

Bell County Annual Water Symposium

November 14, 2023

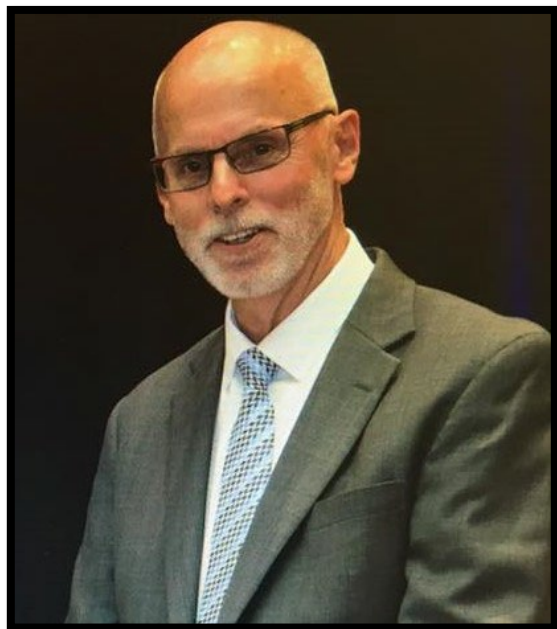
The screenshot displays the Clearwater Underground Water Conservation District website dashboard. At the top left is the LRE WATER logo, and at the top right is a Portal Login button. The main header features the Clearwater logo with the tagline "Every drop counts!".

The dashboard is divided into three main sections:

- Left Section:** A landscape image of a mountain range with two yellow buttons: "Texas Drought Maps" and "Bell County Drought Maps". Below the image is the NIDIS Texas Drought.gov logo and a button for "USGS Water Dashboard Salado Ck at Salado, TX".
- Middle Section:** A USGS data plot for "Salado Ck at Salado, TX" (USGS 08104300). The plot shows discharge in cubic feet per second (cfs) from 05 Nov to 11 Nov. The current discharge is 12.5 cfs at 2:55 PM CST, 13 minutes ago. The plot shows a steady increase in discharge from about 5 cfs on Nov 5 to a peak of 12.5 cfs on Nov 10.
- Right Section:** A map titled "Clearwater Wells Public Map" showing numerous wells (blue and red dots) around a reservoir. A callout box says "Well Owners Enter Production Data".

Groundwater Resource Update

Clearwater UWCD



Dirk Aaron
General Manager

- ✓ **Serving as General Manager since 2011**
- ✓ **Texas AgriLife Extension Service 30 yrs. until 2011**

Leland Gersbach
Board President



- ✓ **Serving since 2002**
- ✓ **Board President since 2010**

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Board President



- ✓ **Serving since 2002**
- ✓ **Board President since 2010**





Elected Directors



Leland Gersbach
Board President
Director Precinct 1



Jody Williams
Board Vice – President
Director Precinct 3



Scott Brooks
Director Precinct 4



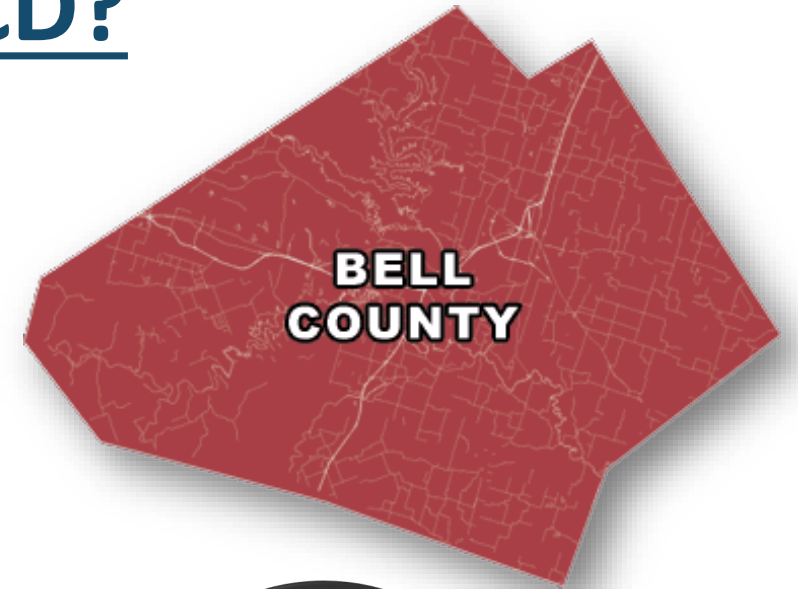
Gary Young
Board Secretary
Director Precinct 2

Jim Brown
Director At-Large



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
- ❖ **FY24 tax rate \$0.002372/\$100 assessed value**



Every drop counts! Every drop counts!

Clearwater UWCD Staff & Office

Dirk Aaron – General Manager

Shelly Chapman – Administrative Manager

Tristin Smith – Compliance/Education Coordinator

Corey Dawson – Field Technician





Dirk Aaron
General Manager

- ✓ **Serving as General Manager since 2011**
- ✓ **Texas AgriLife Extension Service 30 yrs. until 2011**



GROUNDWATER VOCABULARY

GCD Groundwater Conservation Districts are political subdivisions created to protect aquifers and manage the use of groundwater. GCDs are granted authority in Chapter 36 of the Texas Water Code to manage groundwater production through various methods, including well spacing and production limitations.

GMA Groundwater Management Areas are designated by the TWDB for regional planning purposes. GCDs within the GMA meet to jointly develop DFCs for the GMA region.

DFC a Desired Future Condition is a quantifiable condition of an aquifer at a specified future time. It may be based on aquifer levels, spring flows, or volumes of water in the aquifer (example: average drawdown not to exceed 75 feet at the end of 50 years). In setting DFCs, GCDs balance groundwater production with conservation and protection of the aquifer and then manage that production on a long term basis to achieve and maintain the DFC.

TWDB The Texas Water Development Board is the state agency responsible for overseeing state and regional water planning, providing financial assistance for local government water projects, and studying the state's surface water and groundwater resources.

MAG the Modeled Available Groundwater is calculated by the TWDB and is the amount of water that may be produced on an average annual basis to achieve a DFC. The MAG is one tool used by GCDs to ensure consistency with the DFC, and is used by regional water planning groups.

texasgroundwater.org



GROUNDWATER VOCABULARY

Rule of Capture grants landowners a legal right to capture the water beneath their property without regard to effects on neighboring wells except in cases of waste or malice.

Groundwater Ownership the Texas Legislature and Texas Supreme Court have recognized that landowners have a constitutionally protected property right in groundwater and own the groundwater below the surface as real property, subject to the rule of capture and regulation by GCDs.

GAM a groundwater availability model is a regional groundwater flow model approved by the TWDB.

Joint Planning the process by which GCDs in a GMA work together to develop DFCs, review groundwater management plans, assess the accomplishments of the GMA, and evaluate the need to modify the DFCs.

Management Plan a plan adopted by a GCD, approved by the TWDB, and forwarded to regional water planning groups that outlines the GCD's management goals and objectives. The plan must include performance standards, methods for achievement, and groundwater estimates.

TAGD the Texas Alliance of Groundwater Districts is a 501(c)(3) association that assists GCDs, provides outreach and education, and facilitates communication.

GCDI the GCD Index is available on TAGD's website and is a searchable, interactive online information bank with data on GCDs across the state.

texasgroundwater.org



TAGD's GUIDE TO TEXAS GCDs

CHAPTER 36, TEXAS WATER CODE

All GCDs are governed by the laws defined in Chapter 36 of the Texas Water Code. Chapter 36 provides specific instruction on operational, permitting, procedural, and planning requirements.

ACCOUNTABILITY & OVERSIGHT

As political subdivisions, GCDs are subject to special purpose district laws. Additionally, GCDs are subject to local accountability through local boards and public input, as well as state agency and judicial oversight. GCDs are also accountable to each other through the GMA process and development of DFCs.

CONSERVATION & PROTECTION

The fundamental mandate of a GCD is to balance the protection of the resource with a landowners' right to produce water. GCD rules protect groundwater by ensuring fair access to and long term management of the resource.

COOPERATIVE MANAGEMENT

All GCDs are required to set cooperative management goals within their GMAs through the adoption of a DFC. This requires GCDs to coordinate their groundwater usage and manage cooperatively within an aquifer.

texasgroundwater.org



TAGD's GUIDE TO TEXAS GCDs

NOT ALL AQUIFERS ARE CREATED EQUAL

Texas has 9 major and 21 minor aquifers, and each operates differently. GCD rules are designed to address the different hydrogeologic characteristics of each aquifer. GCD rules must allow for differences in hydrology between and within aquifers.

LOCAL CONDITIONS

Different groundwater uses require different management. The type, frequency, and volume of groundwater usage can affect the aquifer. For example, groundwater produced for agriculture in a rural area may allow different spacing than groundwater produced for a public water supply in an urban area. Chapter 36 allows GCDs to address local conditions in their rules.

ENABLING LEGISLATION MATTERS

Most GCDs are locally created by legislative action. A GCD's individual enabling legislation defines the districts characteristics, including its financing and exemptions. A GCD's enabling legislation and its subsequent rules affect its management.

PROPERTY RIGHTS & MARKET TRANSACTIONS

GCDs ensure equal protection of all property rights and investment-backed expectations. GCDs also provide regulatory certainty for market transactions through permitting and by managing to the DFC.

texasgroundwater.org

GCDs 101

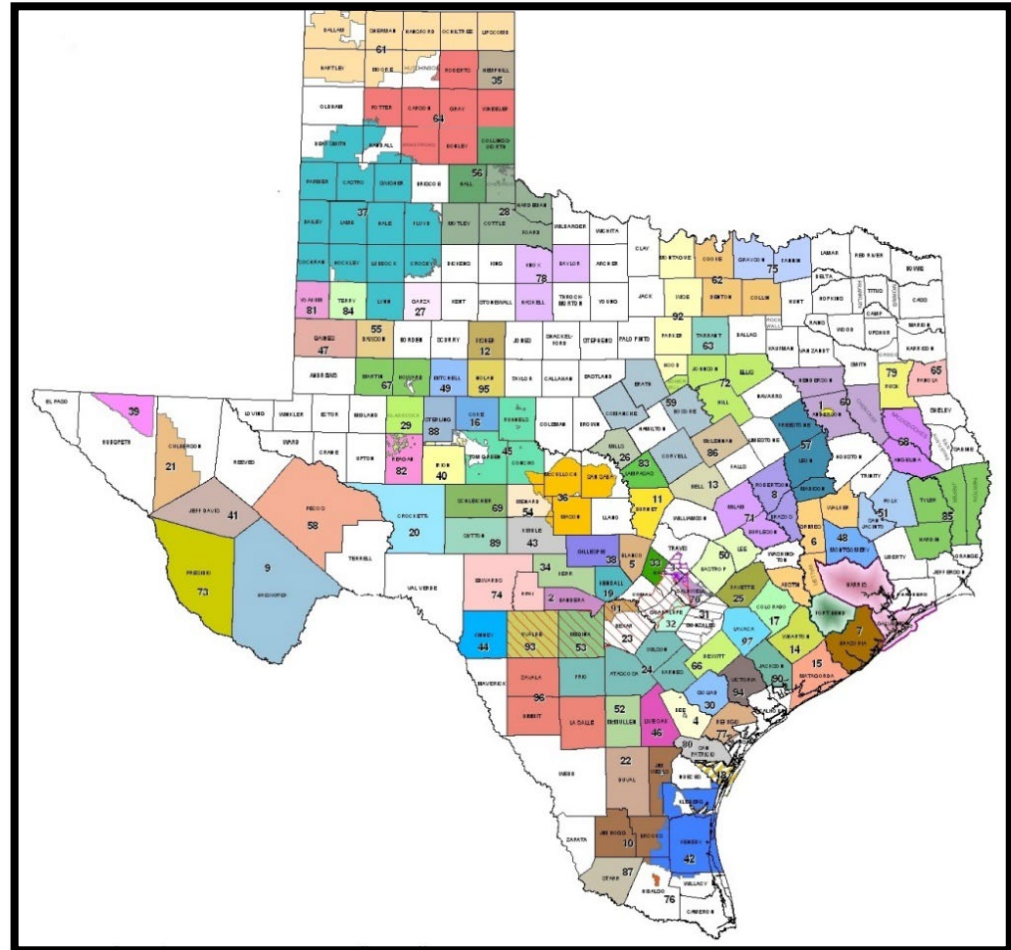
Rule of Capture VS Modified Rule of Capture



- ✓ **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

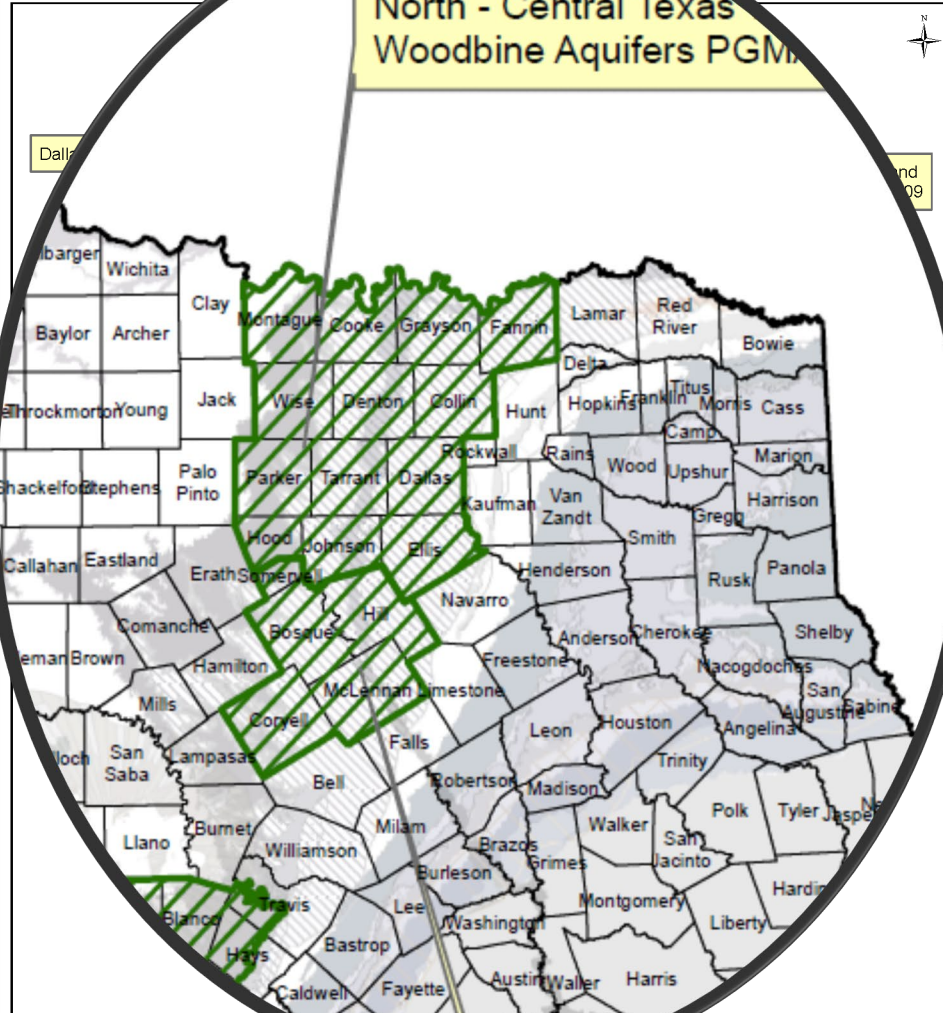
GCD = Groundwater Conservation Districts

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

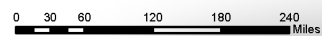


Texas Priority Groundwater Management Areas (PGMAs)

North - Central Texas Woodbine Aquifers PGMAs



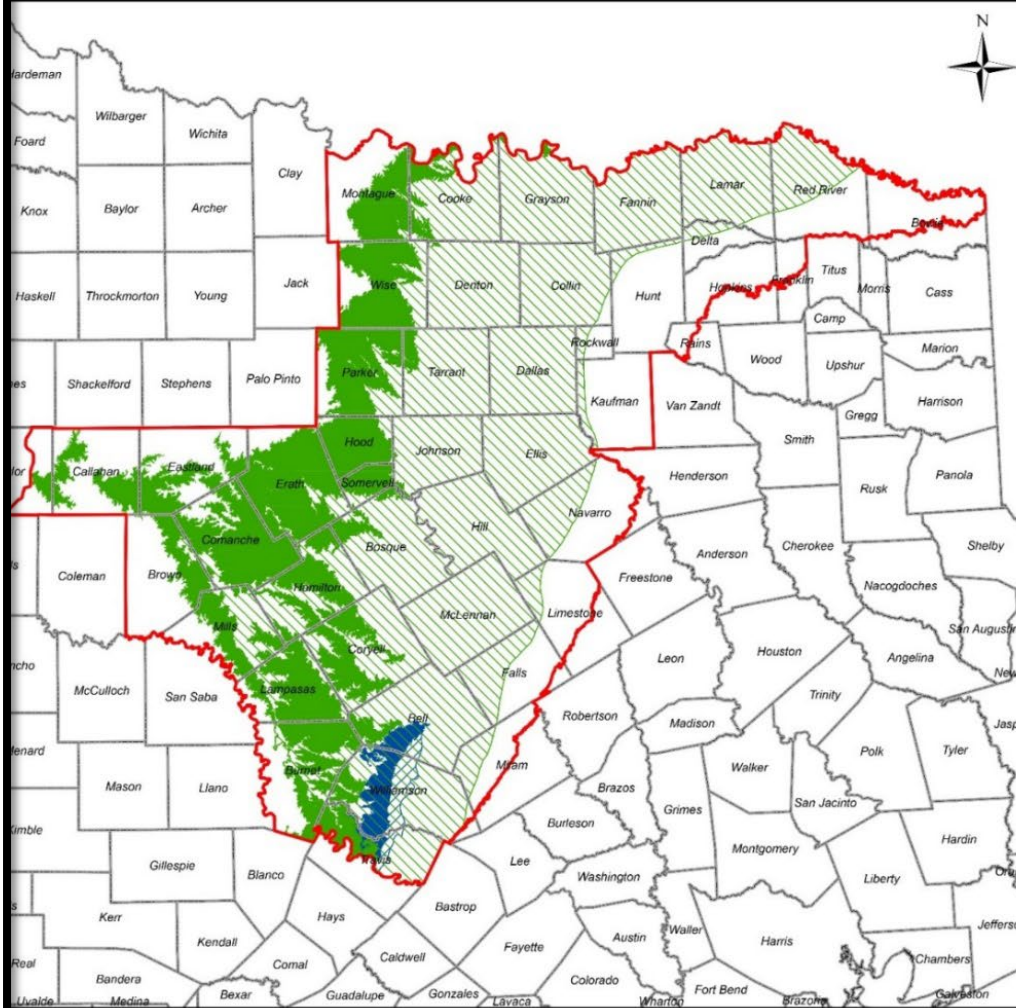
- Designated PGMA
- County Boundaries
- Texas Major and Minor Aquifers



This map was generated by the Water Availability Division of the Texas Commission on Environmental Quality. This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries. For more information concerning this map, contact the Water Availability Division at (512) 239-4891

Map printed January, 2018.

Groundwater Management Area 8



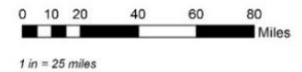
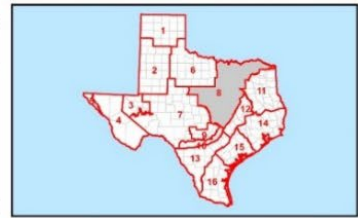
MAP LEGEND

- GMA 8
- Counties

Major Aquifers

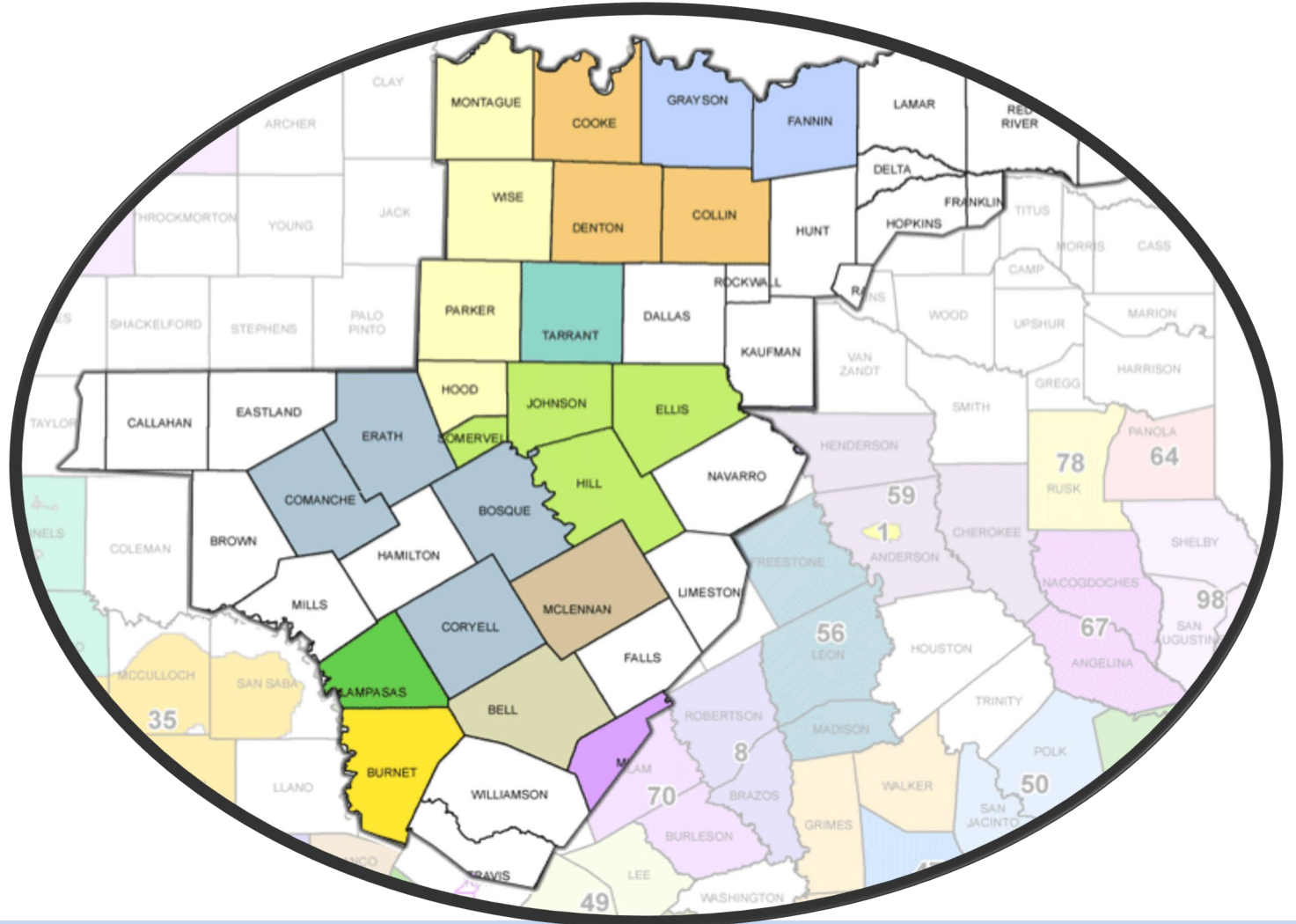
- Edwards BFZ (outcrop)
- Edwards BFZ (subcrop)
- Trinity (outcrop)
- Trinity (subcrop)

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



11 Total GCDs

- Red River GCD – 2 **PIGMA**
- North TX GCD – 3 **PIGMA**
- Upper Trinity GCD – 4 **PIGMA**
- Northern Trinity GCD – 1 **PIGMA**
- Prairie Lands GCD – 4 **PIGMA**
- Middle Trinity GCD – 4 **PIGMA**
- Southern Trinity GCD – 1 **PIGMA**
- Saratoga UWCD – 1
- Central Texas GCD – 1
- Clearwater UWCD – 1
- Post Oak Savannah GCD – 2



Tax Implications

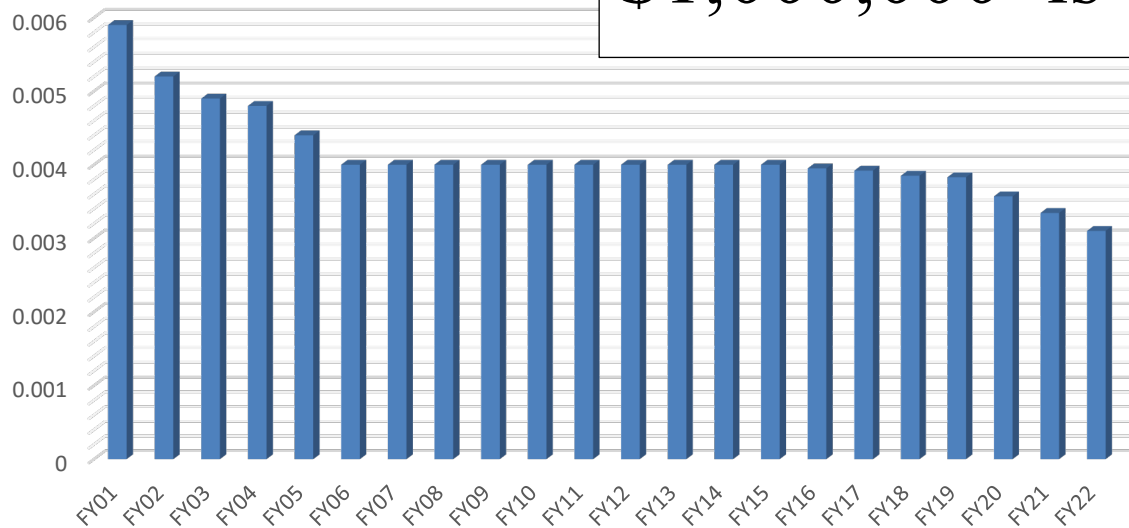
FY24 = .002372/ \$100

\$100,000 is \$ 2.37/year

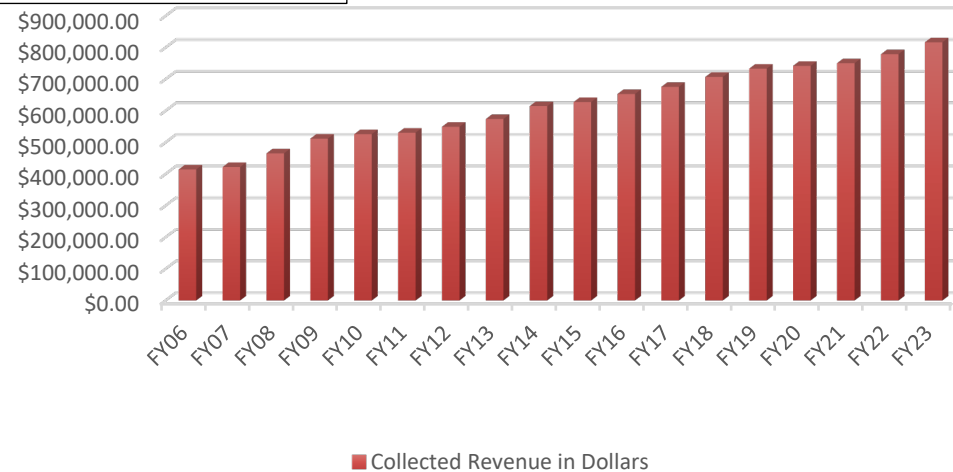
\$250,000 is \$ 5.93/year

\$1,000,000 is \$ 23.70/year

CUWCD Tax Rate



District Budget



Groundwater Wells Managed for Clarity

All wells in Bell County are required to be registered.

Two Types of Wells

5,778 well pts in the data base

1) Exempt Wells are exempt from permitting:

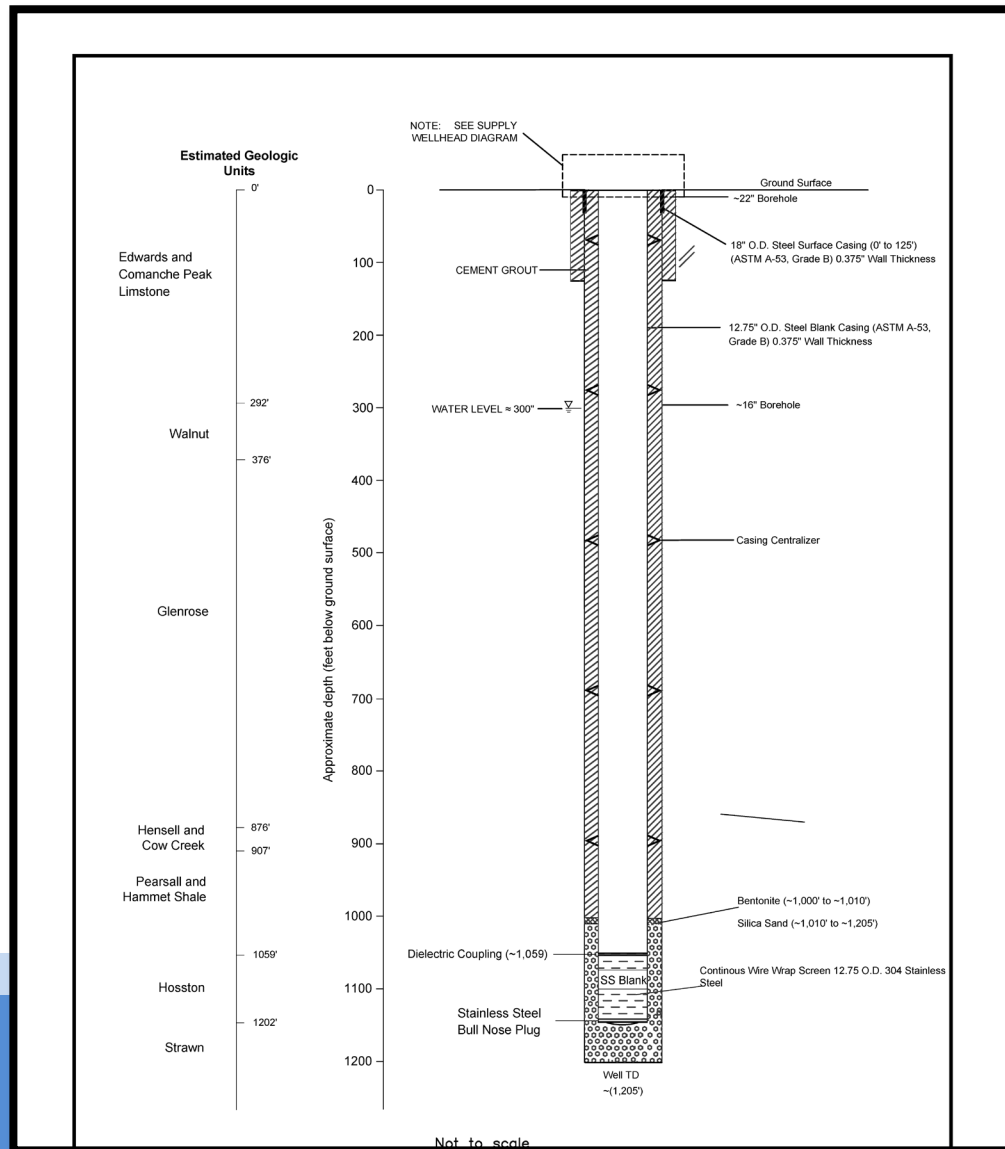
- ❖ Wells used for domestic purposes or for watering livestock or poultry
- ❖ Wells must be incapable of producing more than 25,000 gallons per day
- ❖ Wells must be located on a tract of land consisting of at least ten acres;
 - ❖ Smaller tracts are acceptable if they were lawfully configured prior to March 1, 2004, as a tract less than 10 acres in size.

2) Non-Exempt wells must obtain a permit and report monthly Use.

4,028 active
Exempt wells

159 active
Non-Exempt
permitted wells

Permitting Process for Non-Exempt Wells



Must Go to a Public Hearing

- **Step One**
 - Drilling Report
- **Step Two**
 - Operating Permit
- **Each Hearing Allows:**
 - Applicant to be Heard
 - Applicants Experts
 - District to be Heard
 - Districts Experts
 - District GM
- **Protestants to be Heard**

What does the Legislature require us to do?

Powers and Duties

Participate in Joint Planning

Develop & Adopt a Groundwater Management Plan

Develop Rules to Implement the Groundwater Management Plan & Achieve Desired Future Condition

Use Chapter 36 Toolbox to determine well spacing, permitting structure, production limits on wells, etc.

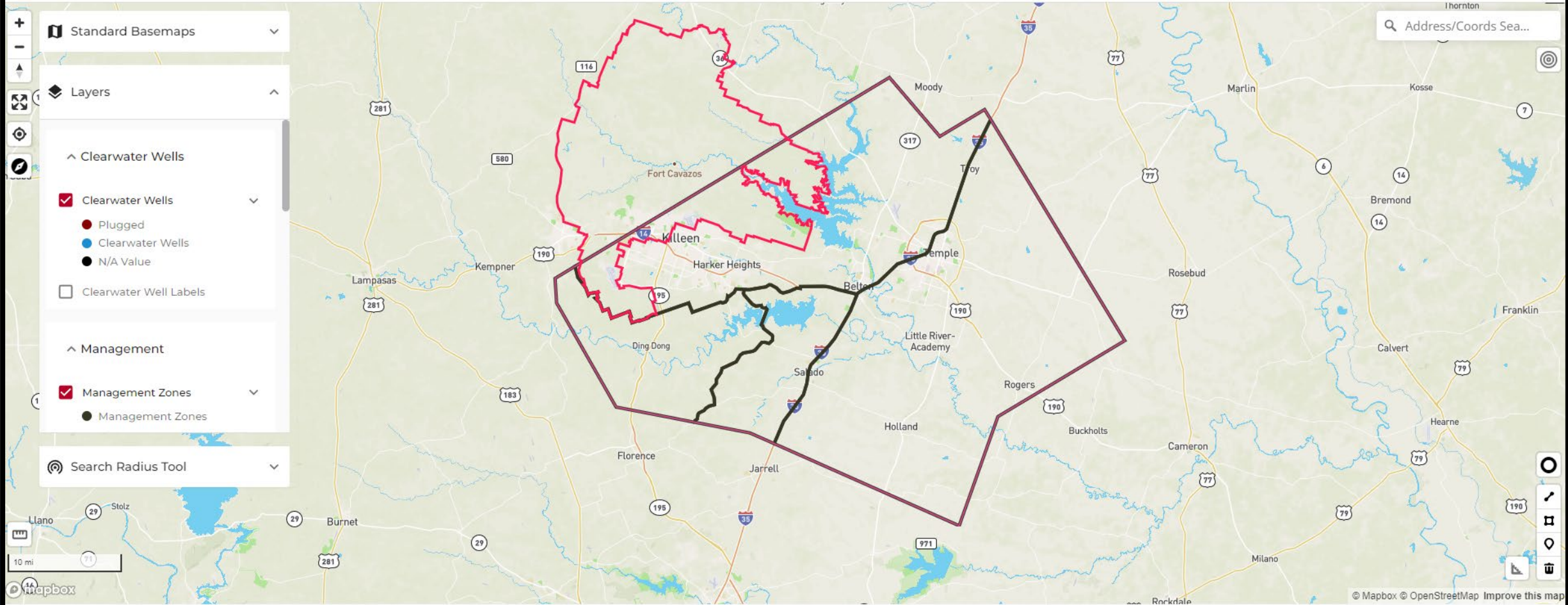
Issue permits, Register wells, and Ensure proper drilling completion



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

Aquifers | 9 Primary Use | 8 Well Status | 5 Management Zones | More Filters | Color wells by Default | Print PDF

Standard Basemaps
Layers
Clearwater Wells
 Clearwater Wells
● Plugged
● Clearwater Wells
● N/A Value
 Clearwater Well Labels
Management
 Management Zones
● Management Zones
Search Radius Tool



ACA was created to build the strategy

Action of the Legislature - Formed through special legislation, which is usually introduced by a local senator or representative

Petition to TCEQ by property owners - Local landowners may petition the Texas Commission on Environmental Quality (TCEQ) to form a groundwater conservation district.

Initiation by the TCEQ - If local landowners do not take action to create a groundwater conservation district in a priority groundwater management area, the TCEQ can create one.

Addition of territory to an existing district - A group of landowners can petition an existing GCD's board of directors to be annexed into that district. The annexation must be approved by the directors, public hearings must be held and the addition must be confirmed by voters.



September 2023 Repeat Petition

Williamson
County
Petitioners asked
for Annexation

January 2, 2023

Withdrawn in February 2023



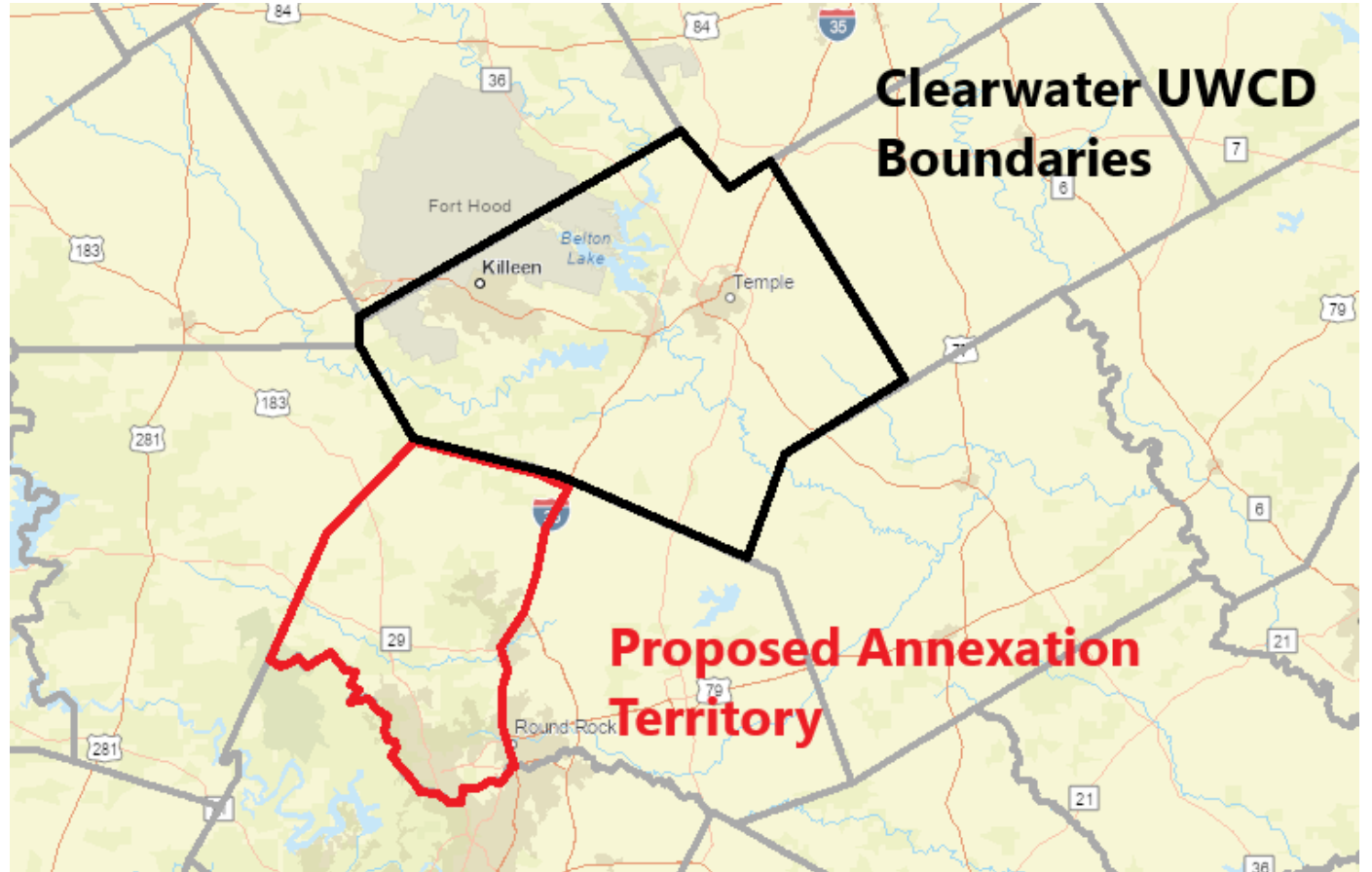
TWC § 36.325 Annexation Petition Requirements

- Petition must be signed by:
 - A majority of the landowners in the proposed territory to be annexed, **OR**
 - At least 50 landowners if the number of landowners is more than 50, **OR**
 - the commissioners court of the county in which the area is located **if** the area is identified as a priority groundwater management area or includes the entire county.
- Petition must describe the land by legal description **or** by metes and bounds **or** by lot and block number if there is a recorded plat of the area to be included.



Clearwater UWCD's Legal Obligations

- After receiving a petition to annex territory, the Board **must**:
 - **Order** at least two public hearings, and set the time and for both: one in Bell County, and one in the proposed annexation territory.
 - **If after** the hearings, the Board believes the proposed annexation would benefit the District, the Board **may** add the territory by resolution.
 - **If** the Board adds the territory by resolution, it must call for a **ratification election**.



What is a Water District?

- Chapter 49, 54, 51, 65: Texas Water Law?

- *River Authorities*

- *WCID*

- *SUD*

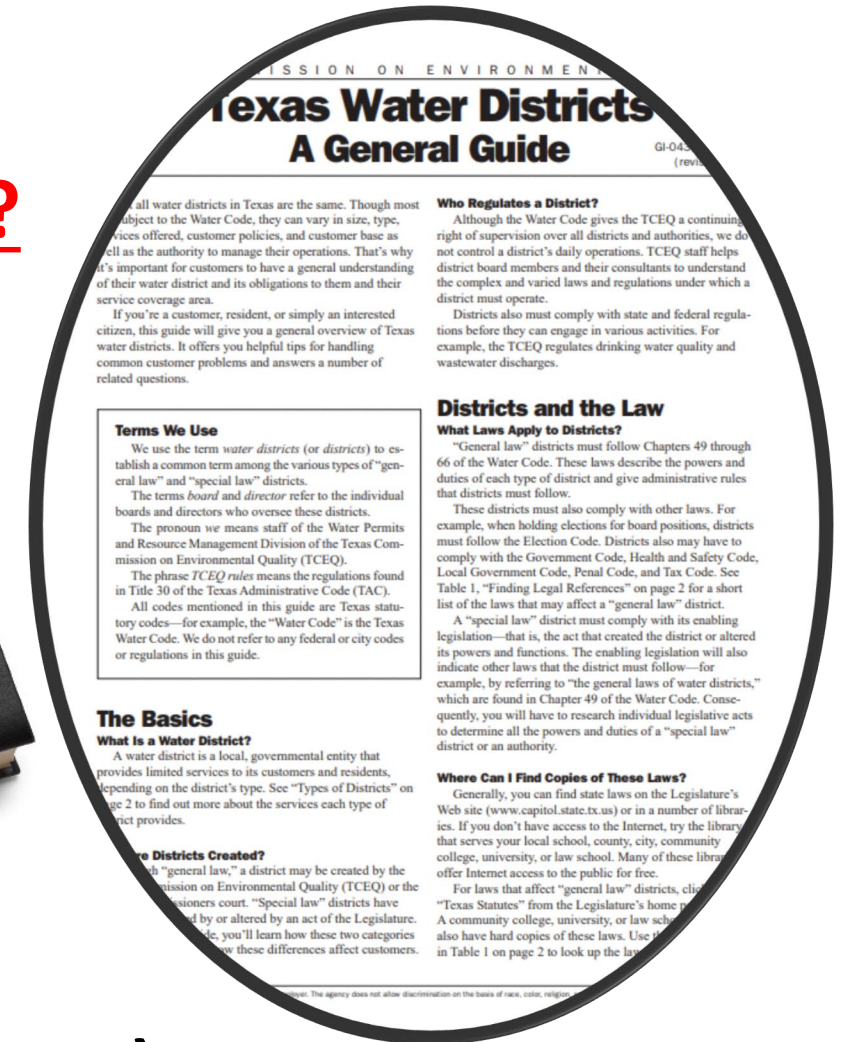
- *WSC*

- *MUD*



- Chapter 36: Texas Groundwater Law?

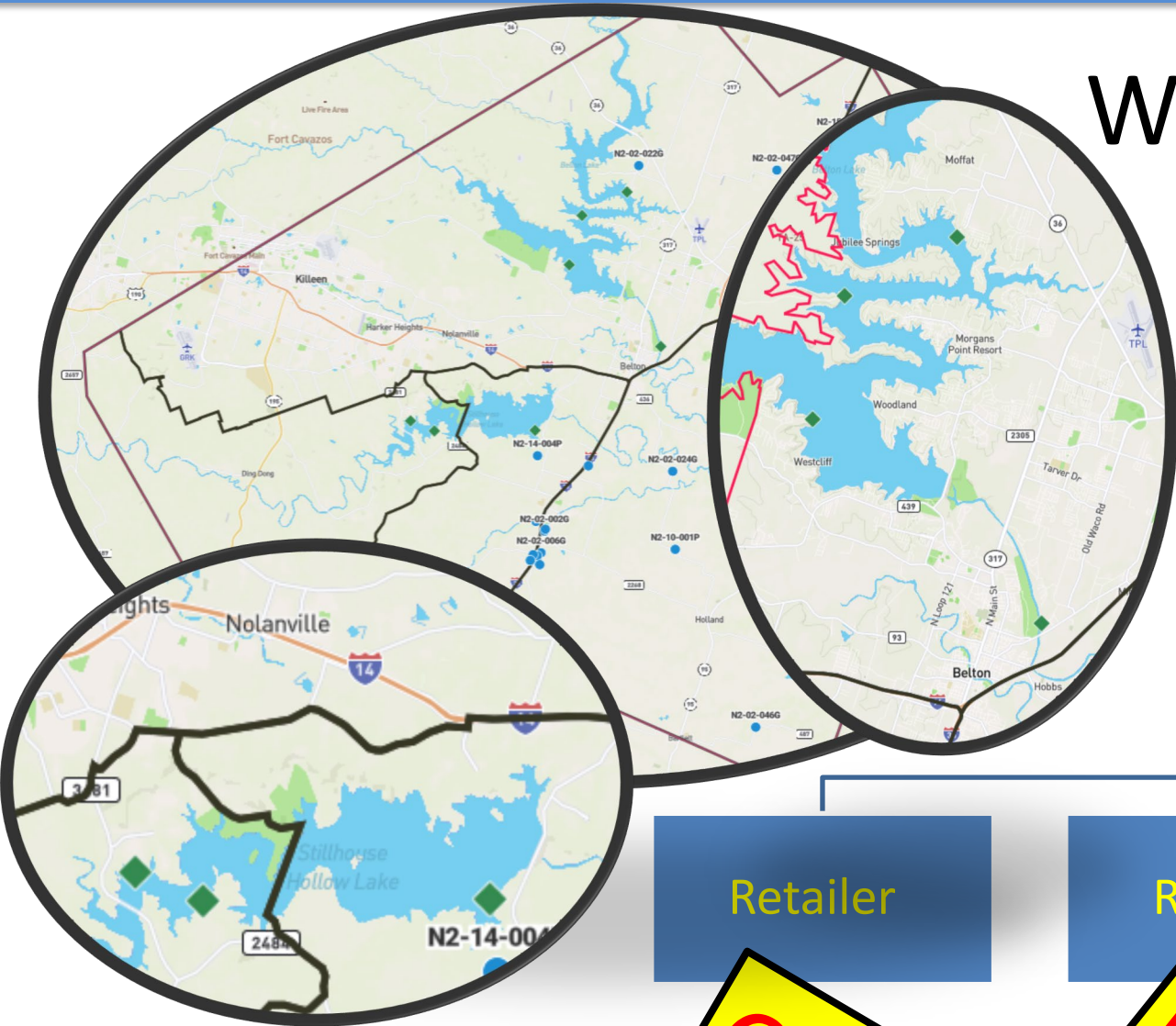
- Groundwater Conservation Districts (GCD)



Wholesaler VS Retailer

Who is Who?

Why?



Wholesale
Water Provider

7-Total

Retailer

Retailer

Retailer

Retailer

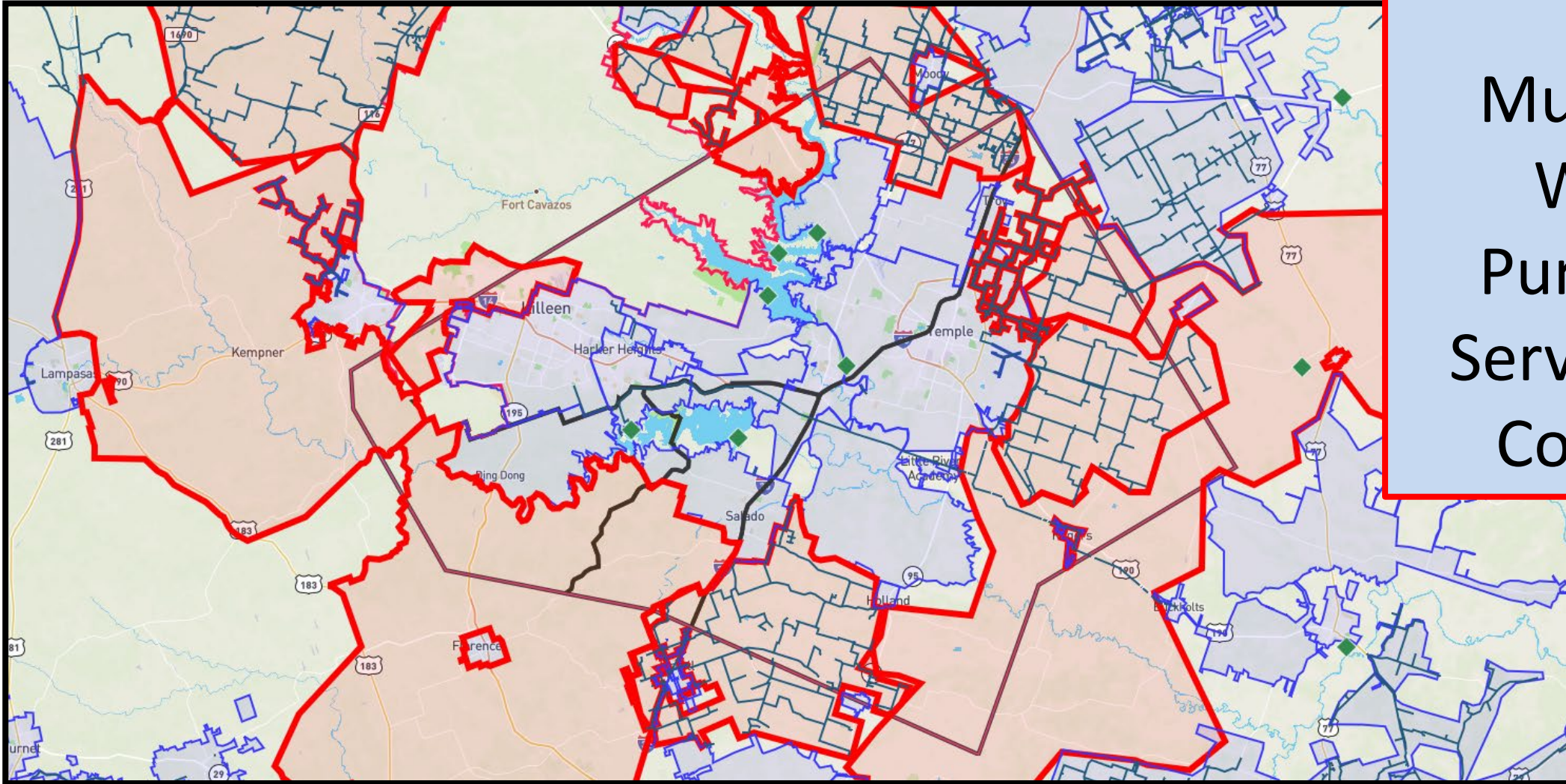
City

MUD

SUD

WSC





32
Municipal
Water
Purveyors
Serving Five
Counties

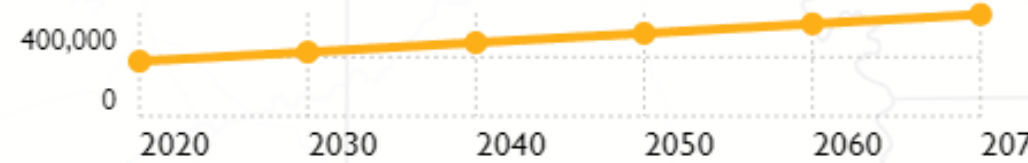


Every drop counts!

Bell County

County in Region G

Population

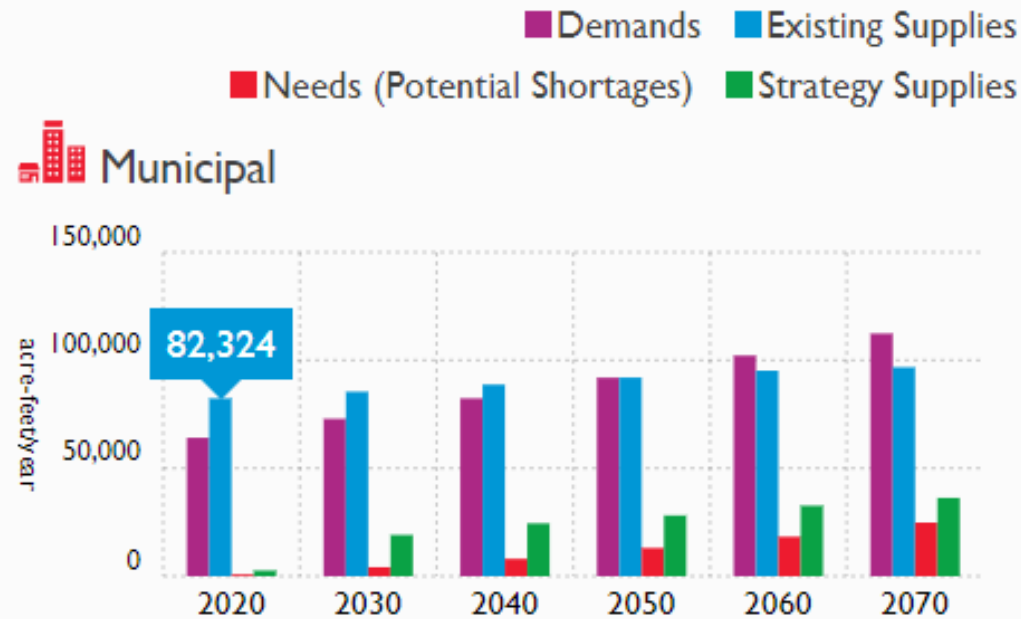


HIDE DATA TABLE

2020	2030	2040	2050	2060	2070
371,956	433,618	497,830	560,252	624,686	688,107

Source Water

- Supply for Municipal:
 - ✓ **82,324** acre-feet / year
- Groundwater Permits:
 - ✓ **7,551** acre-feet / year
 - ✓ 2022 Use of GW for PWS
 - ✓ **3,929** acre-ft / year (**52%**)



<https://cuwcd.org/>

CONTACT US | DIRECTIONS | PUBLIC RECORDS | VISIT OLD SITE

Clearwater
Underground Water Conservation District
Every drop counts!

[Home](#) | [District Overview](#) | [Public Records](#) | [Aquifer Science](#) | [Videos](#) | [Educational Programs](#) |

Where is my well?
Where is my property?
[Click Here](#)

USEFUL LINKS

- Bell County Well Driller and Pump Installers
- TWDB Statewide Monitor Wells
- TWDB Statewide Reservoir Levels
- TexMesonet
- Permitted Well Owner Login
- Election Advisory No. 2019-19
- Transparency Tax Code

Clearwater Underground Water Conservation District [more info >](#)

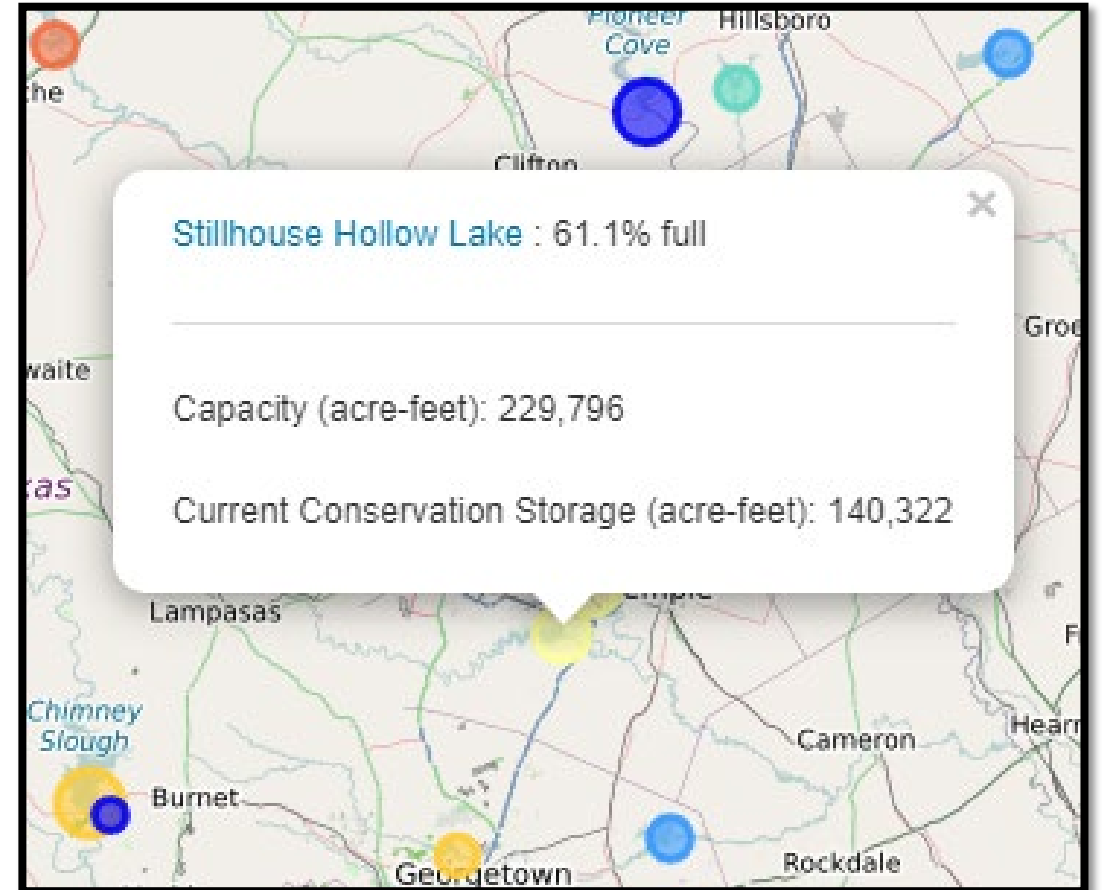
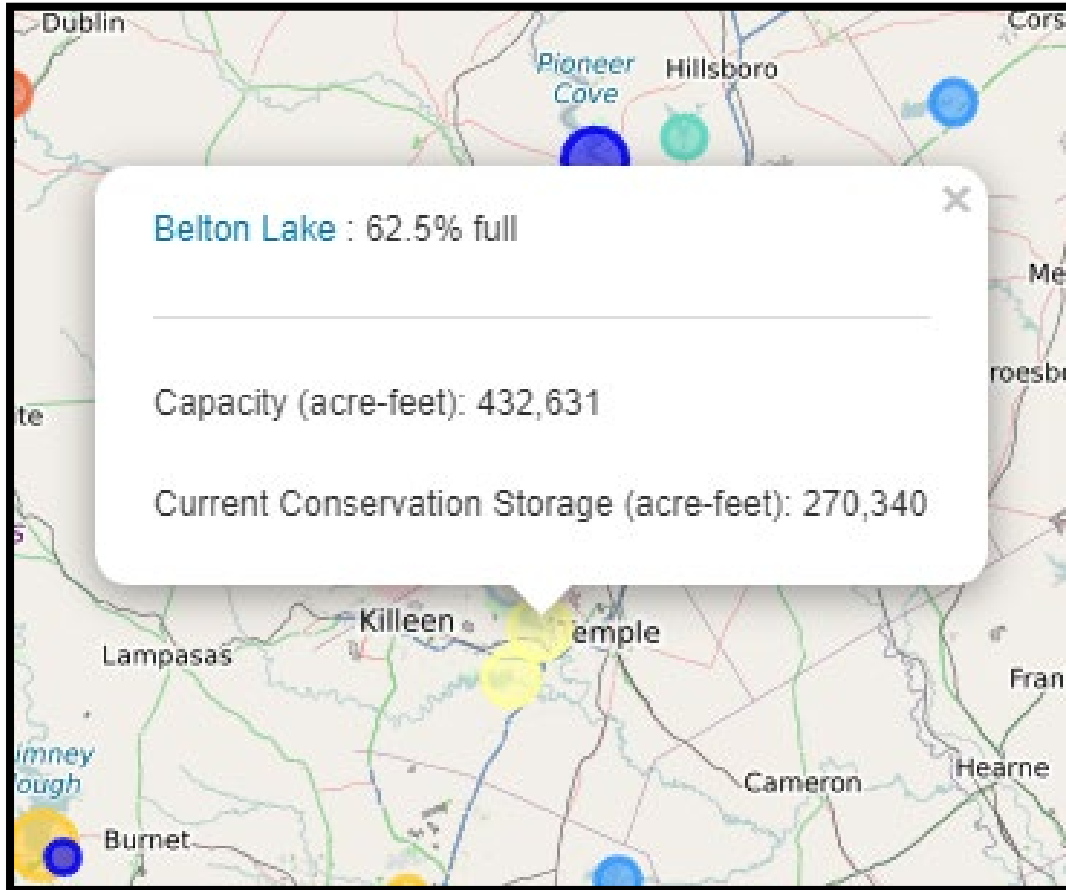
DOMESTIC WELL APPLICATION (10 ACRES OR MORE)

DOMESTIC WELL (<10 ACRES - GREATER THAN OR =2 ACRES)

COMMERCIAL WELL APPLICATION

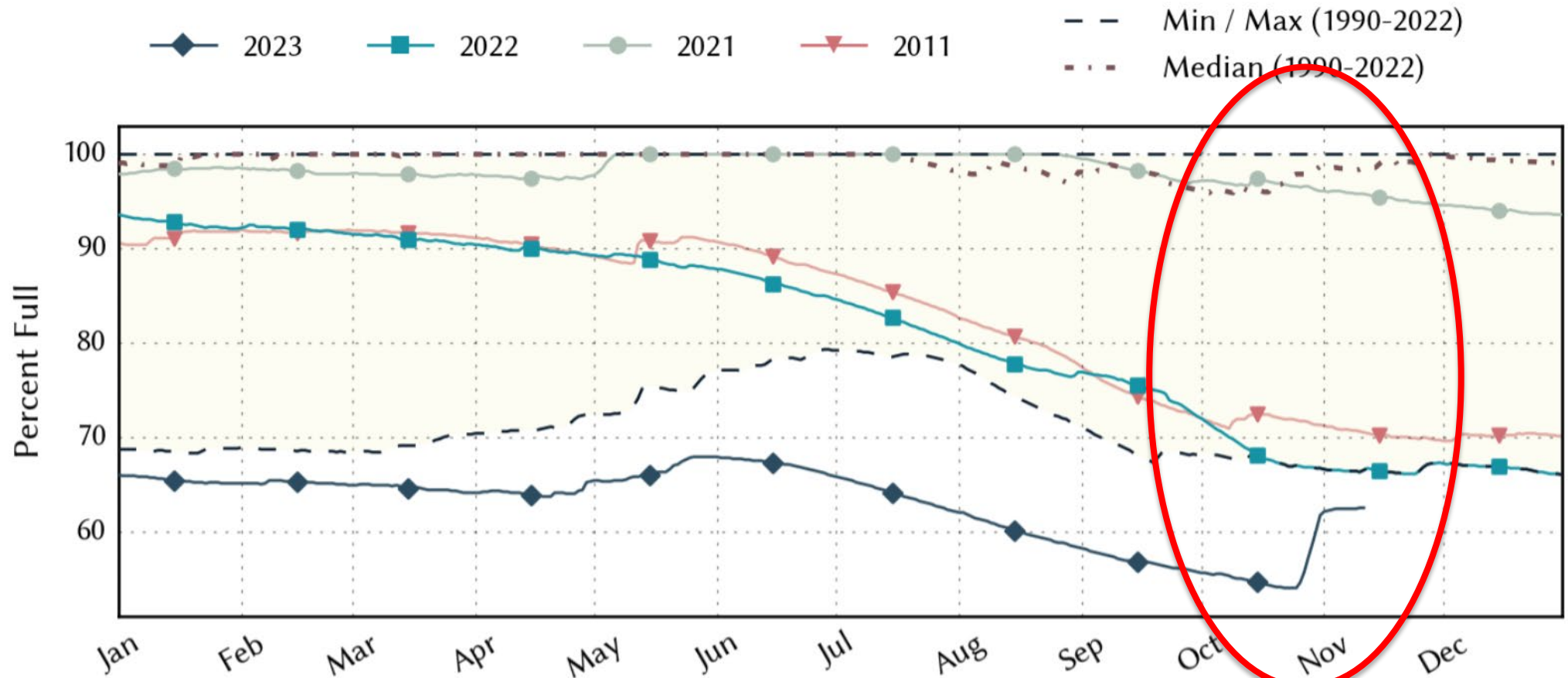
GROUNDWATER INVESTIGATION FOR PLATTING

<https://waterdatafortexas.org>



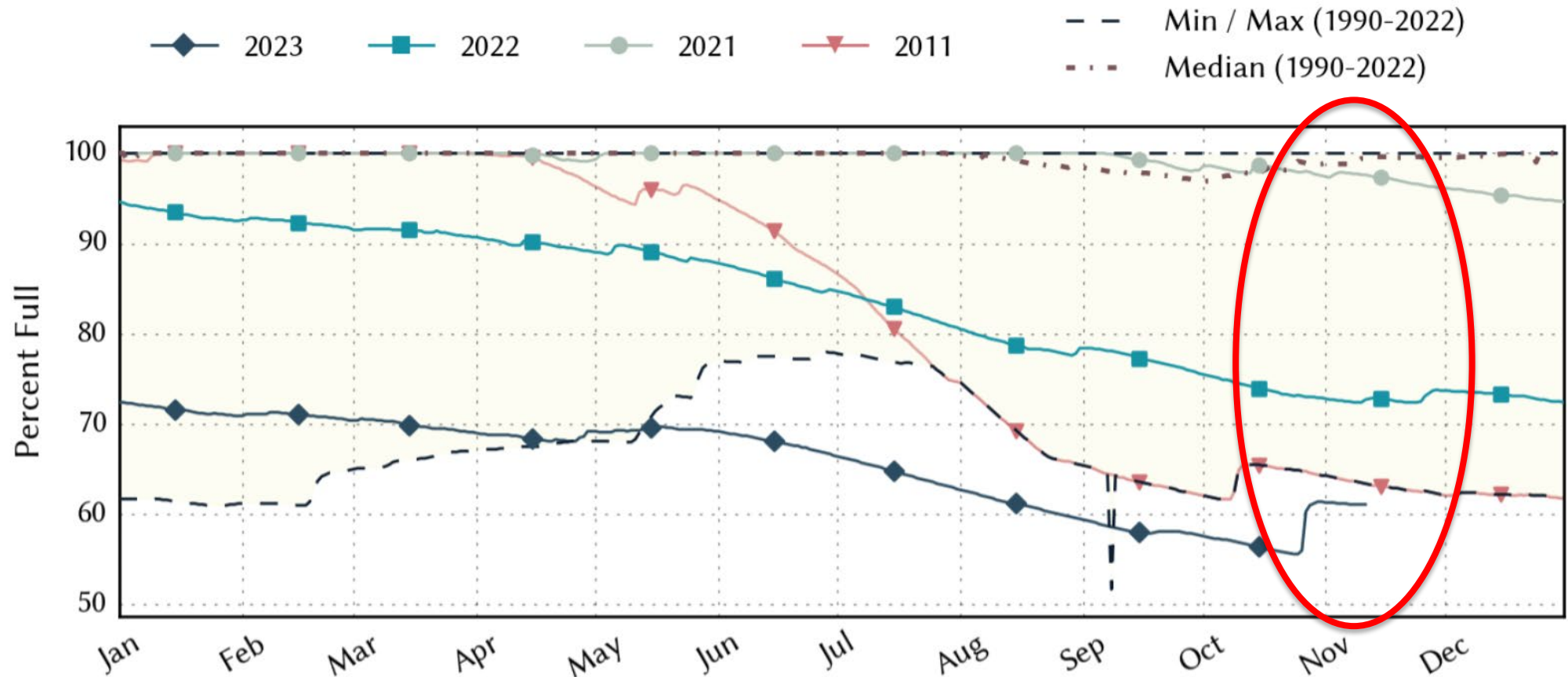
<https://waterdatafortexas.org>

Belton Lake: 62.5% full as of 2023-11-11



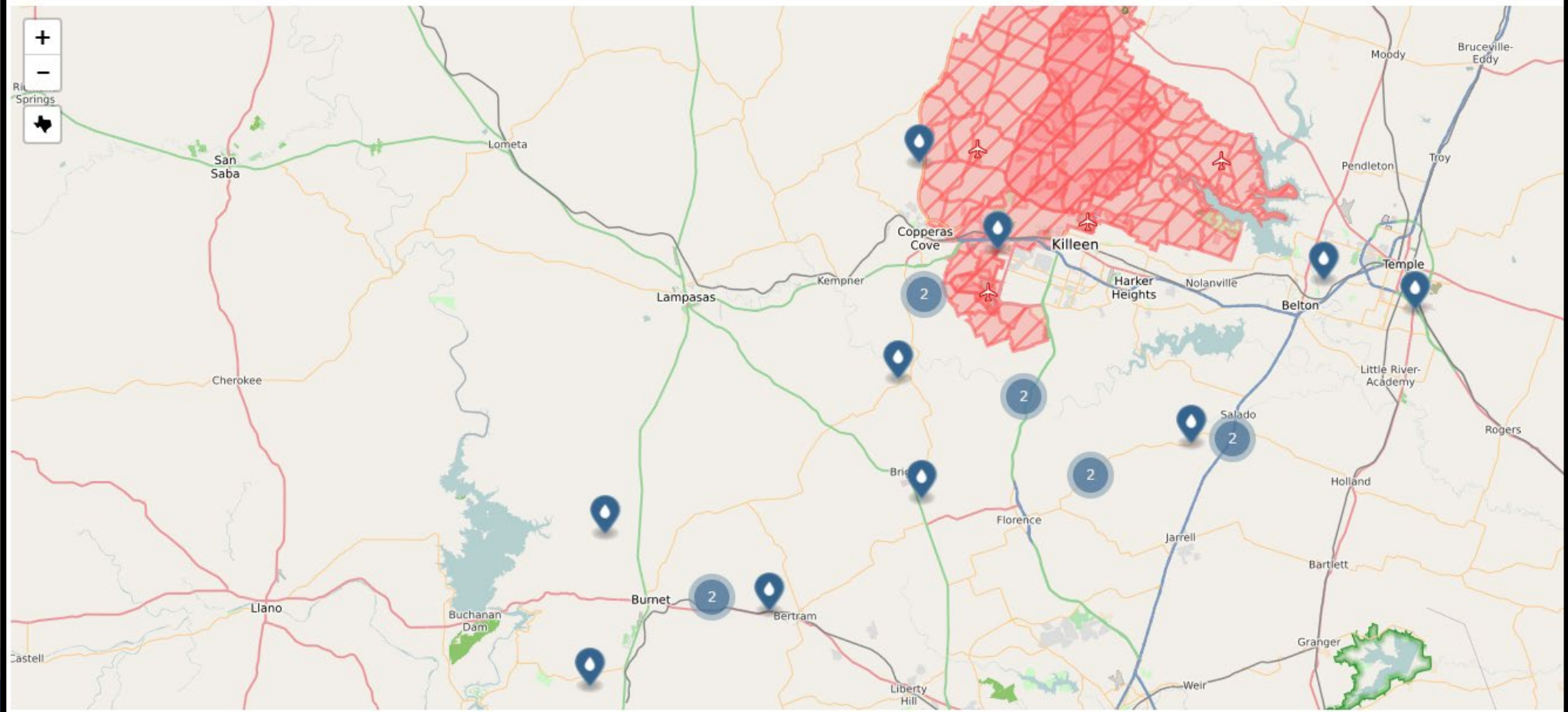
<https://waterdatafortexas.org>

Stillhouse Hollow Lake: 61.1% full as of 2023-11-11



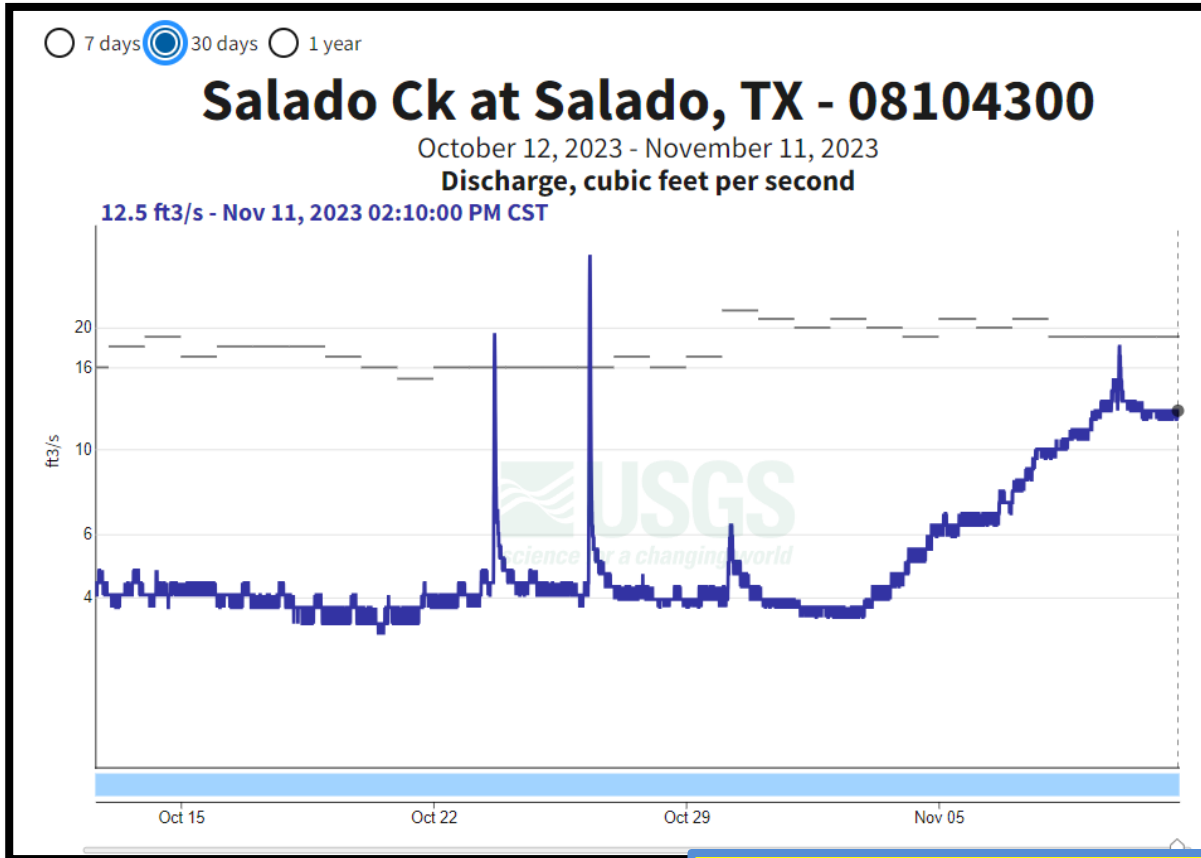
<https://waterdatafortexas.org/groundwater>

Automated Groundwater Level Wells

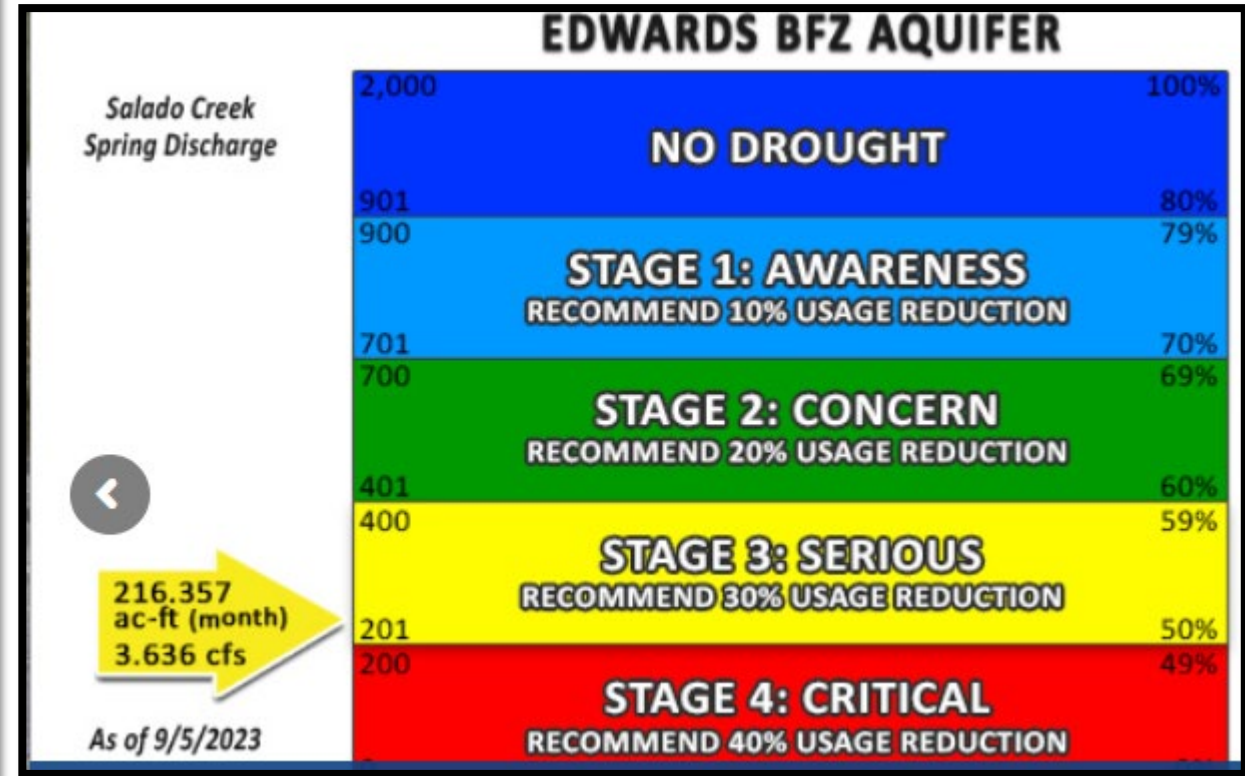


All data are provisional and subject to revision. The Texas Water Development Board (TWDB) specifically disclaims any and all liability for any claims or damages that may result from providing quality data, search the [TWDB Groundwater Database \(GWDB\)](#).

Salado Springs Complex, Real-Time Data



352.026 ac-ft (month)
5.916 cubic feet/second
As of 11/7/2023



Groundwater Resource and Research Update



Mike Keester

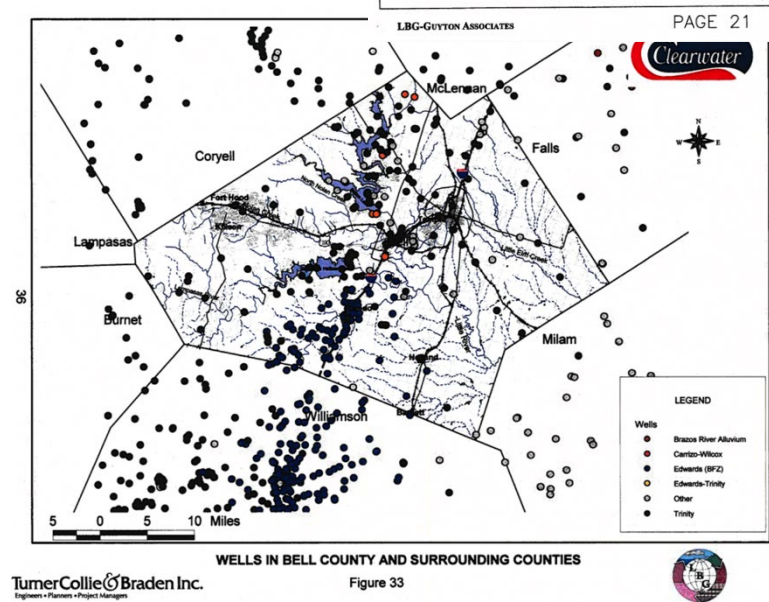
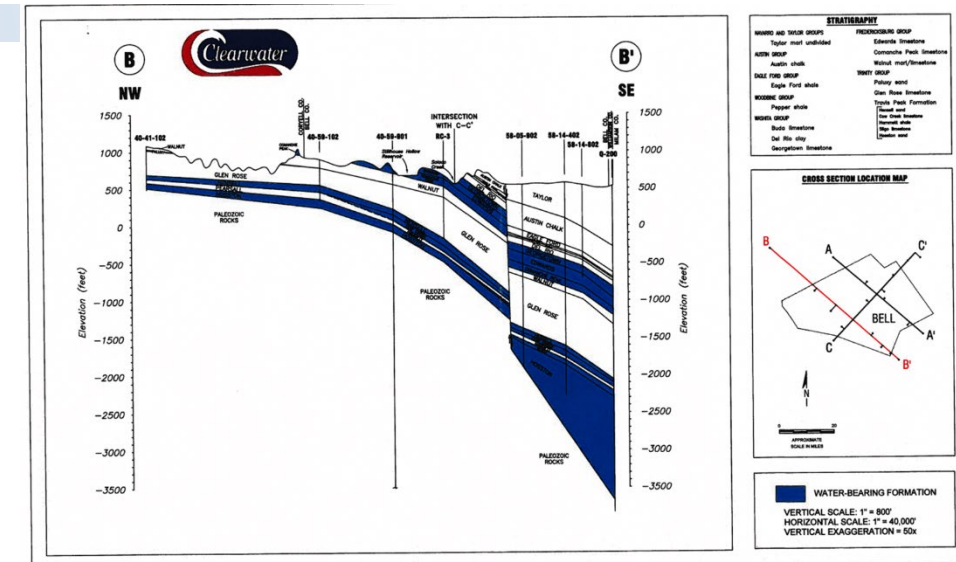
Hydrogeologist

RW Harden & Associates

- ✓ Professional Hydrogeologist since 2003
- ✓ Consulting Hydrogeologist for Clearwater since 2013
- ✓ Serves several Groundwater Districts across Texas
- ✓ Resides in Round Rock

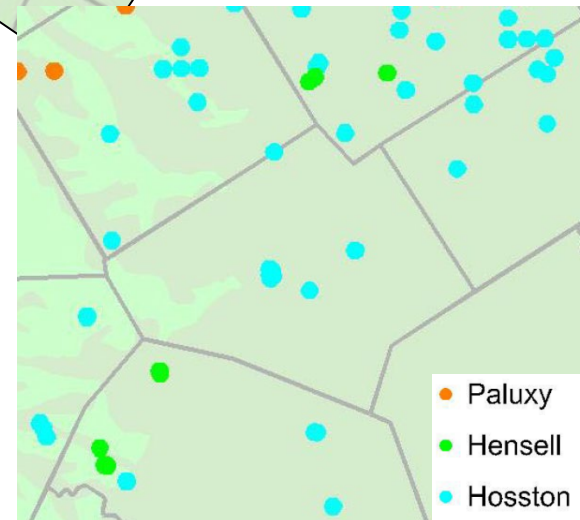
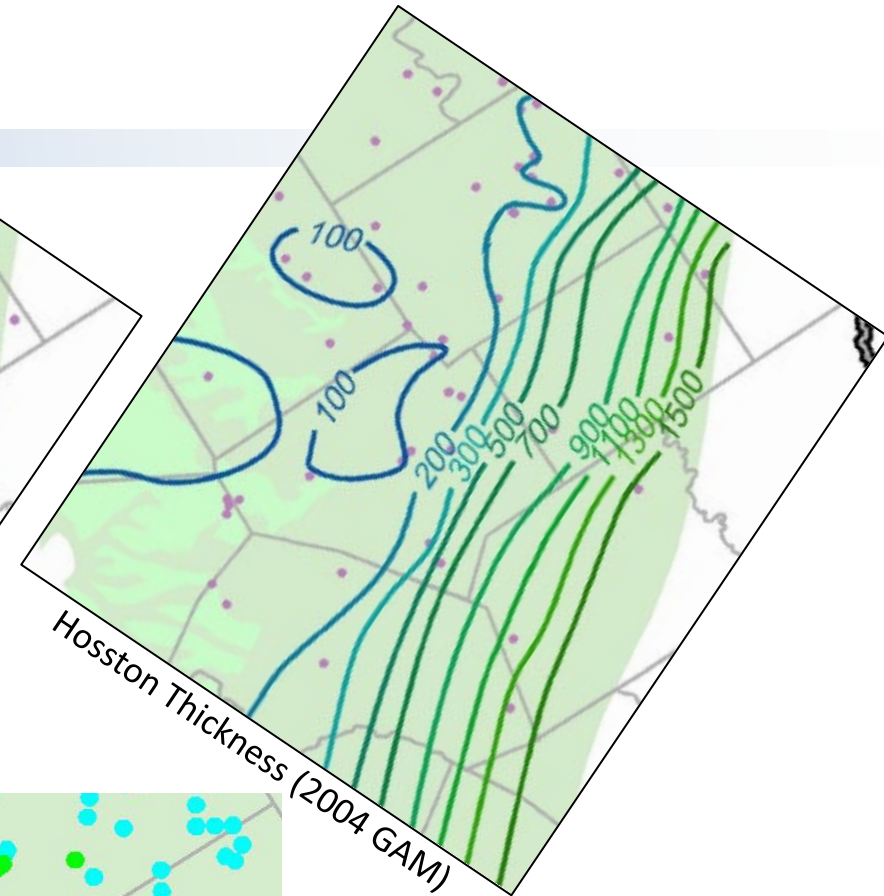
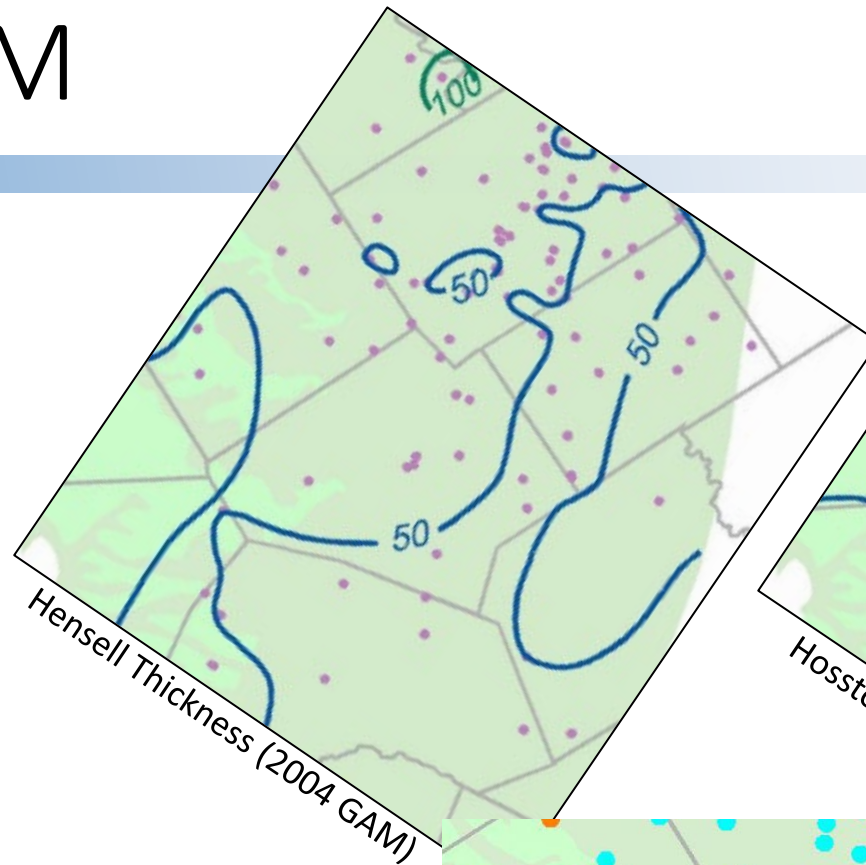
What did we know?

- Primarily TWDB research
 - Numbered reports
 - Groundwater DB
 - First GAMs
- District investigations
 - Management report (2002)
 - Monitoring report (2003)
 - 3 Edwards wells
 - 5 Trinity
 - 2 Travis Peak
 - 3 Hosston



2004 Trinity GAM

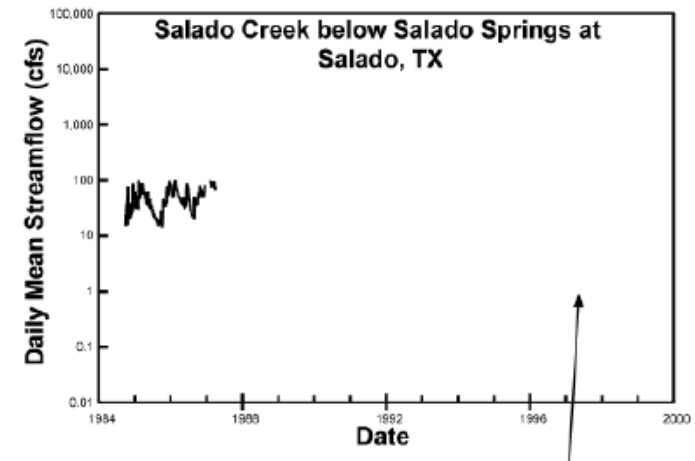
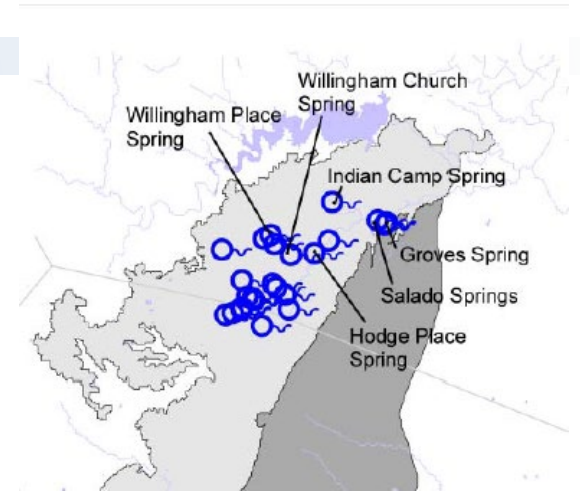
- Limited structure data
- Few pumping tests
 - 0 Middle Trinity
 - 4 Lower Trinity
- Average Transmissivity
 - Hensell: ~2,300 gpd/ft
 - Hosston: ~5,400 gpd/ft



Transmissivity Data (2004 GAM)

2003 Edwards GAM

- Several mapped springs
- Limited spring flow data
- Uniform hydraulic conductivity



What have we learned?

- Increased monitoring system

- Annual investment

- Aquifer structure
- Aquifer hydraulics
- Water quality

- Evaluations reveal the complexity of the aquifer system

- Investment in tools to help manage the resources

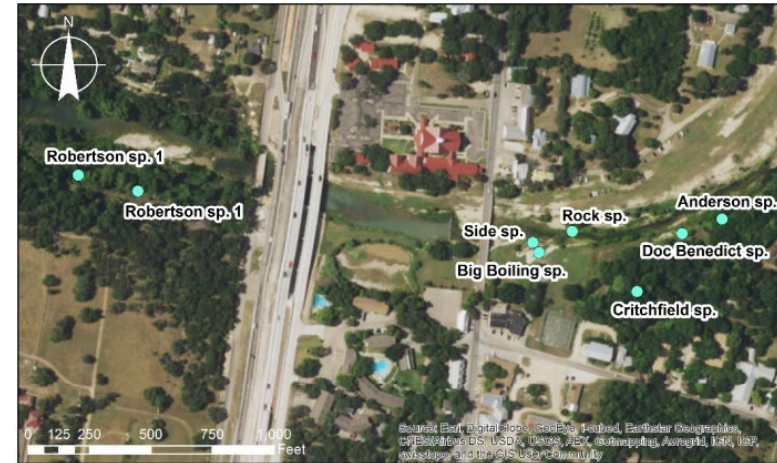
- Data management
- Permit analysis
- Aquifer status

Wells With More Than 3 Water Level Measurements

Period	Pre-2011	Current
Edwards	9	50
Upper Trinity	3	8
Middle Trinity	9	56
Lower Trinity	7	33

Edwards Aquifer

- Multiple research studies
 - Baylor University
 - U.S. Fish & Wildlife
 - Other Technical Consultants
- Complex hydraulic properties and flow paths
- Salado Salamander preservation



Wong and Yelderman, Jr. (2016)

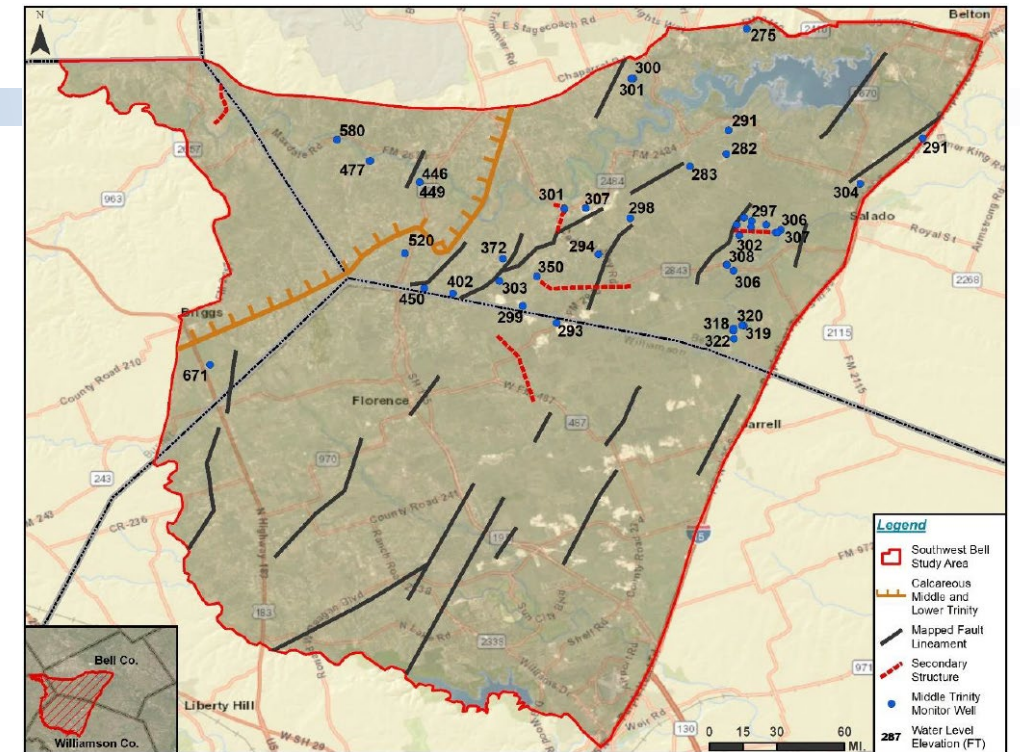
Salado Salamander Monitoring Final Reports



Diaz and others (2019)

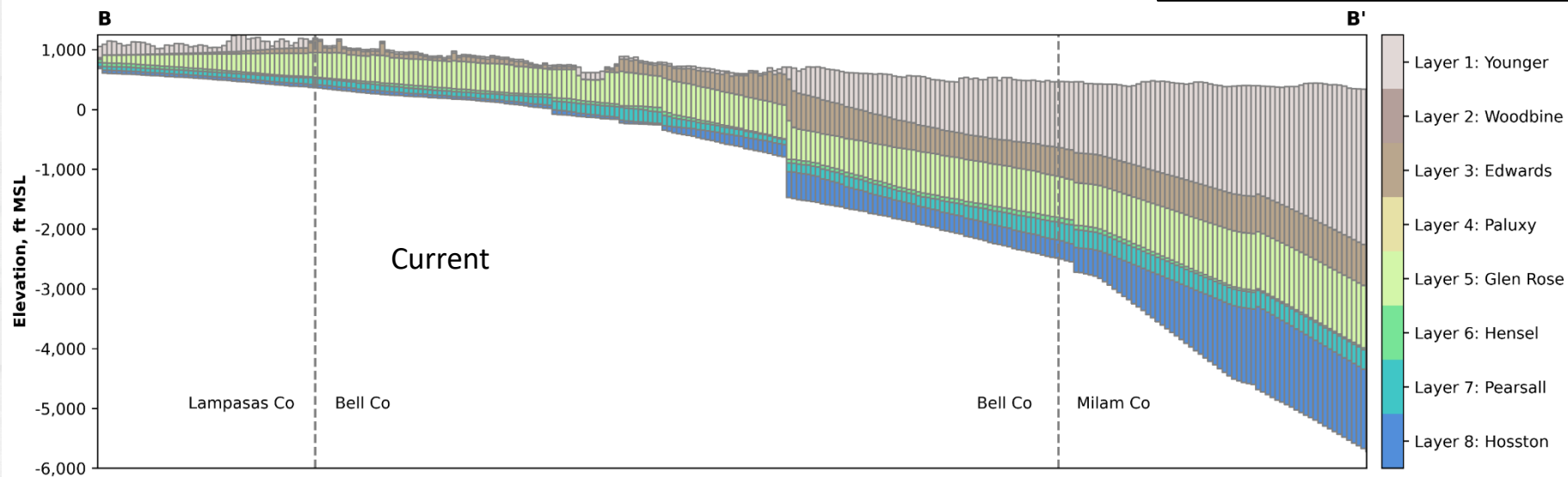
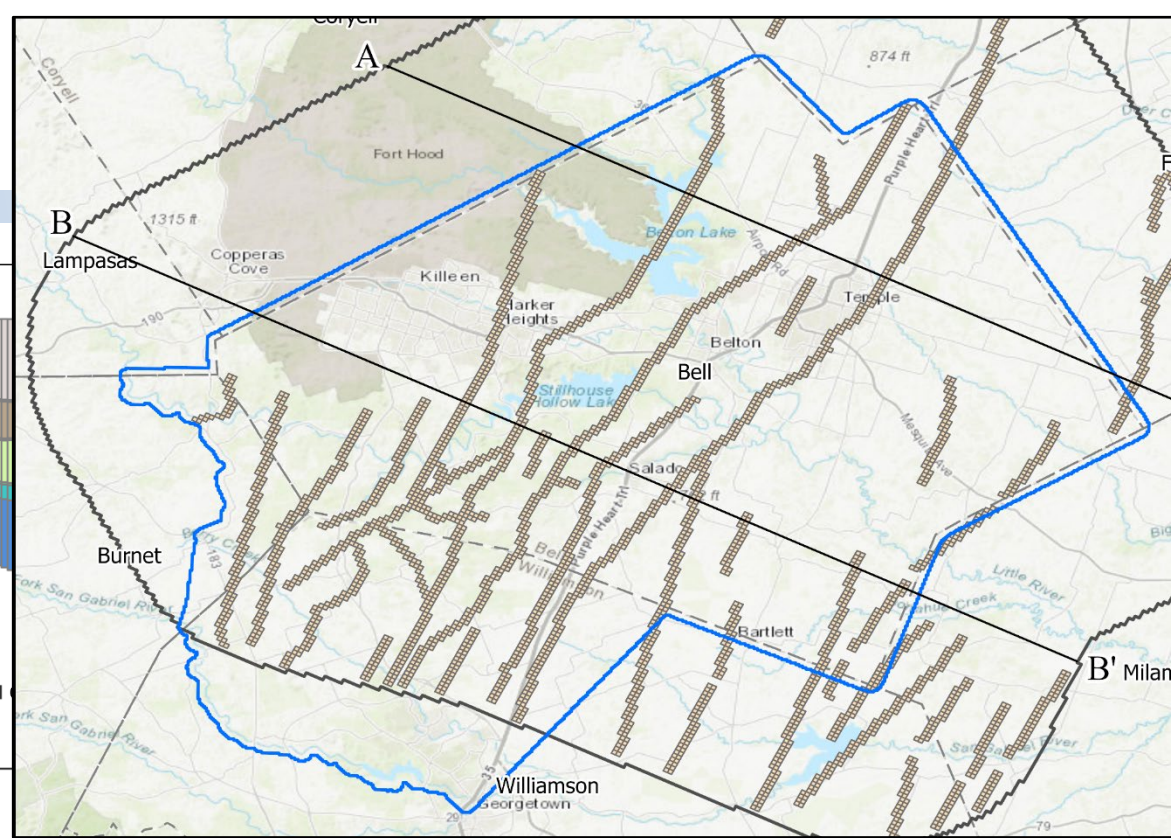
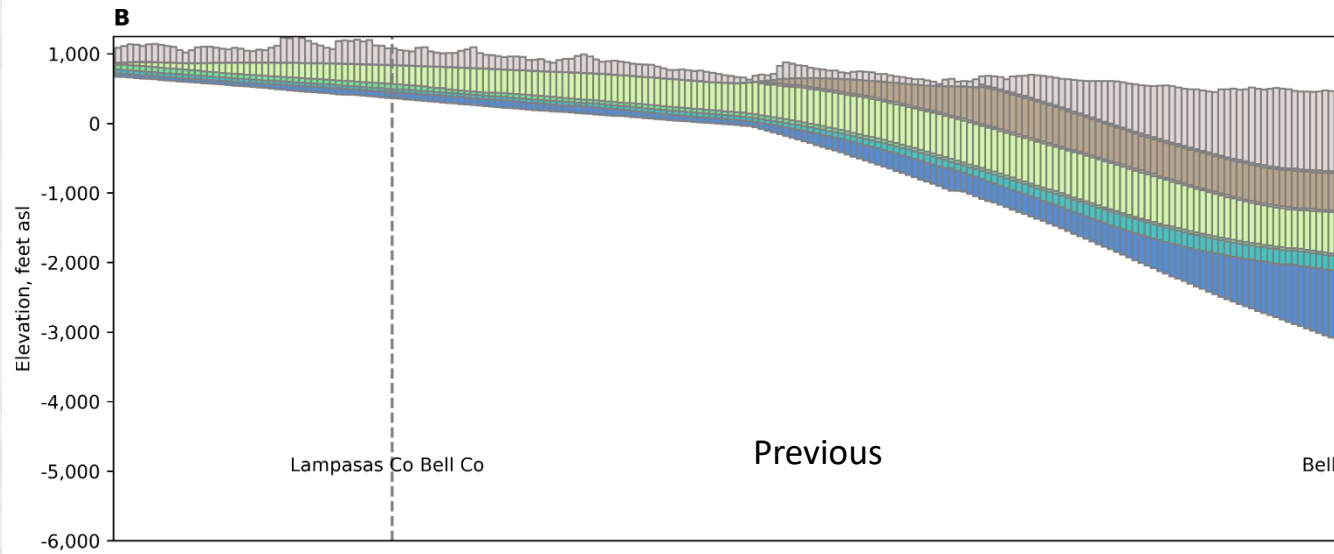
Trinity Aquifer

- Stratigraphy
 - 1,000s of well control points
 - Local investigations
- Highly complex structure
 - Multiple faults
 - Offset formations
- Aquifer Testing
- Aquifer Status Evaluation

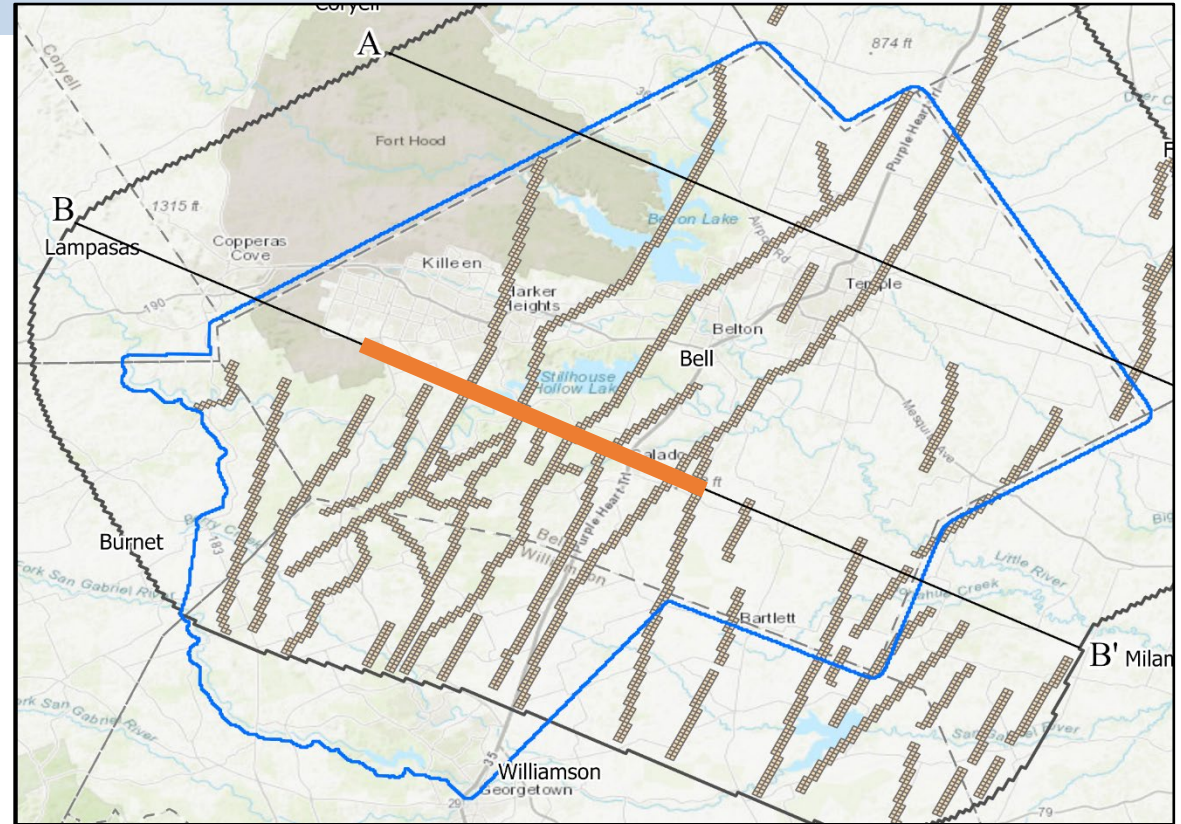
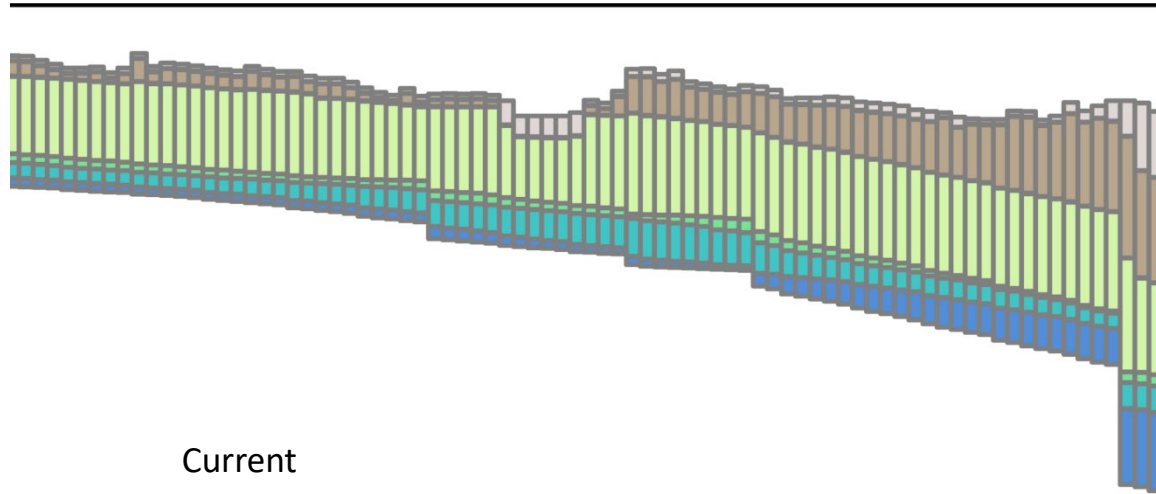
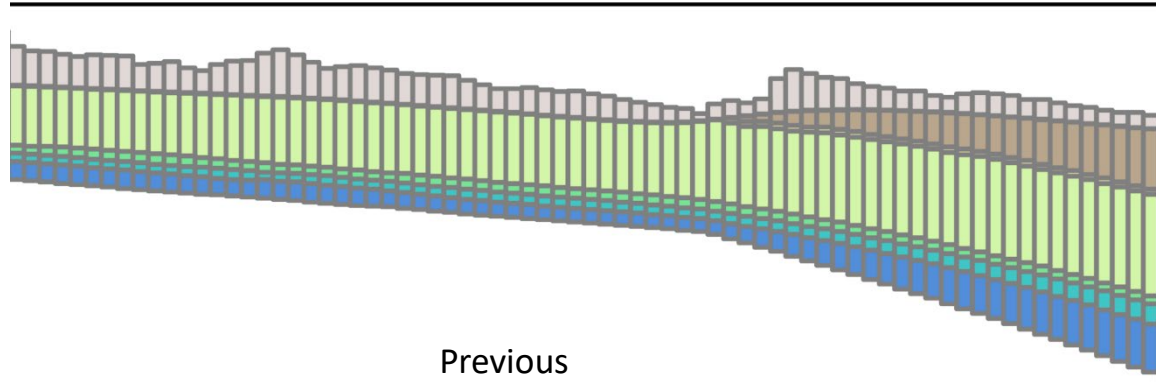


Standen and Clause (2021) – only newly mapped faults shown

Structural Complexity

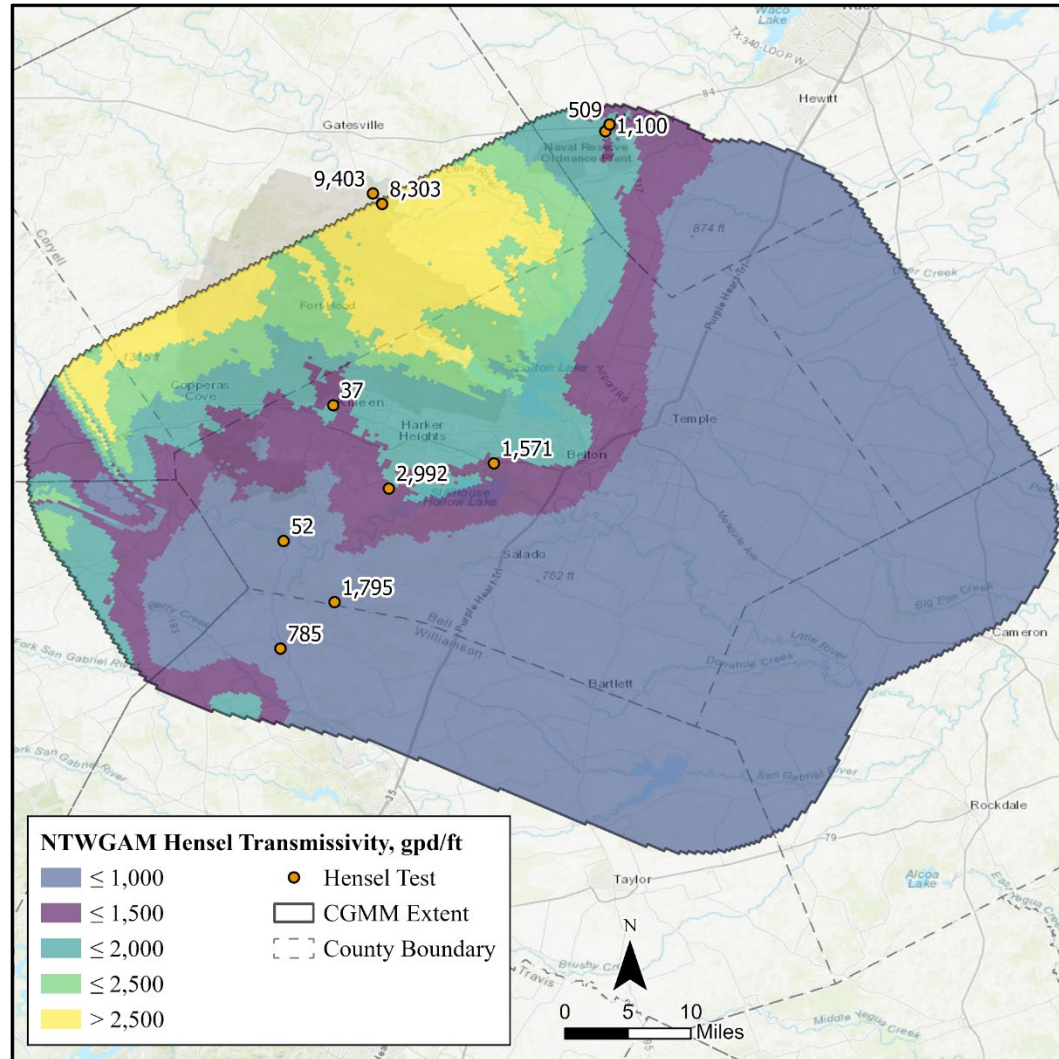


Structural Complexity

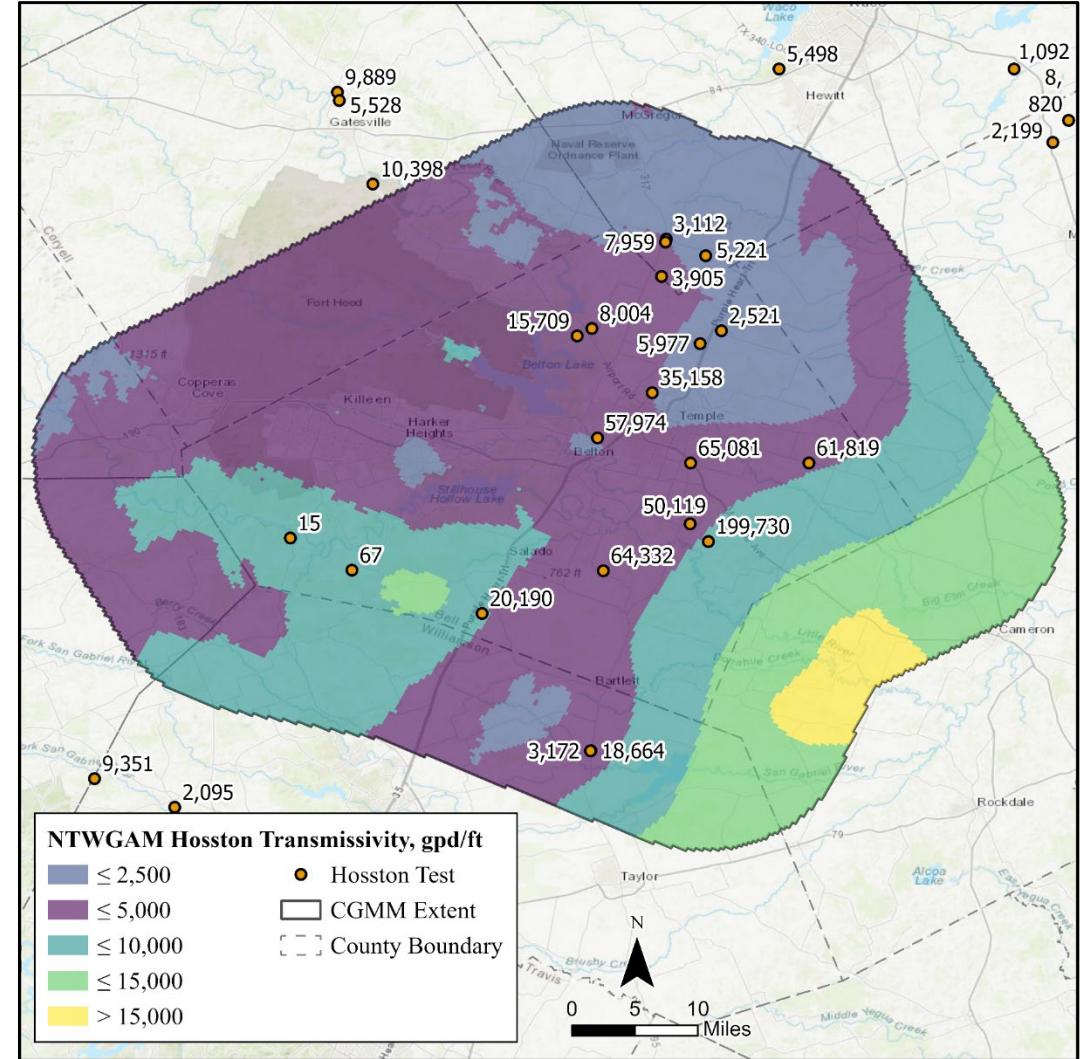


Aquifer Testing

Middle Trinity

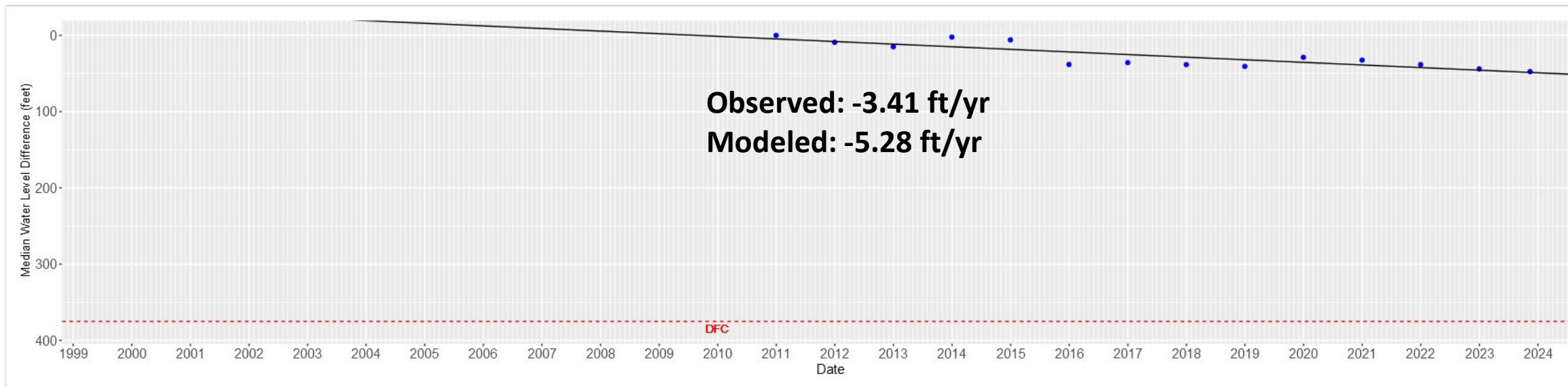
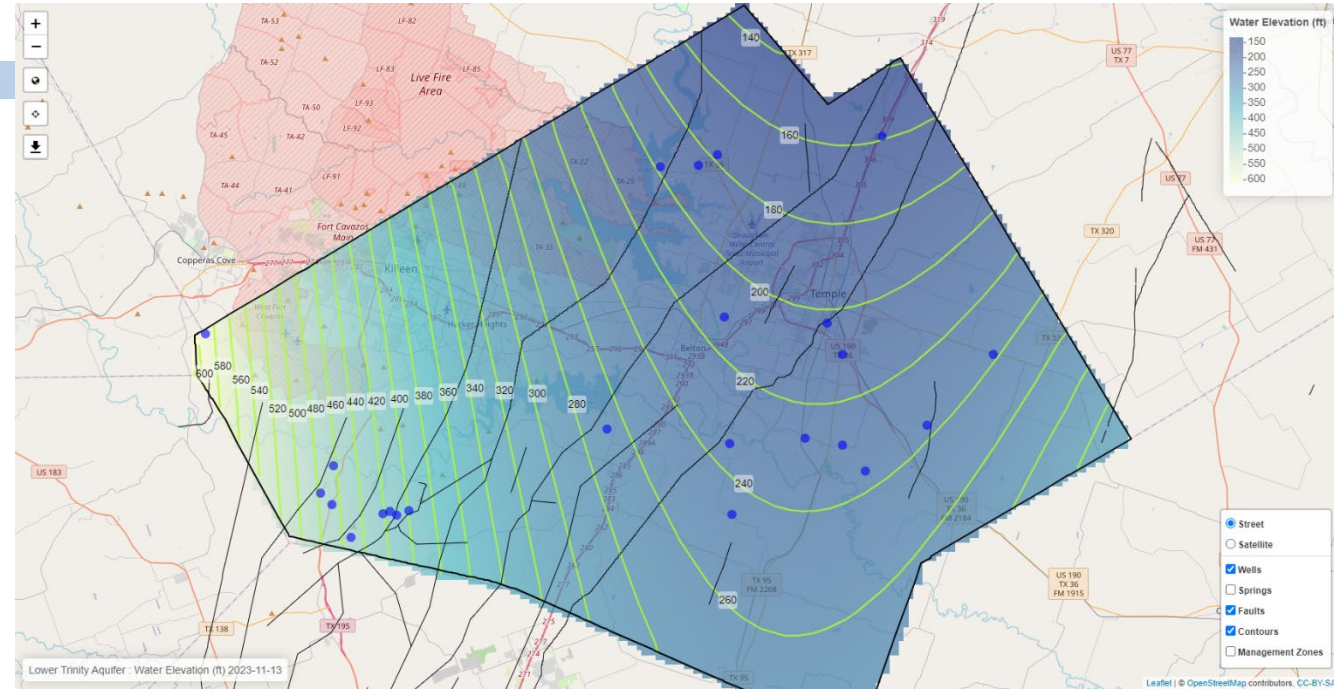


Lower Trinity



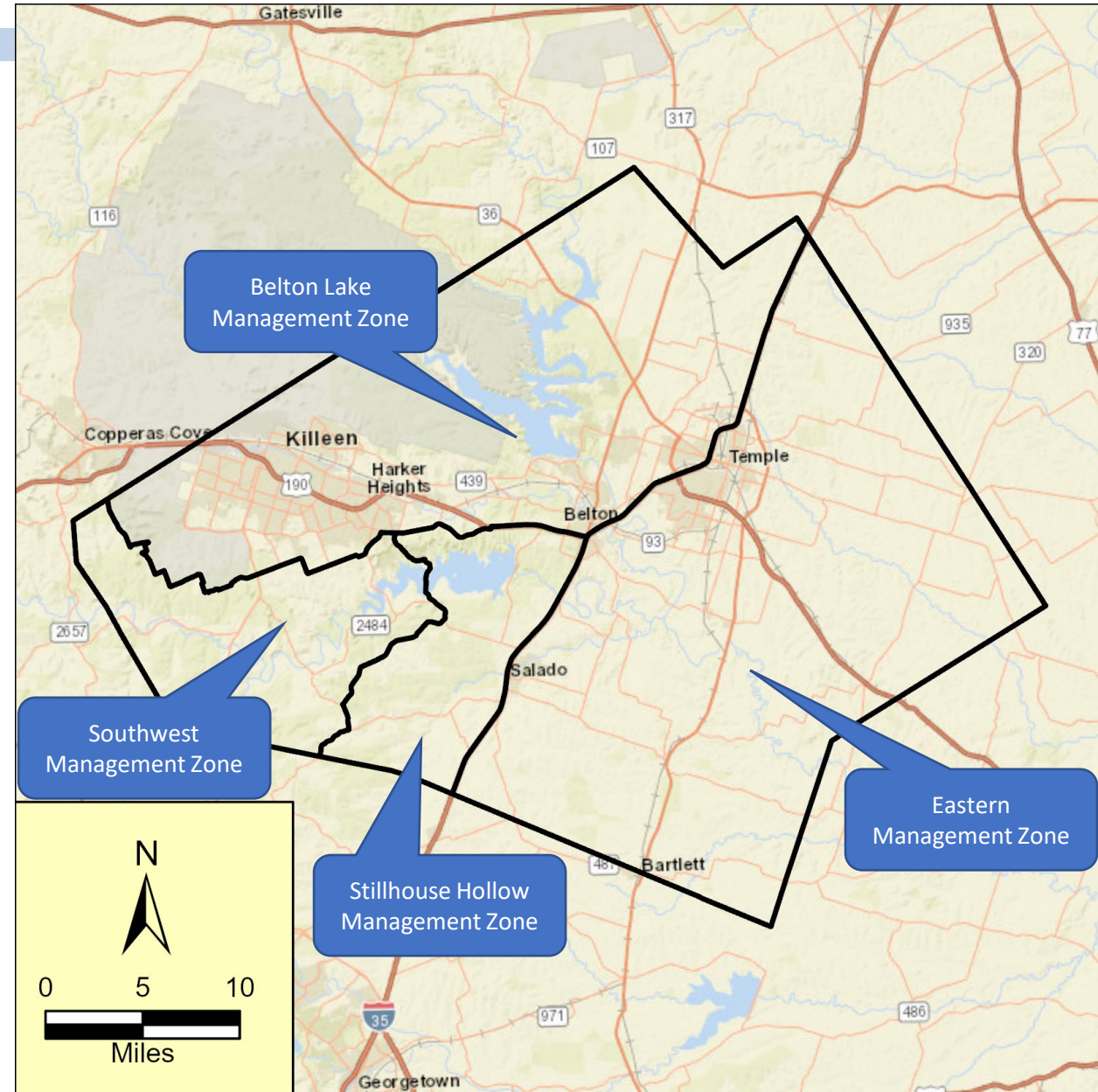
Aquifer Status

- Tools for evaluating monitoring data
- Assess aquifer status relative to Desired Future Conditions
 - Modeled versus observed water level change
 - How good is our model?



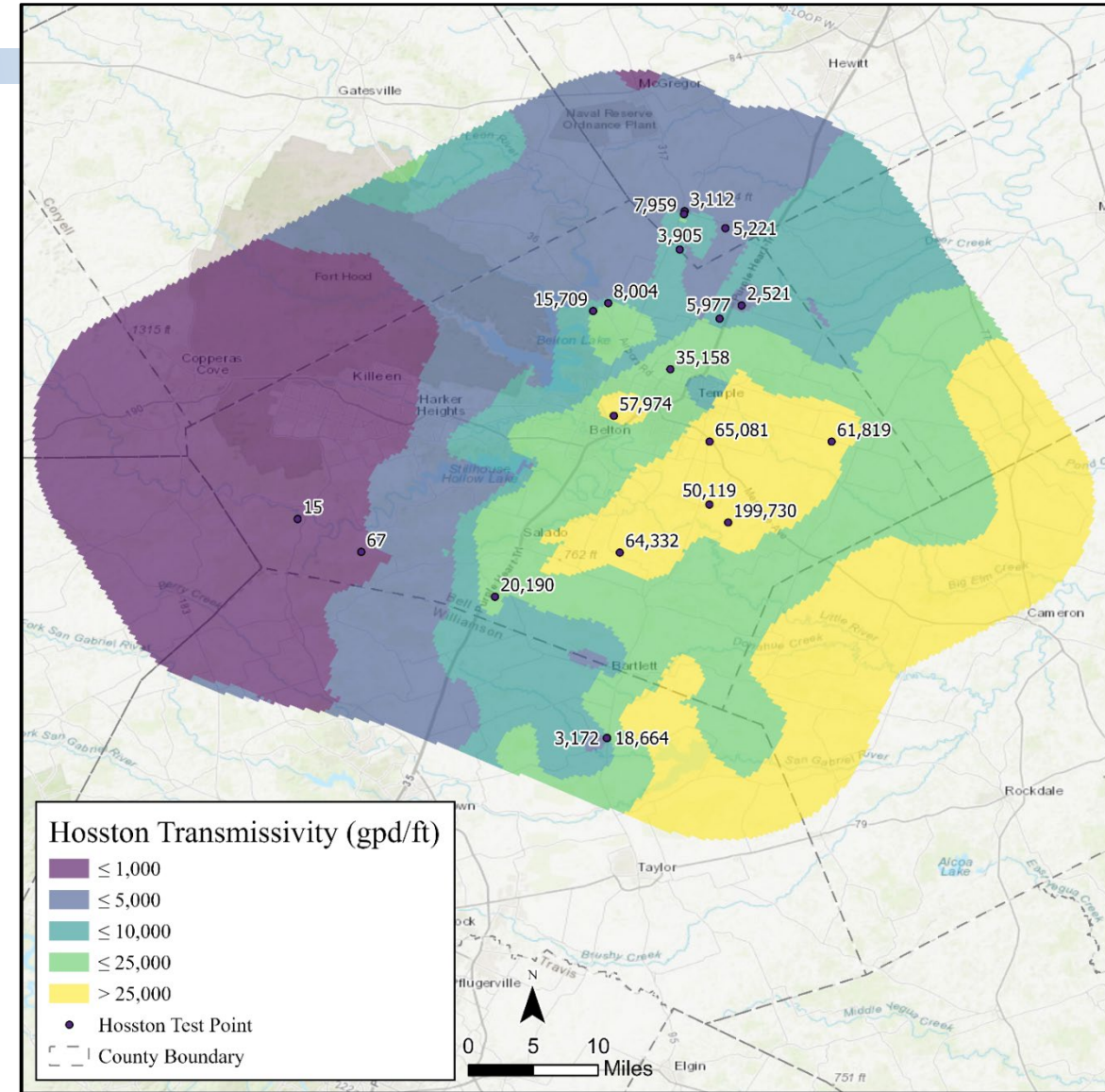
Where are we now?

- Highly complex groundwater flow systems
- Quantity and quality vary
- Management zones developed to delineate areas with substantially differing aquifer conditions



Where are we going?

- Edwards
 - HCP Development
 - Updated GAM
- Trinity
 - Updating GAM
 - Clearwater Groundwater Management Model
- Continued data acquisition
 - Aquifer testing
 - Constant water-level recorders
 - Data-worth analyses



Questions

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



People Want to be Heard!

People Want to be afforded an Opportunity to Listen!

People Need & Want to Be Informed!