Northeast Aquatic Research, LLC

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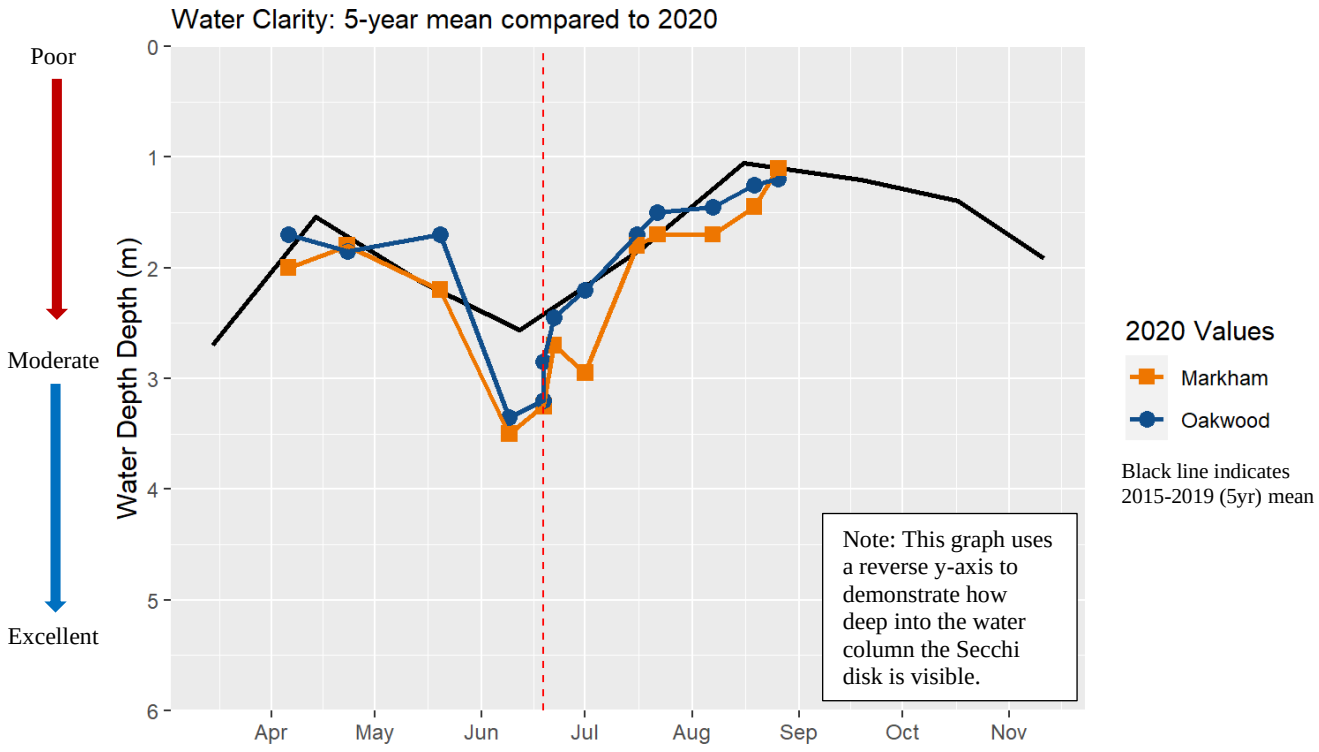
Revised: September 4, 2020

TO: Residents of East Hampton, CT
ATTN: Town of East Hampton Conservation Lake Commission
FROM: Hillary Kenyon Garovoy, Limnologist & Certified Lake Manager
George Knoecklein, Ph.D. Principal Limnologist

RE: Results from August 2020 Water Quality Monitoring Visits

The following results display data collected on August 7th, 19th, and 26th. Water quality data collected on each visit included water clarity, phytoplankton, temperature, dissolved oxygen, conductivity, and nutrient sample collection at both the Markham and Oakwood stations. Raw profile data is included at the end of this summary letter.

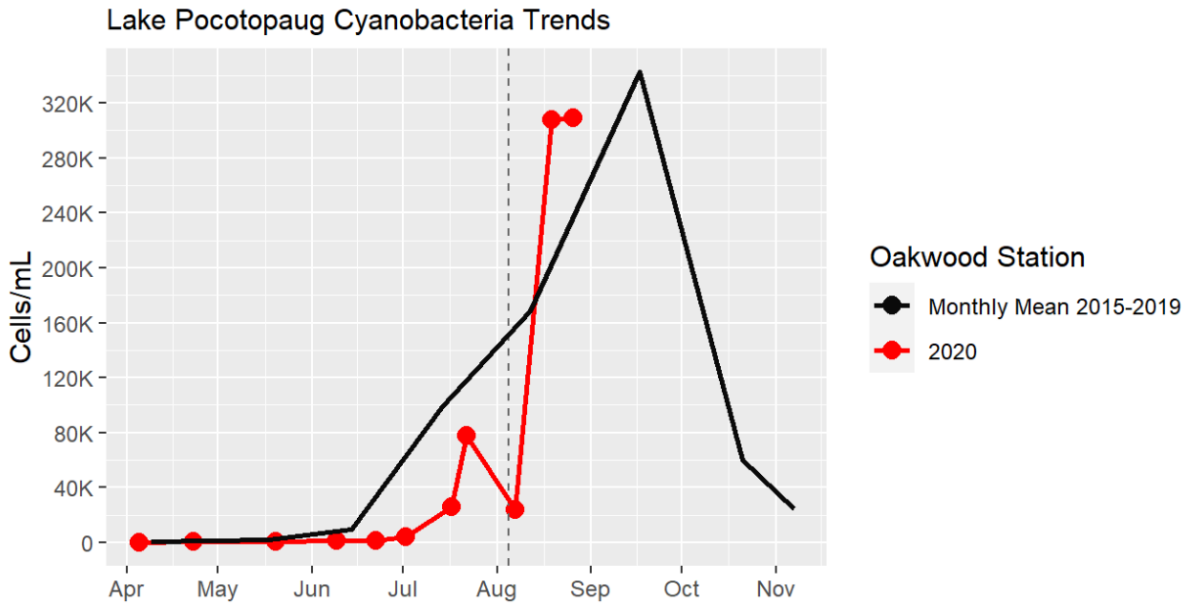
Temperature and dissolved oxygen results indicate that the lake is well mixed and that the destratification aeration system has achieved fully oxygenated conditions in nearly the entire water column of both bays. However, water clarity is still poor, with an average August clarity of roughly 1.3m in Oakwood bay. Clarity in late August was slightly worse than early August. As explained in the June and July 2020 water quality monitoring summaries, the lake experienced good water clarity in June of this year, but by July and August, the water clarity was near average. The vertical dashed line indicates the date of the aeration system activation.



The lake is currently experiencing a cyanobacteria bloom and poor clarity despite both bays maintaining oxygen to the lake bottom. The figure below shows a continuation of the cyanobacteria 2020 trend compared to the average of the past five years, graphed in cells/mL. The vertical dashed line corresponds to the date of EverBlue Lake's first microbial additive treatment, using a product called PureAg. This is the first time this product has been applied to a Connecticut waterbody. After the first PureAg treatment, the CT Department of Energy and Environmental Protection stepped in and notified the Town that a permit was needed under RCSA 22a-430-3. That permit is currently in review, but based on feedback from the state officials, it appears that the CT DEEP will permit further use. CT DEEP aims to ensure that there is adequate water quality monitoring to confirm no negative impacts of such novel treatments. Microbial additives intended for agriculture and/or lake applications are not regulated under a federal program.

As one can see from the cyanobacteria graph below, the date of the microbial additive application (vertical dashed line) coincides with a significant decrease in cyanobacteria cell counts in open water. Though, cyanobacteria counts increased dramatically within the next two weeks. This sharp increasing trend in late-season cyanobacteria counts is not unusual for Lake Pocotopaug and there is no evidence to support that the mid-August increase is directly related to the microbial additive treatment. Instead, it appears that the treatment may have provided temporary relief by suppressing cyanobacteria for a period of time.

There were several confounding factors that could have also influenced August cyanobacteria levels. Tropical storm Isais hit Connecticut on August 4th, causing a power-outage that resulted in a short period where the aeration system was inoperable. This power-outage is the suspected reason behind the low dissolved oxygen at the bottom of Markham bay on August 7th. While Isais swept mid-eastern CT with high winds, the amount of rainfall was minimal compared to the large unnamed rainstorm, of up to 4.5-inches, that occurred on August 24th. This rainstorm was very localized and disproportionately affected the Town of East Hampton, as other nearby Towns did not experience the same level of rainfall intensity. Several erosion events were documented as a result of the August 24th storm. Watershed nutrient loading from the August 24th precipitation occurred after the August 19th sampling date. Further analysis of the August data will be presented in the year-end report, which will include all nutrient test results and a more wholistic interpretation of lake and watershed data.



In-lake and watershed monitoring will continue through the rest of the summer season. It will be especially critical to monitor cyanobacteria cell counts following a potential late-season PureAg treatment. Temperature, oxygen, and conductivity data from the August monitoring visits are included on pages 4-5.

Residents should be aware that despite very high cyanobacteria cell counts, the types of cyanobacteria present in Lake Pocotopaug this season have not yet accumulated in thick surface scums. It is the dense surface accumulations that typically have high cyanotoxins and may be harmful for people and pets. High cyanobacteria cells counts in open water do not always equate to high toxins. The relationship between cell counts and the presence of toxins is complicated by the fact that some cyanobacteria infrequently produce toxins. Similarly, cyanobacteria taxa differ substantially in cell size. Pocotopaug is dominated by cyanobacteria with very small cell sizes [Chrysosporum, Planktolyngbya, Planktothrix], whereas dense surface blooms occur more frequently with cyanobacteria taxa that have large cell sizes [e.g. Dolichospermum]. We recommend that residents continue to follow guidance from the Chatham Health Department and make informed decisions about recreation.

Thank you,
Hillary Kenyon, CLM

Date: 08/07/2020

Markham Station (41.59949, -72.49493)
Water clarity: **1.7 meters** (5.6 feet)
Water depth: 8.1 meters (26.6 feet)
Weather: raining, overcast, calm

Depth (m)	Temp (°C)	Oxygen (mg/L)	Oxygen Saturation %	Conductivity (µS)
0	26.9	7.4	92	205
1	26.3	7.5	93	204
2	26.5	7.4	93	204
3	26.6	7.4	93	204
4	26.6	7.5	94	195
5	26.7	7.5	95	202
6	26.7	7.5	94	199
7	26.6	3.9	49	204
7.5	26.4	1.9	23	204
8	26.4	1.3	16	204

Oakwood Station (41.59758, -72.50849)
Water clarity: **1.45 meters** (4.8 feet)
Water depth: 10.5 meters (34.4 feet)
Weather: Overcast, slight breeze to mostly calm

Depth (m)	Temp (°C)	Oxygen (mg/L)	Oxygen Saturation %	Conductivity (µS)
0	25.9	7.7	95	203
1	26.1	7.7	95	203
2	26.3	7.6	95	203
3	26.3	7.6	95	203
4	26.3	7.6	95	203
5	26.4	7.6	95	202
6	26.2	7.6	94	202
7	26.3	7.5	93	202
8	26.3	6.7	84	204
9	26.4	7.1	89	203
10	26.4	7.1	88	203
10.5	26.4	5.6	70	204

Date: 08/19/2020

Markham Station (41.59949, -72.49493)
Water clarity: **1.45 meters** (4.8 feet)
Water depth: 8 meters (26.2 feet)
Weather: Overcast, calm

Depth (m)	Temp (°C)	Oxygen (mg/L)	Oxygen Saturation %	Conductivity (µS)
0	24.8	8.0	98	201
1	25.1	7.7	95	201
2	25.2	7.7	95	200
3	25.3	7.6	94	200
4	25.3	7.7	95	200
5	25.4	7.7	95	200
6	25.4	7.6	94	200
7	25.4	7.8	96	200
7.9	25.3	7.7	95	200

Oakwood Station (41.59758, -72.50849)
Water clarity: **1.25 meters** (4.1 feet)
Water depth: 10 meters (32.8 feet)
Weather: Overcast, mostly calm

Depth (m)	Temp (°C)	Oxygen (mg/L)	Oxygen Saturation %	Conductivity (µS)
0	24.9	7.7	94	200
1	24.9	7.7	94	200
2	24.9	7.5	91	200
3	25.0	7.4	91	200
4	25.0	7.4	91	199
5	25.0	7.4	91	199
6	24.9	7.3	90	199
7	24.9	7.4	91	199
8	24.9	6.5	80	200
9	24.8	6.3	76	201
10	24.7	4.2	51	205
10.4	24.7	1.7	20	212

Date: 08/26/2020

Markham Station (41.59949, -72.49493)
Water clarity: **1.1 meters** (3.6 feet)
Water depth: 8.2 meters (26.9 feet)
Weather: sunny, breezy

Depth (m)	Temp (°C)	Oxygen (mg/L)	Oxygen Saturation %	Conductivity (µS)
0	25.3	8.6	106	196
1	25.5	8.5	106	196
2	25.5	8.5	105	197
3	25.6	8.4	105	196
4	25.6	8.4	104	197
5	25.6	8.4	104	197
6	25.6	8.3	104	196
7	25.5	8.3	102	196
7.5	25.5	8.2	101	196
8	25.5	8.2	101	196

Oakwood Station (41.59758, -72.50849)
Water clarity: **1.2 meters** (3.9 feet)
Water depth: 10.5 meters (34.4 feet)
Weather: Overcast, slight breeze to mostly calm

Depth (m)	Temp (°C)	Oxygen (mg/L)	Oxygen Saturation %	Conductivity (µS)
0	24.9	8.3	102	195
1	25.1	8.2	101	195
2	25.2	8.2	101	195
3	25.2	8.1	100	195
4	25.2	8.1	100	195
5	25.3	8.2	101	195
6	25.1	8.4	103	195
7	25.2	8.4	104	195
8	25.2	8.4	104	195
9	25.2	8.1	100	195
10	24.9	3.6	45	198
10.5	24.7	0.8	12	206