

NOAA's NATIONAL OCEAN SERVICE

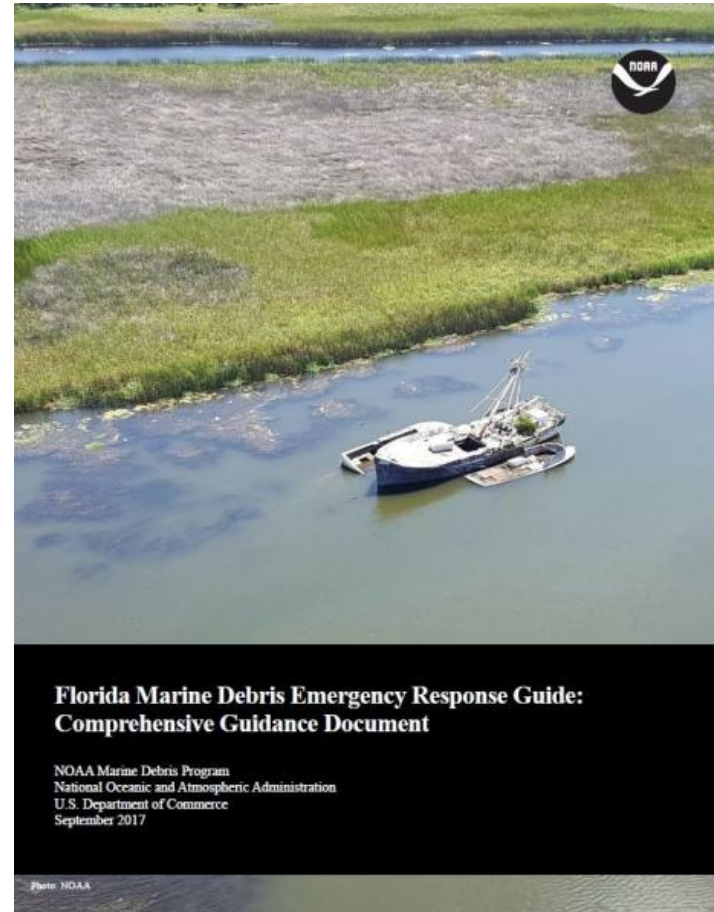
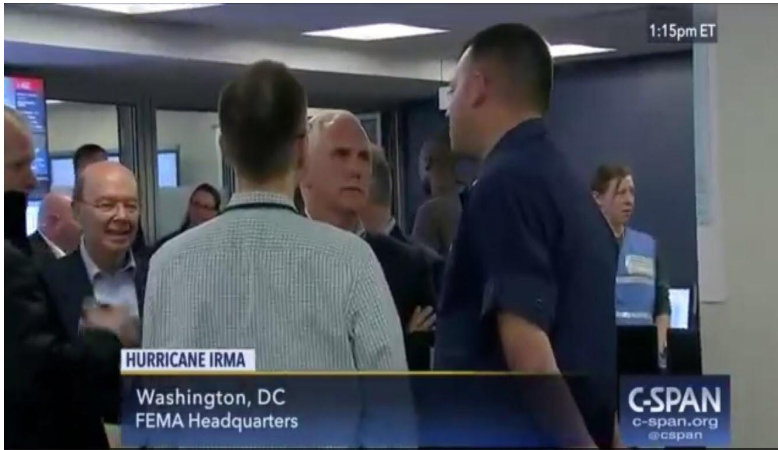
RESPONDING TO HURRICANES



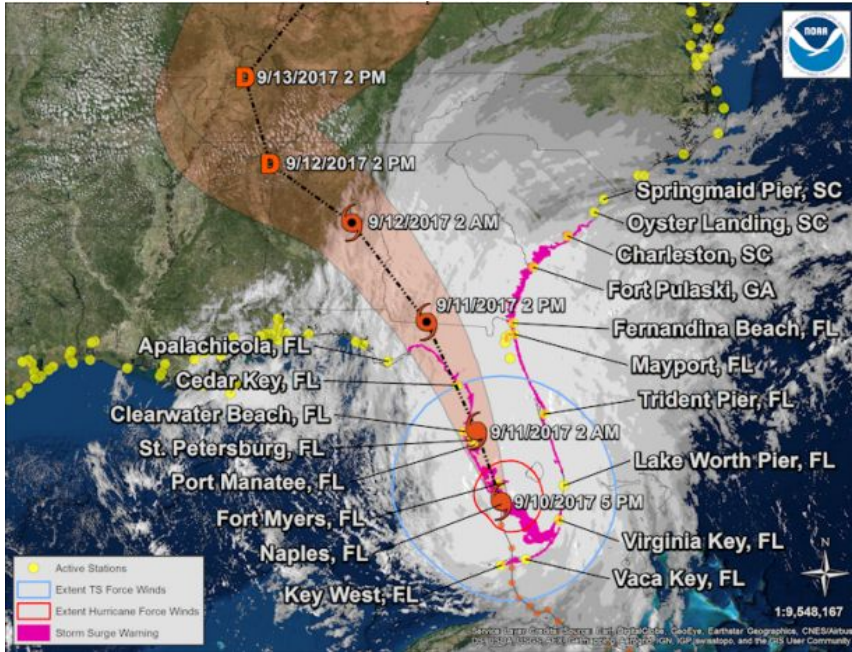
Russell Callender, Ph.D.
Assistant Administrator, NOAA's National Ocean Service
October 30, 2017

Common Mission

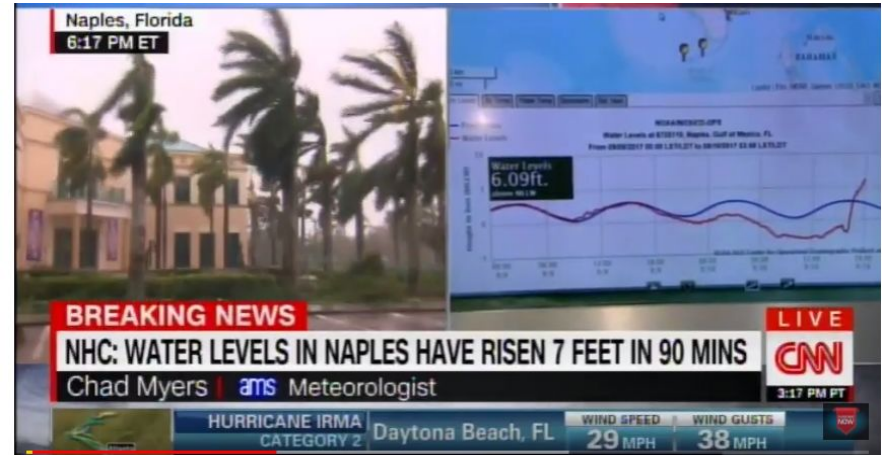
FEMA National Response Coordination Center



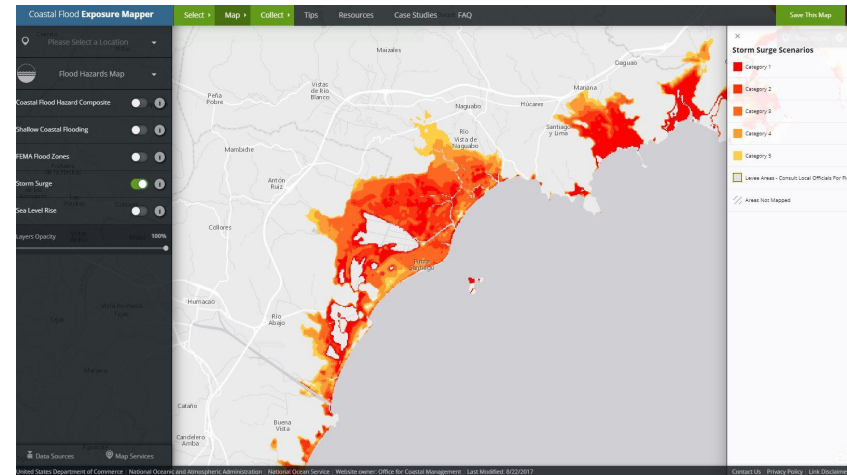
Real-time Oceanographic and Meteorological Observations



Quicklook from Hurricane Irma



Screen capture of live CNN broadcast during Irma



Coastal Flood Exposure Mapper – East Coast PR



Hydrographic Surveys Reopen Ports

Estimated loss of trade for port closures = \$500M/day
NOS annual budget = \$500M/year



Hurricane Irma

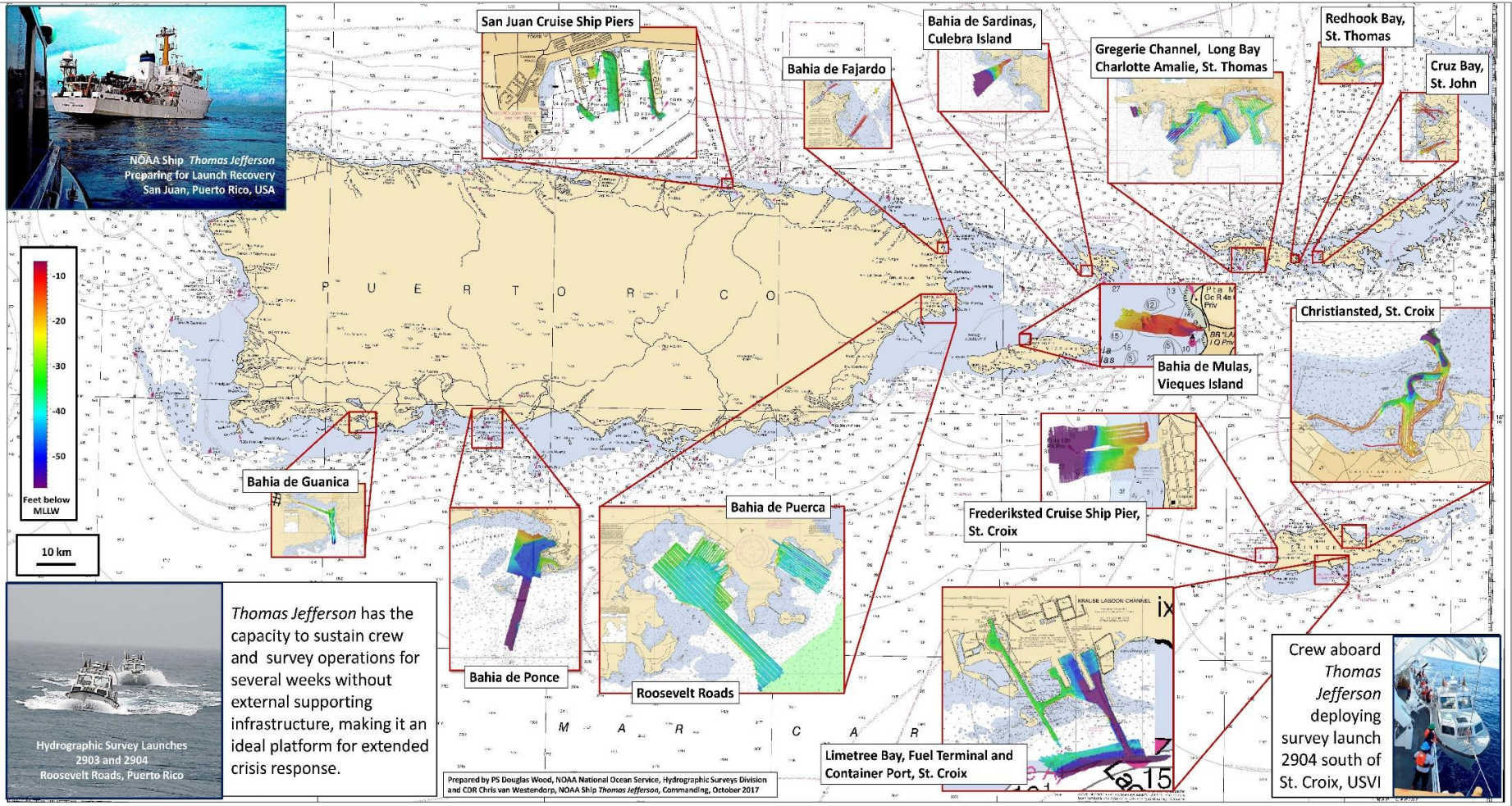
Surveying so emergency vessels and cruise ships can enter ports to provide temporary housing.

Hurricane Harvey

Surveying so deep draft vessels can reach refineries through Corpus Christi and Houston/Galveston.



Hydrographic Surveys Reopen Ports



NOAA Ship *Thomas Jefferson* Preparing for Launch Recovery San Juan, Puerto Rico, USA

Thomas Jefferson has the capacity to sustain crew and survey operations for several weeks without external supporting infrastructure, making it an ideal platform for extended crisis response.

Hydrographic Survey Launches 2903 and 2904 Roosevelt Roads, Puerto Rico

Crew aboard *Thomas Jefferson* deploying survey launch 2904 south of St. Croix, USVI

Prepared by PS Douglas Wood, NOAA National Ocean Service, Hydrographic Surveys Division and CDR Chris van Westendorp, NOAA Ship *Thomas Jefferson*, Commanding, October 2017



Aerial Imagery for Damage Assessment



Near Lynchburg, Texas





Big Pine Key, Florida





St. Croix, U.S. Virgin Islands



Thank You(s) from the Public

“Thank you, NOAA, for getting the imagery of Big Pine Key. I can see my property, as well as neighbors and other places of interest. It's hard to look at, but at least I know. Thanks.”

Florida Keys resident

“ Thank you and the team for posting the Hurricane Irma Imagery for the Lower Keys. I have shared this link to the pertinent FL Keys Facebook Groups. Please know that whatever we find, we are grateful for answers.”

Florida Keys resident

“Amazing job. Thanks you guys are the best!”

Texas resident

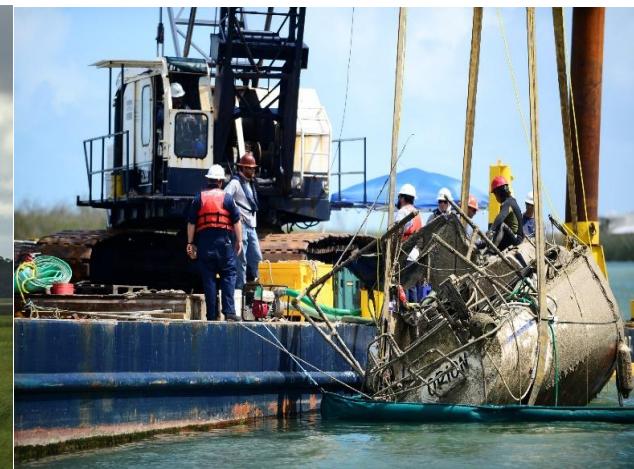
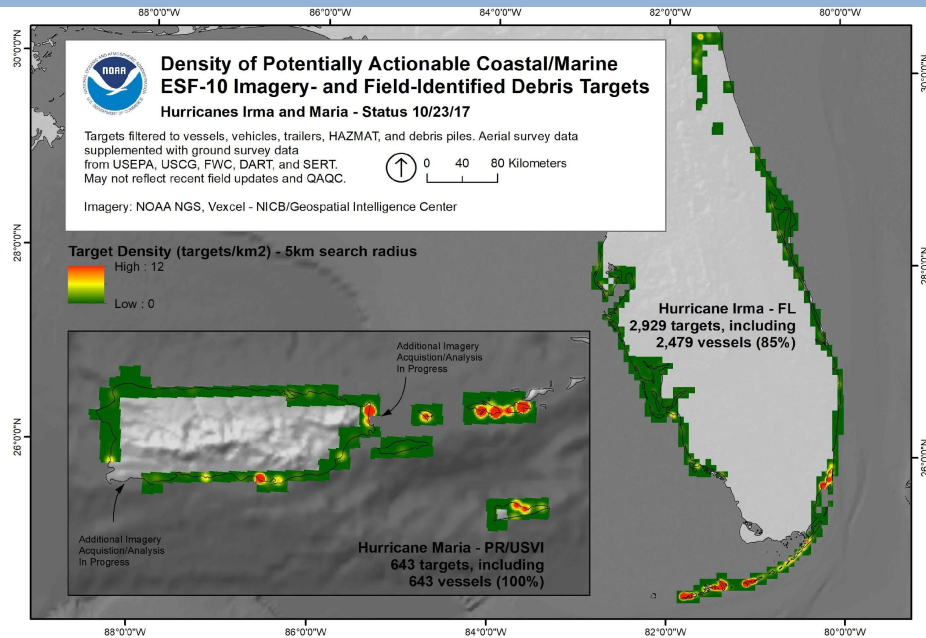
“Thank very much for your work on photographing Puerto Rico after the hurricane.”

Puerto Rico resident



Scientific Support for Pollution Response

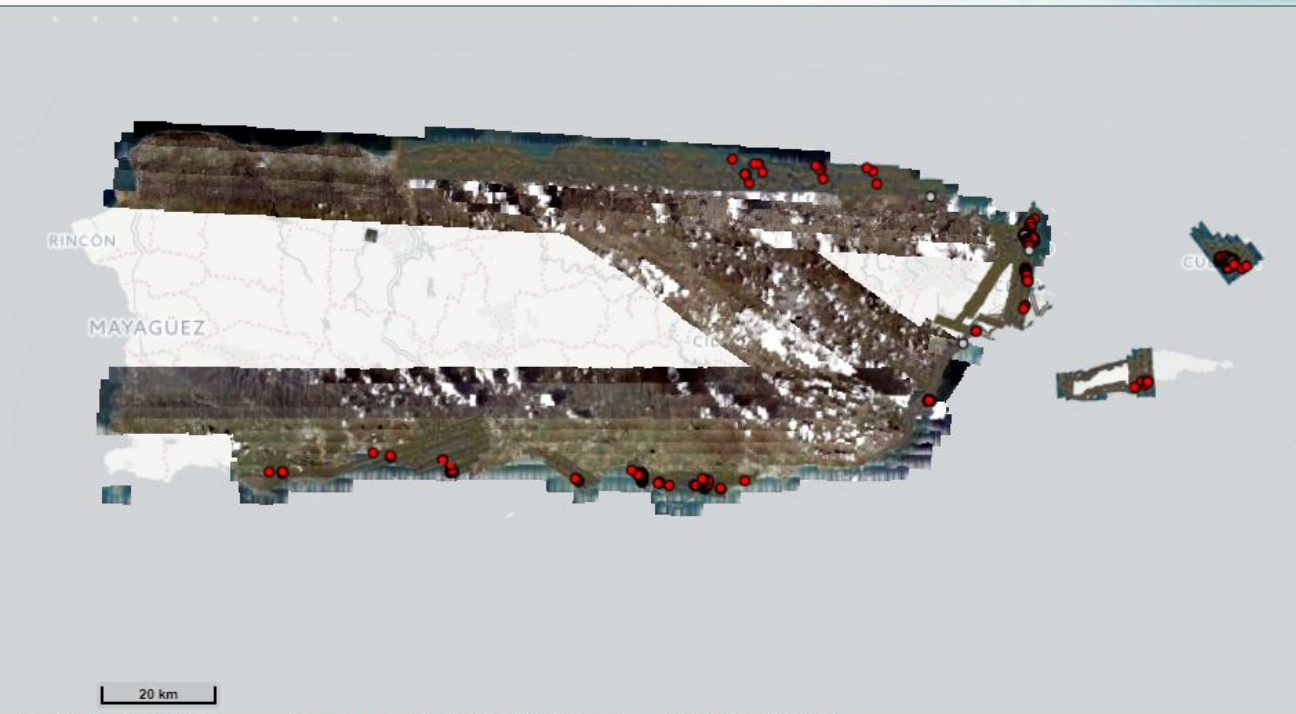
- Recreational vessels a substantial concern for oil, chemicals and debris
- Over 3,500 potential pollution targets in FL, PR, USVI



Common Operating Picture

Aerial Imagery used to identify large debris

ERMA® Environmental Response Management Application
Caribbean



Aerial Imagery Identified Debris 09-Oct-2017 (RPI)

Aerial Imagery Identified Debris 09-Oct-2017 (RPI)

- Automotive
- Construction
- Debris Pile
- Trailer
- Unknown
- Vessel
- Oil Hazmat Container

Post-Harvey, Irma, Maria Imagery (Vexcel/NICB)

Post-Harvey, Irma, Maria Imagery (Vexcel/NICB)

Aerial Imagery 2017-0923b (NOAA NGS)

Aerial Imagery 2017-0923b (NOAA NGS)

Aerial Imagery 2017-0923a (NOAA NGS)

Aerial Imagery 2017-0923a (NOAA NGS)



Aerial Imagery 2017-0924a (NOAA NGS)

Aerial Imagery 2017-0924a (NOAA NGS)



Scale: 1 : 707,213 Zoom Level: 9.21815928421628 Location: 18.6690°, -65.1655°

US DOC | NOAA | NOS | NOAA Office of Response & Restoration
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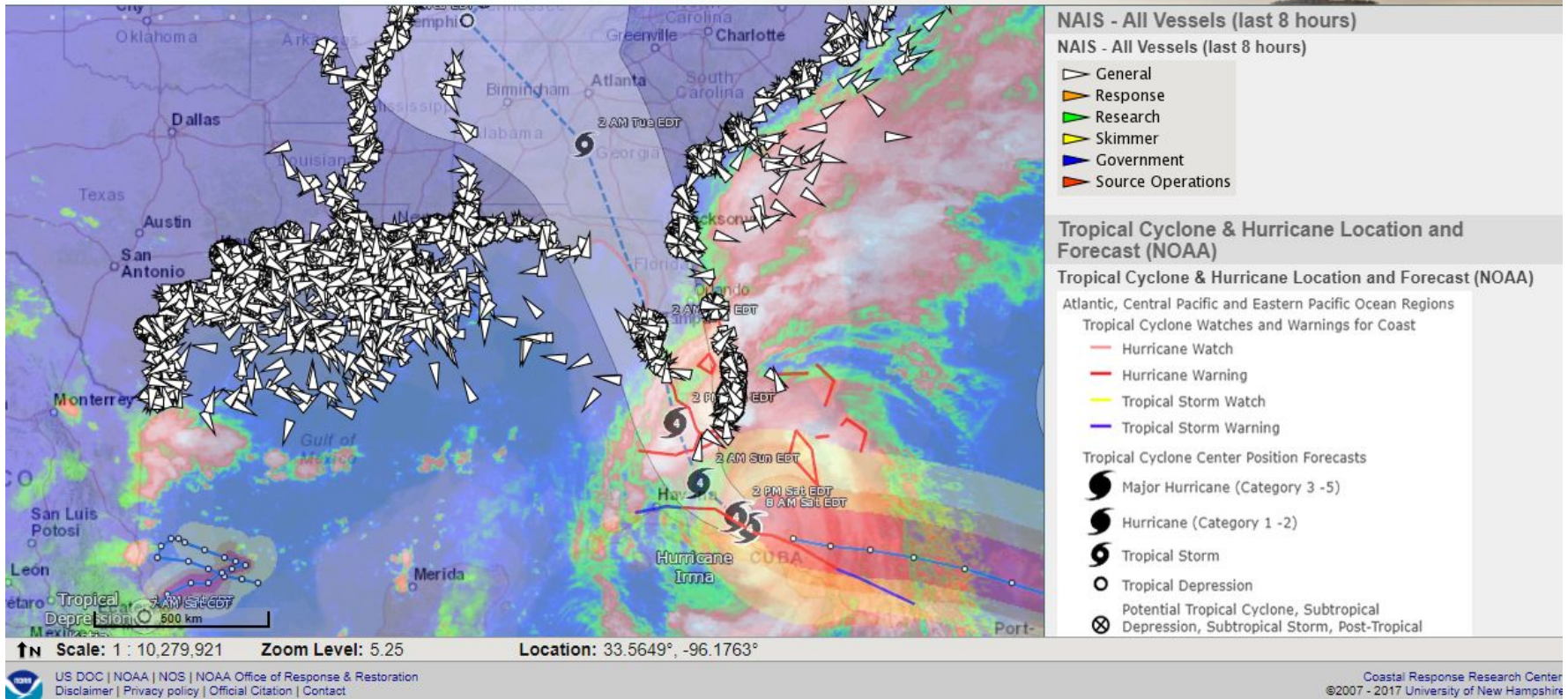
Coastal Response Research Center
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Common Operating Picture

Ships Moving out of Irma's Path

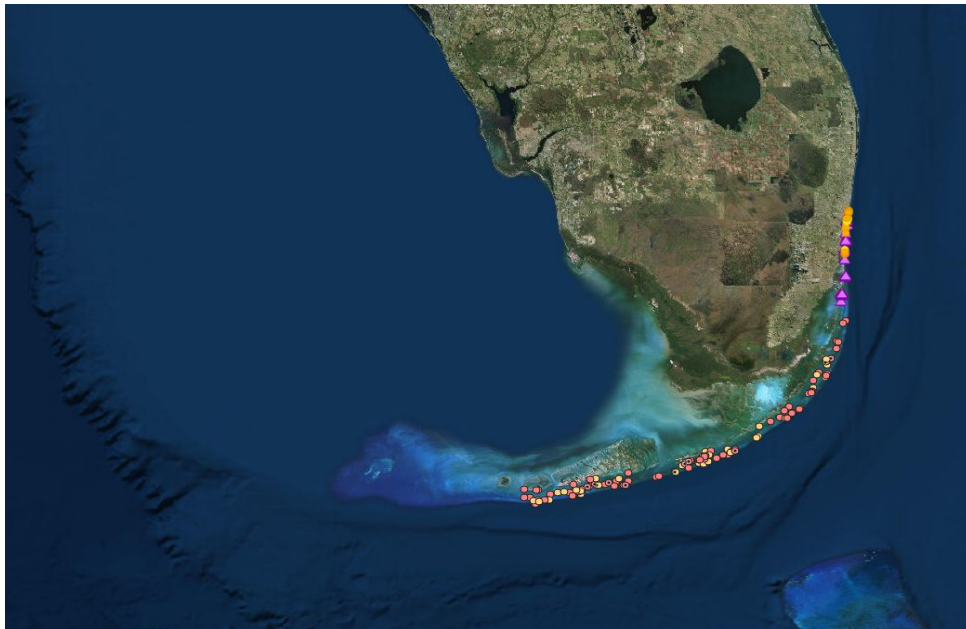
ERMA® | Environmental Response Management Application
Atlantic



Rapid Assessment of Natural Resources

Florida Keys National Marine Sanctuary Assessment Observations:

- Broken and dislodged corals and smothered sponges
- Heavy accumulations of sediment
- Marine debris - lobster traps, ropes, wire, appliances, construction materials, etc.



BEFORE



AFTER



Value of Preparedness



NOS coastal partnership programs reduce flood damage.

A reclaimed urban wetland project in Clear Lake, supported by the Texas Coastal Management Program, kept Harvey floodwaters away from area homes.



Lessons Learned



Elevated Water Level Station



Hardened Water Level Station in the Gulf



Ongoing Response, Road to Recovery

Florida, Puerto Rico and US Virgin Islands

- Science support to USCG
- Identification and prioritization of pollution threats (recreational vessels)
- Natural resource assessments
- Marine debris assessments



BACKUP SLIDES



Hurricane Impacts

NOAA Impacts

- Facilities in Key Largo and Key West Florida; Charleston, South Carolina
- Small vessels
- Water level stations
- Mooring buoys >100
- Harmful algal bloom monitoring equipment, high-frequency radar, coastal buoys managed by partners

National Estuarine Research Reserves

- Mission-Aransas (Texas)
- ACE Basin (South Carolina)
- Sapelo Island (Georgia)
- Rookery Bay (Florida)
- Tolomato Matanzas (Florida)
- Jobos Bay (Puerto Rico)



Mission Aransas NERR, UT Facility, August 29, 2017