



## U.S.-Canada Hydrographic Commission Minutes of the 44<sup>th</sup> Meeting

18-19 March, 2021, VTC via Google Meets

Participants list and materials: <https://iho.int/en/uschc44-meeting-2021>

On Thursday, March 18, 2021 and Friday, March 19, 2021, approximately 35 participants met virtually to convene the 44<sup>th</sup> meeting of the U.S.-Canada Hydrographic Commission (USCHC).

### Day One – Thursday, March 18, 2021

#### **1. Introductions and Welcome**

RDML-select Richard Brennan opened the meeting and welcomed the participants. He reviewed certain protocols for managing the video teleconference, such as using the "hand raise" feature and encouraging participants to use the chat feature for any input they wished to provide without verbal intervention.

Dr. Geneviève Bécharde proposed the USCHC44 meeting be dedicated to the memory of Mr. Sean Hinds of the Canadian Hydrographic Service. The participants agreed and reflected on Mr. Hinds many contributions to the Commission and hydrography.

#### **2. Approval of the Agenda**

The agenda was presented and approved without revision.

#### **3. Opening Remarks**

RDML-select Brennan offered brief opening remarks. Highlights included:

- ) U.S. Hydro (2021), normally to have been held earlier in the year, has been postponed and will not be convened in person this year due to COVID.
- ) It was very positive that the USCHC was proceeding largely as scheduled in the early months of the year.
- ) RDML-select Brennan has not yet assumed full Director of NOAA Office of Coast Survey. The planned date of transition of Director from RDML Smith to RDML-select Brennan is April 20, 2021. RDML-select expressed appreciation to those who have indicated the intent to join the transition ceremony via VTC and those who are present today.
- ) This is an optimistic year and important forthcoming decade. The hydro community has come a long way recently. S-100 use in Canada (CA) is exciting and S-102 work in CA has inspired us. CA/U.S. meetings help us motivate. Three key topics on the agenda- IHO Strategic Plan (SP) and implications to USCHC, Seabed 2030 (SB 2030) in USCHC, and an S-100 Roadmap discussion.
- ) We are at the starting gate of the new decade and our first USCHC meeting since Assembly-2,

and there are many exciting global initiatives beginning such as the launch of the UN Decade of Ocean Science for Sustainable Development, etc.

- ) USCHC should make full use of tasking working groups to dive deeper into the most important and complex topics we will touch on during USCHC-44. We have promised a lot, and as an RHC we can aim high.
- ) Lastly, RDML-select congratulated Dr. Bécharard for her selection as IHO Council Chair, noting the important role that the Council Chair will have for the organization.

In her remarks, Dr. Bécharard congratulated RDML-select Brennan on his appointment and welcomed him as chair of the USCHC. Notably, the USCHC was Dr. Bécharard's very first IHO event, and now it is RDML-select Brennan's very first IHO event as well. The agenda is very full, and there are a lot of examples of U.S.-CA collaboration. It is important to generate actions to "push the envelope," especially as we look at transboundary waters. U.S. and CA share many common stakeholders that both agencies serve.

#### **4. National Reports**

RDML Select Richard Brennan offered the U.S. National Report summary. See DOC: USCHC44-03 U.S. Nat Report.

A selection of points made, while not exhaustive, included:

- ) A survey cruise of NOAA ship THOMAS JEFFERSON previously set for summer 2021 has been postponed. When NOAA survey ship THOMAS JEFFERSON does conduct its anticipated survey in waters of the U.S.-CA transboundary area, please inform CHS as events may be organized to highlight the importance of collaboration. Current planning for the ship route includes a potential stop in Ontario.
- ) NGA is creating a world-wide ENC grid.
- ) NOAA is about 10 percent completed moving ENC's to a new grid. ENC rescheming in the Great Lakes and Maine is a current focal area.
- ) The NOAA sunsetting of raster charts, as described briefly in the National Report, is scheduled to be completed in January 2025. This topic is currently an important topic in planning in CA. There should be discussion on joint communications if and when raster charts are sunsetted in transboundary waters.
- ) NOAA is crafting its S-101 transition plan and is moving forward on the envisioned S-101 world. This has bearing on further delivery of services in the S-100 framework.
- ) The COVID period has provided an opportunity to consider the future delivery of S-100 services more closely.
- ) A reconnaissance project of Saildrone from California to the U.S.-CA Arctic and back since the prior USCHC meeting is considered an exciting highlight of the past year. Another small mission is being assembled for similar work in summer 2021. The Saildrone Surveyor has also been launched and is in testing. The platform is being expanded in a new Saildrone fleet.
- ) In the U.S., the National Ocean Mapping and Exploration program has been launched and is notable.
- ) A new global ESTOFS model was released.  
The broad use of VTC has effectively increased our contacts and our ability to maintain engagement with partners, even during COVID.

Participants echoed the excitement and interest in Saildrone projects, including collaborative projects through a joint mission. The point of contact for CHS on these discussions is Chris Marshall. Other

related experiences to share include those of CA with XOcean platform and the UKHO recent work around Turks and Caicos Islands.

Three comments made centered upon 1) when NOAA ship THOMAS JEFFERSON does conduct survey operations in the Great Lakes transboundary waters, please let CHS know for potential celebratory events, 2) joint communications of sunsetting of raster charts in transboundary areas 3) follow-up on Sairdrone.

Dr. Geneviève Bécharde presented the CA National report. See DOC: USCHC44-04 CA Nat Report. A selection of highlights included:

- ) CA proposed to dedicate the USCHC44 meeting to the memory of Mr. Sean Hinds who recently passed away. Mr. Hinds sat around "the USCHC table" for many years. He was a firm believer in international cooperation and played a strong role in the development of Regional Hydrographic Commissions and the IHO. Participants agreed.
- ) CA will take a new approach to its National report, inviting the CHS directors to speak to selected components of the National Report outline. New personnel updates within CHS and the Department of National Defence (DND) were noted.
- ) In light of COVID, CHS was able to adapt. Prior to COVID, CHS had no telework culture, but the transition went smoothly with 100 percent of CHS staff moving to telework as of March 16. During COVID, much of CHS survey work was considered "critical" by the Department of Fisheries and Oceans. So, while some scientific work was suspended from spring to mid-June, much of CHS field work (including water levels and tide gauges) continued during COVID. COVID also allowed CHS to accelerate testing related to remote survey work. Success stories are being shared on ASV trials and remote operations to collect data.
- ) CHS continues to deliver on the Ocean Protection Plan. Four of the five years have been completed. Funding through the plan has greatly facilitated CHS digital transformation to a new era of service delivery.
- ) International work remains considerable. This includes the work with the IHO. Additionally, in February, Canada engaged in the launch of the UN Ocean Decade of Ocean Science and it is now conducting a consultation on the "Blue Economy" interests, actions and strategies. These topics are generating considerable interest and are expected to lead to new programming initiatives.
- ) The Digital Transformation initiative was launched two years ago in a comprehensive and strategic fashion.
- ) Each Executive at CHS is a champion of a component of the CHS transformation. The "chapters" presented in the National Report were:

#### 1. CHS Workforce and Workplace Topics (Dr. Geneviève Bécharde)

A senior human resources expert has been brought into CHS to help design a change management plan. A workshop will be convened in the near future and the U.S. is invited where questions to be addressed will include "what is the hydrographer of the future?" "What skill sets are needed?" "What training is required?" "What workforce do we need over the upcoming 10-15 years?"

#### 2. Business Model Modernization (Chris Hemmingway)

The CHS business model was last reviewed almost a decade ago and since then, changes have occurred in legislation and other areas. An important element being reviewed now is the provision of data and whether CHS should be charging for data for cost recovery. Is there a way where CA might wish to provide data without charge? A review on these and related topics is currently underway in CA.

### 3. Data Acquisition Transformation (Chris Marshall)

Lake Superior work since last year allowed for some exciting work using autonomous platforms and drones. A key issue in data transformation is the collection of massive amounts of data from various platforms, including remote operations. This is a data challenge and a technology challenge. There are several projects underway now to understand and address these through case studies. CHS hopes to do more work in the Arctic and Great Lakes in the coming months to test new platforms. Another focal area is remote data collection projects using existing technologies in new ways. Lastly, third party collaborative partnerships to collect data are being studied to ensure data is accessible, shared and made available appropriately to support other uses, including SB 2030 and the IHO Crowd Sourced Bathymetry (CSB) initiative.

### 4. Database Transformation (York Friesen)

CHS has a lot of data in different formats and is working on making everything "digital ready." CHS databases contain a variety of data formats with various characteristics that are not uniformly standardized. Right now, CHS works to review where they are, where they want to be and the steps necessary (including required resources) to be digital ready in the near future. This is also a change management process underway so we learn to do things differently in the future. This focal area aims to ensure CHS can provide near real time digital information at the end of the transformation.

### 5. Product Rationalization (Modernization) (Mark LeBlanc)

This is the "clean-up crew" at CHS. When CHS introduces the ENC's in the new framework, they will use the S-101 recommended scales. Those that do not comply with the scales, will be cancelled, thereby reducing the maintenance suite. Over the course of the transformation, CHS expects to see various increases in efficiencies. Data technologies will help the validation procedures. Do we need so much coverage in low risk areas? There will be no printing of tide tables anymore, they are now available online by pdf.

### 6. Products to S-100 Services (Louis Malthais)

CHS is phasing out BSB starting in April. Paper Chart 2.0 is a priority and CHS hopes this will be well underway in the next few months. Sailing Directions is another product attracting much attention to develop the new product. ENC rescheming is underway in CA, especially in the Pacific. Tide tables will not be printed anymore, only available via pdf format online. CHS is focusing on the S-100 Canadian interdepartmental Committee, because different Canadian Departments have lead authority on different S-10# products. 20 percent BSB to be pulled by end of month. This work is making important progress. While BSB is "going away," paper charts will remain. 41 percent of the CHS ENC portfolio has a "true" ENC as well. CHS is decoupling paper and ENC's. One issue being studied involves the continuous update process - at what time do you say "this is the chart you must carry?" There is a need to think through the legal aspects. Some of these complexities need to be discussed in a "North American perspective." On the MSDI front, free access is important.

### 7. Data Distribution (Claude Tremblay)

Last year, CHS presented its cloud distribution model. Access to services will be by subscription and can be delivered seamlessly. Another service will be a National integrated water level system via the internet. For this, an app is being developed too.

### 8. Communication (Claude Tremblay)

Hired external support to engage staff on transformation and the way forward as well as to keep

stakeholders informed of forthcoming changes. There is some reluctance among stakeholders on the end of printing charts (by HOs). CHS is happy to learn from U.S. experiences on these similar issues related to transformation. An update on the Department of National Defense was presented along with its three main functions and in relation to key international partnerships.

RDML-select Brennan noted the business model transitions presented by CHS are very helpful to NOAA Office of Coast Survey, as both agencies are in the same process generally. It is important to keep respective efforts in harmony.

## **6. Actions and Decisions (Review)**

Jonathan Justi and Doug Brunt provided a summary review of actions pertaining to the USCHC from USCHC43 (2020), IRCC and HSSC.

### USCHC-43

- ) USCHC-43 was concluded in February 2020 in Quebec City Canada just before the COVID impact.
- ) USCHC-43 listed 18 actions and the status as of USCHC44 is generally positive. We have managed the COVID shock reasonably well, with nearly half of the actions completed in some form. A few remain ongoing, approximately four are integrated into our agenda, and just a few are not completed or are proposed for extension.
- ) DOC: USCHC44-06 USCHC43 Actions/Decisions was reviewed with additional status detail on each item. Selected highlight include the following:
  - 1) *Action 03*: the future of the paper charts is a topic that has been discussed of high interest to the U.S. and CA. We reported to the IRCC and HSSC last year on U.S.-CA thoughts and will continue to keep those bodies apprised of developments, as warranted. The IHO NCWG has stood up a Project Team on a Unified Symbol Set with CA as chair.
  - 2) *Action 04*: SB 2030 is an important global initiative, and we will be hearing from our USCHC SB 2030 representative, Andy Armstrong, tomorrow on the status of this effort in reference specifically to the USCHC.
  - 3) *Action 06*: we have an events strawman calendar developed for 2021 which will hopefully help us identify early the key events and milestones for our exchanges and efforts for the upcoming year as related to IHO events, but also bilateral events of common interest.
  - 4) *Actions 07, 08, and 09* will be addressed within the context of our HGPSC report out and discussion tomorrow.
  - 5) *Action 13*: Mr. Brunt and Mr. Justi propose a ten year scoping of U.S.-CA goals, for review by our leadership, to be postponed until early summer to take advantage of some of the discussions that will take place today, and in light of adoption of the IHO SP by the Assembly just last fall.

### IRCC

For IRCC actions, Mr. Justi and Mr. Brunt pulled out the 22 actions specific to the RHC's and generated the subset of actions shown in the IRCC actions table (DOC: USCHC44-07 IRCC12/HSSC12 Highlights for IRCC). In the interest of time, Mr. Justi noted that the USCHC is well underway in all of these, and will need to report back to the IRCC prior to its summer meeting in June. The USCHC has a very good story to tell from following up on these actions with the topics integrated into the agenda today and tomorrow. Of note, Mr. Justi cited Action 14 where the SB 2030 coordinator, in our case Andy Armstrong, will have an additional lens from which to progress this effort - namely that of CSB and SB 2030 Coordinator for our RHC. Mr. Justi asked for any comments from Mr. Brunt and the group, of which there were none.

## HSSC

Mr. Justi highlighted the actions for the RHC set from the HSSC meeting last year. The HSSC secretariat has updated the actions status as of late November 2020 and produced an actions and decisions table (13 pages), which is posted on the HSSC website. There are no particular highlights from that summary other than to note the action specific to U.S., CA, and Denmark (DK) under the Nautical Cartography WG, entry 5.4 page 8, "*HSSC invited CA, DK and the U.S. to engage with the NCWG as appropriate regarding unified symbology for the production of paper charts.*" There was a NCWG VTC meeting earlier this month, and NCWG-7 is scheduled for November, 2021. Mr. Justi asked for any comments from Mr. Brunt and the group, of which there were none.

## **7. Year in Preview**

DOC: USCHC44-08 Year in Preview Strawman Calendar was presented for reference. The Year in Preview document aims to identify key meetings and events in the upcoming year, to identify missing events worthy of early notice, and to stimulate thinking for USCHC or U.S. and CA input into IHO and other events of interest.

Points observed include:

- ) The IMO NCSR coming up where a proposal dealing with IMARSAT and Iridium is expected. The issue for attention is that new satellite providers are coming on-line. As these come online, how should NAVAREA coordinators interact with the new providers?
- ) Anticipated papers for HSSC were noted. Louis Maltais noted an HSSC information paper - CHS met with the Chair and Vice Chair. The meeting will be virtual. A value chain PowerPoint (Caris, PRIMAR) abstract is entered for stakeholder reception. IIC will also add a paper about autonomous vehicle.
- ) IMO NCSR is coming up. IMO ECDIS performance standards will be opened up, potentially to be revised to accommodate S101. U.S. and CA should closely track this. Our range of services to the Nav community will be part of that performance standard update.
- ) Regarding Council-5, a key question will be how to build up engagement in support of the IHO SP and the UN Decade of Ocean Science. There may be opportunities to think through opportunities and issues in the preparation to Council-5. Regional consensus may foster building a consensus of perspectives.

NCWG is working through NIPWG and the UKHO to make sure USCHC points are being addressed. NCWG will follow closely to what U.S. comments are put forward.

## **5. IHO Report and 9. Council Update**

Due to technical difficulties, Dr. Mathias Jonas, Secretary General of the IHO, was unable to remain on the VTC. On his behalf, Dr. Geneviève Bécharde delivered the IHO report, and gave a Council update.

Highlights of the report touched upon efforts with regard to S-23, hydrographic interest, the future of the paper chart and others. See DOC: USCHC44-05 IHO Report.

Dr. Bécharde, in her capacity as Council Chair, noted her ongoing discussions with the IHO Secretariat, which include identifying the relationship between the work of the Council compared to those activities already underway within the IRCC and HSSC. What body of work is happening at HSSC and IRCC and where are the gaps, particularly relating to the implementation of the IHO SP? Member States and Regional Hydrographic Commissions might consider "stepping up" to address those things that cannot be and aren't being done at the Committee (i.e., HSSC and IRCC) level. The Council can also help with

those needs as well. One gap is the need for a technical committee on global S-100 distribution, which was flagged at HSSC-10.

Additionally, IHO SP Goal 2 (Increasing the use of hydrographic data for the benefit of society) and Goal 3 (Participating actively in international initiatives related to the knowledge and the sustainable use of the Ocean) require more reflection. These may need further discussion - how do "we" as Hydrographic Offices (HOs) or members of the IHO, contribute to these? These may not have a home at present within the two Committees (HSSC and IRCC). A workshop ahead of C-5 could help bring some thinking to C-5. What can HOs do about Goals 2 and 3? One could envision bringing those questions to the C-5 following some maturation of thinking over the summer/fall. Also, a potential intersessional IHO workshop on the UN Decade of Ocean Science may be helpful.

A special call was made for Member States and partners to review their inventories of historical images to share with the IHO Secretariat in support of commemorative activities for the 100th Anniversary of the IHO in and around World Hydrography Day (June 2021).

Additional comments during this session include noting that workshops to progress ideas before C-5 are a great idea; the end of the year (2021) will be packed with meetings - the more early planning the better. The IHO-Singapore Innovation Center will host a big event week after C-5 - are there projects to offer the Center? The use of VTC's during COVID has opened doors to more participants being able to join meetings together with wider broadcast events notices. However, it was also noted that the shorter, less in-depth nature of the VTC has slowed down some S-100 development and there is a degree of 'VTC fatigue' setting in.

#### **8. USCHC Support of the IHO Strategic Plan 2021-2026**

As backdrop to the discussion of USCHC support to the IHO SP, four briefs were offered:

- ) DOC: USCHC44-08-a Implementation of S-100 at SHOM (S-57 to S-100 Transition)
- ) USCHC44-09-b WENDWG Report
- ) Analyzing needs within the SWHPC to develop an implementation plan
- ) USCHC44-09-c UNGGIM-WGMGI

#### **SHOM Report**

Laurent Kerléguer (LK) presented a report on behalf of Shom, and began with S-101 ENC production. By 2026, mariners can start using S-101 compliant ECDIS. Goals for Shom include: transitioning from S-57 to S-101 by 2025, converting 850 cells and beginning native files. Once S101 will be produced, S-57 will be derived from S-101.

There are a few issues: S-101 conversion rules for objects that do not have direct compatibility, setting up a S-57 to S-101 roadmap, setting up a procedure for database conversion, and the production workflow (including test and validation process). Organization is needed during the transition and afterwards.

Also there is an important milestone regarding the availability of S-101 compliant ECDIS. IHO is discussing this issue with IMO. Shom considers that notwithstanding future added value coming up with new S-100 possibilities, the "simple" fact that S-101 will be more cyber-secure than S-57 should be a decisive argument and put forward.

The Shom roadmap for transition from S-57 to S-101 was presented. Shom intends to switch the entire

suite at once. The rationale is as follows, once S101 is available it becomes the reference, Shom intends to reduce as much as possible the period where some ENC are only available in S-57 and intends to have the whole reference portfolio available in S-101 by 2025. The period from 2021-2023 will be busy to establish and test conversion rules, with full production of S-101 by 2025. Shom has discussed testing five converters. Initial results were shared - attributes with direct equivalence in S-57 and S-101 performed well. Some converted cells have difficulty being opened in the S-100 viewer. Manual input is still needed in some cases, especially for metadata. Ongoing actions were presented regarding work on test software and conversions and customized conversion rules. Shom is confident that after 2025, some converters will work. The burden associated with making available ENC both in S-101 and S-57 has to be as limited as possible, so Shom's intention regarding the dual fuel will be to produce in S-101 (the reference) and delegate to PRIMAR (Shom is a PRIMAR RENC member) the delivery in S-57 ENCs. Discussions with PRIMAR are underway.

Regarding paper charts, Shom wants to make them as straight forward as possible to derive them from S-101 ENCs.

S-100 is not just for S-101 but also an opportunity to renew products and services for mariners. Shom is very much involved in the WENDWG to contribute to the IHO agenda on this topic. To prepare future products and services, Shom created an innovation lab last year, looking at AI, data, etc., which will be closely linked to marketing to ensure next generation products align with real user needs. To make S-100 successful, it must be generalized to all IHO members, and this touches on capacity building. S-100 is a complex task, and even well-developed HOs will need help in the S-100 era. RHCs and RENCs will have important roles to play in developing capacity. This includes e-learning. The Singapore Innovation Lab will be an important asset in preparing this new S-100 era.

In brief, the Shom strategy is to transition to S-101 in a limited period of time, in order S-101 to be the reference for its whole portfolio as quickly as possible and to automatize and sub-contract (under its responsibility though) S-57 production. Additionally, Shom schedule will take into account perspective regarding the IMO to switch to be S-100 compliant ECDIS, indeed it is useless to produce in S-101 if there is no perspective for compliant ECDIS.

Discussion:

- ) The role of government to provision hydrographic services was the first item discussed. What is the government role as to whether the product is good enough to go out? For example, the S-57 product and whether it is compatible with the S-101 product.
- ) LK answered that there is need to ensure the subcontractor is "qualified," and that SHOM is still thinking through this. The government has the SOLAS responsibility, but it is not incompatible with the principle of contracting.
- ) Louis Maltais said, as the U.S. and CA are moving toward S-100, there is opportunity to move to a gridded scheme. ROK is already using gridded approach. Is France looking into this gridded approach too?
- ) LK answered that SHOM does not have a strategy for this at this moment, but a strategy is needed. To decide on this strategy, we want a global approach, considering technical issues and marketing issues as well. If a gridded scheme is used, what is the impact on sales? This is different from U.S., as France receives funds from ENC sales. We need to understand the potential impacts of changing the ENC scheme. In short, there is no strategy yet, but it will need to be holistic with a tech/marketing approach.
- ) Mr. Maltais: CHS is also revisiting its business model in CA. The future is in services - the way you



'slice and dice' data is meaningless. If you subscribe to our service, coverage will be up to date, and you will get the service. CHS is pleased to share it's thinking in these regards moving forward.

### WENDWG Report

Julia Powell reported out on the activities of the WENDWG to the USCHC. The key items to note are:

- ) The WENDWG agreed to submit the proposed IHO Resolution on the WEND-100 principles to IRCC-13 for endorsement with the commitment that the basic technical guidelines will follow.
- ) The WENDWG discussed recommendations on the establishment of S-101 ENC Schemes for small scale coverage. The commission noted that the actual development of the schemes is most likely too technical and that perhaps the USCHC could support this effort with lessons learned from their new gridded schemes.
- ) It was reported that the WENDWG has stood up a drafting group (led by the Netherlands) for the "Guidelines on the implementation of the WEND Principles". There is general agreement that all the WEND-100 principles would apply to S-101 ENCs, however, the difficulty will be in determining the applicability of the WEND-100 principles to other S-100 products such as S-111 surface currents, which do not have explicit rules about non overlapping coverage.

The U.S. and CA are rapidly progressing their surface current models, but models do not stop at borders. Which principles are applicable to which products?

Is WEND looking at a worldwide grid? This could help address the overlap of products and services? Some countries are looking at slightly different approaches.

Dr. Geneviève Bécharde asked, is this an area where the USCHC wants to do some testing in terms of implementing the principles in our transboundary waters? This could be a demonstration topic. Does the commission wish to put an action on?

The conversation will continue into tomorrow's session where the HGSPC report includes a great example of how the U.S. and CA are looking at S-111.

From prior USCHC meetings, it was clear that "USCHC should look to lead the way," and manage transboundary issues. Another aspect is the question - "where is the gap?" A highly technical committee is needed to look at the best approach and to discuss the grid. Could there be a special grid for each specification? Or one? South of 60 degrees? It was suggested that the 'South of 60' report from CA be shared.

John Lowell noted that NGA partnered with IIC technologies and conducted a report that can be completed and shared with this group. The report aligns fairly well with the 'South of 60' report from CA.

### SWHPC Response to the IHO Strategic Plan - Preliminary Report Out

Matt Borbash, Capacity Building (CB) coordinator for the SWHPC, reported on the recent SWHPC meeting (February 2021), and the RHC's efforts to respond to the adoption of the IHO SP.

The SWHPC-18 Chair has set a goal to develop a 3-to-6 year draft work plan and priority plan to align with the IHO SP. As homework, all HOs in the region were asked to look at the three IHO SP goals and conduct gap analyses against the articulated targets. From this, actions were to be identified for the

region. HO input was submitted prior to the SWHPC-18 meeting - all of the input and the executive summary is available at the [SWHPC-18 IHO website](#) now. The SWHPC meeting itself was held by MS (Microsoft) teams VTC platform and the recordings of those sessions has been submitted to be shared by the IHO when issues related to that distribution are figured out.

The SWHPC CB coordinator (Matt Borbash) and the Australia (AU) HO were asked to consolidate action items for each goal presented and develop a work plan for each of the three IHO SP goals. This analysis and distillation work is still ongoing as of the USCHC meeting.

Briefly, some highlighted ideas for the SWHPC include:

For Goal 1 "Evolving the hydrographic support for safety and efficiency of maritime navigation, undergoing profound transformation:"

- ) Share and collaborate S-100 implementation strategies among members
- ) Identify and develop capacity building, including developing tools for S-10# implementation
- ) Identify available or support development of risk assessment tools
- ) Emphasize "hydrographic information" and deemphasize use of the term "hydrographic data," noting this creates an interesting juxtaposition with IHO SP goal 2 wording

For Goal 2 "Increasing the use of hydrographic data for the benefit of society:"

- ) Leverage MSDIWG maturity assessment effort to establish an MSDI baseline. It is unclear where the region stands presently
- ) Conduct a regional inventory of existing portals and consider next steps, including possible development of an SWHPC exclusive portal, and work with the IHO to develop a report of portals capability
- ) Promote/increase awareness of new survey tools and techniques
- ) Prepare operational geospatial framework for the region

For Goal 3 "Participating actively in international initiatives related to the knowledge and the sustainable use of the Ocean:"

- ) Continue to emphasize basic or advanced MSI training
- ) Establish cohesive regional awareness of ocean and marine affairs and priorities
- ) Align SWHPC initiatives with UN Decade of Ocean Science
- ) Explore catalytic CB efforts where activities could be more immediate toward items with short term impacts
- ) Consider a model for developing a regional plan by organizing the regional work plan first along the IHO SP goals and then work backward to identify steps to address gaps or needs

The assessment and conclusions of the review are still in progress, and will be made available on the IHO SWHPC website. The above summary is provided for general informational purposes for the USCHC.

Discussion:

- ) What was the most challenging aspect of the SWHPC assessment?
- ) Every commission should do a similar effort
- ) Do you think the gap analysis results will be common globally or unique to the region? Mr. Borbash answered that the regional context is important and somewhat distinct, but the process to develop capacity for the S-10# may be more common (aligning CB to S-100)
- ) CB is a big element in the SWHPC IHO SP implementation in support of S100

UNGGIM Report

John Nyberg gave an update on the UNGGIM Marine Geospatial Working Group.

Mr. Nyberg highlighted the Working Group (WG) objectives, goals and policies, and encouraged agreed standards and support for the committee of experts. The WG is composed of 24 members, and tracks progress to support Sustainable Development Goals. He commended Chris Hemmingway (CHS) for his active role and meaningful participation and contributions.

An update was shared last August. One important note is the completion of a white paper on readily available geospatial information, which included several case studies. The paper identifies challenges and proposes ways to address them. An up to date work plan is also readily available and is organized along the five UN GGIM themes: leadership, coordination, capacity development, standards and inclusion. The work plan supports standards and bringing the land-sea interface together. The WG is responsible for all water on the planet, not just the marine aspect.

Integrated Geospatial Information Framework – Water (IGIF-W) was briefed at the last meeting, as the WG is working on a supplement to the IGIF, an overarching framework of the UN for managing geospatial information. One key aspect is focus on emerging structures, so that developing programs will be able to see the importance of focusing on a marine program in their efforts. Data distribution and users are highlighted too. This will be a contribution to the UN Decade of Ocean Science as a mid-level/project contribution. It will endorse the concept of standards and "collect once and use many times." The IGIF WG draft document will be made available to Work Group and IHO members very soon.

Lastly, a "big week" in Singapore is planned in October the week after the Council-5 meeting, which is connected with the events of the Singapore Innovation Center, etc. This should be a good venue for some of these items to come to a conclusion.

Discussion:

- ) What is it that the USCHC can contribute to the UN decade?
- ) Are there opportunities to connect into the IHO to the efforts of the UNGGIM?
- ) Can the innovation center itself be a contribution IGIF-WG as mid-level commitment? Standards "can help make things happen."

## **Day Two – Friday, March 19, 2021**

### **11. Welcome**

RDML-select Brennan opened the second day of the meeting.

### **12. Great Lakes Review**

LCDR Charles Wisotzkey offered a brief update on activities in the Great Lakes region and on matters that are of mutual interest to CHS and OCS. LCDR Wisotzkey introduced the participants of the recently formed ad hoc OCS-CHS Great Lakes coordination team.

In December 2020, vessel groundings in St. Lawrence occurred, spurring the interest to have periodic coordination meetings between CA and U.S. navigation agencies. This group is now meeting monthly with meeting notes being maintained. At the monthly meetings, participants report on issues relevant to critical navigation, water level datum updates, bilateral coordination and other matters. Topics do include Canadian Coast Guard and the U.S. Army Corps of Engineers. The group shares information contained in CA's critical updates and Single Agency Charting matters. It fosters a much improved

common understanding and venue to clarify various topics as well as to promote timely data sharing. The group would likely be very beneficial for envisioned future delivery of S-100 transboundary services. The promotion of the mid-level working relationships in the departments and agencies active in supporting navigation in the Great Lakes is particularly valuable.

Laura Colombe and Doug Brunt echoed and underscored the value of the group in terms of addressing a variety of complex issues in the region. The monthly meetings will hopefully continue to build on this collaboration going forward.

Dr. Geneviève Bécharde added her commendation of the group and invited the group to feel free to bring issues to the attention of the USCHC attention. The benefit of other regional teams in the U.S.-CA transboundary regions (Pacific Northwest and the New England area) was discussed.

NOAA has Navigation Managers in the Pacific Northwest region and in the New England region.<sup>1</sup> On the NOAA side, standing up similar regional groups would be easy to staff.

It was recommended that the Great Lakes team could report to the broader HGSPC as a mechanism, and that this group could provide read outs to the USCHC on an ongoing basis, as needed. The HGSPC will investigate the benefits of further regional focus groups for the other two regions mentioned. Based on their investigation, further action may be recommended from the HGSPC to the USCHC.

### **13. Transboundary Service Delivery (HGSPC)**

Christie Ence briefed the group on recent developments of the HGSPC as well as reporting the status of the relevant actions from USCHC-43 (2020) assigned to the HGSPC. The HSPSC was able to stand up the transboundary [ENC limits application](#) online, which is publically available. It includes U.S. reschemed ENC cells and CA current ENC cells. Cells provide certain metadata features indicating which charts are managed by which agency. Data can be updated as decisions are made. This portal completes action 9 from USCHC-43 to have a shared ENC footprint (coverage) database.

HGSPC was able to load a Canadian chart into the NOAA custom chart application, and this was demonstrated during the presentation combining data from US4NY26M (Western Lake Ontario) and CA473519 (Toronto to Hamilton) using the web application. IT developers were able to load CHS chart data into the chart viewer without significant issue. Next steps would be to determine if the two countries could transmit the data to each country for additional uses.

Louis Maltais presented on Paper Chart 2.0. CHS did a similar test and the demonstration worked. As a result of the Seaway accident reported in the prior agenda item, ship traffic was redirected. What we learned is that the area is very complicated with several agencies involved, but data was not really being shared actively. Now, however, there are better exchanges underway and the portal will help maintain current and best available information.

CHS is planning to retire 146 raster (BSB) products representing close to 20 percent of the national portfolio. Prior to official cancellation, there is a three month stakeholder notification and comment period. Where CA has a good ENC, they are confident the product can support GPS navigation. A suggestion was made that if the IHO were to freeze or decommission S-61, it will support stakeholder

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<sup>1</sup> Northwest and Pacific Islands Nav Manager: Crescent Moegling ([crescent.moegling@noaa.gov](mailto:crescent.moegling@noaa.gov)) and Northeast Nav Manager: Colleen Roche ([northeast.navmanager@noaa.gov](mailto:northeast.navmanager@noaa.gov))

discussions of the transition.

The first chart to be canceled by NOAA is Chart 18665, Lake Tahoe. A U.S. Coast Guard Local Notice to Mariners was published at the beginning of March (LNM 09-21) announcing the chart's cancellation in six months (08/26/21). At this point, only critical corrections are being applied to raster products. NOAA is working full steam on rescheming its suite with the gridded ENC coverage. Larger scale ENCs will replace raster products, providing the mariner with better products.

Seamless transboundary S-111 is difficult. PRIMAR generates information. CHS is using a fixed grid; NOAA is not. File names, file sizes, and other things are different. Even if we agree on a definition of a product, there will be challenges with implementation. S-111, as a "soft layer," brings an extra level of complexity. CA also references meteorological service providers for the transboundary areas for additional insights.

Moving to the grid, HGSPC was asked to come up with a tool which has unified symbology, and they are continuing to work on this. CA is ready to fund some of this work.

Ms. Ence provided additional live detailed demonstrations of the web application. With the transboundary web application stood up, discussions, coordination and decision-making are all greatly enhanced. With the open application, the viewer can see all U.S. and CA charts in the transboundary areas. Every usage band is available, and data is provided by a popup with additional metadata for each chart. CA will become the single agency solution at the 12,000 scale level (for transboundary U.S. and CA agreed charts).

Please explore and provide feedback of the application to [Christie.Ence@Noaa.gov](mailto:Christie.Ence@Noaa.gov). Any changes or updates can readily be made. Hopefully this will become a useful tool for discussing and agreeing to various topics.

Laura Columbe added that this webpage will become our record of decisions, as opposed to the prior approach of screen grabs and paper documents. This new web approach provides an improved means to discuss and document decisions.

John Lowell raised the question of the group's interest to share the underlying data so the manipulation of data in the region becomes even more seamless. Since the U.S. is planning to move to metric depth contours, prior complications of metric and imperial measurement conversion will go away. That will hopefully address many of the depth contours not matching now.

Dr. Geneviève Bécharde requested the USCHC report to the IRCC and provide an appropriate read out of this work to share with the global community. The HGSPC was asked to consider what time frame is right for the U.S. and CA to communicate out to other bodies, such as IRCC and others, as new concepts arise and are being addressed and/or solutions adopted. The USCHC should engage the broader IHO community early. An important part of our work is to report out at the IRCC in June.

Autonomous vessels transiting in CA and U.S. waters also underscores the need for a seamless stream of common shared data.

As the U.S. and CA cancel raster charts in the Great Lakes and other areas, where we have shared responsibilities, the two countries HOs need to coordinate communications to stakeholders.

S-111 would be a good topic to discuss at the WENDWG, as it provides a case study on various operational considerations in light of the WEND principles. For example, is it okay to have overlapping S-11 data or not? Some product specifications should not overlap, and some may be fine to overlap.

Mr. Maltais was tasked to report to the Chair and Vice Chair by early summer (May) for further planning and reporting to broader IHO groups, especially the IRCC.

#### **14. Seabed 2030 in the USCHC**

Andy Armstrong, the USCHC's designated SB 2030 Project and CSB focal point, reported on progress of the SB 2030 and CSB in the USCHC region (see DOC: USCHC44-13-a). The review included an introduction to the Regional Data and Assembly Center (RDAC) governance affecting the region, which includes Pacific and Atlantic Ocean areas, and Data Centre for Digital Bathymetry (DCDB) holdings of data in the region, including CSB.

He also introduced the establishment of the National Ocean Mapping, Exploring and Characterization of the U.S. EEZ Council (NOMECE) in the U.S. in November, 2019 by Presidential Executive Order, and its goals. The Executive Order is now under consideration as legislation titled, "Ocean Exploration Bill." The effort involves 11 agencies looking at the next 20 years (2020-2040). The Council is co-chaired by NOAA's RDML Shep Smith and Dr. Alan Leonardi, and U.S. Geological Survey's Dr. John Haines.

In his conclusion, Mr. Armstrong offered a selection of possible goals for the USCHC to further progress the SB 2030 and CSB initiative in the region. These included:

- A) Add non-public data to IHO DCDB and GEBCO Grids
  - ) Identify known existing non-public data and develop coverage polygons
  - ) Identify barriers to releasing known non-public data
  - ) Develop a plan to make presently non-public data available wherever there are not existing barriers, and endeavor to remove barriers where they do exist
- B) Increase Data Coverage
  - ) Identify barriers, including environmental compliance requirements, to full-time operation of MBES by hydrographic, other agency, and academic vessels during transits; commit to/approve continuous operation of these systems in U.S. and Canadian waters whenever practicable
  - ) Develop strategy to obtain bathymetry, backscatter, and related data sets from offshore wind siting surveys in U.S. and Canada waters
  - ) Employ the SB 2030 Transit Planner for multibeam data collection on coastal and ocean transits of multibeam-equipped vessels
  - ) Facilitate, accept, archive and share CSB data in USCHC waters
  - ) Undertake or support CSB trusted system projects with full availability of resultant CSB sounding data
- C) Manage for Success
  - ) Commit to USCHC "sponsorship" of USCHC waters outside of areas of national jurisdiction
  - ) Continued HO participation in Atlantic Seabed Mapping International Working Group (ASMIWG)
  - ) Identification of scientific mapping opportunities in these international waters
  - ) For CHS—determine if interest in establishing Canada gap-analysis still exists, and if so, what are operating assumptions and what approach is envisioned
  - ) For CHS—identify a CHS point of contact for SB2030 activity to work with USCHC SB2030 liaison (Mr. Armstrong)

) Institute a goal-tracking process and report on SB 2030 progress at annual USCHC meetings

All recommendations were endorsed.

Dr. Geneviève Bécharde informed the USCHC that Dana Gallant ([dana.gallant@dfm-mpo.gc.ca](mailto:dana.gallant@dfm-mpo.gc.ca)) is the new CHS point of contact for CA in the USCHC on SB2030 going forward. She also confirmed CHS wants to use the same methodology that the U.S. uses - such as for conducting gap analysis and supporting the Blue Economy, and identifying gaps in coasts and offshore.

### **15. Guest Remarks (if any)**

Rear Admiral Hardern (ret.), UKHO, noted that on Tuesday the UK had publicized its first integrated defense review in five years, in which resiliency contingency planning (in response to such things as climate change and others) figured prominently and will play an important role going forward. The UKHO is looking at promoting the development of new survey capability in the UK. Rear Admiral Peter Sparkes remains the interim CEO of the UKHO, and the review for a more permanent replacement for the previous CEO is expected to continue with a decision on permanent selection possible in April. The UKHO has signed new agreements recently with CHS and NOAA which will help the S-100 progression. Rear Admiral Hardern (ret.) noted the UK expects to include a paper on standing up a working group on maritime autonomous surface ships in a month or so to support the May 4-7 HSSC meeting. He noted that "Project MAYFLOWER" (an autonomous vessel reproduction of the original MAYFLOWER sailing ship) is planning to sail from Plymouth, UK to Plymouth, Massachusetts in May (delayed from September 2020 due to the COVID pandemic). The UK thanks NOAA and NGA for supporting this effort with the provision of data, etc. There is some talk of the MAYFLOWER sailing into Canadian waters in the summer for which there may be follow-up with CHS and/or the CA Coast Guard.

RDML Laurent Kerlèguer, SHOM (France), commented he was very pleased that USCHC was giving attention to the S-100 rescheming and would be providing additional feedback. This comes while France is also thinking of its own strategy in these regards. He requested the U.S. and CA please include consideration in their feedback of impacts of cost effectiveness and maintenance issue considerations. For example, does S-100 rescheming provide an opportunity to reduce costs or improve maintenance going forward?

### **16. International Hydrographic Review Update**

On March 16, 2019, Denis Hains was selected to represent USCHC to the International Hydrographic Review (IHR). Mr. Hains reported on progress to date in the two issues per year issued regularly in May and November (see DOC USCHC44-15).

Mr. Hains noted that in the upcoming May 2021 Edition vol.25 of the IHR (Editor: Brian Connon), six Scientific Articles have been received and are currently being peer-reviewed, including contributions from authors of the USCHC community. The USCHC contributions include:

- 1) "Estimating Observer and data Reputation in Mariner-volunteered Bathymetry"<sup>2</sup>
- 2) "Identifying future Hydrographic Survey priorities: a quantitative uncertainty based approach"<sup>3</sup>

Additionally 10 "Notes" received for the IHR and are currently being reviewed. These include two from

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<sup>2</sup> By Cassandra Bongiovanni-1, Thomas C. Lippmann-1, Brian R. Calder-1, and Andrew Armstrong-2 (1-CCOM-UNH, 2-NOAA-UNH Joint Hydrographic Center NOS)

<sup>3</sup> By Brian R. Calder, NOAA-UNH Joint Hydrographic Center NOS

USCHC community:

- 1) "EMPOWERING WOMEN IN HYDROGRAPHY"<sup>4</sup>
- 2) "The Most Significant Improvement of Navigation Since SOLAS"<sup>5</sup>

In conclusion Mr. Hains offered concluding remarks and recommendations to the USCHC going forward:

- ) While ensuring high standards - the "DESIRED TARGET" per IHR issue could be a total of about 10 Peer-Reviewed Articles + 10 Notes + 2 General Info
- ) The suggested minimum U.S. + Canada + USCHC TARGETS could be:
  - a. One Peer-Reviewed Article per issue - 2 per year
  - b. One Note per issue - 2 per year
  - c. One Peer-Reviewed Article per year
  - d. One Note per issue - 2 per year
  - e. One co-produced USCHC Peer-Review Article per year
  - f. One co-produced USCHC Note per year

Recommended action items were:

- 1- USCHC to establish a three year-Plan with topics (based on a two IHR Editions per year); in these regards, Mr. Hains recommends a balance between peer reviewed articles and notes. The Notes could provide a good venue to share more strategic and policy oriented developments, with regard to such national policy developments in the U.S. and CA as the NOMECE (U.S.) and the OPP (CA)
- 2- Designate U.S. & Canada LEADERS per topic and per IHR Issue to ensure quality and in-time production of the papers in coordination with the USCHC Representative on the IHR Editorial Board; and;
- 3- Create a standing agenda item, "IHR Contributions" for the USCHC meetings so that the plan can be reviewed and revised.

The USCHC endorsed the recommended actions. The sharing of "notes" presents an opportunity for the U.S. and CA to share updates quickly with the broad community, such as short term awareness, managing COVID, transboundary demonstration efforts lessons-learned or SB 2030 progress.

The IHR is coming up on its 100th year anniversary itself. Over the prior century, the IHR has played a valuable role advancing the discipline of hydrography. The [digital archive](#) of historical editions is available live online through the University of Brunswick.

The IHR provides an excellent peer-reviewed professional venue for hydrographers to share important developments and news specific to hydrography. The IHR is in the process of being revitalized as a globally relevant scientific journal to propagate hydrography.

Andy Armstrong noted he recently authored the chapter in the "100 years of Hydrography" prestige book published by the IHO as a commemorative publication. He noted the IHR had been an important source in his research to identify the evolution and introduction of important new technologies and science over the past 100 years.

RDML-select Brennan volunteered that until NOAA identifies a dedicated staff point of contact to champion the IHR within NOAA or the U.S., he would be happy to serve in that capacity. Mr. Hains was

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<sup>4</sup> By Annie Biron-1 and Evert Flier-2 (1- Canadian Hydrographic Service, 2- Norwegian Mapping Authority)

<sup>5</sup> By RDML Shepard Smith, NOAA-Director, Office of Coast Survey and Outgoing Chair, IHO Council



requested to keep the USCHC informed of any assistance that could be provided when needed.

### **17. Global Maritime Traffic Density Service (GMTDS) Project (NGA)**

Ted Schindler, NGA, presented on the Global Maritime Traffic Density Service (GMTDS) project and its current status. GMTDS is a public-private partnership for ocean mapping with high potential to contribute a range of socio-economic benefits. NGA is collaborating with the private sector to provide updates on traffic patterns at 1 km scale globally. The goal is to develop a web-based interface and to make this service available to the public by the end of 2021. At today's USCHC, the goal is to give a current status and invite networking and collaboration across the community to "strengthen and expand international partnerships in the maritime domain."

Mr. Schindler presented a screen shot of October 2020 data based on 1km cell. The assigned values show the magnitude of time ships spent in that cell over a month time frame. Data can be updated regularly without disrupting user access.

Three project goals of the GMTDS are:

- 1) to develop the global AIS product
- 2) to co-design with partners the evolution of the project during its current development
- 3) to distribute to product widely using open geospatial consortium principles

The project uses the EMODNet Methodology to calculate Traffic Density.

NGA is sponsoring and managing the development of GMTDS with the mindset to serve hydrographers and cartographers with the immediate goal to show traffic patterns and traffic density and to identify where there are potential gaps in charts and navigational products in light of actual traffic patterns.

Analysis features will allow the filtering of data by vessel type and other parameters, which is displayed in the online screen. For example, ship type (tankers, fishing vessels, etc.), as well as vessel status (at moored, underway, etc.) can be discerned. The data set is able to be manipulated so further analysis can be performed by various users. It is important to note, the GMTDS project managers imagine there are uses beyond which they are currently envisioning, for example in understanding cumulative vessel greenhouse gas emission levels. By presenting the update today, organizers invite additional reviewers who might share ideas of how the GMTDS could provide even more societal benefit than originally envisioned.

This is envisioned to be a web enabled service, and an AIS product that is widely available.

Dissemination of the information will be through API for heavy users, or via partnerships with parties such as the INTOGIS system the IHO maintains. The INTOGIS will provide multiple layers of hydrographic data, with overlays of traffic density in a few clicks using a browser. Users that are more technical will be able to access the OGC compliant WMS to input the data into GIS systems for robust analysis.

Others may develop new other use cases for the data, and we hope to collaborate with them to meet their needs. . NGA is inviting collaborators to help in the development process.

It is important to think of the value of the GMTDS effort to increase visibility of ocean mapping and international collaboration. Collaboration with various non-traditional users early in the GMTDS development process is sought. Data discoverability and the ability to utilize data is important in the project.

Louis Maltais noted he has been looking for such a product for a long time. He raised a question - let's assume AIS data is filled with correct draught data. Then one could derive a sense of hot spots to ascertain where we have hot spots and need to be particularly attentive of a need for excellent depth accuracy. It was noted the data would not be "real-time," but rather historical, presented in "monthly chunks" going back 10 years.

NGA is using the EMODNet traffic density methodology due to its approach to time and area and potential scalability to other uses. A challenge will be moving to high latitudes (Polar Regions) because of the recto-linear grid that is in place now.

Due to the amount of errors in AIS data, algorithms are in place to adjust, repair and mitigate those errors. The EMODNet paper on methodology explains more details to the calculation methodology. The major change from the EMODNet is the global data being processed is much larger than the European dataset upon which EMODNet was originally focused. We do have some ability to adjust methodology as more feedback is offered.

The intent of the project is to provide GMTDS as a service. The IHO is one means of dissemination of this service and the initial focus is dissemination via the International Hydrographic Organization's (IHO) INTogIS web-based mapping platform, which supports Regional Hydrographic Commissions and related collaborations in the international hydrographic community. But NGA does anticipate additional dissemination vehicles as collaboration expands. If it can eventually be provided via a rest service, it will be helpful to user's further analysis.

Chris Hemmingway noted this was a very interesting product. CHS uses AIS quite a bit, including in the Arctic. For this, it is using both satellite and terrestrial platforms to assess AIS. Chris welcomed further discussions off-line. He noted, whenever AIS is aggregated, there are opportunities to reduce redundant efforts across various disciplines and user communities for similar information. For example, AIS can help planners understand management issues related to fish habitat, marine conservation, etc.

The Arctic Council PAME has an Arctic AIS database that they have stood up. Have NGA and this group exchanged views? Discussions are underway in the Arctic and non-Arctic regions with many stakeholders.

An important primary goal of the GMTDS was to create a simple way for HOs to access user activity, including seafaring nations with low GEOINT capacity. The Arctic Council has been working on a more sophisticated effort. Working with IHO, NGA wants to make it easier for HO's worldwide, since many are not so heavily funded or lacking powerful GIS software to access this information and likely wouldn't normally have access.

The UKHO confirmed it will be a beta tester for the GMTDS product.

### **18. Review of USCHC-44 Actions**

Jonathan Justi and Doug Brunt presented a draft list of actions that have been collected real-time during the USCHC meeting itself. Jonathan showed two parts of the draft table of actions, and each table represented actions collected in each half day session. After Day One, 10-12 actions were collected and circulated to U.S. and CA teams. Preliminary feedback was received and appreciated. For Day two, Jonathan noted he had made better progress utilizing the "notes" feature of the VTC to solicit real time input from the experts during the meeting and improving wording on selected actions real-time.

Jonathan proposed the USCHC secretariat might work more offline to organize and edit the wording of the actions into a more final document for review following the meeting. Dr. Geneviève Béchar and RDML-select Brennan agreed.

Dr. Béchar noted that her preliminary review of the draft indicated a call to diver deeper into the actions for the USCHC in light of the discussions of the IHO SP.

Louis Maltais noted USCHC actions with regard to the IHO SP (USCHC agenda Item 8). USCHC discussions had centered on a proposal to look at the SWPHC IHO SP gap analysis model and that the USCHC should look at doing a similar "gap analysis" itself along the goals of the IHO SP. Stronger wording in the actions was called for and that a gap analysis be completed before Council-5.

A discussion of "gap analysis" followed where the term meant both identifying "unmapped territory" as well as analysis to understand gaps in terms of process or strategy that need more attention. Assessment of the goals and how the USCHC will contribute to those goals as an RHC is needed. Where is clarity needed (i.e., where is the IHO going?) to inform C-5, and where is action required (because the RHC needs to address operational needs which are currently insufficient). The USCHC should consider recommending to the IRCC that all RHCs do a similar exercise to gain a global perspective, acknowledging the work of the SWPHC which was further studied at USCHC to help the latter in its efforts.

Mr. Justi noted that several performance measures in the IHO SP are reported at the national or HO itself and then summed for a global measure. The U.S. and CA could readily report their national compliance or status as individual nations as indicated in the IHO SP performance measures.<sup>6</sup> This may inspire other nations to similarly report to the appropriate IHO body, so that the IHO itself can then benchmark the baseline at the start of the decade.

### **19. Next Meeting**

Dr. Geneviève Béchar confirmed the CA Hydro Conference will be September 2022 to align with the new hydrographic conference rotation timeline between the U.S. and CA. This rescheduling has been a consequence of schedule adjustments in light of COVID.

She proposed the next USCHC-45 nevertheless be held in approximately March 2022 and be hosted in CA offices where participants could share first hand of the work being done in the HOs themselves.

A second recommendation was raised to consider intersessional sessions during the new Hydro Conferences schedule (Fall 2022) where we can follow-up on various subjects.

### **20. Closing Remarks and Observations**

Dr. Geneviève Béchar expressed appreciation to RDML-select Brennan for guiding the RHC through a fairly dense agenda of important topics. There is much going on in important directions, including S-100

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<sup>6</sup> For example, under goal two, target 2.3 (apply UN shared guiding principles for geospatial information management in order to ensure interoperability and extended use of hydrographic data in combination with other marine related data), indicator 2.3.1 is a direct action for Member States: Number of HOs reporting success applying the principles in their national contexts (2026: 70%) – there are several instances in the SP that specifically call our Member State action

implementation, push for ocean mapping, etc. Dr. Béchard congratulated all participants for contributions during the dislocations imposed during COVID.

RDML-select Brennan noted the important role that CA has played historically in his own career development. The U.S.-CA relationship is very valuable and today's meeting further underscored that value. RDML-select Brennan thanked the meeting organizers for putting together the robust agenda, materials and discussions. The meeting was adjourned.

<b>USCHC-44 – List of Actions<sup>7</sup></b>			
<b>#</b>	<b>Action</b>	<b>Note</b>	<b>Due</b>
1	Note and take action on recommendations from the IHO Report, as appropriate	See USCHC44_2021_EN_05_IHO_SEC_Report_V1 .pdf for a complete list, but highlighted recommendations to USCHC include: <ol style="list-style-type: none"> <li>1. USCHC is invited to adapt their respective instruments to comply with the recommendations of the IHO Resolution 2/1997 (Establishment of Regional Hydrographic Commissions (RHC) as amended by A-2).</li> <li>2. The Secretariat invites USCHC members to consider to contribute to a future joint activity of interested parties in the development phase of a revised definition of hydrographic interest.</li> <li>3. The Secretariat invites USCHC members to proactively contribute to the implementation of the strategic developments in future paper chart layout and production. Likewise the Secretariat welcomes any practical experience gained with the parallel production of S-57 and S-101 ENCs including their use for streamlined paper chart production.</li> </ol>	See footnote 7
2	Review, update, maintain the USCHC events calendar	Consider such items as relate to supporting the Council and other intergovernmental processes within the IHO and others (IMO, etc.). Consider focused discussion opportunities where we, as IHO member states or interested HOs, can mature ideas over the year.	See footnote 7
3	Follow-up on MS interests in Saildrone, including lessons learned from test operations and opportunities for collaborative activities going forward	UKHO also expressed interest in possible joint Saildrone missions, as well as any lessons learned so far, e.g. Statement of Work.	See footnote 7
4	Share information on survey	For example, the potential cruise of the NOAA Ship THOMAS	See

<sup>7</sup> Because not all actions were assigned, or had a specific due date, USCHC Secretariat to follow-up with appropriate participants

	plans and operations for collaborative opportunities to promote hydrography	JEFFERSON and potential port call in CA in 2022.	footnote 7
5	Continue dialogue on raster sunset including HO planning and communications with stakeholders in transboundary waters		See footnote 7
6	Consider actions subsequent to USCHC44 regarding global S-100 services distribution models and requirements	Consider standing up a U.S.-CA technical team to support WEND WG which will look at the technical issues associated with service delivery locally, across national borders, and globally.	See footnote 7
7	Identify focal areas for USCHC in terms of services delivery demonstrations in transboundary services and WEND-100 services		See footnote 7
8	Realizing the IHO Strategic Plan	Consider: <ol style="list-style-type: none"> <li>1. Potential workshop on UN Decade of Oceans and other venues to develop and mature ideas 8 weeks before C-5</li> <li>2. Potential workshop focusing on how the hydrographic community can contribute to Goals 2 and 3 of the IHO SP, in particular</li> <li>3. Complete a USCHC gap analysis along the goals of the IHO SP (based on SWPHC)</li> <li>4. Recommend all RHCs completing gap analyses through the IRCC</li> <li>5. Consider initial implementation status report for US and CA in existing IHO performance indicators.</li> </ol>	Report 10 weeks before Council-5
9	100th Anniversary of IHO	Locate historical photos and materials to support World Hydrography Day and other events scheduled for 2021 (including “peak of the peak”) and provide to IHO Secretariat	(Completed as of May 1, 2021)
10	Consider projects to contribute the IHO-Singapore Innovation Center	<ol style="list-style-type: none"> <li>1. Monitor “big week” activities and participate as appropriate</li> <li>2. Consider USCHC activities to support UNGGIM activities</li> </ol>	See footnote 7
11	‘South of 60’ report from CA and the NGA/IIC technologies report should both be shared with the USCHC group		(Sending of NGA/IIC report completed as of May 1, 2021)

12	Great Lakes	<ol style="list-style-type: none"> <li>1. Great Lakes team to report to the broader HGSPC as a mechanism, and that this group could provide read outs to the USCHC on an ongoing basis, as needed</li> <li>2. HGPSC will investigate the benefits of further regional focus groups for the other two regions mentioned</li> <li>3. HGPSC to report out any further actions</li> </ol>	
13	USCHC to explore and provide feedback on transboundary web app to <a href="mailto:chrisite.ence@noaa.gov">chrisite.ence@noaa.gov</a>		See footnote 7
14	HGSPC (Louis Maltais) to report to the Chair and Vice Chair of the USCHC in May, 2021 for further planning and reporting to broader IHO groups, especially the IRCC		May 2021
15	Seabed 2030 actions	<ol style="list-style-type: none"> <li>1. Add non-public data to IHO DCDB and GEBCO grids</li> <li>2. Increase data coverage</li> <li>3. Manage for success</li> </ol> <p>**See agenda item 14 minutes for additional details</p> <p>Dana and Andy to get together and report back in a few months on timelines and other recommendations</p>	See footnote 7
16	U.S. and CA to include consideration in their feedback of impacts of cost effectiveness and maintenance issue considerations for S-100 reschemeing	France would like to hear updates on this at appropriate time(s)	See footnote 7
17	IHR actions for USCHC	<ol style="list-style-type: none"> <li>1. USCHC to establish a three year-Plan with topics (based on a two IHR Editions per year); in these regards, Mr. Hains recommends a balance between peer reviewed articles and notes. The Notes could provide a good venue to share more strategic and policy oriented developments, with regard to such national policy developments in the U.S. and CA as the NOMEAC (U.S.) and the OPP (CA)</li> <li>2. Designate U.S. &amp; Canada LEADERS per topic and per IHR Issue to ensure quality and in-time production of the papers in coordination with the USCHC Representative on the IHR Editorial Board; and;</li> <li>3. Create a standing agenda item, "IHR Contributions" for the USCHC meetings so that the plan can be reviewed and revised.</li> </ol>	See footnote 7

