Cyanobacteria Monitoring Program 2022 Report

Summer – Fall 2022

Wenscott Reservoir, North Providence, R.I – August 2022

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Introduction

Cyanobacteria (blue-green algae) are microscopic, photosynthetic bacteria naturally found in waterbodies. These organisms either attach to a substrate or float in the water column as individual cells or within colonies. There are many factors that may cause cyanobacteria to experience rapid growth events known as blooms. These factors include light availability, alteration of water flow, water temperature, pH, and excess nutrients.

Some freshwater cyanobacterial blooms are able to produce highly potent toxins, known as cyanotoxins. These toxins can potentially cause health risks for humans as well as wildlife, pets, and livestock. Cyanotoxins are produced and contained within the cyanobacterial cells (intracellular). The release of these toxins in an algal bloom into the surrounding water occurs mostly during cell death and lysis (i.e., cell rupture). Some cyanobacteria species are capable of releasing toxins (extracellular) into the water without cell rupture or death.

The Rhode Island Department of Health (RIDOH) and the Rhode Island Department of Environmental Management's Office of Water Resources (RIDEM OWR) work cooperatively to monitor for the presence of cyanobacteria blooms, evaluate the potential risk to the public, and issue advisories notifying the public of health concerns. The agencies jointly issue health/recreational advisories when any of the following three thresholds are met:

- Evidence of a visible cyanobacteria scum, mat, or pond/lake-wide cyanobacteria bloom.
- Cyanobacteria cell count exceeding 70,000 cells/mL.
- Toxin (Microcystins -LR) level of lysed cells meeting or exceeding 4 ppb (µg/L).

The advisories recommend that individuals avoid all contact with the affected waterbody, including recreational activities such as swimming, boating, or fishing. People are also advised to not eat fish from the affected waterbody or to allow pets to wade in, swim in, or drink untreated water from the affected waters.

RIDEM OWR receives reports annually about nuisance algal conditions and potential cyanobacteria blooms from municipal staff, lake and watershed associations, and the broader public. RIDEM began monitoring for cyanobacteria in 2011, with biweekly monitoring for ponds that frequently bloom beginning in 2017.

From 2011 to 2022, forty-one (41) waterbodies[1] have had advisories issued with an average of approximately fifteen (15) waterbodies per year. Ten (10) of the forty-one waterbodies are public drinking water supplies and nearly all the remaining waterbodies have a public boat/canoe launch, are routinely used for recreational activities, or have a well-known public access point.

[1] Unless otherwise noted, Roger Williams Park Ponds are counted as one waterbody in this report (Polo Lake, Willow Lake, Roosevelt Lake, Pleasure Lake, Edgewood Lake, Cunliff Lake, Elm Lake, Japanese Gardens).

In 2022, OWR monitored twenty-eight (28) waterbodies. This report provides a summary of the results of the 2022 cyanobacteria monitoring program. Previous year's reports, as well as a table listing all advisories from 2011-present, are located at RIDEM OWR's Cyanobacteria homepage.

Methods

RIDEM OWR's Freshwater Harmful Algal Bloom Monitoring Quality Assurance Project Plan (QAPP) describes in detail the field and analytical methods and Quality Assurance/Quality Control (QA/QC) procedures related to this sampling program. The QAPP was approved by EPA in 2017. QAPP addenda are generated annually to update the list of regularly monitored waterbodies.

The first field visit of the 2022 season occurred on May 20th, 2022, while the last field visit occurred on December 27th, 2022. During each visit, a field sheet was filled out and photographs were taken, regardless of whether a bloom was observed. The field sheet documented information about location, extent and physical appearance of blooms, weather conditions, any active recreation occurring at the waterbody, and presence/absence of any dead or distressed fish or wildlife.

If a bloom was observed during a visit, one or more samples were collected following the procedure outlined in the QAPP. Samples were collected from the shoreline with the aid of a sampling stick from the densest portion of the bloom. Typically, monitoring and sample collection occurred at public access points on each pond. If no public access was available, monitoring and sample collection were done from a secondary access location or through permission of a private owner. A list of the ponds visited in 2022 and access locations for each pond are provided in Table 1. A map of the pond locations throughout the state is provided in Figure 1. Waterbodies listed as "Screening Level" were selected for monitoring at the start of the 2022 season due to having a history of frequent cyanobacteria blooms in previous years. These waterbodies were visited approximately every two weeks from early June through October. "Response Level" waterbodies were visited in response to calls or emails from the public.

Samples were submitted to the Rhode Island State Health Laboratory for cyanotoxin analysis and identification/enumeration by colony count of cyanobacteria genera. The cyanotoxins identified by the lab are listed in Table 2, and the cyanobacteria genera are listed in Table 3, along with the thresholds for issuing an advisory. RIDEM OWR staff estimated cyanobacteria cell counts from colony counts using conversion factors provided in Hartman and Graffius (1960) (Table 4). Since there are no criteria for issuing an advisory based on colony counts, estimating cell counts from colony counts allows for more thorough identification of potentially harmful blooms.

Cyanotoxin concentration, colony count, cell count estimation, and visual appearance were evaluated by RIDEM OWR and RIDOH staff, and an advisory was issued if any of the advisory thresholds were met. If an advisory was issued for a waterbody because of a response visit, the waterbody was subsequently added to the routine biweekly monitoring list for the rest of the season.

Advisories generally remained in place until two successive and representative sampling rounds conducted one or two weeks apart achieved cell count and toxin levels below the threshold concentrations. After the end of the recreation season (typically early November), visual assessments were conducted to lift the remaining advisories in place. If the visual assessment indicated that the bloom had subsided, the advisory was lifted; however, since there is no guarantee that toxins are not present without confirmatory sampling. The public were therefore advised to continue to exercise caution around these waters.

Biweekly monitoring summaries describing conditions during field visited were generated and distributed to relevant RIDEM and RIDOH staff. The biweekly summaries, photographs, copies of field sheets, chain of custody forms, and laboratory data reports are filed in hard copy and electronically with RIDEM OWR in the Providence office.

Table 1: List of waterbodies evaluated for cyanobacteria blooms during 2022 season.

Monitoring Program Type	Name	Town	Waterbody ID	Primary Access
Screening Level	Almy Pond	Newport	RI0010047L-01	Off Coggeshall Ave on Southern side
	Blackamore Pond	Cranston	RI0006018L-06	On Winter Street at the boat ramp
	Central Pond	East Providence	RI0004009L-01A	On Newman Ave
	Georgiaville Pond	Smithfield	RI0002007L-02	From public beach on Still Water Rd
	J.L. Curran Reservoir (Upper)	Cranston	RI0006016L-02	Off Seven Mile Rd (boat launch area)
	Larkin Pond	South Kingstown	RI0008039L-11	From Camp Hoffman and Kingston's Camp Beach
	Little Pond	Warwick	RI0007024L-01	Behind Warwick Veteran Junior High School
	Lower Melville Pond	Portsmouth	RI0007029R-04	Near gate at the end of Smith Rd
	Mashapaug Pond	Cranston	RI0006017L-06	From the boat launch behind the baseball field at JT Owens Park

Monitoring Program Type	Name	Town	Waterbody ID	Primary Access
Screening Level	Slack Reservoir	Smithfield-Johnston	RI0002007L-03	At public beach off Green Lake Drive or Terrace Dr
	Spectacle Pond	Cranston	RI0006017L-07	Behind Twin Oaks Restaurant
	Stafford Pond	Tiverton	RI0007037L-01	At DEM Boat Ramp on Stillwater Rd
	Tiogue Lake	Coventry	RI0006014L-02	At Briar Point Beach
	Turner Reservoir	East Providence	RI0004009L-01B	Off Newman Ave (route 152) bridge or along Brigham Farm walking area off Brigham Farm Rd
	Upper Melville Pond	Portsmouth	RI0007029R-04	Near elementary school at fishing dock
	Warwick Pond	Warwick	RI0007024L-02	At the boat launch on Wells Ave
	Wenscott Reservoir	North Providence	RI0003008L-05	Across from the Twin Rivers Building off Douglas Pike and Notte Park
Response Level	Barney Pond	Lincoln	RI0003008L-02	Off Grandview Ave
	Bowdish Lake	Glocester	RI0005047L-03	At Bowdish Lake Campground and George Washington State Park Campground
	J.L. Curran Reservoir (Lower)	Cranston	RI0006016L-02	On Spring Lake Trail on Laten Knight Rd
	Johnson's Pond	Coventry	RI0006013L-01	At Zeke's Bridge on Harkey Hill Rd and Island Drive
	Meader Pond	Lincoln	None	Off Meader Pond Rd
	Roger William Park Ponds	Providence	RI0006017L-05	Off FC Greene Memorial Blvd/Natural History Ave

Monitoring Program Type	Name	Town	Waterbody ID	Primary Access
Response Level	Scott Pond	Lincoln	RI0001003L-01	From Saylesville Fire Department
	Spring Lake	Burrillville	RI0001002L-04	At Spring Lake Beach on N. Shore Drive or Spring Lake Fishing area on Black Hut Rd
	Upper Dam Pond	Coventry	RI0006014L-04	Off White Rock Rd
	Volpe Pond	Barrington	None	Off Upland Way
	Wash Pond	South Kingstown	RI0010043L-06	From Hale House off Route 1

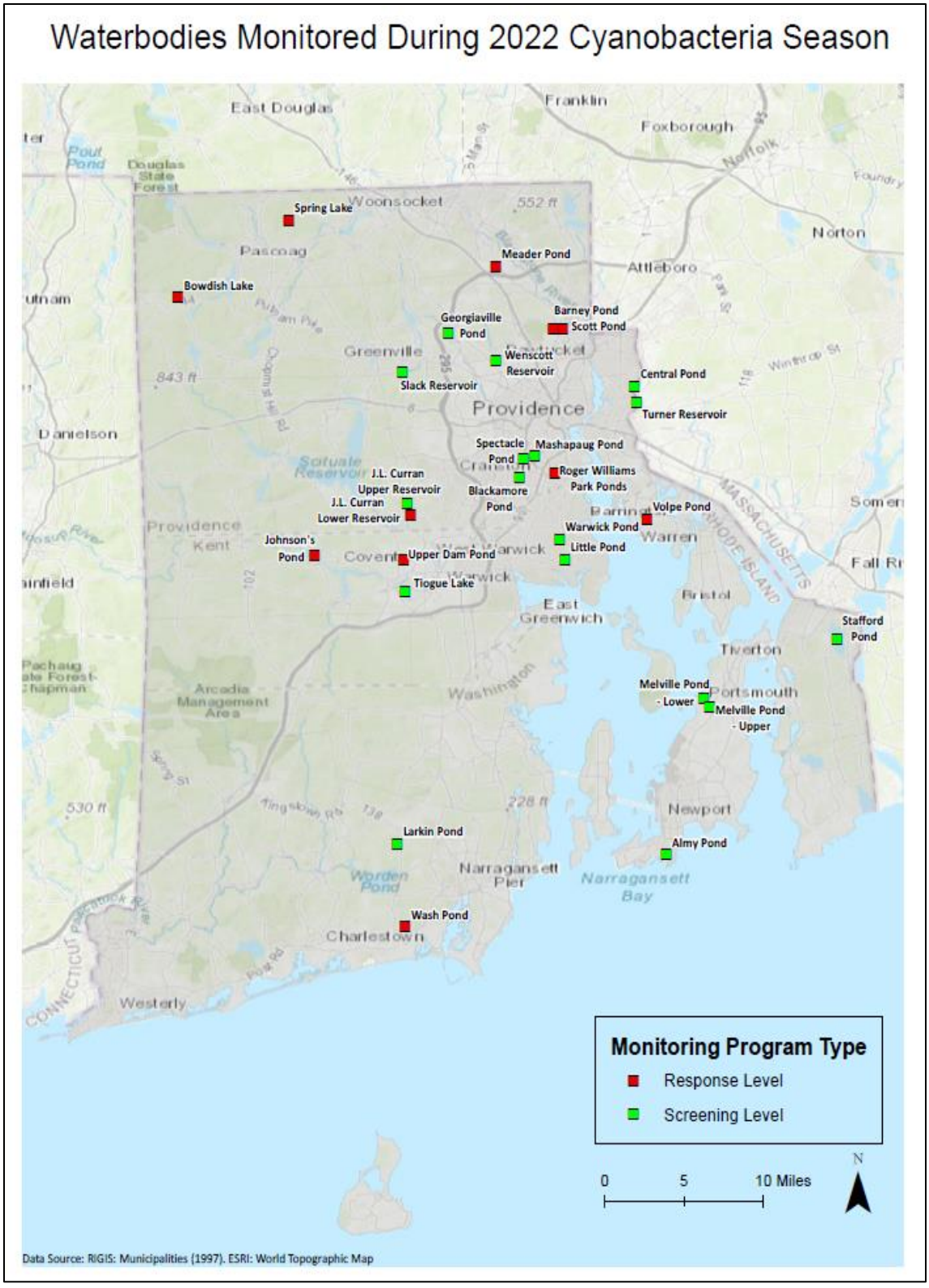


Figure 1: Map of waterbodies monitored during 2022 cyanobacteria season.

Table 2: List of cyanotoxins analyzed and advisory threshold level.

Toxin	Threshold for Issuance of Advisory
Total Microcystins	4.0 µg/L
Cylindrospermopsin	None Defined
Anatoxin	None Defined
Nodularin	None Defined

Table 3: List of cyanobacteria genera identified by the Rhode Island State Health Laboratory.

Genera	Threshold for Issuance of Advisory
Anabaena	>70,000 cells/mL (Total Cyanobacteria)
Aphanizomenon	
Cylindrospermopis	
Microcystis	
Nodularia	
Woronichinia	
Planktothrix	

Table 4: Conversion of cyanobacteria genera colony count to cell count.

Genera	Anabaena	Aphanizomenon (Single)	Aphanizomenon (Bundle)	Microcystis	Planktothrix	Woronichinia
Colony Conversion[1]	X 23	X 28	X 280	X 140	X 28	X 250

[1] Multiply number of colonies by conversion to get estimate of cell count.

Results

In 2022, RIDEM OWR conducted routine biweekly cyanobacteria monitoring of seventeen (17) waterbodies from approximately mid-May through December (Table 1). Additional monitoring of eleven (11) waterbodies was done in response to calls or emails from the public, municipal staff, watershed associations, park and beach staff, or other RIDEM staff about potential cyanobacteria blooms.

The field visits led to the issuance of nineteen (19) advisories for cyanobacteria blooms, fourteen (14) of which were a result of routine monitoring (Table 5). Response visits resulted in the issuance of five (5) advisories.

Table 5: List of confirmed cyanobacteria blooms throughout the 2022 monitoring season.

Waterbody	Town	Date Advisory Posted	Date Advisory Lifted	Basis for Advisory	Routine or Response Visit
Almy Pond	Newport	6/10/2022	12/15/2022	Cell Count	Routine
Turner Reservoir	East Providence	6/24/2022	7/15/2022	Toxins	Routine
Upper Melville Pond	Portsmouth	6/24/2022	12/15/2022	Cell Count and Toxins	Routine
Tiogue Lake	Coventry	6/27/2022	7/15/2022	Toxins	Routine
Roosevelt Lake (Roger Williams Park)	Providence	6/27/2022	7/13/2022	Visual	Response
Lower Melville Pond	Portsmouth	7/7/2022	12/15/2022	Cell Count	Routine
Elm Lake (Roger Williams Park)	Providence	7/8/2022	12/29/2022	Cell Count	Response
Roger Williams Park Ponds	Providence	7/22/2022	12/29/2022*	Cell Count and Toxins	Response
Mashapaug Pond	Cranston	7/22/2022	12/29/2022	Cell Count	Routine
Slack Reservoir	Smithfield-Johnston	7/22/2022	8/3/2022	Cell Count and Toxins	Routine
Johnson's Pond	Coventry	7/29/2022	10/31/2022	Cell Count and Toxins	Response
Larkin Pond	South Kingston	8/5/2022	12/2/2022	Cell Count	Routine
Wenscott Reservoir	North Providence	8/5/2022	12/29/2022	Cell Count and Toxins	Routine
Spring Lake	Burrillville	8/26/2022	9/9/2022	Cell Count and Toxins	Response
Blackamore Pond	Cranston	9/2/2022	12/2/2022	Cell Count and Toxins	Routine
J.L. Curran Upper Reservoir	Cranston	9/21/2022	12/29/2022	Toxins	Routine
Slack Reservoir	Smithfield-Johnston	10/14/2022	11/16/2022	Cell Count and Toxins	Routine
Georgiaville Pond	Smithfield	10/14/2022	12/2/2022	Cell Count and Toxins	Routine
Stafford Pond	Tiverton	10/18/2022	11/16/2022	Cell Count	Routine

*****Advisories were not lifted for Polo Lake, Roosevelt Pond, and Willow Lake in Roger Williams Park in 2022 due to the visual presence of a bloom during the last field visit of 2022.

A total of sixty-nine (69) cyanobacteria samples were collected from twenty-two (22) waterbodies throughout the state. Of the 69 samples, twenty (20) supported the initial issuance of an advisory, twenty-five (25) did not exceed the advisory thresholds and therefore did not result in the issuance of an advisory, and twenty-four (24) were collected as follow-up samples to lift an advisory.

Thirteen (13) advisories remained in place at the end of the recreation season (November 1st). The last round of follow-up sampling to lift advisories was conducted on 11/9/2022 and 11/10/2022. After these dates, visual assessments were conducted in November and December to lift the remaining advisories in place. Advisories were lifted if the visual assessment showed no signs of a cyanobacteria scum, mat, or bloom. The advisories were lifted for all ponds with an advisory in place, except for Roosevelt Pond, Polo Lake, and Willow Lake in Roger Williams Park, which still displayed evidence of a cyanobacteria bloom during the last visual assessment in December.

The highest measured total microcystin concentration was 720 ug/L from a sample collected from Spring Lake in Burrillville on 8/27/2022. The highest total cell count estimation was 4,272,500 cells/mL from a sample collected from Wenscott Reservoir in North Providence on 9/27/2022. The total microcystin threshold of 4 ug/l was exceeded in twelve (12) samples from eight (8) different waterbodies (Figure 2 and Table 7). The cell count threshold was exceeded in eighteen (18) samples from thirteen (13) different waterbodies (Figure 3 and Table 8).

Potentially toxigenic species Anabaena, Aphanizomenon, Microcystis, Planktothrix, Woronichinia and Cylindrospermopis were identified in 50 of the 69 samples collected. Figure 4 shows the distribution of cyanobacteria genera in the 2022 samples. Anabaena was the most abundant, being present in 58% of the collected samples, followed by Microcystis (38%), Anabaena (29%), Woronichinia (23%), Aphanizomenon (16%), Planktothrix (7%) and Cylindrospermopis (1%). Microcystis accounted for the majority of the total cell count from all samples combined at 38%, followed by Anabaena (28%), Woronichinia (19%), Aphanizomenon (13%), and Planktothrix (2%).

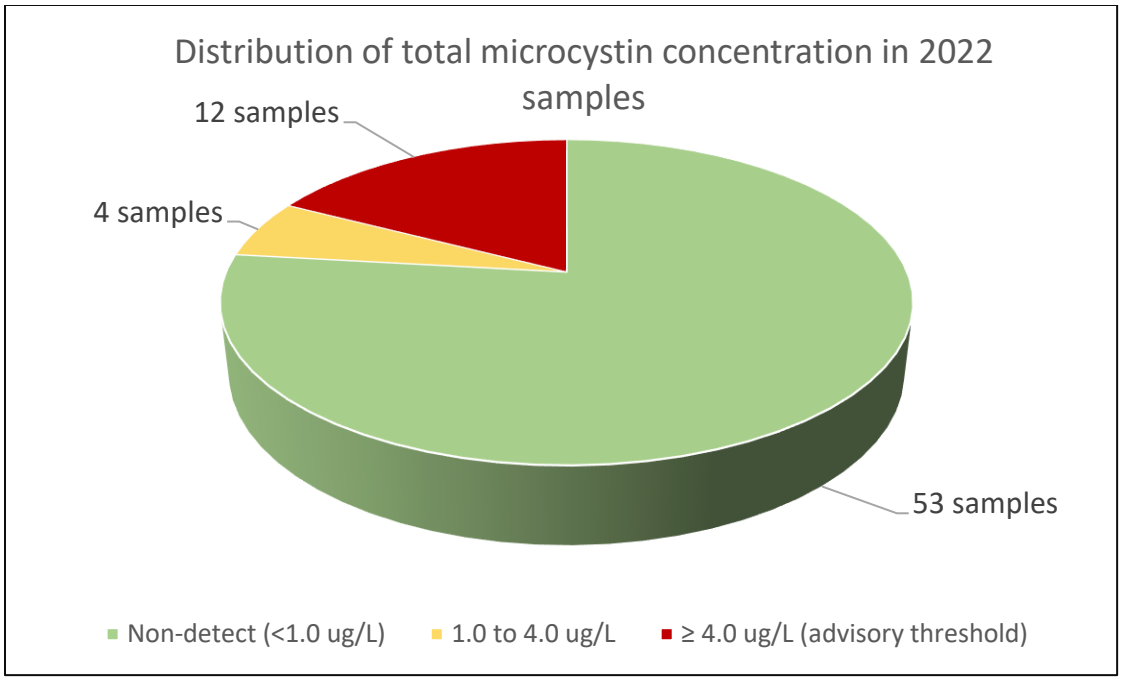


Figure 2: Distribution of total microcystin concentrations in 2022 samples.

Table 6: List of samples exceeding total microcystin concentration advisory threshold.

Waterbody	Town	Sampling Date	Total Microcystins (ug/L)
Blackamore Pond	Cranston	8/31/2022	61.0
Georgiaville Pond	Smithfield	10/13/2022	44.0
J.L. Curran Reservoir	Cranston	9/21/2022	4.2
Johnson's Pond	Coventry	7/28/2022	35.0
Johnson's Pond	Coventry	9/14/2022	120.0
Slack Reservoir	Smithfield-Johnston	7/20/2022	140.0
Slack Reservoir	Smithfield-Johnston	10/13/2022	140.0
Spring Lake	Burrillville	8/25/2022	65.0
Spring Lake	Burrillville	8/26/2022	130.0
Spring Lake	Burrillville	8/27/2022	720.0
Tiogue Lake	Coventry	6/22/2022	5.4
Wenscott Reservoir	North Providence	9/27/2022	55.0

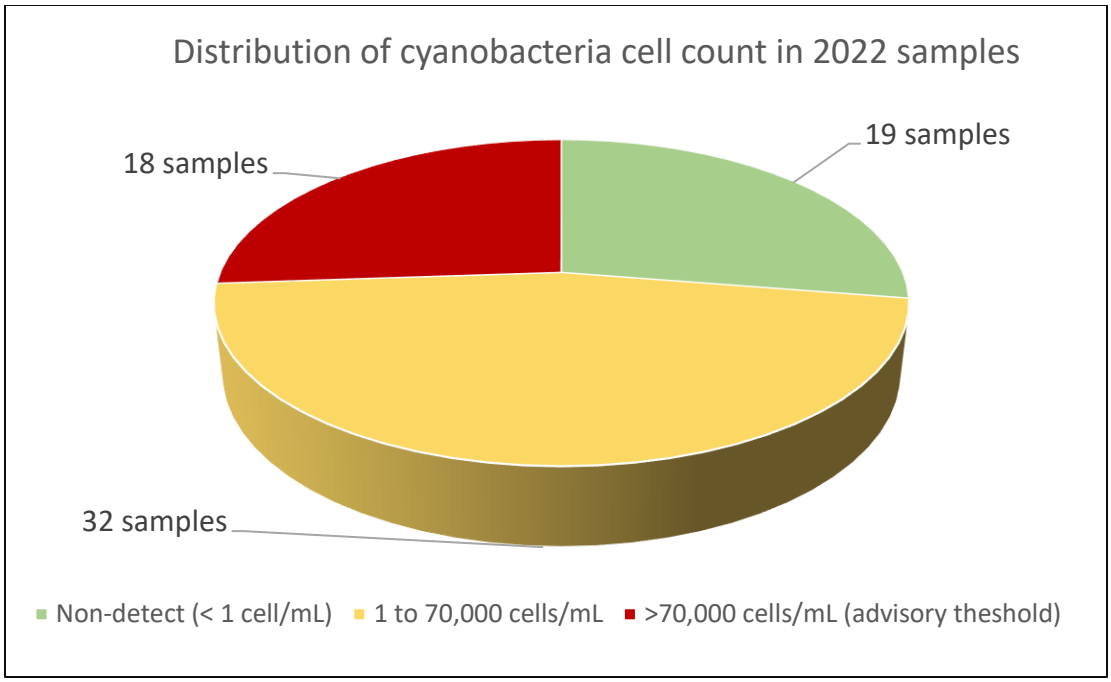


Figure 3: Distribution of cyanobacteria cell count in 2022 samples.

Table 7: Samples exceeding cell count advisory threshold.

Waterbody	Town	Sampling Date	Total Cell Count (cells/mL)
Almy Pond	Newport	06/07/2022	365,380
Blackamore Pond	Cranston	8/31/2022	309,100
Elm Lake (Roger Williams Park)	Providence	7/6/2022	230,800
Georgiaville Pond	Smithfield	10/13/2022	2,735,900
Johnson's Pond	Coventry	7/28/2022	96,790
Johnson's Pond	Coventry	9/14/2022	1,723,700
Larkin Pond	South Kingstown	8/4/2022	161,000
Mashapaug Pond	Cranston	7/19/2022	91,170
Upper Melville Pond	Portsmouth	6/21/2022	177,700
Lower Melville Pond	Portsmouth	7/5/2022	1,462,380
Slack Reservoir	Smithfield-Johnston	7/20/2022	251,040
Slack Reservoir	Smithfield-Johnston	10/13/2022	177,880
Spring Lake	Burrillville	8/26/2022	131,100
Spring Lake	Burrillville	8/27/2022	1,205,840
Stafford Pond	Tiverton	9/27/2022	110,400
Stafford Pond	Tiverton	10/13/2022	98,900
Wenscott Reservoir	North Providence	8/4/2022	1,327,200
Wenscott Reservoir	North Providence	9/27/2022	4,272,500

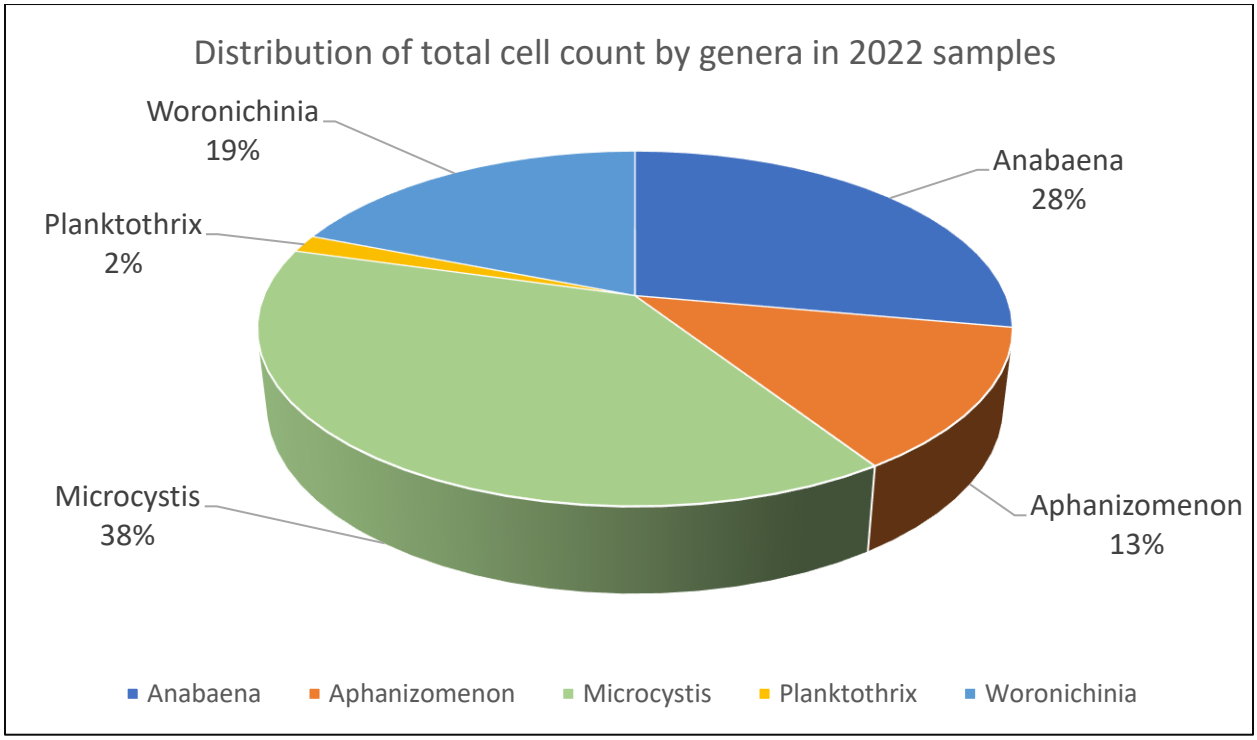


Figure 4: Distribution of total cell count by cyanobacteria genera in 2022 samples.

Conclusions and Future Plans

The results of the 2022 cyanobacteria monitoring season are relatively consistent with previous years. Table 8 summarizes the results of the cyanobacteria monitoring since 2017, when routine biweekly monitoring began (except for 2019 when only response visits were conducted due to lack of funding). There do not appear to be any substantial trends indicating an increase in the number of confirmed blooms or toxin concentrations over the years. As the program continues and more data is collected, RIDEM OWR will continue to evaluate the data for trends. It is of note that the highest recorded total microcystin concentration since the program began occurred in Spring Lake in Burrillville from a sample collected on 8/27/2022, with a value of 720 ug/L. This sample was collected in the vicinity of Spring Lake Beach, a popular recreational area operated by the Town of Burrillville.

Table 8: Summary of selected results from the RI Cyanobacteria Monitoring Program, 2017 to 2022.

	2017	2018	2020	2021	2022
Total number of samples collected	64	37	88	81	69
Number of waterbodies monitored (total)	27	34	28	27	28
Number of waterbodies monitored (in response to calls/emails)	3	10	15	14	11
Number of advisories issued	16	14	17	19	19
Date of first advisory	7/5/2017	6/8/2018	6/24/2020	6/12/2021	6/10/2022
Date last advisory lifted	12/29/2017	12/8/2018	12/31/2020	Two in place as of 12/31/2021	One in place as of 12/31/2022
Percent samples exceeding the cell count threshold	44	45	30	22	28
Percent samples exceeding the total microcystin threshold	33	11	7	12	18
Highest total microcystin concentration (ug/L)	600	53	260	170	720
Waterbody with the highest total microcystin concentration	Slack Reservoir (Smithfield/Johnston)	Slack Reservoir (Smithfield/Johnston)	Slack Reservoir (Smithfield/Johnston)	Worden Pond (South Kingstown)	Spring Lake (Burrillville)

The results from the 2022 cyanobacteria monitoring season continue to demonstrate the importance of routine, biweekly monitoring of the waterbodies that experience frequent cyanobacteria blooms. Fourteen (14) of the nineteen (19) advisories issued in 2022 resulted from routine monitoring efforts, and similar results were seen in previous years where RIDEM

OWR conducted routine biweekly monitoring. Public involvement and awareness are still crucial to identifying problematic cyanobacteria blooms but relying solely on the public to report blooms would likely result in many blooms going undetected which could in-turn increase the potential for contact with these waterbodies resulting in cyanobacteria-related health effects to the public and or pets.

Follow-up sampling conducted this season for the purpose of lifting advisories continues to highlight the complicated nature of cyanobacteria blooms and the difficulties associated with issuing and rescinding advisories in a timely manner. On some ponds, blooms subsided then re-emerged over periods of days or weeks. For example, Roosevelt Lake in Roger Williams Park was put under advisory on 6/22/2022. Follow-up samples were collected on 7/6/2022 and 7/13/2022 indicating that the bloom was gone, and the advisory was lifted on 7/13/2022.

However, all the Roger Williams Park Ponds including Roosevelt Lake were again placed under advisory on 7/22/2022 due to the re-emergence of a cyanobacteria bloom. Roosevelt Lake, along with Polo Lake and Willow Lake in Roger Williams Park are still under advisory at the time of this report issuance due to the presence of cyanobacteria during the last visual monitoring visit in December of 2022. Similar patterns of cyanobacteria blooms dissipating then re-emerging over the season were observed in Slack Reservoir in Smithfield/Johnston and Johnson's Pond in Coventry. Lifting advisories via sample collection is also complicated by limited funding for the cyanobacteria monitoring and sampling program that varies from year to year.

Warmer fall and winter weather has also made lifting advisories more complicated in recent years. Advisories generally remain in effect until two successive and representative sampling rounds conducted two weeks apart achieve cell count and toxin levels below the threshold concentrations. Prior to the 2015 season, in the absence of follow-up sampling the advisories that were still in place as of November 1st were automatically lifted. November 1st is generally considered the end of the recreation season and dispersion of cyanobacteria blooms has historically occurred in the late fall due to cooling water temperatures and declining sunlight.

In recent years, RIDEM OWR has noted that some cyanobacteria blooms have persisted beyond November 1st, likely in-part due to prolonged warm weather in the fall and winter seasons. Out of an abundance of caution and due to the potential for secondary recreation (i.e., boating, fishing) to occur into the fall and winter, since 2015 any advisories that remain in effect on November 1st have been kept in place if no follow-up sampling has occurred. Visual assessments are conducted to lift advisories if follow-up sampling cannot be done, but without sampling there is no guarantee that toxins are not present, so the public is encouraged to remain cautious around these waters. Cyanobacteria was visible under ice on December 27, 2022, on three ponds in Roger Williams Park, resulting in the advisories for those ponds being kept in place.

Cyanobacteria blooms are expected to become more frequent and abundant with climate change as water temperatures increase (Paerl and Huisman 2008). Climate change is also causing an increase in extreme precipitation events, which provides more opportunities to transport nutrients into waterways, which supports cyanobacteria growth. The continuation of the cyanobacteria monitoring program in future years will be essential to protect the public health of Rhode Islanders from cyanobacteria blooms. RIDEM OWR and RIDOH plan to continue biweekly and response cyanobacteria monitoring/sampling during the 2023 recreation season with support of a seasonal intern if funding is available.

References

Hartman RT, Graffius JH (1960). “Quantitative seasonal changes in the phytoplankton communities of Pymatuning Reservoir”. Ecology 41(2): 334-340.

Paerl HW, Huisman J (2008). “Blooms like it hot”. Science 320(5872): 57-58.

Appendix A

Monitoring and Sampling Summary for 2022 waterbodies

Table 9: Results of 2022 cyanobacteria monitoring for Almy Pond, Newport RI.

Almy Pond - Newport					
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	 *Picture Taken: 05/25/2022*
5/25/22	Pond-wide bloom present. Pea soup-like in appearance with dots and clumps along the surface. Lab was closed, no sample taken for analysis.	-	-	-	
6/7/2022	Pond-wide bloom still present, light green in appearance. Advisory put in place on 6/10/2022.	N.D.	Anabaena: 60 Aphanizomenon: 13,000	365,380	
6/22/2022	Pond-wide bloom still present.	-	-	-	
7/12/2022	Pond-wide bloom still present.	-	-	-	
7/21/2022	Pond-wide bloom still present.	-	-	-	
8/9/2022	Pond-wide bloom still present.	-	-	-	
11/2/2022	Water had a green hue but no particulates. Appears better than earlier in the summer.	-	-	-	
12/14/2022	Water is clear of bloom. Advisory lifted 12/15/2022 based on visual assessment.	-	-	-	

Red indicates advisory in place and/or threshold exceeded. N.D. = non-detect.

Table 10: Results of 2022 cyanobacteria monitoring for Barney Pond, Lincoln RI.

Barney Pond-Lincoln					
Date	**Observations**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
6/29/2022	Bloom reported in the A.M., when visited in the afternoon, bloom seemed to have subsided. One sample was taken.	N.D.	Cylindrospermopis: 10 Woronichinia: 200	50,000	
7/28/2022	Bloom reported a few days before sampling, Bloom was pond-wide, along with bright green streaks along the shoreline.	N.D.	Anabaena: 870 Woronichinia: 50	32,510	 *Picture Taken: 07/28/2022*

N.D. = non-detect.

Table 11: Results of 2022 cyanobacteria monitoring for Blackamore Pond, Cranston RI.

Blackamore Pond- Cranston					
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (Cells/mL)**	
6/8/2022	Water is clear of bloom.	-	-	-	
6/22/2022	Water is clear of bloom.	-	-	-	
7/6/2022	Water is clear of bloom.	-	-	-	
7/19/2022	Water is clear of bloom.	-	-	-	
8/4/2022	Water is clear of bloom.	-	-	-	
8/16/2022	Water is clear of bloom.	-	-	-	
8/31/2022	Water was tinted green with bright green dots at the shoreline. Advisory put in place on 9/2/2022.	Anatoxin: 0.71 Microcystins: 61	Anabaena: 1,700 Microcystis: 1,500 Woronichinia: 240	309,100	
9/14/2022	Bright green streaks along the shoreline at the boat ramp on Winter Street.	-	-	-	
9/27/2022	Bright green streaks along the shoreline at the boat ramp on Winter Street.	-	-	-	
10/13/2022	Bloom from previous weeks is now gone, one sample taken to lift, but toxins still present.	Anatoxin: 1.1	Anabaena: 80 Woronichinia: 10	4,340	

Picture Taken: 09/14/2022

Blackamore Pond- Cranston				
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (Cells/mL)**
10/26/2022	Pond-wide bloom present in the form of "light pea soup." No sample taken since advisory is already in effect.	-	-	-
11/10/2022	Water is clear of bloom. Sample collected to lift advisory.	N.D.	Anabaena: 10 Microcystis: 40 Woronichinia: 30	13,330
11/30/2022	Water is clear of bloom. Advisory lifted 12/02/2022 based on visual assessment.	-	-	-

Red indicates advisory in place and/or threshold exceeded. N.D. = non-detect.

Table 12: Results of 2022 cyanobacteria monitoring for Bowdish Lake, Glocester RI.

Bowdish Lake- Glocester					
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
7/20/2022	Woman reported getting ill after swimming in the water, her dog also got ill and passed away after being in the water. One sample was taken to check for toxins.	N.D.	N.D.	N.D.	
9/12/2022	Bloom was reported at the beach area at George Washington State Campground. Bloom was gone at the time of the visit, but residual cyanobacteria was at the boat ramp.	Anatoxin: 1.9	Anabaena: 1,600	36,800	 *Picture Taken: 09/12/2022*
9/27/2022	Sampled for toxin analysis after multiple reported illnesses over the summer.	N.D.	N.D.	N.D.	
10/12/2022	Water is clear of bloom.	-	-	-	

N.D. = non-detect.

Table 13: Results of cyanobacteria monitoring for Central Pond, East Providence.

Central Pond- East Providence					
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
6/7/2022	Water is clear of bloom.	-	-	-	
6/21/2022	Water is clear of bloom.	-	-	-	
7/5/2022	Water is clear of bloom.	-	-	-	
7/19/2022	Water is clear of bloom.	-	-	-	
8/3/2022	Water is clear of bloom.	-	-	-	
8/17/2022	Water is clear of bloom.	-	-	-	
8/30/2022	Water is clear of bloom.	-	-	-	
9/14/2022	Water is clear of bloom.	-	-	-	
9/27/2022	Bright green streaks can be seen pond wide and coming from under the Newman Ave. Bridge	Anatoxin: 1.5	Anabaena: 300 Aphanizomenon: 10 Microcystis: 50 Woronichinia: 50	29,200	
10/12/2022	Streaks from last visit are now gone.	-	-	-	
10/26/2022	Water is clear of bloom.	-	-	-	

Picture Taken: 9/27/2022

Table 14: Results of 2022 cyanobacteria monitoring for Cunliff Lake, Roger Williams Park, Providence RI.

Cunliff Lake- Roger Williams Park, Providence					
Date	**Observation**	**Toxin Levels (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	 *Picture Taken on 11/30/2022.*
11/30/2022	Advisory was put in place for all Roger Williams Park Ponds on 7/22/2022. Visited pond to see if advisory could be lifted. Bloom present as streaking along shorelines.	-	-	-	
12/13/2022	Water is clear of bloom.	-	-	-	
12/27/2022	Water is clear of bloom. Advisory lifted based on visual assessment on 12/29/2022.	-	-	-	

Red indicates advisory in place and/or threshold exceeded.

Table 15: Results of 2022 cyanobacteria monitoring for Edgewood Lake, Roger Williams Park, Providence RI.

Edgewood Lake- Roger Williams Park, Providence					
Date	**Observation**	**Toxin Levels (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	 *Picture Taken on 11/30/2022.*
11/30/2022	Advisory was put in place for all Roger Williams Park Ponds on 7/22/2022. Visited pond to see if advisory could be lifted. Water is cloudy but no bloom is present.	-	-	-	
12/13/2022	Water is clear of bloom. Advisory lifted on 12/29/2022 based on visual assessment.	-	-	-	

Red indicates advisory in place and/or threshold exceeded.

Table 16: Results of 2022 cyanobacteria monitoring for Elm Lake, Roger Williams Park, Providence RI.

Elm Lake- Roger Williams Park, Providence					
Date	**Observation**	**Toxin Levels (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
7/6/2022	Elm lake was reported to have a bloom. Shoreline bloom consisted of bubbling green scum. Advisory put in place on 7/8/2022.	Microcystins: 3.1	Anabaena: 1400 Microcystis: 220 Woronichinia: 100 Planktothrix: 2300 Aphanizomenon: 2800	230,800	 *Picture Taken – 7/13/2022*
7/13/2022	Follow up visit, bloom appeared worse than previous week, no sample taken since the bloom was still present. Other ponds connected to Elm Lake are now starting to bloom.	-	-	-	
11/30/2022	Water is a little murky, but no bloom is present.	-	-	-	
12/13/2022	Water is clear of bloom.	-	-	-	
12/27/2022	Water is clear of bloom. Advisory lifted 12/29/2022 based on visual assessment.	-	-	-	

Red indicates advisory in place and/or threshold exceeded. N.D. = non-detect.

Table 17: Results of 2022 cyanobacteria monitoring for Georgiaville Pond, Smithfield RI.

Georgiaville Pond, Smithfield					
Date	**Observation**	**Toxin Levels (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
6/7/2022	Water is clear of bloom.	-	-	-	 *Picture Taken: 8/3/2022*
6/21/2022	Sample taken near the boat ramp because small green clumps were present in the water.	N.D.	Planktothrix: 140	3,920	
7/5/2022	Very small clumps, less frequent than last visit.	-	-	-	
7/20/2022	Water is clear of bloom.	-	-	-	
8/3/2022	Large clumps of cyanobacteria floating throughout the water. Beach was also monitored, and a clump was noted near the swimming area.	N.D.	Anabaena: 10 Woronichinia: 20 Planktothrix: 730	25,670	
8/17/2022	Water is clear of bloom.	-	-	-	
8/30/2022	Water is clear of bloom.	-	-	-	
9/13/2022	Bloom reported on 9/10/2022 at the beach area. When monitoring occurred, the bloom dissipated, and the water was clear.	-	-	-	

Georgiaville Pond, Smithfield				
Date	**Observation**	**Toxin Levels (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**
9/27/2022	Water is clear of bloom.	-	-	-
10/12/2022	Bloom present along the shoreline of the boat ramp area. Bright green streaks and paint-like bloom present. Advisory put in place on 10/14/2022.	Microcystins: 44	Anabaena: 3300 Microcystis: 1500 Woronichinia: 9800	2,735,900
10/25/2022	Paint-like bloom is now gone, streaks are still present in the water.	-	-	-
11/10/2022	Water is clear of bloom. First sample collected to lift the advisory.	N.D.	N.D.	N.D.
11/29/2022	Water is clear of bloom. Sample collected to lift the advisory. Advisory lifted on 12/2/2022.	N.D.	N.D.	N.D.

Red indicates advisory in place and/or threshold exceeded. N.D. = non-detect.

Table 18: Results of 2022 cyanobacteria monitoring for J.L. Curran Upper Reservoir, Cranston RI.

J.L. Curran Upper Reservoir, Cranston					
Date	**Observation**	**Toxin Levels (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	 *Picture Taken: 10/26/2022*
6/8/2022	Water is clear of bloom.	-	-	-	
6/22/2022	Water is clear of bloom.	-	-	-	
7/6/2022	Water is clear of bloom.	-	-	-	
7/20/2022	Water is clear of bloom.	-	-	-	
8/4/2022	Water is clear of bloom.	-	-	-	
8/15/2022	Experiencing a pond-wide bloom with "Pea Soup"-like appearance.	N.D.	Anabaena: 580	13,340	
8/31/2022	Pond-wide bloom still present, more vibrant than last visit.	N.D.	Anabaena: 500	11,500	
9/14/2022	Pond-wide bloom still present, conditions improved since last visit.	-	-	-	
9/21/2022	Bloom was reported the morning of the sample collection. Pond-wide bloom with paint-like bloom along the shoreline. Advisory was issued.	Anatoxin: 20 Microcystins: 4.2	Anabaena: 1300	29,900	
9/29/2022	Paint-like bloom along the shoreline seems to have dissipated, pond-wide bloom still present.	-	-	-	
10/13/2022	Pond-wide bloom still present.	-	-	-	

J.L. Curran Upper Reservoir, Cranston				
Date	**Observation**	**Toxin Levels (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**
10/26/2022	Pond-wide bloom still present, paint-like bloom along the shoreline.	-	-	-
11/9/2022	Pond-wide bloom is still present.	-	-	-
11/30/2022	Very limited bloom is still present. Small clumps are present along the shoreline by the dam.	-	-	-
12/13/2022	Water is clear of bloom.	-	-	-
12/27/2022	Water is clear of bloom. Advisory lifted on 12/29/2022 based on visual assessment.	-	-	-

Red indicates advisory in place and/or threshold exceeded. N.D. = non-detect.

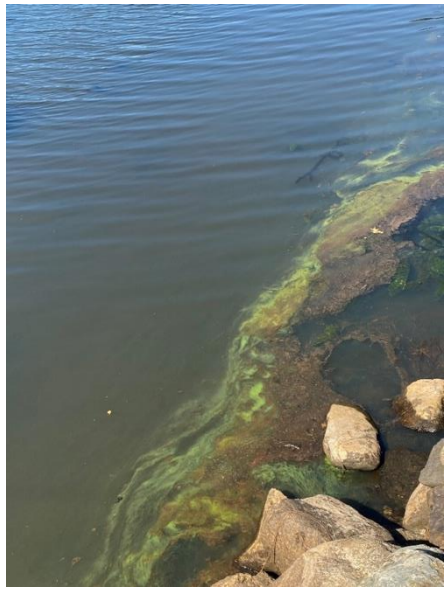
Table 19: Results of 2022 cyanobacteria monitoring for J.L. Curran Lower Reservoir, Cranston RI.

J.L. Curran Lower Reservoir, Cranston					
Date	**Description**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
10/28/2022	J.L. Curran Upper Reservoir is experiencing a pond-wide bloom that is entering the lower reservoir through the spill way. One sample was taken for analysis.	N.D.	N.D.	N.D.	 *Picture Taken: 10/28/2022*

N.D. = non-detect.

Table 20: Results of 2022 cyanobacteria monitoring for Johnson's Pond, Coventry RI.

Johnson's Pond, Coventry					
Date	**Observation**	**Toxin Concentration(µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
7/21/2022	Several residents reported a bloom in their backyards. Green clumps were present in the water, but analysis shows no cyanobacteria present.	N.D.	N.D.	N.D.	
7/28/2022	Residents of Sharon Drive claimed to have seen a bloom, no bloom was present at Sharon Drive, but a bloom was present on Island Drive. Advisory put in place on 7/29/2022.	Microcystins: 35	Anabaena: 130 Microcystis: 670	96,790	
8/4/2022	Did not sample because bloom is still present, and waterbody is already under advisory.	-	-	-	
8/16/2022	Bloom at Island Drive seems to have dissipated; water is still cloudy. Visited other locations and the water seems clear.	-	-	-	
8/31/2022	Water is clear of bloom.	N.D.	Microcystis: 10	1,400	



Picture Taken 8/4/2022

Johnson's Pond, Coventry				
Date	**Observation**	**Toxin Concentration(µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**
9/14/2022	Large bloom present at Island Drive with the appearance of bubbling scum on the top of the surface, as well as the bright green streaks along the shoreline. One sample was taken since the previous visit's samples came back clear.	Anatoxin: 20 Microcystins: 120	Anabaena: 1,900 Microcystis: 12,000	1,723,700
9/29/2022	Large bloom on Island Drive seems to have dissipated a bit, but remains of the bloom are still along the shoreline.	-	-	-
10/13/2022	No bloom present on Island Drive, first sample taken to lift the advisory.	N.D.	N.D.	N.D.
10/26/2022	Second sample taken to lift the advisory. No bloom was present on Island Drive. Advisory was lifted on 10/31/2022.	N.D.	N.D.	N.D.

Red indicates advisory in place and/or threshold exceeded. N.D. = non-detect.

Table 21: Results of 2022 cyanobacteria monitoring for Larkin Pond, South Kingstown RI.

Larkin Pond, South Kingstown					
Date	**Observation**	**Toxin Levels (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
6/22/2022	Water is clear of bloom.	-	-	-	
7/28/2022	Clumps of cyanobacteria were spotted the day before this visit. Pictures showed a bloom, but it seemed to be gone by the time it was monitored. A sample was taken to make sure the waterbody was clear.	N.D.	N.D.	N.D.	
8/4/2022	Widespread clumps of cyanobacteria reported the day before this visit. One sample was taken, and an advisory was put in place on 8/5/2022.	Anatoxin: 0.57	Microcystis: 10 Planktothrix: 5700	161,000	 *Picture Taken 8/4/2022*
11/09/2022	Water is clear of bloom.	N.D.	N.D.	N.D.	
11/30/2022	Water is clear of bloom. Advisory lifted on 12/2/2022 based on visual assessment.	-	-	-	

Red indicates advisory in place and/or threshold exceeded. N.D. = non-detect.

Table 22: Results of 2022 cyanobacteria monitoring for Little Pond, Warwick RI.

Little Pond, Warwick					
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
6/8/2022	Water is clear of bloom.	-	-	-	
6/22/2022	Water is clear of bloom.	-	-	-	
7/6/2022	Water is clear of bloom.	-	-	-	
7/20/2022	Water is clear of bloom.	-	-	-	
8/4/2022	Water is clear of bloom.	-	-	-	
8/16/2022	Water has green clumps floating near the shoreline. It is also noted that there were 5 dead fish floating on the surface. One sample was taken.	N.D.	N.D.	N.D.	
8/30/2022	Water is clear of bloom.	-	-	-	
9/14/2022	Water is clear of bloom.	-	-	-	
9/29/2022	Water is clear of bloom.	-	-	-	
10/13/2022	Water is clear of bloom.	-	-	-	
10/26/2022	Water is clear of bloom.	-	-	-	

Picture Taken- 8/16/2022

N.D. = non-detect.

Table 23: Results of 2022 cyanobacteria monitoring for Lower Melville Pond, Portsmouth RI.

Lower Melville Pond, Portsmouth					
Date	**Observation**	**Toxin Levels (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
6/7/2022	Water is clear of bloom.	-	-	-	
6/21/2022	Water is clear of bloom	-	-	-	
7/5/2022	Small clumps spotted along the shoreline. Water is also "Pea Soup"-like in appearance. Advisory put in place on 7/7/2022.	N.D.	Anabaena: 60 Aphanizomenon: 25,000 Woronichinia: 20	1,462,380	
7/19/2022	Pond-wide bloom is still present.	-	-	-	
8/3/2022	Pond-wide bloom is still present.	-	-	-	
8/17/2022	Pond-wide bloom is still present.	-	-	-	
8/30/2022	Pond-wide bloom is still present.	-	-	-	
9/13/2022	Pond-wide bloom is still present.	-	-	-	
9/27/2022	Pond-wide bloom is still present.	-	-	-	

Picture Taken: 8/17/2022

Lower Melville Pond, Portsmouth				
Date	**Observation**	**Toxin Levels (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**
10/12/2022	Pond-wide bloom still present.	-	-	-
10/25/2022	Pond-wide bloom still present.	-	-	-
11/29/2022	Water is clear of bloom.	-	-	-
12/14/2022	Water is clear of bloom. Advisory lifted on 12/15/2022 based on visual assessment.	-	-	-

Red indicates advisory in place and/or threshold exceeded. N.D. = non-detect.

Table 24: Results of 2022 cyanobacteria monitoring for Mashapaug Pond, Providence RI.

Mashapaug Pond, Providence					
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	 *Picture Taken 7/19/2022*
6/8/2022	Water is clear of bloom.	-	-	-	
6/22/2022	Water is clear of bloom.	-	-	-	
7/6/2022	Water is clear of bloom.	-	-	-	
7/19/2022	Sample taken at boat ramp at JT Owens Park because water is experiencing a pond-wide bloom. Advisory put in place on 7/22/2022.	N.D.	Anabaena: 190 Aphanizomenon: 3,100	91,170	
8/4/2022	Pond-wide bloom still present.	-	-	-	
8/16/2022	Pond-wide bloom still present.	-	-	-	
8/31/2022	Pond-wide bloom still present.	-	-	-	
9/13/2022	Pond-wide bloom still present.	-	-	-	
9/29/2022	Pond-wide bloom still present.	-	-	-	
10/13/2022	Pond-wide bloom still present.	-	-	-	
10/26/2022	Pond-wide bloom still present.	-	-	-	
11/10/2022	Pond-wide bloom still present.	-	-	-	
11/30/2022	Pond-wide bloom still present.	-	-	-	

Mashapaug Pond, Providence					
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
12/13/2022	Pond-wide bloom still present.	-	-	-	
12/27/2022	Water is clear of bloom. Advisory lifted on 12/29/2022 based on visual assessment.	-	-	-	

Red indicates advisory in place and/or threshold exceeded. N.D. = non-detect.

Table 25: Results of 2022 cyanobacteria monitoring for Meader Pond, Lincoln RI.

Meader Pond, Lincoln					
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
5/24/2022	Email received with concern about Meader Pond potentially experiencing a bloom. When visited, it appeared to be pollen/Cladophora clumps. One sample was taken to be looked at under the scope and no cyanobacteria was present in the sample.	-	-	-	 *Picture Taken 5/24/2022*

Table 26: Results of 2022 cyanobacteria monitoring for Pleasure Lake, Roger Williams Park, Providence RI.

Pleasure Lake, Roger Williams Park, Providence					
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
11/30/2022	Advisory was put in place for all Roger Williams Park Ponds on 7/22/2022. Visited pond to see if the advisory could be lifted. Bloom is still present as small dots/clumps along the shoreline.	-	-	-	
12/13/2022	Water is clear of bloom.	-	-	-	
12/27/2022	Water is clear of bloom. Advisory lifted based on visual assessment on 12/29/2022.	-	-	-	

Picture Taken: 11/30/2022

Red indicates advisory in place and/or threshold exceeded.

Table 27: Results of 2022 cyanobacteria monitoring for Polo Lake, Roger Williams Park, Providence RI.

Polo Lake, Roger Williams Park, Providence					
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
11/30/2022	Advisory was put in place for all Roger Williams Park Ponds on 7/22/2022. Visited pond to see if the advisory could be lifted. Bloom is still along the shoreline.	-	-	-	
12/13/2022	Water is clear of bloom.	-	-	-	
12/27/2022	Clumps of cyanobacteria present underneath ice. Advisory to remain in place.	-	-	-	

Picture Taken: 11/30/2022

Red indicates advisory in place and/or threshold exceeded.

Table 28: Results of 2022 cyanobacteria monitoring for Roosevelt Pond, Roger Williams Park, Providence RI.

Roosevelt Pond, Roger Williams Park, Providence					
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
6/22/2022	AIS interns were at Roosevelt Lake monitoring for invasives, a bloom was present in the water in the form of bright green streaks. They took a sample for analysis and an advisory was issued.	Anatoxin: 2.1 Microcystins: 3.4	Anabaena: 1,000 Microcystis: 160	45,400	 *Picture Taken 7/21/2022*
7/6/2022	Sampled to Potentially lift the advisory, sample came back with low cell count.	N.D.	Aphanizomenon: 20	560	
7/13/2022	Sampled to lift the advisory. Analysis showed very low cell count, advisory was lifted on 7/15/2022.	N.D.	Anabaena: 4 Microcystis: 2 Aphanizomenon: 7	2,528	
7/21/2022	Pictures were provided through BloomWatch of a substantial bloom. Since other ponds in the park were experiencing a bloom as well, all waterbodies in Roger Williams Park had advisories issued on 7/22/2022.	-	-	-	

Roosevelt Pond, Roger Williams Park, Providence				
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**
11/30/2022	A bloom is still present along the weir by the Seal house. Dots and clumps are present.	-	-	-
12/13/2022	Bloom is still present underneath the ice.	-	-	-
12/27/2022	Bloom is still present underneath the ice along the shoreline. Advisory remains in place.	-	-	-

Red indicates advisory in place and/or threshold exceeded. N.D. = non-detect.

Table 29: Results of 2022 cyanobacteria monitoring for Scott Pond, Lincoln RI.

Scott Pond, Lincoln					
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	 *Picture Taken 7/14/2022*
07/14/2022	Visit in response to email about possible bloom. Pea soup-like appearance and hairy, silky strands present along the shoreline and throughout the pond. One sample collected to be looked at under the microscope. One sample was taken to be looked at under the scope and no cyanobacteria was present in the sample.	-	-	-	

Table 30: Results of 2022 cyanobacteria monitoring for Slack Reservoir in Smithfield/Johnston RI.

Slack Reservoir, Smithfield/Johnston					
Date	**Observation**	**Toxin Concentration(µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
6/7/2022	Water is clear of bloom.	-	-	-	
6/21/2022	Water is clear of bloom.	-	-	-	
7/5/2022	Water is clear of bloom.	-	-	-	
7/20/2022	Bright green clumps limited to the shoreline. One sample was taken for analysis and high toxins were present. An advisory was issued.	Microcystins: 140	Anabaena: 380 Microcystis: 820 Woronichinia: 510	251,040	
7/28/2022	Sample taken to potentially lift the advisory, water was clear of bloom.	N.D.	Woronichinia: 10	2500	
8/3/2022	Sample taken to lift the advisory. Results show no cyanobacteria. Advisory was lifted on 8/3/2022.	N.D.	N.D.	N.D.	
8/17/2022	Water is clear of bloom.	-	-	-	
8/30/2022	Water is clear of bloom.	-	-	-	
9/13/2022	Water is clear of bloom.	-			
9/27/2022	Water is clear of bloom.	-	-	-	
10/12/2022	Small clumps along the shoreline of Greenlake Drive town beach. It appears that this bloom could be pond-wide because it was seen across the waterbody. An advisory was issued on 10/14/2022.	Anatoxin: 2.7 Microcystins: 140	Anabaena: 560 Microcystis: 1,000 Woronichinia: 100	177,880	

Picture Taken: 10/12/2022

Slack Reservoir, Smithfield/Johnston				
Date	**Observation**	**Toxin Concentration(µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**
10/25/2022	Bloom from previous visit is now gone, the first sample was taken to lift the advisory.	N.D.	N.D.	N.D.
11/10/2022	Water is clear of bloom. Sample collected to lift the advisory. Advisory was lifted on 11/16/2022.	N.D.	Microcystis: 10	1400

Red indicates advisory in place and/or threshold exceeded. N.D. = non-detect.

Table 31: Results of 2022 cyanobacteria monitoring for Spectacle Pond, Cranston RI.

Spectacle Pond, Cranston					
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
6/22/2022	Water is clear of bloom.	N.D.	Anabaena: 700 Microcystis: 20	18,900	
7/6/2022	Water is clear of bloom.	-	-	-	
7/19/2022	Water is clear of bloom.	N.D.	Anabaena: 990 Aphanizomenon: 60	24,450	
8/4/2022	Pond-wide pea soup appearance. Results did not warrant an advisory.	-	-	-	
8/16/2022	Water is clear of bloom but looks cloudy and brown.	-	-	-	
8/31/2022	Water conditions have improved since last visit, noticeably less green pond wide.	N.D.	Anabaena: 1,200 Aphanizomenon: 330	36,840	
9/14/2022	Water conditions have improved since last visit, noticeably less green.	-	-	-	
9/29/2022	Water is clear of bloom.	-	-	-	
10/13/2022	Water is clear of bloom.	-	-	-	
10/26/2022	Water is clear of bloom.	-	-	-	

Picture Taken: 7/19/2022

N.D. = non-detect.

Table 32: Results of 2022 cyanobacteria monitoring for Spring Lake, Burrillville RI.

Spring Lake, Burrillville					
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
07/07/2022	Visited in response to pictures sent in the previous day. No bloom noted.	-	-	-	
08/25/2022	Bubbling scum and spilled paint appearance on southern and northern swimming portions of beach. Three samples collected, two from the southern portion and one from the northern. An advisory was issued on 8/26/2022.	Anatoxin: 1.9 Microcystins: 720	Anabaena: 80 Microcystis: 8600	1,205,840	
		Microcystins: 130	Anabaena: 100 Microcystis: 920	131,100	
		Anatoxin: 1.9 Microcystins: 65	Anabaena: 30 Microcystis: 330	46,890	
08/30/2022	Water is clear of bloom. Sample collected from southern portion of the lake to potentially lift advisory.	N.D.	N.D.	N.D.	
08/31/2022	Return visit to collect a second sample from state launch site. Water appeared clear of bloom.	N.D.	N.D.	N.D.	
09/07/2022	Water is clear of bloom. Second sample collected to lift advisory. Advisory lifted on 9/9/2022.	N.D.	Microcystis: 10	1,400	

Picture Taken: 08/25/2022

Red indicates advisory in place and/or threshold exceeded. N.D. = non-detect.

Table 33: Results of 2022 cyanobacteria monitoring for Stafford Pond, Tiverton RI.

Stafford Pond, Tiverton					
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
6/7/2022	Water is clear of bloom.	-	-	-	
6/21/2022	Water is clear of bloom.	-	-	-	
7/7/2022	Water is clear of bloom.	-	-	-	
7/19/2022	Water is clear of bloom.	-	-	-	
8/3/2022	Water is clear of bloom.	-	-	-	
8/17/2022	Water is clear of bloom.	-	-	-	
8/30/2022	Water is clear of bloom.	-	-	-	
9/13/2022	Water is clear of bloom.	-	-	-	
9/27/2022	Bright green streaks along the boat ramp and rocks. Cloud-like green mass along the boat ramp.	N.D.	Anabaena: 4,800	110,400	 *Picture Taken: 10/12/2022*
10/6/2022	Follow up sample collection because of previous visits high cell count.	N.D.	N.D.	N.D.	
10/12/2022	Same type of bloom seen on 9/27, paint-like streaks within the rocks as well as a “green cloud” at the boat ramp. Partial advisory issued on 10/18/2022.	N.D.	Anabaena: 4,300	98,900	
10/25/2022	Previous bloom at the shoreline is now gone, first sample taken to lift the advisory.	N.D.	N.D.	N.D.	
11/09/2022	Water is clear of bloom. Second sample collected to lift the advisory. Advisory lifted on 11/16/2022.	N.D.	Anabaena: 10	230	

Red indicates advisory in place and/or threshold exceeded. N.D. = non-detect.

Table 34: Results of 2022 cyanobacteria monitoring for Tiogue Lake, Coventry RI.

Tiogue Lake, Coventry					
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
5/20/2022	Reports of cyanobacteria in someone's backyard in the form of clumps along the shoreline. No advisory was issued.	N.D.	Anabaena: 300 Microcystis: 20	9,240	
6/8/2022	Water is clear of bloom.	-	-	-	
6/22/2022	Small clumps along the shoreline of Briar Point Beach. Advisory was issued on 6/27/2022.	Microcystins: 5.4	Anabaena: 10 Microcystis: 290	40,830	
7/6/2022	Bloom appeared to be gone, the first sample was taken to lift the advisory.	N.D.	Anabaena: 10 Microcystis: 60	8,630	
7/13/2022	Sample was taken to lift the advisory. Water was clear of bloom. Advisory lifted on 7/15/2022.	N.D.	Microcystis: 10 Planktothrix: 5	1,540	
7/21/2022	Water is clear of bloom.	-	-	-	
8/4/2022	Water is clear of bloom.	-	-	-	
8/16/2022	Water is clear of bloom.	-	-	-	
8/31/2022	Water is clear of bloom.	-	-	-	
9/14/2022	Water is clear of bloom.	-	-	-	
9/29/2022	Water is clear of bloom.	-	-	-	
10/13/2022	Water is clear of bloom.	-	-	-	
10/26/2022	Water is clear of bloom.	-	-	-	

Picture Taken: 6/22/2022

Red indicates advisory in place and/or threshold exceeded. N.D. = non-detect.

Table 35: Results of 2022 cyanobacteria monitoring for Turner Reservoir, East Providence RI.

Turner Reservoir, East Providence					
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
6/7/2022	Water is clear of bloom.	-	-	-	
6/21/2022	Green bubbling scum on the surface at the boat launch. Elevated toxin levels when sampled and an advisory was issued on 6/24/2022.	Anatoxin: 72 Cylindrospermopsin: 3.8	Anabaena: 370	8,510	 *Picture Taken: 6/21/2022*
7/5/2022	Bloom is starting to clear up, sampled to potentially lift the advisory.	Anatoxin: .87	Anabaena: 110	2,530	
7/13/2022	Second sample taken to lift the advisory. Sample came back clear, and the advisory was lifted on 7/15/2022.	N.D.	N.D.	N.D.	
7/19/2022	Water is clear of bloom.	-	-	-	
8/3/2022	Water is clear of bloom.	-	-	-	
8/17/2022	Water is clear of bloom.	-	-	-	
8/30/2022	Green streaks at the shoreline of the boat launch.	Anatoxin: 0.55	N.D.	N.D.	
9/13/2022	Duck weed and pond meal cover the shoreline, hard to see if the bloom is still present.	-	-	-	
9/27/2022	Bright green streaks along the shoreline of the boat launch. Bloom seems to be going under the bridge to central pond.	Anatoxin: 1.8	Anabaena: 100	2,300	

Turner Reservoir, East Providence					
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
10/12/2022	Streaks in the water appear to be getting worse.	Anatoxin: 0.98	N.D.	N.D.	
10/25/2022	Previous streaks in the water are now gone.	-	-	-	

Red indicates advisory in place and/or threshold exceeded. N.D. = non-detect.

Table 36: Results of 2022 cyanobacteria monitoring for Upper Dam Pond, Coventry RI.

Upper Dam Pond, Coventry					
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
5/26/2022	Visited in response to concern about dead fish from local conservation group. Filamentous algae were present, but no cyanobacteria were present. No samples collected.	-	-	-	 *Picture Taken: 5/26/2022*

Table 37: Results of 2022 cyanobacteria monitoring for Upper Melville Pond, Portsmouth RI.

Upper Melville Pond					
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
6/7/2022	Water is clear of bloom.	-	-	-	
6/21/2022	Pond-wide bloom present, bubbling scum, and pea soup appearance. Advisory put in place on 6/24/2022.	Microcystins: 2.1	Anabaena: 2,000 Microcystis: 30 Woronichinia: 510	117,700	 *Picture Taken: 06/21/2022*
7/5/2022	Pond-wide bloom still present.	-	-	-	
7/13/2022	Pond-wide bloom still present.	-	-	-	
7/19/2022	Pond-wide bloom still present.	-	-	-	
8/3/2022	Pond-wide bloom still present.	-	-	-	
8/17/2022	Pond-wide bloom still present.	-	-	-	
8/30/2022	Pond-wide bloom still present.	-	-	-	
9/13/2022	Pond-wide bloom still present.	-	-	-	
9/27/2022	Pond-wide bloom still present.	-	-	-	
10/12/2022	Pond-wide bloom still present.	-	-	-	
10/25/2022	Pond-wide bloom still present.	-	-	-	
11/29/2022	Water is clear of bloom.	-	-	-	
12/14/2022	Water is clear of bloom. Advisory lifted based on visual assessment on 12/15/2022.	-	-	-	

Red indicates advisory in place and/or threshold exceeded. N.D. = non-detect.

Table 38: Results of 2022 cyanobacteria monitoring for Volpe Pond, Barrington RI.

Volpe Pond, Barrington					
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	 *Picture Taken: 9/7/2022*
6/8/2022	Pond visited in response to concern from public. One sample collected to look at under the microscope, cyanobacteria was not present.	-	-	-	

Table 39: Results of 2022 cyanobacteria monitoring for Warwick Pond, Warwick RI.

Warwick Pond, Warwick					
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
6/8/2022	Water is clear of bloom.	-	-	-	
6/22/2022	Water is clear of bloom.	-	-	-	
7/6/2022	Water is clear of bloom.	-	-	-	
7/21/2022	Water is clear of bloom.	-	-	-	
8/3/2022	Water is clear of bloom.	-	-	-	
8/16/2022	Water is clear of bloom.	-	-	-	
8/31/2022	Water is clear of bloom.	-	-	-	
9/14/2022	Water is clear of bloom.	-	-	-	
9/29/2022	Water is clear of bloom.	-	-	-	
10/13/2022	Water is clear of bloom.	-	-	-	
10/26/2022	Water is clear of bloom.	-	-	-	

Picture Taken: 8/4/2022

Table 40: Results of 2022 cyanobacteria monitoring for Wash Pond, South Kingston RI.

Wash Pond, South Kingstown					
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
8/23/2022	Pond visited in response to call from the public. The bloom appeared to have dissipated when staff arrived. A sample was collected to view under the microscope and low cyanobacteria numbers were noted. Sample bottles were provided to the local resident to collect a sample if the bloom reappeared later in the summer/fall.	-	-	-	 *Picture Taken: 8/23/2022*

Table 41: Results of 2022 cyanobacteria monitoring for Wenscott Reservoir, North Providence RI.

Wenscott Reservoir, North Providence					
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
6/7/2022	Water is clear of bloom.				
6/21/2022	Water is clear of bloom.				
7/5/2022	Water is clear of bloom.				
7/20/2022	Sample was taken because brown material was accumulating in the water.	N.D.	N.D.	N.D.	
8/3/2022	Western half of the reservoir is experiencing a "pea soup" like bloom. One sample was taken, and an advisory was issued on 8/5/2022.	Microcystins: 1.6	Anabaena: 56,000 Microcystis: 280	1,327,200	 *Picture Taken: 8/30/2022*
8/17/2022	Bloom still present, now pond-wide on the western half of the reservoir.	-	-	-	
8/30/2022	Bloom still present, worse than last visit.	-	-	-	
9/13/2022	Bloom still present, same as last visit.	-	-	-	

Wenscott Reservoir, North Providence				
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**
9/27/2022	Bloom is still present at the original advisory location. A new paint-like bloom is now present at the beach are of Notte Park. One sample was taken.	Anatoxin: 8.9 Microcystins: 55	Anabaena: >100,000 Microcystis: 14,000 Woronichinia: 50	>4,272,500
10/12/2022	Bloom is still present on the western half; conditions seem to be improving on the eastern half.	-	-	-
10/25/2022	Bloom is still present on the western half, paint like bloom is now present near the parking lot of Gov. Notte Park.	-	-	-
11/10/2022	Bloom is still present on the western half of the reservoir.	-	-	-
11/30/2022	Water is clear of bloom.	-	-	-
12/13/2022	Water is clear of bloom.	-	-	-
12/27/2022	Water is clear of bloom. Advisory lifted based on visual assessment on 12/29/2022.	-	-	-

Red indicates advisory in place and/or threshold exceeded. N.D. = non-detect

Table 42: Results of 2022 cyanobacteria monitoring for Willow Lake, Roger Williams Park, Providence RI.

Willow Lake, Roger Williams Park, Providence					
Date	**Observation**	**Toxin Concentration (µg/L)**	**Colony Count (colonies/mL)**	**Total Cell Count (cells/mL)**	
11/30/2022	Advisory was put in place for all Roger Williams Park Ponds on 7/22/2022. Visited pond to see if the advisory could be lifted. Bloom is still present along the shoreline.	-	-	-	 *Picture Taken: 12/13/2022*
12/13/2022	Bloom is still present throughout the pond and underneath the ice.	-	-	-	
12/27/2022	Bloom is still present underneath the ice along the shoreline. Advisory remains in place.	-	-	-	

Red indicates advisory in place and/or threshold exceeded.