

Trinity groundwater, wells, and springs

An overview of the Trinity Aquifer in Hays County, results from the Fall 2019 site visits, online monitor site information, well owner tips and tricks, and highlight Trinity springs.



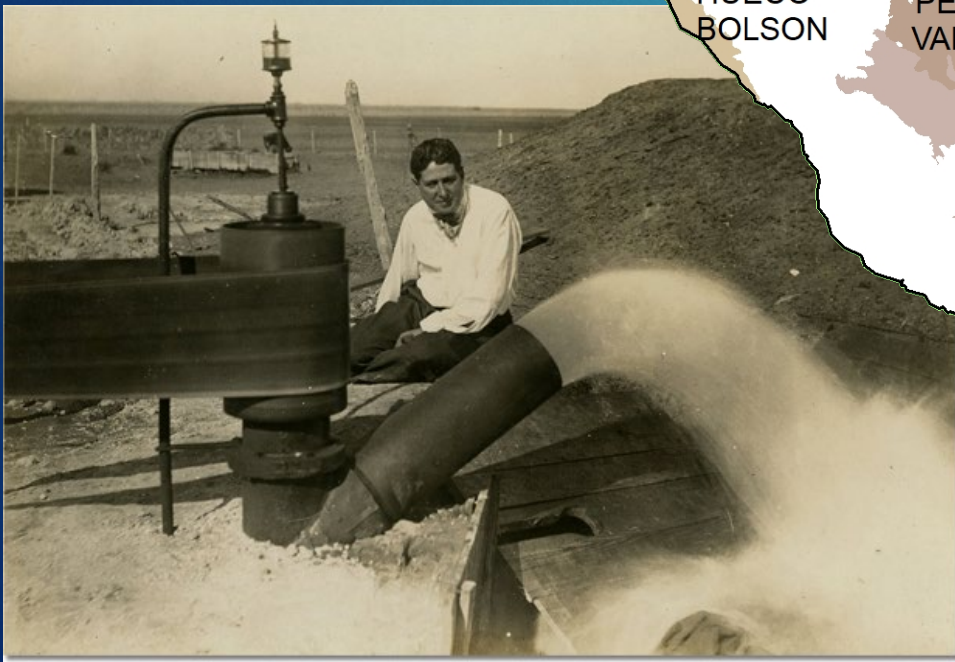
Hydrostratigraphy	Group	Formation	Stratigraphic Column & Geologic Features	
Confining units and perched		Austin Chalk		
		Eagle Ford		
		Buda		
		Del Rio		
		Georgetown		
Edwards Aquifer	Edwards Group	Person Formation		
		Kainer Formation		
		Walnut Fm		
Upper Trinity Aquifer	Trinity Group	Glen Rose Formation	Upper Glen Rose Member	
Glen Rose Formation		Lower Glen Rose Member		
Semi-confining unit		Hensel		
		Cow Creek		
Confining unit		Hammett		
		Sligo		
Lower Trinity Aquifer		Sycamore/Hosston		
UNDIFFERENTIATED PALEOZOIC				

ROBIN GARY

BARTON SPRINGS/EDWARDS AQUIFER CONSERVATION DISTRICT

In Texas, groundwater is subject to the Rule of Capture

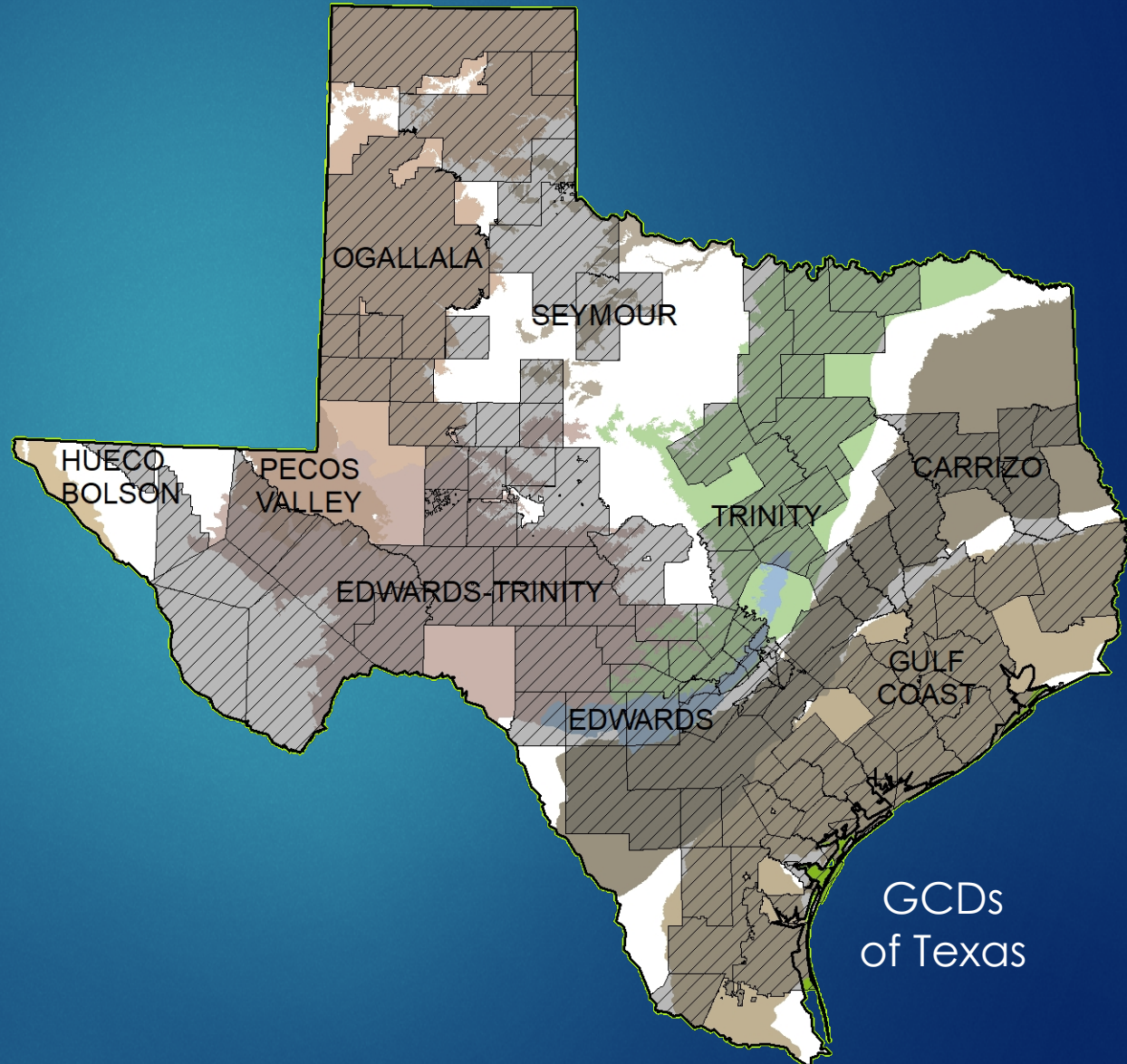
(aka, law of the biggest pump)



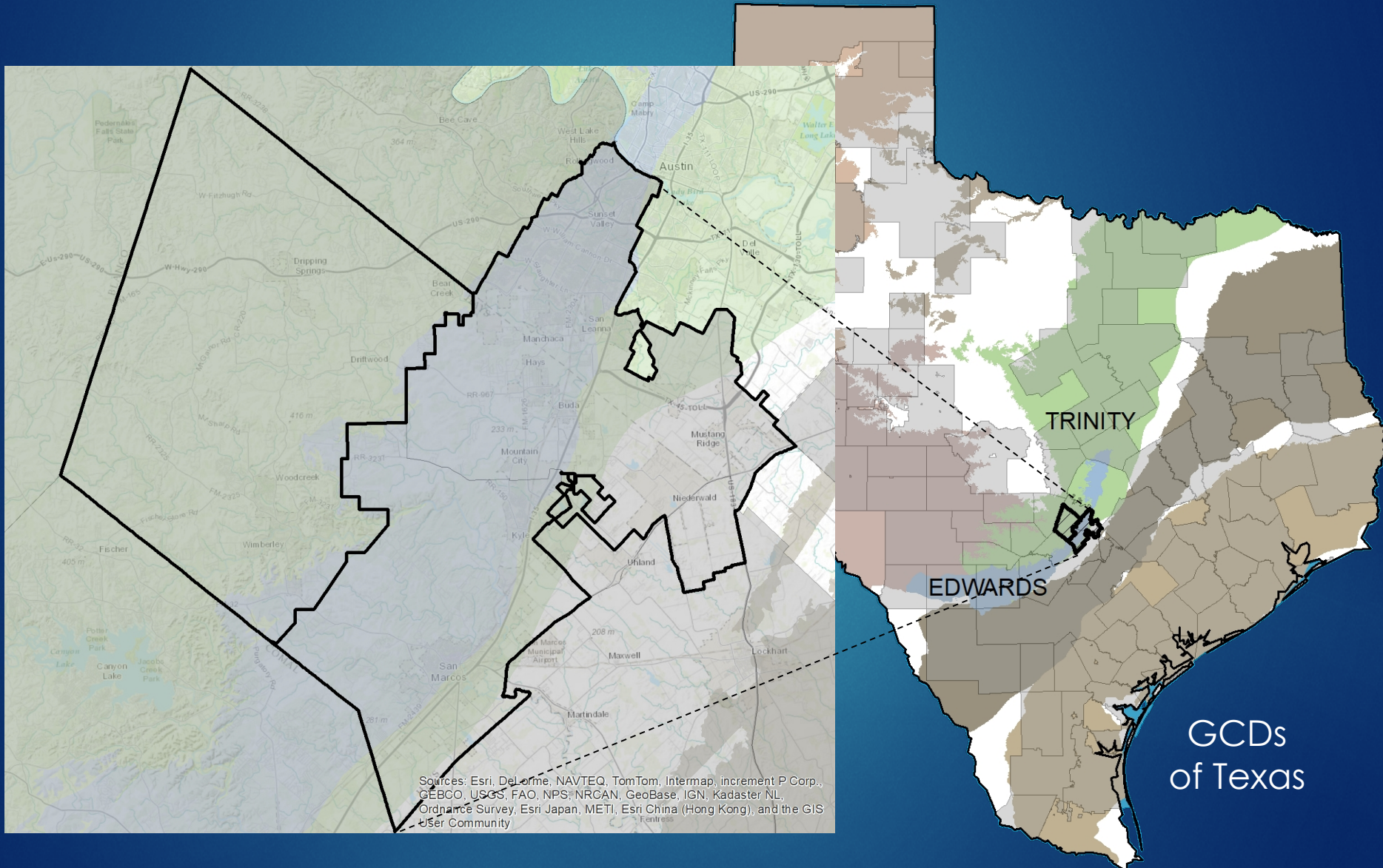
EXCEPT where there is a Groundwater Conservation District

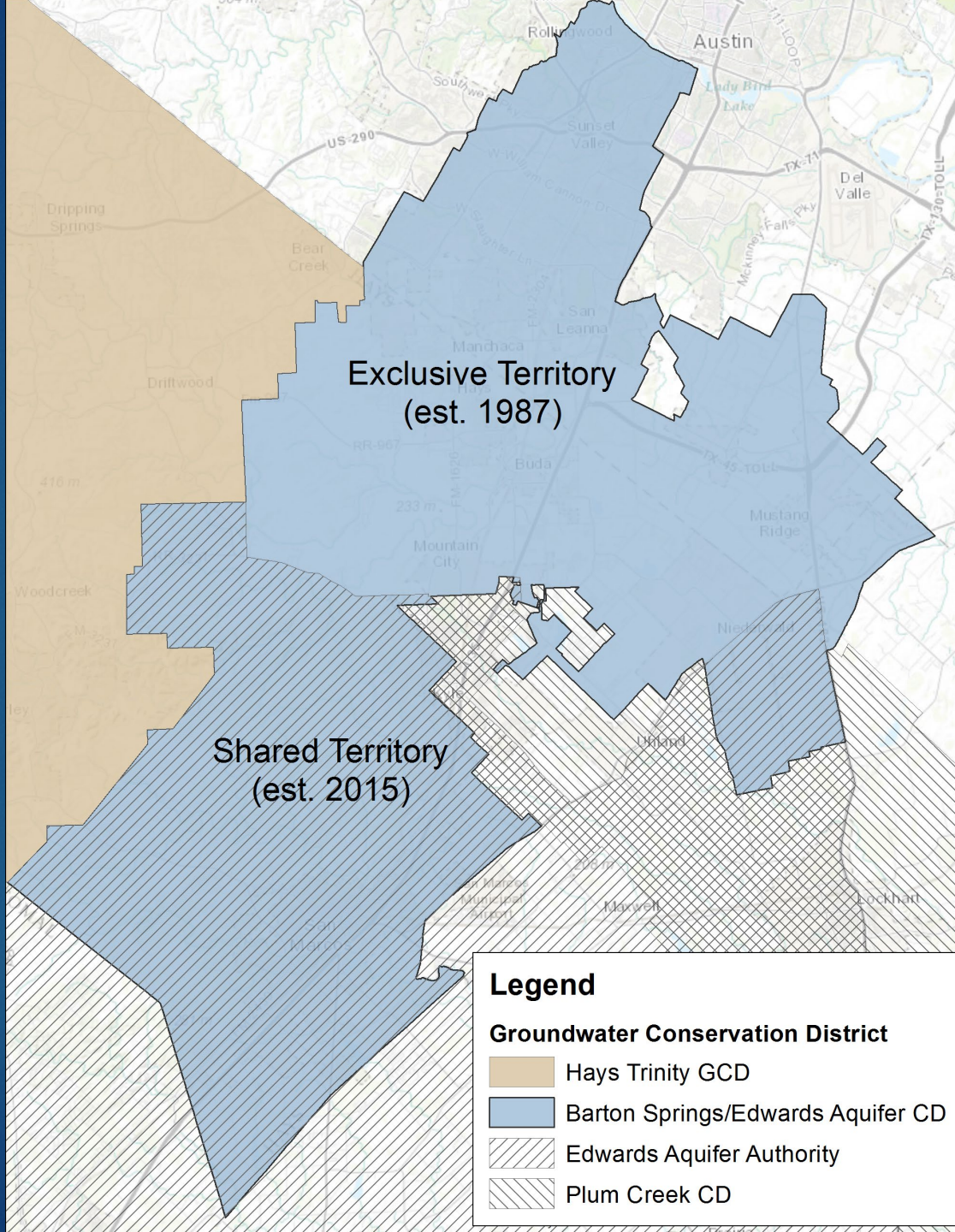
Tasks:

- ▶ Manage pumping
- ▶ Coordinate conservation
- ▶ Permit wells
- ▶ Protect water quality
- ▶ **Research and document aquifer dynamics**



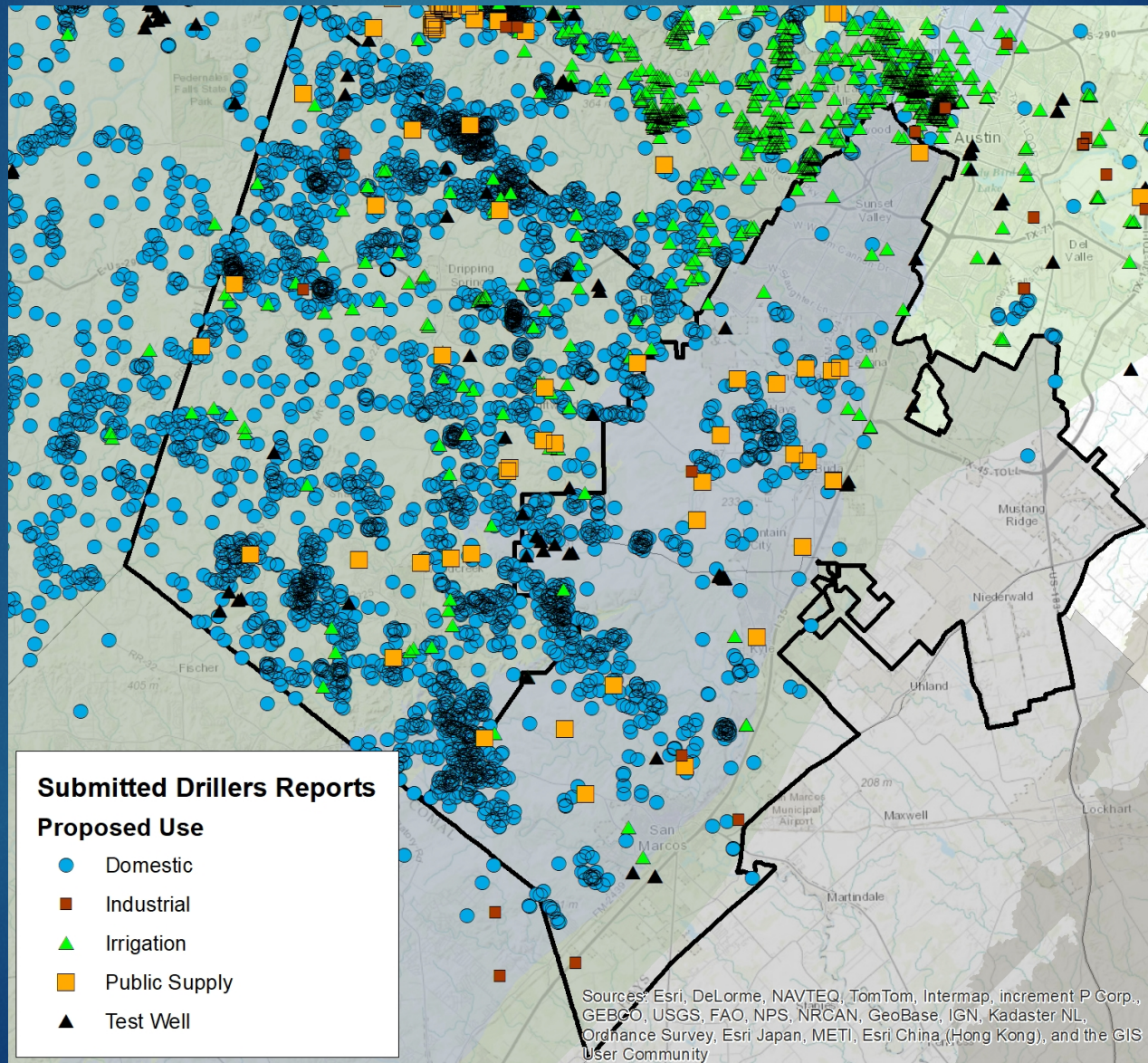
Mission: To conserve, protect, recharge, and prevent waste of groundwater and preserve all aquifers.





Lots of known wells

(recorded in Submitted Well Drillers database since 2003)



The challenge:

How to meet well owners to:

- ▶ Measure water levels and water quality
- ▶ Better understand aquifer dynamics
- ▶ Document geologic controls
- ▶ Establish a monitoring network to track water level fluctuations over time

Avoid



Avoid



GOAL!



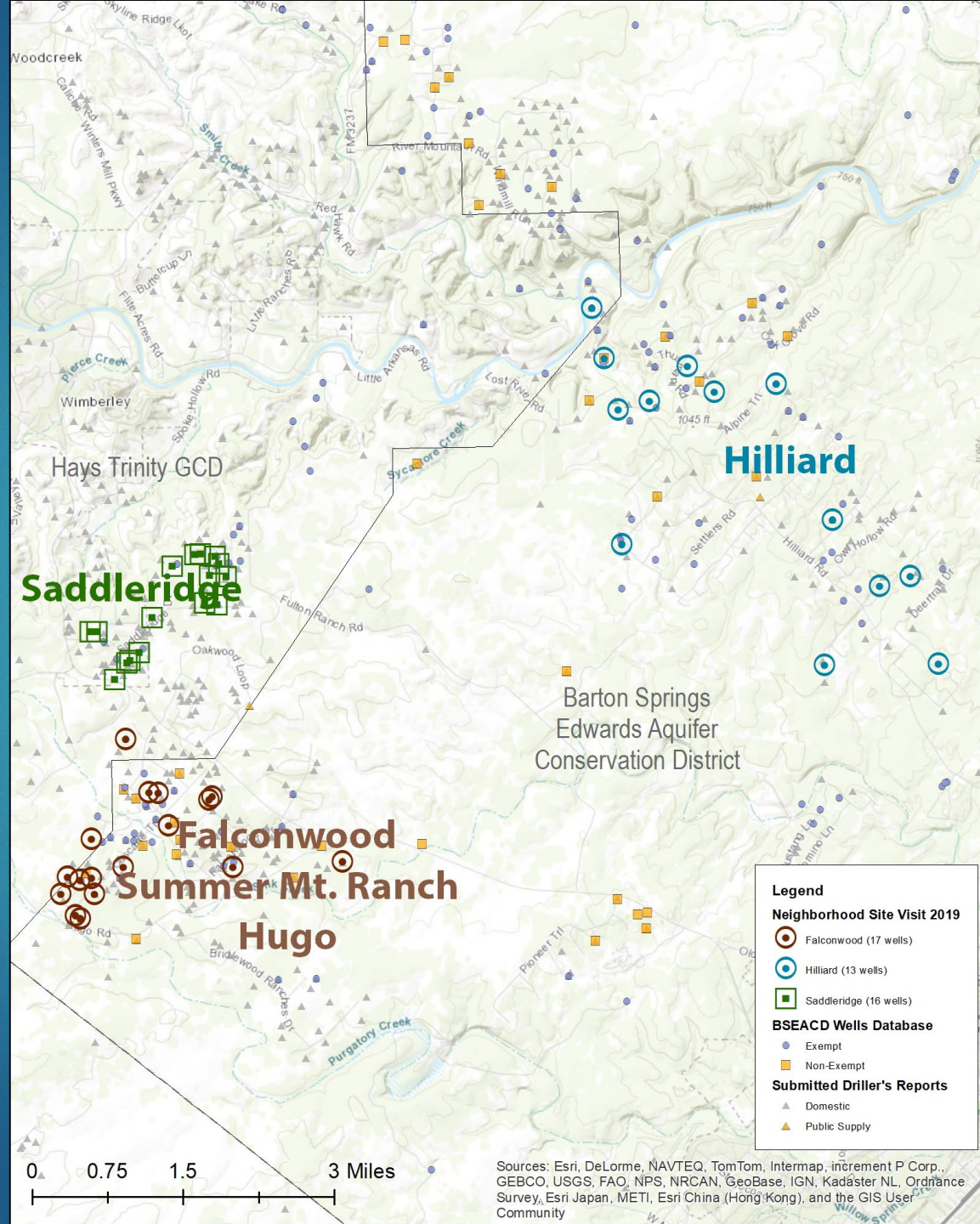
The solution:

Neighborhood Site Visits

Provide a free service &
Make it relevant to well
owners



46 wells



Water level measurements (depth to water)



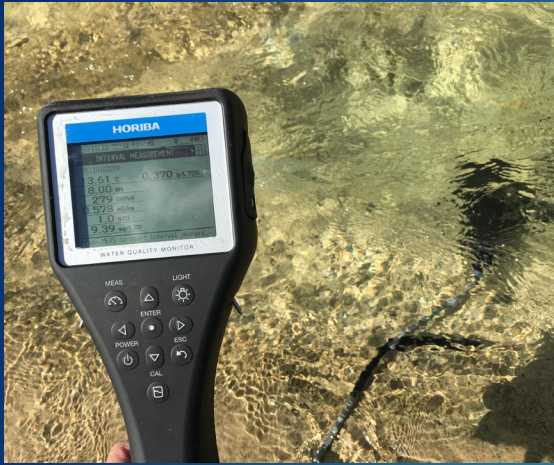
Sonic meter



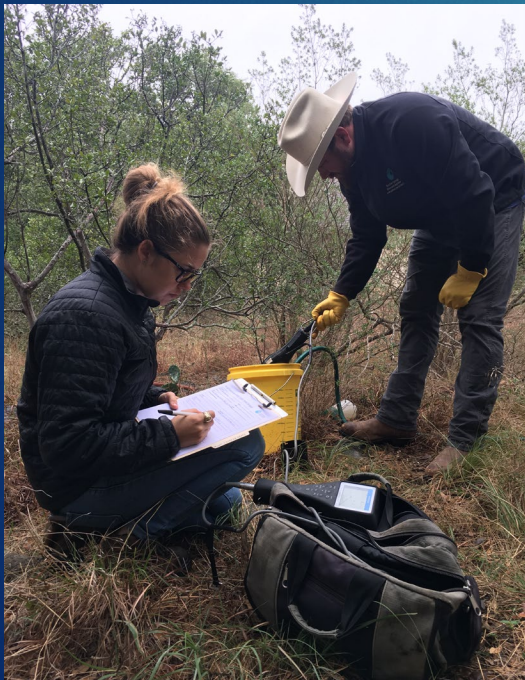
Electric tape (E-line)



Water Quality (field parameters)



- ▶ Conductivity
- ▶ Total Dissolved Solids
- ▶ Nitrate/Nitrite
- ▶ Estimated Primary Aquifer



Well owner discussions



- ▶ Well completion
- ▶ Water level
- ▶ Yield, availability
- ▶ Water quality
- ▶ Well components

	Falconwood Summer Mt. Ranch Hugo area	Hilliard area	Saddleridge area	Total
Sites Visited	17	13	16	46
Eline measurements	12	12	14	38
Minimum depth-to-water	203 ft	161 ft	377 ft	--
Maximum depth-to-water	413 ft	283 ft	528 ft	--

Well Completion

(Submitted Driller's Reports: TWDB Water Data Interactive)

Groundwater Data Viewer | Texas | WellReportWDI

https://www3.twdb.texas.gov/apps/waterdatainteractive/groundwaterdataviewer/

WATER DATA Interactive | Groundwater | Layers | Base Maps

101 Limestone Ln, Drift

STATE OF TEXAS WELL REPORT for Tracking #445643

Owner: Barton Springs Edwards Aquifer Const Dist | Owner Well #: No Data | Grid #: 57-64-6

Address: 101 Limestone Ln, Drift | 30° 03' 02.34" N | 098° 01' 18.14" W | 672 ft. above sea level

Borehole Completion: Straight Wall

Top Depth (ft.)	Bottom Depth (ft.)	Description (number of sacks & material)
90	285	12 Bentonite
285	495	47 Cement
495	510	1 bentonite

Annular Seal Data:

Seal Method: **Pos. Displacement** | Distance to Property Line (ft.): **50+**

Sealed By: **Driller** | Distance to Septic Field or other concentrated contamination (ft.): **100+**

Distance to Septic Tank (ft.): **No Data** | Method of Verification: **Measured**

Surface Completion: Surface Sleeve Installed

Water Level: **275 ft. below land surface on 2015-04-16** | Measurement Method: **Unknown**

Packers: Shale/6Mil Poly 510, Shale/6Mil Poly 515, Shale/6Mil Poly 520, Shale/6Mil Poly 720, Shale/6Mil Poly 730, Shale/6Mil Poly 740

Type of Pump: **Submersible** | Pump Depth (ft.): **760**

Well Tests: **Jetted** | Yield: **50 GPM**

Bottom Depth (ft.): 39, 857

Number of sacks & material: 13 Bags/Sacks

Line (ft.): 15'

Distance to other contamination (ft.): +/- 150'

Distance to Septic Tank (ft.): +/- 150'

Verification: Visual

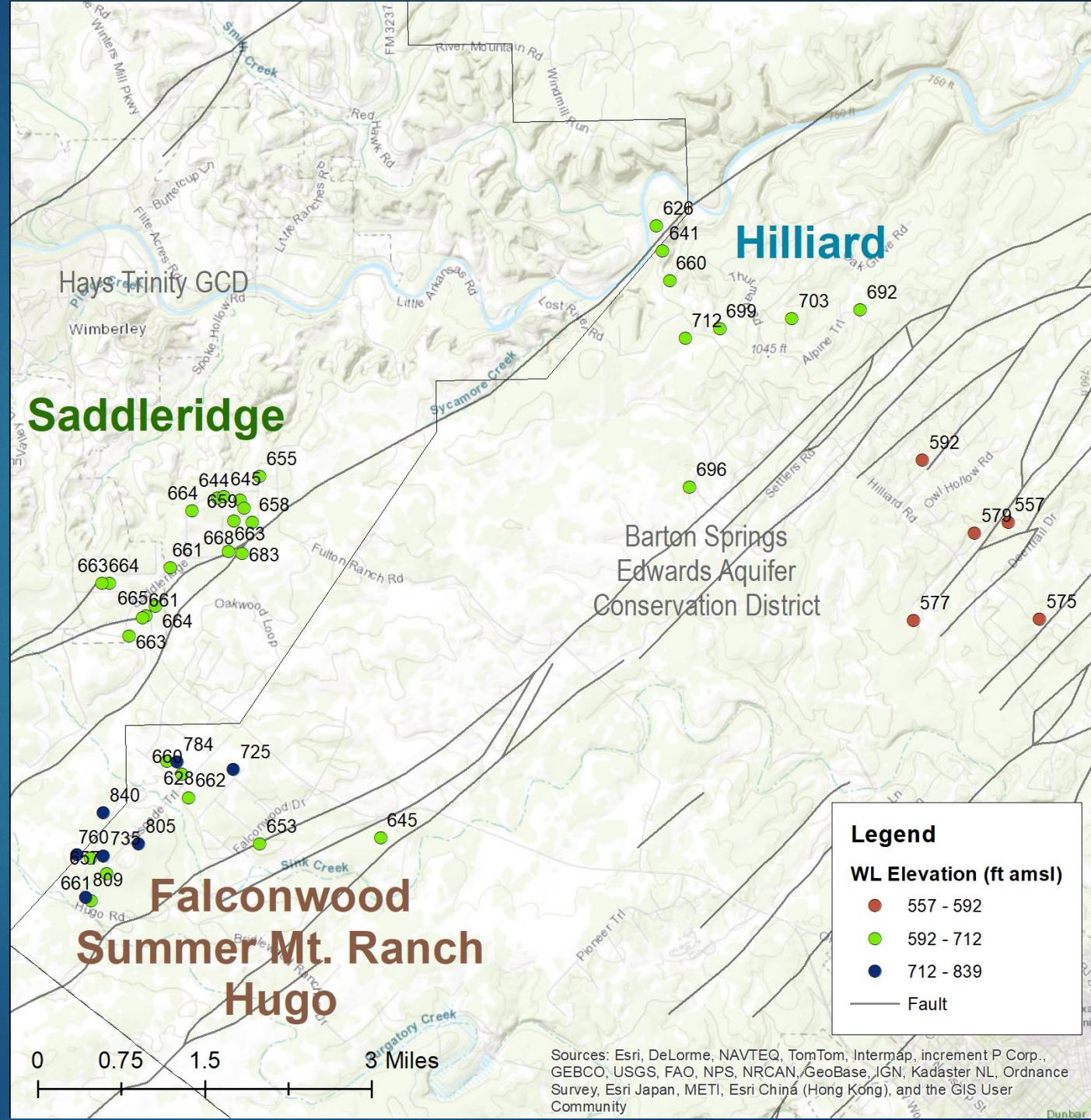
Completion by Driller

1 : 18056 | 0.4km | 0.3mi

Pointer - DMS: 30° 4' 14.62" N 98° 0' 49.28" W | DD: 30.070728 -98.013689 | Halifax, Austin, Texas Parks & Wildlife, Esri, HERE, Garmin, INCREMENT...

www3.twdb.texas.gov/apps/WaterDataInteractive/.../Disclaimer | TEXAS WATER DEVELOPMENT BOARD

Water level elevations



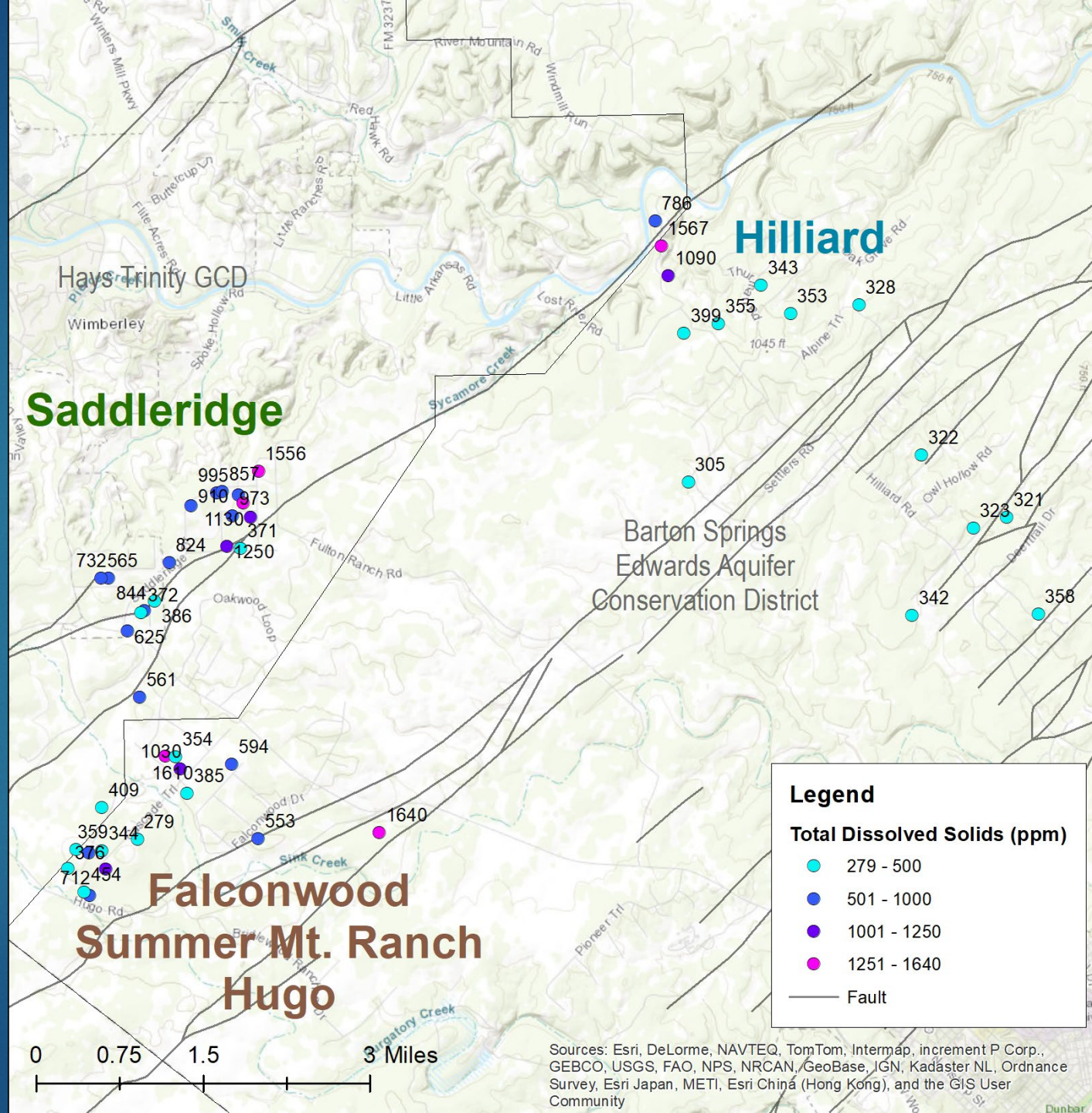
Well owner discussions



- ▶ Well completion
- ▶ Water level
- ▶ Yield, availability
- ▶ Water quality
- ▶ Well components

	Falconwood Summer Mt. Ranch	Hilliard	Saddleridge	EPA Standard
Nitrate (ppm)	0 - 0.5	0 - 1	0 - 0.5	<i>Below 10</i>
Nitrite (ppm)	0 - 0.15	0 - 0.15	0	<i>Below 1</i>
pH	6.7 - 7.47	6.84 - 7.34	6.55 - 7.53	--
Conductivity (mS/cm)	538 - 2,520	469 - 1,700	605 - 2,230	--
TDS (mg/L)	344 - 1,610	322 - 1,090	372 - 1,420	<i>Secondary standard (aesthetics)</i>

Total Dissolved Solids



Well owner perspective:

How do I protect my home, investment & family?

Well Components

Supply

- ▶ Pressure tank
- ▶ Storage tank
- ▶ Pump saver

Treatment Options

- ▶ Softener
- ▶ Bacteria treatment options (chlorinator, UV)
- ▶ Filters



WHAT THE WELL?

Pressure Tank



Barton Springs
Edwards Aquifer
CONSERVATION DISTRICT



What does it do?

It provides pressure for household or irrigation use. Sizes range from 10-200 gallons., average size is 44 gallons.

How does it work?

It maintains a constant water pressure and turns the pump on once a set volume is used. For example, a 44 gallon tank has a drawdown of 16 gallons.

Do you have one?

Most well systems have one. Most commonly they are small, blue metal tanks. They are often confused with a storage tank, but they are much smaller.

WHAT THE
WELL?

Storage Tank



Barton Springs
Edwards Aquifer
CONSERVATION DISTRICT



What does it do?

It stores water for peak household or irrigation demand and allows the pump to gradually fill tank. Sizes range from 2,500-6,000 gal.

How does it work?

A float switch triggers pump once the water in the tank gets below the set level. Storage tanks reduce stress on the pump.

Do you have one?

Storage tanks are especially useful for wells in drought-prone aquifers or in formations with low yield. They also can be filled by external supplies in emergencies.

WHAT THE
WELL?

Pump Protector



Barton Springs
Edwards Aquifer
CONSERVATION DISTRICT



What does it do?

It protects submersible pumps from burning out due to low yield or low water levels.

How does it work?

It monitors the pump's electrical current and automatically trips a switch to turn off the pump if it runs too long.

Do you have one?

We recommend these for all wells, especially shallow wells or wells with known supply issues.

WHAT THE
WELL?

Water Softener



Barton Springs
Edwards Aquifer
CONSERVATION DISTRICT



What does it do?

It is a common treatment system for "hard" water that reduces the amount of calcium in the water.

How does it work?

It uses a chemical reaction to substitute calcium ions for either sodium or potassium ions (not as likely to leave deposits in pipes).

Often there is a charcoal filter incorporated as pretreatment.

Do you have one?

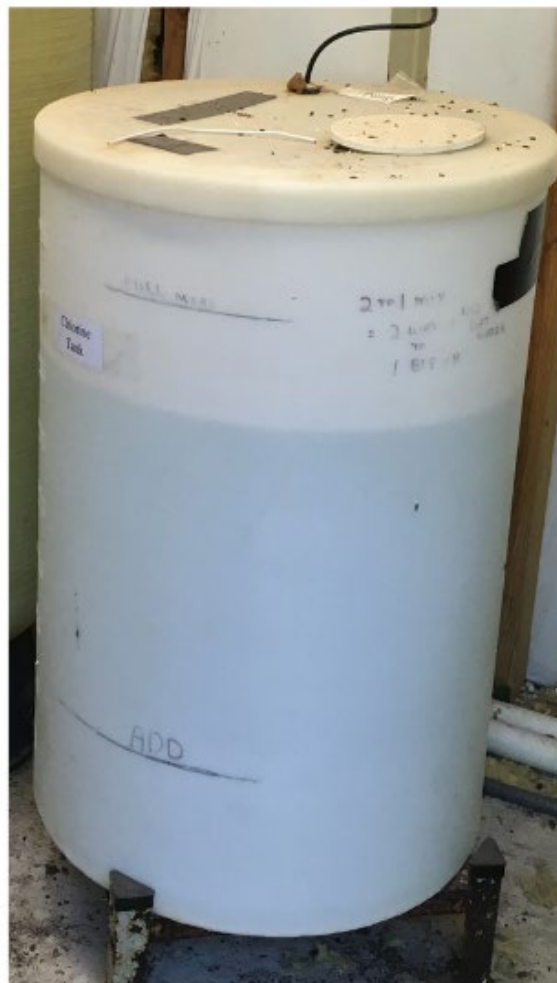
Water softeners (even those with charcoal filters) do not remove harmful bacteria or nitrates and do not reduce total dissolved solids.

WHAT THE WELL?

Chlorinator



**Barton Springs
Edwards Aquifer**
CONSERVATION DISTRICT



What does it do?

Chlorine water treatment methods work to eliminate odor issues and disease causing bacteria.

How does it work?

Injected chlorine kills harmful bacteria and oxidizes constituents such as iron and manganese. Usually comes in liquid or pellet forms.

Do you have one?

Often paired with filtration. Consult with your professional installer to ensure proper treatment through dosage and equipment functionality.

WHAT THE WELL?

UV Light System



Barton Springs
Edwards Aquifer
CONSERVATION DISTRICT



What does it do?

UV light systems neutralize harmful bacteria without changing the taste of the source water.

How does it work?

Water passes through pre-filters to remove particles that would create shadows where bacteria could hide then through a light tube where the UV rays neutralize remaining bacteria.

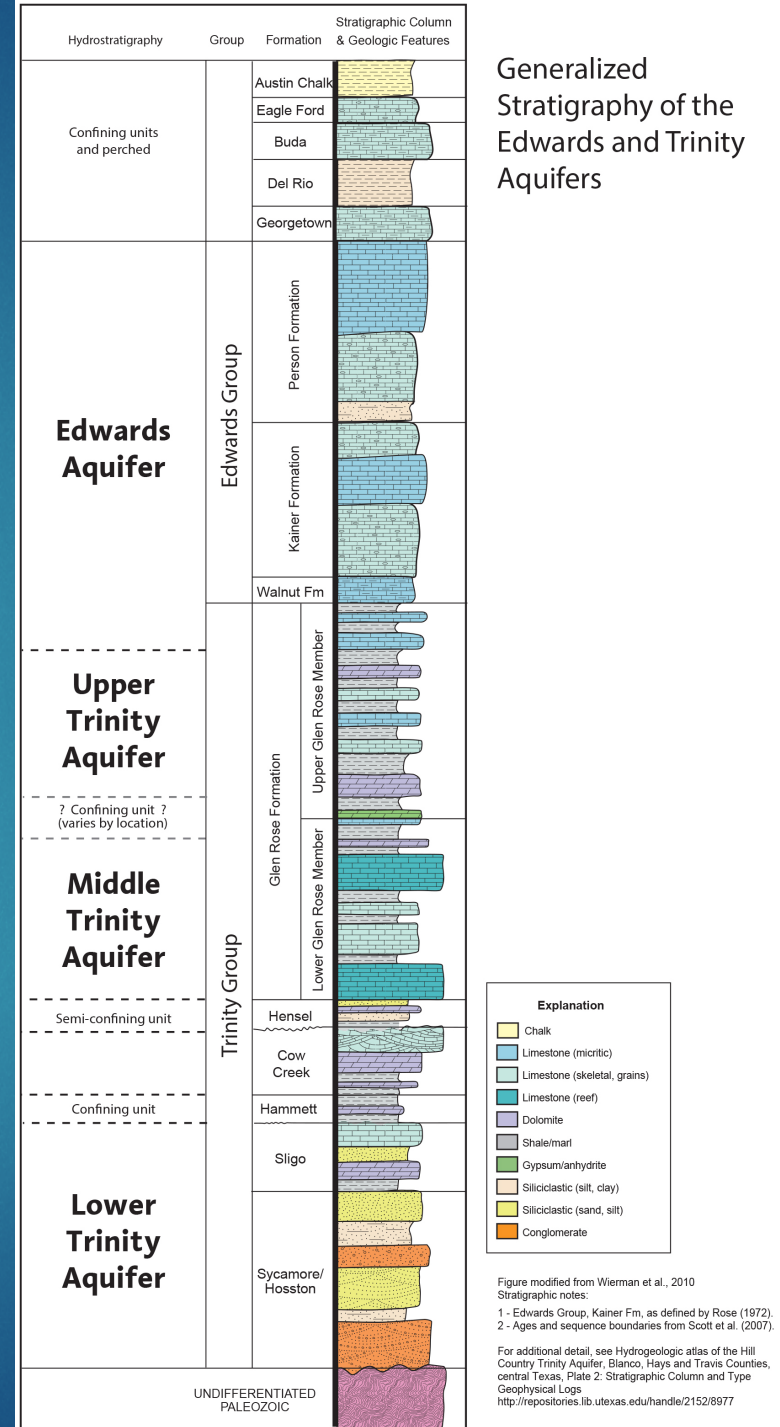
Do you have one?

The UV light bulb should be replaced annually to maintain effective treatment. Pre-filters will need to be cleaned/replaced throughout the year.

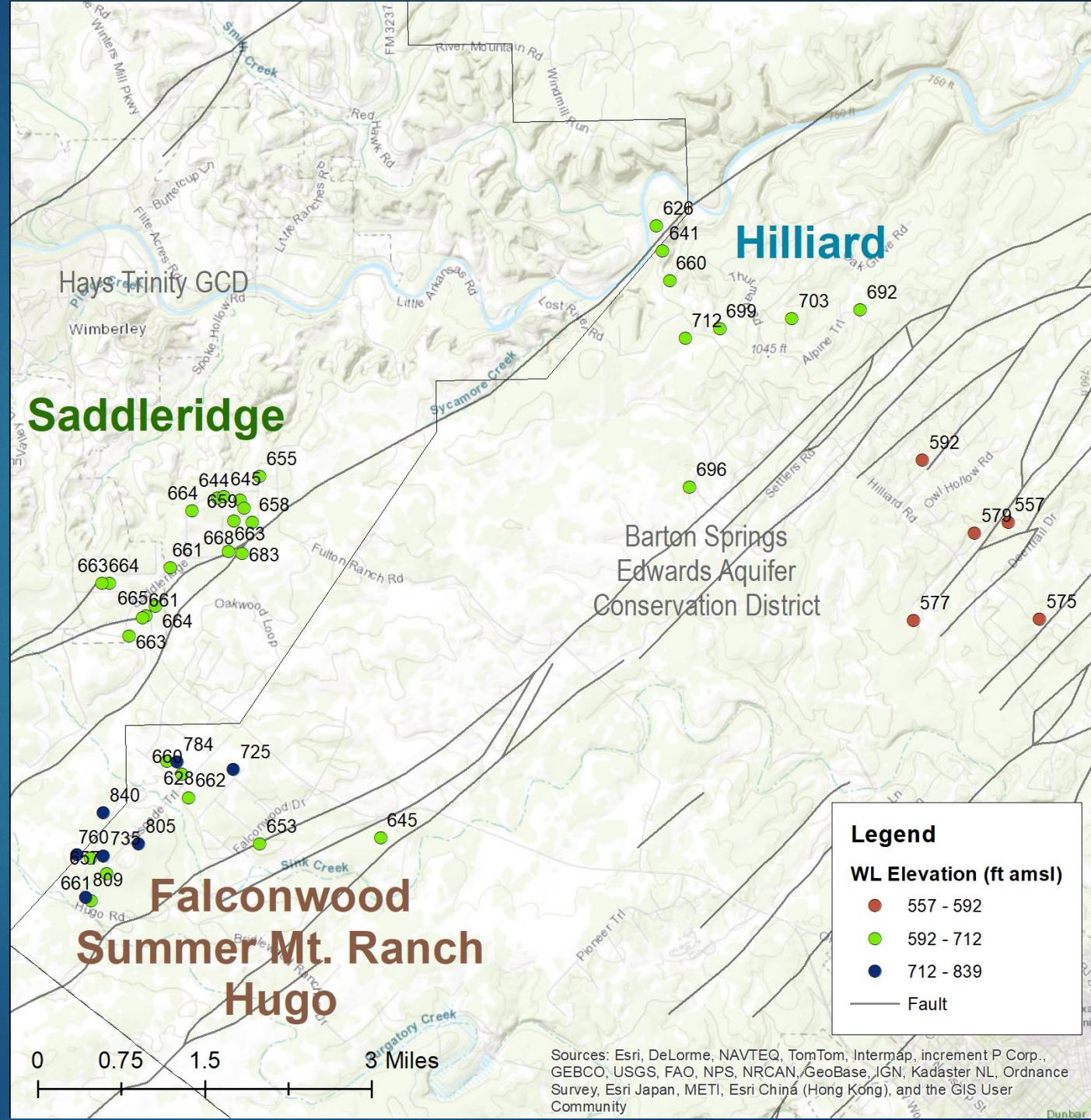
Science perspective:

Groundwater is complicated

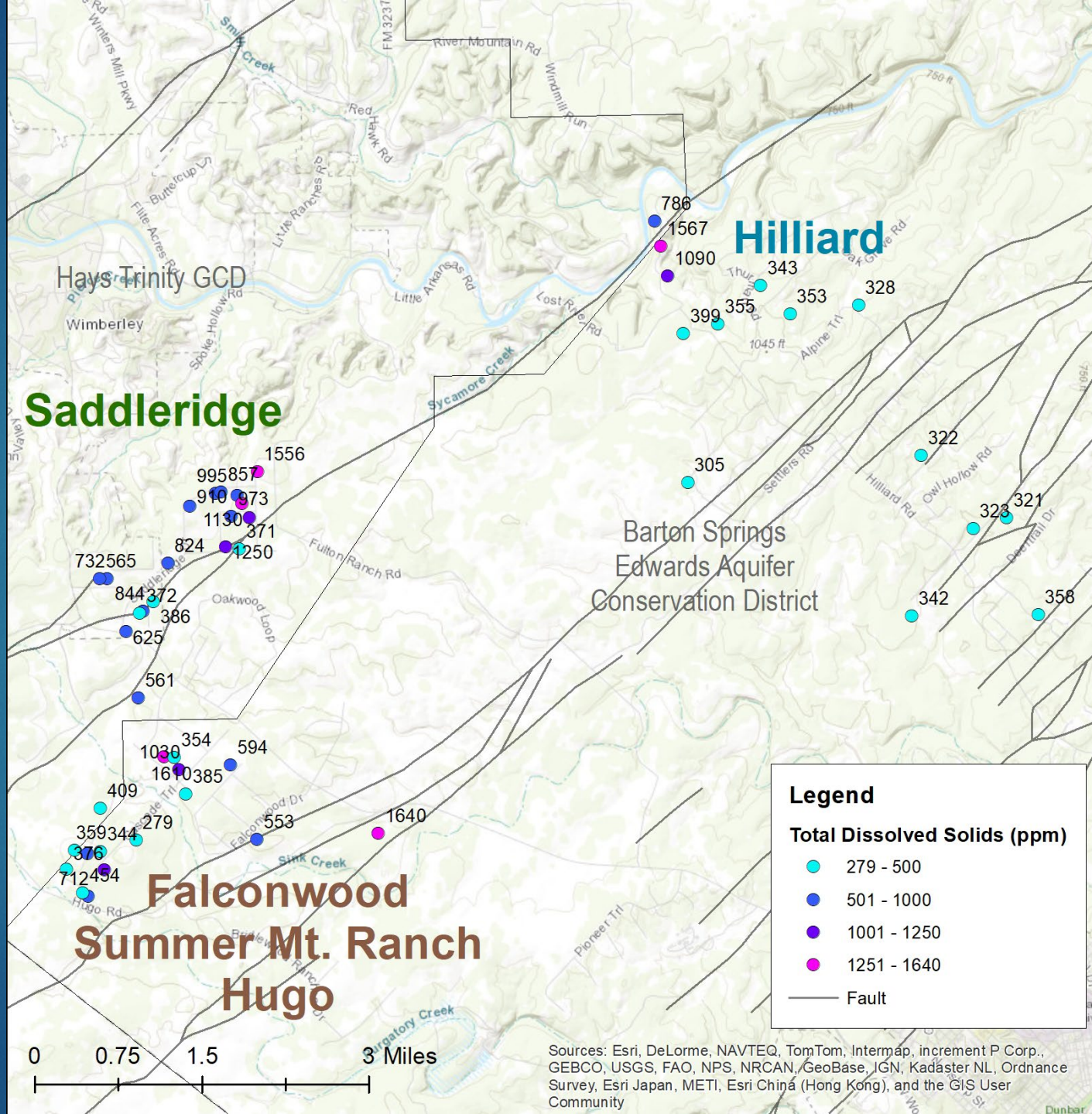
- ▶ Multiple aquifers
- ▶ Faults
- ▶ Variable well completion (difficulty in documenting)
- ▶ 3/4" observation port



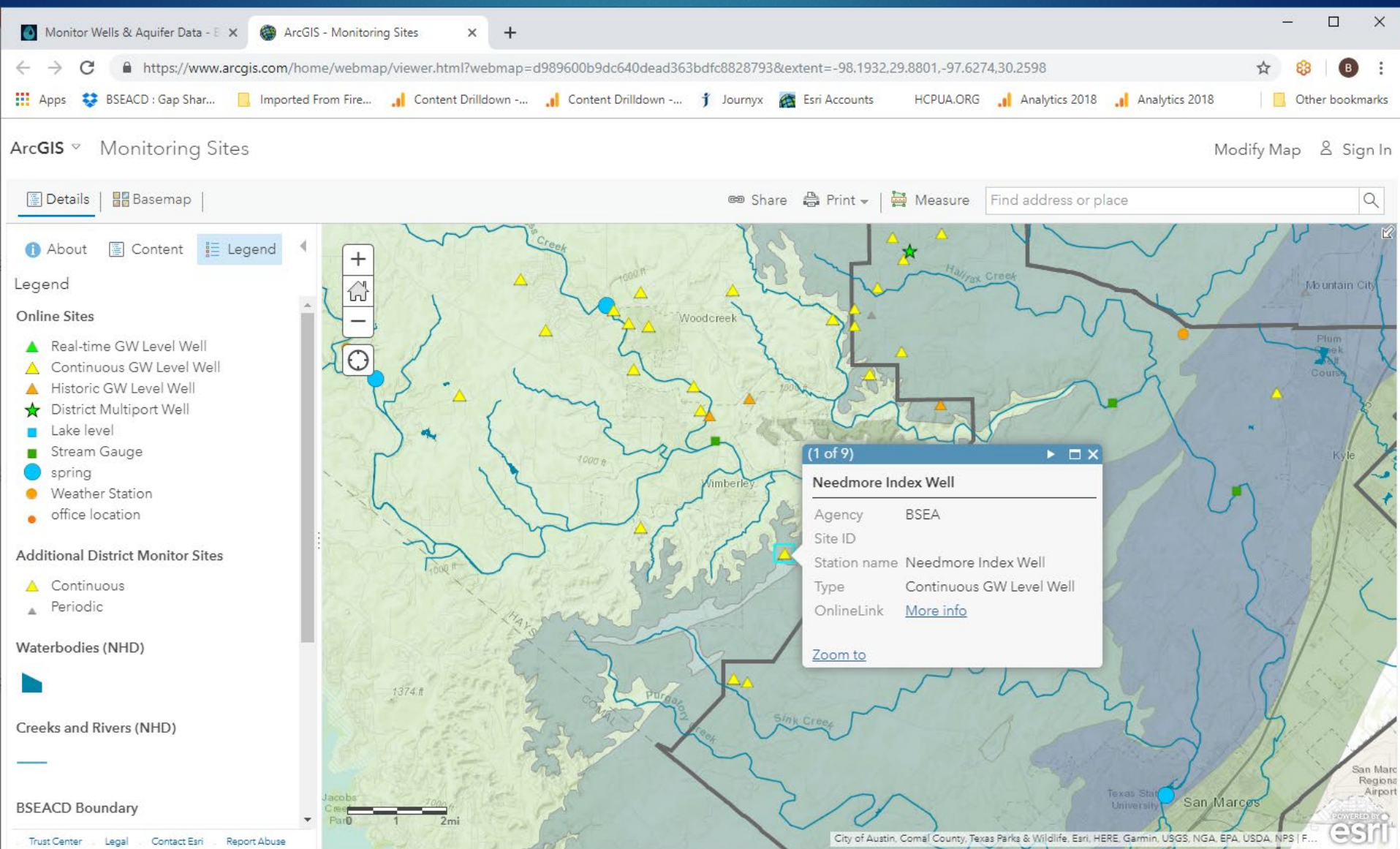
Water level elevations



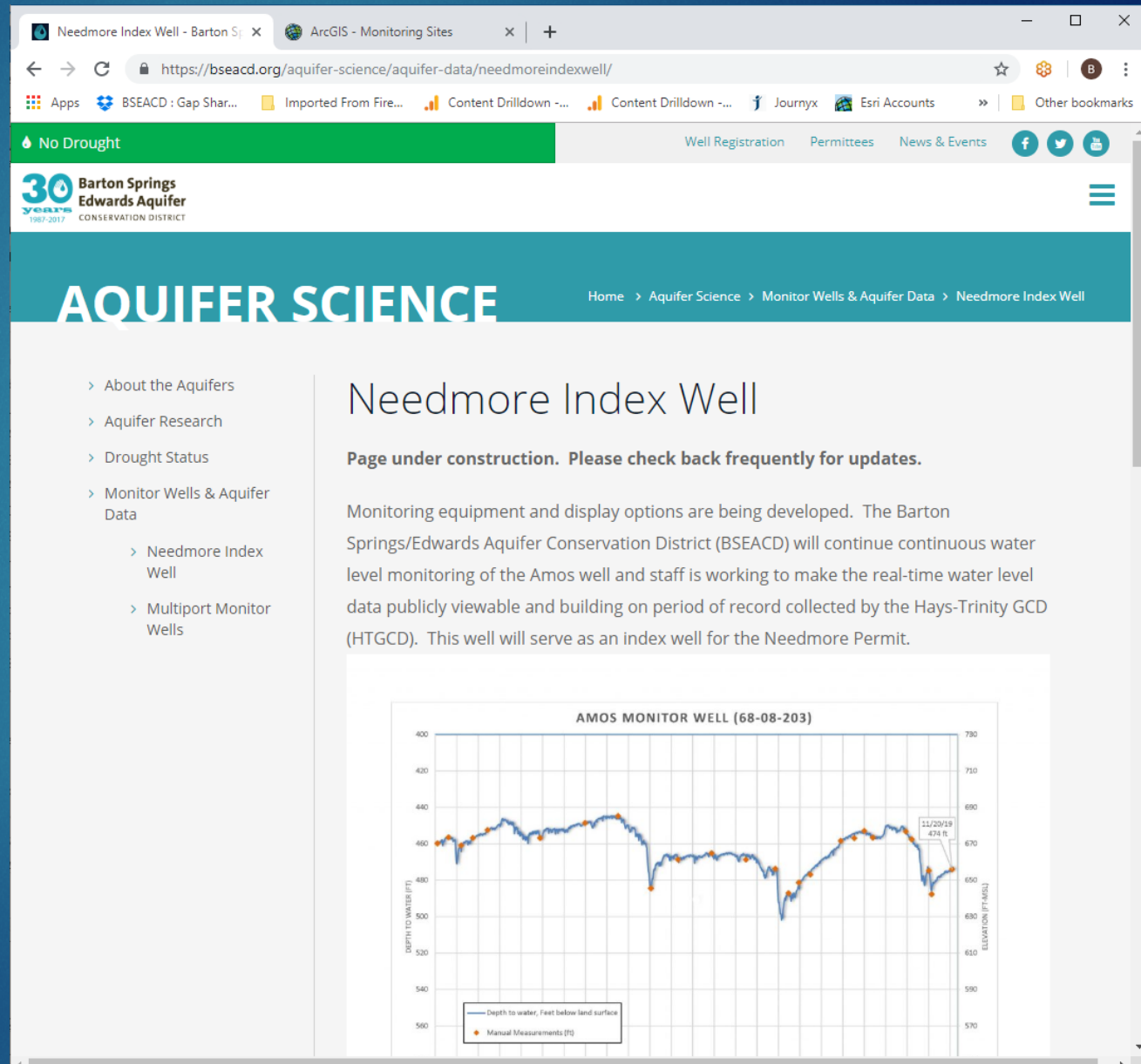
Total Dissolved Solids



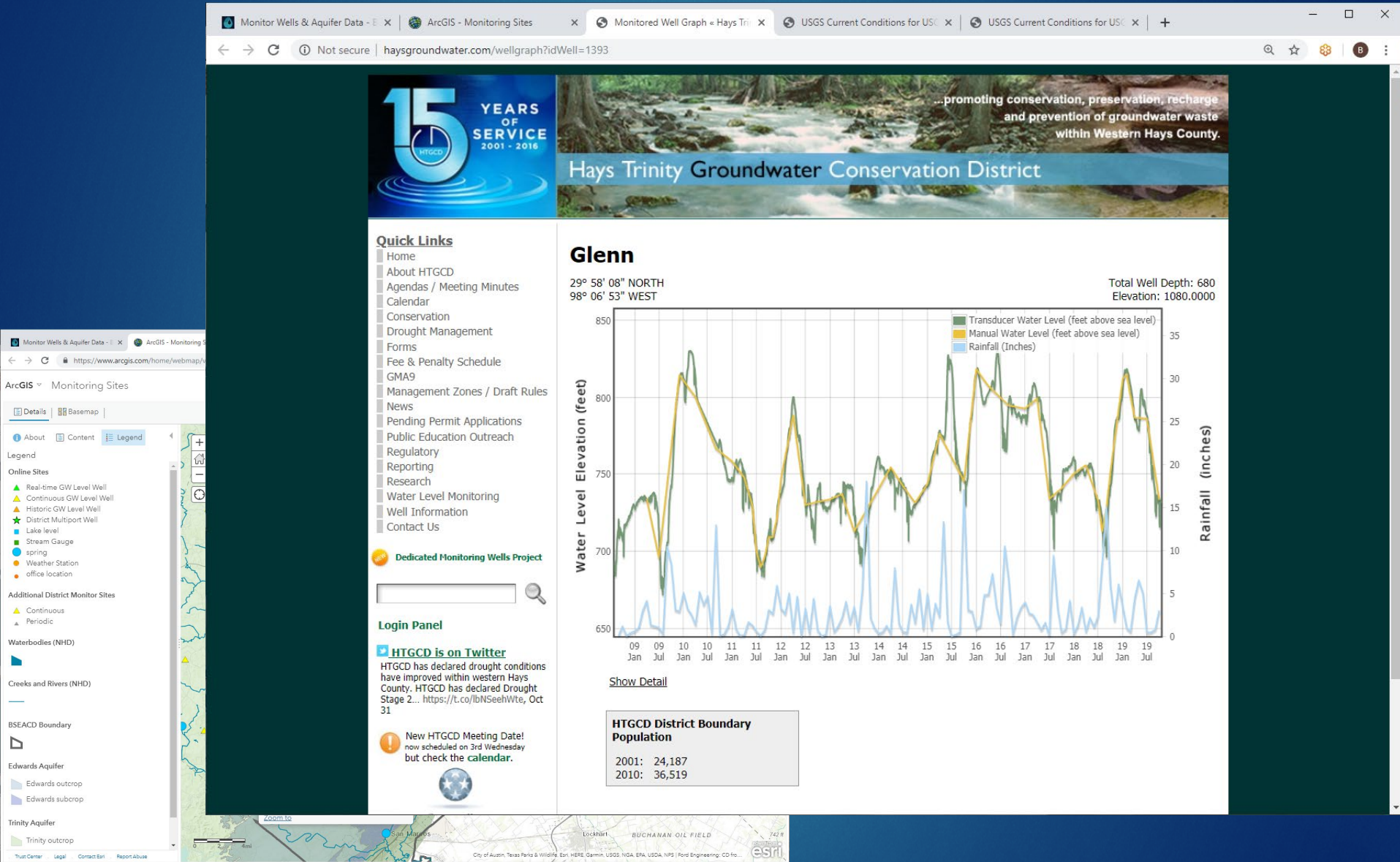
Monitor Network



Needmore Index Well



HTGCD Glenn Well





Texas Water Resources

hydrostratigraphy	group	formation	stratigraphic column & geologic features
CARRIZO-WILCOX AQUIFER		Carrizo	
		Wilcox	
confining units and perched aquifers		Taylor	
		Austin Chalk	
		Eagle Ford	
		Buda	
		Del Rio	
		Georgetown	
EDWARDS AQUIFER	Edwards Group	Pearns Formation	
		Malone Formation	
		Walnut Fin	
UPPER TRINITY AQUIFER	Trinity Group	Glen Rose Formation Upper Glen Rose Mbr	
MIDDLE TRINITY AQUIFER		Lower Glen Rose Mbr	
semi-confining unit		Mansell	
confining unit		Cow Creek	
LOWER TRINITY AQUIFER		Hammett	
		Sligo	
		Sycamore/ Houston	
PALEOZOIC AQUIFERS	undifferentiated Paleozoic		
CRYSTALLINE ROCK AQUIFERS	undifferentiated Precambrian		



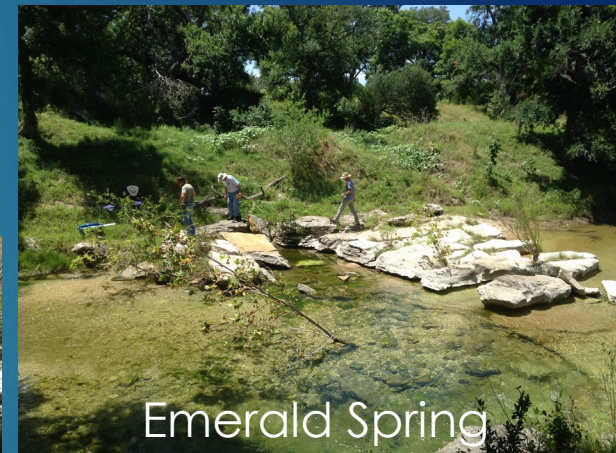
Sources:
 Holly O'Halloran
 cross section after Brune & Duffin 1983
 maps after Wieman et al 2010



Saunders Swallet



Jacobs Well



Emerald Spring



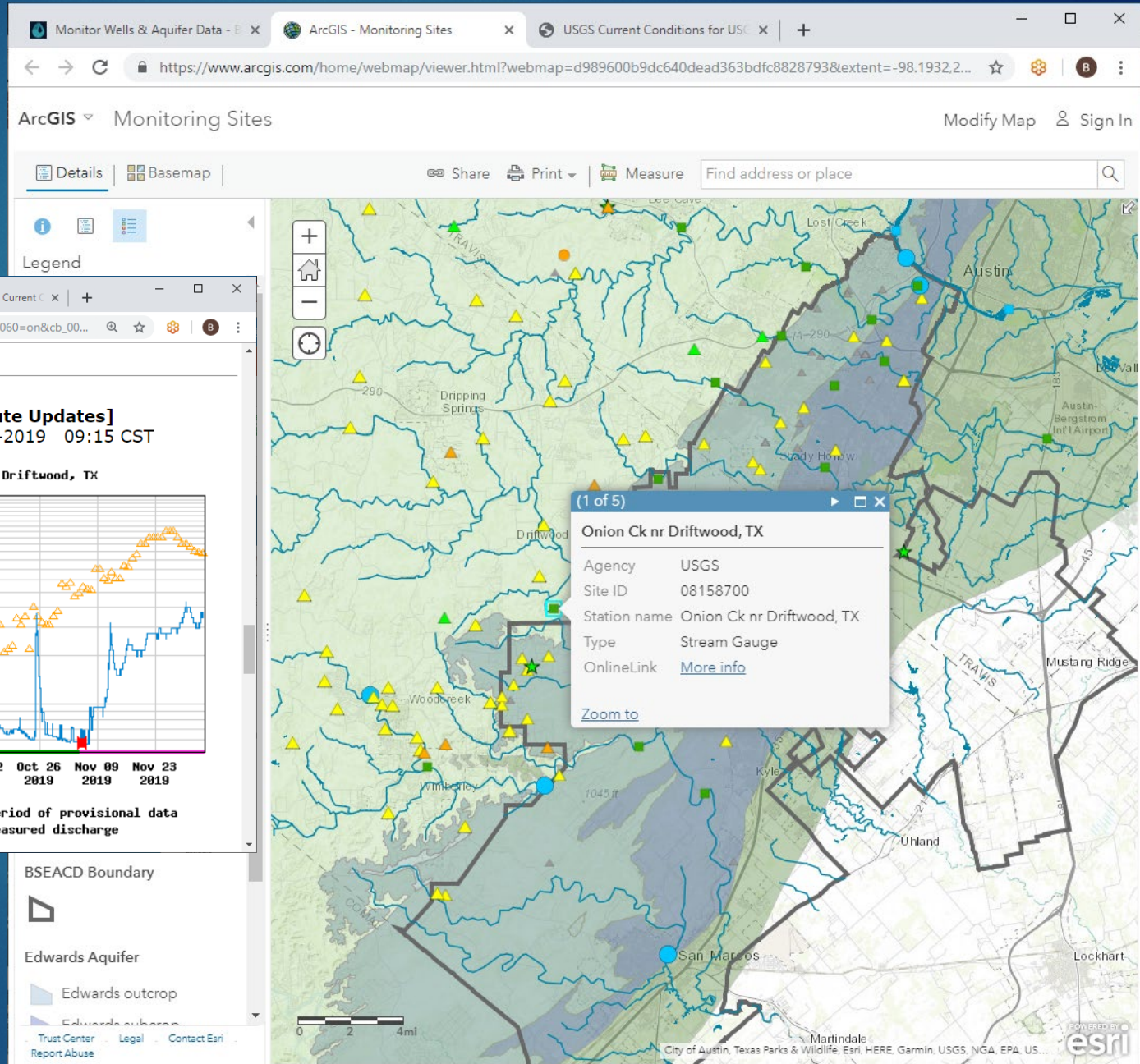
McCullough Spring

Pleasant Valley Springs



Park Spring

Flow gauges (Creeks, rivers, & springs)



Flow gauges (Creeks, rivers, & springs)

Monitor Wells & Aquifer Data - x ArcGIS - Monitoring Sites x Monitored Well Graph - Hays Tri x USGS Current
https://www.arcgis.com/home/webmap/viewer.html?webmap=d989600b9dc640dead363bdfc8828793&extent=-

ArcGIS Monitoring Sites

Details Basemap

About Content Legend

Legend

Online Sites

- Real-time GW Level Well
- Continuous GW Level Well
- Historic GW Level Well
- District Multipoint Well
- Lake level
- Stream Gauge
- spring
- Weather Station
- office location

Additional District Monitor Sites

- Continuous
- Periodic

Waterbodies (NHD)

Creeks and Rivers (NHD)

BSEACD Boundary

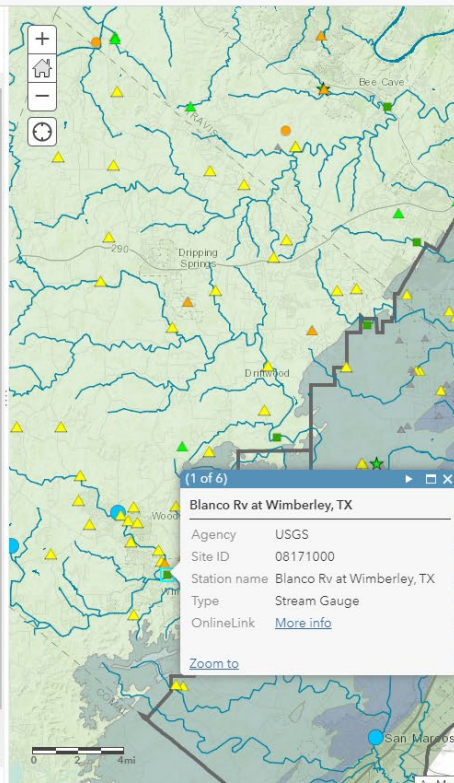
Edwards Aquifer

- Edwards outcrop
- Edwards subcrop

Trinity Aquifer

- Trinity outcrop

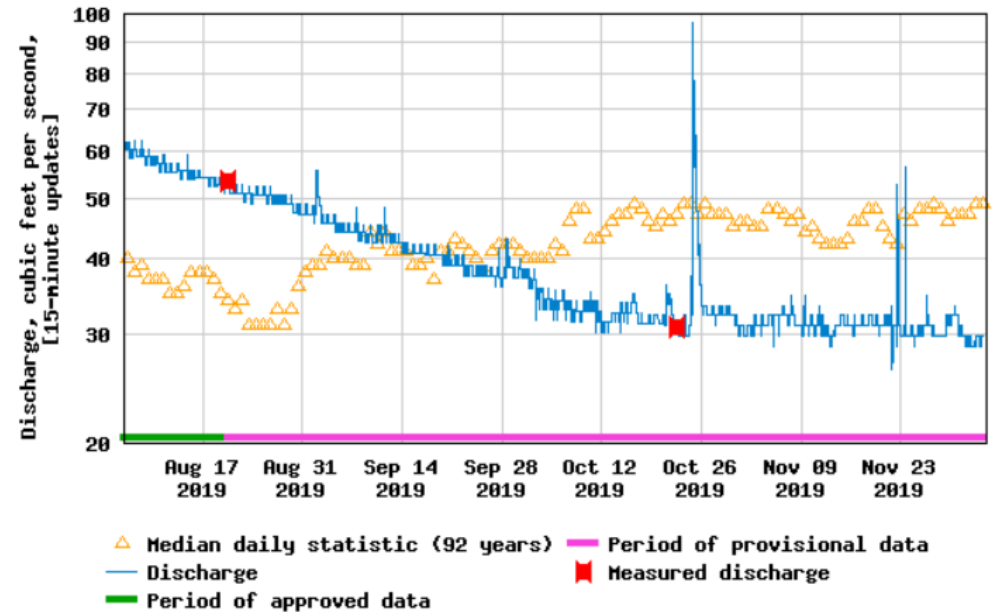
Trust Center Legal Contact Us Report Abuse



Discharge, cubic feet per second, [15-minute updates]

Most recent instantaneous value: 29.9 12-04-2019 09:30 CST

USGS 08171000 Blanco Rv at Wimberley, TX



Create [presentation-quality](#) / [stand-alone](#) graph. Subscribe to [WaterAlert](#) P00060

Keep an eye out & stay tuned

- ▶ Online Resources
 - ▶ Search for your well record
 - ▶ Check monitor site data
- ▶ Enews
- ▶ Upcoming programs
 - ▶ Scholarships
 - ▶ Well water checkup (April 2020)
 - ▶ Austin Cave Festival (Feb 2020)

Many thanks to...

- ▶ BSEACD and HTGCD staff
- ▶ Collaborators who help spread the word
- ▶ ALL THE WELL OWNERS who participated

Good science is built on good
well owner relationships.

Good policy is informed by good
science.

Online resources

- ▶ **BSEACD Monitor Wells page:**

www.bseacd.org/aquifer-science/aquifer-data/

- ▶ **HTGCD Monitor Wells page:**

www.haysgroundwater.com/monitored-wells-data

- ▶ **Guidance to search for a well record, download well owner guide, water quality labs, well water checkup:**

<https://bseacd.org/education/well-owners/>

- ▶ **Monitoring Sites Interactive map**

<https://bseacd.org/aquifer-science/aquifer-data/>

- ▶ **Texas Well Owner Network Water Treatment fact sheets**

<http://twon.tamu.edu/fact-sheets/>

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