Brawley Consulting Group, LLC

Land Conservation and Management Services

Memo

Date: July 28, 2024

To: Ball Pond Advisory Commission

From: Brawley Consulting Group

Re: Results of Lake and Cyanobacteria Monitoring of July 21, 2024

Dear BPAC Members:

On July 21st, the Brawley Consulting Group visited Ball Pond to conduct monthly water quality and cyanobacteria monitoring as part of the ongoing lake management program. We are grateful for the on-the-water transportation and assistance graciously provided by BPA members George Buck and Frank Yulo. Data and sample collection methods were described in previous memos.

Summary: Cyanobacteria cell concentrations on July 21st in the open water were low. Conditions in the water column were similar to those observed in June with warm surface waters and oxygen concentrations <1 mg/L at and below 5 meters of depth to the bottom. Open water conditions did not pose a public threat. There were no reports of shoreline blooms but there was a report of a fishkill on July 15th.

Water Column Conditions

The total depth at the sampling site on July 21st was measured at 15 meters. Secchi disk transparency is a surrogate for the level of organic (e.g., algae) and inorganic (e.g. silt or clay) material suspended in the water column. Secchi transparency was 2.10 m which is a modest increase of 23 centimeters over Secchi disk transparency last measured on June 22nd.

Water temperatures in the top 3 meters were between 27 and 28°C and decreased to 23°C by 4 meters of depth. The thermocline was situated between 4 and 5 meters of depth where the temperature was approximately 17°C (Fig. 1). Below that, temperatures gradually decreased to 6.6 by 13 meters of depth.

Oxygen concentrations were between 8.3 and 7.5 mg/L in the top three meters of the water column. Those rapidly decreased to <1 mg/L by 5 meters of depth, i.e., just above the thermocline. Anoxic conditions were observed from that layer to the bottom of the water column.

Algae and Cyanobacteria Community

Nineteen algal genera were identified in the samples collected on July 21st. The taxonomic groups with the greatest richness (number of genera identified) were the Chlorophyta (aka green algae) and Cyanophyta (aka cyanobacteria or blue-green algae) at 8 and 6 genera, respectively. Five other taxa were represented by 1 genus each.

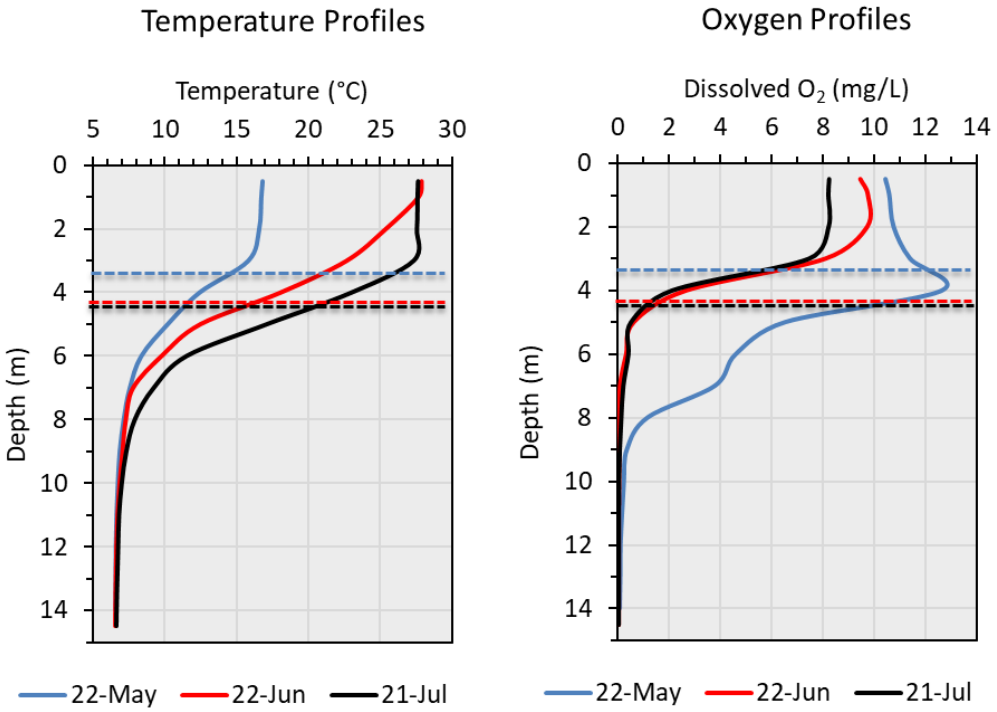

Figure 1. Temperature (left) and dissolved oxygen (right) profiles for Ball Pond on May 11, 2024, and June 22, 2024.

The cell concentration in the top three meters of the water column, where the sample for algal count was collected, was approximately 9,500 cells/mL, which was approximately 60% of all cells counted. The cyanobacteria cell concentration was modestly higher than that in June but still relatively low.

Dominant cyanobacteria genera were *Snowella spp*. and *Dolichospermum spp*.

For comparison, the State's guidance document for municipalities with regards to beach closures due to harmful algal blooms uses a threshold 20,000 cyanobacteria cells/mL below which is considered not to present a risk to public health and consistent with Visual Rank Category 1 condition. Visual Rank Category 3 are observable blooms and characterized by cyanobacteria cell concentrations of >100,000 cells/mL. Contact with blooms should be avoided by people and particularly pet who might later ingest cyanobacteria while grooming themselves.

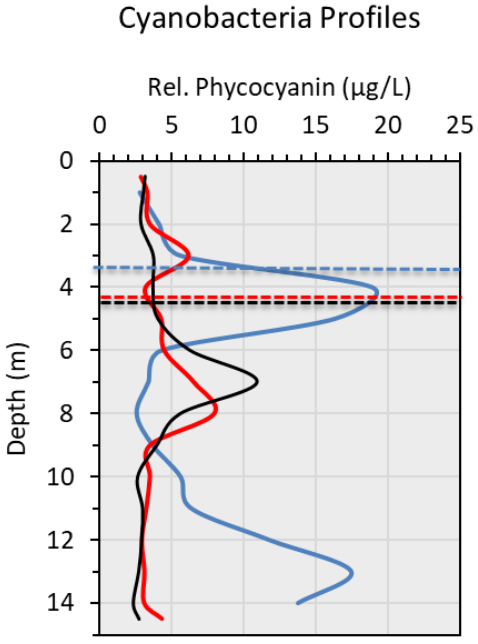

Figure 2. Relative phycocyanin profiles in Ball Pond on May 11th, June 22nd, and July 21st of 2024.

The relative cyanobacteria biomass was also low in the top five meters but increased to its maximum at 7 meters of depth before decreasing to levels similar to those near the surface (Fig. 2).

Conclusions

Open water cyanobacteria concentrations were low and did not present a potential public health threat. However, blooms were photo documented in June. Caution should be used in near shore areas and coves where cyanobacteria concentrations can be higher and reach bloom-forming levels. Cyanobacteria blooms should be reported and documented and contact with blooms avoided by people or pets.

A fishkill was reported on July 15th and photo documented (Fig. 3). Fishkills can occur and are often associated with the stress of spawning. The event has been reported to the CT DEEP and the image has been provided to them for identification. Further similar events should be reported to CT DEEP Inland Fisheries.

Figure 3. Photograph of a fishkill along the shoreline of Ball Pond on July 15, 2024. Photo credit: Elissa Johnson.

The protracted period of anoxic conditions near the bottom of the water column results in the loading of phosphorus into those waters. This may contribute to the maximum concentrations of cyanobacteria at deeper depths where they can take advantage of the elevated phosphorus levels.

Literature Cited

Connecticut Department of Public Health and Connecticut Department of Energy and Environmental Protection. 2023. Guidance to Local Health Departments for Blue–Green Algae Blooms in Recreational Freshwaters. See https://portal.ct.gov/-/media/dph/ehdw/blue-green-algae-blooms/guidance-to-lhd-for-blue-green-algaeblooms.pdf