

Long Island Sound
Water Quality
Monitoring Program

www.ct.gov/deep/lis

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WQJUL19 Water Quality Summary

Dissolved Oxygen Concentrations Continuing to Drop, Station A4 below 5 mg/L

CT DEEP sampled 35 stations during the WQJUL19 survey that was conducted 1-3 July 2019. The lowest dissolved oxygen (DO) recorded during this survey was at Station 15 with a concentration of 4.23 mg/L. Two other stations sampled during this survey, Station A4 and B3, had concentrations below 4.8 mg/L. The highest concentration occurred at Station 25. As expected, DO generally increased moving West to East across the Sound. Data are available in an [Excel spreadsheet format](#).

This July, the DO at Station 25 was 0.34 mg/L less than in July 2018 (4.57 mg/L). In contrast, the DO at Station A4 was 4.29 mg/L, 0.92 mg/L more than in July 2018 (3.37 mg/L). Minimum DO concentrations at Station A4 during WQJUL surveys from 1998 to 2019 range from 1.36 mg/L to 4.63 mg/L, with an average of 3.17 mg/L. As such, Station A4 had above average DO concentrations. Previous to this year’s survey, the minimum DO concentration in July occurred at Station A4 for 10 consecutive years (Table 1).

There were of 114.4 km² of bottom water that had DO concentrations less than 4.8 mg/L during the WQJUL19 survey (74.7 km² less than during the WQJUL18 survey). The areal estimates of bottom waters with DO concentrations less than 4.8 mg/L range from 78.4 km² (2014) to 1,022.8 km² (2010). The DO has not dropped below 3 mg/L during the WQJUL survey since 2011, 8 years ago, and the highest area of bottom waters (139.4 km²) to have dropped below concentrations of 3 mg/L during the WQJUL surveys occurred in 2002.

Dissolved Oxygen



Dissolved Oxygen in Long Island Sound Bottom Waters 1-3 July 2019

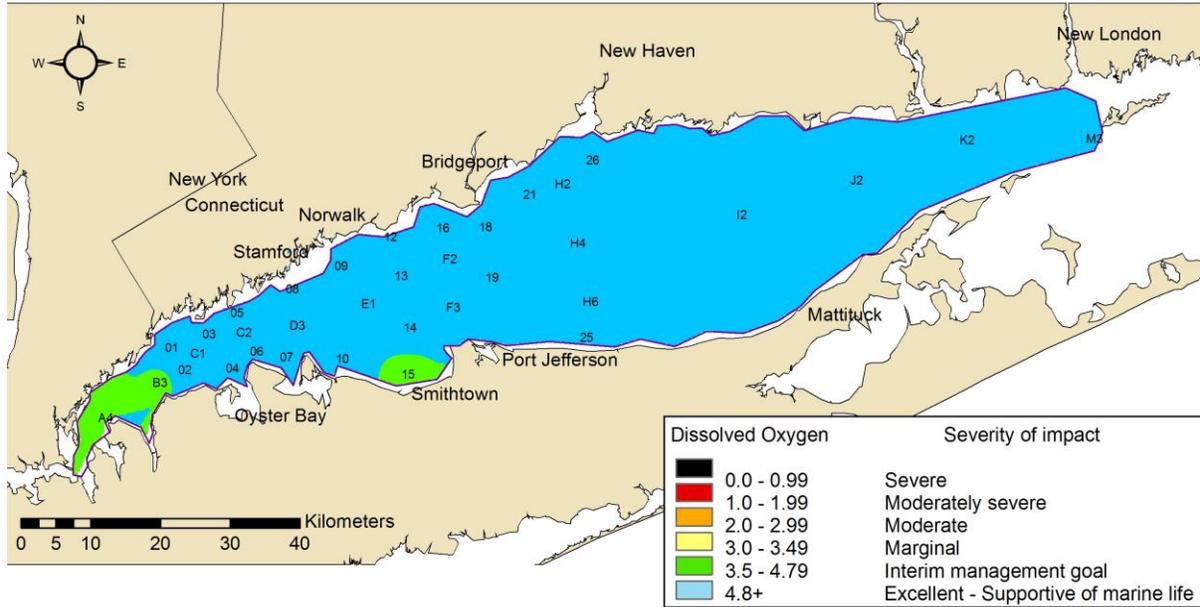


Table 1. Minimum Dissolved Oxygen Concentrations and Areal Estimates for WQJUL Cruises Conducted from 1998-2019 by CT DEEP.

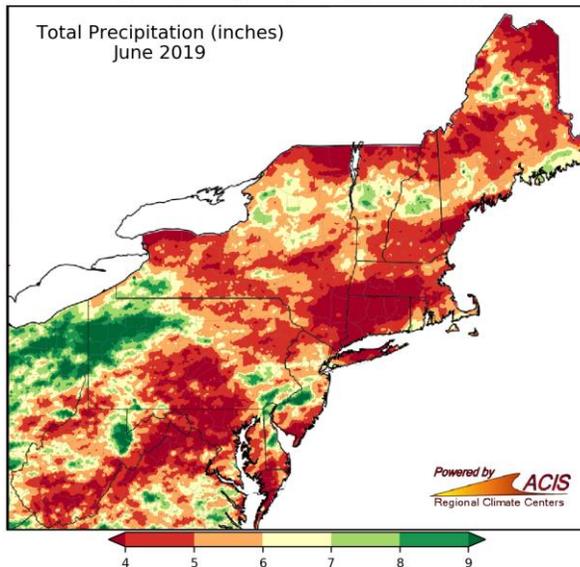
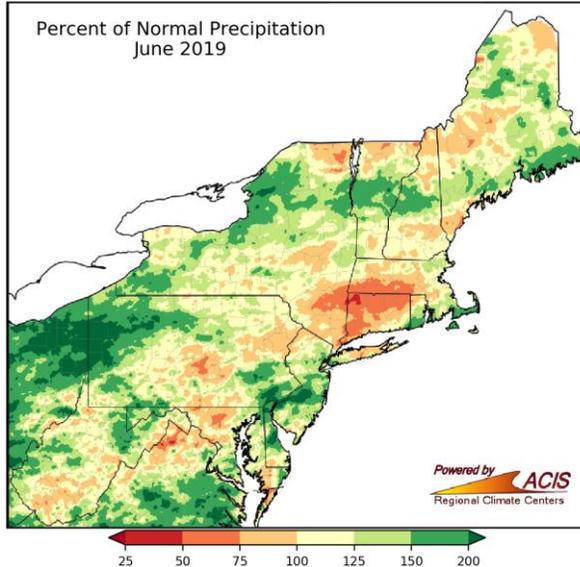
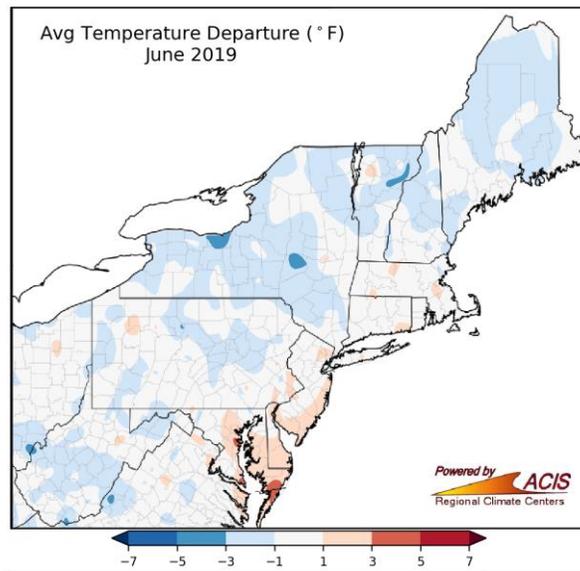
Cruise	Minimum DO Observed (mg/L)	Station with Minimum DO	Area under 4.8 mg/L (km ²)	Area under 3 mg/L (km ²)
WQJUL98	2.57	02	475	33.4
WQJUL99	2.44	A4	552.3	43.7
WQJUL00	1.36	A4	735.7	114.6
WQJUL01	3.06	A4	760.8	0
WQJUL02	1.39	A4	546.7	139.4
WQJUL03	2.18	15	480.9	122
WQJUL04	3.56	02	166.8	0
WQJUL05	3.21	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	1,022.8	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	114.4	0

Weather

June temperatures throughout the Northeast did not vary far from the 30-year average, especially around Long Island Sound. However, the last 10 days of June and the beginning of July saw a consistent increase in temperature in the Bridgeport, CT area. The survey days of July 1-3 warmed to 86°F each day in Bridgeport, where the July normal is 82.2°F. Islip, NY temperatures were higher, reaching the upper 80s/lower 90s in days transitioning to July.

The month of June had below average precipitation. The Bridgeport, CT area received 3.36 inches, nearly a third of which was from a single precipitation event in the middle of June. The rest of June and the beginning of July were dry. Islip, NY received a similar pattern of precipitation with an additional 0.23-inch event the day before the first WQJUL19 survey day.

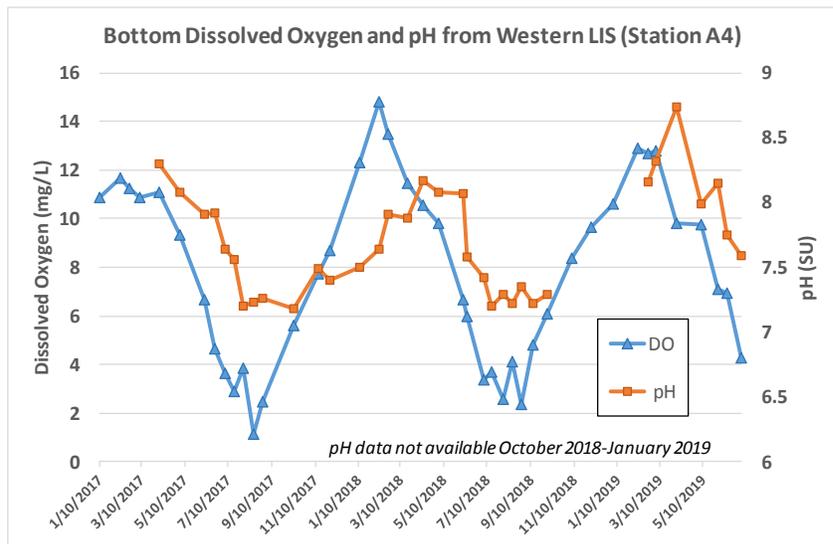
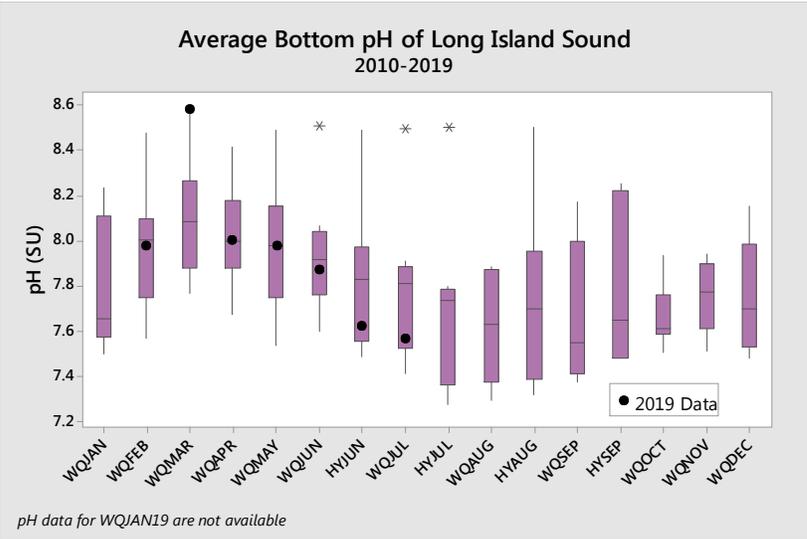
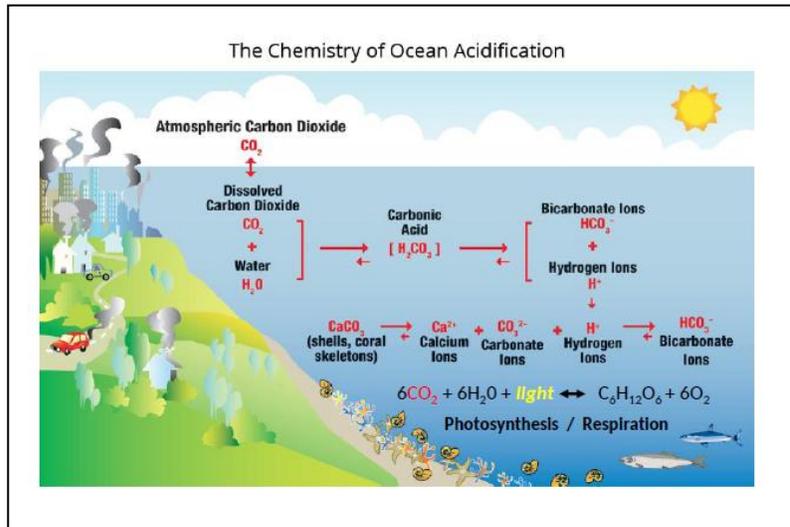
More detailed weather information can be viewed on the Northeast Regional Climate Center's website:
<http://www.nrcc.cornell.edu/>.



The pH of the surface waters of Long Island Sound during the WQJUL19 survey ranged from 7.42 SU (Station 18) to 8.98 SU (Station 10) and averaged 7.83 SU. The pH of the bottom waters ranged from 7.35 SU (Station A4) to 7.88 SU (Station 25) and averaged 7.56 SU.

The pH of both the surface and bottom water has declined since the WQJUN19 survey. As pH declines, acidity increases. During the summer, the Sound follows this trend with increasing temperatures and decreasing dissolved oxygen concentrations.

Some factors which may influence these changes of pH include increased atmospheric carbon dioxide (CO₂) deposition, anthropogenic inputs, and seasonal weather changes.



SPOTLIGHT Shell Day 2019



Monitoring Blitz for Coastal Acidification

On **Thursday, August 22, 2019**, more than thirty-five (35) citizen scientist groups from ME to NY will be participating in the first ever Shell Day Monitoring Blitz for Coastal Acidification. Shell Day is an event to sample Total Alkalinity (TA), salinity, and temperature up and down the eastern seaboard. The event will create a snapshot of coastal marine conditions and contribute to coastal acidification research. The hope is that data collected during the event can be used to establish a correlation between TA and salinity, and, in the future, salinity can be used as a proxy for TA, enabling citizen scientists to collect valuable data via an affordable means.

Participating groups will collect grab samples for TA under a QAPP prepared in consultation with EPA and utilize SOPs developed by leading OA scientists. Samples will be collected at low, mid, and high tide. Analyses of the samples will be performed by leading OA scientists at the University of New Hampshire, Woods Hole, UCONN and others. Sample analyses are funded in part by the NOAA Ocean Acidification Program.

Nine groups across LIS have committed to participating so far. These groups will sample the Pawcatuck River, Wequetequock Cove, Eastchester Bay, Saugatuck Harbor, Little Neck Bay, Peconic/Greenport Harbor, Bronx River, and Pt Jeff Harbor. Analyses of LIS samples will be performed by the **Vlahos lab at UCONN**. LIS groups will also collect dissolved oxygen data. An educational workshop is being planned for September to disseminate results to participating LIS groups.

There is still time to join. Contact Katie O'Brien-Clayton at Katie.obrien-clayton@ct.gov or read more on the OAIE and [NECAN website](#).



Ocean Acidification Information Exchange

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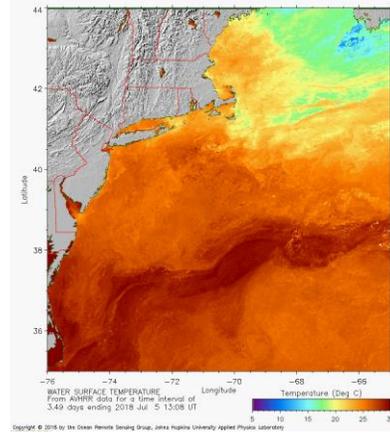
Join the OA Info Exchange and check out blog posts on the project.



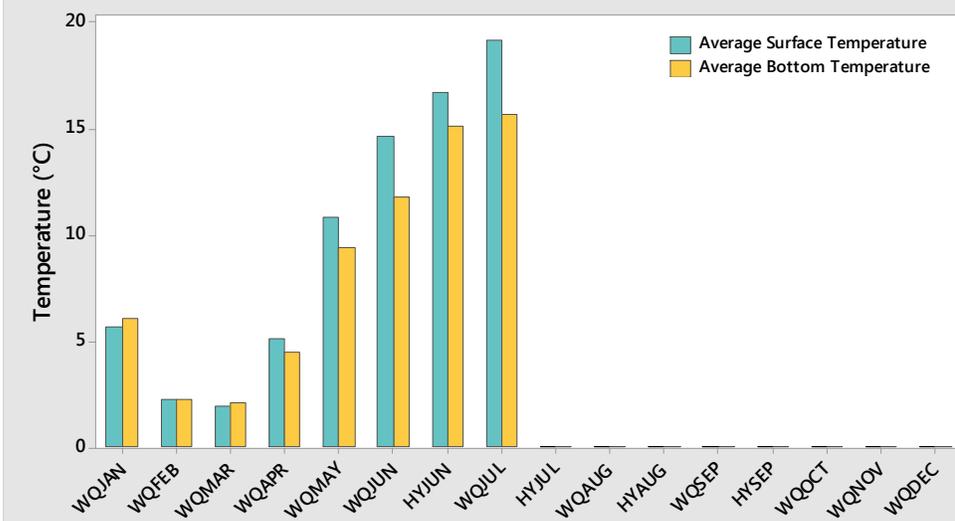
Temperature

For the WQJUL19 survey, surface water temperatures averaged 19.06°C and bottom waters averaged 15.78°C. Both temperature averages are significantly higher than those from the WQJUN19 survey; there was a 4.41 °C increase in average surface temperature and a 4.04°C increase in average bottom temperature.

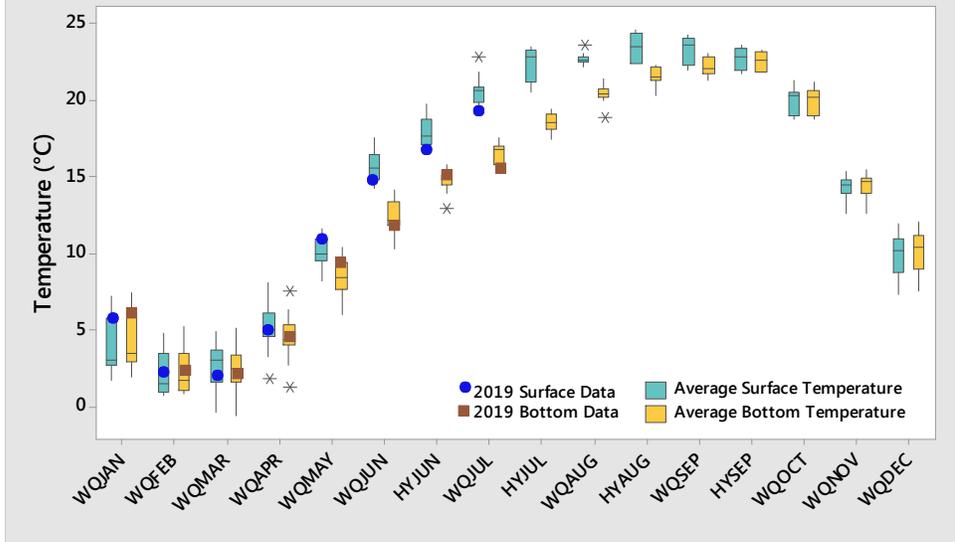
The warmest surface waters were recorded at Station 15 (22.15°C), and the warmest bottom waters were recorded at Station 25 (20.66°C). Station 15 had the greatest temperature difference between the surface and bottom water (ΔT), 6.30°C.



Average Monthly Temperature of Long Island Sound
2019



Average Long Island Sound Water Temperatures
2009 - 2019



Secchi Disk Depths

Water clarity is a measure of how much light penetrates the water column, and clarity can be reduced by the presence of suspended solids, organic matter, phytoplankton, and zooplankton.

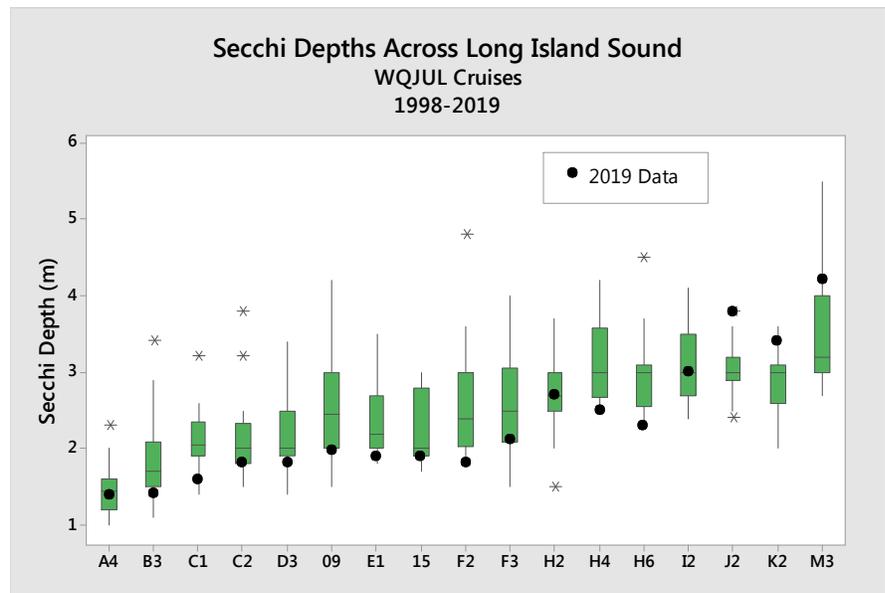
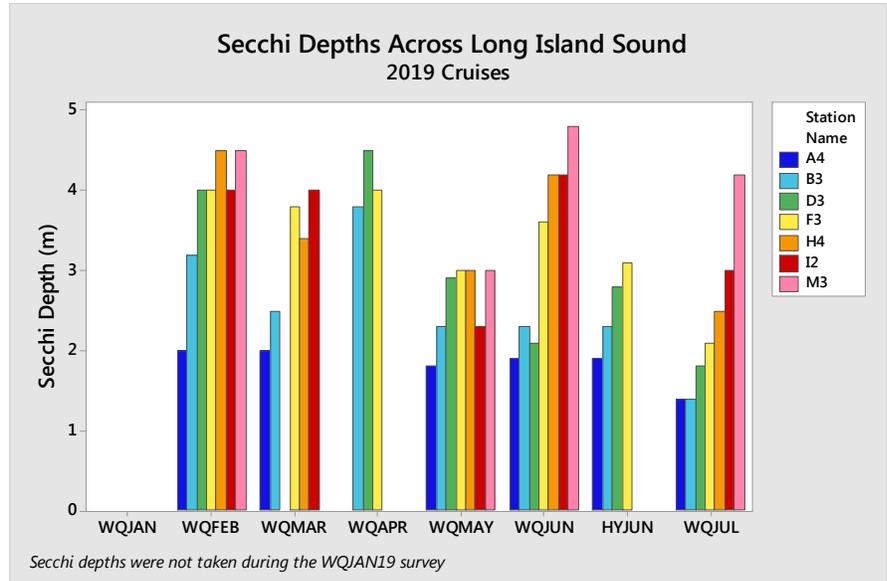
In order to assess the water clarity across Long Island Sound, Secchi disks are used at each station. The black and white disk is lowered into the water column until such a depth is reached that the black and the white quarters can no longer be differentiated. This is called the Secchi depth.

The Secchi depths determined during the WQJUL19 survey ranged from 1.3 to 4.2 meters.

The [Long Island Sound Report Card](#) developed by Save the Sound utilizes the following water clarity depth 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).

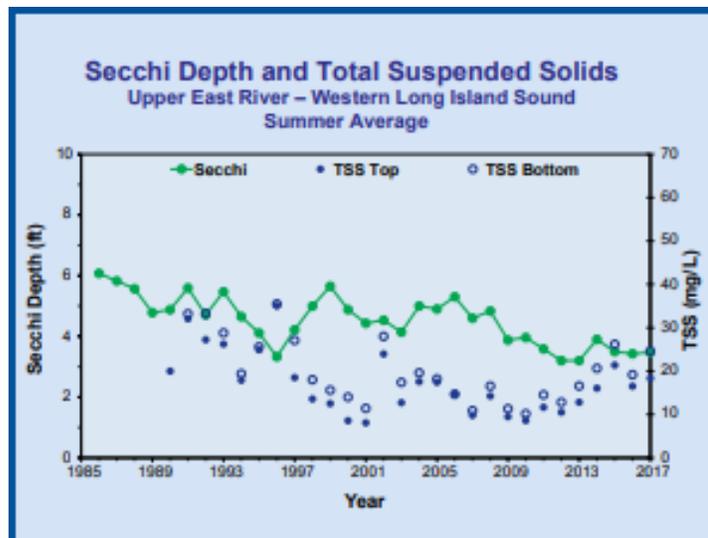
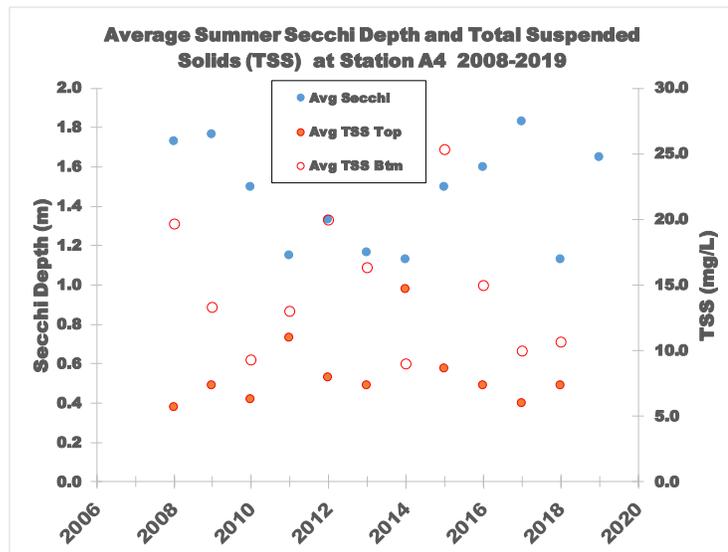
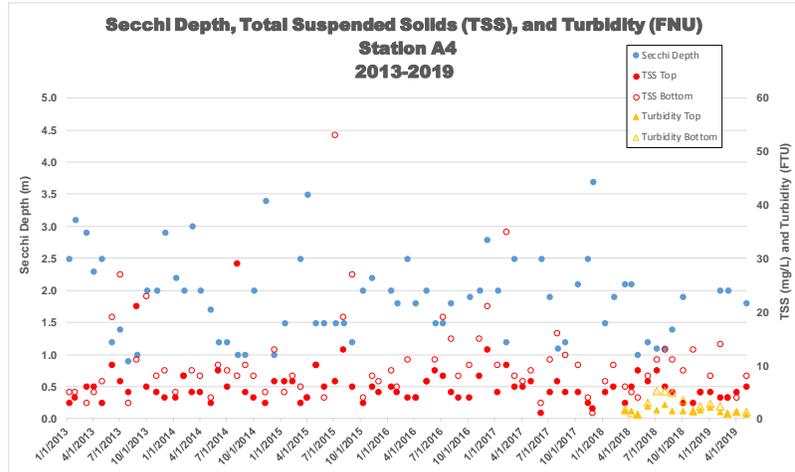
Station A4, the westernmost station sampled by CT DEEP, consistently receives the worst grade, though it has improved over time. In 2015, A4 received a D (66%) in water clarity. In the Report Card most recently published (using 2017 data), A4 scored a C+ (77%).



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 (TSS) 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.



From the NYCDEP 2017 Harbor Water Quality Report, Upper East River-Western Long Island Sound

Next Survey

The next survey is scheduled for 7/15-7/19 (HYJUL19) aboard the R/V John Dempsey. The [schedule](#) for the remainder of 2019 is available on our website.



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