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# Long Island Sound Water Quality Monitoring Program

July 22<sup>nd</sup>, 2024

# July

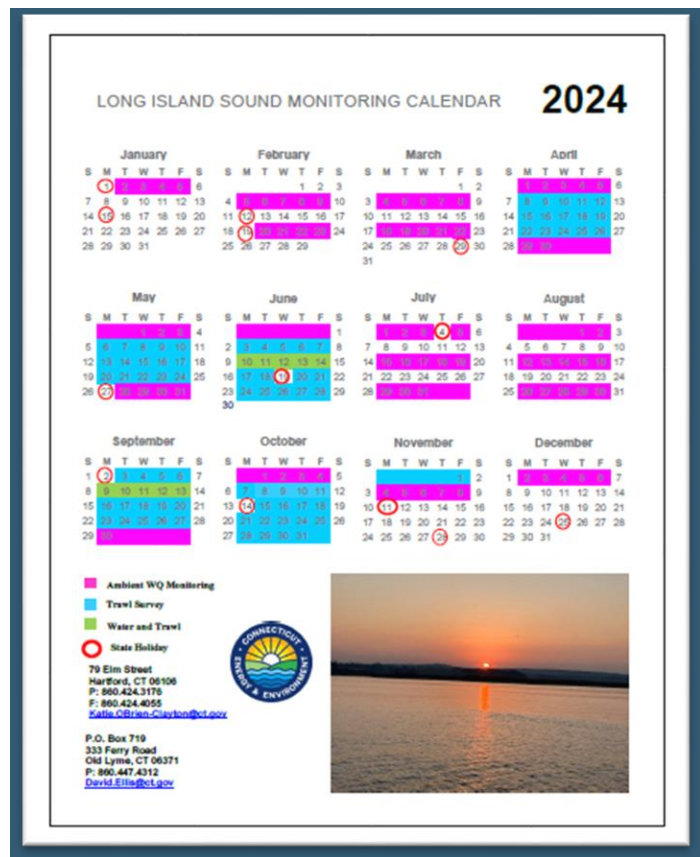


## Dempsey Update

After completing the July water quality survey, the RV John Dempsey was hauled for CG inspection. During repairs, new transducers for the depth finder were installed. Also, the bottom of the vessel received a new coat of paint. Currently underway, are efforts to install a new anchor windlass on the bow. If you have any questions or want more information on the Dempsey, please contact Matthew Lyman at [matthew.lyman@ct.gov](mailto:matthew.lyman@ct.gov).

## 2024 Sampling Schedule

The 2024 Long Island Sound Sampling began on January 2, 2024. The WQJAN24, WQFEB24, CHFEB24, WQMAR24 and CHMAR24, WQAPR24, WQMAY24, WQJUN24 and HYJUN24, and WQJUL24 and HYJUL24 cruises were completed as scheduled. The next scheduled cruise is WQAUG24. Below are the anticipated sampling dates for the year.



# Dissolved Oxygen

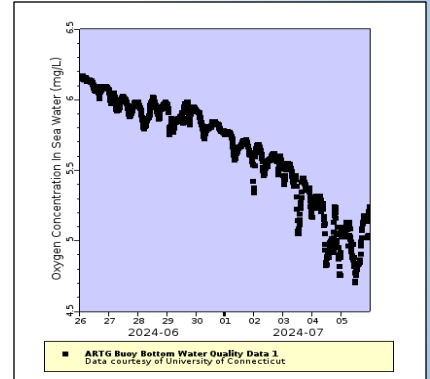
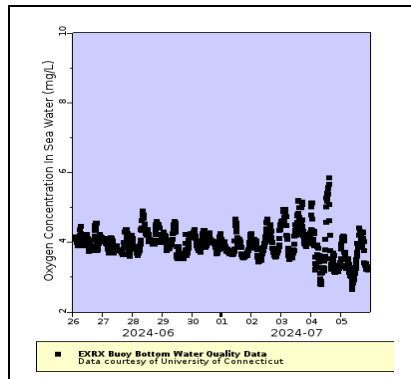
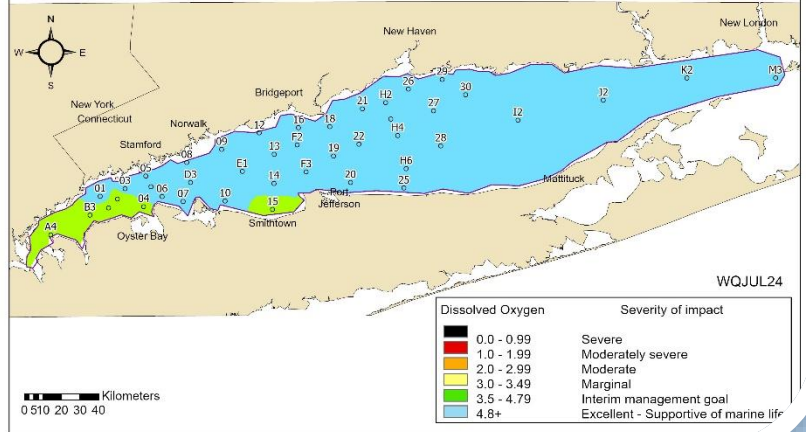
Dissolved oxygen (DO) concentrations in the bottom waters of Long Island Sound remained above 4 mg/L through the July Water Quality Survey. The lowest concentration measured during the survey was 4.02 mg/L at Station A4 and the highest was 7.92 mg/L measured at Station M3. These are very similar to WQJUL23 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 WQJUL24 survey, DO in the bottom water at Station A4 was 3.83 mg/L. Of the 27 bottom waters measurements recorded at Station A4 between 1998 and 2024, the median concentration was 3.37 mg/L with a range of 1.36 to 4.63 mg/L. The mean was 3.08 mg/L.

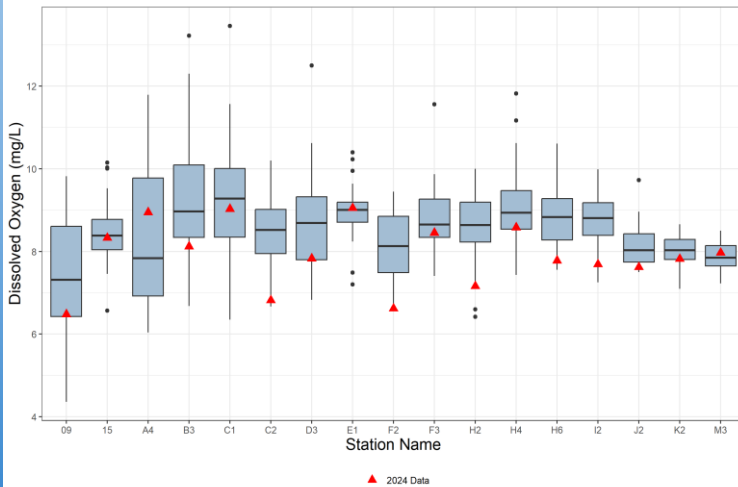
Leading up to the WQJUL24 survey, A4 had concentrations of 8.64 mg/L in May and 5.41 mg/L in June.



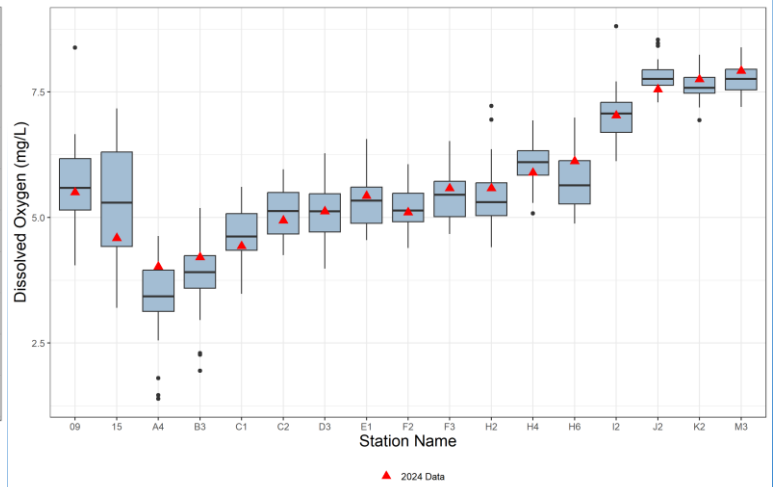
Dissolved Oxygen in Long Island Sound Bottom Waters  
27 June - 3 July 2024



Surface Dissolved Oxygen Concentrations Across Long Island Sound  
WQJUL Cruises  
1998-2024



Bottom Dissolved Oxygen Concentrations Across Long Island Sound  
WQJUL Cruises  
1998-2024



Preliminary data from this survey and prior 2024 cruises are available in Excel spreadsheet format from the [Water Quality Portal](#) as well as on the [UCONN ERDDAP site](#).



# Weather

Average temperatures for the late half of June ranged from near normal to 6°F above normal. At the Northeast's 35 major climate sites, June average temperatures ranged from 1.8°F above normal to 5.2°F above normal in Hartford, CT. This June was record hot for four major climate sites - Hartford, CT; Caribou, ME; Bridgeport, CT; and Islip, NY - and among the 20 hottest for the rest of the sites. During an exceptionally hot period in mid-June, several sites had one of their 10 hottest June temperatures on record, which was record hot. Also, low temperatures were unusually warm during the mid-month heat wave, with three sites setting/tying records and multiple others having one of their 10 warmest low temperatures for June.

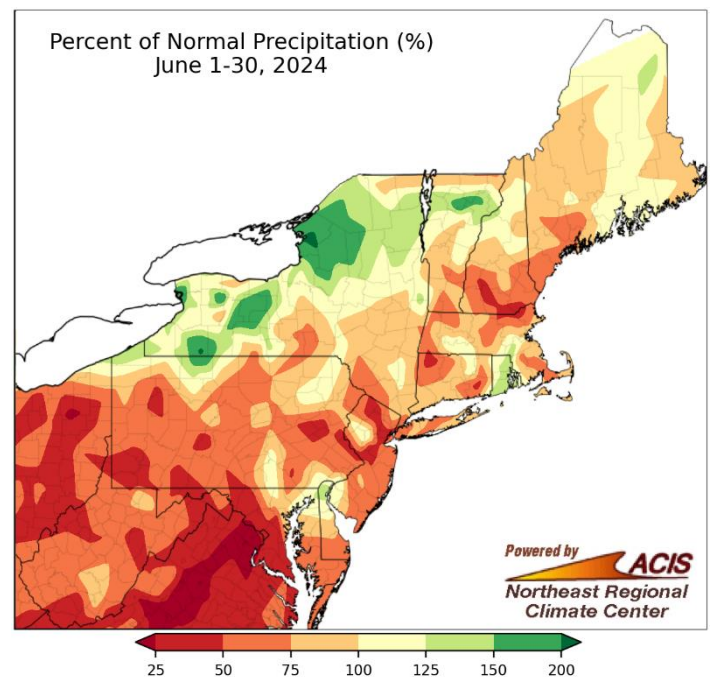
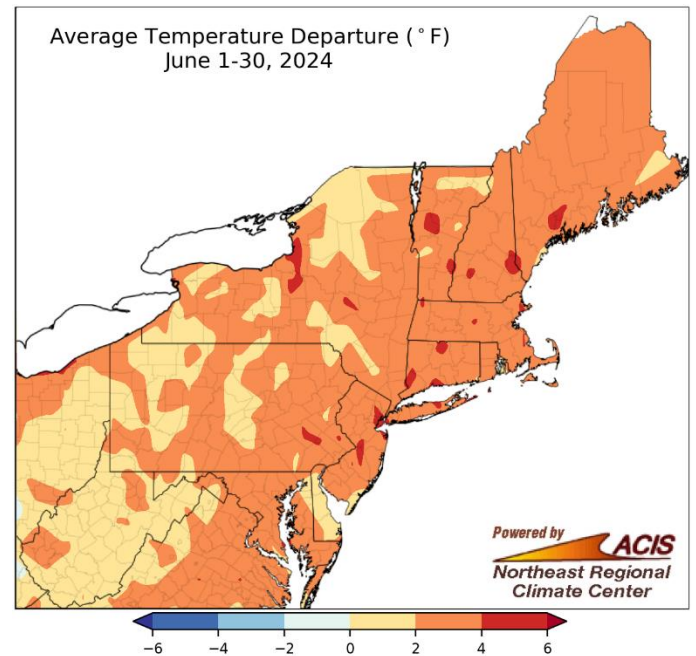
Precipitation ranged from less than 25% of normal to 200% of normal. At the region's 35 major climate sites, June precipitation ranged from 16% of normal to 152% of normal, with 23 of the sites being drier than normal. This June ranked among the 20 driest Junes on record for eight major climate sites but among the 20 wettest for five other sites.

Drier-than-normal conditions in the Mid-Atlantic led to the rapid introduction/expansion of moderate drought and abnormal dryness. Impacts such as record-low streamflow and/or groundwater levels, requests for water conservation, burn bans, and heavy reliance on irrigation were noted in parts of the Mid-Atlantic.

Hartford, CT had a 5.2°F departure from normal temperature of 68.9°F. The average temperature from June 1<sup>st</sup> to June 30<sup>th</sup> was 74.1°F. Hartford, CT was ranked 1<sup>st</sup> among the 20 hottest sites in the Northeast. Precipitation was 66% of normal with an average of 2.81 inches compared to a normal 4.28 inches.

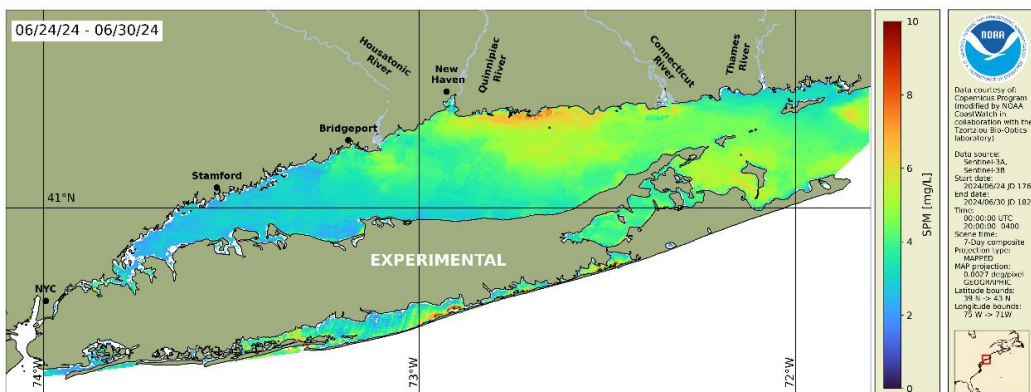
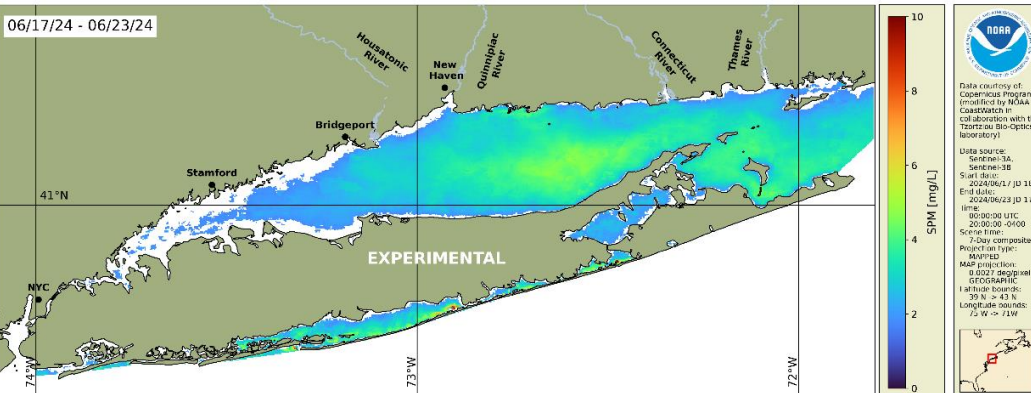
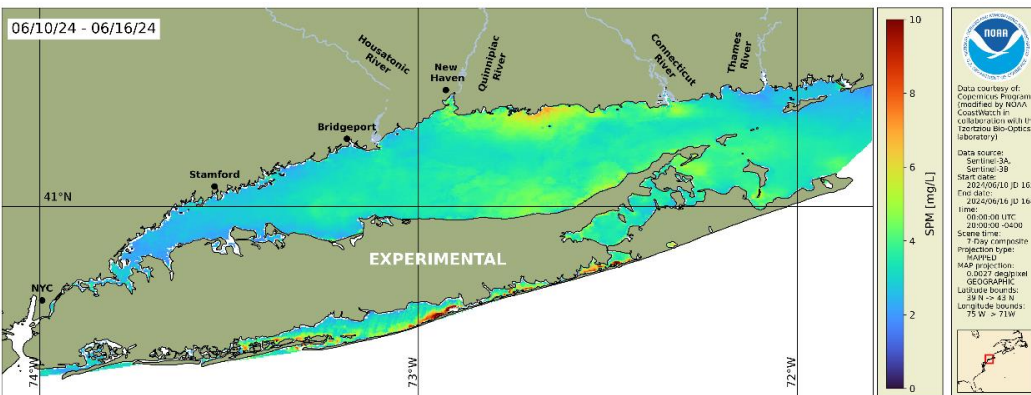
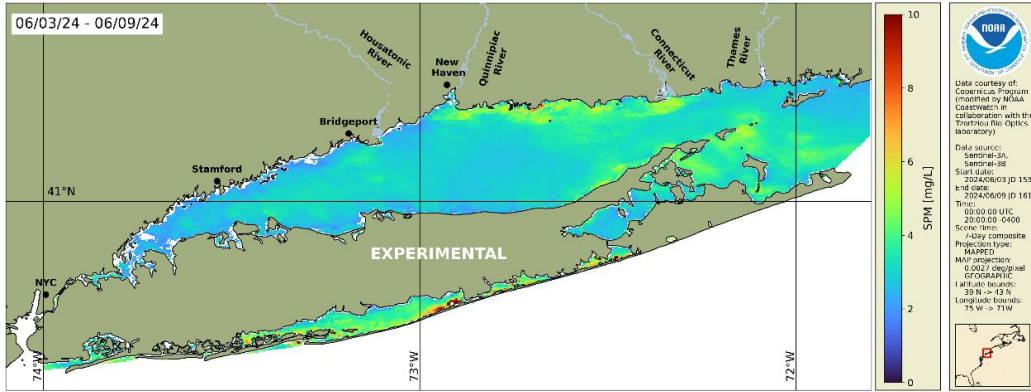
Bridgeport, CT had an above average temperature of 72.6°F with a 3.0°F departure from normal temperature of 69.6°F. Bridgeport, CT was ranked 1<sup>st</sup> among the 20 hottest sites in the Northeast. Precipitation was 93% of normal with an average of 3.50 inches compared to a normal 3.77 inches.

Islip, NY also had an above average temperature. There was a 3.0°F departure from a normal temperature of 69.0°F, with the average temperature in Islip, NY at 72.0°F. Islip, NY was ranked 1<sup>st</sup> among the 20 hottest sites in the Northeast. Precipitation was 61% of normal with an average of 2.44 inches compared to a normal 4.00 inches.



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

# Suspended Particulate Matter (SPM)

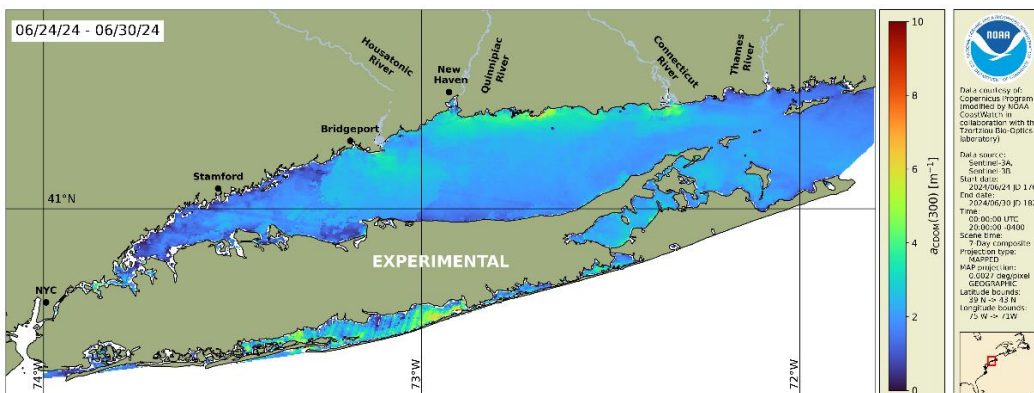
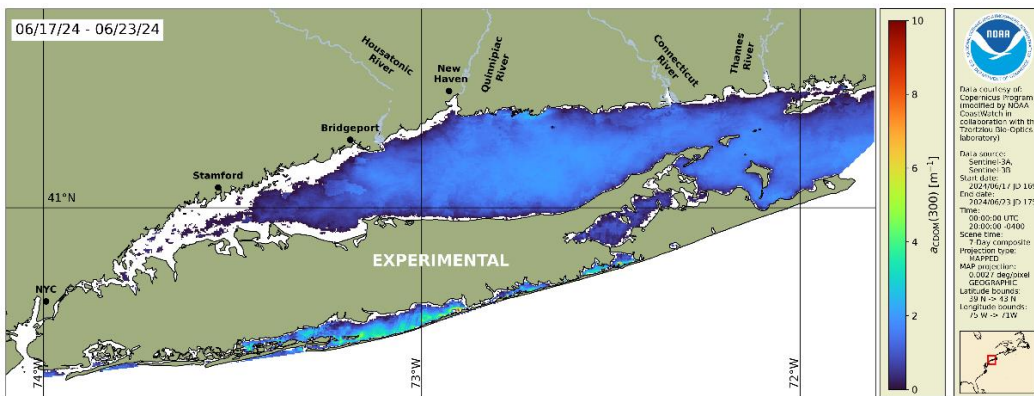
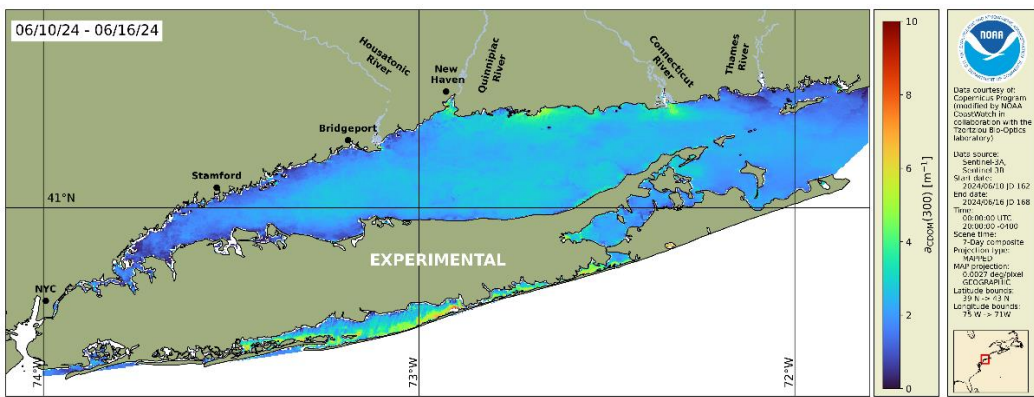
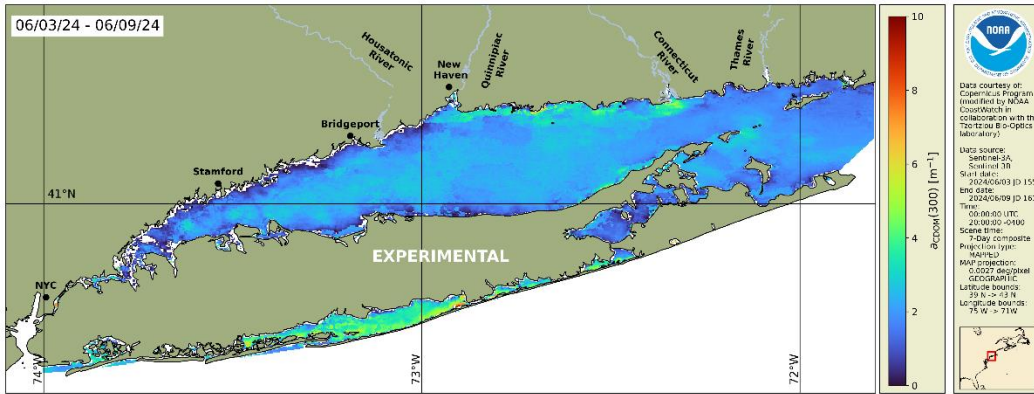


Weekly composites show fluctuations of suspended particulate matter across the Long Island Sound in the month of June 2024. The composite image from 6/24/24 to 6/30/24 most closely resembles the conditions observed during the WQJUL24 cruise, which ran from 6/27/2024 to 7/3/2024. The highest concentrations were recorded within the last week of the month. This could be attributed to recent storm events or increased sea surface temperature, which can impact biological productivity and breakdown of organic material, potentially altering the amount of suspended particulate matter in the water.

Data courtesy of Copernicus Program, modified by NOAA CoastWatch in collaboration with the Tzortziou Bio-Optics Lab.

Optimized and validated for Long Island Sound.

# Colored Dissolved Organic Matter (CDOM)



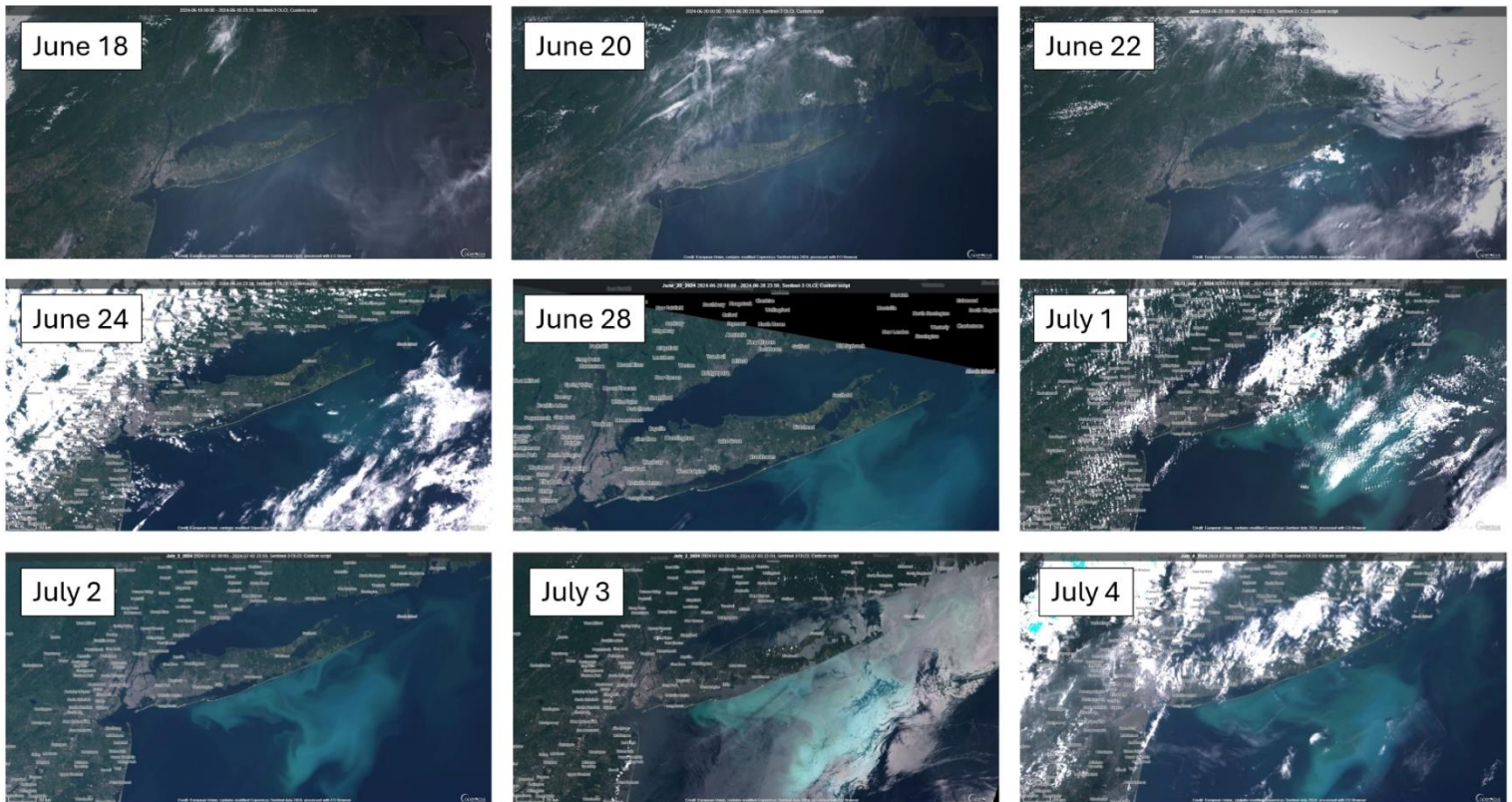
Weekly composites show fluctuations of colored dissolved organic matter across the Long Island Sound in the month of June 2024. The composite image from 6/24/24 to 6/30/24 most closely resembles the conditions observed during the WQJUL24 cruise, which ran from 6/27/2024 to 7/3/2024.

Data courtesy of Copernicus Program, modified by NOAA CoastWatch in collaboration with the Tzortziou Bio-Optics Lab.

Optimized and validated for Long Island Sound.

# Ocean Color

Sentinel-3/OLCI imagery (L1B), Bands 4,6,8 composite (Copernicus)



Researchers Chris Paparo and Dr. Chris Gobler from Stony Brook University worked collaboratively to solve a mystery of what turned out to be an algal bloom on the South Shore of Long Island around the 4<sup>th</sup> of July that resulted in crystal clear blue water, much like that found in the Caribbean. (See <https://fb.watch/t6A1NIHFeu/> and <https://www.facebook.com/100064548795605/posts/pfbid022MAa3JDkeREda94dmBrThKTwcC1tDgKcSetVm2B7tjSC8esUP46LEU9KkRvwYJsYL/?d=n>).

During our cruise Katie O'Brien-Clayton observed small patches similar to those observed on the South Shore. She reached out to Dr. Tzortziou and her team to see if anything could be seen in LIS Ocean Color imagery.

While nothing was visible in LIS, Dr. Tzortziou noted that the South Shore bloom seemed to have started developing in mid-June, and was clearly visible on OLCI imagery on June 18. She provided this mosaic of images from OLCI, showing the development and spatial extent of this event.

Drs. Senjie Lin and Huan Zhang of UConn Marine Sciences will review our phytoplankton samples collected during this survey for the presence of Cocolithophores but note that they are rare in Long Island Sound.

## What is Ocean Color?

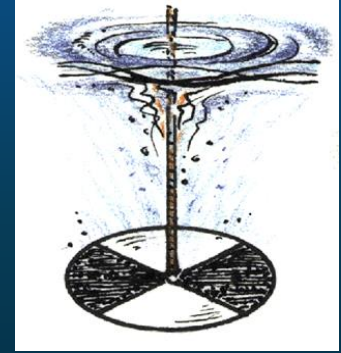
Excerpted from NASA's Ocean Color webpage:  
<https://oceancolor.gsfc.nasa.gov/>

*Ocean Color is the apparent hue, shade, or tone of water that results from the interactions of sunlight with the microscopic composition of the water column and water itself. Typical relevant water constituents include phytoplankton, mineral particles, and dissolved organic matter. The color of the ocean varies with how these materials in seawater absorb and scatter photons of different wavelengths, which varies with their composition. For example, highly productive waters where phytoplankton are abundant can appear green, whereas less productive waters with fewer constituents typically appear blue.*

*The spectral nature of color of the water, that is, the intensity at which different wavelengths absorb and scatter photons, can be used to infer the quality and quantity of materials that comprise natural waters - allowing scientists, policymakers, and society as a whole to understand their composition on local to global scales. This understanding can lend insight into how aquatic organisms at the base of the food chain thrive or decline under changing conditions of their environments.*

# Secchi Disk Depths

To assess the water clarity across Long Island Sound, Secchi disks are used at each station. The black and white disk is lowered into the water column until such a depth is reached that the black and the white quarters can no longer be differentiated. This is called the Secchi depth.

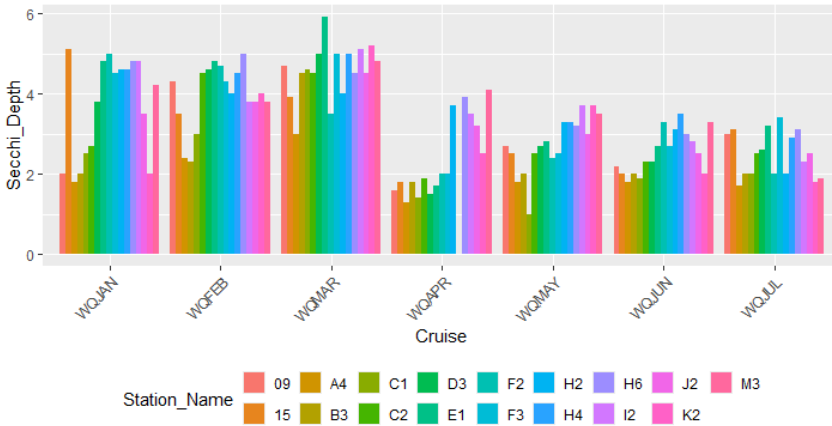


The Long Island Sound Report Card developed by Save the Sound utilizes the following water clarity depths thresholds:

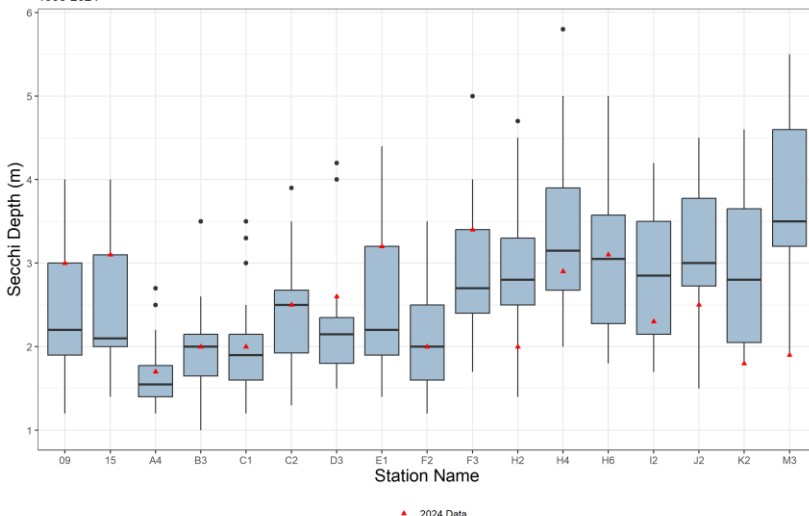
1. >2.28 m (A- to A+; 90-100)
2. 2.12 to <2.28 (B- to B+; 80-89)
3. 1.95 to <2.12 (C- to C+; 70-79)
4. 1.8 to <1.95 (D- to D+; 60-69)
5. 0 to <1.8 (F; <60)

Secchi depths were taken at 17 stations during the WQJUL24 survey; these depths ranged from 1.7 meters (Station A4) to 3.4 meters (Station F3).

Secchi Depths Across Long Island Sound  
2024



Secchi Depths Across Long Island Sound  
WQJUL Cruises  
1998-2024



In Report Card terms, 10 stations were in the A- range (>2.28m), no stations were in the B- range (2.12-2.28), 4 stations were in the C- range (1.95-<2.12m), 2 stations were in the D- range (1.8 to <1.95m), and 1 station failed (<1.8m).

For more information on the Long Island Sound Water Quality Monitoring Program please visit:

<https://portal.ct.gov/v/DEEP-LISWater>

