



Cyanobacteria Monitoring Bi-Weekly Report of Orleans Ponds.

Sampling for the week of: July 25th, 2022.

Report prepared by: Rebecca Miller, Taylor Lanxon, Lenny Pitts. Chiara Nava

Report prepared for: The Town of Orleans

Data collected by: Rebecca Miller, Brooke Withers, Chiara Nava, Leah Stucke, Meribeth Ratzel and Taylor Lanxon, APCC Cyanobacteria Monitoring Program.

Reviewed by Kevin Johnson, Ecologist.

Sample collection by: Members of Both Orleans Pond Coalition and Brewster Ponds Coalition

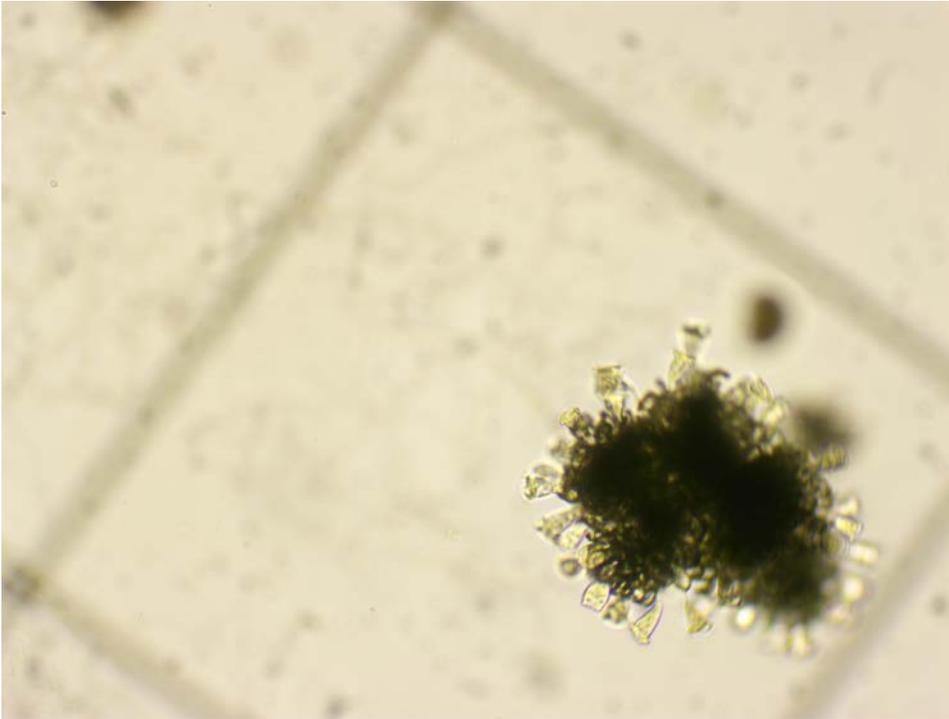
For more information: <https://apcc.org/our-work/science/community-science/cyanobacteria/>

Pond	Sample Date	Pond Water Temp (F)	General Turbidity	Dominant Genus	BFC PC ave. (ug/L ⁻¹) *	Estimated BFC microcystin concentrations (ug/L ⁻¹)			Net growth rate (ud ⁻¹)			Cyano. Scum	Recent Activity	Current Risk Category
						MC (Cl-) *	MC *	MC (Cl+) *	<50um	WLW	BFC			
Bakers	7/27/22	80	Clear	DS	100	-	-	-	-	-	0.08	-	6/29/22- Acceptable 7/13/22- Potential for Concern 7/20/22- Potential for Concern	Potential for Concern
Pilgrim	7/28/2022	79.1	Clear	DS	23	-	-	-	-	-	-0.12	Confirmed cyanobacteria scum present	7/5/22- Potential for Concern 7/13/22- Acceptable 7/19/22- Potential for Concern	Potential for Concern
Uncle Harvey's	7/28/2022	78.7	Clear	WO	124	-	-	-	-	-0.07	0.05	Confirmed cyanobacteria scum present	7/5/22- Potential for Concern 7/13/22- Potential for Concern 7/19/22- Potential for Concern	Potential to Concern

* Phycocyanin and microcystin concentrations ($\mu\text{g L}^{-1}$) reported to the nearest whole number. Complete data set available upon request.

Notes

Bakers, Pilgrim and Uncle Harvey's remain in the Potential for Concern category. Bakers and Uncle Harveys experienced elevated net daily cyanobacteria growth rates. Pilgrim and Uncle Harvey's each had cyanobacteria bloom accumulations. Pictures of the cyanobacteria scum on Pilgrim have been sent on to MDPH to request guidance on whether an advisory is necessary. If an advisory is recommended, Pilgrim will be elevated to the Use Restriction Recommended category. These ponds will be resampled next week on the normal schedule for Orleans ponds.



Above: DS found in Uncle Harvey's Pond on July 28th, 2022.



Above: Confirmed cyanobacteria scum lines found in Uncle Harvey's Pond on July 28, 2022.



Above: Confirmed cyanobacteria scum seen at Pilgrim Lake on July 28, 2022.

Abbreviations:

C&D (Composition and Dominance) Identifies the dominant genus of cyanobacteria found in the sample.

BFC PC (Bloom Forming Colonies Phycocyanin Concentration)

WLW (Whole Lake Water)

DS (*Dolichospermum*) Common genus of cyanobacteria. Produces regulated toxins at low level.

MC (*Microcystis*) Common genus of cyanobacteria. Produces regulated toxins at relatively high levels.

Mixed Indicates that no single genus of cyanobacteria was found to be dominant. A genus must be found to have a composition and dominance of at least 70% to be considered the dominant genus in a sample.

WO, AZ (*Woronochinia* and *Aphanizomenon*) Additional genera of cyanobacteria that are believed to produce regulated toxins at a similar rate to *Dolichospermum*.

Risk Category Descriptions

Cyano Status: Acceptable

Definition: No concerning cyanobacteria results at the time and place of sampling. To the best of our knowledge and based on our monitoring results, regular recreational usage of the pond is safe with respect to cyanobacteria and toxins. Map color is blue. Formerly the Low Warning Tier.

Cyano Status: Potential for Concern

Definition: Monitoring results at the time and place of sampling indicate either moderate risk for potential exposure to cyanobacteria toxins or a likelihood for higher cyanobacteria risks in the near future. While these conditions pose low health risks to adults, risks are higher for children or pets, particularly if contaminated water is incidentally ingested. Children may inadvertently consume pond water while swimming and pet exposure can result from directly drinking pond water or from grooming after swimming. Due to lower body masses, children and pets are more susceptible to cyanobacteria risks than adults. A “Pet Advisory” may be posted at public access points. Map color is yellow. Formerly the Moderate Warning Tier.

Cyano Status: Use Restriction Warranted

Definition: Monitoring results at the time and place of sampling indicate a high risk for potential exposure to cyanobacteria toxins, based on one or more of the following criteria: 1) exceedance of microcystin according to MDPH guidance, 2) presence of cyanobacteria scum layers according to MDPH guidance, or 3) a municipal health agent issues a closure for any other reason related to cyanobacteria. Recreational risk to adults is moderate following exposure. Recreational risks are especially high for children and pets following exposure through accidental ingestion of contaminated water. Children may inadvertently consume pond water while swimming and pet exposure can result from directly drinking pond water or from grooming after swimming. Due to lower body masses, children and

pets are more susceptible to cyanobacteria risks than adults. A “Use Restriction Advisory” has been recommended for public access points. Map color is red. Formerly the High Warning Tier.

2022 Risk Category Criteria

APCC 2022 Cyanobacteria Risk Categories				
Criteria	APCC Acceptable	APCC Potential for Concern	Use Restriction Warranted	
Microcystin	Estimated microcystin calculated by APCC.	Less than the confidence interval for phycocyanin converted to 8 ppb <u>estimated</u> microcystin in APCC’s BFC (bloom-forming colonies) sample for <i>Microcystis</i> spp. dominated samples ^{2,4} .	Within or greater than the confidence interval for phycocyanin converted to 8 ppb <u>estimated</u> microcystin in APCC’s BFC sample for <i>Microcystis</i> spp. dominated samples ^{2,4} .	
	Measured microcystin by BCDHE Water Quality Lab.	Less than 4 ppb microcystin <u>measured</u> in GRAB sample.	Between or equal to 4 and 8 ppb microcystin <u>measured</u> in GRAB sample.	Greater than 8 ppb microcystin <u>measured</u> in GRAB sample ³ .
Cyanobacteria Biomass	Cyanobacteria daily growth rate calculated by APCC.	Less than 0.05 in all APCC samples ^{1,2,4} .	Greater than or equal to 0.05 and where the genus specific biomass concentration remains elevated in any APCC sample ^{1,2,4} .	
	Cyanobacteria bloom material confirmed by APCC.	None present at the time and place of sample collection.	A slight cyanobacteria scum or small patches of cyanobacteria bloom material sampled and confirmed ¹ .	Significant cyanobacteria scum or large patches of cyanobacteria bloom material sampled and confirmed ^{1,3} .
Notes	<p>To interpret cyanobacteria data using this table, the most hazardous result determines the category the pond is placed in from right to left. A pond that meets even a single criterion in the “Use Restriction Warranted” column will be placed in that category. Likewise, a pond that meets even a single criterion in the “APCC Potential for Concern” category, but does not meet any criteria in the “Use Restriction Warranted” category, will be placed in the “APCC Potential for Concern” category. If a pond meets no criteria in the “Use Restriction Recommended” or the “APCC Potential for Concern” category, that pond is placed in the “APCC Acceptable” category.</p> <p>¹ Developed with recommendations from Karen Malkus-Benjamin, former Coastal Health Agent for the Town of Barnstable. ² Developed with recommendations from Nancy Leland of Lim-Tex Inc. and affiliated with the University of New Hampshire Center for Freshwater Biology. ³ Criteria attributed to MDPH. ⁴ Predictive cyanobacteria metrics that project and estimate risks, rather than reactive cyanobacteria metrics that measure risk after a bloom has occurred.</p>			

Contact: Kevin Johnson, APCC Ecologist and Cyanobacteria Program Coordinator

Email: kjohnson@apcc.org