

SESSION 6: *Water Quantity*



T W O N
T E X A S
Well Owner
N E T W O R K

SESSION 6: Water Quantity

- Texas Water Rights and Groundwater Ownership
- Groundwater Conservation Districts
- Low Yielding Wells
- Drought



Texas Groundwater Ownership

English Common Law or Rule of Capture

- Landowners have the right to pump unlimited groundwater from the land they own, as long as not wasteful, without liability to neighbors
- Law of the biggest pump
- Referred to as “property right”
- Exceptions (waste, land subsidence, slant wells, GCDs)



Texas Groundwater Ownership

Rules and regulations on groundwater in Texas have evolved through legislation and court rulings



Texas Groundwater Ownership

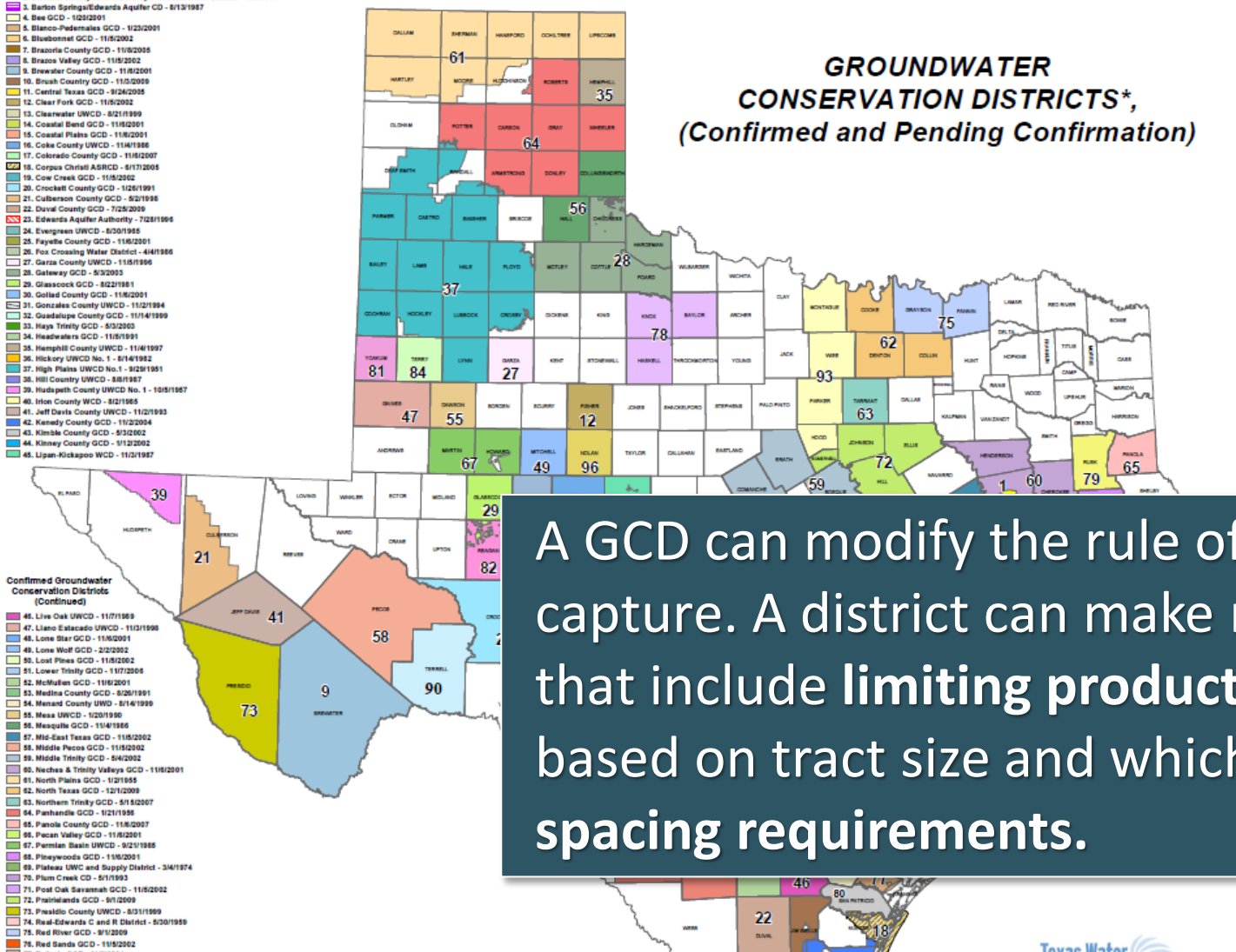
Texas has adopted the philosophy of “local management of groundwater through groundwater conservation districts.”



- Confirmed Groundwater Conservation Districts**
1. Anderson County UWCD - 10/17/1987
 2. Blanks County River Authority & Ground Water District - 11/7/1988
 3. Barton Springs-Edwards Aquifer GCD - 8/13/1987
 4. Bee GCD - 1/25/2001
 5. Blanco-Pedernales GCD - 1/23/2001
 6. Blount GCD - 11/6/2002
 7. Brazoria County GCD - 11/8/2005
 8. Brazos Valley GCD - 11/8/2002
 9. Brewster County GCD - 11/8/2001
 10. Brush Country GCD - 11/3/2009
 11. Central Texas GCD - 9/24/2009
 12. Clear Fork GCD - 11/8/2002
 13. Clearwater UWCD - 8/21/1999
 14. Coastal Bend GCD - 11/8/2001
 15. Coastal Plains GCD - 11/8/2001
 16. Coke County UWCD - 11/4/1988
 17. Colorado County GCD - 11/8/2007
 18. Corpus Christi ASRCD - 8/17/2005
 19. Cow Creek GCD - 11/8/2002
 20. Crockett County GCD - 10/21/1991
 21. Culberson County GCD - 8/21/1998
 22. Duvall County GCD - 7/25/2009
 23. Edwards Aquifer Authority - 7/28/1996
 24. Evergreen UWCD - 8/28/1985
 25. Fayette County GCD - 11/8/2001
 26. Fox Crossing Water District - 4/4/1986
 27. Garza County UWCD - 11/8/1996
 28. Gateway GCD - 8/3/2005
 29. Glasscock GCD - 8/22/1981
 30. Goliad County GCD - 11/8/2001
 31. Gonzales County UWCD - 11/2/1994
 32. Guadalupe County GCD - 11/4/1999
 33. Hays Trinity GCD - 8/3/2003
 34. Headwaters GCD - 11/8/1991
 35. Hemphill County UWCD - 11/4/1997
 36. Hickory UWCD No. 1 - 8/14/1982
 37. High Plains UWCD No. 1 - 8/28/1991
 38. Hill Country UWCD - 8/8/1987
 39. Hudspeth County UWCD No. 1 - 10/15/1987
 40. Iron County WCD - 8/2/1985
 41. Jeff Davis County UWCD - 11/21/1993
 42. Kennedy County GCD - 11/2/2004
 43. Kimble County GCD - 8/3/2002
 44. Kinney County GCD - 11/2/2002
 45. Lipan-Kickapoo WCD - 11/3/1987

GROUNDWATER CONSERVATION DISTRICTS*, (Confirmed and Pending Confirmation)

- Confirmed Groundwater Conservation Districts (Continued)**
46. Live Oak UWCD - 11/7/1989
 47. Llano Estacado UWCD - 11/31/1998
 48. Lone Star GCD - 11/8/2001
 49. Lone Wolf GCD - 2/22/2002
 50. Lost Pines GCD - 11/8/2002
 51. Lower Trinity GCD - 11/7/2006
 52. McMullen GCD - 11/8/2001
 53. Medina County GCD - 8/26/1991
 54. Menard County UWCD - 8/14/1999
 55. Mesa UWCD - 1/20/1999
 56. Mesquite GCD - 11/4/1986
 57. Mid-East Texas GCD - 11/8/2002
 58. Middle Pecos GCD - 11/8/2002
 59. Middle Trinity GCD - 11/8/2002
 60. Neches & Trinity Valleys GCD - 11/8/2001
 61. North Plains GCD - 1/21/1985
 62. North Texas GCD - 12/1/2009
 63. Northern Trinity GCD - 8/15/2007
 64. Parkade GCD - 1/21/1985
 65. Pecos County GCD - 11/8/2007
 66. Pecan Valley GCD - 11/8/2001
 67. Permian Basin UWCD - 9/21/1986
 68. Pineywoods GCD - 11/8/2001
 69. Platana UWC and Supply District - 3/4/1974
 70. Plum Creek CD - 5/1/1993
 71. Post Oak Savannah GCD - 11/8/2002
 72. Prairielands GCD - 8/1/2009
 73. Priddy County UWCD - 8/31/1989
 74. Real-Edwards C and R District - 5/30/1989
 75. Red River GCD - 9/1/2009
 76. Red Sands GCD - 11/9/2002



A GCD can modify the rule of capture. A district can make rules that include limiting production based on tract size and which have spacing requirements.

Groundwater Conservation Districts

90. Terrell County GCD - 11/8/2014
91. Tarrant GCD - 11/8/2001
92. Trinity Glen Rose GCD - 11/8/2002
93. Upper Trinity GCD - 11/8/2007
94. Uvalde County UWCD - 9/1/1993
95. Victoria County GCD - 8/8/2006
96. West-Tex GCD - 11/8/2002
97. Wintergarden GCD - 1/17/1998

- Subsidence Districts**
- Harris-Galveston Subsidence District
 - Fort Bend Subsidence District
- NOTE: These subsidence districts are not Groundwater Conservation Districts as defined under Chapter 201 of the Texas Water Code, but have the same regulatory groundwater production to prevent land subsidence (refer to Senate Bill 1537 of the 76th Legislative Session)

© The Districts themselves.

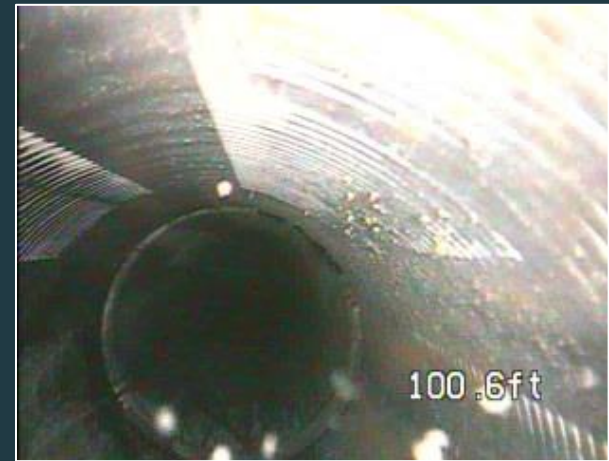
GCD Data Source: Texas Commission on Environmental Quality (TCEQ) 912.239.1980

Map updated: January 2015

Low Yielding Wells

Several factors reduce well yield

- Lowered water table
- Development of scale
- Accumulation of bacteria



Low Yielding Wells



- *Pump needs to be properly sized*
- *Low pressure cut off switch*
- *Large pressure tank for low yielding wells*

Correcting Low Yielding Wells

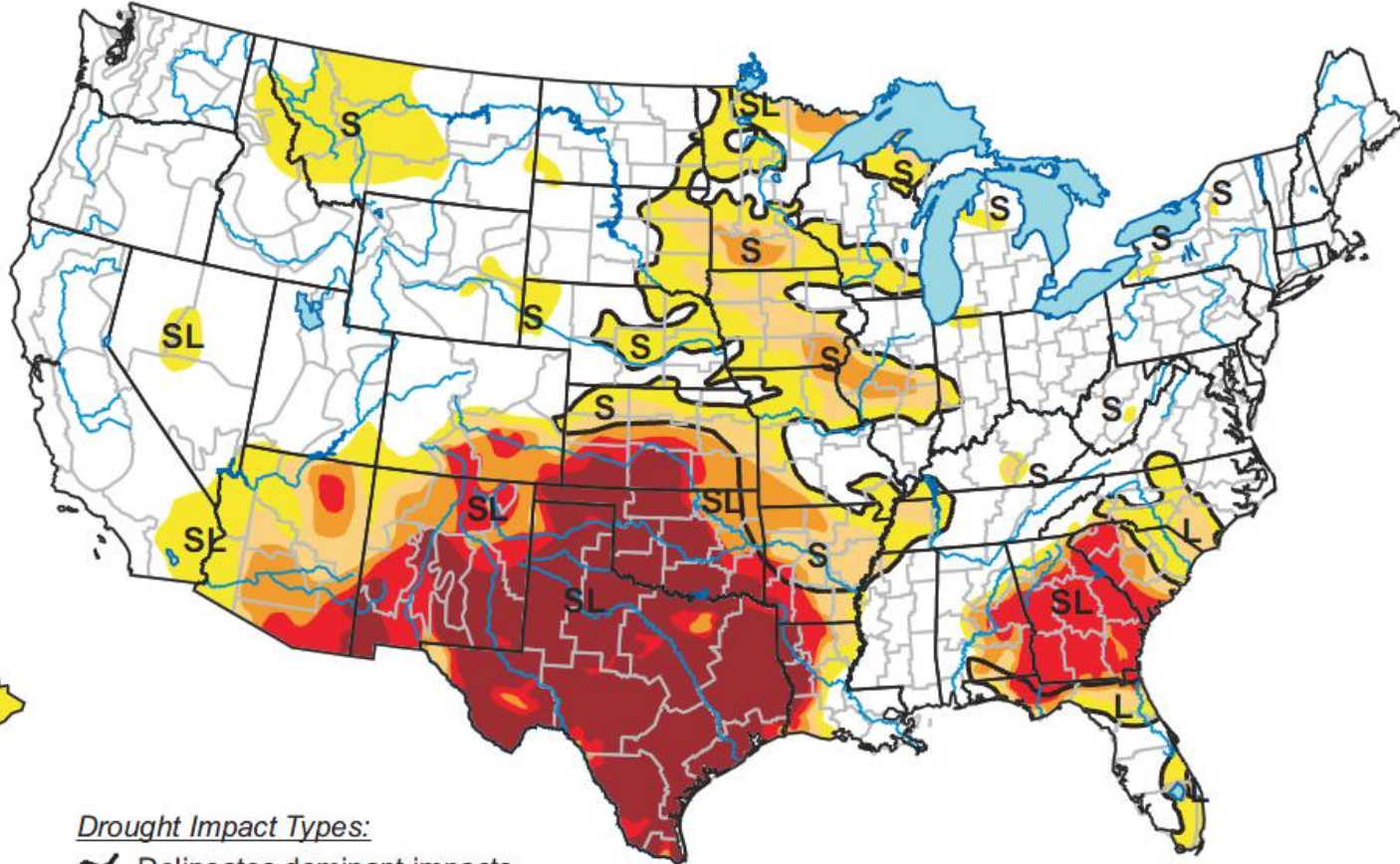


- Shock chlorination
- Scrubbing
- Redevelopment
- Well deepening or pump lowering






U.S. Drought Monitor

October 4, 2011


Valid 8 a.m. EDT



Intensity:

-  D0 Abnormally Dry
-  D1 Drought - Moderate
-  D2 Drought - Severe
-  D3 Drought - Extreme
-  D4 Drought - Exceptional

Drought Impact Types:

-  Delineates dominant impacts
- S = Short-Term, typically <6 months
(e.g. agriculture, grasslands)
- L = Long-Term, typically >6 months
(e.g. hydrology, ecology)

The Drought Monitor focuses on broad-scale conditions.
Local conditions may vary. See accompanying text summary
for forecast statements.

<http://droughtmonitor.unl.edu/>



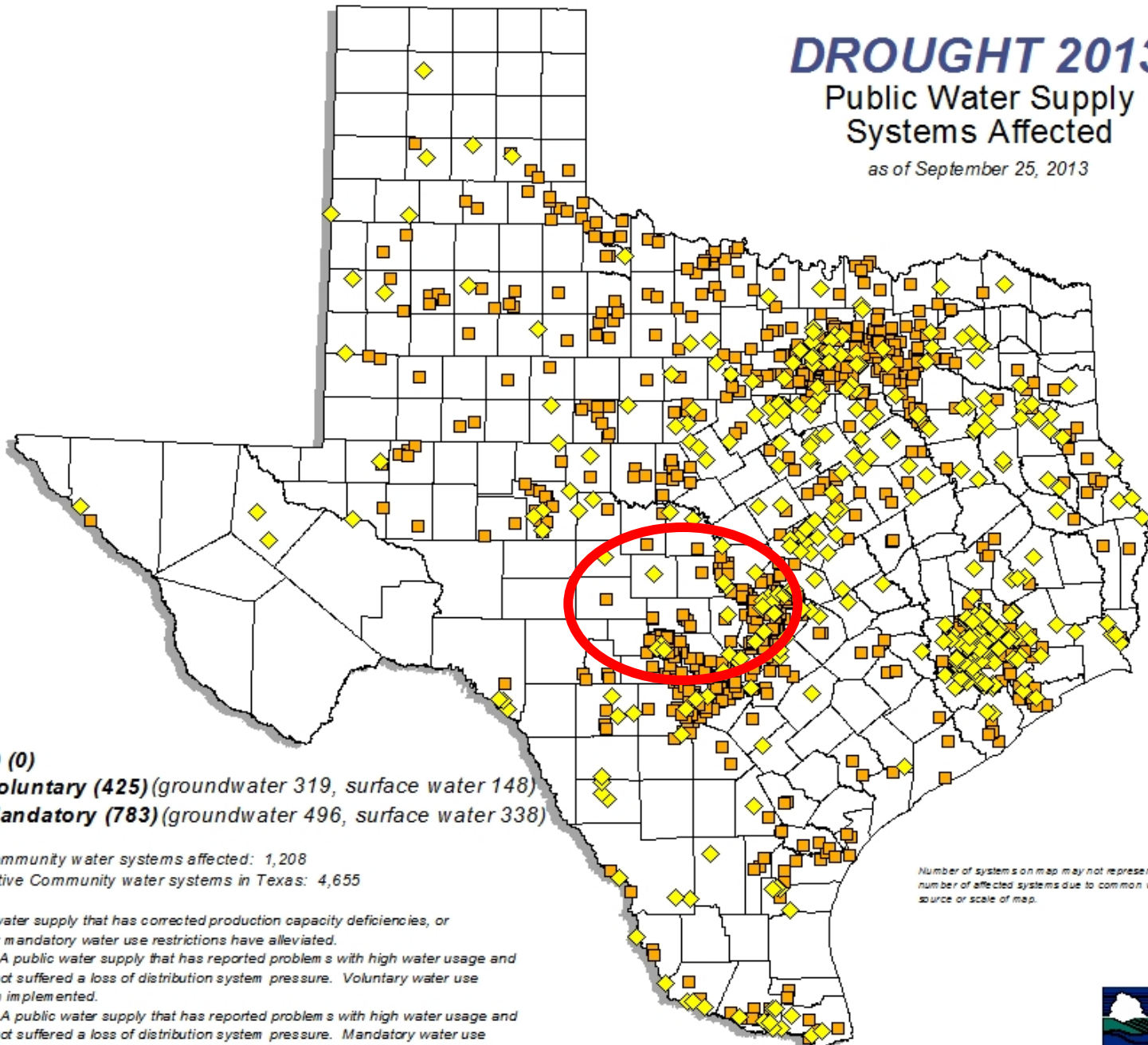
Released Thursday, October 6, 2011

Author: Rich Tinker, CPC/NCEP/NWS/NOAA

DROUGHT 2013

Public Water Supply Systems Affected

as of September 25, 2013



● **RESOLVED (0)**

◆ **WATCH - Voluntary (425)** (groundwater 319, surface water 148)

■ **WATCH - Mandatory (783)** (groundwater 496, surface water 338)

Total number of Community water systems affected: 1,208

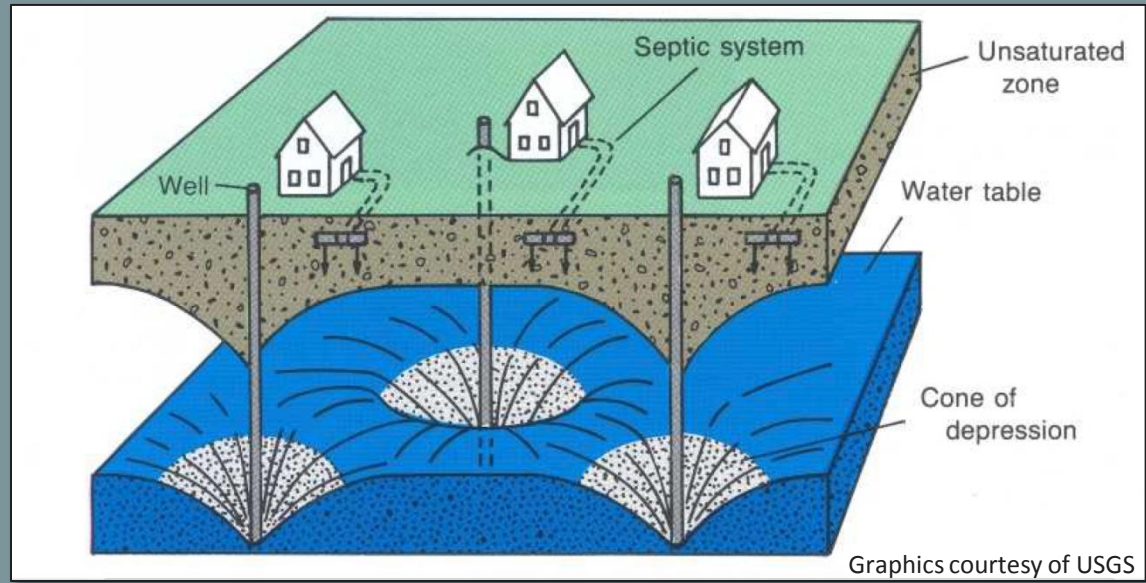
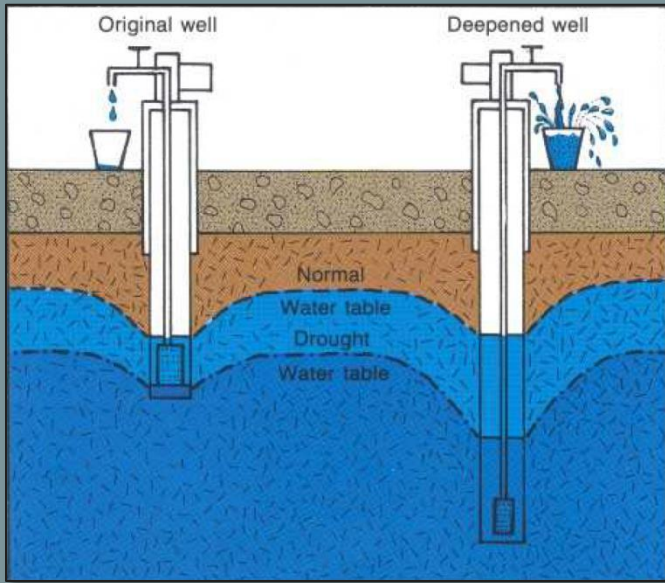
Total number of active Community water systems in Texas: 4,655

Resolved A public water supply that has corrected production capacity deficiencies, or drought conditions for mandatory water use restrictions have alleviated.

Watch - Voluntary A public water supply that has reported problems with high water usage and production, but has not suffered a loss of distribution system pressure. Voluntary water use restrictions have been implemented.

Watch - Mandatory A public water supply that has reported problems with high water usage and production, but has not suffered a loss of distribution system pressure. Mandatory water use restrictions have been implemented.

Number of systems on map may not represent total number of affected systems due to common water source or scale of map.



Graphics courtesy of USGS



Rainwater Harvesting

- **Rainwater harvesting** is the capture, diversion, and storage of rainwater for use in landscaping, rangeland, and other purposes.



Advantages of Rainwater Harvesting

- Is a conservation practice
- Can reduce storm water runoff, and so decrease loads on storm sewers
- Rainwater is of superior quality: zero hardness, sodium-free, and nearly neutral pH (neither acidic nor basic)
- When properly managed, rainwater harvesting eliminates the need for costly treatment and distribution systems
- Apart from costs to collect, store, treat, and convey the water into the facility, rainwater harvesting is free

Disadvantages of Rainwater Harvesting

- Rainwater harvesting may need to be supplemented with water from other sources, especially during extended dry periods or droughts
- Systems require regular maintenance after installation
- Storage systems can take up space around the house
- Standardized construction guidelines for systems are lacking

How Much Rain Can I Harvest?

- During a **one inch rain**, each ft^2 of a collection surface footprint receives 0.6 gallons of water

Total Gallons H_2O = Square Feet of Footprint X 0.6 Gallons/ ft^2

Example:

*If 1 inch of rain falls on a 2,000 ft^2 roof it would produce **1200 gallons** of water*

*[2000 x 0.6 gallons/sq ft = **1200 gallons** of water]*



For additional information:

<http://rainwaterharvesting.tamu.edu/>

40 GALLON CHALLENGE

DAILY WATER SAVINGS



Gallons saved from
7,580 United States pledges

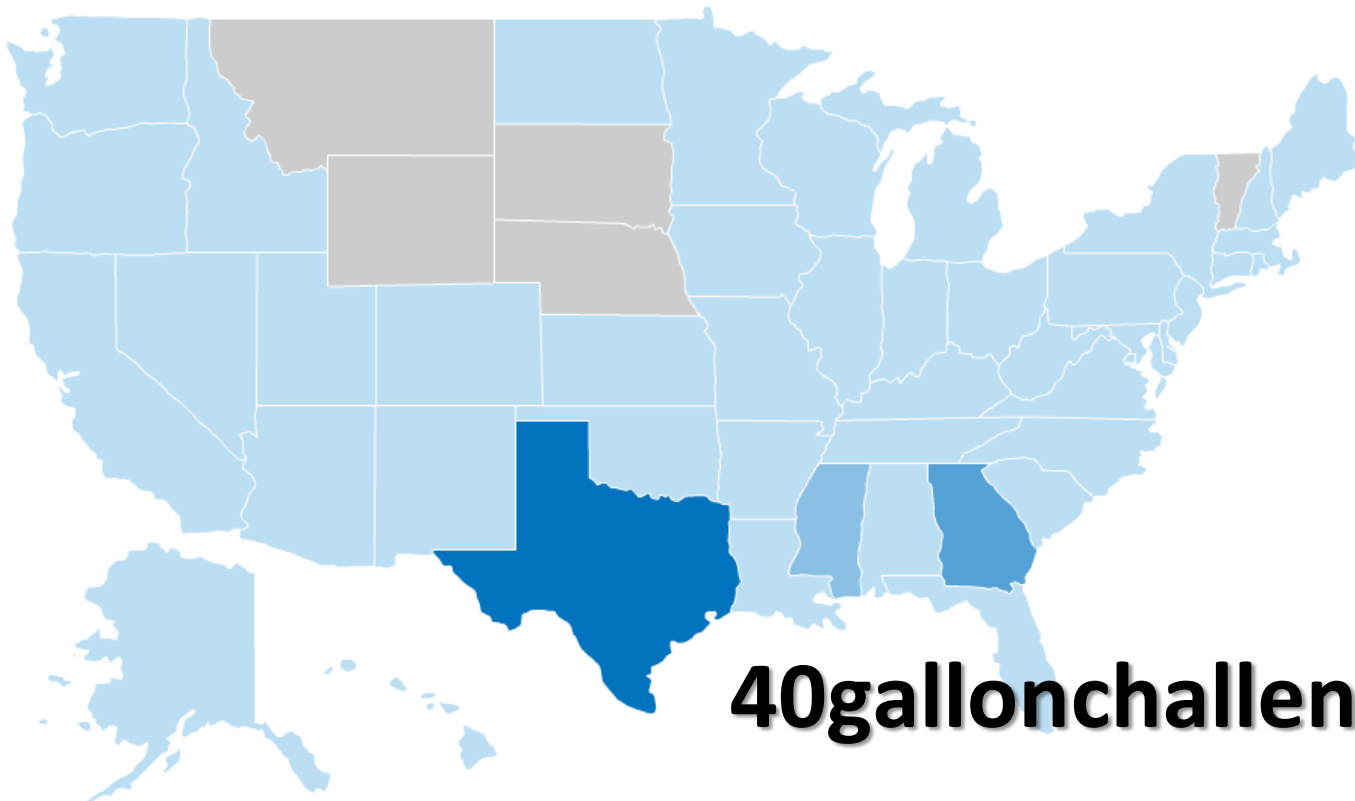


Save 40 gallons of water a day for your county and state. [Read more about the program.](#)

Take the pledge to conserve water.

Choose your state:

GO



Top 3 actions pledged saving most water:

- Reduce irrigation station runtimes by 2 minutes.
(169760 gallons)
- Use a broom instead of a hose to clean driveways and sidewalks.
(101420 gallons)
- Fix a leaky toilet.
(97530 gallons)

40gallonchallenge.org

U.S. Drought Monitor

Texas

July 22, 2014

(Released Thursday July 24, 2014)

Valid 8 a.m. EDT

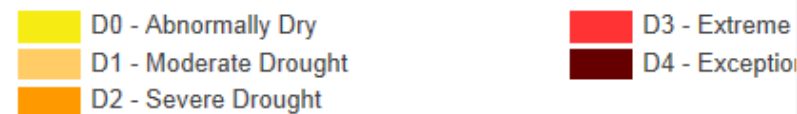
Statistics type: Traditional (D0-D4, D1-D4, etc.) Categorical

Drought Condition (Percent Area):

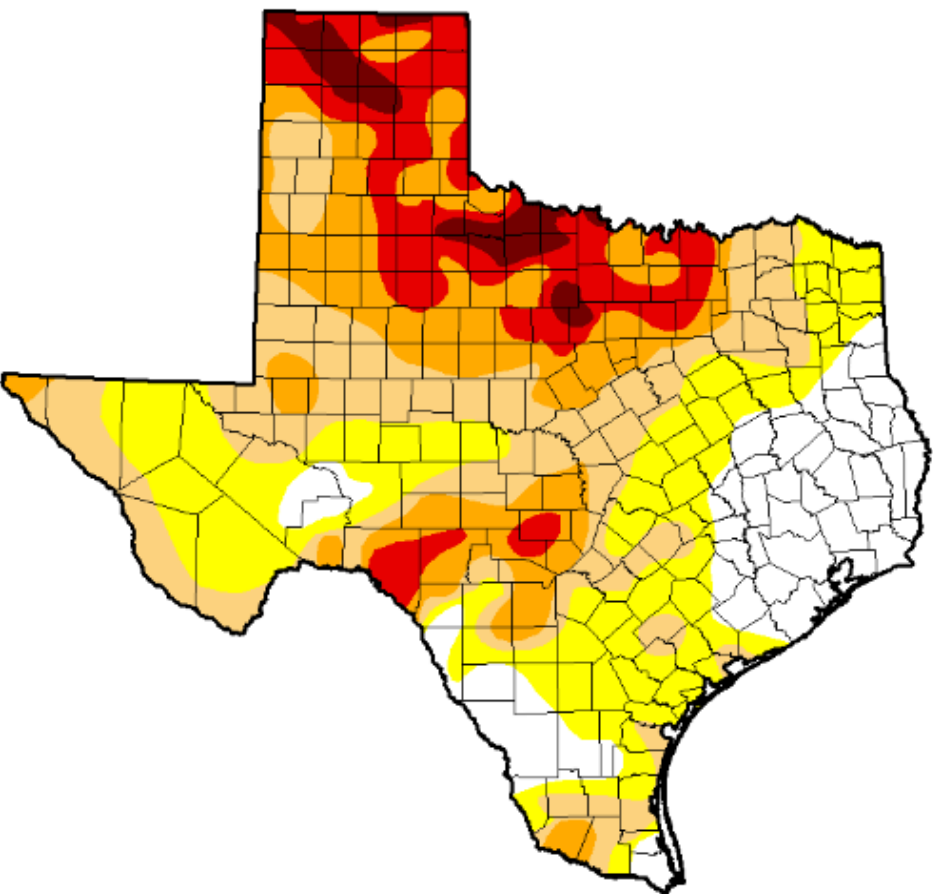
Week	Date	Nothing	D0-D4	D1-D4	D2-D4
Current	7/22/2014	16.58	83.42	57.97	33.37
Last Week	7/15/2014	12.72	87.28	63.36	36.80
3 Months Ago	4/22/2014	13.62	86.38	68.68	48.56
Start of Calendar Year	12/31/2013	28.48	71.52	43.84	21.15
Start of Water Year	10/1/2013	6.62	93.38	70.95	25.08
One Year Ago	7/23/2013	0.62	99.38	92.54	67.42

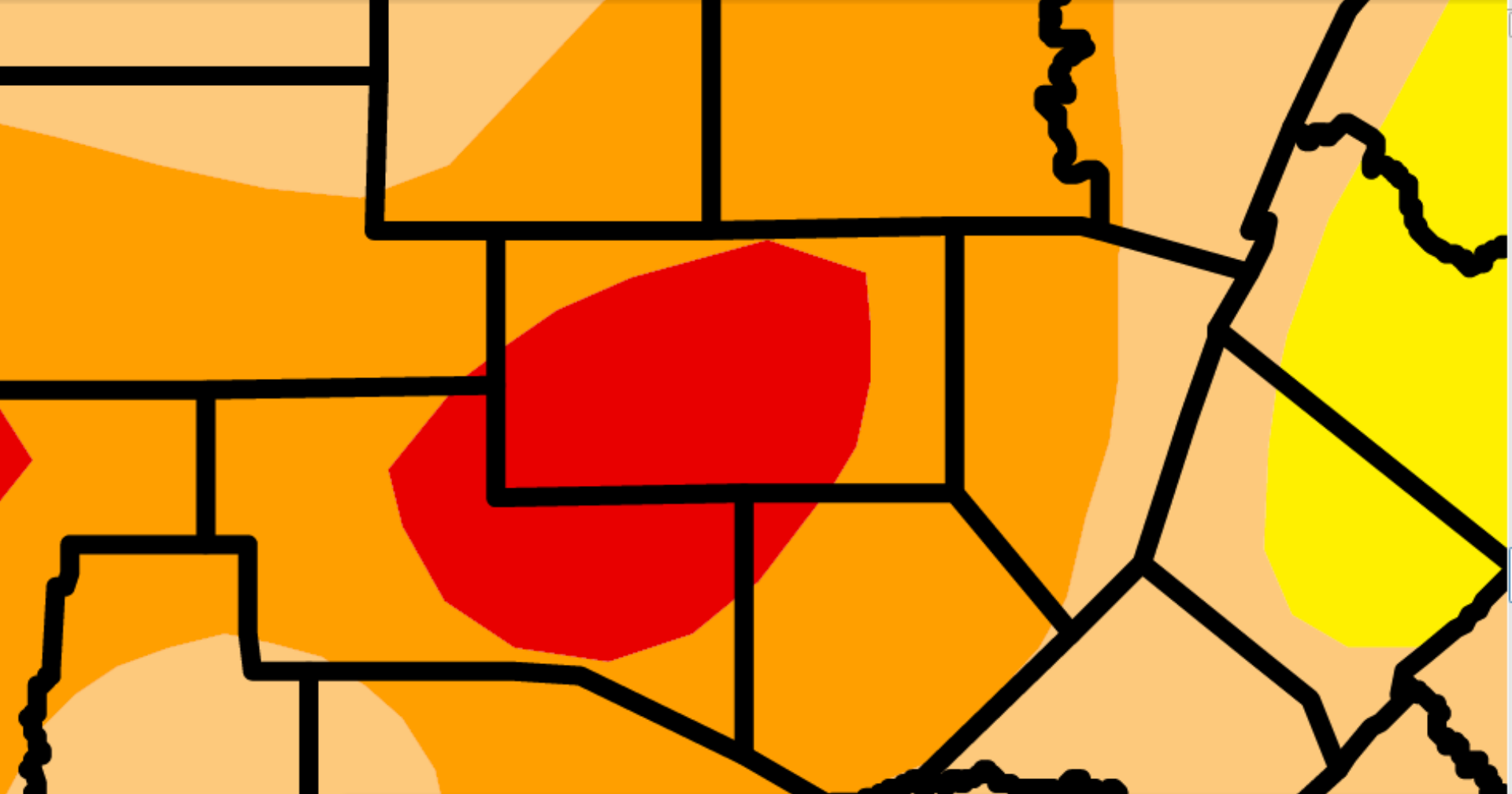
[View More Statistics](#)

Intensity:



The Drought Monitor focuses on broad-scale conditions. Local conditions accompanying [text summary](#) for forecast statements.





Intensity:



D0 Abnormally Dry



D3 Extreme Drought



D1 Moderate Drought



D4 Exceptional Drought



D2 Severe Drought

40 GALLON CHALLENGE

DAILY WATER SAVINGS



Gallons saved from
7,580 United States pledges

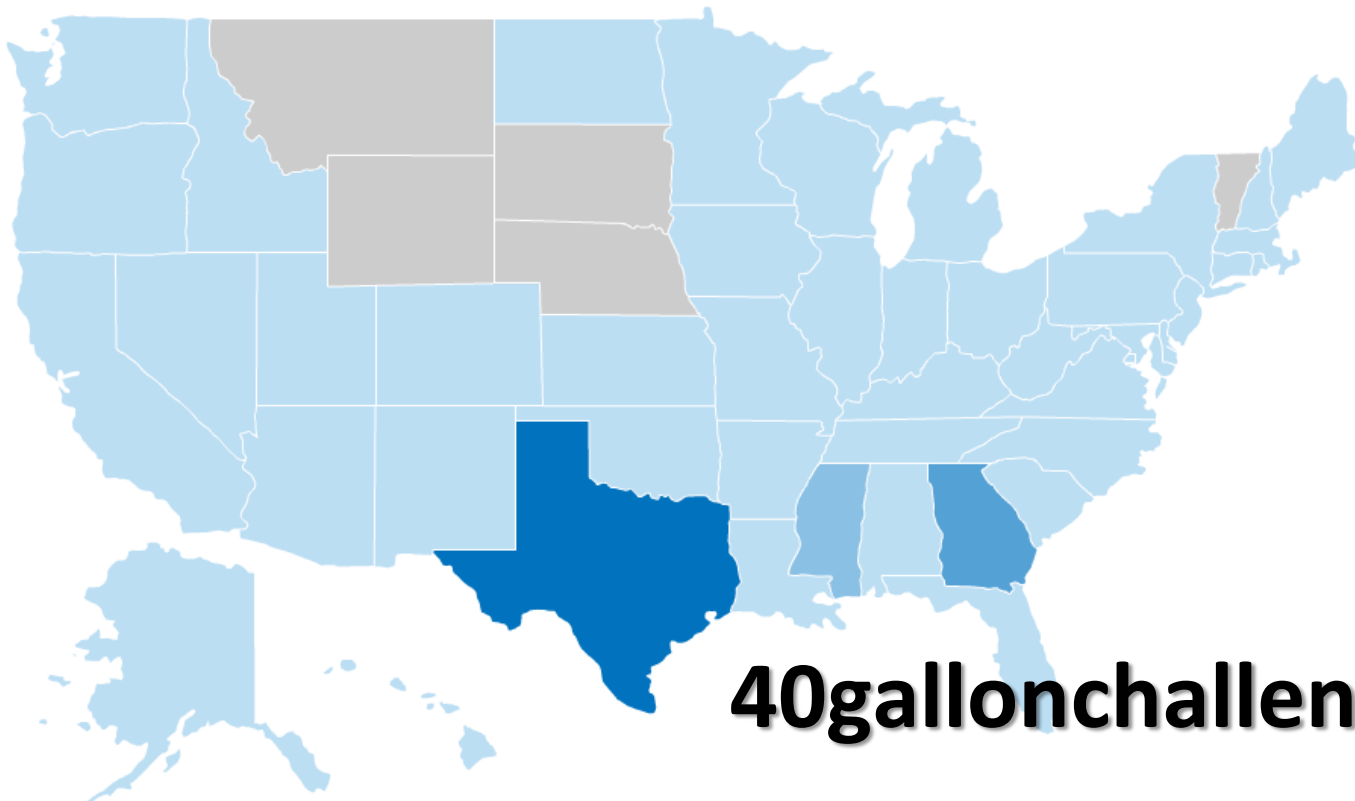


Save 40 gallons of water a day for your county and state. [Read more about the program.](#)

Take the pledge to conserve water.

Choose your state:

GO

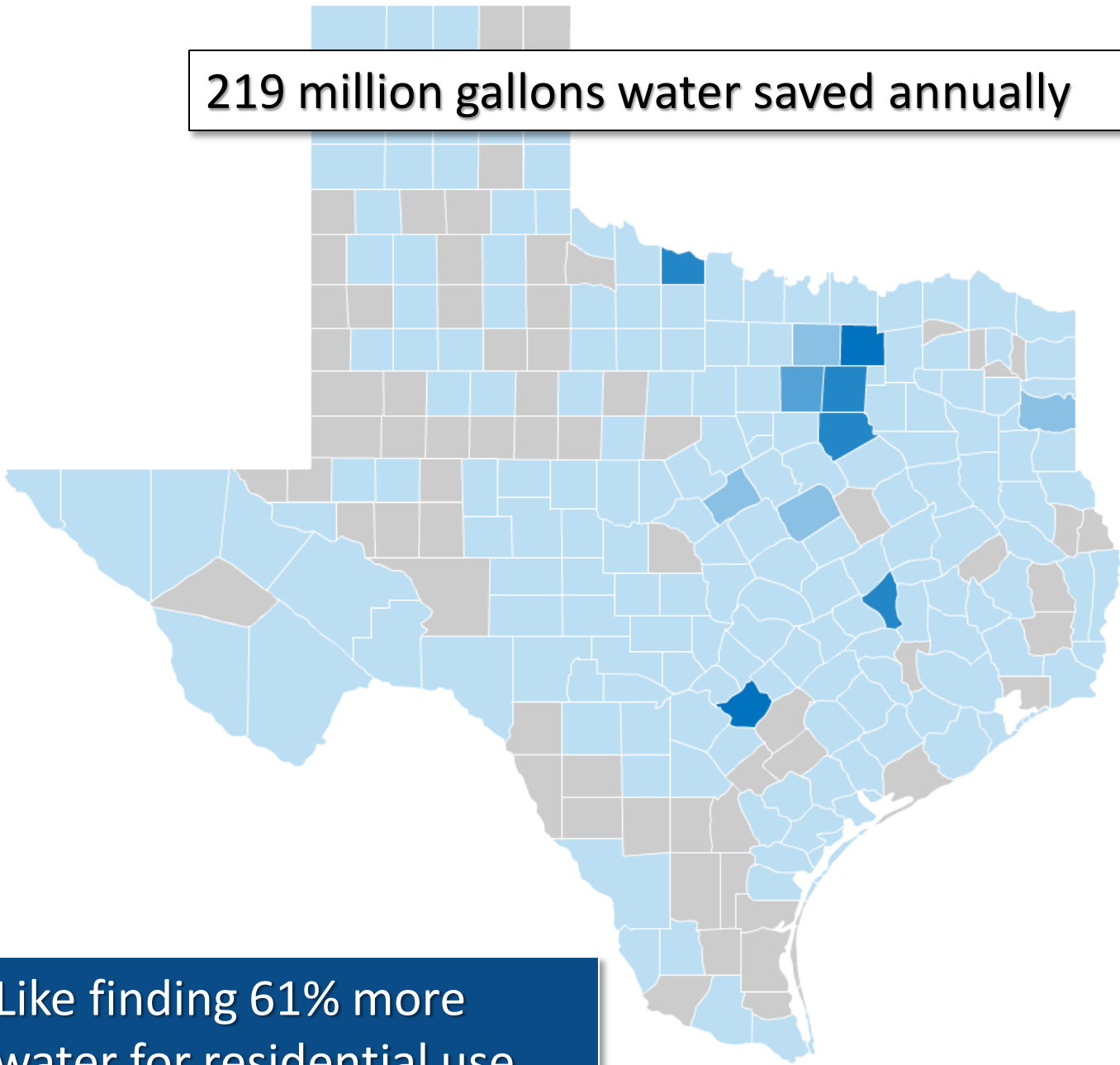


Top 3 actions pledged saving most water:

- Reduce irrigation station runtimes by 2 minutes.
(169760 gallons)
- Use a broom instead of a hose to clean driveways and sidewalks.
(101420 gallons)
- Fix a leaky toilet.
(97530 gallons)

40gallonchallenge.org

219 million gallons water saved annually



Top 3 Texas counties saving most gallons:

COLLIN

58194 gallons saved daily

GUADALUPE

47498 gallons saved daily

ELLIS

42481 gallons saved daily

Top 3 Texas counties saving most gallons per capita*:

GUADALUPE

0.186 gallons per capita

ELLIS

0.16 gallons per capita

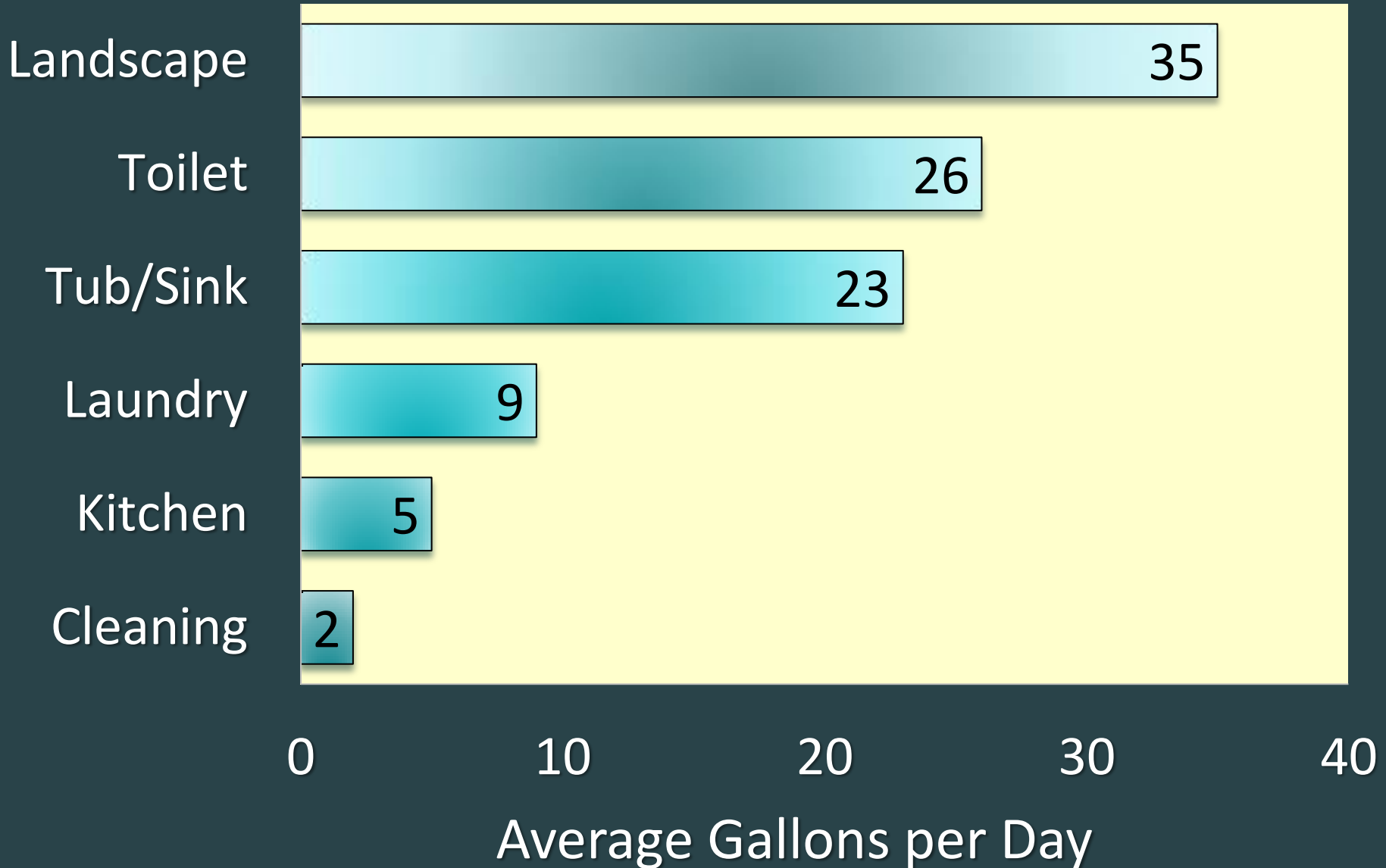
COLLIN

0.046 gallons per capita

* per person, based on Census 2000 population data.

Like finding 61% more water for residential use without any NEW water

Home/Landscape Water Use



Landscape Water Conservation

- Know how much you apply and distribution – 5 to 6 tuna cans
- Grass watering needs
 - Water to 6 inch depth – soil type
 - Water 30 minutes – rod/spade test
 - Schedule accordingly
 - Watch runoff and adjust
- When to water (summer)
 - Buffalograss– two to five weeks
 - Bermuda and Zoysiagrass – once a week



Home/Landscape Water Conservation

Action	Savings
(Family of 4, 2 bathrooms)	
Reduce irrigation runtime by 2 mins	80 gal/day
High efficiency dishwasher	18 gal/day
Faucet aerators	14 gal/day
Low-flow toilets	8 gal/day
High efficiency washing machine	10 gal/day
TOTAL	130 gal/day

40 GALLON CHALLENGE

WATER CONSERVATION PLEDGE: www.40gallonchallenge.org

Water conservation is an ever-growing concern for everyone. How can you make a difference to save water on a daily basis? Take the pledge below to contribute your part. Here are a few guidelines:

- Submit only one pledge per household
- Check off only new practices or actions that you will do to save water
- Do not submit duplicate pledges

The information you submit today will go towards the running tally of water saved daily in the U.S. and Texas.

What will you do to conserve water?

INDOORS	PLEDGE?	SAVED DAILY
Run the dishwasher only when full		2 gallons
Not leave water running while rinsing dishes		5 gallons
Turn off water while brushing teeth (twice daily, per person)		8 gallons
Shorten showers by 2 minutes (once daily, per person)		5 gallons
Fill the bathtub half full while bathing (per person)		18 gallons
Not use the toilet as a wastebasket (once daily)		2 gallons
Wash only full loads of laundry and cut back by one load per week		5 gallons
Fix a leaky faucet		15 gallons
Fix a leaky toilet		30 gallons
Install aerators with flow restrictors on kitchen/bathroom faucets (3 faucets)		14 gallons
Purchase a new, more efficient clothes washer		10 gallons
Replace old, non-efficient toilet with new low-flush toilet (4 flushes daily)		8 gallons
Replace old, non-efficient showerhead with low flow showerhead		20 gallons
OUTDOORS (continues on back)		SAVED DAILY
Make a compost pile instead of using the garbage disposal		4 gallons
Use a 55-gallon or larger rain barrel to capture rain water		5 gallons
Use a broom instead of a hose to clean driveways and sidewalks (twice/week)		22 gallons
Water yard after midnight and before 10 a.m.		20 gallons
Reduce irrigation station runtimes by 2 minutes		80 gallons
Eliminate one irrigation cycle per week		30 gallons
Adjust sprinklers to reduce overspray onto sidewalks, driveways, etc.		20 gallons
Repair at least one pipe leak or broken sprinkler head		20 gallons

Add mulch (2"-3") around trees and plants (1,000 sq. ft.)	<input type="checkbox"/>	25 gallons
Install water-efficient drip irrigation system	<input type="checkbox"/>	20 gallons
Install a "smart irrigation controller" that adjusts for temperature and rain	<input type="checkbox"/>	40 gallons
Use automatic car wash instead of hand washing cars	<input type="checkbox"/>	18 gallons
Replace 1,000 sq. ft. of high water-use landscape with a low water-use landscape	<input type="checkbox"/>	40 gallons
Repair at least one leak around pool or spa pump	<input type="checkbox"/>	20 gallons
Repair any leaking hose bibs.	<input type="checkbox"/>	20 gallons
Install a pool cover to reduce evaporation	<input type="checkbox"/>	30 gallons
Install spa cover to reduce evaporation	<input type="checkbox"/>	5 gallons

Please provide the following information. Items marked with an * are required.

COUNTY:*

Email address:

Your email address will only be used for the following items with your permission.

May we send you a follow-up survey?

Send me an email reminder of my pledged activities.

How many people are in your household? *

Total gallons saved daily:



Questions?

