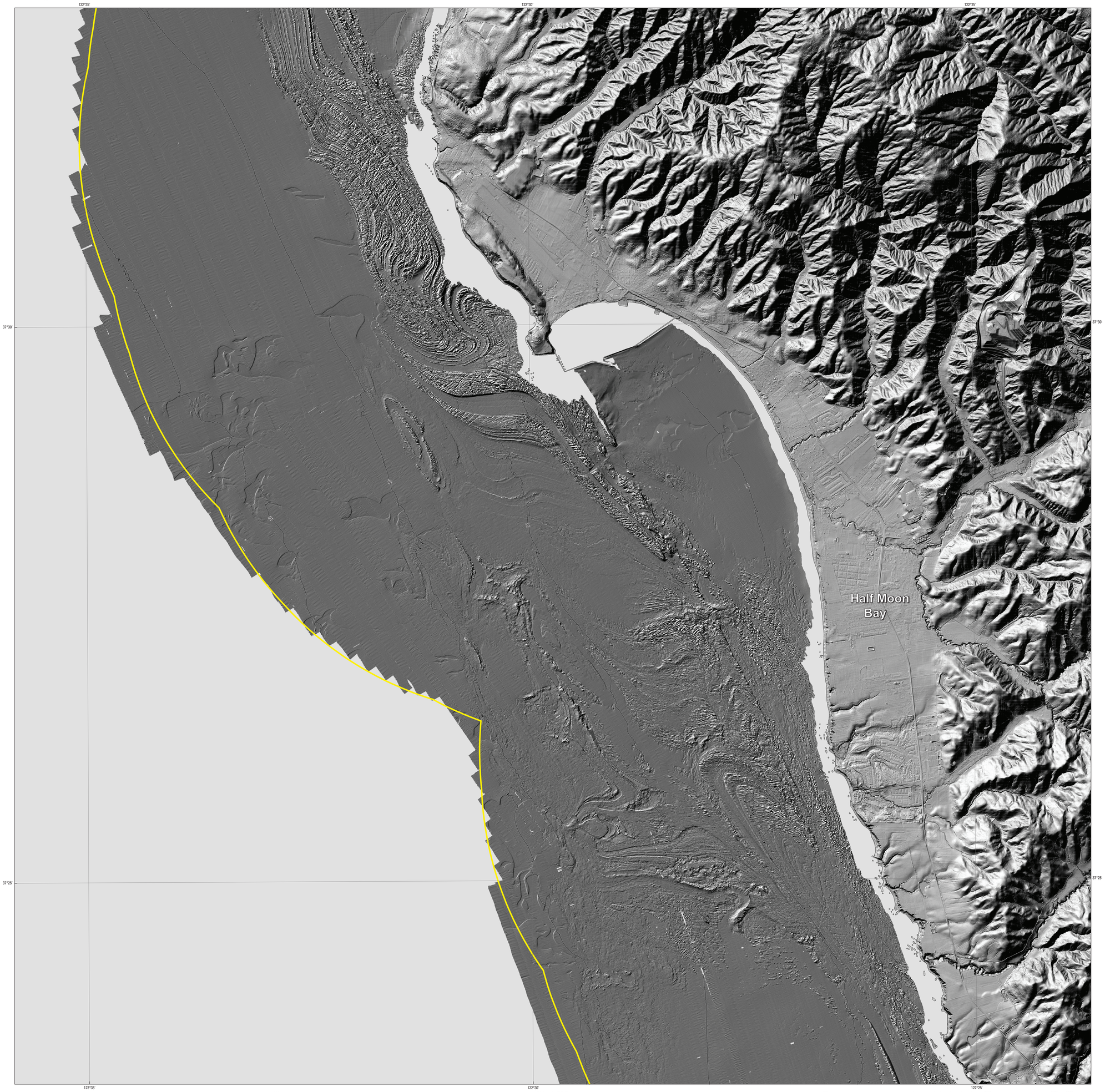
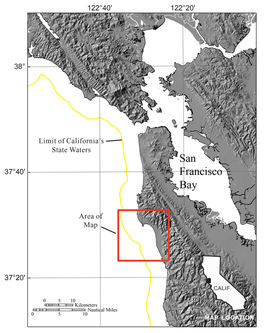
U.S. Department of the Interior
U.S. Geological Survey

Open-File Report 2014–1214
Sheet 2 of 10
Pamphlet accompanies map





DISCUSSION

This shaded-relief bathymetry map of the Offshore of Half Moon Bay map area in northern California was generated from bathymetry data collected by Fugro Pelagos and by California State University, Monterey Bay (CSUMB) (fig. 1). Mapping was completed in 2006 and 2007, using a combination of 400-kHz Reson 7125 and 244-kHz Reson 8101 multibeam echosounders. These mapping missions combined to collect bathymetry data from about the 10-m isobath to beyond the 3-nautical-mile limit of California's State Waters.

During all the mapping missions, an Applanix POS MV (Position and Orientation System for Marine Vessels) was used to accurately position the vessels during data collection, and it also accounted for vessel motion such as heave, pitch, and roll (position accuracy, ±2 m; pitch, roll, and heading accuracy, ±0.02°; heave accuracy, ±5%, or 5 cm). To account for tidal-cycle fluctuations, CSUMB used NavCom 2050 GPS receiver (CNAV) data, and Fugro Pelagos used KGPS data (GPS data with real-time kinematic corrections); in addition, sound-velocity profiles were collected with an Applied Microsystems (AM) SVPlus sound velocimeter. Soundings were corrected for vessel motion using the Applanix POS MV data, for variations in water-column sound velocity using the AM SVPlus data, and for variations in water height (tides) using vertical-position data from the KGPS receivers.

Processed soundings from the different mapping missions were exported from the acquisition or processing software as XYZ files and bathymetric surfaces. All the surfaces were merged into one overall 2-m-resolution bathymetric-surface model and clipped to the boundary of the map area. An illumination having an azimuth of 300° and from 45° above the horizon was then applied to the bathymetric surface to create the shaded-relief imagery. Gray areas in map are gaps in data.

Bathymetric contours were generated at 10-m intervals from the merged 2-m-resolution bathymetric surface. The most continuous contour segments were preserved; smaller segments and isolated island polygons were excluded from the final output. Contours were smoothed using a polynomial approximation with exponential kernel algorithm and a tolerance value of 60 m.

The onshore-area image was generated by applying the same illumination (azimuth of 300° and from 45° above the horizon) to 1-m-resolution topographic-lidar data collected by Photoscience in 2005 for the U.S. Geological Survey and the County of San Mateo.

EXPLANATION

Amount of illumination

Illuminated (facing false sun)

In shadow (facing away from false sun)

Direction of illumination from false sun—Position of false sun is at 300° azimuth, 45° above horizon [arrow included in explanation for illustration purposes only; not shown on map]

Area of "no data"—Areas near shoreline not mapped owing to insufficient high-resolution seafloor mapping data; areas beyond 3-nautical-mile limit of California's State Waters were not mapped as part of California Seafloor Mapping Program

3-nautical-mile limit of California's State Waters

Bathymetric contour (in meters)—Derived from 2-m-resolution bathymetry grid. Contour interval: 10 m

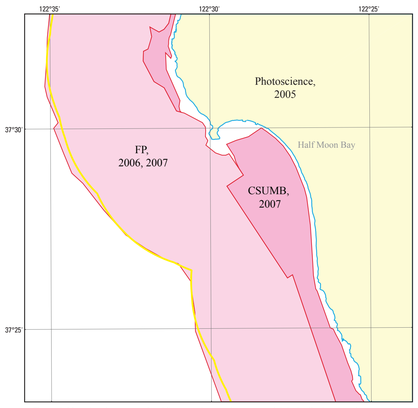


Figure 1. Map showing areas of multibeam-echosounder surveys (pink shading) and onshore topographic-lidar surveys (yellow shading). Also shown are data-collecting agencies (CSUMB, California State University, Monterey Bay, Seafloor Mapping Lab; FP, Fugro Pelagos) and dates of surveys if known.

Onshore elevation data collected by Photoscience in 2005 for U.S. Geological Survey and County of San Mateo. California's State Waters limit from NOAA Office of Coast Survey

Universal Transverse Mercator projection, Zone 10N

NOT INTENDED FOR NAVIGATIONAL USE

APPROXIMATE MEAN DECLINATION, 2014

SCALE 1:24 000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER

BATHYMETRIC CONTOUR INTERVAL 10 METERS

ONE MILE = 0.869 NAUTICAL MILES

MAP LOCATION

Shaded-relief bathymetry by Peter Dartnell, 2012 (data collected by Fugro Pelagos in 2006 and 2007 and by California State University, Monterey Bay, Seafloor Mapping Lab in 2007). Bathymetric contours by Carrie K. Bretz, 2008

GIS database and digital cartography by Nadine E. Golden

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Shaded-Relief Bathymetry, Offshore of Half Moon Bay Map Area, California

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