

**Water Quality Monitoring Work Group
TEAMS Online Meeting
September 27, 2024 – Meeting Summary**



Attendance

Jim Ammerman-- LISS/NEIWPC
Mary Becker—CT DEEP
Robert Burg—LISS/NEIWPC
Anthony Caniano—Suffolk County
Alex DuMont--NEIWPC
Melissa Duvall--EPA
Abdulai Fofanah—NYC DEP
Richard Friesner—NEIWPC
Michele Golden—NYS DEC
Dianne Greenfield--CUNY
Anya Grondalski—LISS/NEIWPC
Jim Hagy—EPA ORD
Michael Jensen—Suffolk County
Peter Linderoth—Save the Sound
Kamazima Lwiza—Stony Brook University
Matt Lyman—CT DEEP
Michelle Lapinel McAllister—Coalition to Save Hempstead Harbor
Jon Morrison—USGS
Katie O'Brien-Clayton—CT DEEP
Evelyn Powers--IEC
Beau Ranheim—NYC DEP
Youngmi Shin—EPA ORISE
Gregory Stewart--USGS
Kelly Streich—CT DEEP
Cayla Sullivan-- EPA
Christine Suter—Friends of the Bay
Nikki Tachiki--EPA
Elizabeth Tanzi—EPA
Mark Tedesco--EPA
Kimarie Yap—NYS DEC

Jim Ammerman started the meeting by stating that he wanted to accomplish three things: 1. Review the results of the summer hypoxia monitoring season, 2. Go through the results of the data access survey, and 3. Briefly review the new draft CCMP. He asked Nikki Tachiki to comment briefly on how to provide input to the new CCMP, now that it is out for public comment. She showed a PowerPoint slide with active links, including the LISS website and said that the LISS is

now in its 60-day public comment period. She mentioned that comments were being accepted through the public comment form or at an email address shown on the screen. Comments are being accepted through midnight November 22nd. Jim thanked Nikki and said that we would briefly return to the CCMP at the end of the meeting.

Review of Summer 2024 Hypoxia Monitoring

Jim Ammerman showed the CT DEEP data with comments from Matt Lyman, the hypoxic area was only 43.3 square miles, the third smallest on record since monitoring started in 1987, with a duration of 38 days, slightly below average. The maximum hypoxic area was during the July 29 to August 1 cruise. The lowest oxygen level recorded by CT DEEP was 2.25 mg/liter at Station A4 in the channel, while the nearby LISICOS buoy recorded some values near zero. Jim asked Matt about other general observations from their summer cruises, such as plankton blooms. Matt replied that they did see some surface blooms and in the eastern Sound some blooms at two of the plankton sites (K2 and another), possible rotifer blooms which coated the nets in thick brown “soup”. There were no similar blooms in the western Sound though there were surface blooms which reduced visibility. Jim noted that it was a warm and initially wet summer, and he was surprised that there was not more hypoxia than found, and Matt agreed.

Jim then asked Matt about the status of their new ship and Matt replied that they will start cutting metal in October, with a hull “flip” to right-side-up in April 2025, and a delivery date of early 2026. Jim said he would bring the champagne.

Jim showed a summary of Jim O’Donnell’ LISICOS buoy data, provided by Katie O’Brien-Clayton of CT DEEP. The minimum dissolved oxygen (DO) at the Execution Rocks buoy was about 0.5 mg/liter, with minimums of 1.5 and 2.5 mg/liter respectively, at the Western Sound and ARTG buoys. What was noticeable in the summer Execution Rocks time-series of oxygen concentrations was the extreme number of ventilation events, many more than the one or two typically observed. Similar though attenuated patterns with overall higher oxygen concentrations were also observed at the Western Sound and ARTG buoys. Despite the reduced hypoxia overall, the Execution Rocks buoy still showed 47 days of < 3 mg/liter of dissolved oxygen.

IEC observed a minimum DO of 0.76 mg/liter on August 6th in Manhasset Bay. Both inner Manhasset Bay and Hempstead Harbor displayed anoxia with hypoxic waters out into the open Sound. This is not unusual, but it significantly improved a week later. Michele McAllister added that for Hempstead Harbor hypoxia started earlier in the season than usual, it started on May 29th at one station where it was intermittent. On July 17th all stations were hypoxic at the bottom, with DO values of 1-2 mg/liter. DO was still low on July 24th.

Jon Morrison said that early on it was a warm, wet summer. He noted that there were mixed signals, low DO interrupted by multiple ventilation events. There were some equipment problems with the Thames River monitor due to construction. There was hypoxia in the upper Thames bottom water near Norwich but none in the lower Thames. At Old Lyme on the

Connecticut River there were some excursions below 5 mg/liter in the bottom water, a trend that is becoming more frequent. The Farm River also had significant periods of hypoxia in the bottom water (< 5 mg/liter) as well as some surface blooms in June. The Norwalk River was the worst, with bottom waters often below 5 mg/liter and sometimes surface waters as well in July. Though it improved in August, recently DO has again declined with bottom DO around 2 mg/liter.

Peter Linderoth of the Unified Water Study said that there are more than two dozen groups now involved in the Study. He said they noted significant hypoxia and anoxia in Eastchester Bay, down below 1 mg/liter where the Hutchinson River comes in, which is not unusual. Hunter Island Bay, near New Rochelle was not as severe. The Fishers Island Seagrass Management Coalition joined the Unified Water Study in 2024 and is collecting data in West Harbor. The Saugatuck River in Westport, Connecticut, is also new this year. By 2025, they hope to have 29 or 30 different groups participating, including Mt. Sinai on Long Island and one or two embayments in Greenwich, Connecticut. Project Oceanology has also joined and will monitor two embayments. Peter said he could report back once all the data was in. Peter also added that there was interest in forming a small group to develop embayment hypoxia standards for the new CCMP, something that Jon Morrison also thought was important. New York and Connecticut define hypoxia differently. Peter also added that the 2024 Save the Sound Report Card will be released on October 10th with simultaneous announcements on both sides of the Sound and can discuss details after the release.

Beau Ranheim of NYC DEP said this year was a lost cause with boat, lab, personnel, and contract problems. They saw the same up and down pattern that everyone else saw. Their most current data available is a new report on their website with data from 2023, though he is hoping for a live data weblink by a year from now. His continuous monitoring in the harbor stopped because the contract ran out and they have been unable to get equipment or service for the last two years. They have had continuous minor problems with their new boat but hope to soon use it daily. They have been short of lab personnel and because of some special studies have had to limit some of their routine monitoring.

Mark Tedesco asked for general comments about the summer results, hypoxia was limited and there were not major HAB blooms, how do we explain it? Jon Morrison replied that it was a complicated year because of the frequency and magnitude of the storms until very recently. The large rainfalls that occurred usually bring in nutrients with the runoff and produce blooms but there were also several significant wind events that mixed the water and prevented those. Without those the hypoxia might have been much worse. Beau Ranheim mentioned some EPA satellite images from late August or early September that showed large blooms throughout the Sound and the Bight, but they did not appear to be particularly intense. He added that there were not enough hot and sunny days following rainstorms to develop major blooms. Matt Lyman agreed and said that you don't get severe hypoxia unless there is a period of stratification following a rain and runoff event. The surface to bottom temperature difference this year was also not that strong. Jim Ammerman added that both Gulf of Mexico hypoxia forecasts for 2024, a NOAA one and an academic one, underestimated the hypoxic area, the latter forecast by a lot.

Jim Hagy commented that we must be careful about ad hoc explanations for the small area of hypoxia this year when past years with larger areas of hypoxia may have had similar conditions. He said that it was good that the area was small and factors which might have made it larger did not occur, but he still does not have ready explanations for why it is different from year to year. Mark Tedesco agreed with Jim's caution on armchair explanations, he said that we tell a weather story every year but unless we had a graph of weather patterns like the hypoxia pattern, we are not much closer to explanations and still have work to do. Jim said that he was struck by how low the oxygen was in some of the embayments, however. Mark added that we don't have the long time-series of embayment data like we have in the open Sound, so we are just beginning to understand the patterns there. Jim Ammerman added that Melissa Duvall's *Estuaries and Coasts* paper published a year ago showed an increase in the hypoxic are of the western Sound based on IEC data, despite the overall decline in the Sound.

Anya Grondalski asked for people to contact her by email if they had images related to hypoxia that were not fish kills, and Cayla Sullivan seconded that saying she needed them to develop a story map. Jim Hagy noted that hypoxia was difficult to photograph, and various people mentioned contrasting a depauperate marine environment with a vibrant one. Melissa Duvall mentioned that Jim Hagy and Anna Lisa Mudahy are using time-frequency techniques with embayment data to predict high-frequency dissolved oxygen (DO) variations as part of their empirical hypoxia modeling. Additionally, EPA will be hosting the HDR water quality model and can in the future extend to the watershed and ecosystem models which may provide more information and ways to communicate about hypoxia. Mark Tedesco added that if we used the Gulf of Mexico hypoxia definition of 2 mg/liter, the area of LIS hypoxia would be even smaller though there continue to be some very low DO values at Execution Rocks. Looking at hypoxia in terms of biological impacts will be useful in distinguishing among different years.

Data Access Survey Results

Jim Ammerman provided an abbreviated summary of the data access survey that he sent to the work group, for which he got 15 responses and thanked those who responded. **A summary of the responses to the questions is provided below and the survey results are also included.**

Question 3: Are you a data provider or user, or both? About half the respondents were data users and half were users and providers, there was a smaller group of providers only.

Question 4: If a data provider, where is your data primarily stored? The primary storage site for over 50% of the providers was "Other" as was also 30% of the secondary storage site, perhaps the question should have read "archive" rather than "storage". This suggests that a lot of data is not in permanent accessible archives for some time, though it may be transferred later.

Question 5: Primary data Storage site if you chose "Other" above. Some of these "Other" sites included: Excel files in Dropbox, Internally stored in Access database, Transitioning to SQL then uploaded to WQX, Data is stored in a local data management system (mySQL/Python) and

routinely pushed to public repositories (WQX & ERDDAP), Save the Sound website, and Excel-- but we are working on getting data converted to QuickDrops.

Question 6: If a data provider, what is your major challenge in storing your data at your primary site? Again, the major storage challenge is "Other" (>70%), which covers a wide range of issues below.

Question 7a.: List your major challenge if you chose "Other" above. A variety of responses included lack of institutional IT support, sustaining the system as volume and demand grow, updating data quickly for users.

Question 7b: List any important secondary challenges, which may include some in the list above. Also list possible remedies for all challenges listed (database improvements, funding, personnel, "Other"). Responses included demands for data, delays in receiving data back from analytical labs, and challenges of updating.

Question 12: If a data user, where is your data primarily accessed from? Data user said that they access data from more diverse sources but 40% still said they access it from "Other".

Question 13: Data Access site if you chose "Other" above. Many users use multiple sites including national/global datasets, data emailed directly from data generators, and mappers and geo-spatial sites not included in the survey, secondary sites (not shown) were even more diverse.

Question 14: If a data user, what is your major challenge in retrieving your data from your primary data access site? Availability of current data was first (38.5%) followed by "Other" (23.1%), followed by QA/QC and downloading challenges.

15a. List your major challenge if you chose "Other" above. Major challenges included discovering datasets and developing queries, connecting water quality to spatial databases (mappers), and the lack of availability of all needed data fields from WQX portal.

15b. List any important secondary challenges, which may include some in the list above. Also list possible remedies for all challenges listed (database improvements, funding, personnel, "Other"). Additional challenges include limited database curating and lack of infrastructure (personnel), difficulties of database use, poor connection to mappers and models, no centralized access mechanism, other challenges for secondary databases (not shown) include education of users, translation to products for managers and the public, need "R" code to get CT DEEP and other data from WQX.

20. Finally enter any additional comments about the information requested on this form or about the form itself. Challenges include connecting water quality to spatial land use and watershed data for effective management, there are some improvements with the use of QuickDrops to

help get data into WQX, more data (like from NCCA) should go to WQX, NWIS can be effective especially when accesses with “R”, lots of work remains to be done.

Jim Ammerman then opened it up for discussion. Peter Linderoth started by noting that getting data for the Save the Sound Report Card over the last eight years has been rather seamless because he knows who to reach out to. He said that CT DEEP, IEC, and NYC DEP have all been very cooperative with their data because he knows them all. The same would not necessarily be true for people who did not have the same contacts, but also having one over arching database is probably not realistic. However, a few centralized areas for people to go to would probably be helpful. He added that QuickDrops was coming along well, alpha groups are using it and commenting on it in surveys like the above. The full marketing roll-out should be this fall, they are now just adding legal language for things like cookie settings, etc. Anyone can start using it at any time, they just have not yet done the outreach for it.

Jim Hagy said that in the work he has been doing in the past couple of years people have been very helpful and willing to share data, so we have a system that works for some people, but there are others who could contribute but find the data access barriers are just too high. Jim said he had reviewed the status of some of Long Island Sound’s peers, like the Chesapeake Bay Program. They have a centralized data manager who serves up frequently requested data sets that are already assembled and curated. They provide a lot of common links all in one place. Mike Mallonee is their long-time water quality data manager. That is one model but not the only one, he also looked at Tampa Bay. Marcus Beck has revamped their Open Science approach so you can look at Tampa Bay data sets from a variety of different angles. You can look at a data set, for instance nitrogen loading, choose a graph, and then download the data and the “R” code that went into making that graph.

Jim Hagy said that he had not looked at Chesapeake Bay data in a long time, but that they seem to have more of a central access point. It is not clear whether they host all the data or that the data manager curates data sets that he knows are in demand. Jim suggested that we could combine some of the strategies used by these other groups, such as helping to develop “R” code to do data discovery and retrieve data from WQX. This same code could be used by multiple investigators and help to accelerate Long Island Sound science. He added that he is not pointing fingers, data collectors have been very good in providing him with data, but that he is just suggesting some future improvements.

Mary Becker added to what Jim was saying, she said that CT DEEP was pushing to get all their data into WQX, so it becomes available through the Water Quality Portal (WQP). She is excited to hear about QuickDrops, which should be a good resource for watershed groups to get their data into WQX. QuickDrops will enable groups with limited resources to get their data into the WQP where it will be more widely available and then can be used to develop visualization and other data products like those developed by the Tampa Bay Estuary Program. Jim Ammerman added that the LISS was very supportive of CT DEEP’s efforts to make their data more available,

especially now that there are thirty years' worth of data. Mary added that the consistent format of QuickDrops allows them to utilize the data more effectively for their assessments.

Jon Morrison noted that there was gradient of sophistication in LIS users of USGS data. They range from those who can write code to put the data in any format they want to those who need the data in an Excel template. He said that getting the data in a standardized format, as in WQX, will be very helpful. The USGS Data Clearinghouse Phase One, which is about to come out, is designed to help people get access to the data. It will point people in the right direction and provide tools to help them extract the data and understand the metadata. High-quality metadata is very important to understand what the data is useable for. Jon is excited that clearinghouse is coming out, though it will not initially meet everyone's expectations. Now they need the data generators to populate the clearinghouse and work with USGS to serve the data to the public. USGS is also working on its nitrogen load dashboard to provide model output of nitrogen loading to LIS for people to explore and download in a usable format, for example the annual nitrogen load from all LIS tributaries. USGS is also considering expanding that dashboard to additional parameters and sites that are included. Wastewater treatment plant nitrogen loads, and atmospheric inputs could be other parameters included in the dashboard, and perhaps even groundwater load data from the north and south shores of Long Island Sound. Jon suggested a discussion or data détente, which would agree on where LIS data would have to be stored, and if you have LISS funding you need to undertake specific agreed-on courses of action with your data. He thought that such an agreement would be very useful, though challenging because of the great diversity of data types, and should start with a smaller subset of data types.

Michele Golden noted that New York State has data requirements for ELAP certification, an approved QAPP, and storage in WQX to be used for assessment or regulatory purposes. Melissa Duvall added that even in the recent LISS Research RFP there are data access requirements such that the program could require that research metadata be deposited in the USGS Clearinghouse or other requirements. In response to a question from Jim Ammerman, Jon Morrison said that USGS has a meeting soon to discuss the clearinghouse with EPA and that the clearinghouse will be introduced in late October. Melissa added that the clearinghouse should be closely followed by the water quality monitoring work group much like the SRC work group has worked with the USGS coastal flood risk assessment. The work group can provide input to make sure the clearinghouse is developed to be of greatest use and that data generators and users are aware of it and use it. Mark Tedesco added that this is an important topic, and the program looks to this work group to advance data accessibility either by adding additional requirements for supported data generators, working with USGS on the dashboard or other projects, or adding additional staffing support. He suggested that the work group stay engaged with this topic to make internal changes or work with partners to add additional capacity.

Jim Hagy had a question for data providers, noting that several mentioned in the data access survey that WQX had limitations with profile and time-series data. He said that the CT DEEP data he acquired had 80 columns of data for every data point, that was the metadata ratio for WQX. He wondered if there was a fundamental problem that needs to be addressed and added that

the USGS data system (NWIS) works well with time-series data. Jon Morrison replied that not all data behave well when put into a database and can be difficult to extract. He said that vertical profile data are challenging and USGS often publishes them as separate data releases which are more manageable. NWIS does a good job with discrete and continuous data in terms of output options. However, vertical profiles and drone flight data are difficult to work with. Jim Ammerman asked Jon if NWIS was being changed and he responded that USGS has the new Aquarius Samples Program, though you will still go through the web interface to get to the data. It has been under development for about six months and is currently operational. He said that changes in language and metadata have been jarring to long time users of the previous system. Evelyn Powers noted that her continuous monitoring work group that she co-chairs with the Harbor Estuary Program is meeting on October 10th and will have a presentation on uploading continuous data into WQX. Jim Ammerman summarized the data access discussion as concluding that the best way to access LIS data is to know the data provider. While this is fine for insiders, it clearly does not work for all, and more work needs to be done to make LIS data accessible. Jim added that we take Mark's comment about addressing additional data access issues seriously.

CCMP Revision

Jim Ammerman briefly highlighted relevant aspects of the new CCMP including nutrients, where little has changed except a possible increase in Sound and embayment monitoring. Watershed Health is a new objective of the Clean Water theme which involves mostly land use actions. Another new objective is pathogens, which have not been a focus until the recent addition of some tributary, harbor, and embayment monitoring efforts, which again will probably increase in the future. Toxic contaminants are another objective which will see increased scrutiny, with continued use of sediment quality data from the EPA National Coastal Condition Assessment, now expanded to LIS embayments. Increased research and assessment of emerging contaminants of concern including PFAS are also likely. Marine debris is another objective which had one ecosystem target in the previous CCMP but will likely see increased research and monitoring, utilizing the recent Sea Grant Marine Debris Action Plan. Finally, Jim showed the spreadsheet for the new monitoring plan, focused largely on water quality and habitat monitoring. He developed it from the old plan with appropriate additions, though it is far from complete. It is an EPA requirement for the new CCMP, and he urged all monitoring groups to read it closely, especially the spreadsheet, and suggest revisions as needed. Peter Linderoth asked if the spreadsheet was on the SharePoint site and Jim said yes, though it is now out for public comment so the comment process may be somewhat different. Peter said he has something to add and would go to the site. Jim thanked everyone for participating and ended the meeting.