

Cyanobacteria Monitoring Program 2017 Report

November 2017

Rhode Island Department of Environmental Management

Office of Water Resources

235 Promenade Street

Providence, Rhode Island 02908



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Introduction

Cyanobacteria (blue-green algae) are microscopic, photosynthetic bacteria naturally found in waterbodies either attached to the substrate or floating in the water column as individual cells or within colonies. Under certain conditions, cyanobacteria can experience rapid growth (blooms) and may produce toxins, which when released into waters can potentially cause health risks for wildlife, pets, livestock, as well as humans. The Rhode Island Department of Health (HEALTH) and the Rhode Island Department of Environmental Management (RIDEM) work cooperatively to detect/respond to the presence of cyanobacteria blooms, evaluate the potential risks to the public, and, when necessary, issue health advisories notifying the public of health concerns. The agencies jointly issue health/recreational advisories when any of the following three guidelines are met:

- Evidence of a visible cyanobacteria scum or mat or lake/pond-wide cyanobacteria bloom.
- Cyanobacteria cell count exceeding 70,000 cells/mL.
- Toxin (Microcystin-LR) level of lysed cells meeting or exceeding 4 ppb ($\mu\text{g/L}$).

Health 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 or swim in, or drink untreated water from the affected waters. Health advisories remain in effect for the remainder of what is considered to be the recreation season (until November 1st), unless follow-up sampling by a city, town, or third party indicate that the advisory can be lifted. Health advisories may be lifted after two successive and representative sampling rounds, two weeks apart, demonstrate no evidence of a cyanobacterial scum or mat and demonstrate cyanobacteria cell counts and toxin levels below threshold concentrations.

RIDEM's Office of Water Resources (OWR) receives reports annually about nuisance algal conditions and cyanobacteria blooms from municipal staff, lake and watershed associations, as well as the broader public. Since 2007, thirty-five (35) waterbodies have had recreational/health advisories issued with an average of ten (10) waterbodies per year. Twelve (12) of the 35 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.

Methods

RIDEM's Quality Assurance Project Plan (QAPP) describes in detail the field and analytical methods and quality assurance/quality control procedures related to this sampling program. The QAPP, titled "Rhode Island Freshwater Harmful Algal Bloom Monitoring for 2017" is available at DEM's Providence office.

Throughout the 2017 season, RIDEM conducted routine screening and response level monitoring, and on a limited basis as resources allowed, follow-up monitoring for purposes of lifting an advisory. Analysis of samples by the State Health Laboratory included toxin analysis

and identification and enumeration of cyanobacteria by colony count. Physical characteristics of the bloom were recorded on field sheets while sampling in the field along with taking photographs to document the bloom. Field sheets document visits at each site; recording location of bloom on waterbody, weather conditions and wind direction, recreation on water, and extent of coverage by bloom along with a few other parameters. In 2017, 64 cyanobacteria samples were collected from 32 waterbodies, dispersed across the state from Greenville to Newport. Of the 64 samples collected, 20 led to health advisories being issued jointly by RIDOH and RIDEM throughout the sampling season on 18 waterbodies, including 4 ponds part of Roger Williams Park. All 32 waterbodies sampled were routinely included in the screening level program; with reports coming in from members of the public, allowing access to various portions of waterbody where a bloom was located at the time.

Response level site visits occurred for three (3) other waterbodies across the state, but upon inspection no bloom was evident and no samples were submitted to the State Health Laboratory. RIDEM received emails from concerned citizens about possible blooms occurring on seven waterbodies: Blackamore Pond, Manville Dam, Mashapaug Pond, Pocasset Pond, Warwick Pond, and Wilson Reservoir. Samples of blooms were taken from Blackamore Pond, Mashapaug Pond, Slack Reservoir, and Warwick Pond and submitted to the Health Lab. Follow-up monitoring for lifting an advisory was done for both Slack Reservoir and Pleasure Lake. Two consecutive follow-up samples needed to be taken 2 weeks apart starting after the bloom first subsides, both samples must come back under the threshold for toxins for advisory to be rescinded.

Samples submitted to the State Health Laboratory underwent analysis to determine toxin concentrations for Total Microcystins, Cylindrospermopsin, Anatoxin, and Nodularin. Samples were also analyzed under a microscope for identification and enumeration of bacterial colonies to determine genera of organisms producing bloom, classifying as: *Anabaena*, *Aphanizomenon*, *Chlorella*, *Cylindrospermopsis*, *Microcystis*, *Nodularia*, *Woronichina*, *Plantothrix*. The State Health Laboratory did not have the capacity to identify colonies until mid-July 2017.

Table 1: List of cyanobacteria genera identified within by the State Health Laboratory.

Genera	Threshold for Issuance of Advisory
<i>Anabaena</i> *	70,000 cells/mL (total cyanobacteria)
<i>Aphanizomenon</i> *	
<i>Chlorella</i>	
<i>Cylindrospermopsis</i>	
<i>Microcystis</i> *	
<i>Nodularia</i>	
<i>Plantothrix</i>	
<i>Woronichina</i>	

*: Most common genera found in samples.

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	
Nodularin	

*: Most common toxin found in samples.

Screening Level Monitoring

Most of the water bodies selected for screening in the 2017 sampling season were previously sampled at least once between 2010 and 2016; during this period, frequent blooms were observed among 25 of the 35 waterbodies. Many of these waterbodies have also been documented with elevated levels of chlorophyll a and/or total phosphorus. The EPA Multi-Purpose Grant that DEM received allowed for monitoring of all waterbodies which in previous years have experienced frequent harmful algal blooms (HABs). New screening level ponds in 2017 included Polo and Deep Spring Lake located at Roger Williams Park. Water bodies selected for response level monitoring were done so by public or agency requests to investigate potential algal blooms.

RIDEM collected screening level samples from July-October. Samples were collected from the shoreline at the water's surface (6" or shallower) with the aid of a sampling stick, at the densest section of the bloom, generally at public access points. If no public access point was present, samples were collected from a secondary access location or through permission of private property owner.

Water samples were placed on ice and transported to the State Health Laboratory for cyanobacteria ID/enumeration and toxin analysis.

Table 3. List of Waterbodies Evaluated for Cyanobacteria Blooms.

Sampling Program	Name	Town	Waterbody ID	Primary Access
Screening Level	Almy Pond	Newport	RI0010047L-01	Access off Coggeshall Ave on South side
	Blackamore Pond	Cranston	RI0006018L-06	Access off Winter Ave
	Cunliff Lake-RWP	Providence	RI0006017L-05	Access at Trailhead parking area
	Deep Spring Lake-RWP	Providence	RI0006017L-05	Access across road from parking area at Cunliff
	Easton Pond-North	Newport	RI0007035L-03	Access road off Bliss Mine Rd
	Easton Pond-South	Newport	RI0007035L-04	Access road off Bliss Mine Rd.
	Edgewood lake-RWP	Providence	RI0006017L-05	Access on east side of FC Greene Memorial Blvd
	Elm Lake- RWP	Providence	RI0006017L-05	Access on South side of FC Greene Memorial Blvd
	Gardiner Pond	Middletown	RI0007035L-01	Access from pull off on Hanging Rock Rd.
	Japanese Gardens-RWP	Providence	RI0006017L-05	Access near Carousel and Roosevelt Lake
	J.L. Curran Reservoir	Cranston	RI0006016L-02	Access area off Seven Mile Rd (boat Launch area)
	Lawton Valley Reservoir	Portsmouth	RI0007035L-06	Access road off Flanagan Rd
	Mashapaug Pond	Providence	RI0006017L-06	Access boat launch near baseball field at end of Access Rd or Providence Boating Center
	Melville Ponds	Portsmouth	RI0007029R-04	Access near elementary school at fishing dock
	Nonquit Pond	Tiverton	RI0007035L -08	Access off Neck Rd
Omega Pond	East Providence	RI0004009L-03	Access on Roger Williams Ave near Railroad crossing	

	Paradise Pond	Middletown	RI0007035L-02	Access at 600 Paradise Ave
	Pleasure Lake-RWP	Providence	RI0006017L-05	Access off Natural History Ave
	Polo Lake-RWP	Providence	RI0006017L-05	Access from North side of FC Greene Memorial Blvd
	Roosevelt Lake-RWP	Providence	RI0006017L-05	Access off Fredrick C Greene Memorial Blvd
	Scott Pond	Lincoln	RI0001003L-01	Access at fishing area off Rte. 122 or Chapel Ln
	Sisson Pond	Portsmouth	RI0007035L-10	Access road off Union St.
	Slack Reservoir	Smithfield-Johnston	RI0002007L-03	Access at public beach off Green Lake Drive or Terrace Drive
	Slater Memorial Park Pond	Pawtucket	RI0004009R-01A	Access near paddleboat rentals
	Spectacle Pond	Cranston	RI0006017L-07	Access at baseball field (Carlton St) or Providence Jewelry Museum (light craft/dirt access)
	St. Mary's Pond	Portsmouth	RI0007035L-05	Access road off Union St.
	Stafford Pond	Tiverton	RI0007037L-01	Access at DEM Boat Ramp or Pelletier Ln
	Ten Mile River	East Providence	RI0004009R-01B	Access on North Broadway
	Turner Reservoir	Rumford	RI0004009L-01B	Access road off Newman Ave
	Warwick Pond	Warwick	RI0007024L-02	Access at boat launch or trailhead on Lake Shore Drive
	Watson Reservoir	Little Compton	RI0007035L-07	Access road off Old Main Rd
	Willow Lake-RWP	Providence	RI0006017L-05	Access near bridge or paddle boat rentals
Response Level	Pocasset Pond	Johnson	RI0006018R-03A	Access at Johnson Parks and Rec off Memorial Park Rd
	Wilson Reservoir	Burrillville	RI0001002L-01	Access at boat launch at White Mill Park on E Wallum Lake Rd
	Manville Dam	Cumberland	RI0001003R-01A	Access at Manville Dam Park off Main St

Response Level Monitoring

Samples collected from response level cyanobacteria samples were done so using the same methods as those utilized for the screening level collection. However, sampling focused on collection from active blooms so 3 of the 7 waterbodies (Manville Dam, Pocasset Pond, and Wilson Reservoir) reported by the public were not sampled as no HAB was evident. The other four (Slack Reservoir, Warwick Pond, Mashapaug Pond, and Blackamore Pond) were routinely screened but in response to public reports were sampled between screening level visits. If possible, response level samples were pre-screened under a microscope by RIDEM staff to determine dominant cyanobacteria species present as well as qualitative assessment of whether the sample contained greater than 70,000 cells/ml. If samples showed substantial numbers of cyanobacteria then samples were sent to the State Health Laboratory for toxin analysis and ID/enumeration.

Results

All cyanobacteria sampling QA/QC requirements were followed for all screening and response level monitoring samples collected consistent with the Rhode Island Freshwater Harmful Algal Bloom Monitoring QAPP. Additionally, all analytical QA/QC requirements were followed for each sample-as reported in the State Health Laboratory analytical result reports.

Cyanobacteria colony counts ranged from 10 colonies/mL on Pleasure Lake in Roger Williams Park to greater than 100,000 colonies/mL on Stafford Pond in 2017. In a few instances where bloom density was such that there was a question whether the cell count threshold was exceeded, cell density in cells/mL was estimated from colony counts by RIDEM staff. Cell density exceeded 70,000 cells/mL (one threshold for issuance of an advisory) three times: a sample collected at Blackamore Pond on July 28th and two samples from Stafford Pond, one on July 18th and the other on September 26th. The State Health Laboratory was unable to quantify cell density from the genus *Anabaena* in one sample collected from Stafford Pond on July 18th and was labeled too numerous to count.

Analysis of total microcystin concentrations ranged from 1.0 µg/L at Blackamore Pond on July 21st to 600 µg/L at Slack Reservoir on July 12th. The threshold for issuance of an advisory total microcystins (4µg/L) was exceeded 21 times over the course of the season on 15 waterbodies, 6 of which had multiple samples that exceeded the 4 µg/L threshold.

Potentially toxigenic species, *Anabaena*, *Aphanizomenon*, *Cylindrospermopsis*, *Microcystis*, *Planktoniopsis*, and *Woronichina* were identified in 45 of the 63 samples collected on 25 waterbodies. The genera *Anabaena*, *Aphanizomenon*, and *Microcystis* were observed most frequently as the co-dominant genera. A full list of genera screened for is found in Table 1.

RIDEM received notice of potential cyanobacteria blooms from members of the public 7 times in 2017. One of the reported blooms (on the Blackstone River at Manville Dam) was found to be aquatic vegetation (duckweed) and not cyanobacteria, and samples collected at two other sites reported to be have cyanobacteria blooms (Pocasset Pond and Wilson Reservoir) were pre-screened by RIDEM and determined to have cyanobacteria densities below levels of concern and were not submitted to the State Health Laboratory for analysis.

Table 4: List of confirmed cyanobacteria blooms throughout the 2017 monitoring season.

Waterbody	Town	Advisory Posted	Date Advisory Posted	Date Advisory Lifted
Stafford Pond	Tiverton	Y	9/28/2017	11/01/2017
Pleasure Lake	Providence	N	9/28/2017	11/01/2017
J. L Curran Reservoir	Cranston	N	9/28/2017	-
Mashapaug Pond	Providence	Y	9/12/2017	11/01/2017
Lawton Valley Reservoir	Portsmouth	N	8/31/2017	11/01/2017
Slack Reservoir	Greenville	Y	8/31/2017	-
Pleasure Lake	Providence	Y	8/18/2017	9/12/2017
Warwick Pond	Warwick	N	8/18/2017	11/01/2017
Roger Williams Park	Providence	Y	8/18/2017	-
Sisson Pond	Portsmouth	N	8/04/2017	11/01/2017
Turner Reservoir	Rumford	Y	8/02/2017	11/01/2017
Blackamore Pond	Cranston	Y	7/31/2017	-
Spectacle Pond	Cranston	Y	7/24/2017	-
Almy Pond	Newport	Y	7/21/2017	-
Slack Reservoir	Greenville	Y	7/14/2017	8/18/2017
Saint Mary's Pond	Portsmouth	Y	7/07/2017	11/01/2017
Roosevelt Lake	Providence	Y	7/07/2017	-
Elm Lake	Providence	Y	7/07/2017	-
Japanese Gardens	Providence	Y	7/07/2017	-
Melville Ponds	Portsmouth	Y	7/05/2017	-

Conclusions


RIDEM routinely screened 32 water bodies across the state and collected 64 samples for analysis as part of the 2017 screening level monitoring program. Of the 64 samples collected, 20 led to health advisories being issued jointly by RIDOH and RIDEM throughout the sampling season. RIDEM received notice of potential cyanobacteria blooms from members of the public 7 times in 2017. Most years, RIDEM and RIDOH rely upon members of the public to report cyanobacteria blooms before staff members conduct site visits and sampling to verify cyanobacteria blooms. Had RIDEM relied upon the public to report blooms in 2017, blooms on 13 waterbodies would have gone undetected resulting in potential human exposure to cyanotoxins and their related health implications.

Follow-up monitoring for the purpose of lifting the advisories was conducted on two water bodies, Pleasure Lake and Slack Reservoir, which led to initial health advisory being rescinded. Follow up monitoring in order to lift advisories is challenging given that blooms can subside

then reemerge in a few days or weeks. One sample, on July 12th from Slack Reservoir produced the highest level of microcystin toxins (600 µg/L) the state has seen since cyanobacteria monitoring of freshwater bodies commenced back in 2007. Only three samples, one from Blackamore Pond and two from Stafford Pond, exceeded the 70,000 cells/mL threshold on July 28th with 73,000 colonies/ mL and on July 18th and September 26th with greater than 100,000 colonies/ mL. Most of the advisories issued were due to the threshold for microcystins being exceeded (>4.0 µg/L), with colony counts falling far short of cell count threshold. Two advisories, one for Roosevelt Lake and the other for Warwick Pond, were issued due to lake-wide discoloration (green) of waters with the presence of a surface scum/mat along some shoreline.


Appendix A

Table 5: Results for cyanobacteria monitoring of Almy Pond in 2017.

Almy Pond	Observation	Toxin Levels	Colony Count	Photograph
July 11 th	Spilled Paint (green) and pea soup appearance on W shore near dock at 213 Coggeshall Ave.	Not Sampled	Not Sampled	
July 18 th *		Total Microcystin: 6.1	Anabaena: 55160 Microcystin: 1580 Plantothrix: 2430	
August 1st		Not Sampled	Not Sampled	
August 16th		Total Microcystin: 6.2	Anabaena: 2230 Aphanizomenon: 10 Microcystis: 1290 Plantothrix: 260	
September 12th		Not Sampled	Not Sampled	
September 26th		Not Sampled	Not Sampled	

*: Health Advisory Issued; **Exceedance of Threshold.**

Table 6: Results for cyanobacteria monitoring of Blackamore Pond in 2017.

Blackamore Pond	Observation	Toxin Levels	Colony Count	Photograph
July 21 st	Seems to be moving with the wind, found near boat launch on Winter St. Entire pond turned green.	Total Microcystin: 1.0	Anabaena: 310 Woronichina: 10	
July 28 th *		Total Microcystin: 100	Anabaena: 73000 Aphanizomenon: 2180 Microcystis: 1060	
August 3 rd		All <1.0	Anabaena: 1060 Aphanizomenon: 450 Microcystis: 20	
August 13 th		All <1.0	Anabaena: 180 Aphanizomenon: 18000 Microcystis: 40	
August 22 nd		All <1.0	Anabaena: 100 Aphanizomenon: 29000 Microcystis: 30	
August 30 th		Not Sampled	Not Sampled	
September 11 th		Not Sampled	Not Sampled	
September 25 th		Not Sampled	Not Sampled	

*: Health Advisory Issued; **Exceedance of Threshold.**

Table 7: Results for cyanobacteria monitoring of Cunliff Lake in 2017.


Cunliff Lake	Observation	Toxin Levels	Colony Count	Photograph
July 21 st	Grey Streaks in water near boat launch.	All <1.0	Anabaena: 30 Aphanizomenon: 470 Planktothrix: 300	
August 30 th		Not Sampled	Not Sampled	
September 11 th		Not Sampled	Not Sampled	
September 25 th		Not Sampled	Not Sampled	

Table 8: Results for cyanobacteria monitoring of Deep Spring Lake in 2017.


Deep Spring Lake	Observation	Toxin Levels	Colony Count	Photograph
August 15 th	One Bubbling cluster (green) near shore across road from Cunliff parking area.	Total Microcystin: 1.1	All genera <1	
August 30 th		Not Sampled	Not Sampled	
September 11 th		Not Sampled	Not Sampled	
September 25 th		Not Sampled	Not Sampled	

Table 9: Results for cyanobacteria monitoring of North Easton’s Pond in 2017.


North-Easton’s Pond	Observation	Toxin Levels	Colony Count	Photograph
July 18 th	Streaks of spilled paint on surface of S shore.	All <1.0	Anabaena: 30 Aphanizomenon: 8180	
August 1 st		Not Sampled	Not Sampled	
August 16 th		Not Sampled	Not Sampled	
August 29 th		All <1.0	Anabaena: 230 Aphanizomenon: 1040	
September 12 th		All <1.0	Anabaena: 200 Aphanizomenon: 10	
September 26 th		Not Sampled	Not Sampled	

Table 10: Results for cyanobacteria monitoring of South Easton’s Pond in 2017.


South-Easton’s Pond	Observation	Toxin Levels	Colony Count	Photograph
August 16 th	No signs of HAB but sample taken to check for toxins to allow for complete screening of all Newport Water Supply reservoirs once during the 2017 season.	Not Sampled	Not Sampled	
August 29 th		All <1.0	Anabaena: 70 Aphanizomenon: 110	
September 12 th		Not Sampled	Not Sampled	
September 26 th		Not Sampled	Not Sampled	

Table 11: Results for cyanobacteria monitoring of Edgewood Lake in 2017.

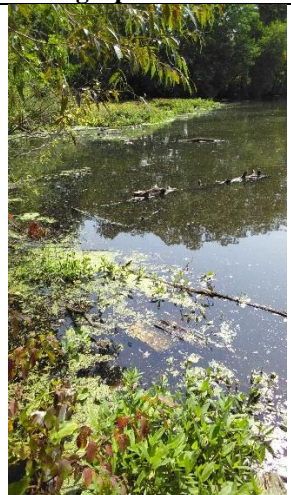

Edgewood Lake	Observation	Toxin Level	Colony Count	Photograph
August 30 th	No samples submitted to Health, no evidence of bloom upon visits.	Not Sampled	Not Sampled	
September 11 th		Not Sampled	Not Sampled	
September 25 th		Not Sampled	Not Sampled	

Table 12: Results for cyanobacteria monitoring of Elm Lake in 2017.

Elm Lake	Observation	Toxin Levels	Colony Count	Photograph
July 5 th *	Bloom on S shore near Sri Chinmoy statue, dark green mixed with brown and light green.	Total Microcystin: 9.0	Not Analyzed	
August 3 rd		All <1.0	Anabaena: 20 Aphanizomenon: 50 Plantothrix: 70	
August 15 th		All <1.0	Anabaena: 50 Aphanizomenon: 20 Plantothrix: 40	
August 30 th		Total Microcystin: 24	Anabaena: 1580 Aphanizomenon: 80 Microcystis: 550	
September 11 th		Not Sampled	Not Sampled	
September 25 th		Not Sampled	Not Sampled	

*: Health Advisory Issued; **Exceedance of Threshold.**

Table 13: Results for cyanobacteria monitoring of Gardiner Pond in 2017.

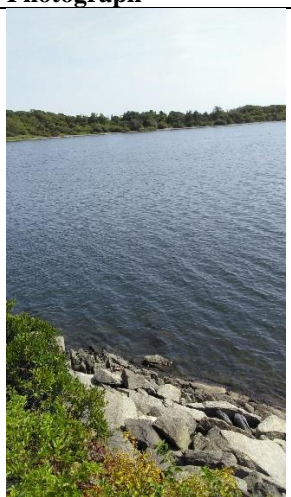


Gardiner Pond	Observation	Toxin Levels	Colony Count	Photograph
August 16 th	No signs of HAB but sample taken to check for toxins to allow for complete screening of all Newport Water Supply reservoirs once during the 2017 season.	Not Sampled	Not Sampled	
August 29 th		All <1.0	All genera <1	
September 12 th		Not Sampled	Not Sampled	
September 26 th		Not Sampled	Not Sampled	

Table 14: Results for cyanobacteria monitoring of the Japanese Gardens in 2017.

Japanese Gardens	Observation	Toxin Levels	Colony Count	Photograph
July 5 th *	Dark green mixed with brown and light green spilled paint, wind blowing into Willow Lake.	Total Microcystin: 9.3	Not Analyzed	
July 21 st		Not Sampled	Not Sampled	
August 3 rd		All <1.0	Anabaena: 130 Microcystis: 20	
August 15 th		Not Sampled	Not Sampled	
August 30 th		Total Microcystin: 24	Anabaena: 1580 Aphanizomenon: 80 Microcystis: 550	
September 11 th		Not Sampled	Not Sampled	
September 25 th		Not Sampled	Not Sampled	


*: Health Advisory Issued; **Exceedance of Threshold.**

Table 15: Results for cyanobacteria monitoring of J.L. Curran Reservoir in 2017.

J.L. Curran Reservoir	Observation	Toxin Levels	Colony Count	Photograph
August 30 th	Water is discolored green with a spilled paint appearance near Fish & Wildlife boat launch.	All <1.0	Anabaena: 100 Aphanizomenon: 2910 Microcystis: 10	
September 11 th		Not Sampled	Not Sampled	
September 25 th *		Total Microcystin: 61	Anabaena: 6910 Aphanizomenon: 90 Microcystis: 590	

*: Health Advisory Issued; **Exceedance of Threshold.**

Table 16: Results for cyanobacteria monitoring of Lawton Valley Reservoir in 2017.

Lawton Valley Reservoir	Observation	Toxin Levels	Colony Count	Photograph
August 16 th	Small patch in cove on N shore near entrance, Bright green and looks like spilled paint.	Not Sampled	Not Sampled	
August 29 th *		Total Microcystin: 42	Anabaena: 4600 Aphanizomenon: 70 Microcystis: 800	
September 12 th		Not Sampled	Not Sampled	
September 26 th		Not Sampled	Not Sampled	

*: Health Advisory Issued; **Exceedance of Threshold.**

Table 17: Results for cyanobacteria monitoring of Manville Dam in 2017.




Manville Dam	Observation	Toxin Levels	Colony Count	Photograph
July 26 th	Some clumps on the surface but no scum or mat present, water is mostly clear	Not Sampled	Not Sampled	

Table 18: Results for cyanobacteria monitoring of Mashapaug Pond in 2017.

Mashapaug Pond	Observation	Toxin Levels	Colony Count	Photograph
August 30 th	Strong odor, and lake wide bloom observed from Boathouse.	Not Sampled	Not Sampled	
September 11 th *		Total Microcystin: 24	Anabaena: 16300 Aphanizomenon: 46800 Microcystis: 800	
September 26 th		Not Sampled	Not Sampled	

*: Health Advisory Issued; **Exceedance of Threshold.**

Table 19: Results for cyanobacteria monitoring of Melville Pond in 2017.

Melville Pond	Observation	Toxin Levels	Colony Count	Photograph
July 3 rd	Scum looks like pea soup mixed with clumps in water. Man is fishing at dock.	Total Microcystin: 1.9	Not Analyzed	
July 18 th *		Total Microcystin: 4.4	Anabaena: 160 Microcystis: 80	
August 1 st		Total Microcystin: 6.7	Anabaena: 2840 Aphanizomenon: 970 Microcystis: 290 Planktothrix: 2570	
August 16 th		All <1.0	Anabaena: 690 Aphanizomenon: 40	
September 12 th		Not Sampled	Not Sampled	
September 26 th		Not Sampled	Not Sampled	

*: Health Advisory Issued; Exceedance of Threshold.

Table 20: Results for cyanobacteria monitoring of Nonquit Pond in 2017.


Nonquit Pond	Observation	Toxin Levels	Colony Count	Photograph
August 16 th	No evidence of HAB, water has been clear all season.	Not Sampled	Not Sampled	
September 12 th		Not Sampled	Not Sampled	
September 25 th		Not Sampled	Not Sampled	

Table 21: Results for cyanobacteria monitoring of Omega Pond in 2017.


Omega Pond	Observation	Toxin Levels	Colony Count	Photograph
July 10 th	North Side of pond had bubbling scum while whole pond is green in color.	All <1.0	All <1	
July 31 st		Not Sampled	Not Sampled	
August 17 th		Not Sampled	Not Sampled	
August 31 st		All <1.0	Anabaena: 1440 Aphanizomenon: 1320 Microcystis: 50	
September 13 th		All <1.0	Anabaena: 1510 Aphanizomenon: 40 Microcystis: 10	
September 28 th		Not Sampled	Not Sampled	

Table 22: Results for cyanobacteria monitoring of Paradise Pond in 2017.

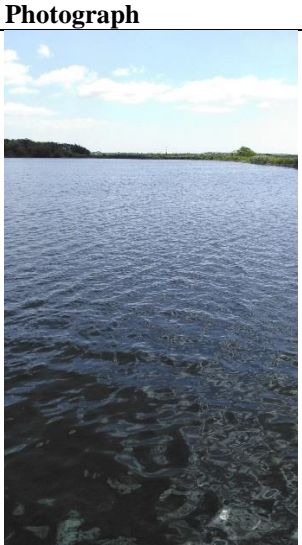

Paradise Pond	Observation	Toxin Levels	Colony Count	Photograph
August 16 th	No signs of HAB but sample taken to check for toxins to allow for complete screening of all Newport Water Supply reservoirs once during the 2017 season, water level low.	Not Sampled	Not Sampled	
August 29 th		All <1.0	Anabaena: 20 Aphanizomenon: 10	
September 12 th		Not Sampled	Not Sampled	
September 26 th		Not Sampled	Not Sampled	

Table 23: Results for cyanobacteria monitoring of Pleasure Lake in 2017.

Pleasure Lake	Observation	Toxin Levels	Colony Count	Photograph
August 15 th *	Found in small cove opposite Carr St. Sample here led to Park wide advisory.	Total Microcystin: 22	Anabaena: 610 Microcystis: 580 Plantothrix: 6870	
August 30 th		All <1.0	Anabaena: 60 Microcystis: 10	
September 11 th °		All <1.0	Anabaena: 10 Aphanizomenon: 10	
September 25 th *		Total Microcystin: 63	Anabaena: 7000 Aphanizomenon: 25000 Microcystis: 1500 Plantothrix: 490	

*: Health Advisory Issued; °: Health Advisory Rescinded; **Exceedance of Threshold.**

Table 24: Results for cyanobacteria monitoring of Pocasset Pond in 2017.




Pocasset Pond	Observation	Toxin Levels	Colony Count	Photograph
July 14 th	Water was discolored brown but no surface scum or mat, took grab sample to store in sampling center.	Not Sampled	Not Sampled	

Table 25: Results for cyanobacteria monitoring of Polo Lake in 2017.

Polo Lake	Observation	Toxin Levels	Colony Count	Photograph
August 15 th *	Brown and grey streaks found around dock near zip line exit.	Total Microcystin: 14	Anabaena: 3230 Aphanizomenon: 40 Microcystis: 570 Plankton: 190	
August 30 th		All <1.0	All genera <1	
September 11 th		Not Sampled	Not Sampled	
September 25 th		Not Sampled	Not Sampled	


*: Health Advisory Issued; **Exceedance of Threshold.**

Table 26: Results for cyanobacteria monitoring of Roosevelt Lake in 2017.

Roosevelt Lake	Observation	Toxin Levels	Colony Count	Photograph
July 5 th *	Water is discolored green with green surface streaks lake wide.	Total Microcystin: 3.2	Not Analyzed	
July 21 st		Not Sampled	Not Sampled	
August 3 rd		Not Sampled	Not Sampled	
August 15 th		Not Sampled	Not Sampled	
August 30 th		Not Sampled	Not Sampled	
September 11 th		Not Sampled	Not Sampled	
September 25 th		Not Sampled	Not Sampled	

*: Health Advisory Issued

Table 27: Results for cyanobacteria monitoring of Saint Mary’s Pond in 2017.

Saint Mary’s Pond	Observation	Toxin Levels	Colony Count	Photograph
July 3 rd *	Hairy, silky strands on rocks near shore, water is discolored green. Cell count threshold exceeded.	Total Microcystin: 1.3	Not Analyzed	
August 16 th		Not Sampled	Not Sampled	
August 29 th		All <1.0	Microcystis: 20	
September 12 th		Not Sampled	Not Sampled	
September 26 th		Not Sampled	Not Sampled	

*: Health Advisory Issued.

Table 28: Results for cyanobacteria monitoring of Scott Pond in 2017.

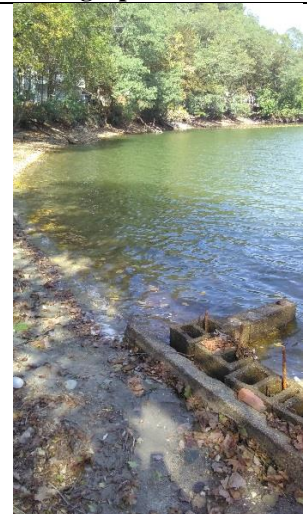


Scott Pond	Observation	Toxin Levels	Colony Count	Photograph
August 17 th	No scum or mat but pond is entirely discolored green.	Not Sampled	Not Sampled	
August 31 st		All <1.0	Anabaena: 50 Aphanizomenon: 4520	
September 13 th		Not Sampled	Not Sampled	
September 28 th		Not Sampled	Not Sampled	

Table 29: Results for cyanobacteria monitoring of Sisson Pond in 2017.

Sisson Pond	Observation	Toxin Levels	Colony Count	Photograph
August 1 st *	Orange clumps on surface in cove on N shore.	Total Microcystin: 5.8	Anabaena: 10 Aphanizomenon: 530 Microcystis: 440	
August 16 th		Not Sampled	Not Sampled	
August 29 th		All <1.0	Anabaena: 20 Aphanizomenon: 110	
September 12 th		Not Sampled	Not Sampled	
September 26 th		Not Sampled	Not Sampled	

*: Health Advisory Issued; **Exceedance of Threshold.**

Table 30: Results for cyanobacteria monitoring of Slack Reservoir in 2017.

Slack Reservoir	Observation	Toxin Levels	Colony Count	Photograph
July 12 th *	Pea soup mixed with spilled paint, found in cove off Bayou Dr.	Total Microcystin: 600	Not Analyzed	
July 17 th		Total Microcystin: 1.4	Not Analyzed	
July 31 st		All <1.0	All genera <1	
August 17 th °		All <1.0	Microcystis: 10	
August 31 st *		Total Microcystin: 230 Anatoxin: 3.5	Anabaena: 53300 Microcystis: 4080	
September 13 th		Not Sampled	Not Sampled	
September 28 th		Not Sampled	Not Sampled	

*: Health Advisory Issued; °: Health Advisory Rescinded; **Exceedance of Threshold.**

Table 31: Results for cyanobacteria monitoring of Slater Memorial Park Pond in 2017.

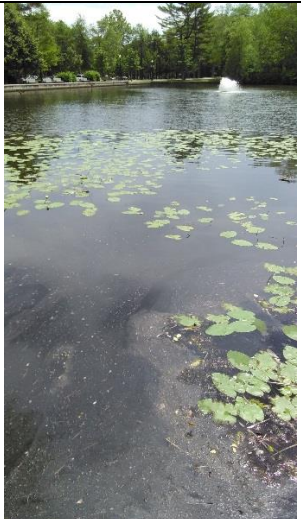


Slater Memorial Park Pond	Observation	Toxin Levels	Colony Count	Photograph
July 10 th	Green streaks on surface near paddle boat rentals.	All <1.0	Not Analyzed	
July 17 th		All <1.0	Aphanizomenon: 60 Microcystis: 12990	
August 17 th		Not Sampled	Not Sampled	
August 31 st		All <1.0	All genera <1	
September 13 th		Not Sampled	Not Sampled	
September 28 th		Not Sampled	Not Sampled	

Table 32: Results for cyanobacteria monitoring of Spectacle Pond in 2017.

Spectacle Pond	Observation	Toxin Levels	Colony Count	Photograph
July 21 st *	Grey and brown streaks on surface in cove near Jewelry Museum.	Total Microcystin: 120	Anabaena: 4290 Microcystis: 2470	
August 3 rd		Not Sampled	Not Sampled	
August 15 th		Not Sampled	Not Sampled	
August 30 th		All <1.0	Anabaena: 470 Aphanizomenon: 120 Microcystis: 70	
September 11 th		Not Sampled	Not Sampled	
September 25 th		Not Sampled	Not Sampled	

*: Health Advisory Issued; **Exceedance of Threshold.**

Table 33: Results for cyanobacteria monitoring of Stafford Pond in 2017.

Stafford Pond	Observation	Toxin Levels	Colony Count	Photograph
July 11 th	Streaks of spilled paint in small cove off Pelletier Ln, found on W shore near water treatment facility.	Not Sampled	Not Sampled	
July 13 th		All <1.0	Anabaena: 27010	
July 18 th		Anatoxin: 2.4	Anabaena: Too numerous to count	
July 20 th		Not Sampled	Not Sampled	
August 16 th		Not Sampled	Not Sampled	
September 12 th		Not Sampled	Not Sampled	
September 26 th *		Total Microcystin: 66	Microcystis: >100,000	

*: Health Advisory Issued; **Exceedance of Threshold.**

Table 34: Results for cyanobacteria monitoring of Ten Mile River in 2017.




Ten Mile River	Observation	Toxin Levels	Colony Count	Photograph
August 17 th	Whole reach is discolored green but, no scum or mat is present.	Not Sampled	Not Sampled	
August 31 st		All <1.0	Anabaena: 230 Aphanizomenon: 40 Microcystis: 20	
September 13 th		Not Sampled	Not Sampled	
September 28 th		Not Sampled	Not Sampled	

Table 35: Results for cyanobacteria monitoring of Turner Reservoir in 2017.

Turner Reservoir	Observation	Toxin Levels	Colony Count	Photograph
July 10 th	Near bridge on Newman Ave pea soup mixed with spilled paint.	All <1.0	Not Analyzed	
July 31 st *		Total Microcystin: 33	Not Analyzed	
August 17 th		All <1.0	All genera <1	
August 31 st		All <1.0	Anabaena: 70 Aphanizomenon: 40	
September 13 th		Not Sampled (Thickest mat yet)	Not Sampled	
September 28 th		No Bloom	No Bloom	

*: Health Advisory Issued; Exceedance of Threshold.

Table 36: Results for cyanobacteria monitoring of Warwick Pond in 2017.

Warwick Pond	Observation	Toxin Levels	Colony Count	Photograph
July 5 th	Entire pond is discolored green.	Not Sampled	Not Sampled	
August 15 th *		All <1.0	Anabaena: 60 Aphanizomenon: 4230 Cylindrospermopsis: 17000	
August 30 th		Not Sampled	Not Sampled	
September 11 th		Not Sampled	Not Sampled	
September 25 th		Not Sampled	Not Sampled	

*: Health Advisory Issued.

Table 37: Results for cyanobacteria monitoring of Watson Reservoir in 2017.


Watson Reservoir	Observation	Toxin Levels	Colony Count	Photograph
August 16 th	Entire pond is green with some streaks near intake station.	Not Sampled	Not Sampled	
August 29 th		All <1.0	Anabaena: 300	
September 12 th		Not Sampled	Not Sampled	
September 26 th		Not Sampled	Not Sampled	

Table 38: Results for cyanobacteria monitoring of Willow Lake in 2017.


Willow Lake	Observation	Toxin Levels	Colony Count	Photograph
August 30 th	Not sample this season as park advisory was issued before lake wide bloom occurred, seems to come from the Japanese Gardens.	Not Sampled	Not Sampled	
September 11 th		Not Sampled	Not Sampled	
September 25 th		Not Sampled	Not Sampled	

Table 39: Results for cyanobacteria monitoring of Wilson Reservoir in 2017.

Wilson Reservoir	Observation	Toxin Levels	Colony Count	Photograph
September 7 th	Took sample for Jane to observe in sampling center	Not Sampled	Not Sampled	