

UNCLASSIFIED



# International Hydrographic Organization

United States of America

National Report

## 20<sup>th</sup> South-West Pacific Hydrographic Commission (SWPHC) Meeting

22-24 February 2023



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



Source Operations and Management Directorate  
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.navmetocom.navy.mil>  
<https://www.facebook.com/NavalOceanography/>

UNCLASSIFIED

## Table of Contents

1.	Hydrographic Office/Service .....	4
1.1	Government Agencies with hydrographic responsibilities in the SWPHC Region .....	4
1.2	United States Open Data Policy – Managing Information as an Asset .....	4
2.	Surveys.....	5
2.1	Surveys in U.S. Waters.....	5
2.2	Surveys outside U.S. Waters .....	7
2.3	U.S Hydrographic Survey Platforms.....	8
3.	New Charts and Updates .....	8
3.1	Charting Plan .....	8
3.2	Electronic Navigational Chart (ENC).....	10
3.3	Raster Navigational Charts (RNC) & Electronic Navigational Charts (ENC) Distribution .....	10
3.4	Raster Navigational Charts (RNC) and Paper Charts.....	11
3.5	International Charts .....	11
4.	New Publications and Updates.....	12
4.1	New Publications .....	12
4.2	Updated Publications .....	13
4.3	Means of Delivery.....	14
5.	Maritime Safety Information (MSI).....	15
5.1	Existing infrastructure for transmission .....	15
5.2	Notice to Mariners.....	15
5.3	Navigation Warnings.....	15
6.	C-55 .....	16
7.	Capacity Building.....	16
7.1	Offer of and/or Demand for Capacity Building .....	16
7.2	Training Offered .....	17
7.3	Status of National, Bilateral, Multilateral or Regional Projects with a Hydrographic Component .....	17
8.	Oceanographic Activities .....	18
8.1	Crowdsourced Bathymetry .....	18
8.2	GEBCO/IBC’s activities, GEBCO Seabed 2030 activities .....	18
9.	Spatial Data .....	19
9.1	Status of MSDI.....	19
9.2	Involvement in Regional or Global MSDI efforts.....	19

9.3	MSDI National Portal.....	20
10.	Innovation.....	20
10.1	Use of New Technologies .....	20
11.	Other Activities.....	21
11.1	Preparations for Responses to Disasters.....	21
12.	Conclusions.....	22
13.	Annex A .....	23
14.	Annex B .....	23
15.	Annex C .....	23

## 1. Hydrographic Office/Service

This National Report provides specific information pertaining to individual products and services of primary interest to the South West Pacific Hydrographic Commission (SWPHC) Region. Three 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 SWPHC Region

- i. National Oceanic and Atmospheric Administration's (NOAA)<sup>1</sup> conducts hydrographic surveys and produces nautical charts and related hydrographic information within the nation's Exclusive Economic Zone (EEZ).
- ii. National Geospatial-Intelligence Agency (NGA)<sup>2</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.
- iii. The U.S. Navy<sup>3</sup> conducts oceanographic, bathymetric, and hydrographic surveys worldwide to satisfy DOD and national security requirements.

For more information on NOAA, NGA, and NAVY hydrographic activities, see [IHO Publication 5](#).

### 1.2 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>4</sup>—is the foundation of the [U.S. Open data policy](#). The open data policy has led to the public availability of most hydrographic data, products, and services produced by U.S. Hydrographic Offices (HOs) 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>5</sup>. Additionally, ENC data is available for use in GIS applications via the ENC direct to GIS website<sup>6</sup>. The US DoD may make data available to support crisis events and various initiatives<sup>7</sup>.

---

<sup>1</sup> Primarily the Office of Coast Survey

<sup>2</sup> Primarily Source Operations and Management Directorate, Foundation Group, Maritime Safety Office (MSO).

<sup>3</sup> Primarily, Commander, Naval Meteorology and Oceanography Command (COMNAVMETOCOM) and the Hydrographer of the Navy

<sup>4</sup> 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>

<sup>5</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>6</sup> NOAA ENC direct to GIS: <https://nauticalcharts.noaa.gov/data/gis-data-and-services.html#enc-direct-to-gis>

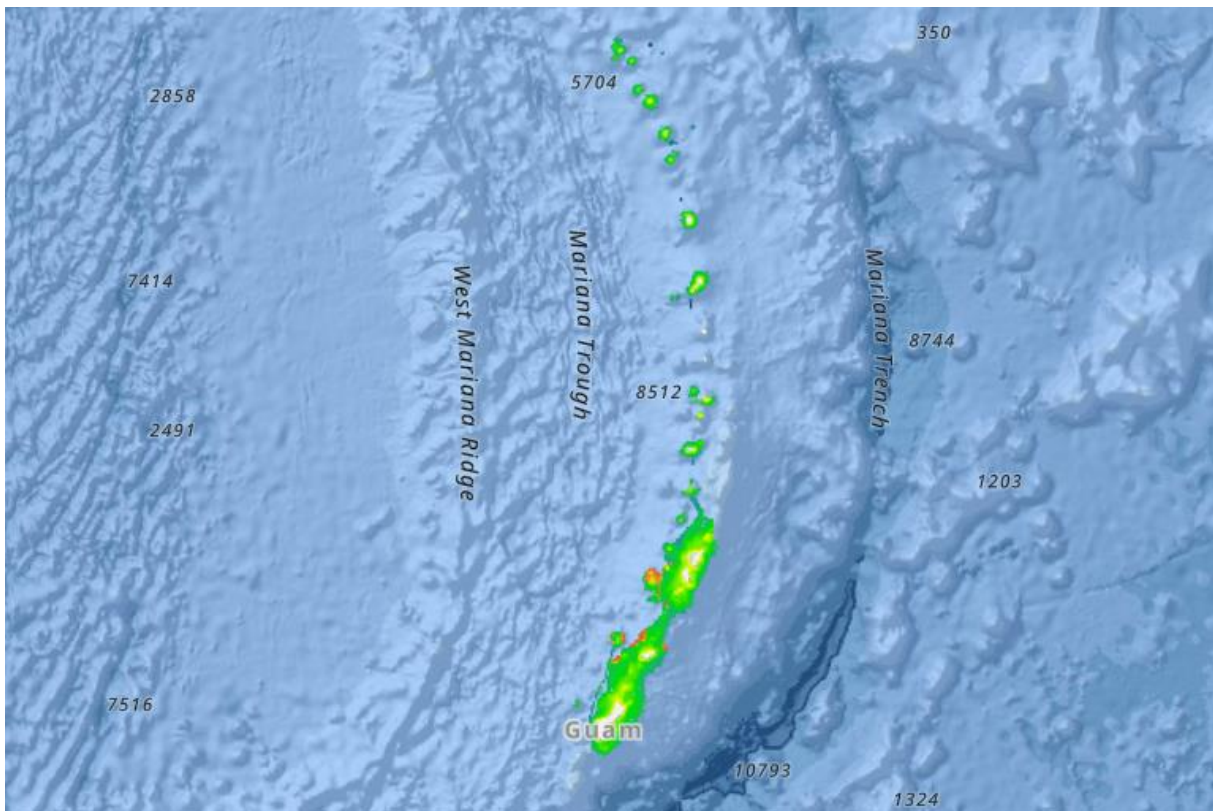
<sup>7</sup> NGA Crisis Support website: <https://nga.maps.arcgis.com/home/index.html>

## 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 field units or external contractors then conduct surveys to meet these priorities. Data acquired from these surveys meet the IHO Standard for Hydrographic Surveys (S-44) and the Office of Coast Survey's Hydrographic Surveys Specifications and Deliverables<sup>8</sup>, in compliance with the National Ocean Service 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 (e.g. traffic density, known hazards to navigation, reported ship groundings, etc.) and the consequence of that event occurring. Current information about the model and survey prioritization can be found at:



<sup>8</sup> Current version is 2022, [https://nauticalcharts.noaa.gov/publications/docs/standards-and-requirements/specs/HSSD\\_2022.pdf](https://nauticalcharts.noaa.gov/publications/docs/standards-and-requirements/specs/HSSD_2022.pdf)

<https://nauticalcharts.noaa.gov/publications/national-hydrographic-survey-priorities.html>

*Figure 2.1: NOAA's survey coverage around the Northern Marianas Islands in 2022*

In 2022, NOAA Ship *Rainier* surveyed around Guam and the Commonwealth of the Northern Mariana Islands (CNMI). The project included collecting bathymetry and backscatter data from the nearshore environment to approximately 1500 meters depth for charting and habitat characterization, performing dive operations to assess the condition of the coral reef ecosystems and fish populations, and collecting water quality data and other oceanographic observations. This comprehensive dataset will aid in managing the marine resources of the area.

NOAA plans to continue this work in American Samoa and the Pacific Remote Island Area (PRIA) in 2023.

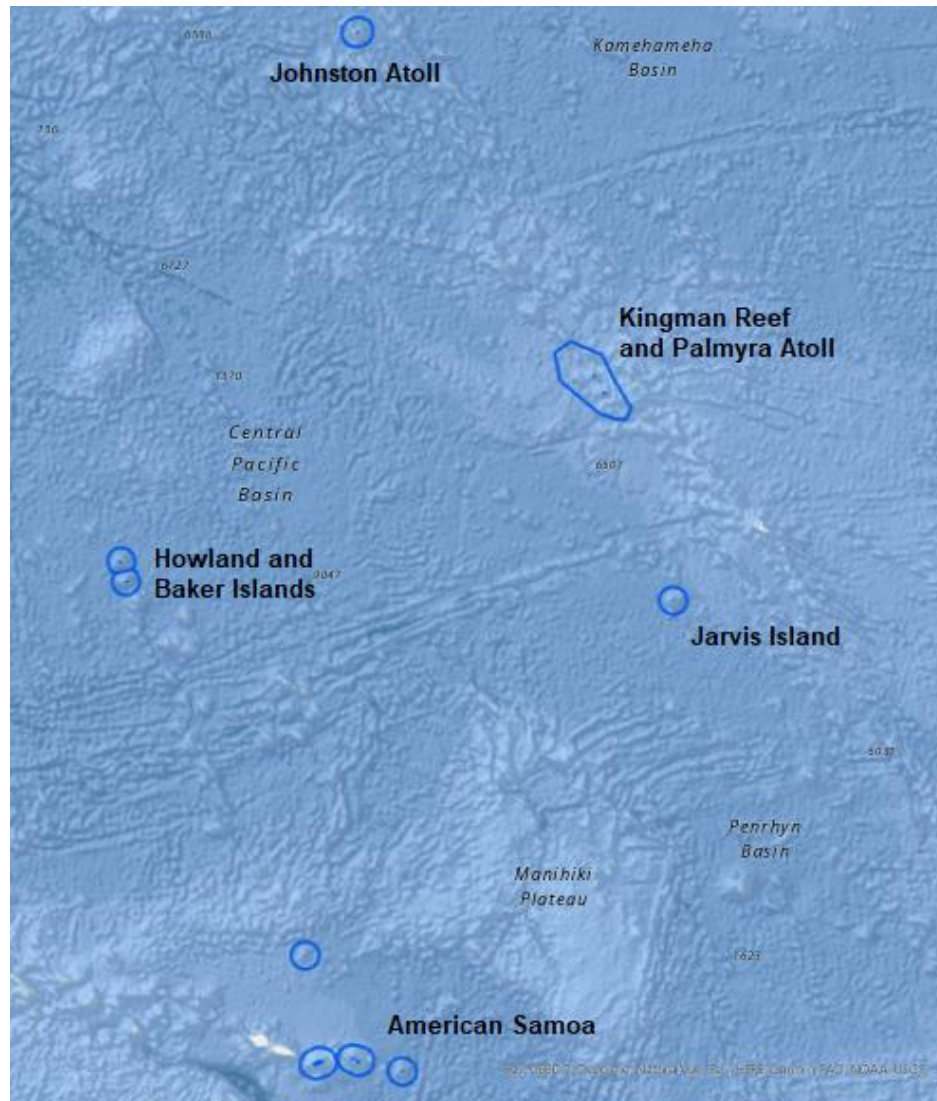


Figure 2.2: NOAA's planned survey areas (blue polygons) around the TRIA and American Samoa in 2023.

## 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.

By U.S. Navy, Commander, Naval Meteorology and Oceanography Command (COMNAVMETOPCOM) Instruction 5510.1A, "Disclosure of Information to Foreign Governments", 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.

In September 2022, the U.S. Navy conducted a partnered hydrographic survey with Palau's Bureau of Marine Transportation.



## 2.3 U.S Hydrographic Survey Platforms

### i. National Oceanic and Atmospheric Administration (NOAA)

NOAA survey platforms include six 28-foot survey boats, a research vessel, a LIDAR-capable aircraft, 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>

In addition, NOAA has a hydrographic services contract that is made up of seven individual contracts with a total ceiling of \$250 million over the life of the five-year contract (FY 2019–2023).

### ii. 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). Construction of a seventh Pathfinder Class vessel is currently underway.

NAVOCEANO also maintains a limited 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), will be decommissioned in 2023. FST has traditionally employed 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). A very limited FST-like capability will transition to the Naval Oceanography Mine Warfare Center (NOMWC). NOMWC’s future capacity to execute hydrographic surveys is still undetermined.

## 3. New Charts and Updates

### 3.1 Charting Plan

On November 1, 2017, NOAA released the National Charting Plan, a strategy to improve NOAA nautical chart coverage, products, and distribution. Part of the plan involves “re-scheming” the current suite of ENC—based on the original paper chart extents—to a gridded format with standardized sizes and scales. The new layout will exceed 7,000 ENCs with new charts often providing larger scale and more detailed coverage. The timeline for completing regriding in the SWPHC region has not been determined, but the current status for the creation of all reschemed ENCs is available online at: <https://distribution.charts.noaa.gov/ENC/rescheme/>



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. All chart information is available via the INTOGIS system at:

<http://chart.iho.int:8080/iho/main.do>

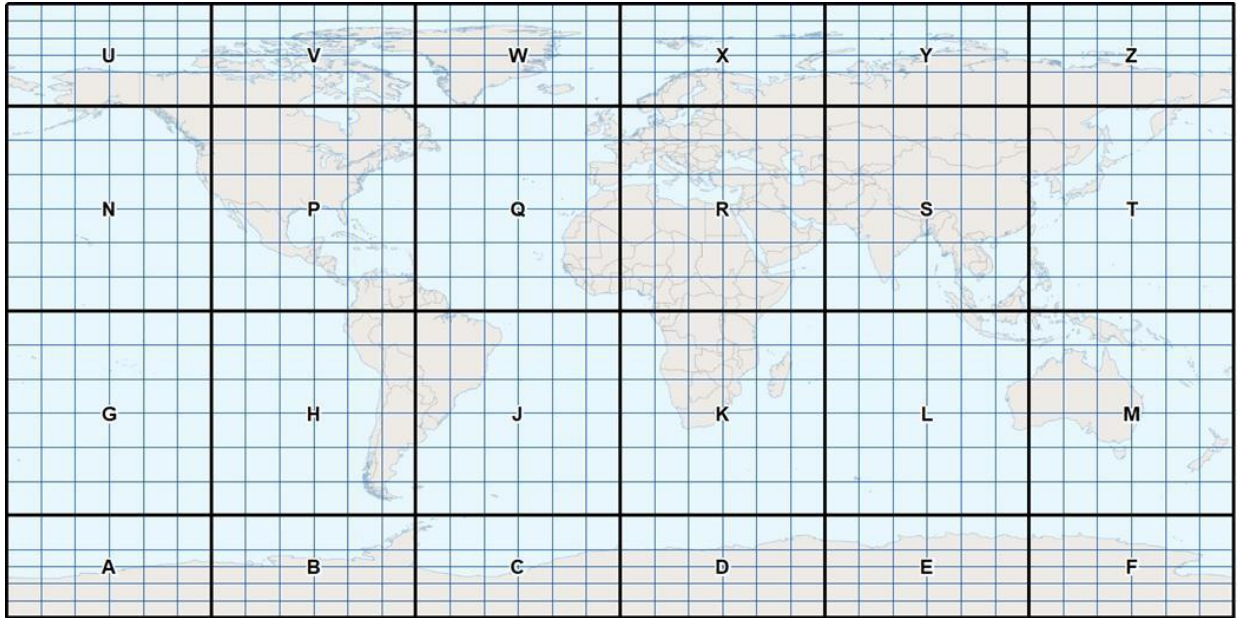


Figure 3.1: NGA ENC Grid

### 3.2 Electronic Navigational Chart (ENC)

The NOAA currently maintains ENCs in U.S. waters within the SWPHC 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 SWPHC Region in areas where the U.S. acts as the PCA.

ENC Band	1	2	3	4	5	6
Number of U.S. ENCs existing in SWPHC Region (NOAA)	4	3	1	4	17	1
Number of U.S. ENCs existing in SWPHC Region (NGA)	0	4	18	55	30	0

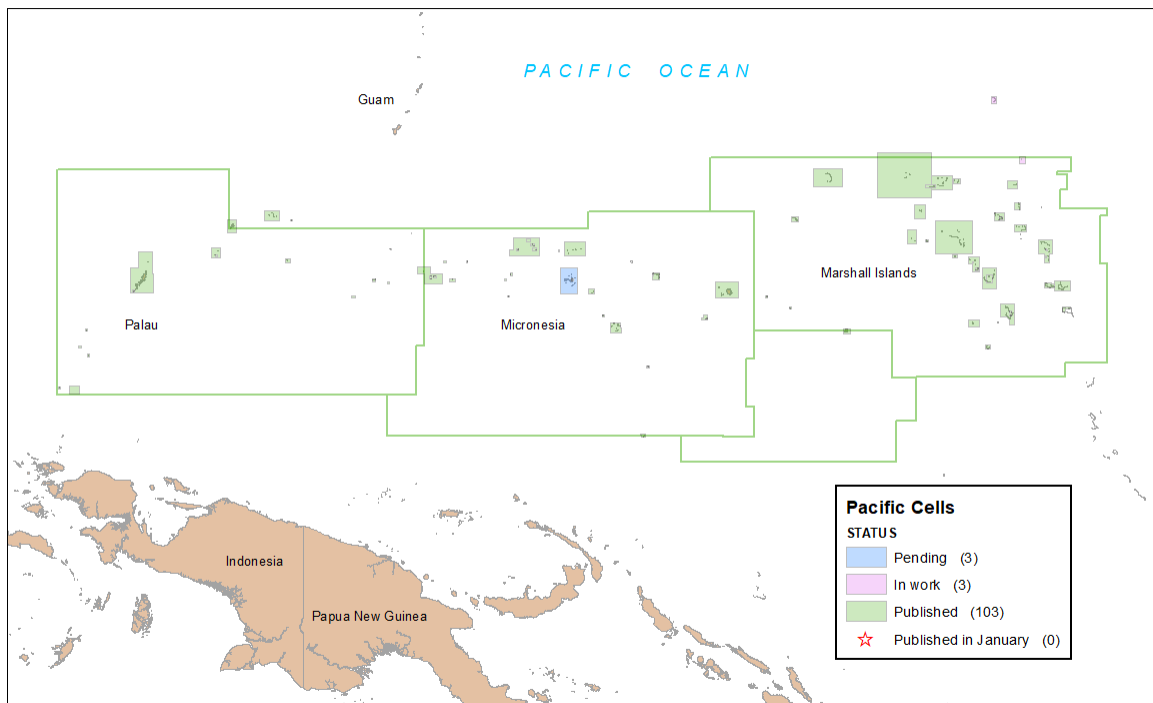


Figure 3.2: US Produced ENC Cells

### 3.3 Raster Navigational Charts (RNC) & Electronic Navigational Charts (ENC) Distribution

In November 2019, NOAA released a Federal Register Notice (FRN) announcing the five-year program to end all raster and paper nautical chart production. Ultimately, production of all NOAA paper nautical charts, raster navigational charts (NOAA RNC®), and related products, will cease. In the interim, NOAA will apply critical updates to paper charts on a weekly basis and make them available for download as Print-on-Demand (POD) products or in paper form from [NOAA-certified chart-printing agents](#). More details are available at: <https://nauticalcharts.noaa.gov/charts/farewell-to-traditional-nautical-charts.html>

NOAA is developing and improving a NOAA Custom Chart web-based application that will enable users to download and print raster chart files created from the most up-to-date ENC data. These chart backup files will look somewhat different from traditional paper nautical charts, but will provide a similar functionality. The NOAA Custom Chart is available at <https://devgis.charttools.noaa.gov/pod/>.

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

- i. NOAA website at: <https://nauticalcharts.noaa.gov/>
- ii. NOAA's Interactive Catalog at: <https://www.charts.noaa.gov/InteractiveCatalog/nrnc.shtml>
- iii. International Center for ENC's Distributors at: <http://www.ic-enc.org/Distribution.html>.
- iv. PRIMAR Distributors at: <https://www.primar.org/home>

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

By 2025 NOAA will end production and maintenance of NOAA traditional paper charts and RNC products. Six months before a chart is canceled, NOAA updates the chart with a note in the lower left corner stating the chart's status as a "last edition" and the date on which it will be canceled. NOAA also updates its Lists of Latest Chart Editions to indicate that the last edition of the chart has been published. When the chart is canceled, the chart number will be moved from its position in the list of active charts to a cumulative list of canceled charts at the bottom of the page. The List of Latest Chart Editions can be found at: <https://nauticalcharts.noaa.gov/charts/list-of-latest-editions.html>

Other products and services based on the paper chart that will be or have been canceled by January 2025 include: 1) Full-size nautical chart PDF images, 2) BookletCharts™, 3) RNC Tile Service, 4) Seamless Raster Navigational Chart Services, and 5) RNC Viewer.

NGA ceased production on paper charts in 2022. Going forward if a required RNC is cancelled, NGA will produce and maintain a nautical chart-like hardcopy product known as Certified Printed Electronic Navigational Chart (CPENC) to fulfill any DoD requirements.

U.S. RNCs are downloadable from a list at <http://www.charts.noaa.gov/RNCs/RNCs.shtml>

CPENCs are downloadable from **ADD LINK**

### 3.5 International Charts

The U.S. produces INT charts within the SWPHC region, primarily over areas where they serve as the Prime Charting Authority (PCA) and builds its chart schema and DNC library limits from these INT schema, if practical.

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.

The U.S. produces many DNCs in SWPHC 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 <https://msi.nga.mil>.

DNC consists of libraries in a variety of scales for complete worldwide coverage. SWPHC data is included in DNC regions 4, 5, 6 and 12. See coverage below.

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](mailto:maritime.international@nga.mil)

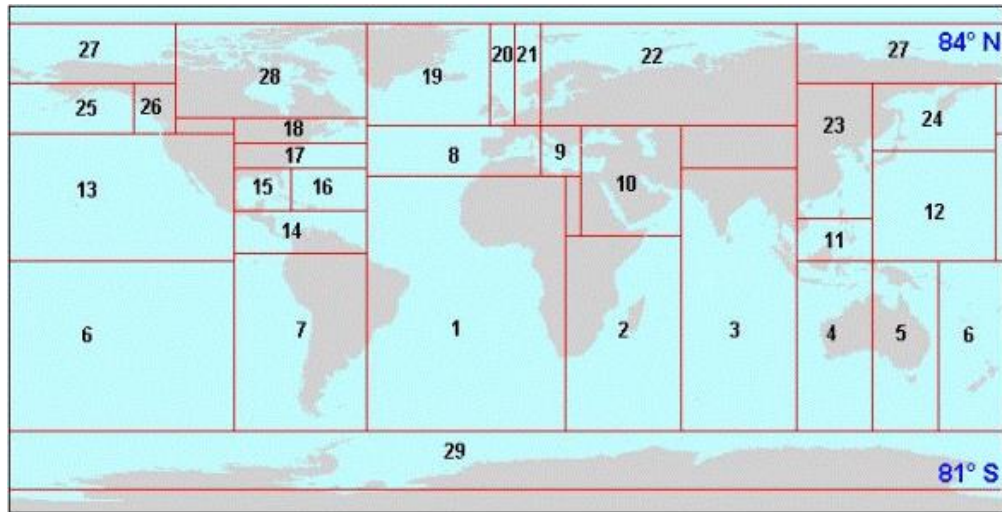


Figure 3.5: DNC Worldwide Coverage

## 4. New Publications and Updates

### 4.1 New Publications

NGA developed a new web application(s) to view, analyze, download, and contribute port information for the World Port Index (WPI). The WPI is 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 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.

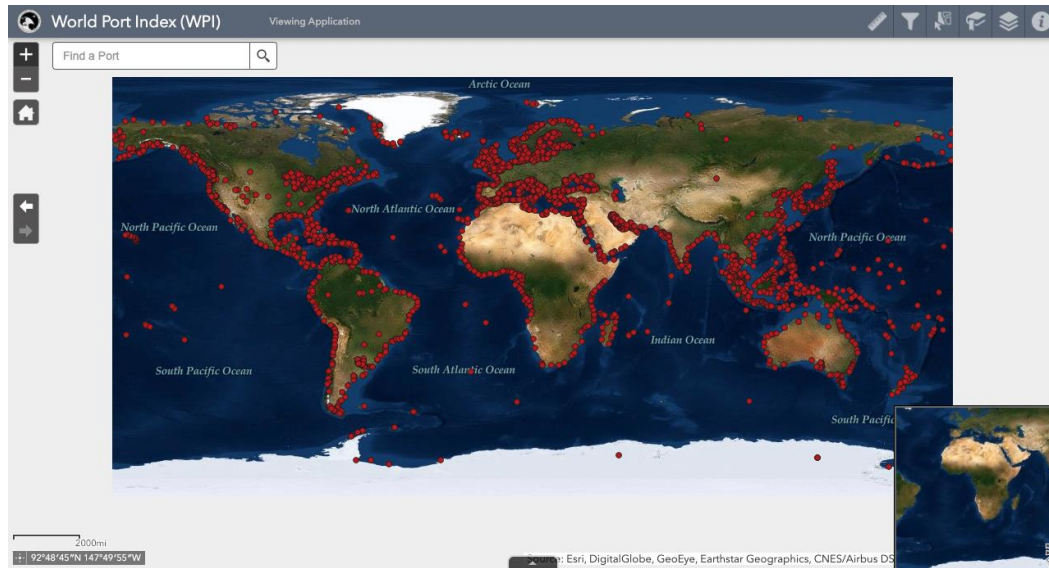


Figure 4.1: World Port Index (WPI) geodatabase.

The U.S. released an article in the International Hydrographic Review covering “The End of Traditional Paper Charts: The Final Transition to Electronic Navigational Charts.” The full text can be found at: <https://ihr.iho.int/articles/the-end-of-traditional-paper-charts-the-final-transition-to-electronic-navigational-charts/>

## 4.2 Updated Publications

- i. NGA has just 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. The interface can be found at: <https://msi.nga.mil/>
- ii. The **United States Coast Pilot** consists of a series of ten regionally focused nautical books that cover a variety of useful information important to navigators for coastal and intra-coastal waters and the U.S. Great Lakes. *Coast Pilots 10 (2022)* provides information for the U.S. west coast, Hawaii, and the Pacific, including Trust Territories of the Pacific Islands. U.S. Coast Pilots, updated on a weekly basis, can be downloaded at: <https://nauticalcharts.noaa.gov/publications/coast-pilot/index.html>
- iii. NGA **Sailing Directions** consist of useful information important to

navigators of coastal waters. Information for the SWPHC region is contained in following Publications:

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

Publication	Edition Date
<i>Sailing Directions 120</i> – Pacific Ocean and Southeast Asia (Planning Guide)	2022 Edition
<i>Sailing Directions 126</i> – Pacific Islands (Enroute)	2017 Edition
<i>Sailing Directions 127</i> – East Coast of Australia and New Zealand (Enroute)	2022 Edition
<i>Sailing Directions 171</i> – East Africa and South India Ocean (Enroute)	2020 Edition
<i>Sailing Directions 175</i> – North, West, and South Coasts of Australia (Enroute)	2022 Edition

- iv. World Port Index (WPI) - 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. The WPI is also available via the IHO Online catalogues and can be used as an API for other web services. Digital updates are available to the public and posted at the NGA Maritime Safety website, at: <https://msi.nga.mil/Publications/WPI>.
- v. The **NGA List of Lights** and their digital updates are available to the public and posted at the NGA Maritime Safety website, at: <https://msi.nga.mil/Publications/NGALOL>.

One volumes of List of Lights cover the SWPHC region:

Publication	Edition Date
List of Lights Pub. 111 (W. Coast N & S America (excluding USA), Australia, Tasmania, NZ, and Islands in the N/S Pacific Ocean	2022 Edition, 2032 Edition available April 27, 2023

- vi. The **NGA Radio Aids and Fog Signals (Pub 117)** and their digital updates are available to the public and posted on the NGA Maritime Safety website at: <https://msi.nga.mil/Publications/RNA>.

#### 4.3 Means of Delivery

- i. All the publications are available digitally in PDF format from the NGA website at: <https://msi.nga.mil/Publications>.



- ii. Users can enroll in a Publication Updates Subscription Service to receive e-mail notifications of nautical publication updates and new editions.
- iii. Many of NGA's products are available via the IHO Online catalogue.
- iv. 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) is navigational and meteorological warnings, meteorological forecasts and other urgent safety-related messages broadcast to ships. NGA is the NAVAREA IV and XII Coordinator and promulgates warnings via Inmarsat's SafetyNET II service and Iridium's Safetycast service. The USCG promulgates coastal warnings for the United States via NAVTEX. The USCG operates one NAVTEX station in NAVAREA XI, which is located in Guam. That station continues to broadcast on 4209.5 kHz because its 518 kHz transmission capability remains out of service. USCG has no current plans to repair the 518 kHz antenna.

### 5.2 Notice to Mariners

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

The U.S. Coast Guard issues Local Notices to Mariners for NOAA charts, while NGA issues Notices to Mariners for the worldwide suite of NGA paper charts.

Local Notice to Mariners are updated weekly and available for download in several formats. For future chart cancellations, Local Notice to Mariners will announce "no new editions" and the cancellation date. It will subsequently announce the cancellation six months later.

Mariners can download applicable Notices from the web at

<https://www.navcen.uscg.gov/?pageName=InmMain>.

The U.S. Notice to Mariners are posted at the NGA Maritime Safety website at

<https://msi.nga.mil/NTM>.

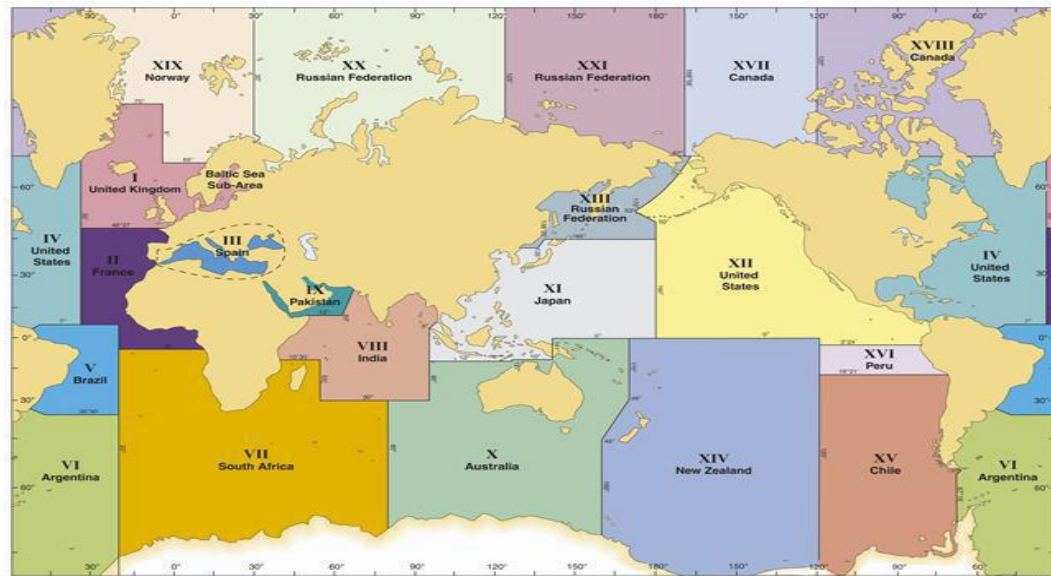
### 5.3 Navigation Warnings

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).



SWPHC Waters primarily lie within NAVAREA X (Australia is Regional Coordinator), NAVAREA XIV (New Zealand is Regional Coordinator), and NAVAREA XI (Japan is Regional Coordinator).

### World Wide Navigational Warning Service (WWNWS)



Figure

5.2: NAVAREAS for coordinating and promulgating navigational warnings under the WWNWS program.

## 6. C-55<sup>9</sup>

The US updates its C-55 entry annually. C-55 can be found at: December 2022 IHO U.S. C-55. <https://iho.int/uploads/user/pubs/cb/c-55/c55.pdf>

## 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).

NOAA is supporting a capacity building initiative led by the IHO and Canada called '[Empowering Women in Hydrography](#),' via hosting three women aboard NOAA ships for a hands-on experience during the 2022, 2023, and 2024 survey seasons. The 2022 survey season successfully hosted three candidates hailing from [Nigeria](#), [Japan](#) and [Suriname](#). Nigeria's EWH candidate sailed aboard NOAA Ship *Rainier* while surveying from Guam to Saipan. Candidate selection for the next cycle will happen throughout winter 2023, with participation of three candidates envisioned during the 2023 survey season (June to October, 2023).

U.S. Navy traveled to Koror, Palau in July 2022 to assist in an effort to install data loggers on Palauan vessels. These data loggers record position and depth from a vessel's onboard depth sounder and GPS during their normal operations, and are used to support a Crowd Sourced Bathymetry (CSB) effort led by the Seabed 2030 initiative. Loggers were successfully installed

<sup>9</sup> Source: December 2022 IHO U.S. C-55. <https://iho.int/uploads/user/pubs/cb/c-55/c55.pdf>

on five vessels and data upload to the IHO Data Centre for Digital Bathymetry (IHO DCDB) was confirmed in July. A list of necessary parts was generated, and upon return in September to conduct a partnered survey, the remaining vessels/loggers were installed.

## 7.2 Training Offered

### i. Category-A Competence Training for Hydrography

Training opportunities are available at various institutions in the United States. Two Category A certified hydrographic programs are available through:

- The University of Southern Mississippi (USM) in partnership with U.S. Navy<sup>10</sup>
- The University of New Hampshire (UNH)<sup>11</sup>

### ii. 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 plans to continue offering this training in the future.

The IBSC approved the NOAA program for Category B in Cartography in 2017. Since 2017, over 50 students have graduated from the program, including one foreign national student from the Nigerian Navy.

- ### iii. 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 COMNAVMETOCOM and the Information Warfare Training Group in Gulfport, Mississippi. This training is available to both uniformed and civilian government personnel. U.S. Navy's Category A and B programs and mobile training all qualify for Security Cooperation assistance.
- ### iv. Maritime Safety Information (MSI) Training –
- The US (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.

## 7.3 Status of National, Bilateral, Multilateral or Regional Projects with a Hydrographic Component

- ### i. Palau Technical Visit -
- NGA Analysts continue to engage with Palau's Bureau of Marine Transportation. NGA along with US Navy and the Fleet survey team visited Palau in July

<sup>10</sup> <https://www.usm.edu/marine/hydrographic-science>

<sup>11</sup> <https://marine.unh.edu/program/center-coastal-and-ocean-mappingjoint-hydrographic-center>

2022 to assist with the CSB efforts. Palau has made several advances in their hydrographic capability during the last few years. This will continue to help move them further in the direction of one day building a fully functional Hydrographic Office doing everything from MSI, to hydrographic surveys, to producing nautical charts.

- ii. Marshall Islands Technical Visit - NGA Analysts continue to engage with the Port Authority for RMI. Marshall Islands has been working hard to make advances in their hydrographic capability during the last few years. This will help move them further in the direction of one day building a fully functional Hydrographic Office doing everything from MSI, to hydrographic surveys, to producing nautical charts.

## 8. Oceanographic Activities

### 8.1 Crowdsourced Bathymetry

The United States provides support for the IHO-initiated project to develop a global database for crowdsourced bathymetry hosted by IHO DCDB. The IHO DCDB, co-located with NOAA's National Centers for Environmental Information (NCEI), is building the infrastructure necessary to provide archiving, discovery, display and retrieval of global crowdsourced bathymetry data from mariners around the world. The online database can be found at [https://maps.ngdc.noaa.gov/viewers/iho\\_dcdb/](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. The U.S. is an active participant 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.

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

The United States participates on the IOC-IHO Guiding Committee for GEBCO and hosts the IHO Data Centre for Digital Bathymetry at NOAA's National Centers for Environmental Information (NCEI) (formerly the National Geophysical Data Center, NGDC).

Seabed 2030 was officially launched at the United Nations Ocean Conference in 2017. Seabed 2030 (<https://seabed2030.gebco.net/>) 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.

In June 2022, NOAA Administrator Dr. Rick Spinrad signed a memorandum of understanding (MOU) that formalizes U.S. participation in the Seabed 2030 Project. The MOU is intended to facilitate cooperation on the exchange of information and the promotion of joint efforts to bathymetrically map the world's oceans by 2030. Acquisition of global water depths supports NOAA's many mission areas reliant on bathymetry, as well as broader U.S. national interests and global governance.

## 9. Spatial Data

### 9.1 Status of MSDI

The United States actively supports MSDI within the country, as well as regionally, and internationally, and is supporting the Pacific Community (SPC) in its collaboration with Pacific Islands on marine spatial planning (MSP). 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

- i. 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 are 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)
- ii. NGA recently sponsored Phase 3 of the ongoing Open Geospatial Consortium (OGC) Federated Marine SDI-Pilot (FMSDI-Pilot). This pilot directly responds to the OGC-IHO MSDI Concept Development Study and seeks to initiate a full-scale Pilot to demonstrate a multi-country, federated Marine Spatial Data Infrastructure (SDI) under land/ sea interface use-cases. Starting in JUL 2022, phase 3 includes an overarching, sea-based health and safety scenario incorporating the land/ sea interface in the Arctic. The scenario will demonstrate the technology and data used with OGC, IHO, and other community standards in response to a grounding event and the evacuation of a cruise ship or research vessel in the Arctic. Incorporating the Arctic Voyage Planning Guide will also be an important part of the Phase 3 use case, where the main goal is to extend the

use cases developed in the second phase of the FMSDI pilot and add the Arctic region as a new location to the demonstration scenarios.

Source: <https://www.ogc.org/projects/initiatives/fmsdi>

### 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

- iii. NGA Data Centric Production Transition – NGA is in the process of moving to a data centric production environment from the traditional product centric production environment. This development will create some efficiencies in the production process by removing some of the duplication found in the product centric model.
- iv. 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.
- v. Global Maritime Traffic Density Service - Leveraging space-borne Automatic Identification Systems (AIS), NGA is developing a Global Maritime Traffic Density Service (GMTDS) to support hydrographic risk assessments at regional and global scales. The aim of the project is to make 1-kilometer monthly raster grids of historical maritime vessel traffic accessible via web-map services such as the IHO’s INT to GIS website.

Source: [GMTDS | Data of Global Maritime Traffic Density Service](#)



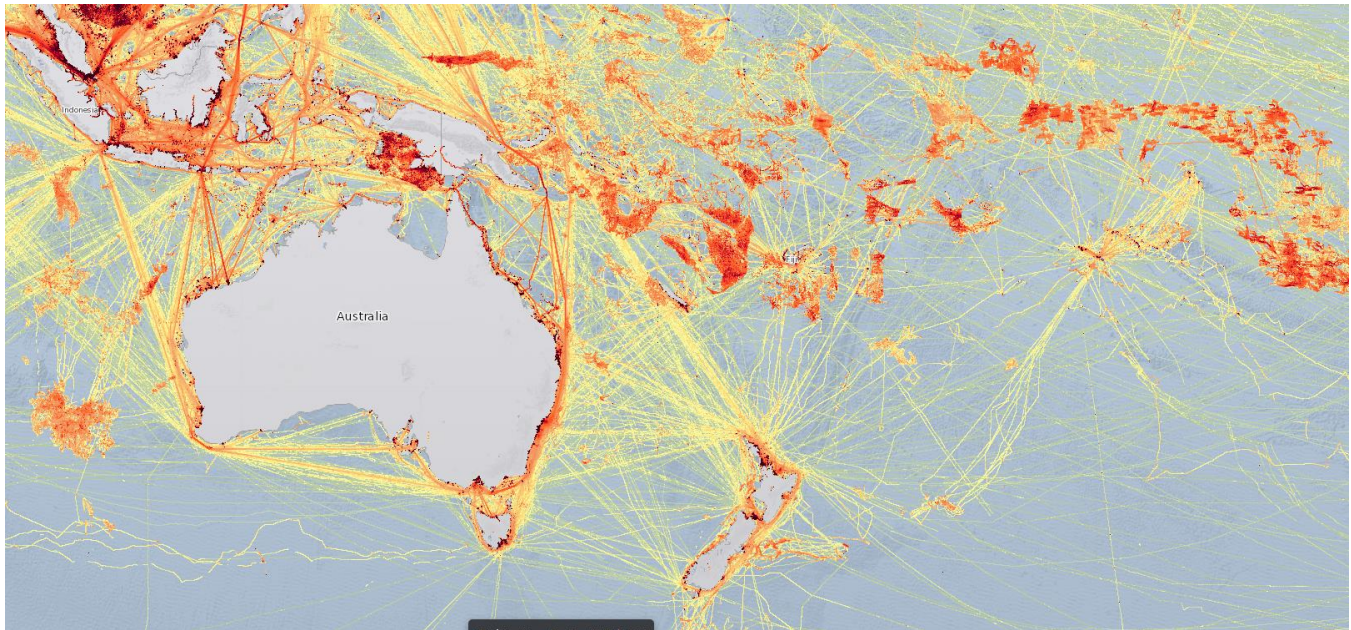


Figure 10.1 Maritime Traffic Density Map. Vessel Density: 2023

## 11. Other Activities

### 11.1 Preparations for Responses to Disasters

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

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

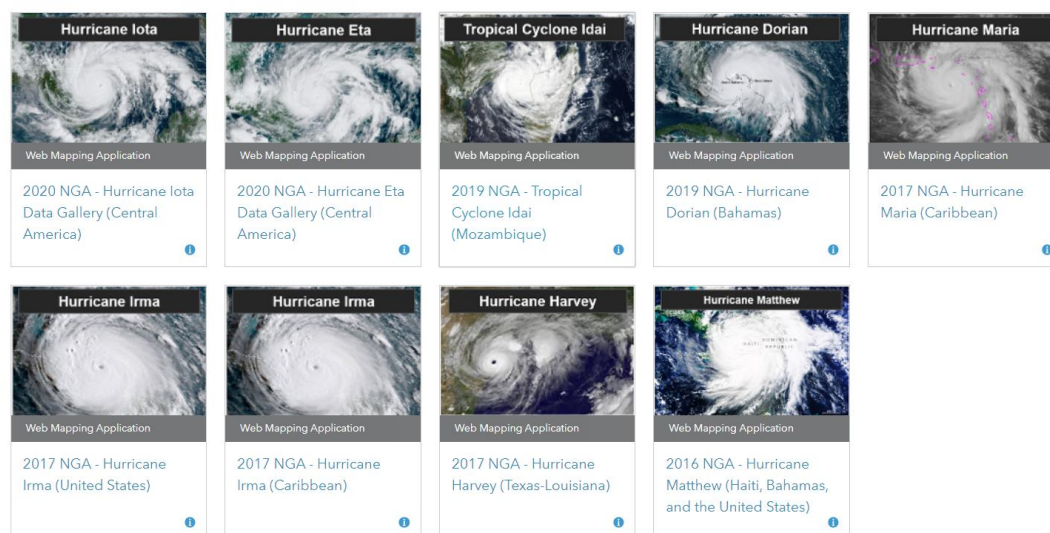


Figure 11.1: Humanitarian Assistance and Disaster relief website.

## 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 SWPHC Region.



### 13. Annex A

Please see the IHO webpage for P-5.

### 14. Annex B

Please see the IHO web page for C-55.

### 15. Annex C

Please see the MSI section of this National Report.