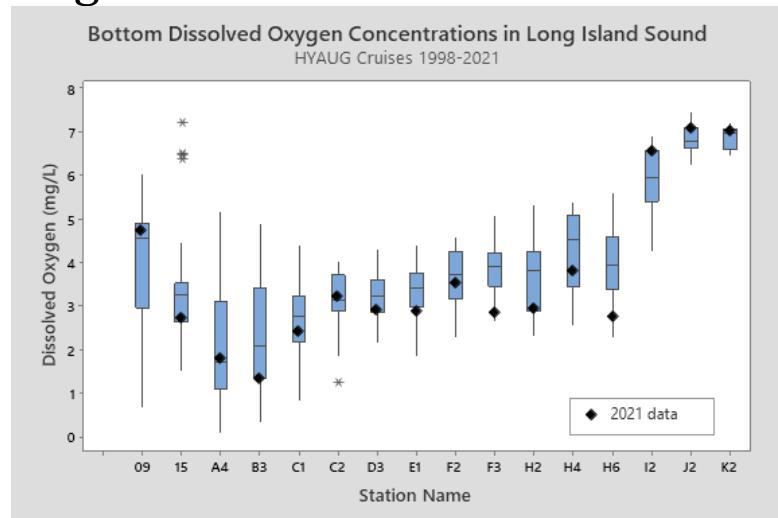


August 2021



[Volume 4, Issue 6]



Long Island Sound Water Quality Monitoring Program

<https://portal.ct.gov/DEEP-LIS>

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HYAUG21 Hypoxia Summary

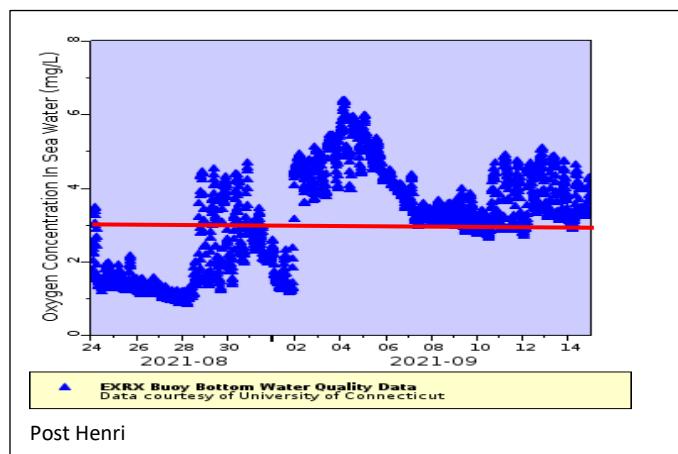
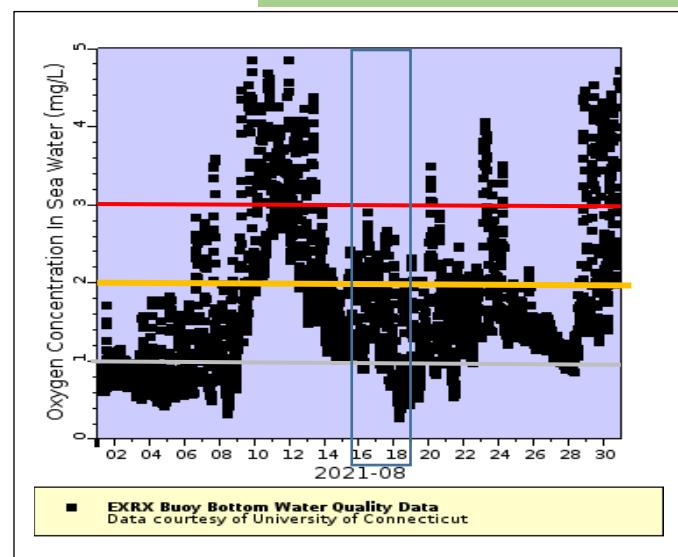
Stations A4 and B3 below 2 mg/L

CT DEEP sampled 42 stations during the HYAUG21 survey that was conducted 16-18 August 2021. The lowest dissolved oxygen (DO) recorded during this survey was at Station B3 with a concentration of 1.34 mg/L. Eleven other stations were below 3 mg/L, 7 stations were less than 3.5 mg/L, and 11 stations were below 4.8 mg/L. Data are available in an Excel spreadsheet format and on the [UConn ERDDAP site](#). The graphs to the right show the continuous DO data from the Execution Rocks buoy for the month of August (top) and following Tropical Storm Henri (bottom). Graphs are a data output from the ERDDAP site.

The DO at Station A4 during the HYAUG21 survey (1.82 mg/L) was slightly below its average (1.93 mg/L) and above the median (1.55 mg/L) values from all HYAUG surveys conducted by CT DEEP between 1998 and 2021. The DO at Station A4 during HYAUG surveys from 1998-2019 (n=24) ranged from 0.11 mg/L (HYAUG03) to 5.21 mg/L (HYAUG00).

During the HYAUG surveys, the minimum 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 HYAUG21 survey, there were 109.2 km² of bottom water that had DO concentrations less than 2.0 mg/L, an additional 258.7 km² of bottom water that had DO concentrations less than 3.0 mg/L (for a total of 367.9 km² of bottom water that had DO concentrations less than 3.0 mg/L), and an additional 1386.1 km² of bottom water with DO concentrations less than 4.8 mg/L. The areal estimates for HYAUG surveys from 1998-2021 average 286.6 km².



Dissolved Oxygen

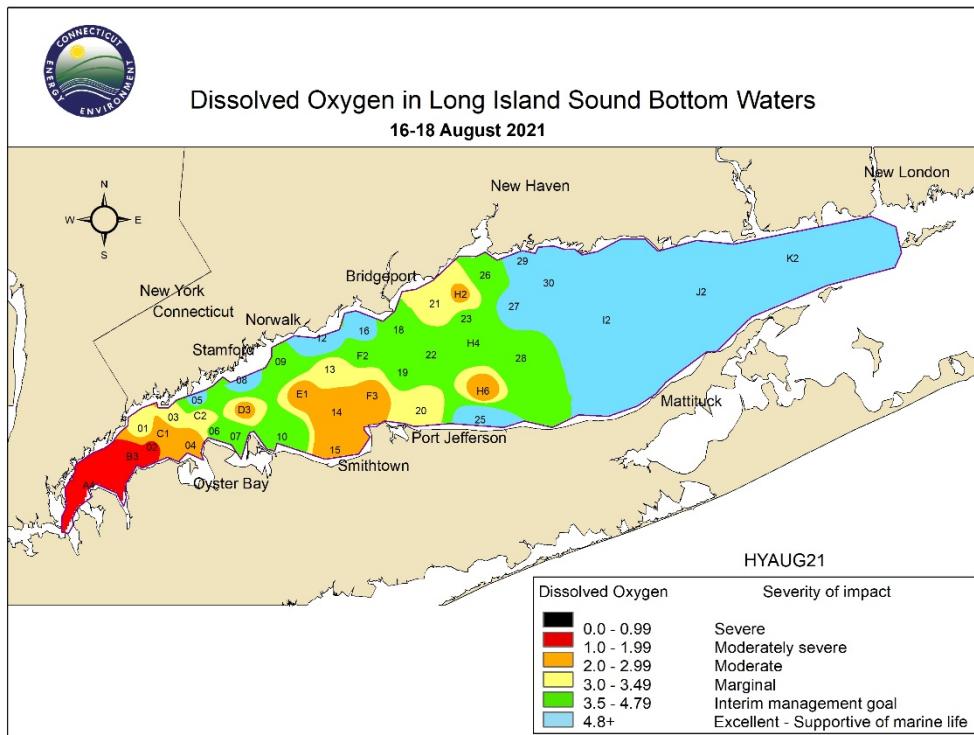


Table 1. Minimum Dissolved Oxygen Concentrations and Areal estimates for HYAUG Cruises Conducted from 1998-2021 by CT DEEP.

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
HYAUG20	3.56	26	1090	0
HYAUG21	1.34	A4	1386.1	367.9

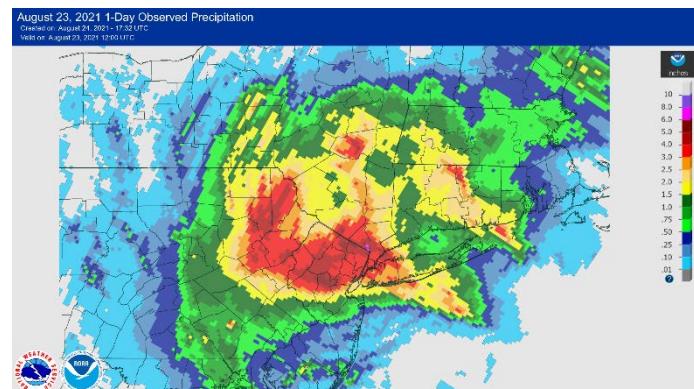
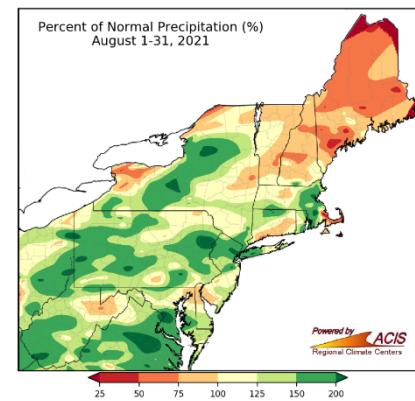
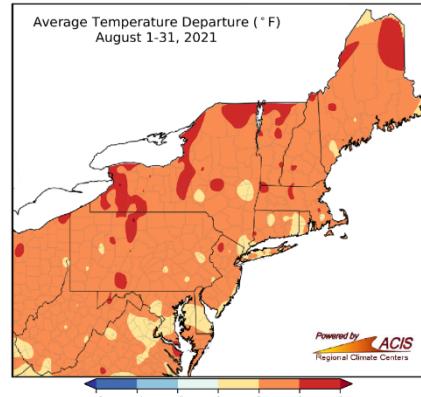
Weather

The month of August came with temperature departures of approximately 2°F to 4°F for most parts of the Northeast. The average temperature in Hartford, CT and Bridgeport, CT was 74.8°F and 76.4°F, respectively. The normal temperatures for these areas are 72.5°F for Hartford and 74.5°F for Bridgeport. With slightly above average temperatures, August 2021 was ranked 3rd for Bridgeport and 7th warmest August for Hartford.

From August 1-15th, precipitation amounts recorded at Bridgeport (7th driest), Hartford, La Guardia, and JFK were all below normal. Islip recorded above normal precipitation (2.28 inches) with August 1-15, 20201 being the 20th wettest on record. As August continued, multiple storms occurred, increasing the amounts of precipitation for the month. Tropical Storm Fred travelled through the Northeast between August 18 to 20. Fred brought between 4 and 8 inches of rain to various areas. In addition, Tropical Storm Henri made landfall in Westerly, RI on August 22, dropping 5 to 9 inches of precipitation across the area.

Hartford received 8.80 inches for the month, 204% of the normal 4.21 inches, making August 2021 the 4th wettest on record. Central Park, JFK, La Guardia, and Islip all ended the month with above normal totals, while Bridgeport remained below normal for the month, only receiving 2.21 inches.

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



Water Temperature

Surface and bottom water temperatures have risen steadily since the WQMAR21 cruise. The average temperature of the bottom waters continued to increase to 21.41°C, as did the average temperature of the surface waters (23.64°C). The surface waters were similar to 2020, but about a degree warmer than HYAUG19.

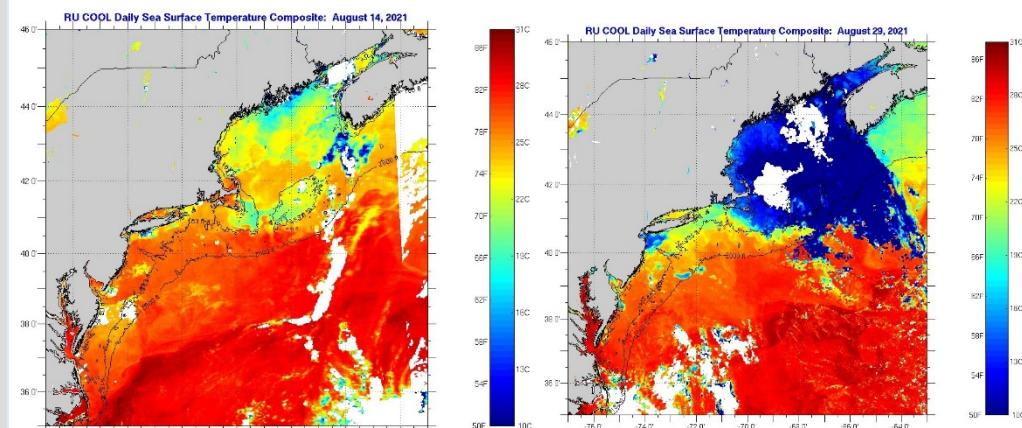
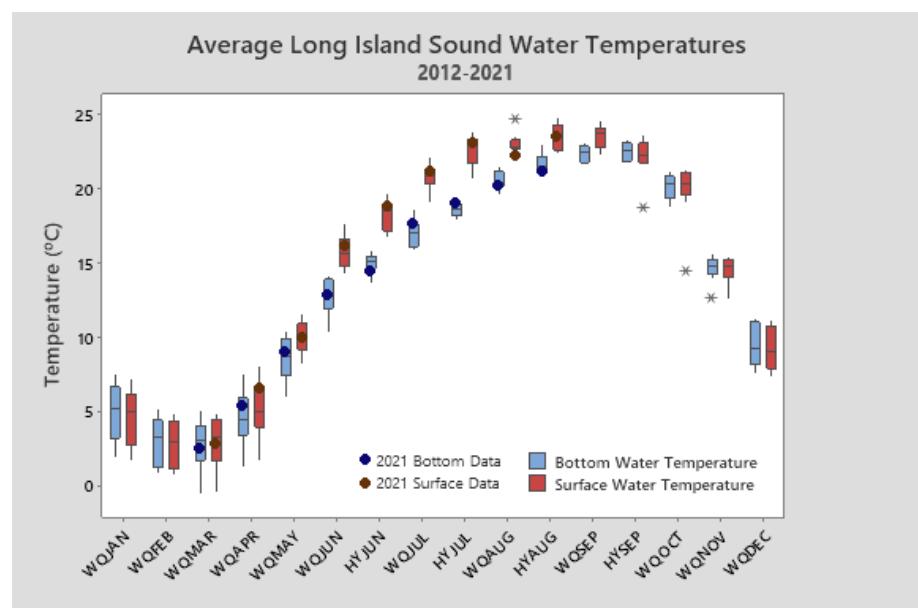
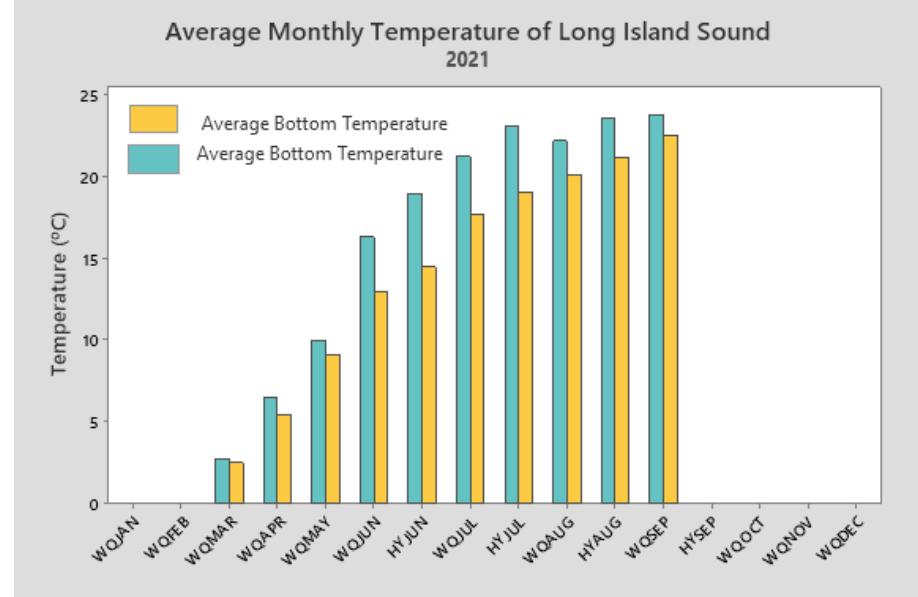
The maximum surface water temperature during the HYAUG21 survey occurred at Station 28 (25.25°C), while the maximum bottom water temperature occurred at Station 25 (23.12°C).

HYAUG21 Δ Ts (the difference between the surface and bottom water temperatures) ranged from 0.13°C (Station 12) to 5.49°C (Station H6). The average Δ T was 2.23°C during the HYAUG21 survey, a slight increase of 0.31°C from the WQAUG21 average of 1.92°C.

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

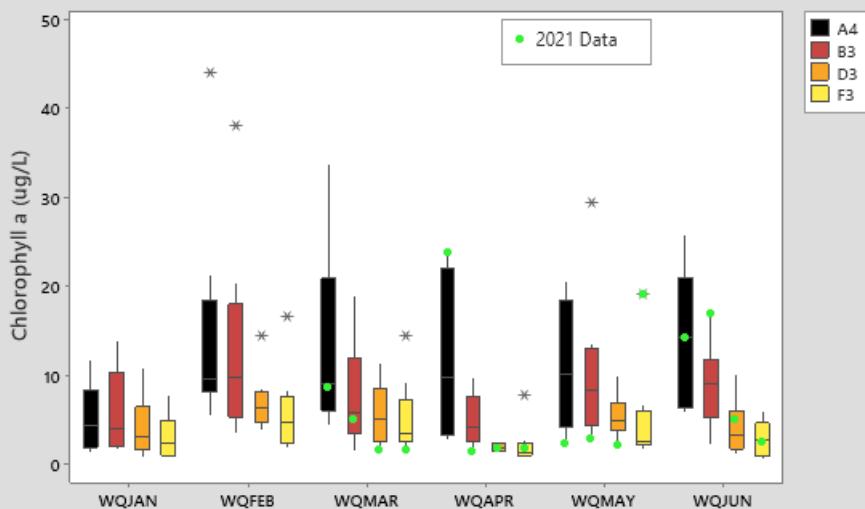
The two graphs at the bottom show sea surface temperatures (SST) in and around Long Island Sound from before and after our HYAUG21 survey. The August 14th graph (left) displays a temperature around 25.6 °C for LIS. On August 29th, the temperature was approximately 23.3°C within LIS.

More information about sea surface temperature can be found on the Rutgers University's Coastal Ocean Observation Lab's page:
https://marine.rutgers.edu/cool/sat_data/?bm=8&bd=1&by=2021&sort=date&em=8&ed=31&ey=2021®ion=bigbright&product=sst_com¬humbs=0&okb.x=51&okb.y=17

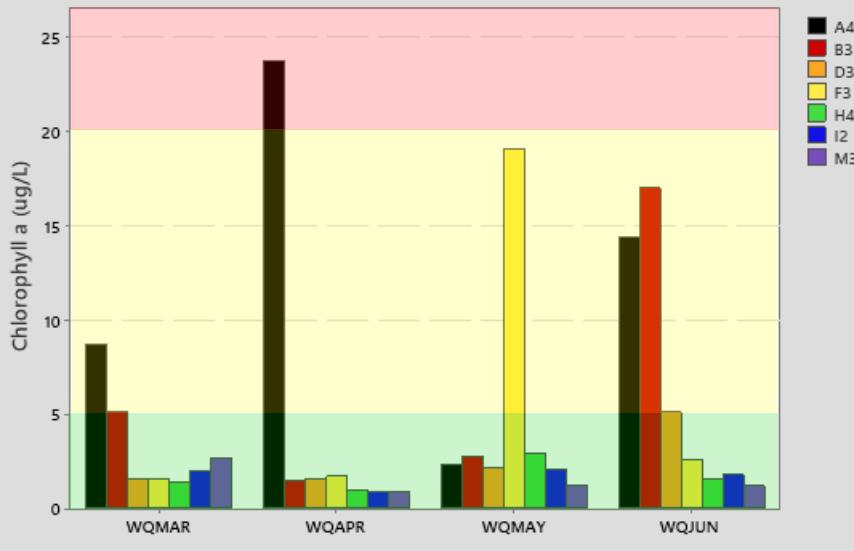


Chlorophyll a

Surface Chlorophyll a Data from Four Stations in Long Island Sound
2011-2021



2021 Chlorophyll a Data from Seven Stations Across Long Island Sound



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.

Due to COVID restrictions, we were unable to sample in January and February this year. The spring phytoplankton bloom seems to have peaked during April with chlorophyll a levels at A4 measuring 23.7 ug/L. A secondary bloom occurred in June.

Winter 2020-2021 temperatures and precipitation were above normal for much of the region. Spring (March- May 2021) temperatures remained above normal along the coast of LIS and in the upper watershed. Precipitation was close to normal. Bridgeport, Central Park, Hartford, and Islip had above normal precipitation and near normal temperatures in May. Following the influx of freshwater and nutrient, we saw another large boost in phytoplankton in June.

Chlorophyll concentrations at A4 between 2011 and 2021 averaged 14.02 ug/L (+/- 9.81 ug/L) and ranged between 4.40 and 33.70 ug/L with a median of 9.00 ug/L.

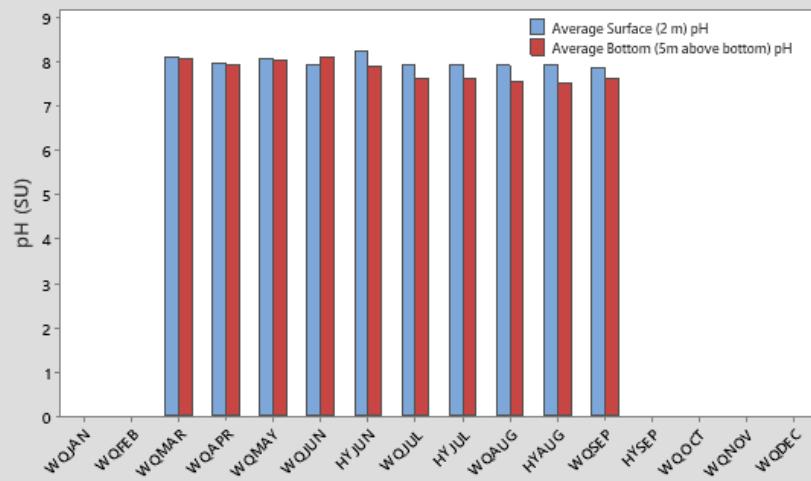
Using thresholds established by the National Coastal Condition Assessment, 2021 spring chlorophyll a concentrations were generally fair (5 to 20 ug/L) to good (<5 ug/L).

During the HYAUG21 survey, the surface pH averaged 7.93 SU, and the bottom pH averaged 7.53 SU, which are about 0.09 to 0.14 SU above the mean value for HYAUG surveys. These average values are similar to WQAUG21 average values.

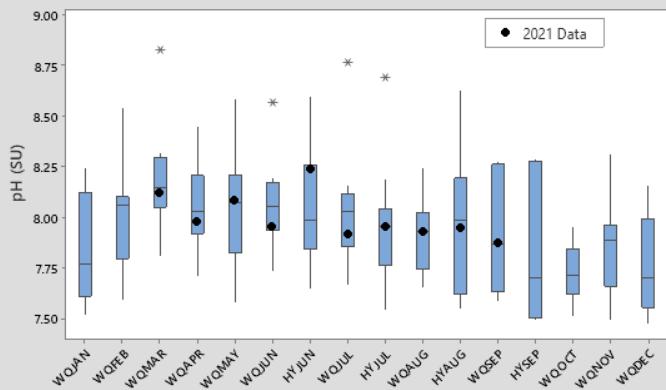
The lowest surface pH (7.54 SU) was measured at Station 16 while the lowest bottom pH (7.31 SU) was measured at Station A4.

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

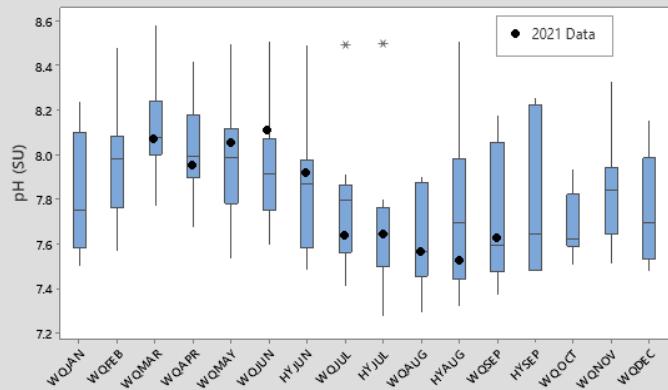
Average Monthly pH of Long Island Sound 2021



Average Surface pH of Long Island Sound 2011-2021



Average Bottom pH of Long Island Sound 2011-2021



Next Survey

Our next survey is scheduled for 30 August- 1 September (WQSEP21) aboard the R/V John Dempsey.
The schedule for the remainder of 2021 is available on our website.



Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION