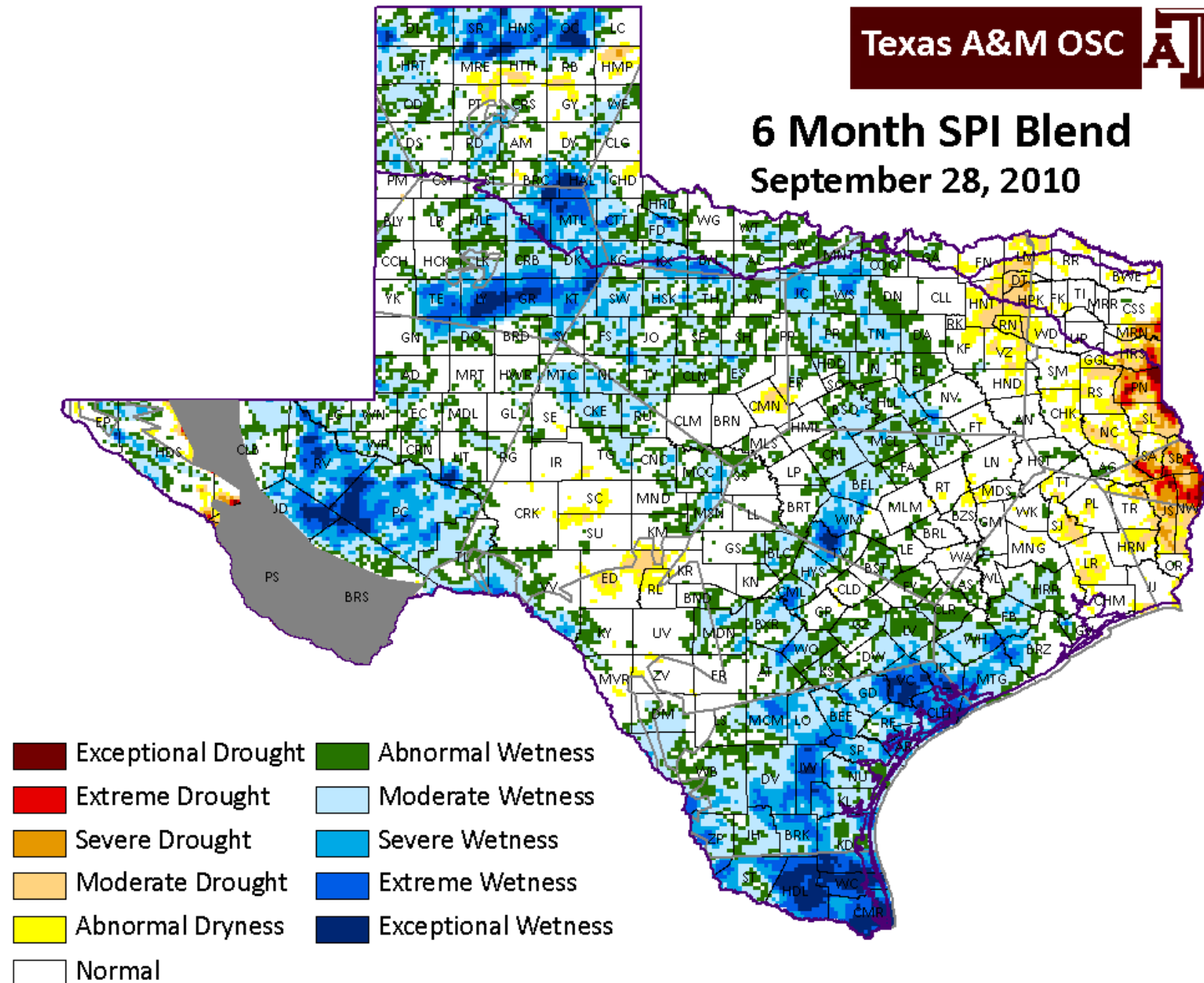


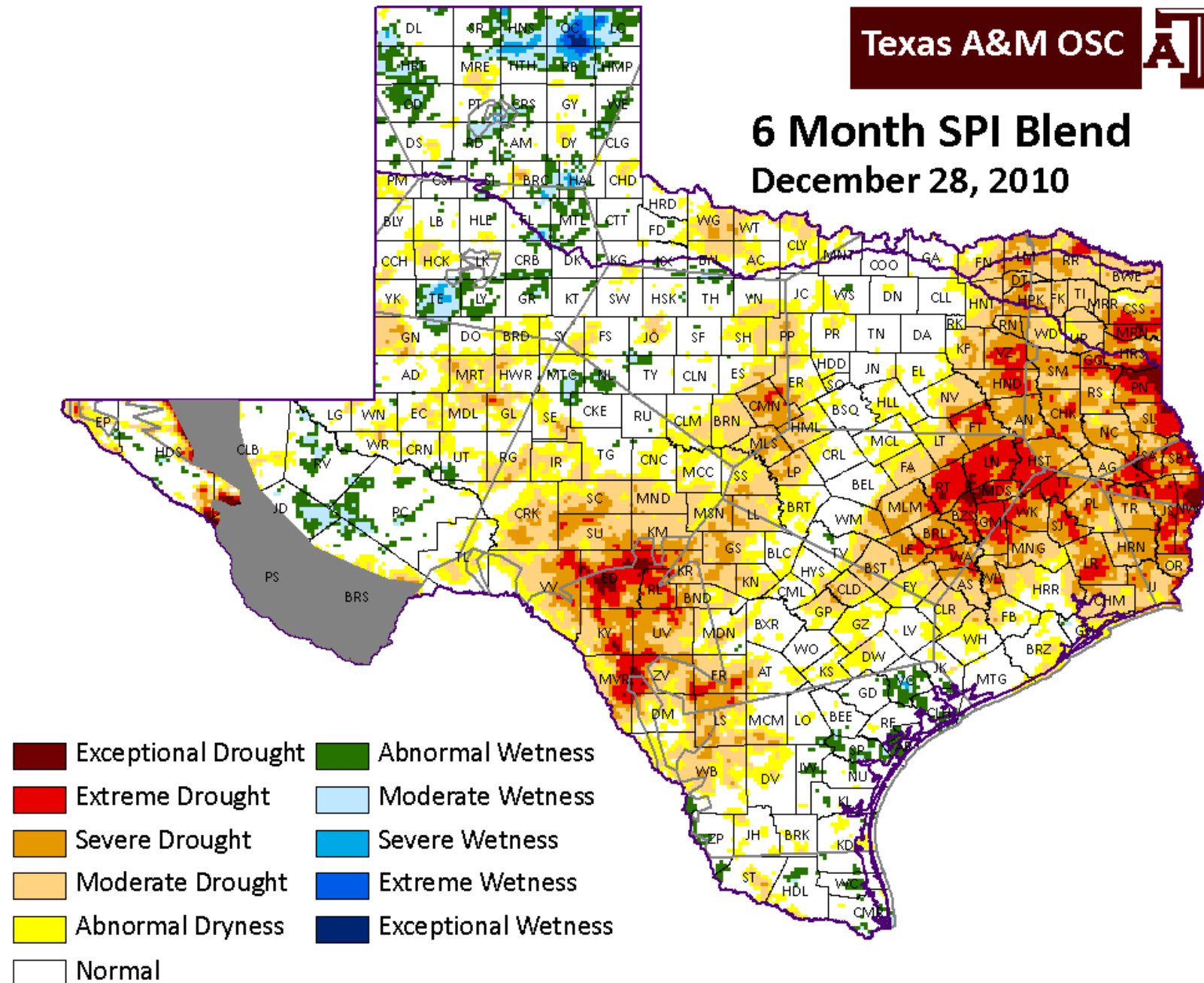
What Did The Texas Drought Do?

John W. Nielsen-Gammon
Texas State Climatologist
Texas A&M University
n-g@tamu.edu

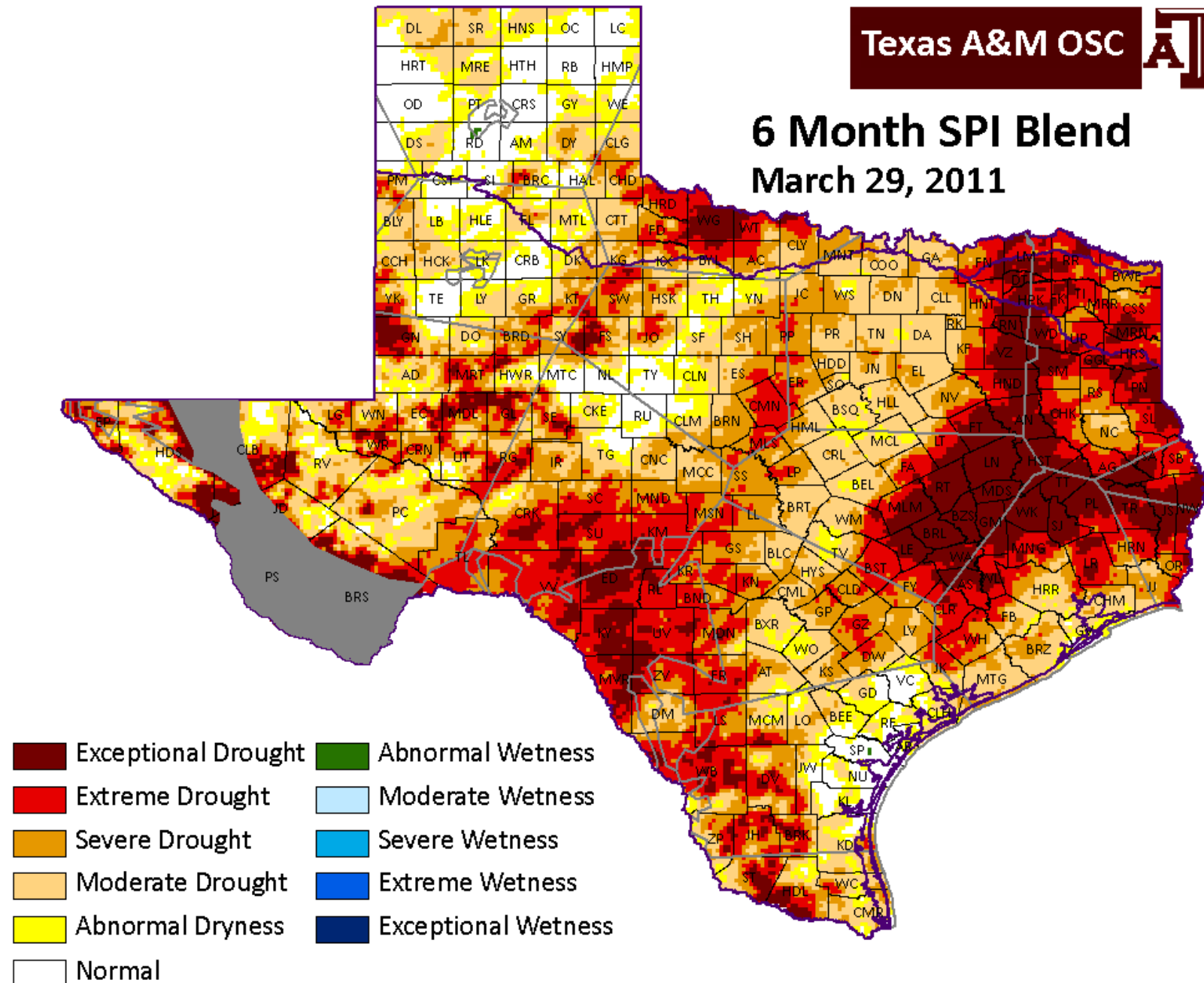
6 Month SPI Blend September 28, 2010



6 Month SPI Blend December 28, 2010

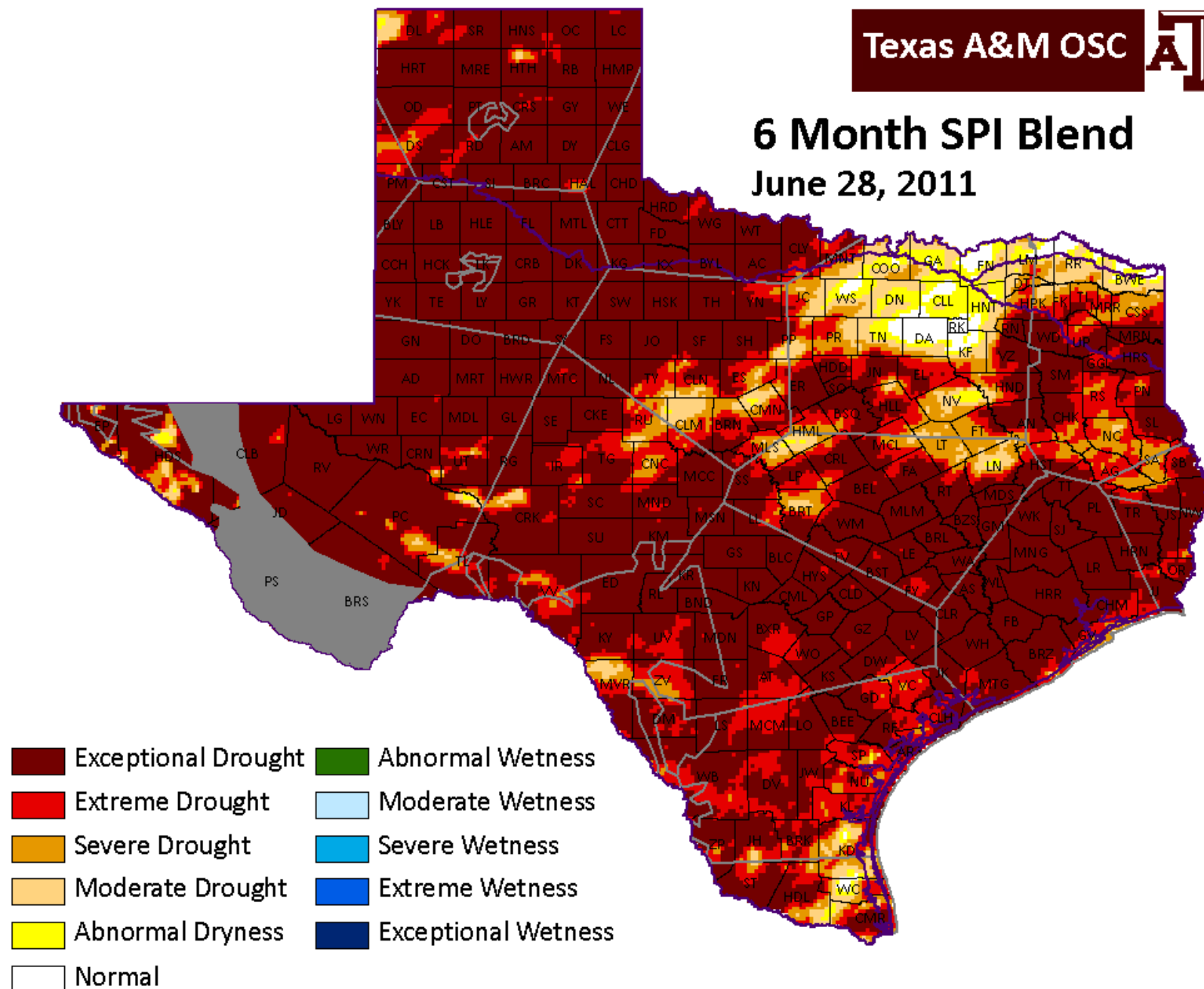


6 Month SPI Blend March 29, 2011

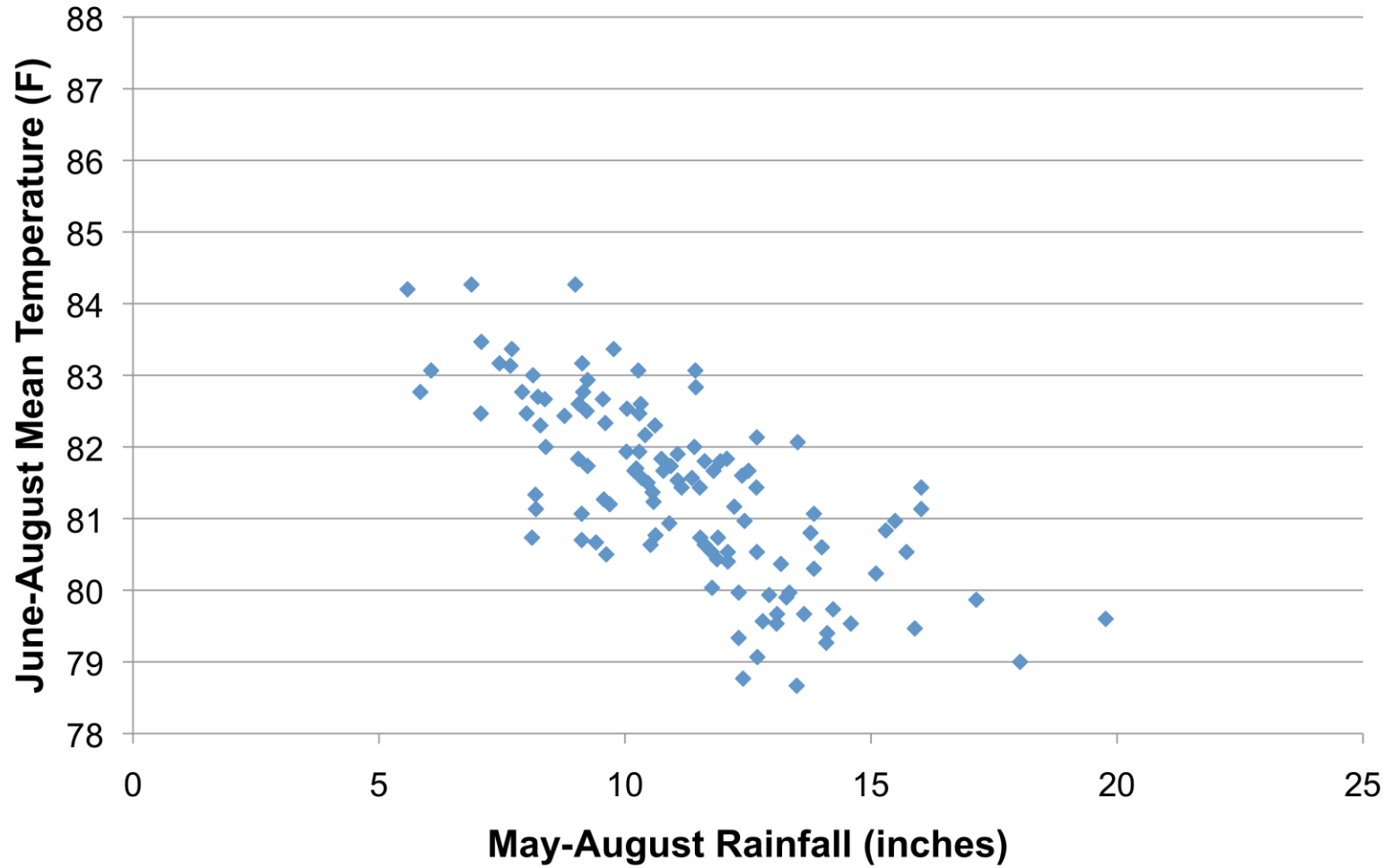


6 Month SPI Blend

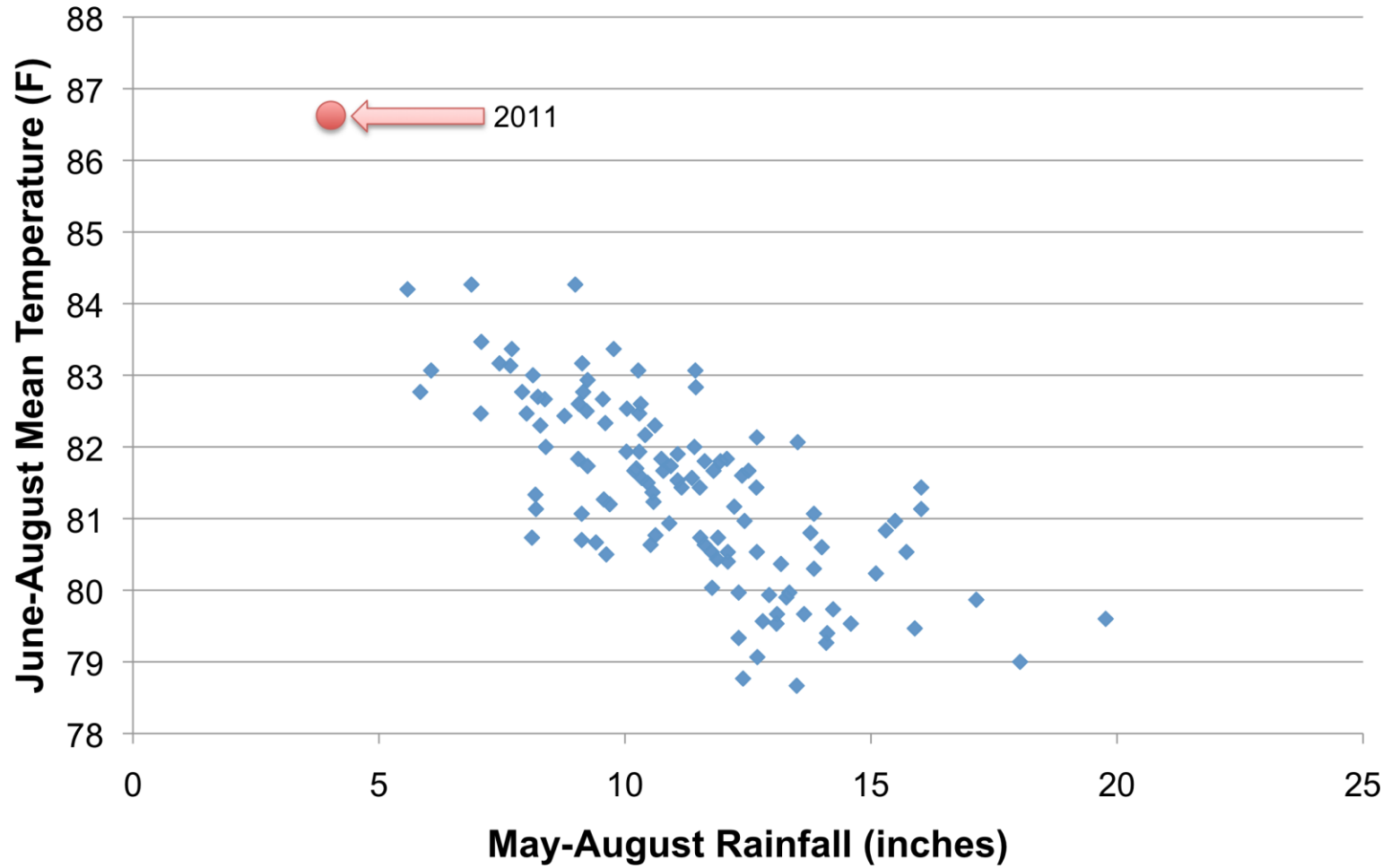
June 28, 2011



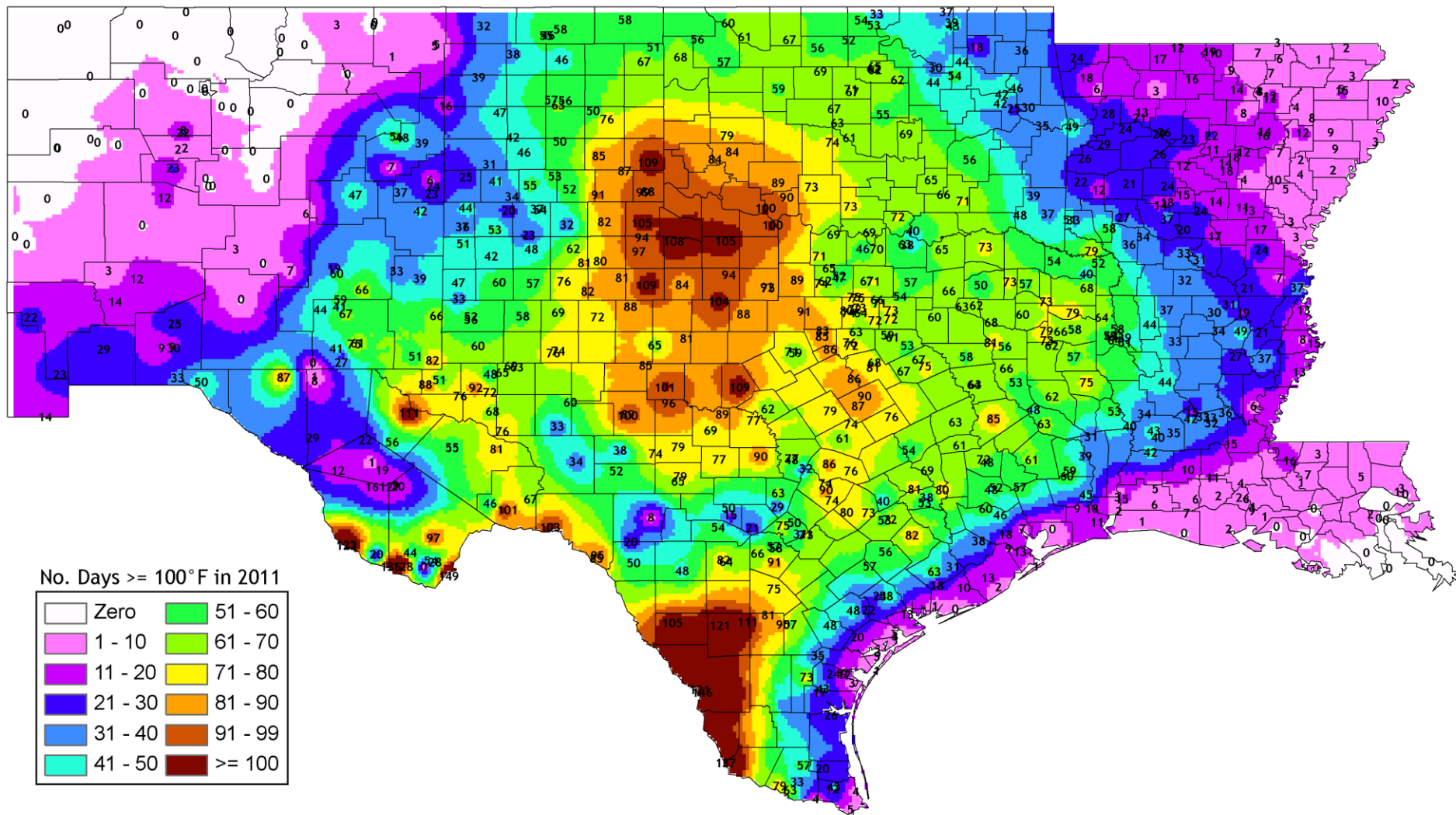
Texas Summertime Rainfall and Temperatures, 1895-2011



Texas Summertime Rainfall and Temperatures, 1895-2011



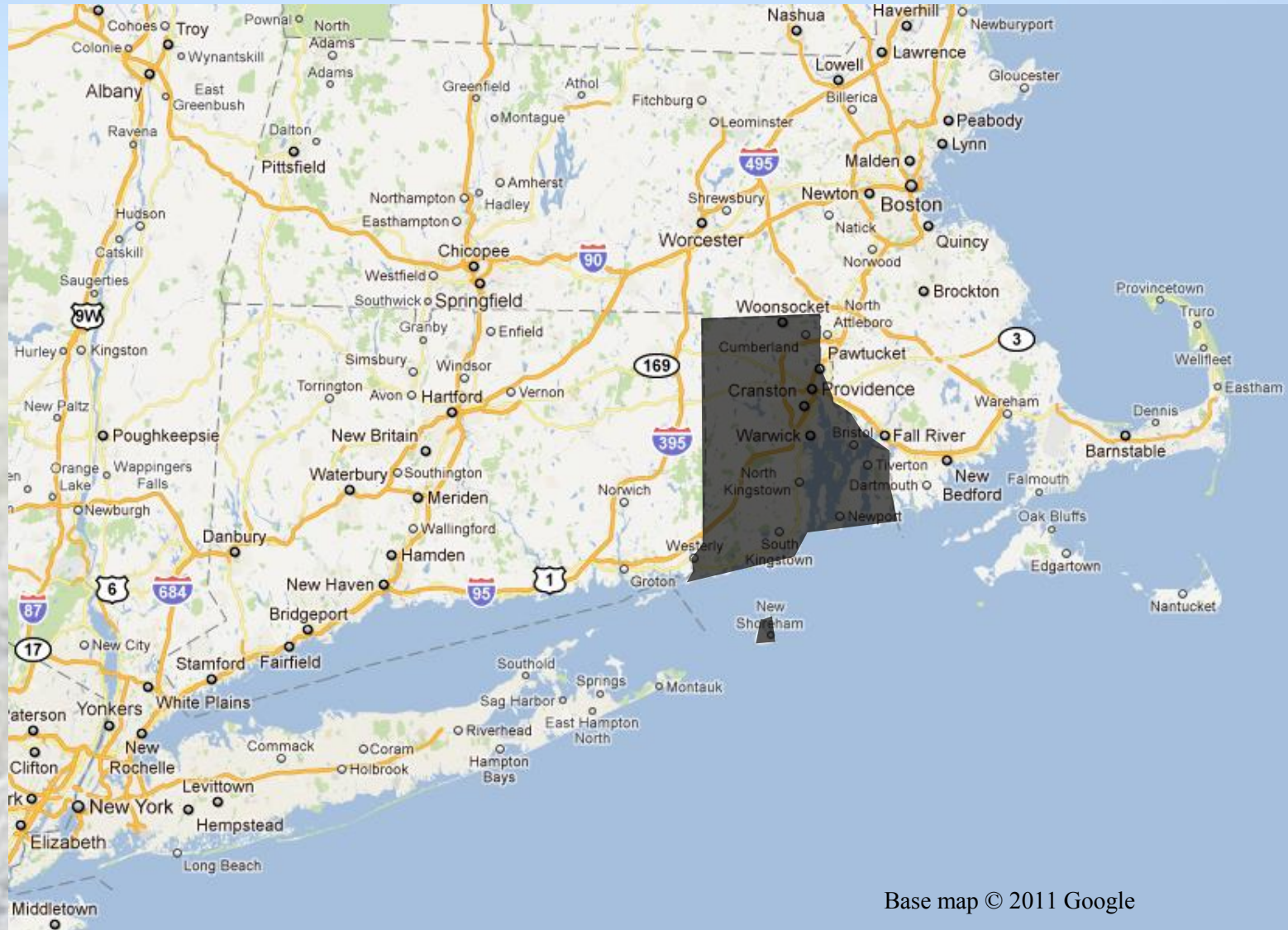
Number of triple digit days



Area burned in Texas equals...



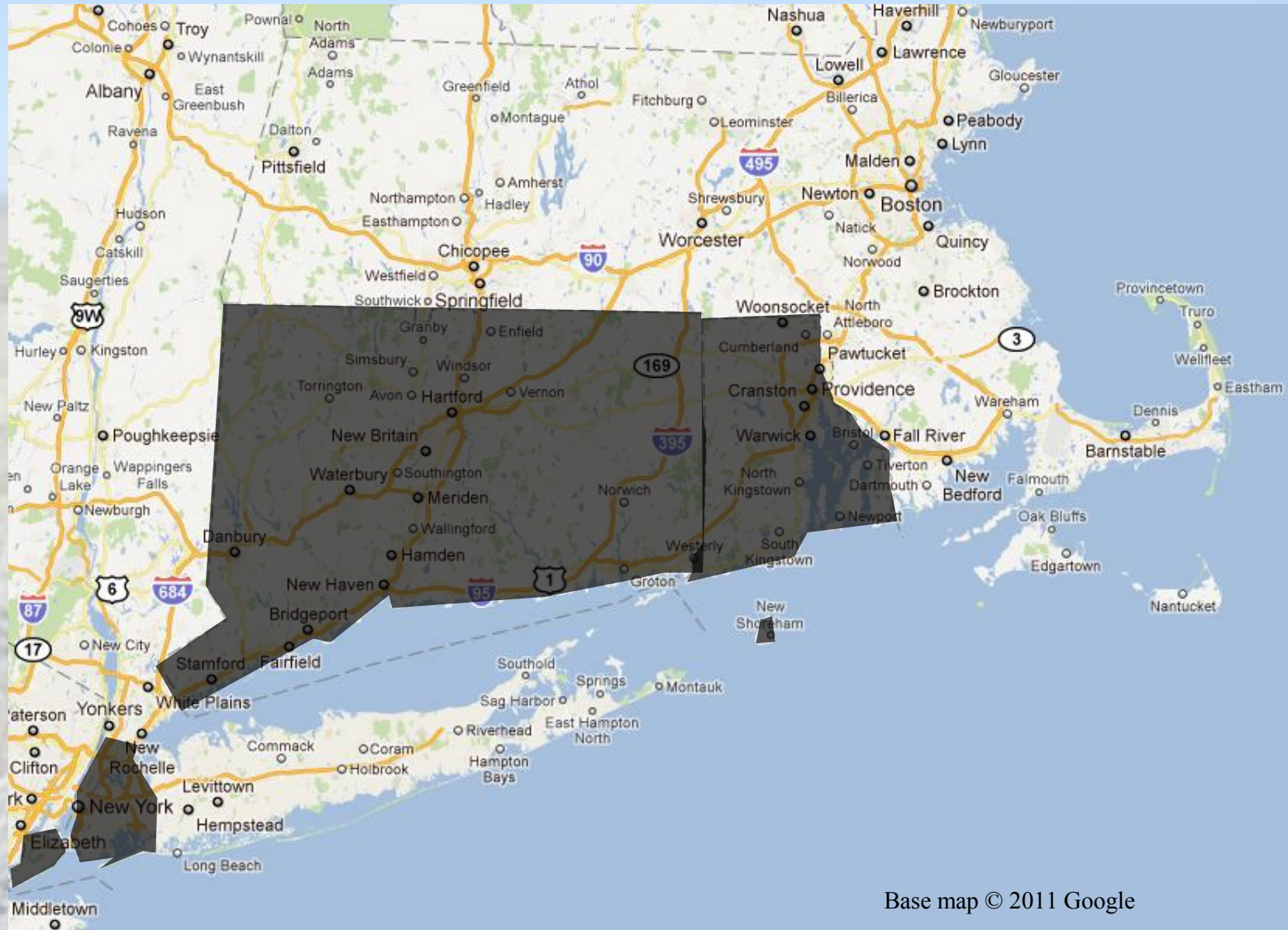
All the land of Rhode Island



Base map © 2011 Google

n-Gammon Texas A&M

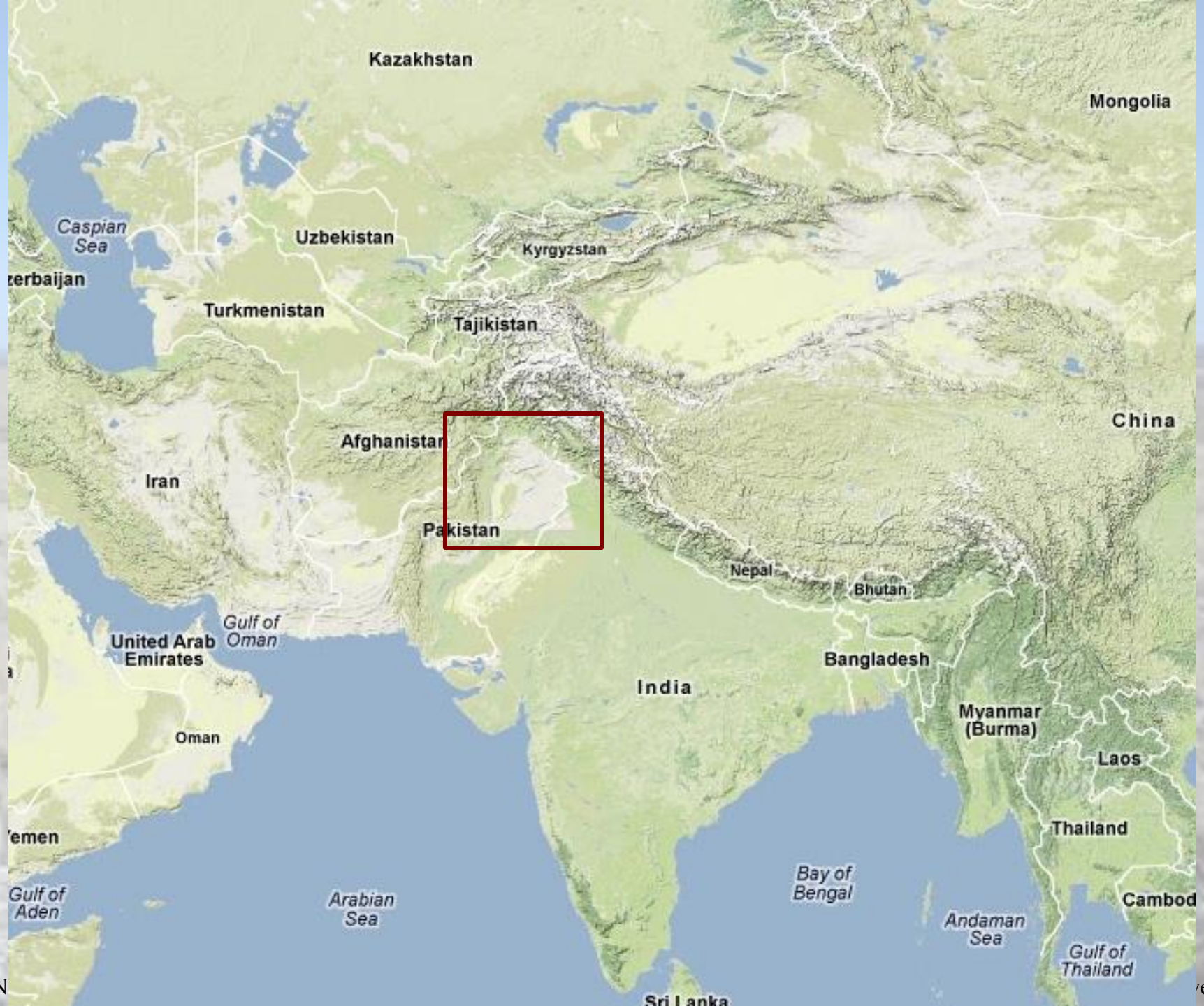
Plus all of New York City!

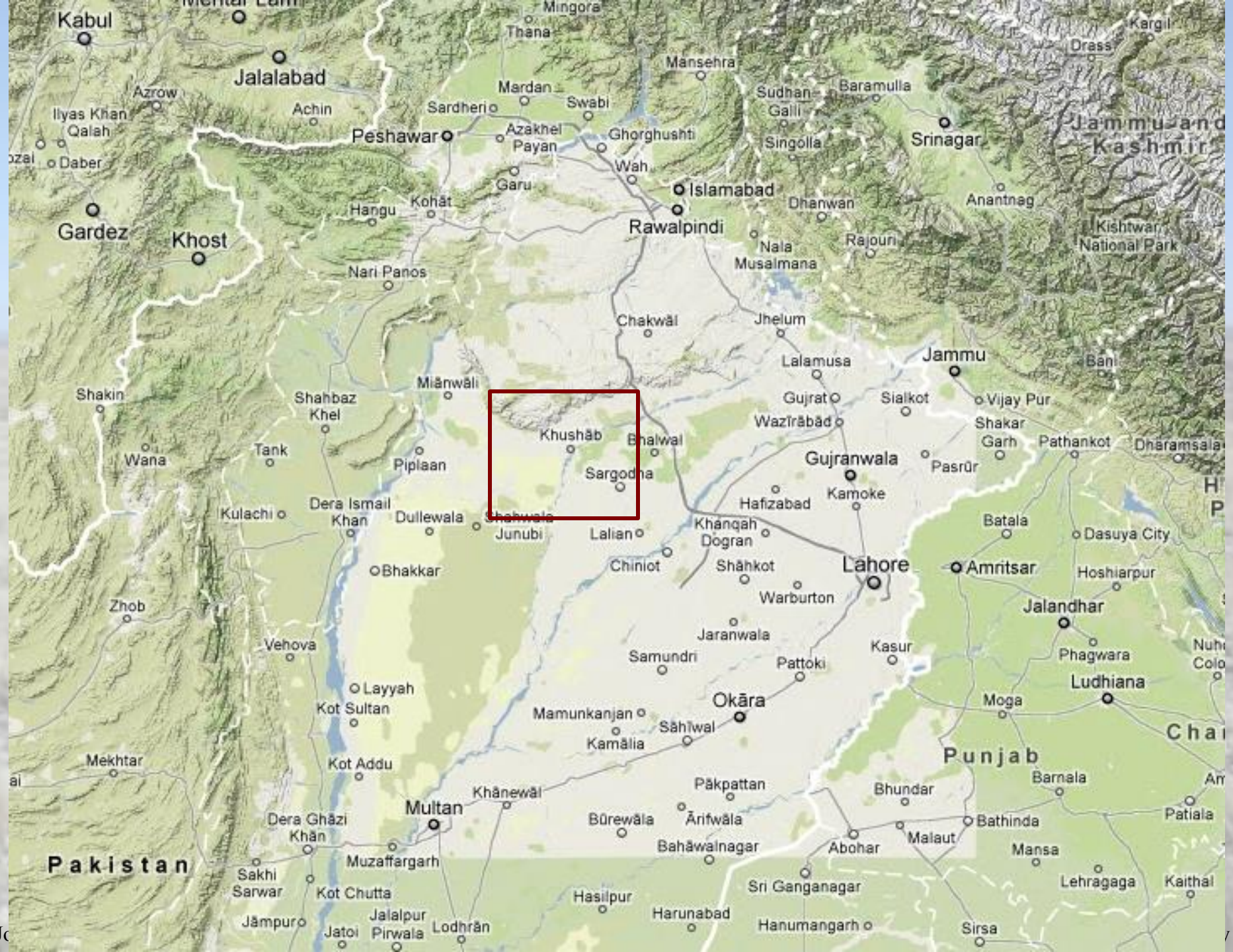


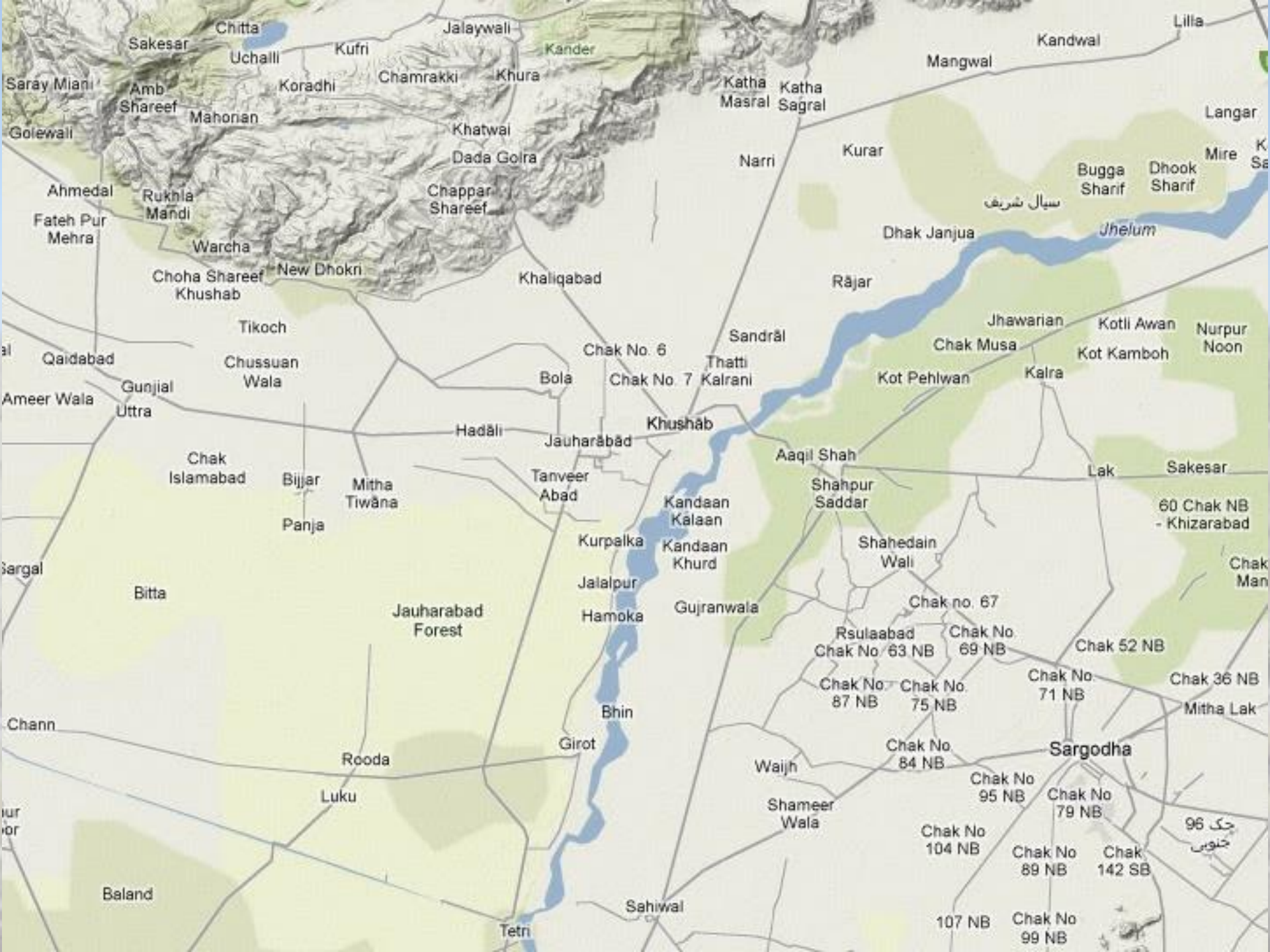
Base map © 2011 Google

Losses

- \$7.62B in major agricultural losses
- \$766M in merchantable timber losses
- \$535M in insured property losses
- Sixth most devastating fire ever in U.S.







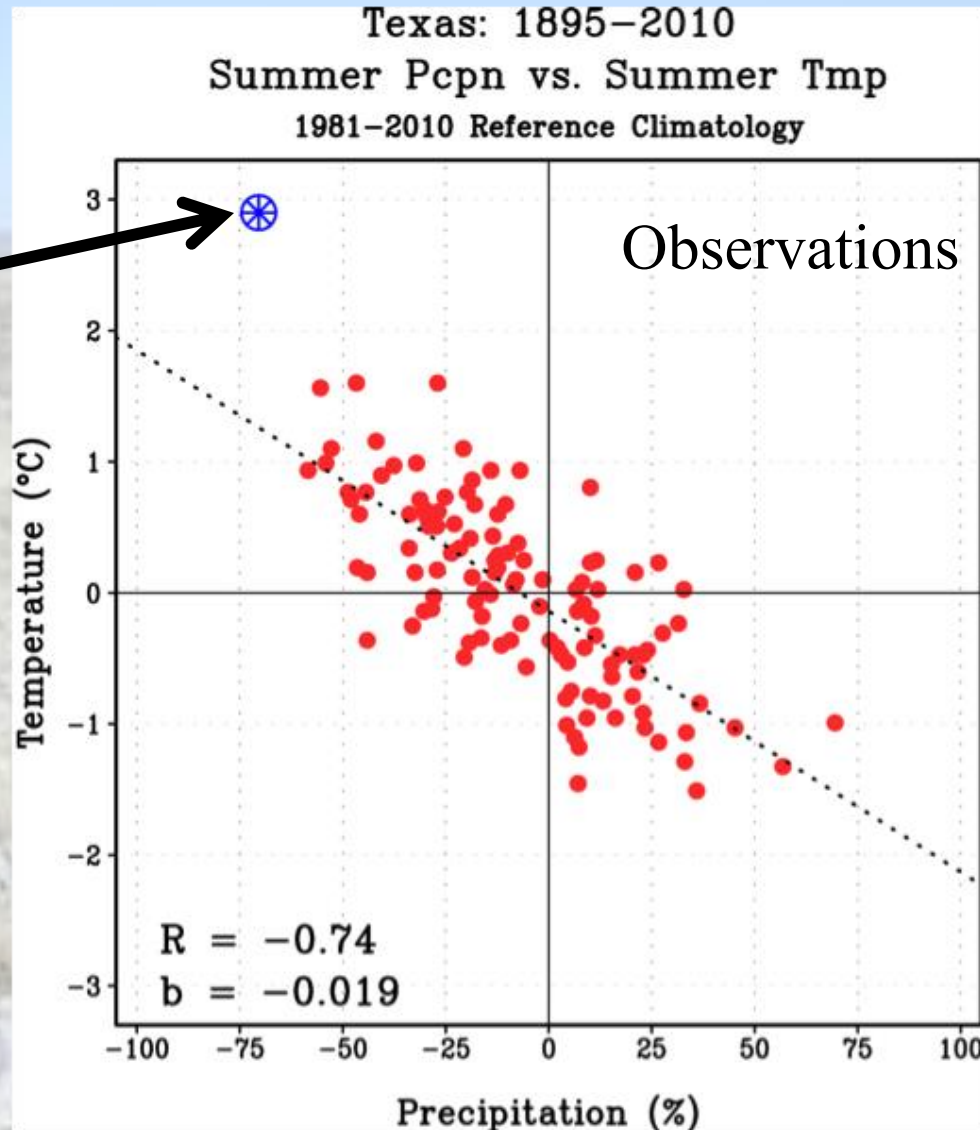
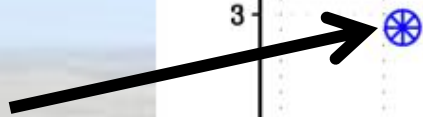


Khushab, Pakistan



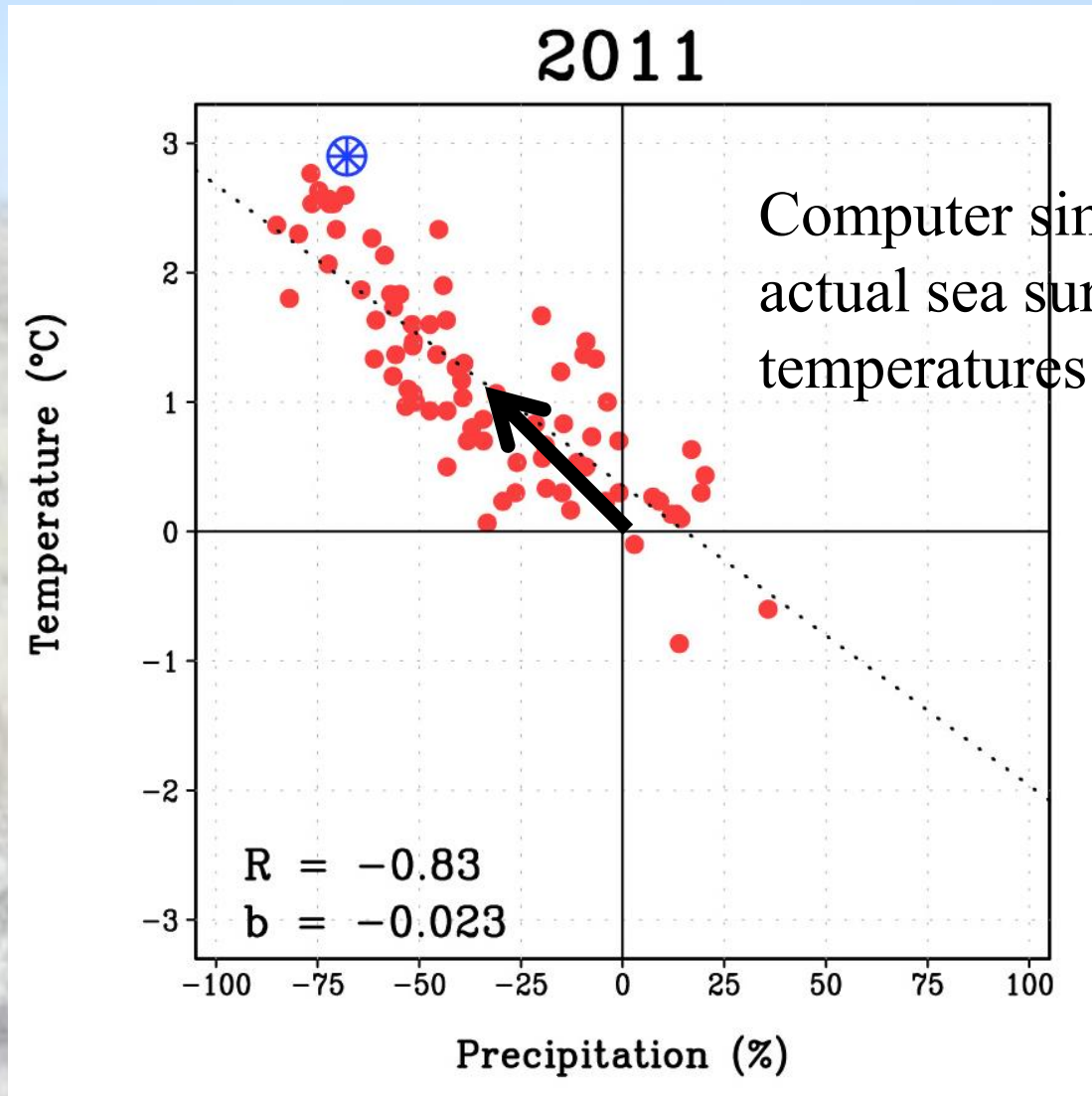
Why did this drought develop?

2011



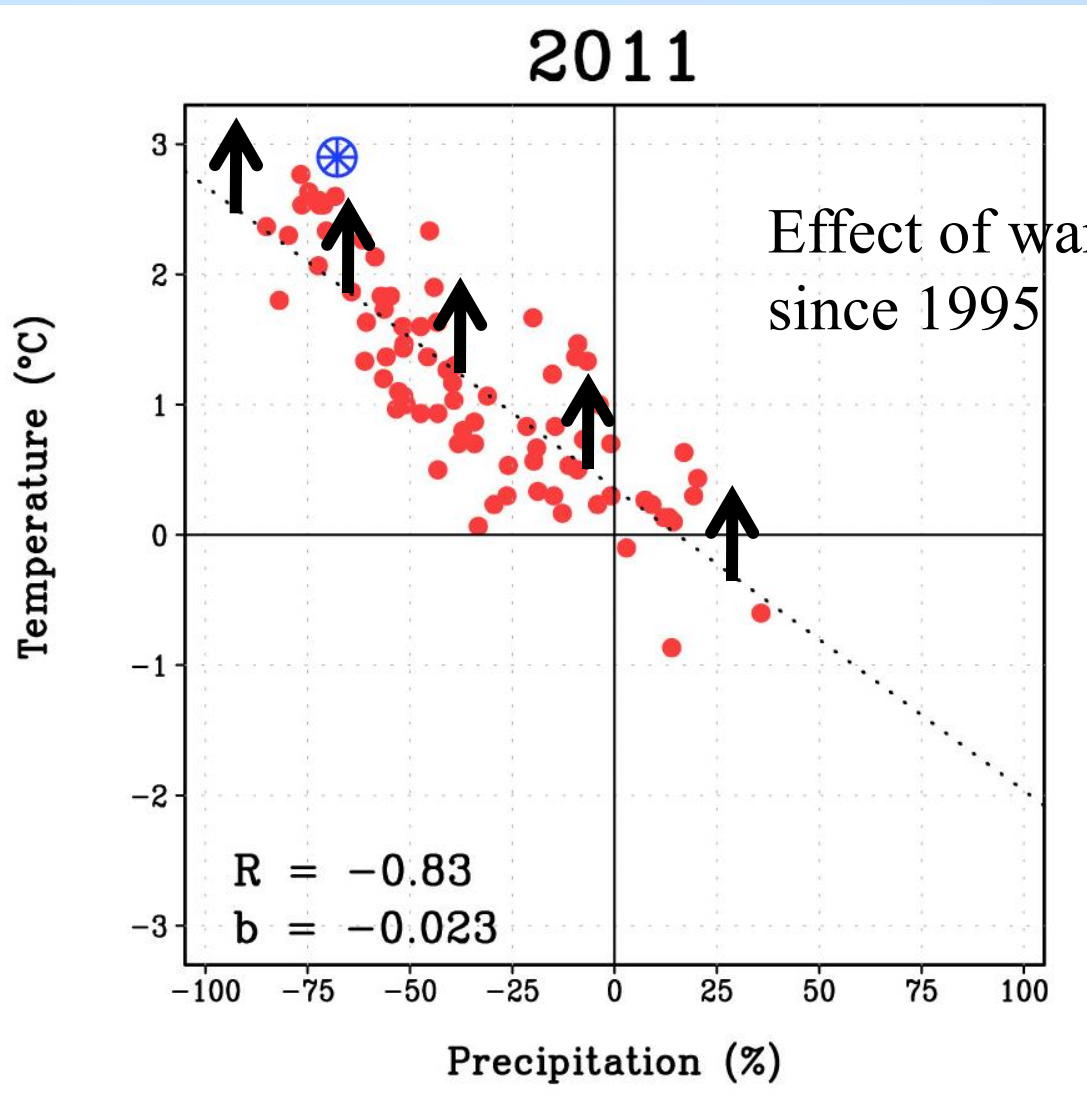
Hoerling et al.,
Journal of
Climate, 2013,
in press, DOI:
10.1175/JCLI-
D-12-00270.1

Why did this drought develop?



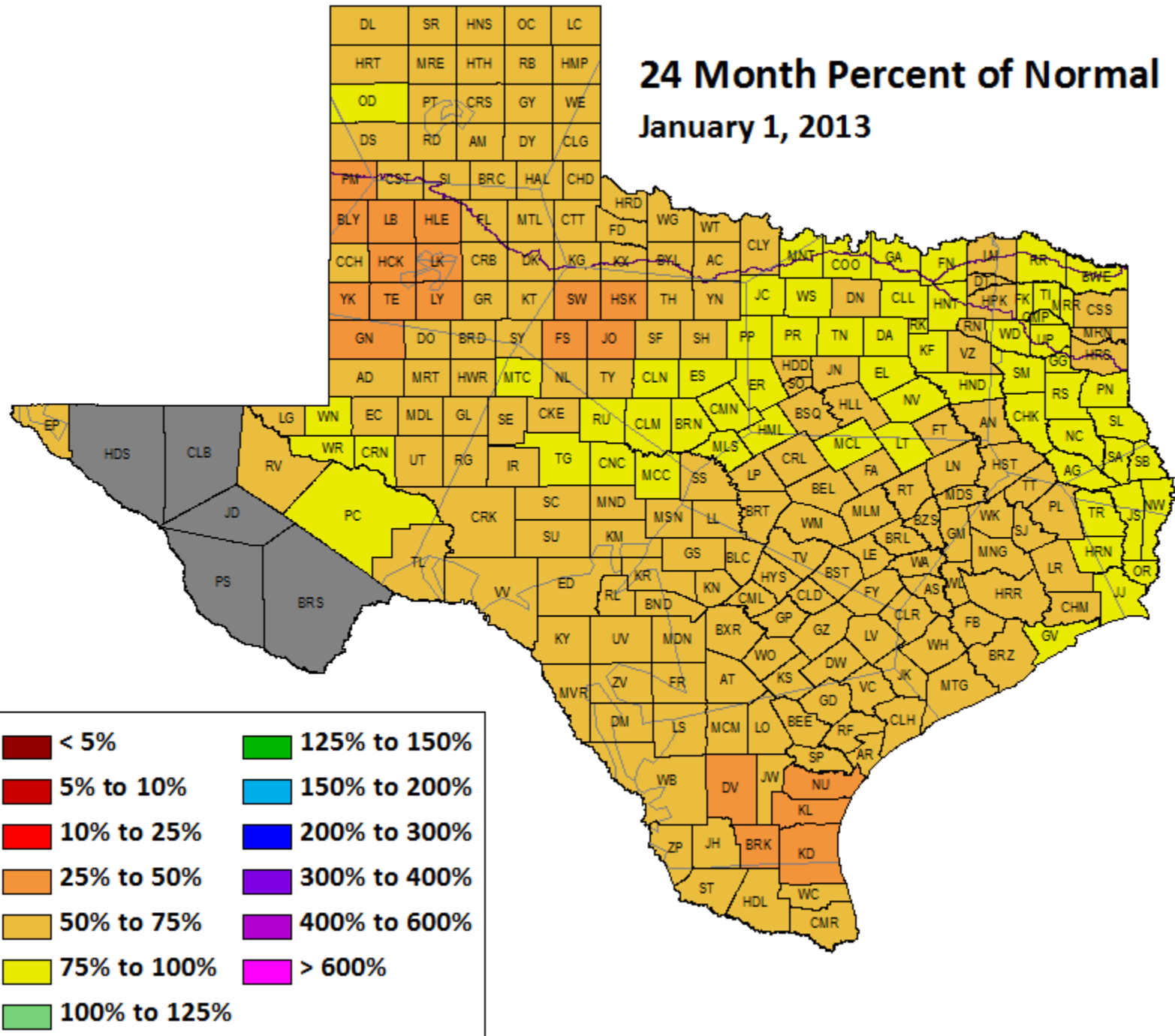
Hoerling et al.,
Journal of
Climate, 2013,
in press, DOI:
10.1175/JCLI-
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Why did this drought develop?



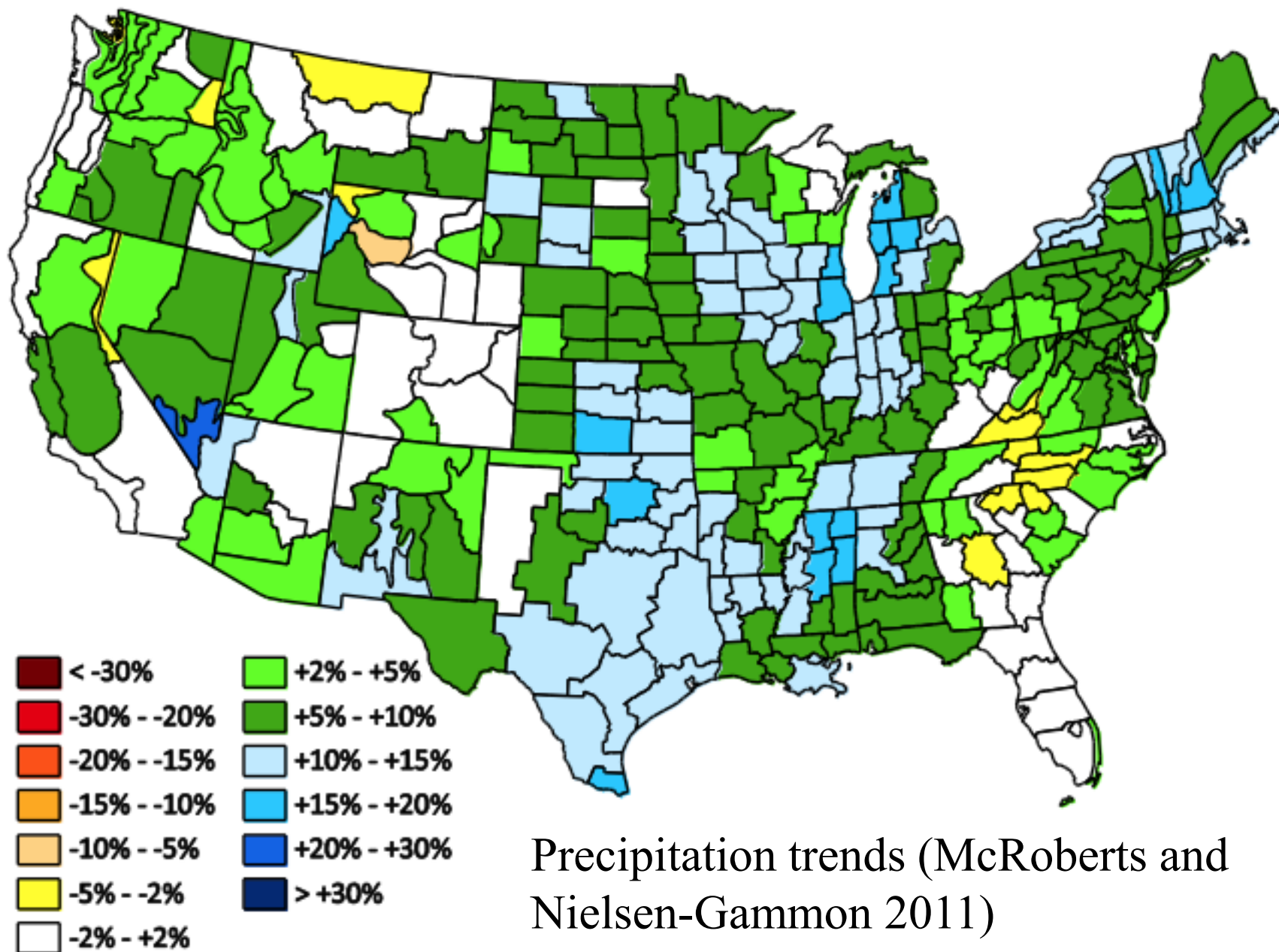
Hoerling et al.,
Journal of
Climate, 2013,
in press, DOI:
10.1175/JCLI-
D-12-00270.1

24 Month Percent of Normal January 1, 2013



Climate Change and Drought

- Decreased rainfall?
- Increased evaporation?
- Changes in SST patterns?



SST Patterns

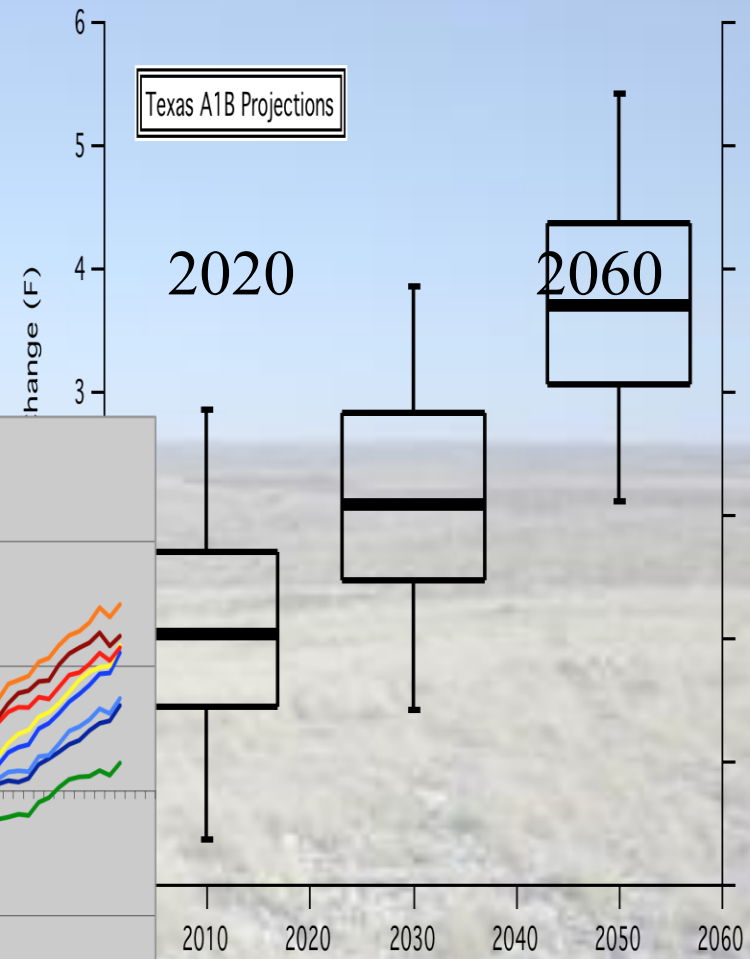
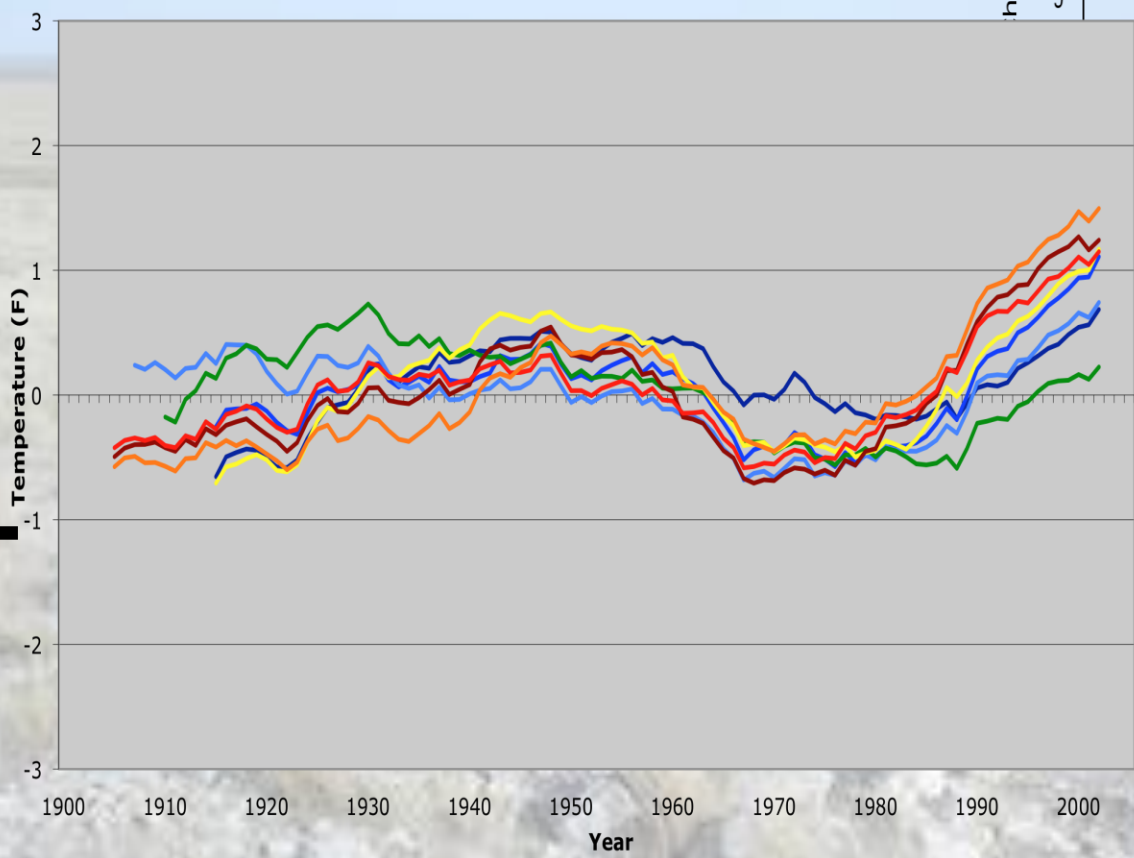
- All review articles agree:
 - La Niña may become stronger, or maybe not
 - La Niña may become more frequent, or maybe not
 - Important changes taking place in tropical Pacific
 - Too soon to measure the consequences

Time →

1900 1940 1980

Annual Mean Temperature

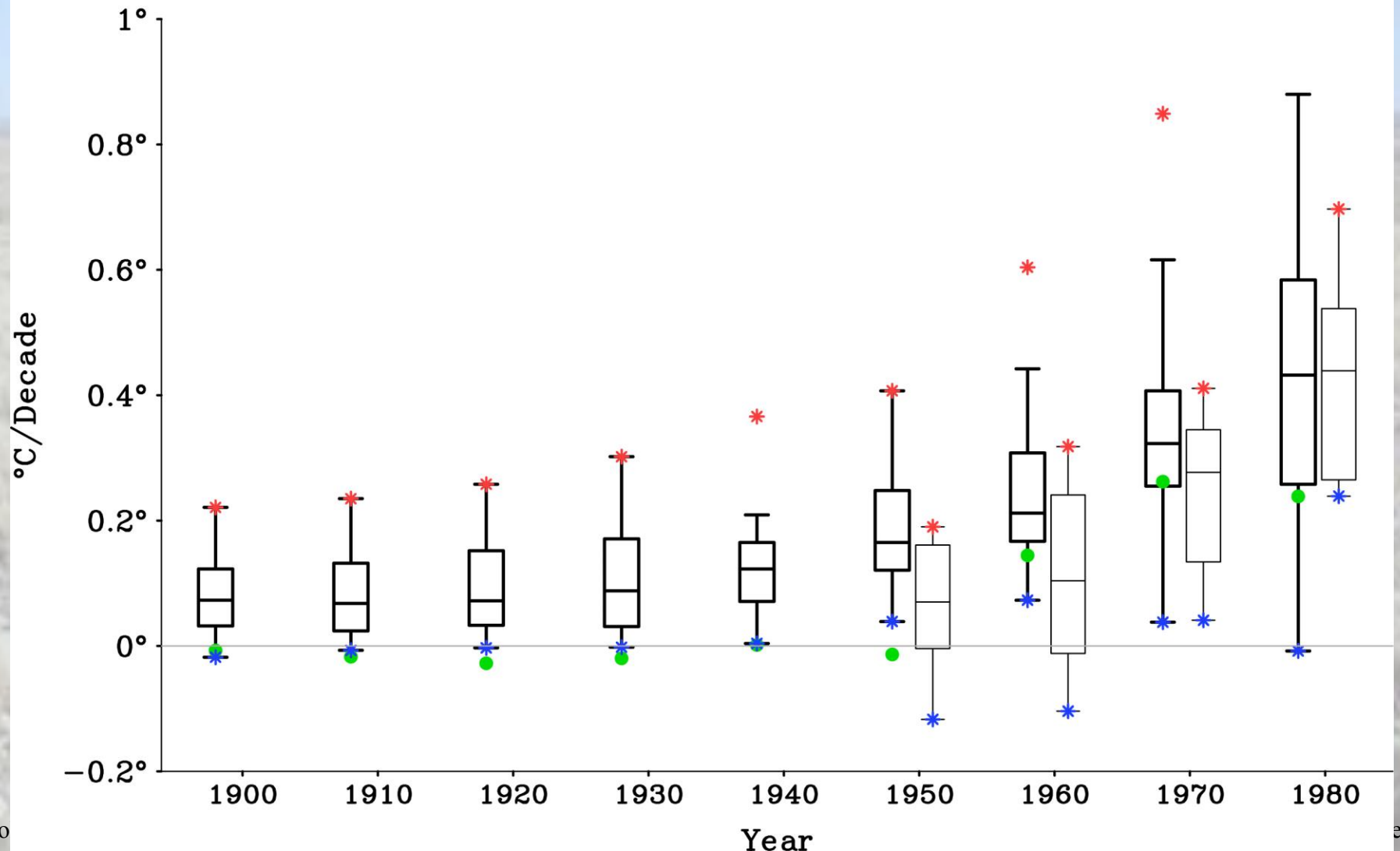
Temperature ↑



- Panhandle and Plains
- West Central Texas
- North Central Texas
- East Texas
- Far West Texas
- South Texas
- South Central Texas
- Southeast Texas

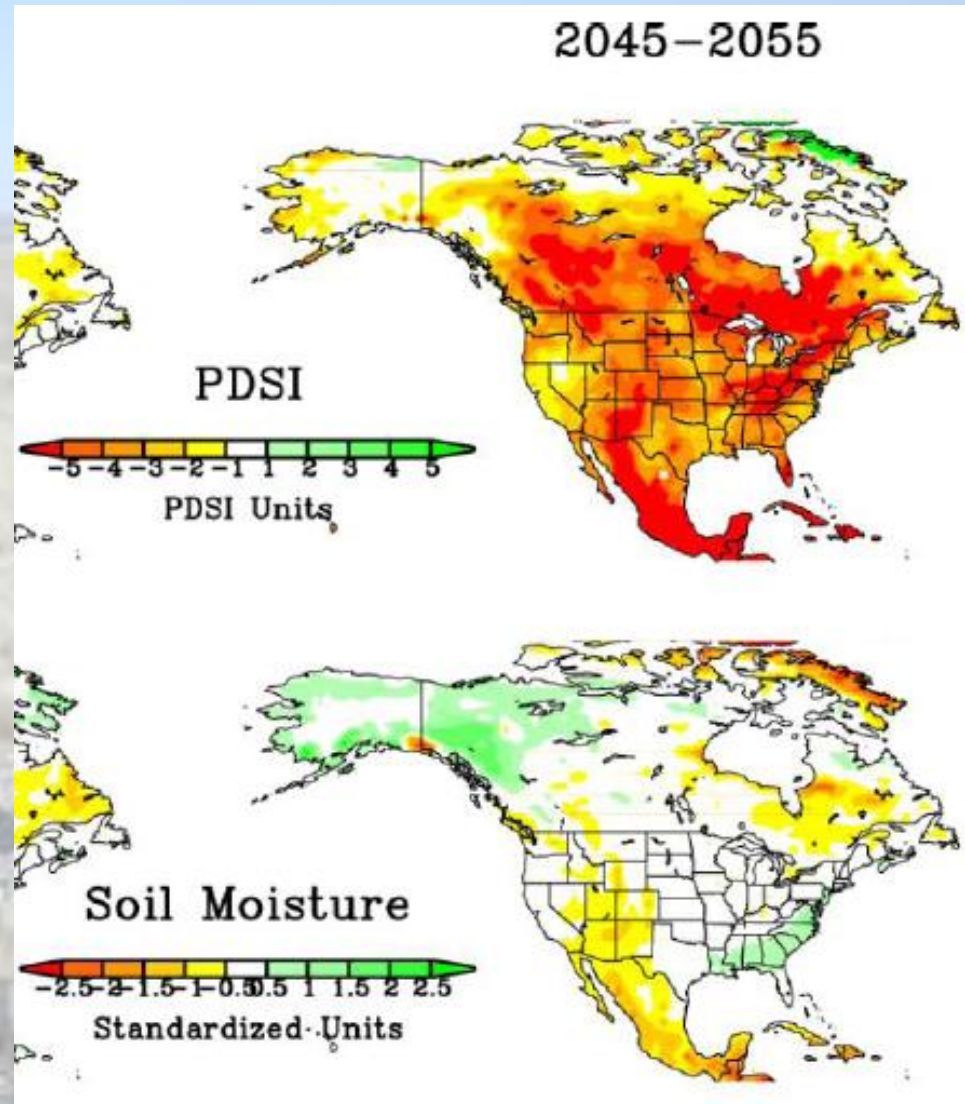
Warming in Texas

Texas-JJA Tmp Trend
CMIP5/GFSv2 and Observed



Warming and Drought Intensity

Hoerling et al., 2012,
Journal of Climate,
doi:10.1175/JCLI-D-12-
00449.1, in press



Policy Consequences

- Increased awareness of
 - Importance of water to economy
 - Vulnerability of water supply
 - Climate sensitivity
- Need for legislative action to
 - Fund State Water Plan (\$53B?)
 - Sort out groundwater rights and management

Policy Consequences, cont'd.

- New water stakeholders emerge
- Interstate water disputes (DFW vs. OK, TX vs. NM)
- Lawsuit challenging prioritization of water access by societal need instead of seniority

Summary

- Drought hit Texas agriculture hard
- Drought made people aware of climate vulnerability
- Rising population meets shrinking water supply
- This may yet exceed the drought of record
- It's just a plan until it hits the fan

The End!

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- <http://climatexas.tamu.edu>
- <http://blog.chron.com/climateabyss>