Long Island Sound Study (LISS) Science & Technical Advisory Committee (STAC)
11/17/2017

Presentations

- Shellfish Aquaculture and Nutrient Management – Science and Policy (Rose)
- Economic Valuation of Nitrogen Bioextraction (Dvarskas)
- LIS Report Card Update – Revisiting Nutrient Criteria (Vaudrey)

In Attendance:

STAC Members: James Ammerman, Paul Anderson, Vera DeSantis (for John Connolly), Charles DeQuillfeldt, Anthony Dvarskas, David Lipsky, Darcy Lonsdale (NY Co-chair), Robin Landeck Miller, John Mullaney, James O'Donnell (CT Co-chair), Danielle Alexander (for Evelyn Powers), Julie Rose, Kelly Streich, Larry Swanson, Mark Tedesco, Jamie Vaudrey, Penny Vlahos, Robert Wilson

Others: Cassie Bauer (NYSDEC/LISS), David Berg (Long Island Regional Planning Council), Soren Dahl (NYSDEC), Kristin Kraseski (NEIWPCC/NYSDEC), Jeffrey Levinton (Stony Brook U.), Peter Linderoth (Save the Sound), Robert Nyman (EPA Region 2), Vicky O'Neill (NEIWPCC/LISS), Kimberly Roth (NEIWPCC), Paul Stacey (Footprints in the Water, LLC), Andy Thuman (HDR)

On the phone: Charles Yarish

Darcy Lonsdale (NY) Co-Chair, opened the meeting at 9:15 AM: She went over meeting logistics and noted that the meeting could also be joined by phone.

Jeff Levinton, Stony Brook University: *"N extraction potential in Jamaica Bay and Great South Bay, and the mismatch between bloom times and feeding rate potential".* Jeff discussed the potential for significant removal of nitrogen (N) by oysters in estuaries and the important factors which would make it practical in some estuaries but not others. These factors include the amount of N loading and the amount of N that could be removed based on the rate of oyster metabolism and the percent of habitat area cover. Oysters in heavily N-loaded estuaries like Jamaica Bay could remove 61% of the N if they covered the entire area of suitable habitat. However, the oysters could not be sold for food because of human health concerns and the costs would be prohibitive. In Great South Bay, in contrast, where N loading is less, oysters

could remove significant N with a smaller coverage area and could be sold for human consumption, making N bioextraction a practical removal process there. Shallow estuaries with modest N loading will be the most successful, however, preventing loading in the first place is still the best strategy. (See the following for details: Sebastiano, D, J. S. Levinton, M. Doall, and S. Kamath. 2015. J. of Shellfish Research 34[20]: 573-583.) Another concern is the timing of the spring phytoplankton bloom vs. the peak of oyster metabolism and feeding. These may not coincide, especially in an estuary like Long Island Sound where the phytoplankton often bloom in the winter before the oysters are active.

Julie Rose, NOAA; and Anthony Dvarskas, Stony Brook University: *"Hyperlocal ecosystem services: nutrient removal and increased water clarity provided by shellfish to a municipality"*. Julie and Anthony discussed local examples of shellfish bioextraction from both ecological and economic points of view. Julie described how shellfish could contribute to nitrogen removal in coastal waters, provided several examples, and focused on current efforts in Greenwich, Connecticut. Shellfish can be one of many useful methods to address non-point source nitrogen inputs in order to improve water quality. The shellfish N removal pathways include direct assimilation, enhanced sediment denitrification, and increased N burial. Several local case studies of bioextraction efforts in various stages of implementation were described, including Mashpee and Falmouth on Cape Cod, Chesapeake Bay, and the Delaware River in Pennsylvania, and a list of common needs for such projects was discussed. The current Greenwich project is a collaboration among the Greenwich Shellfish Commission, NOAA, and Stony Brook University. Greenwich has ideal shellfish waters which are productive but with low bacterial counts. Currently 60% of its seafloor is used for shellfish activity, including separate areas for seed beds and harvest areas. Julie then described modeling and measuring hard clam feeding and N absorption in order to determine how much N the clams could remove and to compare this to Jamie Vaudrey's N loading model for the same Greenwich watersheds.

Anthony reviewed the economic valuation of bioextraction, with a focus on the Greenwich project. He reviewed the wide range of N bioextraction values from previous coastal studies, and also the economic and valuation methods use in the Greenwich study, including credit valuation, replacement with treatment plant upgrades alone, and allocated replacement cost. The treatment plant upgrades had the lowest estimate of value but made the significant assumption that they could address all N sources. Significant investments would be needed to replace the oyster and clam services. Additional information is needed to determine the value of benefits to residents, such as to homeowners, beach visitors, boaters, and fishers. Long-term

surveys and bioeconomic models (ecological and economic) with benefit-relevant indicators important to people will be needed for further progress.

Larry Swanson, Acting Dean, SoMAS, Stony Brook University: *"Update on NY State Shellfish Funding and Shellfish Council"*. Larry gave an update on the aggressive actions by Governor Andrew Cuomo to improve water quality on Long Island focused on shellfish bioextraction and involving the School of Marine and Atmospheric Sciences (SoMAS) at Stony Brook. The Governor recently announced a $10.4 M program for shellfish hatcheries on Long Island. (This is in addition to the related activities of the Center for Clean Water Technology at Stony Brook which is addressing N removal from septic systems, as well as the re-routing of the Bay Park sewage outfall to the ocean from Hempstead Bay.) Both hatcheries and shellfish sanctuaries will be distributed at sites around Long Island both on the north and south shores and especially at the east end. Funding also includes upgrades for the SoMAS Flax Pond facility, which will be part of the hatchery system. SoMAS will be part of the oversight committee which also includes the Marine Program of Cornell Cooperative Extension of Suffolk County and other groups. This program is on a tight 2-year time frame with commercial clam production anticipated by 2019.

Mark Tedesco, LISS/EPA: *"Information on and discussion about new LISS/DEC Bioextraction Coordinator position*". Mark lead a discussion of the new Bioextraction Coordinator position which is funded by the LISS and will be located at NYS DEC office in Stony Brook. This is a NEIWPCC position, with a detailed description of duties posted on the NEIWPCC website and applications closed on November 10, 2017. In brief, the coordinator will work with both shellfish and seaweed aquaculture and collaborate with the Long Island Nitrogen Action Plan (LINAP) implementation efforts. The coordinator will review and report on ecological and production requirements for potential seaweed and shellfish species, as well as the bioextractive potential of these species. The coordinator will also review the risks and challenges for bioextraction aquaculture, including natural hazards, regulatory and permitting hurdles, and market pressures. They should also benefit from new N sensors resulting from EPA's push in sensor technology and use GIS tools for planning and priority-setting. The record of past challenges which have confronted aquaculture efforts on Long Island will provide useful background information for improved efforts in the future.

David Lipsky, NYC DEP: *"Next Generation LIS Modeling Effort"*. David discussed the current progress on the modeling efforts which are jointly funded by the LISS and the NYC DEP. Over time these efforts will develop a new series of models for LIS under a $2.8M cooperative

agreement between EPA and NYC DEP and subsequent funding. The first step is to use a DEP in-house consulting service along with a five-person technical advisory committee (to be appointed) to help develop a scope of work for what will ultimately be an integrated LIS hydrodynamic, water quality, and ecosystem model, in that order. Proposals for hydrodynamic and water quality modeling will be solicited in the first RFP to be developed. Some of the required criteria for models to be developed include: 1. An open-source modular design. 2. Capability to be built in stages. 3. Ability to be externally reviewable with some level of remote/graphical user interface to facilitate reviews. 4. Ability to work with other models.

Mark Tedesco, LISS/EPA*: "New NOAA Coastal Hypoxia Research Program (CHRP) RFP and LISS Budget Update".* Mark mentioned the new NOAA RFP for the Coastal Hypoxia Research Program (CHRP). The focus of this RFP is the impacts of hypoxia, including effects on the ecology and ecosystem services, as well as economic effects. The proposal deadline is January 30, 2018, and the Long Island Sound Study can help to provide the required management connections for interested investigators. See the CHRP RFP at:

https://www.grants.gov/web/grants/view-opportunity.html?oppId=298562

Jamie Vaudrey, University of Connecticut*: "Ecological Indicators for the 2018 Save the Sound (STS) Report Card on LIS"*. Jamie noted that the purpose of the Save the Sound report card is to reach the general public, not scientists or managers. It is a quick snapshot report of the water quality and ecosystem health of LIS. It does not address human health issues or details of monitoring or data needs. If desired, those interested can find a lot more information online at various partner websites. STS is re-evaluating the indicators used in its Long Island Sound Report Card, which in 2015 included nitrogen, phosphorus, dissolved oxygen, chlorophyll *a*, and water clarity. In the 2016 Report Card, nitrogen and phosphorus were combined into a "nutrients" parameter, due to concerns that low ratings for phosphorus were exaggerating concerns about it when nitrogen is the real problem. The next Report Card will be released in 2018 and a series of potential indicators are currently under evaluation, including a review of indicators used by other related programs. Indicators which can show trends over time are of particular interest, as well as interannual variability.

Meeting was adjourned at 2:30 PM

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Note: The Rose, Dvarskas, and Vaudrey presentations are also provided, please note that any information in these presentations is preliminary and subject to change.