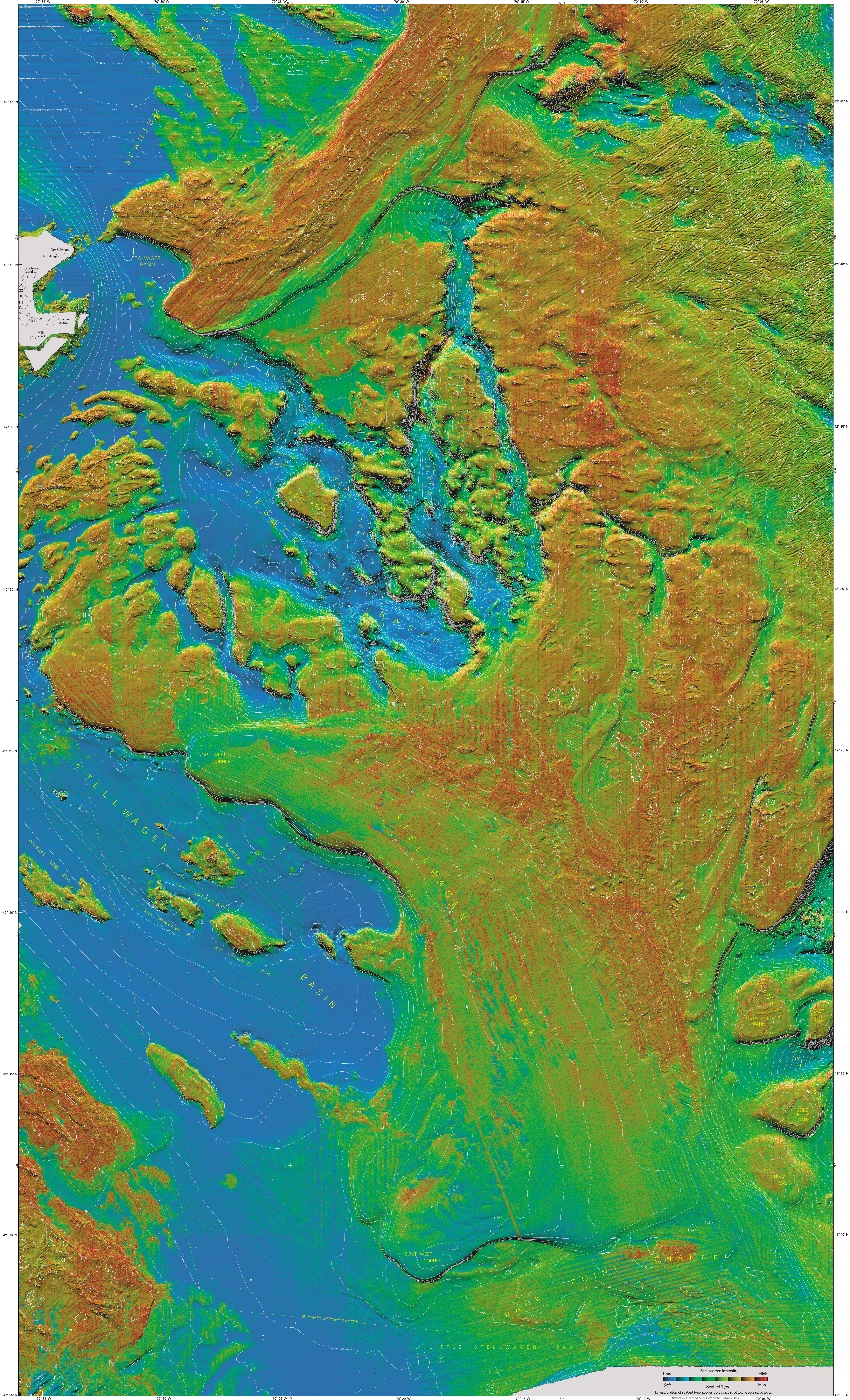




MapScale: Bathymetric Reference System 1983, North American Datum 1983
Longitude of central meridian: 70° 10' W; latitude of map scale: 41° 30' N
This map is not to be used for navigational purposes.

DISCUSSION

This map is part of a three-map series of the Stellwagen Bank National Marine Sanctuary region. The maps are the products of a 1994-1996 survey that used a multibeam echo sounder to map 1,100 square nautical miles of the sea floor. The other two maps show new sea floor topography and sun-illuminated shaded relief sea floor topographic imagery (U.S. Geological Survey Open-File Report 00-410 Sheets 1 and 2). This map combines the sun-illuminated topography with the backscatter intensity shown here to reveal the sea floor. Backscatter intensity is a measure of the hardness and roughness of the sea floor as determined from the strength of sound waves reflected from the seafloor during the survey. High-backscatter materials (red and orange) are coarse sand, gravel (including pits and ridges of boulders), and rock outcrops. Moderate backscatter (green) represents sand or muddy sand. Low backscatter (blue) represents sandy mud and mud. These interpretations apply best in regions of low regional topography, because steep slopes can direct the path of some of the reflected sound waves away from the survey vessel. Thus, seafloor that slopes steeply away from the survey track can produce a lower backscatter intensity than if it were level. Unnatural-looking stripes and patterns oriented parallel or perpendicular to survey tracklines are artifacts of data collection. Blank areas represent places where no data exists. The topographic imagery is identical to that shown on Open-File Report 00-410 Sheet 2. Major topographic features depicted in the maps were formed by glacial processes. In broad terms, these features are interpreted here to represent a geologic history that developed in several stages. Ice containing rock debris moved across the region, sculpting its surface and depositing sediment to form the large basins, banks, ridges, and valleys. Many other features observed here represent the latter stages of deglaciation. They are the result of processes at work when much of the area was covered by stationary retreating ice, and when at the same time small valley glaciers and ice falls were active in and near areas of high topographic relief. The sea invaded the region formerly occupied by ice, and glacial features were partly eroded and some new deposits formed. Today, the sea floor is modified mainly by strong southward-drifting bottom currents caused by storm winds from the northeast. These currents erode sediments from the shallow banks and transport them into the basin. With time, the banks become overtopped, as sand and mud are removed and gravel remains, and the western flanks of the banks, as well as adjacent basins, are built up by deposits of mud and sand. The Stellwagen Bank National Marine Sanctuary Mapping Project is a cooperative effort of the U.S. Geological Survey and the National Oceanic and Atmospheric Administration, with support from the University of New Brunswick and the Canadian Hydrographic Service. For information on survey methods and on two map series of 18 quadrangles each (see location map that show sea floor topography and sun-illuminated imagery at a scale of 1:25,000, see Open-File Report 00-410 Sheet 1 and references therein). On this map, the corners of the 18 quadrangles are shown for reference as labeled ticks and as large crosses on the map.

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BACKSCATTER INTENSITY AND SUN-ILLUMINATED SEA FLOOR TOPOGRAPHY OF THE STELLWAGEN BANK NATIONAL MARINE SANCTUARY OFF BOSTON, MASSACHUSETTS

By
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