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Long Island Sound Water Quality Monitoring Program

August 31, 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 WQSEPT23, scheduled during the week of 28 August. Click the link to learn more about the program and our sampling schedule: [Long Island Sound Water Quality and Hypoxia Monitoring Program Overview \(ct.gov\)](#)



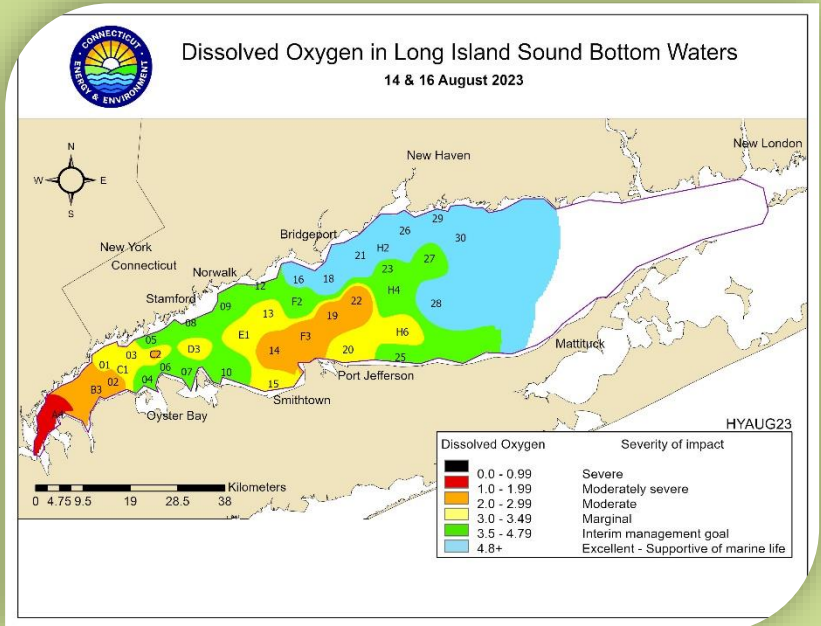
Dissolved Oxygen Summary

CT DEEP sampled 38 stations during the HYAUG23 survey that was conducted on 14 August and 16 August 2023. Dissolved oxygen (DO) concentrations in the bottom waters of Long Island Sound during the HYAUG23 showed improvements compared to WQAUG23 concentrations. One station had DO below 2.0 mg/L, seven stations were below 3.0 mg/L and an additional 22 stations fell below 4.8 mg/L. The lowest concentration measured during the survey was 1.94 mg/L at Station A4 and the highest was 6.52 mg/L measured at Station 21. These are higher DO levels than recorded in the WQAUG23 cruise.

Of the 26 bottom waters measurements recorded in August at Station A4 between 1998 and 2023, the median concentration was 1.80 mg/L with a range of 0.16 to 5.16 mg/L. The mean was 2.06 mg/L.

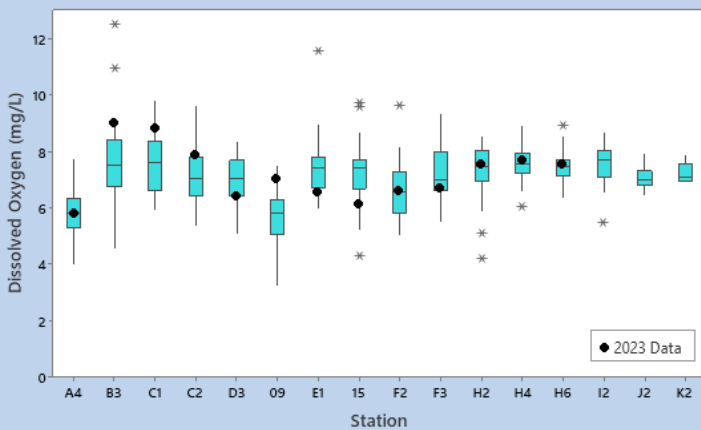
Leading up to the HYAUG23 survey, A4 had concentrations of 1.70 mg/L in August and 1.85 mg/L in HYJUL23.

During the HYAUG23 survey there were 39.4 km² (15.21 mi²) of bottom water with DO less than 2.0 mg/L, 314.7 km² (121.51 mi²) with DO between 2.0 and 3.0 mg/L, and 1249.1 km² (482.28 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 in Long Island Sound
HYAUG Cruises 1998-2023



Bottom Dissolved Oxygen Concentrations in Long Island Sound
HYAUG Cruises 1998-2023

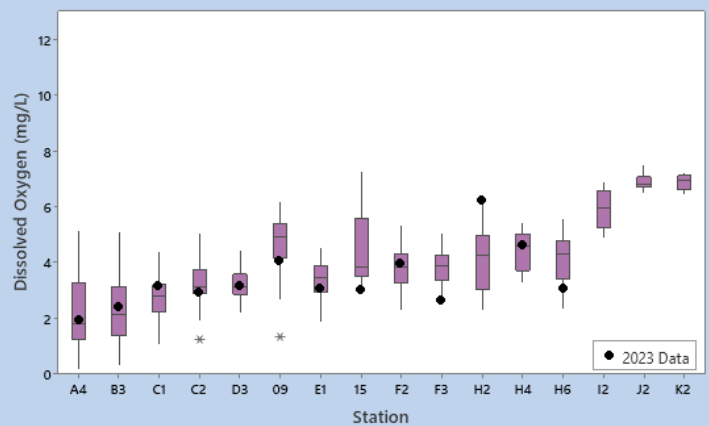
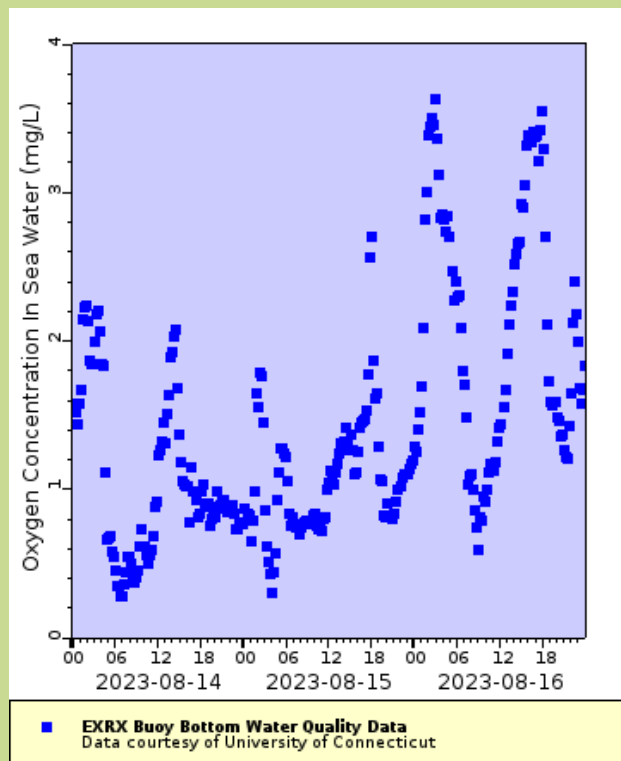
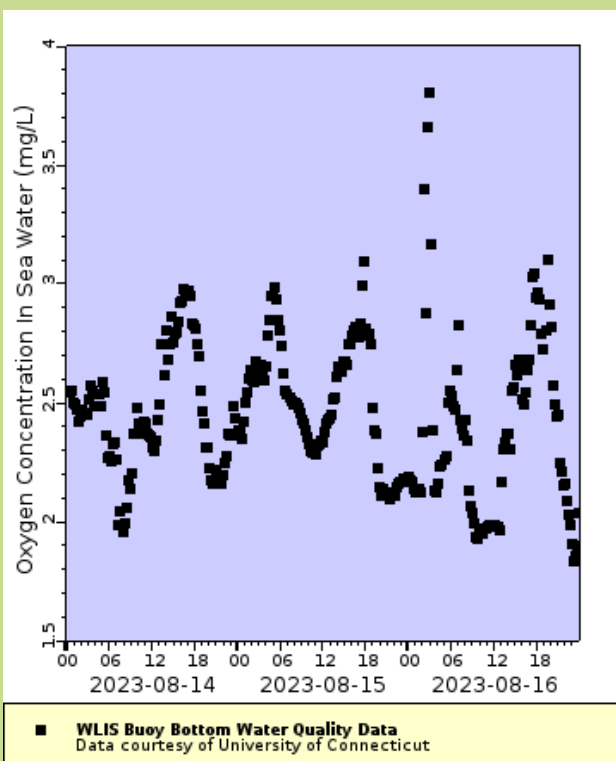


Table 1. Minimum Dissolved Oxygen Concentrations and Areal estimates for HYAUG Cruises Conducted from 1998-2023 by CT DEEP.

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)
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
HYAUG22	2.47	14	401.9	48.6
HYAUG23	1.94	A4	1249.1	314.7



Temperature Data Summary



Surface water temperatures rose an average of 0.04°C, while bottom water temperatures saw a 1.08°C increase of average bottom temperatures from WQAUG23 to HYAUG23.

The maximum surface water temperature during the HYAUG23 survey occurred at Station 04 (23.96°C) while the maximum bottom water temperature occurred at Station H2 (22.86°C).

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

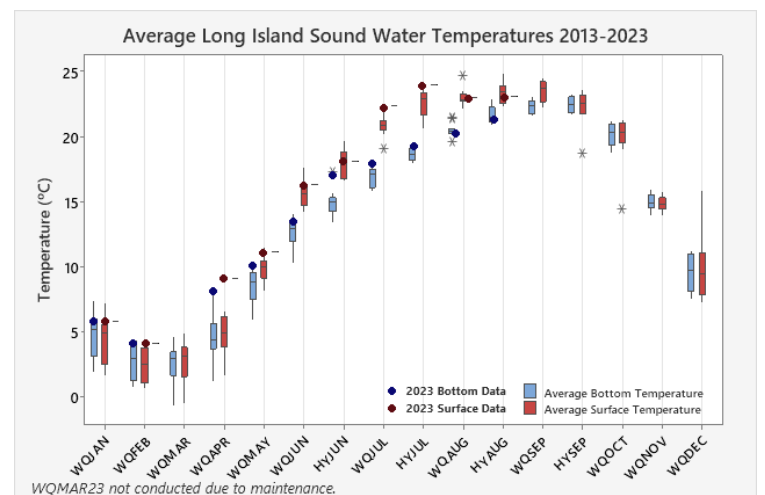
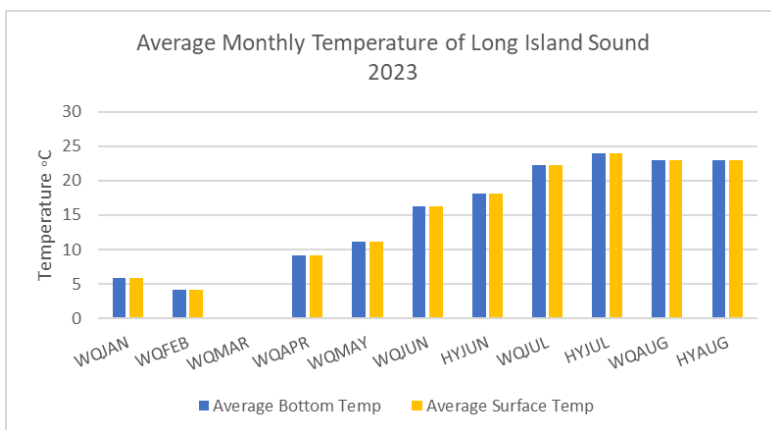
Delta T (ΔT)

The greatest temperature difference between the surface and bottom waters during the HYAUG23 survey was 3.31°C, measured at Station H6. The smallest temperature difference was 0.57°C at both Station F2 and H2.

ΔT 's averaged 1.83°C during the HYAUG23 survey compared to HYAUG22 ΔT 's average of 0.94°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

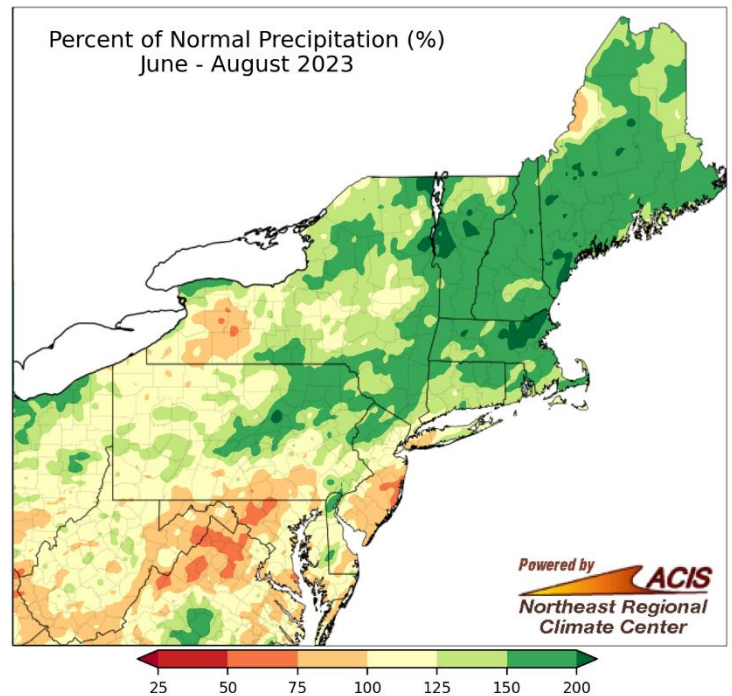


This August has brought an unusual amount of severe weather. The Northeast has had double the typical summer tornado count. New York had seven tornadoes, but typically averages one in August. Connecticut also had two tornadoes this month compared to a normal zero. Twenty-three major climate sites were cooler than normal. Two major climate sites had August among the 20 warmest on record. August precipitation ranged from 25% of normal to more than 200% of normal.

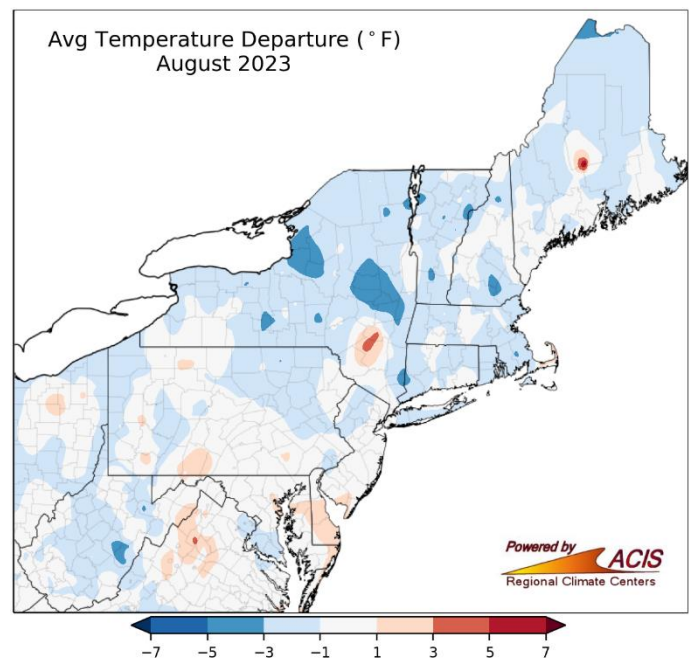
Hartford, CT had a -1.0°F departure from normal temperature of 71.5°F . The average temperature for the month of August was 69.0°F . Hartford also experienced a drop to 92% of normal precipitation at 3.88 inches versus a typical 4.21 inches of rainfall in August.

Bridgeport, CT had a cooler than normal August averaging 73.1°F with a -1.4°F departure from a normal temperature of 74.5°F . Precipitation was 98% of normal at 3.92 inches compared to a normal 3.98 inches.

Islip, NY also had slightly cooler temperatures than normal. There was a -0.4°F departure from a normal temperature of 73.7°F , with the average temperature in Islip, NY this August being 73.3°F . Islip, NY had 120% of normal precipitation at 5.09 inches. Normal precipitation was 4.24 inches. Islip, NY ranked 15th wettest out of the top 20 sites in the Northeast.



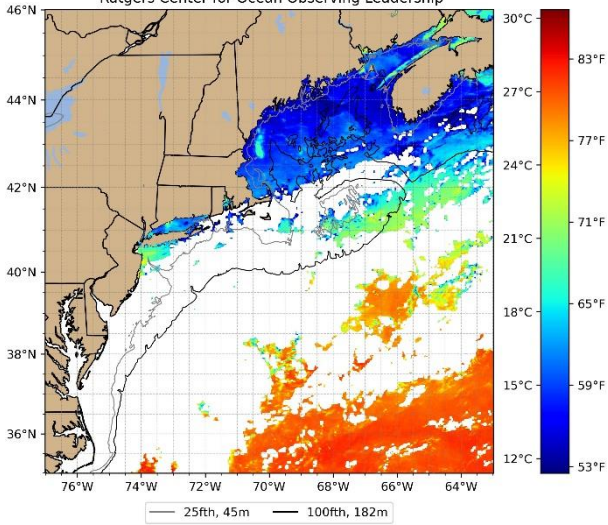
This August ranked among the 20 driest on record at two major climate sites but among the 20 wettest for 13 major climate sites.



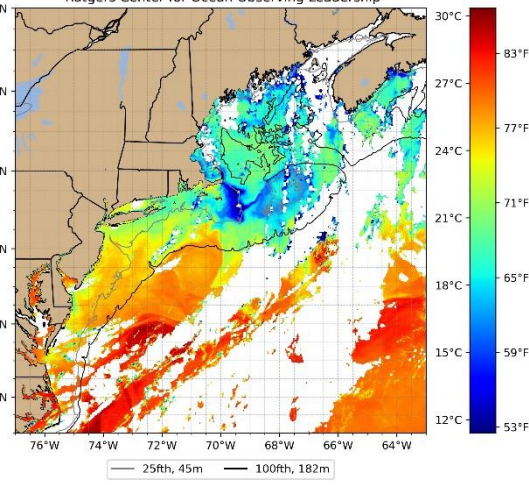
All data and images were from the Northeast Regional Climate Center's website. Please visit <http://www.nrcc.cornell.edu/> for more information.

Sea Surface Temperature

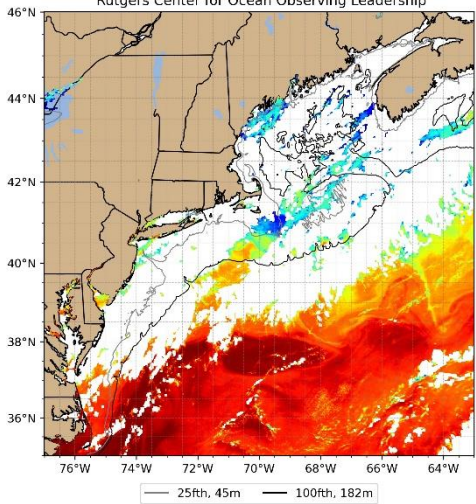
NOAA-19 Sea Surface Temperature: August 17 2023 1254 GMT
Rutgers Center for Ocean Observing Leadership



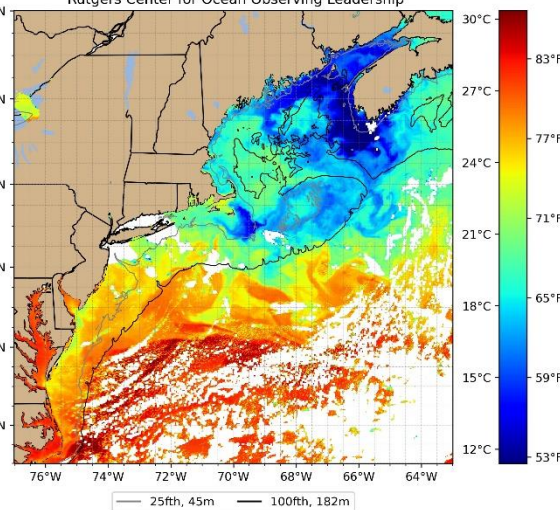
NOAA-18 Sea Surface Temperature: August 19 2023 0212 GMT
Rutgers Center for Ocean Observing Leadership



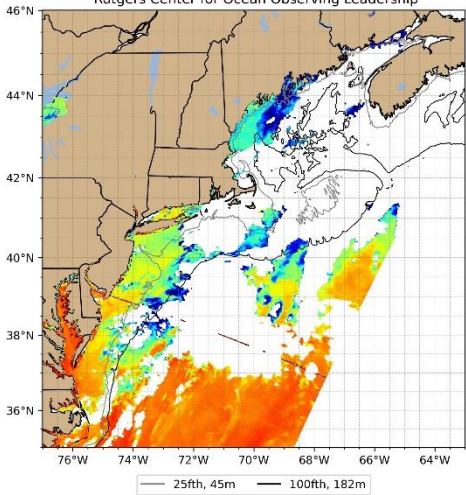
NOAA-18 Sea Surface Temperature: August 21 2023 1553 GMT
Rutgers Center for Ocean Observing Leadership



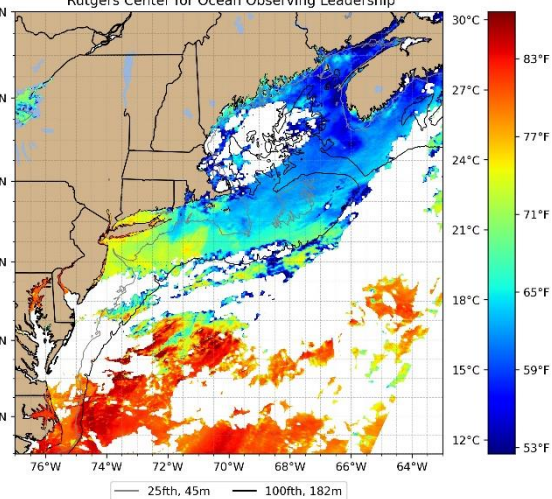
NOAA-19 Sea Surface Temperature: August 23 2023 1322 GMT
Rutgers Center for Ocean Observing Leadership



NOAA-18 Sea Surface Temperature: August 26 2023 1633 GMT
Rutgers Center for Ocean Observing Leadership



NOAA-18 Sea Surface Temperature: August 27 2023 1620 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 17th, the waters in Long Island Sound are around 15°C-18°C (59°F-64.4°F), with some areas along the western coastline around 20°C (68°F).

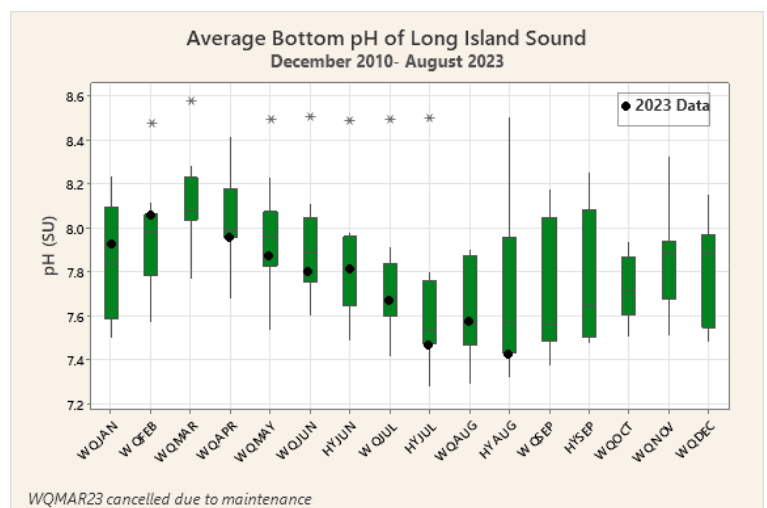
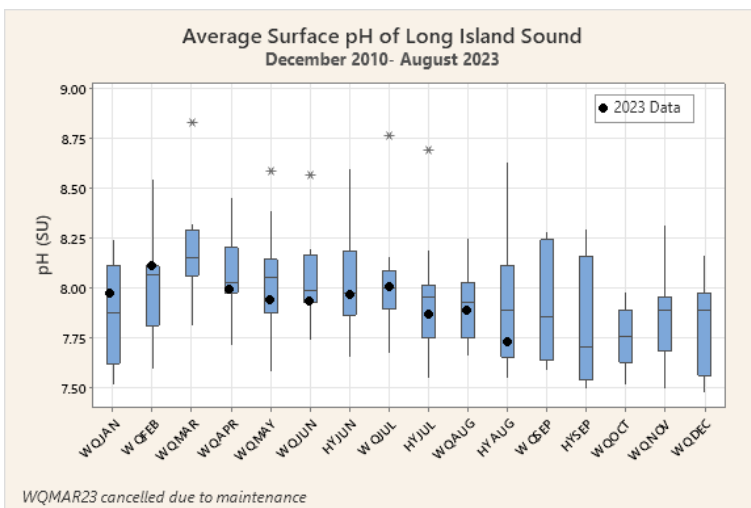
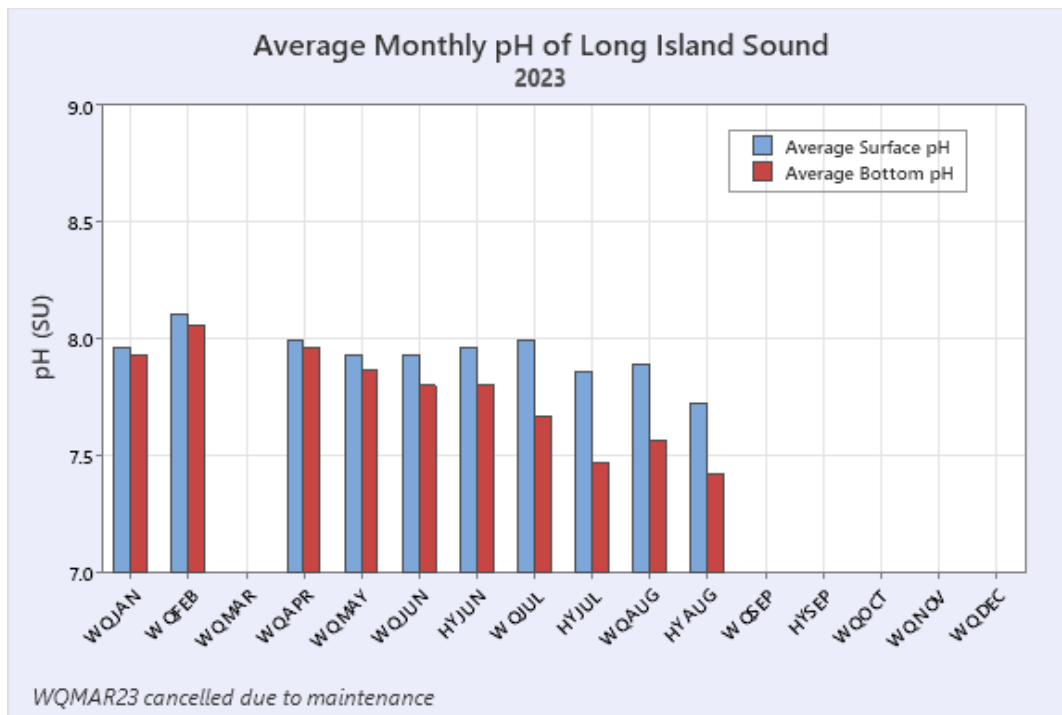
The five other images (left) show a warm system in the south rising upwards to warm LIS. By August 27th, temperatures in the Sound increased to between 22-24°C (71.6-75.2°F).

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 HYAUG23 survey were 7.73 and 7.42 SU, respectively. The lowest bottom pH was 7.22 (Station A4), the highest bottom pH was 7.73 (Station H2), the lowest surface pH was 7.46 (Station 16), and the highest surface pH was 7.9 (Station H4).

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

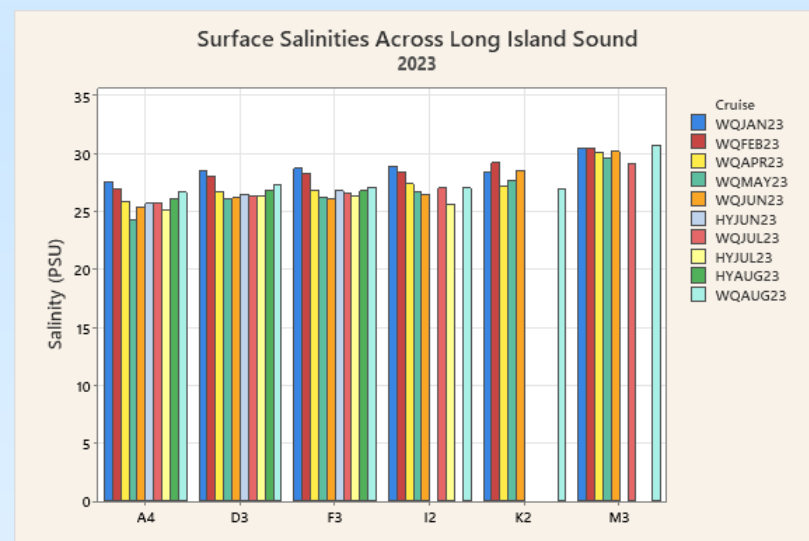
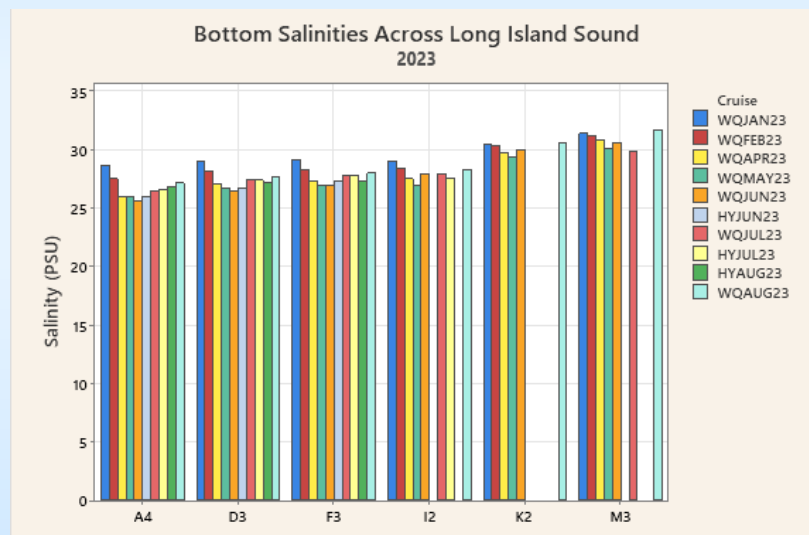


Salinity

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 salinity values during the HYAUG23 survey were slightly below the 2009-2023 average for Stations A4 and D3. Bottom salinity values were very close to but slightly above 2009-2023 averages for Stations A4 and D3. (See table below).

	A4	D3
2023 Surface	26.1	26.87
2009-2023 Average Surface	26.40	27.05
2023 Bottom	27.17	27.75
2009-2023 Average Bottom	27.03	27.76



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)
 HYAUG23 sampled three of the six stations represented (A4, D3, F3)

Spotlight: Get to Know LIS Sharks!

Sandbar Shark

Aka Brown Shark

- Maximum Size: about 8 feet long
- Feeds on menhaden, croaker, snapper, crustaceans, smaller sharks, rays and sometimes octopus
- Protected species in CT
- IUCN Red List: Vulnerable



Sandbar Shark

Sand Tiger Shark

Aka Gray Nurse Shark

- Maximum Size: 7-10 ft long
- Feeds on variety of small fish, rays, crustaceans and smaller sharks from the ocean floor
- Protected species in CT
- IUCN Red List: Critically endangered
- 1 observed in Fish and trawl survey 2021; 1 observed in 2016

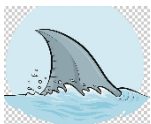


Sand Tiger Shark aboard the Dempsey in 2016

“Misconceptions about sharks can be an impediment to engaging the public in conservation efforts.”
- **David Cochran, Mystic Aquarium**

Sharks are vital to marine biodiversity as apex predators and have a large impact on its natural environment relative to their abundance, making them a *keystone species*. According to the executive director at the Atlantic Shark Institute, Jon Dodd, global shark populations have declined by about 70 percent since 1970 due to harmful sport and trade fishing practices. Sharks differ widely in their temperature tolerances, migratory habits, and food preferences so predicting what will happen to them is challenging, but on the East Coast sharks have been recovering due to improved water quality and fishing industry regulations (CT Insider). More info: [5 shark species that live in the Long Island Sound off Connecticut](#)

FIN FACTS



Two types of dogfish, spiny and smooth, also live within Long Island Sound and only grow to be 2-3 feet long!

Most shark species in LIS are not aggressive and pose very little potential threat to humans.

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

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