

Long Island Sound
Water Quality Monitoring
Program

www.ct.gov/deep/lis

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HYJUN19 Water Quality Summary

Dissolved Oxygen Concentrations above 6.0 mg/L

The Connecticut Department of Energy and Environmental Protection conducted our HYJUN19 survey June 12, 2019 aboard the R/V Patricia Lynn. Dissolved oxygen concentrations in the bottom waters of Long Island Sound remained above 6.0 mg/L through the survey. In fact, bottom water concentrations measured during this HYJUN19 survey were generally greater than typical observed concentrations.

The lowest concentration measured during the survey was 6.29 mg/L at Station B3, a 0.57 mg/L decrease from WQJUN19. The dissolved oxygen concentration at Station A4 was 6.94 mg/L. Of the 21 measurements recorded at Station A4 between 1998 and 2019, the median concentration was 4.95 mg/L with a range of 2.98 mg/L (2004) to 6.94 mg/L (2019). Leading up to the HYJUN19 survey, A4 had concentrations of 9.78 mg/L in May and 7.08 mg/L in early June.

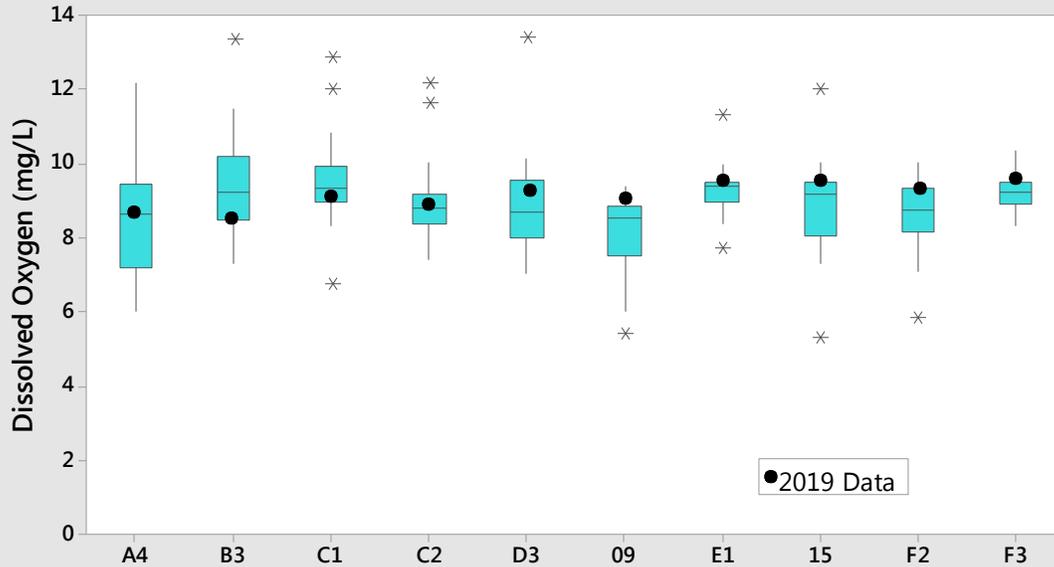
Preliminary data from this survey and prior 2019 cruises are available in [Excel spreadsheet format](#).

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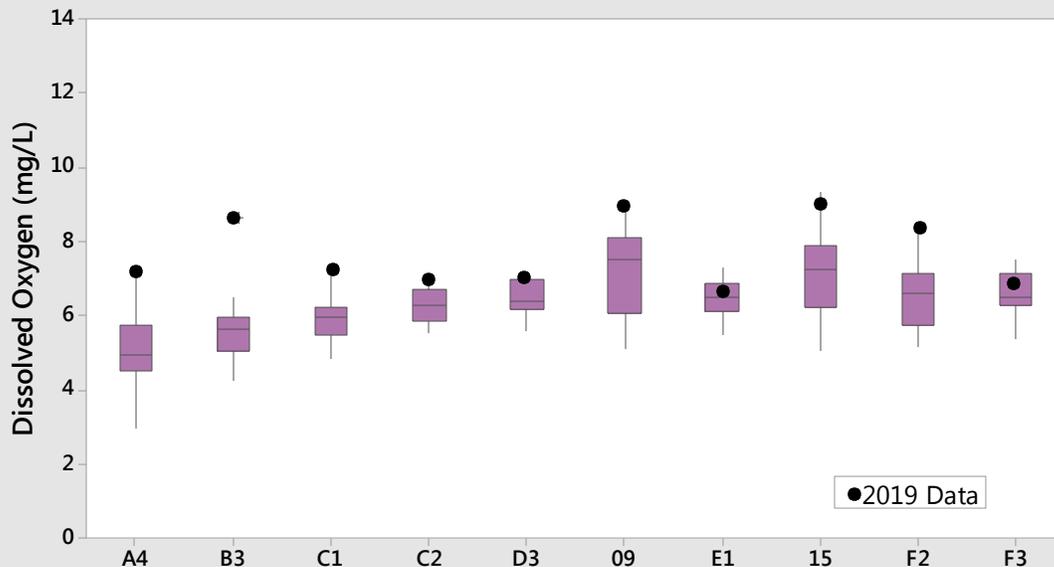
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Dissolved Oxygen

Surface Dissolved Oxygen Concentrations Across Long Island Sound
HYJUN Cruises
1998 - 2019



Bottom Dissolved Oxygen Concentrations Across Long Island Sound
HYJUN Cruises
1998 - 2019

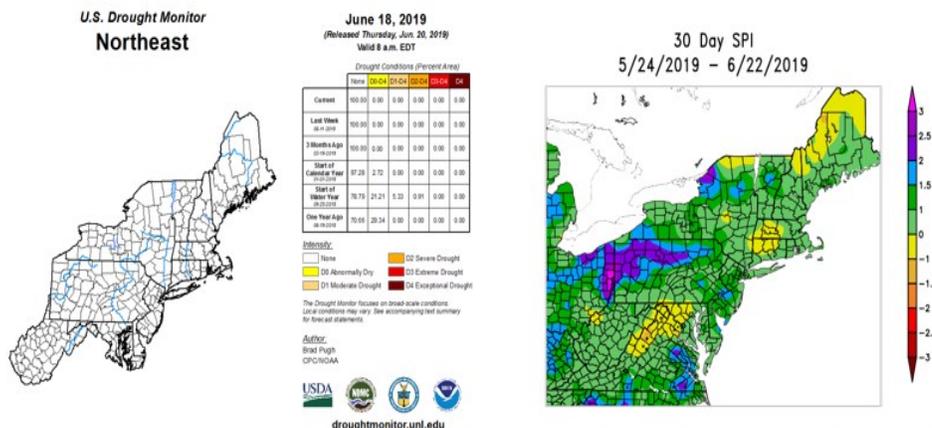
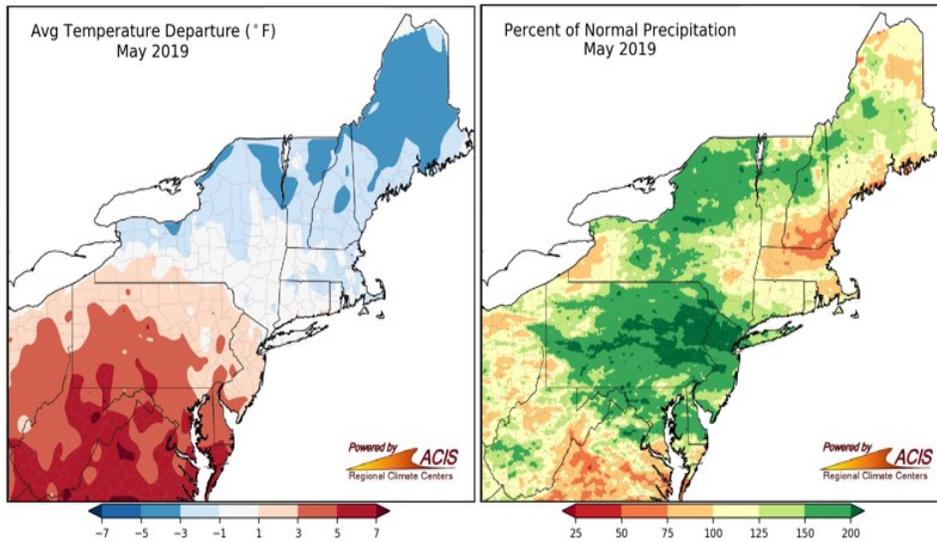


Coming in to June, all of the Northeast states except for Massachusetts received above-normal precipitation. Connecticut ranked as the 38th wettest May since 1895, receiving 111% of its normal precipitation. While temperatures started to get a little warmer, Connecticut came in with an average of 56.4°F which is just slightly below the normal average temperature of 57.0°F (a difference of 0.4°F colder).

Weather during the survey was seasonable. Bridgeport reported a high of 74°F with clear to partly cloudy skies. The average June temperature at Bridgeport was close to normal at 69.4°F, only 0.7 degrees above average. Precipitation was variable across Long Island Sound with a close to average 3.36 inches of rain falling at Bridgeport and 3.76 inches falling at Islip, but close to 5 inches fell at LaGuardia and Central Park, marking the 15th wettest June on record for LaGuardia, while only 2.24 inches fell at Hartford (51% of normal).

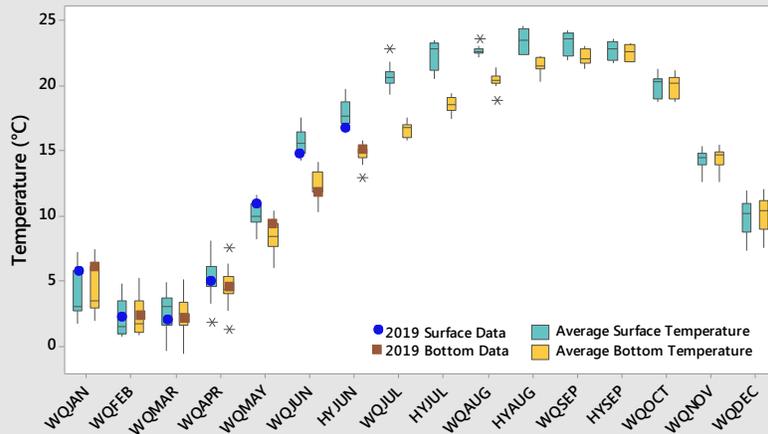
The Standardized Precipitation Index (30 day SPI) graphic below depicts precipitation patterns throughout the Northeast region based on a 30 day model of variable sources of moisture (i.e., Precipitation, groundwater, and soil moisture). A negative index indicates dry conditions and a positive index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

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



Temperature

Average Long Island Sound Water Temperatures
2009 - 2019



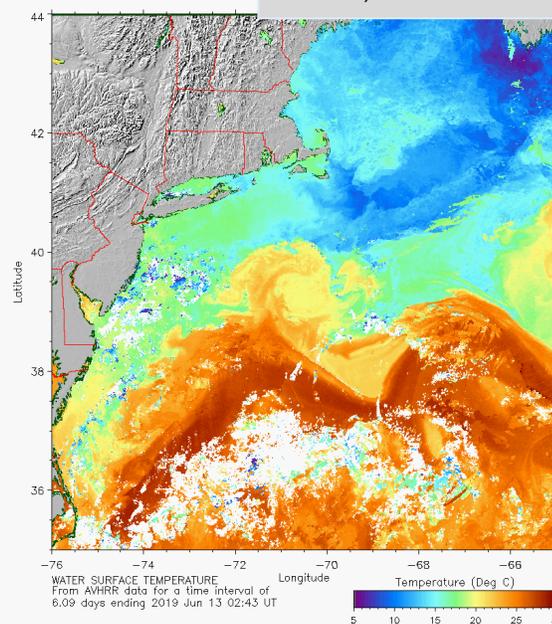
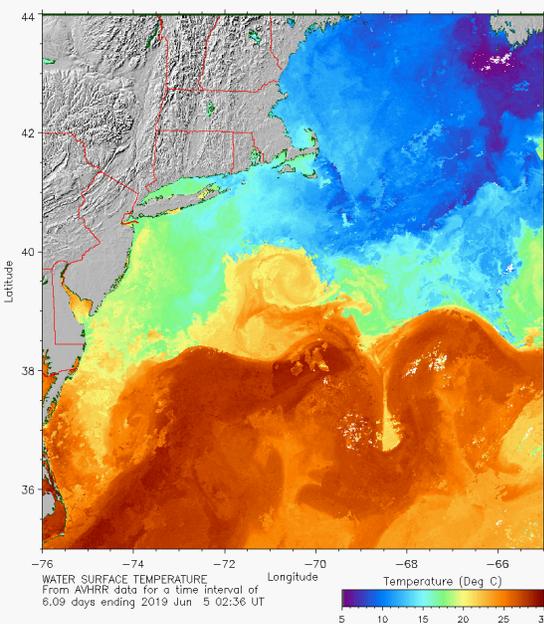
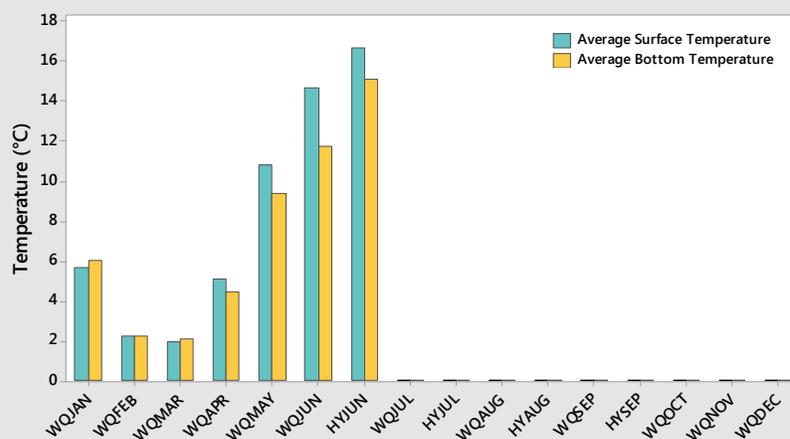
As both bottom and surface water temperatures rose from WQMAY19 to WQJUN19 (with a 3.84°C jump for surface waters and a 2.34°C jump for bottom waters), there was a similar warming of both surface and bottom waters from the WQJUN19 to the HYJUN19 survey (with a 2.03°C jump for surface waters and a 3.33°C jump for bottom waters). The maximum bottom water temperature occurred at Station 16 (16.87°C) and the maximum surface water temperature occurred at Station F2 (17.20°C) during the HYJUN19 survey.

The average monthly surface and bottom water temperatures in LIS are trending to be slightly warmer than in 2018 and appear to be tracking similar to the 2017 water temperatures.

The sea surface temperature satellite images below demonstrate transitional warming which occurred over the course of 12 days from the WQJUN19 survey (left image) to the HYJUN19 survey (right image) as a warmer mass of water advanced northward, pushing the colder water towards the Shelf.

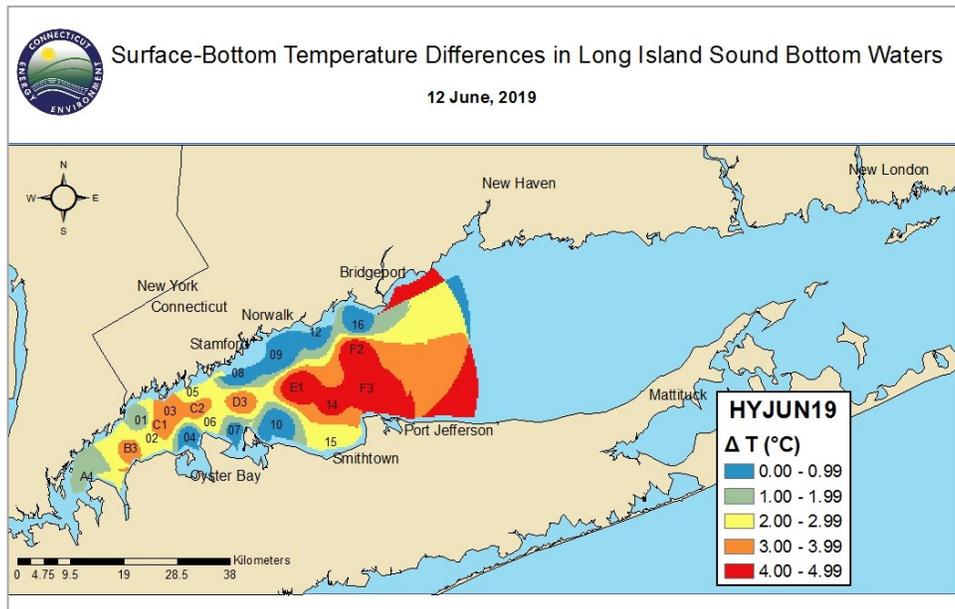
The NOAA National Centers for Environmental Information Global Climate Report for [May 2019](#), states, "the global ocean-only surface temperature was 0.73°C (1.31°F) above the 20th century average, tying with 2015 as the second highest May global ocean surface temperature on record, behind 2016 (+0.80°C / +1.44°F)".

Average Monthly Temperature of Long Island Sound
2019



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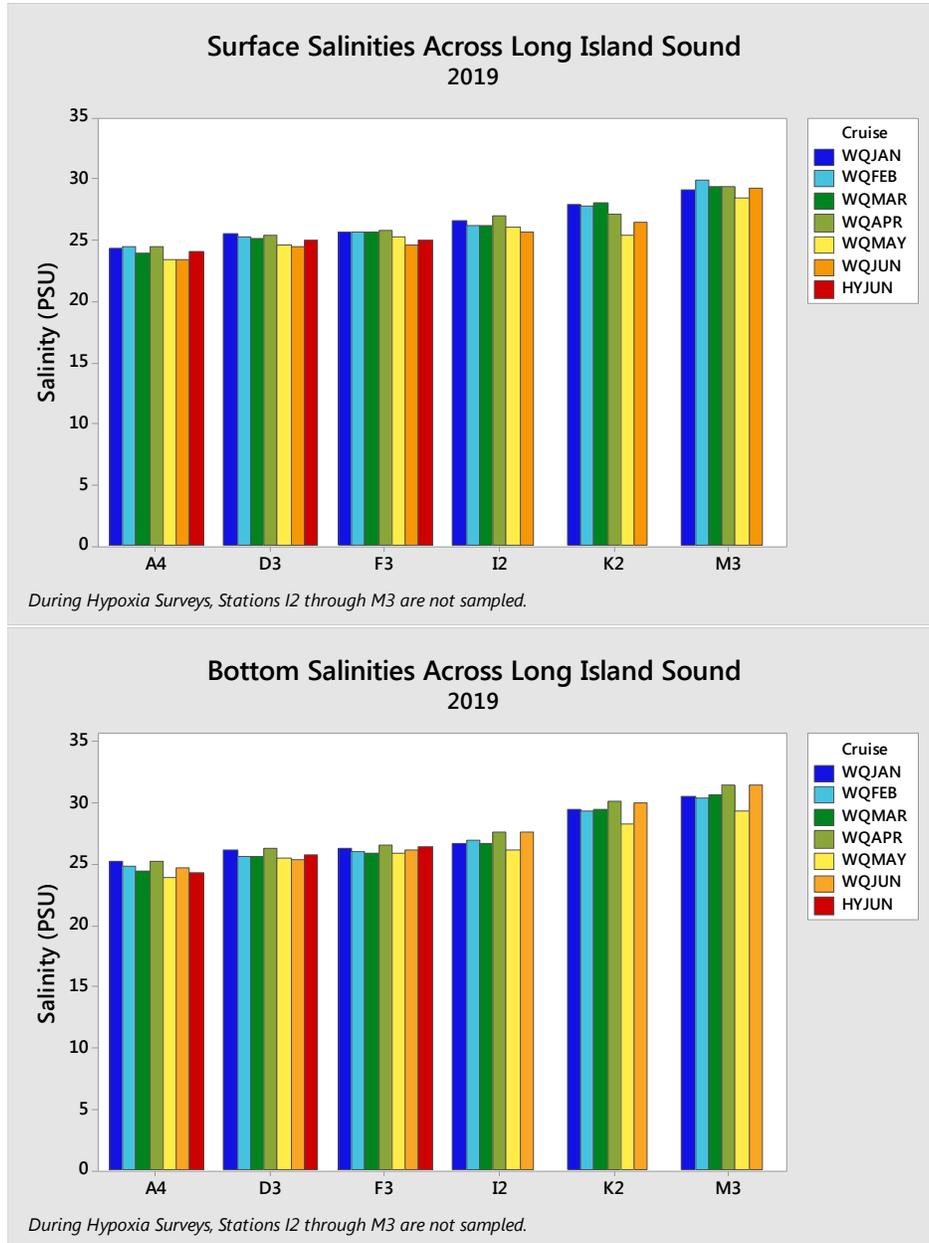
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Delta T (ΔT) is the difference between the surface and bottom water temperature. Differences in water temperature contribute to stratification and exacerbate hypoxic conditions. In general the shallower coastal stations tended to have the smallest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

The greatest temperature difference between the surface and bottom waters during the HYJUN19 survey was 4.47°C, measured at Station F2. The smallest temperature difference was 0.26°C at Station 09.

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.



Surface salinities across Long Island Sound generally decrease slightly from January through May due to snow melt and spring rains. This year there was a noticeable decrease during the WQMAY survey (yellow bar on graphs above), reflective of the fact that Connecticut received 163% of its normal precipitation and New York received 125% during the month of April and 111% and 139% of normal precipitation, respectively, during the month of May. 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. Salinities rose slightly during June.

Surface and bottom salinity values during the HYJUN19 survey were slightly below the 2009-2019 average for Stations A4, D3, and F3. (See table below).

	A4	D3	F3
2019 Surface	24.02	24.95	24.95
2009-2019 Average Surface	24.86	25.76	25.71
2019 Bottom	24.33	25.80	26.45
2009-2019 Average Bottom	25.63	26.71	26.89

SPOTLIGHT -The Respire Project

This summer researchers from UCONN will be onboard the *Dempsey* collecting samples for the Respire Project.

The project looks to gain a better understanding of how oxygen is used in the water column of Long Island Sound, specifically to quantify components of the respiration process including organic matter degradation rates, nutrients, oxygen, carbon dioxide and controlling variables including pH, alkalinity and temperature. Data collected from the project will inform management decisions related to hypoxia and shifting climate. The Primary Investigators for the project are Penny Vlahos, Michael Whitney and Jamie Vaudrey. Ten sites across the estuary will be sampled. This project builds on work completed in 2017 by the PIs.

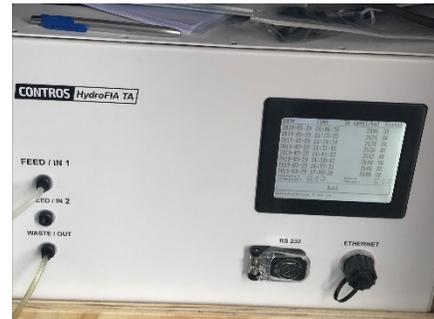
Specific Objectives (from the respire website):

<https://env.chem.uconn.edu/the-long-island-sound-lis-respire-program/>

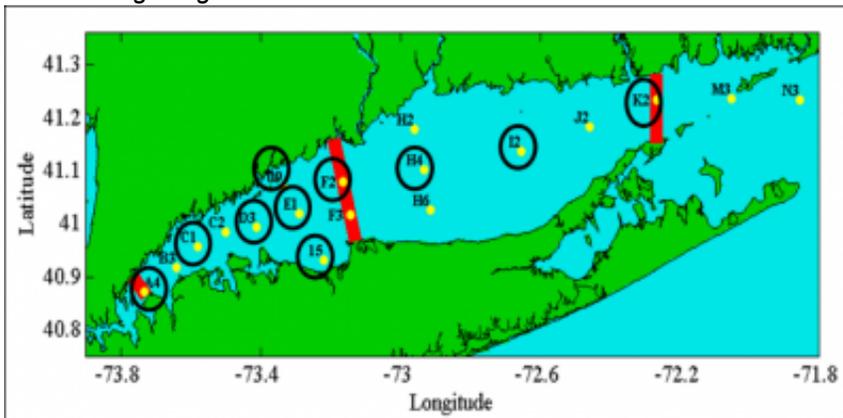
- 1) To measure respiration rates and biological oxygen demand (BOD) at 10 Long Island Sound (LIS) water quality stations over the project period.
- 2) To measure key biogeochemical parameters at these stations (pCO_2 and total alkalinity (TA)), in addition to those already measured in the LIS surveys (pH, nutrients, dissolved oxygen (DO), chlorophyll a and organic carbon).
- 3) To conduct incubations on dissolved and particulate organic carbon (DOC, POC) that measure degradation rates at 10 sites across LIS to complement respiration studies.
- 4) To evaluate the above values across LIS spatially and temporally to begin the foundational work for a combined LIS biogeochemical model that considers respiration in terms of season (i.e. temperature (T), salinity (S), stratification), location, depth, DOC and POC lability and important biogeochemical parameters.
- 5) To conduct a LIS DO balance for LIS from 1991 to present.
- 6) To ascertain the utility of adding respiration and/or inorganic carbon components to the Long Island Sound Water Quality Monitoring Program.



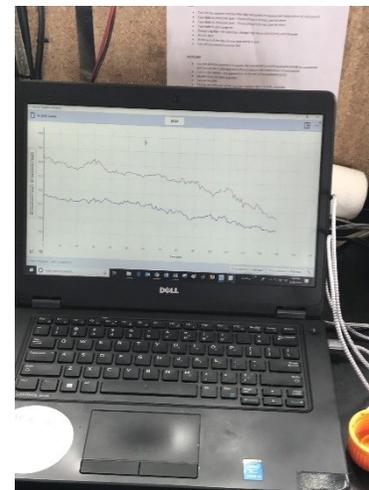
PhD student Lauren Barrett gathers data during the WQJUN19 cruise



Total Alkalinity samples are analyzed *in situ*



LIS Respire stations (black circles)



BOD data

Next Survey

The next survey is scheduled for 7/1-7/3 (WQJUL19) aboard the R/V John Dempsey. The [schedule](#) for the remainder of 2019 is also available on our website.



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