

Kathy Warzecha

From: Jean Pillo <Jean.Pillo@Comcast.net>
Sent: Monday, December 13, 2021 3:35 PM
To: Kathy Warzecha
Cc: 'Susan Hotchkiss'; 'Tim Hotchkiss'
Subject: "EXTERNAL" Avery Pond water quality data
Attachments: Avery Pond Report Card August 6_2014.pdf; Avery Pond Report Card July_22_2015.pdf

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Hi Kathy,

I was asked by Tim and Sue Hotchkiss to send copies of the water quality data for Avery Pond that they, as volunteers with The Last Green Valley Water Quality Monitoring Program, helped to collect. They want the IWWC to have access to this information prior to the public hearing next week.

As the water quality monitoring program coordinator for The Last Green Valley, they have been working with me. They live on the west shore of Avery Pond. We conducted a mid-summer depth profile of multiple parameters, including temperature, DO, pH, conductivity and turbidity in 2014 and again in 2015. In addition, we took a secchi depth reading and collected water samples at the surface, mid depth and near the bottom that were analyzed for Total Nitrogen and Total Phosphorus. The surface samples were also analyzed for Chlorophyll A. Comparing this data with the lake trophic classification table in the CT Water Quality Guidelines and Classifications, the data indicated the pond was highly eutrophic in two categories in 2014, but mesotrophic to eutrophic in 2015. The temperature data showed that the pond was not thermally stratified either year, and the DO showed the level be <1 mg/l at the bottom both years, which would allow for any phosphorus bound to iron in the substrate to be released into the water column. Without any thermal resistance to mixing, this phosphorus would be chemically available for supporting phytoplankton growth just from a good breeze blowing across the surface of water. The data they helped to collect in 2014 and 2015 were submitted to DEEP.

TLGV is also involved with the Cyanobacteria Monitoring Collaborative (CMC) that is being coordinated by US EPA region 1. Cyanobacteria a type of phytoplankton that were formerly known as blue green algae. In 2020 and 2021, we photographically documented cyanobacteria blooms in Avery Pond, and submitted this information through the CMC BloomWatch app. In addition to the observational data, we also collected samples of the surface scum which were shipped to the EPA lab in Chelmsford for analysis. In 2020, the analysis included cyanobacteria identification and phytotoxin screening for Microcystin. In 2021, we repeated the sampling as they expanded the suite of cyanotoxins they were testing for. Cyanobacteria blooms are a growing concern for water quality. Sometimes, under certain circumstances, cyanobacteria create byproducts of the metabolism that in high levels are toxic to mammals. This doesn't happen uniformly, so part of the study the EPA is focused on is to document the frequency of the blooms and whether the local blooms contain a high level of these toxins. Unfortunately, I do not have the results of those samples yet. The lab in Chelmsford was shuttered for a year due to Covid and they have a large backlog of work to get caught up on, so I also haven't received this year's results yet.

I have also reviewed the water quality data included in the *Connecticut Lakes, A Study of the Chemical and Physical Properties of 56 Connecticut Lakes* compiled by Richard Canavan IV and Peter Siver. The data they compiled for Avery Pond is from Spring 1989 to Summer 1993. The parameters range from mesotrophic conditions to highly eutrophic, and likely are impacted by rainfall prior to the sampling date as Avery Pond is a "run of the river" natural lake with a large watershed area above it. The highly eutrophic conditions are typically in summer.

Please share these reports, and a copy of this email, with members of the Preston IWWC and PZC. I would be happy to answer any questions the commissioners may have on this data if asked at the upcoming IWWC public hearing that I plan to attend. I will be representing the Eastern Connecticut Conservation District and want to assure there will not be any impacts from this development on the restoration of the historic Alewife migratory pathway from Poquetanuck Cove to Amos Lake through Indiantown Brook and Avery Pond.

Jean Pillo, CPESC
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Avery Pond Report Card for August 6, 2014

Parameter	Lake Surface Results (7/30/14)	Trophic level indicated
Total Phosphorus	52.5 µg/l	Highly Eutrophic
Total Nitrogen	644 µg/l	Eutrophic
Chlorophyll A	21.5 µg/l	Eutrophic
Secchi Disk depth	.99 M	Highly Eutrophic
Aquatic Macrophytes	< 30%	

The above results are based on Lake Trophic Categories in the Connecticut Water Quality Standards

Additional information:

Avery Pond is located in Preston, CT.

Sampling Date: 8/6/2014

Depth of lake at the sampling site: +/- 2.6 M

Was the lake/pond thermally stratified? No

At the surface of the pond, the dissolved oxygen levels was 9.65 mg/l. The dissolved oxygen level decreased with depth and was 1.09 mg/l by 2 M depth and near zero at 2.5 M.

Water temperature of the pond ranged from 26.5 °C at the surface to 23.3 °C near the bottom. The temperature data did not indicate a thermocline had developed.

On the sampling date, it was observed that the water level in the pond was approximately 0.5 M lower than normal. This is likely related to a lack of precipitation in the weeks prior to sampling.

The lack of dissolved oxygen in the lower depths of the lake will impact fish habitat and the ability of rooted plants to become established.

This report was prepared by Jean Pillo, Watershed Conservation Project Manager
Eastern Connecticut Conservation District
TLGV Water Quality Monitoring Program Coordinator

Connecticut Water Quality Standards, Section 22a-426-6 Lake Trophic Categories

(a) The ranges of Total Phosphorus, Total Nitrogen, Chlorophyll-a, and Secchi Disk Transparency appearing in the table in this section titled "Parameters and Defining Ranges for Trophic State of Lakes in Connecticut" shall be assessed collectively to determine the trophic state of a lake. In addition to water column data, the trophic state of a lake shall be determined by the percentage of the surface area covered by macrophytes in accordance with subsection (b) of this section. For the purpose of determining consistency with the Connecticut Water Quality Standards, the natural trophic state of a lake shall be compared with the current trophic state to determine if the trophic state of the lake has been altered due to excessive anthropogenic inputs. Lakes in advanced trophic states which exceed their natural trophic state due to anthropogenic sources shall be considered to be inconsistent with the Connecticut Water Quality Standards.

Water Quality Standards.

Parameters and Defining Ranges for Trophic State of Lakes in Connecticut		
Trophic State Based on Water Column Data	Parameters	Defining Range
Oligotrophic	Total Phosphorus	0-10 ug/l spring and summer
	Total Nitrogen	0-200 ug/l spring and summer
	Chlorophyll-a	0-2 ug/l mid-summer
	Secchi Disk Transparency	6 + meters mid-summer
Mesotrophic	Total Phosphorus	10-30 ug/l spring and summer
	Total Nitrogen	200-600 ug/l spring and summer
	Chlorophyll-a	2-15 ug/l mid-summer
	Secchi Disk Transparency	2-6 meters mid-summer
Eutrophic	Total Phosphorus	30-50 ug/l spring and summer
	Total Nitrogen	600-1000 ug/l spring and summer
	Chlorophyll-a	15-30- ug/l mid-summer
	Secchi Disk Transparency	1-2 meters mid-summer
Highly Eutrophic	Total Phosphorus	50 + ug/l spring and summer
	Total Nitrogen	1000 + ug/l spring and summer
	Chlorophyll-a	30 + ug/L mid-summer
	Secchi Disk Transparency	0-1 meters mid-summer

(b) Aquatic Macrophytes

(1) Macrophytes are aquatic plants large enough to be seen without magnification. Macrophyte distribution and abundance data shall be reviewed in conjunction with the water column data to determine the trophic states of lakes and ponds.

(2) If macrophyte growth is very extensive (75 - 100% of water body area) and dense, the trophic state of a lake or pond shall be considered "highly eutrophic" regardless of the water column data.

(3) If macrophyte growth is extensive (30 - 75% of water body area) and dense, the trophic state shall be considered "mesotrophic" when the water column indication is oligotrophic, and the trophic state shall be considered "eutrophic" when the water column indication is mesotrophic or eutrophic.



Avery Pond Report Card for July 22, 2015

Parameter	Lake Surface Results (7/30/14)	Trophic level indicated
Total Phosphorus	0.031	Eutrophic
Total Nitrogen	0.485	Mesotrophic
Chlorophyll A	6.2	Mesotrophic
Secchi Disk depth	1.00	Eutrophic/Highly Eutrophic
Aquatic Macrophytes	< 30%	

The above results are based on Lake Trophic Categories in the Connecticut Water Quality Standards

Additional information:

Avery Pond is located in Preston, CT.

Sampling Date: 7/22/2015

Depth of lake at the sampling site: +/- 3.3 M

Was the lake/pond thermally stratified? No

At the surface of the pond, the dissolved oxygen level was 8.99 mg/l. The dissolved oxygen level decreased with depth and was 5.77 mg/l at 2 M depth and 0.72 mg/l at 2.5 M.

The lack of dissolved oxygen in the lower depths of the lake may impact fish habitat and the ability of rooted plants to become established. Lack of dissolved oxygen also allows for the release of phosphorus from the surface of sediment on the lake bottom, contributing to higher nutrient values in the lower regions of the pond.

Water temperature of the pond ranged from 27.9°C at the surface to 23.7 °C near the bottom. The temperature data did not indicate a thermocline had developed. This means any nutrients release from the bottom sediments under low oxygen conditions can be mixed with the surface water on breezy days.

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TLGV Water Quality Monitoring Program Coordinator

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	Secchi Disk Transparency	1-2 meters mid-summer
Highly Eutrophic	Total Phosphorus	50 + ug/l spring and summer
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