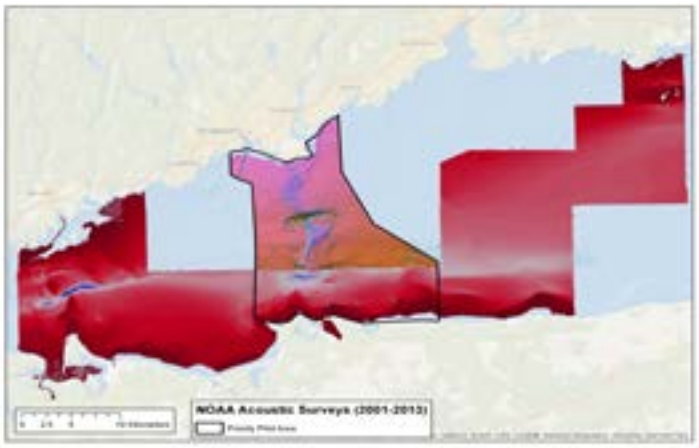
Acoustic Mapping

NOAA is an important collaborator with the LIS Seafloor Mapping Program. NOAA's Office of Coast Survey (OCS) and National Centers for Coastal Ocean Science (NCCOS) are providing management and technical expertise, acquiring data, and developing products for the seafloor mapping program. As a leading Federal agency in national seafloor mapping, NOAA has filled critical data gaps by collecting new data and interpreting those data to provide informative products. The LIS Seafloor Mapping Program needed bathymetry and backscatter, and biological and physical observational and sampling data, to produce all the products needed by governments, industry, academia, and the public.

In 2012 and 2013, NOAA Ship *Thomas Jefferson* conducted extensive hydrographic surveys in LIS. Coast Survey, the nation's nautical chartmaker, needed new bathymetry to update charts for ships traveling through the increasingly crowded Sound (see figure top right). To meet the needs of LIS partners, Coast Survey made some adjustments to survey areas and parameters to support both nautical charting and the seafloor mapping of Long Island Sound over the next several years. *Thomas Jefferson* conducted hydrographic surveys collecting high resolution acoustic data for approximately 900 km^2 of LIS in water depths ranging from approximately three to 60 meters using state-of-the-art acoustic multibeam sonar systems. These surveys also included the collection of data within the southern third of the pilot area, the focus of the LIS Seafloor Mapping Program's initial efforts. Products from these surveys include high resolution bathymetric and backscatter maps. Bathymetry information can identify areas of important topographic change or complexity, such as undulating sand waves (see figures below). Coincident backscatter data provides a measure of the roughness, hardness, and habitat composition of seafloor features, which is useful for distinguishing different habitat types. NOAA's partners in this mapping effort, two academic consortia led by LDEO and UConn, have assisted in the collection of nearshore (less than five meters) data along the Connecticut and New York coastlines. In addition, researchers from LDEO have also collected an extensive set of sub-bottom profiles by using low-frequency sonar devices to "see" the geologic structure beneath the seafloor itself.

In addition to collecting new data, NOAA was able to use data previously collected within the pilot area in 2001 and 2003. At the time, these data were gathered explicitly for nautical charting purposes, but this provided an opportunity to reuse existing data for new purposes. Reprocessing of these existing data using new techniques developed by NOAA provided valuable planning insight for the other ecological, geological, and oceanographic components by bringing to bear increased clarity and resolution on these efforts.



NOAA, 2013

HYDROGRAPHIC DATA indicates the depth to the seafloor. Red indicates a shallow area, while blue indicates a deeper area.

Products from the LIS Seafloor Mapping Program will give state and federal governments valuable information for their coastal management and planning efforts, as well as produce the hydrographic data necessary to update nautical charts of the Sound. The program synergies demonstrate how integrating various technologies, sciences, capabilities, and needs can exponentially increase the value of data. It is a practical example of NOAA's commitment to the concept of integrated ocean and coastal mapping, where the goal is to map once, use many times. The integrated "whole ocean" philosophy leverages limited resources by identifying common mapping requirements, ensuring proper stewardship of mapping data, and, where possible, re-using these data to derive additional products for ocean and coastal needs.

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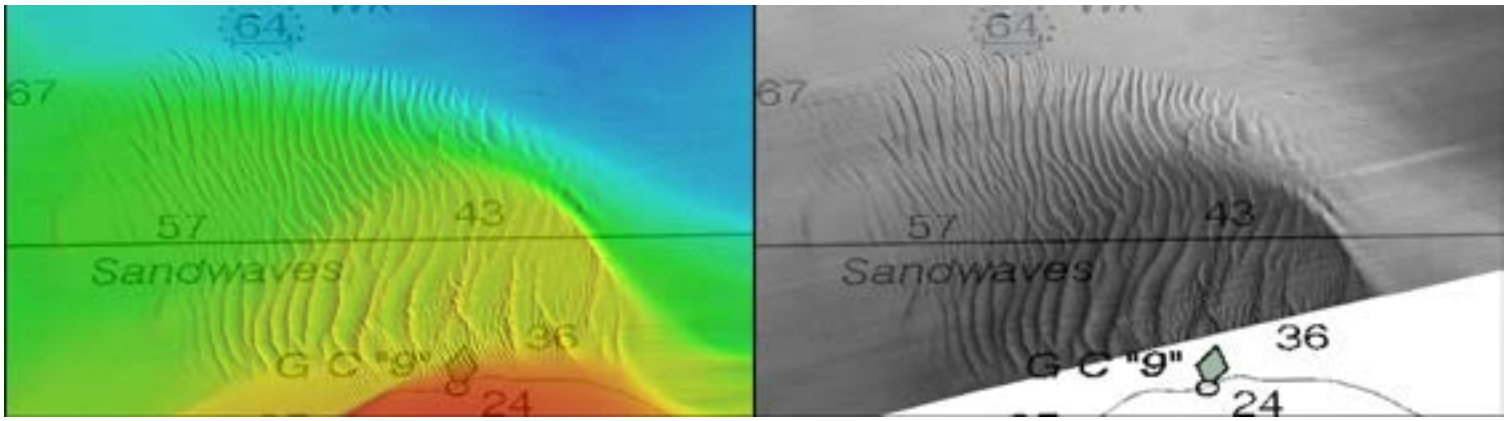

NOAA, 2013

ACOUSTIC PRODUCTS collected by the NOAA Ship *Thomas Jefferson* depicting a sand wave field. Color shaded bathymetry (left) and backscatter intensity (right).