Water Scarcity: Who's the Gorilla in the Room?

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USDA Outlook
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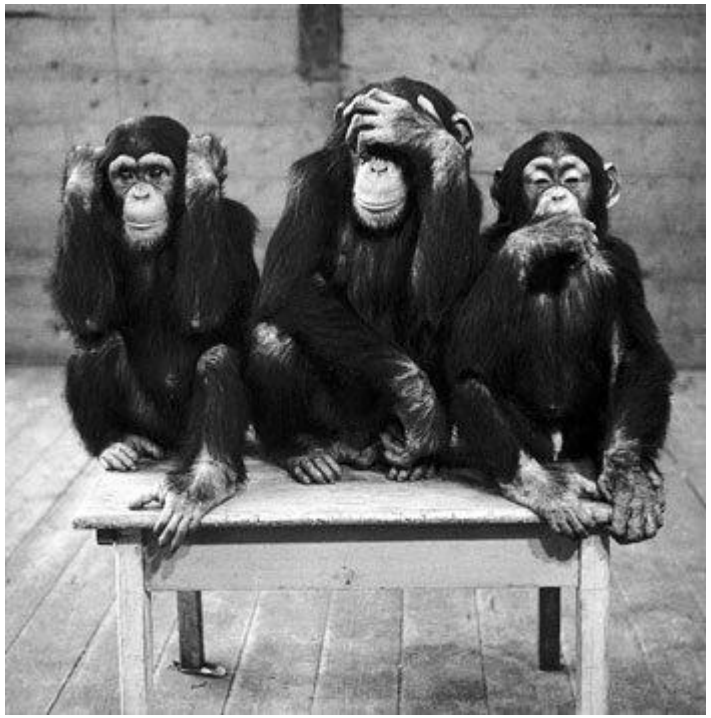
TEXAS A&M UNIVERSITY

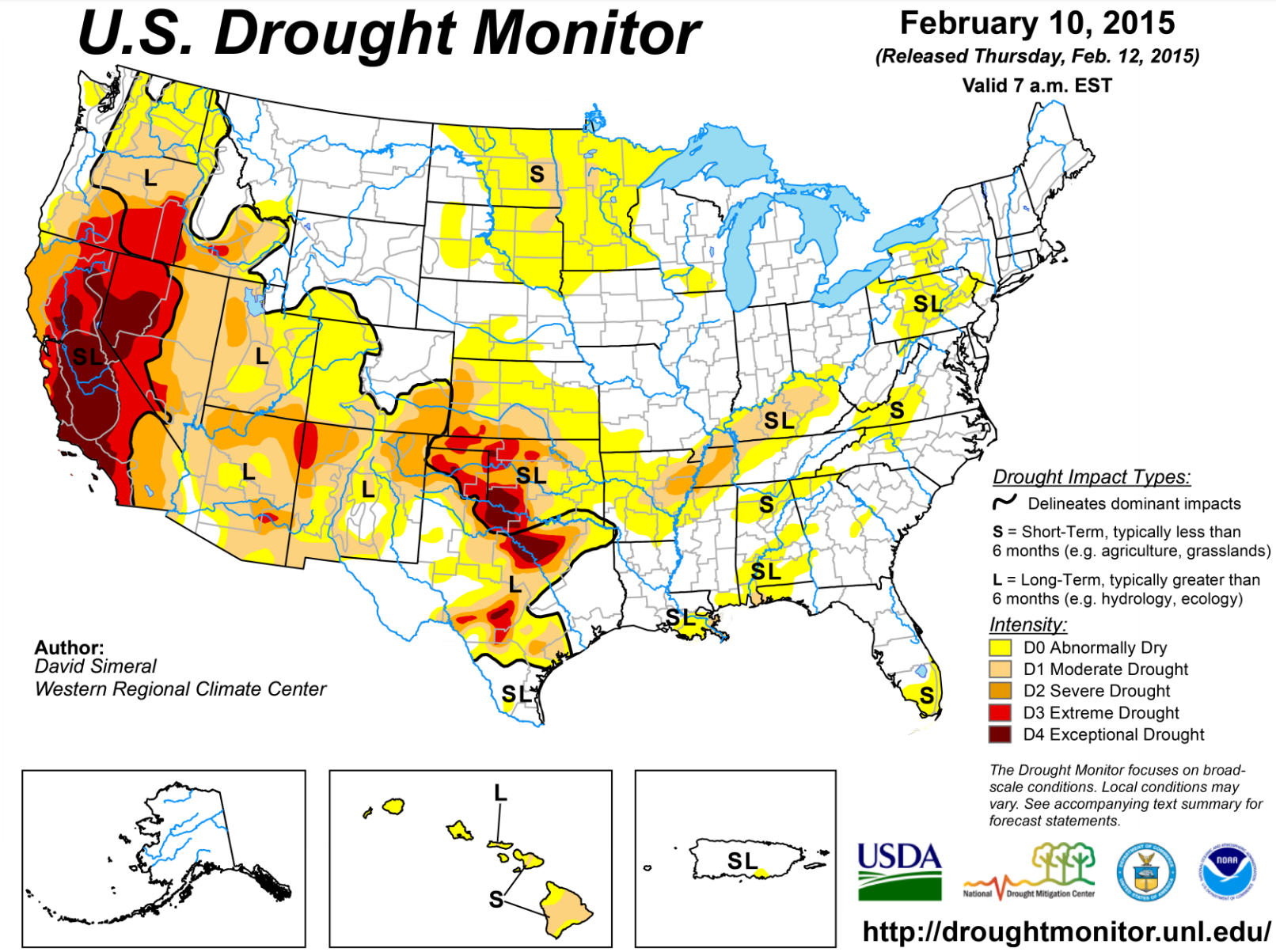
AFPC

A Gorilla or Three Big Monkeys?



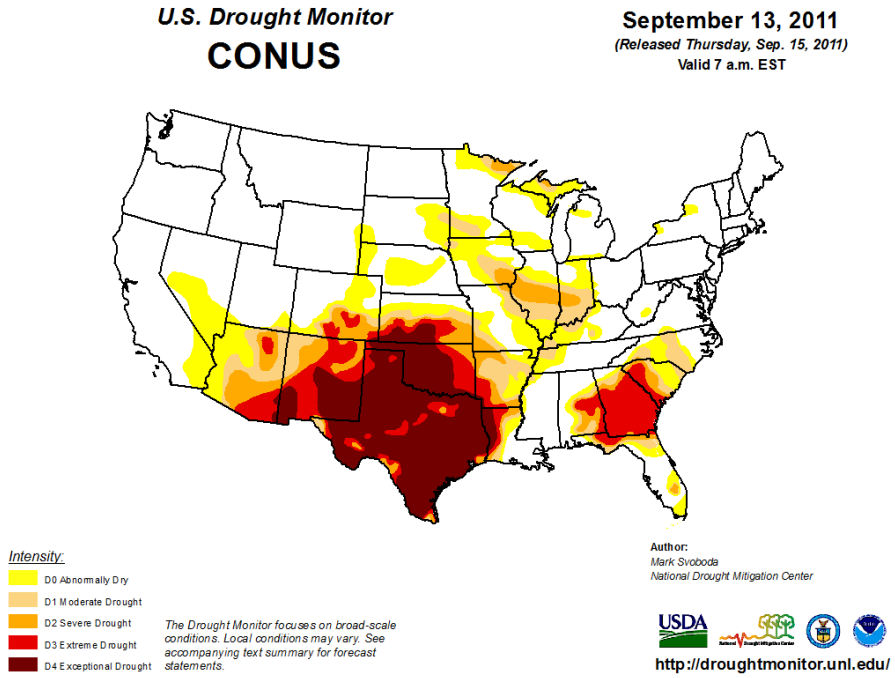
- Drought
- Population Growth
- Agricultural and Industrial Uses

US Drought: Current Conditions

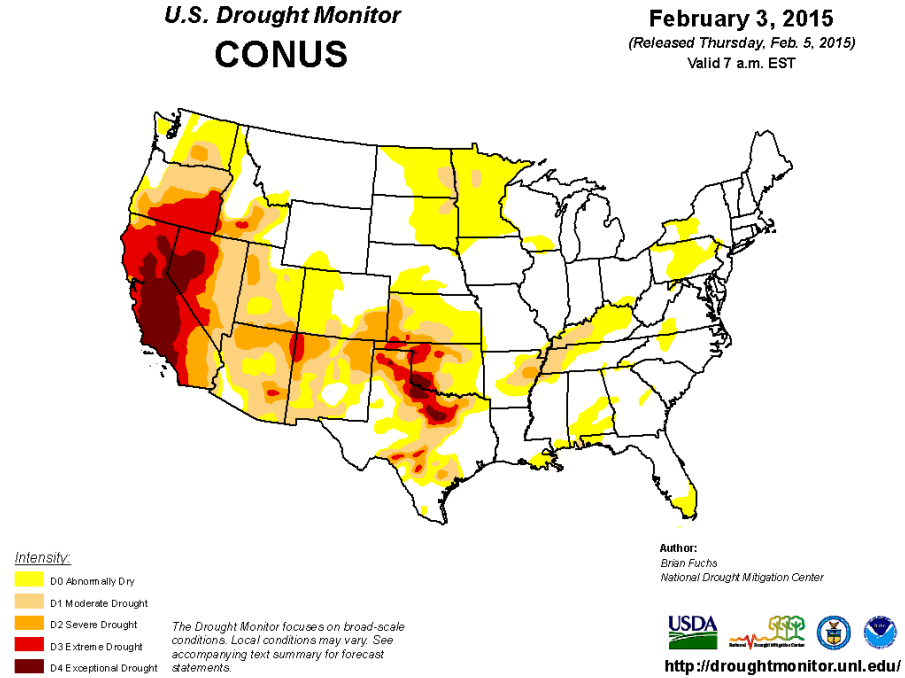


Texas is actually looking pretty good relative to 2011 …

September 13, 2011



February 3, 2015



… but parts of Texas are still in an exceptional, multi-year drought …

Will Drought Be More Commonplace?

A 'megadrought' will grip U.S. in the coming decades, NASA researchers say

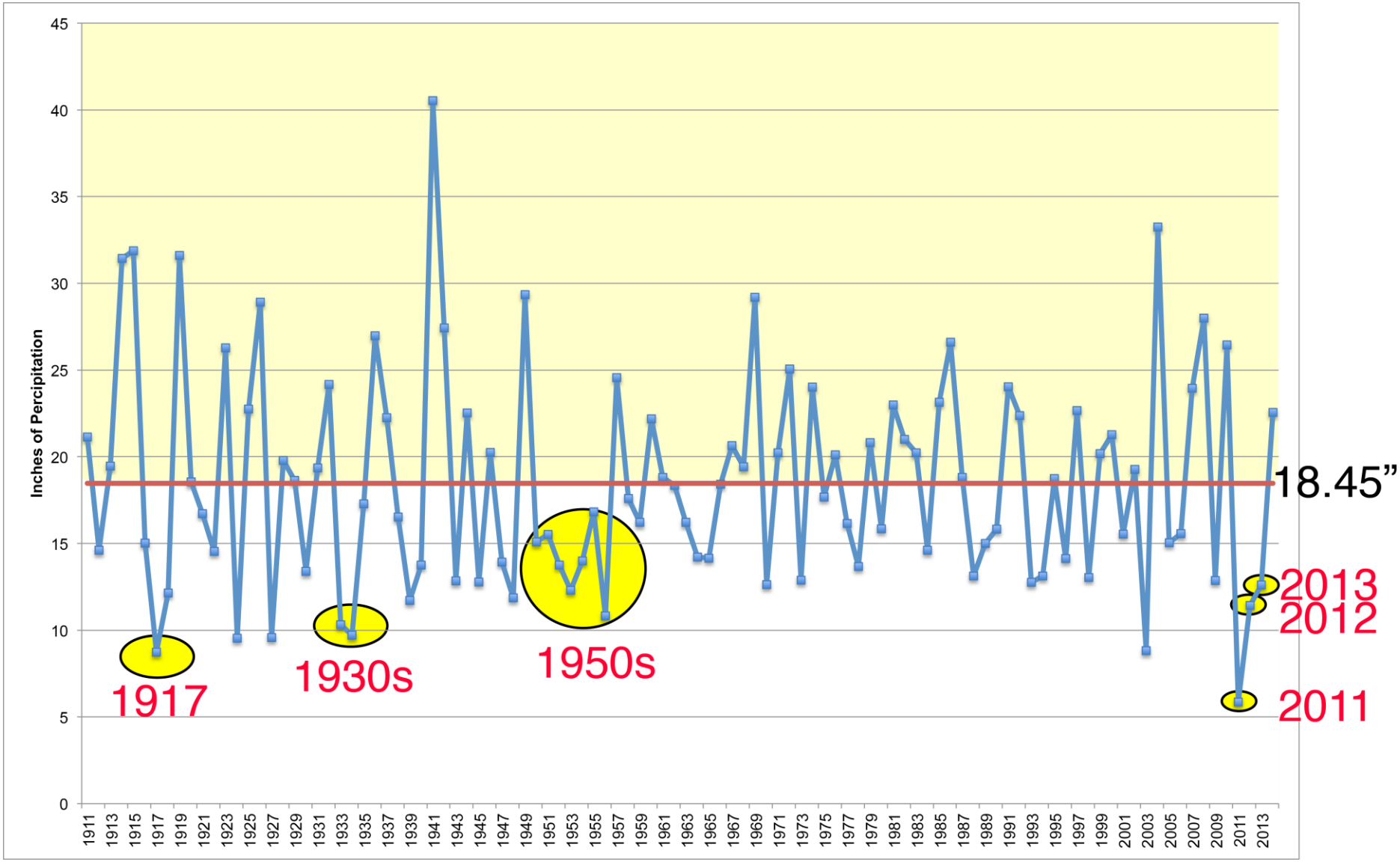
Fading El Niño could extend Texas drought

Southwest, Central Plains Face 'Unprecedented' Drought

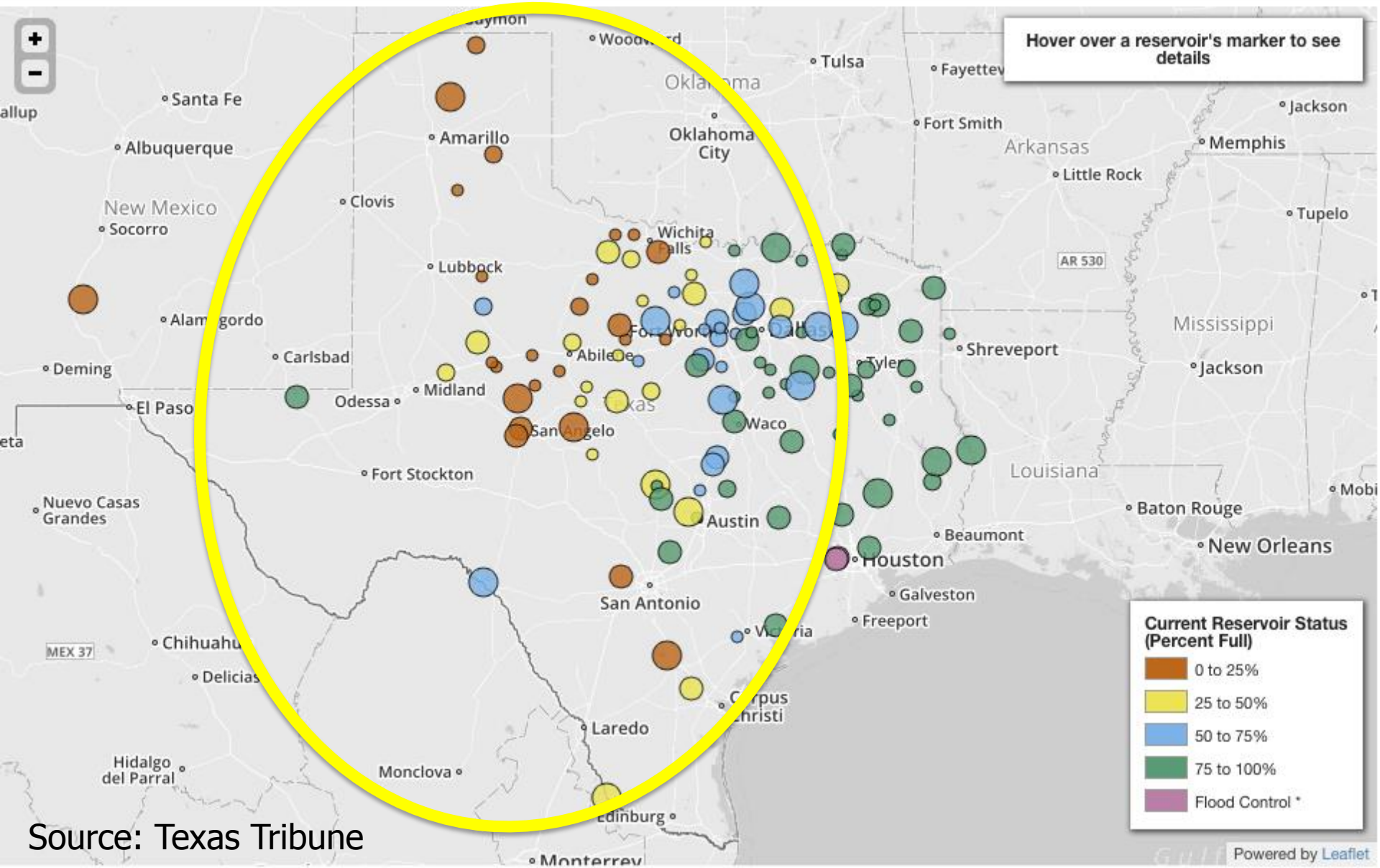
Climate Forecast: More Southwest Droughts and Australian Floods
Global warming will drive La Niña to greater extremes, a new study says—and El Niño too.

Drought among the worst in Texas in past 500 years

Lubbock, TX, Rainfall (1911 – 2014)



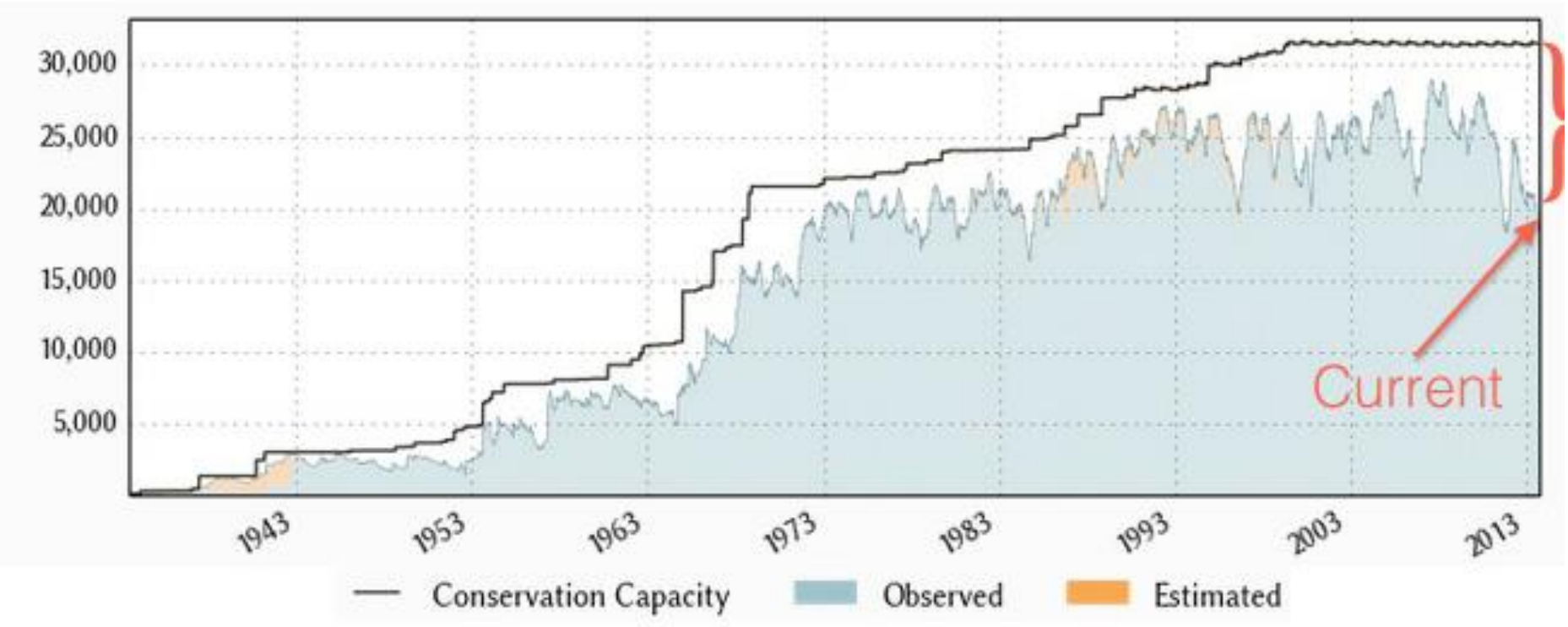
Texas Reservoir Levels (2015)



Source: Texas Tribune

Reservoir Levels vs. Capacity

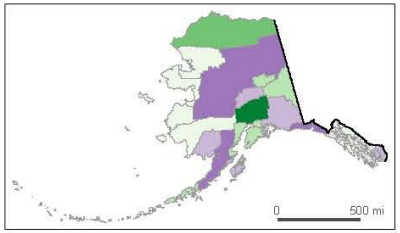
Texas water supply reservoirs are at 64.9%

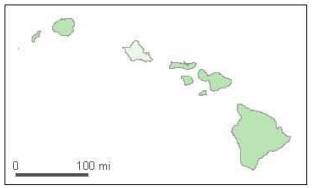


2010 Census Results - United States

Percent Change in Population: 2000 to 2010

US population growth areas have water scarcity issues…





Percent Change by County or County Equivalent

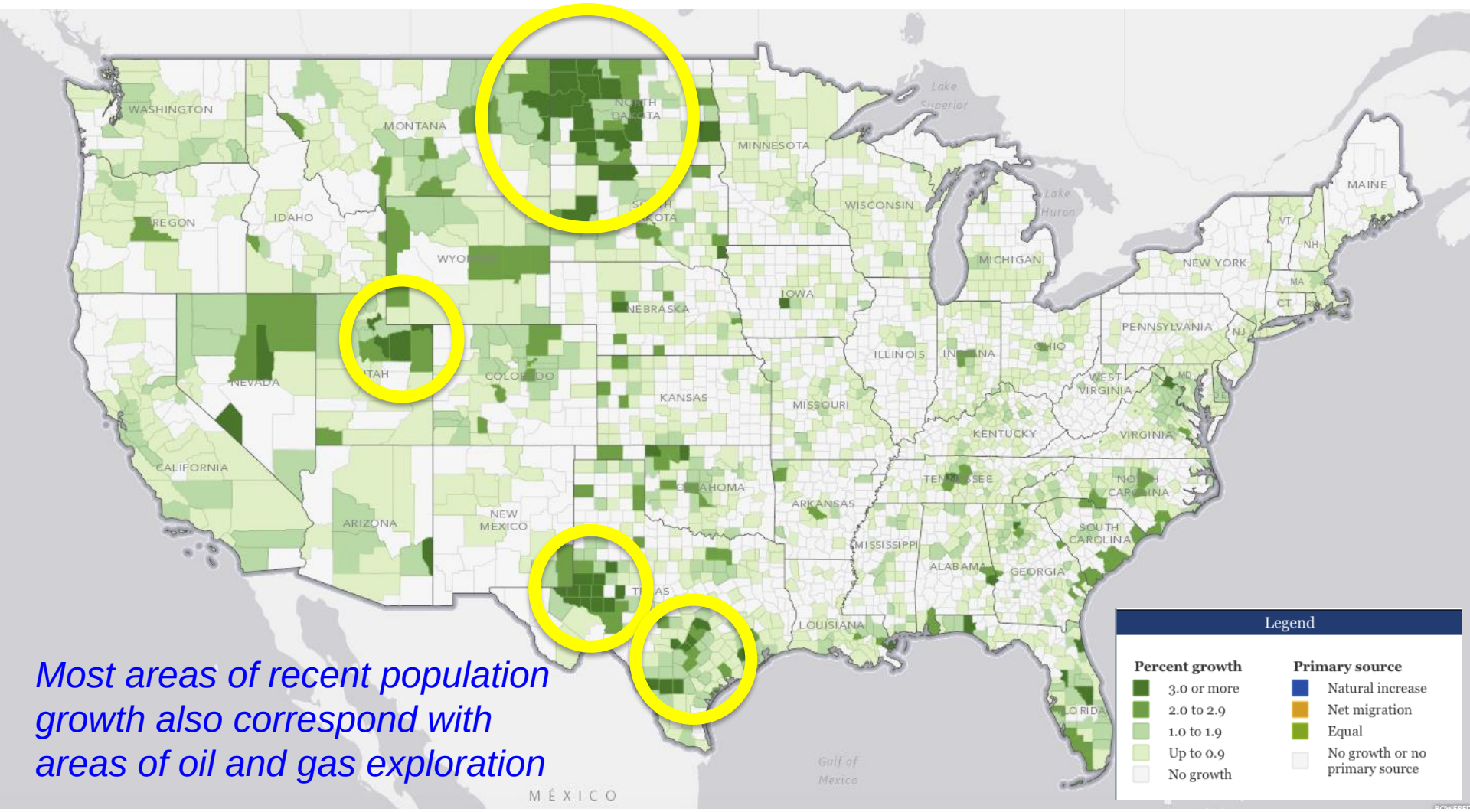
- Gain: 50.0 to 110.4
- 25.0 to 49.9
- 9.7 to 24.9
- U.S. percent change 9.7
- 0.0 to 9.6
- -10.0 to -0.1
- Loss: -46.6 to -10.1
- Comparable data not available

0 200 mi

Source: U.S. Census Bureau, Census 2000 and 2010 Census Redistricting Data Summary File
For more information visit www.census.gov.

United States Census Bureau

County Population Growth (2012 – 2013)



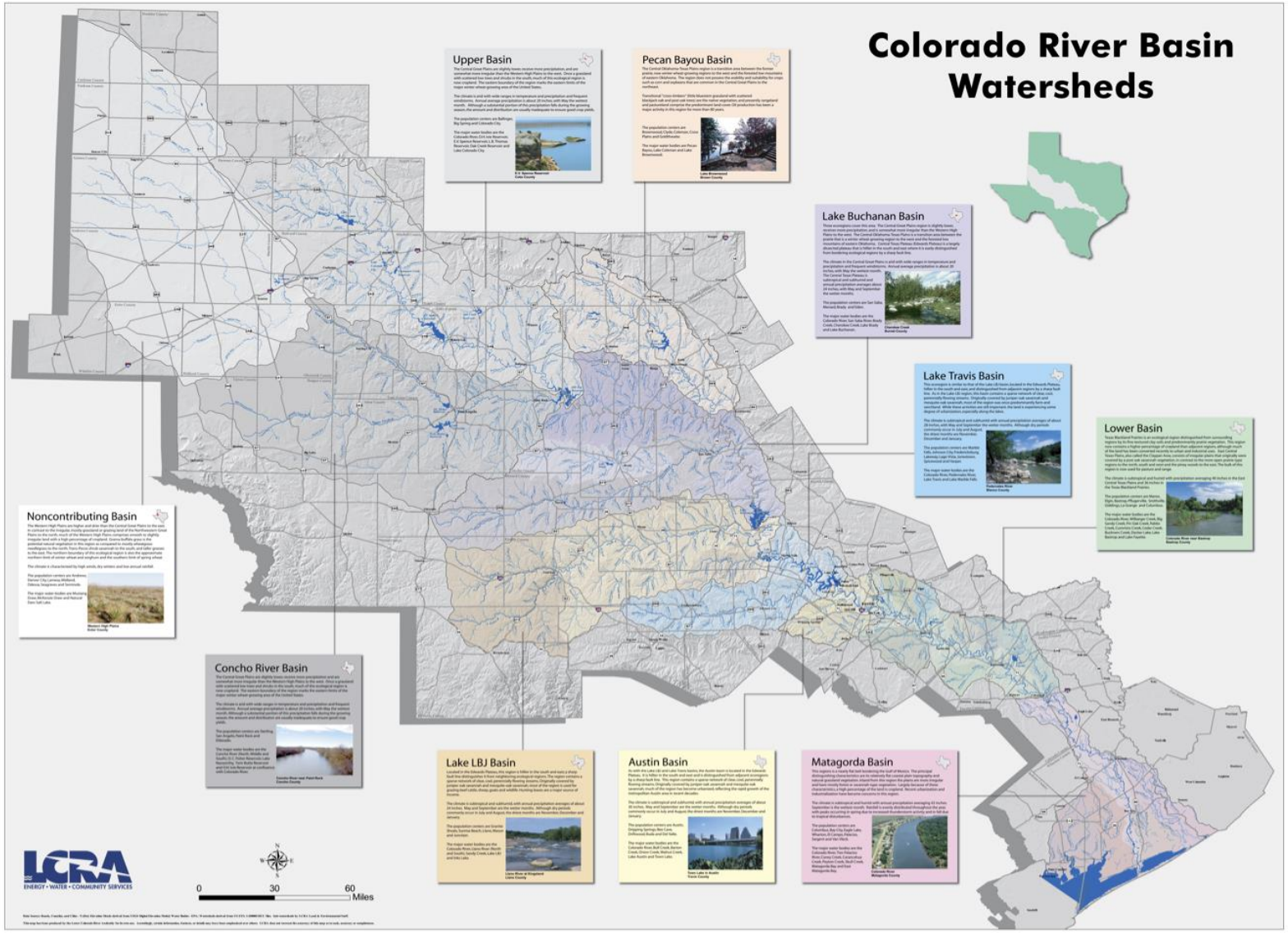
Most areas of recent population growth also correspond with areas of oil and gas exploration

Source: US Census Bureau

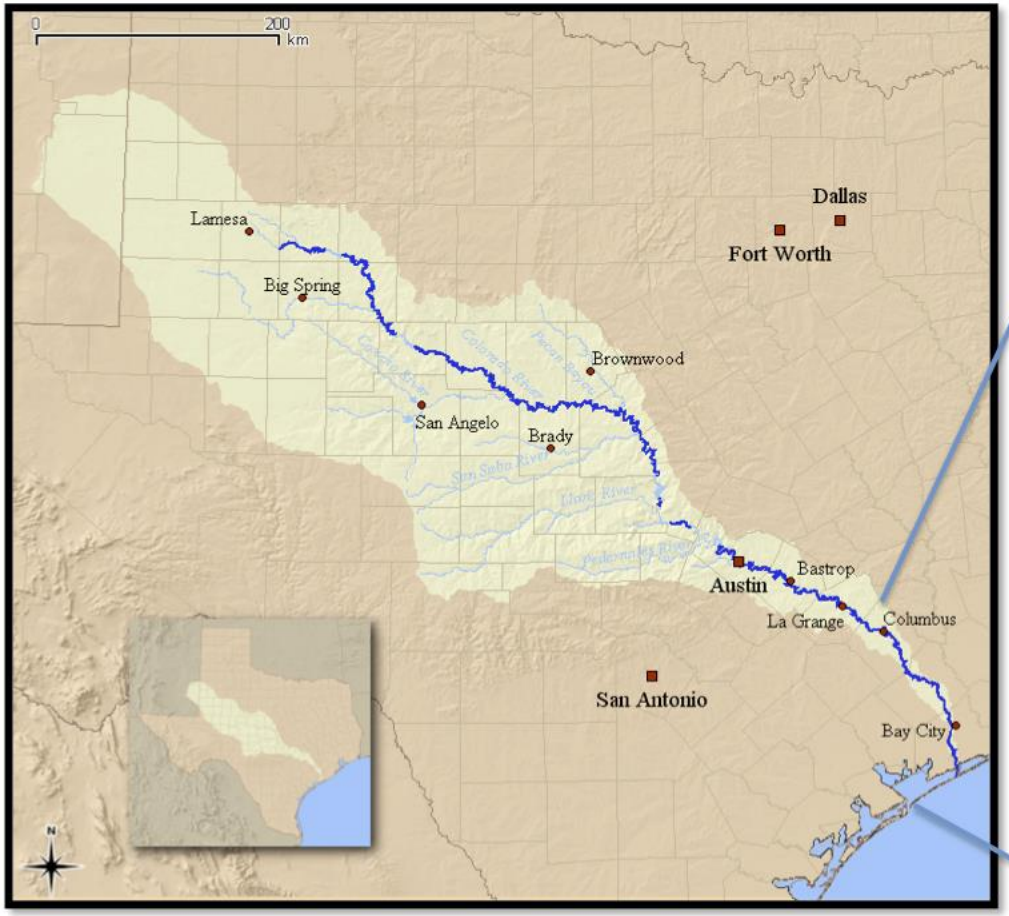
Situation

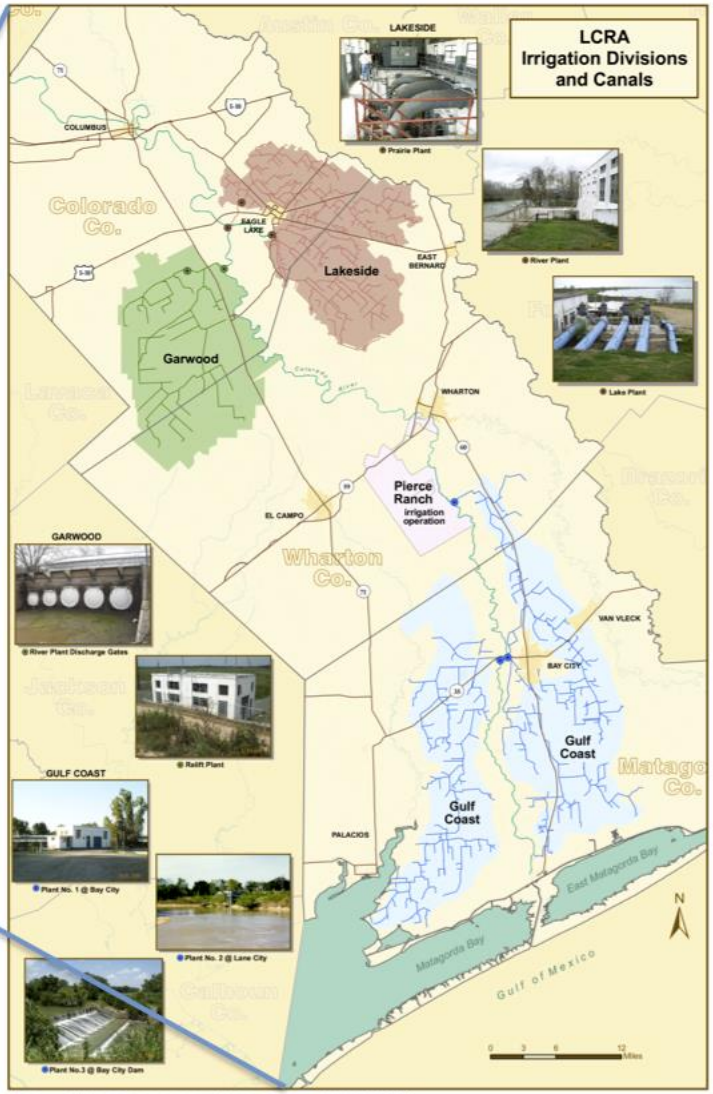
- Gorilla 1: A big drought in the Southwest
- Gorilla 2: Increased rate of population growth in the aid regions
- What does this mean for water consumers other than people?
  - Gorilla 3: Agriculture and Industry

Agriculture Example Will Focus on One River Basin in Texas



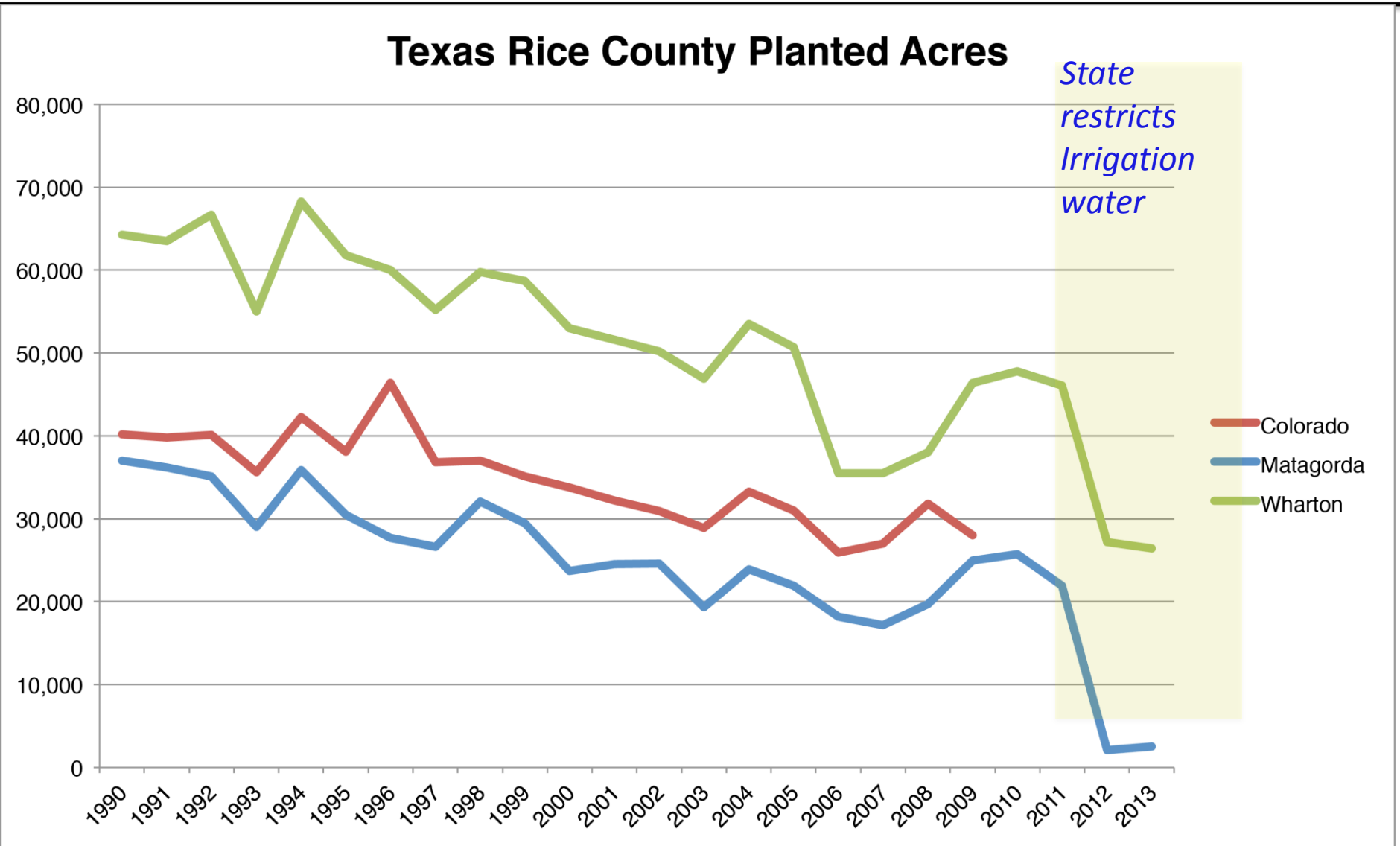
LCRA Rice Irrigation Areas in Texas





People vs. Agriculture?

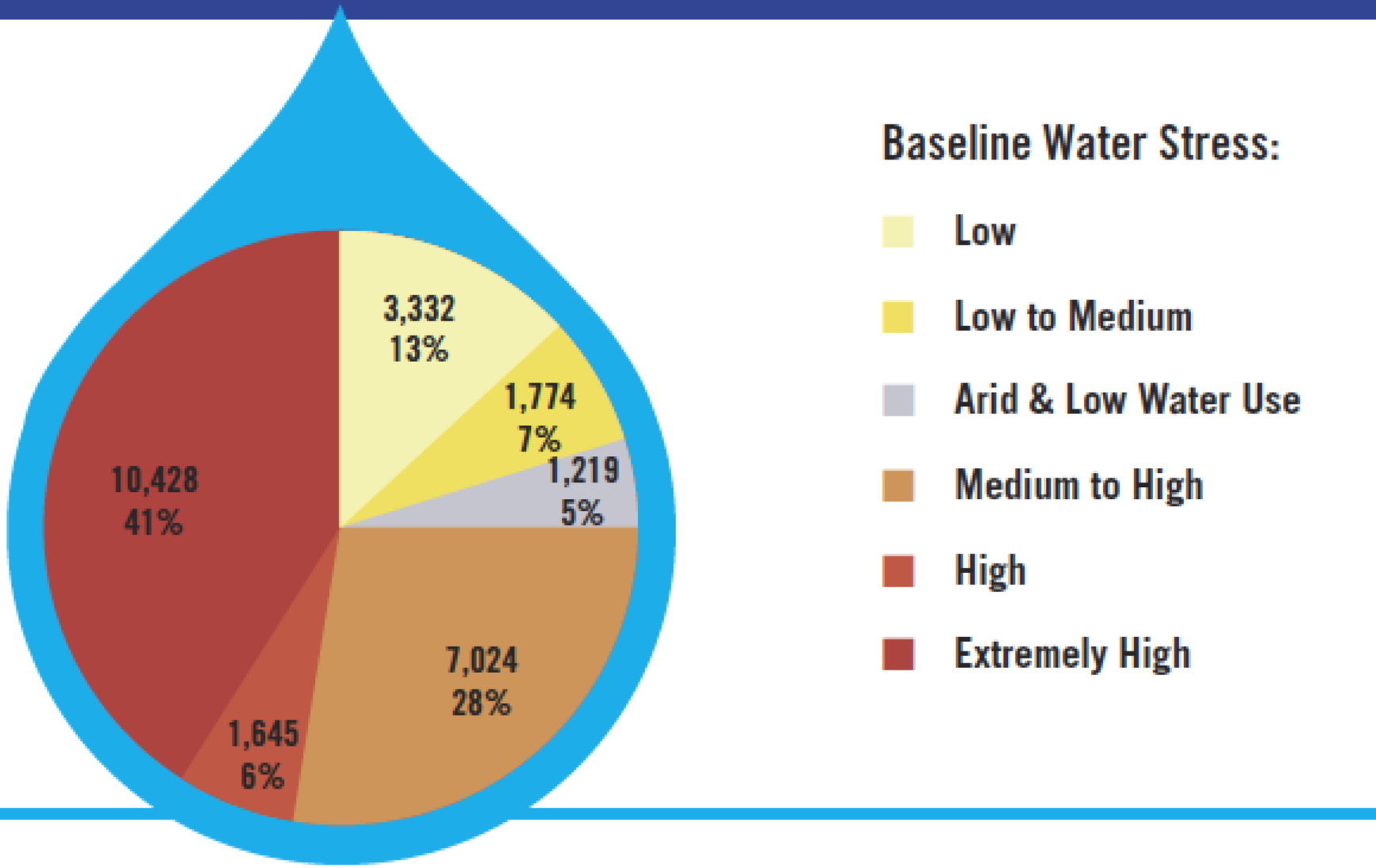
Texas Rice Farmers Take the Hit; No Water in 2011-15; Likely Cause a Loss of Infrastructure & Community



Energy Industry is a Growing Water User

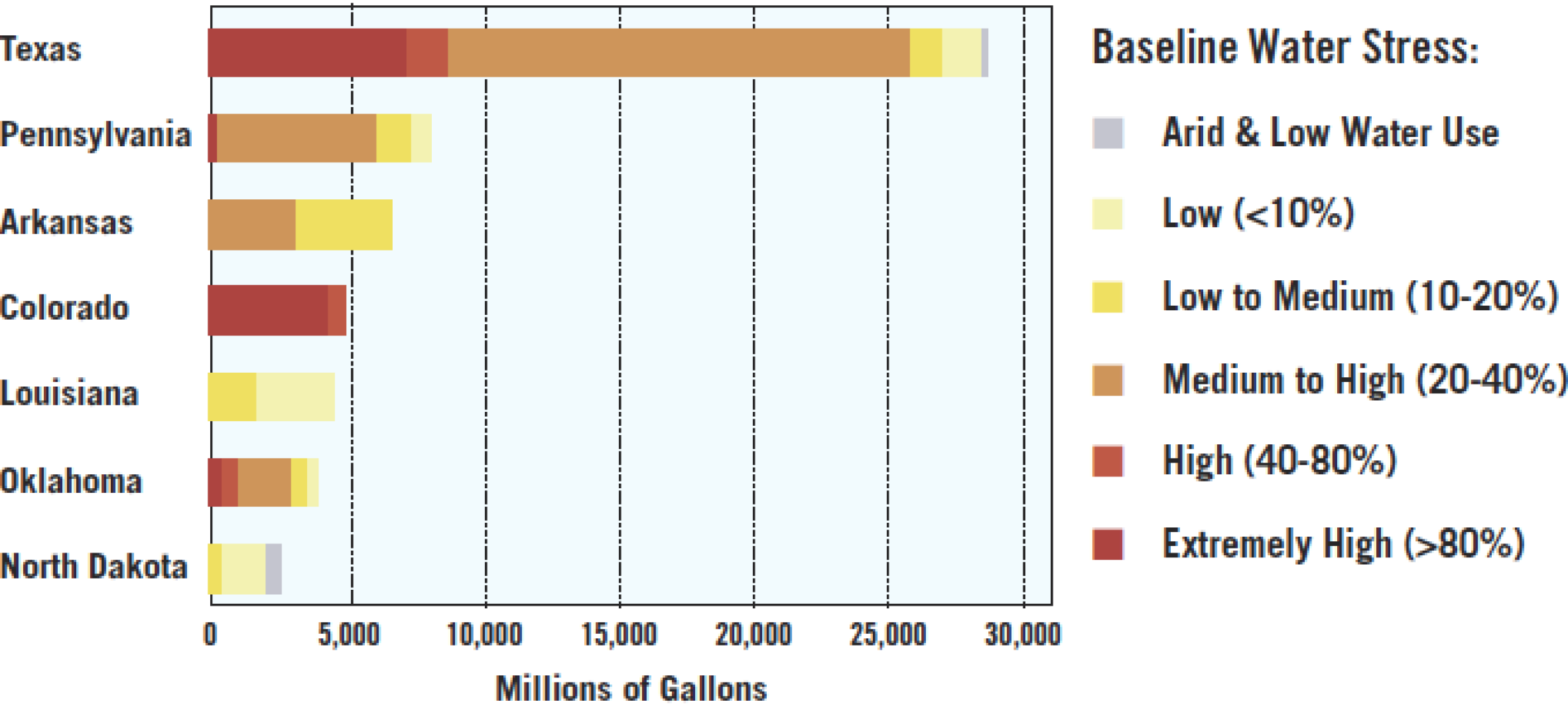
- Water used for fracking is small, usually about 1% of the state's water usage
- But, locally water usage could be quite large
  - 2 to 10 million gallons per well
  - Globally 38% of shale oil & gas in water stressed regions
  - In the Texas Eagle Ford Shale water use could amount to 89% of total water use in peak production
  - In the Texas Burnett Shale about 50% of water usage in 2006 was for fracking
- Jan 2001-Sept 2012, 25,450 wells reported using 65.8 bill gallons; the annual water needs for 2.5 million Americans

FIGURE 1: NUMBER & PERCENTAGE OF HYDRAULICALLY FRACTURED WELLS BY WATER STRESS



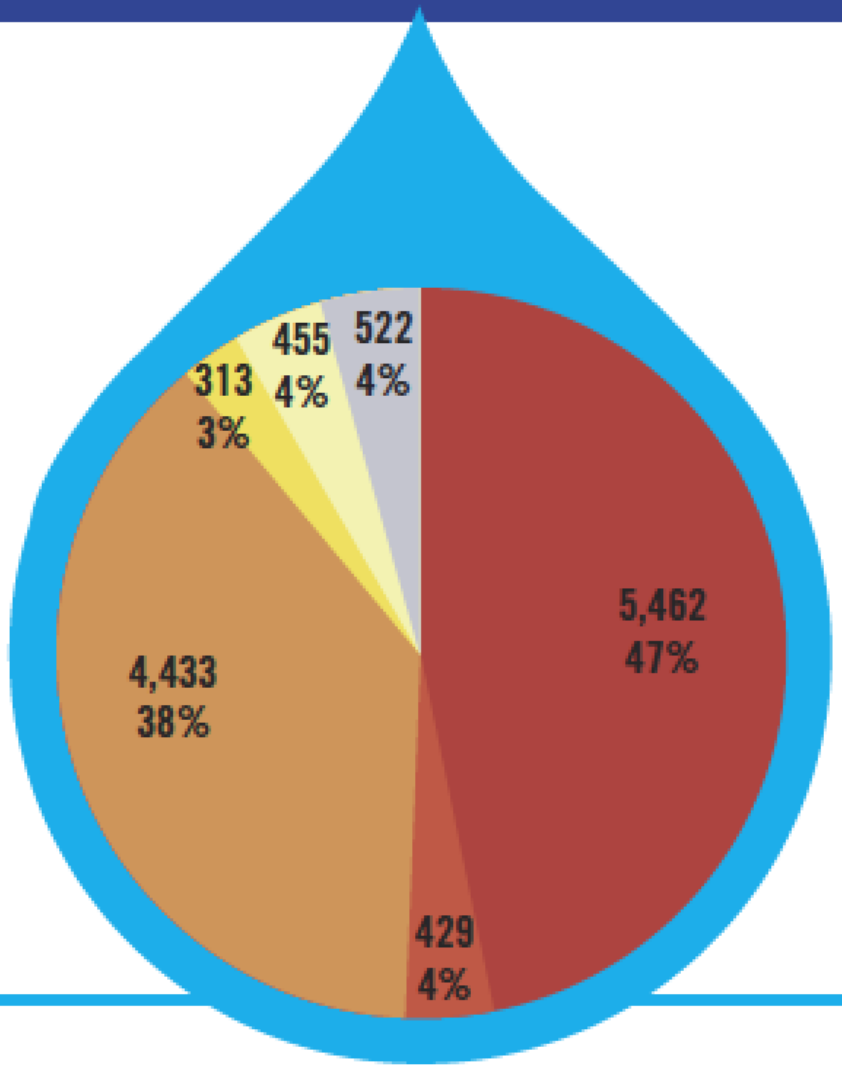
Source: CERES, Hydraulic Fracturing & Water Stress, May 2013

FIGURE 6: VOLUME OF WATER INJECTED FOR HYDRAULIC FRACTURING BY STATE & WATER STRESS REGIONS



Source: CERES, Hydraulic Fracturing & Water Stress, May 2013

FIGURE 3: TEXAS—NUMBER OF WELLS BY WATER STRESS



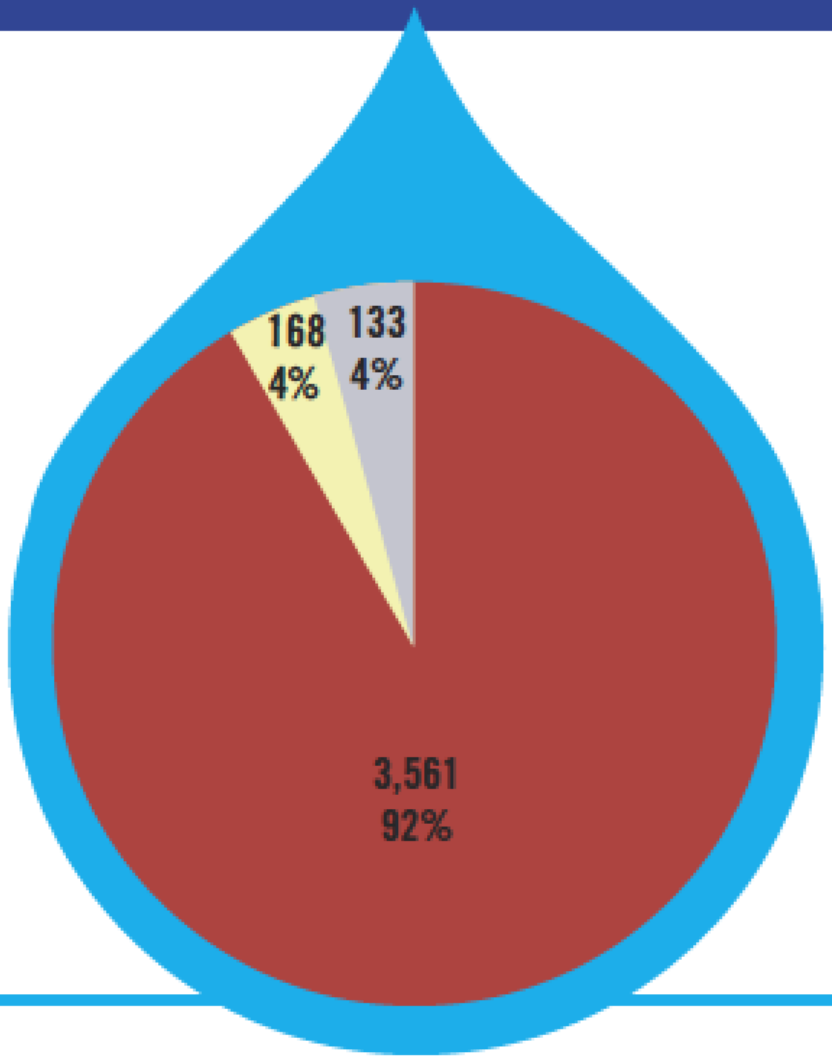
Baseline Water Stress:

- Low
- Low to Medium
- Arid & Low Water Use
- Medium to High
- High
- Extremely High

Texas: number and percentage of wells in varying water stress regions

Source: CERES, Hydraulic Fracturing & Water Stress, May 2013

FIGURE 4: COLORADO—NUMBER OF WELLS BY WATER STRESS



Baseline Water Stress:

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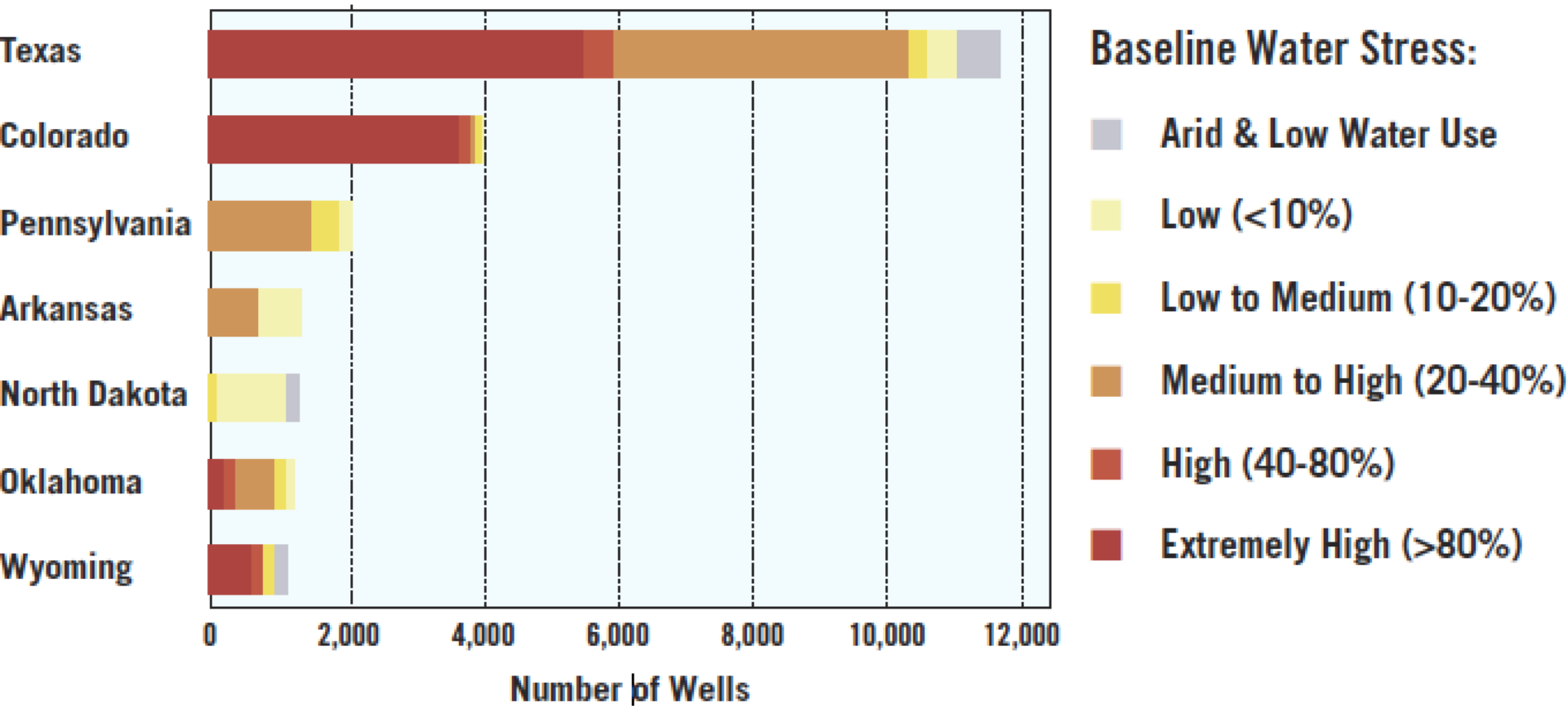
Colorado: number and percentage of wells in varying water stress regions

Source: CERES, Hydraulic Fracturing & Water Stress, May 2013

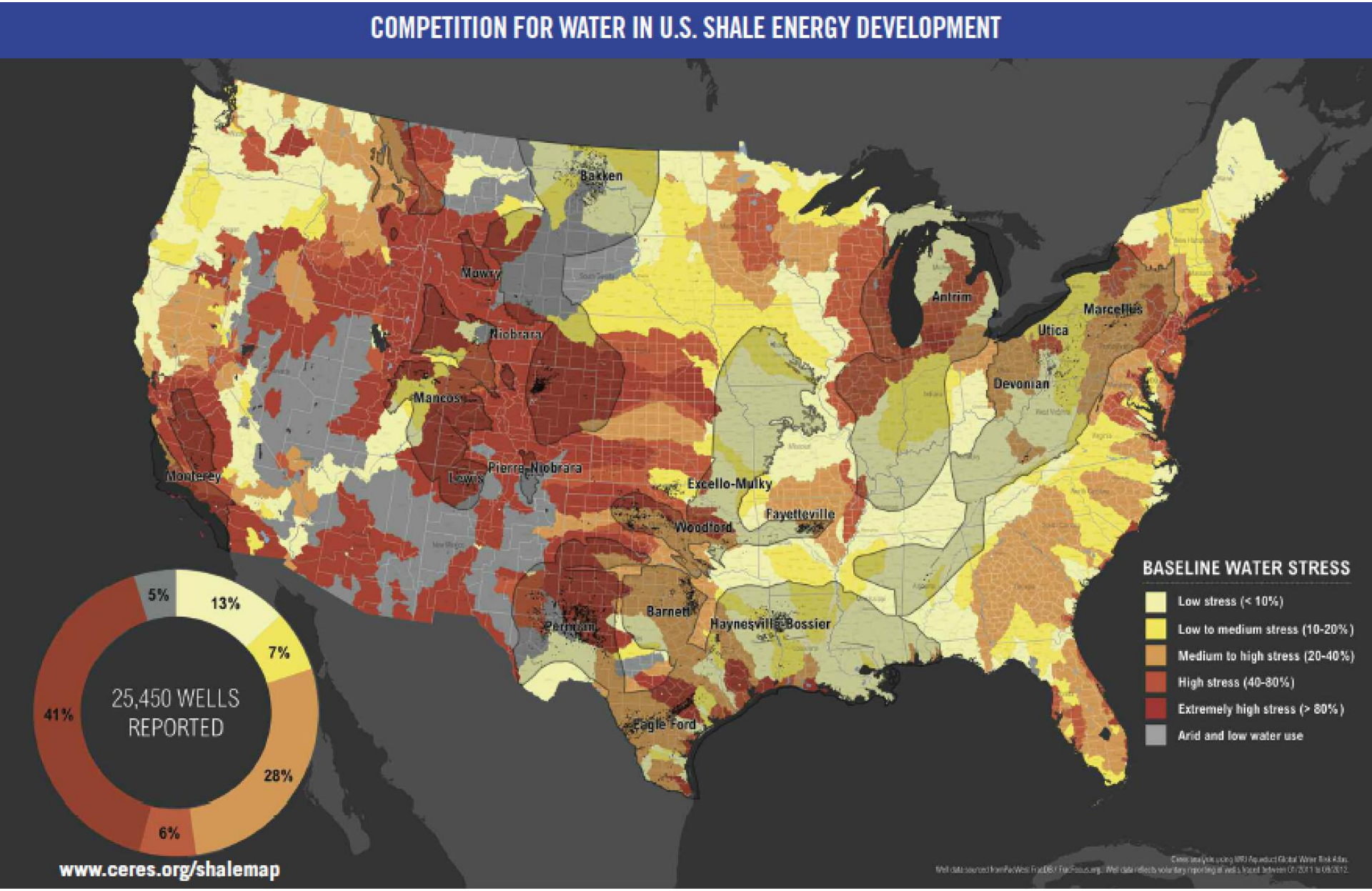
Summary

- Drought appears to be with us for many years
  - Continued water scarcity in Southwest and West
- Population continues to grow in water scarce regions
  - Added stress on diminished water supplies
- Agriculture is the first to lose access to water
  - Even if the industry has long standing water rights
  - Puts severe economic pressure on agricultural infrastructure and rural communities
- Energy industry water needs are expanding
  - Water stress regions are using water at increasing rates
  - Majority of water is for energy
  - Where will the trade-off end?

FIGURE 2: NUMBER OF HYDRAULICALLY FRACTURED WELLS BY STATE & WATER STRESS



Source: CERES, Hydraulic Fracturing & Water Stress, May 2013



Source: CERES, Hydraulic Fracturing & Water Stress, May 2013