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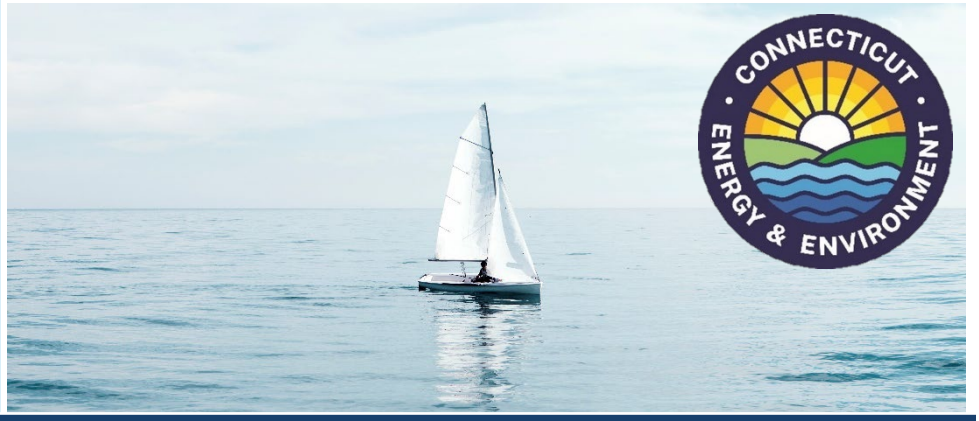


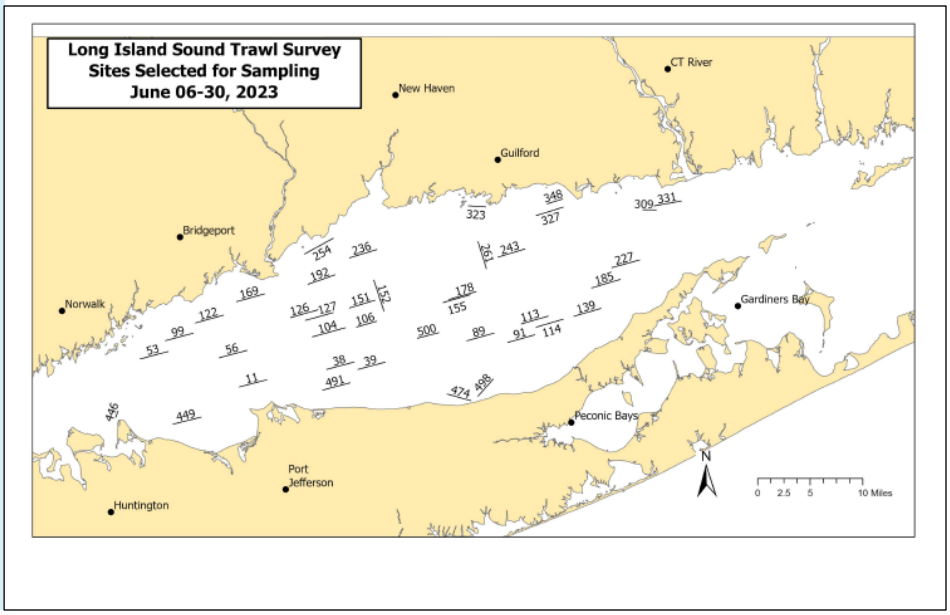
Long Island Sound Water Quality Monitoring Program **July 24, 2023**

June

HYJUN23 Water Quality Summary

Dempsey Update

With the spring trawl surveys finishing up at the end of June, the Dempsey will be available for the WQ and HY surveys until September when fall trawl surveys begin. We are back to full capacity and are welcoming additional researchers on our summer surveys. If you have any questions or want more information on the Dempsey, please contact Matthew Lyman at: matthew.lyman@ct.gov.



2023 Sampling Schedule

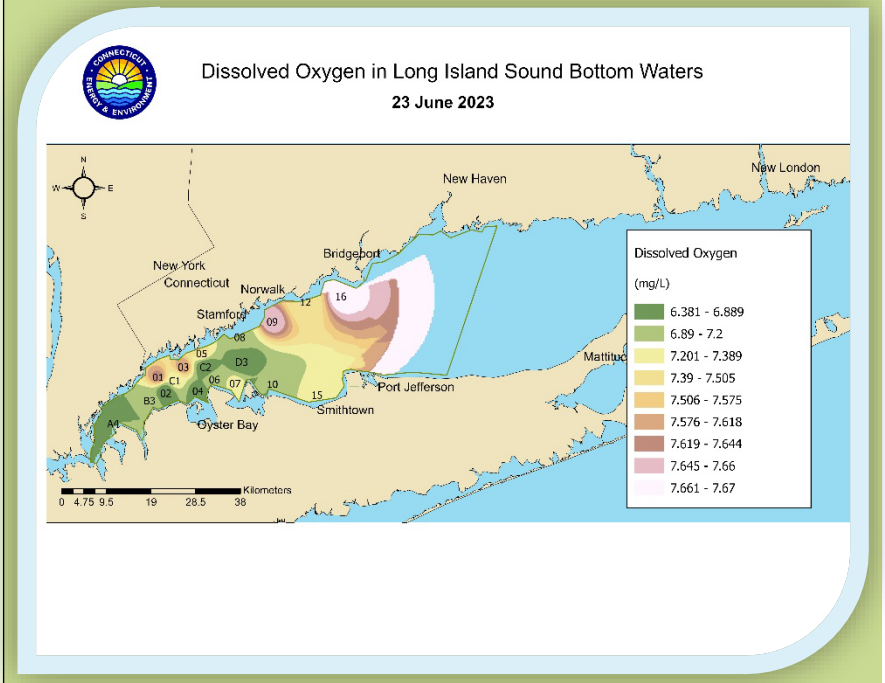
The 2023 Long Island Sound Sampling began on 3 January 2023. All scheduled cruises except for CHFEB23 and WQMAR23 (maintenance issues) were completed as scheduled. The next survey is WQJUL23, scheduled during the week of 3 July. Click the link to learn more about the program and our sampling schedule: Long Island Sound Water Quality and Hypoxia Monitoring Program Overview (ct.gov)

Dissolved Oxygen Summary

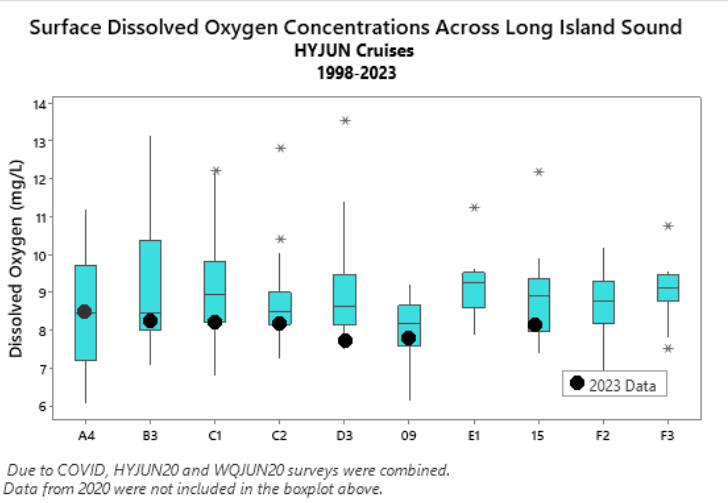
Dissolved oxygen (DO) concentrations in the bottom waters of Long Island Sound remained well above 6 mg/L through the June Hypoxia Survey. The lowest concentration measured during the survey was 6.38 mg/L at Station A4 and the highest was 7.67 mg/L measured at Station 16. These are very similar to WQJUN23 data.

Station A4 is usually one of the first stations to exhibit hypoxia, defined as DO below 3.0 mg/L, and therefore, is the focus of much of our reporting. During the HYJUN23 survey, DO in the bottom water at Station A4 was 6.38 mg/L. Of the 26 bottom waters measurements recorded at Station A4 between 1998 and 2023, the median concentration was 6.40 mg/L with a range of 2.84 to 9.02 mg/L. The mean was 6.366 mg/L.

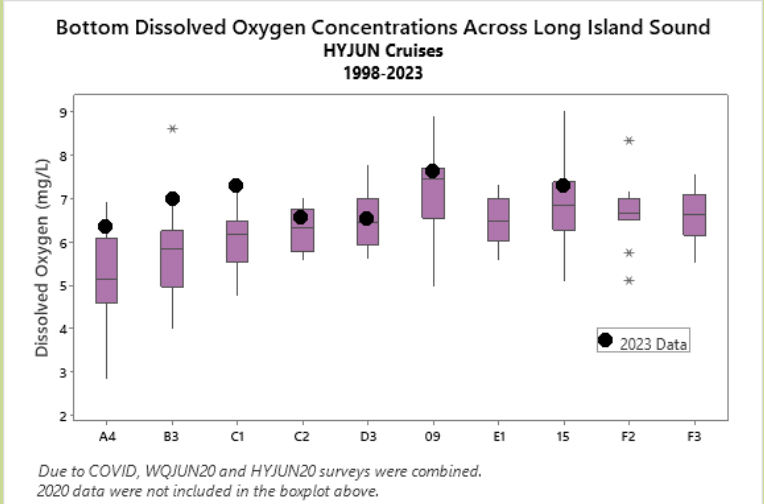
Leading up to the HYJUN23 survey, A4 had concentrations of 8.35 mg/L in May and 6.45 mg/L in June.



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



Due to COVID, HYJUN20 and WQJUN20 surveys were combined. Data from 2020 were not included in the boxplot above.



Due to COVID, WQJUN20 and HYJUN20 surveys were combined. 2020 data were not included in the boxplot above.

Temperature Data Summary

Bottom and surface water temperatures continue to rise with a 1.75˚C increase of average surface temperatures and a 3.84˚C increase of average bottom temperatures from WQJUN23 to HYJUN23.

The maximum surface and bottom water temperature during the HYJUN23 survey occurred at Station 09 with surface water temperature at 18.75˚C and bottom water temperature at 18.51˚C.

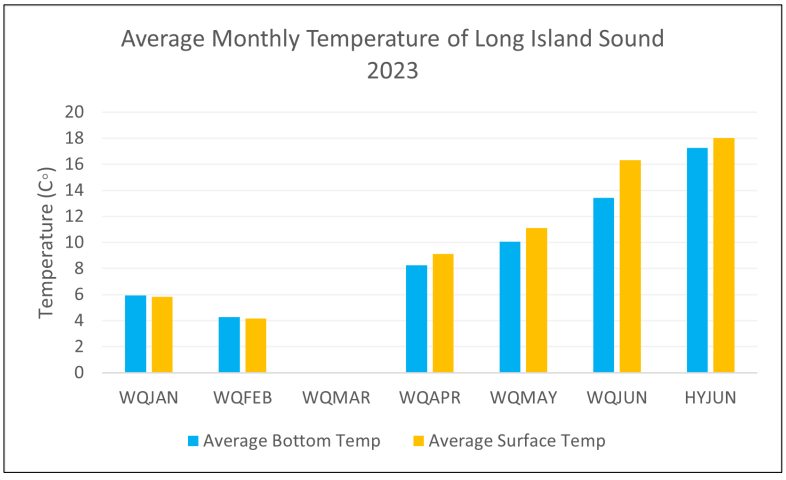
The average surface and bottom water temperature for HYJUN were higher in 2023 than in 2022.

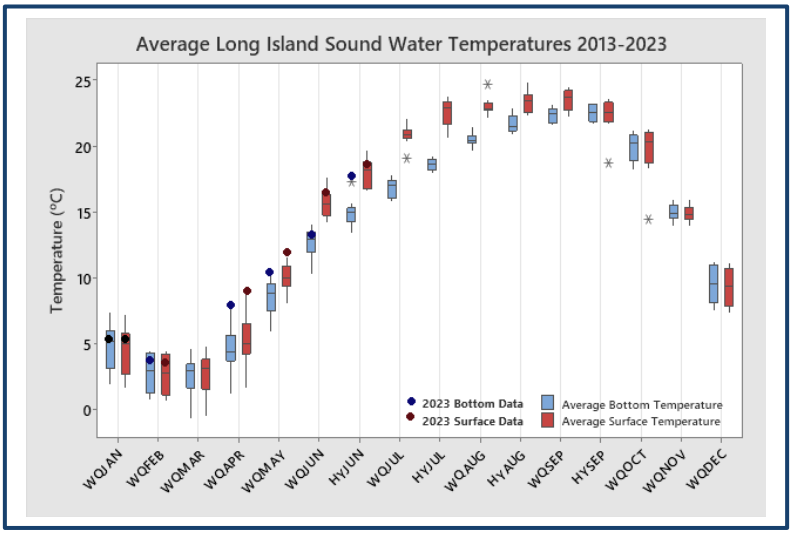
Delta T (ΔT)

The greatest temperature difference between the surface and bottom waters during the HYJUN23 survey was 1.19˚C, measured at Station A4. The smallest temperature difference was 0.22˚C at Station C1.

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

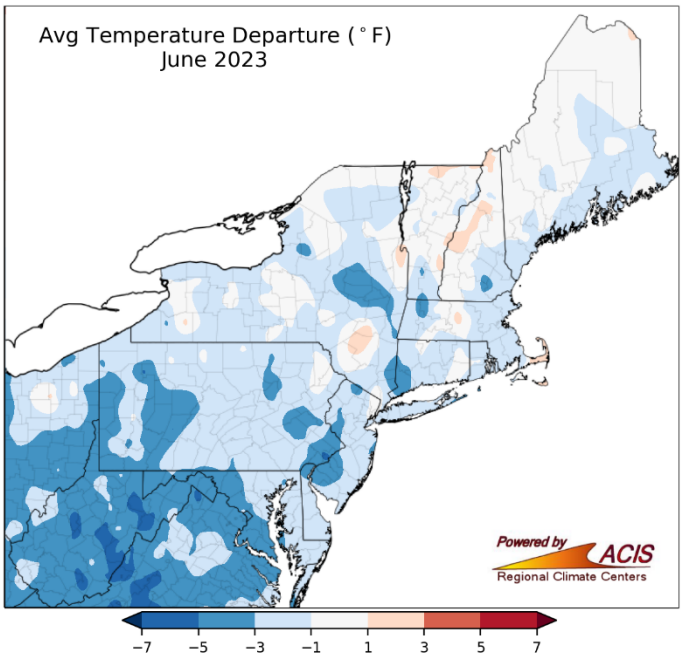
Weather

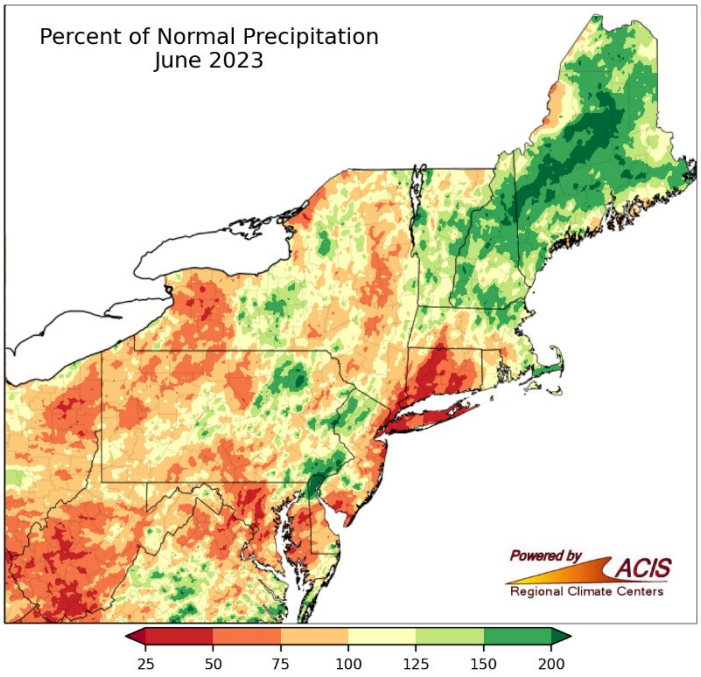
June was consistently cool for much of the Northeast including ten major climate sites that had one of their 20 coolest early June periods. June had average temperatures range from than 4◦F below normal to 0.4◦F below normal. Cooler temperatures were attributed to a stalled low-pressure system funneling winds from the north. This weather system also steered smoke from the Quebec wildfires into the Northeast. Precipitation ranged from 59% of normal to 156% of normal, for an average of 101% of normal and a total of 4.46 inches across the Northeast. The data recorded is from the month of June 2023.

Hartford, CT had a 0.9°F departure from normal temperature of 68.9°F. The average temperature for the month of June was 68.0°F. Hartford also experienced only 30% of normal precipitation at 1.27 inches versus a typical 4.28 inches of rainfall in June. Hartford, CT was ranked 10th among the 20 driest sites in the Northeast.

Bridgeport, CT had a below average temperature of 66.9°F with a 2.7°F departure from a normal temperature of 69.6°F this June. Bridgeport, CT was ranked 14th among the 20 coolest sites in the Northeast. Precipitation was 41% of normal with an average of 1.53 inches compared to a normal 3.77 inches in June.

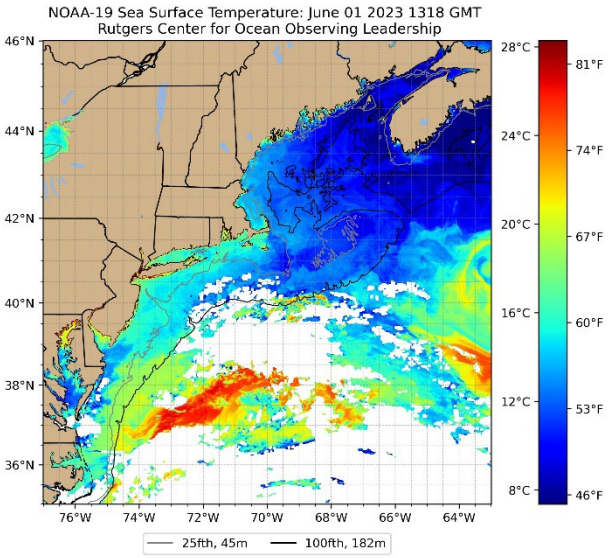
Islip, NY also had below average temperature. There was a 1.5°F departure from a normal temperature of 69.0°F, with the average temperature in Islip, NY this June was 67.5°F. For precipitation Islip, NY had 48% of normal precipitation at 1.90 inches. Normal precipitation was 4.00 inches. Islip, NY ranked 19th driest and 19th coolest out of the top 20 sites for each category in the Northeast.

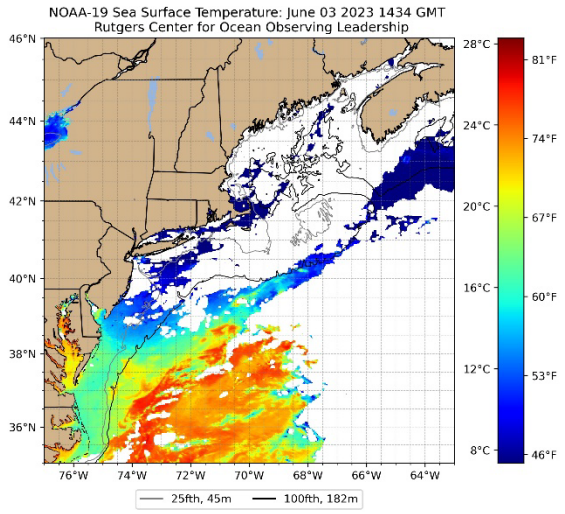


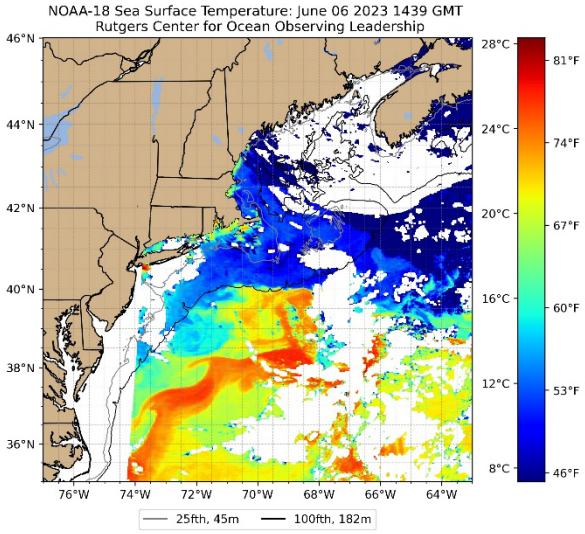


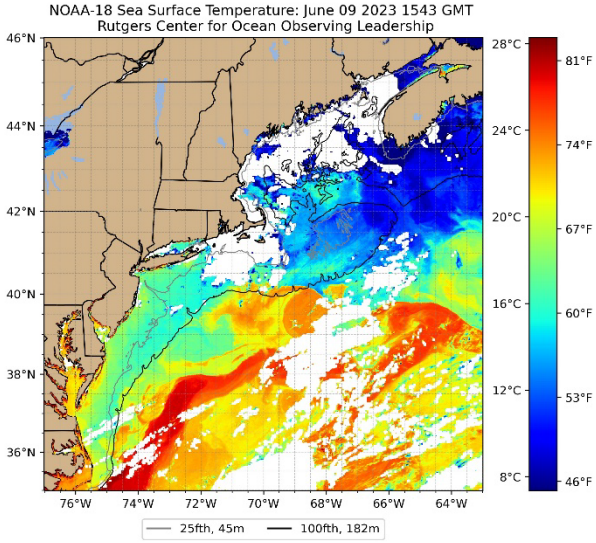
All data and images were from the Northeast Regional Climate Center's website. Please visit http://www.nrcc.cornell.edu/ for more information.

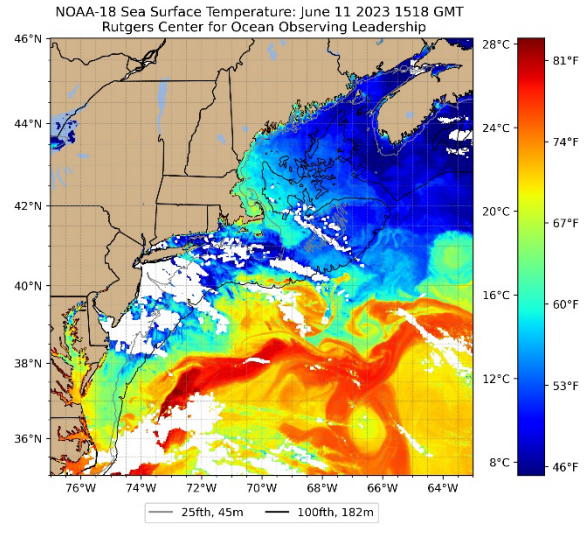
Sea Surface Temperature

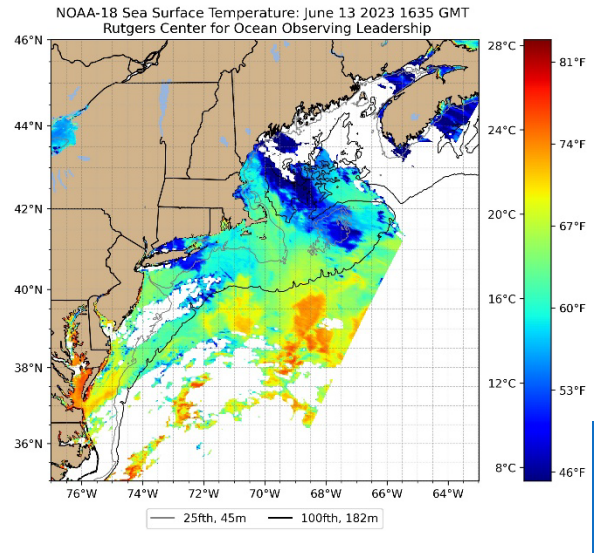












Sea Surface temperature data from Rutgers University IMCU Coastal Ocean Conservation Lab illustrates how currents and fronts impact water temperatures in the Sound and offshore.

In the first image, taken on June 1st, the waters in Long Island Sound are around 16◦C-20◦C (60.8°F-68°F).

The five other images (left) show a stalled cold system in the north as well as warm water from the South Atlantic pushing upward toward LIS. By June 3rd, temperatures in the Sound decreased to between 8-12◦C (46.4-53.6°F).

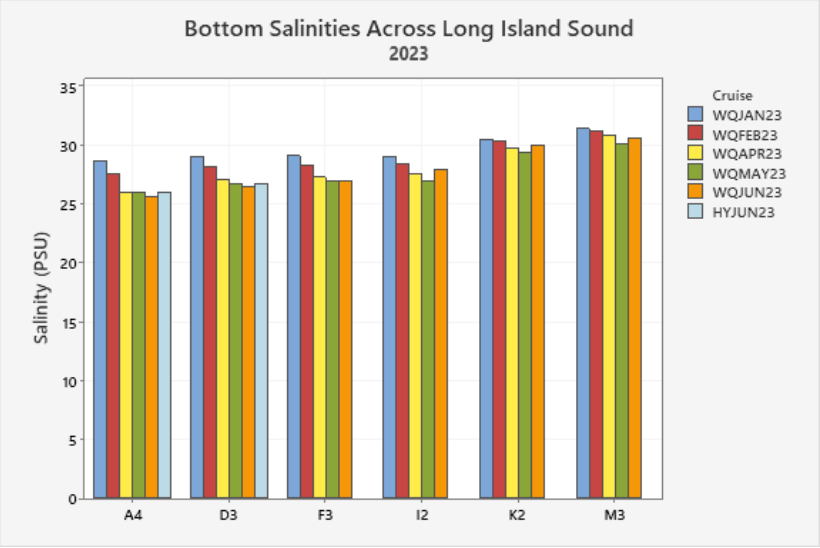
More information about sea surface temperature can be found on the Rutgers University Satellite Imagery website [Sea Surface Temperature - IMCS Coastal Ocean Observation Lab (rutgers.edu)]

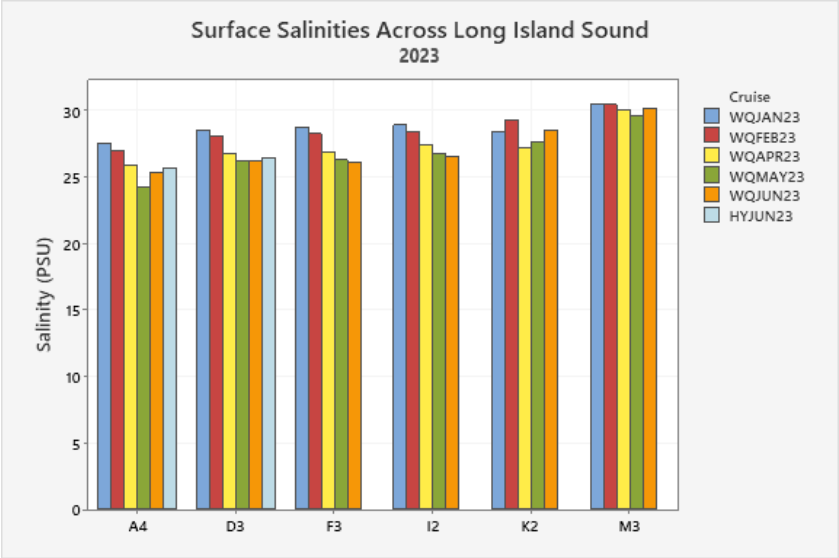
Salinity

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 the 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 HYJUN23 survey were above the 2009-2023 average for Station A4 and below average for bottom salinity at Station D3. (See table below).

	A4	D3
2023 Surface	25.71	26.48
2009-2023 Average Surface	25.12	25.92
2023 Bottom	25.98	26.69
2009-2023 Average Bottom	25.83	26.84





Note: WQMAR23 survey could not be completed due to maintenance
HYJUN23 only sampled two of the six stations represented (A4 & D3)

Spotlight:

Watershed Models!

This month we are highlighting progress on modeling tools for nonpoint source pollution and Best management practices (BMPs) in LIS watersheds. BMPs are ways to treat, prevent, or reduce surface and groundwater pollution. BMPs can be structural runoff diversions, vegetative buffers (i.e. rain gardens), or managerial practices such as setting Total Maximum Daily Loads (TMDLs).

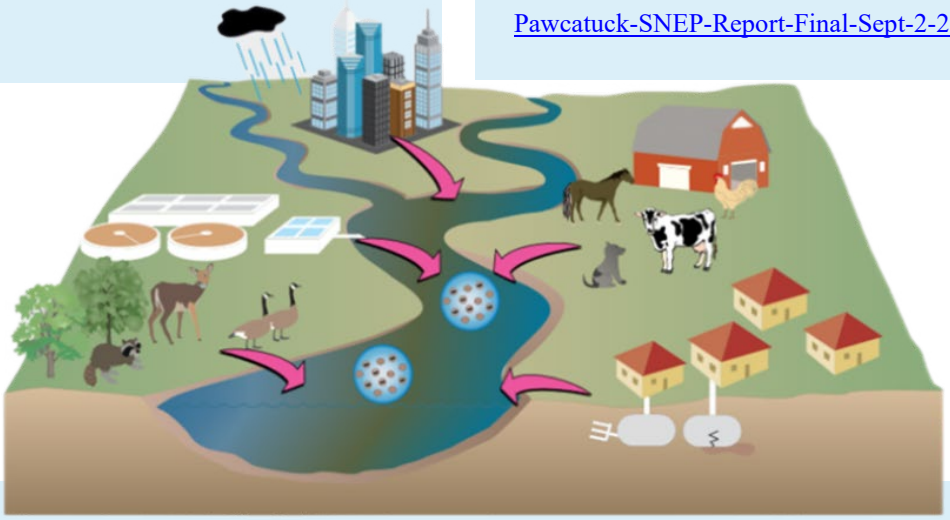
NEIWPCC and LISS partners are requesting proposals for the continued development of BATT, a BMP-specific accounting and tracking tool for nutrient load reduction. The extensive inventory of BMPs in BATT would offer consistency and efficiency in crediting low-impact development. This incentivizes developers to mitigate their impact on water quality and allows environmental analysts to track changes in land use.

Also, on the horizon in Connecticut, DEEP is finalizing the calibration on the Hydrologic Simulation Program – Fortran (HSPF). The HSPF is a comprehensive watershed model supported by the EPA and USGS that includes inputs specific to Connecticut's soil chemistry, present and future climate, land use, BMPs, and existing water quality data.

The HSPF helps offer a detailed, large-scale picture of the optimal mitigation or conservation scenario for a particular water body and will be used to link results between other water quality models. The calibration is set to be completed by the end of September 2023 and in its first round of outreach will be October 2023-September 2025.

More Info: Funding Available for Development of Nonpoint Source Tracking Tool in the Long Island Sound • NEIWPCC

Pawcatuck-SNEP-Report-Final-Sept-2-2022.pdf (ct.gov)



The R-BEROST is another model coming up in development for the full Connecticut River watershed. The River Basin Export Reduction Optimization Support Tool (R-BEROST) is set to meet nutrient loading targets for the lowest financial cost. CT DEEP staff are hopeful that the R-BEROST will account for nitrogen deposition put on roads by vehicles that is not captured by the HSPF.

For more information on the Long Island Sound Water Quality Monitoring Program please visit:
https://portal.ct.gov/DEEP-LISWater
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