WHY AND HOW DISTRICTS CAN SUPPORT RECYCLING OF OIL AND GAS PRODUCED WATER

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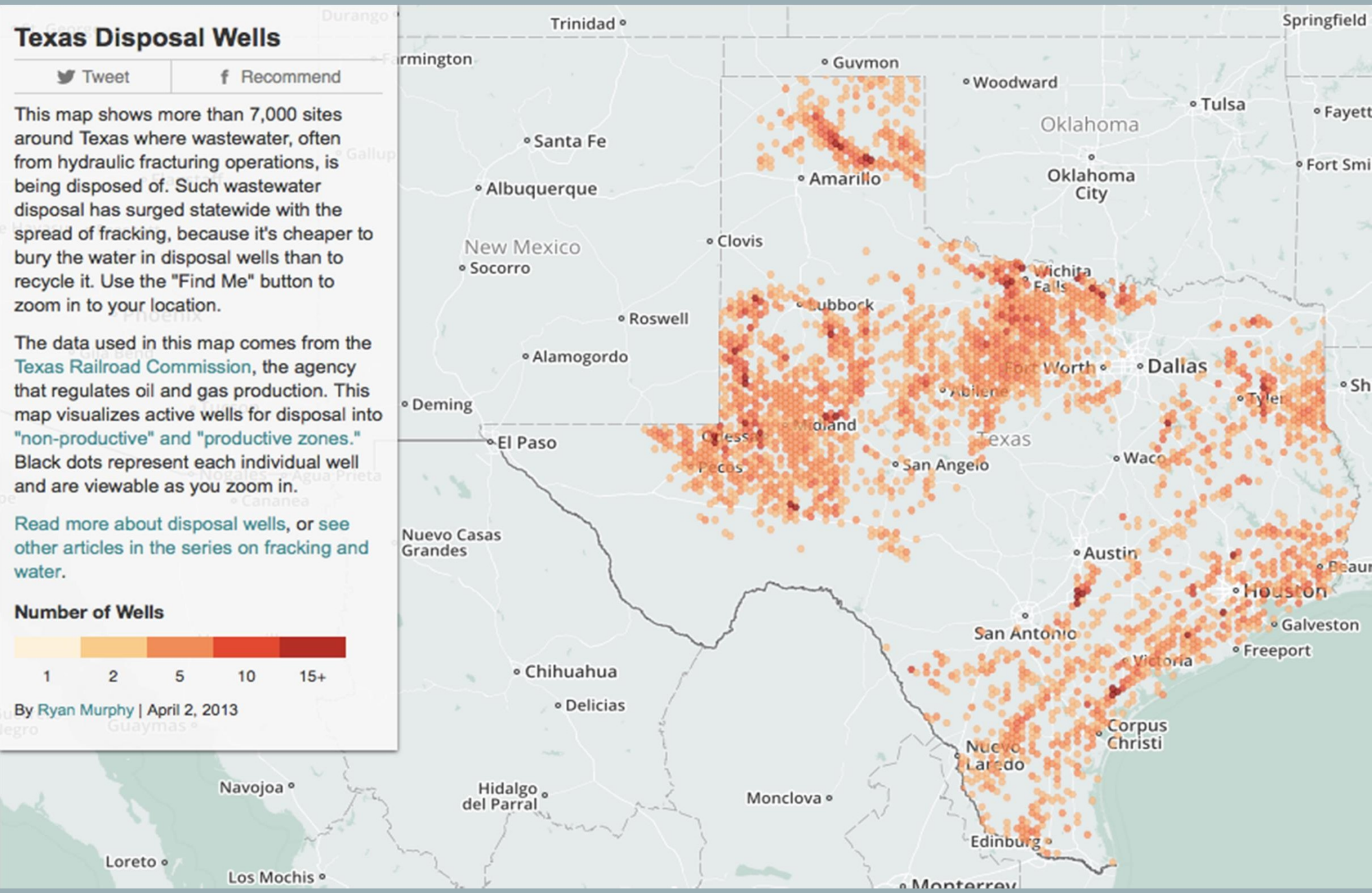
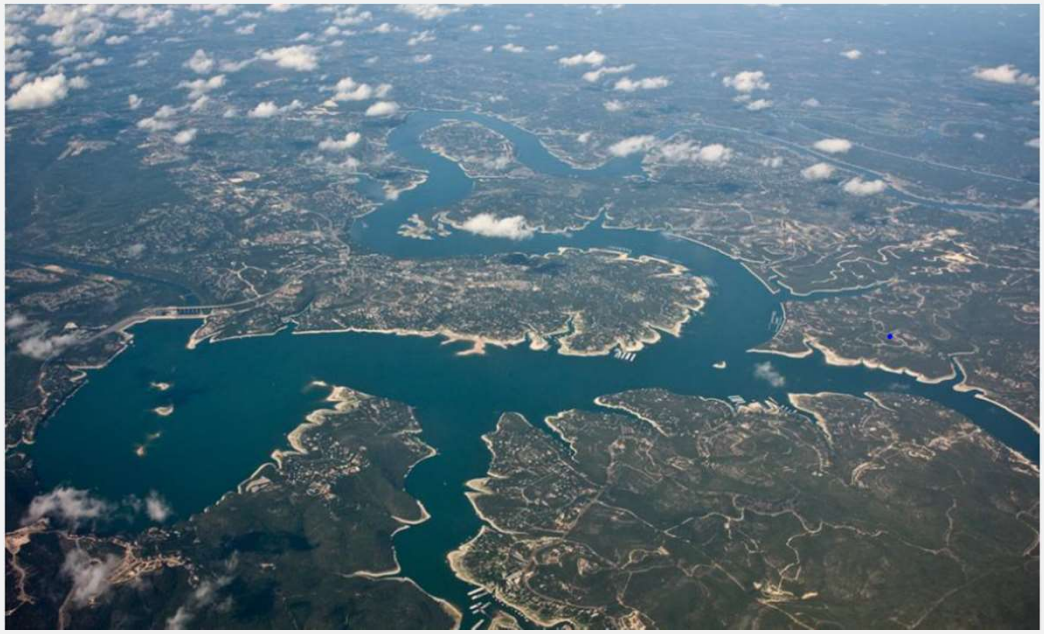
McElroy, Sullivan, Miller & Weber, L.L.P

Texas has 7,744 active disposal wells



Texas Tribune 4.2.2013

COMMERCIAL WASTEWATER DISPOSAL



2011 – 2017

291B Gallons
80% of Lake Travis

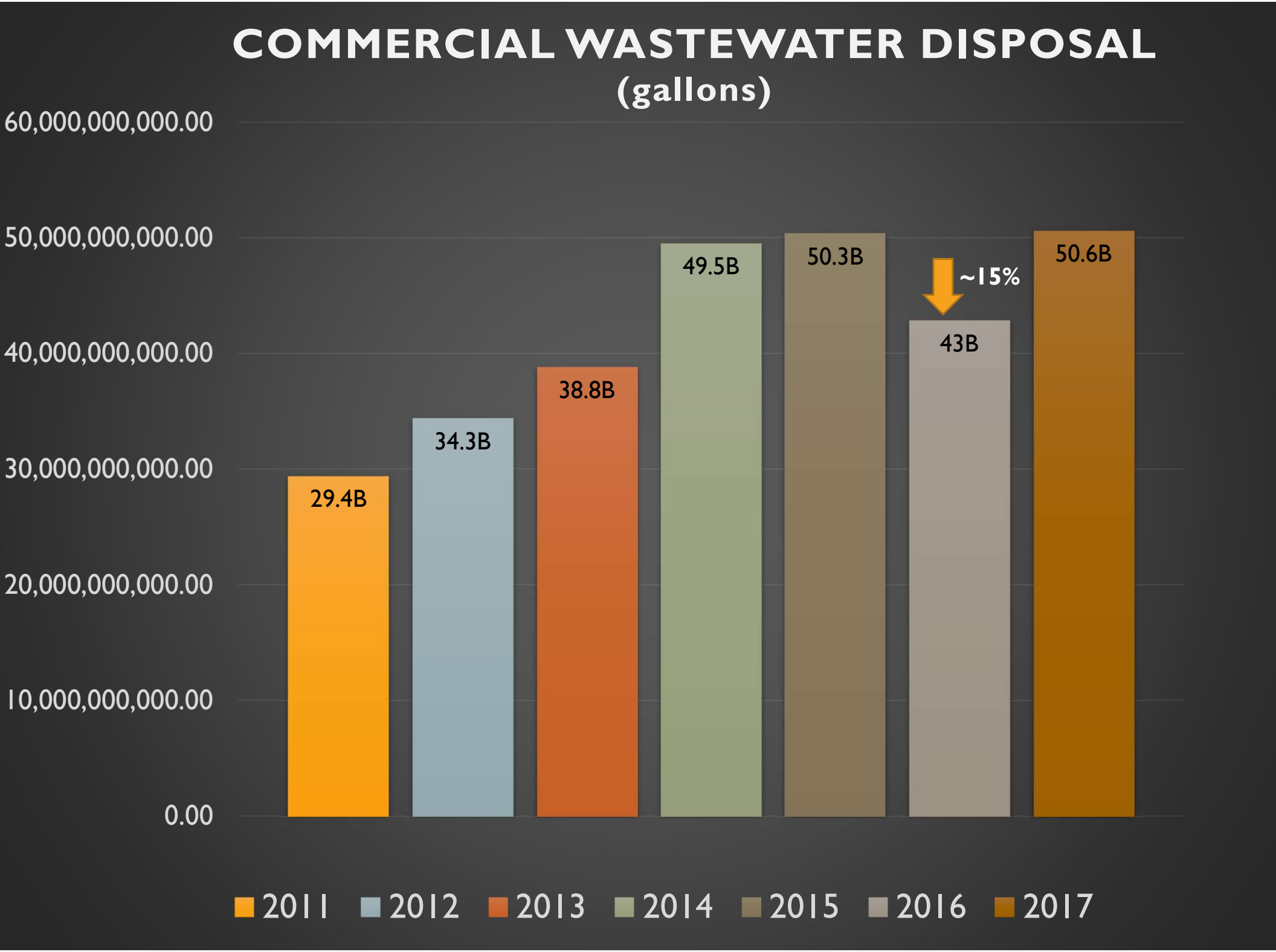
2017

50B Gallons
≈2.5x Austin Residential Use (2015)

2015 TWDB Water Use Survey

CONNECTIONS/USAGE:	CONNECTIONS	VOLUME (GALLONS)
Total Metered Retail	221040	35375189200
Residential - Single Family	197401	13555634200
Residential - Multi Family	5833	8706481900
Institutional	194	994655100
Commercial	17604	9338981800
Industrial	8	2779436200
Agriculture	0	0
Reuse	0	0
Total Unmetered	0	85812164

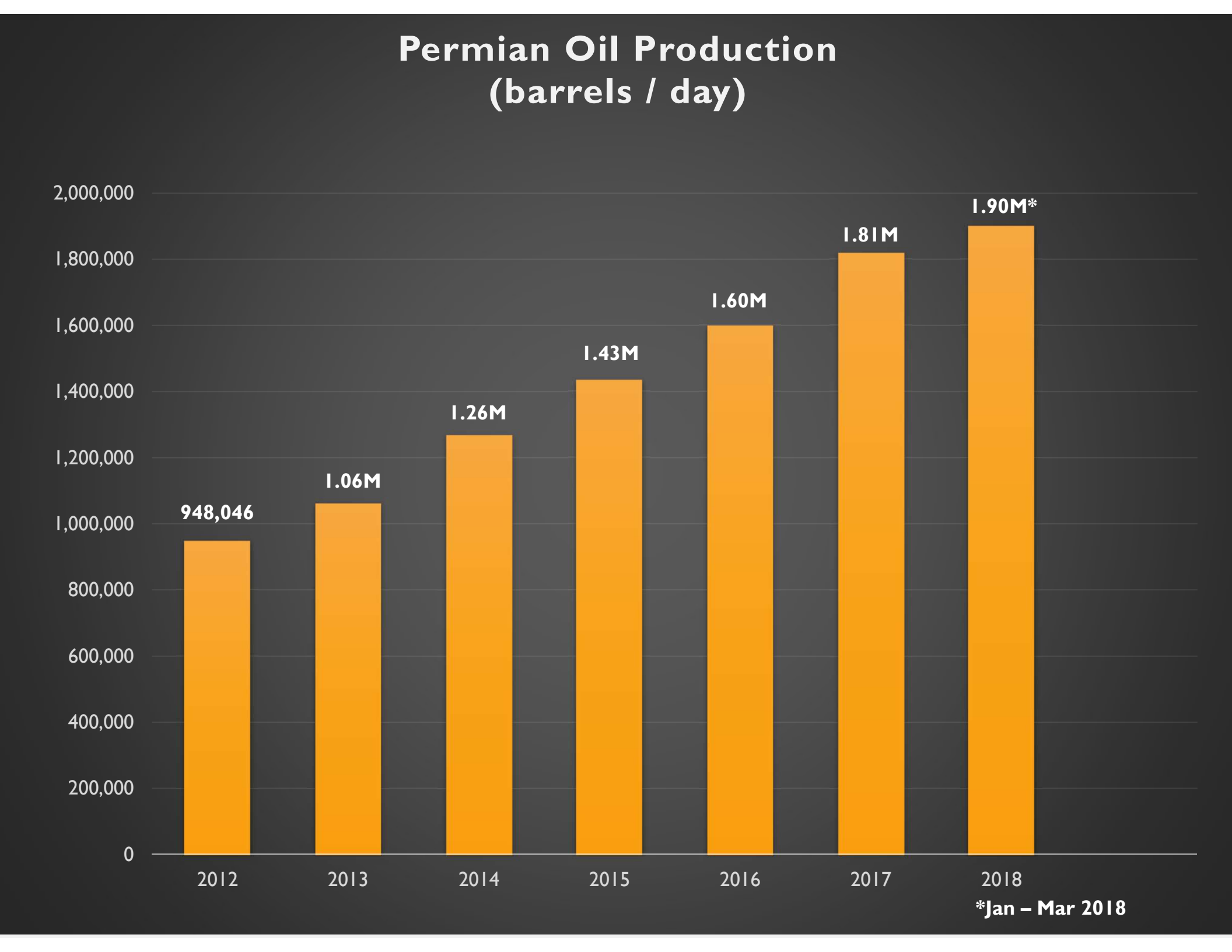
WATER SYSTEM INFORMATION:	
Estimated full-time residential population served directly by this system	926,624


COMMERCIAL WASTEWATER DISPOSAL
(gallons)
60,000,000,000.00
50,000,000,000.00
40,000,000,000.00
30,000,000,000.00
20,000,000,000.00
10,000,000,000.00
0.00
29.4B
34.3B
38.8B
49.5B
50.3B
~15%
43B
50.6B
2011
2012
2013
2014
2015
2016
2017

DISPOSAL & PRODUCTION BY DISTRICT

District	2018 Active Disposal Wells	2016 Commercial Injected Volume (acre-feet)	2018 Oil Production Jan - May (bbls)	2018 Gas Production Jan - May (MCF)
Reeves GCD (Reeves)	211	17,201	32,056,856	98,785,245
Upper Trinity GCD (Montague, Wise, Parker, Hood)	176	4,417		135,521,947
Santa Rita UWCD (Reagan)	144	4,904	16,736,280	
Permian Basin UWCD (Howard)	158	3,297	16,213,533	25,915,732
Evergreen UWCD (Frio, Atascosa, Wilson, Karnes)	100	8,146	46,640,064	81,593,620

Permian Oil Production
(barrels / day)



WHY RECYCLING MATTERS

TEXAS FACES 4.8M ACRE-FEET SUPPLY SHORTAGE BY 2020

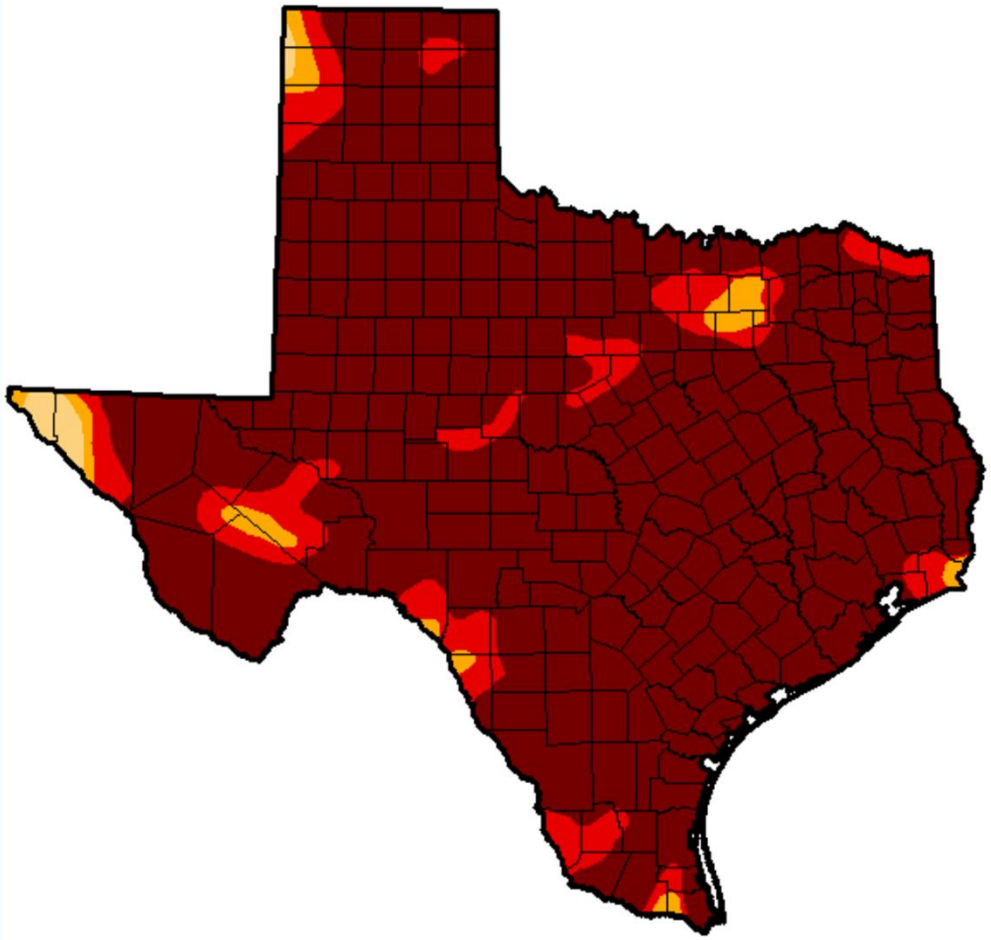
1.56 Trillion Gallons

4x Lake Travis

2011 Drought

U.S. Drought Monitor

Texas



October 4, 2011

(Released Thursday, Oct. 6, 2011)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	99.16	96.99	87.99
Last Week 9/27/2011	0.00	100.00	100.00	99.16	96.65	85.75
3 Months Ago 7/5/2011	2.41	97.59	95.73	94.39	90.21	71.30
Start of Calendar Year 1/4/2011	13.55	86.45	66.68	36.30	13.04	0.00
Start of Water Year 9/27/2011	0.00	100.00	100.00	99.16	96.65	85.75
One Year Ago 10/5/2010	75.60	24.40	2.43	1.01	0.02	0.00

Intensity:

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

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

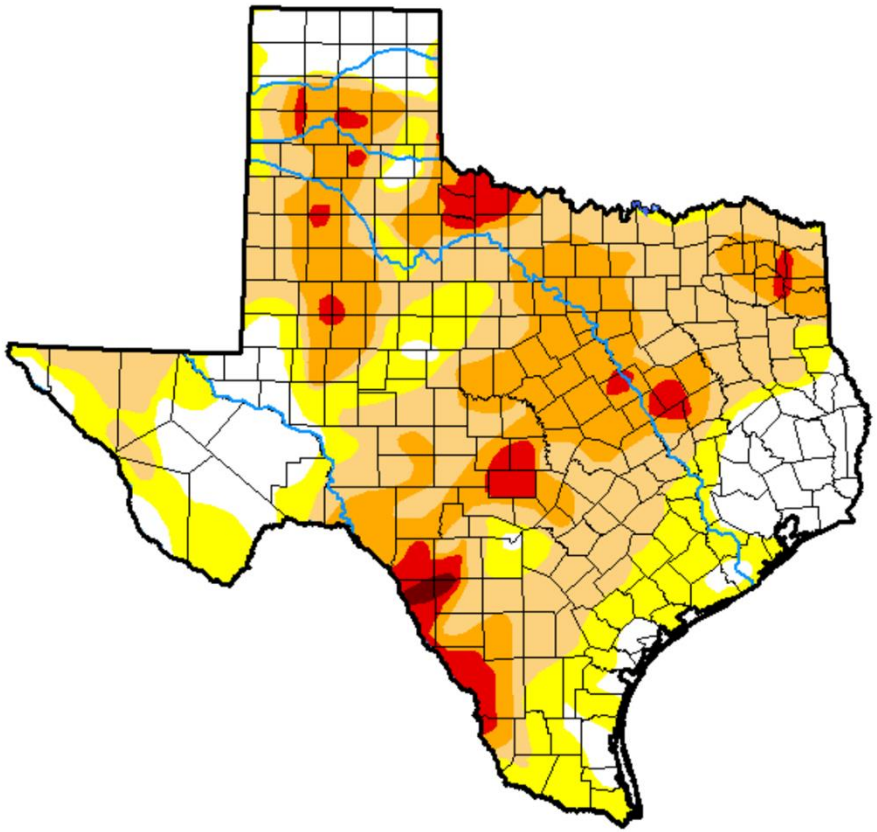
Author:
Richard Tinker
CPC/NOAA/NWS/NCEP

USDA National Drought Mitigation Center

http://droughtmonitor.unl.edu/

CURRENT CONDITIONS

U.S. Drought Monitor
Texas



August 21, 2018

(Released Thursday, Aug. 23, 2018)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	18.99	81.01	59.88	28.00	5.22	0.30
Last Week *08-14-2018*	22.28	77.72	59.18	32.14	6.22	0.35
3 Months Ago *05-22-2018*	37.32	62.68	40.53	22.46	9.20	2.54
Start of Calendar Year *01-02-2018*	33.37	66.63	33.56	5.94	0.11	0.00
Start of Water Year *09-26-2017*	70.54	29.46	4.17	0.04	0.00	0.00
One Year Ago *08-22-2017*	86.44	13.56	2.47	0.00	0.00	0.00

Intensity:

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

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

Author:

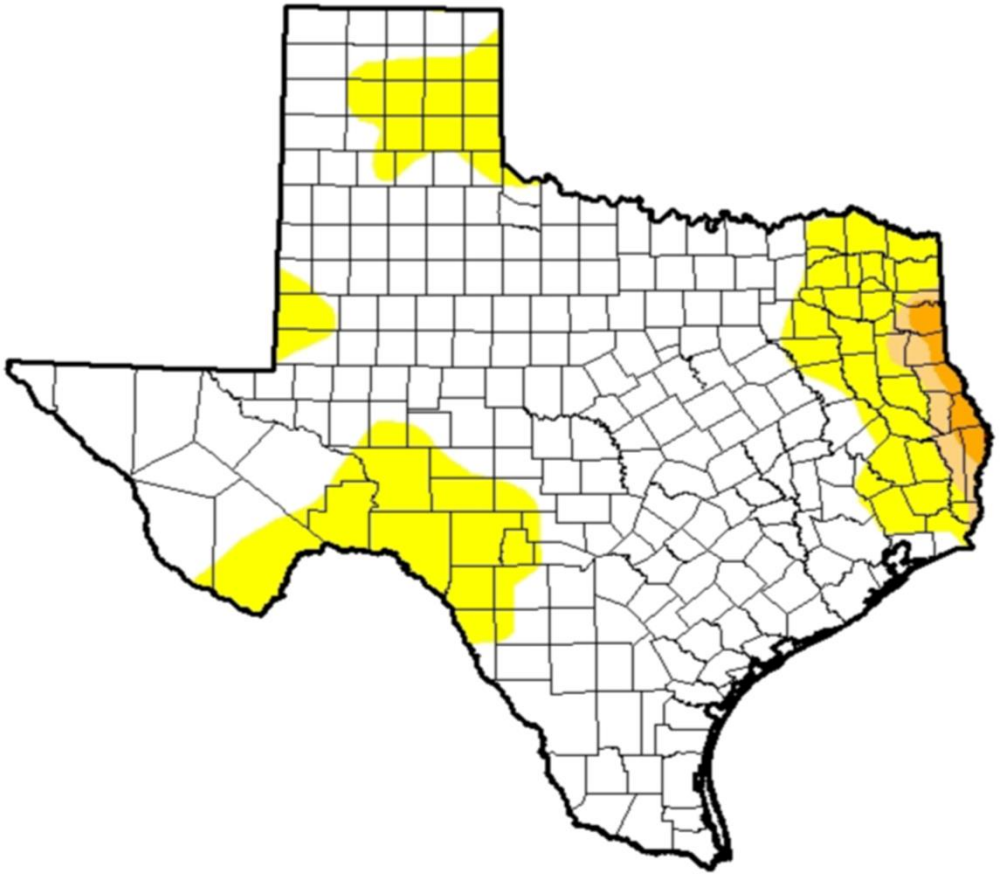
Jessica Blunden

NCEI/NOAA

http://droughtmonitor.unl.edu/

NOT INDEFINITE

U.S. Drought Monitor
Texas



October 5, 2010
(Released Thursday, Oct. 7, 2010)
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	75.60	24.40	2.43	1.01	0.02	0.00
Last Week 9/28/2010	75.57	24.43	2.43	0.99	0.00	0.00
3 Months Ago 7/6/2010	82.85	17.15	7.36	1.67	0.00	0.00
Start of Calendar Year 12/29/2009	72.90	27.10	6.98	2.31	0.00	0.00
Start of Water Year 9/28/2010	75.57	24.43	2.43	0.99	0.00	0.00
One Year Ago 10/6/2009	66.07	33.93	22.37	14.51	6.78	1.46

Intensity:

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

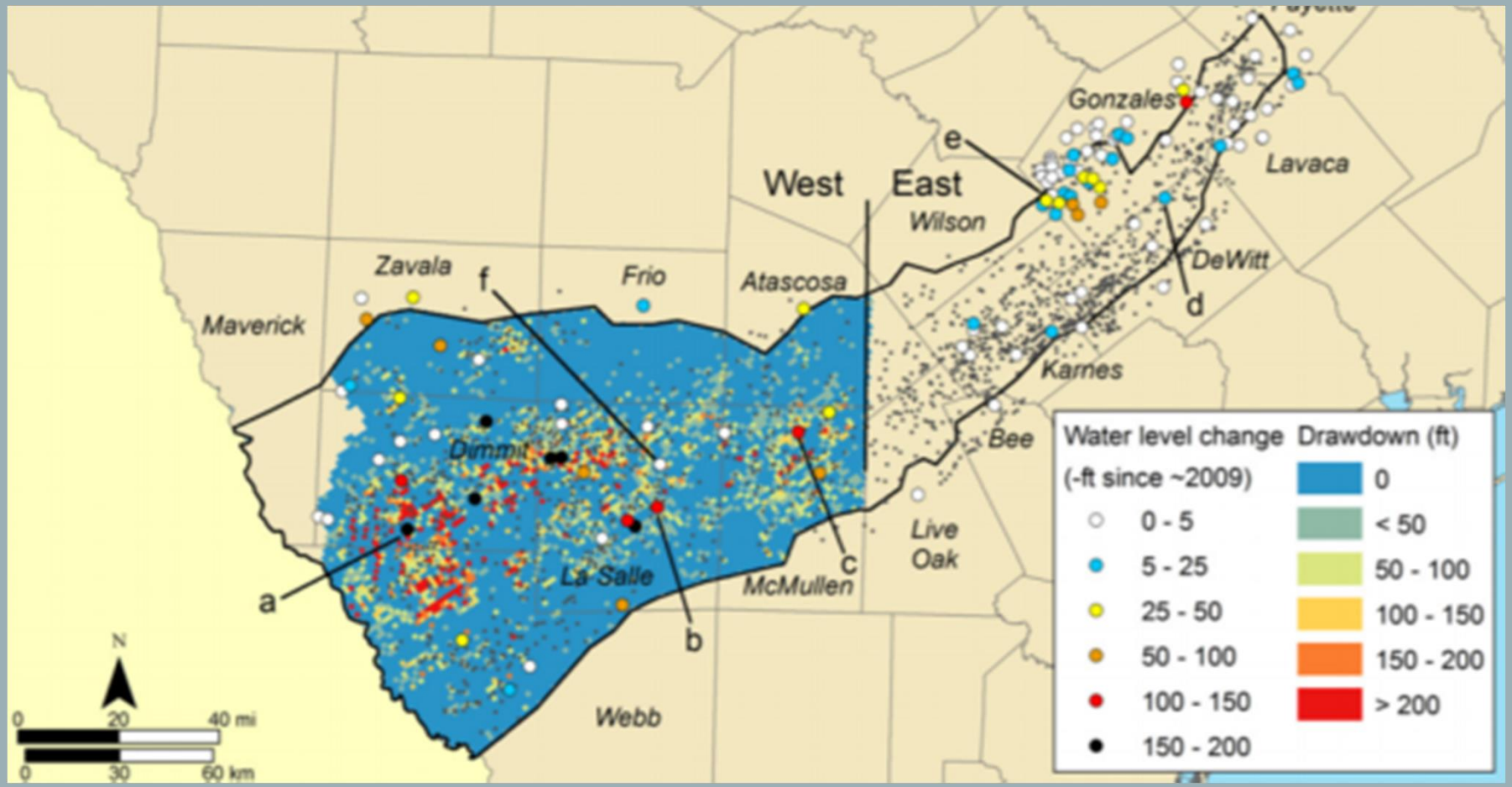
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
Richard Heim
NCDC/NOAA

USDA National Drought Mitigation Center

http://droughtmonitor.unl.edu/

AQUIFER DRAWDOWN IN EAGLE FORD AREA

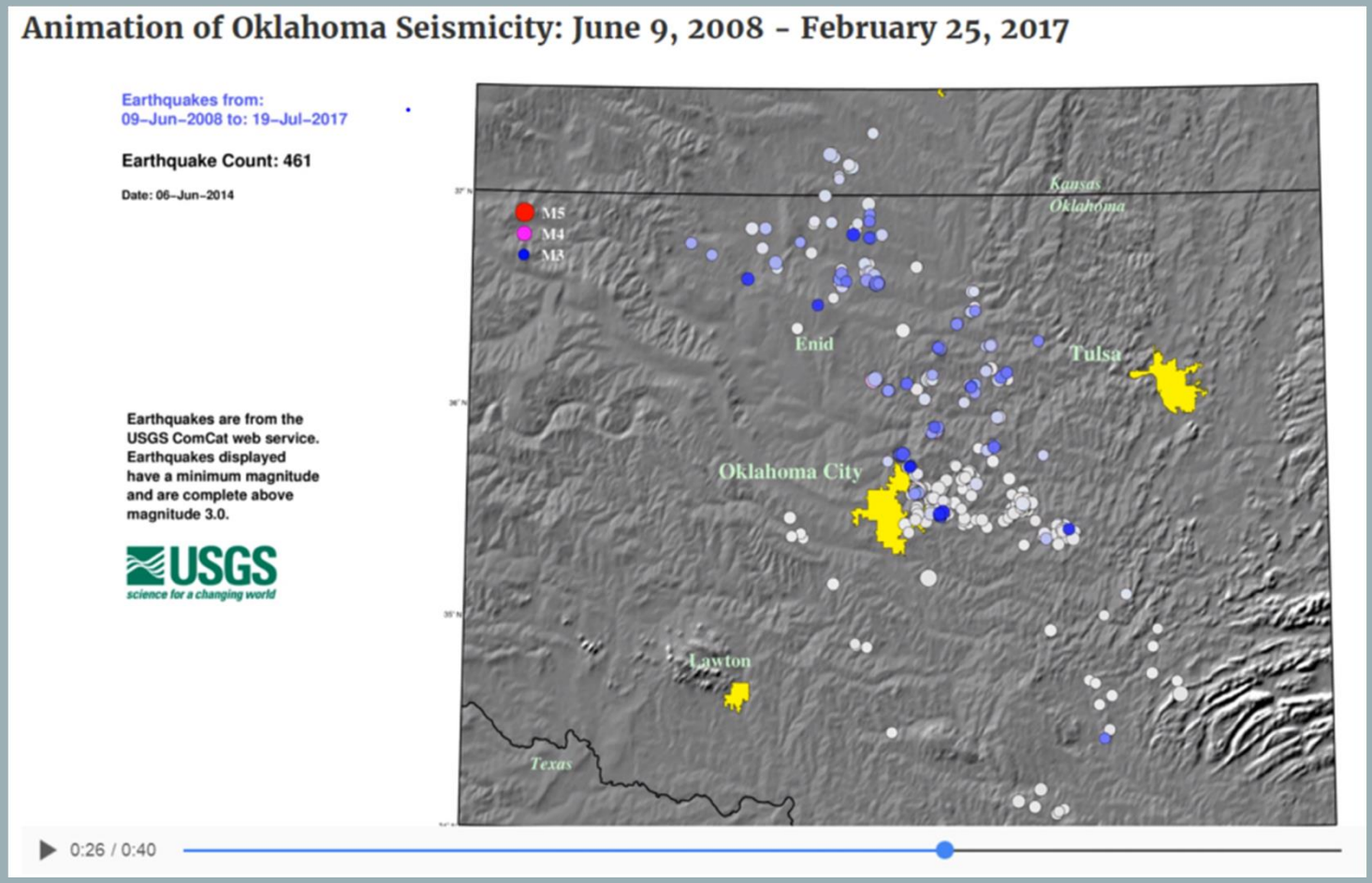


>100 ft. in 6.2% of the land area
>150 ft. in 3.7% of the land area
>200ft. in 2.3% of the land area

GROUNDWATER WELLS FOR FRACKING AND RIG SUPPLY

	Fracking	Rig Supply
Statewide	3,293	29,648
Permian Basin UWCD	755	1,858
Reeves County GCD	292	541
Santa Rita UWCD	159	887
Evergreen UWCD	118	536
Middle Pecos GCD	41	127
Upper Trinity GCD	12	505

OKLAHOMA SEISMIC ACTIVITY

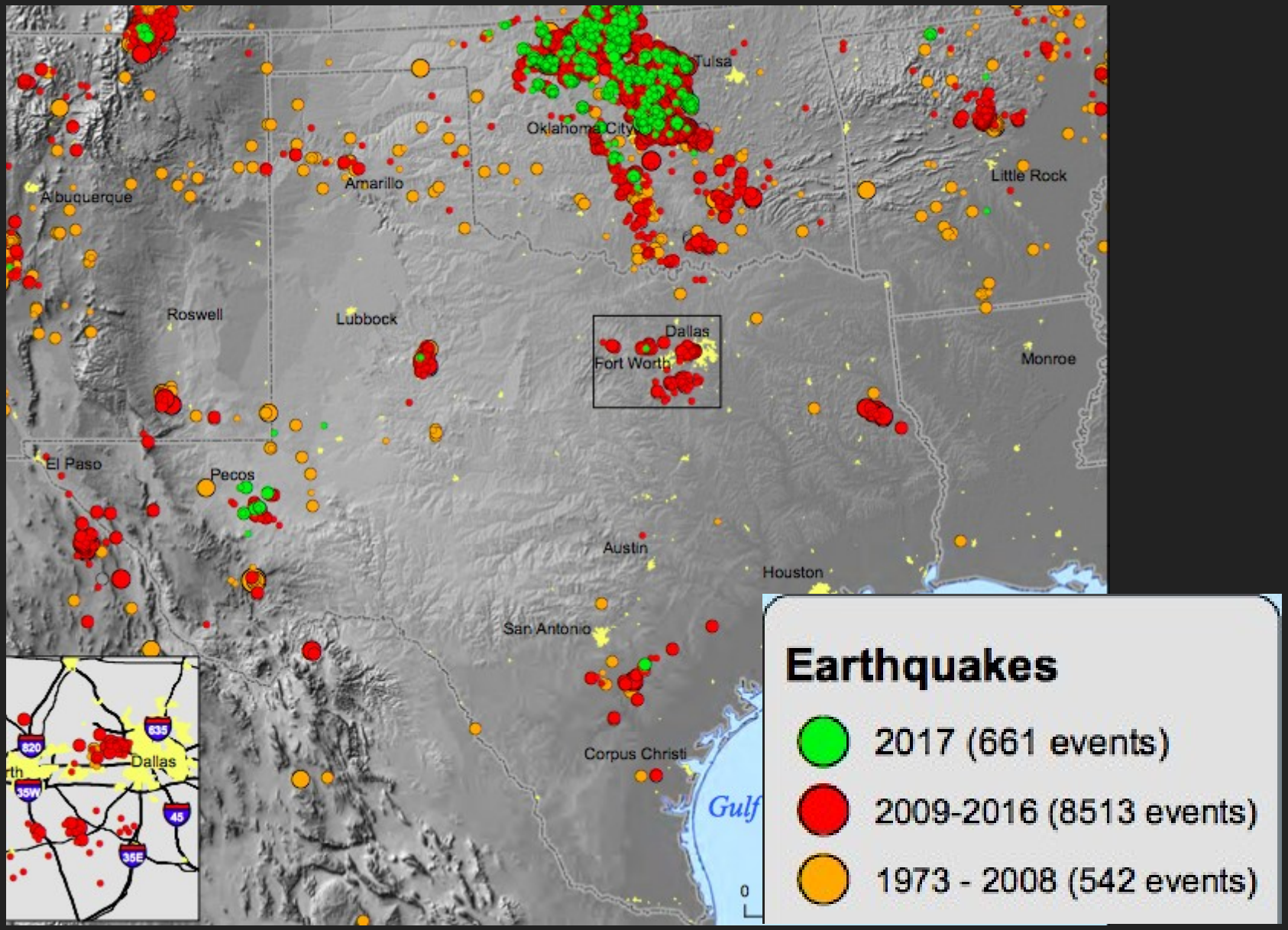


Pre 2009: 2 / year

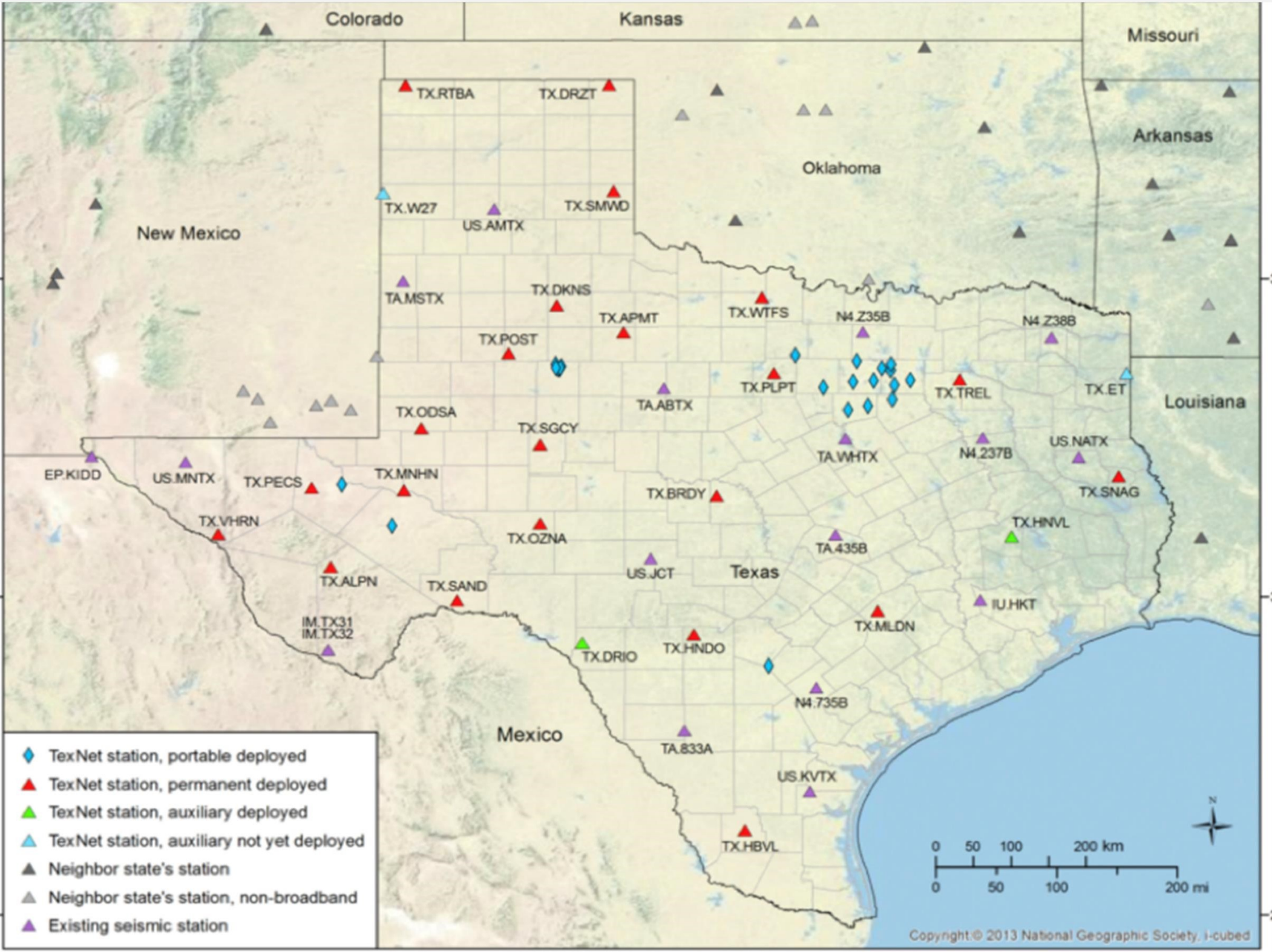
2015: 2 / day

https://earthquake.usgs.gov/earthquakes/byregion/oklahoma/OKeqanimation.php

TEXAS SEISMIC ACTIVITY



- M 2.5
- September 2016 registered 3.6 magnitude in Reeves County and Pecos County area


Colorado
Kansas
Missouri
Arkansas
Oklahoma
New Mexico
Louisiana
Texas
Mexico
TX.RTBA
TX.DRZT
TX.W27
US.AMTX
TX.SMWD
TA.MSTX
TX.DKNS
TX.APMT
TX.WTFS
N4.Z35B
N4.Z38B
TX.POST
TX.PLPT
TX.TREL
TX.ET
TA.ABTX
TX.ODSA
TX.SGCY
TA.WHTX
N4.237B
US.NATX
EP.KIDD
US.MNTX
TX.PECS
TX.MNHN
TX.SNAG
TX.BRDY
TX.VHRN
TX.HNVL
TX.OZNA
TA.435B
US.JCT
TX.ALPN
TX.SAND
IU.HKT
IM.TX31
IM.TX32
TX.MLDN
TX.DRIO
TX.HNDO
N4.735B
TA.833A
US.KVTX
TX.HBVL
TexNet station, portable deployed
TexNet station, permanent deployed
TexNet station, auxiliary deployed
TexNet station, auxiliary not yet deployed
Neighbor state's station
Neighbor state's station, non-broadband
Existing seismic station
N
0 50 100 200 km
0 50 100 200 mi
Copyright © 2013 National Geographic Society, i-cubed

RECYCLING REGULATORY FRAMEWORK

TEXAS HAS TAKEN STEPS TO ENCOURAGE RECYCLING

- RRC adopted Non-Commercial Recycling (April 2013)
  - **without permits**

- Texas Legislature helped clarify wastewater ownership
    - (TEX. NAT. RES. CODE §122.002)
  - wastewater taken for treatment **owned** by recycler
  - transferred treated product **owned** by reuser

NON-COMMERCIAL FLUID RECYCLING

*No RRC Permit Required

16 Tex. Admin. Code § 3.8(d)(7)(B)

The recycling of fluid produced from an oil or gas well, including produced formation fluid, workover fluid, and completion fluid, including fluids produced from the hydraulic fracturing process ***on an existing commission-designated lease or drilling unit*** associated with a commission-issued drilling permit … where the operator of the lease, or drilling unit … ***contracts*** with a person for the treatment of the fluid, and may accept such fluid from other leases and or operators.

16 Tex. Admin. Code §3.8(a)(41) (emphasis added)

COMMERCIAL FLUID RECYCLING

***RRC Permit Required**

A facility whose owner or operator **receives compensation** from others for the storage, handling, treatment, and recycling of oil and gas wastes and the **primary business** purpose of the facility is to provide these services for compensation, whether from the generator of the waste, another receiver, or the purchaser of the recyclable product produced at the facility.

16 Tex. Admin. Code § 4.204(3) (emphasis added)

HOW CAN TEXAS FACILITATE MORE RECYCLING?

Fees

Oklahoma State Rep. proposed $.05 / bbl (produced water fom within state written off)

Ohio charges $.05 / bbl; $.20 if generated outside of regulatory district of disposal

TX would generate approx. $50m / yr

Severance Tax Incentive

Regulatory/Legislative

Legislative mandate prohibiting disposal when frac fluid uses groundwater unless 40% recycled

Oklahoma proposed requiring permit to drill in water saturated formations, conditioned on a percentage of wastewater be recycled

Expedited permitting for commercial facility

Infrastructure

Pipelines for transporting wastewater and treated water to reusers

WHAT CAN DISTRICTS DO?

TEX. WATER CODE 36.0015(b) ("Purpose"):

In order to provide for the ***conservation, preservation, protection*** recharging, and prevention of waste of groundwater, … ***groundwater conservation districts may be created***…

TEX. WATER CODE 36.101(a) ("Rulemaking Power"):

A district may ***make and enforce rules*** … to provide for ***conserving***, ***preserving***, ***protecting***, and recharging ***of the groundwater*** … to carry out the powers and duties provided by this chapter.

TEX. WATER CODE 36.117(g) ("Exemptions; Exceptions; Limitations"):

A district may not deny an application for a permit to drill and produce water for ***hydrocarbon production*** activities ***if the application meets all applicable rules*** as promulgated by the district.

TEX. WATER CODE 36.1131(b)(9) ("Elements of Permit"):

A permit may include ***any conservation-oriented methods*** of drilling and operating prescribed by the District

WHAT CAN DISTRICTS DO?

TEX. WATER CODE 36.1071(a)(1), (5)-(7) ("Management Plan"):

[T]he district shall … develop a management plan that addresses the following management goals, as applicable:

(1) providing the ***most efficient*** use of groundwater;
…
(5) addressing ***natural resource*** issues;
(6) addressing drought conditions;
(7) addressing ***conservation***, recharge enhancement, rainwater harvesting, precipitation enhancement, or brush control, where appropriate and ***cost-effective***…

TEX. WATER CODE 36.113(c)(4) ("Permits for Wells; Permit Amendments"):

A district may require a permt or permit amendment application to include "a ***water conservation plan*** or a declaration that the applicant will comply with the district's management plan"

TEX. WATER CODE 36.205(c) ("Authority to Set Fees"):

A district may assess a production fees based on the amount of water authorized by ***permit*** to be withdrawn from a well or the amount actually withdrawn.

TEX. WATER CODE 36.205(f) ("Authority to Set Fees"):

A district … may assess a production fee … for any water ***produced under an exemption under Section 36.117*** if that water is subsequently ***sold*** to another person.

"A TEXAS PLAN FOR THE COAST"

"We are living in a time when the Earth is filling up with humans and human impacts, yet we have value sets, policies, and thinking that were developed during a time when the world was relatively empty of people and impacts."

"The future is about the green (natural) and gray (built) coming together, merging, cooperating, problem solving together"

APRIL 14, 2019

DROUGHT IS COMING