

Sea and Lake Floor Mapping

SUMMARY:

Vast areas of the sea and lake floors of the United States are unmapped. New high-resolution mapping technologies enable detailed bathymetry, backscatter intensity, and sediment thickness information to be collected over large areas. Regional mapping of the sea floor geology provides a fundamental framework for research, and geologic information necessary for a wide range of management decisions. Digital geologic maps of high-priority areas of the sea and lake floors of the United States will serve the nation for years to come.

INVESTIGATORS:

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Sea Floor mapping image

DESCRIPTION:

The objective of this project is to map and characterize the sea floor of key areas of the U.S. EEZ and other water bodies as appropriate. Regions selected for mapping include areas offshore of major metropolitan centers, key biological habitats, unique topographic features, areas where new maps are needed for process or regional studies, and areas identified by cooperators.

START DATE OF PROJECT:

October 1, 1994

END DATE OF PROJECT:

TOPIC:

Aquatic and Marine Processes Related to Human Health, Develop and Maintain Databases, GIS, and Decision Support Systems' Offshore - Marine, Lacustrine, Coastal, Wetland, Riverine, and Associated Watersheds, Secondary Earth Surface Dynamics

APPROACH:

Various techniques and mapping systems are used to map the sea floor, including sidescan sonar, multibeam sonar, high resolution seismic reflection profiling, bottom imaging, and direct sampling. Data are acquired, processed, analyzed and archived, published in both paper and digital form, and made available over the web. Sea and Lake Floor Mapping is an on-going project that provides an administrative home for a range of mapping activities, including: 1) Synthesis and publication from several large mapping projects in the final stages of completion (Task 1, EEZ Mapping/New York Bight; Task 2 Hudson Canyon System; Task 3, Massachusetts Bay); 2) Mapping projects carried out in cooperation with NOAA to utilize data collected as part of their routine charting (Task 8, Long Island Sound); 3) Cooperative mapping projects with various agencies and organizations (Task 12, Lake Winnepesaukee); and 4) CMGP efforts utilizing existing data from previous studies (Task 7). Tasks previously included in Sea and Lake Floor Mapping, Apalachicola and High-resolution mapping offshore of Massachusetts are now separate projects (see projects 2921C49 and 2921AWW respectively).

IMPACT/RESULTS:

The maps produced by this and other projects using new high-resolution mapping systems are revolutionizing the way we think about the sea and lake floors. The maps provide a fundamental framework for research and geologic information for a wide range of research and management issues over the long-term. Outcomes: The maps and interpretations generated by this project provide the geologic framework for commercial, scientific and management activities in the coastal ocean. Many of the maps have been initiated at the request of cooperators. Some specific outcomes include: (a) The Massachusetts Bay multibeam data were requested by INTEC Engineering, Houston, TX for use in siting a natural gas pipeline from an offshore terminal proposed for Massachusetts Bay; (b) Based on this work, the Massachusetts office of Coastal Zone Management has cooperatively funded additional mapping to support coastal management activities; (c) The New Hampshire Department of Environmental Services (DES) has funded the collaborative WRD VT/NH and WHSC habitat mapping within Lake Winnepesaukee in order to gain a better understanding of the invasive aquatic plant, variable milfoil, and the environments conducive to its spread and growth. Ultimately, the results of this and other studies will enable NH DES to conduct risk assessments on other water bodies and mitigate the further spread of variable milfoil; (d) the mapping of the Hudson Canyon system has been the basis for further proposals to NOAA OE program.

PUBLICATIONS:

- ◆ Butman, Bradford, Alexander, P. Soupy, Harris, Courtney K., Traykovski, Peter A., Buchholtz ten Brink, Marilyn, Lightsom, Frances S., and Martrini, Marinna A., 2003, Oceanographic Observations in the Hudson Shelf Valley, December 1999-April 2000: Data Report. U.S. Geological Survey Open File Report 02-217. 1 DVD-ROM.
- ◆ Twichell, D.C., Cross, V.A., and Belew, S.D., Mapping the floor of Lake Mead (Nevada and Arizona): Preliminary discussion and GIS data release: USGS Open-File Report 03-320, 1 DVD-ROM.
- ◆ Butman, Bradford, Middleton, T.J., Thieler, E.R., and Schwab, W.C., 2003, Topography, shaded relief, and backscatter intensity of the Hudson Shelf Valley, offshore of New York: U.S. Geological Survey Open-File Report 03-372. 1 CD-ROM.
- ◆ Schwab, W.C., Denny, J.F., Butman, B., Danforth, W.W., Foster, D.S., Swift, B.A., Lotto, L.L., Allison, M.A. and Thieler, E.R.: Sea-floor characterization offshore of the New York-New Jersey metropolitan area using sidescan sonar, 2000, U.S. Geological Survey Open-File Report 00-295
- ◆ Foster, D.S., Swift, B.A., and Schwab, W.C., Stratigraphic framework maps of the nearshore area of southern Long Island from Fire Island to Montauk Point, New York: U.S. Geological Survey Open-File Report 99-559, 2 sheets, scale 1:250,000.
- ◆ Harris, C.K., B. Butman, and P. Traykovski, 2003, Winter-time circulation and sediment transport in the Hudson Shelf Valley. Continental Shelf Research, v23(8), p. 801-820.
- ◆ Mecray, E.L., Reid, J.M., Hastings, M.E., and Buchholtz ten Brink, M.R., 2003, Contaminated Sediments Database for Long Island Sound and the New York Bight, U.S. Geological Survey Open-file Report No. 03-241, Online at <http://pubs.usgs.gov/of/2003/of03-241>.
- ◆ Schwab, W.C., Denny, J.F., Foster, D.S., Lotto, L.L., and others, High-resolution quaternary seismic stratigraphy of the New York Bight Continental Shelf: U.S. Geological Survey Open-File Report 02-152, DVD-ROM.
- ◆ Schwab, W.C., Thieler, E.R., Denny, J.F., and Danforth, W.W., Sea-floor sediment distribution off southern Long Island, New York: U.S. Geological Survey Open-File Report 00-243, Electronic, 2 sheets, scale 1:275,000.

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- ◆ [USGS sediment studies in Lake Mead](#)