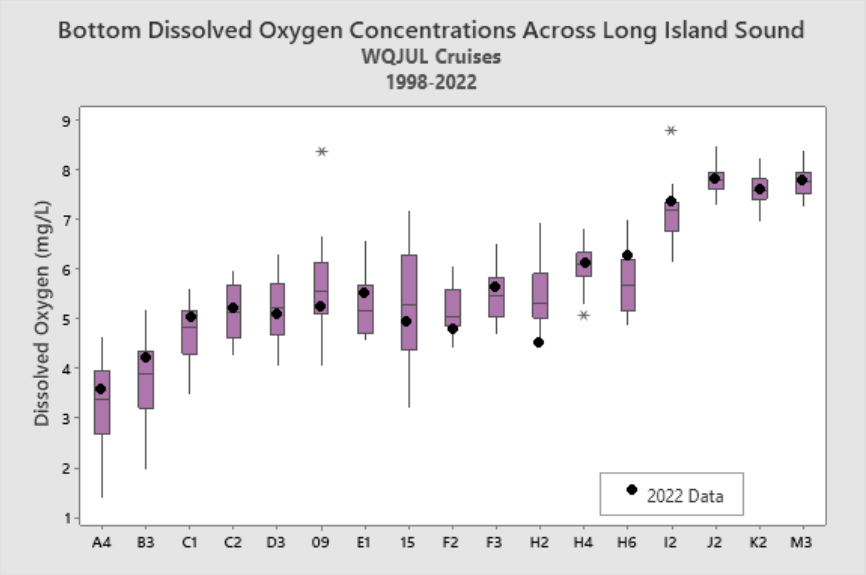
July 2022

[Volume 5, Issue 3]



Long Island Sound Water Quality Monitoring Program

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WQJUL22 Water Quality Summary

Dissolved Oxygen Concentrations Continuing to Drop, still above 3 mg/L

CT DEEP sampled 42 stations during the WQJUL22 survey that was conducted 6-8 July 2022. Due to generator issues, the R/V John Dempsey was only able to collect samples from stations K2 and M3 before docking back in Old Lyme. The R/V Patricia Lynn was utilized to collect the rest of the samples.

The lowest dissolved oxygen recorded during this survey was at Station A4 with a concentration of 3.62 mg/L and was the only station that had a DO concentration below 3.0 mg/L. Five other stations sampled during this survey had concentrations below 4.8 mg/L. Preliminary data from this survey and prior 2022 cruises are available in Excel spreadsheet format.

In 2022, the DO at Station A4 was 0.55 mg/L higher than in 2021 (3.07 mg/L). Dissolved oxygen concentrations measured in the Sound in 2022 were generally at or above the median values. Bottom water concentrations at Station A4 during the WQJUL surveys range from 1.39 to 4.63 mg/L and the average bottom water DO concentration (1998-2022) is 3.30 mg/L. For 12 of the past 13 years the minimum dissolved oxygen concentration for the WQJUL survey occurred at Station A4 (Table 1).

There were of 327 km^2 of bottom water that had dissolved oxygen concentrations less than 4.8 mg/L during the WQJUL22 survey (99.5 km^2 more than in 2021. The areal estimates of bottom waters with DO concentrations less than 4.8 mg/L range from 0 km^2 to 1022.8 km^2 (2010). For five of the past six years the DO in the bottom waters has not dropped below 3 mg/L during the WQJUL survey. The highest area (139.4 km^2) of bottom waters with concentrations below 3 mg/L during the WQJUL surveys occurred in 2003.

Dissolved Oxygen in Long Island Sound Bottom Waters

6-8 July 2022

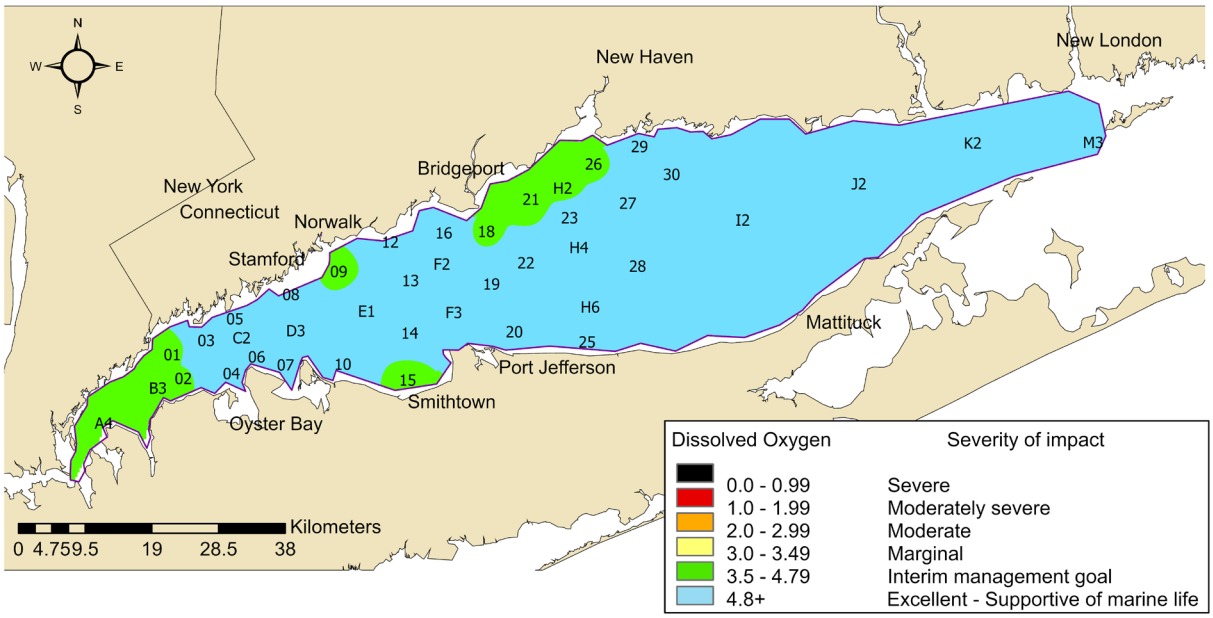


Table 1. Minimum Dissolved Oxygen Concentrations and Areal Estimates for WQJUL Cruises Conducted from 1998-2021 by CT DEEP.

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)
WQJUL98	2.57	02	475	33.4
WQJUL99	2.44	A4	552.3	43.7
WQJUL00	1.36	A4	735.7	114.6
WQJUL01	3.06	A4	760.8	0
WQJUL02	1.39	A4	546.7	139.4
WQJUL03	2.18	15	480.9	122
WQJUL04	3.56	02	166.8	0
WQJUL05	3.21	B3	808.6	0
WQJUL06	2.47	A4	417.9	104.6
WQJUL07	3.5	15	537.1	0
WQJUL08	2.96	B3	312.6	10.1
WQJUL09	3.83	A4	131.2	0
WQJUL10	1.76	A4	1022.8	102.3
WQJUL11	2.88	A4	535.8	64.3
WQJUL12	3.2	A4	134.5	0
WQJUL13	3.56	A4	102.6	0
WQJUL14	3.91	A4	78.4	0
WQJUL15	4.02	A4	106.0	0
WQJUL16	4.26	A4	95.2	0
WQJUL17	3.65	A4	222.6	0
WQJUL18	3.37	A4	189.1	0
WQJUL19	4.23	15	191.5	0
WQJUL20	2.97	A4	301.6	34.5
WQJUL21	3.07	A4	227.5	0
WQJUL22	3.62	A4	327.0	0

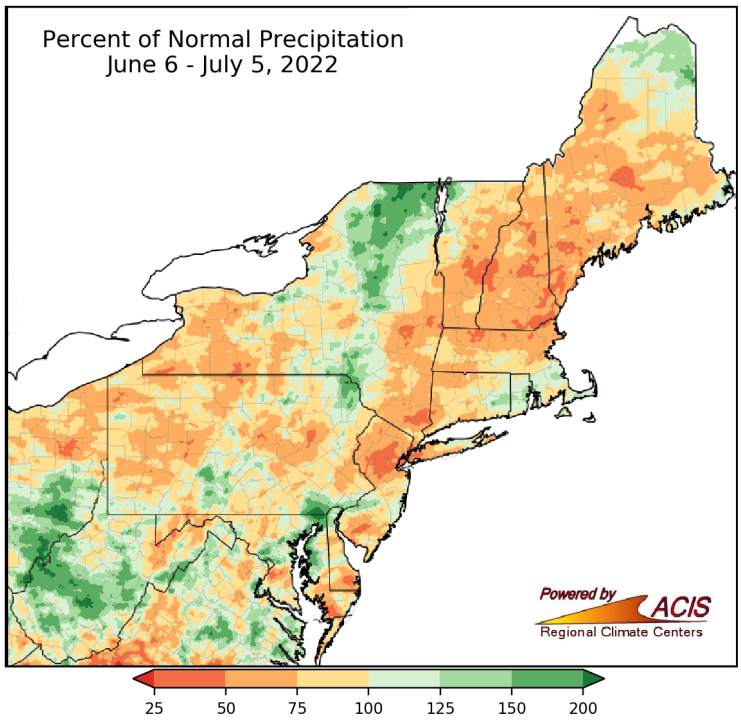
Weather

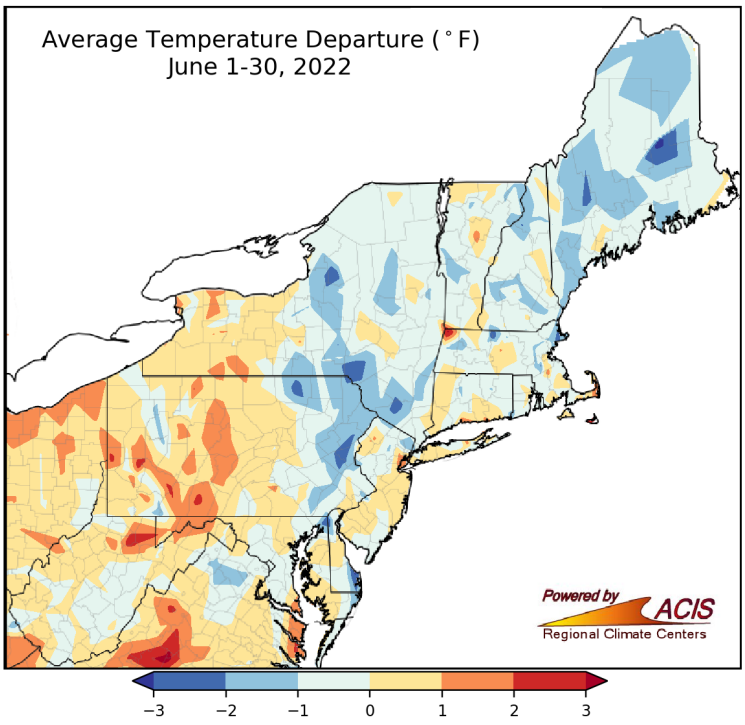
During the 2nd half of June and 1st week of July, the New England region was experiencing a drought, with precipitation being below-average for most of Connecticut and Long Island. By the end of June, Bridgeport, CT received around 74% of the normal precipitation for the month, and Islip, NY received around 70% of its normal precipitation. Hartford, CT and Central Park, CT were even drier, with Hartford receiving only around 61% of its normal precipitation and Central Park receiving only about 64% of its normal precipitation. The NOAA Climate Prediction Center (CPC) predicts that the 8–14-day outlook for July 14-20 will favor average precipitation for most of the New England region, including CT and Long Island Sound.

By the end of June, New England had experienced slightly cooler than average temperatures for the month, with Bridgeport being 0.8°F cooler than average, Hartford being 0.2°F below average, and Central Park being 0.6°F below average. Temperatures for the most of July are expected to be above average.

Weather during the survey was mostly warm and partially cloudy with no precipitation.

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



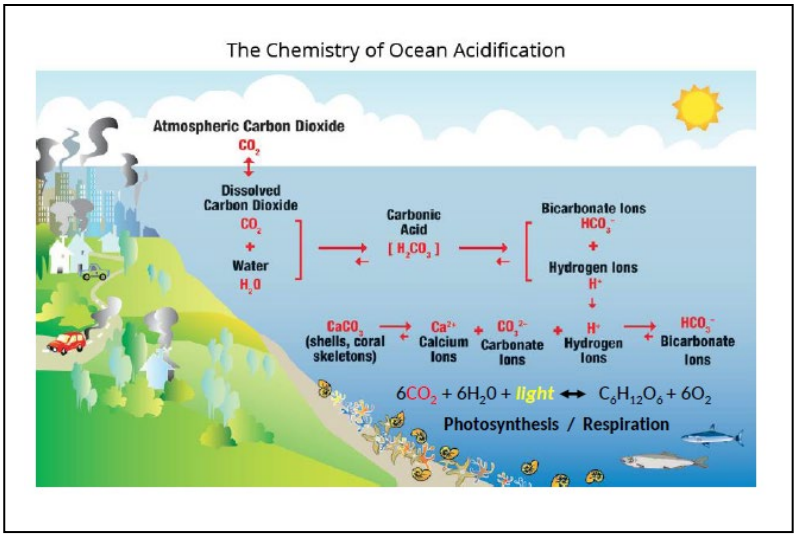


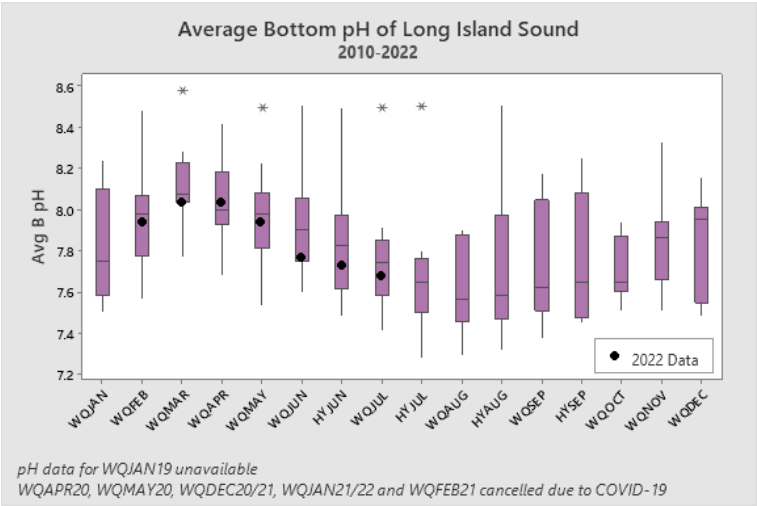
pH

pH in the surface waters of the Sound during the WQJUL22 survey ranged from 7.62 to 8.04 SU and averaged 7.90 SU. pH in the bottom waters ranged from 7.39 to 7.88 SU and averaged 7.64 SU.
Both the surface and bottom water pH have declined beginning in May.

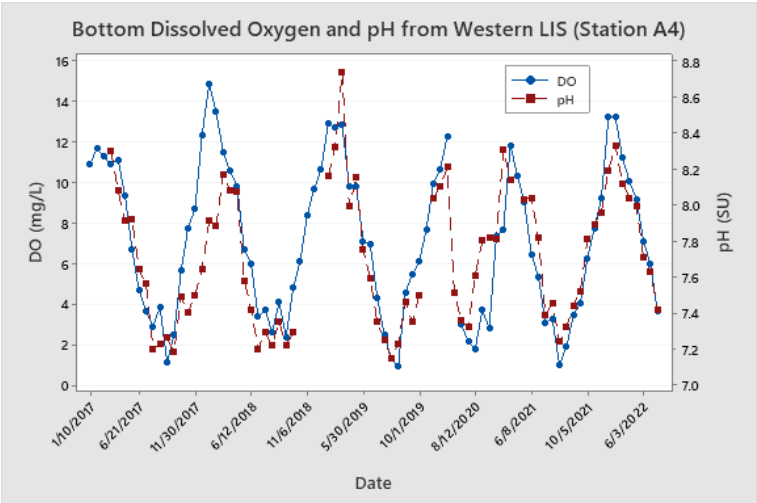
During the summer pH in the bottom waters decreases (acidity increases) with increasing temperature and decreasing dissolved oxygen concentrations.

Some factors which may influence these changes of pH in the Sound include increased atmospheric carbon dioxide (CO_2) deposition, anthropogenic inputs, and other seasonal weather changes.

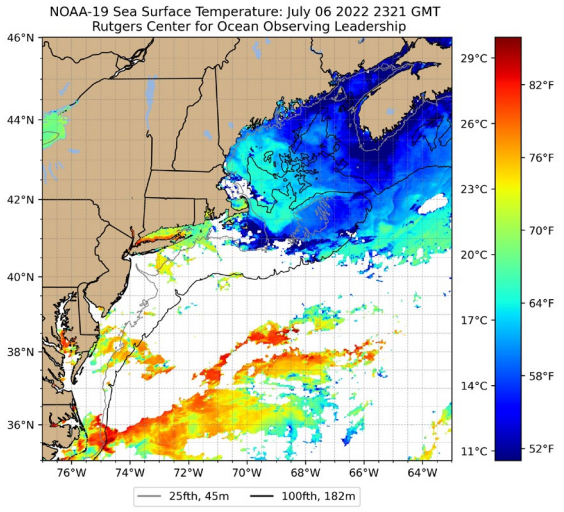




pH data for WQJAN19 unavailable
WQAPR20, WQMAY20, WQDEC20/21, WQJAN21/22 and WQFEB21 cancelled due to COVID-19

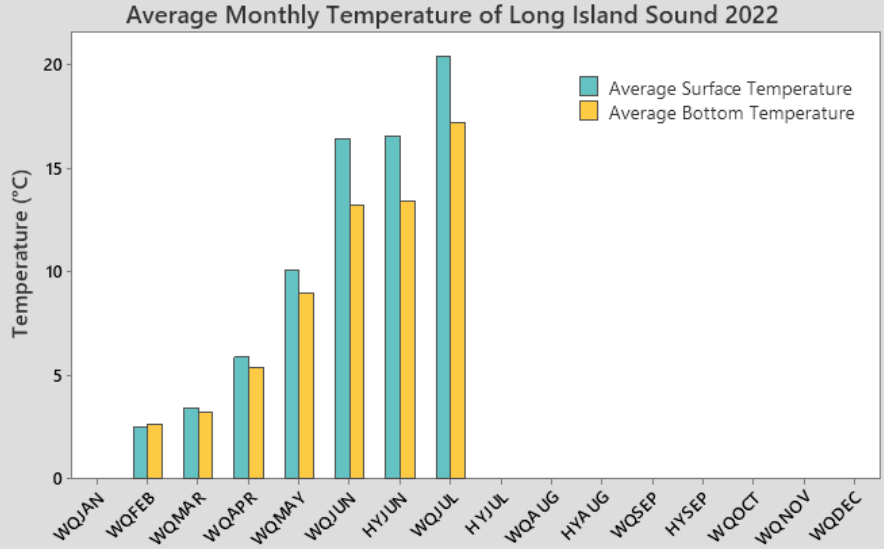


Temperature

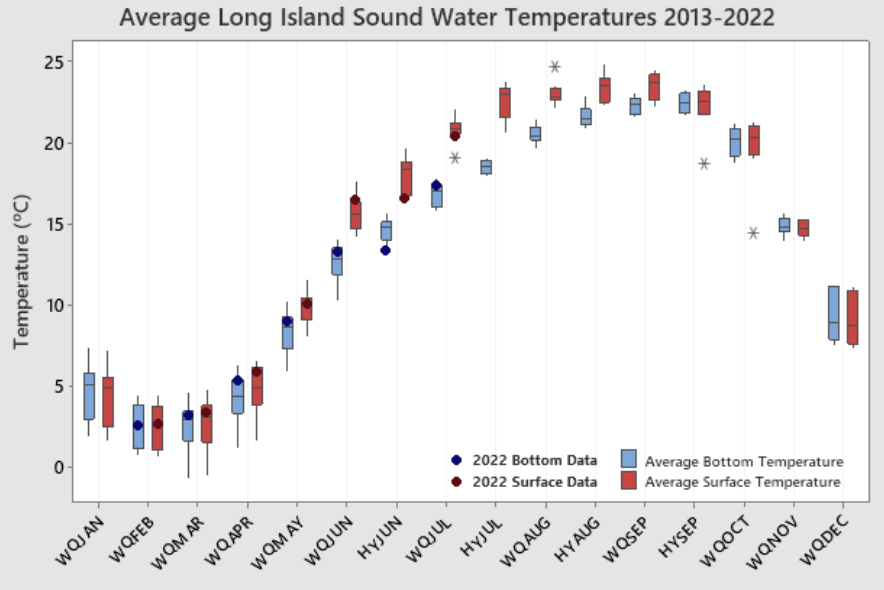


Average bottom and surface water temperatures rose about four (4) degrees from the HYJUN22 survey to WQJUL22 survey. Bottom waters averaged 17.21° C and surface waters average 20.37°C.

During the WQJUL22 survey, the warmest bottom waters were recorded at Station 29 (20.72° C) and the warmest surface waters were recorded at Station 30 (22.32° C). Station E1 had the greatest ΔT of 4.88°C. The average ΔT of WQJUL22 was 3.02°C.



WQJAN22 survey cancelled due to COVID.
Due to missing surface data, Station D3 not included in HYJUN22.



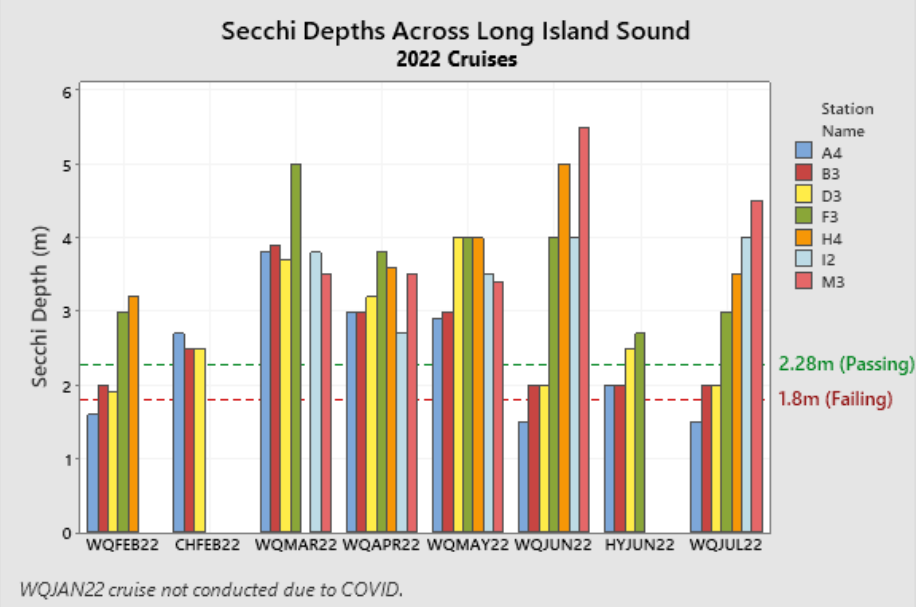
Secchi Disk Depths

Secchi disk transparency depths, which reflect water clarity, during this survey ranged from 1.5 meters to 4.5 meters.

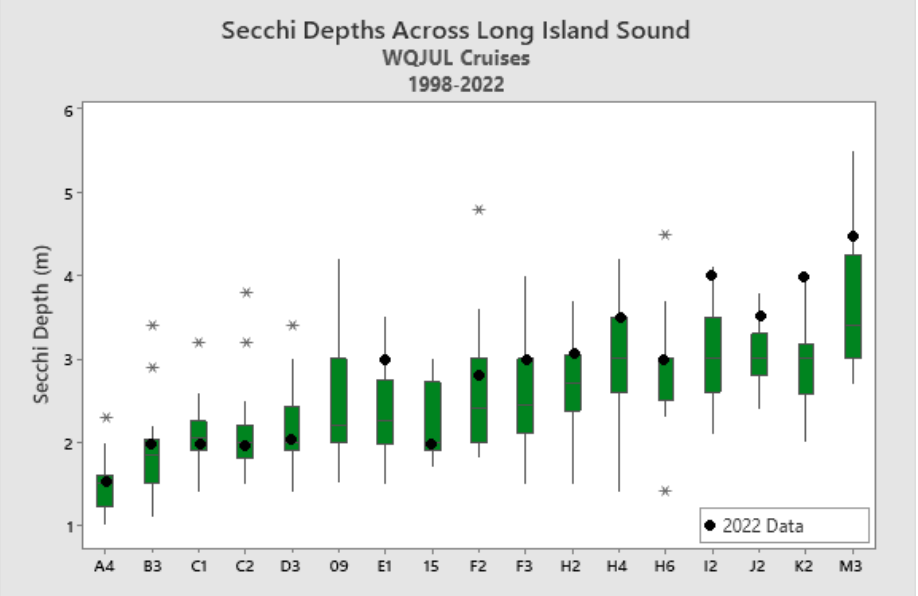
Suspended solids, organic matter, phytoplankton and zooplankton can all reduce water clarity.

The Long Island Sound Report Card has established four threshold levels to “grade” water clarity in Long Island Sound. Secchi depths less than 1.8m are considered poor/failing and receive an F (<60%), depths of 1.8 to <1.95m receive a D (60-70%), depths of 1.95 to <2.12m receive a C (70-80%), depths of 2.12 to <2.28 receive a B (80-90%), and Secchi depths greater than 2.28 m are considered excellent/passing and receive an A (100%).

The Long Island Sound Comprehensive Conservation and Management Plan (CCMP) has established a goal of increasing Secchi dish depths, by the year 2035, by half a Report Card letter grade from the grade first reported in the 2013 Report Card. In the 2013 Report Card, Station A4 received a grade of D+ (67%) while in the 2020 Station A4 scored an F (50%).



WQJAN22 cruise not conducted due to COVID.

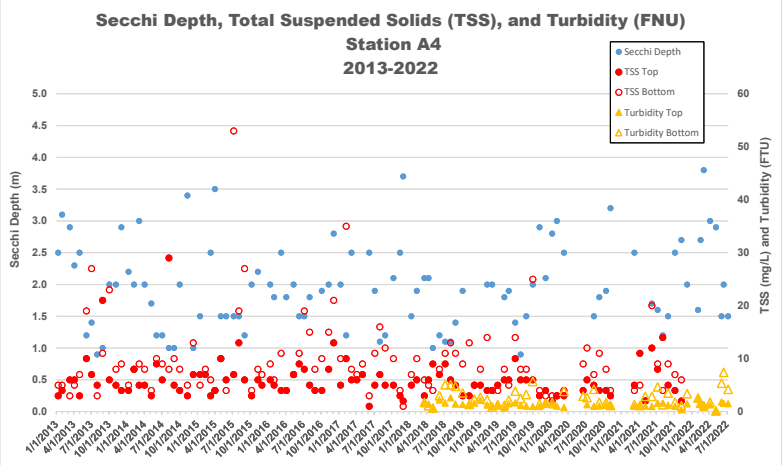


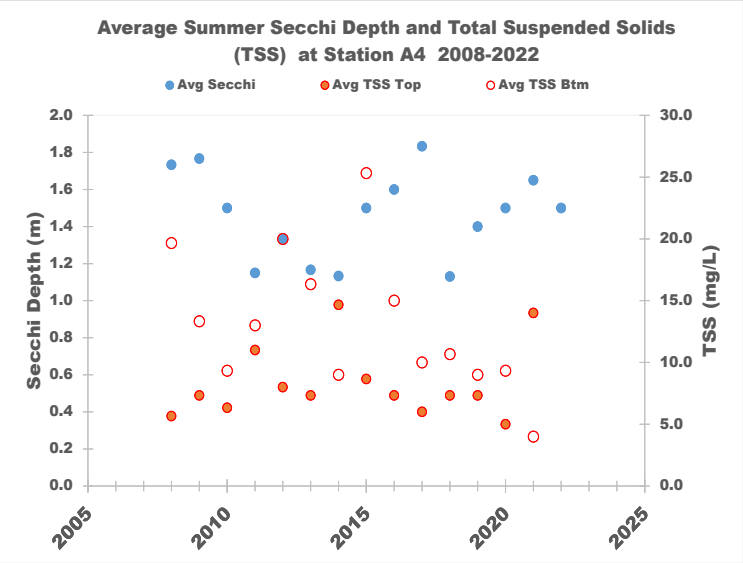
Secchi Disk Depths

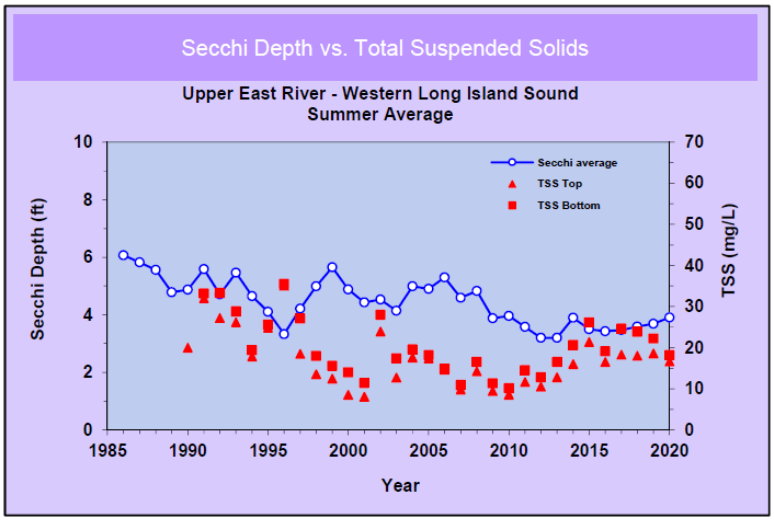
Western Long Island Sound waters are more turbid, especially after rainfall events and freshwater inputs from the Hudson River and Harlem River. The NYC Department of Environmental Protection also samples far Western LIS as part of the Harbor Water Quality Survey. NYCDEC suggests a decrease in chlorophyll a and/or total suspended solids may be contributing to increased transparencies.

When examining year-round and average summer (June-August) data at Station A4, Secchi depths and TSS concentrations remain relatively stable.

** 2022 TSS data not received from lab







From the NYCDEP 2020 Harbor Water Quality Report, Upper East River-Western Long Island Sound

Action Shots - Fun on the Lynn!

Preparing a sample of surface water to be later filtered on the R/V John Dempsey.

Collecting a sample from the water column.

Enjoying another wonderful survey aboard the R/V Patricia Lynn.

View of Long Island Sound from the R/V Patricia Lynn.

Next Survey

The next survey is scheduled for 7/18-7/22 (HYJUL22) aboard the R/V John Dempsey. The schedule for the remainder of 2022 is available on our website.

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION