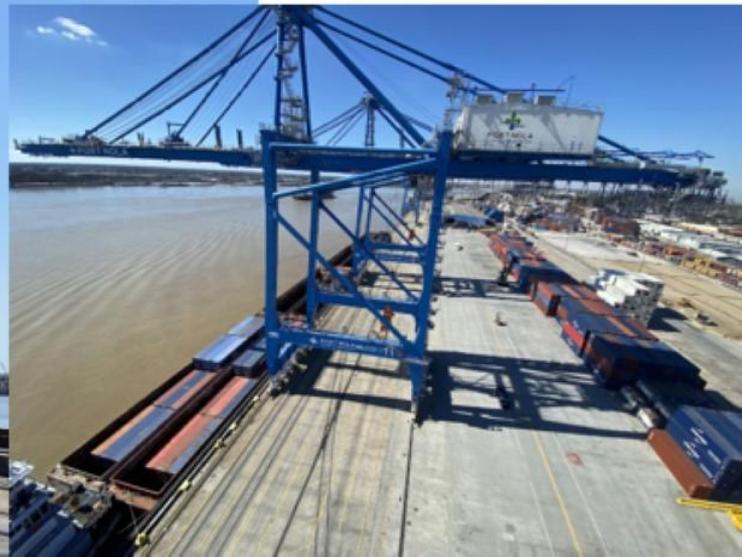
A satellite image of a hurricane over the Gulf of Mexico, with a white grid overlay. The hurricane is centered in the Gulf, with a clear eye and spiral cloud bands. The Gulf of Mexico coastline is visible on the left, and the Florida peninsula is on the right. The text is overlaid in the center of the image.

NOAA and Industry- A Critical Working Partnership
Tim Osborn
NOAA Coast Survey
Central Gulf







\$89 million



Airbus Ships Providing Materials for the Construction of 60 Airbus A319s, A320s, A321s per Year- ~\$6-7 Billion Annually and 2,500 Jobs Directly with Airbus in South Alabama

\$101 million



\$114 million

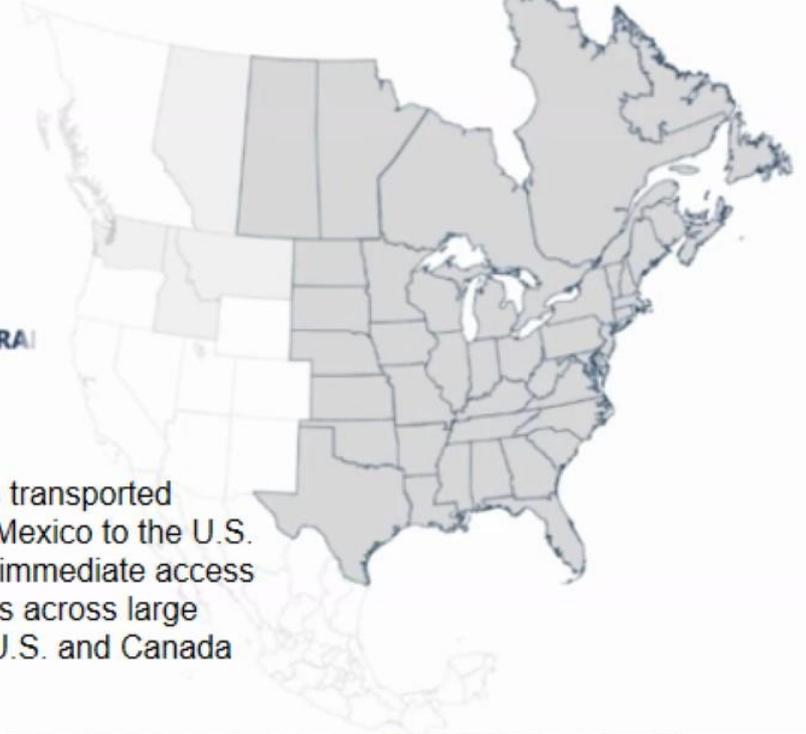


CGR's Mayan- rail service across water-
Port Mobile



FROM ANYWHERE RAIL

~140 rail cars transported
directly from Mexico to the U.S.
(Mobile) with immediate access
to destinations across large
areas of the U.S. and Canada



Venture Global LNG Calcasieu Pass, Cameron Parish



Cameron LNG, Cameron Parish



Cheniere LNG, Sabine Pass, Cameron Parish



Port Fourchon- Supporting over 90% of the Offshore Installations in the Gulf of Mexico, that Supply about 20% of the Energy Consumed in America Daily





NOAA- Marine Debris Program Grant Announcement

Fiscal Year 2025 NOAA Marine Debris Removal under the Bipartisan Infrastructure Law with Letters of Intent due on September 27, 2024, 11:59 p.m. Eastern Time. An applicant webinar will be offered on August 07, 2024 at 3:00 p.m. Eastern Time. Register for the webinar.

Fiscal Year 2025 NOAA Marine Debris Interception Technologies under the Bipartisan Infrastructure Law with Letters of Intent due on October 09, 2024, 11:59 p.m. Eastern Time. An applicant webinar will be offered on August 14, 2024 at 3:00pm Eastern Time. Register for the webinar.

For more information, please visit the Removal and Interception Technologies opportunities on Grants.gov and the NOAA Marine Debris Program's website.

<https://marinedebris.noaa.gov/resources/funding-opportunities>

The National Oceanic and Atmospheric Administration's (NOAA) Marine Debris Program is pleased to announce two Notices of Funding Opportunity for Marine Debris Removal and Interception Technologies under the Bipartisan Infrastructure Law. NOAA will award up to \$54 million to support impactful, large marine debris removal projects, as well as the installation of proven marine debris interception technologies, throughout the coastal United States, Great Lakes, United States territories, and Freely Associated States.

The Marine Debris Removal funding opportunity prioritizes the development of large scale marine debris removal projects. These removal projects should focus on large marine debris, including abandoned and derelict vessels, derelict fishing gear, and other debris that is generally unable to be collected by hand. Applicants may submit letters of intent (LOI) from July 24 to September 27, 2024 for this opportunity.

The second funding opportunity for Marine Debris Interception Technologies focuses on the installation, monitoring, and maintenance of proven marine debris interception technologies that will capture marine debris at or close to known marine debris sources or pathways. These proven technologies may include litter traps, shoreline removal technologies, booms, skimmers, conveyors, floating collection devices, and other technologies that do not require additional research and development. LOIs can be submitted for this opportunity from July 24 to October 09, 2024.

Priority for both opportunities will be placed on proposals that clearly demonstrate the beneficial impacts the project will have on NOAA trust resources and the surrounding coastal environment or community; incorporate marine debris prevention activities that are tied to the appropriate audience for the debris type being removed; and support the principles of justice, equity, diversity, and inclusion when writing their proposals and performing their work.

These are two separate funding opportunities, and they have different application requirements. Applicants wishing to compete under both funding opportunities must submit separate applications for each. NOAA expects to fund awards from each competition depending on the merit of submitted proposals. Applicants who submit successful LOIs will be invited to submit a full proposal following the LOI review period.

The Marine Debris Program will host an applicant webinar for each competition providing an overview of the process and materials required for submitting an LOI. The webinar schedule is as follows:



NOAA- Brennan Ocean Mapping Fund- Annual Funding for Participant Surveying Projects

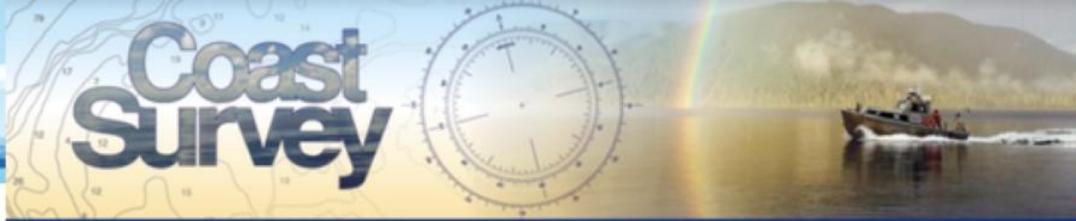
<https://www.federalregister.gov/documents/2024/06/18/2024-13387/notice-of-matching-fund-opportunity-for-ocean-and-coastal-mapping-and-request-for-partnership>

The goal of the Rear Admiral Richard T. Brennan Ocean Mapping Fund program is to leverage NOAA and non-Federal partner funds to acquire more ocean and coastal mapping data from qualified contract surveyors during Fiscal Year (FY) 2026. Subject to the availability of appropriations, NOAA will provide up to 70 percent of the total project cost, with the selected entity providing at least 30 percent of the total project cost. For example, for a \$1 million project, the partner must provide at least \$300,000, and NOAA would provide up to \$700,000.

NOAA anticipates funding between two and five projects, with a total cost of up to \$1 million per project. NOAA may consider providing additional funding for a project, thereby exceeding \$1 million, subject to the availability of funds and NOAA's discretion. All projects are expected to have a FY 2026 project start date, and NOAA must receive all non-Federal partner matching funds before October 1, 2025. NOAA reserves the right to increase or decrease its funding match based on the quality and feasibility of proposals received.

After NOAA selects a non-Federal entity as a partner, NOAA will enter into an agreement with the partner pursuant to the Coast and Geodetic Survey Act of 1947 (33 U.S.C. 883e), which enables NOAA to receive funds for the mapping project.

In addition to providing matching funds, NOAA brings its expertise to manage survey planning, quality-ensure all data and products, provide the data and products to the partners within an agreed-upon timeframe, and handle data submission to the National Centers for Environmental Information for archiving and public accessibility. All ocean and coastal data and related products from the Rear Admiral Richard T. Brennan Ocean Mapping Fund program will be available to the public to the greatest extent allowed by applicable laws.



A Critical Need for Data!

Please submit any processed data, and final products (e.g. bathymetric grids and feature files), in addition to raw data. Questions? Please contact esd.team@noaa.gov.

External Source Data How to prepare data for nautical charting?

External Source Data (ESD), defined as data with potential value for nautical charting applications, but was not acquired or contracted by Coast Survey for this specific purpose, is a critical input to NOAA's nautical charting mission. ESD is obtained from data archives, or in some cases, directly from established ESD providers. If you wish to best prepare your hydrographic data as ESD for nautical chart application, here are some guidelines to follow.

Most importantly, ensure you have included the [required metadata](#) to accompany your ESD, otherwise it may have very limited, if any, value.

If it's not already licensed, [select a data license](#) to define any restrictions. Note that some of the licenses will prohibit nautical chart application.

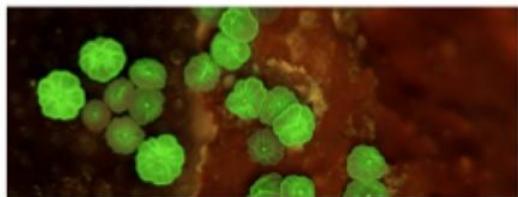
Adequacy of the data for charting is determined by the Category of Zone of Confidence in Data (CATZOC), well-defined in the [IHO S-67 publication](#), and summarized in this presentation, "[Publishing Data Quality](#)."

It is not a requirement, but in order to be charted as CATZOC A1, the data must meet IHO Order 1a as defined in the [IHO S-44 publication](#). Most critical questions to answer:

- Was there complete or partial coverage within the survey area?
- Were all features identified (or disproved) with a system capable of detecting and measuring least depths?
- What is the positional accuracy of the soundings?
- What is the depth accuracy of the soundings?

Priority Focus Areas

NOAA's Small Business Innovation Research Program



[About SBIR](#)

[Funding Opportunities](#)

[Resources for Applicants](#)

[SBIR Successes](#)

NOAA frequently identifies areas of critical need within its mission areas where the agency will be focusing its resources in the coming years. These focus areas are also excellent areas for SBIR project proposals.



NOAA Science & Technology Focus Areas

NOAA's strategies in six key science and technology (S&T) focus areas guide transformative advancements in the quality and timeliness of NOAA's products and services across our mission areas. Our strategies help us more efficiently and effectively adopt the breakthrough S&T applications to help deliver the world's best weather forecasts and to grow the American Blue Economy.

- Citizen Science
- Data
- Cloud Computing
- Uncrewed Systems
- Artificial Intelligence
- Omics

<https://techpartnerships.noaa.gov/sbir/>

Contact & Follow Us



SBIR Email: NOAA.SBIR@noaa.gov or [Join Our Mailing List](#)



SBIR Invoice and Payment Questions: SBIR.invoices@noaa.gov



Twitter: [@NOAAinnovate](#)

Real Time Observations!

The Need for Real Time Observations is Growing Beyond All Past and Present Projections of Need



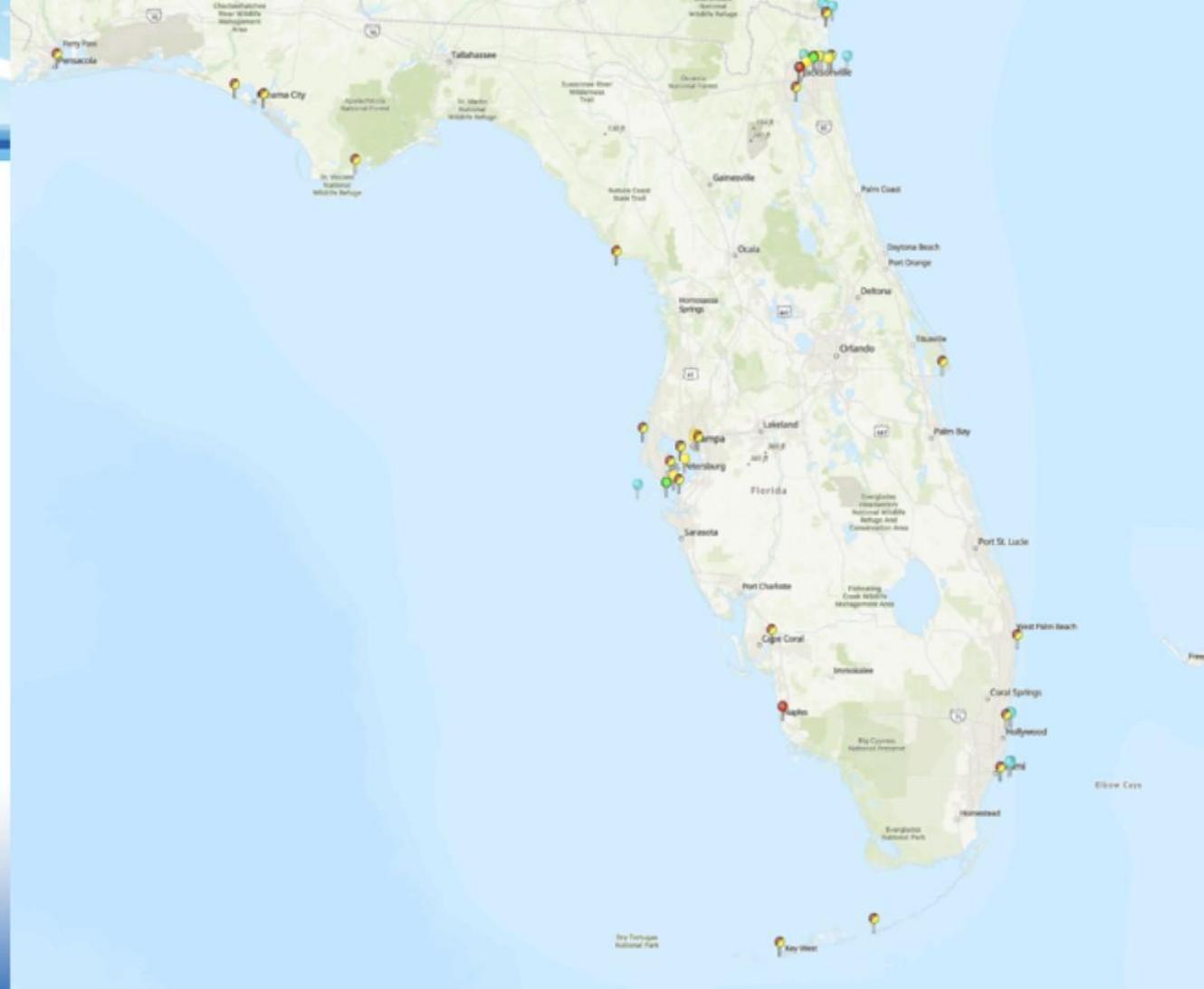
Waves, Currents, Water Levels, Winds/Weather, Visibility, Real Time Camera Visuals- All Are Needed to Support a Blue Economy with Rapidly Diminished Planned Downtime, Limiting to No Under Keel Clearance, Occupation of 90% or More of Bridge Air Draft





Lack or Reduced Number of Offshore Data Buoys, No Wave Observations, No Visibility Sensors, No Current Meters, Limited to No Weather Stations---What Could Go Wrong?

Coverage of Coastal
Areas – Such as Florida
and 21 Million
Residents- Is Lacking in
Geographic Coverage



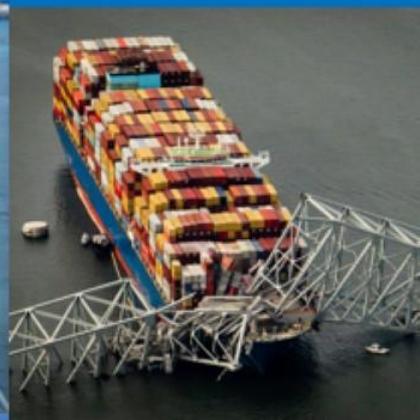


The Majority of the
Bridges of the Lower
Mississippi River Still
Have No Air Gap
Sensors. There are No
Current Meters, No
Operating Publicly
Open Cameras

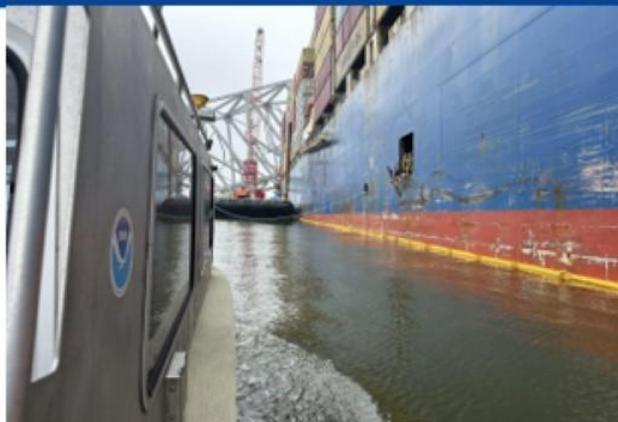


NOAA

NOAA Navigation Response Efforts in the aftermath of the Francis Scott Key Bridge Allision



Ops/MTSRU – NRT



Equipment: Currents Real-time Buoy (CURBY)



CURBY Components

- Nortek 600 kHz Zcell Aquadopp
- In-Situ Aquatroll CTD
- Gil MaxiMet Weather Station
- Sutron Satlink 3 Data Logger
- Iridium, cell, wifi communications

Development/Use

- Employs a small, lightweight footprint to allow for rapid, quick response deployments
- Designed by CO-OPS Ocean System Test and Evaluation Program

Data Types:

- Current profiles
- Surface conductivity
- Water & air temperature
- Wind speeds
- Barometric pressure

Access data *in real time*:

- tidesandcurrents.noaa.gov
- CO-OPS API

NAVIGATION RESPONSE TEAM ASSETS

Seattle
Washington

New London
Connecticut

Solomons
Maryland

Fernandina Beach
Florida

Stennis
Mississippi



<https://nauticalcharts.noaa.gov/customer-service/navigation-response.html>

Key Bridge Response 2024 Common Operating Picture

Search by Vessel Name
All Vessels

Select a CART EEI Status
All statuses

Select CART Report Type
None

Wind
14 kts
from 110° T
Curtis Bay Ent Wx buoy
Last update: 2 minutes ago

Air Temp
55°F
Curtis Bay Ent Wx buoy
Last update: 2 minutes ago

Current
0.21 kts at 297.00° T
CURBY 1501
Last update: 2 hours ago

Water Temp
66°F
Curtis Bay Ent Wx buoy
Last update: 2 minutes ago

Conditions



Esri, Maxar, Earthstar Geographics, and the GIS User Community | Esri Community Maps Contributors, Baltimore County Government, County of Anne Arundel, VGIN, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc. ...

- COP
- Vessel Tracking - Transit Queue/ AIS Backup/ Radar
- Skyline CCTV
- NWS Weather Threat





NOAA
Coast Survey

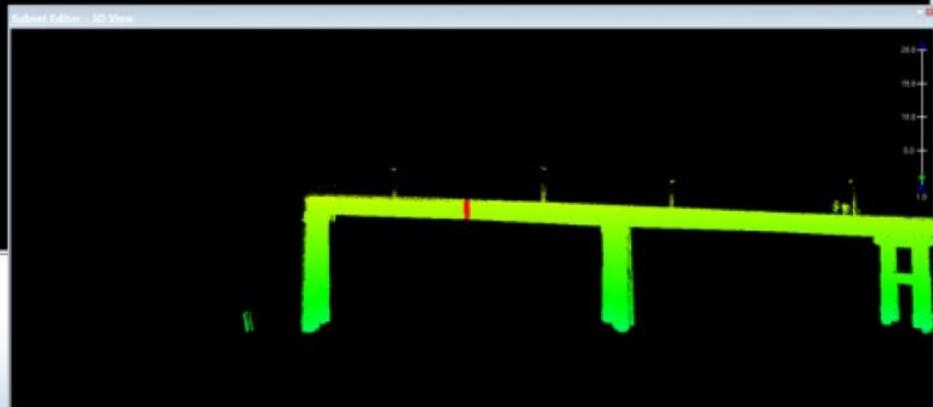
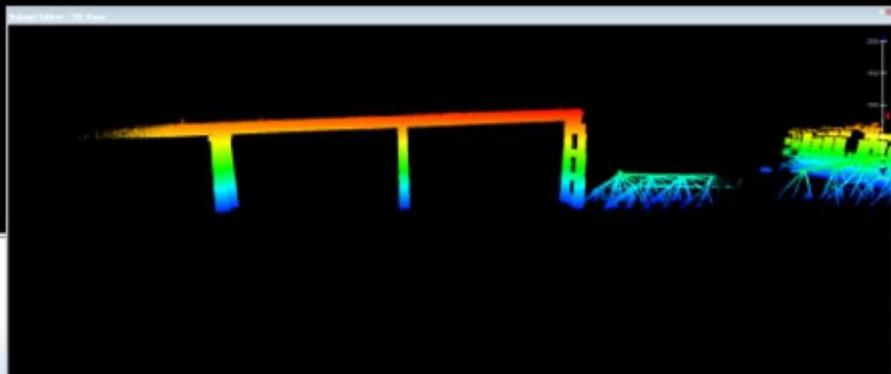
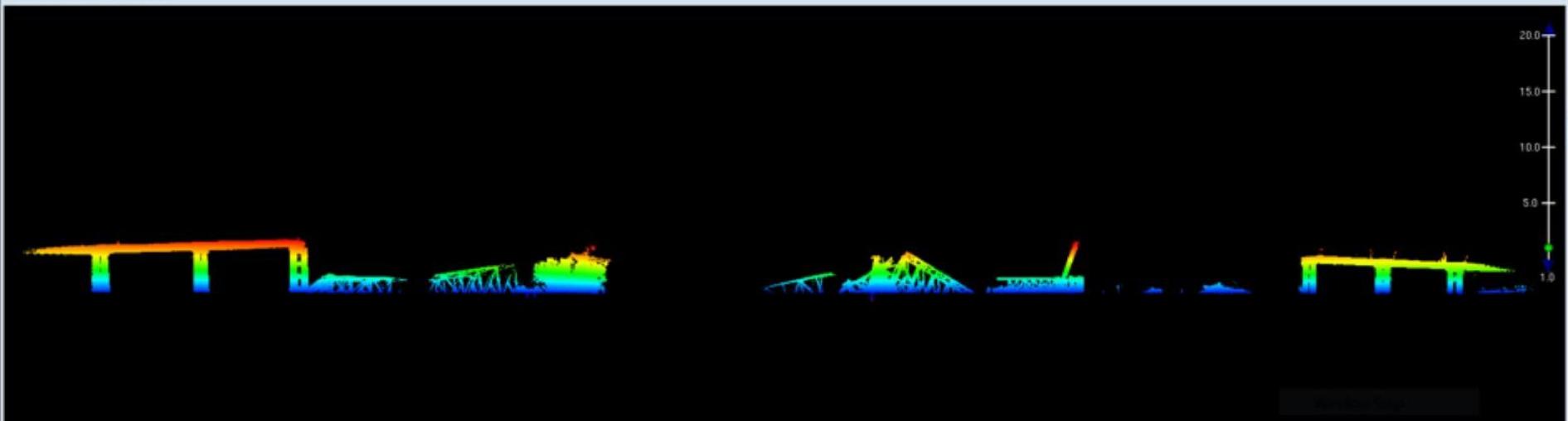
3D Models (SfM) developed from the imagery

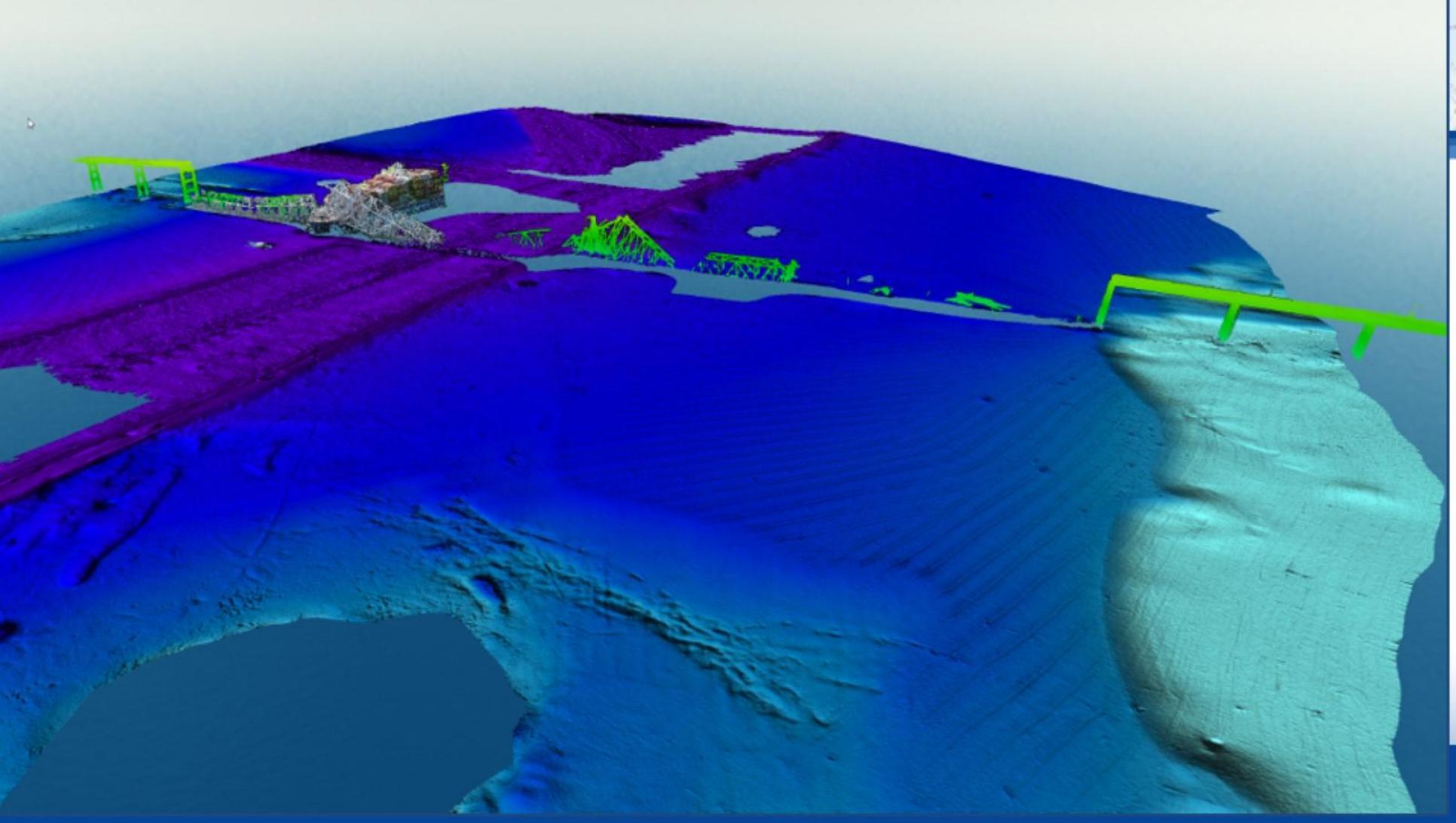


Pre-event



Post-event







NOAA
Coast Guard

Francis Scott Key Bridge Recovery Efforts

UNCLASSIFIED//FOR OFFICIAL USE ONLY

DHS National Operations Center



Date: 03 April 2024

Location: Baltimore, MD



USCGC SAILFISH



USACE CATLETT



USACE REYNOLDS

Unified Command Post
USCG, USACE, MDE, MDTA,
MSP, and Witt O'Brien's
representing Synergy Marine

Wreckage Processing Facility
Sparrows Point

USACE REYNOLDS
USACE CATLETT

Incident Location
Francis Scott Key Bridge

Fort Armistead
Staging Area

USCGC SAILFISH

U.S. Coast Guard Yard
2401 Hawkins Point Rd



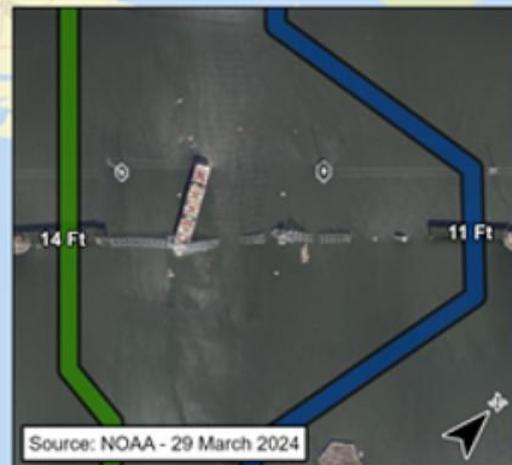
A crane/excavator mounted shear cuts and removes debris.



Baltimore, MD

Baltimore, MD
~ 7 Miles

- Incident Location
- Unified Command Post (UCP)
- Asset Staging Area
- Wreckage Processing Facility
- U.S. Army Corps of Engineers Asset
- U.S. Coast Guard Asset
- Sollers Point Temporary Alternate Channel
- Hawkins Point Temporary Alternate Channel
- ~2,000 Yard Safety Zone
- Temporary Flight Restriction



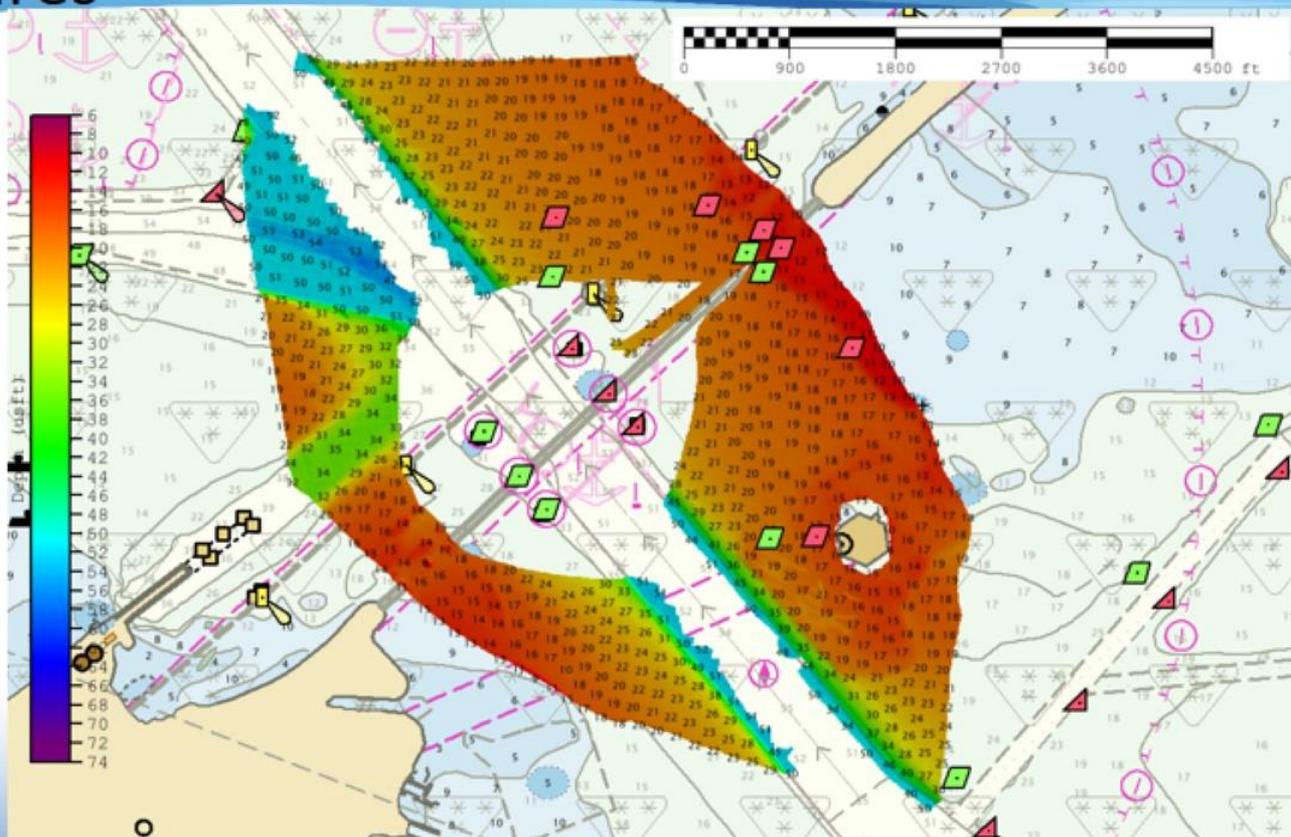
Source: NOAA - 29 March 2024



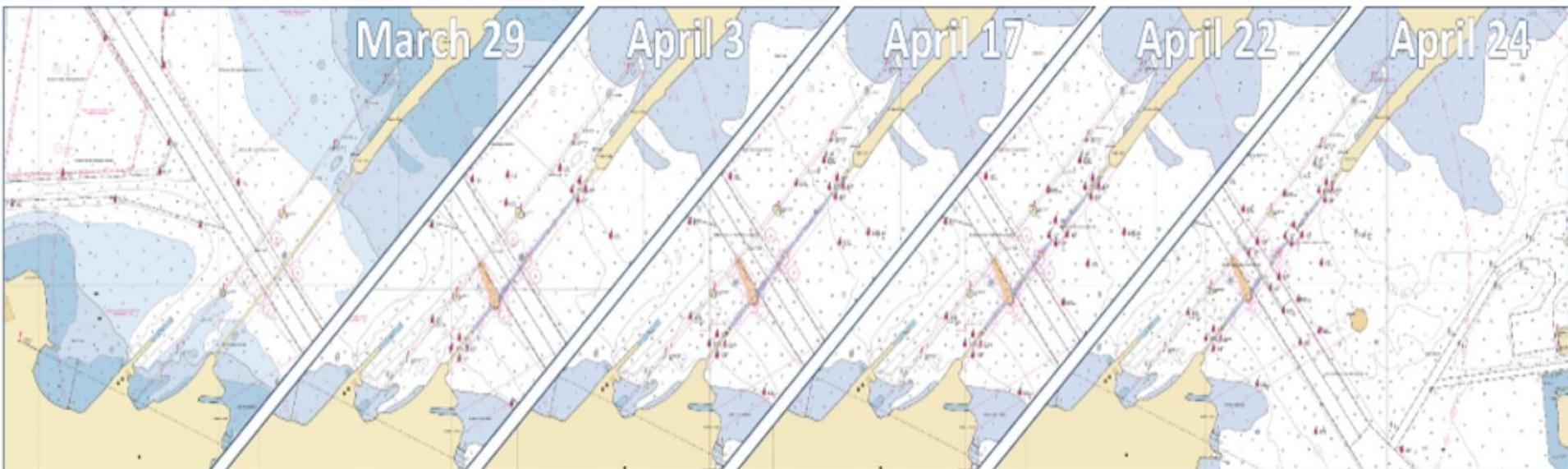
UNCLASSIFIED//FOR OFFICIAL USE ONLY



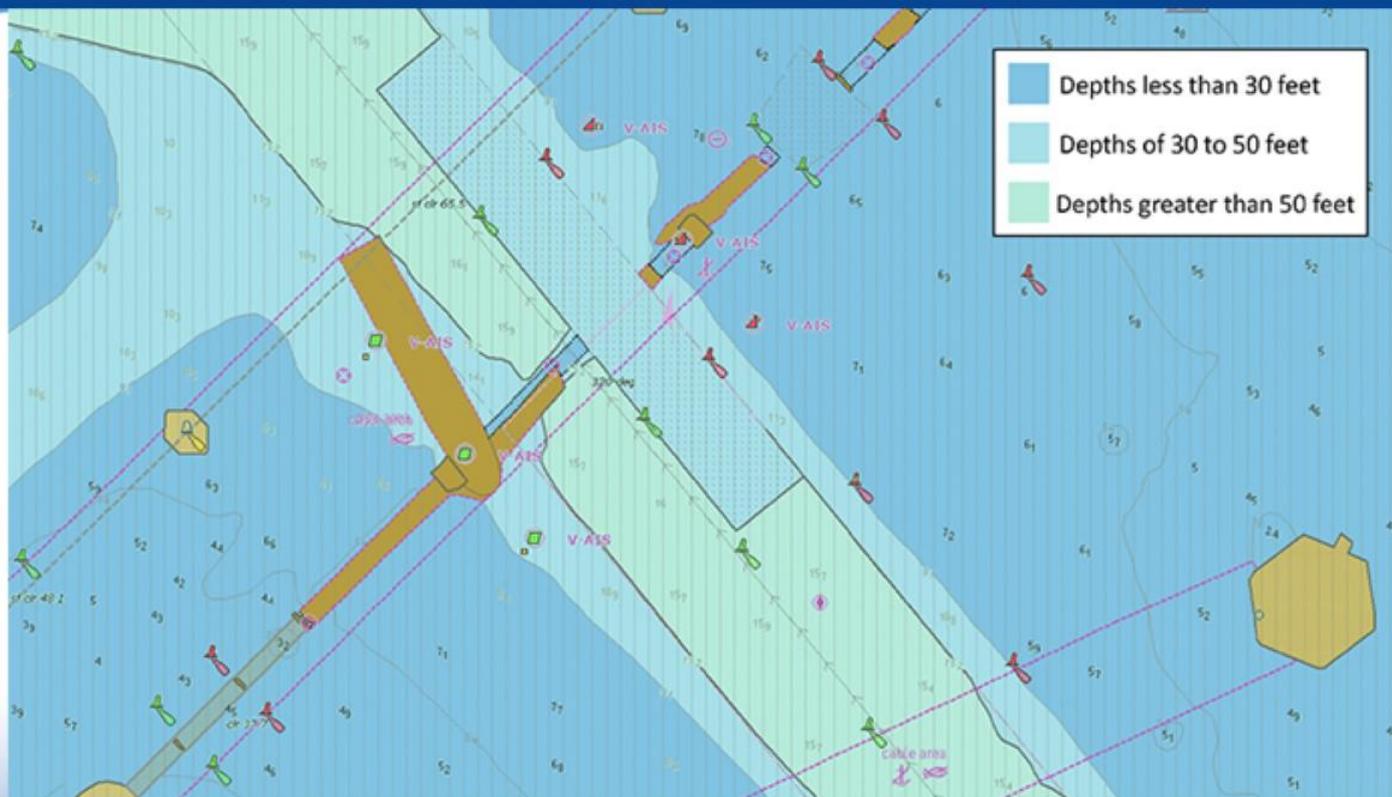
ENC Preview - Apr 1, 2024 with updated shoreline features

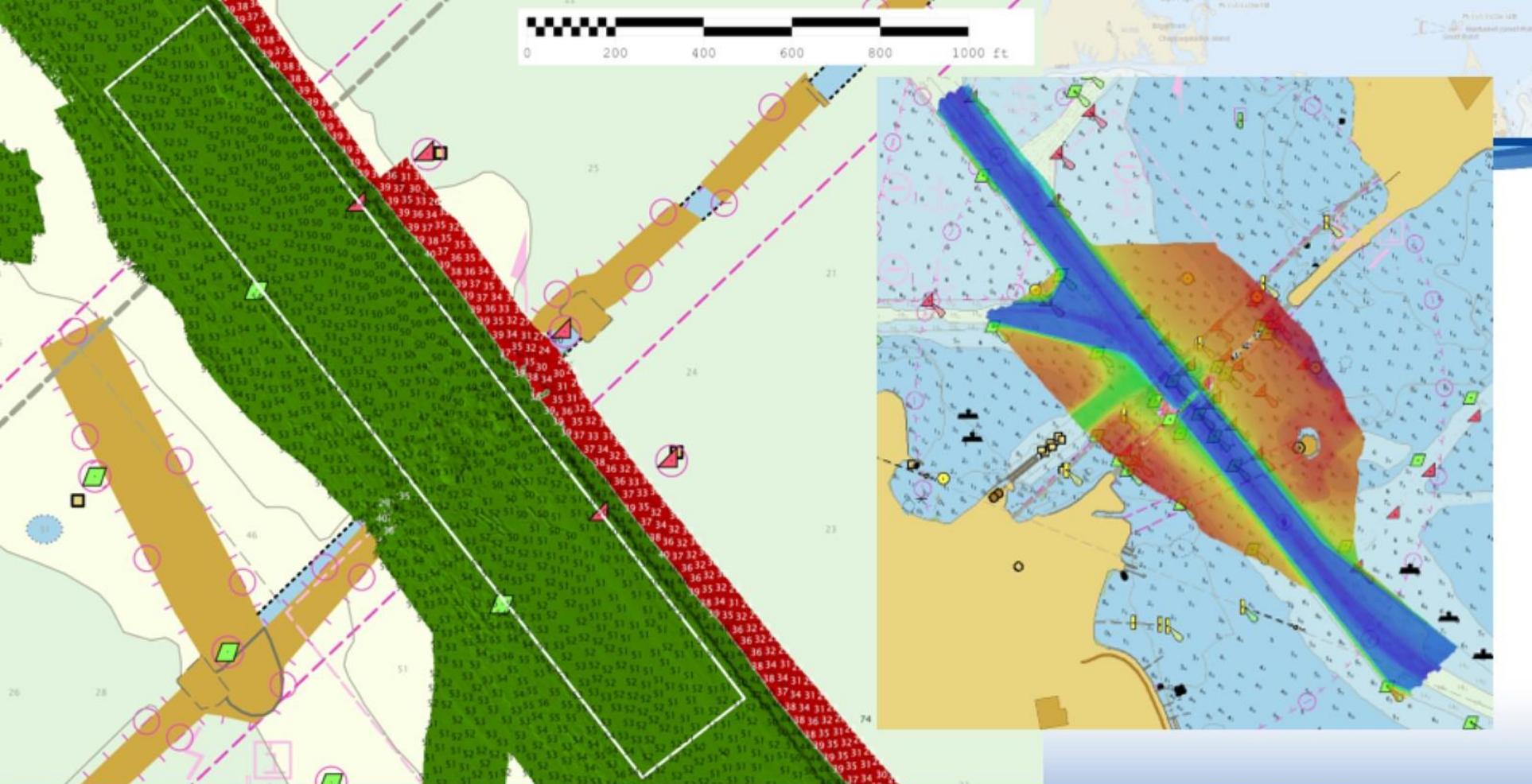


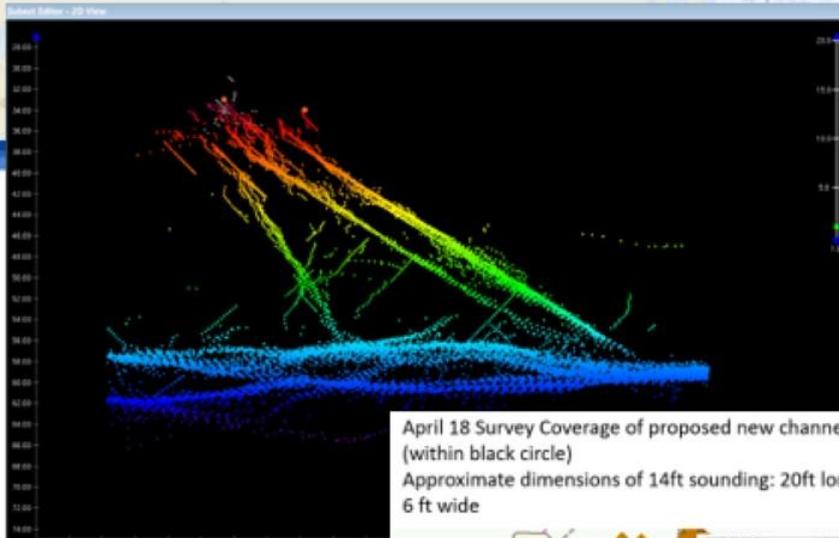
Progression of Rasterized Nautical Chart Updates



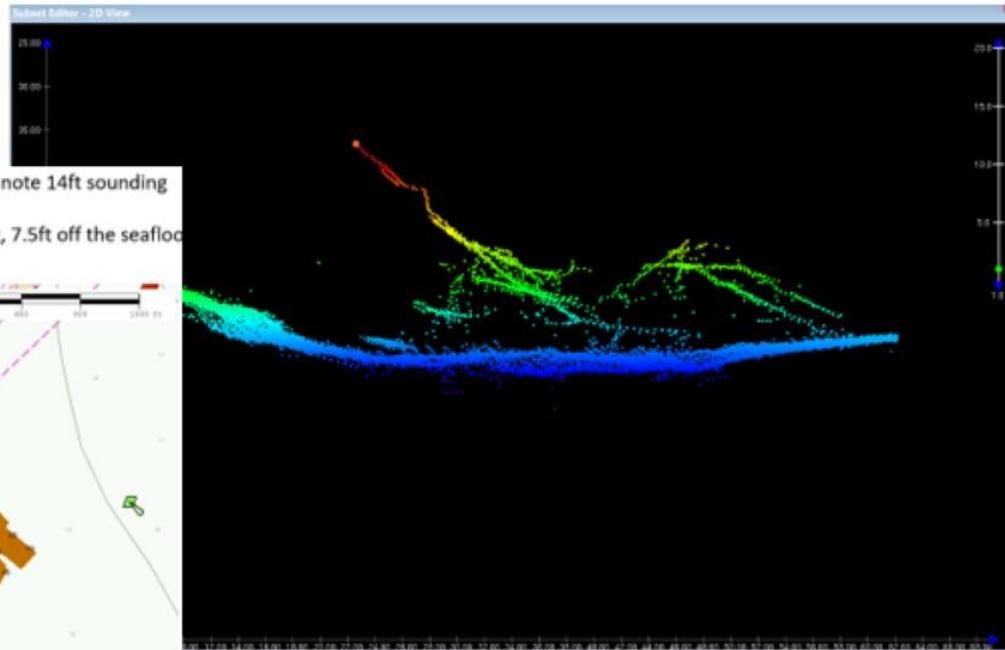
Example: Re-opening a Portion of Ft. McHenry Channel (38ft)







April 18 Survey Coverage of proposed new channel, note 14ft sounding (within black circle)
 Approximate dimensions of 14ft sounding: 20ft long, 7.5ft off the seafloor, 6 ft wide



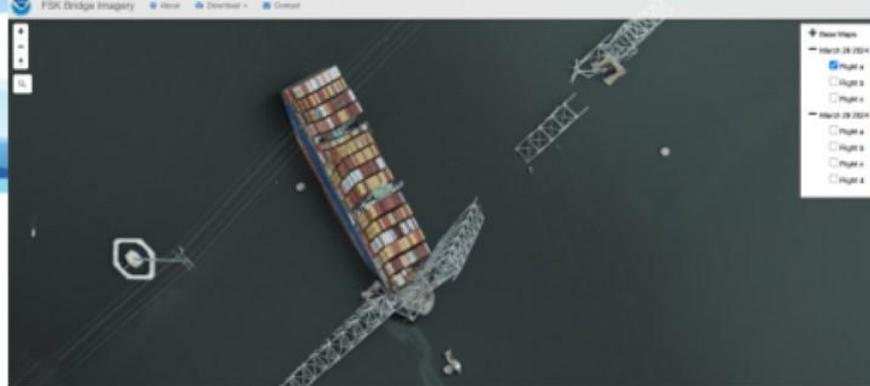


Publicly Available Data

Initial Imagery Data

https://storms.ngs.noaa.gov/storms/fs_kb_2024/index.html#15.87/39.217509/-76.528448

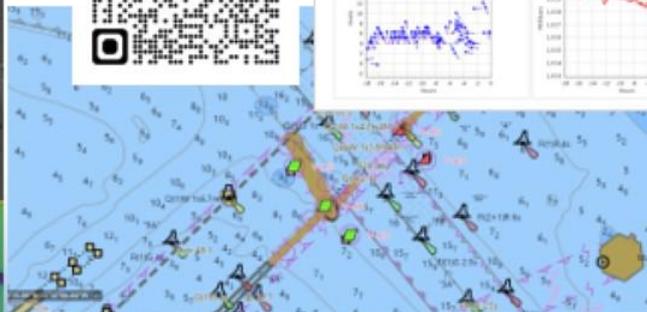
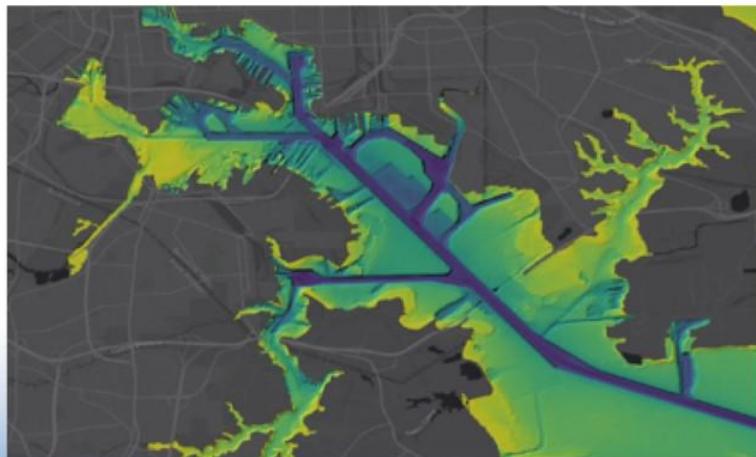
Precision Marine Navigation Data (including S-102 Bathymetric Layer for Navigational Awareness)



CURBY Buoy Real-time Data



PORTS[®]: cb1501 Patapsco Rvr, SW of FIMch 7 (CURBY)



Outline

- Office of Coast Survey (OCS)
- Navigation Manager
 - Area of Responsibility (AOR)
 - Partners & Stakeholders
 - Navigation Manager Role & Responsibility
- NOAA (OCS) Hurricane Response
 - Storm Preparedness, Response, & Recovery
 - Education & Outreach (Pre/Post-season)
 - Center for Oceanographic Operational Products & Services (CO-OPS)
 - PORTS
 - Inundation Dashboard
 - Hurricane Season (June 1st through November 30th)
 - Hurricane Season Operations & Review
 - GOM
 - FL/PR/USVI
 - Hurricane Response Challenges



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 - SECOFS, NGOFS2, STOFS, CERA
- Hurricane Season (June 1st through November 30th)
 - Hurricane Season Operations & Review
 - GOM
 - FL/PR/USVI
 - Hurricane Response Challenges



- Nation's nautical chart-maker.
- Responsible for:
 - Upgrading charts.
 - Surveying the seafloor.
 - Responding to maritime emergencies.
 - Searching for underwater obstructions that pose a danger to navigation.

Navigation Manager Regions

- 10 strategically stationed in port areas along U.S. coasts and Great Lakes.



Stakeholders & Partners

- U.S. Coast Guard
- U.S. Army Corps of Engineers (Mobile/Jacksonville District)
- Harbor Safety & Security Committees
- Area & Spill Committees
- Pilots Association
- State & Local Government
- Recreational Community

JACKSONVILLE DISTRICT – SURVEYING AND MAPPING USCG SECTOR MIAMI SECTOR COMMAND MEET & GREET



USCG Sector Miami February 2023

Staff members from Project Management and Operations Division met with USCG Sector Miami personnel on 6 February to discuss dredging projects, post storm recovery procedures as well as USCG Civil Engineering Initiatives underway for FY2023. Pictured from Left to Right: Cdr Steve Elliot, Chris McNees, Steve Conger, Matt Davies, Captain Chris Cederholm (USCG Sector Commander) Lisa Holland and Brooke Hubbard, Nic Alvarado (NOAA) and Lt. Ben Adrien.



JACKSONVILLE DISTRICT

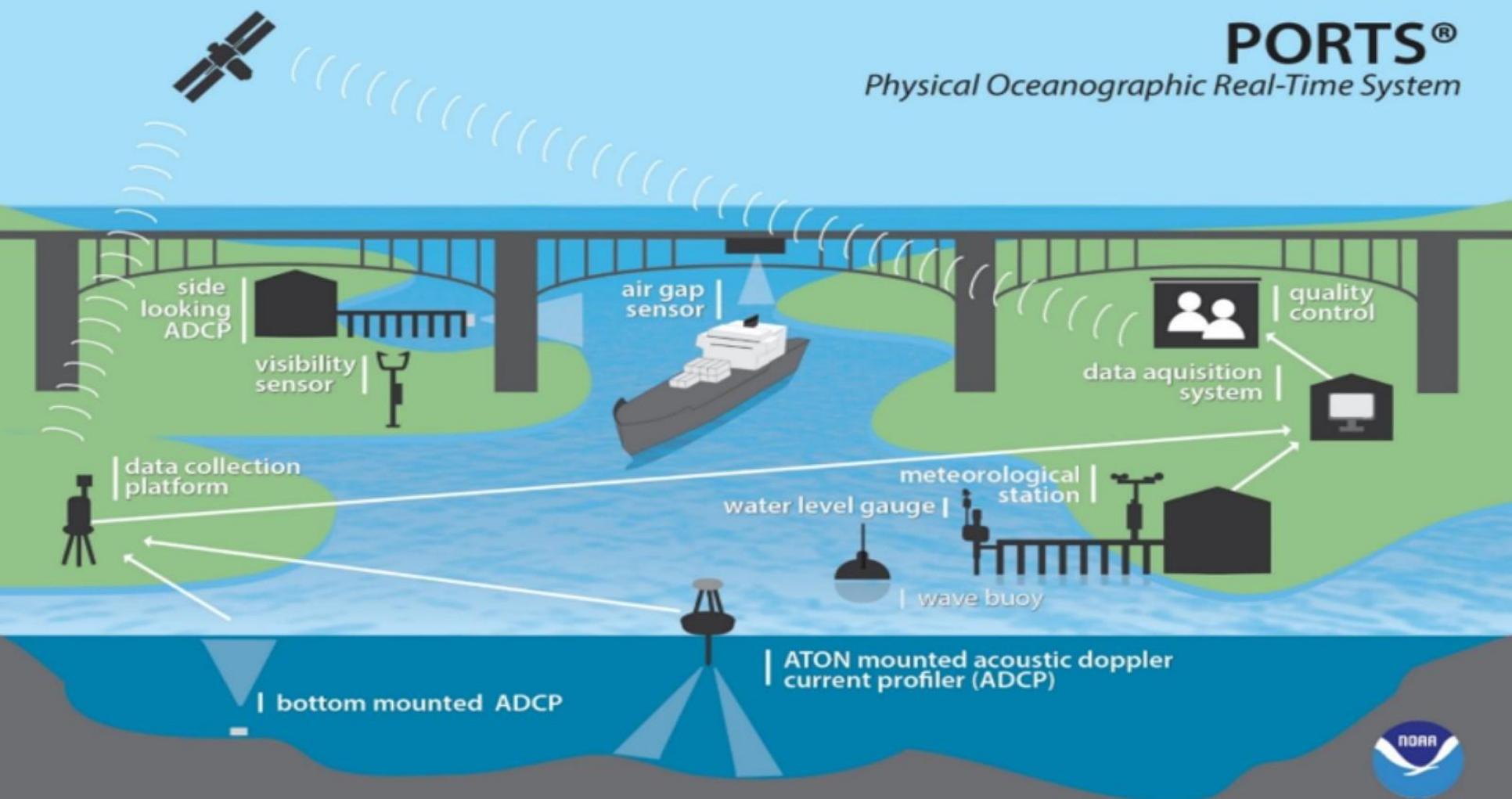
Key Area
Partnerships
Readiness

Physical Oceanographic Real-Time System (PORTS®)

- A domestic shared responsibility partnership program between the National Oceanic and Atmospheric Administration (NOAA) and the maritime community.
- Provides real-time oceanographic and meteorological observations in busy seaports across the U.S.
- All real-time PORTS® information is quality controlled by NOAA 24 hours a day, 365 days a year, to ensure that suspect data is not disseminated.
- In operation since 1991, PORTS® has a solid reputation among the maritime community as a highly trusted source for real-time oceanographic and meteorological information to support safe and efficient maritime commerce.
- Built on the foundation of the NWLON
- [NOAA Celebrates 30 Years of Safer Marine Navigation Through PORTS®](#)
video

PORTS[®]

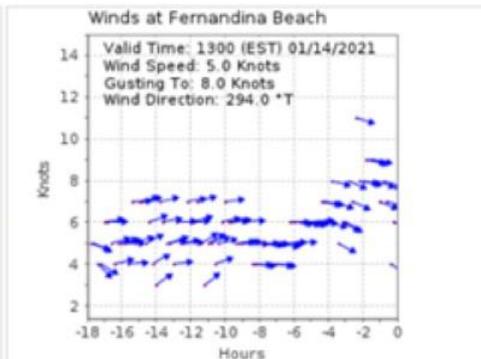
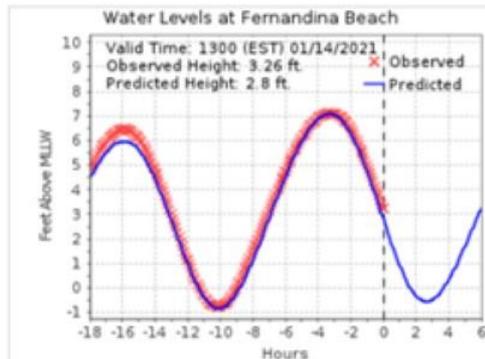
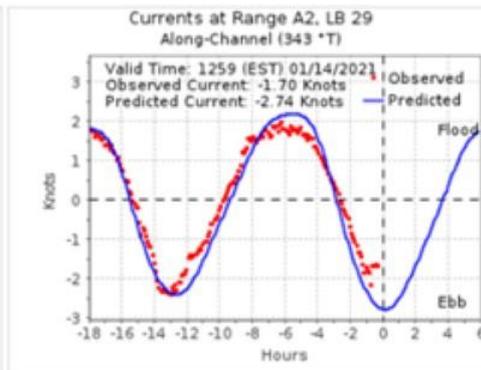
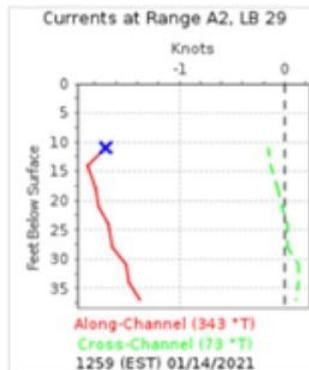
Physical Oceanographic Real-Time System

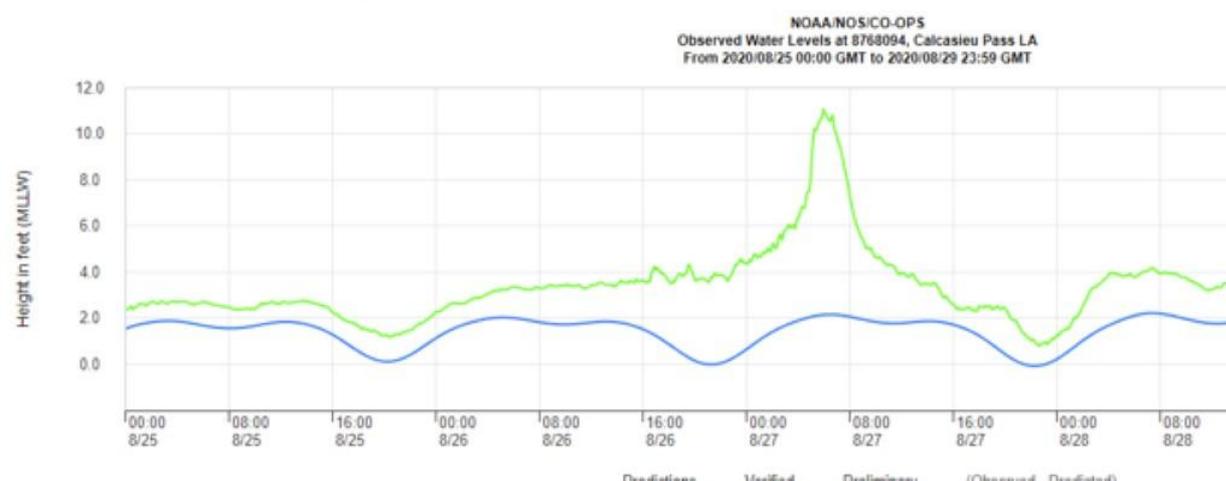
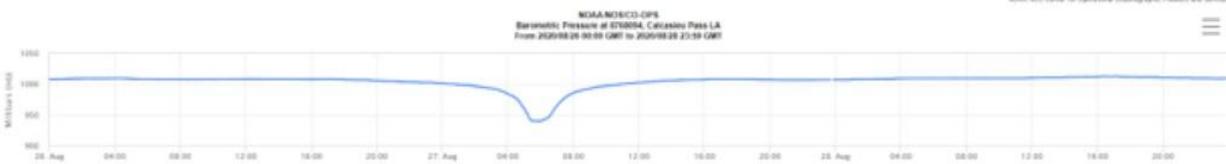
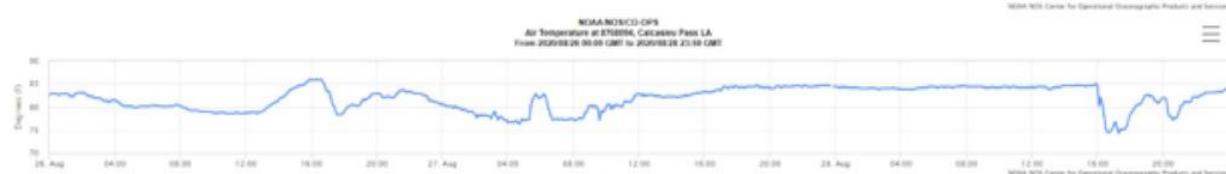
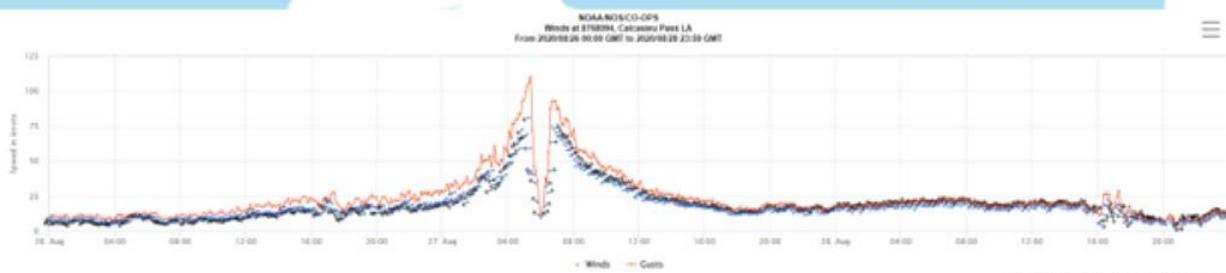


Sample PORTS[®] Graphics

PORTS[®]: kb0301 Range A2, LB 29

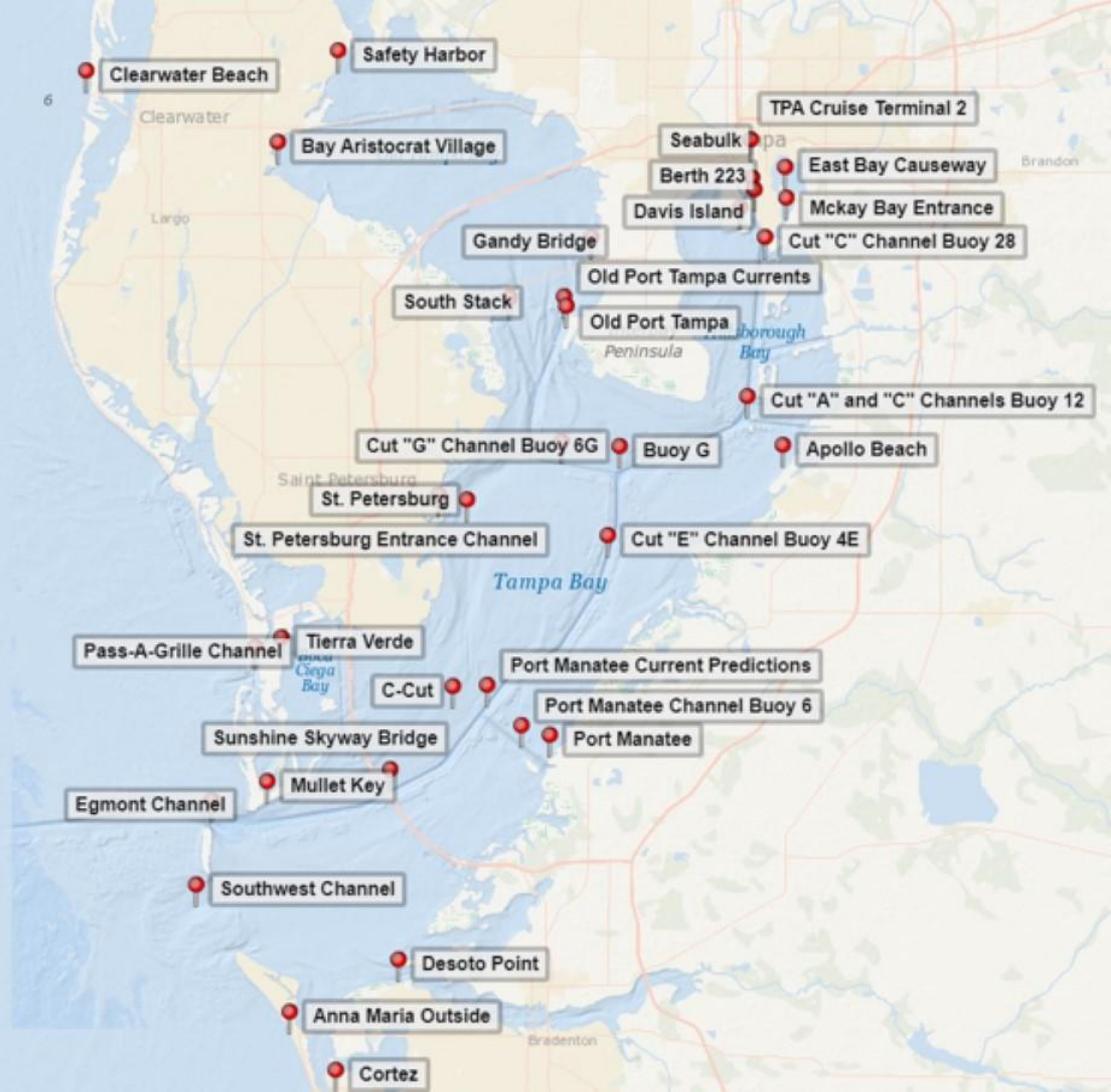
Summary Composite All Currents 3 Days Currents





Hurricane Laura- August, 2020- Over 110 knots of Winds and Over 11 Feet of Storm Surge (with a 70 mb drop in pressure – seen at Calcasieu Pass and a Top Ten Port Complex in America

Need for More Real Time Observation Stations



Hurricane Preparedness, Response, and Recovery

- Speeding the re-opening of ports and protecting lives
 - U.S. Coast Guard (4 USCG Sectors)
 - U.S. Army Corps of Engineers
 - NOAA Navigation Response Teams
 - State & Local governments
 - Local stakeholders/partners

JACKSONVILLE DISTRICT – SURVEYING AND MAPPING USCG SECTOR MIAMI SECTOR COMMAND MEET & GREET



Staff members from Project Management and Operations Division met with USCG Sector Miami personnel on 6 February to discuss dredging projects, post storm recovery procedures as well as USCG Civil Engineering Initiatives underway for FY2023. Pictured from Left to Right: Cdr Steve Elliot, Chris McNees, Steve Conger, Matt Davies, Captain Chris Cederholm (USCG Sector Commander) Lisa Holland and Brooke Hubbard, Nic Alvarado (NOAA) and Lt. Ben Adrien.

Key Area
Partnerships
Readiness

Emergency Response

- Navigation Response Teams

- Object detection
- Chart updates
- Emerging needs



- NOAA hydrographic survey vessels

- Large scale response
 - Challenging Marine Conditions
 - Location (e.g., Caribbean)
 - Hurricane Maria



Navigation Response Teams

Strategically Located for Rapid Response



NRT-Fernandina

Team: Navigation Response Team 2

Homeport: Fernandina Beach, Florida

Navigation Response Teams

Strategically Located for Rapid Response



NRT-Gulfport

Team: Navigation Response Team 1

Homeport: Gulfport, Mississippi

- NRT, USV and MIST

Navigation Response Team (NRT)

- NOAA Survey Response in Coordination with USACE to USCG requests
- Navigation Response Team (NRT)
 - **24-48 hour Response time**
 - [Pre-storm pre-positioning policy]
 - **30-foot trailer-able survey boat with three-person survey team and two government vehicles**



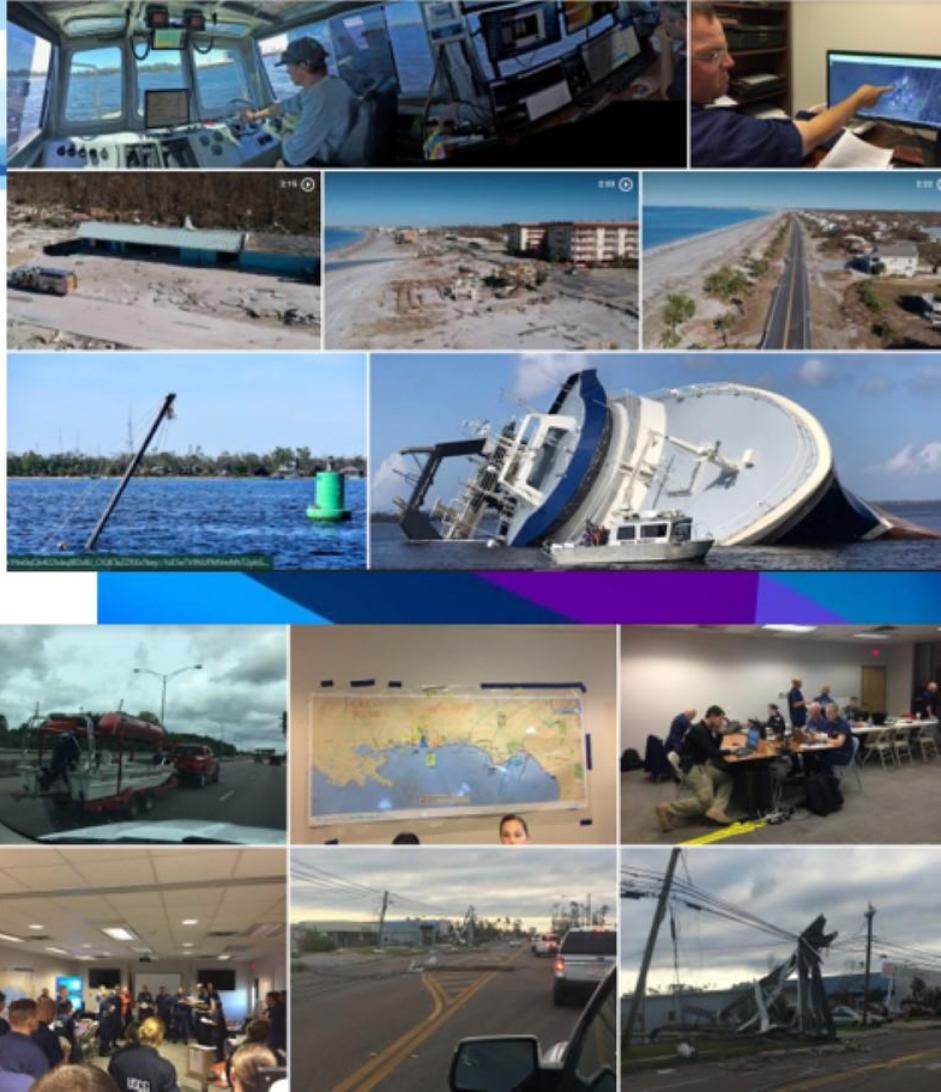
NO TWO STORM EVENTS ARE THE SAME- IN THE TIME
AVAILABLE, FOCUS ON THREE EVENTS

IDA, IAN

Understanding

HURRICANES

- Have Seen greater rates of Intensification (greatly reducing preparedness and response time envelopes)
- 8 consecutive years of a category 4/5 hurricanes making landfall along the Gulf
- Flooding, Winds, disruption of Ports supplying critical resources to large populations
- Recovery of hurricanes takes years for coastal and inland areas
- Multiple resources and programs of noaa needed to prepare and respond to these events
- Coastal areas and Inland Cities and populations are vulnerable



SEVERE SURGE AND DESTRUCTIVE WINDS WERE SEEN WITH THIS SLOW-MOVING STORM EVENT

IMPACTS TO POPULATIONS, WATERWAYS, PORTS FROM TERREBONNE PARISH TO THE NEW ORLEANS AND MISSISSIPPI RIVER AREAS WERE SEEN

THIS SHUT DOWN THE SUPPLY OF ABOUT 20 PERCENT OF THE ENERGY THAT IS RELIED ON ACROSS THE NATION EVERY DAY

THIS SHUT DOWN THE WORLD'S LARGEST PORT COMPLEX- THE LOWER MISSISSIPPI RIVER

HURRICANE IDA- AUGUST 29, 2021 LANDFALL AS A CATEGORY 4, PORT FOURCHON, LOUISIANA



Select View



Location

8/29/21
07:20 PM

Low



High



Knowing the Port and its priorities for rapid recovery, The Administration and Coordination and Contact Points is Refreshed every year





The survey vessel Blake is offshore Fourchon, commencing work



E Slips and Northern Expansion Slips- Very Active Ship Movements. Survey Coverage has been made



Old Pass Fourchon- is a waterway and Port area just below E Slips. It is being asked to be included in the survey coverage by the Port



The survey vessel Blake is offshore Fourchon, commencing work

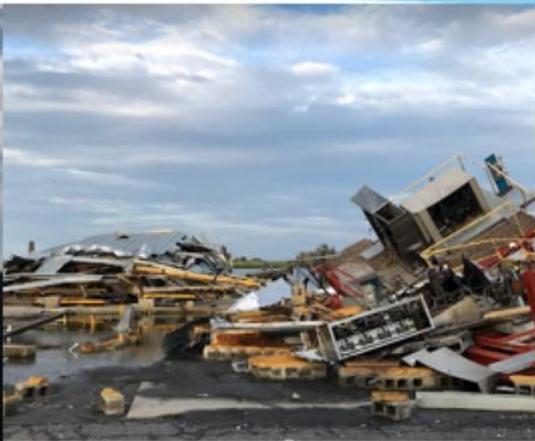


Houma Nav- From the entrance of Terrebonne Bay, up to the large floodgate near Dulac

NRT Team now in Cocodrie with base at the LUMCON laboratory.



Findings and Reporting- opening of Waterways and Communities that have seen heavy Impact and destruction





‘...This has never happened before this quick. We are weeks ahead of prior storms. I can’t begin to tell you how important it is to get industry back on its feet. The work that Tim coordinated along with the team he put together really made a huge difference. It also created a template for future storms (response)...’

NOAA NRT

David Rabalais david@terrebonneport.com terrebonneport.com@microsoft.com
to: rick.spinrad@noaa.gov

Dr. Richard Spinrad
Under Secretary of Commerce for Oceans and Atmosphere
Administrator NOAA
1401 Constitution Ave. NW
Room 5120
Washington, D.C. 20230

Mon, Sep 6, 2021, 7:44AM

Dr. Spinrad,

I am writing you this letter to document and commend NOAA's response to hurricane Ida and the people of Terrebonne parish. Ida is the worst storm to hit this area in my 61 years of living here in Houma, LA.

This area has prepared for and endured many storms in the past (six last year alone) but none as bad as Ida.

Every time a storm hits this area, navigation is compromised. Channels need to be surveyed and obstructions removed before the channel can be opened to industry. This takes a long time.

Prior to this hurricane season, Tim Osborne met with me with a plan he had to get down here with a Navigation Response Team as soon as the storm leaves.

Tim set up a survey team and within one week the team surveyed the Houma Navigation Canal and bayou Lafourche.

The team arrived at the port office in Houma within a day of the storm's exit and went to work. Within a few days they identified all obstructions in the Houma Navigation canal. Each obstruction location was documented and identified. This information was electronically forwarded to the Corp's MNC project manager and the us coast guards captain of the port of Houma.

One week after the storm hit, the Corp and coast guard have all the information they need to get the channels open.

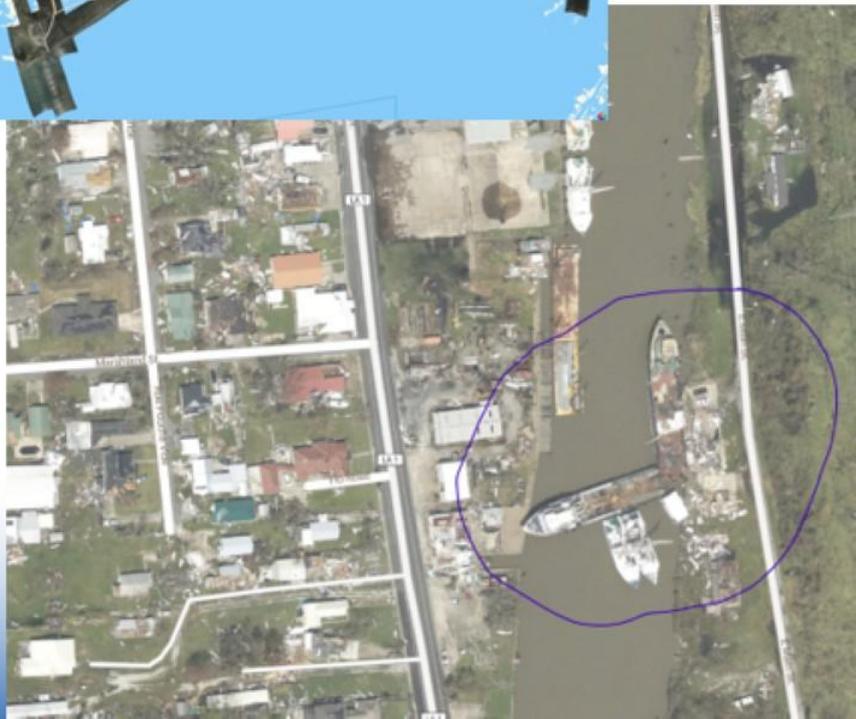
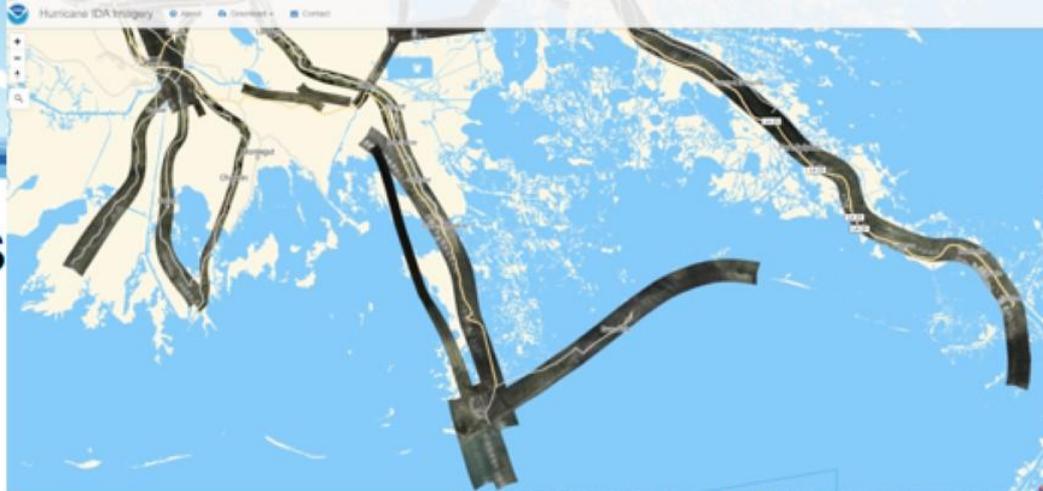
The Corp located funds to remove these structures and have started mobilizing equipment to Houma expected to arrive this Tuesday to begin the removal process.

This has never happened before this quick. We are weeks ahead of prior storms.



Imagery resources have significant importance

Applying NOAA NGS Post Storm Imagery to
Response Efforts
Ida Imagery Was So Good,
That It Was Used to Find and Report Navigation
Dangers With Very Precise Locations



Economic Impact of Ports in Florida- If Disruptions Occur

Florida's Fuel Ports

- Port Tampa Bay
 - Port of Jacksonville
 - Port Everglades
 - Port Canaveral
 - Port of Palm Beach
- <https://www.wbd.com/news/local-news/from-ground-to-gas-tank-how-gasoline-gets-to-florida-drivers>

Florida petroleum product supply



U.S. Energy Information Administration
<https://www.eia.gov/todayinenergy/detail.php?id=15651>
<https://www.eia.gov/todayinenergy/detail.php?id=54099>

\$2.63 million/hour

- Port Tampa Bay
 - Top 25 Ports - Cargo Shipping (24th Total Tonnage and 25th Dry Bulk)
 - Cruise Ship Industry
 - **\$18 Billion/year, \$49.3 million/day, \$2.05 million/hour**
- Port Manatee
 - Cargo Shipping Cruise Ship Industry
 - **\$5.1 Billion/year, \$14.0 million/day, \$0.58 million/hour**

\$8.22 million/hour

- Port Miami
 - Top 25 Ports - Container Shipping (13th TEU)
 - Cruise Ship Industry
 - **\$43 Billion/year, \$117 million/day, \$4.91 million/hour**
- Port Everglades
 - Top 25 Ports - Container Shipping (18th TEU)
 - Cruise Ship Industry
 - **\$29 Billion/year, \$79.4 million/day, \$3.31 million/hour**
- Port of Jacksonville
 - Top 25 Ports - Container Shipping (12th TEU)
 - Cruise Ship Industry
 - **\$31.1 Billion/year, \$87.6 million/day, \$3.55 million/hour**
- Port of Key West (pre-pandemic)
 - Cruise Ship Industry
 - **\$85 Million/year, \$232.7 thousand/day, \$9.70 thousand/hour**

NOAA OCS Hurricane Ian Response

- Port of Tampa re-opening (<24 hours)
 - NOAA NRT Fernandina beach
 - Geodynamics (Contractor)
- Surveying Efforts in Fort Myers, Naples, and Franklin Lock & Dam
 - NOAA NRT Fernandina Beach
 - NOAA NRT Stennis USV
- [Office of Coast Survey \(OCS\) 2022 Story Map](#)
- <https://storymaps.arcgis.com/stories/b254b97e2c0b449c91dfc5ad8540375b>

One NOAA (but many individuals)

- Thank you to the Navigational Response Team members & Survey Contractors
- Thank you for the local partners and stakeholders
 - US Coast Guard, their Sectors, their COTPs, & CG Colleagues
 - US Army Corps of Engineers Colleagues
 - Port Pilots, Tug boat Captains
 - Port Authority
- THANK YOU ALL!



NOAA Regional Navigation Mangers



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- Nicolas Alvarado, PhD, Southern Florida, Puerto Rico, & U.S. Virgin Islands
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Thank You

