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Long Island Sound Water Quality Monitoring Program

August 25, 2023

August



Dempsey Update

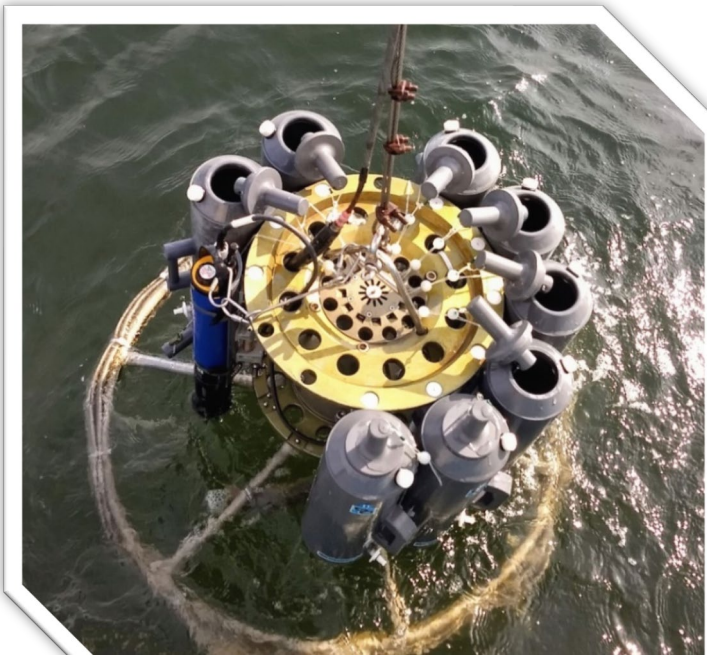
The Dempsey received a new AC unit and plans to install new hydraulic valves, that will be remote controlled, the week of 21 August.

If you have any questions or want more information on the Dempsey, please contact Matthew Lyman at: matthew.lyman@ct.gov.

2023 Sampling Schedule



The 2023 Long Island Sound Sampling began on 3 January 2023. All scheduled cruises except for CHFEB23 and WQMAR23 (maintenance issues) were completed as scheduled. The next survey is HYAUG23, scheduled during the week of 14 August. Click the link to learn more about the program and our sampling schedule: [Long Island Sound Water Quality and Hypoxia Monitoring Program Overview \(ct.gov\)](#)



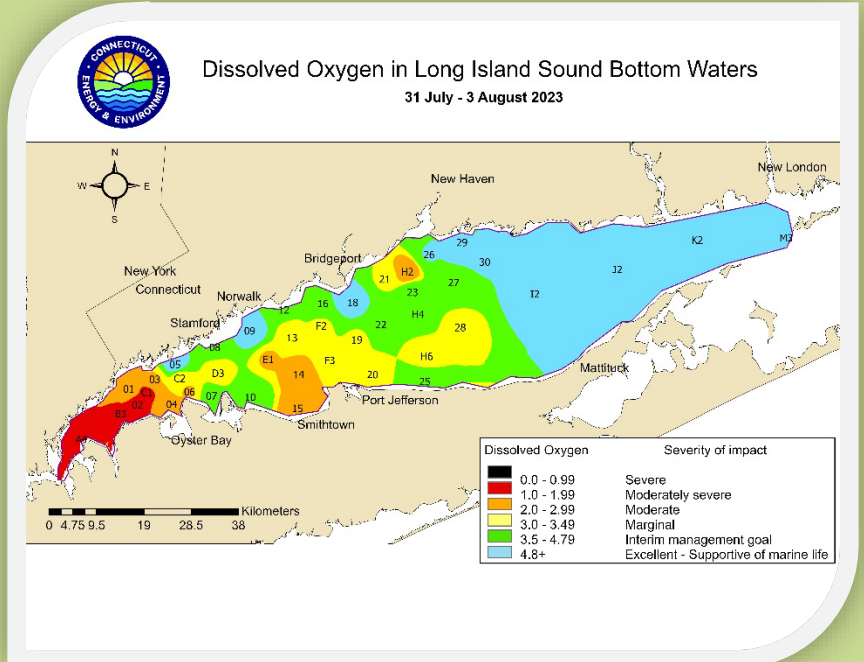
Dissolved Oxygen Summary

CT DEEP sampled 42 stations during the WQAUG23 survey that was conducted from 31 July-3 August 2023. Dissolved oxygen (DO) concentrations in the bottom waters of Long Island Sound during the WQAUG23 continued to decline. Four stations had DO below 2.0 mg/L, nine stations were below 3.0 mg/L and an additional 20 stations fell below 4.8 mg/L. The lowest concentration measured during the survey was 1.69 mg/L at Station A4 and the highest was 6.42 mg/L measured at Station M3. These are lower DO levels than recorded in the HYJUL23 cruise.

Of the 26 bottom waters measurements recorded in August at Station A4 between 1998 and 2023, the median concentration was 1.69 mg/L with a range of 0.32 to 4.62 mg/L. The mean was 1.97 mg/L.

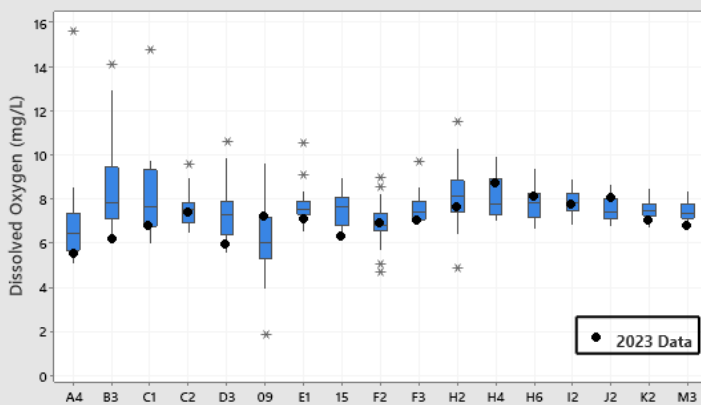
Leading up to the HYJUL23 survey, A4 had concentrations of 6.38 mg/L in June and 3.41 mg/L in WQJUL23.

During the WQAUG23 survey there were 118.7 km² (45.8 mi²) of bottom water with DO less than 2.0 mg/L, 209.7 km² (80.97 mi²) with DO between 2.0 and 3.0 mg/L, and 604.95 km² (467.17 mi²) with concentrations between 3.0 and 4.8 mg/L.



Preliminary data from this survey and prior 2023 cruises are available in Excel spreadsheet format as well as on the [UCONN ERDDAP site](#).

Surface Dissolved Oxygen Concentrations Across Long Island Sound
WQAUG Cruises
1998-2023



Bottom Dissolved Oxygen Concentrations Across Long Island Sound
WQAUG Cruises
1998-2023

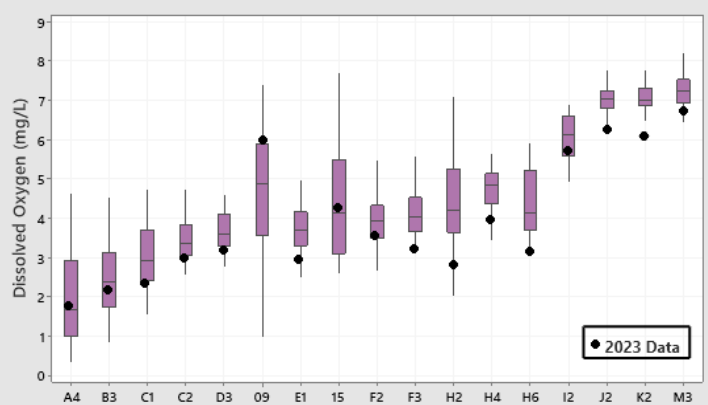
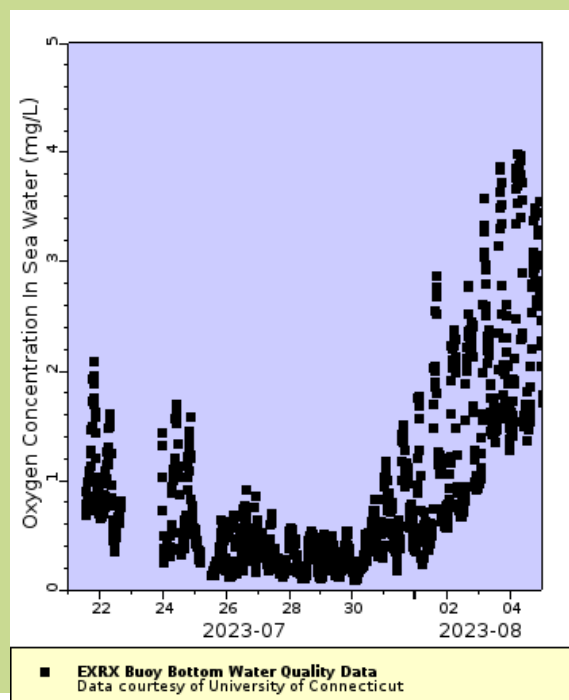
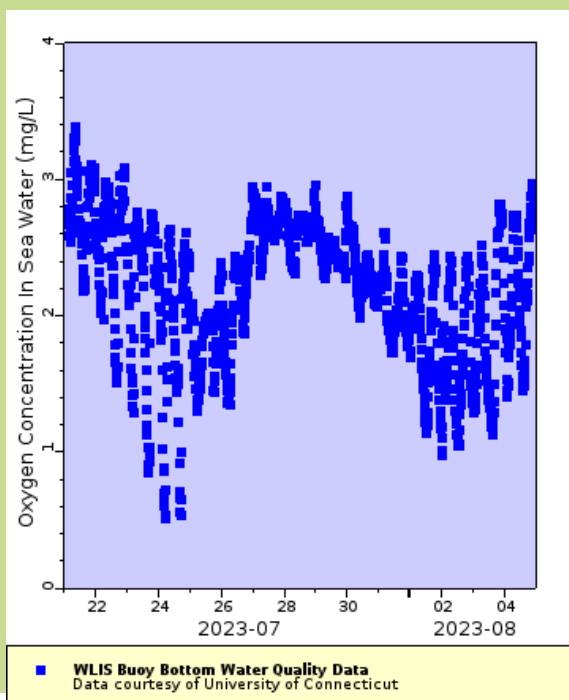


Table 1. Minimum Dissolved Oxygen Concentrations and Areal Estimates for WQAUG Cruises Conducted from 1998-2023 by CT DEEP

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)
WQAUG98	0.33	A4	1188.6	312.5
WQAUG99	0.8	A4	1458.6	311.5
WQAUG00	3.13	06	1183.2	0
WQAUG01	2.23	A4	1532.3	165.8
WQAUG02	0.56	02	1303.5	324.7
WQAUG03	1.91	B3	1733	275.1
WQAUG04	2.67	A4	1213.3	53.1
WQAUG05	0.6	A4	1338.7	459.5
WQAUG06	0.63	A4	1597.7	515.4
WQAUG07	1.59	A4	1480.4	418.9
WQAUG08	0.61	A4	1530.5	235.9
WQAUG09	1.49	A4	1177.1	113.2
WQAUG10	1.17	02	1210.5	261.8
WQAUG11	1.65	A4	1049.7	165.5
WQAUG12	2.35	02	1615	121.1
WQAUG13	2.28	A4	1066.7	41.3
WQAUG14	1.67	B3	980.5	225.6
WQAUG15	2.77	A4	552.4	90.1
WQAUG16	3.37	F3	890.2	0
WQAUG17	3.37	F3	1232	0
WQAUG18	2.58	A4	1080.3	53.5
WQAUG19	1.29	A4	1218.8	231.6
WQAUG20	1.77	A4	1470.3	164.2
WQAUG21	0.99	A4	1389.1	206.1
WQAUG22	1.43	A4	1098.4	224.4
WQAUG23	1.69	A4	1538.3	328.4



Temperature Data Summary



Surface water temperatures have lowered with a 0.97°C decrease of average surface temperatures while bottom water temperatures have risen with a 0.87°C increase of average bottom temperatures from HYJUL23 to WQAUG23.

The maximum surface water temperature during the WQAUG23 survey occurred at Station 28 (24.89°C) while the maximum bottom water temperature occurred at Station 09 (22.3°C).

The average surface and bottom water temperature for WQAUG were lower in 2023 than in 2022.

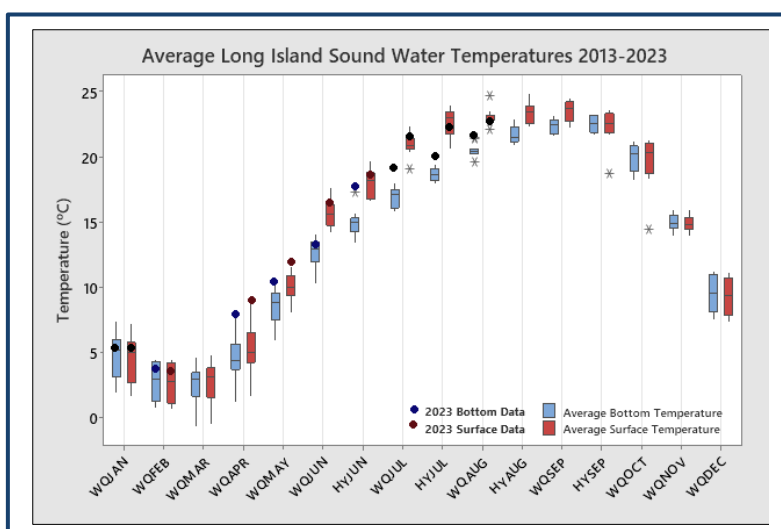
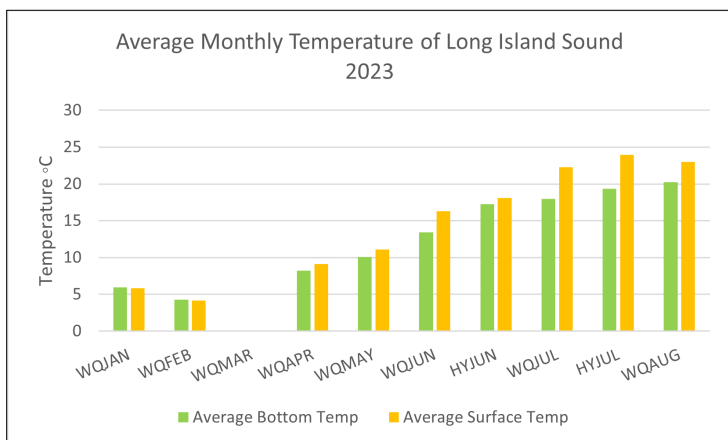
Delta T (ΔT)

The greatest temperature difference between the surface and bottom waters during the WQAUG23 survey was 6.28°C, measured at Station H6. The smallest temperature difference was 0.02°C at Station 09.

ΔT 's averaged 2.61°C during the WQAUG23 survey compared to WQAUG22 ΔT 's average of 2.55 °C.

Delta T (ΔT) is the difference between the surface and bottom water temperature. Differences in water temperature contribute to stratification and exacerbate hypoxic conditions. In general, the shallower coastal stations tended to have the smallest temperature differences, as they are more susceptible to mixing, weather, and anthropogenic influences (human caused Influences). The greater the delta T, the greater the potential for hypoxia to be more severe.

In June, DEEP's hypoxia monitoring cruises began. The DEEP's monitoring program records water temperatures and salinity during its hypoxia monitoring cruises to help estimate the extent of favorable conditions for the onset and ending of hypoxia. Water temperature plays a major role in the timing and severity of the summer hypoxia event. Water temperature differences in the western Sound during the summer months are particularly influential in contributing to the difference in dissolved oxygen content between surface and bottom waters.



Note: WQMAR23 survey could not be completed due to maintenance

Weather

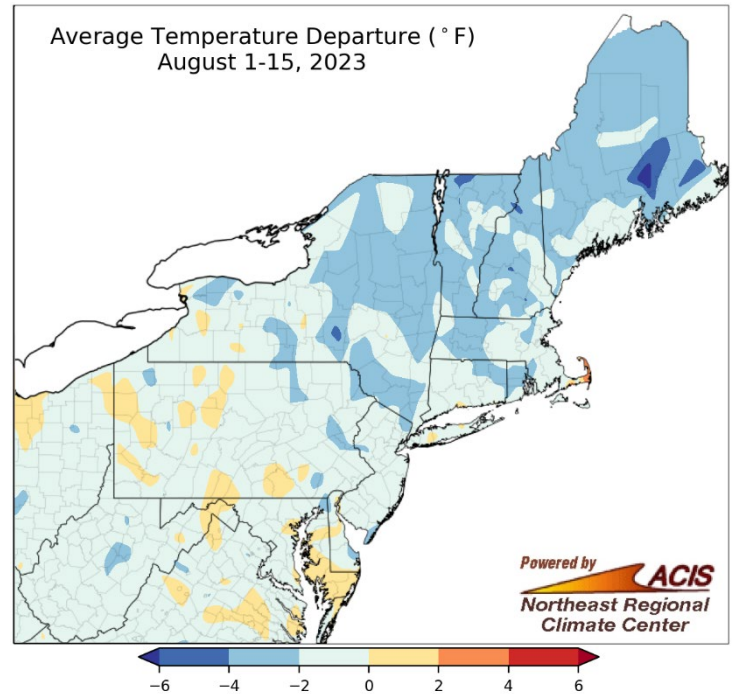


August started off wet and cool with near or above-normal rainfall the first half of the month in the Northeast. Areas in West Virginia, central Pennsylvania, northern New York, and Maine saw more than double their normal rainfall amount. Nine major climate sites ranked among the 20 wettest for the first half of August and 29 out of the 35 major climate sites were cooler than normal.

Hartford, CT had a -1.5°F departure from normal temperature of 73.6°F . The average temperature for the month of August was 72.1°F . Hartford also experienced a jump of 108% of normal precipitation at 2.39 inches versus a typical 2.22 inches of rainfall in August.

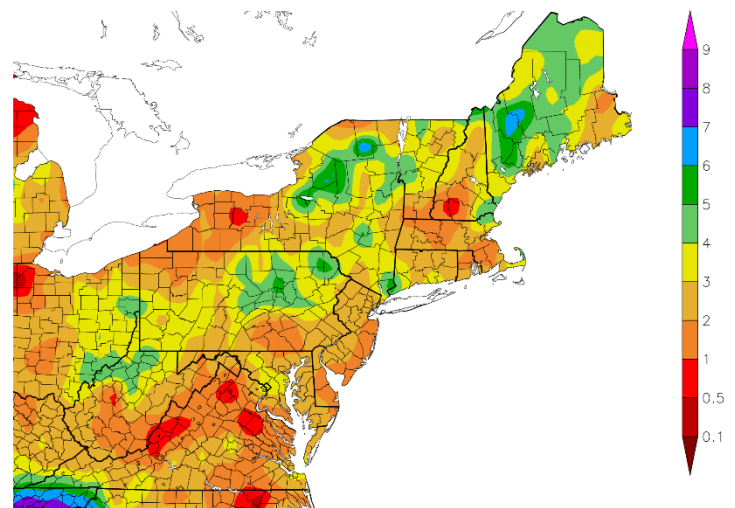
Bridgeport, CT had a cooler than normal August averaging 73.8°F with a -1.6°F departure from a normal temperature of 75.4°F . Precipitation was 129% of normal reaching 2.55 inches compared to a normal 1.97 inches.

Islip, NY also had cooler temperatures than normal. There was a -0.5°F departure from a normal temperature of 74.7°F , with the average temperature in Islip, NY this August being 74.2°F . For precipitation Islip, NY had 190% of normal precipitation at 4.04 inches. Normal precipitation was 2.13 inches. Islip, NY ranked 10th wettest out of the top 20 sites in the Northeast.



August 1-15 average temperatures ranged 4°F below normal to 1°F above normal.

Precipitation (in)
8/1/2023 – 8/15/2023

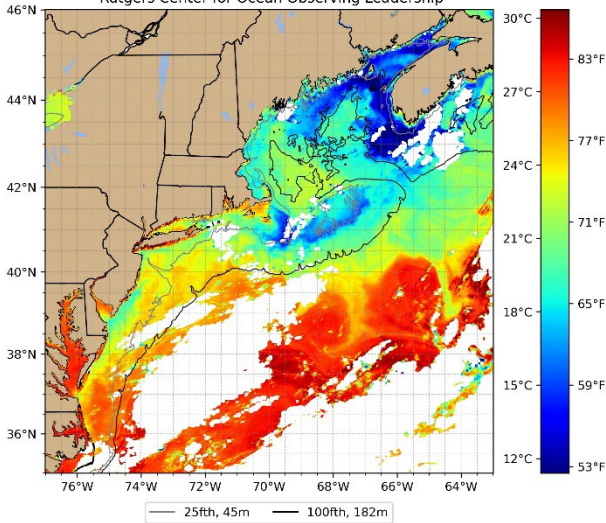


Geographic Information System (GIS) Data

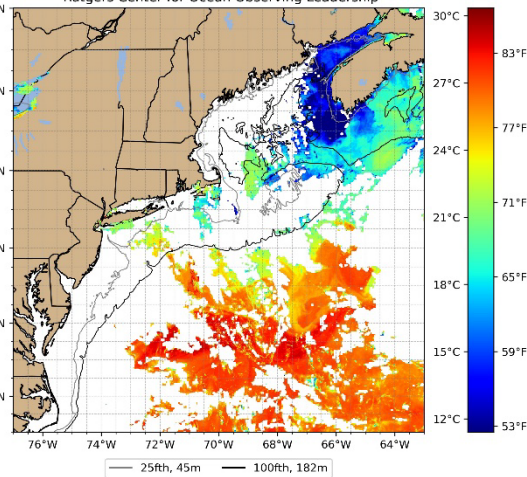
All data and images were from the Northeast Regional Climate Center's website. Please visit <http://www.nrcc.cornell.edu/> for more information.

Sea Surface Temperature

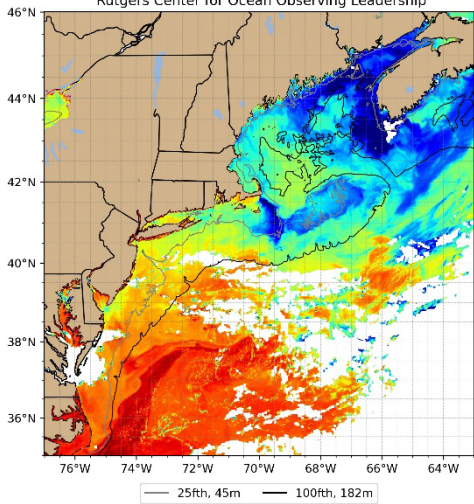
NOAA-19 Sea Surface Temperature: August 01 2023 1426 GMT
Rutgers Center for Ocean Observing Leadership



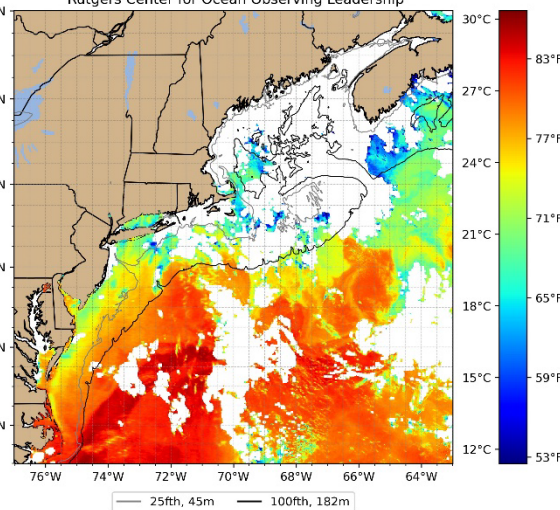
NOAA-19 Sea Surface Temperature: August 04 2023 1350 GMT
Rutgers Center for Ocean Observing Leadership



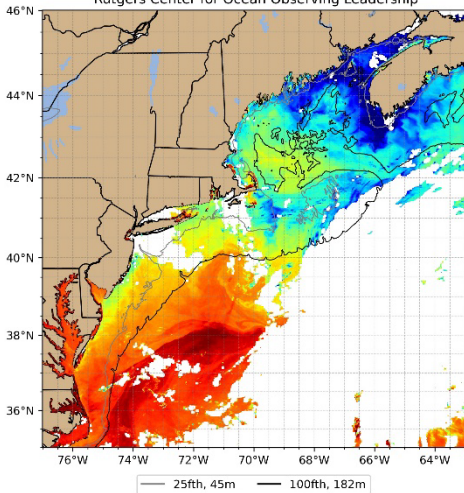
NOAA-18 Sea Surface Temperature: August 06 2023 1536 GMT
Rutgers Center for Ocean Observing Leadership



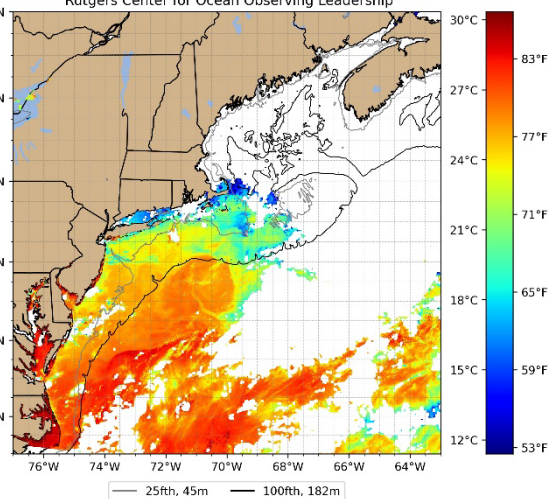
NOAA-19 Sea Surface Temperature: August 08 2023 1302 GMT
Rutgers Center for Ocean Observing Leadership



NOAA-18 Sea Surface Temperature: August 12 2023 1603 GMT
Rutgers Center for Ocean Observing Leadership



NOAA-18 Sea Surface Temperature: August 15 2023 1527 GMT
Rutgers Center for Ocean Observing Leadership



Sea Surface temperature data from Rutgers University IMCU Coastal Ocean Conservation Lab illustrates how currents and fronts impact water temperatures in the Sound and offshore.

In the first image, taken on August 1st, the waters in Long Island Sound are around 20°C-24°C (68°F-75°F), with some areas along the western coastline around 27°C (80°F).

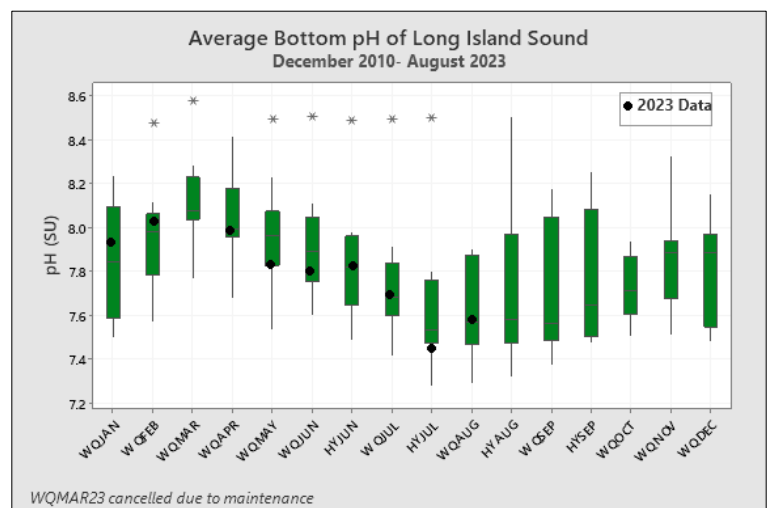
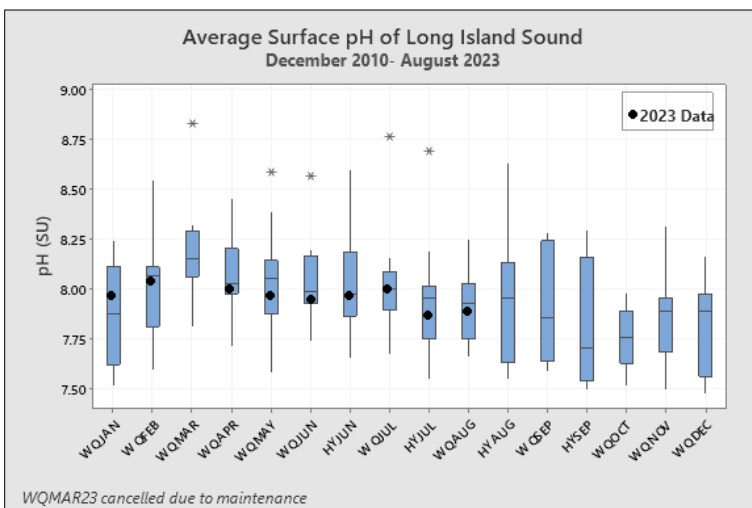
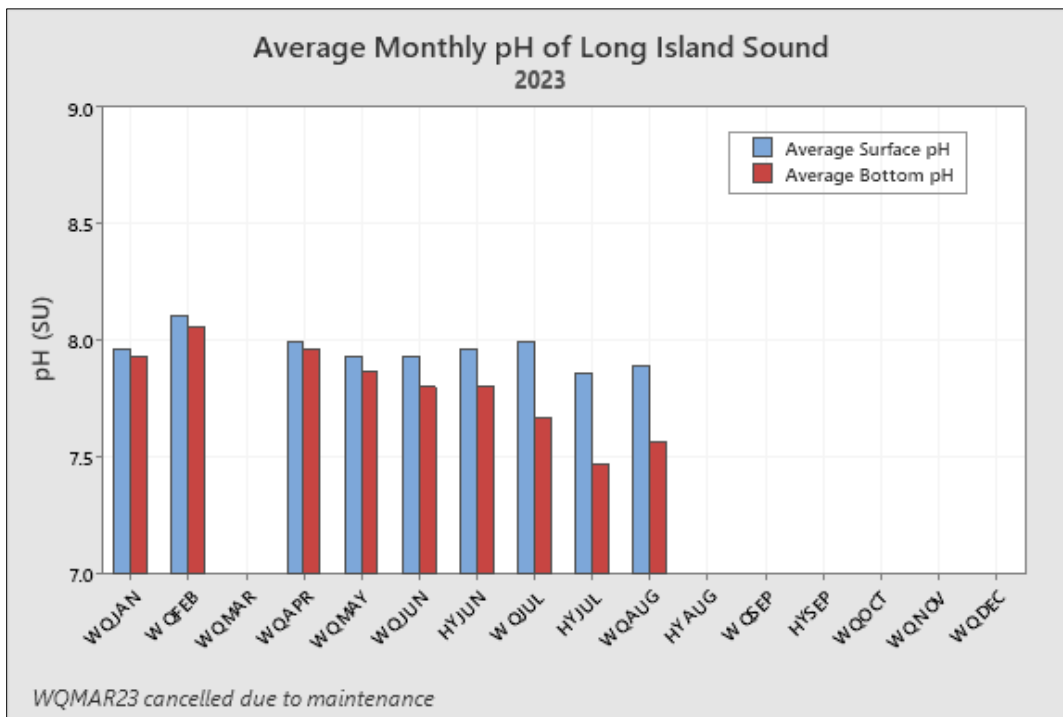
The five other images (left) show a cold system in the north as well as warm water from the South Atlantic pushing upward toward LIS. By August 3rd, temperatures in the Sound decreased to between 15-18°C (59-64.4°F).

More information about sea surface temperature can be found on the Rutgers University Satellite Imagery website [Sea Surface Temperature - IMCS Coastal Ocean Observation Lab \(rutgers.edu\)](#)

pH

The average surface and bottom pH from all the stations across LIS during the WQAUG23 survey were 7.86 and 7.56 SU, respectively. The lowest bottom pH was 7.25 (Station A4), the highest bottom pH was 7.97 (Station M3), the lowest surface pH was 7.55 (Station 18), and the highest surface pH was 8.17 (Station 28).

The average surface and bottom pH graphs for all the cruises from 2010 to date only include the 17 year-round water quality stations

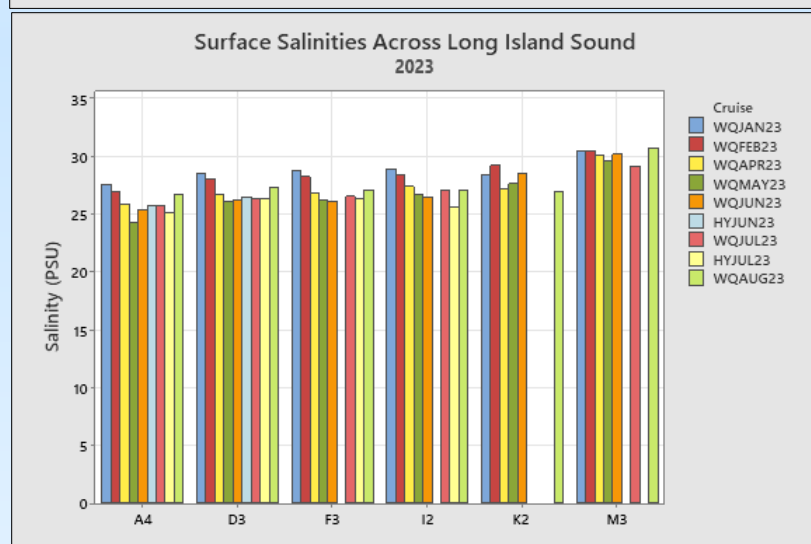
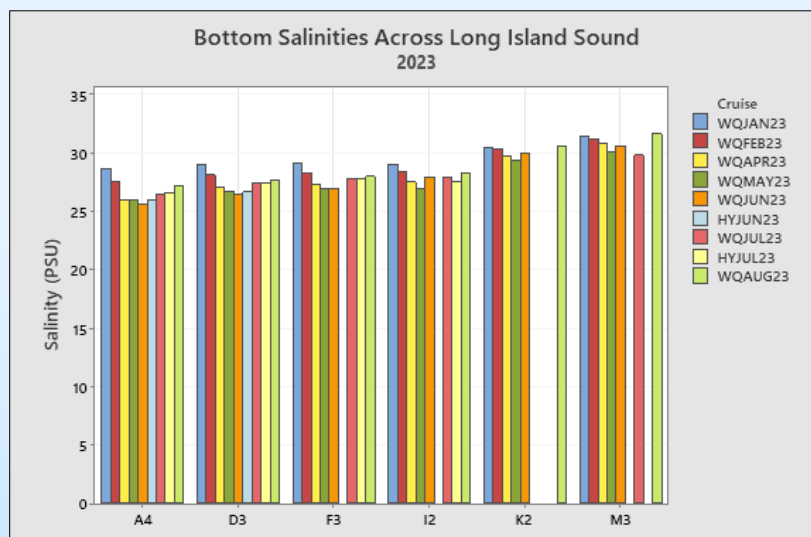


Salinity

Surface salinities across Long Island Sound generally decrease slightly from January through May due to snow melt and spring rains. The less dense freshwater will float on top of the denser saltwater contributing to stratification and impacting hypoxia. Additionally, nutrients carried by runoff fuel phytoplankton growth. Surface and bottom water salinities in 2023 were constant across much of the Sound.

Surface and bottom salinity values during the WQAUG23 survey were slightly above the 2009-2023 average for Stations A4 and D3. (See table below).

	A4	D3
2023 Surface	26.68	27.28
2009-2023 Average Surface	26.13	26.92
2023 Bottom	27.17	27.75
2009-2023 Average Bottom	26.85	27.73



Note: WQMAR23 survey could not be completed due to maintenance
 HYJUN23 only sampled two of the six stations represented (A4 & D3)
 WQJUL23 did not have salinity data for station K2.
 HYJUL23 only sampled four of the six stations represented (A4, D3, F3, I2)



Spotlight: Shell Day 2023



What is Shell Day?

On 24 August 2023, volunteers across the Long Island Sound (organizations listed below) will participate in a sampling blitz. These researchers and citizen scientists will be collecting water samples under EPA-approved QAPPs and SOPs to measure total alkalinity during low, mid, and high tides. The sites are located within LIS embayments, closer to shellfish resources.

The samples will be analyzed by the Vlahos lab at UCONN. This project is spearheaded by PhD Candidate Lauren Barrett. This research builds on NECAN Shell Day 2019 (<http://necan.org/ShellDay>). During that blitz, which occurred from the coast of Maine to the Long Island Sound, 500 samples were collected.

What is Total Alkalinity?

Total alkalinity (TA) is the buffering capacity of seawater. This measurement equates to the ability of the water to resist changes in pH when acid is added. Climate change and decay of algal blooms has caused an increase in carbon dioxide absorption to the ocean. This increase in carbon dioxide creates ocean acidification.



Sample Sites:

Northport Harbor, Huntington, NY
Huntington Harbor, Huntington, NY
Manhasset Bay, Hempstead, NY
Milton Harbor, Rye, NY
Holly Pond, Stamford, CT
Norwalk Harbor, Norwalk, CT
Black Rock Harbor, Bridgeport, CT
Eastern Point Bay, Groton, CT
Stonington Harbor, Stonington, CT
CT River at Old Lyme, CT



For more information on the Long Island Sound Water Quality Monitoring Program please visit:
[Long Island Sound Water Quality and Hypoxia Monitoring Program Overview \(ct.gov\)](http://LongIslandSoundWaterQualityandHypoxiaMonitoringProgramOverview.ct.gov)

Or contact us:

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