

Flood and Flash Flood Events of South Central Texas



Paul Yura

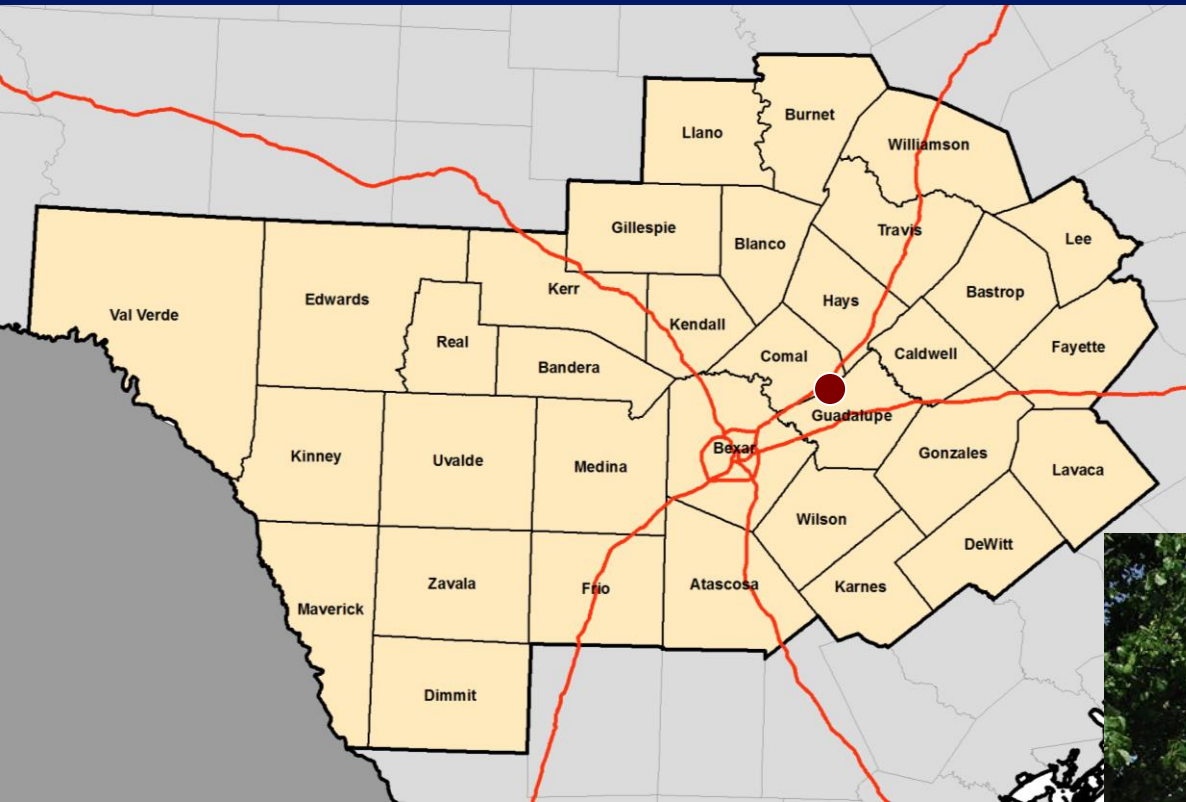
**Warning Coordination Meteorologist
National Weather Service Austin-San Antonio TX**



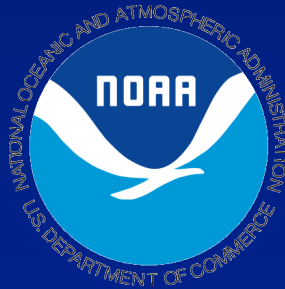
Who is the National Weather Service?



NWS Austin/San Antonio “County Warning Area”

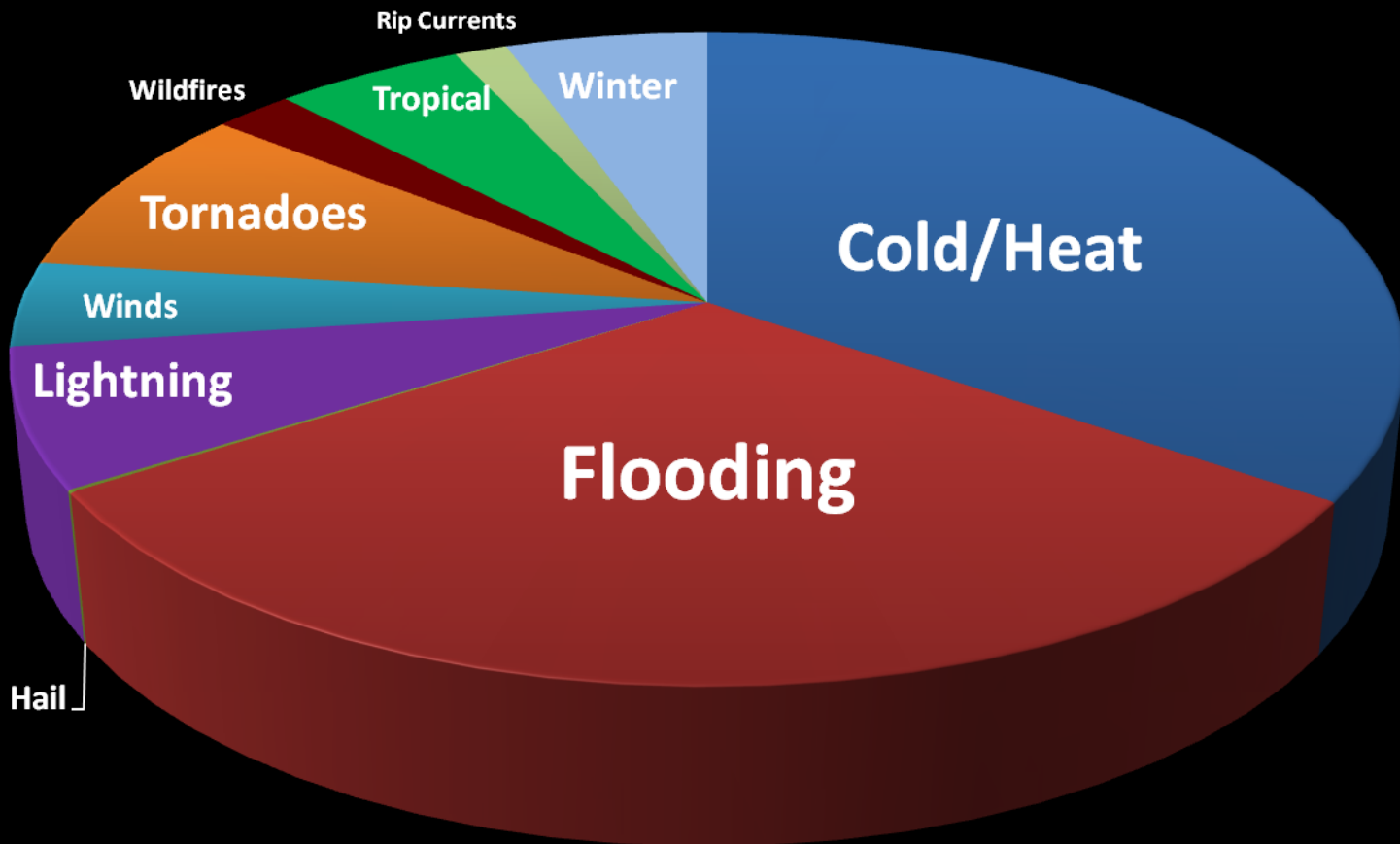


- **Forecasts**
- **Watches/Warnings**
- **Decision Support**
- **Local Research**
- **Outreach**

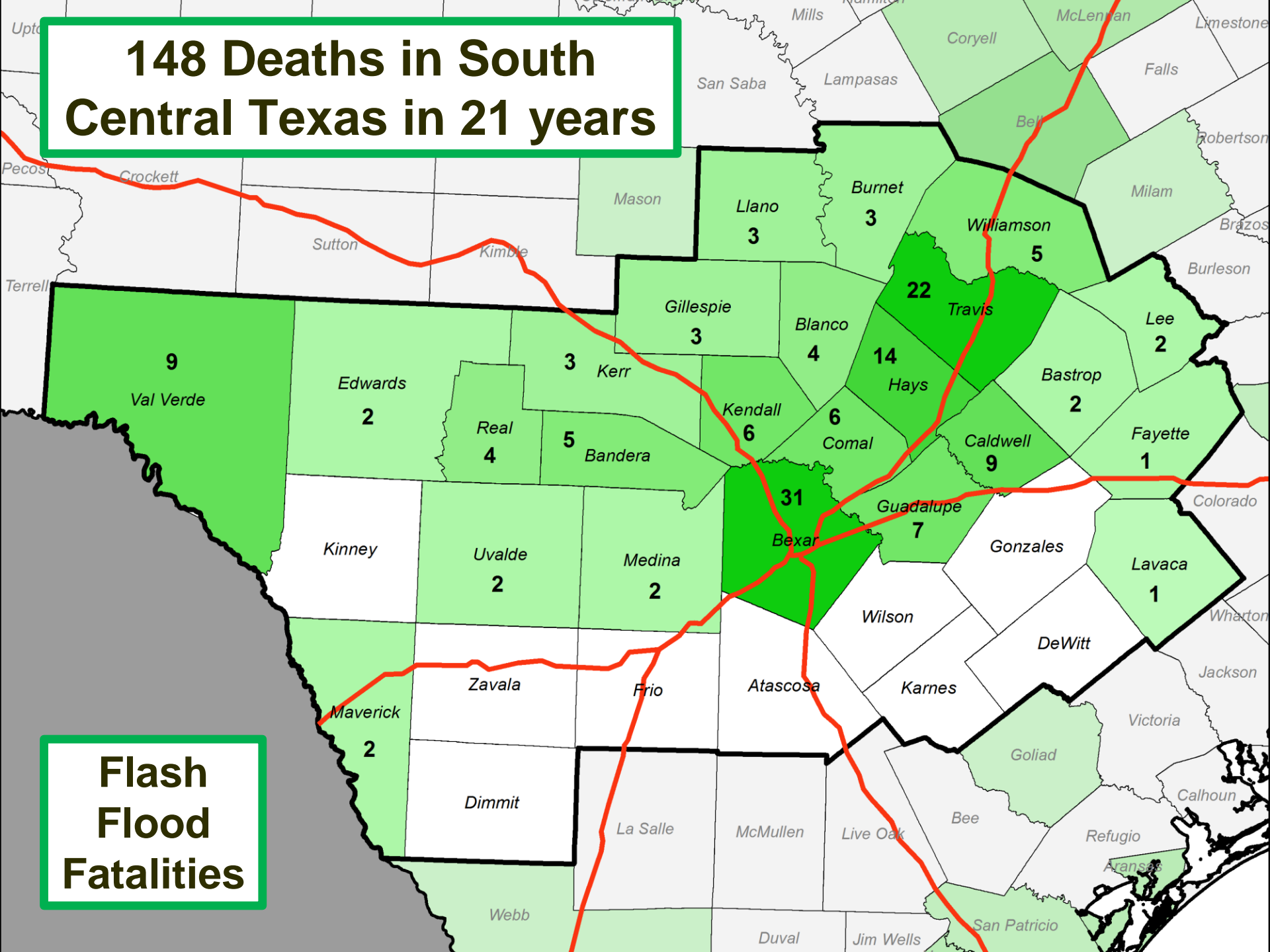


Texas Weather Related Deaths, 1990-2010

Texas has more flooding deaths than any other state



148 Deaths in South Central Texas in 21 years

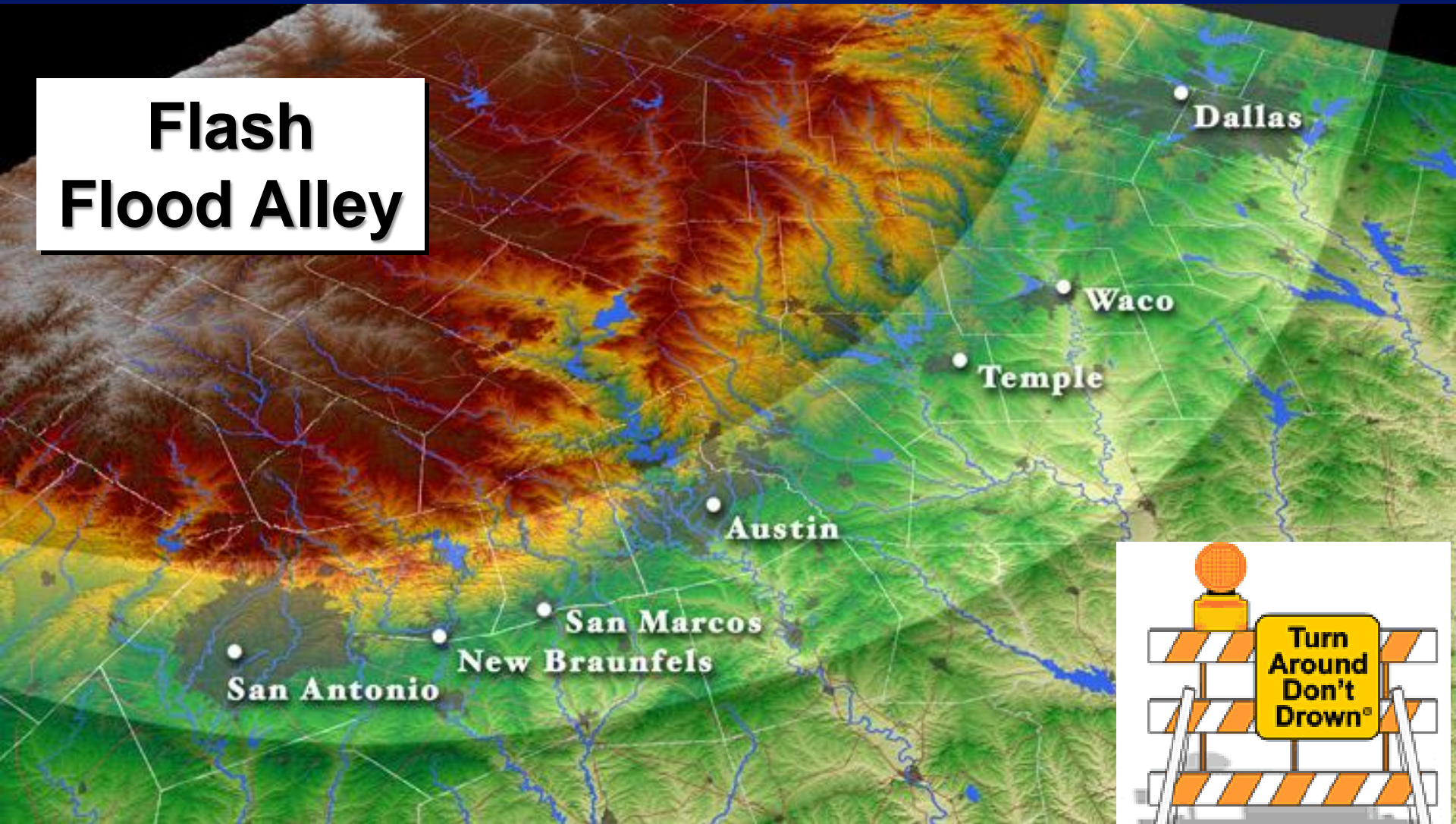


**Flash
Flood
Fatalities**

Flash Flooding

Terrain and Heavy Rain Don't Mix

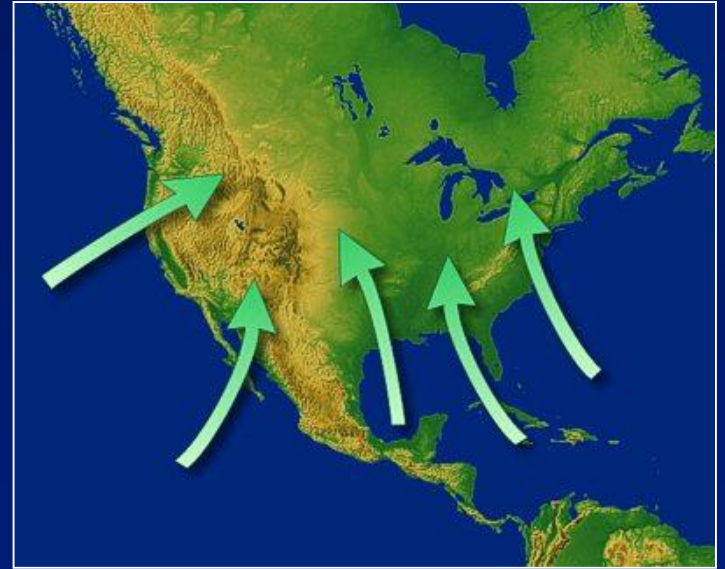
**Flash
Flood Alley**



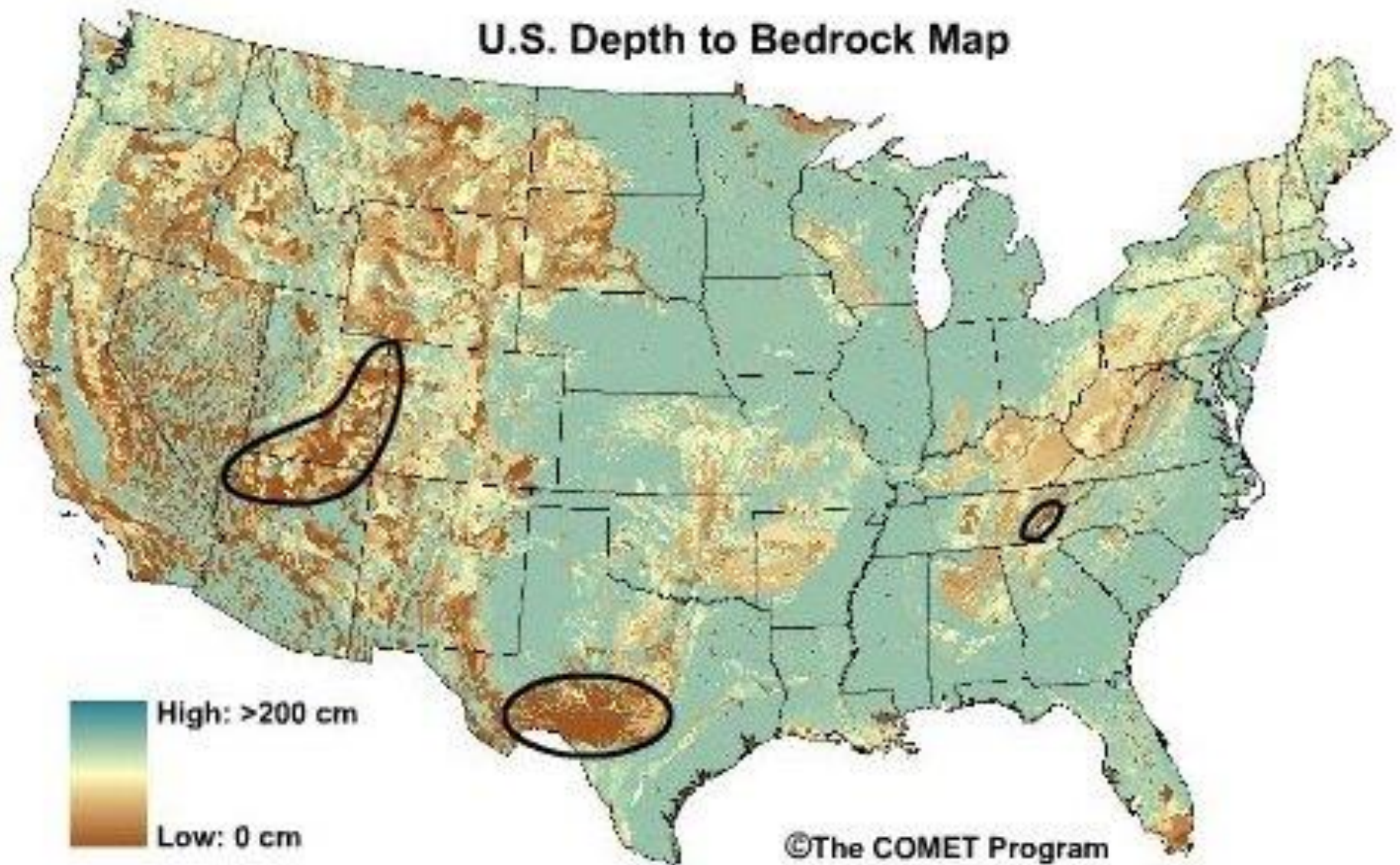
Don't drive through low water crossings!

Why are we so prone to flood?

- Close to moisture source regions
- Terrain, lack of soil
- Urbanization, Population growth



Lack of Soil in Hill Country



Flash Flooding

**#1 Thunderstorm
Weather Related Killer**



Dangers:

- Low Water Crossings
- Nighttime Driving



People Make Some Really Bad Choices



**Sometimes you
get lucky!**



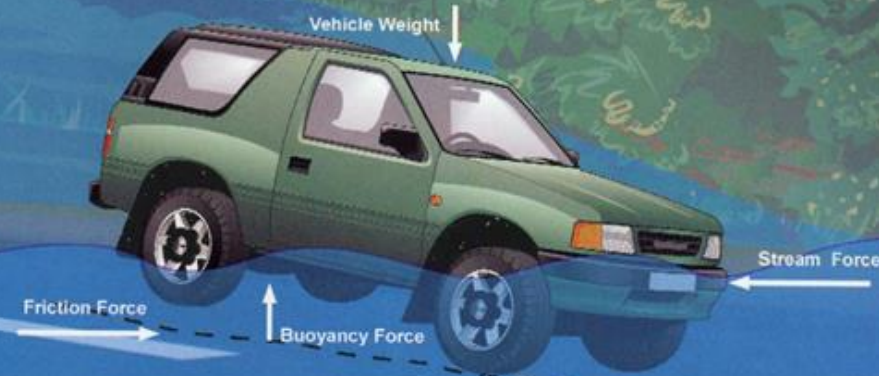
Don't Rely on Your Big Vehicles



They Wont
Save You

Forces on Vehicles From High Water

The car will be carried when:
Buoyancy Force **Greater Than** Vehicle Weight.



There is no friction force once the vehicle is lifted off the road

Nearly half of all flood fatalities are vehicle related

Bandera County Watersheds



Ways to Get Flash Flooding

- **Cell Mergers (storms combine)**
- **Training (move over same area)**
- **Stationary (storms don't move)**
- **Tropical System (efficient rain)**
- **Stalled Weather System**
- **Upstream Rain Events**
- **Burn Scar**

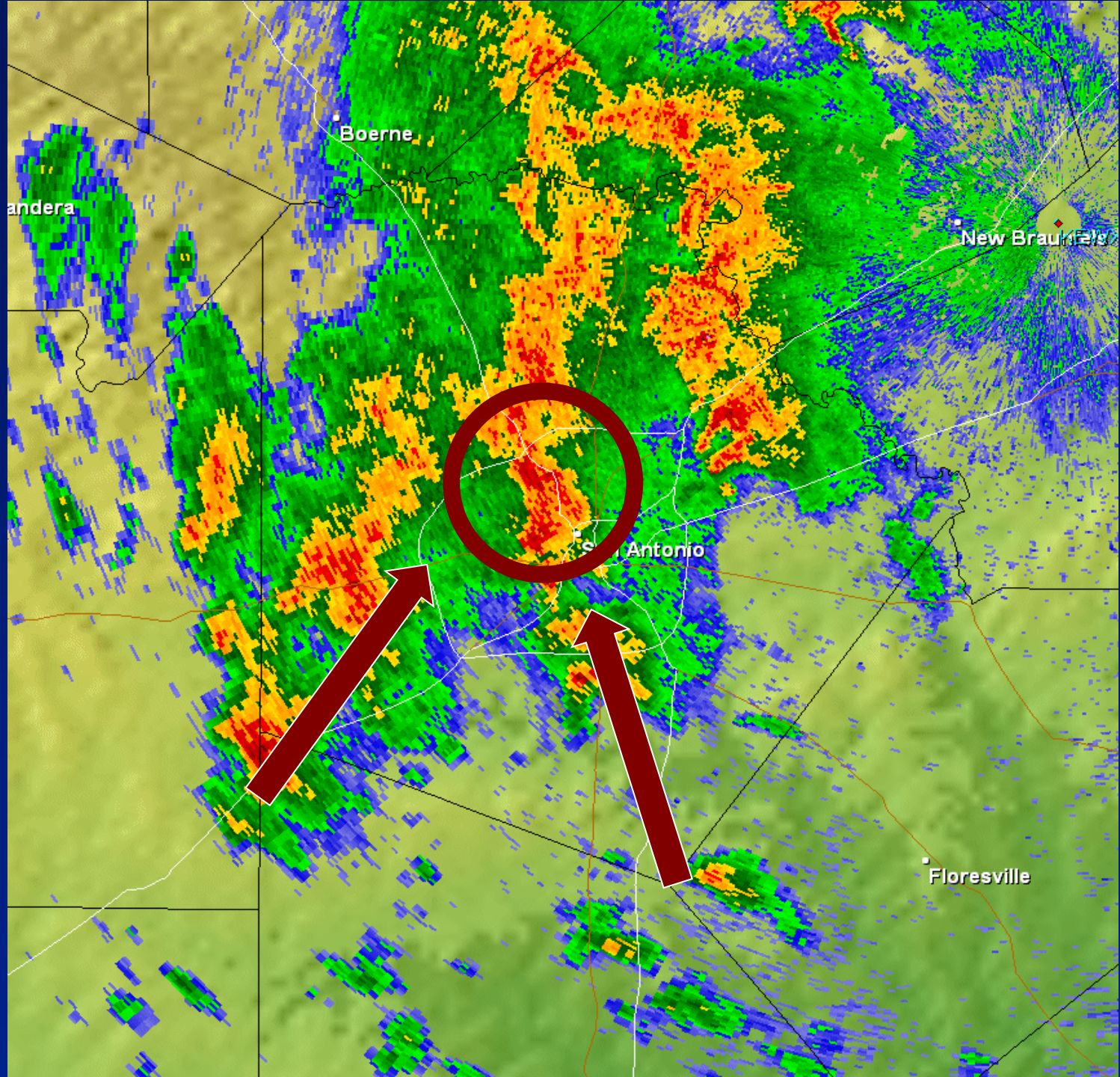
San Antonio Memorial Weekend Flood, May-25-2013

a 30% chance of Rain



Cell Mergers Over Olmos Basin

Record Rainfall



USGS River Gauge, Olmos Creek at Dresden



2.58 inches in 15 minutes
6.13 inches in 1 hour
8.59 inches in 1.5 hours
9.46 inches in 2 hours
13.70 inches in 4 hours
15.31 inches in 5 hours
17.00 inches in 24 hours

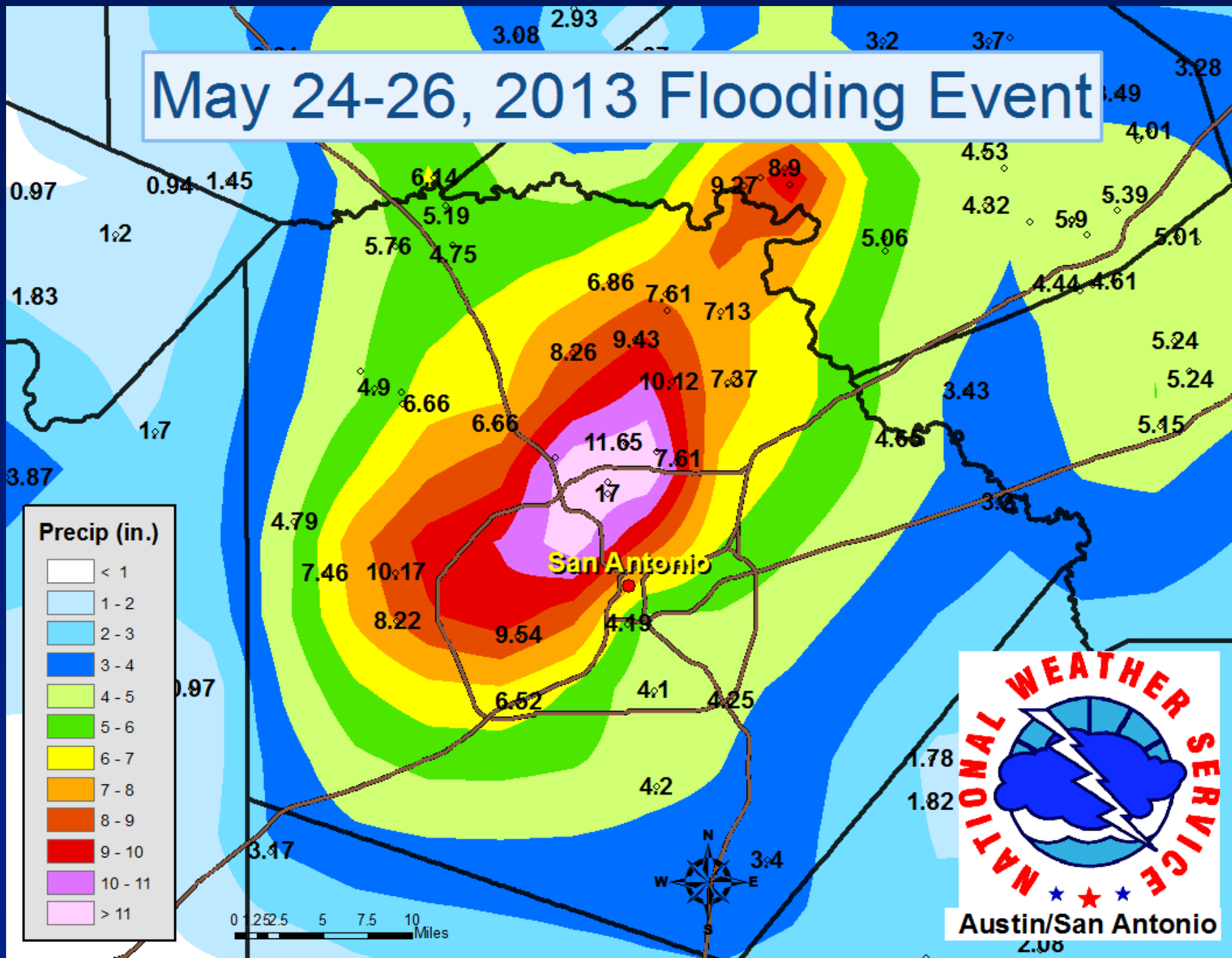
04:00 CDT	0.02 ^P
04:15 CDT	0.14 ^P
04:30 CDT	0.33 ^P
04:45 CDT	0.07 ^P
05:00 CDT	0.05 ^P
05:15 CDT	0.24 ^P

05:30 CDT	1.14 ^P
05:45 CDT	1.32 ^P
06:00 CDT	0.99 ^P
06:15 CDT	0.95 ^P
06:30 CDT	2.58 ^P
06:45 CDT	1.61 ^P

08:45 CDT	0.66 ^P
09:00 CDT	0.64 ^P
09:15 CDT	0.28 ^P
09:30 CDT	0.35 ^P
09:45 CDT	0.32 ^P
10:00 CDT	0.07 ^P



May 24-26, 2013 Flooding Event



Flash Flood on a Lake?

Sandy Creek, Lake Travis, Sept 13 2012



6.5" in 1.5 hours

LCRA Hydrologic Data

Default Map Areas

Choose a Map Extent

Select Hydromet data to display

Rainfall - Past Week

Gauge Data List

View Rainfall data

Data retrieved at 9:10 am

Disclaimer:
Sensor data displayed is automatically retrieved
and is subject to revision.

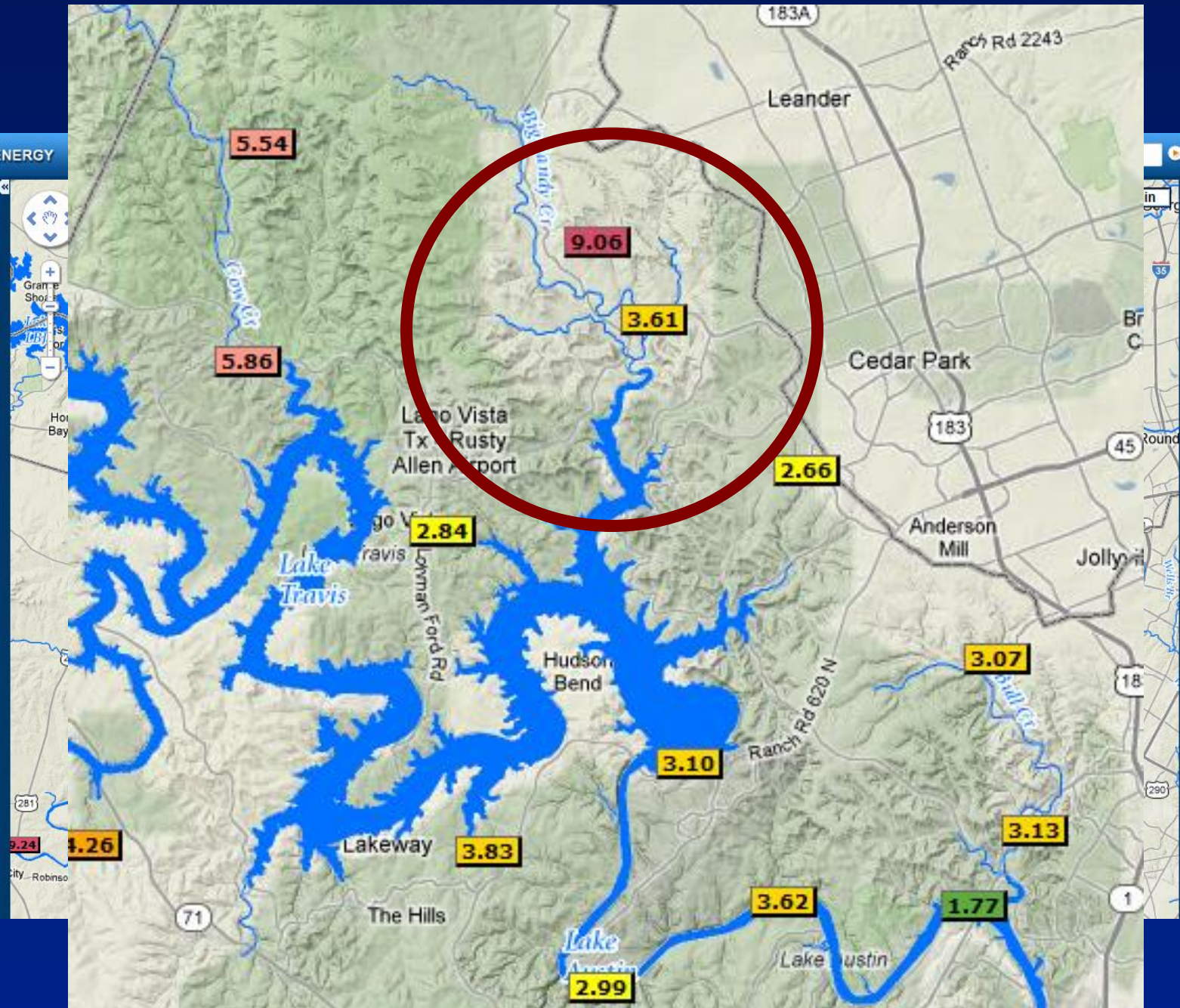
Toggle map data below.

- ☐ Current Radar
- ☒ Stream Overlay
- ☐ Watersheds
- ☐ Drought (New!)
- ☒ County Boundaries

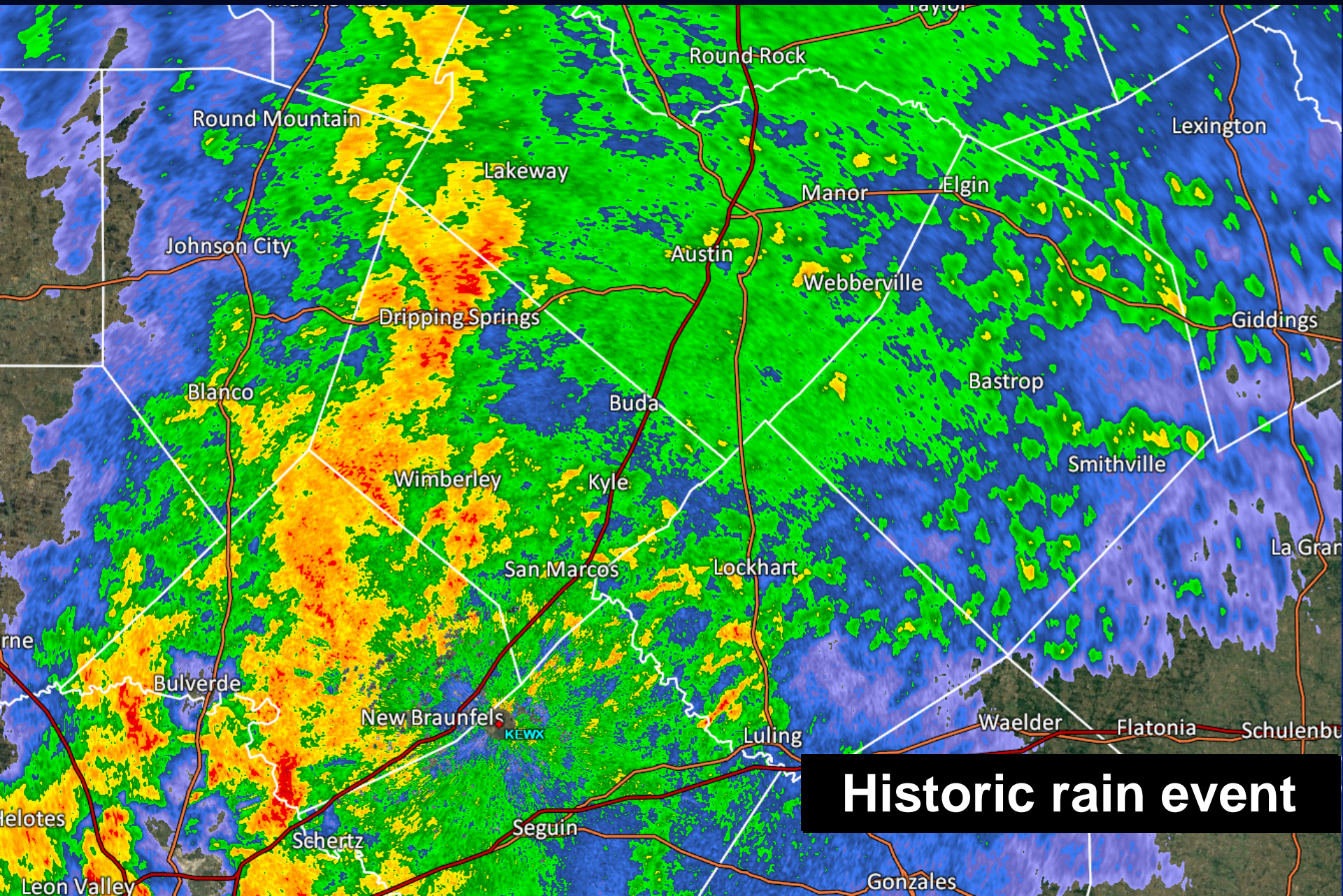
- ▶ Weather Forecast
- ▶ Forecast References
- ▶ Gauge Data Reports
- ▶ Historical Reports
- ▶ Lake / River Data
- ▶ Historical Lake Data
- ▶ Charts (New!)
- ▶ River Report
- ▶ Rainfall Data
- ▶ Flood Summary
- ▶ Water Glossary
- ▶ FAQ
- ▶ Send us Feedback

Rainfall - 1 Week Accumulation

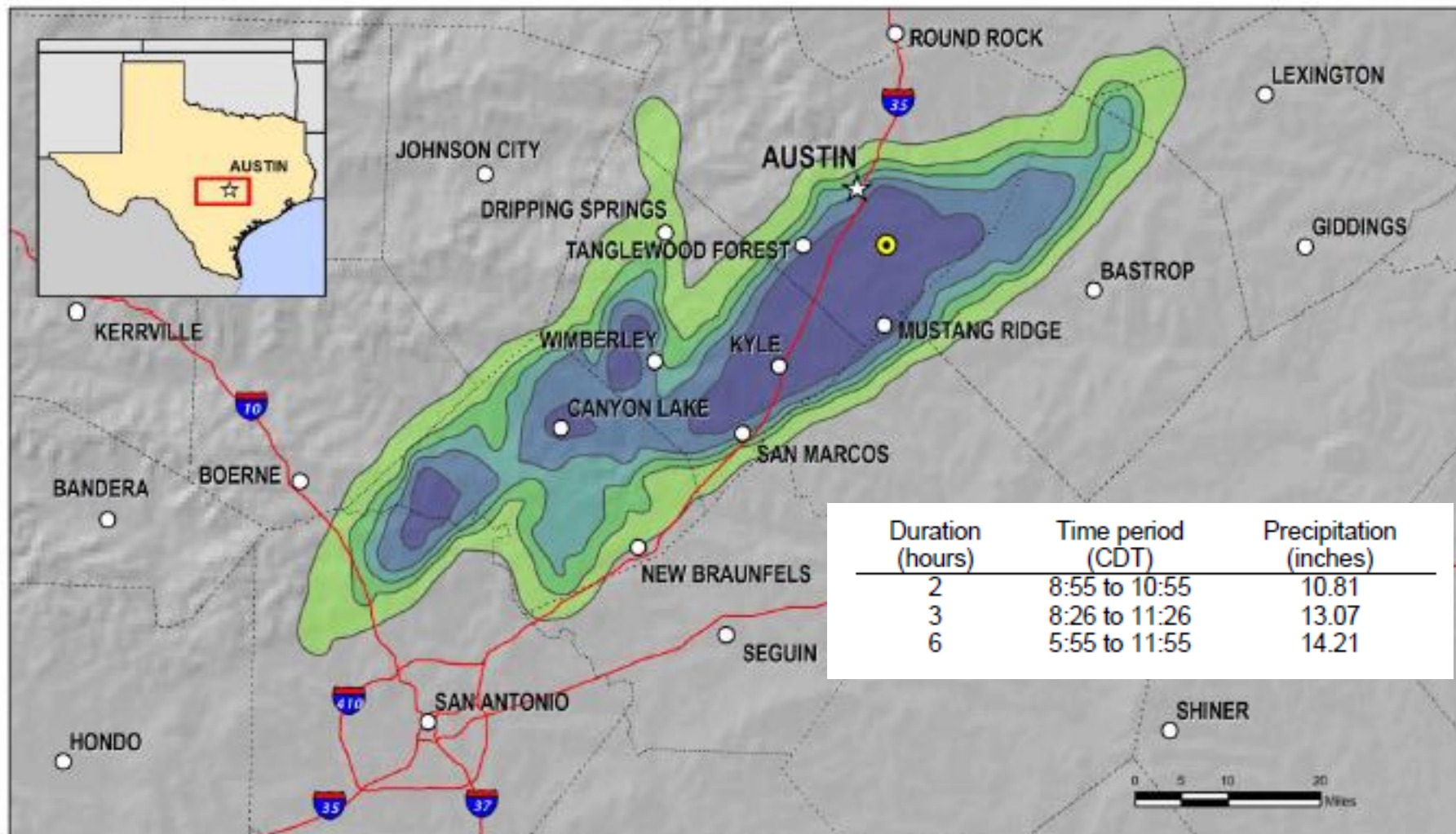
15+ in	5 in	1 in
15 in	4 in	0.5 in
12 in	3 in	0.2 in
10 in	2 in	0.01 in
8 in	1.5 in	None
6 in		



Closeup of I-35 Area...October 30, 2015







Austin event, 30 October 2015

Annual Exceedance Probabilities (AEPs) for the Worst Case 3-hour Rainfall

Hydrometeorological Design Studies Center
National Water Center, National Weather Service
National Oceanic and Atmospheric Administration

<http://www.nws.noaa.gov/ohd/hdsc/>

Created 30 November 2015
Rainfall frequency estimates are from TP40 (extrapolated to 1/500 AEP)
Rainfall values come from 1-hour Stage IV data.



- > 1/10
- 1/50 - 1/10
- 1/100 - 1/50
- 1/200 - 1/100
- 1/500 - 1/200
- < 1/500

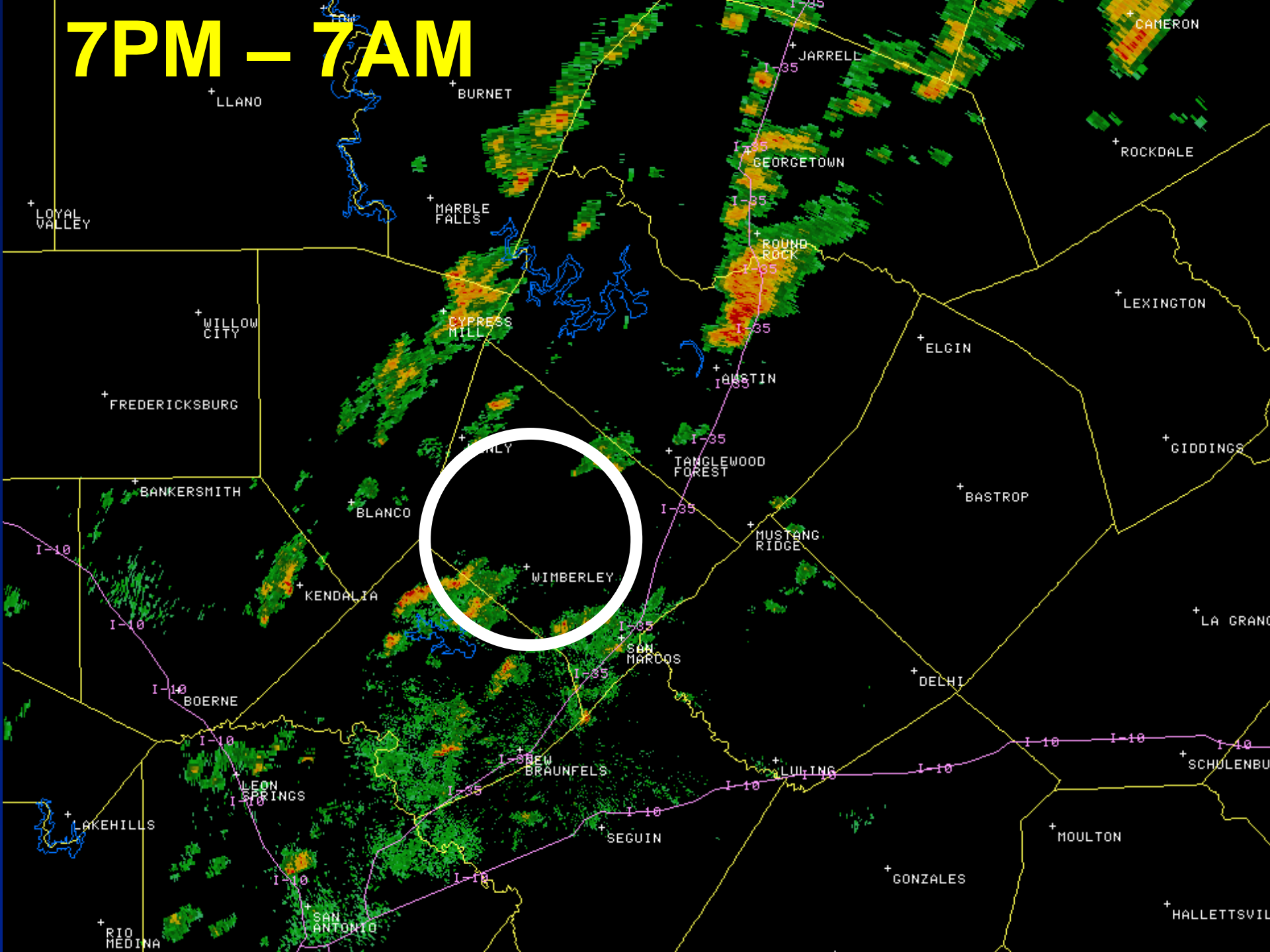
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Halloween Flood, October 30-31, 2013



7PM – 7AM

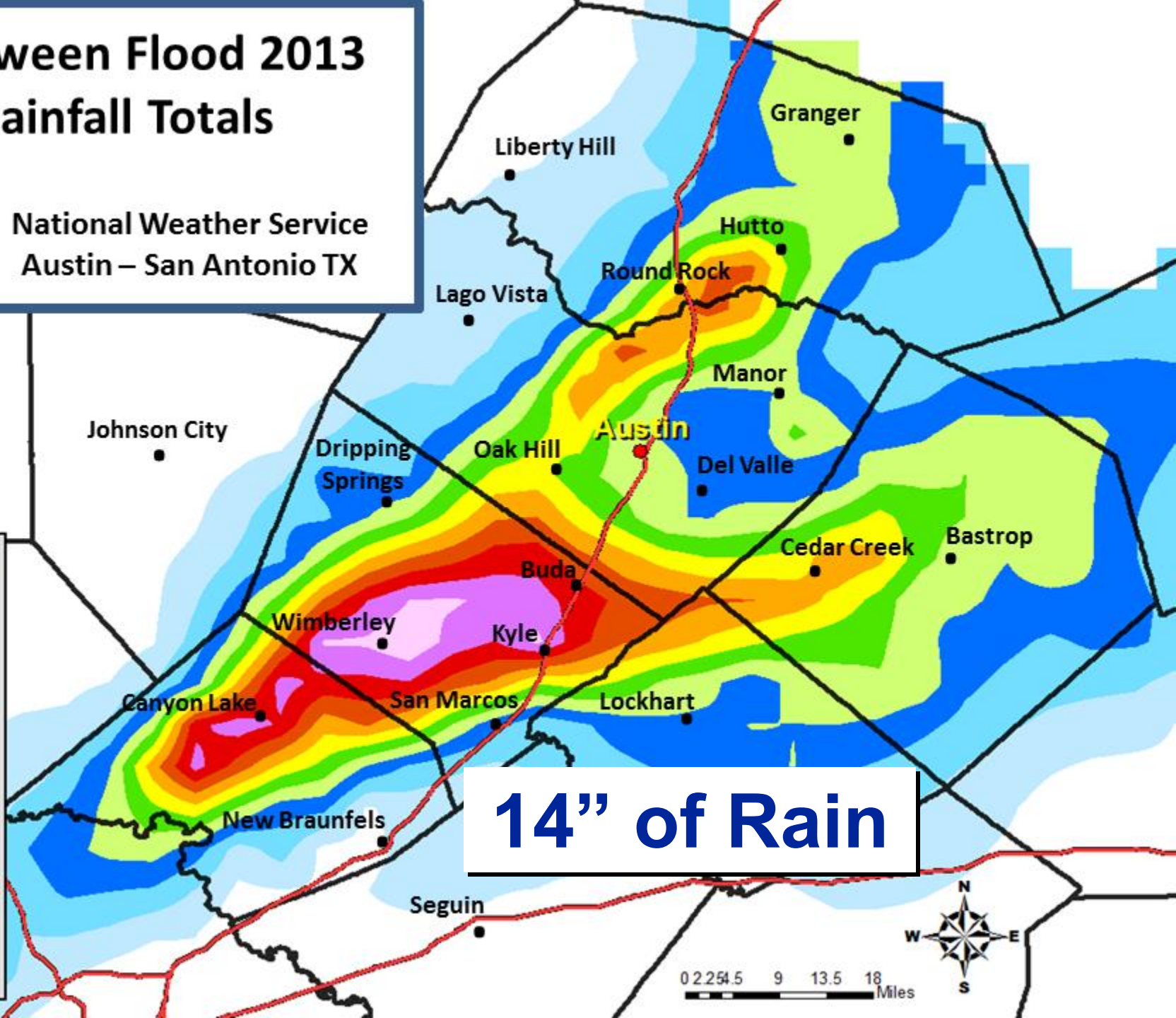
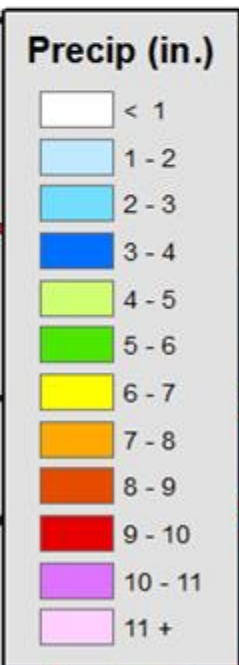


Halloween Flood 2013

Rainfall Totals

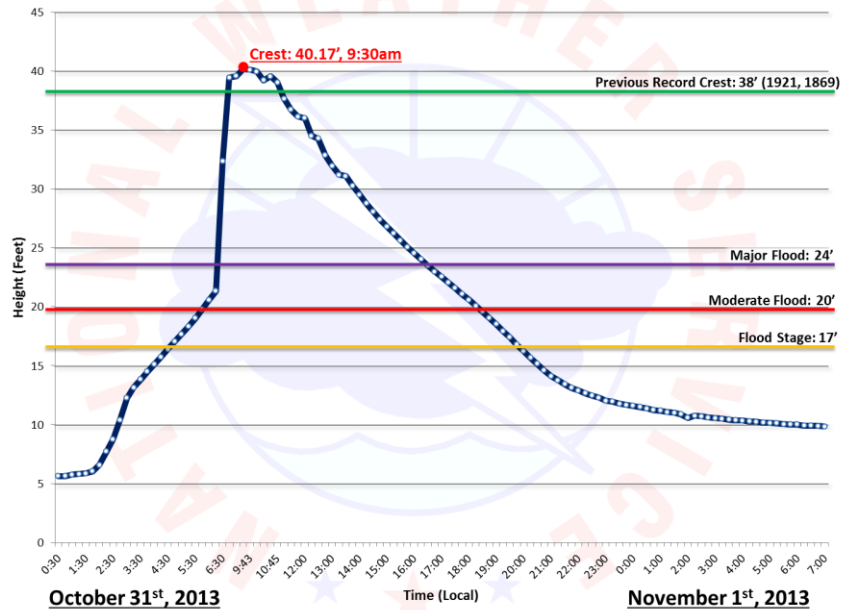


National Weather Service
Austin – San Antonio TX



14" of Rain

Onion Creek @ HWY 183 – ATIT2 – River Gauge



Onion Creek @ Hwy 183

Record height on Onion Creek



San Marcos River near Martindale

The 1987 Guadalupe River Flood

