Water Quality Work Group Meeting

February 9, 2021

Location: Zoom (online only)

## Minutes

**Attendees:** Marco Alebus (NJDEP), Brett Branco (Brooklyn College-STAC, co-chair), Rob Buchanan (NYC Water Trail Association, CAC), Elizabeth Butler (EPA), Lisa Congiu (NJDEP, co-chair), Rosana Da Silva (HEP), Mick DeGraeve (NJHDG/GLEC), Phil DeGatano (IEC, HRWA), Mike Dulong (Riverkeeper), Jason Fagel (NYSDEC), Brent Gaylord (EPA), Roop Guha (NJDEP), Wayne Jackson (EPA), Lingard Knutson (EPA), Amanda Levy (NYCDOHMH), Hildegaard Link (Rutgers), Rosella O'Connor (EPA), Neel Patel (NYCDOHMH), Rob Pirani (HEP), Evelyn Powers (IEC), Melissa Sinisgalli (PVSC/NJHDG), Isabelle Stinnette (HEP, RWG), Stan Stephenson (EPA), Judy Weis (Rutgers-STAC), and M. Ani Hsieh (UPenn)

**Next Meeting:** Tuesday, May 11, 2021

### 1) Overview of Agenda, Introductions, and Minutes Approval

Brett Branco opened the meeting and welcomed Lisa Congiu as the new NJ-chair. Lisa provided an overview of the agenda and introduced the October minutes, motioned to approve by Mick DeGraeve and seconded by Evelyn Powers.

### 2) Water Quality Monitoring and Modeling Updates

Brett Branco welcomed all members to share any updates – monitoring or modeling – and plans for this coming year.

- Mick DeGraeve shared that the NJHDG will continue their harbor-wide monitoring, a program that is consistent with NYCDEP harbor monitoring program. Some concessions had to be made due to the pandemic, but for the most part the program is continuing. NJHDG is proposing a project with Battelle to the CDC to look at WWTPs' influent from up to 8 sampling sites to generate a plan in determining the effectiveness of the vaccines.
- Stan Stephenson shared that he is currently working with the Edison Lab to design a pathogen track down program for the Lower Raritan and will share more about the project at a later date.
- Judy Weis shared a recent paper she has collaborated on that has been recently picked up and shared in other platforms. The paper explores microplastics in the ocean: https://www.ecomagazine.com/news/oceans/are-plastics-and-microplastics-in-the-ocean-on-the-increase
- Brett Branco discussed his colleague's recent NSF award which looks at linkages between nutrient quality and phytoplankton assemblage responses to COVID-19 stay-at-home orders in an urban, estuarine system, exploring how reductions in atmospheric contaminants (particularly nitrogen) and improved air quality, due to COVID-19 restrictions on human activity, may be affecting the biogeochemistry and ecology of the Long Island Sound. A second proposal seeks to use an autonomous underwater vehicle (AUV) that will have a number of sensors and can be used for the NY waterways. If anyone is interested in applications for the AUV, CUNY is looking for ways to

collaborate with local partners to utilize the equipment. Additional information is available by [clicking here](#).

- Evelyn Powers shared that IEC had a successful monitoring effort in 2020, which included all routine monitoring in LIS and the coordinated citizen pathogen (4 groups) monitoring. IEC plans to continue the citizen pathogen monitoring and partnering with USGS to analyze samples in the Harlem River (year-round assessment on boat traffic/wake) that may begin later this month and continue into the recreational session. IEC has been talking with NJDEP to support a new harbor monitoring program to assess HUC-14 segments that were downgraded in the 1990s, this includes the Hackensack and Passaic rivers, tidal tributaries, and open shared waters to monitor for nutrients and pathogens potentially to start in May 2021. IEC is also following up on some additional continuous monitoring sites, specifically in the Arthur Kill, and following up on a restoration project in the Raritan Bay.
- Elizabeth Butler added that the Urban Waters Federal Partnership in the Passaic will be partnering with USGS and PVSC to conduct additional pathogen track down in the Saddle River. Looking to start in May through September, measuring *E.coli*, caffeine, and microbial source tracking markers – dogs and birds – and can share the proposal if anyone is interested.
- Amanda Levy shared that DOH has been very focused on COVID, but assisting NYCDEP to look at the effluent of the POTWs. DOH is moving forward plans to open beaches in May and continuing the beach monitoring program.
- Rob Buchanan shared that the NYCWTA started their monitoring late June in 2020 with fewer sites, but anticipate being able to go back up to 75 sites this year to get coverage around the harbor. Rainfall data continues to be a challenge and would like to have better access to other weather stations outside of Central Park and the airports. Hopeful to do more testing around bigger storms to get a better handle on how CSOs behave and support a better notification system for CSOs - model of how the CSOs are reacting and not just assumptions.
- Rosana Da Silva shared that HEP has partnered with MSU and PVSC to submit a proposal to NOAA. The project will build upon the data set of right-of-way litter and collect data of the types/quantities of debris collected by PVSC's skimmer vessel to determine the most common debris. We will then add GPS transmitters to select classes of debris and conduct a coastal zone marine debris pathway study in the Passaic River to see what gets caught along the intertidal zone vs. captured by the skimmer vessel vs. what may flow into Newark Bay.

**Next Steps**: Roop/Marco will follow up with an update on the environmental coastal sites that were planned for 2020 in the Raritan and Sandy Hook Bays. Jason will follow up with an update on the Hudson River Estuary Program's efforts to monitor pathogens in the mid-Hudson.

**Update:** Jason Fagel shared the NYSDEC Division of Water will be collecting macroinvertebrate samples via multi-plate and associated water chemistry. Project area is Troy dam to the Bronx-Westchester line. Project will span two seasons with sampling in summer 2021 and 2022. Chemistry parameters include nitrogen, phosphorus, DOC, solids, DO, metals and chlorophyll a. The macroinvertebrates collected on the multi-plates will be compared to DEC developed metrics for macroinvertebrate community health. The project is currently in the QAPP review stage. The bacteria monitoring project for the mid-Hudson is still being discussed internally. There is no clear path forward at this point, but it's not dead.

Roop Guha shared NJDEP and IEC are pursuing a proposed effort (timeline TBD) to set up a Harbor-wide WQ sampling network to address data gaps related to the Integrated Report (i.e., 305(b) report). This network may also be used to validate pathogenic indicator and dissolved oxygen/eutrophication models

developed by non-DEP organizations, and/or the highest attainable uses and associated aquatic life-based WQS, in conjunction with other data. Sheri Shifren of NJDEP has also shared that the annual summary report is being drafted and will be posted to njbeaches.org once finalized. It includes a description of the supplemental Environmental Coastal Monitoring (ECM) of areas of possible primary recreation (part of which includes the bay shore area) that are outside of the CCMP program and sanitary code 1. Despite interruptions due to covid, supplemental samples were collected in 2020 and the program will continue in 2021.

**3)    Frontiers in Monitoring and Modeling: Intelligent and Adaptive Systems for Environmental Monitoring**

Lisa introduced Dr. M. Ani Hsieh from UPenn's GRASP Lab. Ani shared that GRASP is the oldest robotic lab founded in 1978 and is seeking ways to partner and collaborate with others interested in using robotics. Span a wide range of robotics research and different areas from biological to dynamical to planning and mapping, etc. As an example, GRASP has worked with USACE to improve safe inspections of dams/tunnels and use robotics to conduct mapping of these areas, improve design to capture vehicle's position and orientation, and develop 3D models for USACE to use to identify regions for human inspections or require repairs, etc. Mapping river depth via an autonomous robot can also be done with high quality data. Generally, when planning to use robotics you need to consider creating networks for sensor communication, leverage mobility to do more with limited data, consider tradeoffs between mobile and non-mobile instruments, and whether the AUV can collect enough data to develop a useful model. Goals of the models are always to be better predictors of the most probable scenario. The ROSE-HUB I/UCRC is seeking members to pull resources together with industry and government to address complex issues where robotics can help improve system understanding using robotics.

*Discussion:* Isabelle Stinnette asked how the river depth robot handles wave action, strong currents, and saline waters. Ani indicated that while they do not allow their students to operate in strong currents, they are getting good results with identifying the vehicle's location and sensing. Accuracy and precision is cost-dependent to understand which the best vehicle is. Lisa Congiu asked whether a combination of stationary and mobile sensing, especially with limited resources, may be used. Ani indicated that yes, as researchers they want to throw any robot to the problem, but partnering with local agencies is better and working in a budget pushes the Lab to really consider the questions/design of the model goal. Rob Buchanan commented that the missing drifters in particular, but all of these remote probes, seem like an environmental pollution issue in themselves. What are the protocols regarding their recovery? Ani shared that Miami had run into trouble as these drifters are made of plastic parts and when released, had the issue of going against international treaties of no dumping into the ocean. This led to developing instruments with biodegradable parts and every panel had an "if found return to" label and the University paid for shipping costs to return the equipment. Rob also suggested that it would be great for students to utilize AUVs in relationship to CSOs for improved notification systems. Rob Pirani indicated it would be interesting to see water quality impacts during CSOs. Marco Alebus suggested such technology can be used to track down illicit discharge, like in the Lower Passaic, where it can track change in temperature and identify hypoxia areas in the Harbor. Ani suggested the technology can be used to track various discharges as long as the sensor exists, we can do the monitoring.  And even if the sensor doesn't exist, GRASP can always think about what other proxy sensors we can use. Marco added another potential use is track down of groundwater seepage to rivers for the purpose of identifying potential sources of PFAS and 1,4 Dioxane contaminations to surface waters since these chemicals persist in groundwater.

**4)      Waterway Stories – Group Discussion**

Brett Branco introduced the Action Agenda goal of developing waterway stories, building upon the Harbor-Wide Water Quality Report and the discussion today, how we connect data with the personalized stories that exist in these waterways and other issues that were not able to be captured in the report. Rosana Da Silva shared the Harbor-Wide Water Quality Report's summaries for additional input on communicating in/out of compliance with the states standards. Rob Buchanan suggested red/yellow/green seem to work great with their communication, though as HEP is the editor we do have reason to select the colors that are currently being used. Jason Fagel indicated the new display looks acceptable.

Rosana Da Silva shared some initial ideas that could include collaborating with partners that are already sharing data or stories and engage on comparable analysis; waterways that do not have a core partner developing data/stories, HEP could take a primary role in developing those summaries; printer versus online options are available. Brett Branco suggested that existing waterway stories by a specific agency or group, has some kind of bias and there is a benefit for a neutral perspective in developing stories where we can gather all these different divides. Mick DeGraeve asked who the intended audience would be. These stories, as outlined in the Action Agenda, are intended for the general public in improving understanding of water quality. Roop Guha suggested that New Jersey could showcase the last IR for which NJDEP has developed a story map, if others are interested. And for the 2018-20, NJDEP is planning to use a web platform instead of a 800 page document to connect the designated uses to the water quality parameters. Isabelle Stinnette shared these waterway stories could be a great way to bring people to these waterbodies, what happens to it, what it looks like, a lot of different and interesting things we can do. There are a number of citizen science experts that can talk about their waterbodies and attach it to the data would be even better. Rob Pirani echoed that part of what we wanted to achieve with the WQ report and these stories is for the public to understand whether the water is safe enough for recreation. Somewhere between "eww" to "it's fine, go swim." How do we provide the nuance for that information? Lisa Congiu, Roop Guha, and Hildegaard Link echoed StoryMap may be an excellent way to connect different stories. Rob Buchanan suggested to reach out to the Harbor Educators who have videos. It may be a better use of time to curate what is already out there and a map interface to connect these videos or crowdsource 1-2 minute videos at a waterbody and compile them. Brett Branco agreed that video collections would be great, but we should ensure that we are capturing a number of perspectives and make connections to the data. Roop Guha suggested shinyapps would be the app to use to create the front end of the user interface, GitHub is the repository of the scripts. A storymap that you develop, could embed the graphs and the videos. Shiny apps can be linked on the storymap. Amanda Levy stated technology is great but I think we probably need to consider accessibility issues for some groups and come at it from a more equitable stance. Maybe in terms of printable lesson plans and activities as well. Isabelle Stinnette also asked if we could put signs up at waterfront parks with a QR code so that it is more accessible for folks that don't know what to google. If we are trying to reach the public, how do we make the information more accessible?

**Next Steps:** Rosana Da Silva will synthesize this brainstorming discussion and engage the Public Access Work Group, Harbor Educators Work Group, and the Citizen Advisory Committee to understand their needs in terms of waterbody stories and its connection to water quality data. This may include videos, building an interactive graph, utilizing videos, connecting to lesson plans.