INTERNATIONAL HYDROGRAPHIC ORGANIZATION

UNITED STATES OF AMERICA

National Report

22nd Meso-American and Caribbean Sea Hydrographic Commission (MACHC) Virtual Conference, hosted by Brazil 30 November - 3 December 2021

Office of Coast Survey
National Oceanographic & 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
http://www.navmetoccom.navy.mil
https://www.facebook.com/NavalOceanography/

Contents[1]

[1] Based on "Structure for National Reports to Regional Hydrographic Commissions"

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 National Oceanic and Atmospheric Administration's (NOAA)[2] conducts hydrographic surveys and produces nautical charts and related hydrographic information within the nation's Economic Exclusion Zone (EEZ).

1.1.2 National Geospatial-Intelligence Agency (NGA)[3] 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[4] 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 Marines 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[5]

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 ENCs (IENCs).

For more information on NOAA, NGA, and NAVY hydrographic activities, see IHO Publication 5. Submitted by: NOAA – Jonathan.Justi@noaa.gov; NAVY – matthew.borbash@navy.mill; and NGA – James.E.Rogers@nga.mil.

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.

[2] Primarily the Office of Coast Survey

[3] Primarily Source Operations and Management Directorate, Foundation Group, Maritime Safety Office (MSO).

[4] Primarily, Commander, Naval Meteorology and Oceanography Command (COMNAVMETOCCOM) and the Hydrographer of the Navy

[5] www.atlanticarea.uscg.mil/Our-Organization/District-7/ and https://www.atlanticarea.uscg.mil/Our-Organization/District-8/

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[6] - 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.[7] Additionally, NOAA makes ENC data available for use in GIS applications via their ENC direct to GIS website.[8] NGA also makes data available to support crisis events and various initiatives.[9]

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.

NOAA is in the process of re-defining how hydrographic survey plans are generated and how survey priorities are identified in federal waters. NOAA hydrographic in-house field units or external contractors then conduct surveys to meet these priorities. Data acquired from these surveys must meet the IHO Standard for Hydrographic Surveys (S-44), but also the NOS Hydrographic Surveys Specifications and Deliverables[10], in compliance with the NOS data specification guide which is updated annually.

The main component of the new hydrographic survey priorities method is the hydrographic health model. The hydrographic health model is 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

[6] Open Data Policy-Managing Information as an Asset. (2013). Retrieved from https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/memoranda/2013/m-13-13.pdf

[7] NOAA & NGA websites: https://nauticalcharts.noaa.gov/index.html & https://msi.nga.mil/NGAPortal/MSI.portal?_nfpb=true&_st=&_pageLabel=msi_faq_page

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

[9] NGA Crisis Support website: https://nga.maps.arcgis.com/home/index.html

[10] Current version is 2020, https://nauticalcharts.noaa.gov/publications/docs/standards-and-requirements/specs/hssd-2019.pdf

navigation, and reported ship groundings to estimate the likelihood of an adverse event. To estimate the consequence of an adverse event, the model incorporates parameters such as proximity to search and rescue stations, and 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.

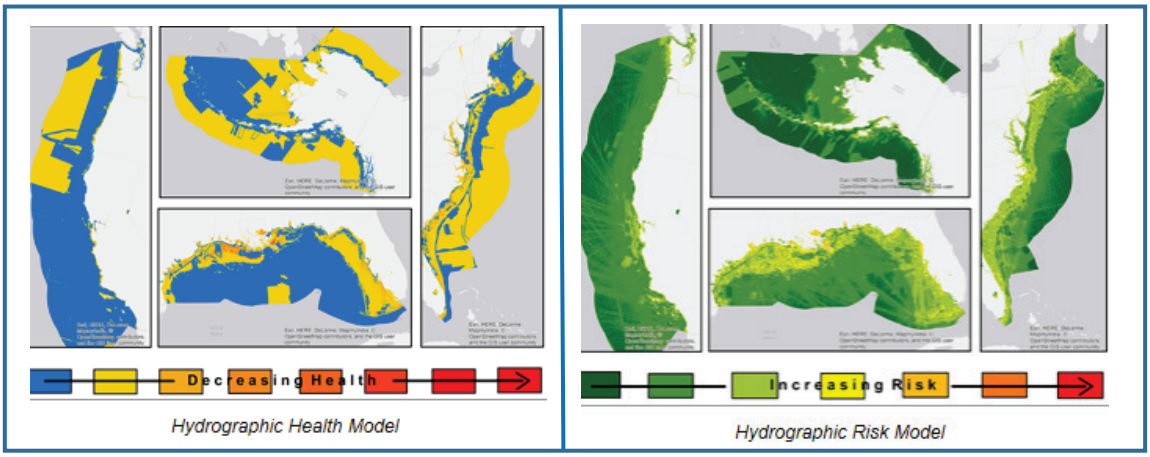


Figure 2.1: Hydrographic Health and Risk Conceptualization

Current information about the model and survey prioritization can be found at: https://nauticalcharts.noaa.gov/publications/national-hydrographic-survey-priorities.html.

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.

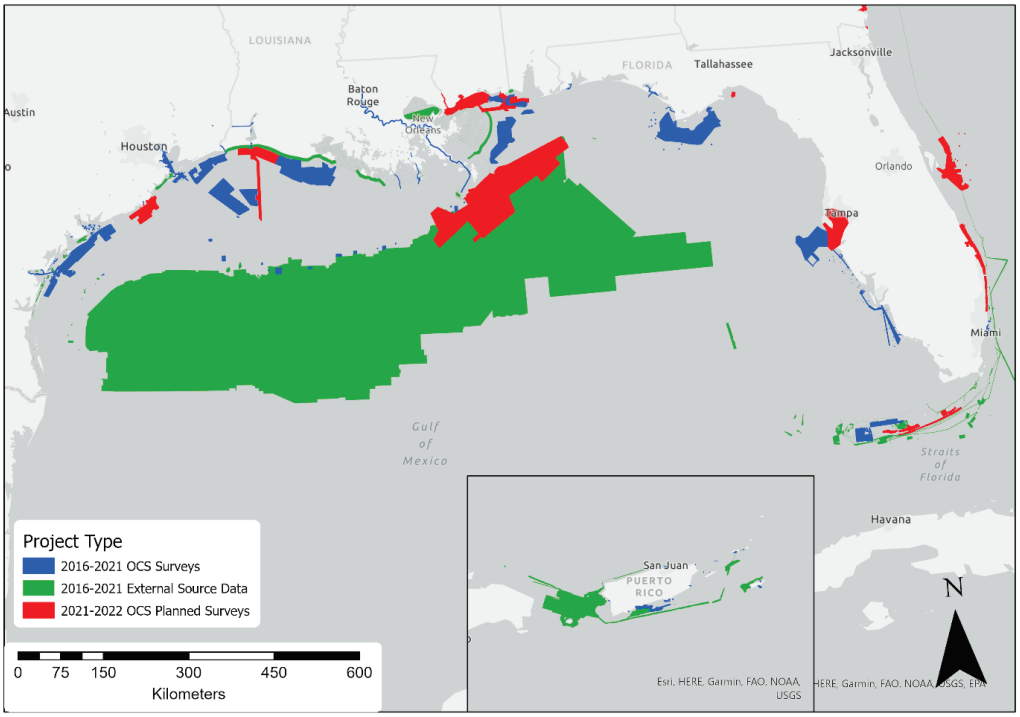


Fig 2.2: Hydrographic surveys conducted by NOAA's Office of Coast Survey between 2016-2021, planned for 2022, and external source data that was evaluated and applied to the charts in the Gulf of Mexico, Puerto Rico and the US Virgin Islands.

Planned surveys will be a combination of either 200% side scan sonar/object detection multibeam coverage in regions of critical under keel clearance, or 100% 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 (COMNAVMETOCCOM) 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)

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 COMNAVMETOCCOM, 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 the 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 National Charting Plan (NCP)

On November 1, 2017, NOAA released the National Charting Plan, a strategy to improve NOAA nautical chart coverage, products, and distribution. It describes the evolving state of marine navigation and nautical chart production, and outlines actions that will provide the customer with a suite of products that are more useful, up-to-date, and safer for navigation. It is not a plan for the maintenance of individual charts, but a strategy to improve all charts.

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 7,500 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 November 2021, NOAA has produced 740 new ENC's based on the gridded chart scheme described within the National Charting Plan, including 101 in the MACHC region.

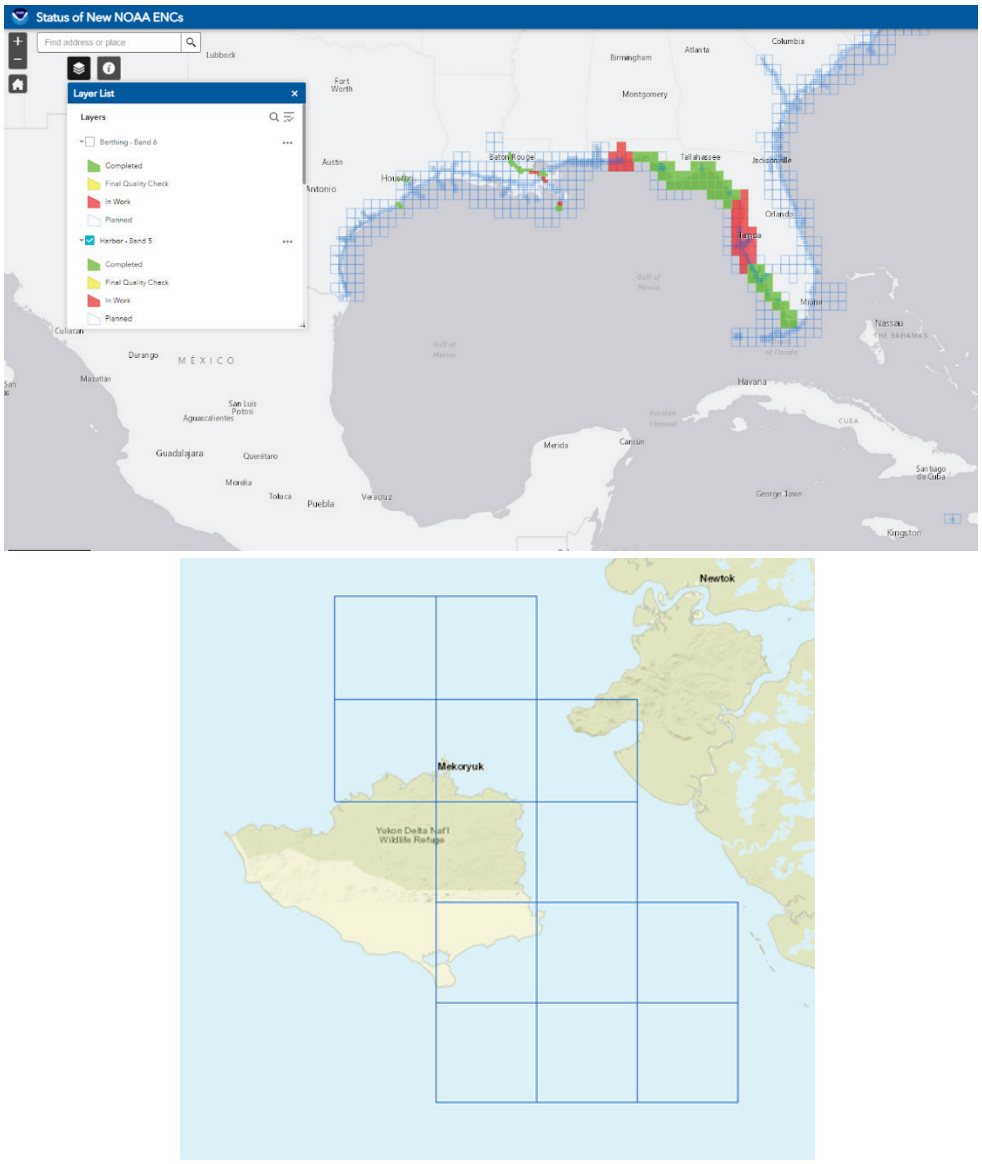


Fig 3.1: Re-scheme ENC coverage, 27 new usage band 4 cells in Florida

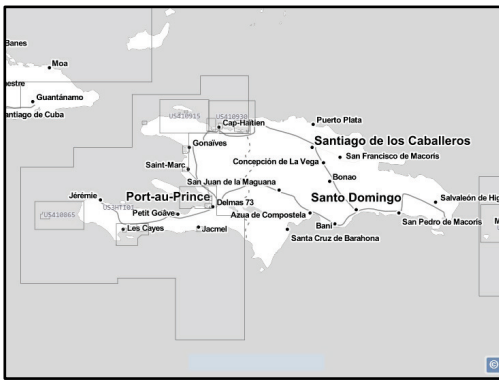
NOAA is currently re-scheming portions of the Northeast U.S., the Great Lakes, the Mississippi River, and the Florida Gulf Coast. The re-scheme effort aims to standardize cell size and scales using a gridded framework.

3.2 Electronic Navigational Chart (ENC)

NOAA currently maintains 1,574 ENCs in U.S. domestic waters and 322 in waters within the MACHC region.

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.



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

NGA Cells		
Cell Name	Title	Posted
US3HTI01	Haiti Coast	06/20/2019
US409860	Approach to Panama Canal – North, Panama	12/20/2018
US409890	Punta Rincon to Isla Tupile, Panama	02/15/2018
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	04/04/2019
US410880	Approach to Port-Au-Prince, Haiti	08/14/2018
US410915	Canal De La Tortue, Haiti	08/30/2018
US410930	Approaches to Cap-Haitien and Bahia de Monte Cristi, Haiti	11/21/2018
US509860	Panama Canal Northern End, Panama	Cancelled
US509890	Golfo De San Blas, Panama	07/22/2015
US510820	Jacmel, Haiti	09/12/2014
US510830	Aquin, Haiti	03/04/2015
US510840	Les Cayes, Haiti	03/19/2019
US510850	Anse d'Hainault, Haiti	01/03/2020
US510855	Jeremie, Haiti	01/03/2020
US510860	Miragoane, Haiti	08/30/2018
US510870	Petit Goave, Haiti	08/30/2018
US510880	Port-Au-Prince, Haiti	08/14/2018
US510885	Baie de Saint-Marc, Haiti	09/12/2014
US510890	LaFiteau, Haiti	08/30/2018
US510910	Gonaives, Haiti	09/12/2014
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	08/30/2018
US510930	Cap-Haitien, Haiti	11/28/2015
US510960	Pepillo Salcedo, Haiti / Dominican Republic	08/30/2018
US515390	Panama Canal, Panama	Cancelled
US515410	Panama Canal Southern End, Panama	02/06/2019
US510970	Monte Cristi, Dominican Republic	Completed

US511048	Punta Palenque, Dominican Republic	Completed
US511050	Bahia De Las Calderas, Dominican Republic	Completed
US510121	Cay Sal, Bahamas	05/31/2018

U.S. ENCs are available as free downloads from the internet. Mariners who wish to download NOAA ENCs directly and use the data to fuel ECDIS or ECS may do so. The ENCs, including newly created NGA ENCs, 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: http://www.ic-enc.org/Distribution.html.
iii. PRIMAR Distributors at: https://www.primar.org/home

ENC Band	1	2	3	4	5	6
Number of U.S. ENCs existing in MACHC Region (NOAA)	3	5	14	62	119	5
Number of U.S. ENCs existing in MACHC Region (NGA)	0	0	1	8	25	0

NGA is in the process of creating a Worldwide ENC grid for use in building its future ENC portfolio. This ENC grid will provide for a standardization of ENC scales and coverage across the portfolio. The grid will be comprised of regions which will be labeled with a letter as the region identification. Each region will be further subdivided into smaller areas to support different scale ENC Cells.

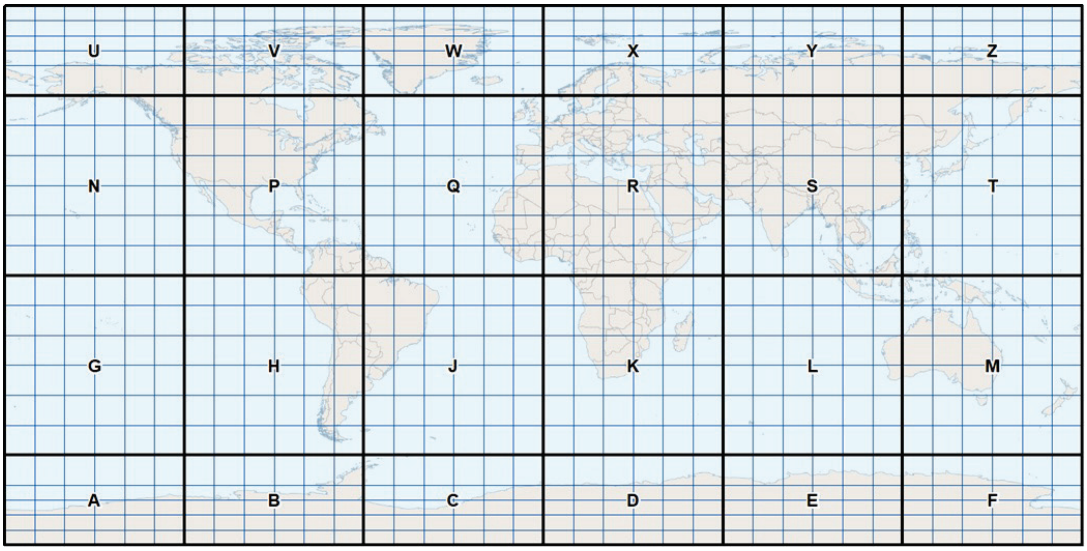


Figure 3.3: NGA ENC Grid

3.3 Raster Navigational Charts (RNC) & 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 184 RNC charts and 209 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 ENCs directly and use the data to fuel ECDIS or ECS may do so. ENCs, including newly created NGA ENCs, are distributed directly from NOAA at https://nauticalcharts.noaa.gov, as well as through the International Center for ENC's Distributors, http://www.ic-enc.org/Distribution.html.

The Digital Nautical Chart (DNC) is maintained with new source information from the U.S. and foreign primary charting authorities. The DNC product is Limited Distribution and are not available for public sale or download except for those that are within U.S. territorial waters or in areas where source data restrictions allow them to be released. However, DNC data can be shared with host nations for coverage in their territorial waters through formal bilateral exchange agreements. For requests regarding DNC data, please contact: maritime.international@nga.mil

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). RNCs, developed under the IHO S-61 product specification, are unique to NOAA. NGA does not produce RNCs.

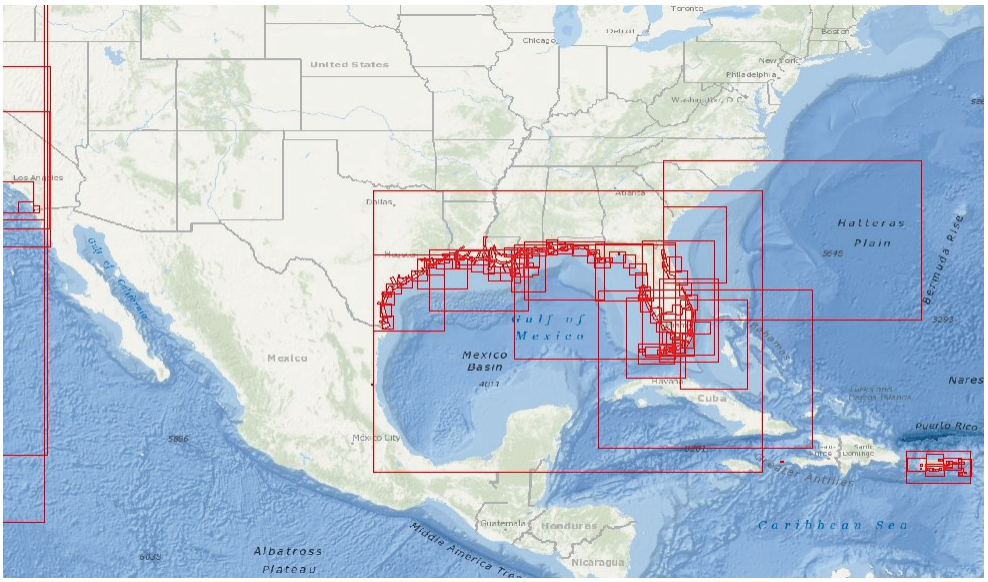


Figure 3.4: NOAA MACHC RNC

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

U.S. RNCs 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

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	FY2022
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

NGA produces 566 paper charts 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. These charts are in areas where the U.S. conducts the surveys, compiles and issues charts, and there is no fully functioning

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

Chart	Chart Title	Edition Date	Distribution
26224	Bahia de Santiago de Cuba, Cuba	March 2020	LIM DIS
27163	Bahia de Cienfuegos, Cuba	September 2020	LIM DIS
28170	Approaches to Puerto Cortes, Honduras	October 2020	
25606	Basseterre, Saint Kitts and Nevis	February 2021	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.

3.6 Other Charts

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.

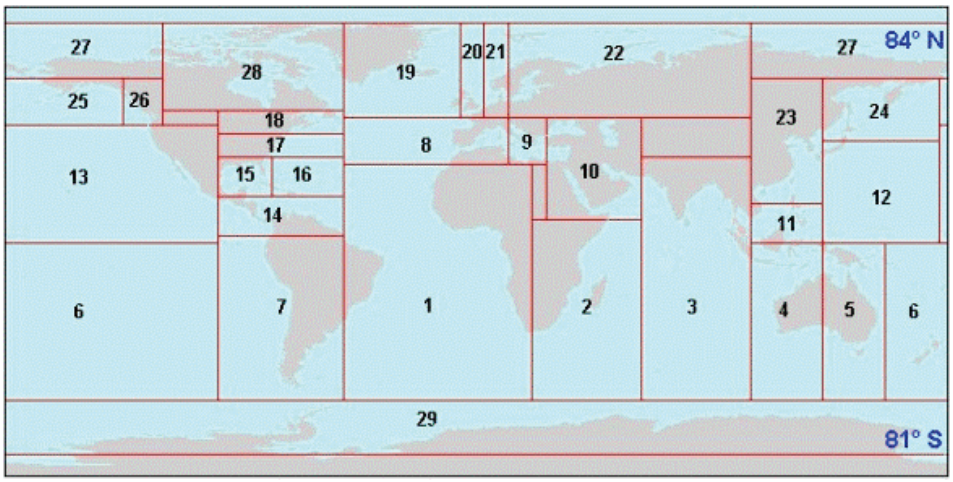


Figure 3.5: DNC Worldwide Coverage

4 NEW PUBLICATIONS AND UPDATES

4.1 New Publications

NGA has developed a new web application(s) to view, analyze, download, and contribute port information for the World Port Index (WPI). The WPI will soon be available in csv, shapefile, json, and file geodatabase formats via the NGA Maritime Safety Information website. Contributors can submit new ports and edits to existing ports through an ArcGIS Online platform. An Application Programming Interface (API) will also allow dynamic information exchange for use in other platforms, such as the IHO ENC Catalog. This change allows 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. This WPI is available through NGA's ArcGIS Online platform and updated weekly. A .csv file containing the complete set of data is updated monthly and posted on NGA's Maritime Safety Information web site.

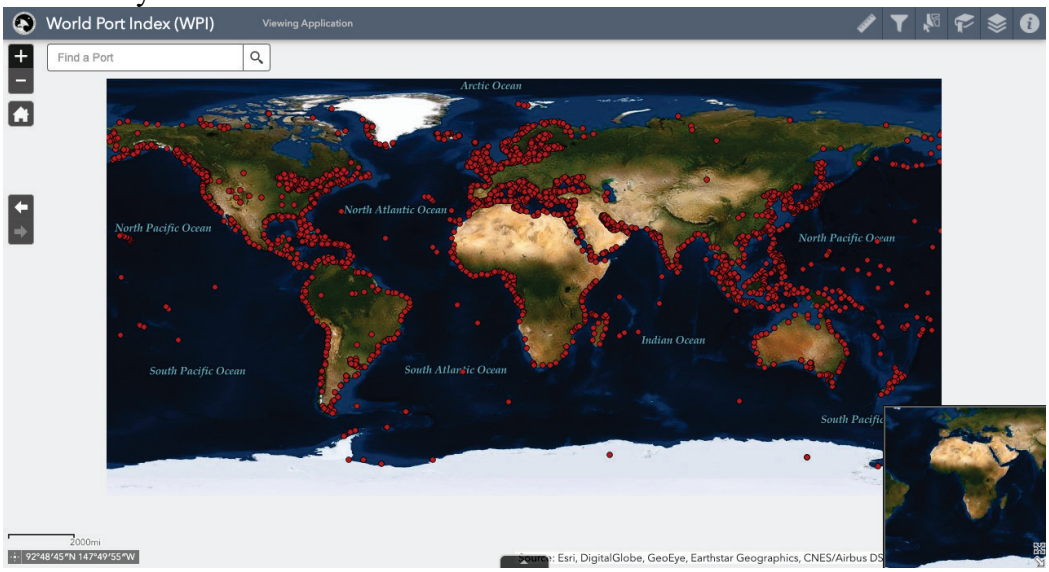


Figure 4.1: World Port Index (WPI)

In early calendar year 2022, NGA will also release a beta version of Radio Navigation Aids (Pub 117) available as a web application.
These web applications allow users to interact directly with the data, querying and searching through entries to find applicable attributes. In the next year, the ability to download customized sets of data will become available to the general public, as well.

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
Sailing Directions 120 – Pacific Ocean and Southeast Asia (Planning)	2018 Edition
Sailing Directions 140 – North Atlantic Ocean and Adjacent Seas (Planning)	2019 Edition
Sailing Directions 124 – East Coast of South America (Enroute)	2017 Edition
Sailing Directions 147 – Caribbean Vol. 1 (Enroute)	2018 Edition
Sailing Directions 148 – Caribbean Vol. 2 (Enroute)	2017 Edition
Sailing Directions 153 – 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)	2021 Edition
List of Lights Pub. 111 (W. Coast N & S America (excluding USA), Australia, Tasmania, NZ, and Islands in the N/S Pacific Ocean	2021 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 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 (MSI)

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. 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.

Another component of MSI is the U.S. Notice to Mariners, which 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.

5.2 Notice to Mariners

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/ and https://www.atlanticarea.uscg.mil/Our-Organization/District-8/, respectively.

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

5.3 Navigation Warnings

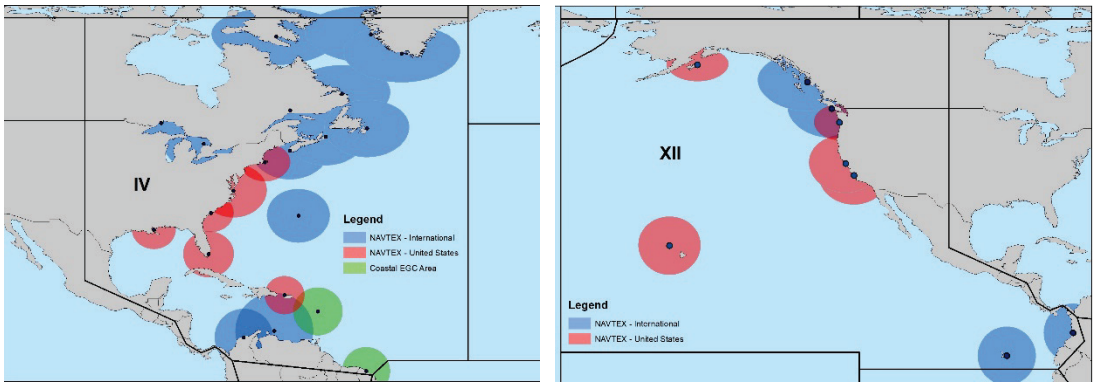


Figure 5.1 NAVAREA IV and XII. U.S. NAVTEX Stations in red, non-U.S. in blue, SafetyNET Coastal warnings in green.

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

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) (see figure below).

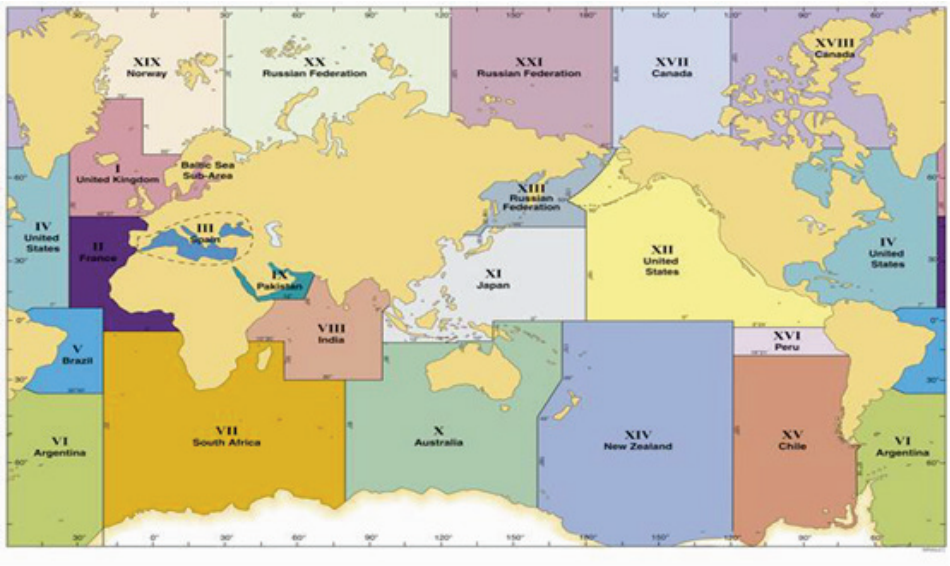


Figure 5.1: NAVAREAS for coordinating and promulgating navigational warnings under the World-Wide Navigational Warning Service

Statistics on work of the National Coordinator: In 2021, to date, NAVAREA IV promulgated 1,034 individual navigational warnings and NAVAREA XII promulgated 636 individual navigational warnings. As far as total number of broadcasts, using data from Inmarsat's SafetyNET II, NAVAREA IV estimated it made 13,622 broadcasts and NAVREA XII made 8,669 broadcasts, which included repetitions. The USCG

promulgated approximately 3,416 NAVTEX warnings, which does not include repetitions.

New infrastructure in accordance with GMDSS Master Plan: NGA declared "Operational Status" with Iridium SafetyCast on March 24, 2021. Since that date, NAVAREA IV issued 775 SafetyCast messages and NAVAREA XII issued 400 SafetyCast messages. NAVAREA IV continues to work with France to determine how to best provide Iridium SafetyCast messages for France's two coastal warning areas in NAVAREA IV.

Challenges: In 2021, NAVAREA IV/XII did not receive MSI and had no confirmed point of contact from Aruba (Netherlands), Bonnaire (Netherlands), Saba (Netherlands), Saint Eustatius (Netherlands), Saint Maarten (Netherlands), Guadeloupe (France), Martinique (France), Saint-Martin (France), Saint-Barthélemy (France), Bahamas, St. Thomas (U.S. Virgin Islands), St. John (U.S. Virgin Islands), St. Croix (U.S. Virgin Islands), Costa Rica, Nicaragua, St Kitts & Nevis, and Montserrat.

Achievements: NAVAREA XII provided support to the Ocean Cleanup's first deployment in 2021, which operated from August 9 through October 15. NAVAREA XII issued 100 navigation warnings in support, notifying mariners daily of the half-mile long trash-trapping system's position. Ultimately, the deployment netted 63,000 pounds of trash. The Ocean Cleanup's second 12-week deployment began on November 5.

5.4 New NGA MSI Website Interface:

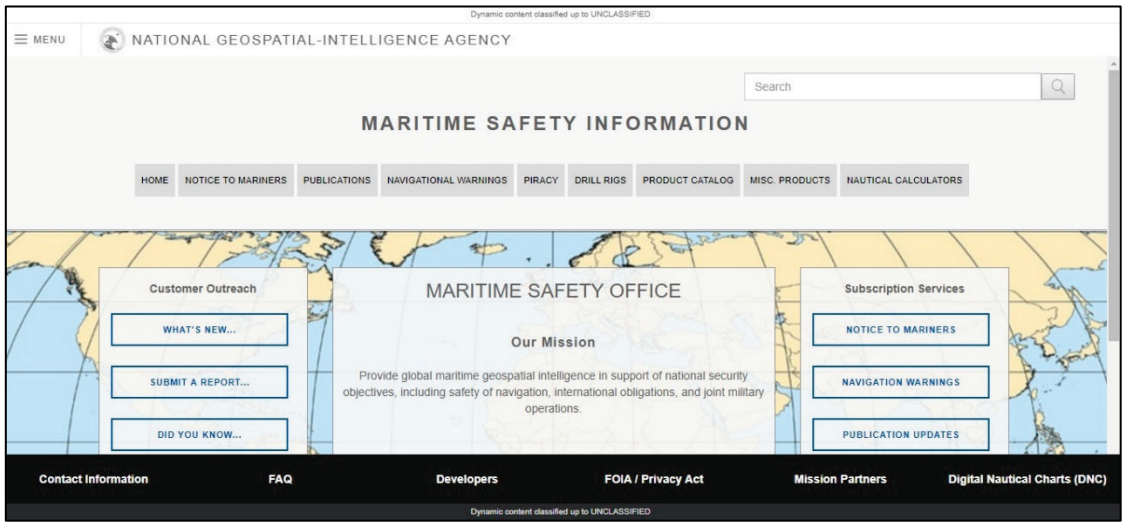


Figure 5.3: New NGA MSI website interface

NGA has updated the MSI interface to reorganize 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.

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:[11]

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	16.2%	47.9%	35.8%
Depths > 200m	48.3%	51.7%	0%

6.2 Nautical Chart Coverage Available:

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 ENCs 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%		

7. CAPACITY BUILDING

[11] 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.

7.1 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[12]
- The University of New Hampshire (UNH)[13]

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. There has been a NOAA S-8 Cat-B class every year since 2018. The course runs for approximately 52 weeks. The 2021 class began on August 16, 2021. For more information, please contact Colby Harmon (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 submissions to the International Board for Category A or Category B recognition. (andy.armstrong@noaa.gov).

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.

[12] https://www.usm.edu/marine/hydrographic-science
[13] https://marine.unh.edu/program/center-coastal-and-ocean-mappingjoint-hydrographic-center

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 military and civilian personnel. COMNAVMETOCCOM also offers mobile hydrographic training via NAVOCEANO. U.S. Navy's Category A and B programs and mobile training all qualify for Security Cooperation assistance.

8. OCEANOGRAPHIC ACTIVITIES

8.1 General

Crowdsourced Bathymetry – Crowdsourced bathymetric data can be used 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 key 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.

NOAA provides financial support for the IHO-initiated project to develop a global database for crowdsourced bathymetry hosted by the IHO Data Centre for Digital Bathymetry (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://maps.ngdc.noaa.gov/viewers/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 a CSB Guidance Document for layman mariners who wish to collect and contribute CSB data to the IHO DCDB. This document will provide volunteer collectors with information about CSB, the installation and use of CSB data loggers, data quality issues, and instructions for submitting the data to the IHO data repository. Edition 2.0.0 of B-12 IHO Guidance on Crowdsourced Bathymetry has now been in circulation for over two years and, apart from including feedback from operational use and experience, there was a strong desire to make the document more "equipment agnostic" with the intent of soliciting data from all sources, not just single beam echo sounders. The CSBWG intends to circulate an updated version to MSs for comment in 2022.

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. as chair has facilitated furthering Seabed 2030 objectives in the Caribbean.

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

9.2.1 IHO - The International Hydrographic Organization Data Centre for Digital Bathymetry (IHO DCDB) was established in 1988 to steward worldwide bathymetric data on behalf of the IHO Member States. The Centre provides long term archive of and access to single and multibeam deep and shallow water ocean depths contributed by a range of mariners. The IHO DCDB welcomes bathymetric data and metadata, accepts descriptions and spatial footprints of data that is already online and of data that are not publicly available to provide easy search and discovery. Information can be obtained at https://www.ngdc.noaa.gov/iho/.

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 (Marine DWG)

9.2.2 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. During the last year there have been major new developments within the MMSDIWG in the areas of an updated Workplan, the Bathymetric Data Protocols, engagement with other RHC MSDI WGs, and regular quarterly meetings.

9.2.3 Marine Spatial Data Infrastructures – Concept Development Study (MSDI-CDS) - NGA is supporting and organizing a project along with the Open Geospatial Consortium (OGC) on behalf of the IHO and international marine communities. The aim of this project is 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

9.2.4 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.

NGA proudly announces the completion and public release of GMTDS. 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.

The completion of 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.

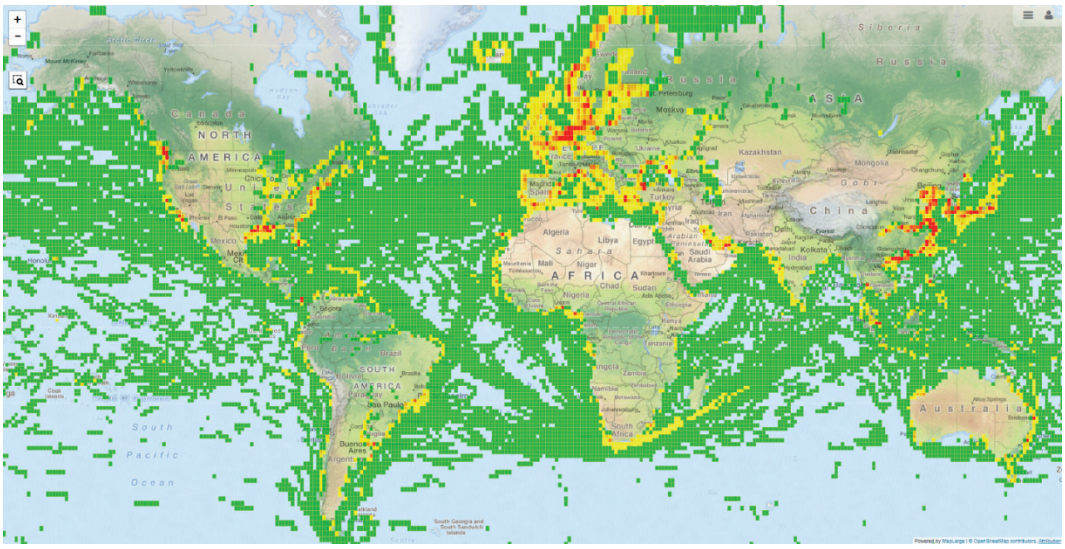


Figure 9.2: Maritime Traffic Density Map. Point-in-poly "volume" aggregations of ~450M cleaned October 2020 AIS messages

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 Responses to Disasters

11.1.1 MACHC Disaster Response Website

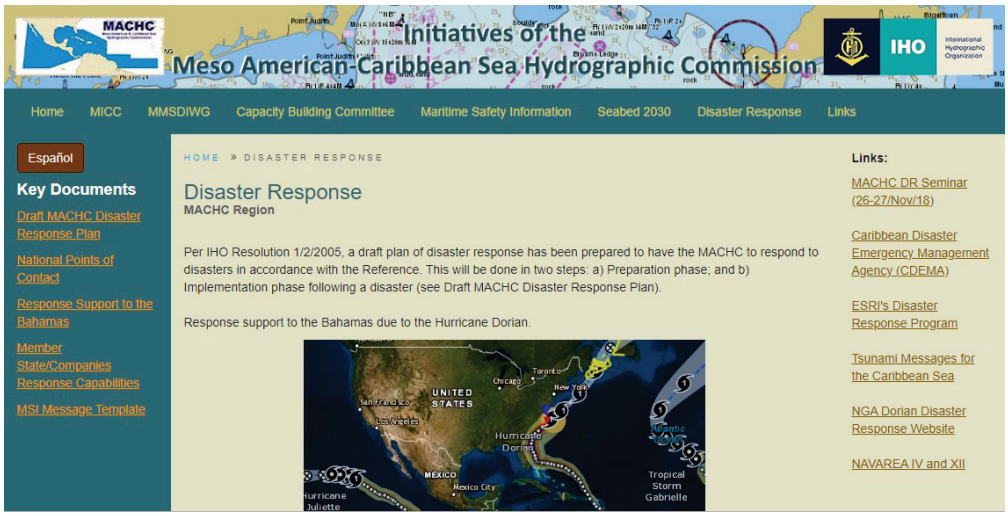


Figure 11.1: MACHC Disaster Response Website

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. This website also contains links to other resources like the NGA Hurricane Dorian Disaster Response website.

11.1.2 NGA Hurricane Disaster Support

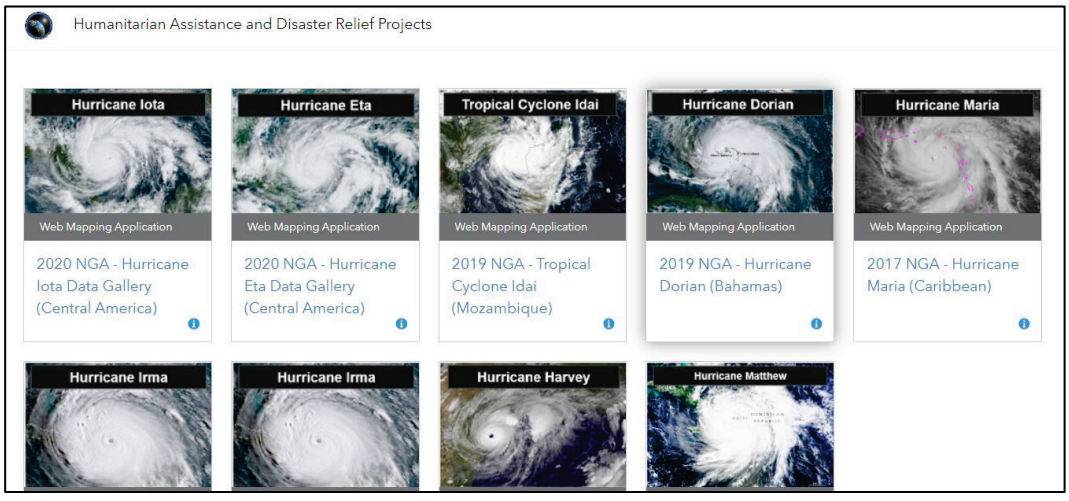


Figure 11.2: Humanitarian Assistance Disaster Response (HADR) Website

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.

11.2 Others

11.2.1 EarthDEM

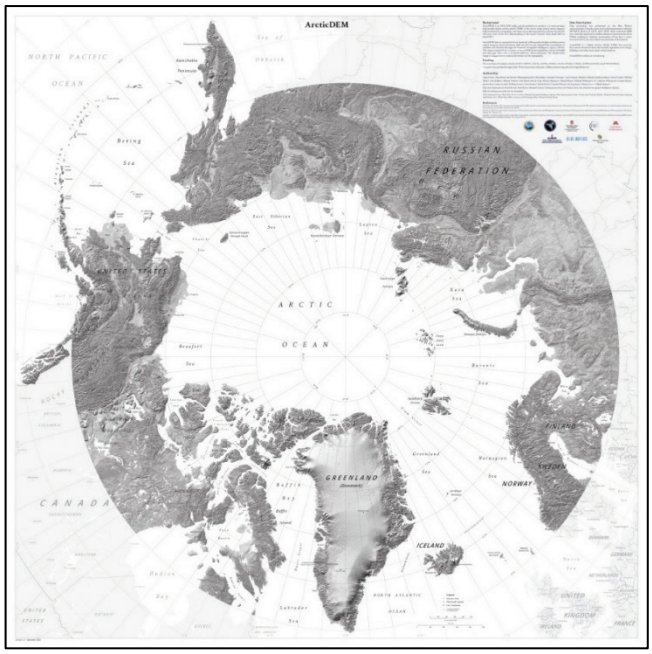


Figure 11.3: ArcticDEM Example

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 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 modelling around the world.

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.

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

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

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

Contact information/ Informations de contact / Información de contacto	
-National Hydrographer or equivalent -Directeur du service hydrographique ou équivalent -Director del Servicio Hidrográfico o equivalente	Director of NOAA's Office of Coast Survey Capt Benjamin EVANS Staff Point of Contact, Mr Jonathan JUSTI E-mail: hydrographer@noaa.gov Agency address: 1315 East-West Highway SSMC-3 N/CS x 7, SILVER SPRING, Maryland, 20910-3282, United States of America
-Web site -site web -sitio web	http://www.nauticalcharts.noaa.gov
-Date of establishment and Relevant National Legislation -Date de mise en place et législation nationale pertinente -Fecha de constitución y legislación nacional pertinente	1807 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…"

-Remarks on membership -Remarques sur l'adhésion -Comentarios sobre la adhesión	
Agency information/ Information sur l'agence/ Información sobre la agencia	
-Top level parent organisation -Organisme mère -Organización asocieda de nivel superior	National Oceanic and Atmospheric Administration (NOAA) U.S. Department of Commerce.
-Principal functions of the organisation or the department -Attribution principales de l'organisme ou du département -Principales funciones de la Organización o departamento	Hydrographic surveys, Nautical charts, Geodetic surveys, Tides/Currents, Engineering and Systems Development. Specialized library: marine and earth sciences (NOAA library facility related to NOS activities).
-Number of INT charts published -Nombres de cartes INT publiées -Número de cartas INT publicadas	15 (does not include NGA maintained INT Charts)
-Total number of paper charts published-Nombre total de cartes papier publiées-Número total de cartas de papel publicadas	1026
-Number of ENC cells published -Nombres de cellules ENC publiées -Número de células ENC publicadas	1750 (Updated monthly, please refer to the website for recent postings.) http://nauticalcharts.noaa.gov/charts/noaa-enc.html
Number of RNC published -Nombres de RNC publiées -Número de RNC publicadas	1026
-Type of publications produced -Type d'ouvrages produits -Tipo de publicaciones producidas	Sailing Directions. NOAA's Coast Pilot (10 volumes). For details, consult the following website: http://nauticalcharts.noaa.gov/publications/coast-pilot/index.html

-Detail of surveying vessels/ aircraft -Détail des bâtiments hydrographiques / aéronefs -Detalle de los buques hidrográficos / aeronaves	-Name -Nom -Nombre	-Displacement -Déplacement -Desplazamiento	-Date Launched -Date de mise en service -Fecha de botado	-Number of crew -Nombre de l'équipage -Tripulación
	RAINIER	1800	1967	62 (10*)
	FAIRWEATHER	1800	1967	45 (7*)
	THOMAS JEFFERSON	2054	2003**	31 (8*)
	FERDINAND R HASSLER	738	2012	14 (4*)
	BAY HYDRO II	45	2009	3 (1*)
	6 Navigation Response Teams (Hydrographic Field Parties)	27 ft launches, 3 person crews.		
	2 Mobile integrated survey teams (MIST)	2 Echoboats, Remus 100, Remus 600, 3 person team Portable hydrographic survey equipment able to be installed on vessels of opportunity during emergencies (SSS, VBES, and SSS equipped AUV) * = number of officers included in figure ** = Thomas Jefferson was in US Navy vessel launched in 1992, and acquired and recommissioned by NOAA in 2003		
-Other information of interest -Autres informations utiles -Otra información de interés				

NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY (NGA)

Contact information/ Informations de contact / Información de contacto	
Remarks -Remarques - Observaciones	Dept of Defense Hydrographer Capt (Ret) John LOWELL, Jr Tel: + 1 571 558 3558 Fax: + 1 571 558 3261 Agency address: 7500 Geoint Drive , Springfield, VA, 22150 - 7500, United States of America

Other point(s) of contact - Autre(s) point(s) de contact - Otros punto(s) de contacto	Director, Maritime Safety Office Capt Richard A. KENNEDY Postal address: Tel: + 1 571 557 3558 Email: maritimeinternational@nga.mil
-Web site -site web -sitio web	http://msi.nga.mil/ngaportal/msi.portal
Agency information/ Information sur l'agence/ Información sobre la agencia	
-Date of establishment and Relevant National Legislation -Date de mise en place et législation nationale pertinente -Fecha de constitución y legislación nacional pertinente	6 December 1830
-Top level parent organisation -Organisme mère -Organización asocieda de nivel superior	Department of Defense.
-Principal functions of the organisation or the department -Attribution principales de l'organisme ou du département -Principales funciones de la Organización o departamento	NGA provides: Nautical charts, Aeronautical charts, Topographic maps, Sailing Directions, List of Lights, Notices to Mariners, navigational and geodetic data, and related products and services to the Armed Forces of the United States, other Department of Defense and federal agencies and to the Merchant marine and Mariners in general.
-Total number of paper charts published-Nombre total de cartes papier publiées-Número total de cartas de papel publicadas	Approximately 5,000 chart
-Number of ENC cells published -Nombres de cellules ENC publiées -Número de células ENC publicadas	40
-Number of Other charts -Nombre d'Autres cartes -Número de Otras cartas	3,400 Digital Nautical Chart (DNC) libraries

<table>
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-Type d'ouvrages produits
-Tipo de publicaciones producidas</td><td colspan="4">Paper charts (worldwide folio of approx. 4000).
Digital charts (worldwide folio of 5000 Digital Nautical Charts in Vector Product Format).
Notices to Mariners.
Sailing Directions.
For details consult the WEB site:
http://www.nga.mil
Marine Safety Information:
http://msi.nga.mil/NGAportal/MSI.portal
Digital Nautical Chart: http://msi.nga.mil/NGAportal/DNC.portal</td></tr>
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-Détail des bâtiments hydrographiques / aéronefs
-Detalle de los buques hidrográficos / aeronaves</td><td>-Name
-Nom
-Nombre</td><td>-Displacement
-Déplacement
-Desplazamiento</td><td>-Date Launched
-Date de mise en service
-Fecha de botado</td><td>-Number of crew
-Nombre de l'équipage
-Tripulación</td></tr>
<tr><td colspan="4">Ships of the Naval Oceanographic Office support NGA Nautical Chart Production.</td></tr>
<tr><td>-Other information of interest
-Autres informations utiles
-Otra información de interés</td><td colspan="4">Ships of the Naval Oceanographic Office support NGA Nautical Chart Production.</td></tr>
</table>

COMMANDER, NAVAL METEOROLOGY AND OCEANOGRAPHY COMMAND (CNMOC)

Contact information/ Informations de contact / Información de contacto	
Remarks -Remarques - Observaciones	RAdm Ron Piret E-mail: ronald.piret@navy.mil 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 -Autre(s) point(s) de contact -Otros punto(s) de contacto	Deputy Hydrographer of the Navy, Mr Matthew Borbash Tel: +1 228 688 5082 E-mail: matthew.borbash@navy.mil Capt Ken Wallace Tel: +1 228 688 4203 E-mail: kenneth.a.wallace1@navy.mil Naval Oceanographic Office Technical Director, Mr Wade Ladner Tel: +1 228 688 4205 E-mail: rodney.ladner@navy.mil Fleet Survey Team Commanding Officer, Cdr Jennifer Landry Tel: 228-688-5325 E-mail: jennifer.j.landry@navy.mil

-Web site -site web -sitio web	http://www.navy.mil/local/cnmoc			
Agency information/ Information sur l'agence/ Información sobre la agencia				
-Date of establishment and Relevant National Legislation -Date de mise en place et législation nationale pertinente -Fecha de constitución y legislación nacional pertinente	6 December 1830			
-Principal functions of the organisation or the department -Attribution principales de l'organisme ou du département -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. 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 -Détail des bâtiments hydrographiques / aéronefs -Detalle de los buques hidrográficos / aeronaves	-Name -Nom -Nombre	-Displacement -Déplacement -Desplazamiento	-Date Launched -Date de mise en service -Fecha de botado	-Number of crew -Nombre de l'équipage -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. BRUCE HEEZEN (TAGS-64)	5,000	2000	55
	U.S.N.S. MARY SEARS (T-AGS-65)	5,000	2003	55
	USNS MAURY (T-	5,000	2016	55

	AGS-66)			
-Other information of interest -Autres informations utiles -Otra información de interés				

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

Country: _____

(Please provide the information in English)

C-55 Summary for:				**Comments on Charts:**
Country:				
Country Iso Code:				
Country SubCode:				
INT Region:				
Country/Depend:				
Last updated:				
Provided by:				
Chart coverage	**Passage (%)**	**Coastal (%)**	**Port (%)**	
INT				**Comments on Surveys:**
RNC				
ENC				
Status of Paper Charts				
Paper charts with depths in meters (%)				
Paper charts referenced to a satellite datum (%)				
Status of surveys	**Adequate (%)**	**Resurvey (%)**	**No survey (%)**	
0-200m				
> 200m				

MSI	**Y/N**	**Comments on MSI:**
Local warning		
Coastal warning		
Nav warning		
Port warning		
GMDSS	**Y/N**	**Comments on GMDSS:**
Master Plan		
Area A1		
Area A2		
Area A3		
NAVTEX		
SafetyNet		

National MSI Self-Assessment *(well established in the US)*

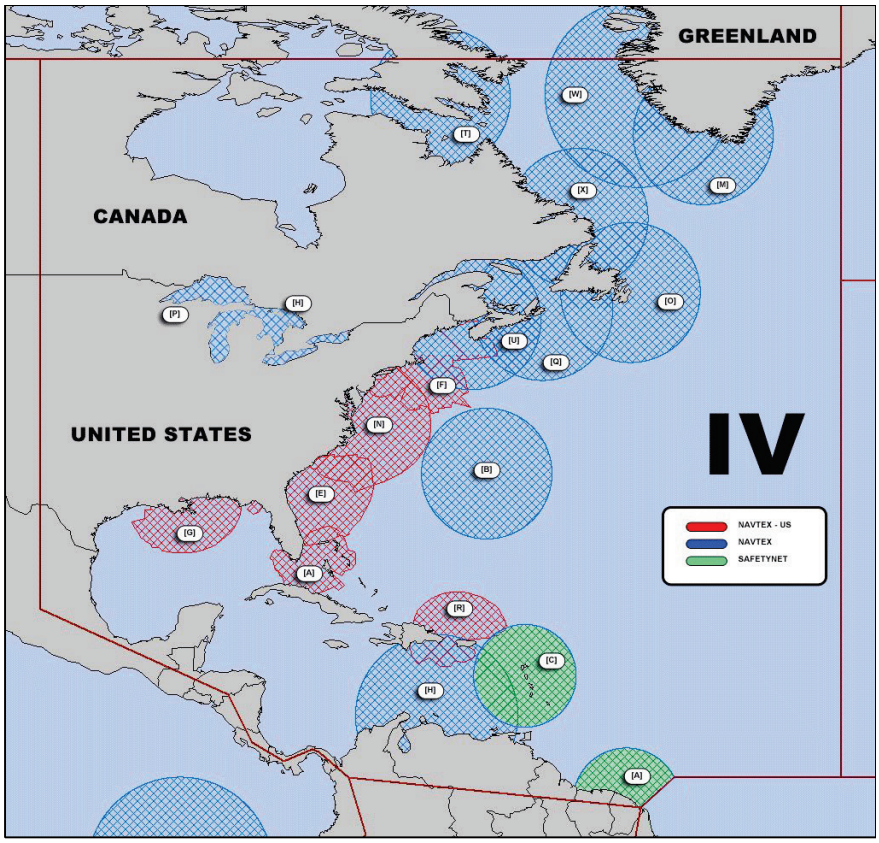
Country: *USA*
Organization: *NGA*

(Please provide the information in English)

1. Maritime area

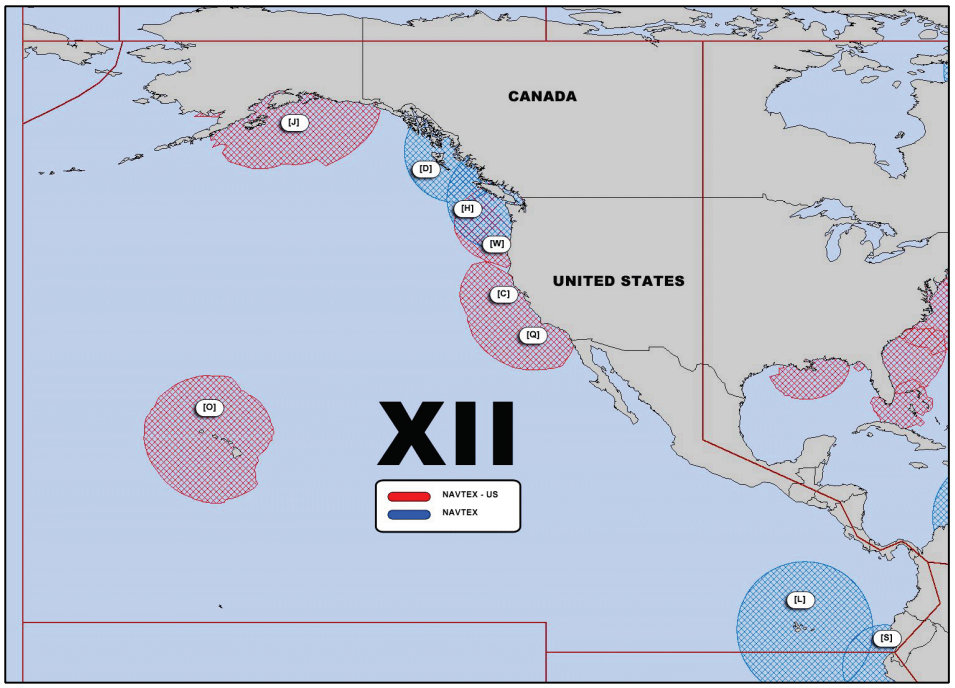
Limits of NAVAREA IV: From the east coast boundary of French Guiana to 07-00N out to 035-00W, from there to 067-00N and the coastline of Greenland, following 067-00N to the coastline of Canada (Baffin Islands area).

67-00-00N	102-00-00W
66-59-49N	034-59-49W
06-59-45N	035-00-17W
06-59-49N	048-59-57W
04-30-00N	051-46-13W
06-59-59N	076-14-17W
09-08-41N	078-44-03W
09-22-43N	079-19-09W
08-21-53N	081-39-33W
09-56-49N	084-18-08W
13-54-39N	086-17-03W
21-02-23N	102-00-00W
67-00-00N	102-02-00W



Limits of NAVAREA XII: from the coast line at 03-24S to 120-00W, then to 00-00, then to 180-00, then to 50-00N, and then following the International Date Line to 67-00N.

57-30-00N	180-00-00W
59-06-04N	176-39-54W
60-38-31N	173-41-49W
62-10-55N	171-18-57W
64-09-14N	169-24-14W
67-00-00N	168-36-25W
67-00-00N	102-00-00W
21-02-24N	102-00-00W
13-54-39N	086-17-02W
09-56-49N	084-18-07W
08-21-54N	081-39-32W
09-22-51N	079-18-50W
09-08-56N	078-44-02W
07-00-00N	076-14-16W
02-13-15N	074-45-28W
03-24-07S	079-59-49W
03-24-07S	119-59-45W
00-00-00N	120-00-00W
00-00-00N	180-00-00W
50-00-00N	180-00-00E
53-00-00N	172-00-00E
57-30-00N	180-00-00E



2. Operational Points of Contact for the National Coordinator

INSTITUTION	TELEPHONE	FACSIMILE	EMAIL
NGA	571-557-5455	--	navsafety@nga.mil

3. GMDSS Master Plan

Master plan is up to date. Last update August 2019.

Equipment Type for Ports and Local Area	Software Version	Date of Up-date
TT-3027M (Virginia, AOR-E)	2.02 Build 006	22 OCT 18
TT-3027M (Virginia, AOR-W)	2.02 Build 006	22 OCT 18
TT-3027M (Missouri, AOR-E)	2.02 Build 006	08 JUN 17
TT-3027M (Missouri, AOR-W)	2.02 Build 006	08 JUN 17
TT-3027M (Hawaii, POR)	2.02 Build 006	08 JUN 17
TT-3026S (Stuttgart, IOR)	1.15 Build 27 FW 2.25	06 FEB 09

[Detail the number of warnings identified as immediate priority (requiring transmission within 30 minutes) and the average elapsed time for passing to NAVAREA coordinator, as reported to the last RHC meeting]:

	2016		201		2018	
	Total	Average elapsed time	Total	Average elapsed time	Total	Average elapsed time
IV	146	22.8 Mins	152	9.6 Mins	327	15.3 Mins
XII	52	29.1 Mins	54	9.0 Mins	148	15.1 Mins

4. NAVTEX Coverage:
    a. NAVTEX Coverage:
        a. NAVAREA IV
            i. NAVTEX Coverage:
                1. United States (USCG COMCOMM, Derrick Croinex, 202-475-3551).
                    a. Boston, Massachusetts [F] – Remote controlled from Portsmouth
                    b. Chesapeake (Portsmouth), Virginia [N]
                    c. Charleston, South Carolina [E] – Remote controlled from Portsmouth
                    d. Miami, Florida [A] – Remote controlled from Portsmouth
                    e. New Orleans, Louisiana [G] – Remote controlled from Portsmouth
                    f. San Juan, Puerto Rico [R] – Remote controlled from Portsmouth
                2. Canada
                    a. Iqaluit [T] (Telephone: 867-979-0310)
                        i. Controlled by Iqaluit MCTS
                    b. Cartwright [X] (Telephone: 709-896-2252)
                        i. Controlled by Labrador MCTS
                    c. Robin Hood Bay [O] (Telephone: 709-772-2182)
                        i. Controlled by Placentia MCTS
                    d. Moisie [C] (Telephone: 418-269-5686)
                        i. Controlled by Les Escoumins MCTS
                    e. Port Caledonia [Q] (Telephone: 902-564-7751)
                        i. Controlled by Sydney MCTS
                    f. Chebogue [U] (Telephone: 902-426-9750)
                        i. Controlled by Halifax MCTS)
                3. Greenland (Denmark)
                    a. Kook Island (Nuuk) [W] (Telephone: 299-691-911)
                    b. Simiutaq [M] (Remote controlled by JRCC Greenland, +299 36 40 10)
                4. Great Lakes Region
                    a. Ferndale [H] – Remote controlled from Prescot
                    a. Pass Lake [P] (Telephone: 807-345-5190) (Out of service)
                    b.
                5. Bermuda (United Kingdom, Telephone: 441 297 1010)
                    a. Bermuda [B]
                6. Colombia (Juan David Ortiz Buitrago, (5) 6694465 Ext. 5142-5121)
                    a. Santa Marta [C]

7. Curaçao (Netherlands) (Telephone: 599 9 463 7733)
    a. Curaçao [H]

ii. SafetyNet

1. French West Indies [C] (Telephone: 596 (0)5 96 39 50 59)
2. French Guiana [A] (Telephone: 594 (0)5 94 39 56 69)

b. NAVAREA XII

i. NAVTEX Coverage

2. United States (USCG COMCOMM, Derrick Croinex, 202-475-3551)
    a. Kodiak, Alaska [J]
    b. Astoria, Washington [W] – Remote controlled from Point Reyes
    c. Point Reyes, California [C] – Remote controlled from Point Reyes
    d. Cambria, California [Q] – Remote controlled from Point Reyes
    e. Honolulu, Hawaii [O] – Remote controlled from Point Reyes
    f. Guam [V] – Out of service
3. Canada (Controlled by Prince Rupert MCTS, Telephone 250-627-3074)
    a. Digby Island [D] (Telephone: 250-627-3074)
    b. Amphitrite [H] (Telephone: 250-627-3074)
4. Colombia (Juan David Ortiz Buitrago, (5) 6694465 Ext. 5142-5121)
    a. Buenaventura [O]
5. Ecuador
    a. Ayora [L] (Out of service)
6. Peru
    a. Paita [S] (51-1-7321-1670)

5. Operational Issues:

Iqaluit NAVTEX station was off air for a total of 674 hours between 15 May and 29 November 2018. NAVAREA XVIII coordinated with NAVAREA IV to ensure it issued navigational warnings to denote the outages. The Iqaluit issue was complex. It included various equipment issues, which included a damaged line feed between transmitter and the tower—a difficult repair.

In June 2019, the Chair of the IMO NAVTEX Coordinating Panel advised he received a complaint that Robin Hood Bay NAVTEX was transmitting outside of its allocated broadcast schedule and causing interference with Jeloya, Norway. An investigation revealed that the system was transmitting the 0220 broadcast 20 minutes early. The technicians resolved the problem and the transmitter is again compliant with its assigned broadcast schedule.

In 2018, the Dominican Republic began sending MSI for the first time. Last year they sent a total of nine MSI reports. This year they have sent five. Cuba continues to regularly provide MSI: five reports in 2018 and four in 2019. Cuba and the Dominican Republic both completed the MSI course in 2017 and 2016, respectively. NAVAREA IV greatly appreciates the Dominican Republic's and Cuba's contributions and their support to ensure safe navigation.

In 2018, NAVAREA IV/XII received MSI from 27 (54%) of 50 national coordinators, an increase from 40% in 2017. Thirty-two of 50 (64%) national coordinators have completed the IHO MSI capacity building course.

6. Contingency Planning

NAVAREA IV and XII have fully redundant along with site separated NAVAREA operational systems to include: satellite transceivers, telecommunications, internet and desktop PC's. Operations are tested on a daily basis at both locations to ensure full continuity of NAVAREA operations.

7. Capacity Building

None required.

8. Other Activities

IHO MSI Training Course, Brazil – Oct 2018
MACHC Meeting, Colombia – Dec 2018
IMO NCSR6 Meeting, IHO Rep, London - Feb 2019
IHO WWNWS Guidance Document Review Meeting, London - Feb 2019
IHO IRCC, Italy - June 2019
WWNWS11, Halifax - Aug 2019
IHO MSI Training Course, Indonesia – Sep 2019

9. National Maritime Website

http://msi.nga.mil/NGAPortal/MSI.portal
How often is the information on your web site updated? Daily, Monday through Friday.
Do you display the date and time of the last update on your web site? Yes.

10. Recommendations

None

11. Summary

The United States via NGA serves as the NAVAREA IV and XII Coordinator. NGA works with USCG to fulfill national coordinator roles and responsibilities. The USA does not require any MSI capacity building training and is ready to provide assistance to national coordinators within NAVAREA IV and XII to train, develop, and improve their MSI capacity.