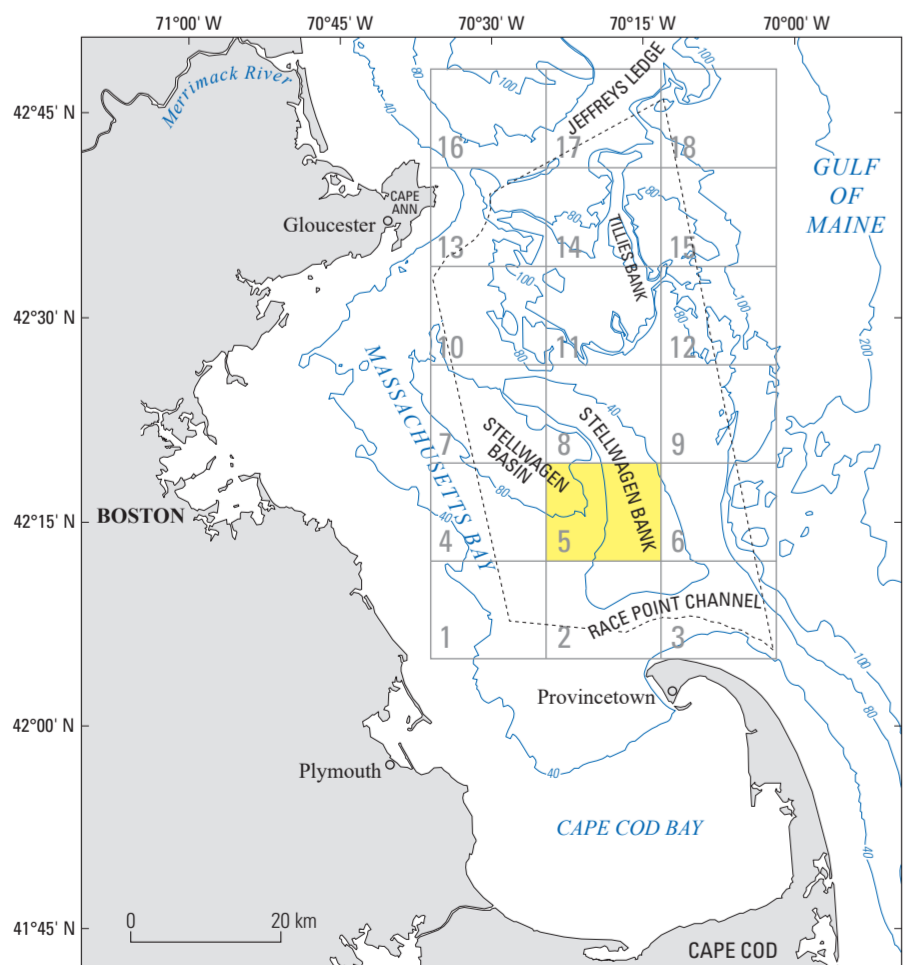
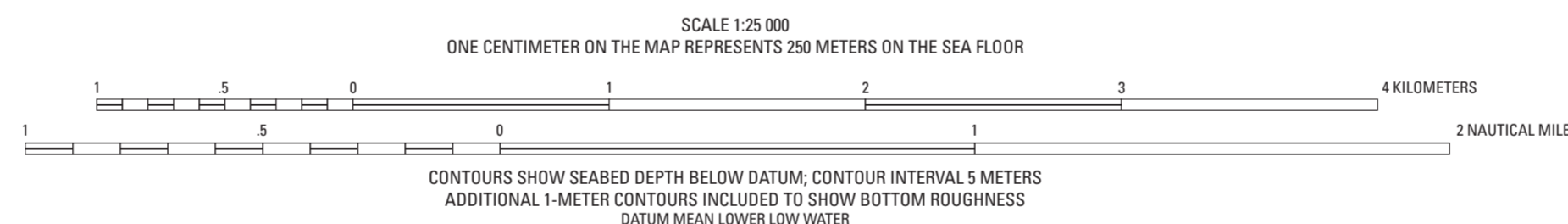


Mercator projection
Geodetic Reference System 1980; North American Datum of 1983
Longitude of central meridian 70°19' W; latitude of true scale 41°39' N
False easting 0 m; false northing 0 m
This map is not intended for navigational purposes



Location Map. Map showing the location of quadrangle 5 (highlighted in yellow) of the Stellwagen Bank National Marine Sanctuary region offshore of Boston, Massachusetts. The numbered grid indicates the quadrangles of the U.S. Geological Survey multibeam sonar substrate-mapping project. The dashed line represents the Stellwagen Bank National Marine Sanctuary boundary. Bathymetric contours are labeled in meters and the contour interval is variable. Base from Valentine and Galica (2015).

DESCRIPTION OF MAP UNITS
[Grain-size categories are given in mean weight percent. Weight percent values were rounded and may not add up to 100 or other summed values, for example, sand, 94 (fgS, 3; cgS, 90). Substrates are mapped as irregular-sided polygons if the density of data allows for their extent to be mapped with some confidence. Substrates are mapped as straight-sided polygons if transitions between substrates are ambiguous because data are sparse. For differences between substrates and an explanation of characters used in their names, see the section "Description of Map Units (Substrates)" and table 3 (in pamphlet). For more information on the sediment textural properties of all identified substrates, see tables 6 and 7 (in pamphlet) and Valentine and Cross (2024b)]

- A1_r_cgS** Rippled, coarse-grained sand—Water depth range of the mapped substrate: 24 to 55 m. Grain-size categories: mud, <1; sand, 94 (fgS, 3; cgS, 90); gravel, 6 (G₁, 5; G₂, 1)
- A3_r_cgS** Rippled, coarse-grained sand—Water depth range of the stations: 23 to 53 m. Grain-size categories: mud, <1; sand, 98 (fgS, 22; cgS, 76); gravel, 1 (G₁, 1; G₂, <1)
- B_r_cgS/i_cbG** Rippled, coarse-grained sand; partial veneer on immobile cobble, boulder gravel—Water depth range of the mapped substrate: 30 to 44 m. Upper layer of substrate B is equivalent to substrate A1
- C_i_cbG** Immobile, cobble, boulder gravel—Water depth range of the mapped substrate: 30 to 65 m
- H_r_fgS** Rippled, fine-grained sand—Water depth range of the mapped substrate: 35 to 52 m. Grain-size categories: mud, 2; sand, 98 (fgS, 83; cgS, 15); gravel, <1 (G₁, <1; G₂, 0)
- I_i_fgS** Immobile, fine- and coarse-grained sand—Water depth range of the mapped substrate: 40 to 75 m. Grain-size categories: mud, 7; sand, 92 (fgS, 42; cgS, 49); gravel, 1 (G₁, 1; G₂, <1)
- J_r_cgS/i_cbG** Rippled, coarse- and fine-grained sand; partial veneer on immobile pebble, cobble, boulder gravel—Water depth range of the mapped substrate: 46 to 59 m. Upper layer grain-size categories: mud, 4; sand, 92 (fgS, 47; cgS, 45); gravel, 4 (G₁, 2; G₂, 2)

- K_r_cgS** Rippled, coarse-grained sand—Water depth range of the mapped substrate: 40 to 50 m. Grain-size categories: mud, 1; sand, 98 (fgS, 24; cgS, 75); gravel, <1 (G₁, <1; G₂, 0)
- L_i_mfgS** Immobile, muddy, fine-grained sand—Water depth range of the mapped substrate: 44 to 77 m. Grain-size categories: mud, 10; sand, 89 (fgS, 73; cgS, 17); gravel, 1 (G₁, 1; G₂, 0)
- M_i_mfgS/pcbG** Immobile, muddy, coarse-grained sand; partial veneer on pebble, cobble, boulder gravel—Water depth range of the mapped substrate: 56 to 69 m. Upper layer grain-size categories: mud, 22; sand, 73 (fgS, 13; cgS, 60); gravel, 5 (G₁, 4; G₂, 1)
- P_i_mfgS** Immobile, muddy, fine-grained sand—Water depth range of the mapped substrate: 44 to 77 m. Grain-size categories: mud, 29; sand, 69 (fgS, 60; cgS, 10); gravel, 1 (G₁, 1; G₂, <1)
- O_i_mfgS/pcbG** Immobile, muddy, fine-grained sand; partial veneer on pebble, cobble, boulder gravel—Water depth range of the mapped substrate: 49 to 81 m. Upper layer grain-size categories: mud, 24; sand, 69 (fgS, 42; cgS, 20); gravel, 7 (G₁, 4; G₂, 3)
- R_i_mfgM** Immobile, fine-grained sandy mud—Water depth range of the mapped substrate: 67 to 88 m. Grain-size categories: mud, 58; sand, 42 (fgS, 38; cgS, 3); gravel, <1 (G₁, <1; G₂, 0)
- S_i_M** Immobile mud—Water depth range of the mapped substrate: 82 to 105 m. Grain-size categories: mud, 94; sand, 6 (fgS, 5; cgS, 1); gravel, 0 (G₁, 0; G₂, 0)
- T_i_mcgS/pcbG** Immobile, muddy, coarse-grained sand; partial veneer on pebble, cobble, boulder gravel—Water depth range of the mapped substrate: 70 to 103 m. Upper layer grain-size categories: mud, 34; sand, 52 (fgS, 14; cgS, 37); gravel, 14 (G₁, 10; G₂, 4)

- U_i_pcbG** Immobile, pebble, cobble gravel—Only one station (station number 1644) was sampled. This sample was a mixture of pavement and underlying sand. Grain-size categories: mud, 10; sand, 44 (fgS, 11; cgS, 33); gravel, 46 (G₁, 10; G₂, 36)
- V_i_mfgM/cbG** Immobile, fine-grained sandy mud; partial veneer on cobble, boulder gravel—Water depth range of the mapped substrate: 72 to 82 m. Upper layer grain-size categories: mud, 68; sand, 32 (fgS, 30; cgS, 2); gravel, 0 (G₁, 0; G₂, 0)

- EXPLANATION OF MAP SYMBOLS**
[Magenta circle and magenta square symbols show the locations of sample stations where sediment samples were collected or the locations of ends of video drifts if no sediment was collected]
- Stellwagen Bank crestline
 - Leading edge of sand sheet formed by episodic sediment transport
 - Video transect—Line shows the ship's drift path during videography of the seabed. Still photographs were collected during some video drifts. Some drifts are too short to be shown at this scale
 - Station location of mapped substrate—Data from these stations were used to map the extents of each substrate. See Valentine and Cross (2024b) for data on these stations
 - Station location of unmapped substrate—Data from these stations represent substrates A1, A3, N, O, U, and W that occur as scattered deposits within other mapped substrates and could not be mapped as coherent units. See Valentine and Cross (2024b) for data on these stations

Sheet 1.—Seabed geology and station data types
Map D.—Distribution of Geologic Substrates

Seabed Maps Showing Topography, Ruggedness, Backscatter Intensity, Sediment Mobility, and the Distribution of Geologic Substrates in Quadrangle 5 of the Stellwagen Bank National Marine Sanctuary Region Offshore of Boston, Massachusetts

By
Page C. Valentine and VeeAnn A. Cross
2024

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For sale by U.S. Geological Survey, Box 25286, Denver Federal Center, Denver, CO 80225; <https://store.usgs.gov>; 1-888-436-4363 (1-888-275-2747)
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