Title: Acoustic data acquisition for seafloor mapping in Long Island Sound

Project Summary:

Benthic mapping of Long Island Sound (LIS) has long been identified as a priority need and is essential to improving science-based environmental management and mitigation decisions. Sea floor landscape maps depicting habitat structure and the ecological characteristics associated with those habitats are critical pieces of information which typically integrate information from a variety of sources including acoustic bathymetry and backscatter, sedimentary, geochemical, physical, and biological data.

In 2004, a settlement fund (LIS Cable Fund) resulting from issues surrounding cable infrastructure in LIS was created to support a benthic mapping effort. To manage this, a Steering Committee was formed consisting of representatives from DEEP, US EPA Regions 1 & 2, New York Department of Environmental Conservation, New York Department of State, and the SeaGrant offices of Connecticut and New York. The committee works in a joint administrative capacity, but financial management of the fund is the responsibility of DEEP.

In 2012 three areas of LIS were identified to develop a multi-phased benthic mapping effort. These were designated as the Pilot, Phase 2, and Phase 3 (Figure 1).
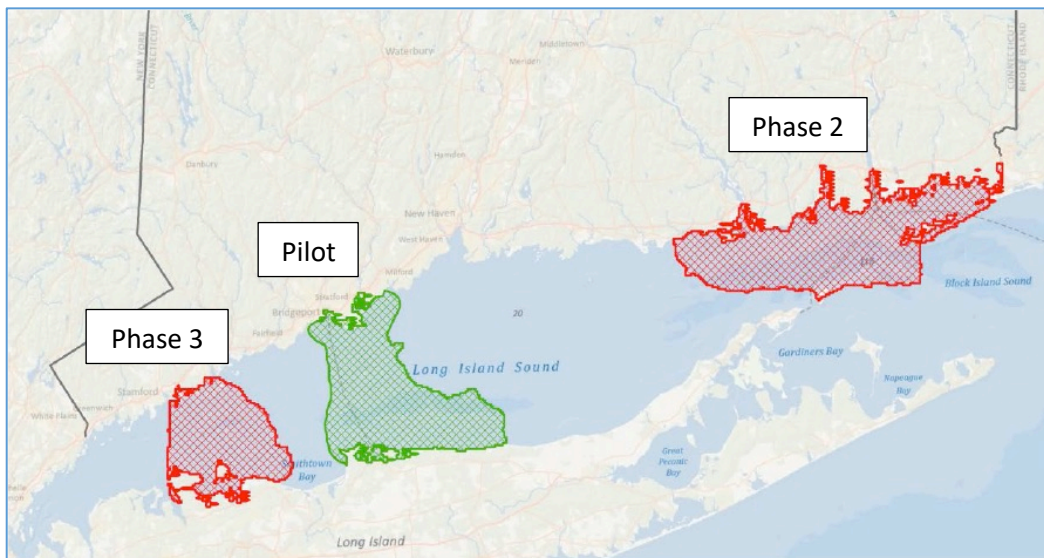

Figure 1. LIS Cable Fund Priority areas as of 2012.

The Pilot was carried out from 2012 – 2014 in partnership with consortia from the National Oceanic and Atmospheric Administration and two academic groups led by the University of Connecticut and the Lamont-Doherty Earth Observatory of Columbia University. They delivered data and products on the following thematic areas:

- Acoustic Intensity;
- Seafloor Topography;
- Benthic Habitat and Ecological Processes;
- Sediment Texture and Grain Size Distribution;
- Sedimentary Environments;
- Physical and Chemical Environments; and,
- A Data Management component

Upon submission and review of the Pilot data the Steering Committee initiated Phase 2 in January 2017 continuing with the same partners and thematic data areas. Finalization of the reporting for Phase 2 is currently ongoing, and an initial proposal to support acoustic data acquisition in the Phase 3 area has been completed, with work to begin in 2023.

The LIS Cable Fund is anticipated to deliver data for the proposed Phase 3 area consistent with the Pilot and Phase 2, and is projected to have a modest balance, which will be used to focus on the gap in the central LIS basin between the Pilot and Phase 2 areas. With the addition of funds from the LISS CCMP Enhancement Grant, the Steering Committee and its mapping partners will be able to leverage the ongoing work from the past 8 years and maximize the consistent collection and analysis of data within the central LIS basin, where no other recent acoustic surveys have been made, depicted as the region outlined in purple in Figure 2.
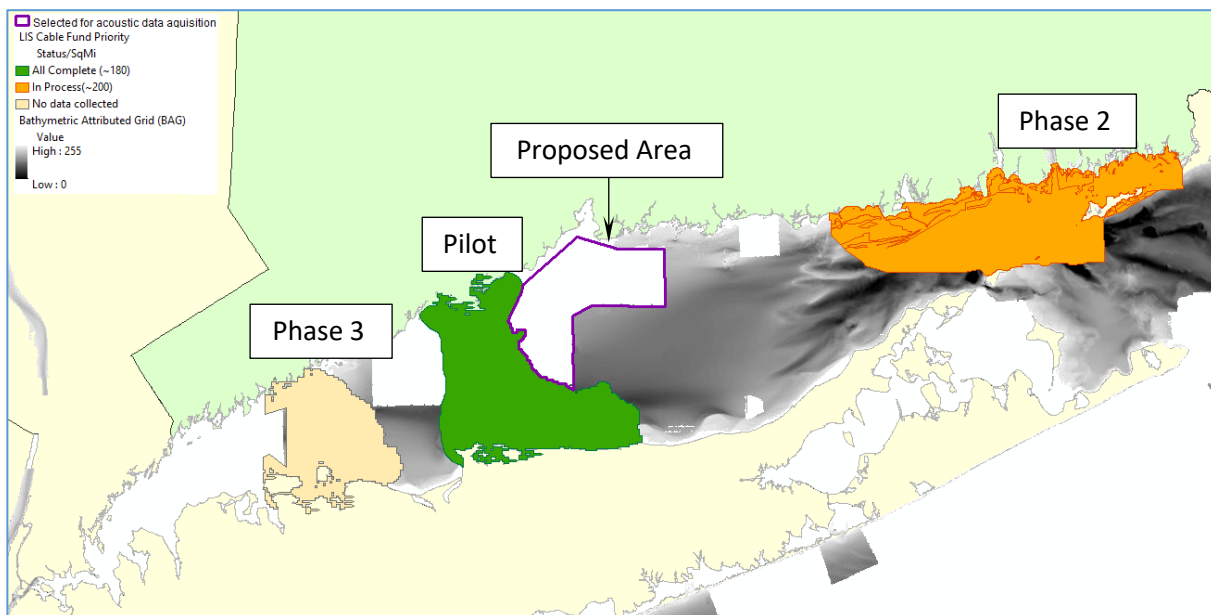

Figure 2. Map showing proposed area for acoustic data acquisition.

The LISS CCMP Enhancement funds are supporting on-going acoustic surveys of this 99.5 square-mile area and the acquisition of a new multibeam sonar system (Kongsberg EM2040c MkII with dual heads, motion sensor, and logging computer plus software) that will provide state-of-the-art bathymetric and backscatter data. The first leg of the new surveys was conducted in August, 2022 using the RV Connecticut and the second completed in September, 2022. The third and final leg is being conducted in late November to early December, 2022. Much of the initial processing of the acoustic data has been done during the survey, with the final deliverable products digitized bathymetric and backscatter maps to be delivered in early 2023.

The acquisition of additional acoustic data within the portion of the LIS central basin where no current bathymetric data is available would increase the extent where management decisions for LIS can be made based on the best available data and scientific analysis. Acoustic data from sidescan or multibeam sonar are typically the first pieces of any benthic mapping effort. In addition to providing important data on sea-floor depth, topography, and various sedimentary characteristics, they also serve as an important roadmap to inform efficient and relevant sampling plans for subsequent geological, ecological, and physical collections. Furthermore, acoustic data also serve as the foundation for linking together the individual thematic data the LIS Cable Fund has targeted to

generate final integrated habitat maps. The additional acoustic data acquisition of this 99.5 square-mile area within the central LIS basin supports the implementation of the 2015 CCMP by improving the scientific knowledge base essential to making informed decisions to protect and restore the health of LIS.

Project Relevance and Need:

Acoustic data acquisition is critical to the completion of the LIS seafloor mapping effort, which shall assist managers in the State of Connecticut, the State of New York, Connecticut and New York Sea Grant, and the U.S. Environmental Protection (USEPA) agency with their mandates to preserve and protect coastal and estuarine environments and water quality of Long Island Sound, while balancing competing human and energy needs with protection and restoration of essential ecological function and habitats. The proposed project will be consistent the Implementation Actions (HW1, HW3, HW5, HW6, HW22, SM1, SM2, SM3, SM7, SM9, SM10, SM24) and Objectives (2-1a, 2-1b, 2-4a, 3-3a, 4-1a, 4-1b, 4-1c, 4-2a) specified in the 2015 CCMP. This project directly addresses the Implementation Action (SM2) – to complete seafloor mapping conducted under the Sound Cable Fund, and use the results to guide further mapping – for the strategy (4-1b1) – to characterize, inventory, and map open and shallow water habitats to support resource management and marine spatial planning. The acquisition of high-resolution bathymetry and backscatter data provide the stepping off point for all subsequent elements of the habitat mapping initiative. Thus, these products are fundamental components necessary to satisfy the objectives of the benthic mapping project.