Continuous Monitoring Subcommittee

IEC Shared Waters Workgroup and HEP Water Quality Work Group

May 7, 2021

Location: Remote Meeting

Minutes

Attendees: Jim Ammerman (NEIWPCC-LISS), Jessica Bonamusa (IEC), Rosana Da Silva (HEP), Melissa Duvall (EPA ORD), Leah Ettema (EPA), Carrie Ferraro (Rutgers), Mike Flood (EPA), Chris Girgenti (Randall's Island), Joe Grzyb (MERI, NJSEA), Jim Hagy (EPA), Siddhartha Hayes (HRPT), Peter Linderoth (Save the Sound), Sara Malone (Rutgers), Esther Nelson (EPA), Neel Patel (NYCDOHMH), Nicole Petersen (BBP), Evelyn Powers (IEC), Beau Ranheim (NYCDEP), Dan Rearick (NEIWPCC-NYSDEC), Melissa Sinisgalli (PVSC), Zachary Smith (NYSDEC), Jim Vasslides (BBP), Yongshan Wan, and Cheryl Yao (MERI, NJSEA)

Next Meeting: September 17, 2021 from 1:30-3:00pm

Introductions and Agenda Overview

> Evelyn Powers welcomed the group and reviewed the agenda.

Group Updates

Evelyn Powers opened the meeting for the group to share any updates to their continuous monitoring programs.

- **LIS Unified Water Study:** Peter Linderoth shared that they are moving one of their sondes to Black Rock Harbor. There are 13 bays and the Save the Sound has 16 loggers. In the upcoming unified water study, the are looking to install two or three exo sondes around the Bronx, such as Flushing Creek, to get more information in the Narrows.
- **NYCDEP:** Beau Ranheim shared that not much has changed since the last meeting. All 6 stations are still active and working to have 10 stations up and running by the end of the year. He has also been working on a GIS database.
- **HRPT:** Siddhartha Hayes share that HRP will continue to maintain sondes at Pier 25 and 84. This year, staff is in place to be able to keep up with the maintenance schedule, an issue that occurred due to COVID.
- **HRECOS:** Dan Rearick shared that all HRECOS stations should be in place by the end of next week. This year, he will be working to upgrade several sondes to YSIs. There are a total of 16 sites, with two added in partnership with HRNERR at Bear Mountain and Ferry Landing.
- **MERI:** Joe Grzyb shared that on Tuesday, they had set up a new exo sensor at their marina where it is sitting in a huge cooper pipe. He is hopeful that this will reduce biofouling.
- **IEC:** Evelyn Powers shared they will be continuing to work on the LIS Unified Water Study.
- **EPA:** Esther Nelson shared that EPA Office of Water (Office of Wetlands, Oceans, and Watersheds, Monitoring and Analysis Branch) has been working on identifying and addressing challenges around QA/QC of continuous data at a national level. Danielle Grunzke leads the workgroup. Esther is the EPA R2 contact.

- **HEP:** Rosana Da Silva shared that HRF has been in discussions with BCPA and looking to pilot a station for this summer in Battery Park. This is an area where we do have an existing gap and we are hopeful, if successful, this could be a permanent station. She also shared that the [continuous monitoring map](#) is being updated to include some additional information that this group requested.

Evelyn Powers added, that as HEP works to set up a webpage for this group, we can look to also include some information or presentations that were also shared during the 12th National Monitoring Conference as well as the latest meeting by the New Jersey Water Monitoring Council that also focused on continuous monitoring.

Jim Ammerman followed up with Jim O'Donnell after the meeting and shared the Central Sound buoy (CLIS), the Execution Rocks (EXTX) buoy near Throgs Neck, and ARTG are rehabbed and sampling. The WLIS buoy will be deployed on June 7. Locations are available here: https://lisicos.uconn.edu/

Learning More From Your High-Quality Continuous DO Measurements

Jim Hagy presented on what you can do with continuous monitoring data by sharing some of his previous work as well as his colleague Melissa Duvall. Jim shared the R code and the sample data to help everyone on the call that even if you are not familiar with R, you can also do it.

Jim shared some basic things that you can do with the data include describing the DO distribution and comparing the distribution of different sites. His Laguna Madre example shared ten years of data that he plotted into a graph first to spot patterns, gaps, or odd things that hopefully you can explain. Taking that same data and plotting it in a histogram or a cumulative distribution function (CDF) allows you to see what the probability of the data where the DO value is less than the X value as well as plot multiple CDFs to compare site to site. The code Jim shared also will help make the small map on each slide with the graph. Another thing you can do is examining attainment of DO standards by adding the state's threshold, use of temperature and salinity data for percent saturation, 10th and 90th percentile of DO, as well as surface and bottom DO. Another thing you can do is count how many events, days, and length that the DO passes a threshold. All of this you can do easily without a lot of code and once you have a code that works, you can recall the function over and over again with the same code.

Jim also discussed an open water method where the wind-wave interactions, tides, length of daylight, and the flux of air impacts the net DO productivity and calculating day-time respiration. You can also look at tidal variations. Jim's R code currently pulls NOAA tide data, but you can replace that with your own data if you have a water level sensor in re-projecting DO time series that is smooth and less nosy. Melissa's work focused on vertical DO profiles to separate across frequency domain using a continuous wavelet transform (cwt) to correlate processes at different time scales. We are moving to imperially understand DO processes even though at a simple scale they are intertwined and seem that you can't separate.

At the end of the day, if you try to do these analyses in a spreadsheet, it is doable but gets more complicated and less time-efficient. Jim recommends some coding ability in R or MAT-Lab to do this work is worth it as R is free and a lot of people share their code on Git-Hub. If you don't understand the code, don't assume you can't use it if they work! Jim recommends testing codes in small cases before mass producing it and recycle codes.

Jim asked the group, what are the main questions that you want to try an answer with the data that you are collecting? Peter Linderoth stated addressing standards is key. Peter asked, regarding the code that pulls from NOAA, where Jim had a NOAA station close to his station? Jim confirmed that one was pretty close, but that they also had an EPA-weather station nearby. He noted the further away the station gets, you may have a 10-15-minute lag that would then need to be adjusted and pay attention to time and time zone.

Jim Ammerman asked what Jim's goal was his sensors in Wickford? Jim shared that in Wickford there are a number of out-of-date septic systems and cesspools. The town will be connecting to a treatment plant and we wanted to know what kind of improvements are happening while the town works to connect? Working with USGS to also look at groundwater flow in addition to EPA's 25 sensors to give us a better understanding of metabolism in tidal environments. Mike Flood added that in the case of Suffolk County, we have very porous sediment which can impact quality of groundwater.

Esther Nelson added that with this work, communicating value is important. In order for the community to understand what the solution, we need to be able to communicate the problem.

Jim Vasslides, Carrie Ferraro, and Siddhartha Hayes thanked Jim for sharing the R codes and packets which will be helpful for their work. Melissa Duvall added that the time series analysis code is free. Although, she used Mat Lab there is a lot of code that can be easily translated and used in R and Python. Melissa is happy to share codes, please email her directly at duvall.melissa@epa.gov.

Next Meeting

Rosana Da Silva shared that the next meeting is scheduled for September 17, 2021. Evelyn Powers asked the group what they would like to learn at the next meeting. Jim Hagy answered with addressing why we are monitoring and what we want to solve with the data would be helpful. Nicole Peterson added that data analysis, QC and coding would be helpful. Esther Nelson added showing different issues and showing case studies of how the data can be used in multiple ways that can inform use of the data. Jim Hagy added for multiple prong sensors, what is the group using all the parameter data for or are you just using a few and why not just DO? Jim added that he has been looking at streamlining quality control and that there are a few commercial packages out there that people are using that may be helpful. Cheryl Yao added QC is important and that MERI is collecting data and trying to watch the data continuously by the staff which can be quite challenging. Nicole Petersen added that the group may all have some tips and tricks and codes that may be useful in QCing data.