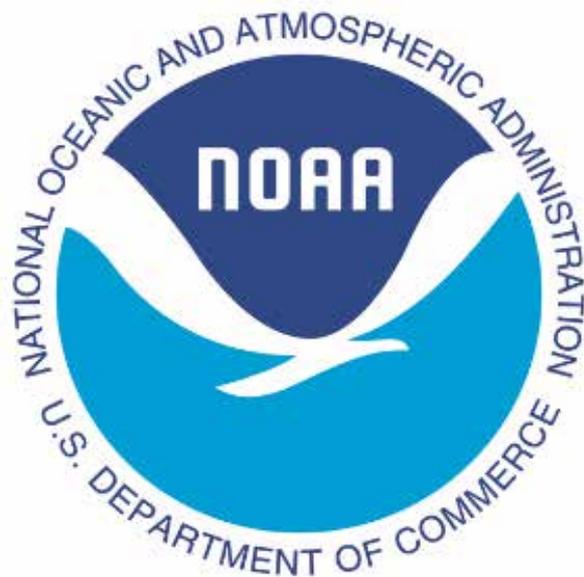




Building a Weather-Ready Nation



2016 Hurricane Season Outlook



**American
Red Cross**



Building a Weather-Ready Nation

2016 Hurricane Season Outlook

Manson K. Brown, P.E.

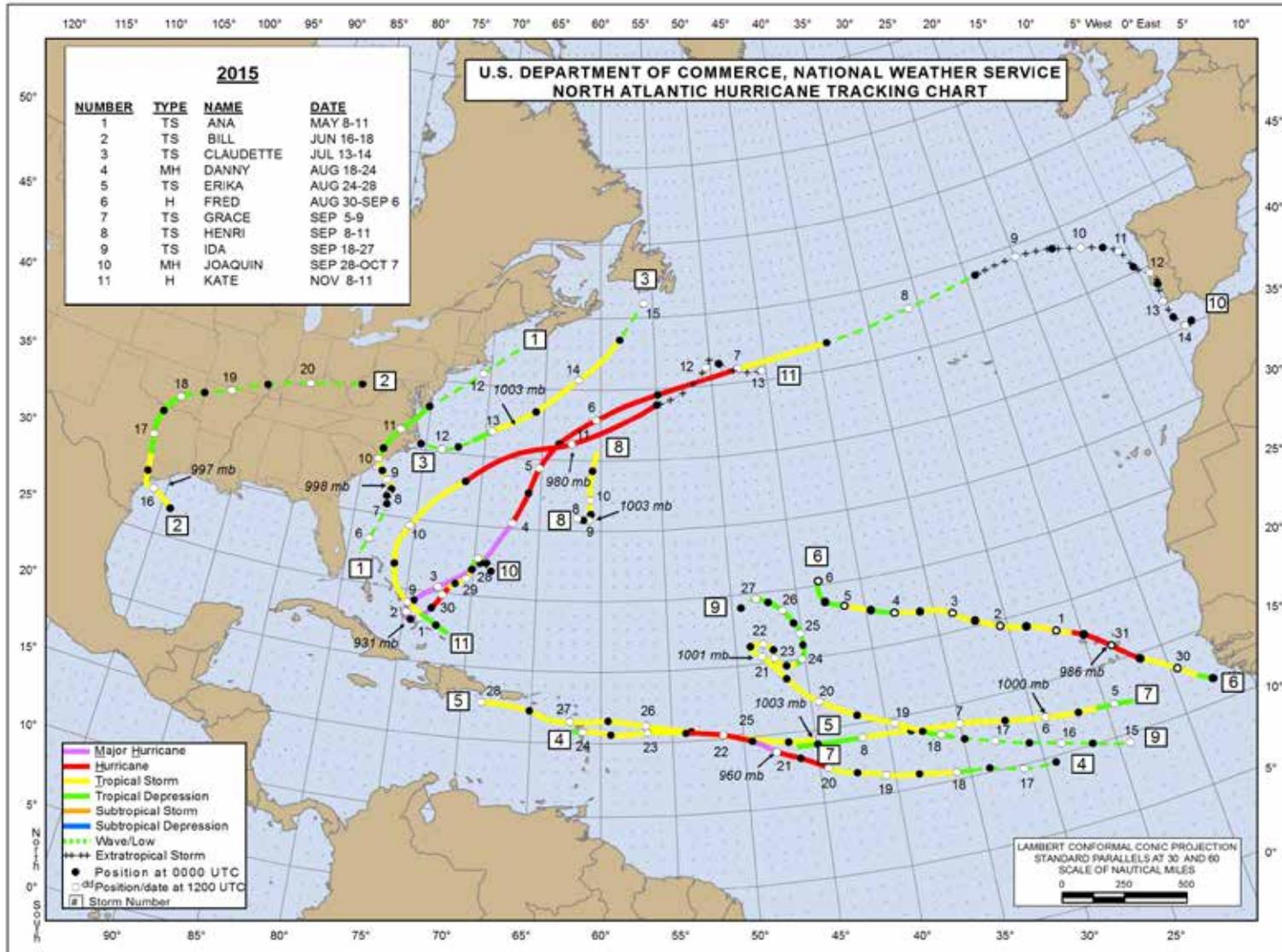
**Assistant Secretary of Commerce for
Environmental Observation and Prediction
and Deputy Administrator of NOAA**

June 1, 2016



Review of 2015 Atlantic Hurricane Season

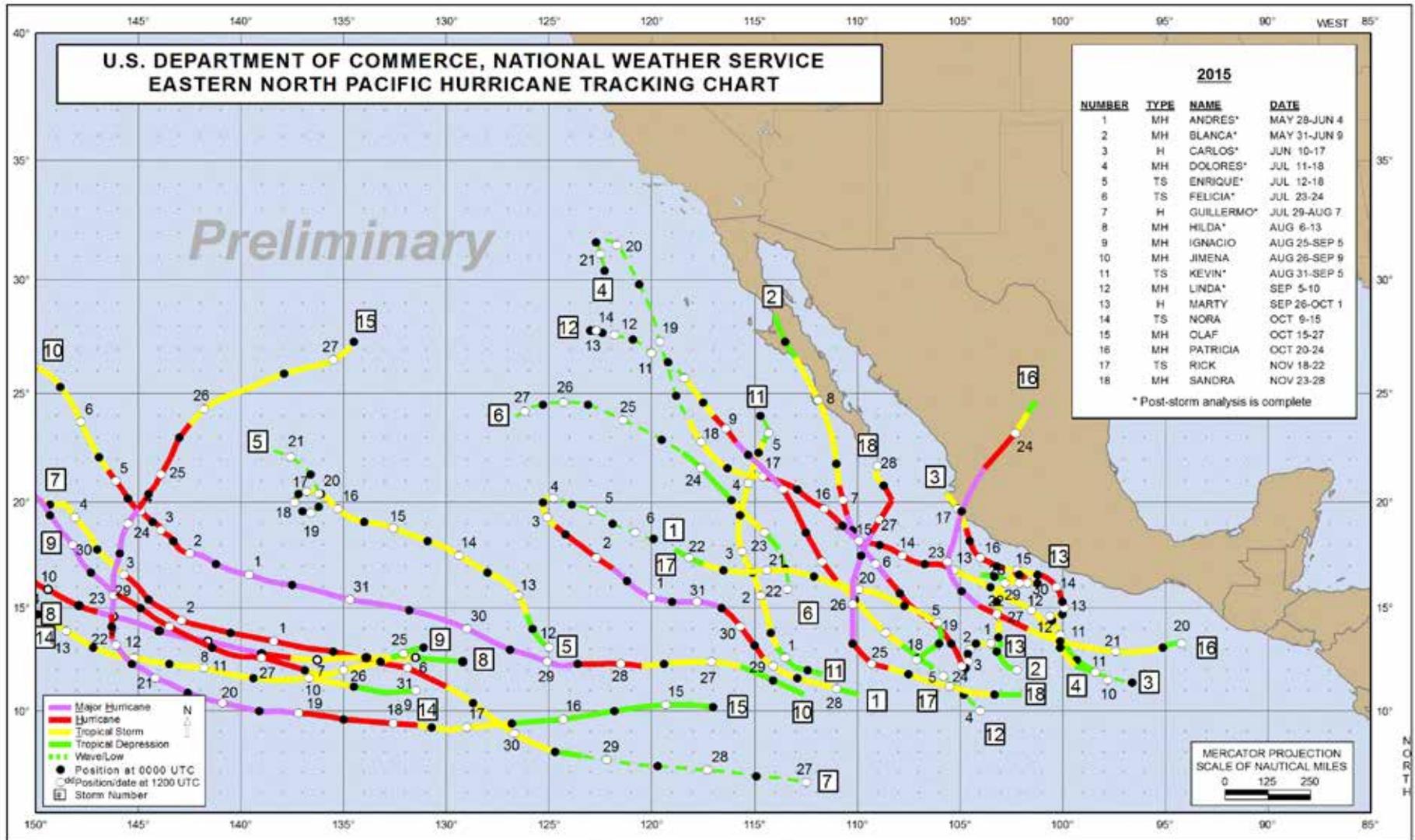
Below-Normal Atlantic Season in 2015





Review of 2015 Eastern Pacific Hurricane Season

Above-Normal Eastern Pacific Season in 2015

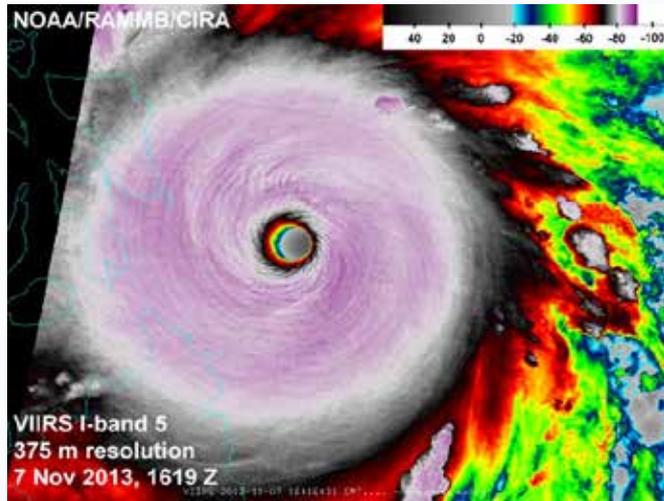




Notable Cyclones from 2015 Pacific Hurricane Seasons

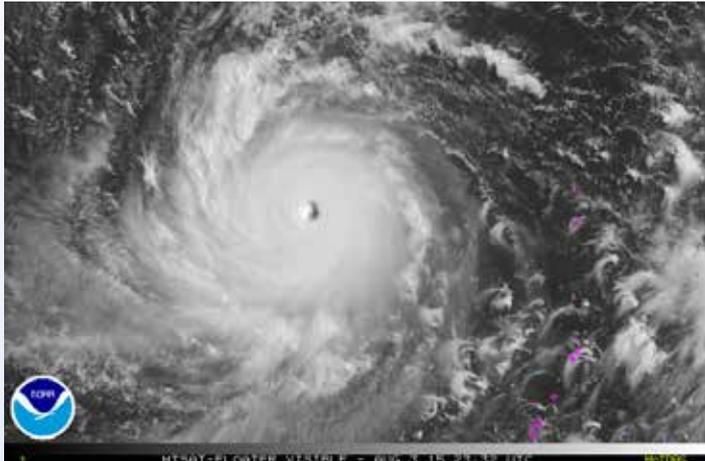
Hurricane Patricia (Oct. 20-25, 2015)

- Struck southwest Mexico as a Cat 4, but reached Cat 5 before landfall
- Strongest hurricane ever recorded in either North Atlantic or North Eastern Pacific basins.



Typhoon Soudelor (Jul 29-Aug 12, 2015)

- Struck Saipan (CNMI) as a Cat 2. Later reached Cat 5 strength.
- Most destructive storm to hit Saipan in 29 years.





2016 Hurricane Season Outlook

Central Pacific
Near-Normal (40%)
4-7 Tropical Cyclones

Eastern Pacific
Near-Normal (40%)
13-20 Named Storms
6-11 Hurricanes
3-6 Major Hurricanes

Atlantic
Near-Normal (45%)
10-16 Named Storms
4-8 Hurricanes
1-4 Major Hurricanes



Comparing the 2016 Atlantic Outlook to Last Year

A Near-Normal Atlantic season is most likely in 2016

Season Activity and Type	2016 Outlook	May 2015 Outlook (Actual Observed)	1981-2010 Averages
Chance Above Normal	30%	10%	
Chance Near Normal	45%	20%	
Chance Below Normal	25%	70% (Below-Normal)	
Total Named Storms	10-16	6-11 (11)	12
Hurricanes	4-8	3-6 (4)	6
Major Hurricanes	1-4	0-2 (2)	3
ACE - Accumulated Cyclone Energy (%Median)	65-140	40-85% (62%)	100%

Note: This is not a forecast of hurricane landfalls.

There is a 70% probability for each of the predicted ranges.

This year's hurricane outlook is more challenging than most years, due to uncertainty about how environmental conditions will interact this summer and into the fall.

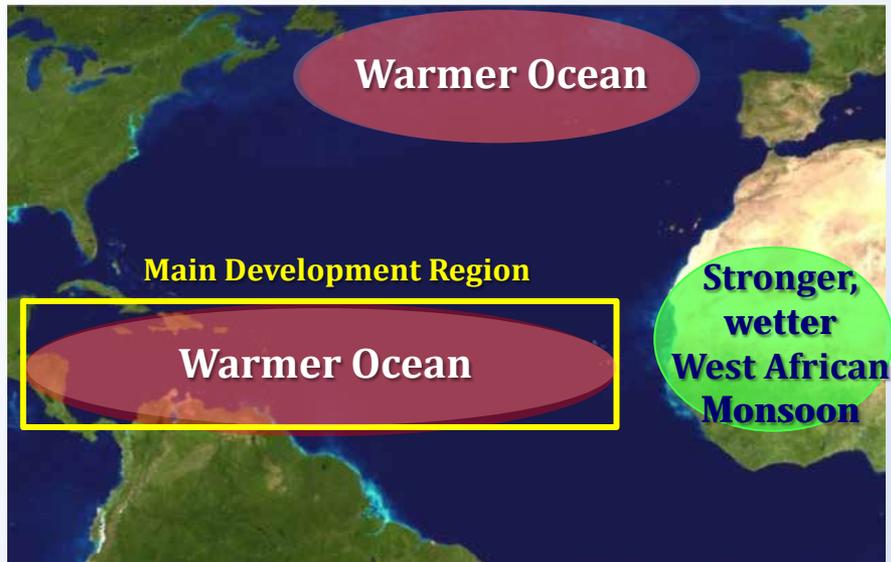


2016 Atlantic Hurricane Season Outlook

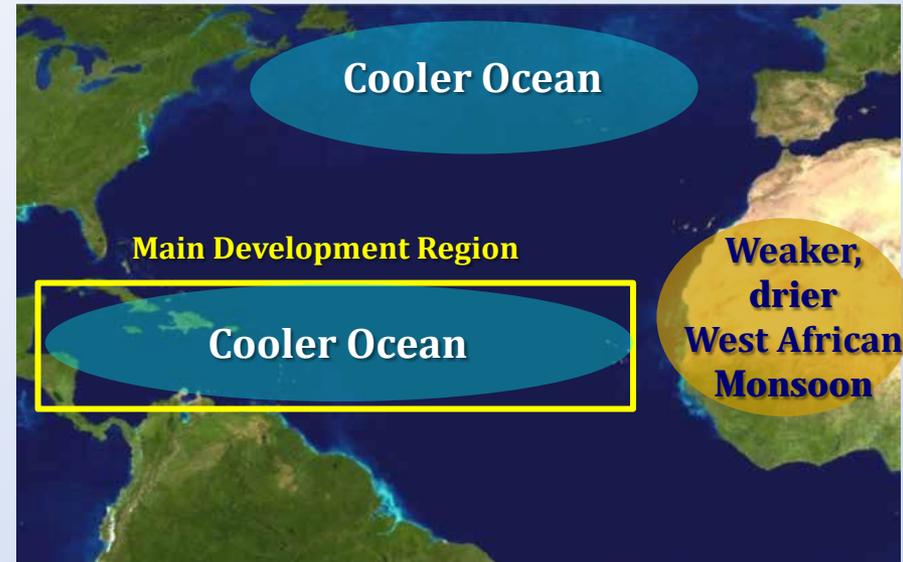
Uncertain Atlantic Ocean Temperature Patterns in 2016

Atlantic Multi-Decadal Oscillation (AMO):
Multi-decadal fluctuations in Atlantic hurricane activity

Climate Pattern for High-Activity Era
Warm Phase of AMO



Climate Pattern for Low-Activity Era
Cool Phase of AMO

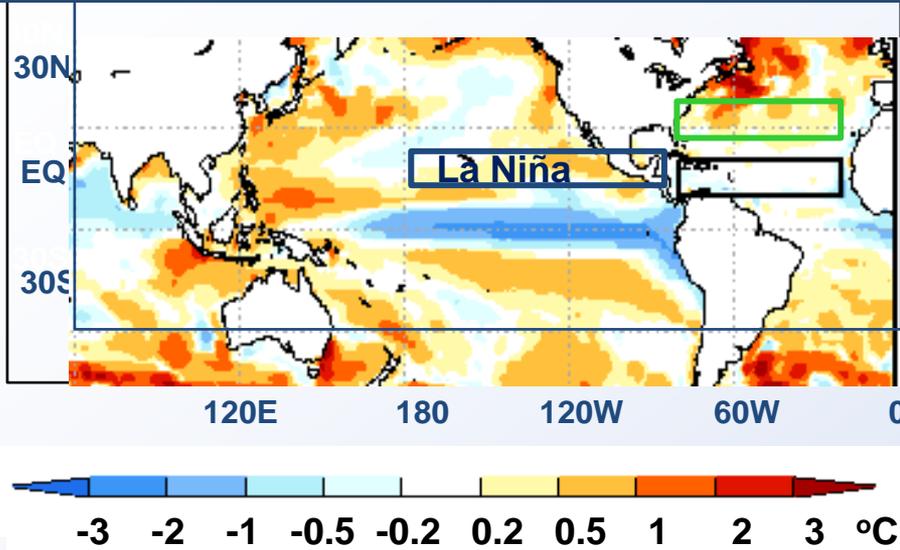


The AMO sets the backdrop upon which other climate phenomena such as El Niño and La Niña overlay. Due to considerable variability in the AMO during the last three years, it is unclear whether the warm phase AMO (Left) will return this season, or if the Atlantic has shifted into the cold AMO phase (Right). Therefore, it is uncertain whether there will be reinforcing or competing climate factors this season. The AMO is a multi-decadal signal and hard to discern over a short time period.



2016 Atlantic Hurricane Season Outlook

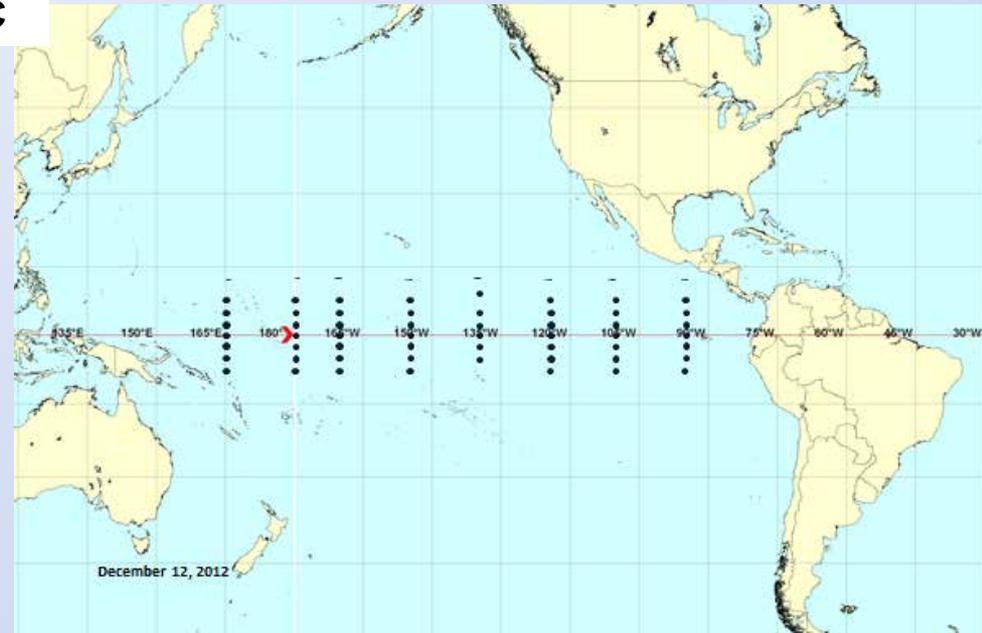
Uncertain Strength and Timing of Transition to La Niña



Sea Surface Temperature (SST) Anomaly Forecast

Predicted sea surface temperature (SST) anomalies (°C) for August-October 2016, from NOAA's high-resolution (T-382) Climate Forecast System (CFS). Anomalies are departures from the 1981-2010 means.

Tropical Ocean and Global Atmosphere (TAO) Array -- 55 Stations





What's New for 2016?

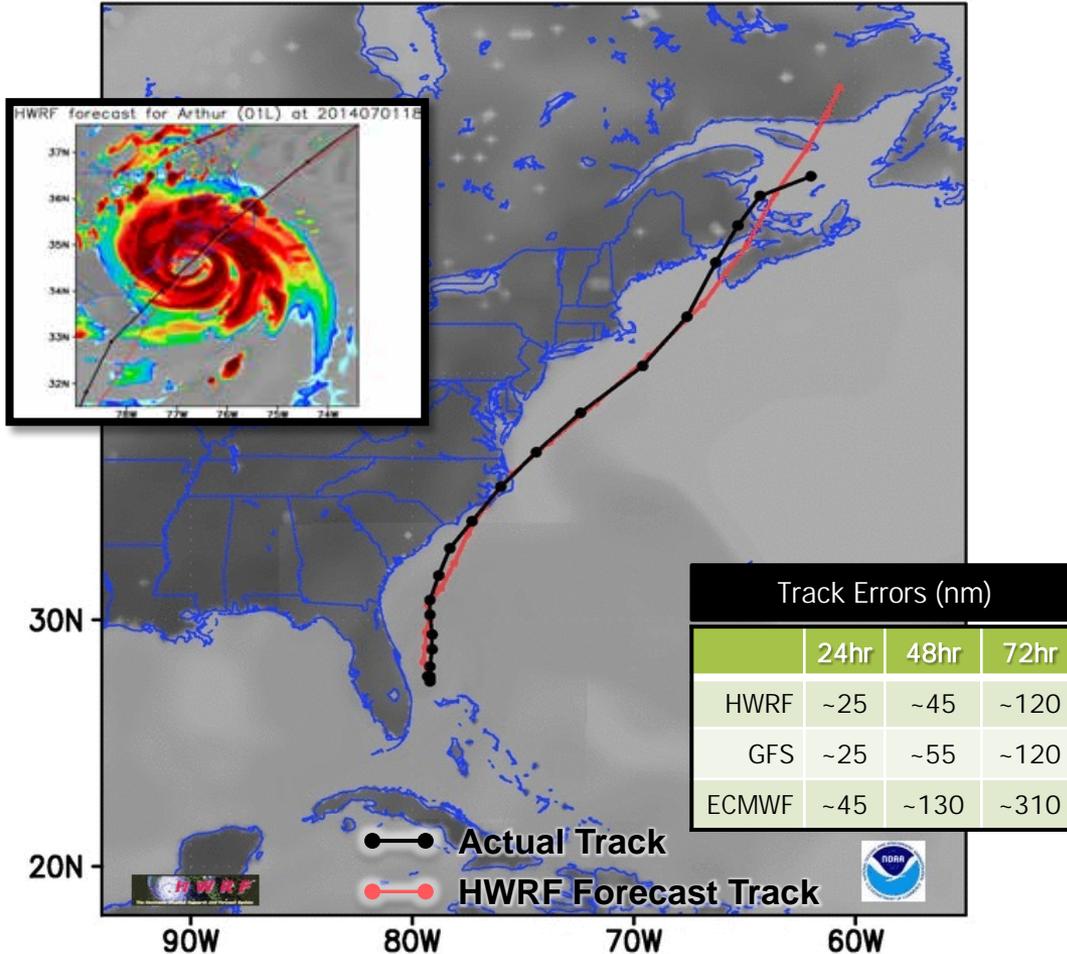
- **Potential Storm Surge Flooding graphics have gone operational.**
- **Second year of Experimental Storm Surge Watch/Warning product and graphics.**
- **Major upgrade to NOAA's supercomputing capacity.**
- **National Water Model for inland flooding.**
- **GOES-R Launch later this year**

Supports NOAA's goal to improve environmental intelligence for better decision-making and stronger community resilience.



Improvements to Hurricane Prediction Models

HWRF Forecast Track & Forecast Radar Reflectivity for Hurricane Arthur (18z 01 JUL 14)

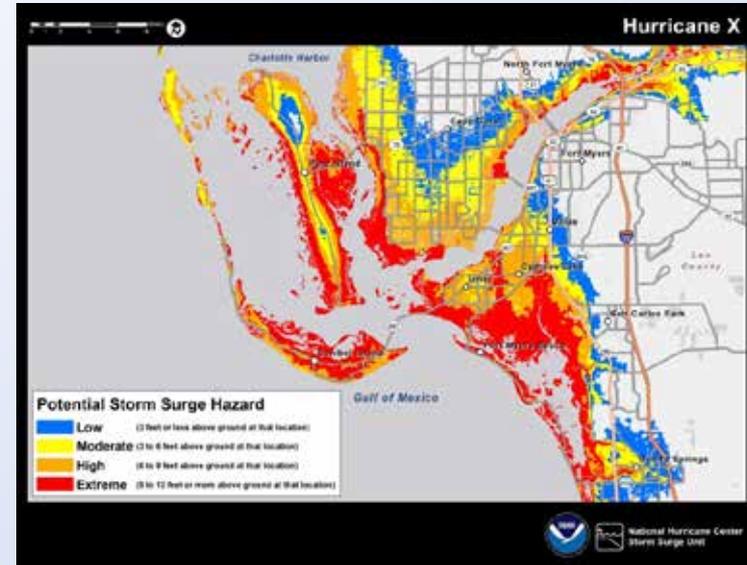


- Major upgrade to NOAA's supercomputing system earlier in 2016, funded by the 2013 Sandy Supplemental.
- Upgrade to NOAA's Global Forecast System (GFS) provides us hourly forecast guidance (up from every 3 hours) 5 days out.
- Recent enhancements to NOAA's HWRF model have made it our best-performing intensity model over the 2013-15 period.



Potential Storm Surge Flooding Map

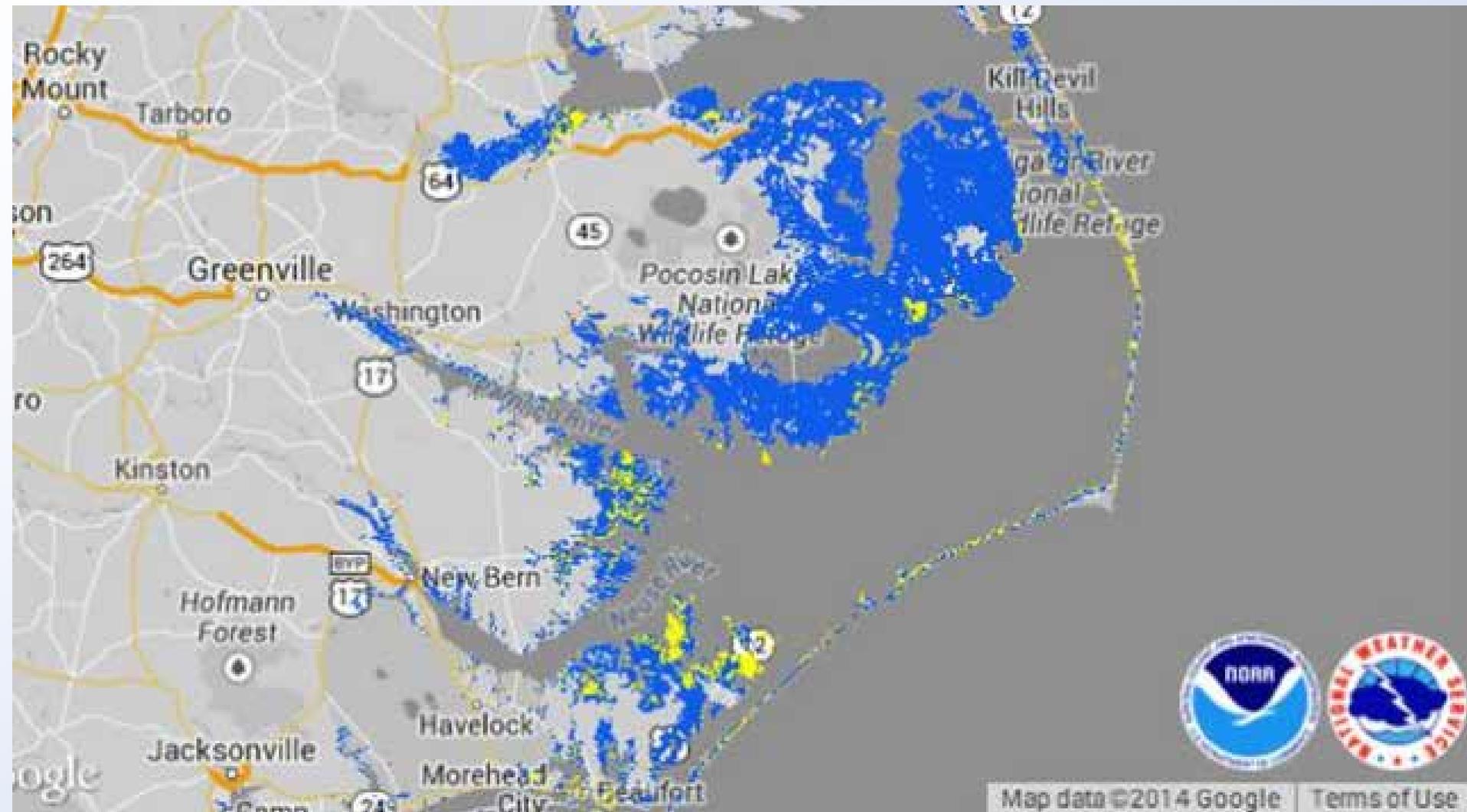
- Operational in 2016
- Highlights areas where inundation from storm surge could occur and height above ground that the water could reach
- Depicts the reasonable worst-case scenario for any individual location
 - Displays inundation levels that have a 10% chance of being exceeded.





Potential Storm Surge Flooding Map

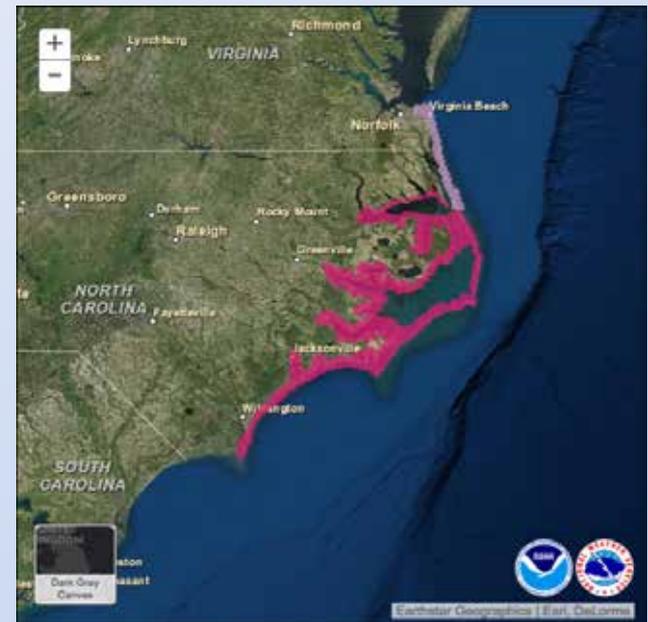
Example from Hurricane Arthur in 2014





Storm Surge Watch/Warning Graphic

- **Experimental** product (2nd year) – Accelerated one year as a result of Sandy Supplemental funds.
- Designed to introduce the concept of a watch or warning specific to storm surge.
- Current hurricane “category” warnings focused on wind threats.
- Separate watches/warnings for wind vs. surge should provide emergency managers, the media, and the general public better hazards guidance.

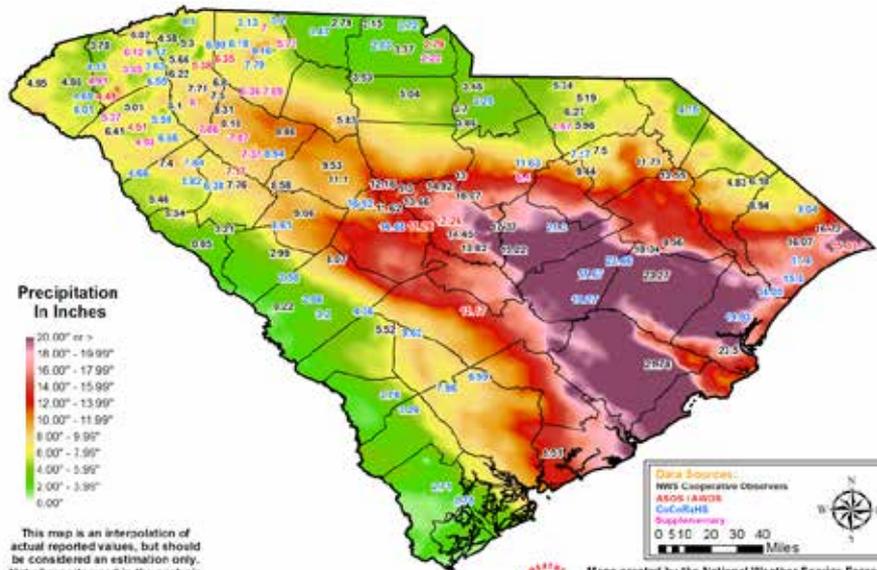




Inland Flooding

Hurricane Joaquin (Sept. 27-Oct. 7, 2015)

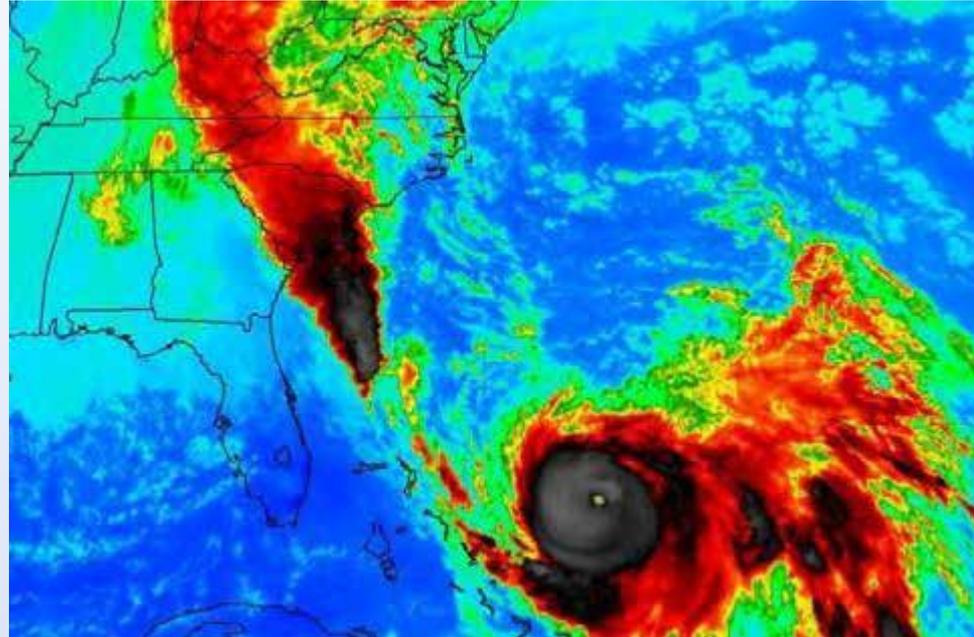
South Carolina Precipitation Storm Total Ending at 7 AM Oct. 5th, 2015



This map is an interpolation of actual reported values, but should be considered an estimation only. Not all reports used in the analysis will be displayed due to space constraints. Reports are precipitation through the above mentioned period.

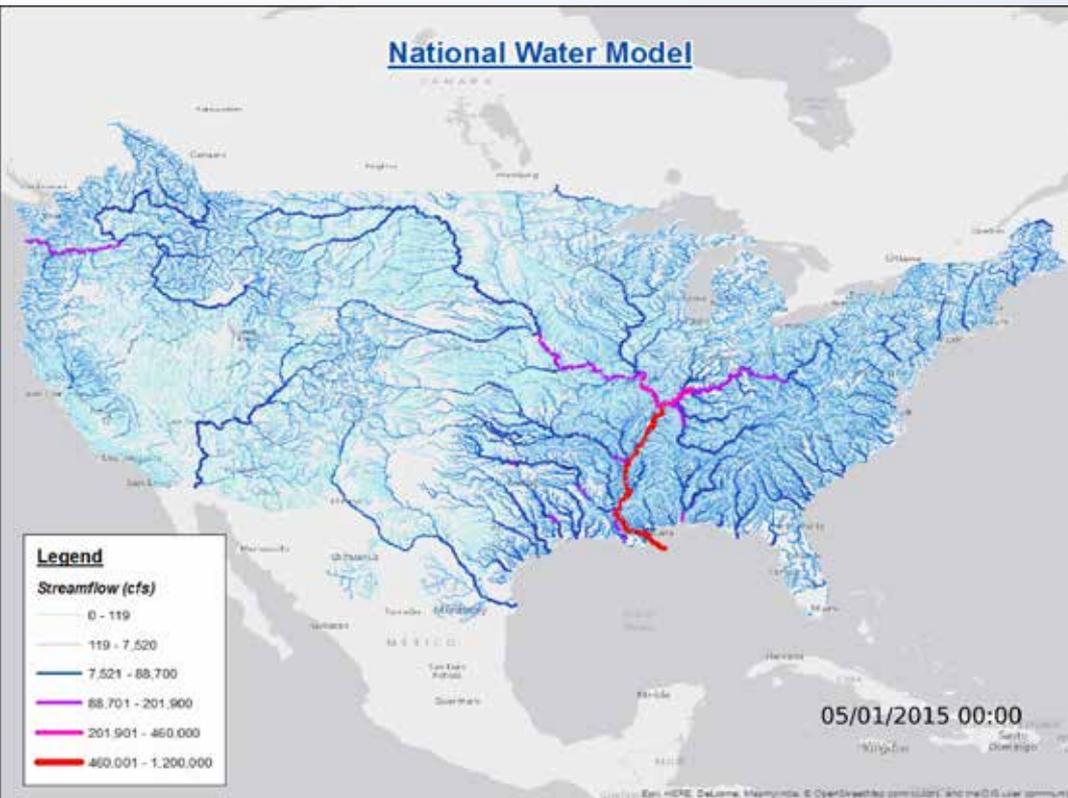


Maps created by the National Weather Service Forecast Office in Greenville/Spartanburg and in cooperation with the NWS Forecast Offices in Columbia and Charleston South Carolina as well as Wilmington North Carolina.





Inland Flooding

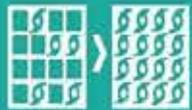


- NOAA's National Water Center opened 2015.
- New National Water Model to debut this summer.
- First national water resources facility
- Partnership with USGS, FEMA, USACE, and academia.

GOES-R

THE FUTURE OF FORECASTING

3X MORE CHANNELS



Improves every product from current GOES Imager and will offer new products for severe weather forecasting, fire and smoke monitoring, volcanic ash advisories, and more.

4X BETTER RESOLUTION



The GOES-R series of satellites will offer images with greater clarity and 4x better resolution than earlier GOES satellites.

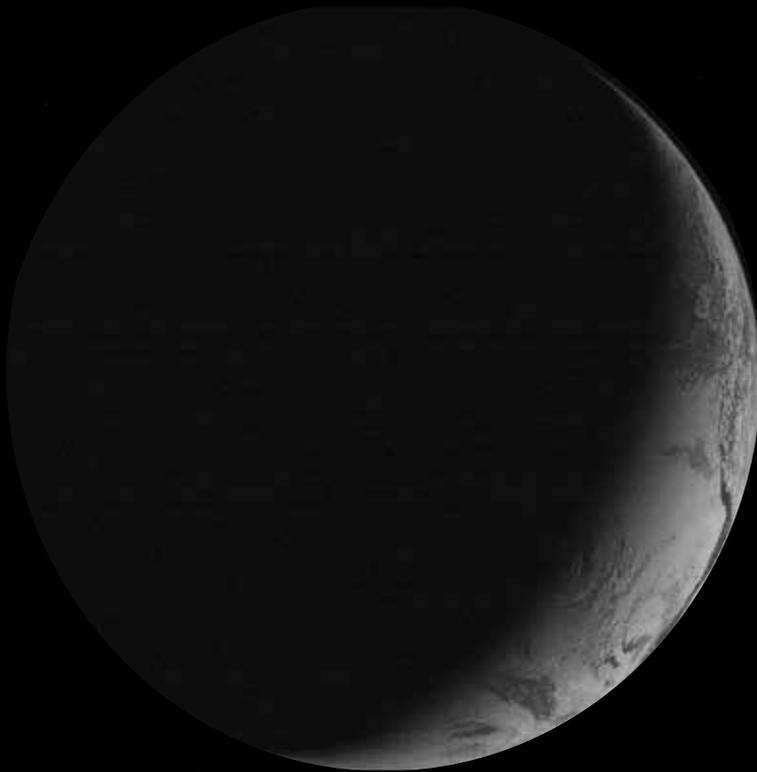
5X FASTER SCANS



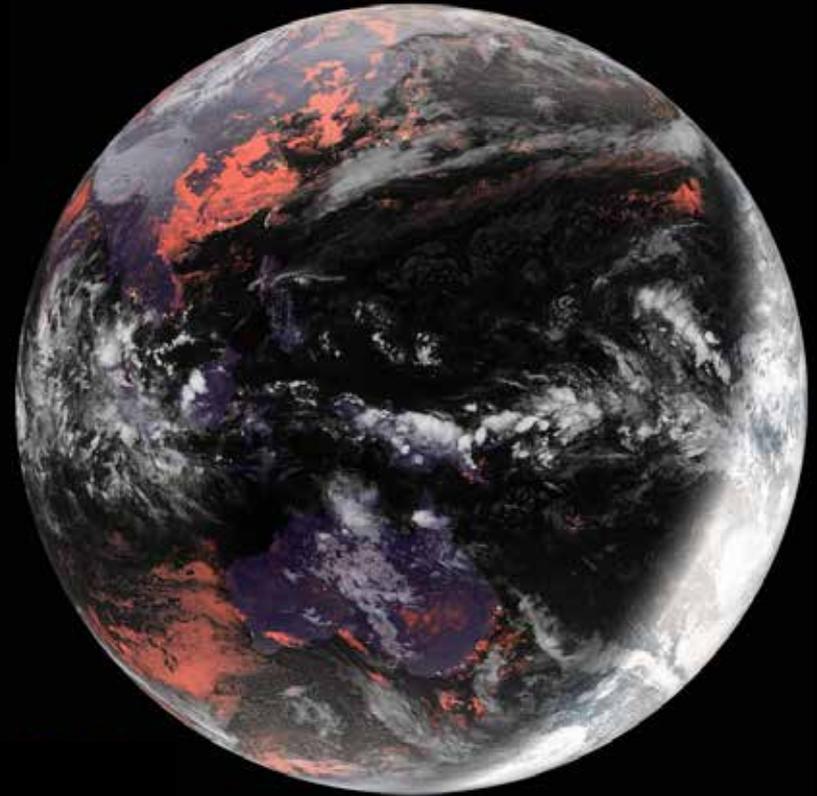
Faster scans every 30 seconds of severe weather events and can scan the entire full disk of the Earth 5x faster than before.



Current GOES Imaging



GOES-R Imaging *Video from Japanese Himawari-8*





Public Outreach

Facebook:



Twitter: @NWS | @NHC_Atlantic

Web: www.weather.gov
www.hurricanes.gov



Summary

2016 Outlook for the Atlantic Basin:

A near-normal season is most likely in 2016.

10-16 Named Storms

4-8 Hurricanes

1-4 Major Hurricanes (CAT 3 or greater)

Remember...

It Only Takes One!

Be Ready! Take Action!

Help Build a Weather-Ready Nation



Building a Weather-Ready Nation



2016 Hurricane Season Outlook

For additional information:

Matt Borgia

Congressional Affairs

National Oceanic & Atmospheric Administration

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Main Phone: (202) 482-4981



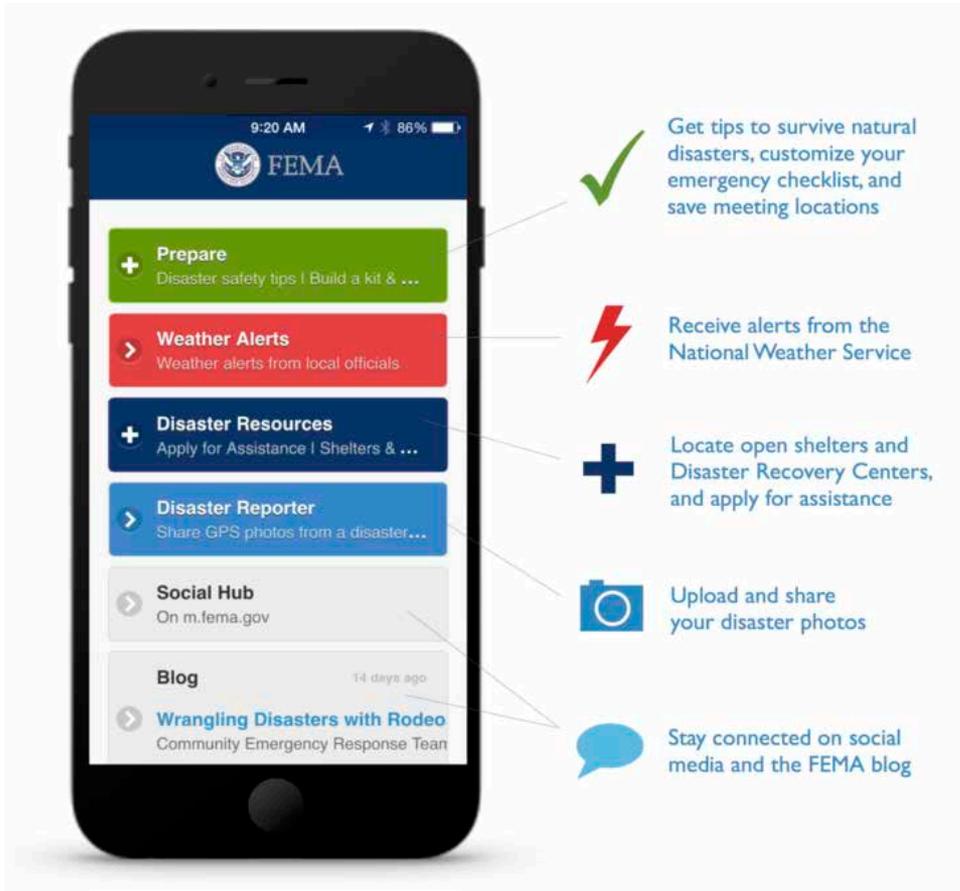
2016 Hurricane Season Overview: FEMA Office of Response and Recovery

June 1, 2016



FEMA

FEMA App



- § Weather Alerts
- § Emergency Checklist
- § Share Disaster Photos
- § Open Shelters
- § Open Recovery Centers



Ready.gov Campaign



TV Web Social Outdoor Graphics Radio Newsletter

National Hurricane Program



USACE

**NATIONAL PROGRAM
MANAGEMENT**

**DISTRICT OFFICE
PROJECT MANAGERS**



FEMA

**NATIONAL
PROGRAM MANAGER**

**REGIONAL PROGRAM
MANAGERS**

LIAISONS TO NHC



NHC

**HURRICANE
SPECIALIST UNIT**

**TECHNOLOGY AND
SCIENCE BRANCH**

Response and Evacuation Planning Technical Assistance
Operational Technical Assistance and Decision Support
to Tribal, Local, State, and Federal Emergency Managers



FEMA

National and Regional Plans

- Yearly refresh to hurricane plans in Regions 4 & 6
- All other hurricane prone regions have a hurricane annex
- Guam/CMNI Typhoon update



Response Federal
Interagency Operational
Plan

July 2014



FEMA



Homeland
Security

Training and Exercises

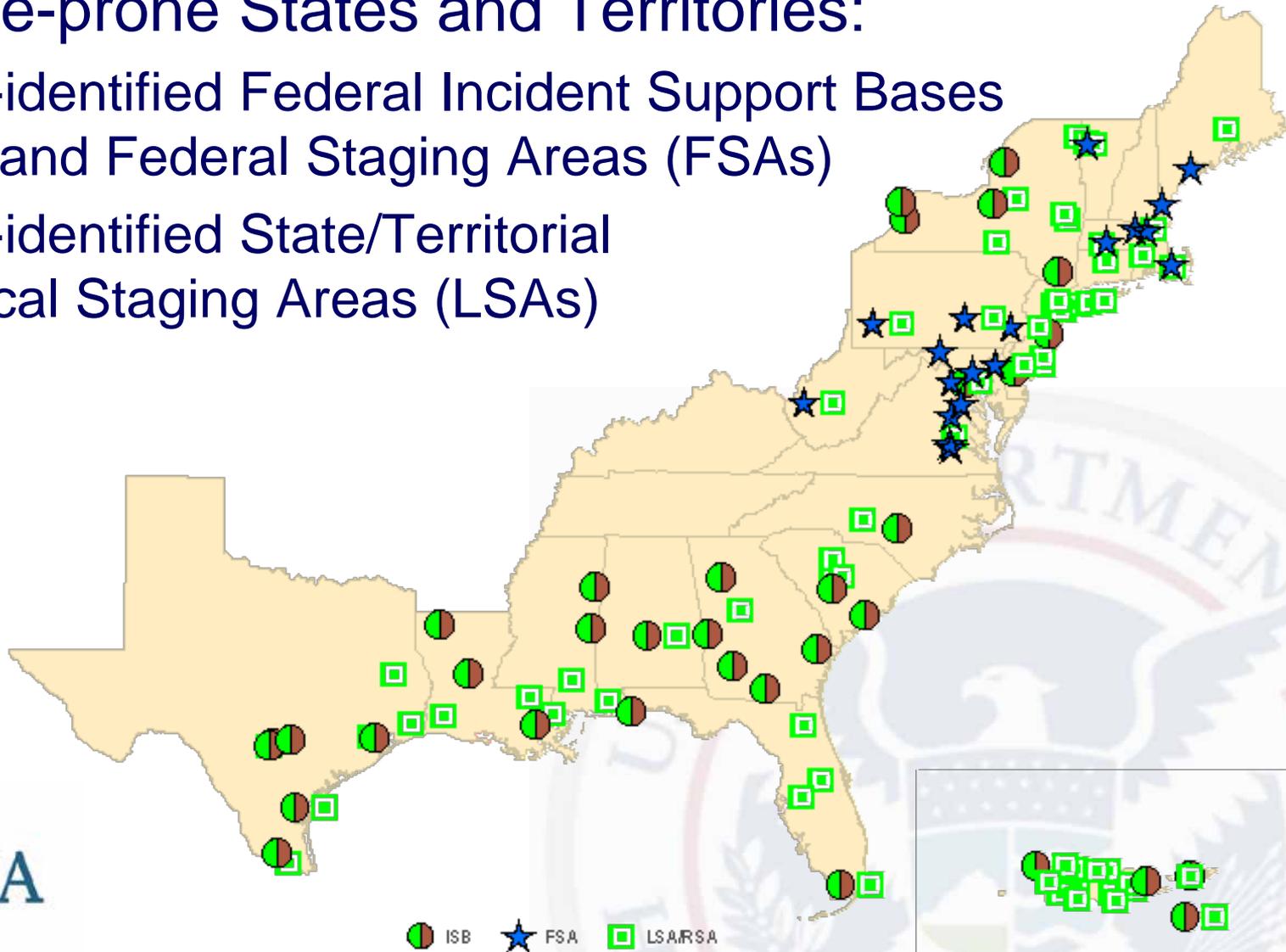
- NHP provides specific hurricane training to State, local, tribal, and territorial partners
- FEMA conducts recurring National Exercises to validate plans and prepare Federal response



Logistics Staging

In hurricane-prone States and Territories:

- § 53 pre-identified Federal Incident Support Bases (ISBs) and Federal Staging Areas (FSAs)
- § 78 pre-identified State/Territorial Logistical Staging Areas (LSAs)



FEMA

● ISB ★ FSA □ LSARSA



FEMA



American Red Cross

Hurricane Season 2016



Mission

*The American Red Cross
prevents and alleviates human suffering
in the face of emergencies
by mobilizing the power of volunteers and
the generosity of donors.*

Disaster Cycle Services

Mission: Disaster Cycle Services is America's partner and a leader in mobilizing communities to help people prepare for, respond to and recover from disasters and other life-threatening emergencies.

Range of responses: The Red Cross responds to nearly 66,000 disasters every year, including:

- § House fires and apartment fires
- § Natural events, such as tornadoes, floods, winter storms, hurricanes, wildfires and earthquakes
- § Human-made events, such as transportation incidents

Key Services

What we do when disasters occur:

- § Feeding, sheltering
- § Distribution of emergency supplies
- § One-on-one casework, assistance, referrals
- § Health services
- § Mental health services
- § Family reunification
- § Community recovery and resilience building
- § Blood and blood products
- § Lead and convene partner organizations and mobilize communities

Sheltering and Feeding Capabilities

Sheltering Resources

- § Stock supplies (cots, blankets and comfort kits) to support 500,000 shelter residents
- § National Shelter System (NSS) shows 60,000+ potential shelters with capacity to shelter millions

Feeding Resources

- § Total capacity of **1 million meals per day** served using a combination of the following:
 - § 5 trailer-based kitchens with capacity of 50,000 meals/day
 - § 100+ Southern Baptist Field Kitchens
 - § Local vendors and caterers, and our own shelf-stable meals
- § **500+ Red Cross Emergency Response Vehicles** to serve meals and distribute supplies on mobile routes

Partnerships

- § Federal, state, tribal and local government alignment
 - § Leveraging resources
- § Long-term alliances
 - § Southern Baptists
- § National Mass Care Strategy
 - § Partner shelters
- § National Youth Preparedness Education Strategy
- § America's PrepareAthon!
- § Joint exercises and planning
- § Shared workforce and training



A Unified Network

To minimize duplication of efforts and ensure there are no gaps in services, the Red Cross works with hundreds of government and nongovernment partners



Catholic Charities USA



FEEDING AMERICA



Readying the Workforce

- § More than 47,000 trained disaster workers enrolled in “Volunteer Connection” (92% volunteer)
- § Incident Command (ICS) training for all disaster leadership across 7 divisions
- § *21 Disaster Response Management Teams* (advance leadership teams)
- § Advanced volunteer intake process in development (Event-based volunteers)
- § New trainings and resources to educate workforce



Preparedness Actions – Get a Kit, Make a Plan, Be Informed

- **Red Cross Mobile Apps**

- Free, available for iPhone and Android, English/Spanish
- Provide expert emergency information and weather alerts
- *On average, the Red Cross sends 1.13 million weather alerts every day through mobile apps*



- **Emergency App**

- 35 NOAA/USGS severe weather and emergency alerts
- Monitor several locations across U.S. for alerts
- Notify loved ones that alert has been issued in their area
- Review resources for before, during, and after disaster
- Activates Shelter Finder, showing open shelters in area



Preparedness Actions

- Resources and training to help Red Cross workers & communities to be ready and become prepared at home
- Customized resources for Red Cross regions to help their communities prepare
- Children & youth engagement in classrooms and after school with technology, challenges, and science-based education



Preparedness Roundup

[Back to top](#)

“Power Outages and Hurricane Preparedness”

Power Outage Safety

High winds and flooding from hurricanes often result in blackouts or power outages. Preparation is the best protection.

Food Safety Tips

- Keep refrigerator and freezer doors closed as much as possible. First, use perishable food from the refrigerator, then, use food from the freezer. If it looks like the power outage will continue beyond a day, prepare a cooler with ice for your freezer items.

Electrical Equipment Safety Tips

- Turn off and unplug all unnecessary electrical equipment and appliances. When power returns, surges can damage electronics.

Carbon Monoxide Poisoning Awareness

- Never use a generator, grill, camp stove, or other gasoline, propane, natural gas or charcoal-burning device inside a home garage, basement, or any other partially enclosed area. Always locate these units outside - far away from doors, windows and vents that could allow carbon monoxide to come indoors.

Click [here](#) for more information on power outage safety.

National Hurricane Preparedness Week

Know the Difference

- Hurricane Watch – Hurricane conditions are a threat within 48 hours.
- Hurricane Warning - Hurricane conditions are expected within 36 hours.

Learn about your community’s response plan.

Identify a place you will go in the event of an evacuation.

Plan your evacuation route or routes to local shelters and identify a contact out of the area. Register family members with special needs as required.

Get a kit. The Red Cross recommends that you have enough food, water and supplies for at least 72 hours. For more ideas about what you should include in your kit click [here](#).

Download from the [App Store](#) or [Google Play](#)



5/28/2015



#NHPW
#HurricaneSafety
@RedCross



Resources for constituents

- § **Volunteer-** Reach out to local chapters/regions or redcross.org
- § **Be prepared** – download Red Cross apps at the Android/iTunes app stores
- § **Get trained** – check out redcross.org/take-a-class for opportunities
- § **Stay Informed** – Follow Red Cross on Social Media @RedCross

Contact Information

§ For additional information, please contact:

Cherae Bishop

Cherae.Bishop@redcross.org

(202.303.7574)

And/or

Marvin Steele

Marvin.Steele@redcross.org

(202.285.6256)



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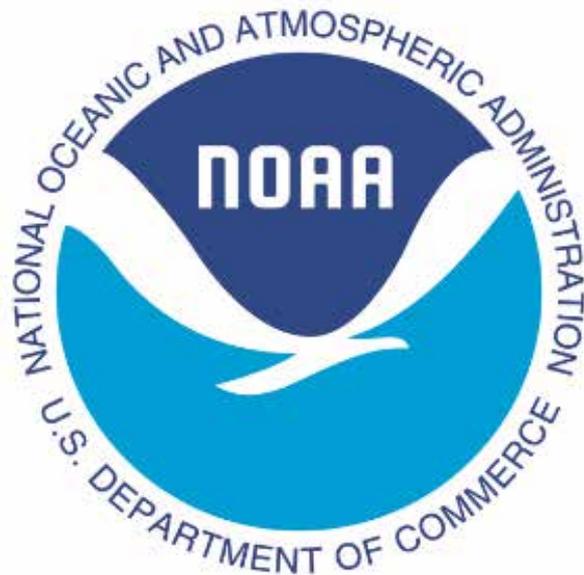
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