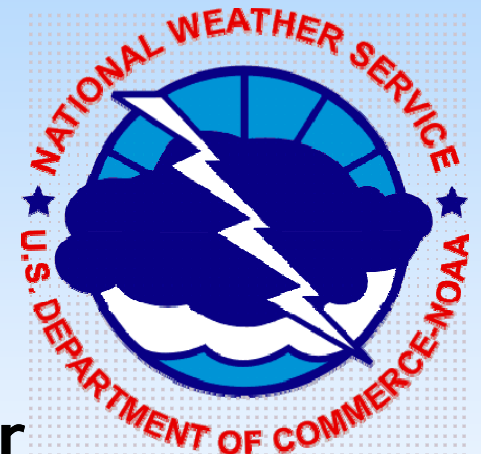


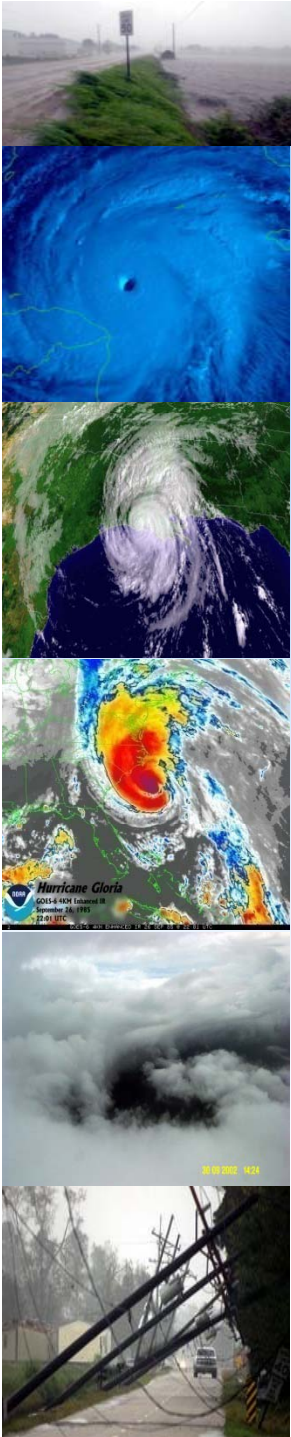
National Weather Service Tropical Cyclone Service Improvements at Landfall



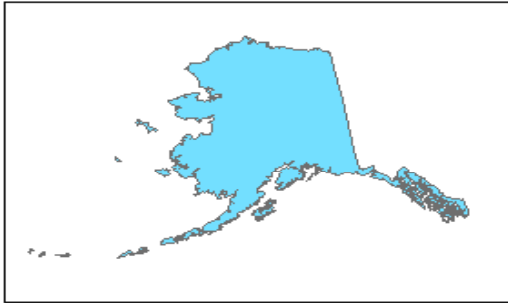
Bill Proenza, Director
National Weather Service – Southern Region

62nd Interdepartmental Hurricane Conference
Charleston, SC
March 4, 2008

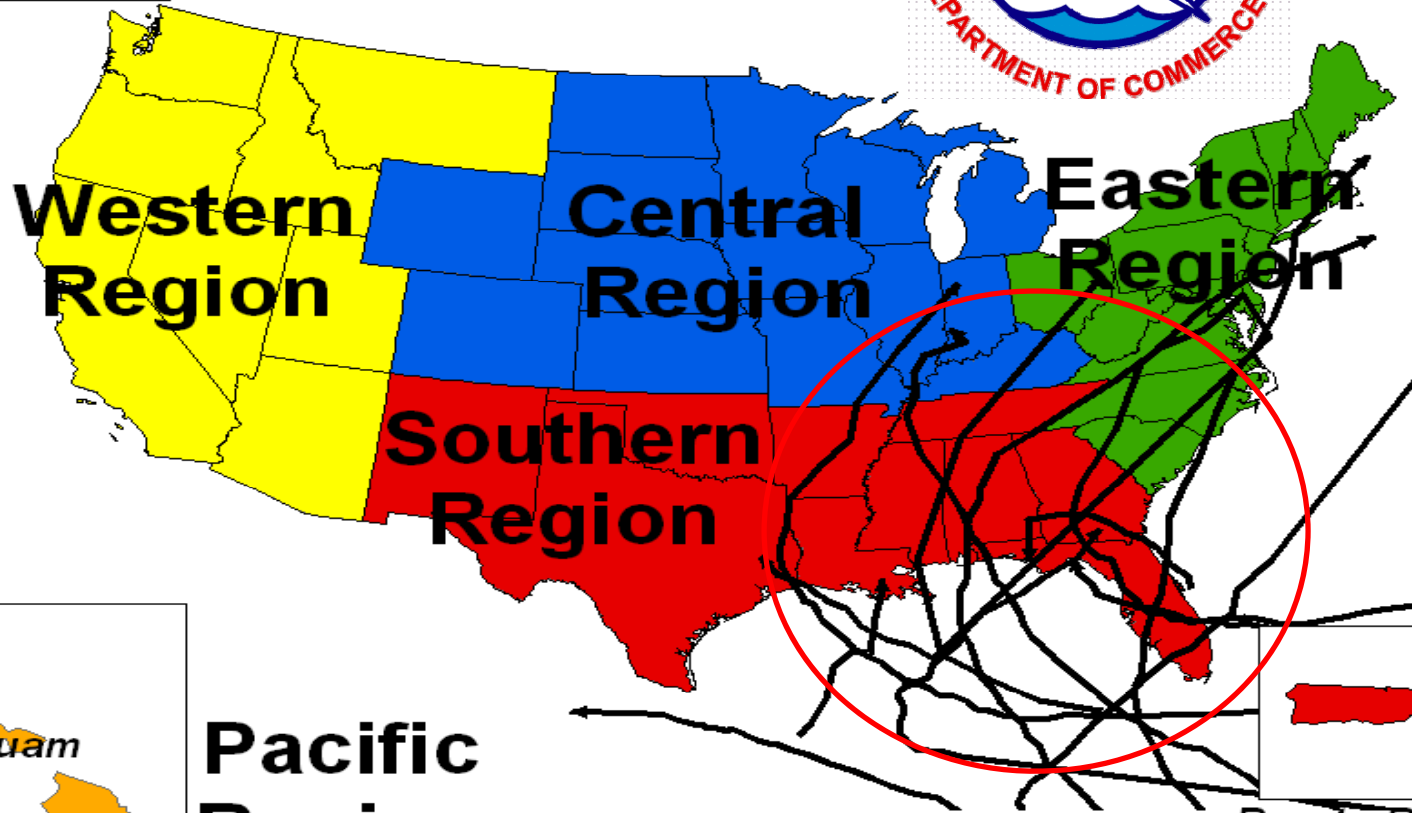
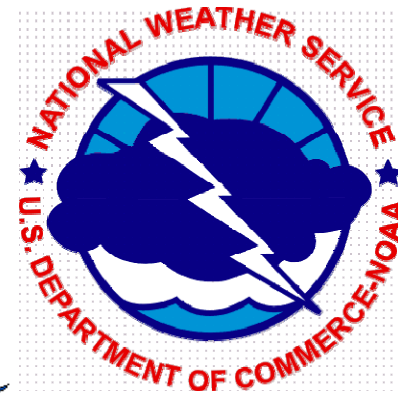
www.SRH.noaa.gov



The USA's Landfalling Tropical Cyclones in 2004 and 2005



**Alaska
Region**

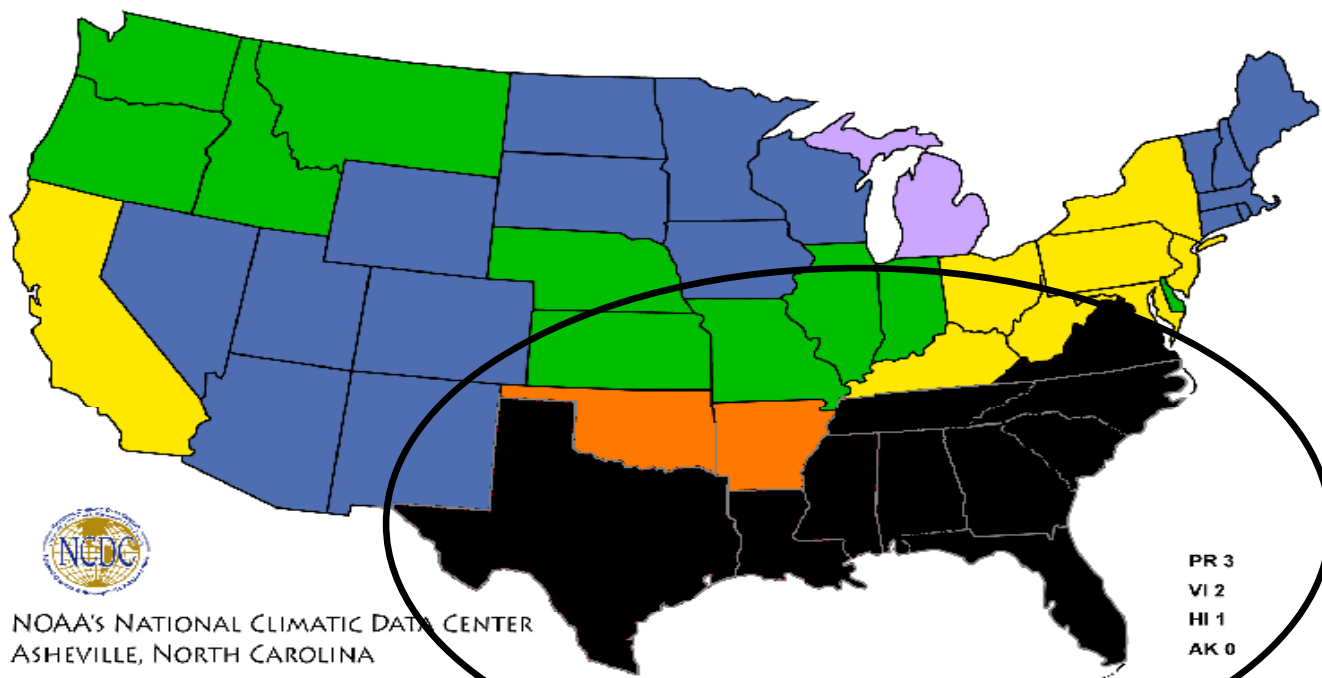


Hawaii and Guam

**Pacific
Region**



*Puerto Rico and
Virgin Islands*



Tropical Cyclones cause nearly 50% of USA Billion dollar weather events since 1980 ! No surprise that our coastal states have the most.



NOAA'S NATIONAL CLIMATIC DATA CENTER
ASHEVILLE, NORTH CAROLINA

NUMBER OF EVENTS	DISASTER TYPE	NUMBER OF EVENTS	PERCENT FREQUENCY	NORMALIZED DAMAGES (Billions of Dollars)	PERCENT DAMAGE
16 - 25	Tropical Storms/Hurricanes	24	35.8%	269	52.0%
13 - 15	Non-Tropical Floods	12	17.9%	55	10.6%
10 - 12	Heatwaves/Droughts	11	16.4%	145	28.1%
7 - 9	Severe Weather	7	10.4%	13	2.5%
4 - 6	Fires	6	9.0%	13	2.5%
4 - 6	Freezes	2	3.0%	6	1.2%
4 - 6	Blizzards	2	3.0%	9	1.7%
4 - 6	Ice Storms	2	3.0%	5	-1.0%
1 - 3	Noreaster	1	1.6%	2	-0.3%
		67		517	

Please note that the national map color-coded by state reflects a summation of billion dollar events, for each state affected--ie, it does not mean that each state shown suffered at least \$1 billion in losses for each event.

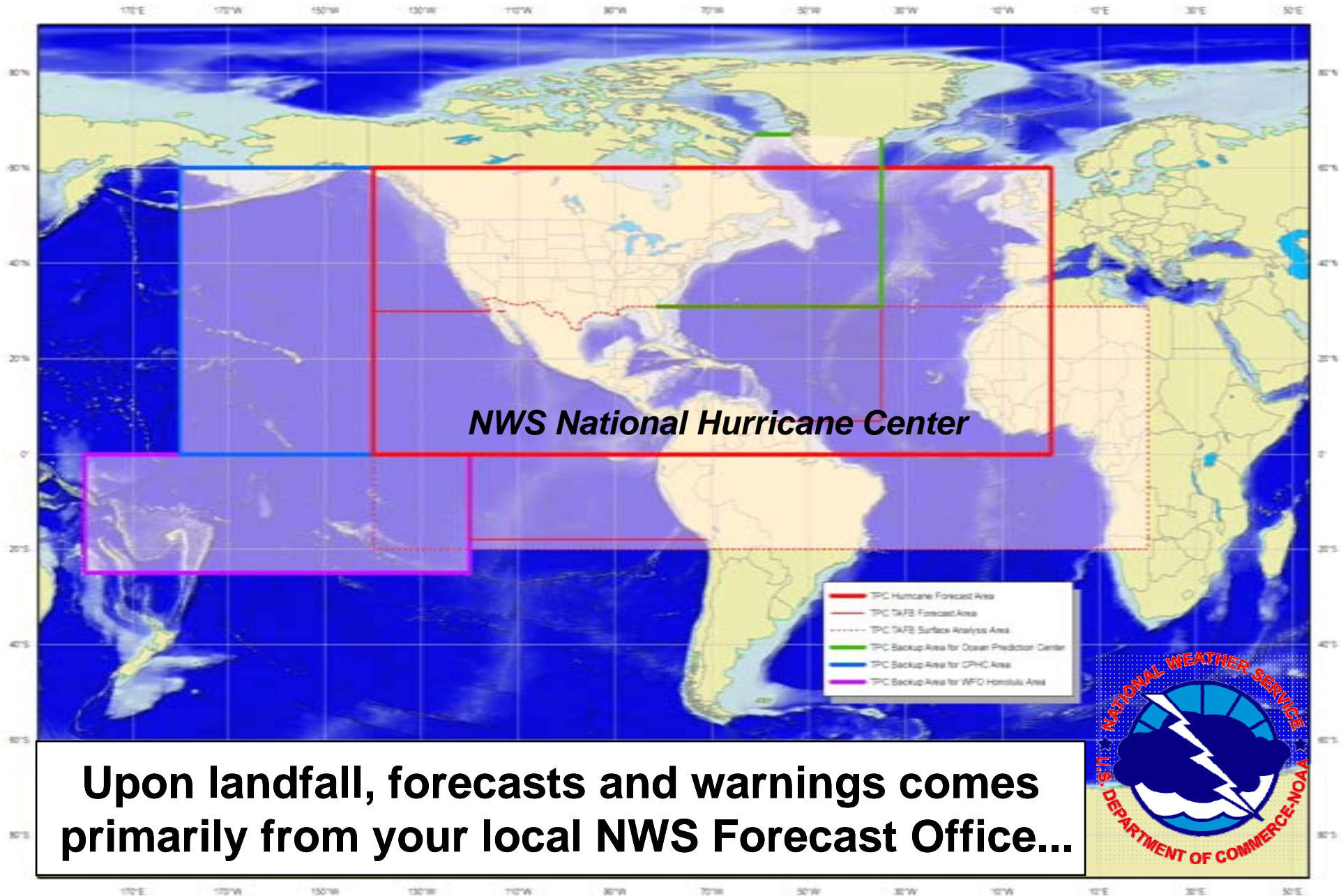
Billions Dollar Weather Events, 1980-2005

It all makes economic sense !

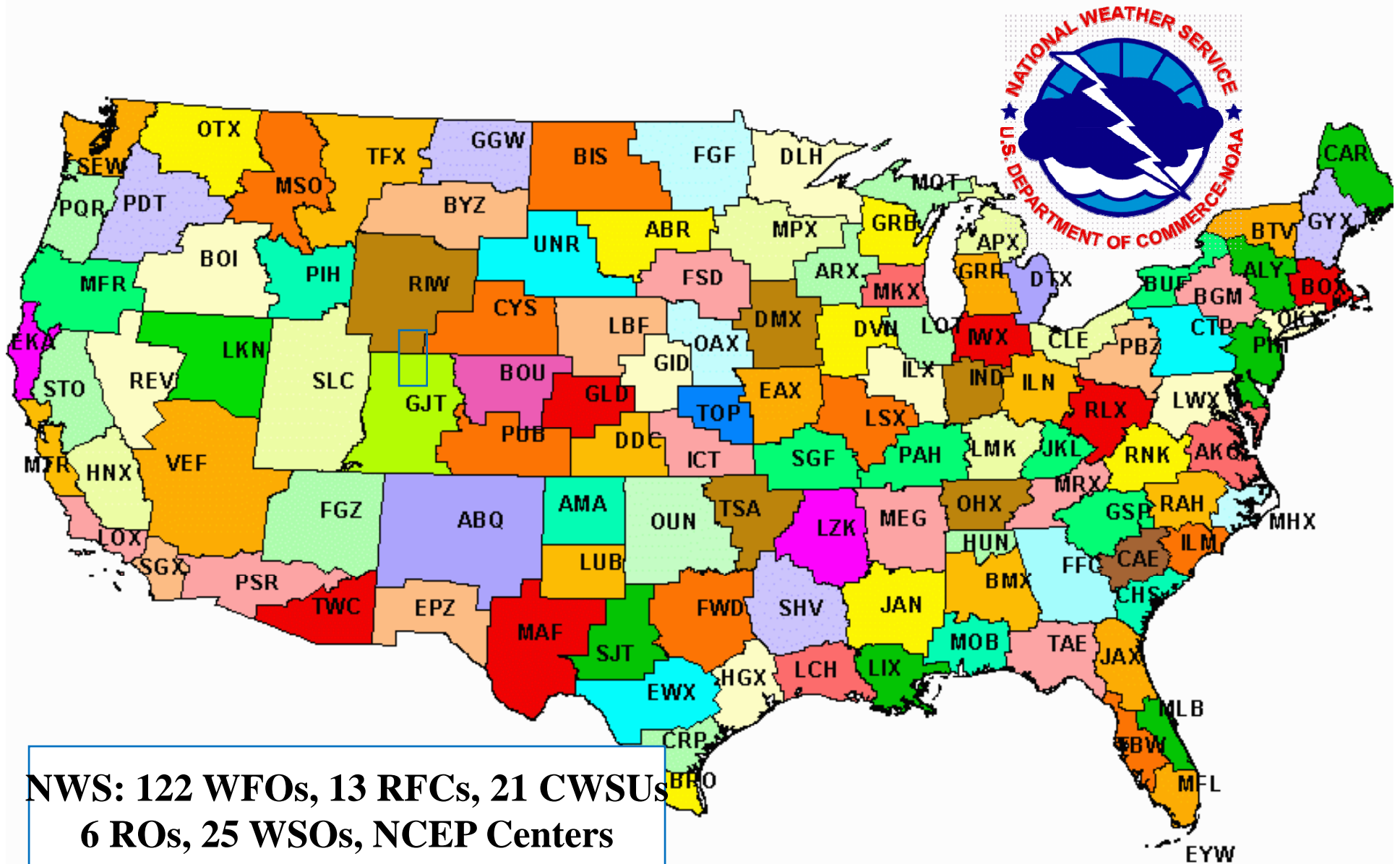
- **More than 50% of our Nation's Gross Domestic Product (GDP) is Weather sensitive.**
- **Since 1995, hurricanes averaged \$19 Billion per year in losses to the Nation (*Prior period: \$5 B*)**
- **Seven of the 10 most expensive hurricanes in US history occurred in the 14 months from Aug 2004 – Oct 2005**
 - **Charley - \$15.0 billion insured losses**
 - **Katrina - \$81.0 billion**
 - **Rita - \$10.6 billion**
 - **Wilma - \$20.6 billion**



NHC has ocean to coastal TC forecast/warning responsibility...



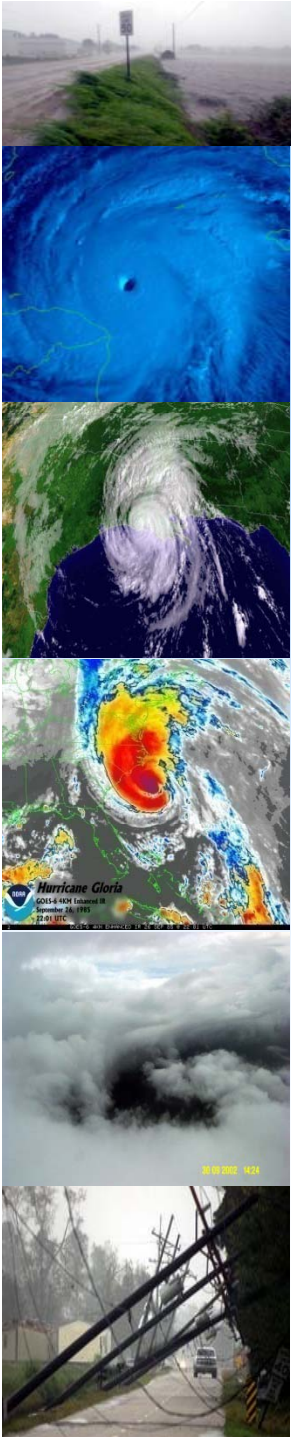
Your *nearby* NWS WFO is the best source for the Hurricane's expected *local* impacts

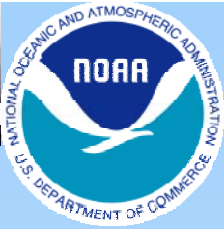
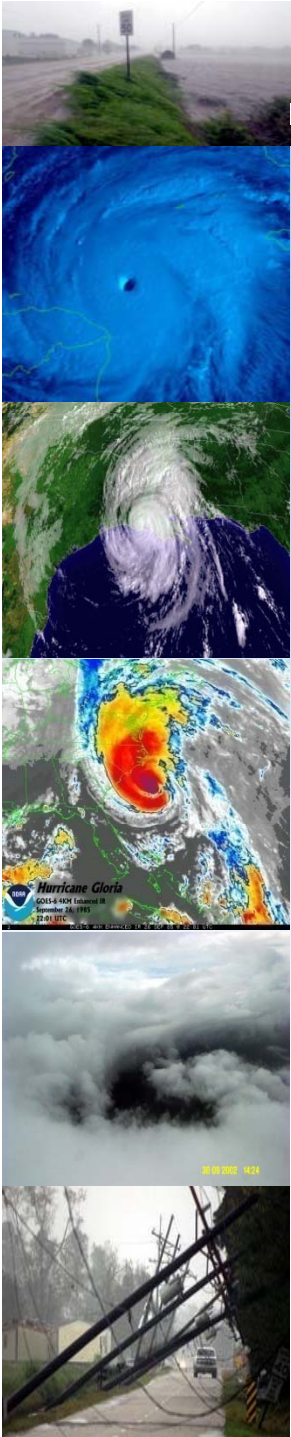


WFO Tropical Cyclone Impact Graphics

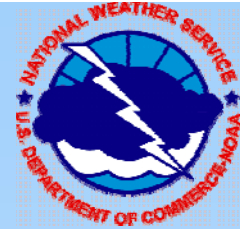
- Wind Forecasts & Warnings
- Coastal & Inland Flooding Watches and Warnings
- Tornado Hazardous Weather Outlooks & Warnings

- WFO Gridded Data + WFO Smart Tools = Impact Graphics





Participating WFOs



Eastern Region

Upton
Sterling
Charleston
Newport/Morehead City

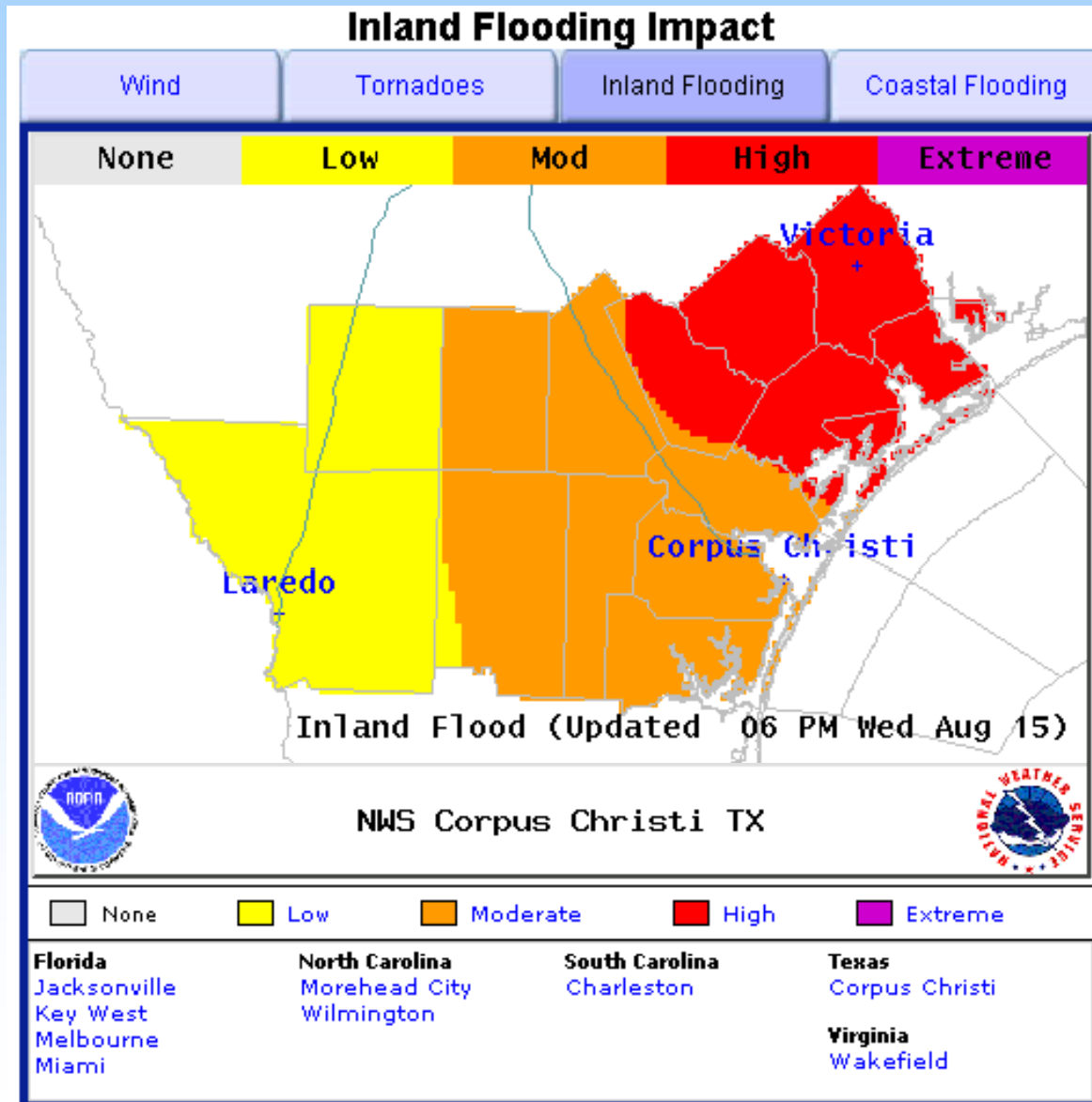
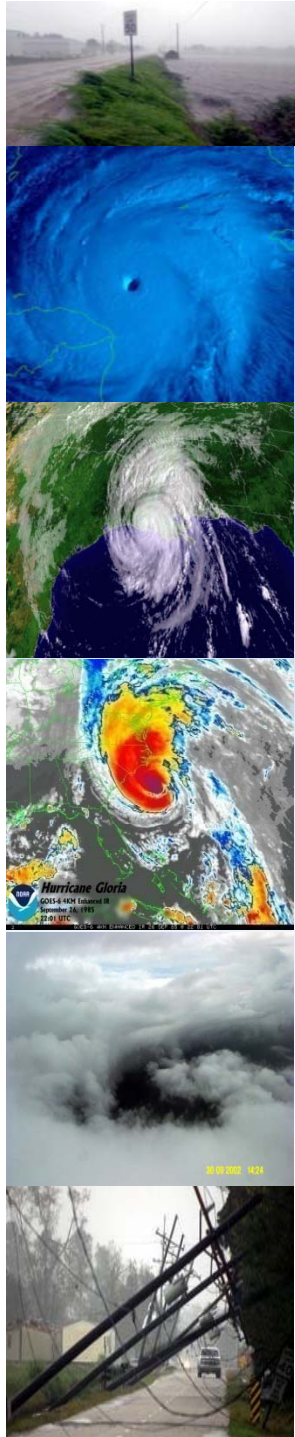
Mount Holly
Wakefield
Wilmington

Southern Region

Jacksonville
Miami
Tampa Bay
Lake Charles
Brownsville

Melbourne
Key West
Mobile
Corpus Christi

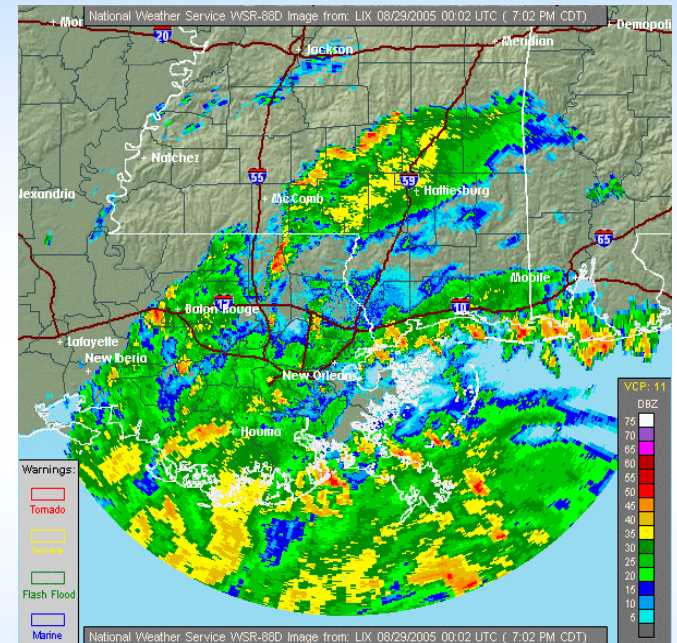
WFO Corpus Christi



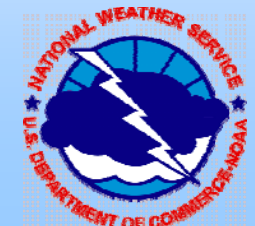
As storms near the coast, your NWS WFOs provide the best GIS radar data

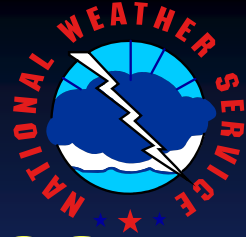
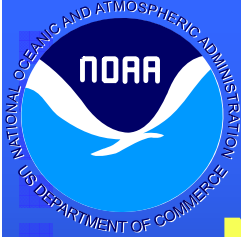
- National Weather Service WFO GIS radar graphics include the latest **watches and storm-based warning boxes** right on the radar loops.
- Our GIS radar depiction gives you from any geographic point, the distance and direction to the edge of approaching weather.
- Our data gives you a running tally on **local rainfall amounts**.
- You can superimpose our radar onto your own GIS awareness and response program e.g. Google Earth.

www.SRH.weather.gov



Example of NWS radar & warnings in Google Earth

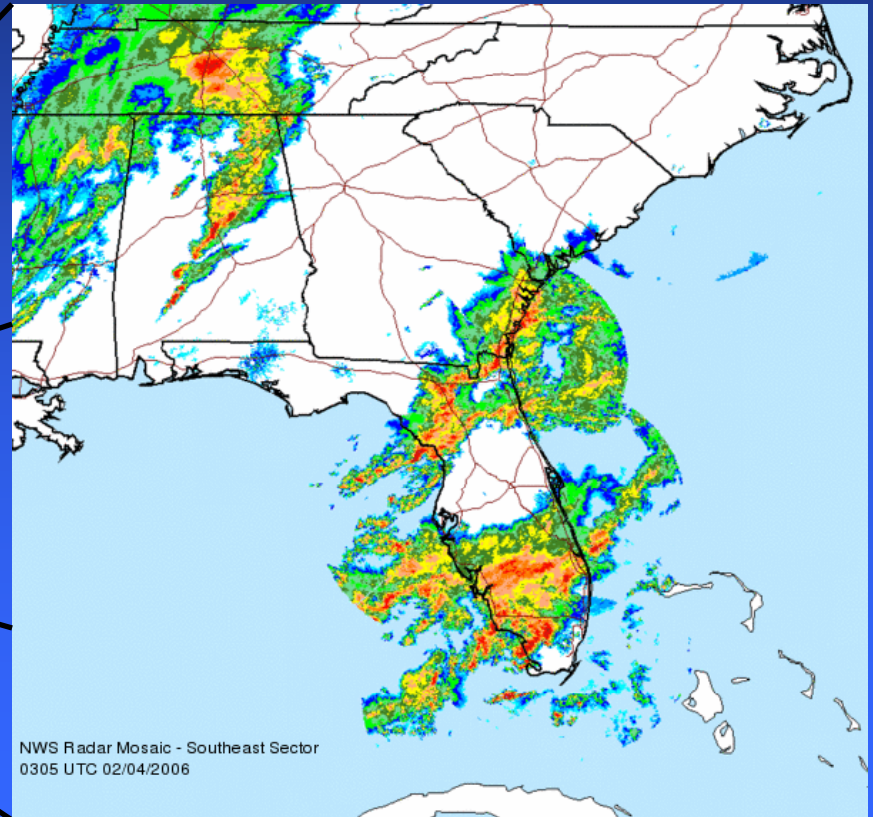
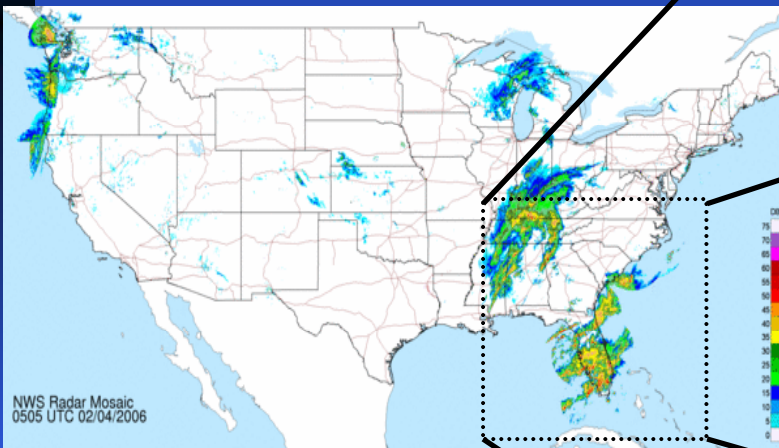




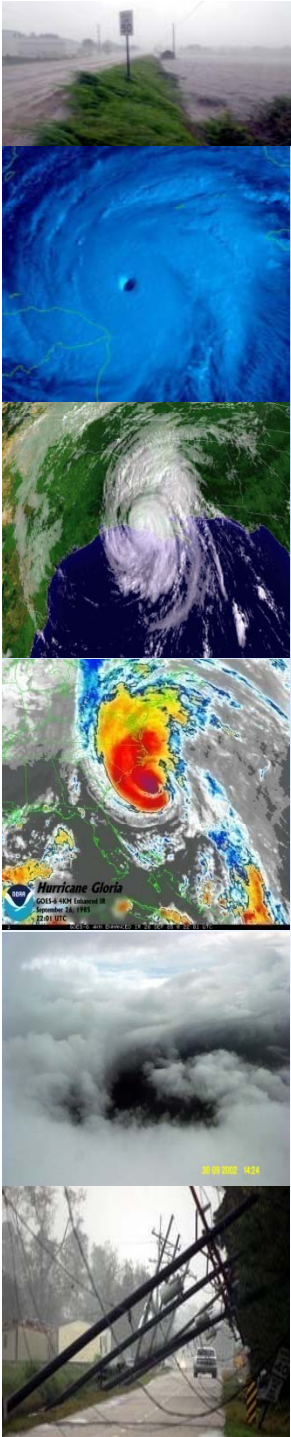
With GIS Radar: Improved National and Regional Mosaics

<http://www.srh.noaa.gov/ridge>

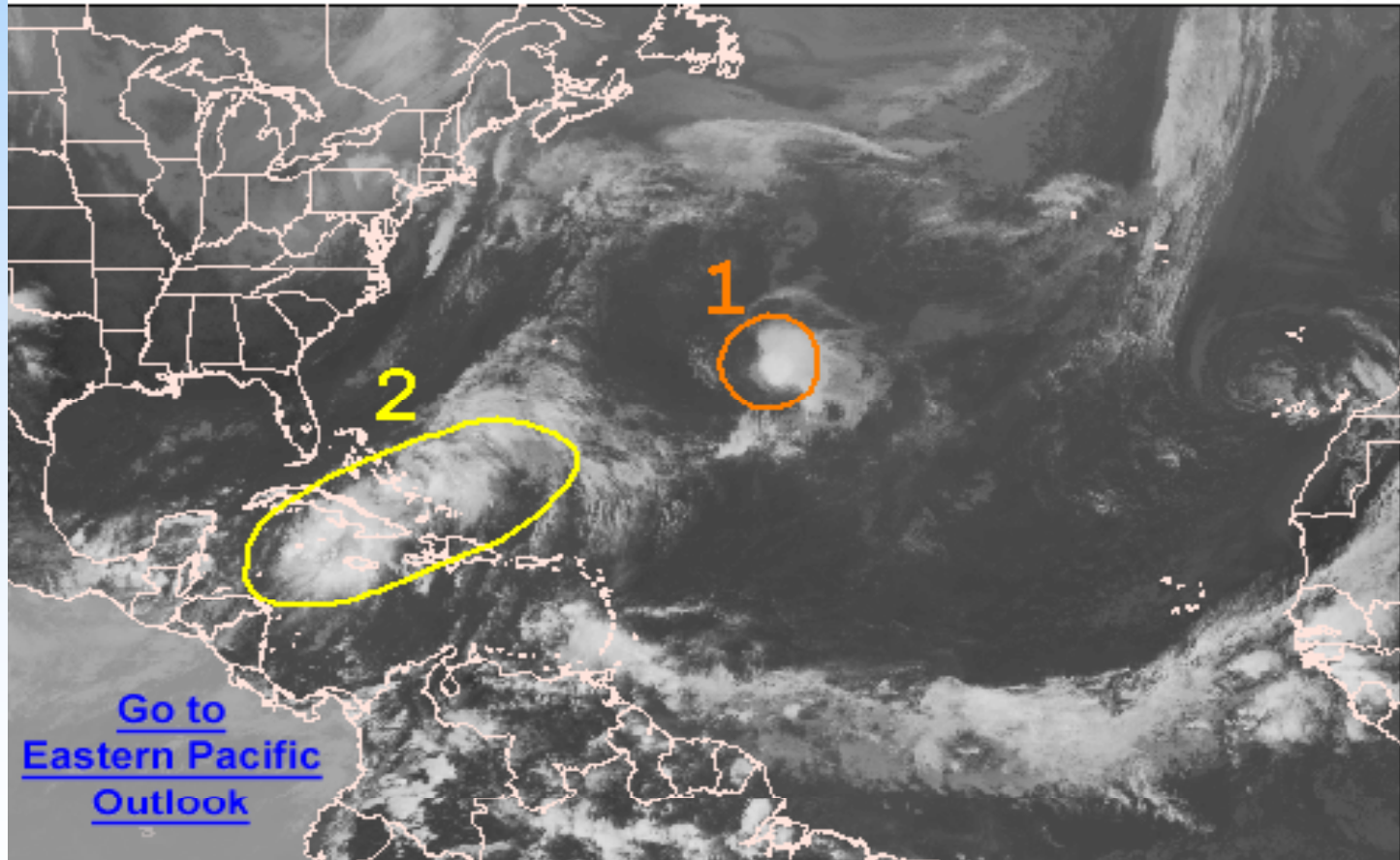
NWS Southern Region



Experimental Graphical Tropical Weather Outlook



Experimental Graphical Tropical Weather Outlook



200 PM EDT THU OCT 11 2007

Satellite Image: 0322 PM EDT

The highlighted and numbered areas, if any, indicate current locations of weather systems discussed in the Tropical Weather Outlook below.



Key Steps for NWS support cycle...

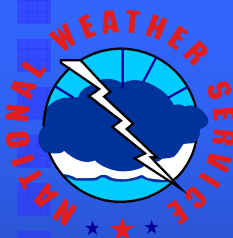
- Expanded NWS infusion of science & technology leads to improved critical information and warnings for our interdepartmental partners...e.g.
 - ◆ **Dual-Pol Doppler Radar (2-4 Yrs)**
 - ◆ **New generation Ocean Surface Vector Winds solution replacing aging “QuikSCAT” (5 yrs +)**
 - ◆ **Phased Array Radar (10-15 Yrs)**
 - ◆ **Global to local scale, better spatial and temporal resolution modeling (continuous)**



New Radar Technology

- **Current Radar Enhancements**
 - ◆ Improved elevation scans
 - ◆ Faster scans (from 6 to 4 mins)
- **Dual-Pol Radar (2-4 yrs)**
 - ◆ Improved resolution, TC structure imaging and velocity data
 - ◆ Better severe weather lead-times
 - ◆ Improved precipitation detection and flood warning lead-times
- **Phased Array Doppler (10+ yrs)**
 - ◆ Less than a minute scans adds 4 mins to tornado lead-times.
 - ◆ better resolution and much more!

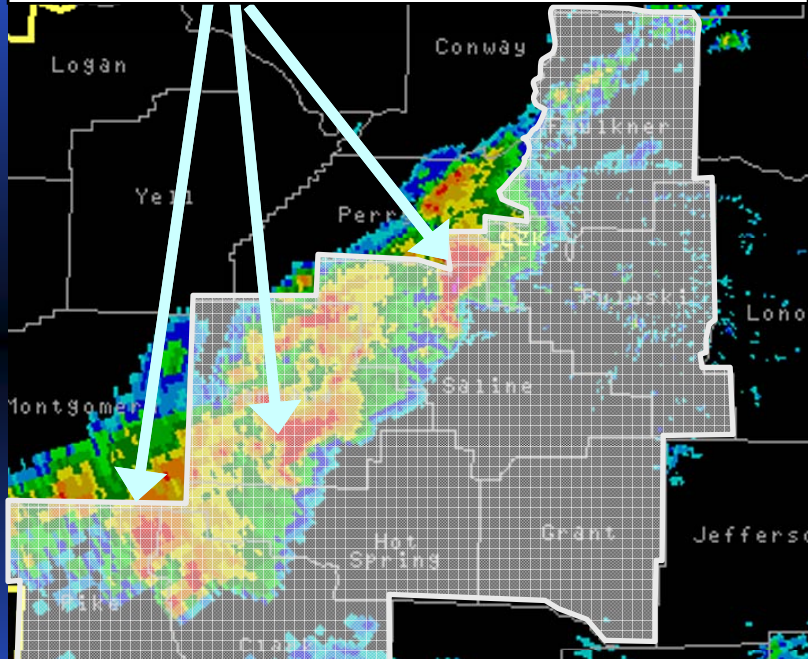




NWS Southern Region

Current radar enhancements allow us to move from County-Based to Storm-Based Warnings

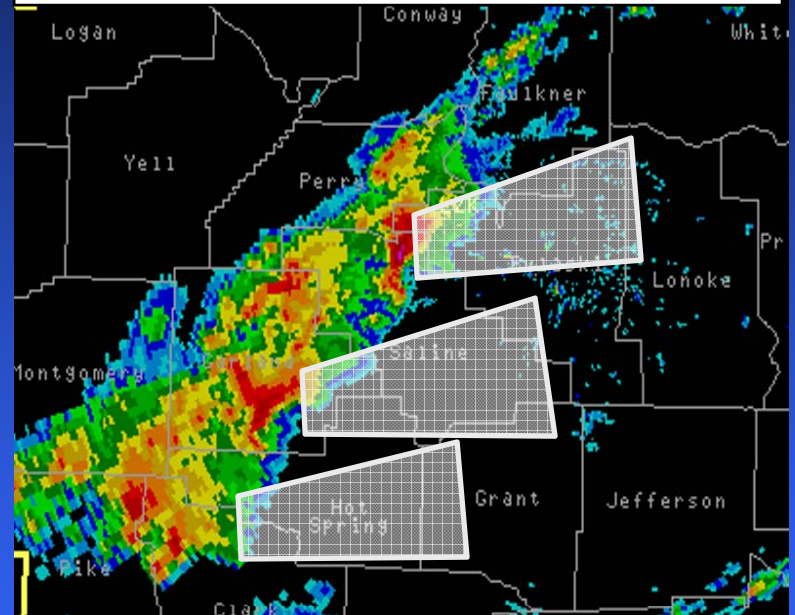
Three simultaneous tornadoes within line of severe thunderstorms



County-Based Tornado Warnings

8 counties under warning
Almost 1 million people warned

- More specific
- Increased clarity
- Supports new dissemination technology



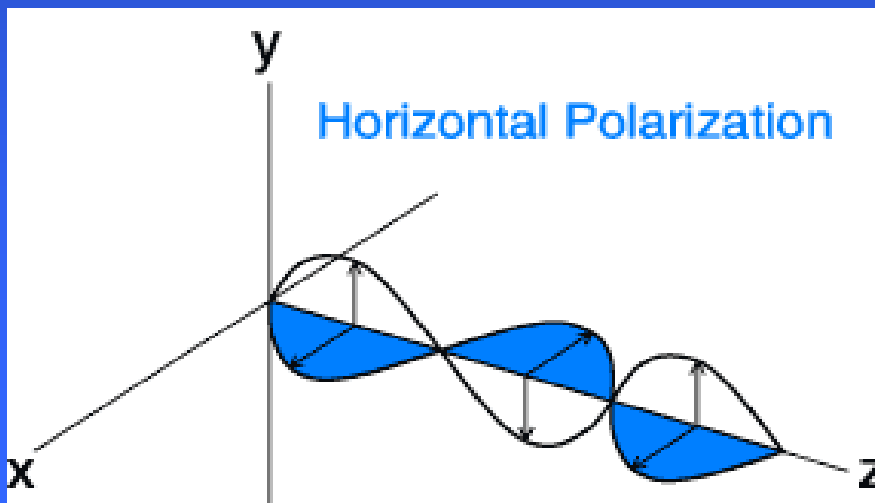
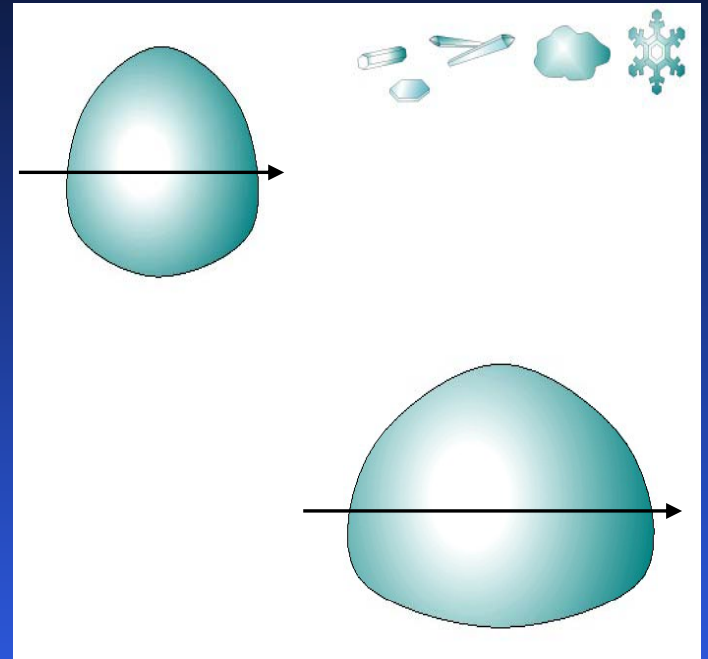
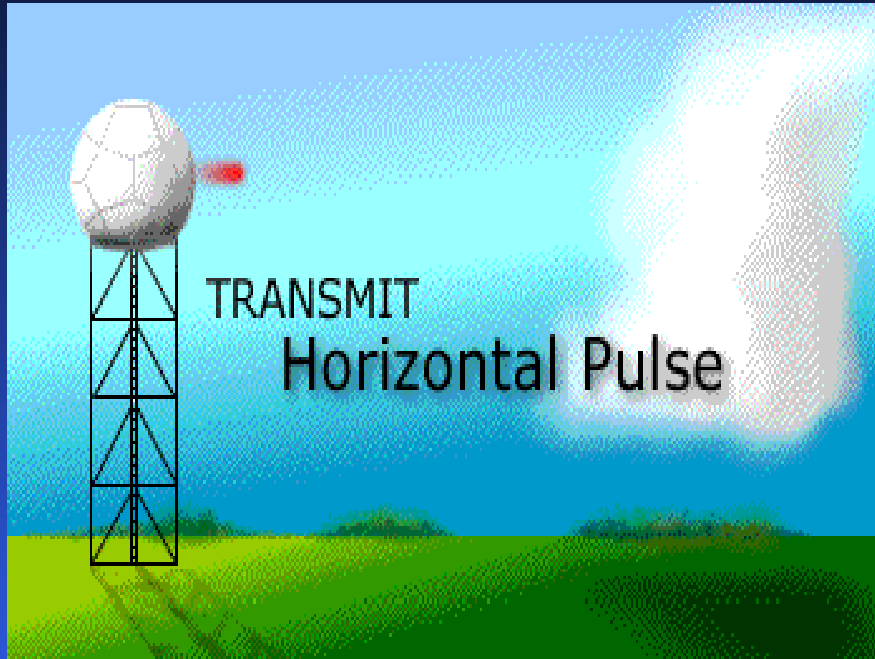
Storm-Based Tornado Warnings

70% less area covered
~600,000 fewer people warned



NWS Southern Region

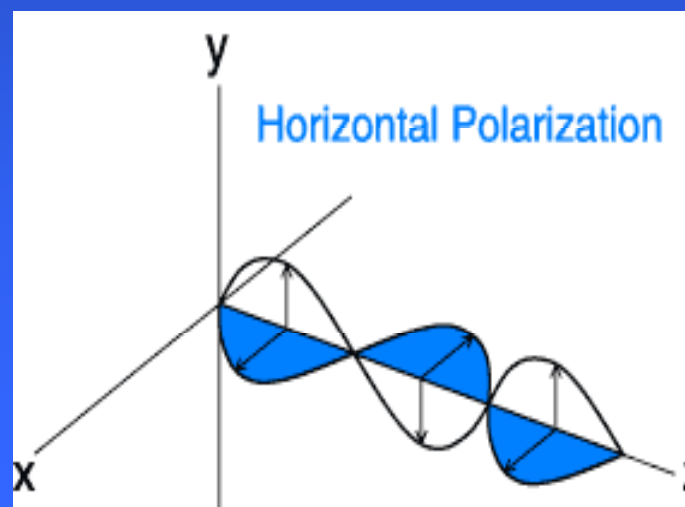
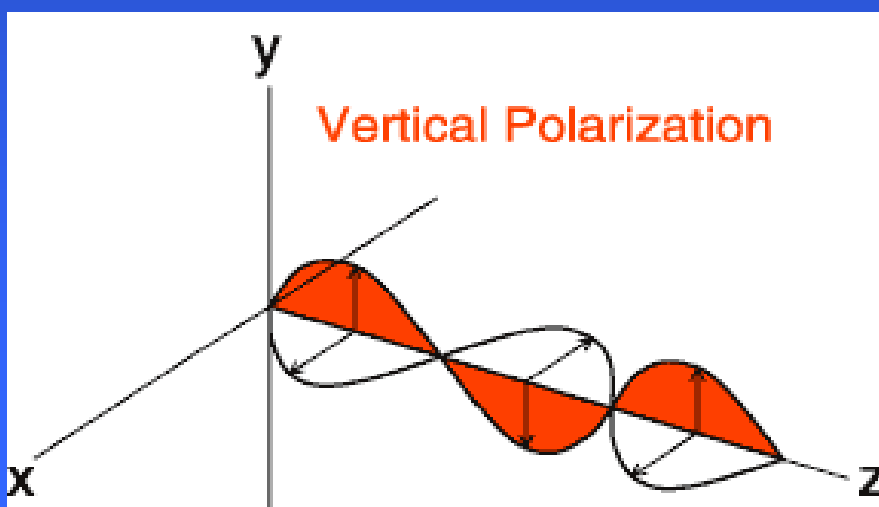
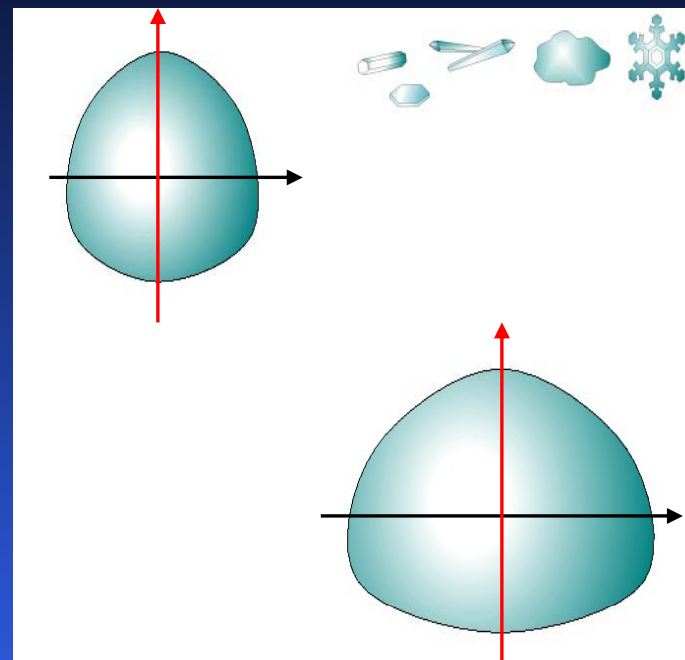
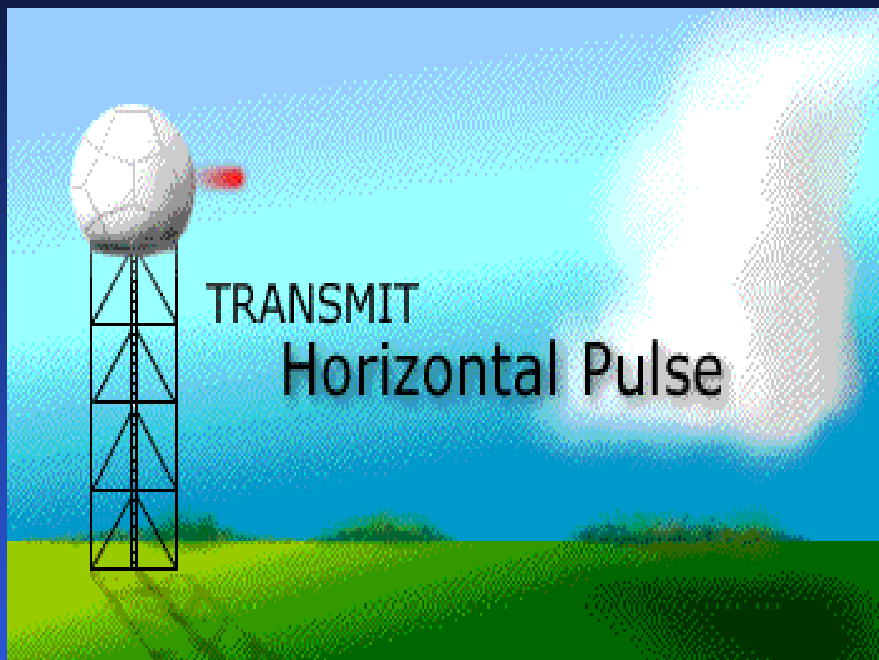
Current WSR-88D Radar





NWS Southern Region

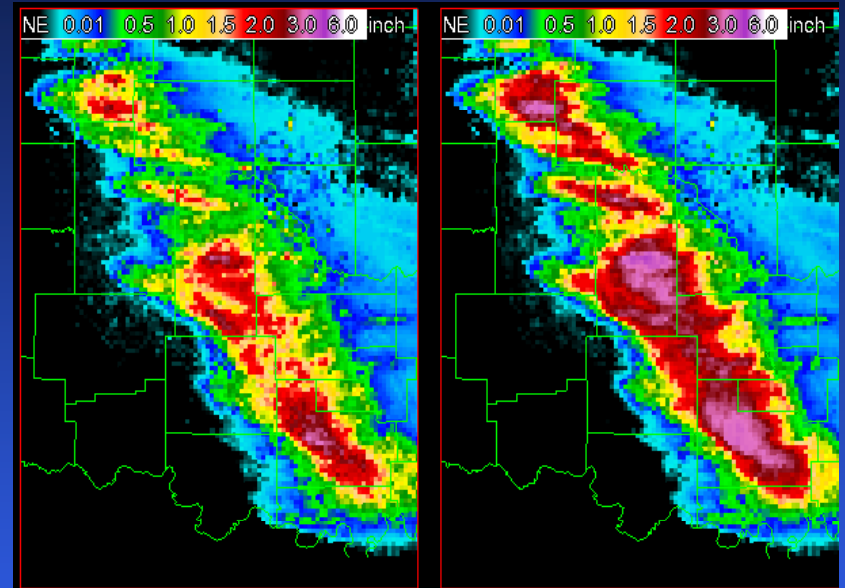
Dual-polarization Radar





Dual Polarized Doppler Radar

- **Dual- Pol results demonstrate much improvement** (*NSSL documented reports*):
 - ◆ **Finer Imaging** (see images)
 - ◆ **Data Quality**
 - ◆ **Rainfall Estimation**
 - ◆ **Pinpoint tornado location**
 - ◆ **Much more...**

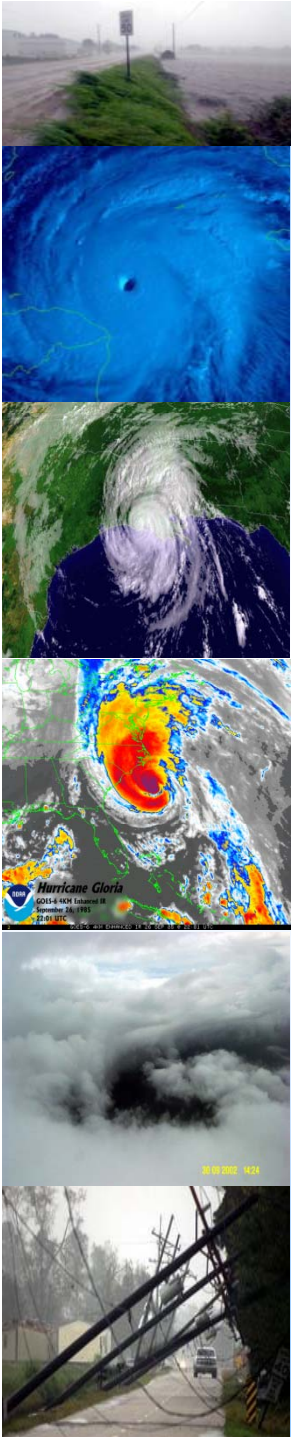
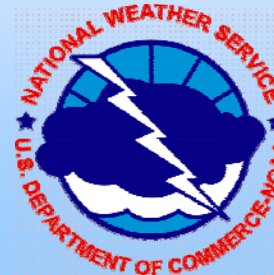


Dual-Pol WSR-88D 1-hr rainfall est. (left) vs. legacy WSR-88D estimate (right).

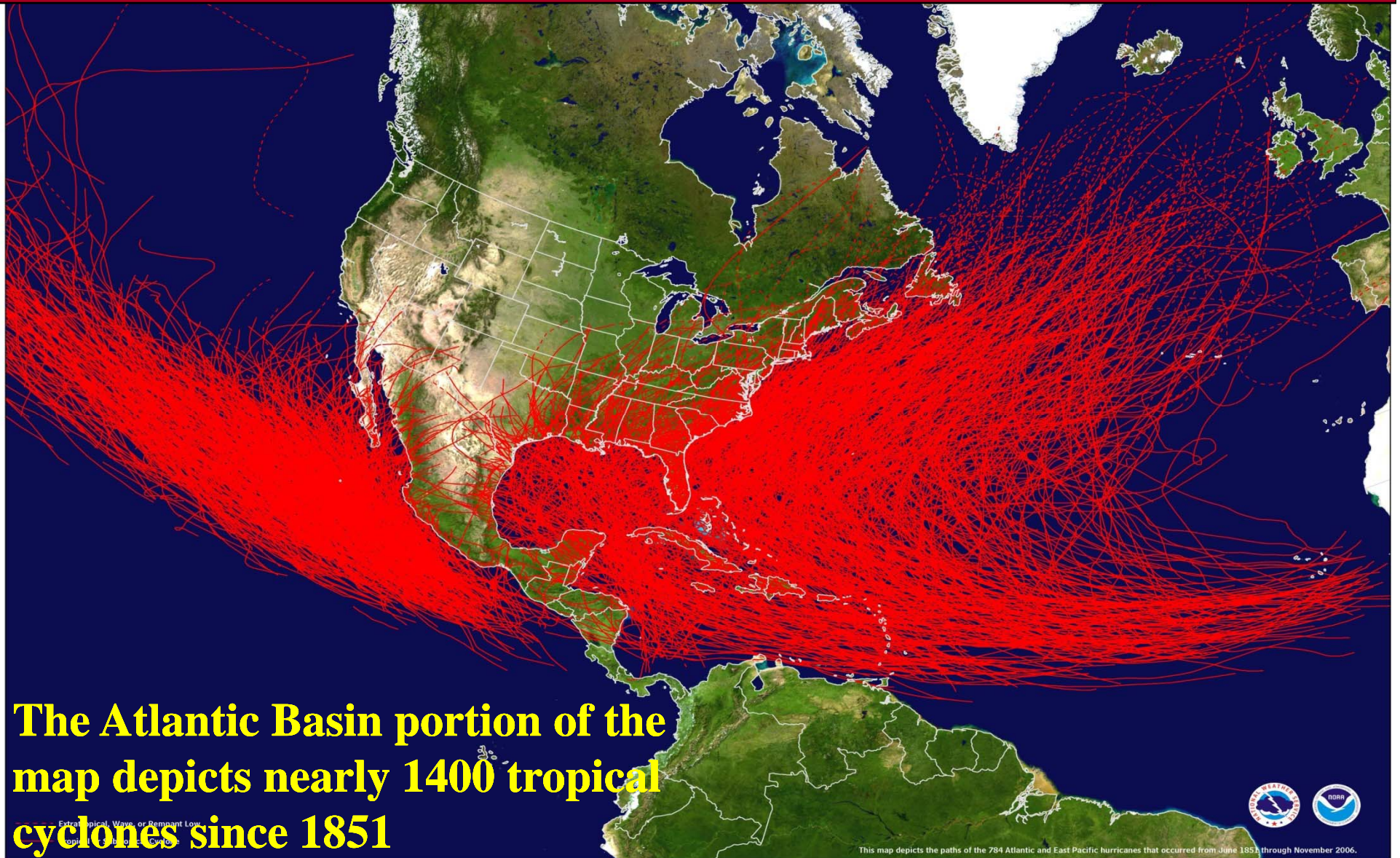
The right-hand image was a significant overestimate but the Dual-Pol product provided a much better estimate.

The way ahead...

- Interdepartmental partnering of TC research and operations, **and...**
- expanded investment in science and technology infusion, **for a stronger...**
- national resiliency against loss of life and costly economic impact.



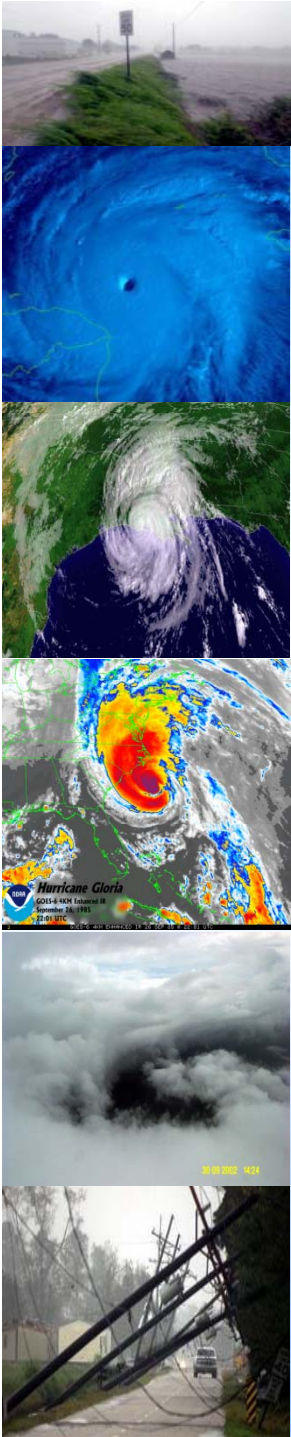
Vulnerable? Yes, but with interdepartmental collaboration, more RESILIENT



The Atlantic Basin portion of the map depicts nearly 1400 tropical cyclones since 1851



This map depicts the paths of the 784 Atlantic and East Pacific hurricanes that occurred from June 1851 through November 2006.



The National Weather Service...

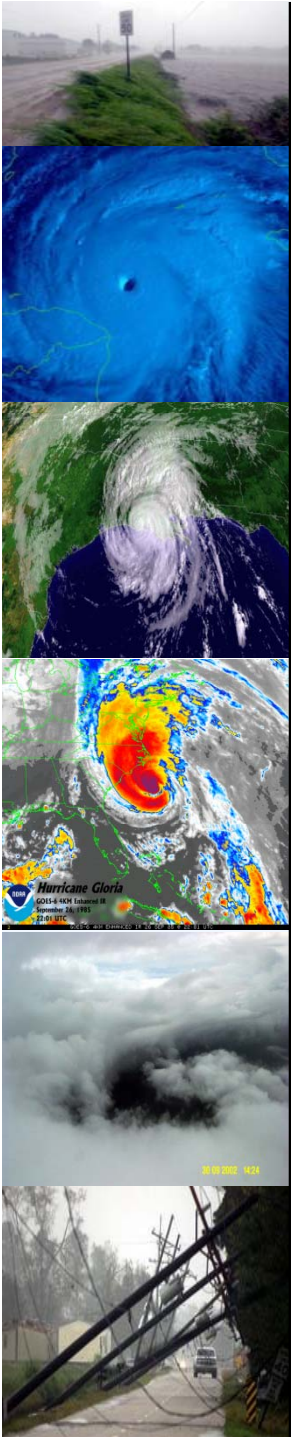
its coastal WFOs, including CPHC, its RFCs and NHC...

is indeed your primary TC warnings partner.

Our seamless suite of timely services is a product of all of NOAA and epitomizes the concept:

...government closest to the people, serves best.





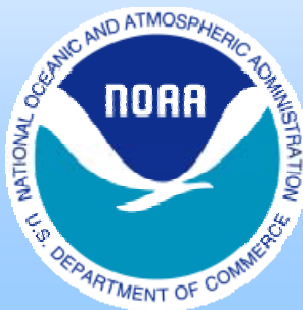
***A nation committed to understanding
severe weather & being prepared
avoids having to learn through tragedy.***

www.SRH.noaa.gov

Click: “Welcome from the Director”

Click under presentations:

“Interdepartmental Hurricane Conference – 03/04/08”



Bill Proenza, Director
National Weather Service Southern Region

