

12th Meeting of the IHO Crowd Sourced Bathymetry Working Group

Report

7 – 10 March 2022

(Paragraph numbering is the same as the Agenda Item numbering and does not necessarily reflect the order in which matters were discussed)

1. Welcome and opening remarks

1.1. Welcome and opening remarks

The Chair opened the meeting and provided welcomed participants < insert Jenn's speech >

1.2. Welcome

IHO Director Luigi Sinapi (**LS**) welcomed participants including those who were physically present in Monaco. He noted that fortunately, after more than 2 years, the pandemic is losing strength and the barriers to holding in person meetings are being gradually removed. He explained that the IHO was pleased to host this meeting in hybrid format, being the second working group meeting attempted in this way. He explained that he had hoped for more physical participation, but the presence of the chairing team would for sure aid in arriving at a unified vision on some important aspects and decisions; primarily, the new edition of the B12 Publication, so that it can be presented to the next IRCC14 meeting for endorsement ahead of being submitted for approval to the IHO Member States.

In striving to achieve this milestone, he re-iterated the IHO's commitment to facilitating the process and discussions over the next four days so that compromises can be found were differences of opinions remain.

Finally he noted that once the work on B-12 has been completed, the group would need to turn its attention to the challenges associated with the widespread acceptance of CSB and the ability to scale it to a level where it becomes a useful tool in contributing to mapping the world's oceans.

1.3. Introductions

The Chair invited new participants to introduce themselves. Introductions were made by:

- Akim Mahmud – US NGA
- Helen Snaith – BODC – SB2030 global Centre lead

1.4. Approval of Agenda and CSBWG11 report

The Chair noted that the Agenda was heavily weighted to focus on finishing the work on B-12, however everything possible would be done to protect the session on Day four that would deal with updates on CSB related activity.

Decision 1. The Agenda and CSBWG11 report were accepted.

1.5. Review of Actions

It was agreed that open action items from CSBWG11 would be addressed during the various agenda items and any remaining would be reviewed with new actions and decisions arising from CSWG12 post meeting.

Action 1. IHO Sec to circulate consolidated Actions and Decisions following CSBWG12

1.6. Introduction to future operational considerations

With the permission of the Chair, this item was deferred until CSBWG13.

2. B-12 review

2.1. B-12 Status and Goals

The Chair gave a summary of the intersessional work that had been carried out since CSBWG11 to progress the revision of B-12. She further stressed that this has been a difficult process but thanked all for their perseverance.

LS explained the process of submitting B-12 Ed. 3.0.0 to IRCC for endorsement ahead of circulation for MS approval. In doing so he referenced Resolution 2002 as amended which sets out this process.

2.2. B-12 Document-wide Proposed Changes

The Chair explained that in order to progress the revision intersessionally, the various chapters had been worked on by separate teams; doing so had introduced a number of editorial inconsistencies. To redress this an editorial review had been undertaken by the Chair and IHO Secretary. The chair went through the issues that had been addressed. A number of observations were made by the participants:

- Brian Calder (**BC**) noted that British or international English preferred as opposed to 'Queens English';
- A question was raised re. the difference between Openly, freely and publicly. The Chair acknowledged that this can be an issue but noted that this would be discussed further later on agenda;
- Steve Keating (**SK**) advocated for remaining consistent with other international publications. He specifically mentioned that Echo Sounder is used in documents such as SOLAS;

- The Vice Chair stated that openly is used in the context of the International Open Data Charter. Open data is a global resource and therefore free.

2.2.1. B-12 Drafting of resolutions to outstanding document-wide changes

Completed in other agenda items

2.2.2. Recap of agreed changes and outstanding issues

Completed in other agenda items

2.2.3. Member State vote if required

Not Required

2.2.4. Wrap up and next steps

Summarised in later Agenda items

2.3. B-12 Review of Individual Sections

The Chair explained the format of the session. The suggested changes for each chapter would be presented by the associated review team, with options identified where required. The notes of these discussions below should be read/reference in conjunction with the presentation available [here](#).

2.3.1. B-12: Introduction

Discussion topic 1. CSB Definition

The Chair presented the seven iterations of the definition that had been worked up. She explained that the consensus in the intersessional work was that we should add 'sharing', leave in 'Standard navigation instruments'. A number of the definitions were discussed but eventually the group decided on an eighth option with amended text - "CSB is the collection and sharing of depth measurements from vessels, using standard navigation instruments, while engaged in routine maritime operations".

Decision 2. Option 8 to be the new definition of CSB.

Discussion topic 2. New text from IHO for Forward

New text for the IHO Secretary General's (**IHO SG**) Forward was presented to the group. There has been an existing question over the inclusion of the SB2030 project in the Forward given that it has an end date, whilst B-12 is a publication in perpetuity. It was noted that there is also a reference to UN Ocean Decade. The Chair noted that any issues identified would be referred back to the **IHO SG** given it is his

Forward. Suggestion was made to remove reference to IMO regulations as it is not deemed relevant. This suggestion was supported.

Decision 3. Text agreed, noting changes and suggested adjustments.

Discussion topic 3. Use of the word ***Not***

It was proposed to retain the italicised ***not***.

Decision 4. Agreed

Discussion topic 4. Who are the intended users of B-12?

The Chair proposed four options:

1. The IHO seeks to reach out to all potential crowdsourced bathymetric data collectors and users and provide them with guidance.
2. The IHO seeks to reach out to all potential crowdsourced bathymetric stakeholders and provide them with guidance.
3. The IHO welcomes the provision of all types of data to improve knowledge for the best possible representation of seabed and the water bottom. IHO seeks to inform and guide collectors of crowdsourced bathymetry data.
4. The IHO seeks to inform and guide all stakeholders of crowdsourced bathymetry data.

The Chair proposed option 4, which following a brief discussion was agreed.

Decision 5. Agreed

Discussion topic 5. Description of Chapter 4.

The Chair proposed new text for the description of Chapter 4 which reflected the change in the title of this chapter. The proposal was agreed.

Decision 6. Agreed

2.3.2. B-12: Data Contribution

The Chair, who was the review lead for the Data Contribution Chapter, took the group through the minor edits to the section summarised as:

1. Data contribution to DCDB - Substituted 'freely and publically' available for 'openly';
2. IHO DCDB. New suggestion for new wording on data archiving and discoverability;
3. Overview of CSB data flow. Proposed revised wording that is more accurate with regard to UNCLOS and waters of national jurisdiction;

4. Overview of CSB Data Flow. Proposed text relating to nations that consent to CSB activities in their waters;
5. The trusted node model. Revised text relating to nature of contributors that will be accepted;
6. Accessing CSB Data. Revised text with more detail relating to what the data package will include.

Decision 7. Minor edits 1 – 6 Agreed

Discussion topic 1 – List example users; term Mariners

The Chair explained that there is a lot of inconsistency in the document where the various stakeholders are either described as CSB data contributors or named by sector/occupation e.g. mariners. She provided updated text that explained the context of the onward usage of the term 'CSB Data Contributors'.

It was suggested to add the term 'indigenous peoples', for which the IHO Sec confirmed that this was the appropriate term currently used within the UN system. It was suggested that a 2 page flyer could be created for Indigenous Peoples

It was noted that the given the proposed change to the Creative Commons licence, that this reference should also be adjusted.

Action 2. Consider production of dedicated 2 page flyer for indigenous peoples

Decision 8. New text agreed with addition of indigenous peoples and CCO reference.

Discussion topic 2 - Trusted Node Model suggested text from Denmark (DK) relating to CSB and national jurisdiction.

The Chair introduced the new wording as provided by DK. The question posed to the group was whether this was the correct location for this statement. It was agreed by the group that this passage would be a better fit in the Additional Considerations section.

It was asked whether a new Circular Letter asking for Member States to indicate whether they support CSB would be released once B-12 was published? The IHO Sec indicated that at present there is no plan for a future CL as the previous two CLs were deemed to still be in force. However, it was agreed that following the successful publication of B-12 3.0.0, this position could be reconsidered

Action 3. IHO to consider whether a new CL is required following publication of B-12 3.0.0

Decision 9. Agreed to move proposed text to Additional Considerations section

Discussion topic 3 – How to become a trusted node is still unclear.

The Chair explained the intersession work that had been undertaken and proposed text that would form a new section. She made it clear that this text would reference a separate document that exists outside of B-12 so that it could be maintained separately and outside of the formal IHO Publication management system. This is necessary because it is a document related to the DCDB rather than B-12.

Decision 10. New text agreed

Discussion topic 4 – References to DCDB-maintained documents.

The Chair, as the Director of the DCDB, proposed that the two annexes - 1) Trusted Node Data Submission Form and 2) CSB Data Submission to IHO DCDB Guidance Documentation – be separated from B-12 and made available via a URL to where they will be stored and maintained by the DCDB. The rationale being as described above.

Decision 11. Separation of documents agreed

Discussion topic 5 – Updated Data Access Text

The Chair presented the new text regarding how to extract data from the DCDB viewer and cloud-hosted point store.

Decision 12. New text agreed.

2.3.3. B-12: Data Collection

Thierry Schmitt (**TS**) introduced the section and the process the group had gone through. He took the group through some of the previous edits agreed at CSBWG11; these included moving to echosounder from other terms, maintaining the balance of detail vice accessible language for non-specialists, and the focus on data collection – not on onboard data management (any details concerning loggers have been removed). He then went through the various discussion topics.

Discussion topic 1 – Sensor Offset – where to detail information

New text was provided that clarified that the sensor offset information is normally entered into the specific echo sounder software.

Decision 13. New text agreed.

Discussion topic 2 – Sensor offset – effects

TS proposed new figures relating to Sensor Offsets. He noted that the Figures were previously used in the uncertainty section and clarified that the proposed insertion

aims to describe more explicitly the consequences of poor relative measurements of the sensors.

Decision 14. Insertion agreed.

Discussion topic 3 – Generalisation of sensor offsets concept to more complex systems (i.e Multibeam)

TS proposed new text that explains some of the greater complexities of using a multibeam in the context of CSB. He noted that this one case where it was appropriate to use the term Echosounder.

Decision 15. New text agreed.

2.3.4. B-12: Data and Metadata

Georginana Zelenak (**GZ**) introduced the chapter and the intersession work that had been undertaken. In terms of minor edits she noted that the terms ‘optional’ and ‘Required’ had been replaced with ‘Recommended’ and ‘Required’ respectively.

Decision 16. Replaced terms agreed.

Discussion topic 1 – Reordering of topics

GZ presented the proposed reordering of the topics within the chapter to put a greater emphasis on those mandatory fields.

Decision 17. Reordering agreed.

Discussion topic 2 – Depth sensor vs sounder

GZ explained that three suggestions had been discussed for what term to use to describe the equipment used to take a depth measurement. These were depth sensor, echo sounder and sounder. Whilst the group agreed that the term ‘depth sensor’ was the most generic/universal, in specific cases it would be necessary to be specific. It was agreed that this should be picked up in the final editorial review.

Decision 18. Use of the term ‘depth sensor’ agreed subject to editorial review to ensure that the correct term is used where being specific (e.g. MBES).

Discussion topic 3 - CRS of navigation data, vertical reference of depth, and vessel position point.

GZ noted that the CRS is not listed as a metadata field and the vertical reference of Depth is an optional field. With this in mind, three suggestions were discussed:

1. Incorporate these fields into Table 1. Trusted Node Metadata
2. Incorporate these fields into Table 2. Mandatory Information
3. Incorporate these fields into Table 3. Recommended Metadata - Vessel Information and Sensor Configuration

Decision 19. Option 1 agreed.

Discussion topic 4 - Topic 4 – specify vessels PRP longitude and latitude geographic coordinates.

New text was proposed to more accurately describe the vessels Position Reference Point in terms of Longitudinal and Latitudinal geographic coordinates.

Decision 20. New text agreed

Discussion topic 5. Creation of sensor description composite metadata field

GZ explained that there are numerous fields for adding sensor information, but that it this is not exhaustive and overly complex. The proposal is to have one single composite metadata field that contains the type, make, model and position of the sensor. Optional information could be added beneath table three.

Decision 21. Proposal for composite metadata field agreed.

Discussion topic 6 – Level of processing

A proposal was made to add 'Data Processed' field to Table 3. Recommended Metadata - Vessel Information and Sensor Configuration. Anticipate true/false response. If true, optional fields in section 3.3.4 should be reviewed. If false, information in 3.3.4 is not needed.

Decision 22. Addition of field and conditions agreed.

Discussion topic 7 – Additional metadata table for processing

A new section was proposed with corresponding table.

Decision 23. New section agreed.

Discussion topic 8 – Reference point for time

A proposal was made for the addition of a new field and associated naming convention.

Decision 24. New field and naming agreed.

Discussion topic 9 – Sound velocity value

The proposal was made to maintain the sound speed applied field and request additional metadata if answer is true. It was noted that sound speed over sound velocity should be used in this case. It was recommended to strengthen the guidance to be very specific which fields should be completed if Sound Speed applied = True. It was also decided that in the case of using Applied vs. Documented that the use of Documented was more logical and accurate.

Action 4. Review the section to identify other areas where we need to be more specific regarding which fields need to be filled out when Sound Speed = True.

Action 5. Change the name of the section to Sound Speed Documents rather than Applied.

Action 6. Change name of Position Offset Applied to Documented for consistency.

Decision 25. Proposal Agreed with further clarification of the meaning of ‘false’ to make it clear that this is to be used where we have no information regarding the Sound Speed.

Discussion topic 10 – Specification of SI units

Proposal was made to add a description of SI units relating to knots.

Decision 26. Proposal agreed.

Discussion topic 11 – New Version 3.0 convention needed potential addition of XYZ example

Proposal to reference new convention, use new sample file, create additional annexes for demonstrating only mandatory fields in GeoJSON format and demonstrating xyz format.

Action 7. Make GeoJSON file example available via DCDB website

Decision 27. Proposal agreed.

Discussion Topic 12 – Inclusion of Encoding Information

The notion of having a dedicated encoding guide was discussed. Whilst it was agreed that there was clearly value in such a resource, it was accepted that this was beyond the scope of this review and that careful consideration would need to be given to the format, and impact on future revisions of B-12.

Discussion Topic 13 – Controlled Vocabulary

In a similar vein to the proposed encoding guide in discussion topic 12, guidance on naming conventions and use of vocabulary could be included in such a companion document. After a discussion, this position was adopted.

Decision 28. Defer creation of an encoding guide until future revisions of B-12.

Discussion topic 14 – Data License

It was proposed that a new field was added that would reflect the license that covered the data.

Decision 29. Proposal agreed.

2.3.5. B-12: Data Quality

Giuseppe Masetti (**GM**) introduced the chapter and the work that had been done in the intersession. He explained that the main driver had been to make the information more accessible to potential data contributors by reducing technical content to the minimum required in order to effectively participate in CSB.

Discussion topic 1 – Change of Chapter title

Proposal to change the title of the chapter to Data Quality Assessment.

Decision 30. Change to title agreed

Discussion topic 2 – Reduce the error theory component

GM proposed that this section was significantly reduced in content to better suit the intended user of the document. It was noted that the information which would be removed still had a value and could exist as an annex or companion document of some kind. The question over exactly where this document would live was posed. It was noted by the IHO Sec that if possible, repeating technical detail in B-12 that exists in another authoritative IHO publication should be avoided and instead, an appropriate reference be made within the text.

Decision 31. Agreed reduction in detailed text subject to decision on where to place redacted text.

Discussion topic 3 – Emphasis on data quality/consistency

It was reported that the DQWG recommends that emphasis is put on data quality and consistency assessment. Concern was raised regarding the use of the term ‘cross-lines’ to improve quality as it changes the nature of the activity and could be considered systematic survey, therefore having UNCLOS implications. In light of this,

a counter proposal was made to consider explaining that vessels undertaking historical cross lines may be acceptable. Following a lengthy discussion it was proposed that the introduction of the concept be approved, but an action taken to rephrase the content.

Action 8. Rephrase content to remove references to systematic survey techniques.

Decision 32. Inclusion of the concept agreed subject to appropriate wording.

Discussion topic 4 – Data Quality report

Proposed that a non-mandatory data report feedback be used, together with an example data quality report. Discussion over whether the proposed annex is in the spirit of the CSB definition or whether it is indicative of a systematic survey commissioned by the MS and undertaken by citizens. Revised proposal is to seek consensus for approval of first paragraph relating to data quality feedback, whilst removing annex C. GM and MR agreed to explore working up an alternative example that was less like a systematic survey.

Action 9. GM and MR agreed to explore working up an alternative example

Decision 33. To remove example Data Quality report until a new example is developed. – See action 50 for updated way ahead.

2.3.6. B-12: Additional Considerations

The Chair introduced the chapter and recapped the history of the content. She went through the work that had been undertaken in the intersession and highlighted some of the challenges that had been encountered.

Making specific reference to licensing, she recalled that the data licensing text found in the Additional Considerations section was reviewed by NOAA and the IHO as part of the overall review of B-12. In consultation with NOAA legal counsel, US representatives proposed updates to clarify which entities potentially held rights to the CSB data, what permissions the IHO, DCDB, and users needed in those data to meet CSB policy objectives, and what data providers needed to do to provide those permissions. While proposing these edits to the IHO, US representatives also proposed switching from the CC BY license to the CC0 public domain dedication, to confirm that data providers are relinquishing any potential rights in the data and that there are no restrictions on use. CC0 still includes a disclaimer of warranty and other legal terms, is one of the Open Knowledge Foundation's recommended conformant licenses, avoids any suggestion that data not eligible for copyright protection is being afforded such status, and eliminates the problem of attribution stacking when integrating multiple datasets. She noted that the IHO Secretary General is in strong agreement of these proposed changes and endorses the suggested updates.

Minor edits – the chair proposed new text to replace the word ‘uncertainty’ with ‘quality’ when referring to data.

Decision 34. New text agreed

Discussion topic 1 – Proposed new text relating to periodicity of review of information provided.

Proposed new text to state that the information is not exhaustive in this section and may be updated periodically

Decision 35. New text agreed

Discussion topic 2 – Removal of the term Passage Sounding

The Chair explained that ‘Passage sounding’ is used correctly in the document in other places, however in this context it was not appropriate so the proposal is to replace it with CSB.

Decision 36. Agreed to replace term with CSB

Discussion topic 3 – Change of data license and associated text

The Chair recapped the background driving the change of licenses and the associated proposed new text. A question was raised regarding whether a change of licensing would have implications for those nations that had already responded to the 2 CLs with certain caveats. Both the Chair in her capacity as Director of the DCDB and the IHO confirmed that this had been carefully considered and that there would be no conflict.

Decision 37. Proposal and new text agreed.

Discussion topic 4 – Updating data licenses

The Chair proposed new text that explains the IHO may, in the future, update its selected licenses as the versions and terms of the Creative Commons licenses change. Publication of any updates to the license in B-12 will be an administrative change to the document, and CSB stakeholders will be notified by IHO Circular Letter and on the DCDB Website.

Decision 38. New text agreed.

Discussion topic 5 – Trusted Node Agreement form

The Chair recapped the proposal to separate the TN agreement form from B-12, that the IHO would become the countersignatory and associated new text to describe this

change. GM asked for clarity over the rationale for the TN agreement forms not being publicly available. It was explained that this was not possible due to the need to protect personal and/or proprietary information. It was also suggested that there was no obvious need for signed forms to be in the public domain. Following further discussion there was support for an official list of trusted nodes which the Chair, in her capacity as Director of the DCDB agreed to provide.

Action 10. Chair to publish list of CSB Trusted Nodes

Decision 39. TN Form to separated from B-12, IHO to become the signatory and associated new text agreed.

2.3.7. B-12: Annexes

The chair introduced the annexes and described the two proposals. 1) to live with the existing text with minor updates and update via clarification or revision at a later date or 2) to identify any important new terms, define them and seek endorsement by the end of the meeting.

Julian Desroschers (**JD**) asked whether we should be including the term citizen science in our definition of CSB. The Chair agreed with the sentiment but revisited the challenges that this would bring at the current point (with regards to UNCLOS MSR implications), but that we should try to move us to this position in the future.

A number of new terms, including 'open data', were suggested for inclusion. The Chair noted that it was impractical to go through all of these terms in plenary, and agreed that as a minimum we should seek to remove terms and associated definitions that have been changed or are no longer in use. She requested that the review team section leads take an action to review the annexes from the perspective of each of their subject areas and report back to plenary with required changes.

Action 11. Section leads review and propose deletion/addition of terms and abbreviations as required.

Moving on to the contributions section, the Chair showed the existing annex which consists of a page of logos. She noted that this would not be possible to reproduce the annex in this format due to the large number of contributors. She tabled three proposals:

1. No list
2. Include a list of organisations of all participants in last three CSBWG meetings
3. List individuals with affiliations who have participated in the last three CSBWG meetings

Decision 40. Participants in the last three CSBWG meetings will be invited to indicate that they wish to be included in a list of contributors.

2.4. B-12 Remaining Issues - Document-wide and Individual Sections. Discussion of remaining issues.

The Chair led a final review of outstanding issues that had been identified on day 1 and 2 of the meeting along with the suggested way forward on each count. These are summarised in this report by noting the Chapter number and discussion topic number for reference. These references correspond with the discussion presentation available [here](#).

Chapter 1 – Topic 5

New text proposed. Additional suggestion to remove the word ‘Hopefully’ so as not to diminish confidence in the document.

Decision 41. Proposals agreed.

Chapter 1 – Topic 6

New text proposed. IHO Sec gave reference to relevant UN Declaration. Suggestion that the order of stakeholders to have indigenous peoples earlier in the list.

Decision 42. Proposals agreed.

Chapter 2 - Topic 4

Proposed new text was submitted to the group. Minor edits were suggested including replacing swath sounder with Swath systems. It was also suggested to remove the footnote.

Decision 43. Proposal agreed.

Chapter 2 - Topic 5

Suggestion to replace MBES with Swath Bathymetry System. There was a question over whether Bathymetry needs to be used at all given previous references. The consensus was that it should for completeness. It was noted that all the content in the chapter needs to be considered.

Decision 44. Proposal to replace terms agreed.

Chapter 3 – minor edits

- 1- Reordering of strings
- 2- Revised text
- 3- Revision to date and time stamp

Decision 45. All edits agreed.

Chapter 3 – topic 9

Bullet 4 - Change to SS Documented.

Bullet 5 - Additional language to make it specific which metadata fields should be populated and strengthening the recommendation it was proposed to change wording to ‘no information about how sound speed was applied...’

Bullet 6 - Replace applied with documented. Additional proposal for the specific metadata field be reference for positional offset.

Bullet 7 - proposal to include ‘strongly recommended’

Decision 46. All proposals agreed.

Chapter 4 – topic 1

Question was where to put the removed uncertainty content. Three options were presented and option 3 was chosen.

Decision 47. Option 3 agreed.

Chapter 4 – topic 2

Revised text to remove references to systematic survey from the self – consistency/ peer consistency sections. The concept and term of ‘Peer consistency’ put forward for consensus. After a long discussion the following text was proposed – “The peer-consistency assessment of a dataset can be performed when there is overlap with existing data”.

Decision 48. Proposed text agreed.

A Self-consistency statement was proposed – “the self-consistency assessment of a dataset can be performed where redundant measurements available. In Practice, this assessment is usually obtained by analysing lines of soundings that cross each other”.

Decision 49. Proposed text agreed.

Chapter 4 - topic 4

A new template was proposed. The title was adjusted to make it consistent with earlier agreed changes.

Decision 50. New template agreed.

B-12 Annexes

Section leads reported back on proposed removal of no-longer relevant abbreviations and definitions. It was further proposed to identify terms to be added in the future and defined during intersessional and/or future CSBWG meetings.

Decision 51. Adjustments agreed and new approach agreed.

DK proposed a new annex to clarify the relationship between B-12 and the supplementary documents that were formally annexes. A counter proposal was made that recommended appropriate language be added to the additional considerations chapter instead of creating a new annex. In doing so, the wording was softened to indicate that the supplementary documents would be consistent with B-12.

Decision 52. New text agreed.

2.5. Wrap up and next steps

The Chair wrapped up the B-12 session and thanked everyone for their dedication and contributions over the last three years. She noted that subject to implementing the decisions that had been agreed and a final editorial review, we were in a position to submit B-12 Ed. 3.0.0 to IRCC14 for endorsement. She invited the IHO Sec to elaborate on the process and next steps.

IHO Sec explained that following the final Editorial review, it is proposed to submit the document to IRCC14 for Endorsement, and if this was successful, it would then be circulated to Member States for approval. In doing so it would require one third of Member States to respond and of those a simple majority would be required for it to enter into force. The IHO Sec sought permission from CSBWG members via silence procedure to move forward with the submission of B-12 Ed 3.0.0 to IRCC.

Decision 53. CSBWG12 agreed to put B-12 Ed.3.0.0 to to the WG with post meeting edits ahead of submission to IRCC14 for Endorsement and subsequent approval by Member States.

Action 12. Chair and IHO Sec to implement decisions made at CSBWG12, undertake final review and submit to IRCC14 for endorsement.

3. Messaging and Outreach

3.1. Updates from CSB/Seabed 2030 RHC coordinators

The Chair introduced the session and invited the RHC Coordinators to provide a short update on activity in their respective regions. The presentations given are available on the IHO website with highlights summarised below:

SAIHC – C. Theunissen

- CT gave some background to the CSB concept and trial being undertaken in the SAIHC Region. A collaborative project between SANHO and the Institute for maritime technology.
- The trial has two parts - data collection and data sharing
- He went through the execution of the trial. He recapped where they had got to by the last CSBWG, and stated that 2 new stakeholders had been identified taking the total to 28. These cover the following sectors; commercial fishing industries, recreational boating, government vessels, small scale subsistence fishing community, private sector and SAIHC member states.
- He showcased the vessels that they are working with, noting that some are actively recording data, some still need data to be recovered and others have had technical troubles.
- He noted that data has already been shared with GEBCO and gave an indication as to the extent of this.
- Turning to challenges, he cited low/tentative response from fishing and offshore mining sectors, COVID 19 restrictions, lengthy decision making processes, limited off the shelf deployments, SAIHC members not fully committed to CSB, data acquisition and processing and data quality issues as considerations.

SWPHC – S. CAIE

- SC gave an update on CSB activities in the SWPHC region.
- Palau. Number of data loggers have been supplied coordinated through the NIWA hosted portal.
- Follow up work with the Solomon Islands ongoing to discuss future work and collaboration.
- In New Zealand a number of test cases are underway with the regional SaWPac Regional Centre.
- Four data loggers have been installed on two private yachts and their workboats
- Data now with SaWPac Regional Data Centre
- He noted that NZ/SWPHC will be involve in the upcoming SB2030 webinar series.

ARHC and NSHC – E. Flier

- EF provided a brief on activity for two RHCs
- He illustrated the need for CSB in areas such as the Arctic by using real world examples of data paucity.
- He covered recent advancements in data availability and how this would be incorporated into the IBCAO and showed a comparison of data availability by RHC region
- He provided an update of the Canadian Hydrographic Service's CSB activities, including the new data logger that they have developed and the equipping of a number of Canadian Coastguard vessels with loggers.

BSHC – J.P. Hartmann

- He went through the response to the CL11/19
- He noted the intention to canvas the opinion of BSHC members what their thoughts are on the CL to provide a better status update
- He presented some ideas for how MS can get involved including applying to SB2030 to become the next funded member

EAHC – T. Dias

- TD provided an update from the EAHC region.
- He reported that there is a MSDI working group for EAHC. This group has a number of actions relating to CSB including the identification of data sources. He summarised the efforts currently being undertaken. This included the example of Cape Verde where bathymetry from three research vessels was identified, compiled and processed.
- He advised that data would be made available to GEBCO and that he hoped to have a more comprehensive update at the next CSBWG.

3.2. CSB Project updates

3.2.1. CIRM & discussion on the NOAA Assist service - A. Bergstrom - Presentation

3.2.2. FarSounder (pre-recorded) - Presentation

3.2.3. Great Barrier Reef project - Presentation

3.2.4. SealD - Presentation

3.2.5. SevenCs - Presentation

3.3. Outreach next steps

3.3.1. Formalisation/certification of becoming a 'Trusted Node'?

Linden Brinks (**LB**) provided an update on the work of the Great Lakes Observing System (GLOS) and explained that they had just established a Trusted Node. In doing so they had considered what could be done to elevate or formalize this status. Initial ideas centred on specific TN Branding, a public register and the concept of having TNs for specific regions or sectors.

The Chair thanked her for the presentation and the idea but noted that there could be unintended consequences of over formalizing or raising the bar to entry for potential TNs. The group acknowledged that the idea merited further conversation and it was noted as a topic for future meetings.

3.3.2. Discussion and planning of intersessional CSB project related webinars

The Chair noted that given the focus of previous meetings had been almost entirely on B-12, that she was very keen to provide more opportunities for industry and those engaged in promoting CSB related activities to present their work. With this in mind,

she floated the idea of intersession webinars that could be focused on particular sectors or topics. The group agreed to further this discussion post meeting.

Action 13. Chair to canvas opinion for intersession industry webinar

4. Closing issues

4.1. Review of ToRs

It was agreed to revisit any updates required to the ToRs until CSBWG13 when the focus would be strategy and the group will have a better idea of priorities going forward.

4.2. AOB

The Chair and IHO Sec undertook to circulate a post meeting questionnaire to gather feedback as a retrospective given the hybrid nature of the meeting.

Action 14. Develop and circulate retrospective questionnaire

The notion of having extra/new supplementary documents to compliment B-12 with some of the extra detail that has been removed was discussed. It was agreed that this would be picked up at the CSBWG13.

4.3. Confirm date and venue of intersessional activity and CSBWG13

Initial dates were discussed but it was noted that the IHO calendar was very busy in autumn 2022 given that 2023 would be an Assembly year. It was agreed that potential dates and Venue would be explored post meeting.

4.4. Review of List of Actions and Decisions for CSBWG12

To be circulated post meeting for approval

4.5. Draft Agenda for CSBWG13

To be created following confirmation of B-12 submission to IRCC and outcome of intersession Webinars.

4.6. Discussion on outstanding issues and post-meeting expectations/focus

The Chair explained how the process of conducting post meeting activities will be undertaken. She reiterated the desire to complete a retrospective of the meeting to find out what went well and what didn't.

SM reflected that having been the only member who was both there in person (3 days) and remote (1 day), it was definitely more beneficial to be there in person. We should



really strive to be an in person group at the next meeting (world pandemic and conflicts pending).

DH (participating remotely) stated “Thank you all for this excellent meeting! I trust that you'll manage the next steps the best you can. You've been great at managing the challenging exchanges with patience and diplomacy. THANK YOU AGAIN! Please keep Hybrid meetings, Time zones are manageable, whatever the future of traveling is”