

Long Island Sound Water Quality Monitoring Program

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

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HYJUN21 Water Quality Summary

Dissolved Oxygen Concentrations above 5 mg/L

The Connecticut Department of Energy and Environmental Protection conducted our HYJUN21 survey on June 21 and 22, 2021 aboard the R/V Patricia Lynn. Dissolved oxygen concentrations in the bottom waters of Long Island Sound remained above 5 mg/L through the survey. In fact, bottom water concentrations measured during this HYJUN21 survey were generally greater than typical observed concentrations.

The lowest concentration measured during the survey was 5.33 mg/L at Station A4, a 1.11 mg/L decrease from WQJUN21. Of the 15 measurements recorded at Station A4 between 1998 and 2021, the median concentration was 4.95 mg/L with a range of 2.84 mg/L (2004) to 6.94 mg/L (2019). Leading up to the HYJUN21 survey, A4 had concentrations of 9 mg/L in May and 6.44 mg/L in early June.

Preliminary data from this survey and prior 2021 cruises are available in Excel spreadsheet format. CT DEEP data from 1991-present are also available in the UCONN CTDEEP Cruise Data Viewer App:

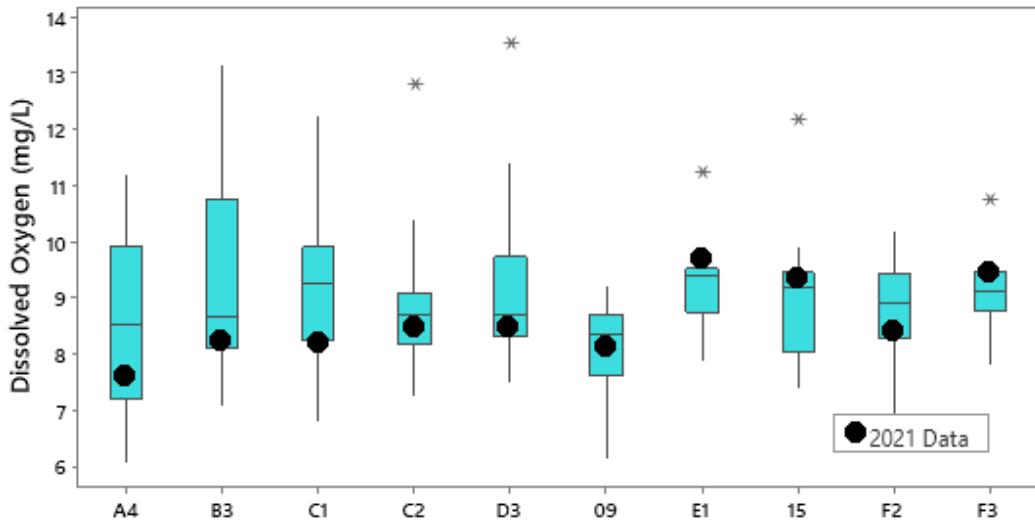
<http://merlin.dms.uconn.edu:9988/webapps/home/> or the UCONN ERDDAP website http://merlin.dms.uconn.edu:8080/erddap/tabledap/DEEP_WQ.html

Contents

Dissolved Oxygen	1
Weather	3
Temperature	4
Delta T (ΔT)	5
Salinity	6
Spotlight-DA/BA HAB Program	7
Sampling Schedule	8

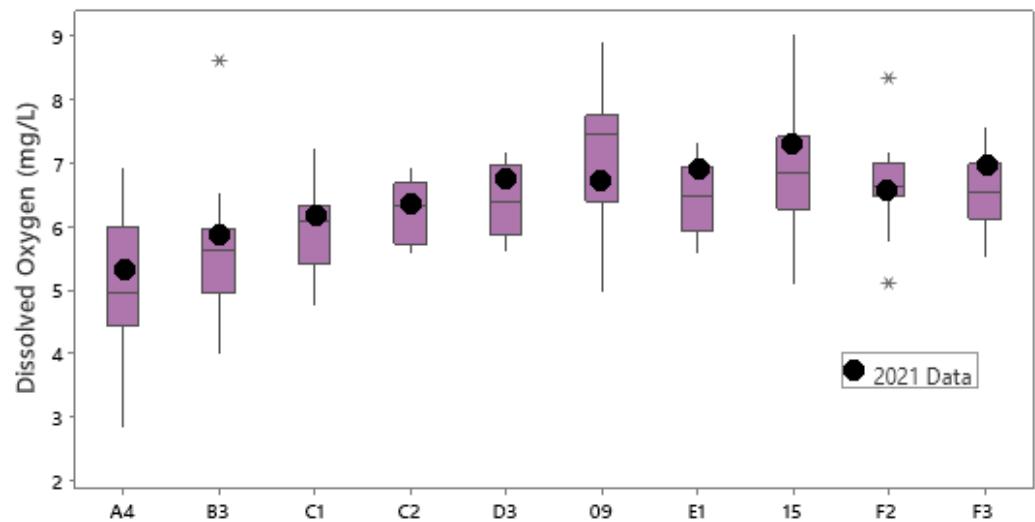
Dissolved Oxygen

Surface Dissolved Oxygen Concentrations Across Long Island Sound
HYJUN Cruises
1998-2021



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

Bottom Dissolved Oxygen Concentrations Across Long Island Sound
HYJUN Cruises
1998-2021



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

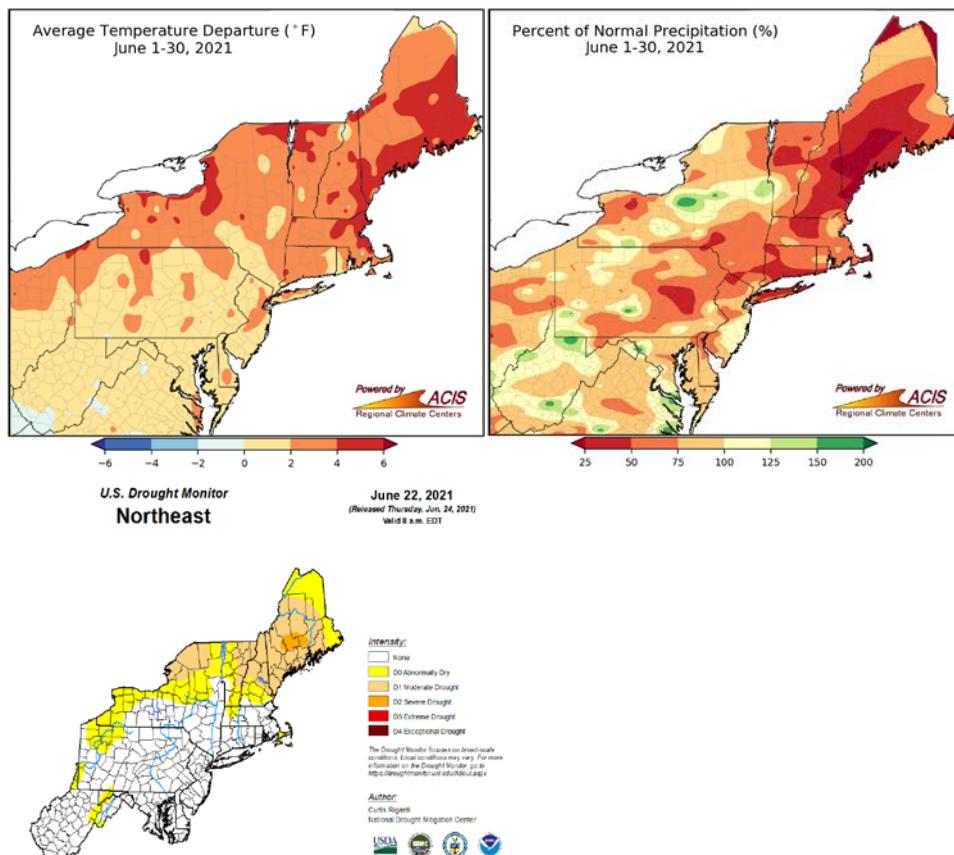
Weather

June 2021 temperatures were above normal, with all the regional climate locations around LIS reporting June 2021 was among the top 10 on record. Bridgeport, Islip and New York City locations were about 2 degrees above average while Hartford was 3.3 °F above normal. Precipitation in June was below normal across the LIS region. June 2021 ranked among the 20th driest on record for Islip, Bridgeport, and JFK with all receiving only about 40% of the normal precipitation for the month. Hartford was also dry, receiving only about 64% of its normal precipitation.

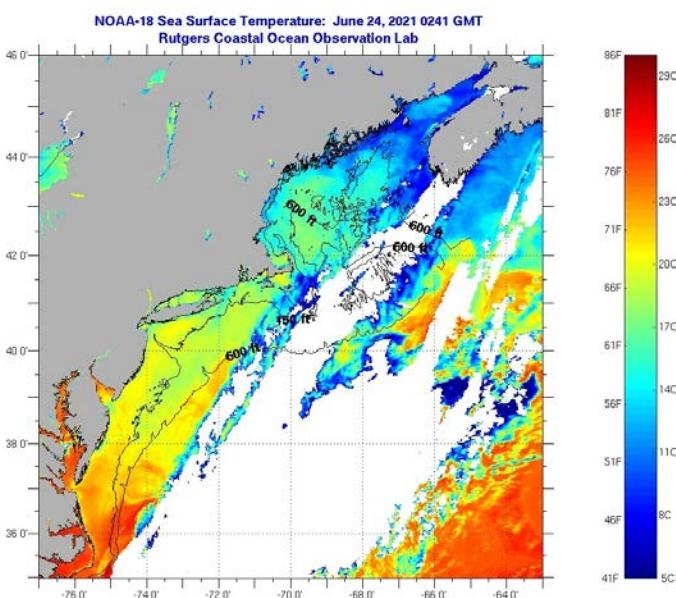
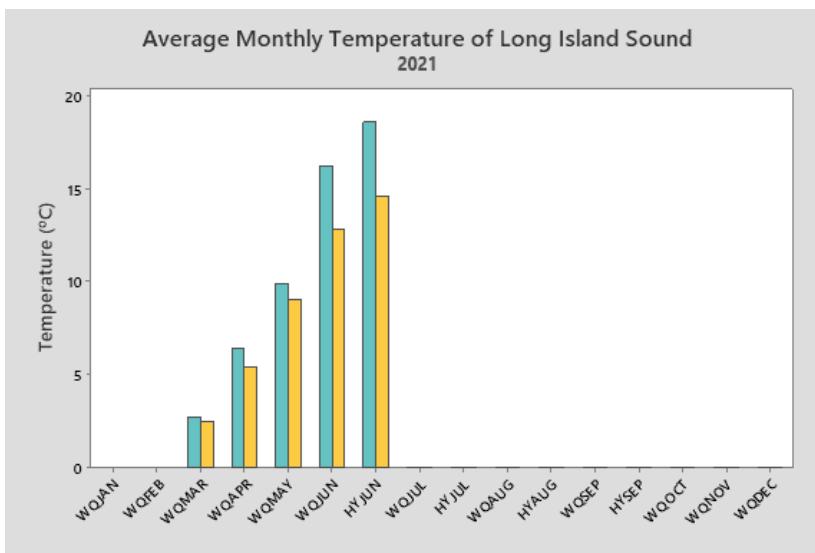
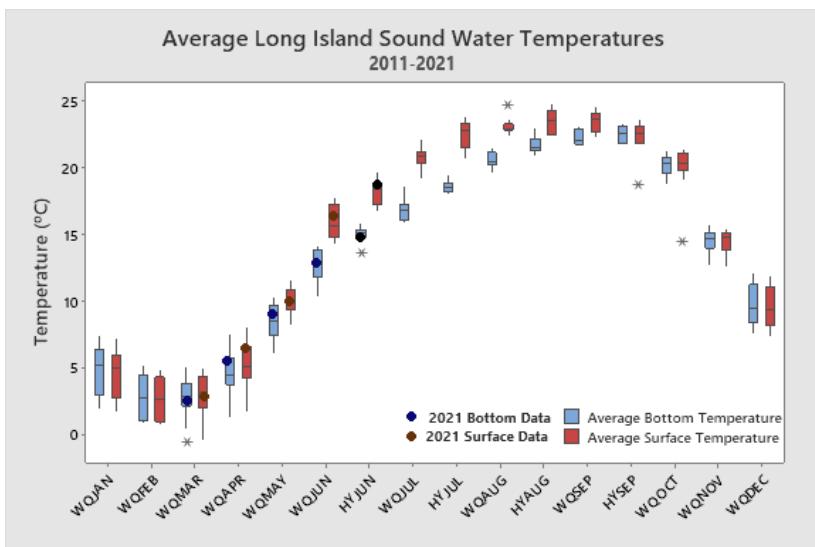
Weather during the survey was cloudy with rain occurring on 6/22. Seas were generally calm.

The Standardized Precipitation Index (30 day SPI) graphic below depicts precipitation patterns throughout the Northeast region based on a 30 day model of variable sources of moisture (i.e., Precipitation, groundwater, and soil moisture). A negative index indicates dry conditions and a positive index indicates wet conditions; the LIS Watershed was slightly wetter than normal.

Climate information can be viewed on the Northeast Regional Climate Center's website
<http://www.nrcc.cornell.edu/>.



Temperature

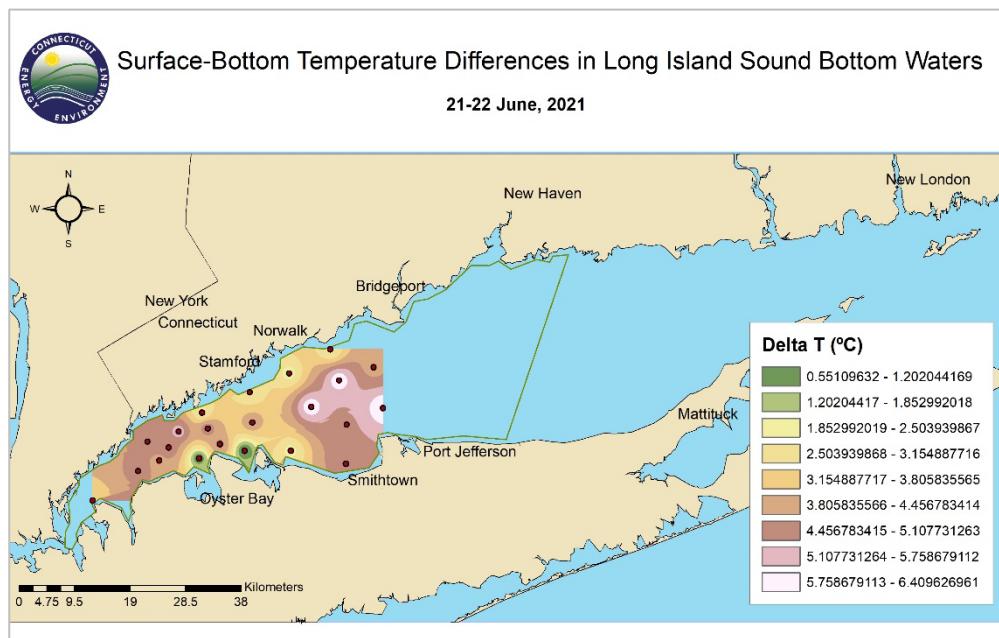


Bottom and surface water temperatures rose from WQJUN21 to HYJUN21 (with a $^{\circ}6.3\text{C}$ jump for surface waters and a $^{\circ}3.8\text{C}$ jump for bottom waters), and warming of both surface and bottom waters continued from the WQJUN21 to the HYJUN21 survey (with a $^{\circ}2.3\text{C}$ jump for surface waters and a $^{\circ}1.79\text{C}$ jump for bottom waters).

Average monthly temperatures in the surface waters during the HYJUN surveys for the ten-year period from 2011 - 2021 ranged from $16.68\text{--}19.64^{\circ}\text{C}$ with a median temperature of 18.395°C . In the bottom waters temperatures ranged from $13.59\text{--}15.8^{\circ}\text{C}$ with a median temperature of 15.05°C . The average temperature of LIS bottom waters in 2021 was 14.62°C while the surface water was 18.61°C .

The maximum bottom water temperature occurred at Station 04 (18.81°C) and the maximum surface water temperature occurred at Station F3 (20.14°C) during the HYJUN21 survey.

Be sure to check out the monthly webinar series from the Northeast Regional Climate Center: <https://www.nrcc.cornell.edu/workshops/webinars/2021/07/index.html>. The June topic was changing ocean circulation with a look at the Atlantic Meridional Overturning Circulation which impacts global and regional climate, sea level, extreme weather events, ecosystems, and fisheries. The July webinar series topic is marine heatwaves.

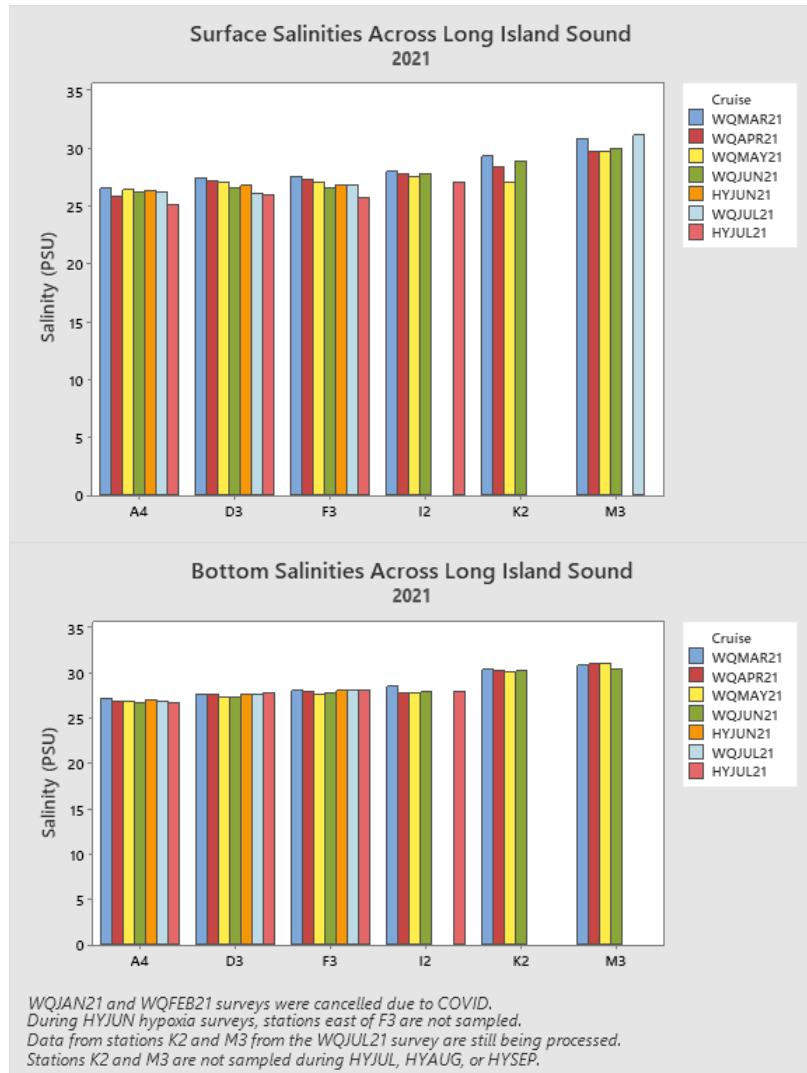


Delta T (ΔT) is the difference between the surface and bottom water temperature. Differences in water temperature contribute to stratification and exacerbate hypoxic conditions. In general the shallower coastal stations tended to have the smallest temperature differences, as they are more susceptible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

The greatest temperature difference between the surface and bottom waters during the HYJUN21 survey was 6.41°C, measured at Station F3. The smallest temperature difference was 0.55°C at Station 07.

For comparison, during the HYJUN18 survey the greatest ΔT was 6.50°C measured at Station E1. In 2018, ΔT 's continued to increase through the WQJUL survey before diminishing in the HYJUL survey. During the HYJUN19 survey the greatest ΔT was 4.47°C measured at Station F2. During the hybrid WQ/HYJUN20 survey the greatest ΔT was 5.86°C measured at Station E1.

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 2021 were fairly constant.

Surface and bottom salinity values during the HYJUN21 survey were above the 2009-2019 average for Stations A4, D3, and F3. (See table below).

	A4	D3	F3
2021 Surface	26.38	26.81	26.86
2009-2021 Average Surface	24.995	25.847	25.837
2021 Bottom	27.06	27.71	28.10
2009-2021 Average Bottom	25.76	26.795	27.028

SPOTLIGHT- CT DA/BA HAB Monitoring Program

The CT Department of Agriculture, Bureau of Aquaculture (DA/BA) has conducted marine biotoxin and harmful algal bloom (HAB) monitoring in CT since 1985 and 1997, respectively. The DA/BA enhanced the program in 2019 to collect semi-quantitative data and survey widespread CT shellfish growing areas at an increased frequency.

The following information comes from the 2020 HAB Report prepared by Emily Van Gulick of CT's DA/BA. A copy of the report is available on the DA/BA HAB website:

<https://portal.ct.gov/DOAG/Aquaculture1/Aquaculture/Harmful-Algal-Blooms>

- Improved documentation has revealed the presence of many HAB taxa in CT, but threats to human health and ecosystem function have been rare and localized.
- Populations of HAB species remain modest and potentially toxic species seldom produce or only produce low concentrations of toxins.
- The presence of HAB taxa with the potential to cause public health and/or ecological harm underscores the necessity for continued monitoring and surveillance. HAB monitoring provides an early warning system to guide management decisions and prevent shellfish recalls and illnesses, and allows widespread surveillance of shellfish growing areas.
- The downstream movement of freshwater cyanobacteria blooms to CT's estuarine environment represent a newly-recognized concern for shellfish safety in some nearshore locations, and is an emerging issue in many national and international coastal areas.
- In 2020, routine monitoring from March – October resulted in the collection of 226 samples. *Alexandrium catenella*, *Pseudo-nitzschia* spp., *Dinophysis* spp., *Prorocentrum* spp., and *Margalefidinium polykrikoides* were documented.
- Mumford Cove in Groton was closed due to PSP saxitoxin beginning in April and lasting through early/mid- May; the earliest closure ever for a CT shellfish area. *A. catenella* cells were present at 370 cells/L and saxitoxin concentrations in blue mussels were recorded at 128.5 µg STX/100g. The FDA closure threshold is 80 ug STX/100g.



DA/BA Fisheries Biologist and HAB Specialist
Emily Van Gulick examines a recently collected
sample under the microscope

The next survey is scheduled for 7/6-7/8 (WQJUL21) aboard the R/V John Dempsey. The schedule for the remainder of 2021 is also available on our website <https://portal.ct.gov/DEEP-LIS>.



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