U.S.-Canada Hydrographic Commission Minutes of the 47th Meeting

30-31 May 2024, St. John's NL

Participants list and materials: USCHC47 Meeting (2024) | IHO

On Thursday, May 30, 2024, and Friday May 31, 2024, approximately 20 in-person participants and 10 virtual participants met in St. John's to convene the 47th meeting of the U.S.-Canada Hydrographic Commission (USCHC).

1. Introduction and Welcome / Opening Remarks

Mr. Craig Hogan, a/Regional Director General, welcomed the group to St. John's. He highlighted the USCHC's common vision to better understand our oceans and lakes for the safety of navigation and pursue stability of our water in the marine environment. He also highlighted that the CHS' first Paper Chart 2.0, an ENC-derived paper chart covered an area in the Newfoundland region.

Mrs. Manon Larocque, as co-Chair of the USCHC and meeting host, opened the meeting and welcomed the participants. In addition to the USCHC membership, the International Hydrographic Organization (IHO) Secretary-General and members of a delegation from the United Kingdom Hydrographic Office (UKHO) were recognized as observers.

The host spoke about the nature of the partnership between the US and Canada and how valuable the cooperation was between the two countries. She also thanked all those who made the meeting possible and stated that she looked forward to hearing about the progress everyone had made on the issues on the agenda, and in identifying future areas of collaboration.

RDML Ben Evans also emphasized how nice it was to have a collaborative partnership between two neighbouring member states, that our commission is unique in only having two member states, and that both states are relatively mature and robust in their progress toward S-100. He also stated, that among other things, he looked forward to identifying areas in which we could collaborate in the Great Lakes.

The **IHO Secretary-General, Dr. Mathias Jonas,** spoke about what a pleasure it was to continue to attend the USCHC and Canadian Hydrographic Conference together to be able to get a snapshot of the state of play in hydrography. He appreciated that the USCHC takes collaboration as a given, or a starting point for advancement and held the commission up as an example of how to collaborate across boundaries. He highlighted things coming down the pipe from Seabed 2030, to data production and dissemination and working on transboundary Electronic Nautical Charts (ENCs).

2. Approval of the Agenda

USCHC47-02 V4 USCHC47 Agenda v. 4.0 was approved with an amendment for the IHO Secretary-General to provide an update from HSSC 16.

3. National Reports

DOC: USCHC47-03A US National Report / (For Information: NOAA Center of Excellence Overview)
DOC: USCHC47-03B Status on Implementation of the S100 Year 2024
DOC: USCHC47-03C INF: OCS Strategic Plan (2023-2027)

RDML Evans presented the US National Report which was a summary of work from multiple agencies, the National Oceanic and Atmospheric Administration (NOAA), US Department of Defence (DOD), the National Geospatial Intelligence Agency (NGA), and the US Army Corps of Engineers, with responsibility for the inland ENC program.

RDML Evans highlighted the following key achievements/activities:

- Progress on ENC transboundary cut scenarios, resulting in a signed addendum to the USCHC Memorandum of Agreement (MOA).
- NGA has built out approximately 85% of their ENCs, and they are on track to complete the transition by October 2024 and full S-100 transition by 2026. The agency is migrating to GIS Pro by the end of the fiscal year due to the ESRI capabilities needed for S-100 production.
- Focus on Great Lakes surveys: survey kits in Western Lake Superior, Navigation Response Team in Eastern Lake Ontario. Two traditional surveys in Chicago and the vicinity of Fairport, OH in Lake Erie.
- NOAA's final tranche of paper charts will be canceled by December 6, 2024, and NGA's will be canceled by the end of the following year.
- Gridding is 39% complete, with an accelerated timeline to be on track for 2026, aligning with the initial release of S-101 products.
- NOAA has developed NOAA Custom Chart Tool, version 2.0, which can be used to produce an ENC-derived paper chart built on an Azure tool set, Intended as a backup to ENC. The Coast Guard determines carriage requirements.
- Lakebed 2030 is coming up in the fall and NOAA invites Canada to participate. It was noted that perhaps there is an area for collaboration on a joint paper.
- The US continues to support the Empowering Women in Hydrography and welcomes the continuation of the project.
- The Centre of Excellence for the Operation, Ocean, and Great Lakes Mapping was founded last year and has four main goals:
    - to improve US ability to transition research to operations,
    - to provide applied training in mapping and surveying for hydrographers and grow the pool of talent,

    - to enhance technical support capability and capacity for ocean mapping operators in the field,
    - underlying the previously noted points, the intent is for the work to be accomplished by NOAA but in partnership with the public sector, academic and private sector partners.
- CAPT. Andy Armstrong will serve as acting director while building staff and programming.

Decision 47.1: Mr. Chris Marshall committed that two representatives from the Ontario, Prairie and Arctic region would attend Lakebed 2030.

Action 47.1: OCS to provide CHS with an inventory of some of the project and operational management training offered by the organization.

Action 47.2: NOAA to share the S-101 transition plan once it is available.

DOC: USCHC47-03D CA National Report / (For Information: CHS Workforce of the Future Report)
DOC: USCHC47-03E CA Presentation
DOC: USCHC47-03F CHS Strategic Plan (2020-2030)

Mrs. Manon Larocque presented Canada's National Report with input from the Department of National Defense (DND) representative, **LCDR Kray Robichaud**.

Mrs. Larocque highlighted the following updates, achievements, and activities:

- Changes to the CHS organizational chart, with a new Minister, new Director General and Senior Advisor, and new Directors on both coasts.
- CHS efforts to operationalize route monitoring layers and the operationalization of the database transformation chapter of the CHS transformation. The CARIS Hydrographic Products Database used by CHS is now S-100 compliant.
- OPP2 represents a significant investment to improve safety of navigation in the Arctic. CHS continues to survey and chart to increase coverage and fill data gaps, leveraging innovation such as space based remote sensing, automated data processing, uncrewed and autonomous surface and subsurface systems.
- 30% of the surveys targeted under the OPP five-year plan are completed. CHS is also using Community-Based Hydrography, building on recent pilot projects and initiatives by CHS to expand crowd-sourced bathymetry.
- Survey highlights, particularly in the Great Lakes.
- Between April 1st, 2023, to April 15th, 2024, CHS released:
    - 509 new ENCs
    - 129 new edition ENCs
    - 9 new paper charts
    - 10 new edition paper charts
    - 1 Paper Chart 2.0 – piloted first release
- As of April 2024, 276 of the 810 BSBs have been canceled.
- First Paper Chart 2.0 released in Lark and York Harbours, NL. CHS intends to gradually release these charts in high traffic areas.

- CHS is implementing a human resources plan for transformation, including the implementation of a skills matrix to assess gaps to identify areas of recruitment and training as CHS defines the skills required by the organization's Workforce of the Future. To build the matrix, CHS will rely on multiple consultations, including conversations with the international community and internal consultations.
- Canada thanked the US for their continued support of the Empowering Women in Hydrography initiative
- As HSSC was concluding in Japan, Canada presented a proposal for an IHO-Canada International S-100 Sea Trial Area in the St. Lawrence. The CHS proposed that a Phase II could take place in eastern Lake Ontario to test these products in the US-Canada transboundary.
- Challenges faced by CHS include the fact that IT is external to CHS, ongoing challenges with recruitment, retention, and training, ship time scheduling, aligning Canadian S-100 implementation with the IHO roadmap, S-101 international standard development timelines, and limited funding for surveying, with priority given to the Arctic.

LCDR Robichaud noted the following:

- NGA is to visit Vancouver Island to meet CHS Pacific and DND Hydrographic Service Office in Esquimalt. Ms. Zapp will be one of the staff to visit in June 2024.
- A MOA between DND and CHS allows DND to contribute to CHS operations in the Arctic. CHS staff will be on board his majesty Canadian ship Margaret Brooke.
- Under MOA between DND US Department of Defense, the two navies are collaborating in the Arctic, with three ships deploying to the Arctic this summer. There will be about 20 floats split between the three ships and they will deploy the floats.
- NATO Geospatial Maritime Working Group Technical Panels will meet this fall in Victoria between October 21 and 25 and consists of a number of different technical panels. The S-501 AML Project Team is a new project team.

4. IHO Report

DOC: USCHC47-04 IHO Secretariat Report

Dr. Mathias Jonas presented the IHO Secretariat Report. He noted the following:

- Kiribati joined last week, bringing the total number of IHO Member States to 100.
- The payment of member states contribution is at an historic low after COVID; Dr. Jonas is hopeful member states are recovering from the economic impact of that crisis and pay their dues until end of 2024.
- IHO Council 7 update:
    - Several decisions in support of the IHO S-100 Roadmap
    - Technical projects funded by IC-ENC (US revenue from ENC sales) have been substantial for the IHO.

    - The IHO received project money for Empowering Women in Hydrography from Belgium, Denmark, and Norway and in-kind contributions: NOAA for at-sea experiences for women, Canada considers support for Pacific Region.
    - Republic of Korea offering a seat as well as personal and material resources for the planned S-100 Infracentre.
    - Progress in creation of a global thematic layer for marine protected areas (MPA) (S-122).
    - New Ex Abysses ad Alta Award– annual champion on hydrography selected and will be announced via Circular Letter.
- The decision from Assembly 3 to invest in the transition to S-100.
- Almost 50% of chart producing member states have committed to the production of S-101 ENCs and the regular production of S-102 bathymetric datasets.
- The IHO S-100 Working Group put forth a 2024 timeline for completion of S-100 based Phase 1 product specifications: Member States approval is expected by December 2024, with frequent production initiated by 2025 onward.
- The IHO Capacity Building Work Program has nearly 1 M € for earmarked and non-earmarked projects.
    - The focus will be on the S-100 Implementation Roadmap support through best practice transfer and training.
- There continue to be Empowering Women in Hydrography opportunities including, internships, education, and on-the-job training activities.
- Thirty-five member states have taken official positive positions on crowd-sourced-bathymetry (with caveats).
- The Data Centre for Digital Bathymetry (DCDB) will cooperate with Regional Hydrographic Commissions (RHCs) to produce annual regional breakdowns of data holdings as part of strategic plan indicator (SPI) reporting.
- The General Bathymetric Chart of the Oceans (GEBCO) celebrated its 120th year of ocean discovery.
- The IHO-Organization for Economic Cooperation and Development (OECD) launched a joint project to identify the linkages between seafloor mapping, the ocean economy and ocean health.
- IHO Secretariat participated in the UN Ocean Decade Conference in Barcelona in April 2024.
- The proposed theme for World Hydrography Day: *"Hydrographic Information -Enhancing Safety and Efficiency in Marine Activities."*
- There is an open question on how to better support Goals 2 and 3 of the IHO Strategic Plan. He invited US and Canada representatives to come prepared to Council with these types of questions.

The USCHC noted the report.

5. UKHO Report

- Moved to Day 2 – lunch.

6. Review of Actions

- Moved to Day 2.

End Day 1

Day 2

6. Review of Actions

DOC: USCHC47-06 Actions outstanding for USCHC Outstanding Actions Table / Attachments to Actions table (for information)

Mrs. Larocque led the discussion, focusing on priority items:

Action 46.2 on Marine Protected Areas: S-122 – Mr. Julio Castillo extracted from a database on regional boundaries to select out areas that are defined as MPAs; however, there remain challenges with the definition of MPAs. Should Mr. Castillo continue this work as pilot?

Dr. Jonas commented that, focusing on international waters, the IHO hopes to have a global dataset covering international waters as a start in place for the agreed format.

Action 47.3: report back to the Interregional Coordination Committee (IRCC) and address back at Council in the Fall regarding S-122 and action USCHC46.2: "Consider a global set of S-122 to support the UN "30 by 30" (30% by 2030) initiative. It should be manageable for the high seas and member states could consider addressing their domestic areas. A cumulative dataset would offer good visibility to the IHO." Once different hydrographic commissions have supplied their different proposals or views on an approach to this, there is opportunity to discuss at IRCC or Council.

46.3 Action on Automated paper charts – Consider a joint paper which could go into IHR at some point. A deliverable to keep in mind when we arrive at automated paper charts piece later today.

Action **46.4** requested USCHC look at a planning cycle, as part of preliminary discussions leading up to this meeting, USCHC is considering a one year planning cycle and the Chair invited the Hydrographic Commission to look at potential opportunities for publications on an annual basis.

Action 47.4: US and Canada individually implement an annual review cycle to consider what can be published in the IHR.

46.6: Investigate US and CA sharing S-100 services plans as opposed to having test data sets right next to each other. Consider an S-102 joint test bed. Pilot associations around the Great Lakes, the St Lawrence River or on either coast are interested. Can consider this action closed with an update.

46.8: With regard to USCHC46-10C, add in Canada, and present the S-100 snapshot as one document/report.

Action 47.5: Keep action USCHC 46.8 "With regard to USCHC46-10C, add in Canada, and present the S-100 snapshot as one document/report". Merge national snapshots developed for USCHC 47 to create this document.

46.13: Work collaboratively on transboundary area suggested in the Great Lakes, discussed later in agenda.

46.14: Create a single USCHC SPI report card focusing only on those elements of the Strategic Plan applicable to the Member States and Regional Hydrographic Commissions. Include 25 considerations of C-55. Team would include Doug Brunt, David Palmer, Jonathan Justi, Caitlin Johnson and others as well as the IHO Secretariat. For C-55, Christie Fandel and Young Baek should be consulted. Consider implications of the United Nations Integrated Geospatial Information Framework (UN-IGIF)-Hydro matrix and the S-100 coordinator.

Action 47.6: Consider reestablishing a team to look at an integrated USCHC SPI Report Card. C-55 integration already underway.

46.15: Develop/consolidate reports with an annual cycle of reporting – in favour of continuing this ensuring ample time to review.

Mr. Justi commented on the roles and responsibilities of an S-100 coordinator, suggesting on US side a new name associated with that.

Decision 47.2: Commission agrees to have separate national points of contact for S-100 coordinator not single point of contact for our commission.

Action 47.7: To look at S-100 coordinator responsibilities for USCHC TOR document by August 1st. Revise, update and discuss as necessary with more details on their responsibilities. Report back to WEND and IRCC that USCHC intends to maintain two (CA and US) S-100 leads due to multi agency national contexts.

8. Hydrographic Geospatial Products and Services Committee (HGPSC)

DOC: USCHC47-08 HGPSC Report

Ms. Christie Ence and **Ms. Mina Foroutan** delivered the HGPSC presentation.

They addressed several action items from USCHC 46:

46.3 (formerly 46.2) on the automated production of paper charts and how it aligns or not with S-4. This could form a joint paper for the International Hydrographic Review (IHR).

46.5 (formerly 46.4) Investigate revisions to the MOA to allow reference to include continental shelf areas (addressed later in Agenda item 17).

46.13 (formerly 46.12) Work collaboratively on a North American analysis starting in the Great Lakes.

46.15 (formerly 46.14) Review some of the 'best practices' of the HGPSC at an interim meeting. An interim meeting was not held and so this item should be closed. The best practices will be reviewed as part of this presentation.

Regarding item 46.3 on automated production of paper charts and alignment with S-4, the HGPSC proposed to load IHO S-52 digital files into each HO's symbology and completed a feature-by-feature comparison to INT1/INT2/INT3 (the automated paper chart IHR paper is addressed later in the meeting).

The HGPSC has also prepared an IHR article on a separate topic, in which the committee discussed how the HGPSC used technology to facilitate international collaboration in the transboundary.

Regarding Action item 46.13, to work collaboratively on a North American Analysis (other aspects of this item are addressed later in the meeting under agenda items 8, 12, and 20).

HGPSC identified a workflow for working within multiple regions. HGPSC is responsible for organizing regional meetings between the US and Canadian production teams and set up points of contact. The committee is beginning to discuss potential ways of sharing data more efficiently (addressing IT issues and limitations of the Canadian data sharing process).

Regarding action item 46.16 (formerly 46.15), and the 'review of some of the best practices of the HGPSC,' the committee presented a schedule to be added to the USCHC MOA on transboundary ENC cuts and provided three options:

(1) single agency charting,
(2) category of coverage in which each agency provides coverage in their waters, and
(3) a hybrid version necessary in some situations.

The schedule to be added to the MOA also captures how the two hydrographic offices will encode the differences in vertical and sounding datums and encoding procedures for maritime boundary features. The schedule also discusses common notes on both US and Canadian cells addressing general copyright and agreed upon language in areas of disputed boundaries.

Ms. Ence presented the USCHC Transboundary Web App, highlighting that some fields have been added including 'Schema,' 'Region,' 'In Work' and 'Decision.' She noted that the 'Decision Document URL' will link to documents that the individual regional groups have decided upon.

In response to a question from **CAPT. Armstrong** in USCHC 46 (Action 46.5) pertaining to whether language regarding the extended continental shelf was included in the transboundary agreement, **Ms. Ence** noted that it was not specifically. **CAPT Armstrong** stated that it might be an addition to consider. Action 46.5 remains open.

Ms. Ence also noted that as we discuss how we are going to cut the ENC according to provided methods, we can develop and link a letter that prescribes exactly how we have cut those cells, and those letters are registered with our data branch. **Ms. Ence** presented the USCHC Transboundary Web Application live.

Ms. Mina Foroutan presented updates on regional collaboration, a series of meetings in which both agencies were able to establish an agreement on ENC cuts for the scale bands in the Bay of Fundy. The Great Lakes already have monthly meetings with several successes over the last year, including coordinating charting of the newly built Gordie Howe International Bridge, and other parts of the Great Lakes. Pacific and Arctic have also established regular meetings and have already drafted an agreement for the Dixon Entrance to find the best fit for the data, a notable success. Discussions are ongoing for the Juan de Fuca Strait.

Decision 47.3: ENC cut agreements within the context of the HGPSC should be signed by the manager with delegated authority from each country and HGPSC will add record of decision to formalize for context in the USCHC Web App.

Action 47.8: HGPSC add record of decision page including a signature block for managers to capture who made that decision including where and when the decision was made.

The HGPSC also noted the proposed IHO-Canada S-100 International Sea Trial Area.

Ms. Ence noted the need to connect S-102, 104 and 111 representatives as similar agreements will need to be forged for these standards. The MOA currently addresses S-101, but the other standards may need different approaches.

Ms. Lynn Patterson stated that she can raise transboundary issues at the S-102 level for consideration for Edition 3.

Action 47.9: Ms. Patterson to raise transboundary issues at the S-102 level for consideration for Edition 3 and report back at USCHC 48.

RMDL Evans commented that a natural place to look at potential solutions is with the Lake Ontario test bed. These questions to be formalized with the established test bed and then brought to some sort of working group to address these issues.

Ms. Ence proposed an action to address the issue of data sharing. She noted that we need a neutral place to share data and Canadian licensing issues. Proposed deadline to get started Q1 FY2025 (October 2024).

Action 47.10: Develop data sharing plan for transboundary charts. Context: Due to the complexity of some waterways, it is best to use a single-agency method, where the entire ENC cell encompasses both US and Canadian waters. Because of this, it is important to have a way to share source data from both member states in a neutral location (file sharing accessible to both US and CA) to ensure the entire ENC is up to date.

Action 47.11: HGPSC to come back with formalized questions/concerns around transboundary S-102. Supported by St. Lawrence International S-100 Sea Trial Area and S-102 SMEs: Anthony Klemm (US), Andrew Roberts (CA). Context: S-102 is raster-based and cannot be cut in the same way as S-101.

Action 47.12: HGPSC to come back with formalized questions/concerns around transboundary S-104 and S-111. Supported by St. Lawrence International S-100 Sea Trial Area and SMEs: Greg Seroka (US) and Phil MacAulay (CA).

Action 47.13: HGPSC to formalize the workplan and terms of reference to get us where we want to be by 2026.

10. WENDWG 14 Report to USCHC

DOC: USCHC47-10 WENDWG Report to USCHC

Mr. Jeremy Nicholson presented the Worldwide ENC Database Working Group (WEND WG) report, where he highlighted that 42 people attended the meeting, named the leadership, and summarized the RHC reports and Regional ENC Coordinating Centre (RENC) updates on S-100. Of note, PRIMAR will not support system ENC distribution as the digital signature is lost in the process.

Mr. Nicholson flagged a concern raised by RHCs that the S-101 spec was not yet final and that future delays in the finalization will lead to impacts on the production of S-101 ENCs for 2026 as software vendors will not have time to implement the specifications. The Chair of WEND WG plans to discuss the management plan with the S-100 working group and report back to the Interregional Coordination Committee (IRCC).

The United Nations Integrated Geospatial Information Framework (UN-IGIF) matrix and readiness survey found that 53% of RHCs have some level of readiness to produce S-101 ENCs. The WEND Chair will issue a follow-up survey on the readiness level coming in November 2024 to calculate the SPI and will be reported at IRCC.

Canada presented a paper on S-128 for information to outline the approach Canada plans to take to S-128, whereby the hydrographic office will lead the production of S-128, thus delivering a single Government of Canada catalogue.

Mr. Nicholson noted the following actions required of the USCHC:

(1) the continued coordination within the transboundary including non-S-101 products (addressed already under HGPSC),
(2) RHCs to present their 2026 road maps for the next meeting and confirm the S-100 coordinator roles,
(3) WENDWG14/03 members and RHCs to review membership list of WEND WG.

Action 47.14: RHCs to present 2026 roadmaps for next meeting.

Action 47.15: WENDWG 14/03 Members and RHCs to review the WENDWG membership list and provide updates to the WENDWG annually.

Mr. Justi asked if we have details on what kind of coverage we will have for S-101 and when we can expect that coverage?

Mr. Nicholson replied that each member of the commission should share what they can do within their own country.

Dr. Jonas commented: Functionalities are coming in 2026 to support S-101 or additional S-100 based products in general. Though hydrographic offices are not mandated to do that, the functional supports for the S-100 concept should be made available to those early adopters. He noted that the focus for S-101 and other S-100 services should be on shallow waters.

Mr. Nicholson replied that he believed the proposed IHO-Canada S-100 International Sea Trial area meets these criteria and will allow for testing of multiple layers. **Mr. Nicholson** agreed with NOAA that major ports should be first.

Mr. Marshall noted it would be useful to find a coherent way of identifying which are those priority ports or channels, interconnecting waterways or what the priority will be in the next two, three, five years to deliver these services.

Action 47.16: Identify priority ports, channels, and waterways for the implementation of S-100 and determine how to share that information externally. Start with soft commitments and create lists of focus areas. Aim to set a three-year plan, recognizing 2026 as a milestone, with a commitment to regular updates. Add this information as a layer to the USCHC Web App.

Action 47.17: HGPSC add priority areas information layer to the USCHC Web App.

10a. Addition to Agenda: HSSC Update

Dr. Jonas delivered an update from HSSC, which had just ended. He noted the following:

- Proposed IHO infrastructure center, a unit to maintain all of the digital elements of the S-100 ecosystem. HSSC will be seeking approval from the Council 8 for an interim status for the center, followed by permanent establishment.

- HSSC agreed that the project teams in place for S-101, S-102 and S-129 should remain active until these products are fully operational.
- HSSC welcomed the offer from Canada and endorsed the proposal to designate the Saint Lawrence River as an IHO Canada S-100 International Sea Trial Area.
- IHO approved the request to create new editions of S-52 and S-64.
- HSSC noted the offer from the US to lead a new task force within the Nautical Cartography Working Group to establish minimum guidelines for automatic paper chart output from ENC. **Dr. Jonas** noted that nothing prevents national hydrographic offices from developing these solutions for the automated paper chart produced from an ENC Content database. HSSC did not support a new task on nautical cartography, but the committee invited the US to keep the working group informed.
- Estimated completion dates for Editions 2 of S-102, S-103 and S-111 is July 2024.

11. S-100 Implementation

Marine Spatial Data Infrastructure Working Group Update

DOC: USCHC47-11A IHO MSDI Report & OGC MFSDI Pilot Project Update

Mr. Chris Hemmingway, as Vice Chair of the IHO Marine Spatial Data Infrastructure Working Group (MSDI WG), presented the update from the working group meeting held in conjunction with the United Nations Global Geospatial Information Management (UNGGIM) meeting in early March in Indonesia.

On the first day there was an international seminar about the UNGGIM itself, with additional presentations and a round table discussion. The seminar was quite successful and well attended, setting the tone for the rest of the week.

A number of states presented national MSDI reports.

The working group completed the drafting of the IHO publication C-17 v. 3.0 and decided to maintain the document with a document management team led by Mr. Hemmingway through GitHub in order to keep the document evergreen, while allowing for collaboration.

In response to some of the evolving actions from IRCC15, Council 7 and Assembly 3 related to IHO strategic Plan Target 2.1, the MSDI Working Group had a presentation from the company Protected Seas on MPAs and the work Protected Seas is doing to present their MPA data in developing S-122 standard.

The MSDI WG held a mini-interactive session to reimagine the MSDI workplan and decided to align the workplan with the UN-IGIF.

The group compiled a list of regional MSDI ambassadors and working group chairs to aid in communication and collaboration. **Mr. Hemmingway** noted that USCHC may wish to consider a new ambassador as well.

As part of updates from the regional MSDI WGs, the MSDI WG asked the Pacific Regional MSDI WG to present on their initiatives on data sharing since they had also created a series of UN-IGIF strategic pathway videos.

The MSDI WG also conducted an interactive session on collaboration and regional MSDI WGs, participants broke into smaller working groups discussing strategies that have worked well for enhancing group collaboration and challenges.

The UNGGIM discussed the implementation of the UN-IGIF-Hydro and the need to collaborate across marine, terrestrial and cadastral domains. There were also presentations from member states regarding their national initiatives and perspectives on UN-IGIF implementation strategies. Working groups are also continuing to advance this effort and work is planned to make marine geospatial information available, accessible and discoverable for a multitude of purposes. The UNGGIM is preparing its report to the 14th session of the committee of experts in August 2024 in New York City.

Mr. Hemmingway also presented the Open Geospatial Consortium Federated MSDI Pilot timeline. Phase 3 is now moving to Phase 4: connecting land and sea.

The commission was invited to take note of this summary and designate a regional hydrographic commission MSDI Ambassador.

The commission took note of the summary.

Action 47.18: Between Brynn Zapp and Chris Hemmingway to discuss offline and make the decision on who would be the USCHC MSDI Ambassador. Role to help promote and highlight the importance of MSDI and things that are part of MSDI, liaison between the Commission and the MSDI working group.

Government of Canada S-100 Interdepartmental Committee

DOC: USCHC47-11B S-100 Interdepartmental Government of Canada Committee

Ms. Robin Jefferies gave an update on Canada's Interdepartmental S-100 Committee:

- The committee is made up of CHS, the Canadian Coast Guard, Environment and Climate Change Canada, Transport Canada, DND, and the St. Lawrence Seaway Corp.
- Updates are made to Canadian S-100 Catalogue, which is discussed at each meeting.
- The committee also discusses data dissemination (with subtopics), including that Canadian Coast Guard had successful SECOM trials to disseminate S-124 data.

RDML Evans commented there is currently no equivalent in the US and expressed interest in looking at the committee's Terms of Reference.

Action 47.19: Share Terms of Reference for the S-100 Interdepartmental Committee with Jonathan and RDML Ben Evans.

US S-100 Implementation Update

DOC: USCHC47-11C US S-100 Implementation Update

Mr. Darren Wright presented an update on the status of NOAA's S-100 implementation.

NOAA has S-100 encapsulated within their Precision Marine Navigation Program. The Maritime Economy is growing, there is congestion in waterways, and vessels are larger. Therefore, there is a demand to integrate environmental information. NOAA has these environmental data, but they are in different formats and from different sources. There are challenges to take all the navigationally significant information and combine it in the S-100 format, make it machine readable, which NOAA is trying to do using the Precision Marine Navigation Program. NOAA is also trying to provide it in the Amazon Cloud so navigation system manufacturers can come to one location to get all this information in that standard format and integrate it into the navigation systems.

Mr. Wright also showed S-102 data overlayed on ENC, as well as a glimpse of the future with S-104 data shown on ENC.

The US is now offering test S-102 bathymetry at six locations. **Mr. Wright** also presented data where test S-111 data are offered. In Early 2025, the US hopes to offer a test S-104 water level forecast viewer. NOAA's NowCoast S-100 Product Coverage Viewer shows where there is S-100 information.

Question from **Mrs. Larocque**: Any security issues with using Amazon Cloud?

RDML Evans commented that the US has a purchase agreement with Amazon Web Services, and he assumes there is cyber security requirements built into that.

RDML Evans discussed the unique limitations/challenges depending on location (wind forecasts, tides, depths with time, etc.). NOAA are thinking about where to push and what to prioritize to account for the particular needs of ports.

Mrs. Larocque commented that Canada is trying to do it all and agreed that priority information does depend on location.

Mr. Marshall commented that he liked Darren's presentation and wished to view the tagline **Precision Marine Navigation Program** to give a better understanding of S-100. He took note of the use of Amazon Cloud by US.

Action 47.20: US to share Precision Marine Navigation Program with Canada (Mr. Marshall).

Canada's Progress on S-101

DOC: USCHC47-11D Timeline and approaches to S-101

Mr. Gabriel Cavanagh presented on Canada's progress on S-101. He noted that the primary challenge is that the S-101 standard is not yet approved by IHO, and so CHS internal software is not ready to go through IT approval, and so traditional paper charts are still in S-57. **Mr. Cavanagh** stated that it is unrealistic to think that we would be ready in a year's time to have S-101 compliant ENCs using S-101 native data. Therefore, the CHS decision database will remain S-57 and be mapped to S-101; an interim solution, and the database will need to be converted to S-101 by 2035.

Mrs. Larocque commented that Canada should have further discussions on internal process and investigate what is commercially available in private industry including new information presented at CHC2024.

12. USCHC Engagement with Other International Initiatives

DOC: USCHC47-12 GEBCO Seabed 2030 Report

CAPT. Armstrong provided an update on General Bathymetric Chart of the Ocean (GEBCO). He noted that multibeam constitutes the major proportion of Seabed 2030 mapping.

CAPT. Armstrong presented various graphs displaying percentage mapped based on soundings in a 300 m grid cell, and included different data breakdowns of mapping by type, depth, area, regional hydrographic commission area, etc.

Mr. Justi requested to show the presentation to the ARHC Seabed Coordinator.

Action 47.21: Share GEBCO report with Chair of the ARHC.

13. Capacity Building

DOC: USCHC47-13 CB Coordinator Report

Mr. Justi presented the USCHC Capacity Building report. He stated that both the US and Canada are at a mature level in terms of IHO Capacity Building Strategy.

Mr. Justi asked the USCHC to note the establishment of the Center of Excellence at UNH, which offers a wealth of information sharing and perspective sharing and will be the focal point for applied training for mapping and surveying operations, looking to grow and diversify the pool of well-qualified talent in this expanding field. **Mr. Justi** also expressed US interest in the fact that workforce is a key component of the CHS strategic plan. He noted the CHS Workforce of the Future report that came out May 2023, integrating some of these concepts.

NOAA continues to support Empowering Women in Hydrography and has included links to writeups of experiences from participants in the presentation. Three more participants have been selected for this

year. NOAA continues to support Community Hydrography and E-learning, with a focus on data management.

Mr. Justi also discussed the USCHC input to the IHR and whether we include this update under the capacity building item of the agenda.

Additionally, for awareness, the next USCHC will be held in Wilmington, North Carolina.

Also, in the Summer 2025, the NOAA ship Thomas Jefferson will be in the Great Lakes completing DRIX field work.

RDML Evans commented that one of their hydrographers, Annie Raymond, had the opportunity to go on board the CCG Cutter. He welcomes exchanges of personnel on ships.

Mrs. Larocque commented that there is a manager responsible for community hydrography under OPP, who could share his experience with respect to work happening there.

Action 47.22 (Complete): Connect US-Canada community hydrography counterparts to share experiences in Indigenous communities.

Action 47.23: Have a yearly reporting cycle for the IHR. Identify opportunities as part of the Capacity Building report and report on what was published.

14. UKHO Report

DOC: USCHC47-05 UKHO Report

Mr. Simon Hardern presented the UKHO report. **Mr. Hardern** noted the following:

- Change in CEO: interim CEO.
- UKHO had hoped to grow from 960 to 1150 employees but must reduce to 900.
- UKHO announced it would withdraw Paper Charts following the announcement from NOAA in July 2022. The hydrographic office now expects they need to stay in paper charts in certain areas (UKHO have an arrangement with NGA to provide paper charts around the world).
- S-100: now digging into what UKHO will or will not provide; what needs to be ready by 2026.
- Decided differently from Canada and US on gridding.
- Crowdsource bathymetry: UKHO has not yet adopted this.
- UKHO are finding one of the biggest challenges are businesses wanting more data with more permissions.

15. Earth Observation and New Technologies

Paper Chart 2.0

Mr. Dion Gaulton presented an update on CHS' Paper Chart 2.0 initiative. He noted that there are no Paper Charts within S-101. As part of Transformation, CHS is moving to ENC grids. Initially, CHS went with ESRI Maritime Chart Services for automated charts, which is also being used at NOAA. He noted that there will not be a one-to-one relationship between Paper Charts and ENCs, and that potentially multiple gridded ENCs will be needed to make a paper chart in the future. He highlighted that CHS recently released York and Lark Harbour Paper Chart 2.0 and the goal now is to transition from pilot to production. In anticipation, CHS has moved the project from the Planning and Innovation to the Production and Support teams for implementation. CHS will develop a project implementation plan and look into other technologies that are coming online. **Mr. Gaulton** presented the next release in Quebec region, in which the title block was moved to left side as will be standard in the next version of Paper Chart 2.0.

Pressure on Traditional Products

DOC: USCHC47-15B Pressure on Traditional Products

Mr. Chris Marshall (on behalf of Mr. Louis Maltais) tabled for discussion the impact on hydrographic products and hydrographic offices in response to our large and growing sources of data focusing on Earth observation. The paper tabled by Mr. Marshall speaks to two events in Western Canada and damage in the East Coast from Hurricane Fiona where automated assessment and change detection using remote sensing may offer opportunities for a more active and targeted response from hydrographic offices. The paper asked if we should be more actively challenging our academic networks or potentially our geophysicist partners to look at the potential for development of tools for automatic assessment of shoreline changes or to complete proactive assessments. At a very high level, Canada and US should bring this problem to our academic communities.

ACTION 47.24: Bring the problem statement to the academic community through the COMREN network in Canada and the UNH network in the US, among others. Context: CHS raised a concern that there is widely available bathymetry that could contain information that is not captured through our traditional methods of data integration. Interested in feedback and in learning where similar initiatives are currently happening to ensure that all available bathymetry is accounted for if appropriate QC available (e.g. satellite derived bathymetry).

Uncrewed Survey Vessels

DOC: USCHC47-15A Collaboration Opportunities with Testing Uncrewed Survey Vessels

CAPT. Sam Greenaway outlined US plans for DRIX in the coming years. He stated that the US is planning next year to mobilize one or two units on the Thomas Jefferson in the Great Lakes in the summer of 2025. He noted the potential for collaboration with Canada and the importance of starting to plan early. It would be a great story to have collaboration in the Great Lakes, maybe even going into Canadian waters.

Mr. Marshall expressed that CHS would love to collaborate on the Thomas Jefferson in the Great Lakes (either Lake Erie and/or Ontario).

The US would also welcome Canadian collaboration for a shore-based operation running out of the Ocean Exploration Cooperative Institute (Portsmouth, NH) in October.

Action 47.25: Operationally collaborate on the planning before November for the NOAA Ship Thomas Jefferson Great Lakes collaboration, focusing on Lake Erie and Lake Ontario, and to conduct surveys on both sides of the border. Share details on dates and items for Canadian participation in Portsmouth, NH, in October, or in reviewing reports and findings from that exercise, which includes ship-based and shore-based activities.

RDML Evans noted that questions remain on the best operational model – should it be fully government owned and operated, or simply data as a service, or in between? Topic remains open for discussion, though US is tending toward hybrid (government owned asset, aboard vessel with baseline capability to operate and perform basic maintenance).

20a. Opportunities for Collaboration in the Great Lakes, Including Gap Analysis Discussion

Moved up from below in the agenda

DOC: USCHC47-20 Gap Analysis – Great Lakes

CAPT. Armstrong presented a binational bathymetric coverage and gap analysis pilot. Each nation approached their gap analyses slightly differently: The US accepted data after 1960, 100 m cell, minimally 1 sounding per 100-meter cell divided into multiple layers; and Canada included all bathymetric digital holdings contained in the CHS bathymetric database.

The US Bathymetry Coverage tool was looked at as possible option to display both Canadian and US coverage. **CAPT. Armstrong** showed the Test Tool with a combined example in Lake Erie. He proposed that the commission consider sharing this report and having a discussion on finding a common approach. The US currently has 48% unmapped areas. Canada reports 84.8% of waters void of soundings and specifically in the Great Lakes, 73.7%.

Mr. Marshall commented that it could be useful to have a public facing tool like that shown by CAPT. Armstrong because this coverage information is useful for the public to know. The tool could take complex data and display it simply via a public facing portal. He suggested starting with the Great Lakes. Something for the Commission to consider in subsequent years.

Action 47.26: Determine ability to do Bathymetric Gap Analysis, focused on resource availability. Chris Marshall to continue the dialogue and consult with Ontario, Prairie and Arctic and CHS Executive team.

Action 47.27: Proceed with a pilot project of preparing and publicly releasing a Great Lakes Gap analysis and present this at Lakebed 2030. Deadline for abstract submission is June 7, 2024.

16. US-Canada Alignment on C-55

DOC: USCHC47-16 C-55 Current Methods and Opportunities to Streamline and Achieve Consistency in Approach / Canada approach

Ms. Christy Fandel and **Mr. René Chenier** presented a unified approach to populating the C-55 in which each nation will input their current adequate survey and chart coverage. This is an IMO requirement with the aim of reporting on global coverage to foster collaboration and to contribute to the safety of navigation. The two proposed a standardized GIS-based approach to calculate the percentage of area adequately surveyed to populate the C-55. The new unified approach incorporates water depth, CATZOC as well as recent survey footprints to assess the adequacy of surveys in US and Canadian waters.

With respect to defining areas of navigational concern, the two nations proposed slightly different tools. The US proposed leveraging their Hydrographic Health model. Canada proposed using the CHS Priority Planning Tool (CPPT). The Hydrographic Health model is a risk-based model that prioritizes areas for hydrographic surveying. The model has two main parts, hydrographic gap and hydrographic risk. Hydrographic gap is the difference between desired survey score and the actual survey score (computed by looking at a combination of the under-keel clearance and the seafloor complexity).

The hydrographic gap is then weighted by the hydrographic risk term. Hydrographic risk incorporates things like the number of vessels transiting through the area, the quality of the bathymetry, recent groundings in the area, rocks, obstructions, etc.

CHS has used the CPPT since 2016. The key layer contains the proposed low impact shipping corridors. About 20 layers are used to create the CPPT. The model focuses on key navigational areas, but it also takes in all kinds of waters. There have been challenges to making it effective at the national level, and employee training is required on using and updating the tool.

Next steps: **Ms. Fandel** and **Mr. Chenier** are looking for approval to move forward with updating the C-55 analysis with the new proposed unified approach between Canada and the US and if the Chairs are supportive of the navigational concern component, the pair will also move forward with that for the updated C-55 analysis.

Action 47.28: Move forward with updating C-55 using the model described at USCHC, aiming to complete this in time for national reporting to ARHC. Populate C-55 for ARHC in respective national reports to build on the momentum from the synergy between the two C-55 methods.

17. IHO Strategic Plan

IHO Strategic Plan

Dr. Jonas elaborated that the IHO will be updating the IHO Strategic Plan and the planning phase for this has already begun. The IRCC is requesting that the Regional Hydrographic Commissions provide some inputs on the strategic plan for the next cycle**. Dr. Jonas** suggested opening the conversation. Some examples he offered: perhaps Precision Marine Navigation Program is a good term, maybe that is a concept to throw at IRCC. The whole idea of workforce is missing from the current plan. IHO would welcome that feedback. Another piece that has been identified is the monitoring of the SPIs on the web.

RDML Evans stated that the USCHC will draft an intervention (low threshold level idea) capturing some points we heard.

Mr. Justi offered to take a first shot at drafting that and vet it with the Secretary-General and the Chair and Co-Chair and other US partners.

RDML Evans stated that there will be a need double down on an S-100 focus for next strategic period. He also suggested wrapping Goals Three and Two into Goal Two creating some space to recognize that none of this will happen without the workforce element.

Action 47.29: Write a one or two pager for IRCC on approach. Intervention suggesting adjusting thinking that was agreed on atCcouncil to stick with the three primary themes of the current Strategic Plan. Mr. Justi to prepare and share with Ms. Bhatia.

19. Expansion of Hydrographic Risk Assessment Methodology with Reference to ARHC 13.C1

DOC: USCHC47-19 Testing Arctic Hydrographic Risk Assessment Methodology

LCDR Bart Buesseler presented work completed by Canada and the US on an expansion of the Hydrographic Risk Assessment Methodology that was originally presented at ARHC 13 (ARHC13.C1 ARHC13.C1 Arctic Hydrographic Risk Assessment 2023 update & revised baseline).

The analysis presented at ARHC 13 focused on the Arctic circle, but did not include areas further South where there is in fact a lot more ship traffic, for example, Hudson Bay, James Bay, etc.

The proposal is to work together on a path forward that would use both the US and Canadian methodology and data to expand the area, identify the risk analysis, and identify the process. US can share AIS and source data. The risk assessment is a purposefully simplified analysis.

Action 47.30: Ms. Bhatia to connect LCDR Buesseler with a subject matter expert (SME) within CHS to support the Canadian portion of the risk assessment and for LCDR Buesseler and the Canadian SME to complete this analysis by ARHC 14.

20. Collaboration in the Great Lakes and St. Lawrence

Mr. Marshall presented on opportunities for collaboration stemming from the IHO-Canada S-100 International Sea Trial Area in the St. Lawrence with reference to the Canadian paper to HSSC-16 HSSC16-2024-05.1H Canadian S-100 international sea trial area.

There is an opportunity to expand the St. Lawrence testbed to Eastern Lake Ontario as part of a phase II, so tests can be conducted in transboundary waters.

Mrs. Larocque stated that the idea is to start in the St. Lawrence and then expand into Eastern Lake Ontario over time.

RDML Evans extended an invitation to the Lakebed 2030 Conference to the CHS and stated that he is looking to collaborate on the submission of a paper. The gap analysis would be a nice fit and the bulk of the work is already completed.

Action 47.31: Look at the level of effort that would be associated in expanding into Lake Ontario/transboundary area and identifying what we would do. What are we going to do with the test bed area? What products would we trial? Do analysis / project plan -> level of effort. Come back late fall / early winter to see if we want to move forward.

Ms. Foroutan proposed that collaboration should not just be focused on field work but also on charting. She suggested doing a swap or "virtual" personnel exchanges. **RDML Evans** and **Mrs. Larocque** agreed this could be meaningful.

Action 47.32: Explore development of a Cartographer Exchange Program that also addresses feasibility/timeline to plan/clearances & IT. If feasible, present a plan no later than USCHC48 (2025).

Action 47.33: Canada to share their experience with new ship building and new scientific suites. To add topic to next USCHC meeting.

21. Preparations and deadlines for USCHC

- *16th IRCC*
- *8th Council*
- *4th Assembly*

DOC: USCHC47-21A Preparations and deadlines for USCHC
DOC: USCHC47-21B USCHC Report to IRCC
DOC: USCHC47-21C USCHC Report to CBSC

22. Review of USCHC47 Actions

Will be circulated post meeting.

Action 47.34: circulate draft actions by June 30th.

23. Next Meeting USCHC48

Paired with US Hydrographic Conference, **RDML Evans** proposed the next USCHC meeting to be held Thursday March 20, 2025, to Friday March 21st, with the Thursday being a half day. The meeting would immediately follow the US Hydrographic Conference in the Wilmington, NC which is scheduled to run from the 17th to the 20th.

Note: Would be good to move off the same week as the HSSC for Canadian-held meetings in future years.

Action 47.35: Review timing of the meeting to avoid conflicts with HSSC.

24. Closing Remarks and Observations

RDML Evans noted the packed agenda and is happy that the commission is coming away with some clear actions and victories. He thanked the organizers for the work that went into this. He also stated that he was very excited about looking forward to the Great Lakes effort that was identified and is excited to report on these successes at the conference in the fall and moving into next year. He concluded by congratulating Canada on the hosting, hospitality and chairing the meeting. He also thanked Mr. Hardern and the Secretary-General of the IHO for joining the commission meeting as well.

Dr. Jonas expressed that this was his sixth time in a row attending the USCHC annual meeting and that as always, he found it very instructive. He has always found the meeting inspiring, but this time in particular was greatly encouraging. He saw the USCHC regional breakdown of the collective aspirations of the IHO towards S-100 implementation and that we have arrived here after so many years of concept development and debates on the topic of this S-100. He elaborated that the Commission could help to carve out a path toward a new level of navigational support. He finds this to be the powerhouse of modern hydrography reflected in the Commission's strong commitment to S-100. He appreciated the Commission's pragmatic approach to transboundary collaboration. He really felt the passion, professionalism and dedication of the folks participating in the commission.

Mrs. Larocque thanked both RDML Evans and Dr. Jonas for their comments. She echoed what had been said and thanked US and UK colleagues, and the Secretary-General for joining the meeting. She stated that she found the meeting to be very informative and instructive and that she was humbled by the experience in the room, as pointed out by the Secretary-General. She expressed that she hoped that those present at the meeting would continue the strong collaboration she witnessed throughout the meeting in the intersessional period.

25. Signing Schedule A

Mrs. Larocque and **RDML Evans** signed the Schedule A to the MOA between the NOAA Office of Coast Survey and the Canadian Hydrographic Service.

ACTIONS

Ref #	Item	Action
47.1	National Reports	OCS to provide CHS with an inventory some of the project and operational management training offered by the organization.
47.2	National Reports	NOAA to share the S-101 transition plan once it is available.
47.3	Review of Actions from USCHC 46	Report back to the Interregional Coordination Committee (IRCC) and address back at Council in the Fall regarding S-122 and action USCHC46.2: "Consider a global set of S-122 to support the UN "30 by 30" (30% by 2030) initiative. It should be manageable for the high seas and member states could consider addressing their domestic areas. A cumulative dataset would offer good visibility to the IHO." Once different hydrographic commissions have supplied their different proposals or views on an approach to this, there is an opportunity to discuss at IRCC or Council.
47.4	Review of Actions from USCHC 46	US and Canada individually implement an annual review cycle to consider what can be published in the IHR.
47.5	Review of Actions from USCHC 46	Keep action USCHC 46.8 "With regard to USCHC46-10C, add in Canada, and present the S-100 snapshot as one document/report". Merge national snapshots developed for USCHC 47 to create this document.
47.6	Review of Actions from USCHC 46	Consider reestablishing a team to look at an integrated USCHC SPI Report Card. C-55 integration already underway.
47.7	Review of Actions from USCHC 46	To look at S-100 coordinator responsibilities for USCHC TOR document by August 1st. Revise, update and discuss as necessary with more details on their responsibilities. Report back to WEND and IRCC that USCHC intends to maintain two (CA and US) S-100 leads due to multi agency national contexts.
47.8	Hydrographic Geospatial Products and Services Committee (HGPSC) Report	HGPSC add record of decision page including a signature block for managers to capture who made that decision including where and when the decision was made.
47.9	Hydrographic Geospatial Products and Services Committee (HGPSC) Report	Ms. Patterson to raise transboundary issues at the S-102 level for consideration for Edition 3 and report back at USCHC 48.
47.10	Hydrographic Geospatial Products and Services Committee (HGPSC) Report	Develop data sharing plan for transboundary charts. Context: Due to the complexity of some waterways, it is best to use a single-agency method, where the entire ENC cell encompasses both US and Canadian waters. Because of this, it is important to have a way to share source data from both member states in a neutral location (file sharing accessible to both US and CA) to ensure the entire ENC is up to date.

47.11	Hydrographic Geospatial Products and Services Committee (HGPSC) Report	HGPSC to come back with formalized questions/concerns around transboundary S-102. Supported by St. Lawrence International S-100 Sea Trial Area and S-102 SMEs: Anthony Klemm (US), Andrew Roberts (CA). Context: S-102 is raster-based and cannot be cut in the same way as S-101.
47.12	Hydrographic Geospatial Products and Services Committee (HGPSC) Report	HGPSC to come back with formalized questions/concerns around transboundary S-104 and S-111. Supported by St. Lawrence International S-100 Sea Trial Area and SMEs: Greg Seroka (US) and Phil MacAulay (CA).
47.13	Hydrographic Geospatial Products and Services Committee (HGPSC) Report	HGPSC to formalize the workplan and terms of reference to get us where we want to be by 2026.
47.14	WENDWG Report	RHCs to present 2026 roadmaps for next meeting.
47.15	WENDWG Report	WENDWG 14/03 Members and RHCs to review the WENDWG membership list and provide updates to the WENDWG annually.
47.16	WENDWG Report	Identify priority ports, channels, and waterways for the implementation of S-100 and determine how to share that information externally. Start with soft commitments and create lists of focus areas. Aim to set a three-year plan, recognizing 2026 as a milestone, with a commitment to regular updates. Add this information as a layer to the USCHC Web App.
47.17	WENDWG Report	HGPSC add priority areas information layer to the USCHC Web App.
47.18	MSDI WG Update	Between Brynn Zapp and Chris Hemmingway to discuss offline and make the decision on who would be the USCHC MSDI Ambassador. Role to help promote and highlight the importance of MSDI and things that are part of MSDI, liaison between the Commission and the MSDI working group.
47.19	S-100 Interdepartmental Government of Canada Committee (SIGCC)	Share Terms of Reference for the S-100 Interdepartmental Committee document with Jonathan and RDML Ben Evans.
47.20	US S-100 update	US to share Precision Marine Navigation Program with Canada (Mr. Marshall).
47.21	GEBCO/Seabed 2030 Coordinator report	Share GEBCO report with Chair of ARHC.
47.22	USCHC Capacity Building	Connect US-Canada community hydrography counterparts to share experiences in Indigenous communities.
47.23	USCHC Capacity Building	Have a yearly reporting cycle for the IHR. Identify opportunities as part of the Capacity Building report and report on what was published.

47.24	Pressure on traditional products from new technologies, like publicly available satellite derived bathymetry.	Bring the problem statement to the academic community through the COMREN network in Canada and the UNH network in the US, among others. Context: CHS raised a concern that there is widely available bathymetry that could contain information that is not captured through our traditional methods of data integration. Interested in feedback and in learning where similar initiatives are currently happening to ensure that all available bathymetry is accounted for if appropriate QC available (e.g. satellite derived bathymetry).
47.25	Autonomous systems: US Experience with drone technologies	Operationally collaborate on the planning before November for the NOAA Ship Thomas Jefferson Great Lakes collaboration, focusing on Lake Erie and Lake Ontario, and to conduct surveys on both sides of the border. Share details on dates and items for Canadian participation in Portsmouth, NH, in October, or in reviewing reports and findings from that exercise, which includes ship-based and shore-based activities.
47.26	Gap Analysis	Determine ability to do Bathymetric Gap Analysis, focused on resource availability. Chris Marshall to continue the dialogue and consult with Ontario, Prairie and Arctic and CHS Executive team.
47.27	Gap Analysis	Proceed with a pilot project of preparing and publicly releasing a Great Lakes Gap analysis and present this at Lakebed 2030. Deadline for abstract submission is June 7, 2024.
47.28	C-55	Move forward with updating C-55 using the model described at USCHC, aiming to complete this in time for national reporting to ARHC. Populate C-55 for ARHC in respective national reports to build on the momentum from the synergy between the two C-55 methods.
47.29	IHO Strategic Plan	Write a one or two pager for IRCC on approach. Intervention suggesting adjusting thinking that was agreed on at council to stick with the three primary themes of the current strategic plan. Mr. Justi to prepare and share with Ms. Bhatia.
47.30	Expansion of hydrographic risk assessment methodology with reference to ARHC13.C1	Ms. Bhatia to connect LCDR Buesseler with a subject matter expert (SME) within CHS to support the Canadian portion of the risk assessment and for LCDR Buesseler and the Canadian SME to complete this analysis by ARHC 14.
47.31	Collaboration in the Great Lakes and St. Lawrence	Look at the level of effort that would be associated in expanding into Lake Ontario/transboundary area and identifying what we would do. What are we going to do with the test bed area? What products would we trial? Do analysis / project plan -> level of effort. Come back late fall / early winter to see if we want to move forward.

47.32	Lakebed 2030 Conference	Explore development of a Cartographer Exchange Program that also addresses feasibility/timeline to plan/clearances & IT. If feasible, present a plan no later than USCHC48 (2025)
47.33	Lakebed 2030 Conference	Canada to share their experience with new ship building and new scientific suites. To add topic to next USCHC meeting.
47.34	USCHC 47 Action	Circulate draft actions by June 30.
47.35	Next USCHC Meeting	Review timing of the meeting to avoid conflicts with HSSC.
DECISION		
D47.1	National Reports	Mr. Chris Marshall committed that two representatives from the Ontario, Prairie and Arctic region would attend Lakebed 2030.
D47.2	Review of Actions from USCHC 46	Commission agrees to have separate national points of contact for S-100 coordinator not single point of contact for our commission.
D47.3	Hydrographic Geospatial Products and Services Committee (HGPSC) Report	ENC cut agreements within the context of the HGPSC should be signed by the manager with delegated authority from each country and HGPSC will add record of decision to formalize for context in the USCHC Web App. All decision records will have a cover memo documenting the points of contact for the ENC cut decision. Report annually status on progress in these regards at USCHC.