



# *Workshop on* **Crowdsourced Bathymetry** *(CSB)*



**IHO**

International  
Hydrographic  
Organization



# Dr Mathias Jonas

## IHO



# Jennifer Jencks

## NOAA





# Workshop on Crowdsourced Bathymetry (CSB)

Jennifer Jencks  
Chair, IHO CSB Working Group



[jennifer.jencks@noaa.gov](mailto:jennifer.jencks@noaa.gov)

26 April 2024





***To facilitate an informed discussion and  
to provide advice at and within the IHO  
IRCC.***

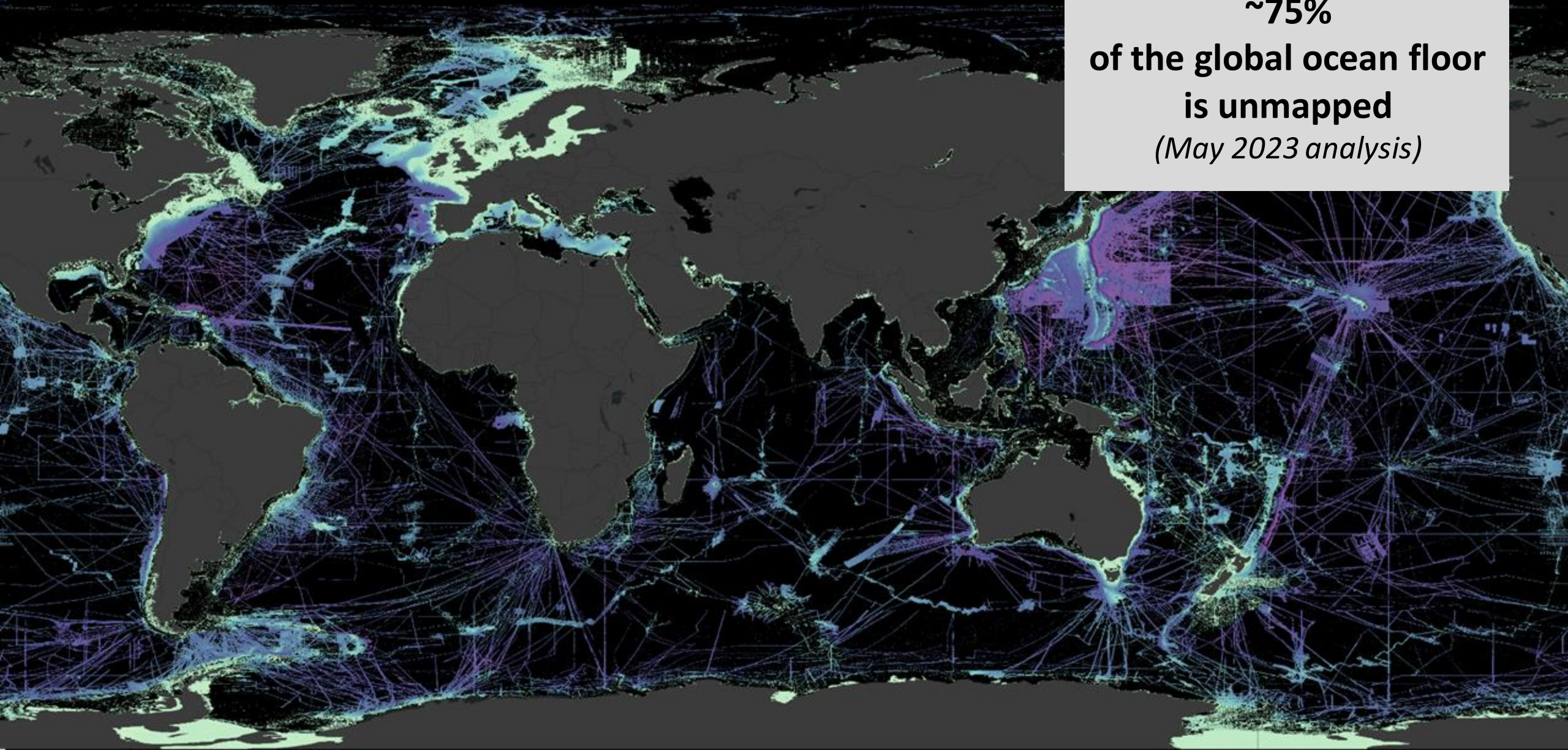


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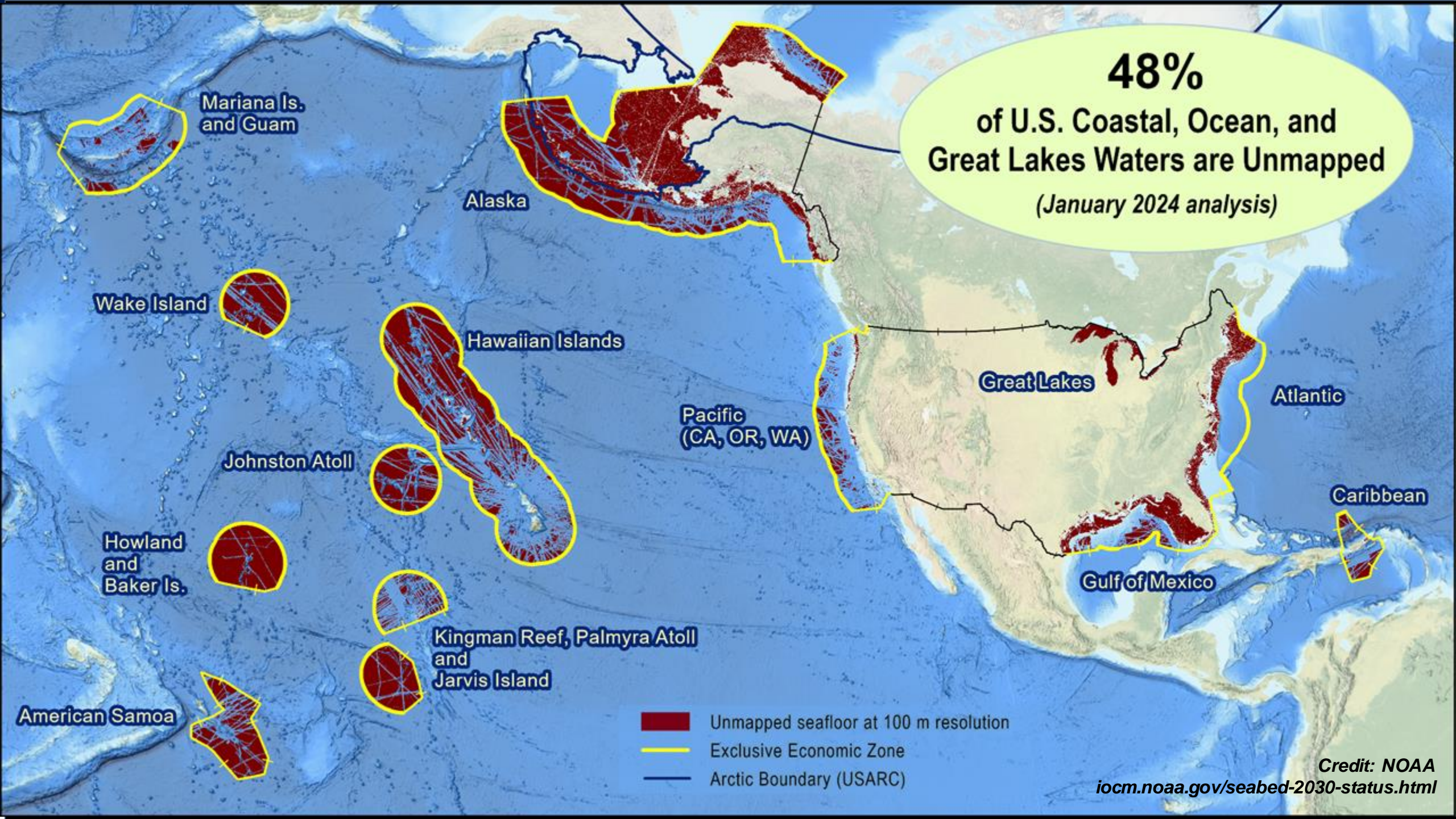


**~75%**  
**of the global ocean floor**  
**is unmapped**  
*(May 2023 analysis)*



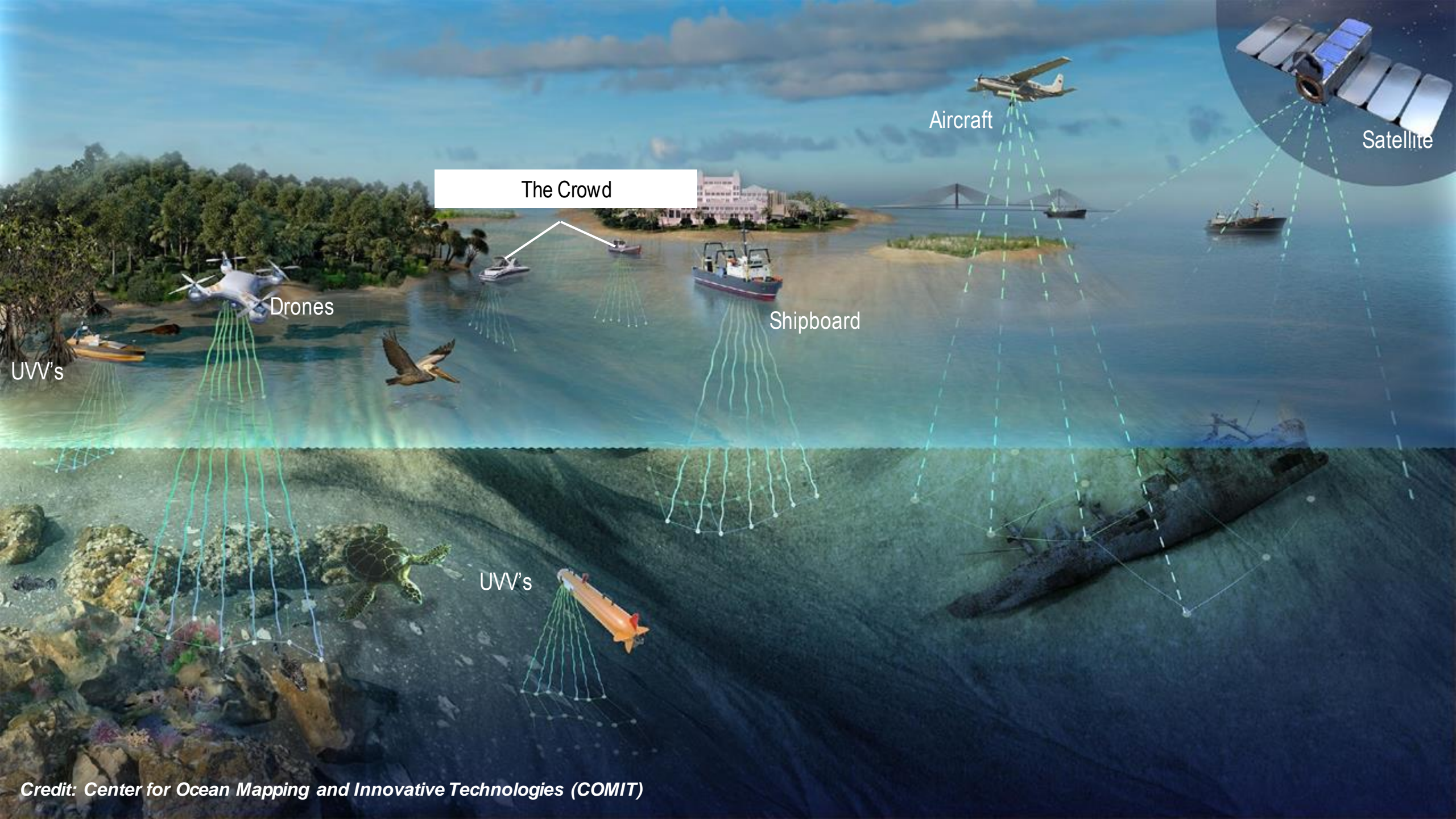


**48%**  
of U.S. Coastal, Ocean, and  
Great Lakes Waters are Unmapped  
(January 2024 analysis)



- Unmapped seafloor at 100 m resolution
- Exclusive Economic Zone
- Arctic Boundary (USARC)





The Crowd

Drones

UW's

Shipboard

Aircraft

Satellite

UW's





# *Google: How many boats are on the water?*

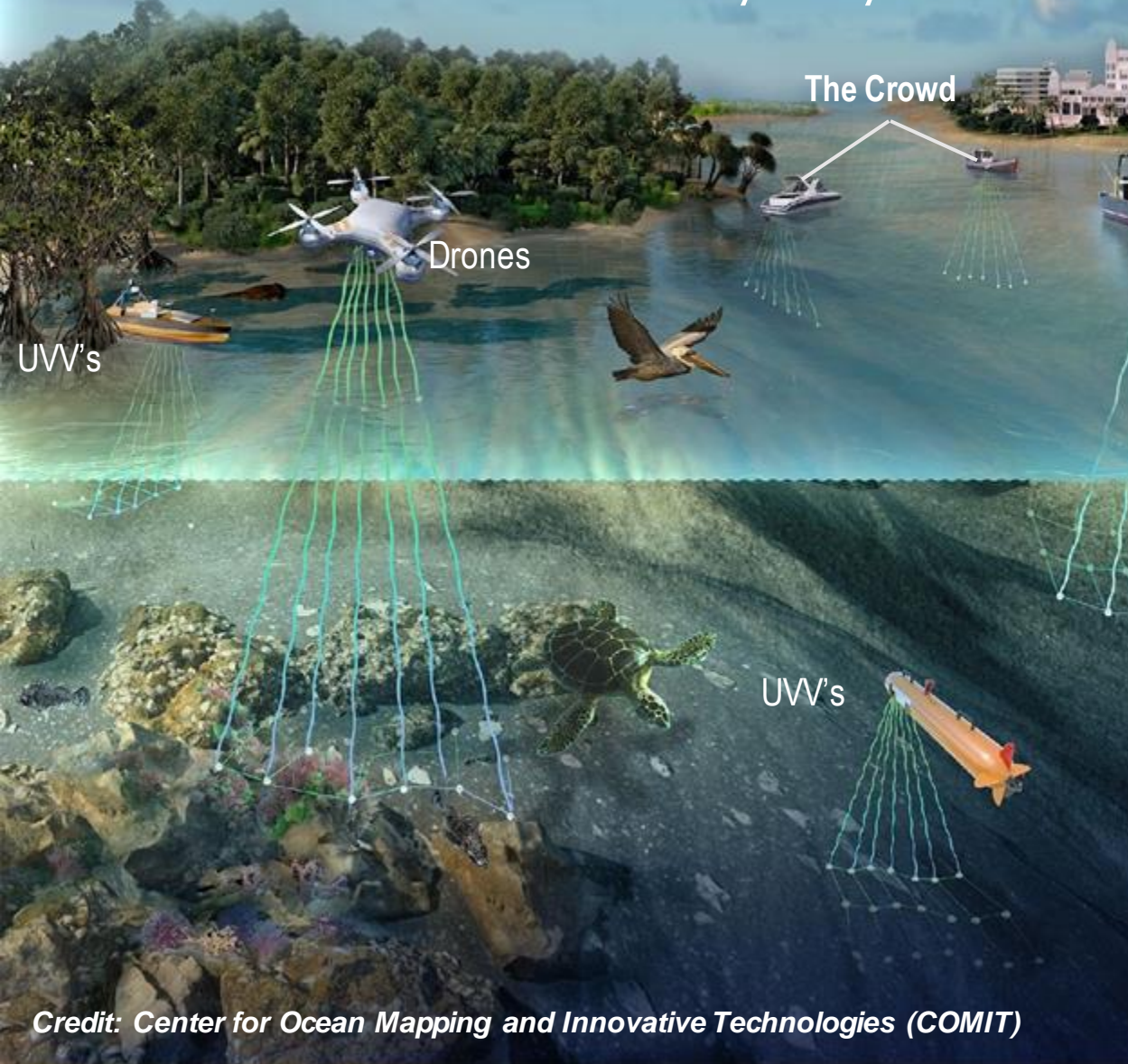
1. ...roughly speaking, there are around 100,000 vessels globally which includes bulk carriers, tankers, container ships, and other types of cargo and passenger vessels (these do not include smaller specialty vessels, fishing vessels, yachts and other recreational boats, and military fleets).
2. AIS signals from some 180,000 vessels are monitored daily
3. In 2022, there were about 11.77 million registered vessels in the United States

1. [https://community.magicport.ai/t/how-many-ships-are-there-in-the-world/727#:~:text=But%20roughly%20speaking%2C%20the%20are,boats%2C%20and%20military%20fleets\).](https://community.magicport.ai/t/how-many-ships-are-there-in-the-world/727#:~:text=But%20roughly%20speaking%2C%20the%20are,boats%2C%20and%20military%20fleets).)

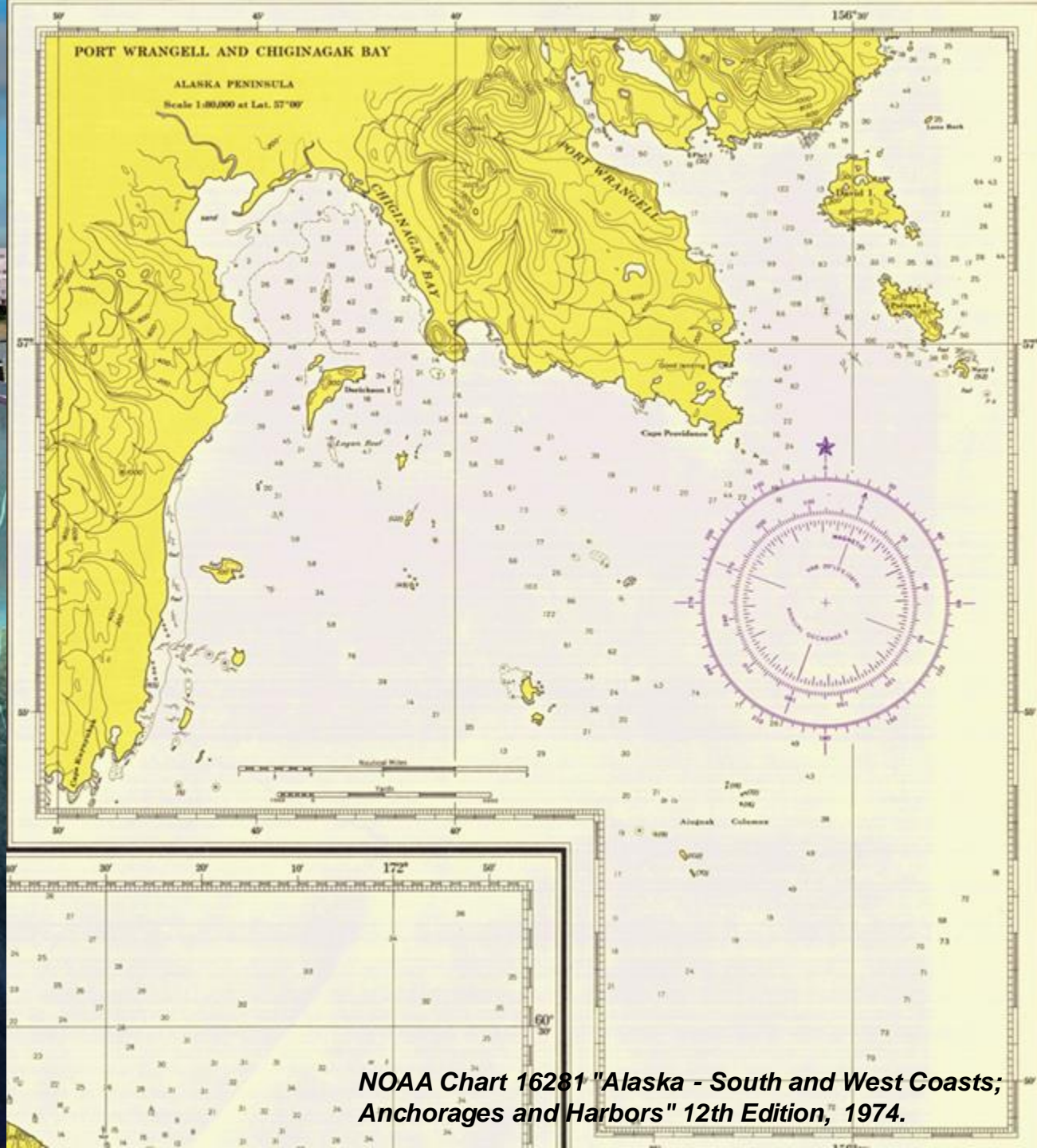
2. <https://gijn.org/tracking-ships-at-sea/>



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)



NOAA Chart 16281 "Alaska - South and West Coasts; Anchorages and Harbors" 12th Edition, 1974.





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# Crowdsourced Bathymetry Working Group



**CSBWG15 - Monaco**

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

B-12 Edition 3.0.0



INTERNATIONAL HYDROGRAPHIC ORGANIZATION

## Guidance to CROWDSOURCED BATHYMETRY



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Published by the  
International Hydrographic Organization  
4b quai Antoine 1<sup>er</sup>  
Principauté de Monaco  
Tel: (377) 83 10 81 00  
Fax: (377) 83 10 81 40  
info@iho.int  
www.iho.int

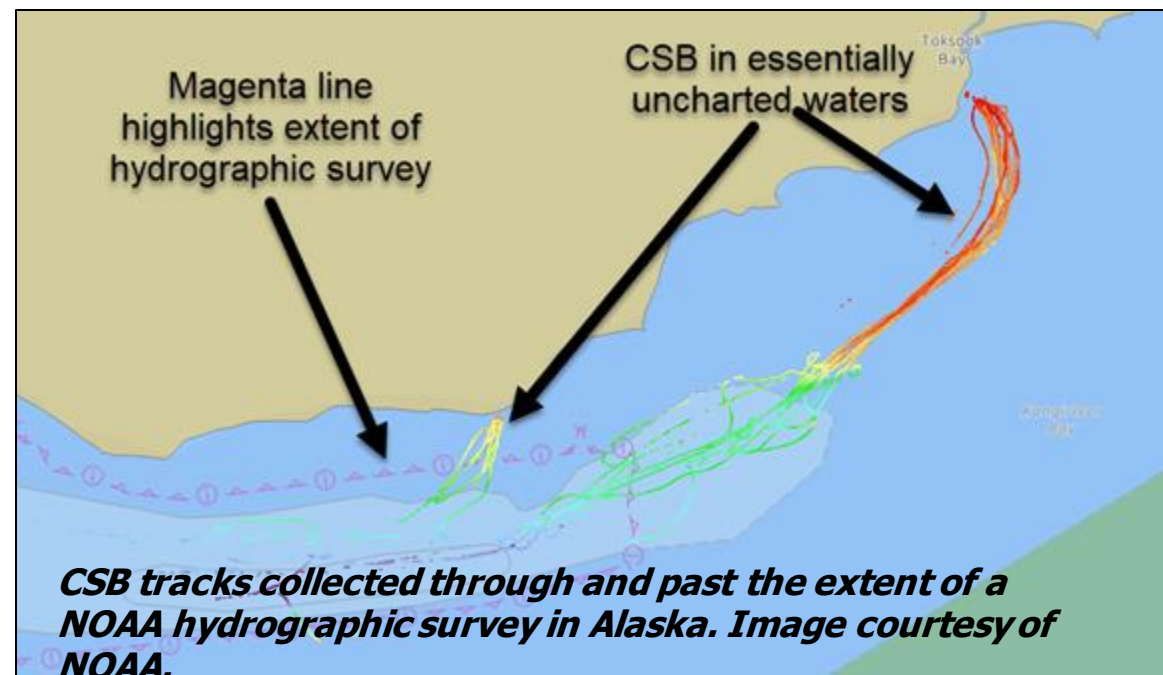
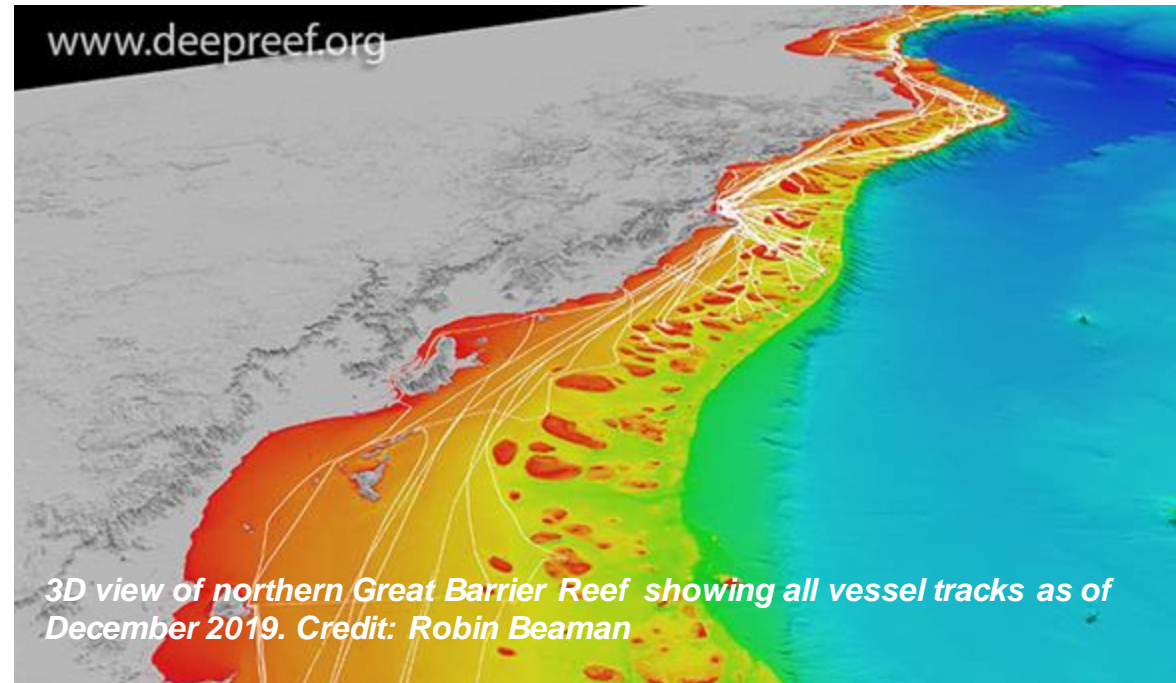


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# The Value of CSB Data

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- Data with scientific, commercial & research value at little to no cost to the public sector
- Fill gaps where data is scarce (eg: Large Pacific Ocean States)
- Improving safety of navigation
- Supporting prioritisation for Hydrographic Authorities



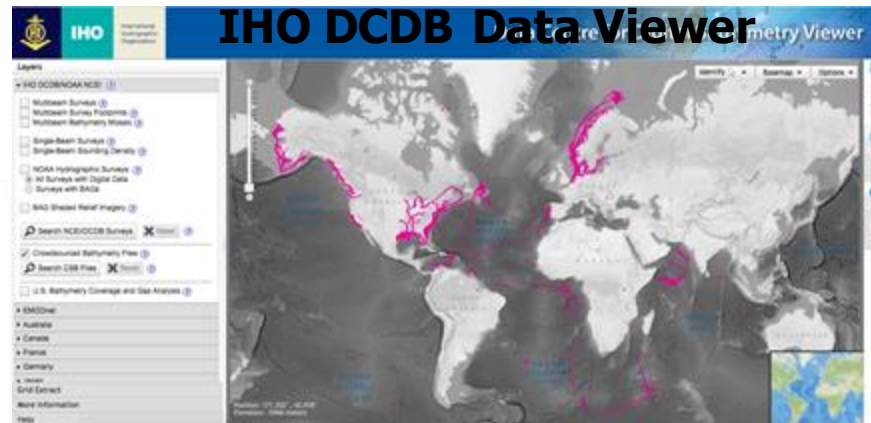
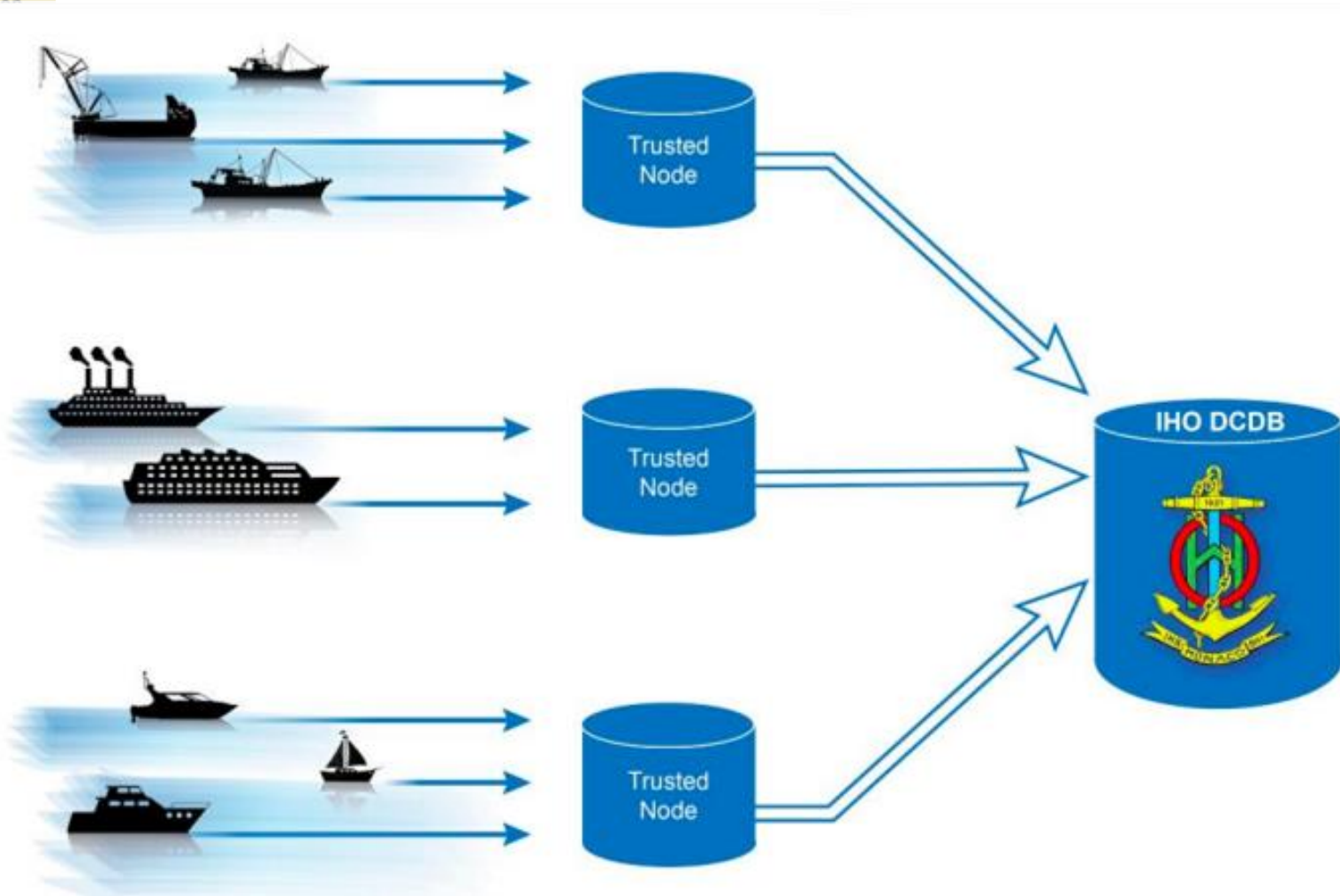




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# IHO CSB Data Flow

International  
Hydrographic  
Commission



**Geographic Filter Applied**

*...to take into account coastal States' positions on the distribution of CSB collected in their areas of jurisdiction.*





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# National Policy

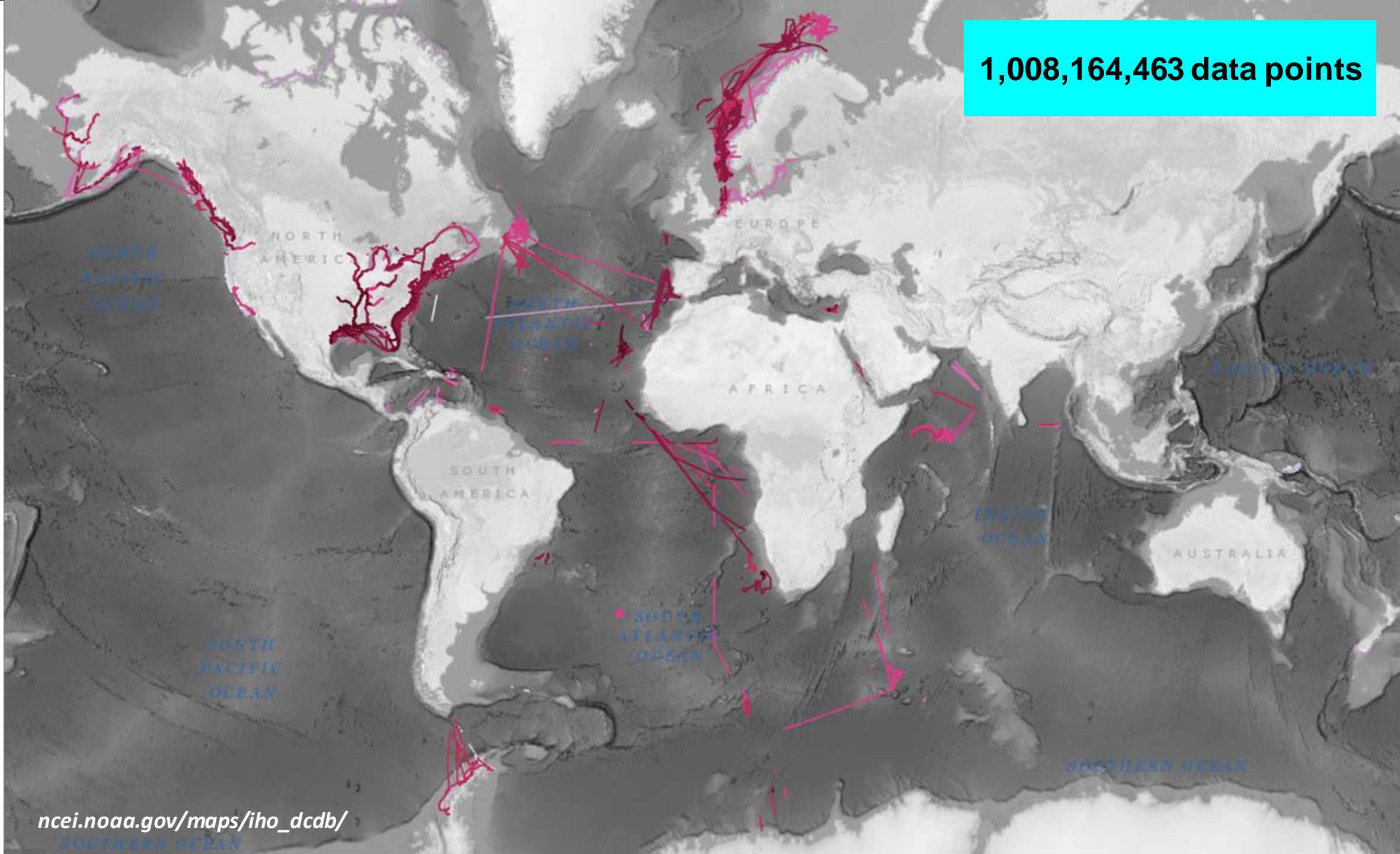
International  
Hydrographic  
Organization




Coastal states were requested by the IHO to indicate their position on the public sharing of CSB data collected within waters subject to their national jurisdiction.

To date, 35 coastal states (green) have replied positively to IHO CL 21/2020 & IRCC CL 1/2020

**1,008,164,463 data points**







“If we got 1% of all seagoing vessels logging data, and on average they spent half their time at sea, then that’s about 5 billion data points a day.”

- Tim Thornton, TeamSurv





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# Why we have invited you all here today

International Hydrographic Organization

- To learn more about CSB
- Explore common misconceptions
- Articulate the potential of CSB
- ***Invite feedback and understanding of the requirements of HOs***

SESSION 1		
1320-1335	How CSB is supporting the UN Decade, GEBCO, & The IHO Strategic Plan	Belen Jimenez Baron
1335-1340	Q&A	All
1340-1355	Legal Considerations & Misconceptions	Steve Keating
1355-1400	Q&A	All
1400-1415	BREAK	
SESSION 2		
1415-1430	Utility of CSB (The NOAA Example)	Anthony Klemm
1430-1435	Q&A	All
1435-1450	Implementation of CSB in waters of national jurisdiction: the FRANCE case.	Laurent Kerléguer
1450-1455	Q&A	All
1455-1510	CSB and the world of Yachting: the experience of the Yacht Club de Monaco (YCM)	YCM (speaker TBD)
1510-1515	Q&A	All
1515-1530	FINAL WRAP-UP AND DISCUSSION on Developing CSB inside and outside the IHO Community	IHO Secretariat Jennifer Jencks
END OF WORKSHOP		



After each presentation there will be ~5 minutes for questions, comments and responses for that topic.

At the end of the workshop, there will be an additional opportunity for Q&A.

Questions should be submitted via the chat window.

We acknowledge that not all questions will be answered within this workshop.

We encourage ALL to submit their questions and the speakers will do their best to respond post-workshop via the appropriate mechanisms.



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# Session 1





# Belen Jimenez Baron

## NIWA

# IRCC Workshop on Crowdsourced Bathymetry

*How CSB is supporting the UN Decade, GEBCO, & The IHO Strategic Plan*

**Belen Jimenez Baron**  
*Vice-chair, IHO CSB Working Group*







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# **IHO Strategic Plan**

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Hydrographic offices are facing significant challenges that shape the context in which the IHO builds the strategy to fulfil its vision:

- Growing needs for hydrographic knowledge, for increasingly diversified customers
- Progress in sensors, carriers and IT technology
- Data revolution, transforming the hydrographic ecosystem of gathering, processing and provision
- Increasing environmental, societal and economic attention to the Ocean

*IHO Strategic Plan*

References

[IHO Strategic Plan](#)

[IHO Strategic Plan Summary](#)



INTERNATIONAL  
HYDROGRAPHIC  
ORGANIZATION

Strategic Plan  
2021-2026



## ***Vision***

The vision of the IHO is to be the authoritative worldwide hydrographic body which actively engages all coastal and interested States to advance maritime safety and efficiency and which supports the protection and sustainable use of the marine environment.

## ***Mission***

The mission of the IHO is to create a global environment in which States provide adequate, standardized and timely hydrographic data, products and services and ensure their widest possible use.

## ***Object***

The Organization has a consultative and technical nature. It is the object of the Organization:

- a. To promote the use of hydrography for the safety of navigation and all other marine purposes and to raise global awareness of the importance of hydrography;
- b. To improve global coverage, availability and quality of hydrographic data, information, products and services and to facilitate access to such data, information, products and services;
- c. To improve global hydrographic capability, capacity, training, science and techniques;
- d. To establish and enhance the development of international standards for hydrographic data, information, products, services and techniques and to achieve the greatest possible uniformity in the use of these standards;
- e. To give authoritative and timely guidance on all hydrographic matters to States and international organizations;
- f. To facilitate coordination of hydrographic activities among the Member States; and
- g. To enhance cooperation on hydrographic activities among States on a regional basis.





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# IHO Strategic Plan

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## GOAL 1

Evolving the hydrographic support for safety and efficiency of maritime navigation, undergoing profound transformation

## GOAL 2

Increasing the use of hydrographic data for the benefit of society

## GOAL 3

Participating actively in international initiatives related to the knowledge and the sustainable use of the Ocean



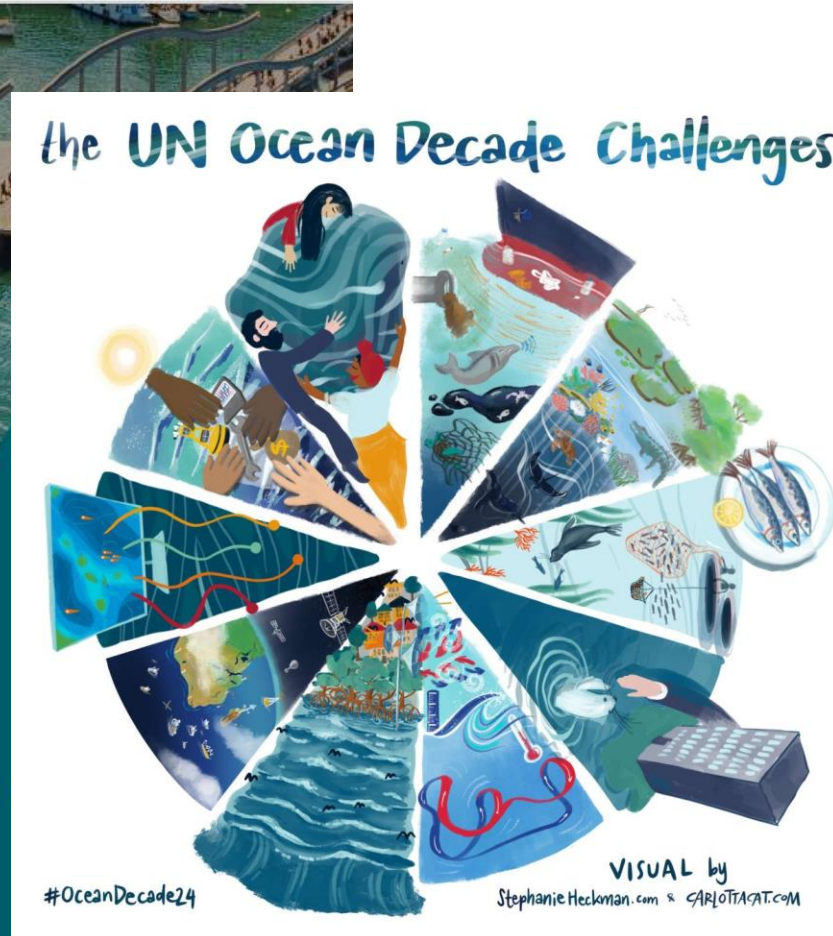
**unesco**

Intergovernmental  
Oceanographic  
Commission



**2021  
2030**

United Nations Decade  
of Ocean Science  
for Sustainable Development



#OceanDecade24

VISUAL by  
Stephanie Heckman.com & ARIOTIAT.COM

# 2024 OCEAN DECADE CONFERENCE BARCELONA STATEMENT

12 April 2024

Barcelona, Spain



# the UN Ocean Decade Challenges



#OceanDecade24

VISUAL by  
StephanieHeckman.com & CARLOTTAAT.COM



Visual by: stephanieheckman.com



Visual by: CARLOTTAAT.COM



Visual by: stephanieheckman.com



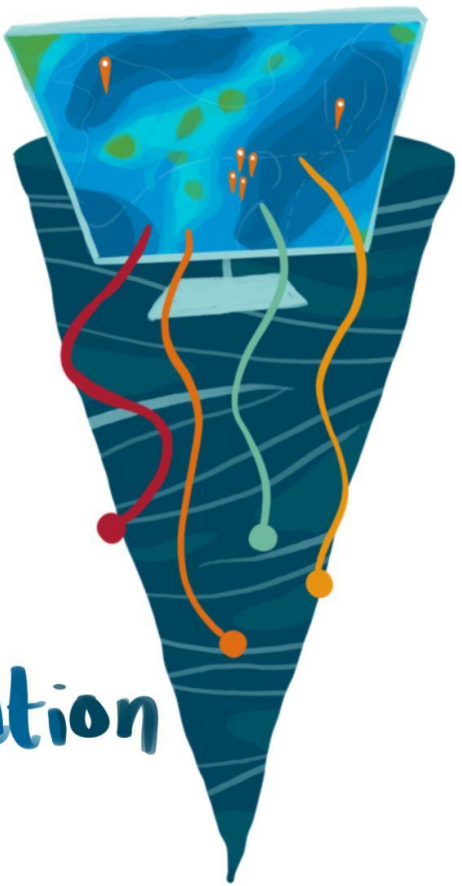
Visual by: CARLOTTAAT.COM





# Challenge 8

digital  
representation  
of the  
Ocean



VISUAL by : CARLOTTACAT.COM

# Challenge 6

Community Resilience



VISUAL by : CARLOTTACAT.COM

# Challenge 7

Global Ocean  
Observing System



# Challenge 9

skills  
technology  
knowledge



VISUAL by StephanieHeckman.com

# Challenge 10

humanity's  
relationship  
with the  
Ocean



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How do we leverage the Need for hydrographic offices to remain at the center of this conversation?

It is our responsibility to ensure that Depth Data is given the importance it deserves in terms of policy making, funding and prioritization



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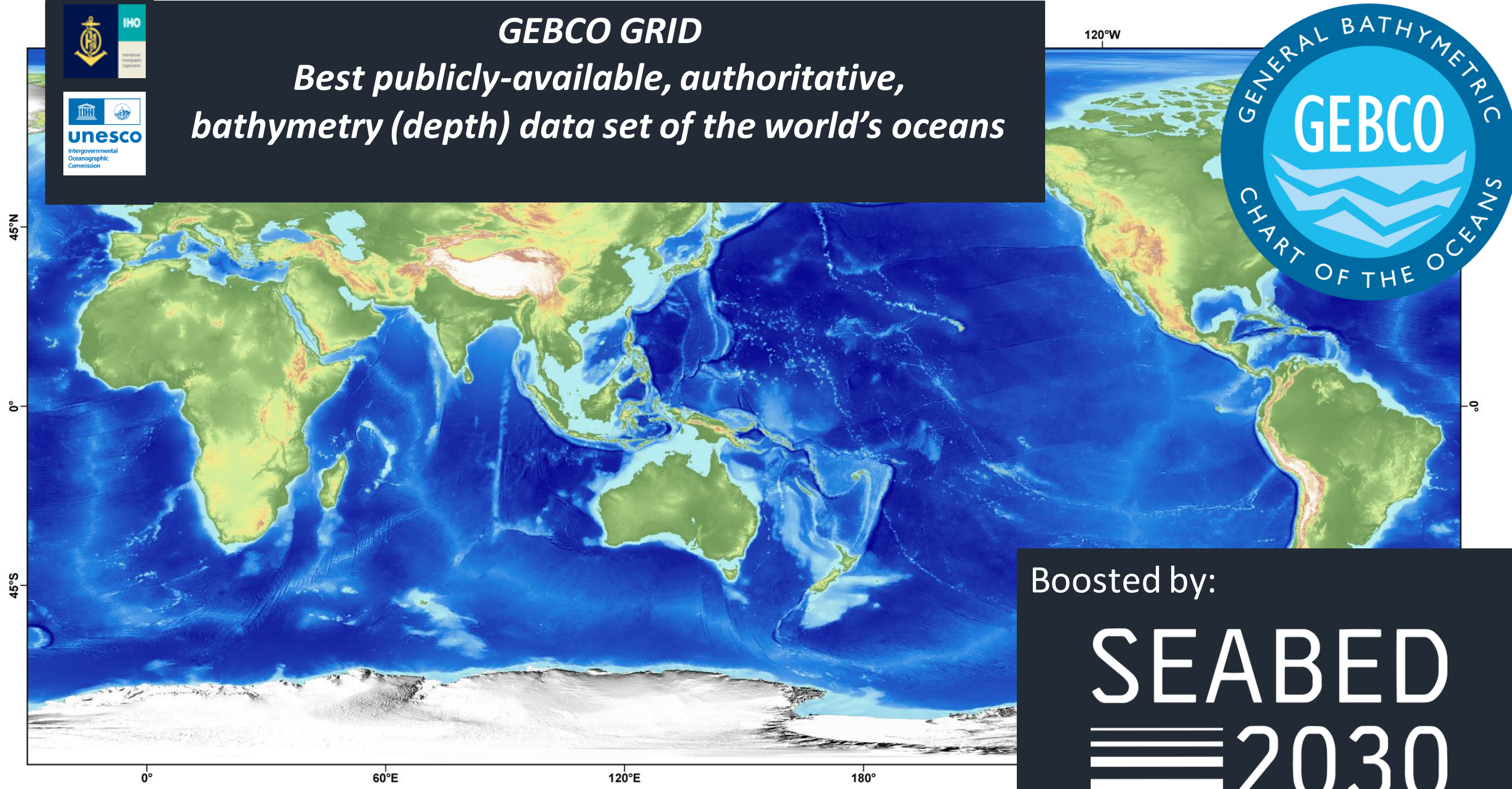
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# GEBCO GRID

*Best publicly-available, authoritative, bathymetry (depth) data set of the world's oceans*



Boosted by:

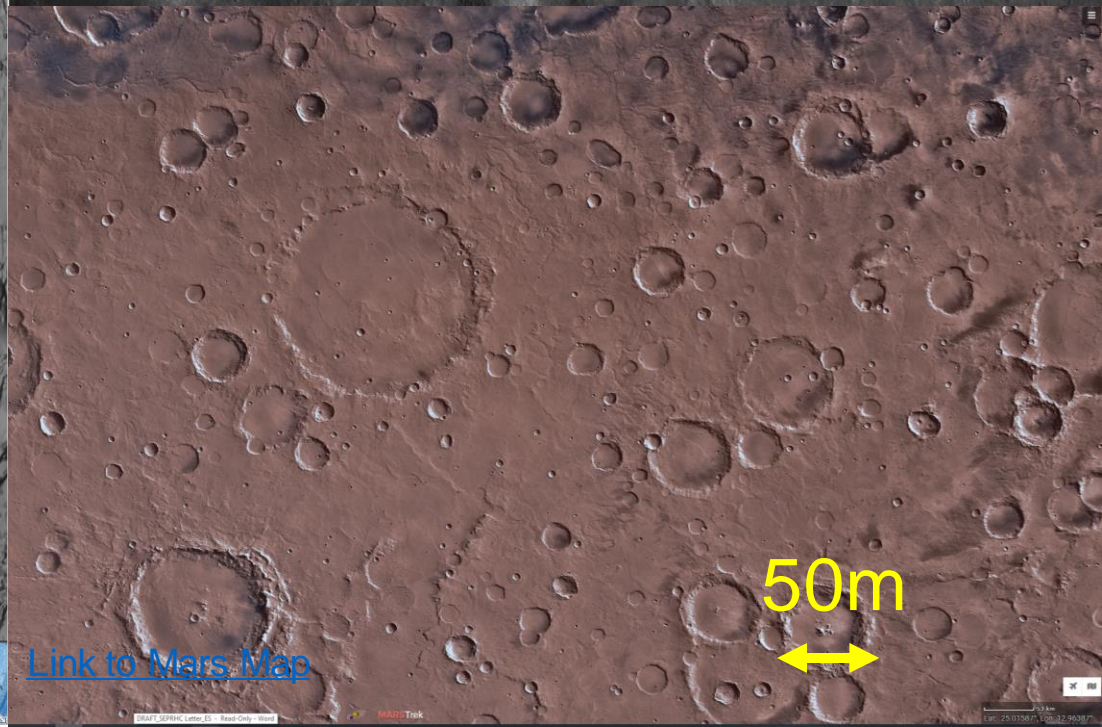
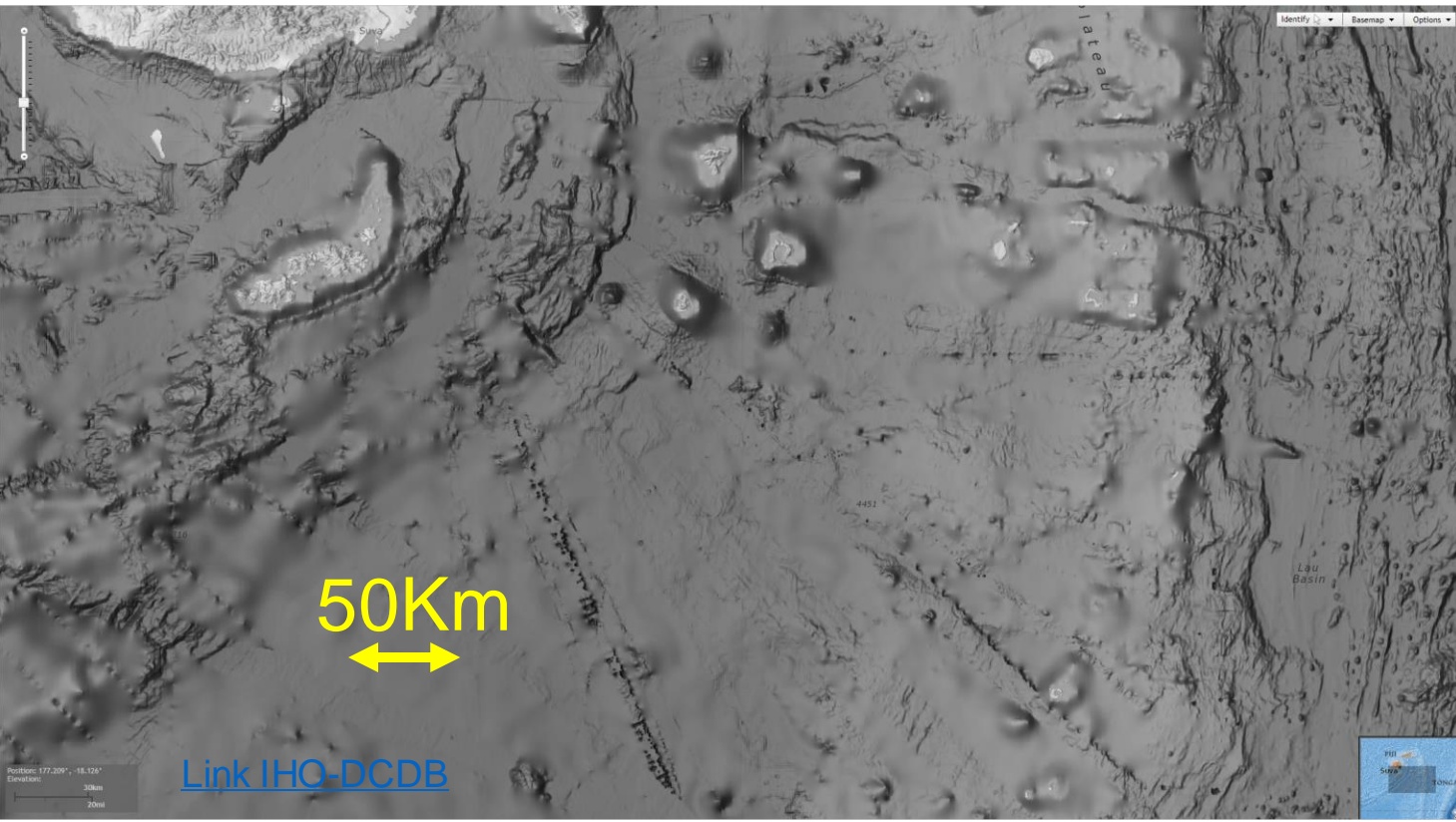
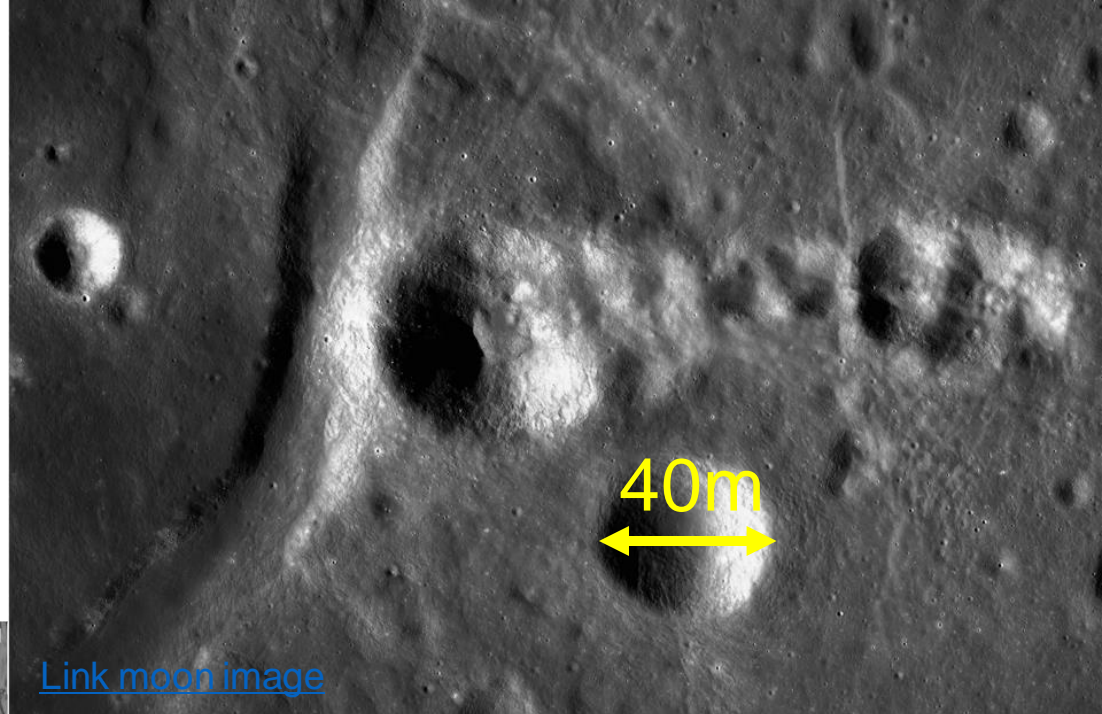




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**“We know the surface of  
Mars and the Moon better  
than our own planet”**





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## Summary

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### **Crowdsourced Bathymetry Supports the objectives, strategies and vision of**

- UN Decade of Ocean Science
- International Hydrographic Organization Strategic plan
- GEBCO-Seabed2030

### **You can also contribute to supporting this by:**

- Joining CSBWG
- Reaching out to your [RHC CSB/Seabed2030 Coordinator](#)
- Allow for the provision of data within your national jurisdiction by signing the [IHO CL 21/2020 & IRCC CL 1/2020](#)
- Engaging in and promoting CSB within your country/region





CSB is a low entry way to take part in the UN Decade.

Hydrographic expertise blends with innovative technology through collaborative networks that foster community engagement and empowerment



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Q&A





# Steve Keating

## NGA



# **Crowdsourced Bathymetry (CSB) : Legal Considerations & Misconceptions Inter Regional Coordination Committee Workshop on CSB IHO Headquarters, Monaco**

Steven G. Keating, United States Observer to the Advisory Board on the Law of the Sea

26 April 2024

Approved for Public Release, 2024-00785



# Acknowledgement

Thanks to:

- The IHO Secretariat,
- The IHO Crowdsourced Bathymetry Working Group (CSBWG), and
- IHO Member State Hydrographers

## CAVEAT

While I am here in my official capacity, my remarks are my own and do not necessarily reflect those of the United States Government, the U.S. Department of Defense, or the U.S. National Geospatial-Intelligence Agency.



## Purpose of Presentation

- A candid conversation to advocate for international cooperation to ensure that billions of CSB depth soundings are freely made available as the common heritage of humankind
- Dispel misconceptions regarding the acquisition, aggregation, and dissemination of CSB.

# Defining Crowdsourced Bathymetry

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



Images in Public Domain  
Courtesy of IHO CSBWG

**SNI** – Not defined in SOLAS, closest analogue is “shipborne navigational systems and equipment” found in SOLAS, 1974, Chapter V, Regulation 19.2, includes Compasses, Echosounders, Radar, etc.

**RMO**—Also not defined in treaty or code; RMO is intended to mean maritime operations which are not hydrographic surveying nor Marine Scientific Research, but rather activities such as transiting from one point to another, passenger carriage, yachting, fishing, towing, etc.

\*Definition from IHO Publication B-12, Guidance on Crowdsourced Bathymetry, page 3



# FACTS ABOUT CSB – Dispelling Misconceptions

## CSB Data Cycle



### ACQUISITION

At the point a vessel is collecting passage soundings, mandated by SOLAS, Chapter V, Regulation 19, paragraph 2.3 or best navigation practices

“All ships of 300 gross tonnage and upwards and passenger ships irrespective of size **shall**, in addition to meeting the requirements of paragraph 2.2, be fitted with: an echo sounding device, or other electronic means, to measure and display the available depth of water.”

NOT HYDROGRAPHIC SURVEYING  
NOT MARINE SCIENTIFIC RESEARCH

BUT ACQUISITION INCIDENTAL TO  
SAFE NAVIGATION PURSUANT TO  
INTERNATIONAL LAW AND CUSTOM

# FACTS ABOUT CSB – Dispelling Misconceptions

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### AGGREGATION

This occurs when vessels and/or Trusted Nodes upload CSB data to the DCDB

There is no express prohibition on the recordation and sharing of passage soundings (i.e., CSB data) in UNCLOS, SOLAS, or other international law conventions

In fact, Voyage Data Recorders are authorized (mandated for passenger ships, and other covered ships in SOLAS), and data is intended to be shared in the event of maritime disaster (Chapter V, Reg. 20)

CSB data is factual data,  
LAT/LONG/DEPTH plus metadata

FACTS are not subject to copyright



# FACTS ABOUT CSB – Dispelling Misconceptions

## CSB Data Cycle



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LAT/LONG/DEPTH plus metadata

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### DISSEMINATION & USE

Dissemination of CSB data by the DCDB does not create liability for a coastal State’s Hydrographic Office (HO) because the CSB data is merely factual information recorded by a vessel as part of its passage/transit soundings.

Data in the DCDB is not represented as a product endorsed by coastal State HO.

**Even if HOs choose not to use CSB soundings for safety of navigation products, they should not prevent other parties from accessing CSB data for other uses**

The use of CSB data from the DCDB for scientific research does not render the initial recordation of echo sounded depth by a vessel’s data logger MSR

# Conclusion

- The active and positive support of IHO Member States to make CSB freely available without CAVEAT through the DCDB is ESSENTIAL in order to achieve the goals established by The UN Decade on Ocean Science and Sustainability, GEBCO, and SEABED 2030
- The concept is FREE CSB to Map the Seabed





Approved for Public Release,



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Q&A





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# Break





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# Session 2



# Anthony Klemm

## NOAA





# The Utility of Crowdsourced Bathymetry Data

*A NOAA Perspective*

Anthony Klemm, NOAA  
Coast Survey Development Lab

26 April 2024



The NOAA NCEI-hosted IHO Data Centre for Digital Bathymetry (DCDB) established a data pipeline to allow the public to contribute, discover and download CSB data.

The screenshot shows the IHO Data Centre for Digital Bathymetry Viewer interface. The 'Layers' panel on the left includes the following items:

- IHO DCDB/NOAA NCEI
- Multibeam Surveys
- Multibeam Survey Footprints
- Multibeam Bathymetry Mosaic
- Single-Beam Surveys
- Single-Beam Sounding Density
- NOAA Hydrographic Surveys:
  - All Surveys with Digital Data
  - Surveys with BAGs
- BAG Shaded Relief Imagery
- Search NCEI/DCDB Surveys
- Crowdsourced Bathymetry Files
- Search CSB Files
- U.S. Bathymetry Coverage and Gap Analysis

The map displays global bathymetry data with red lines indicating survey tracks. The interface includes a search bar, a 'Basemap' dropdown, and a 'Help' link at the bottom left.

Funded by NOS OCS

[ncei.noaa.gov/maps/iho\\_dcdb](https://ncei.noaa.gov/maps/iho_dcdb)





- NOAA (OCS and NCEI) teamed up with Rose Point Navigation Systems
- Using their navigational system software (Coastal Explorer), mariners can enable a modified electronic charting system log file to record position, depth and time.
- Mariners can capture metadata about vessel and equipment.
- Whenever the mariner updates the software or chart catalog, the data is submitted to the DCDB via HTTPS post.
- [noaacoastsurvey.wordpress.com/2016/06/14/beta-test-csb/](http://noaacoastsurvey.wordpress.com/2016/06/14/beta-test-csb/)

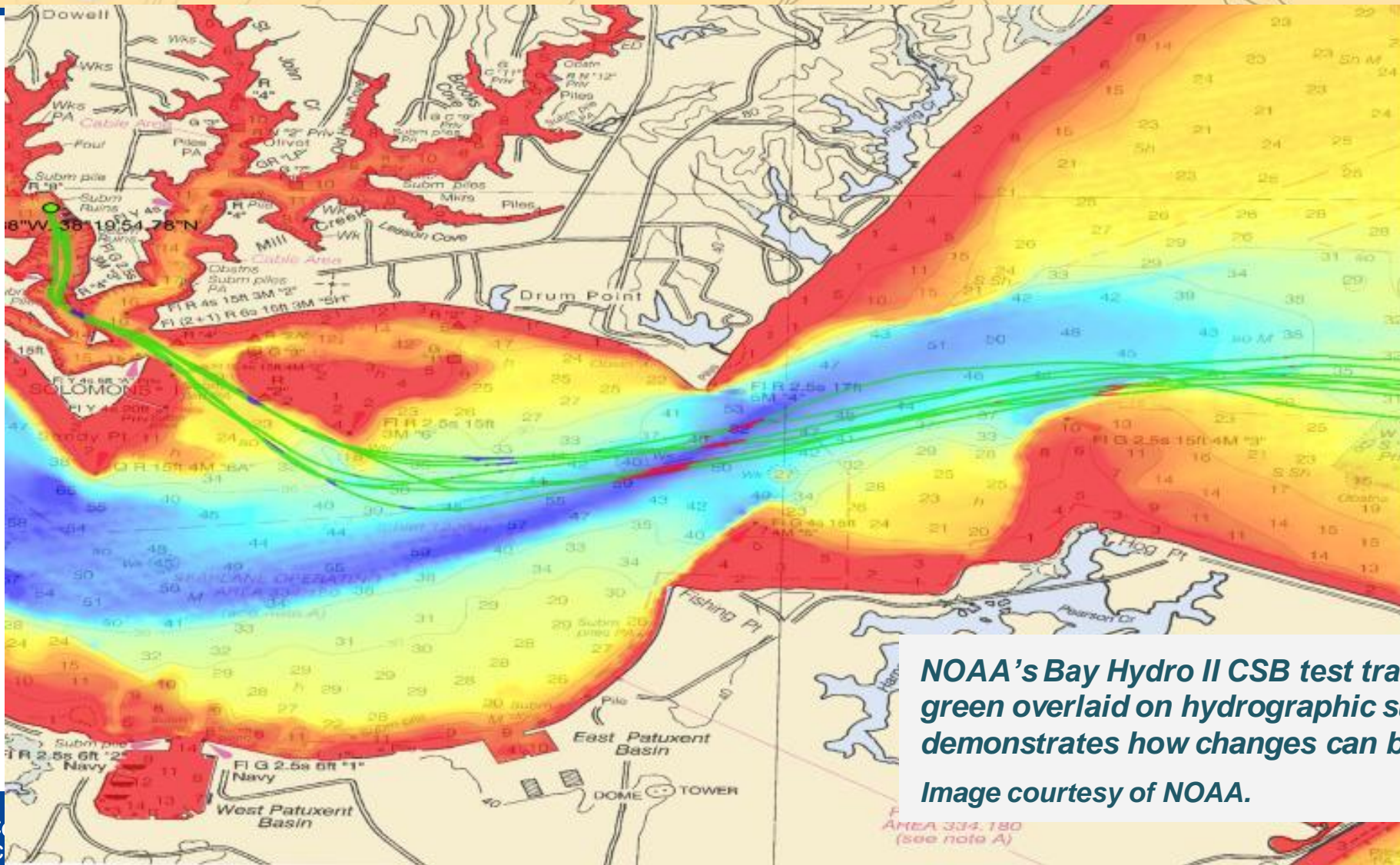


[www.pcmaritime.com](http://www.pcmaritime.com)





## Early NOAA Support - Pilot



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

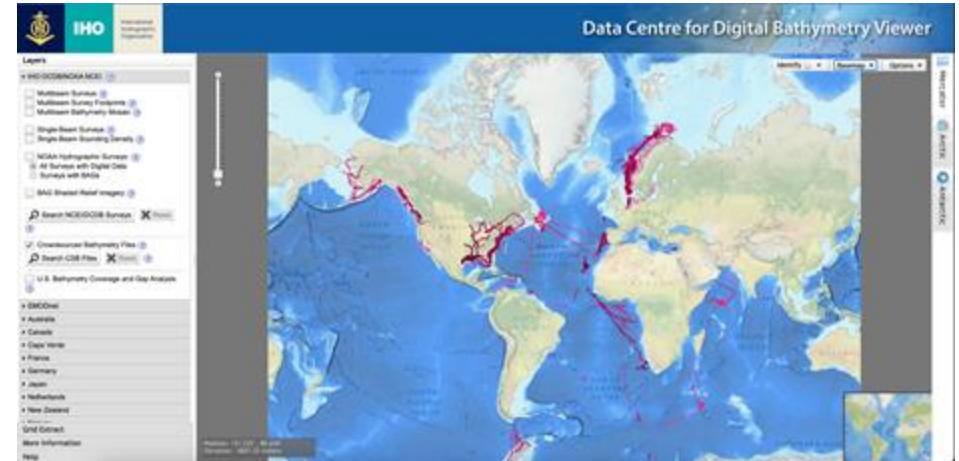


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**CSB data log file  
(with JSON  
metadata string)**

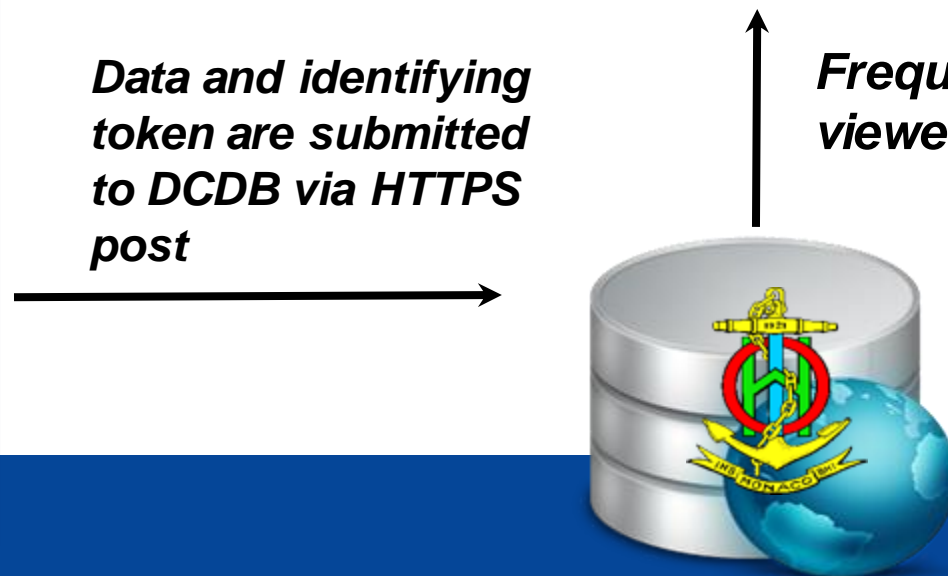
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68.496143	15.835387	53.3	2020-02-25T01:08:55Z

**Data discovery and access via map viewer.**



**Data and identifying  
token are submitted  
to DCDB via HTTPS  
post**

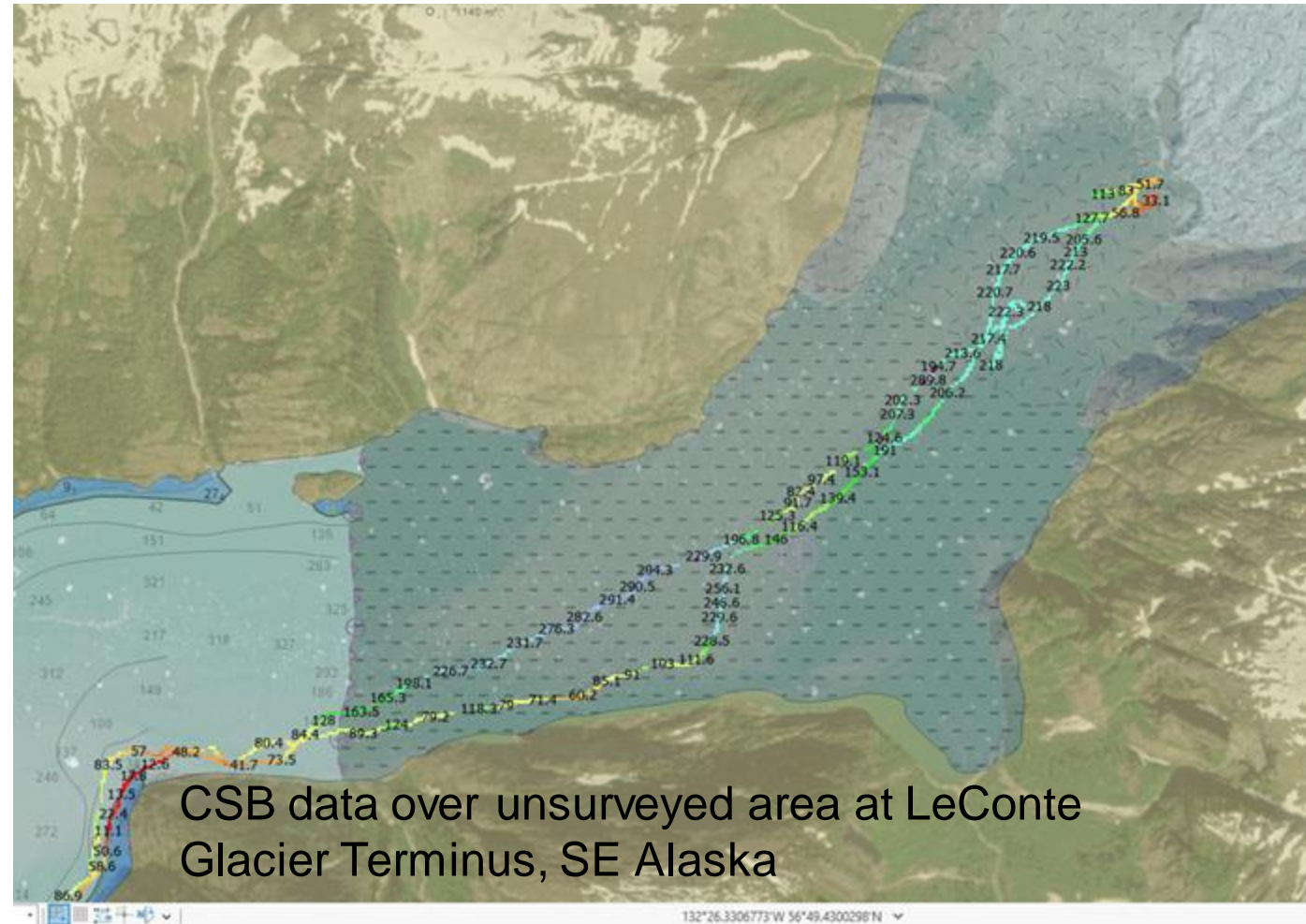
**Frequent update of  
viewer**



**Funded by NOS OCS**

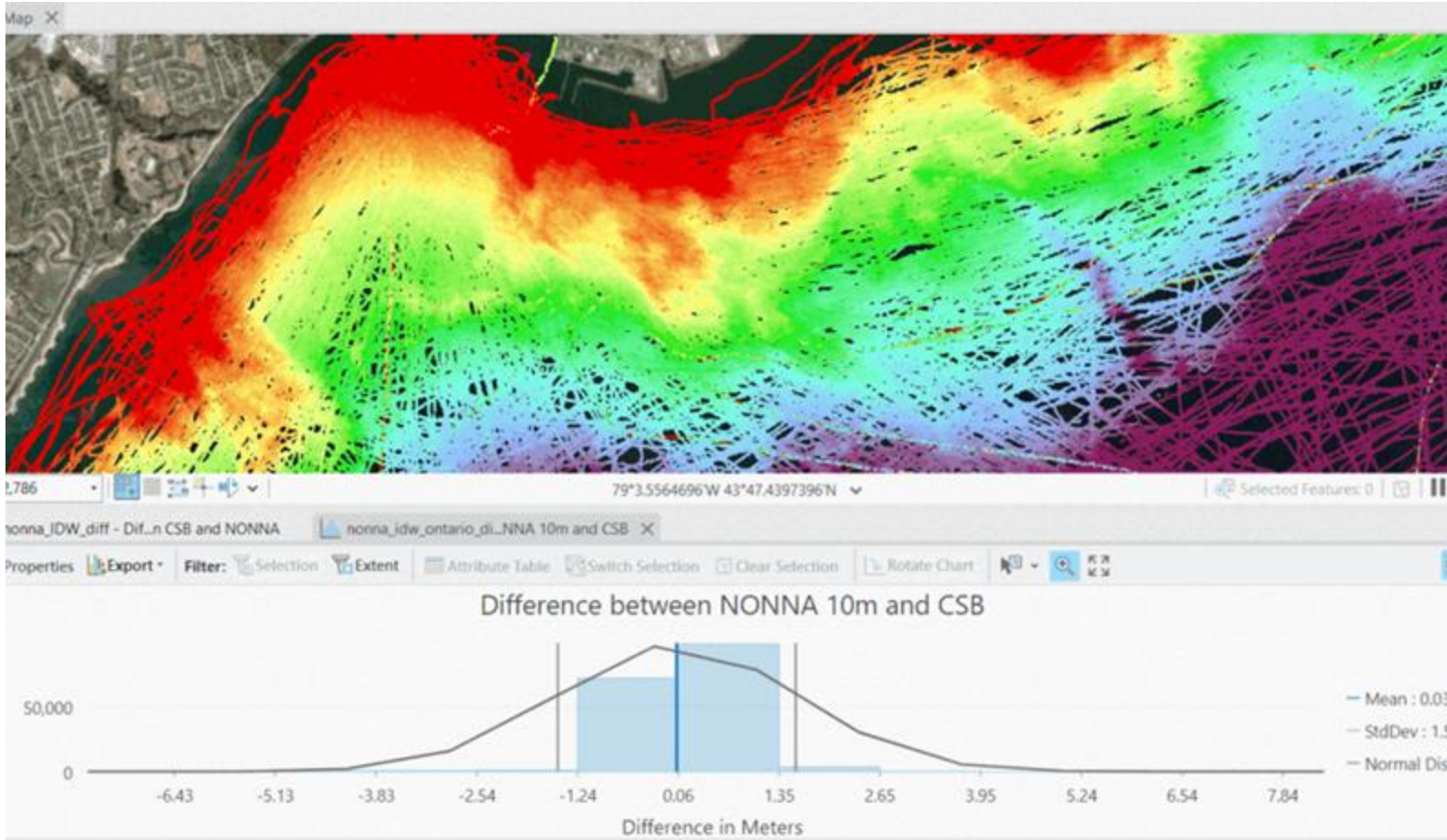
### KEY USE CASES FOR CSB WITHIN NOAA:

- Filling in gaps and improving our bathymetric record (i.e. crowd-to-chart)
- Detection of chart discrepancies and change detection
- Reconnaissance to increase efficiency and safety of field hydrography



CSB data over unsurveyed area at LeConte Glacier Terminus, SE Alaska



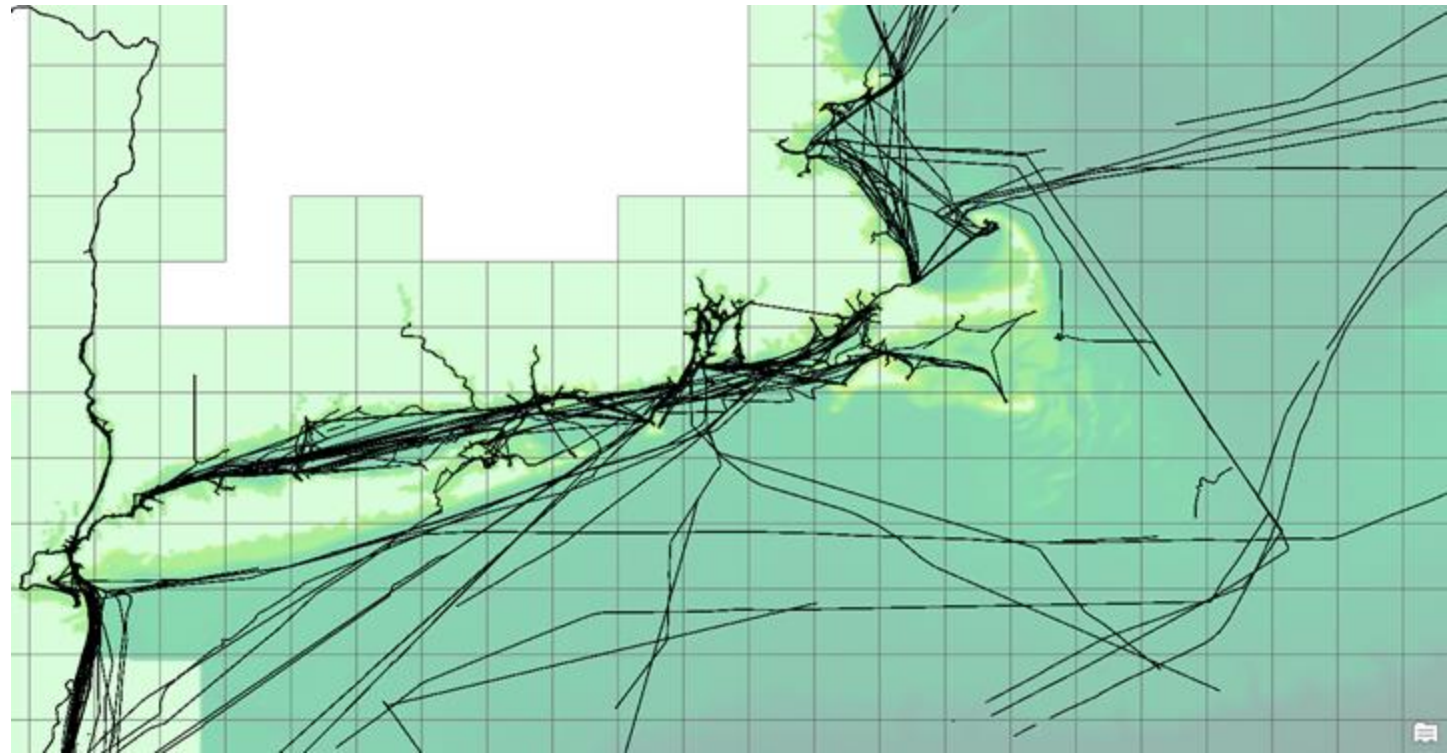


Processed CSB Data in Lake Ontario using Canadian Hydrographic Service NONNA reference bathymetry

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

### Automated data pipeline currently in beta testing

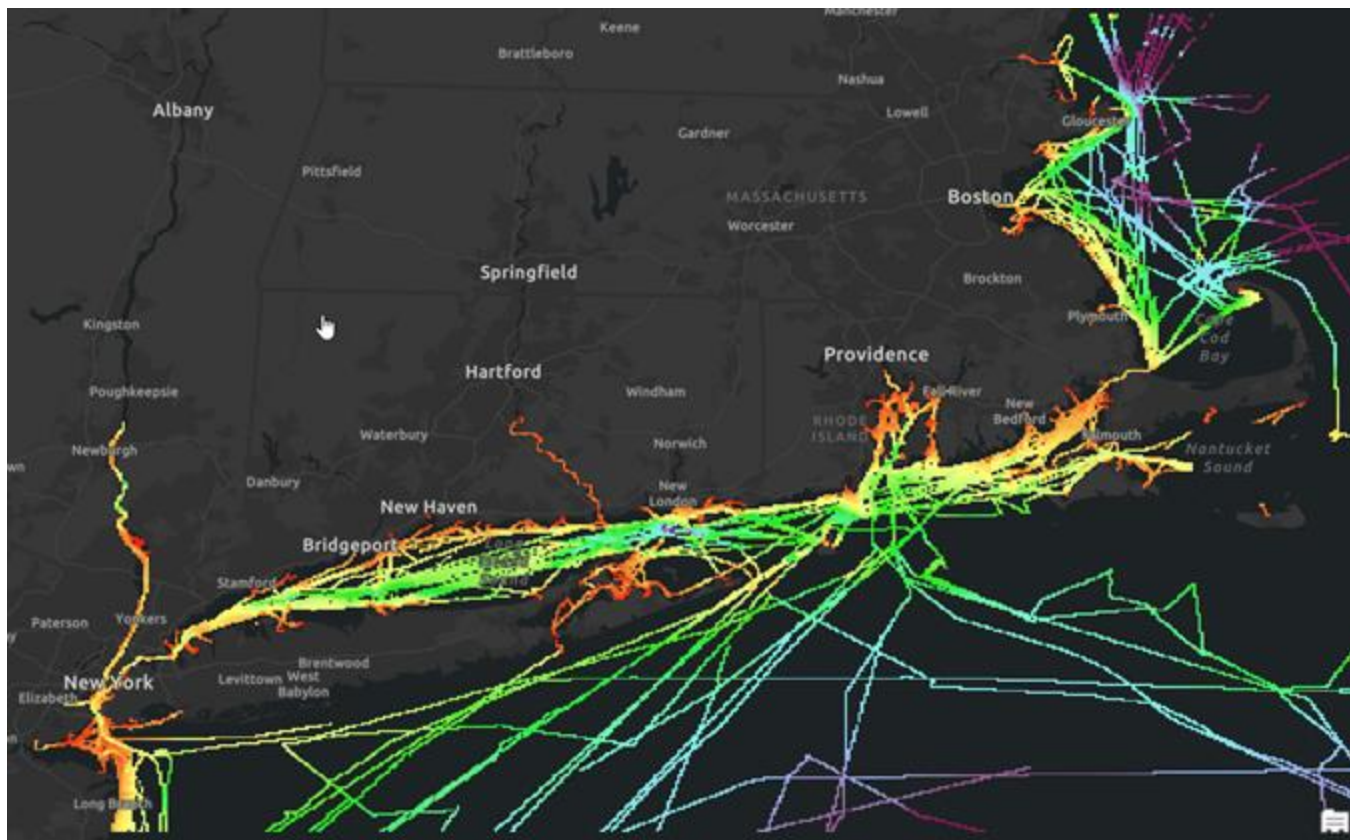
- Scraper developed to programmatically extract CSB data from DCDB via API
- Automated tide corrections via API
- Vertical bias detection and comparative analysis against reference bathymetry of known accuracy
- Finalizing first-pass uncertainty estimation and metadata format for CSB-specific External Source Data pipeline





## Automated data pipeline currently in beta testing

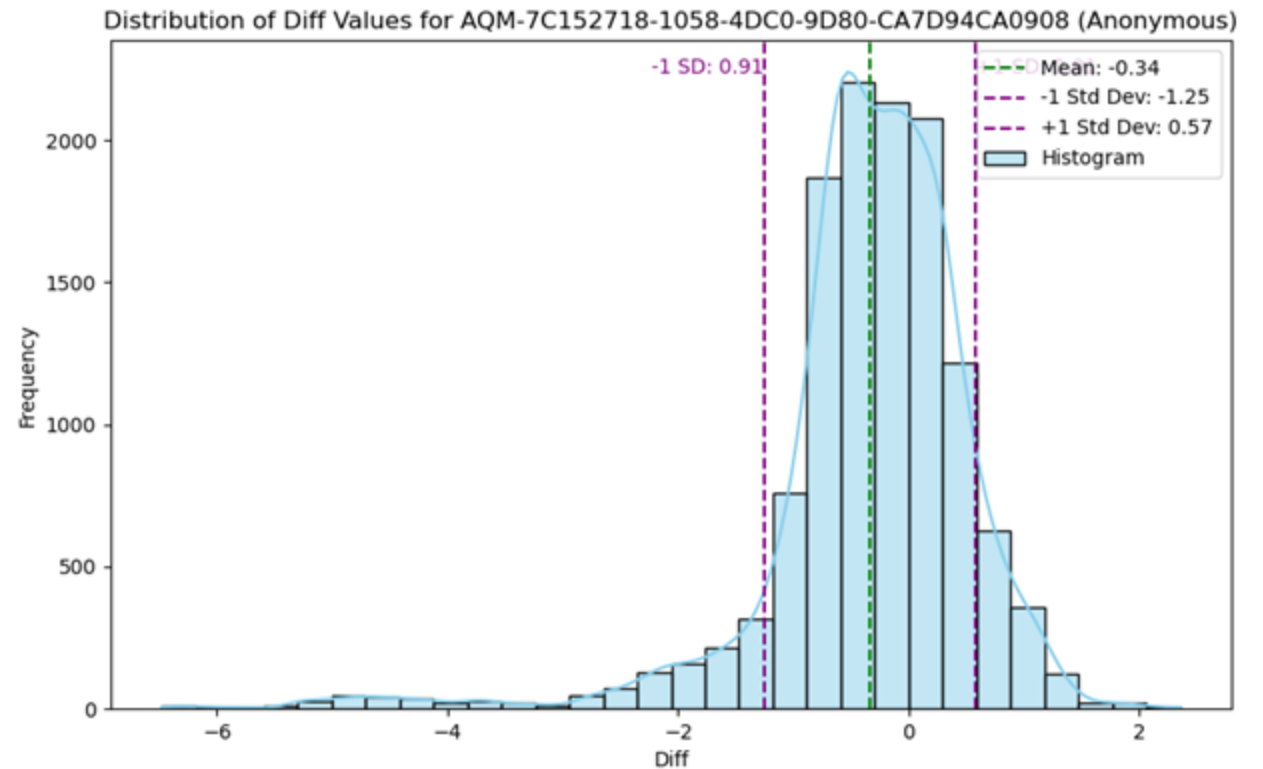
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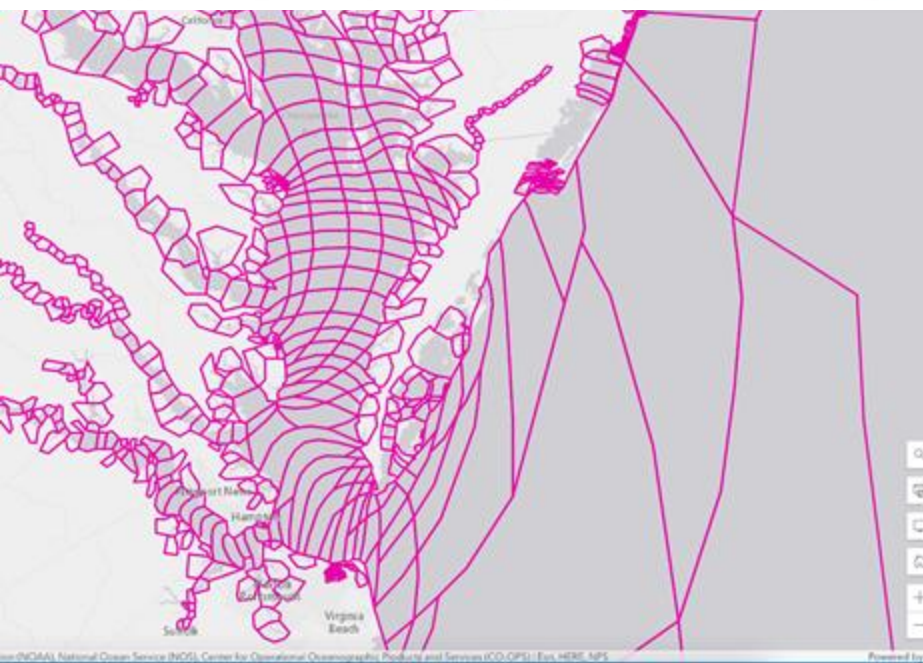
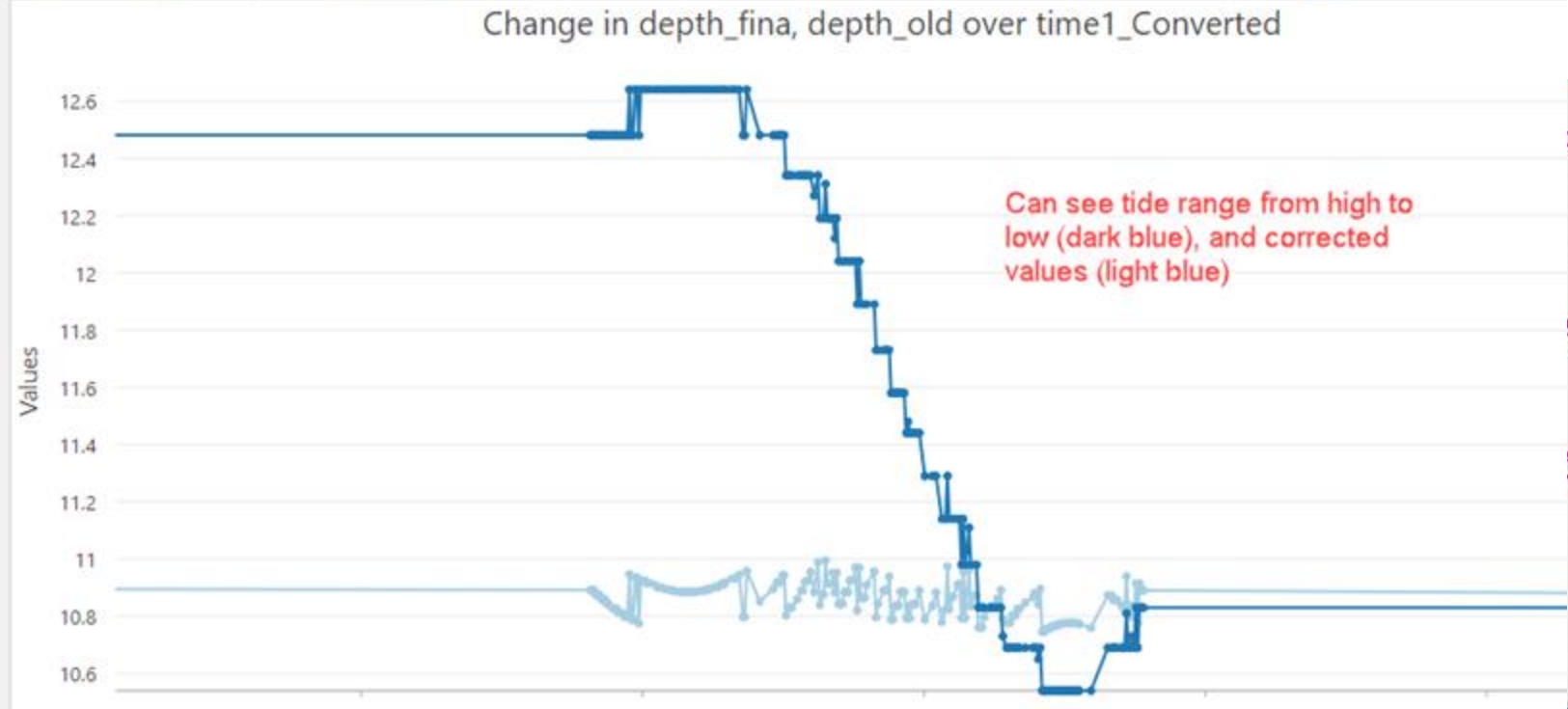
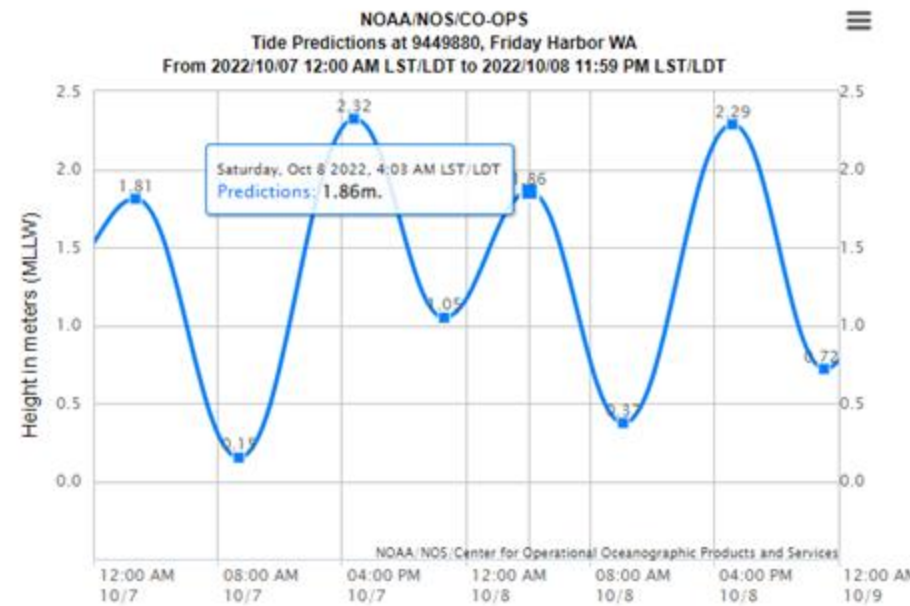
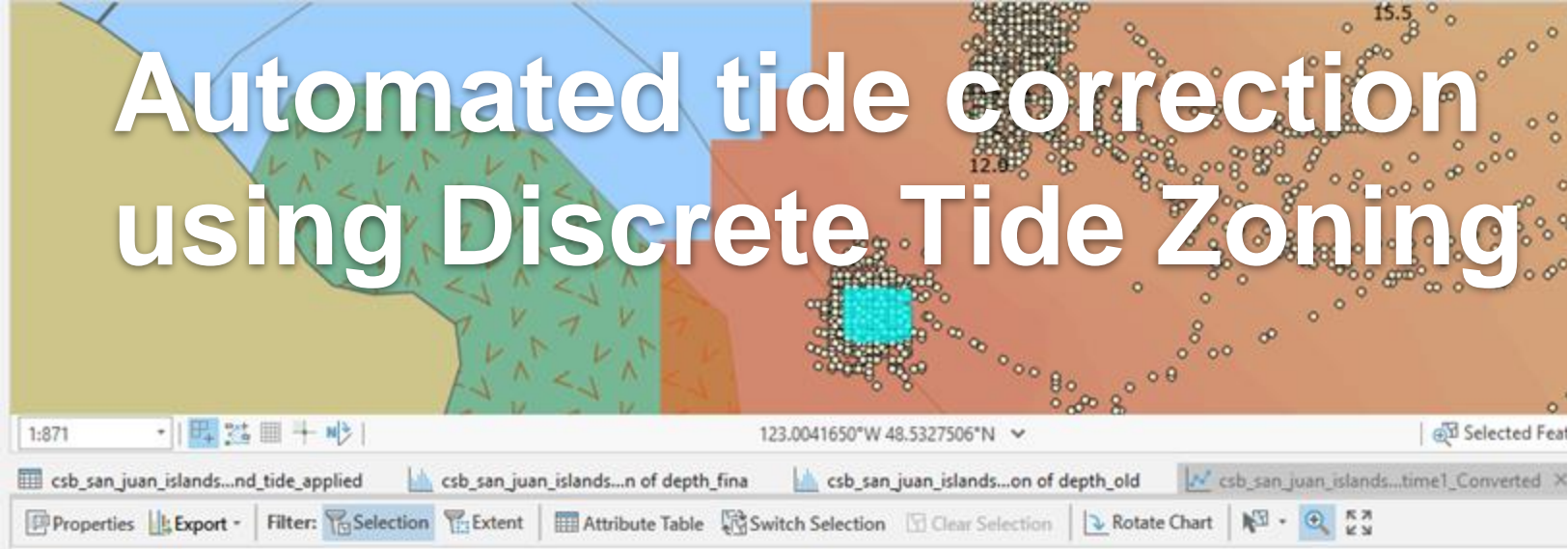


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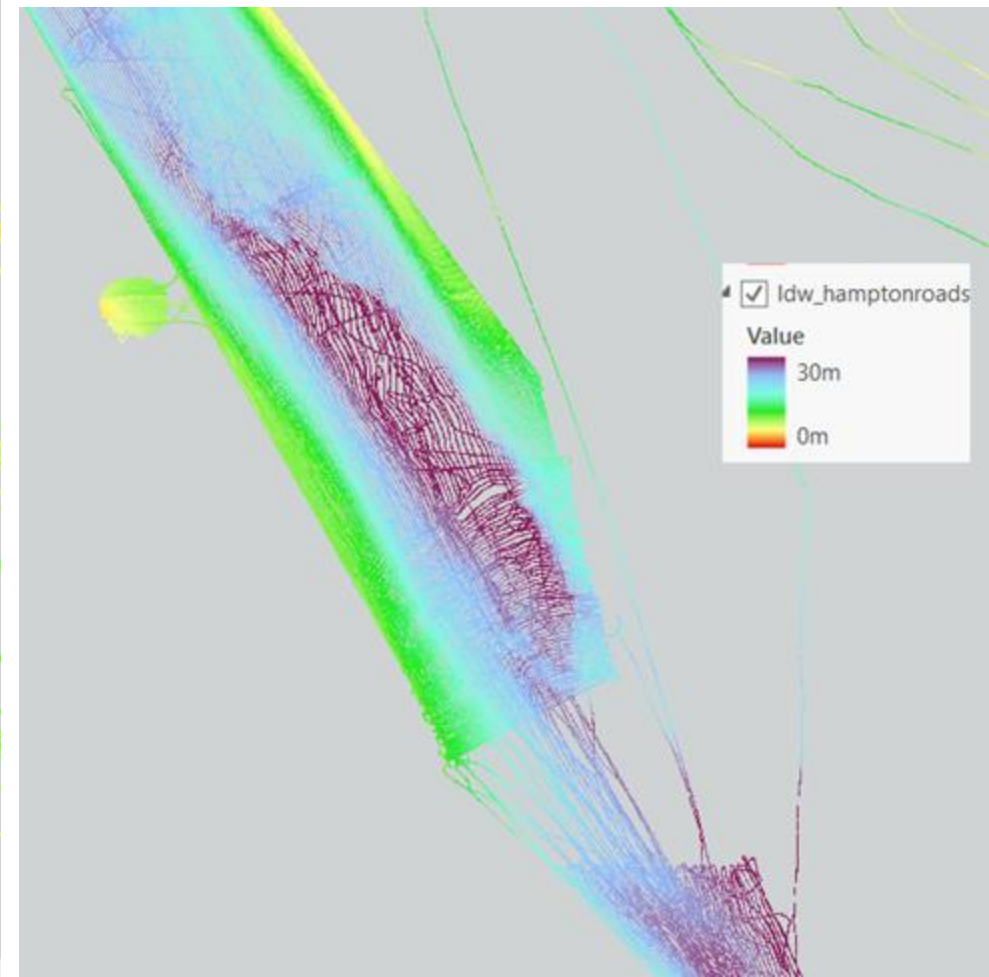
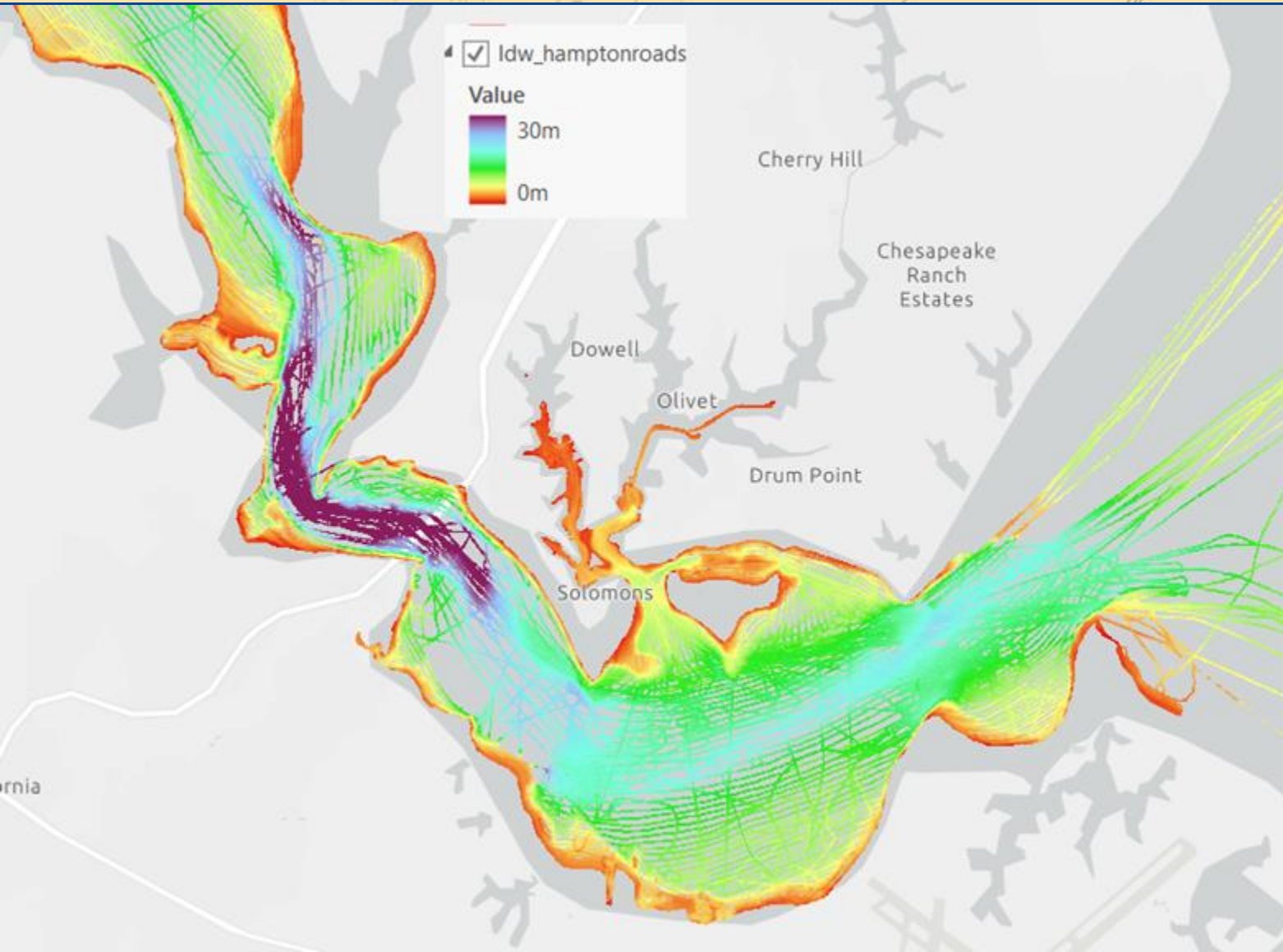


# Automated tide correction using Discrete Tide Zoning





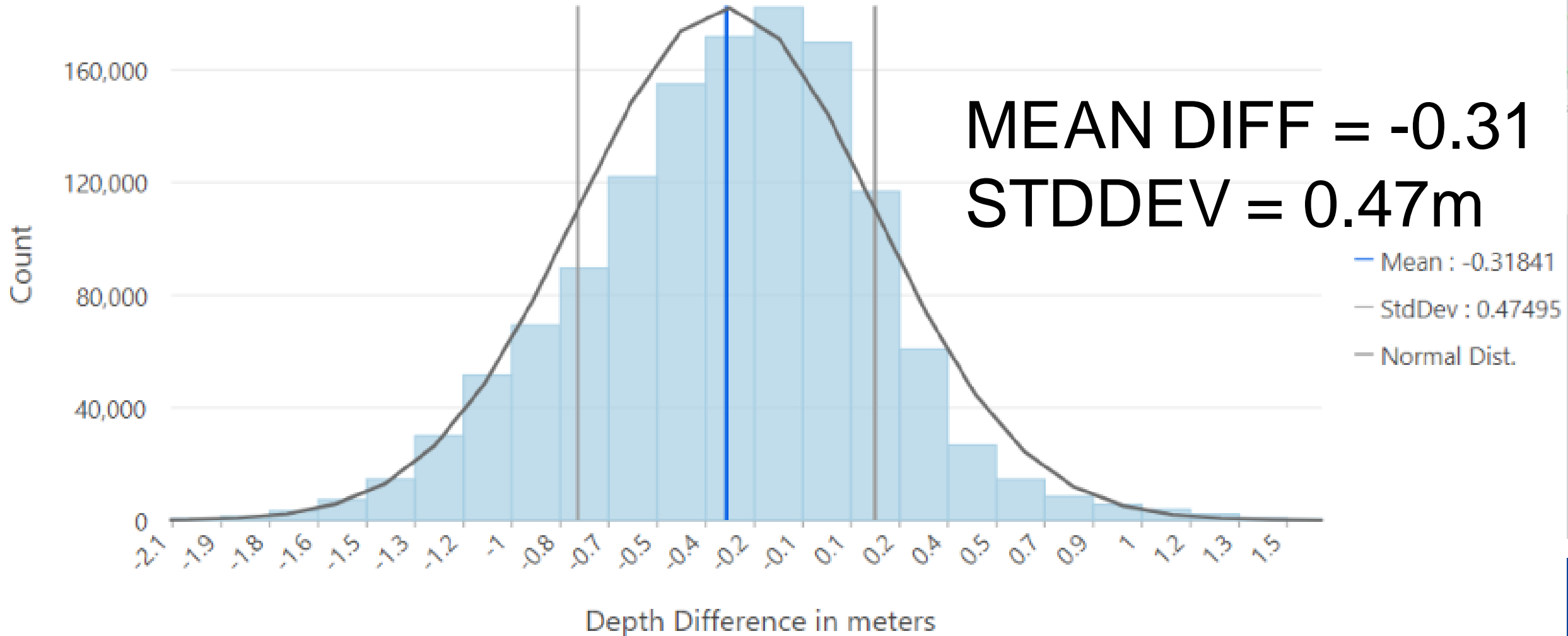
## CSB Quality Assessment - Bay Hydro II collected CSB during hydrographic surveys





## CSB Quality Assessment - Bay Hydro II collected CSB during hydrographic surveys

Difference between CSB and F00747



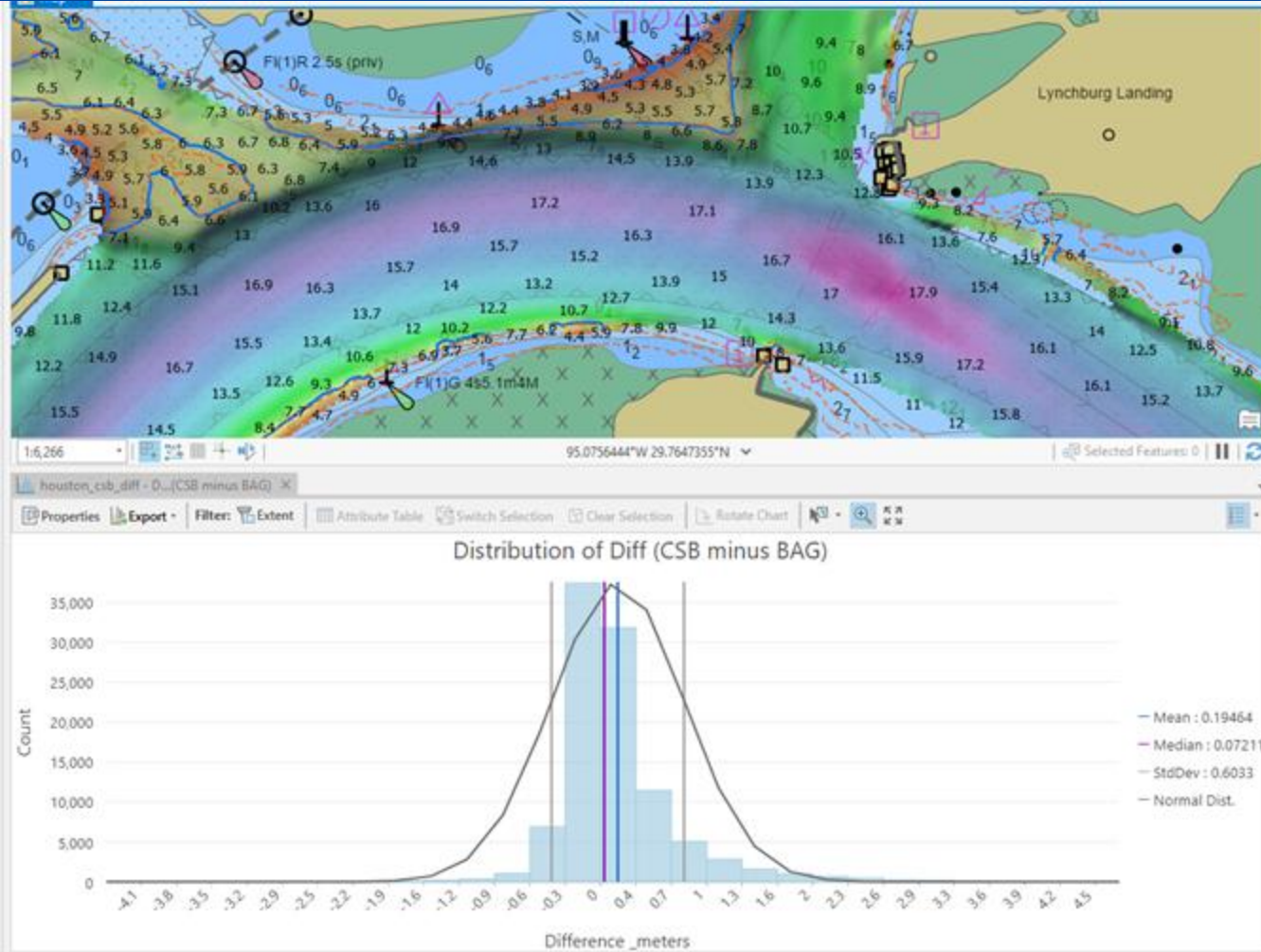
## Preliminary results are promising

Houston, TX

Comparison of CSB to recent survey:

Mean difference: 0.19 m

Standard deviation: 0.60 m



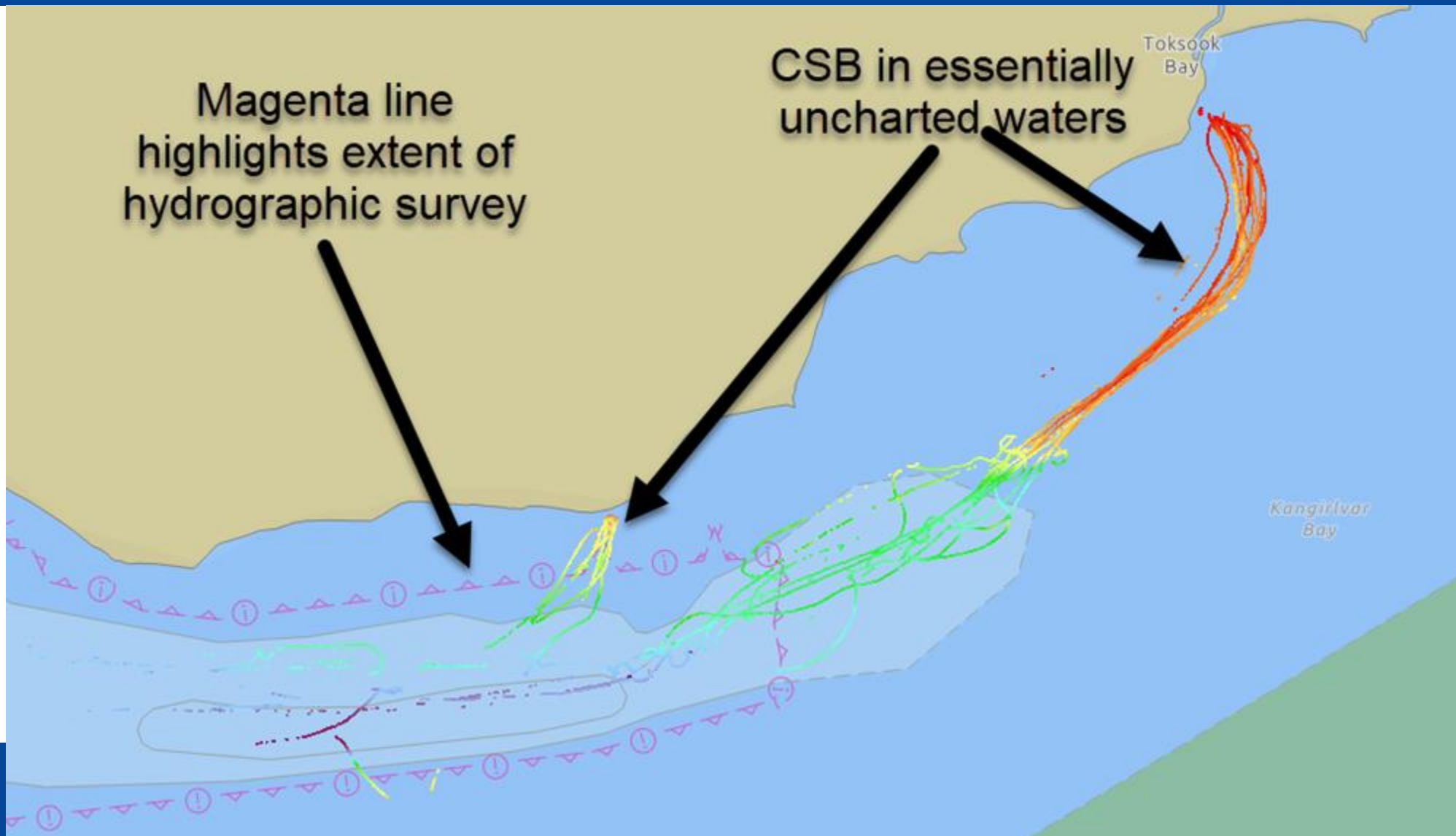
Processed CSB accuracy is generally CATZOC C capable (or better)

Table 4-1 – ZOC Categories

ZOC	Position accuracy	Depth accuracy	Seafloor coverage
A1	± 5 m + 5% depth	0.50 m + 1% depth	Full area search undertaken. Significant seafloor features detected and depths measured.
A2	± 20 m	1.00 m + 2% depth	Full area search undertaken. Significant seafloor features detected and depths measured.
B	± 50 m	1.00 m + 2% depth	Full area search not achieved; uncharted features hazardous surface navigation are not expected but may exist
C	± 500 m	2.00 m + 5% depth	Full area search not achieved, depth anomalies may be expected.
D	Worse than ZOC C	Worse than ZOC C	Full area search not achieved, large depth anomalies may be expected.
U	Unassessed – The quality of the depth data has yet to be assessed.		



## Toksook Bay Approach - Filling in NBS Gaps where mariners navigate



# Ninglick River - Filling in NBS Gaps where mariners navigate





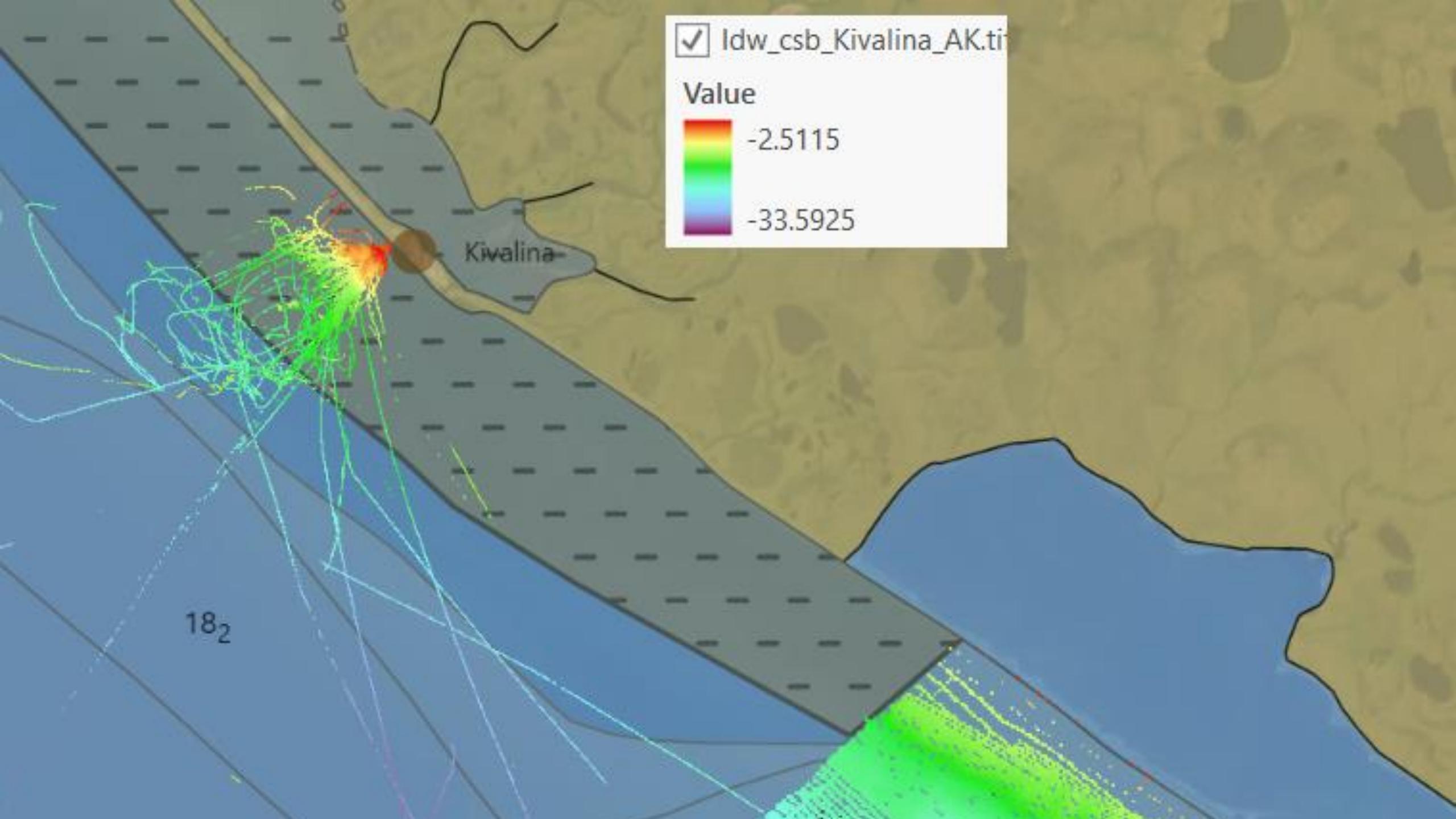
Idw\_csb\_Kivalina\_AK.tif

Value



-2.5115

-33.5925

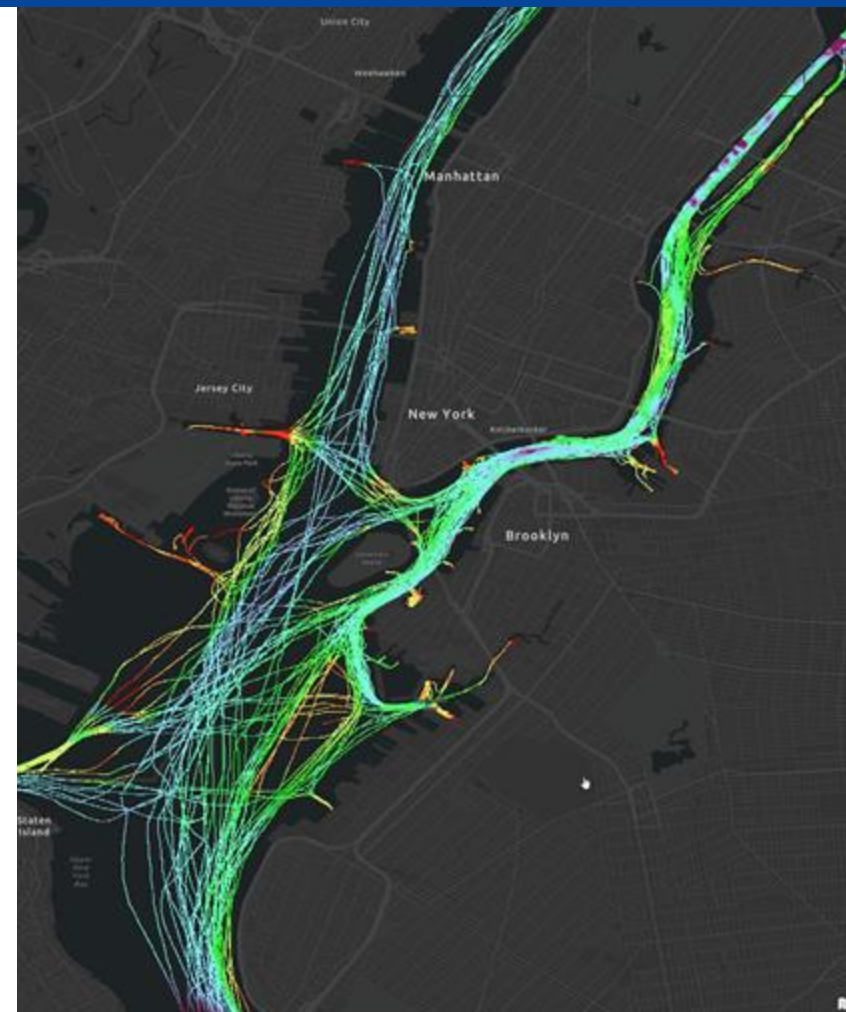


Kivalina

182

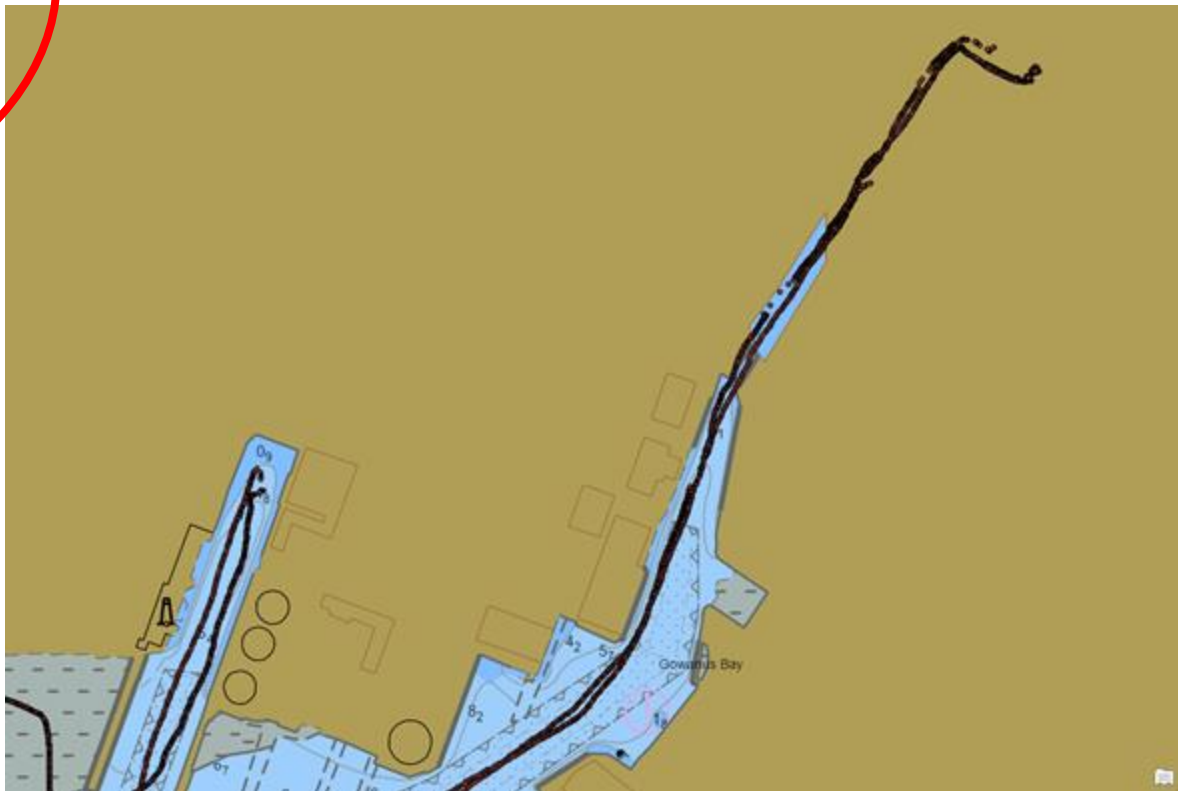
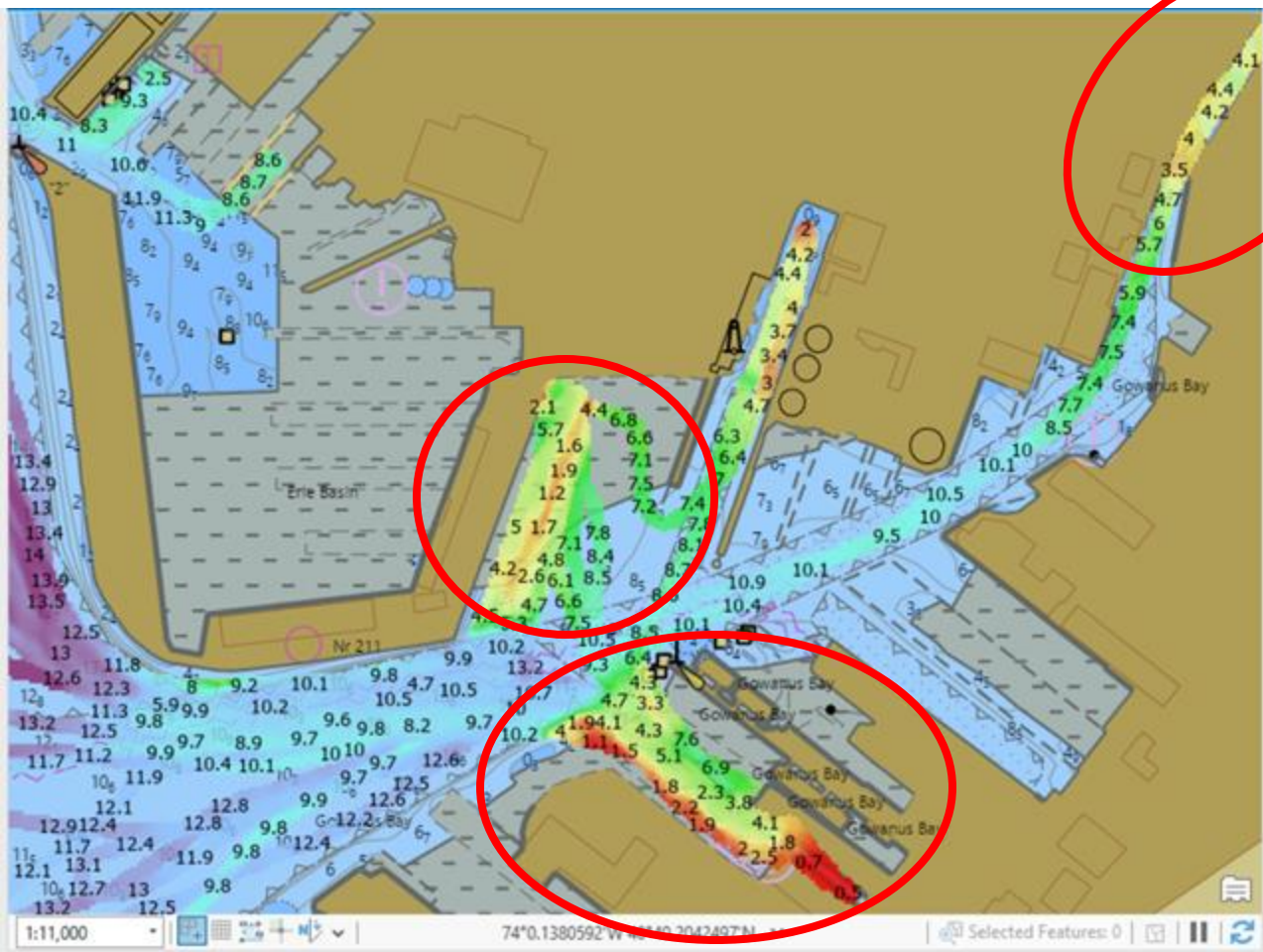


## Brooklyn, NYC - Filling in NBS Gaps where mariners navigate



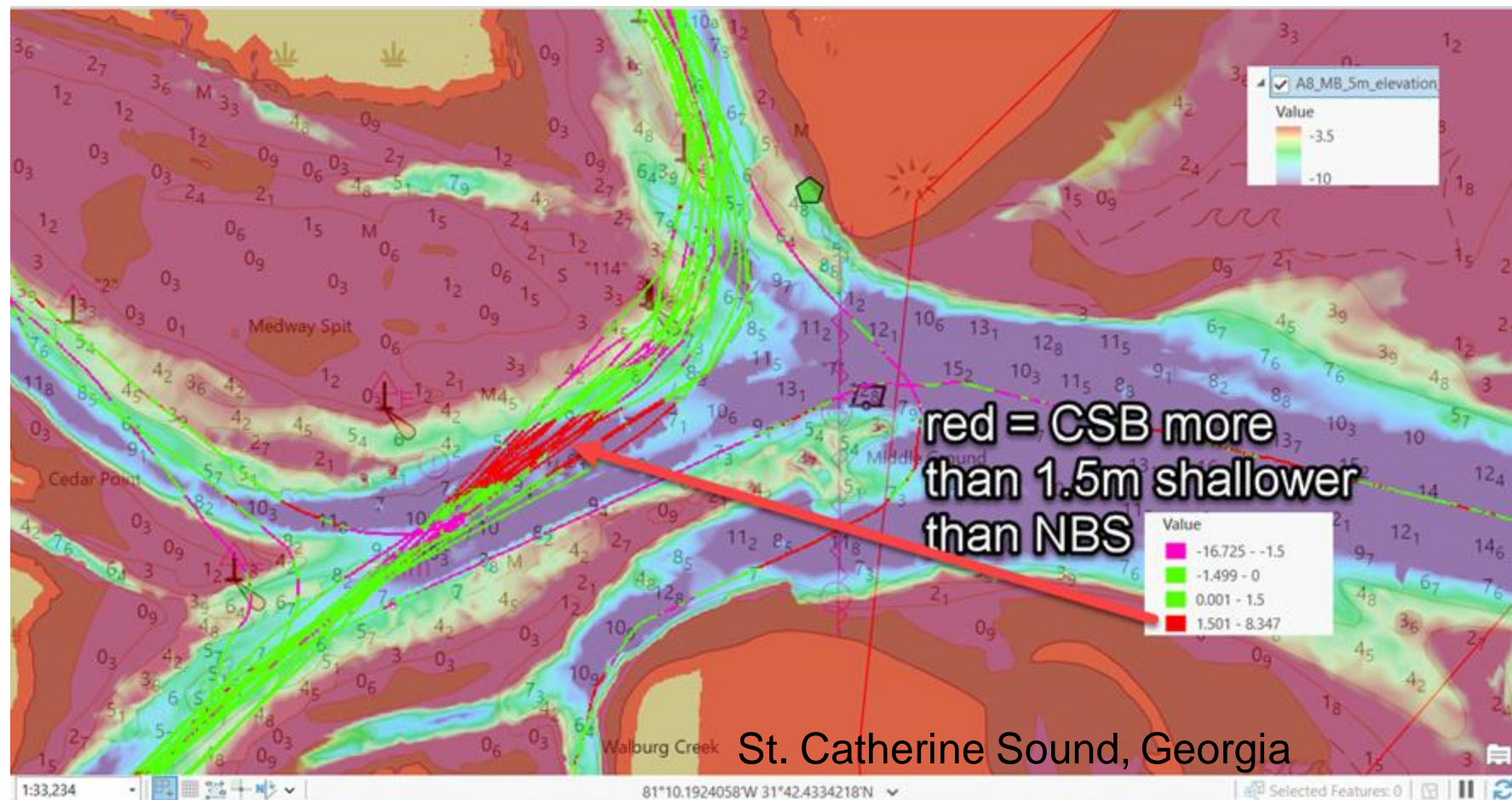


## Brooklyn, NYC - Filling in NBS Gaps where mariners navigate



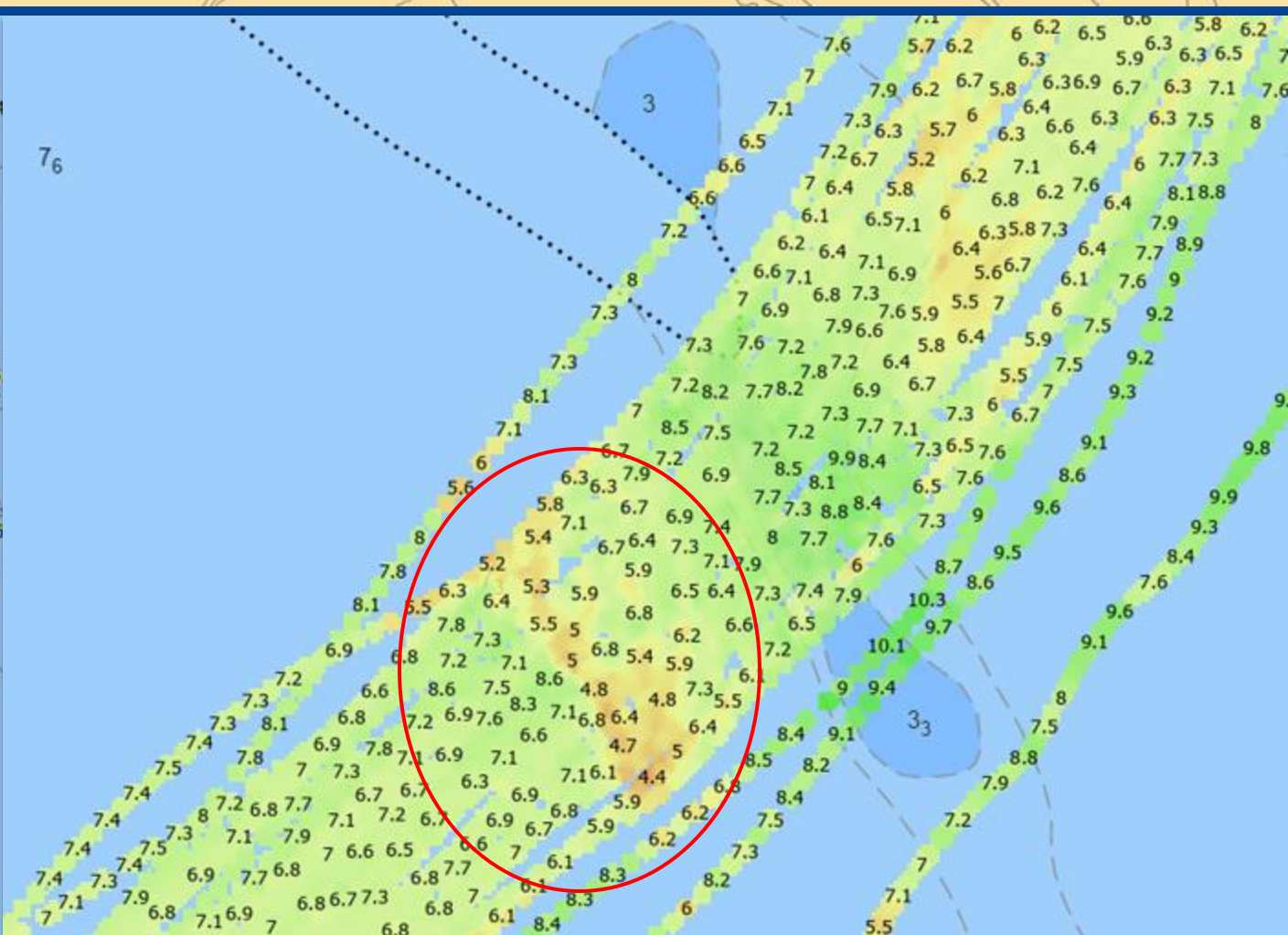
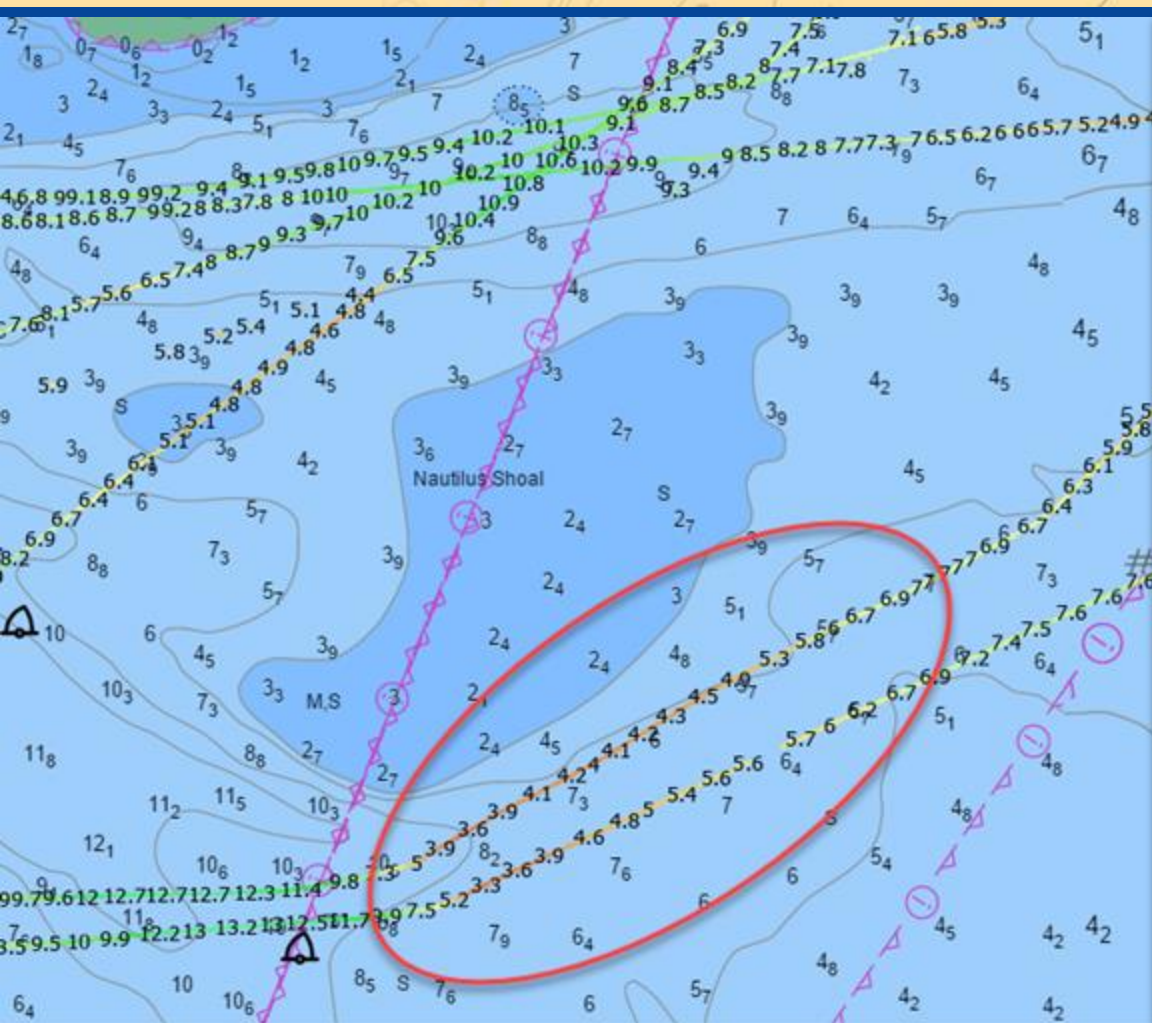


- Detecting coastal change over time and bathymetric discrepancies in NBS
- Automated change - detection product updated as new data is processed





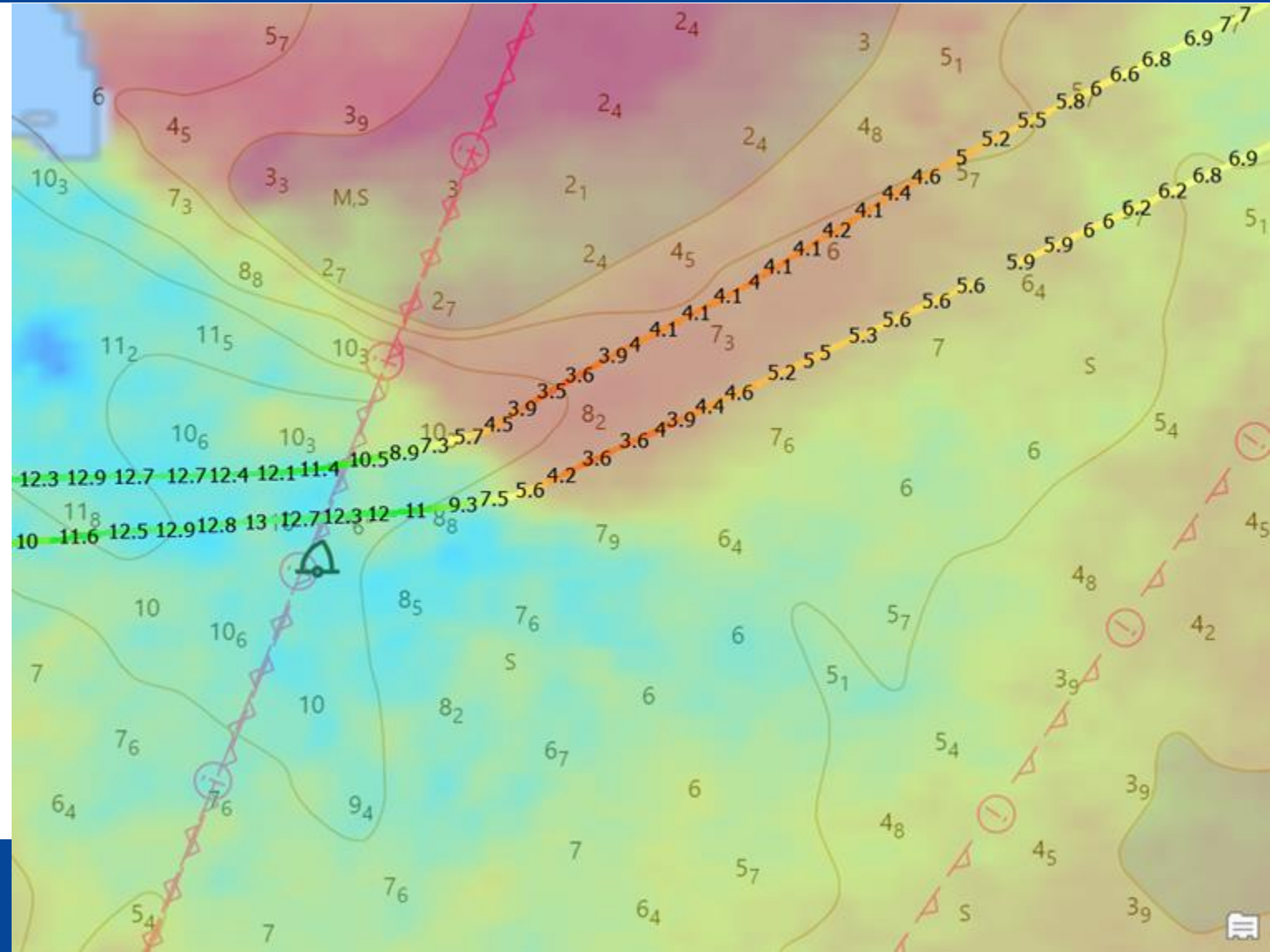
## Mischarted Shoals Detected in Chesapeake and Delaware Bays





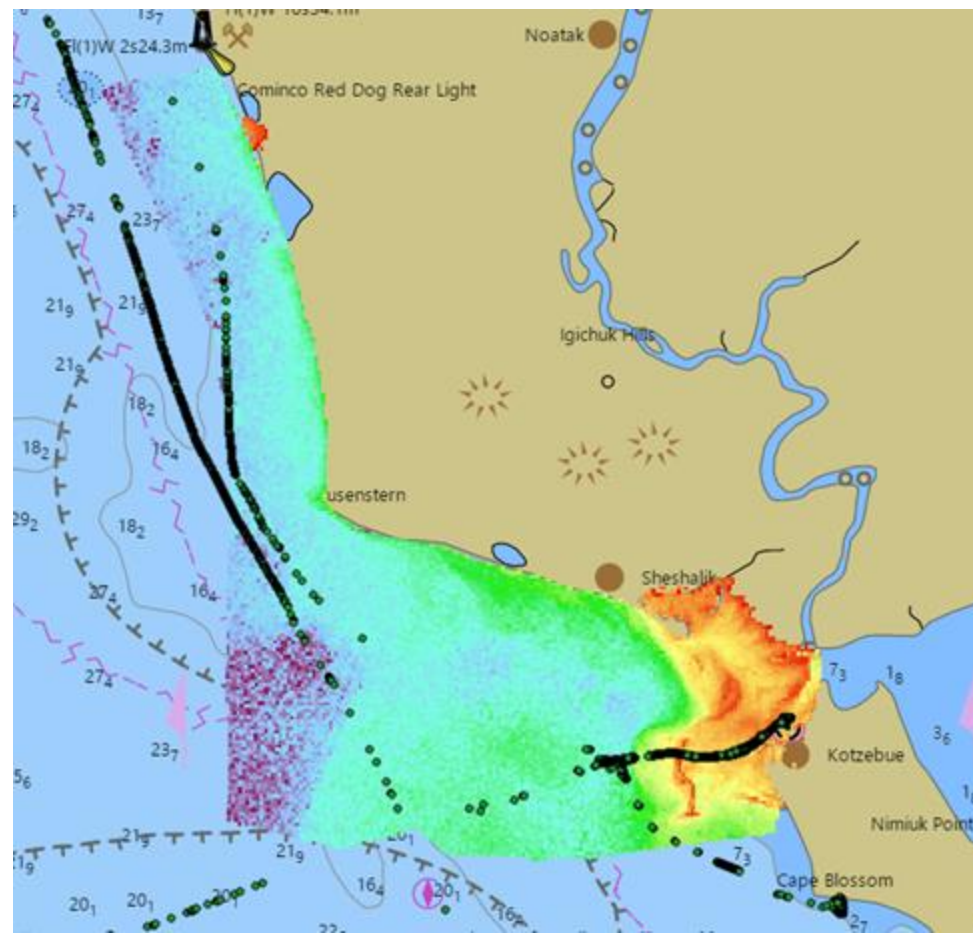
## The Value of CSB Data - SDB correlation and groundtruthing

- CSB detected and SDB confirmed shift of Nautilus Shoal in Mouth of Chesapeake Bay



# The Value of CSB Data - SDB correlation and groundtruthing

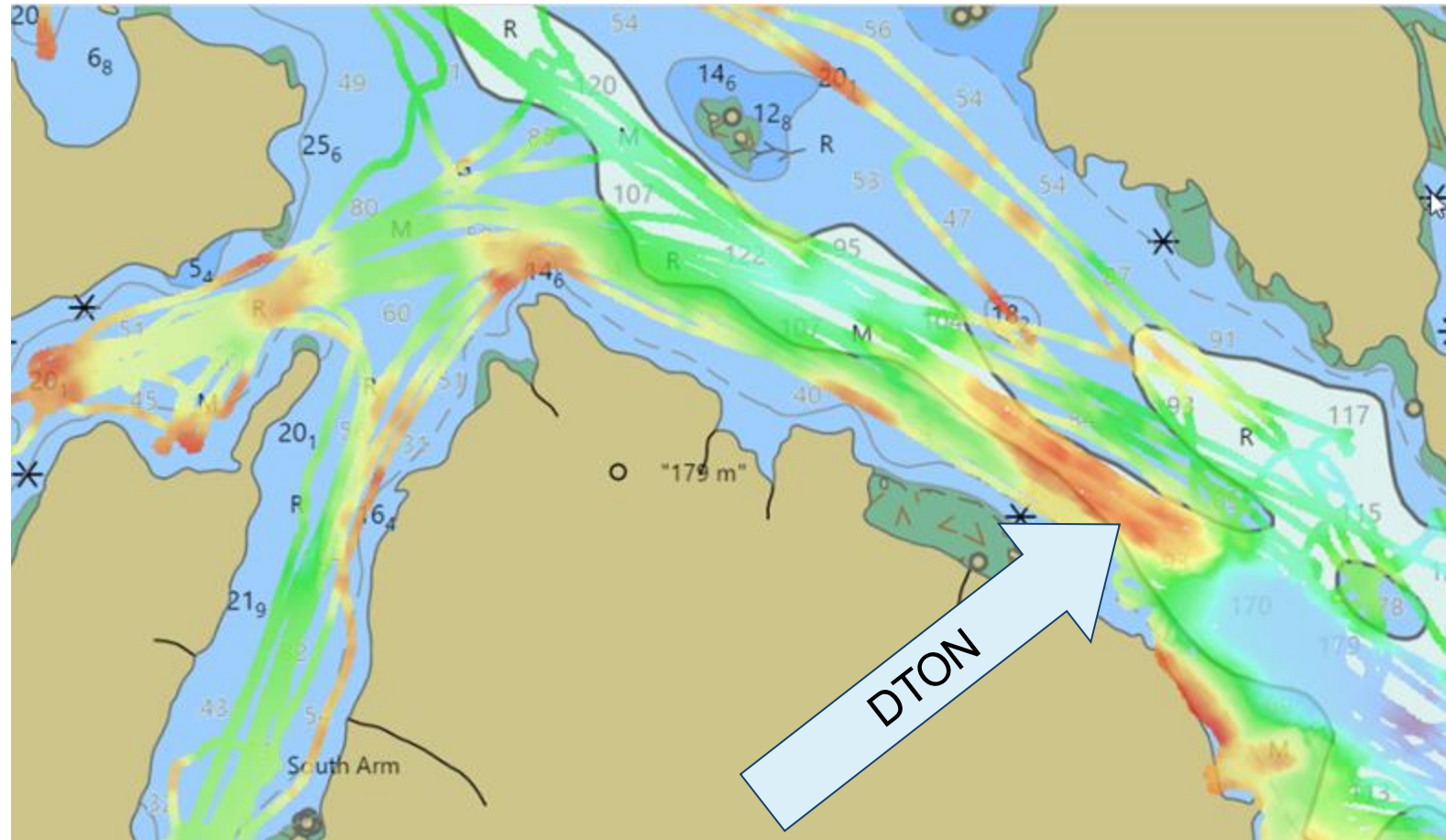
CSB used in analysis of  
Satellite-Derived  
Bathymetry Products in  
Remote Alaskan Arctic





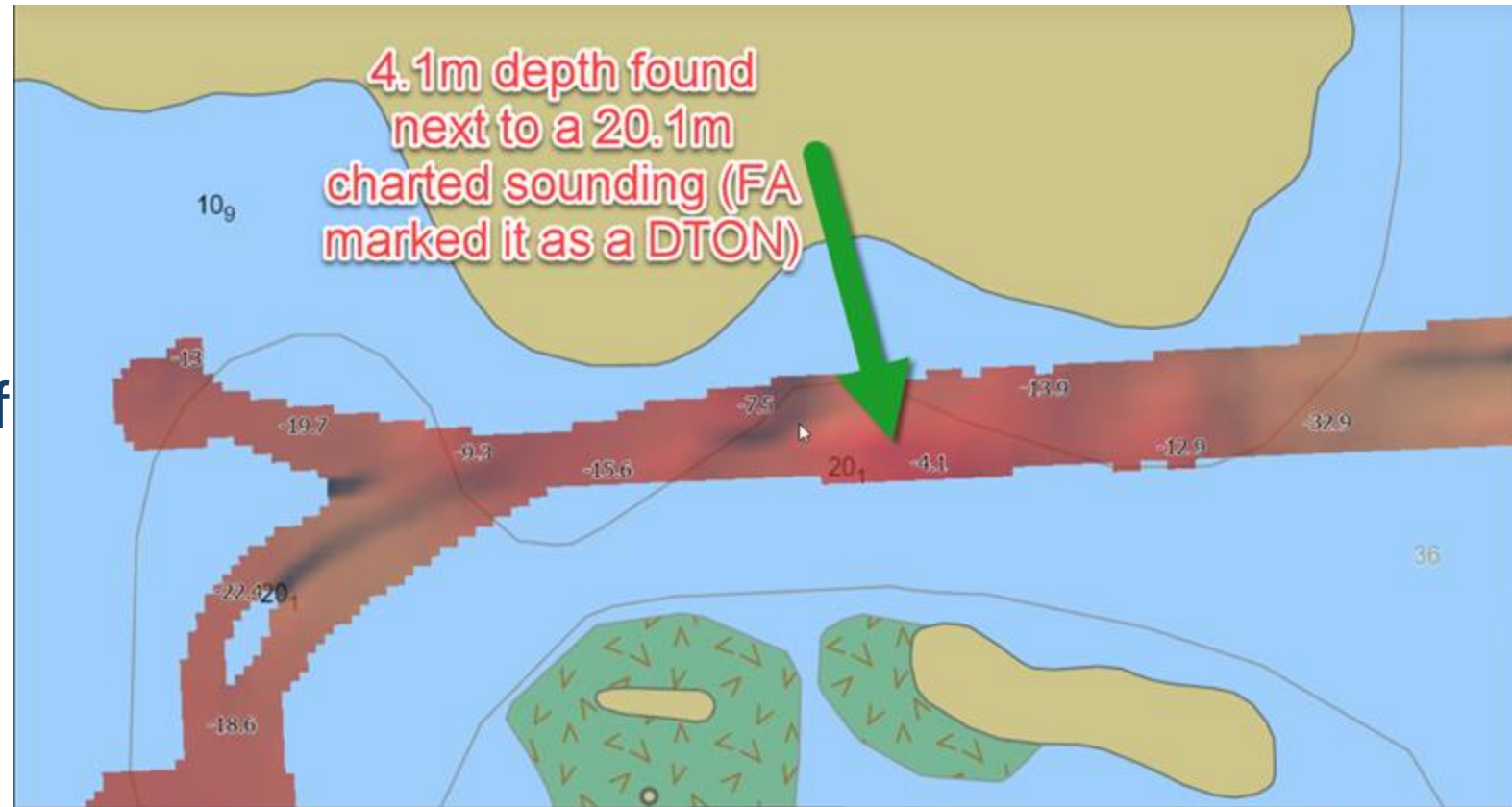
## Reconnaissance - Detecting Dangers to Navigation before deploying field hydrographers

- Fairweather 2023 Dixon Entrance Project - CSB identified over half of field-submitted DTONs ahead of time



## Reconnaissance - Detecting Dangers to Navigation before deploying field hydrographers

- Fairweather 2023 Dixon Entrance Project - CSB identified over half of field-submitted DTONs ahead of time





# We need a larger crowd

## Part 4: Questions / Next steps / Vision



The available CSB data is a drop in the bucket compared to available AIS data.

We need to support the adoption, contribution, publicization, and use of CSB data.



A world map showing bathymetry data. The map is overlaid with a network of red lines representing bathymetric contours or data points. The lines are most prominent in the North Atlantic, North Pacific, and Southern Ocean regions. The map is semi-transparent, allowing the underlying bathymetry to be visible.

**Thank you!**

Questions/comments:

*[anthony.r.klemm@noaa.gov](mailto:anthony.r.klemm@noaa.gov)*



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# Laurent Kerleguer

## SHOM



RÉPUBLIQUE  
FRANÇAISE

*Liberté  
Égalité  
Fraternité*



L'océan en référence

# CROWDSOURCED BATHYMETRY

## FRENCH NATIONAL POSITION

### Workshop on Crowdsourced Bathymetry (CSB)

Friday 26 April 2024, 13:00 – 15:30 CEST

Hybrid Event: In-person at the IHO Secretariat – Monaco & online  
Open to all





# Crowdsourced Bathymetry - General definition

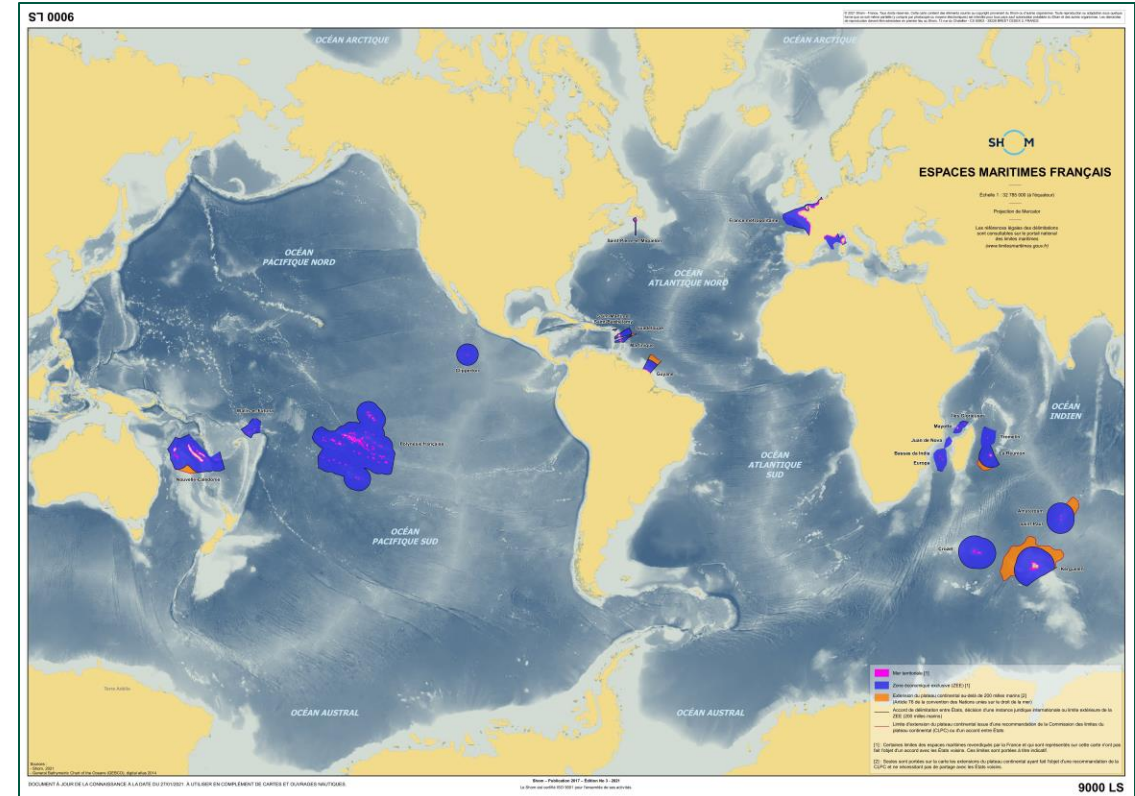
## B-12 IHO publication

- Crowdsourced bathymetry (CSB) is the collection and sharing of depth measurements from vessels, using standard navigation instruments, while engaged in routine maritime operation
- France is member of the Crowd Source Bathymetry Working Group since 1<sup>st</sup> CSBWG



# FACTS

- France has a 10.2 million km<sup>2</sup> of rather poorly measured EEZ;
- Shom supports CSB;
- French national official position on CSB established by *Prime minister - secrétariat général de la mer* ;
- The quality of the data is key to the acceptation and the benefit of CSB, mediocrity is the ennemy that can ruin the concept.





# French legislation applicable to bathymetric and geophysical surveys

- « **Code minier** » for research and exploitation of mineral resource.
  - all information part of geophysical survey in French EEZ relative to **safety of navigation (includes bathymetry) is falling in the public domain** (must be transmitted to Shom)
- « **Code de la recherche** » for marine scientific research.
  - integrates in the French legislation **UNCLOS Marine Scientific Research** (Part XIII)
- Metadata/data flows meeting this legal framework in place and efficient
- Manages commercial protection/scientific caveats. E.g: moratorium before data release if requested by the data owner

# Instruction relative to CSB signed by Prime Minister

## 22/11/2022

- Subject to compliance with the regulations in force (e.g. regulations regarding areas prohibited to navigation) measurements collection in marine areas under the sovereignty or jurisdiction of France, is possible without prior authorization **under the following conditions:**
  - Depth measurements from non-specialized vessels, using standard navigation instruments, during routine marine operations, **once validated and released by Shom**
  - Excludes measurements acquired as part of an operation to describe the underwater topography, whether this description is the end goal or an intermediate step for another objective.

RÉPUBLIQUE FRANÇAISE

Première ministre

Instruction de la Première ministre du 22 novembre 2022  
relative à la bathymétrie participative

NOR : [...]

Le 22 novembre 2022.

A

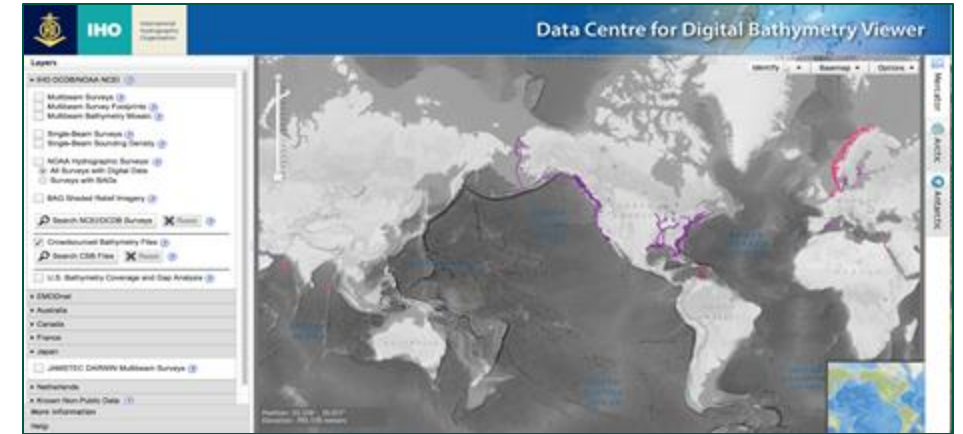
destinataires in fine :

Références : a) Instruction du Premier ministre du 8 avril 2020 relative au recueil, à la transmission, au traitement et à la diffusion de l'information nautique (PRMM2002228A).  
b) Publication OHI B-12 : guide sur la bathymétrie participative.  
c) Article R.3416-3 du code de la défense définissant la mission du Service hydrographique et océanographique de la marine (SHOM).

Pièces jointes : glossaire.  
Textes abrogés : Néant

Legend: **writing in blue = France CSB caveats**

# CSB, France specifics

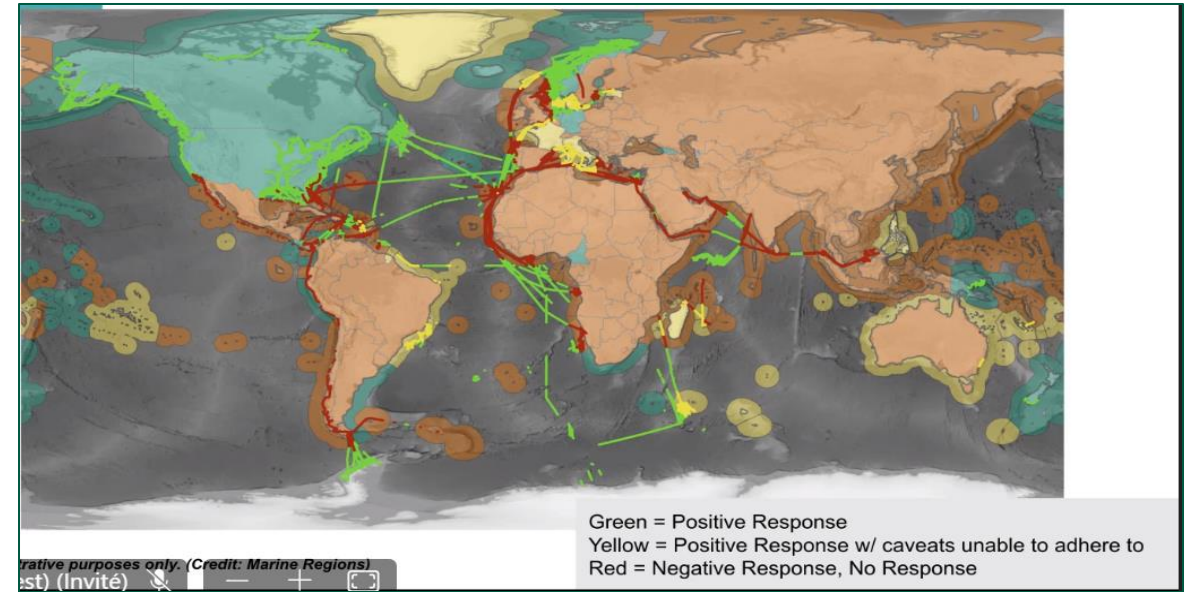


- Measurements collected in French waters **must be transmitted as a priority to Shom, or to trusted nodes** (EMODnet Ingestion or IHO DCDB)
- Notwithstanding the reception node, measurements have to be **made known to Shom** as the national hydrographic service, **prior to any local, national or international distribution.**
- **It is only after Shom has made sure those measurements conform with CSB definition and conform with protected areas that they become CSB data available for ingestion in DCDB.**



# Implementation

- France has **replied positively** to IHO CL 21/2020, IRCC CL 01/2020 with the caveat **“All data to be reviewed by HO before ingestion into DCDB”**;
- IHO DCDB CSB dataset **geographical filtering** based on the marine zonings and acceptance list;
- **Acceptance/Refusal tool** for HO (Crowbar) currently being developed by IHO DCDB;
- Shom internal data flow mechanisms and associated tools currently being improved.



The screenshot shows the Crowbar web interface. At the top, there is a browser address bar with the URL <https://crowbar-lite.mggdev.cloud/ingest-external/crowbar/view/main/approval/list>. Below the browser, there is a map of the Atlantic Ocean with several orange markers indicating data points. Below the map, there is a table titled "CSB Data" with columns for Trace Id, Approval Status, Instrument, Start Time, End Time, File Size, Last Updated, and Actions. The table contains two rows of data, both with "Not approved" status.

Trace Id	Approval Status	Instrument	Start Time	End Time	File Size	Last Updated	Actions
0066136-8e66-4663-80ec-3d394d77f5	Not approved		2023-10-10T03:40:29Z	2023-10-10T03:40:29Z	19048	2023-10-10T03:40:32:613112Z	🔍 ⬇️
1662a22-8b68-40e9-88e8-08f739902a5	Not approved		2023-10-10T03:40:38Z	2023-10-10T03:40:38Z	37843	2023-10-10T03:40:42:005019Z	🔍 ⬇️

# Ensuring a clear distinction between MSR and CSB

- On April 2023, following acceptance of CSB by France, Fugro exposes in good faith bathymetric data acquired in transit;
- Following B12 and French regulation **this is not CSB**, this is MSR: two reasons 1) data acquired from a specialized vessel, 2) data acquired using a dedicated geophysical device.
- **Not being clear about the status of RSM when it is RSM would lead to a loss of confidence detrimental to the CSB**
- Shom considers RSM has enough flexibility to foster contribution of research vessel in transit to general knowledge of the ocean : flexibility on areas and time frame of a request.

FUGRO

FUGRO N.V.  
Veurse Achterweg 10  
P.O. Box 41  
2260 AA Leidschendam  
The Netherlands

28 April 2023

RAdm. Laurent Kerleguer  
Directeur Général  
Service Hydrographique et Oceanographique de la Marine  
13 rue du Chatellier - CS 92803  
BREST Cedex 2 29228  
France

Subject: Acceptance of Crowdsourced Bathymetry Activities and Provision of Resultant Datasets

# Concluding remarks

CSB, Shom's feedback :

- Identify and communicate with competent administration (Secretariat général de la mer);
- Use of B-12 documentation within the French legislation, adding necessary caveats;
- Ensure unambiguous understanding of the distinction between MSR and CSB (ambiguity spoils the concept);
- Provide technical assurance (implementation of data flow / acceptance tools).





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# Claudia Batthyany

## Yacht Club de Monaco

## H.S.H. PRINCE ALBERT II

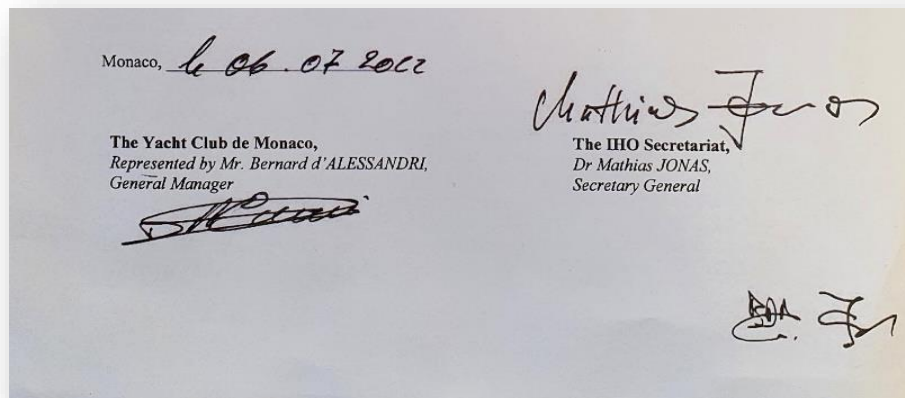
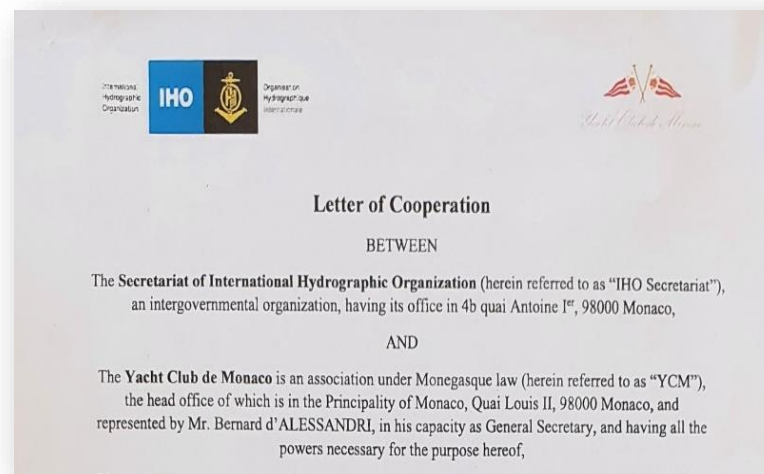
***“It is our commitment that will help us to reconcile the use and preservation of the Seas and Oceans.”***







# 1. IHO & YCM : SIGNING OF A LETTER OF COOPERATION





## 2. ALFREDO GIACON : installation of a data logger





## 2. ALFREDO GIACON : sailing crossing with data logger



Yacht Club de Monaco

Dans le cadre de notre démarche  
«Monaco Capital of Advanced Yachting»  
et à l'occasion de l'arrivée à Monaco du voilier *Janeris*,  
nous avons le plaisir de vous convier  
au Cocktail Dinatoire qui sera offert  
**vendredi 22 juillet 2022 à partir de 18h30**  
**sur le Quai Louis II**  
à l'occasion duquel sera présentée la mission  
« A Sail for the Blue »  
et l'aventure humaine et exploratoire  
d'Alfredo Giacon



Événement organisé avec le soutien de l'OHI  
et coordination de Michele Fiorentino

Batthyany | +377 93 10 65 35 | c.batthyany@ycm.org











### 3. YCM DINNER CONFERENCE : MAP THE GAP

  
*Yacht Club de Monaco*

**DÎNER CONFÉRENCE**

# HOW CAN YACHTS HELP MAP OUR OCEANS

**29 MARS 2023 - 19H30**

📍 RESTAURANT 1909 - DECK 2

**PARTICIPATION : 90€/PERS**

 **IHO** International Hydrographic Organization

Réservations : Service membres | +377 93 10 63 00 | [conferences@ycm.org](mailto:conferences@ycm.org)



### 3. YCM DINNER CONFERENCE : MAP THE GAP





## 4. IYBA & MYBA RENDEZ-VOUS





## 5. WHITE ROSE OF DRACHS ON BOARD RECEPTION











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# Luigi Sinapi

## IHO



# Jennifer Jencks

## NOAA



**WE ALSO ENCOURAGE ALL HYDROGRAPHIC AUTHORITIES TO ATTEND FUTURE CSBWG MEETINGS WHERE THEIR CONCERNS, SUGGESTIONS, AND WORK WOULD BE MOST WELCOME.**

**CSBWG16 WILL BE HOSTED BY NEW ZEALAND IN MARCH 2025 AND WILL INCLUDE A HANDS ON WORKSHOP FOCUSES ON THE VARIETY OF OPEN SOURCE TOOLS THAT SUPPORT THE END TO END FLOW OF CSB DATA.**



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Hydrographic  
Organization



- CSB IS A LOW ENTRY WAY TO TAKE PART IN THE UN DECADE AND IHO STRATEGIC GOALS
- CSB IS FULLY CONSISTENT WITH THE LAW OF THE SEA, LEVERAGING DATA REQUIRED BY SOLAS
- CSB HOLDS SIGNIFICANT VALUE. AND THE MORE CSB, THE BETTER.
- FRANCE PROVIDED AN EXCELLENT AND DETAILED EXAMPLE OF ONE IMPLEMENTATION OF CSB IN WATERS OF NATIONAL JURISDICTION PROCESS
- AN EXPERIENCE OF CSB IN THE YACHTING COMMUNITY



*Workshop on*  
**Crowdsourced Bathymetry**  
*(CSB)*



**THANK YOU**

