Crowdsourced Bathymetry

Crowd Sourced Bathymetry WG Report

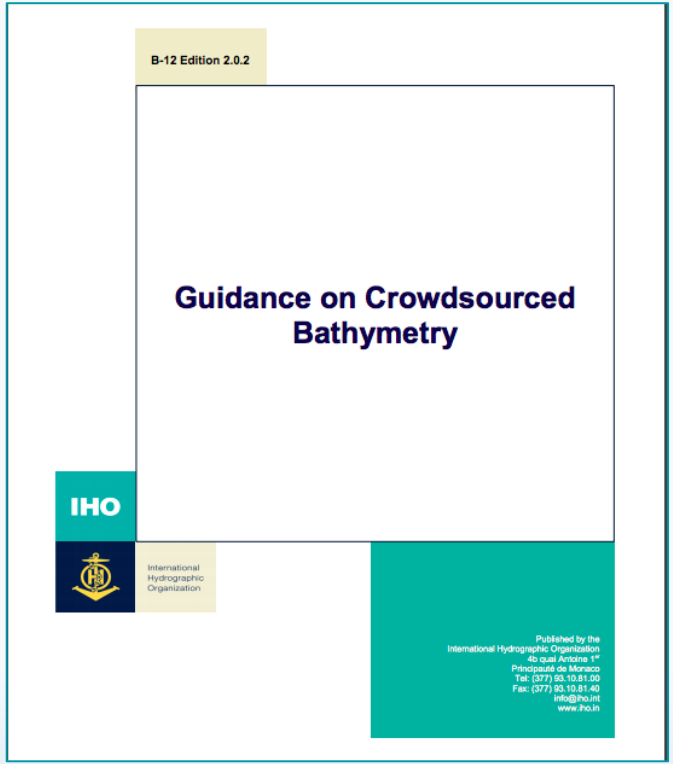
Jens Peter Weiss Hartmann
jepha@gst.dk

IHO Crowdsourced Bathymetry Initiative

In 2014, the IHO initiated a collaborative project to enable mariners to collect “crowdsourced bathymetry”.

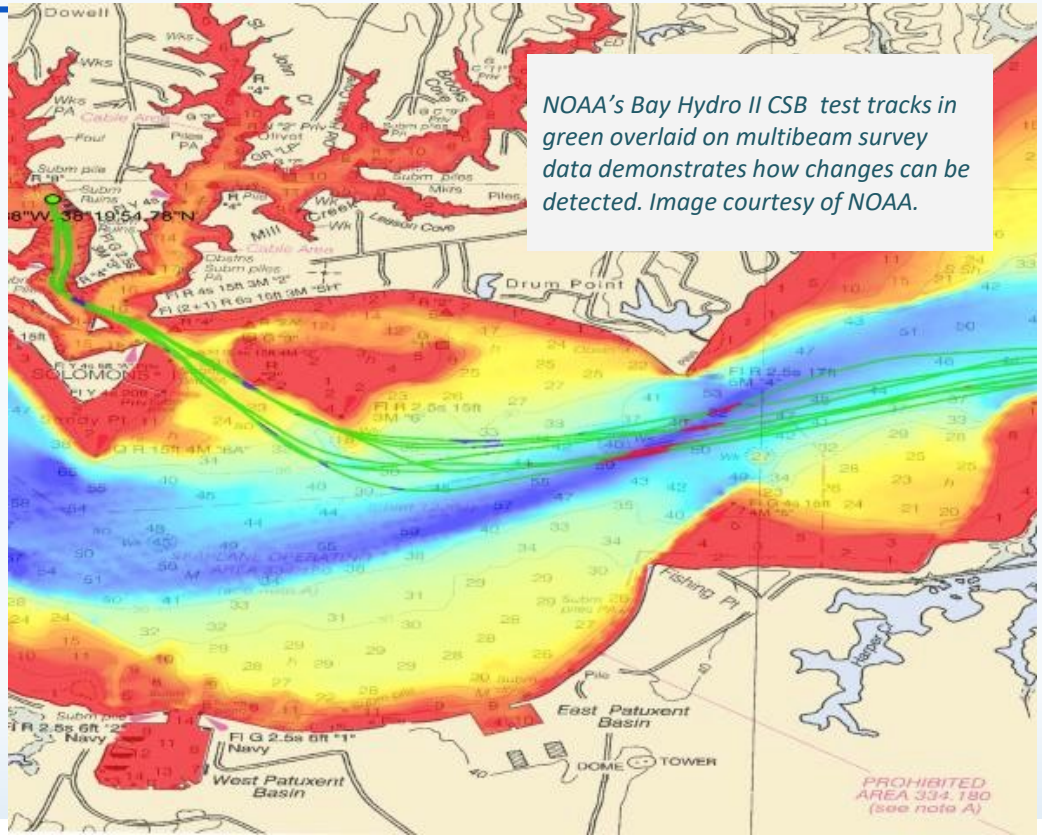
A Working Group was formed and tasked to develop ***B-12 IHO Guidance on Crowdsourced Bathymetry*** that states the IHO’s policy towards, and best practices for, the collection and contribution of CSB.

IHO Data Centre for Digital Bathymetry (DCDB) built a data pipeline that allows the public to contribute, and discover and download CSB data via a web-based map viewer interface.



The Value of CSB Data

- Data with scientific, commercial & research value at **no cost** to the public sector
- Fill gaps where data is scarce (eg: Arctic, Small Island Developing States)
- Useful along shallow, complex coastlines
- Identify uncharted features
- Assist in verifying charted information
- Confirm whether charts are appropriate for the latest traffic patterns.

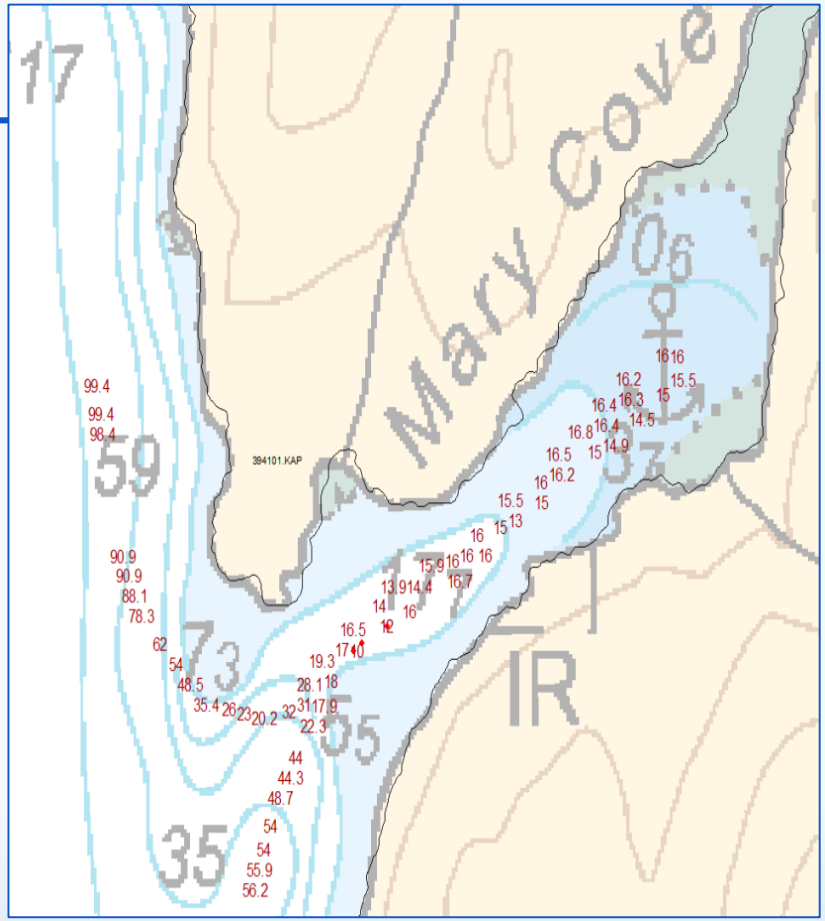


NOAA's Bay Hydro II CSB test tracks in green overlaid on multibeam survey data demonstrates how changes can be detected. Image courtesy of NOAA.

...but only if vessels collect and donate depth information while on passage

The Value of CSB Data:

- CHS has used CSB to update several Inside Passage charts along coastal routes.
- A systematic comparison of charted depths < 10 m yielded improved charted channel depths, data density and improved chart compilation in areas that were surveyed with singlebeam.
- CSB helped prioritize survey areas for the following survey season
- CSB has initiated the publication of Notices to Mariners.



CSB revealed some chart compilation problems.
Don't use the chart to figure out how much anchor chain you need!

IHO CL 11/2019

“CALL FOR APPROVAL OF EDITION 2.0.0 OF IHO PUB B-12”

- 35 Member States approved the adoption of B-12 out of 38 replies.

“ACCEPTANCE OF CROWDSOURCED BATHYMETRY ACTIVITIES IN NATIONAL WATERS OF JURISDICTION”

- 15 IHO MS replied “positive”
  CL 47/2019 provides a summary analysis of positive responses
  ==>
- The DCDB now filters out CSB data collected from the waters of all coastal countries not included on the positive list.
- The lack of initial replies showed that the CL ask was not clear.

ACCEPTANCE OF CROWDSOURCED BATHYMETRY ACTIVITIES IN NATIONAL WATERS OF JURISDICTION

1. Based on the comments received to the questionnaire in Annex B to IHO CL 11/2019, the following table is published as the Positive List to guide potential data gathering activities undertaken by the wider maritime community in waters of national jurisdiction:

Member State	Area	Specific actions required
Argentina	EEZ only	Provide copy of dataset to Hydrographic Office
Brazil	EEZ only	Provide copy of dataset to Hydrographic Office
Canada	All waters – no multibeam activity without prior permission	Inform Hydrographic Office of new dataset
Cyprus	All waters	Provide copy of dataset to Hydrographic Office
Denmark	All waters – no multibeam activity without prior permission	Inform Hydrographic Office of any variance with published chart
Georgia	All waters	Provide copy of dataset to Hydrographic Office
Germany	All waters	Inform Hydrographic Office of new dataset
Monaco	All waters	Provide copy of dataset to Hydrographic Office
Netherlands	All waters - Detailed bathymetric surveys of wreck sites around Bonaire, Curaçao, Saba, Sint Eustatius and Sint Maarten falls under UNCLOS definition of scientific research and thus requires prior permission; resultant data cannot be published until authorised	Inform Hydrographic Office of new dataset
New Zealand	All waters	Inform Hydrographic Office of new dataset
Norway	All waters – no multibeam activity without prior permission	Inform Hydrographic Office of new dataset
Philippines	Shipping routes and transit passages only	None
South Africa	EEZ only	Provide copy of dataset to Hydrographic Office
Sweden	EEZ only	Inform Hydrographic Office of new dataset
USA	All waters	None

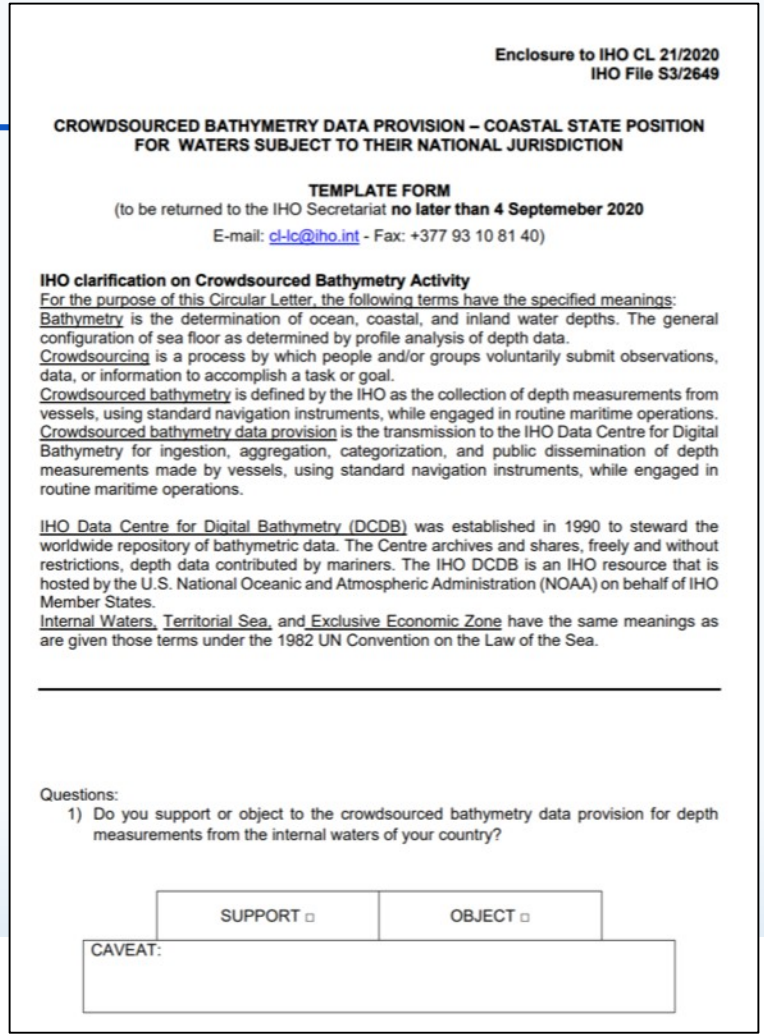
IHO CL 21/2020 & IRCC CL 01/2020

- All Coastal States are now requested to indicate their position on the ***provision of CSB data*** from ships within waters subject to their national jurisdiction into the public domain
- To date, 30 coastal states (green) have replied positively
- The geographic filter has been updated in 2021 to reflect updated coastal state positions.

iho.int/uploads/user/circular_letters/eng_2020/CL21_2020_EN_v1.pdf
iho.int/uploads/user/Inter-Regional%20Coordination/IRCC/IRCC_Letters/IRCC_Letter_2020_01_CSB_Activities.pdf

CL Questionnaire asks:

- Do you support or object to the CSB data provision for depth measurements from the internal waters, territorial sea, or EEZ of your country?
- Do you wish to be informed when such information is received by the IHO DCDB?
- Do you wish to review such information before its ingestion into the IHO DCDB?
- Do you wish for the opportunity to put caveats on the further dissemination of such data?



Enclosure to IHO CL 21/2020
IHO File S3/2649

CROWDSOURCED BATHYMETRY DATA PROVISION – COASTAL STATE POSITION FOR WATERS SUBJECT TO THEIR NATIONAL JURISDICTION

TEMPLATE FORM
(to be returned to the IHO Secretariat **no later than 4 Septemeber 2020**
E-mail: cl-lc@iho.int - Fax: +377 93 10 81 40)

IHO clarification on Crowdsourced Bathymetry Activity
For the purpose of this Circular Letter, the following terms have the specified meanings:
Bathymetry is the determination of ocean, coastal, and inland water depths. The general configuration of sea floor as determined by profile analysis of depth data.
Crowdsourcing is a process by which people and/or groups voluntarily submit observations, data, or information to accomplish a task or goal.
Crowdsourced bathymetry is defined by the IHO as the collection of depth measurements from vessels, using standard navigation instruments, while engaged in routine maritime operations.
Crowdsourced bathymetry data provision is the transmission to the IHO Data Centre for Digital Bathymetry for ingestion, aggregation, categorization, and public dissemination of depth measurements made by vessels, using standard navigation instruments, while engaged in routine maritime operations.

IHO Data Centre for Digital Bathymetry (DCDB) was established in 1990 to steward the worldwide repository of bathymetric data. The Centre archives and shares, freely and without restrictions, depth data contributed by mariners. The IHO DCDB is an IHO resource that is hosted by the U.S. National Oceanic and Atmospheric Administration (NOAA) on behalf of IHO Member States.
Internal Waters, Territorial Sea, and Exclusive Economic Zone have the same meanings as are given those terms under the 1982 UN Convention on the Law of the Sea.

Questions:
1) Do you support or object to the crowdsourced bathymetry data provision for depth measurements from the internal waters of your country?

SUPPORT □	OBJECT □
CAVEAT:	

How to Contribute CSB Data

- The DCDB accepts CSB contributions through a network of "**Trusted Nodes**"
  - Eg: organizations, companies or universities serving as data liaisons between mariners (data collectors) and the DCDB.
  - Trusted Nodes may supply data logging equipment, provide technical support to vessels, download data from data loggers, and be responsible for data transfer directly to the DCDB.
- CSB data must be provided in either CSV or GeoJSON, and capture the minimum required information (XYZ, timestamp).

Those interested in contributing data or becoming a Trusted Node should contact the DCDB at bathydata@iho.int.

IHO CSB Working Group

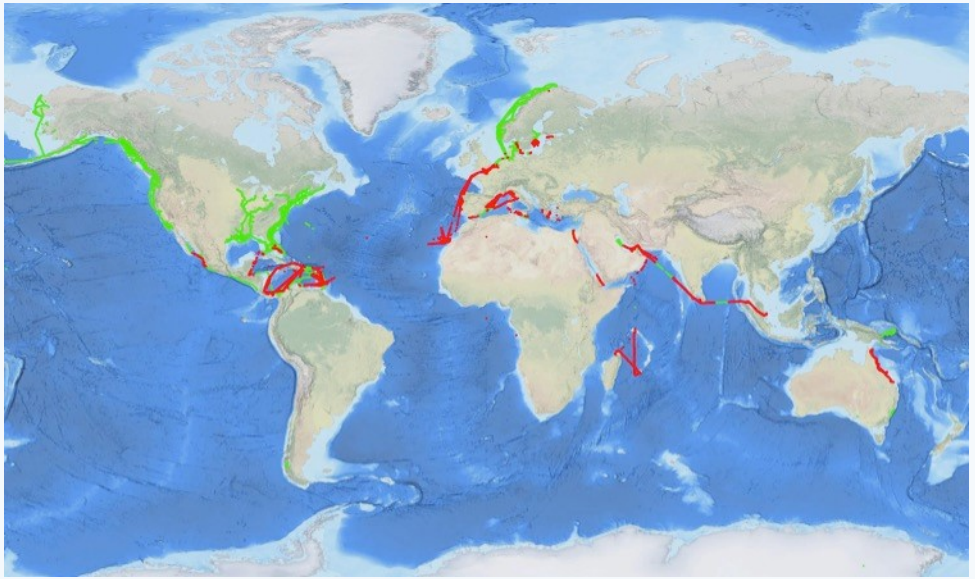
- **10 meetings; 1 Industry workshop**
- Chair (Jennifer Jencks, USA) and Vice-Chair (Pete Wills, CA)
- **Representatives from 14 Member States:**
  - *Canada, Croatia, Italy, Nigeria, Norway, Philippines, Denmark, Finland, France, Germany, India, Netherlands, New Zealand, Portugal, UK, & USA*
- **Observers and expert contributors:**
  - *CCOM-JHC, CIDCO, Da Gamma Maritime Ltd, Dongseo U, ECC AS, ESRI, FarSounder, FLIR Systems AB, Fugro, GMATEK, Inc., James Cook U, JAMSTEC, Navico/C-Map, ONE Data Tech Co., Olex, PYA, Seabed 2030, Sea-ID, SevenCs/ChartWorld, TeamSurv, Teledyne CARIS, World Maritime University, and WOC*
- **IHO:** Assistant Director Sam HARPER

CSBWG2: 10-11 Jan 2016
Boulder, Colorado, USA

CWBWG8:23-25 Oct 2019
Monaco

How can HOs become involved?

- Offer a positive response to the IHO or IRCC Circular Letters
- Consider joining and/or attending the CSBWG - it is open to all!
- Volunteer to become the next Seabed 2030-funded CSB Program!



CSB from a MSDI perspective?