

Case Study of Collaboration Groundwater Availability and Platting

Dirk Aaron

General Manager

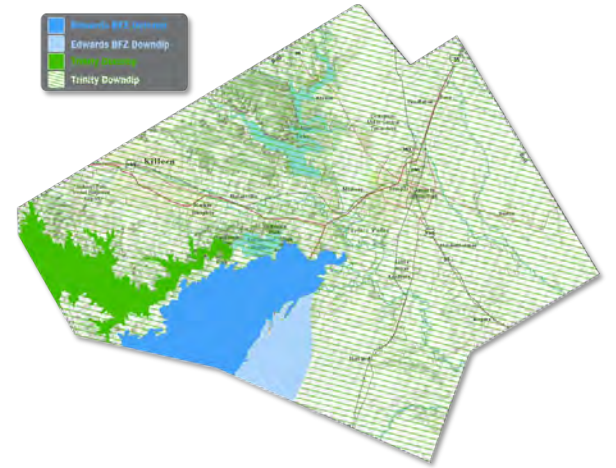
October 25, 2022

Groundwater Protection & Policy that must be Legally Defensible through Science



Today's Discussion

1. Brief History of GCD's
2. Groundwater
3. What is a GCD?
4. Case Study in Bell County
 - ✓ Groundwater Availability – TCEQ §230.1 – 230.11
 - ✓ Interlocal Agreement
 - ✓ Application of the Agreement
5. Final Questions



Directors Positions Aligned with County Government

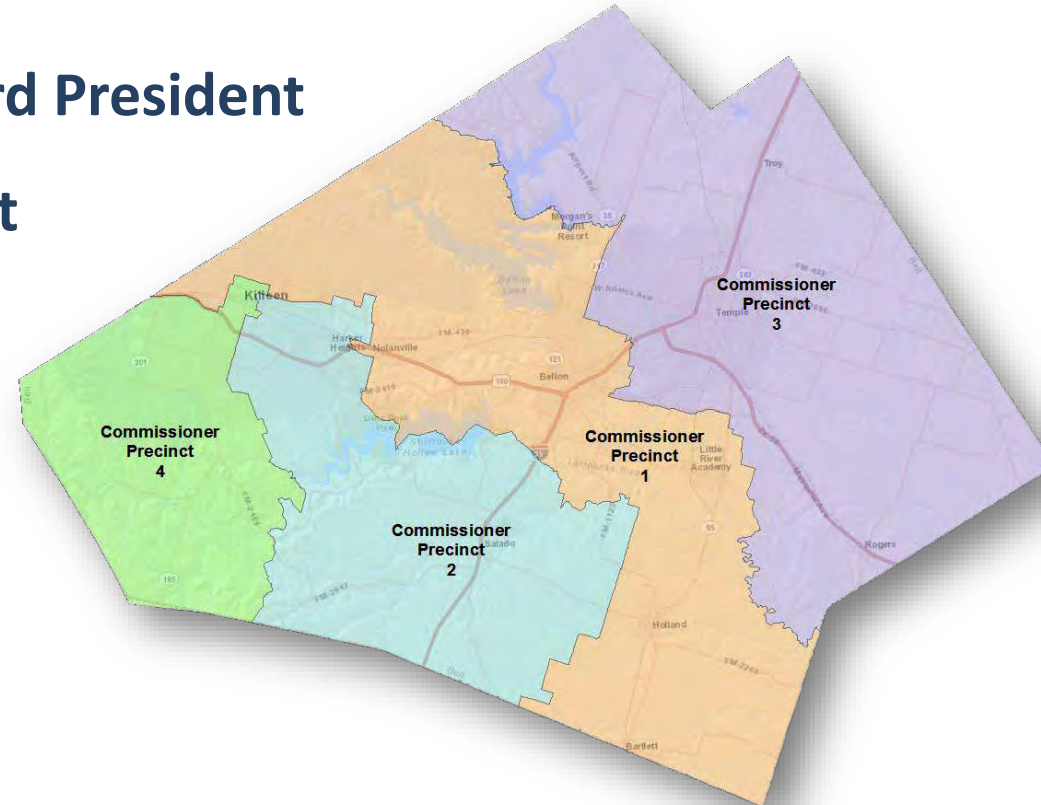
Leland Gersbach - Precinct #1, Board President

David Cole - At-Large, Vice President

Gary Young - Precinct #2, Secretary

Jody Williams - Precinct #3

Scott Brooks- Precinct #4



Clearwater UWCD Staff & Office

Dirk Aaron – General Manager

Shelly Chapman – Administrative Manager

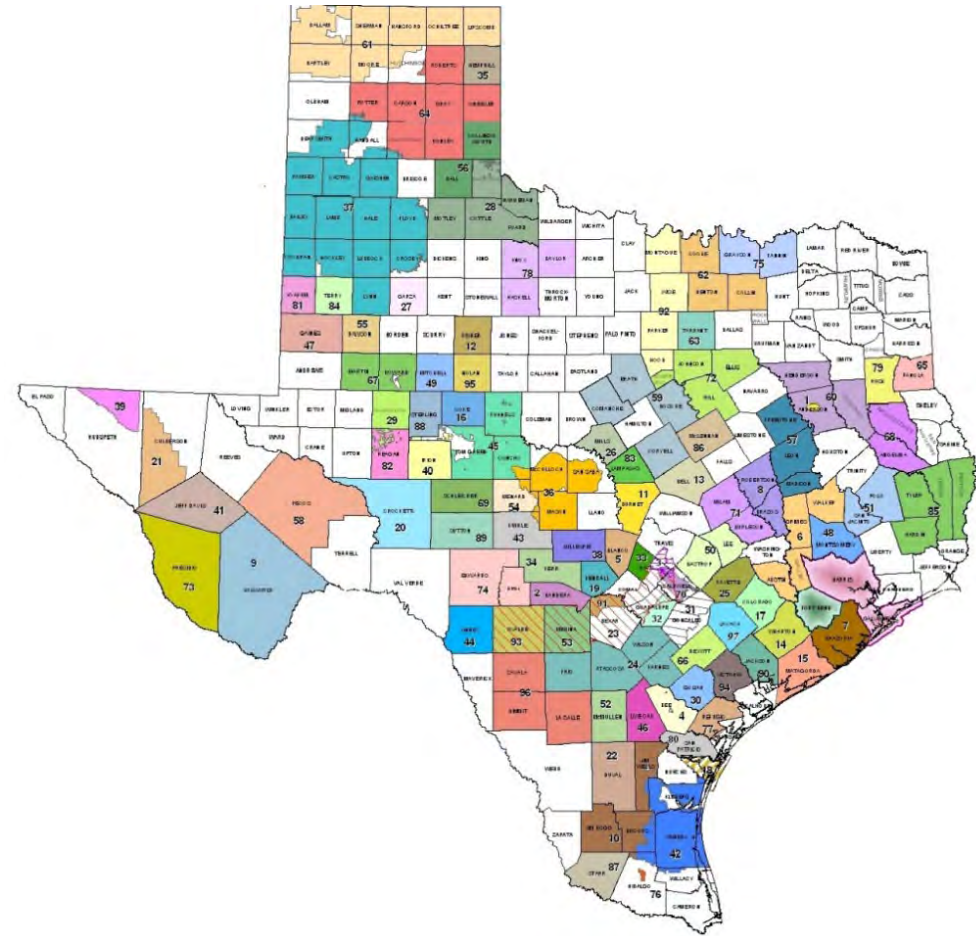
Tristin Smith – Compliance/Communication

Corey Dawson – Field Technician



GCD = Groundwater Conservation Districts

- ✓ Legislative Statutory Authority
 - ✓ Defined in Chapter 36
 - ✓ “Groundwater Law”
- ✓ Specific Enabling Legislation can give or limit additional Authority to a GCD



Texas Constitution

1910s

1917



Conservation amendment
approved Texas Constitution

Article XVI, Section 59

"The conservation and development of all of the natural resources of this State, ..., and the preservation and conservation of all such natural resources of the State are each and all hereby declared public rights and duties; and the Legislature shall pass all such laws as may be appropriate thereto."

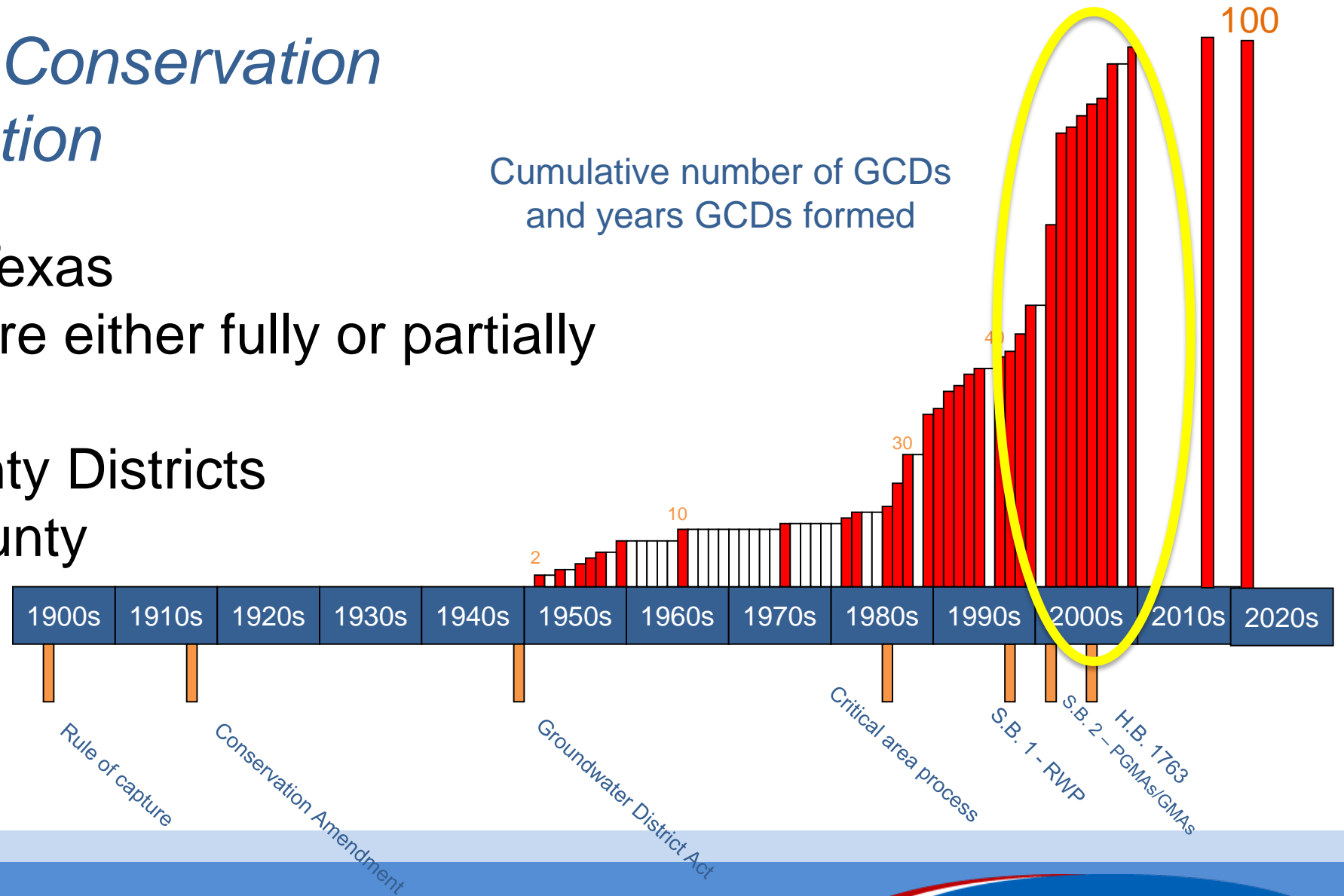
Rule of Capture VS Modified Rule of Capture

- ✓ **Rule of Capture** was adopted in 1904
 - Texas Supreme Court Ruling
 - Know as “The Law of the Biggest Pump”
 - EXCEPT if it causes subsidence, or is intentionally malicious
- ✓ **GCDs** were created to balance one private property owners' rights from another
- ✓ The rule of capture still exists (**UNMODIFIED**) in areas not covered by a GCD

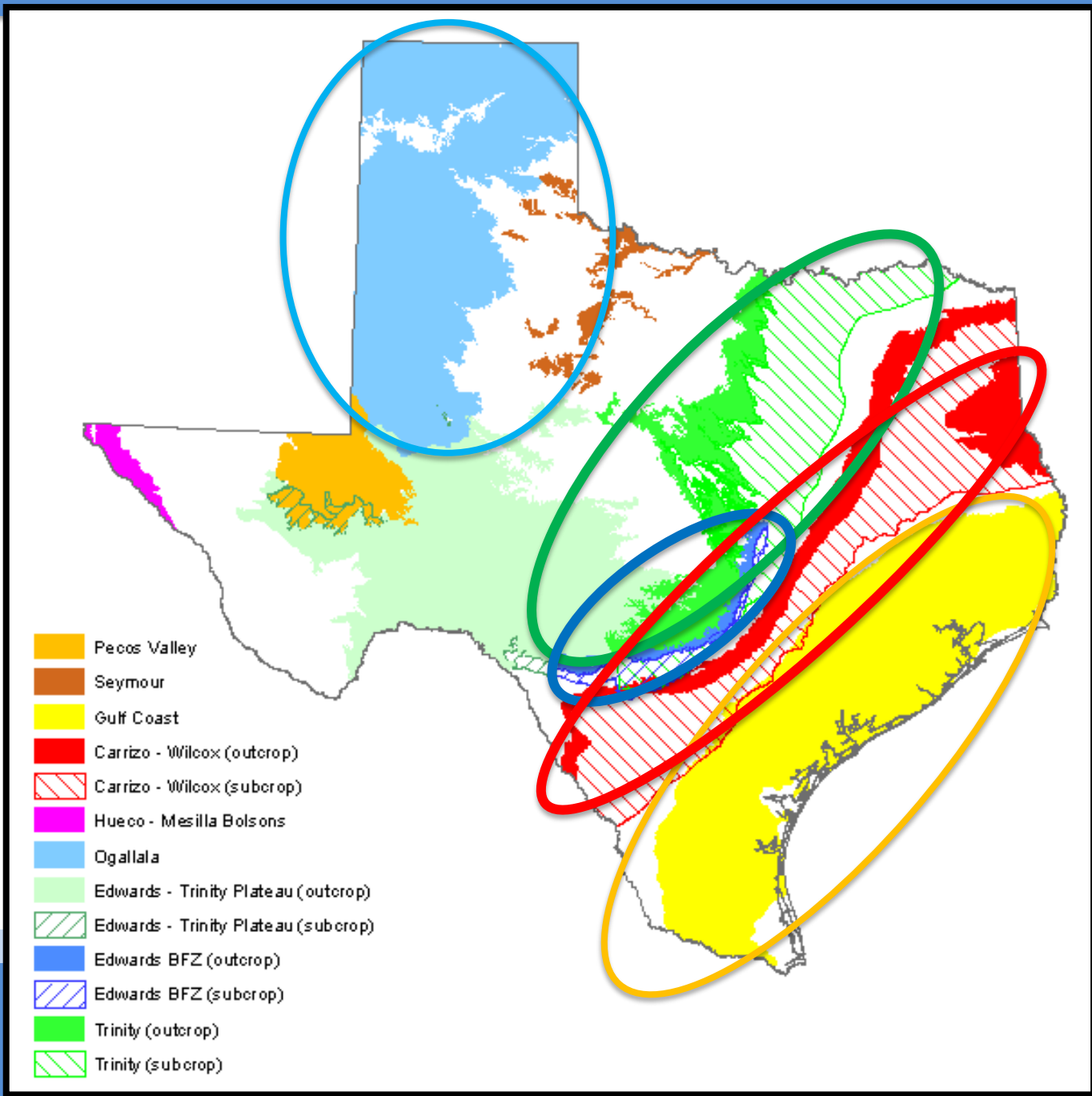
Groundwater Conservation Districts Creation

- 100 GCD's in Texas
- 177 Counties are either fully or partially
- 62 Single-County Districts
- 38 Multiple-County

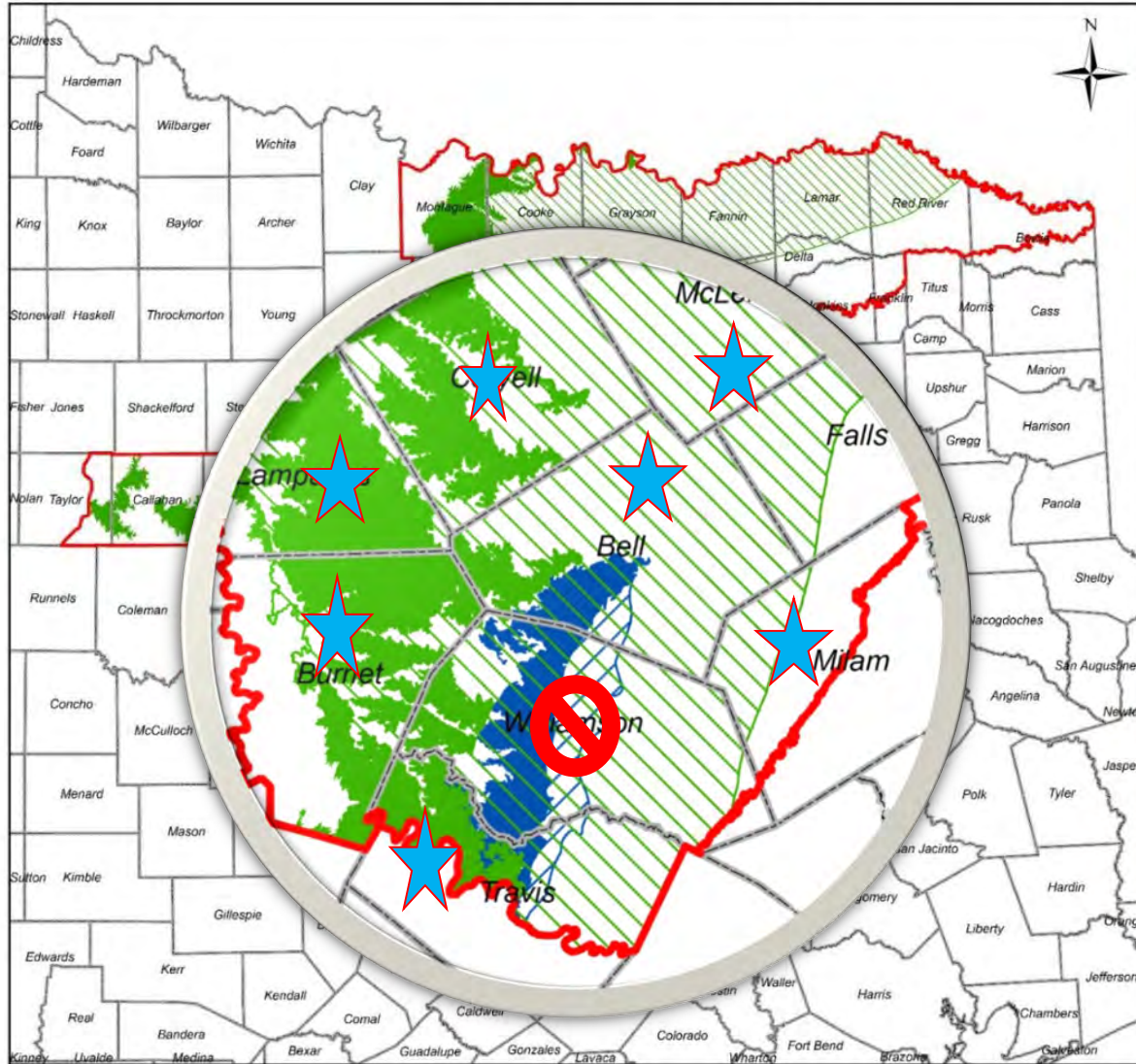
Cumulative number of GCDs and years GCDs formed



Major Aquifers



Groundwater Management Area 8



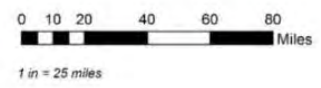
MAP LEGEND

- GMA 8
- Counties

Major Aquifers

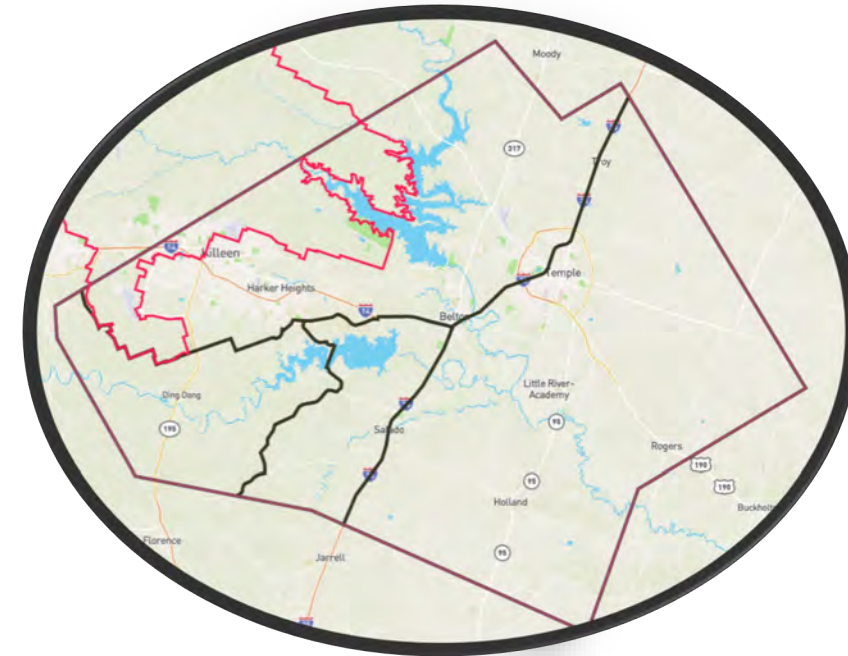
- Edwards BFZ (outcrop)
- Edwards BFZ (subcrop)
- Trinity (outcrop)
- Trinity (subcrop)

DISCLAIMER
This map was generated by the Texas Water Development Board. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of all mapped data are approximate. Boundaries for groundwater conservation districts are approximate and may not accurately depict legal descriptions.
Updated 7/18/2013

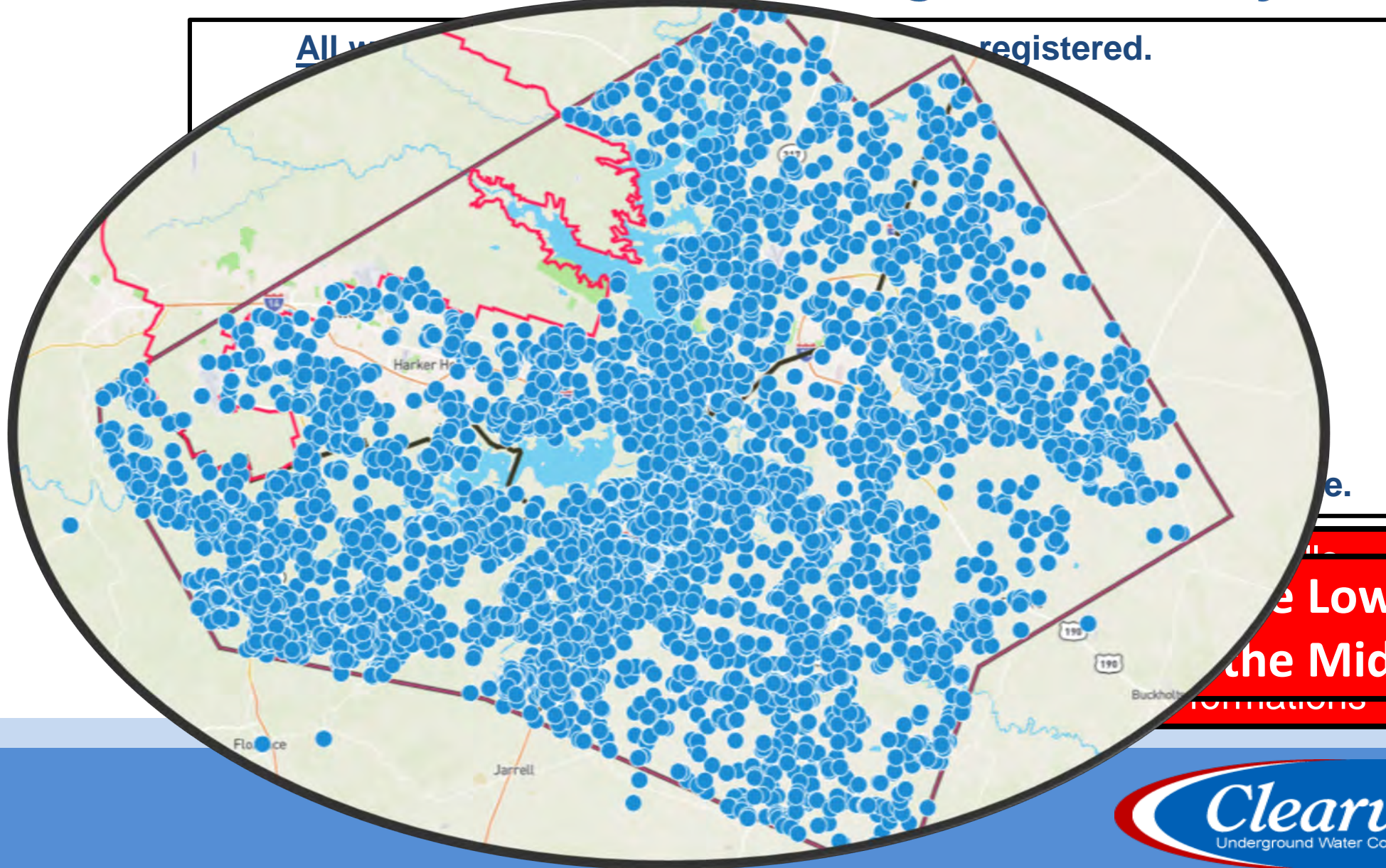


Who is Clearwater UWCD?

- ❖ Created by 71st Legislature in 1989 (HB 3172)
- ❖ Confirmed by Bell County voters in 1999
- ❖ Doors opened for business in 2002
- ❖ District's jurisdiction includes all of Bell County—approximately 1,055 square miles
- ❖ Authority to levy ad valorem tax at rate not to exceed five cents/\$100 assessed value—
- ❖ FY22 tax rate \$0.003100/\$100 assessed value
- ❖ FY23 tax rate \$0.002708/\$100 assessed value

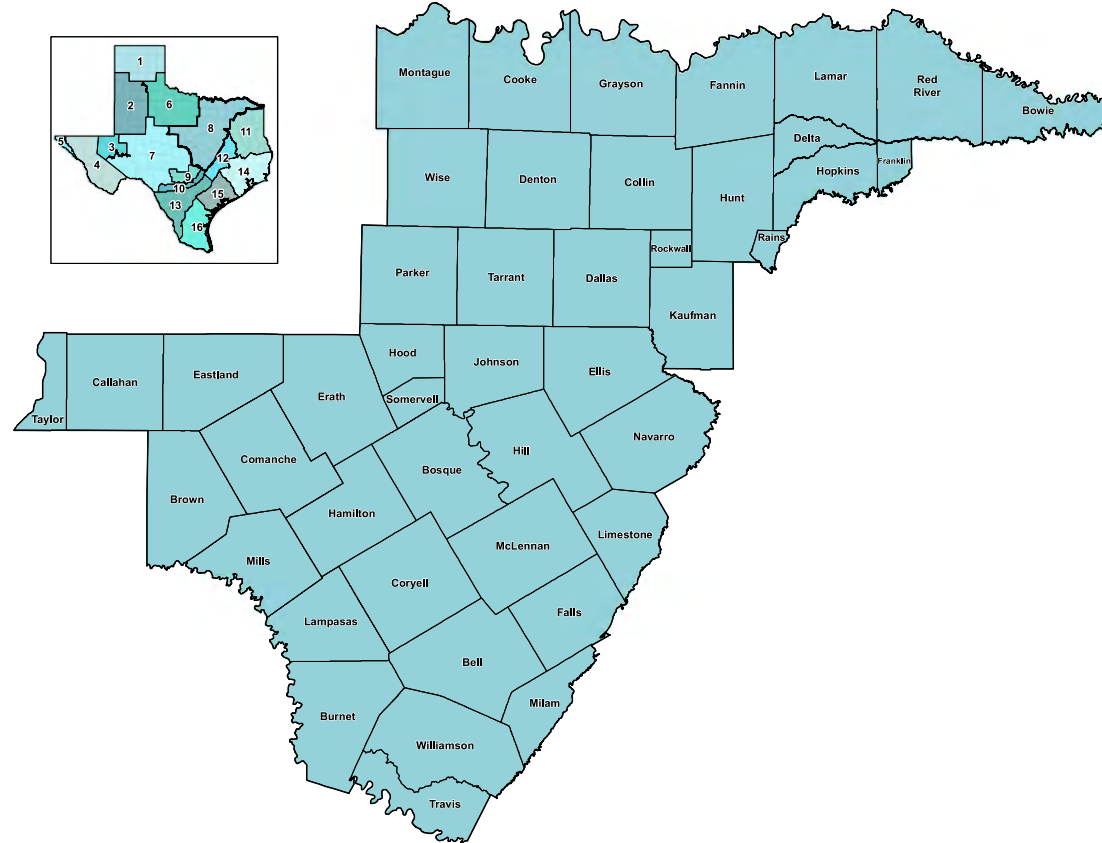


Groundwater Wells Managed for Clarity



Lower Trinity
Middle Trinity

Groundwater Management Area 8



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TEXAS WATER DEVELOPMENT BOARD
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Austin, Texas 78714-3231

information, and education
for the conservation and responsible development of water for Texas.



Website Required

CONTACT US | DIRECTIONS | PUBLIC RECORDS | VISIT OLD SITE

clearwater.lre-up.com/map

CUWCD - Login | Dashboard | The Texas Tribune | New folder | TLO | TexPool - Home | The Zen of Modelin... | A J L Advertising Sp... | Speakeasy Internet... | New Tab | CUWCD Water Leve... | WellRpts_Advanced... | Sitemap | Texas Wat... | CUWCD Map Viewer

Clearwater

Public Resources

Search Options: Attributes | Individual Well Search: Search by well attributes

Aquifers | Primary Use | Well Status | Management Zones | More Filters | Color wells by Default | Save PNG

Interactive Map

- Standard Basemaps
- Layers
 - Clearwater Wells
 - Clearwater Well Labels
 - Management Zones
 - Management Zones
 - Fill Opacity
 - Bell CAD County Boundary
 - Bell CAD County Boundary
 - Fill Opacity
 - Eagle View 2022 Imagery
- Search Radius Tool

Address/Coords Search

Map showing Management Zones and Bell CAD County Boundary in the Killeen, Texas area.

Mapbox | © 2022 - Leonard Rice Engineers, Inc.

ACRES OR MORE)

OR =2 ACRES)

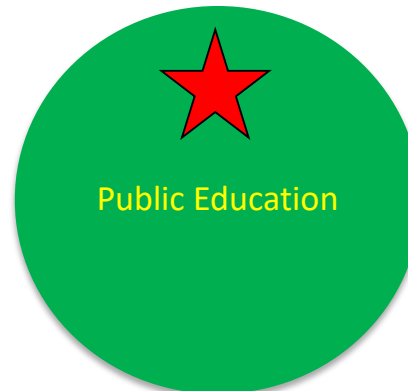
PLATTING

Election Advisory No. 2019-19

Transparency Tax Code

Every Drop Counts!

Activities / Mission of a GCD?



Activities / Mission of a GCD?

Services Added by ILA

Proposed
Subdivision Plats

Groundwater
Availability
Studies

Records Review
State & Local
Sources

Real Estate
Transactions

Texas Groundwater

Groundwater Conservation Districts

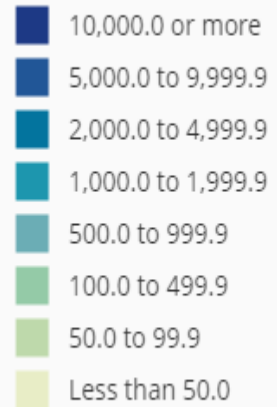
Case Study of Bell - Clearwater UWCD



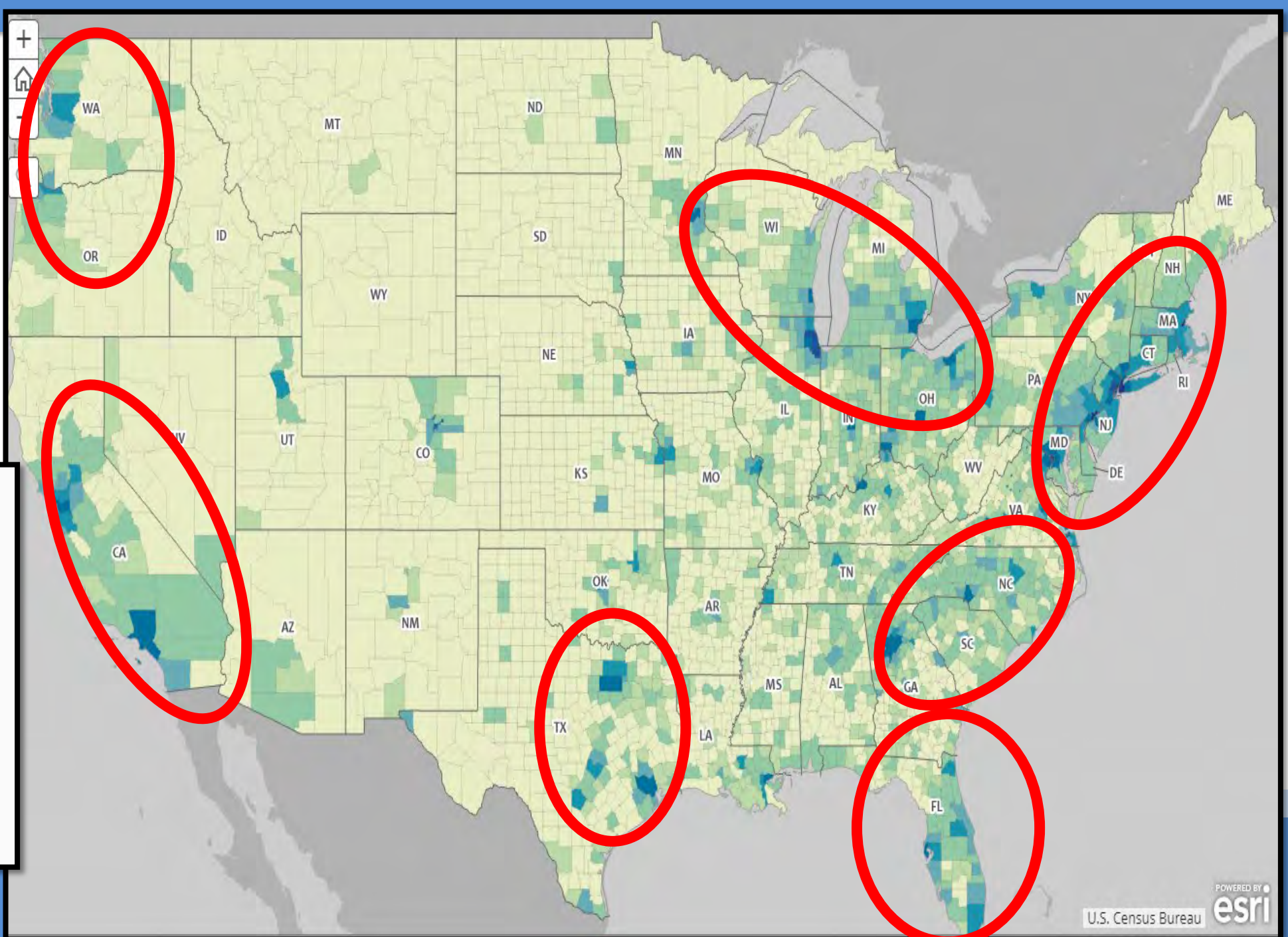
US Population
331,449,281

About 80% 'Clustered'
in 7 geographic areas

Persons per square mile by county (or county equivalent)

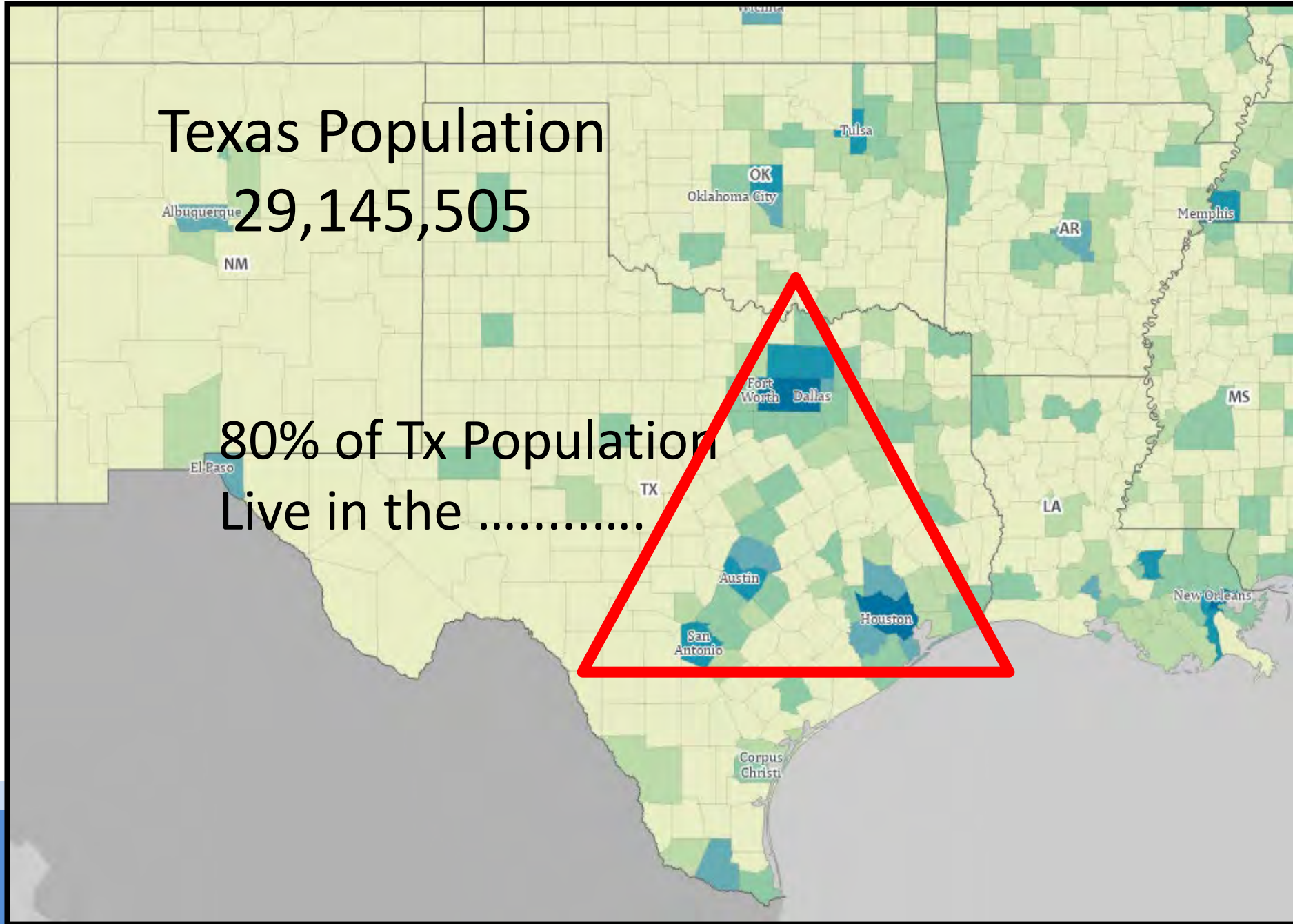


U.S. density = 93.7

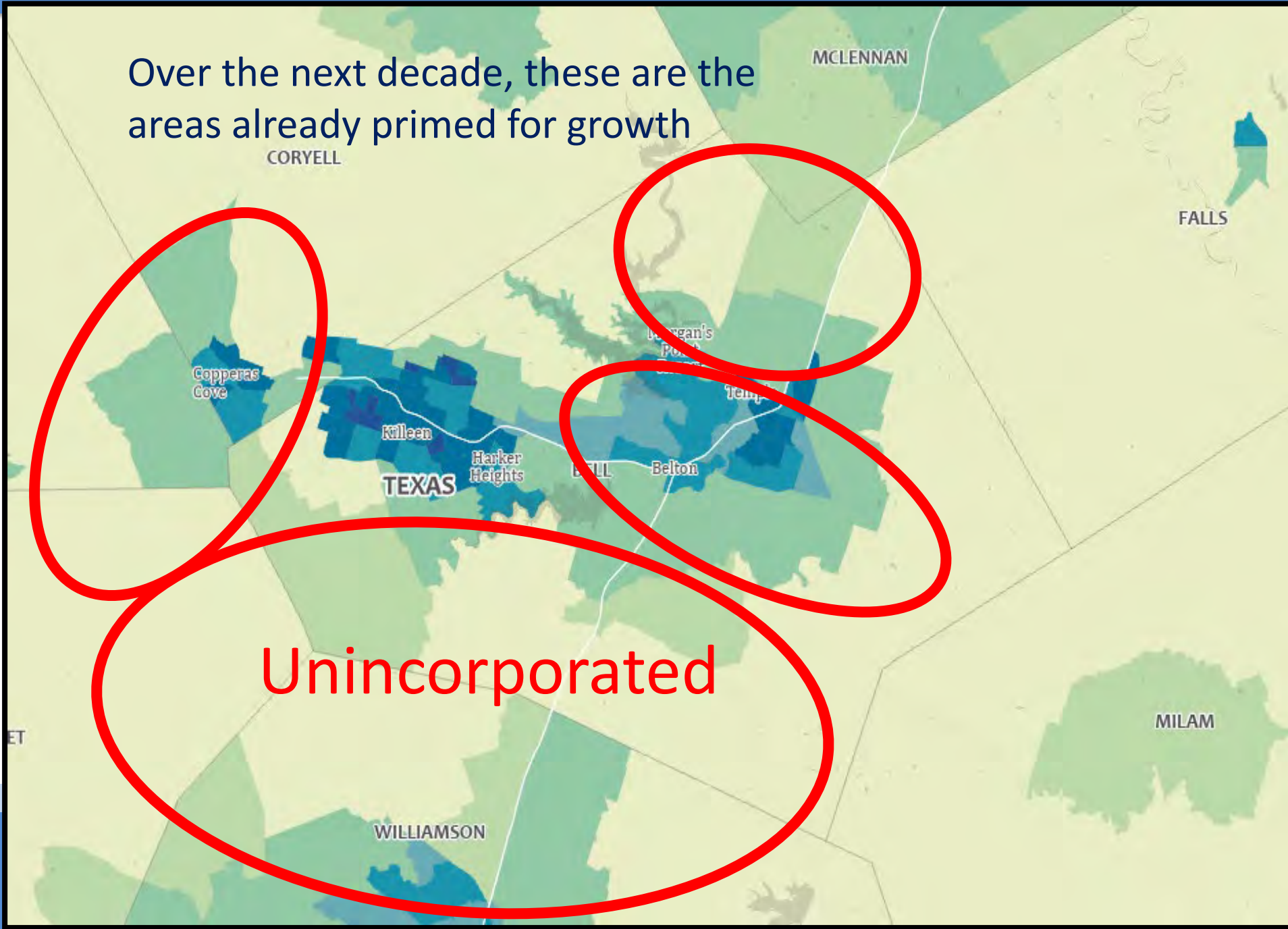


Texas Population
29,145,505

80% of Tx Population
Live in the



Over the next decade, these are the areas already primed for growth



Groundwater Wells & Groundwater Availability

Texas Commission on Environmental Quality
Chapter 230 - Groundwater Availability Certification for Platting

Page 1

GROUNDWATER AVAILABILITY CERTIFICATION FOR PLATTING

§§230.1 - 230.11

Effective July 31, 2008

§230.1. Applicability.

(a) Subdivisions utilizing groundwater as the source of water supply. In the plat application and approval process, municipal and county authorities may require certification that adequate groundwater is available for a proposed subdivision if groundwater under that land is to be the source of water supply. The municipal or county authority is not required to exercise their authority under Texas Local Government Code, §212.0101 or §232.0032. However, if they do exercise their authority, the form and content of this chapter must be used.

(b) Use of this chapter. If required by the municipal or county authority, the plat applicant and the Texas licensed professional engineer or the Texas licensed professional geoscientist shall use this chapter and the attached form to certify that adequate groundwater is available under the land of a subdivision subject to platting under Texas Local Government Code, §212.004 and §232.001. These rules do not replace other state and federal requirements applicable to public drinking water supply systems. These rules do not replace the authority of counties within designated priority groundwater management areas under Texas Water Code, §35.019, or the authority of groundwater conservation districts under Texas Water Code, Chapter 36.

“ILA”

Rural Plat Applications for Groundwater

- Authority of Each and Purpose of the Agreement
- Duties of Each Defined (County & GCD)
- Communication is Paramount (not for a bookshelf)
 - Developer
 - Developers Consultant/s
 - Discuss the process and goals of the Certification Efforts.
 - Discuss what should be in the TCEQ report.
 - Who does the Geoscience Certification Report go to?
- District Prepare a Written Report

Rural Plat Applicant

Bell County Engineers Office
Guidance before Reviewing
Bell County Engineers Office
Notifies Clearwater UWCD

Required
Water Certification

If **Groundwater** is Proposed Source of Water

Plat Applicant

Clearwater UWCD

Bell County Engineers Office Receives Non-Binding Opinion
from **Clearwater UWCD**

Plat Applicant pursues

Clearwater UWCD Guidance:

- ✓ Tract Size
- ✓ Source Aquifers
- ✓ Certification Process
- ✓ Hire Consultant to Conduct GAC Study*
- ✓ Procure drilling approval
- ✓ Prepare final Study
- ✓ Submit Study to Clearwater UWCD
- ✓ Applicable Fees received

Clearwater UWCD

- ✓ Receives GAC Study Report*
- ✓ Receives permit application (exempt vs non-exempt)
- ✓ Board Deliberation (if needed)
- ✓ Clearwater UWCD issues non-binding opinion to
Commissioners Court per County Engineer's Request

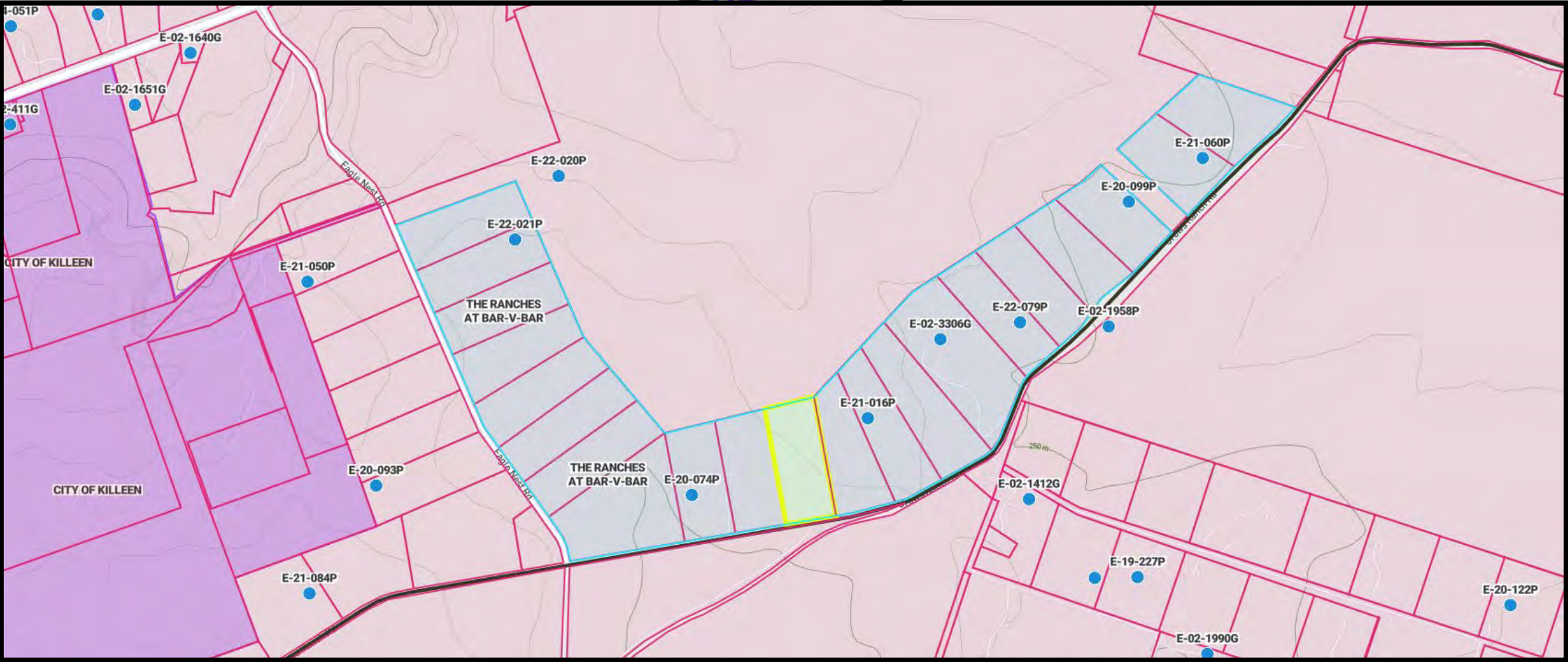
*GAC- Groundwater Availability Certification Per Title 30 of the Texas Administrative Code, Chapter 230



Every drop counts!

Every drop counts!

Example: Ranches at Bar-V-Bar



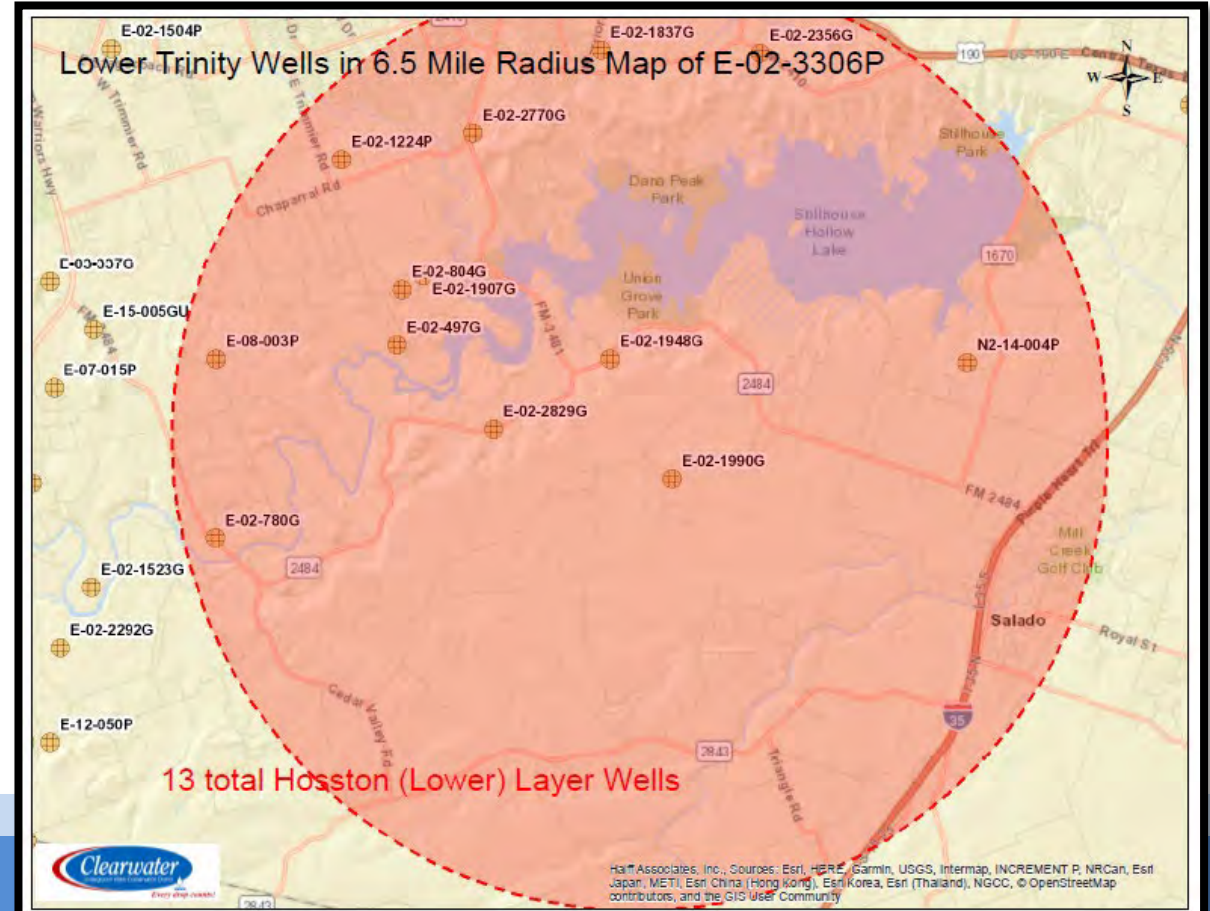
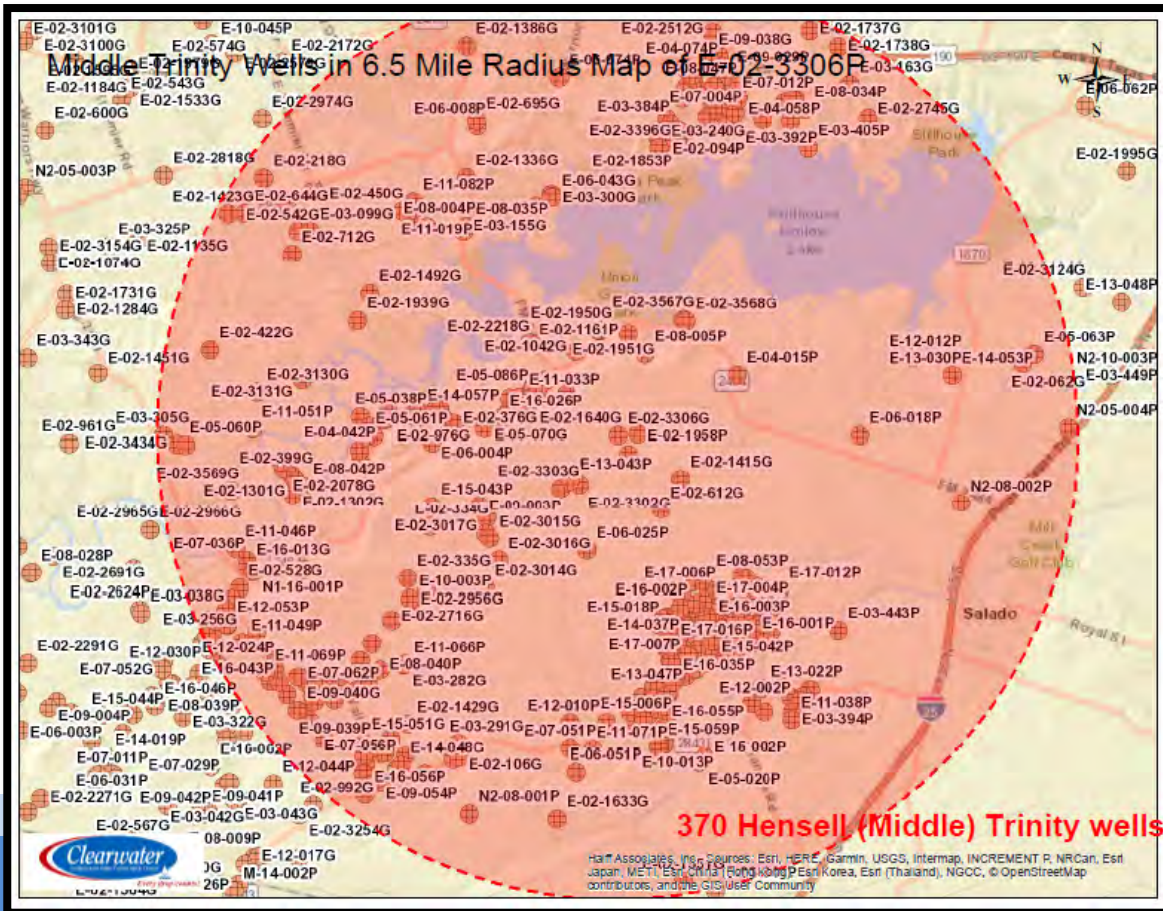
Every drop counts!

Calculated Drawdown Comparison

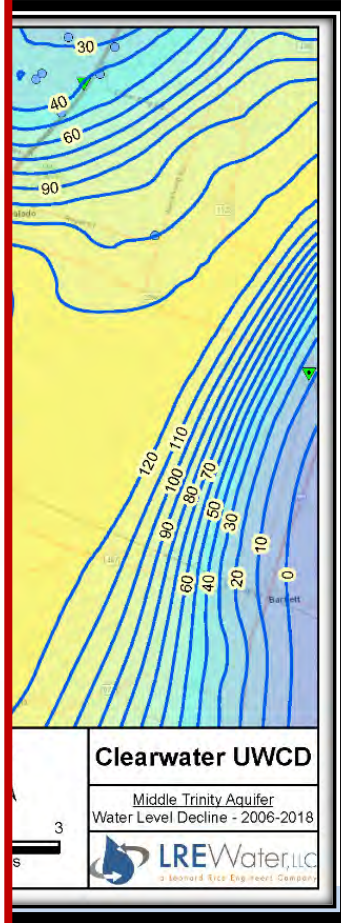
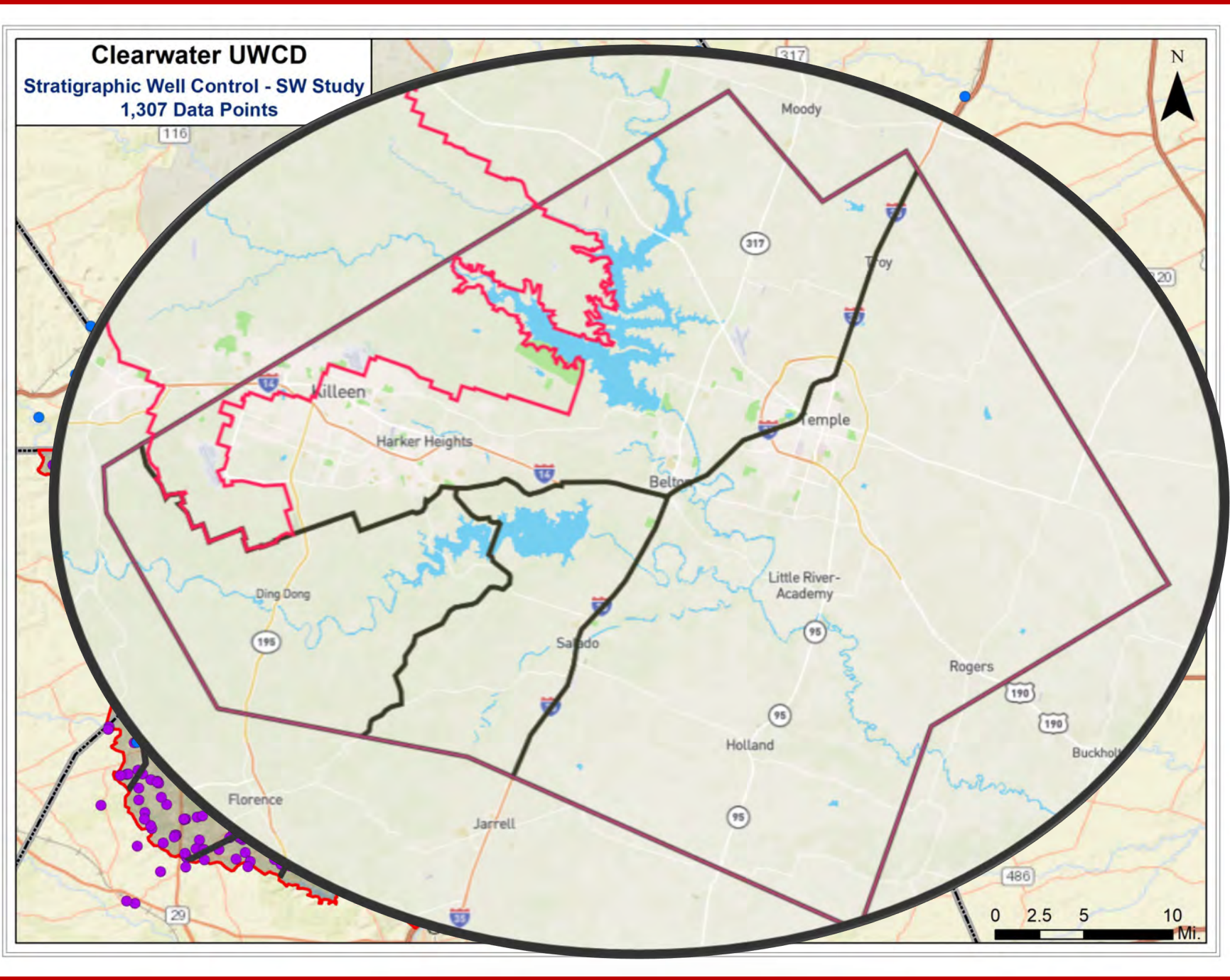
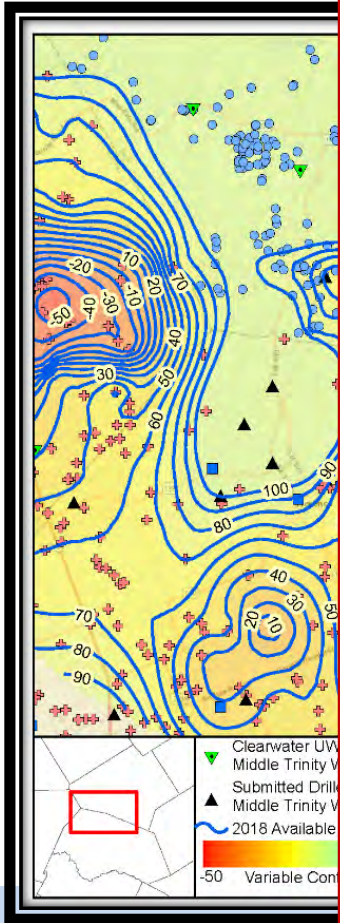
Table 2. Calculated drawdown due to pumping Bar-V-Bar.

<i>Parameter</i>	<i>Middle Trinity</i>	<i>Lower Trinity</i>
1-Year Drawdown, feet	10	1
10-Year Drawdown, feet	13	2
30-Year Drawdown, feet	15	2
Well Interference, feet	1	Negligible
Radius of Influence, miles	6.5	< 1
Limit one Well per Tract	20	
Lower Trinity Aquifer	20	

6.5 Miles Hensell VS Hosston

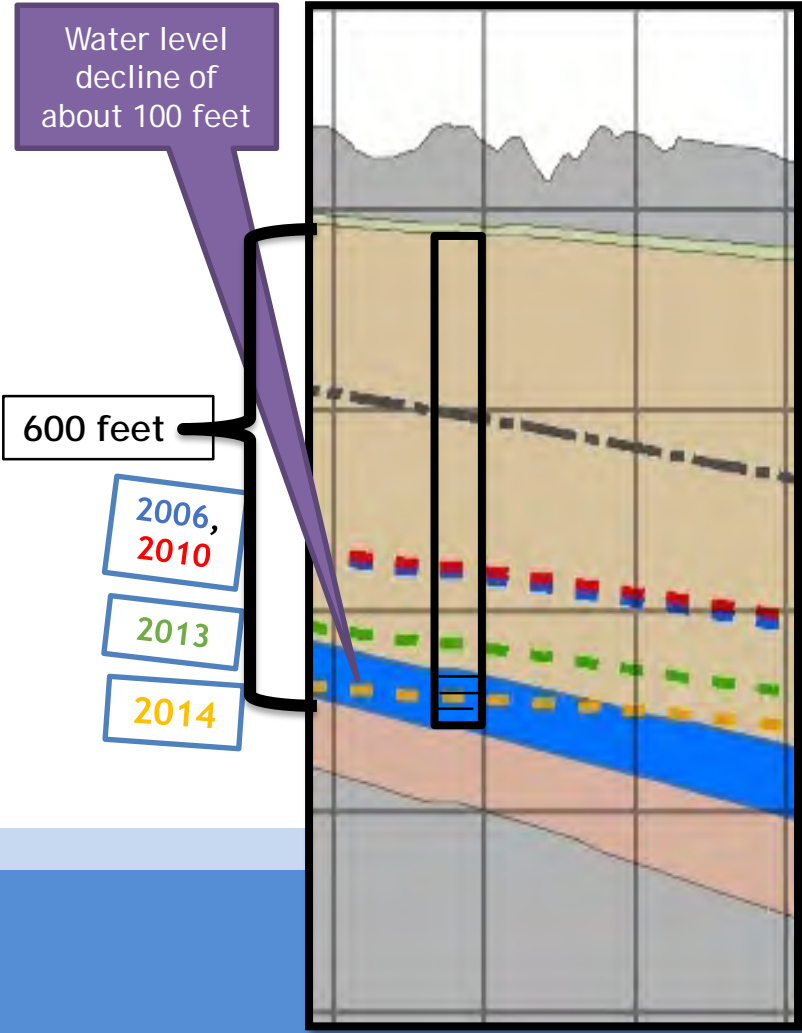


2006-2018

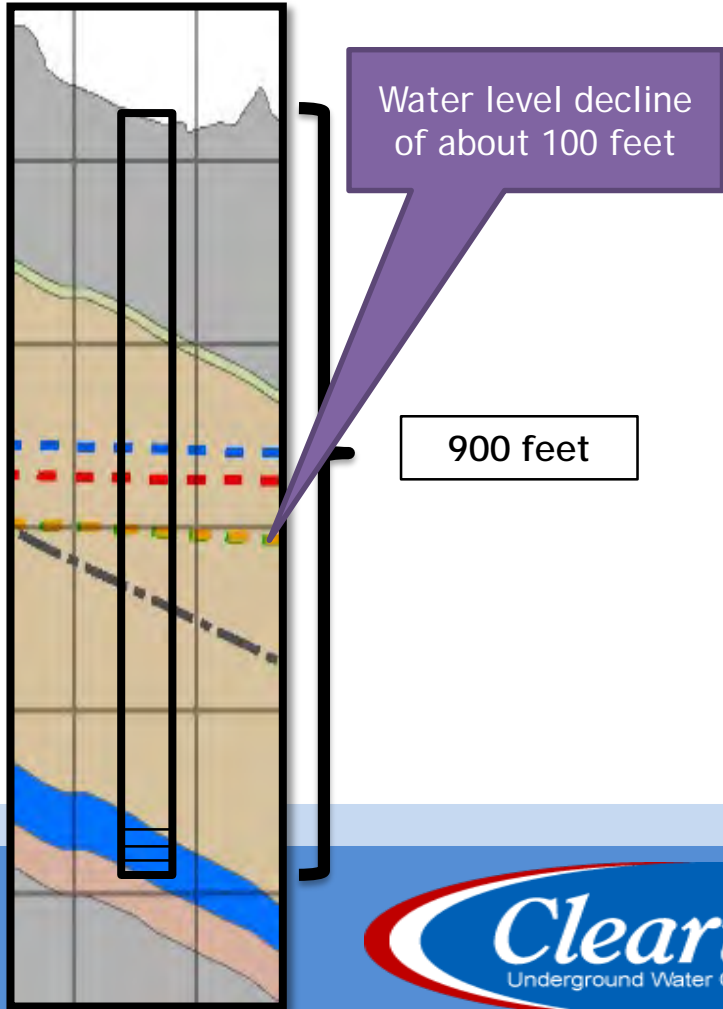


Effects of Water Level Decline

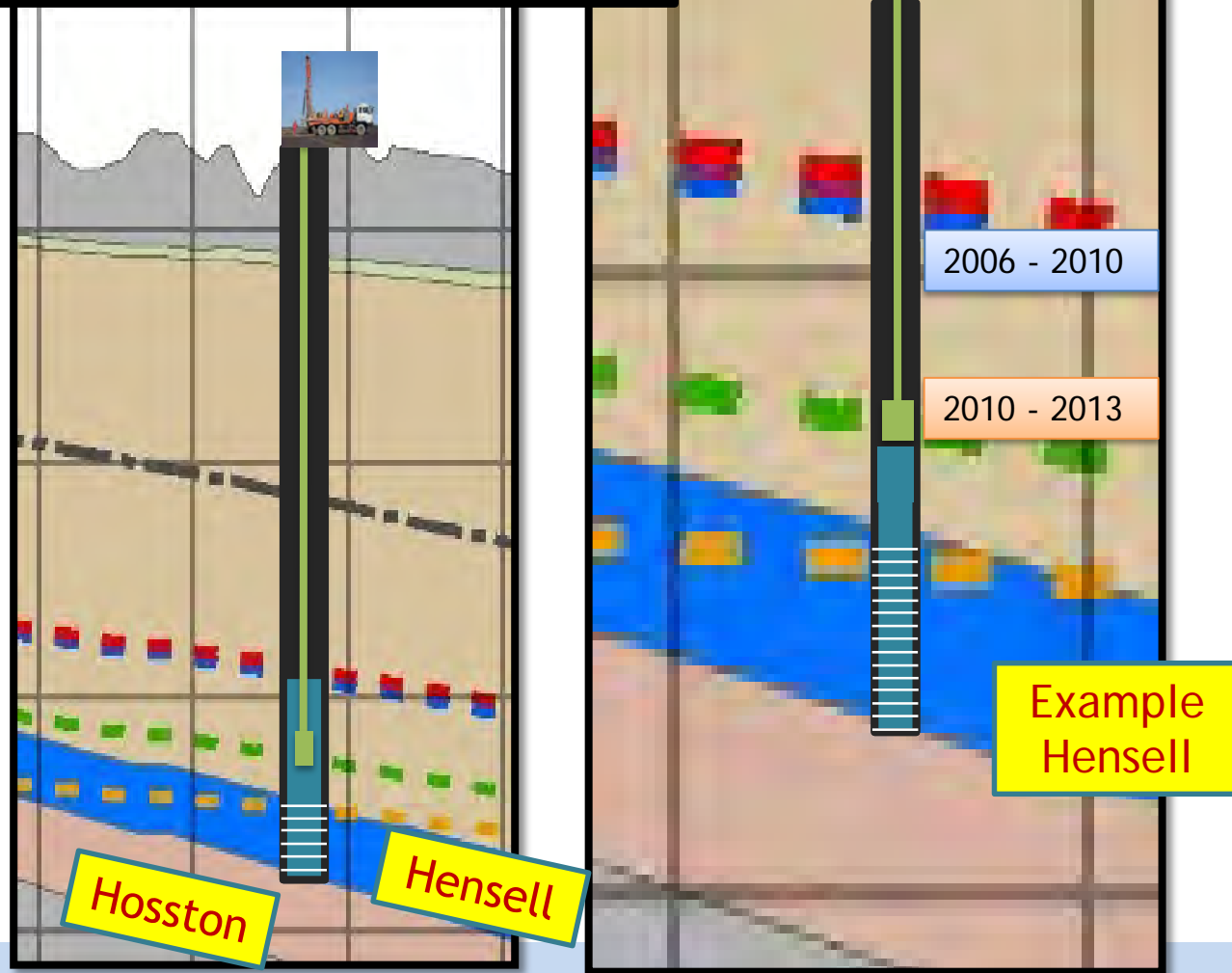
Up-dip Well



Down-dip Well



Effects of Water Level Decline



3D Visualization of the Geology



Hydrographs of “2 Well System” Conjunctive USE

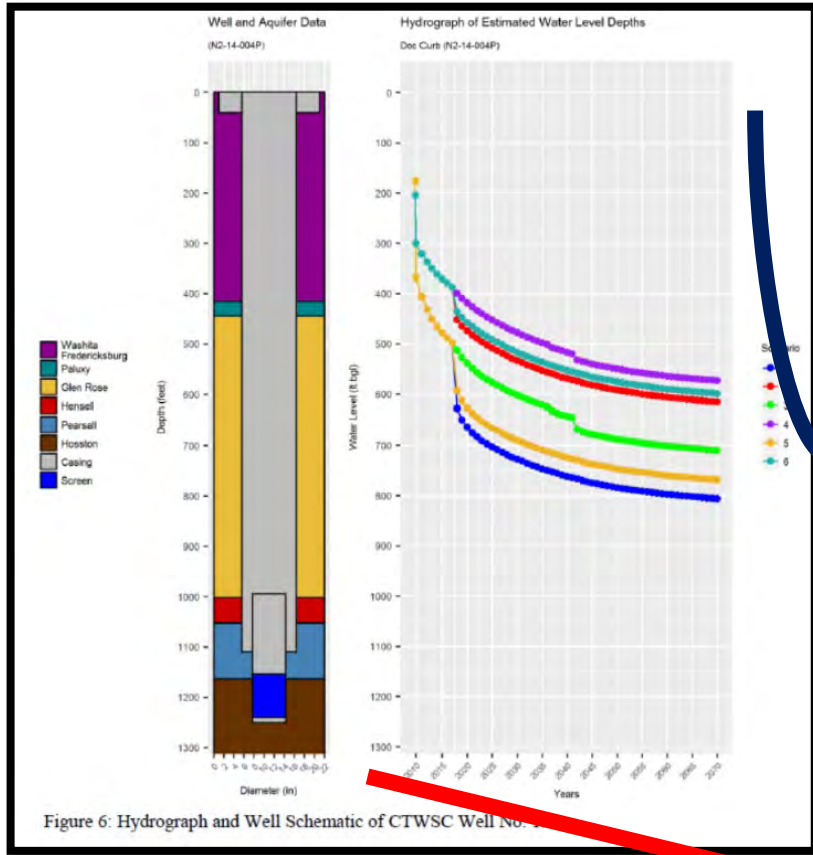


Figure 6: Hydrograph and Well Schematic of CTWSC Well No. 1

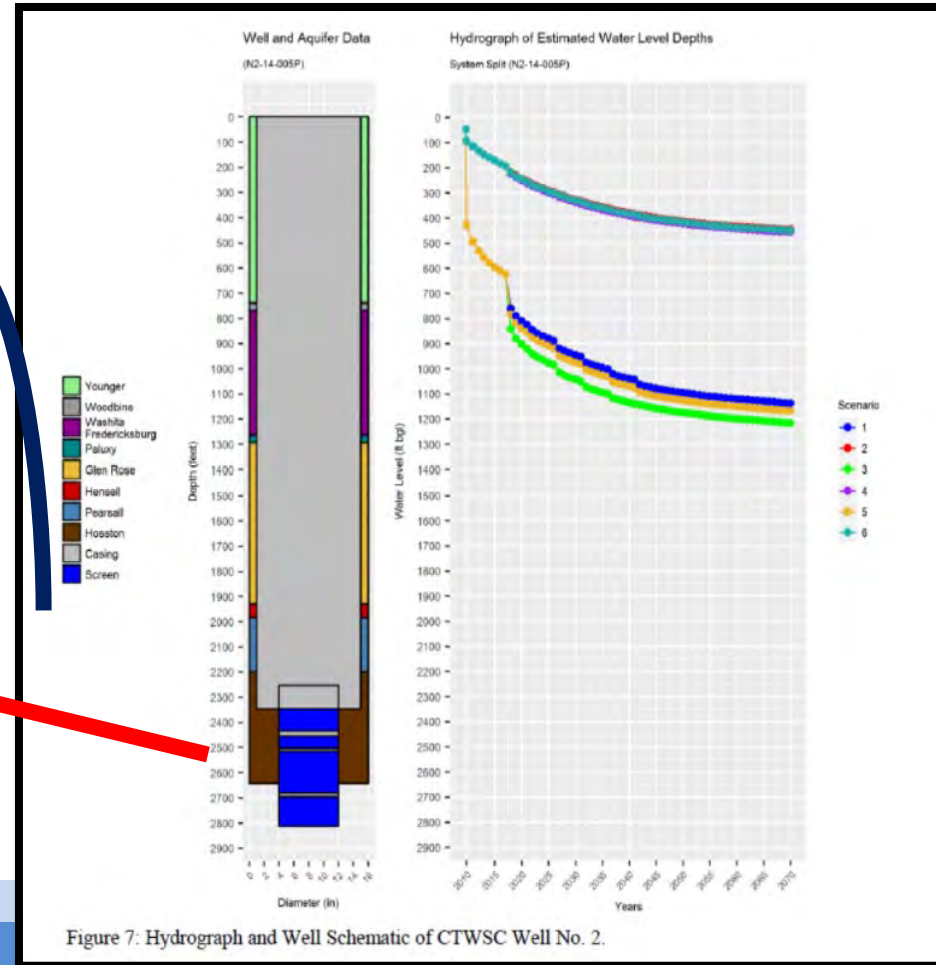
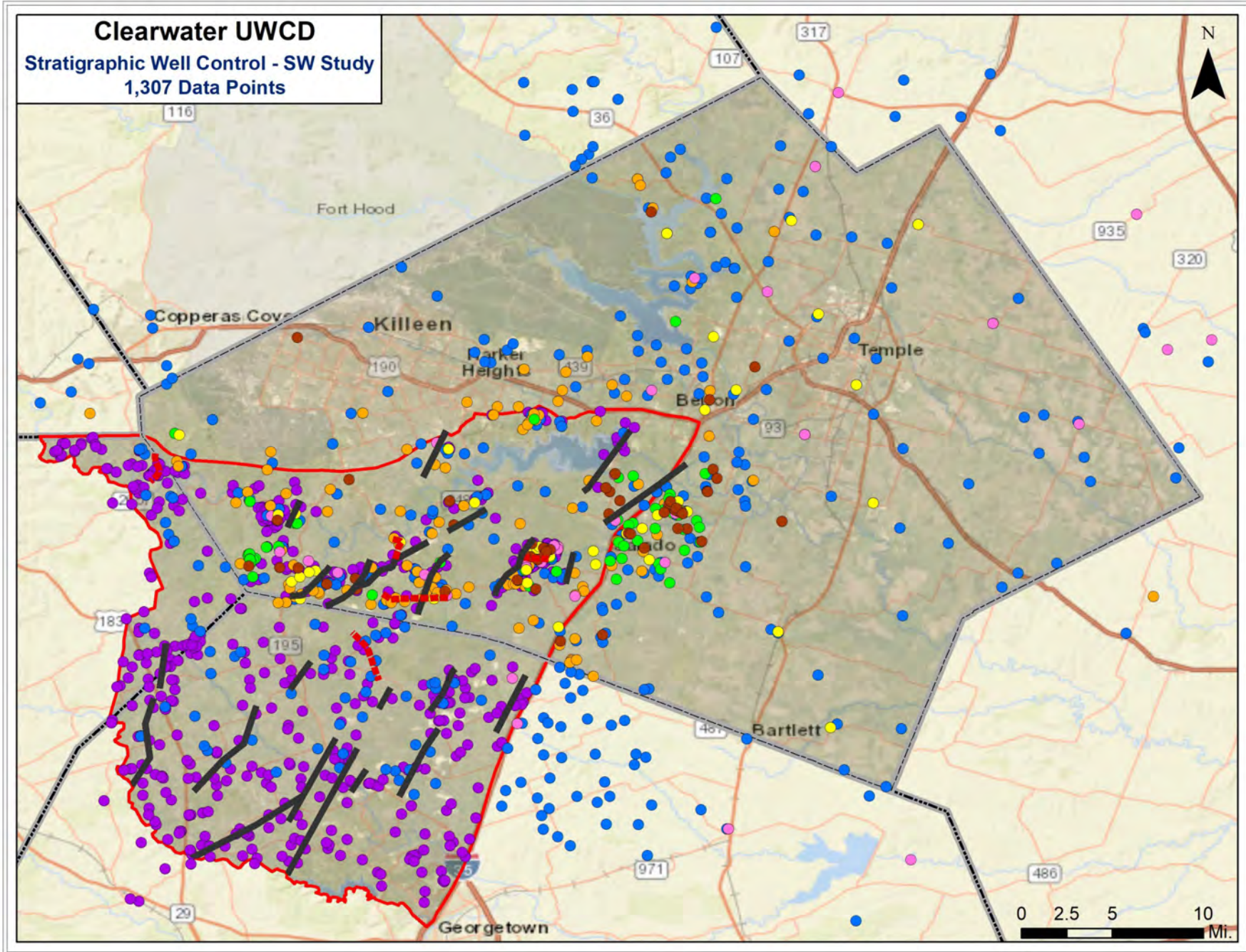
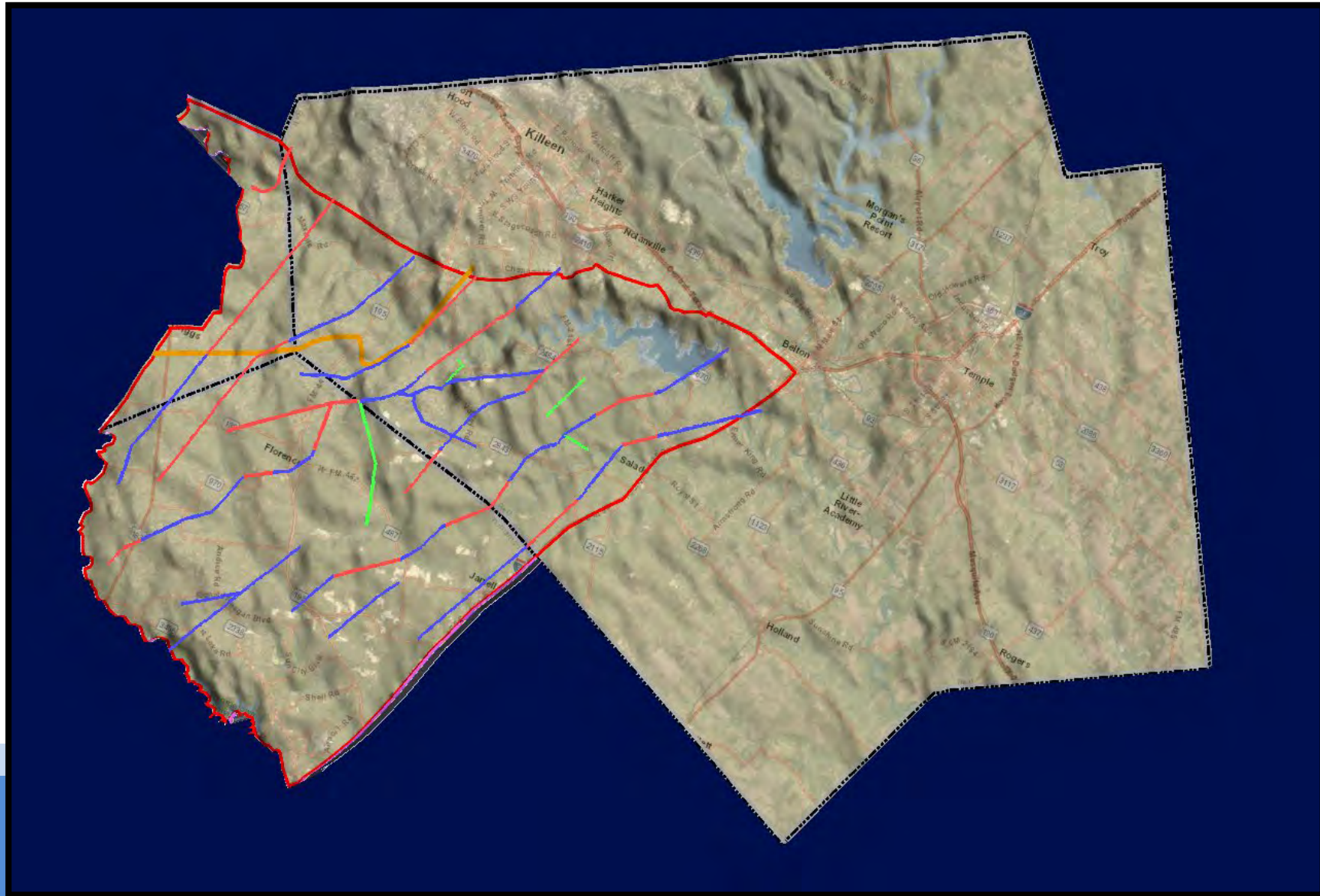


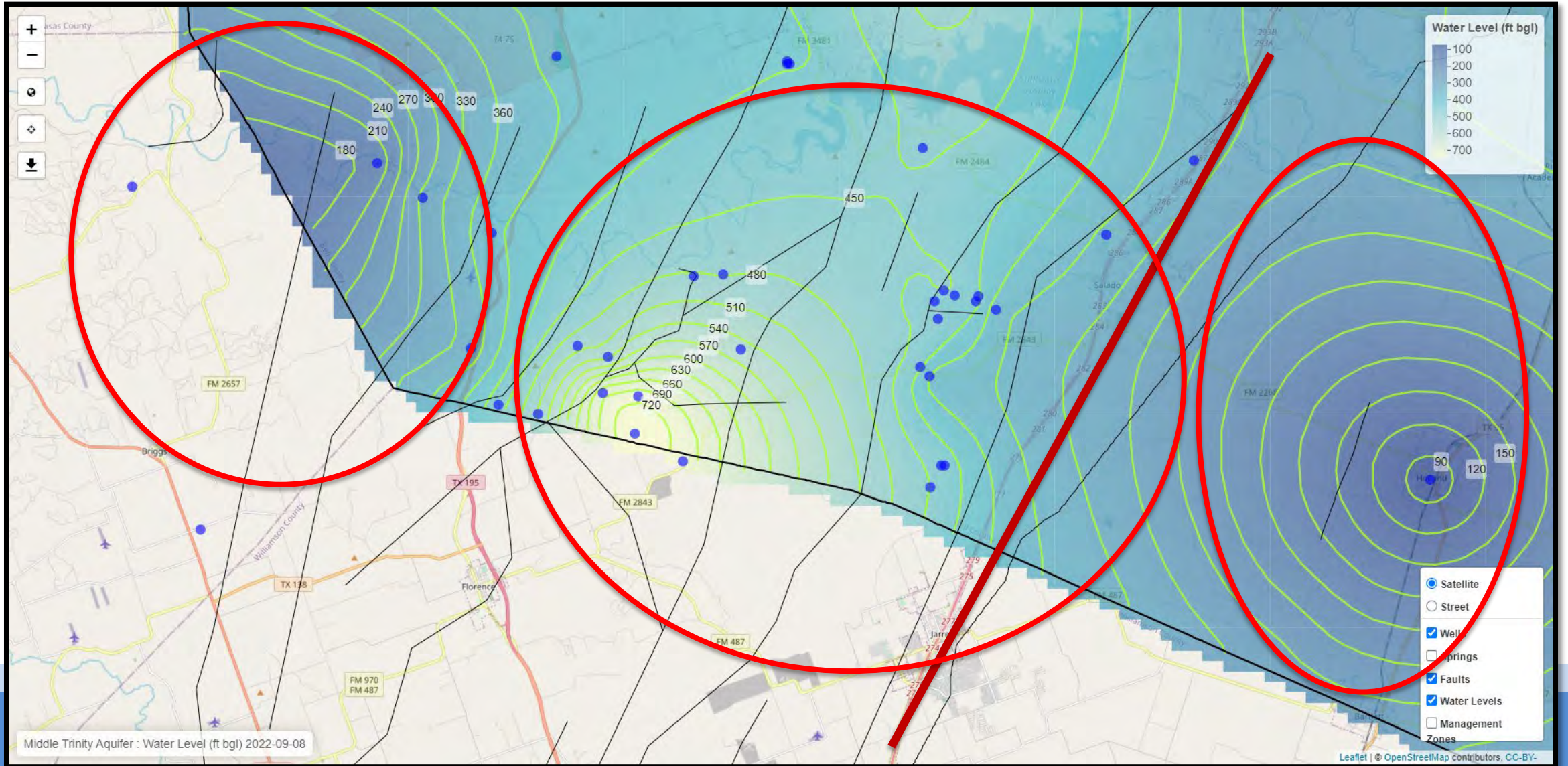
Figure 7: Hydrograph and Well Schematic of CTWSC Well No. 2.

6 - Yrs



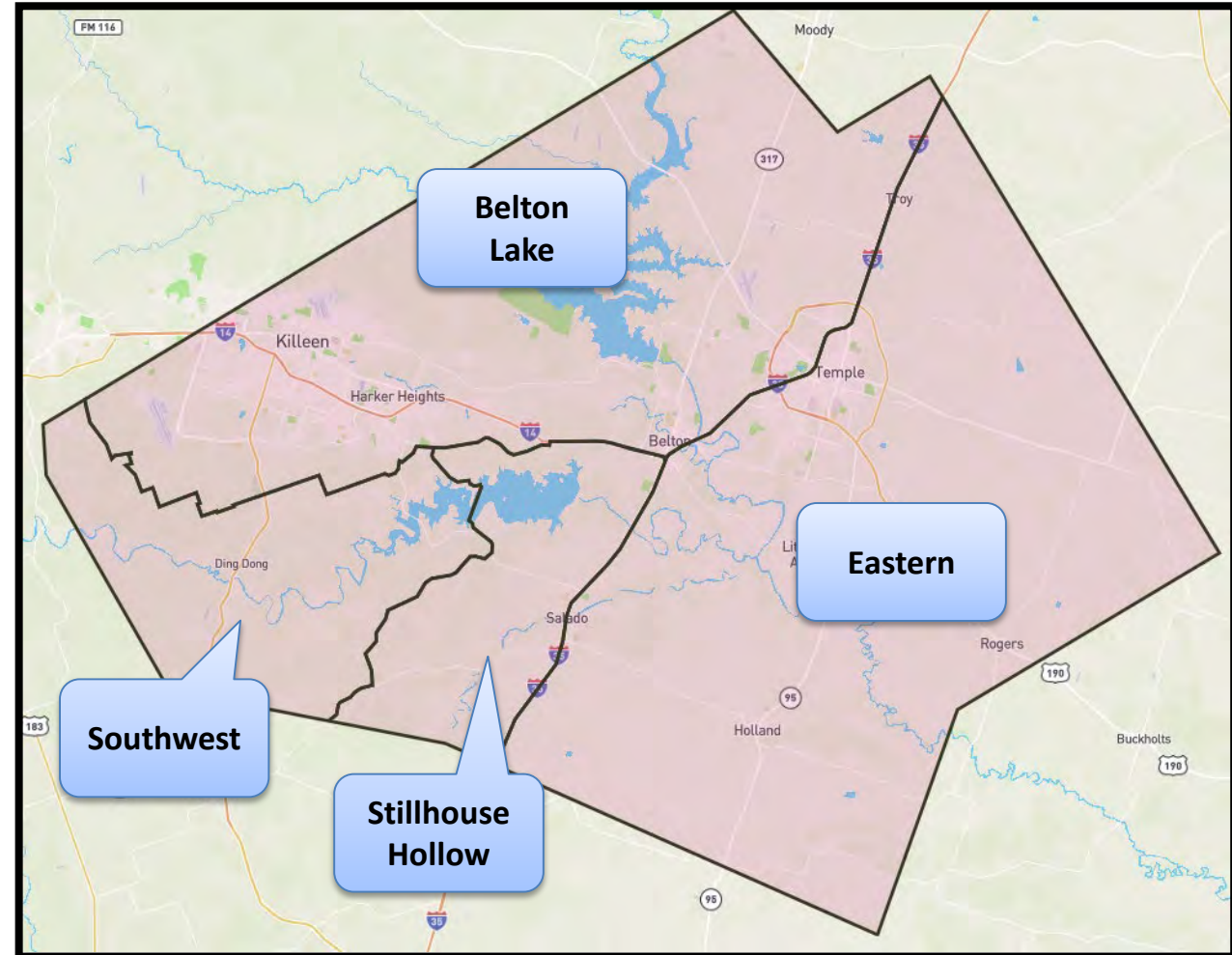


Analytics in an Automated Tool



Trinity Management Zones

- ✓ Science indicates the delineation of management zones
- ✓ Adopted Zones
- ✓ Spacing requirements
- ✓ Column Pipe Size
- ✓ Allow for Exceptions when needed
- ✓ “Well Completion Report”



Upper & Middle Trinity Column Pipe Size, Tract Size, Spacing

Management Zones ***	Min Well Spacing * Min Tract Size	Min Well Spacing * Min Tract Size	Min Well Spacing * Min Tract Size	Min Well Spacing * Min Tract Size	Min Well Spacing * Min Tract Size	Min Well Spacing * Min Tract Size
Column Pipe ** Size	1 ¼-inch	1 ½-inch	2-inch	>2-4 inch	>6-8 inch	>8 inch
Southwest	150 ft 2-acres	330 ft 5-acres				
Stillhouse Hollow	150 ft 2-acres	330 ft 5-acres	660 ft 10-acres			
Belton Lake	150 ft 2-acres	330 ft 5-acres	660 ft 10-acres			
Eastern IH35	150 ft 2-acres	330 ft 5-acres	660 ft 10-acres	1320 ft 20-acres		

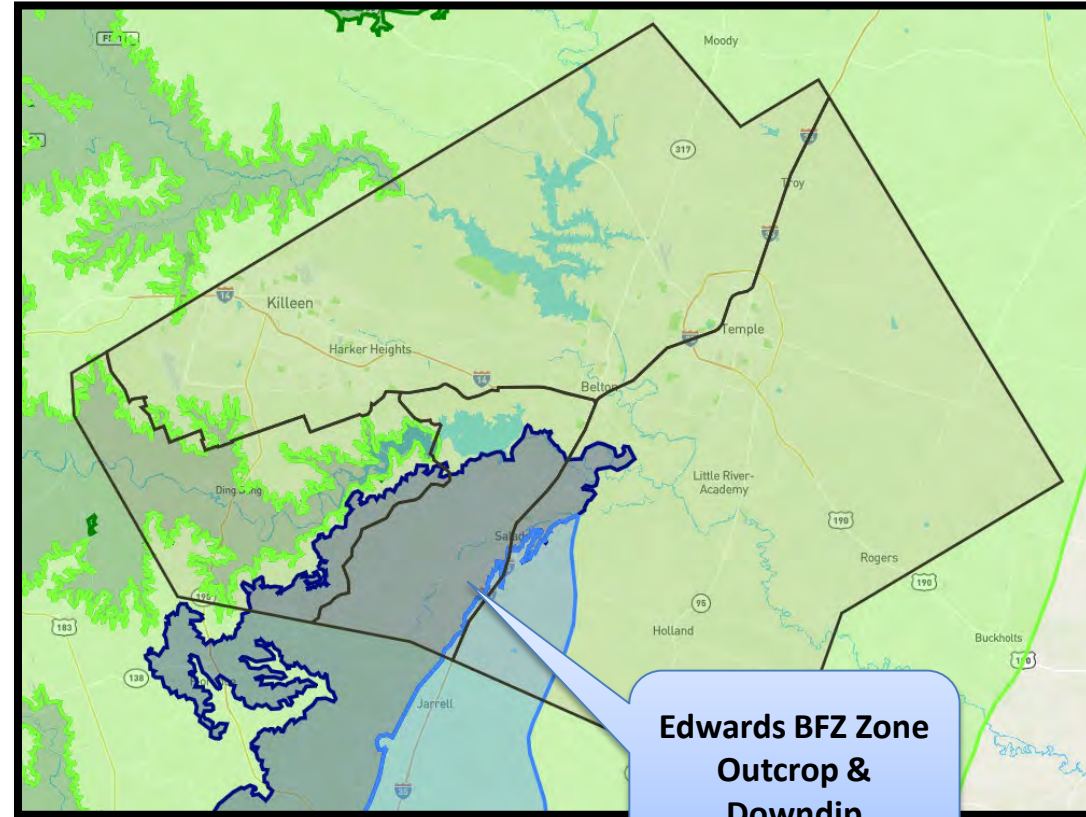
Lower Trinity

Column Pipe Size, Tract Size, Spacing

Management Zones ***	Min Well Spacing *	Min Well Spacing *	Min Well Spacing *	Min Well Spacing *	Min Well Spacing *	Min Well Spacing *	Min Well Spacing *
	Min Tract Size	Min Tract Size	Min Tract Size	Min Tract Size	Min Tract Size	Min Tract Size	Min Tract Size
Column Pipe **Size	1 ¼-inch	1 ½-inch	2-inch	>2-4 inch	>4-6 inch	>6-8 inch	>8 inch
Southwest	150 ft 2-acres	330 ft 5-acres	⊗	⊗	⊗	⊗	⊗
Stillhouse Hollow	150 ft 2-acres	330 ft 5-acres	660 ft 10-acres	1320 ft 20-acres	1980 ft 30-acres	⊗	⊗
Belton Lake	150 ft 2-acres	330 ft 5-acres	660 ft 10-acres	1320 ft 20-acres	1980 ft 30-acres	5280 ft 40-acres	5280 ft 40-acres
Eastern IH35	150 ft 2-acres	330 ft 5-acres	660 ft 10-acres	660 ft 20-acres	1320 ft 30-acres	2640 ft 40-acres	5280 ft 50-acres

Edwards BFZ Management Zone

- ✓ Science indicates the delineation of a management zone
- ✓ Adopts full suite of specific spacing requirements
- ✓ Continue use Column Pipe Size with enhanced tract size
- ✓ Allow for Exceptions when needed
- ✓ “Hydrogeologic Report” to a “Well Completion Report”



Edwards BFZ Zone
Outcrop &
Downdip

Proposed Edwards BFZ

Column Pipe Size, Tract Size, Spacing

Management Zone	Min Well Spacing *	Min Well Spacing *	Min Well Spacing *	Min Well Spacing *	Min Well Spacing *	Min Well Spacing *	Min Well Spacing *
***	Min Tract Size	Min Tract Size	Min Tract Size	Min Tract Size	Min Tract Size	Min Tract Size	Min Tract Size
Column Pipe **Size	1 ¼ -inch	1 ½ -inch	2-inch	>2-4 inch	>4-6 inch	>6-8 inch	>8 inch
Edwards BFZ	150 ft *	330 ft *	330 ft *	660 ft *	1320 ft *	2640 ft *	5280 ft *
	2-acres	5-acres	10-acres	20-acres	30 -acres	40-acres	50-acres

Balancing Act

Conservation

protection, recharging and
of groundwater

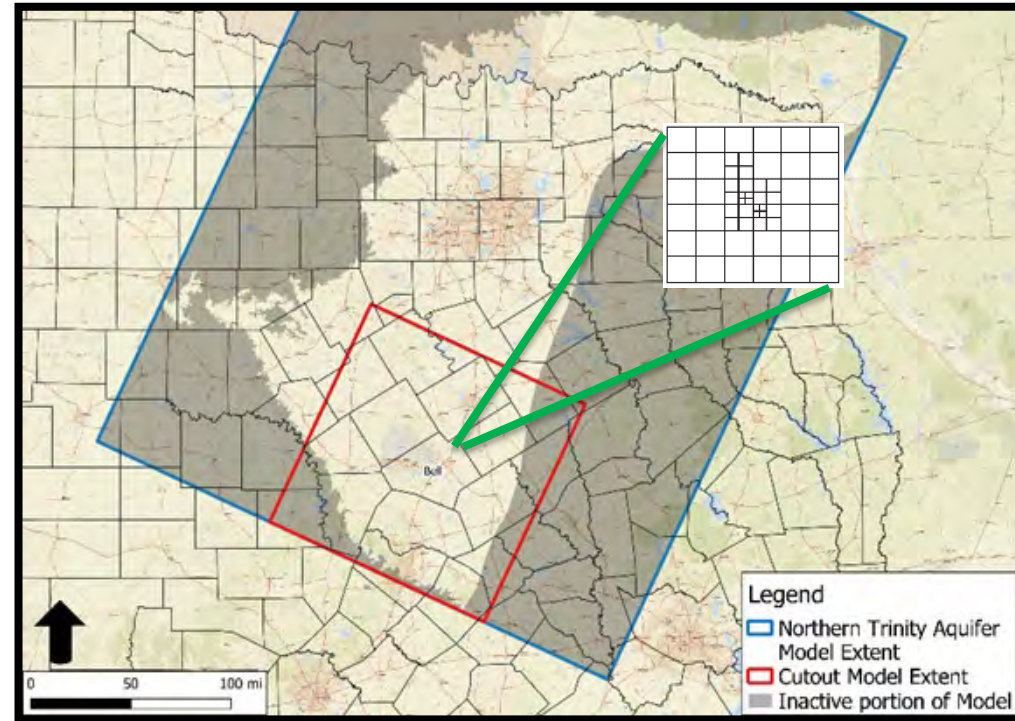
Rights of Land
highest prac
groundwater



Future Investment

Proposed New CUWCD GAM

- Develop smaller area model based on Bell County ASR model
- Use MODFLOW 6 code
- Incorporate new pumping test results for Hensell and Hosston
- Update Bell County stratigraphy based on 3D model
- Update pumping
- Calibrate the model with tight constraints on parameterization



Questions

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Learn more on our website at:
www.cuwcd.org