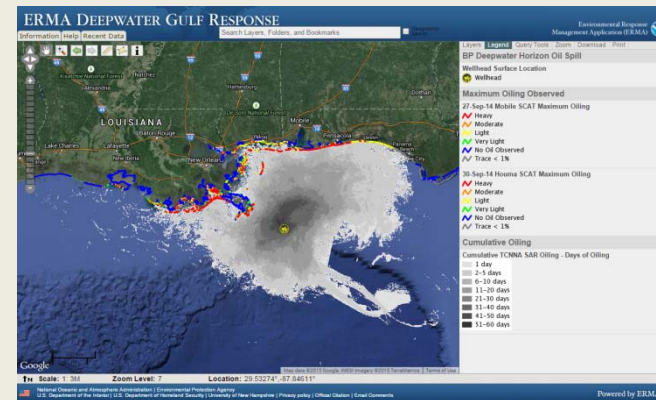
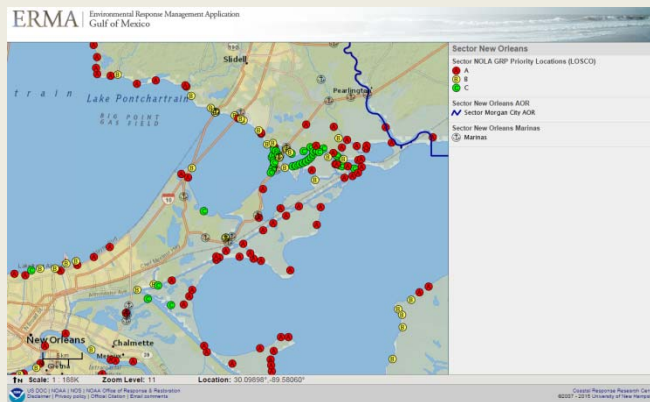


NOAA | National Ocean Service

Office of Response and Restoration



Environmental Response Management Application (ERMA®)

Jay Coady

Jay.Coady@noaa.gov

NOAA Office of Response & Restoration

What is Required for a Good COP?

- Operational and Environmental Data
- Standard Presentation: Interface, Data, Symbology, & Products
- Support On-Scene and Off-Site Leadership Needs
- Provides secure 24/7 access
- Planning support & tools
- Data Interoperability with RP and other agencies
- Maintains data after the Incident ends
- Secure Access of Data & Users
- Internal and external audience
 - Federal COP supports the Public right to know and government transparency
- **DATA SHARING PLANS**

USCG Interagency Agreement ERMA

Key Point:

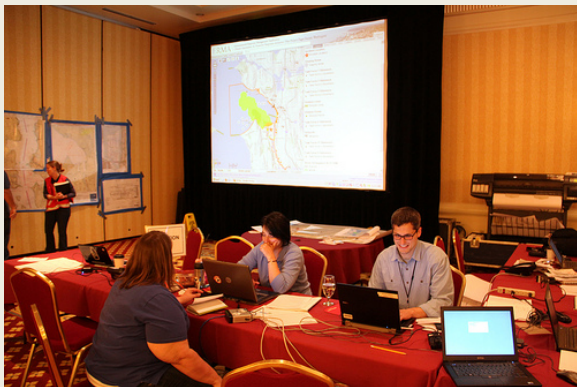
- “Standardize the use of NOAA’s Environmental Response Management Application (ERMA®) as the Common Operating Picture (COP) for USCG-led training, exercises, oil spill responses and releases of hazardous substances, pollutants, and contaminants”

ERMA Key Points

- Customizable web based mapping application that provides centralized access and visualization of integrated data.
 - Creating and building upon relationships, partners, and data standards
 - Tiered system security that protects data.
 - Progressive disclosure
 - Scalability
 - Distributed contributions
 - Standardized user interface
 - Access via any modern web browser.

ERMA is used to...

Visualize the situation status during an oil spill drill/training



Create a Common Operational Picture in a disaster response



Assess damage and plan for restoration



Analyze threats from climate change, drilling, and hurricanes

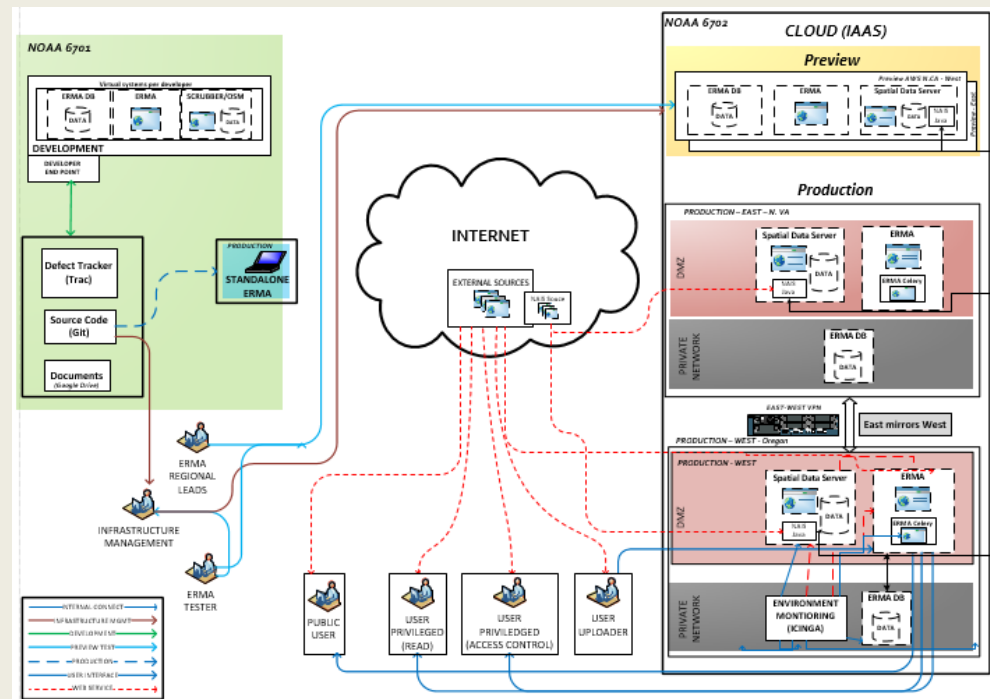


How ERMA is Used in Response

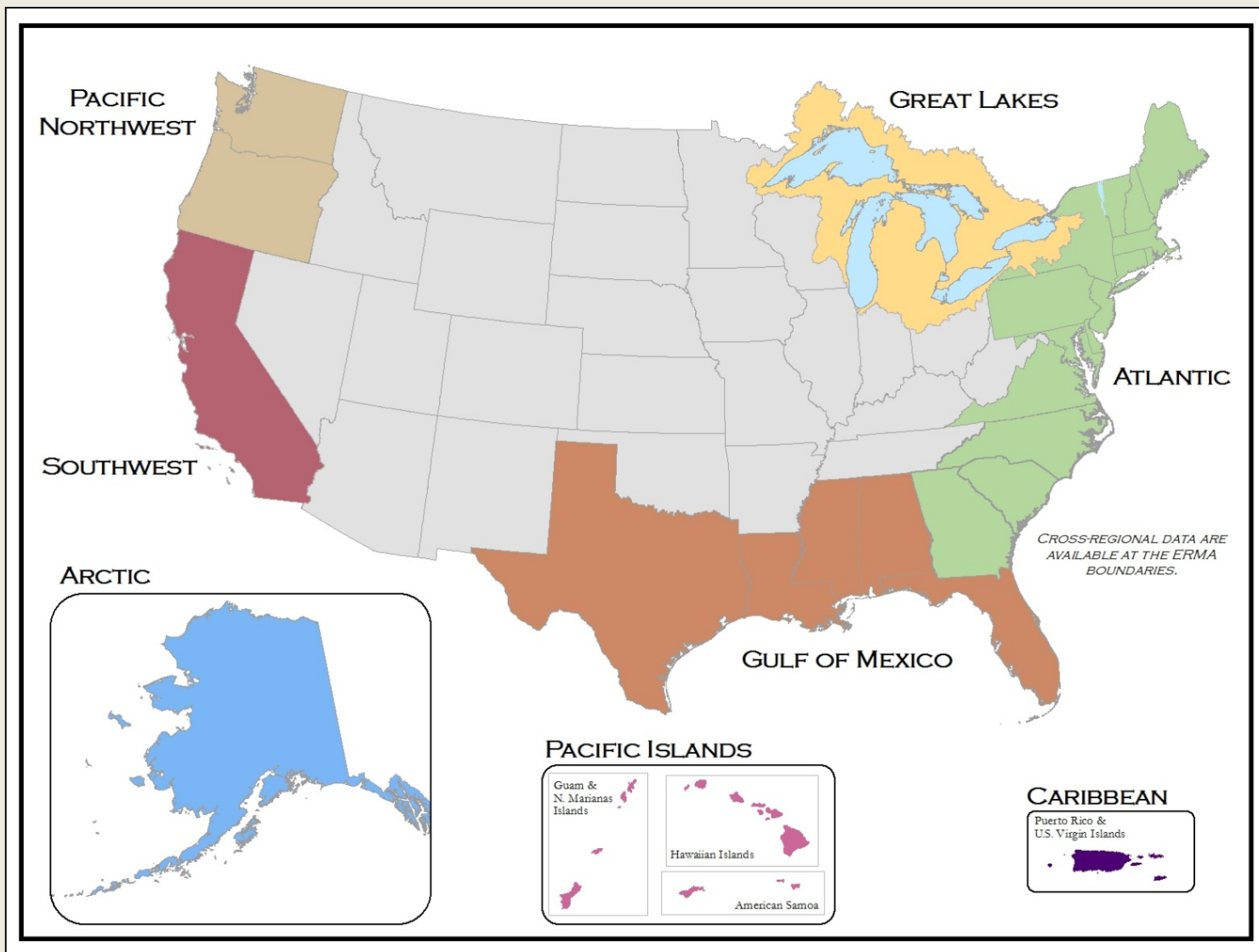
- **Operations Section**
 - Incident Location
 - Vessel Locations
 - Dispersant Zones
 - In-Situ Burns
 - Divisions & Segments
 - Booming Strategies
- **Environmental Unit**
 - Threatened & Endangered Species
 - SCAT Data
 - Sensitive Sites
 - Wildlife Observations
 - Overflight Observations
- **Situation Unit**
 - Mirror SitStat Board
 - Trajectories
 - Weather
 - Current Operations
- **Unified Command**
 - Up-To-Date Picture of All Operations
- **JIC**
 - Up-To-Date Picture of All Operations
 - Potential to show publically released data

ERMA's Architecture

- Distributed layer/data management
- In AWS. Live zone, hot-swap 2nd zone, 3rd zone development tier
- Open-source stack:
 - OpenLayers, Mapserver, PostgreSQL
- Data Layers and User accounts are role-based: user and layer permissions have to line up
 - Plus a public view
- Local shapefiles, rasters, external map services
- Serves out WMS for all local data
 - References for external data



Where is ERMA?



ERMA URLs

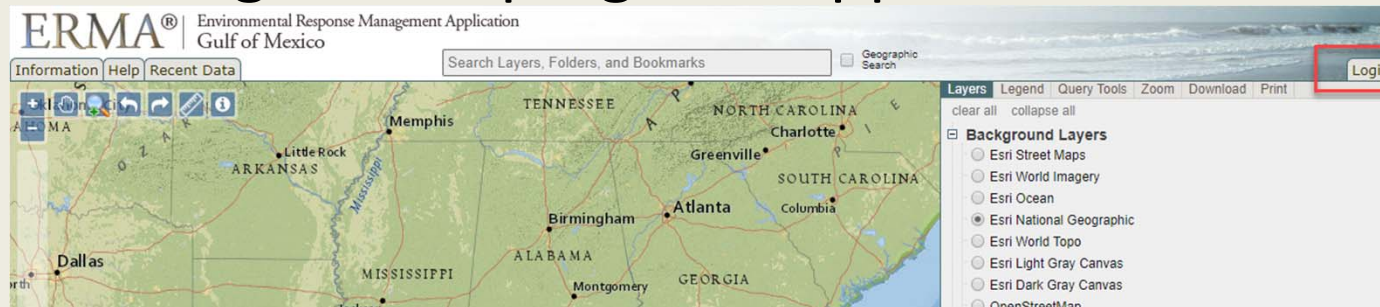
- erma.noaa.gov
- erma.noaa.gov/Atlantic
- erma.noaa.gov/GulfofMexico

ERMA Layout

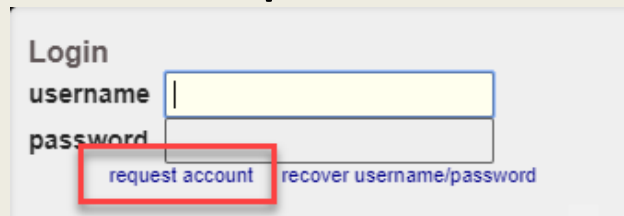
The screenshot displays the ERMA web application interface. At the top, the NOAA logo and 'Office of Response and Restoration' are visible. The main navigation bar includes 'Info/Admin Tabs', 'Search', and 'Login/out'. Below this is a secondary menu with 'Information', 'Help', 'Recent Data', 'Admin', 'Upload', and 'Incident'. The central area is a map of the Northeastern United States, with a 'Map Toolbar' on the left and a 'Map Key' at the bottom left. A 'Table of Contents' panel is on the right, listing various layers such as 'Background Layers', 'Admin Boundaries & Refer...', 'Bathymetry & Hydrology', 'Environmental Quality & Monitoring', 'Marine Debris', 'Imagery & Remote Sensing', 'Natural Resources, Habitats, & Managed Areas', 'Coastal Resources & Habitats', 'Critical Habitat', 'Cultural Resources & Human Use', 'Essential Fish Habitat (NOAA EFH)', 'Environmental Vulnerability Index (Maine DEP)', and 'Environmental Sensitivity Index (NOAA ESI)'. A 'Shortcut Menu' is open over the ESI layer, showing options like 'view metadata', 'zoom to extent', 'bring to front', 'send to back', and 'view data'. A 'Bookmark Panel' is also visible at the bottom right, showing 'Bookmark Views: new' and 'Expand' options. The status bar at the bottom left shows 'Scale: 1:5M', 'Zoom Level: 6', and 'Location: 45.44249°, -83.63681°'. The footer contains the NOAA logo and links for 'US DOC | NOAA | NOS | NOAA Office of Response & Restoration', 'Disclaimer | Privacy policy | Official Citation | Email comments', and 'Research Center of New Hampshire'.

How to Request an ERMA Account

- Click Login on top right of application



- Click Request Account



- Fill out form and hit submit.
 - Use only work email
 - Use NOAA SSC or Jay Coady as your NOAA sponsor.

ERMA Account Access

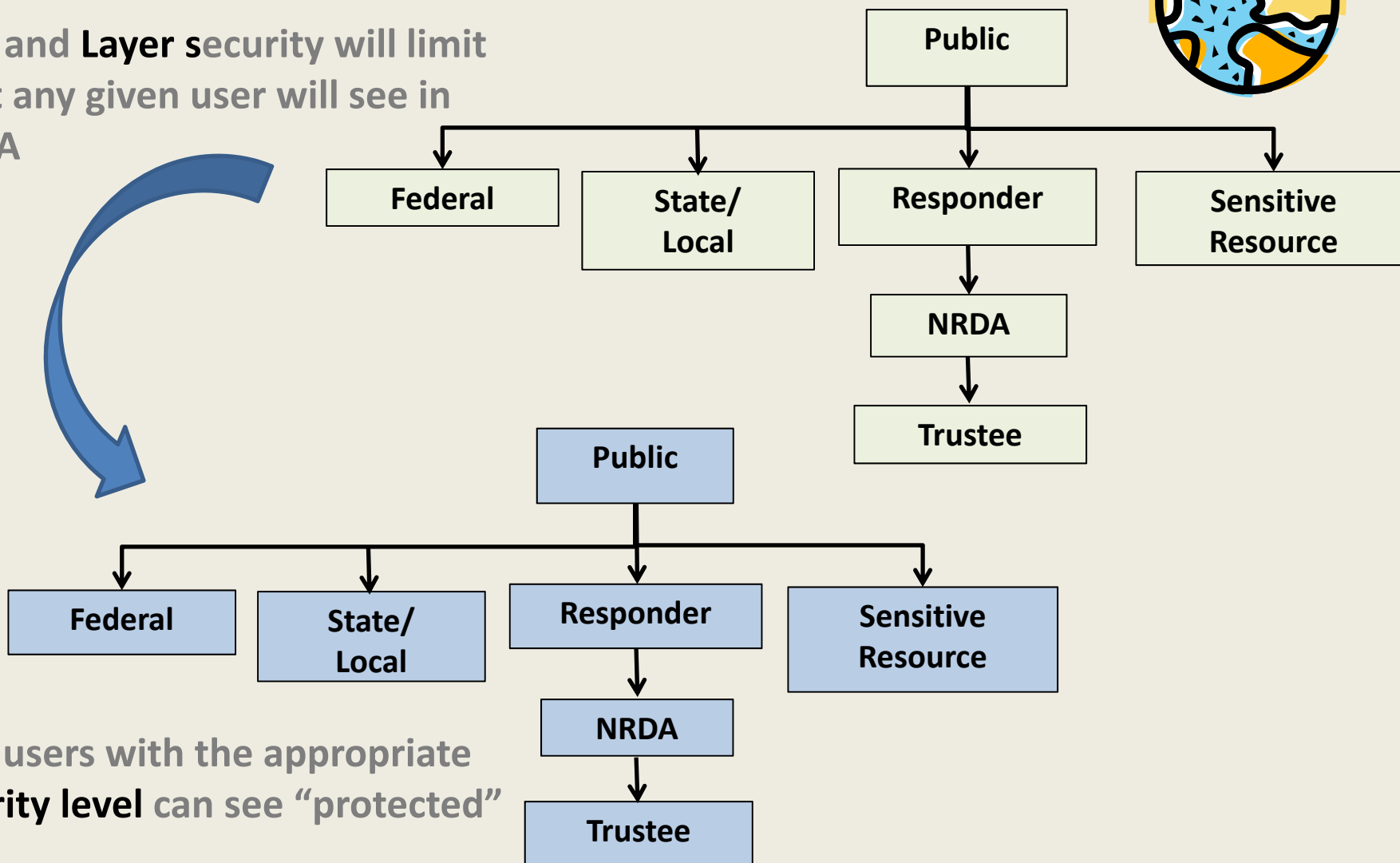
- Public accounts
 - Publically available data (no login required)
- Restricted accounts for planning & response
 - Username/password required
 - Verified by NOAA
 - Various levels of access
 - Active incidents
 - Sensitive datasets
 - NRDA/Trustees
 - Drills
 - Password reset 90 days; Inactive accounts 6 months
 - Only NOS application that uses these password requirements
- Data available only to appropriate users and use



ERMA Layer Security



User and Layer security will limit what any given user will see in ERMA



Only users with the appropriate security level can see “protected” data

How is ERMA Data Updated?

- GIS Data (shapefiles, real-time map services)
 - NOAA Spatial Data Branch Regional Data Managers
 - Trained Regional Partners
 - State (California OSPR)
 - Universities (University of Washington)
 - U.S Coast Guard Academy
- Map Drawings
 - Trained Advanced Users
 - USCG Sector Guam
 - USCG District 9/Great Lakes



Foundational Data in ERMA

- Base maps
- Administrative Boundaries
- Bathymetry & Hydrology
- Environmental Data
- Imagery
- Natural Resources, Habitats, and Managed Areas
- Navigational and Marine Infrastructure
- Public Safety & Infrastructure
- Response Planning
- Weather

Satell

ERMA® Environmental Response Management
Gulf of Mexico



↑N Scale: 1 : 3M Zoom Level: 7

US DOC | NOAA | NOS | NOAA Office of Response & Restoration
Disclaimer | Privacy policy | Official Citation | Contact

NESDIS Marine Pollution Surveillance Reports

- April 2017
- March 2017
- February 2017
- January 2017
- December 2016
- November 2016
- October 2016
- September 2016
- August 2016
- July 2016
- June 2016
- May 2016
- April 2016
- March 2016
- February 2016
- January 2016
- December 2015
- November 2015
- October 2015
- September 2015
- August 2015
- July 2015
- June 2015
- May 2015
- April 2015
- March 2015
- January 2015
- 2014
- 2013

toring



April 2017

SDIS Suspected Oil 10-April-2017 (0742 CDT)

- Possible Oil
- Possible Thicker Oil

SDIS Suspected Oil 09-April-2017 (1134 CDT)

- Possible Oil
- Possible Thicker Oil

SDIS Suspected Oil 08-April-2017 (1138 CDT)

- Possible Oil
- Possible Thicker Oil

SDIS Suspected Oil 08-April-2017 (1138 CDT) B

- Possible Oil
- Possible Thicker Oil

SDIS Suspected Oil 08-April-2017 (1138 CDT) C

- Possible Oil
- Possible Thicker Oil

SDIS Suspected Oil 08-April-2017 (1138 CDT) D

- Possible Oil
- Possible Thicker Oil

SDIS Suspected Oil 04-April-2017 (1901 CDT)

- Possible Oil
- Possible Thicker Oil

February 2017

MARINE POLLUTION SURVEILLANCE REPORT



Analysis Provided by: The National Oceanic and Atmospheric Administration/National Environmental Satellite, Data and Information Service (NOAA/NESDIS)

REPORT DATE: APRIL 10, 2017
 REPORT TIME: 1345Z (0945 EDT)
 ANALYST: BOLL

DATA SOURCE: RADARSAT-2
 MODE: ScanSAR Wide VV
 RESOLUTION: 100 meter (wide)
 IMAGE DATE/TIME: 4/10/2017 1053Z (0653 EDT)

Legend

- Possible Oil
- Possible Thicker Oil
- Coimbra Tanker Shipwreck: [40°24'4" N / 72°22'14" W]
- 2.7 km² Area of Possible Oil
- False-Positive (not oil)

CONFIDENCE: High

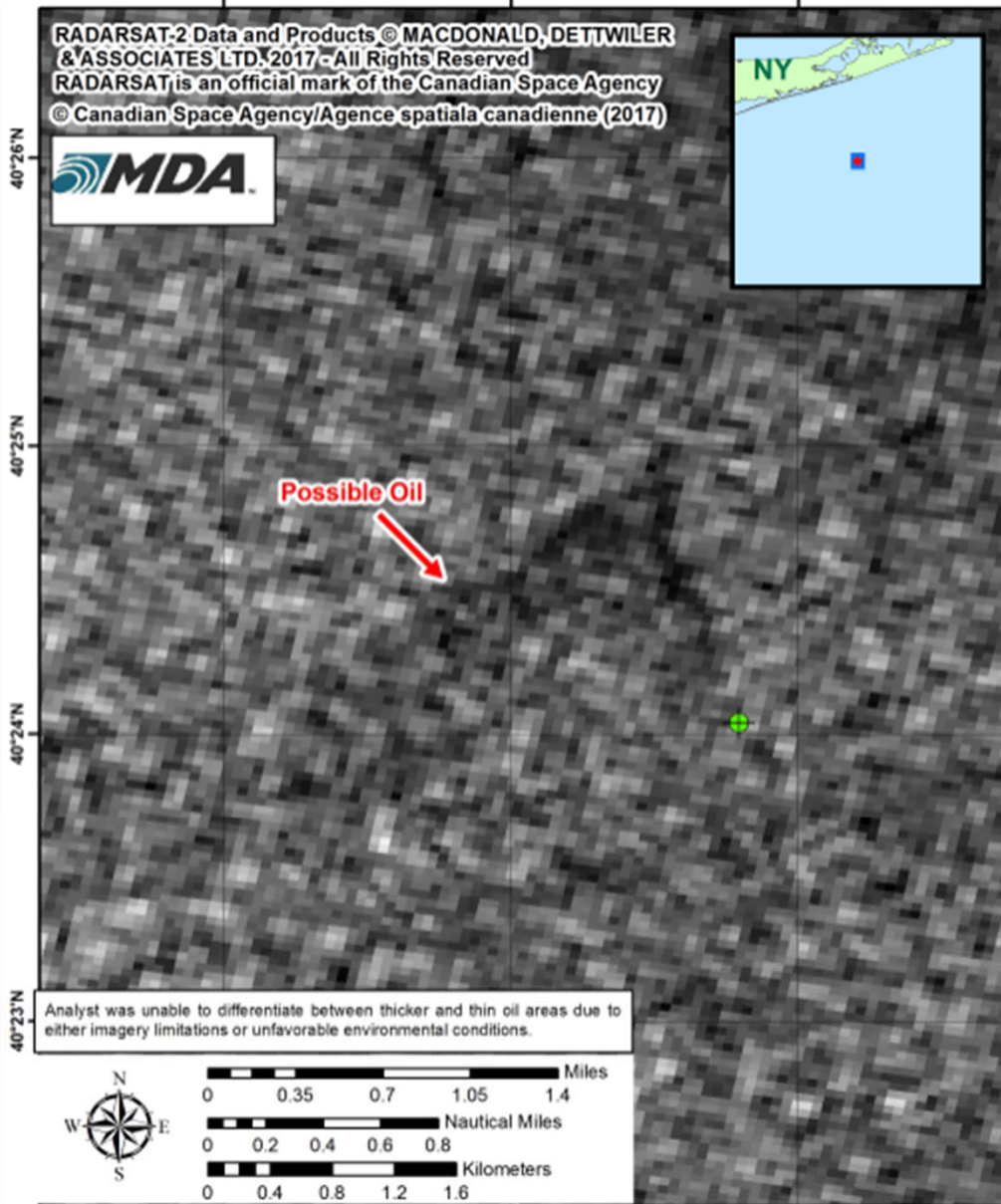
REMARKS:

Satellite analysis indicated a possible oil anomaly emanating from the known repeat leak source the sunken Coimbra Tanker off the coast of Long Island, NY. The anomaly was 1.7 NM in length and 0.5 NM in width.

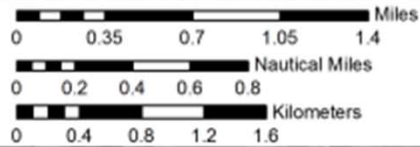
Measured winds in the area were 10 knots and from the South. Modeled ocean currents were under 0.75 knots with variable directionality.

Confidence was High given the anomaly was connected to a point source, displayed a contrast to its surroundings, and appeared out of place.

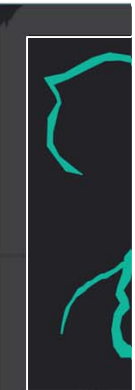
RADARSAT-2 Data and Products © MACDONALD, DETTWILER & ASSOCIATES LTD. 2017. All Rights Reserved
 RADARSAT is an official mark of the Canadian Space Agency
 © Canadian Space Agency/Agence spatiale canadienne (2017)



Analyst was unable to differentiate between thicker and thin oil areas due to either imagery limitations or unfavorable environmental conditions.



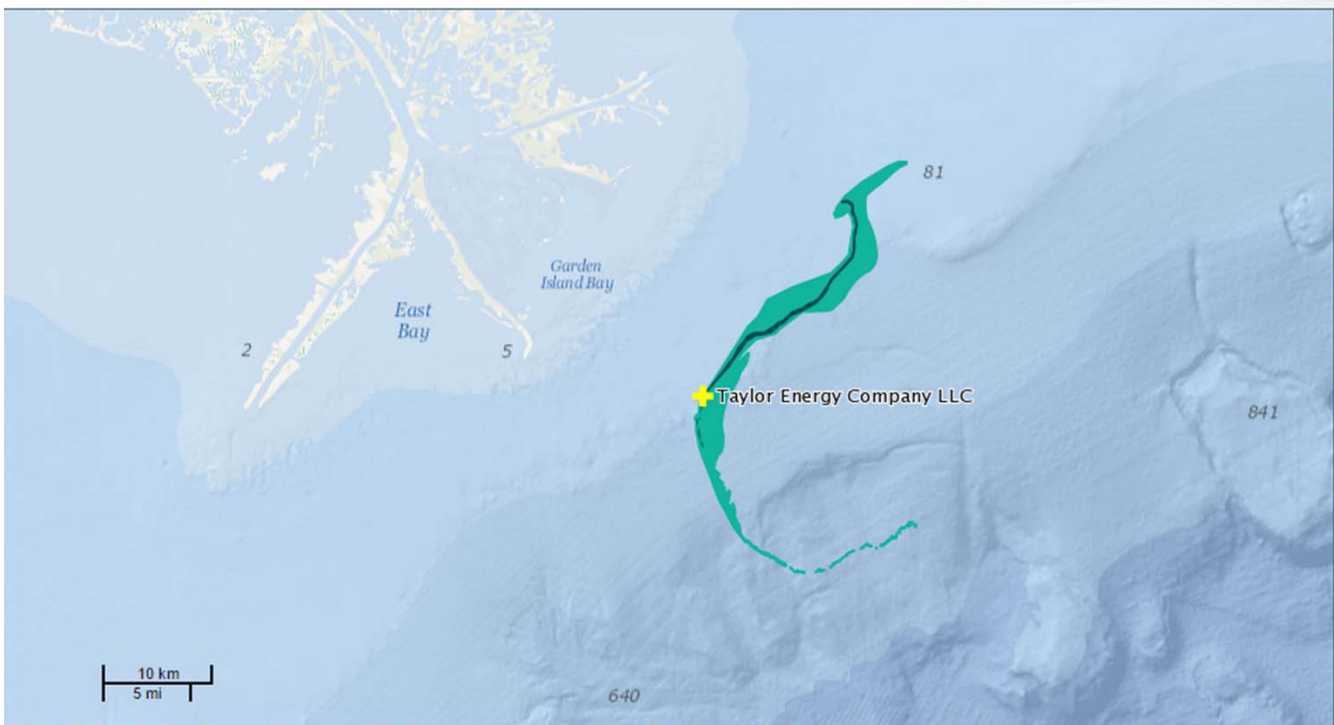
ERM



Threats

Satellite Tracking & Monitoring

ERMA® Environmental Response Management Application
Gulf of Mexico



September 2016

NESDIS Suspected Oil 22-September-2016 (1629 CDT)
Possible Oil
Possible Thicker Oil

NESDIS Suspected Oil 29-September-2016 (1650 CDT)
Possible Oil
Possible Thick Oil

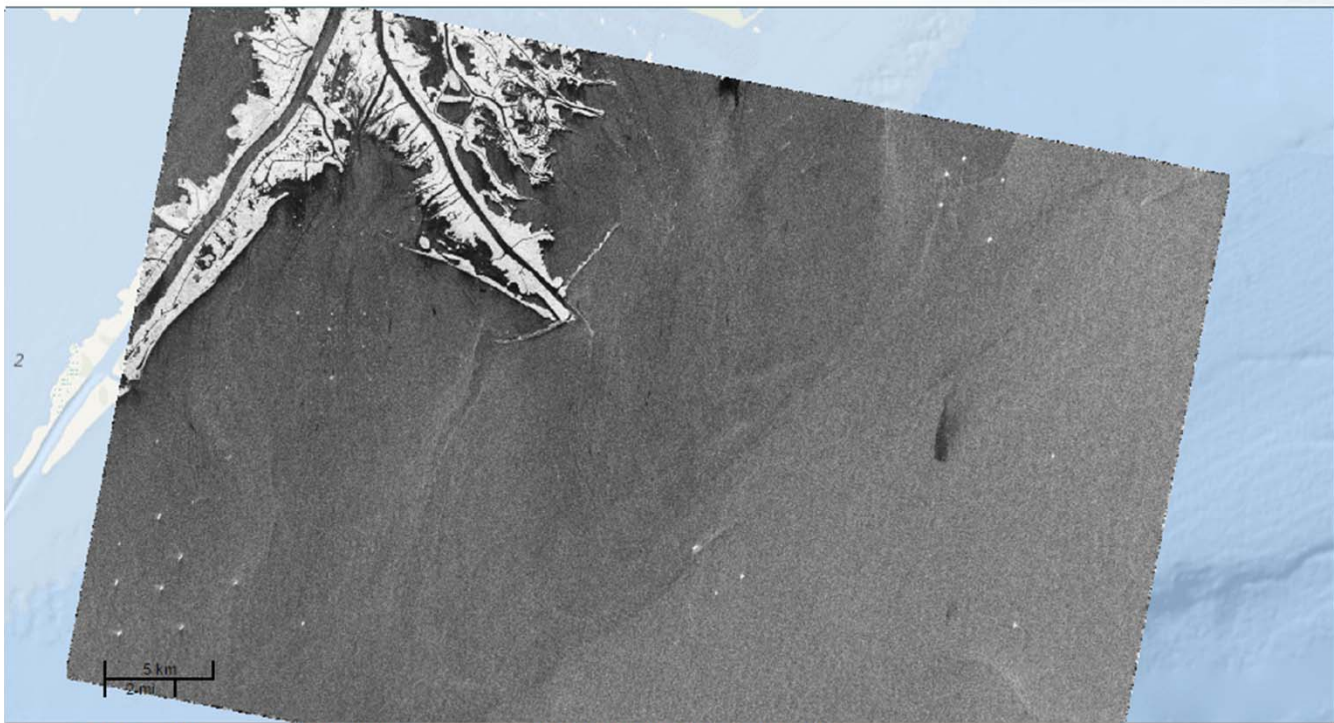
Platforms & Wells

Platform Saratoga (Taylor Energy)
Taylor Energy

Scale: 1 : 379K Zoom Level: 10 Location: 29.08343°,-88.35850°

Remote Sensing Advances

ERMA® | Environmental Response Management Application
Gulf of Mexico

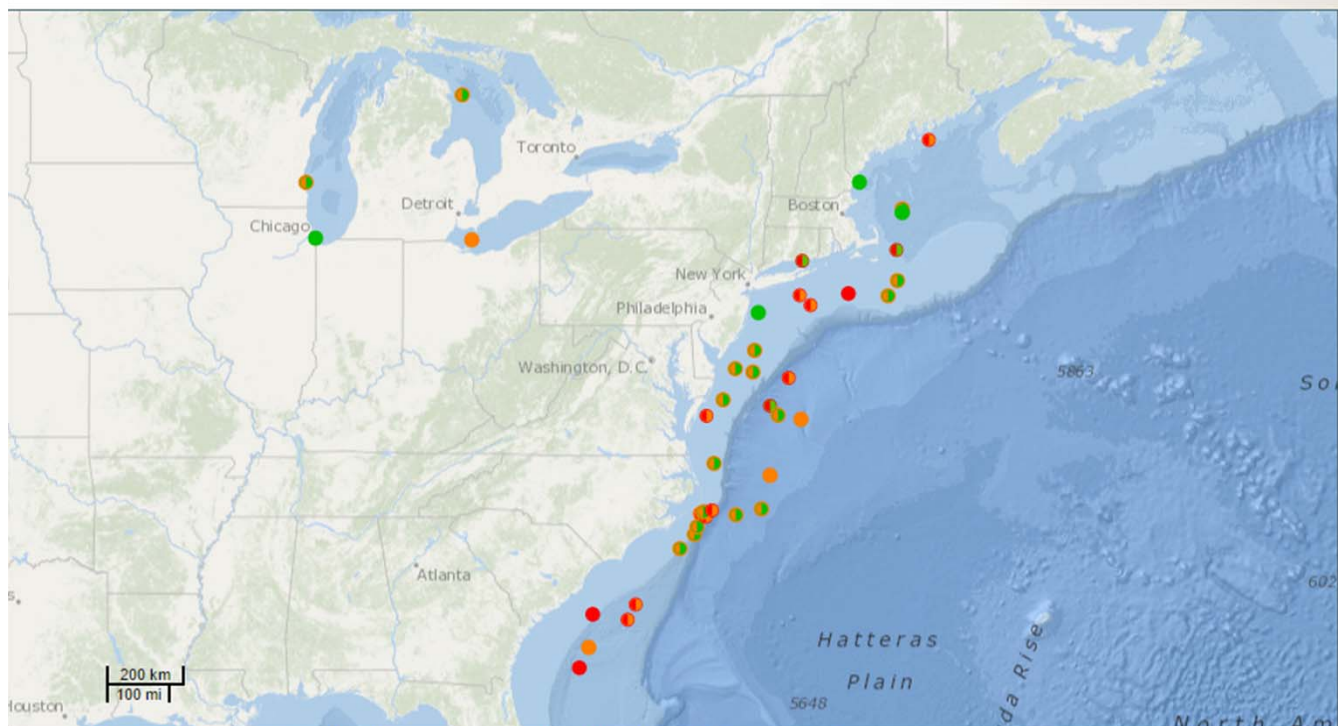


2016 NESDIS/MDA
RS2 Greyscale 2016-11-15

↑N Scale: 1 : 190K Zoom Level: 11 Location: 28.96285°, -88.77836°

NOAA RULET

ERMA® Environmental Response Management Application
Atlantic



Wrecks and Obstructions
Remediation of Underwater Legacy Environmental Threats (RULET) (NOAA)

RULET July 2012 Final Scores

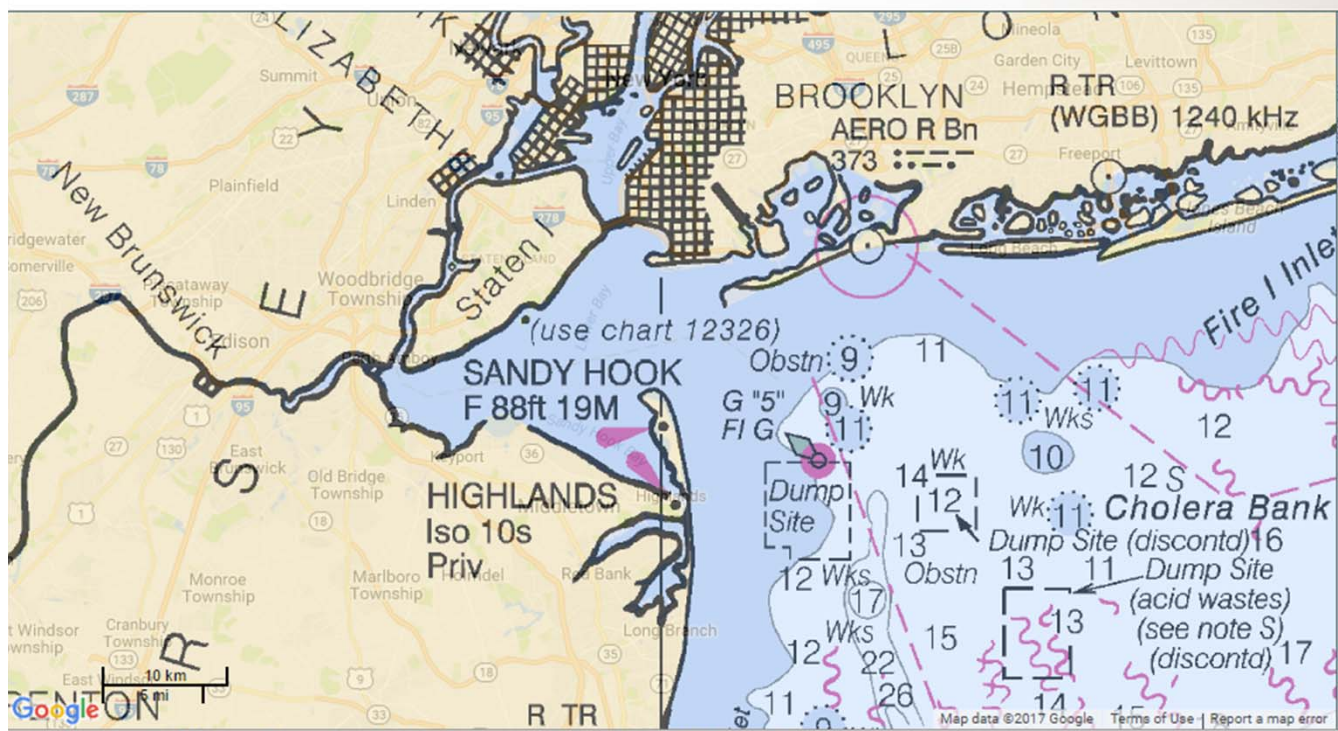
Worst case discharge / most probable discharge score

- High / High
- High / Medium
- High / Low
- Medium / Medium
- Medium / Low
- Low / Low

↑N Scale: 1 : 11M Zoom Level: 5 Location: 40.67081°,-69.51627°

Navigational Charts (RNCs)

ERMA® Environmental Response Management Application
Atlantic

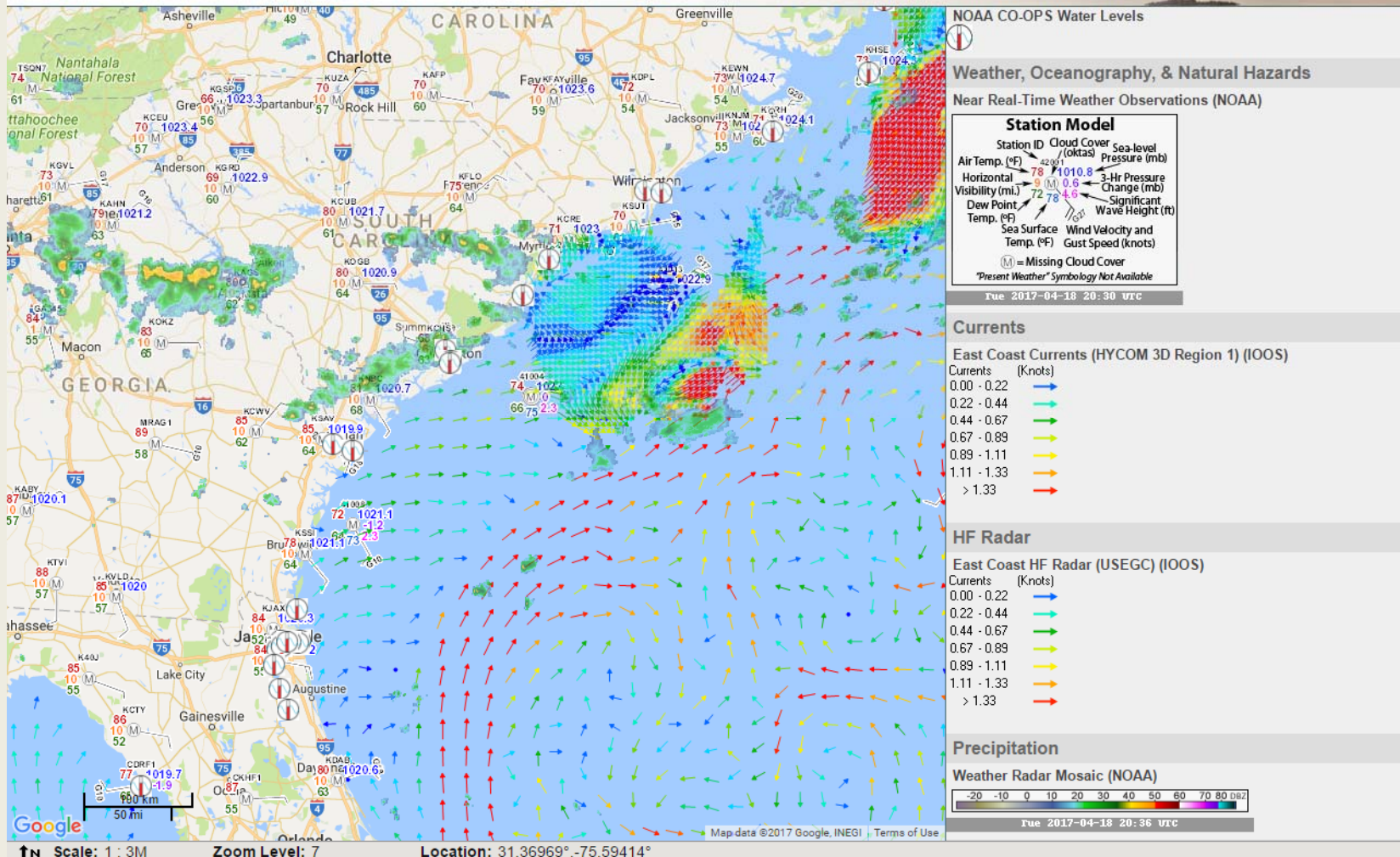


NOAA Navigation Charts
Raster Navigational Charts (RNC) (NOAA)

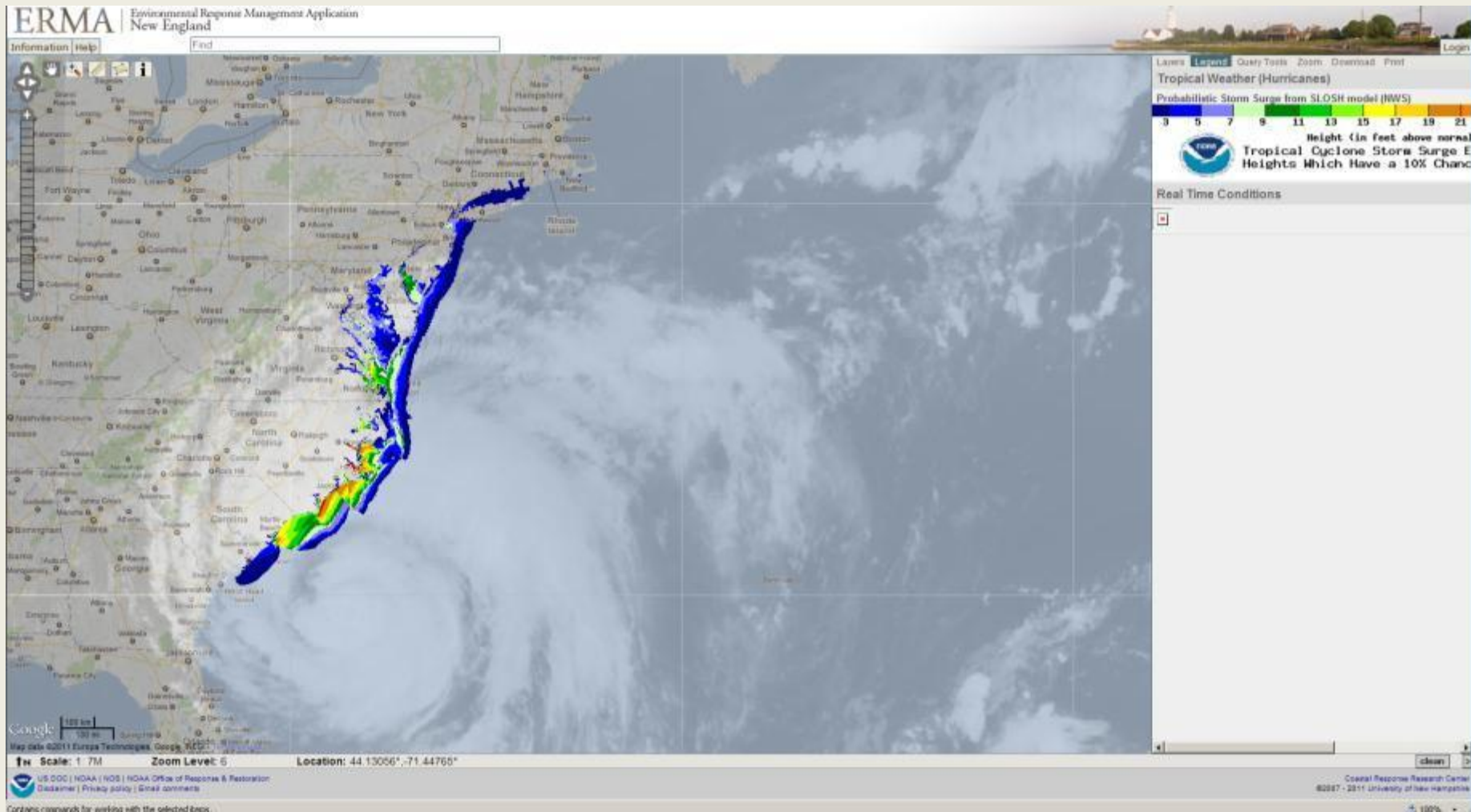
Scale: 1 : 330K Zoom Level: 10 Location: 40.61060°,-73.34417°

Current Near Real Time Weather

ERMA® Environmental Response Management Application
Atlantic



Model Output & Satellite Tracking



Overflights & Oiling Observation

ERMA | Environmental Response Management Application
Southwest



Refugio Incident, Santa Barbara Co. (19-May-2015)

Refugio Incident Location

Field Observations and Photos

Dark Oil on Overflight

Dark Oil on Overflight

29-May-2015

NOAA Overflight Path - 29 May 2015 0650

Overflight 23-MAR-10 1600

NOAA Overflight Observations 29 May 2015 0650 hours

- Overflight Observations at 0800 Hours (NOAA)

NOAA Overflight Photos 29 May 2015 0650 hours

Scale: 1 : 89K Zoom Level: 12 Location: 34.49067°, -119.80657°

Overflights & Oiling Observation

ERMA | Environmental Response Management Application
Southwest


Information | Help | Recent Data | Admin | Upload | Incident | Search Layers, Folders, and Bookmarks | Geographic Search | Change Password | Logout

Layers | Legend | Query Tools | AOI | Labels | Zoom | Download | Print


Refugio Incident, Santa Barbara Co. (19-May-2015)

Refugio Incident Location


Field Observations and Photos

Dark Oil on Overflight
 Dark Oil on Overflight

29-May-2015

NOAA Overflight Path - 29 May 2015 0650
 Overflight 23-MAR-10 1600

NOAA Overflight Observations 29 May 2015 0650 hours
 ● Overflight Observations at 0800 Hours (NOAA)

NOAA Overflight Photos 29 May 2015 0650 hours


Refugio Incident Refugio State Beach at ...

NOAA Overflight Photos
 Refugio Incident

W 119° 58.531'
 N 34° 24.003'

Refugio Incident Refugio State Beach at 34.40055172 -119.92618324
 Photo taken at 5/29/2015 8:45:54 AM by NOAA

4 Bands of oil trending East to West from vicinity of Platform Holly. Oil is from black oil to silver sheens.

Scattered sheens.

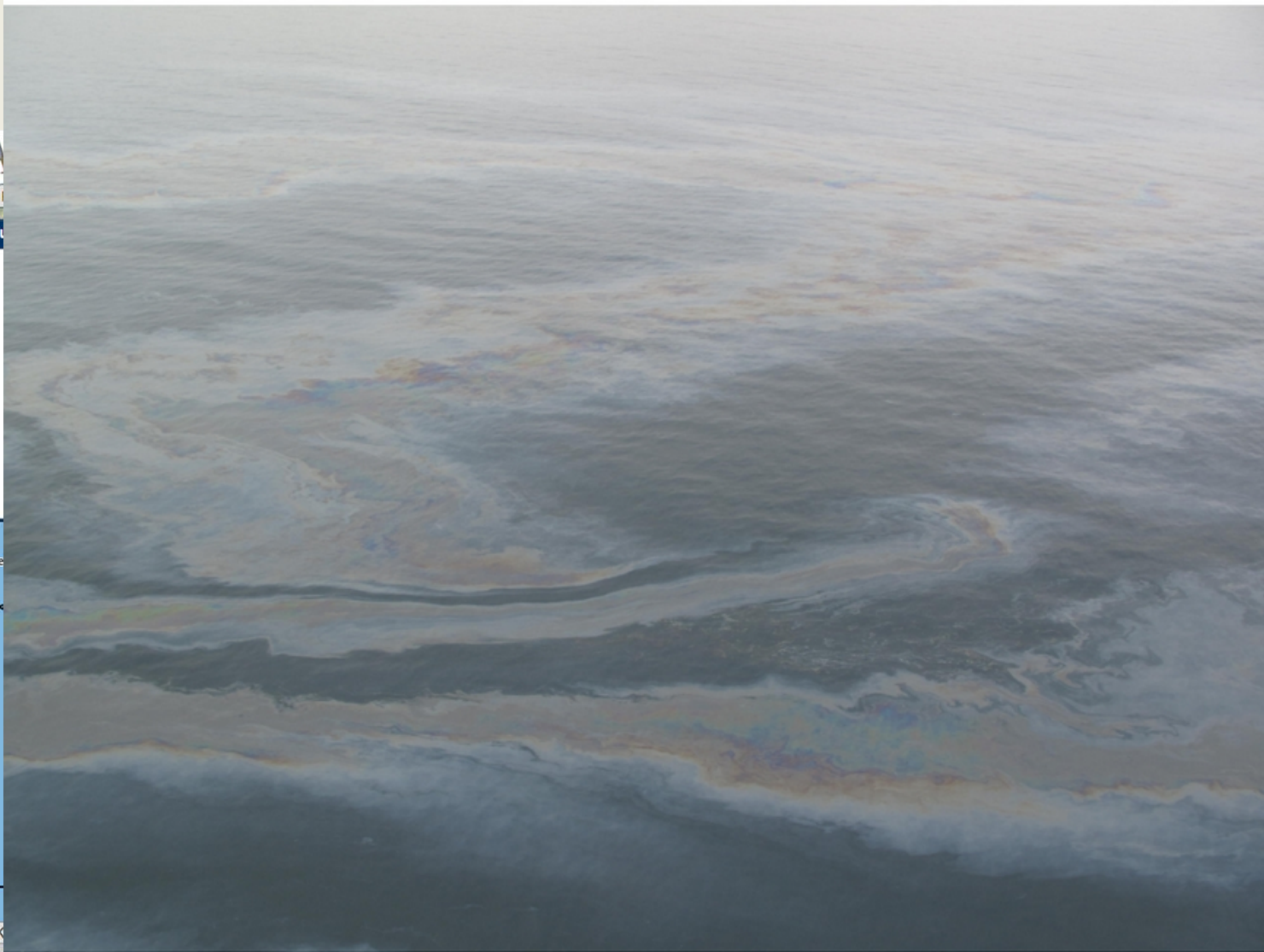
Possible seep.

Scale: 1 : 89K | Zoom Level: 12 | Location: 34.39866°,-119.91746°

US DOC | NOAA | NOS | NOAA Office of Response & Restoration
<https://erma.noaa.gov/layerfiles/12404/locations/6122/6364/6364.jpg>

Coastal Response Research Center
 ©2007 - 2015 University of New Hampshire

NOAA Overflight Photos Refugio Incident



ERMA

Information Help

Refugio

Tajiri

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e of bands originating ne

2 km
1 mi

Scale: 1 : 89K

US DOC | NOAA | N

https://erma.noaa.gov/la

Change Password Logout

els Zoom Download Print

a Co. (19-May-2015)

:50

2015 0650 hours
rs (NOAA)

0650 hours

clean >

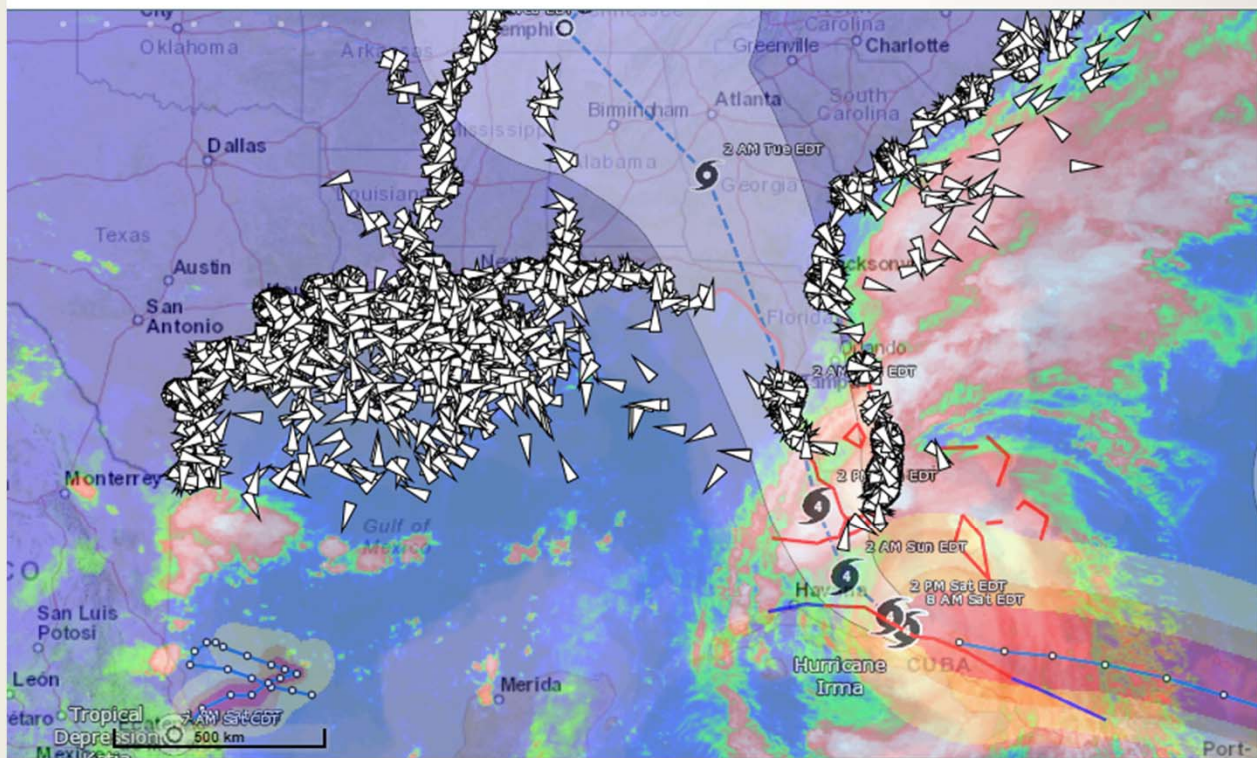
Coastal Response Research Center
7 - 2015 University of New Hampshire

W 119° 55.571'
N 34° 24.033'

5/29/2015 8:45:54 AM

Response and Research Ship Tracking

ERMA® | Environmental Response Management Application
Atlantic



NAIS - All Vessels (last 8 hours)

NAIS - All Vessels (last 8 hours)

- ◻ General
- ◼ Response
- ◼ Research
- ◼ Skimmer
- ◼ Government
- ◼ Source Operations

Tropical Cyclone & Hurricane Location and Forecast (NOAA)

Tropical Cyclone & Hurricane Location and Forecast (NOAA)

Atlantic, Central Pacific and Eastern Pacific Ocean Regions

Tropical Cyclone Watches and Warnings for Coast

- Hurricane Watch
- Hurricane Warning
- Tropical Storm Watch
- Tropical Storm Warning

Tropical Cyclone Center Position Forecasts

- Major Hurricane (Category 3 -5)
- Hurricane (Category 1 -2)
- Tropical Storm
- Tropical Depression
- ⊗ Potential Tropical Cyclone, Subtropical Depression, Subtropical Storm, Post-Tropical

Scale: 1 : 10,279,921 Zoom Level: 5.25 Location: 33.5649°, -96.1763°

Field Personnel Tracking

ERMA | Environmental Response Management Application
Gulf of Mexico

Information Help Admin Upload Find Logout

Layers Legend Query Tools AOI Labels Zoom Download Print

Deepwater Horizon MC 252 Incident

- Points + Labels + Tracks
● All SPOT Teams
- Points + Labels + Tracks
● Bird SPOT Teams
- Points + Labels + Tracks
● Marsh SPOT Teams
- Points + Labels + Tracks
● Rapid_Marsh SPOT Teams
- Points + Labels + Tracks
● Submerged SPOT Teams
- Points + Labels + Tracks
● Mussel Watch SPOT Teams
- Points + Labels + Tracks
● Oyster SPOT Teams
- Points + Labels + Tracks
● WQS SPOT Teams
- Points + Labels + Tracks
● Fish SPOT Teams

Scale: 1: 867K Zoom Level: 9 Location: 29.29359°,-87.71210°

US DOC | NOAA | NOS | NOAA Office of Response & Restoration
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RMP Facilities

ERMA® Environmental Response Management Application
Atlantic

ID location (lat,lon): 41.06577,-74.66496

[Add Selected Features To Query Tab \(Polygons Only\)](#)

Risk Management Plan Facilities (EPA) (RMP as of 01-01-2017)

gid	epafacilit	facilityid	name	street	street2	city	state	zip	lat	long	url	facphone	emergpocph	emergpocpi	phone24	operatorna	chemicalna	quantity
558	100000135524	1000022659	Diversified CPC International, Inc.	189 Houses Corner Rd		Sparta	NJ	7871	41.0633330000	-74.6655560000		0.000000000000	9733837869.00		9733837869.00	Case Schipper	Isobutane [Propane, 2-methyl]	469900.000000
559	100000135524	1000022659	Diversified CPC International, Inc.	189 Houses Corner Rd		Sparta	NJ	7871	41.0633330000	-74.6655560000		0.000000000000	9733837869.00		9733837869.00	Case Schipper	Methyl ether [Methane, oxybis-]	90000.000000
560	100000135524	1000022659	Diversified CPC International, Inc.	189 Houses Corner Rd		Sparta	NJ	7871	41.0633330000	-74.6655560000		0.000000000000	9733837869.00		9733837869.00	Case Schipper	Difluoroethane [Ethane, 1,1-difluoro-]	600000.000000
561	100000135524	1000022659	Diversified CPC International, Inc.	189 Houses Corner Rd		Sparta	NJ	7871	41.0633330000	-74.6655560000		0.000000000000	9733837869.00		9733837869.00	Case Schipper	Propane	423400.000000
562	100000135524	1000022659	Diversified CPC International, Inc.	189 Houses Corner Rd		Sparta	NJ	7871	41.0633330000	-74.6655560000		0.000000000000	9733837869.00		9733837869.00	Case Schipper	Butane	340480.000000

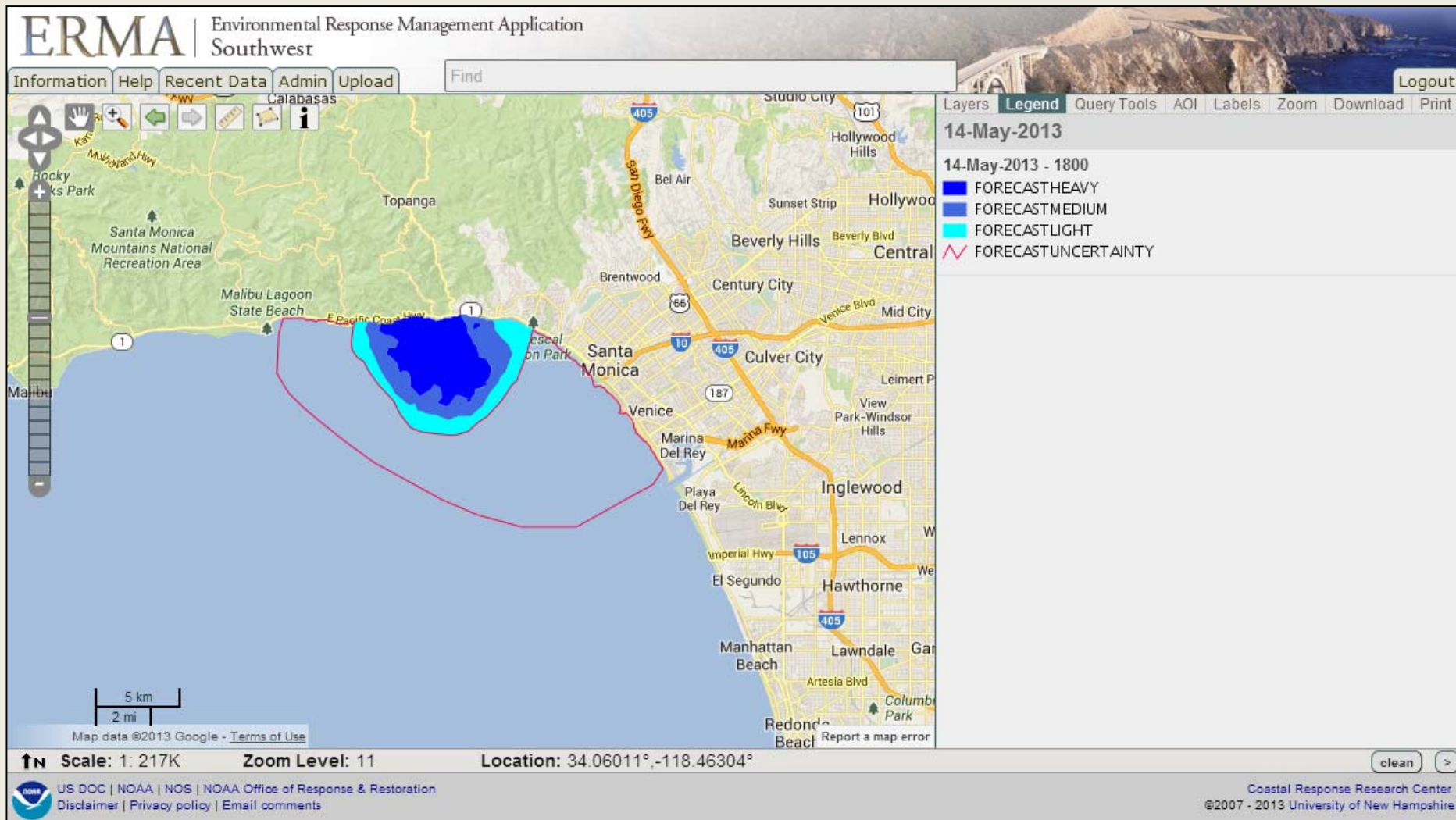
Map data ©2017 Google | Terms of Use | Report a map error

Scale: 1 : 3M Zoom Level: 7 Location: 43.06549°,-69.02784°

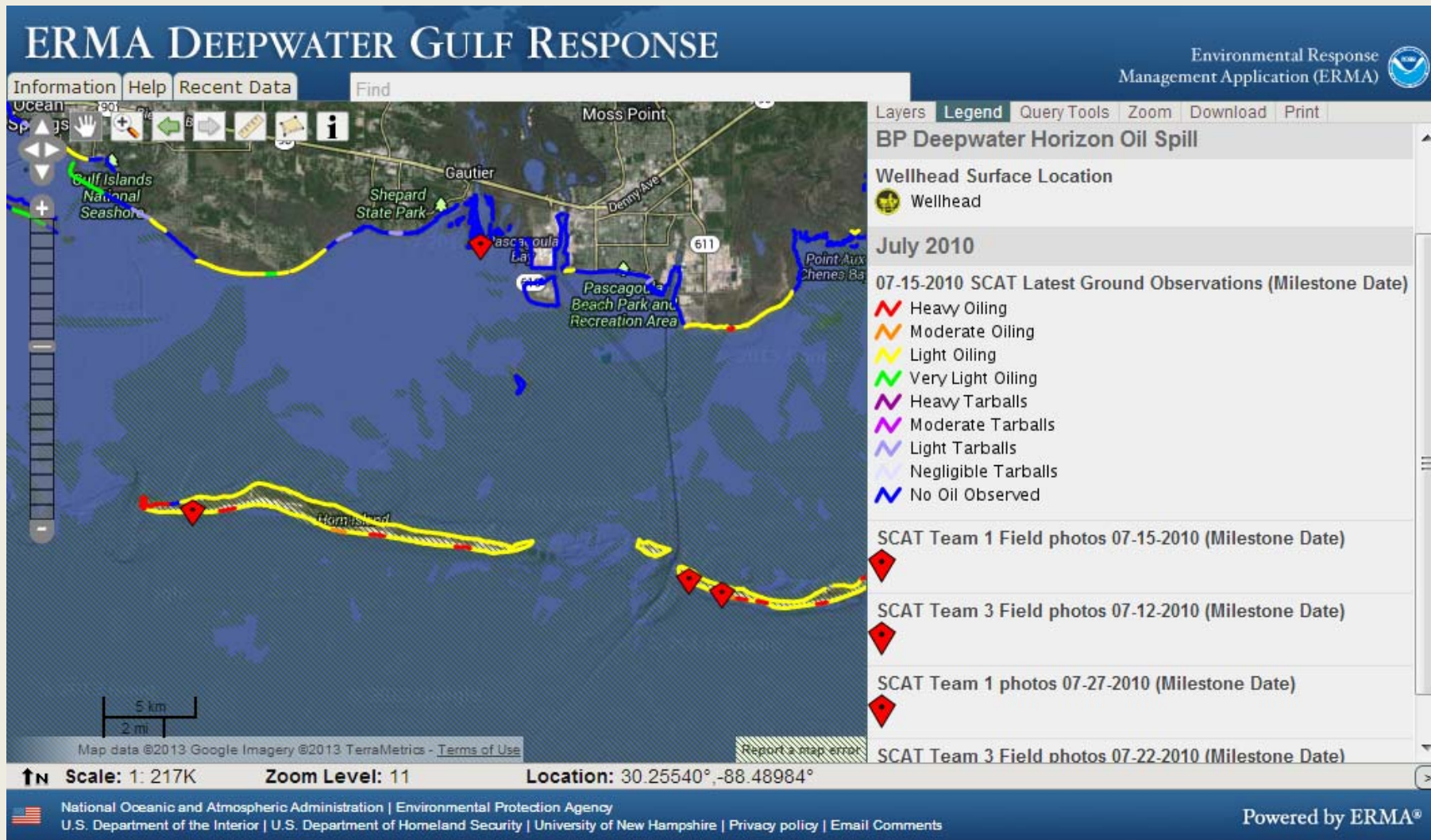
US DOC | NOAA | NOS | NOAA Office of Response & Restoration
Disclaimer | Privacy policy | Official Citation | Contact

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Trajectory Models



Shoreline Assessment & Photo Documentation



Shoreline Assessment & Photo Documentation

ERMA DEEPWATER GULF RESPONSE

Environmental Response Management Application (ERMA)

Information Help Recent Data Find

Layers Legend Query Tools Zoom Download Print

BP Deepwater Horizon Oil Spill

Wellhead Surface Location

- Wellhead

July 2010

- July 2010 SCAT Latest Ground Observations (Milestone Date)
- Heavy Oiling
- Moderate Oiling
- Light Oiling
- Very Light Oiling
- Heavy Tarballs
- Moderate Tarballs
- Light Tarballs
- Negligible Tarballs
- No Oil Observed

SCAT Team 1 Field photos 07-15-2010 (Milestone Date)

SCAT Team 3 Field photos 07-12-2010 (Milestone Date)

SCAT Team 1 photos 07-27-2010 (Milestone Date)

SCAT Team 3 Field photos 07-22-2010 (Milestone Date)

SCAT Team 1 photos 07-27-2010 at 30.2038...

Petitbois Island, MS: Buried layer of oil. Left image shows burial further inland by wind action; right image shows burial by wave action (Gulf is below image).

Scale: 1: 217K Zoom Level: 11 Location: 30.39232°, -88.48641°

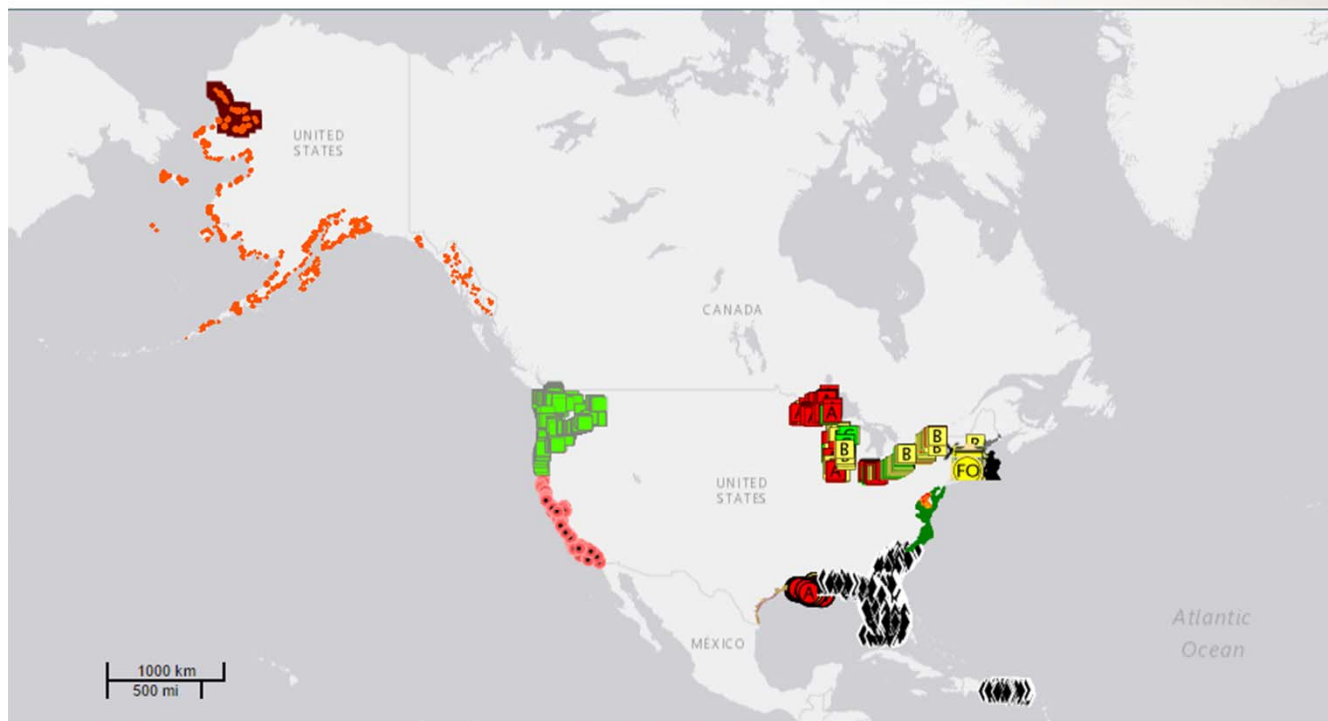
Map data ©2013 Google Imagery ©2013 TerraMetrics - Terms of Use Report a map error

National Oceanic and Atmospheric Administration | Environmental Protection Agency
U.S. Department of the Interior | U.S. Department of Homeland Security | University of New Hampshire | Privacy policy | Email Comments

Powered by ERMA®

Coastal GRP Effort in ERMA

ERMA® Environmental Response Management Application
Atlantic



MSU Toledo

DRAFT-Priority Sites (last update 27-June-2016)

A A - Highest Protection Priority

Sector Lake Michigan

DRAFT - Priority Strategy Sites (updated 14-Mar-2017)

A A - Highest Protection Priority

B B - Protect after A Areas

C C - Protect after B Areas

MSU Duluth

DRAFT-Priority Sites (last updated 27-June-2016)

A A - Highest Protection Priority

B B - Protect after A Areas

C C - Protect after B Areas

Sector Detroit

DRAFT - Priority Strategy Sites (updated 14-Mar-2017)

A A - Highest Protection Priority

B B - Protect after A Areas

C C - Protect after B Areas

Sector Buffalo

DRAFT-Priority Sites (last updated 6-May-2016)

A A - Highest Protection Priority

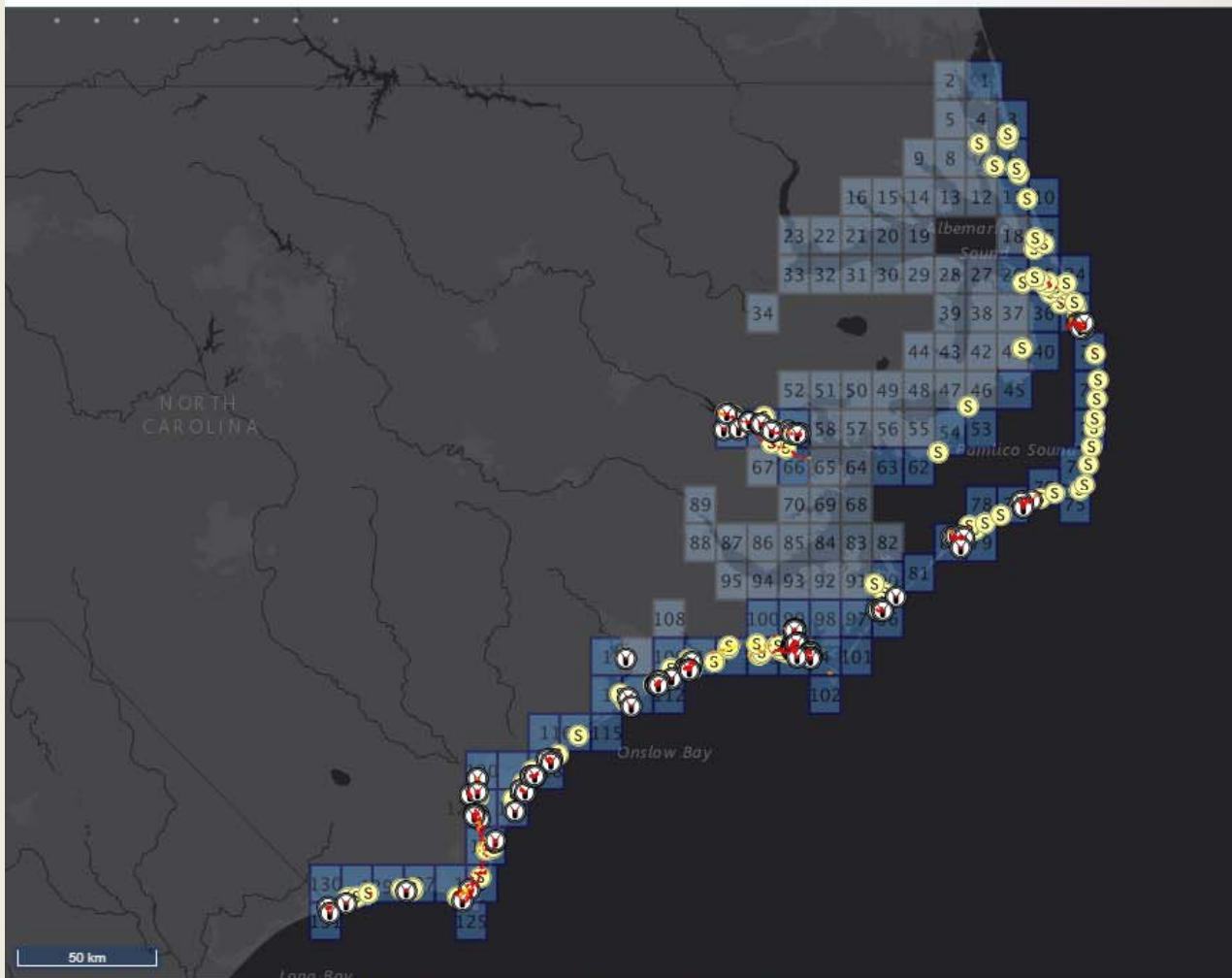
B B - Protect after A Areas

C C - Protect after B Areas

Scale: 1 : 35M Zoom Level: 3 Location: 30.13607°,-39.52582°

ACP / GRS Data

ERMA® | Environmental Response Management Application
Atlantic



Sector North Carolina Skimmer Boom

- Sector North Carolina Skimmer Boom
- ✓ Sector North Carolina Skimmer Boom

Sector North Carolina Booming Strategies

- Sector North Carolina Booming Strategies
- ✓ Boom Priority 1
- ✓ Boom Priority 2
- ✓ Boom Priority 3

Sector North Carolina Skimmers

- Sector North Carolina Skimmers
- ⊙ Sector North Carolina Skimmers

Sector North Carolina Staging Areas

- Sector North Carolina Staging Areas
- ⊙ Sector North Carolina Staging Areas

Sector North Carolina GRS Index

- Sector North Carolina GRS Index
- Active Booming Strategy
- No Active Booming Strategy

Esri Dark Gray Canvas

↑N Scale: 1 : 1,414,510 Zoom Level: 8.0 Location: 33.9320°, -75.0119°

GRS Data

ERMA® | Environmental Response Management Application
Atlantic

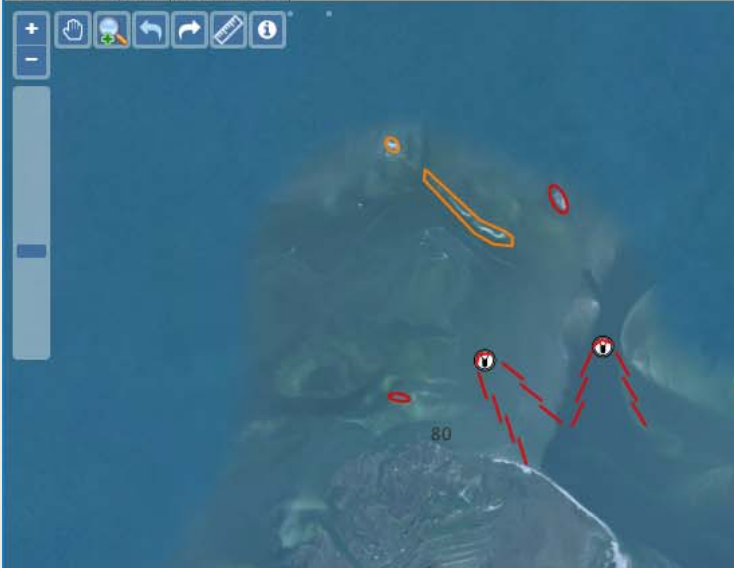
Information Help Recent Data

Search Layers, Folders, and Bookmarks

Geographic Search

Layers Legend Query Tools Zoom Download Print

Login



GRP booming strategies be modified based on weather, seasonal variations, or other incident-specific considerations.

- 1- Opportunity for on water cleanup.

Calm Water Boom: 6-12" draft
Protected Water Boom: 12-18" draft
Open Water Boom: 18' and higher draft
Boom Anchor Rule of Thumb: One anchor for every 300' of boom.
Workboat: 30 foot, trailerable, protected water booming, 2 crew
Utility Boat: 15-20 foot, trailerable, for nearshore, protected water booming, 2 crew
Shoreside Crew: 10 persons

Resource		Quantity
Boom (specify type/length)		PI/20488 feet, PII/11059
Boom (sorbent)		N/A
Anchors		105 Anchors
Boats (specify types/numbers)		Workboat/16 Utility Boat/30
Shoreside Skimmers		4
Offshore Skimmers		1
Personnel (specify # of crews/Supervisors)		92 (46 2-person crews) for boom deployment 13 Div/Group Supervisor Total: 105 persons
Booming installation supplies		Rope, rebar, and supplies to deploy and light the boom and anchor to shoreside. Shovels and sorbent pads.

ID Location: 35.08283, -76.04196 - Google Chrome

Secure | <https://erma.noaa.gov/ident.html?v=e6b79dee>

ID Location: 35.08283, -76.04196

Add Selected Features To Query Tools Tab (Polygons Only)

Sector North Carolina GRS Index

gid	objectid	tile_name	topo_name	qrc_url
85	91	80	PORTSMOUTH, N.C.	http://sds.erma.noaa.gov/GRS/D5_NorthCarolina

Sector North Carolina Skimmers

gid	id	type
56	177	Skimmer

Sector North Carolina Booming Strategies

gid	id	priority	length	boom_type	notes	boom_lengt	lenth temp	boomnumb...
371	0	1	1000			999.998000013305	1000	3

Sector North Carolina Skimmer Boom

gid	id	priority
90	0	1.000000000000
91	0	1.000000000000

Area

ERMA® Environmental Response Management
Atlantic

ID location (lat,lon): 32.80514,-79.90889 -

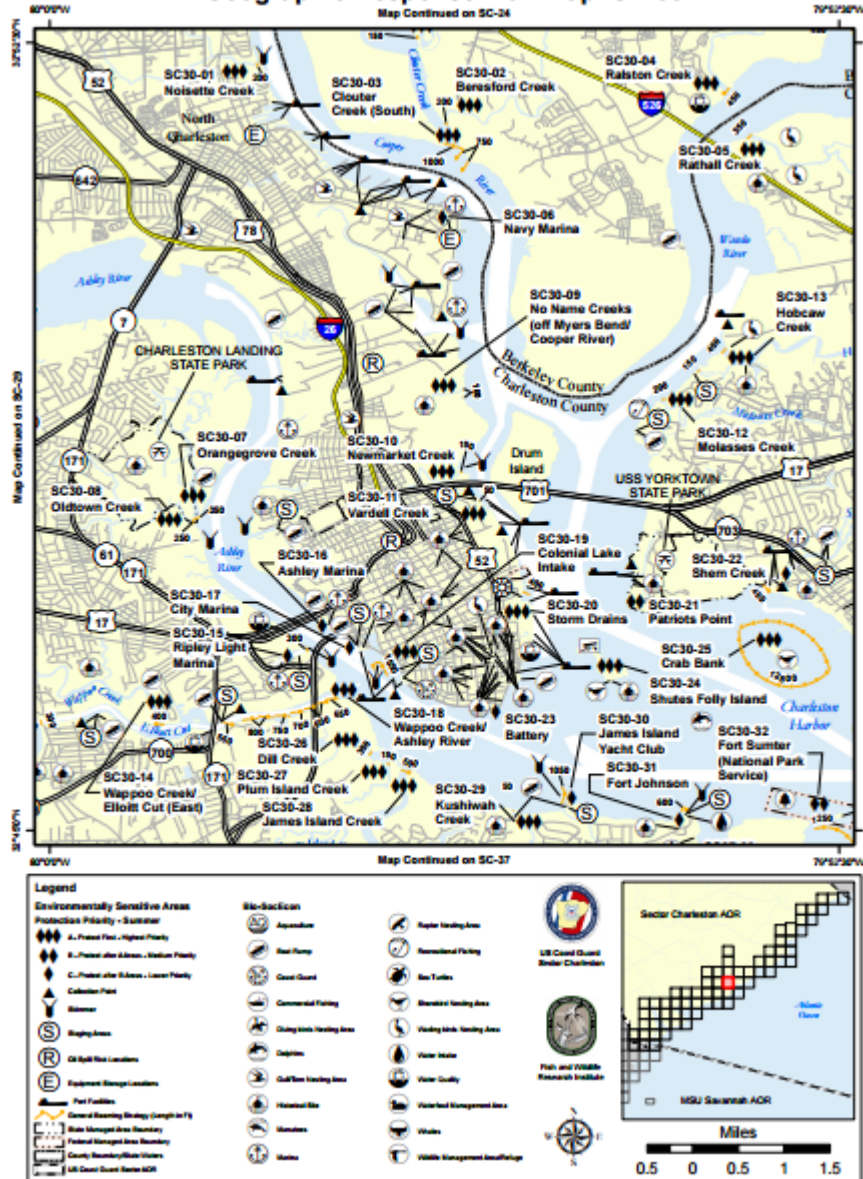
Secure | <https://erma.noaa.gov/js/>

OBJECTID	GRP/ESI Map Number	Alternate GRP/ESI Map Number	T Na
203	SC-30		30



Scale: 1 : 182K Zoom Level: 11
US DOC | NOAA | NOS | NOAA Office of Response & Restoration
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Geographic Response Plan Map: SC-30

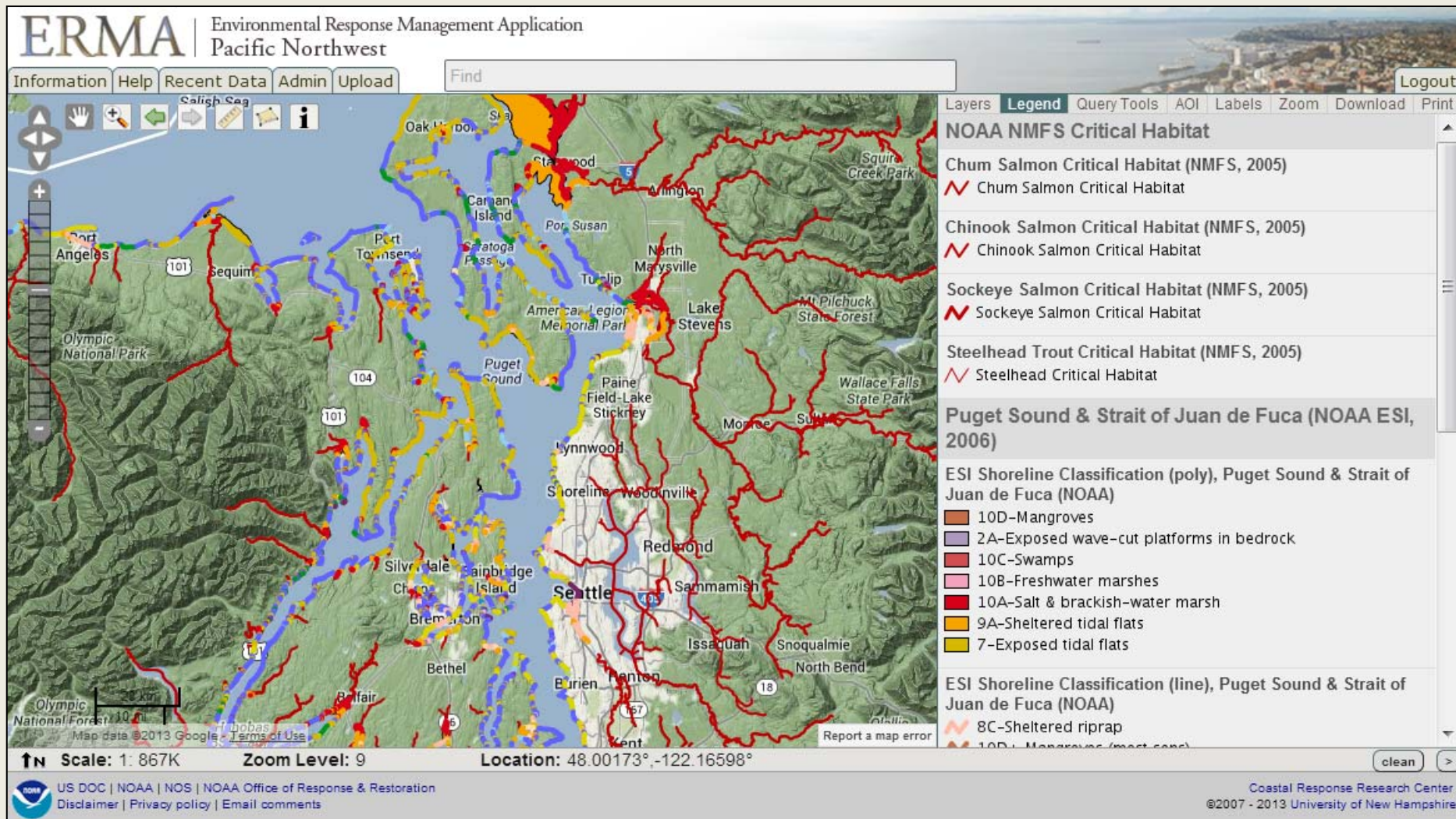


Data

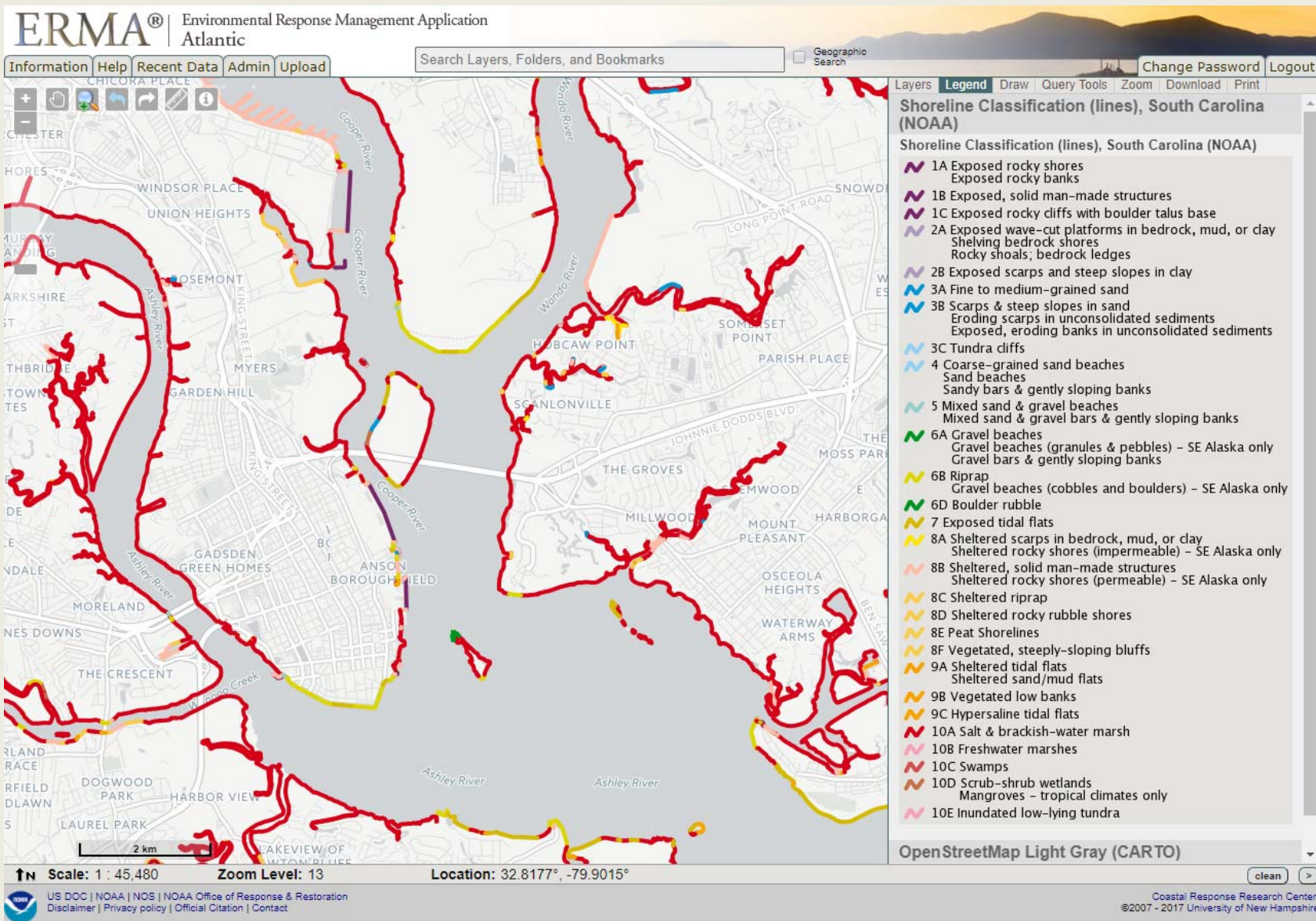
rs Mobile | St. Petersburg | Key West | Miami |
onville | Charleston | San Juan

Alternate GRP Map Link	Me
RP_Maps_2011/SC-	

Resources at Risk



South Carolina ESIs (Shoreline)





Map 12D
South Carolina

BIOLOGICAL RESOURCES

Note: An asterisk (*) indicates that life stage occurs in this range but not in all months included

DISPLAYED ON MAP

BIRDS

Map ID	Subelement	Species	Mapping Qualifier	S	F	Concentration	Monthly Presence																	
							J	F	M	A	M	J	J	A	S	O	N	D	Nest	Mig.(S)	Mig.(F)	Molt		
7	Passerine	Nelson's sparrow	Wintering			.																		
	Passerine	Saltmarsh sparrow	Wintering			.																		
9	Raptor	Bald eagle	Nesting	T		Possible																		
17	Raptor	Bald eagle	Nesting	T		Present																		
50	Waterfowl	Scaup	Rafting			100S																		
	Waterfowl	Scoters	Migration			100S																		
	Waterfowl	Scoters	Rafting			1,000S																		
119	Waterfowl	American black duck	Wintering			10S																		
	Waterfowl	American coot	Wintering			10,000S																		
	Waterfowl	Blue-winged teal	Wintering			10S																		
	Waterfowl	Gadwall	Wintering			100S																		
	Waterfowl	Green-winged teal	Wintering			100S																		
	Waterfowl	Hooded merganser	Nesting			Possible																		
	Waterfowl	Mottled duck	Nesting			Possible																		
	Waterfowl	Northern shoveler	Wintering			10S																		
	Waterfowl	Ring-necked duck	Wintering			1,000S																		
	Waterfowl	Wood duck	Nesting			100S																		
	Waterfowl	Wood duck	Wintering			10S																		

FISH

Map ID	Subelement	Species	Mapping Qualifier	S	F	Concentration	Monthly Presence																	
							J	F	M	A	M	J	J	A	S	O	N	D	Spawn	Eggs	Larvae	Juveniles	Adults	
235	Diadromous	Atlantic sturgeon	General Distribution		E	Rare																		
	Diadromous	Shortnose sturgeon	General Distribution		E	Rare																		
239	Diadromous	American eel	Migration			.																		
	Diadromous	American shad	Migration			.																		
	Diadromous	Blueback herring	Migration			.																		
241	Diadromous	American shad	Migration			High																		
	Diadromous	Atlantic sturgeon	General Distribution		E	Low																		
	Diadromous	Blueback herring	Migration			High																		
242	Diadromous	Atlantic sturgeon	General Distribution		E	Present																		
243	Estuarine Nursery	Spotted seatrout	Spawning Area			Aggregation																		
244	Diadromous	American shad	Migration			.																		
	Diadromous	Blueback herring	Migration			.																		
245	Diadromous	Shortnose sturgeon	General Distribution		E	Present																		



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Environmental Sensitivity Index (ESI) data and Query Tool

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Atlantic

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Search Layers, Folders, and Bookmarks

Layers | Legend | Draw | **Query Tools** | Zoom | Download | Print

Query Tools

Step 1: Create New or Use Existing Shapes:

Create new shapes by selecting the Create Polygon button. Draw the polygon on the map by clicking vertices with the mouse. Double click to end drawing.

To use an existing shape continue to Step 2.

All shapes drawn on the map will be used by the Layer Query by Polygon Tool and the ESI Query Tool. The IPaC Query Tool can only use one polygon. If you want run the query with one shape, delete the remaining shapes. You do not need to select a shape for it to be run in the query.

https://erma.noaa.gov/erma_esi.html - Google Chrome

Secure | https://erma.noaa.gov/erma_esi.html

- DOUG HOWELL AND JOE FULLER, NORTH CAROLINA WILDLIFE RESOURCES COMMISSION: DISTRIBUTION AND SEASONALITY OF WATERFOWL IN NORTH CAROLINA, 0
- PORTAL ACCESS TO WILDLIFE SYSTEMS (PAWS), NORTH CAROLINA WILDLIFE RESOURCES COMMISSION: SHOREBIRD DATABASE QUERY, JULY 2016, 0

Download features in these formats: [Excel \(.xls\)](#) | [Text \(.csv\)](#) | [PDF this section](#)

Search:

Name	State	Federal	Nesting	Laying	Hatching
American oystercatcher More info >	*	C	Mar-Jul	-	-
Black rail More info >	*	C	-	-	-
Least tern More info >	*	C	E	May-Aug	-
Red knot More info >	*	T	-	-	-
Wilson's plover More info >	*	C	Apr-Aug	-	-
American black duck More info >			-	Feb-Mar	Oct-Nov
American black duck More info >			Apr-May	-	-
Bufflehead More info >			-	Feb-Mar	Oct-Nov
Gadwall More info >			-	Feb-Mar	Oct-Nov
Redhead More info >			-	Feb-Mar	Oct-Nov
Scaup More info >			-	Feb-Mar	Oct-Nov
Seaside sparrow More info >			May-Aug	-	-

Scale: 1 : 44,315

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F&WS IPAC Query Tool

(Information for Planning and Conservation)

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Layers Legend Draw Query Tools Zoom Download Print



IPaC Information for Planning and Consultation **U.S. Fish & Wildlife Service**
LOG IN

What's next?
Define a project at this location to evaluate potential impacts, get an official species list, and make species determinations.
DEFINE PROJECT

Mammals

- Threatened**

Northern Long-eared Bat
Myotis septentrionalis
- Threatened**

West Indian Manatee
Trichechus manatus
Marine mammal

Birds

- Threatened**

Piping Plover
Charadrius melodus
- Threatened**

Red Knot
Calidris canutus rufa

Scale: 1 : 44,315 Zoom Level: 13

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Response Imagery

The screenshot displays the ERMA Atlantic web application interface. At the top, the title "ERMA | Environmental Response Management Application Atlantic" is visible. Below the title is a navigation bar with tabs for "Information", "Help", "Recent Data", "Admin", and "Upload", along with a search box labeled "Find" and a "Logout" button. The main content area shows an aerial satellite image of a coastal region with buildings and a beach. On the left side of the image, there are navigation controls including a hand icon, a zoom in (+) and zoom out (-) icon, a pan icon, and a scale bar. On the right side, there is a "Layers" panel with a list of map layers. The "Layers" panel includes a "clear all" button, a "collapse all" button, and a "manage" checkbox. The layers are organized into several categories: "Public Safety & Infrastructure", "Response Planning", "Restoration", "Weather, Oceanography, & Natural Hazards", "Hurricane and Post Tropical Storm Sandy", "Imagery & Remote Sensing", "Weather Predictions & Coastal Monitoring", "Historic Incidents & Drills", and "ERMA Tools". Under "Imagery & Remote Sensing", the "NOAA NGS Aerial Imagery" layer is expanded, showing a list of dates from 10/31/2012 to 11/06/2012. The "NOAA Aerial Imagery 10/31/2012" layer is checked. Other layers include "NCDOT Aerial Images 10/31/12", "Collected Civil Air Patrol (CAP) Images (Zoom Dependent)", "Google Aerial Imagery 11/04/2012 (Flight 1)", and "Imagery Observed Point Damages (Zoom Dependent)". At the bottom of the interface, there is a "Bookmark Views" section with a "new" button and an "Expand" button. The status bar at the very bottom shows "Scale: 1: 846", "Zoom Level: 19", and "Location: 39.95969°,-74.06726°". The footer contains the NOAA logo and text: "US DOC | NOAA | NOS | NOAA Office of Response & Restoration", "Disclaimer | Privacy policy | Email comments", and "Coastal Response Research Center @2007 - 2013 University of New Hampshire".

ERMA | Environmental Response Management Application Atlantic

Information Help Recent Data Admin Upload Find Logout

Layers Legend Query Tools AOI Labels Zoom Download Print

clear all collapse all manage

- Public Safety & Infrastructure
- Response Planning
- Restoration
- Weather, Oceanography, & Natural Hazards
- Hurricane and Post Tropical Storm Sandy
 - Imagery & Remote Sensing
 - NOAA NGS Aerial Imagery
 - NOAA Aerial Imagery 11/06/2012
 - NOAA Aerial Imagery 11/05/2012
 - NOAA Aerial Imagery 11/04/2012
 - NOAA Aerial Imagery 11/03/2012
 - NOAA Aerial Imagery 11/02/2012
 - NOAA Aerial Imagery 11/01/2012
 - NOAA Aerial Imagery 10/31/2012
 - NCDOT Aerial Images 10/31/12
 - Collected Civil Air Patrol (CAP) Images (Zoom Dependent)
 - Google Aerial Imagery 11/04/2012 (Flight 1)
 - Imagery Observed Point Damages (Zoom Dependent)
 - Weather Predictions & Coastal Monitoring
 - Historic Incidents & Drills
 - ERMA Tools

Bookmark Views: new Expand

Scale: 1: 846 Zoom Level: 19 Location: 39.95969°,-74.06726° clean

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Response Imagery

ERMA | Environmental Response Management Application
Atlantic

Information | Help | Recent Data | Admin | Upload | Find | Logout

Layers | Legend | Query Tools | AOI | Labels | Zoom | Download | Print

clear all collapse all manage

- Public Safety & Infrastructure
- Response Planning
- Restoration
- Weather, Oceanography, & Natural Hazards
- Hurricane and Post Tropical Storm Sandy
 - Imagery & Remote Sensing
 - NOAA NGS Aerial Imagery
 - NOAA Aerial Imagery 11/06/2012
 - NOAA Aerial Imagery 11/05/2012
 - NOAA Aerial Imagery 11/04/2012
 - NOAA Aerial Imagery 11/03/2012
 - NOAA Aerial Imagery 11/02/2012
 - NOAA Aerial Imagery 11/01/2012
 - NOAA Aerial Imagery 10/31/2012
 - NCDOT Aerial Images 10/31/12
 - Collected Civil Air Patrol (CAP) Images (Zoom Dependent)
 - Google Aerial Imagery 11/04/2012 (Flight 1)
 - Imagery Observed Point Damages (Zoom Dependent)
 - Weather Predictions & Coastal Monitoring
 - Historic Incidents & Drills
 - ERMA Tools

Bookmark Views:

Scale: 1: 846 Zoom Level: 19 Location: 39.95981°,-74.06725°

Imagery ©2013, DigitalGlobe - Terms of Use Report a map error

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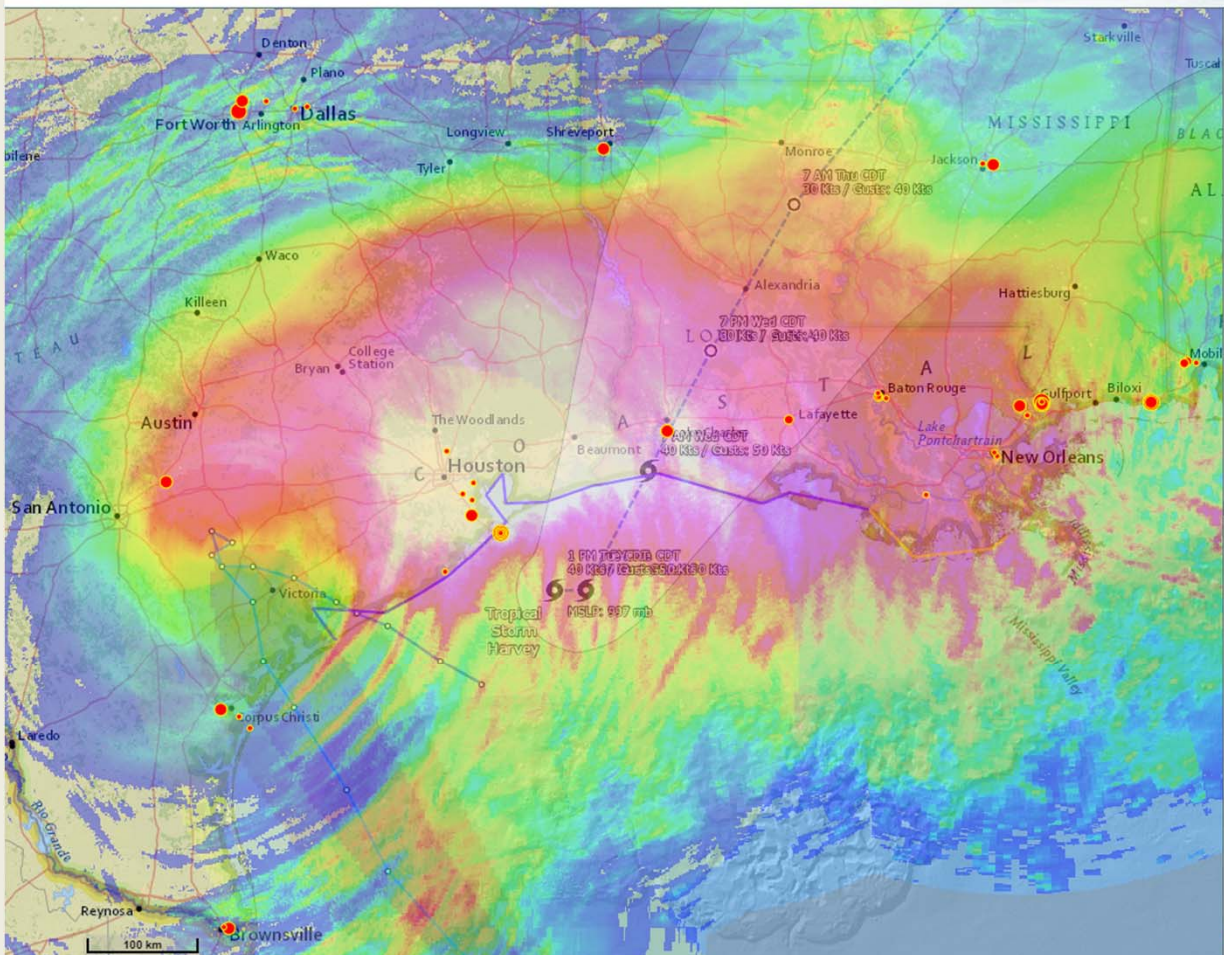
Recent Hurricanes 2017-2018

- Harvey (2017)
- Irma (2017)
- Maria (2017)
- Nate (2017)
- Florence (2018)
- Michael (2018)



Harvey

ERMA® Environmental Response Management Application
Gulf of Mexico



- Hurricane Warning
- Tropical Storm Watch
- Tropical Storm Warning

Tropical Cyclone Center Position Forecasts

- Major Hurricane (Category 3 - 5)
- Hurricane (Category 1 - 2)
- Tropical Storm
- Tropical Depression
- Potential Tropical Cyclone, Subtropical Depression, Subtropical Storm, Post-Tropical Cyclone, or Remnants

Tropical Cyclone Track Line Forecasts

- - - 120-hr Forecast Track Line

Tropical Cyclone Cone of Uncertainty for Track Forecasts

- 120-hr Forecast Cone of Uncertainty

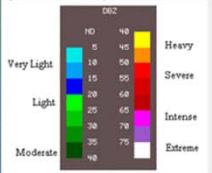
Tropical Cyclone Observed Surface Wind Swath

- Observed (Best Track) Winds >= 34 knots (39 mph)
- Observed (Best Track) Winds >= 50 knots (58 mph)
- Observed (Best Track) Winds >= 64 knots (74 mph)

Tue 2017-08-29 13:16 UTC

72-hr NEXRAD Radar Cumulative Precipitation (CONUS) (IAState/NWS)

72-hr NEXRAD Radar Cumulative Precipitation (CONUS) (IAState/NWS)



NOAA Locations with Staff Counts


NOAA Locations with Staff Counts

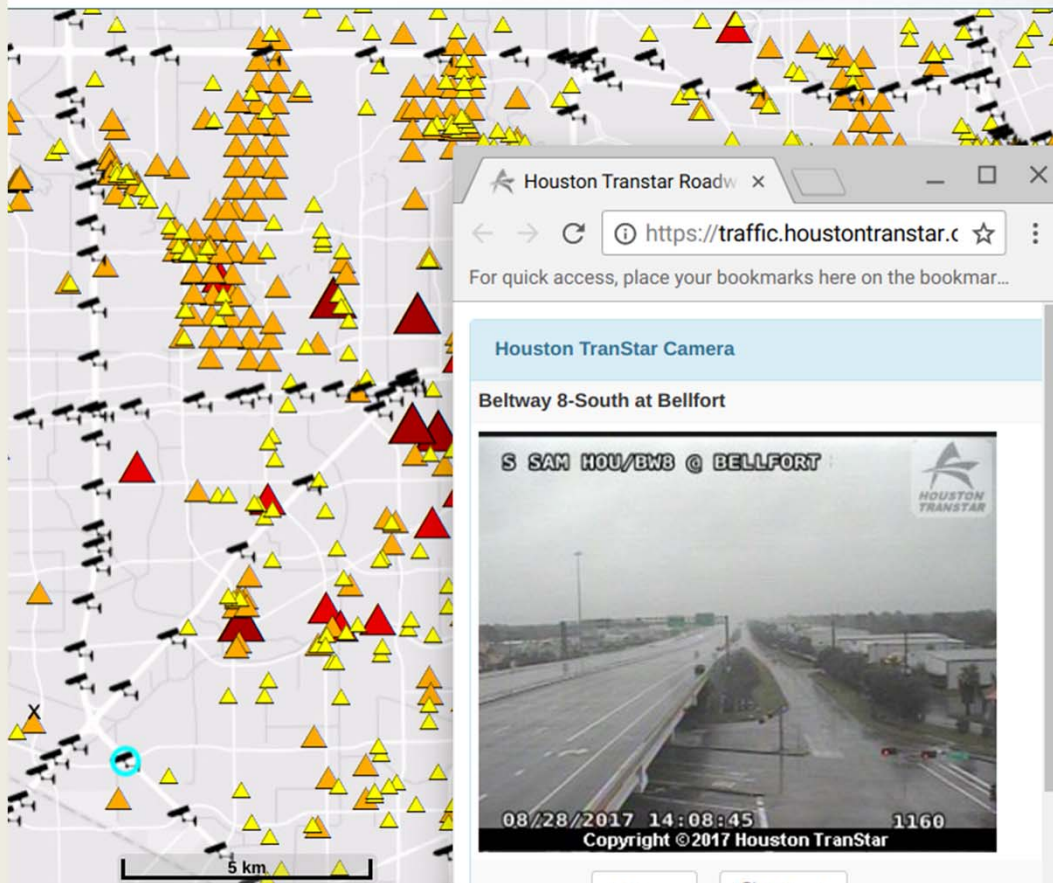
- 1-5
- 6-15
- 16-50
- 51-100
- 101-2700

Scale: 1 : 3,008,434 Zoom Level: 7 Location: 27.1627°, -88.1480°

Harvey

ERMA® | Environmental Response Management Application
Gulf of Mexico






Houston TranStar Roadw x

https://traffic.houstontranstar.c

Houston TranStar Camera
Beltway 8-South at Bellfort

S SAM HOU/BWB @ BELLFORT



08/28/2017 14:08:45 1160
Copyright ©2017 Houston TranStar

Close Refresh

Esri Light Gray Canvas

Esri Light Gray Canvas

NOAA Locations with Staff Counts

NOAA Locations with Staff Counts

- 1-5
- 6-15
- 16-50
- 51-100
- 101-2700

Houston Power Outages (CenterPoint Energy)

Houston Power Outages (CenterPoint Energy)

- ▲ 1 - 10 customers without power
- ▲ 11 - 100 customers without power
- ▲ 101 - 300 customers without power
- ▲ More than 300 customers without power

Houston Traffic Webcams (Houston TranStar)

Houston Traffic Webcams (Houston TranStar)

📹 Houston Traffic Webcams (Houston TranStar)

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Coastal Response Research Center
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Harvey

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Gulf of Mexico

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Search Layers, Folders, and Bookmarks

Scale: 1 : 1,501,572 Zoom Level: 8 Location: 29.7293°, -93.3440°

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Calcasieu Pass at 29.7682 -93.3429 - Google Chrome

about:blank

NOAA/NOS/CO-OPS
Observed Water Levels at 8768094, Calcasieu Pass LA
From 2017/08/29 00:00 GMT to 2017/08/30 23:59 GMT

NOAA CO-OPS Water Levels

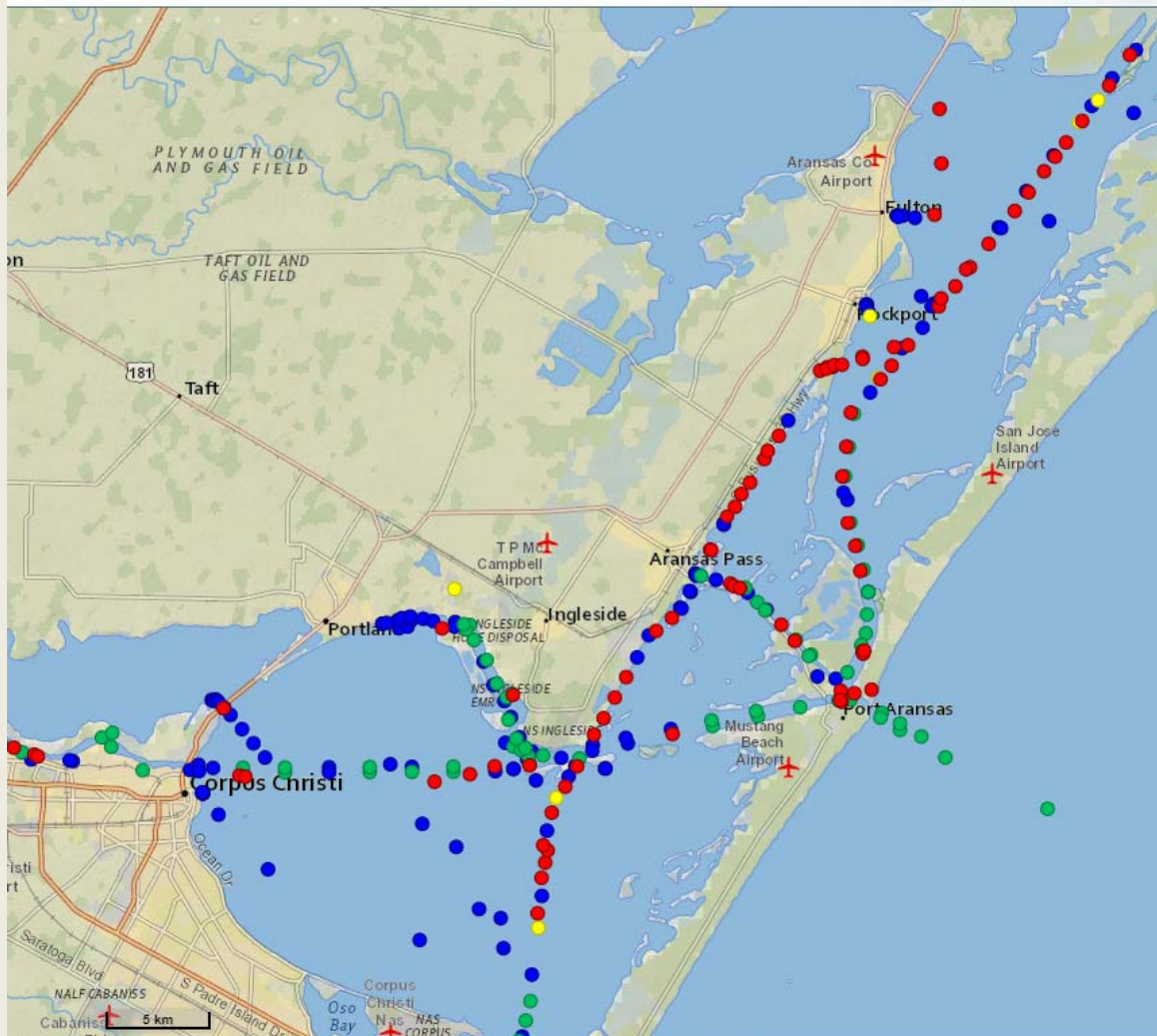
NOAA CO-OPS Water Levels

AHPS Stream Gauge Service - Observed (NOAA)

- Major Flooding
- Moderate Flooding
- Minor Flooding
- Near Flood
- No Flooding
- Flood Category Not Defined
- At or Below Low Water Threshold
- Observations Are Not Current
- Out of Service

Harvey USCG Support for ATONS

ERMA® | Environmental Response Management Application
Gulf of Mexico



USCG Sector Corpus Christi & Sector Houston Galveston All ATONs September 5, 2017

USCG Sector Corpus Christi & Sector Houston Galveston All ATONs September 5, 2017

- Hurricane-Caused - InActive
- Hurricane-Caused - Corrected
- Not-Hurricane-Caused - InActive
- Not-Hurricane-Caused - Active

Esri National Geographic

Esri National Geographic

Scale: 1 : 191,235 Zoom Level: 11 Location: 27.9746°, -96.8967°

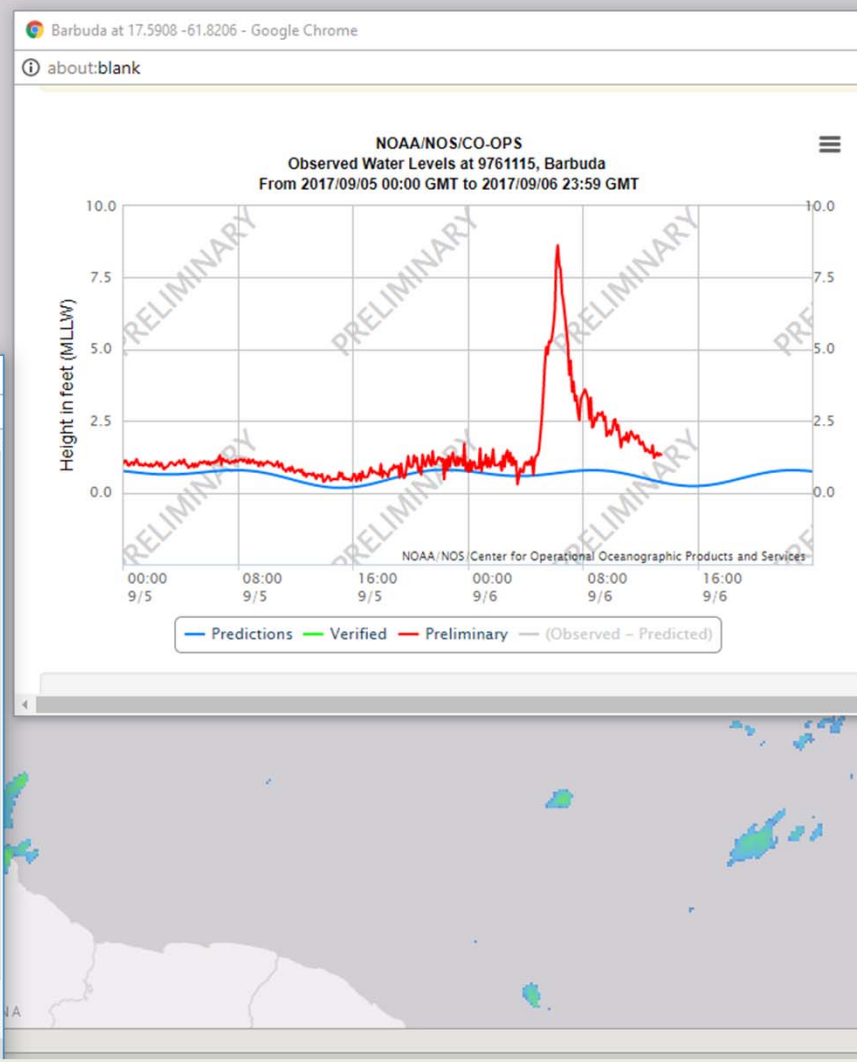
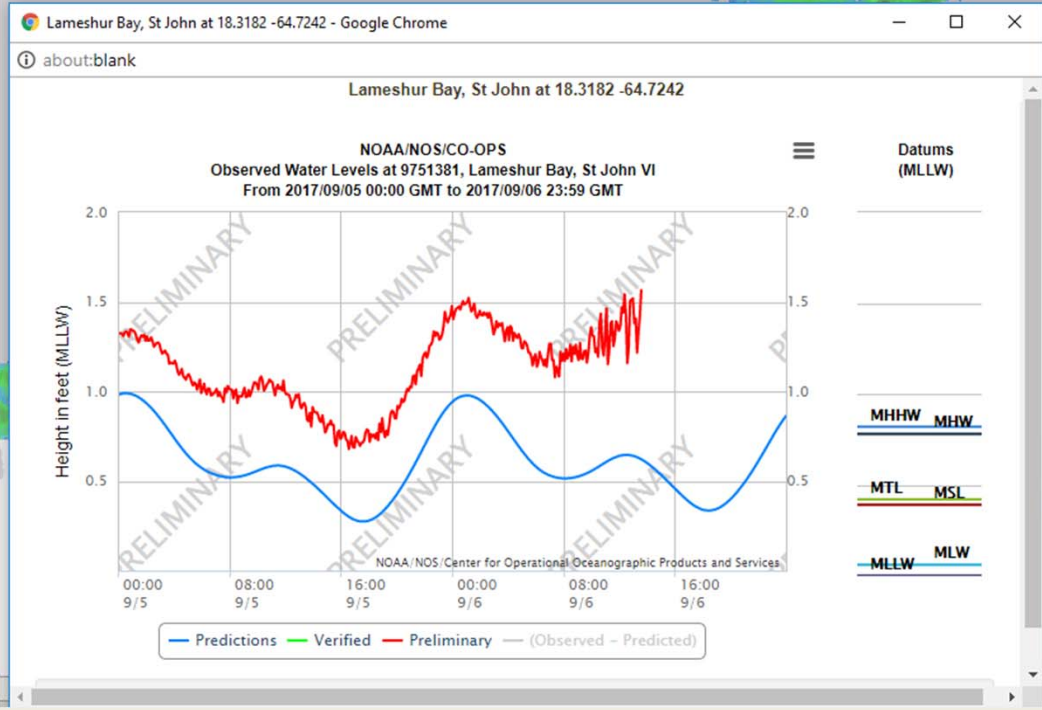
Hurricane Irma Water level stations 9/6, 10am

ERMA® | Environmental Response Management Application
Caribbean

Information Help Recent Data Admin Upload

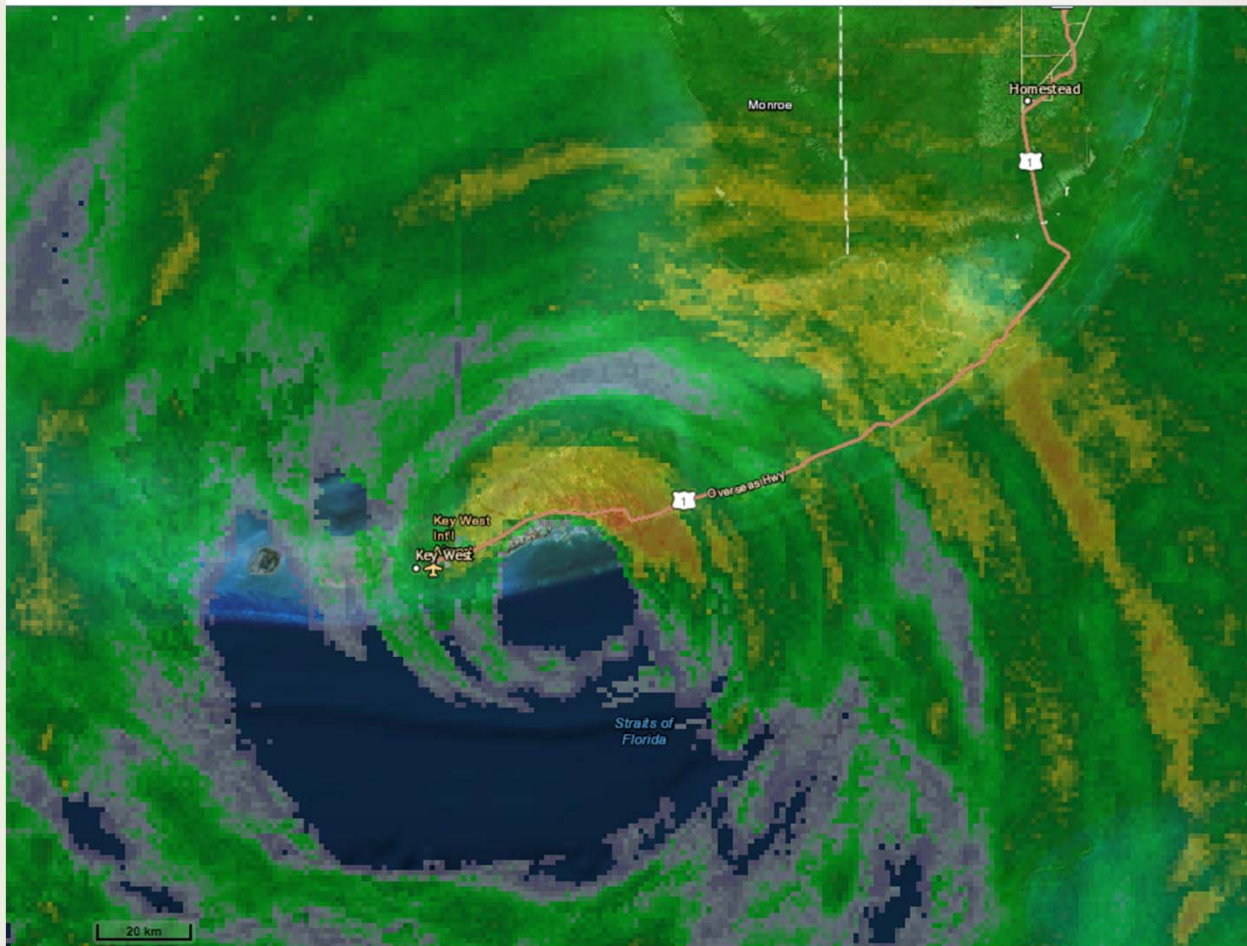
Search Layers, Folders, and Bookmarks

Geographic Search



Hurricane Irma Florida Keys - Irma 9/10 - 8am

ERMA® | Environmental Response Management Application
Atlantic



Reference Features and World Boundaries/Places

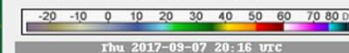
Reference Features and World Boundaries/Places
World Boundaries and Places

Reference World Transportation

Reference World Transportation
World Transportation

Weather Radar Mosaic (NOAA)

Weather Radar Mosaic (NOAA)



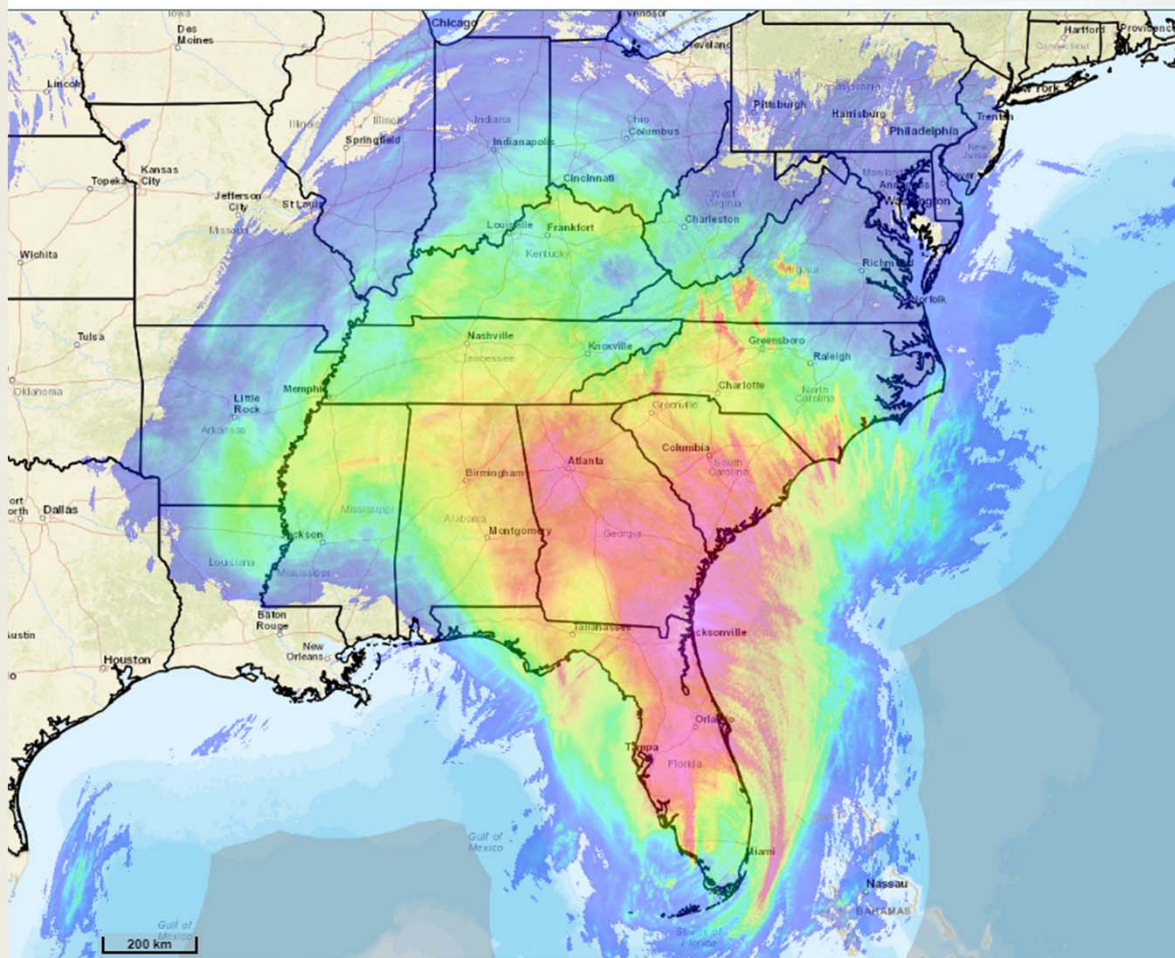
Esri World Imagery

Esri World Imagery

↑N Scale: 1 : 786,304 Zoom Level: 9 Location: 24.7693°, -80.1255°

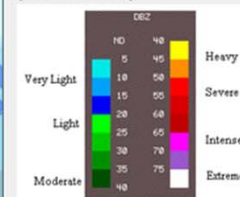
Hurricane Irma Cumulative NEXRAD Precipitation from 9/10-9/12

ERMA® Environmental Response Management Application
Gulf of Mexico



72-hr NEXRAD Radar Cumulative Precipitation (CONUS) (IAState/NWS)

72-hr NEXRAD Radar Cumulative Precipitation (CONUS) (IAState/NWS)



U.S. States and Provinces Boundaries

U.S. States and Provinces Boundaries

U.S. States and Provinces Boundaries

Esri Street Maps

Esri Street Maps

Scale: 1 : 8,178,427 Zoom Level: 5.5 Location: 30.4569°, -78.5684°

Irma Imagery

ERMA® Environmental Response Management Application
Gulf of Mexico



Identified Debris, Florida Keys - Post Hurricane Irma 9-21-17 (RPI)

Identified Debris, Florida Keys - Post Hurricane Irma 9-21-17 (RPI)

- Automotive
- Construction
- Debris Pile
- Trailer
- Unknown
- Vessel

Post-Harvey and Irma Imagery (Vexel/NIBC)

Post-Harvey and Irma Imagery (Vexel/NIBC)

OpenStreetMap Light Gray (CARTO)

OpenStreetMap Light Gray (CARTO)

5 m



Scale: 1:96

Zoom Level: 22

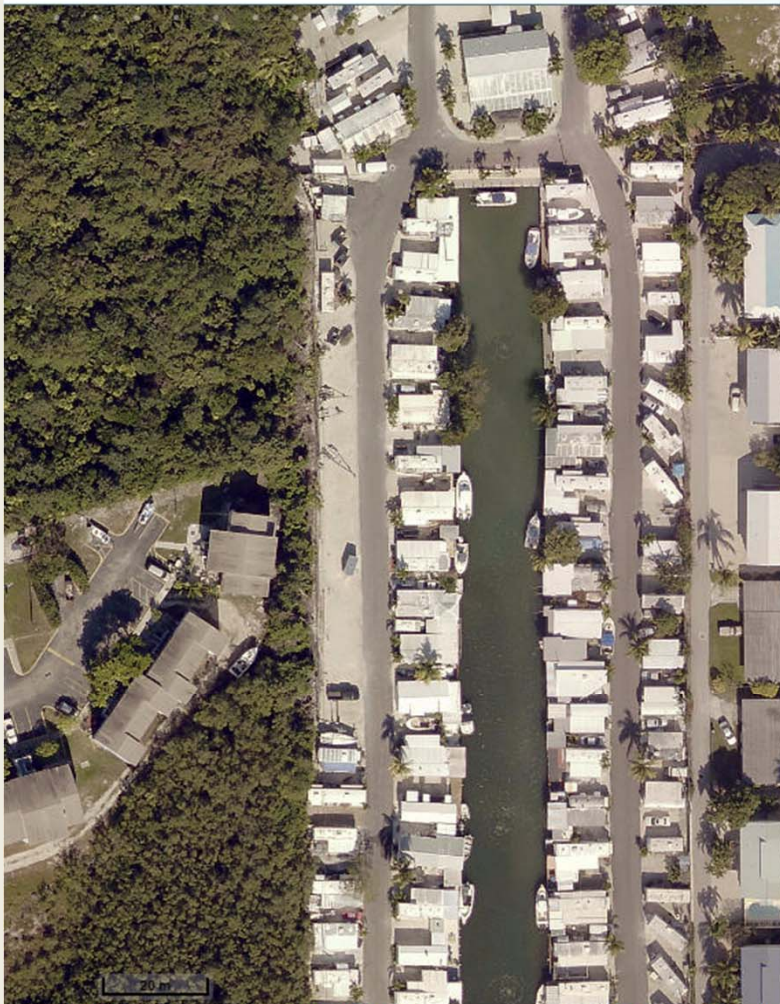
Location: 24.7101°, -81.0914°



Irma Imagery

ERMA® Environmental Response Management Application
Gulf of Mexico

ERMA® Environmental Response Management Application
Gulf of Mexico



Aerial Imagery 2017-09
Aerial Imagery 2017-0912a



Esri World Imagery
Esri World Imagery

↑N Scale: 1 : 768

Zoom Level: 19

Location: 24.7161°, -81.

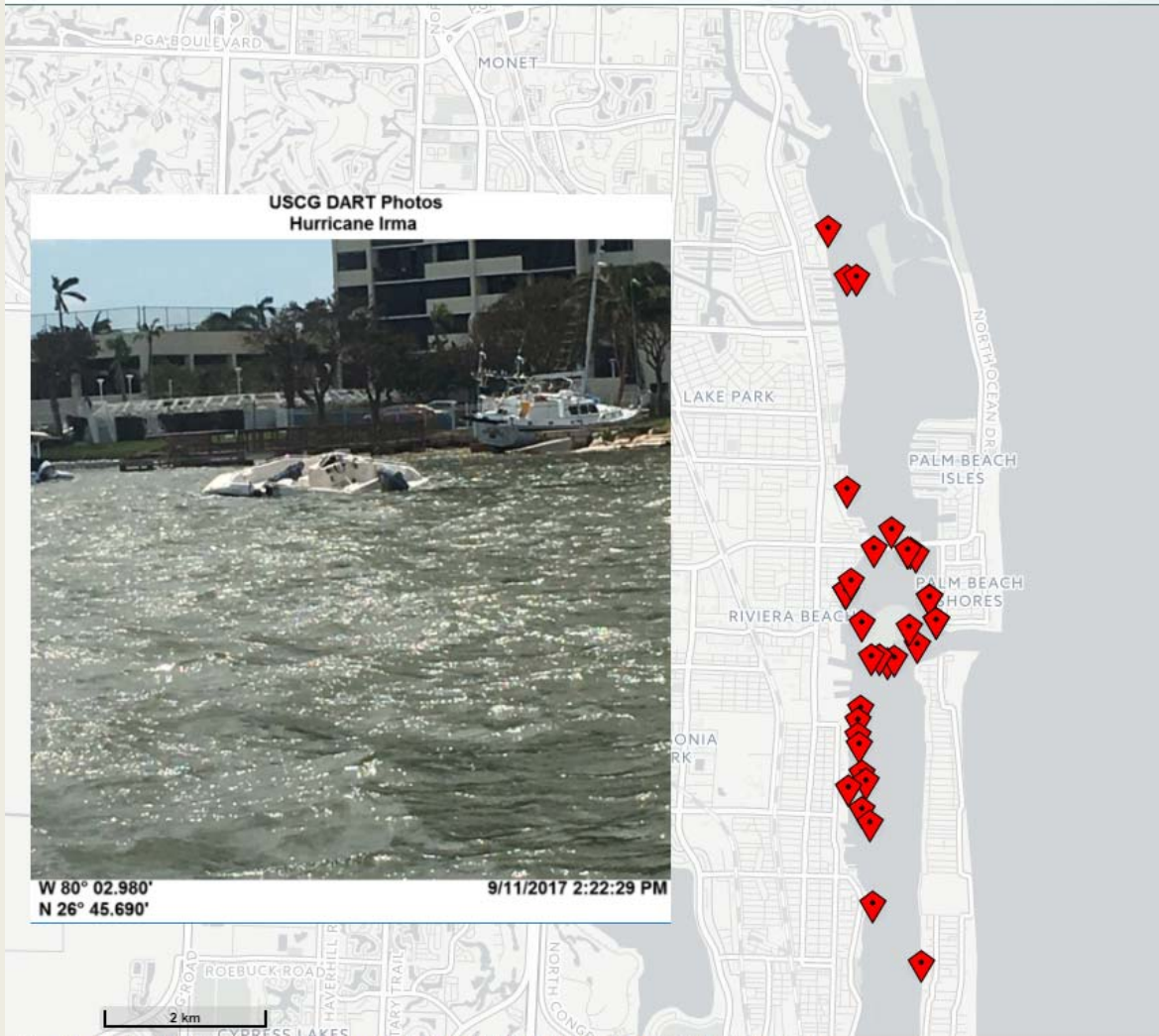
↑N Scale: 1 : 768

Zoom Level: 19

Location: 24.7161°, -81.0699°

Irma USCG Marine Patrol Photos

ERMA® Environmental Response Management Application
Gulf of Mexico

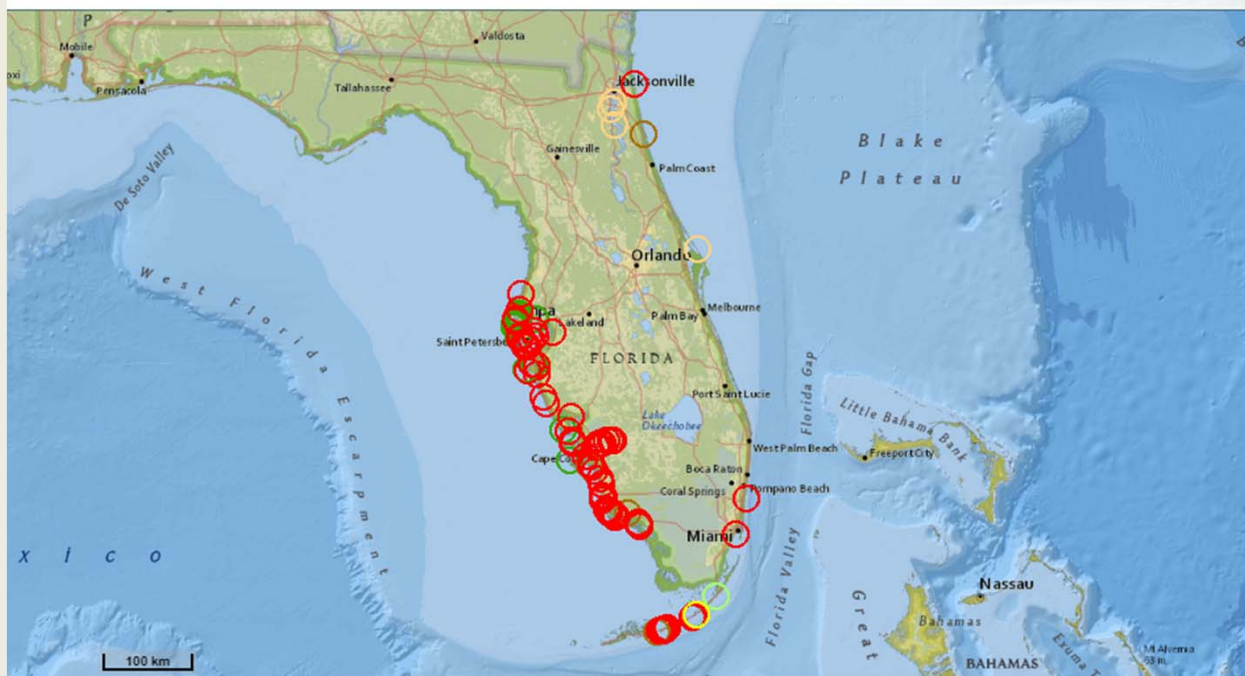


- USCG Sector Miami Harbor Patrol
- USCG Sector Miami Harbor Patrol
- OpenStreetMap Light Gray (CARTO)
- OpenStreetMap Light Gray (CARTO)

Scale: 1 : 48,312 Zoom Level: 12.9996973387910 Location: 26.8003°, -80.1143°

Irma EPA & USCG Targets 09-28-17

ERMA® | Environmental Response Management Application
Gulf of Mexico



USCG Target Status

- Assessed
- Recovery Complete
- Removal Complete
- Recovery in Progress
- Removal in Progress
- Unknown
- Not Found
- Transfer Complete
- Transfer in Progress

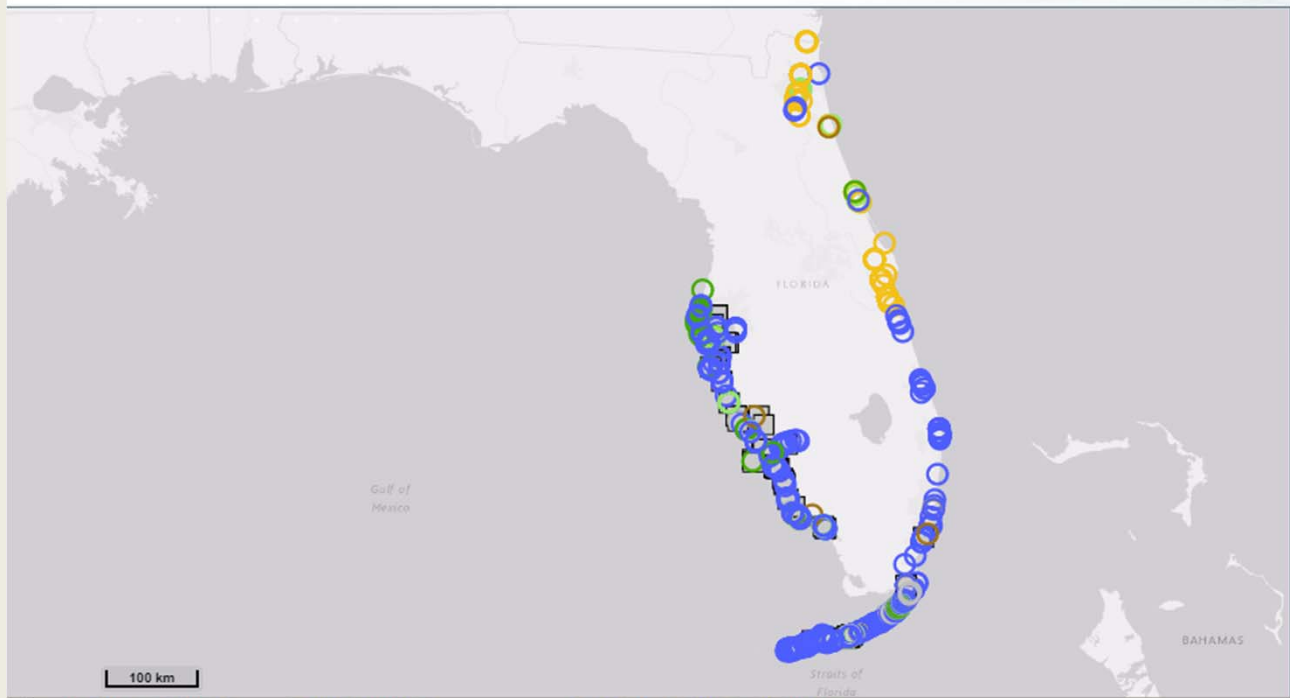
Esri National Geographic

Esri National Geographic

Scale: 1 : 4,335,602 Zoom Level: 6.5 Location: 30.9132°, -75.1161°

Florida ESF-10 Assessments by Status (10-3-2017)

ERMA® | Environmental Response Management Application
Gulf of Mexico



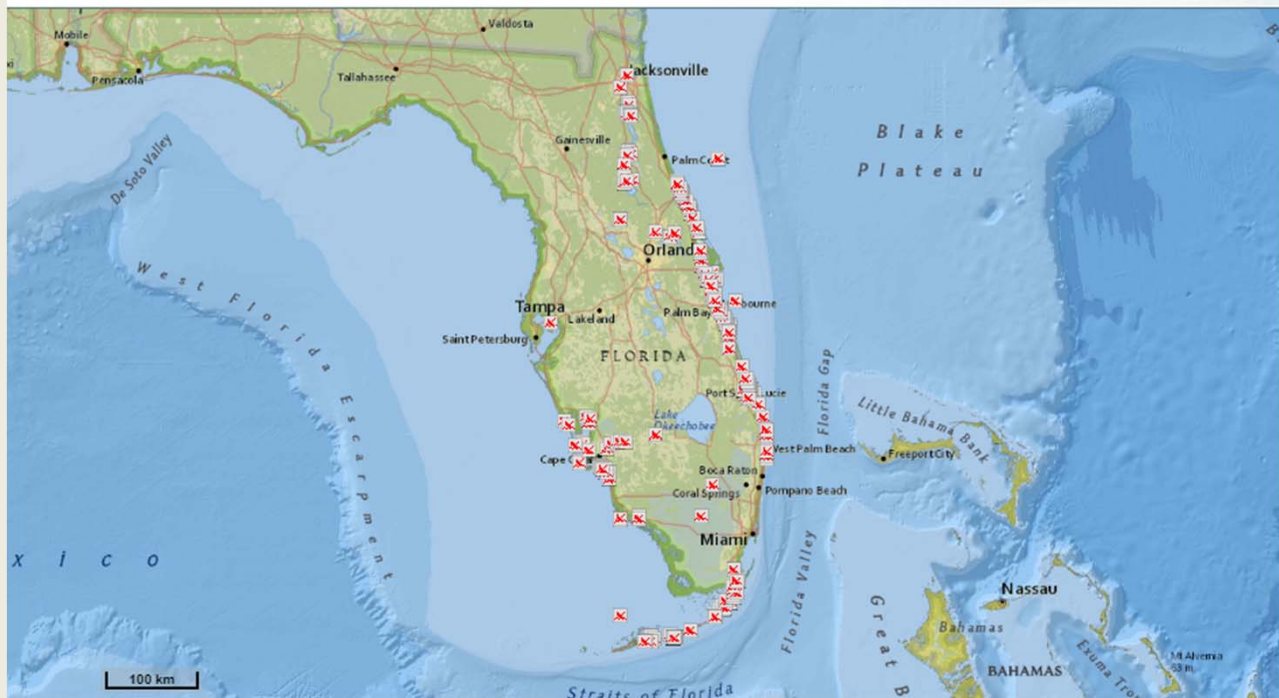
- ESF-10 Field Assessment by Status (EPA Survey123)
- Assessed
 - Recovery Complete
 - Removal Complete
 - Recovery in Progress
 - Removal in Progress
 - Transfer Complete
 - Transfer in Progress
 - Unknown (Not Prev. Assessed)
 - Not Found (Prev. Assessed)

Esri Light Gray Canvas

Scale: 1 : 4,339,357 Zoom Level: 6.5 Location: 30.9415°, -76.3806°

Identified Vessels by State of FL 09-28-17

ERMA® | Environmental Response Management Application
Gulf of Mexico



FWC DLE Identified Derelict Vessels (FWC DLE)
FWC DLE Identified Derelict Vessels (FWC DLE)
FWC DLE Identified DV

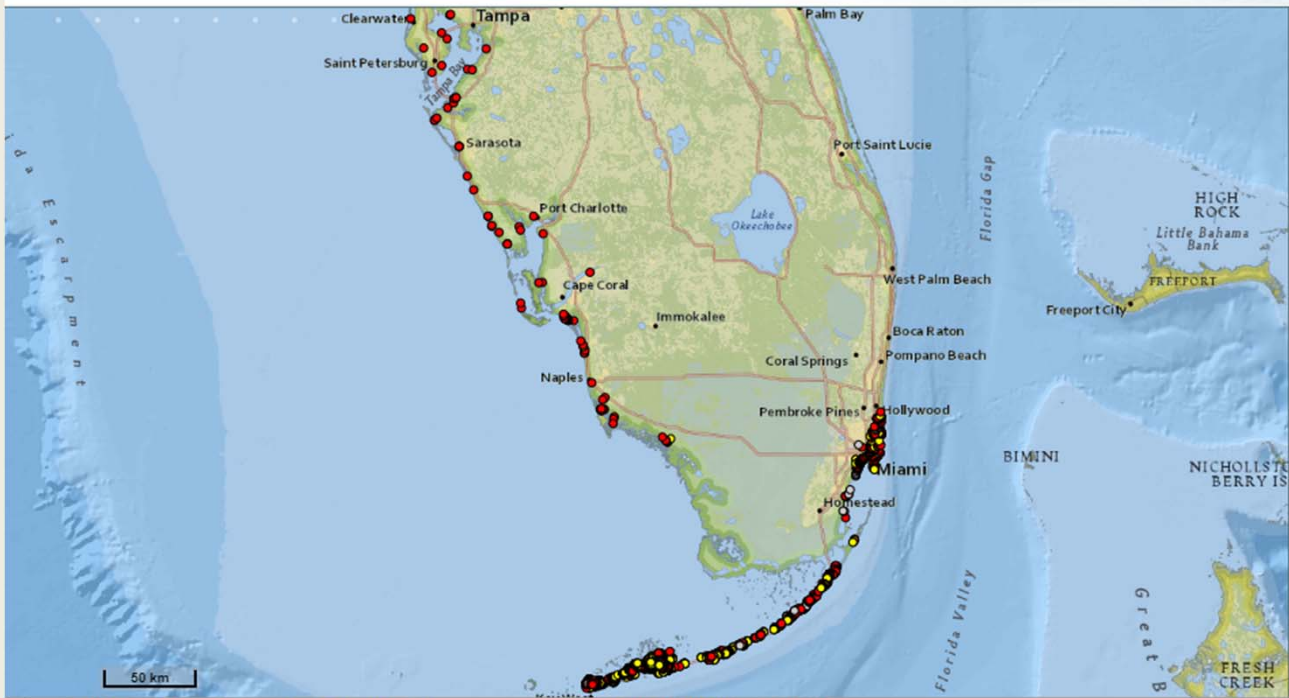


Esri National Geographic
Esri National Geographic

Scale: 1 : 4,339,725 Zoom Level: 6.5 Location: 25.3462°, -74.1846°

Identified Debris from Imagery 09-28-17

ERMA® | Environmental Response Management Application
Gulf of Mexico



Identified Debris, Florida - Post Hurricane Irma 9-26-17 (RPI)

Identified Debris, Florida - Post Hurricane Irma 9-26-17 (RPI)

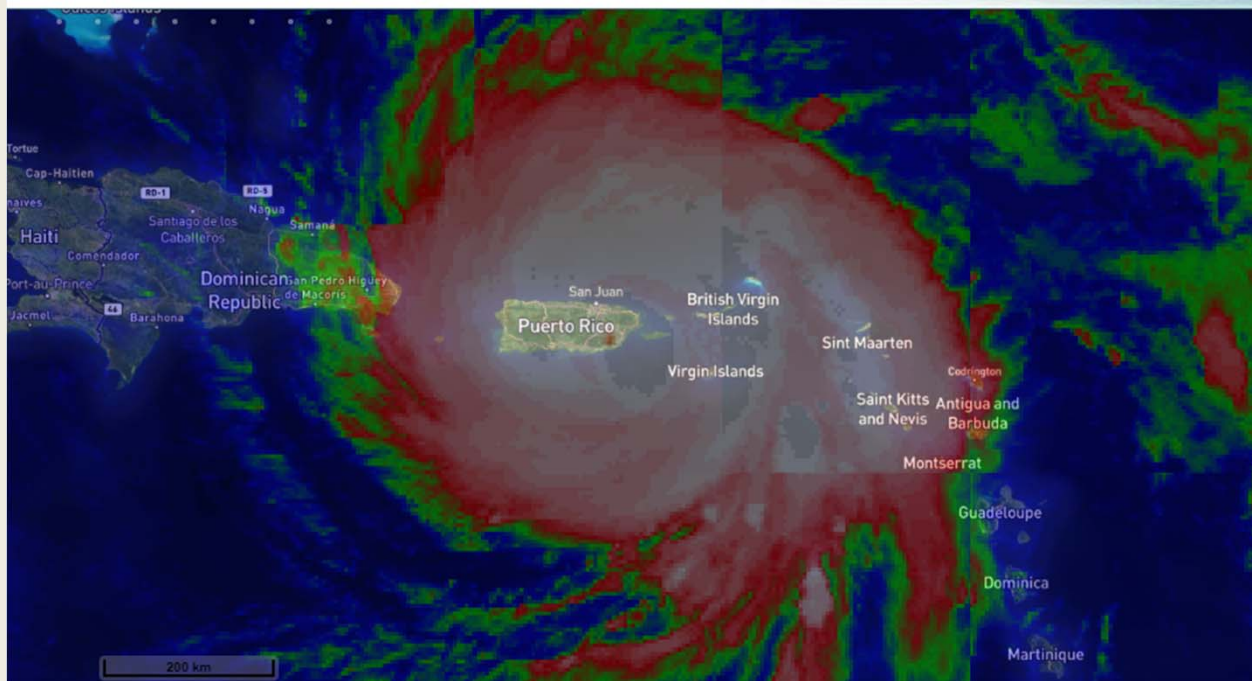
- Automotive
- Construction
- Debris Pile
- Trailer
- Unknown
- Vessel
- Oil Hazmat Container

Esri National Geographic
Esri National Geographic

Scale: 1 : 2,195,465 Zoom Level: 7.5 Location: 28.0153°, -77.8039°

Maria Landfall, 9/20 @ 8:00 am

ERMA® | Environmental Response Management Application
Caribbean



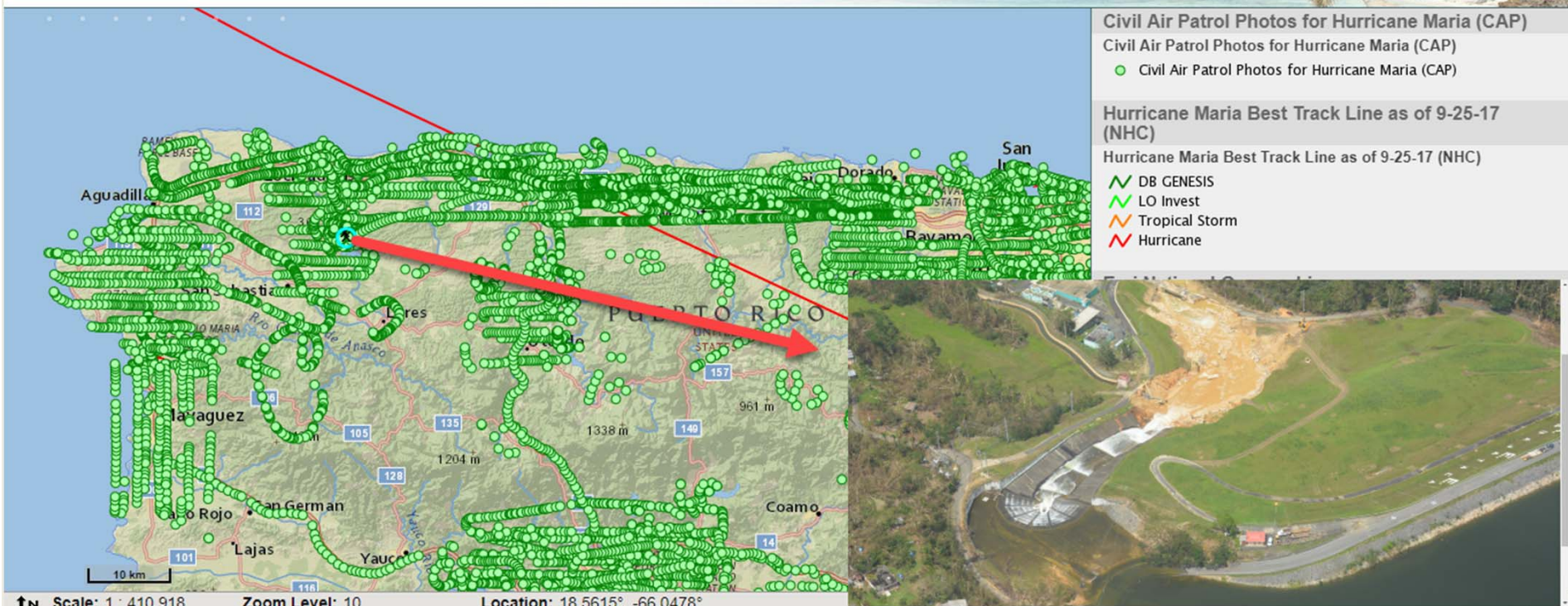
Global GOES IR Rainbow display (RealEarth)
Global GOES IR Rainbow display (RealEarth)
Global Infrared - Rainbow (C)
40 20 0 -20 -40 -60 -80

MapBox Hybrid Imagery
MapBox Hybrid Imagery

Scale: 1 : 4,521,310 Zoom Level: 6.54290167916289 Location: 14.8748°, -67.1668°

Civil Air Patrol Photos Post Maria, Guajataca Dam

ERMA® Environmental Response Management Application
Caribbean



EPA Region 2 Response Manager Feeds 09-29-17

ERMA® | Environmental Response Management Application
Caribbean



Pesticide Facility Assessments (zoom dependent) (EPA RM)

- Assessed: Follow-up
- Assessed: Follow-up
- Not Yet Assessed

SPCC Facilities (zoom dependent) (EPA RM)

SPCC Facilities (zoom dependent) (EPA RM)

- Assessed: Follow-Up
- Assessed: No Follow-Up
- Not Yet Assessed

RMP Facility Assessments (zoom dependent) (EPA RM)

RMP Facility Assessments (zoom dependent) (EPA RM)

- Assessed: Follow-Up
- Assessed: No Follow-Up
- Not Yet Assessed

Drinking Water Facility Assessments (zoom dependent) (EPA RM)

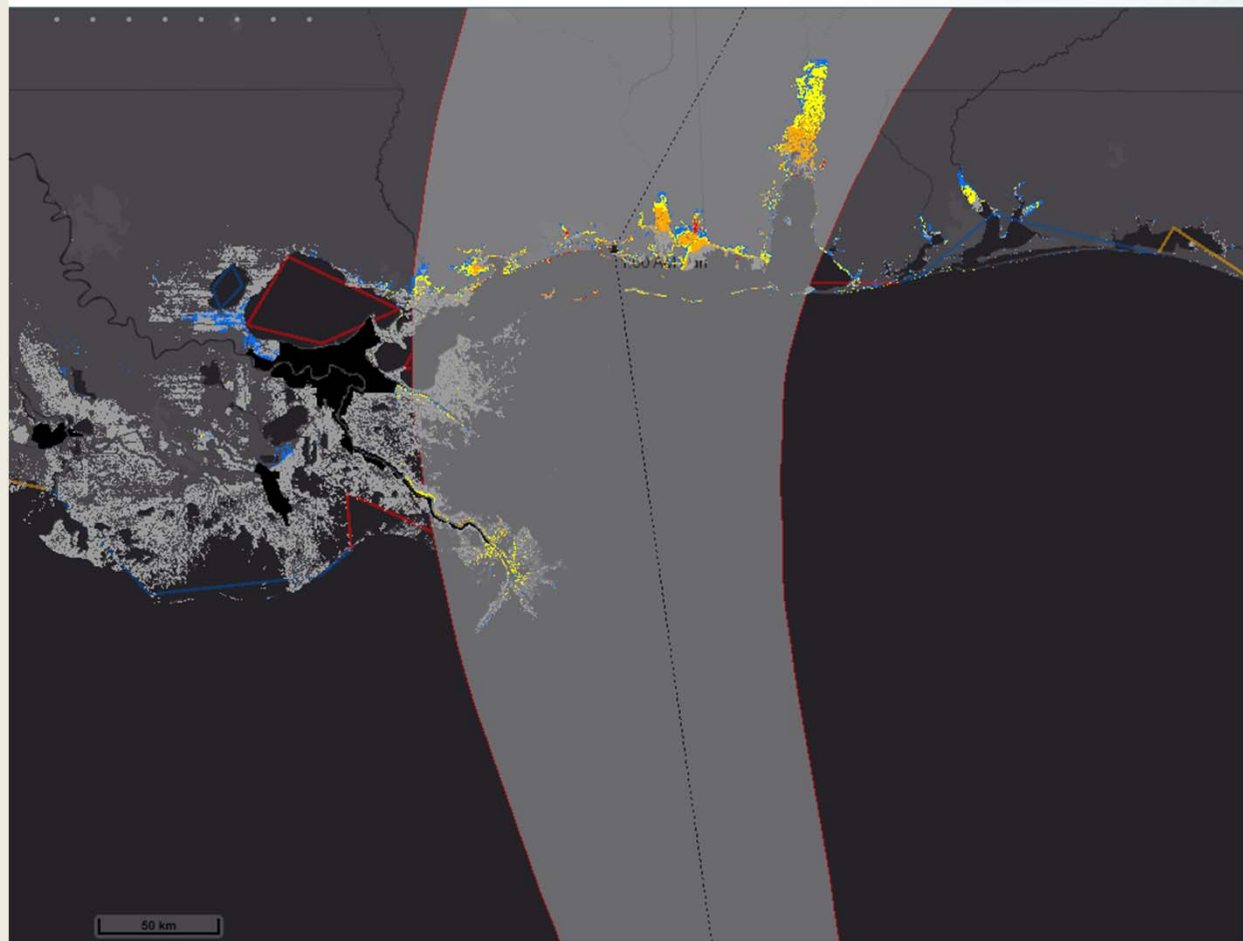
Drinking Water Facility Assessments (zoom dependent) (EPA RM)

- Fully Operational
- Operational w/ Restrictions
- Non-Operational
- Not Yet Assessed

Scale: 1 : 882,296 Zoom Level: 8.9000000000000000 Location: 17.8151°, -64.8155°

Nate, Potential Storm Surge Flooding 10/7@8am

ERMA® Environmental Response Management Application
Gulf of Mexico



Potential Storm Surge Flooding - With Intertidal Mask (visible through zoom level 12 only) (NOAA)
Potential Storm Surge Flooding - With Intertidal Mask (visible through zoom level 12 only) (NOAA)

- Potential Storm Surge Flooding Map Boundary
- Potential Storm Surge Flooding Map Not Presently Available
 - Potential Storm Surge Flooding Map Boundary

- Levee Areas
- Levee Area - Contact local officials for flood risk

Potential Storm Surge Flooding - With Intertidal Mask

Image

- Less than 1 foot above ground
- Greater than 1 foot above ground
- Greater than 3 feet above ground
- Greater than 6 feet above ground
- Greater than 9 feet above ground
- Levee Area - Contact local officials for flood risk
- Intertidal Zone/Estuarine Wetland

sat 2017-10-07 11:46 UTC

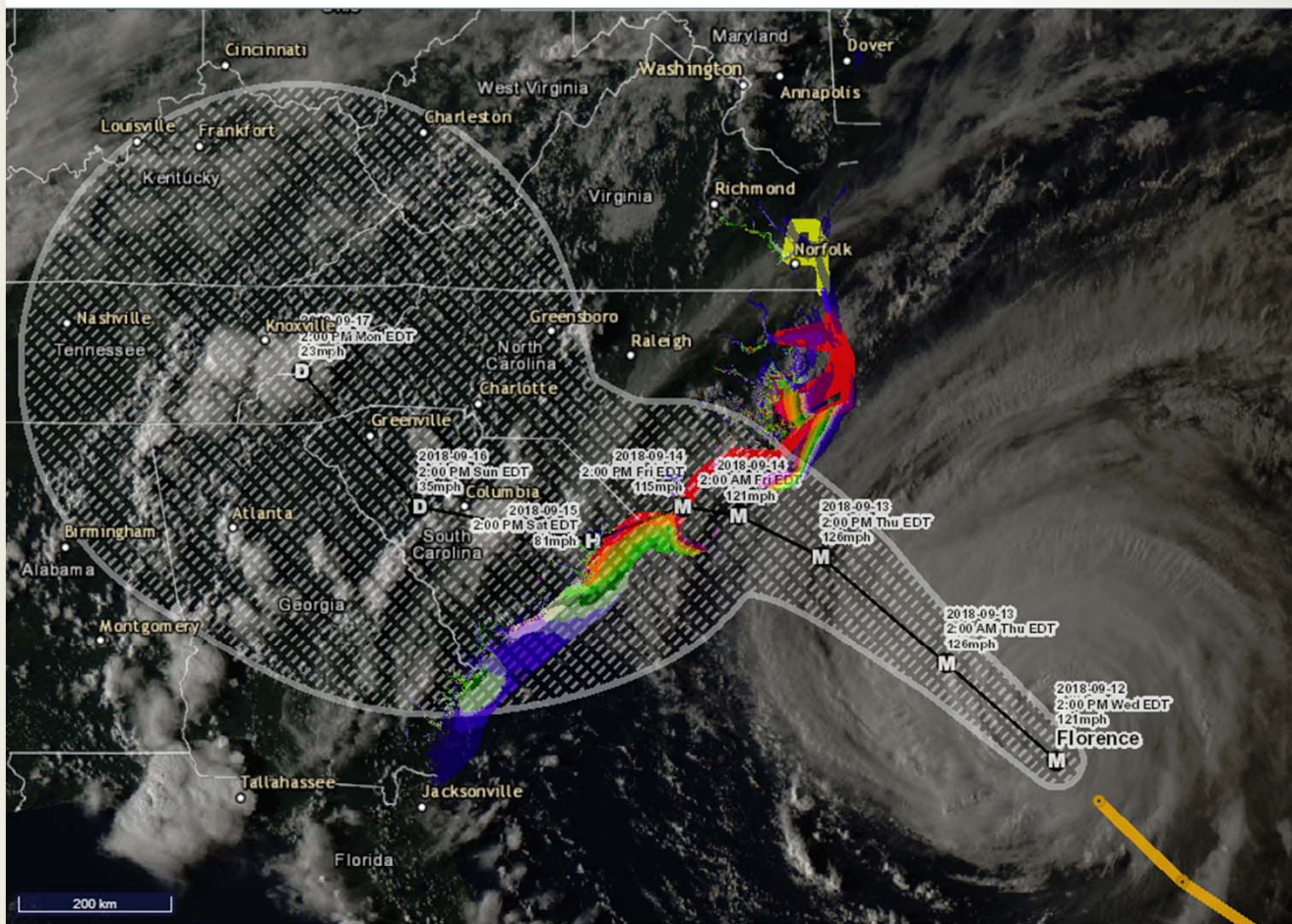
IDP Hurricanes

- IDP Hurricanes
- Post-Tropical Cyclone
 - Tropical Cyclone
 - 72
 - 120
 - Day 1-3
 - Day 4-5
 - Hurricane Watch
 - Hurricane Warning
 - Tropical Storm Watch
 - Tropical Storm Warning
 - AT1 Past Points
 - AT1 Past Track
 - Post-Tropical Cyclone

Scale: 1 : 1,506,486 Zoom Level: 8 Location: 30.9253°, -86.0800°

Florence, GOES East Visible and Probabilistic Storm Surge : 9/12/18, 18:00

ERMA® Environmental Response Management Application
Atlantic



Reference Features and World Boundaries/Places
Reference Features and World Boundaries/Places
World Boundaries and Places

P-Surge Probabilistic Hurricane Storm Surge (NOAA)
P-Surge Probabilistic Hurricane Storm Surge (NOAA)

1; 2
3; 4
5; 6
7; 8
9; 10
11; 12
13; 14
15; 16
17; 18
19; 20; 21; 22
23; 24; 25; 26
27; 28
29; 32; 35

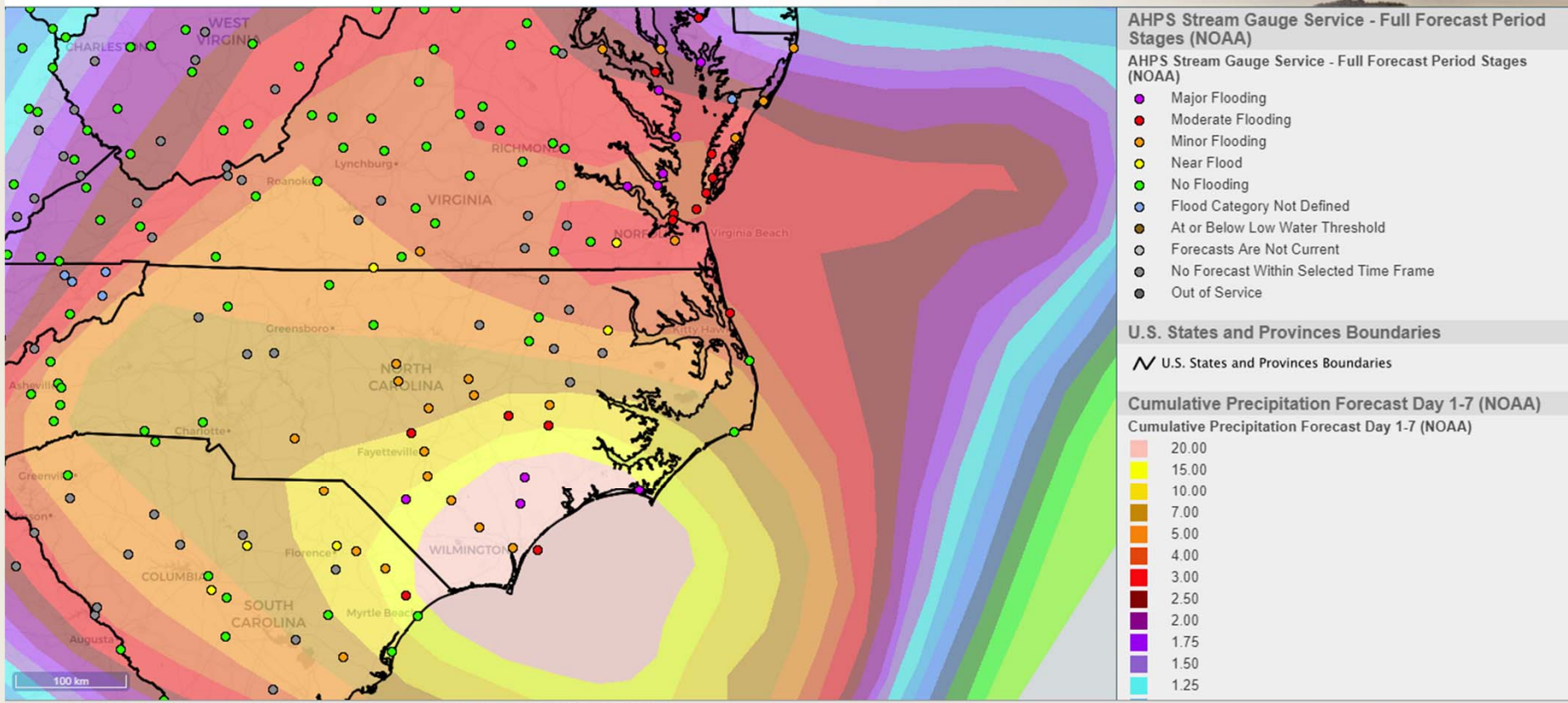
Hurricane and Cyclone Forecast Track (non-NOAA)
Hurricane and Cyclone Forecast Track (non-NOAA)

- Tropical Low
- Tropical Depression
- Tropical Storm
- Hurricane
- Major Hurricane
- Observed Position
- Forecast Track
- Low
- Tropical Storm
- Hurricane1

Scale: 1 : 4,971,737 Zoom Level: 6.2 Location: 39.4384°, -69.0341°

Florence, Stream Gauge Flooding Forecast and 7-day Cumulative Precipitation Forecast : 9/13/18

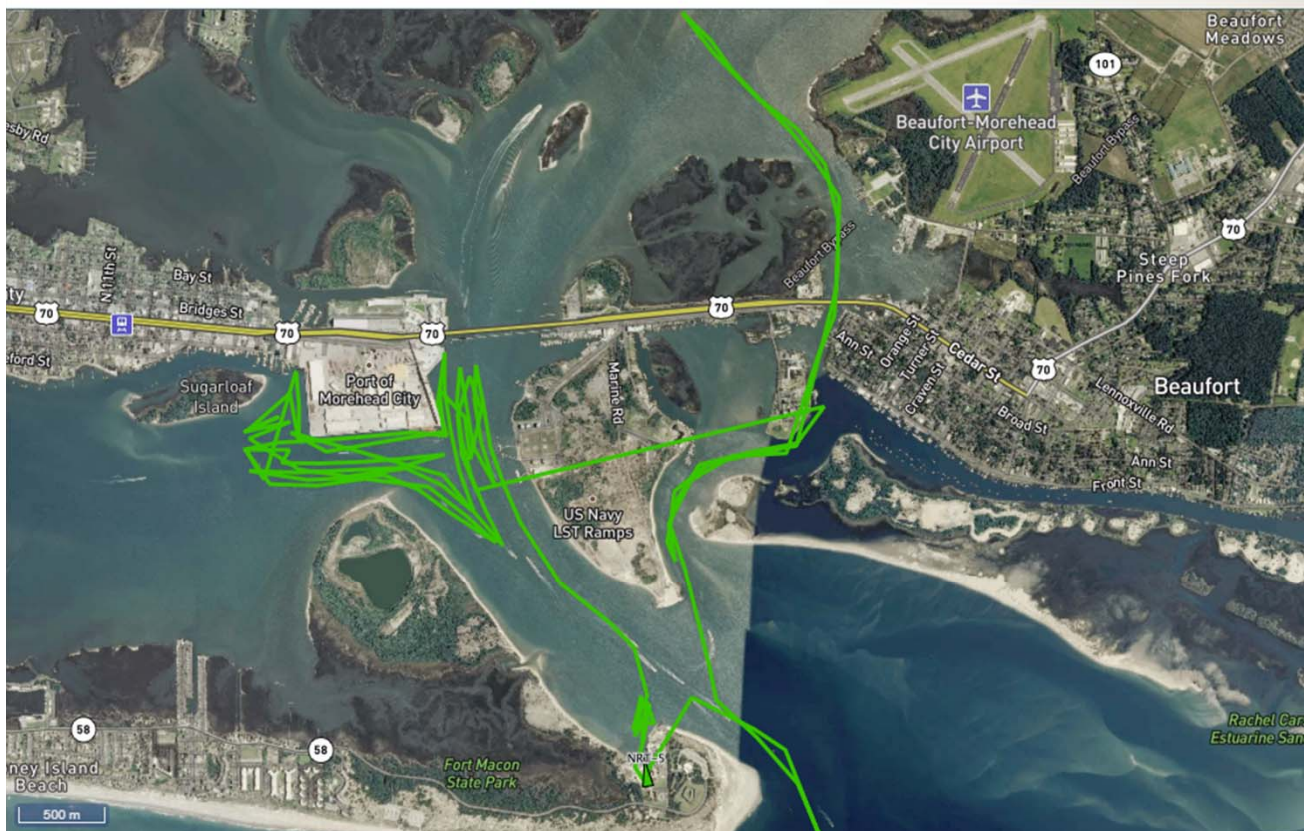
ERMA® | Environmental Response Management Application
Atlantic



Scale: 1 : 2,806,787 Zoom Level: 7.0 Location: 38.6469°, -77.7063°

Florence, NRT-5 transit : 9/17/18, 08:00-16:00

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Atlantic



NAIS - NOAA Navigation Response Teams (NRT)

NAIS - NOAA Navigation Response Teams (NRT)

▢ Vessel Group

NAIS - NOAA NRT Tracklines (last 8 hours)

NAIS - NOAA NRT Tracklines (last 8 hours)

⤿ Vessel Group

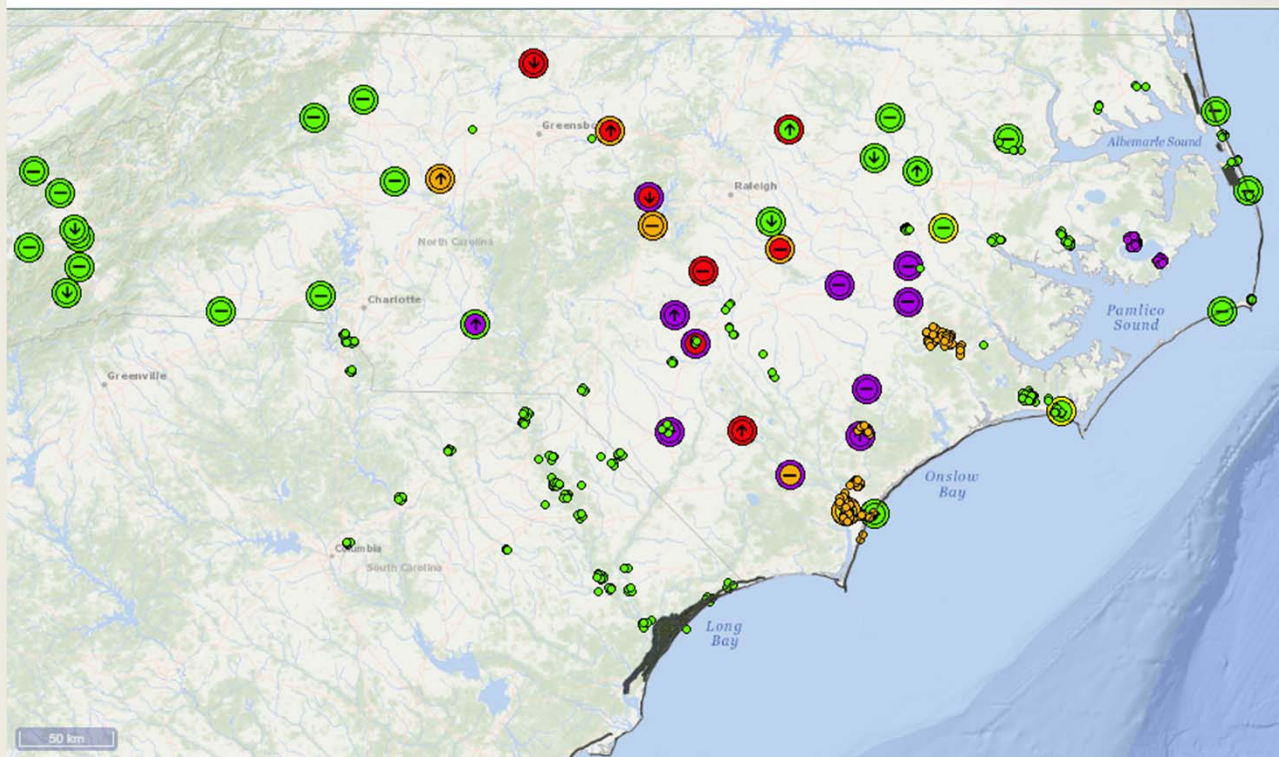
MapBox Hybrid Imagery

MapBox Hybrid Imagery

↑N Scale: 1 : 22,238 Zoom Level: 14.0 Location: 34.7125°, -76.6472°

Florence, NOAA NGS Photography, CAP Photography and NC Stream Gauge Status, 9/18/18

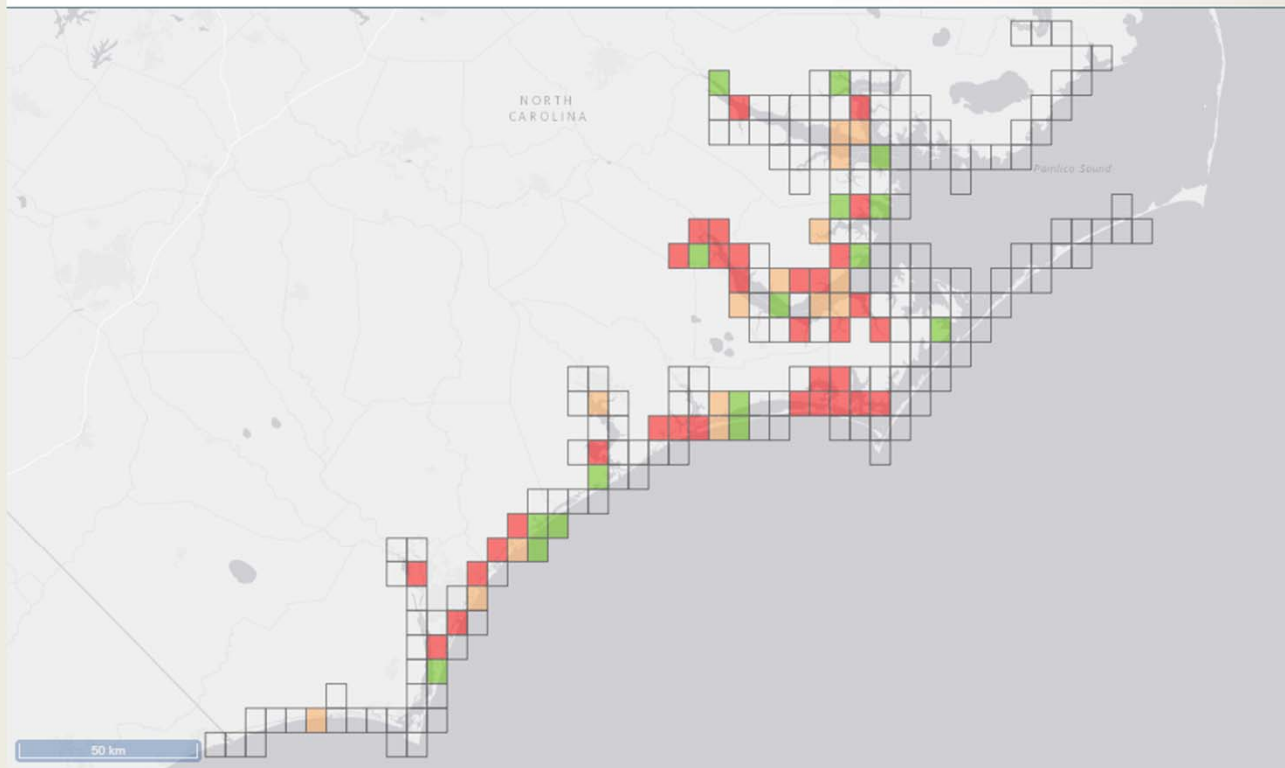
ERMA® | Environmental Response Management Application
Atlantic



Scale: 1 : 2,009,598 Zoom Level: 7.5 Location: 35.6943°, -76.0809°

Florence, ESF-10 Sensitive Site status grid: 10/12/18

ERMA® Environmental Response Management Application
Atlantic



USCG Sensitive Site Grid Status

USCG Sensitive Site Grid Status

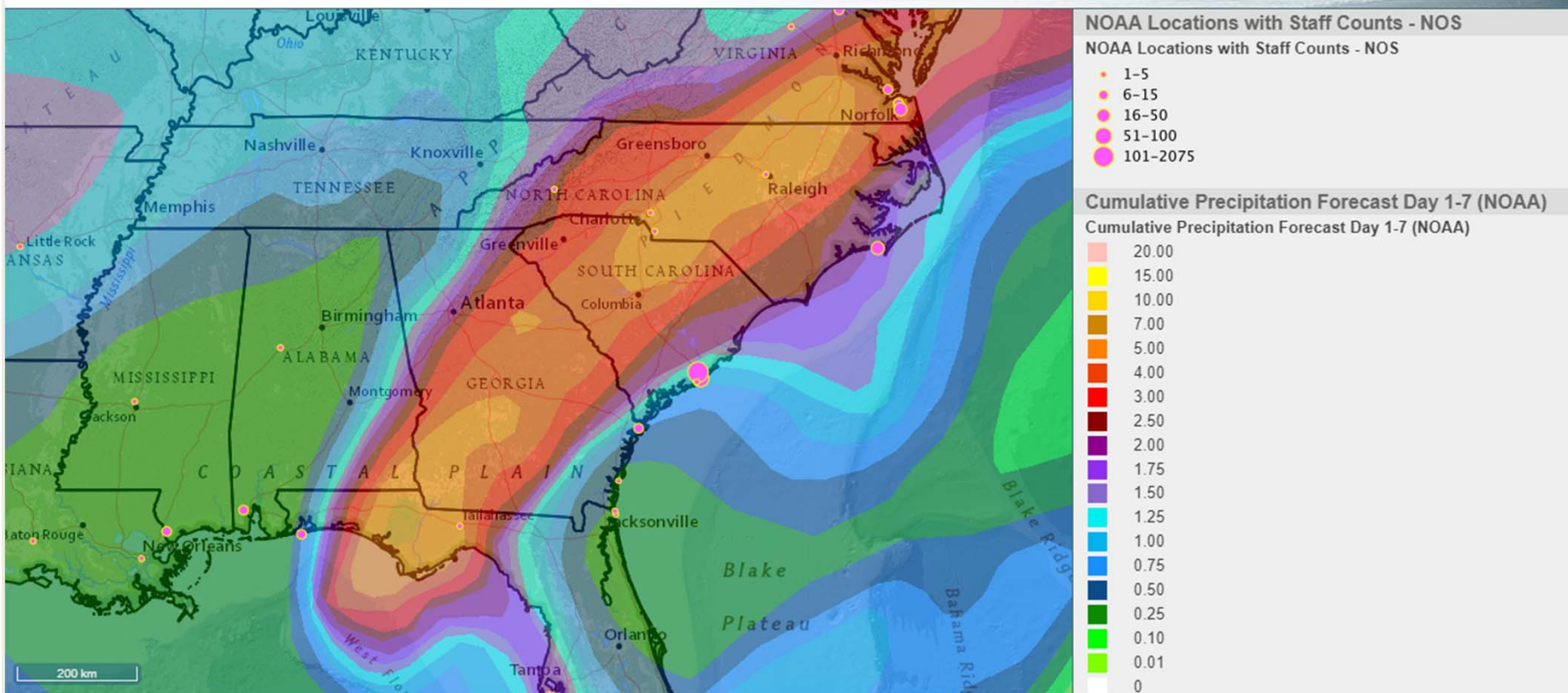
- ✓ No Sites
- No Sensitive Sites
- Has Potentially Sensitive Sites
- Has Sensitive Sites

Esri Light Gray Canvas

↑N Scale: 1 : 1,005,917 Zoom Level: 8.5 Location: 34.4962°, -75.3448°

Hurricane Michael

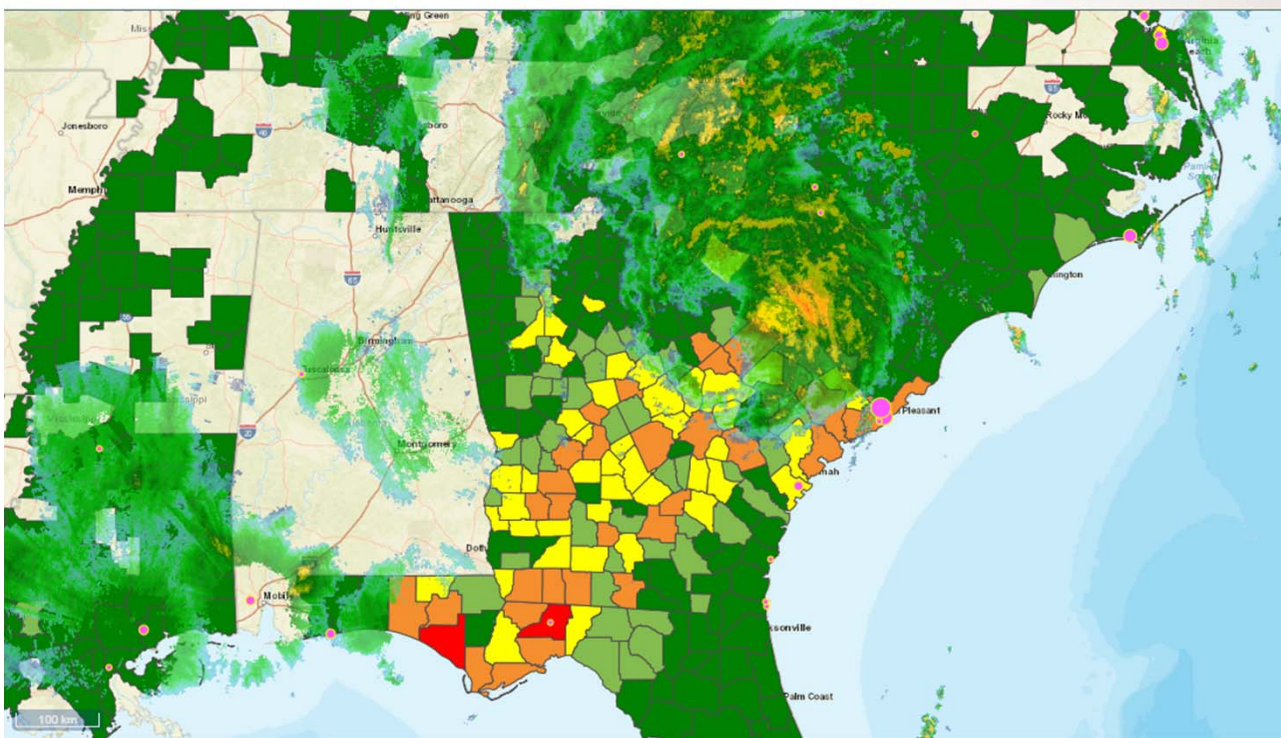
ERMA® Environmental Response Management Application
Gulf of Mexico



Scale: 1 : 5,798,189 Zoom Level: 6.0 Location: 38.0221°, -73.4875°

Hurricane Michael

ERMA® Environmental Response Management Application
Atlantic



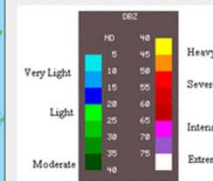
NOAA Locations with Staff Counts - NOS

NOAA Locations with Staff Counts - NOS

- 1-5
- 6-15
- 16-50
- 51-100
- 101-2075

NEXRAD Radar Current Base Reflectivity (IA State)

NEXRAD Radar Current Base Reflectivity (IA State)



Eagle-I Current Electrical Outages (# customers) (ORNL)

Eagle-I Current Electrical Outages (# customers) (ORNL)

- 0 - 500
- 501 - 1500
- 1501 - 5000
- 5001 - 25000
- > 25001

Esri Street Maps

Scale: 1 : 4,097,071 Zoom Level: 6.5 Location: 36.0625°, -74.9972°

Hurricane Michael

ERMA® Environmental Response Management Application
Gulf of Mexico



Scale: 1 : 1,718,529 Zoom Level: 7.8 Location: 31.6042°, -82.8804°

Civil Air Patrol Photos for Hurricane Michael (CAP)

- 📍 Heading + Offset
- 📍 No Heading
- 📍 Aerial Nadir
- 📍 Heading + Offset
- 📍 No Heading

Hurricane Michael NICB Aerial Imagery (NICB)

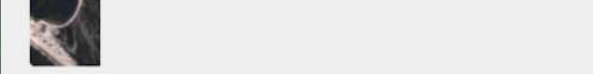


Hurricane Michael NOAA Imagery 2018-10-14a

Hurricane Michael NOAA Imagery 2018-10-14a

Hurricane Michael NOAA Imagery 2018-10-11

Hurricane Michael NOAA Imagery 2018-10-11



Esri National Geographic

Hurricane Michael NOAA Imagery 2018-10-12b

Hurricane Michael NOAA Imagery 2018-10-12b

Hurricane Michael NOAA Imagery 2018-10-11

Hurricane Michael NOAA Imagery 2018-10-11

