

# A Risk Assessment Approach to Managing HABs on Cayuga Lake

Water and Community Forum

The Cayuga Lake Water Quality Consortium: *Community Science Institute,  
Cayuga Lake Watershed Network, Discover Cayuga Lake*

Tompkins County Public Library, December 15, 2018  
Stephen Penningroth, Director, Community Science Institute

# Classic Definition of Toxic Chemical Risk

Risk of an adverse health impact from a toxic chemical is a function of:

a) The inherent toxicity of the chemical

b) The degree to which people are exposed to it

It is impossible to control a chemical's toxicity

It *is* possible to manage exposure.





# Classic Definition of Toxic Chemical Risk

Cyanobacteria blooms differ from toxic chemicals in that they may not – or they may – contain toxins.

Therefore, it is necessary to assess risk separately for each bloom.



# Cayuga Lake Water Quality Consortium Fills Void Left by State and County Agencies



**Parks, Recreation  
and Historic Preservation**



**Department of  
Environmental Conservation**



# How County Health Departments Address HABs

- Staff address regulated swimming areas and drinking water concerns as they arise.

## How NYS Parks Address HABs

- Program focuses on state parks only.
- If a suspicious bloom is observed, the swimming beach is closed and a sample is taken 24 hours after the bloom disappears.
- The beach is re-opened if microcystin toxin is less than 4 ug/L.

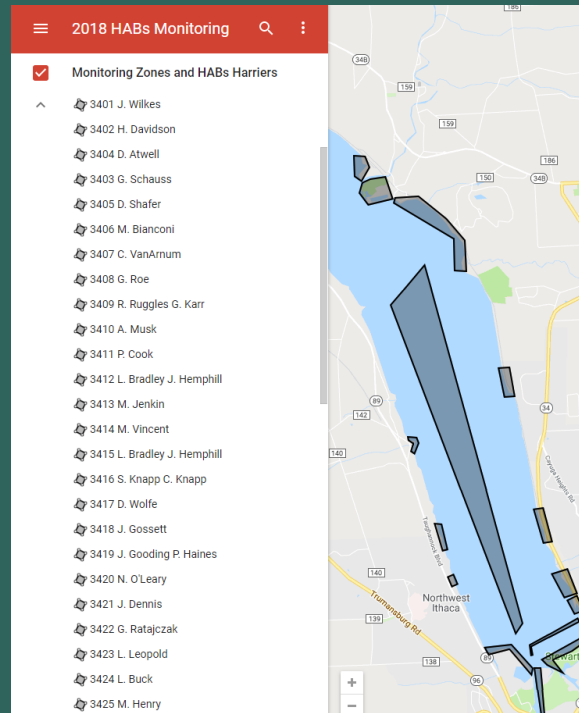
# How NYS DEC Addresses HABs

- NYS DEC's program is a national leader in the statewide surveillance of lakes for HABs
- Program based on individual lakes' volunteer surveillance programs and chance reporting of suspicious blooms by the public
- Bloom samples are analyzed by a DEC contract lab
- Results are disseminated to regional stakeholders primarily via email
- Communication lag times of days to weeks can occur

**Cayuga Lake Water Quality Consortium takes NYSDEC surveillance program to the next level.**

# Strategy of Cayuga Lake Water Quality Consortium for Assessing Risk from HABs Toxins in 2018

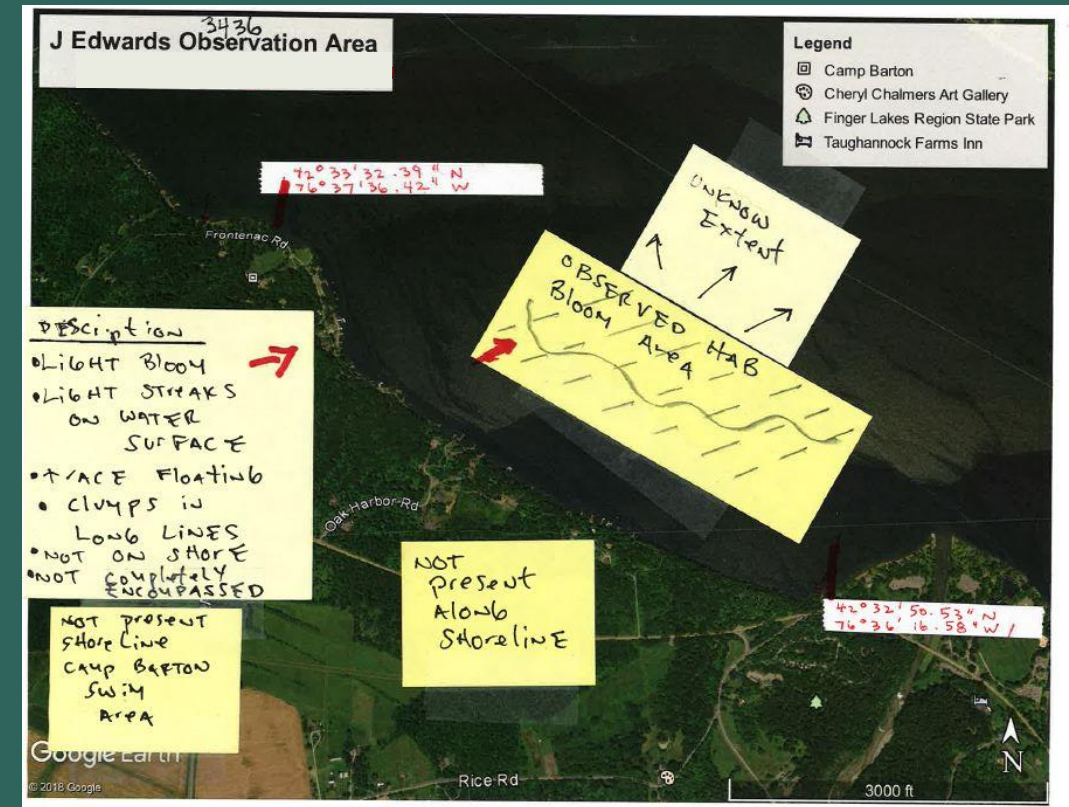
**Recruit:** Recruit, train and coordinate over 70 volunteers to monitor the occurrence of suspicious algal blooms around Cayuga Lake.





# Strategy of Cayuga Lake Water Quality Consortium for Assessing Risk from HABs Toxins in 2018

**Monitor:** Monitor bloom occurrence, collect a sample from each suspicious bloom, and transport samples to CSI's lab.





# Strategy of Cayuga Lake Water Quality Consortium for Assessing Risk from HABs Toxins in 2018

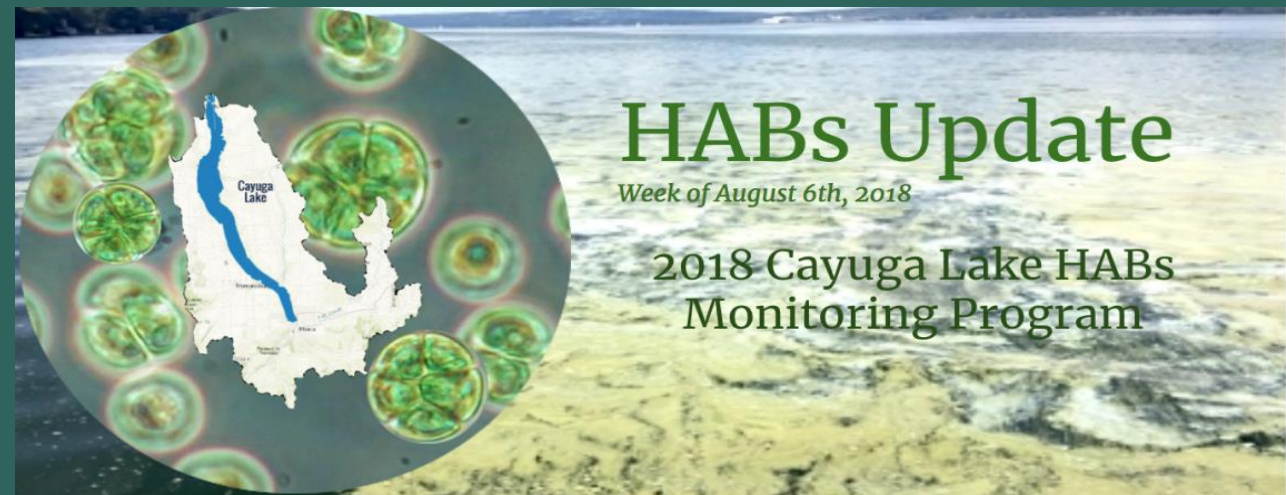
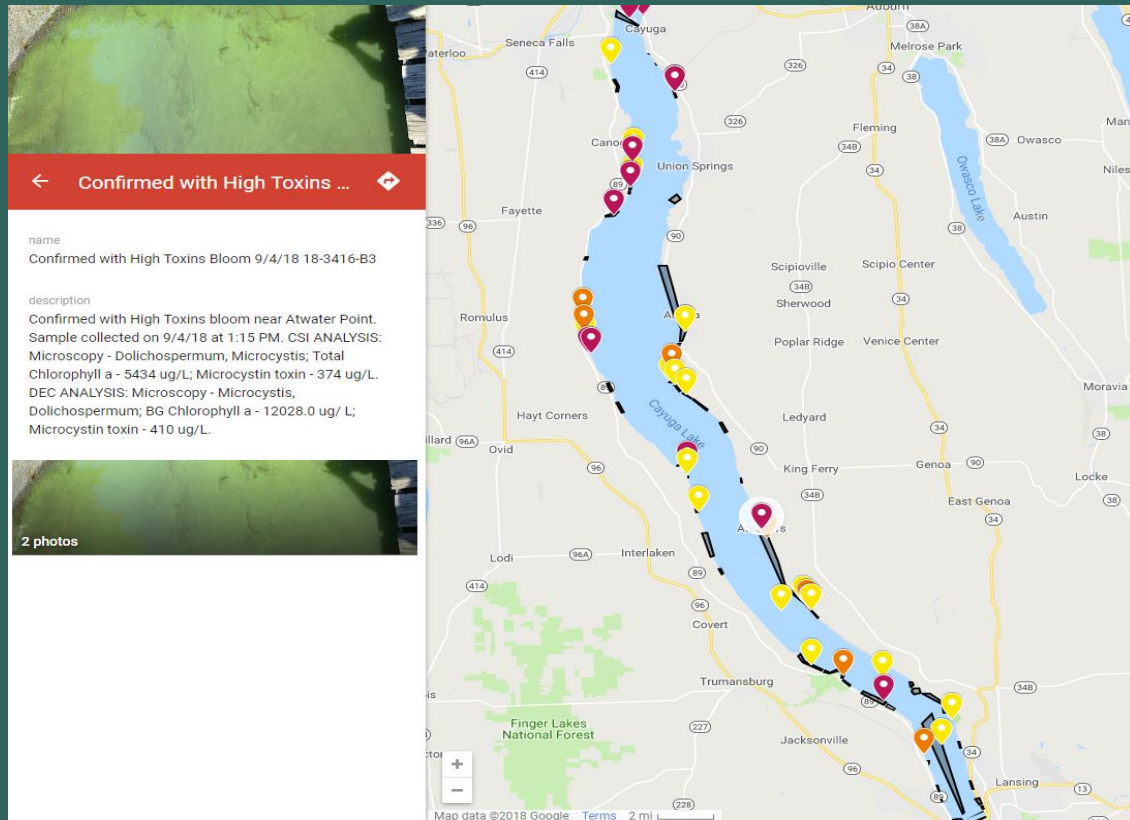
**Analyze:** Examine bloom sample under the microscope to determine whether it contains cyanobacteria. If cyanobacteria is present, analyze the sample for microcystin, the most prevalent cyanotoxin in New York.



# Strategy of Cayuga Lake Water Quality Consortium for Assessing Risk from HABs Toxins in 2018

## Communicate:

Communicate the results to the public as soon as possible and caution community members to limit exposure to all suspicious blooms unless and until there is solid evidence that a bloom does not contain toxin.





# Risk Communication and Management

Basic Bloom Information				Bloom Location Information			CSI Analyses (note reasoning if samples are not tested)						Sample sent to DEC contract lab?	NYSDEC-funded analyses, limited to 40 samples (note reasoning if sample is not sent to UFI for analyses)					
Bloom Sample Code	Date Sampled	Time Sampled	Date Sample Received	Location Description	Latitude	Longitude	Microscopy (cyanobacteria taxa in bold)		Total Chlorophyll a		Microcystin			Microscopy (cyanobacteria taxa in bold)		BG Chlorophyll a		Microcystin	
							Description	Analysis Date	Result in ug/L	Analysis Date	Result in ug/L	Analysis Date		Description	Results Received	Result in ug/L	Results Received	Result in ug/L	Results Received
18-3435-B1	7/12/2018	11:00	7/12/2018	South Side of Taughannock Falls SP	42.5457	-76.5951	Dolichospermum	7/12/2018	1040	7/12/2018	< 0.30	7/13/2018	yes	Dolichospermum	7/18/2018	1089.02	7/18/2018	Not available	NA
18-3454-B1	7/12/2018	11:30	7/12/2018	Across from Bolton Point	42.5053	-76.5298	Dolichospermum	7/12/2018	566.5	7/12/2018	< 0.30	7/13/2018	no	Sample not sent. Midlake bloom				Not available	NA
18-3400-B2	7/12/2018	14:05	7/13/2018	31 Maplewood Rd	42.5440	-76.5440	Dolichospermum	7/12/2018					yes	Sample not sent. Midlake bloom	7/18/2018	275.94	7/18/2018	Not available	NA
18-3400-B3	7/14/2018	13:15	7/18/2018	Off of Lake Ridge Point	42.5100	-76.5233	Dolichospermum	7/14/2018					yes	Spirogyra, Dolichospermum	7/18/2018	852.95	7/18/2018	Not available	NA
18-3418-B2	7/15/2018	12:00	7/18/2018	715 Lansing Station Rd, Lansing	42.5838	-76.6196	Dolichospermum	7/17/2018	891	7/18/2018	< 0.30	7/19/2018	yes	Dolichospermum, Spirogyra	7/18/2018	3517.9	7/18/2018	Not available	NA
18-3416-B2	7/16/2018	13:09	7/19/2018	235 Rabbit Run, King Ferry	42.6299	-76.6495	Dolichospermum	7/17/2018	3300	7/18/2018	0.31	7/19/2018	yes	Dolichospermum, Spirogyra	7/18/2018	3517.9	7/18/2018	Not available	NA
18-3404-B1	7/16/2018	7:00	7/19/2018	5475 State Road 30, Cayuga	42.8819	-76.7075	Microcystis aeruginosa	7/17/2018	151	7/18/2018	41.00	7/31/2018	yes	Filamentous green algae, Microcystis	8/2/18	161.42	8/2/18	NA	8/10/18
18-3433-B1	7/16/2018	11:00	7/19/2018	1577 Taughannock Falls SP	42.5457	-76.5951	Dolichospermum	7/16/2018					yes	Sample not sent. Midlake bloom					
18-3407-B1	7/16/2018	14:00	7/17/2018	279 Main St, Cayuga	42.7400	-76.7400	Dolichospermum	7/16/2018					yes	Sample not sent. Midlake bloom					
18-3404-B2	7/26/2018	16:00	7/27/2018	Fire Lane 18, Cayuga, Midway between Cayuga	42.8809	-76.7074	Microcystis	7/27/2018	33.9	7/31/18	15.62	7/31/18	yes	Microcystis	8/2/18	31.56	8/2/18	NA	8/10/2018
18-3418-B3	8/16/18	14:15	8/17/18	Lansing Station Rd, Lansing NY	42.5838	-76.6171	Dolichospermum, Microcystis	8/17/2018	192	8/17	1.55	8/21/18	yes	Dolichospermum	8/23/18	301.13	8/23	Not available	
18-3400-B4	8/23/18	12:00	8/24/18	Cayuga Lake State Park, Midlake between Taughannock	42.8979	-76.7496	Sample not collected						NA	Sample not collected					
18-3400-B5	8/24/18	5:30	8/27/2018	South of Portant Point	42.5200	-76.5250	Dolichospermum	8/28/18	811	8/28/18			no	Sample not sent. Bloom was not dense enough to warrant					
18-3400-B6	9/4/2018	unknown	9/4/2018	Northern Tip of Cayuga Lake	42.9255	-76.7285	Microcystis	9/4/2018	7768	9/4/18	2533.20	9/7/2018	yes	Microcystis, Lyngbya	9/11/2018	13231.6	9/11/2018	2500	9/28/2018
18-3416-B3	9/4/2018	13:15	9/4/2018	Atwater Point	42.6299	-76.6495	Dolichospermum, Microcystis	9/4/2018	5434	9/4/18	14.00	9/7/2018	yes	Microcystis, Dolichospermum	9/11/2018	12028	9/11/2018	410	9/28/2018
18-3408-B1	9/4/2018	18:15	9/4/2018	Wall's College Dock	42.7440	-76.7400	Dolichospermum	9/4/2018	45	9/4/18			no	Sample not sent. Bloom was not dense enough to warrant					
18-3441-B1	9/4/2018	15:32	9/4/2018	Sheldrake Point Public Launch	42.6656	-76.7325	Dolichospermum, Microcystis	9/4/2018	10	9/4/18			yes	Microcystis, Dolichospermum	9/11/2018	999.3	9/11/2018	150	9/28/2018
18-3418-B4	9/4/2018	17:24	9/5/2018	655 Lansing Station Rd, Lansing	42.5838	-76.6196	Dolichospermum, Microcystis	9/5/2018	3	9/5/2018	< 0.30	9/7/2018	no	Sample not sent. Possible overlap with 18-3418-B3					
18-3447-B1	9/4/2018	11:00	9/5/2018	4063 Canora Shores Dr, Seneca Falls	42.8270	-76.7368	Microcystis, Dolichospermum	9/5/2018	909	9/6/2018	389.00	9/7/2018	yes	Microcystis, Dolichospermum	9/11/2018	908.7	9/11/2018	470	9/28/2018
18-3449-B1	9/4/2018	8:30	9/5/2018	Red Jacket Yacht Club	42.8307	-76.7355	Microcystis, Dolichospermum	9/5/2018	365	9/6/2018	101.52	9/7/2018	no	Sample not sent. Possible overlap with 18-3447-B1					
18-3440-B1	9/4/2018	18:15	9/5/2018	7504 County Road, Interlaken	42.8317	-76.6988	Microcystis, Dolichospermum	9/5/2018	785	9/6/2018	34.80	9/7/2018	no	Sample not sent. Possible overlap with 18-3441-B1					
18-3444-B2	9/4/2018	17:00	9/5/2018	6041 Lakeville Rd, Seneca Falls	42.7810	-76.7510	Microcystis, Dolichospermum	9/5/2018	1168	9/14/2018	310.00	9/14/2018	no	Sample not sent. Sample volume too low.	9/11/2018	1554.7	9/11/2018	210	9/28/2018
18-3439-B1	9/12/2018	11:45	9/13/2018	Busy Bee Market Shoreline	42.6400	-76.6910	Microcystis, Dolichospermum	9/14/2018	1168	9/14/2018	310.00	9/14/2018	no	Sample not sent. Sample volume too low.					
18-3400-B7	9/13/2018	17:00	9/14/2018	Northern Tip of Cayuga Lake			Microcystis, Dolichospermum	9/14/2018	4114	9/14/2018	214.10	9/14/2018	yes	Microcystis	9/18/2018	4041	9/19/2018	800	10/5/2018
18-3451-B1	9/13/2018	14:10	9/14/18	3687 South Parker Rd.	42.8463	-76.7351	Microcystis, Dolichospermum	9/14/2018	869	9/14/2018	40.28	9/14/2018	no	Sample not sent. Possible overlap with 18-3451-B2					
18-3451-B2	9/13/2018	16:30	9/14/2018	3777 Gusty Lane, Fayette	42.8417	-76.7364	Microcystis, Dolichospermum	9/14/2018	1192	9/14/2018	55.10	9/14/2018	yes	Microcystis, Dolichospermum	9/19/2018	802	9/19/2018	330	10/5/2018
18-3436-B1	9/13/2018	19:30	9/14/2018	Frontenac Point, Covert	42.5590	-76.6268	Microcystis, Dolichospermum	9/14/2018	478	9/14/2018	6.14	9/14/2018	no	Sample not sent. Sample not dense enough.					
18-3444-B3	9-13-2018	15:00	9/14/2018	Dean's Cove	42.7316	-76.7638	Microcystis, Dolichospermum	9/14/2018	2406	9/14/2018	281.70	9/14/2018	yes	Microcystis	9/19/2018	2324	9/19/2018	850	10/5/2018
18-3404-B3	9/13/2018	16:00	9/14/2018	41 Fire Lane, Cayuga	42.9261	-76.7284	Microcystis, Dolichospermum	9/14/2018	693	9/14/2018	41.00	9/14/2018	yes	Microcystis	9/19/2018	560	9/19/2018	170	10/5/2018

Effective risk management depends on communicating risk – or non-risk – to the general public.

For HABs, this means communicating:



# Risk Communication and Management

Basic Bloom Information				Bloom Location Information			CSI Analyses (note reasoning if samples are not tested)						Sample sent to DEC contract lab?	NYSDEC-funded analyses, limited to 40 samples (note reasoning if sample is not sent to UFI for analyses)					
Bloom Sample Code	Date Sampled	Time Sampled	Date Sample Received	Location Description	Latitude	Longitude	Microscopy (cyanobacteria taxa in bold)		Total Chlorophyll a		Microcystin			Microscopy (cyanobacteria taxa in bold)		BG Chlorophyll a		Microcystin	
							Description	Analysis Date	Result in ug/L	Analysis Date	Result in ug/L	Analysis Date		Description	Results Received	Result in ug/L	Results Received	Result in ug/L	Results Received
18-3435-B1	7/12/2018	11:00	7/12/2018	South Side of Taughannock Falls SP	42.5457	-76.5951	Dolichospermum	7/12/2018	1040	7/12/2018	< 0.30	7/13/2018	yes	Dolichospermum	7/16/2018	1089.02	7/16/2018	Not available	NA
18-3454-B1	7/12/2018	11:30	7/12/2018	from Bolton Point	42.5053	-76.5298	Dolichospermum	7/12/2018	566.5	7/12/2018	< 0.30	7/13/2018	no	Sample not sent. Midlake bloom					
18-3400-B2	7/12/2018	14:05	7/13/2018	31 Maple	42.5001	-76.5415	Dolichospermum	7/17/2018	306	7/18/2018	< 0.30	7/19/2018	yes	Dolichospermum	7/18/2018	275.94	7/18/2018	Not available	NA
18-3400-B3	7/14/2018	13:15	7/16/2018	Off of Lake Ridge	42.5830	-76.6363	Dolichospermum	7/17/2018	742	7/18/2018		Not tested.	no	Sample not sent. Midlake bloom. Sparse.					
18-3418-B2	7/15/2018	12:00	7/16/2018	715 Lansing Station Rd.		-76.6196	Dolichospermum	7/17/2018	851	7/18/2018	< 0.30	7/19/2018	yes	Spirogyra, Dolichospermum	7/18/2018	852.95	7/18/2018	Not available	NA
18-3416-B2	7/16/2018	13:09	7/16/2018	235 Rabbit Run, King Ferry			Dolichospermum	7/17/2018	3300	7/18/2018	0.31	7/19/2018	yes	Dolichospermum, Spirogyra	7/18/2018	3517.9	7/18/2018	Not available	NA
18-3404-B1	7/16/2018	7:00	7/16/2018	5475 State Route 90, Cayuga				7/17/2018	454	7/18/2018	14.00	7/21/2018	yes	Filamentous green algae, Microcystis	8/2/2018	161.42	8/2/2018	NA	8/10/18
18-3433-B1	7/16/2018	11:00	7/16/2018												not sending.				
18-3407-B1	7/16/2018	14:00	7/17/2018												not sending.				
18-3404-B2	7/26/2018	16:00	7/27/2018												8/3/2018	31.56	8/2/2018	NA	8/10/2018
18-3418-B3	8/16/18	14:15	8/16/2018												8/3/2018	301.13	8/23/2018	Not available	
18-3400-B4	8/23/18	12:00	8/23/2018												not sending.				
18-3400-B5	8/24/18	5:30	8/27/2018												not sending.				
18-3400-B6	9/4/2018	unknown	9/4/2018												8/3/2018	13231.6	9/11/2018	2500	9/28/2018
18-3416-B3	9/4/2018	13:15	9/4/2018	Remond's Creek	42.6269	-76.6455	Dolichospermum, Microcystis	9/5/2018	444	9/10/2018	0.30	9/12/2018	yes	Microcystis, Dolichospermum	9/12/2018	12028	9/11/2018	410	9/28/2018
18-3408-B1	9/4/2018	18:15	9/4/2018	Wall's College Dock	42.7440	-76.7005	Dolichospermum, Microcystis	9/5/2018	45.5	9/6/2018	14.25	9/7/2018	no	Sample not sent. Bloom was not dense enough to warrant sending.					
18-3441-B1	9/4/2018	15:32	9/4/2018	Walton's Point Public Launch	42.6656	-76.5969	Dolichospermum, Microcystis	9/5/2018	1093	9/6/2018	> 5.00	9/7/2018	yes	Microcystis, Dolichospermum	9/11/2018	999.3	9/11/2018	150	9/28/2018
18-3418-B4	9/4/2018	17:24	9/5/2018	Lakeview Lane, Romulus	42.7316	-76.7638	Dolichospermum, Microcystis	9/5/2018	339	9/10/2018	0.30	9/12/2018	yes	Microcystis, Dolichospermum	9/11/2018	908.7	9/11/2018	470	9/28/2018
18-3447-B1	9/4/2018	11:00	9/5/2018	Old County Road, Seneca	42.6807	-76.6365	Microcystis, Dolichospermum	9/5/2018	305	9/6/2018	0.30	9/7/2018	yes	Microcystis, Dolichospermum	9/11/2018	908.7	9/11/2018	470	9/28/2018
18-3449-B1	9/4/2018	8:30	9/5/2018	Red Jacket Tack Shop	42.6937	-76.6307	Microcystis, Dolichospermum	9/5/2018	365	9/6/2018	0.30	9/7/2018	no	Sample not sent. Possible overlap with 18-3441-B1					
18-3440-B1	9/4/2018	18:15	9/5/2018	7504 County Road, Interlaken	42.6617	-76.6968	Microcystis, Dolichospermum	9/5/2018	785	9/6/2018	54.80	9/7/2018	no	Sample not sent. Possible overlap with 18-3441-B1					
18-3444-B2	9/4/2018	17:00	9/5/2018	6041 Lakeview Lane, Romulus	42.7316	-76.7638	Dolichospermum, Microcystis	9/5/2018	425	9/10/2018	0.30	9/12/2018	yes	Dolichospermum, Microcystis	9/11/2018	1554.7	9/11/2018	210	9/28/2018
18-3439-B1	9/12/2018	11:45	9/13/2018	Busy Bee Market Shoreline	42.8417	-76.7364	Microcystis, Dolichospermum	9/14/2018	1192	9/14/2018	55.10	9/14/2018	yes	Microcystis, Dolichospermum	9/19/2018	802	9/19/2018	330	10/5/2018
18-3400-B7	9/13/2018	17:00	9/14/2018	Northern Tip of Cayuga Lake	42.7116	-76.7016	Microcystis, Dolichospermum	9/14/2018	4712	9/14/2018	2.30	9/14/2018	yes	Microcystis	9/19/2018	4041	9/19/2018	800	10/5/2018
18-3451-B1	9/13/2018	14:10	9/14/2018	3967 South Parker Rd.	42.8403	-76.7391	Microcystis, Dolichospermum	9/14/2018	693	9/14/2018	41.00	9/14/2018	no	Sample not sent. Possible overlap with 18-3451-B2					
18-3451-B2	9/13/2018	16:30	9/14/2018	3777 Gusty Lane, Fayette	42.8417	-76.7364	Microcystis, Dolichospermum	9/14/2018	1192	9/14/2018	55.10	9/14/2018	yes	Microcystis, Dolichospermum	9/19/2018	802	9/19/2018	330	10/5/2018
18-3436-B1	9/13/2018	19:30	9/14/2018	Frontenac Point, Covert	42.5590	-76.6268	Microcystis, Dolichospermum	9/14/2018	478	9/14/2018	6.14	9/14/2018	no	Sample not sent. Sample not dense enough.					
18-3444-B3	9-13-2018	15:00	9/14/2018	Dean's Cove	42.7316	-76.7638	Microcystis, Dolichospermum	9/14/2018	2406	9/14/2018	281.70	9/14/2018	yes	Microcystis	9/19/2018	2324	9/19/2018	850	10/5/2018
18-3404-B3	9/13/2018	18:00	9/14/2018	41 Fire Lane, Cayuga	42.9261	-76.7264	Microcystis, Dolichospermum	9/14/2018	693	9/14/2018	41.00	9/14/2018	yes	Microcystis	9/19/2018	560	9/19/2018	850	10/5/2018

The location, date and time of the suspicious bloom

# Risk Communication and Management

Basic Bloom Information				Bloom Location Information			CSI Analyses (note reasoning if samples are not tested)						Sample sent to DEC contract lab?	NYSDEC-funded analyses, limited to 40 samples (note reasoning if sample is not sent to UFI for analyses)					
Bloom Sample Code	Date Sampled	Time Sampled	Date Sample Received	Location Description	Latitude	Longitude	Microscopy (cyanobacteria taxa in bold)		Total Chlorophyll a		Microcystin			Microscopy (cyanobacteria taxa in bold)		BG Chlorophyll a		Microcystin	
							Description	Analysis Date	Result in ug/L	Analysis Date	Result in ug/L	Analysis Date		Description	Results Received	Result in ug/L	Results Received	Result in ug/L	Results Received
18-3435-B1	7/12/2018	11:00	7/12/2018	South Side of Taughannock Falls SP	42.5457	-76.5951	Dolichospermum	7/12/2018	1040	7/12/2018	< 0.30	7/13/2018	yes	Dolichospermum	7/16/2018	1089.02	7/16/2018	Not available	NA
18-3454-B1	7/12/2018	11:30	7/12/2018	Across from Bolton Point	42.5053	-76.5298	Dolichospermum	7/12/2018	566.5	7/12/2018	< 0.30	7/13/2018	no	Sample not sent. Midlake bloom				Not available	NA
18-3400-B2	7/12/2018	14:05	7/13/2018	31 Maplewood Rd	42.5001	-76.5415	Dolichospermum	7/17/2018	306	7/18/2018	< 0.30	7/19/2018	yes	Dolichospermum	7/18/2018	275.94	7/18/2018	Not available	NA
18-3400-B3	7/14/2018	13:15	7/16/2018	Off of Lake Ridge Point	42.5830	-76.6363	Microcystis	7/17/2018	742	7/18/2018	Not tested		no	Sample not sent. Midlake bloom. Sparse.				Not available	NA
18-3418-B2	7/15/2018	12:00	7/16/2018	715 Lansing Station Rd, Lansing	42.5860		Microcystis	7/17/2018	851	7/18/2018	< 0.30	7/19/2018	yes	Spirogyra, Dolichospermum	7/18/2018	852.95	7/18/2018	Not available	NA
18-3416-B2	7/16/2018	13:09	7/16/2018	235 Rabbit Run, King Ferry	42.5860		Microcystis	7/17/2018	3300	7/18/2018	0.31	7/19/2018	yes	Dolichospermum, Spirogyra	7/18/2018	3517.9	7/18/2018	Not available	NA
18-3404-B1	7/16/2018	7:00	7/16/2018	5475 State Route 90, Cayuga			Microcystis	7/17/2018	151	7/18/2018	11.55	7/19/2018	yes	Filamentous green algae, Microcystis	8/2/18	161.42	8/2/18	NA	8/10/18
18-3433-B1													no	Sample not sent. Bloom was not dense enough to warrant sending.					
18-3407-B1													no	Sample not sent. Bloom was not dense enough to warrant sending.					
18-3404-B2													yes	Microcystis	8/2/18	31.56	8/2/18	NA	8/10/2018
18-3418-B3													yes	Dolichospermum	8/23/18	301.13	8/23	Not available	
													NA	Sample not collected					
18-3400-B4													no	Sample not sent. Bloom was not dense enough to warrant sending.					
18-3400-B5													no	Sample not sent. Bloom was not dense enough to warrant sending.					
18-3400-B6													yes	Microcystis, Lyngbya	9/11/2018	13231.6	9/11/2018	2500	9/28/2018
18-3416-B3													yes	Microcystis, Dolichospermum	9/11/2018	12028	9/11/2018	410	9/28/2018
18-3408-B1													no	Sample not sent. Bloom was not dense enough to warrant sending.					
18-3441-B1													yes	Microcystis, Dolichospermum	9/11/2018	999.3	9/11/2018	150	9/28/2018
18-3418-B4													no	Sample not sent. Possible overlap with 18-3416-B3.					
18-3447-B1													yes	Microcystis, Dolichospermum	9/11/2018	908.7	9/11/2018	470	9/28/2018
18-3449-B1													no	Sample not sent. Possible overlap with 18-3447-B1.					
18-3440-B1													no	Sample not sent. Possible overlap with 18-3441-B1.					
18-3444-B2													no	Sample not sent. Possible overlap with 18-3444-B1.					
18-3439-B1													yes	Microcystis	9/11/2018	1554.7	9/11/2018	210	9/28/2018
18-3400-B7	9/13/2018	17:00	9/14/2018	Northern Tip of Cayuga Lake			Microcystis, Dolichospermum	9/14/2018	4114	9/14/2018	214.70	9/14/2018	yes	Microcystis	9/19/2018	4041	9/19/2018	800	10/5/2018
18-3451-B1	9/13/2018	14:10	9/14/18	3687 South Parker Rd.	42.8463	-76.7351	Microcystis, Dolichospermum	9/14/2018	869	9/14/2018	40.28	9/14/2018	no	Sample not sent. Possible overlap with 18-3451-B2					
18-3451-B2	9/13/2018	16:30	9/14/2018	3777 Gusty Lane, Fayette	42.8417	-76.7364	Microcystis, Dolichospermum	9/14/2018	1192	9/14/2018	55.10	9/14/2018	yes	Microcystis, Dolichospermum	9/19/2018	802	9/19/2018	330	10/5/2018
18-3436-B1	9/13/2018	19:30	9/14/2018	Frontenac Point, Covert	42.5590	-76.6268	Microcystis, Dolichospermum	9/14/2018	478	9/14/2018	6.14	9/14/2018	no	Sample not sent. Sample not dense enough.					
18-3444-B3	9-13-2018	15:00	9/14/2018	Dean's Cove	42.7316	-76.7638	Microcystis, Dolichospermum	9/14/2018	2406	9/14/2018	281.70	9/14/2018	yes	Microcystis	9/19/2018	2324	9/19/2018	850	10/5/2018
18-3404-B3	9/13/2018	18:00	9/14/2018	41 Fire Lane, Cayuga	42.9261	-76.7264	Microcystis, Dolichospermum	9/14/2018	693	9/14/2018	41.00	9/14/2018	yes	Microcystis	9/19/2018	560	9/19/2018		10/5/2018

The type (genus or species) of cyanobacteria

# Risk Communication and Management

Basic Bloom Information				Bloom Location Information			CSI Analyses (note reasoning if samples are not tested)						Sample sent to DEC contract lab?	NYSDEC-funded analyses, limited to 40 samples (note reasoning if sample is not sent to URI for analyses)					
Bloom Sample Code	Date Sampled	Time Sampled	Date Sample Received	Location Description	Latitude	Longitude	Microscopy (cyanobacteria taxa in bold)		Total Chlorophyll a		Microcystin			Microscopy (cyanobacteria taxa in bold)		BG Chlorophyll a		Microcystin	
							Description	Analysis Date	Result in ug/L	Analysis Date	Result in ug/L	Analysis Date		Description	Results Received	Result in ug/L	Results Received	Result in ug/L	Results Received
18-3435-B1	7/12/2018	11:00	7/12/2018	South Side of Taughannock Falls SP	42.5457	-76.5951	Dolichospermum	7/12/2018	1040	7/12/2018	< 0.30	7/13/2018	yes	Dolichospermum	7/18/2018	1089.02	7/18/2018	Not available	NA
18-3454-B1	7/12/2018	11:30	7/12/2018	Across from Belton Point	42.5053	-76.5298	Dolichospermum	7/12/2018	566.5	7/12/2018	< 0.30	7/13/2018	no	Sample not sent. Midlake bloom					
18-3400-B2	7/12/2018	14:05	7/13/2018	31 Maplewood Rd	42.5001	-76.5415	Dolichospermum	7/17/2018	306	7/18/2018	< 0.30	7/19/2018	yes	Dolichospermum	7/18/2018	275.94	7/18/2018	Not available	NA
18-3400-B3	7/14/2018	13:15	7/16/2018	Off of Lake Ridge Point	42.5830	-76.6363	Dolichospermum	7/17/2018	742	7/18/2018		Not tested.		Sample not sent. Midlake bloom. Sparse.					
18-3418-B2	7/15/2018	12:00	7/16/2018	715 Lansing Station Rd, Lansing	42.5860	-76.6196	Dolichospermum	7/17/2018	851	7/18/2018	< 0.30	7/19/2018	yes	Dolichospermum	7/18/2018	852.95	7/18/2018	Not available	NA
18-3416-B2	7/16/2018	13:09	7/16/2018	235 Rabbit Run, King Ferry	42.6299	-76.6496	Dolichospermum	7/17/2018	3300	7/18/2018	0.31	7/19/2018	yes	Dolichospermum	7/18/2018	3517.9	7/18/2018	Not available	NA
18-3404-B1	7/16/2018	7:00	7/16/2018	5475 State Route 90, Cayuga	42.8819	-76.7075	Microcystis aeruginosa	7/17/2018	161	7/18/2018	41.60	7/31/2018	yes						10/18/2018
18-3433-B1	7/16/2018	11:00	7/16/2018	1577 Taughannock Blvd.	42.5255	-76.5592	Dolichospermum	7/17/2018		Not tested. Not dense enough			no						
18-3407-B1	7/16/2018	14:00	7/17/2018	279 Main St. Aurora						Not tested. Not dense enough			no						
18-3404-B2	7/26/2018	16:00	7/27/2018	Fire Lane 18, Cayuga. Midway between Cayuga Lake and Taughannock Falls	42.5839	-76.6171	Dolichospermum, Microcystis	8/17/2018	192	8/17/2018	1.56	8/21/2018	yes						2018
18-3418-B3	8/16/18	14:15	8/17/18	Lansing Station Rd, Lansing NY	42.5839	-76.6171	Dolichospermum, Microcystis	8/17/2018	192	8/17/2018	1.56	8/21/2018	yes						
				Cayuga Lake State Park Midlake between Taughannock SP and Myers Point	42.8970	-76.7499	Sample not collected						NA						
18-3400-B4	8/23/18	12:00	8/24/18							Results Pending			no						
18-3400-B5	8/24/18	5:30	8/27/2018	South of Portlant Point						Results Pending			no						
18-3400-B6	9/4/2018	unknown	9/4/2018	Northern Tip of Cayuga Lake	42.6255	-76.7285	Microcystis	9/4/2018	7768	9/4/18	2533.28	9/7/2018	yes						2018
18-3416-B3	9/4/2018	13:15	9/4/2018	Atwater Point	42.6299	-76.6496	Dolichospermum, Microcystis	9/4/2018	5434	9/4/18	375.00	9/7/2018	yes						2018
18-3408-B1	9/4/2018	18:15	9/4/2018	Well's College Dock	42.5249	-76.5293	Dolichospermum, Microcystis	9/5/2018	100	9/5/2018	10.00	9/7/2018	no						
18-3441-B1	9/4/2018	15:32	9/4/2018	Sheldrake Point Public Launch	42.5839	-76.6171	Dolichospermum, Microcystis	9/5/2018	100	9/5/2018	10.00	9/7/2018	yes						2018
18-3418-B4	9/4/2018	17:24	9/5/2018	655 Lansing Station Rd, Lansing	42.5839	-76.6171	Dolichospermum, Microcystis	9/5/2018	100	9/5/2018	10.00	9/7/2018	no						
18-3447-B1	9/4/2018	11:00	9/5/2018	4053 Canora Shores Dr, Seneca Falls	42.8270	-76.7368	Microcystis, Dolichospermum	9/5/2018	908	9/6/2018	389.00	9/7/2018	yes						2018
18-3449-B1	9/4/2018	8:30	9/5/2018	Red Jacket Yacht Club	42.8307	-76.7373	Microcystis, Dolichospermum	9/5/2018	365	9/6/2018	101.52	9/7/2018	no						
18-3440-B1	9/4/2018	18:15	9/5/2018	7504 County Road, Interlaken	42.7678	-76.6341	Microcystis, Dolichospermum	9/5/2018	54.80	9/6/2018	54.80	9/7/2018	no						
18-3444-B2	9/4/2018	17:00	9/5/2018	6041 Lakeview Lane, Romulus	42.7678	-76.6341	Microcystis, Dolichospermum	9/5/2018	397	9/6/2018	68.75	9/7/2018	yes						2018
18-3439-B1	9/12/2018	11:45	9/13/2018	Busy Bee Market Shoreline	42.6400	-76.6916	Microcystis, Dolichospermum	9/14/2018	1188	9/14/2018	319.00	9/14/2018	no						
18-3400-B7	9/13/2018	17:00	9/14/2018	Northern Tip of Cayuga Lake			Microcystis, Dolichospermum	9/14/2018	4114	9/14/2018	214.70	9/14/2018	yes	Microcystis	9/19/2018	4041	9/19/2018	800	10/5/2018
18-3451-B1	9/13/2018	14:10	9/14/18	3887 South Parker Rd.	42.8463	-76.7351	Microcystis, Dolichospermum	9/14/2018	869	9/14/2018	40.28	9/14/2018	no	Sample not sent. Possible overlap with 18-3451-B2					
18-3451-B2	9/13/2018	16:30	9/14/2018	3777 Gustly Lane, Fayette	42.8417	-76.7364	Microcystis, Dolichospermum	9/14/2018	1192	9/14/2018	55.10	9/14/2018	yes	Microcystis, Dolichospermum	9/19/2018	802	9/19/2018	330	10/5/2018
18-3436-B1	9/13/2018	19:30	9/14/2018	Frontenac Point, Covert	42.5590	-76.6268	Microcystis, Dolichospermum	9/14/2018	478	9/14/2018	6.14	9/14/2018	no	Sample not sent. Sample not dense enough.					
18-3444-B3	9-13-2018	15:00	9/14/2018	Dean's Cove	42.7316	-76.7638	Microcystis, Dolichospermum	9/14/2018	2406	9/14/2018	281.70	9/14/2018	yes	Microcystis	9/19/2018	2324	9/19/2018	850	10/5/2018
18-3404-B3	9/13/2018	16:00	9/14/2018	41 Fire Lane, Cayuga	42.9281	-76.7284	Microcystis, Dolichospermum	9/14/2018	693	9/14/2018	41.00	9/14/2018	yes	Microcystis	9/19/2018	560	9/19/2018	100	10/5/2018

The concentration of microcystin toxin compared to public health criteria

Microcystin	
Result in ug/L	Analysis Date
< 0.30	7/13/2018



# Uniqueness of Cayuga Lake HABs Surveillance Program

Cayuga Lake is the only lake in New York with a local lab that:

- Can identify cyanobacteria under the microscope; and

- Is certified to analyze blooms for the microcystin toxin (EPA Method 546).

These laboratory capabilities combined with a lake-wide network of volunteers make it possible to assess the risk from each algal bloom and communicate the result in near-real time.

