

# **Please, Pass the Salt: Can the Oil Industry Benefit from Desalination Wastes?**

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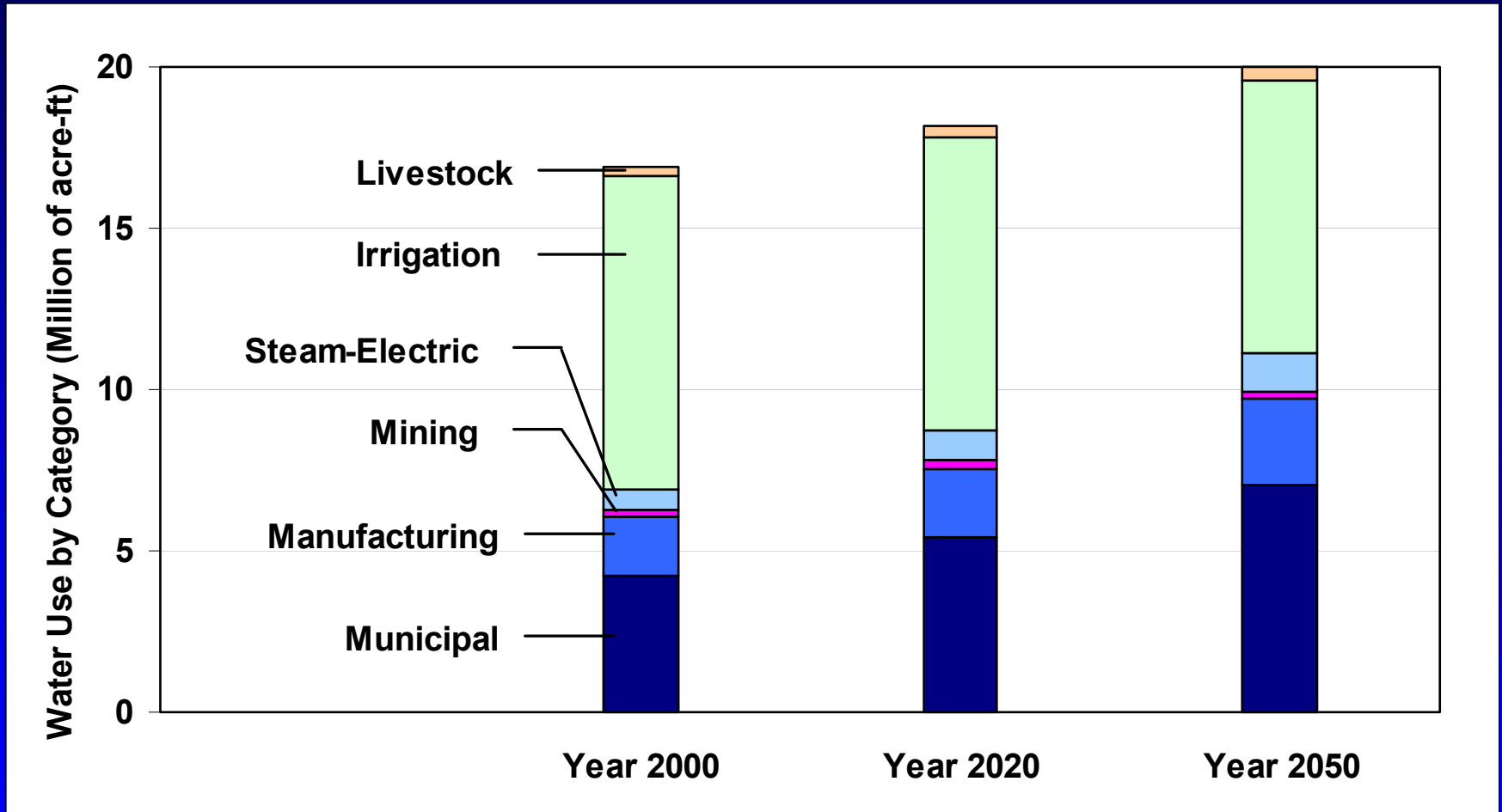
# The Problem

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- Texas population will likely grow from 21M in 2000 to 40M in 2050
- Despite conservation measures, demand for water will grow from 17M AFY in 2000 to 20M AFY in 2050
- Municipal water needs will increase from 4.2M AFY in 2000 to 7.1M AFY in 2050

# Water Use by Category

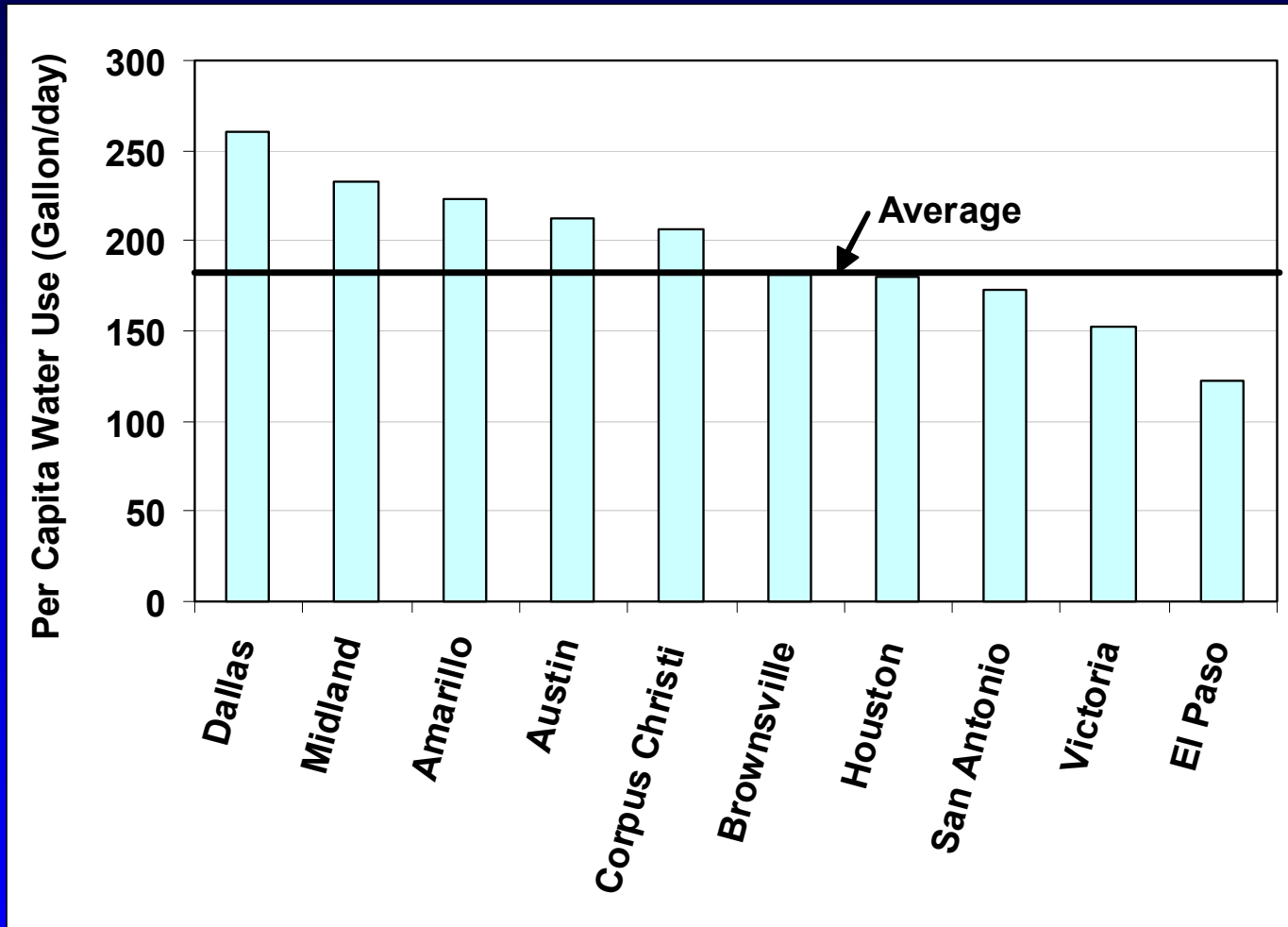
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Source: Water for Texas, TWDB, 2002

# Per Capita Water Use (year 2000)

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Source: Water for Texas, TWDB, 2002

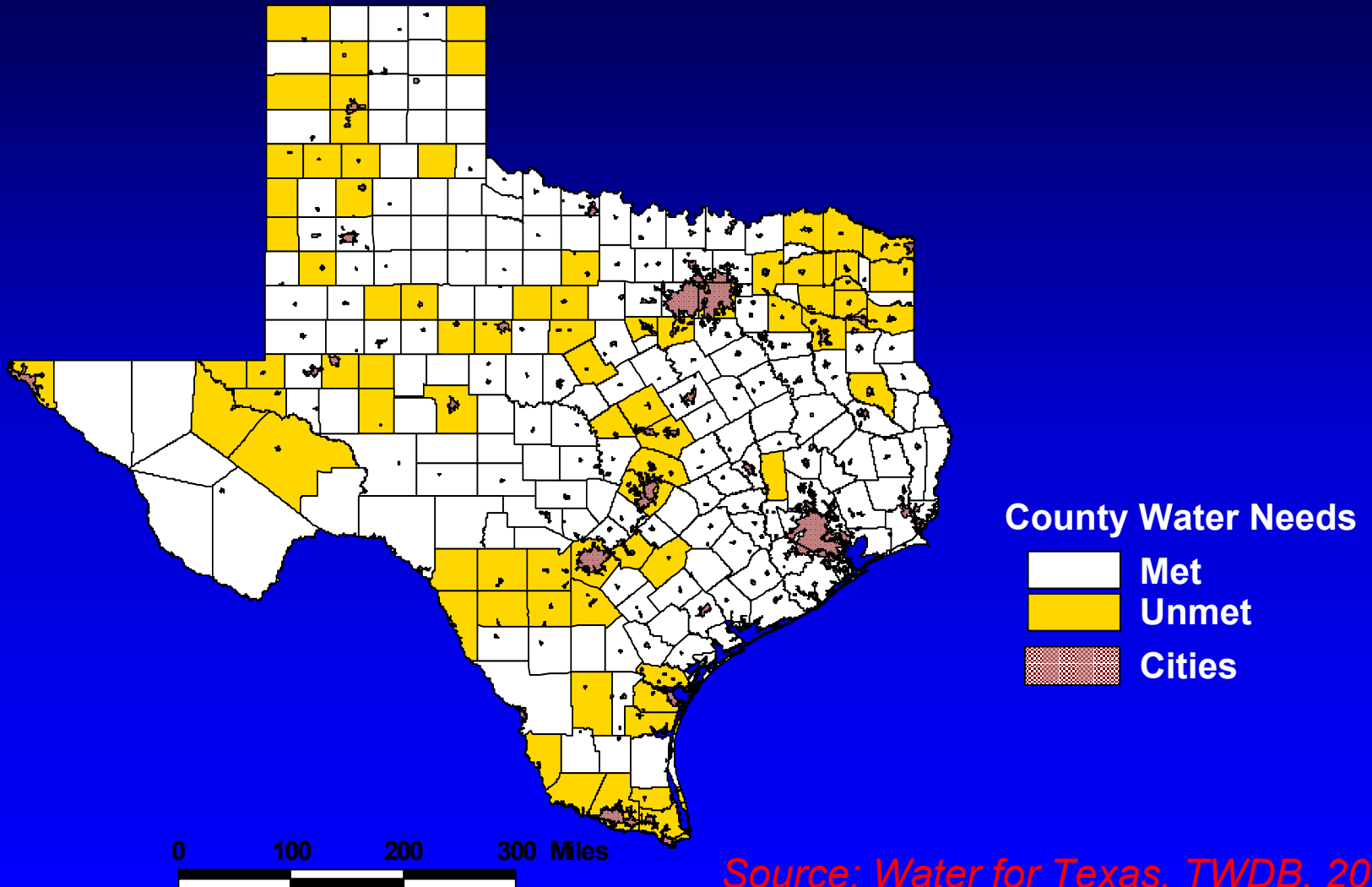
# Uneven Predicted Water Shortage

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- A water shortage can occur because of either limited amount or insufficient quality
- The problem is or will be more acute in some counties/cities especially during droughts (municipal needs in El Paso County)
- Unconventional water sources are already considered and/or used (reuse of waste water, brackish water, sea water, produced waters) in addition to conservation and additional development of conventional sources (surface and ground water)

# Counties with Unmet Needs in 2050

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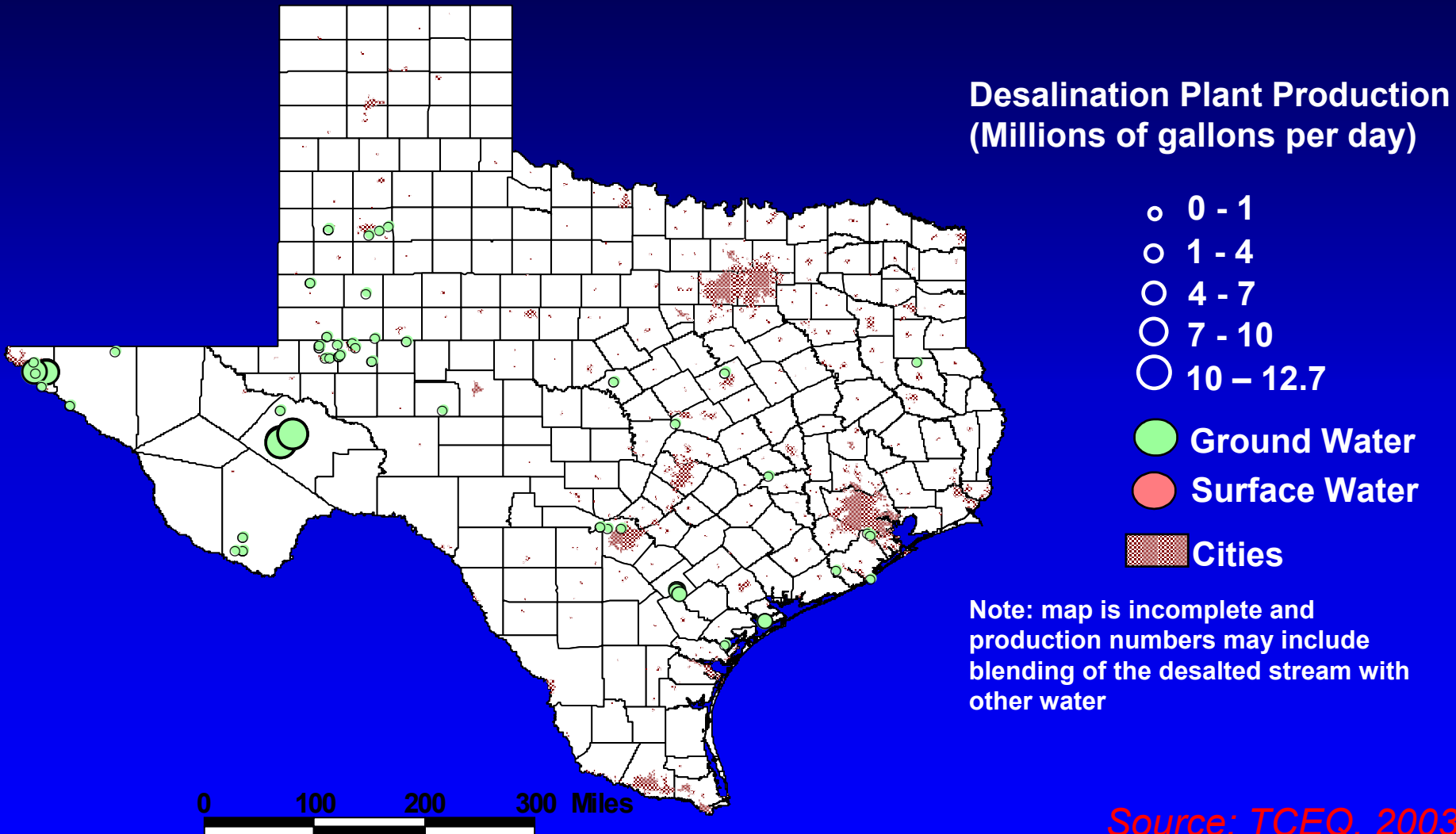
# A Solution: Desalination

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- Desalination of brackish water / sea water is a drought-proof, mature technology
- Several cities have chosen desalination as a viable mean to fill their municipal needs (e.g., Fort Stockton, Sherman)
- Several plants are under consideration: El Paso, Wichita Falls, Freeport, Corpus Christi, Brownsville
- Current desalination municipal capacity is ~0.045 M AFY (~1% of demand), this produces a waste stream of ~5-10 M gal/day (to be compared to the more than 600 M gal/day of produced waters in Texas – 2/3 in the Permian Basin)

# Current Desalination Plants in Texas

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# A Solution: Desalination

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- Fate of concentrate is the biggest issue facing desalination (options include return to sea, evaporative basins, injection wells, disposal into surface waters or waste water stream)
- Class I Injection well applications are expensive and technically complex, but this is currently the only class allowed to accept desalination wastes
- Injection along with produced waters into Class II wells for pressure maintenance or for EOR could greatly simplify the process to the benefit of both parties

# Opportunities for the Oil Industry

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- Limit drawbacks of reinjecting produced waters (presence of suspended solids, oil droplets...)
- Reduce need for fresh water as make-up water and potential conflicts with other fresh water consumers
- Bring an extra source of revenue

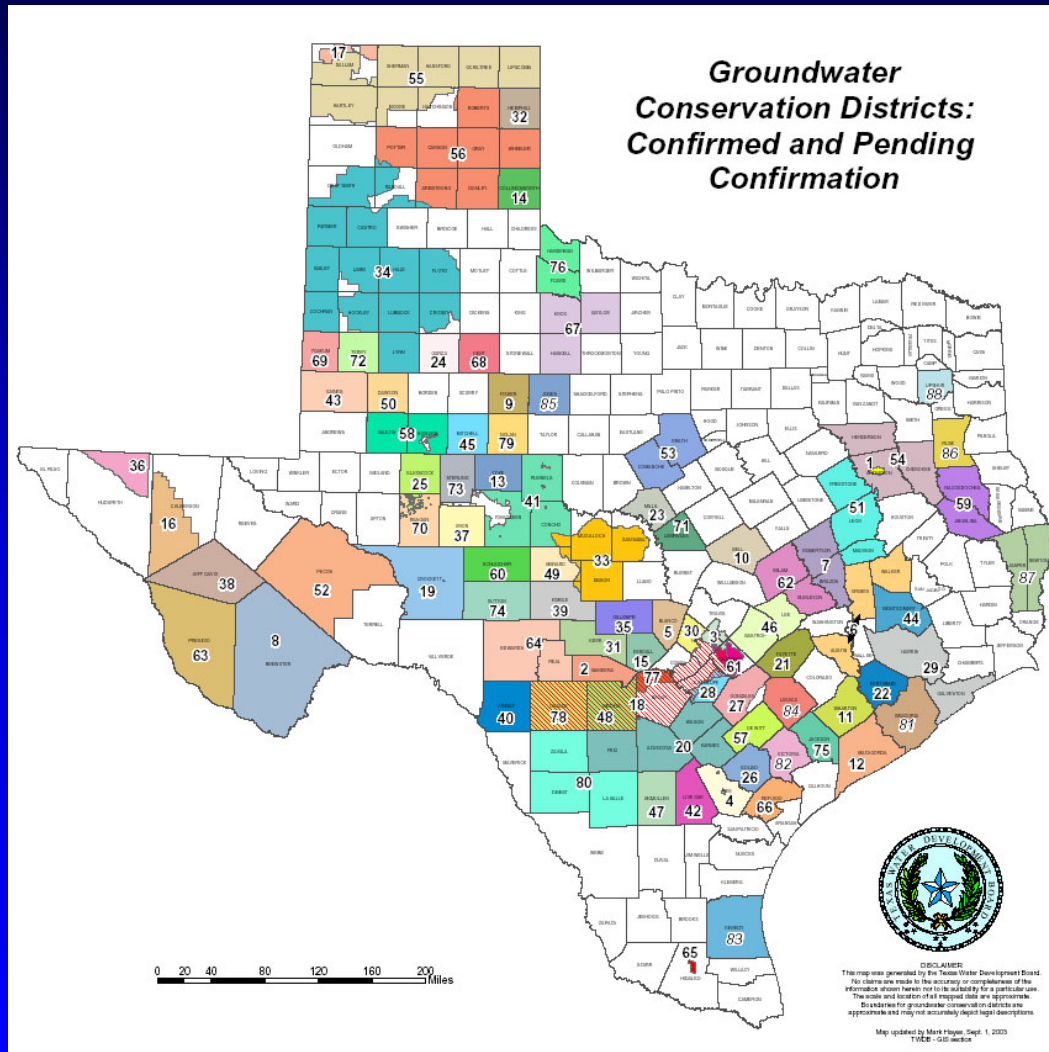
# Favorable Conditions

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- We are entering an era where water is treated as a commodity
- Texas water laws give power to local governments (Groundwater Conservation Districts, municipalities) to manage water issues facilitating agreements with local oil operators

# Groundwater Conservation Districts

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Source: TWDB, 2003

# Potential Challenges

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- Potential increased scale deposition, clay swelling and other compatibility issues but this is no worse than mixing waters from two different sources
- Consistent quality and quantity of the concentrate effluent
- Possible additional water handling material investment
- However, there is a history of using brackish waters and waste waters in waterfloods

# Conclusions

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- Current desalination waste stream accounts for less than 1 percent of state-wide produced water volume. It may grow in the future to a few percents
- There is no technical difficulty in injecting desalination waste along with produced waters
- Additional revenue is created
- A case by case evaluation of benefits and suitability is needed

# Contacts - Information

*Bureau of Economic Geology*

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- Ali Chowdhury, TWDB, Austin, TX: 512 936 - 0834
  
- Web sites, regularly updated, to visit:
  - <http://www.twdb.state.tx.us/desalination/Desal/Index.asp>
  - <http://www.beg.utexas.edu/environq/ty/grndwater/index.htm>

# Questions, Comments?

“.....And we must not only improve water conservation, but desalinate the saltwater that splashes upon our coast each day.”

Governor Rick Perry

State of the State Address

February 11, 2003



# AQUIFERS OF TEXAS

