

Raster Sunset Update

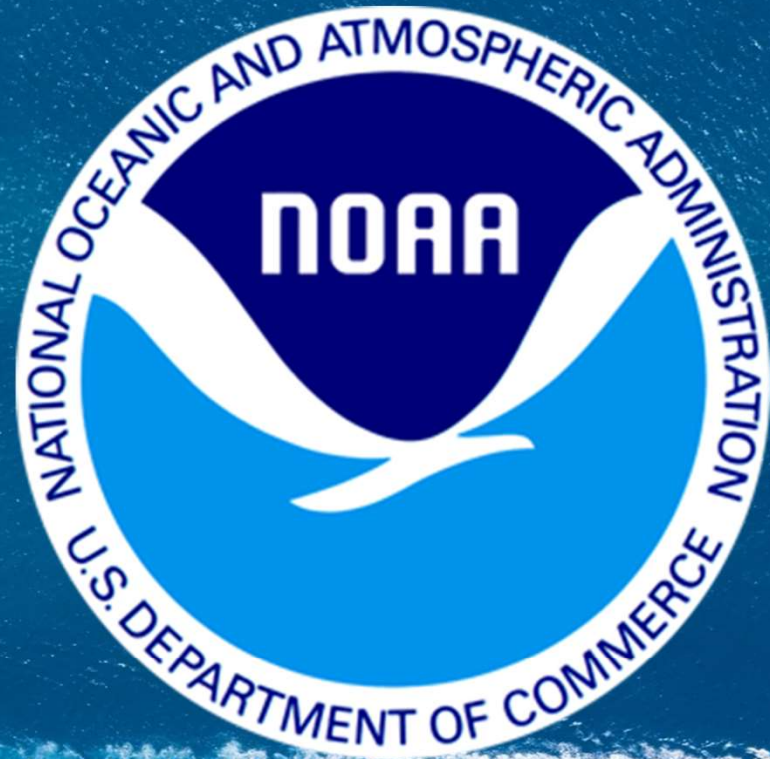
Presentation to AIWA
November 14, 2023

Kyle Ward – Coast Survey
kyle.ward@noaa.gov



Office of Coast Survey
National Oceanic and Atmospheric Administration

NOAA - National Oceanic and Atmospheric Administration



NOAA

**Under Secretary of Commerce for Oceans &
Atmosphere, and NOAA Administrator**
Dr. Richard W. Spinrad



**National Marine
Fisheries Service**



**National Ocean
Service**



**National
Environmental
Satellite, Data &
Information
Service**



**Oceanic &
Atmospheric
Research**



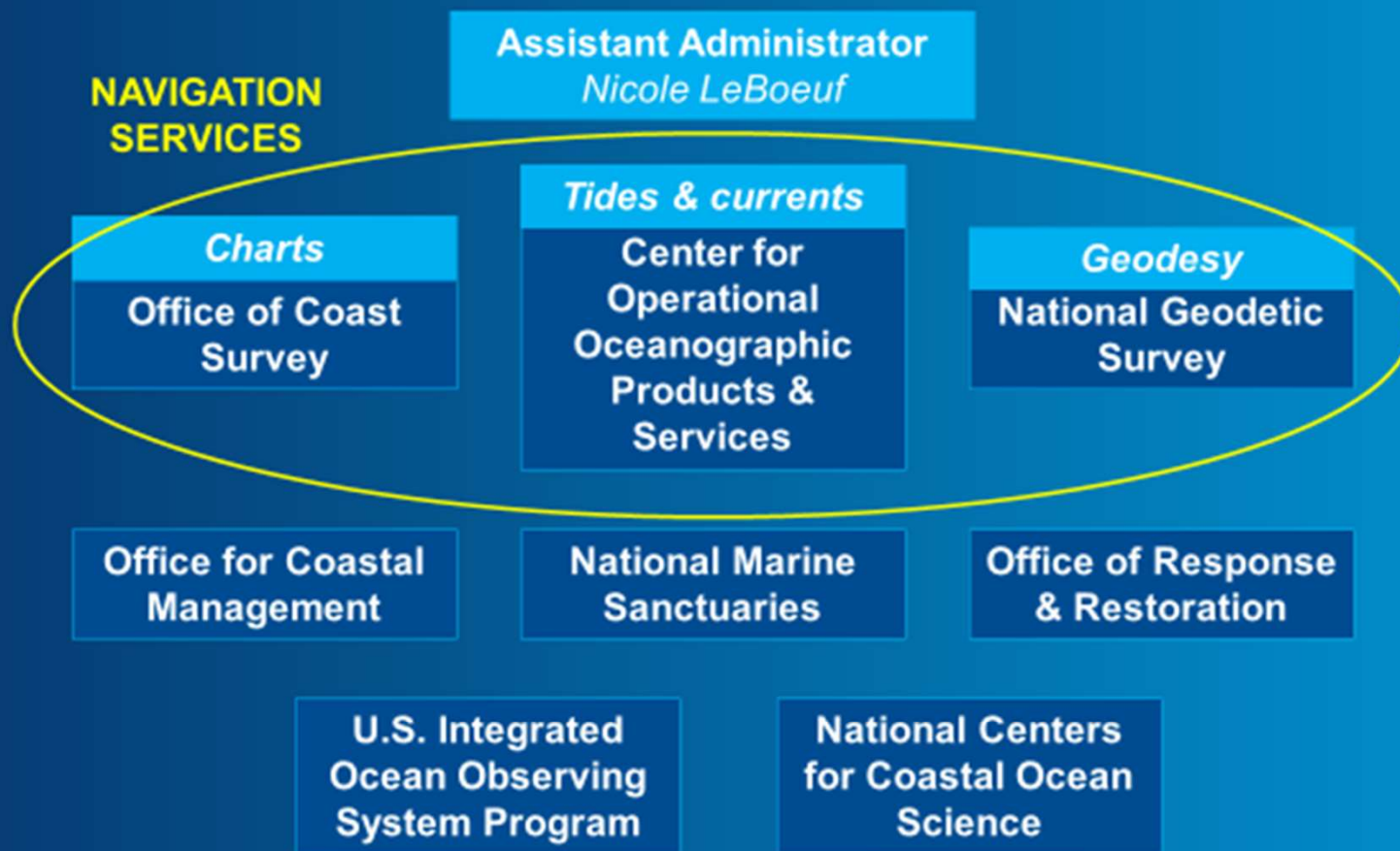
**National Weather
Service**
www.weather.gov/pqr/about



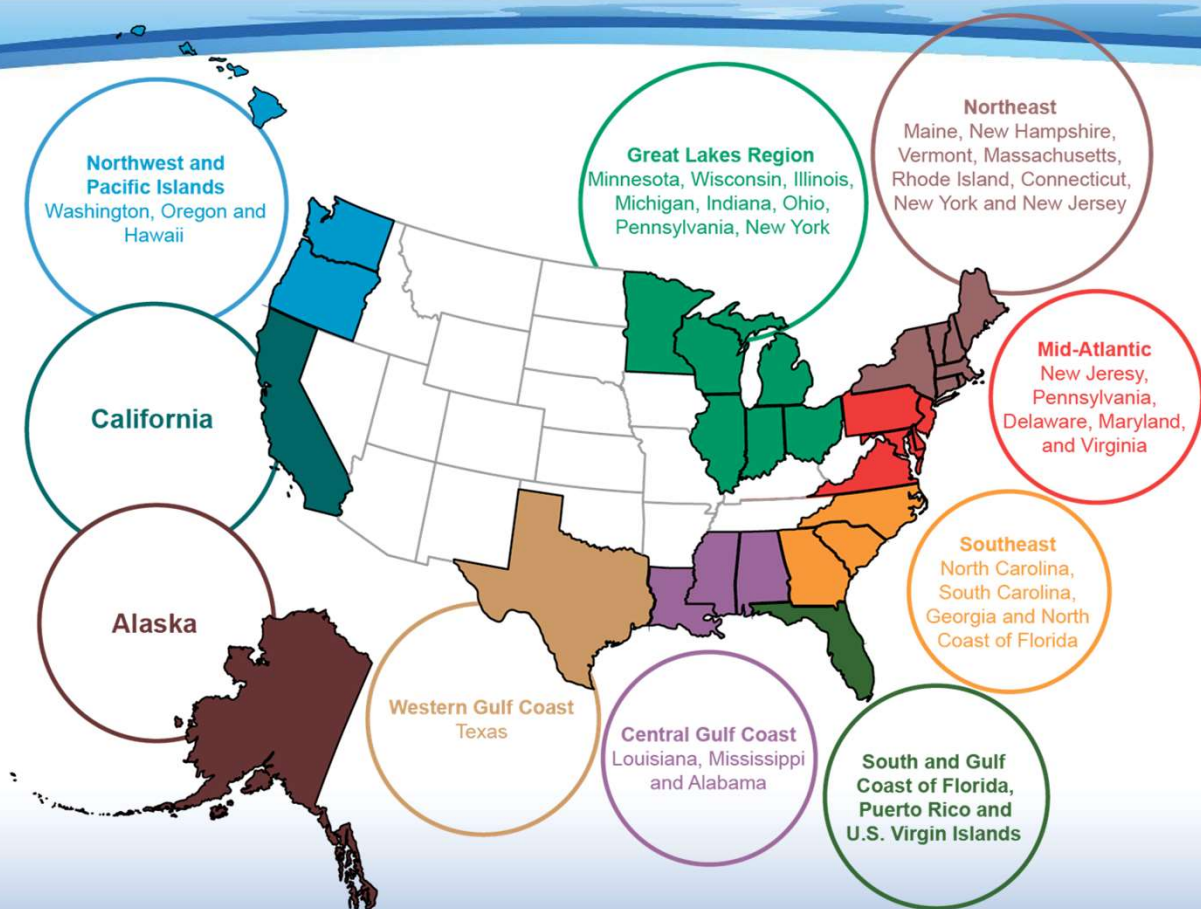
**Marine & Aviation
Operations**



National Ocean Service



Regional Navigation Managers



<https://nauticalcharts.noaa.gov/customer-service/regional-managers/index.html>

East Coast Navigation Managers



Northeast



Name: Colleen Roche
Email: northeast.navmanager@noaa.gov
Office: 401-782-3252
Mobile: 401-545-0174
Fax:

Colleen became a Navigation Manager in 2018 after working for NOAA for 7 years. Before coming to NOAA she worked as a coastal engineer for 8 years supporting port design and expansion, environmental remediation and beach renourishment efforts. She looks forward to serving as the liaison between NOAA and community.

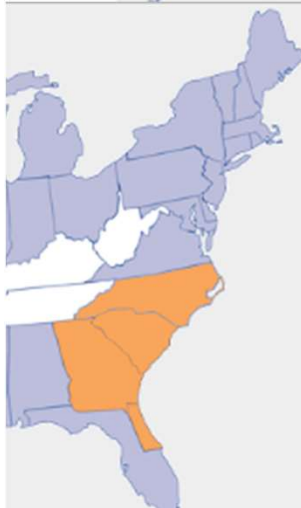


Mid-Atlantic



Name: Ryan Wartick
Email: midatlantic.navmanager@noaa.gov
Office:
Mobile: 571-302-0995
Fax:

Ryan Wartick first became a Navigation Manager in 2015 and more recently resumed the role in 2020 after 21+ years of combined active duty service in the Navy and NOAA Corps. He has held a variety of assignments over the years helping NOAA to make and update nautical charts from the Arctic to the Gulf of Mexico and sailed on each NOAA Hydrographic ship in the process. Ryan is excited to continue supporting mariners and the industry.

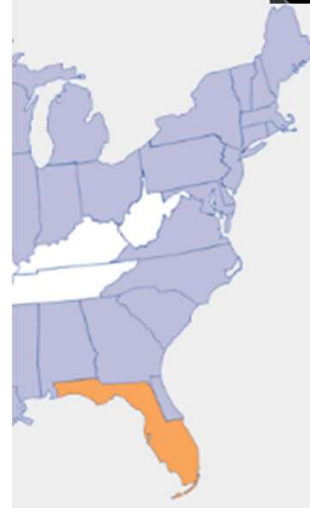


Southeast



Name: Kyle Ward
Email: kyle.ward@noaa.gov
Office: 843-740-1153
Mobile: 301-651-4852
Fax: 843-740-1329

Kyle Ward became a Navigation Manager in 2011 after working 8 years at NOAA. He enjoys updating charts making boating safer for professional and recreational mariners. A highlight for him has been coordinating hurricane response surveys for ports affected by hurricanes Sandy and Matthew.



South Florida, Puerto Rico, U.S. Virgin Islands



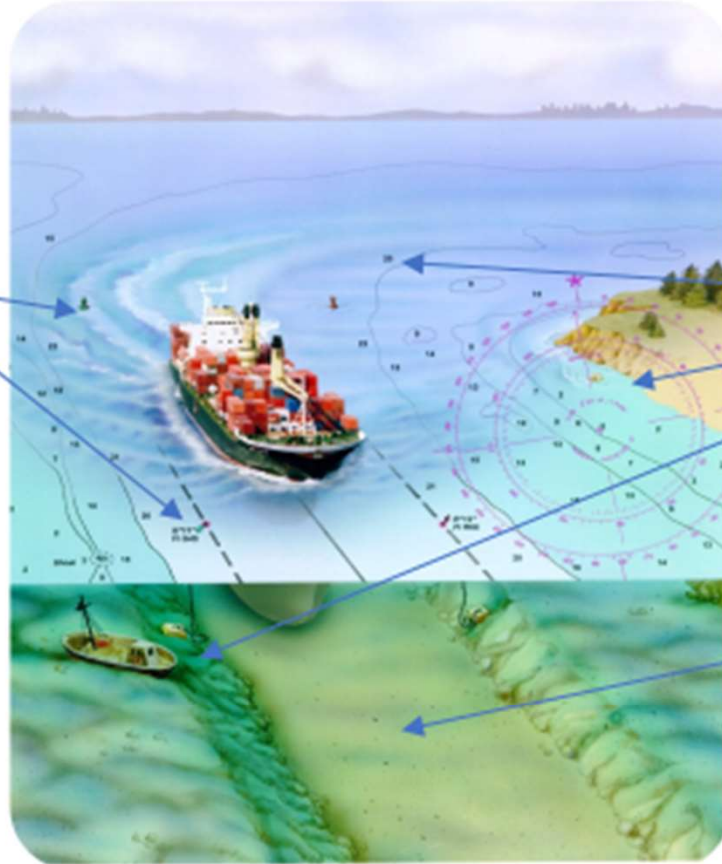
Name: Nicolás Alvarado
Email: florida.navmanager@noaa.gov
Office:
Mobile: 202-253-9536
Fax:

Nicolás (Nic) became a Navigation Manager in 2021 after working at NOAA for 17 years. He worked as a fishery management specialist and an Endangered Species Act consulting biologist for 8 years supporting NOAA Fisheries and worked as a physical scientist for 9 years supporting NOAA Research in the Office of Ocean Exploration & Research. Nicolas holds a Ph.D. from Texas A&M University in Oceanography.

Federal Charting Responsibilities



Aids to Navigation
Local Notice to Mariners



Shoreline, Hazards
Soundings, Contours

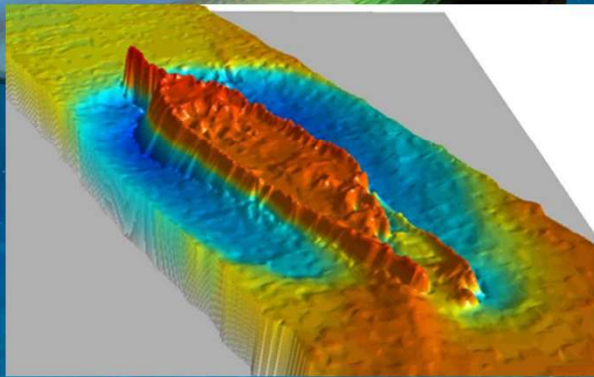
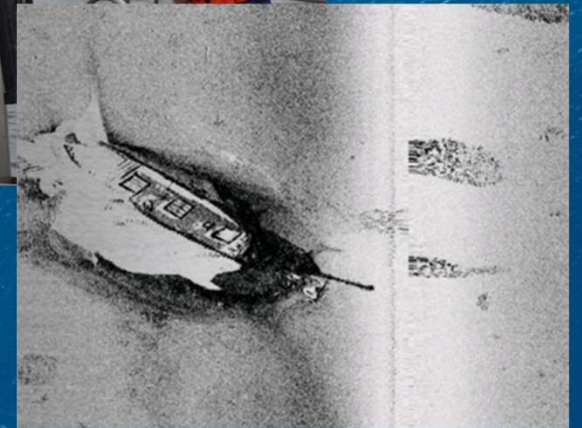
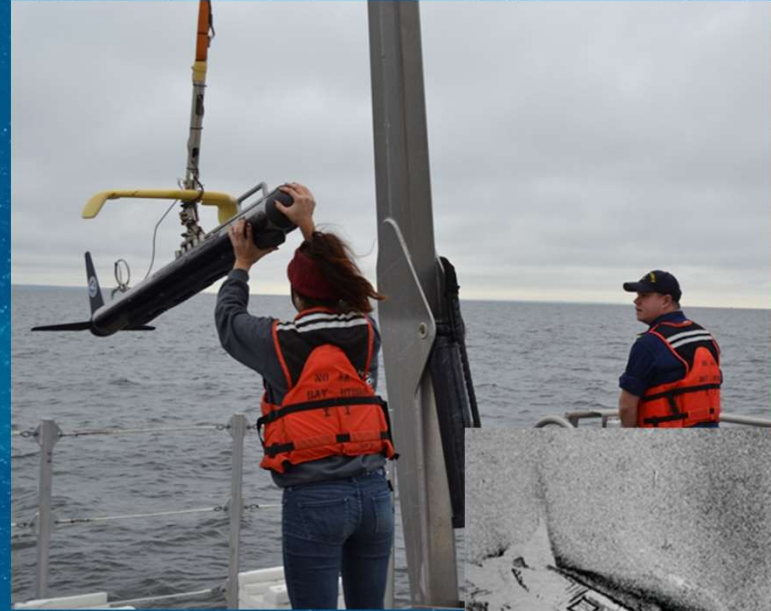
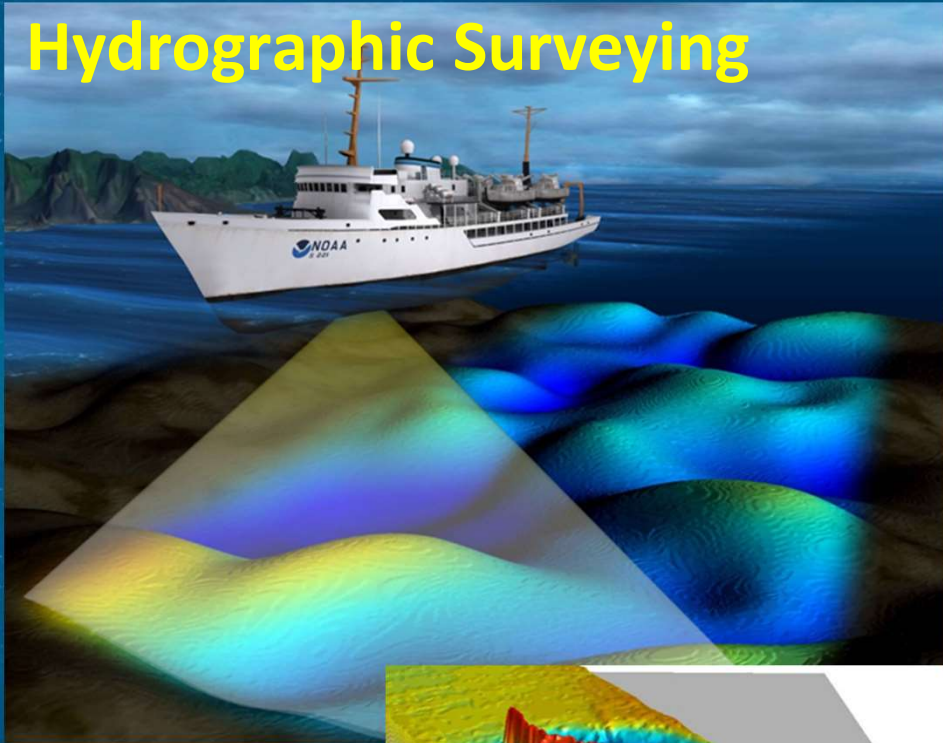


Federally Maintained
Channels



Office of Coast Survey
National Oceanic and Atmospheric Administration

Hydrographic Surveying



Data is collected in the field, then needs to be processed and verified, then...

Where does it go? (Where can you find it?)

NCEI - National Centers for Environmental
Info

For archive and public distribution

NBS - National Bathymetric Source


Continually updated, "best" high

rez bathy


ENC - Electronic Navigational Charts



NCEI - Crowdsourced Bathymetry Initiative



International Hydrographic Organization
Organisation Hydrographique Internationale



IHO DCDB Home Contribute Data **Crowdsourced Bathymetry** CSB Mapping Projects

IHO Crowdsourced Bathymetry Initiative

Crowdsourced bathymetry (CSB) is the collection and sharing of depth measurements from vessels, using standard navigation instruments, while engaged in routine maritime operations. CSB can be used to supplement the more rigorous and scientific bathymetric coverage done by hydrographic offices, industry, and researchers around the world.

In 2014, the IHO recognized that traditional survey vessels alone could not be relied upon to solve data deficiency issues and agreed there was a need to encourage and support all mariners in an effort to "map the gaps." An initiative was established to support and enable mariners and professionally manned vessels to collect CSB. This approach leverages underway x, y, z, t data already being collected on vessels with common commercial echo sounders and Global Navigation Satellite System receivers.


Contributing CSB Data to the DCDB

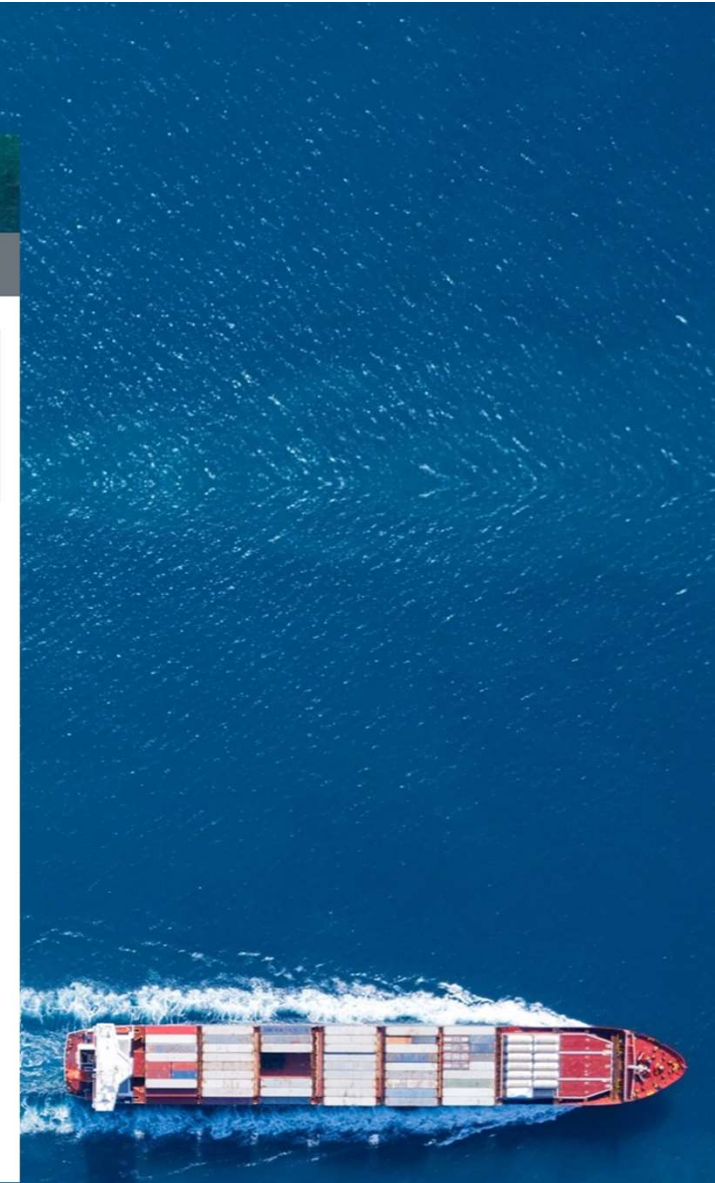
The DCDB accepts CSB contributions through a network of "Trusted Nodes," which may be organizations, companies or universities serving as data liaisons between mariners (data collectors) and the DCDB. Trusted Nodes may supply data logging equipment, provide technical support to vessels, download data from data loggers, and be responsible for data transfer directly to the DCDB. The IHO DCDB intends to publicly release the Trusted Node's data in its original form under the [CC0](#) public domain dedication via the [IHO DCDB Viewer](#).

The following documents clarify some aspects on CSB related to the submission of data to IHO DCDB:

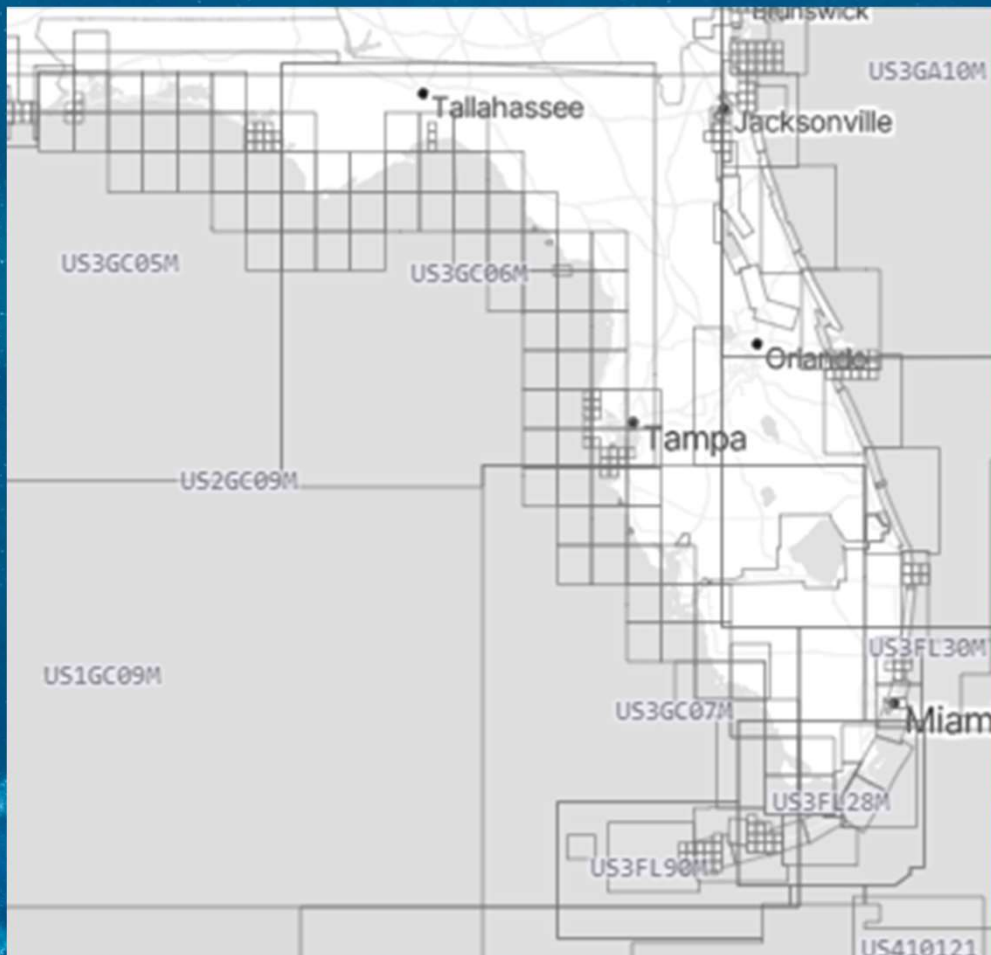
- [IHO CSB Trusted Node Agreement Form Template](#)
- [Guidance for Submitting CSB Data to the IHO DCDB](#)
- [Sample CSB File Formats](#)
- [Example CSB GeoJSON file](#)

Those interested in contributing data or becoming a Trusted Node should contact the DCDB at bathydata@iho.int.





ENC and RNC - www.nauticalcharts.noaa.gov



This image shows the same ENC map as the left, but with a metadata popup window overlaid. The popup contains the following information:

Last Edition Chart: 11450LE	
Title:	Fowey Rocks to American Shoal
Type:	Coastal Chart
Scale:	1:180,000
Edition:	11
Published:	9/1/2011
Chart will be canceled on undefined	

The map also shows a green track and various chart numbers like 11366, 11379, 11382, 11388, 11405, 11160, 11140, 11005, 11440, 11442, 11450LE, 11469, 11013, and 414.



ENC Gridding

Home

Future of NOAA Charts

Charts

Publications

Data

Learn

Custom

Paper Charts (RNC & PDF) **Electronic Charts (ENC)** Coast Pilot Help

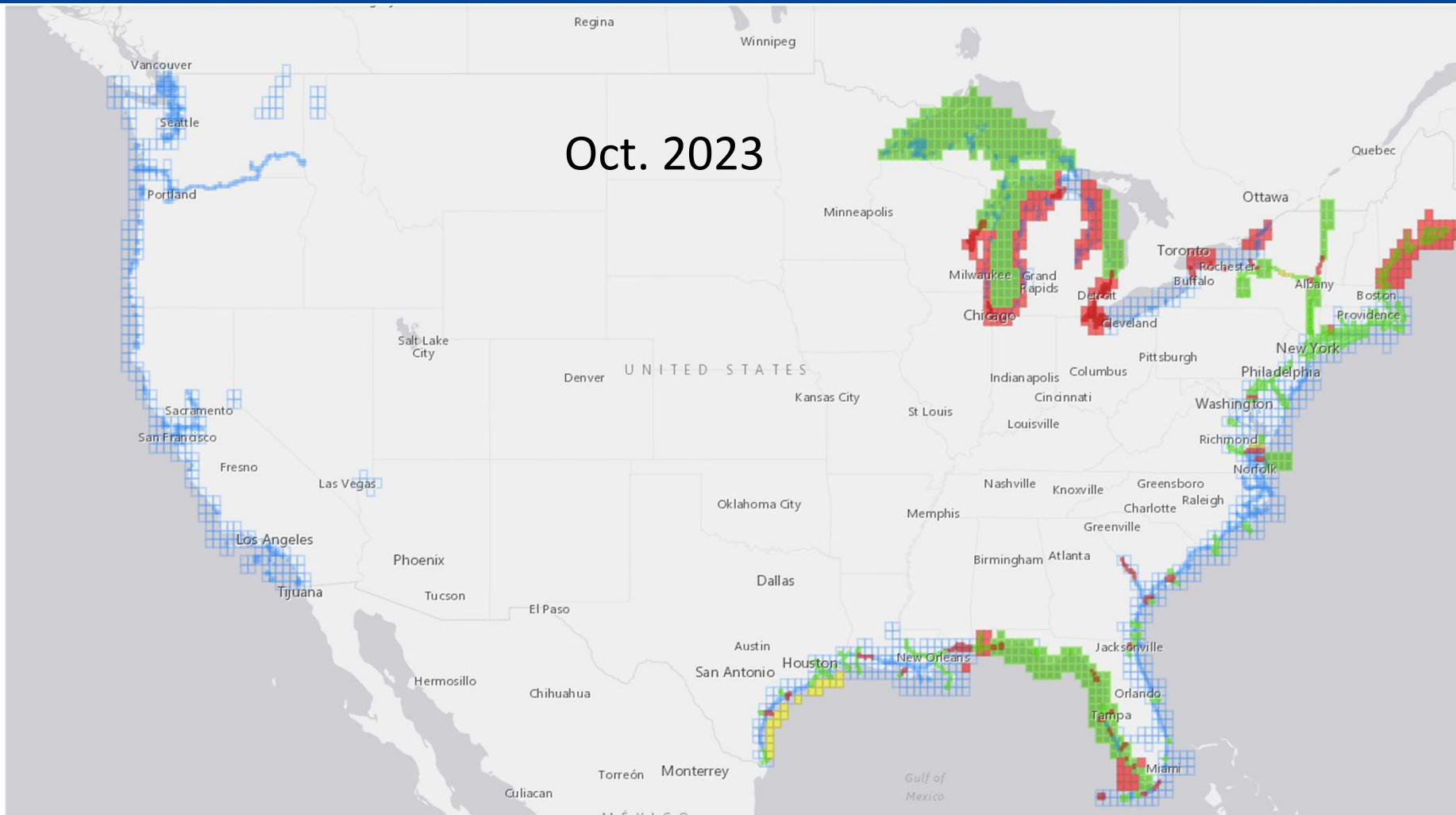
JS4FL1TO US4FL1TP US4FL1TQ Submit

Sanford
Titusville
Orlando
Kissimmee
Melbourne
Tampa
Saint Petersburg
Vero Beach
Fort Pierce
Sarasota
Port Charlotte

US4FL80M
US4FL15Q
US4FL10Q
US4FL13M

distribution.charts.noaa.gov/ENC/rescheme/

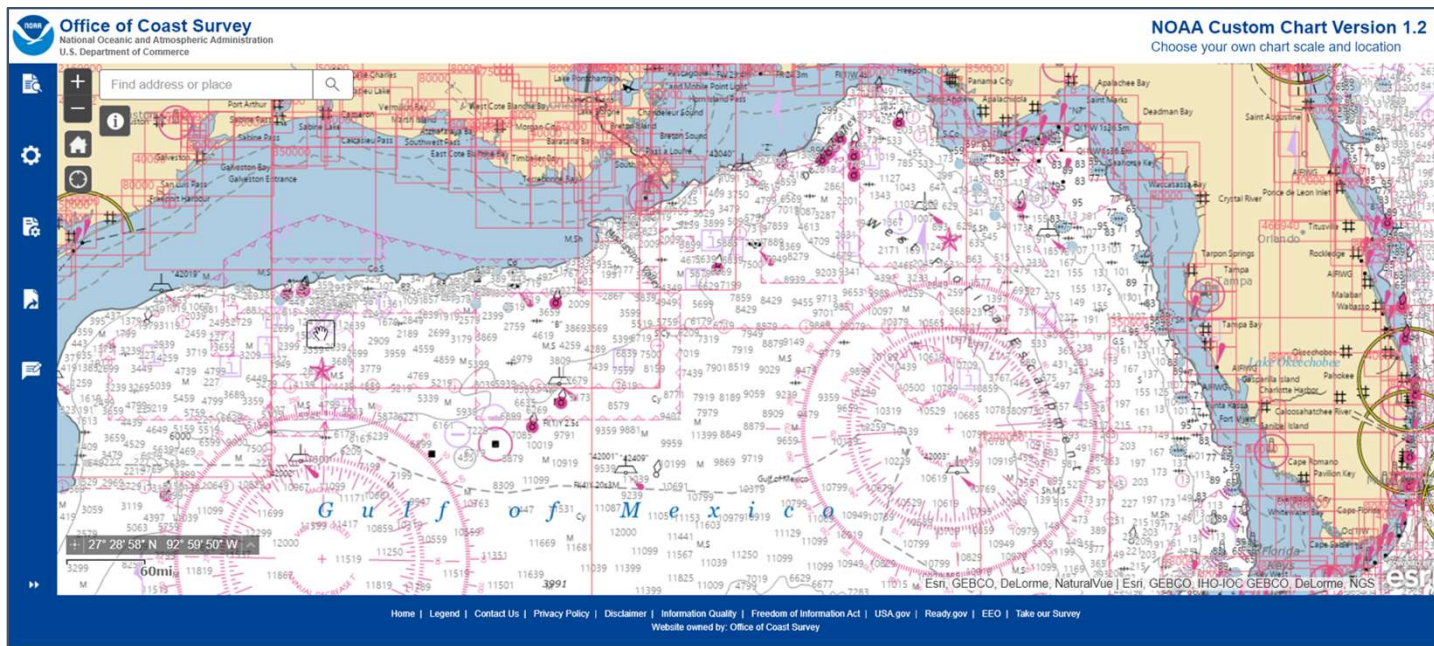
Oct. 2023



NOAA Custom Chart Tool

NOAA Custom Chart (NCC) is a web app that enables users to create their own customized nautical charts directly from the latest official NOAA electronic navigational chart (NOAA ENC®) data.

NCC outputs geospatially referenced Portable Document Format (PDF) files using the paper size, scale, and location selected by the user. Depths can be displayed in meters, feet, or fathoms and there are a few other display options, such as changing the depth at which a shallow water blue tint is applied and the depiction of a "safety contour" based on a vessel's draft.



NOAA Custom Chart Tool

Export Functions

New charts and charts retrieved from your Personal Chart Catalog are shown in this list. To export, delete, or move selected charts into your catalog, click the associated button.

Chart Catalog

[Open Chart Catalog Viewer](#)

Active Catalog

Chart Queue

<input type="text" value="11478_PORT CANAVERAL"/>	0:02:44 Export Succeeded	Open
<input type="text" value="11481_APPROACHES TO PORT CANAVERAL"/>	0:02:30 Export Succeeded	Open

[Export Selected Charts](#) [Delete Selected Charts](#)

[Add Selected Charts to Chart Catalog →](#)

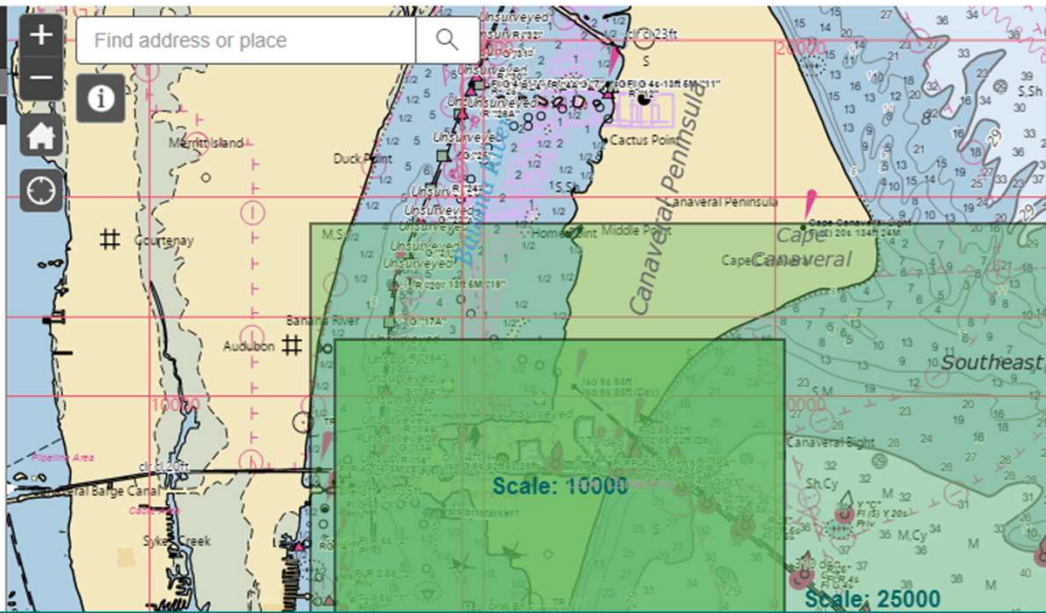


Chart Catalog Viewer

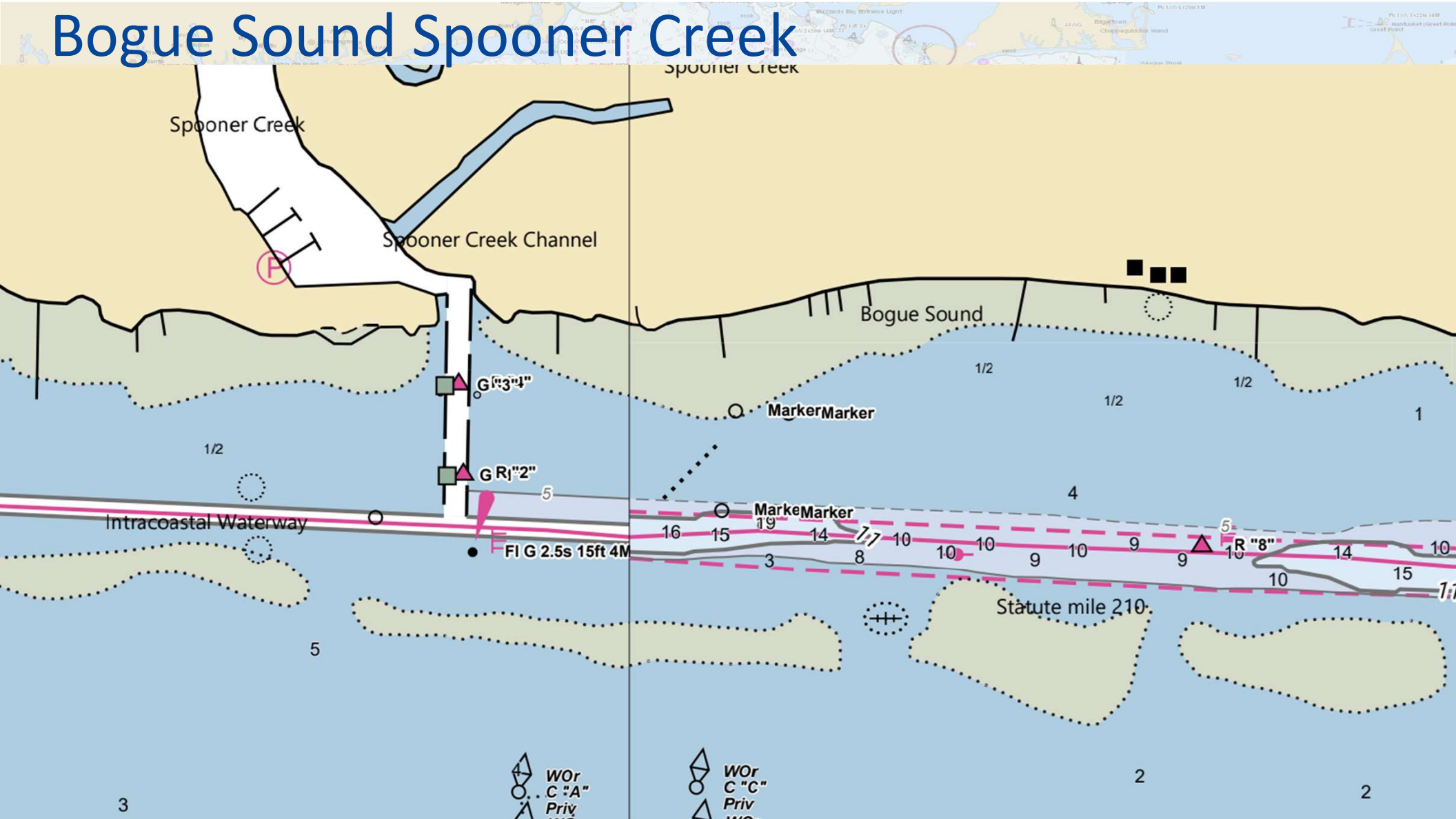
Catalog changes will be lost if you close the application before clicking "Save Chart Catalog".

[Open Existing Chart Catalog](#) [Create / Save Chart Catalog](#)

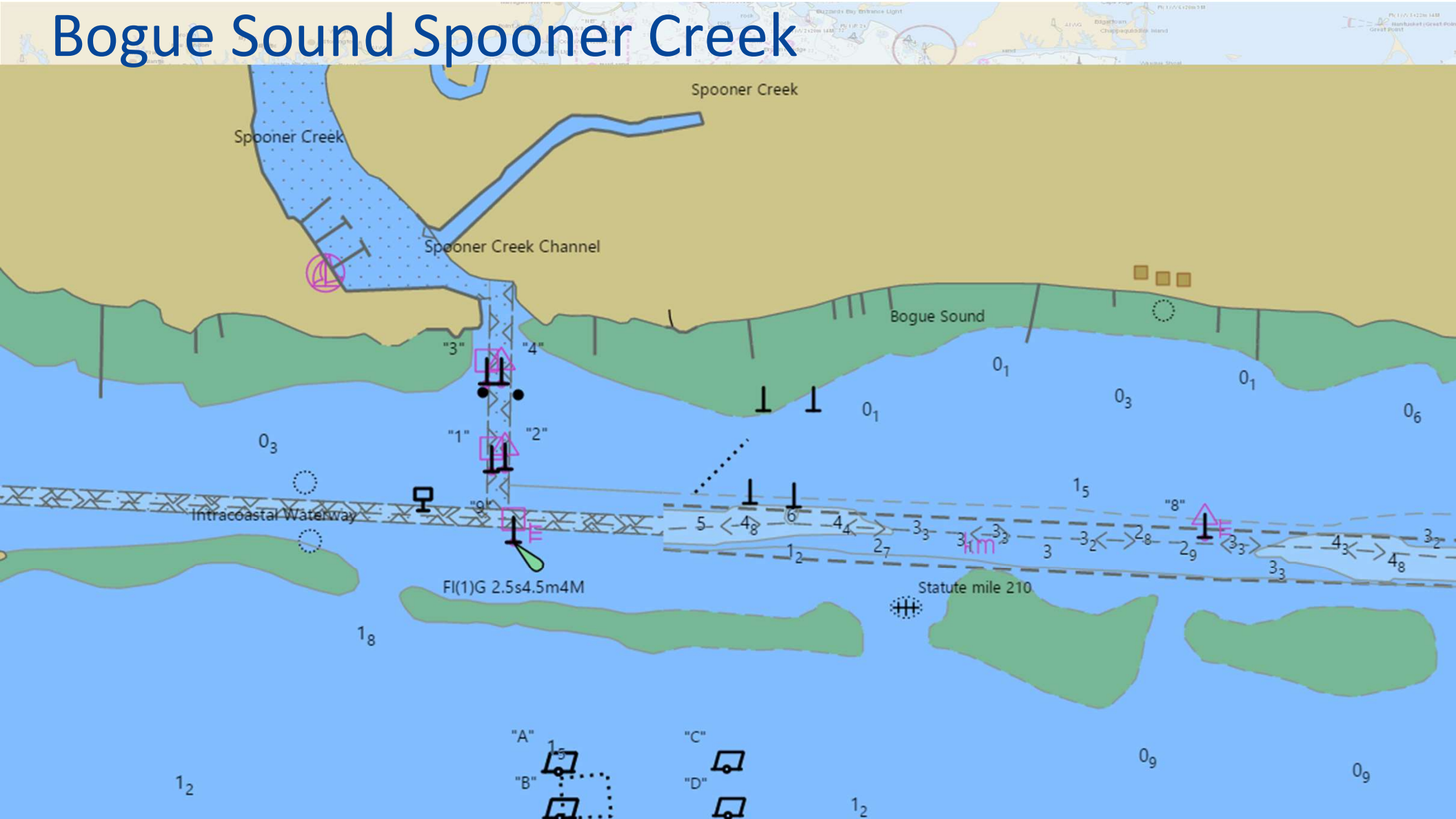
Charts in Active Chart Catalog

	Actions	Date	Title	Scale	Page Size	Orientation	Coordinates	Depth Units	Depth Zone Tints
<input checked="" type="checkbox"/>	Delete	1/25/2023	11481_APPROACHES TO PORT CANAVERAL	25000	ANSI E	Landscape	28.38°N -80.527°W	Feet	Four

Bogue Sound Spooner Creek



Bogue Sound Spooner Creek



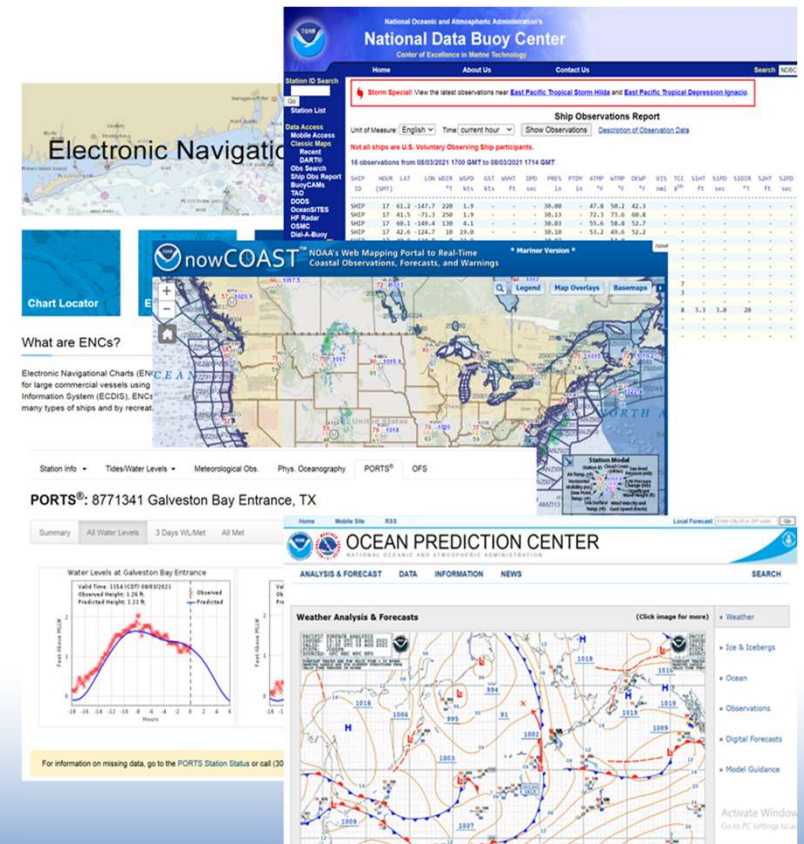
What is Precision Marine Navigation?

...the ability of a vessel to safely and efficiently navigate and operate in close proximity to the seafloor, bridges, narrow channels, or other marine hazards.



Difficult to access and process NOAA's navigation data, due to:

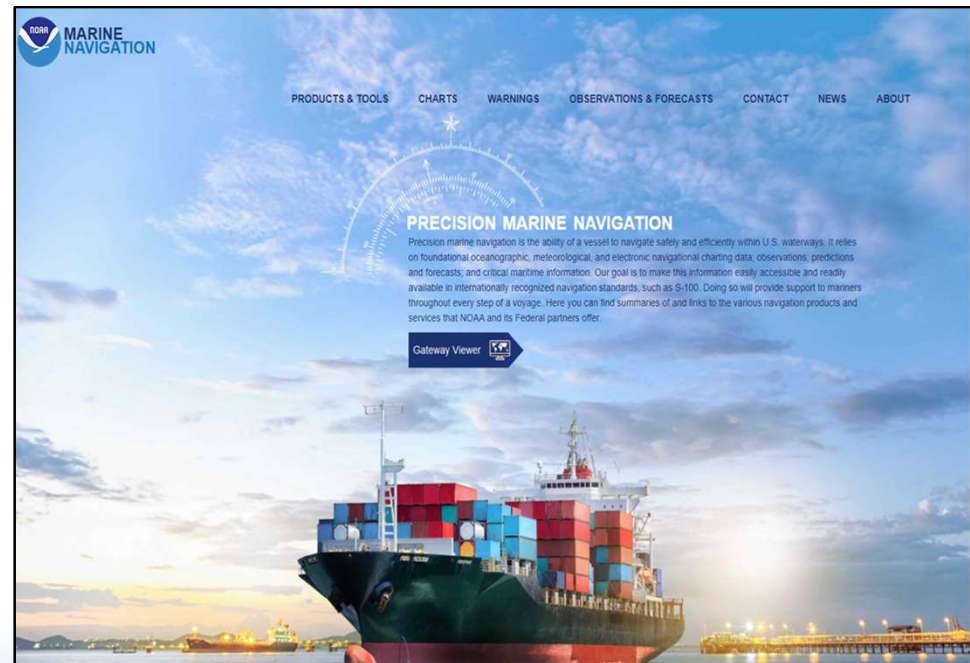
- Multiple devices and systems required to access the data
- Datasets spread across various websites and data servers
- Datasets are encoded in different formats that are not navigation standards



The collage illustrates various NOAA navigation data sources:

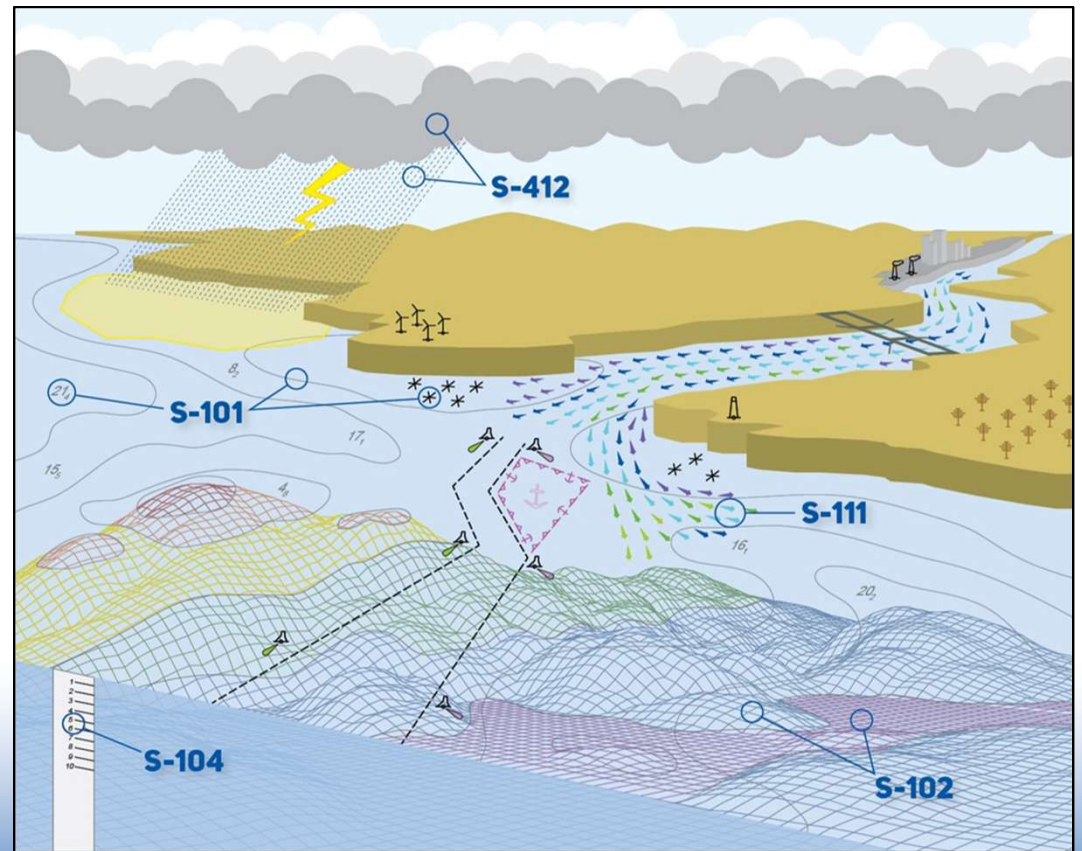
- National Data Buoys:** A screenshot of the National Data Buoys Center website showing a search for station ID 5252 and a table of ship observations with columns for station ID, hour, latitude, longitude, depth, and various measurements.
- Electronic Navigational Charts (ENCs):** A screenshot of the nowCOAST website showing a map of the Galveston Bay Entrance, TX, with a legend and map overlays.
- Ocean Prediction Center:** A screenshot of the Ocean Prediction Center website showing a weather analysis and forecast map for the Galveston Bay Entrance, TX, with a legend and map overlays.

- Leveraging International Standards (S-100)
- Precision Marine Navigation Data and Dissemination Services
- Machine to Machine capability
- Marinenavigation.noaa.gov Website



S-100 Data Products

- **S-101:** Electronic Navigational Charts (ENC)
- **S-102:** Bathymetric Surface
- **S-104:** Water Level Information
- **S-111:** Surface Currents
- **S-41X:** Weather Overlays



What are we doing right now...

Test areas in NY/NJ and LA/LB

Charleston, Savannah, MS

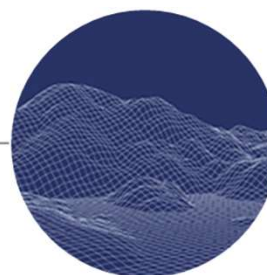
River, other...

**Other areas will be added as the
National Bathymetric Source (NBS) is built
out nationally.**

What does it look like...



National Bathymetric Source Products



Navigation

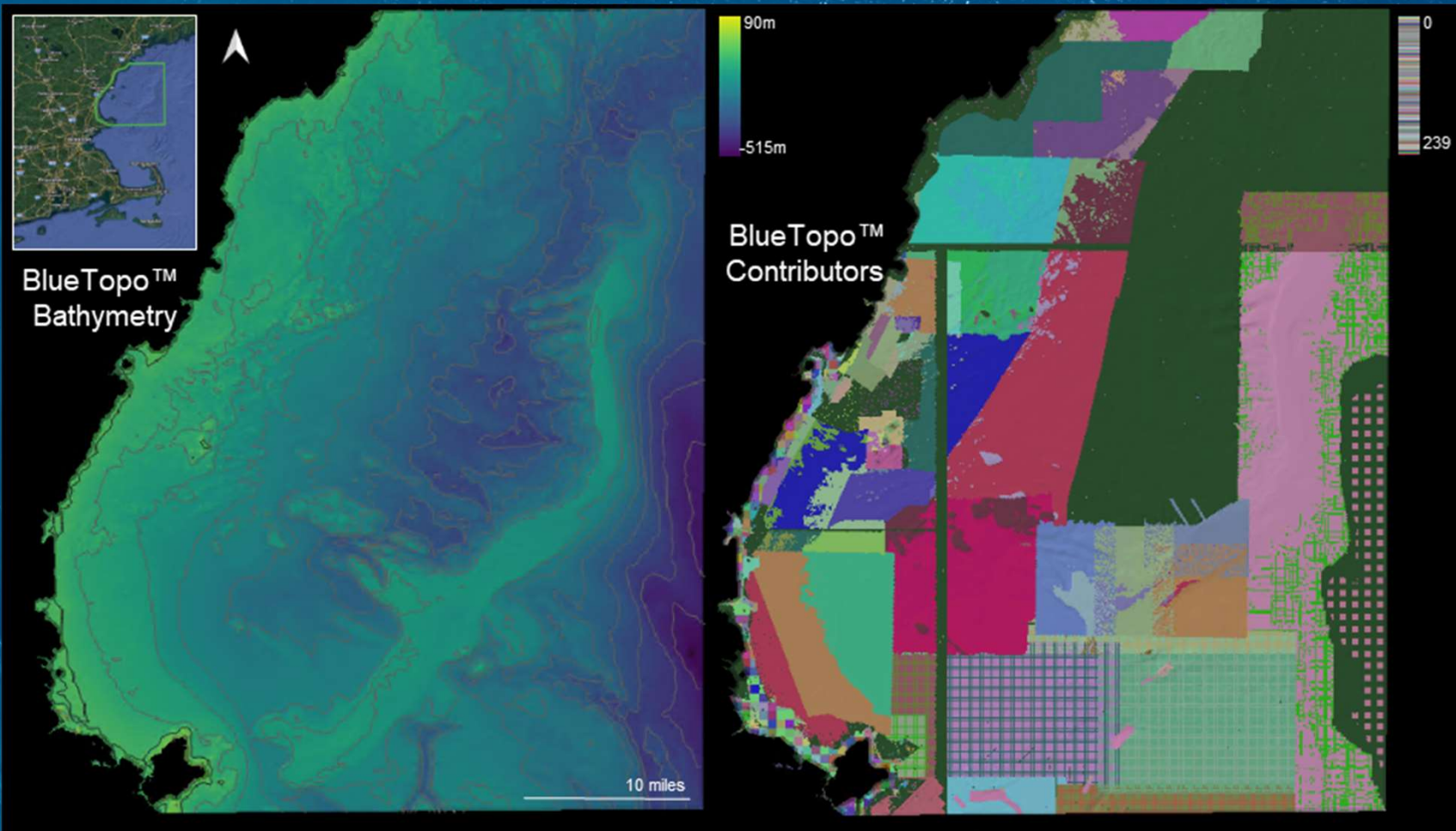


Internal

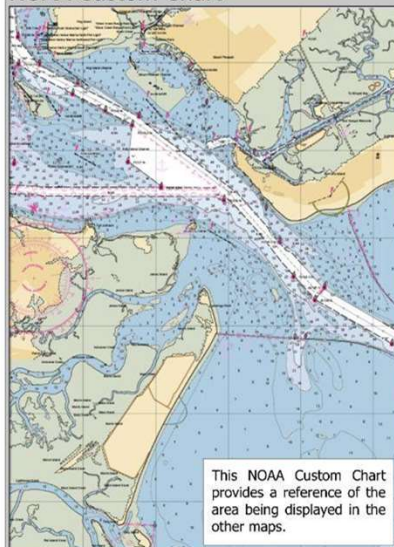


Public

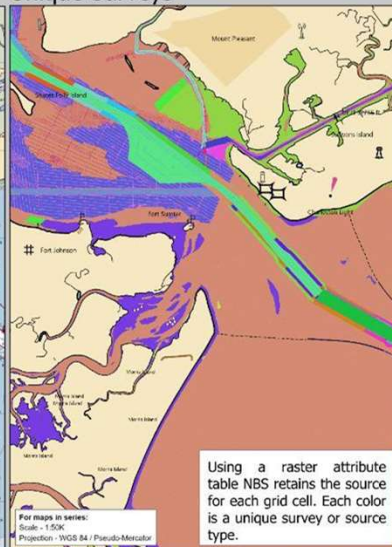
NBS - National Bathymetric Source



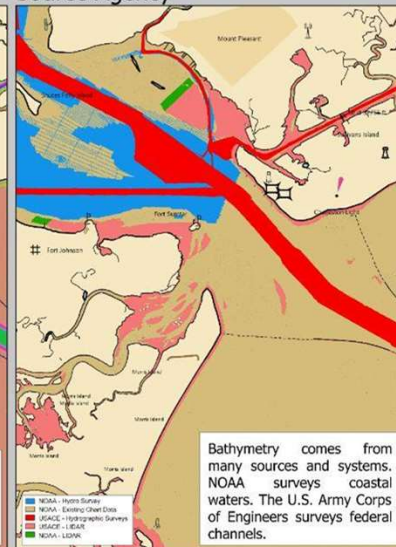
NOAA Custom Chart



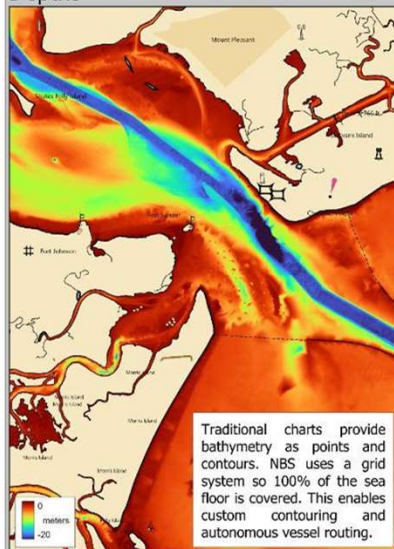
Unique Surveys



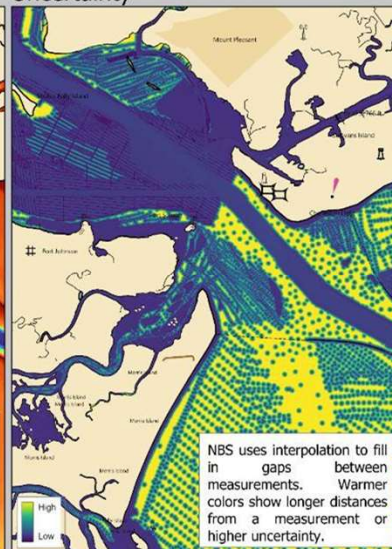
Source Agency



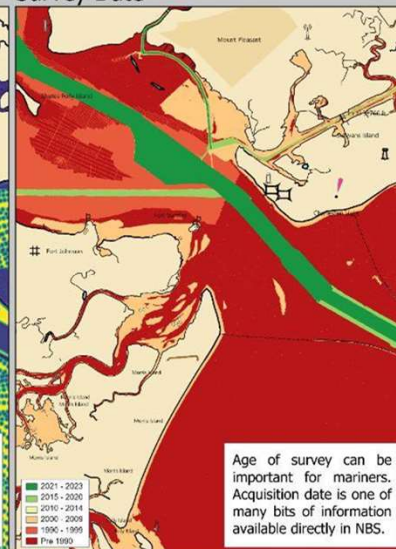
Depths



Uncertainty

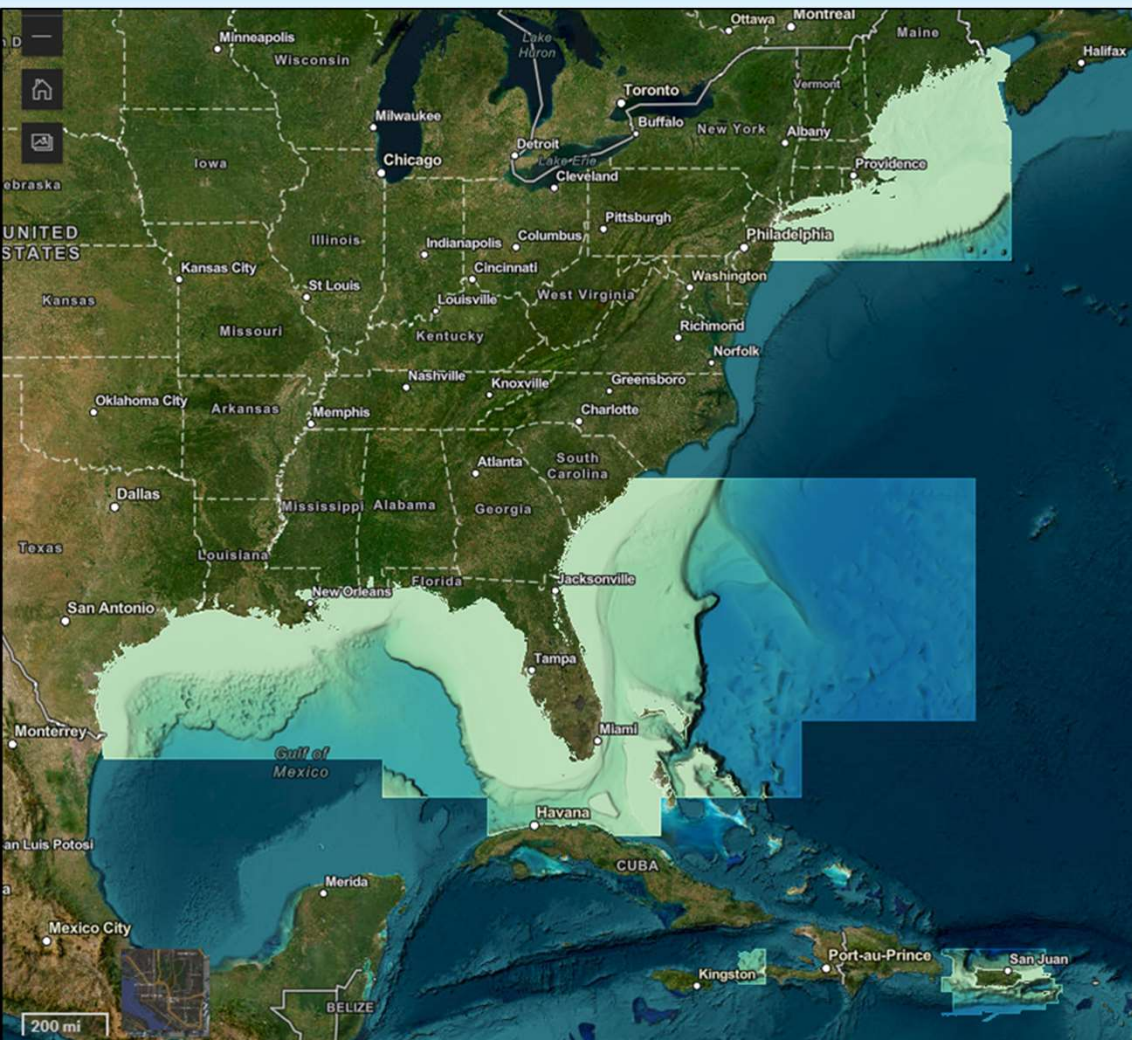


Survey Date





BlueTopo™

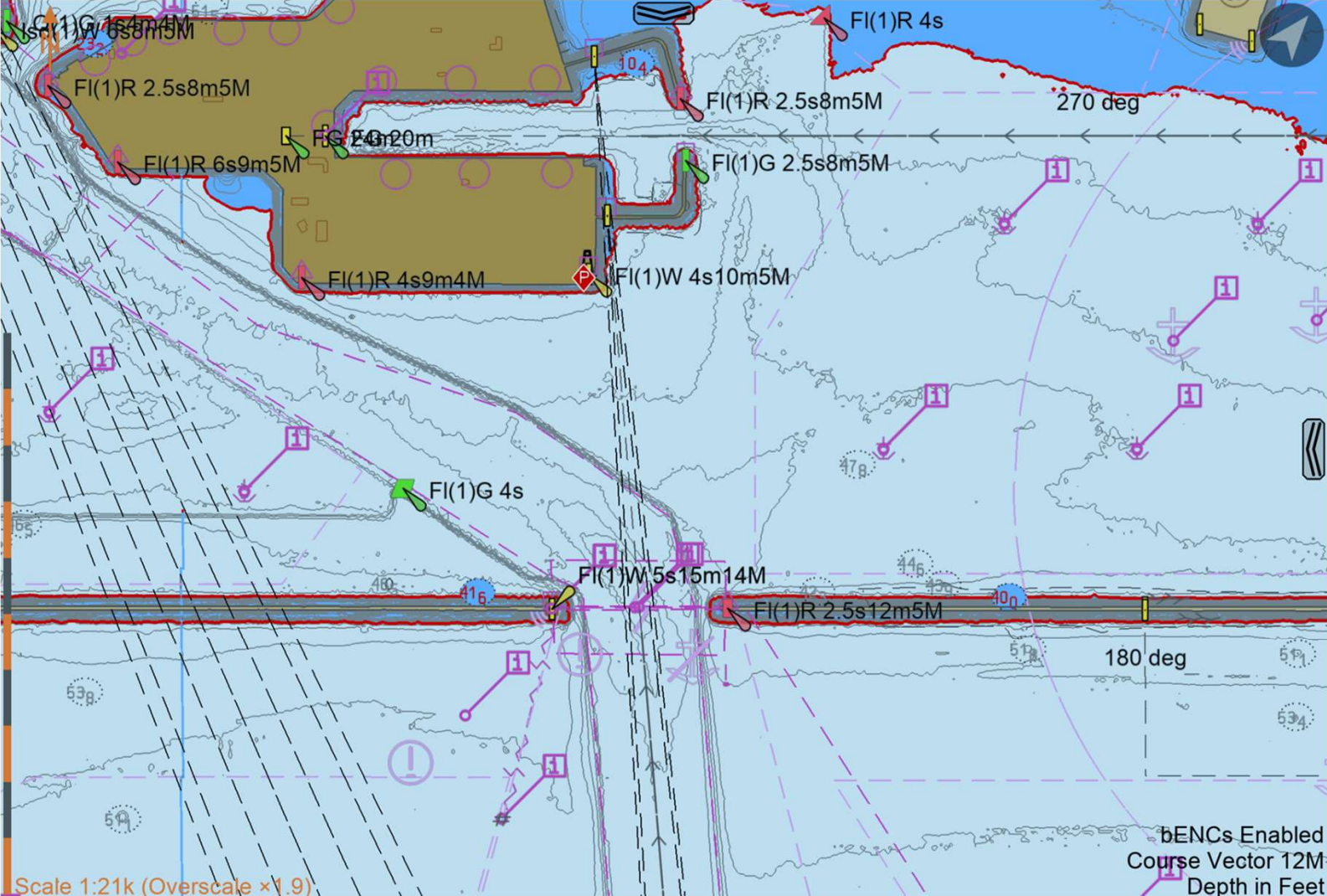


NOT FOR NAVIGATION

Data is on NAVD88

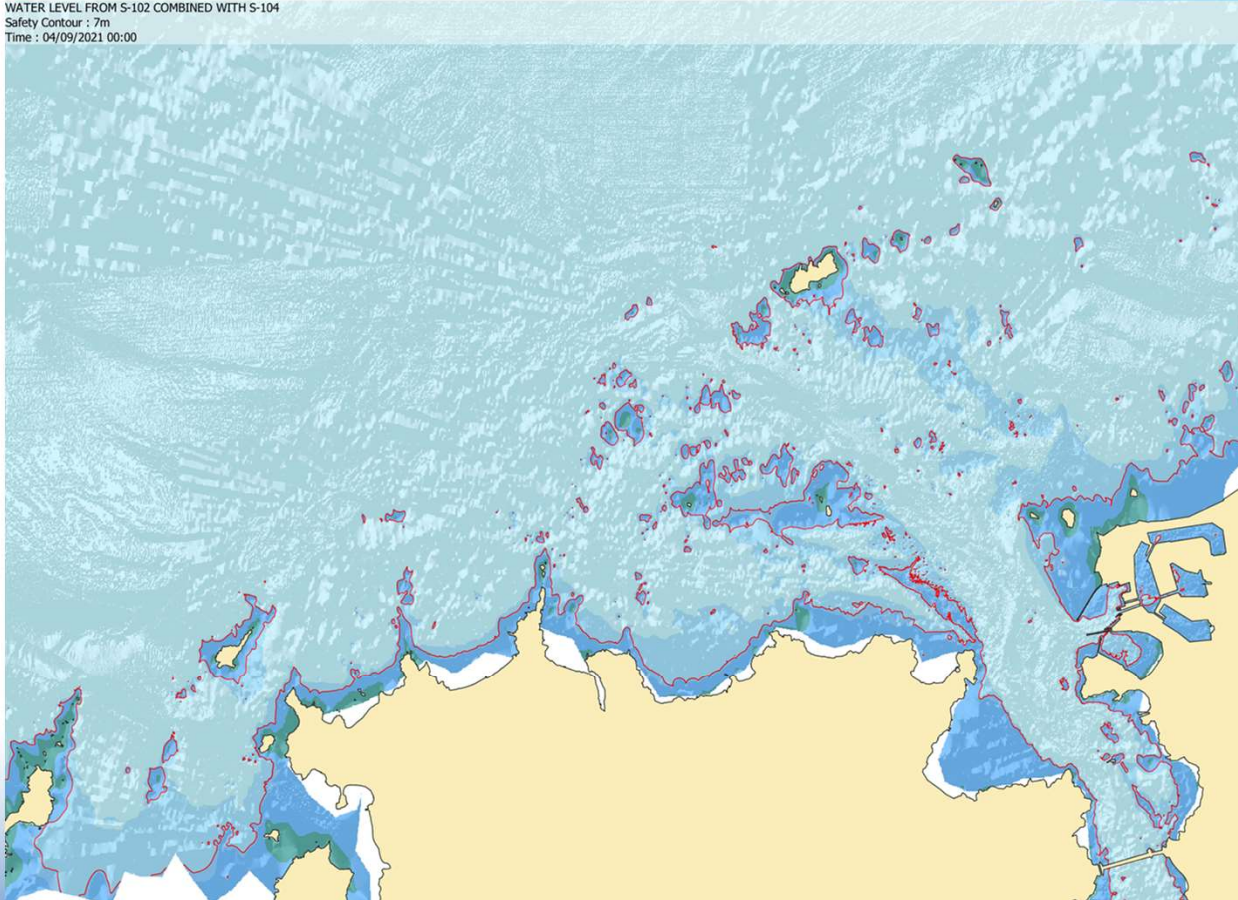
May include unqualified data.

<https://nauticalcharts.noaa.gov/data/bluetopo.html>



Integrated Water Level and Bathymetry

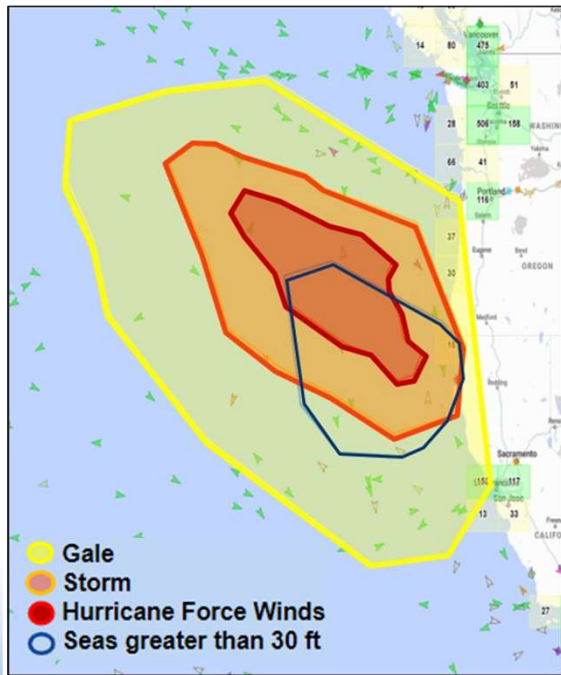
WATER LEVEL FROM S-102 COMBINED WITH S-104
Safety Contour : 7m
Time : 04/09/2021 00:00



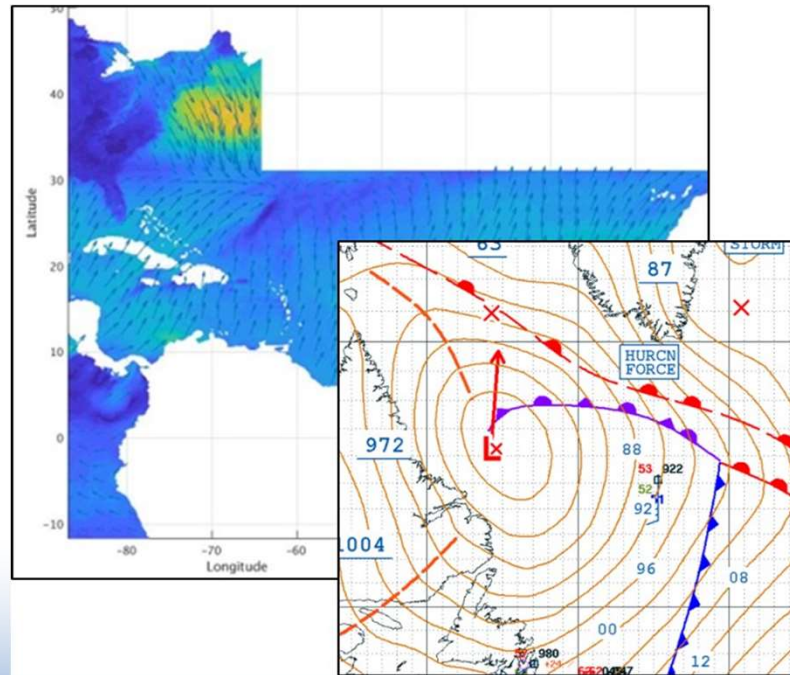
Animation Courtesy of SHOM

Safety Contour 7m. The safety contour changes are based on S-102 bathymetry and Water Level Adjustment (WLA), using S-104, over a period of 21 hours.

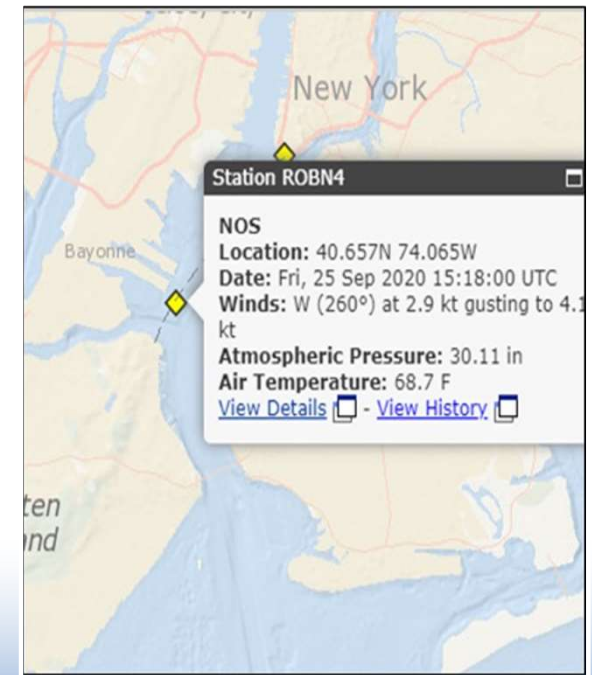
Wave and Weather Hazards (S-412)

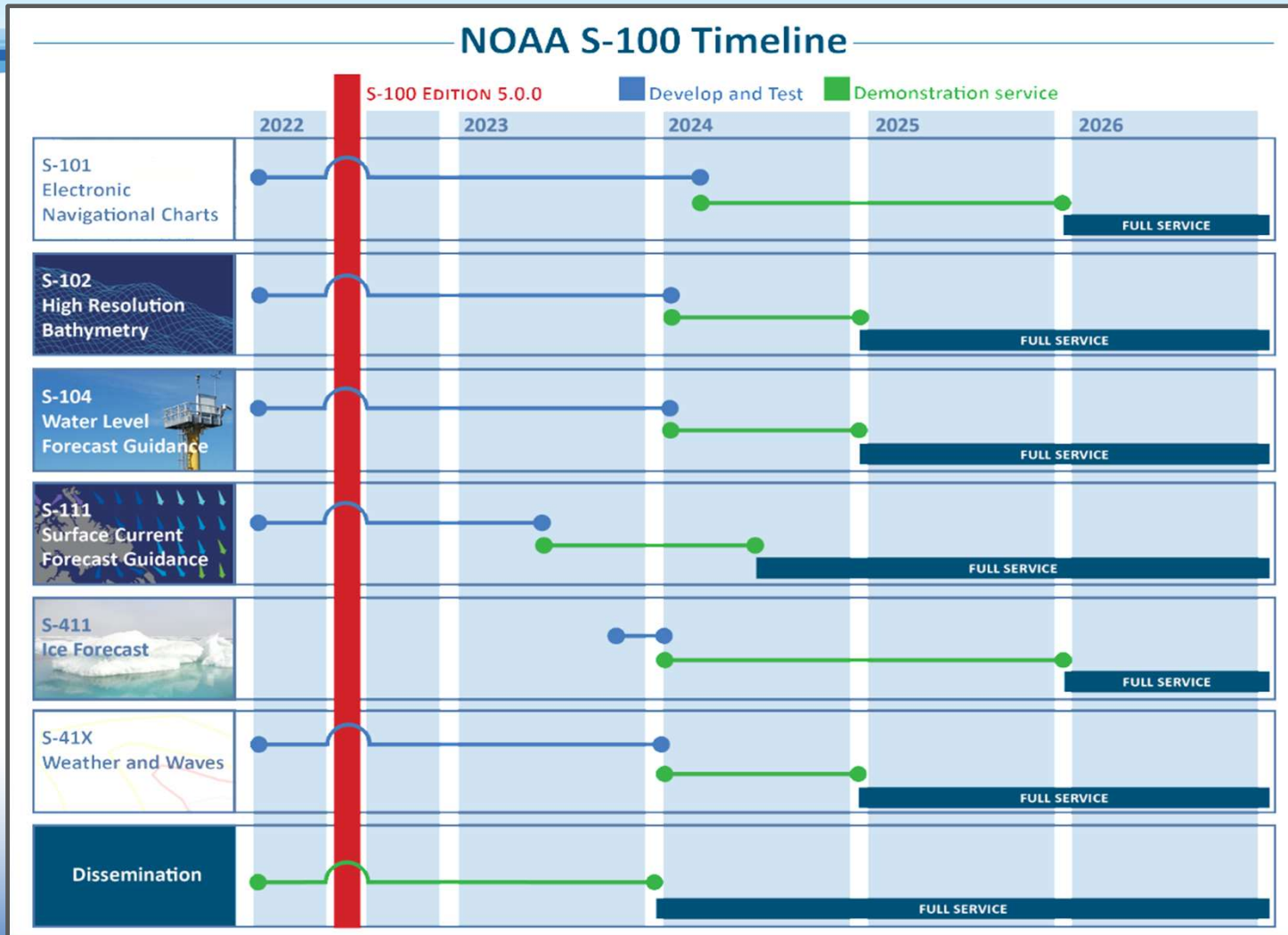


Wave and Weather Conditions (S-413)



Wave and Weather Observations (S-414)





- In 2022, the International Maritime Organization (IMO), amended its Electronic Chart Display and Information System (ECDIS) standard to leverage S-100 based ENC's beginning in 2026.
- S-100 ECDIS will be voluntary starting **1 January 2026**
- From **1 January 2029** new systems must comply with the new IMO Resolution on ECDIS Performance Standards (MSC.530(106))



- NOAA's Precision Marine Program (PMN) Program endeavours to consolidate it's important marine information in a internationally standard format in one location for easy accessibility
- These international standards have not been finalized and will take time
- NOAA's PMN development is tied to these standards
- In the meantime we are building out our infrastructure (*retiring RNCs, reschemeing ENC's, S-57 to S-101 and continuing to build the NBS*)
- As we add S-102 (bathymetry) information we seek YOUR input on the quality of the information to assure it's accuracy.
- We are in this together to get it right!

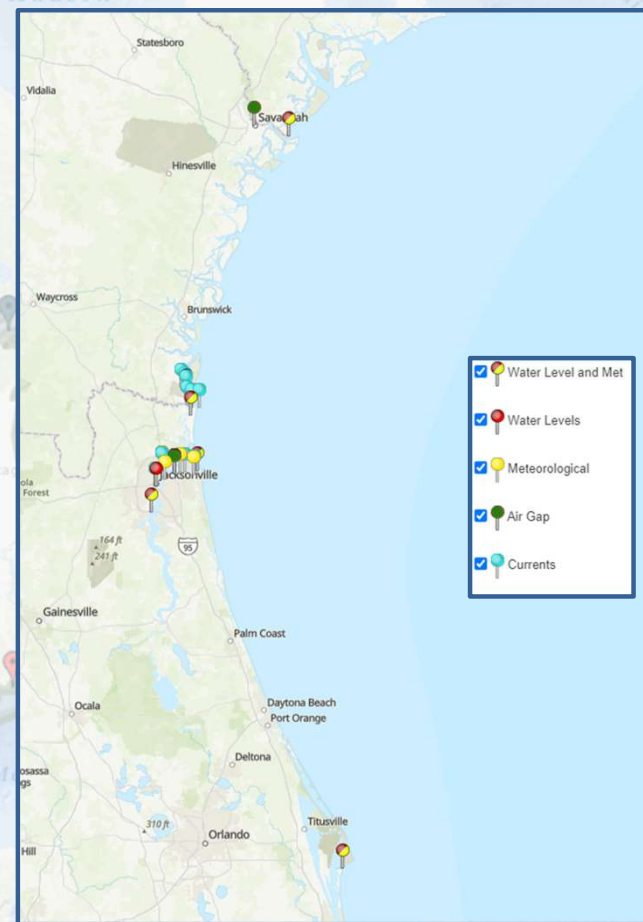
Operational Forecast Systems

Gathering Requirements for Coastal Models



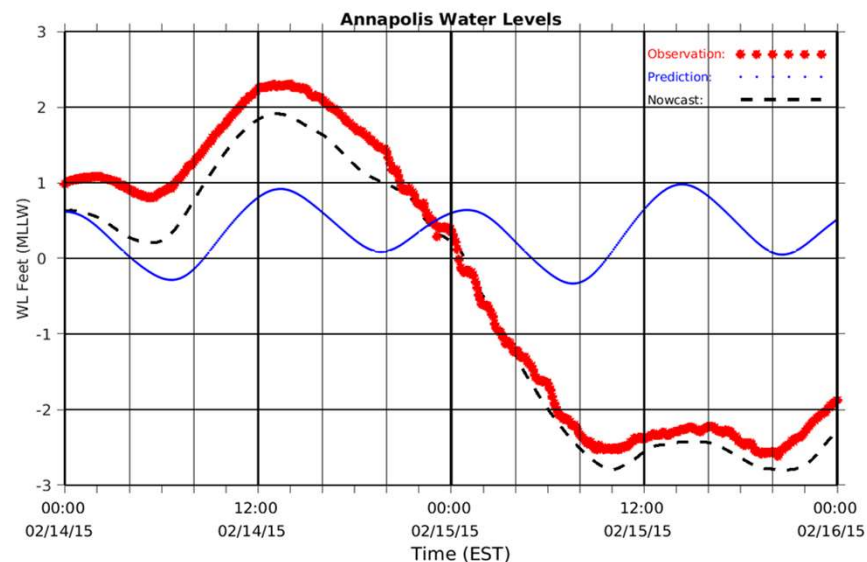
Why do we need models?

- Installing and maintaining observation infrastructure (water level or current observations stations) is expensive and difficult to maintain.
- Models can fill observation gaps everywhere.



Why do we need models?

- Models can be just as useful as real-time observations.

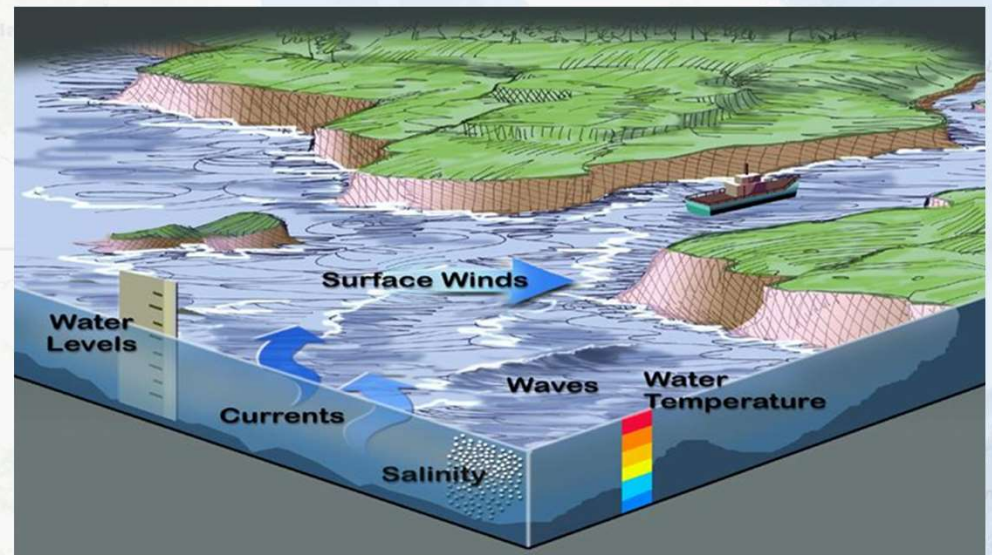


In 2015, a cold front caused water to rise and then drop 3 feet below predictions in the Chesapeake Bay. The model nailed it.

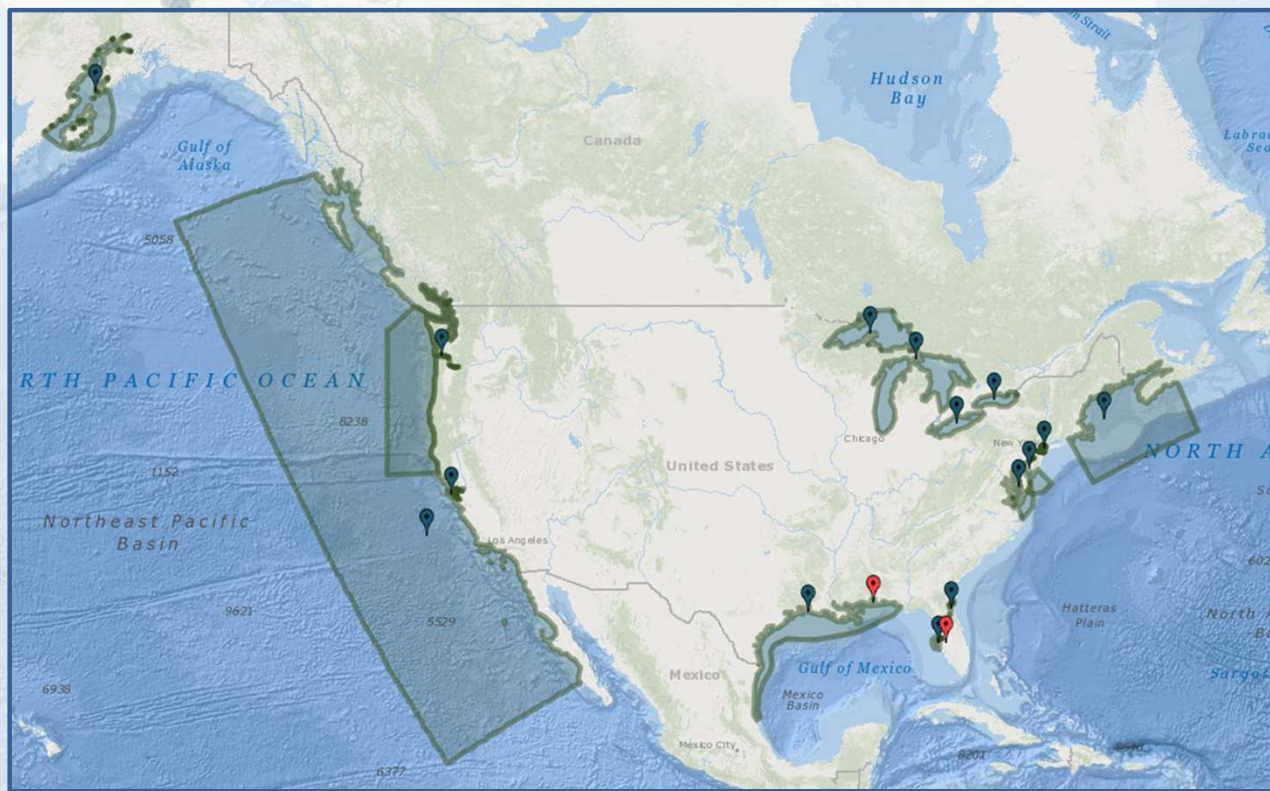


What do operational forecast systems do?

- Produce 24-hour nowcasts and 48- to 120-hour forecasts for:
 - water levels
 - currents
 - water temperature
 - salinity
 - ice concentration, thickness & velocity
- Run every 6 hours of every day



Existing coastal models: 15 total

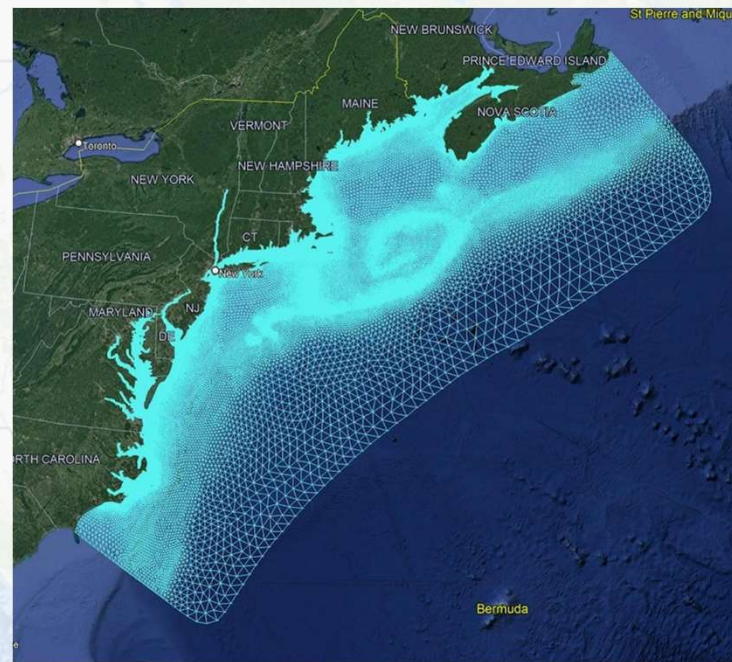
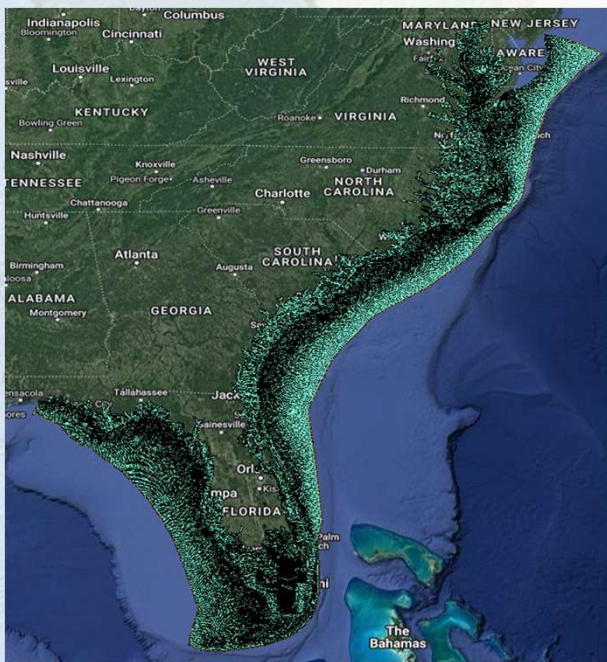


- Cook Inlet, AK
- West Coast
- Columbia River
- San Francisco Bay
- Gulf of Mexico
- Tampa Bay
- St. Johns River
- Lake Erie
- Lake Michigan-Huron
- Lake Ontario
- Lake Superior
- Chesapeake Bay
- Delaware Bay
- New York/New Jersey
- Gulf of Maine

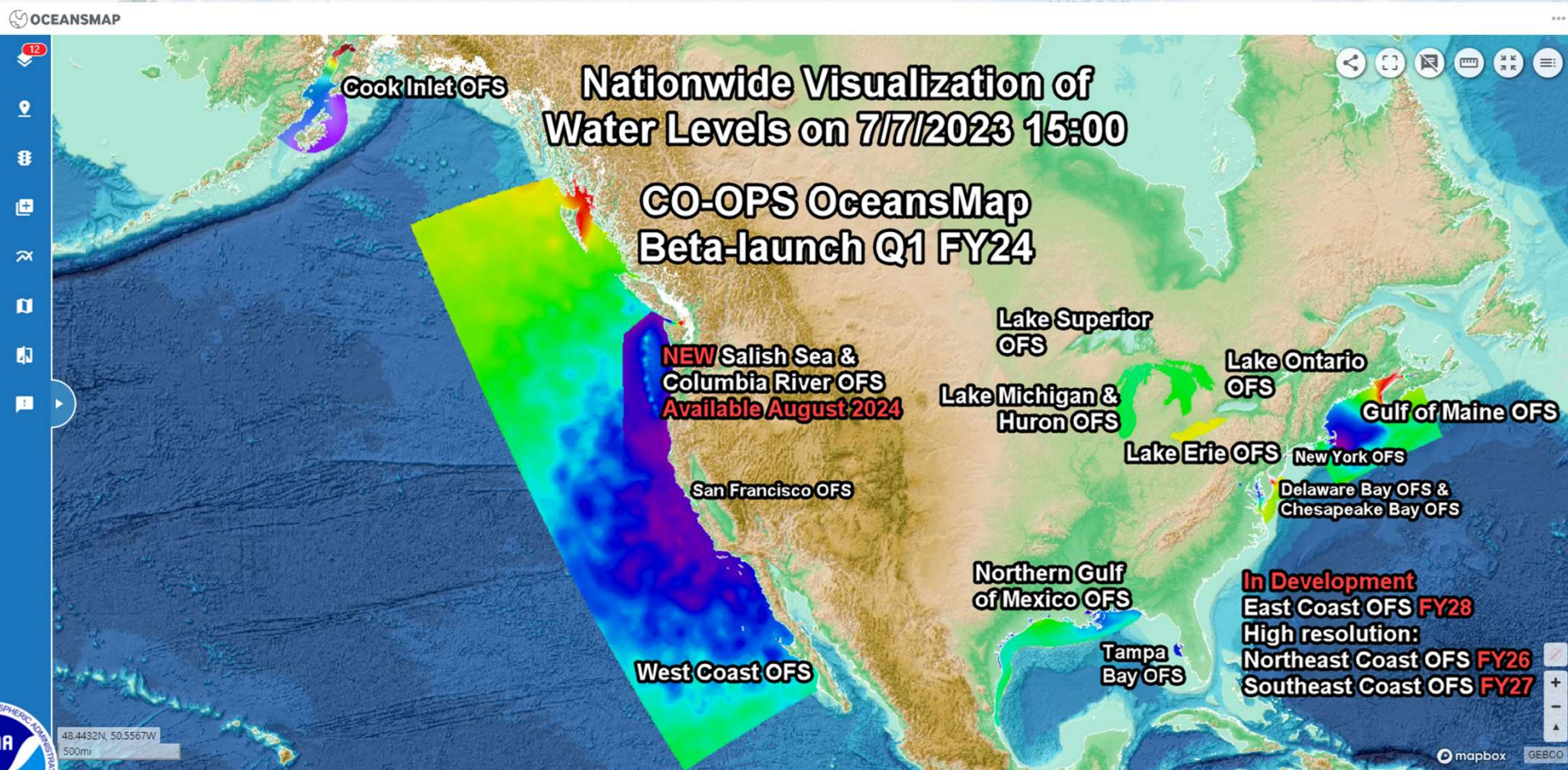


Questions for the Audience

- Model Coverage: Which particular areas (offshore, along the coast and up rivers) do you need a model to include?



New models in development



Questions for the Audience

- Model Resolution: Which particular areas (offshore, along the coast and up rivers) need high resolution?
 - Navigable channels?
 - Popular recreation sites?
 - Dynamic areas (fast currents and/or quickly varying current directions)?
 - Heavy traffic routes in the offshore?
 - Anchorages? (Lightering?)





How to reach Coast Survey

<https://nauticalcharts.noaa.gov/customer-service/assist/>

- Submit questions & comments
- Report an error
- 1-888-990-NOAA (1-888-990-6622)





Kyle Ward

kyle.ward@noaa.gov