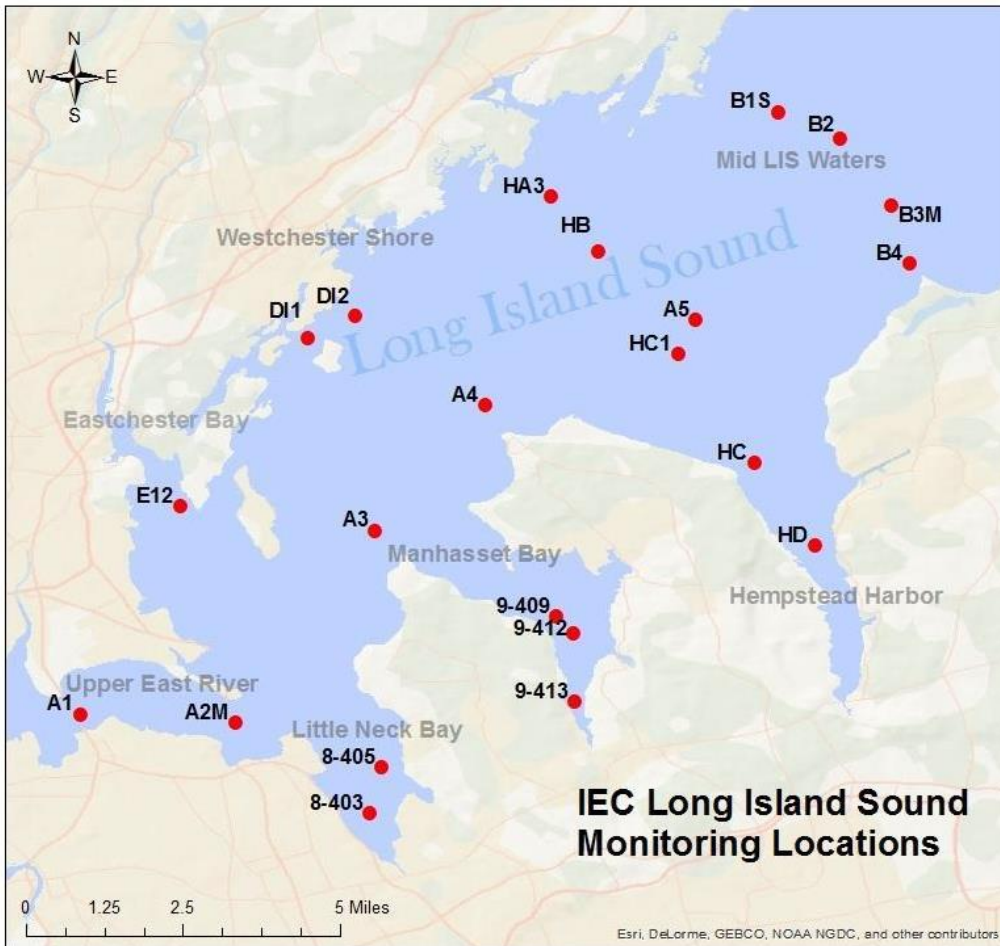




**Western Long Island Sound Monitoring
2024 Summer Survey Bi-Weekly Summary
Surveys #5 & #6
Survey Dates: July 23, 2024 & July 30, 2024**



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

Table 1. List of IEC sites and coordinates.

Interstate Environmental
Commission
www.iec-nynjct.org
C/O BioBAT
Brooklyn Army Terminal,
Building A
140 58th Street
Brooklyn, NY 11220

As a part of the Long Island Sound Study’s ongoing water quality monitoring program, IEC started its 34th consecutive summer of weekly ambient monitoring surveys in western Long Island Sound and the upper East River on Tuesday, June 25th, 2024.

Throughout the summer of 2024, IEC staff will perform 12 weekly surveys at each of the 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 **bold** in Table 1). 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.

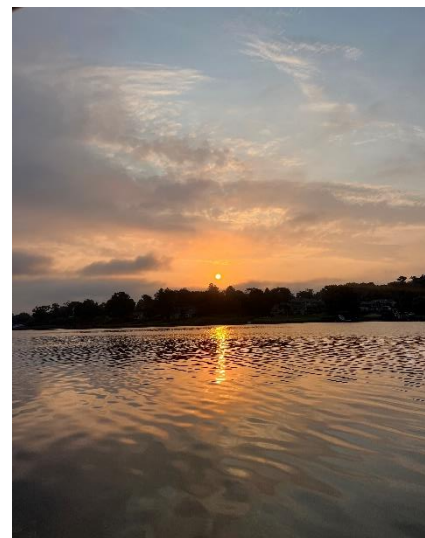
Nutrient parameters that will be analyzed include Ammonia, Nitrate+Nitrite, Particulate Nitrogen, Orthophosphate/DIP, Total Dissolved Phosphorus, Particulate Phosphorus, Dissolved Organic Carbon, Particulate Carbon, Dissolved Silica, and Biogenic Silica.

In October 2022, IEC also began collecting dissolved inorganic carbon (DIC) and Total Alkalinity samples to monitor coastal acidification. In aquatic ecosystems, **DIC** acts as a source of carbon for photosynthesis and has a function in controlling the pH. Increasing levels of anthropogenic CO₂ gas emissions are leading to coastal acidification, which can pose a significant threat to marine life, including calcifying organisms like corals and shellfish that make hard shells and skeletons by combining calcium and carbonate from seawater. **Total Alkalinity** is the capacity of water to resist (buffer against) a change in pH when acidity is added. As CO₂ from the atmosphere and from decay of algal blooms increases in LIS, Total Alkalinity guards against pH changes and coastal acidification.

Proposed 2024 Summer Schedule		
Date	Survey Number	Parameters
06/25/2024	1	<i>In situ</i> , nutrients, chlorophyll <i>a</i> , BOD, TSS
07/02/2024	2	<i>In situ</i> parameters only
07/09/2024	3	<i>In situ</i> , nutrients, chlorophyll <i>a</i> , BOD, TSS
07/16/2024	4	<i>In situ</i> parameters only
07/23/2024	5	<i>In situ</i> , nutrients, chlorophyll <i>a</i> , BOD, TSS
07/30/2024	6	<i>In situ</i> parameters only
08/06/2024	7	<i>In situ</i> , nutrients, chlorophyll <i>a</i> , BOD, TSS
08/13/2024	8	<i>In situ</i> parameters only
08/20/2024	9	<i>In situ</i> , nutrients, chlorophyll <i>a</i> , BOD, TSS
08/27/2024	10	<i>In situ</i> parameters only
09/05/2024	11	<i>In situ</i> , nutrients, chlorophyll <i>a</i> , BOD, TSS
09/12/2024	12	<i>In situ</i> parameters only



A faint rainbow after the rain at Station H-B during Survey #5



The sunrise from Manhasset Bay during Survey #6

SURVEY #5 AT A GLANCE 07/23/2024

Hypoxia (DO < 3.00 mg/L)	<p>2 station exhibited hypoxia at surface depth: Manhasset Bay – 9-413 Little Neck Bay – 8-403</p> <p>14 stations exhibited hypoxia at bottom depth: Manhasset Bay – 9-413 Little Neck Bay – 8-403 Upper East River – A2M Westchester Shoreline – H-A3, H-B Mid-LIS Waters – A3, A4, A5, B1S, B2, B3M, H-C1 Hempstead Harbor – H-C, H-D</p>
Lowest surface DO concentration	1.45 mg/L (Station 9-413 in Manhasset Bay)
Lowest bottom DO concentration	1.56 mg/L (Station 9-413 in Manhasset Bay)
Average surface DO concentration	4.85 mg/L
Average bottom DO concentration	2.73 mg/L
Average surface water temperature	21.86 °C
Average bottom water temperature	20.10 °C
Average water column ΔT (Surface-Bottom)	1.77 °C
Average surface salinity	25.47 ppt
Average bottom salinity	26.08 ppt
Lowest surface pH	6.89 (Station 9-413 in Manhasset Bay)
Lowest bottom pH	6.88 (Station 9-413 in Manhasset Bay)
Average surface pH	7.46
Average bottom pH	7.27

Survey #5 Narrative Summary

This survey began at 06:21 and ended at 10:55, with the most recent low tide at 07:25 and 07:43 at New Rochelle, NY and Kings Point, NY, respectively. The weather conditions were overcast with light rain and mist at most stations. Cloud coverage ranged from 80 to 100% during the survey. The average air temperature was 72°F. The weather station at LaGuardia Airport reported a total of 0.27” of precipitation for both the 24- and 48-hour period prior to the start of the survey. Secchi disk measurements ranged from 2.0 ft in Eastchester Bay to 6.5 ft in the Upper East River.

Two stations exhibited hypoxia at surface depth and 14 stations exhibited hypoxia at bottom depth. In comparison, there was one station at surface depth and 16 stations at bottom depths that exhibited hypoxia during Survey #5 in 2023. **Average surface DO concentrations were *lower* than last year, while average**

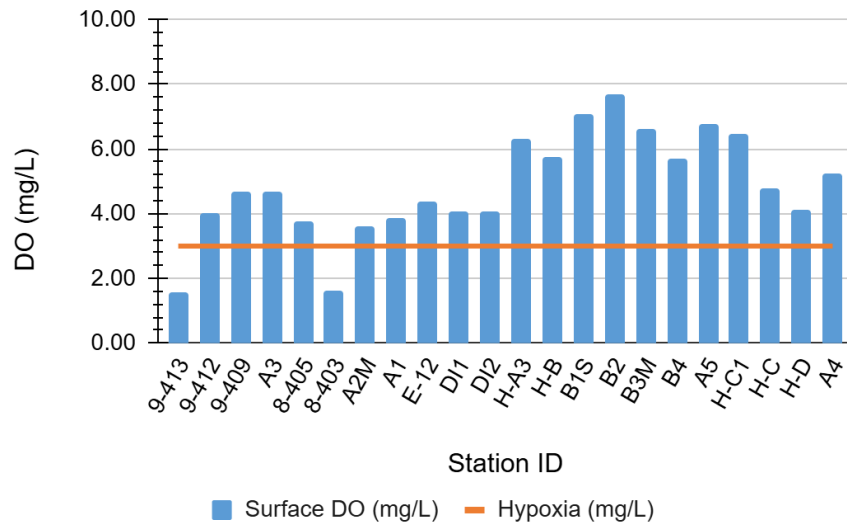
bottom DO concentrations were *higher*. Average Surface DO: 4.85 mg/L in 2024 vs 6.24 mg/L in 2023. Average Bottom DO: 2.73 mg/L in 2024 vs 2.48 mg/L in 2023. **The minimum surface DO concentration was *lower* this year compared to last year, while the minimum bottom DO concentration was *higher*.** Minimum Surface DO: 1.56 mg/L in 2024 vs 2.96 mg/L in 2023. Minimum Bottom DO: 1.45 mg/L in 2024 vs 0.63 mg/L in 2023.

Average water temperatures were *lower* during this survey compared to last year at both surface and bottom depth. Average Surface Temperature: 21.86 °C in 2024 vs 23.81 °C in 2023. Average Bottom Temperature: 20.10 °C in 2024 vs 21.52 °C in 2023.

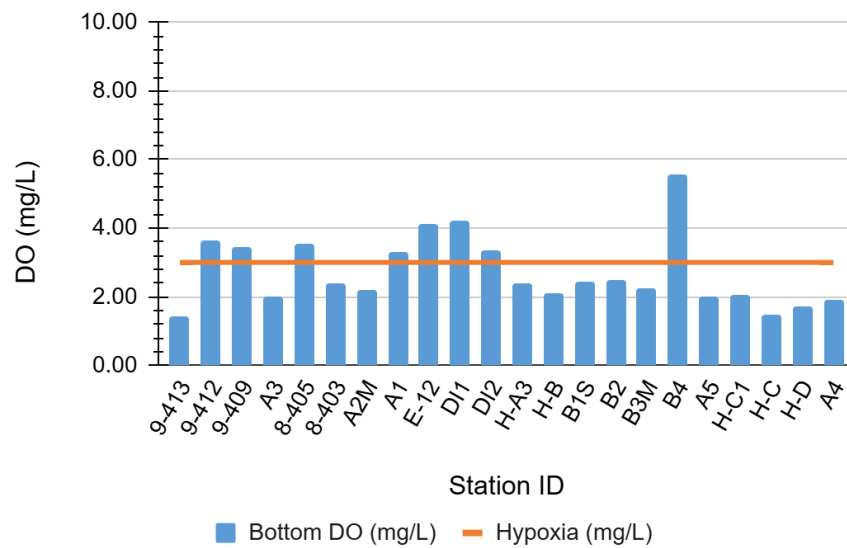
Average surface and bottom salinity during this survey were *higher* compared to last year. Average Surface Salinity: 25.47 ppt in 2024 vs 25.09 ppt in 2023. Average Bottom Salinity: 26.08 ppt in 2024 vs 25.90 ppt in 2023.

Average surface and bottom pH during this survey were *lower* compared to last year. Average Surface pH: 7.46 in 2024 vs 7.69 in 2023. Average Bottom pH: 7.27 in 2024 vs 7.30 in 2023. **The lowest surface and bottom pH *decreased* compared to last year.** Lowest surface pH: 6.89 in 2024 vs 6.99 in 2023. Lowest bottom pH: 6.88 in 2024 vs 6.91 in 2023.

WLIS Surface Dissolved Oxygen, Survey #5 07/23/24



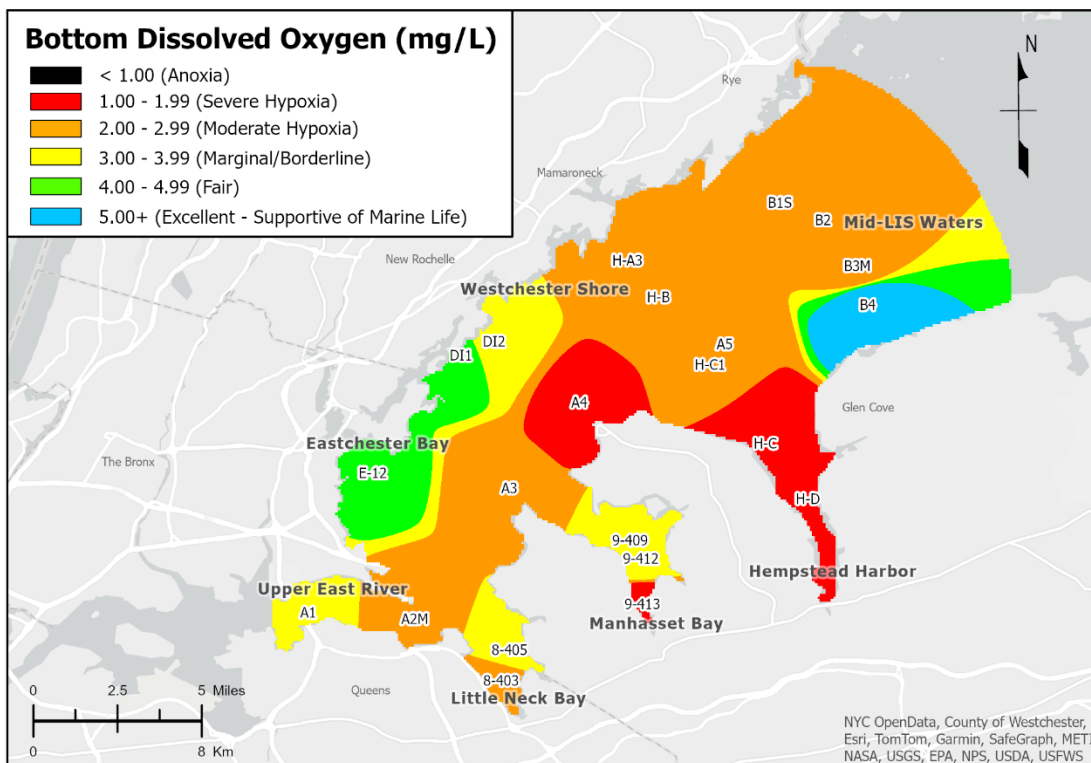
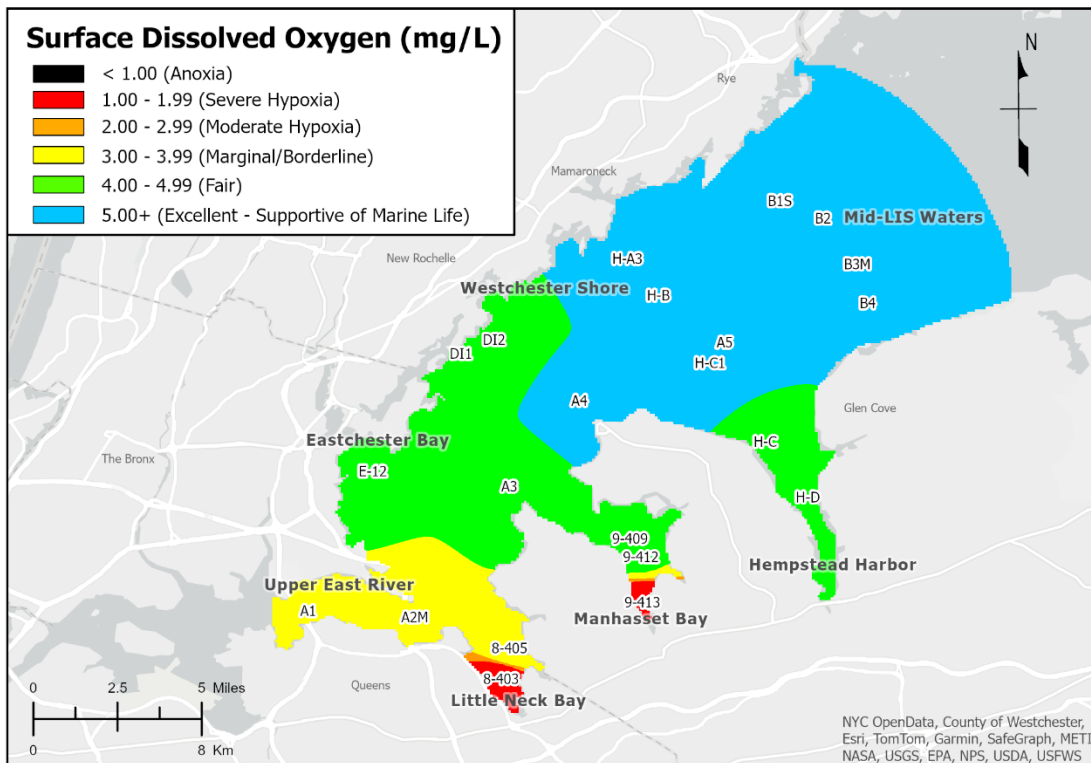
WLIS Bottom Dissolved Oxygen, Survey #5 07/23/24



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 #5: July 23, 2024



IDW Interpolation, Power 10

Map by: Jovan Snyder

Map made: 08/05/2024

SURVEY #6 AT A GLANCE 07/30/2024

Hypoxia (DO < 3.00 mg/L)	10 stations exhibited hypoxia at bottom depth: Manhasset Bay – 9-413 Westchester Shoreline – H-B Mid-LIS Waters – A3, A4, A5, B2, B3M, B4, H-C1 Hempstead Harbor – H-D
Lowest surface DO concentration	3.89 mg/L (Station A1 in the Upper East River)
Lowest bottom DO concentration	1.22 mg/L (Station 9-413 in Manhasset Bay)
Average surface DO concentration	5.74 mg/L
Average bottom DO concentration	3.17 mg/L
Average surface water temperature	23.39 °C
Average bottom water temperature	21.91 °C
Average water column ΔT	1.48 °C
Average surface salinity	25.77 ppt
Average bottom salinity	26.07 ppt
Lowest surface pH	7.27 (Station 9-413 in Manhasset Bay)
Lowest bottom pH	6.95 (Station 9-413 in Manhasset Bay)
Average surface pH	7.54
Average bottom pH	7.31

Survey #6 Narrative Summary

The survey began at 06:24 and ended at 10:51, with the most recent high tide at 07:53 and 08:09 at New Rochelle, NY and Kings Point, NY, respectively. The weather conditions were mostly cloudy with mostly low cloud coverage varying from 5 to 100% throughout the survey. The average air temperature was 80 °F. The weather station at LaGuardia Airport reported a total of 0.07” and 0.09” of precipitation for the 24- and 48-hour period, respectively, prior to the start of the survey. Secchi disk measurements ranged from 3.5 ft in Manhasset Bay to 7.0 ft in the Mid-LIS waters.

No stations were hypoxic at surface depth and 10 stations exhibited hypoxia at bottom depth. In comparison, there was one station at surface depth and 10 stations at bottom depths that exhibited during Survey #6 in 2023. **Average surface DO concentrations were *higher* than last year, while average bottom DO concentrations were *lower*.** Average Surface DO: 5.74 mg/L in 2024 vs 4.91 mg/L in 2023. Average Bottom DO: 3.17 mg/L in 2024 vs 3.39 mg/L in 2023. **The minimum surface and bottom DO concentration were *higher* this year compared to last year.** Minimum Surface DO: 3.89 mg/L in 2024 vs 1.67 mg/L in 2023. Minimum Bottom DO: 1.22 mg/L in 2024 vs 0.98 mg/L in 2023.

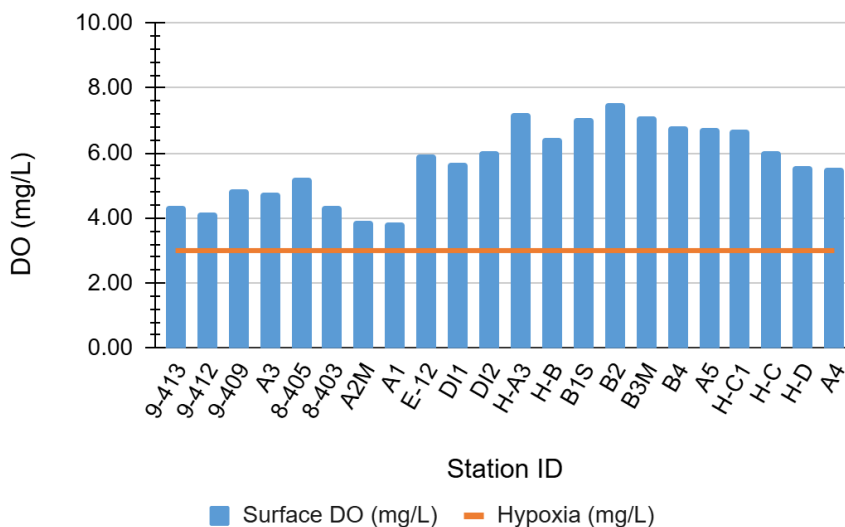
Average water temperatures during this survey were *higher* compared to last year at both surface and bottom

depth. Average Surface Temperature: 23.39 °C in 2024 vs 22.46 °C in 2023. Average Bottom Temperature: 21.91 °C in 2024 vs 21.83 °C in 2023.

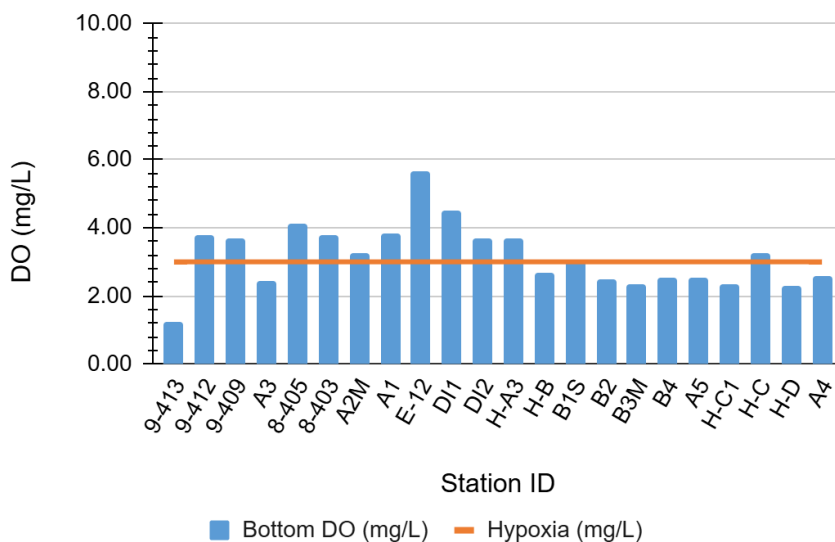
Average surface and bottom salinity during this survey were lower compared to last year. Average Surface Salinity: 25.77 ppt in 2024 vs 25.81 ppt in 2023. Average Bottom Salinity: 26.07 ppt in 2024 vs 26.30 ppt in 2023.

Average surface and bottom pH during this survey were higher compared to last year. Average Surface pH: 7.54 in 2024 vs 7.39 in 2023. Average Bottom pH: 7.31 in 2024 vs 7.27 in 2023. **The lowest surface and bottom pH increased compared to last year.** Lowest surface pH: 7.27 in 2024 vs 6.83 in 2023. Lowest bottom pH: 6.95 in 2024 vs 6.83 in 2023.

WLIS Surface Dissolved Oxygen, Survey #6 07/30/24



WLIS Bottom Dissolved Oxygen, Survey #6 07/30/24



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 #6: July 30, 2024

