July 2021

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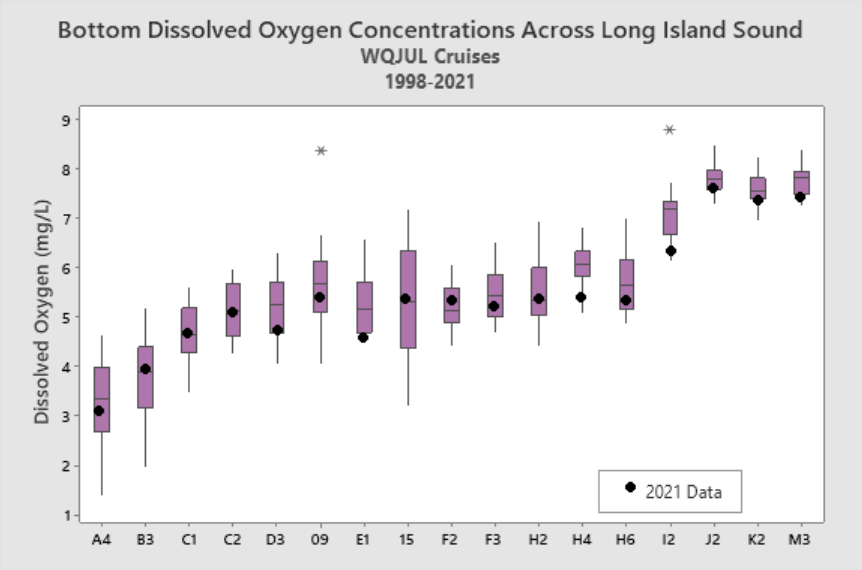


Long Island Sound Water Quality Monitoring Program

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

79 Elm Street
Hartford, CT 06106
(860) 424-3176
Katie.obrien-clayton@ct.gov

WQJUL21 Water Quality Summary

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

CT DEEP sampled 39 stations during the WQJUL21 survey that was conducted 8-12 July 2021. The lowest dissolved oxygen recorded during this survey was at Station A4 with a concentration of 3.07 mg/L. Station B3 was less than 4 mg/L (3.96 mg/L). Six other stations sampled during this survey had concentrations below 4.8 mg/L. 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.

In 2021, the DO at Station A4 was 0.1 mg/L higher than in 2020 (2.97 mg/L). Dissolved oxygen concentrations measured in the Sound in 2021 were generally at or below than 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 (1998-2021) is 3.28 mg/L. For 11 of the past 12 years the minimum dissolved oxygen concentration for the WQJUL survey occurred at Station A4 (Table 1).

There were of 227.5 km^2 of bottom water that had dissolved oxygen concentrations less than 4.8 mg/L during the WQJUL21 survey (74.1 km^2 less than in 2020). 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.

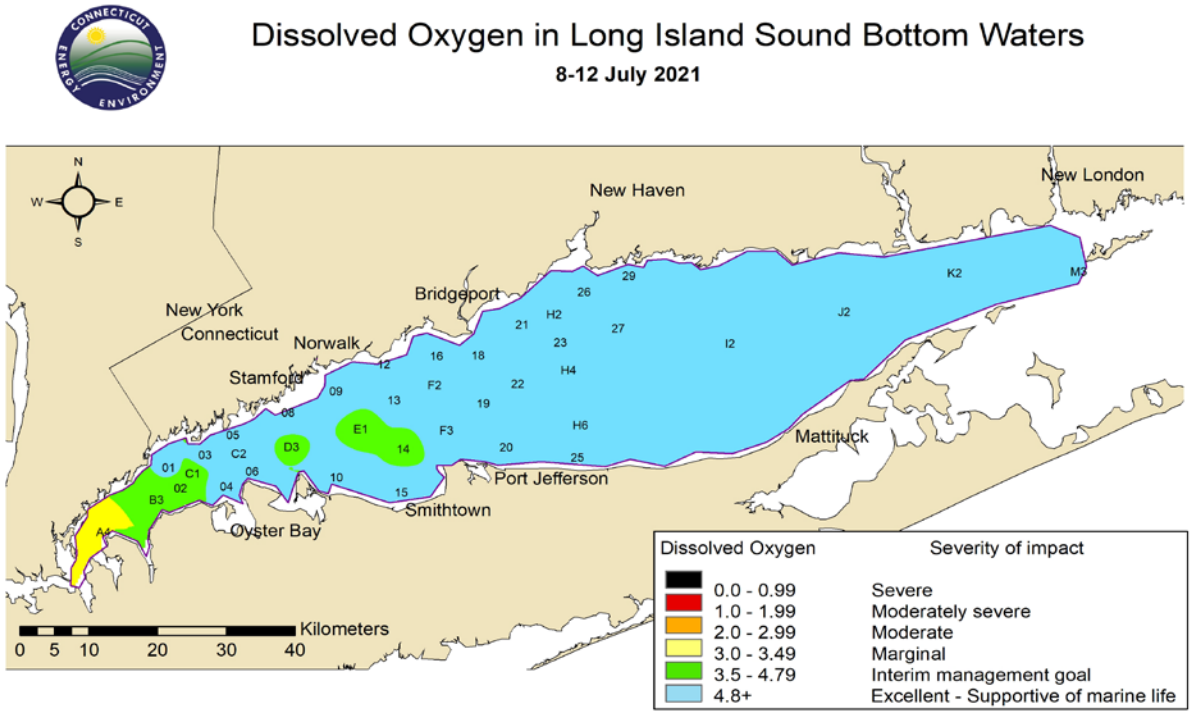


Table 1. Minimum Dissolved Oxygen Concentrations and Areal Estimates for WQJUL Cruises Conducted from 1998-2021 by CT DEEP.

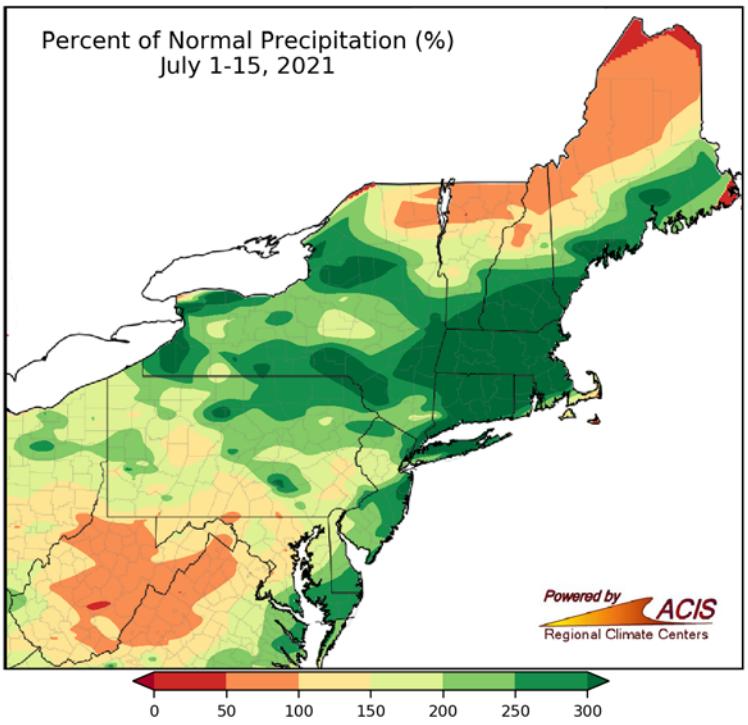
Cruise	Minimum DO Observed (mg/L)	Station with Minimum DO	Area under 4.8 mg/L (km^2)	Area under 3 mg/L (km^2)
WQJUL98	2.57	02	475	33.4
WQJUL99	2.44	A4	552.3	43.7
WQJUL00	1.36	A4	735.7	114.6
WQJUL01	3.06	A4	760.8	0
WQJUL02	1.39	A4	546.7	139.4
WQJUL03	2.18	15	480.9	122
WQJUL04	3.56	02	166.8	0
WQJUL05	3.21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

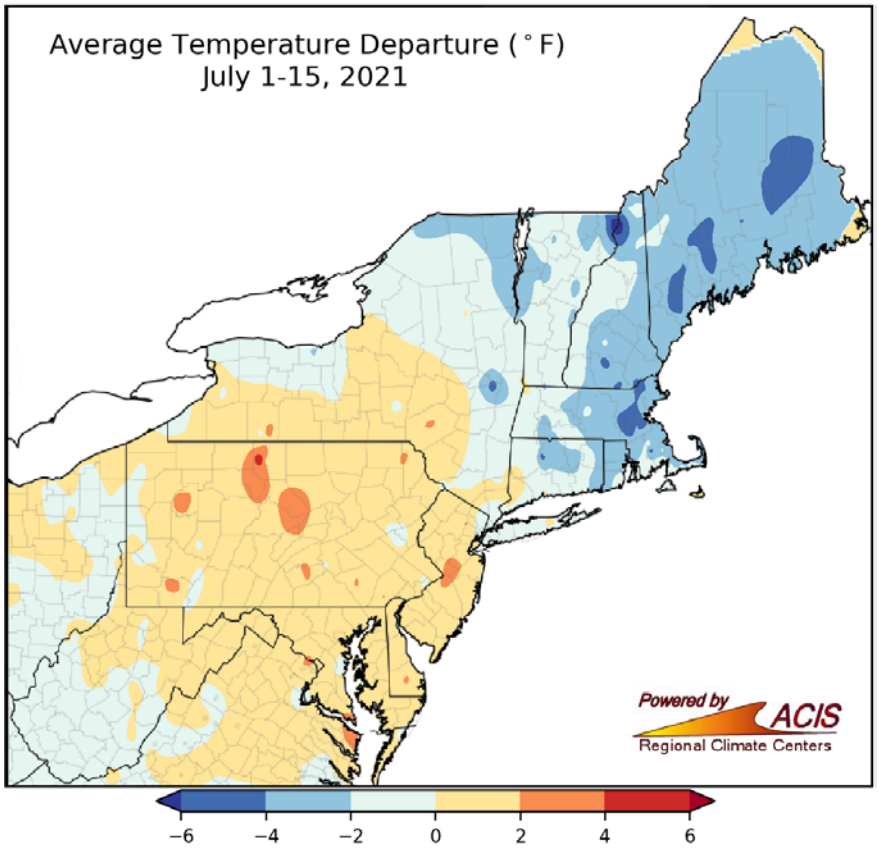
Weather

In the 1st half of July, the New England area received an above average amount of precipitation. Repeated thunderstorms and other severe weather conditions, such as Tropical Storm Elsa which dropped over 5 inches of rain on CT July 8-10, resulted in flash flooding in many areas across New York and Connecticut. Hartford and Bridgeport received 438% and 519% percent of normal precipitation, respectively. The precipitation so far within Bridgeport was measured to be 7.73 and Hartford received 8.23 inches. Normal amounts are 1.88 in for Hartford and 1.49 in for Bridgeport. With precipitation levels such as this, this July has been ranked 4th wettest July on record for both cities.

The beginning part of July was cooler than normal with average temperature departures 2-4°F below normal. Connecticut experienced average temperatures of 71.7°F in Hartford, with the normal average being 74.1°F, while Bridgeport had an average of 73.7°F, with 75.3°F being the normal average in the area.

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



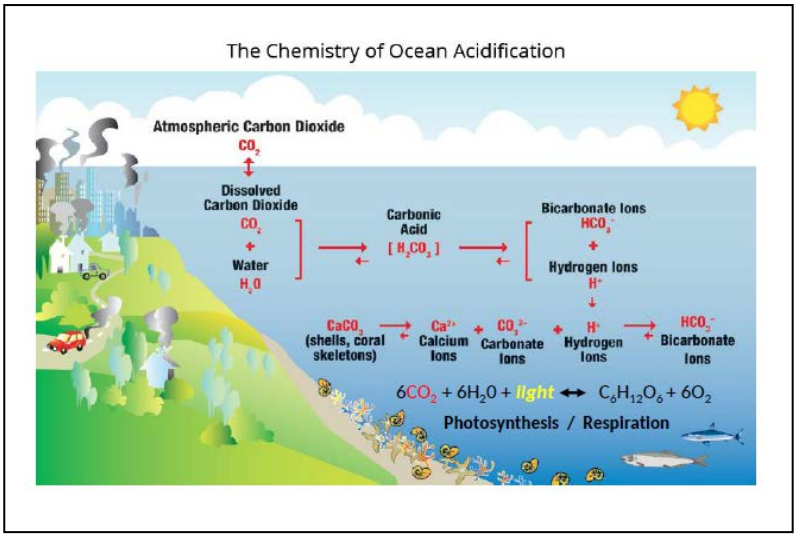


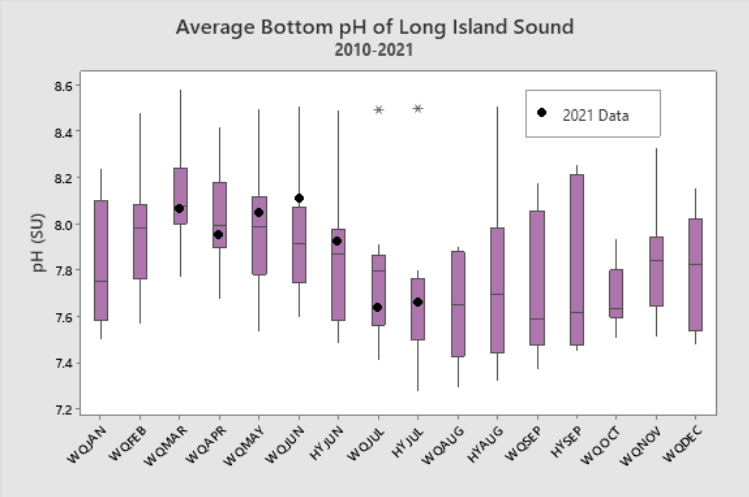
pH

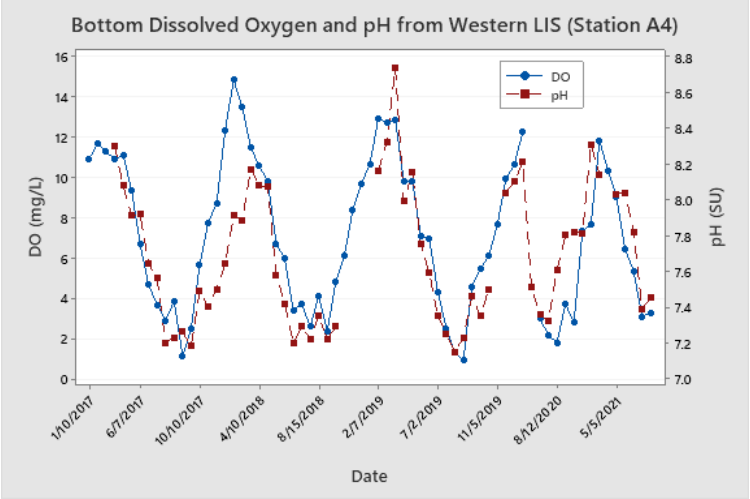
pH in the surface waters of the Sound during the WQJUL21 survey ranged from 7.62 to 8.04 SU and averaged 7.90 SU. pH in the bottom waters ranged from 7.37 to 7.88 SU and averaged 7.61 SU. Both the surface and bottom water pH has declined beginning in June.

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

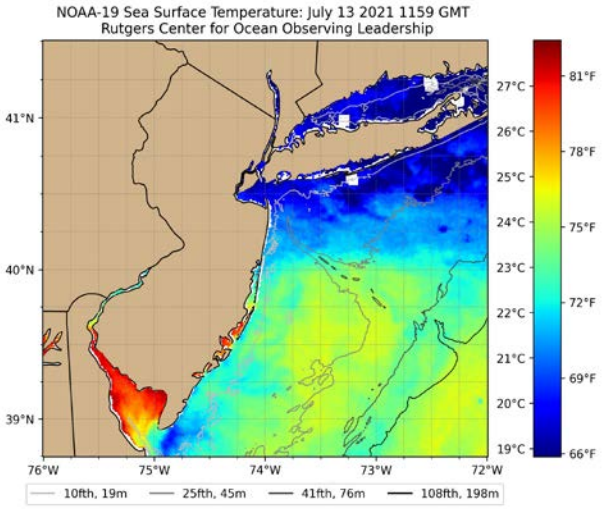
Some factors which may influence these changes of pH in the Sound include increased atmospheric carbon dioxide (CO_2) deposition, anthropogenic inputs, and other seasonal weather changes.





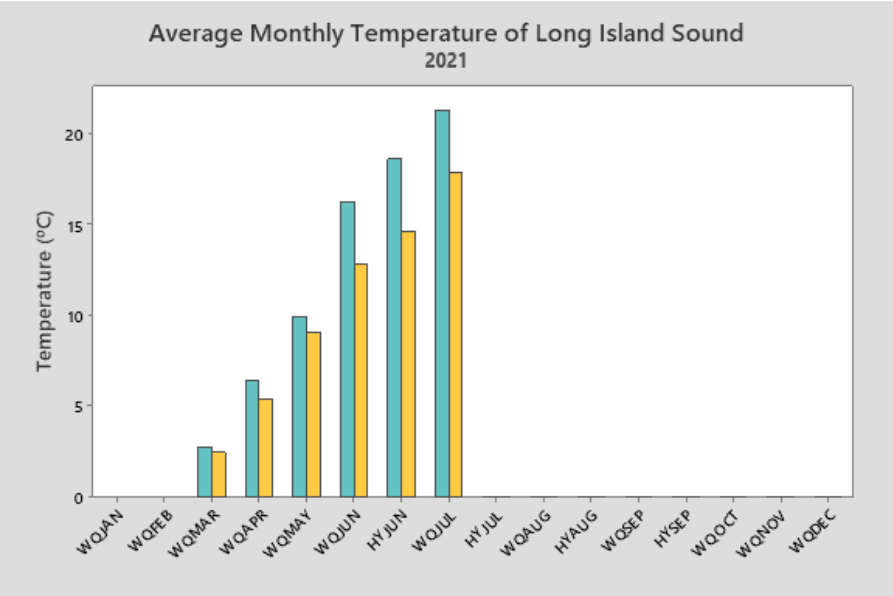


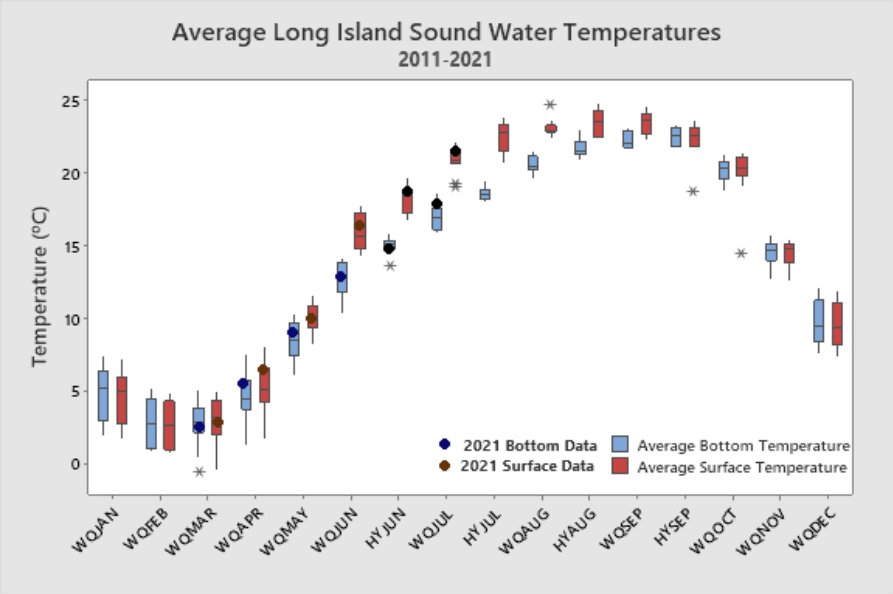
Temperature



Average bottom and surface water temperatures rose about three (3) degrees from the HYJUN21 survey to WQJUL21 survey. Bottom waters averaged 17.86° C and surface waters average 21.33°C.

During the WQJUL21 survey, the warmest bottom waters were recorded at Station 26 (20.51° C) and the warmest surface waters were recorded at Station H6 (22.41° C). Station H6 had the greatest ΔT of 6.06°C.



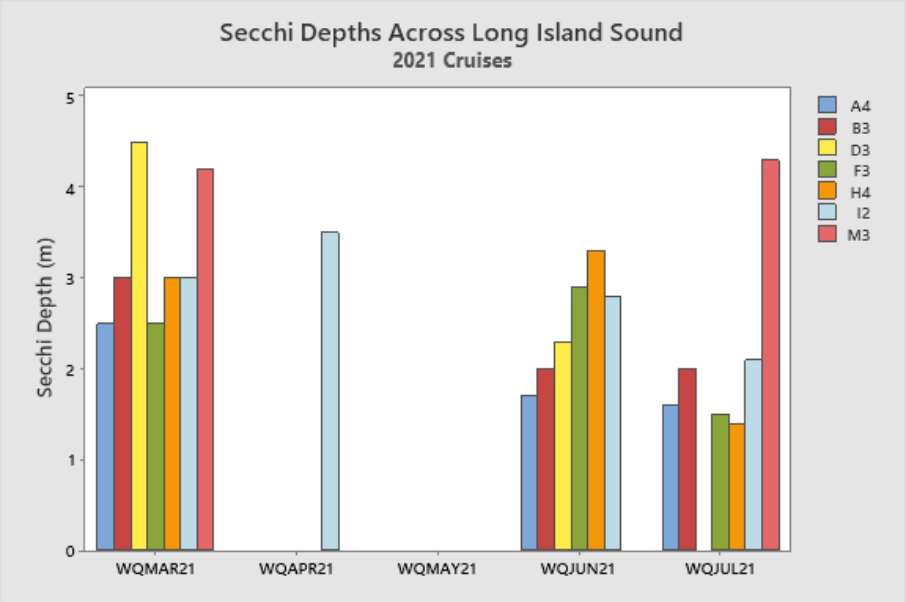


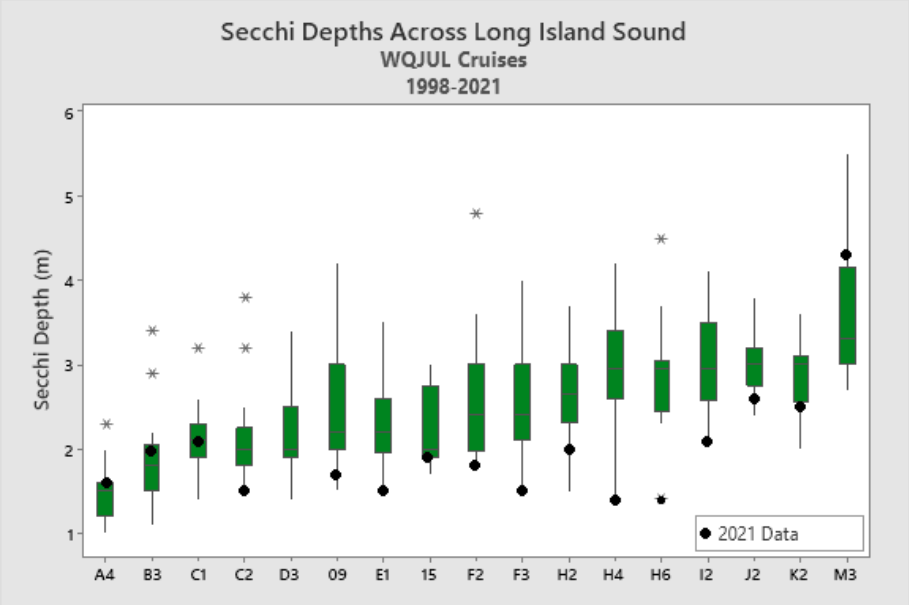
Secchi Disk Depths

Secchi disk transparency depths, which reflect water clarity, during this survey ranged from 1.4 meters to 4.3 meters.

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

The Long Island Sound Report Card has established four threshold levels for grading water clarity in Long Island Sound. Secchi depths less than 0.7 m are considered poor/failing. Secchi depths greater than 2.4 m are considered excellent/passing. Secchi depths between 0.1 and 1.1 m are marginal and depths between 1.1 and 2.4 are fair. 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 2018 Station A4 scored an F (50%).

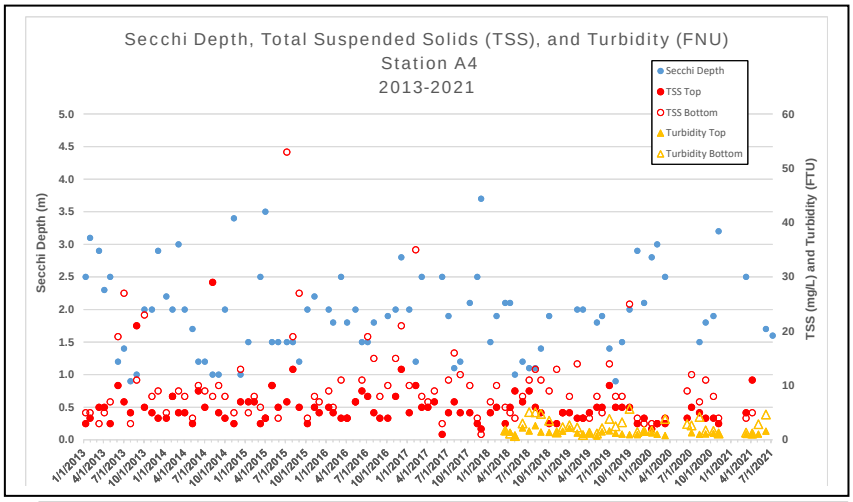


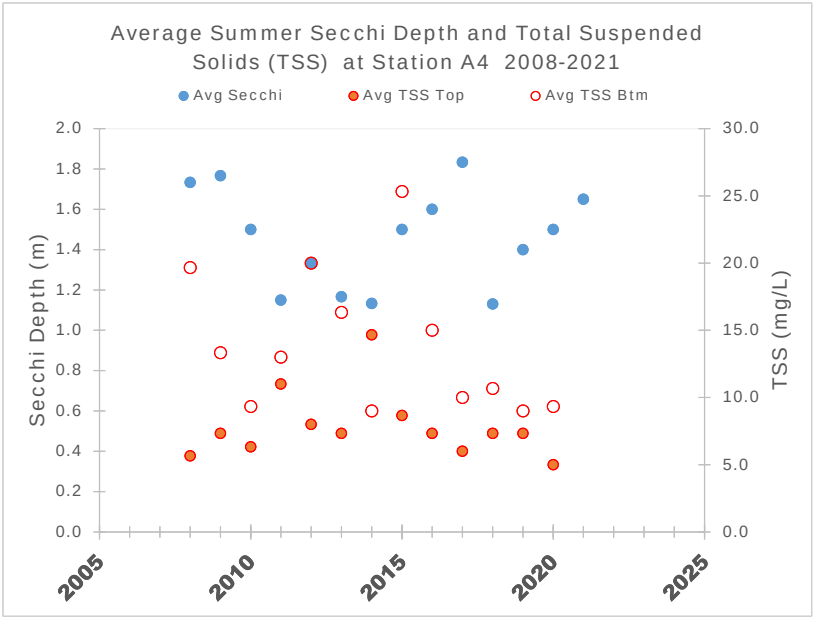


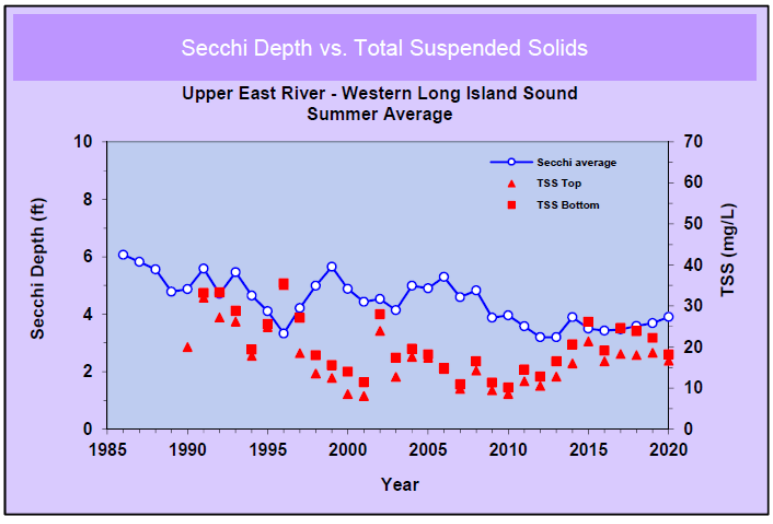
Secchi Disk Depths

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.



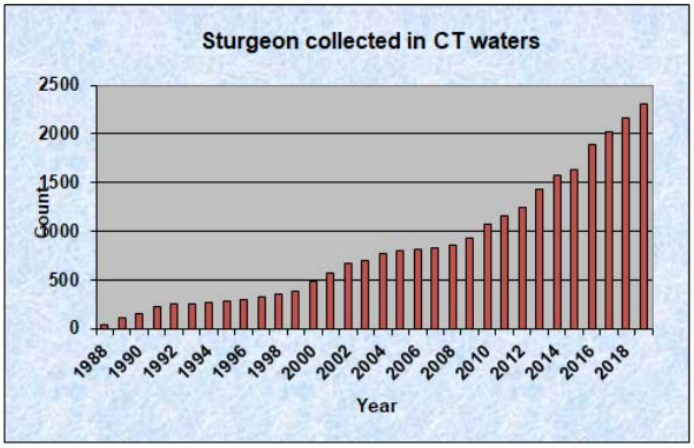




From the NYCDEP 2020 Harbor Water Quality Report, Upper East River-Western Long Island Sound

SPOTLIGHT- CT DEEP
Sturgeon Monitoring Program

CT DEEP Marine Fisheries Biologists began researching Shortnose Sturgeon in the Connecticut River in 1988 to estimate abundance, preferred habitat and seasonal migration patterns. Early efforts utilized marked-recapture studies and acoustic telemetry. CT DEEP studies indicate the Shortnose Sturgeon population in CT is increasing. Shortnose Sturgeon migrate seasonally within the CT River.



Additionally, Atlantic Sturgeon research has also been conducted since 1984. Atlantic Sturgeon arrive in CT waters in the spring, as early as April; most depart in the fall as water temperatures drop. A few overwinter in CT. Atlantic sturgeon have been documented regularly near Middletown/Portland and as far north as Hartford. CT DEEP has documented Atlantic Sturgeon spawning in CT waters; a very rare event. While the numbers of spawning individuals in CT are very low, biologists are hopeful they increase.

A recently funded LISS project set to begin during the summer 2022 will continue acoustic telemetry work and allow staff biologists to upgrade acoustic receivers to current technology, increasing our understanding of sturgeon migrations and habitat use of Long Island Sound. Tag data will be uploaded to the Atlantic Cooperative Telemetry Node within the Mid-Atlantic Telemetry Observation System Database and can be shared globally. Additionally, the project has an added benefit of documenting other telemetered species of interest including sharks, striped bass, black sea bass, sea turtles, and marine mammals.

Additional information is available in the form of a Story Map https://www.arcgis.com/apps/MapJournal/index.html?appid=fb7239b0b12343f89833e133b3659dc5 andon the CT DEEP website https://portal.ct.gov/DEEP/Fishing/Fisheries-Management/Shortnose-Sturgeon-Research. Be sure to check out the cool video of sturgeon breaching recently posted on the CT Fish and Wildlife Facebook page https://www.facebook.com/355152261188535/posts/4092137814156609/?vh=e&d=n.

CT DEEP Fisheries Biologist Tom Savoy with Shortnose (top) and Atlantic Sturgeon (bottom).

Next Survey

The next survey is scheduled for 7/19-7/23 (HYJUL21) aboard the R/V John Dempsey. The schedule for the remainder of 2021 is available on our website.

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION