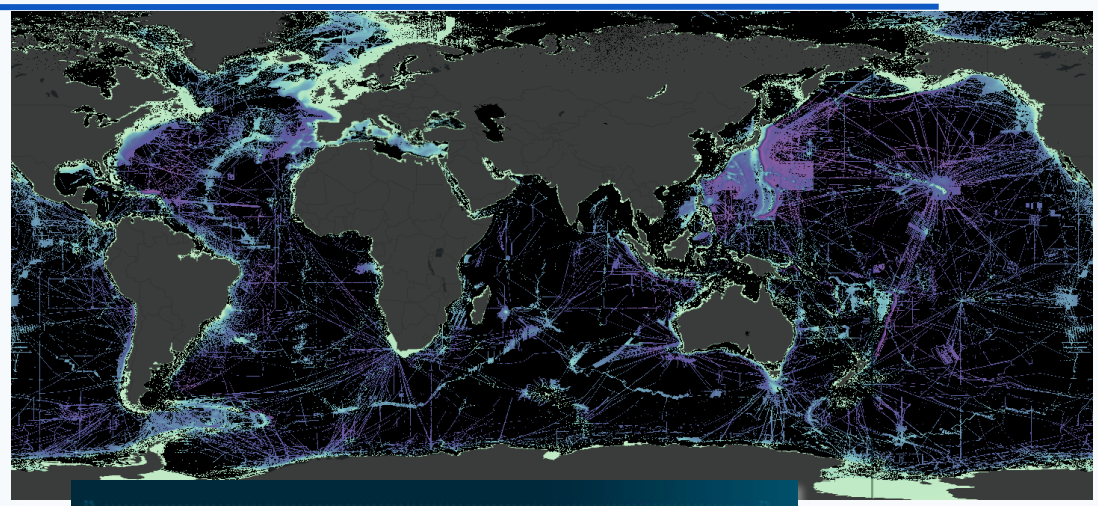
24th Conference of the Meso American - Caribbean Sea Hydrographic Commission

MACHC/IOCARIBE Seabed 2030/CSB Update to the MACHC December 2023

Diego Billings
Seabed 2030/CSB Coordinator for the MACHC
Diego.Billings@nla.gov.jm

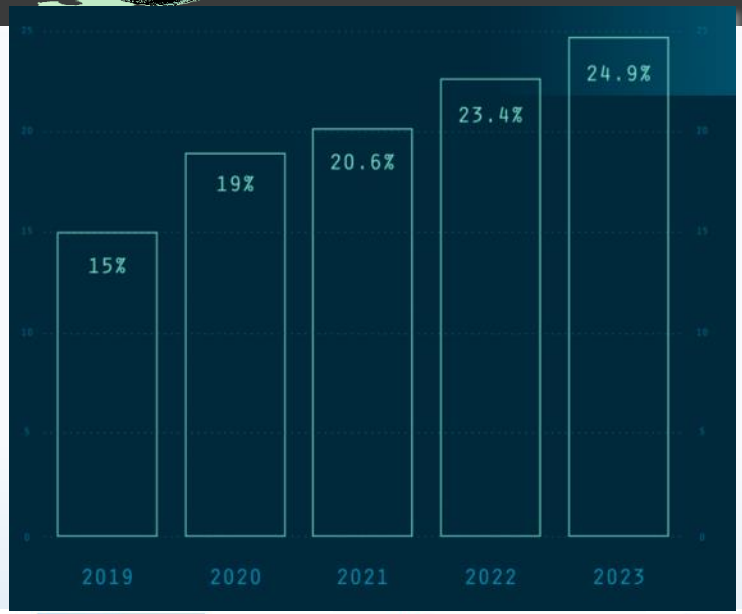
Why is Seabed 2030 Important?

- Bathymetry data is an essential ocean observation
- Seabed mapping data has broad use and value
- Ocean processes extend beyond territorial waters
- Mapping the entire ocean can only be achieved through cooperation and coordination
- Only ~25% of the ocean has been mapped with direct observation (GEBCO 2023)
- Seabed 2030 is an **accelerator** for GEBCO



Only 6% of the ocean floor was mapped to an adequate resolution when the initiative first started...

Seabed 2030 was launched at the first ever UN Ocean Conference in New York in 2017. Today, we've seen the figure grow to a quarter of the seabed mapped.



Atlantic and Indian Regional Center Team

- Based at Columbia University in New York
- Diverse team with scientific and technical expertise
- Available to provide technical assistance
- Multiple languages spoken
- Here to help!

atlantic-Indian@seabed2030.org

Vicki Ferrini, PhD
Center Head

Frank Nitsche, PhD
Research Scientist

Tinah Martin
***Lead** Data Manager, Indian Ocean*

Hayley Drennon
***Lead** Data Manager, Atlantic Ocean*

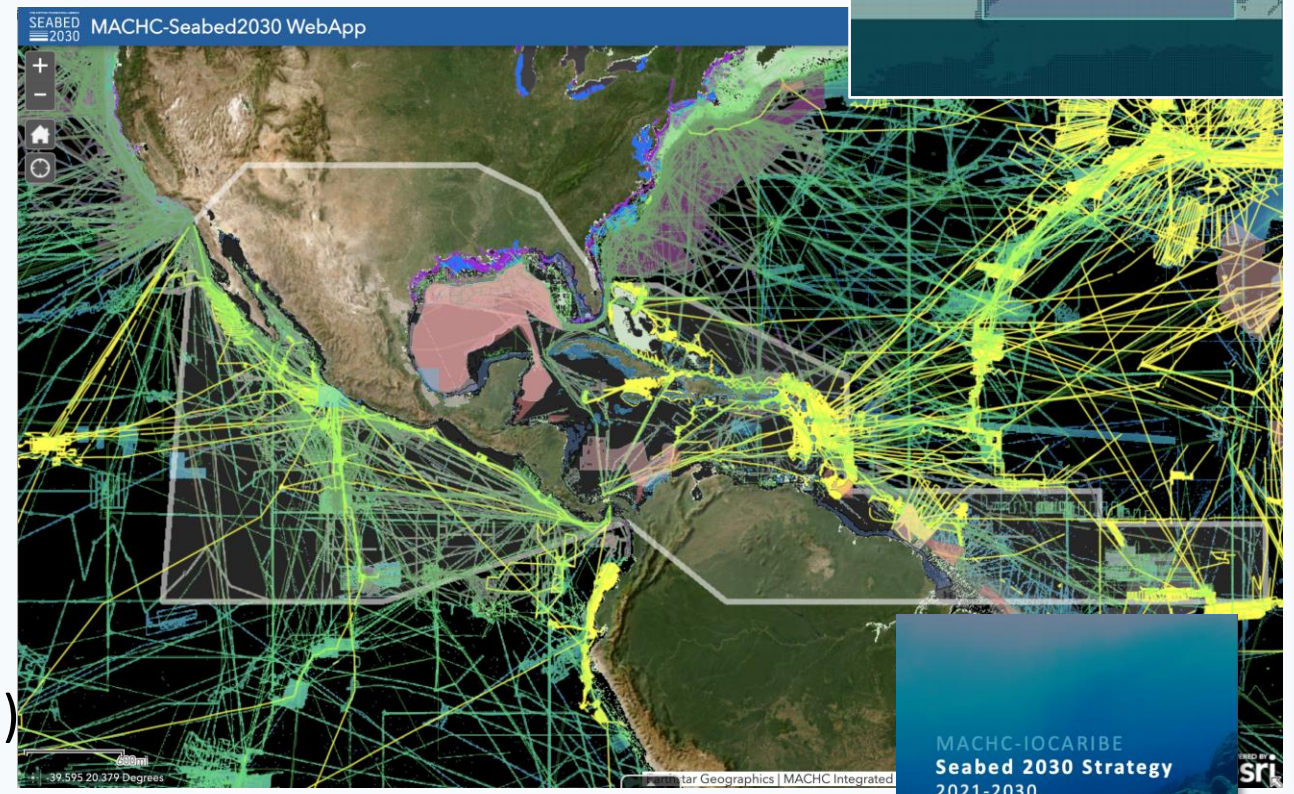
Sheila Caceres
Data Manager

John Morton
Applications Developer

Country of origin

Seabed 2030 Regional Center Activities-MACHC

- 2020
  - MACHC Web App Developed
  - MACHC Webinar Series
- 2021
  - MACHC Webinar
  - MACHC – IOCARIBE Seabed Strategy
- 2022
  - UN Decade Project led by IOCARIBE
  - GEBCO SCRUM MSI Workshop (Cartagena)
- 2023
  - Seabed 2030 Workshop (Cartagena)
    - Collaboration with South & West Pacific Seabed 2030 Regional Center



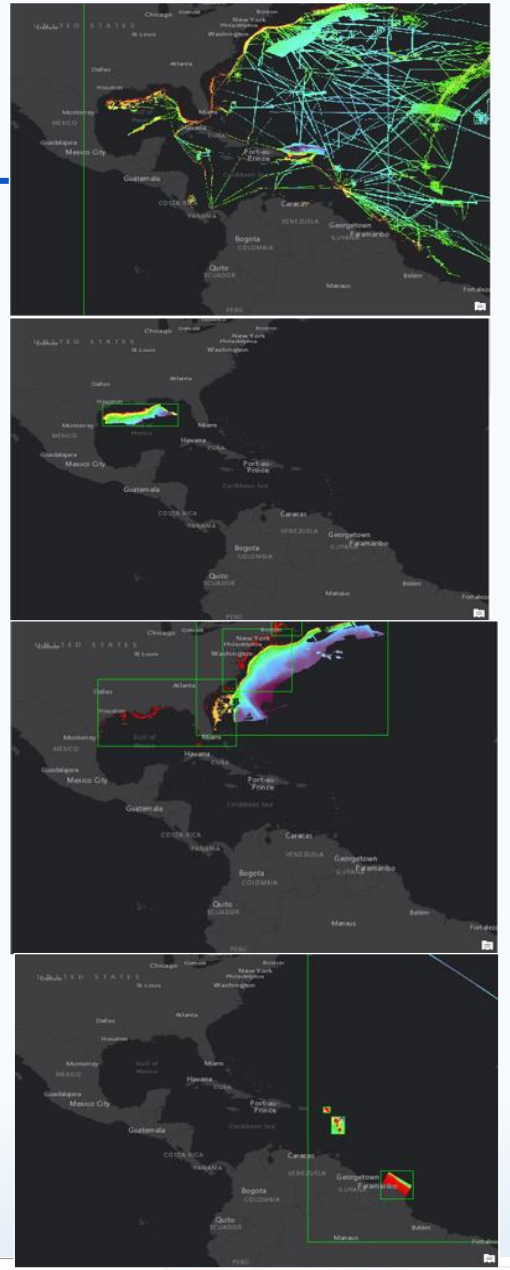
Regional Data Assembly

Data types received

- Multibeam
- Singlebeam
- Subbottom
- Seismic-derived
- Digitized contours
- Digitized soundings
- Isolated soundings
- Lidar
- Satellite-derived
- ENC
- Mixed

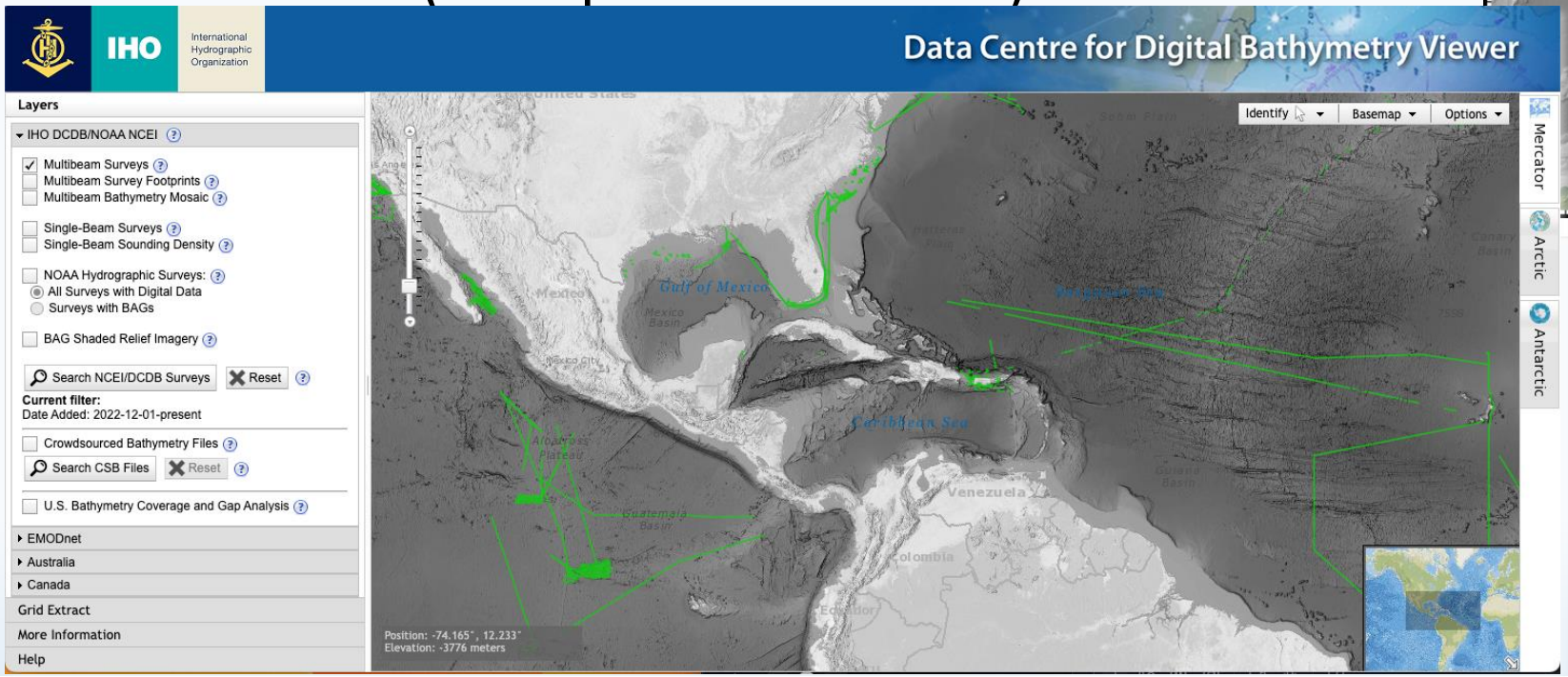
Data formats received

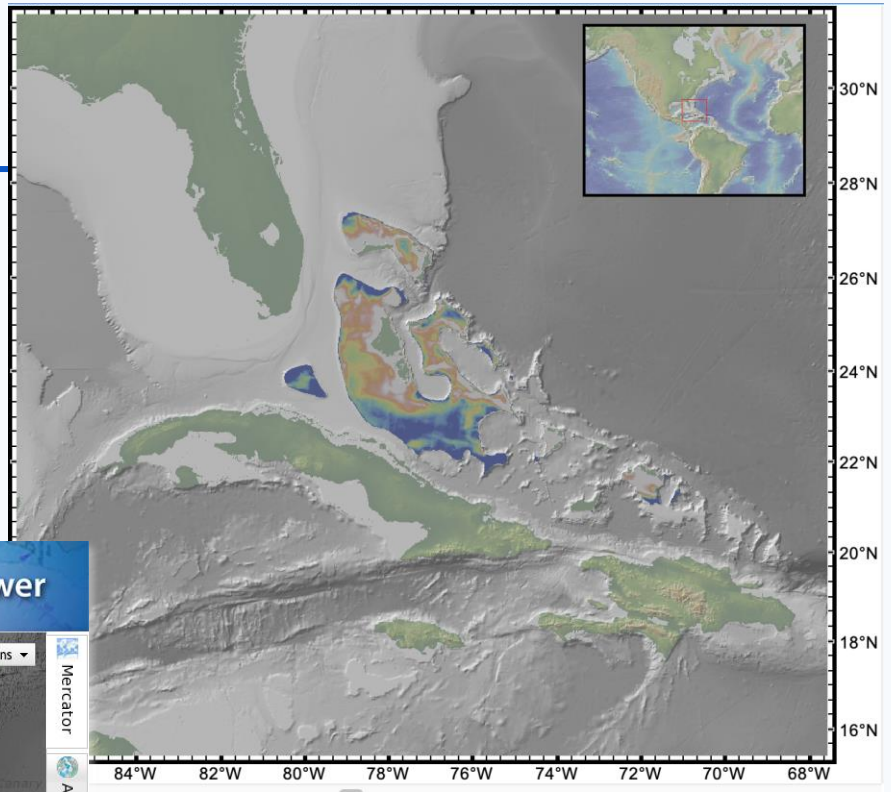
- Raw swath
  - Modern formats
  - Legacy formats
- Processed swath
- ASCII
  - Trackline
  - Swath export
  - Raster export
  - Digitized soundings
- Raster
  - With interpolation
  - Without interpolation
- Shapefile



Recent Data Contribution Highlights

- Satellite Derived Bathymetry (SDB)
- Multibeam data
  - Raw (DCDB)
  - Gridded (multiple contributors)

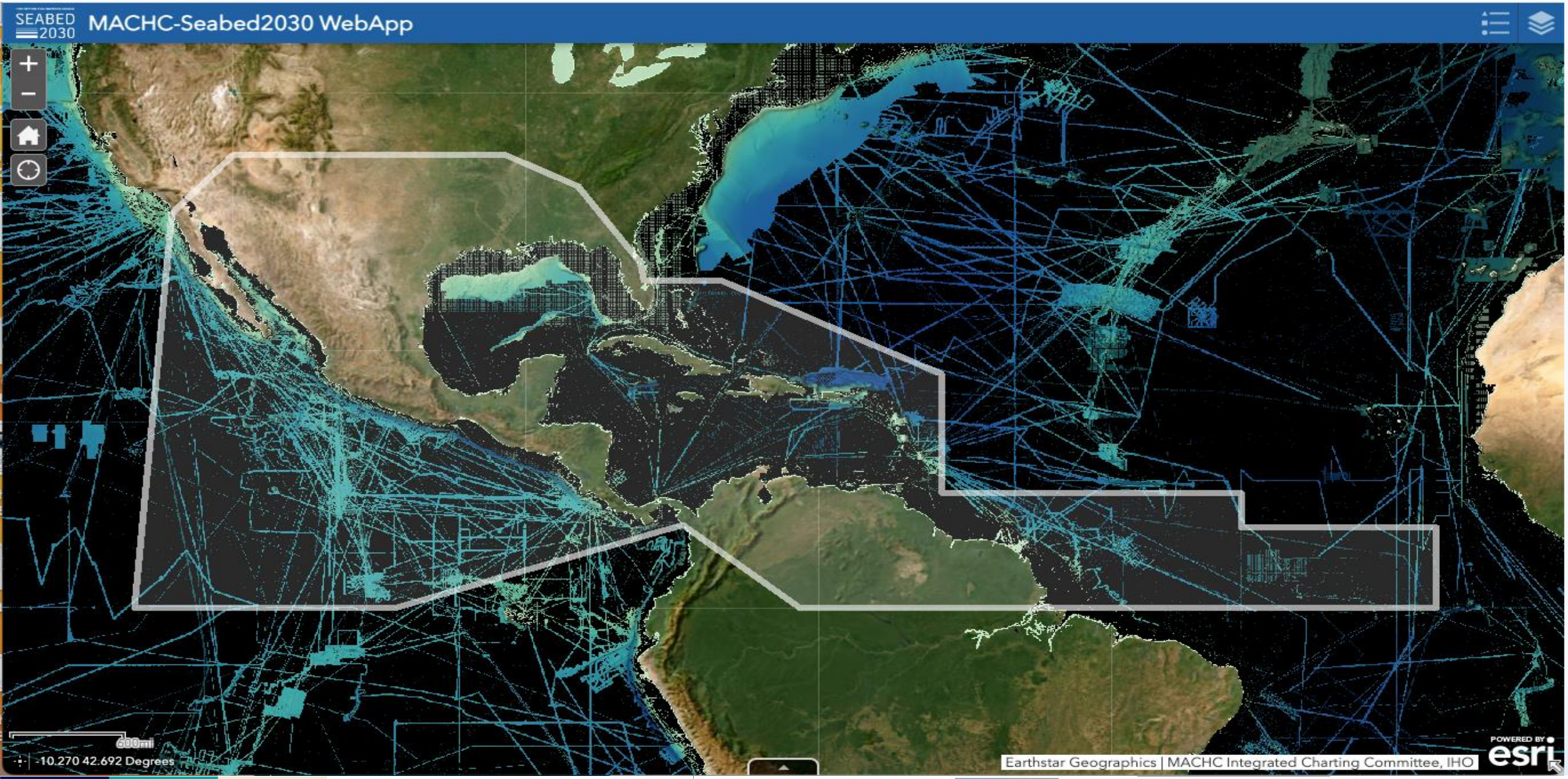




TCARTA 100m SDB Bahamas

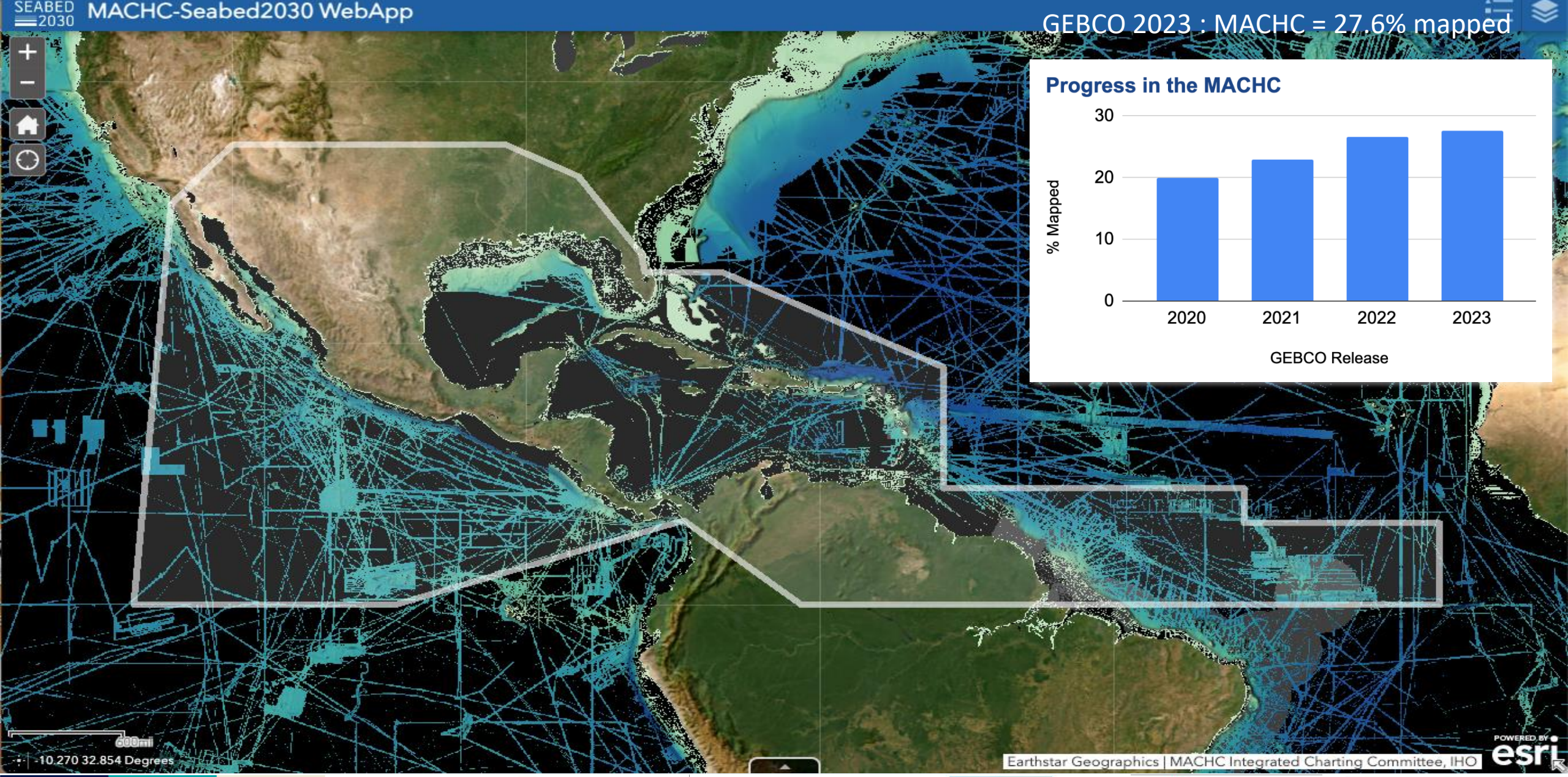
Thank you to all contributors!!

How much of the MACHC is mapped?


SEABED 2030
MACHC-Seabed2030 WebApp
600mi
-10.270 42.692 Degrees
Earthstar Geographics | MACHC Integrated Charting Committee, IHO
POWERED BY esri

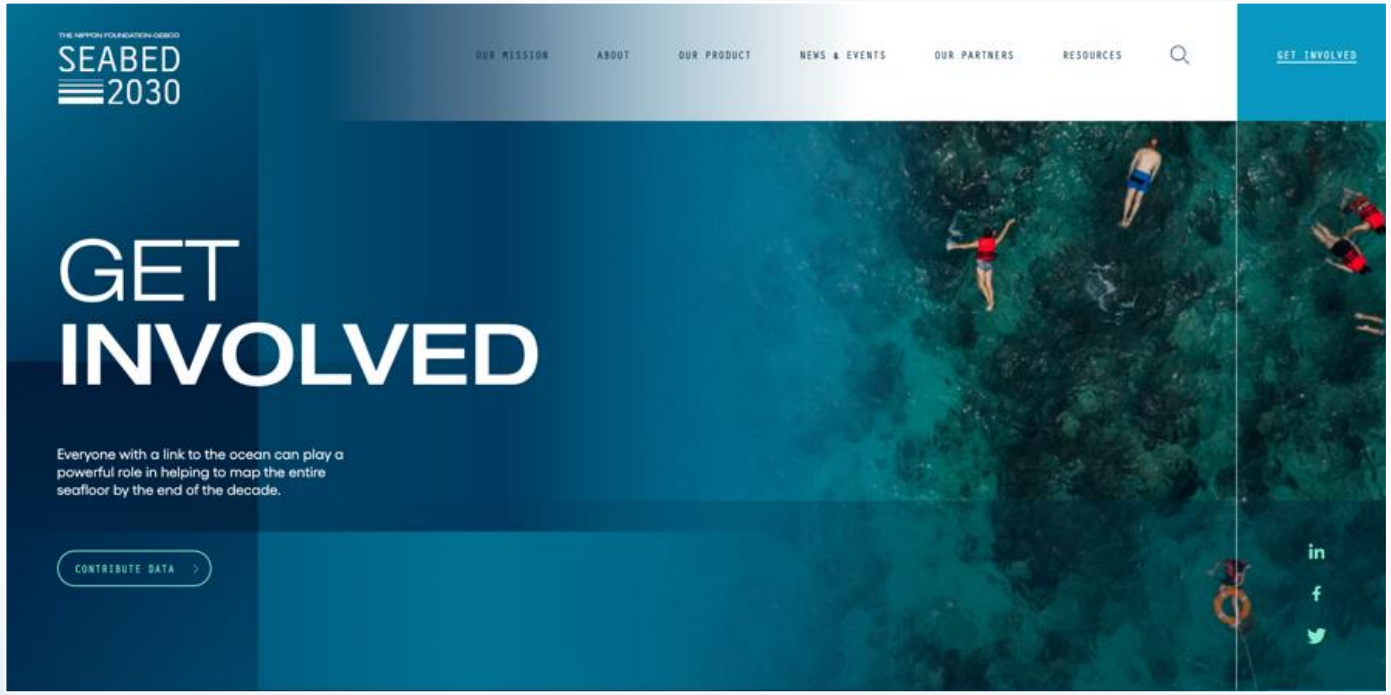
SEABED 2030 MACHC-Seabed2030 WebApp

GEBCO 2023 : MACHC = 27.6% mapped



Conclusions

- Data coverage steadily increasing in the MACHC region
- Seabed 2030 Coordinator and Regional Center Team available to assist
- Contact us with questions or requests - we are here to help!



MACHC-IOCARIBE CSB/Seabed 2030 Coordinator

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Crowdsourced Bathymetry

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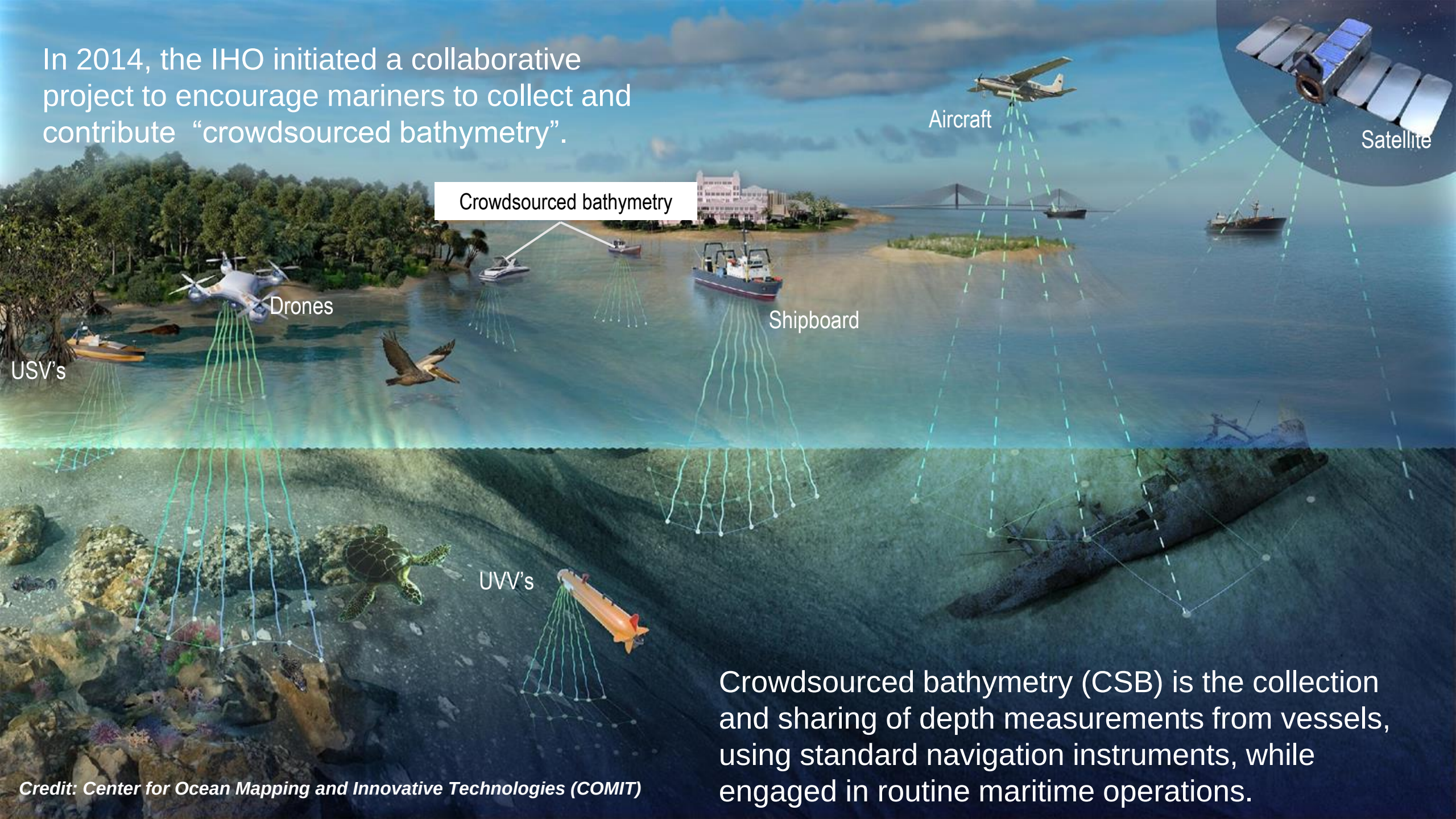
In 2014, the IHO initiated a collaborative project to encourage mariners to collect and contribute “crowdsourced bathymetry”.

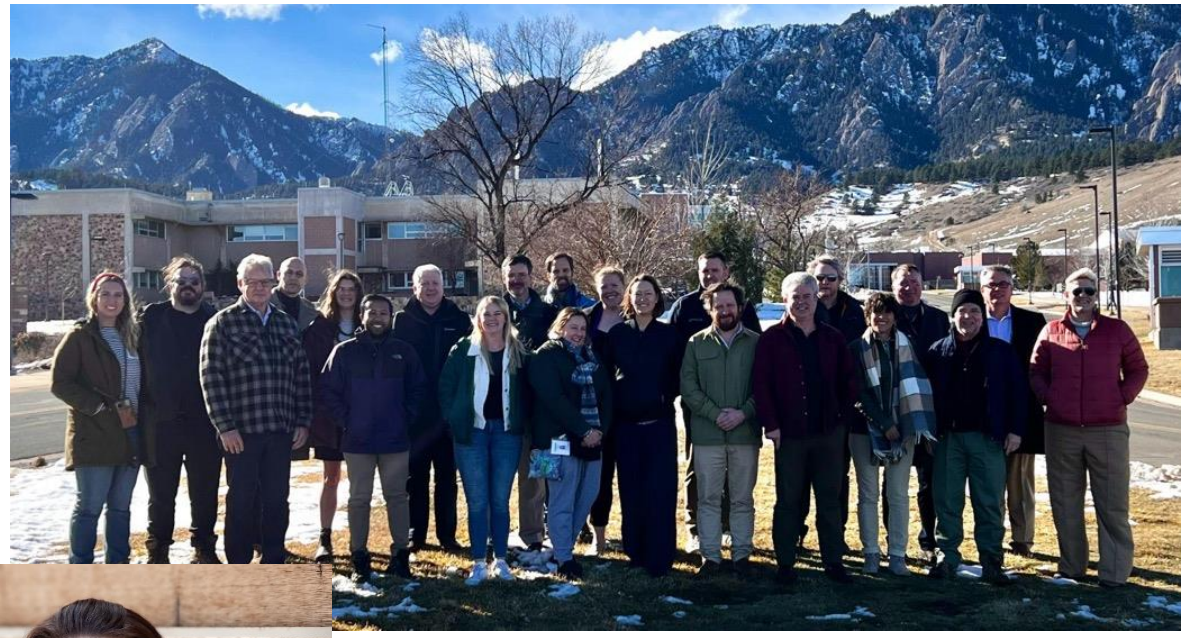


Credit: Center for Ocean Mapping and Innovative Technologies (COMIT)

Crowdsourced bathymetry (CSB) is the collection and sharing of depth measurements from vessels, using standard navigation instruments, while engaged in routine maritime operations.

CSB Working Group Meetings

- **Meetings:** *CSBWG 13*: January 2023, hosted by NOAA in Boulder, Colorado, U.S.A.; *CSBWG 14*: August 2023, hosted by Norway HO in Stavanger, Norway
- **Chair:** Jennifer Jencks, USA; **Vice Chair**: Peter Wills, Canada
- **Representatives from 18 Member States:** Canada, China, Denmark, France, Germany, India, Iran, Italy, Jamaica, Lebanon, Mexico, Netherlands, New Zealand, Norway, Portugal, South Africa, Sweden, UK, Uruguay, USA
- **IHO Secretariat:** IHO Assistant Director Sam
- **Observers and expert contributors:** CCOM-JHC, CIDCO, CIRES, Da Gama Maritime Ltd, Dock Tech, ECC AS, FarSounder, FLIR Systems AB, Fugro, Great Lakes Observing System (GLOS), H2i, James Cook U, OrangeForce Marine, Seabed 2030, Sea-ID, SevenCs/ChartWorld, Teledyne CARIS



Chair: Jennifer Jencks, USA

IHO CL 01/2020 & IRCC CL 21/2020

International Hydrographic Organization

- All coastal States are requested to indicate their position on the ***provision of CSB data*** from ships within waters subject to their jurisdiction into the public domain
- To date, 34 coastal States (green) have replied positively*

iho.int/uploads/user/Inter-Regional%20Coordination/CSBWG/MISC/B-12_2020_EN_Acceptance_of_CSB_Data_in_NWJ_v3.0.pdf

IHO CL 21/2020

International Hydrographic Organization

All Coastal States…"are requested to indicate their position on the provision of CSB data from ships within waters subject to their national jurisdiction into the public domain as well as highlighting …any caveats they wish to apply to such provision."

MACHC IHO Member States:
Brazil, Colombia, Cuba, Dominican Republic, France, Guatemala, Guyana, Jamaica, Mexico, Netherlands, Suriname, Trinidad and Tobago, United Kingdom, United States of America, Venezuela.

MACHC Associate States:
Antigua and Barbuda, Barbados, Belize, Costa Rica, El Salvador, Grenada, Haiti, Honduras, Nicaragua, Panama, Saint Lucia, St Kitts and Nevis, St. Vincent and the Grenadines.

MACHC Observer States:
Dominica, Spain

The IHO encourages all member States to review IHO CL 21/2020 and, if possible, offer a positive response to IHO Secretariat.

iho.int/uploads/user/circular_letters/eng_2020/CL21_2020_EN_v1.pdf
iho.int/uploads/user/circular_letters/esp_2020/CL21_2020_ES_v0.1.pdf

International Hydrographic Organization

CL Questionnaires ask:

- 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.

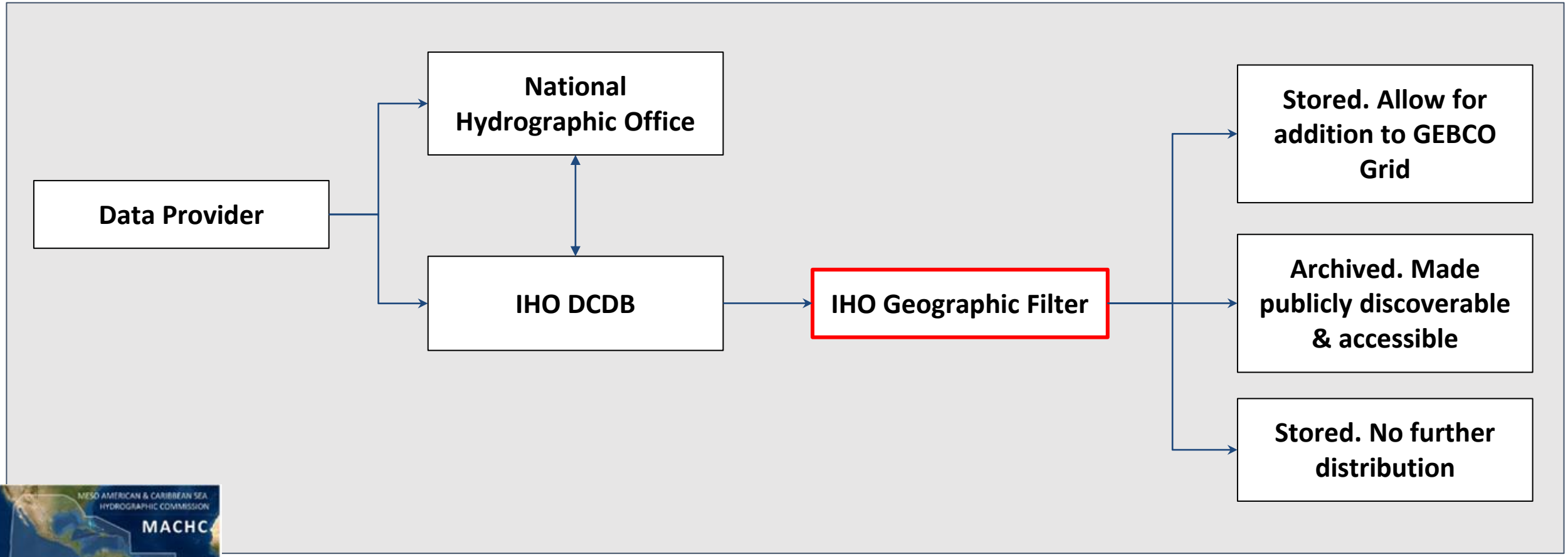
Questions:
1) Do you support or object to the crowdsourced bathymetry data provision for depth measurements from the internal waters of your country?

SUPPORT □	OBJECT □
CAVEAT:	

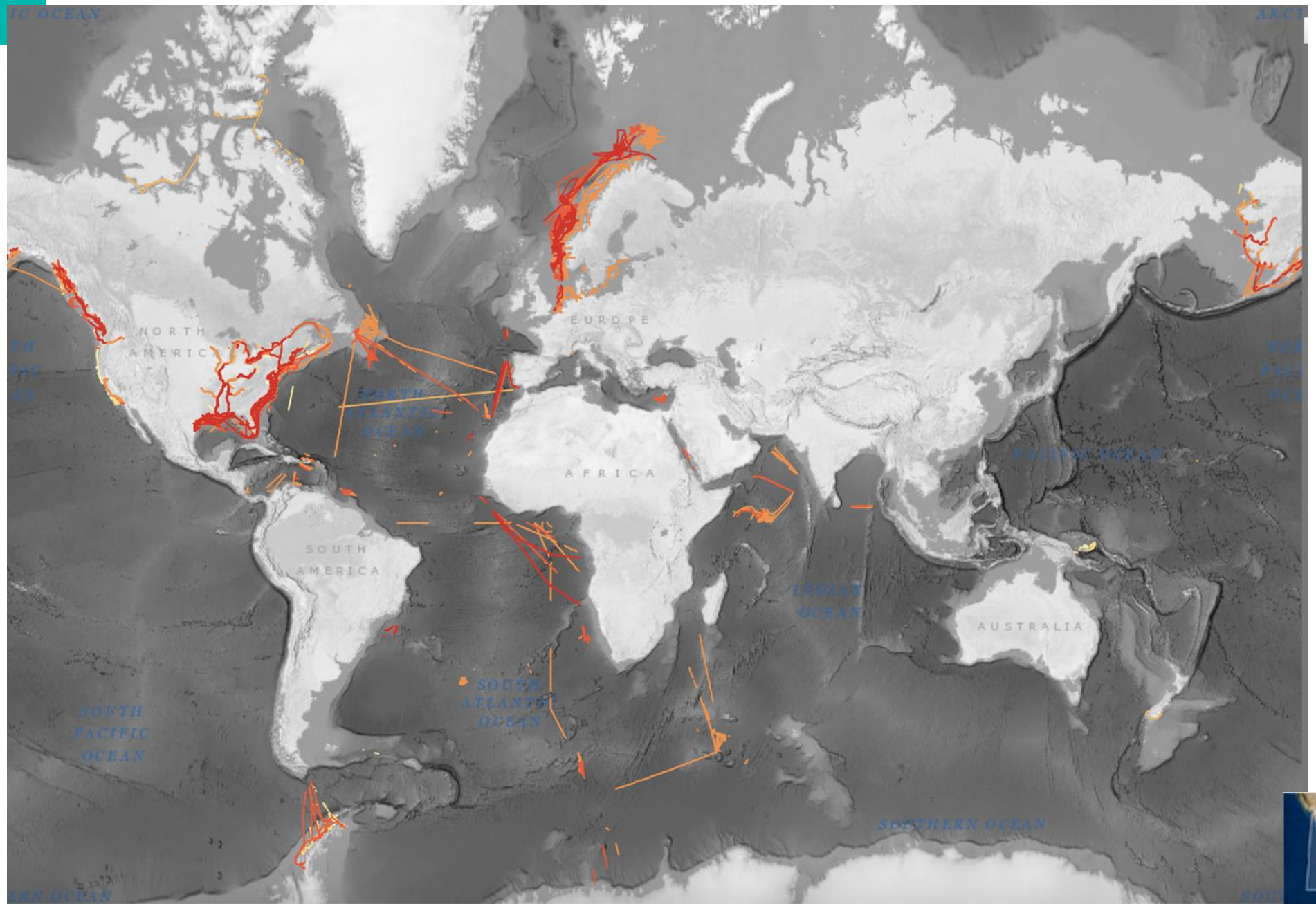
Geographic Filter

International Hydrographic Organization

In response to feedback provided to the IHO, the IHO Data Centre for Digital Bathymetry (DCDB) implemented (and continues to update) a geographic filter for incoming data to take into account coastal countries' positions on the distribution of CSB collected in their areas of jurisdiction.



CSB Data Holdings

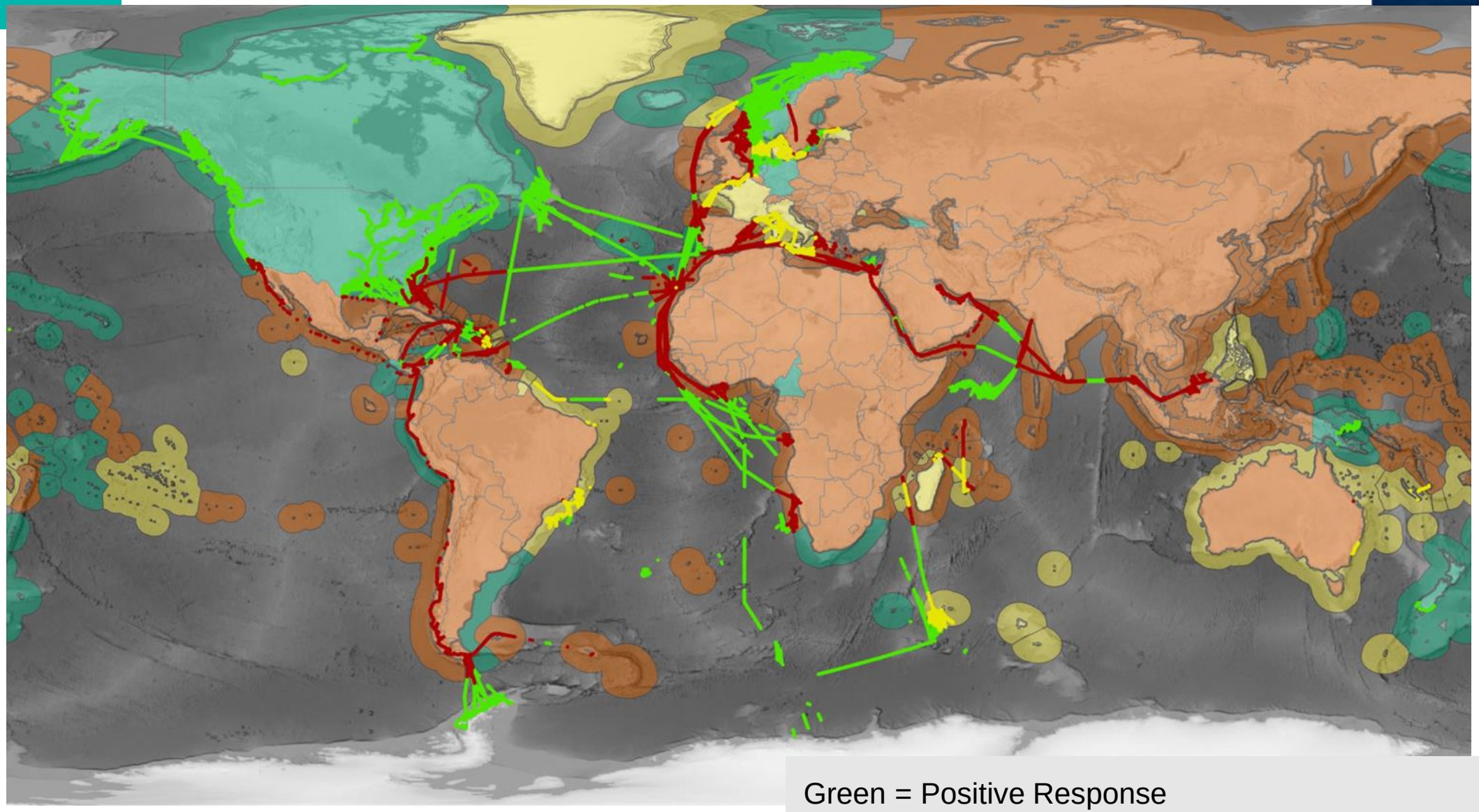


CSB Data Holdings in the MACHC Region

IHO

International Hydrographic Organization

CSB Data Holdings with Geographic Filter applied



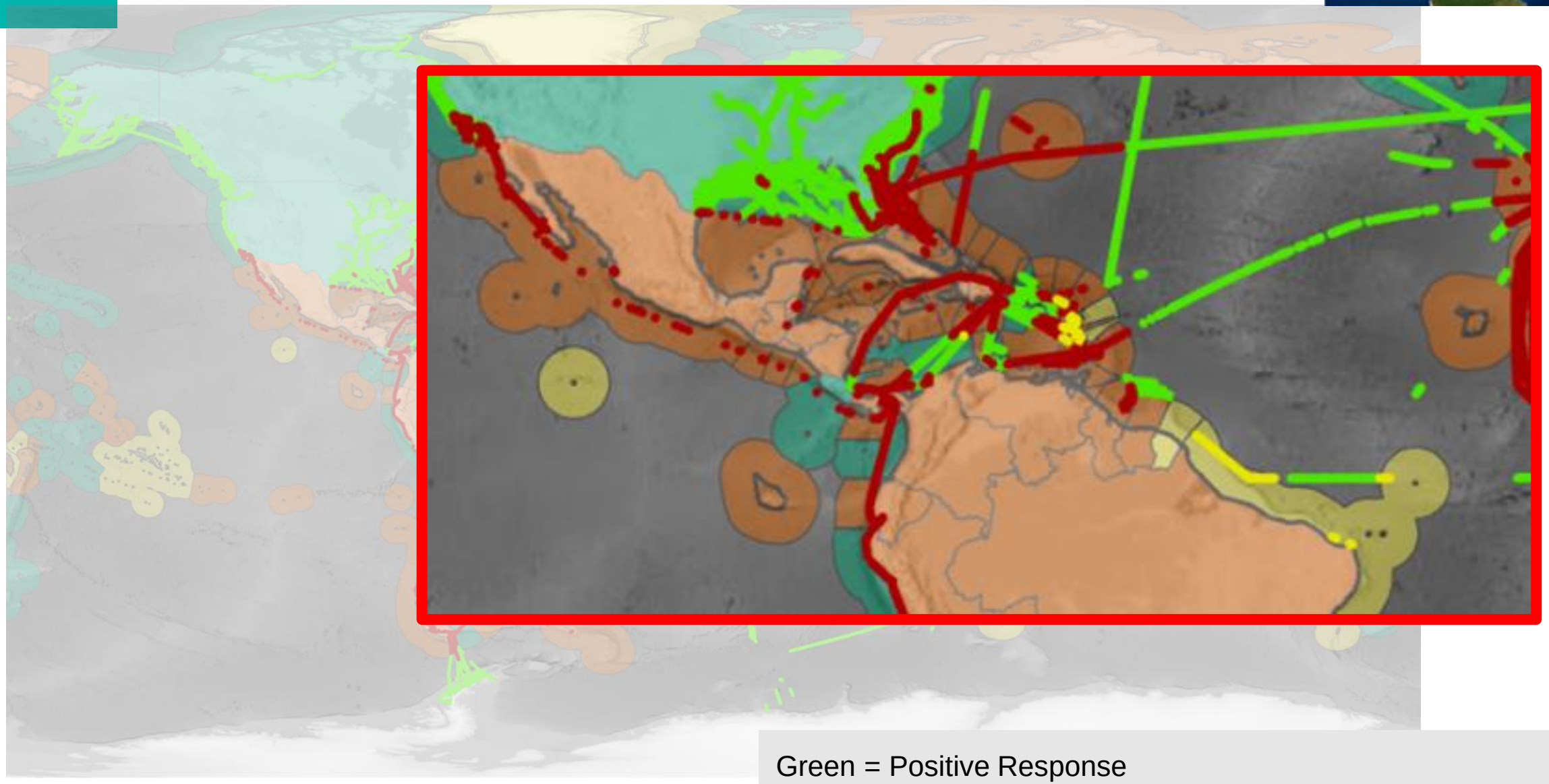
Green = Positive Response
Yellow = Positive Response w/ caveats unable to adhere to
Red = Negative Response, No Response

Map for illustrative purposes only. (Credit: Marine Regions)

CSB Data Holdings

IHO

International Hydrographic Organization



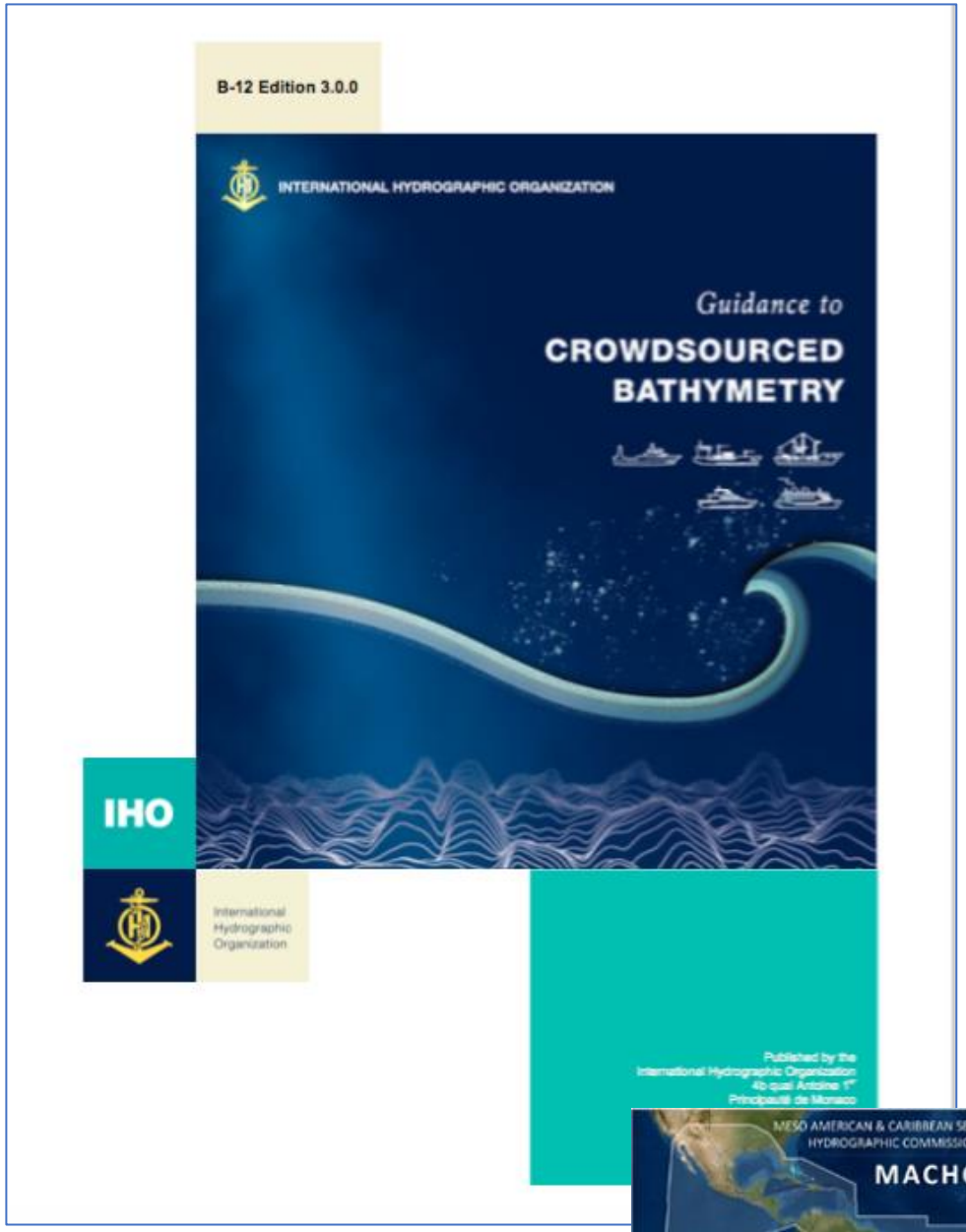
Map for illustrative purposes only. (Credit: Marine Regions)

Green = Positive Response
Yellow = Positive Response w/ caveats unable to adhere to
Red = Negative Response, No Response

How to Collect & 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.



Current CSB Trusted Nodes

Rose Point Navigation System

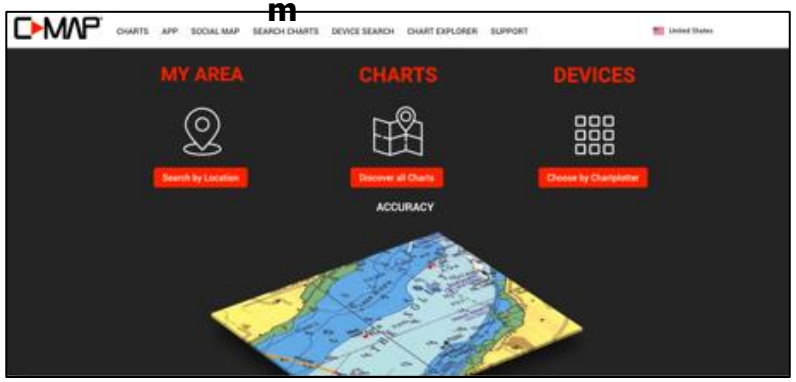
- Mariners can enable their electronic charting system log file to record *position, depth, and time*.

Voyage Data Recorder

www.rosepointnav.com

Navico C-MAP

- New CSB feed b/w DCDB & navigation software company.



MacGregor/Carnival Cruise Line

- Data provided by Voyage Data Recorders (VDR)

Petroleum Geo-Services (PGS)

- Data feed from PGS vessels to the DCDB

M2Ocean

- Testing data submissions with data collected by Hydroballs (small autonomous bathymetric buoys)

SmartLog USB data logger

James Cook University

- Distributed data loggers to volunteer vessels along the Great Barrier Reef

MACHC-IOCRIBE SEABED 2030 – WORK PLAN 2024

- **001**- Assemble information (polygons) about existing non-public bathymetric data falling under its remit not yet identified on the MACHC Web App to identify gaps - **Coastal States - As soon as possible**
- **002-** Broadly communicate the steps to submit polygons showing data coverage of existing data to both the RDACC and the IHO DCDB **- Seabed 2030 Coordinator - Ongoing**

•003- Look at existing regulatory requirements, legislation, bilateral, contractual or other arrangements for surveying within national waters of jurisdiction to reassess what bathymetric data can be made publicly available and at what resolution is acceptable to the government and to the data owner. Share examples on the MACHC Initiative Seabed 2030 webpage **- Coastal States - As soon as possible**

MACHC-IOCRIBE SEABED 2030 – WORK PLAN 2024

- **004-** Constantly communicate the Seabed 2030 Project importance, the gap areas identified and the steps to submit data to the IHO DCDB and the RDACC **- Seabed 2030 Coordinator - Ongoing**
- **005-** Contribute multibeam, single-beam and ENC data to the IHO DCDB, wherever possible, for long-term archive and data access - **Coastal States - As soon as possible**
- **006 -** Contribute national bathymetric data products to the RDACC at the appropriate resolution approved by the national authorities for integration into the GEBCO grid **- Coastal States - As soon as possible**
- **007 -** Identify ways to promote or to support bathymetric data sharing **- Coastal States and Seabed 2030 Coordinator – Ongoing**
- **008 -** Assemble information and polygons about upcoming surveys and data acquisition opportunities in national waters of jurisdiction to integrate into the WebApp to define data gaps and plan coordinated mapping campaigns **– Coastal States and Seabed 2030 Coordinator - As soon as possible**

MACHC-IOCRIBE SEABED 2030 –WORK PLAN 2024

- **009** - Identify gap areas in the MACHC region without any kind of bathymetric data (distances greater than 1,000m) providing the polygons to the respective Coastal States **- Seabed 2030 Coordinator - June**
- **010 -** Explore with national authorities expanded permissions for opportunistic data acquisition via research and survey vessels during transits, consistent with national policy **- Coastal States - Ongoing**
- **011 -** Respond to IRCC CL 1/2020 or IHO CL 21/2020 to allow for the provision of CSB data from ships within waters subject to their national jurisdiction into the public domain, according to national policy, or update **it – MACHC Members and Associate Members - As soon as possible (Brazil, Costa Rica, Columbia, Netherlands, USA)**
- **012 -** Consider carrying CSB field trials with designated “trusted nodes” (data liaisons) and data collectors (mariners) in the region to provide data to the IHO DCDB **- Seabed 2030 Coordinator with Interested Coastal States - Ongoing**

MACHC-IOCRIBE SEABED 2030 –WORK PLAN 2024

- **013** - Discuss and address concerns related to responding to CLs and plan visits to help resolve them – **Seabed 2030 Coordinator - As soon as possible**
- **014 -** Identify technical and other challenges to data collection, assembly and sharing and look for solutions **- Coastal States and Seabed 2030 Coordinator - May**
- **015 -** Conduct an annual review process to resolve challenges to data collection and sharing **- Seabed 2030 Coordinator - MACHC 25**
- **016 -** Provide technical support and data submission guidelines for data and accompanying metadata and Type Identifier (TID) information **- Seabed 2030 Coordinator - Ongoing**

MACHC-IOCRIBE SEABED 2030 – WORK PLAN 2024

Objective 2.3. Encourage the collection and contribution of crowdsourced bathymetry (CSB) data among volunteer commercial and non-commercial vessels.

#	Action Item	Responsible Party	Due Date
011	Respond to IRCC CL 1/2020 or IHO CL 21/2020 to allow for the provision of CSB data from ships within waters subject to their national jurisdiction into the public domain, according to national policy, or update it.	MACHC Members and Associate Members	As soon as possible (Brazil, Costa Rica, Columbia, Netherlands, USA)

MACHC-IOCRIBE SEABED 2030 –WORK PLAN 2024

Action 13 Proposed Amendment to the Work Plan

012	Consider carrying CSB field trials with designated “trusted nodes” (data liaisons) and data collectors (mariners) in the region to provide data to the IHO DCDB.	Seabed 2030 Coordinator with Interested Coastal States	Ongoing
013	Discuss and address concerns related to responding to CLs and plan visits to help resolve them.	Seabed 2030 Coordinator	As soon as possible

MACHC-IOCRIBE SEABED 2030 – WORK PLAN 2024

016	Provide technical support and data submission guidelines for data and accompanying metadata and Type Identifier (TID) information.	Seabed 2030 Coordinator	Ongoing

CruisePack

About

CruisePack is a data packaging and metadata gathering software tool NCEI developed to simplify data submission preparation for cruise-based data. *CruisePack* has a simple interface to control packager operation and metadata entry. Once the metadata entry is complete, data packaging is automatic.

CruisePack copies the data, generates machine-parseable JavaScript Object Notation (JSON) metadata records, and creates a checksum manifest file. And all of this information comes in a structured data package that conforms to the BagIt specification.

CruisePack and its predecessors have packaged more than 100TB of data since 2014.

MACHC STATES ARE REQUESTED TO

1. Note this report
2. Approve the 2024 Work Plan (Retaining all the actions from 2023 Work Plan)
3. Respond to the IHO CL 21/2020

IHO International Hydrographic Organization

Thank you.

Diego Billings

CSB/SB2030 Coordinator

Diego.Billings@nla.gov.jm