with your thumb and lift it out of the water, then while the weighted end is in the bottle labeled “WLW” release your thumb. Repeat this process until you have filled the bottle. Securely cap and place the filled bottle in the cooler.

Note: Be sure to not stir up sediments during bottle rinsing or by walking in the water at the sample site and take caution to not scoop sediment from the pond bottom. To avoid this, rinse the bottle slightly adjacent to the final sample location.

6. Next, rinse your sample bottle labeled “NET” three times in the same fashion as described above for the “WLW” sample.

7. Take out the plankton net, walk out into the water again to a depth where you can cast the net without scraping the bottom and rinse the net a few times to “condition” the net.
Note: Double check the plastic valve clip that’s on the hose at the bottom of the plankton net. This can slip down the hose and slip off into the pond if not far enough up on the hose before casting the net. (The clip does not float)

8. Next, unwind the line, pinch the plastic valve closed and toss the net 3-meters horizontally toward the pond center. The net should then be slowly retrieved at about one foot per second. Slow retrieval is important because the mouth of the net can form a pressure wave that will displace organisms and plankton, preventing them from being captured in the net sample. Too slow of a retrieval and you will not be pushing the water through to capture your material. Once retrieved, hold the net up vertically and dip it up and down in the water a few times to help rinse down any particles that may be stuck to the sides of the net. **When rinsing the particles down, be sure to not allow any water to enter the net through the opening at the top of the net**. Be sure to filter water out of the net until the sample fills the 250mL plastic cod-end to the point that it meets the mesh. Fill the “NET” sample bottle by inserting the hose into the top of the sample bottle and releasing the valve. You will have to do this twice to fill the bottle. Cap the full bottle and place it in the cooler. **Note: If net picks up sediment from the bottom or you happen to stir some up by walking through the shallows, move to an adjacent area where the water is undisturbed and clear of suspended sediments and resample.**

9**.** When you have finished sampling and you have returned to where the equipment is stored, clean all equipment with tap water and hang it to dry. **Do not let the plankton tow net dry in direct sunlight as it will damage the net, instead hand it in the shade of a shed or garage.**

Thank you for your help!

APCC really appreciates your efforts. Your contributions provide important data to protect people, pets, and the ponds. Your data helps us all learn new insights about the complex pond environments. Each season we build a more meaningful portrait of the dynamic freshwater ecosystems so we all can be better stewards.

Thanks again for being part of APCC's cyanobacteria monitoring team!

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