



Map projection: UTM, Zone 18N, Datum: North American Datum 1983
Longitude of central meridian: 70° 10' W (radius of map scale: 41 231 m)
This map is not to be used for navigational purposes.

SCALE 1:60,000
ONE CENTIMETER ON THE MAP REPRESENTS 600 METERS ON THE SEA FLOOR
CONTOUR INTERVAL: 5 METERS
BROWN CONTOUR INTERVAL: TOPOGRAPHIC LOWS
DASHED CONTOUR INTERVAL: LOWER LOW WATER

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

By
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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 1100 square nautical miles of the sea floor. The other two maps show near sea floor topography, and combined sun-illuminated (shaded relief) sea floor topography and backscatter intensity (U.S. Geological Survey Open File Report 00-410 Sheets 1 and 2). This map combines contour topography and sun-illuminated topographic imagery. The image shown here uses a sun elevation angle of 45 degrees above the horizon from an azimuth of 350 degrees and a vertical exaggeration of four times. To direct topographic relief is enhanced by having the sun illuminate the sea floor from a position 10 degrees west of north so that shadows are cast on the western flanks of seafloor features. Unwanted-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 3. 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. For continuing 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 later stages of deposition. They are the result of processes at work when much of the area was covered by stationary resting 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-flowing bottom currents caused by storm winds from the northeast. These currents erode sediments from the shallow basins and transport them into the banks. With time, the banks become coarser, 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 Open File Report 00-410 Sheet 1 and reference therein). On this map, the corners of the 18 quadrangles are shown for reference as labeled tides and as large crosses on the map.

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