

## 3<sup>rd</sup> SESSION OF THE IHO ASSEMBLY

Monaco, 2-5 May 2023

### REPORT OF THE

### Meso American - Caribbean Sea Hydrographic Commission (MACHC)

#### 1. Chair

Rear Admiral Rhett Hatcher (UK) from March 2023 to present

Vice Admiral Renato Arruda (Brazil) from December 2021 to March 2023

Vice Admiral Edgar Barbosa (Brazil) from March 2021 to December 2021

Ms. Katie Ries (USA) from November 2020 to March 2021

#### Vice-Chair

Mrs. Bernice Mahabier (Suriname) from March 2023 to present

Rear Admiral Rhett Hatcher (UK) from March 2021 to March 2023

Vice Admiral Edgar Barbosa (Brazil) from November 2020 to March 2021

#### 2. Membership

**Members:** Brazil, Colombia, Cuba, Dominican Republic, France, Guatemala, Guyana, Jamaica, Mexico, Netherlands, Suriname, Trinidad and Tobago, United Kingdom, United States of America, Venezuela.

**Associate Members:** Antigua and Barbuda, Barbados, Belize, Costa Rica, El Salvador, Grenada, Haiti, Honduras, Nicaragua, Panama, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines.

**Observer States:** Dominica, Spain.

**Observer Organizations:** ICG/Caribe EWS, Caribbean Geospatial Development Initiative (CARIGEO), Caribbean Disaster Emergency Management Agency (CDEMA), Central American Commission for Maritime Transport (COCATRAM), IALA, IC-ENC, IHO, IMO, IOCARIBE, MapAction, The Hydrographic Society of America (THSOA), The Nippon Foundation-GEBCO Seabed 2030 Project, University of Southern Mississippi (USM), University of the West Indies (UWI).

**Observer Companies:** 4 Earth Intelligence, AXYS Technologies, EOMAP, Esri, Fugro, IIC Technologies, iXblue, OceanWise, QPS, Kongsberg Maritime, SevenCs, TCarta, Teledyne Geospatial (CARIS), Terratec AS, Xylem/HYPACK.

#### 3. Meetings

20 <sup>th</sup> Conference	Santo Domingo, Dominican Republic	4 - 6 December 2019
21 <sup>st</sup> Conference	Virtual	30 November - 3 December 2020
22 <sup>nd</sup> Conference	Virtual	30 November - 3 December 2021
23 <sup>rd</sup> Conference	Saint Louis, Missouri, USA (Hybrid)	29 November - 2 December 2022

Next Conference (24<sup>th</sup> Conference): Suriname, November-December 2023.

MACHC held 6 Webinars on the Seabed 2030 Project in September and October 2020, in November 2021 and in June 2022.

A MACHC Webinar on Satellite-Derived Bathymetry (SDB) Technology & Experience was held in November 2020.

A MACHC Webinar on S-100 was held in November 2021.

MACHC held a Seminar on Hydrographic Governance and Introduction to MSDI in December 2019 and another Seminar on Hydrographic Governance and a Workshop on MSDI in November 2022.

#### 4. Agenda Items

The main topics dealt with during the reporting period were primarily organized around the MACHC Committee and Working Groups. The major activities follow:

##### a) MACHC Capacity Building Committee (CBC)

MACHC Members have contributed to the last editions of the International Hydrographic Review (IHR).

In November 2020, a Webinar on Satellite-Derived Bathymetry (SDB), supported by EOMAP, Esri and TCarta was conducted, exploring the technology and possible applications of SDB.

Other SDB capacity building opportunities were shared with MACHC Members: the Earth Observation Clinic or EO Science for Society Program; the Earth Observation Resilient Society; a webinar with in-depth use cases and applications, in December 2020, held by TCarta and Esri; and 3<sup>rd</sup> and 4<sup>th</sup> International Conferences on SDB, also known as SDB Day 2021 (January 2021) and SDB Day 2022 (October 2022).

The candidates from Colombia, Guatemala and Venezuela who were selected for the 2021 Training For Trainers Programme in Basic Hydrography sponsored by the Republic of Korea have successfully completed the programme from 1 to 12 November 2021.

In November 2021, a Webinar on S-100 was held via VTC for the MACHC and neighbouring RHCs. The Webinar was supported by the IHO S-100 Working Group and IALA who discussed the development of the new standards and the opportunities that they present. MACHC Members shared their plans for S-100 development and production and the challenges that they face with the transition from S-57 to S-100.

The candidates from Colombia, Dominican Republic and Guyana who were selected for the 2020 Category “B” level Geospatial Marine Analysis and Cartography course, funded by the Nippon Foundation and hosted by the United Kingdom successfully completed the course in 2022 following the postponement of the course due to COVID travel restrictions.

Due to the impact of COVID, the IHO funded face-to-face Capacity Building Activities from the 2020 and 2021 workplans could not be completed. The funding for these events were carried into 2022 and 2023 so that these important opportunities were not lost. Scheduled for delivery this year are the High-Level Technical Visit to the Dominican Republic, the High-Level Technical Visit to Jamaica, the Technical Visit to Honduras, the Technical Visit to Belize, the Technical Visit to Costa Rica, and the Tides Workshop for Spanish Speakers. In recognition that the IHO CB funding resources are not enough to meet the regional demand, the MACHC is actively seeking and leveraging CB partnerships with other regional organizations and stakeholders who have common capacity building needs. These include the Central American Commission for Maritime Transport (COCATRAM), Inter-American Development Bank (IADB), the Intergovernmental Coordination Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE EWS), IALA, IMO, IOC Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE) and neighbouring RHCs (SEPRHC, SWAtHC). The Tides Workshop for Spanish Speakers is an excellent example of these efforts and is supported both through IHO funding and through co-sponsorship by multiple regional partners (COCATRAM, ICG/CARIBE EWS, SEPRHC, SWAtHC and the MACHC).

The MACHC Members have been notified about the IALA webinars that took place in January 2021 (AtoN Remote Monitoring and Buoys Moorings) and February 2021 (AtoN Light Characters and AtoN Maintenance).

As part of the Empowering Women in Hydrography initiative a number of internships have been offered to provide opportunities to engage in international forums and to gain leadership skills and experience. The USA offered space for 2-3 women a year on NOAA hydrographic vessels starting in 2022 for which a candidate from Suriname has been successful in gaining a place. The International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC) offered 4 internships; the USA was successful in being selected for one.

The Ports and Shallow Water Survey Course hosted by Brazil under the coordination of the South-West Atlantic Hydrographic Commission (SWAtHC) was held in October 2022. Guatemala also attended this course.

Dominican Republic and Mexico attended the Hydrographic Databases Workshop hosted by Ecuador under the coordination of the South East Pacific Regional Hydrographic Commission (SEPRHC) in November-December 2022.

The candidates from Guyana and Jamaica who were selected for the 2022 Category “B” Hydrographic Survey Programme, funded by the offered by the IHO-Republic of Korea Programme of Technical

Cooperation and hosted by the Korea Hydrographic and Oceanographic Agency (KHOA) have successfully completed the programme.

A candidate from Guatemala was selected for the 2022-2023 session of the Category "A" Master of Science in Hydrographic Science at the University of Southern Mississippi (USM), USA.

The "Assessment of Capacity Building Phases of Coastal States" based on IHO CB Procedure 11 is constantly updated. It will be used to better evaluate, prioritize and focus future capacity building training.

The importance of keeping the IHO Publication C-55 current, as this is utilized in the IMO audit, has been highlighted to MACHC Members.

#### b) MACHC Integrated Charting Coordination Working Group (MICC)

The MACHC and the South-West Atlantic Hydrographic Commission (SWAtHC) agreed on the boundary limit between them (moved from 0° Equator to 01°S) to include the entire Amazon basin in the MACHC Region (IHO International Charting Region B), having informed the IRCC.

The availability of ENCs and of INT Charts in Region B stands at 1,114 and 54, respectively. There was a considerable increase of Usage Bands 4 and 5 ENC cells in recent years. There are still 30 INT Charts schemed for Region B.

MACHC regularly performs Cruise Ship Ports Gap Analysis to identify gaps added anchorage areas to list of ports, identifying 207 ports and anchorage areas with only 8 not covered by nautical cartography.

The MICC sub-working group developed a MACHC Regular ENC Scheme for Usage Band 1. The UKHO presented the gridded scheme built by the UKHO for GB ENC coverages. NOAA presented the US approach for ENC re-scheme plan. It was decided for the adoption of the UKHO regular grid scheme for the MACHC ENC Scheme for Usage Band 1.

Testbeds for S-100 series products by MACHC Members were reported to be in progress: S-102 (Bathymetric Surface) by France, the Netherlands, the UK and the USA, S-111 (Surface Currents) by the USA, S-122 (Marine Protected Areas) by France, and S-124 (Navigational Warnings) by France.

Colombia as chair of IOC International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico Project (IBCCA) announced the conclusion of the 16 schemed maps in 2020. The second phase of the project, increasing the data resolution and leveraging the participation and the capacity of national Hydrographic Offices and research institutions, has been started.

#### c) MACHC Marine Spatial Data Infrastructure Working Group (MMSDIWG)

The MMSDIWG section in the MACHC Initiative website is used as a method for sharing meeting materials and useful links with MACHC Members, contributing organizations, industry partners, academia and potential stakeholders.

The MACHC is engaging with multiple stakeholders on MSDI use cases / partnerships in the MACHC Region to advance the use and sharing of geospatial information to support improved decision making for sustainable national and regional development. These include: Risk Assessment and Mitigation Measures of Maritime Navigation in the Caribbean Sea; Silver Bank project; Disaster Response Support; Caribbean Marine Atlas (CMA); Caribbean GeoPortal; Caribbean Geospatial Development Initiative (CARIGEO); European Marine Observation and Data Network (EMODnet); and UN-GGIM/WG-MGI.

A MSDI Inventory survey has been conducted since 2020 to help the MACHC to document the various existing MSDI and SDI web resources within the MACHC Region; the results of these can be found in “MACHC MMSDIWG Inventory Survey Results”. Subsequently, another survey has been carried out on the MSDI Inventory for the Additional Layers for the MACHC Region based on the feedback from potential non-navigation users. These layers will support many use cases found in the Region. The results of this survey can be found in “MACHC MMSDIWG Inventory - Additional Layers Results”.

A bathymetric data protocols was completed to ensure users, such as CDEMA and MapAction, can more efficiently support disaster relief efforts within the MACHC Region. The protocols define the process for requesting the data, ensuring that the data is made available in the appropriate formats, and defining the process for sharing the data with the disaster response organizations.

MACHC began reaching out other RHC MSDI WG to share best practices and knowledge, having met with representatives from ARHC, SAIHC and SWPHC.

The MACHC was introduced to the Operational Framework for Integrated Marine Geospatial Information Management (or Integrated Geospatial Information Framework – Hydro “IGIF-H”) being developed by the UN-GGIM Working Group on Marine Geospatial Information.

#### d) MACHC Coordination to the Seabed 2030 Project and Crowdsourced Bathymetry

The MACHC partnered with the Seabed 2030 Regional Data Assembly and Coordination Centre (RDACC) for the Atlantic and Indian Oceans to develop a gap analysis tool to help focus national efforts to contribute existing data and organize new collaborative surveys.

The MACHC Coordinator to the Seabed 2030 Project established close collaboration with this RDACC and with IHO DCDB.

The MACHC and IOCARIBE promoted four Seabed 2030 Webinars in September and October 2020 on the following subjects: Current Mapping Status; How to Build the Map: Sharing Data and Attribution; Increasing Data Coverage: Crowdsourced Bathymetry (CSB) and Related Tools; and draft joint MACHC-CARIBE Seabed 2030 Strategy.

The MACHC and IOCARIBE promoted a Webinar on the Seabed 2030 Project in November 2021 on the following subjects: Exploring Applications for the Bathymetric Grid Generation and Remote Bathymetric Data Processing using the Nippon Foundation/GEBCO Training Programme Alumni Network.

The MACHC approved, in December 2021, the expansion of the title of the MACHC Seabed 2030 Coordinator to “MACHC CSB/Seabed 2030 Coordinator”.

The Commission approved the MACHC Seabed 2030 Work Plan for 2023, in accordance with the MACHC-IOCARIBE Seabed 2030 Strategy. Actions are in progress to contribute with existing non-public bathymetric data to the IHO DCDB and GEBCO grid, in order to increase data coverage in the MACHC Region and to build capacity for mapping contributions. Polygons with the gaps where no bathymetric data is recorded in the MACHC Region have been sent to the national points of contact to the MACHC CSB/Seabed 2030 Coordinator.

The Intergovernmental Oceanographic Commission (IOC) had recognised the MACHC-IOCARIBE Seabed 2030 Strategy as an endorsed Decade Project of the UN Decade of Ocean Science for Sustainable Development (2021-2030) entitled “No 140.2. MACHC-IOCARIBE Seabed 2030 Project” and attached to the Decade Programme “107. The Nippon Foundation-GEBCO Seabed 2030 Project” in June 2022.

The MACHC Seabed 2030/CSB Coordinator, in collaboration with IHO Crowdsourced Bathymetry Working Group (CSBWG) Chair, prepared a MACHC proposal to IRCC for the establishment of a Seabed 2030/CSB Coordinator Collaboration Team to discuss the past and current updates on Seabed 2030 Project and/or CSB efforts within the RHCs, to update on Coordinator-led efforts within their RHCs, to establish of a cohesive regional approach, to share challenges, issues, successes and lessons learned experienced by Coordinators. CSBWG will investigate the establishment of a Seabed 2030/CSB Coordinator Collaboration Team within that WG and report back to IRCC.

#### e) Maritime Safety Information

The MACHC MSI Status Matrix and MACHC MSI Training Status Details on the MACHC Initiative website provide a color-coded representation that describes the level of MSI support National Coordinators provide to NAVAREA IV, NAVAREA V and NAVAREA XII. This matrix is used to identify and prioritize future MSI training and support within the MACHC.

Year 2020 was particularly busy for the promulgation of navigational warnings with an unprecedented number of storms and hurricanes, and the WWNWS issued numerous navigational warnings informing mariners regarding port closures due to these dangerous storms, allowing them to adjust their course to navigate more safely to a different area, or to remain out of harm's way.

The NAVTEX stations in the MACHC Region enhance the capacity of the coastal warning service. Colombia established two new NAVTEX stations.

NAVAREA IV/XII Coordinator informed how the Commission will measure the Strategic Performance Indicator 3.1.1 “Percentage of Coastal States that are capable to provide marine safety information (MSI)

according to the joint IMO/IHO/WMO manual on MSI". He reported that in 2021, NAVAREA IV/XII received MSI from 52% of National Coordinators and confirmed satisfactory coordination with 65%, and in 2022, NAVAREA IV/XII received MSI from 56% of National Coordinators and confirmed satisfactory coordination with 86%.

A MSI Course was held in Colombia under the coordination of the South East Pacific Regional Hydrographic Commission (SEPRHC) in September 2022. The Dominican Republic and Guatemala also attended this course.

The MACHC established a MSI WG in December 2022.

#### f) Disaster Response

A Response to Disasters section has been established since 2019 on the MACHC Initiative website. This section is being filled with more information about National Points of Contact, Disaster Contingency Plans, Response Capabilities and Past Event Responses.

Brazil shared its experience with the response that the State of Brazil gave to the oil spill that hit the Brazilian coast as of October 2019. Many national, international and foreign organizations supported the investigation with resources and information. About 5,340 tons of oil residues hit the Brazilian coast, affecting 3,600 km, 130 cities and 11 states, from the north coast to the southeast coast. The head of the Brazilian Hydrographic Office was the head of the investigation. It was very important the knowledge of the marine environment and it was necessary to apply a multidisciplinary analysis, such as oil geochemistry analysis, mathematical modelling, maritime traffic analysis and dispersion of oil at sea.

The hurricane season in 2020 ended with a record of more than 30 storms.

Colombia shared how it responded to hurricanes Eta and Iota. A hydrographic team was deployed to carry out hydrographic surveys in order to generate plans and charts and verify navigable areas, anchoring, and other areas of interest for navigation.

The USA has a series of navigation response teams that conduct hydrographic surveys on small vessels to update NOAA's suite of charts. These teams are strategically located around USA and remain on call to respond to emergencies in order to restore resumption of shipping after storms and to protect life and property from dangers to navigation. During the pandemic, recreational vehicle rentals were deployed due to the scarcity of available lodging and restricted protocols, such as, virtual planning, personal protective equipment and social distancing, were applied.

The MACHC Disaster Response Framework is now at Annex 4 to the Statutes of the MACHC.

## **5. Difficulties encountered and challenges yet to be addressed**

A key challenge is to get more active participation from most MACHC Members in the Committee/Working Groups.

Finding ways to increase alternate sources of funding and partnerships for capacity building, as the demand far outweighs IHO CB funds.

Full ENC and INT Chart coverages not yet achieved.

The MACHC held a Workshop on S-100 in 2021 and discussions during the 23<sup>rd</sup> Conference of the MACHC to communicate on this issue, but the challenge is to get engagement from more MACHC Members in testing the implementation of S-100 based products. There are still many questions about the development and the implementation of S-100 based products by MACHC Members in the MACHC Region to be understood.

The MACHC established the MACHC MSDI WG in 2018 and carried out two Seminars on MSDI in 2019 and 2022, but we still face a challenge for most MACHC Members and certain contributing organisations to understand how and why it is in their interest to participate and contribute to MSDI.

While a MACHC Seabed 2030 Strategy was established in 2020, there is a challenge to motivate, receive support and sustain the engagement of MACHC Members so as to continue receiving bathymetric data contributions to fill gaps in the MACHC Region.

To implement a GIS-based layer for the MACHC Disaster Response Framework that could most effectively support coordination and communication efforts before and after a disaster event with effects on maritime infrastructures.

## **6. Achievements/Outputs/Conclusions**

Despite of the Coronavirus pandemic, the MACHC arranged to organize virtual meetings of its Committee/Working Groups, a webinar on S-100, webinars on the Seabed 2030 Project, and the MACHC Conferences in virtual format, through a videoconferencing platform generously resourced by NOAA/USA.

The Statutes of the MACHC was revised in order to adapt to the IHO Resolution 2/1997 (“Establishment of Regional Hydrographic Commissions – RHC”) as amended.

The dissemination of IHO-funded trainings and opportunities has certainly benefited the selection of candidates from IHO Member States in the MACHC Region.

The annual Seminars on Raising Awareness in Hydrography are fundamental for the greater participation of Associate Members in the Commission events.



Technical Visits and High-Level Technical Visits to Associate Members are extremely relevant to leverage hydrographic and cartographic activities in these countries, as well as to raise their awareness in these fields.

The partnership with IOCARIBE to establish a joint strategy to support the Seabed 2030 Project resulted in the submission in January 2022 for IOC endorsement, a Decade Project linked to an endorsed Decade Programme (Call for Decade Action 02/2021) and the endorsement itself in June 2022.

The value of increased collaboration across RHCs and regional partnerships for capacity building training, Seabed 2030/CSB (including the development of a Regional Strategy and an Annual Work Plan), MSDI and other requires concerted effort to identify the specific activities of common interest and sustain those connections.

The MACHC, in collaboration with other international, regional and bi-lateral partners, is committed to carrying forward hydrographic, nautical cartography, MSDI and capacity building activities in close alignment with IHO objectives and goals.

The “Initiatives of the MACHC” website, generously hosted by NOAA/USA, is a space where the work of the MACHC is contained and designed to be a centralized resource for all MACHC Members and Observers. Some of the key features include: it is in both English and Spanish; is mobile device friendly; and provides up-to-date information related to the work of the MACHC Committee, Working Groups and other initiatives as described above, complementing the IHO MACHC webpage.

## **7. Actions required of the Assembly**

- a) Note the report of the MACHC;
- b) Consider the maintenance of IHO CB-fund for annual Seminars on Raising Awareness in Hydrography, Technical Visits and High-Level Technical Visits for Associate Members in the RHCs; and
- c) Take any other action considered appropriate.