Lake Hopatcong Harmful Algal Bloom: Field Sampling Locations, Results and Aircraft Remote Sensing Information

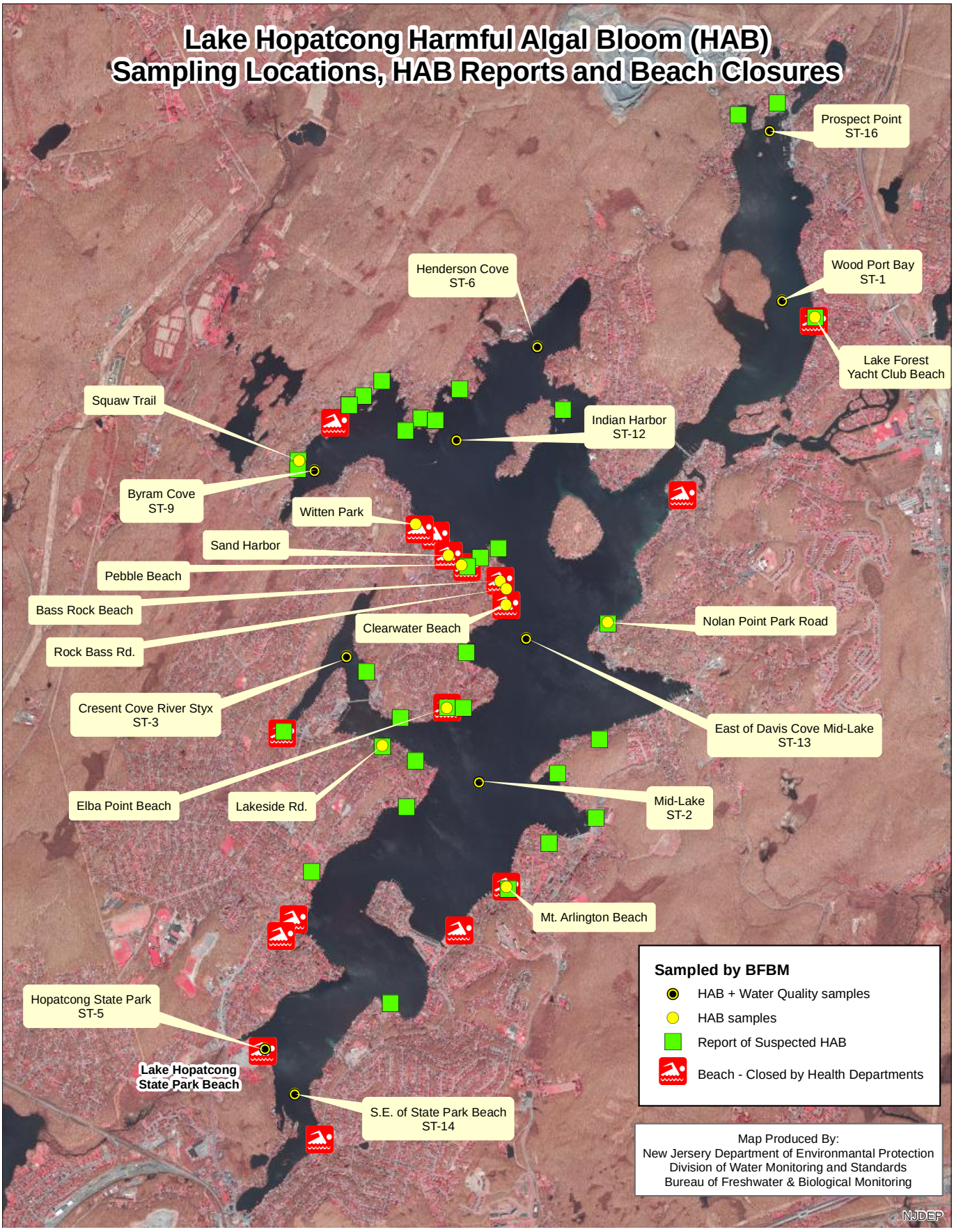
7/10/19 update

Since the initial report of an algal bloom on 6/17/19, the DEP Bureau of Freshwater and Biological Monitoring has been sampling and analyzing the waters in Lake Hopatcong to identify the algal species and to determine whether cell count levels or cyanotoxins are present above NJ Health Advisory Guidance Levels. HAB response has been conducted in accordance with NJ's Cyanobacterial Harmful Algal Bloom (HAB) Freshwater Recreational Response Strategy, which is a unified interagency approach for responding to HABs. Field sampling was conducted on 6/18, 6/21, 6/26, 6/27, 6/28, 7/1, 7/2 and 7/9 at bathing beaches with reported HABs. Sampling was also conducted on 6/28, 7/2, 7/5 and 7/9 at open water locations within the lake. Going forward, sampling will be conducted on Tuesdays and Thursdays with results posted on the following days. Flights will continue every Wednesday.

Due to the widespread nature of this bloom, based on field sampling, laboratory results and aircraft remote sensing, on 6/27 and 7/3 DEP issued press releases advising the public to avoid swimming in or contact with Lake Hopatcong water. In addition to some beaches already being closed due to visual, field or lab results, as a precaution, DEP recommended that local health authorities close all public swimming beaches along the lake.

Bloom reports and sampling locations, as well as the results from sampling events can be found in the map and table below. NJ Health Advisory Guidance Levels include cell counts ≥ 20,000 cells/ml and microcystin levels ≥ 3µg/L. While many HAB cell counts in Lake Hopatcong have been above NJ Health Advisory Guidance Levels, measurable microcystin levels have been below the guidance. DEP will continue to monitor the lake until the HAB subsides to levels below all NJ Health Advisory Guidance triggers.

Sampling Locations, HAB Reports and Beach Locations



Potential Health Effects and Results

Exposure to cyanobacteria can cause a range of health effects, including rashes, allergy-like reactions, flu-like symptoms, gastroenteritis, respiratory irritation and eye irritation. Exposure to a HAB which is actively producing cyanotoxins may result in more serious health effects including liver toxicity and neurological effects. HABs may begin to produce cyanotoxins at any time.

In order to be classified as a harmful algal bloom, NJ first identifies the presence of cyanobacterial species and then performs analyses for cell counts and/or toxins. The chart below details the sampling that has occurred since 6/18/2019, as well as the results to date. Due to the characteristics of the lake, as the bloom progresses, some areas may test higher on some days than previous days. This variability is expected due to the shift in cyanobacteria populations, wind or water currents moving the blooms around the lake.

Results from sampling conducted on 7/9/19 show continued cell counts above advisory levels for both some recreational bathing beaches as well as some open water lake locations as highlighted below.

Lake Hopatcong Harmful Algal Bloom (HAB) Samples and Results as of 7/9/2019

Site name	Station# (where applicable)	Cyanobacteria Counts cells/mL*									Microcystins µg/l (lowest Reporting Level 0.15µg/l)*								
		Date Sampled									Date Sampled								
Bathing Beach Sites		6/18/2019	6/21/2019	6/26/2019	6/27/2019	6/28/2019	7/1/2019	7/2/2019	7/5/2019	7/9/2019	6/18/2019	6/21/2019	6/26/2019	6/27/2019	6/28/2019	7/1/2019	7/2/2019	7/5/2019	7/9/2019
Pebble Beach		57000					95000	16850	NA	19300	0.83					0.15	0.16	NA	0.17
Sand Harbor		51375					9250	27800	NA	17750	1.35					0.17	< Reporting Level	NA	0.21
Clearwater Beach			8750				21000	13000	NA	33375		0.16				< Reporting Level	0.18	NA	0.24
Bass Rock Beach			35812				33030	53450	NA	24125		0.21				0.08	0.16	NA	0.23
Lake Forest Yacht Club Beach				9750			115000	4400	NA	21250			0.38			0.24	0.35	NA	0.29
Elba Point Beach				37125			18500	29090	NA	12875			< Reporting Level			0.19	< Reporting Level	NA	0.19
Mt. Arlington Beach					179000		12750	14125	NA	25875				0.15		< Reporting Level	0.16	NA	0.32
Hopatcong State Park	ST-5					24250	7750	0	17125	32000					< Reporting Level	< Reporting Level	0.15	< Reporting Level	0.24
Other Lake Sites																			
Nolan Point Park Road		12500					12500	11900	NA	NA	< Reporting Level					< Reporting Level	< Reporting Level	NA	NA
Rock Bass Rd.			9750						NA	NA		0.23						NA	NA
Squaw Trail			11875						NA	NA		0.16						NA	NA
Lakeside Rd.			10281						NA	NA		0.17						NA	NA
Witten Park					14500				NA	NA				0.06				NA	NA
Wood Port Bay	ST-1					34000		8000	20475	30500					0.34		0.38	0.42	0.41
Mid-Lake (collected at surface, 0.5, 1.0, and 2 meters. Highest results listed)	ST-2					36000 at 1 meter		65750 at 2 meters	22750	29875 at 0.1 meters					0.15		0.16	0.15	0.22 at 0.1 meter
Cresent Cove River Styx	ST-3					34500		2000	35500	79000					0.18		< Reporting Level	< Reporting Level	0.26
Henderson Cove	ST-6					28280		19000	13000	18500					< Reporting Level		0.15	0.18	< Reporting Level
Byram Cove	ST-9					10250		28000	37000	29000					0.2		< Reporting Level	0.16	0.18
Indian Harbor	ST-12					22000		39750	10000	8000					< Reporting Level		0.32	0.16	0.19
East of Davis Cove Mid-Lake	ST-13					18500		19000	7000	18500					< Reporting Level		< Reporting Level	0.28	0.45
SE. of State Park Beach	ST-14					34000		21100	17500	NA					0.16		< Reporting Level	< Reporting Level	NA
Prospect Point	ST-16							5150	37000	6000							0.35	0.31	0.28

*NJ Health Advisory Guidance Levels
Cell Count ≥ 20,000 cells/ml;
Microcystins ≥ 3ug/L

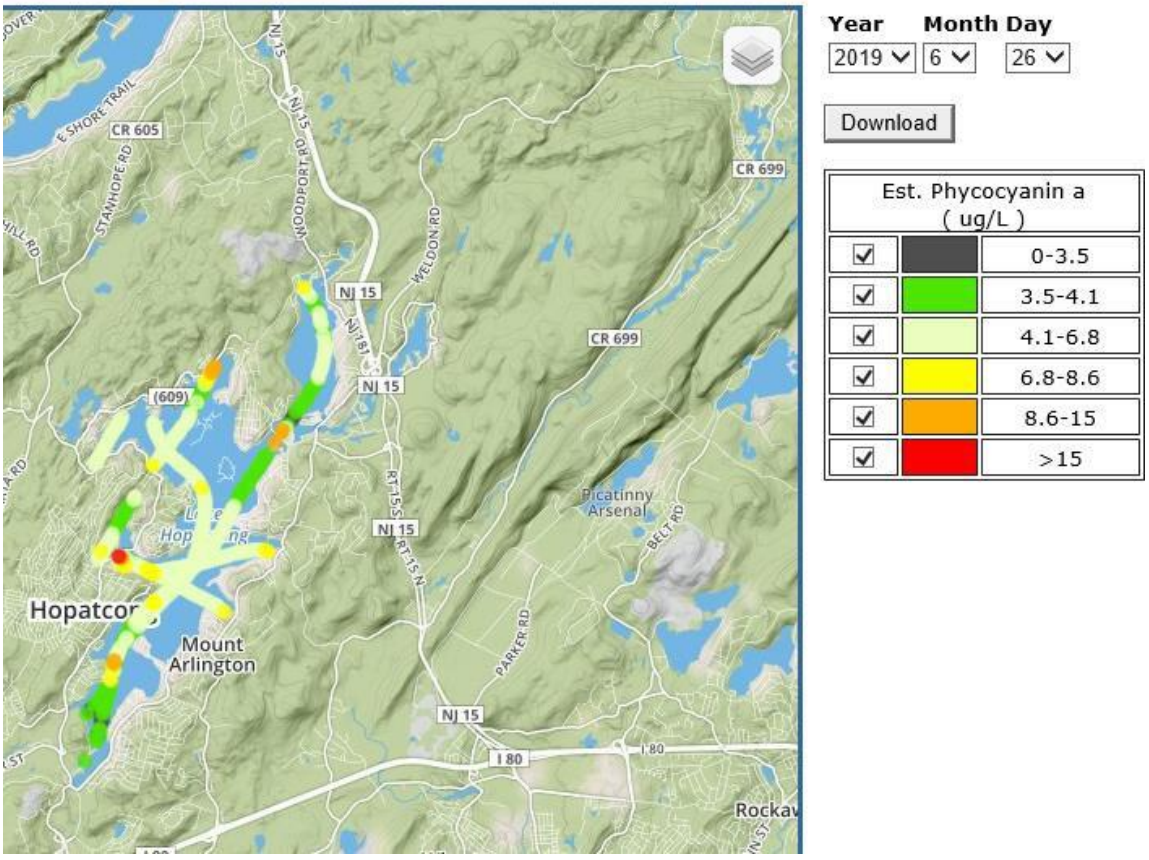
Indicates > than advisory levels

Aircraft Remote Sensing Information and Results

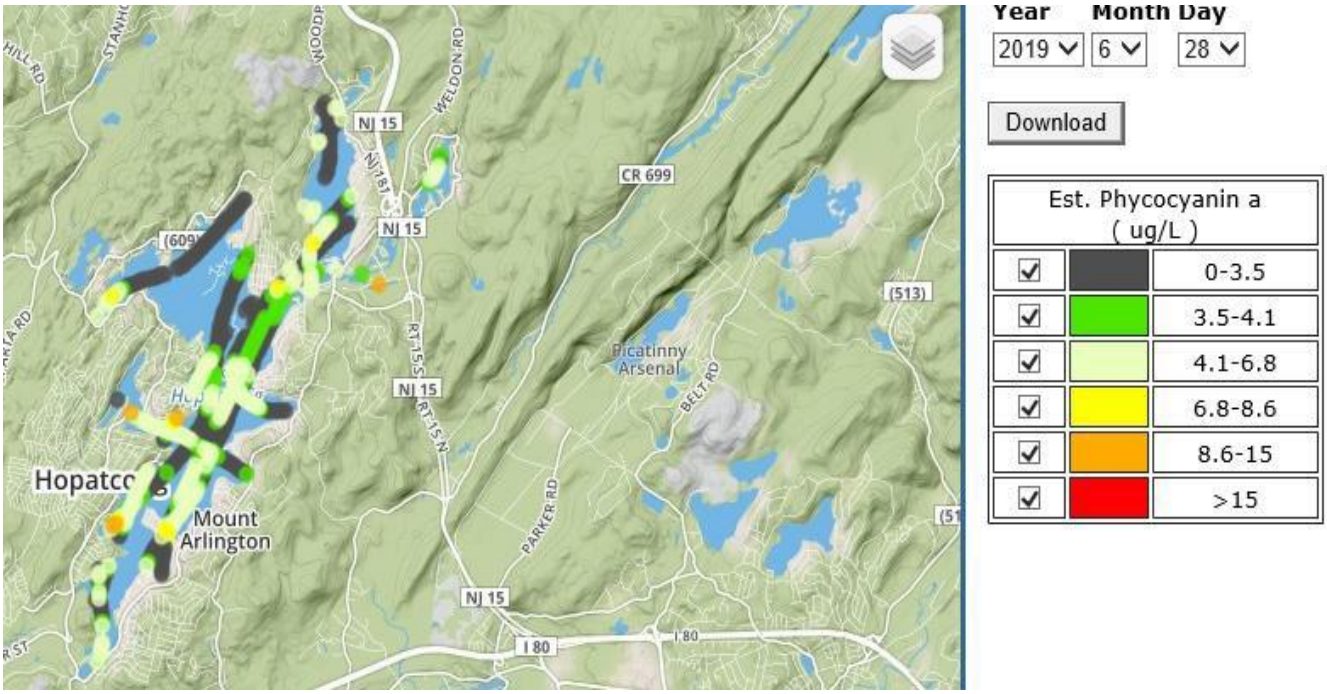
In addition to the response to Harmful Algal Bloom visual reports, field sampling and laboratory analyses described above, the DEP has developed aircraft remote sensing capabilities for general cyanobacteria detection and tracking. A sensor is used to pick up wavelengths of light specific to the cyanobacteria pigment phycocyanin in a waterbody. This advanced monitoring method provides immediate feedback on the presence and relative cyanobacteria cell counts, and can serve as a screening method to target waters for sample collection. While laboratory analyses serve as the definitive determination of whether results exceed NJ Health Advisory Guidance levels, remote sensing data provides useful information on the general extent and trends of a bloom.

Remote sensing flights were conducted over Lake Hopatcong on 6/26, 6/28, 6/30, 7/3 and 7/10. The scale below estimates the pigment concentrations and cell counts; the bright yellow to red is estimated to be over 20,000 cells/ml or higher, light green denotes an area of concern where cell counts may be near 20,000 cells/ml and dark gray denotes low levels or non-detect. Images are available below for four of the flights. Samples results are needed to confirm sensor estimates.

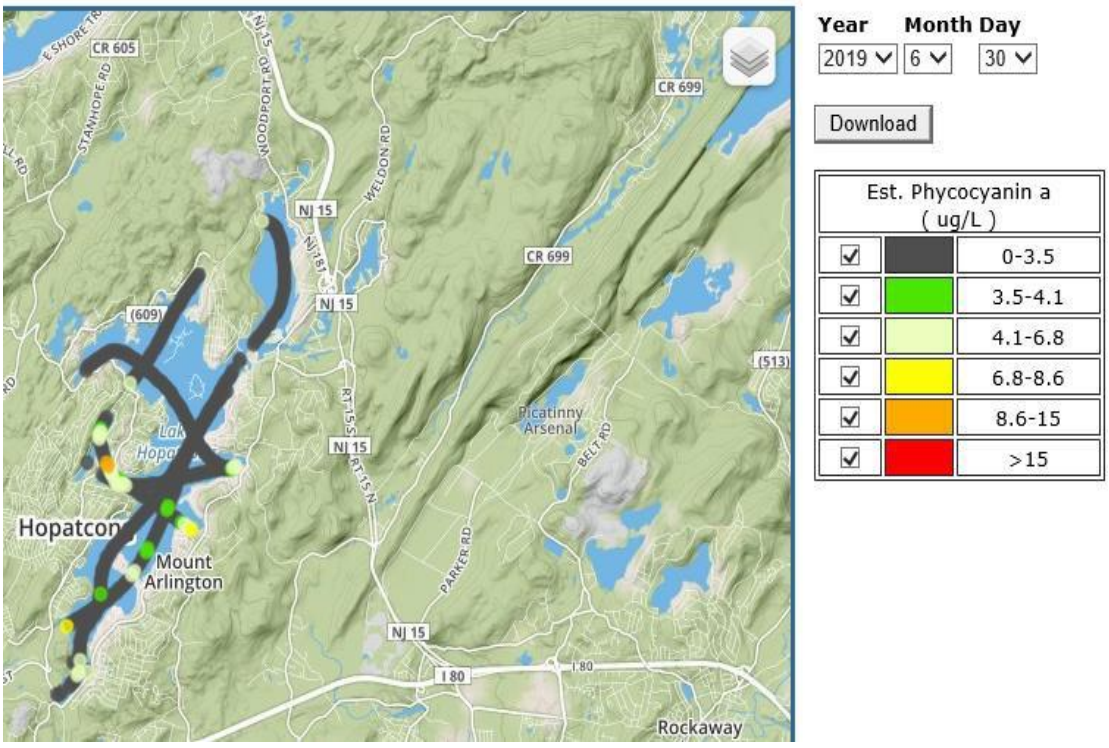
On 6/26/2019, the flight data shows elevated levels of the phycocyanin pigment covering almost the entire lake.



On 6/28/2019, the bloom still covers a large section of the lake, with the coves to the north showing signs that the bloom was diminishing.



On 6/30/2019, the intensity of the bloom appears to be diminishing, but there are still areas of concern in many coves and by the State Park Beach.



Today's flight (7/10/19) shows that the phycocyanin levels have increased over a large portion of the lake.