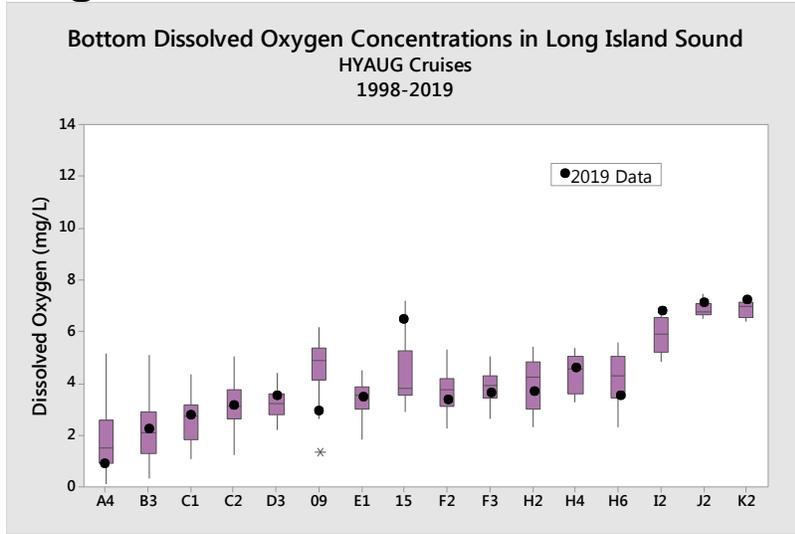


August 2019



HYAUG19 Hypoxia Summary

Station A4 below 1 mg/L

CT DEEP sampled 41 stations during the HYAUG19 survey that was conducted 12-14 August 2019. The lowest dissolved oxygen (DO) recorded during this survey was at Station A4 with a concentration of 0.89 mg/L. The last time CT DEEP recorded DO during the HYAUG survey below 1 mg/L was in 2012. Six other stations were below 3 mg/L, 15 stations were less than 3.5 mg/L, and 17 stations were below 4.8 mg/L. Data are available in an [Excel spreadsheet format](#).

The DO at Station A4 during the HYAUG19 survey (0.89 mg/L) was below its average (1.93mg/L) and median (1.55 mg/L) values from all HYAUG surveys conducted by CT DEEP between 1998 and 2019. The DO at Station A4 during HYAUG surveys from 1998-2019 (n=22) ranged from 0.11 mg/L (HYAUG03) to 5.21 mg/L (HYAUG00). During the HYAUG surveys, DO levels in the bottom waters of Long Island Sound were less than 1 mg/L on 7 occasions and were only above 3.0 mg/L on 3 occasions between 1998 and 2018 (Table 1).

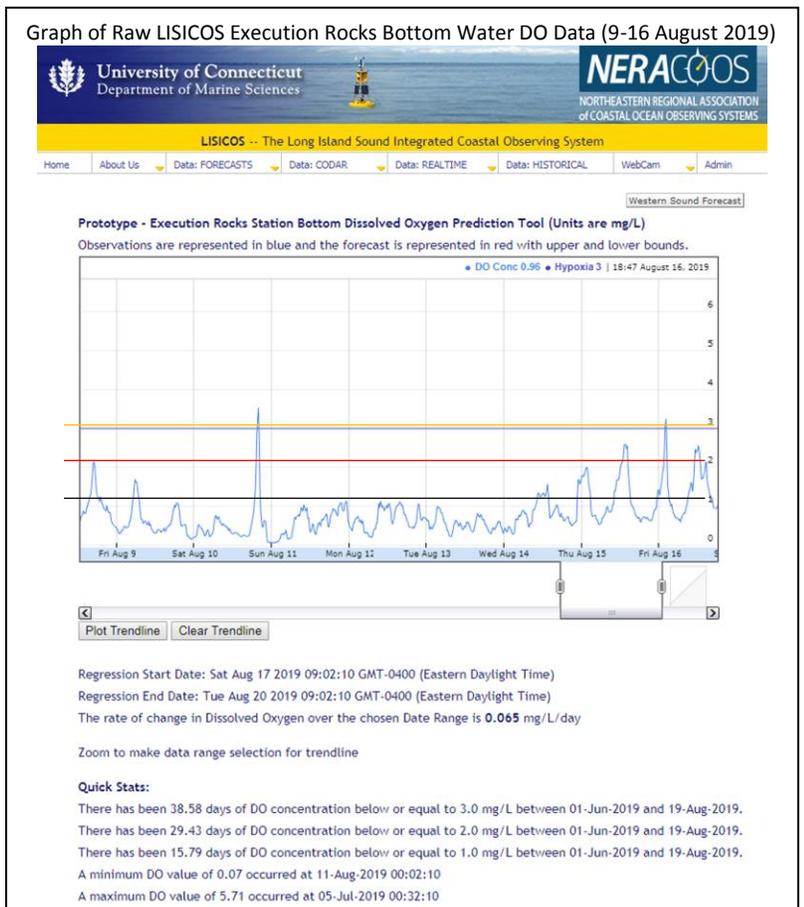
During the HYAUG19 survey, there were 38.2 km² of bottom water that had DO concentrations less than 1.0 mg/L, 192 km² of bottom water that had DO concentrations less than 3.0 mg/L, and an additional 1251 km² of bottom water with DO concentrations less than 4.8 mg/L. The areal estimates for HYAUG surveys from 1998-2019 average 286.6 km².

[Volume 3, Issue 6]

Long Island Sound
Water Quality Monitoring
Program

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Dissolved Oxygen

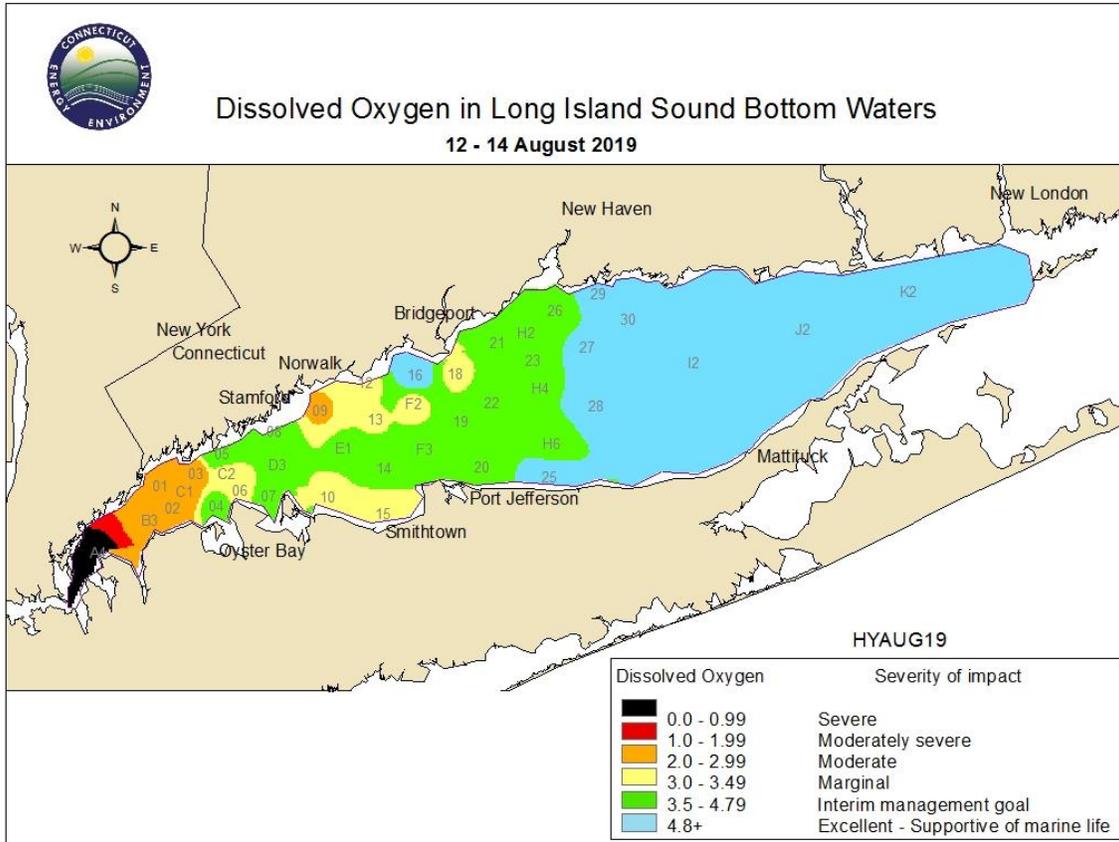


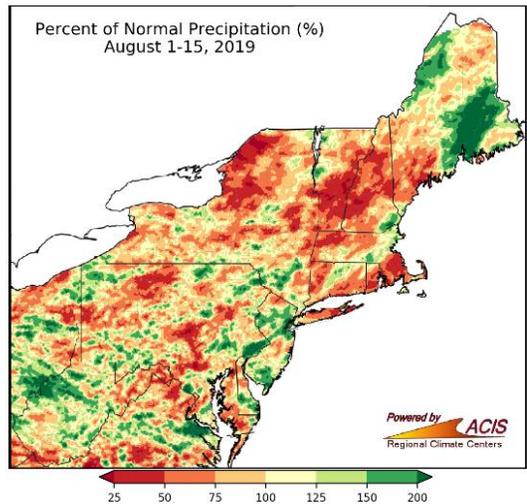
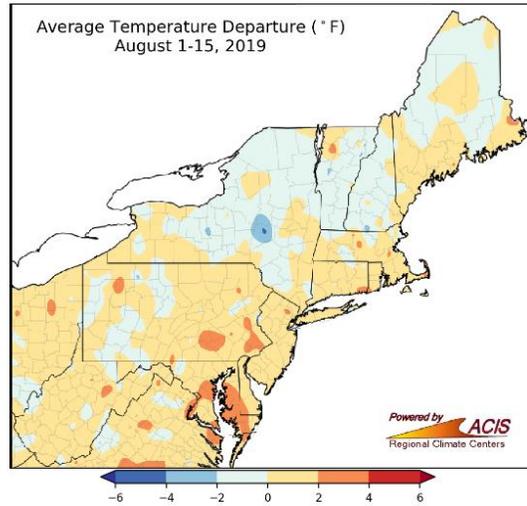
Table 1. Minimum Dissolved Oxygen Concentrations and Areal estimates for HYAUG Cruises Conducted from 1998-2019 by CT DEEP.

Cruise	Minimum DO Observed (mg/L)	Station with Minimum DO	Area under 4.8 mg/L (km ²)	Area under 3 mg/L (km ²)
HYAUG98	1.5	A4	1423	237.7
HYAUG99	2	A4	1379.6	115.2
HYAUG00	3.11	27	1114.3	0
HYAUG01	1.6	02	1571.1	344.1
HYAUG02	0.82	A4	1206	220.6
HYAUG03	0.11	A4	1890.5	894
HYAUG04	0.28	A4	1353.3	523.5
HYAUG05	0.51	A4	1565.4	448.6
HYAUG06	1.73	A4	1214.7	131.7
HYAUG07	1.84	E1	1428.5	255.3
HYAUG08	0.14	A4	1387.3	466.5
HYAUG09	1.49	A4	1615.3	438
HYAUG10	3.12	D3	1303.8	0
HYAUG11	1.89	A4	1659.5	337.6
HYAUG12	0.9	A4	1500.4	747.1
HYAUG13	1.34	A4	1051.3	209.1
HYAUG14	3.5	21	1072.9	0
HYAUG15	2.12	A4	1448.8	99.2
HYAUG16	1.37	A4	1384	511.4
HYAUG17	1.11	A4	1254	114.3
HYAUG18	2.81	03	909.1	19.7
HYAUG19	0.89	A4	1251	192

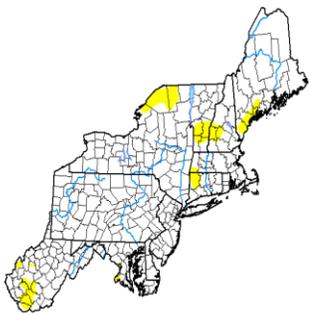
The summer of 2019 remains exceptionally hot and humid; temperatures during the first half of August averaged in the mid-80s in Bridgeport, CT; Islip, NY; and LaGuardia Airport, two to three degrees above the monthly normal in all three locations.

The second day of the cruise, August 13, was also rainy with 0.32 inches of precipitation falling in Islip, NY. The Long Island Sound area had one more notable rainfall event on 7 August (0.41 inches in Bridgeport, CT), but the other days have been dry. The Percent of Normal Precipitation image (bottom right) shows the area to be at only 50-75% of its normal.

More detailed weather information can be viewed on the Northeast Regional Climate Center's website.



U.S. Drought Monitor Northeast



August 13, 2019
(Released Thursday, Aug. 15, 2019)
Valid 8 a.m. EDT

	Drought Conditions (Percent Area)					
	None	D0	D1	D2	D3	D4
Current	83.77	6.23	0.00	0.00	0.00	0.00
Last Week 26-08-2019	87.25	2.75	0.00	0.00	0.00	0.00
3 Months Ago 26-05-2019	100.00	0.00	0.00	0.00	0.00	0.00
Start of Calendar Year 01-01-2019	97.28	2.72	0.00	0.00	0.00	0.00
Start of Water Year 01-12-2018	78.79	21.21	5.33	0.91	0.00	0.00
One Year Ago 08-08-2018	78.21	23.79	8.34	0.00	0.00	0.00

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
Richard Timber
CPC/NORMAN/WSN/CEP



droughtmonitor.unl.edu

Water Temperature

Surface and bottom water temperatures have risen steadily since the WQMAR19 cruise. However, while the average temperature of the bottom waters continued to increase (+1.73°C), the average temperature of the surface waters decreased by 0.59°C (23.12°C to 22.53°C) from WQAUG19 to HYAUG19. The surface waters were lower, on average, than in HYAUG18 and HYAUG17.

The maximum surface water temperature during the HYAUG19 survey occurred at Station D (23.41°C), while the maximum bottom water temperature occurred at Station 15 (22.96°C).

When compared to WQAUG19, stratification has decreased slightly. HYAUG19 ΔTs (the difference between the surface and bottom water temperatures) ranged from 0.23°C (Station 15) to 3.09°C (Station B3). Furthermore, the average ΔT was 1.76°C during the HYAUG19 survey, a significant decrease of 2.36°C from the WQAUG19 average of 4.12°C.

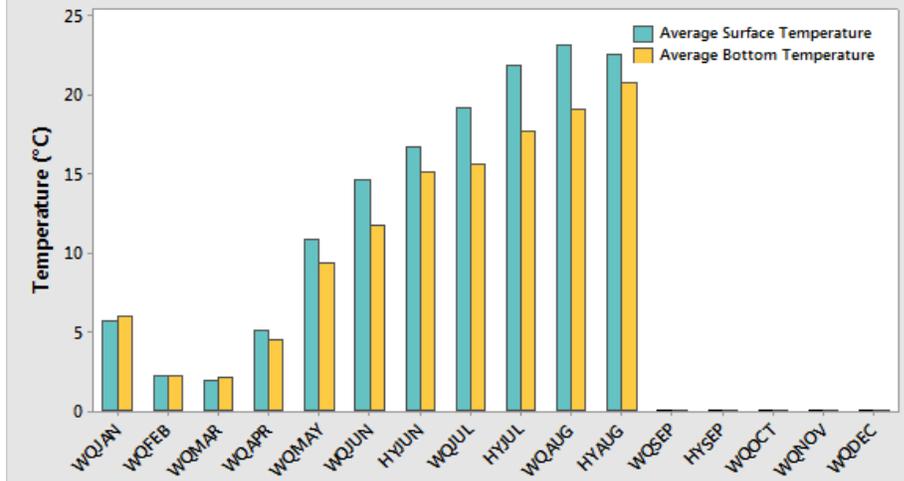
Note: The surface and bottom water temperatures discussed above and graphed reflect data from only the 17 year-round water quality stations.

Sea surface temperature data from Johns Hopkins University Applied Physics Laboratory illustrate how currents and fronts impact water temperatures in the Long Island Sound and offshore.

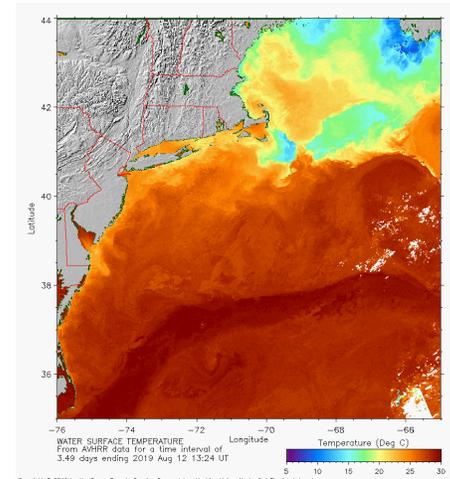
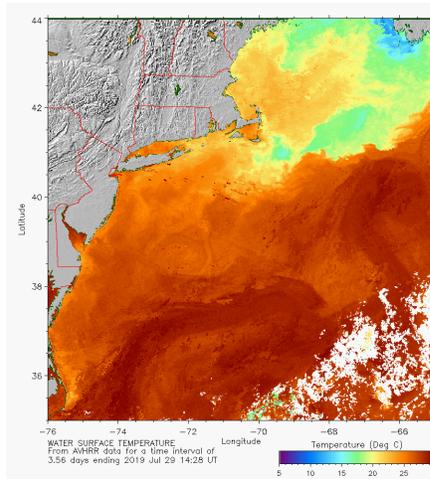
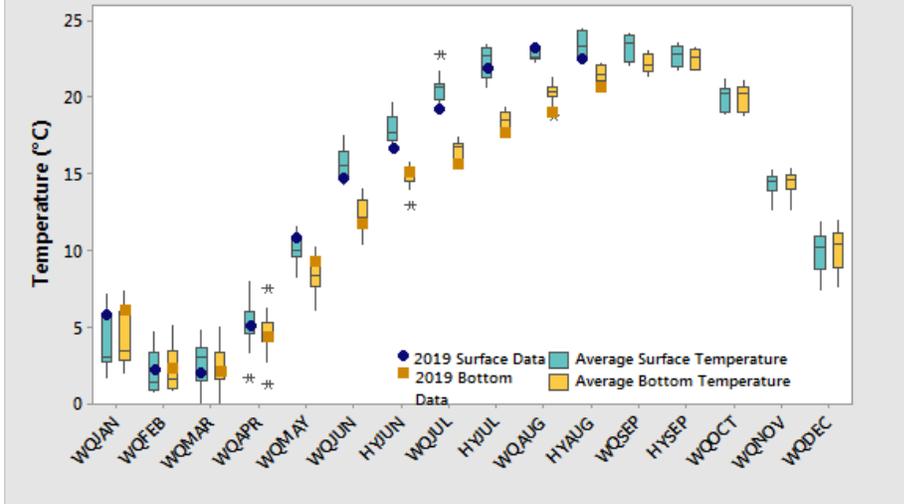
On the left is a 3 day composite SST image ending July 29. On the right is the 3 day composite image ending on August 12 that shows slightly cooler water trying to make its way into LIS from the Gulf of Maine and Georges Bank.

More information about sea surface temperature can be found on the Johns Hopkins APL Ocean Remote Sensing website: http://fermi.jhuapl.edu/avhrr/gs_n/averages/index.html.

Average Monthly Temperature of Long Island Sound 2019



Average Long Island Sound Water Temperatures 2009 - 2019

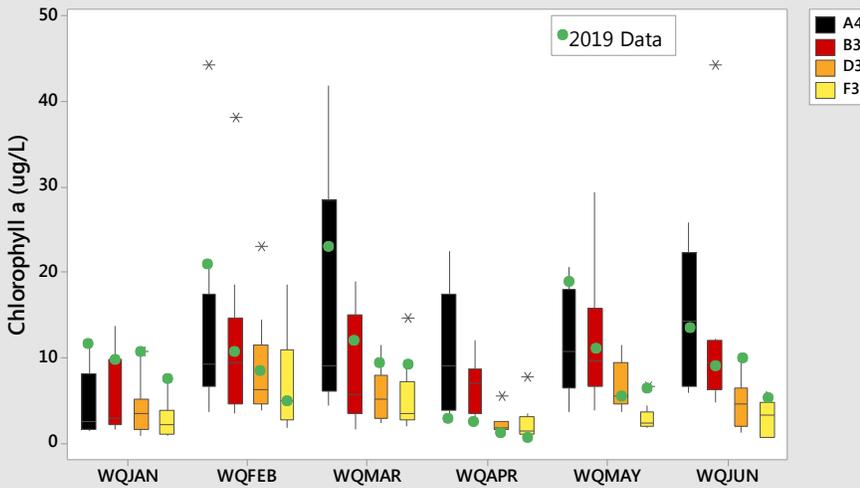


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Chlorophyll a

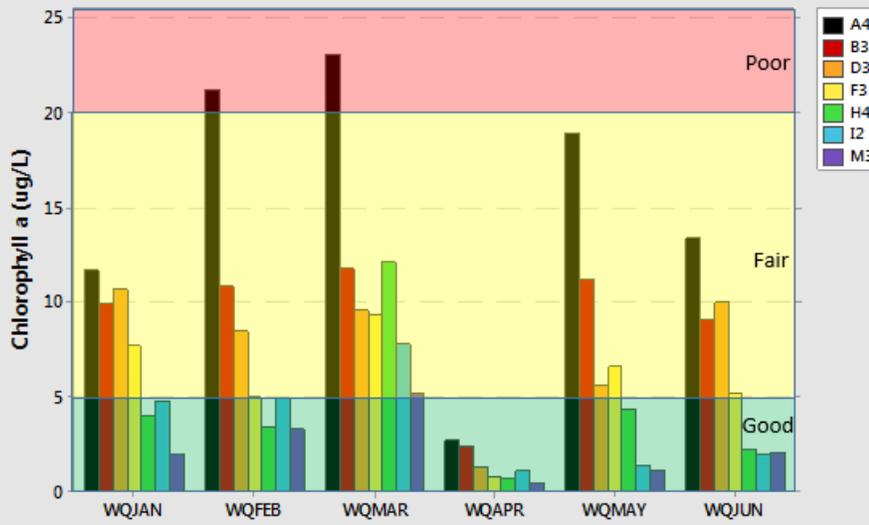
Surface Chlorophyll a Data from Four Stations in Long Island Sound
2009 - 2019



The concentration of chlorophyll a is a measure used to estimate the quantity of phytoplankton biomass suspended in surface waters. In Long Island Sound, spring chlorophyll a levels generally peak during February and March, and these concentrations decrease from west to east. Historically high levels of chlorophyll a in the Western Sound during this time have been linked to summertime hypoxia conditions.

The spring phytoplankton bloom occurred on time this year, beginning in January with peak chlorophyll a levels measured in March. Winter (December 2018-February 2019) temperatures and precipitation were above normal for much of the region. Spring (March- May 2019) temperatures were above normal along the coast of LIS, but below normal in the upper watershed. Precipitation was plentiful with most of the region receiving above normal precipitation. Bridgeport, Central Park, Hartford, and Islip had a record number of days with measureable precipitation in April resulting in flooding and peak stream flows. Following the influx of freshwater and nutrients in April, we saw another large boost in phytoplankton in May and June.

2019 Chlorophyll a Data from Seven Stations Across Long Island Sound



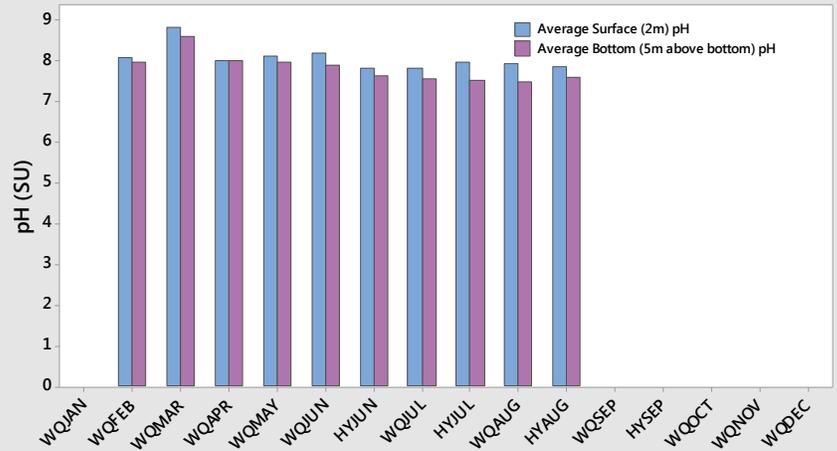
January chlorophyll a concentrations were a little above average, while February and March concentrations were on par with measurements over the past ten years. April concentrations were very low compared to past years. Concentrations in May and June were mostly on par with measurements over the past ten years as well.

During the HYAUG19 survey, the surface pH averaged 7.84 SU, and the bottom pH averaged 7.58 SU, which are about 0.09 to 0.14 SU above the mean value for HYAUG surveys. These average values are below the WQAUG19 surface pH average (7.94 SU) but above the bottom pH average (7.48 SU).

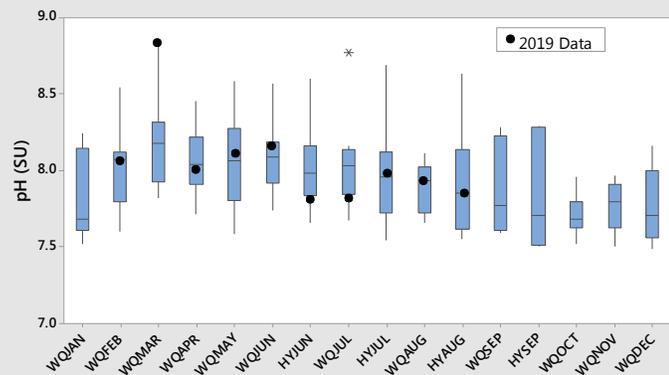
Station A4 was the site of both the lowest surface and the lowest bottom pH with values of 7.61 SU and 7.23 SU, respectively.

Note: The surface and bottom pHs discussed and graphed reflect data from only the 17 year-round water quality stations.

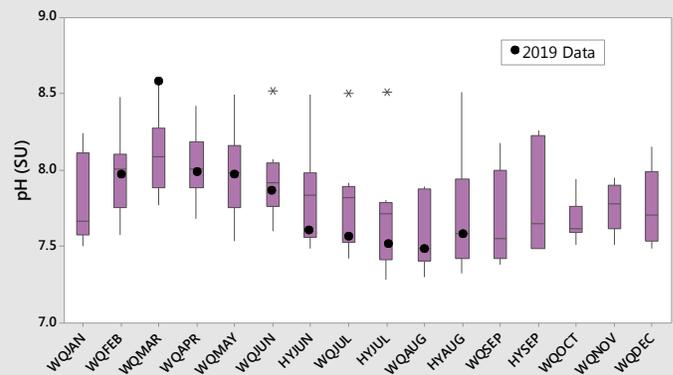
Average Monthly pH of Long Island Sound
2019



Average Surface pH of Long Island Sound
December 2010 - July 2019



Average Bottom pH of Long Island Sound
December 2010 - July 2019





SPOTLIGHT!

During the HYJUL19 and HYAUG19 cruises, we were joined by Dr. Luciana Santoferrara and Ph.D. student Sue Smith from UCONN Stamford who are working on a new joint study with Dr. George McManus of UCONN Avery Point. Dr. Santoferrara provided a brief summary of the project:

Microbial communities under seasonal hypoxia in Western Long Island Sound

This project compares the structure of microbial communities under different oxygenation conditions in Western Long Island Sound. On board the R/V John Dempsey, we collected bacteria, archaea and protists on filters for latter DNA extraction and sequencing. Bioinformatic analyses of the DNA sequences will tell us if the taxonomic composition and relative abundance of diverse microbes change between normoxic and hypoxic waters. Our hypothesis is that hypoxia correlates with an increased diversity of decomposer prokaryotes and a decreased abundance of herbivores like ciliates and dinoflagellates. Such changes could impact nutrient recycling in the microbial food web and energy transfer into higher trophic levels.



Next Survey

Our next survey is scheduled for 27-29 August (WQSEP19) aboard the R/V John Dempsey. The schedule for the remainder of 2019 is available on our website.



Connecticut Department of
**ENERGY &
ENVIRONMENTAL
PROTECTION**