The IHO Crowdsourced Bathymetry Working Group 13

Welcome & Opening Remarks

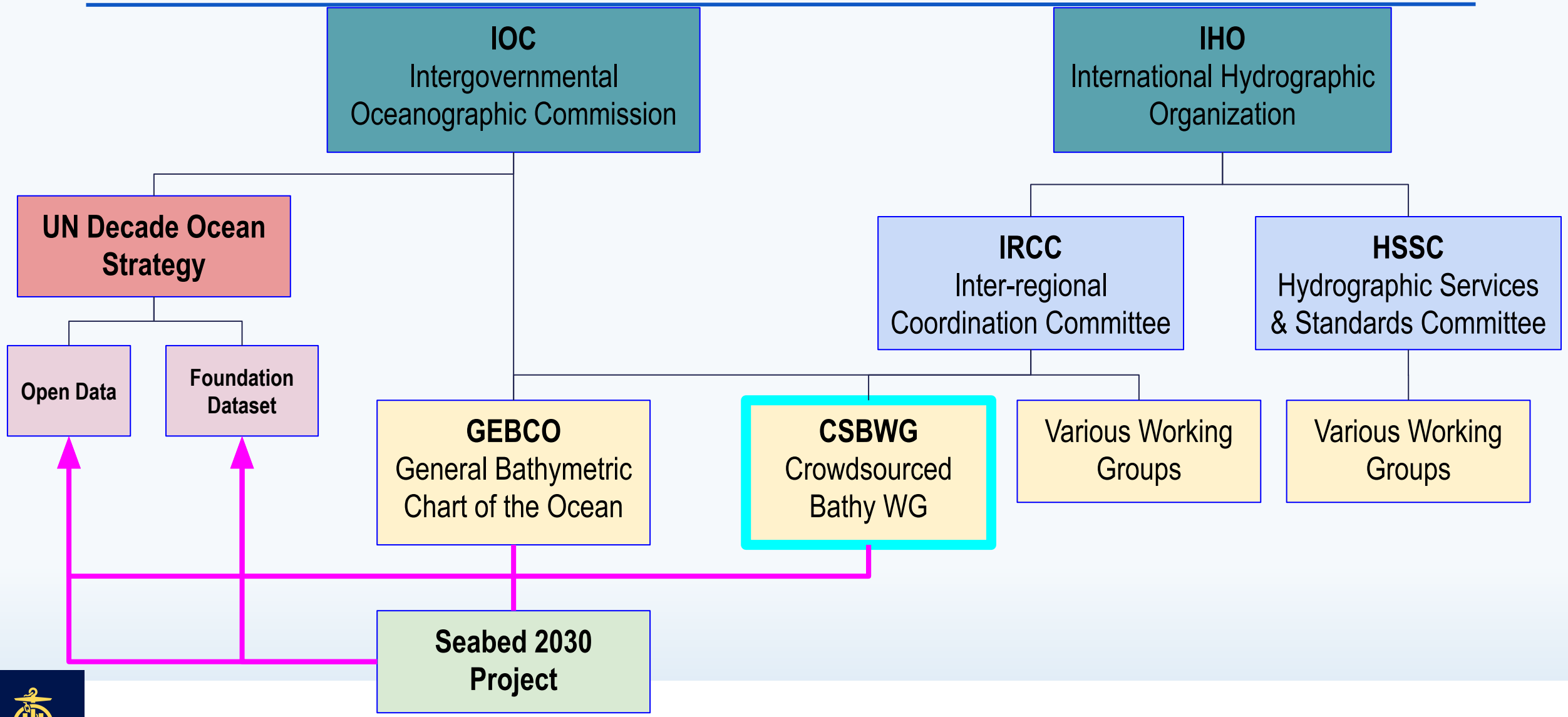
IHO Crowdsourced Bathymetry Initiative

In 2014, the International Hydrographic Organization (IHO) initiated a collaborative project to encourage mariners to collect and contribute “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.

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

Governance


IOC
Intergovernmental Oceanographic Commission
IHO
International Hydrographic Organization
UN Decade Ocean Strategy
IRCC
Inter-regional Coordination Committee
HSSC
Hydrographic Services & Standards Committee
Open Data
Foundation Dataset
GEBCO
General Bathymetric Chart of the Ocean
CSBWG
Crowdsourced Bathy WG
Various Working Groups
Various Working Groups
Seabed 2030 Project

CSBWG Meetings

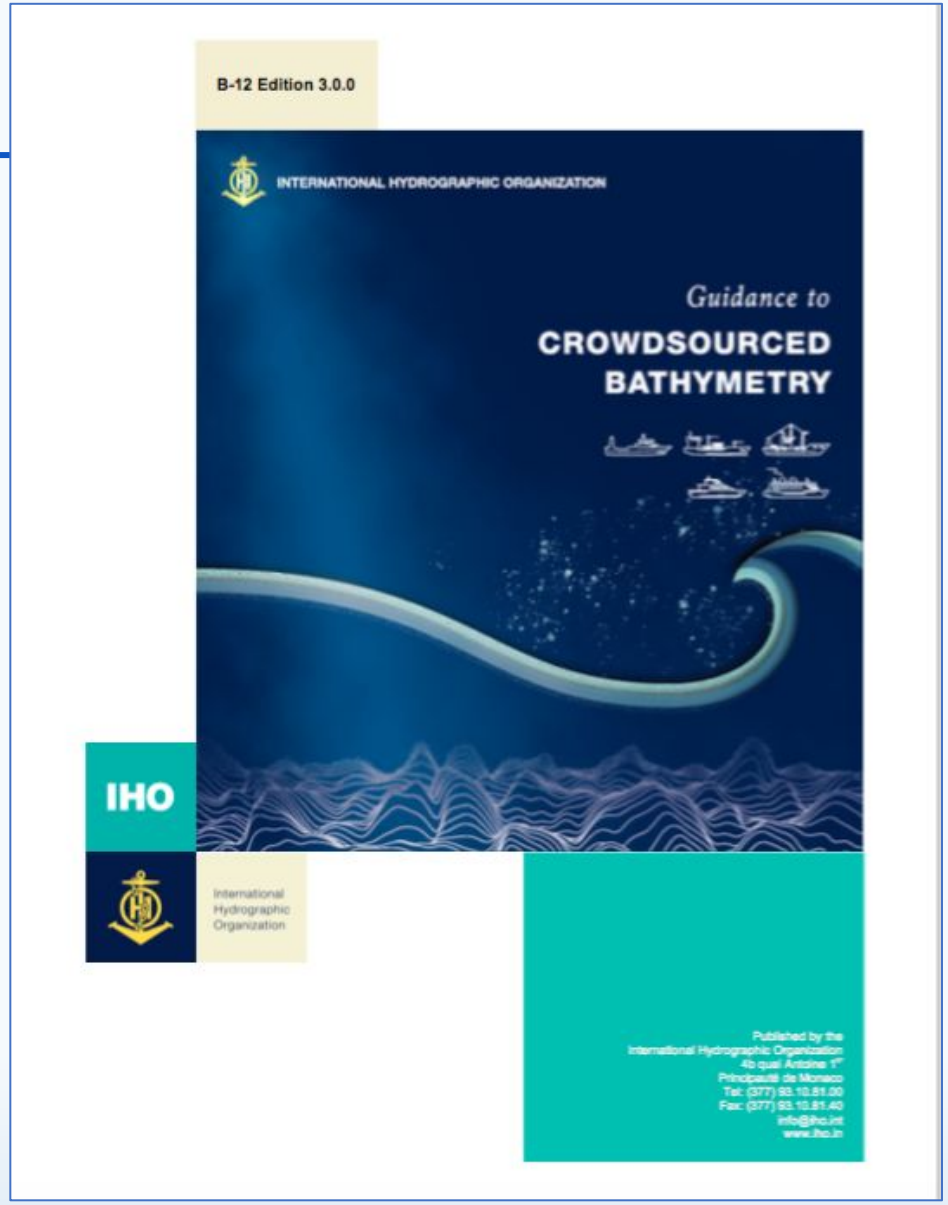
- **Meetings:** 12 Meetings, 1 Industry Day
- **Chair:** Jennifer Jencks, USA; **Vice Chair**: Pete Wills, Canada
- **Representatives from 18 Member States:** Canada, China, Denmark, France, Germany, India, Italy, Lebanon, Mexico, Netherlands, New Zealand, Norway, Portugal, South Africa, Sweden, UK, Uruguay, USA
- **IHO Secretariat:** IHO Assistant Director Sam Harper, IHO Director Luigi Sinapi

- **Observers and expert contributors:** CCOM-JHC, CIDCO, CIRES, Da Gamma Maritime Ltd, Dongseo U, ECC AS, ESRI, FarSounder, FLIR Systems AB, Fugro, GMATEK, Inc., H2i, James Cook U, JAMSTEC, Navico/C-Map, ONE Data Tech Co., Olex, Orange Force Marine, PYA, Seabed 2030, Sea-ID, SevenCs/ChartWorld, TeamSurv, Teledyne CARIS, World Maritime University, and World Ocean Council

CSBWG Highlights - B12

Edition 3.0.0 has been approved by IHO Member States

Updates include: incorporating feedback from operational use and experience, making the document more "equipment agnostic", simplifying the document and making it more accessible to ALL readers (data collectors, providers and users).



iho.int/uploads/user/pubs/bathy/B_12_CSB-Guidance_Document-Edition_3.0.0_Final.pdf

CSBWG Highlights - Outreach to RHCs

IRCC12 Action 14: Have RHC's identify Seabed 2030 / CSB Coordinators

RHC	Country	Coordinator Name
NHC (Nordic)	Norway	Evert Flier
NSHC (North Sea)	Norway	Evert Flier
MBSHC (Mediterranean and Black Seas)	Lebanon	Joud Sayah
ARHC (Arctic)	Norway	Evert Flier
BSHC (Baltic Sea)	~~Denmark~~ Sweden	~~Jens Peter Hartmann~~ Hans Öiås
USCHC	USA	Andy Armstrong
EAHC (East Asia)	Japan	Kentaro Kaneda
EAtHC (Eastern Atlantic)	Portugal	LCDR Telmo Geraldes Dias
SEPRHC (South-East Pacific)		
SWPHC (South-West Pacific)	New Zealand	Stuart Caie
MACHC (Meso American & Caribbean Sea)	~~Mexico~~ Jamaica	~~Cecilia Cortina Guzman~~ Diego Billings
SAIHC (Southern African and Islands)	S. Africa	Cdr Christoff Theunissen
NIOHC (N. Indian Ocean)	India	Cdr Rahul Bhatt
RSAHC (ROPME Sea Area)		
SWAtHC (SW Atlantic)	Uruguay	Cdr Niki Eugenio Silvera
HCA (HC on Antarctica)	Norway	Evert Flier

CSBWG Highlights - 2 pagers

- Superyacht
- Marine Contractors
- Fisheries
- Cruise Ships
- Software/hardware industry
- Hydrographic Offices
- Academic/Scientific Research

IHO

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CITIZEN SOURCED DATA

HELP REVEAL THE DEEP AND SHARE YOUR DATA

CROWDSOURCED DEPTH INFORMATION

Commercially owned ships can participate in increasing our knowledge of the ocean by sharing depth measurements from navigation instruments while out at sea. Known as Crowdsourced Bathymetry (CSB), this information can help identify uncharted features such as seamounts and canyons, verify charted information, and help fill the gaps where no data exists.

CRUISE SHIPS

Many expedition cruise ships explore the world's oceans, often in areas where data is sparse, non-existent, or of poor quality. These are exactly the places where contributions to global seafloor mapping efforts can have the greatest impact.

To minimise effort on the part of the ship's crew, data collection and contribution of data can occur by using either built-in navigation software systems that are participating in the CSB initiative, or through a small hardware data logger that can be interfaced to the ship's NMEA data bus. Routinely measured parameters such as under keel depth and position, can then be stored, uploaded and contributed to local and global mapping initiatives. These contributions can also benefit navigational safety, detect unknown hazards, and aid other mariners and ocean scientists.

By contributing data, cruise ships can help avoid accidents, environmental damage and make the oceans a safer place for all. Additionally, participation in this global effort can be included in the cruise line's marketing materials highlighting the various ways they contribute to scientific endeavors.

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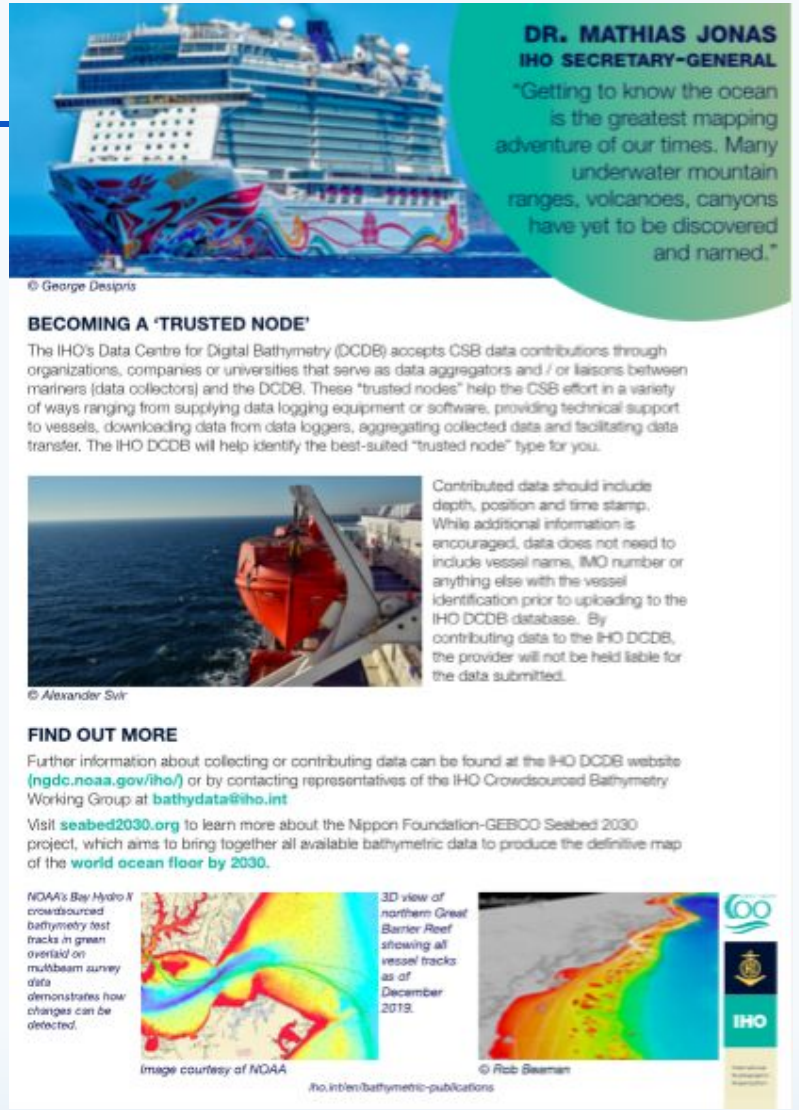

DR. MATHIAS JONAS
IHO SECRETARY-GENERAL

"Getting to know the ocean is the greatest mapping adventure of our times. Many underwater mountain ranges, volcanoes, canyons have yet to be discovered and named."

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BECOMING A 'TRUSTED NODE'

The IHO's Data Centre for Digital Bathymetry (DCDB) accepts CSB data contributions through organizations, companies or universities that serve as data aggregators and / or liaisons between mariners (data collectors) and the DCDB. These "trusted nodes" help the CSB effort in a variety of ways ranging from supplying data logging equipment or software, providing technical support to vessels, downloading data from data loggers, aggregating collected data and facilitating data transfer. The IHO DCDB will help identify the best-suited "trusted node" type for you.

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Contributed data should include depth, position and time stamp. While additional information is encouraged, data does not need to include vessel name, IMO number or anything else with the vessel identification prior to uploading to the IHO DCDB database. By contributing data to the IHO DCDB, the provider will not be held liable for the data submitted.

FIND OUT MORE

Further information about collecting or contributing data can be found at the IHO DCDB website (ngdc.noaa.gov/iho/) or by contacting representatives of the IHO Crowdsourced Bathymetry Working Group at bathydata@iho.int

Visit seabed2030.org to learn more about the Nippon Foundation-GEBCO Seabed 2030 project, which aims to bring together all available bathymetric data to produce the definitive map of the world ocean floor by 2030.

NOAA's Bay Hydro II crowdsourced bathymetry test tracks in green overlaid on multibeam survey data demonstrates how changes can be detected.

3D view of northern Great Barrier Reef showing all vessel tracks as of December 2019.

Image courtesy of NOAA

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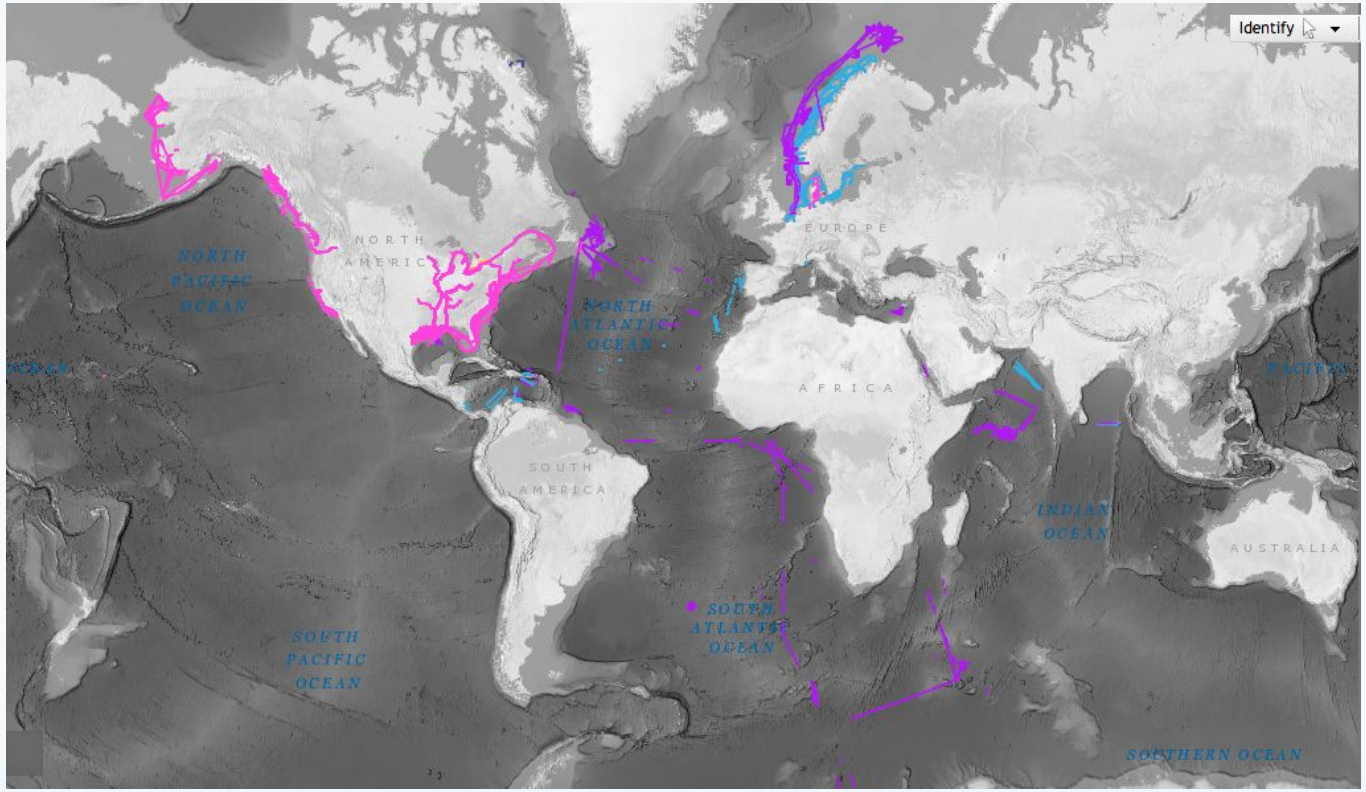
Thank you to Christophe Buzzi and Sarah Couture (IHO)

Other Highlights - Positive responses continue

- IHO Member States were requested to indicate their position on the **provision of CSB data** collected within waters subject to their national jurisdiction into the public domain
- To date, 32* coastal States (green) have replied positively
  - France*

Other Highlights - # of TNs increase

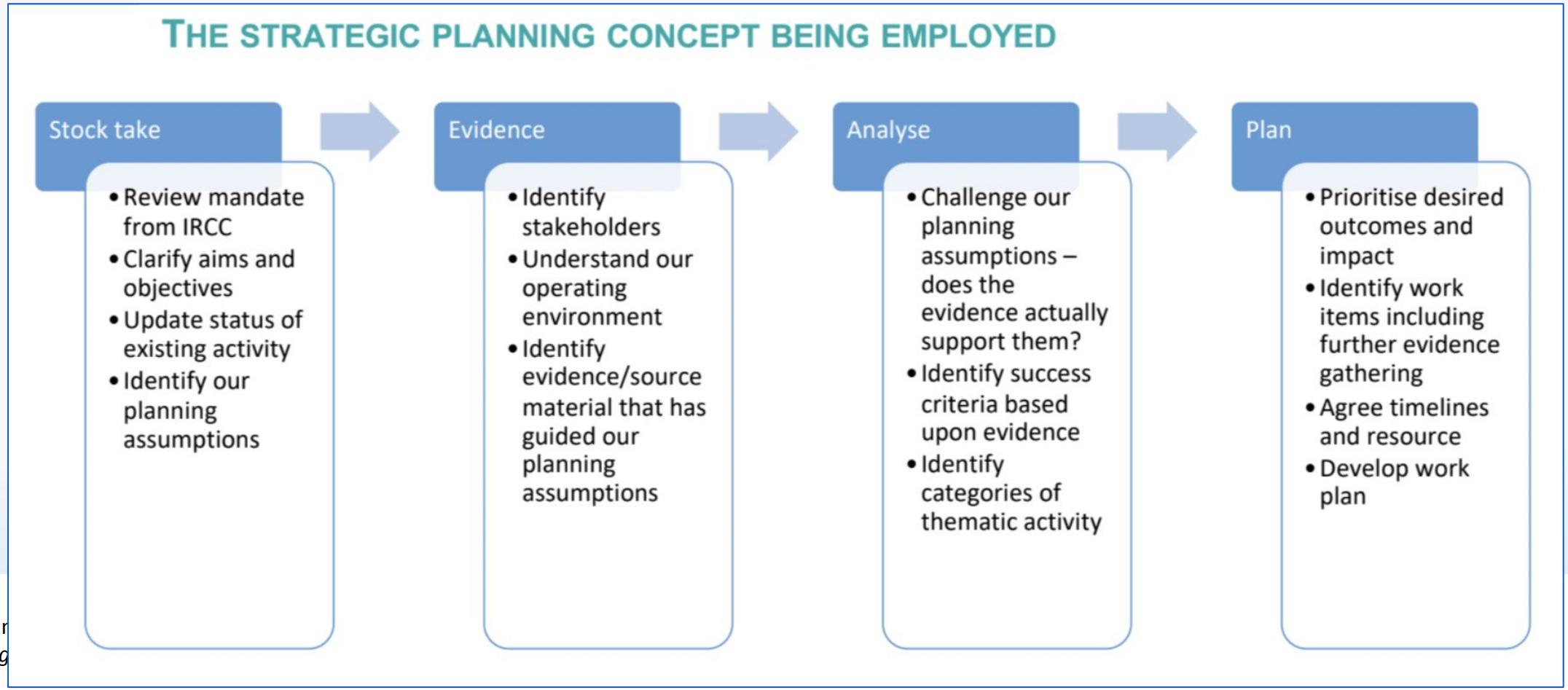
- TNs who have sent public data to our production endpoint:
  - PGS, M2Ocean, GLOS, MacGregor, Farsounder, Rosepoint, Navico C-MAP
- TNs that have sent data, not yet on viewer:
  - JCU
- Additional TNs who have sent test data:
  - OFM, SB2030, UNHJHC



So where do we go from here?

CSBWG 13

1. Updates (B-12, Data Use, Outreach, Industry Forum, Projects)
2. Strategic Planning



Ground Rules

- VTC: Mute your microphone & turn camera OFF when you're not speaking;
- To speak, either (VTC) turn camera ON and raise your hand, or (F2F) raise your hand
  - Please wait for the Chair or Vice Chair to give you the floor
  - After speaking (VTC), please **mute** the microphone even if you plan to ask the floor again;
  - (VTC) Please turn off camera when you are done with the conversation
- F2F: Please refrain from side conversations. If you must, please keep your volume down.
- The chat window will be available during the meeting and the Vice Chair will monitor it, questions may be asked here;
- Focus on the agenda item being considered, avoiding distraction.

Actions Requested of IRCC

a) Note the contents of this report;

b) Endorse B-12 IHO Guidance on Crowdsourced Bathymetry Edition 3.0.0.

c) Encourage all Member States to respond to IHO CL 21/2020 and, if possible, offer a positive response, even if qualified, to enable provision of CSB data into the public domain collected from ships within waters subject to their national jurisdiction.

d) Encourage all RHC Chairs to bring the IRCC CL 1/2020 to the attention of all coastal states within their respective RHC, encouraging them to offer a positive response, even if qualified, to enable provision of CSB data into the public domain collected from ships within waters subject to their national jurisdiction.

e) Encourage Member States to release datasets or subsets into the public domain via the IHO DCDB;

f) Encourage Member States to support the CSB initiative with positive actions, such as requiring all research vessels to collect bathymetric data for late uploading, when on passage or when it does not interfere with other research activities;

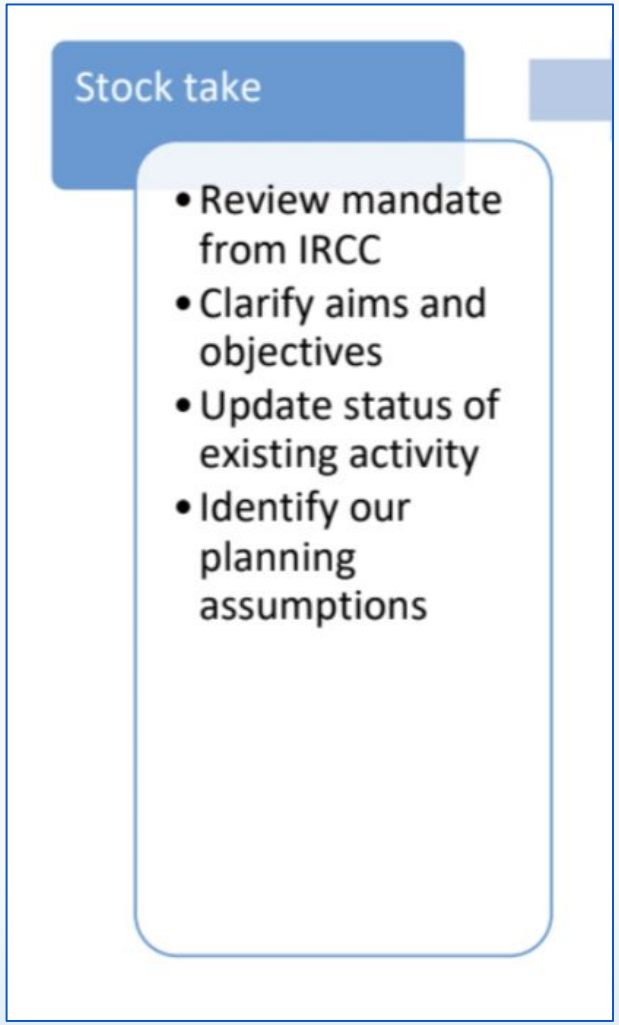
g) Take what other action is deemed necessary.

Day 1:

Updates & Next Steps

- B-12

Strategy Session 1: A Review of where we are today.



B-12

IHO

International Hydrographic Organization

SESSION 1: A REVIEW OF WHERE WE ARE TODAY

THE PURPOSE OF THIS EXERCISE IS TO:

- Revisit the original aims and objectives of the CSBWG and the mandate provided by IRCC (ToRs), critically review progress (Actions) to ensure that future activity is evidence based, targeted, relevant and impactful.

THE OBJECTIVES OF THIS EXERCISE ARE TO:

- Take stock of where we are and what activity is ongoing;
- Clarify current aims and objectives (ToRs)
- Discuss what existing activity should be continued, paused or stopped
- Update status of existing activity (Actions)
- Identify what has worked well and what hasn't;
- Identify our planning assumptions

SESSION 1: A REVIEW OF WHERE WE ARE TODAY

International Hydrographic Organization

Clarify current aims of ToRs

Review status of Actions

CSBWG Terms of Reference

A. Maintain the IHO publication B-12 through periodic reviews and updates identified by Member States;

B. Monitor Member State and Regional progress regarding development of best practices and CSB initiatives and incorporate into B-12 as appropriate;

C. Investigate and [highlight / promote] ways to increase data contributions and incentives on how and why mariners should become involved.

D. Define potential uses of CSB for Hydrographic offices (HOs) with examples and useful land equivalents;

E. Provide guidance on data quality and standards for CSB in liaison with appropriate IHO Working Groups;

F. Liaise with other relevant IHO subordinate bodies involved with CSB data to promote its use and development; and

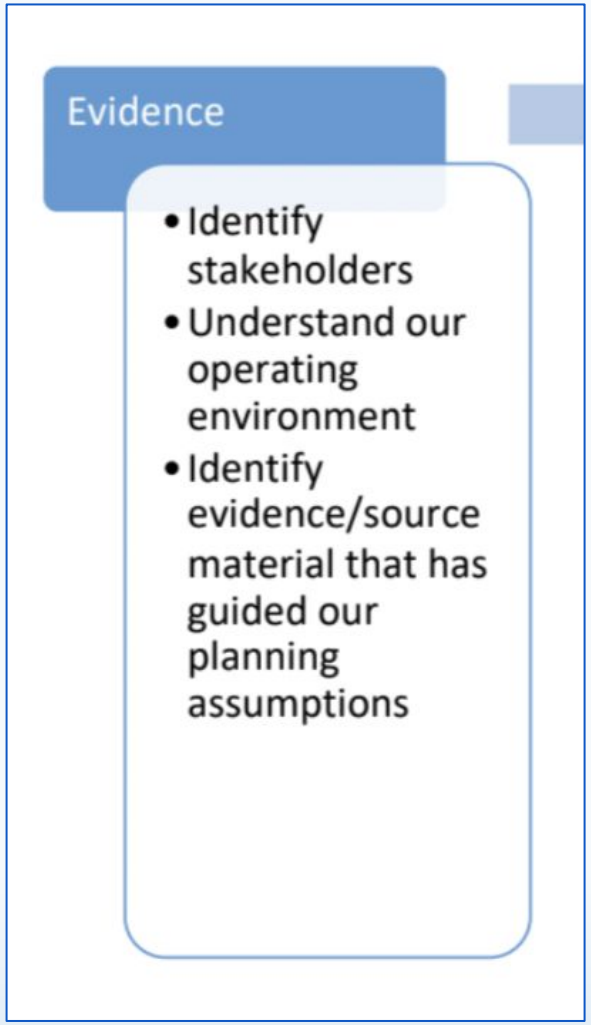
G. Liaise closely with the IHO Data Centre for Digital Bathymetry (DCDB) as it continues to develop technology to collect and distribute CSB to the public.

Day 2:

Updates & Next Steps

- Use of CSB - external and internal
- Perceived barriers to scaling CSB

Strategy Session 2: A Review of the evidence



Use of CSB - external and internal

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Perceived barriers to scaling CSB

CSBWG13 Questionnaire

#2 – What are the key barriers/challenges to CSB becoming successful?

Perceived barriers to scaling CSB

Draft Summary

1. National Policy / Lack of Government Support
2. Lack of HO resources / Low HO priority
   a. to set up/collect/submit data
   b. manage additional dataset
3. Lack of a standard support system for TNs
4. Technology: Complex Data Cycle
   a. system set up ⇒ data collection ⇒ data transfer ⇒ data availability via the DCDB ⇒ data access ⇒ inclusion into usable products
5. Communications
   a. addressing misconceptions
   b. Mariner buy-in; commercial benefits; liability
   c. keeping participants involved
   d. Lack of focus and coordination in stakeholder messaging and engagement.
6. Unclear/Lack of Rewards/Incentives

SESSION 2: REVIEW EVIDENCE

International Hydrographic Organization

THE PURPOSE OF THIS EXERCISE IS TO:

- Review our evidence base to ensure that our working assumptions are valid and to identify where further investigation/research is required

THE OBJECTIVES OF THIS EXERCISE ARE TO:

- Identify stakeholders
- Understand our operating environment
- Identify evidence/source material that has guided our planning assumptions to date
- Identify success criteria based upon evidence

Day 3:

Updates & Next Steps

- Planning for 2023 Industry Forum
- Outreach

Strategy Session 3: Analysis - Where should we go and why?

Strategy Session 4: Expected/Desired Outputs

Planning for 2023 Industry Forum

Outreach

Seabed 2030-Crowdsourced Bathymetry RHC Coordinator Collaboration Team

Kick Off Meeting

13 December 2022

Today's topics

- Introductions
- Review of the IRCC proposal to establish this team
- Review of Questionnaire responses
- Discussion about Next Steps

- There is a LOT of great work going on within some RHCs
- Some RHCs are more supportive of these initiatives than others
- There are many questions and concerns

YOU all are in the best position to inform and learn from each other.

CSBWG Highlights - 2 pagers

- Superyacht
- Marine Contractors
- Fisheries
- Cruise Ships
- Software/hardware industry
- Hydrographic Offices
- Academic/Scientific Research

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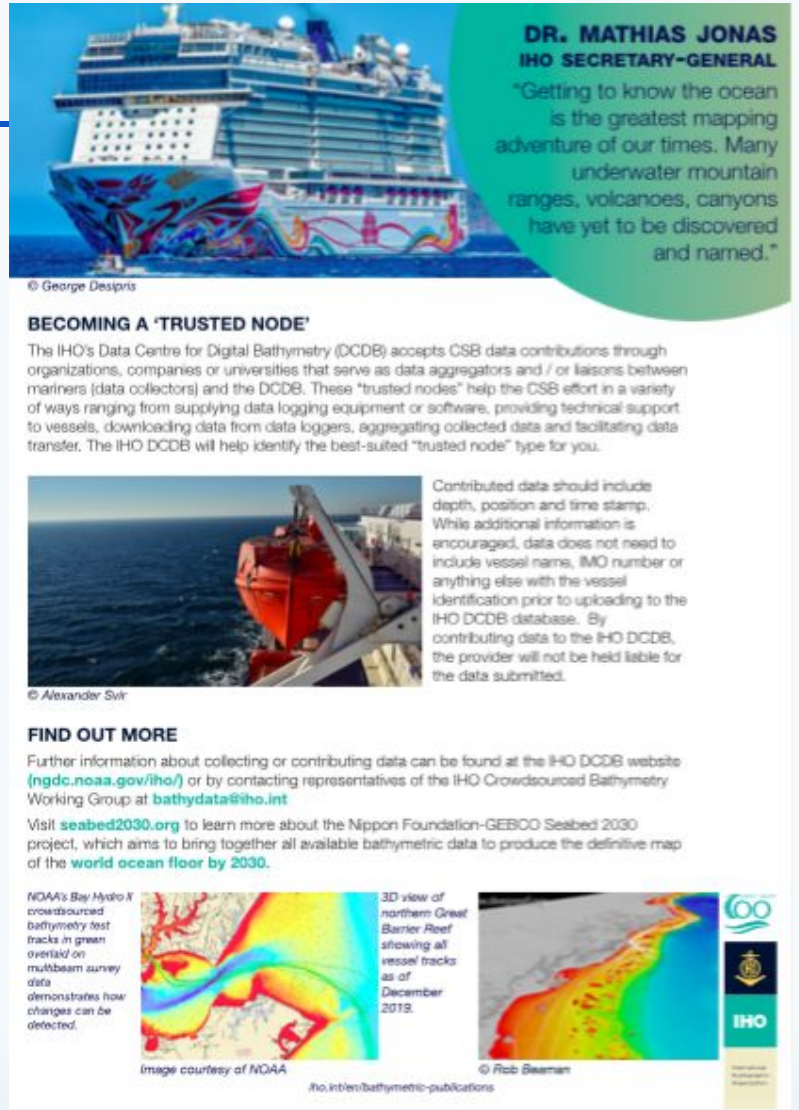

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NOAA's Bay Hydro II crowdsourced bathymetry test tracks in green overlaid on multibeam survey data demonstrates how changes can be detected.

3D view of northern Great Barrier Reef showing all vessel tracks as of December 2019.

Image courtesy of NOAA

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Day 3: Outreach

Updates & Next Steps: CSB Project Related updates

1. **SAIHC Update - Christoff Theunissen**
2. CHS Update - Pete Wills/Mathieu Rondeau
3. NOAA Coast Survey Update - Anthony Klemm
4. Florida CSB Project - Sarah Grasty
5. CIDCO Update - Guillaume Morissette
6. **SuperYacht Outreach - Steve Monk**
7. Cell Aggregation - Shaul Solomon
8. **FarSounder Update - Matt Zimmerman**
9. Teledyne FLIR Systems data processing update - Anders Bergström
10. CSB in the S Pacific update - Belen Baron
11. Orange Force Marine Update - Colin Thomson
12. GLOS - Linden Brinks
13. IHO DCDB Update - Georgie Zelenak
14. Bathy Module Update - Justin Cooper
15. **Seakeepers Feedback Materials - Katie Sheahan**
16. Seabed 2030 Update - Jamie McMichael-Phillips

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SESSION 3: ANALYSIS - WHERE SHOULD WE GO & WHY?

THE PURPOSE OF THIS EXERCISE IS TO:

- Review proposed CSBWG priorities
- Set clear priorities for CSBWG activity based upon the evidence available

THE OBJECTIVES OF THIS EXERCISE ARE TO:

- Identify which current activities should continue;
- Seek clarity on all proposed activities;
- Challenge our planning assumptions – does the evidence actually support them?
- Analyse our evidence base behind our proposed priorities
- Identify and group thematic areas of activity

Proposed High Level Priorities

1. Continue to maintain and enhance the standards and guidelines
2. Engage with HOs and IHO Member States on issues relating to CSB, including but not limited to Nautical Cartography
3. Improve/Develop Comms & Outreach
4. Improve coordination with/leverage other bodies and initiatives with interest in CSB
5. Support Trusted Nodes
6. Optimize data life cycle
7. Engage with stakeholders in and outside the hydrographic community
8. Foster and facilitate greater end use of CSB data

SESSION 4: DEVELOP A PLAN

International Hydrographic Organization

THE PURPOSE OF THIS EXERCISE IS TO:

- A # Year Work Plan that is based on strategic analysis, underpinned by a robust evidence base (may well be an iterative process)

THE OBJECTIVES OF THIS EXERCISE ARE TO:

- Develop a work plan to help drive our WG activities;
- Clear map of our stakeholders and their needs;
- Clarify any support required from IRCC, other IHO WGs or other bodies/entities/initiatives.
- Prioritise desired outcomes and impact
- Identify work items including further evidence gathering
- Agree to timelines and resource

Day 4: Outreach

Updates & Next Steps: CSB Project Related updates

1. SAIHC Update - Christoff Theunissen **x**
2. CHS Update - Pete Wills/Mathieu Rondeau **x**
3. NOAA Coast Survey Update - Anthony Klemm **x**
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13. IHO DCDB Update - Georgie Zelenak **x**
14. Bathy Module Update - Justin Cooper **x**
15. Seakeepers Feedback Materials - Katie Sheahan **x**
16. Seabed 2030 Update - Jamie McMichael-Phillips **x**

	Work Items	Lead	Team
1	Submit IHO CSB initiative as a UN Decade Action	Evert	Jenn, Sam, David
2	Gather and prioritize HO-specific issues/opportunities regarding national policy/regulations related to CSB	Jenn	Evert, Steve K,
3	Gather and prioritize HO-specific issues relating to CSB data, including but not limited to Nautical Cartography	Pete	Giuseppe, Anthony, Hans, Andy, Akim
4	Support CSB/SB2030 Coordinators in their RHC engagement	Jenn	Belen, Evert, Anthony
5	Discuss and propose potential software tool support for HOs	Anders	Emma, Meredith, Mathieu
6	Clarify support identified by current Trusted Nodes needed for current and future Trusted Nodes.	Guillaume	Matt, Linden, Brian, Colin
7	Clarify all aspects of the CSB data cycle and capture known issues, requirements and suggested enhancements.	Brian	Shaul, Colin, Giuseppe, Guillaume
8	Develop a communication plan in coordination and collaboration with related efforts (SB2030, GEBCO, etc)	Tim	Steve M., Meredith, Akim, David, Derek
9	Develop a recognition & incentive strategy plan	David	Matt, Linden