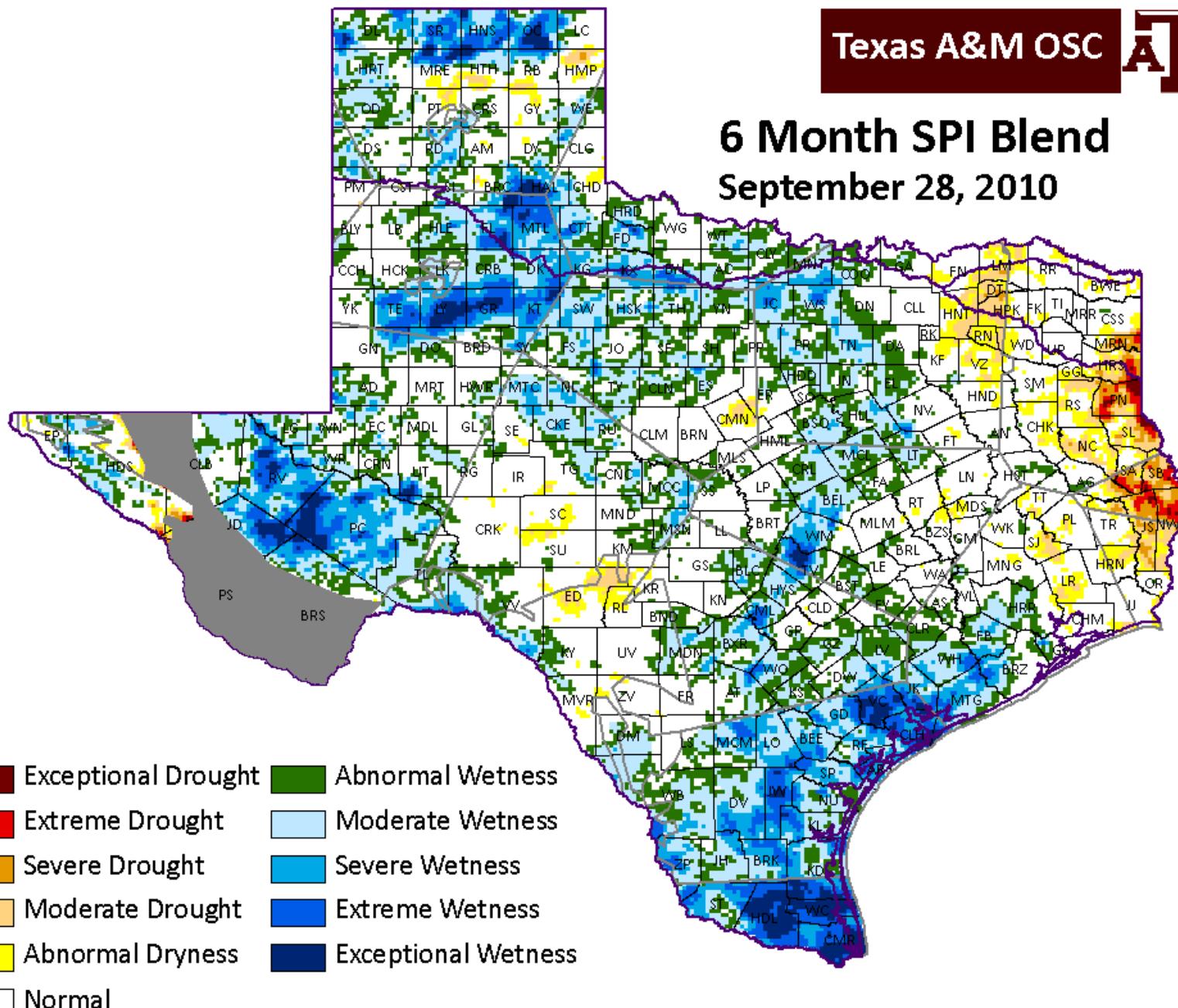


What Did The Texas Drought Do?

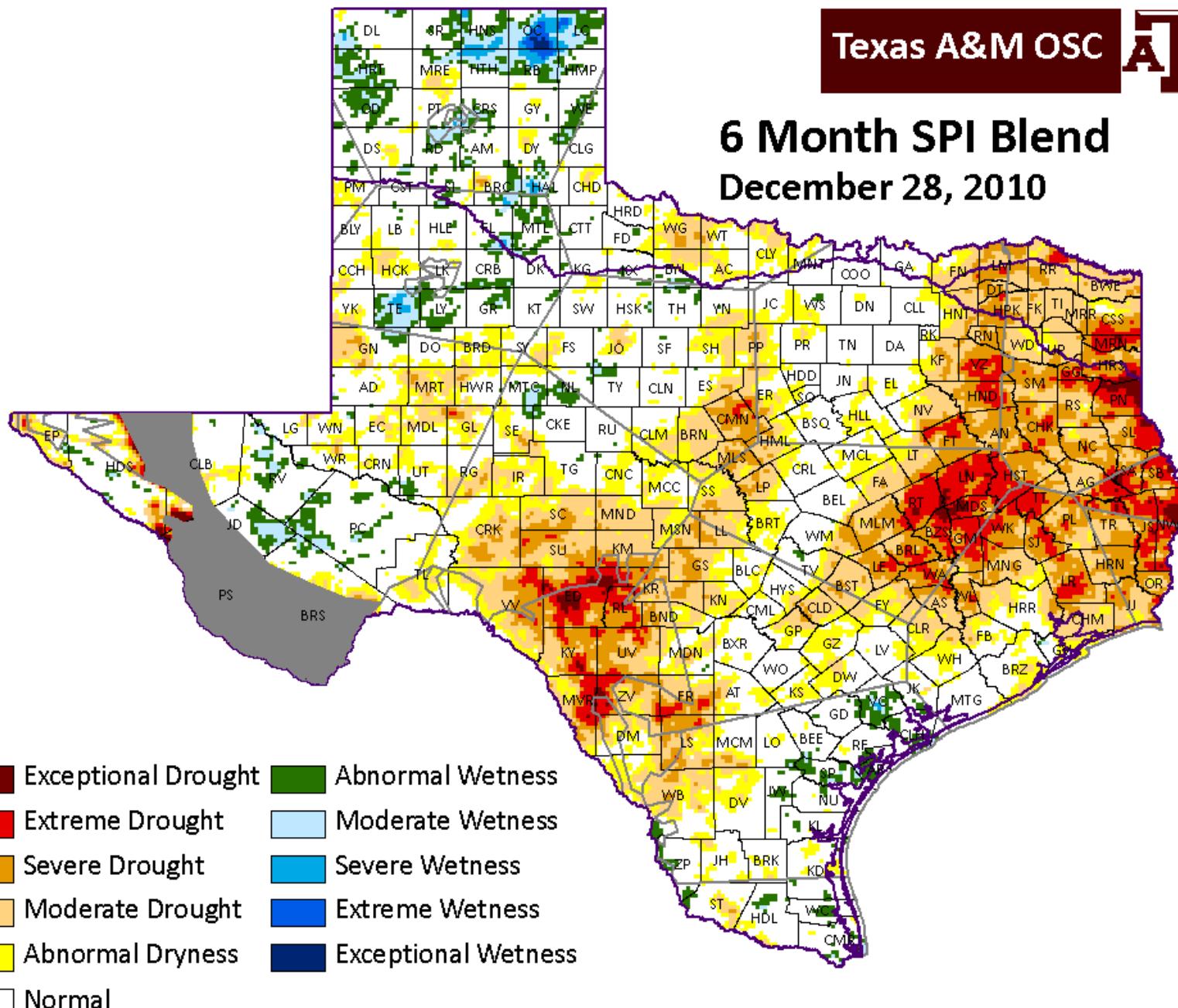


John W. Nielsen-Gammon
Texas State Climatologist
Texas A&M University
n-g@tamu.edu

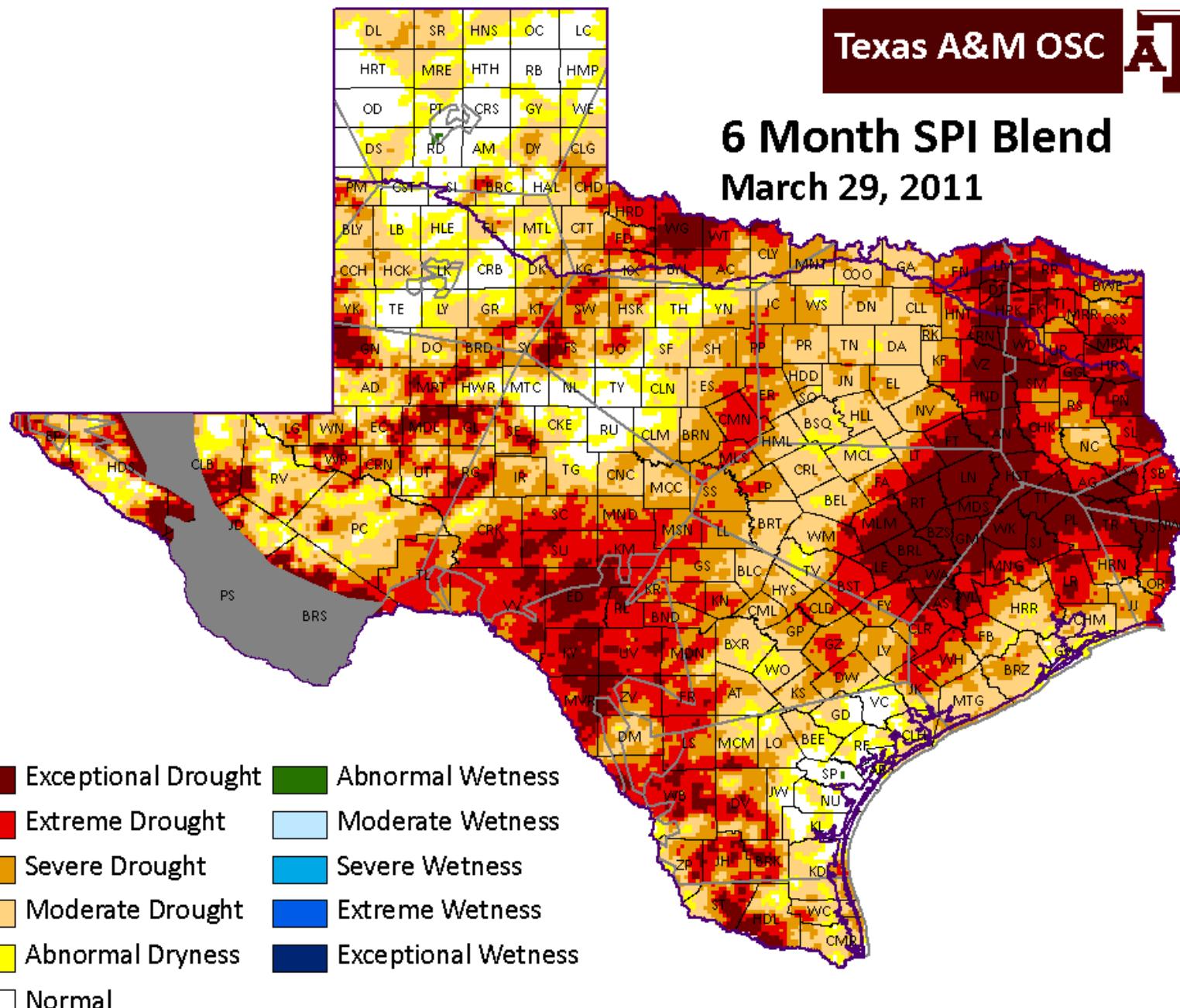
6 Month SPI Blend



6 Month SPI Blend December 28, 2010

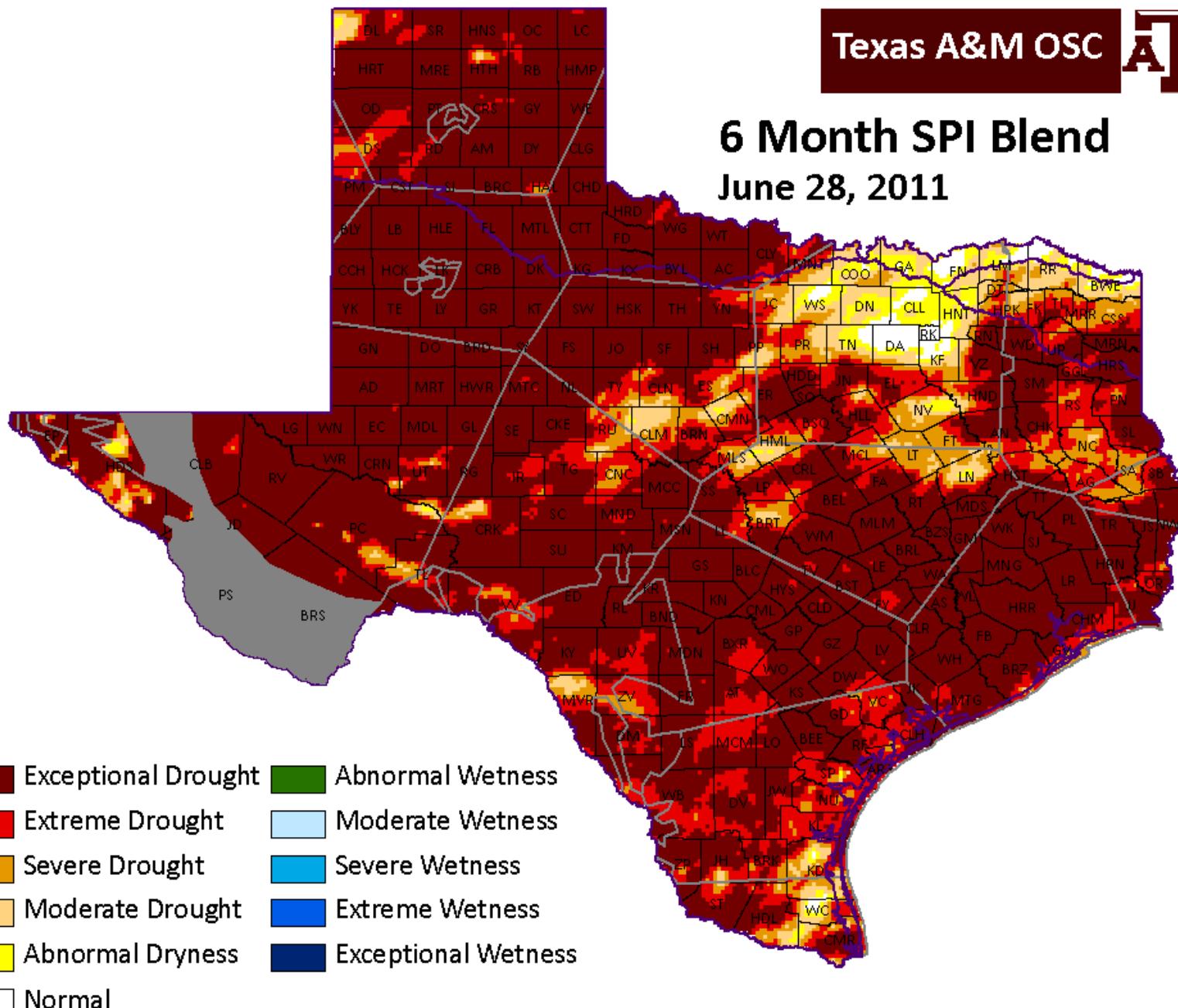


6 Month SPI Blend March 29, 2011

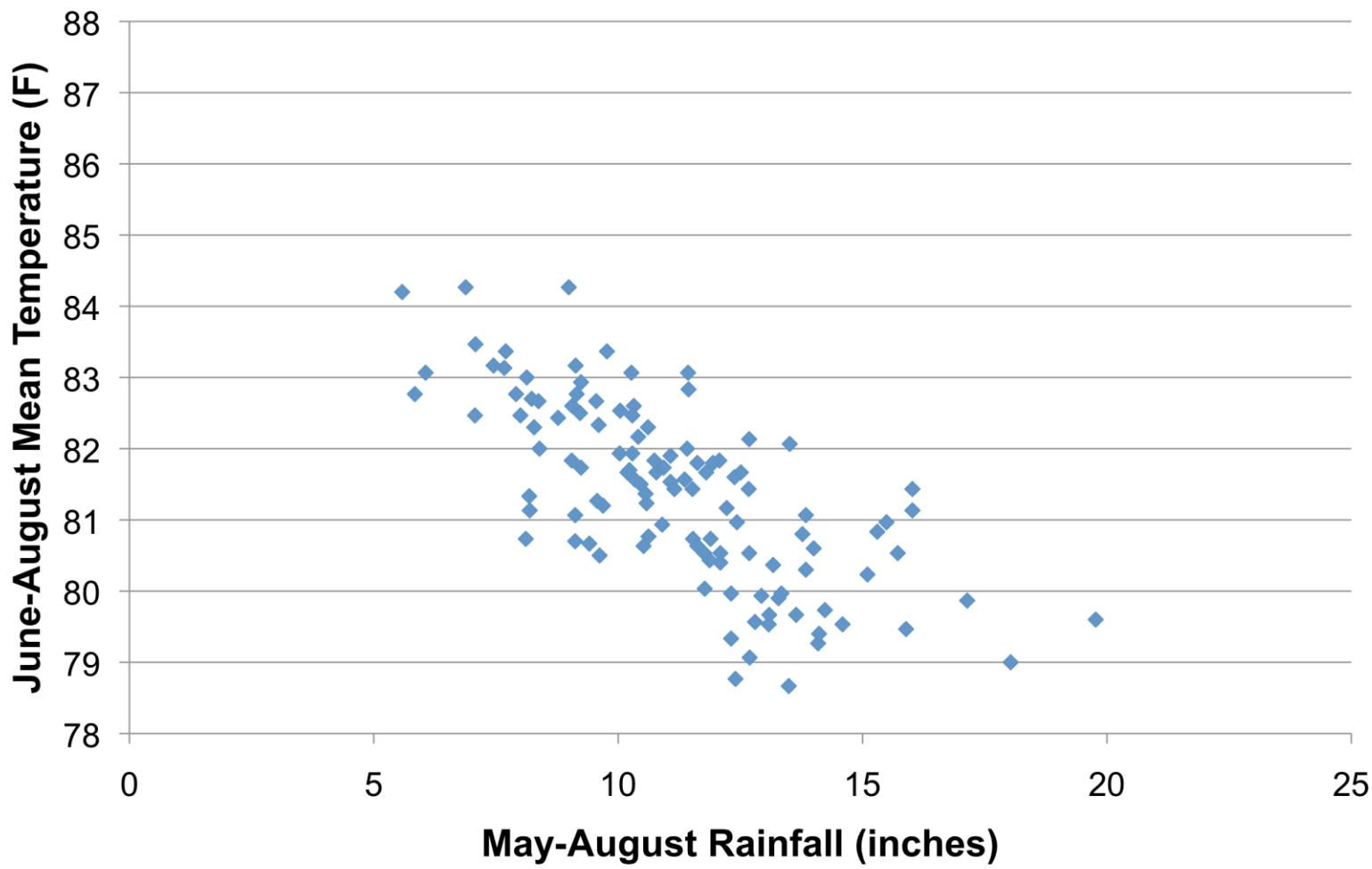


6 Month SPI Blend

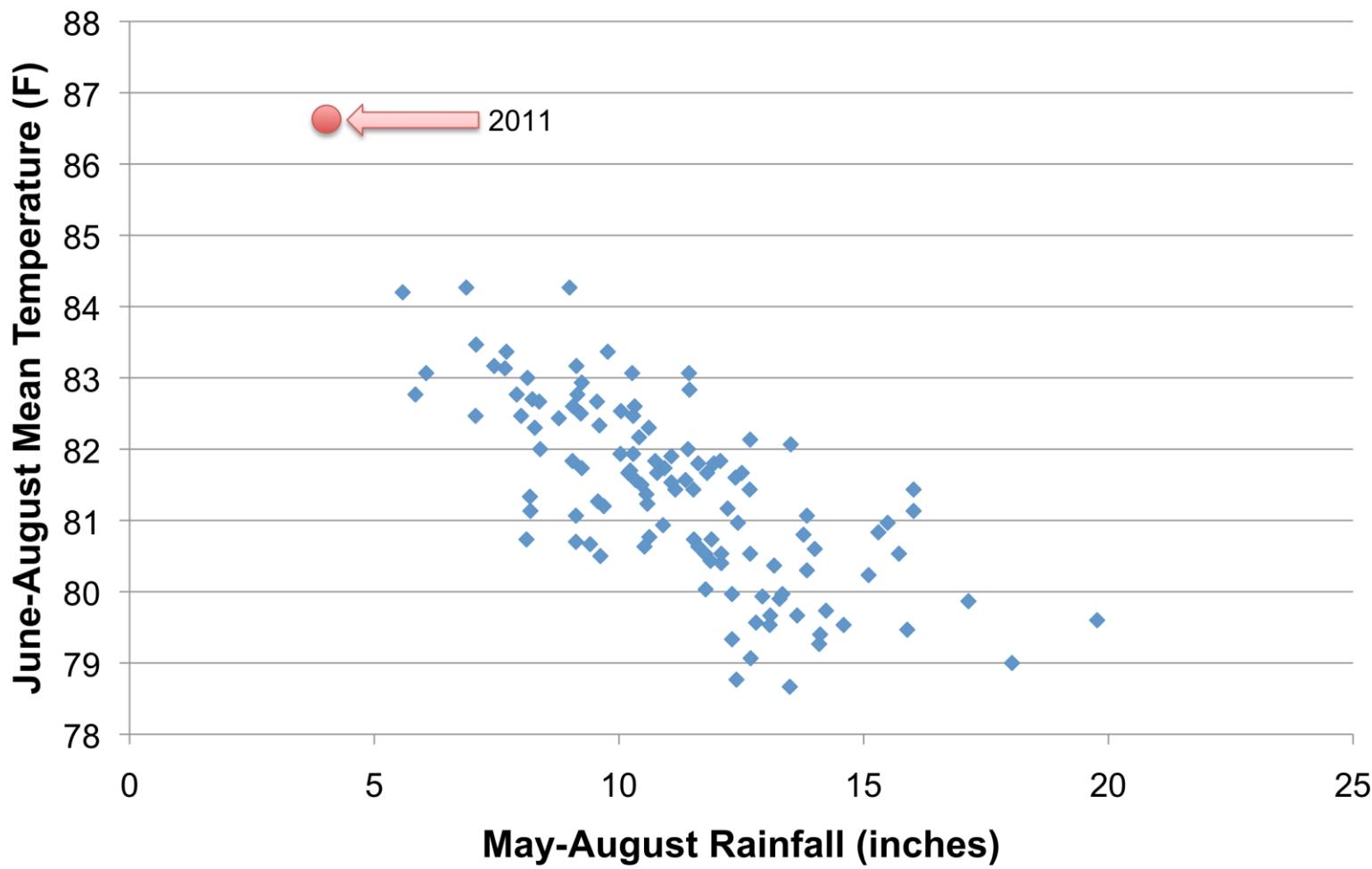
June 28, 2011



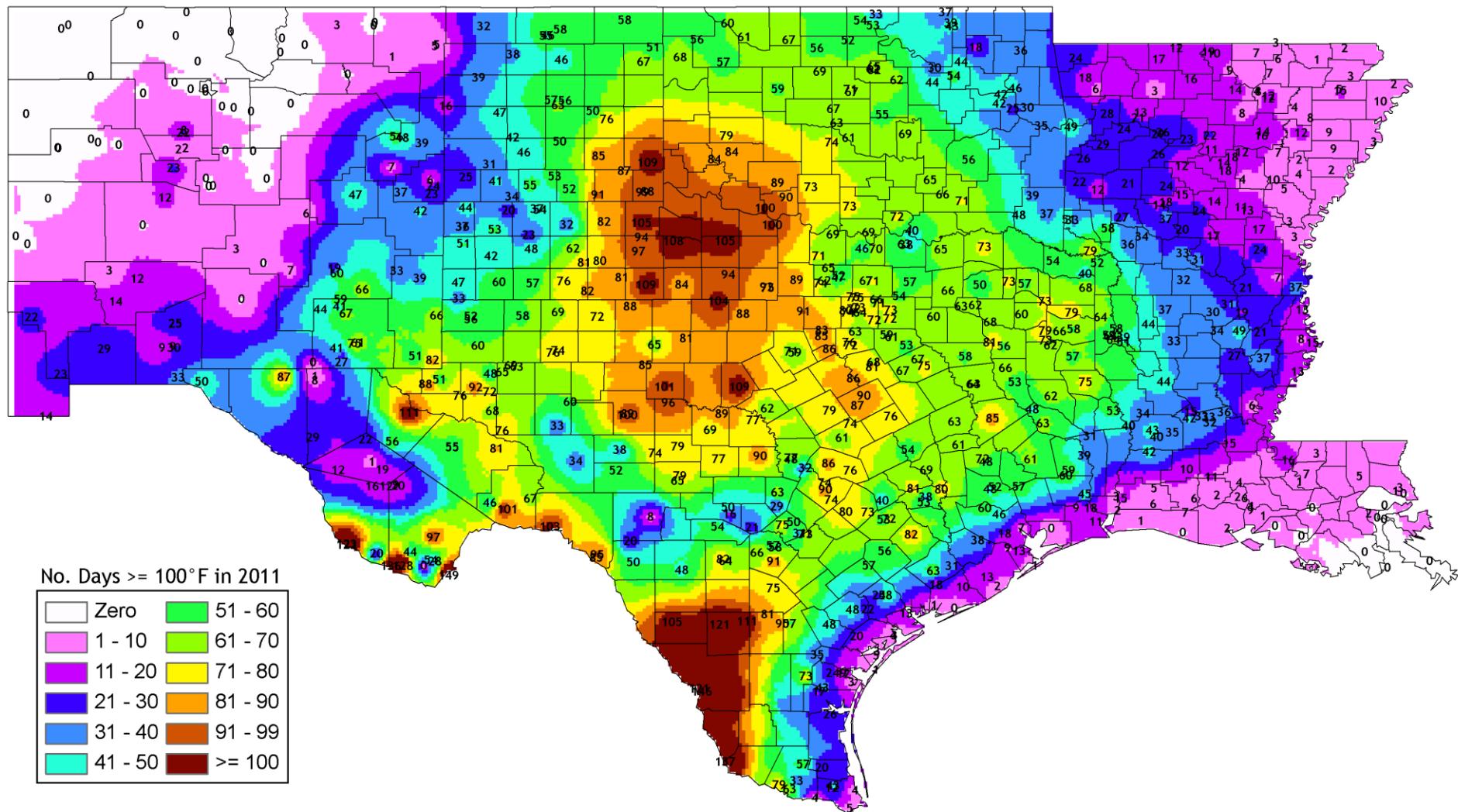
Texas Summertime Rainfall and Temperatures, 1895-2011



Texas Summertime Rainfall and Temperatures, 1895-2011



Number of triple digit days



Area burned in Texas equals...

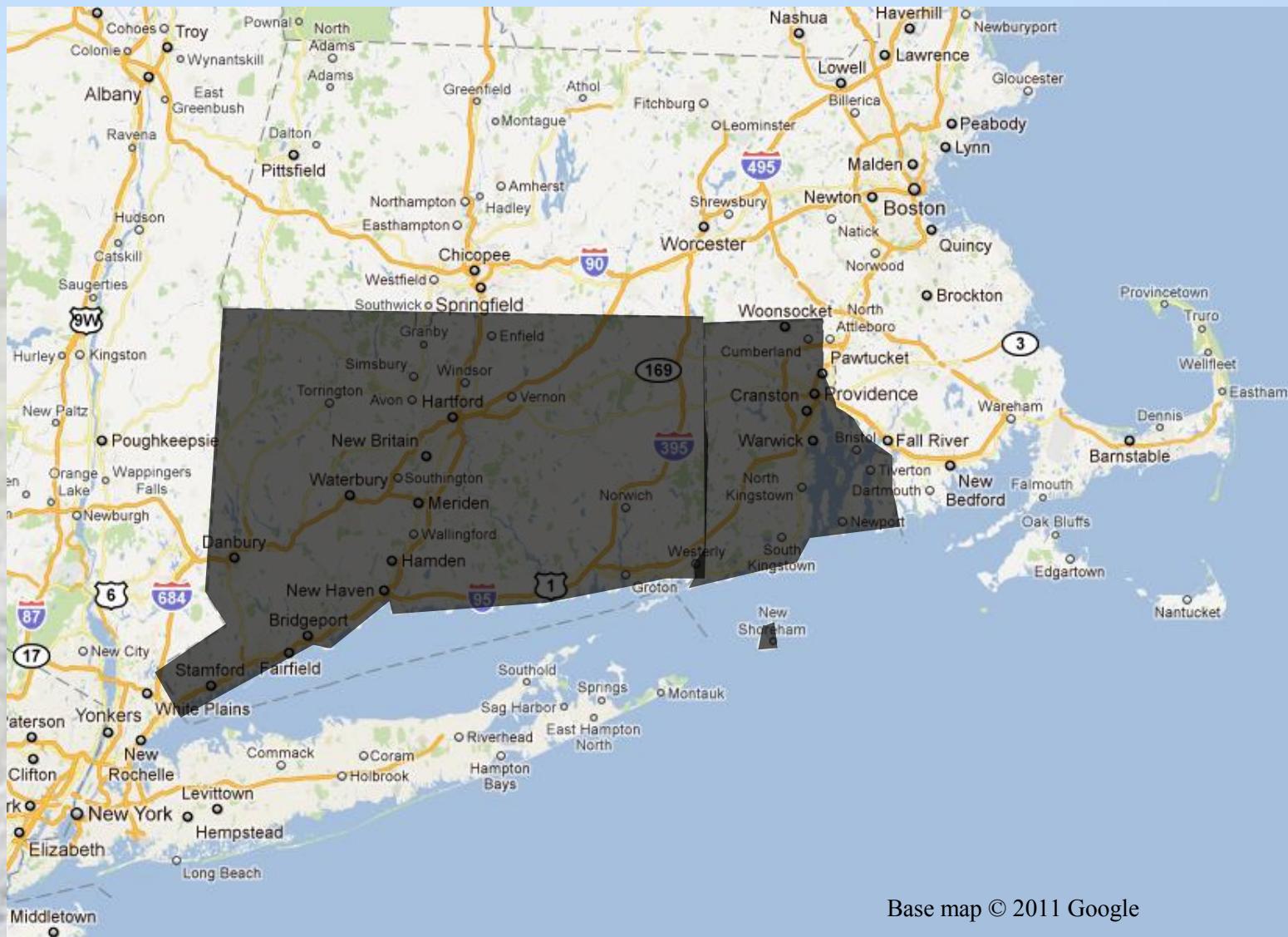


Base map © 2011 Google

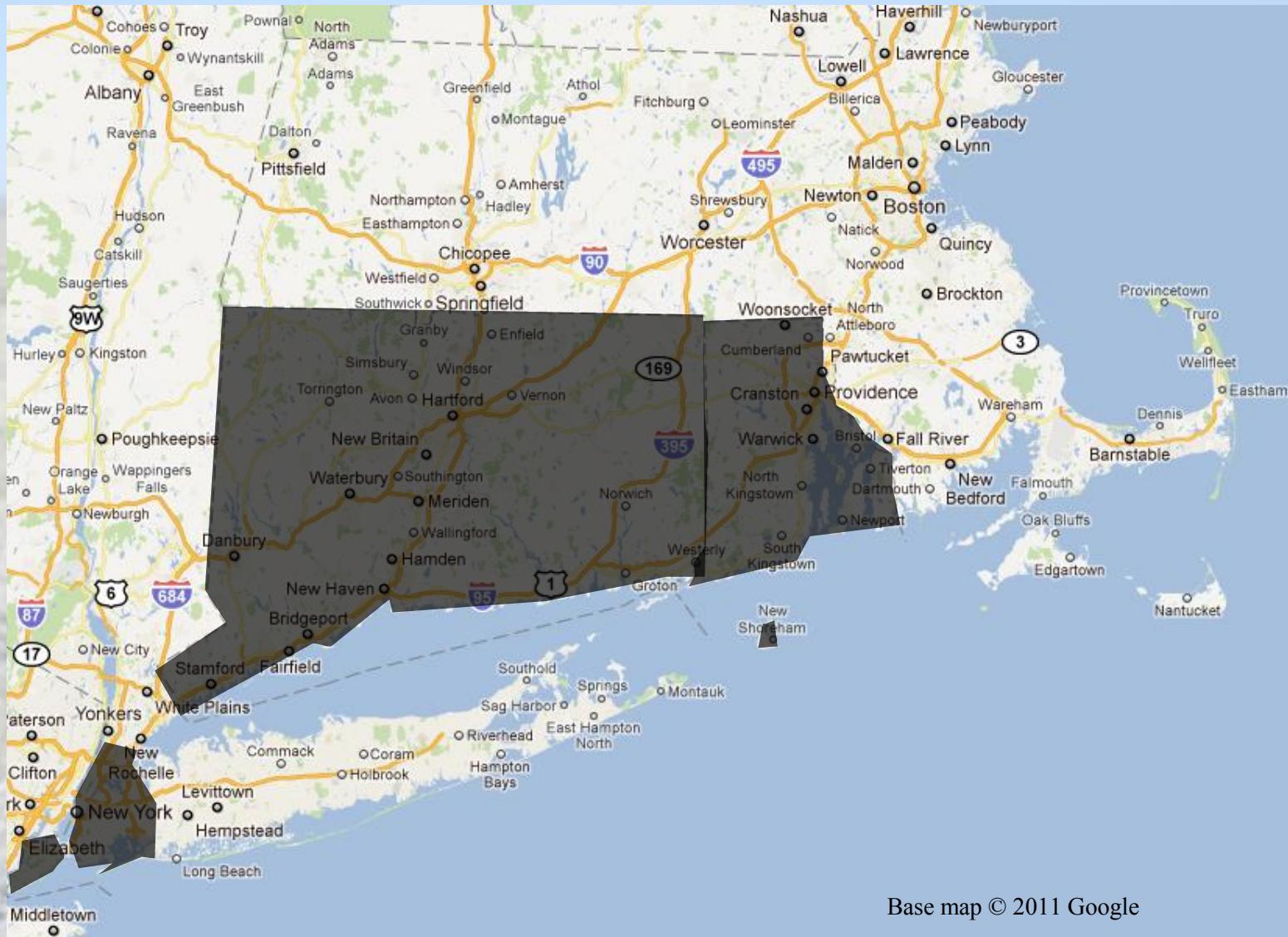
All the land of Rhode Island



And all the land of Connecticut

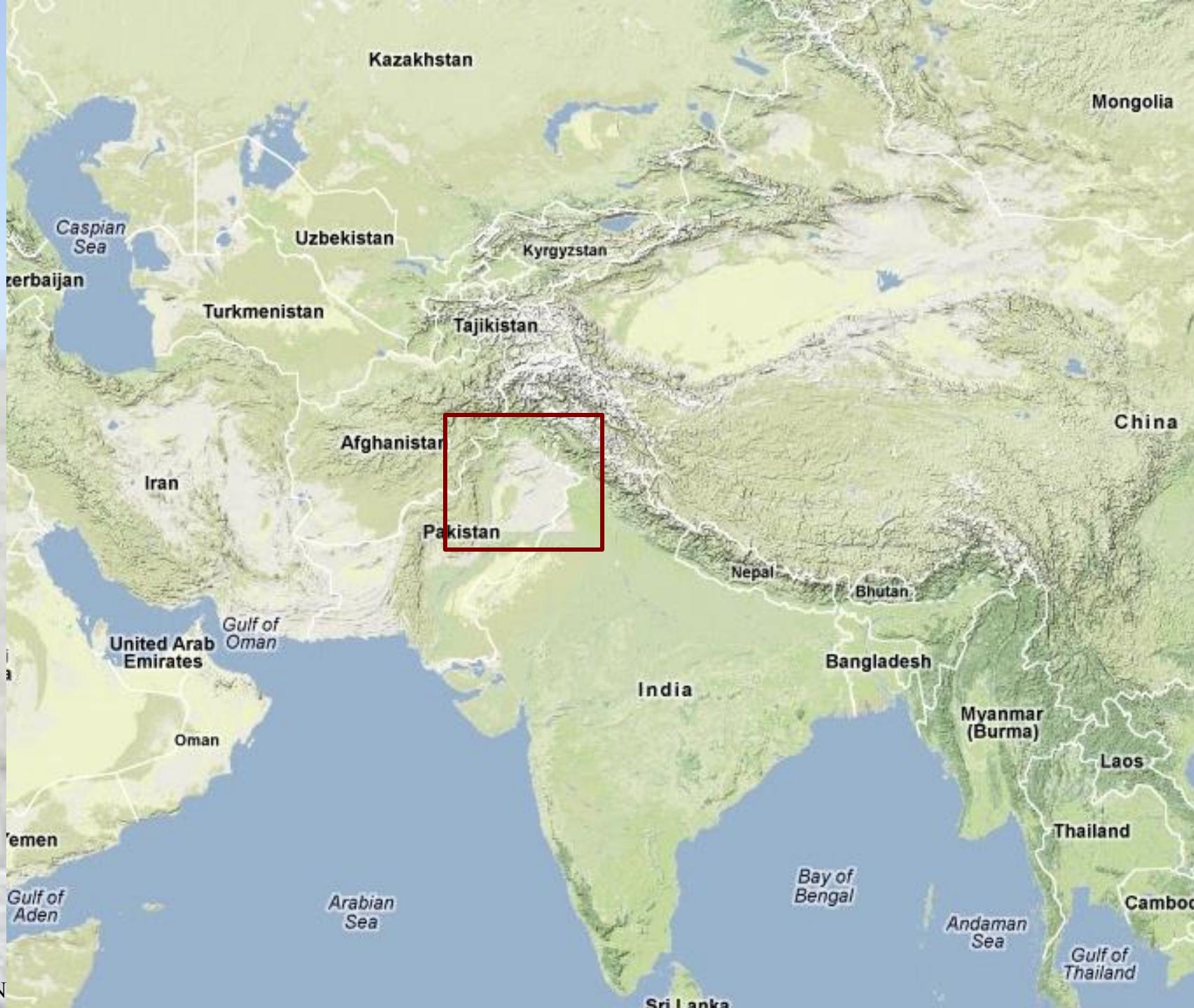


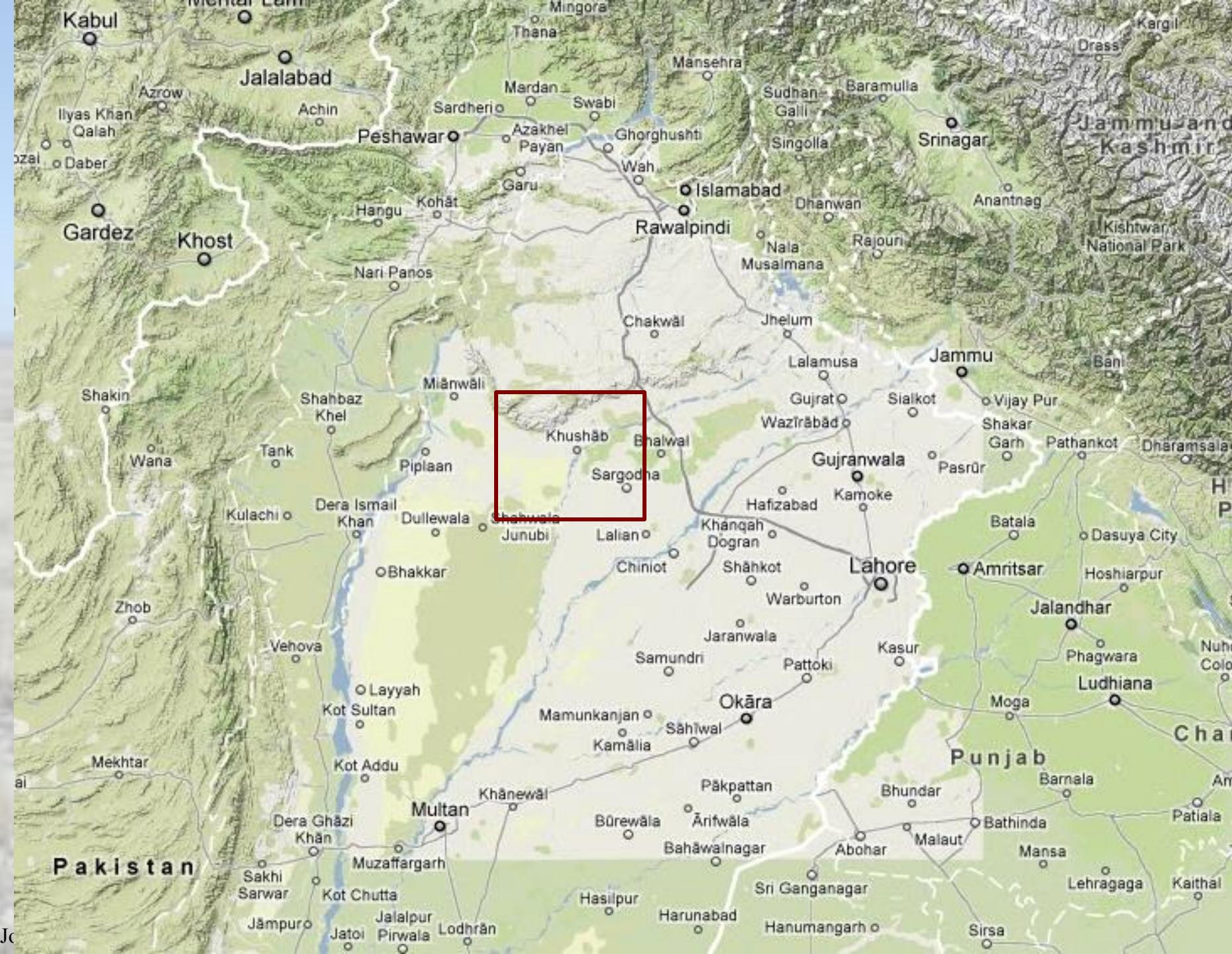
Plus all of New York City!

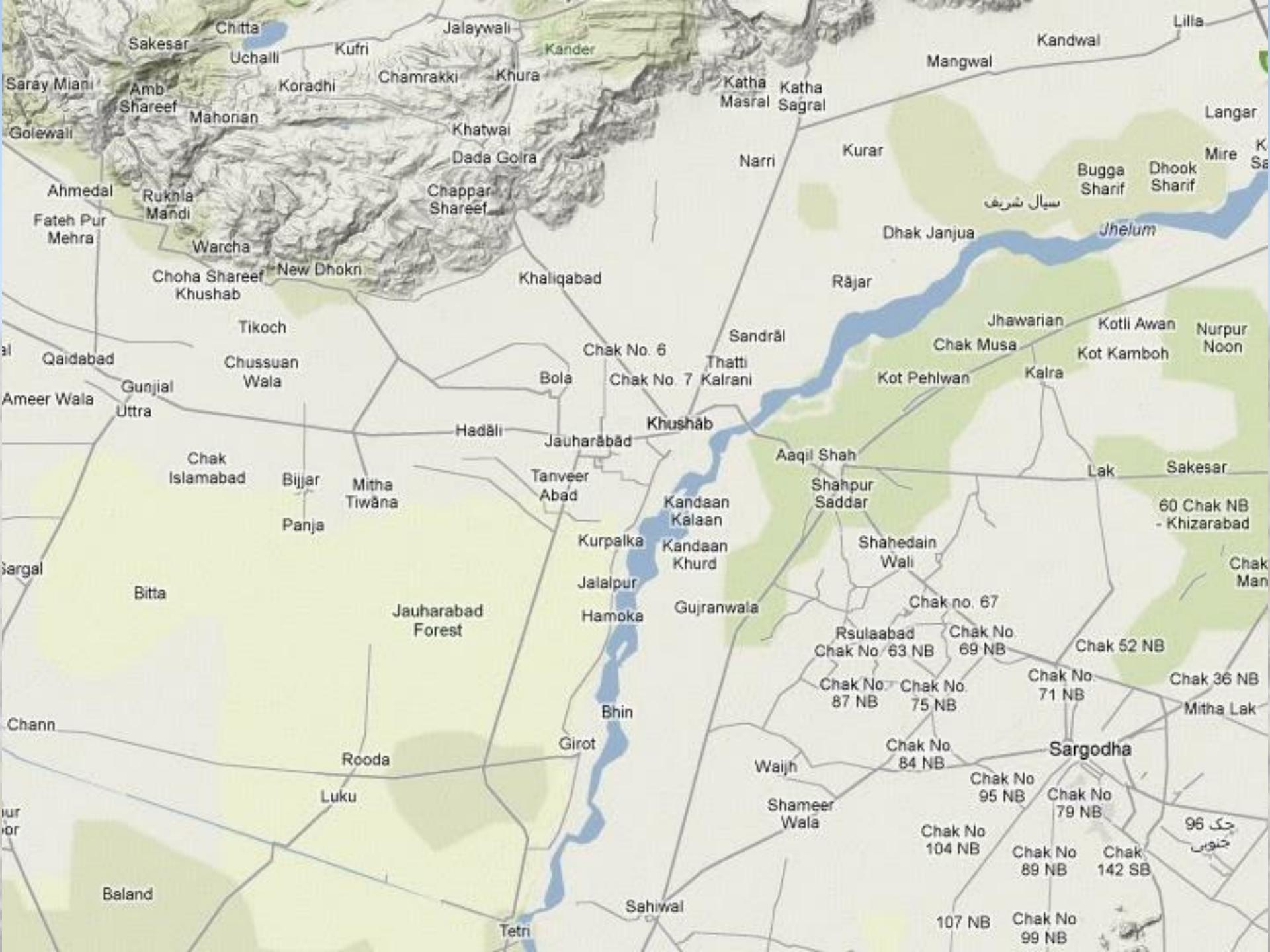


Losses

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







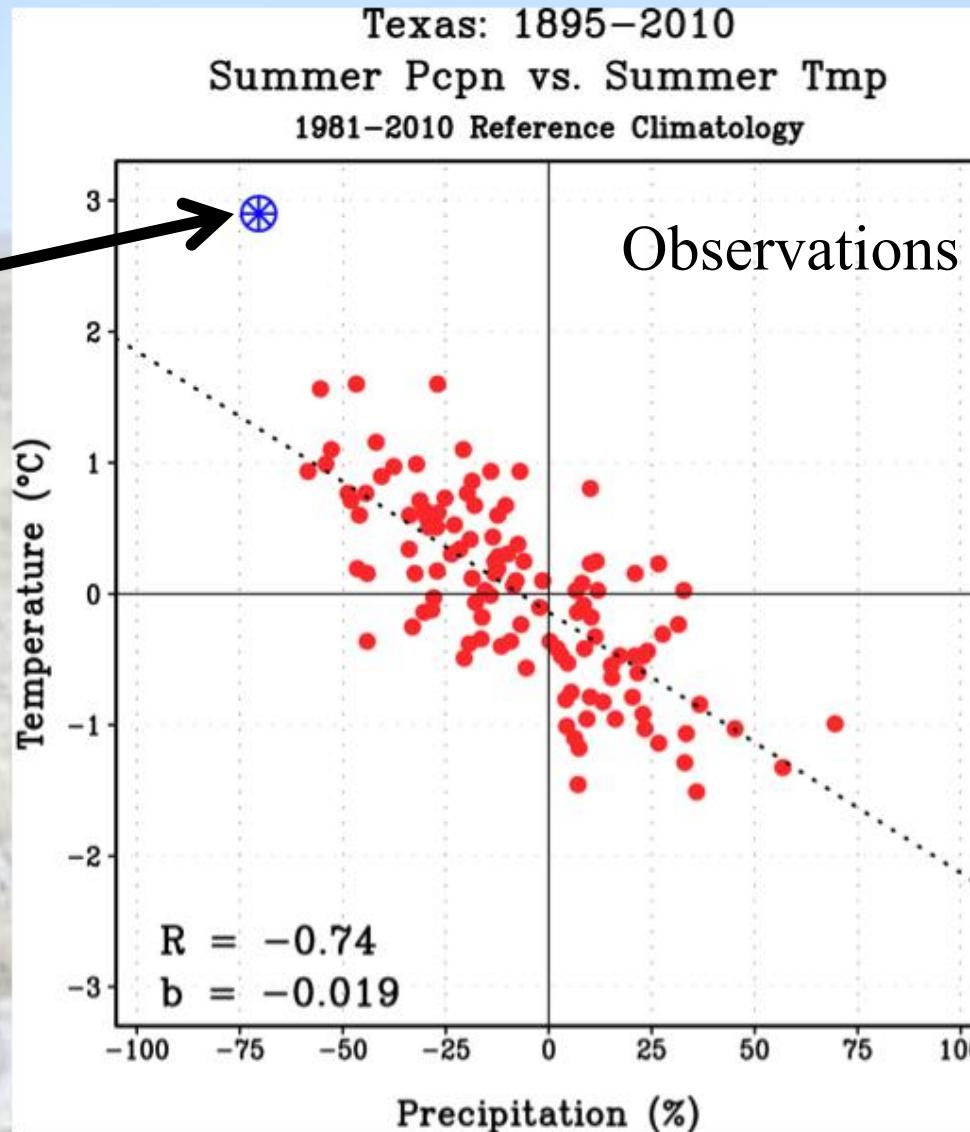


Khushab, Pakistan



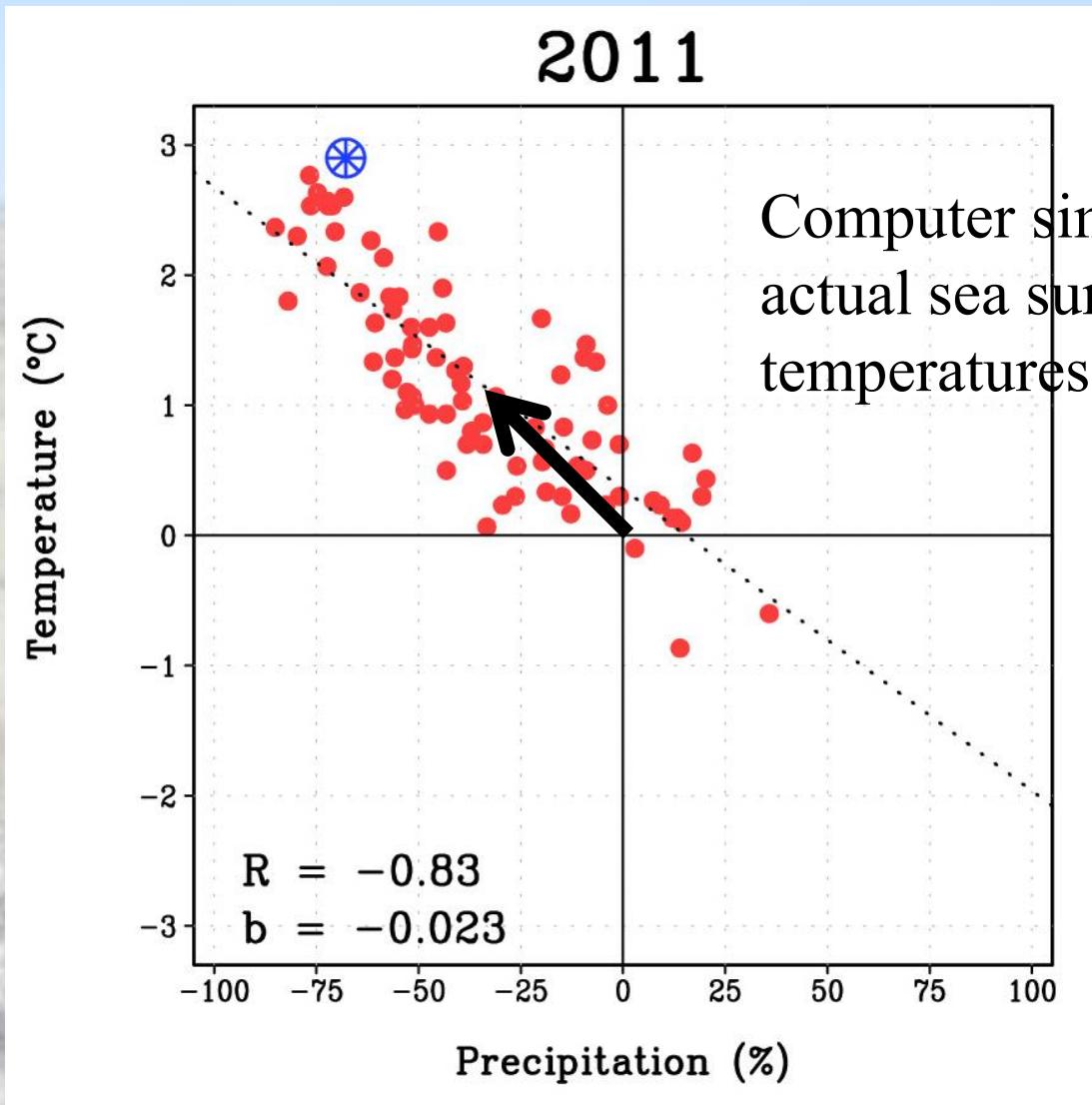
Why did this drought develop?

2011



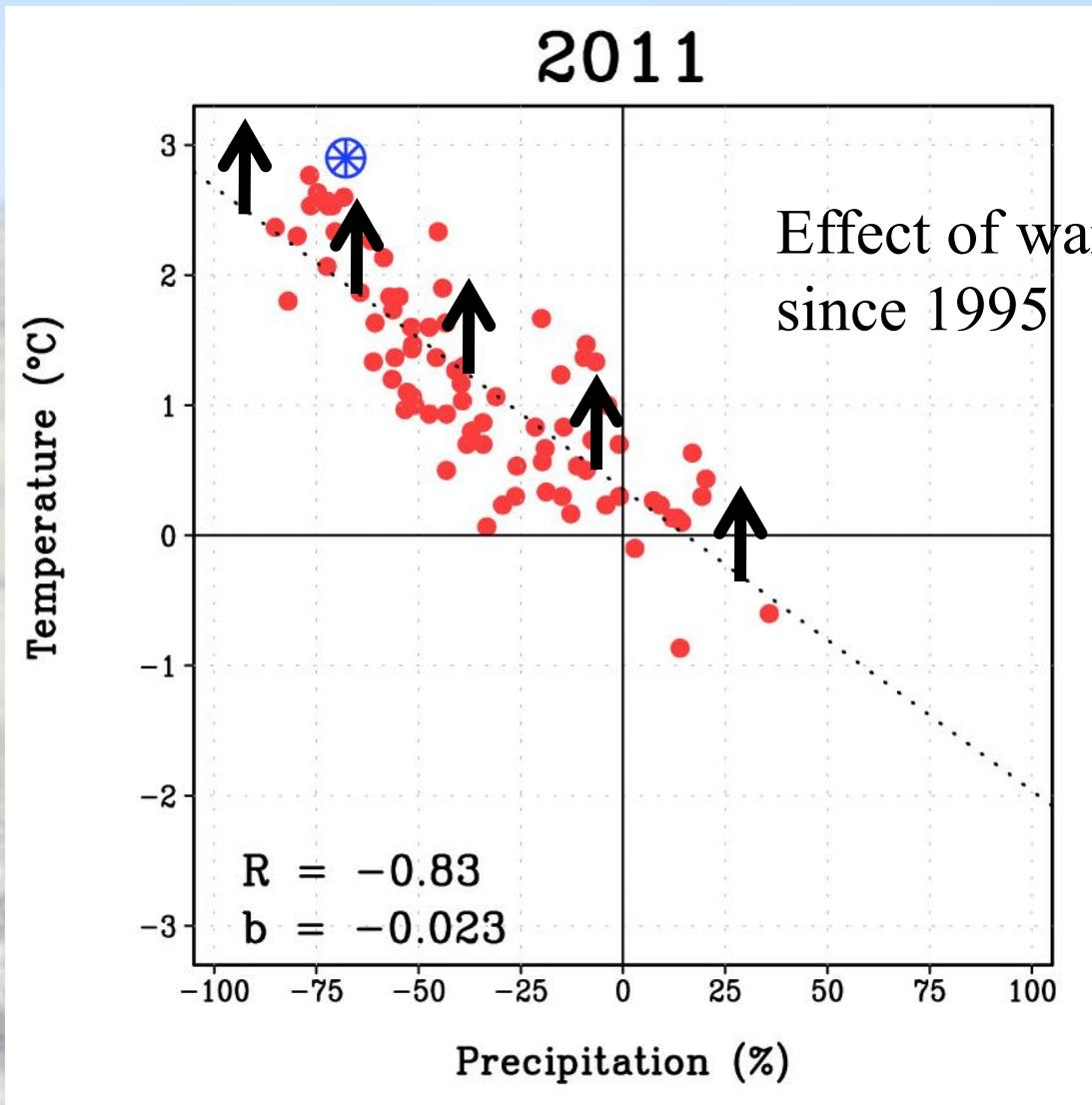
Hoerling et al.,
Journal of
Climate, 2013,
in press, DOI:
[10.1175/JCLI-D-12-00270.1](https://doi.org/10.1175/JCLI-D-12-00270.1)

Why did this drought develop?



Hoerling et al.,
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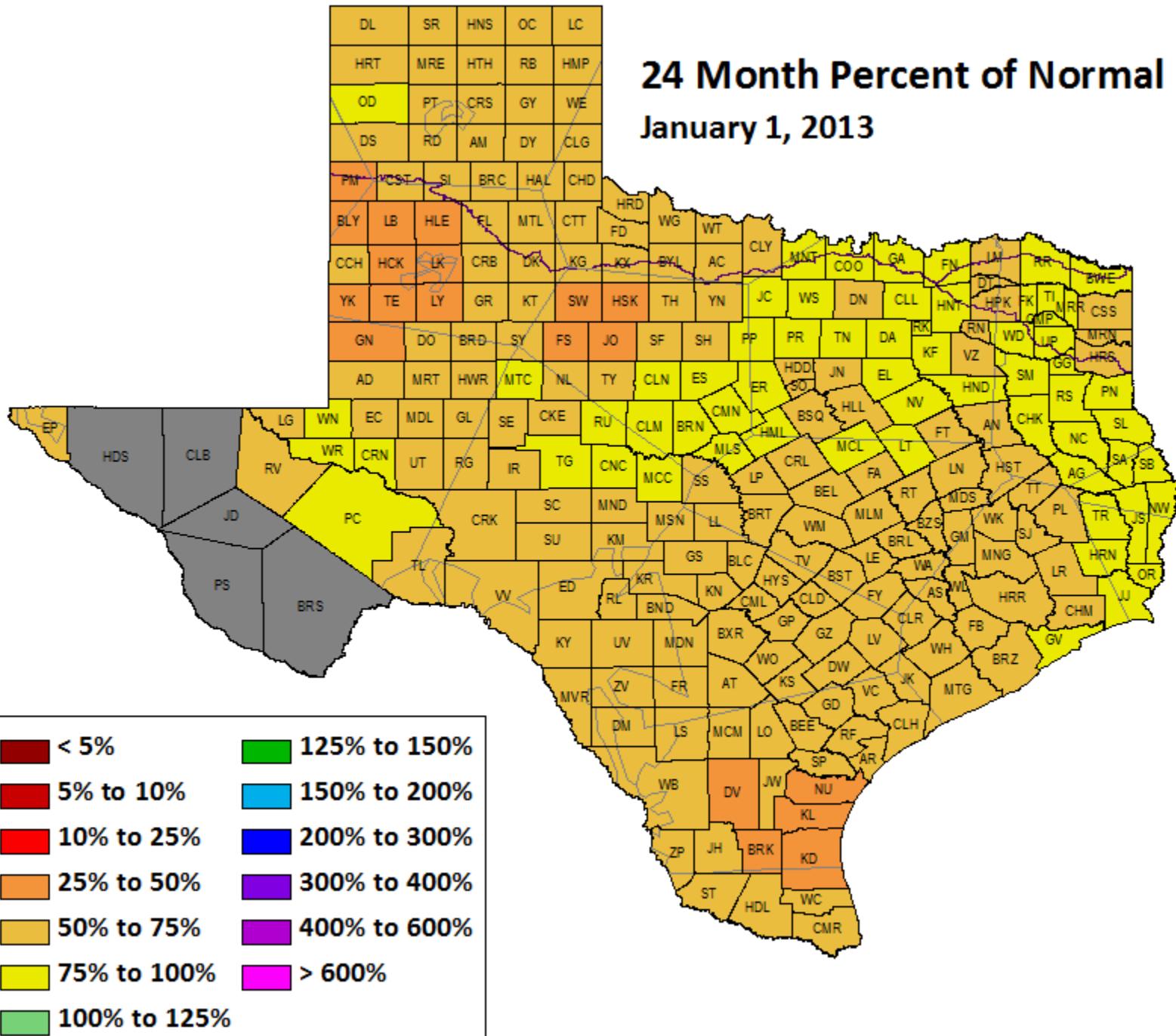
Why did this drought develop?



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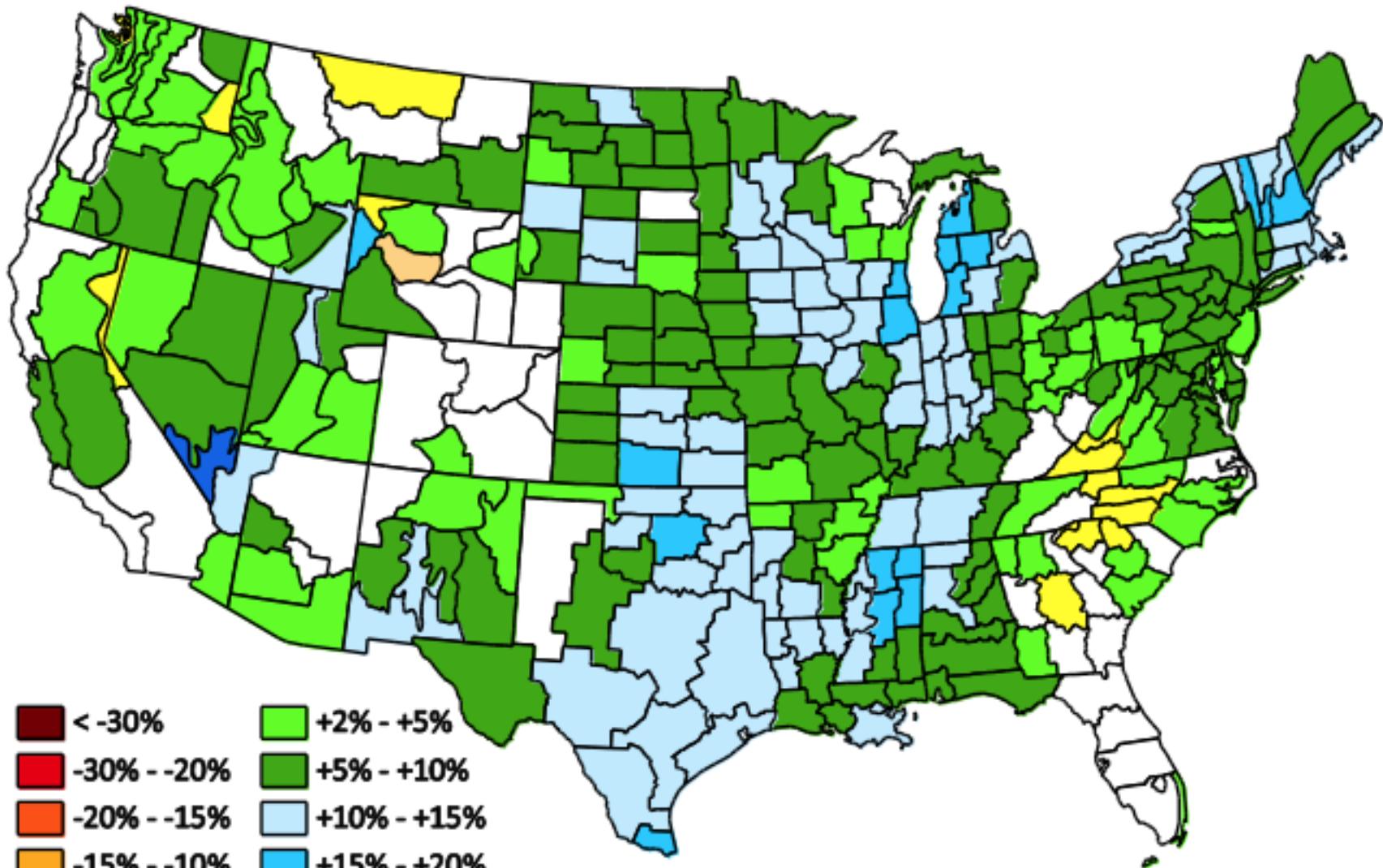
24 Month Percent of Normal

January 1, 2013



Climate Change and Drought

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



Precipitation trends (McRoberts and Nielsen-Gammon 2011)

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 →

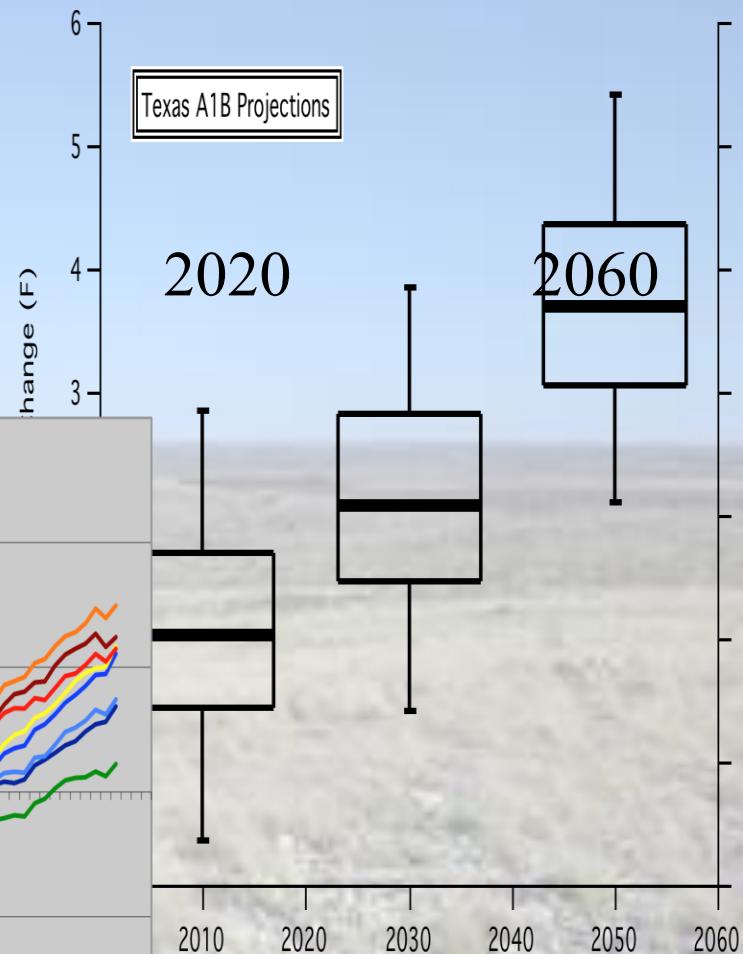
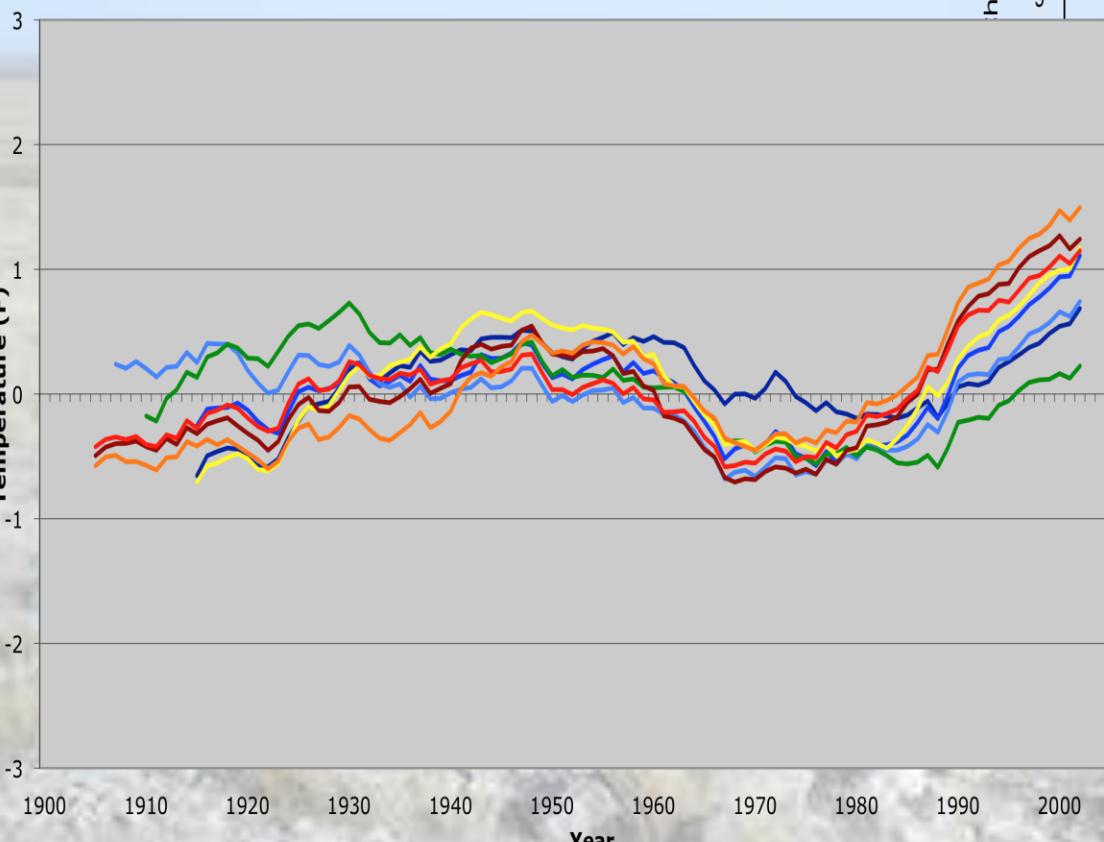
1900

1940

1980

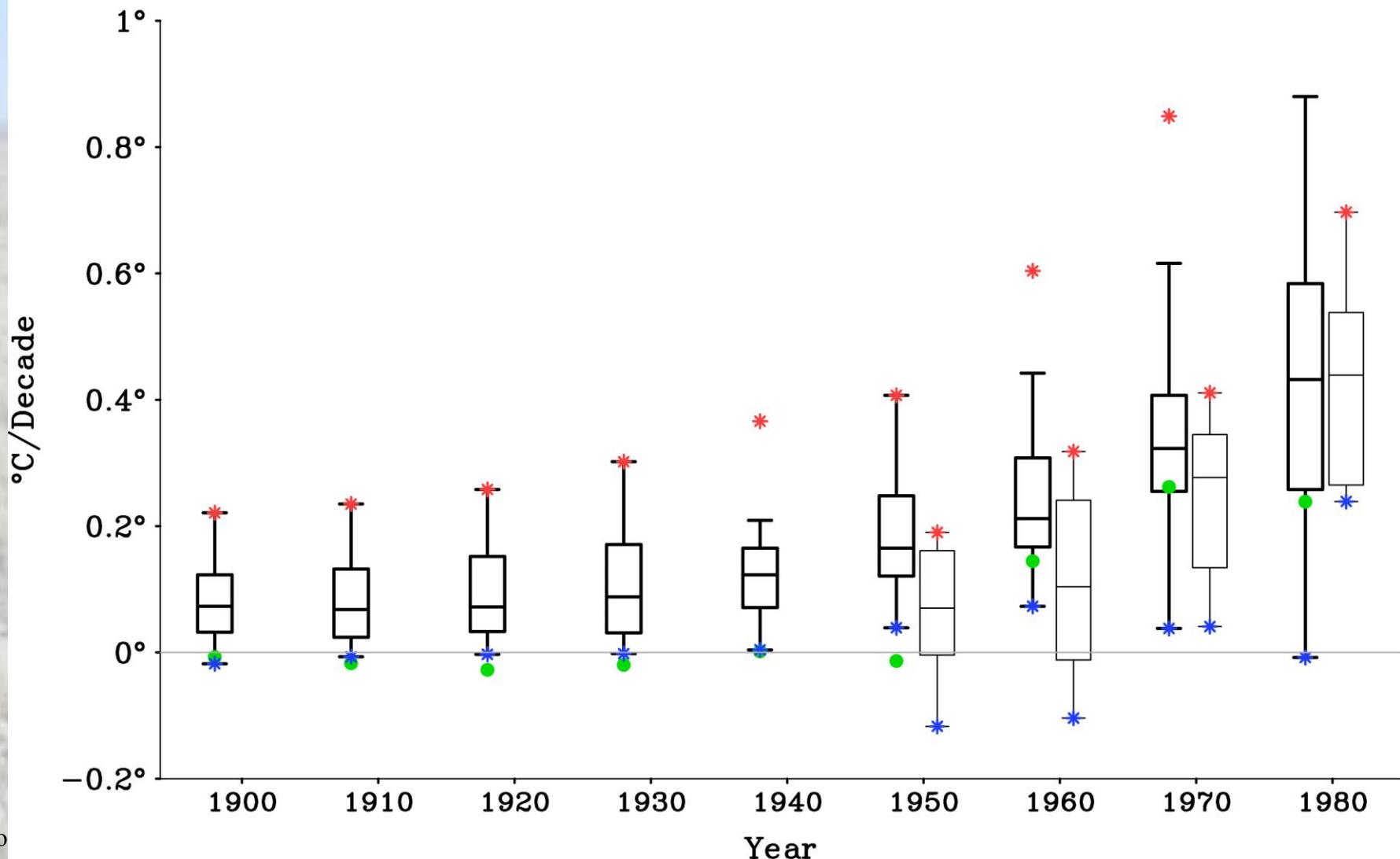
Annual Mean Temperature

Temperature →



Warming in Texas

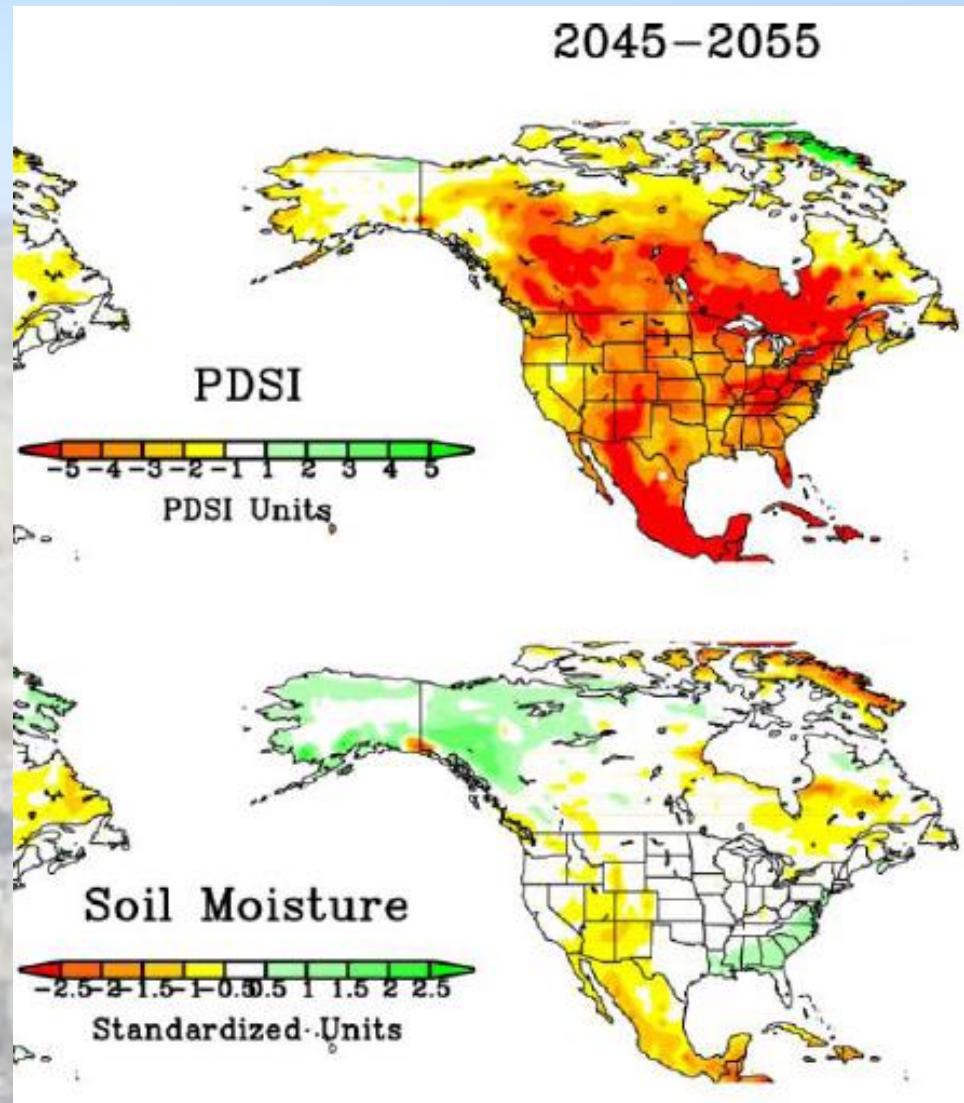
Texas–JJA Tmp Trend
CMIP5/GFSv2 and Observed



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!

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