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

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Texas has 7,744 active disposal wells

This map shows more than 7,000 sites around Texas where wastewater, often from hydraulic fracturing operations, is being disposed of. Such wastewater disposal has surged statewide with the spread of fracking, because it’s cheaper to bury the water in disposal wells than to recycle it. Use the "Find Me" button to zoom in to your location.

The data used in this map comes from the Texas Railroad Commission, the agency that regulates oil and gas production. This map visualizes active wells for disposal into "non-productive" and "productive zones." Black dots represent each individual well and are viewable as you zoom in.

Read more about disposal wells, or see other articles in the series on fracking and water.

Number of Wells

1 2 5 10 15+

By Ryan Murphy | April 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
COMMERCIAL WASTEWATER DISPOSAL (gallons)

<table>
<thead>
<tr>
<th>Year</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gallons</td>
<td>29.4B</td>
<td>34.3B</td>
<td>38.8B</td>
<td>49.5B</td>
<td>50.3B</td>
<td>43B</td>
<td>50.6B</td>
</tr>
</tbody>
</table>

~15% decrease from 2016 to 2017.
## DISPOSAL & PRODUCTION BY DISTRICT

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

*Jan – Mar 2018
WHY RECYCLING MATTERS
TEXAS FACES 4.8M ACRE-FEET SUPPLY SHORTAGE BY 2020

1.56 Trillion Gallons

4x Lake Travis
CURRENT CONDITIONS

U.S. Drought Monitor
Texas

August 21, 2018
(Released Thursday, Aug. 23, 2018)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>D0-D4</th>
<th>D1-D4</th>
<th>D2-D4</th>
<th>D3-D4</th>
<th>D4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>18.99</td>
<td>81.01</td>
<td>59.88</td>
<td>28.00</td>
<td>5.22</td>
<td>0.30</td>
</tr>
<tr>
<td>Last Week</td>
<td>22.28</td>
<td>77.72</td>
<td>59.18</td>
<td>32.14</td>
<td>6.22</td>
<td>0.35</td>
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<tr>
<td>3 Months Ago</td>
<td>37.32</td>
<td>62.68</td>
<td>40.53</td>
<td>22.46</td>
<td>9.20</td>
<td>2.54</td>
</tr>
<tr>
<td>Start of Calendar Year</td>
<td>33.37</td>
<td>66.63</td>
<td>33.56</td>
<td>5.94</td>
<td>0.11</td>
<td>0.00</td>
</tr>
<tr>
<td>Start of Water Year</td>
<td>70.54</td>
<td>29.46</td>
<td>4.47</td>
<td>0.04</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>One Year Ago</td>
<td>86.44</td>
<td>13.56</td>
<td>2.47</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

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/
AQUIFER DRAWDOWN IN EAGLE FORD AREA

>100 ft. in 6.2% of the land area
>150 ft. in 3.7% of the land area
>200 ft. in 2.3% of the land area
## Groundwater Wells for Fracking and Rig Supply

<table>
<thead>
<tr>
<th>Region</th>
<th>Fracking</th>
<th>Rig Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statewide</td>
<td>3,293</td>
<td>29,648</td>
</tr>
<tr>
<td>Permian Basin UWCD</td>
<td>755</td>
<td>1,858</td>
</tr>
<tr>
<td>Reeves County GCD</td>
<td>292</td>
<td>541</td>
</tr>
<tr>
<td>Santa Rita UWCD</td>
<td>159</td>
<td>887</td>
</tr>
<tr>
<td>Evergreen UWCD</td>
<td>118</td>
<td>536</td>
</tr>
<tr>
<td>Middle Pecos GCD</td>
<td>41</td>
<td>127</td>
</tr>
<tr>
<td>Upper Trinity GCD</td>
<td>12</td>
<td>505</td>
</tr>
</tbody>
</table>
OKLAHOMA SEISMIC ACTIVITY

Pre 2009: 2 / year
2015: 2 / day

M 2.5

September 2016 registered 3.6 magnitude in Reeves County and Pecos County area
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
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)
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 from 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.
**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;
2. …
3. addressing **natural resource** issues;
4. addressing drought conditions;
5. 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 permit 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”
DROUGHT IS COMING