

# Brawley Consulting Group, LLC

## *Land Conservation and Management Services*

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### **Memo**

**Date:** July 18, 2024  
**To:** Bantam Lake Protective Association  
**From:** Brawley Consulting Group  
**Re:** Results of Cyanobacteria Monitoring of July 15, 2024



### **Summary**

Based on cyanobacteria cell concentrations in samples collected from the lake and other water quality characteristics measured at the lake on July 15, 2024, the risk to the public from cyanobacteria and harmful algal blooms was moderate. Cyanobacteria cell concentrations at two of the three sampling sites, and the lake average were consistent with the State's Visual Rank Category 2 conditions. Recommended public interventions for Category 2 include notify CT DPH and CT DEEP, increase regular visual surveillance until conditions change, and consideration of cautionary postings at public access points ([CT DPH & CT DEEP 2023](#)).

### **Methods and Conditions**

On Monday, July 15<sup>th</sup>, the Brawley Consulting Group collected field data and waters samples from the lake and analyzed those over the next 3 days as part of the biweekly *Cyanobacteria Monitoring Program*. Detailed methods have been described in past summaries. Field data were collected at the North Bay (NB), Center Lake (CL), South Bay (SB) and Foly Point sites. Water samples were collected at the NB, CL, and SB sites and analyzed at Brawley Consulting Group facilities.

Arrival at the Lake was at approximately 9:00 AM. Visible cyanobacteria surface blooms were not observed along the shoreline or in the open water. The lake water did not appear turbid, i.e., clarity appeared good. Winds were light ([Weather Underground 2024](#)).

### **Algae and Cyanobacteria Community**

A total of 26 algal genera were identified in the plankton net or whole water samples. The Chlorophyta (aka green algae) and Cyanophyta (aka cyanobacteria or blue-green algae) had the greatest richness (numbers of different genera) with 8 and 7 genera identified, respectively. Bacillariophyta (aka diatoms) and Chrysophyta (aka golden algae) were represented by 5 and 3 genera, respectively. Two other taxonomic groups were represented by two or less genera.

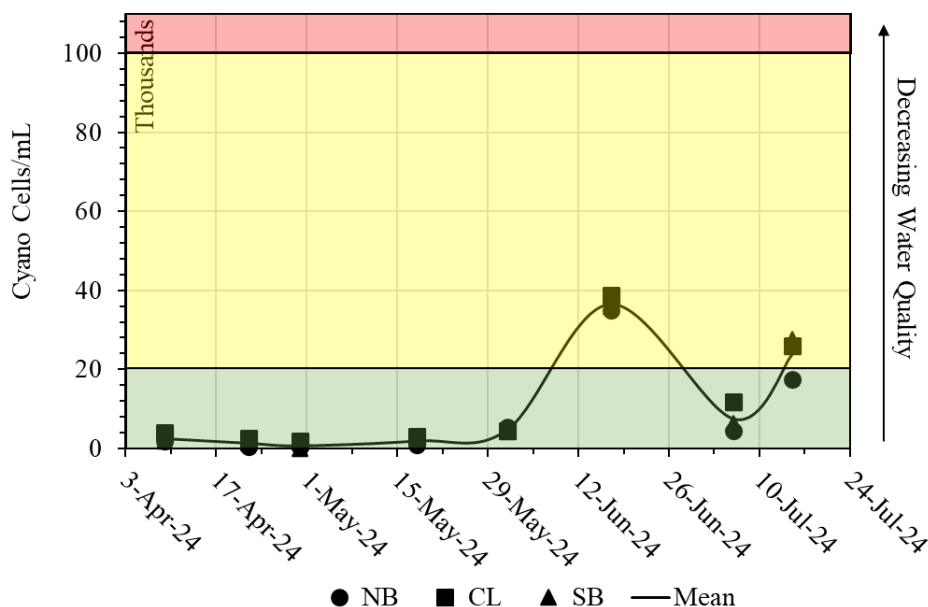


Figure 1. Cyanobacteria cell concentrations at the North Bay (NB), Center Lake (CL), and South Bay (SB) sites in the 2024 season at Bantam Lake. The plot is color coded to represent the CT DEEP’s Visual Rank Categories for risk from harmful algal blooms: green = low risk; yellow = moderate risk; and red = high risk.

Cyanobacteria at two of the counted three sites, and the lake average, increased since July 6<sup>th</sup> to levels just over the threshold for moderate risk (Fig. 1). As a group cyanobacteria accounted for 95%, 98%, and 86% of all cells counted at the NB, CL, and SB sites, respectively. The most abundant cyanobacteria genus at NB was *Dolichospermum spp.* followed by *Aphanizomenon spp.* At the CL and SB sites, *Aphanizomenon spp.* was the dominant, followed by *Dolichospermum spp.* Cyanobacteria cell concentrations at all sites were between 17,491 and 27,606 cells/mL (Table 1). For comparative purposes, the CT DEEP recommends a threshold of 20,000 cells/mL as the cutoff between low public risk and moderate public risk, and 100,000 cells/mL as the cutoff between moderate and high risk from harmful algal blooms (Fig. 1).

### Water Quality

Several other indicators of algal and cyanobacteria productivity and water quality measured as part of this monitoring program were Secchi disk transparency and relative phycocyanin concentration. Secchi transparency is a measurement indicating how far light transmits through the water column. The more algae and other particulate matter suspended in the water column, the less Secchi disk transparency will be and vice versa. Secchi transparencies on July 15<sup>th</sup> at all sites were between 2.43 and 2.99 meters (Table 1). The average for July 15<sup>th</sup> was 2.77 meters, which was comparable with lake averages since mid-June (Fig. 2).

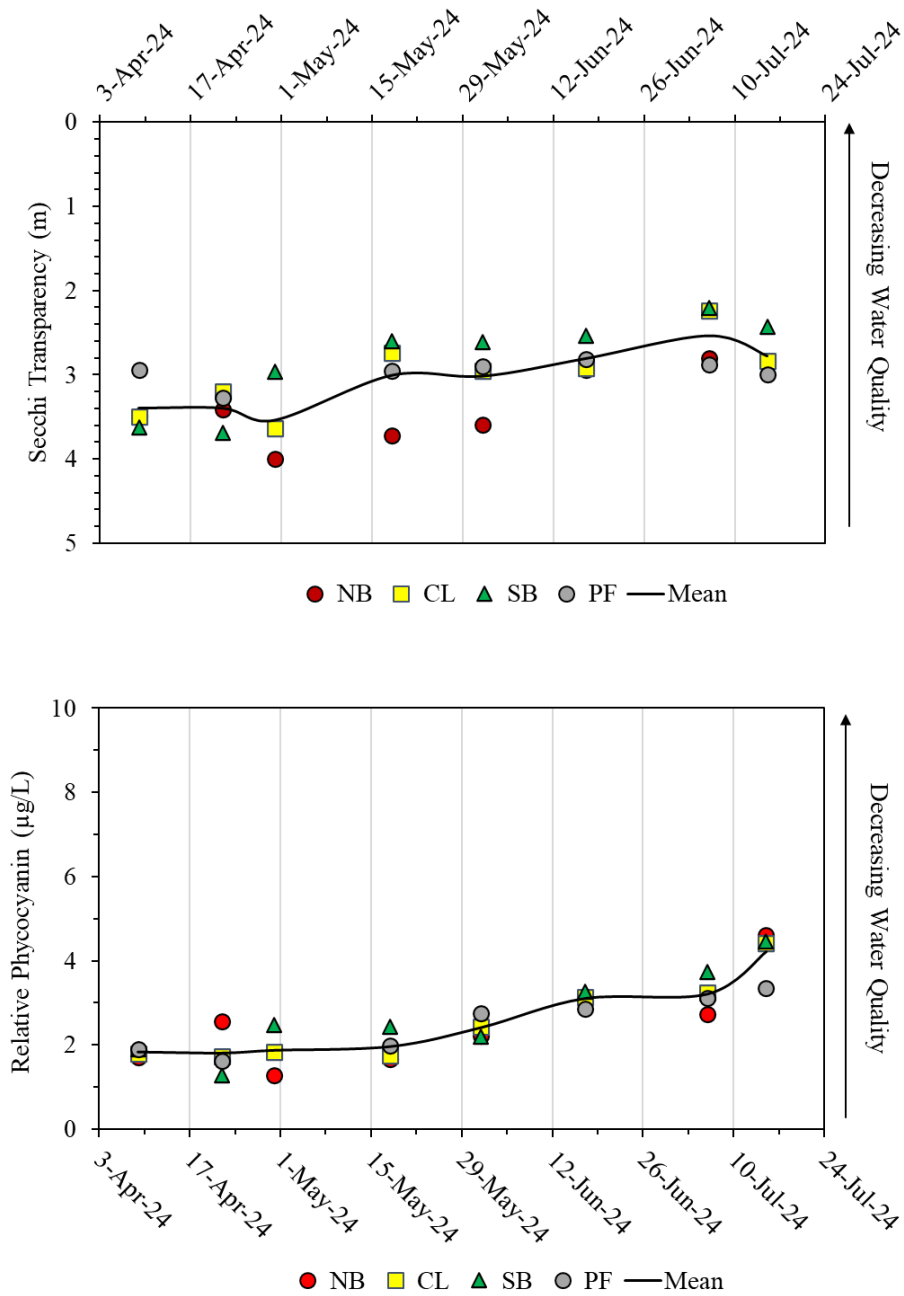


Figure 2. Secchi disk transparencies (top) and relative phycocyanin concentrations (bottom) at the North Bay (NB), Center Lake (CL), South Bay (SB), and Folly Point (PF) sites on Bantam Lake in 2024

Phycocyanin is a photosynthetic pigment mostly unique to freshwater cyanobacteria. It was measured throughout the water column with the fluorimeter in the scientific instrumentation used in the monitoring program. Measurements were relative in that the meter was not calibrated with a primary standard. Although relative, they were useful in that they were comparable to measurements collected at different depths and dates. The average for the top three meters of the water column were used here, as they have in the past.

Relative phycocyanin levels on July 15<sup>th</sup> were up from those measured on July 6<sup>th</sup> with lake averages of 4.2 and 3.2 recorded for those respective dates (Fig. 2).

For comparative purposes, we regressed relative phycocyanin concentrations against corresponding cyanobacteria cell concentrations measure at sites from 2020 to 2023 to create a simple two-dimensional model of Bantam Lake. The April 2024 / May 2024 data, June 2024, and July 2024 data were added as separate datasets (Fig. 3). The July 15<sup>th</sup> data, while still relatively low, was starting to indicate an increase in cyanobacteria productivity.

Similarly, another two-dimensional model was developed by regressing relative phycocyanin concentrations and Secchi disk transparencies from 2020 to 2023 (Fig. 4). Like with the previous model, the April 2024 / May 2024 dataset, the June 2024 dataset, and July 2024 dataset were situated at the far end (red, light blue, and yellow, respectively) of the model where lowest relative phycocyanin and highest Secchi disk transparencies were plotted, i.e. best water quality conditions.

Table 1. Site characteristics and cyanobacteria cell concentrations at Bantam Lake on July 15, 2024.

Sites	Cyanobacteria cells (cells/mL)	Total Depth (m)	Secchi Transparency (m)	Temperature Top/Bottom (°C)	Oxygen Top/Bottom (mg/L)
North Bay	17,491	6.20	2.84	28.4 / 20.3	8.2 / 0.0
Center Lake	25,980	8.00	2.83	28.0 / 17.3	8.6 / 0.0
South Bay	27,606	4.63	2.43	27.8 / 25.4	8.7 / 4.3
Folly Point	---	6.45	2.99	28.0 / 23.3	8.6 / 0.2

### Site Condition

The water columns at three of the four sites were stratified. A thermocline was detected between 5 and 6 meters of depth at NB, CL, and FP sites. Resistance to mixing at the thermocline was strong at the CL site. The SB water column was mixed.

Oxygen was depleted (<1 mg/L) by 5 meters of depth at NB and CL sites, at 6 meters at FP. At SB, where the water column was mixed, the oxygen concentration decreased from 8.7 mg/L near the surface to 4.3 mg/L at the bottom.

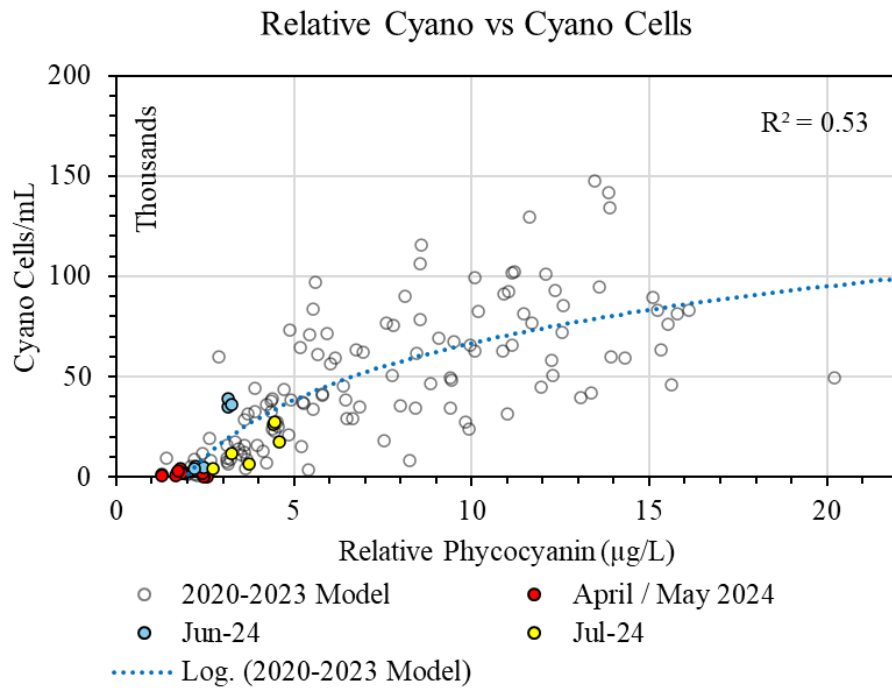


Figure 3. Model of Bantam Lake based on regression of paired cyanobacteria cell concentrations and relative phycocyanin concentration measured at Bantam Lake from 2020 to 2023. The 2024 data have been added as separate datasets.

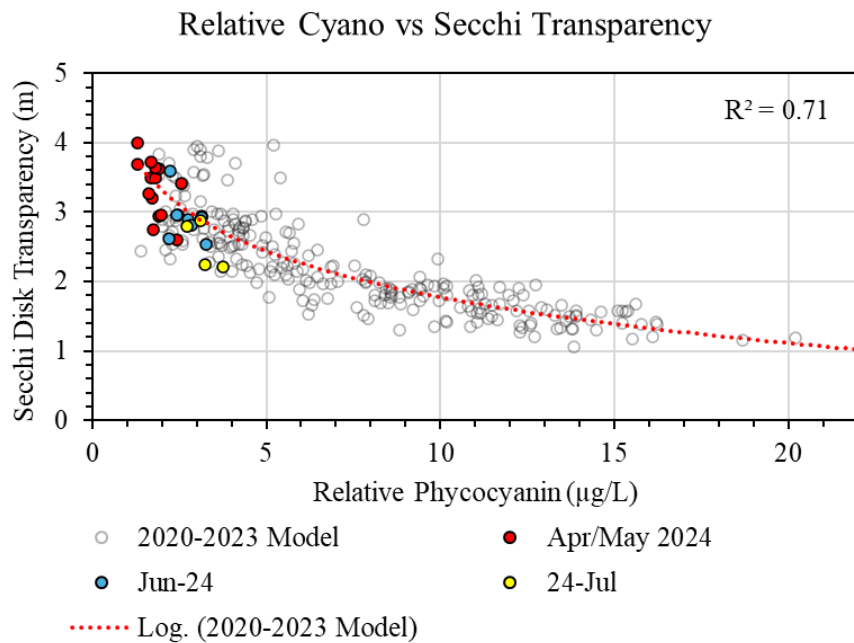


Figure 4. Model of Bantam Lake based on regression of paired Secchi disk transparencies and relative phycocyanin concentrations measured at Bantam Lake from 2020 to 2023. The 2024 data have been added as separate datasets.

## **Conclusions**

The public risk from cyanobacteria at Bantam Lake on July 15, 2024, was moderate based on the cyanobacteria cell concentrations. Concentrations at two of the three counted sites and the lake average were within the Visual Rank Category 2 level. Secchi transparency remained good while relative phycocyanin levels modestly increased over early July levels.

Submitted by,



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## **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>