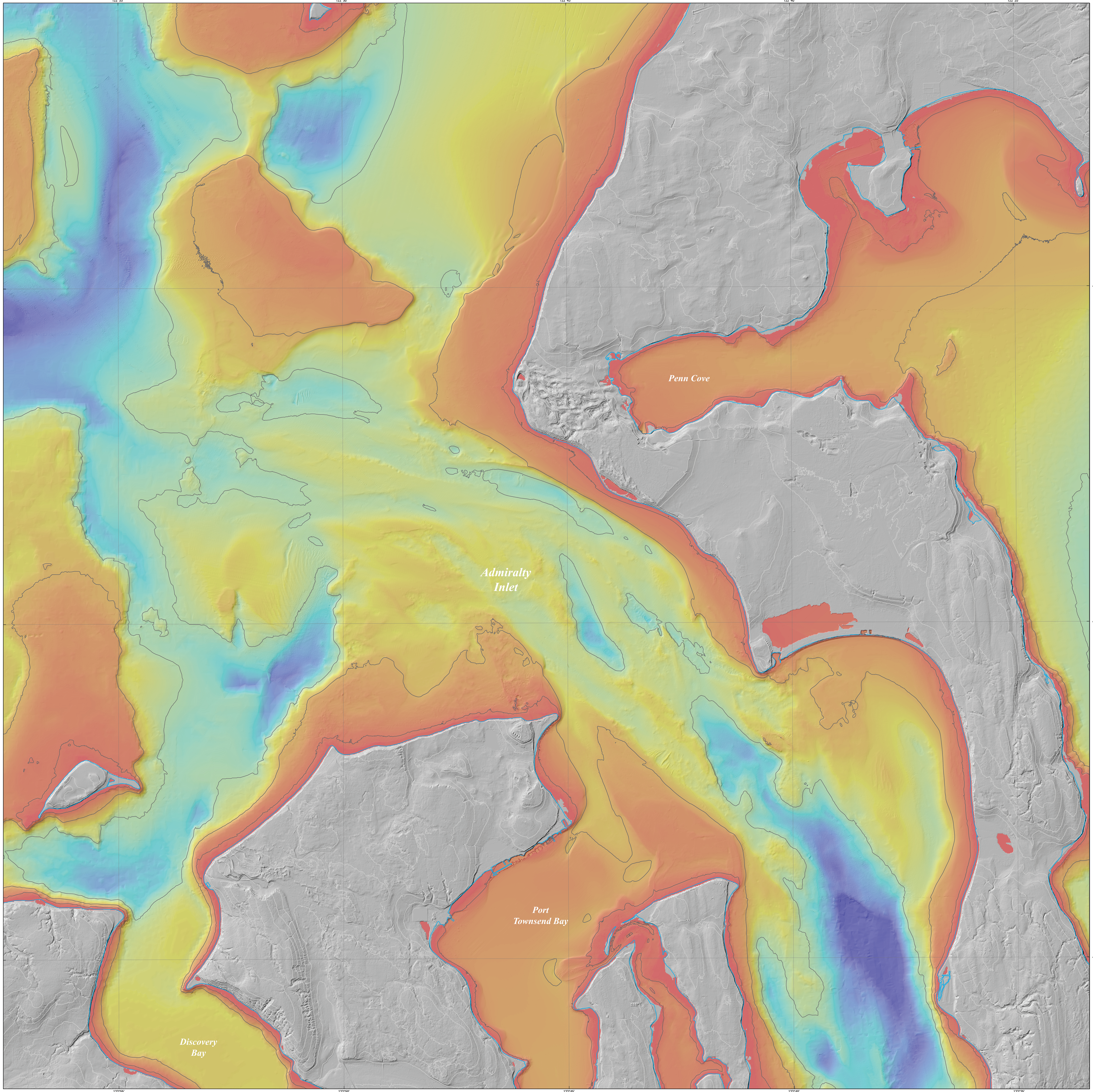
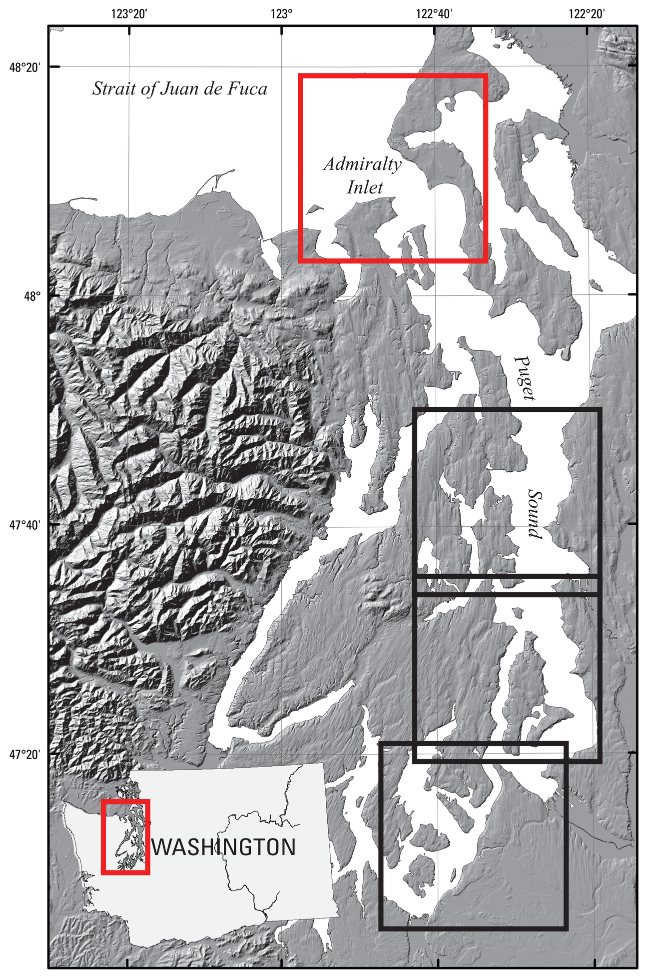




DISCUSSION

The colored shaded-relief bathymetry map (sheet 1) of the Admiralty Inlet map area in the southern Salish Sea was generated from topography extracted from a Digital Elevation Model (DEM) by Finlayson (2005) and bathymetry data collected more recently by the National Oceanic and Atmospheric Administration (fig. 1). Surveys conducted in the Admiralty Inlet map area by the NOAA Ship *Rainier* include H11188, H11040, H11039, H11038 and H11375. Multibeam sonar data were acquired by the *Rainier* and survey launches using Reson 8101, Reson 8125, and Elac 1180 multibeam systems. Sound velocity profiles were measured with SEACAT SBE 19 Plus Profilers. See the pamphlet for citations for these surveys.

The horizontal datum for Rainier surveys is the North American Datum of 1983 (NAD83). Differential GPS (DGPS) was the sole method of positioning. Differential corrections from U.S. Coast Guard beacons at Whidbey Island (transmitting on 302 kHz), and Robinson Point (transmitting on 323 kHz) were utilized during surveys. The vertical datum for the Ranier surveys is Mean Lower-Low Water (MLLW). The operating National Water Level Observation Network (NWLON) primary tide station at Port Townsend, Washington (944-4900) served as control for datum determination and as the primary source for water level reducers.

In addition to *Rainier* surveys, survey H11801, was conducted using the *Kvichak Defender IV* as the primary platform for multibeam sonar and sound velocity data collection in waters deeper than 4 meters. Complete multibeam coverage was verified while in the field using a CARIS workstation aboard *Kvichak Defender IV*, with subsequent verifications performed shore-side on non-survey days. A CODA F-180 motion reference unit was mounted in a water-resistant case to the mid-ships port gunwale immediately adjacent to the Kongsberg EM3002 side-pole mount. The F-180 GPS antennae were mounted in an alongship orientation with a 2 meter separation between primary and secondary antennae. The *R/V Storm* was used for gap-fill surveys on the 20–27th January 2009, 3–6 February 2009 and 17–18 February 2009. *The R/V Storm* was configured with a dual-head Reson 7125 multibeam echosounder and was tasked with acquisition of least depths on rocky shoals at the approach to Oak Harbor channel as well as performing gap-fills after conclusion of large boat operations by *Kvichak Defender IV*. *R/V Storm* employed Hypack for navigation and raw data acquisition, a POS/MV was used for motion and heading and a Sea-Bird CTD for sound speed profiles.

Once all of the bathymetric-surface models were transformed to a common projection and datum, the files were merged into one overall 2-m-resolution bathymetric-surface model, merged with an onshore DEM from Finlayson (2005), and clipped to the boundary of the map area. Difference calculations of the overlapping bathymetry grids showed that there is good agreement between surveys, even though the surveys were conducted at different times.

An illumination having an azimuth of 315° and from 45° above the horizon was then applied to the digital elevation model to create the shaded-relief imagery. A "rainbow" color ramp was applied to the bathymetry data for sheet 1, using reds and oranges to represent shallower depths, and blues to represent greatest depths. The colored bathymetry surface was draped over the shaded-relief imagery at 60-percent transparency to create a colored shaded-relief map. Bathymetric contours (sheets 1– 4) were generated from the surface using ESRI ArcMap.

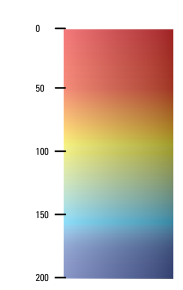
REFERENCE CITED

Finlayson, D.P., 2005, Combined bathymetry and topography of the Puget Lowland, Washington State: University of Washington School of Oceanography Data Archives PSDEM2005, available at *http://www.ocean.washington.edu/data/pugetsound/*

EXPLANATION

Depth (in meters) and illumination (bright areas are illuminated, facing false sun; dark areas are in shadow, facing away from false sun)

Shallow



Deep

Direction of illumination from false sun—Position of false sun is at 315° azimuth, 45° above horizon [arrow included in explanation for illustration purposes only; not shown on map]

Bathymetric contour (in meters)—Derived from 2-m-resolution bathymetry grid. Contour interval: 5m, 30m, 80m.

Shoreline contour—derived from 2-m-resolution bathymetry grid.

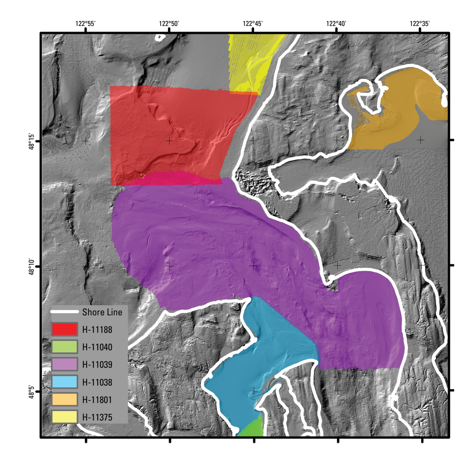


Figure 1. Map showing areas of NOAA multibeam-echosounder surveys used to update the Finlayson (2005) DEM.

United States Environmental Protection Agency

The Nature Conservancy
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NIU

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NOAA

Offshore shaded-relief bathymetry from NOAA's National Ocean Service. Onshore elevation data from Puget Sound Lidar Consortium. Onshore imagery from NASA's Landsat 7.
Universal Transverse Mercator projection, Zone 10N

NOT INTENDED FOR NAVIGATIONAL USE

APPROXIMATE MEAN DECLINATION, 2015

SCALE 1:40 000

CONTOUR INTERVAL 20 METERS
BATHYMETRIC CONTOUR INTERVAL: 5, 30, 80, AND 200 METERS

MAP LOCATION

Bathymetry, Bathymetric contours and hillshade from NOAA NOS hydrographic surveys.
GIS database and digital cartography by A.C. Ritchie and G.R. Cochrane
Manuscript approved for publication April 13, 2015

Bathymetry Map of the Admiralty Inlet Map Area, Washington

By
Andrew C. Ritchie,[1] Guy R. Cochrane,[2] and Crescent H. Moegling[3]
2015

[1]National Park Service;
[2]U.S. Geological Survey;
[3]National Oceanic and Atmospheric Administration

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Digital files available at http://pubs.usgs.gov/of/2015/1073/ and *http://dx.doi.org/10.3133/ofr20151073*.

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