

U.S. Department of the Interior **Scientific Investigations Map 3515** Prepared in cooperation with the Map D, sheet 2 U.S. Geological Survey NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION Pamphlet accompanies map 70°20' Br_cgS/i_cbG Ti_mcgS/pcbG WESTERN U i_pcG 42°19' Br_cgS/i_cbG-EDGE Mi_mcgS/pcbG FIFTEEN A1 r_cgS WESTERN SPUR Si_M Br_cgS/i_cbG C i_cbG Ti_mcgS/pcbG L i_mfgS C i_cbG 42°18' Br_cgS/i_cbG Br_cgS/i_cbG B Vi_fgsM/cbG A1 r_cgS R i_fgsM 1 S i_M B r_cgS / i_cbG 42°17' STELLWAGEN BASIN Br_cgS/i_cbG C i_cbG Br_cgS/i_cbG Br_cgS/i_cbG-Jr_cgfg\$/i_pcbG C i_cbG Vi_fgsM/cbG R i_fgsM C i_cbG Li_mfgS P i_mfgS C i_cbG A3 r_cgS 42°14' R i_fgsM H r_fgs A1 r_cgS A1 r_cgS C i_cbG C i_cbG 42°13' Li_mfgS P i_mfgS Kr_cgS 70°24' 70°20' 70°18' 70°17' 70°15' 70°14' SCALE 1:25 000
ONE CENTIMETER ON THE MAP REPRESENTS 250 METERS ON THE SEA FLOOR 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 4 KILOMETERS This map is not intended for navigational purposes 2 NAUTICAL MILES CONTOURS SHOW SEABED DEPTH BELOW DATUM; CONTOUR INTERVAL 5 METERS ADDITIONAL 1-METER CONTOURS INCLUDED TO SHOW BOTTOM ROUGHNESS **DESCRIPTION OF MAP UNITS** Immobile, fine- and coarse-grained sand—Water depth range of the mapped Immobile, fine-grained sandy mud—Water depth range of the mapped substrate: [Grain-size categories are given in mean weight percents. Weight percent values were rounded and may substrate: 40 to 75 m. Grain-size categories: mud, 7; sand, 92 (fgS, 42; cgS, 49); 67 to 88 m. Grain-size categories: mud, 58; sand, 42 (fgS, 38; cgS, 3); gravel, <1 **MAINE** not add up to 100 or other summed values, for example, sand, 94 (fgS, 3; cgS, 90). Substrates are mapped gravel, 1 (G_1 , 1; G_2 , <1) 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 Rippled, coarse- and fine-grained sand; partial veneer on immobile pebble, Immobile mud—Water depth range of the mapped substrate: 82 to 105 m. because data are sparse. For differences between substrates and an explanation of characters used in their **cobble, boulder gravel**—Water depth range of the mapped substrate: 46 to 59 m. Grain-size categories: mud, 94; sand, 6 (fgS, 5; cgS, 1); gravel, 0 (G₁, 0; G₂, 0) names, see the section "Description of Map Units (Substrates)" and table 3 (in pamphlet). For more infor-Upper layer grain-size categories: mud, 4; sand, 92 (fgS, 47; cgS, 45); gravel, 4 mation on the sediment textural properties of all identified substrates, see tables 6 and 7 (in pamphlet) and Immobile, muddy, coarse-grained sand; partial veneer on pebble, cobble, boulder $(G_1, 2; G_2, 2)$ Valentine and Cross (2024b). Multibeam sonar data were not collected in some small areas, which appear **gravel**—Water depth range of the mapped substrate: 70 to 103 m. Upper layer as lighter shades of the surrounding substrate polygon color] Rippled, coarse-grained sand—Water depth range of the mapped substrate: grain-size categories: mud, 34; sand, 52 (fgS, 14; cgS, 37); gravel, 14 (G₁, 10; G₂, 4) 40 to 50 m. Grain-size categories: mud, 1; sand, 98 (fgS, 24; cgS, 75); gravel, Immobile, pebble, cobble gravel—Only one station (station number 1644) was 42°15' N BOSTON **Rippled, coarse-grained sand**—Water depth range of the mapped substrate: 24 to sampled. This sample was a mixture of pavement and underlying sand. Grain-size 55 m. Grain-size categories: mud, <1; sand, 94 (fgS, 3; cgS, 90); gravel, 6 (G₁, 5; G₂, 1) Immobile, muddy, fine-grained sand—Water depth range of the mapped substrate: categories: mud, 10; sand, 44 (fgS, 11; cgS, 33); gravel, 46 (G₁, 10; G₂, 36) 44 to 77 m. Grain-size categories: mud, 10; sand, 89 (fgS, 73; cgS, 17); gravel, 1 Rippled, coarse-grained sand—Water depth range of the stations: 23 to 53 m. Immobile, fine-grained sandy mud; partial veneer on cobble, boulder gravel— Grain-size categories: mud, <1; sand, 98 (fgS, 22; cgS, 76); gravel, 1 (G₁, 1; Water depth range of the mapped substrate: 72 to 82 m. Upper layer grain-size Immobile, muddy, coarse-grained sand; partial veneer on pebble, cobble, boulder categories: mud, 68; sand, 32 (fgS, 30; cgS, 2); gravel, 0 (G₁, 0; G₂, 0) **gravel**—Water depth range of the mapped substrate: 56 to 69 m. Upper layer 42°00' N Rippled, coarse-grained sand; partial veneer on immobile cobble, boulder grain-size categories: mud, 22; sand, 73 (fgS, 13; cgS, 60); gravel, 5 (G_1 , 4; G_2 , 1) **gravel**—Water depth range of the mapped substrate: 30 to 44 m. Upper layer of substrate B is equivalent to substrate A1 Immobile, muddy, fine-grained sand—Water depth range of the mapped substrate: CAPE COD BAY 59 to 69 m. Grain-size categories: mud, 29; sand, 69 (fgS, 60; cgS, 10); gravel, 1 Immobile, cobble, boulder gravel—Water depth range of the mapped substrate: **EXPLANATION OF MAP SYMBOLS** Immobile, muddy, fine-grained sand; partial veneer on pebble, cobble, boulder ----- Stellwagen Bank crestline CAPE COD Rippled, fine-grained sand—Water depth range of the mapped substrate: 35 to 52 m. **gravel**—Water depth range of the mapped substrate: 49 to 81 m. Upper layer grain-size categories: mud, 24; sand, 69 (fgS, 42; cgS, 26); gravel, 7 (G₁, 4; G₂, 3) Grain-size categories: mud, 2; sand, 98 (fgS, 83; cgS, 15); gravel, <1 (G₁, <1; G₂, 0) Leading edge of sand sheet formed by episodic sediment transport **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 **Sheet 2.**—Seabed geology and sun-illuminated topography labeled in meters and the contour interval is variable. Base from Valentine and Gallea (2015). **Map D.**—Distribution of Geologic Substrates

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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