15th Meeting of the IHO Crowd Sourced Bathymetry Working Group

Report

4-6 April 2024

IH Secretariat, Monaco

(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

Mathias Jonas, IHO Secretary General offered some opening remarks in which he celebrated that ocean mappers were 'coming home' to Monaco. He noted the importance of the sustainability component of initiatives such as the UN Decade of Ocean Science for Sustainable Development and suggested that CSB is entirely consistent with these ambitions given its economic efficiency, repeatability and low barrier to entry for participation.

The Chair added her welcome to participants and provided an introductory presentation – Presentation

In highlighting key elements, the Chair introduced the new document, CSB 101, and mentioned it is open for feedback and recommendations from the team.

The Chair reminded the group that they have agreed to meet in person once a year and conduct one video teleconference (VTC) intersession.

It was noted that the current ToRs on the website need to be updated to reflect the new work plan.

Action 1. Update ToRs on website

1.2. Domestic and administrative arrangements

The IHO Sec explained the administrative arrangements.

1.3. Introductions, apologies and approval of agenda (read ahead)

Some minor changes in scheduling were noted by the Chair and these were accommodated.

1.4. **Approval of CSBWG14 report and review of actions (read ahead)**

The CSBWG14 report was tabled and approved subject to a correction of the labelling of work items I&J.

The actions from CSBWG14 were reviewed. Following a discussion on the process of reporting on new positive replies to the CSB CLs, it was agreed that members should be alerted to these developments I real time.

Decision 1. CSBWG14 Report Approved
Decision 2. Actions reviewed and updated

Action 2. Alert the group of additional coastal states as they approve CSB in waters under national Jurisdiction.

2. **IHO Related Efforts – Status Updates**

2.1. IHO Website

SJC gave an update on the progress with the IHO CSB Website. She acknowledged the CIDCO site and mentioned that the IHO site is meant to show an institutional perspective, creating two complementary sites. She highlighted that the projects page is in progress, with logos and pictures to be added. A question was asked about access and discovery, specifically the location of the CSB page within the IHO site, and whether WG members could share the link directly to the CSB page, acknowledging the navigation challenges within the IHO site. In reply it was pointed out that technical work is being done to update the URL and add it to the "about" drop-down on the IHO site. Current URL: https://iho.int/en/crowdsourced-bathymetry

It was suggested that the CSBWG 101 document be added. The Chair indicated that the document is specifically a WG 101 document and envisioned it falling on the WG page under 'documents', but this could be reviewed by the outreach subgroup. It was further suggested cross-referencing with a link for those considering joining the WG.

It was suggested that flyers currently under the WG page could be added under contributions on the updated CSB site.

Action 3. Cross reference the CSBWG 101 Document between the CSB initiative page and the CSBWG basic documents.

Action 4. Gather feedback on IHO and CIDCO hosted CSB websites

Action 5. Include link to 2 page flyers on CSB initiative page

2.2. IHO DCDB

Georgianna Zelenak (GZ) provided an update on relevant DCDB activity – [Report](#)

Key elements presented were:
- Data can now be accessed via API.
- Data can be reviewed prior to publication if required as per CL response.
- Thanks, given to DK and FR for providing feedback on the Coastal State Review app.
- The Autogrid application currently provides grids based on Multibeam data, with work in progress to include CSB data.
- The next generation of the map viewer is also under development.

In summarising, GZ requested feedback and acknowledged the value of feedback from this WG.

Question - is monitoring the number of views and downloads, including who and where, is possible? It was noted that it is not currently available but is recognized as important for future implementation.

The value and potential use cases for the various metrics that could be extracted were discussed and acknowledged. It was agreed that these metrics could be served up as a DCDB dashboard to aid decision making.

Other Items for the DCDB team to follow up on included:

- Raymarine data: Discussion about sharing mechanisms, industry collaboration, and the types of files needed.
- CCOM: Follow-up on referencing schema/validation tools in submission guidance docs
- Outreach subgroup/Sarah G: Options to build out DCDB internal dashboard for external community use.
- COMIT: Will be sending ASV CSB data.

Action 6. Gather feedback as metrics that could feed a DCDB Dashboard and report back to CSBWG Intersession.

3. CSBWG Work Items – Status Updates

3.1. Work Item A: Maintain & Update B-12

Guillaume Morisette (GMo) provided an update on Work Item A – Report

Having reviewed B-12 Ed. 3.0.0, GMo noted that there are elements that are already out of date. His report focused upon how a change is needed to the way B-12 (as a formal IHO Publication) is maintained/updated and the governance that covers this process. He suggested that a far more agile approach was required and that a committee of experts spanning HOs, Industry and academia should be formed with a view to rapidly innovate.

Having discussed the rationale and options at length, a number of observations were made. Firstly, creating a dedicated project team to take responsibility for B-12 maintenance was possible, and the IHO Sec recommended that the Chair liaise with Megan Greenaway, Vice Chair of the HSWG and Chair of the S-44 PT, to get her advice.

Secondly, if an alternative approach to maintaining B-12 was required, then a detailed proposal should be submitted first to the CSBWG, and subject to endorsement, submitted to IRCC for consideration. Such a proposal should have a clear product review cycle and explore the tensions between innovation and operational structure/governance and justify any proposed changes.

Thirdly, members of the CSBWG who represent MS should investigate who could participate in such a group.

Action 7. Chair to organise meeting with Megan Greenaway to discuss setting up a B-12 Project team.

Action 8. Develop proposal for consideration by IRCC for how to manage B-12 going forward

Action 9. MS to investigate potential member/representatives from their respective HOs to Work Item A team

3.2. Submit IHO CSB initiative as a UN Decade Action

Evert Flier (EF) provided an update work item B.

EF explained that at CSBWG14, the IHO Sec had been tasked to develop a proposal for the new structure of the CSB Initiative for consideration at CSWG15, noting that this is a precursor to considering how the CSB initiative could be formally aligned with the UN Decade.

IHO Sec presented the options paper on the proposed structure of the IHO CSB Initiative and outlined the pros and cons of each option - Report.

IHO explained that the key distinction between the options is that Option 1 would define the entirety of the CSBWG work plan as the CSB Initiative, whereas Option 2 would have a distinct CSB Initiative Work item (through which participants in the initiative would have access to the output of all of the work of the CSBWG). After a discussion, Option 2 was agreed as the way ahead. Noting this, it was decided that this new structure would be proposed to IRCC16, together with a recommendation for a new work item.

Looking to the future of work item B, it was acknowledged that there are lots of different options of how CSB can be formally aligned to the UN Decade. Following approval of the CSB Initiative structure by IRCC16, this will be investigated and brought back to the group for consideration.

Decision 3. Option 2 of proposal endorsed as structure for IHO CSB Initiative.

Action 10. Propose to IRCC to create new work item called the CSB initiative

3.3. **Gather & prioritize HO-specific issues/opportunities regarding national policy/regulations related to CSB**

Chair delivered an update on Work Item C - Report

Key discussion points centred around the amount of data that is currently filtered out in the DCDB due to lack of permissions given by MS for data release in waters under national jurisdiction, and the interpretation of the MSR provisions within UNCLOS.

Belen Jimenez (BJi) – noted the potential for overlap. Noted the need to draw a line under individual work items and deliver them to the various other work items.

David Millar (DM) asked whether more could be done at the policy level. IHO sec noted the work being done at the conferences and the EOV

The IHO Sec reminded the group of the work being undertaken to have depth included as a GOOS Essential Ocean Variable, and how it is hope that this will help MS recognise the value of CSB.

Action 11. Discuss with IHO and Seabed 2030 the feasibility of developing online platforms or dashboards to showcase mapping progress and CSB acceptance by individual States.

Action 12. Develop list of positive coastal States, request the policy framework(s) or guideline(s) adopted by coastal States who positively responded to IHO CL 21/2020 or IRCC CL 01/2020

3.4. Gather and prioritize HO-specific issues relating to CSB data

Anthony Klemm (AK) introduced Work Item D - Report

Each of the four sub tasks was introduced and an update on the status provided (refer to the report for details):

D1: Classification of CSB Data Using S-44 Matrix - Ongoing

D2: Evaluation of CSB in DCDB for Nautical Cartography - Ongoing

D3: Industry Engagement for DCDB-hosted CSB Data Tools - Ongoing

D4: Standards for Describing CSB Data on ECDIS – Ongoing

The key takeaway points were summarised as:

- API access and data review processes have been improved.

- Industry and technical engagements are ongoing to enhance tools and data usability.

- Emphasis on quality assurance and data rescue efforts to maximize the use of available data.

- Development of analytical tools and dashboards for better transparency and decision-making support

The Chair posed a question as to where these tools could be found and accessed, which sparked a conversation about how and when users should be given access to the output of the work item.

Action 13. Investigate what tools need to be shared and where.

3.5. Support CSB/SB2030 Coordinators in their RHC engagement

BJi introduced work item E - Report

The work item, participants and the approach to analysing perceived issues was described. The current status quo and system of RHC representatives was described. It was reported that the group had identified 3 sub tasks and an update on their status was provided (see report for details):

E-1: Revisit and update the CSB/SB2030 Coordinator role, aiming to clearly define responsibilities and provide guidance to minimize the burden and maximize success - Complete

E-2: Work with Coordinators to develop regional strategies aligned with CSBWG and SB2030 goals, recognizing the need for tailored support in different regions – Ongoing/complete

E-3: Raise awareness of CSB in the IHO Capacity Building Subcommittee, with a focus on identifying potential capacity-building activities – Planned

The findings from the work item lead were discussed and a number of issues were highlighted. It was noted that the CSB/SB2030 coordinator guidance could be made available more widely, perhaps through uploading t to the CSBWG website. In terms of briefing material used, it was noted that EBCO SCRUM produces annual update, and these figures could be used accordingly. In terms of support and further improvement of briefing materials, the value in this activity was acknowledged and it was agreed continued support, further refinement of documentation and the organisation of Coordinators meeting would be essential. On the latter item, it was agreed that the outcome/takeaways from such a meeting should be fed back to the group.

Action 14. Upload CSB/SB2030 coordinator guidance onto the website

Action 15. SCRUM updates the HC percentages - look at how to use this as input to the regional updates

Action 16. Continue supporting CSB/Seabed2030 Coordinators

Action 17. Continue improving documentation and processes

Action 18. Organize a Coordinator meeting

Action 19. Feedback output of coordinator meeting to WG members and adjust documentation and Processes

Action 20. Present CSB at CBSC

3.6. **Discuss & propose potential software tool support for HOs**

Brian Jensen (BJe) introduced work item F.

He noted that 7 meetings had been held so far and fruitful discussions had been had. He noted that he had taken over from Anders Bergström (Raymarine).

He recapped that B-12 had been reviewed to identify areas where software solution could help with participation or inlementation of CSB within HOs. Various examples were proided and a fruitful discussion was had (see report for details).

It was noted that the original objective of the work item should not be forgotten and it was observed that there appeared to be overlap with other work items.

Action 21. Review overlap and consider merging F and H

3.7. **Clarify support identified by current Trusted Nodes needed for current and future Trusted Nodes.**

Guillaume Morisette (GMo) introduced work item G – Report.First item discussed was the standardization of tools. CIDCO has partnered with Open VBI from CCOM to tackle this issue, starting to publish tools under open libraries. They aim to create an easy-to-use Python toolkit that hydrographers can integrate into their tools, which includes georeferencing soundings, motion compensation, and advanced raytracing using sound velocity profiles. Additionally, there is a focus on the creation and publication of an open-source uncertainty model and maintaining a free portal to showcase CSB partners and projects. The "Smart Ocean: Connected Boats" project, led by CIDCO, is working on open-source solutions to develop business models.

There was acknowledgment of the work with indigenous communities, noting that data from First Nations can be politically sensitive. A request was made for project partners in this area. A question was raised about the responsibilities of Trusted Nodes (TNs) versus what is available to the larger community, to which GMo responded that it depends on the business model for CSB from the TN.

BJi emphasized the importance of considering how future work will support Trusted Nodes and how input from TNs will be integrated. GMo pointed out the need to focus on streamlining and standardizing while deploying TN solutions, highlighting the progress made with "TN in a box" solutions. They stressed the importance of lowering barriers to entry by making more open-source software available, making it easier to deploy TN solutions without needing to understand the specifics of B-12.

The Chair enquired as to next steps, emphasizing the need for more documentation to provide potential TNs with a clear idea of what to expect. The importance of having drafts reviewed by the WG was highlighted as was ensuring that SB2030/IHO/GEBCO have copies to share with new TNs.

The Chair further suggested that the final slides should include mention of support for getting data into DCDB and other tools, which would be useful for IRCC reporting.

Decision 4. Need to work with work item b – same as all CSB projects

3.8..Clarify all aspects of the CSB data cycle and capture known issues, requirements and suggested enhancements.

Brian Calder (BC) introduced the work item H – Report

BC presented the prioritized list of the CSB life cycle, highlighting the challenges posed by the current pace of development compared to the IHO approval process. He provided examples of how using tools such as GitHub could improve this process. He discussed the various tools currently being developed, including filters, processing tools, and correcting tools. He explained how these tools, when combined in various configurations, could enable interested parties to develop custom CSB ingest pipelines tailored to their specific needs.

The upcoming work includes developing recommendations for DCDB data access and reaching a consensus on workflows for both developers and end users. There will also be a review and further development of the OpenVBI code, with a focus on implementing vertical bias correction and uncertainty estimation in OpenVBI. The working group was requested to provide feedback and assistance to support these initiatives.

It was noted that as with Action. 8, these considerations should be built into developing a B-12 Governance proposal to present to the IRCC. This proposal should detail how the different elements of B-12 will be managed and specify the levels of review each element will be subject to.

Finally, a discussion was had regarding the level of priori knowledge required to use the OpenVBI tools effectively. As a result, it was decided that a dedicated workshop would be organised for members of the WG alongside CSBWG16.

Action 22. Organise a workshop alongside CSBWG16 to explore how to work with the various tools e.g. OpenVBI tool.

3.9. Develop a communication plan in coordination and collaboration with related efforts (SB2030, GEBCO, etc) – Report

Sarah Grasty (SG) introduced work item I – Report.

SG gave an overview of the Communications and Outreach Strategy (phase 1), noting that they had detailed the Who, What, Where, When, and Why. She emphasized the need for clarity regarding the mission, objectives, and outcomes. She also reviewed key proposed activities and highlighted key risks such as broad scope, metrics to measure impact, capacity, and crosstalk with other working groups.

The WG were requested to provide input, brainstorming outreach and communication materials that could be improved, identifying any products or infrastructure they could leverage, and sharing information about any upcoming products or efforts.

Upcoming work included further development and refinement of the Communications and Outreach Strategy (phase 2).

IHO Sec emphasized that communication efforts under this work item should be designed to support every other work item, though the mechanism for doing so is less clear. Noting that every work item will require communication support, the need to measure outputs from each work item against original aims and objectives becomes really important. Establishing a mechanism to prioritize communication support for the various work items was identified as a significant challenge. IHO Sec suggested the creation of a central register where each work item lead can indicate their needs and requirements

Action 23. Central register for work item leads to identify comms needs

3.10. **Develop a recognition & incentive strategy plan**

David Millar (DM) introduced work item J – Report.

Two questionnaires are currently being circulated via the "gebco_folk" distribution list and an IHO LinkedIn post. So far, there have been nine responses to the CSB contributor questionnaire and one response to the TN questionnaire, which have been available for two weeks. A major risk identified is the lack of responses.

The WG were requested to fill in the questionnaires themselves and distribute them within their respective networks and communities. This can be done by forwarding the gebco-folk email, reposting the IHO LinkedIn post, or distributing the questionnaires with explanatory text.

The WOC has committed to pushing the questionnaires to their network of 40,000 people. DM suggested that both organizations and individuals should push the questionnaires. The importance of this as a long-term mechanism for monitoring was noted, highlighting the significance of one-on-one outreach to engage with participants or those expressing interest and to register their concerns.

DM finished by summarising upcoming work which would focus on analysing and summarising results in a report for the next meeting.

Action 24. All to consider how they promote the two questionnaires

Action 25. Reach out to trusted nodes and other early adopters to ask them to supply Questionnaires around their networks

4. Other Topics

4.1. **Seabed 2030 & CSB Update**

A short update was provided by Pauline Weatherall (PW). She informed the group that the SB2030 global centre acts as a Trusted Node (TN) for data collected by CSB. They have implemented CCOM's code, which documents and inputs metadata, and creates geojson files with some quality control information. They have also processed Seakeepers data and provided feedback They have submitted two datasets to DCDB: one filtered and one under review to ensure all files were transferred correctly. Initial processing of Palau datasets has been completed, and feedback has been provided on these initial databases.

Jennifer Cheveaux will be able to give more feedback on the report once she is back in the office

4.2. **CSBWG/Seabed 2030/SO-SI collaboration**

Isabella Glušauskaite (IG) introduced the Smart Oceans – Smart Industries (SO-SI) webinar initiative – Report.

She went through the background and the connection to World Ocean Council. The potential collaboration between CSB and SB2030 was explored and the options discussed.

One area of initial collaboration identified was the development of a shipping focused 2 page flyer. WOC committed to supporting this.

Action 26. Ongoing action for WOC to lead on a shipping focused 2 page flyer in coordination with WI I

4.3. **Data Quality Working Group Update**

Giuseppe Masetti (GMa) gave an update on the work done and the proposal for improving the allocation of CATZOC Values of Crowdsourced Bathymetry Data – Report.

Member states including Canada, Denmark, New Zealand, and NOAA OCS, along with H2i and DockTech, provided input. Canada suggested splitting "data processing" into five components to better understand "partially corrected" data. It was noted that the draft S-44 Ed.6.2.0 now includes a more inclusive introduction, covering hydrographic surveys and other bathymetric datasets. The HSWG suggested using the term "CATZOC capability" to acknowledge other inputs and highlighted the need to reference B-12's chapter on uncertainty in DQWG documents.

Denmark supported creating guidelines for assessing CSB data for nautical charting, suggesting collaboration between CSBWG and HSWG to align guidelines with B-12 and S-44, starting with CSB data collected using SBES.

The creation of a new subgroup within DQWG focused on CSB was announced, with GMa as a member. This subgroup, chaired by the DQWG chair, currently has only two members, and more engagement is encouraged. GMa suggested a joint subgroup between DQWG, HSWG, and CSBWG. Information about DQWG and contact details for the chair and secretary were provided for further involvement.

Action 27 Members to consider joining the DQWG sub working group on CSB

4.4. "To CSB or not to CSB, that is the Question"

Denis Hains (DH) introduced the presentation he gave as a keynote address to Hydro 2023. The PowerPoint presentation can be accessed here: https://www.italianhydrographicsociety.it/wp-content/uploads/2024/04/Hains_Keynote_Hydro2023-2.pdf

The importance of presentations and publications was stressed, emphasizing the need for written materials for reference. Patrick Westfeld indicated that three upcoming texts on CSB will be published in the next IHR in May 2024. Michel Breton expressed his interest in providing a presentation at the next CSBWG working group.

Action 28. Michel Breton to speak on Community Hydrography to CSBWG16

4.5. DockTech Update

Shaul Solomon presented on the acceptance and integration of CSB within the larger charting ecosystem - Report.

He noted some of the Data Quality blocks as barriers to CSB. He suggested providing an INF paper to HSSC articulating the issue that they have found in using CATZOC. IHO Sec offered to discuss this with him offline to agree best way forward as HSSC perhaps not the best forum.

Closing Proceedings

4.6. AOB

The Chair team reflected that during the three meetings held this last year, it has become obvious that we had yet to develop a way to effectively measure progress against our work item objectives. It was reported that the CSBWG Chair Team will prioritise the development of metrics gathering and reporting templates to be shared with Work Item leads before our next intersessional meeting.

It was explained that the intention was to implement a new process during the intersessional work between CSBWG15 and CSBWG16 and will be adjusted as needed based on experience and feedback.

4.7. Date and Venue of next meeting

The next CSWG16 meeting will be held in Wellington, New Zealand 24 – 28 March 2025 – Co-hosted by NIWA and LINZ.

4.8. Review of actions and draft agenda for CSBWG16

Actions from CSWG15 were reviewed and agreed. CSBWG16 Agenda will largely remain the same but a draft will be circulated in due course.

4.9. Discussion on outstanding issues and post-meeting expectations

Nil

4.10. Closing remarks by Chair

The Chair thanked everyone for their participation and wished everyone safe travels home.