



# **United States - Canada Hydrographic Commission (USCHC) Meeting**

**USCHC46  
March 16-17, 2023  
Mobile, Alabama, USA**

## **Meeting Minutes**

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**Day 1, Thursday**

**Agenda Item #1**  
**Welcome and Introductions**

**Dr. John Nyberg** opened the meeting noting he would be replacing RDML Benjamin Evans as chair for the week due to a family emergency. Dr. Nyberg noted he is always impressed with how well the organizations work together, on emerging global challenges and new technologies and that he greatly appreciates the strong common goals. He noted his belief in the power of the S-100 data model and knows we have to work this part of the global community in order to realize the benefits we anticipate from it. We are both working to modernize our chart suites, collect data in very remote areas, and champion the benefits of diverse work forces. Transboundary collaboration has remained active since the USCHC meeting in Ottawa last June. Monthly meetings have continued between OCS and the CHS in the Great Lakes regions. Two schedule A's for working across our borders are ready to sign at USCH46. There have been exciting new opportunities between our offices, including a hydrographer exchange hosted by CHS (Arctic this coming fall).

**Dr. Geneviève Béchar**d, on behalf of the Canadian delegation, offered condolences to RDML Ben Evans and family. She finds holding this meeting right after the Hydro Conference allows participants to carry discussions from earlier this week forward. Looking at the time since we've last met, one of the big news is the IMO decision and the date of 2026 that is looming. Dr. Bechar noted the potential opportunity for a US/Canada test bed / testing out S101 on ships. There also might be other possibilities for collaboration in preparation for 2026.

**Dr. Mathias Jonas** shared his condolences and thanked the Chair and Vice Chair for the opportunity to attend USCHC. His standing practice is to attend the Hydro Conference, and was very impressed with what he heard over the three days. In his opinion, North America is clearly a global powerhouse of hydrography. This is thanks to all of the players, industry, academia, and the two hydrographic offices (Canada and USA) that are so developed not only in their technology but in their collaboration. COVID seemed to tune down the global community of hydrography, however now he can see that it has ramped back up again.

**Agenda Item #2**

## Approval of the Agenda

**Dr. Nyberg** noted the structure of this year's agenda has been shifted in order to better align the discussion points with goals of the IHO's strategic plan. This provided a context to our discussion and framework for viewing our efforts in support of the IHO goals and objectives.

Small revisions to the agenda were noted. **Commander Hillstrom** had to leave early and will be replaced by **Matt Wilson** from the Office of Coast Survey.

Two Schedule A's will be signed during the meeting in support our surveying/data sharing efforts on the West Coast.

**Dr. Nyberg** noted key decisions to be made over the course of the meeting include appointment of an US/Canada MSDI Coordinator and an S-100 Coordinator.

He also suggested participants refresh their reading of the Assembly 3 proposals. It might have an impact on the strategic plan and will also probably inform some of the work the next IHO Council will be doing.

## Agenda Item #3

### National Reports

**Dr. B  chard** delivered the CA National Report. Selected highlights included:

- Annie Biron as the new director in Mont Jolie.
- Department of Fisheries and Oceans (DFO) has a new Deputy Minister, Annette Gibbons.
- Ocean Protection Plan (OPP) phase 1 came to an end. This was the largest investment in hydrography in decades.
- CHS has the largest recruitment in decades (1/3 of CHS staff has been with organization for less than 5 years).
- OPP was renewed last summer (with a sharp focus on the Arctic).
- Partnerships with DND are looking to accelerate surveying.
- CHS is looking to have a dedicated chartered vessel to do surveys.
- Laura Colombe has accepted an acting position to oversee all Arctic charting, with a focus on the transportation corridors.
- A new project, "community-based hydrography" is in place. It's looking to pick up what was at the pilot stage and grow the ability of communities, many are indigenous communities (however not all) across the country to collect and use data. Since a lot of the communities are difficult to access, we are building up resilience throughout many parts of the country. This initiative has been very well received. This "small community-based hydrography" has received a lot of interest. This could become a model for capacity building exercises around the world.
- CHS is developing a "State of Play Report" of where Canada is for hydrography and is targeted to be completed by the end of March. We've also started holding workshops and put out a call

for proposals (we have enough funds for three). In total we received 18 proposals from different communities.

- CHS values its collaboration with the University of New Hampshire (UNH) on data loggers and also is very interested in some of the open-source software being developed (this will be helpful for communities).
- Canada has been doing a lot of work to get ready for S-100 including the withdrawal of raster products, consultations have been done, and some ENC's will be adjusted to ensure the best product possible. There are areas where we have raster products but no ENC's, so we have to develop a plan to ensure these areas are covered. The goal is to be done the process by 2026.
- ENC on the grid has begun and CHS is pleased with progress.
- Paper Chart 2.0 has also begun; however, we would like to see a paper on automatic paper charts at IHO Council.
- "Hydrographer of the Future" report is now available, as is the article in the International Hydrographic Review (IHR).
- Coast guard has been leading the way for E-Navigation. For S-111, the partnership with our colleagues in the meteorological office and oceanography modelling community have been key to delivering on this.

**Sean Dyble** spoke to the Department of Defense aspects of the CA National Report.

- part of the Canadian Armed Forces Intelligence Command is the product distributor (including CHS products and others) to the government of Canada fleets.
- The HSO participates in several international working groups, but we are most active in the NATO Geospatial Maritime Working Group (GMWG) as well as the Allied System for Geospatial Intelligence Maritime Sub-Group (AMSG) working group.
- We are also involved in the next generation of AML, which will be called S-500 and which will be an S-100 compliant product. Submarine ENC's are also produced.

**Kray Robichaud** introduced himself new to his position. Kray spoke to the Allied System for Geospatial Intelligence Maritime Sub-Group (AMSG) that Canada will be hosting in Victoria. He reviewed and our efforts to further strengthen the DND relationship with CHS. CNMOC colleagues will be conducting a staff visit to Halifax Nova Scotia 17-21 April 2023. This is being conducted under a recently signed MOU between DND and the Department of Defense USA as represented by CNMOC (signed August 2021). An initial executive steering group was convened in May 2022. This includes an exchange of operational hydrography, meteorology, and oceanography data, products and info. We will also be looking to enabling visits to local CHS Atlantic offices, and including numerous DND sites.

**Dr. Nyberg** delivered the US National Report.

- NOAA is proud of the transboundary collaboration with Canada. This year two scheduled projects are in Puget Sound and the Clarence Strait/ Dixon Entrance.
- OCS-CHS monthly meetings continue focusing on USA/Canada ENCs
- A new OCS data licensing policy was released September 2022. All OCS data/bathymetry will be available to the public under an Open Data License which makes OCS data free, open and accessible. The policy also addresses external data contributions from the ocean mapping community.

- NGA continues to work through the conversion from DNC to ENC. 55% NGA's global ENC portfolio is in work or complete, which is a big accomplishment.
- The general workforce continues to recover from COVID-19.
- The S-100 roadmap for 2030, the 2026 rollout for the next generation ENCs is rapidly approaching and OCS is developing an S101 transition plan
- All other S-1XX products for use in an ECDIS will require S-101.
- NGA is also transitioning its customers away from the standard Nautical Chart and ENC, and is working toward not only S-57 but S-101.
- The 2022 mapping missions in the Great Lakes have been a big focus. Recently, for first time since the early 1990s, a NOAA white hulled hydrographic ship was deployed. The ship surveyed 450 square nautical miles in Lake Erie and 274 square nautical miles in Lake Ontario. There were 42 new confirmed shipwrecks confirmed and 22 features identified.
- Operational testing of Uncrewed Surface Vehicle to provide force multiplier capabilities for the mission was conducted. The surveys happened within the newly designated Wisconsin ship wreck coastal marine sanctuary and Thunder Bay Marine Sanctuary.
- For the 2023 survey season, NOAA hydrographic ships, contractors have around 41 planned projects. Contracted surveys are very important compliment to NOAA's in-house initiatives.
- Raster chart sunsetting continues. As of March 1, 384 Raster's have been cancelled and 175 paper/raster charts are in last edition status.
- NOAA ENC rescheming - 18% complete and progress has expanded up the East Coast, as well as the Mississippi River, Gulf Coast, Great Lakes, and Alaska.
- OCS is also working towards operationalizing S-101, S-102, S-104 and S-111 by 2026. We believe there is an increased demand for high resolution mapping data across all depths. Foundational data should include depth, shape, composition of the sea floor, currents, water levels and basic observations. This all needs to be tied together with known geodetic reference frames.
- Lakebed 2030 (seeks to map the Great Lakes by 2030). It's contributing towards to the US NOMEAC (National strategy for Ocean Mapping, Exploration and Characterization) goal to map all USA waters deeper than 40 meters by 2030 and water shallower than 40 meters by 2040. In support of Lakebed 2030, the Great Lakes Observing Systems has established a crowd source bathymetry pipeline with NOAA NCEI and the IHO DCDB. In the last year, over 20 vessels have contributed over 5.7 million datapoints to that initiative. Contact point for this effort is [Meredith.Westington@noaa.gov](mailto:Meredith.Westington@noaa.gov).
- USA and Canada agree that the Great Lakes are an ideal point to demonstrate an internal approach to meeting Seabed 2030 goals in transboundary waters. There have been cooperative UXS development in the Great Lakes, which supports the USA and Canada mapping interests in the Arctic waters as well. The Great Lakes are also a very good testing ground for next generation products and services built on the S-100 platform.
- **John Lowell** noted NGA has increased commercial data acquisition from contract partners. An example of this is the investment in the number of contracts to acquire commercial satellite derived bathymetry data.
- NGA is also been making great progress on their CPENC project (Certified Printed ENC's).
- NOAA successfully hosted three women aboard ships during the 2022 survey season from Nigeria, Japan and Suriname in support of the joint IHO-Canada project "Empowering Women in

Hydrography (EWH.)” NOAA has selected three new candidates for this year who will be announced soon.

- **Matt Wilson** elaborated on the NOAA OCS data license policy. OCS is making available the data at the highest resolution that it was gridded at per NOAA specifications. The NOAA data strategy is to have an open license on all of bathymetric data. This is essentially federal law, and stems from the Evidence Act of 2018, which mandates that US government data should be as open and accessible as possible, for the good of industry and to spur innovation and creativity. The best way is to use the open data license and to recommend explicitly it be a “creative commons 1.0 universal public domain dedication license.” It's called “license,” but this CC01 license formally and legally removes copyright-the best way to achieve open data.

46.1	Investigate revisions to the MOU to allow reference to include continental shelf areas.
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<b>Agenda Item #4</b> <b>Observer Reports</b>
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**Mathias Jonas** delivered the IHO Report:

- Several states in the MesoAmerican region are not yet IHO members.
- Council-6 endorsed seven of fifteen proposals. The Council has become the main topical contributor to the Assembly. For this accomplishment, Dr. Jonas extended appreciation to Dr. Geneviève Béchard for her role as Council chair for the last four years.
- Since last year, prioritization of IHP SP Goal One has been among the most relevant developments.
- The IMO revised the ECDIS performance standards.
- IHO has incorporated S-100 as the relevant standard for data provision which the IHO Secretariat notes as an excellent development.
- The production of S-57 alongside S-101 is not embraced by all hydrographic offices around the world. We should understand that S-100 is a derivation from ISO 190000 series for the digital provision of geo information.
- The ENC is our premium product in terms of complexity. It was similar with S-57.
- The provision of the paper chart continues to be debated. We believe it should meet S4, but we understand this is from the technical point of view and is not easy. The issue does touch upon product liability.

We do progress, it's not only to commit to producing S101 based on IHO standards, the major difference from the past is it was mainly paperwork. Today it comes with technical infrastructure as well with the registry web-based applications to derive the feature catalogues etc. It's a whole digital environment that we have to create and maintain. It is an increased focus on interoperability on the catalog part, and on test data. Test data is what the industry is asking for most.

- Concerning challenges facing the IHO community, there is a decrease in number of nominations for office (Chair and Vice Chair) and participation in technical working groups and project teams.

- The classic cartographer cannot help us as before anymore. The emerging need is for “hydrospecialist” professionals; however, these are rare.
- Importantly, UN recently called for 30 percent of world’s oceans to be protected as marine protected areas.

46.2	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.
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- GEBCO’s support for crowdsourced bathymetry has been tremendous. In a few short years, we’ve reached over a billion soundings contributed from citizen-science. In addition, IHO member states support this with professional data. The UKHO is looking to join soon too. Canada and USA are instrumental to the success of GEBCO, including maintenance of the GEBCO grid at the IHO DCDB.

**Simon Harden** delivered the UKHO Report:

- Concerning UKHO exit from paper charts, although UKHO announced this would be accomplished by the end of 2030; it is more likely 2032 or even perhaps 2034.
- UKHO is studying developments with regard to Sailing Directions and S-100 standards.

**Agenda Item #5**  
**Actions Outstanding For USCHC**

This agenda item was shifted to day two. Please see below.

**Agenda Item #6**  
**Review status of US and CA with regard to relevant IHO Strategic Plan SPIs**

**Doug Brunt** briefed the participants on the challenge to develop a methodology or a way to formally respond to the IHO Strategic Plan and its strategic performance indicators (SPIs). CA and US have taken rough cuts at the SPI’s that appear member state-based in the IHO Strategic Plan. Some issues concerning interpretation of the language of the SPIs were noted.

For “operational production and distribution of hydrographic data,” CHS responded that we are producing and delivering S102 in selected areas, S111 is available and we are confident that S101 will be available by January 1<sup>st</sup> (and probably well before that).



For “navigational significant areas,” Canada has 77% navigational significant areas at CATZOC “other than unassessed.” This is taken from C-55, but Doug felt this requires some revision and more thought, because you can imagine that although it’s been assessed, if the quality is CATZOC D, what value is that?

MSI is handled by the Canadian Coast Guard- they are submitting MSI information as required.

In explaining CHS S101 ENC production and where it would be via conversion from a production system by 2026, Doug noted the Caris HPD system and CHS plan is to migrate to a geodatabase structure for S-100. CHS has to migrate the database first, load it with the S-57 ENC’s, and eventually when CHS is in full production, the one database will generate both S-101 and S-57 ENC’s. Conversion process tools are advancing well. CHS has over 1000 ENC’s. If the conversion will require time on each ENC, i.e., manual intervention, the timeline could be affected.

**Jonathan Justi** noted the exercise of drafting national input on the performance indicators was intended to ground truth the reporting and tracking process in a simple way at a national level. In undertaking this exercise, questions or interpretation and consistency arose- such as the scope and interpretation of “confidence” - Confident that S101 ENC production has started incrementally as of January 2026? Or that the whole national suite is available at that time? The “implementation framework” and the dependence of S-101 production in addition to the prioritized S-10# product specifications. In SPI 1.2.2, the question is “adequacy of survey,” percentage of navigational significant areas to a known quality and appropriate quality or standard. Member states would probably interpret the metric and answer differently. Other SPI measures appear to have been fairly straightforward (ie, yes/no). Doug and Jonathan wanted to go through this table top exercise to generate the metrics so that the IHO Secretariat could possibly then present the total (together with other member state input) for the global community. By going through the exercise presented, Doug and Jonathan hoped we might help other states tackle some of the questions noted.

<b>Agenda Item #7</b>
<b>International Hydrographic Review Update</b>

**Denis Haines** updated the USCHC on developments with the International Hydrographic Review. The IHR is published twice a year: May and November, with respective deadlines of January and July. There are three types of info published in IHR: 1) scientific and technical peer reviewed articles, 2) informative notes and 3) general information (personnel appointments, etc...).

46.3	Dr. Bechard noted she would like to see an article on the automatic production of paper charts, how it aligns or not with S-4. US and CA consider a joint paper.
46.4	Three year plan document for IHR. It should designate leaders. This should be provided to Denis Haines (had requested it to be provided by June 2023).

<b>Agenda Item #7.5</b>
<b>Data Licensing</b>

**Matt Wilson** reported in 2022 he spoke at the CHS executive meeting on OCS' experience with data licensing. OCS is requiring an open license on all external data contributions. This is for a variety of reasons- one is the data license facilitates the data being machine readable and this permits rapid ingestion into OCS' national bathymetric source (automation and distribution) applications. Also, the data license approach improves communication to end users as well, since once the license is issued, it is clear what can and cannot be done with the data.

OCS and CHS will continue dialogue on data licensing practices.

## Day 2, Friday

### Agenda Item #5

#### Actions Outstanding for USHPC

**Jonathan Justi** reviewed action items from USCHC45. Some are addressed within forthcoming agenda topics. He also reviewed actions stemming from IRCC14 (June 2022).

Of note,

- IRCC invited RHCs and subordinate bodies to provide comments and inputs on the governance document on Dual Fuel Concept for S-100 ECDIS, intersessionally.
- Geo-coordination within RHC's to help ensure the provision of data on a regional level.
- Begin to include climate change related activities as a possible topic of importance to the IHO.
- Encourage member states to work through their IMO designated agencies to report to the IHO Secretariat on the progress and status of implementation of newly recognized mobile satellite services by MSI providers.
- RHC's to establish an S-100 Coordinator role.
- RHCs to apply Action WENDWG12/33 (WEND-100 Product Matrix)
- RHC to encourage Member States to release datasets or subsets into the public domain via the IHO DCDB.
- Support to the CSB initiative.
- Encourage RHC's to contribute new data to GEBCO.
- Discuss data sharing

Jonathan also introduced the NOAA Science on a Sphere® (SOS) as a data display tool and opportunities to contribute to the SOS display being prepared for Assembly 3.

**John Lowell** highlighted the IBSC topic noting implications to "future workforce" discussions and conversations between academic institutions and consumers/agencies that consume the output of the workforce training. We should consider engaging directly with the IBSC. IBSC structure is very much focused on traditional activities for hydrographers and cartographers.

## Agenda #8

[Group Photo]

## Agenda Item #9

### Hydrographic Geospatial Products and Services Committee (HGPSC) Report

**Christie Ence** provided an update on the Hydrographic Geospatial Products and Services Committee (HGPSC) together with **Laura Columbe** as co-chair. The HGPSC oversees discussions on how US and CA are going to manage transboundary products. This year's focus has been to set up regional bilateral meetings to discuss topics, not just coverage, but surveying and other hydrographic and charting discussions. Both nations are re-gridding their cells, and we're now starting to have real discussions on how we're going to manage the data.

Monthly Great Lakes meetings have been ongoing for two years. A new topic concerns the international Great Lakes datum update and how that will impact navigational products.

In Lake Huron, Canada released their transit scale cells and there were overlaps with US cells. ICENC contacted CHS and OCS informing of the overlap in band 4 coverage- which is not permitted. In the last couple weeks, OCS and CHS have discussed how to cut this particular set of cells.

North Atlantic offices held a meeting; the next one will be early April. The interesting thing about the different regions is they all have unique concerns and challenges. The largest challenge in the Atlantic area is a "sliver" of water that extends from the North Atlantic into the Grand Manan. It contains Seal Rock, where both nations are charting on the ENC as caution areas, noting the area is disputed. If you have a transboundary solution that is splitting cells at the boundary, you don't have a boundary, what do you do?

In the Pacific Region, one meeting was held where contact information was exchanged. US cells and the Canadian cells are different sizes and they don't line up exactly. When you line up the US and the Canadian grid, it's obvious that there is a small gap.

The Alaska/Pacific/Arctic offices are planning to start discussions.

Considering S-102, there are challenges along transboundary areas. Do we cut them like we cut S-101? Are there constraints that will prevent us from doing it that way? S-102 is a gridded cell. You can't cut diagonally along the cell. Further discussions are expected.

**Ms. Ence** referred to a document concerning US-Canada transboundary cell rescheming and requested feedback which references the United States transboundary ENC project report, along with the schedule A's signed in 2011. The purpose of the document is to revise the geographic responsibility of the United States to extend to 48 degrees north. There have been developments since 2011 which will need to be addressed in this document.

**Andy Armstrong** suggested having a high-level process within the MOU allowing reference to continental shelf areas going forward, so when the time came, we could apply the same process to those issues without having to change the MOU.

46.5	Investigate revisions to the MOU to allow reference to include continental shelf areas.
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**Dr. B  chard:** noted this as something we might want to take the next year to do, and come back and approve it at the next USCHC. She also noted our US-CA process could be documented to the WEND working group or somewhere elsewhere for broader awareness.

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 a test bed. Pilot associations around the Great Lakes, the St Lawrence River or on either coast are interested.
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**Agenda Item #10**  
**IHO Initiatives and the USCHC**

WENDWG12 Report **Jeremy Nicholson**, CHS Halifax region, introduced this topic as the Canadian representative on the WEND working group. This year, the WEND working group met in Denmark- 30 people in attendance, 17 representatives and 3 regrets.

One of the first items at the WEND WG meeting was an overview by John Nyberg, consisting of the last 5 years of his tenure. Although meeting virtually during the pandemic, progress was made in terms of the S100 implementation guidelines, WEND IGIF Matrix, overlaps and gaps, the RENC coordination, the INTOGIS and transition from S-57 to S-100.

A key item at the meeting was the 12 RHC reports with lots of good discussion. The USCHC is doing “good” relatively but there is still a lot of work outside the S-101 coordination needed by the USCHC. S-102 and S-11 discussions are still being hashed out. A “best practices” paper is a good idea to forward to the WEND working group- so other countries and nations get a sense of what USCHC has been doing. Additionally, some S-1XX products are not “controlled” by hydrographic offices.

Not all member states have the capacity to produce S-100 products. Capacity approach across RHC members is needed. One of the actions out of the meeting was for the RHCs to present on their 2026 roadmaps at the next WENDWG meeting in February 2024. The working group also discussed confirming an S-100 Coordinator role.

The RENC’s updated their S-100 activities. IC-ENC reported an S-100 readiness service available. They met on March 14, 2023 to showcase the tools to those interested. Also, they have E-Learning tools on HD ENC, S-101 ENC, Gridding ENCs. Primar talked about S-102 and S-111 platform availability which CHS, Primar and Teledyne collaborated to put into service. Primar has an S-104 service in development as well as an S-101 conversion project in development. They also discussed their E-learning modules. One of the actions from that was an invitation for the RENCs to consider the possibility of allowing their materials to be available on the IHO e-Learning platform.

The WEND100-IGIF matrix: 8 of 15 RHCs have completed their IGIF Matrix version 1. It’s meant to promote the S-100 lifecycle, promote regional cooperation, consider best practices, support the

progress of SPI 1.3.1 of the IHO Strategic plan. Members were asked to submit their comments or suggestions for improving the process by April 2023. RHCs that have not yet submitted are invited to submit their IGIF to WENDWG.

INTOGIS Phase 3: NIPWG presented plans for the integrated S-128 catalogue data into the GIS interface. There are currently some test datasets available from Korea Hydrographic and Oceanographic Agency (KHOA). The World Port Index and AIS data sets from NGA are now integrated into the GIS system, and KHOA is to have an S-128 GML tested and integrated by end of 2023.

The operational service of S-128: It is the opinion of the RENC's that member states will send data through them and an S-128 will be created by RENCs and not expecting S-128 catalogue from member states. A little push back from the member states where some prefer to send the data directly to the clients as oppose to going through the RENC's. There might be some confusion if there are multiple S-128's on the market. One of the actions was WENDWG requests that NIPWG develop a concept paper with use case#1 from the WEND100 Implementation Guidelines: SOLAS navigation, Route Monitoring products, as the top priority, and extend the scope of this concept paper for other use cases once step 1 is achieved.

The ENC schemas and S-100 planning: There is clearly no consensus on regular gridding. Member States were asked to report on their S-101 ENC planned schemas using INTOGIS III – due date by December 2023. There were elections of new chair and vice-chair. It was agreed that the WEND working group should be face-to-face and not virtual/hybrid. Possible locations for the next meetings are USA in 2024, Australia 2025, Hong Kong 2026.

Some deadlines to RHCs from the WENDWG meeting:

- present on their 2026 roadmaps for next meeting in Feb 2024.
- confirm the S-100 coordinator role.
- Members asked to submit their comments or suggestions for improving the IGIF process by April 2023.
- Member states to send S-128 test datasets to KHOA by May2023 for input into INTOGIS III.
- RHCs to report on their S-101 ENC planned schemas using INTOGIS III – due date by December 2023.

**Dr Bechard** nominated Christie and Laura to be our S-100 coordinators. The nomination was agreed. A brief discussion of the S-100 coordinator role was held. The short list of S-100 responsibilities discussed at SWHPC was shared.

46.7	CHS and OCS exchange S-128 data sets.
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IGIF product matrix status update: **John Nyberg** updated the USCHC on the IGIF product matrix. In large part it's about the life cycle phenomenon that is S-100 products and services. It promotes regional coordination. There are pieces with regard to best practices, data sharing, collection, innovation. It is centered around nine pathways in the UN GGIM IGIF from which much of the language was taken directly or adapted. The difficult one is the tracking progress on SPI 1.3.1 of the IHO strategic plan. We're trying to figure out where the world stands on readiness to S-100.

Certainly, there have been some challenges in regard to the matrix. It can feel long and complicated, however once you work through one of the product specifications answers it's not so bad. It is a challenge to make sure every commission is answering questions and interpreting the same way. Approximately 50% of RHC's have responded. MSDI has been added into the matrix. Some revisions are being made to the matrix. Discussion followed.

**Doug Brunt** observed the matrix (and its evolution) becomes more understandable as one works their way through the connection between the matrix, the roadmap and the IHO Strategic Plan.

S-100 Strategy: **Jonathan Justi** presented a desk top exercise in which he viewed the status of the US on S-100 product specifications and current status in the near term. Some key reference documents consulted on the S-100 implementation issue were located in a variety of webpages across the IHO.INT website. Some reference documents were labeled "working drafts" and some developments appear to have occurred after the posted reference documents but which were not readily discoverable.

He identified apparent lead experts in the US for each one and asked for a 60 second snapshot for each specification as to current status and prospects moving forward.

Of note, many prioritized product specifications are still listed as edition 1, a *prototype for testing*. Some in the community are saying they will not test until edition 2 is ready due to resource constraints and competing priorities.

**Doug Brunt** commented this as a good exercise that he found to be interesting, informative, and useful. He observed in regards to some of the connections between the roadmap and the strategic plan, this is a good document and a good model to follow. It's a short snapshot on where we're at and where we want to go, but it will also inform the strategic plan. The Strategic Plan 1.3.1 is very general, and that's OK for the strategic plan level. However, I think we need another level of detail, and this is a good template for us and others too to see progress.

Another possible benefit is for other member states to show where they are and to provide their points of contacts information for follow-up.

46.8	With regard to USCHC46-10C, add in Canada, and present the S-100 snapshot as one document/report
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**Dr. B  chard** offered that CHS needs to communicate to and with a number of audiences - "we need to be able to communicate when we will have S-100 available." Each country is going to have to communicate what coverage they are planning to have by when. I'm wondering if this information should become part of our regular country report to USCHC. This could be a very simple template that we could use to communicate on our website.

**Dr. Jonas** observed in terms of the IMO ECDIS Standard, we are due to report on the progress in terms of data provision on an annual basis to NCSR. This leads us to "what progress has been made over the years in the regions?" We need to create a template that fits to all levels.

46.9	Consider S-100 status template be incorporated into annual National Reports to USCHC
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**Dr. Nyberg** suggested to consider a mechanism to roll up reporting that we have some sort of high-medium-low readiness.

Capacity Building: **Jennifer Landry**, USCHC representative to the CBSC, reported on this topic. The IHO CBSC held an intersessional earlier this week and a plenary is scheduled for June. There are no funded programs for USCHC, although the USA and Canada have many hydrographic training programs.

The CBSC work program for 2023 has 14 technical visits and 11 workshops and training events, much of what is roll over from COVID. CBSC is discussing ways to track all capacity building activities, not just those funded. There was a revision of procedure 11 (the assessment of capacity building stage of coastal states.)

Continued funding for the e-learning initiative is in place. E-learning is going to be used as a pre-requisite for the Cat A and Cat B courses. The CBSC agreed to translate courses into other languages and will be available on the e-Learning portal in English, French and Spanish. Guidelines will be presented to the CBSC in June and then to IRCC 15 and which will give boundaries of what kind of content is being sought as well as the technical details of what should be submitted. Right now, there are four courses available.

The Empowering Women in Hydrography effort continues to receive support from other RHCs. The mentorship program currently has 11 mentors (can be men or women) and 22 mentees.

The NOAA-at-Sea experience for 2023 has now closed for application. Upcoming there is a work place psychology webinar (later this month). There is also an in-person event on one of the days in Monaco. Next up in the initiatives around the world. Part of that, the “empowered women and hydrography” has a booth with portraits of female hydrographers, and the initiatives from around the world (one is from the USA and one is from Canada).

The last thing we did was talk about the C-55 project team. The desire was to better reflect both the requirements for safety of navigation and the use of hydrographic data for non-navigational purposes and a technical solution would be required. There is a new ArcGIS tool that the project team plans to present to the plenary session.

46.10	Prepare or identify content for the e-Learning center. Continue to report, Capacity Building activities, whether funded or not, and if you want to have any virtual events that you’re hosting on the Capacity Building Calendar to open membership, we can do that as well.
46.11	Identify a replacement for Jennifer Landry as USCHC capacity building coordinator as she leaves her current position within Navy at end of May
46.12	Identify a number of trainings we could send to the e-Learning center

Jennifer indicated her intent is to prepare the report and presentation CBSC 21 and Matt Borbash has graciously offered to present if we don’t have anyone replacing Jennifer as USCHC CB Coordinator by June.

**Dr. Jonas** explained the context of the IHO capacity building effort. The domain activity is mainly funding of Cat A and B courses in the universities from the earmarked money. The IHO CB budget from the annual budget is \$65000, however this normally just covers travel costs for non-member states of the region to participate and learn about hydrography. The IHO budget cannot fund full courses in S-100 production education.

CBSC projects funded totaled €75000 against the total requested of €662,000.

**Annie Biron** noted the end of the initial demonstration of the EWH project is March 2024. If this effort is to continue, other member states should be mobilized to share or increase their contributions (funding). Also, the CA grant fund can only finance 75% of the project. The IHO is contributing in-kind. The USA contribution (in-kind ship time, travel, etc.) is also helping.

### Agenda Item #11

#### Marine Spatial Data Infrastructure (MSDI) activities and initiatives

Marine Spatial Data Infrastructure Working Group: Caitlin Johnson, as previous Vice Chair and incoming Chair of MSDIWG, briefed the USCHC. The most recent meeting was in Genoa, Italy this year. MSDIWG meetings are being held in collaboration with the UNGGIM working group on marine geospatial information and the open geospatial consortium marine domain working group.

The MSDIWG's main focus is updating IHO publication C17-spatial data infrastructures with the marine connection guidance for hydrographic offices-with the goal to submit C17 version 3.0 to IRCC15. The working group also discussed the IHO strategy and relation to the MSDI as well as the MSDI applications for S-100 including S-100 applications beyond navigation.

Caitlin reiterated she personally doesn't feel the USCHC needs its own MSDI working group, but having a regional MSDI coordinator is still a good plan going forward.

The UNGGIM WG on marine geospatial information portion of the meeting had some several main topics. Marine members participated in a final drafting session for the IGIF Hydro or IGIF2, a complementing document to the UNGGIM's broader IGIF document which seeks to provide practical guidance for member states to use, to enhance the availability and accessibility of marine geospatial information. The working group plans to host a side event and meeting at the 13th session of the UNGGIM Committee of Experts (August, New York) to promote and raise awareness for the IGIFH.

The main focus of the OGC marine domain working group portion of the meeting was to discuss the progress and next phases of the federated marine SDI pilot project. This project directly responds to the OGC IHO concept development study and seeks to initiate a full-scale pilot to demonstrate the multi-country federated MSDI. The current phase, Phase 3, is wrapping up now. It was an overarching sea-based health and safety scenario incorporating the land sea interface in the arctic demonstrating the technology and data used with OGC IHO and other community standards in response to a grounding event and evacuation of a vessel. There's currently a call for participation in Phase 4 connecting land and sea for global awareness. Phase 4 will build on the land/sea interface work from Phase 3 on multiple locations to include Singapore, the Arctic and Canada.



The USCHC is invited to designate a regional MSDI ambassador and to continue to contribute expertise to MSDI working group actions and related initiatives.

Dr. Bechard nominated Caitlin Johnson for the vacant position of MSDI coordinator. This was agreed.

S-131 (Harbor Infrastructure) update (Canada): **Sara Rahr** gave a brief overview of the S-131 layer-progress and upcoming next steps for Canada. S-131. It will host the location, characteristic of facilities and services offered by all harbor, terminals etc. The aim is equip the mariners with advanced knowledge to support their berth route. Like other S-100 layers, S-131 will be an overlay for the ENC ECDIS. Unlike the other layers it will serve a dual purpose: it will 1) assist with data exchange between ports and hydrographic offices and 2) act as a standalone product specification for distribution. S-131 proof of concept database is currently being developed by a project team sponsored by CHS through the IHO lab and support. This marine harbor infrastructure database will improve information exchange between ports and hydrographic offices by acting as a trusted neutral repository of harbor information. All stakeholders will be able to store and customize and share unclassified encrypted S-101 compliant information. A proof-of-concept database may act as an interim solution until it is replaced by national solutions for S-131 information exchange or, alternatively, where it concerns permanent solutions. The S-131 two-year project is already at the half way mark. The S-131 1.0.0 product specification package was finalized last month and submitted to network.

The automated programmable interface (API) development is ongoing - the feature catalog was approved in December 2022 and has been implemented into the database. In practical terms, upload, single features, feature collections, are now possible. Next up will include all of the S-131 features. Also, a GML export is available, but it's not supporting exchange just yet. Integration within the GUI is almost complete. Current challenges include attribute display prioritization, as the GUI has to support all possible data input and output.

The data model is sophisticated enough to handle the inherent complexities of multiple levels of attribution and sub-attribution. But we need to simplify the effort. Another challenge is who should be able to upload and access the data. We're going to be supplying integrity checks against digital signatures and source providers ensuring interoperability with the marine connectivity platform. The biggest challenge, which all countries are facing, is to cultivate the required relationships between the government agencies and their ports to ensure uptake because ports are going to supply the bulk of the data and will be essential to maintaining it so we can publish our products with their data. Therefore, the S-131 database tool needs to facilitate easy updating of the information.

The upcoming steps for the project team are to try out test data sets from select harbors. This is underway this month. By the end of 2023, we're going to test the capacity to connect users existing GIS to import, customize, and export their own data. We will be inviting those select ports to test the database product. The end goal is an operational system available by April 2024. We will be relying on ports to supply much of the data for S-131 whereas we will supply the structure storage and API for users to access it. Currently we're expecting a small number of ports in North America, Europe and Asia, to be the first participants but we need to cultivate those relationships.

CHS doesn't want to build a complex identity management system. The goal is to establish good information flow, not just between ports and hydrographic offices, but between multiple government

agencies. As the system matures the integration of two main elements will be executed. We hope this will be operational by March 2024.

**Dr. B  chard** asked if the US was having such discussions with some of US ports and if the US would consider having test data sets? **John Lowell** noted the discussions in Canada will also happen in the US community as we develop our S-100 strategy with the 27 agencies.

**Chris Marshall** noted Annie and Sara’s reference to interchanging information between port operators, port authority and hydrographic offices. What is the vision for who will manage this information? In a CHS context, I can’t think of a day where we’d manage that information, nor would we necessarily interface.

The point of the database being developed is to serve as a repository for the data coming in from various ports and harbors etc. and they will also be able to access it. They will also be the end user. They will be able to extract it in an open-source customizable S-131 compliant data layer. CHS will be creating these products from that data. Ultimately, it’ll be up to the port to both supply, update, and maintain the data. We’re going to maintain the products. Every coastal state will have the option to use something similar to the template database that we’re developing or to create their own repository.

**Chris Marshall** asked who will be the authority managing, it will probably depend on each nation’s governance of such things. He expressed concern that HO’s need and want the data for their products, it’s uncertain if HO’s would need to be the data managers.

**Sara** noted part of this will be managed by the marine connectivity platform, so that’s going to ensure this digital signature, so the ports are the ones uploading their data into the secure database. That will be part of the identity management challenge that we’re currently wrestling. Once we have a secured “who can access it, customize it, export it,” we will be connecting our database to this existing database. In terms of management, it will be different in every country.

**Agenda Item #12**  
**Break**

**Agenda Item #13**  
**USCHC engagement with other international initiatives**

UNGGIM and OGC: Linkage to UNGGIM by both organizations has been pretty well communicated so far this week, through MSDI WG and WEND WG.

From the UNGGIM side, there will be an abbreviated working group meeting in August ahead of the committee of experts meeting in New York City. The main goal is to have the IGIF Hydro part 2 completed and ready for endorsement at that meeting. What happens next is it will go out to every member state head of delegation of UNGGIM and you will have another chance to review it, and then a month or so to provide comment.

**UN Decade of Ocean Science**

**Doug Brunt** noted the Ecosystems and Ocean Science sector leads the UN Ocean Decade effort from the Canadian point of view (CHS is part of that). For Canada, 34 projects, 3 contributions and more than 30 activities recognized. Doug noted the project “Indigenous Engagement and Indigenous Knowledge.” Doug highlighted one activity for the USCHC: the detection of undersea features. It is a project that will focus on the use of AI and the detection of undersea features.

**Jonathan Justi** noted the US Ocean actions involving NOAA, the National Science Foundation, non-governmental organizations. Jonathan noted 100 items listed, and pulled out those related to hydrographic interests for reference.

**Dr. B  chard** noted when Canada first put forward the undersea feature project, part of the thinking was it was a way of raising the profile. So maybe a way to look at this, is does this create an opportunity for cross group connections? The list is very useful, I was looking at one of them (#17) Committee on Earth Observations Satellites - Coastal Observations, Applications, Services, and Tools, and I’d like to know more about that one. Canada is about to take over the chairmanship of COAS, for two years, when we look at the title, that connects into some of the stuff we’re looking at. SDB and coastal change, it may be way off mark, but it may be not. So maybe there’s a couple on that list that will provide us with an opportunity to connect and get visibility for some things that we want to do.

**Dr. Nyberg** noted the IOC will be starting a working group on data management.

**Dr. Jonas** noted the Empowering Women in Hydrography project is officially registered as a project under the UN Ocean Decade. The IHO Secretariat also promotes S-100 as a good contribution to the Ocean Decade as well. A significant recent accomplishment is the World Meteorological Organization’s (WMO) reorganizing itself in terms of working groups and data management groups. A standing committee on marine meteorological oceanographic services met just recently (in Switzerland). At COP27 that all UN member states are covered by a multi-hazard early warning system by 2025/26. WMO is the lead of that- it’s their top priority. They discussed at length how they can do that technically. Of note to the IHO community is that WMO acknowledged the S-141X series as the product specification of choice. This was a very positive outcome!

### **Agenda Item #13**

#### **GEBCO SB2030 (including Lakebed 2030 and Seascape Alaska) & Crowdsourced Bathymetry**

**Meredith Westington** briefed on Seabed 2030 and ties into regional mapping campaigns in the USA. In the USA, in 2020 we developed a NOMECE national strategy for mapping, exploring and categorizing the US EEZ. NOMECE seeks to not only map but explore and characterize priority areas in US waters. We apply that 2030 goal to waters deeper than 40 meters, and the 2040 goal to water shallower than 40 meters. There are 5 goals with the NOMECE strategy: 1) coordinating across the federal government, 2) and 3) deal with approaches to mapping, exploring and characterizing the EEZ, 4) focuses on advancing science and technology and 5) emphasizes public and private partnerships.

Meredith focused remarks on goal 2, mapping the US EEZ.

We have four high level steps in the implementation of these regional mapping campaigns. 1) catalog and analyze data gaps. 2) identify priorities to inform planning. 3) design and execute campaigns in manageable segments over time. And 4) track and report progress.

We want to also look at leveraging diverse suites of funding mechanisms, advancing technology and to also coordinate with those explorer characterization efforts to make the most of every opportunity and survey mile. We're looking to pool money and resources to maximize data acquisition. We're going to try to encourage tech innovation to increase survey, efficiency, and also to extract bathymetry from non-traditional sources. We want the opportunity to standardize map products, and improve documentation and discoverability of those existing data sets and the opportunity to implement the standard ocean mapping protocol. Importantly, data must be publicly accessible at the IHO DCDB

Lakebed 2030 predates the NOMECE strategy. It sprung from the Great Lakes Bottom Mapping working group. There's a desire to sort of take at least the initial bones of that group and sort of recast it into this Lakebed 2030 campaign. The Lakebed 2030 conference happens each year- there is some interest to turn it into something with more of a government structure and strategic plan associated with it.

There is some work happening with Crowdsourced Bathymetry in the Great Lake Observing System with Orange Horse Marine. Last year it was stood up at the IHO DCDB and there's a tremendous amount of data on the Canadian side.

**Chris Marshall** noted CHS attended the Lakebed conference last year, and CHS hoped to attend again this fall. One CHS staff member did work specifically with Andy Armstrong, Dana Gallant, to develop a methodology similar to NOMECE, but in terms of bidding and doing a comprehensive gap analysis of our hydrographic moldings in Canada, moving away from the traditional CATZOC A, B C which is meaningful for charting and hydrographers, and something that's a bit more consumable by policy makers who might be providing the budgets and funding. That analysis is completed. For the Great Lakes, we have about 17% of Great Lakes mapped to full bottom coverage, or moderate standard. About 75% of the lakes on the Canadian lakes are not mapped to modern standards. We are eager to look for collaborations, crowdsource partners who might be interested in collecting data.

46.13	Work collaboratively on a North American analysis (maybe starting in the Lakes, a transboundary area). Maybe for next year's USCHC meeting, present a holistic Canadian US analysis of the Great Lakes.
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**Agenda Item #14**  
**USCHC IHO SP Gap Analysis**

**Doug Brunt** led the group through the USCHC IHO SP Gap Analysis. The objective of this agenda is to discuss how USCHC could add some rigor and some structure to reporting on the IHO Strategic Plan.

The USCHC Gap Analysis was introduced at USCHC45. Some key with respect to how USCHC currently fills obligations vis a vis the IHO Strategic Plan. This item further builds on what we've already discussed at USCHC46 under item 6, because the review status of the US and Canada in regards to the relevant IHO's SPI's and other items which included the WEND Report, the IGIF-H report and the presentation the

S-100 implementation strategy. The desired outcome of this discussion is to identify a set of actions that solidify the manner in which USCHC reports on the IHO’s strategic plan.

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 considerations of C-55. Team would include Doug Brunt, David Palmer, Jonathan Justi, Caitlin Johnson and others as well as the IHO Secretary General. For C-55, Christie Fandel and Young Baek should be consulted. Consider implications of the IGIF-H matrix and the S-100 coordinator.
46.15	Develop a recording cycle for the SPI’s which fits with the requirements for IRCC and particularly Council. Have a “USCHC IHO Strategic Plan secretariat” proceed and update each reporting cycle.

**Dr. Béchard** noted perhaps the report card only touches on the commission and C-55 touches on the member states. Does the report card cover everything or just what needs to be covered through the commission? We’re a simple commission; the Mediterranean Black Sea will be infinitely more complicated.

46.16	If USCHC will have an interim meeting, review some of the (“best practices”) of the HGSPC.
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**Dr. Jonas** asked to be included in the drafting process in the event good approaches could be applied to other commissions as well.

The recording cycle is fairly straightforward, you just look at the calendar and just work back from when we had to report (especially things to council). The purpose is to put us on the same schedule/timeline. The last updates of C-55 for US and CA was several years ago. It should be updated annually.

46.17	USCHC to contribute an issue for the MSDI WG for consideration
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**Dr. Nyberg** introduced the MACHC region web site and its evolution over the past 10 years when it started with just chart coordination and then evolved to the MSDI WG and a few other things as a place to have web services runs. The MACHC has used it to conduct gap analyses on chart coverage and the site has been very beneficial especially for a large commission like the MACHC to manage resources.

**Dr. Béchard** noted a web presence has a role to communicate with stakeholders about future directions. OCS and CHS, or US and CA, stakeholders will be the same and vary in various contexts. They will have questions about transboundary and so maybe one way to approach this issue is to look at how we can do joint communications and point to each other’s websites. That may be a very simple way of still making sure we’re consistent that we get the same message but that we use the sites that stakeholders already know so that they can get to the information quickly.

Participants discussed US and CA respective web presences and the idea to consolidate them in a fashion to both communicate and direct stakeholders to proper information including for domestic and

transboundary information. Rather than build a new mock-up of a web presence, we use what we have and share communication, and reference each other websites. We were talking about a transboundary web service.

**Andy Armstrong** noted some work was still required to get our respective gap analyses aligned. US and CA, SB2030 and GEBCO have some different approaches that need to be resolved. He outlined some of the fundamental differences: the US approach uses the data in DCDB and is publicly available - this includes any kind/source of data. As understood, Canada's approach is based on data in Canada's qualified sounding database, so it doesn't include "other sources." US and CA are still very far apart in how we categorize areas. We use similar methods to compile our statistics but with fairly different inputs into the computation.

**Dr. B  chard** noted that in discussing how to report within our countries, a fundamental issue is also to consider "how we report to our governments" - in many cases it will be different. We have to reconcile our (domestic internal and international collective) needs in terms of what we report.

For example, the CA auditor general comes in to CHS and checks regularly on our progress in terms of the Arctic. We have an agreement on how we do it, and even if things change internationally, we have to be consistent because they're comparing to what we did in prior years. We will have to appreciate how we report internationally knowing that domestic reporting might be different. Consistency and at some point, doing crosswalks across different reports may be important.

**Chris Marshall** noted CA gap analysis is CA national bathymetric holdings. Canada is not necessarily including all possible sources of third party crowd sourced data. In Canada, crowd sourced data would be a very small percentage. Canada has generally included most of its trusted sources such as universities, or international vessels who might share data in the Arctic.

Nevertheless, a common gap analysis is a great idea. Considering DCDB data is critical and to include that as a "toggle on toggle off" feature would be good. Definitions are going to be very important. The NOAA approach is very straight forward and explainable to a non-hydrographer and stakeholders outside our community. Whether or not we can pull of a North American analysis here might be a little bit ambitious, but I do think common definitions and maybe some notes saying "yes this is 90% good except for this this and this". It would be a "victory" if we could get a "90% fluid analysis" of our North American map holdings.

46.18	Continue scoping a US-CA common gap analysis considering factors discussed at USCHC46
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<b>Agenda Item #15</b> <b>Other Topics – MOU and Schedule A's</b>
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**Jonathan Justi** noted the OCS-CHS MOU is set to expire in September 2023.

**Dr. B  chard** raised a topic that not on the agenda "staff exchange." Chris Marshall has made arrangements and CHS confirms that NOAA hydrographer Andy Raymond will be going to the Canadian Arctic on one of Canada's coast guard vessels approximately late August, September time frame.

## Agenda Item #18

### Closing Remarks

In closing remarks, **Dr. Nyberg** observed every time he attends USCHC meetings, he is very happy to be in this line of work. It's a really wonderful profession to be in and this meeting does not disappoint. US and CA working together, it's always been a pleasure. We have a pretty ambitious list of action items, that means we are productive, and have a lot of work to do.

**Dr. Béchar**d recognized Doug Brunt, as USCHC-47 is his last participation in USCHC with the announcement of his retirement. You've made very strong contributions, not just to keep us honest, but also to propose innovative ways for us to move forward. We saw that again today. I also wanted to thank you for your many contributions to the IHO. In particular more recently as secretary to the strategic plan working group which led to some of the discussions that we had today around performance indicators and how we deliver on strategic plans. We wish you well and thank you.

Note: these minutes are developed from a transcript of the meeting. The transcript is available on request.

## Actions

Number	Description
46.1	Develop a methodology on how to use community-based hydrography as a model for capacity building exercises. The intent is to share this internationally.
46.2	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.
46.3	Dr. Bechard noted she would like to see an article on the automatic production of paper charts, how it aligns or not with S-4. US and CA consider a joint paper.
46.4	Three year plan document for IHR. It should designate leaders. This should be provided to Denis Haines (had requested it to be provided by June 2023).
46.5	Investigate revisions to the MOU to allow reference to include continental shelf areas
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 a test bed. Pilot associations around the Great Lakes, the St Lawrence River or on either coast are interested.
46.7	CHS and OCS exchange S-128 data sets.
46.8	With regard to USCHC46-10C, add in Canada, and present the S-100 snapshot as one document/report
46.9	Consider S-100 status template be incorporated into annual National Reports to USCHC
46.10	Prepare or identify content for the e-Learning center. Continue to report Capacity Building activities, whether funded or not, and if you want to have any virtual events that you’re hosting on the Capacity Building Calendar to open membership, we can do that as well.
46.11	Identify a replacement for Jennifer Landry as USCHC capacity building coordinator as she leaves her current position within Navy at end of May
46.12	Identify a number of trainings we could send to the e-Learning center
46.13	Work collaboratively on a North American analysis (maybe starting in the Lakes, a transboundary area). Maybe for next year’s USCHC meeting, present a holistic Canadian US analysis of the Great Lakes.
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



	considerations of C-55. Team would include Doug Brunt, David Palmer, Jonathan Justi, Caitlin Johnson and others as well as the IHO Secretary General. For C-55, Christie Fandel and Young Baek should be consulted. Consider implications of the IGIF-H matrix and the S-100 coordinator.
46.15	Have a “USCHC IHO Strategic Plan secretariat” proceed and update each reporting cycle.
46.16	If USCHC will have an interim meeting, review some of the (“best practices”) of the HGSPC.
46.17	USCHC to contribute an issue for the MSDI WG for consideration
46.18	Continue scoping a US-CA common gap analysis considering factors discussed at USCHC46