

**Water Quality Monitoring Work Group
TEAMS Online Meeting
February 24, 2022 – Meeting Summary**



Attendance

Jim Ammerman (Chair)—Long Island Sound Study (LISS)/NEIWPCC
Jordon Bishop—NEIWPCC
Sarah Crosby—Harbor Watch
Carol DiPaolo—Coalition to Save Hempstead Harbor
Richard Friesner—NEIWPCC
Michele Golden—New York State Department of Environmental Conservation (NYSDEC)
Jim Hagy—EPA ORD
Alex Huddell—ORISE/EPA
David Lipsky—New York City Department of Environmental Protection (NYCDEP)
Matt Lyman—Connecticut Department of Energy and Environmental Protection (CT DEEP)
Michelle Lapinel McAllister-- Coalition to Save Hempstead Harbor
Jon Morrison—United States Geological Survey (USGS)
Esther Nelson—EPA
Katie O’Brien-Clayton—CT DEEP
Jim O’Donnell—U Conn
Evelyn Powers—Interstate Environmental Commission (IEC)
Samarra Scantlebury--NYSDEC
Sarah Schaefer-Brown—New York Sea Grant
Paul Stacey—Footprints in the Water
Kelly Streich—CTDEEP
Cayla Sullivan-- EPA, LIS Office
Nikki Tachiki-- EPA, LIS Office
Mark Tedesco—EPA, LIS Office
Samantha Wilder—IEC
Kimarie Yap--IEC

Announcement: EPA Tools & Resources Webinar

Advances in Environmental Monitoring – Water Sensors

Tuesday, March 16, 2022, from 3-4 PM ET

[Register for the webinar: Advances in Environmental Monitoring – Water Sensors!](#)

Agenda--Discuss Proposals Which Address Work Group Priorities

Priorities are numbered, proposals and principal investigators and/or organization in parentheses.

1. Refine monitoring objectives.

2. Increase coordination of the various monitoring efforts to improve coverage and efficiency.
3. Support data science within the program and support partner data management efforts as needed including development of Open APIs to facilitate data exchange. (USGS, Jon Morrison; NEIWPC, Jim Ammerman, Jordan Bishop)
4. Initiate the first steps of long-term monitoring for coastal acidification in Long Island Sound. (CT DEEP, Katie O'Brien-Clayton; IEC, Evelyn Powers; USGS, Jon Morrison)
5. Develop and implement a water quality monitoring strategy for nitrogen in the upper basin states of Massachusetts, Vermont, and New Hampshire along with partners (USGS, Jon Morrison; NEIWPC, Richard Friesner, Jordan Bishop)
6. Improve the reliability of LISICOS telemetry to provide real-time data. (U Conn, Jim O'Donnell)
7. New infrastructure funding could be directed to the R/V Dempsey and LISICOS. (Purchase of new monitoring vessel, CT DEEP)
8. Other proposed projects (not necessarily work group priorities):
 - a. Additional monitoring has been proposed for pathogens, HABs, and toxins, and potentially microplastics as well. (Watershed pathogen monitoring, Harbor Watch, Sarah Crosby, also IEC and CT DEEP-primarily vetted by the Watersheds and Embayments Work Group)
 - b. Water quality monitoring at Flax Pond, Nissequogue River, and Oyster Bay (USGS, Jon Morrison)

Opening Discussion

Jim Ammerman asked attendees to introduce any new members of their groups who had not previously attended, and Evelyn Powers introduced Samantha Wilder and Kimarie Yap from IEC. Jim briefly reviewed the meeting agenda and mentioned that Tetra Teach had thanked this work group for its previous input on their LIS retrospective analysis and Shiny App. He also mentioned an upcoming March 16th EPA webinar on water sensors. Jim asked if anyone had any monitoring updates or news and Jim O'Donnell replied that the bottom water temperature in the western Sound, typically the coldest water, is beginning to increase after bottoming out at about 1.5 °C and said that he would generate a figure. Jim Ammerman mentioned that the next work group meeting would be in May near the start of the monitoring season and would include a presentation from the Environmental Justice work group on incorporating more environmental justice into water quality monitoring activities.

Jim Ammerman then started to review the work group's priorities, using the list in the agenda above. He mentioned that he still thinks there is a need to refine our monitoring objectives and better coordinate our rapidly expanding monitoring efforts as listed in priorities 1 and 2, however, this meeting focuses in on proposals to address the other priorities.

Data Management

Addressing priority 3, data science, integration, and management, Jon Morrison said that USGS had been asked to develop a data clearinghouse, based on their expertise in this area and as Federal agency they would not need matching funds. This clearinghouse would be a searchable interactive web tool with a map and links to various sources of data included the types of data, metadata, models, and agency contact information. (The NY-NJ Harbor Estuary Program currently has a related website, <https://www.hudsonriver.org/hep-emp/>, for the Hudson estuary and watershed.) USGS would like to develop methods to pull data from the various data sources and then use data visualization tools to present it. This proposal will be submitted by March 4.

Paul Stacey asked whether this would integrate biological data and Jon replied that it would, however, it will not be an actual database but a data portal. He also clarified that it was a request for new funding. Dave Lipsky asked if any data would be stored so that it would not have to be retrieved by everyone separately and Jon replied that ultimately, they hoped to have common types of analyzed data in the same location, such as WQX for water quality data, so that it would be more readily accessible. Other comments noted that the Sentinel Monitoring work group already had a database with metadata, and a question about whether most water quality was not already in WQX? Jon replied that much of the water quality data was not in WQX and that was part of this effort to put them there.

Jordan Bishop asked about how much data management, such as QA/QC would be part of this project, expressing concern that it would not address data quality and related issues. Jon replied that he thought it was up to every group to be good stewards of their own data including QA/QC. He suggested further discussion of data standards should occur later. Paul Stacey mentioned the NERACOOS/NROC data effort which he said involved USGS. Jon said that they would be reaching out to stakeholders and building on the current state of the art and working across the USGS region and with estuarine experts across the county. Jim Ammerman asked if there would be one primary lead person on this project and Jon replied that was their intent and an others would be assisting with coding and related tasks. Sarah Crosby reminded the group of the current Community Science database development project with Save the Sound and Chesapeake Commons and Jon Morrison agreed that such a database would be included in their clearinghouse.

Jim O'Donnell pointed out that when divided by time, location, and depth the number of data points in LIS is limited, especially when there are so many parameters of interest. He argued that the main problem was a lack of data usage because potential users were poorly educated in using the data and thus one of the major needs was to educate and support users. Jon replied that USGS gets lots of data requests and has developed multiple user manuals and tip sheets, they are currently in the process of revamping their NWIS database to make the data much more accessible. Jim showed Execution Rocks bottom temperature buoy data displayed from his ERDDAP server and said that the data tools were not the problem, the users are. Paul Stacey said we know all that we need about LIS water quality from a management point of view, the needed information is from the land side including the watershed, where USGS is

focused. We especially need more geospatial information to properly address water quality needs in the LIS watershed, which has been somewhat neglected.

Jim Ammerman summarized the deliverables for a LIS Data Coordinator position description prepared by NEIWPC but applicable to other groups. These include organizing a data management work group, coordinating data gathering and sharing among LISS partners, manage large data sets, perform QA/QC, and create scripts to analyze, visualize, and report data. Jim O'Donnell asked if that position would help to support and educate data users and Jim Ammerman replied that while it was not currently included it is an important issue could be added to that or any other data management plan. Jim O'Donnell responded that the National Science Foundation's Ocean Observatories Initiative was now devoting many more resources to user support than originally planned and the people providing that support were different from the database managers. There was general agreement that user support was an important issue warranting further discussion and as mentioned earlier and an area where USGS had some experience.

Acidification Monitoring

Jim Ammerman then moved on to the issue of acidification monitoring which includes proposals from several different groups and asked how they wanted to describe it. Jon Morrisons said that Cayla Sullivan was leading the charge and that this activity came out of the Watersheds and Embayments Work Group. He said that CT DEEP was covering the open Sound, USGS some rivers and embayments, and IEC the western Sound, mostly at current sampling stations. Cayla then showed a map of proposed monitoring stations organized by the monitoring group and said that Peter Linderoth said that the Unified Water Study was also planning to participate with four embayment stations as well as an acidification communications plan. She noted the lack of coverage in the central and eastern Sound and said that might be added later. Cayla showed another slide that detailed the types of measurements (pH, TA, DIC, DOC, pCO₂) to made at the various stations and included several other locations where pH measurements are current made.

Jim O'Donnell added that they maintain two pH sensors on the two western Sound buoys (Western Sound and Execution Rocks) as well as a pCO₂ sensor at the Western Sound buoy and it would make a lot of sense to put pH and pCO₂ sensors at the surface and bottom of the Central Sound buoy. In response to a question from Matt Lyman, Jim said there were also pH and pCO₂ on the ARTG buoy but only in the summer. Jim asked if most of the samples to be collected were grab samples and Cayla and Evelyn Powers replied that most were grab samples, but Jon Morrison noted that the USGS sampling sites were a combination of grab samples and continuous samplers. Paul Stacey raised the question of acidification from climate change vs. from eutrophication and several people noted that eutrophication was the dominant cause, and the two causes were difficult to separate without sophisticated isotope studies. Jon Morrison said that they were also continuously monitoring oxygen and productivity in the same embayments as acidification and would hope to address these issues, as not all the embayments are eutrophic.

Paul Stacey suggested a clear statement of objectives and said that some of the harbors may now be less eutrophic and acidic than 20-30 years ago because of water quality improvements. Jim O'Donnell said that if the goal was to detect changes over time the current plan was inadequate as daily variability may exceed the annual variability. Cayla showed the objectives as developed by the informal acidification work group and said that there was significant pH data around the Sound but little of the three other parameters needed to characterize the carbonate system and that acidification could also vary widely around the Sound, particularly in embayments. She also mentioned future use of acidification data for models and further studies on species sensitivity as well as for improved nutrient management. Jim Ammerman noted that there were four different proposals for acidification monitoring and asked Cayla about coordination among them. Cayla replied that the work group would continue to meet, the data would be added to the proposed USGS data clearinghouse. Mark Tedesco added that a long-term investment would be required for meaningful monitoring, and it would therefore have to better document the problem and help to identify the value of management actions for additional nutrient reductions. Jim Ammerman agreed with Mark that long-term monitoring would be needed and noted the wide daily swings in dissolved oxygen (DO) and pH found in many embayments and the persistence of high pCO₂ in the bottom water of the western Sound even after hypoxia has ended.

LISICOS Telemetry and Respiration Measurements

Jim O'Donnell then briefly discussed the proposal for improved LISICOS telemetry and added automated respiration measurements. He said that the priority had always been on the instruments and not the telemetry, which have gradually degraded since the cell phone systems used for telemetry have gotten more crowded over time, limiting the range, and leading to more frequent outages. The Central Sound buoy communicates via satellite modem. A second problem is when a cable is cut, or a buoy is dragged off station, it may take until the next funding cycle to repair or replace it, as ship time can cost \$10k and repair trips are made for instrument outages but not telemetry outages. Two instruments for temperature, salinity, and DO are maintained for bottom water data reliability at each buoy.

The budget increase would provide redundant telemetry systems for each buoy as well as an additional buoy readily available to replace an inoperative one, thus reducing turnaround time. Jim Ammerman said it would have been particularly interesting to see the data in real time this past summer with all the storms, but the data was not available, and that this would solve the problem. Jim O'Donnell mentioned that the LISICOS buoy system was funded about 60% by NOAA through NERACOOS, 20% by EPA, and 20% by U Conn. Paul Stacey suggested collaborating with the new Connecticut National Estuarine Research Reserve (CT NERR) which will have four monitoring stations and Jim agreed, though noting that the NERR stations will be much closer to shore. Jon Morrison asked about the type of telemetry and Jim said it was Iridium satellite modems. Jim Ammerman asked about the automated respiration measurements and Jim O'Donnell said that Craig Tobias's respiration chambers would be deployed on LISICOS buoys. Such measurements are very important to hypoxia models and

Craig's student presented a lot of interesting respiration data measured by these chambers at the November 2021 STAC meeting.

Watershed Pathogen Monitoring

Though already discussed in the Watersheds and Embayments Work Group, Jim Ammerman asked for brief discussion of the watershed pathogen monitoring proposal here. Sarah Crosby was not available, but Evelyn Powers from IEC provided a summary. She said it was a three-year budget loosely modeled on the Unified Water Study which would start by taking inventory of the current monitoring programs and then work with municipalities to determine sites for additional needed monitoring. Eventually it would work to track down and address areas with known pathogen problems as has recently been done by various citizens monitoring groups. They have also consulted with CT DEEP and NYS DEC to refine their objectives. The project would start slowly and then the budget would increase significantly in the third year with more groups monitoring. As with the acidification monitoring, this project would be of limited utility unless it was continued for the long term.

New Monitoring Boat for CT DEEP

Jim Ammerman asked Matt Lyman of CT DEEP about the proposal for funding for the new monitoring boat. The R/V Dempsey is already at capacity in terms of collaborating with additional researchers. Shipyards have said that a two-year construction time is about right, and Matt said the ideal boat would be a 30–42-foot catamaran with a shallow draft for embayment access and more interior lab space for inclement weather and additional researchers and measurements. The Dempsey would continue to do trawling while this new boat would focus on water quality monitoring. The cost would be about \$1.5 to \$2 million and use a standard hull with the rest customized to CT DEEP's requirements. In response to a question from Jim O'Donnell, Matt said it could include a hull mounted ADCP and a water intake system. Propulsion would be diesel and not electric.

USGS Monitoring on the Long Island North Shore and the Connecticut River Watershed

Jon Morrison described the sites at Oyster Bay, the Nissequogue River, and Flax Pond as continuous monitoring sites that USGS would like to re-establish on the north shore of Long Island and incorporate into the coastal acidification monitoring network. The upper Connecticut River monitoring would resume previous monitoring in the Massachusetts portion of the Connecticut River and add sites in New Hampshire and Vermont in both the main stem and tributaries. The goal of the project is to develop nutrient load calculations. Paul Stacey noted that we should think beyond nitrogen and that each of the states has ambient biological monitoring occurring which is a good complement to water quality monitoring. He also said that geospatial data is key to watershed management. These various components need to be better integrated, as mentioned in the LISS Science Needs. Paul also mentioned the USGS NAQWA Program as well as the state monitoring plans. He suggested meeting with the state monitoring leads to better address important issues like productivity. Jon replied that they would also be addressing phosphorus and DOC (measured by CDOM) as part of this effort. In a related comment, Richard Friesner of NEIWPCC and the Nitrogen Coordination Group added

that for Phase II Part II of the NPS Tracking Tool they would focus on a subwatershed in Connecticut, but the ultimate plan was to continue going upstream in the watershed. Coordination of the entire monitoring effort for the watershed would be worthwhile. Jon added that USGS has worked a lot with Massachusetts on previous monitoring, but New Hampshire and Vermont have been more difficult to bring to the table.