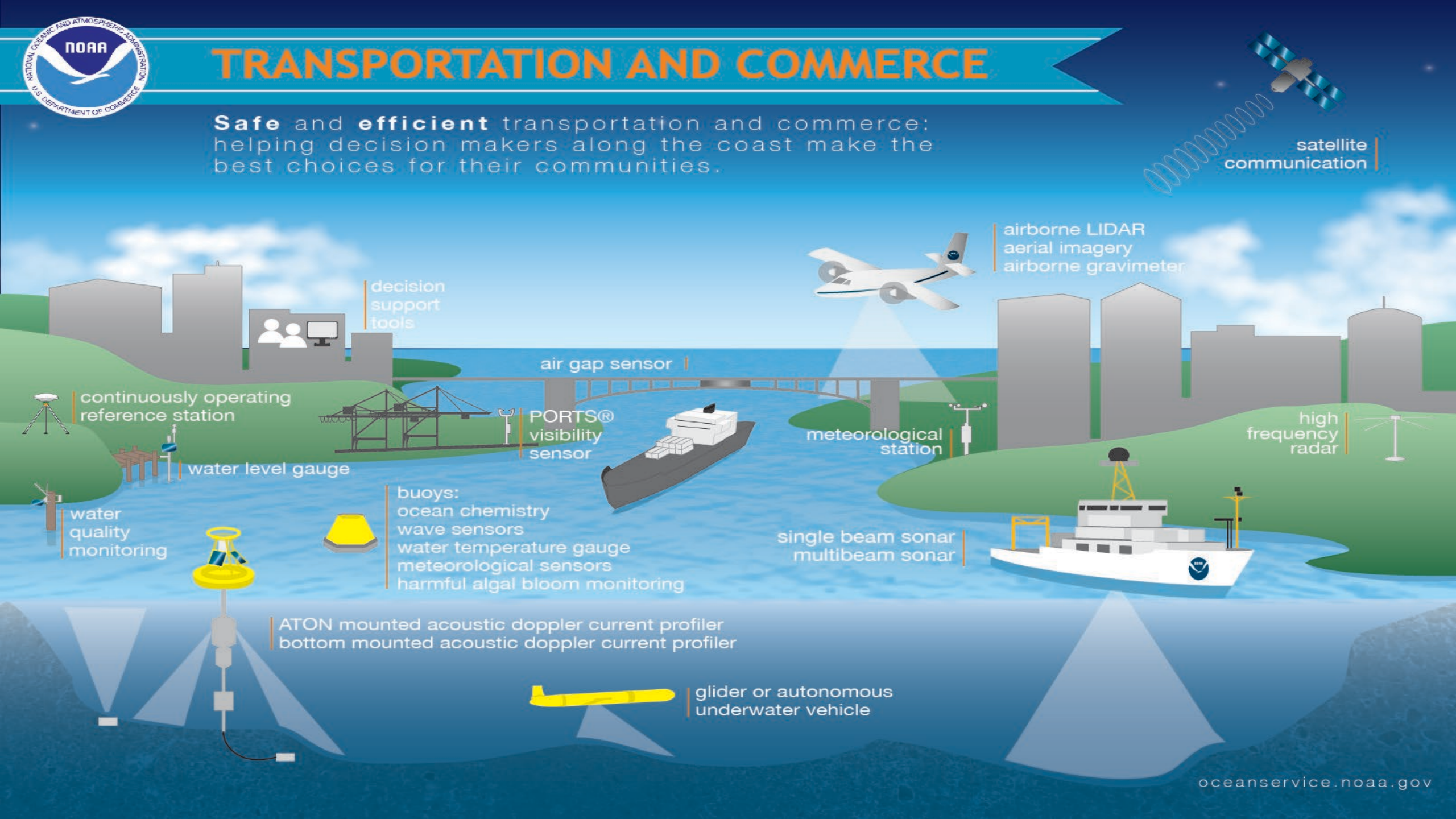
Marine Navigation and Port Recovery

Kyle Ward - 24 May 2021

Science, Service and Stewardship

TRANSPORTATION AND COMMERCE

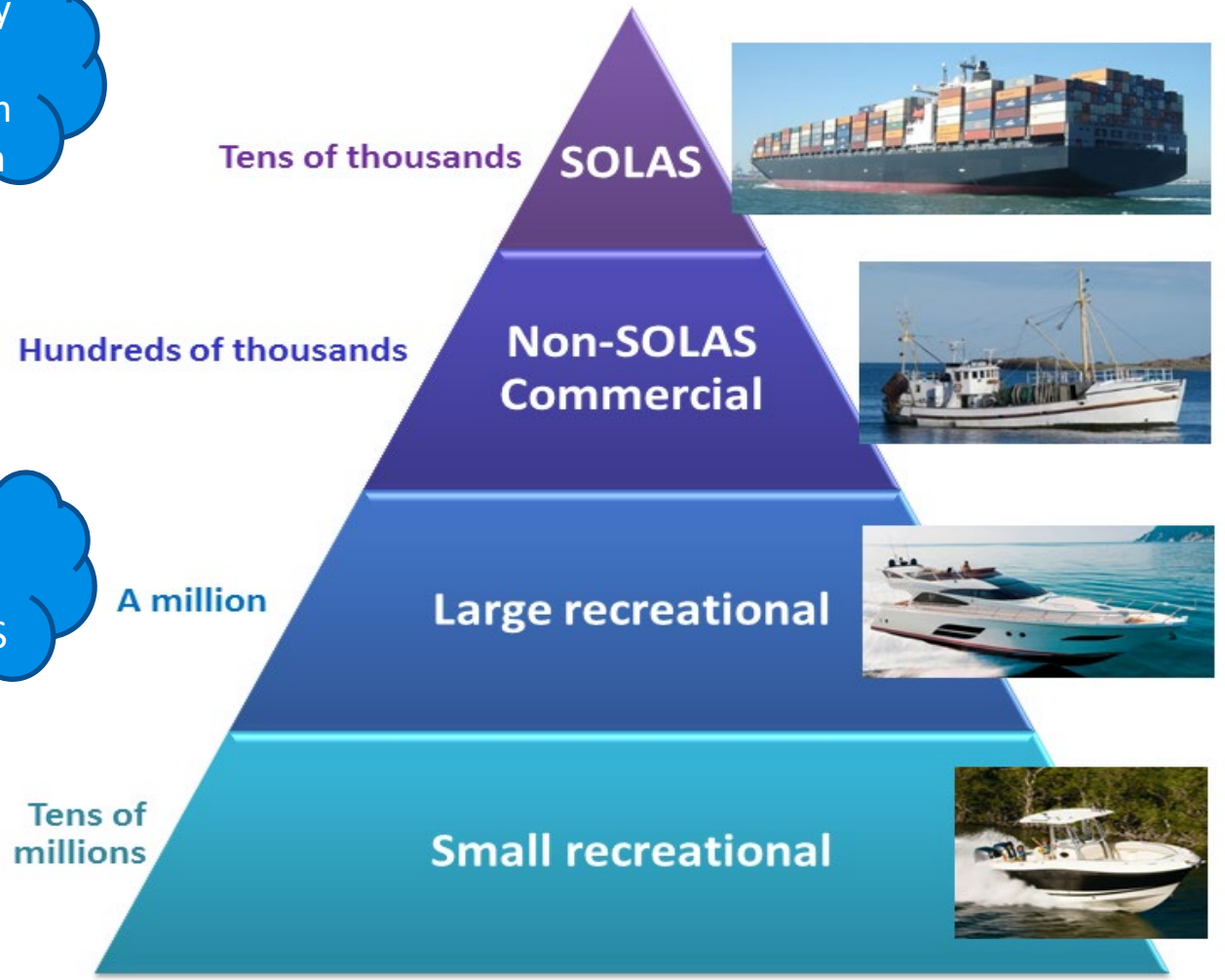
Safe and **efficient** transportation and commerce: helping decision makers along the coast make the best choices for their communities.



oceanservice.noaa.gov

NOAA Navigation Services Customers

$7M/day lost due to UKC in Houston

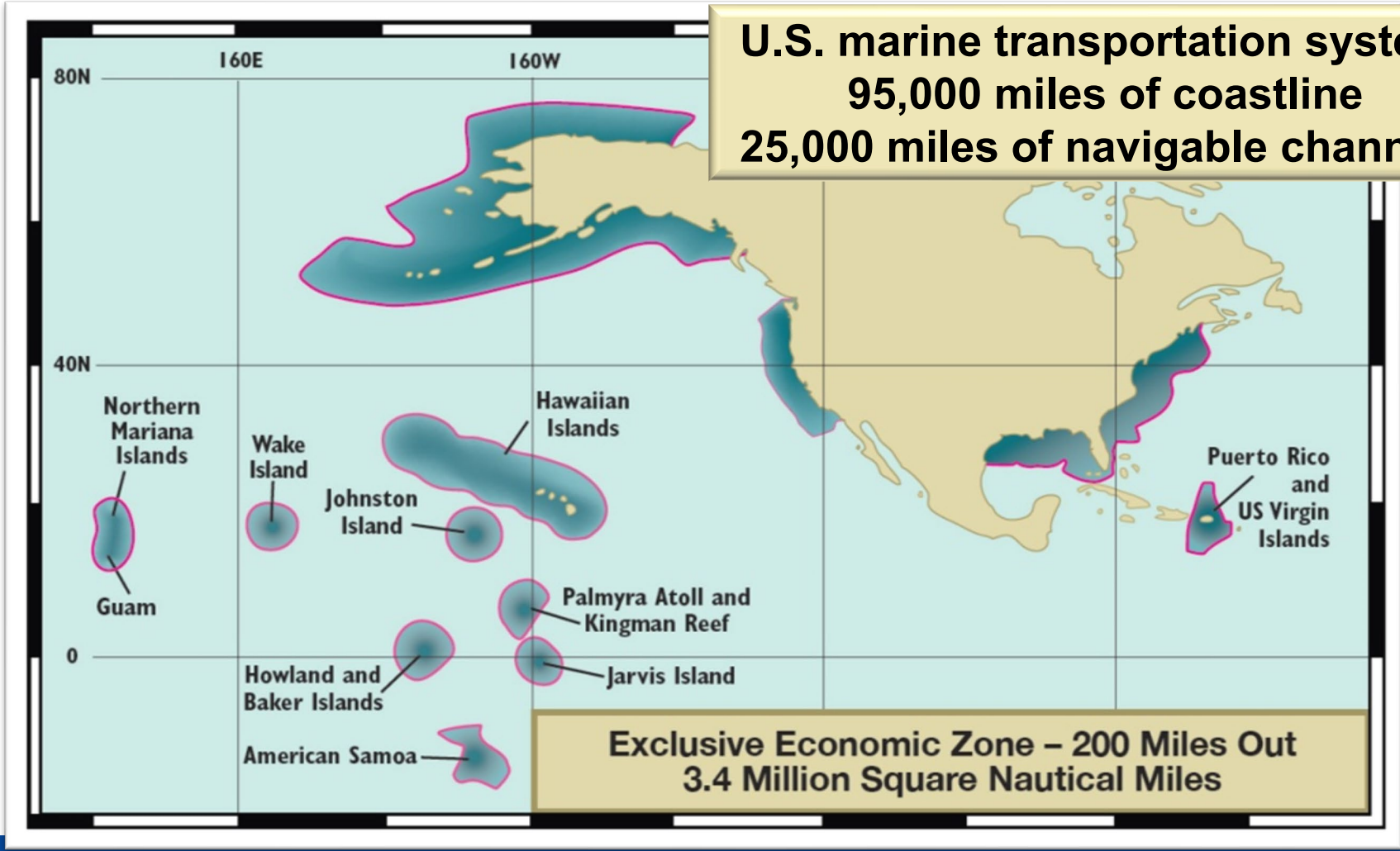


16M boats in use in US

$36B annually spent on boating*

*NMMA 2016

Coast Survey is the Nation's Chart Maker



Coast Survey is the Nation's Chart Maker

Who we are

U.S. Department of Commerce → National Oceanic and Atmospheric Administration → National Ocean Service → **Office of Coast Survey**

Our products

Data collection - Conduct hydrographic surveys to collect depth measurements for nautical charts.

Product development - Create nautical charts and other products for safe and efficient navigation.

Product distribution - Distribute nautical charts in multiple formats, capitalizing on digital formats.

Our services

Navigation response - Conduct routine and emergency hydrographic surveys.

Regional support - Navigation managers strategically located in U.S. coastal areas to assist with navigational challenges.

Model development - Develop models for storm surge and hurricane prediction with real-time data feeds.

Technology research - Develop and test new technologies to improve mapping efficiencies.

National Charting Plan

- One of the responsibilities of a Navigation Manager is to help implement changes within our charting mission that impact users.
- Incorporate stakeholder feedback on these efforts.
- This plan was released in 2017 and details our strategy to improve Nautical Charting

National Charting Plan

A Strategy to Transform Nautical Charting

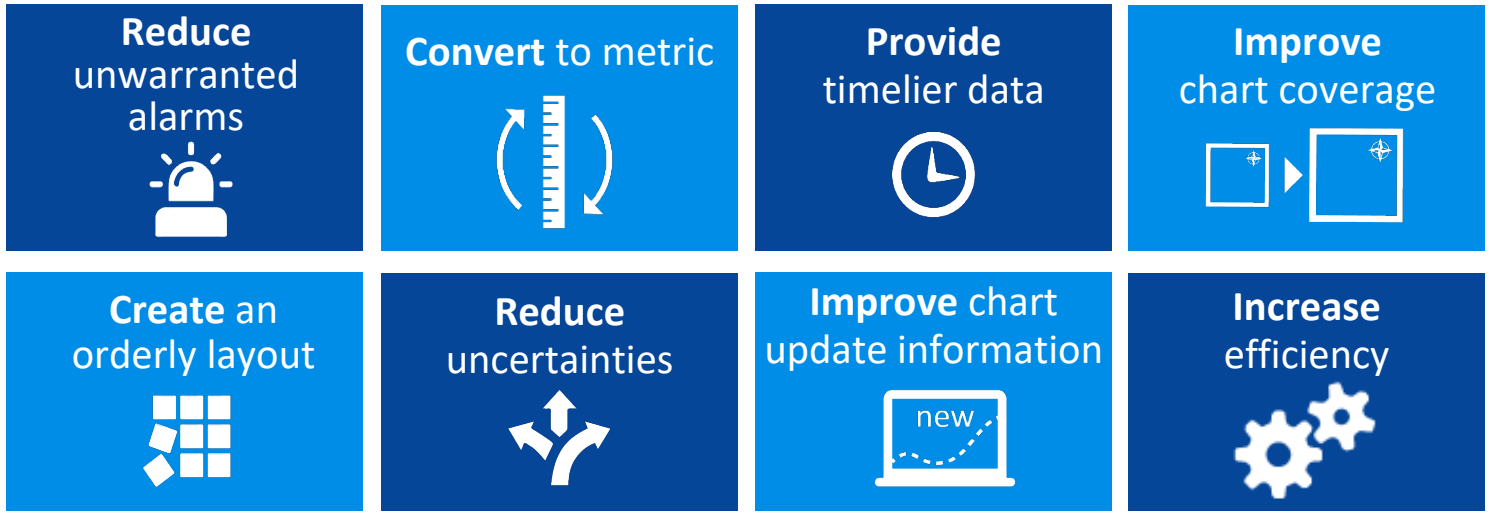
November 1, 2017

Office of Coast Survey
Marine Chart Division

National Charting Plan

Purpose: Improve NOAA nautical chart coverage, products, and distribution

Improvements:



Outcome: Ease of access to more precise, higher-resolution charts that deliver the most up-to-date navigation information possible

Coast Survey Raster Chart Sunset

WORKBOAT

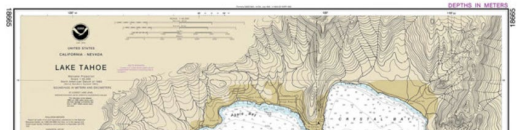
Latest News • Viewpoints • Shipbuilding • Videos • Think Tank • Jobs & Marketplace • News

March 2, 2021

NOAA begins transition to electronic navigation charts

by WorkBoat Staff in Government, News

Guest Author: NOAA



The Ellsworth American.

HOME NEWS + SPORTS + LIFESTYLE + WEATHER OPINION OBITUARIES + CALENDAR

NOAA starts phasing out its paper charts

April 13, 2021 by Ethan Genter on News, Waterfront

ELLSWORTH — When Karl Brunner takes tourists out on his sail charters and lobster tours, he has a trusty paper nautical chart from the National Oceanic and Atmospheric Association (NOAA) that acts as a map to the ocean.

NOAA begins transition exclusively to electronic navigation charts

Digital updates are easier, quicker, increase mariner safety

Oceans & Coasts Charting | nautical charts and maps

SHARE

February 26, 2021 — NOAA will begin to implement its sunset plan for paper nautical charts this month, starting with the current paper chart 18665 of Lake Tahoe. After August, NOAA's electronic navigational chart will be the only NOAA nautical chart of the area.

gCaptain

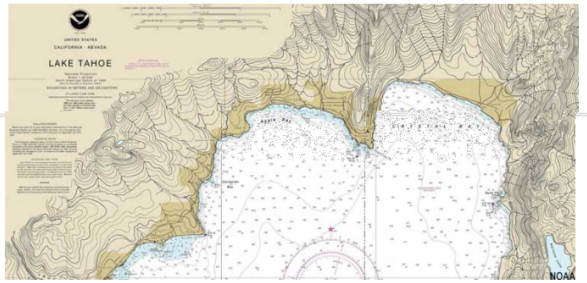
Electronic navigational chart displayed on an Electronic Chart Display and Information System (ECDIS) on NOAA Ship Thomas Jefferson. Photo credit: NOAA

NOAA Kicks Off Transition Exclusively to Electronic Navigation Charts

Mike Schuler

Total Views: 10544

February 26, 2021



NOAA to stop paper charts

BY GCN STAFF | MAR 03, 2021

The National Oceanic and Atmospheric Administration has stopped offering the paper and associated raster versions of the marine navigation chart for Lake Tahoe the first chart to be sunsetted under the five-year plan to move to fully electronic navigational charts (ENCs). After August, the agency said in a Feb. 26 announcement the electronic version will be the only NOAA nautical chart of the area.

NOAA Plans to Stop Producing Traditional Paper Charts

File image courtesy NOAA

BY THE MARITIME EXECUTIVE 11-15-2019 09:16:56

On Friday, the U.S. National Oceanic and Atmospheric Administration's Office of Coast Survey announced plans to phase out the production of all traditional paper nautical charts.

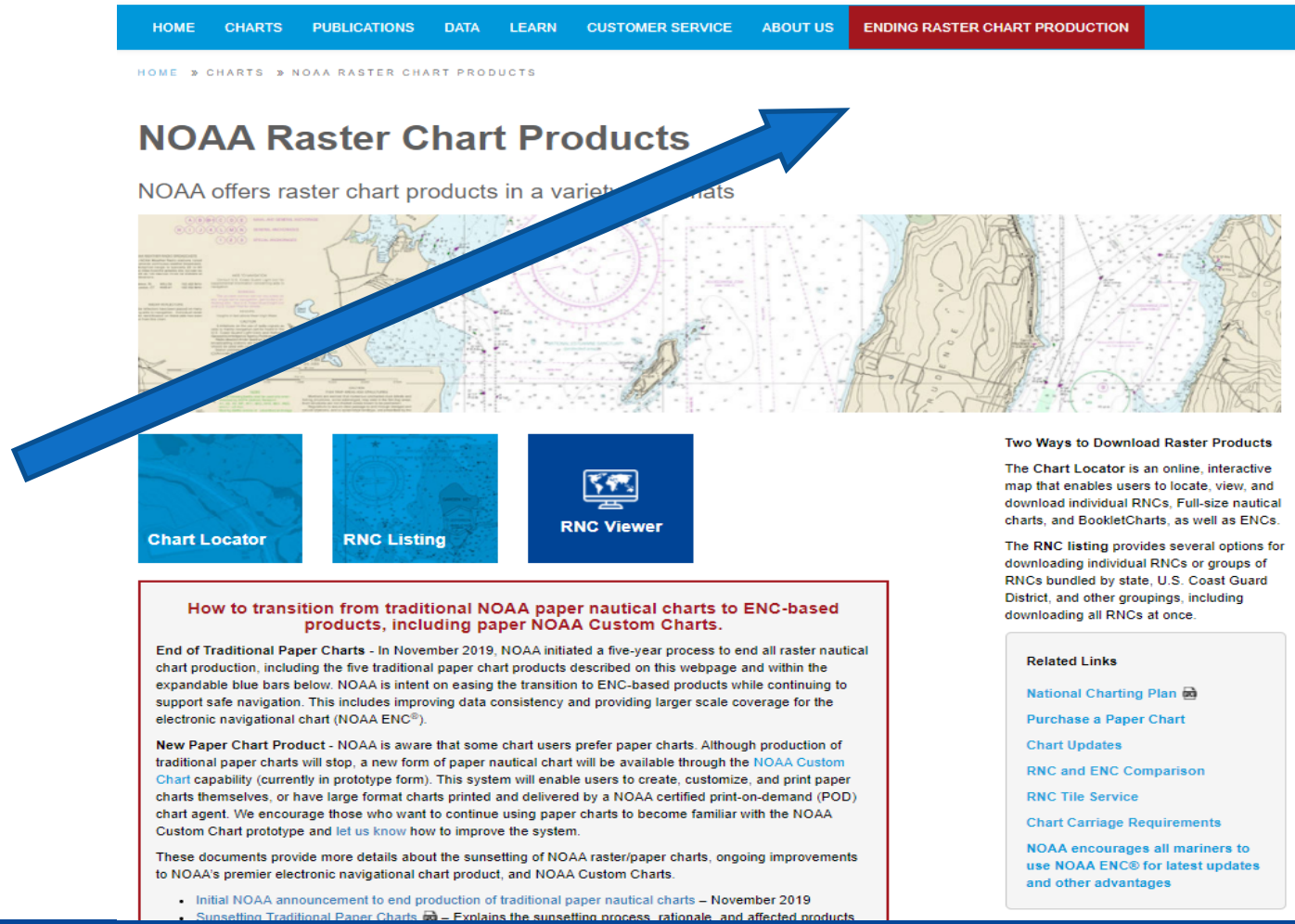
Over the next five years, NOAA says that it plans to transition to electronic chart (ENC) products with a focus on improving data consistency and providing larger scale ENC coverage. This process includes replacing 1,200 irregular ENC cells on 130 different scales with a standardized grid system and set of 12 standard scales

Office of National

Resources For Transitioning to ENCs

Paper plots will still be available

https://nauticalcharts.noaa.gov/



What is emergency response

- Any systematic response to an unexpected or dangerous occurrence
- The goal of an emergency response is to mitigate the impact of the even on people and the environment.
- NSD's work goes beyond just hurricanes
    - Assist with finding sunken vessels
    - Assessing shoaling areas that pose a danger to navigation
    - Search and recovery

Find what is under the water!!

Past Hurricane and Other Significant Response

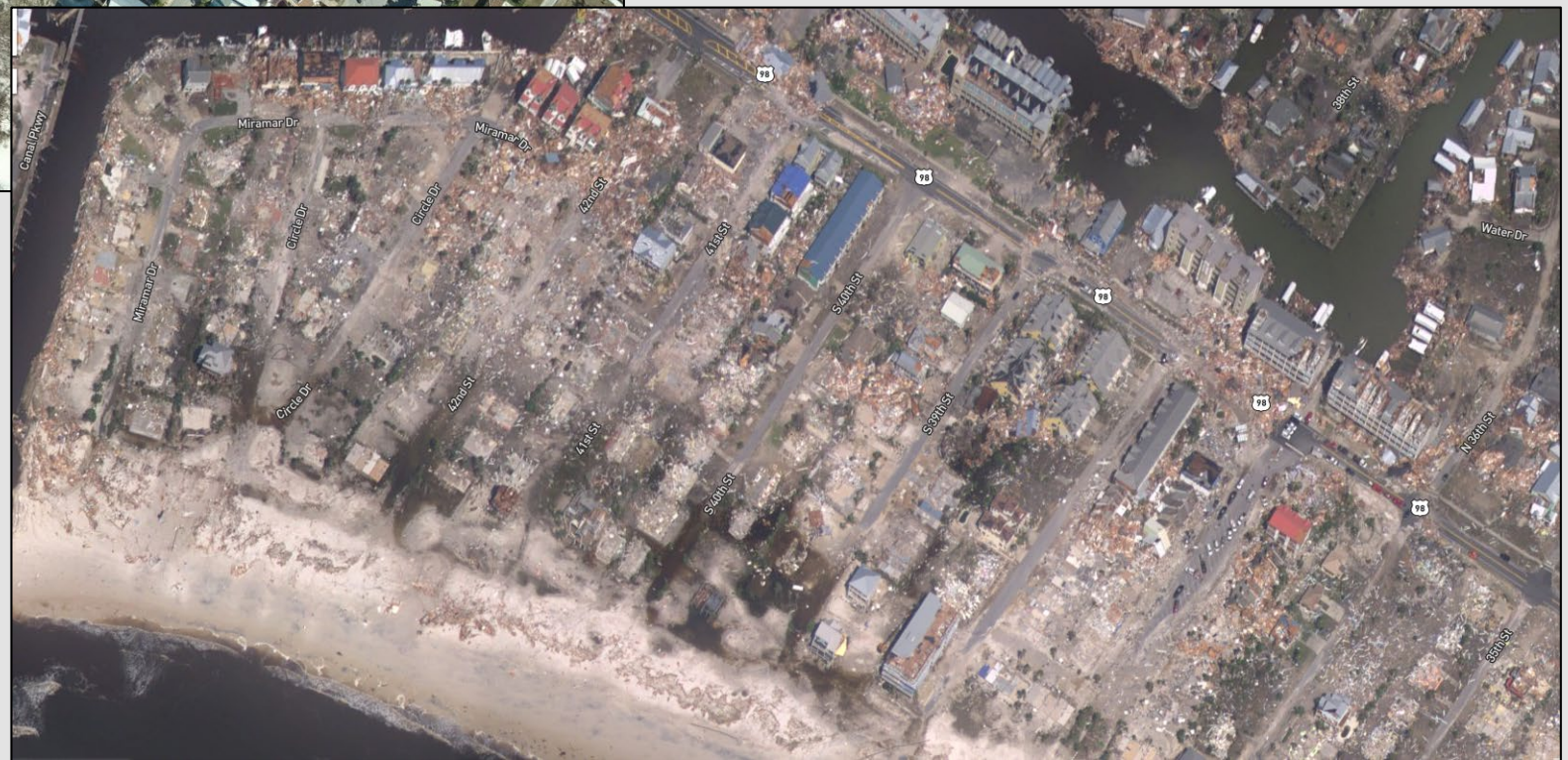
- Some Significant Storms
  - Hurricane Katrina – New Orleans - 2005
  - Hurricane Sandy – New York New Jersey - 2012
  - Hurricane Maria – Puerto Rico and USVI - 2017
  - Hurricane Harvey – Houston Galveston - 2017
- Other Responses
  - TWA Flight 800 – Long Island Sound - 1996
  - JFK Jr. Plane Crash – Martha's Vineyard - 1999
  - Egypt Air Flight 990 – New England - 1999
  - Deep Water Horizon – Gulf of Mexico - 2010

Hurricane Response in 2020

- Responded to four Storms
  - Hurricane Laura – Galveston and Lake Charles
  - Hurricane Sally – Pensacola
  - Hurricane Delta – Lake Charles
  - Hurricane Zeta – Gulfport

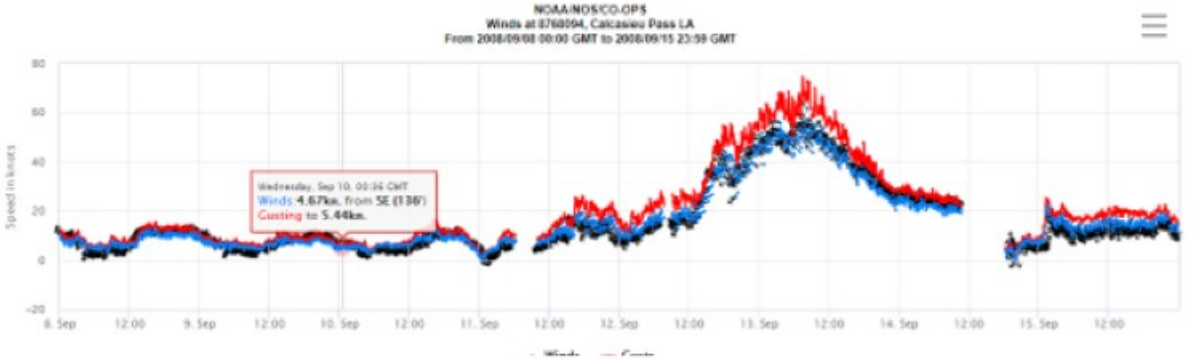
Pre- and Post-
Hurricane Michael imagery

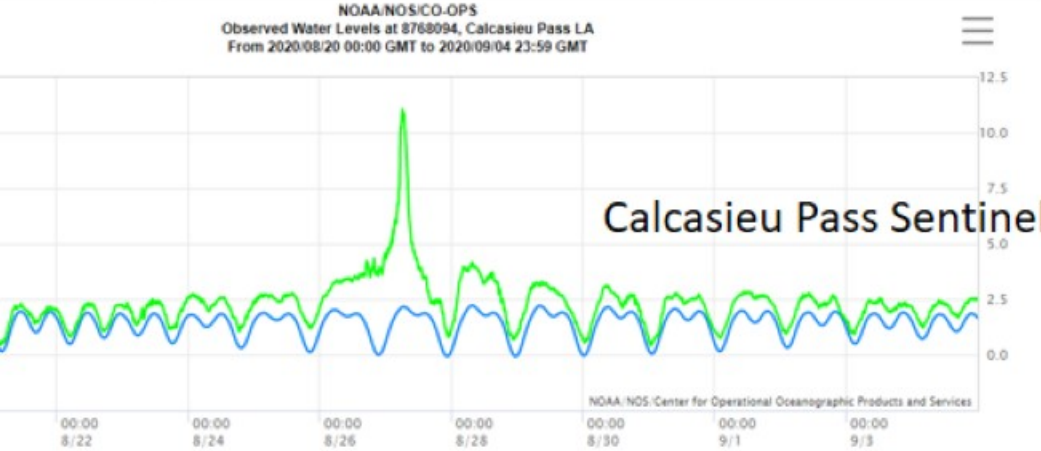
Mexico Beach, FL



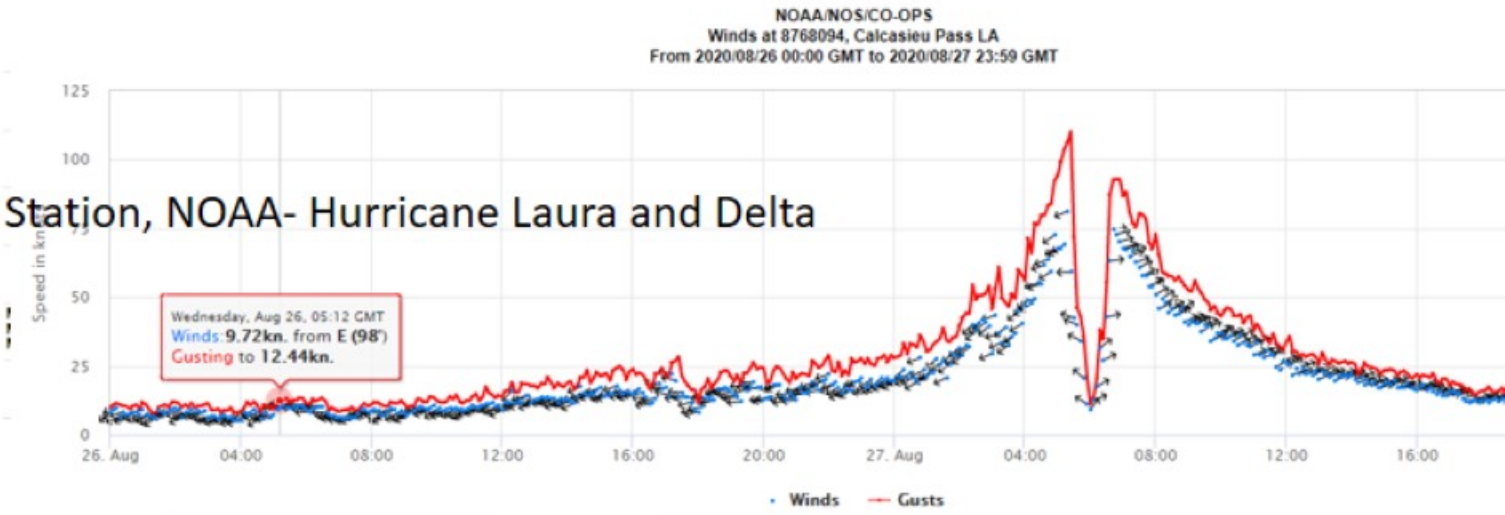
https://storms.ngs.noaa.gov/

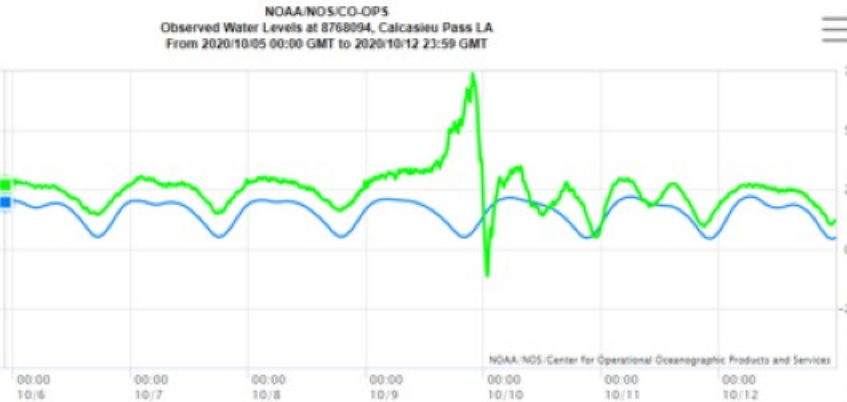
Ike2008
Laura 2020
Delta 2020

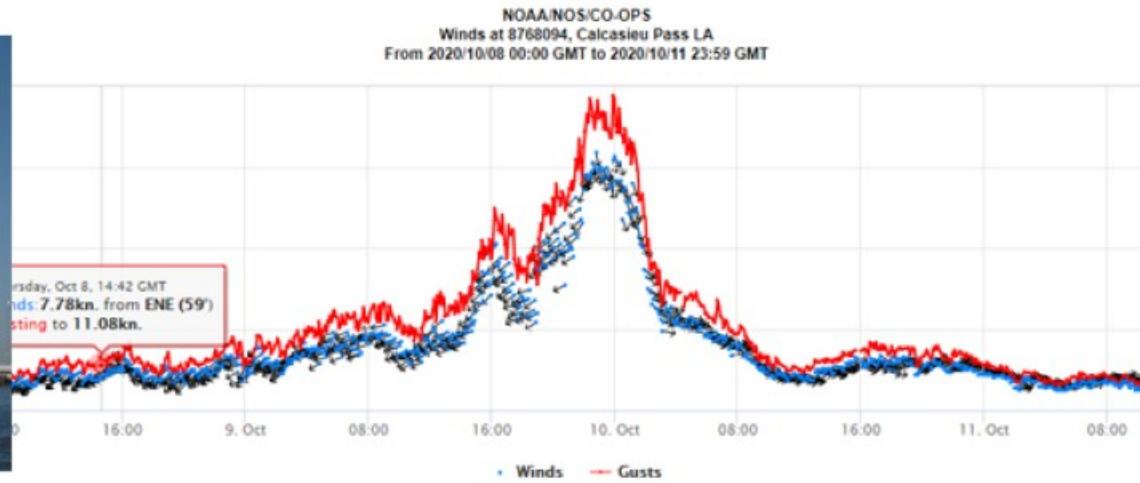




Calcasieu Pass Sentinel Station, NOAA- Hurricane Laura and Delta

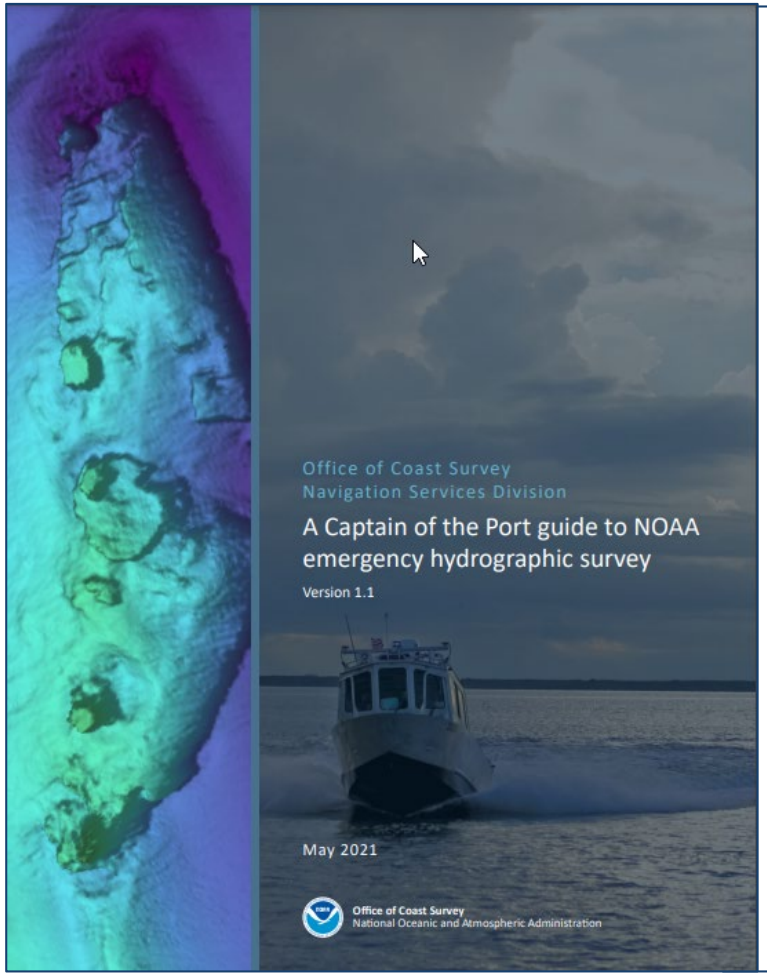


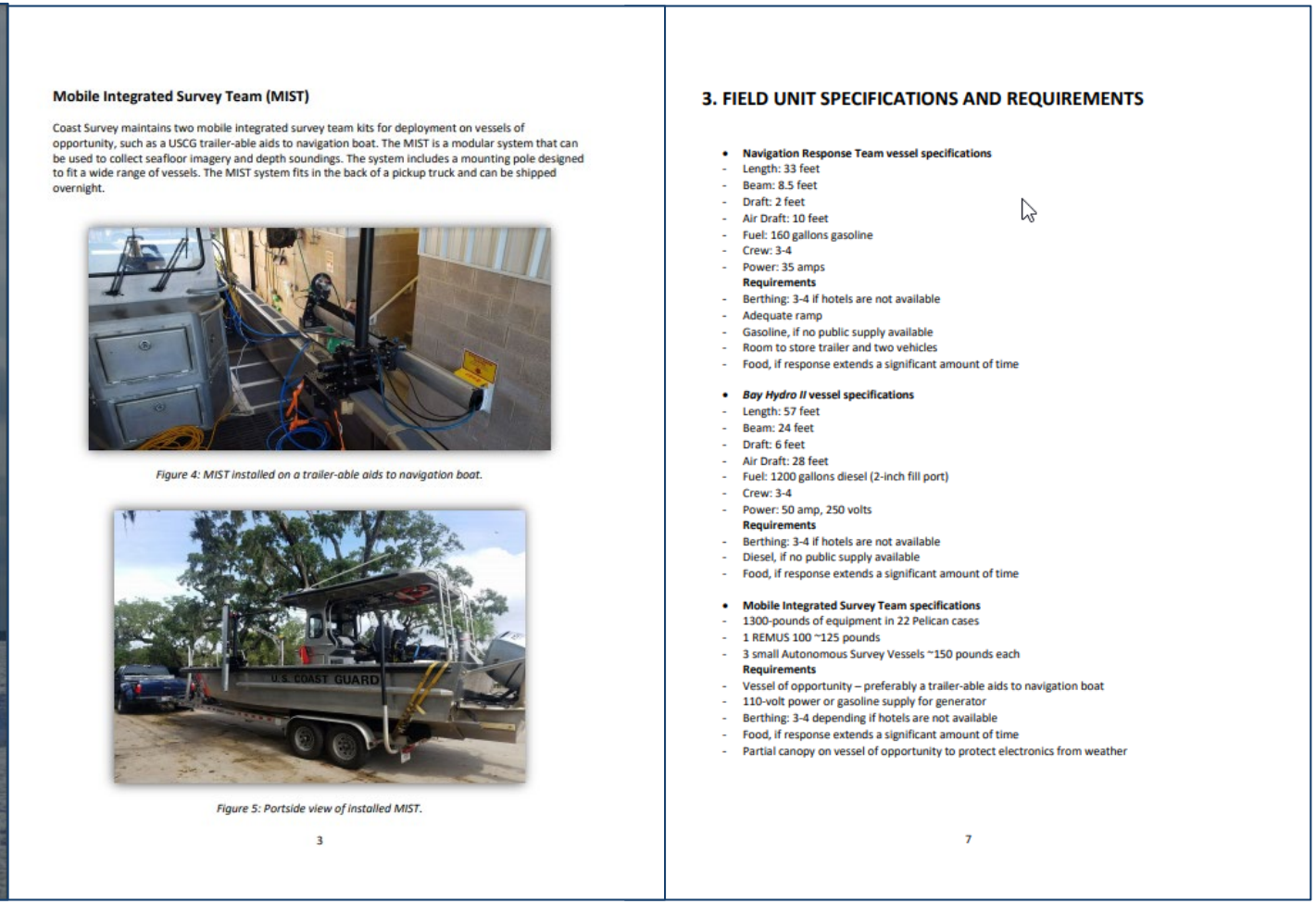




Partners and Customers in Recovery

COTP Guide





Mobile Integrated Survey Team (MIST)

Coast Survey maintains two mobile integrated survey team kits for deployment on vessels of opportunity, such as a USCG trailer-able aids to navigation boat. The MIST is a modular system that can be used to collect seafloor imagery and depth soundings. The system includes a mounting pole designed to fit a wide range of vessels. The MIST system fits in the back of a pickup truck and can be shipped overnight.

Figure 4: MIST installed on a trailer-able aids to navigation boat.

Figure 5: Portside view of installed MIST.

3

3. FIELD UNIT SPECIFICATIONS AND REQUIREMENTS

- **Navigation Response Team vessel specifications**
  - Length: 33 feet
  - Beam: 8.5 feet
  - Draft: 2 feet
  - Air Draft: 10 feet
  - Fuel: 160 gallons gasoline
  - Crew: 3-4
  - Power: 35 amps

  Requirements
  - Berthing: 3-4 if hotels are not available
  - Adequate ramp
  - Gasoline, if no public supply available
  - Room to store trailer and two vehicles
  - Food, if response extends a significant amount of time

- ***Bay Hydro II* vessel specifications**
  - Length: 57 feet
  - Beam: 24 feet
  - Draft: 6 feet
  - Air Draft: 28 feet
  - Fuel: 1200 gallons diesel (2-inch fill port)
  - Crew: 3-4
  - Power: 50 amp, 250 volts

  Requirements
  - Berthing: 3-4 if hotels are not available
  - Diesel, if no public supply available
  - Food, if response extends a significant amount of time

- **Mobile Integrated Survey Team specifications**
  - 1300-pounds of equipment in 22 Pelican cases
  - 1 REMUS 100 ~125 pounds
  - 3 small Autonomous Survey Vessels ~150 pounds each

  Requirements
  - Vessel of opportunity – preferably a trailer-able aids to navigation boat
  - 110-volt power or gasoline supply for generator
  - Berthing: 3-4 depending if hotels are not available
  - Food, if response extends a significant amount of time
  - Partial canopy on vessel of opportunity to protect electronics from weather

7

https://nauticalcharts.noaa.gov/customer-service/docs/navigation-response/a-cotp's-guide-to-noaa-nrt-response-final.pdf

Partners and Customers in Recovery

U.S. Coast Guard – Captain of the Port
Port Status based on arrival gale force winds:

APPROXIMATE TIME	PORT CONDITION	PORT STATUS
June 1 – November 30	Seasonal Alert	Open
72 Hours	Whiskey	Open
48 Hours	X-Ray	Open
24 Hours	Yankee	Closed to inbound traffic
12 Hours	Zulu	Closed to all traffic
Storm Passes	Recovery	Open at completion of port surveys; vessel traffic control measures remain in effect

Partners and Customers in Recovery

U.S. Army Corps of Engineers

Partners and Customers in Recovery

Ports/Pilots

Partners and Customers in Recovery

The Public

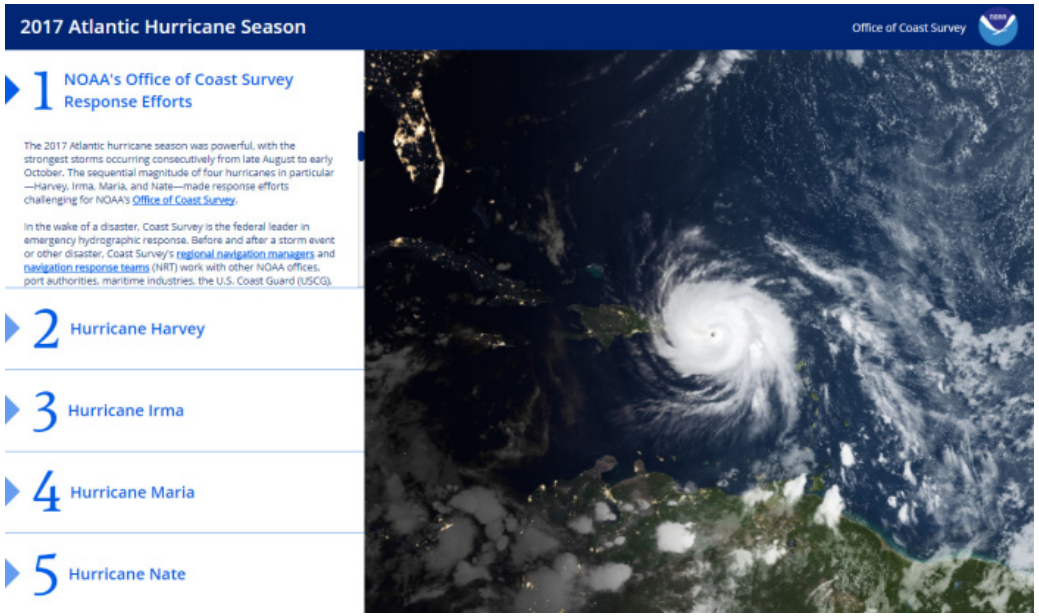
Assessment and Anticipation

Pre – COVD protocols

Team Preparation and Deployment

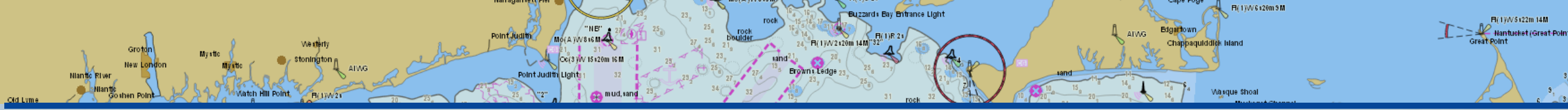
Survey Operations

2017 Irma and Maria Response



Vessel of Opportunity

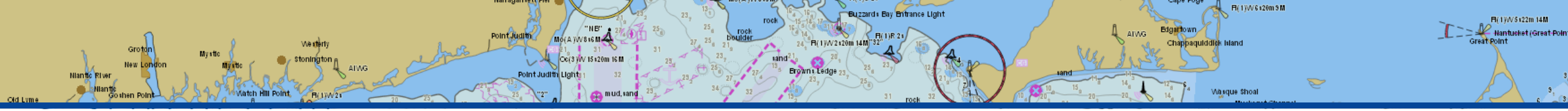
Mobile Survey Team
Hurricane Irma Response
Key West, FL
Platform: USCG TANB.



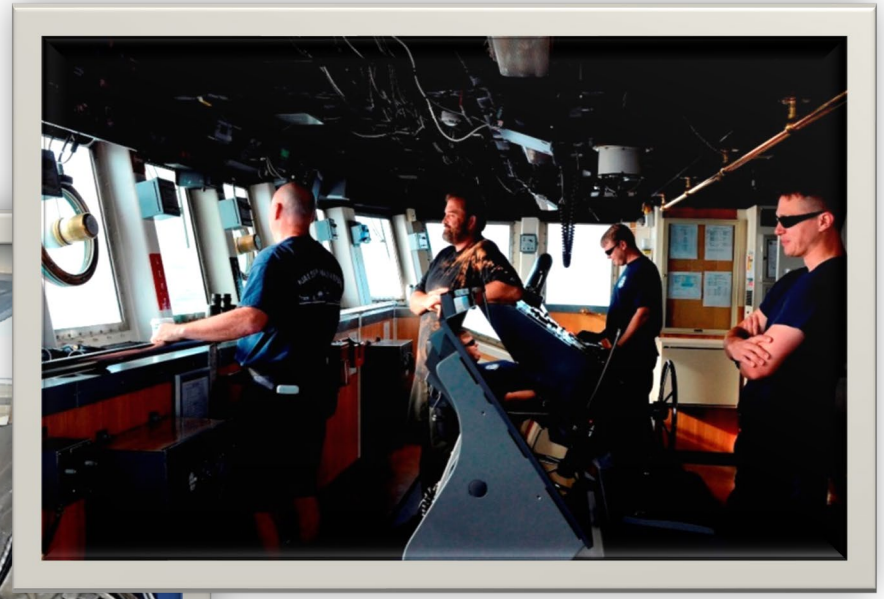
Hurricane Maria Response
NOAA Hydrographic Survey Ship
Thomas Jefferson
September-October, 2017
PS Douglas Wood NOS/HSD/Ops

Office of Coast Survey
National Oceanic and Atmospheric Administration

Thomas Jefferson **and Survey Launch 2904**
Limetree Bay, Saint Croix, USVI, 2 October, 2017
Photo by Tom Jaffurs



Deploying from Port Everglades on September 24th after taking on personnel, ship stores, supplies for Nat'l Weather Service San Juan and tide/weather station field repair materials.



The transit to San Juan took four days; arriving on the 28th.

Hurricane Maria struck the USVI and Puerto Rico as a Category 4 storm on Sept 20th. The damage to local infrastructure made shore deployed survey operations impractical.

First Priority: deliver food and supplies to NWS, San Juan.
Second Priority: open the port at Bahia de Ponce; a critical fuel and container port to accommodate commerce.
In total, the TJ surveyed 18 individual facilities in 13 areas.

1: San Juan

13: Bahia de Fajardo

12: Bahia de Sardinas, Culebra Island

9: Redhook Bay, St. Thomas

10: Cruz Bay, St. John

4: Bahia de Puerca

3: Roosevelt Roads

8: Gregerie Channel, Long Bay Charlotte Amalie, St. Thomas

11: Bahia de Mulas, Vieques Island

15: Bahia de Guanica

2: Bahia de Ponce

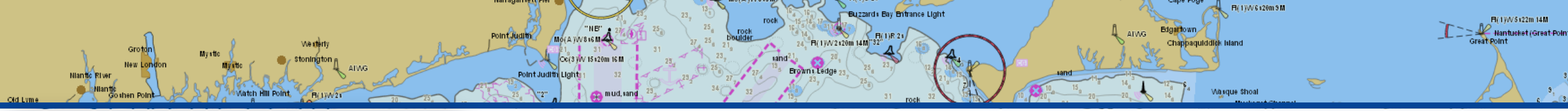
5: Christiansted, St. Croix

6: Frederiksted Cruise Ship Pier, St. Croix

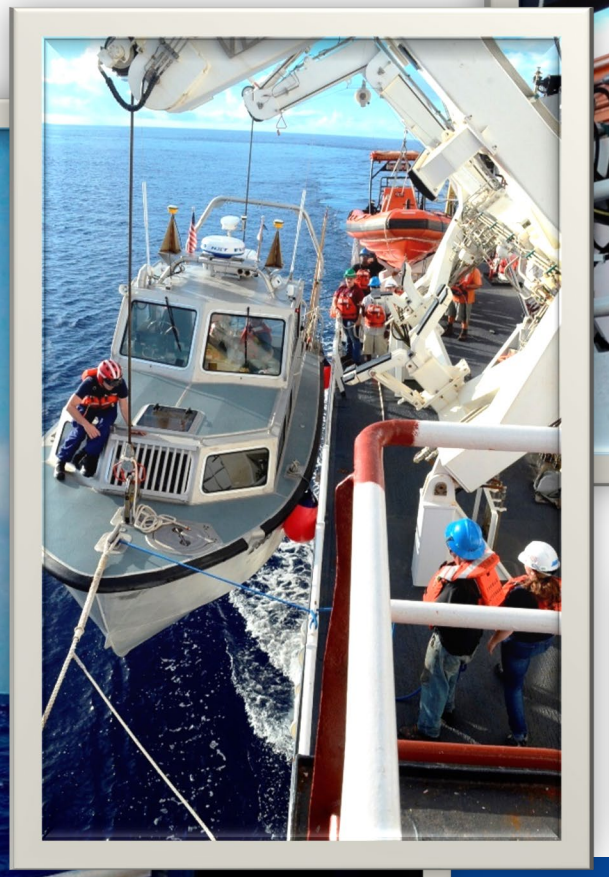
7: Limetree Bay, Fuel Terminal and Container Port, St. Croix

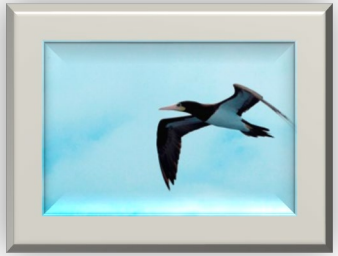
Office of Coast Survey
National Oceanic and Atmospheric Administration

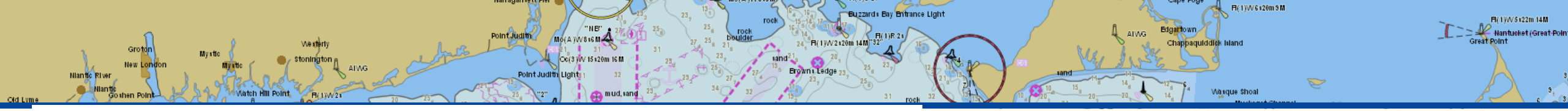
Bahia de Ponce photo by: ST Tracy McMillan



Most hydrographic acquisition was conducted by survey launches 2903 and 2904.
For 20 days the ship sustained the crew and support staff and provided facilities for planning and processing data independent from local infrastructure.







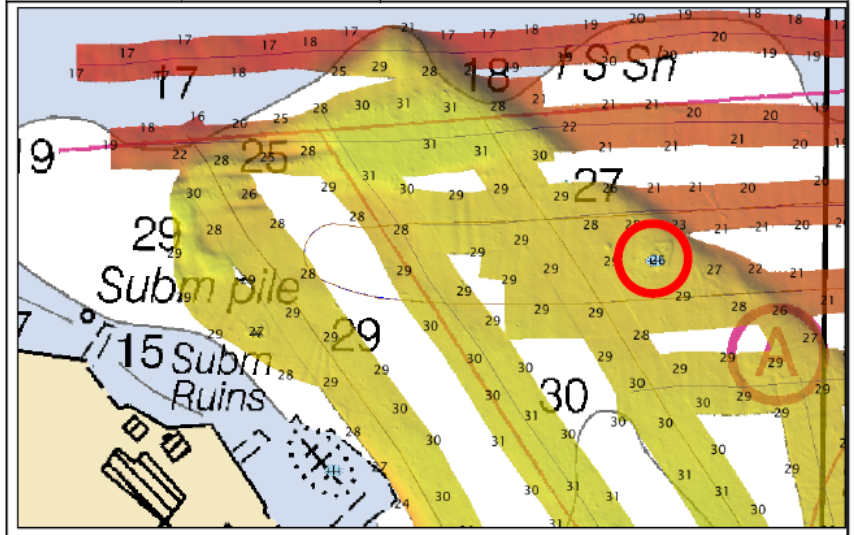
NOAA Ship *Thomas Jefferson* (S-222)
Supplemental Contact Information
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE - OFFICE OF COAST SURVEY

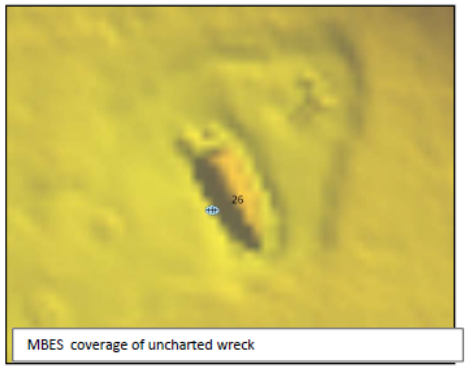
Contact:
Commanding Officer / Chief of Party
CDR Chris van Westendorp, NOAA
co.thomas.jefferson@noaa.gov

Date:	4 October 2017
Latitude:	18.336648 N
Longitude:	64.93101 W
MBES least depth:	26 ft
SSS contact height:	3.5 ft
Contact dimensions:	22 x 9 ft

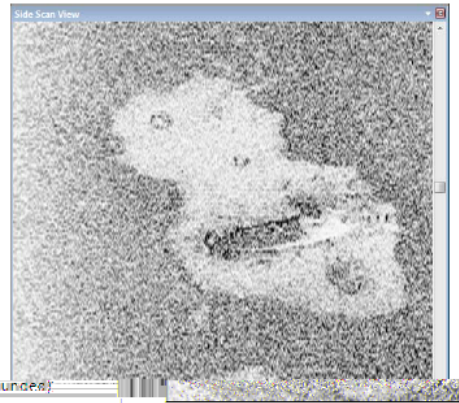
Comments:
Uncharted wreck near Cay Bay inside designated "A" anchorage.

Additional media / information:





MBES coverage of uncharted wreck

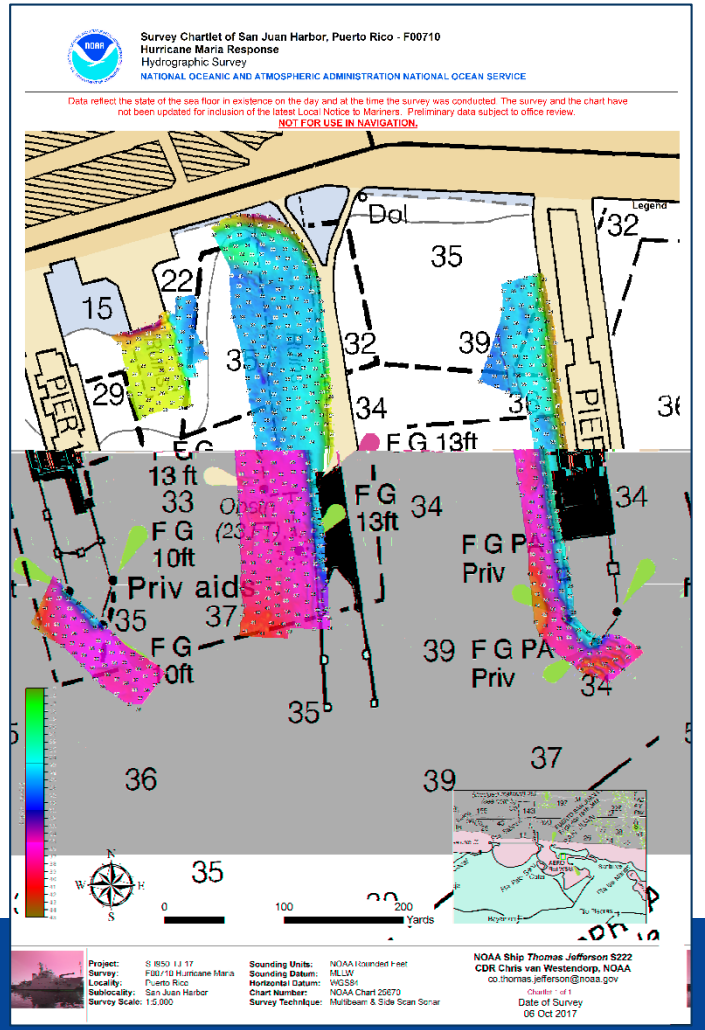


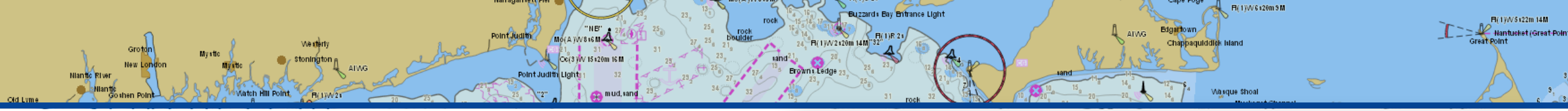
SSS image of wreck.

Project:	S-I950-TJ-17	Chart Number:	25649
Survey:	F00705	Sounding Units:	Feet (NOAA rounded)
Locality:	US Virgin Islands	Datum:	MLLW
Sublocality:	Charlotte Amalie, St Thomas	Date of survey:	3-4 October, 2017

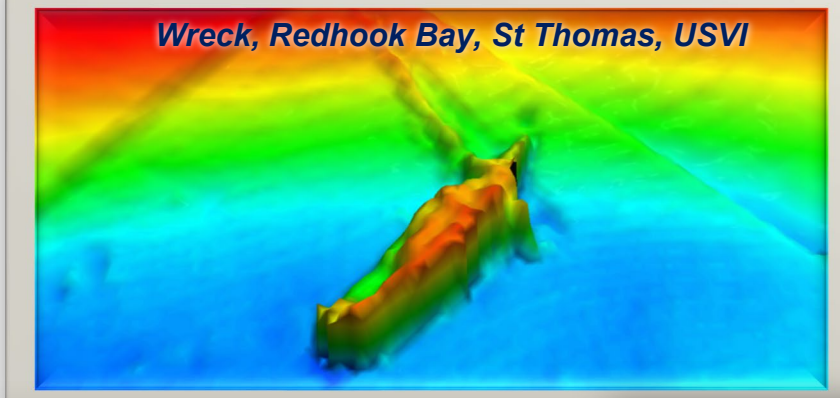
ATION PRELIMINARY PRODUCT - FOR USCG & NOAA DECISIONAL USE ONLY - NOT FOR USE IN NAVIG

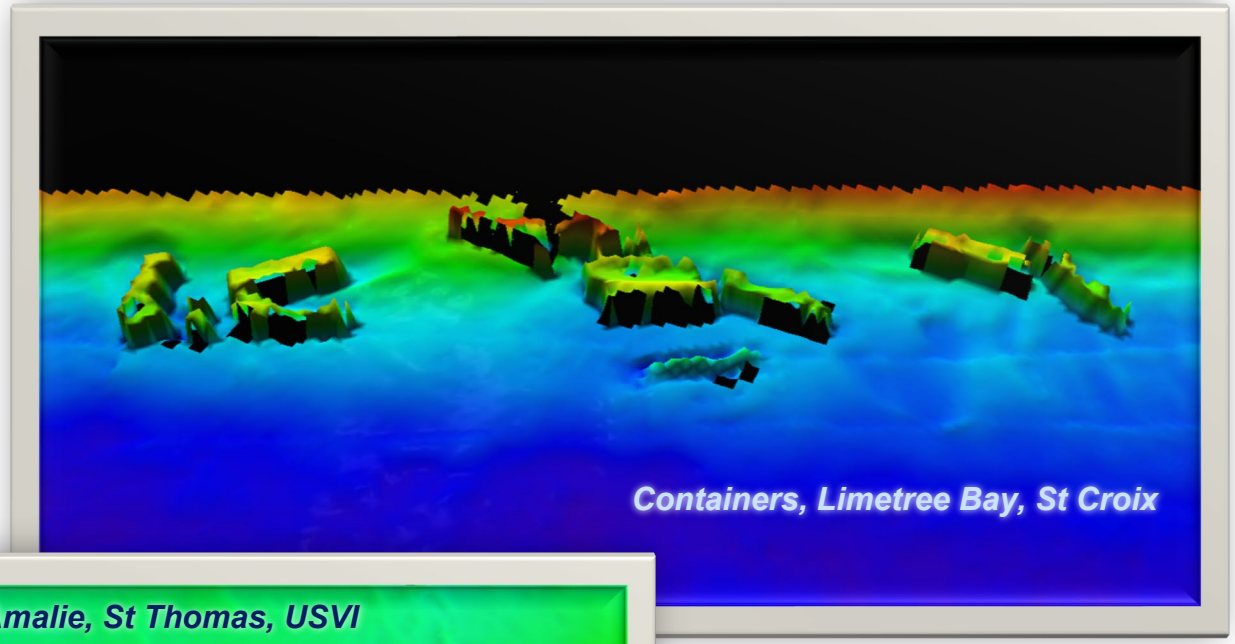
Example of a contact report and digital terrain models delivered to the USCG and other stakeholders a day after acquisition.

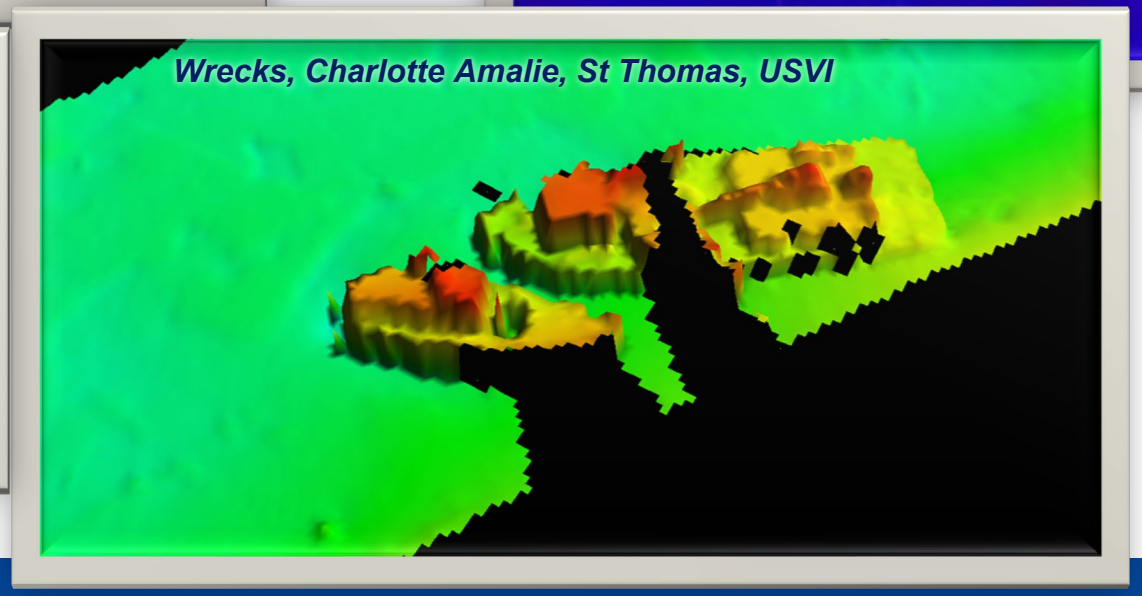




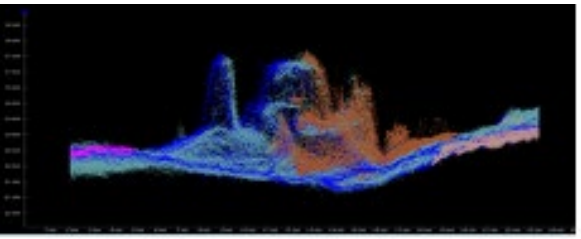
Some Obstructions found in the multibeam and sidescan sonar data:



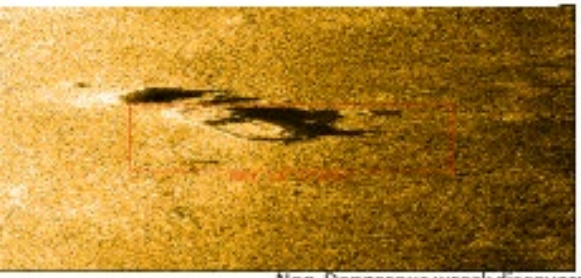




On the Fly Reporting and Night Processing



Length: 24ft
Width: 7ft
Contact Height: 4ft
Least Depth: 17ft
Coordinates:25-56-14.450089N, 080-07-53.472089W



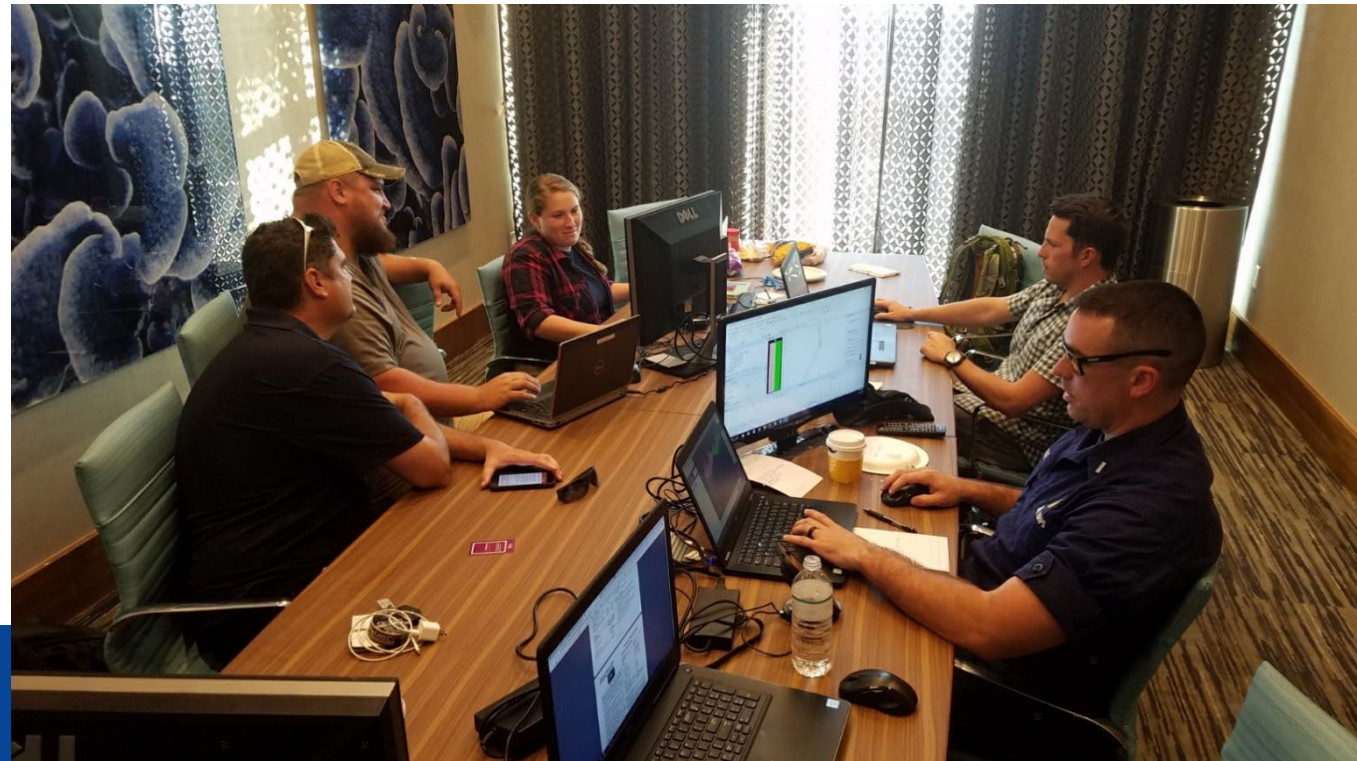
Non-Dangerous wreck discovered on edge of ICW. Least depth of 17 feet poses no threat to navigation.

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

Project:	F00778	**Sounding Units:**	Feet
Survey:	S-H912-NRT2-19	**Sounding Datum:**	MLLW
State:	FL	**Horizontal Datum:**	NAD 83 UTM 17 N
Locality:	MIA to FTL	**Chart Number:**	11467
Sublocality:	Dumbfounding Bay		
Survey Scale:	1:10,000		

NOAA NRT2
James Kirkpatrick

Survey Date:
07/01/2019



Final Products