

Science & Technical Advisory Committee
TEAMS Online Meeting
June 18, 2021 – Meeting Summary



In Attendance:

STAC Members: Jim Ammerman, Cassie Bauer, Vincent Breslin, Chris Conroy, Carmela Cuomo, Sylvain De Guise, Dianne Greenfield, Jim Hagy, Darcy Lonsdale (New York Co-chair), Kamazima Lwiza, Robin Landeck Miller, John Mullaney, Jim O'Donnell (Connecticut Co-chair), Julie Rose, Paul Stacey, Mark Tedesco, Craig Tobias, Penny Vlahos, Nils Volkenborn, Mike Whitney, Chester Zarnoch

CAC Liaisons to STAC: Mickey Weiss (Project Oceanology)

Others: Jeff Barbaro (USGS), Syma Ebbin (CTSG), Michele Golden (NYSDEC), Anna Hamilton (Tetra Tech), Alex Huddell (ORISE/EPA, Kristin Kraseski, NYSDEC/NEIWPC, Julia Lewis (Equinor Wind US), Peter Linderoth (Save the Sound, STS), Scott Lundin (Equinor Wind US), Katie O'Brien-Clayton (CTDEEP), Lane Smith (NYSG), Nathaniel Trumbull (UCONN), Gregory Wilkerson (NYCDEP)

Introductions, Updates: Jim O'Donnell announced that Penny Vlahos was elected the new CT Co-chair of the STAC. Jim Ammerman announced that several STAC members had stepped down or retired and introduced the following new members: Cassie Bauer, NYSDEC; Chris Conroy, UNH; James Hagy, EPA ORD; Bradley Peterson, SBU; Jim Turek, NOAA; and Mike Whitney, UCONN.

LISS FY 2021 Work Plan and Budget; Mark Tedesco, EPA LISS

Mark reviewed the nearly seven-fold increase in the LISS budget from 2016 to 2021, and the proposed \$40M budget for FY2022. He mentioned the increased investments in the nitrogen strategy, habitat and resilience, and an expanded Futures Fund. He also showed an FY2020 pie chart of expenditures organized by program element, with Habitat Protection and Restoration the dominant component at 36%, more than twice the second ranked Futures Fund. Mark then reviewed the major efforts for FY2021 to review 42 Enhancement Proposals, find 40% local match to project awards, and implement the updated 2020 CCMP. The FY2021 expenditures pie chart showed equal amounts (22%) allocated to Habitat Protection/Restoration and the Futures Fund, with Modeling, Monitoring, and Research each at 12-13%, and a new category of Stewardship and Resilience at 3%. This new category includes implementation of the new Sustainable and Resilient Communities Work Plan and the Environmental Justice Needs Assessment. These were detailed along with other highlights of the FY2021 expenditures. For FY2022 a new federal coordinating committee has been formed and the planning and budgeting process is being re-evaluated. The FY2022 budget process will formally begin at the October Management Committee meeting with final decisions at the April meeting.

Discussion:

--Paul Stacey mentioned that it had been 20 years since the LIS TMDL and asked about the possibility of a new one. Mark mentioned that there had been an effort in 2012, but the science

was insufficient at the time. He noted that EPA had developed the revised nitrogen strategy in 2015 and that the increased LISS budget had funded efforts to implement that strategy. Paul responded that without a TMDL it was a roadmap to nowhere and that any TMDL must be attainable.

--Jim Ammerman asked Sylvain De Guise about additional funding for Sea Grant, and Sylvain said there was \$35M proposed for coastal resilience and an additional \$5M for environmental justice communities.

Beacon Wind, Offshore Wind Energy Project; Julia Lewis, Equinor Wind US

Julia, along with two colleagues, returned to the STAC to provide more information on the Beacon Wind project, an offshore wind project about 20 miles south of Nantucket which she briefly introduced at the February meeting. She works for Equinor, which is a Norwegian energy company increasingly focused on sustainability, they have two leases in the US, Empire Wind in the NY Bight and Beacon Wind south of Nantucket next to other leases. Beacon Wind was selected by New York State in January 2021 for a 1,230 MW project called Beacon Wind 1, with a submarine cable through LIS connecting into Astoria, Queens. They will be utilizing a previously disturbed industrial area in Astoria which is an Environmental Justice community. They are currently working on permits and environmental assessments to be completed early in 2022, with construction in 2025 and operation starting in 2028. The wind towers will be fabricated in New York State and the operations and maintenance base will be at the South Brooklyn Marine Terminal. They will be using a high voltage direct current (HVDC) cable which will be buried 4-6 feet in the sediment and requires only one installation trench instead of three. Development of the cable route is ongoing and as stated in February Julia is reaching out to any stakeholders with relevant information or comments. More information is at beaconwind.com.

Discussion:

--Sylvain De Guise asked Julia if she had reached out to the CT fishing community, and she said yes.

--In response to another question about the life span of the turbines, Julia's colleague responded that they had a 25-year contract with New York State and a 30-year lease with the Bureau of Ocean Energy Management (BOEM).

Long Island Nitrogen Action Plan (LINAP) Modeling Overview; Michele Golden, NYSDEC

Michele's talk was postponed from the February STAC meeting when we ran out of time for it. Michele reviewed LINAP and its current modeling efforts, as well as brief mentions of the Westchester County, hydrodynamic modification, and the integrated systemwide modeling efforts. LINAP is a broad multi-year initiative to reduce nitrogen impacts on water quality and its goals include assessing nitrogen pollution in Long Island's waters, identifying nitrogen sources to ground and surface waters, establishing nitrogen reduction endpoints, and developing implementation plans to achieve reductions. NYSDEC's many LINAP partners include Nassau and Suffolk Counties, the three estuary programs (LIS, Peconic, and South Shore), the Long Island (LI) Regional Planning Council, NYS Agriculture and Markets, Stony Brook University, USGS and USEPA, and other stakeholders. Current modeling efforts include Suffolk, Nassau, and Westchester County models of varying detail, a hydrodynamic modification feasibility study,

USGS groundwater and solute transport models, and the integrated systemwide model of NYCDEP and EPA.

Suffolk County’s Subwatersheds Wastewater Plan, prepared by CDM Smith, is by far the most extensive, including groundwater, watershed, and hydrodynamic models and has been adopted by DEC as a Nine Element Plan. The county is a groundwater-dominated system and existing regional groundwater models from 2015 were updated for the Subwatersheds plan. A nitrogen loading model, originally developed by Ivan Valiela, included the following nitrogen sources, wastewater (centralized and on-site facilities), fertilizer, pet waste, and atmospheric deposition. On-site (septic) systems were the dominant groundwater sources (>63%), with fertilizer a distant second (>26%). Surface water loadings also included a significant fraction (>23%) from atmospheric deposition. Hydrodynamic modeling was also conducted on north and south shore LI embayments using the models FVCOM (by SUNY Stony Brook) and EFDC (by HDR). Model results for individual embayments were expressed as the product of “unit nitrogen load * residence time” expressed as mg/l. (Despite the units of mg/l, this does not represent an in-water concentration.) Since New York State does not have a numeric nitrogen standard, model results were compared with reference waterbodies which fit specific water quality and ecological criteria. The average reference value of (unit nitrogen load * residence time) which was 0.128 mg/l (n = 28), was subtracted from the individual embayment value. The result was then divided by the individual embayment value to yield a percent load reduction goal (see the equation below).

$$\frac{\text{Subject Waterbody's Nitrogen Residence Time} - \text{Average Reference Waterbody Nitrogen Residence Time}}{\text{Subject Waterbody's Nitrogen Residence Time}} = \% \text{ Load Reduction Goal}$$

Nassau County is following a similar if less extensive plan, including developing a nine-element plan with Stony Brook University which incorporates an NLM watershed model and EFDC and FVCOM hydrodynamic models. USGS data is being used instead of a groundwater model, pet waste sources will be updated, and a stormwater load will be calculated. A preliminary study completed in January 2020 shows that greater than 50% of the nitrogen loadings to north shore Hempstead and Cold Spring Harbors were from septic systems. Westchester County has no current county or watershed-wide plan, but two projects awarded by the LISS Futures Fund in 2019 and 2020. These will develop nine-element plans for the Pine, Stephenson, and Burling Brooks and Larchmont Harbor subwatersheds in collaboration with NEIWPC, and a portion of the Hutchinson River watershed in collaboration with Save the Sound.

Finally, a hydrodynamic modification study is intended to improve our understanding of hydrodynamic modifications and to determine the benefits and drawbacks of implementing them to achieve load reduction goals. Three hydrodynamic modifications will be modeled in at least three waterbodies and analyzed to determine the impacts on: 1. Water quality, 2.

Ecological/environmental health, and 3. Cost/constructability. A guidance document will result from this effort.

For further information on LINAP see the website (<https://www.dec.ny.gov/lands/103654.html>) or subscribe to the newsletter (https://public.govdelivery.com/accounts/NYSDEC/subscriber/new?topic_id=NYSDEC_174).

Sampling and Analysis to Develop an Invertebrate IBI for Long Island Sound Embayments; Anna Hamilton, Tetra Tech

Anna began her talk by mentioning the other contributors from Tetra Tech, CTDEEP, and NEIWPC: Ben Jessup, Katie O'Brien-Clayton, Christopher Bellucci, Paige Hobaugh, Nancy Roth, MaryAnn Dugan, and Richard Friesner. CT DEEP is expanding upon USEPA National Coastal Condition Assessment (NCCA) monitoring to generate benthic macroinvertebrate and ancillary data within LIS embayments. The goal of this project is to develop a benthic macroinvertebrate index for the LIS embayments to better assess the ecological condition of LIS embayments.

Embayments are defined as upstream of the "head-of-salt" (0.5 ppt) and the boundary with the main Sound is "an imaginary straight-line intersecting two land features fully enclosing a body of coastal water". Site selection is probabilistic with 30 samples completed in both NY and CT in the summer of 2020 and the same planned for 2021. Sampling at each location includes a grab sample with a Van Veen or similar, sieved to 0.5 mm for invertebrates and preserved in buffered formalin. Other grab samples are collected from the top 2 cm for chemistry and toxicology analyses. Water quality and water chemistry samples were also collected using NCCA protocols. The entire grab sample was sorted, with benthic macroinvertebrates as the target which were identified to the lowest practical taxonomic level, mostly to species, and 10% of the samples were re-identified as a check. Water and sediment chemistry and sediment toxicology tests with the amphipod *Leptocheirus plumulosus* also followed NCCA protocols.

Benthic Index Development is a complex endeavor with a Technical Advisory Group (TAG) led by CTDEEP to provide input at strategic points in the process. The initial focus is on a multi-metric index (MMI) which is the most common and combines ecologically and statistically driven metric selection. The five-step approach includes: 1. Organization of data, 2. Characterization of reference & disturbed sites, 3. Classification of sites to account for natural variability, 4. Calculation and testing of metrics, and 5. Assembly, testing, and selection of a multi-metric index. Data sources include the 30 NY and CT embayments sampled in 2020 and to be repeated in 2021, along with any prior NCCA LIS embayment sampling from 2010 or 2015. Power analysis will be used to estimate the needed sample size for index development, which should be possible after the 2021 data are available.

Reference and stressed sites are used to judge metric and index performance using environmental variables like dissolved oxygen (DO) or sediment contaminants that are independent of benthic community data. Thresholds are then set to characterize these reference and stressed sites whose distributions are then reviewed across strata and classes. A variety of methods are then used for site classification, followed by metric calculation and testing, and

index assembly and testing. Several potential problems were anticipated as well as potential solutions should they arise.

Discussion:

--Carmela Cuomo asked detailed questions about indices and metrics, including using camera indices and asking about DO concentrations 0.5 m above the bottom and whether the animals would see those. Further discussion followed.

Open Science in LISS; Alex Huddell ORISE Fellow, Long Island Sound Office

Alex briefly described her Ph.D. research at Columbia University on nitrogen losses in tropical and European agriculture. Despite the large accumulation of nitrate in tropical Amazon soils growing soybeans or soybeans and maize compared with forested soils, inorganic nitrogen export from these soils was modest, less than 1.5 kg nitrogen per hectare. Such low nitrogen loss is apparently due to the high anion exchange capacity of tropical soils and compares with losses of about 20 kg nitrogen per hectare from Iowa soybean-maize croplands. Another strategy to reduce nitrate leaching which was examined at a Swedish agricultural research station was comparing the growth of annual vs. perennial wheat. The latter reduced nitrate leaching by more than 100 times.

Alex then segued from data workflow in her dissertation project to Open Science in the LISS, the reason for her fellowship. She briefly reviewed Open Science principles, namely open data, open process, and open products as well as the advantages of the Open Science Framework over current methods using proprietary software and opaque workflows. She showed figures developed by Marcus Beck, a data scientist with the Tampa Bay Estuary Program, and highlighted his Shiny app seagrass dashboard for Tampa Bay. She concluded with a list of her short-term and long-term next steps and invited others to collaborate.

Discussion:

--Paul Stacey said that he was excited about this effort.