

ASSESSING GAPS VIA BATHYMETRIC SOUNDING DENSITY

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In support of ocean and coastal mapping strategies, the United States has designed a method for assessing gaps in bathymetry through a visualization of sounding density. This method was first reported at the Canadian Hydrographic and National Surveyors' Conference in Victoria, British Columbia, March 2018 (Westington et al., 2018).

This analysis evaluates openly accessible bathymetric data holdings at the International Hydrographic Organization's Data Centre for Digital Bathymetry, which is hosted by the National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information (NCEI). All modern depth soundings from 1960 to present are incorporated into 100-m resolution local grids covering U.S. waters, which extend from land to the exclusive economic zone and potential juridical continental shelf.

To accommodate different definitions of "mapped," the sounding densities are reclassified into two categories: 1 to 2 soundings per cell, which corresponds to "minimally mapped" and 3 or more soundings per cell, which corresponds to "better mapped" and is often associated with modern survey instruments that produce more measurements over a particular area. Unmapped areas have no soundings per cell and are blank.


The resulting grids are published as a geospatial web service using Esri ArcGIS Enterprise software. **Figure 1** shows the NOAA GeoPlatform web page with official links to the visualization product, <http://noaa.maps.arcgis.com/home/item?id=4d7d925fc96d47d9ace970dd5040df0a>.

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4. NOAA, NCEI - International Hydrographic Organisation (IHO), Data Center for Digital Bathymetry

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Bathymetry Gap Analysis

Overview

 Bathymetric sounding densities of multibeam, single beam, NOS Hydro, NOS BAG, bathymetric LIDAR, and CCOM/JHC extended continental shelf surveys, classified by number of soundings per 100 m cell.

Map Image Layer by NOAA GeoPlatform

Created: Oct 30, 2017 Updated: May 11, 2018 View Count: 151

✔ Authoritative

Description

The United States Bathymetry Gap Analysis is a map service providing visual access to the local sounding density derived from all modern bathymetric data holdings at NOAA's National Centers for Environmental Information (NCEI) and Office for Coastal Management (OCM). A team from NOAA's Office of Coast Survey, the University of New Hampshire Center for Coastal and Ocean Mapping/Joint Hydrographic Center, and NCEI - Colorado prepared this analysis and map service to inform a U.S. ocean and coastal mapping strategy for U.S. waters and contribute to the international Seabed 2030 initiative, which aims to map the entire ocean floor at 100 meter resolution by 2030.

Underpinning the map service are six principal layers of bathymetry. Actual soundings of multibeam data (raw), single beam data (1960 or later), and NOS hydrographic surveys (1960 or later) are included. Coverage footprints of NOS BAG-formatted hydrography, bathymetric grids from the U.S. extended continental shelf survey program, and bathymetric LIDAR data are also included. All bathymetry layers used in the gap analysis are archived at NCEI. For convenience, footprints of bathymetric LIDAR data were retrieved from NOAA's Digital Coast.

To effectively manage server resources, the analysis is partitioned across 177 tiles covering all U.S. waters and adjacent continental shelf. Each tile spans 6 degrees in longitude and 4 degrees in latitude. Within this framework, all modern depth soundings or coverage footprints are extracted from NCEI and OCM data holdings and associated with an approximately 100-m resolution grid of the area. MB_System, GDAL, GMT, and Esri ArcGIS software are used to prepare this analysis.

To simplify the visual presentation and accommodate evolving views on the number of soundings needed for a single 100 m cell to be "mapped", the number of soundings for each grid tile are divided into categories of coverage. Sounding densities greater than 0 and less than 3 are reclassified to a value of 1 and displayed as a deep pink color. Sounding densities equal to 3 or greater are reclassified to a value of 3 and displayed as a deep purple color. The coverage footprints obtained from the BAG-formatted hydrography, offshore extended continental shelf grids, and nearshore bathymetric LIDAR were populated with a value of 3, which represents "fully mapped" in this bathymetry coverage and gap analysis.

Legend:

- 3 or more soundings per ~100m cell
- 1-2 soundings per ~100m cell

Layers

bathy_gap_analysis

Terms of Use


This analysis and map service was designed to inform a U.S. ocean and coastal mapping strategy for U.S. waters as well as contribute to the international Seabed 2030 initiative, which aims to map the entire ocean floor at 100 meter resolution by 2030. The bathymetric data were processed in December 2017-January 2018 and will be updated on a to-be-determined schedule.


Open in Map Viewer Open in Scene Viewer Open in ArcGIS Desktop

Details

Source: Map Service
Size: 1 KB
★★★★★
[f](#) [t](#) [s](#)

Owner

 NOAA GeoPlatform

Managed by:
 ncei_noaa

Tags

NOAA, sounding density, bathymetry, Seabed 2030, bathymetry gap analysis, bathy gap analysis

Credits (Attribution)

NOAA Office of Coast Survey (OCS), University of New Hampshire Center for Coastal and Ocean Mapping/Joint Hydrographic Center, NOAA National Centers for Environmental Information (NCEI), NOAA Office for Coastal Management (OCM)

URL

<https://gis.ngdc.noaa.gov/arcgis/rest/s/> View

Figure 1. NOAA GeoPlatform web page for the Bathymetry Gap Analysis

This gap analysis provides a first look at how many individual depth measurements contribute to the overall picture of “mapped.” One may argue that a single measurement in a 100-m grid cell (the pink areas show in **Figure 1**) is not adequate to constitute “mapped.” However, when considering that less than 10% of the global seafloor has been mapped, others may equally argue that one sounding is better than no sounding at all. The product is intended to start a conversation about what it means for an area to be “mapped” and support actions to fill the gaps. To facilitate this dialogue, the service is also available on the U.S. Federal Mapping Coordination website (www.fedmap.seasketch.org). The website is shown on **Figure 2**.

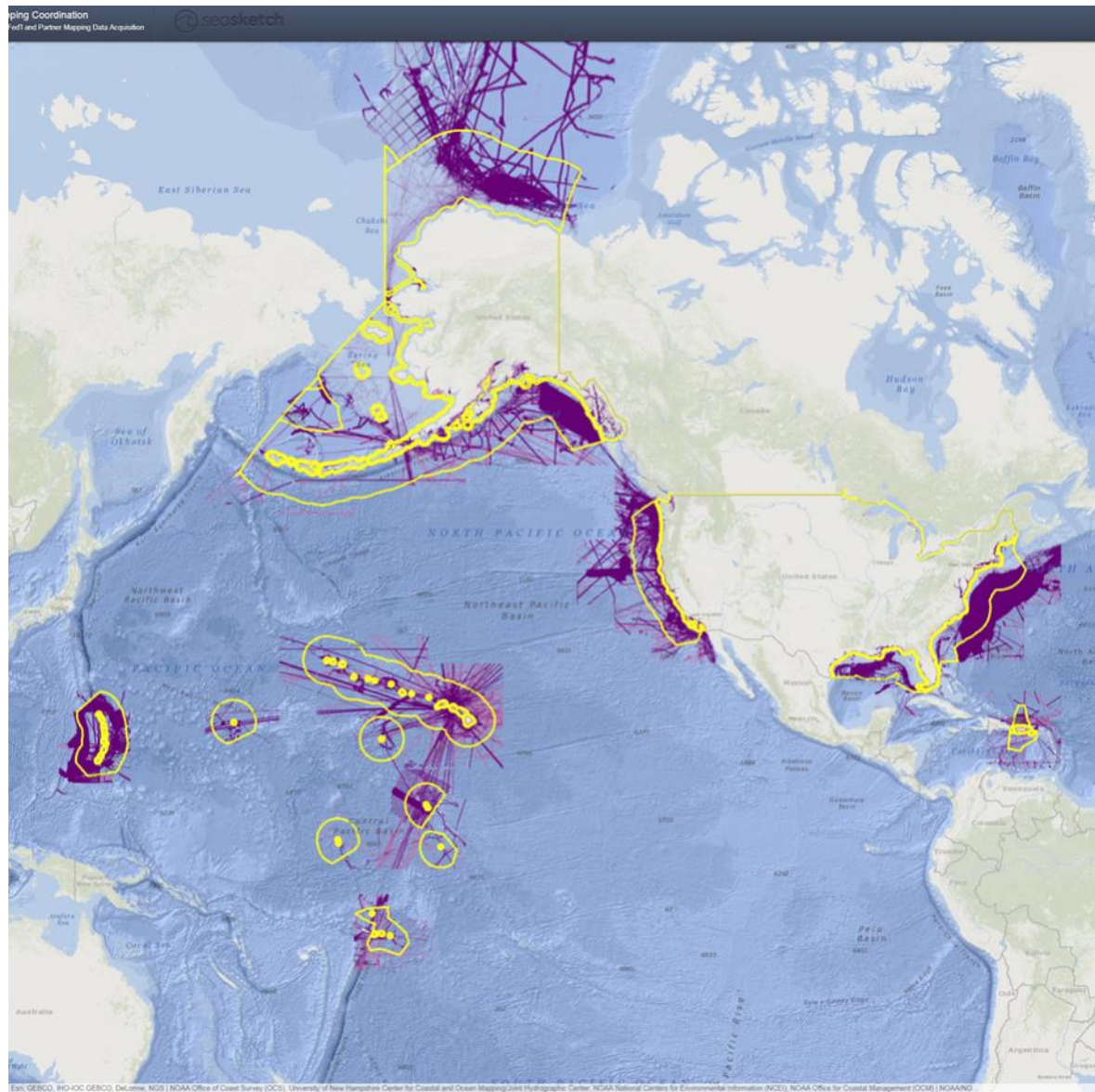


Figure 2. . The Bathymetry Gap Analysis as shown on the U.S. Federal Mapping Coordination website

Instructions for how to use this visualization to identify gaps in bathymetry will be available in a new chapter of the IHO-IOC GEBCO Cook Book (2016; <http://www.gebco.net>) in the upcoming update.

References

International Hydrographic Organization, Intergovernmental Oceanographic Commission (IHO-IOC), (2016). **The IHO-IOC GEBCO Cook Book**, IHO Publication B-11, Monaco, Dec. 2016, 475 pp - IOC Manuals and Guides 63, France, Dec. 2016, 475 pp.

Westington, M., Varner, J., Johnson, P., Sutherland, M., Armstrong, A., & Jencks, J., (2018). "Assessing Sounding Density for a Seabed 2030 Initiative," in proceedings of the 2018 Joint Canadian Hydrographic and National Surveyors' Conference, Victoria, British Columbia, 26-29 March 2018, <https://www.eiseverywhere.com/ehome/chc-nsc2018/711593/>.

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