47TH MEETING OF THE U.S. CANADA HYDROGRAPHIC COMMISSION (USCHC47)

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

NATIONAL REPORT FROM UNITED STATES OF AMERICA

References:

1. 1. IHO Resolution 2/1997 as amended.
2. IHO ACL 27/2020 dated 25 June 2020 – approval of the second tranche of proposals originally for consideration by the 2nd session of the assembly.
3. Decision No. 9 of A-2, 2020.

Executive summary

1. Hydrographic Office / Service: This National Report provides specific information pertaining to individual products and services of primary interest to the U.S. - Canada Hydrographic Commission (USCHC) Region. Five government agencies are responsible for the management of U.S. domestic and international hydrographic products, services, and maintenance.
    a. Name of the institution:
        i. The National Oceanic and Atmospheric Administration (NOAA)
        ii. The National Geospatial-Intelligence Agency (NGA)
        iii. The U.S. Navy (USN)
        iv. The United States Coast Guard (USCG)
        v. The U.S. Army Corps of Engineers (USACE)

    b. Description: Information can be located in the latest edition of IHO Publication P-5. The U.S. updates P-5 as required.

2. Surveys:
    a. Coverage of new surveys
        i. The National Ocean Mapping, Exploration and Characterization (NOMEC) Council and its Interagency Working Groups coordinates ocean mapping, exploration, and characterization for the U.S. The Council, which includes 11 Federal Agencies and Departments, works to develop and implement multi-disciplinary, collaborative, and coordinated approaches to mapping, exploring, and characterizing the United States EEZ. More information can be found at: https://www.noaa.gov/ocean-science-and-technology-subcommittee/national-ocean-mapping-exploration-and-characterization-nomec-council.

    b. New technologies and / or equipment
        i. NASA utilizes ICESat-2 bathymetry to support a wide range of coastal and marine science needs, from coral reef monitoring to studies of nearshore processes. With these new bathymetric capabilities, NASA is

currently funding the development a new Level-3a data product focused on along-track bathymetry extraction with the designation ATL24. This product is projected to launch summer of 2024. Source: https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2023EA.

c. New ships
    i. As of 2024, two new NOAA oceanographic vessels are under construction, Oceanographer and Discoverer. Both ships will support a wide variety of NOAA missions, ranging from oceanographic research and exploration to studying marine life, climate and ocean ecosystems. They will also incorporate the latest clean energy technologies, including vessel emission controls and high-efficiency diesel engines. They are anticipated to be completed in late 2024 and early 2025, respectively. Information on NOAA's hydrographic vessels can be found online at: https://nauticalcharts.noaa.gov/about/survey-vessels.html.
    ii. The U.S. Navy is constructing the seventh hull of the T-AGS 60 "Pathfinder" class Oceanographic and Hydrographic Survey Vessel. USNS Robert Ballard expects to enter service in 2026.

d. Crowdsourced and satellite-derived bathymetry – national policy:
    i. The U.S. allows the collection of CSB within all national waters and continues to support the IHO Crowdsourced Bathymetry Initiative. Continued IT infrastructure improvements in 2023 will enhance the ability to manage Crowdsourced Bathymetry receipt, filtering and provisioning.
    ii. Satellite-derived bathymetry, including multi-spectral, satellite altimetry, ICESat-2 and other spaced based remote sensing is actively used throughout the USCHC region for bathymetry, shoreline, and nearshore topography.

e. Challenges and achievements
    i. The U.S. engages with multiple commercial and industry partners to collect hydrographic data globally to IHO S-44 standards. Reviewing, integrating and working with industry, US agencies are committed to leveraging commercial capabilities. Once reviewed and approved for use, these commercial datasets are considered equivalent to data collected by national assets.

    ii. To expand awareness of industry and academic capabilities, the U.S. has established a Geospatial Innovation Center where U.S. government agencies can engage with industry partners and review innovative technology, methodology, and capabilities for potential use. On 8 January 2024, the U.S. launched a 1-million-U.S.-dollar Grand Challenge to forecast industrial fishing. This challenge includes the detection of illicit activity to support the enforcement and prevention of illegal, unreported, and unregulated (IUU) fishing activity. For more information, visit:

https://info.nga.mil/news/NGA_NSIN_host_$1M_challenge_for_forecasting_IUU_fi.html

iii. The U.S. Navy deactivated its Fleet Survey Team in 2023. Navy maintains a limited capacity to conduct shallow water, littoral hydrographic survey via personnel and equipment from the Naval Oceanographic Office and Naval Oceanography Mine Warfare Center.

3. New charts & updates:
   a. Charting Plan
      i. In August of 2023, NOAA released the Nautical Charting Plan,. The focus of this plan is the transition from the production and use of paper nautical charts to the production and use of NOAA electronic navigational charts (NOAA ENC®). Part of the plan involves "gridding" the current suite of ENCs to a gridded format with standardized sizes and scales. The new layout will include 7,200 ENCs with new charts often providing larger-scale and more detailed coverage.
      ii. As of April 2024, NOAA has produced 3141 new ENCs based on the gridded chart scheme described within the Nautical Charting Plan, including about 2500 in the USCHC region.
      iii. Over the past couple of years NGA has been in the process of populating a Worldwide ENC gird for use by DoD and partner nations.

   b. ENC coverage, gaps and overlaps
      i. The U.S. has no known significant gaps or overlaps. However, as reschemed ENC grids are implemented by both NOAA and NGA, additional work with ENC coverage may be needed.

   c. ENC distribution method
      i. U.S. S-57 ENC produced in domestic waters and over Prime Charting Authority (PCA) waters are available either directly from the NOAA website, or via the RENC system and additional value-added distributors.
         i. NOAA website at: https://nauticalcharts.noaa.gov/ .
         ii. NOAA's Interactive Catalog at: https://www.charts.noaa.gov/InteractiveCatalog/nrnc.shtml .
         iii. International Center for ENC's Distributors at: https://www.ic-enc.org/distribution
         iv. PRIMAR Distributors at: https://www.primar.org/ho.

ii. NOAA produces 138 RNC charts and about 4200 ENC charts in the domestic waters within the USCHC region. As of April 2014, NOAA no longer produces lithographic paper charts with traditional print cycles for new editions. All paper charts are updated weekly and available for download as Print-on-Demand (POD) products, or in paper form from one of 17 NOAA-certified chart-printing agents. U.S. ENCs are available as free downloads from the internet. Mariners wishing to download NOAA ENCs directly and use the data to fuel ECDIS or ECS may do so. US ENCs, are distributed directly from , as well as through the International Center for ENC's Distributors, https://www.ic-enc.org/distribution. Partner nations, by arrangement, can obtain US ENCs via the Defense Logistic Agency, in addition to other hydrographic data that may be available.

d. Raster Navigational Charts (RNCs)
   i. By 2025, NOAA will end production and maintenance of NOAA traditional paper charts and RNC products. Six months before a chart is canceled, NOAA updates the chart with a note in the lower left corner stating the chart's status as a "last edition" and the date on which it will be canceled. NOAA shows the status of raster charts on its List of Latest Chart Editions at: https://charts.noaa.gov/MCD/Dole.shtml. Separate pages on this site show active charts, charts pending cancellation within the next six months, and a cumulative list of charts canceled since 2018. Other products and services based on the paper chart that will be or have been canceled by January 2025 include: 1) Full-size nautical chart PDF images, 2) BookletCharts™, 3) RNC Tile Service, 4) Seamless Raster Navigational Chart Services, and 5) RNC Viewer.

   ii. NGA plans to cancel all traditional paper charts by January 1, 2026 and will shift paper chart production activities to a smaller suit, created via the Certified Printed Electronic Navigational Charts (CPENC) process. This process efficiently converts ENC data directly to a paper chart, including a graphical update service.

e. INT charts
   i. The U.S produces INT charts within the USCHC region and builds its chart schema these INT schema, if practical.

f. Other charts
   i. The U.S. produces many Digital Nautical Charts (DNCs) in USCHC waters. The DNC, produced by NGA, is an unclassified, limited distribution vector-based, digital database containing maritime significant features essential for safe marine navigation. NGA will cease production of DNC in March 2026 and maintain S-57 ENC as we move into the S-100 transition.

ii. Certified Printed Electronic Navigational Charts (CPENCs) are automatically rendered and printed versions of NGA's ENCs that are certified safe for maritime navigation where U.S. hardcopy requirements still exist. CPENCs are maintained via a new corrections process utilizing ENC change detection results, which symbolically highlight and communicate critical changes on an updated, digital "CORRECTED" version. This new corrections process saves a substantial amount of internal resources compared to the traditional textual Notice to Mariners process.

4. Publications
   a. Updated Publications
      i. NGA has updated the Maritime Safety Information (MSI) interface to recognize the information and improve the efficiency of the user. The information found on the MSI website includes Notice to Mariners, Publications, Navigational Warnings, Piracy, Drill Rigs, the Product Catalog, and several miscellaneous products and calculators. Users can also submit questions or subscribe to update services for some of following products as well. The interface can be found at: https://msi.nga.mil/.
      ii. The United States Coast Pilot consists of a series of ten regionally-focused nautical books that cover a variety of useful information important to navigators for coastal and intra-coastal waters and the U.S. Great Lakes.
      iii. NGA Sailing Directions consist of useful information to navigators of coastal waters. Digital updates can be downloaded from NGA at: http://msi.nga.mil/.
      iv. World Port Index (WPI) is a publication maintained by NGA. It contains the location and physical characteristics as well as the facilities and services offered by major ports and terminals worldwide. The WPI is also available via the IHO Online catalogues and can be used as an API for other web services. Digital updates are available to the public and posted at the NGA Maritime Safety website, at: https://msi.nga.mil/Publications/WPI.

      v. The NGA List of Lights and their digital updates are available to the public and posted at the NGA Maritime Safety website, at: https://msi.nga.mil/Publications/NGALOL.
      vi. The NGA Radio Aids and Fog Signals (Pub 117) and their digital updates are available to the public and posted on the NGA Maritime Safety website at: https://msi.nga.mil/Publications/RNA.

b. Means of delivery, e.g. paper, digital
    i. All of the publications are available digitally in PDF format from the NGA website at: https://msi.nga.mil/Publications.
    ii. Users can enroll in a Publication Updates Subscription Service to receive e-mail notifications of nautical publication updates and new editions.
    iii. NGA publications can be ordered from commercial vendors found on the NGA website at: https://msi.nga.mil/Products.
    iv. U.S. Coast Pilots, updated on a weekly basis, can be downloaded at: https://nauticalcharts.noaa.gov/publications/coast-pilot/index.html.

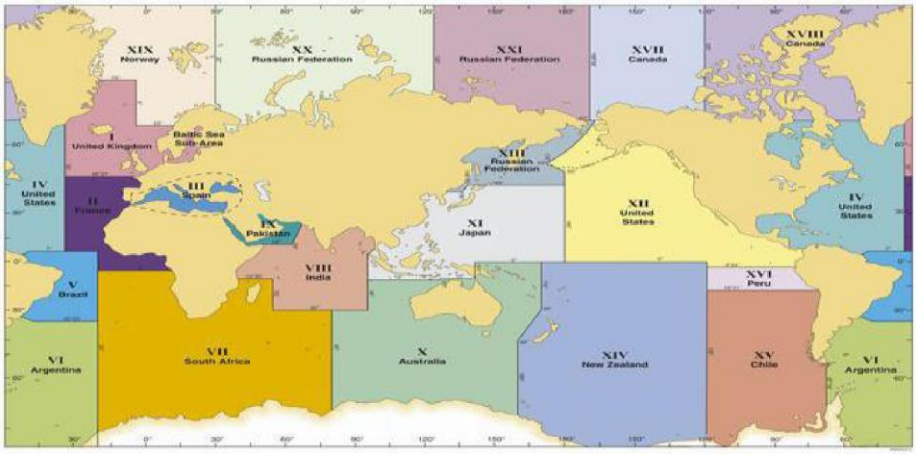
5. Maritime Safety Information (MSI)
    a. Existing infrastructure for MSI dissemination
        i. Maritime Safety Information (MSI) is navigational and meteorological warnings, meteorological forecasts and other urgent safety-related messages broadcast to ships. NGA is the NAVAREA IV and XII Coordinator and promulgates warnings via Inmarsat's SafetyNET II service and Iridium's Safetycast service.

    b. Notice to Mariners
        i. The U.S. Notice to Mariners, provides timely information for the correction of all U.S. Government navigation charts and publications from a wide variety of sources, both foreign and domestic. Information published in Notice to Mariners provides for the correction of unclassified nautical charts, the unclassified NGA/DLA Catalog of Hydrographic Products, United States Coast Pilots, NGA List of Lights, U.S. Coast Guard (USCG) Light Lists, and other related nautical publications produced by NGA, NOAA, and the USCG.

        The U.S. Coast Guard issues Local Notices to Mariners for NOAA charts, while NGA issues Notices to Mariners for the worldwide suite of NGA paper charts. Local Notice to Mariners are updated weekly and available for download in several formats. For future chart cancellations, Local Notice to Mariners will announce "no new editions" and the cancellation date. It will subsequently announce the cancellation six months later.

        Mariners can download applicable Notices from the web at: https://www.navcen.uscg.gov/?pageName=lnmMain.
        The U.S. Notice to Mariners are posted at the NGA Maritime Safety website at https://msi.nga.mil/NTM.

    c. Navigation Warmings
        i. The NAVAREA coordinator is the authority charged with coordinating, collating, and issuing navigational warnings for a designated NAVAREA within the IMO/IHO World-Wide Navigational Warning Service (WWNWS).
        USCHC Waters primarily lie within NAVAREA IV and XXI.



6. C-55
    a. The US updates its C-55 entry periodically. C-55 can be found at: https://iho.int/uploads/user/pubs/cb/c-55/c55.pdf The U.S. entry to C-55 (pages 489-512) covers INT regions A, B, L, K and N.

7. Capacity Building
    a. Offer of and/or demand for Capacity Building
        i. The United States is an active participant in the IHO Capacity Building Sub-Committee (CBSC).
        ii. NOAA is supporting a capacity building initiative led by the IHO and Canada called 'Empowering Women in Hydrography,' via hosting three women aboard NOAA ships for a hands-on experience during the 2022, 2023, and 2024 survey seasons. The 2023 survey season successfully hosted three candidates hailing from The Philippines, Kenya, and Argentina. Solicitation of applications for the 2024 season was announced via IHO CL 09/2024.

    b. Training offered
        i. Category-A Competence Training for Hydrography
        Training opportunities are available at various institutions in the United States. Two Category A certified hydrographic programs are available through:
            - The University of Southern Mississippi (USM)
            - The University of New Hampshire (UNH)
        ii. Category-B Competence Training for Nautical Cartography
            - NGA conducts annual training with an IBSC recognized S-8 Cat B course.
            - NOAA program for S-8 Cat B is on a temporary hold.
        iii. Category-B Competence Training for Hydrography
        U.S. Navy offers an IBSC recognized Cat B International Hydrographic Management and Engineering Program (IHMEP), commencing annually in February. This training is available to

both uniformed and civilian government personnel. U.S. Navy's Category A and B programs and mobile training all qualify for Security Cooperation assistance.

iv. Maritime Safety Information (MSI) Training
The US supports the IHO MSI training course and provides support to nations through on site and remote guidance. NGA is currently finalizing a virtual MSI training course which will be available to the IHO and our international partners in the months to come.

v. Other Training Partnerships

- In 2020, the University of South Florida (USF) College of Marine Science entered into a five-year cooperative agreement with NOAA's Office of Coast Survey to launch the Center for Ocean Mapping and Innovative Technologies (COMIT) with the aim to develop new technologies and approaches to ocean and coastal zone mapping in line with NOAA's commitment to building resilient coastal ecosystems, communities, and economies. COMIT will build on USF's expertise in ocean engineering, habitat and bathymetric mapping, modeling of coastal storm events, coastal geodesy, sea level rise, and safe navigation in ports such as Tampa Bay.

- In 2023, NOAA and the University of New Hampshire (UNH) expanded a 24-year ocean and Great Lakes mapping partnership through the creation of a new Center of Excellence for Operational Ocean and Great Lakes Mapping. The center will focus on: delivering practical hydrographic training and fostering workforce development for ocean mapping operations, providing technical expertise and systems support for NOAA's mapping operations on an increasingly diverse set of platforms, including new ships and uncrewed survey vessels, and partnering with academia and industry to transition ocean mapping research to operations.

8. Oceanographic activities
   a. GEBCO & Seabed 2030
      i. The U.S. is a strong supporter of the IHO/IOC GEBCO and the Seabed 2030 project. Using a shared resource approach, the U.S. provides technology and software in support of the IHO Data Centre for Digital Bathymetry (DCDB) and the GEBCO Gazetteer. These activities work to support the GEBCO and has great potential to create partnerships and cooperation between interested parties, significantly improving our understanding of the sea floor and empower sustainable ocean management.

   b. Crowdsourced Bathymetry Activities
      i. The U.S. provides support for the IHO-initiated project to develop a global database for crowdsourced bathymetry hosted by IHO DCDB. The IHO

DCDB, co-located with NOAA's National Centers for Environmental Information (NCEI), is building the infrastructure necessary to provide archiving, discovery, display and retrieval of global crowdsourced bathymetry data from mariners around the world. The online database can be found at: https://www.ncei.noaa.gov/maps/iho_dcdb/.

9. Spatial data infrastructures
    a. Status of MSDI
        i. The United States actively supports MSDI within the country, as well as regionally, and internationally. The MSDI capability is important for supporting non-traditional users of Maritime Safety data to allow them to complete their environmental research, port development, or disaster support projects. The U.S. MSDI efforts help build a larger community of users for this marine data than the traditionally intended hydrographers and cartographers making Safety of Navigation products and data.

    b. Involvement in regional or global MSDI efforts
        i. The U.S. holds active roles in supporting the work of several international MSDI-focused working groups:
        - IHO MSDIWG
        - UN-GGIM Marine Geospatial Information Working Group (WG-MGI)
        - Open Geospatial Consortium Marine Domain Working Group (OGC Marine DWG)
        - Regional MSDI working groups where applicable

        ii. recently sponsored Phase 3 of the ongoing Open Geospatial Consortium (OGC) Federated Marine SDI-Pilot (FMSDI-Pilot). This pilot directly responds to the OGC-IHO MSDI Concept Development Study and seeks to initiate a full-scale Pilot to demonstrate a multi-country, federated Marine Spatial Data Infrastructure (SDI) under land/ sea interface use-cases. Source: https://www.ogc.org/projects/initiatives/fmsdi

    c. MSDI national portal
        i. National Marine Spatial Data Infrastructures (NMSDI) - The Federal Geospatial Data Committee (FGDC) is an organized structure of federal geospatial professionals that provide executive, managerial, and advisory direction and oversight for geospatial decisions and initiatives across the United States federal government. FGDC works collaboratively with federal, state, and local governments, non-Federal collaborates, communities, constituents, and professional bodies providing the enabling foundation of standards, data catalogs, partnerships, and tools that make up the National SDI (NSDI). For more information visit: https://www.fgdc.gov/.

ii. Related to MSDI is the U.S., "MarineCadastre.gov." This is an integrated marine information system that provides data, tools, and technical support for ocean planning. The team for MarineCadastre.gov continually works "to increase access to data through data and map services. The services are designed to deliver data without replication and directly from the 21 sources." MarineCadastre.gov supports complementary efforts: Digital Coast, Data.gov, and Geoplatform.gov (a FGDC initiative). For more information see: https://marinecadastre.gov/.

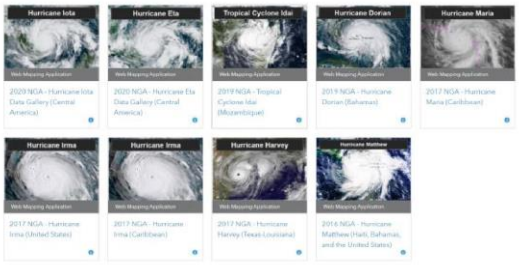
10. Innovation
    a. Use of new technologies
        i. NGA DNC to ENC Production Transition- In the next few years NGA will fully transition from producing the DNC product as the primary digital navigation product to ENC. This will bring NGA into line with the international community and allow for easier sharing of digital data with other hydrographic offices and provide a common operating picture when working together with other foreign partners.
        ii. Global Maritime Traffic Density Service- Leveraging space-borne Automatic Identification Systems (AIS), NGA developed the Global Maritime Traffic Density Service (GMTDS) to support hydrographic risk assessments at regional and global scales. Data can be filtered in several ways, including by ship type, ship draft, or ship loitering behavior. Users can visualize and filter data via web-map services or complete further analysis by downloading data via API. Source: GMTDS | Data of Global Maritime Traffic Density Service

11. Other activities
    a. Center of Excellence for Operational Ocean and Great Lakes Mapping at the University of New Hampshire
        i. NOAA has established The Center of Excellence to serve as NOAA's unified approach providing:
            i. A focal point for activities transitioning developments in mapping platforms, sensors, and concepts of operations into operations
            ii. A focal point for applied training for mapping and surveying operations, to grow and diversify the pool of well-qualified talent in this expanding field
            iii. An agency-wide capability to provide technical support for ocean mapping technologies to operators in the field on an increasingly diverse set of platforms
            iv. A mechanism to leverage public-private partnerships in advancing the nation's ocean and Great Lakes mapping goals.

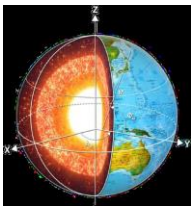
        Through the training structure, the Center of Excellence will serve as the primary resource within NOAA program offices and the external ocean mapping

community for the delivery of hydrographic survey and ocean/ lake mapping training.

b. Preparation for responses to disasters
    i. NGA Humanitarian Support Portal NGA maintains a Humanitarian Assistance Disaster Response (HADR) website to support Hurricanes and various disasters around the World. It contains maps and documents to support the first responders in their relief efforts. It can be found at: https://nga.maps.arcgis.com/home/index.html.



c. Magnetic and gravity surveys
    i. The U.S. is working on outyear plans to continue support for the World Magnetic Model and WGS84 reference frame maintenance.



d. Dynamic World Coastline
    i. NGA is currently reviewing the public release of the Dynamic World Coastline (DWC), a global vector dataset collected at 1:50,000 or larger. Expected approval and public release is Summer 2024.

e. Mobile Awareness GEOINT Environment (MAGE)
    i. MAGE is a situational awareness and mobile data collection platform customizable to support teams with a variety of different missions and use cases. While operating in a low bandwidth or disconnected environment, team members can continue to collect data offline which MAGE automatically shares with the team when a data connection is available.


MAGE IOS and Android displaying observations on the map and showing the details.

f. Marlin – One-stop-shop for Maritime Safety Information in your hands
    i. Marlin brings NGA's Maritime Safety Information datasets to devices in an offline-capable mobile application. Download the latest maritime safety reports and reference information before setting sail, then search and view the information


Marlin provides many unique and interactive visualizations of Maritime Safety Information displayed on iOS and Android mobile devices

on an interactive map, even without cell service.

12. Conclusions
    a. The U.S. is committed to support the global hydrographic community.

Annex A

Input to the IHO Publication P-5 (*Yearbook*)

The United States updates Publication P-5 as required and is not regionally specific.

Annex B

Input to the IHO Publication C-55 (*Status of Hydrographic Surveying and Charting Worldwide*)

The United States updates Publication C-55 as required for all regions.

Annex C

National MSI Self-Assessment

The United States updates National MSI Self-Assessments on an annual basis, and are not regionally specific.