



## INTERNATIONAL HYDROGRAPHIC ORGANIZATION

# UNITED STATES OF AMERICA

## National Report

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### **24<sup>th</sup> Meso-American and Caribbean Sea Hydrographic Commission (MACHC) Paramaribo, Suriname 12 December - 15 December 2023**



Office of Coast Survey  
National Oceanic & Atmospheric Administration  
<http://www.nauticalcharts.noaa.gov>



Maritime Safety Office  
National Geospatial-Intelligence Agency  
<http://msi.nga.mil/NGAPortal/MSI.portal>  
<https://www.nga.mil/Pages/Default.aspx>



Naval Meteorology and Oceanography Command  
United States Navy  
<https://www.cnmoc.usff.navy.mil/>  
<https://www.facebook.com/NavalOceanography/>

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<sup>1</sup> Based on “[Structure for National Reports to Regional Hydrographic Commissions](#)”

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# 1. HYDROGRAPHIC OFFICE/SERVICE

This National Report provides specific information pertaining to individual products and services of primary interest to the Meso American – Caribbean Sea Hydrographic Commission (MACHC) Region. Five government agencies are responsible for the management of U.S. domestic and international hydrographic products, services, and maintenance.

## 1.1 Government Agencies with hydrographic responsibilities in the MACHC Region

1.1.1 The National Oceanic and Atmospheric Administration (NOAA)<sup>2</sup> conducts hydrographic surveys and produces nautical charts and related hydrographic information within the nation’s Economic Exclusion Zone (EEZ).

1.1.2 The National Geospatial-Intelligence Agency (NGA)<sup>3</sup> provides nautical charts and related hydrographic information and is the mapping and charting authority for the U.S. Department of Defense (DoD) and commercial mariners in areas outside the U.S. where the U.S. is the designated charting authority.

1.1.3 The U.S. Navy<sup>4</sup> conducts oceanographic, bathymetric, and hydrographic surveys worldwide to satisfy DoD and national security requirements.

1.1.4 The United States Coast Guard (USCG) provides multifaceted SOLAS support with the responsibility of care and maintenance of maritime aids to navigation used for nautical charting, publishing Local Notice to Mariners for hazard avoidance, search and rescue, and security in the MACHC Region. Coast Guard Districts 7 and 8 serve the US portion within the MACHC<sup>5</sup>.

1.1.5 The U.S. Army Corps of Engineers, is responsible for hydrographic surveys in designated federal waterways and inland rivers, and produces U.S. inland ENC’s (IENCs).

For more information on NOAA, NGA, and NAVY hydrographic activities, see

[IHO Publication 5](#). Submitted by:

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NGA – [James.E.Rogers@nga.mil](mailto:James.E.Rogers@nga.mil).

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<sup>2</sup> Primarily the Office of Coast Survey

<sup>3</sup> Primarily Source Operations and Management Directorate, Foundation Group, Maritime Safety Office (MSO).

<sup>4</sup> Primarily, Commander, Naval Meteorology and Oceanography Command (COMNAVMETOCOM) and the Hydrographer of the Navy

<sup>5</sup> [www.atlanticarea.uscg.mil/Our-Organization/District-7/](http://www.atlanticarea.uscg.mil/Our-Organization/District-7/) and <https://www.atlanticarea.uscg.mil/Our-Organization/District-8/>

## 1.2 United States Strategies for the MACHC Region

The U.S. envisions a stable Meso American – Caribbean Sea area free of conflict, where nations act responsibly in a spirit of trust and cooperation. We have implemented a strategic approach in this region, outlined by a national strategy that focuses on three lines of effort: advance U.S. security interest, pursue responsible regional stewardship, and strengthen international cooperation.

## 1.3 United States Open Data Policy – Managing Information as an Asset

Access to data and services, usable to the public, can help fuel entrepreneurship, innovation, and scientific discovery – all of which improve lives and contribute significantly to job creation<sup>6</sup> - is the foundation of the [U.S. Open data policy](#). With the exception of some data collected and/or obtained by the U.S. Navy through bilateral agreements, the open data policy has led to the public availability of most hydrographic data, products, and services produced by U.S. Hydrographic Offices (HO's) for data downloads at no cost. Further information on U.S. Navy collected data is provided in Section 2.2, below.

Much of this open data information is available on the NOAA and NGA websites<sup>7</sup>. Additionally, NOAA makes ENC data available for use in GIS applications via their ENC direct to GIS website.<sup>8</sup> NGA also makes data available to support crisis events and various initiatives.<sup>9</sup>

# 2. SURVEYS

## 2.1 Surveys in U.S. Waters

NOAA provides nautical charts and related hydrographic information for the safe and efficient navigation of maritime commerce as well as providing basic data for engineering, scientific, and other commercial and industrial activities within the nation's 3.4 million square nautical mile EEZ ([US EEZ](#)) and along its 95,000 miles of shoreline. To help prioritize out-year hydrographic survey efforts, NOAA uses the Hydrographic Health Model.

The Hydrographic Health Model is a model based on the idea of navigational risk. Navigational risk is the product of the likelihood of an adverse event and the consequence of that event occurring. The model incorporates likelihood parameters such as traffic density, known hazards to navigation, and reported ship groundings to estimate the likelihood of an adverse event. To estimate the

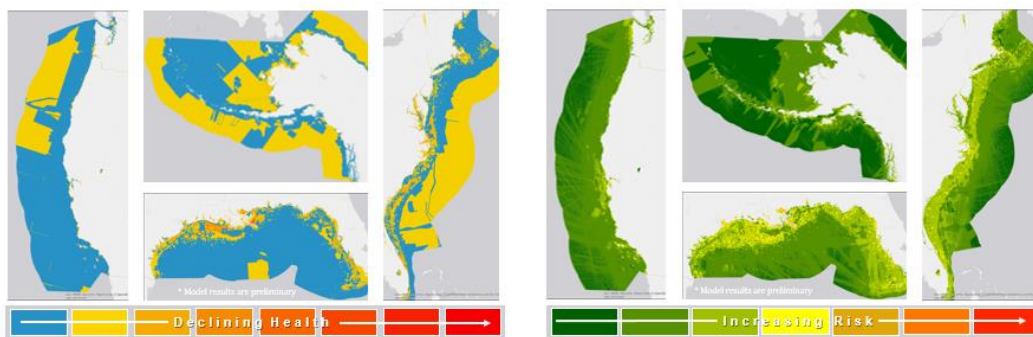
<sup>6</sup> Open Data Policy-Managing Information as an Asset. (2013). Retrieved from <https://digital.gov/resources/open-data-policy-m-13-13/>

<sup>7</sup> NOAA & NGA websites: <https://nauticalcharts.noaa.gov/index.html> & [https://msi.nga.mil/NGAPortal/MSI.portal?nfpb=true&st=&pageLabel=msi\\_faq\\_page](https://msi.nga.mil/NGAPortal/MSI.portal?nfpb=true&st=&pageLabel=msi_faq_page)

<sup>8</sup> NOAA ENC direct to GIS: <https://nauticalcharts.noaa.gov/data/gis-data-and-services.html#enc-direct-to-gis>

<sup>9</sup> NGA Crisis Support website: <https://nga.maps.arcgis.com/home/index.html>

consequence of an adverse event, the model incorporates parameters such as proximity to search and rescue stations, proximity to reefs or marine sanctuaries. The model also considers the necessary quality of data to support modern traffic relative to what is currently available, explicitly recognizing that the seafloor changes over time. Seafloor changeability takes into account the frequency of storms, current speed, and accumulation of marine debris, where the quality of data in highly changeable areas decreases faster than the quality of data in less changeable areas. Using historic knowledge of seafloor changeability, the model can also approximate the future quality of survey data and assess how often an area needs resurveying.



*Figure 2.1: Hydrographic Health and Risk Conceptualization*

A statutory mandate authorizes NOAA to provide nautical charts and related hydrographic information for the safe and efficient navigation of maritime commerce as well as providing basic data for engineering, scientific, and other commercial and industrial activities within the nation's 3.4 million square nautical mile EEZ.

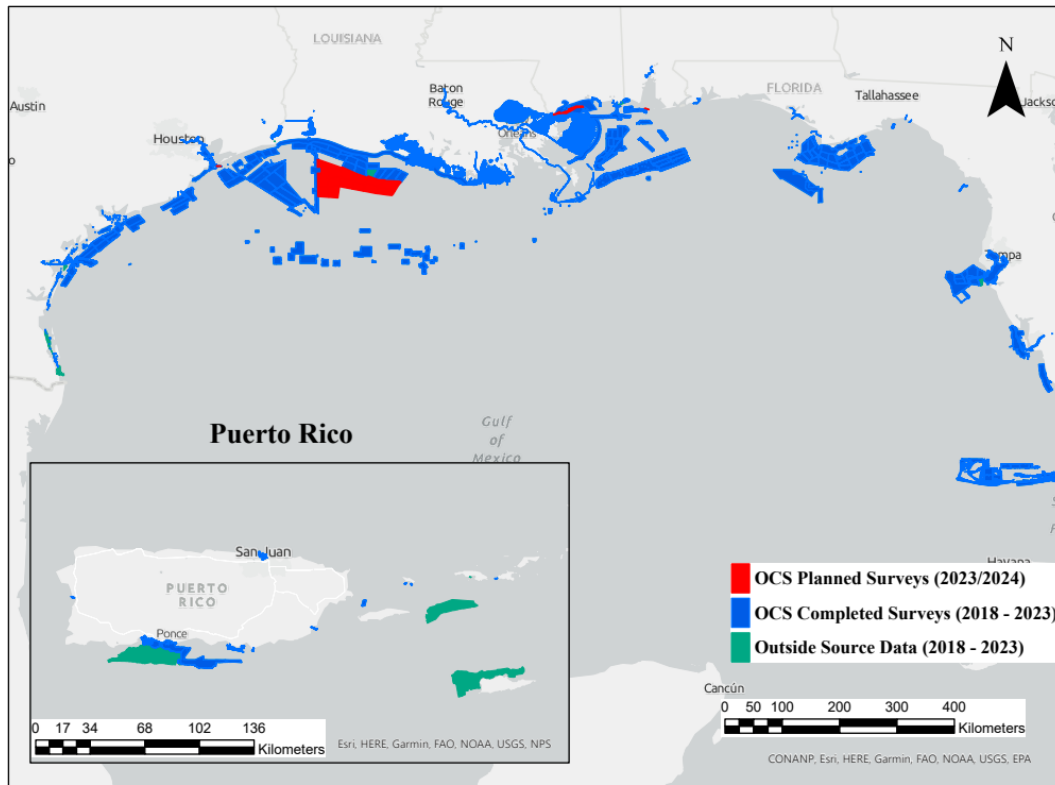


Figure: Hydrographic surveys conducted by NOAA's Office of Coast Survey between 2018 - 2023, planned for 2023/2024 and external source data for 2018 - 2023 that was evaluated and applied to the charts in the Gulf of Mexico and Puerto Rico

Planned surveys will be a combination of either 200 percent side scan sonar/object detection multibeam coverage in regions of critical under keel clearance, or 100 percent side scan sonar/complete coverage multibeam surveys where there is a relaxed requirement for feature detection. Alternatively, data may be acquired at a relaxed requirement to maximize coverage in deeper waters. These plans do not reflect emerging storm response work.

## 2.2 Surveys outside U.S. Waters

The U.S. Navy conducts hydrographic surveys outside the United States in international waters and in territorial waters of partner nations, through diplomatic channels and international agreements. These survey operations enhance maritime commerce and security and support relationship and capacity building initiatives. No cooperative hydrographic surveys have been conducted in the region since MACHC-20.

By U.S. Navy, Commander, Naval Meteorology and Oceanography Command (COMNAVMETOCOM) Instruction 5510.1, "Disclosure of Information to Foreign Governments and International Organizations," it is policy to treat all data collected through bi-lateral agreements as restricted from public release. Accordingly, the Hydrographic Service or Port Authority of the respective

country is the appropriate point of contact for inquiries or requests for data regarding any of these surveys.

### **2.3 U.S. Hydrographic Survey Platforms**

#### National Oceanic and Atmospheric Administration

NOAA survey platforms include six 28-foot survey boats, a research vessel, a LIDAR-capable aircraft, and private contractors and the following ships: [NOAA Ship \*Fairweather\*](#), [NOAA Ship \*Rainier\*](#), [NOAA Ship \*Thomas Jefferson\*](#), and [NOAA Ship \*Ferdinand R. Hassler\*](#).

Additional information on NOAA’s hydrographic vessels can be found online at: <https://nauticalcharts.noaa.gov/about/survey-vessels.html>.

#### U.S. Navy

The Naval Oceanographic Office (NAVOCEANO), a subordinate command of COMNAVMETOPCOM, currently employs six Pathfinder Class 100-meter multi-purpose survey ships to conduct oceanographic, bathymetric, and hydrographic surveys in deep-ocean and coastal waters. Each ship carries two 10-meter hydrographic survey launches (HSLs).

NAVOCEANO also maintains Airborne LIDAR Hydrography (ALH) capability with the Optech, Inc., “Coastal Zone Mapping and Imaging” LIDAR (CZMIL) system. A Basler BT-67, a refurbished DC-3, serves as the airborne system that carries the CZMIL system. NAVOCEANO’s subordinate command Fleet Survey Team (FST), employs rapidly deployable survey assets equipped with four portable multi-beam kits to support boat of opportunity (BOO) surveys; six Unmanned Surface Vessels (USV), including four Teledyne Z-Boat 180, and two Marine Robotics Sea Otters equipped with multi-beam sonar; two Iver3 580 Unmanned Underwater Vehicles equipped with Bathymetric Interferometric Side Scan Sonar; and four rapid littoral survey vehicles (RLSVs) (personal watercraft fitted with a single beam echo sound side-scan scan sonar). FST survey assets are highly portable and can be commercially shipped or hand-carried by our survey team as checked baggage on commercial airlines. FST also maintains a stand-by “Fly-Away Team” consisting of four personnel and survey gear to outfit boats of opportunity. This capability enhances standard Navy survey requirements and provides the capacity to maintain navigable approach corridors in support of humanitarian aid and disaster relief.

## **3. NEW CHARTS AND UPDATES**

### **3.1 Nautical Charting Plan**

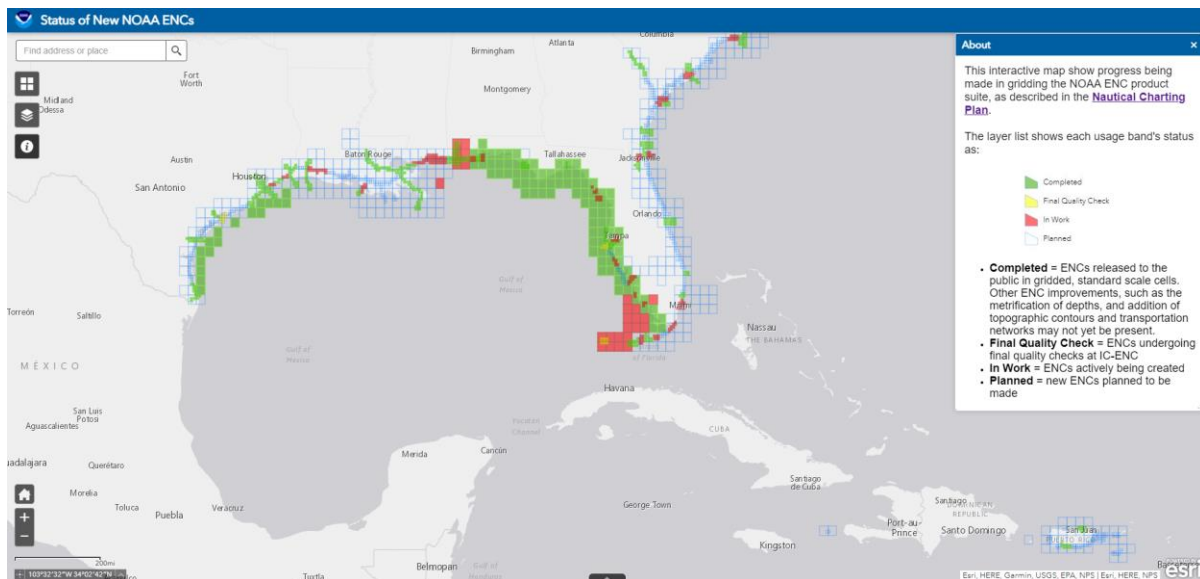
In August of 2023, NOAA released the [Nautical Charting Plan](#), superseding the 2017 National Charting Plan. The focus of this plan, as with the previous charting plan, is the transition from the production and use of paper nautical charts to the production and use of NOAA electronic navigational charts



(NOAA ENC®). NOAA is accomplishing this transition by shutting down production of traditional paper nautical charts to enable devoting additional resources to rescheming and improving ENC charts. Over half of NOAA’s traditional paper nautical charts have now been canceled and over 20% of the new ENC cells that will replace legacy data in a new rectangular grid have been released. Several enhancements to the ENC are also underway, including the adoption of a new ENC product specification that will enable the integrated display and use of many other types of ancillary information.

In 2017, NOAA started to re-scheme its suite of 1,266 ENCs into a regular gridded set of rectangular cells. The current ENC scheme is based on the extents of the paper nautical charts from which ENCs were originally digitized. Rescheming will replace this puzzle-piece layout with a rectangular grid of ENCs, often providing larger scale, more detailed coverage than the existing paper charts. The final product suite is expected to be approximately 7,200 ENCs. More information about the ENC rescheming effort is available on the NOAA Coast Survey “[Rescheming and Improving Electronic Navigational Charts](#)” webpage. Progress of the rescheming effort is shown on the “[Status of New NOAA ENCs](#)” webmap.

As of December 2023, NOAA has produced 2265 new ENCs based on the gridded chart scheme described within the Nautical Charting Plan, including 551 in the MACHC region.



*Fig 3.1: Re-scheme ENC coverage, new usage band 4 and 5 ENC cells in the Gulf of Mexico, Southeast US Coast, and Puerto Rico*

### 3.2 Electronic Navigational Chart (ENC)

NGA produces ENCs in areas where the U.S. functions as the Prime Charting Authority (PCA) outside U.S. domestic waters. These ENCs are maintained by NGA with new source information from the U.S., and our foreign partners as it becomes available. NGA is working to expand its ENC Portfolio within the MACHC Region in areas where the U.S. acts as the PCA.

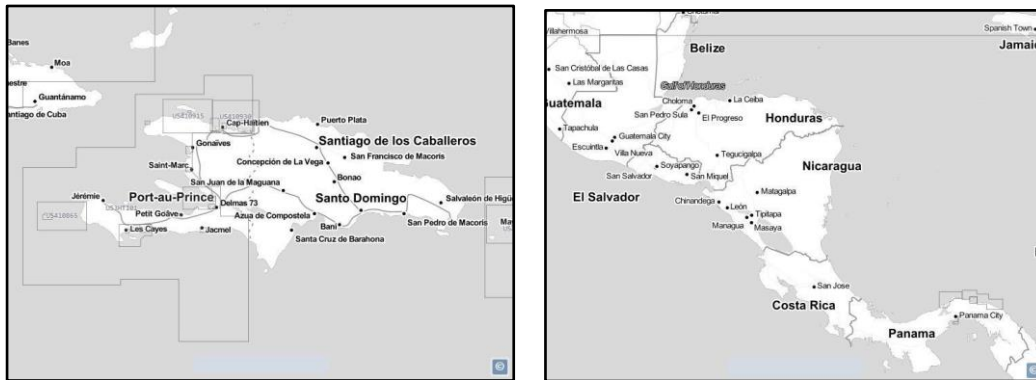


Figure 3.2: NGA ENCs

The table below shows the listing of NGA cells available in the MACHC Region.

| NGA Cells |  |            |
|-----------|--|------------|
| Cell Name | Title  | Posted     |
| US3HTI01  | Haiti Coast  | 02/23/2023 |
| US409860  | Approach to Panama Canal – North, Panama                   | 12/15/2022 |
| US409890  | Punta Rincon to Isla Tupile, Panama                        | 04/27/2023 |
| US410121  | Approach to Cay Sal Bank                                   | 08/19/2021 |
| US410840  | Approaches to Les Cayes and Aquin, Haiti                   | 03/04/2015 |
| US410865  | Navassa Island (US) to Cap Tiburon, Haiti                  | 07/25/2019 |
| US410880  | Approach to Port-Au-Prince, Haiti                          | 07/25/2019 |
| US410915  | Canal De La Tortue, Haiti                                  | 08/30/2018 |
| US410930  | Approaches to Cap-Haitien and Bahia de Monte Cristi, Haiti | 07/22/2021 |
| US509860  | Panama Canal Northern End, Panama                          | 07/22/2015 |
| US509890  | Golfo De San Blas, Panama                                  | 09/12/2014 |
| US510820  | Jacmel, Haiti  | 09/23/2021 |
| US510830  | Aquin, Haiti   | 09/23/2021 |
| US510840  | Les Cayes, Haiti   | 01/03/2020 |
| US510850  | Anse d'Hainault, Haiti                                     | 02/09/2023 |
| US510855  | Jeremie, Haiti   | 08/30/2018 |
| US510860  | Miragoane, Haiti   | 08/30/2018 |
| US510870  | Petit Goave, Haiti   | 07/25/2019 |
| US510880  | Port-Au-Prince, Haiti                                      | 09/12/2014 |

|          |   |            |
|----------|---|------------|
| US510885 | Baie de Saint-Marc, Haiti                   | 11/21/2018 |
| US510890 | LaFiteau, Haiti                             | 09/12/2014 |
| US510910 | Gonaives, Haiti                             | 07/22/2021 |
| US510918 | Mole Saint Nicolas, Haiti                   | 08/30/2018 |
| US510920 | Port de Paix, Haiti                         | 08/30/2018 |
| US510922 | Rada De La Basse Terre, Haiti               | 08/30/2018 |
| US510925 | Baie de L'Acul, Haiti                       | 10/08/2020 |
| US510930 | Cap-Haitien, Haiti                          | 07/22/2021 |
| US510960 | Pepillo Salcedo, Haiti / Dominican Republic | 09/14/2023 |
| US515390 | Panama Canal, Panama                        | Completed  |
| US515410 | Panama Canal Southern End, Panama           | Completed  |
| US510970 | Monte Cristi, Dominican Republic            | Completed  |
| US511048 | Punta Palenque, Dominican Republic          | 05/31/2018 |
| US511050 | Bahia De Las Calderas, Dominican Republic   | 02/23/2023 |
| US510121 | Cay Sal, Bahamas                            | 12/15/2022 |

U.S. ENC's are available as free downloads from the internet. Mariners who wish to download NOAA ENC's directly and use the data to fuel ECDIS or ECS may do so. The ENC's, including newly created NGA ENC's, are distributed directly from the following:

- i. NOAA website at: <https://nauticalcharts.noaa.gov/charts/noaa-enc.html>
- ii. International Center for ENC's Distributors at: <https://www.ic-enc.org/distribution>
- iii. PRIMAR Distributors at: <https://www.primar.org/#/>

| ENC Band   | 1 | 2 | 3  | 4   | 5   | 6 |
|--|---|---|----|-----|-----|---|
| Number of U.S. ENC's existing in MACHC Region (NOAA) | 1 | 3 | 13 | 155 | 418 | 3 |
| Number of U.S. ENC's existing in MACHC Region (NGA)  | 0 | 0 | 1  | 8   | 23  | 0 |

NGA created a Worldwide ENC grid for use in building its ENC portfolio. This ENC grid provides for a standardization of ENC scales and coverage across the portfolio. The grid is composed of regions which are labeled with a letter as the region identification. Each region is further subdivided into smaller areas to support different scale ENC Cells. NGA will also be employing this grid for the Primary Charting Authority (PCA) ENC that is produced in the

MACHC region. The PCA ENC transition to the ENC grid is currently underway.

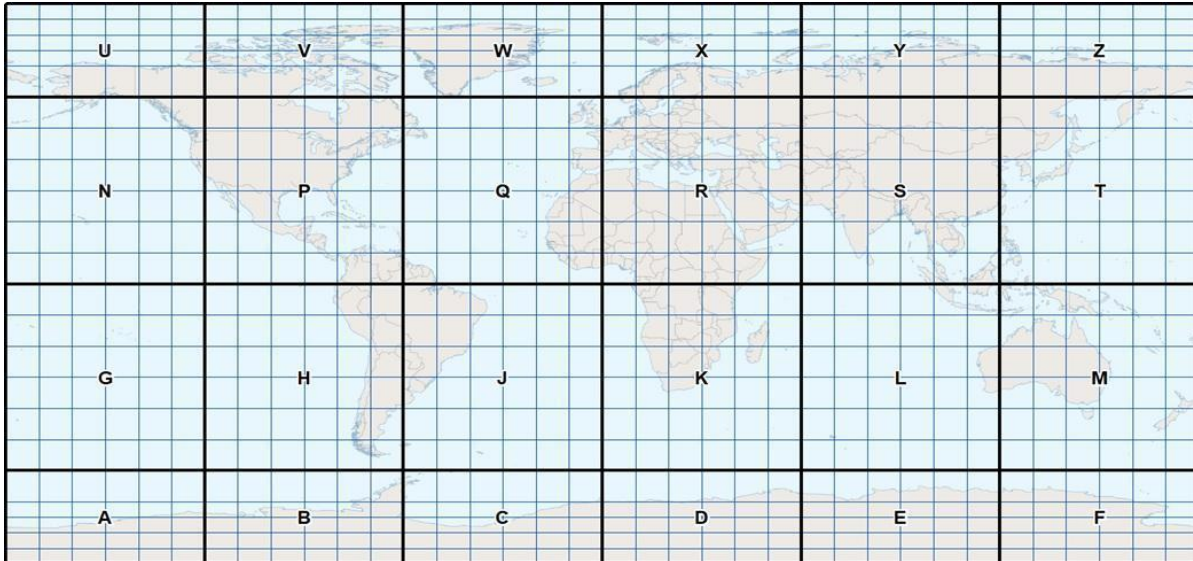


Figure 3.3: NGA ENC Grid

### 3.3 Raster Navigational Charts (RNC) and Electronic Navigational Charts (ENC)

#### Distribution

NOAA provides nautical products, services, and web deliveries of digital versions of most data, which are available free to the public.

For access to survey data:

<https://nauticalcharts.noaa.gov/data/hydrographic-survey-data.html>

For access to RNC Charts:

<https://nauticalcharts.noaa.gov/charts/noaa-raster-charts.html>

For access to ENC Charts:

<https://nauticalcharts.noaa.gov/charts/noaa-enc.html>

For access to the Coast Pilot:

<https://nauticalcharts.noaa.gov/publications/coast-pilot/index.html>

NOAA produces 128 RNC charts and 551 ENC charts in the domestic waters within the MACHC 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. (See Annex A for NOAA certified chart printing agents). U.S. ENCs

are available as free downloads from the internet. Mariners wishing to download NOAA ENC's directly and use the data to fuel ECDIS or ECS may do so. ENC's, including newly created NGA ENC's, are distributed directly from NOAA at <https://nauticalcharts.noaa.gov>, as well as through the International Center for ENC's Distributors, <https://www.ic-enc.org/distribution>.

### 3.4 Raster Navigational Charts (RNC) and Paper Charts

The NOAA RNC® are geo-referenced, digital images of NOAA navigational charts. Because the images are geo-referenced, the end user can display a vessel's position on the chart image if a computer-based navigation system is connected to a global positioning system (GPS). RNC's, developed under the IHO S-61 product specification, are unique to NOAA. NGA does not produce RNC's.

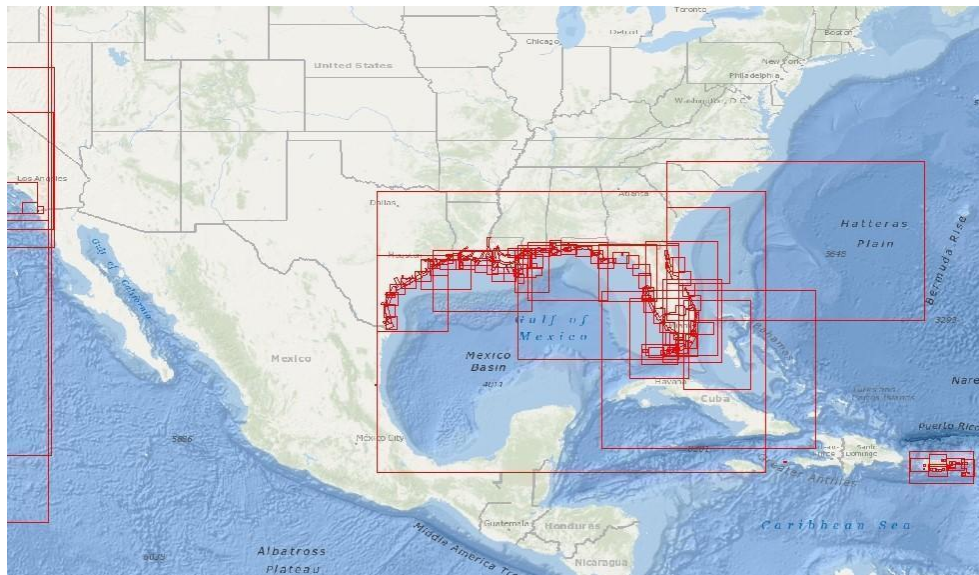


Figure 3.4: NOAA MACHC RNC

Shown above is a graphic of the MACHC region RNC coverage.

U.S. RNC's are downloadable from a list at <http://www.charts.noaa.gov/RNCs/RNCs.shtml> or through the Coast Survey's Nautical Products Catalog at: <http://www.charts.noaa.gov/InteractiveCatalog/nrnc.shtml>

NGA produces paper Standard Nautical Charts (SNC) for the MACHC region in their Region 1 & Region 2 portfolios. Most of these charts are not available via public sale but can be requested by partners via bilateral agreements. The only charts that NGA distributes to the public are those where NGA serves as the Primary Charting Authority (PCA). These charts are in areas where the U.S. conducts the surveys, compiles and issues charts, and there is no fully



functioning national charting authority or NGA has specific authority (e.g., Trust Territory of the Pacific).

NOTE: With the continued transition to electronic navigation NOAA/NGA is actively canceling paper charts (i.e. RNC / SNC) from their respective portfolios. The completion date for the full sunset or cancellation of RNC / SNC is 30 SEP 2025. NGA Public sale / PCA requirements for paper charts after that date will be satisfied via the CPENC process once the RNC / SNC is canceled.

| Chart | Chart Title                                    | Edition Date | Distribution |
|-------|--|--------------|--------------|
| 25480 | Saint George's Harbour and Approaches, Grenada | July 2022    | LIM DIS      |
| 25481 | Grenada  | July 2022    | LIM DIS      |

Information for Certified Chart Agents for NGA public sale charts can be found at the following link:

<https://nauticalcharts.noaa.gov/publications/print-agents.html#nga-paper-charts>

There are a number of Agents that can print and distribute these charts to customers around the world. Many of these Agents provide listings of the NGA charts that they have available on their website. See the various vendor websites for more details.

### 3.5 International (INT) Charts

NOAA and NGA share INT chart responsibility within the MACHC region. The U.S. is responsible for 12 international series charts in the MACHC, ranging in scales between 1:300,000 to 1:2,750,000.

| INT No. | Nat No. | Producing Agency | Title                                      | Edition Date |
|---------|---------|------------------|--|--------------|
| 401     | 401     | NGA              | Gulf of Mexico                             | 1991         |
| 811     | 503     | NGA              | Mexico to Ecuador                          | 1996         |
| 4015    | 11004   | NOAA             | Mississippi River to Rio Grande            | 2014         |
| 4016    | 11006   | NOAA             | Gulf Coast - Key West to Mississippi River | 2013         |
| 4017    | 11013   | NOAA             | Straits of Florida                         | 2012         |
| 4021    | 26025   | NGA              | Eastern Cuba to Puerto Rico                |              |
| 4145    | 11300   | NOAA             | Galveston to Rio Grande                    | 2018         |
| 4146    | 11340   | NOAA             | Mississippi River to Galveston             | 2017         |

|      |       |      |                                       |      |
|------|-------|------|---------------------------------------|------|
| 4147 | 11360 | NOAA | Cape St. George to Mississippi Passes | 2010 |
| 4148 | 11420 | NOAA | Havana to Tampa Bay                   | 2018 |
| 4149 | 11549 | NOAA | Straits of Florida Eastern Part       | 2017 |
| 4178 | 25640 | NOAA | Puerto Rico and Virgin Islands        | 2013 |

### 3.6 Other Charts

#### **Certified Printed ENC (CPENC)**

Certified Printed Electronic Navigational Charts (CPENCs) are automatically-rendered and printed versions of NGA’s digital surface navigation product, Electronic Navigational Charts (ENCs), that are certified safe for maritime navigation and function like a traditional Standard Nautical Chart (SNC) in areas where U.S. hardcopy requirements still exist. In light of the growing trend towards canceling SNC by hydrographic authorities worldwide, and instead providing ENC as the primary surface-navigational chart product, legacy hardcopy products no longer exist in certain portions of the world to continue to support hardcopy navigation. For U.S. and other users still requiring hardcopy, NGA has developed the CPENC product to mitigate gaps created by foreign Hydrographic Offices SNC cancellations and customer needs during the transition to electronic navigation. With CPENC being an automated solution, it allows for rapid chart scheming and production once legacy hardcopy products are canceled and requirements still exist. While CPENCs do not individually receive rigorous cartographic reviews like the predecessor SNC products, their symbology is continuously improved across the catalog and they far surpass previous hardcopy production timelines and quantity: generated and updated within a matter of minutes to provide users with an adequate hardcopy alternative that will always show the latest view of ENC available at the time they are generated. Unlike traditional SNCs, CPENCs are maintained via a new corrections process utilizing ENC change detection results, which symbolically highlight and communicate fewer critical changes on an updated, digital “CORRECTED” version of the CPENC made available between the “IN PRINT” versions containing a significant number of changes that are distributed for normal printing.

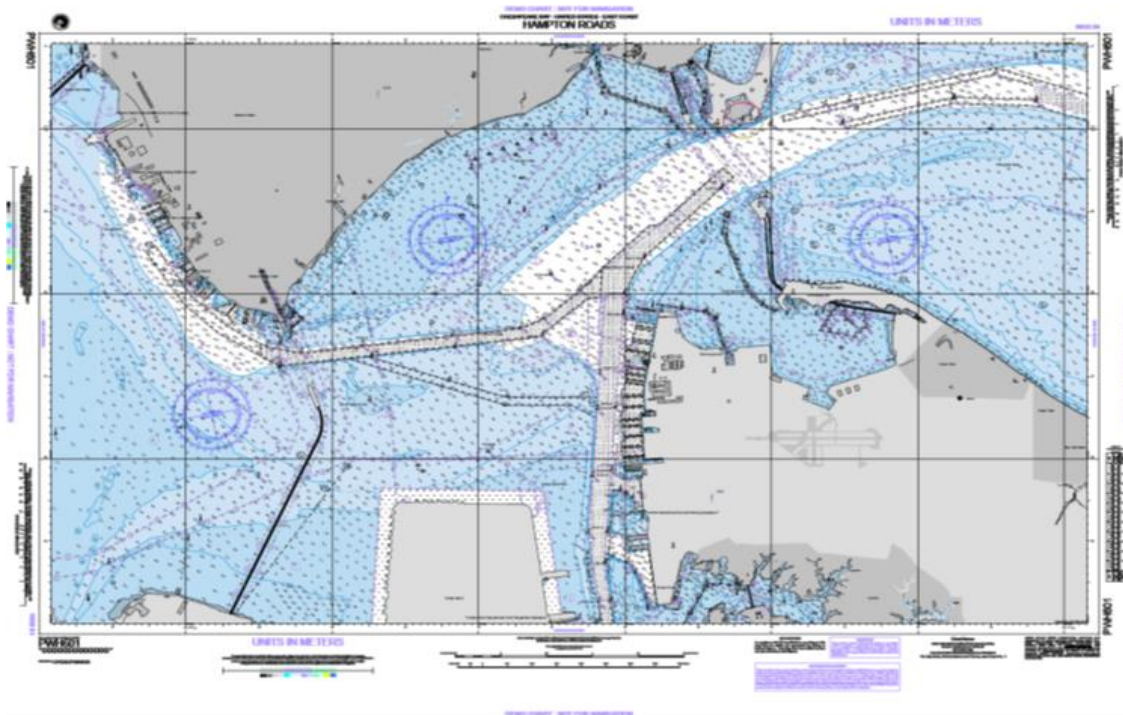


Figure 3.5: CPENC Example

### Digital Nautical Chart (DNC)

The U.S. produces many DNCs in MACHC waters. The DNC, produced by the National Geospatial-Intelligence Agency (NGA), is an unclassified, vector-based, digital database containing maritime significant features essential for safe marine navigation. The DNC uses the Vector Product Format, which is a NATO standard for digital military map and chart data.

Additional details can be located at: <http://msi.nga.mil/NGAPortal/DNC.portal>.

DNC consists of libraries in a variety of scales for complete worldwide coverage. MACHC data is included in DNC regions 13, 14, 15, and 16. See coverage below.



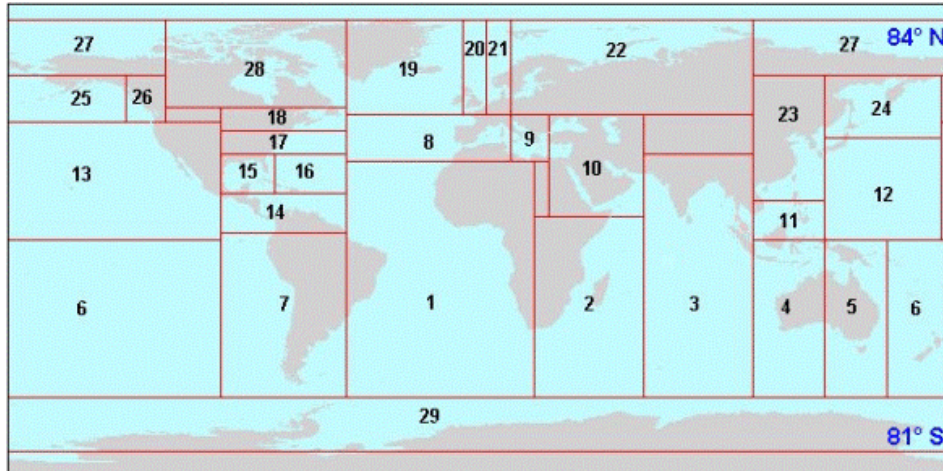


Figure 3.6: DNC Worldwide Coverage

NOTE: With the continued NGA transition to ENC, DNC will likely be canceled sometime early in 2026 to realign those resources to support ENC.

## 4. NEW PUBLICATIONS AND UPDATES

### 4.1 New Publications

NGA's World Port Index (WPI) is available via recently-launched web applications. Users can utilize the web apps to view, analyze, and download port information for the WPI in a dynamically-updated viewing platform, complete with key analytical and planning tools. Trusted contributors can also submit new ports and edits to existing ports through an editing application. WPI data is also available through an Application Programming Interface (API) that allows information exchange for use in other venues, such as the IHO ENC Catalog. These updates allow users to view and work with WPI data in a dynamic new environment utilizing GIS information, and allows port data to be crowd-sourced from knowledgeable resources all over the world. Links to all of the applications are posted, along with a csv file of the complete WPI dataset, on NGA's Maritime Safety Information website:

<https://msi.nga.mil/Publications/WPI>

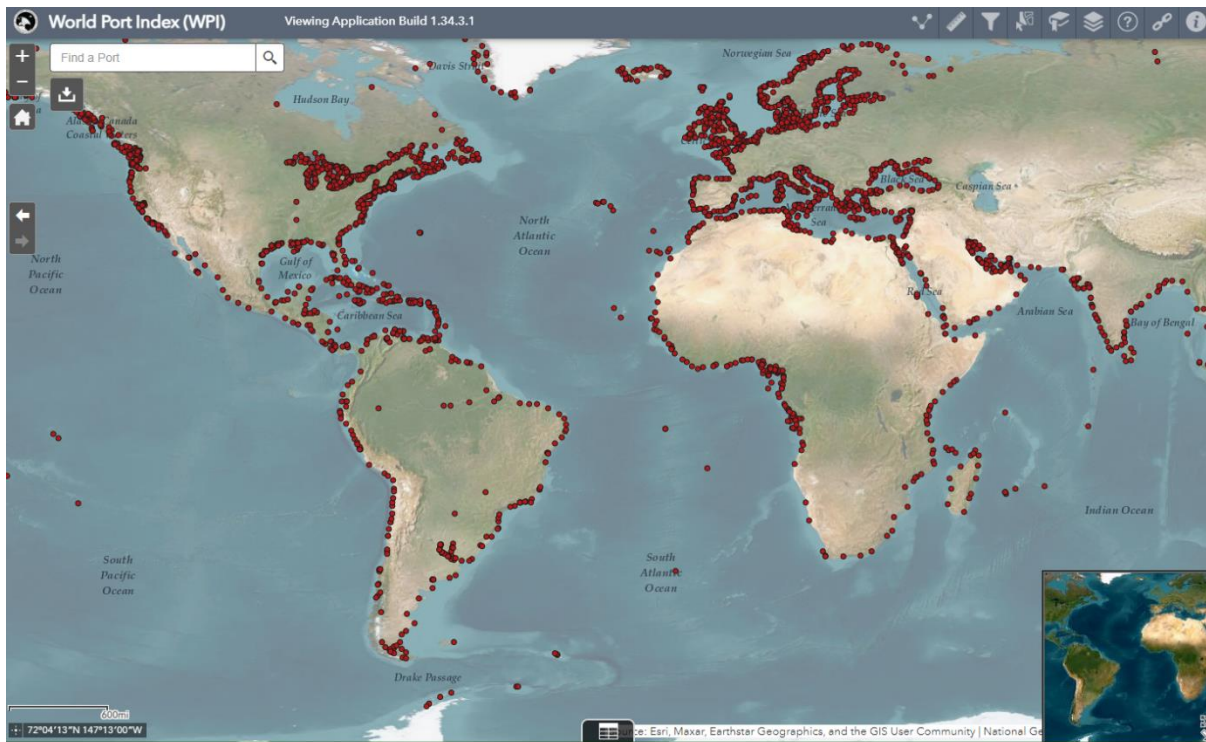


Figure 4.1: World Port Index (WPI)

## 4.2 Updated Publications

- The **American Practical Navigator**, first published in 1802 describes in detail the principles and factors of navigation, including piloting, electronic navigation, celestial navigation, mathematics, safety, oceanography and meteorology. It also contains various tables used in typical navigational calculations and solutions, including the formulas used to derive the tabular data. The 2019 edition of the American Practical Navigator consists of a two-volume format, which can be downloaded as complete PDF documents from the following website: <https://msi.nga.mil/Publications/APN>
- 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. *Coast Pilots 4, 5, and 7* provide information for the MACHC region. U.S. Coast Pilots, updated on a weekly basis, can be downloaded at: <https://nauticalcharts.noaa.gov/publications/coast-pilot/index.html>
- **NGA Sailing Directions** consist of useful information important to navigators of coastal waters. Information for the MACHC region is contained in following Publications:

| Publication   | Edition Date |
|---|--------------|
| <i>Sailing Directions 120</i> – Pacific Ocean and Southeast Asia (Planning)       | 2022 Edition |
| <i>Sailing Directions 140</i> – North Atlantic Ocean and Adjacent Seas (Planning) | 2019 Edition |
| <i>Sailing Directions 124</i> – East Coast of South America (Enroute)             | 2017 Edition |
| <i>Sailing Directions 147</i> – Caribbean Vol. 1 (Enroute)                        | 2022 Edition |
| <i>Sailing Directions 148</i> – Caribbean Vol. 2 (Enroute)                        | 2022 Edition |
| <i>Sailing Directions 153</i> – West Coast of Mexico and South America (Enroute)  | 2021 Edition |

Digital updates can be downloaded from NGA at: <http://msi.nga.mil/>.

- **World Port Index (Pub150)** 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. Digital updates are available to the public and posted at the NGA Maritime Safety website, at: <https://msi.nga.mil/Publications/WPI>.
- 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>.

Two (2) volumes of List of Lights cover the MACHC region:

| Publication   | Edition Date |
|---|--------------|
| List of Lights Pub. 110 (Greenland, E. Coast N & S America and W. Indies, excluding USA)  | 2023 Edition |
| List of Lights Pub. 111 (W. Coast N & S America (excluding USA), Australia, Tasmania, NZ, and Islands in the N/S Pacific Ocean) | 2023 Edition |

- The **NGA Radio Navigational Aids (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>.

### 4.3 Notice to Mariners

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 NGA charts in the MACHC region.

Local Notice to Mariners are updated weekly and available for download in several formats. U.S. Coast Guard Districts 7 and 8 are responsible for publishing Notice to Mariners in the MACHC Region, which are available at [www.atlanticarea.uscg.mil/Our-Organization/District-7/](http://www.atlanticarea.uscg.mil/Our-Organization/District-7/) and <https://www.atlanticarea.uscg.mil/Our-Organization/District-8/>, respectively.

The U.S. Notice to Mariners is posted at the NGA Maritime Safety website at <https://msi.nga.mil/NTM>.

NGA is transitioning the Notice to Mariner (NTM) workforce from the traditional textual NTM process to support digital production processes like ENC / CPENC.

### 4.4 Means of Delivery

- All the publications are available digitally in PDF format from the NGA website at: <https://msi.nga.mil/Publications>
- Users can enroll in a Publication Updates Subscription Service to receive e-mail notifications of nautical publication updates and new editions.
- Additionally, NGA publications can be ordered from commercial vendors found on the NGA website at: <https://msi.nga.mil/Products>.

## 5. MARITIME SAFETY INFORMATION

### 5.1 Existing Infrastructure for Transmission

Maritime Safety Information (MSI) consists of navigational and meteorological warnings, meteorological forecasts and other urgent safety-related messages broadcast to ships in accordance with the International Convention for the Safety of Life at Sea, 1974, as amended. NGA monitors NAVAREA IV and XII Warnings via Inmarsat antennas located in Springfield, Virginia (primary) and St. Louis, Missouri (back up). NGA promulgates warnings via Inmarsat's SafetyNET II service and Iridium's SafetyCast service. USCG promulgates coastal warnings for the United States via NAVTEX. There are 11 NAVTEX stations, five on the West Coast and six on the East Coast. All NAVTEX stations except Puerto Rico are remotely controlled via USCG Communications Command in Norfolk, Virginia.

### 5.2 Navigation Warnings

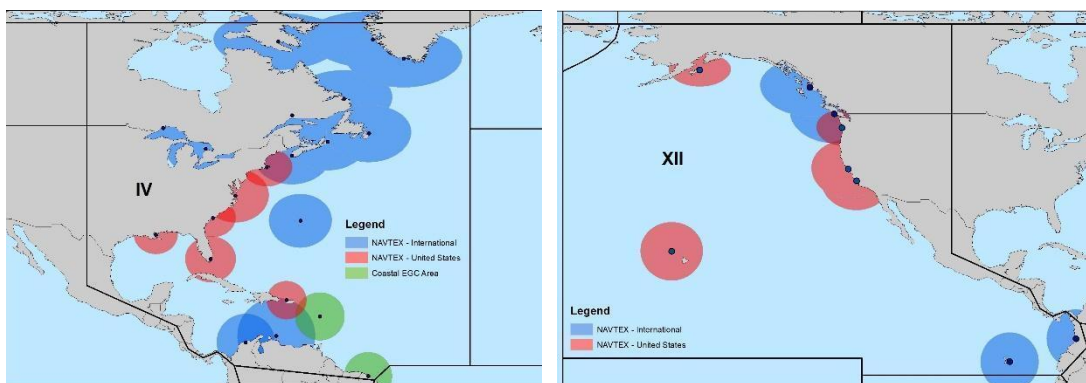
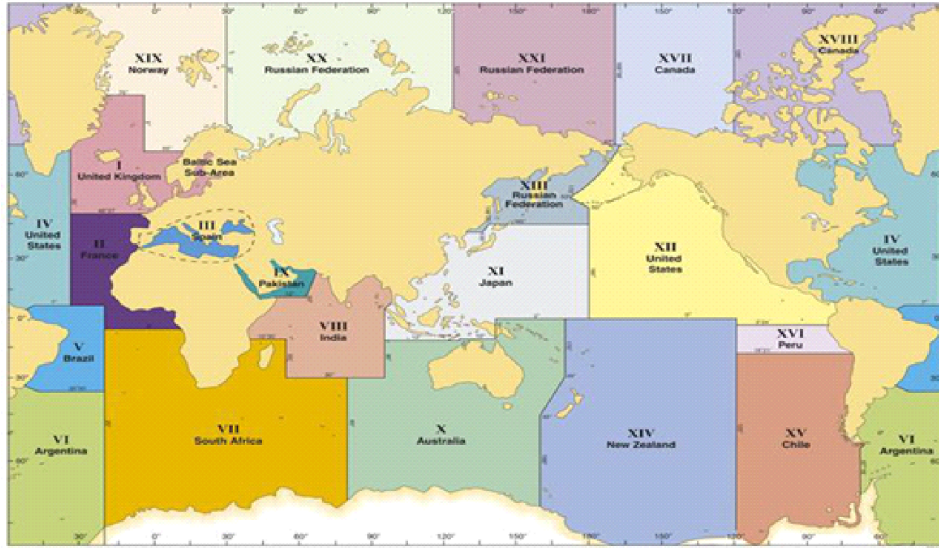


Figure 5.1 NAVAREA IV and XII. U.S. NAVTEX Stations in red, non-U.S. in blue, SafetyNET Coastal warnings in green.

As the NAVAREA IV and XII Coordinator, NGA issues the navigational warnings for these areas and uploads them to <https://msi.nga.mil/> daily. NGA requests the assistance of all member states within these two NAVAREA regions to relay pertinent maritime safety information for promulgation to [navsafety@nga.mil](mailto:navsafety@nga.mil)





*Figure 5.2: NAVAREAS for coordinating and promulgating navigational warnings under the World-Wide Navigational Warning Service*

**Statistics on work of the National Coordinator:** In 2021, to date, NAVAREA IV promulgated 2,435 navigational warnings and NAVAREA XII promulgated 1642 navigational warnings. USCG promulgated approximately 3,516 NAVTEX warnings.

**New infrastructure in accordance with GMDSS Master Plan:** None.

## 6. C-55

The aim of IHO Publication C-55 is to present a clear picture of the worldwide coverage of surveys and nautical charts and of the extent of effective organizations for the timely promulgation of navigational safety information. The following tables outline the survey and nautical chart coverage in the U.S.

### 6.1 Hydrographic Coverage Available

The status of hydrographic surveys of navigable waters in the U.S. portion of the MACHC Region (Gulf of Mexico and Puerto Rico) out to the limits of the EEZ is as follows:

A = percentage which is adequately surveyed

B = percentage which requires re-survey at larger scale or to modern standards

C = percentage which has never been systematically surveyed

|               | A   | B   | C   |
|---------------|-----|-----|-----|
| Depths < 200m | 16% | 48% | 36% |
| Depths > 200m | 48% | 52% | 0%  |

## 6.2 Nautical Chart Coverage Available<sup>10</sup>

Coverage of charts published by the U.S. in the MACHC region (Gulf of Mexico Coast of the Continental U.S.), where:

A = percentage covered by INT series, or a paper chart series meeting the standards in M-4

B = percentage covered by Raster Navigational Charts (RNCs) meeting the standards in S-61

C = percentage covered by ENC's meeting the standards in S-57

| Purpose/Scale   | A     | B    | C    |
|---|-------|------|------|
| Offshore passage/Small                                | 100%  | 100% | 100% |
| Landfall and Coastal passage/Medium                   | 100%  | 100% | 100% |
| Approaches and Ports/Large                            | 100%  | 100% | 100% |
| Percentage of Group A showing depths in metres        | <1.0% |      |      |
| Percentage of Group A referenced to a satellite datum | 100%  |      |      |

Coverage of charts published by the U.S. in the MACHC region (Puerto Rico and U.S. Virgin Islands and Navassa Island), are:

| Purpose/Scale   | A    | B    | C    |
|---|------|------|------|
| Offshore passage/Small                                | 100% | 100% | 100% |
| Landfall and Coastal passage/Medium                   | 100% | 100% | 100% |
| Approaches and Ports/Large                            | 100% | 100% | 100% |
| Percentage of Group A showing depths in metres        | 3.0% |      |      |
| Percentage of Group A referenced to a satellite datum | 100% |      |      |

<sup>10</sup> Values updated based on 2021 analysis following methodology of the 2018 C-55 Report (source document unavailable). Note: The exclusive economic zone surrounding Navassa extends beyond existing NOAA chart coverage. The updated C-55 numbers used to inform this table were limited to the extents of existing NOAA chart coverage.

## 7. CAPACITY BUILDING

### 7.1 Offer of and/or Demand for Capacity Building

The United States is an active participant in the IHO Capacity Building Sub-Committee (CBSC). The U.S. (NGA) directly supports the IHO Maritime Safety Information (MSI) training course as well as provides support to nations through on site and remote guidance and advice as they grow their hydrographic capacity.

### 7.2 Training Offered

#### **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) in partnership with U.S. Navy<sup>11</sup>
- The University of New Hampshire (UNH)<sup>12</sup>

#### **Category-B Competence Training for Nautical Cartography**

The National Geospatial-Intelligence Agency (NGA) commenced training with an IHO/ICA/FIG IBSC approved portable S-8 Category B Nautical Cartography class in 2017. NGA teamed up with IIC Technologies to provide training to analysts with a comprehensive 20-week instructor led course and a six-week final project. A combination of lectures, hands-on compilation techniques, and homework assignments will prepare the students in the training for the final project, the creation of a finished ENC product for NGA users. NGA plans to continue offering this training in the future.

In March, 2017 the IBSC approved the NOAA program for Category B in Cartography. Since 2017, 32 students graduated from the program, including one foreign national student from the Nigerian Navy. The course runs for approximately 52 weeks. For more information, please contact Colby Harmon ([Colby.harmon@noaa.gov](mailto:Colby.harmon@noaa.gov)).

Capt. Andrew Armstrong, NOAA (ret.), NOAA co-director of the Joint Hydrographic Center at UNH, is a member of the FIG/IHO/ICA International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers. As a member of the board, Capt. Armstrong is available to advise institutions on establishing hydrographic training curricula and preparing

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<sup>11</sup> <https://www.usm.edu/hydrographic-science-research-center/index.php>

<sup>12</sup> <https://ccom.unh.edu/>



submissions to the International Board for Category A or Category B recognition. ([andy.armstrong@noaa.gov](mailto:andy.armstrong@noaa.gov)).

### **Category-B Competence Training for Hydrography**

U.S. Navy offers a six-month, IBSC approved Category B International Hydrographic Management and Engineering Program (IHMEP), commencing annually in February, via COMNAVMETOCCOM and the Information Warfare Training Group in Gulfport, Mississippi. This training is available to both uniformed and civilian government personnel.

### **Maritime Safety Information (MSI) Training**

The National Geospatial-Intelligence Agency (NGA) directly supports the IHO Maritime Safety Information (MSI) training course as well as provides support to nations through on-site and remote guidance and advice as they grow their hydrographic capacity. 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. The MSI course is an important first step for building that phase 1 Capacity Building capability within a country.

### **Chart Adequacy Workshop**

NOAA's Office of Coast Survey hosts an annual three-day long workshop on nautical chart adequacy assessment for approximately a dozen students from around the world. The participants receive training in techniques to evaluate the suitability of nautical chart products using chart quality assessment techniques with publicly available information.

## **7.3 Empowering Women in Hydrography**

OCS is supporting a capacity building initiative led by the International Hydrographic Organization (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. Three candidates hailing from [Nigeria](#), [Japan](#) and [Suriname](#) were successfully hosted during the 2022 survey season, and three candidates hailing from the [Philippines](#), [Kenya](#), and [Argentina](#) were successfully hosted during the 2023 survey season. Candidate selection for the next cycle will happen throughout winter 2024, with participation of three candidates envisioned during the 2024 survey season (June - October, 2024).

## 8. OCEANOGRAPHIC ACTIVITIES

### 8.1 General

**Crowdsourced Bathymetry** – Crowdsourced bathymetric data can be used for a variety of reasons, including to identify areas where nautical charts are inadequate and proper hydrographic surveys are needed or can be applied to nautical charts when the source and uncertainties of the data are well understood. The keys to successful CSB efforts are volunteer observers who operate vessels-of-opportunity in places where charts are poor or where the seafloor is changeable and hydrographic assets are not easily available.

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

The vision is to tap into the enthusiasm for mapping the ocean floor by enabling trusted mariners to easily contribute data to fill the gaps in our current bathymetric coverage. NOAA and NGA are active participants in the IHO Crowd-Sourced Bathymetry Working Group (CSBWG), and together, with other CSBWG members, they have written, and continue to update, a CSB Guidance Document for layman mariners who wish to collect and contribute CSB data to the IHO DCDB. Following the publication of B-12 Ed. 3.0.0 IHO Guidance on Crowdsourced Bathymetry (which has been the major focus of the CSBWG for the last three years), the working group has focused on a critical review of the groups operating mandate and have developed a new Work Plan recently approved by IRCC15. The CSBWG have officially shifted their focus to outreach and engagement of hydrographic offices and to better support non-professional mariners in collecting and contributing CSB data.

### 8.2 GEBCO/IBC's activities, GEBCO Seabed 2030 activities

Seabed 2030 was officially launched at the United Nations Ocean Conference in 2017. [Seabed 2030](#) aims to bring together all available bathymetric data to produce the definitive map of the world ocean floor, at the best possible resolution within practical limits, by 2030 and make it available to all. It builds on more than 100 years of GEBCO's history in global seafloor mapping. The project seeks to encourage both data collectors and data managers of governmental, academic and private interests to work together to improve the quality of publicly available data and grids of the ocean floor.

The Seabed 2030 project has great potential to create partnerships and cooperation between interested parties, significantly improving our understanding of the sea floor and empower sustainable ocean management in

the coming century. Seabed 2030 is a focal area for the MACHC and the U.S., especially through the MACHC's Seabed 2030 work plan and UN Decade action.

The [MACHC-Seabed 2030 WebApp](#) was developed collaboratively with the Seabed 2030 Regional Data Center for the Atlantic and Indian Oceans to foster communication and coordination among stakeholders within the MACHC region. The WebApp presents several layers of information relating to the most recent GEBCO bathymetry products, existing data in the region, and upcoming mapping efforts.

## 9. SPATIAL DATA INFRASTRUCTURE

### 9.1 Status of MSDI

The United States actively supports MSDI within the country as well as regionally, and internationally. The MSDI capability is important for supporting those non-traditional users of Maritime Safety data to allow them to complete their environmental research, port development, or disaster support projects. The US 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.

### 9.2 Involvement in Regional or Global MSDI efforts

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 (MGIWG)
- Open Geospatial Consortium Marine Domain Working Group (OGC Marine DWG)

MMSDIWG



*Figure 9.1: MMSDIWG Website*

The United States supports MSDI development within the MACHC Region by supporting and maintaining the MACHC Initiatives website. Additionally, both NGA and NOAA contribute technical and personnel resources to the MMSDIWG and its activities. The MMSDIWG is currently chaired by the United States and the US also contributes several members to the Working Group.

Marine Spatial Data Infrastructures – Concept Development Study (MSDI-CDS) - NGA supported and organized a project along with the Open Geospatial Consortium (OGC) on behalf of the IHO and international marine communities. The aim of this project was to assess the current state of data/product management and exchange technologies used in the marine domain. The knowledge gained from the CDS is now captured in a technical report that will provide the foundation for development of a potential future pilot that will in turn advance the state of Spatial Data Infrastructures (SDIs) that support marine data across the globe.

The final engineering report can be found on OGC's website here:

<https://www.opengeospatial.org/docs/er>

Direct link to download PDF here:

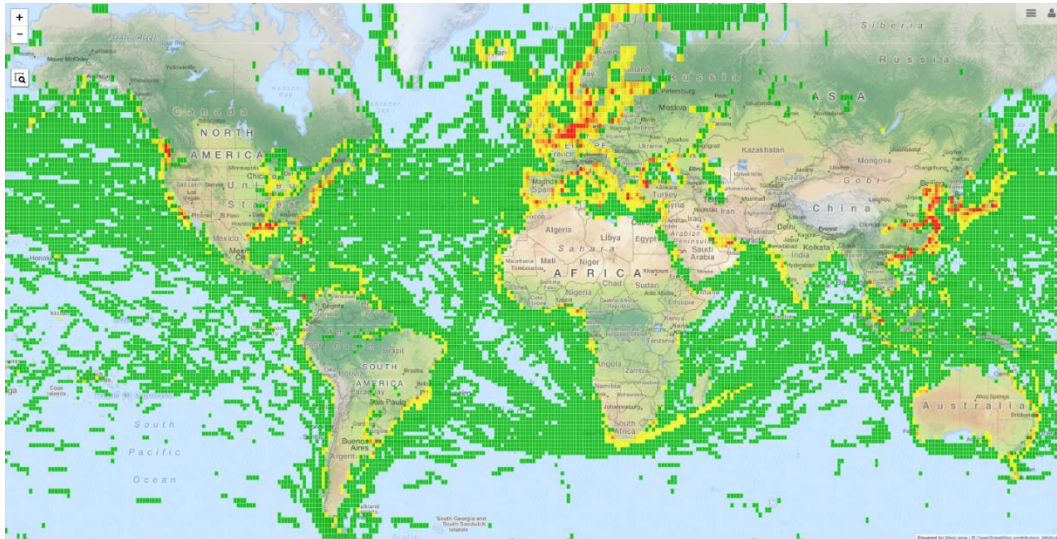
[https://portal.opengeospatial.org/files/?artifact\\_id=88037](https://portal.opengeospatial.org/files/?artifact_id=88037)

Global Maritime Traffic Density Service (GMTDS) – Leveraging terrestrial and spaceborne 13 Automatic Identification Systems (AIS) data to support analysis and decision-makers in the global maritime community.

GMTDS leveraged a collaborative design process to comprehensively develop a user-informed service that provides a uniform monthly ship activity density metric represented at a 1-km resolution for the entire global. 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 such as the IHO's

INToGIS website, or complete further analysis by downloading data via API. The raster library updates monthly and makes available more than a decade of shipping data.

GMTDS demonstrates NGA’s commitment to supporting safety of navigation by providing free data and powerful tools for analysis directly to the public. With access to information, the global maritime community will be better enabled to understand, characterize, and protect the maritime domain.



*Figure 9.2: Maritime Traffic Density Map. Point-in-poly "volume" aggregations of ~450M cleaned October 2020 AIS messages*

### 9.3 MSDI National Portal

**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/>

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

### 10.1 Use of New Technologies

**NGA DNC to ENC Production Transition** – In the next few years NGA will 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.

## 11.OTHER ACTIVITIES

### 11.1 Preparation for Response to Disasters

#### 11.1.1 MACHC Disaster Response Website



Initiatives of the  
Meso American-Caribbean Sea Hydrographic Commission

Home MICC MMSDIWG Capacity Building Committee Maritime Safety Information Seabed 2030 Disaster Response Links Acronyms

Español

**Key Documents**  
Draft MACHC Disaster Response Plan  
National Points of Contact  
Disaster Contingency Plans  
Response Capabilities  
Port Event Responses  
Template - Response Capabilities  
Template - Port Damage Assessment  
Template - MSI Message

HOME » DISASTER RESPONSE

**Disaster Response**  
MACHC Region

Per IHO Resolution 1/2/2005, a draft plan of disaster response has been prepared to have the MACHC to respond to disasters in accordance with the Reference. This will be done in two steps: a) Preparation phase; and b) Implementation phase following a disaster (see Draft MACHC Disaster Response Plan). National and Regional disaster management organizations in the MACHC region must have the capability to effectively respond to emergencies. A list of key documents related to emergency response can be accessed through the links on the left.

National Points of Contact

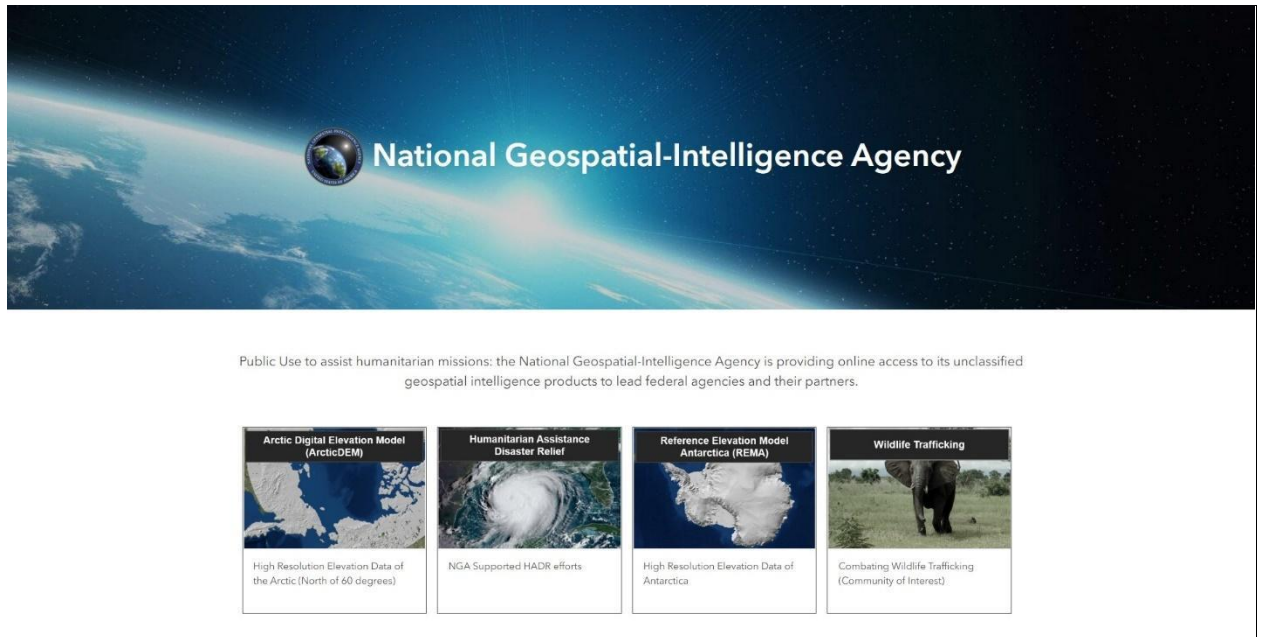
| Members            |                     | Associate Members        | Observers |
|--------------------|---------------------|--------------------------|-----------|
| Brazil             | Netherlands         | Antigua and Barbuda      | Dominica  |
| Colombia           | Suriname            | Barbados                 | Spain     |
| Cuba               | Trinidad and Tobago | Belize                   | EOMAP     |
| Dominican Republic | United Kingdom      | Costa Rica               |           |
| France             | United States       | El Salvador              |           |
| Guatemala          | Venezuela           | Grenada                  |           |
| Guyana             |                     | Haiti                    |           |
| Jamaica            |                     | Honduras                 |           |
| Mexico             |                     | Nicaragua                |           |
|                    |                     | Panama                   |           |
|                    |                     | Saint Lucia              |           |
|                    |                     | Saint Kitts and Nevis    |           |
|                    |                     | St. Vincent & Grenadines |           |

**Links:**  
MACHC DR Seminar (26-27/Nov18)  
Caribbean Disaster Emergency Management Agency (CDEMA)  
ESRI's Disaster Response Program  
Caribbean Tsunami Warning Program  
NGA Donor Disaster Response Website  
NAVAREA IV and XII  
CDEMA  
RAC-BEMPEITC  
IMO  
IALA

Figure 11.1: MACHC Disaster Response Website

The MACHC Region has a Disaster Response section on the MACHC Website to help in the response to disasters within the region. The website includes the MACHC Disaster Response Plan, Points of Contact, Response Capabilities, and Information Templates.

## **11.1.2 NGA Hurricane Disaster Support**



*Figure 11.2: Humanitarian Assistance Disaster Response (HADR) Website*

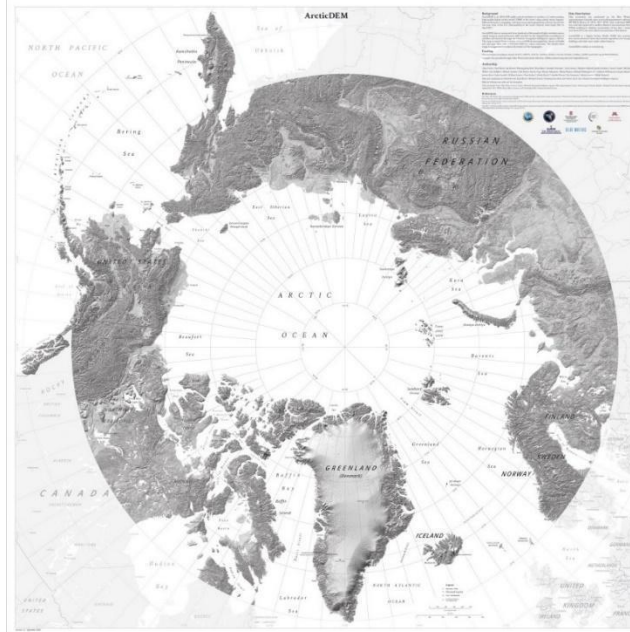
NGA maintains a Humanitarian Assistance Disaster Response (HADR) website to support Hurricanes and various disasters around the World. It contains maps and documents to support the first responders in their relief efforts. This site includes everything from damage assessments, to data, to products that could support operations in the region in the aftermath of a disaster.

The NGA HADR webpage is available at the following link:

<https://nga.maps.arcgis.com/home/index.html>

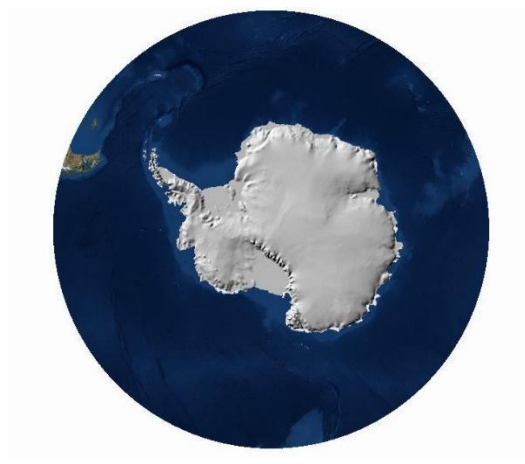
## **11.2 Others**

### **11.2.1 EarthDEM**



*Figure 11.3: Arctic DEM Example*

NGA is teaming up with the University of Illinois, the University of Minnesota, and The Ohio State University to produce digital elevation models of the world via a project called EarthDEM being worked on through the National Science Foundation (NSF). The project will be accomplished by feeding images from different angles into the Blue Waters supercomputer for processing and creation of a 3-D Model of the Earth's surface. This supercomputer is capable of performing more than 13 quadrillion calculations per second. This project comes after recent successes with creating DEMs over the large Arctic and Antarctic regions in the last few years. This EarthDEM data is important for allowing more accurate geospatial modeling around the world.



*Figure 11.4: Antarctica DEM Example*



## 12.CONCLUSIONS

The multiple agencies, responsible for the management of U.S. domestic and international hydrographic products, services, and maintenance must continue to strive to work with one another to achieve proper balance of management of U.S. domestic and international hydrographic products, services, and maintenance. With the ever-increasing maritime commerce, this is especially important in the MACHC Region.

## ANNEX A – Contact Information

| <b>Country information / Informations sur le pays/ Información sobre el país</b>  |  |
|---|--|
| -Declared National Tonnage<br>-Tonnage national déclaré<br>-Tonelaje Nacional<br>Declarado                                  | 24885595 tons (ACL08/2019)   |
| -National day<br>-Fête nationale<br>-Fiesta nacional  | 4 July   |
| -Date first joined IHO<br>-Date d'adhésion à l'OHI<br>-Fecha de adhesión a la OHI   | 20/06/1922   |
| -Date ratification<br>Convention<br>-Date de ratification de la<br>Convention<br>-Fecha de ratificación de la<br>Convención | 10/06/1968-<br><br>11/08/2016 (new protocol entry into force date) |
| -Remarks on membership<br>-Remarques sur l'adhésion<br>-Comentarios sobre la<br>adhesión                                    |  |

**United States of America / États-Unis d'Amérique**

**Office of Coast Survey / National Ocean Service (OCS/NOS)**

|   |
|---|
| <b>Contact information/ Informations de contact / Información de contacto</b> |
|---|

|   |   |
|---|---|
| <p>-National Hydrographer or equivalent<br/>-Directeur du service hydrographique ou équivalent<br/>-Director del Servicio Hidrográfico o equivalente</p>                                    | <p>Director of NOAA's Office of Coast Survey<br/>RDML Benjamin EVANS<br/>Staff Point of Contact, Mr Jonathan JUSTI<br/>E-mail: <a href="mailto:hydrographer@noaa.gov">hydrographer@noaa.gov</a><br/>Agency address: 1315 East-West Highway SSMC-3 N/CS x 7, SILVER SPRING, Maryland, 20910-3282, United States of America</p> |
| <p>-Web site<br/>-site web<br/>-sitio web</p>   | <p><a href="http://www.nauticalcharts.noaa.gov">http://www.nauticalcharts.noaa.gov</a></p>  |
| <p>-Date of establishment and Relevant National Legislation<br/>-Date de mise en place et législation nationale pertinente<br/>-Fecha de constitución y legislación nacional pertinente</p> | <p>1807<br/>The Organic Act of 10 February 1807, (2 Stat.4134) authorized the President of the United States "to cause a survey to be taken of the coasts of the United States..."</p>  |
| <p>-Remarks on membership<br/>-Remarques sur l'adhésion<br/>-Comentarios sobre la adhesión</p>  |   |
| <p><b>Agency information/ Information sur l'agence/ Información sobre la agencia</b></p>  |   |
| <p>-Top level parent organisation<br/>-Organisme mère<br/>-Organización asociada de nivel superior</p>  | <p>National Oceanic and Atmospheric Administration (NOAA)<br/>U.S. Department of Commerce.</p>  |
| <p>-Principal functions of the organisation or the department<br/>-Attribution principales de l'organisme ou du département</p>   | <p>Hydrographic surveys, Nautical charts, Geodetic surveys, Tides/Currents, Engineering and Systems Development.<br/>Specialized library: marine and earth sciences (NOAA library facility related to NOS activities).</p>  |

|   |  |  |  |  |
|---|--|--|--|--|
| -Principales funciones de la Organización o departamento  |  |  |  |  |
| -Number of INT charts published<br>-Nombres de cartes INT publiées<br>-Número de cartas INT publicadas                        | 15 (does not include NGA maintained INT Charts)  |  |  |  |
| -Total number of paper charts published-<br>Nombre total de cartes papier publiées-Número total de cartas de papel publicadas | 1026   |  |  |  |
| -Number of ENC cells published<br>-Nombres de cellules ENC publiées<br>-Número de células ENC publicadas                      | 1750 (Updated monthly, please refer to the website for recent postings.)<br><a href="http://nauticalcharts.noaa.gov/charts/noaa-enc.html">http://nauticalcharts.noaa.gov/charts/noaa-enc.html</a>  |  |  |  |
| Number of RNC published -Nombres de RNC publiées -Número de RNC publicadas  | 1026   |  |  |  |
| -Type of publications produced<br>-Type d'ouvrages produits<br>-Tipo de publicaciones producidas                              | Sailing Directions.<br>NOAA's Coast Pilot (10 volumes). For details, consult the following website:<br><a href="http://nauticalcharts.noaa.gov/publications/coast-pilot/index.html">http://nauticalcharts.noaa.gov/publications/coast-pilot/index.html</a> |  |  |  |
| -Detail of surveying vessels/ aircraft<br>-Détail des bâtiments hydrographiques / aéronefs<br>-Detalle de los buques          | -Name<br>-Nom<br>-Nombre   | -Displacement<br>-Déplacement<br>-Desplazamiento | -Date Launched<br>-Date de mise en service<br>-Fecha de botado | -Number of crew<br>-Nombre de l'équipage<br>-Tripulación |

|  |   |   |        |          |
|--|---|---|--------|----------|
| hidrográficos /<br>aeronaves   | RAINIER   | 1800  | 1967   | 62 (10*) |
|  | FAIRWEATHER   | 1800  | 1967   | 45 (7*)  |
|  | THOMAS<br>JEFFERSON   | 2054  | 2003** | 31 (8*)  |
|  | FERDINAND R<br>HASSLER  | 738   | 2012   | 14 (4*)  |
|  | BAY HYDRO II  | 45  | 2009   | 3 (1*)   |
|  | 6 Navigation<br>Response Teams<br><br>(Hydrographic<br>Field Parties) | 27 ft launches, 3 person crews.   |        |          |
|  | 2 Mobile<br>integrated survey<br>teams<br><br>(MIST)                  | <p>2 Echoboats, Remus 100, Remus 600, 3 person team</p> <p>Portable hydrographic survey equipment able to be installed on vessels of opportunity during emergencies (SSS, VBES, and SSS equipped AUV)</p> <p>* = number of officers included in figure</p> <p>** = Thomas Jefferson was in US Navy vessel launched in 1992, and acquired and recommissioned by NOAA in 2003</p> |        |          |
| -Other information of<br>interest<br>-Autres informations<br>utiles<br>-Otra información de<br>interés |   |   |        |          |

**NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY (NGA)**

**Contact information/ Informations de contact / Información de contacto**

|  |  |
|--|--|
| Remarks -Remarques -<br>Observaciones  | Dept of Defense Hydrographer<br>Capt (Ret) John LOWELL, Jr<br>Tel: + 1 571 558 3558<br>Fax: + 1 571 558 3261<br>Agency address: 7500 Geoint Drive , Springfield, VA, 22150<br>- 7500, United States of America   |
| Other point(s) of contact -<br>Autre(s) point(s) de contact -<br>Otros punto(s) de contacto  | Director, Maritime Safety Office<br>Capt Dwight SMITH<br>Postal address:<br>Tel: + 1 571 557 3558<br>Email: <a href="mailto:maritimeinternational@nga.mil">maritimeinternational@nga.mil</a>   |
| -Web site<br>-site web<br>-sitio web   | <a href="http://msi.nga.mil/ngaportal/msi.portal">http://msi.nga.mil/ngaportal/msi.portal</a>  |
| <b>Agency information/ Information sur l'agence/ Información sobre la agencia</b>  |  |
| -Date of establishment and<br>Relevant National<br>Legislation<br>-Date de mise en place et<br>législation nationale<br>pertinente<br>-Fecha de constitución y<br>legislación nacional<br>pertinente | 6 December 1830  |
| -Top level parent<br>organisation<br>-Organisme mère<br>-Organización asociada de<br>nivel superior  | Department of Defense.   |
| -Principal functions of the<br>organisation or the<br>department<br>-Attribution principales de<br>l'organisme ou du<br>département<br>-Principales funciones de la                                  | NGA provides: Nautical charts, Aeronautical charts,<br>Topographic maps, Sailing Directions, List of Lights, Notices<br>to Mariners, navigational and geodetic data, and related<br>products and services to the Armed Forces of the United<br>States, other Department of Defense and federal agencies and<br>to the Merchant marine and Mariners in general. |

|  |  |  |  |  |
|--|--|--|--|--|
| Organización o departamento  |  |  |  |  |
| -Total number of paper charts published-Nombre total de cartes papier publiées-Número total de cartas de papel publicadas                      | Approximately 5,000 charts   |  |  |  |
| -Number of ENC cells published<br>-Nombres de cellules ENC publiées<br>-Número de células ENC publicadas                                       | 40   |  |  |  |
| -Number of Other charts<br>-Nombre d'Autres cartes<br>-Número de Otras cartas  | 3,400 Digital Nautical Chart (DNC) libraries   |  |  |  |
| -Type of publications produced<br>-Type d'ouvrages produits<br>-Tipo de publicaciones producidas   | <p>Paper charts (worldwide folio of approx. 4000).</p> <p>Digital charts (worldwide folio of 3,400 DNC in Vector Product Format / expanding folio of ENC).</p> <p>Notices to Mariners.</p> <p>Sailing Directions.</p> <p>For details consult the WEB site:<br/> <a href="http://www.nga.mil">http://www.nga.mil</a></p> <p>Marine Safety Information:<br/> <a href="http://msi.nga.mil/NGAportal/MSI.portal">http://msi.nga.mil/NGAportal/MSI.portal</a></p> <p>Digital Nautical Chart:<br/> <a href="http://msi.nga.mil/NGAportal/DNC.portal">http://msi.nga.mil/NGAportal/DNC.portal</a></p> |  |  |  |
| -Detail of surveying vessels/ aircraft<br>-Détail des bâtiments hydrographiques / aéronefs<br>-Detalle de los buques hidrográficos / aeronaves | -Name<br>-Nom<br>-Nombre   | -Displacement<br>-Déplacement<br>-Desplazamiento | -Date Launched<br>-Date de mise en service<br>-Fecha de botado | -Number of crew<br>-Nombre de l'équipage<br>-Tripulación |

|   |  |
|---|--|
|   | Ships of the Naval Oceanographic Office support NGA Nautical Chart Production. |
| -Other information of interest<br>-Autres informations utiles<br>-Otra información de interés | Ships of the Naval Oceanographic Office support NGA Nautical Chart Production. |

**COMMANDER, NAVAL METEOROLOGY AND OCEANOGRAPHY  
COMMAND (CNMOC)**

| <b>Contact information/ Informations de contact / Información de contacto</b>              |   |
|--|---|
| Remarks -Remarques -<br>Observaciones  | RDML Ron Piret<br>E-mail: <a href="mailto:ronald.j.piret@us.navy.mil">ronald.j.piret@us.navy.mil</a><br><br>Agency address: Attention: Hydrographer of the Navy 1100 Balch Blvd., STENNIS SPACE CENTER, MISSISSIPPI, 39522-5001, United States of America   |
| -Other point(s) of contact<br>-Autre(s) point(s) de contact<br>-Otros punto(s) de contacto | Deputy Hydrographer of the Navy, Mr Matthew Borbash<br>Tel: +1 228 688 5082<br>E-mail: <a href="mailto:matthew.borbash2.civ@us.navy.mil">matthew.borbash2.civ@us.navy.mil</a><br><br>Capt David Wolynski<br>Tel: +1 228 688 4203<br>E-mail: <a href="mailto:david.p.wolynski.mil@us.navy.mil">david.p.wolynski.mil@us.navy.mil</a><br><br>Naval Oceanographic Office Technical Director, Mr Wade Ladner<br>Tel: +1 228 688 4205<br>E-mail: <a href="mailto:rodney.ladner@navy.mil">rodney.ladner@navy.mil</a><br><br>Fleet Survey Team Commanding Officer, Cdr Jennifer Landry<br>Tel: 228-688-5325<br>E-mail: <a href="mailto:jennifer.j.landry@navy.mil">jennifer.j.landry@navy.mil</a> |

|   |   |  |  |  |
|---|---|--|--|--|
| -Web site<br>-site web<br>-sitio web  | <a href="https://www.cnmoc.usff.navy.mil/">https://www.cnmoc.usff.navy.mil/</a>   |  |  |  |
| <b>Agency information/ Information sur l'agence/ Información sobre la agencia</b>   |   |  |  |  |
| -Date of establishment and Relevant National Legislation<br>-Date de mise en place et législation nationale pertinente<br>-Fecha de constitución y legislación nacional pertinente  | 6 December 1830   |  |  |  |
| -Principal functions of the organisation or the department<br>-Attribution principales de l'organisme ou du département<br>-Principales funciones de la Organización o departamento | Collection, analysis and display of oceanographic (to include oceanographic, meteorological, hydrographic and geophysical) data to support Navy operations.<br><br>Improvement of oceanographic prediction, data collection, and data analysis methods. Assistance to other countries in meeting their oceanographic and hydrographic requirements. |  |  |  |
| -Detail of surveying vessels/ aircraft<br>-Détail des bâtiments hydrographiques / aéronefs<br>-Detalle de los buques hidrográficos / aeronaves                                      | -Name<br>-Nom<br>-Nombre  | -Displacement<br>-Déplacement<br>-Desplazamiento | -Date Launched<br>-Date de mise en service<br>-Fecha de botado | -Number of crew<br>-Nombre de l'équipage<br>-Tripulación |
|   | U.S.N.S. PATHFINDER (T-AGS-60)  | 5,000  | 1993   | 55   |
|   | U.S.N.S. BOWDITCH (T-AGS-62)  | 5,000  | 1996   | 55   |
|   | U.S.N.S. HENSON (T-AGS-63)  | 5,000  | 1998   | 55   |



|   |  |       |      |    |
|---|--|-------|------|----|
|   | U.S.N.S.<br>BRUCE<br>HEEZEN<br>(TAGS-<br>64) | 5,000 | 2000 | 55 |
|   | U.S.N.S.<br>MARY<br>SEARS (T-<br>AGS-65)     | 5,000 | 2003 | 55 |
|   | U.S.N.S<br>MAURY (T-<br>AGS-66)              | 5,000 | 2016 | 55 |
| -Other information of<br>interest<br>-Autres informations utiles<br>-Otra información de<br>interés |  |       |      |    |

## ANNEX B – NOAA ENC Adequacy in the MACHC Analysis

### NOAA ENC Adequacy in the MACHC

**Purpose:** To provide a baseline analysis of NOAA ENC Adequacy in IHO Region B (MACHC). This data could potentially be used in annual reports to quantify gridding, charting, and surveying progress in the region.

**How “Adequacy” is defined:** For the purposes of this exercise, Adequacy is defined as currently charted M\_QUAL objects with a CATZOC attribute of 1/A1, 2/A2, or 3/B. It is understood that Adequacy is defined differently on different platforms and by different States. Limitations of using currently charted M\_QUAL CATZOC attribution include and are not limited to not taking depth, time since hydrographic surveys have been made, and newer hydrographic surveys that have not been charted yet into account.

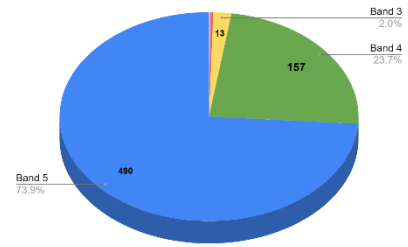
**Procedure:** [NOAA ENCs in an RHC Procedure](#)

**Results:**

1. Number of ENC's in Region B based on Usage Band

| NOAA ENC's in Region B |           |            |  |
|------------------------|-----------|------------|--|
| Usage Band             | ENC Count | Percentage |  |
| 1                      | 1         | 0.15%      |  |
| 2                      | 2         | 0.30%      |  |
| 3                      | 13        | 1.96%      |  |
| 4                      | 157       | 23.68%     |  |
| 5                      | 490       | 73.91%     |  |

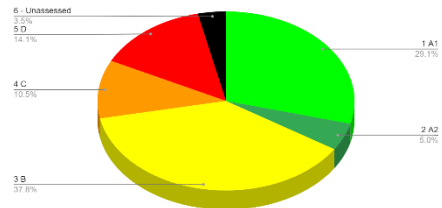
NOAA ENC Count in the MACHC



2. Adequacy within Band 5 ENC's

| NOAA Band 5 ENC M_QUAL CATZOC in Region B (MACHC) |                  |               |  |
|---|------------------|---------------|--|
| M_QUAL CATZOC                                     | Area (Sq Km)     | Percentages   |  |
| 1 A1  | 7,416.85         | 29.09%        |  |
| 2 A2  | 1,267.86         | 4.97%         |  |
| 3 B   | 9,639.70         | 37.80%        |  |
| 4 C   | 2,686.13         | 10.53%        |  |
| 5 D   | 3,586.49         | 14.06%        |  |
| 6 - Unassessed                                    | 902.99           | 3.54%         |  |
| <b>Total Area =</b>                               | <b>25,500.02</b> |               |  |
| <b>Adequate Area =</b>                            | <b>18,324.41</b> | <b>71.86%</b> |  |

NOAA Band 4 ENC M\_QUAL Area in Region N by CATZOC (Sq Km)



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