

GIS Products and Services at the National Weather Service in Corpus Christi, Texas

Michael Buchanan

Science and Operations Officer
National Weather Service Corpus Christi TX

Local GIS Team

- Michael Buchanan - Team Lead
- Lara Keys
- Penny Zabel
- Todd Beal
- Tim Tinsley



GIS Products

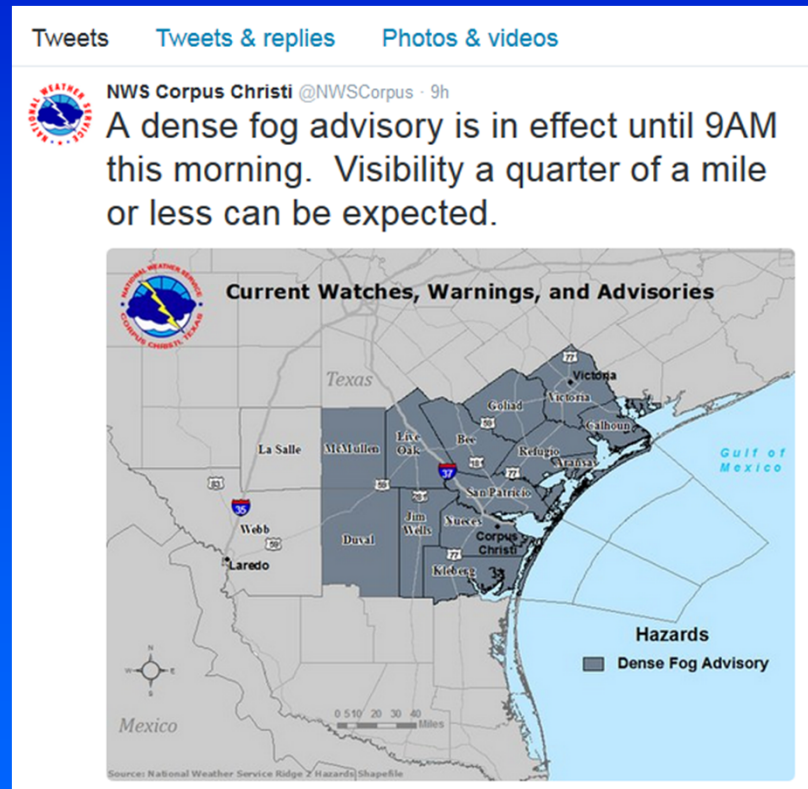
- Observed High and Low Temperatures.
- Observed Daily, Multiday, Monthly, Yearly Rainfall.
- Observed Texas Regional Rainfall.
- Days 1-8 Forecast Elements.
- Long-Fuse Hazards.
- Storm Surge.

GIS Services

- Hourly Surface Observations:
 - Temperature, Dew Point, Wind, Sky/Weather.
 - Waves and Period for Buoys.
- West Gulf Tropical Cyclone Tracks (1851-2014):
 - Wind, Pressure, Storm Surge, Damage Estimate, Fatalities.
 - Ancillary information.

Why produce these?

- Easy comprehension.
- “A picture is worth...”
- Used in:
 - Graphiccasts
 - Social Media Posts
 - Daily Video Briefings
 - Email Briefings
 - Various Web Pages



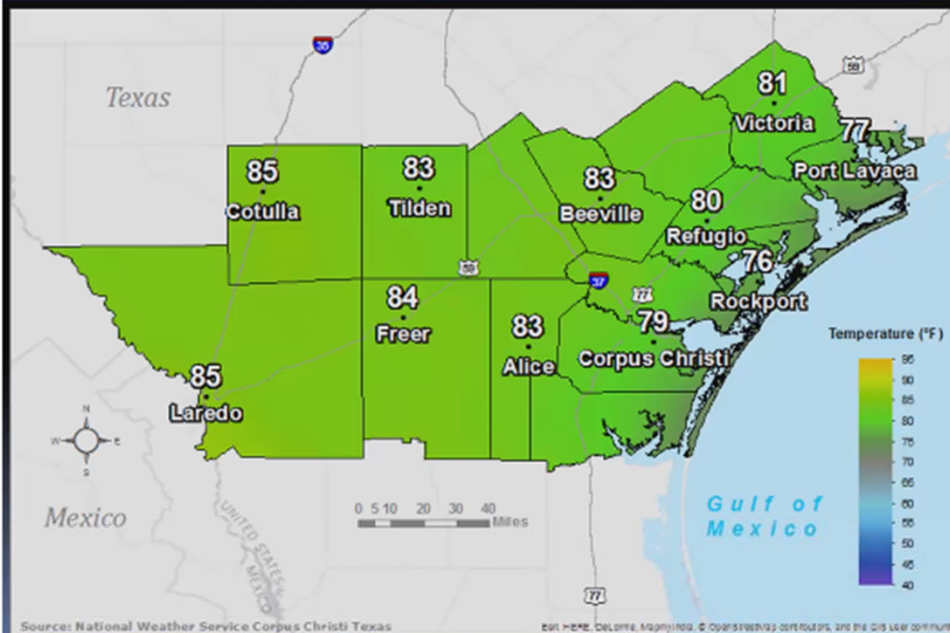
Daily Video Weather Briefing

The video briefing will normally be available by 1000 AM each day.
More frequent updates will occur with significant weather such as tropical cyclones.



Today

Sunny Skies and Warm

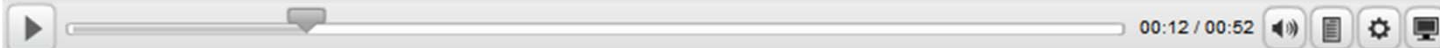


Impacts:



- ☐ Fog this morning lifts giving way to lots of sunshine.
- ☐ Highs mid/upper 70s coast/Victoria to 80 to 85 elsewhere.

Morning clouds and fog lift giving way to plenty of sunshine by the early afternoon. Highs today will be from the mid to upper 70s along the coast and 80 to 85 inland.



Users can view or download the full HD MP4 video below. This is strongly recommended for iPhone users.

[Video Briefing 1080p MP4 file](#)

GIS Processing

- ArcGIS 10.3
- Multiple MXD templates
- Access the MXDs via Python scripting
- “Unlimited design capabilities”

24-Hour Observed Highs, Lows, Rainfall

<http://www.srh.noaa.gov/graphicalweather.php>

City, St Go

XML RSS Feeds

Current Hazards

- Local
- Nationwide
- Outlooks
- Drought

Forecasts

- Local
- Forecast Discussion
- Activity Planner
- Graphical
- Tropical Weather
- Fire Weather
- Aviation Weather
- Marine Weather
- Tide Data
- Quick Forecast
- Hurricane Center
- Storm Surge Threat
- Hurricane Wind Threat

Current Weather

- Observations
- Satellite Images
- Rivers/Lakes
- Rain Estimates

Radar Imagery

- Nationwide
- Local

Climate

- Local
- National
- More...

Norms & Records

- Past Weather Maps**
- Monthly Rainfall
- Regional Rainfall
- Past Tropical Cyclones

Local forecast by "City, St" or Zip Code

City, St Go

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- More...

Norms & Records

- Past Weather Maps**
- Monthly Rainfall
- Regional Rainfall
- Past Tropical Cyclones

Weather Safety

- Get Prepared
- Weather Radio
- SKYWARN
- Hurricane Guide
- Storm Surge Maps
- Guida de Huracanes
- Hurricane Safety
- Flood Safety
- Outdoor Safety

Additional Info

- Major Events
- South-TX Wx Journal
- Educational Resource
- Local Resources
- CoCoReps

Contact Us

Graphical Weather Review - Experimental

Product Description Document | Survey

Select Date:

24 Hour Rainfall Ending 7 AM January 2, 2016

Rainfall (Inches)

- 0.01 - 0.09
- 0.10 - 0.24
- 0.25 - 0.49
- 0.50 - 0.74
- 0.75 - 0.99
- 1.00 - 1.49
- 1.50 - 1.99
- 2.00 - 2.49
- 2.50 - 2.99
- 3.00 - 3.99
- 4.00 - 4.99
- 5.00 - 5.99
- 6.00 - 7.99
- 8.00 - 9.99
- 10.00 +

This information is not official and should be considered as an estimation. Trace amounts not shown. Source: ASOS, AWOS, AHPS, CoCoReps and Co-Op observers.

Click on either of the two thumbnail images below for the corresponding full-size image.

High Temperatures

Low Temperatures

24 Hour Highs Ending 7 AM January 2, 2016

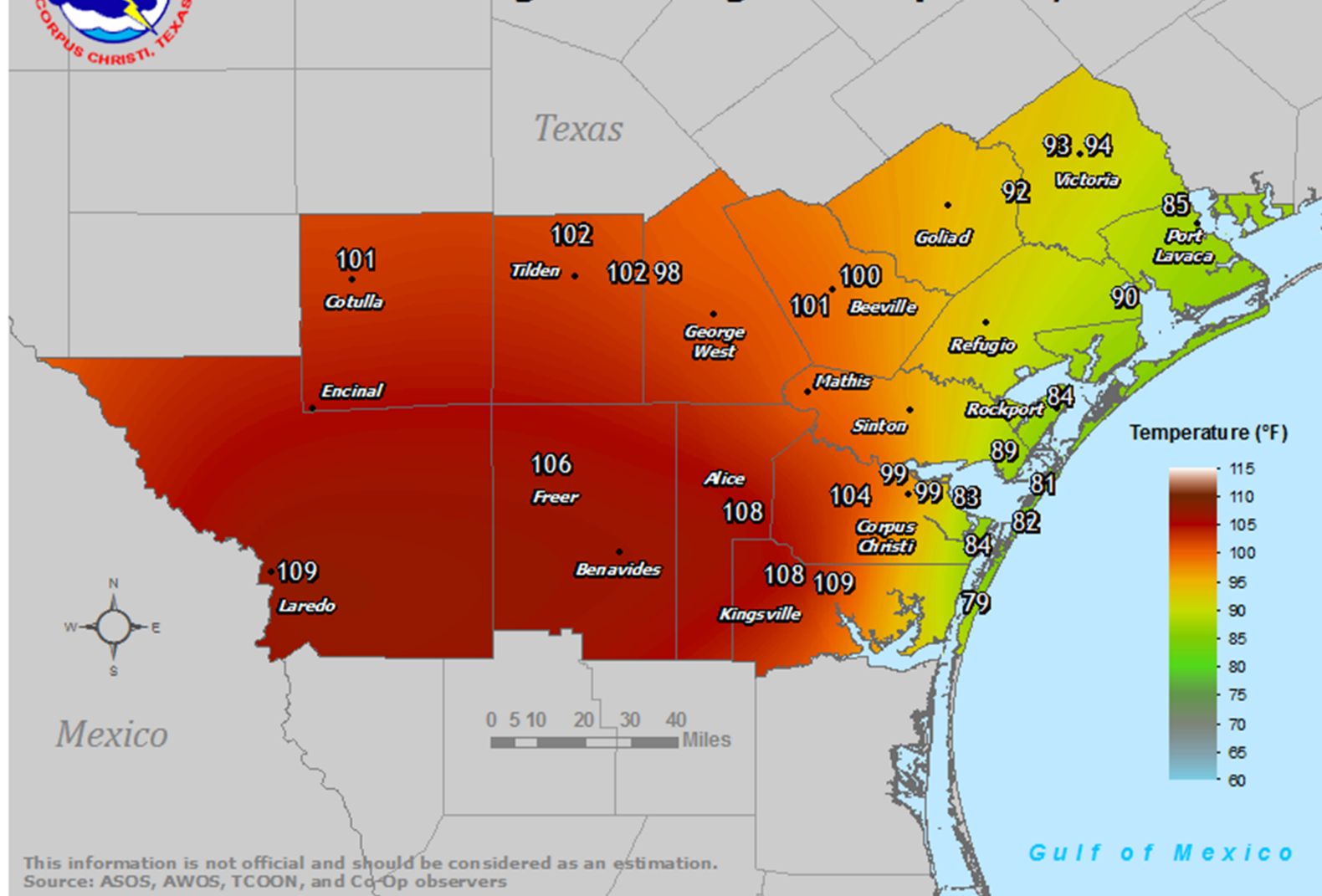
24 Hour Lows Ending 7 AM January 2, 2016

South Texas Daily Rainfall, High Temperature, and Low Temperature KMZ Files:

- Daily Rainfall for 01/02/2016
- High Temperatures for 01/02/2016
- Low Temperatures for 01/02/2016

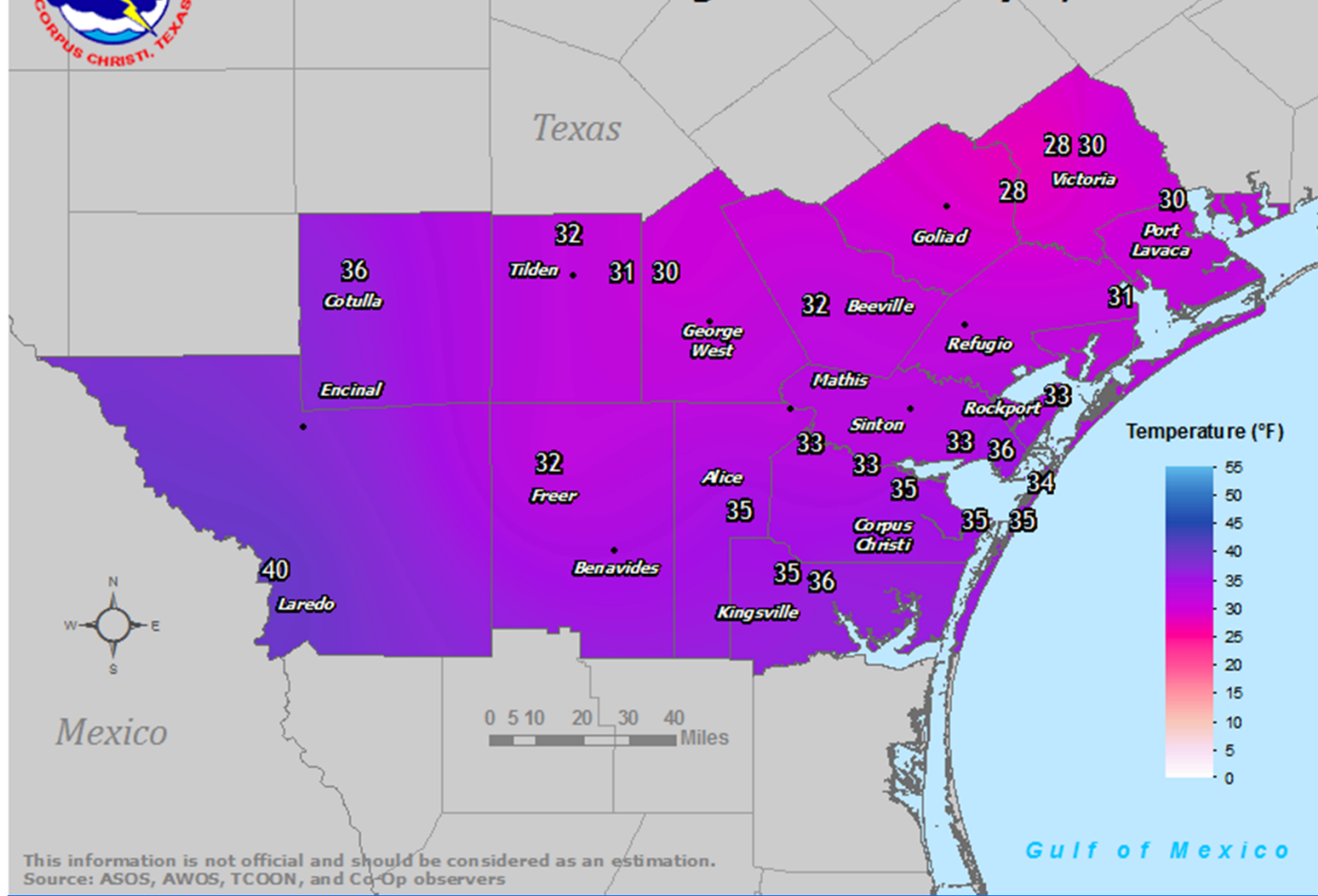


24 Hour Highs Ending 7 AM April 28, 2014

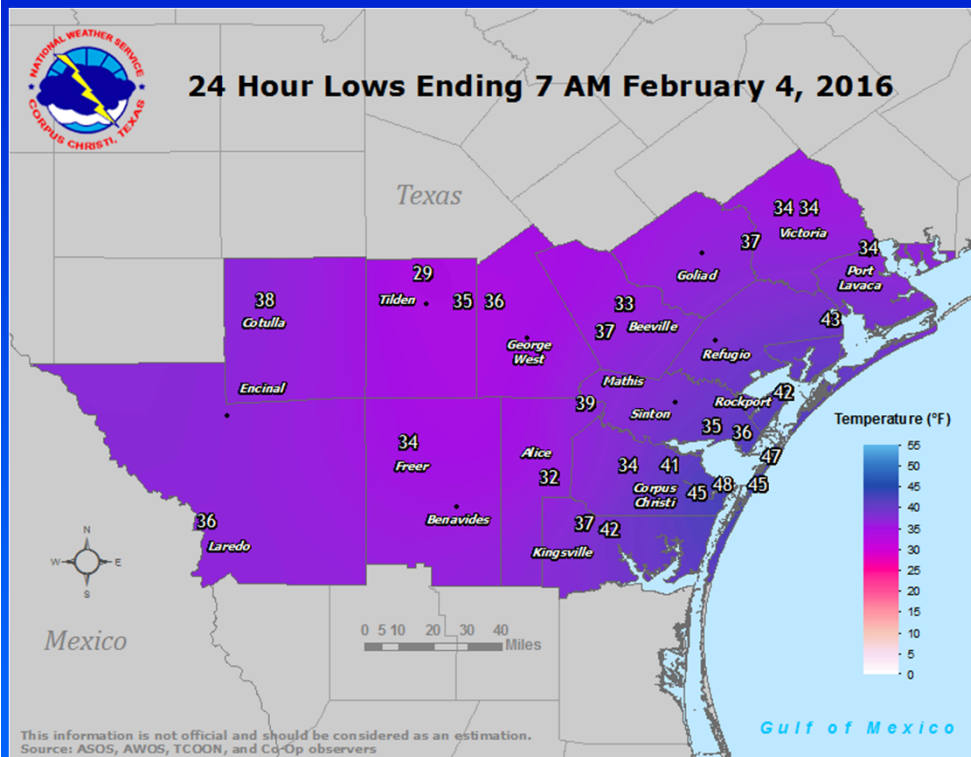




24 Hour Lows Ending 7 AM January 9, 2015



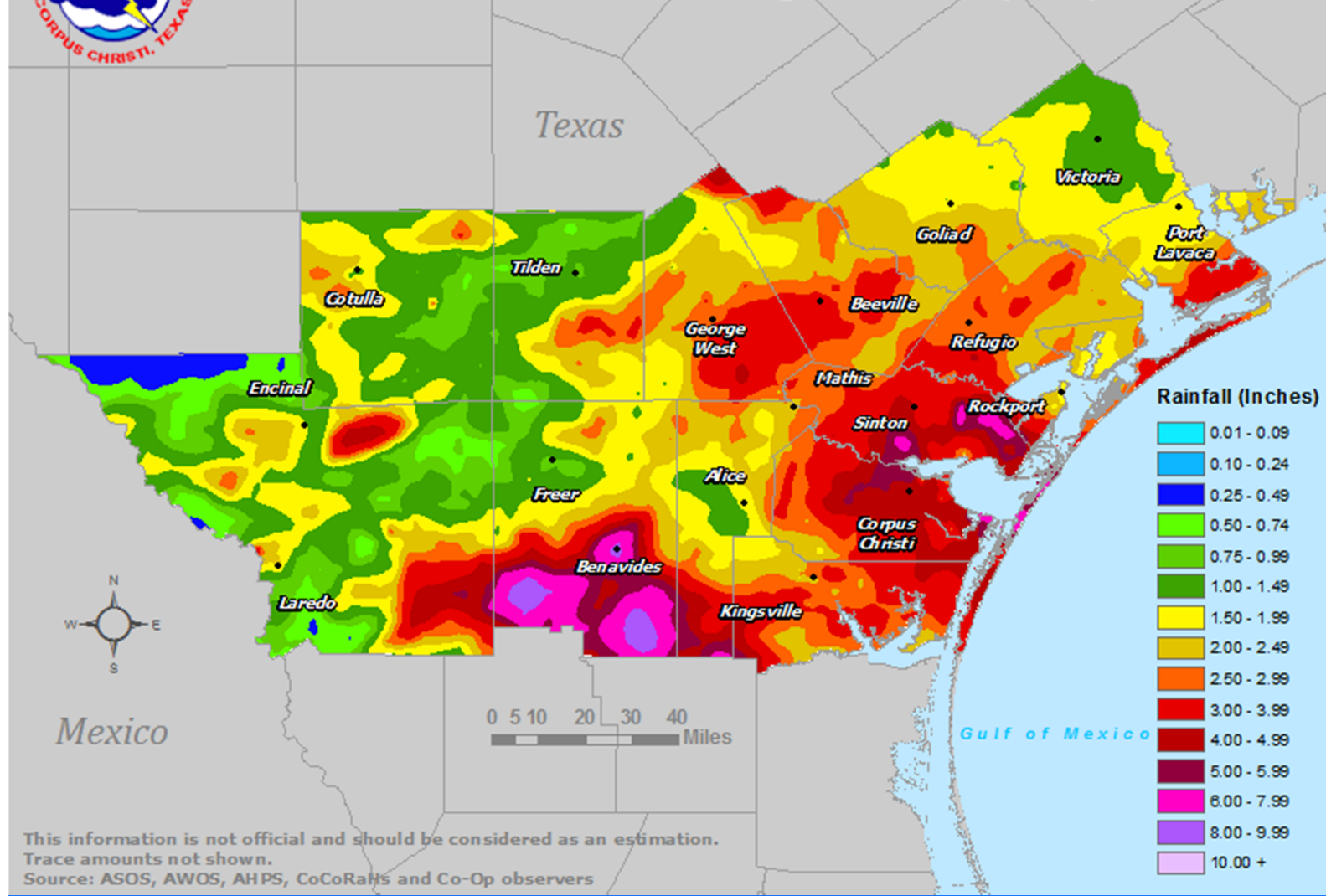
Methodology for Observed Temps



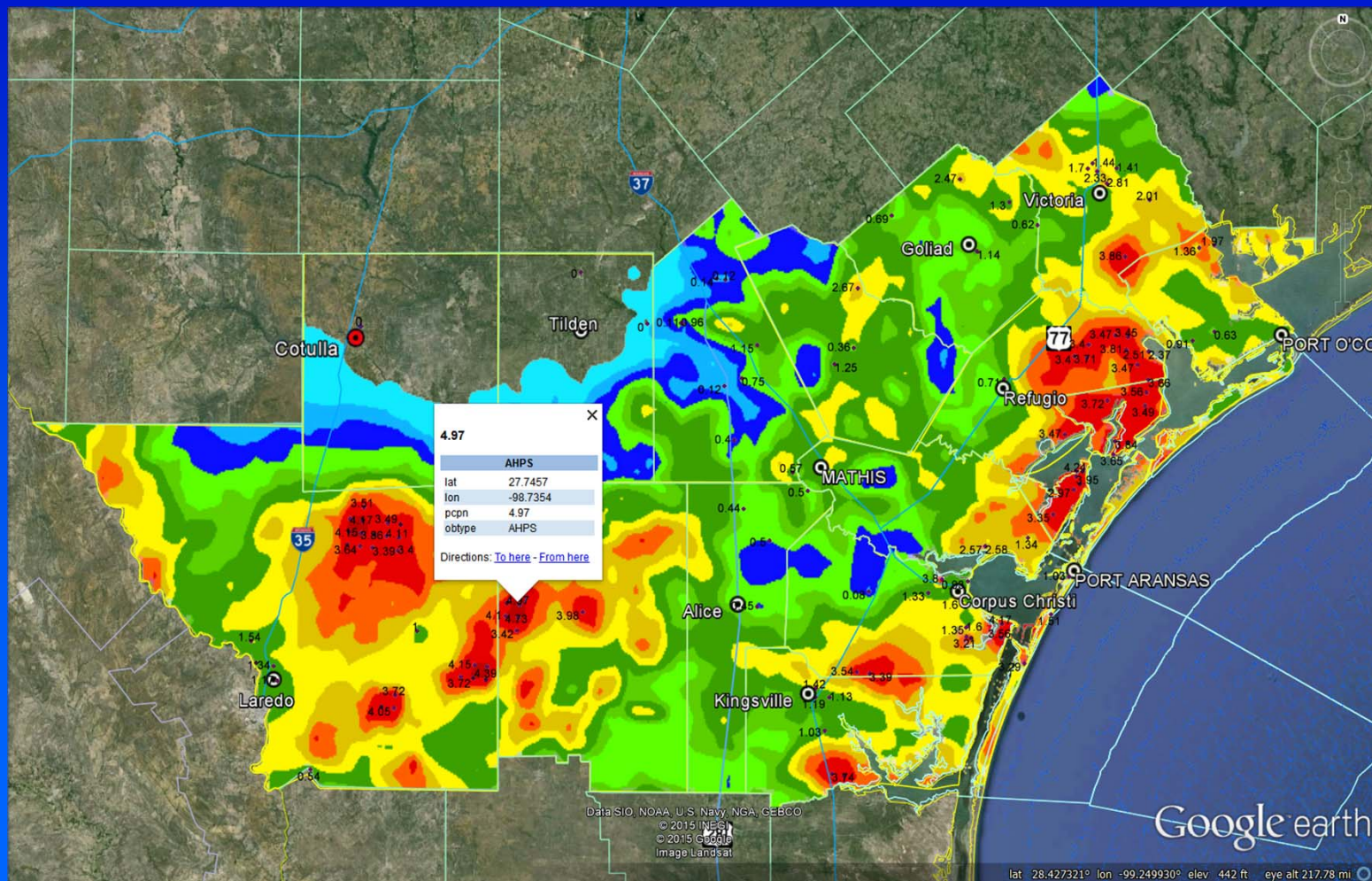
- Decode ASOS, AWOS, and Co-Op observations.
- Kriging Spatial Analysis.
- Dynamic color bar based on min & max values.
 - Numerical Python.



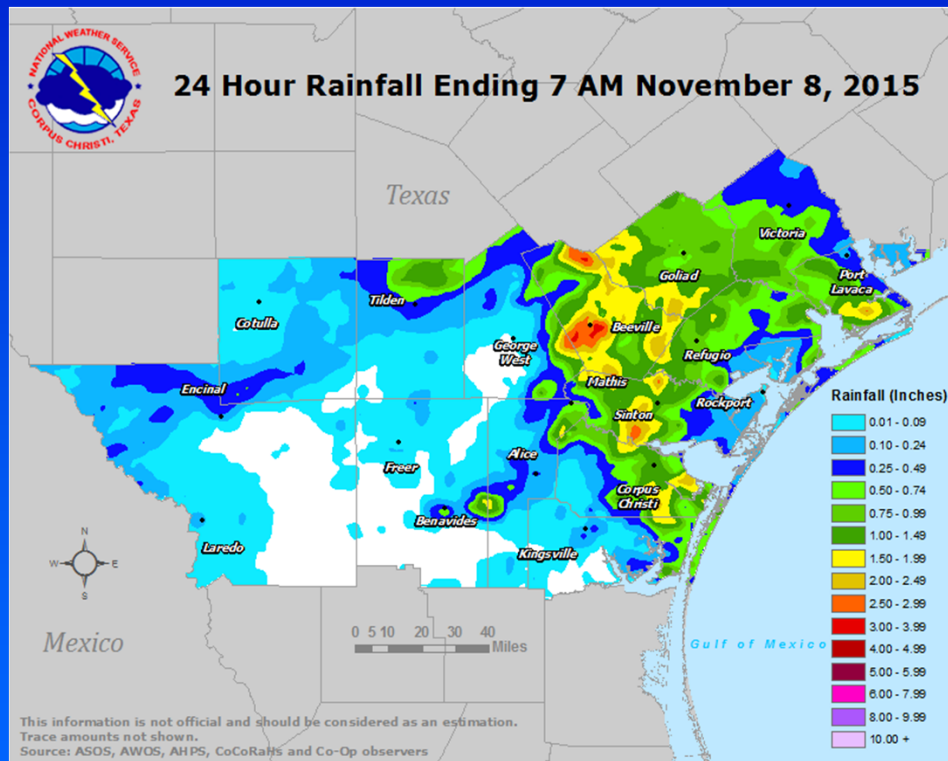
24 Hour Rainfall Ending 7 AM May 12, 2015



KMZ files



Methodology for Observed Rainfall



- Merge Rain Gauge Data with AHPs.
 - Advanced Hydrologic Prediction System shapefiles
- Generate a CSV.
- Natural Neighbor Spatial Analysis.
- Color bar adjusts based on max.

Monthly and Yearly Rainfall

Local forecast by
"City, St" or Zip Code

City, St Go

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Past Tropical

Cyclones

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SKYWARN

Hurricane Guide

Storm Surge Maps

Guía de Huracanes

Hurricane Safety

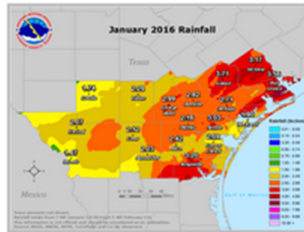
Observed Monthly Rainfall for South Texas

Click thumbnail images below for full-size images.

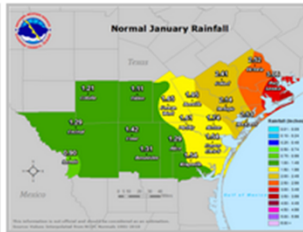
January 2016

<http://www.srh.noaa.gov/crp/?n=monthlyrainfall>

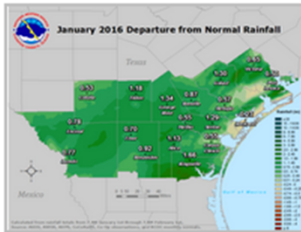
Observed Rainfall



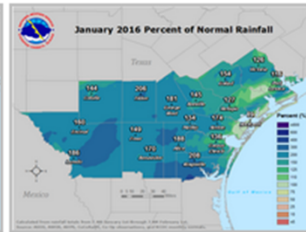
Normal Rainfall



Departure from Normal Rainfall

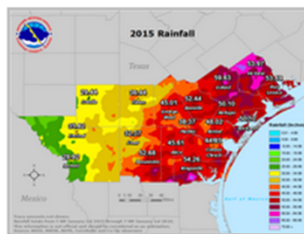


Percent of Normal Rainfall

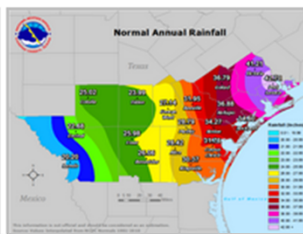


Annual 2015

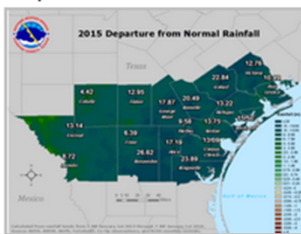
Observed Rainfall



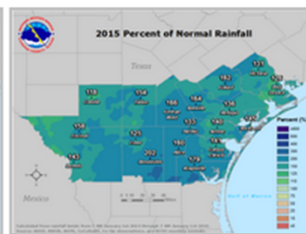
Normal Rainfall



Departure from Normal Rainfall

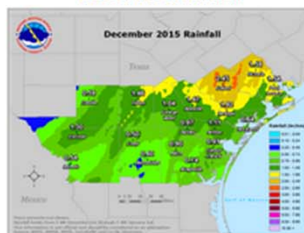


Percent of Normal Rainfall



December 2015

Observed Rainfall



Normal Rainfall



Departure from Normal Rainfall

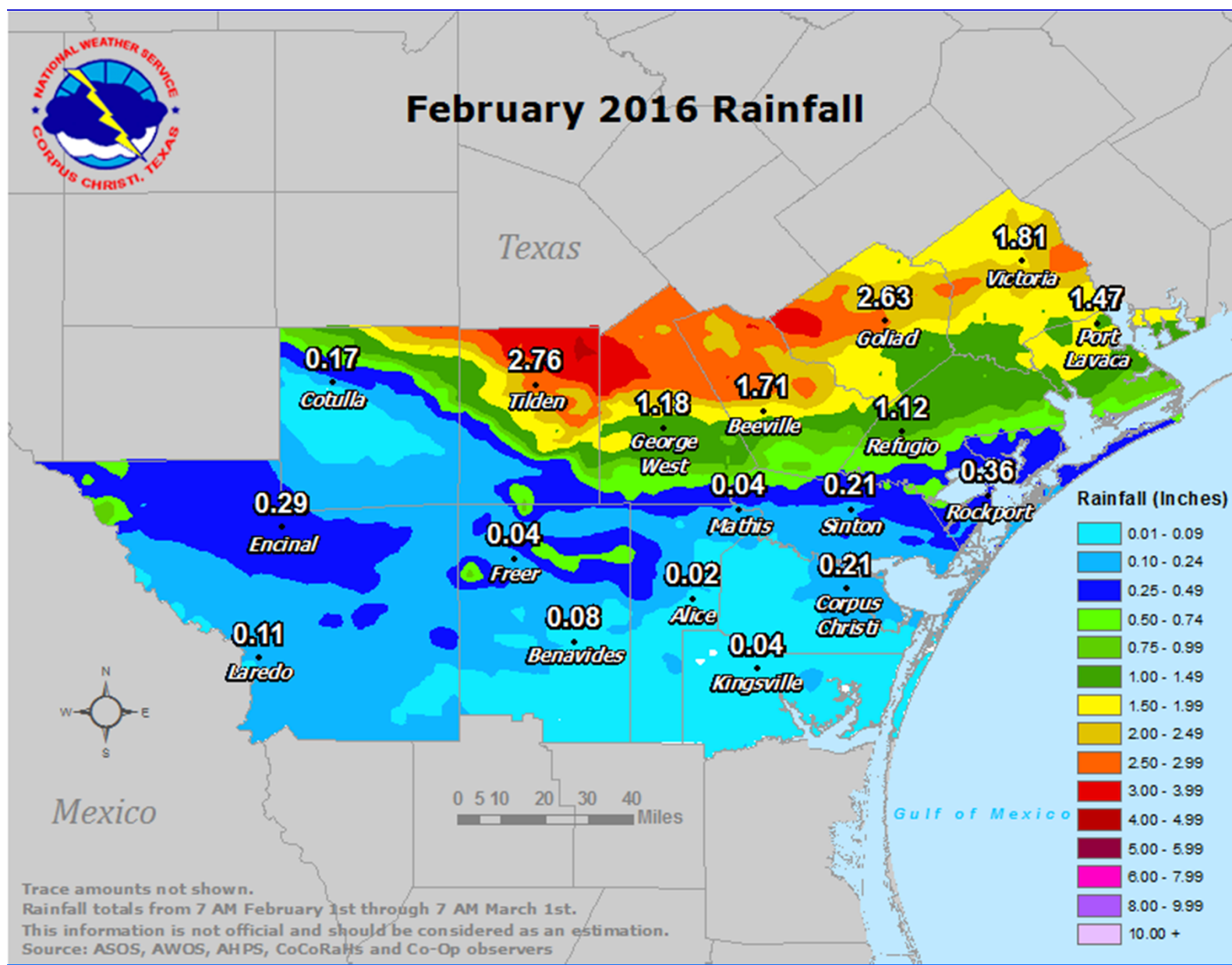


Percent of Normal Rainfall



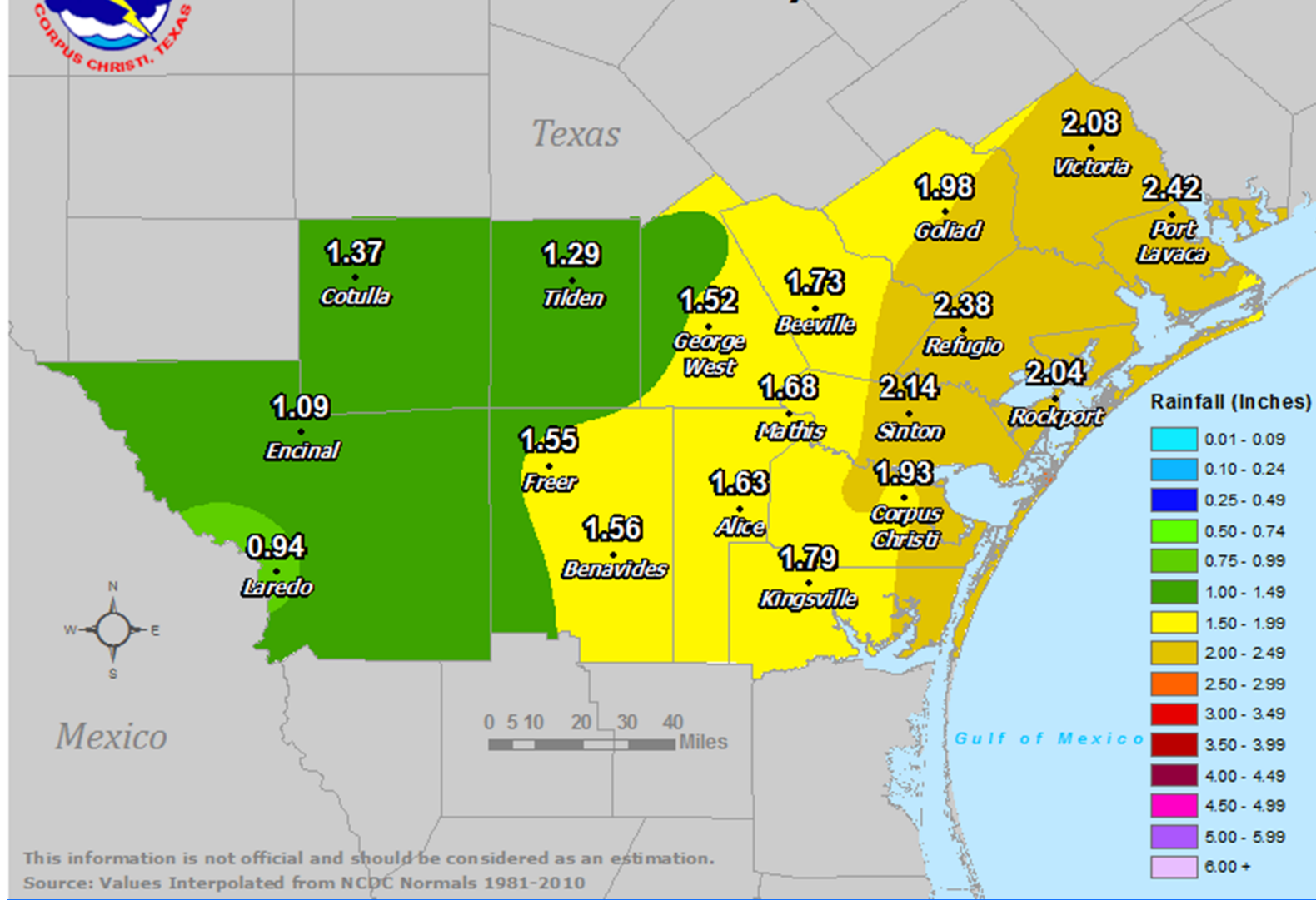


February 2016 Rainfall



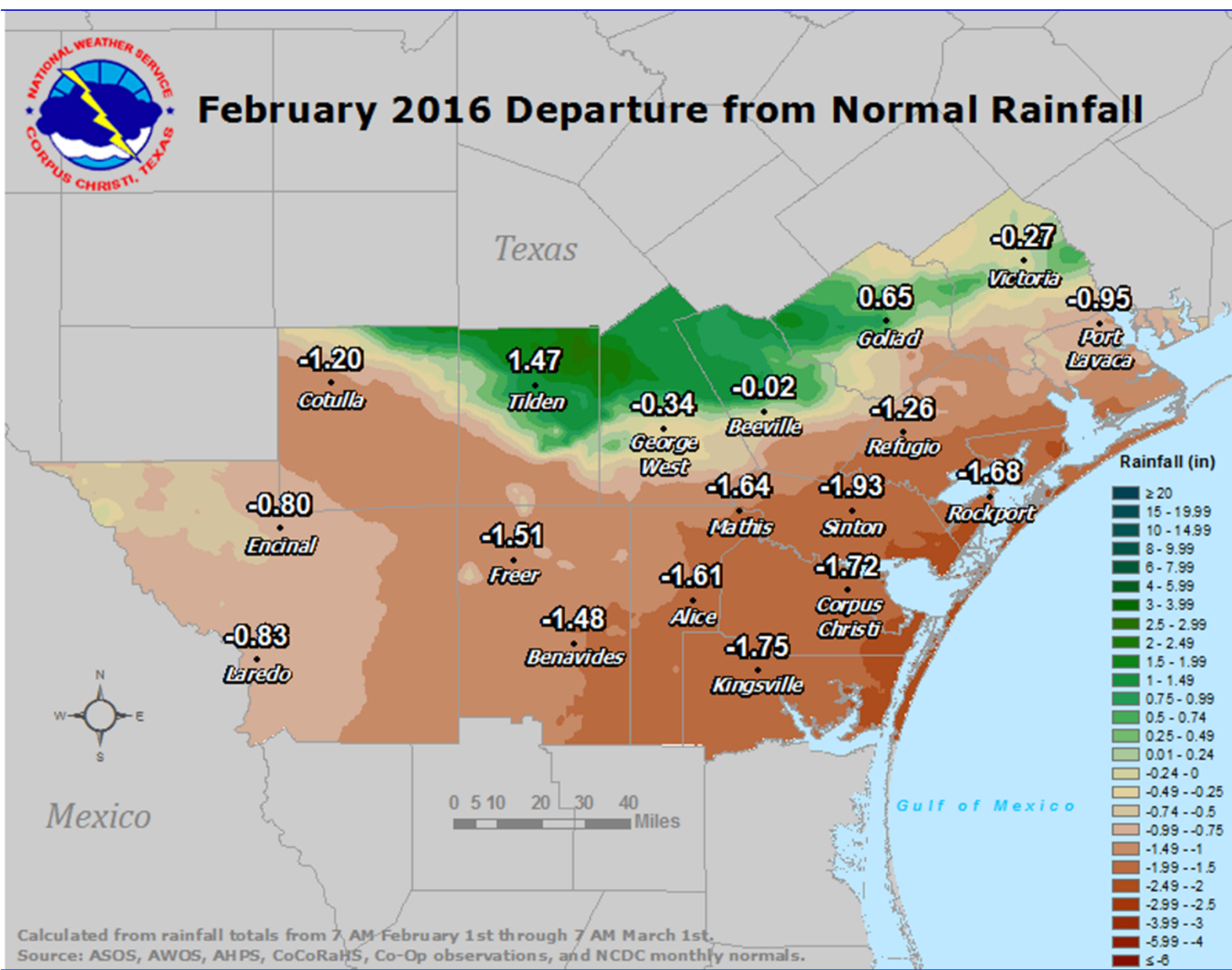


Normal February Rainfall



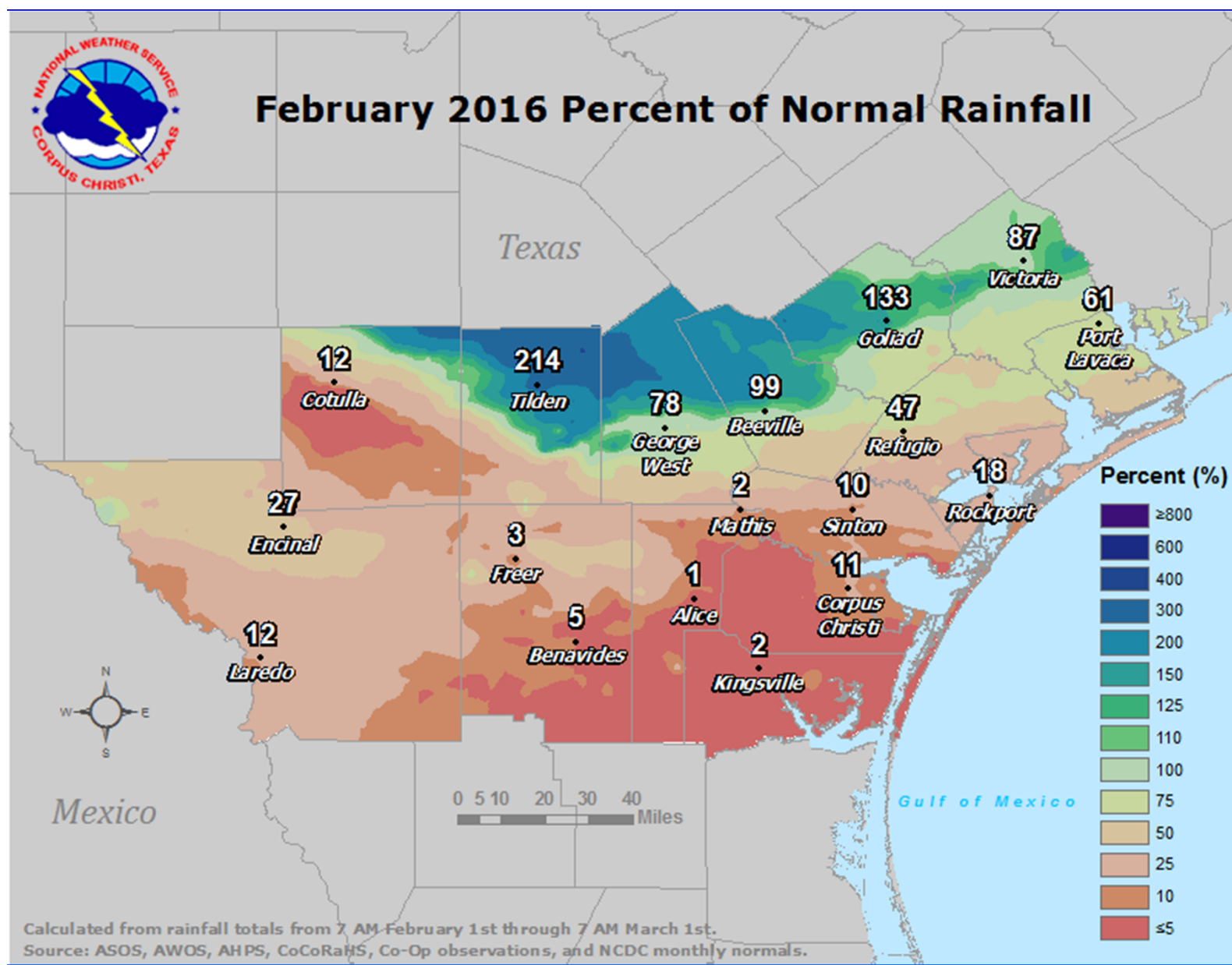


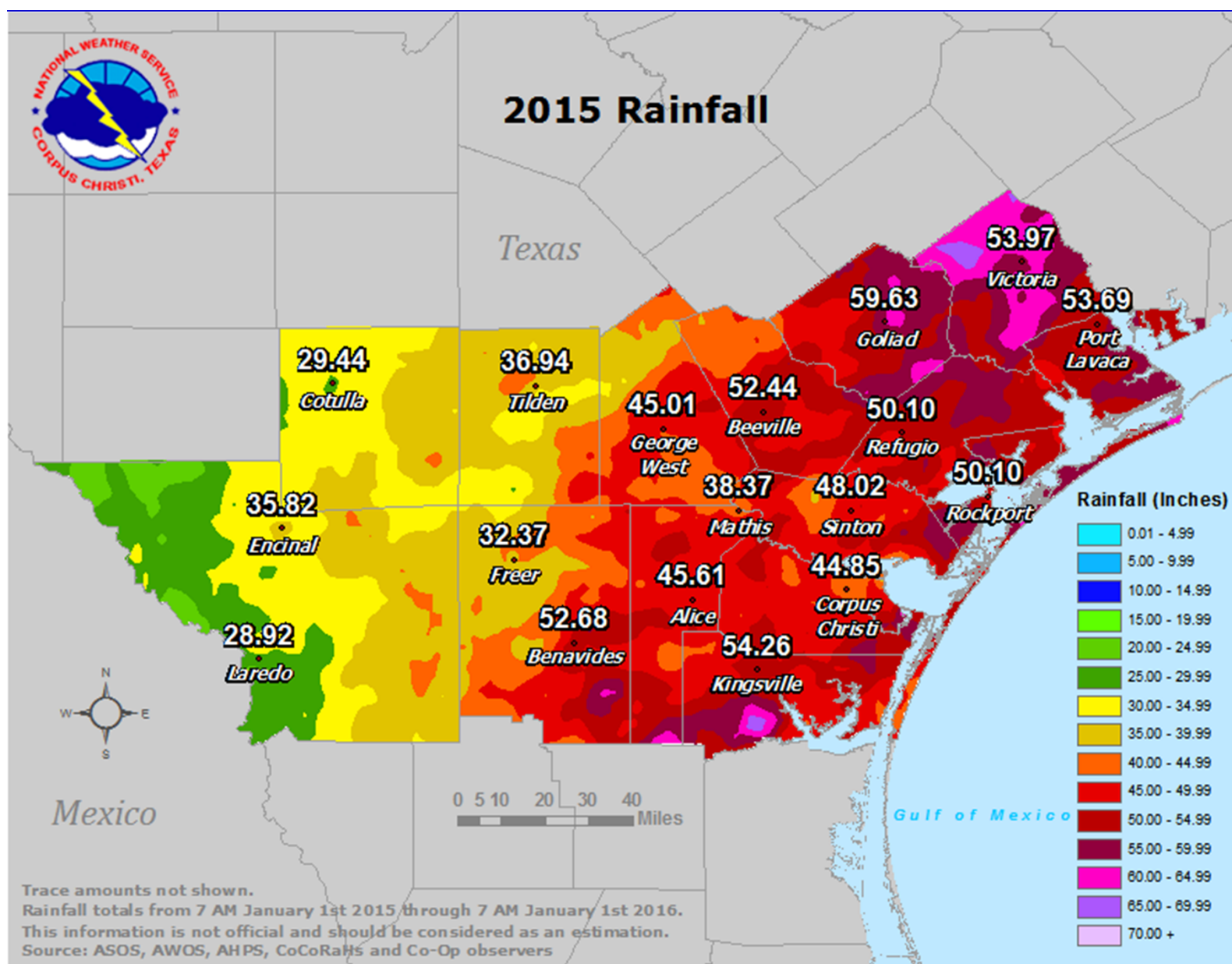
February 2016 Departure from Normal Rainfall



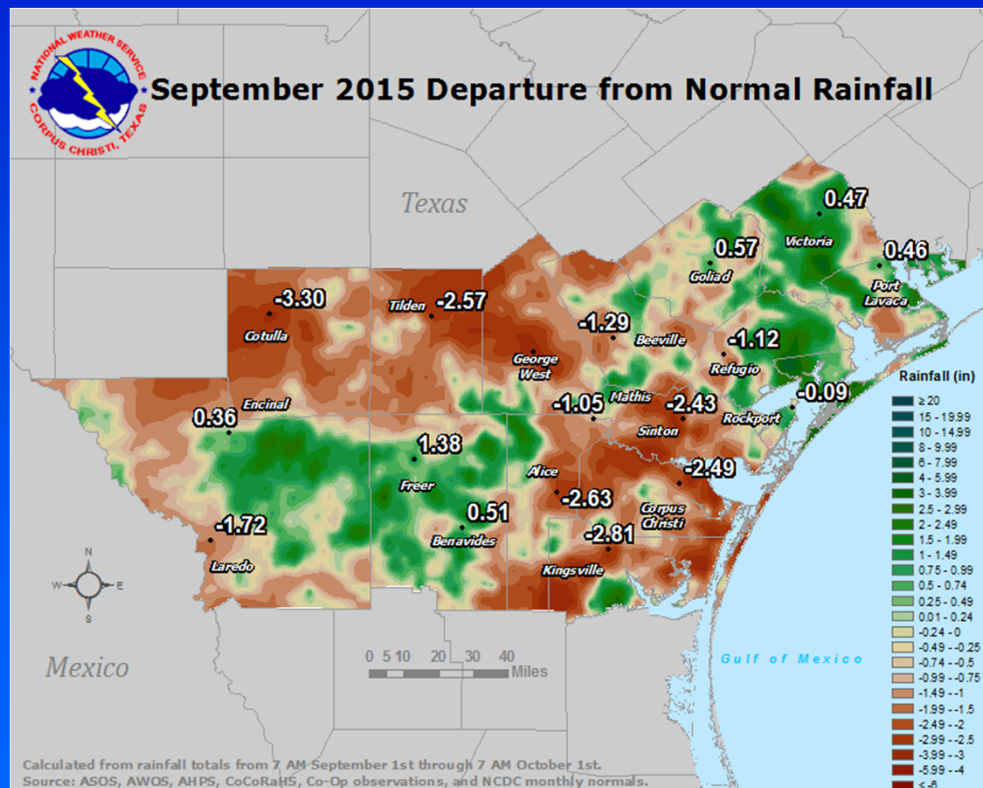


February 2016 Percent of Normal Rainfall



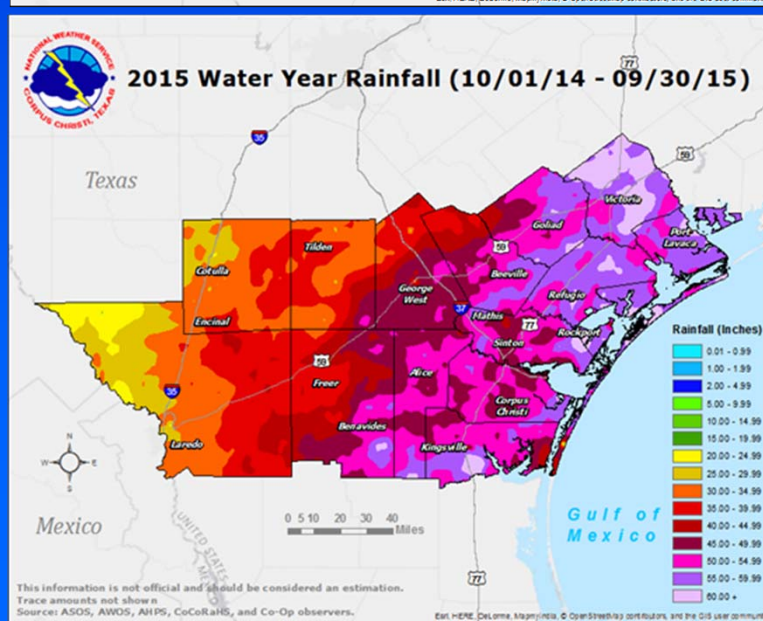
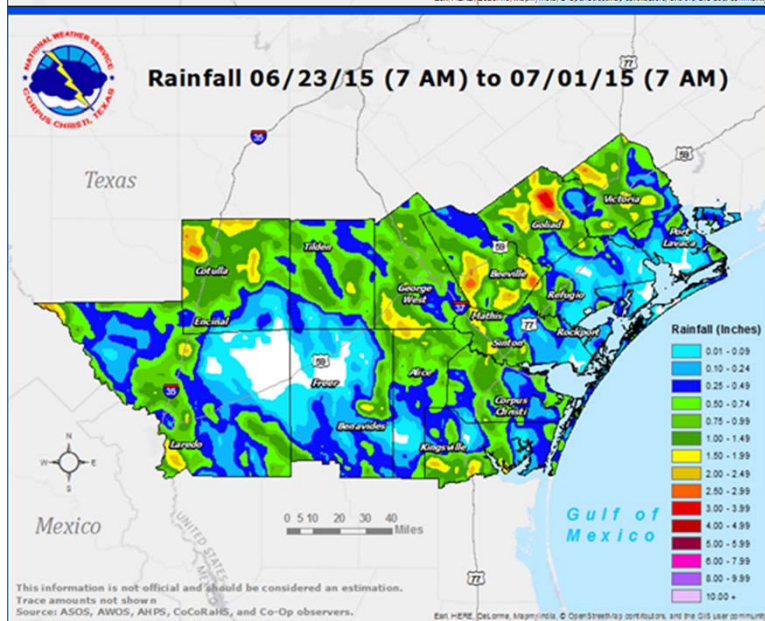
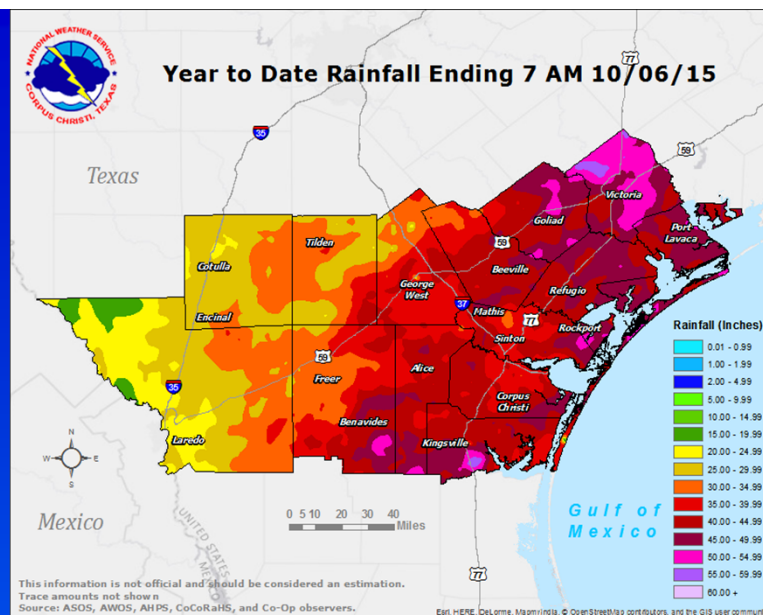
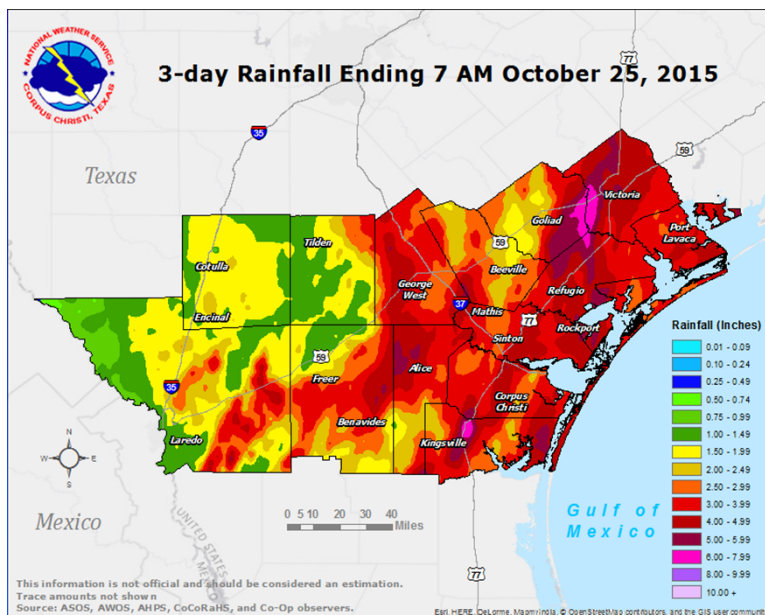


Methodology for Monthly/Yearly Rainfall

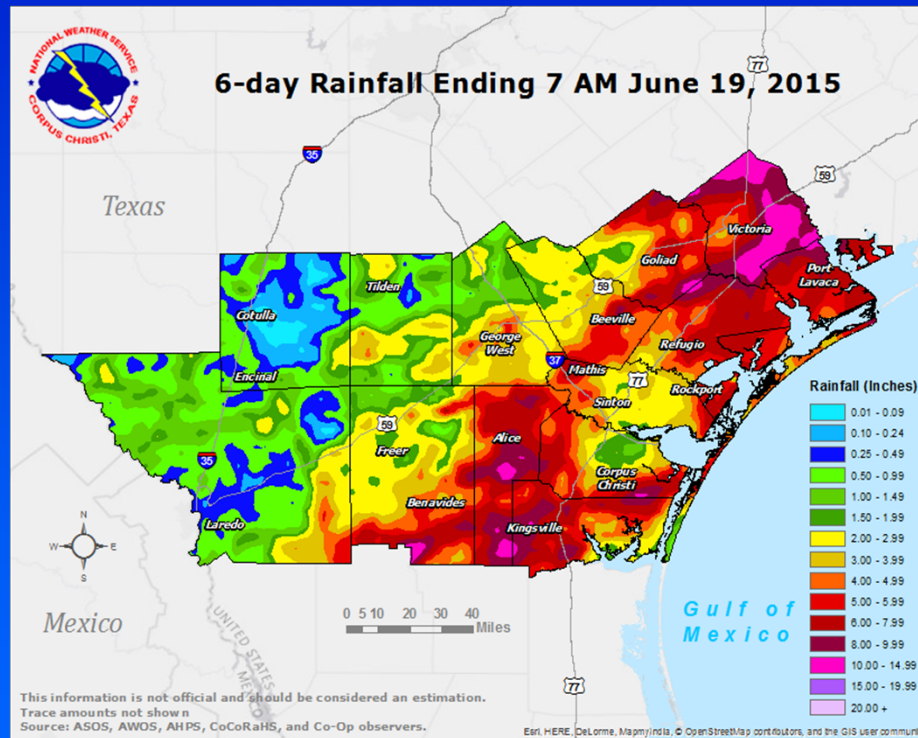


- Add up Daily Rainfall CSVs using Python.
- Use Raster Math Toolset for the Departure and Percent maps.

Multiday Rainfall



Methodology for Multiday Rainfall



- Capability to produce maps for 2 or more days.
- Add up Daily Rainfall CSVs.
- Social Media Posts, Graphicasts, Web Write-Ups on Heavy Rain events.

Texas Regional Rainfall Maps
Implemented on Dec 1, 2015
(Experimental)

Texas Regional Rainfall Project Team

- Michael Buchanan (CRP) - Team Lead
- Melissa Huffman (HGX)
- Erin Billings (BRO)
- Jared Allen (EWX)
- Nick Hampshire (EWX)
- Eric Platt (EWX)
- Jon Zeitler (EWX)



http://www.srh.noaa.gov/crp/?n=texas_regional_rainfall

City, St Go

XML RSS Feeds

Current Hazards

- Local
- Nationwide
- Outlooks
- Drought

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- Hurricane Wind Threat

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Home Site Map News Organization Search for: NWS All NOAA

Observed Texas Regional Rainfall Maps - 24-Hour, 48-Hour, 72-Hour, Weekly
New images will normally be available by noon each day.

Enter the Date of Interest:

24 Hour Regional Rainfall Totals
Valid: 01/02/2016 at 7 AM

Click the thumbnail images below to see the corresponding fullsize image

48-Hour Rainfall 72-Hour Rainfall Weekly Rainfall

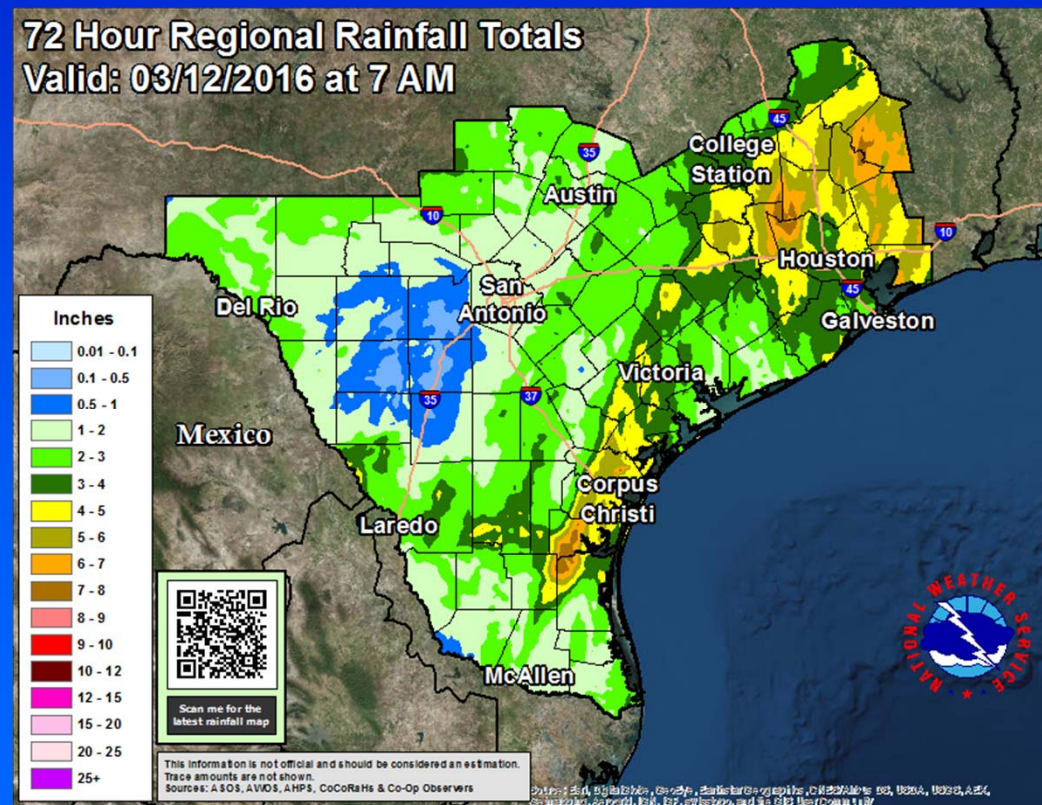
48 Hour Regional Rainfall Totals
Valid: 01/02/2016 at 7 AM

72 Hour Regional Rainfall Totals
Valid: 01/02/2016 at 7 AM

Weekly Regional Rainfall Totals
Valid: 01/02/2016 at 7 AM

Methodology for Texas Regional Rainfall

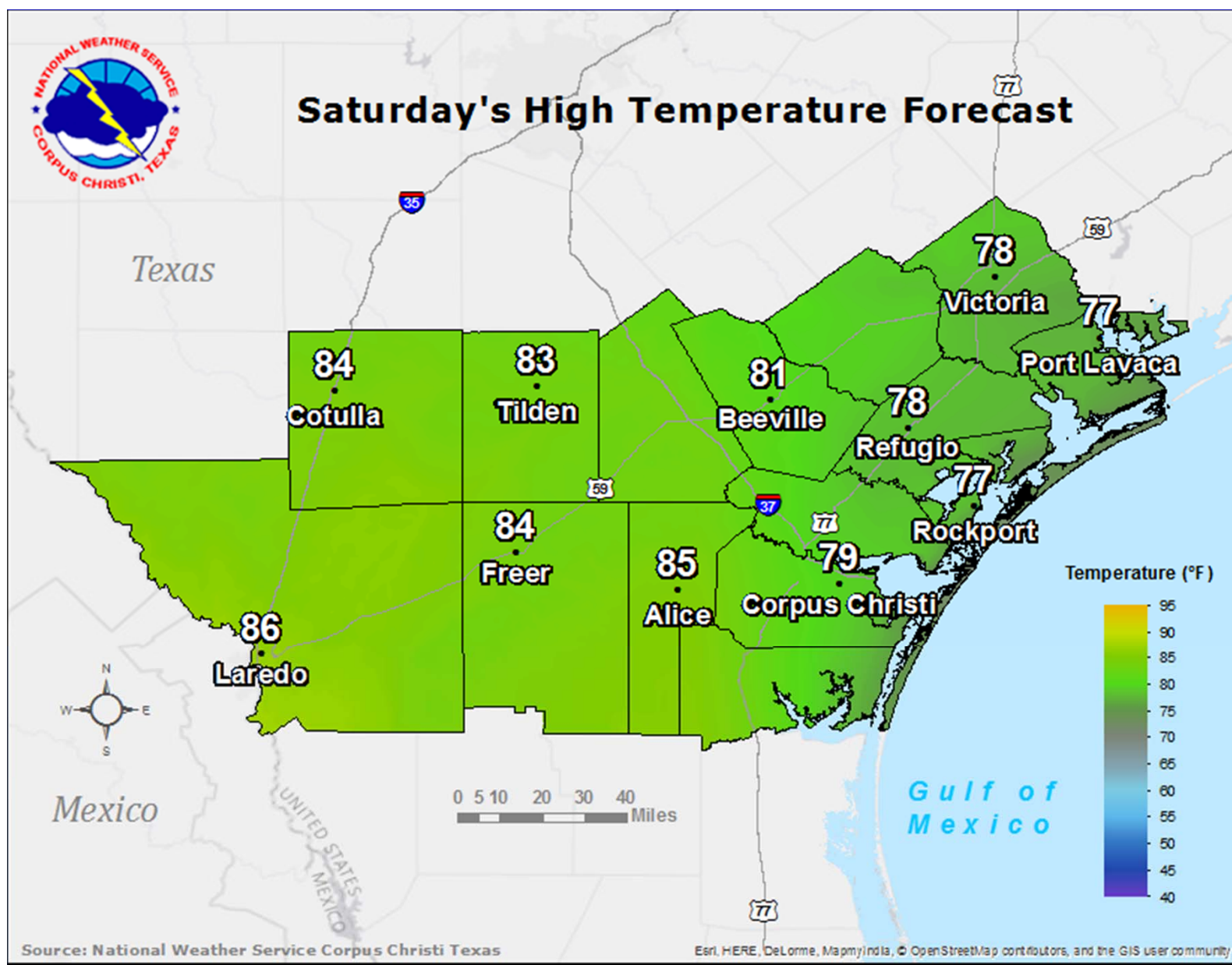
- Only use AHPS daily & weekly shapefiles.
- Sum rasters to produce 48-hour and 72-hour maps.



Days 1-8 Forecast Elements

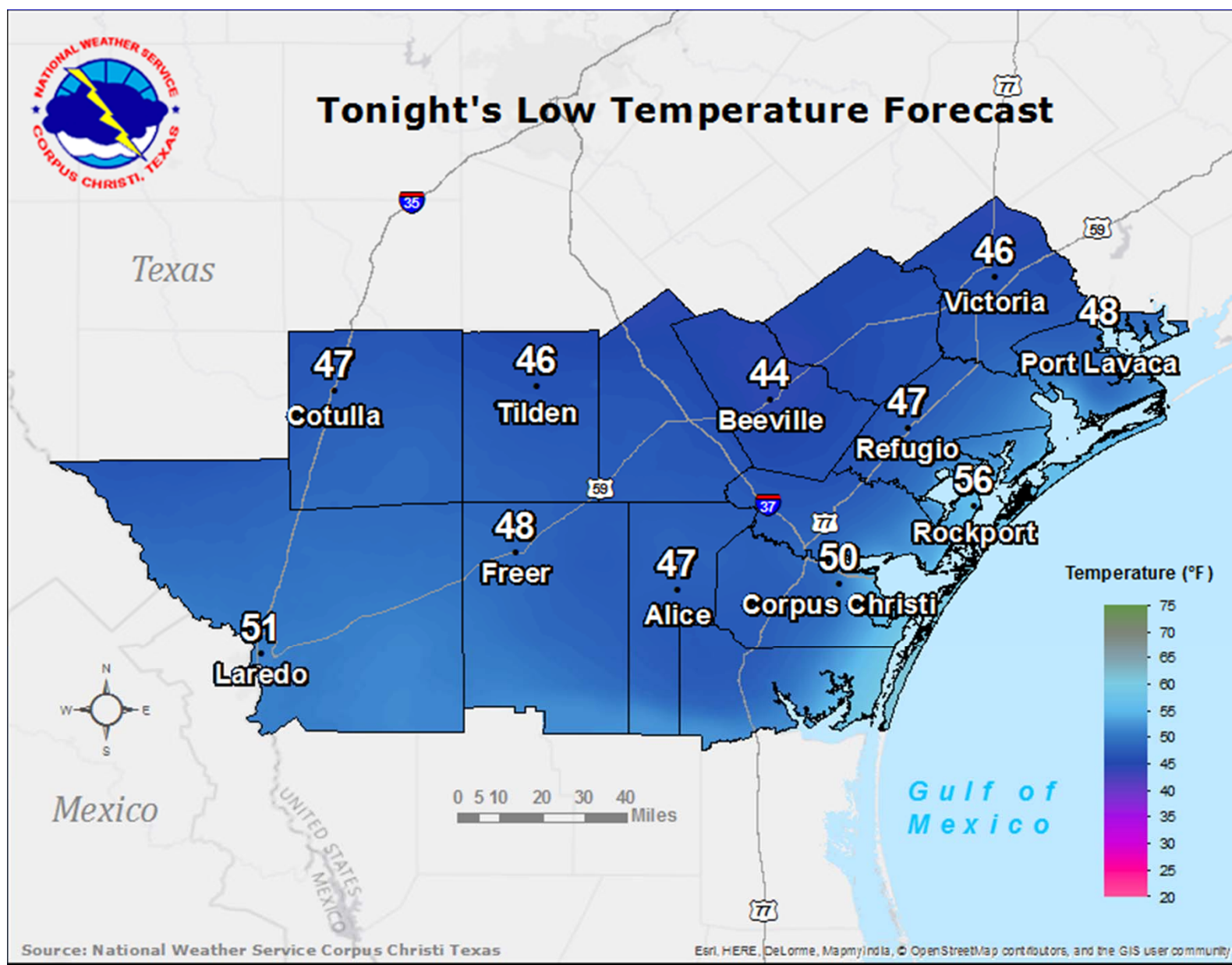


Saturday's High Temperature Forecast



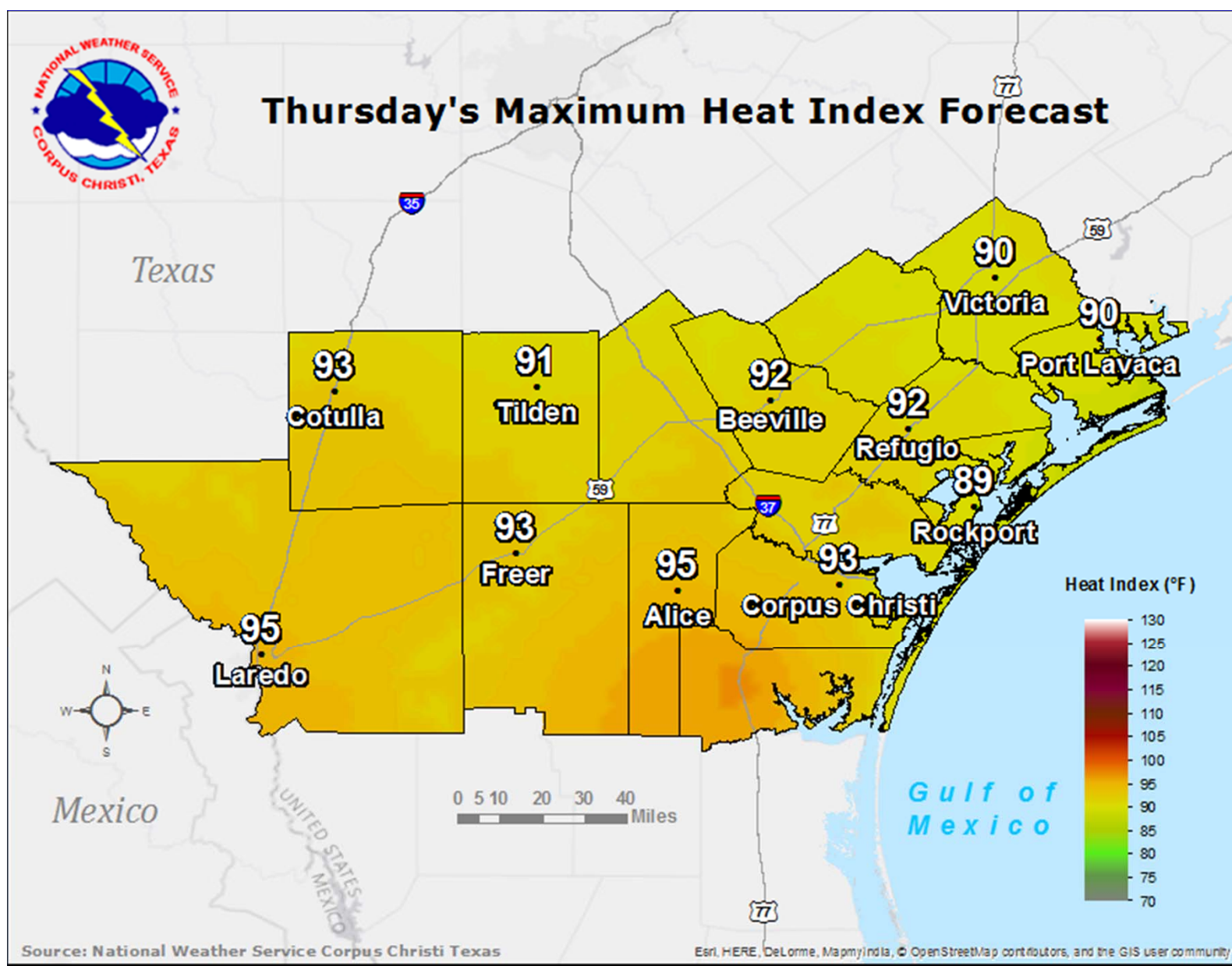


Tonight's Low Temperature Forecast



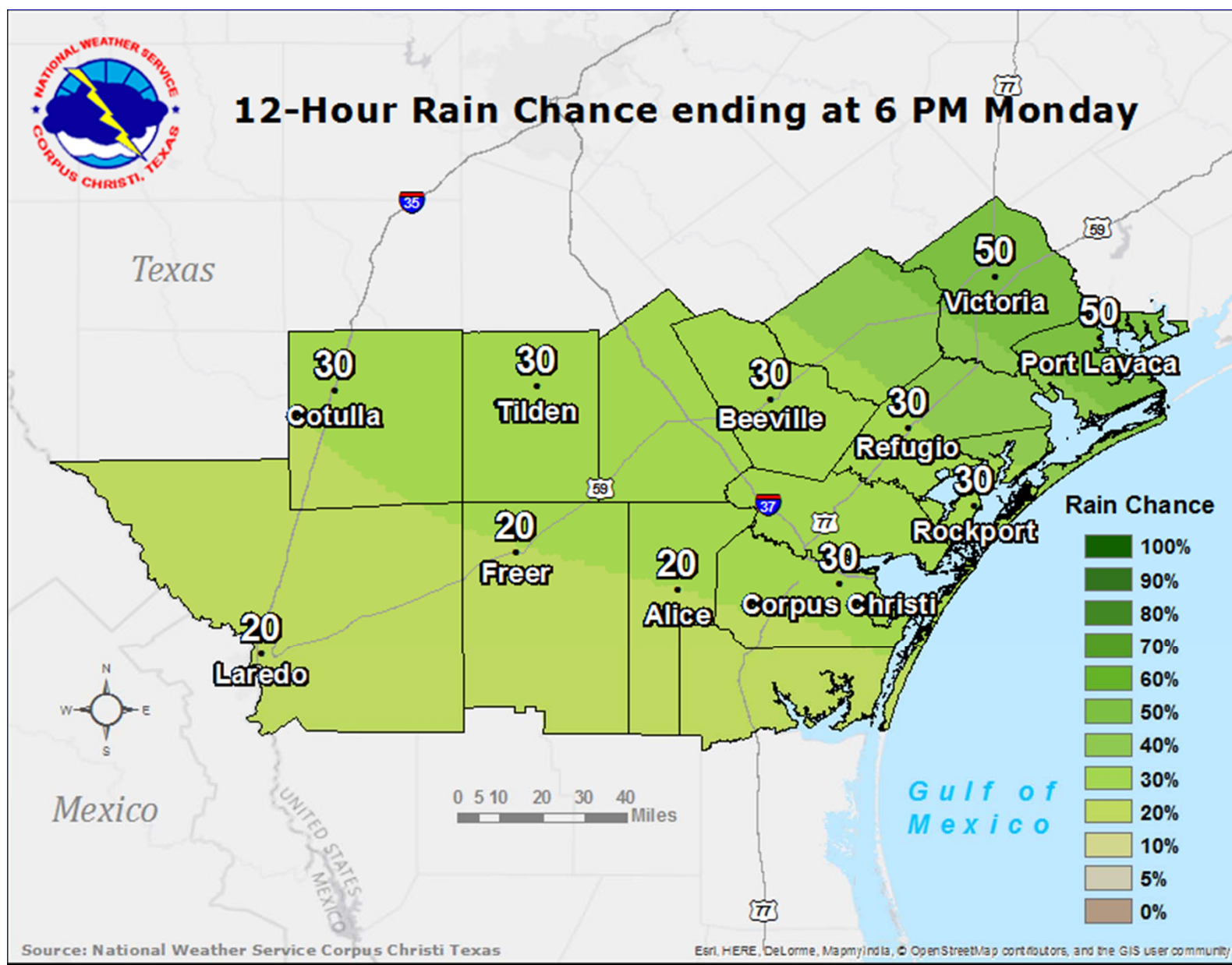


Thursday's Maximum Heat Index Forecast



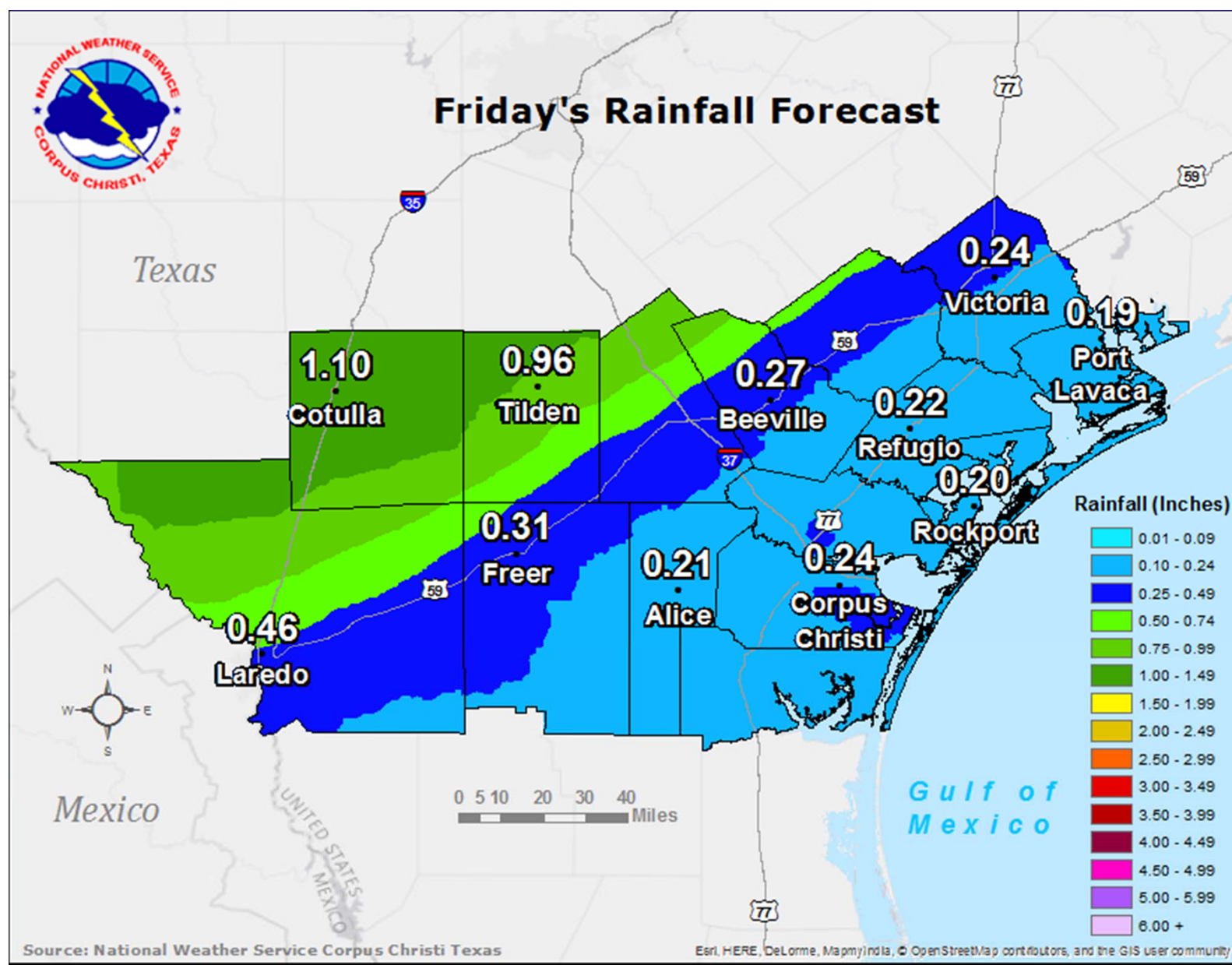


12-Hour Rain Chance ending at 6 PM Monday



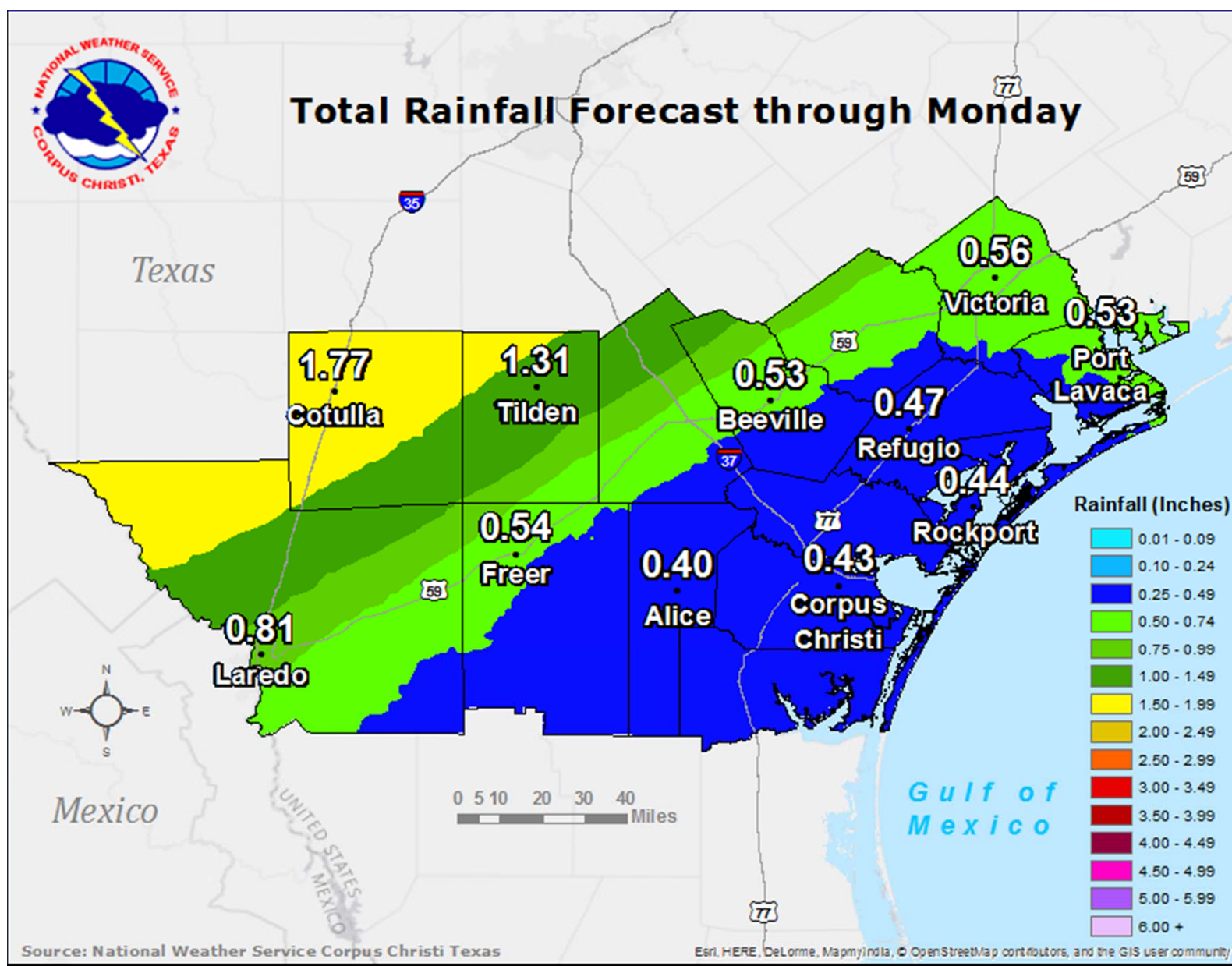


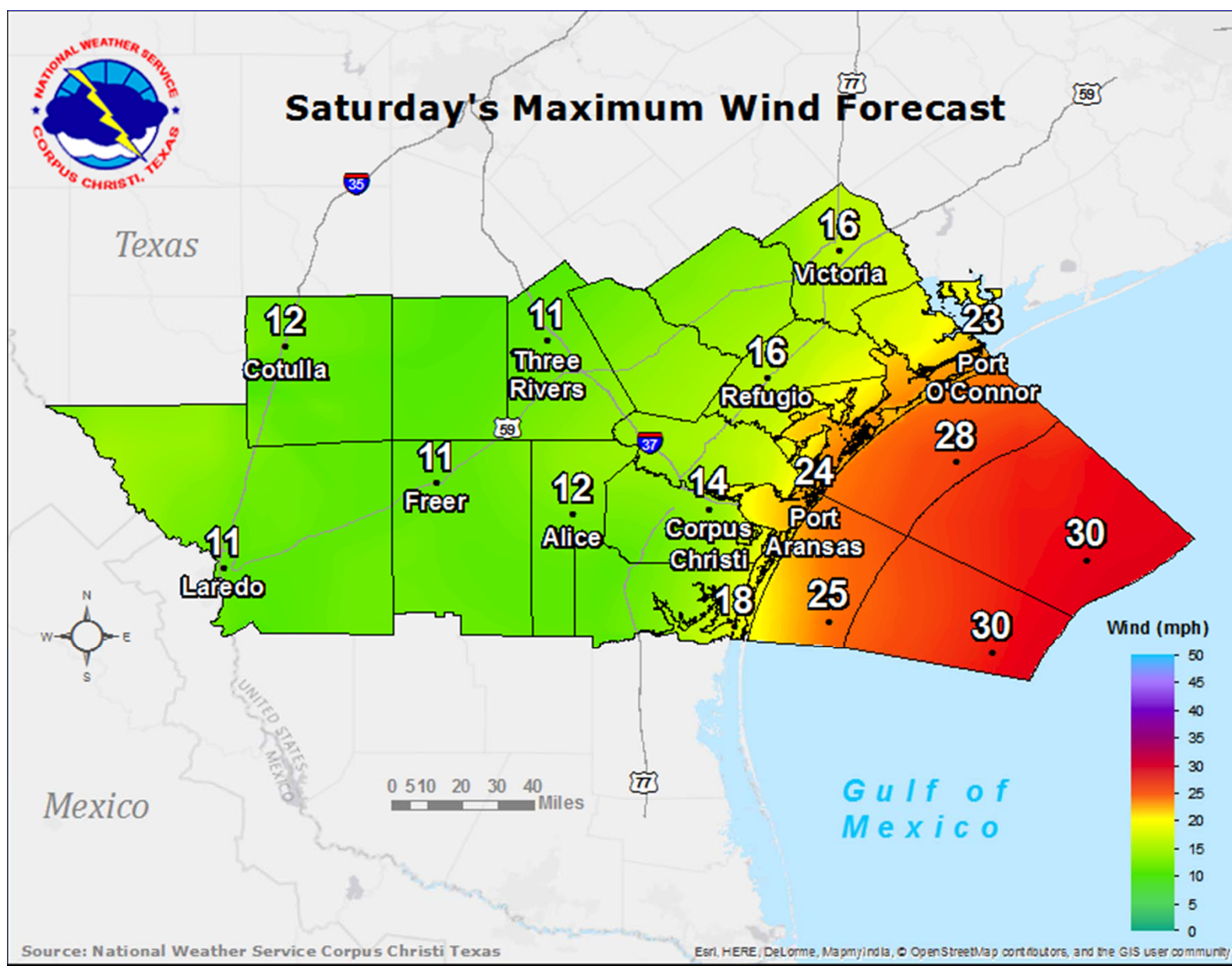
Friday's Rainfall Forecast





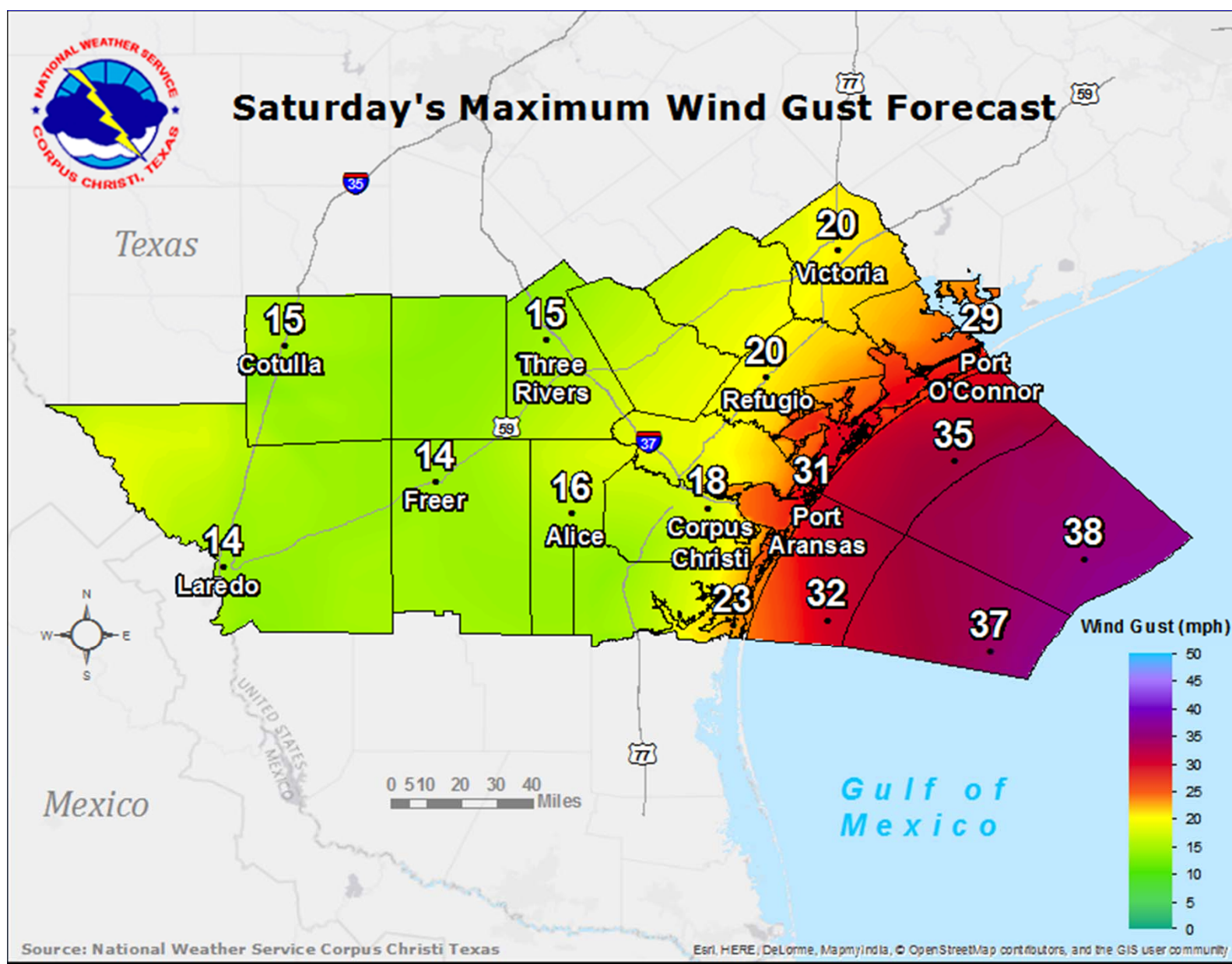
Total Rainfall Forecast through Monday





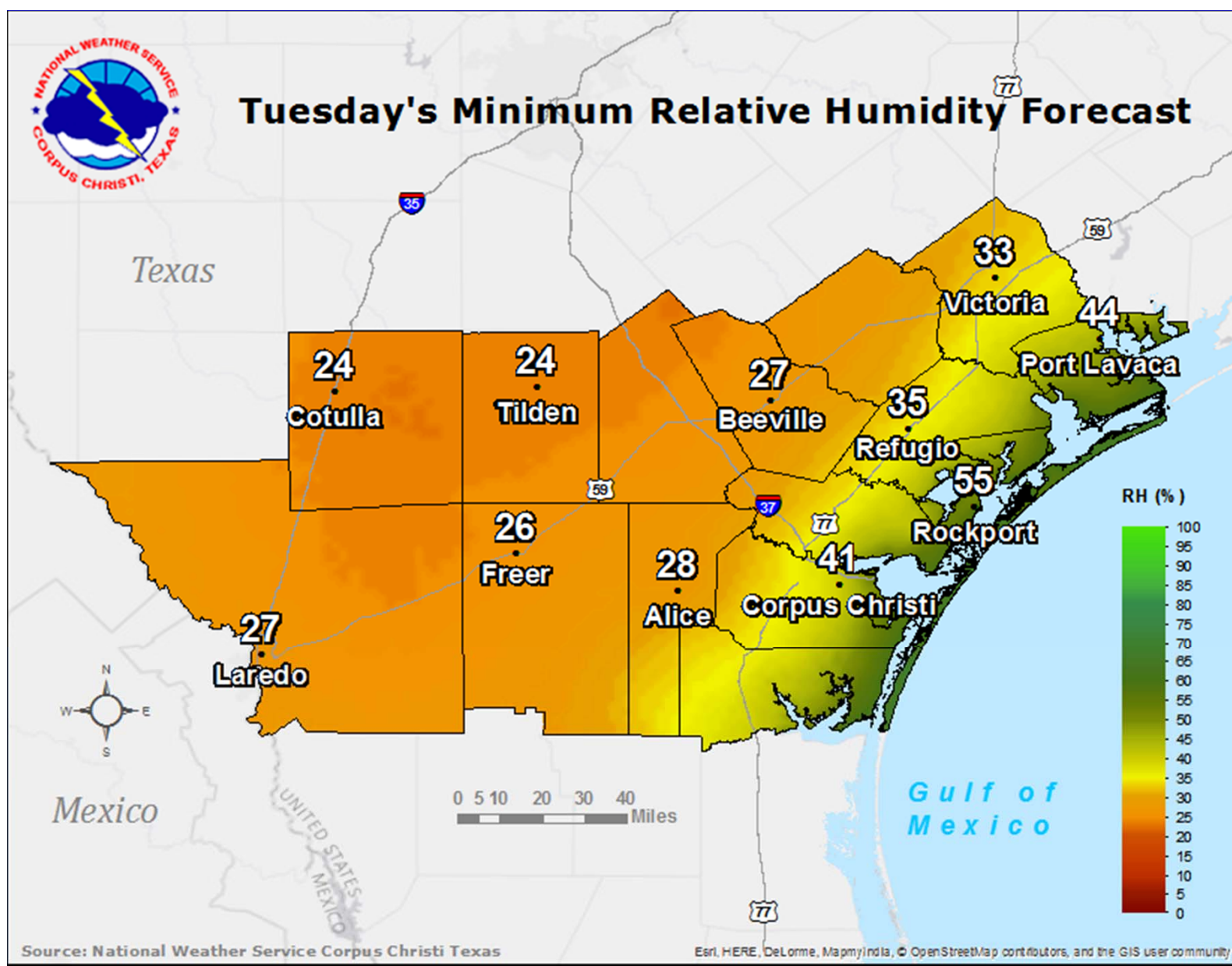


Saturday's Maximum Wind Gust Forecast



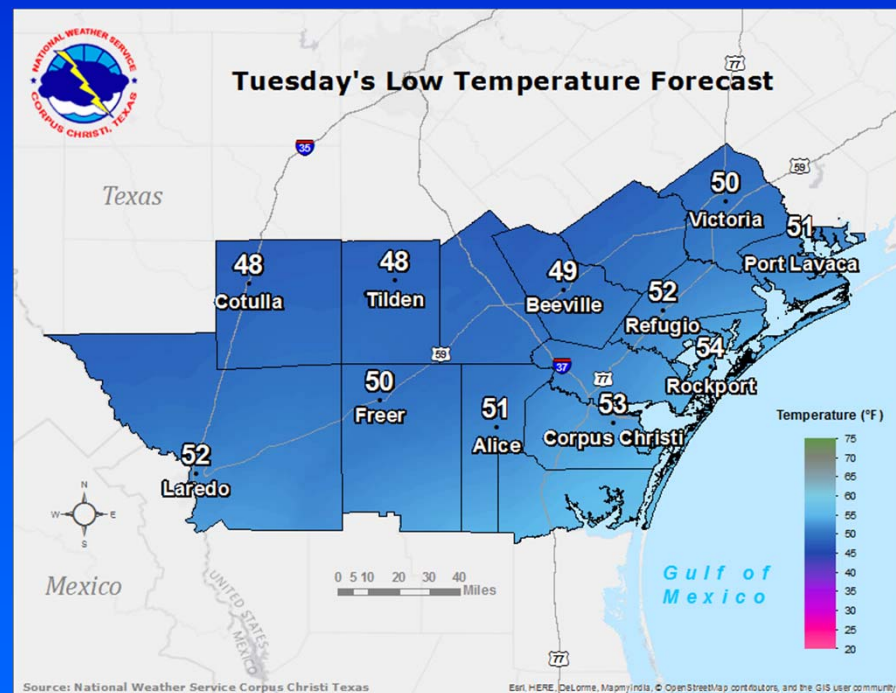


Tuesday's Minimum Relative Humidity Forecast

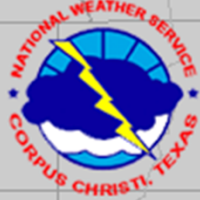


Methodology for Forecast Elements

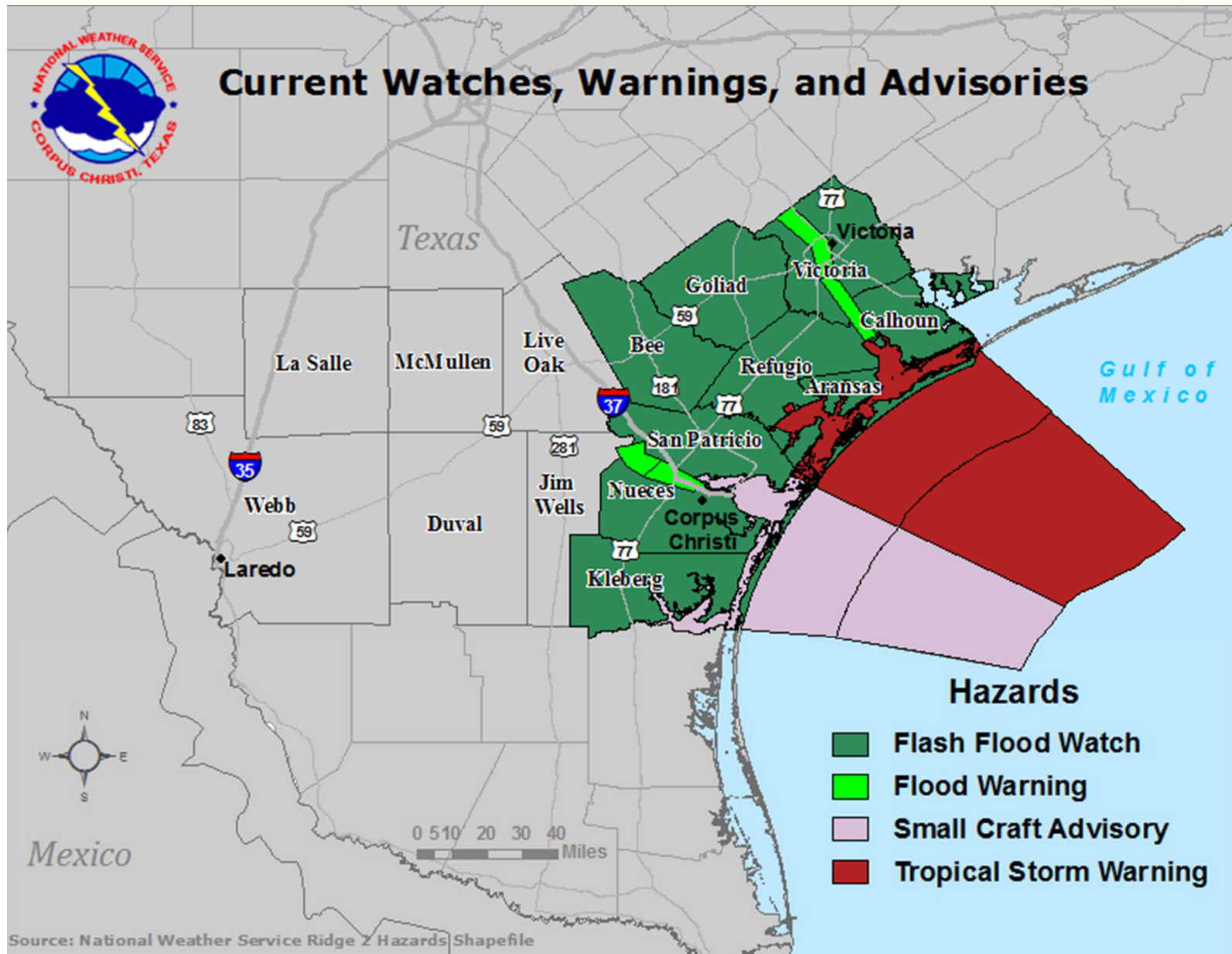
- 3-Step Process:
 - Create a netCDF file of our Official Forecast.
 - Process the netCDF into CSVs for each period.
 - Process CSVs into rasters.



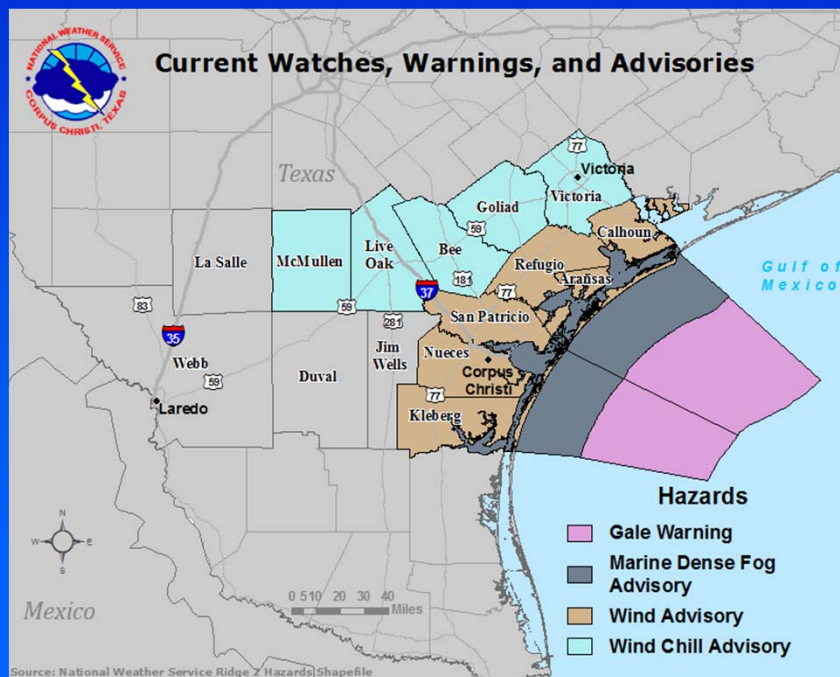
Long-Fuse Hazards (WWA)



Current Watches, Warnings, and Advisories



Methodology for WWA maps



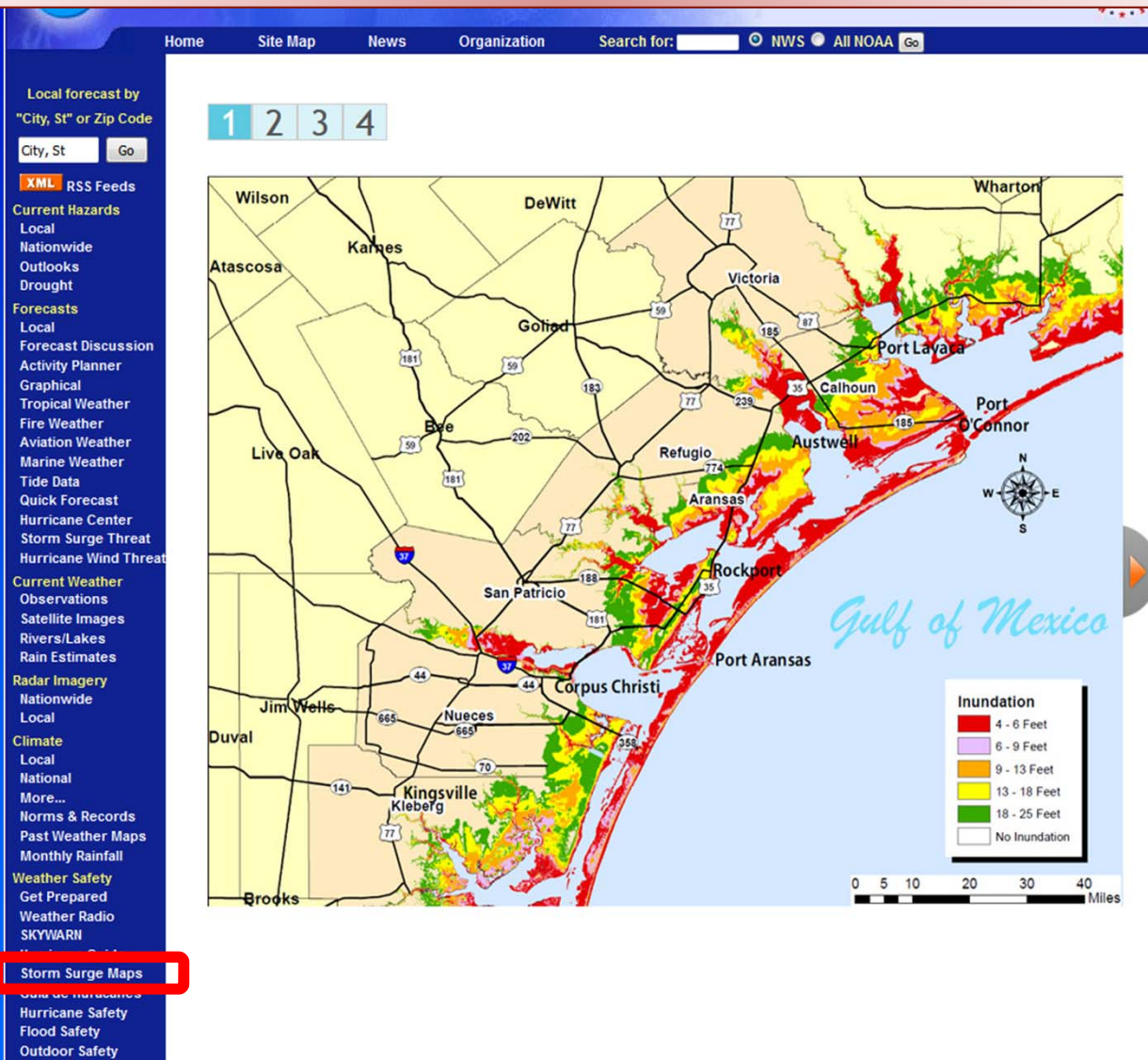
- Process the NWS RIDGE2 "Current Hazards" shapefile.
 - Updated every 5 minutes.
- Can also output maps for each hazard type.

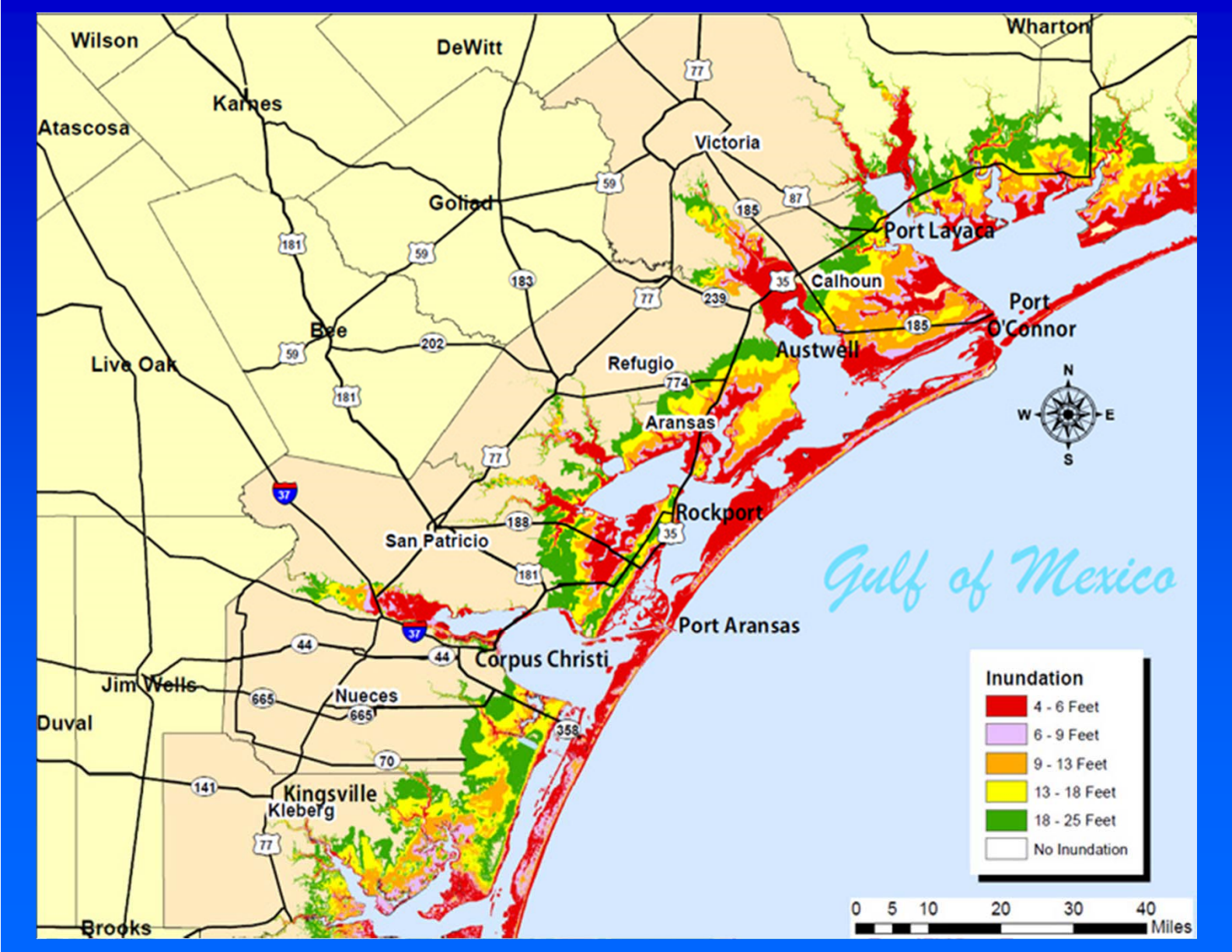
Storm Surge Maps

Storm Surge Maps

- Based upon the maximum storm surge possible for each Hurricane Category (1-5).
 - Output from the Sea, Lake, and Overland Surges from Hurricane (SLOSH) model.
- Used in the Annual Coastal Bend Hurricane Guide.
- <http://www.srh.noaa.gov/crp/?n=tropical>

<http://www.srh.noaa.gov/crp/?n=stormsurge>





Hourly Surface Observations Service

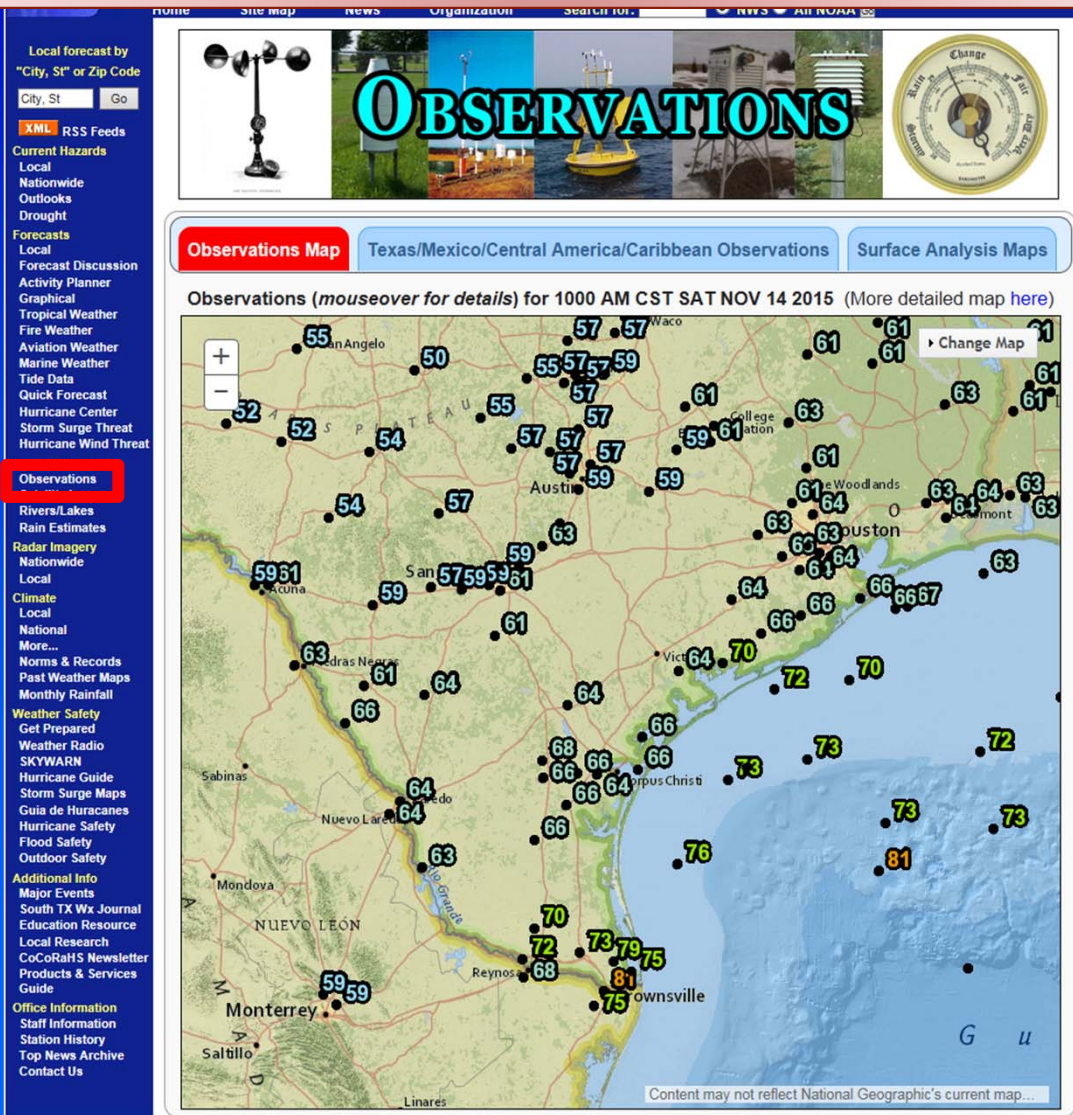
ArcGIS API for JavaScript

- Ability to display GIS Services within a web page.
- Query a Service and output that content dynamically.
- Pop-Ups.
- Mobile-Friendly
- Cross-Platform.
- Geocoding.
- Editing.
- Drawing and Symbolizing.
- Integration with ArcGIS Online.

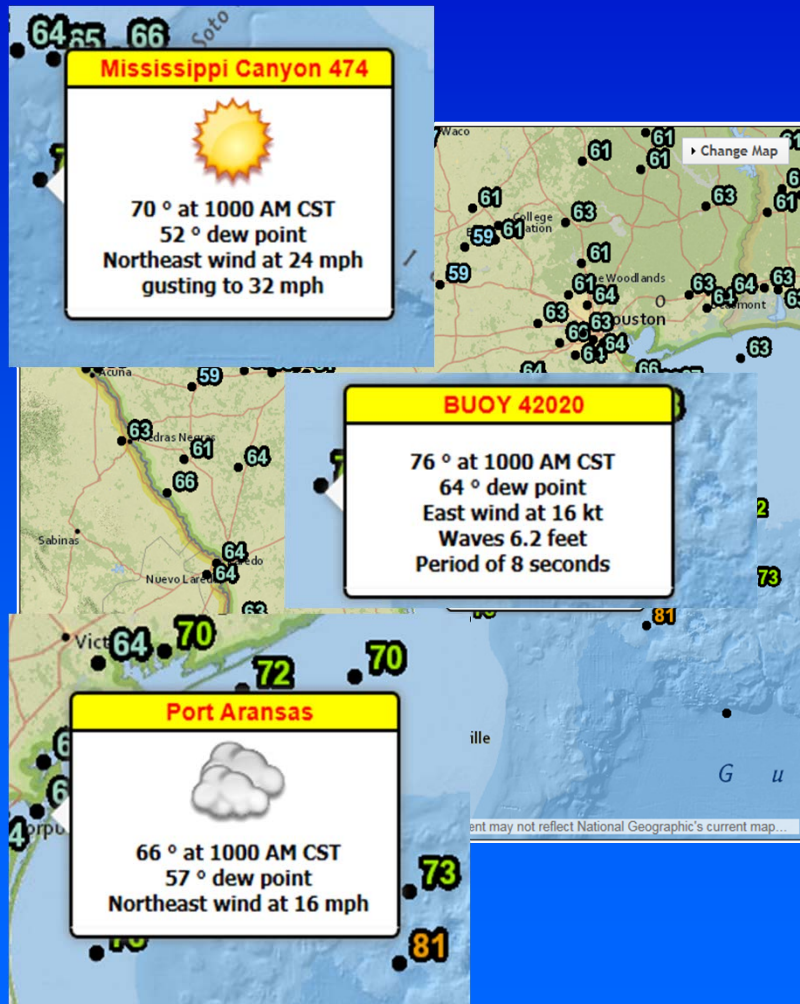
Hourly Surface Observations Service

- Hosted on the NWS Southern Region's GIS development server.
- More than 2500 Observations from mostly North America. Also included:
 - South America
 - Atlantic & Pacific Oceans
 - Europe
 - Africa

<http://www.srh.noaa.gov/crp/?n=observations>

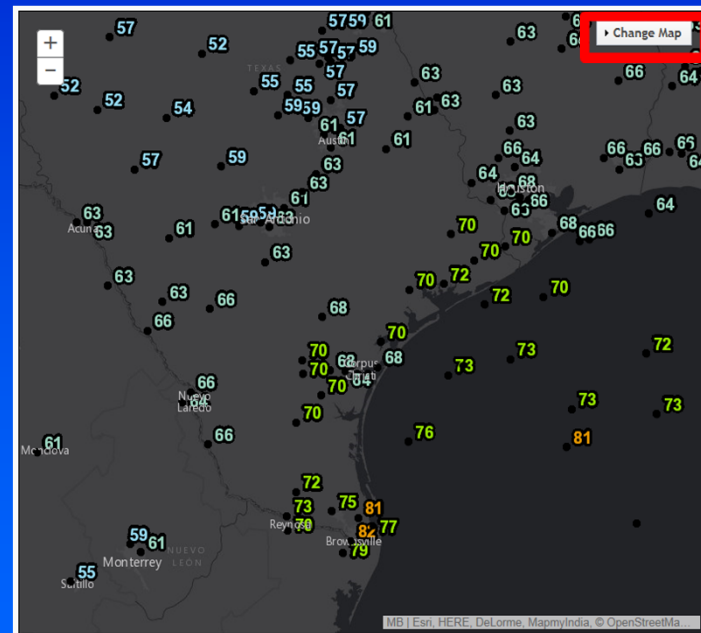
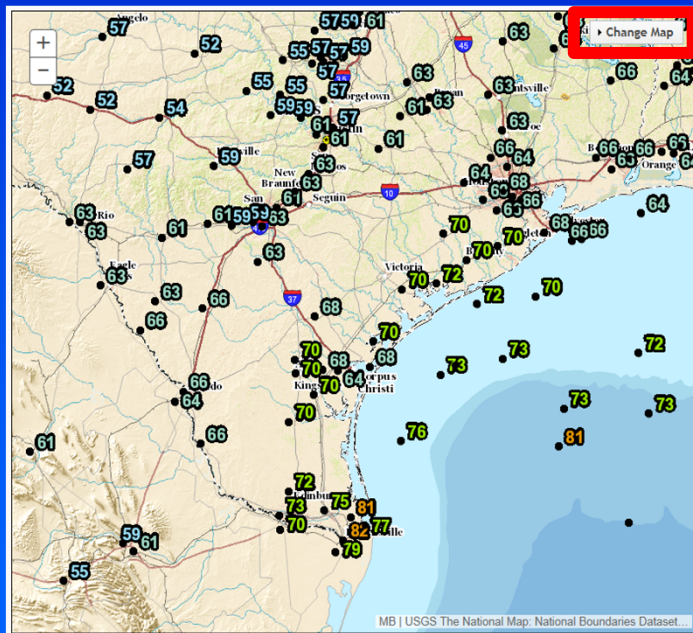


Mouse-over Information



- Temperature
- Dew Point
- Sustained Wind
- Wind Gust (if available)
- Cloud Cover
- Weather Type
- Wave Height (Buoys)
- Wave Period (Buoys)

Change Basemaps Easily



Tropical Cyclone Tracks Service

W Gulf Tropical Cyclone Tracks Service

- Hosted on an ESRI cloud server.
- Experimental.
- 147 Tropical Cyclones between 1851 and 2014.
 - Within 100 miles of the coastline from Tampico, MX to Beaumont, TX.
- NOAA has a similar page with more storms but with far less storm info.
 - Our service allows multiple storm tracks to be plotted AND compared.

http://www.srh.noaa.gov/crp/?n=tropical_cyclone_tracks

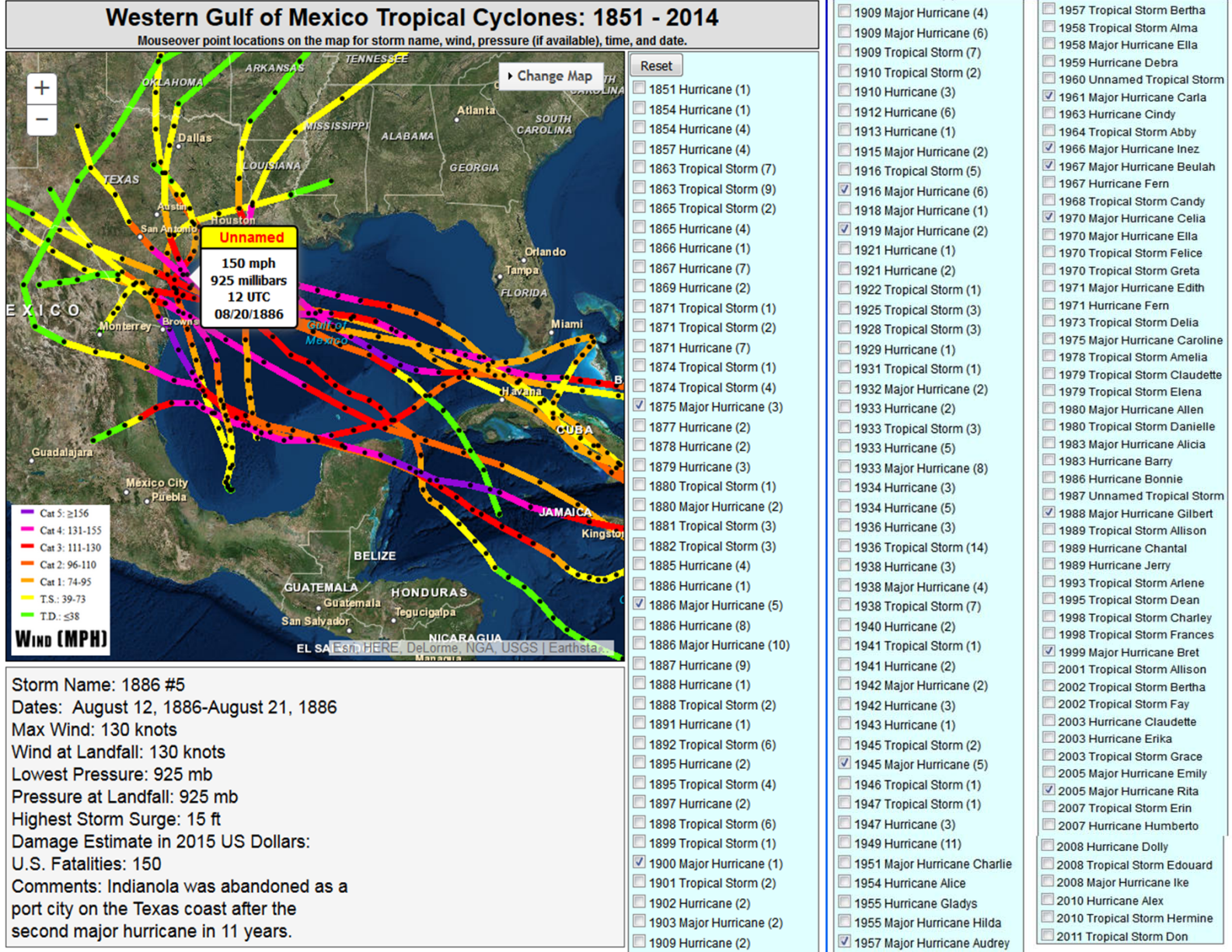
City, St Go

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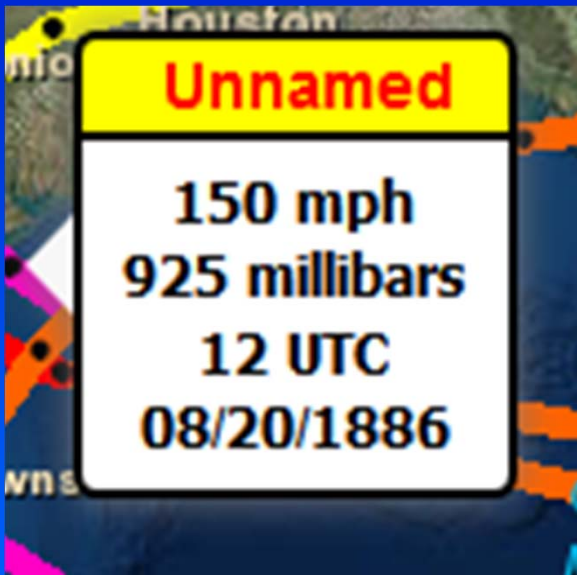
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Storm Name: 1886 #3
Dates: August 12, 1886-August 21, 1886
Max Wind: 130 knots
Wind at Landfall: 130 knots
Lowest Pressure: 925 mb
Pressure at Landfall: 925 mb
Highest Storm Surge: 15 ft
Damage Estimate in 2015 US Dollars: U.S. Fatalities: 150
Comments: Indiana was abandoned as a port city on the Texas coast after the second major hurricane in 11 years.

1886 Hurricane (1)
1886 Hurricane (2)
1886 Hurricane (3)
1886 Hurricane (4)
1886 Hurricane (5)
1886 Hurricane (6)
1886 Hurricane (7)
1886 Hurricane (8)
1886 Hurricane (9)
1886 Hurricane (10)
1886 Hurricane (11)
1886 Hurricane (12)
1886 Hurricane (13)
1886 Hurricane (14)
1886 Hurricane (15)
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Mouse-over Information



- Storm Name
- Wind
- Pressure (if available)
- Time
- Date

Ancillary Information

Storm Name: 1961 Carla
Dates: September 3, 1961-September 16, 1961
Max Wind: 150 knots
Wind at Landfall: 125 knots
Lowest Pressure: 931 mb
Pressure at Landfall: 931 mb
Highest Storm Surge: 22 ft
Damage Estimate in 2015 US Dollars: \$3.3 Billion
Fatalities: 46
Comments: Texas state record for storm surge at Port Lavaca. At the time, it was the largest peace time evacuation of an area.

http://www.aoml.noaa.gov/hrd/hurdat/mwr_pdf/1961.pdf
<http://www.wpc.ncep.noaa.gov/research/txhur.pdf>
<http://www.srh.noaa.gov/crp/?n=hurricane Carla>

- Max Wind
- Wind at Landfall
- Min Pressure
- Pressure at Landfall
- Max Storm Surge
- Damage Estimate in 2015 Dollars
- Fatalities
- Links to more storm information

Questions

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