

July 2019

[Volume 3, Issue 4]

HYJUL19 Hypoxia Summary

26 Stations with Dissolved Oxygen Concentrations below 5 mg/L

CT DEEP sampled 39 stations during the HYJUL19 survey that was conducted 15-17 July 2019. The lowest dissolved oxygen (DO) recorded during this survey was at Station A4 with a concentration of 2.47 mg/L. The next lowest DO occurred at Station 15 with a concentration of 3.09 mg/L. These numbers are significantly less than during the HYJUL18 survey when the lowest DO was 3.70 mg/L at Station A4. In HYJUL19, Stations A4 and 15 were the only ones below 4 mg/L; however, a total of 26 stations were below 5 mg/L, and 16 of those were under the 4.8 mg/L benchmark. More data are available in an [Excel spreadsheet format](#).

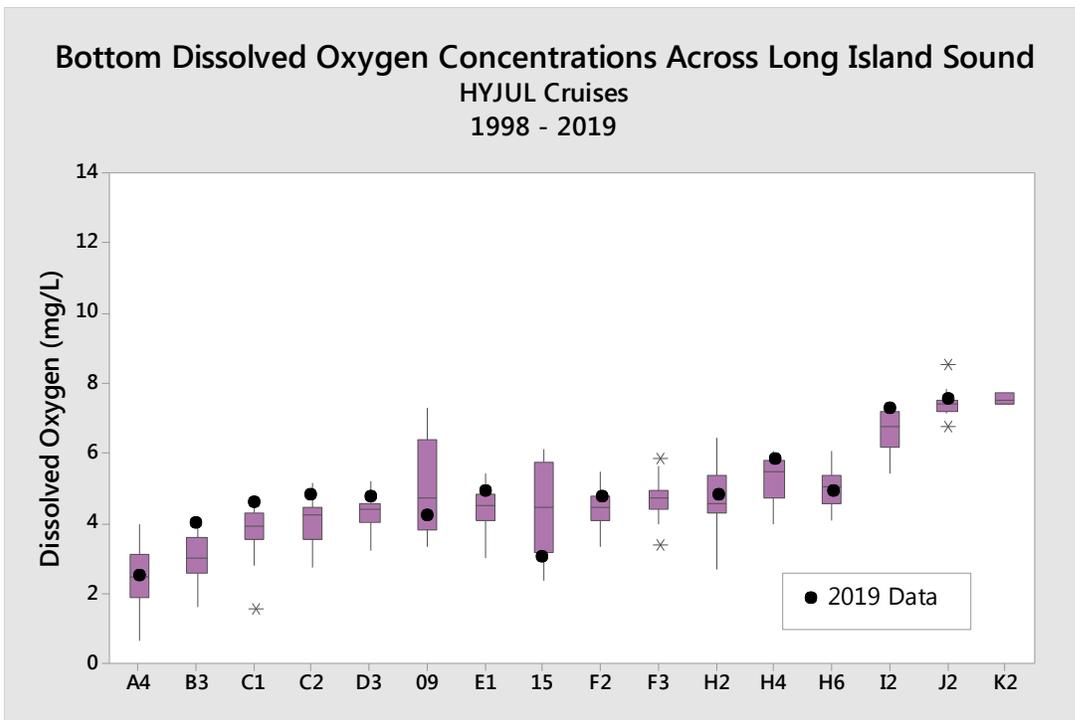
During this July's survey, there were 511.8 km² of bottom water that had DO concentrations less than 4.8 mg/L, and 46.1 km² were less than 3.0 mg/L. Comparatively, last year at this time, there were 232.6 km² of bottom water with DO concentrations less than 4.8 mg/L, and no bottom water was less than 3.0 mg/L. Since 1998, DO levels in the bottom waters of Long Island Sound during the HYJUL survey have been above 3.0 mg/L on only three occasions: HYJUL18, HYJUL14, and HYJUL04 (Table 1). The areal estimates of bottom waters with DO concentrations less than 4.8 mg/L range from 1,342.7 km² in 2000 to 148.2 km² in 2014. The most severe hypoxic event to occur during a HYJUL survey was in 2000 when approximately 447 km² of bottom water had concentrations below 3.0 mg/L.



Long Island Sound
Water Quality Monitoring
Program

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Dissolved Oxygen

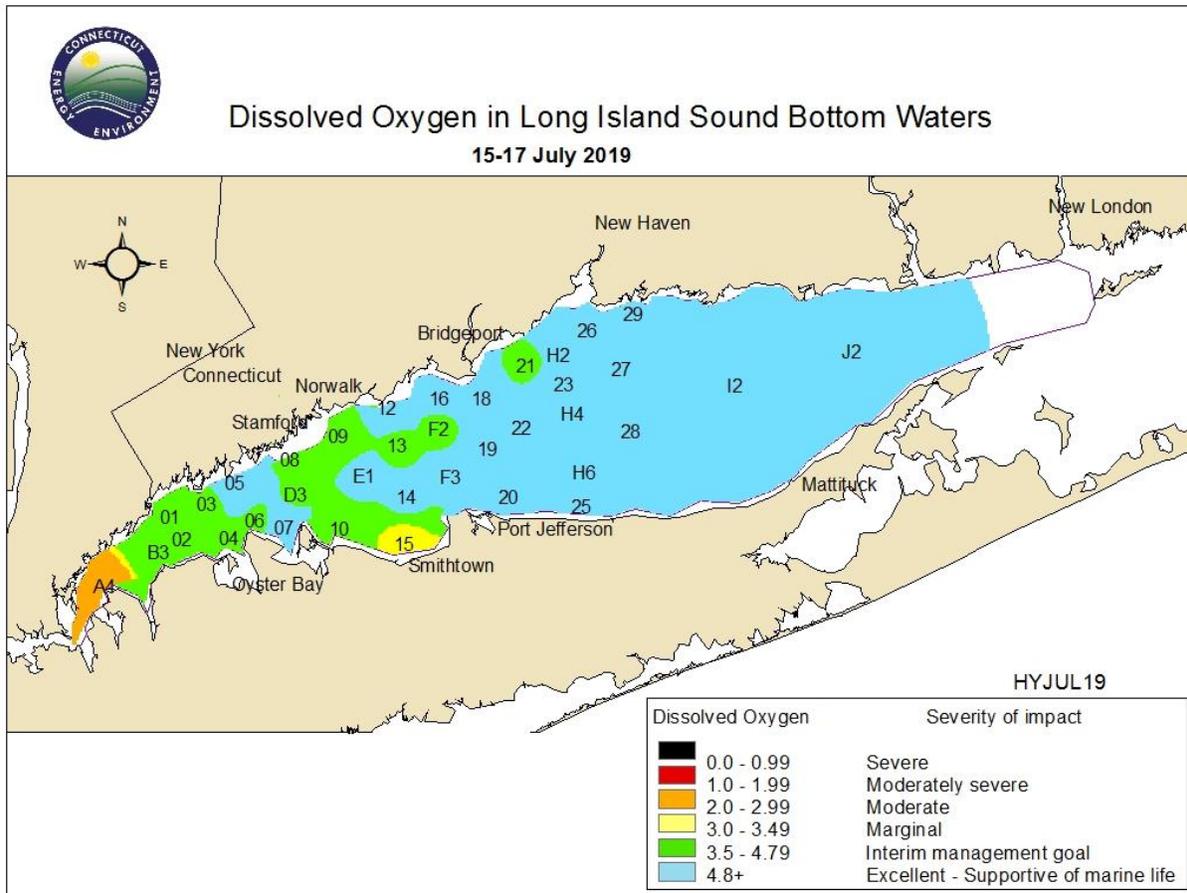


Table 1. Minimum Dissolved Oxygen Concentrations and Areal Estimates for HYJUL Cruises Conducted from 1998-2019 by CT DEEP.

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)
HYJUL98	2.3	15	886.0	86.3
HYJUL99	2.06	A4	1231.8	58.5
HYJUL00	1.27	C1	1342.7	446.9
HYJUL01	2.81	A4	917.1	47.9
HYJUL02	1.8	B3	1702.8	160.2
HYJUL03	2.09	A4	1121.7	175.1
HYJUL04	3.06	A4	1342.1	0
HYJUL05	1.41	A4	1245.5	157.4
HYJUL06	2.83	A4	349.8	66.7
HYJUL07	2.11	A4	823.9	129.9
HYJUL08	0.68	A4	676.5	58.6
HYJUL09	2.43	B3	1030.3	72.8
HYJUL10	1.66	A4	669.3	109.3
HYJUL11	2.5	A4	1110.7	36.2
HYJUL12	1.9	A4	1250.6	126.9
HYJUL13	2.33	C1	671.0	44.8
HYJUL14	3.61	O2	148.2	0
HYJUL15	2.12	A4	554.6	76.2
HYJUL16	2.44	A4	684.4*	49.2
HYJUL17	2.14	O2	1306.2	181.1
HYJUL18	3.70	A4	234.6	0
HYJUL19	2.47	A4	511.8	46.1

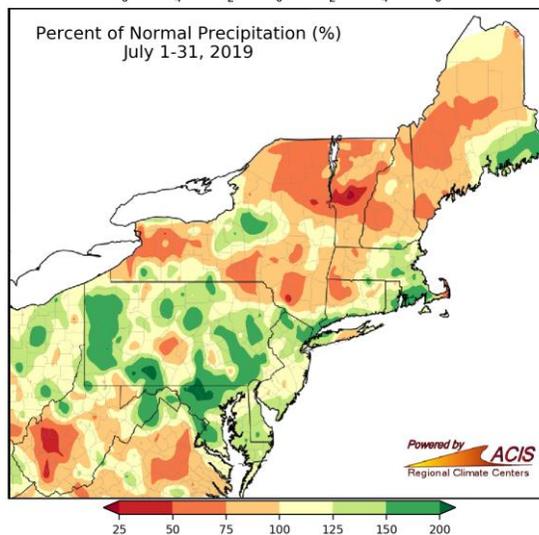
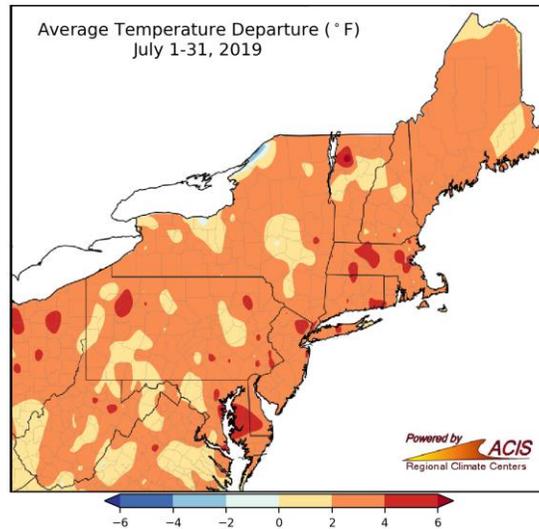
*area underestimated due to CTD battery failure

July 2019 was the all-time hottest month on record for Boston, MA; Hartford, CT; and Portland, ME. Four of the major climate sites surrounding Long Island Sound (Hartford, Bridgeport, Islip, and LaGuardia Airport) were 4.0-4.6°F warmer than the 30-year normal with averages around 78°F for three sites and 81°F for LaGuardia. In Hartford, there were 19 days with a maximum temperature above 90°F throughout the month.

The HYJUL19 survey (15-17 July) fell a couple days before a legitimate heat wave. Temperatures were in the high 80s/low 90s throughout the duration of the cruise.

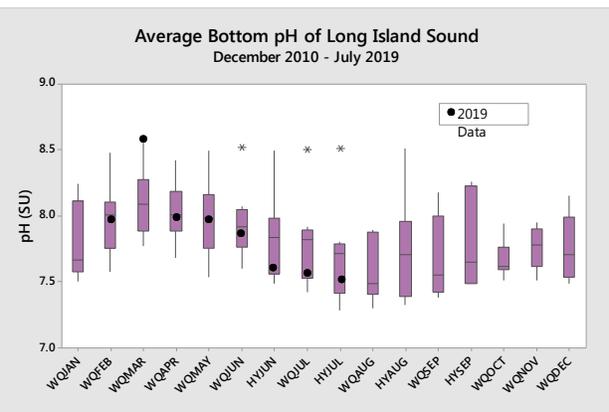
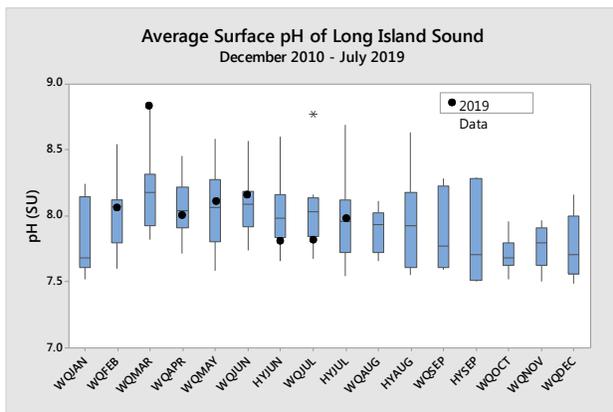
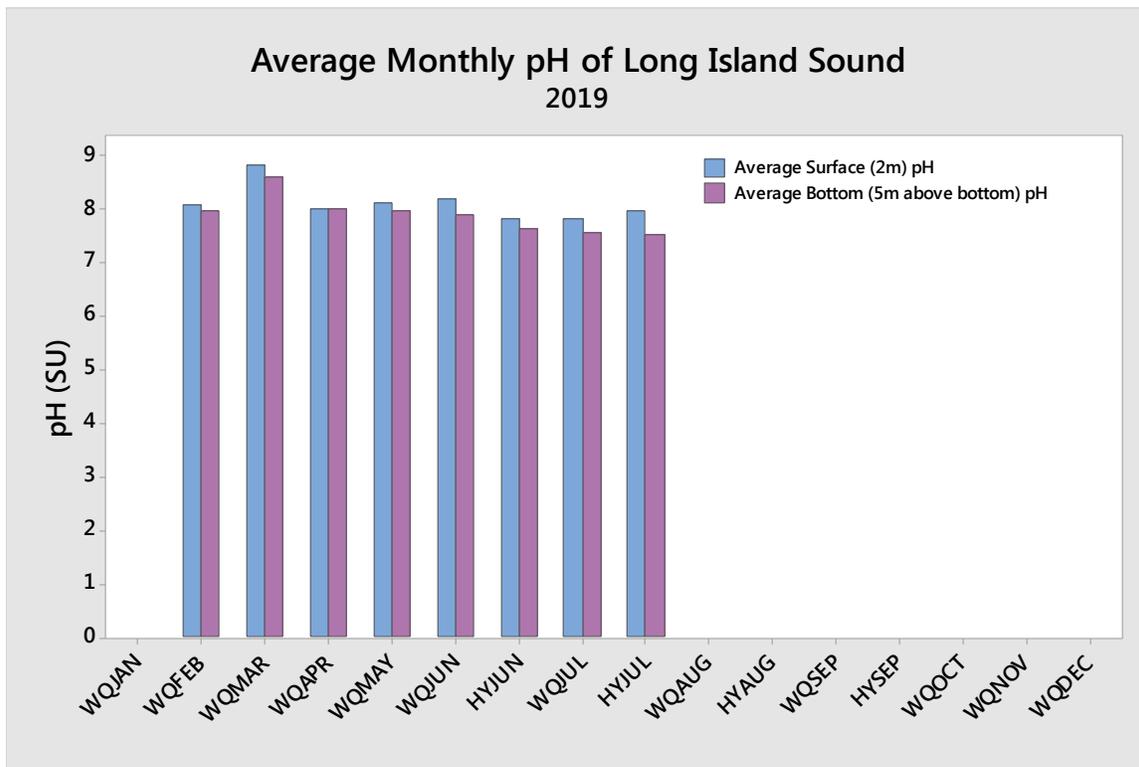
The Long Island Sound region saw above average precipitation for July 2019. Bridgeport, CT totaled 7.57 inches of rain, more than twice the normal of 3.46 inches. Similarly, LaGuardia Airport (NY) recorded 6.11 inches, 1.5 inches above the normal. Islip, NY received only 3.39 inches of rain, nearly the exact normal. In all sites mentioned, most precipitation came from a large rainfall event on July 17th and others scattered towards the middle of the month.

More detailed weather information can be viewed on the Northeast Regional Climate Center's website.



The average surface and bottom pH from all the stations across LIS during this survey were 7.91 and 7.53 SU, respectively. The minimums and maximums of each are as follows: the lowest bottom pH was 7.24 (Station A4), the highest bottom pH was 7.85 (Station I2), the lowest surface pH was 7.41 (Station 16), and the highest surface pH was 8.2 (Station 22).

The average surface and bottom pH graphs for all the cruises from 2010 to date only include the 17 year-round water quality stations.

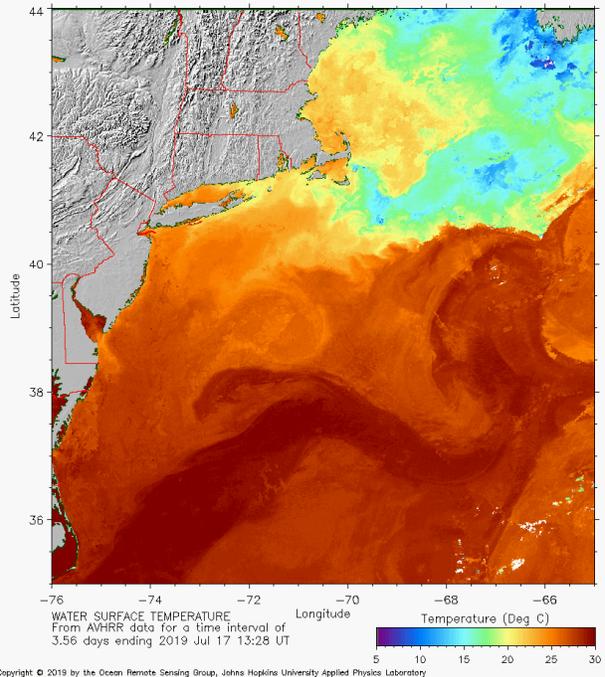


Temperature

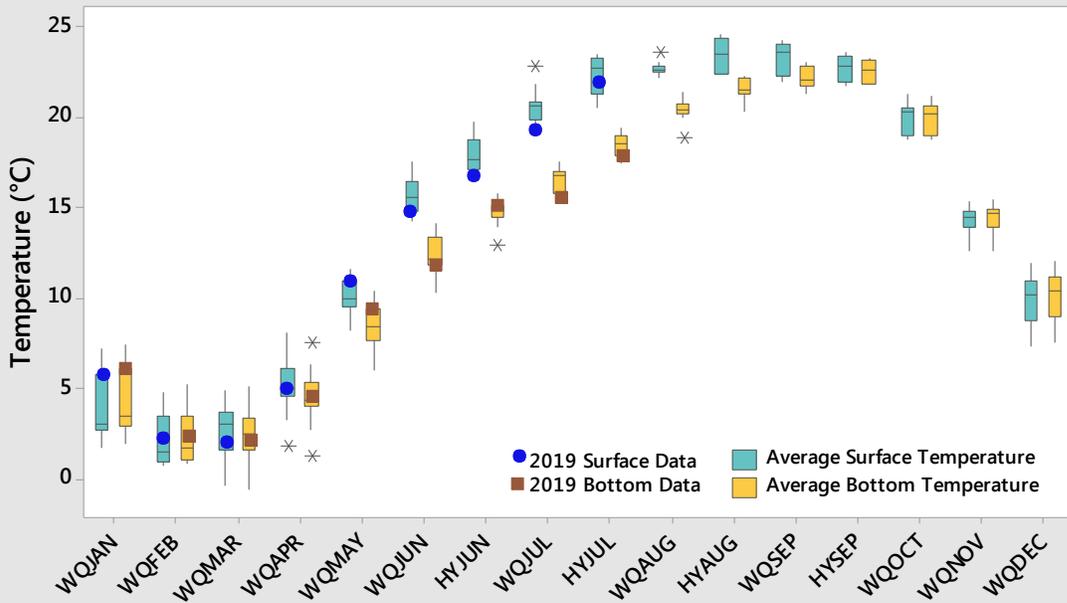
For the HYJUL19 survey, water temperatures averaged 21.71°C for surface waters and 17.86 °C for bottom waters. The surface waters were slightly warmer (+0.32°C) this year than during the HYJUL18 survey whereas the bottom waters were slightly cooler (-0.10°C) in 2019.

The warmest surface temperature recorded was 24.19°C at Station 25, and the warmest bottom temperature recorded was 20.26°C at Station I2.

The difference between the surface and the bottom waters at each station (ΔT) ranged from 0.93°C (Station 12) to 7.25°C (Station H6).



Average Long Island Sound Water Temperatures 2009 - 2019



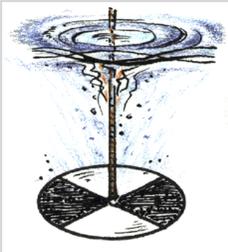
The 1998-2019 average surface and bottom temperature graph reflects only data from the 17 year-round water quality stations.

Secchi Disk Depths

Suspended solids, organic matter, phytoplankton, and zooplankton can all reduce water clarity, a measure of how much light penetrates the water column. To assess the water clarity across Long Island Sound, a Secchi disk is lowered into the water at each station until it can no longer be seen.

The [Long Island Sound Report Card](#) developed by Save the Sound utilizes the following water clarity depth thresholds based on the Secchi depth:

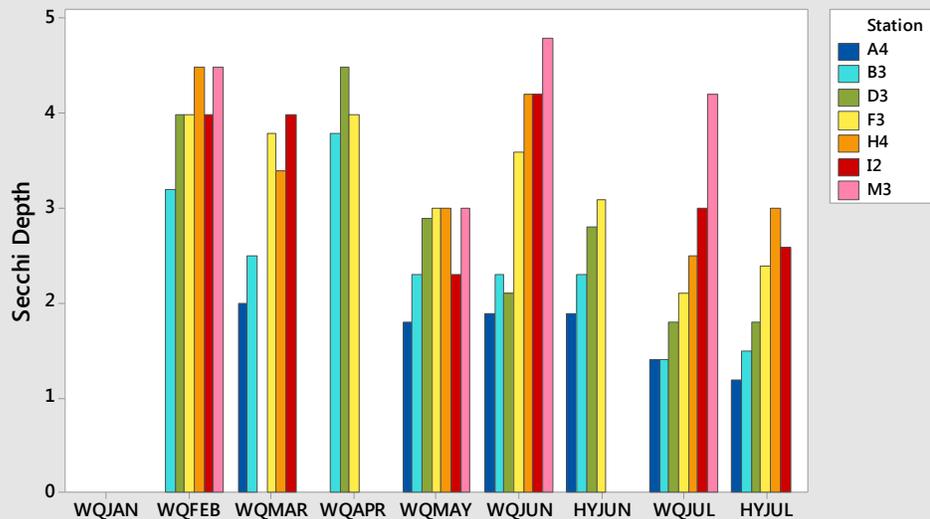
1. >2.28m (90-100)
2. 2.12 to <2.28 (80-89)
3. 1.95 to <2.12 (70-79)
4. 1.8 to <1.95 (60-69)
5. 0 to <1.8 (<60)



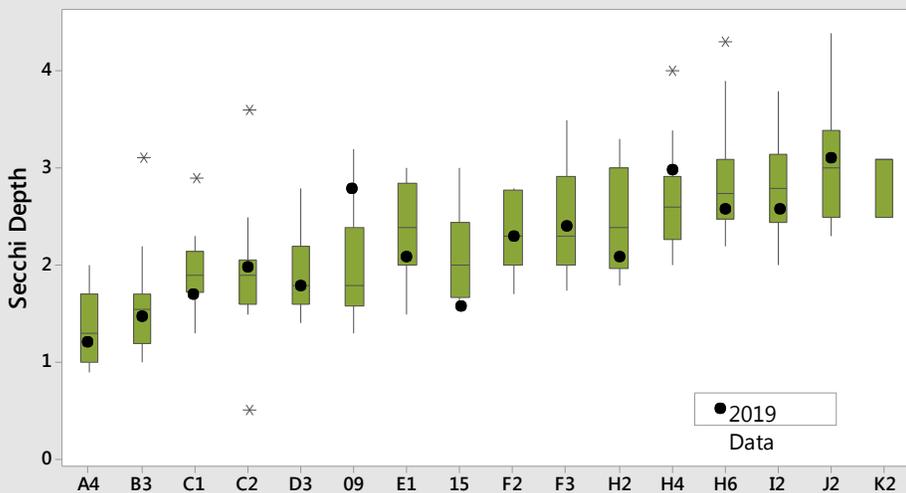
Secchi depths were taken at 38 stations during the HYJUL19 survey; these depths ranged from 1.2 meters (Station A4) to 3.1 meters (Station 28 and Station J2).

In Report Card terms, 14 stations were in the A-range (>2.28m), 8 stations were in the C-range (1.95 to <2.12m), 8 stations were in the D-range (1.8 to <1.95m), and 8 stations failed (<1.8m).

Secchi Depths Across Long Island Sound
2019 Cruises



Secchi Depths Across Long Island Sound
HYJUL Cruises
1998-2019



Next Survey

The next survey is scheduled for 29 July - 2 August (WQAUG19) aboard the R/V John Dempsey. The schedule for the remainder of 2019 is available on our website.



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