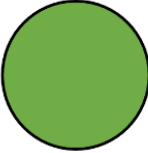
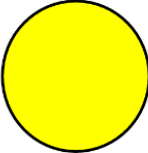
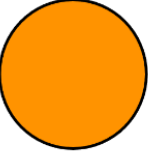
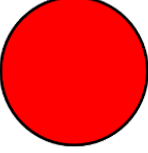


MV CYANO 2022 data for Lake Tashmoo

For more information, please see www.greatpondfoundation.org/mvcyano

GREEN		<p style="text-align: center;">BLOOM NOT PRESENT</p> <p>Conditions are not favorable for a Cyanobacterial Bloom.</p> <p>OK: Swimming, boating, paddling, wading, fishing, and consuming shellfish, crabs, or finfish. No known cyanobacteria risks to humans, pets, and livestock.</p>
YELLOW		<p style="text-align: center;">CYANOBACTERIA ALERT</p> <p>It is the season where Cyanobacterial Blooms are possible.</p> <p>OK: Swimming, boating, paddling, wading, fishing, and consuming shellfish, crabs, or finfish.</p> <p>USE CAUTION: risk to humans/pets/ livestock when ingesting water.</p>
ORANGE		<p style="text-align: center;">CYANOBACTERIA BLOOM WATCH</p> <p>OK: Boating.</p> <p>USE CAUTION: risk for swimming, paddling, and wading, fishing.</p> <p>ADVISE AGAINST: humans/pets/livestock ingestion of water, consuming shellfish, crabs, or finfish.</p>
RED		<p style="text-align: center;">CYANOBACTERIA BLOOM ADVISORY</p> <p>There is an active Cyanobacteria bloom, cyanotoxins may be present.</p> <p>OK: Boating.</p> <p>ADVISE AGAINST: pets/livestock/human ingestion of water, fishing, consuming shellfish or finfish, swimming, paddling, and wading.</p>



The Martha’s Vineyard Cyanobacteria Monitoring Program (MV CYANO) expanded to Lake Tashmoo in 2022. This monitoring was in collaboration with Tisbury Waterways Inc. (TWI) and was made possible thanks to a grant from the Edey Foundation. A site visit on June 6, 2022 established 5 sampling stations (see map, above). Stations 1 and 2 (abbreviated TSH01 and TSH02) were located within the freshwater Tashmoo Spring Pond. TSH02 and TSH03 were located on either side of the fish ladder. TSH04, located at the end a dock on the southwestern shore, provided a station slightly further from shore. TSH05, located adjacent to the dinghy dock at the Lake St. landing, was included to provide data at a busy public access point.

Data were collected biweekly by TWI volunteers and delivered to the Great Pond Foundation laboratory for analysis. Collection dates were as follows:

June	July	August	September
6/6/2022	7/6/2022	8/3/2022	9/14/2022
6/22/2022	7/20/2022	8/18/2022	
		8/31/2022	

Cyanobacteria data

MV CYANO data are generated from a bbe Moldaenke Fluoroprobe instrument. This instrument is a fluorometer, which measures the biomass (quantity) of microscopic plants by detecting the fluorescence produced in response to different wavelengths of light. The amount of fluorescence is directly related to the concentration of plant pigments in the sample. Different types of microscopic aquatic plants, called phytoplankton, utilize different



pigments, which allows the fluorometer to differentiate and quantify different phytoplankton groups. The Fluoroprobe measures the concentration of cyanobacteria in micrograms per liter ($\mu\text{g/L}$) and estimates the number of cells per milliliter (cells/mL). The MV CYANO color designations are based on the $\mu\text{g/L}$ measurement. The total amount of plant pigments in the water sample corresponds to the amount of chlorophyll, measured in $\mu\text{g/L}$. The concentration of chlorophyll is a measurement of the phytoplankton biomass in the sample. Salinity and water temperature, measured at the time of sample collection, are factors that can influence the growth rate of cyanobacteria and other types of phytoplankton. The MV CYANO color determination (see color-chart above) corresponds to the risk level determined by the local Board of Health agencies based on the concentration of cyanobacteria and other environmental factors. The MV CYANO risk matrix is reviewed annually and updated as needed in order to stay current with health standards and scientific studies.

Station	Pond	Date	Cyanobacteria ($\mu\text{g/L}$)	Cyanobacteria (cells/mL)	Chlorophyll ($\mu\text{g/L}$)	Temp ($^{\circ}\text{C}$)	Temp ($^{\circ}\text{F}$)	Salinity (ppt)	MV CYANO
TSH01	TSH	6/6/22	0.00	0.00	30.12	21.00	69.80	0.26	green
TSH02	TSH	6/6/22	0.00	0.00	25.92	19.80	67.64	0.27	green
TSH03	TSH	6/6/22	0.00	0.00	16.95	21.40	70.52	28.10	green
TSH05	TSH	6/6/22	0.00	0.00	6.07	19.10	66.38	34.10	green
TSH01	TSH	6/22/22	8.99	8986.60	141.89	17.50	63.50	1.71	yellow
TSH02	TSH	6/22/22	0.00	0.00	15.84	18.30	64.94	1.95	green
TSH03	TSH	6/22/22	0.46	459.90	37.00	20.50	68.90	31.20	green
TSH04	TSH	6/22/22	0.00	0.00	19.27	20.10	68.18	30.50	green
TSH05	TSH	6/22/22	0.00	0.00	8.55	20.50	68.90	31.30	green
TSH01	TSH	7/6/22	0.00	0.00	49.58	20.10	68.18	0.42	green
TSH02	TSH	7/6/22	0.00	0.00	56.04	21.20	70.16	0.34	green
TSH03	TSH	7/6/22	0.06	59.40	20.62	23.60	74.48	25.60	green
TSH04	TSH	7/6/22	0.00	0.00	28.36	23.30	73.94	25.70	green
TSH05	TSH	7/6/22	0.00	0.00	8.36	22.10	71.78	31.00	green
TSH01	TSH	7/20/22	0.00	0.00	108.93	23.20	73.76	3.17	green
TSH02	TSH	7/20/22	0.00	0.00	90.46	23.40	74.12	3.08	green
TSH03	TSH	7/20/22	0.88	882.60	26.68	24.50	76.10	30.10	yellow
TSH04	TSH	7/20/22	0.00	0.00	16.96	23.90	75.02	30.70	green
TSH05	TSH	7/20/22	0.00	0.00	30.39	23.60	74.48	31.50	green
TSH01	TSH	8/3/22	0.00	0.00	45.46	22.20	71.96	27.00	green
TSH02	TSH	8/3/22	0.00	0.00	41.88	22.30	72.14	26.00	green
TSH03	TSH	8/3/22	0.00	0.00	25.25	23.60	74.48	28.50	green
TSH04	TSH	8/3/22	0.00	0.00	15.28	24.60	76.28	29.40	green
TSH05	TSH	8/3/22	0.00	0.00	7.61	26.00	78.80	31.50	green
TSH01	TSH	8/18/22	0.00	0.00	60.55	19.20	66.56	5.18	green
TSH02	TSH	8/18/22	0.00	0.00	66.32	19.90	67.82	5.51	green
TSH03	TSH	8/18/22	0.00	0.00	20.17	20.50	68.90	25.70	green
TSH04	TSH	8/18/22	0.00	0.00	10.35	22.50	72.50	29.70	green
TSH05	TSH	8/18/22	0.00	0.00	8.89	21.70	71.06	31.00	green
TSH01	TSH	8/31/22	0.00	0.00	41.81	20.70	69.26	0.36	green
TSH02	TSH	8/31/22	0.00	0.00	76.77	21.30	70.34	0.35	green
TSH03	TSH	8/31/22	0.00	0.00	16.50	23.70	74.66	31.40	green



Station	Pond	Date	Cyanobacteria (µg/L)	Cyanobacteria (cells/mL)	Chlorophyll (µg/L)	Temp (°C)	Temp (°F)	Salinity (ppt)	MV CYANO
TSH04	TSH	8/31/22	0.00	0.00	23.70	23.30	73.94	31.30	green
TSH05	TSH	8/31/22	0.00	0.00	16.25	23.90	75.02	32.10	green
TSH01	TSH	9/14/22	0.00	0.00	17.31	18.80	65.84	1.90	green
TSH02	TSH	9/14/22	0.00	0.00	14.14	21.40	70.52	26.80	green
TSH03	TSH	9/14/22	0.00	0.00	11.07	21.60	70.88	26.80	green
TSH04	TSH	9/14/22	0.00	0.00	11.08	22.90	73.22	29.70	green
TSH05	TSH	9/14/22	0.00	0.00	7.88	21.80	71.24	30.50	green

Cyanobacteria were largely nonexistent in Lake Tashmoo in 2022. The majority of samples at all sampling stations had 0 µg/L cyanobacteria (Figure 1). Four samples had measurable levels of cyanobacteria:

Station	Pond	Date	Cyanobacteria (µg/L)	Cyanobacteria (cells/mL)	Chlorophyll (µg/L)	Temp (°C)	Temp (°F)	Salinity (ppt)	MV CYANO
TSH01	TSH	6/22/22	8.99	8986.60	141.89	17.50	63.50	1.71	yellow
TSH03	TSH	6/22/22	0.46	459.90	37.00	20.50	68.90	31.20	green
TSH03	TSH	7/6/22	0.06	59.40	20.62	23.60	74.48	25.60	green
TSH03	TSH	7/20/22	0.88	882.60	26.68	24.50	76.10	30.10	yellow

Of the four samples with detectable cyanobacteria, two of these samples had cyanobacteria levels less than 0.5 µg/L, which places them in the green MV CYANO color category. For these two samples, the concentration of cyanobacteria is low and there is no concern about a cyanobacteria bloom. The 6/22 sample at TSH01 and the 7/20 sample at TSH03 had slightly more elevated cyanobacteria numbers, which placed these samples into the yellow MV CYANO category. This Cyanobacteria Alert designation indicates that cyanobacteria are present but not currently blooming, although environmental conditions such as temperature and salinity could potentially cause a bloom. Per the Boards of Health, swimming and other recreational activities are permitted when cyanobacteria levels are within the yellow category, however extra caution should be taken to ensure there are no visible scums or mats. Compared to other ponds within the MV CYANO program, cyanobacteria numbers were low in Lake Tashmoo. Three out of the four samples with measurable cyanobacteria occurred at TSH03, the station immediately north of the fish ladder connecting Lake Tashmoo to the Spring Pond. It is not clear why this particular sampling location was more prone to cyanobacteria growth. Station TSH01, within the Spring Pond, had the highest cyanobacteria concentration of 8.99 µg/L. The low salinity at this station may have influenced cyanobacteria growth on this date, however samples from all other dates at TSH01 had 0 µg/L cyanobacteria.



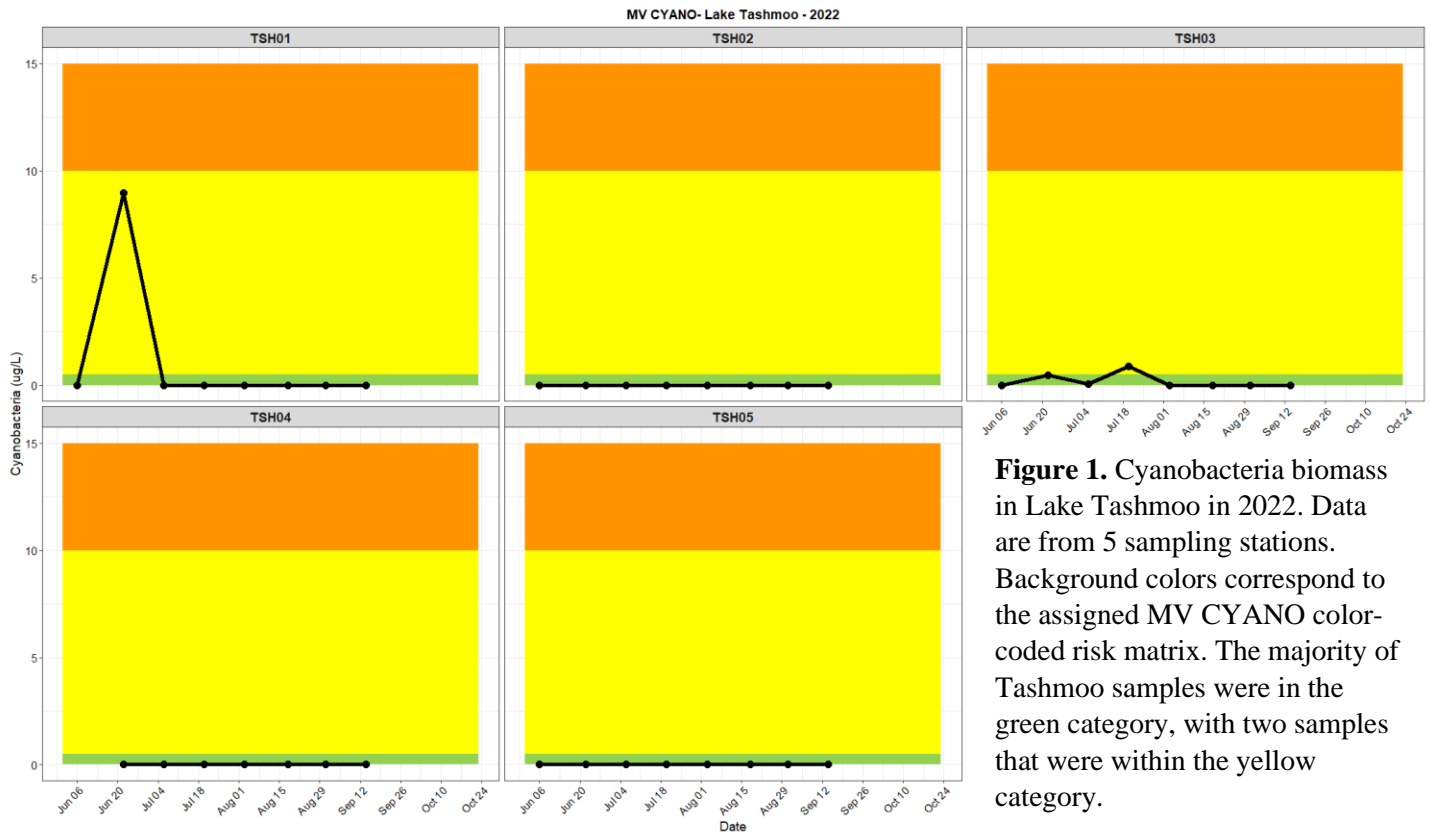


Figure 1. Cyanobacteria biomass in Lake Tashmoo in 2022. Data are from 5 sampling stations. Background colors correspond to the assigned MV CYANO color-coded risk matrix. The majority of Tashmoo samples were in the green category, with two samples that were within the yellow category.

Phytoplankton community data

While MV CYANO focuses on the concentration of cyanobacteria, the Fluoroprobe measures several types of phytoplankton. These include microscopic green algae, diatoms, and cryptophytes (microflagellates). The chlorophyll measurement is the sum of all four phytoplankton classes. Light transmission (measured in percent) is a measurement of turbidity, or how many particles are dissolved in the water. High turbidity corresponds to murky water with a low percentage of light passing through the water column. This turbidity measurement is used as a correction factor for increasing the accuracy of the chlorophyll measurements.

The following table reports phytoplankton concentrations in $\mu\text{g/L}$; data in cells/mL is also available. The cells/mL estimate is derived from the $\mu\text{g/L}$ measurement and is less accurate because cell volume varies between species.



Station	Pond	Date	Time	Green Algae (µg/L)	Cyano-bacteria (µg/L)	Diatoms (µg/L)	Cryptophyta (µg/L)	Chlorophyll (µg/L)	Transmission (%)
TSH01	TSH	6/6/22	14:10	24.10	0.00	6.02	0.00	30.12	100
TSH02	TSH	6/6/22	13:55	22.78	0.00	3.14	0.00	25.92	100
TSH03	TSH	6/6/22	13:45	9.76	0.00	7.19	0.00	16.95	100
TSH05	TSH	6/6/22	14:28	3.20	0.00	2.87	0.00	6.07	100
TSH01	TSH	6/22/22	10:20	42.62	8.99	90.28	0.00	141.89	100
TSH02	TSH	6/22/22	10:40	9.19	0.00	6.65	0.00	15.84	100
TSH03	TSH	6/22/22	10:35	17.14	0.46	19.39	0.00	37.00	100
TSH04	TSH	6/22/22	11:16	12.41	0.00	6.86	0.00	19.27	100
TSH05	TSH	6/22/22	9:55	4.07	0.00	4.49	0.00	8.55	100
TSH01	TSH	7/6/22	10:10	49.58	0.00	0.00	0.00	49.58	100
TSH02	TSH	7/6/22	10:19	53.48	0.00	2.55	0.00	56.04	100
TSH03	TSH	7/6/22	10:24	13.32	0.06	7.14	0.11	20.62	100
TSH04	TSH	7/6/22	11:08	15.33	0.00	13.03	0.00	28.36	100
TSH05	TSH	7/6/22	9:55	4.32	0.00	4.04	0.00	8.36	100
TSH01	TSH	7/20/22	10:23	52.75	0.00	56.18	0.00	108.93	100
TSH02	TSH	7/20/22	10:15	48.11	0.00	42.35	0.00	90.46	100
TSH03	TSH	7/20/22	10:10	7.75	0.88	18.04	0.01	26.68	100
TSH04	TSH	7/20/22	10:50	5.98	0.00	10.98	0.00	16.96	100
TSH05	TSH	7/20/22	9:55	16.07	0.00	14.32	0.00	30.39	100
TSH01	TSH	8/3/22	9:42	23.16	0.00	22.31	0.00	45.46	100
TSH02	TSH	8/3/22	9:25	19.77	0.00	22.12	0.00	41.88	100
TSH03	TSH	8/3/22	9:30	11.41	0.00	13.85	0.00	25.25	100
TSH04	TSH	8/3/22	10:00	7.34	0.00	7.93	0.00	15.28	100
TSH05	TSH	8/3/22	10:24	3.07	0.00	4.54	0.00	7.61	100
TSH01	TSH	8/18/22	8:54	24.24	0.00	36.31	0.00	60.55	100
TSH02	TSH	8/18/22	8:45	26.65	0.00	39.67	0.00	66.32	100
TSH03	TSH	8/18/22	8:50	8.27	0.00	11.90	0.00	20.17	100
TSH04	TSH	8/18/22	9:11	4.54	0.00	5.81	0.00	10.35	100
TSH05	TSH	8/18/22	9:31	4.92	0.00	3.97	0.00	8.89	100
TSH01	TSH	8/31/22	9:35	21.35	0.00	20.46	0.00	41.81	100
TSH02	TSH	8/31/22	9:38	36.92	0.00	39.73	0.12	76.77	100
TSH03	TSH	8/31/22	9:40	8.25	0.00	8.25	0.00	16.50	100
TSH04	TSH	8/31/22	10:07	10.68	0.00	13.02	0.00	23.70	100
TSH05	TSH	8/31/22	10:50	7.00	0.00	9.25	0.00	16.25	100
TSH01	TSH	9/14/22	11:29	5.18	0.00	12.14	0.00	17.31	100
TSH02	TSH	9/14/22	11:35	4.49	0.00	9.43	0.21	14.14	100
TSH03	TSH	9/14/22	11:28	3.74	0.00	7.33	0.00	11.07	100
TSH04	TSH	9/14/22	11:55	3.23	0.00	7.43	0.41	11.08	100
TSH05	TSH	9/14/22	12:15	2.82	0.00	5.06	0.00	7.88	100



The phytoplankton community in Lake Tashmoo was dominated by microscopic green algae and diatoms (Figure 2). Neither of these phytoplankton groups are known to produce toxins or cause harm to human or animal health. Phytoplankton were more abundant in the Spring Pond (TSH01 & TSH02) compared to Lake Tashmoo.

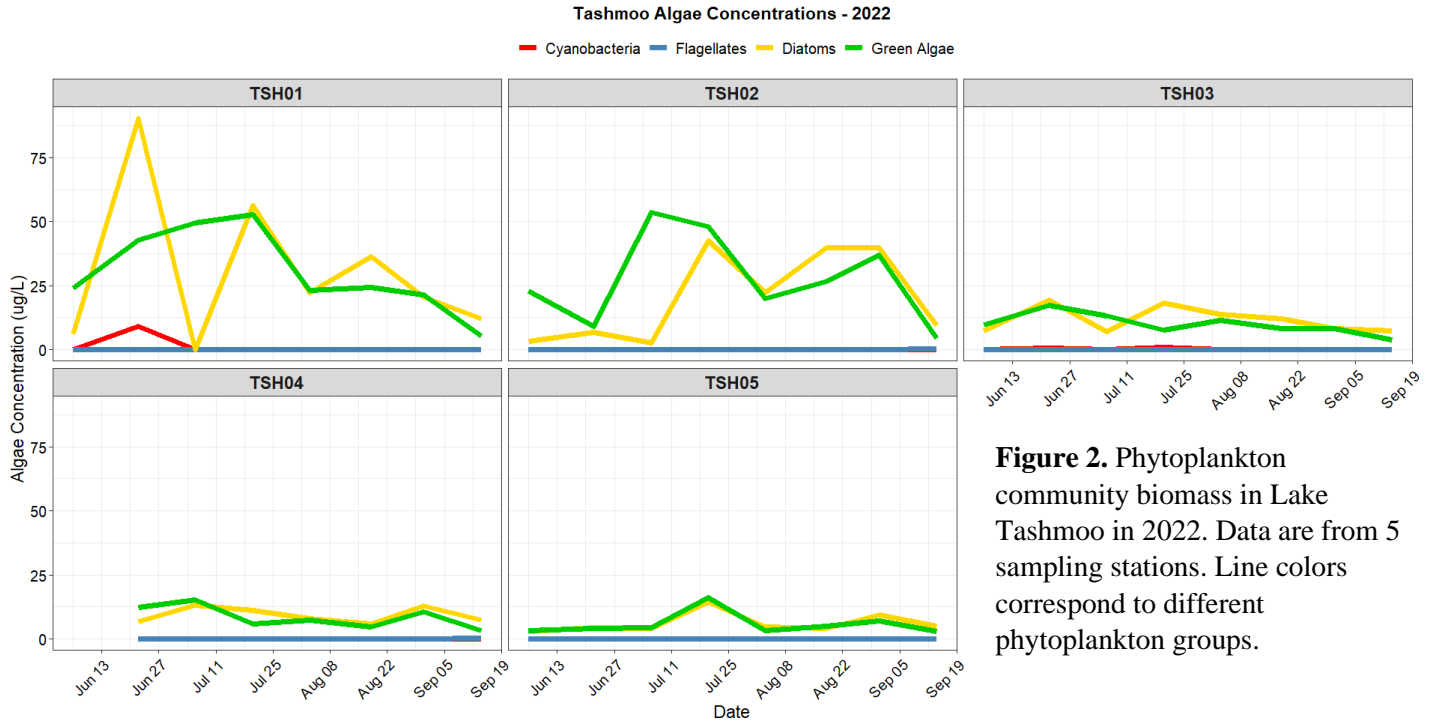


Figure 2. Phytoplankton community biomass in Lake Tashmoo in 2022. Data are from 5 sampling stations. Line colors correspond to different phytoplankton groups.

