

Nacatoch and Blossom Aquifers North East Texas Regional Water Planning Meeting

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Mount Pleasant Civic Center
Mount Pleasant , Texas
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Disclaimer

The following presentation is based upon professional research and analysis within the scope of the Texas Water Development Board's statutory responsibilities and priorities but, unless specifically noted, does not necessarily reflect official Board positions or decisions.

Texas Water Development Board

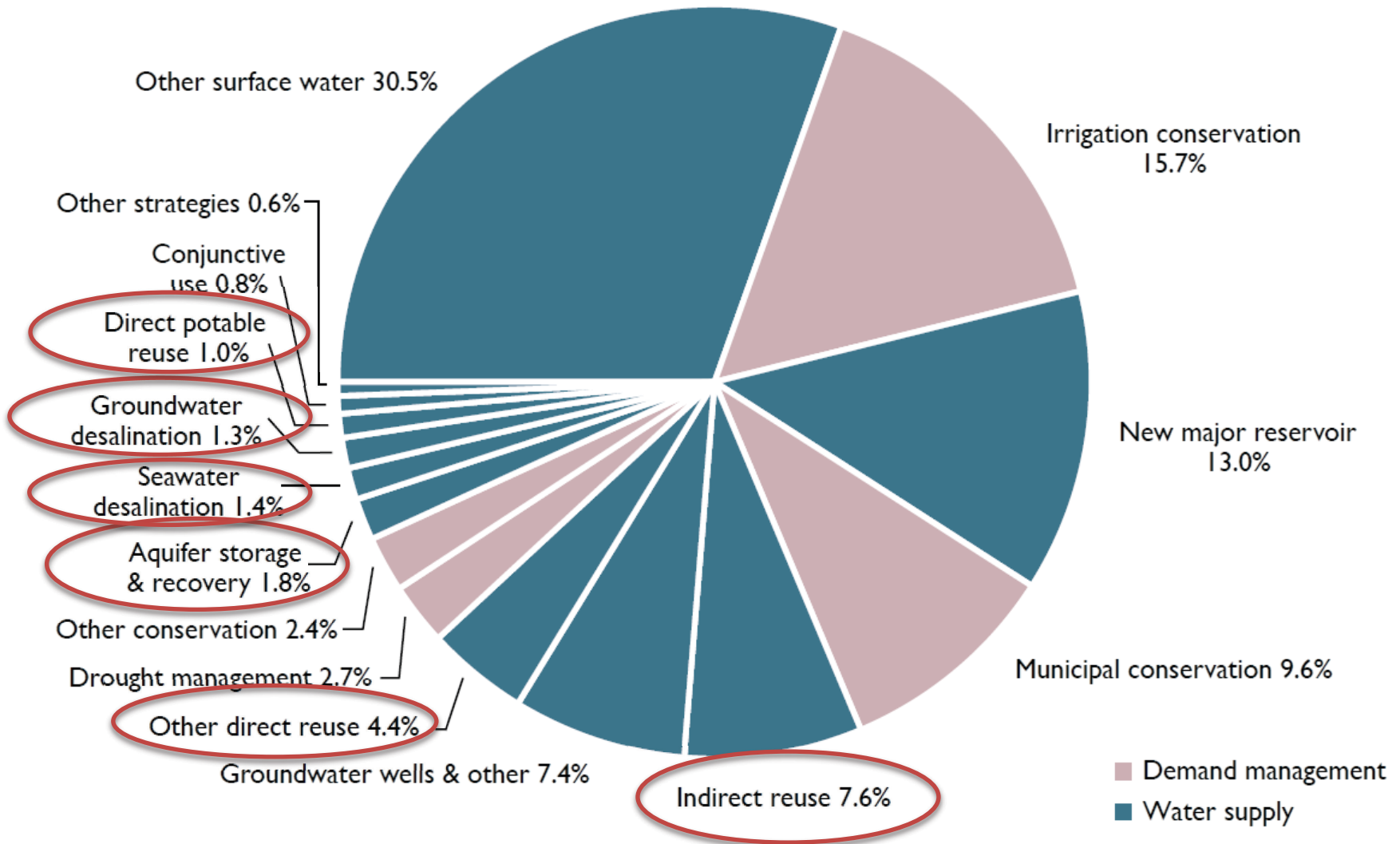
- Development of a statewide water plan
- Administering water funds for the state
- The collection of water resource data
- Outreach for conservation and responsible development of water

IWT Mission



“Our mission is to educate the water community on the use of nontraditional water supplies.”

Recommended Water Management Strategies by 2070



Brackish Resources Aquifer Characterization System

- Collect data
- Map and characterize existing aquifers
- Map key water quality parameters
- Estimate saturated zones using net sand analysis
- Provide data to stakeholders

Groundwater salinity classifications

Brackish groundwater = 1,000 to 10,000 milligrams per liter of Total Dissolved Solids

Groundwater Salinity Classification	Salinity Zone Code	Total Dissolved Solids Concentration (units: milligrams per liter)	
Fresh	FR	0 to 1,000	
Slightly Saline	SS	1,000 to 3,000	← Drinking Water Limit
Moderately Saline	MS	3,000 to 10,000	← Major/Minor Aquifer (Texas) Mapped Limit
Very Saline	VS	10,000 to 35,000	
Brine	BR	Greater than 35,000	← Seawater

Modified from Winslow and Kister, 1956

House Bill 30

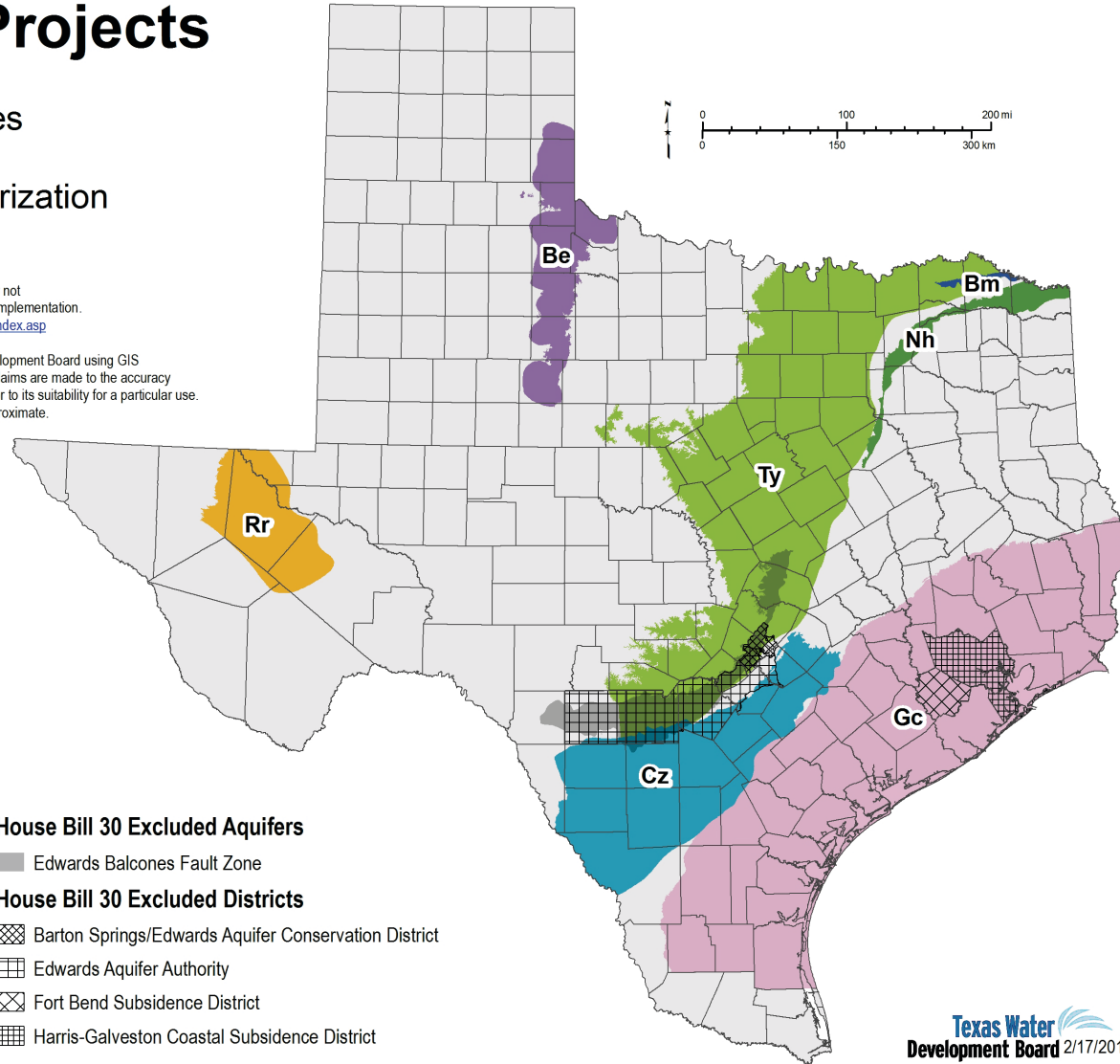
- In 2015, the 84th Texas Legislature passed House Bill 30, directing the TWDB to conduct studies to evaluate potential brackish groundwater production zones in part of the Carrizo-Wilcox Aquifer, the Gulf Coast Aquifers, the Blaine Aquifer, and the Rustler Aquifer and complete those studies by December 1, 2016
- Remaining aquifers in the state required to be mapped by December 1, 2022
- Determine the amount of brackish groundwater that a zone is capable of producing over 30-year and 50-year without causing a significant impact to water availability or water quality in surrounding aquifers
- Make recommendations on reasonable monitoring to observe the effects of brackish groundwater production within the zone
- www.twdb.texas.gov/innovativewater/bracs/HB30.asp

BRACS Projects

Brackish
Resources
Aquifer
Characterization
System

Proposed projects are conceptual and may or may not represent a precise location and extent or actual implementation.
<http://www.twdb.texas.gov/innovativewater/bracs/index.asp>

This map was generated by the Texas Water Development Board using GIS (Geographical Information System) software. No claims are made to the accuracy or completeness of the information shown herein or to its suitability for a particular use. The scale and location of all mapped data are approximate.



House Bill 30 Projects

2016 Aquifers

- Be. Blaine
- Cz. Carrizo
- Gc. Gulf Coast
- Rr. Rustler

2017 Aquifers

- Bm. Blossom
- Nh. Nacatoch
- Ty. Trinity

House Bill 30 Excluded Aquifers

- Edwards Balcones Fault Zone

House Bill 30 Excluded Districts

- Barton Springs/Edwards Aquifer Conservation District
- Edwards Aquifer Authority
- Fort Bend Subsidence District
- Harris-Galveston Coastal Subsidence District

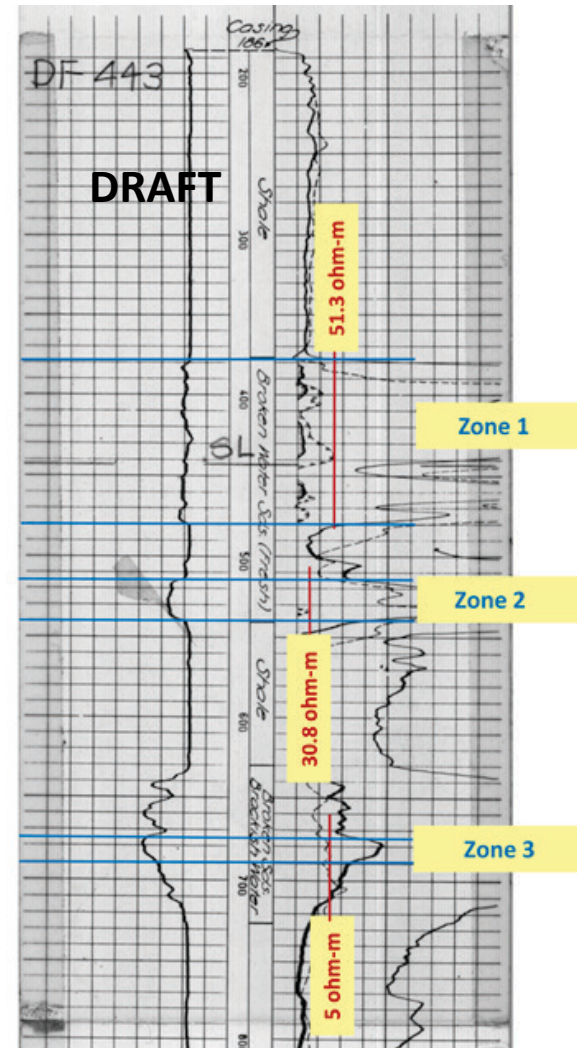
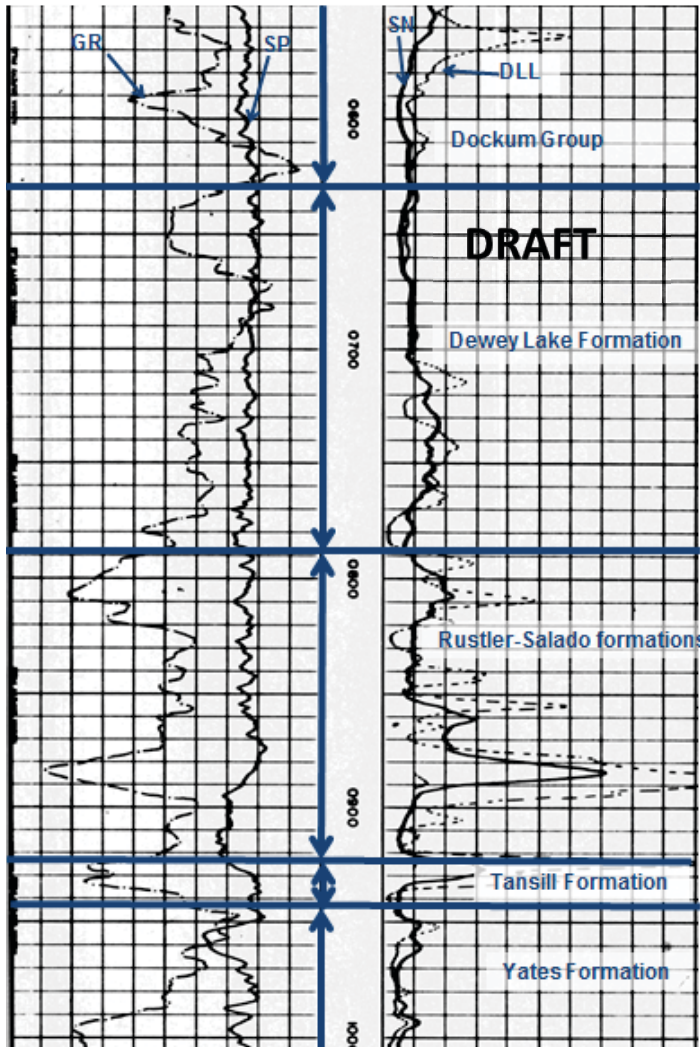
Texas Water
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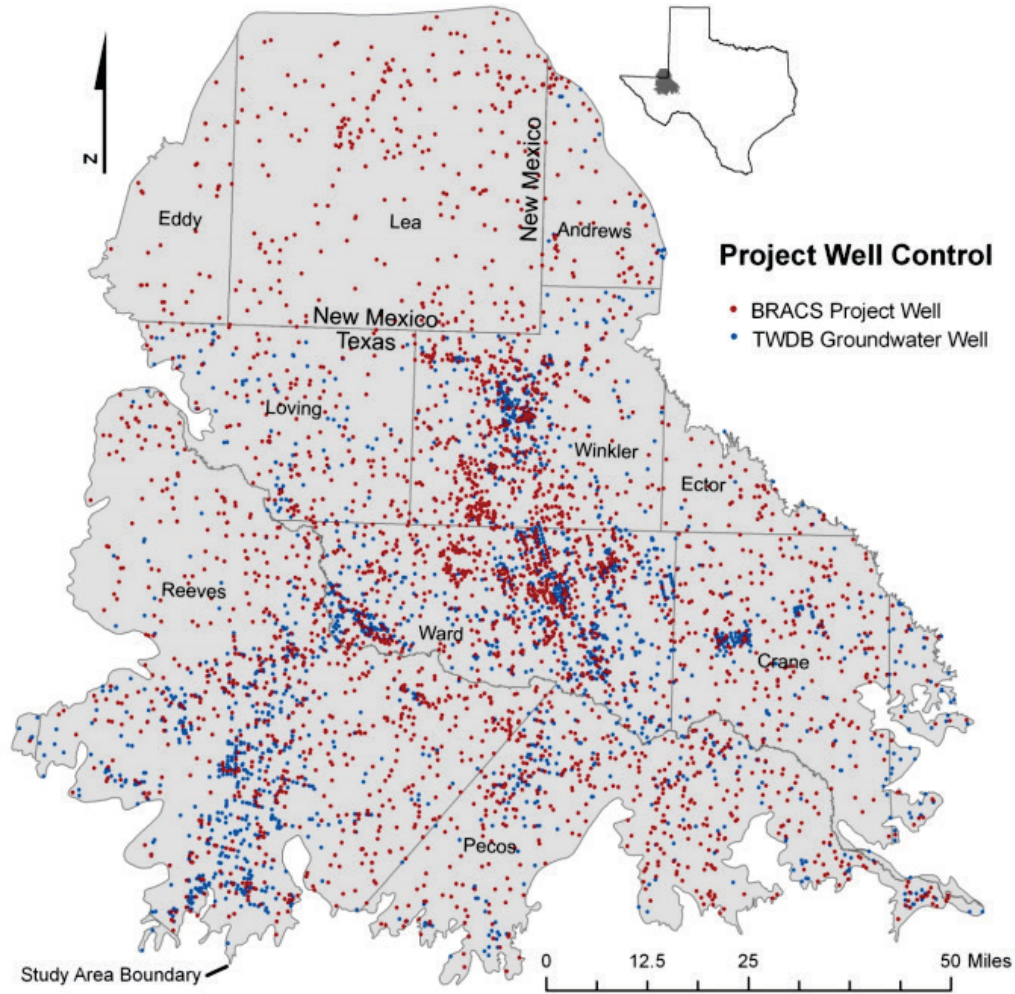
General Methodology

- Identify the type of data available
 - Includes geophysical logs and water quality data
- Analyze data to map groundwater into fresh, slightly saline, moderately saline, and very saline zones
- Identify exclusion zones based on proximity of
 - municipal, domestic, and agricultural water supply wells,
 - injection and disposal wells, and
 - geologic structural considerations.
- Evaluate potential production areas.
- Estimate 30- and 50-year volumes for potential production areas and any potential effects on users.

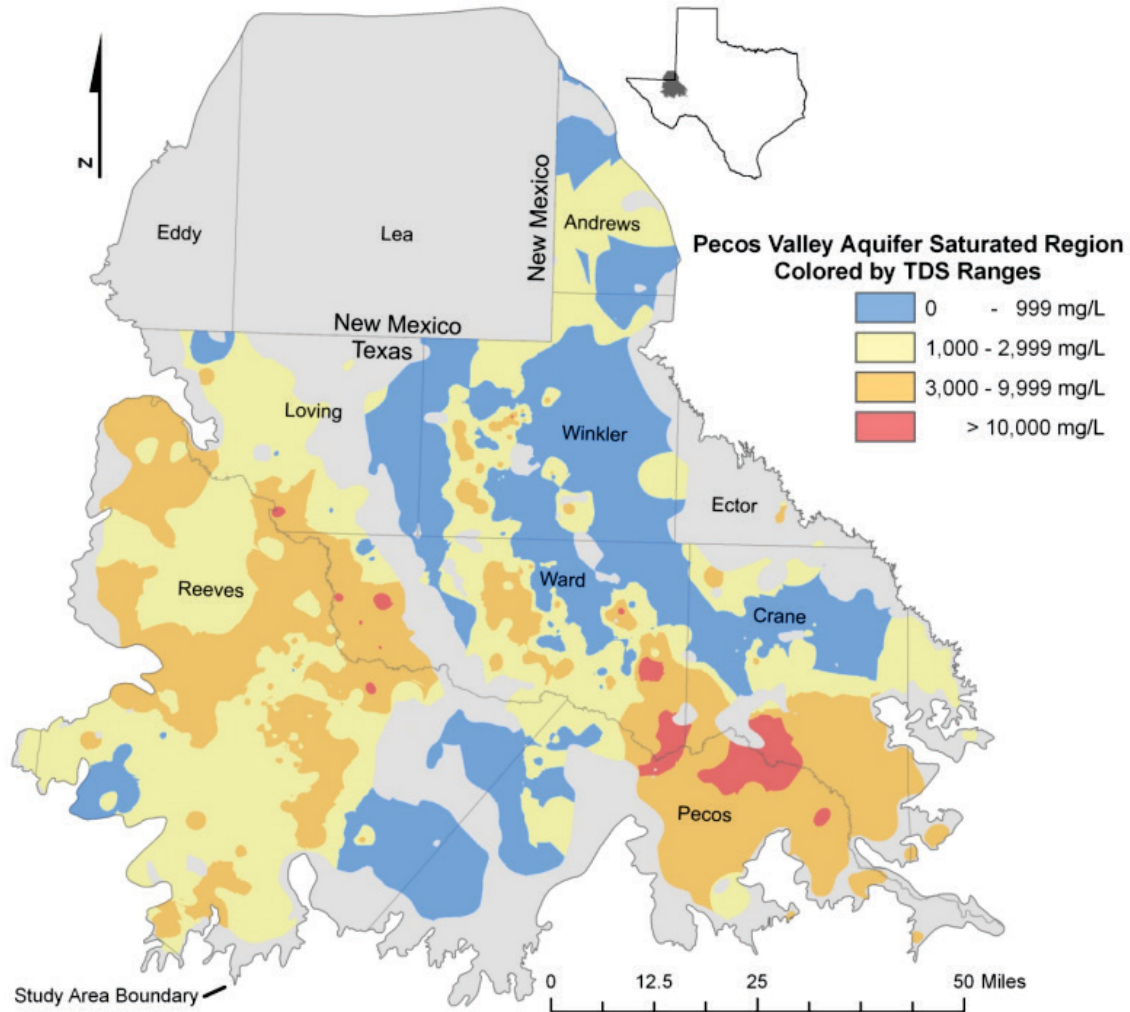
Example geophysical logs



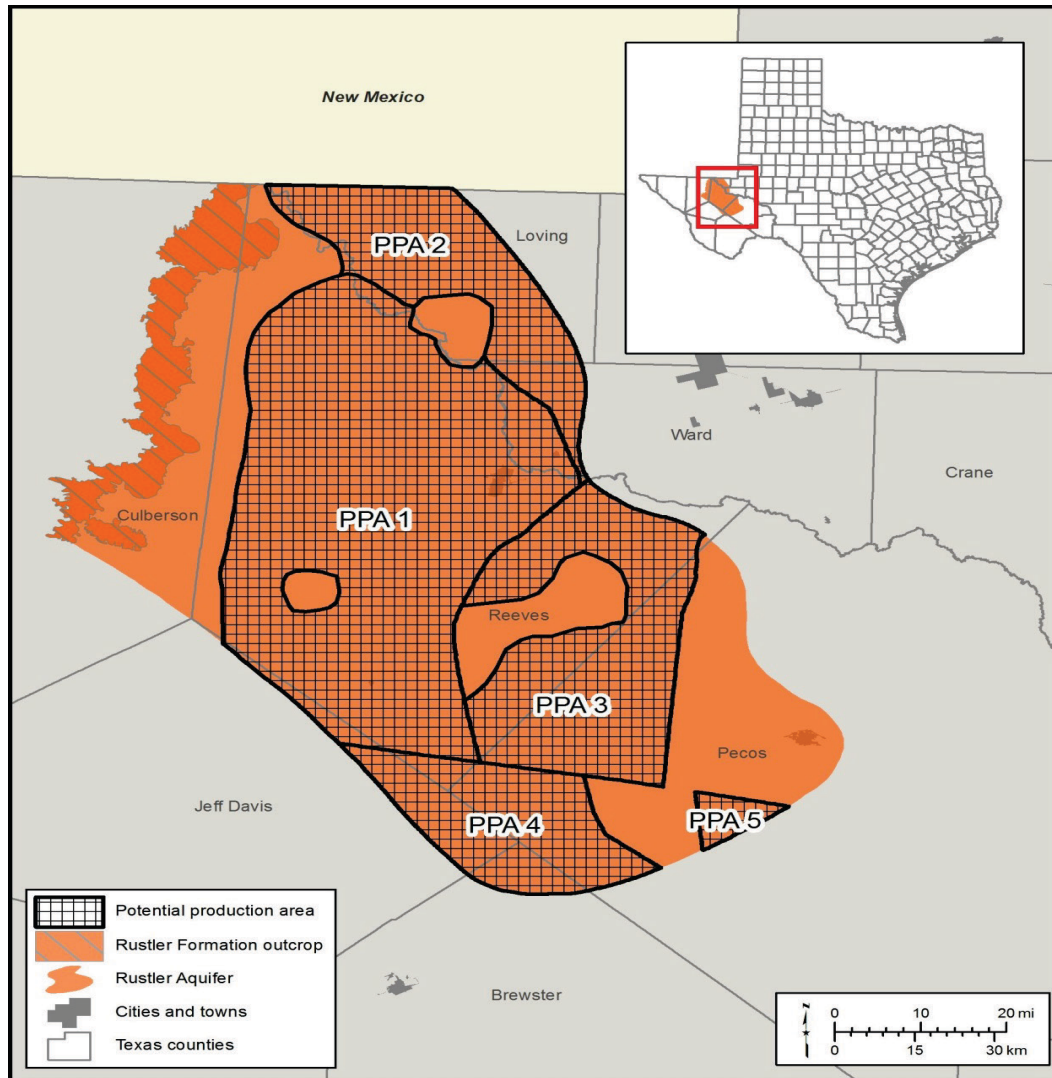
Example of Geophysical Log Distribution



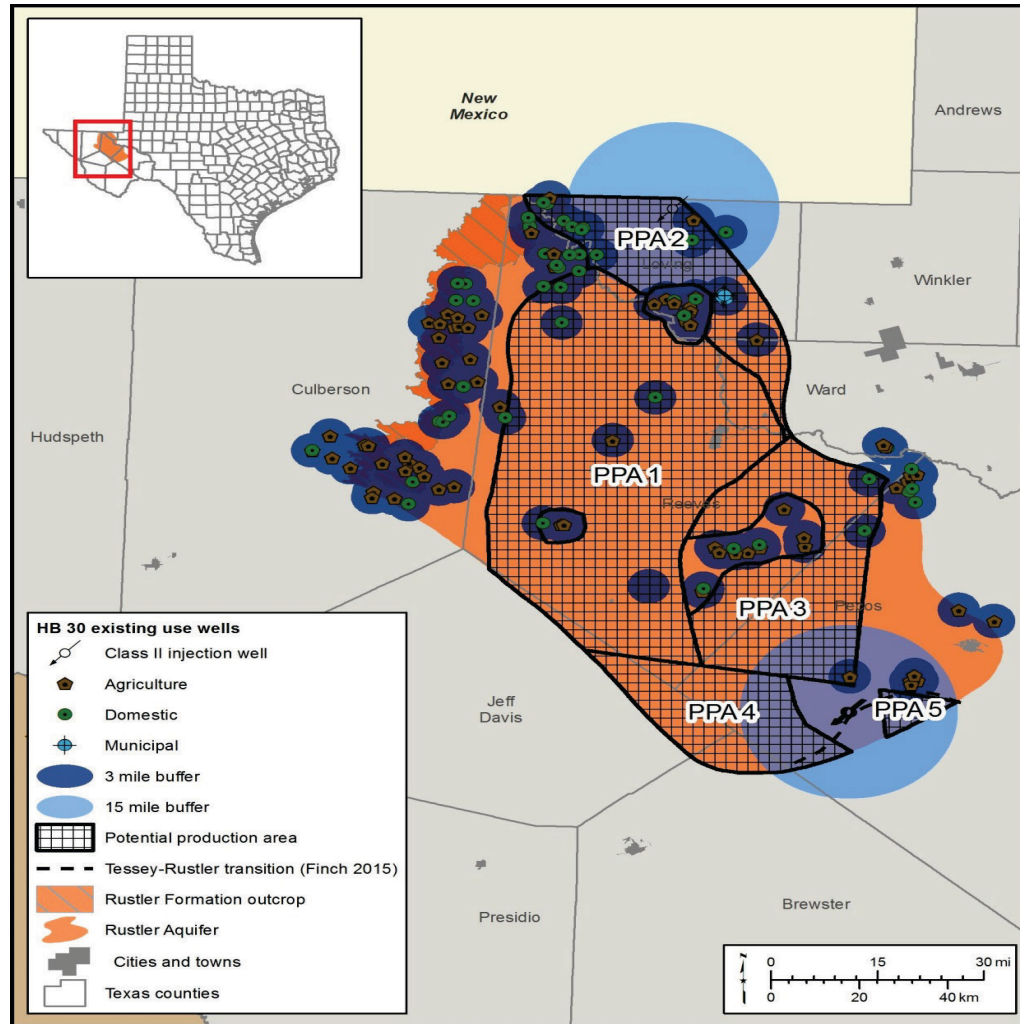
Example of Salinity Zones Map



Example of Potential Production Areas Map

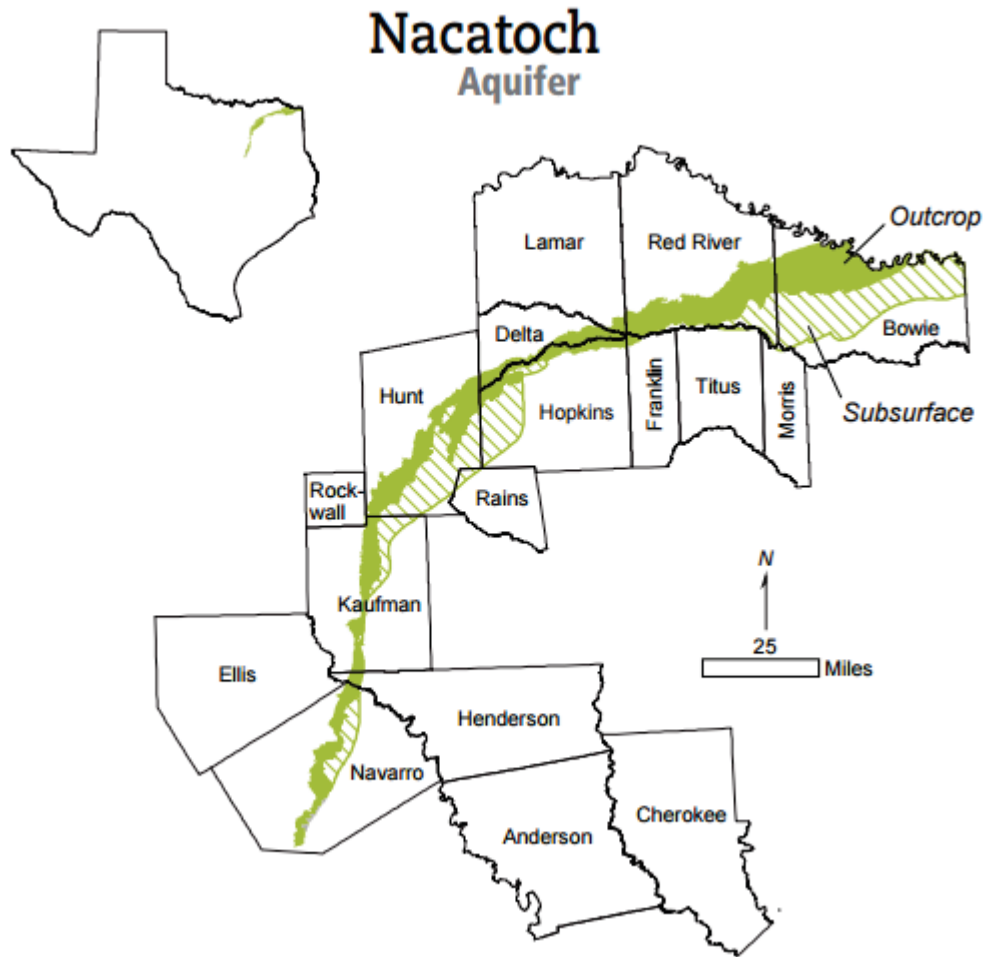


Example of Exclusion Zone Map



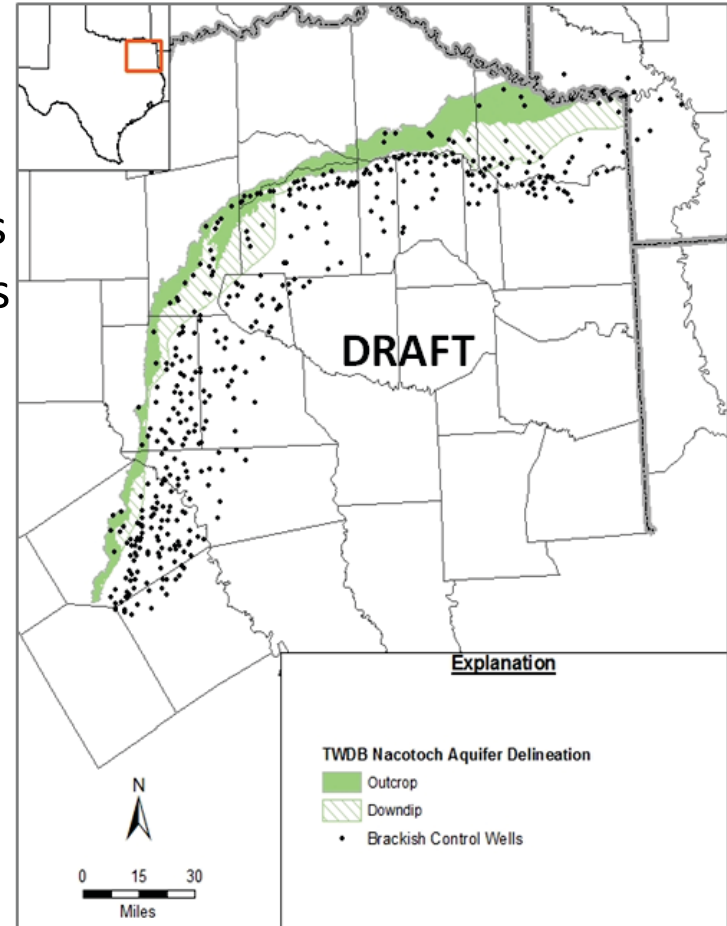
Nacatoch Aquifer

Jean Perez, Contract Manager



Project Study Area

- Areal extent of the aquifer is ~2,500 square miles
- The aquifer's outcrop comprises 889 square miles
- The aquifer's subcrop comprises 936 square miles
- Number of counties containing the aquifer: 15
- Evaluated 478 geophysical logs
- Evaluated 186 water quality samples



Nacatoch Aquifer Stratigraphy

System	Series	Group	Stratigraphic unit	Approximate maximum thickness (feet)	Character of rocks	Water-bearing properties
Quaternary	Recent		Alluvium	80	Sand, silt, clay, and gravel.	Yields small to moderate quantities of fresh to slightly saline water.
Cretaceous	Gulf	Navarro	*Upper Navarro Clay **(Kemp Clay)	400	Clay, calcareous, silty, medium-dark gray.	Not known to yield water.
			*Upper Navarro Marl **(Corsicana Marl)	20	Mudstone, sandy and hard calcareous sandstone and siltstone.	Not known to yield water.
			Nacatoch Formation **(Nacatoch Sand)	450	Alternating sequences of fine-grained quartz sand and mudstone.	Yields small to moderate quantities of fresh to slightly saline water near the outcrop.
			*Lower Navarro Formation **(Neylandville Marl)	125	Clay, calcareous, silty, sandy, medium-gray.	Not known to yield water.
		Taylor	Marlbrook Pecan Gap Wolf City	1,500	Clay, marl, mudstone, and chalk.	Not known to yield water.

* Stratigraphic nomenclature from Wood and Guevara (1981).

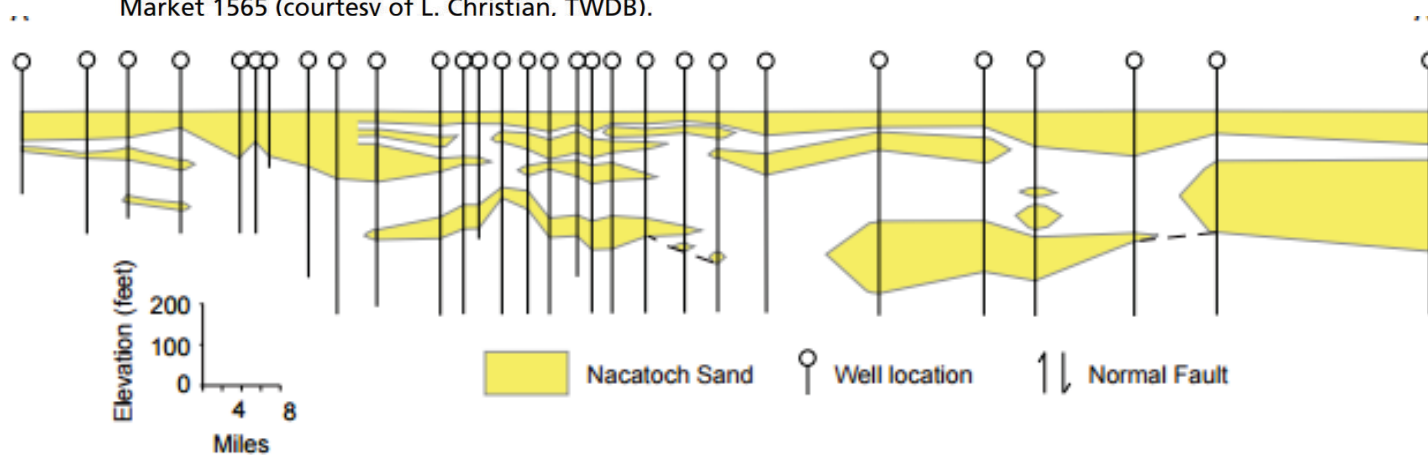
** Surface stratigraphic nomenclature.

Yield of wells: small, less than 100 gal/min (gallons per minute) and moderate, 100-1,000 gal/min.

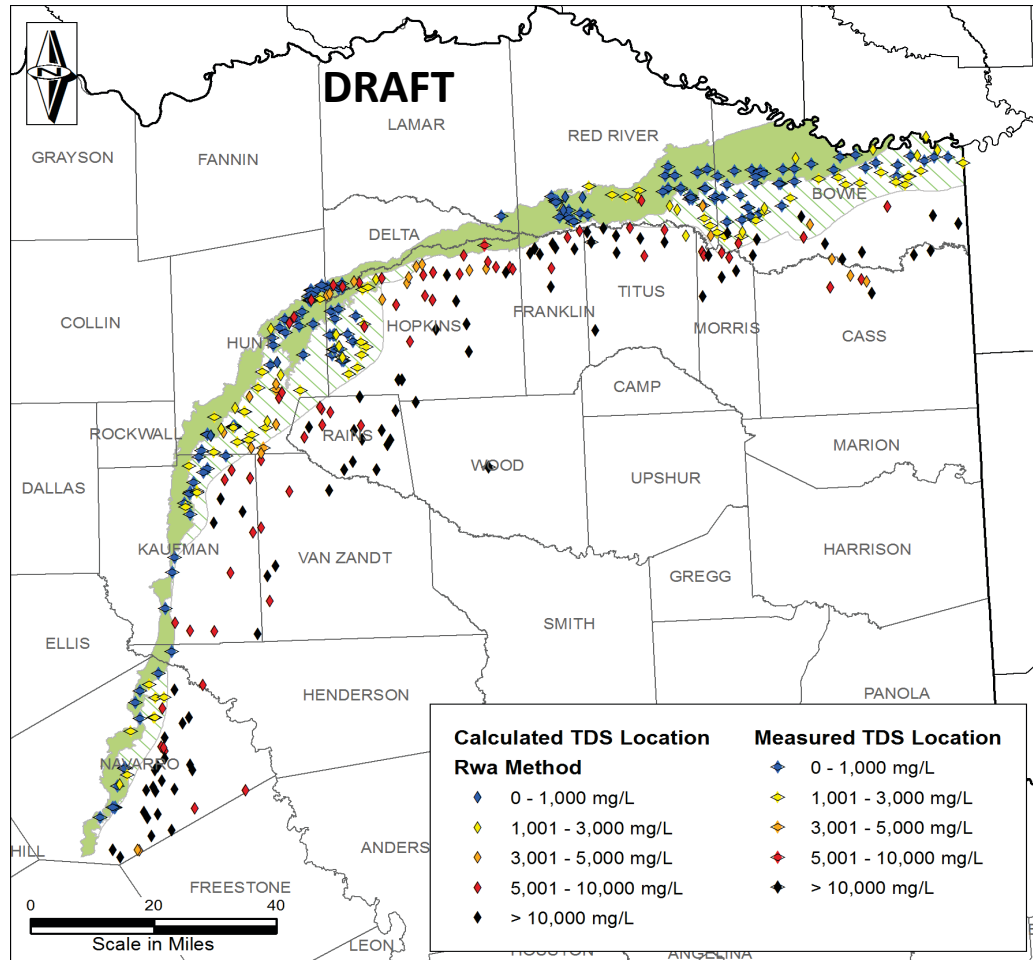
Nacatoch Aquifer Lithology



The Nacatoch Sand from a sand quarry located about 6.5 miles southwest of Quinlan, Texas, along Farm to Market 1565 (courtesy of L. Christian, TWDB).

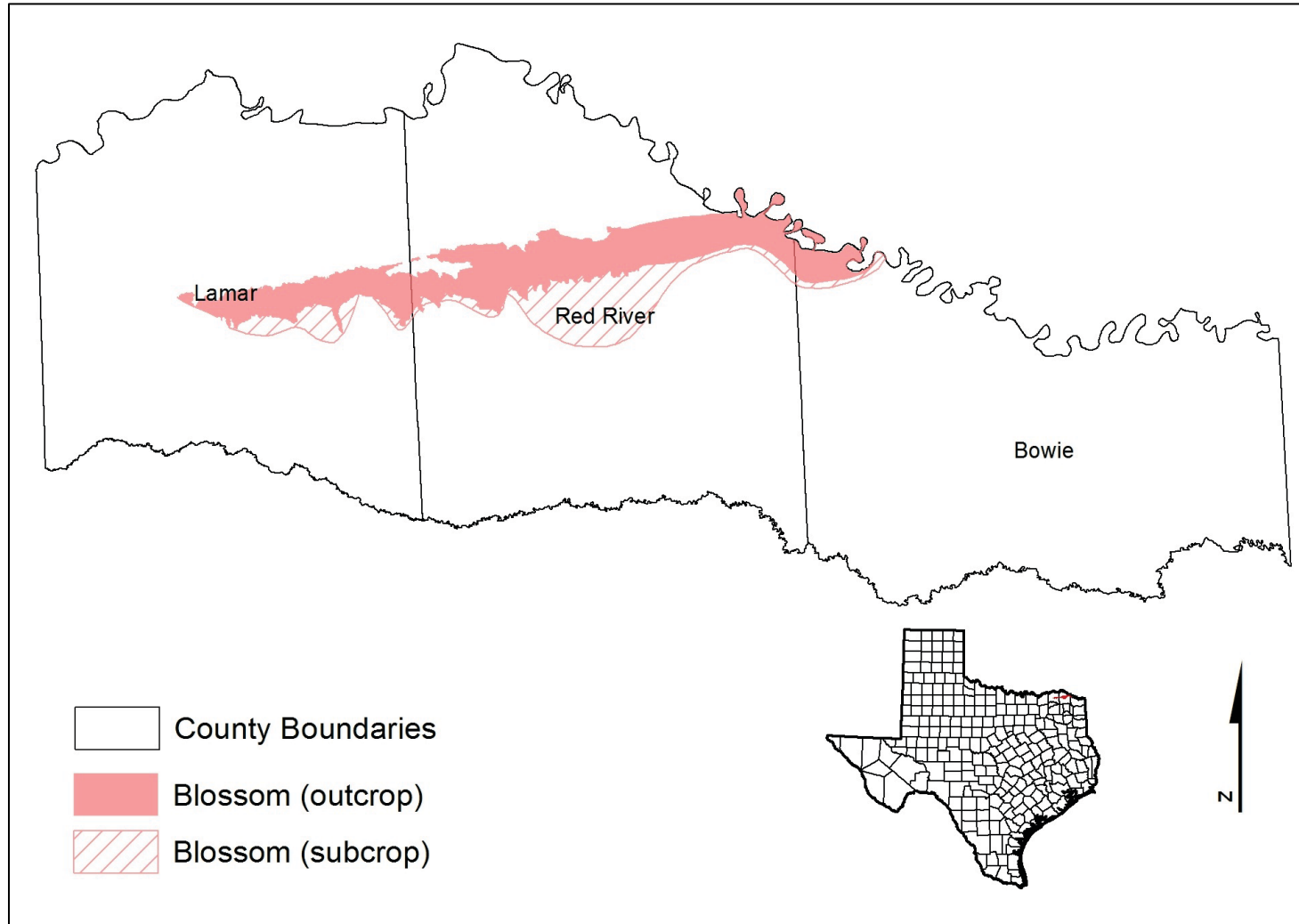


Nacatoch Aquifer TDS



Blossom Aquifer

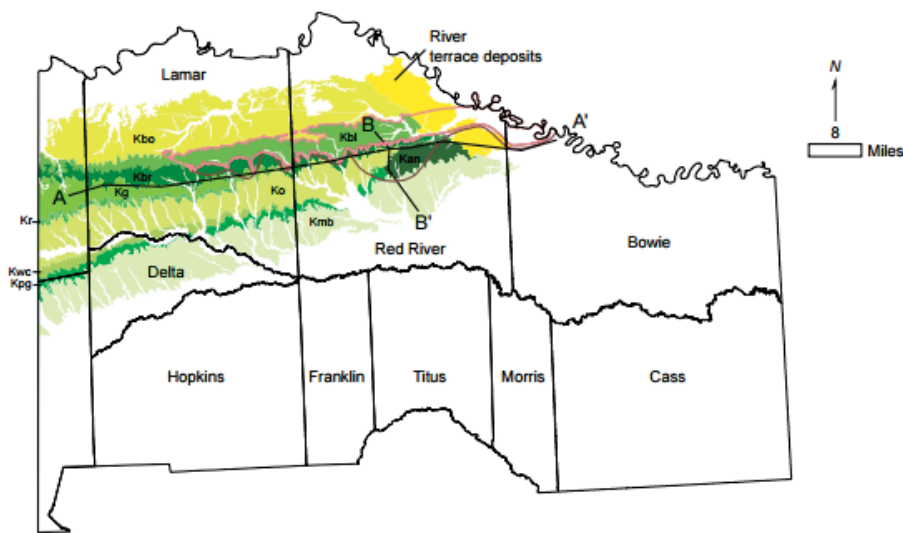
Alan Andrews, Contract Manager



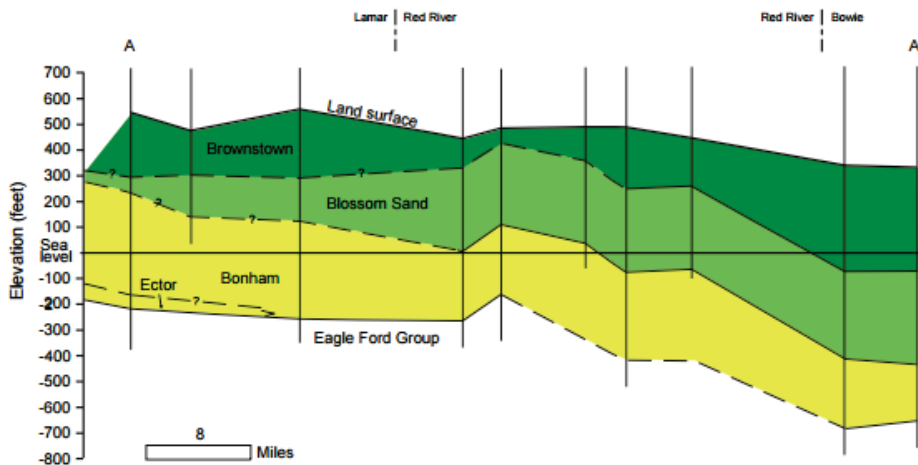
Blossom Aquifer Stratigraphy

Era	System	Series	Group	Formation	Approximate maximum thickness (ft)		Lithology*	Water-bearing characteristics
Cenozoic	Quaternary	Recent		Alluvium	75		Sand, silt, clay and gravel	Yields small to moderate quantities of water to wells along the Red River
		Pleistocene		Fluvialite, terrace deposits				
Mesozoic	Cretaceous	Gulf	Taylor	Marbrook Marl Pecan Gap Chalk Wolfe City-Ozan Formation	1,500		Clay, marl, shale, chalk, mudstone, and sandstone, very fine-grained	Yields small quantities of water to shallow wells
				Gober Chalk				
			Brownstown	Clay or shale	Not known to yield water to wells			
			Austin			Blossom Sand	400	700
				Bonham			Clay or shale	Not known to yield water to wells
				Ector			Chalk	Not known to yield water to wells
			Eagle Ford			650	Shale with thin beds of sandstone and limestone	Yields small quantities of water to shallow wells

*Lithology from Wood and Guevara (1981) and Nordstrom (1982).

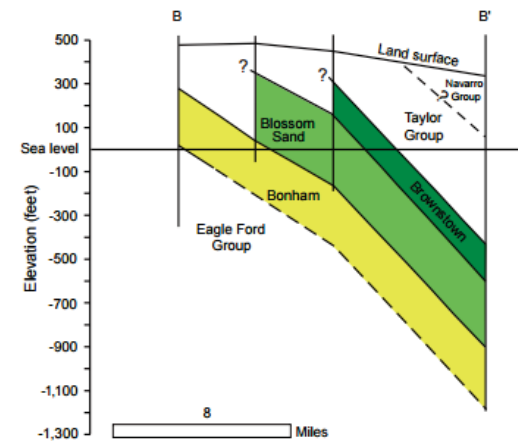


- | | |
|---------------------------|------------------------------|
| Kan - Annona Chalk | Kmb - Marlbrook Marl |
| Kbl - Blossom Sand | Ko - Ozan Formation |
| Kbo - Bonham Formation | Kpg - Pecan Gap Chalk |
| Kbr - Brownstown Marl | Kr - Roxton Limestone beds |
| Kg - Gober Chalk | Kwc - Wolfe City Formation |
| Blossom Aquifer (outcrop) | Blossom Aquifer (subsurface) |



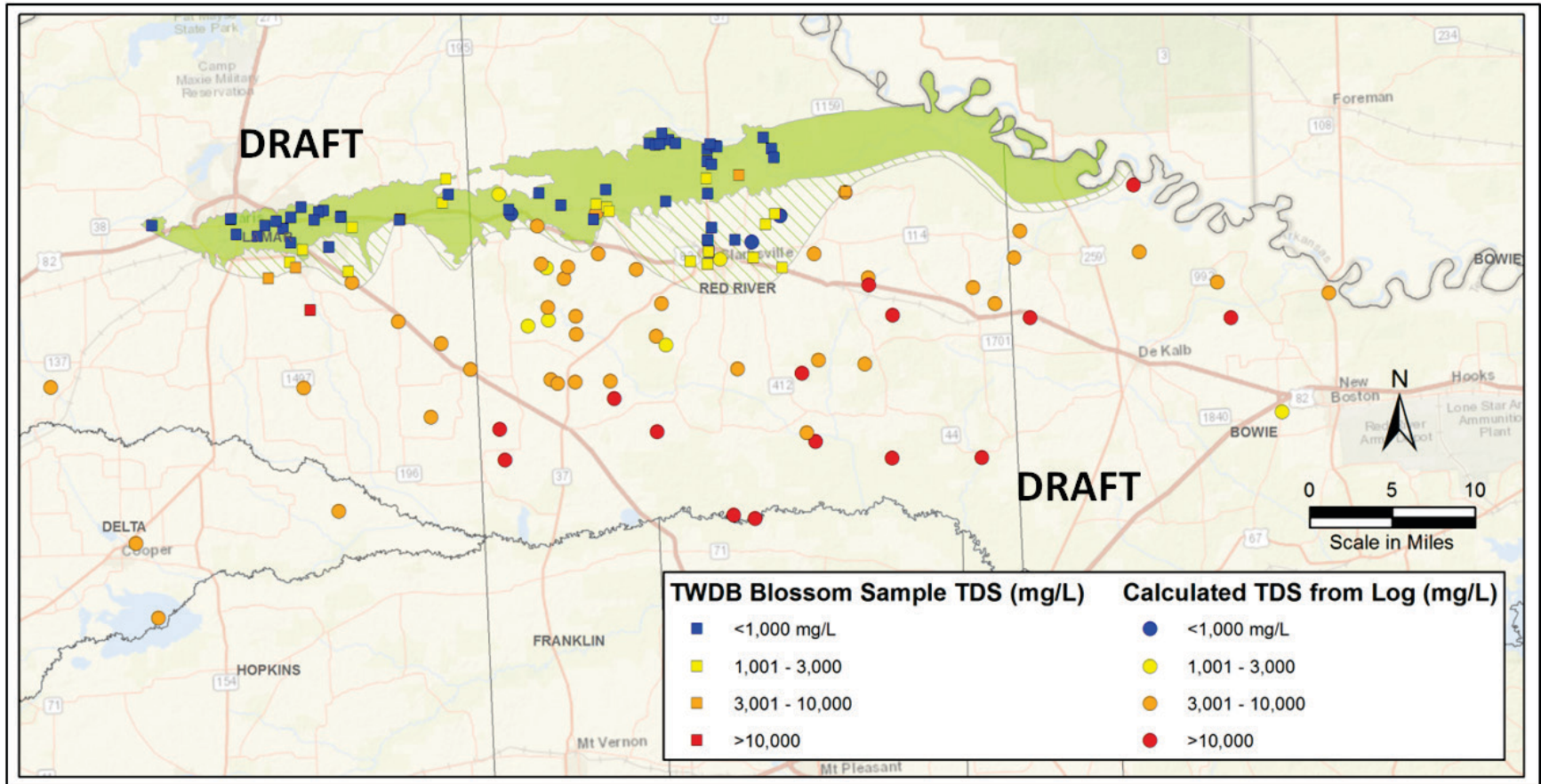
East-west geologic cross section along the Blossom Aquifer (modified from McLaurin, 1988).

Blossom Aquifer Stratigraphy



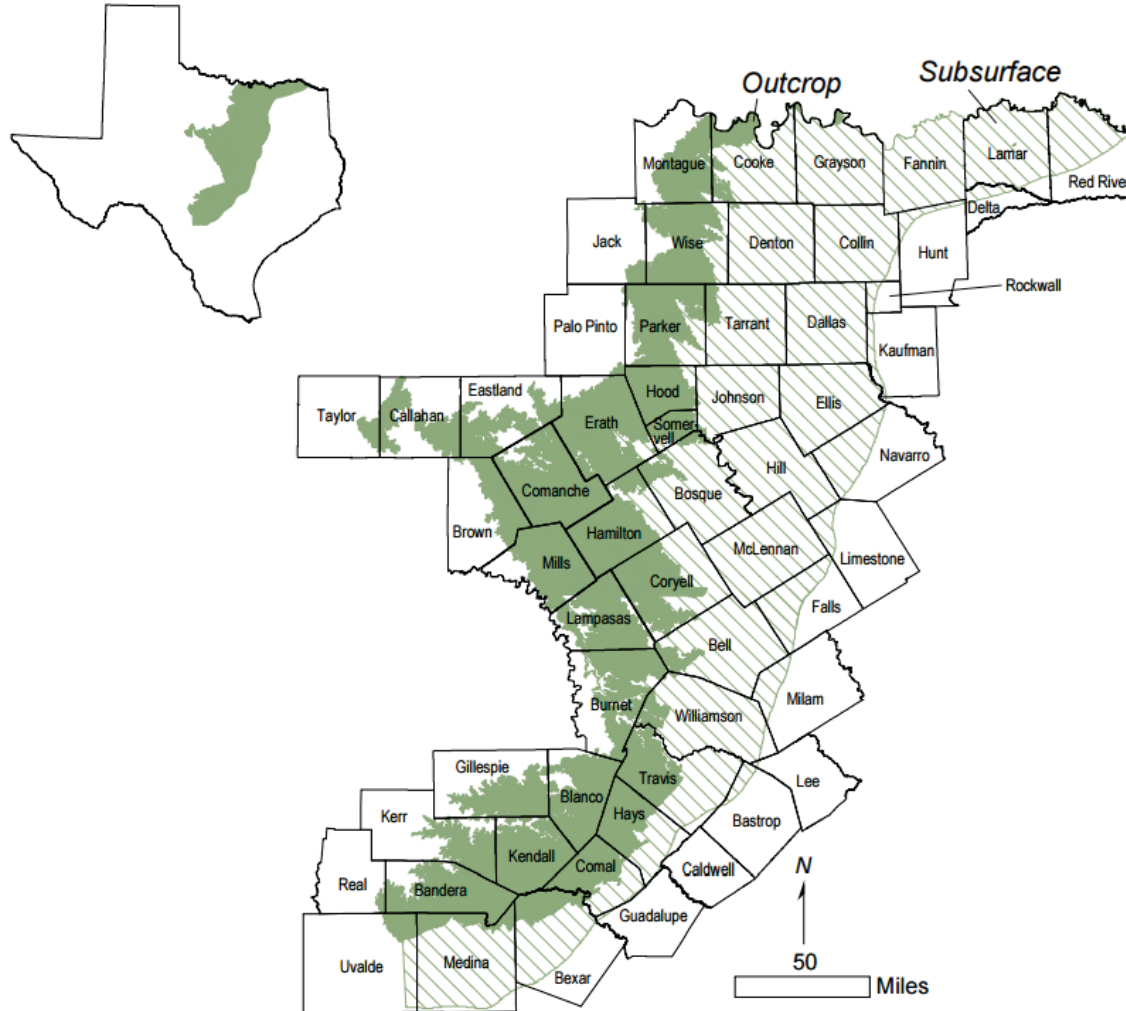
North-south geologic cross section across the Blossom Aquifer (modified from McLaurin, 1988).

Blossom Aquifer TDS



Trinity Aquifer

Mark Robinson, Contract Manager



Next steps...

- Stakeholder meetings will be held on April 11, 2017
 - Stakeholders will receive an email with meeting date, time, and location
- Evaluation of potential production areas area open to public comment:
 - Presentation will be publicly available at the TWDB website
 - Stakeholders will receive an email when posted
- Final report will be delivered to TWDB by August 31, 2017
 - Stakeholders will receive an email when final report is posted to website
- Brackish groundwater production zones will be designated by the TWDB at a public board meeting once the studies are completed
 - Stakeholders will receive an email with meeting date, time, and location

Do you know of any
potential stakeholders?

Data sources?

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Innovative Water Technologies

www.twdb.texas.gov/innovativewater/index.asp

House Bill 30

www.twdb.texas.gov/innovativewater/bracs/HB30.asp

Thank You!