

**Water Quality Monitoring Work Group
TEAMS Online Meeting
September 29, 2021 – Meeting Summary**



Attendance

Jim Ammerman (Chair)—Long Island Sound Study (LISS)/NEIWPCC
Jordon Bishop—NEIWPCC
Richard Friesner—NEIWPCC
Michele Golden—New York State Department of Environmental Conservation (NYSDEC)
Jim Hagy—EPA ORD
Alex Huddell—ORISE/EPA
Mike Jensen— Suffolk County Dept. of Health Services
Jon Morrison—United States Geological Survey (USGS)
Jim O’Donnell—U Conn
Katie O’Brien-Clayton—CT DEEP
Leah O’Neill—EPA
Evelyn Powers—Interstate Environmental Commission (IEC)
Beau Ranheim— New York City Department of Environmental Protection (NYCDEP)
Cayla Sullivan—EPA
Jamie Vaudrey—UConn

Agenda

1. Discussion of 2021 Monitoring Season
2. Discussion of “DRAFT Long Island Sound Study (LISS) Water Quality Monitoring Work Group FY22 Work Plan”

Discussion of 2021 Monitoring Season

Katie O’Brien-Clayton (CT DEEP)—The peak of hypoxia was the HY August cruise (August 16-18), with 368 square km, or 142 square miles of bottom area with < 3 mg/l dissolved oxygen (DO). This was the largest area since 2016, during a hot and wet summer. The area of < 2mg/l was also large, 109 square km (42 square miles) during the same cruise. Katie had previously distributed data tables and maps for most of the cruises through August.

Questions and Comments:

1. Jim O’Donnell said that these results were not significantly different from last five years in terms of means, so far, he has run his algorithms for hypoxic area and volume with the July data but not yet the August data.
2. Jim Hagy noted that this is the first time he has looked at Long Island Sound (LIS) monthly time series hypoxia surveys, he has previously seen many from the Chesapeake Bay, and of course there is only one survey per year from the Gulf of Mexico. Jim suggested that the LIS hypoxic period appears very brief and asked if different sampling

days would make a difference? He said that in Chesapeake Bay, hypoxia set in during May and lasts into September. Combining surveys and time series data from the buoys would be useful.

3. Jim Ammerman agreed that the preliminary evidence so far indicates an unusually short hypoxic period. LIS hypoxia usually averages about 55 days, though it can disappear and then reappear. The buoy data to be discussed later should help with this determination. The frequent storms this past summer may have also been a factor.

Evelyn Powers (IEC)—Evelyn said that IEC monitored from July 1 to September 14, weekly at 22 stations. They started seeing hypoxia on July 25 in Manhasset Bay and Hempstead Harbor, and August 25 the was peak, with hypoxia at 16 of 22 stations. This was after Hurricane Henri but before Hurricane Ida, which hit on September 1 and produced significant mixing. The last two surveys (September 10 and 14) showed no hypoxia. Overall, the hypoxic period appeared shorter than usual.

Jim O'Donnell (U Conn) --Jim showed data from the ARTG buoy, from the eastern end of the western Sound. The bottom oxygen dropped consistently from June through late August, reaching a minimum of about 3 mg/l after which there was a quick increase on September 1 from Hurricane Ida and then a drop again soon after. Bottom salinity decreased at the time of the storm from vertical mixing and then surface salinity decreased even more but slightly later due to the freshwater input from the storm. Surface temperature at ARTG reached a near maximum of about 23 degrees C by the first of August, while the bottom temperature continued to increase. Both were 23 C after Ida and stayed there for most of September. In response to a question from Jim Hagy, Jim O'Donnell suggested that the surface water was in thermal equilibrium after the storm, resulting in salinity stratification but no temperature stratification.

The Execution Rocks buoy showed similar results, with bottom oxygen below 3 mg/l for much of August, but with an increase following Hurricane Ida on September 1. Eight years of hypoxia data from ARTG show little variability in June, but greater variability of +/- 2 mg/l in July and August. Jim quantified that further in his recent report and used it to make uncertainty estimates of the area of hypoxia. There is also data from the Western Sound buoy, though the bottom data from that buoy is not yet available. Dissolved oxygen from the surface and mid-depth in the Western Sound became identical in late August just before the storm and both showed the drop in salinity following the storm. There followed a discussion about the potential variability of the shipboard monitoring data (as shown by the buoy data) as impacted by the time of day and the tidal cycle. Though CT DEEP monitoring cruises are not targeted to the tidal cycle, they do occur every two weeks so occur during similar spring-neap tidal cycles.

Jim noted that his recent report shows a statistically significant relationship between the nitrogen load and the area of hypoxia if four specific years (1993, 2003, 2012, and 2016) are excluded, suggesting a difference in the physics for those four years. The slope of hypoxic area vs. nitrogen loading was similar in those four years compared to the others and decreased with

load, but the areas of hypoxia were higher, with larger areas of hypoxia particularly evident along the north shore of the Sound. A similar trend was found for hypoxic volume. Jim's final report can now be distributed as it has been approved by CTDEEP.

Jon Morrison (USGS)--USGS has an extensive network of LIS tributary monitoring including 45 stations on the Connecticut, Housatonic, and Thames Rivers, with biweekly monitoring starting two years ago. They also just added biweekly monitoring of Norwalk and Mystic embayments. This was a very hot, wet, year. June was warm and showed stratification and development of chlorophyll in some embayments, but these were later suppressed by flow events with turbidity pulses (below). The Connecticut River has four real-time nitrate sensors, and this year was punctuated by several intermittent flow events as shown by the discharge graphs. Modeled concentrations of nitrate in the Connecticut River reached 2mg/l following Hurricane Ida. The high flow events were frequent in July and August, and many transported significant sediment. Most were two-to-ten-year events, though in late July in the upper Connecticut River in southern Massachusetts, there was a 100-to-500-year event which caused a large pulse of sediment which appeared as a turbidity maximum. This turbidity pulse spread out as it was followed downstream.

Other CT rivers showed similar patterns with multiple high-flow and turbidity events. Jim Hagy asked if the area under the turbidity curves could be integrated to determine how much of the sediment made it downstream to the estuary. Jon replied that they took sediment samples, including sand concentrations, during those periods and were developing sediment transport curves. He noted that turbidity worked well as a measure for fine particles but not for sand. Monitoring in the Norwalk estuary showed freshwater pulses even in the bottom water which pushed out the salt water and refreshed the depleted oxygen levels.

Peter Linderoth (Save the Sound)—Peter could not attend but sent an email stating that the Unified Water Study's (UWS) monitoring season would end on Oct. 31. He noted that this year the UWS had 25 groups participating which monitored 42 embayments at the Tier 1 level, and 13 of these at the Tier 2 level. The UWS is in discussions with a group that monitors Black Rock Harbor to add Bridgeport Harbor as well. SUNY Maritime may also join the UWS in 2022 to monitor Westchester Creek. Jim Ammerman asked Jamie Vaudrey if she had anything to add about the UWS. She did not but mentioned a separate monitoring effort in Norwalk and Mystic that is coupled coupled with USGS monitoring for CT DEEP. They are making intensive macrophyte % cover and biomass measurements in Mystic and Norwalk at 330 stations per embayment as well as detailed sediment parameters. This monitoring is directed toward CT DEEP's efforts to model embayment water quality.

Questions and Comments:

1. Jim O'Donnell asked Jamie about the status of the new data system for the UWS. Jamie replied that the UWS is part of larger effort to create a data sharing platform targeted at community monitoring groups. Save the Sound is leading the project in collaboration with Harbor Watch, Chesapeake Commons, and Kisters. Kisters developed the data

platform used by the Cape Cod Commission. The project is currently in a second scoping phase to be completed early next year and has a priority to facilitate data transfer to and from WQX. Data visualization for communication purposes is another priority. It is a multi-year project and beta testing will begin in the spring by data generators and end users. By spring, the database, interface, and visualizations will be ready for trial use, data entry by groups should start next year.

2. Jim Ammerman asked Jamie for an update on the new CT National Estuarine Research Reserve (NERR). Jamie replied that next Thursday is the NOAA-run public hearings on the Environmental Impact Statement, one in the afternoon and again repeated in the evening. It includes a brief presentation of boundary configurations (with four alternatives) and the management plan. The CT NERR will be based at U Conn Avery Point and be an independent center like CIRCA or Sea Grant. NOAA designation is expected by January of 2022 as the Biden administration wants to include it in year one accomplishments. A celebration with state representatives and the media will likely occur in April 2022, and core staff should be hired by about May, with 15 total staff by the end of 2023. Rick Spinrad, NOAA Administrator, has already accepted an invitation to the celebration.

Beau Ranheim (NYCDEP)—Beau said that the last year and a half was a real challenge because of equipment failures, including their boat for much of the last year. They have been concentrating on interior tributaries and small bodies of water, and a new boat on the way. There was also an unanticipated delay in releasing data reports because of transitions in the DEP public relations office, a multiyear report should be released soon. Beau concurred with the late onset of hypoxia, and said Ida produced a lot of rain and freshwater input but little mixing. It was a reasonable year overall, everything continued but at a reduced rate due to the boat problems. Beau noted that there have been increased local reports of whales and other charismatic megafauna in the last few years and some are happy to see nutrients from the Hudson support the foodweb that feeds them. Jim Ammerman concluded this discussion with the thought that there was a lot of information to digest from a very interesting summer.

Discussion of “DRAFT Long Island Sound Study (LISS) Water Quality Monitoring Work Group FY22 Work Plan”

Jim Ammerman quickly reviewed the membership, mission, background, and recent successes by the work group and the related water quality progress by other groups. He focused in more detail on the important issues of refining monitoring objectives, improving monitoring coordination, and addressing data management. He then focused on two new areas of emphasis, acidification monitoring and a water quality monitoring strategy for the upper basin states.

Questions and Comments:

1. Jim asked Cayla Sullivan (EPA) to elaborate briefly on the acidification monitoring. Cayla mentioned that the work group meeting invitation had included an introductory document to an informal ocean acidification (OA) work group. The goal of the group is to find acidification information to present an OA indicator on the LISS website. However, a summer intern, Jordan Welnetz, compiled the available LIS data and found that aside from abundant pH measurements, OA information in LIS is very limited, since measurements of at least two of the four acidification parameters are needed to understand acidification status. Therefore, the informal OA work group has come together to develop a monitoring plan to implement OA monitoring in LIS as soon as reasonably possible. They are planning an OA work group meeting in October so please provide comments and indicate interest to Cayla.
2. Jim O'Donnell mentioned that he had met with a similar interest group earlier in the week, including Peter Raymond at Yale. Yale has some funding for a global climate change mitigation initiative and Peter held a meeting to discuss how interventions might adjust coastal alkalinity values. Katie asked about who at Stony Brook to reach out to about OA.
3. Jim Ammerman said Chris Gobler is the most active researcher. Michele Golden (NYSDEC) noted that Henry Bokuniewicz had taken over Larry Swanson's chairmanship of the New York State Ocean Acidification Commission. Jim Ammerman said that in recent discussions with Mark Tedesco that he seemed ready to move forward with both OA and upper basin monitoring as soon as they could be organized.
4. Jim Ammerman asked Richard Friesner about the Nitrogen Coordination Work Group's support for an upper basin monitoring plan and their suggestion that it be coordinated by the Water Quality Monitoring Work Group. Richard confirmed that this was correct. Jim also asked Jon Morrison about upper basin monitoring as USGS currently dominates the efforts. Jon replied that they were trying to enhance upper basin monitoring and find support for continuing current tributary monitoring into the mainstem of the Connecticut River. They do not really have an overall monitoring plan, and are currently not monitoring above Northfield, Massachusetts. Jon suggested further discussions with Richard. Richard added that developing a monitoring plan would help to bring in support for implementing that plan. Jim Ammerman suggested that this work group (or a subset), the Nitrogen Coordination Work Group, and USGS need to get together to develop a plan.
5. Jim O'Donnell asked about data management and Jim Ammerman said that that was an assumed priority but that individual partners of the LISS were all moving forward with their own efforts at data management and the role of this work group was to help coordinate and emphasize interoperability. Jim O'Donnell strongly suggested developing a defined process for this coordination and cited specific examples of potential interoperability requirements. He mentioned concerns about the Kisters system and whether it was more than just point and click. He suggested that someone be responsible for making things work, otherwise we will be at the same place next year.

Jim Ammerman listed four other monitoring IAs (pathogens, microbial source tracking, HABs/toxins, and trash) which are largely responsibilities of the Watersheds and Embayments Work Group and mostly focused on the watershed, expect perhaps HABs. Jon Morrison mentioned pathogens and microbial source tracking and developing a spreadsheet to compile current monitoring information to see what else may be needed. These four IAs are more focused on human health as opposed to the ecosystem IAs the Water Quality Monitoring Work Group typically focuses on. The were mentioned at an I Team meeting last spring in terms of the need for more information.