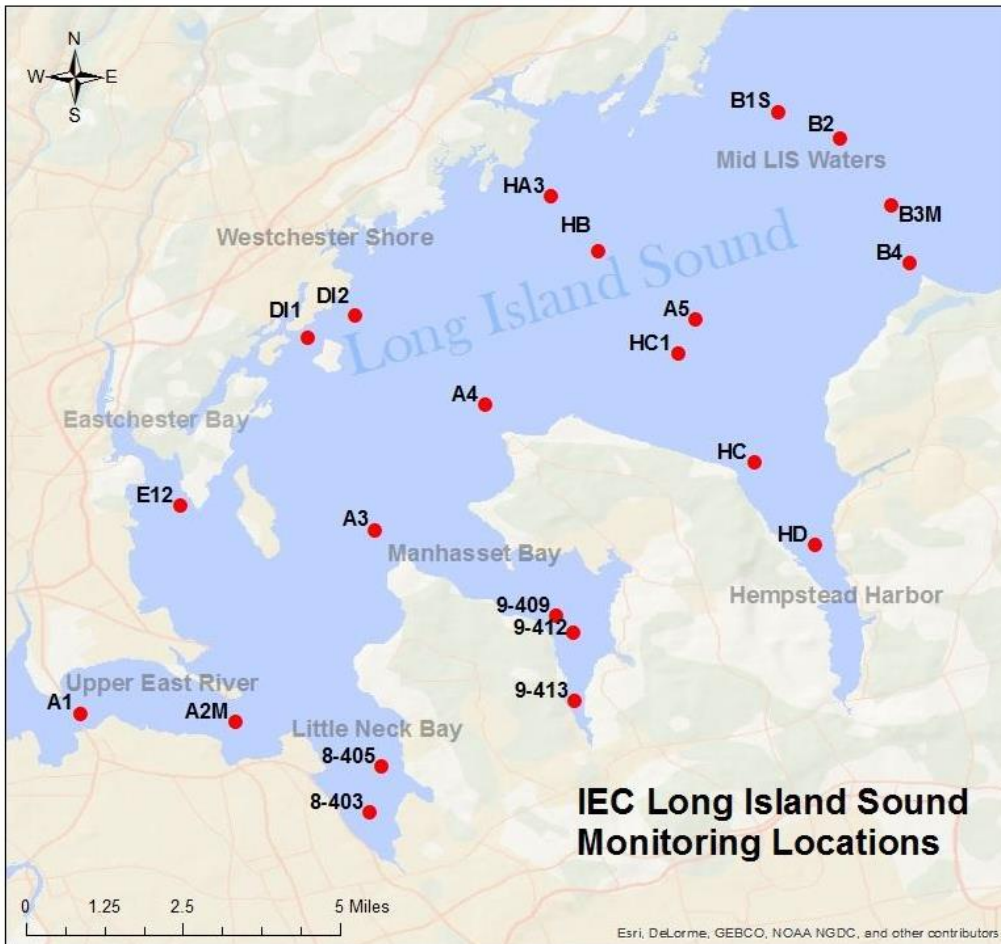




Western Long Island Sound Monitoring 2023 Summer Survey Bi-Weekly Summary Surveys #1 & #2 Survey Dates: June 28, 2023 & July 5, 2023



STATION	LATITUDE DD	LONGITUDE DD
E-12	40.8487	-73.8045
A1	40.8013	-73.8268
A2M	40.7992	-73.7913
8-403	40.7778	-73.7608
8-405	40.7888	-73.7582
A3	40.8433	-73.7590
9-409	40.8240	-73.7175
9-412	40.8200	-73.7135
9-413	40.8041	-73.7133
A4	40.8725	-73.7343
A5	40.8923	-73.6853
B1S	40.9403	-73.6667
B2	40.9343	-73.6520
B3M	40.9187	-73.6403
B4	40.9054	-73.6360
DI1	40.8883	-73.7748
DI2	40.8930	-73.7642
H-A3	40.9207	-73.7187
H-B	40.9080	-73.7090
H-C	40.8590	-73.6717
H-C1	40.8853	-73.6903
H-D	40.8402	-73.6572

As part of the Long Island Sound Study’s ongoing water quality monitoring program, IEC started its 33rd consecutive summer of weekly ambient monitoring surveys in western Long Island Sound and the upper East River on Wednesday, June 28th, 2023.

Throughout summer 2023, IEC staff will perform 12 weekly surveys to each of 22 stations in the far western Long Island Sound to assess seasonal hypoxic conditions. Hypoxia occurs when dissolved oxygen (“DO”) concentrations become low. Marine organisms need oxygen to live and low oxygen concentrations can have serious consequences for a marine ecosystem.

The 12 surveys include weekly *in situ* measurements of water temperature, salinity, dissolved oxygen, pH, turbidity, and Secchi disk depth. Measurements at each station are taken half a meter below the surface, at mid-depth, and half a meter above the bottom.

Biweekly surveys will include collection of additional samples for parameters relevant to hypoxia at 11 of the 22 stations (stations listed in

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bold on table, upper right). These samples will be analyzed for nutrients, Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS), and chlorophyll *a*, in addition to the suite of *in situ* parameters listed above.

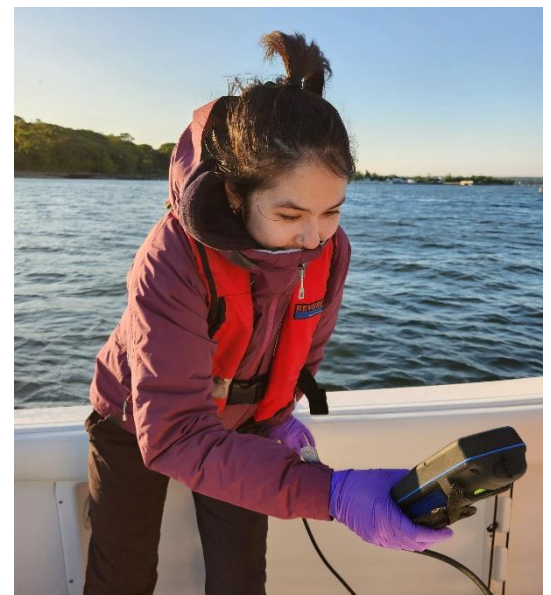
Nutrient parameters that will be analyzed include Ammonia, Nitrate+Nitrite, Particulate Nitrogen, Orthophosphate/DIP, Total Dissolved Phosphorus, Particulate Phosphorus, Dissolved Organic Carbon, Particulate Carbon, Dissolved Silica, and Biogenic Silica.

In October 2022, IEC also began collecting DIC and Total Alkalinity samples to monitor coastal acidification.

Proposed 2023 Summer Schedule		
Date	Survey Number	Parameters
6/28/2023	1	<i>In situ</i> parameters only
7/5/2023	2	<i>In situ</i> , nutrients, chlorophyll <i>a</i> , BOD, TSS
7/12/2023	3	<i>In situ</i> parameters only
7/18/2023	4	<i>In situ</i> , nutrients, chlorophyll <i>a</i> , BOD, TSS
7/25/2023	5	<i>In situ</i> parameters only
8/1/2023	6	<i>In situ</i> , nutrients, chlorophyll <i>a</i> , BOD, TSS
8/9/2023	7	<i>In situ</i> parameters only
8/15/2023	8	<i>In situ</i> , nutrients, chlorophyll <i>a</i> , BOD, TSS
8/22/2023	9	<i>In situ</i> parameters only
8/31/2023	10	<i>In situ</i> , nutrients, chlorophyll <i>a</i> , BOD, TSS
9/6/2023	11	<i>In situ</i> parameters only
9/12/2023	12	<i>In situ</i> , nutrients, chlorophyll <i>a</i> , BOD, TSS



Kimarie Yap, Environmental Analyst II



Kyra Lin, IEC Seasonal Intern



Thousands of comb jellies at Westchester shoreline and Mid-LIS stations during Survey #1. May have been a jellyfish bloom.

SURVEY # 1 AT A GLANCE 06/28/2023

Hypoxia (DO < 3.00 mg/L)	No stations exhibited hypoxia! ☺
Lowest surface DO concentration	5.69 mg/L (Station 9-413 in Manhasset Bay)
Lowest bottom DO concentration	4.22 mg/L (Station H-C1 in Mid-LIS waters)
Average surface DO concentration	8.00 mg/L
Average bottom DO concentration	5.51 mg/L
Average surface water temperature	20.72 °C
Average bottom water temperature	18.88 °C
Average water column ΔT	1.83 °C
Average surface salinity	25.80 ppt
Average bottom salinity	26.11 ppt
Lowest surface pH	7.31 (Station 9-413 in Manhasset Bay)
Lowest bottom pH	7.08 (Station 9-413 in Manhasset Bay)
Average surface pH	7.89
Average bottom pH	7.64

Survey #1 Narrative Summary

This survey began at 06:17 and ended at 10:36, with high tide at 06:46 and 07:02 at New Rochelle, NY and Kings Point, NY, respectively. The weather conditions were mostly cloudy throughout the survey with percent cloud cover ranging from approximately 30 to 100% across all stations. The average air temperature was 73 °F and we experienced calm waters. The weather station at LaGuardia Airport reported 0.00" and 0.09" of precipitation for the 24- and 48-hour period prior to the start of the survey. Secchi disk measurements were relatively high and ranged from 4.0 ft in Manhasset and Little Neck Bays to 10.0 ft in Mid-LIS waters.

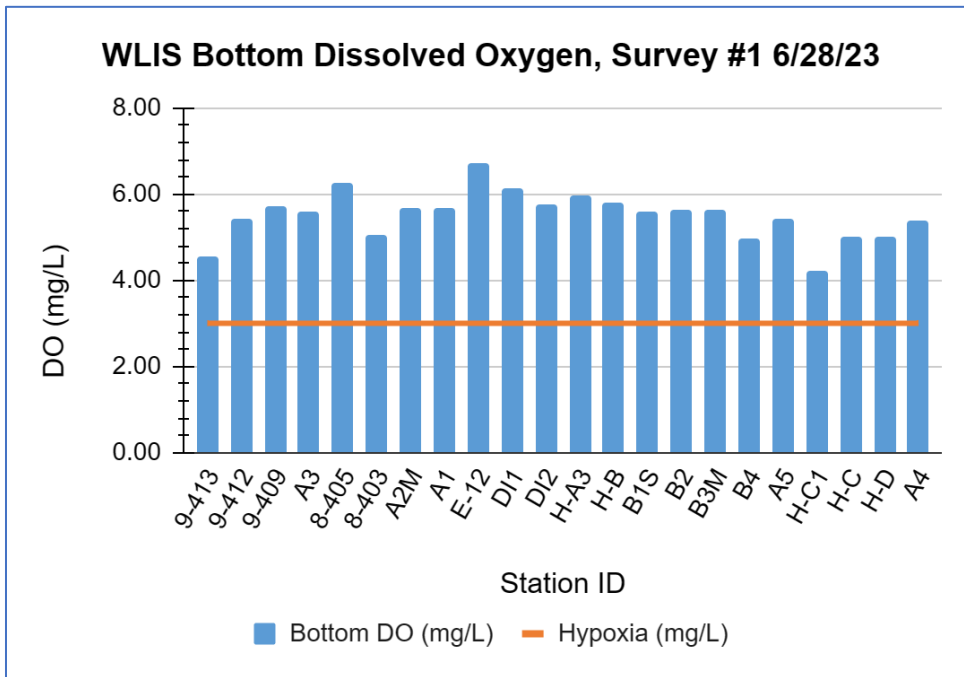
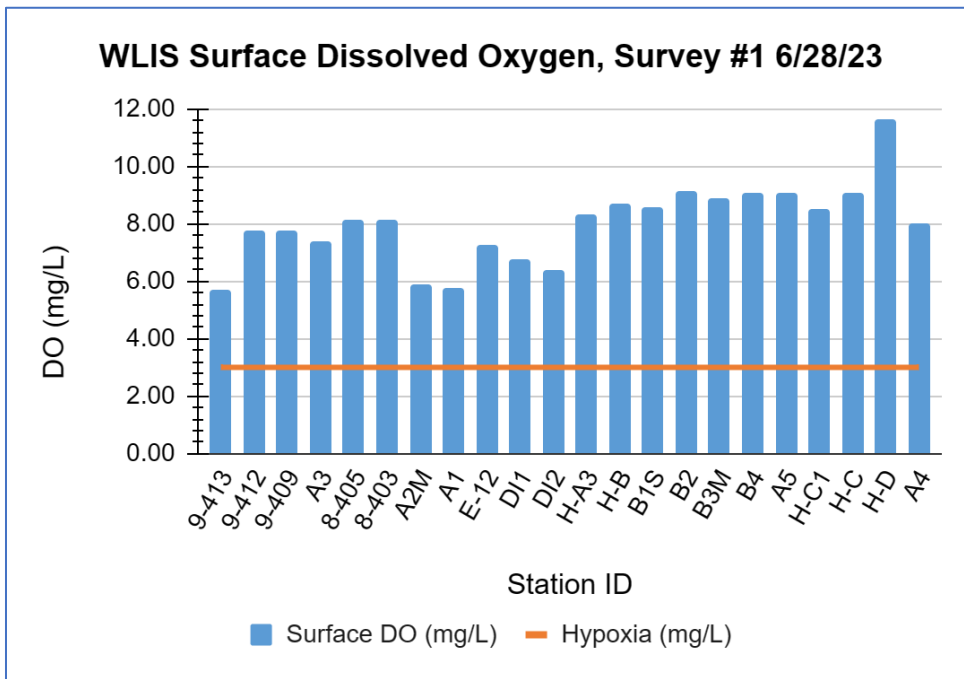
We observed what may have been a jellyfish bloom. There were thousands of small comb jellies at the Westchester shoreline and Mid-LIS stations.

Hypoxia seems to be occurring later in the season this year. There were no hypoxic stations during this survey and average DO concentrations were *higher* than last year. Average Surface DO: 8.00 mg/L in 2023 vs 6.97 mg/L in 2022. Average Bottom DO: 5.51 mg/L in 2023 vs 5.24 mg/L in 2022. In 2022, there was one hypoxic station at both surface and bottom depths during survey #1 (9-413 in Manhasset Bay on June 28, 2022). In 2021, no stations exhibited hypoxia during survey #1 (July 1, 2021).

Average temperatures were *higher* during this survey compared to last year. Surface: 20.72 °C in 2023 vs 18.89 °C in 2022. Bottom: 18.88 °C in 2023 vs 17.35 °C in 2022. The average change in temperature through the water column also increased from last year.

Average salinity at surface and bottom also *increased slightly* compared to last year.

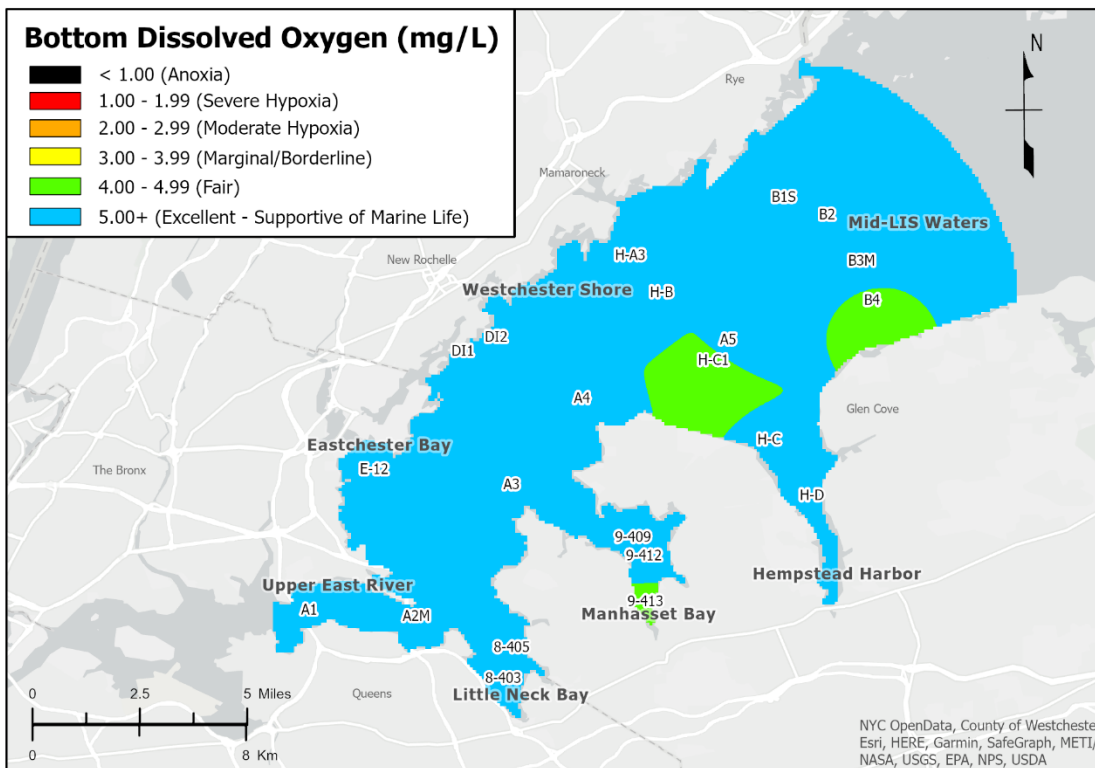
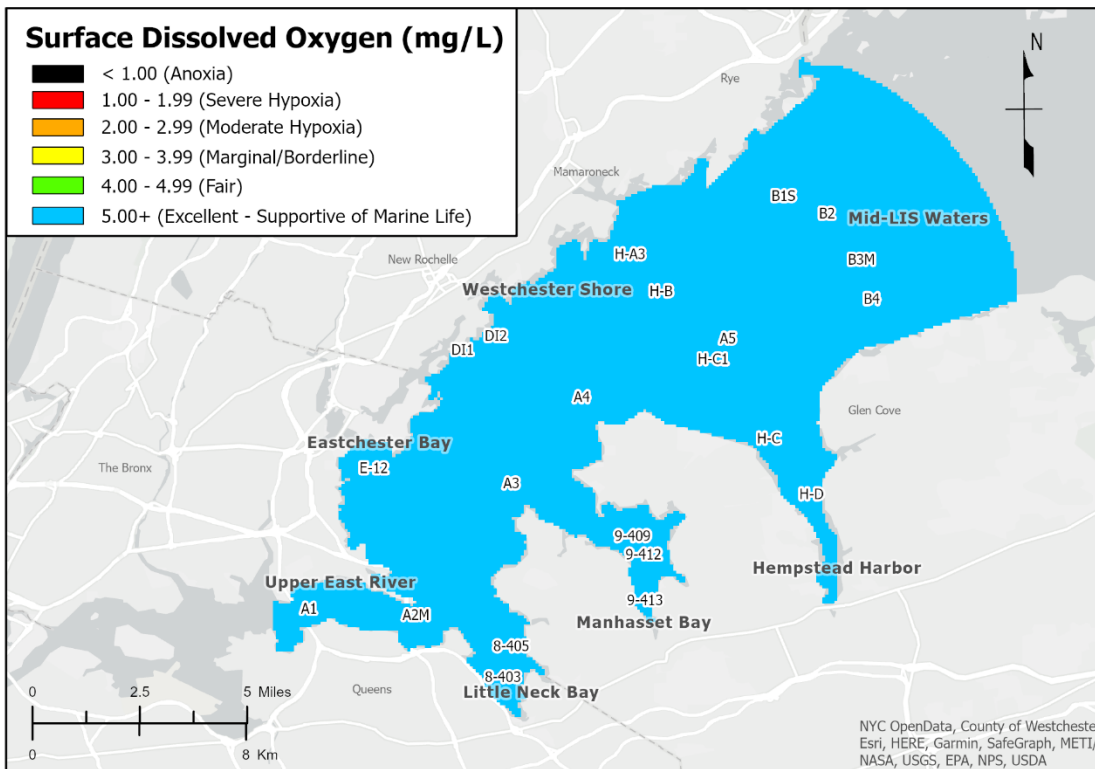
In addition, average pH readings were *higher* this year compared to last year. Average Surface pH: 7.89 in 2023 vs 7.68 in 2022. Average bottom pH: 7.64 in 2023 vs 7.68 in 2022. **At surface, the lowest pH was *significantly higher* than last year, both at station 9-413 in Manhasset Bay.** Lowest surface pH: 7.31 in 2023 vs 7.03 in 2022.



The Long Island Sound Study defines hypoxia as DO values which are below a concentration of 3.00 mg/L.

Interstate Environmental Commission Ambient Water Quality Monitoring of the Western Long Island Sound

Weekly Survey #1: June 28, 2023



SURVEY # 2 AT A GLANCE 07/05/2023

Hypoxia (DO < 3.00 mg/L)	3 stations exhibited hypoxia at bottom depths: Manhasset Bay – 9-413 Hempstead Harbor – H-C and H-D 1 station exhibited hypoxia at surface depth: Manhasset Bay – 9-413
Lowest surface DO concentration	2.67 mg/L (Station 9-413 in Manhasset Bay)
Lowest bottom DO concentration	1.87 mg/L (Station 9-413 in Manhasset Bay)
Average surface DO concentration	7.44 mg/L
Average bottom DO concentration	4.44 mg/L
Average surface water temperature	21.84 °C
Average bottom water temperature	19.48 °C
Average water column ΔT	2.36 °C
Average surface salinity	25.77 ppt
Average bottom salinity	26.24 ppt
Lowest surface pH	6.71 (Station 9-413 in Manhasset Bay)
Lowest bottom pH	6.73 (Station 9-413 in Manhasset Bay)
Average surface pH	7.75
Average bottom pH	7.42

Survey #2 Narrative Summary

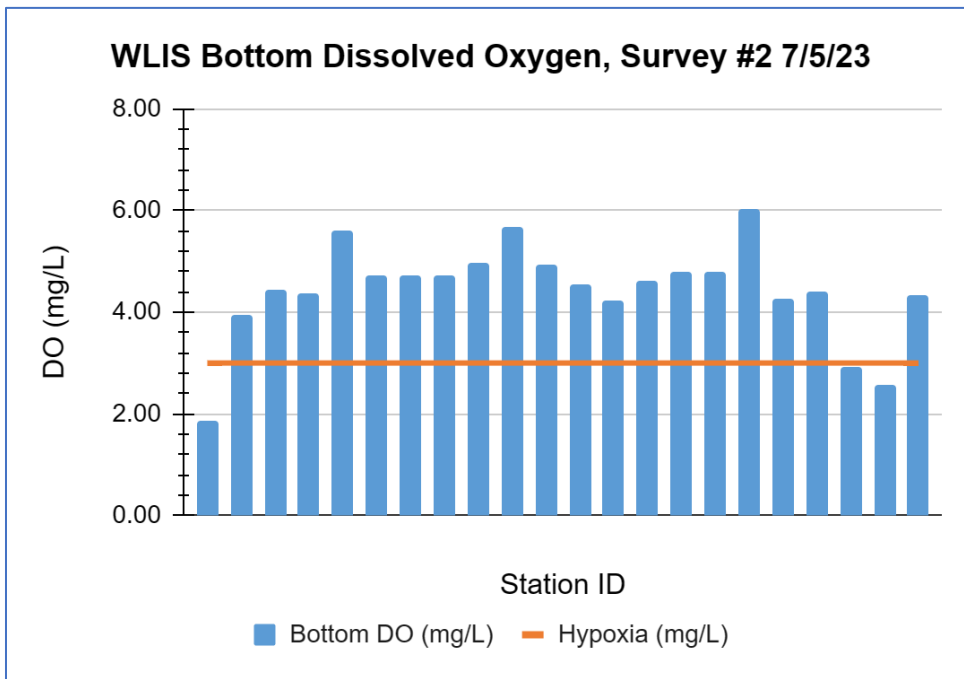
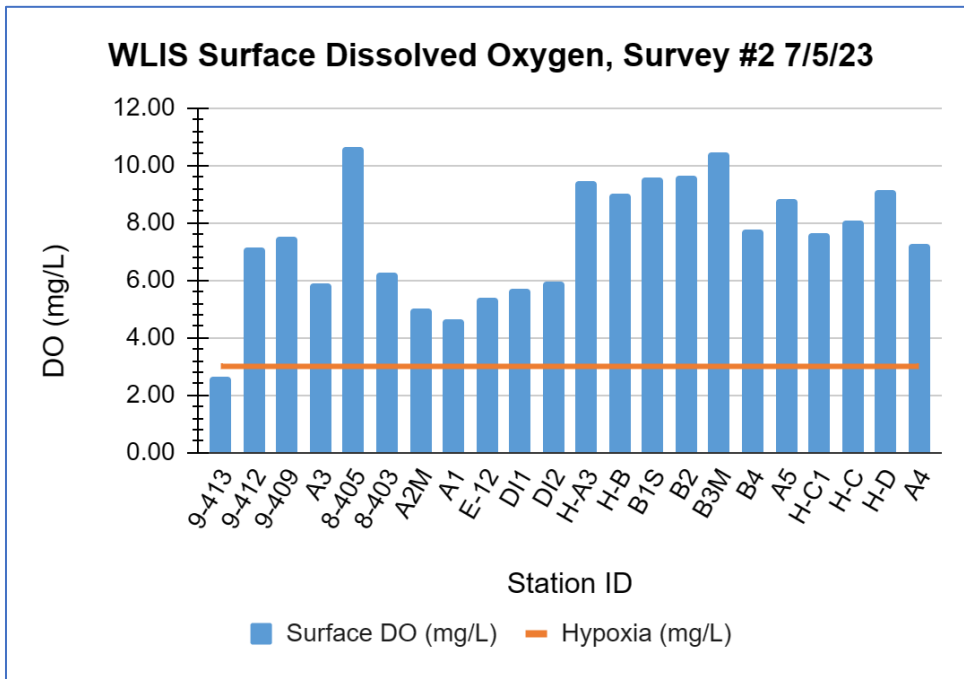
The survey began at 06:51 and ended at 10:47, with low tide at 07:38 and 07:56 at New Rochelle, NY and Kings Point, NY, respectively. It was foggy but skies were clear throughout the survey and average air temperature was 79 °F. The weather station at LaGuardia Airport reported 0.24" and 0.65" of precipitation for the 24- and 48-hour period, respectively, prior to the start of the survey. Secchi disk measurements ranged from 1.5 ft in Manhasset Bay to 7.0 ft in the Mid-LIS waters.

Three stations exhibited hypoxia at bottom depth – 9-413 in Manhasset Bay, H-C and H-D in Hempstead Harbor. Only one station exhibited hypoxia at surface depth – 9-413 in Manhasset Bay. There were more hypoxic stations during survey #2 this year compared to last year. However, average surface and bottom DO were *higher* this year compared to last year. Average surface DO: 7.44 mg/L in 2023 vs 5.91 mg/L in 2022. Average Bottom DO: 4.44 mg/L in 2023 vs 4.13 mg/L 2022. **Minimum Surface DO was *lower* this year compared to 2022 and minimum bottom DO was higher this year compared to 2022.**

Like survey #1, average temperatures were *higher* during this survey compared to last year. Surface: 21.84 °C in 2023 vs 19.63 °C in 2022. Bottom: 19.48 °C in 2023 vs 17.49 °C in 2022. The average change in temperature through the water column also increased from last year.

Average salinity at surface and bottom *decreased* compared to last year.

Average surface pH *increased* compared to last year. Average Surface pH: 7.75 in 2023 vs 7.58 in 2022. In addition, both lowest recorded bottom and surface pH *decreased significantly* compared to last year. Lowest surface pH: 6.71 in 2023 vs 7.19 in 2022. Lowest bottom pH: 6.73 in 2023 vs 7.17 in 2022. **During this survey, station 9-413 in Manhasset Bay was slightly acidic pH (~6.7) at both surface and bottom depths.**



The Long Island Sound Study defines hypoxia as DO values which are below a concentration of 3.00 mg/L.

Interstate Environmental Commission Ambient Water Quality Monitoring of the Western Long Island Sound

Weekly Survey #2: July 5, 2023

