

# Blaine Aquifer System Project Stakeholder Meeting

Bura Handley Community Building  
Wellington, Texas  
August 18, 2016

# 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.

# House Bill 30 (84<sup>th</sup> Texas Legislature, 2015)

- In 2015, the 84th Texas Legislature passed House Bill 30, directing the TWDB to conduct studies to identify and designate brackish groundwater production zones in four aquifers and to report to the legislature by December 1, 2016
- The four aquifers include: part of the Carrizo-Wilcox Aquifer, the Gulf Coast Aquifers, the Blaine Aquifer, and the Rustler Aquifer
- Estimate 30- and 50-year production volumes without causing significant impact to water quality or water quantity in freshwater aquifers
- Remaining aquifers in the state required to be mapped by December 1, 2022
- The full text of House Bill 30:  
[www.twdb.texas.gov/innovativewater/bracs/HB30.asp](http://www.twdb.texas.gov/innovativewater/bracs/HB30.asp)

# Goals of House Bill 30 projects

- Map and characterize the aquifer
- Identify local or regional brackish groundwater production zones
- Determine amount of brackish groundwater the zone is capable of producing over 30- and 50-year period without causing a significant impact to water quality and water quantity
- Recommend reasonable monitoring to observe effects of the zone

Does not include...

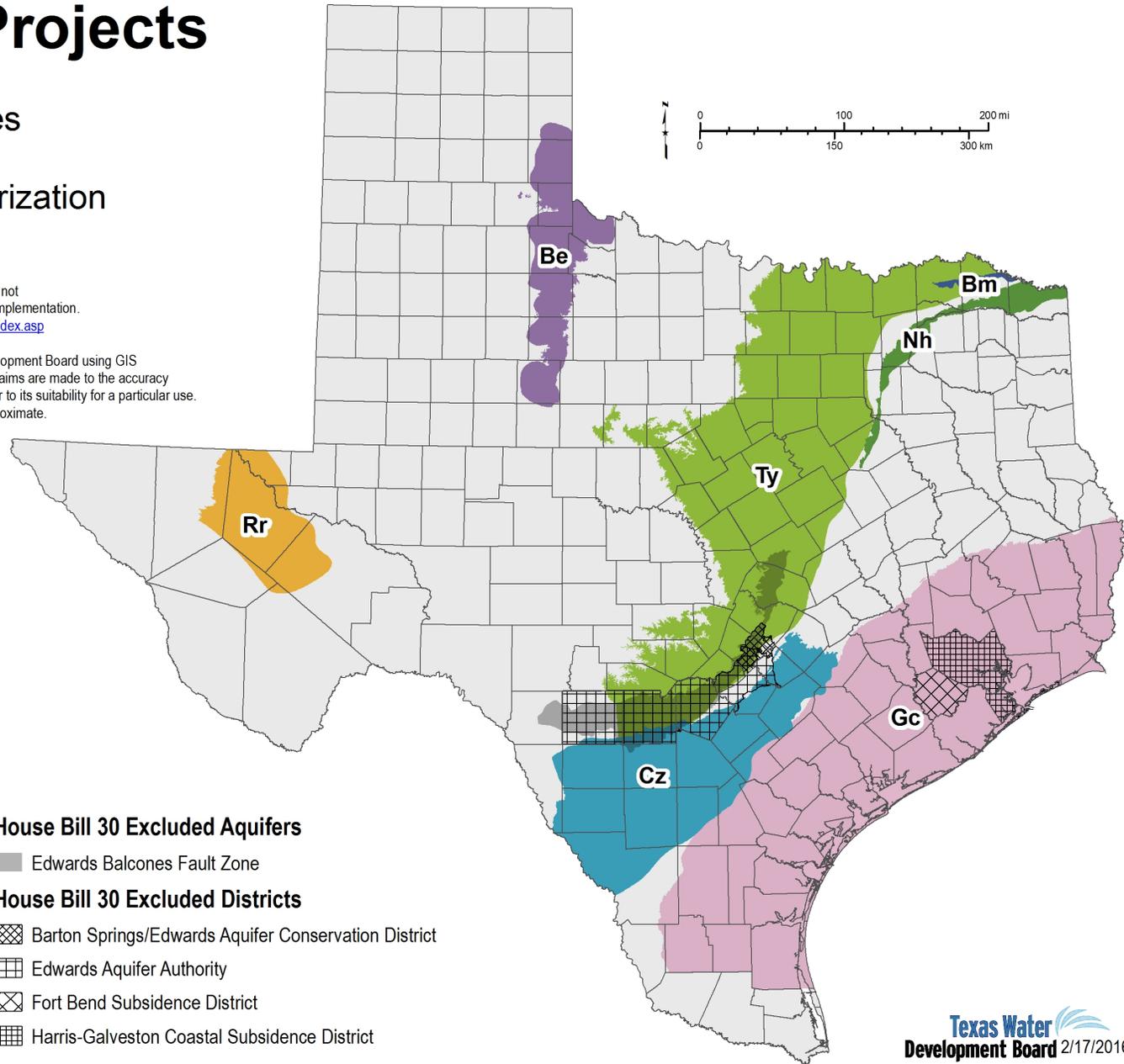
- Policy implementation

# 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

# Project Team

- Neil Blandford (Daniel B. Stephens and Associates, Inc.)
  - Project management, hydrology / water quality, groundwater modeling, database / GIS
- Steve Finch (John Shomaker and Associates, Inc.)
  - Hydrogeology / water quality, expert resources
- Allan Standen (ARS, LLC)
  - Hydrogeology / water quality, GIS
- Michelle Sutherland
  - 3-D geologic modeling/visualization



Michelle A.  
Sutherland, LLC.

# Groundwater salinity classifications

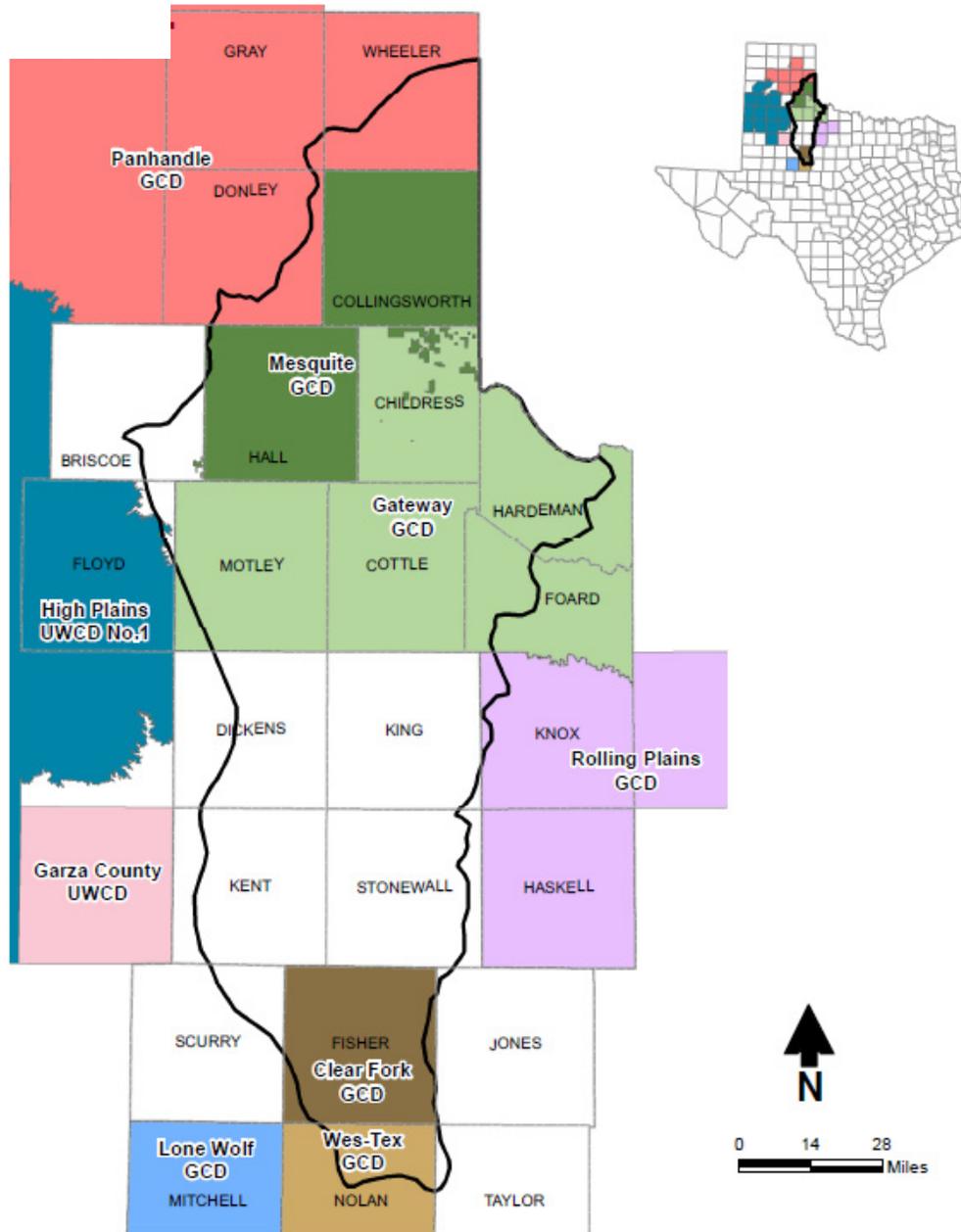
Brackish groundwater = 1,000 to 10,000 milligram per liter

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

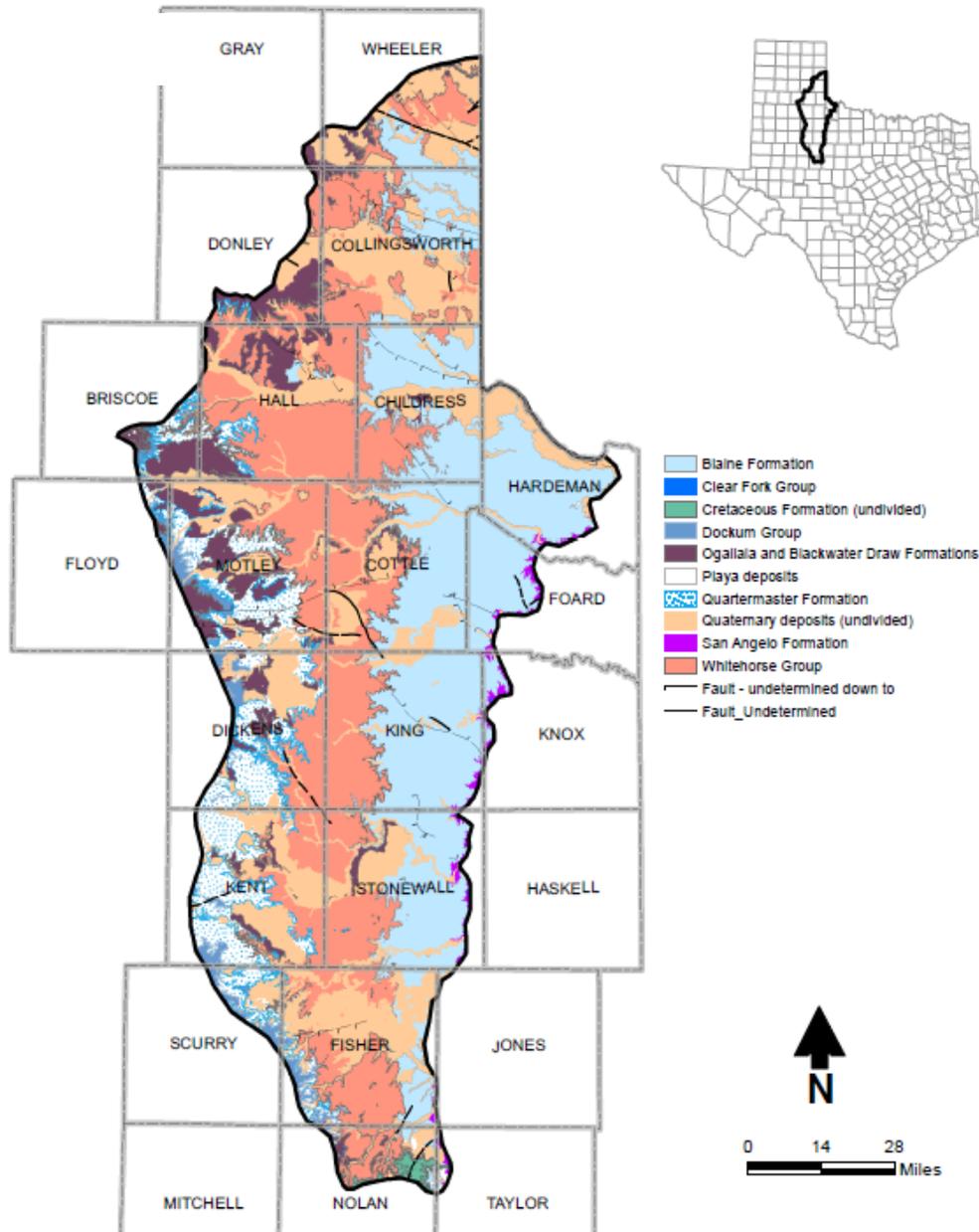
Modified from Winslow and Kister, 1956



# Groundwater conservation districts



# Surface geology and structure



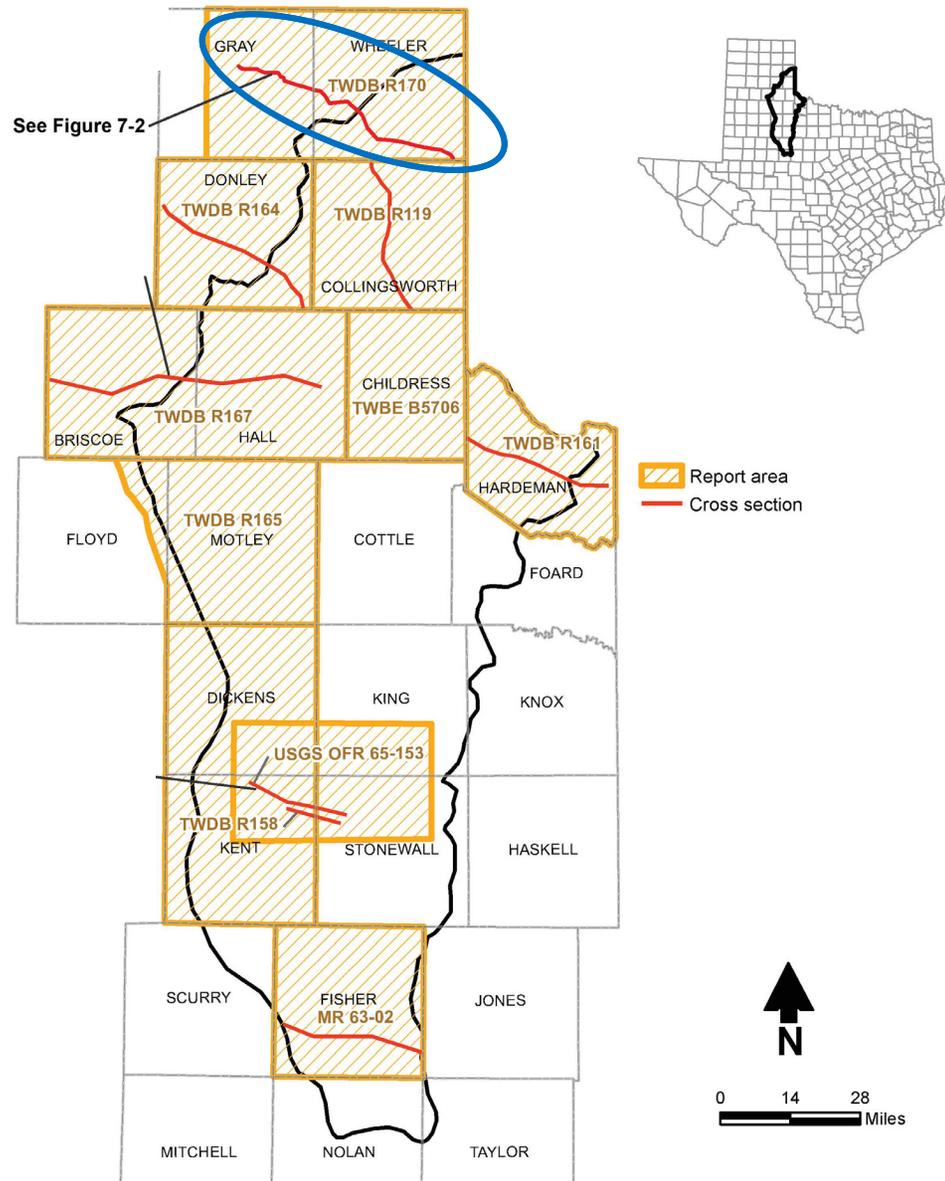
# Stratigraphy of project area

system	series	Palo Duro Basin (subsurface)		Eastern Panhandle North-Centered Texas	
		Central	East		
Permian	Ochoan	Dewey Lake Red Beds Salado Salt		Quartermaster Red Beds	
		Guadalupian	Artesia Group	Cloud Chief Fm	
	Whitehorse Group				
	Dog Creek Shale				
	Blaine Fm				
	San Andres Formation		Flowerpot Salt	Flowerpot Shale	San Angelo Sandstone

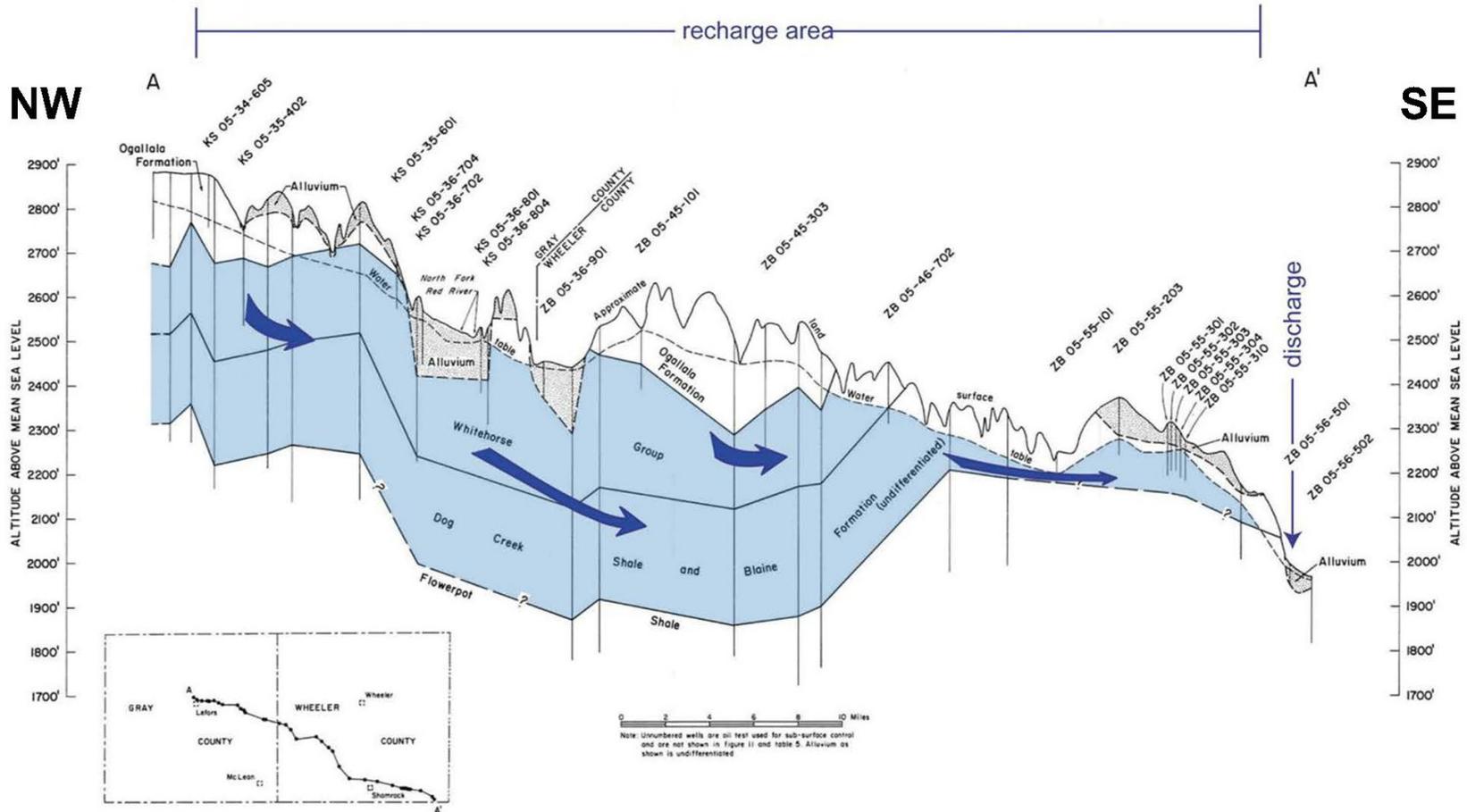
 Blaine Aquifer System

modified from J.S. Johnson (1978), Presley (1981), and Barnes (1974)

# Cross section locations



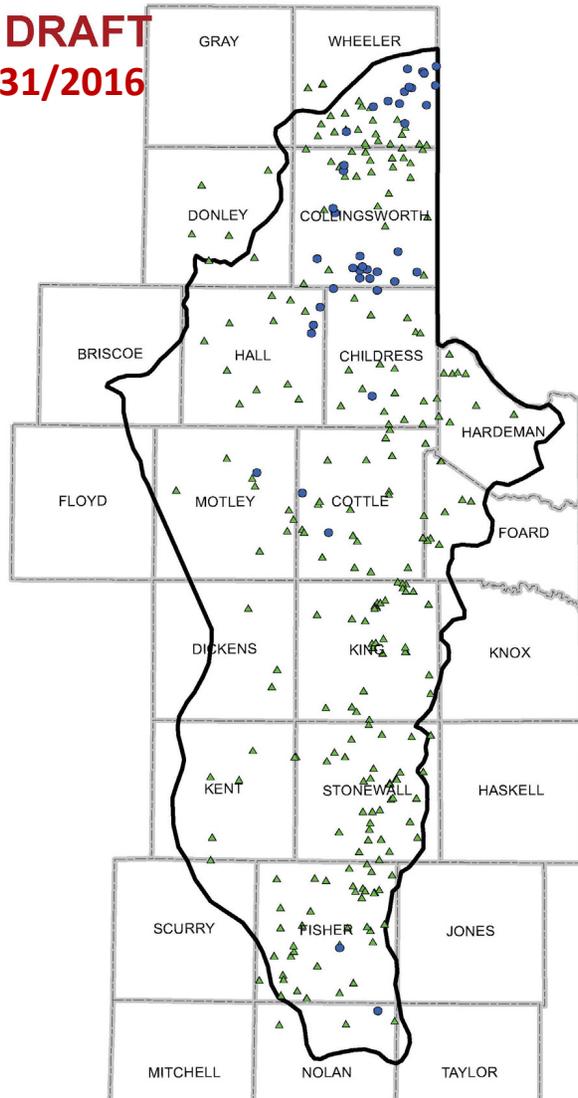
# Figure 7-2: Northwest to southeast hydrogeological cross section through Gray and Wheeler Counties, Texas



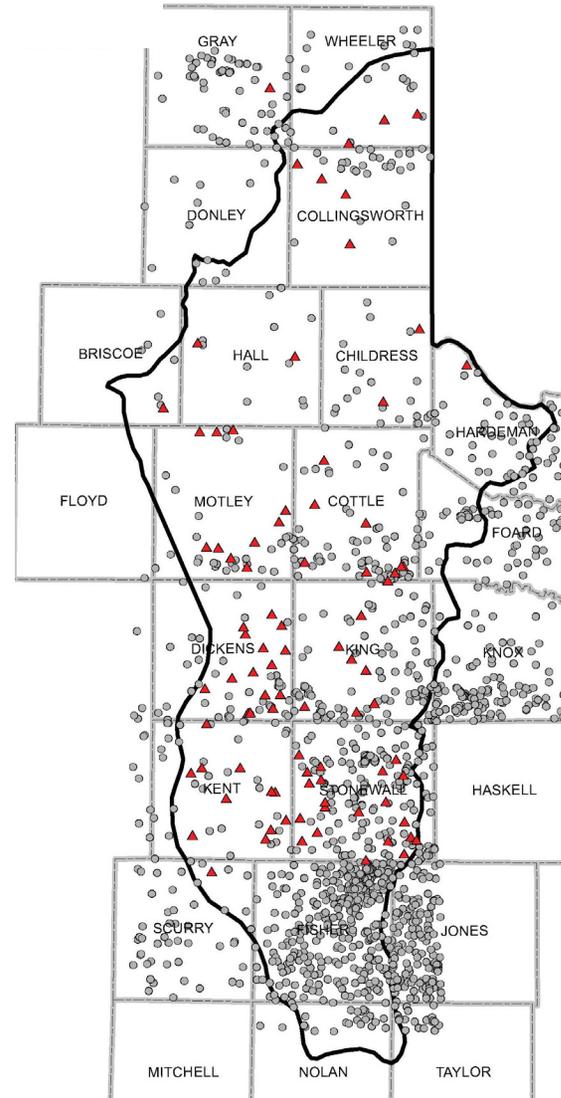
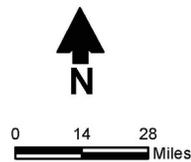
Source: Maderak, 1973

# Data collection and analysis

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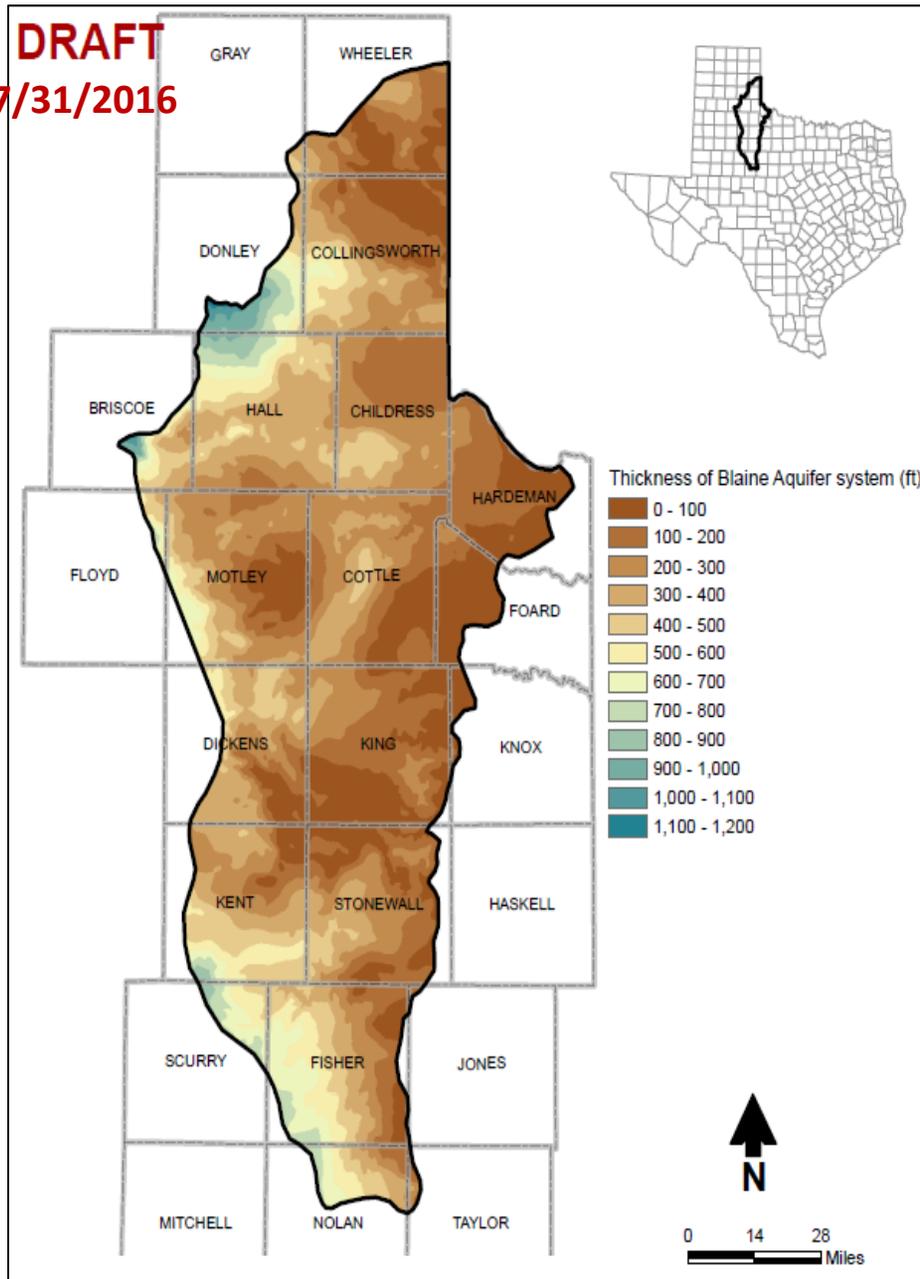


- TDLR Driller Report
- ▲ BEG Driller Report or Scout Ticket



- Geophysical log initially considered for analysis
- ▲ BRACS geophysical log used in final analysis

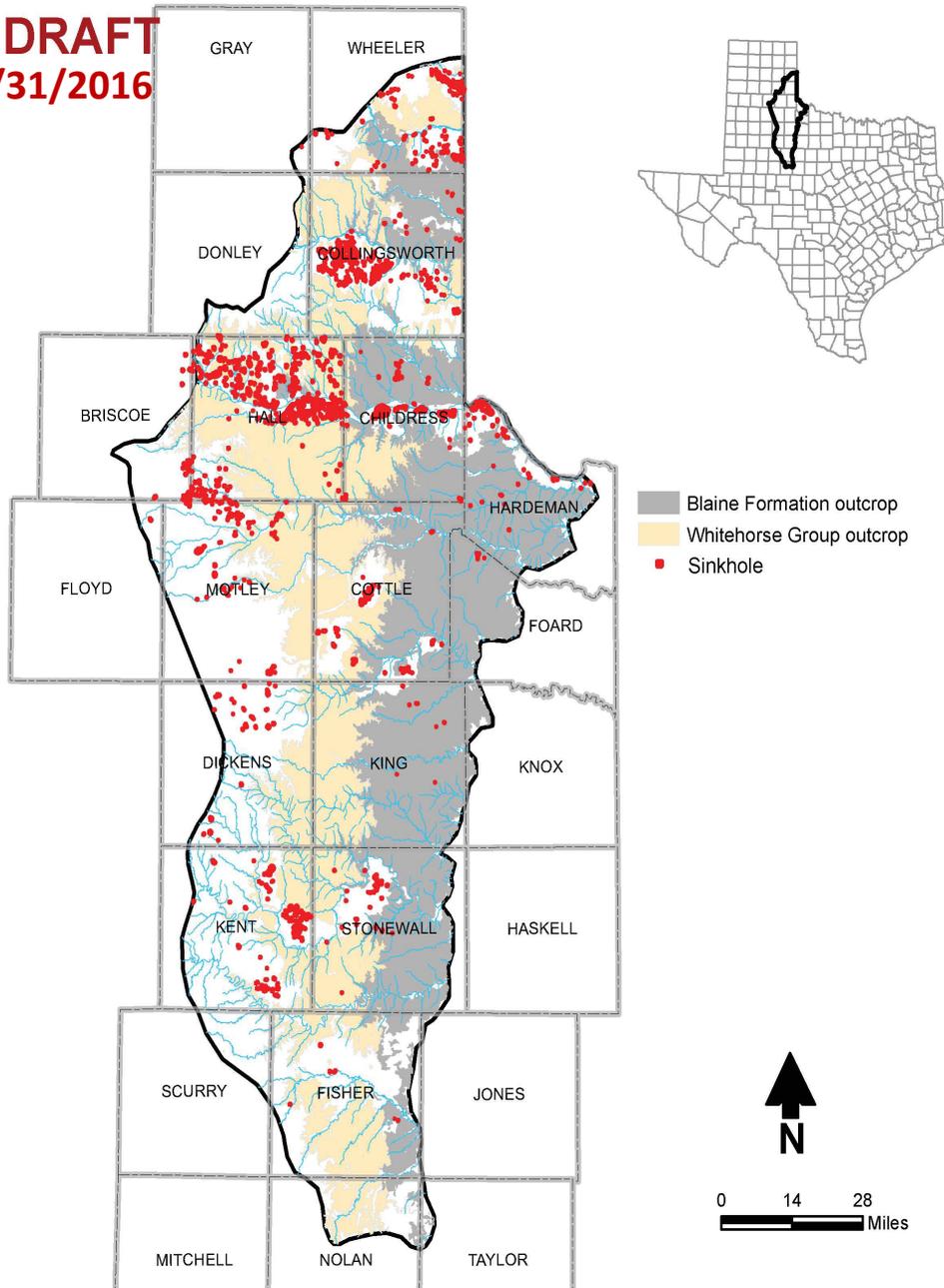
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# Aquifer thickness

- Bottom of aquifer defined by Flowerpot Shale along eastern margin and in the north
- Bottom of aquifer defined by brine interface in south
- Total thickness of fresh to moderately saline groundwater 0 to ~ 500 feet

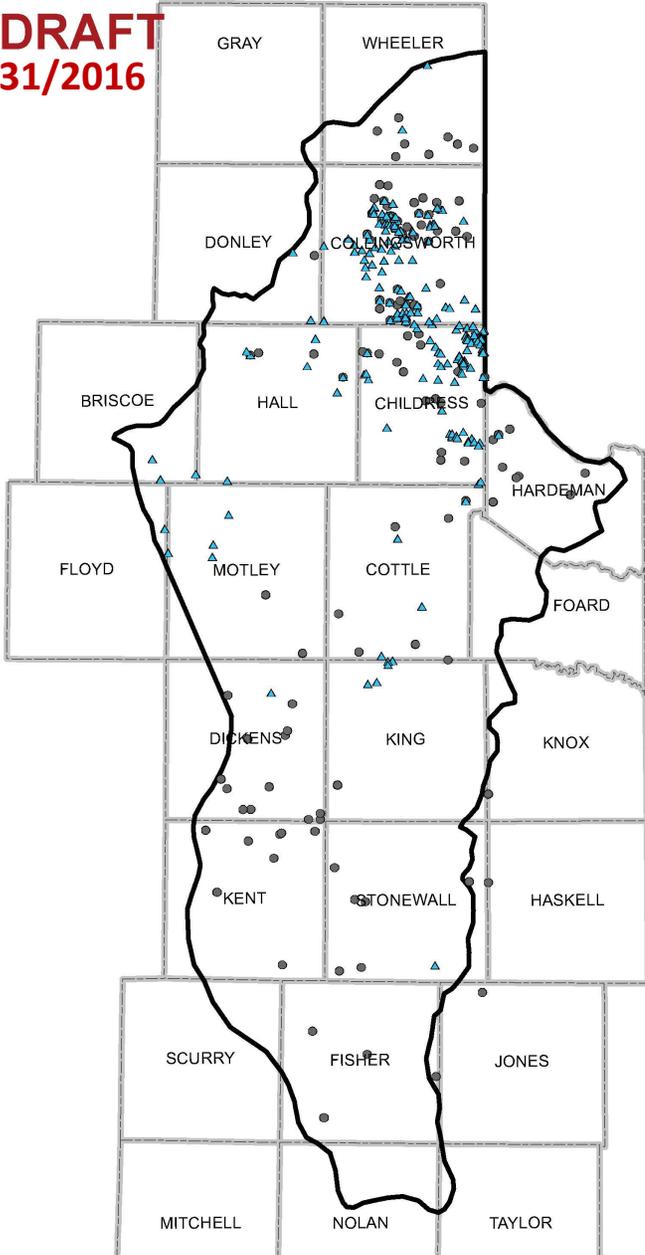
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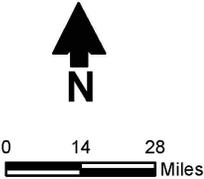
# Karst features

# Cavities and higher capacity wells

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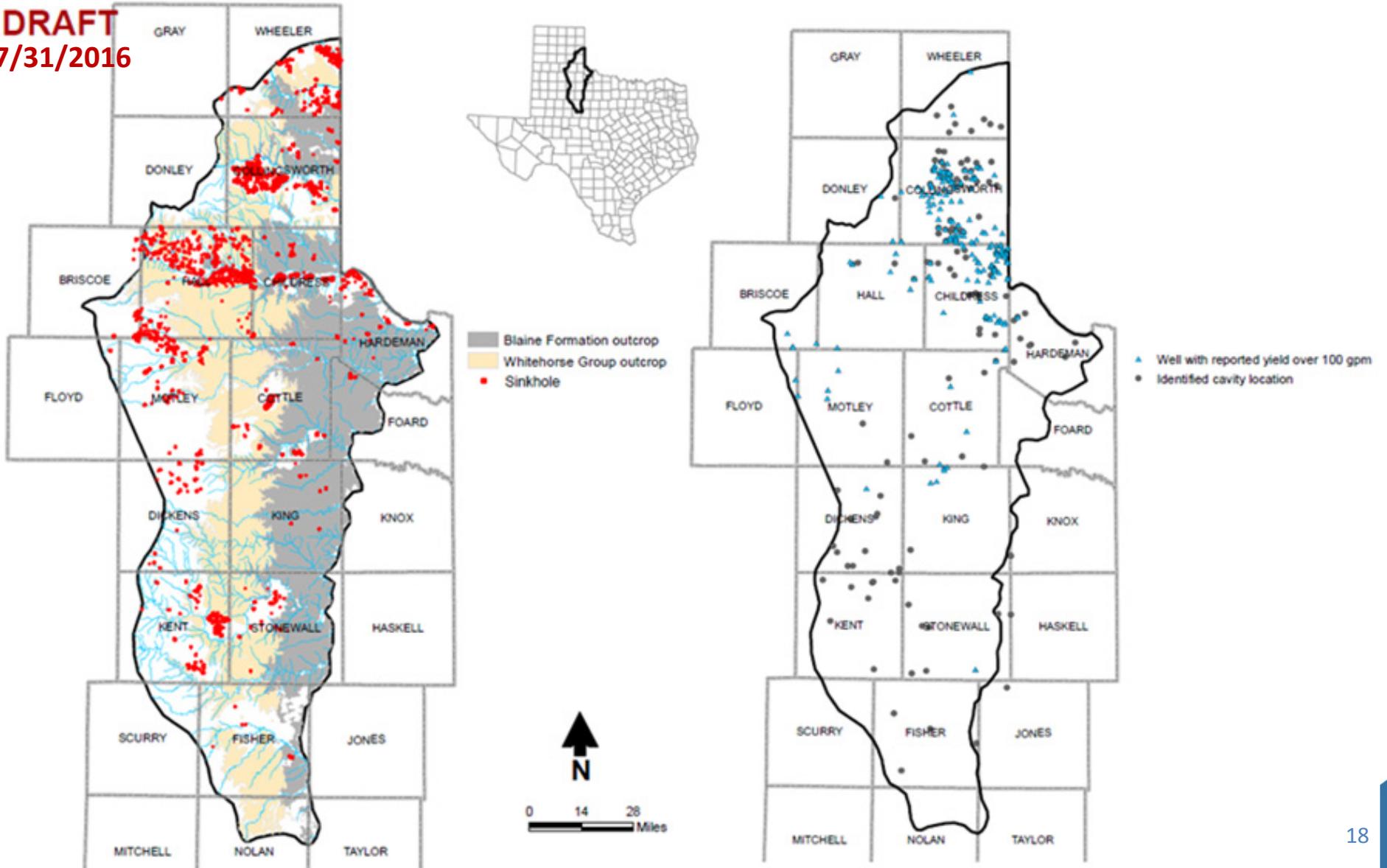


- ▲ Well with reported yield over 100 gpm
- Identified cavity location



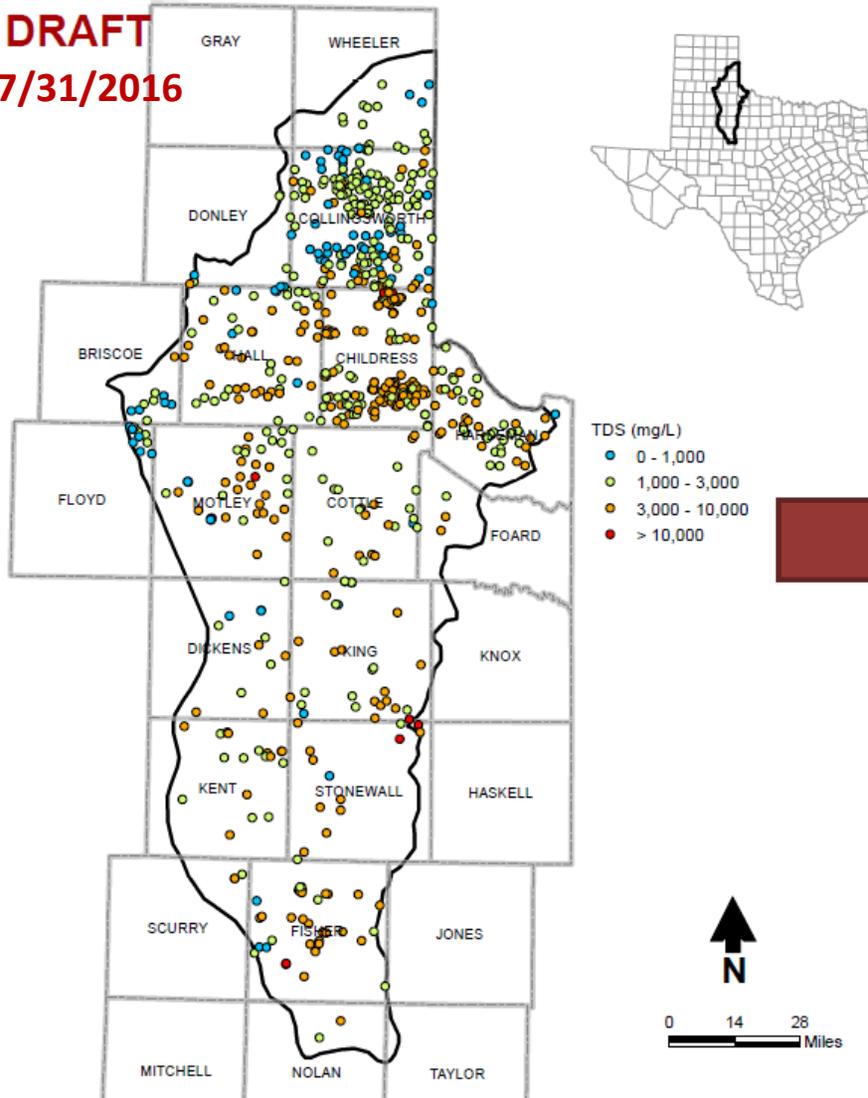
# Identification of groundwater development

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# Water quality data

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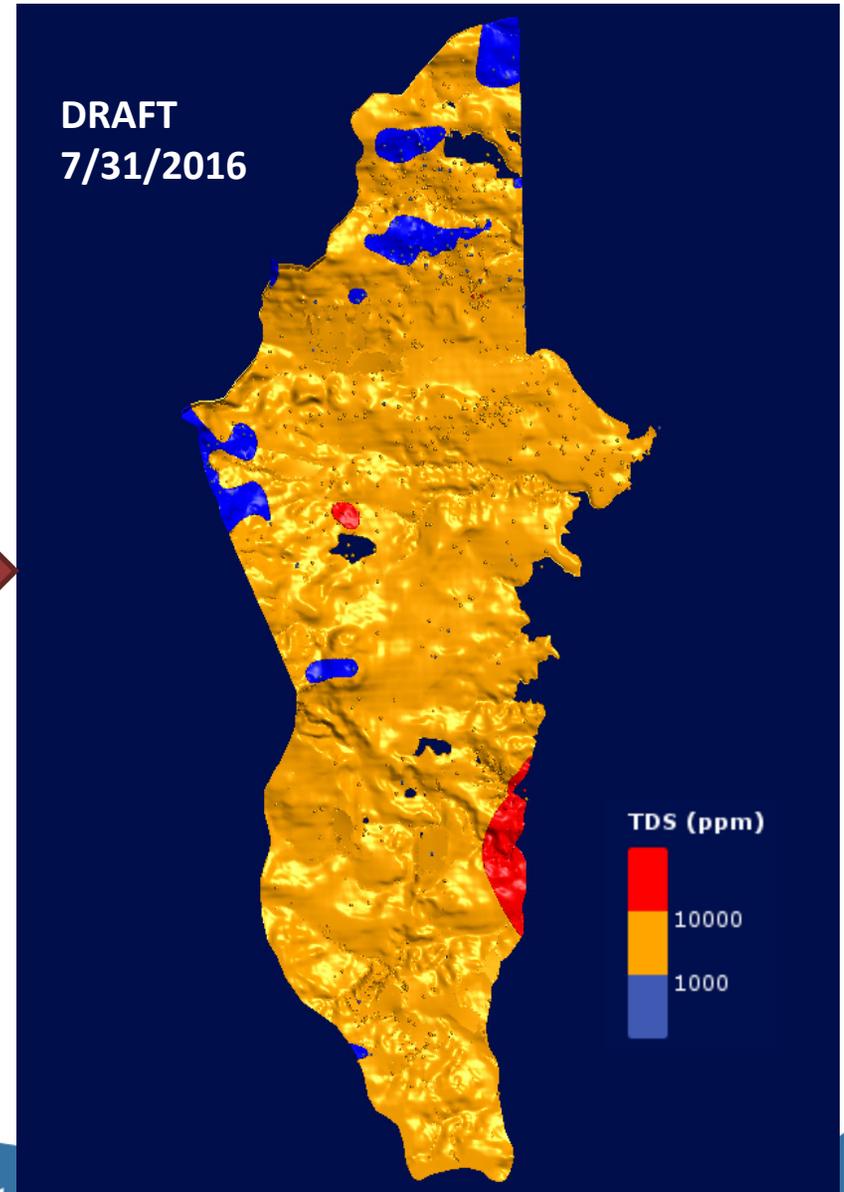


Figure 6-1. Water Quality from Water Wells

# Evaluation of potential production areas

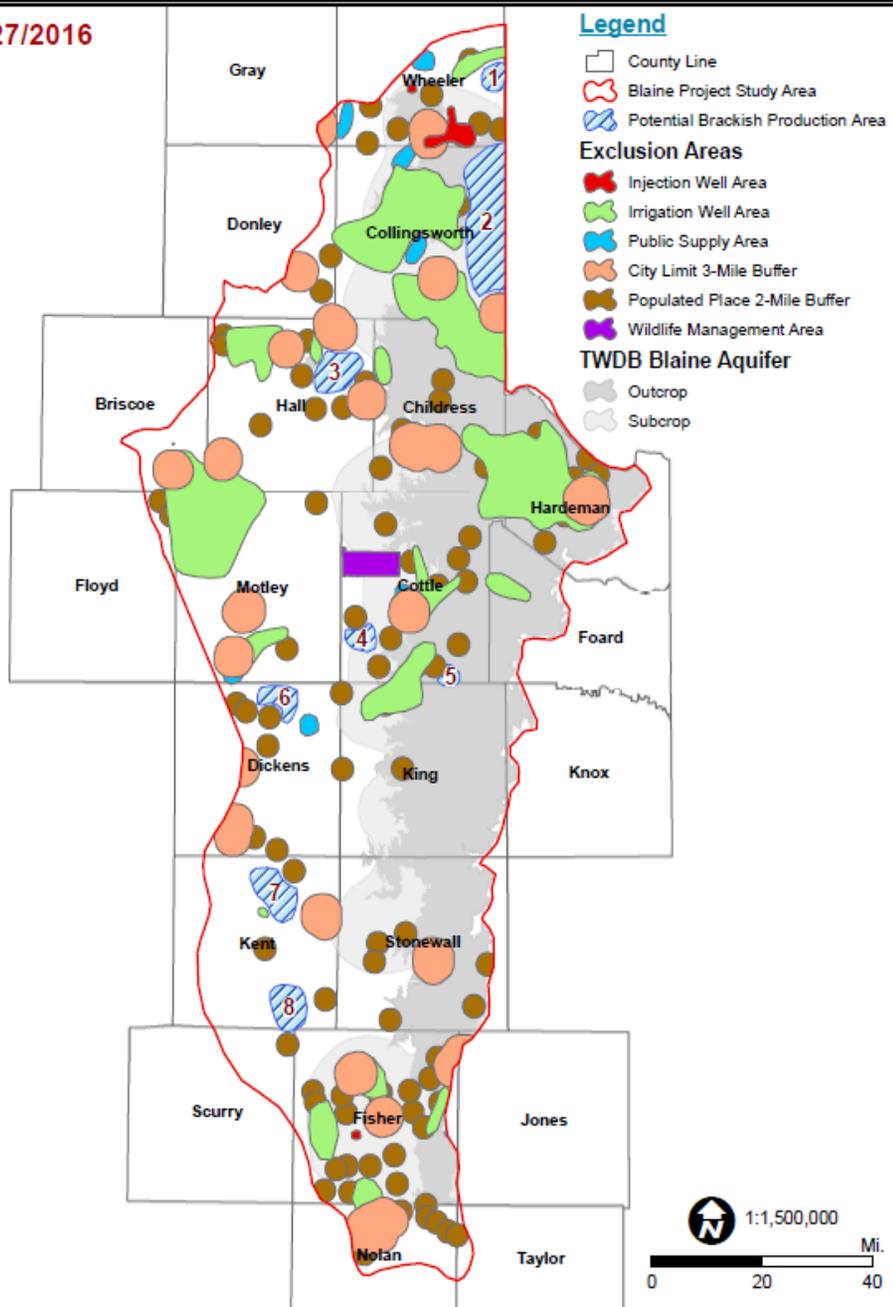
## Two part process

- Identify exclusion areas and buffer zones
- Identify remaining regions where moderate groundwater production might be obtained
- Regions likely to have moderate ( >50 - 100 gpm) groundwater production
  - Documented cavities from driller reports
  - Karst features at land surface (sinkholes)
  - Geologic structure
  - Reported well yields

# Identification of exclusion areas

- Existing areas of the aquifer serving as a “significant source of water supply for municipal, domestic or agricultural purposes” cannot be significantly impacted
- “Area of geologic stratum that is designated or used for wastewater injection through the use of injection wells or disposal wells ...”
- Comments from stakeholder meeting in Quanah
- Wildlife Management Areas (not required by HB-30)

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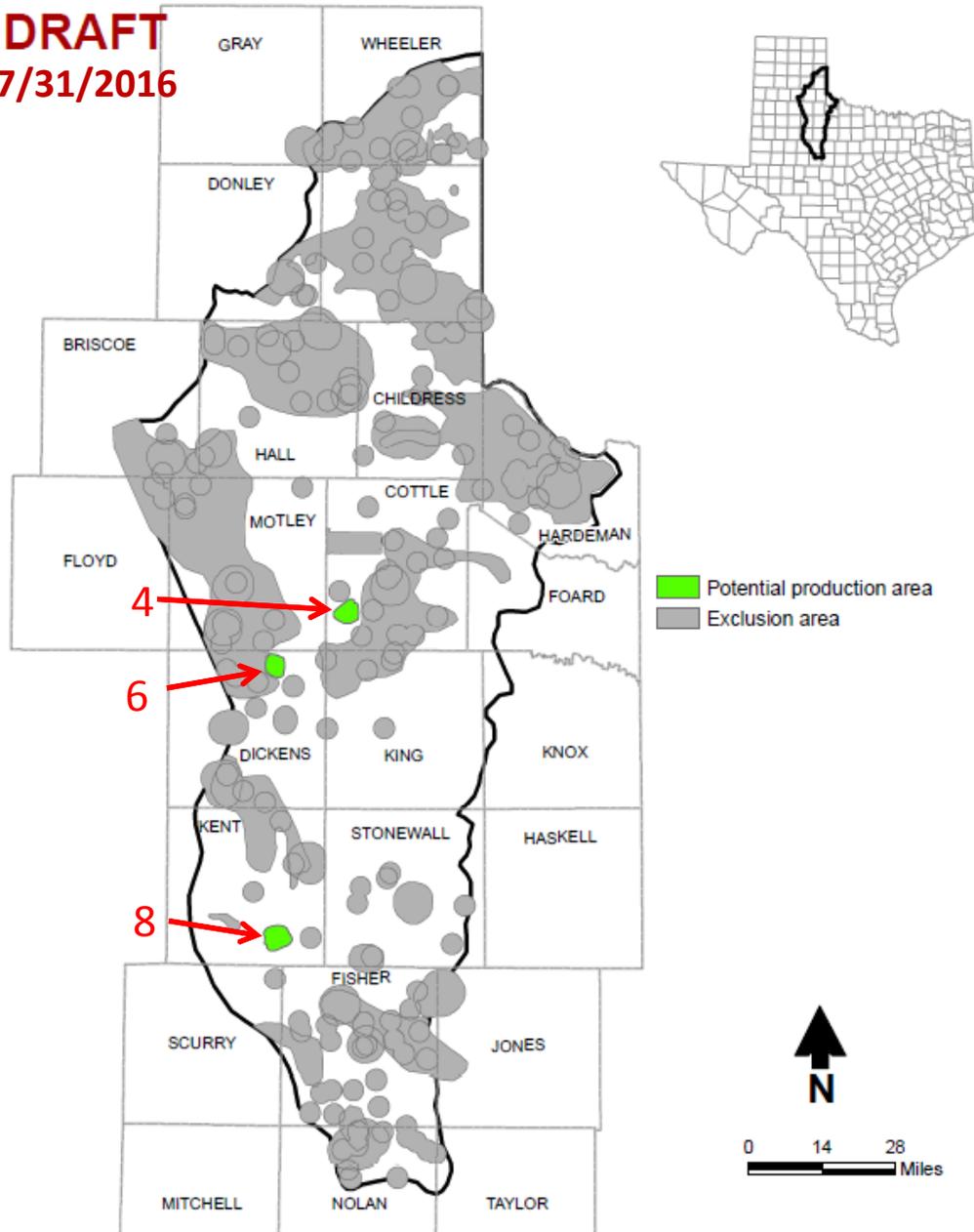


# Potential production areas and exclusions

## July 27, 2016

Map from Stakeholder Meeting held in Quanah, Texas on June 29, 2016

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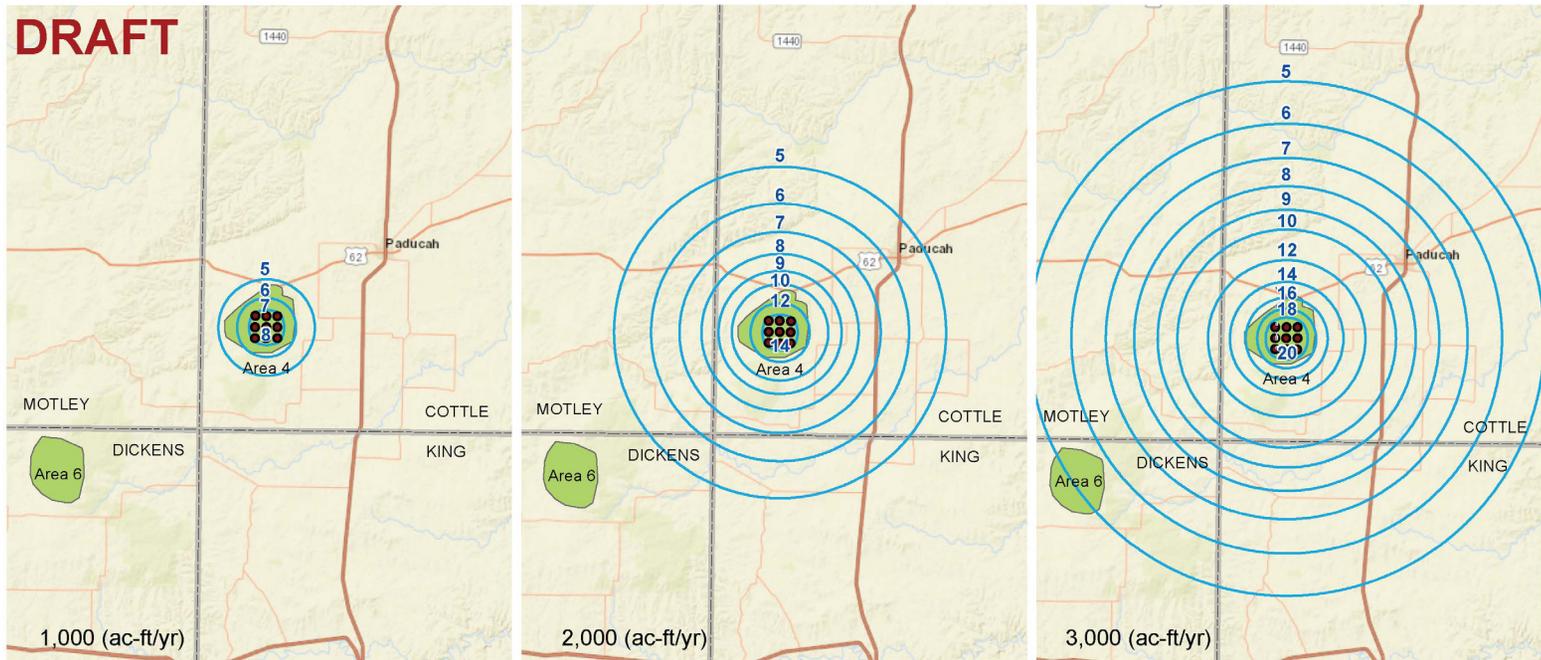


# Potential production areas and exclusions July 31, 2016

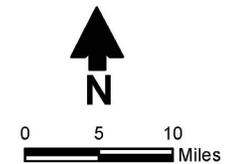
- Removed PPA 1, 2, and 3
  - Existing well use (stakeholder input)
- Redrew PPA extents due to
  - Review of nearby well control

Figure 14-4. Combined Extent of All Identified Exclusion Areas, and Final Potential Production Areas

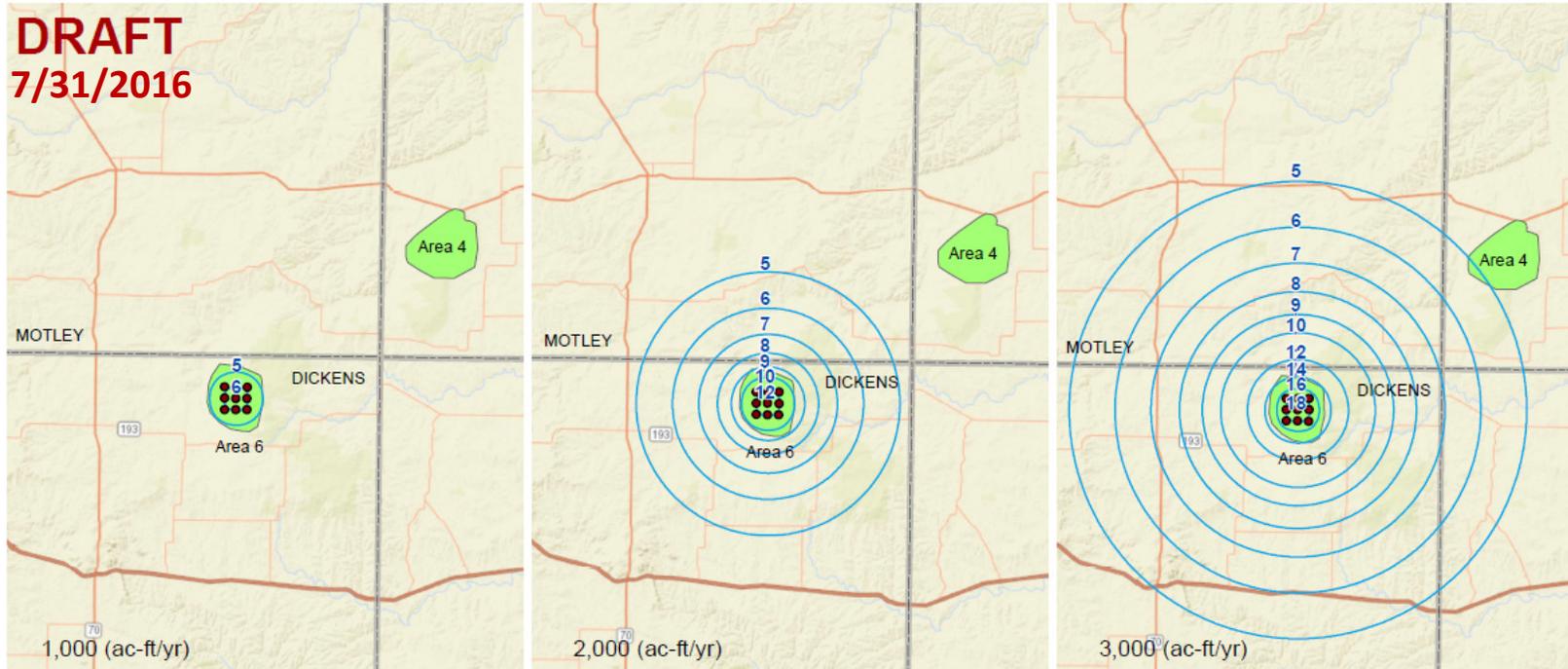
# PPA 4 numerical modeling



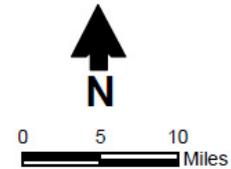
- Hypothetical well
- Simulated drawdown (ft)
- Potential production area
- County boundary



# PPA 6 numerical modeling

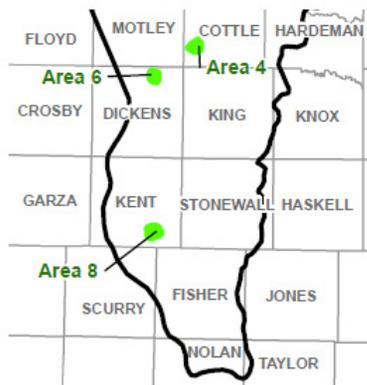
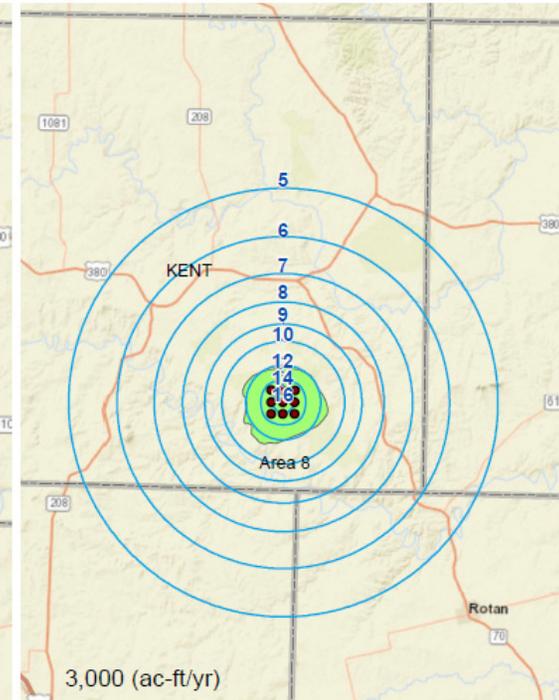
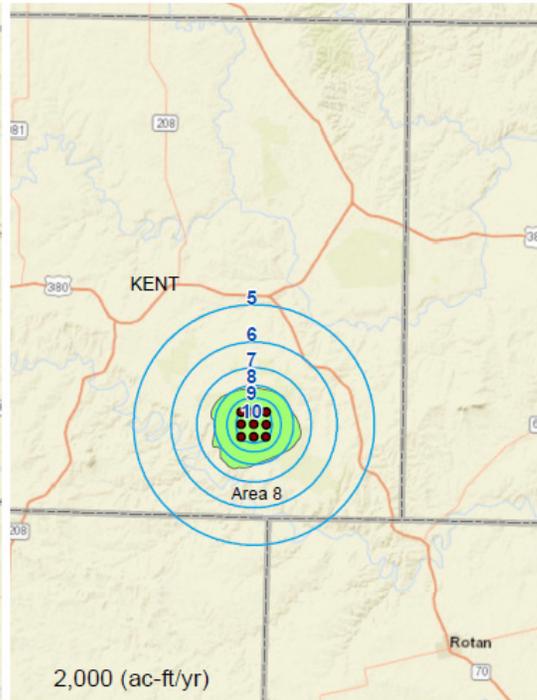
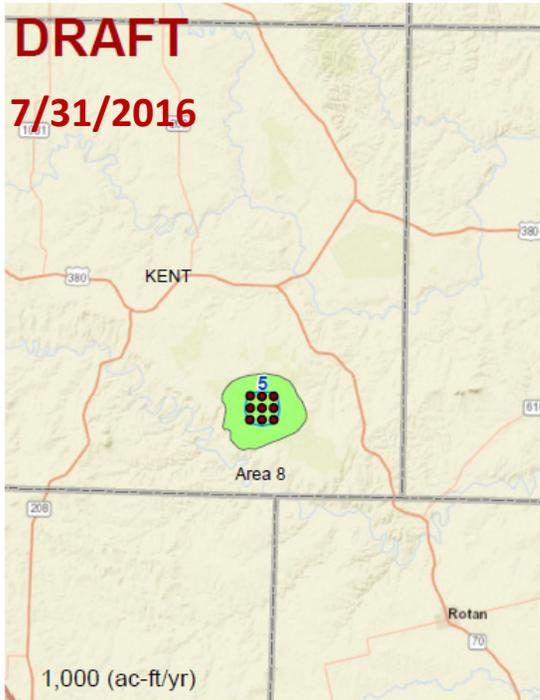


- Hypothetical well
- Simulated drawdown (ft)
- Potential production area
- County boundary

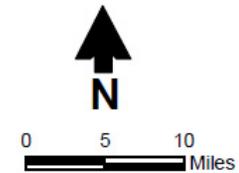


# PPA 8 numerical modeling

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- Hypothetical well
- Simulated drawdown (ft)
- Potential production area
- County boundary



# Next steps...

- 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
  - Stakeholders should have their comments to the TWDB by August 31, 2016
- Final report will be delivered to TWDB by August 31, 2016
  - Stakeholders will receive an email when final report is posted to website
- Stakeholder meeting will be held on September 9, 2016 at 1:30 pm
  - Stakeholders will receive an email with meeting date, time, and location
- Brackish Groundwater Production Zones will be designated by the TWDB at a public board meeting in the fall
  - Stakeholders will receive an email with meeting date, time, and location
- Biennial Desalination report to the Texas Legislature will be approved at a public board meeting in the fall

# Acknowledgements

- Stakeholder Input
- Mesquite Groundwater Conservation District
  - Providing well data
  - Helping coordinate the venue
- Gateway Groundwater Conservation District
  - Hosting the first stakeholder meeting

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House Bill 30

[www.twdb.texas.gov/innovativewater/bracs/HB30.asp](http://www.twdb.texas.gov/innovativewater/bracs/HB30.asp)