

NEW UNDERSTANDING OF THE TRINITY AQUIFER SYSTEM



Mike Keester



Cole Ruiz, Moderator



Vince Clause



Dr. Joe Yelderman

PROJECT ROLES



Mike Keester

- Coordinate Work
- Previous Research
- Water Levels
- Summary Report



Vince Clause

- Hydrostratigraphy
- Structure
- 3D Model
- Report Sections

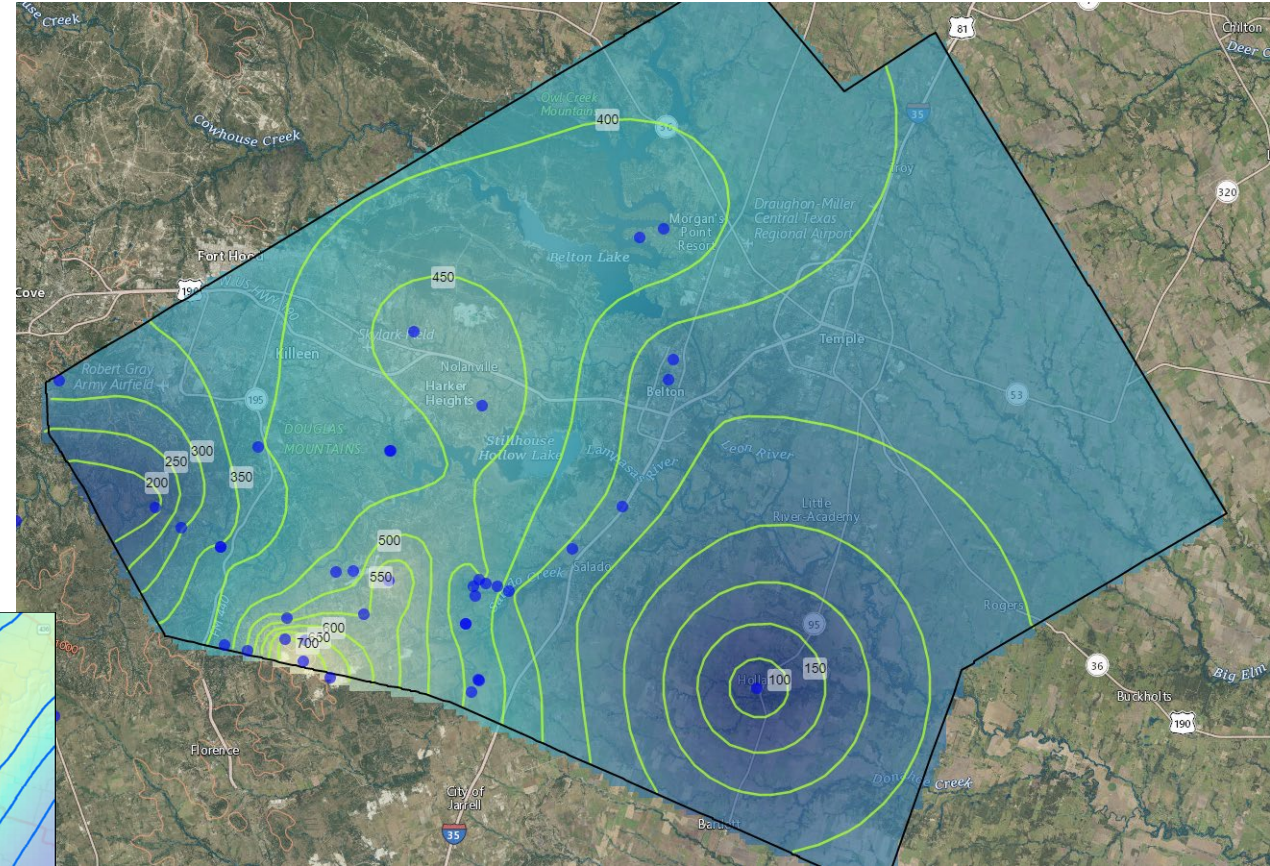
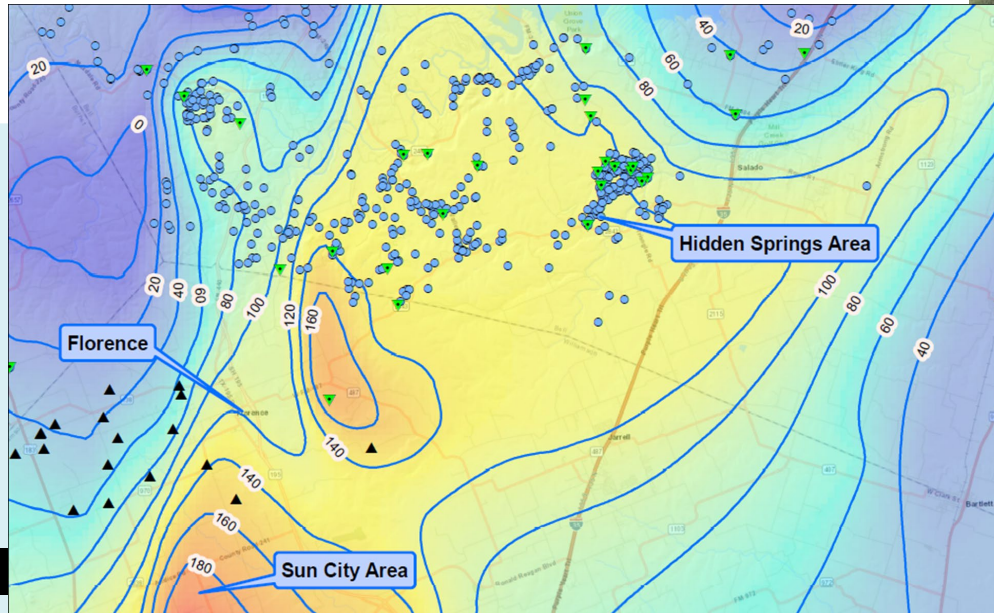


Joe Yelderman

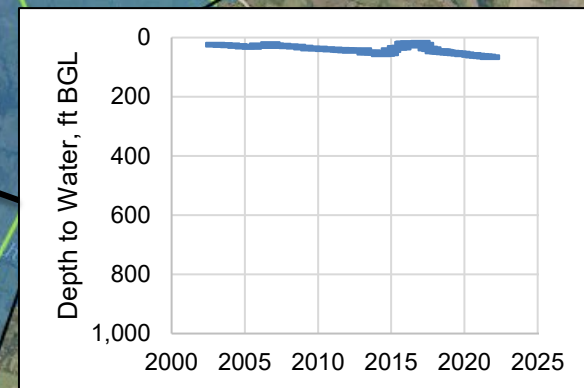
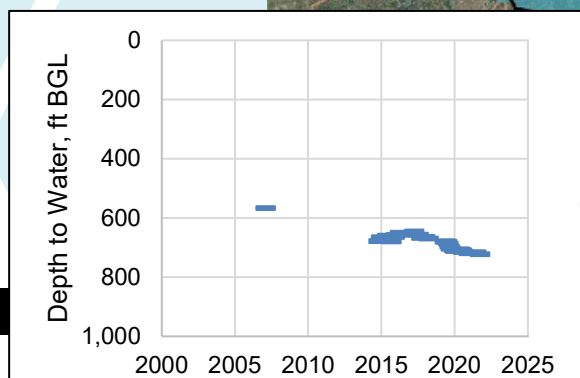
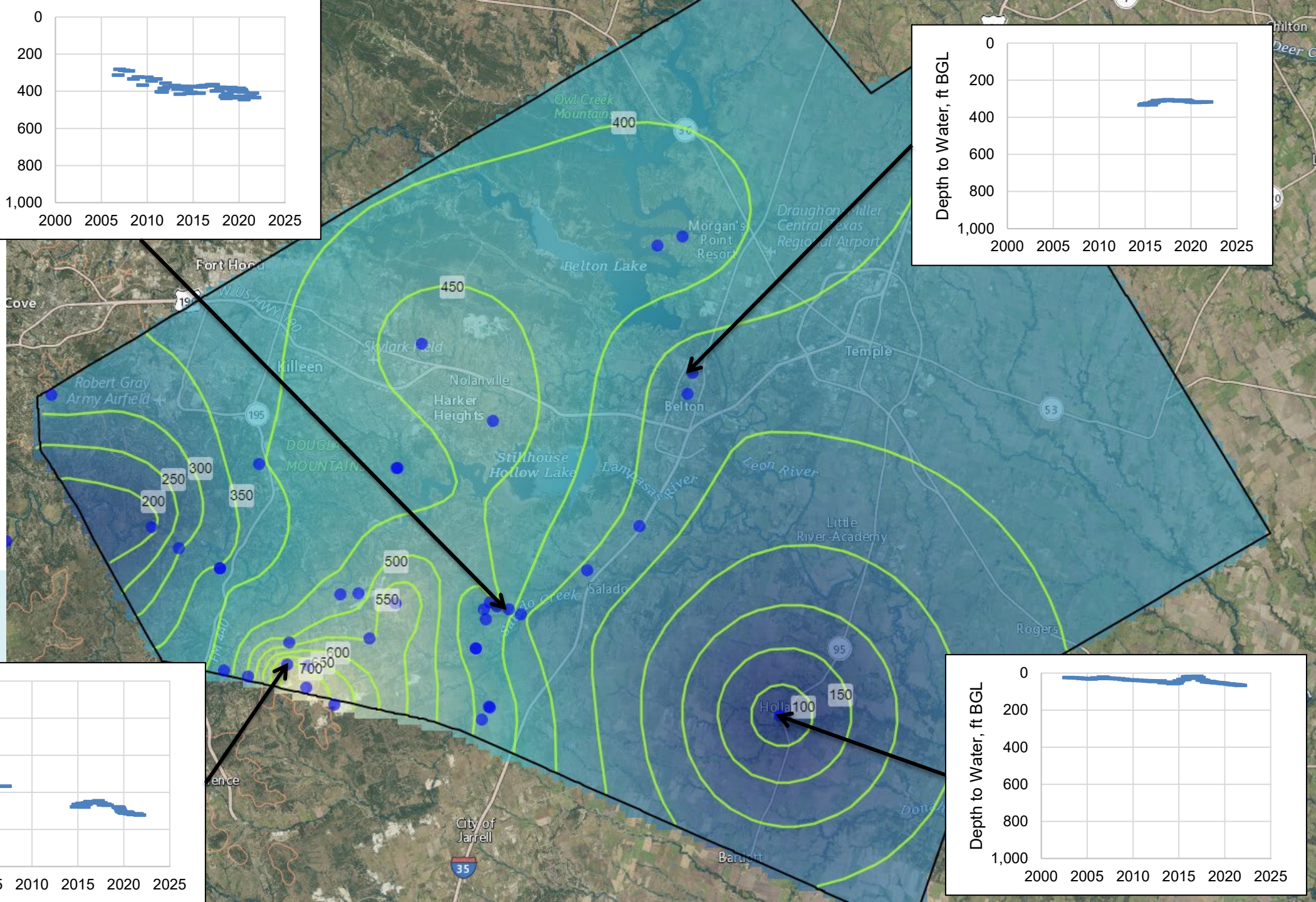
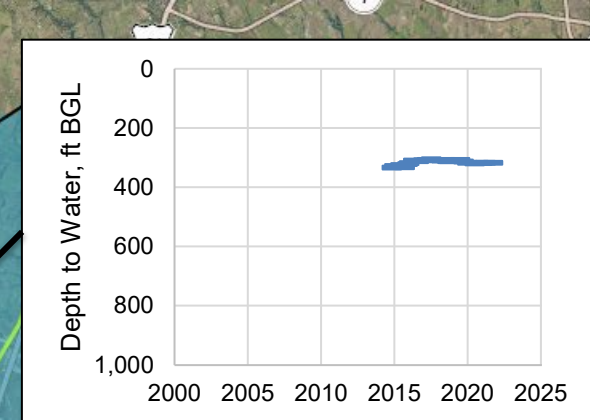
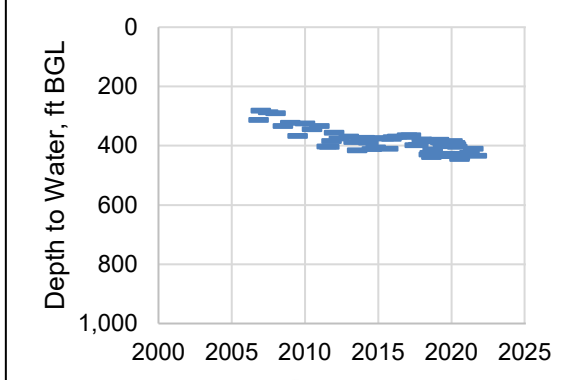
- Aquifer Hydraulics
- Aquifer Testing
- Water Quality
- Report Sections

WATER LEVELS

- Deep water levels in southwest
- Localized water level declines
 - More than 150 feet since 2006
 - Steep gradients

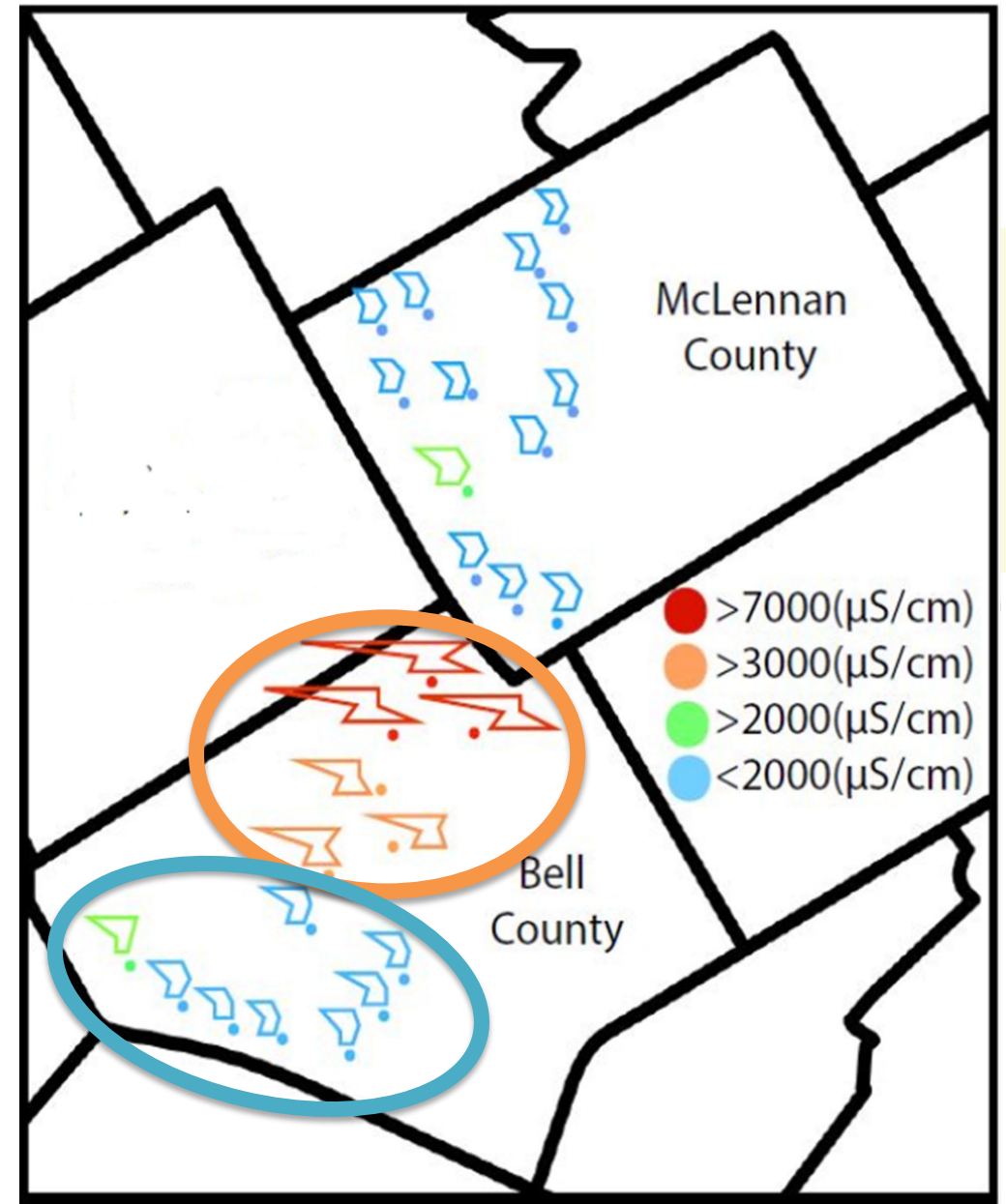


MIDDLE TRINITY



WATER QUALITY

- Distinct water quality differences
- Northern Bell County Middle Trinity
 - Higher total dissolved solids
 - Increases to north



Map modified from Tucker (2018)

QUESTIONS

Bell County Water Symposium

November 17, 2021

Hydrostratigraphic and Geologic Research

ALLAN R. STANDEN, P.G.

VINCE CLAUSE, GISP

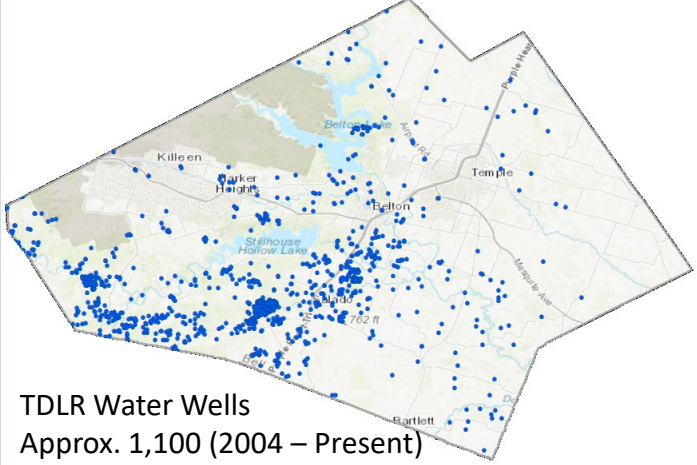
MICHELLE A. SUTHERLAND, P.E.



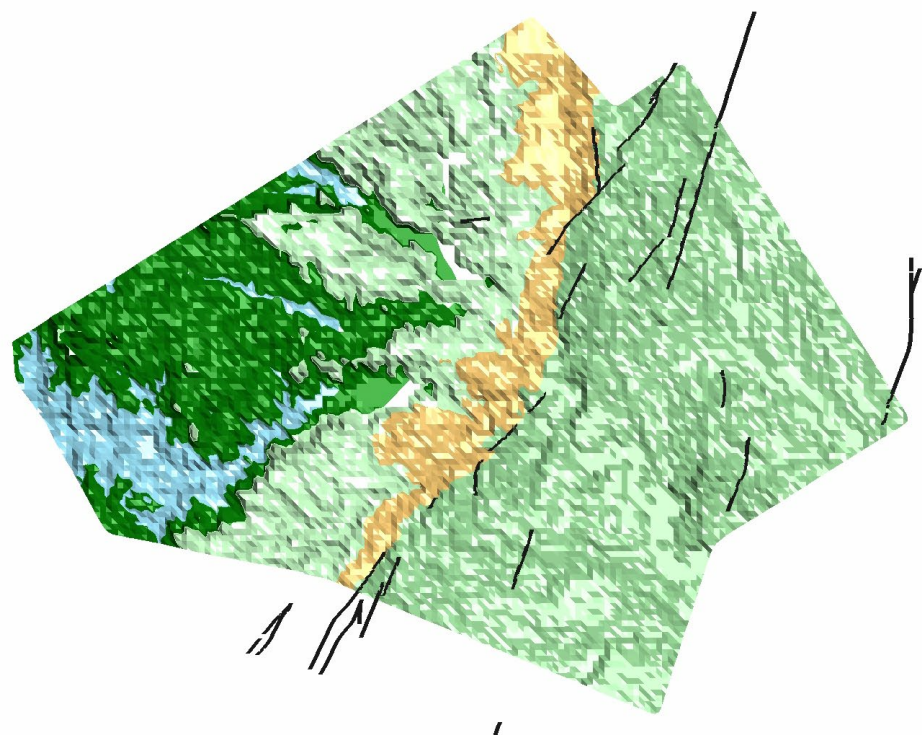
East of Stillman Valley Road looking west.

Photo Credit: CTX MLS

Geologic Data and Aquifer Science

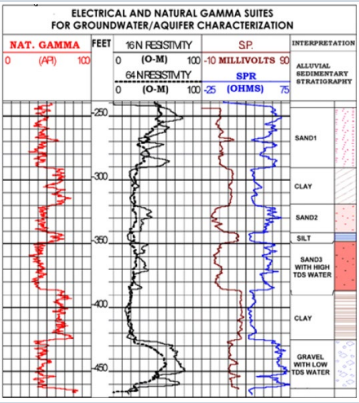


TDLR Water Wells
Approx. 1,100 (2004 – Present)



Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

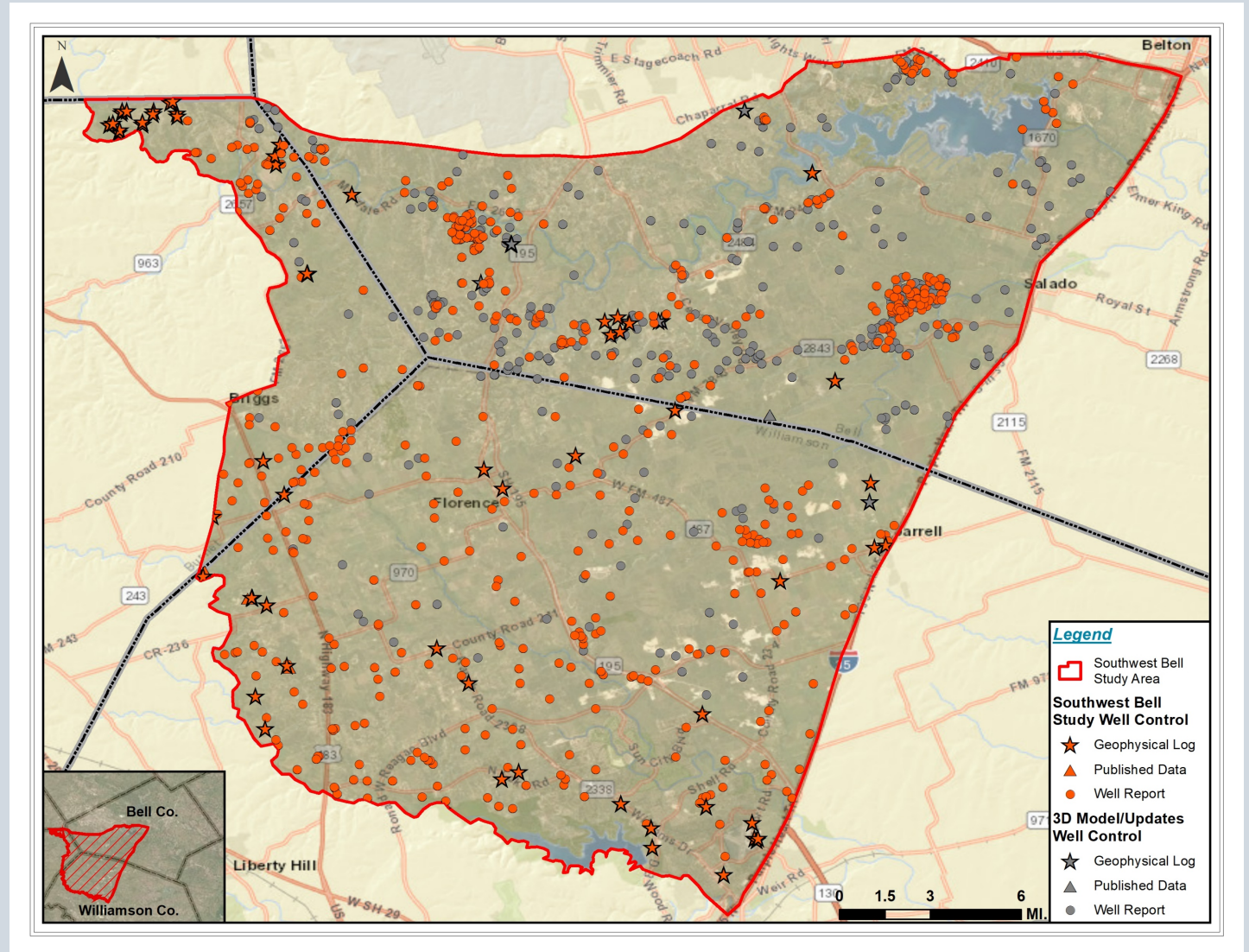
Top (ft.)	Bottom (ft.)	Description
0	3	overburden
3	21	tan lime
21	180	grey lime
180	670	grey and tan lime and grey shale
670	710	tan and grey sandstone
710	720	tan sandstone and green sandy shale
720	755	water sand and gravel
755	760	grey sandstone



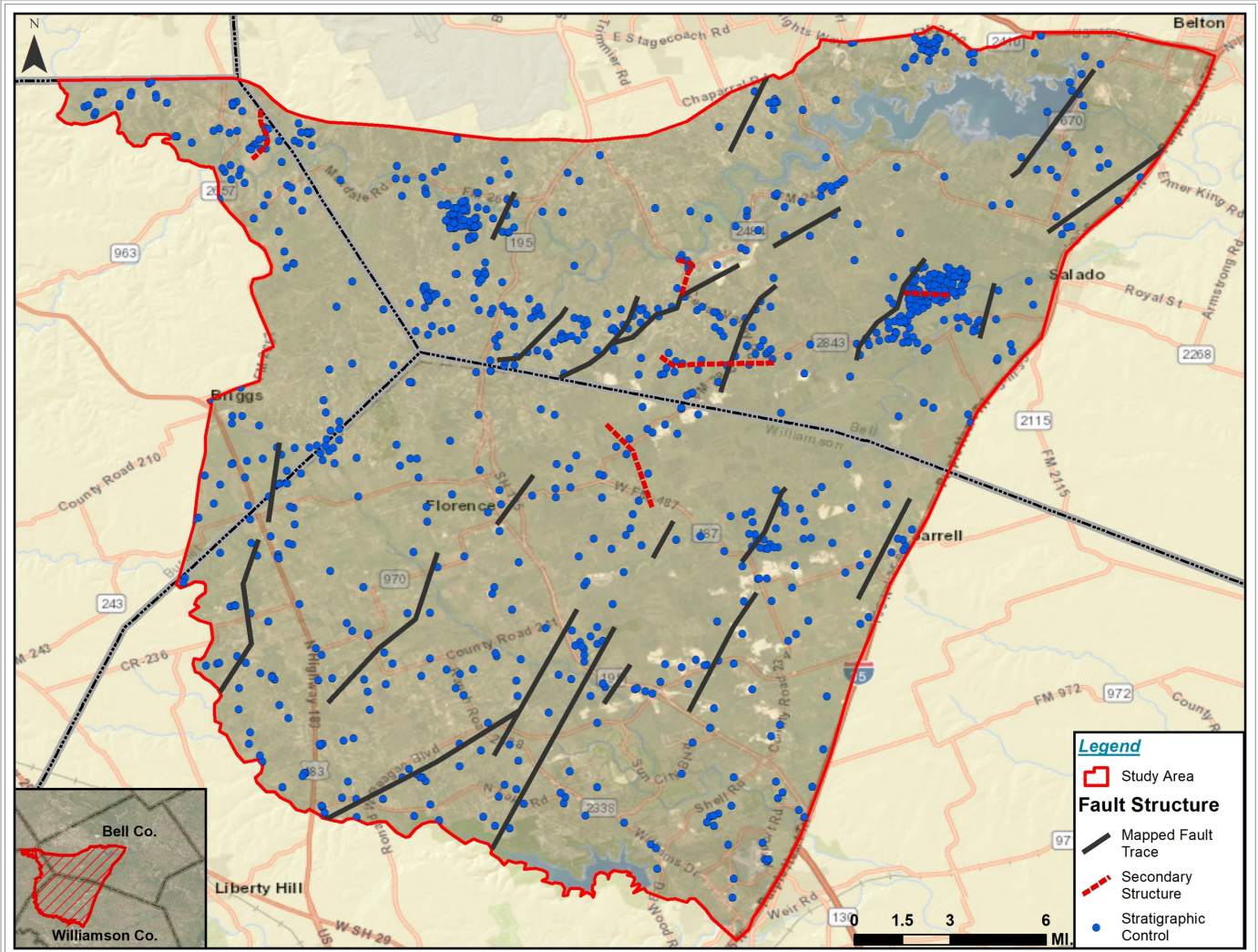
	Depth to Formation (ft)*	Formation Thickness (ft)*	Formation (Geologic Unit)
	0	217.755	Edwards and Comanche Peak Limestone
	217.755	137.904	Walnut
	355.659	466.399	Glen Rose
	822.058	50.202	Hensell and Cow Creek Limestone
	872.260	177.123	Pearsall and Hammett Shale
	1049.383	113.075	Hosston
	1162.458		Undifferentiated

SW Bell and NW Williamson County Study Area

- Stratigraphic analysis
 - 945 stratigraphic well control points
- Fault trace mapping
- Lithology Changes
- 3D model development (MAS LLC)

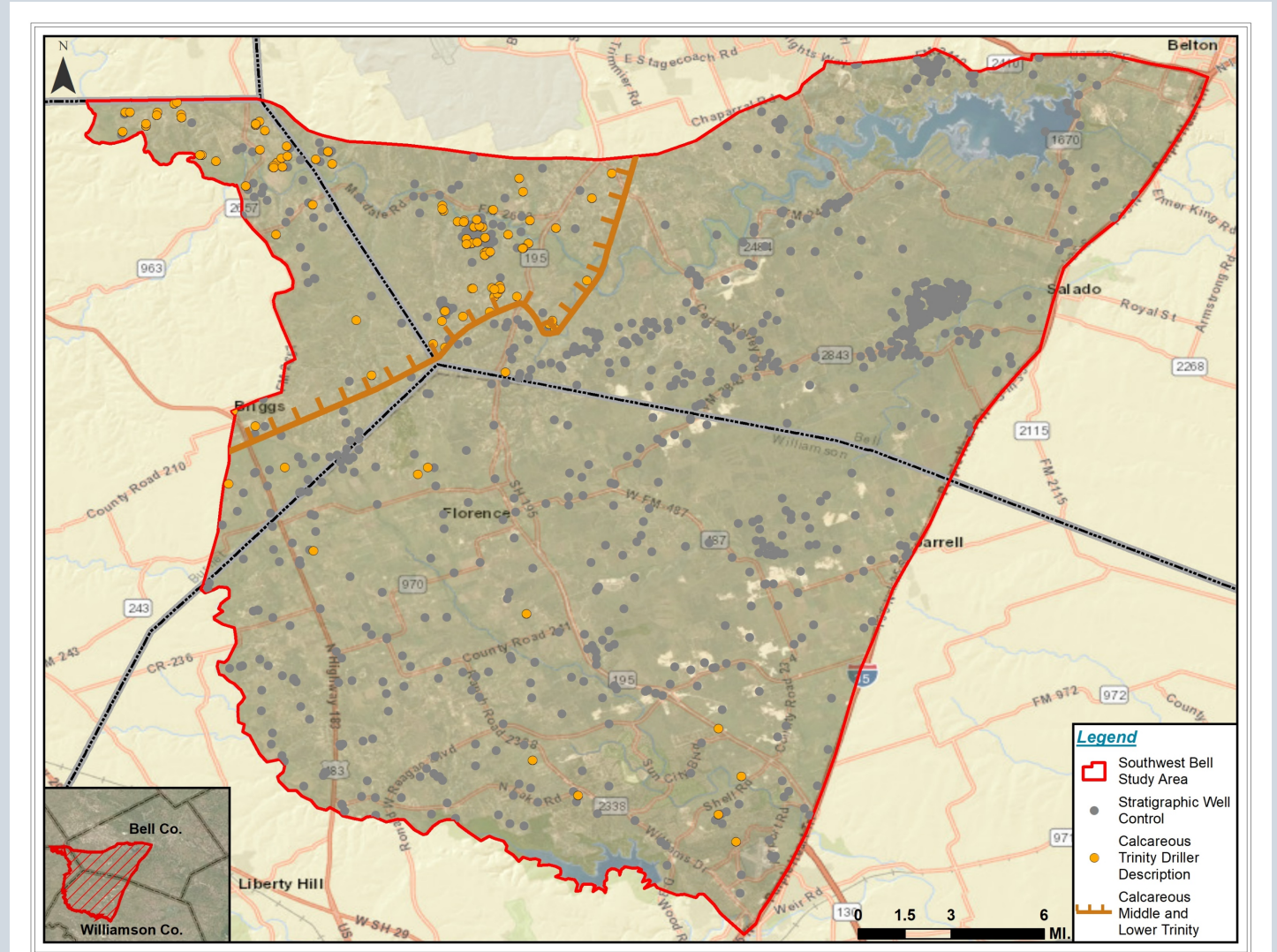


Fault Traces



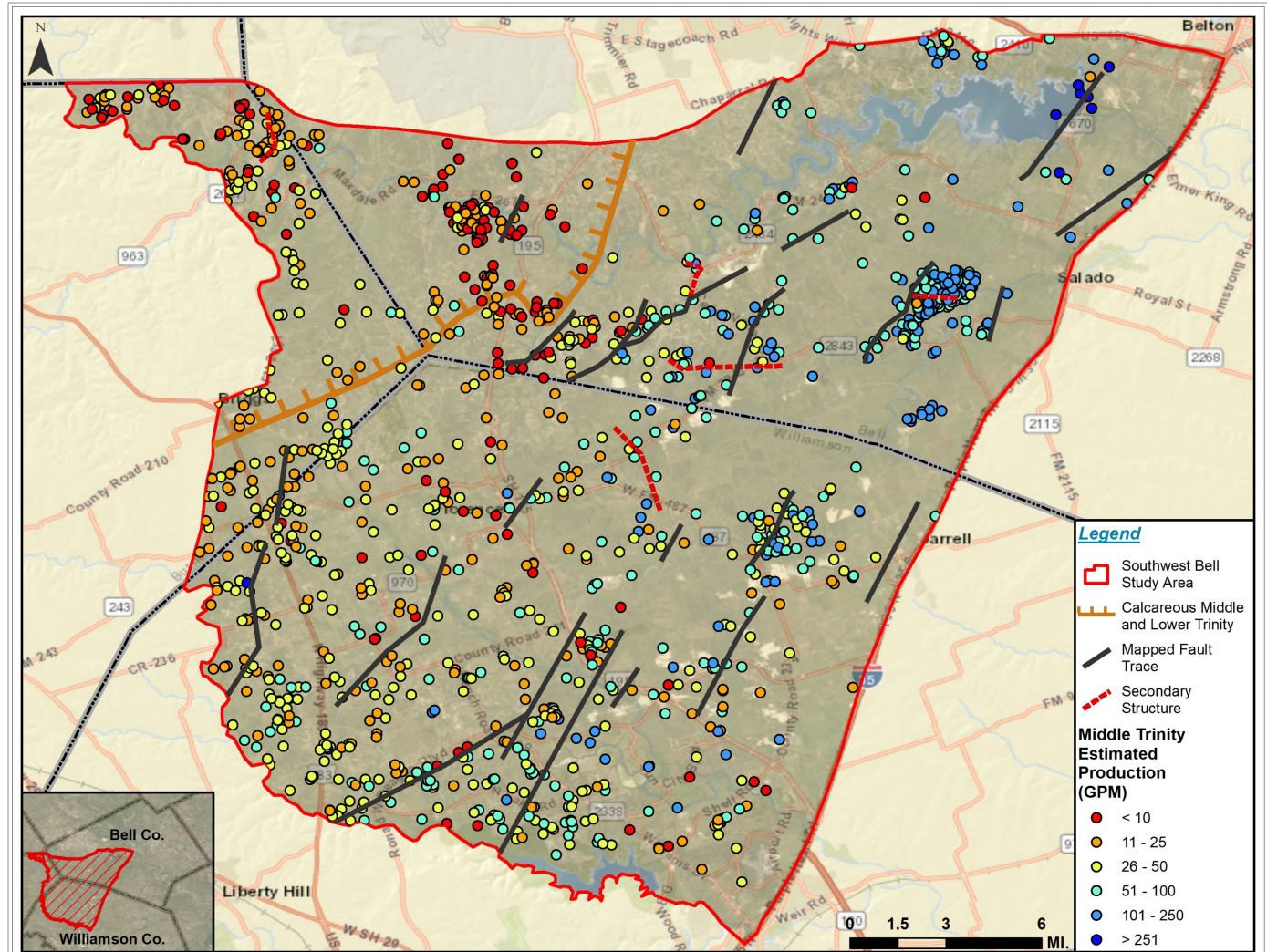
Calcareous Facies of the Middle and Lower Trinity

- < 10 feet of net sands
- Sand replaced by limestone

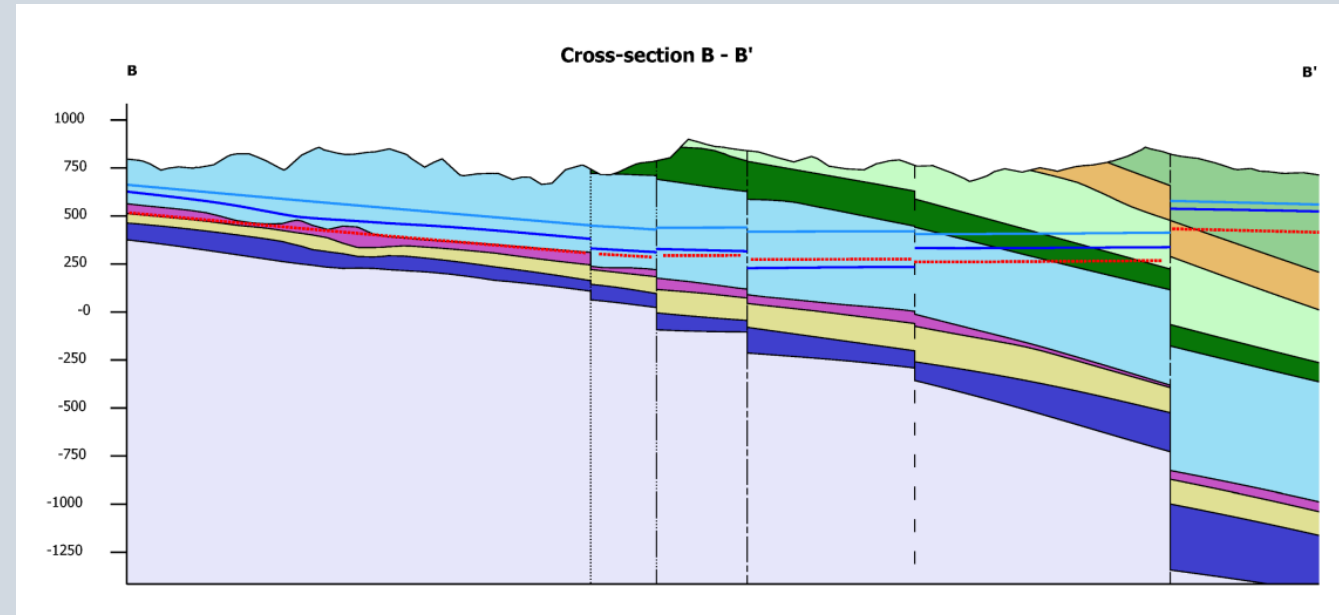
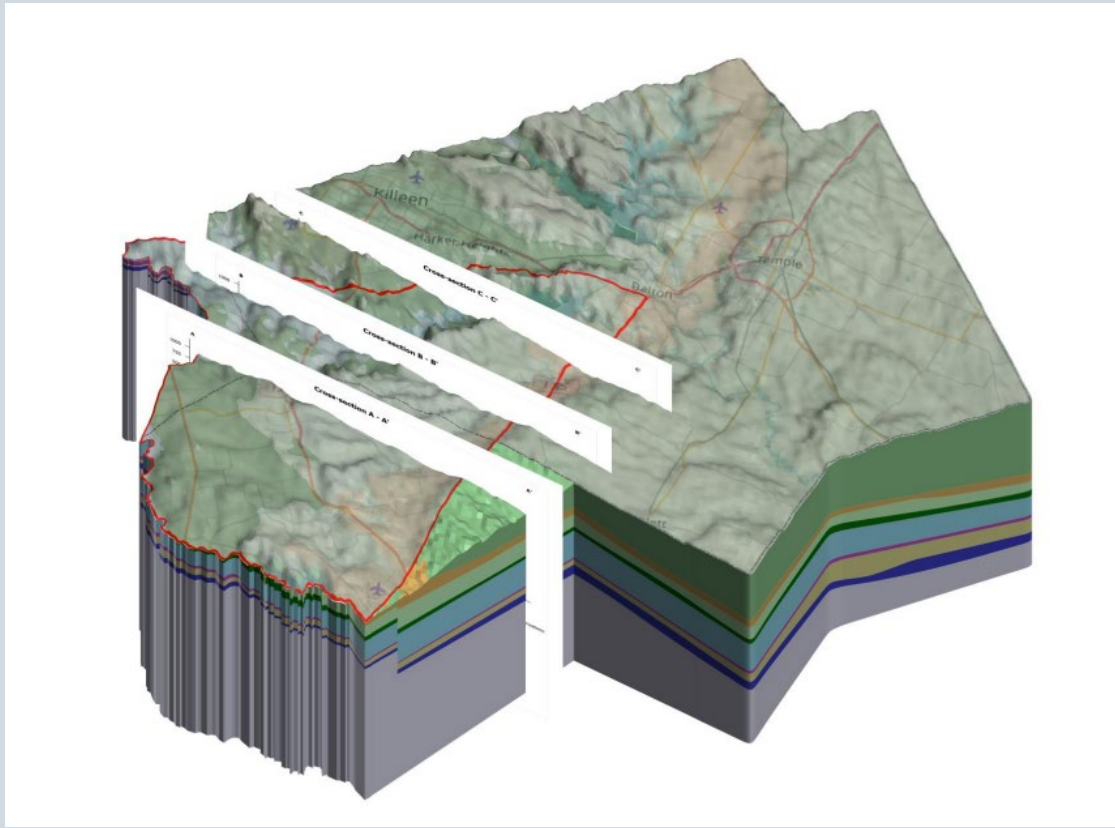


Middle Trinity Estimated Production

- Overall W-E trend with highest values to the east.
- Bell County – Transition from lower to higher values correlates with mapped fault near Stillman Valley Rd
- Williamson County – West to east trend is more complex/gradual.



3D Modeled Faults

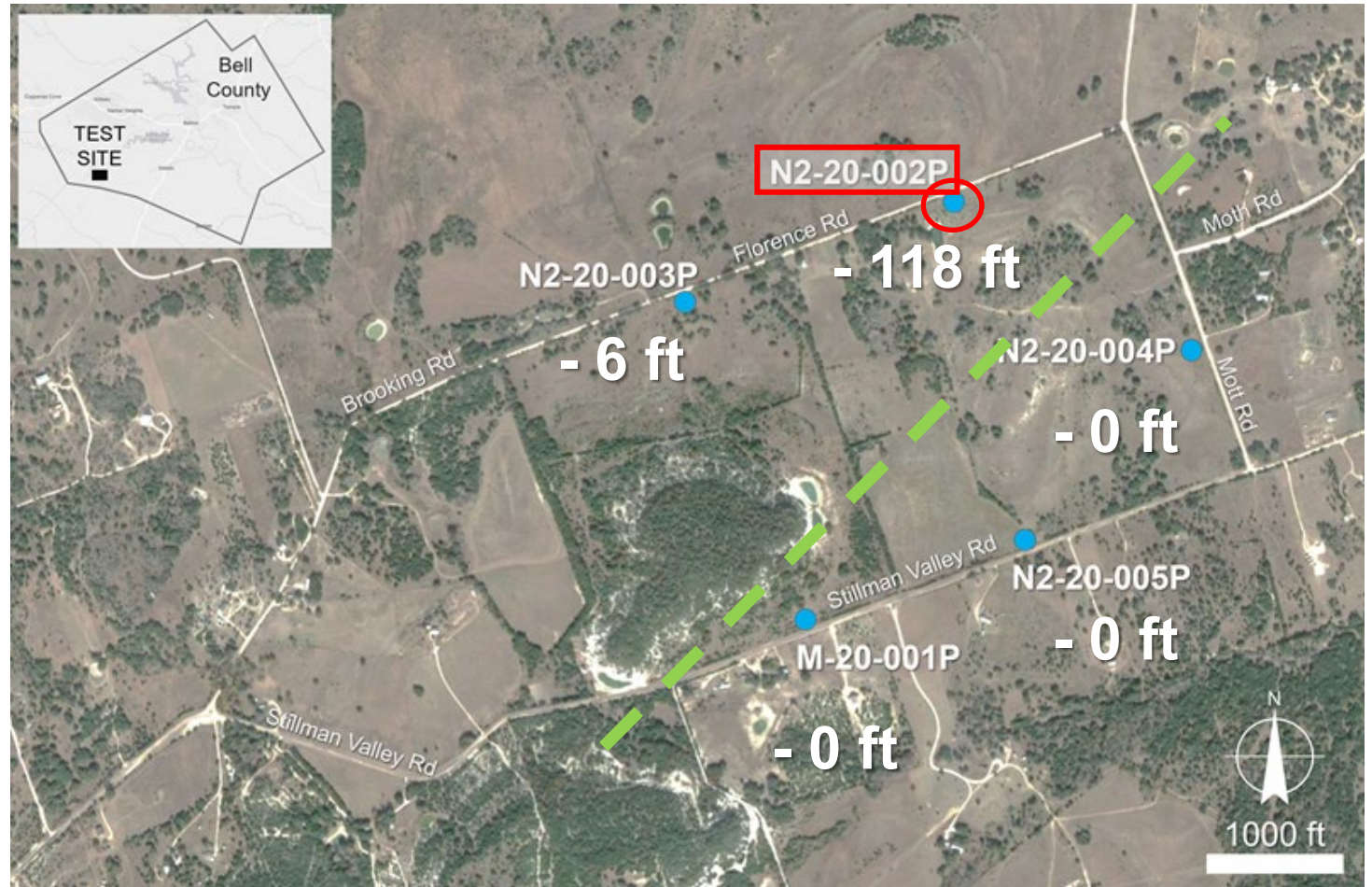


Questions

Aquifer Test Site with pump well

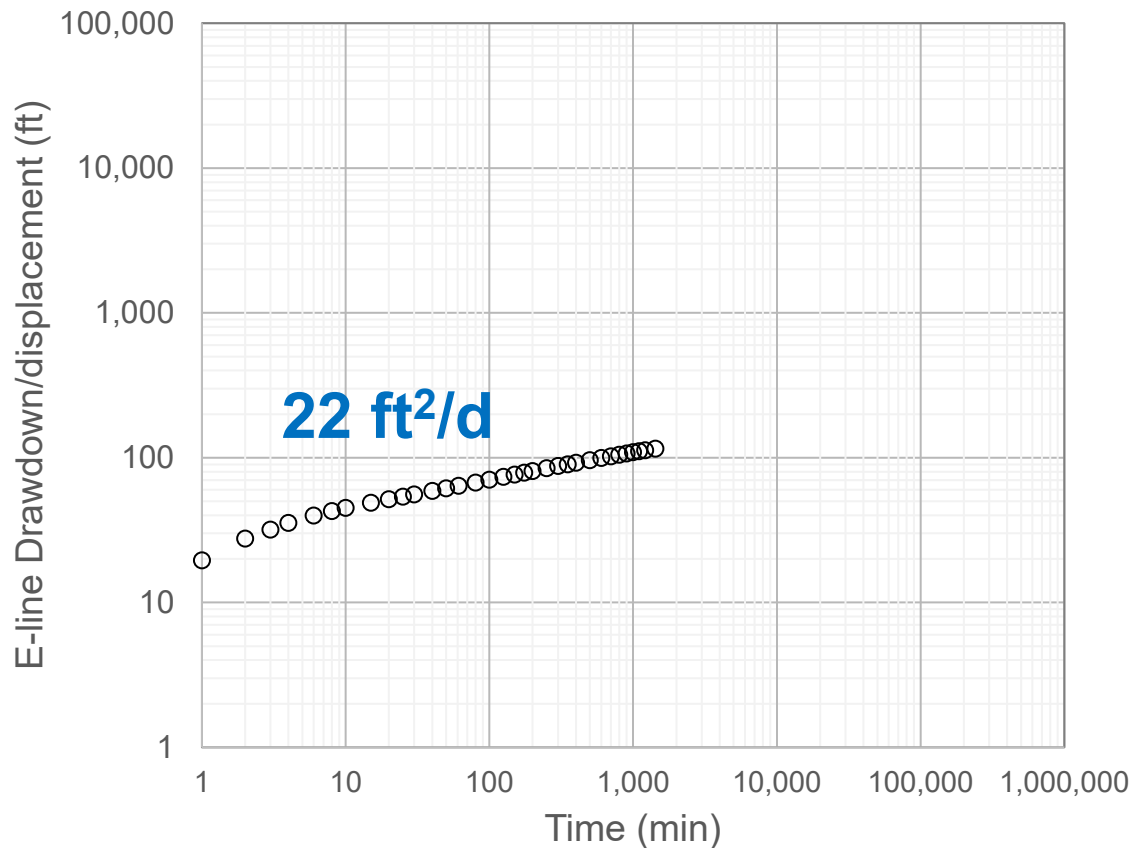
- Hosston (Lower Trinity Aquifer)
- Pumped Well N2-20-002P
- 20 gpm
- 24 hrs

?

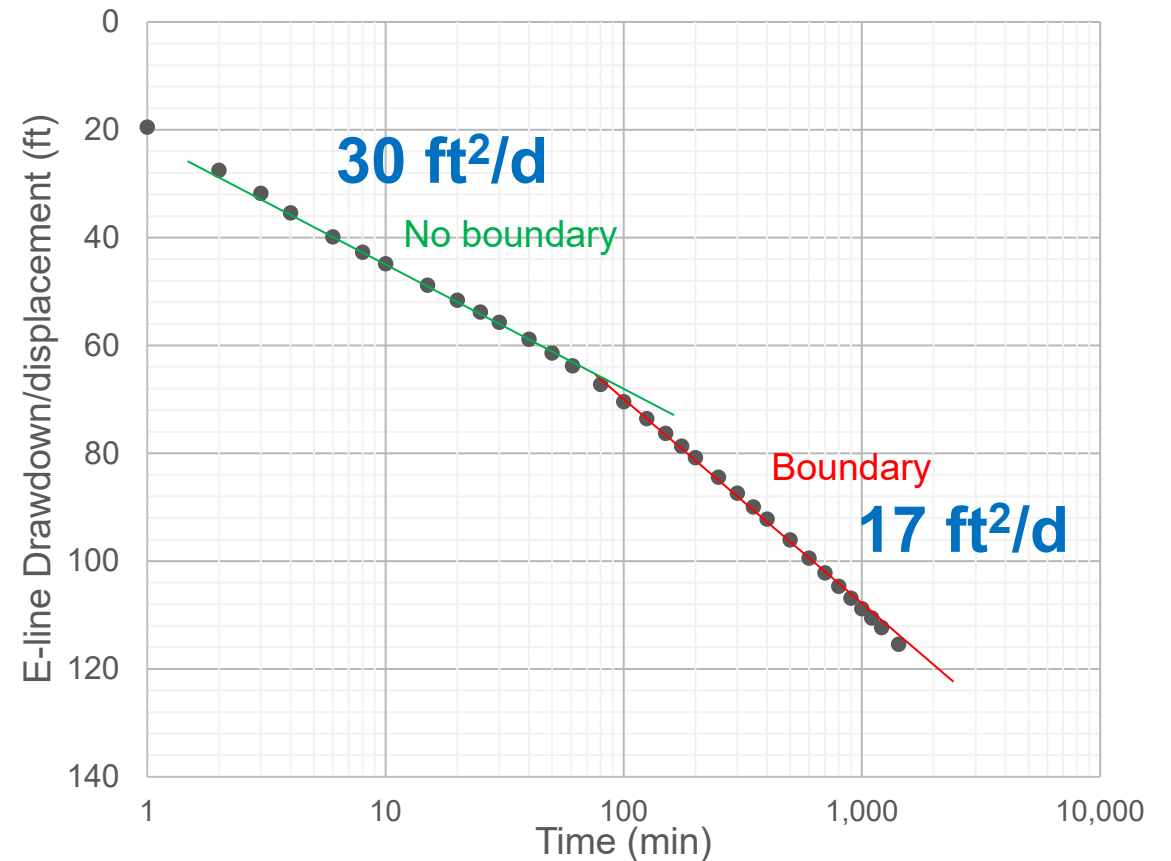


Hosston (Lower Trinity) Transmissivity SW Bell County

Theis Log-Log Analysis

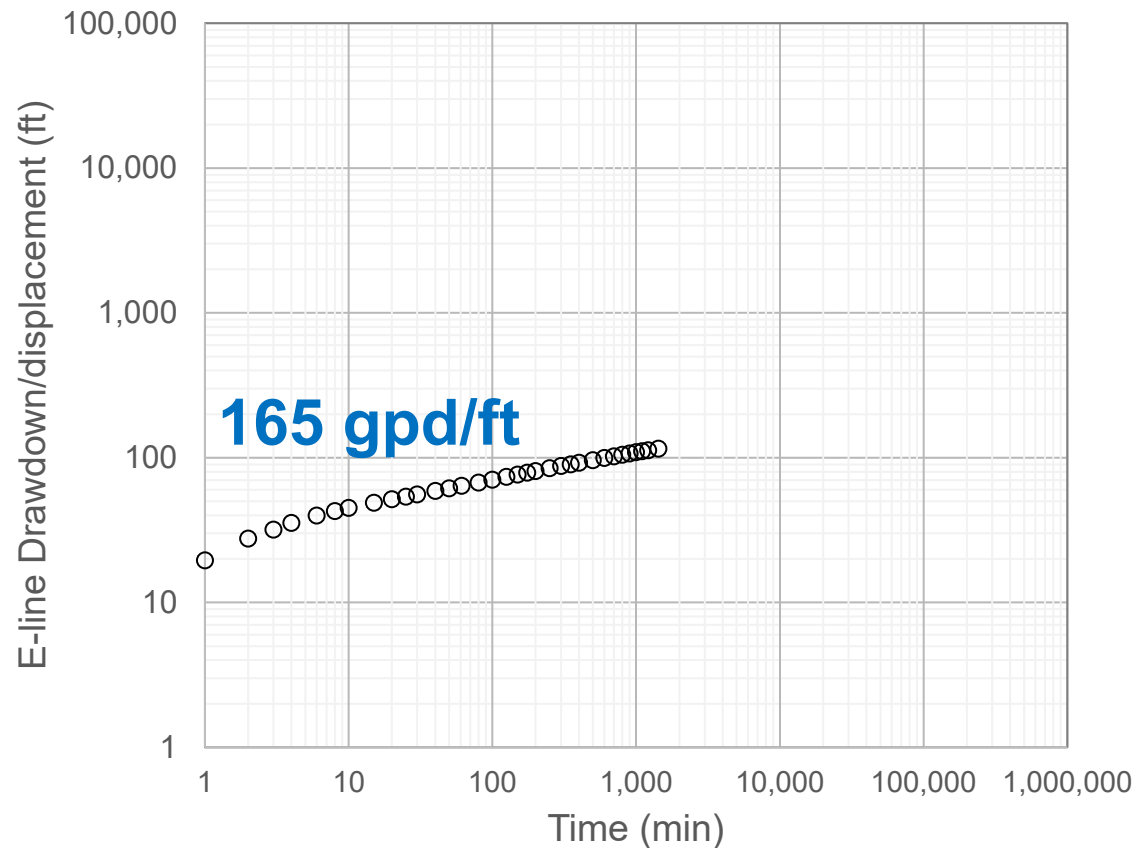


Cooper-Jacob semi-log analysis

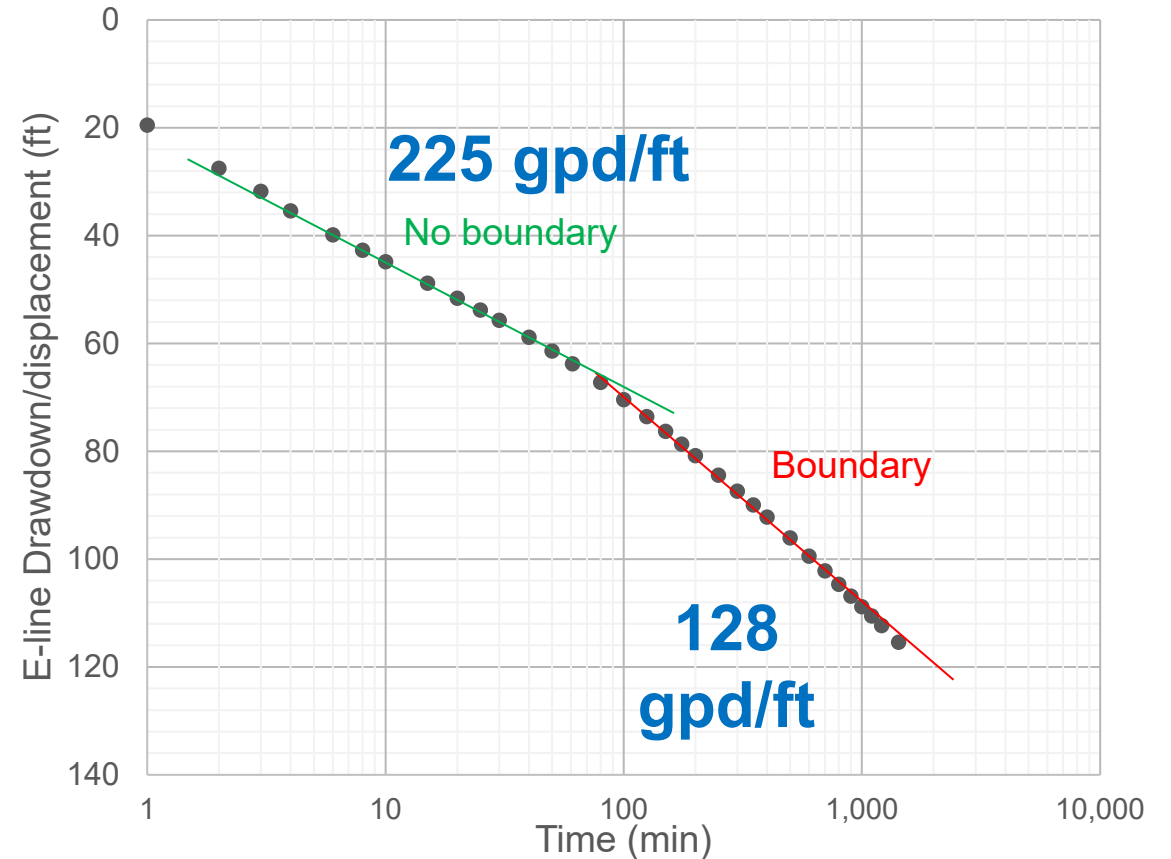


Hosston (Lower Trinity) Transmissivity SW Bell County

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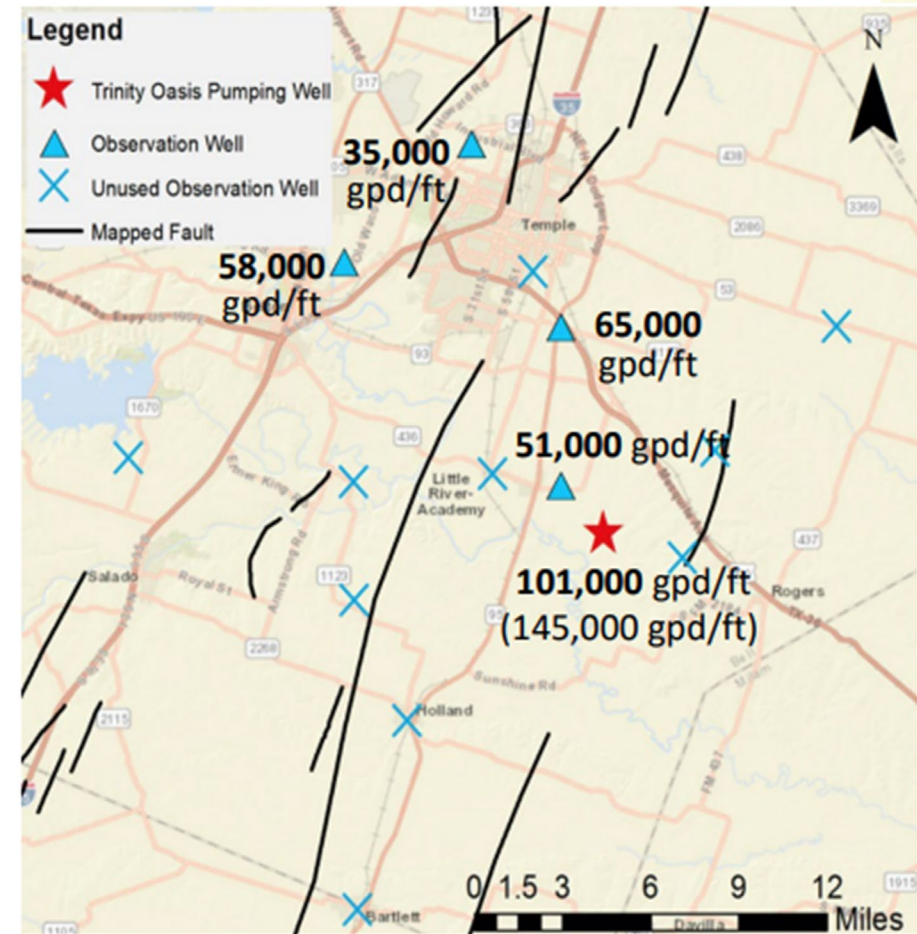


Cooper-Jacob semi-log analysis



HYDRAULIC CHARACTERISTICS

- County-wide observations
- Transmissivity
 - Higher to the east of I-35
 - Diminishes to the west
- Similar trend for Middle and Lower Trinity

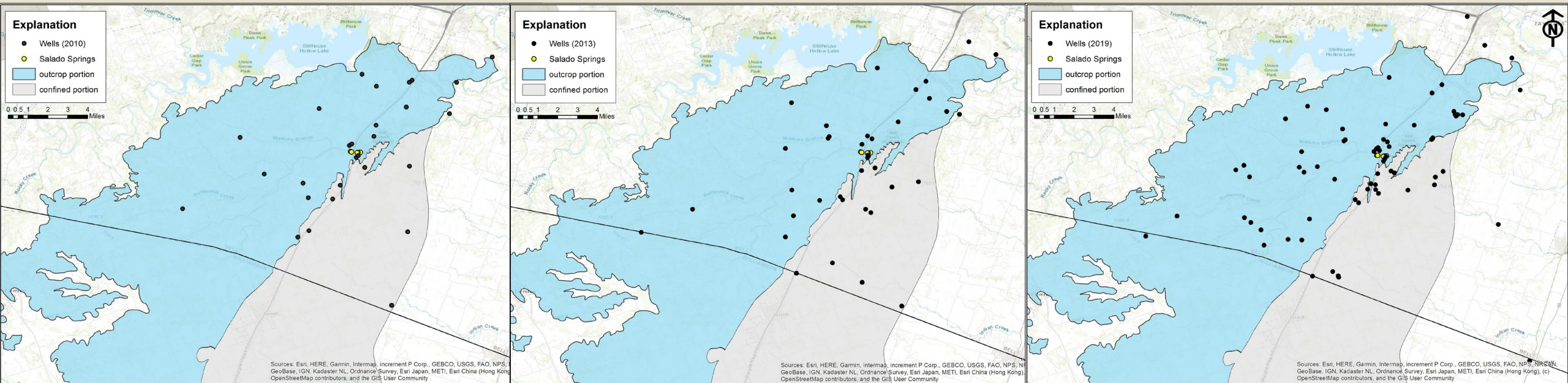


Salado Springs Dye Tracer Test Edwards Aq.

Determining connections
among the springs
defining them
as a spring system



SYNOPTIC WATER LEVELS EDWARDS AQUIFER



2010
28 wells

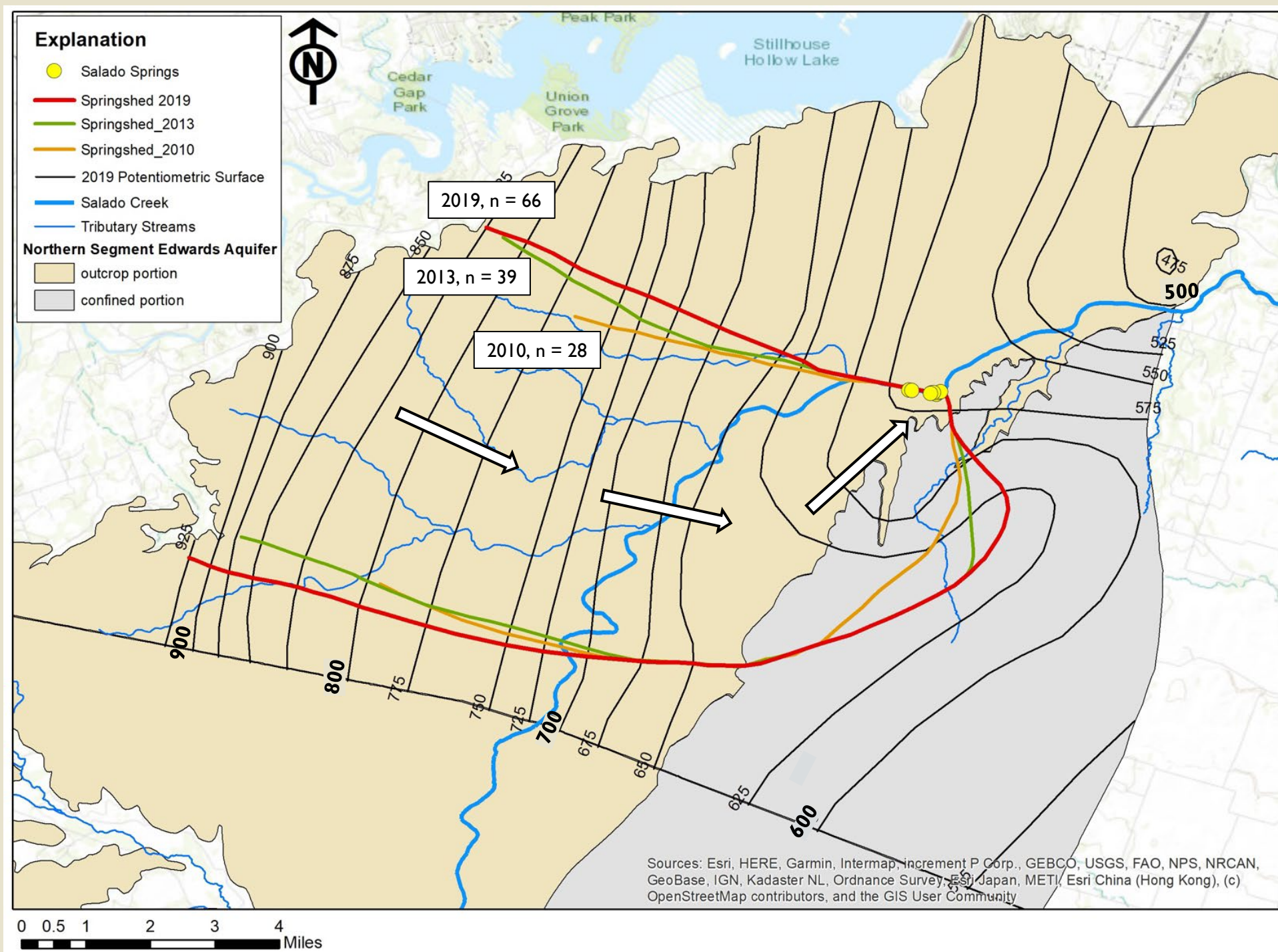
2013
39 wells

2019
66 wells

EDWARDS AQUIFER

SPRINGSHEDED

FROM SYNOPTIC WATER LEVELS

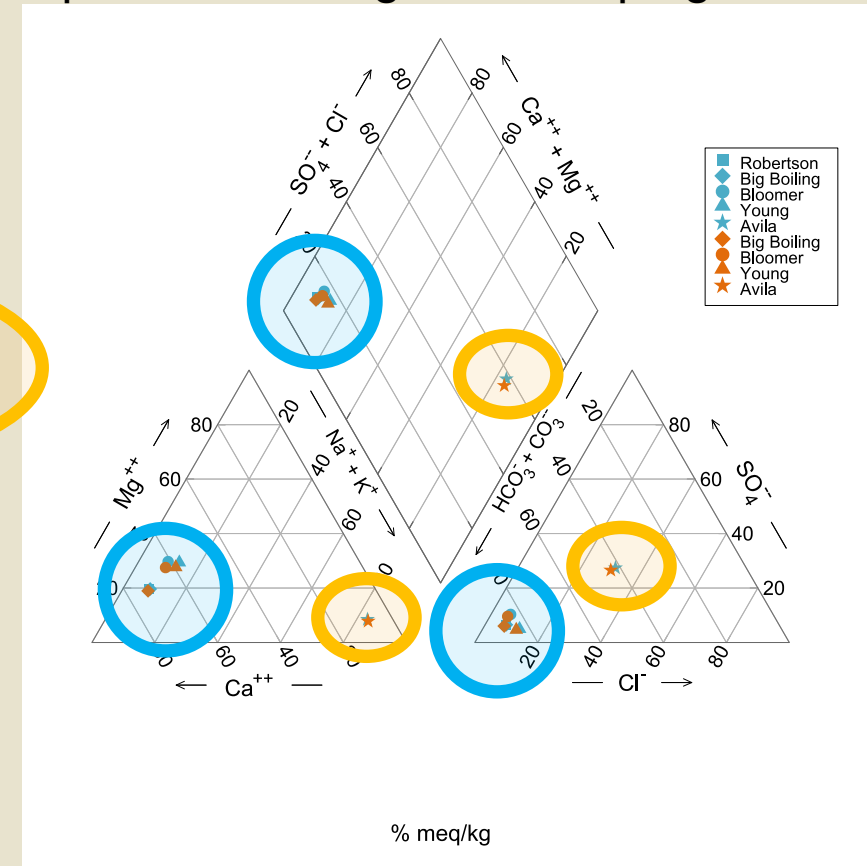


WATER QUALITY – EDWARDS AQUIFER

Stiff Diagrams of Sampling Points



Piper Trilinear Diagram of Sampling Points



QUESTIONS

UNIQUE HYDROGEOLOGIC ZONES

- **Southwest**
 - Low production
 - Large water-level declines
- **Stillhouse Hollow**
 - Large water-level declines
 - Higher available drawdown
- **Belton Lake**
 - Differences in water quality
 - Generally good productivity
- **Eastern**
 - High productivity
 - Fewer users

