Cyanobacteria Monitoring Bi-Weekly Update of Orleans Ponds

Sampling for the week of: June 17, 2024
Report prepared for: Town of Orleans and the Orleans Pond Coalition
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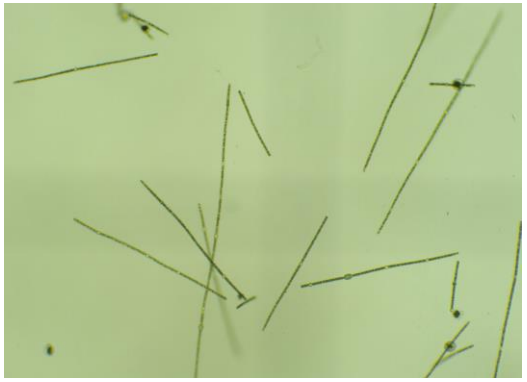
Sample collection by: The Orleans Pond Coalition
For more information: Cyanobacteria | Association to Preserve Cape Cod (apcc.org)

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			
Boland Pond	6/18/24	74	Slightly Cloudy	DS	1487.96	-		-	0.107	-0.162	0.036	-	Use Restriction Warranted 5/29/24 6/05/24: Use Restriction Warranted 6/10/24 Acceptable	Acceptable
Pilgrim Lake	6/18/24	72.1	Clear	DS	727.25	-		-	0.457	0.628	0.529	-	5/29/24: Acceptable 6/10/24 Use Restriction Warranted	Use Restriction Warranted

*All BFC PC values rounded to the nearest whole number. Complete data set available upon request.

Notes: At Pilgrim Lake no scum was observed if after the second monitoring conditions continue to improve the Use Restriction Recommendation will be lifted. For Bolands Pond was determined Acceptable as there was no scum and the growth rate is negative.

Photos:



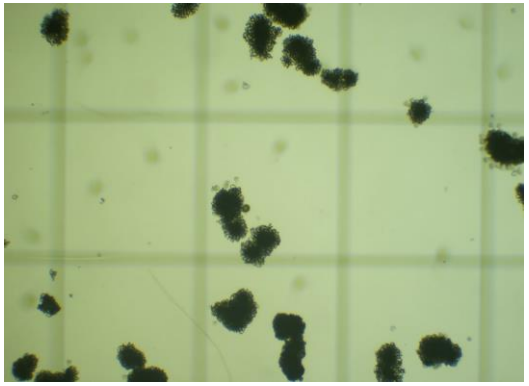


Photo 1. Boland Pond Orleans 6/18/24 Photo 2. Boland Pond Orleans 6/18/24 *Dolichospermum* spp. Photo 3. Pilgrim Lake, Orleans 6/18/24 *Dolichospermum lemmermannii*

Abbreviations:

CI Confidence index range of estimated value for microcystin based on regression model developed by Nancy Leland of Lim-Tex Inc

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.

MCY(*Microcystin*) Toxin produced by many genera -measured by County Lab with ABRAXIS or ELISA methods.

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

Acceptable
Definition: No concerning cyanobacteria results at the time and place of sampling. To the best of APCC's knowledge and based on our monitoring results, toxin levels are below State standards for recreational usage of the pond with respect to cyanobacteria and toxins.
Map color is blue.
Formerly the Low Warning Tier.
Recommended Sampling Frequency: Biweekly.
In samples containing low levels of cyanobacteria with high growth rates APCC will recommend weekly sampling.
Recommended Action: None.

Potential for Concern
Definition: Monitoring results or the presence of cyanobacteria scum at the time and place of sampling indicate a potential for increased risk for exposure to cyanobacteria toxins approaching but below state standards. Conditions do not yet warrant the posting of a recreational human health advisory according to guidelines from the Massachusetts Department of Public Health (MDPH). While these conditions pose low health risks to adults, risks are higher for children or pets based on lower body mass, particularly if contaminated water is incidentally ingested. Children may inadvertently consume pond water while swimming and pet exposure can result from drinking or ingesting pond water or from grooming after swimming.
Map color is yellow.
Map color yellow with crosshatching indicates a municipal pet advisory has been issued.
Formerly the Moderate Warning Tier
Recommended Sampling Frequency: Weekly.

Recommended Action:

1. APCC or the town will provide a GRAB sample for toxin analysis to the Barnstable County Water Quality Lab for samples suspected of possibly exceeding the MDPH guidelines for microcystin in recreational waters.

2. A "Pet Advisory" or similar advisory may be posted in accordance with each town's policies and procedures until the pond returns to Acceptable status.

3. Sampling should be increased to weekly until all results are once again in the "Acceptable" category.

Use Restriction Warranted

Definition: Monitoring results at the time and place of sampling indicate the pond is unsafe for recreation by humans and pets based on one or more of the following criteria: 1) presence of microcystin at or above state standards (8 ppb microcystin) as described in MDPH guidance, 2)presence of significant cyanobacteria scum layers according to MDPH guidance, 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 ingestion or 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.

Map color is red.

Map color red with crosshatching indicates a municipal advisory has been issued.

Formerly the High Warning Tier.

Recommended Sampling Frequency: Weekly.

Recommended Action:

1. APCC or the town will provide a GRAB sample for toxin analysis to the Barnstable County Water Quality Lab for samples suspected of possibly exceeding the MDPH guidelines for microcystin in recreational waters.

2. The town should post a recreational advisory or similar advisory according to municipal policies and procedures and otherwise notify the public to avoid contact and exposure until the pond meets criteria to be reopened or the advisory is lifted by the local health agent.

3. Sampling should be conducted weekly until there are two consecutive weeks when results include no significant cyanobacteria scum and toxin testing of samples contain a microcystin concentration below 8 ppb.

APCC 2023 Cyanobacteria Risk Categories Revised 7/26/2022				
Criteria[1]		**APCC Acceptable**	**APCC Potential for Concern**	**APCC Use Restriction Warranted**
Microcystin	Potential microcystin calculated by APCC based on measurement of phycocyanin in Bloom Forming Colony samples.	Potential microcystin calculated at low levels that do not warrant additional toxin testing[2,4].	Potential microcystin is elevated to a point where an exceedance is deemed possible and confirmatory toxin testing warranted[2,4].	
	Measured microcystin by Barnstable County Water Quality Lab.	Less than 4 ppb microcystin measured in GRAB sample.	Between 4 and 8 ppb microcystin measured in GRAB sample.	Greater than 8 ppb microcystin measured in GRAB sample[3].
Cyanobacteria Blooms and Scums	Cyanobacteria bloom material reported and confirmed by APCC.	None present at the time and place of sample collection.	A cyanobacteria scum or bloom is present but is deemed to be insignificant by the Massachusetts Department of Public Health and the town's health agent.	A cyanobacteria scum or bloom is present and is deemed to be significant by the Massachusetts Department of Public Health or the town's health agent[3].

Notes	[1]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 "APCC Use Restriction Warranted" category, will be placed in the "APCC Potential for Concern" category. If a pond meets no criteria in the "APCC Use Restriction Recommended" or the "APCC Potential for Concern" category, that pond is placed in the "APCC Acceptable" category. [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.

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