

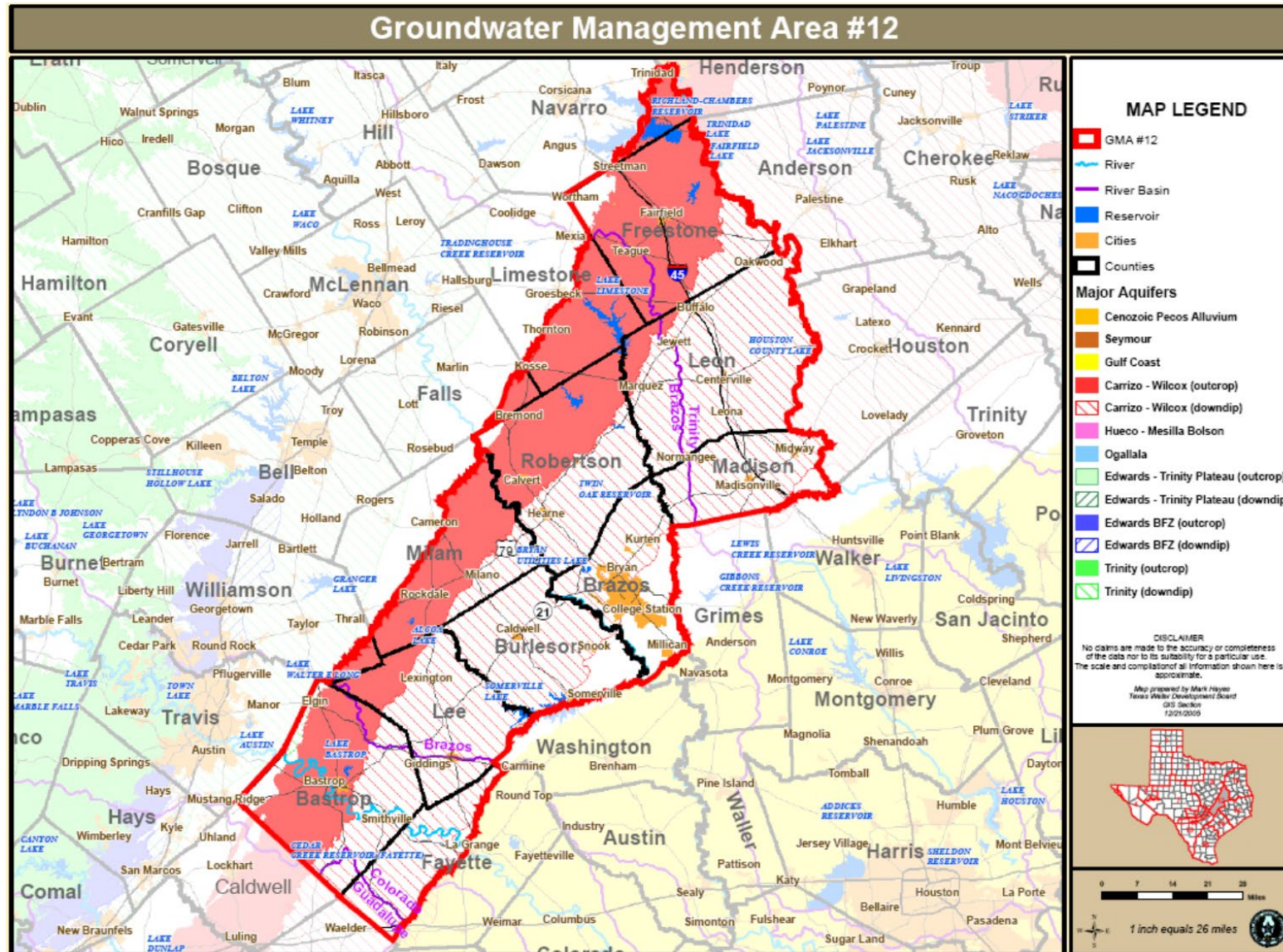
Brazos Valley Groundwater Conservation District

**Status of Water
Levels compared
to Desired Future
Conditions**

2025

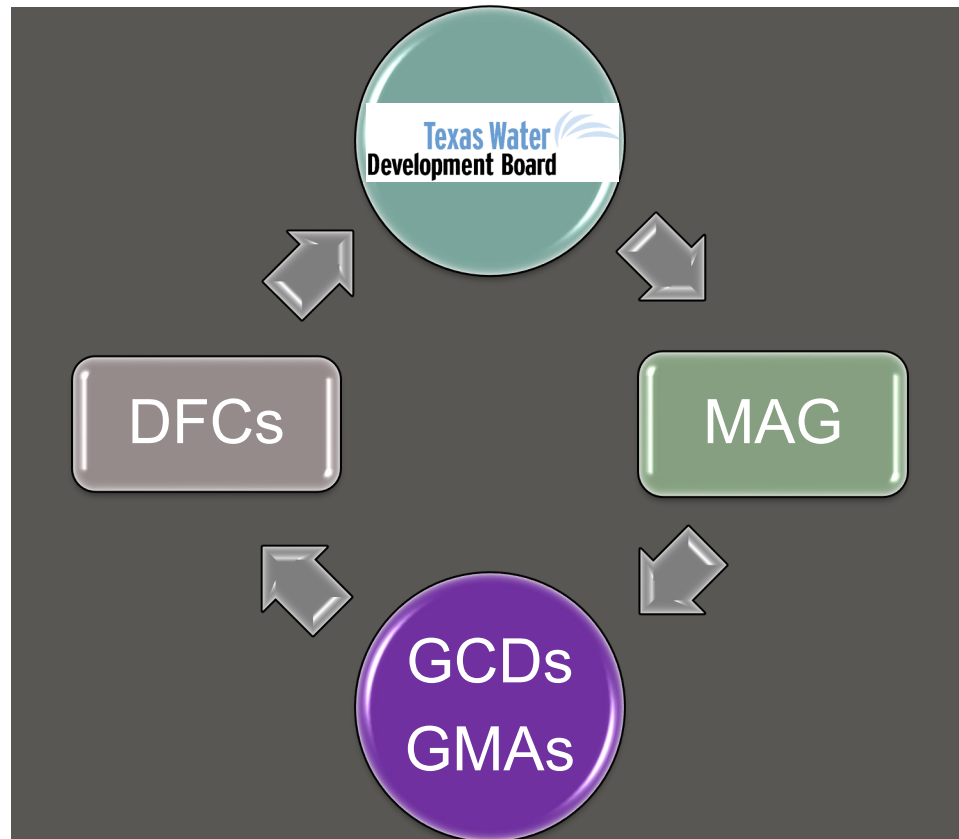
June 12, 2025

Groundwater Management Area 12

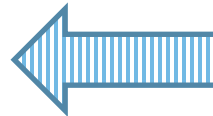
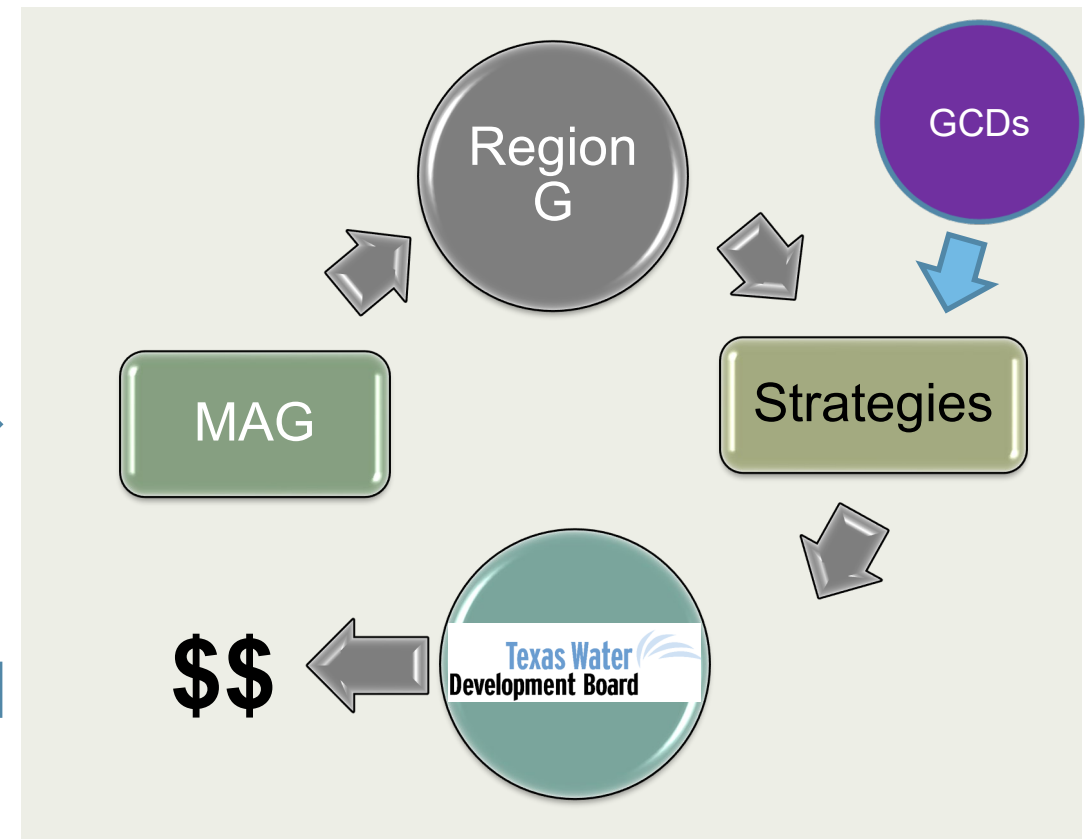


The Texas Groundwater Planning Cycle

Joint Groundwater Planning



Regional Water Planning



Desired future condition means a quantitative description, adopted in accordance with Section 36.108, of the desired condition of the groundwater resources in a management area at one or more specified future times.

Water level decline
Volume remaining
Available drawdown remaining
Spring discharge
Water quality
Subsidence

Why track DFCs?

- Sec. 36.3011 (b) An affected person may file a petition with the commission requesting an inquiry for any of the following reasons:
 - (6) a district fails to update its rules to implement the applicable desired future conditions.....
 - (7) the rules adopted by a district are not designed to achieve the adopted desired future conditions;
 - (9) the groundwater in the management area is not adequately protected due to the failure of a district to enforce substantial compliance with its rules.

Some Potential Monitoring Challenges

- Sufficient monitoring locations in each aquifer
- Good geographic well distribution
- Access to wells
- Identifying screened intervals in wells
- Collecting consistent measurements (pump downtime)
- Even “static” measurements in confined aquifers are sensitive
- Incorporating changes in monitoring network
- Maintaining monitoring wells for long periods
- Back-estimating water levels to starting time

Desired Future Conditions

- BVGCD worked with 4 other GCDs in GMA-12 to establish DFCs for 2070
- DFCs adopted by GMA 12 on November 30, 2021
- TWDB published MAGs on November 1, 2022 (GAM RUN 21-017 MAG)
- Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro, Hooper, Yegua, Jackson and Brazos River Alluvium aquifers
- All DFCs changed from 2016 cycle except for Brazos River Alluvium Aquifer
- DFCs result from both science and policy factors/decisions
- DFCs are generally long-term goals for larger areas

DFC Development versus DFC Tracking

■ DFC Development

- As a part of Joint Planning Process, water level declines are evaluated by simulating the effects of pumping in GMA 12 with the GAM
- DFCs are decided in part by this modeling and other policy decisions

■ DFC Tracking

- Actual water level measurements are used to compare aquifer conditions to DFCs
- Use static artesian head declines in wells taken at generally the same time each year to estimate aquifer conditions for comparison to the DFC
- For Brazos River Alluvium – convert water level measurements to percent aquifer saturation

Current BVGCD DFC Tracking Methods

1. Arithmetic average of data
2. Spatially weighted average
 - Use interpolation method to estimate data onto a regularly-spaced grid
 - Average the grid values

DFC Goals Established During GMA 12 2021 Planning Cycle

Aquifer	BVGCD-DFC, ft	Planning Period
Sparta	53	2000 - Dec. 2069
Queen City	44	2000 - Dec. 2069
Carrizo	84	2000 - Dec. 2069
Calvert Bluff	111	2000 - Dec. 2069
Simsboro	262	2000 - Dec. 2069
Hooper	167	2000 - Dec. 2069
Yegua-Jackson	67	2010 – Dec. 2069

- Monitoring of groundwater pumping essential in understanding changes in artesian head and the status of aquifer conditions compared to DFCs

DFC Well Map – Aquifer Key

- Brazos River Alluvium
- ⊙ Sparta Aquifer
- ⊕ Queen City Aquifer
- ◆ Carrizo Aquifer
- Calvert Bluff Formation
- ⊕ Simsboro Aquifer
- ▲ Hooper Formation
- ⊕ Yegua-Jackson Aquifer

Sparta Aquifer Example:

- 59-22-509 State Well Number
- 21 Artesian Head Change in Well Between about 1999 and 2025, ft
- + = Increase in Artesian Head
- = Decline in Artesian Head
- BVGCD Sparta Observation Well

- Additional Observation Well in BVGCD Monitoring Program

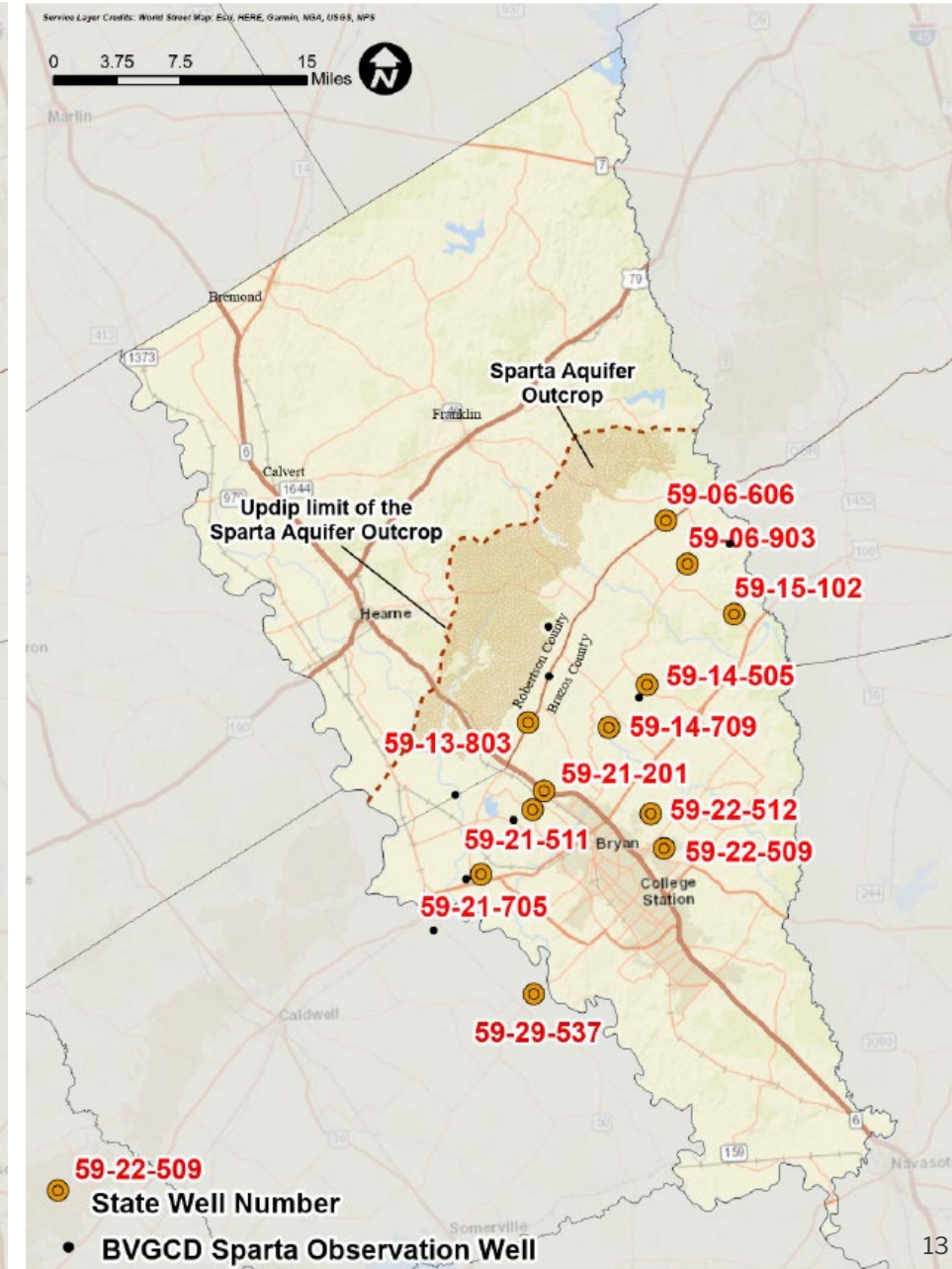
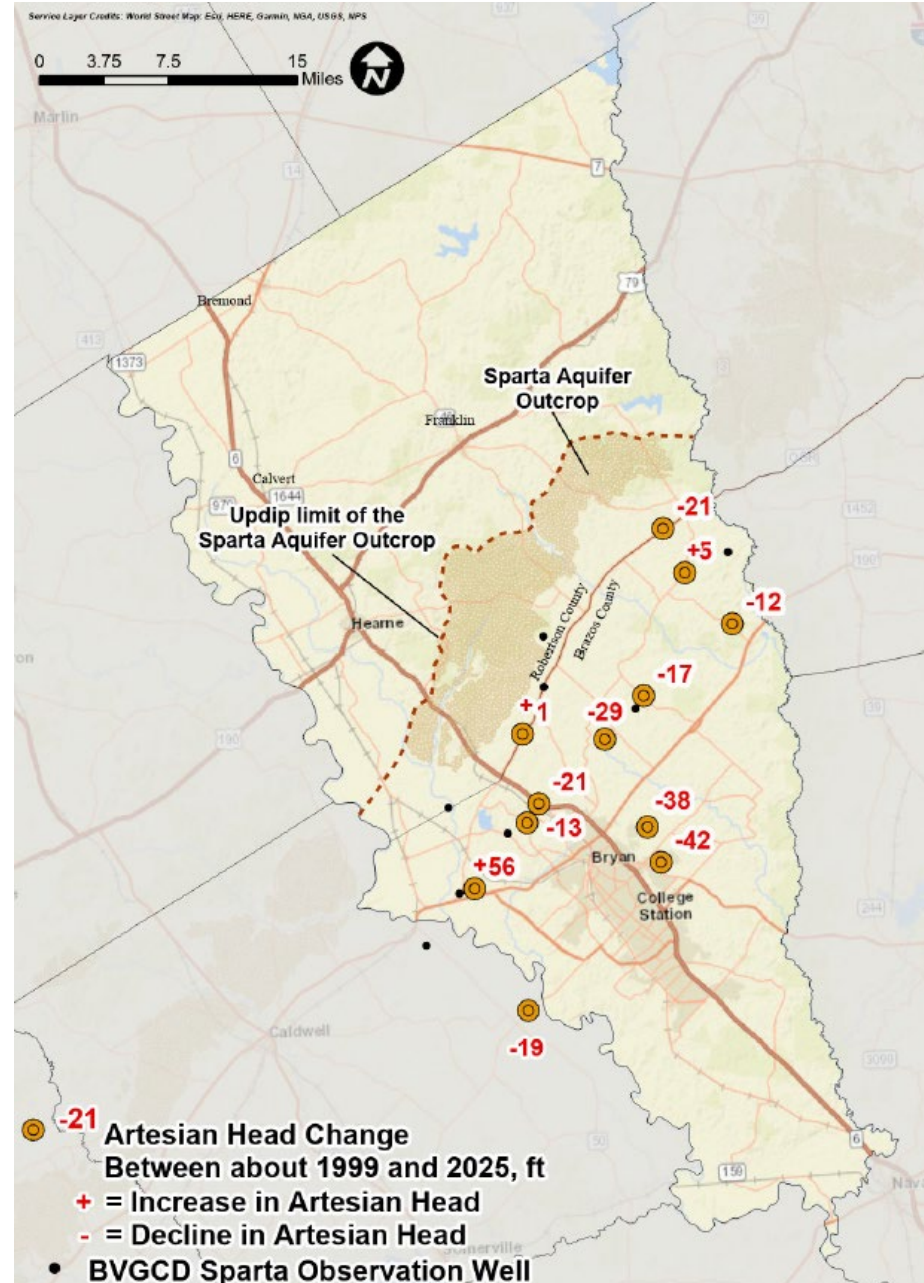
Sparta Aquifer DFC Wells

State Well Number	Owner
59-06-606	Private
59-06-903	Private
59-13-803	Private
59-14-505	Private
59-14-709	Private
59-15-102	Private
59-21-201	City of Bryan Well 6
59-21-511	Private
59-21-705	TAMU Well 2
59-22-509	Miramont County Club Well 2
59-22-512	Private

Sparta Aquifer

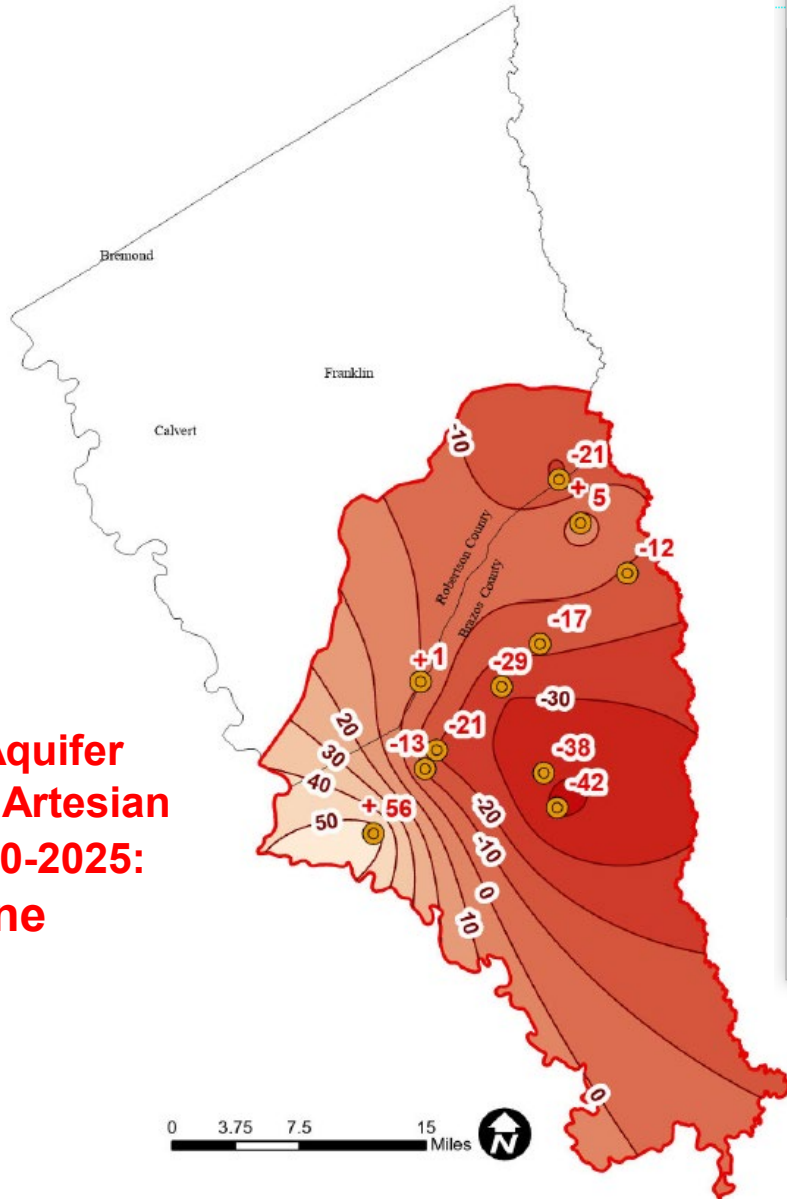
Average Artesian Head Change 2000-2025

Arithmetic Average	12 Feet (Decline)
Spatially Weighted Average	8 Feet (Decline)
2070 DFC	53 Feet (Decline)



Spatially Weighted Sparta Aquifer Head Change Estimate

BVGCD Sparta Aquifer Weighted Average Artesian Head Change 2000-2025: 8 feet decline



The screenshot shows the Kriging software interface with the following settings:

- Input point features:** 23_DFC
- Z value field:** DTW_Diff_f
- Output surface raster:** C:_AGS\Projects\BVGCD\2023\DFC_Update_2023\Esb_Weighted_Avg\GIS_2023\SpBV
- Semivariogram properties:**
 - Kriging method: Ordinary Universal
 - Semivariogram model: Exponential
 - Advanced Parameters... button
- Output cell size (optional):** 661.083439583395
- Search radius (optional):** Variable
- Search Radius Settings:**
 - Number of points: 24
 - Maximum distance: [empty]
- Output variance of prediction raster (optional):** [empty]

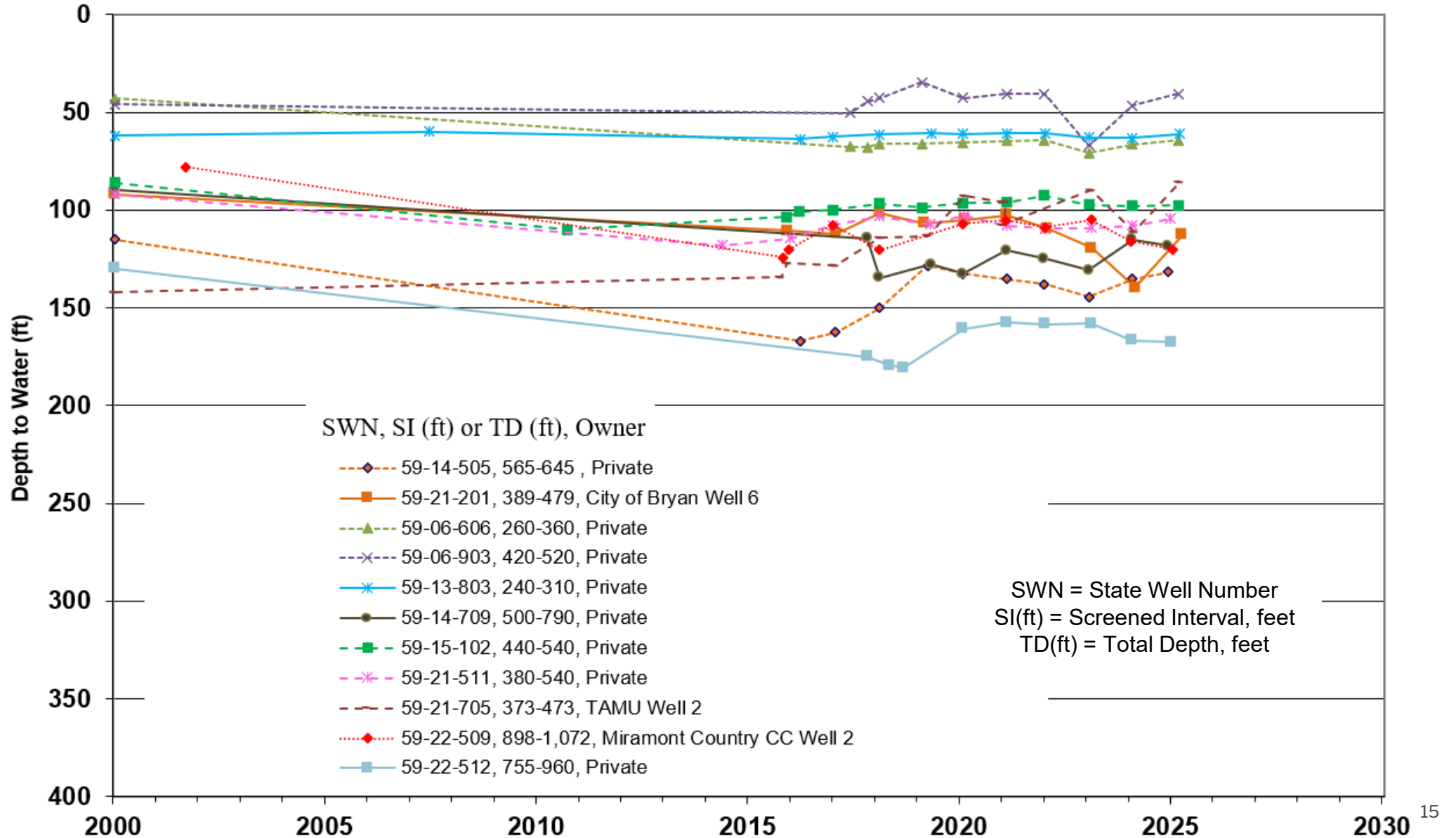
Search radius (optional) dialog box:

- Defines which of the input points will be used to interpolate the value for each cell in the output raster.
- Lag size: 661.083440
- Variogram Parameters:
 - Major range: 100000
 - Partial sill: 1000
 - Nugget: 0
- OK, Cancel buttons

Advanced Parameters dialog box:

- integer value specifying the number of nearest input sample points to be used to perform interpolation. The default is 12 points.
- Maximum distance
- OK, Cancel buttons

Sparta Aquifer Observation Wells

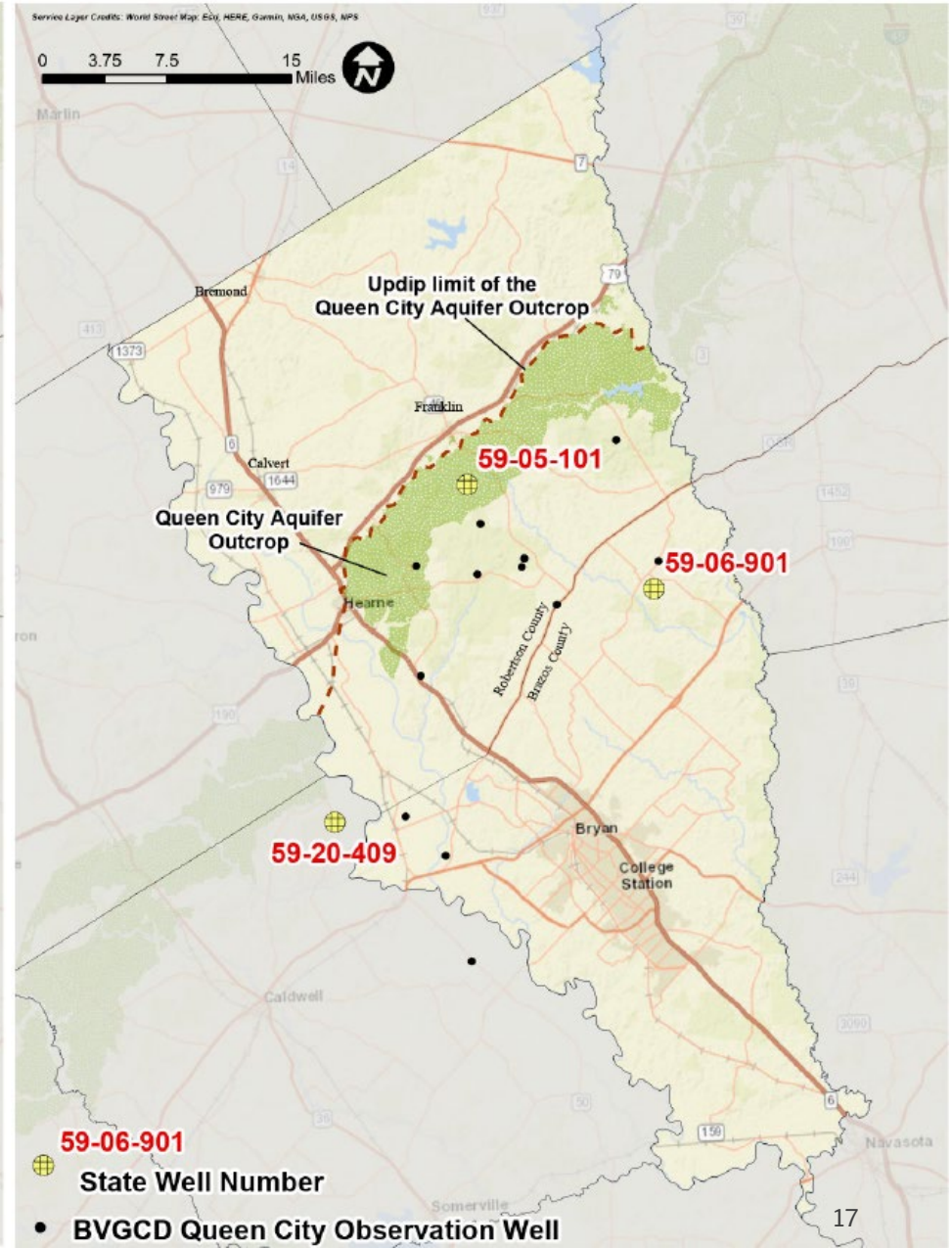
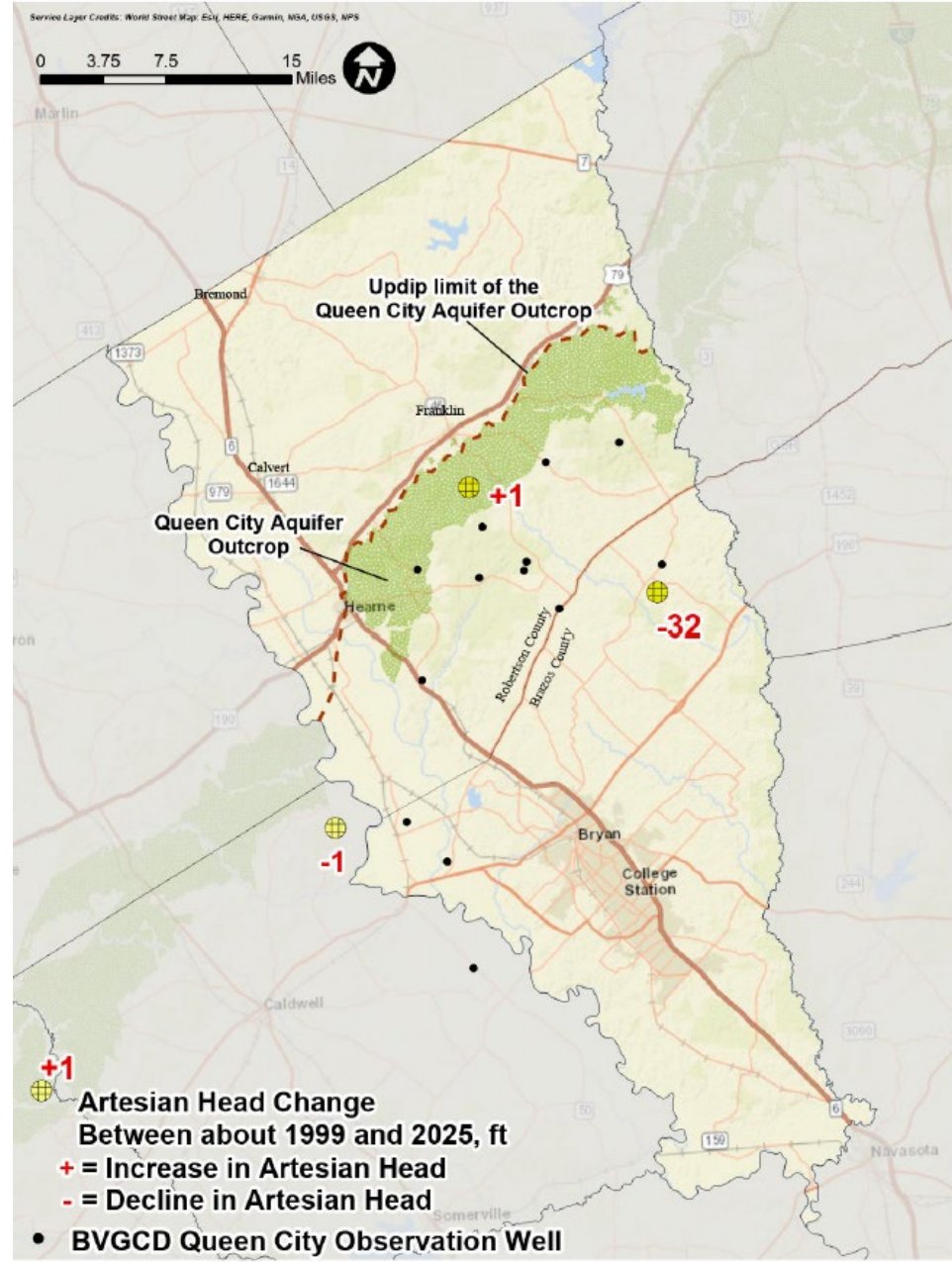


Queen City Aquifer DFC Well

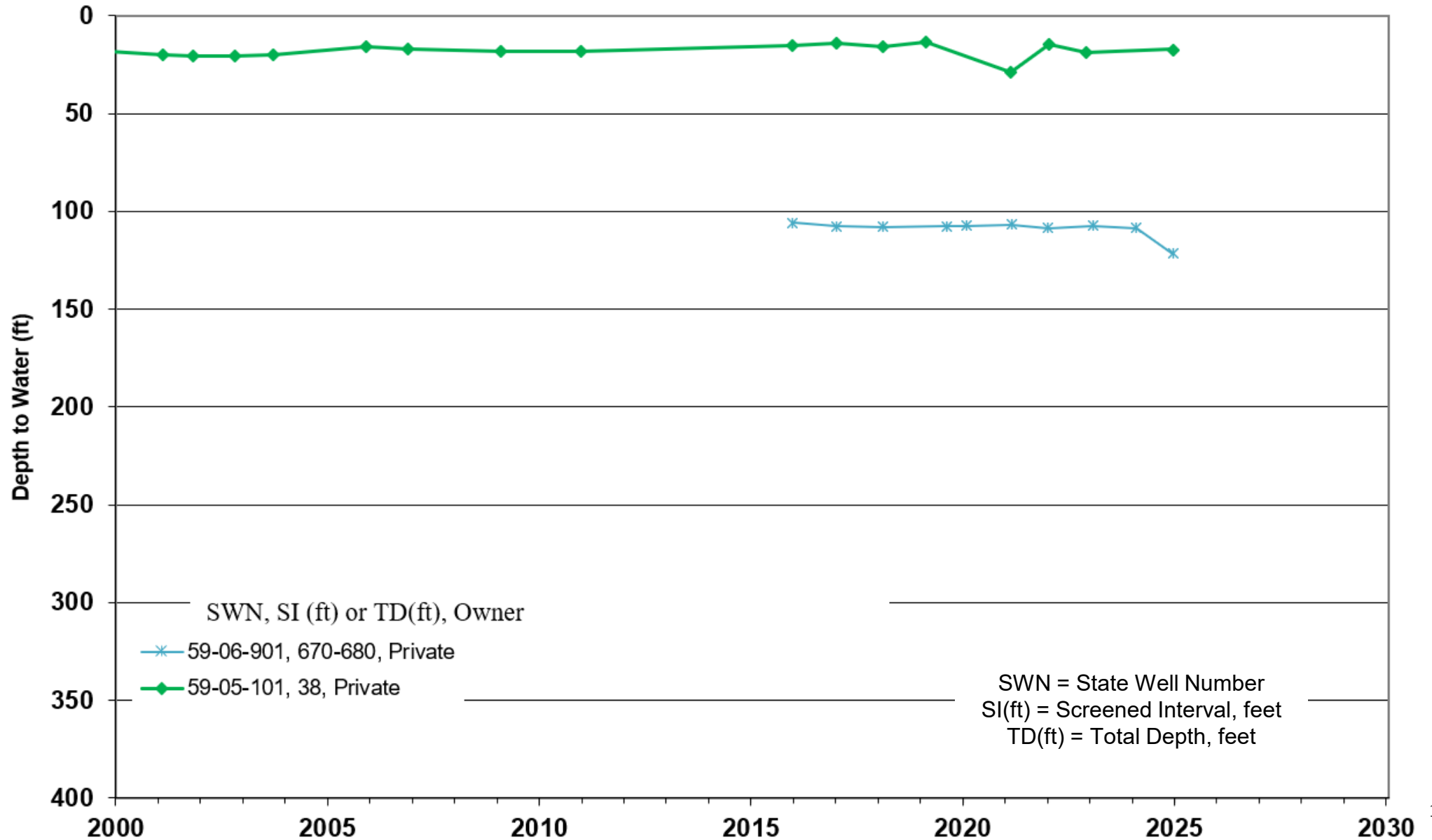
State Well Number	Well Owner
59-05-101	Private
59-06-901	Private

Queen City Aquifer

2070 DFC
Average Artesian Head
44 feet decline



Queen City Aquifer Observation Wells



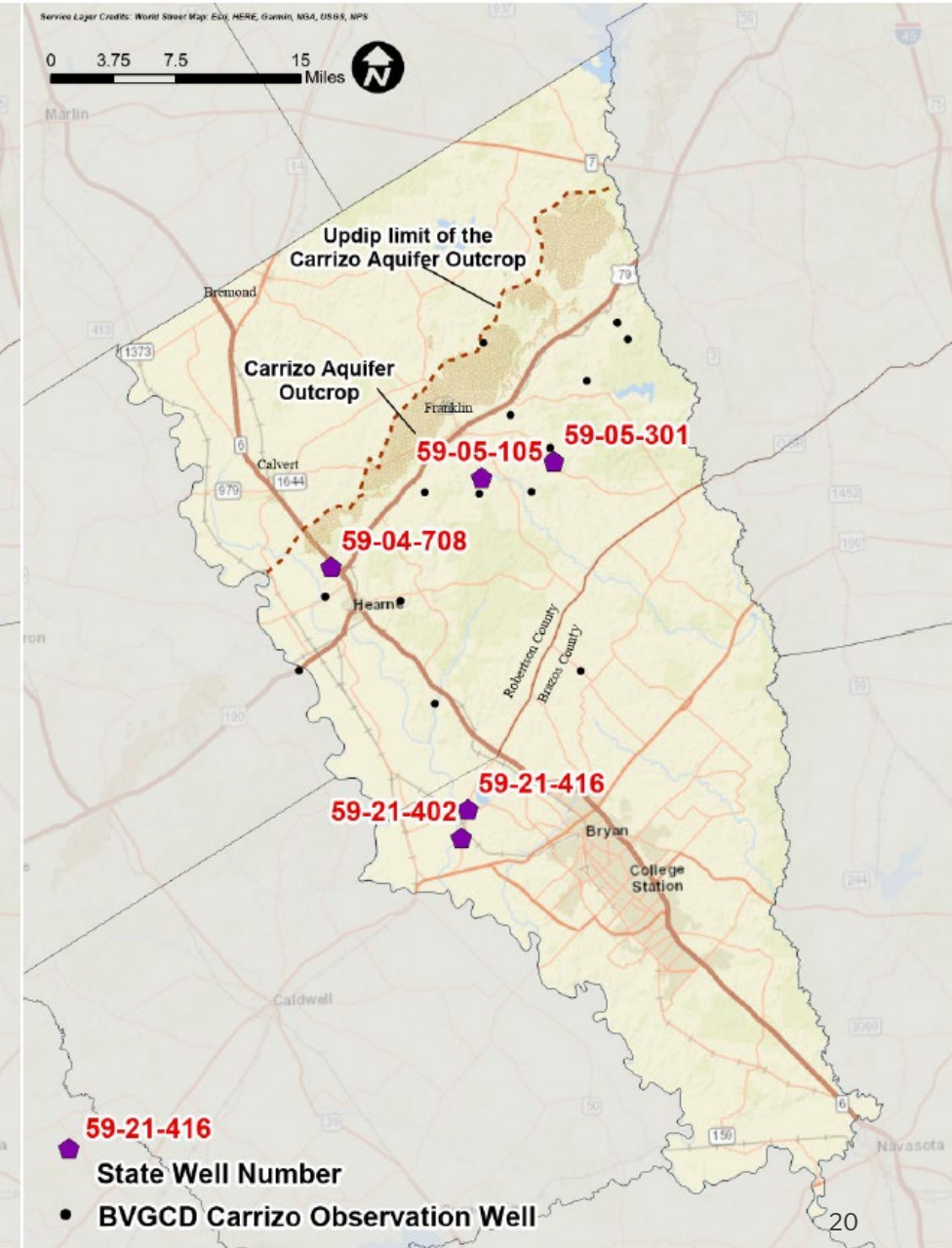
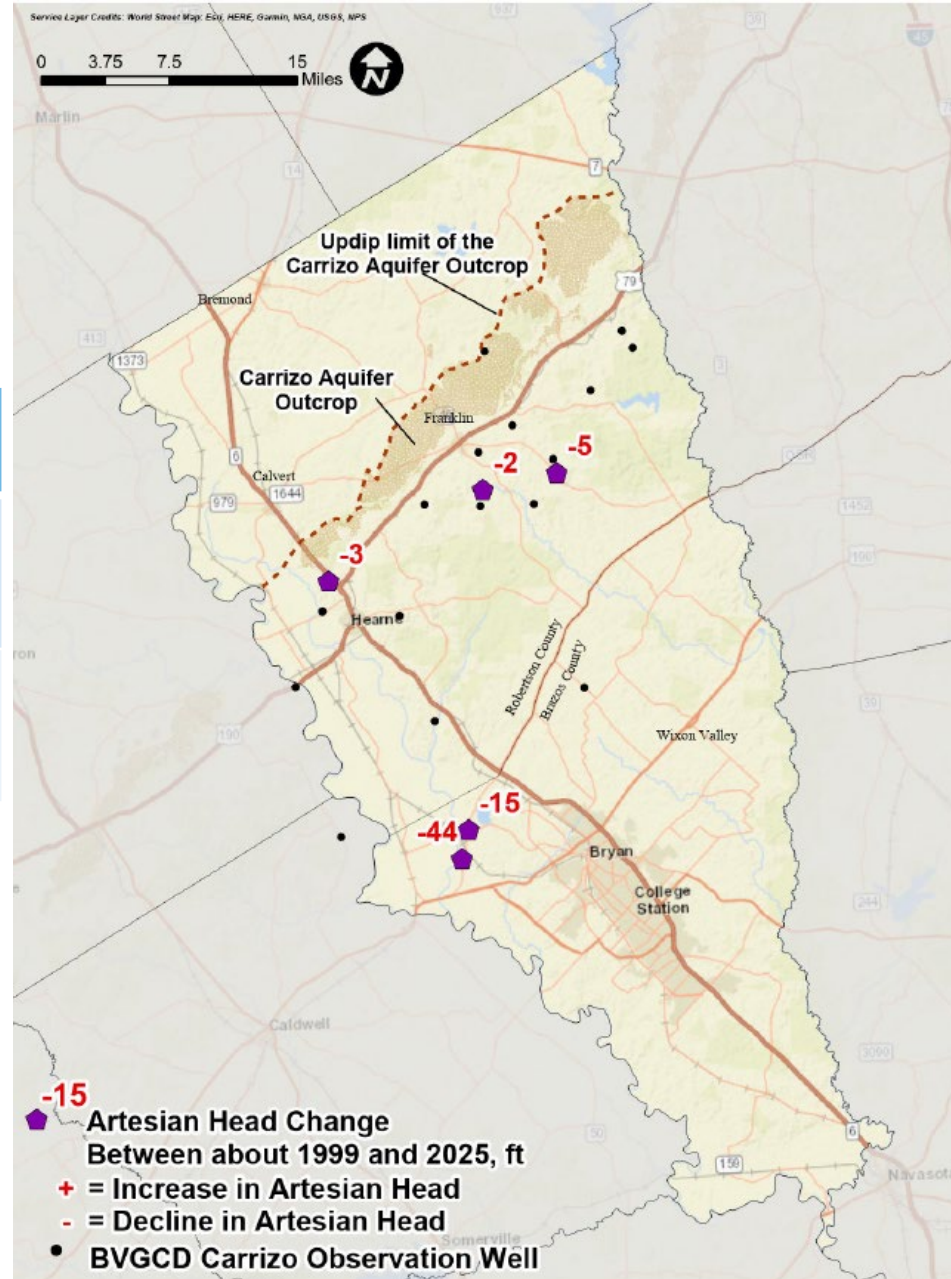
Carrizo Aquifer DFC Wells

State Well Number	Well Owner
59-04-708	Private
59-05-105	Private
59-05-301	Private
59-21-402	TAMU Well 5
59-21-416	City of College Station Carrizo #1

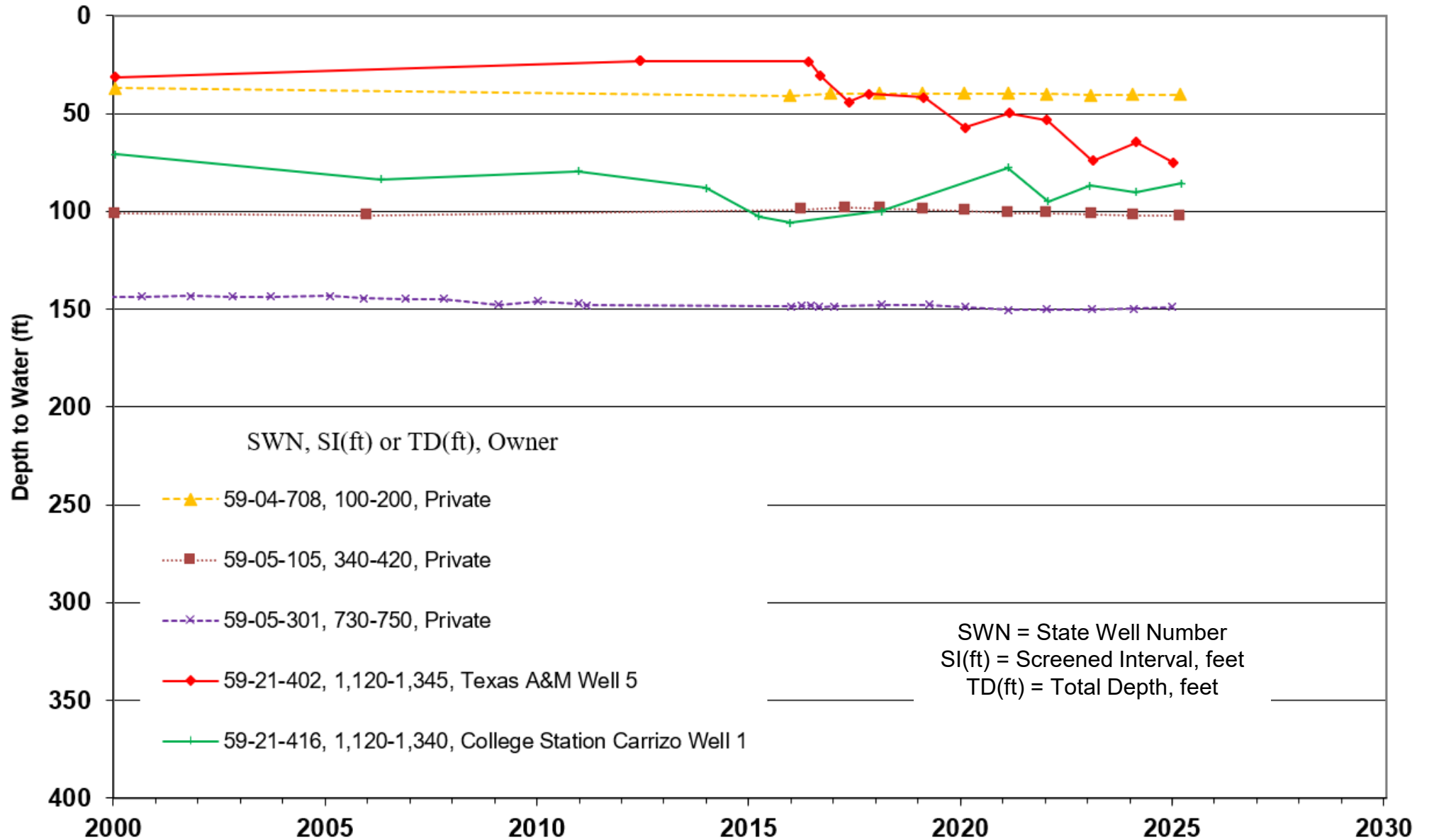
Carrizo Aquifer

Average Artesian Head Change 2000-2025

Arithmetic Average	14 Feet (Decline)
Spatially Weighted Average	13 Feet (Decline)
2070 DFC	84 Feet (Decline)



Carrizo Aquifer Observation Wells

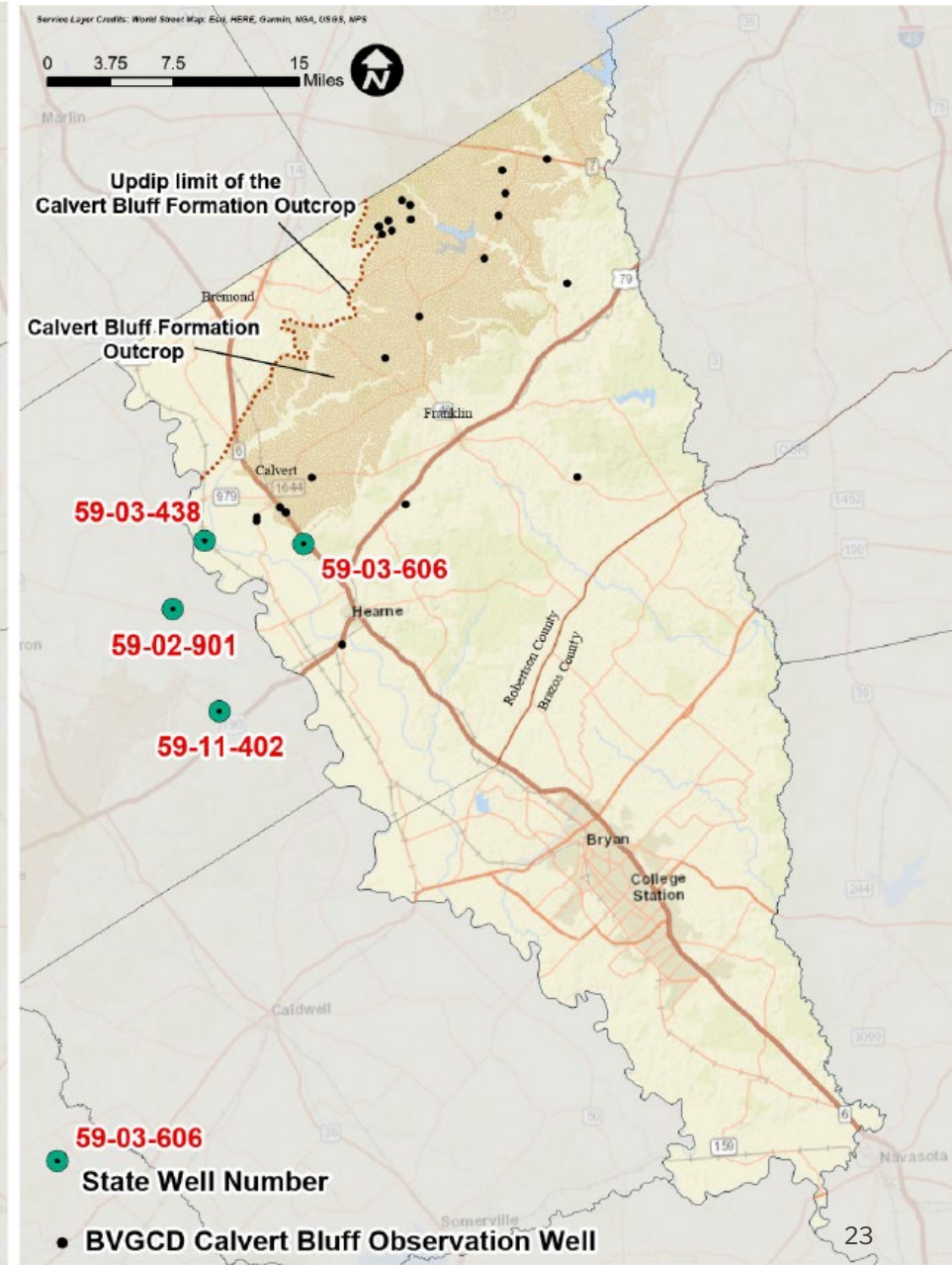
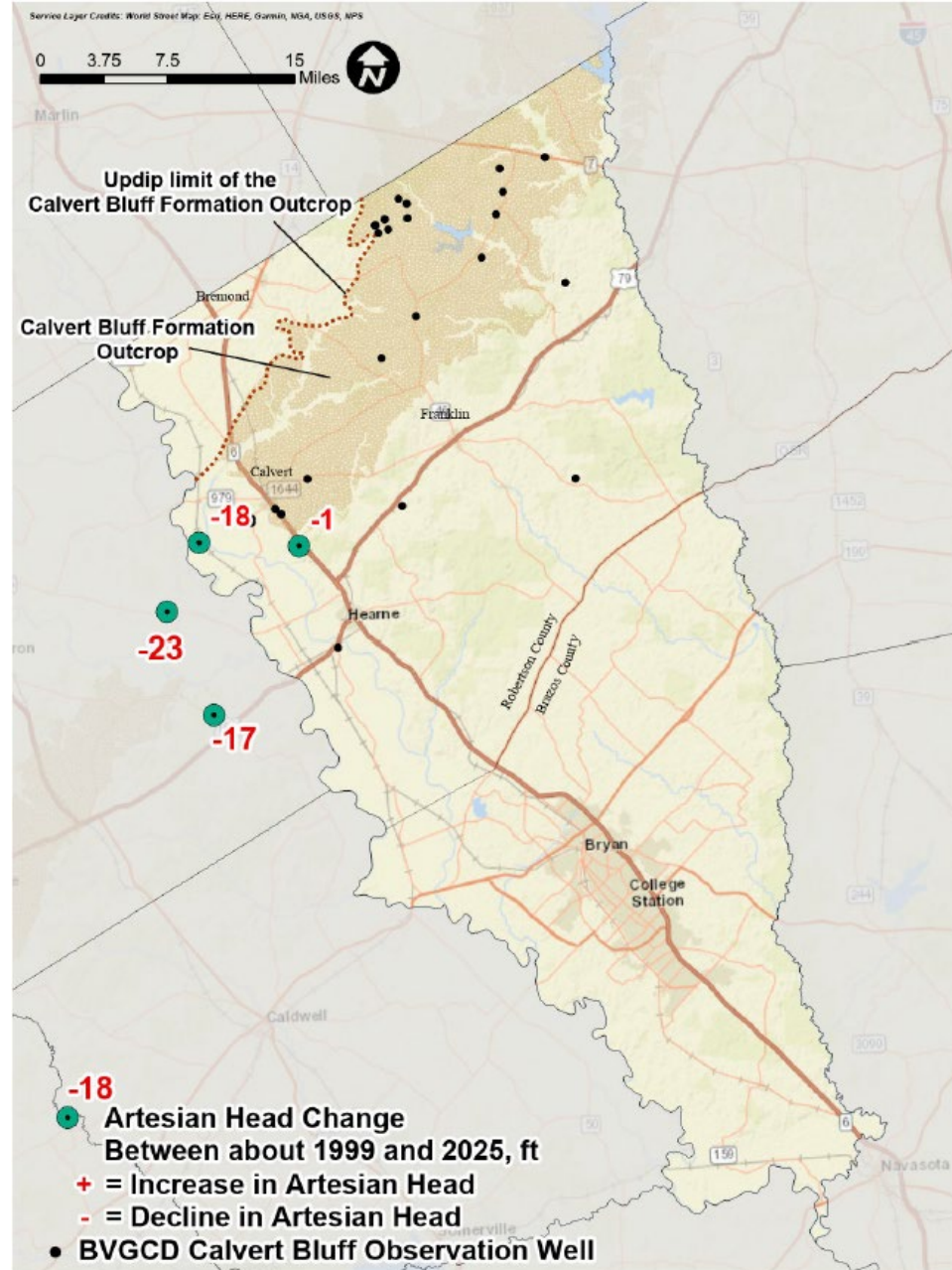


Calvert Bluff Formation DFC Wells

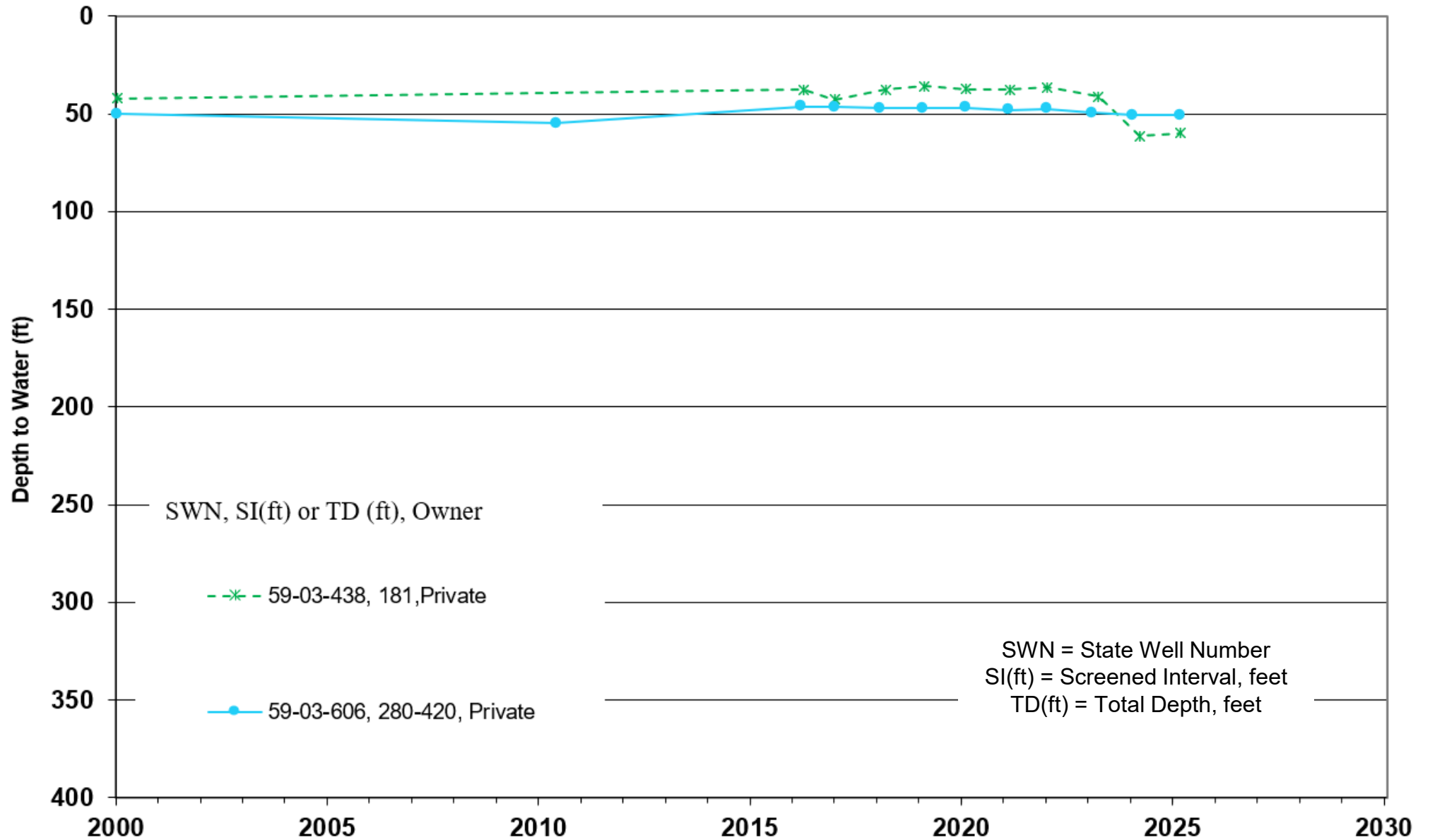
State Well Number	Well Owner
59-03-438	Private
59-03-606	Private

Calvert Bluff Formation

2070 DFC
Average Artesian Head
111 feet decline



Calvert Bluff Formation Observation Wells



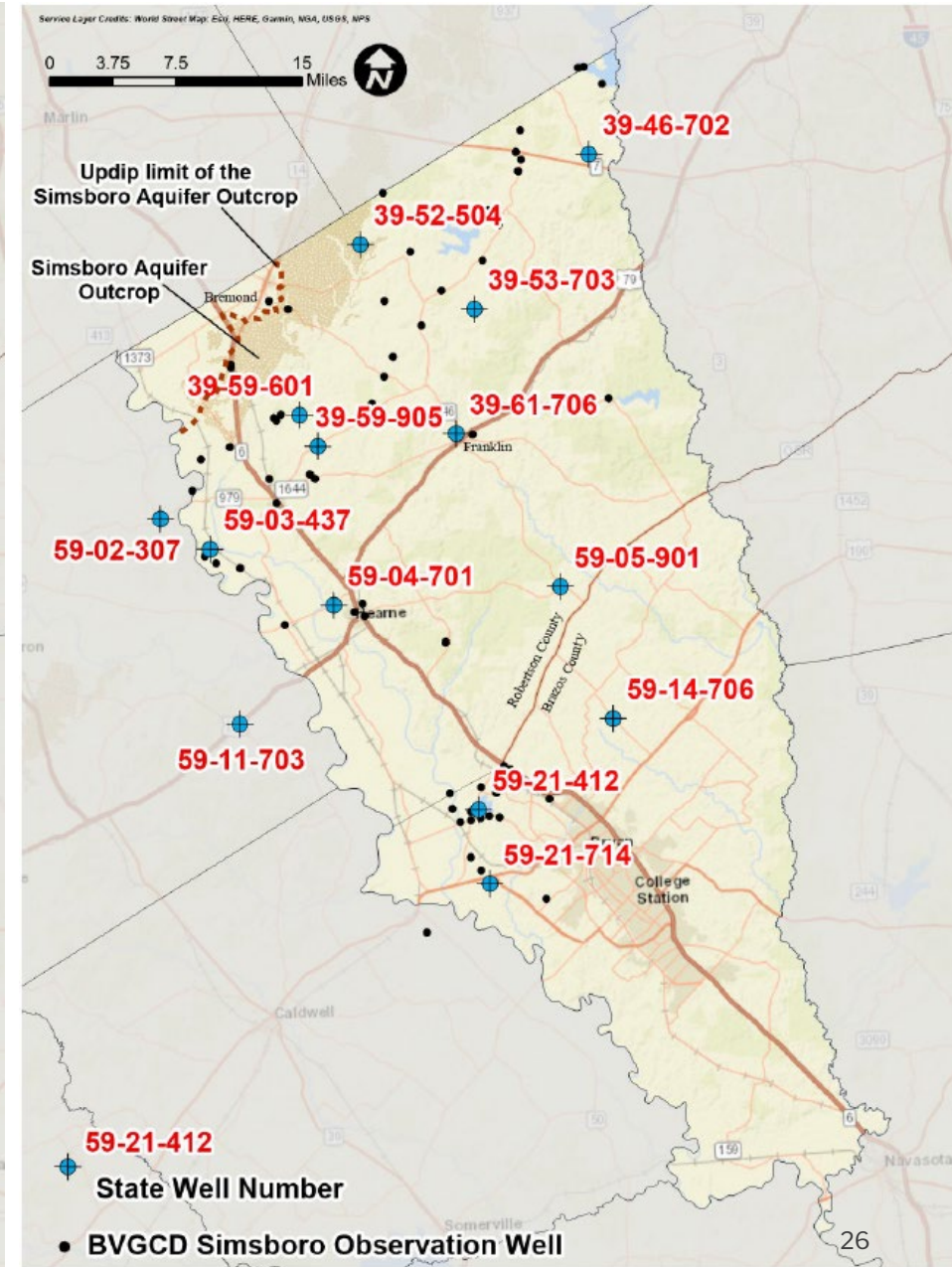
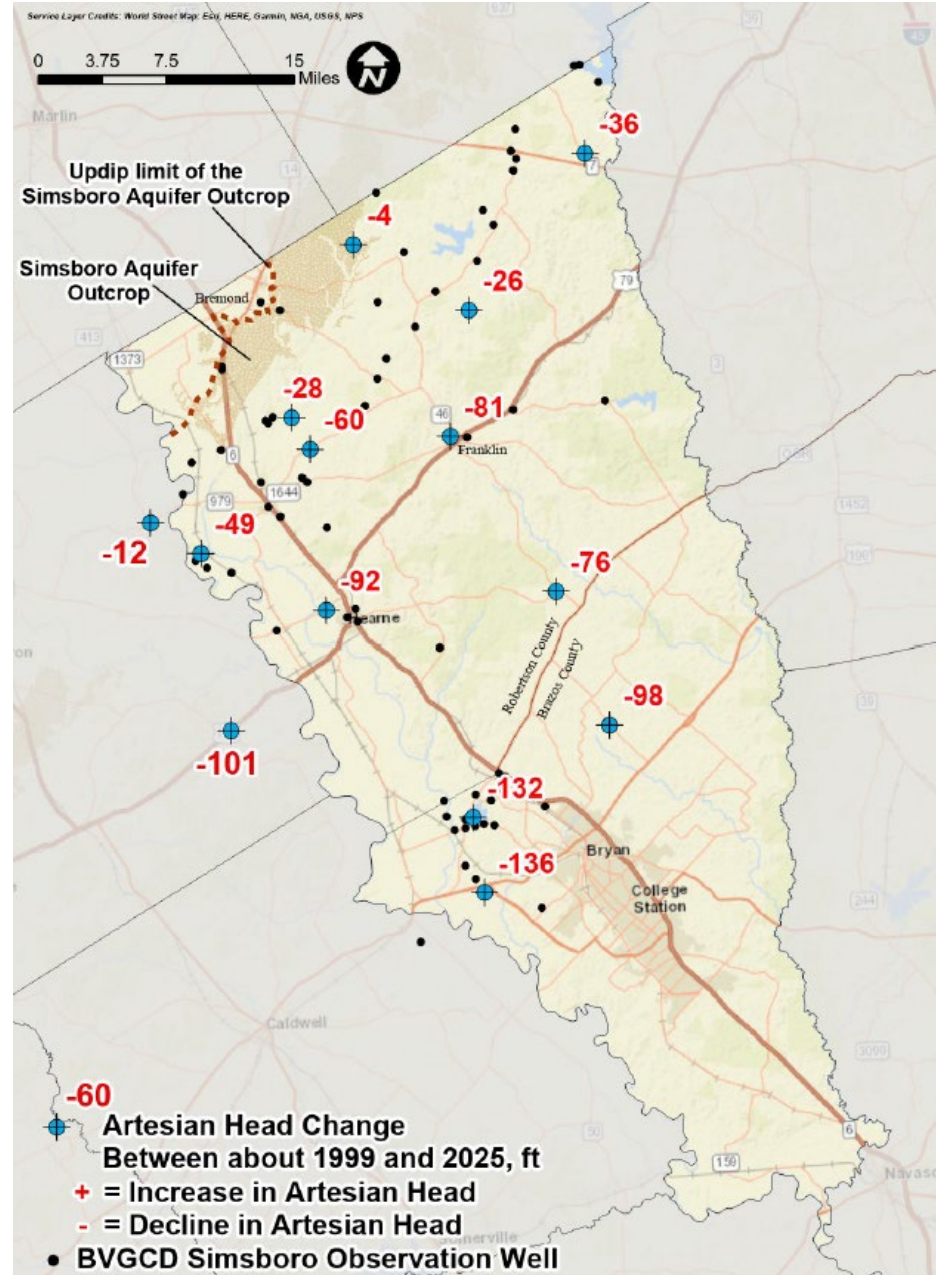
Simsboro Aquifer DFC Wells

State Well Number	Well Owner
39-46-702	Private
39-52-504	Private
39-53-703	Private
39-59-601	Private
39-59-905	Private
39-61-706	City of Franklin Well 4
59-03-437	Private
59-04-701	City of Hearne Well 4
59-05-901	Wickson Creek SUD Wheelock Well
59-14-706	Wickson Creek SUD Well 1
59-21-412	City of Bryan Well 19
59-21-714	TAMU Well 8

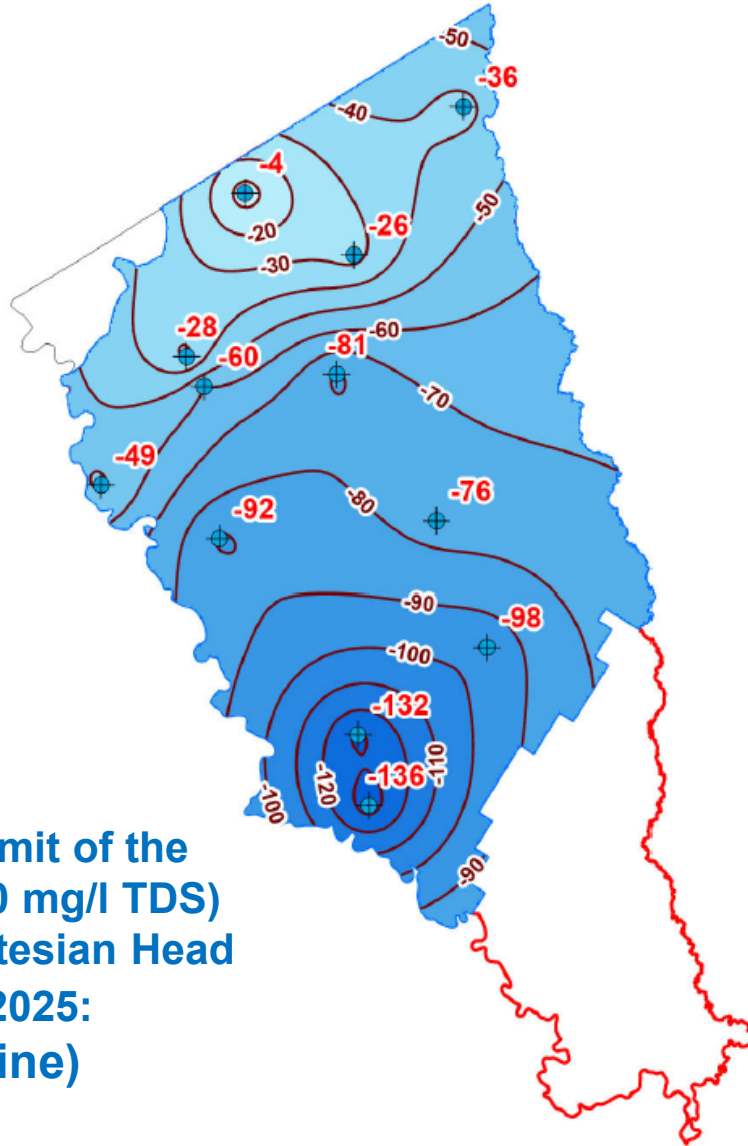
Simsboro Aquifer

Average Artesian Head Change 2000-2025

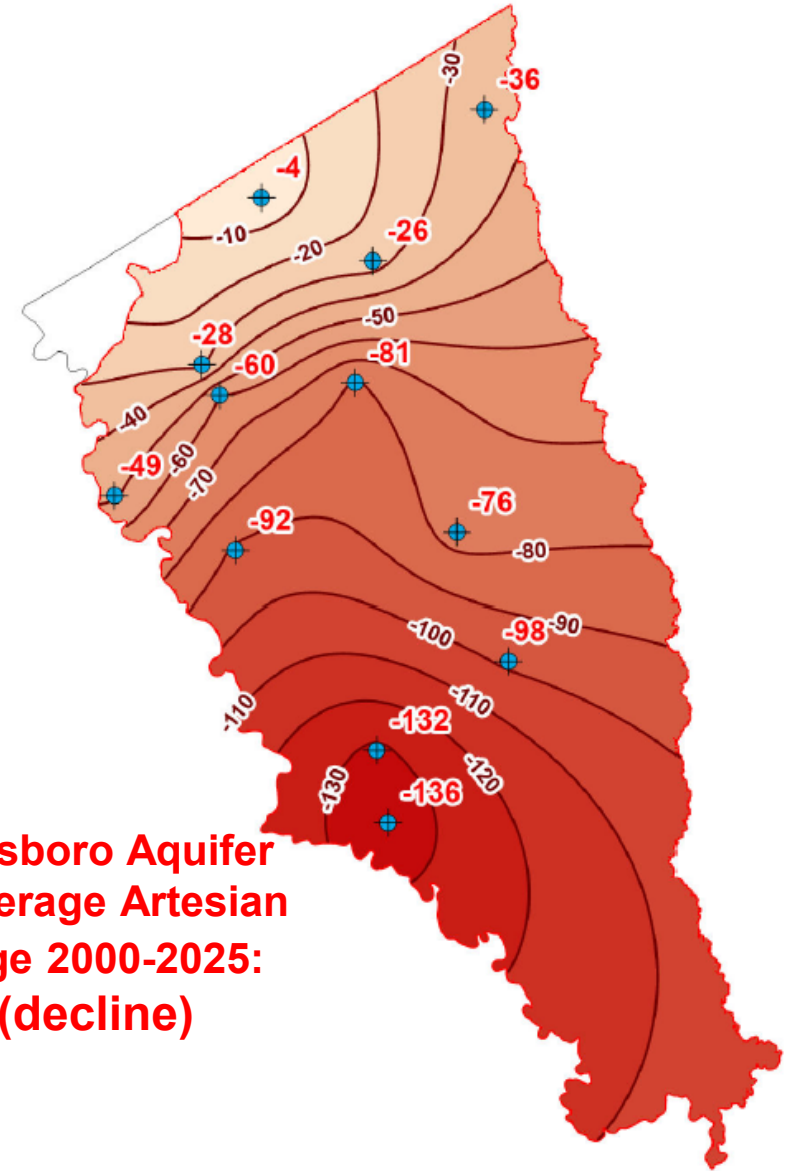
Arithmetic Average	68 Feet (Decline)
Spatially Weighted Average	70 or 80 Feet (Decline)
2070 DFC	262 Feet (Decline)



Spatially Weighted Simsboro Aquifer Head Change Estimates

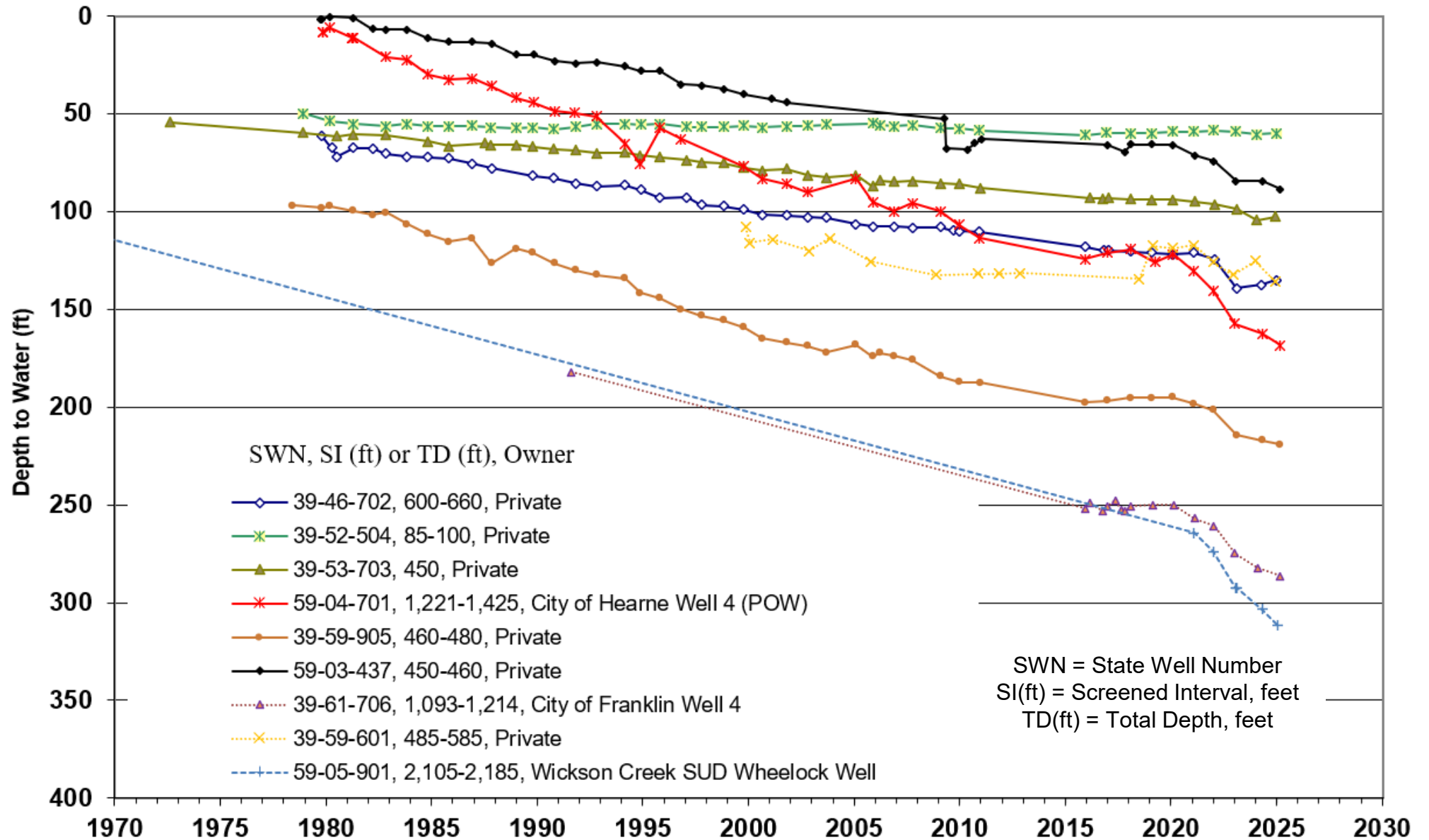


TWDB Down Dip Limit of the Carrizo-Wilcox (3,000 mg/l TDS)
Weighted Average Artesian Head
Change 2000-2025:
70 feet (decline)

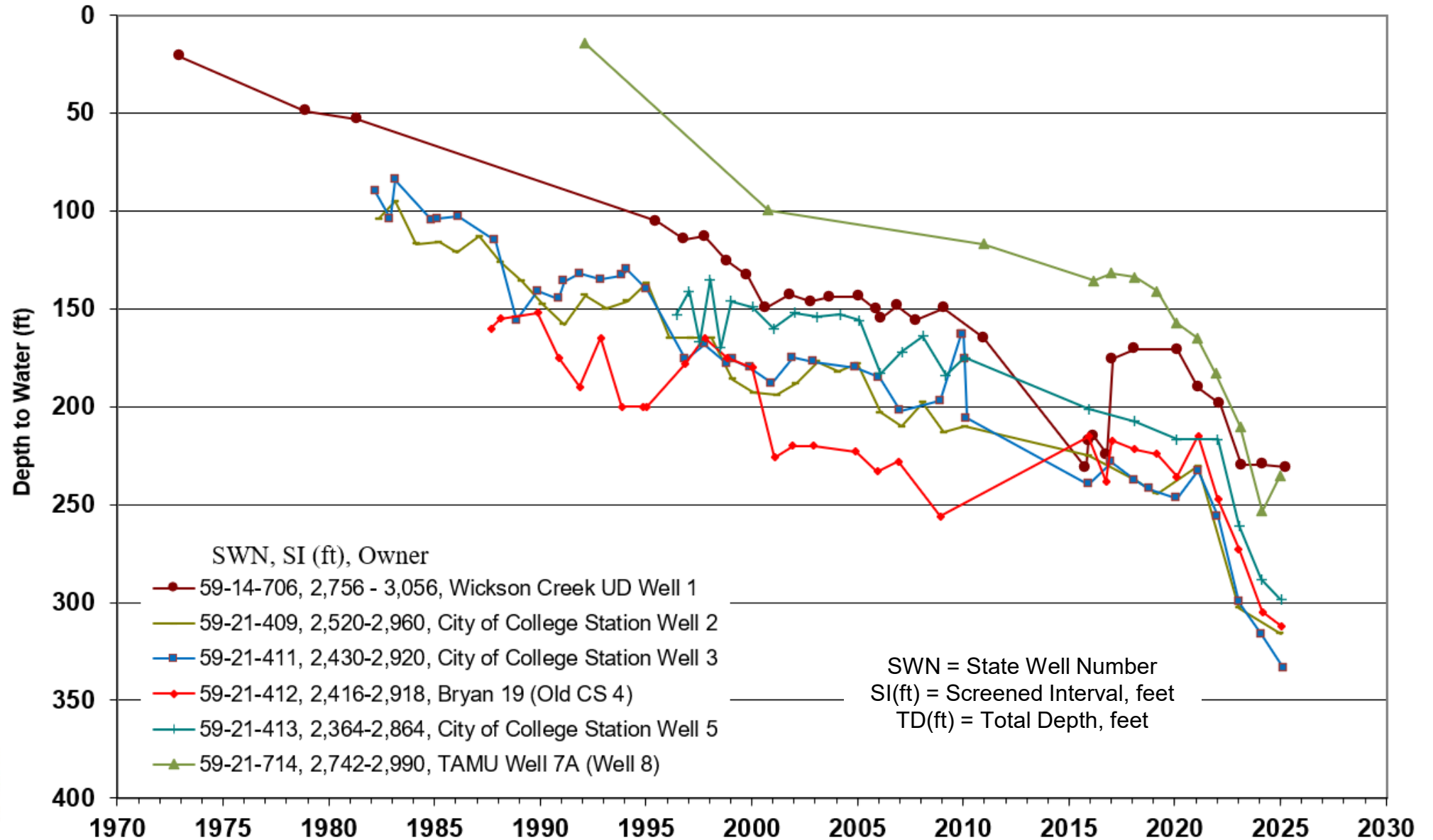


BVGCD Simsboro Aquifer
Weighted Average Artesian
Head Change 2000-2025:
80 feet (decline)

Simsboro Aquifer Observation Wells (Robertson County)



Simsboro Aquifer Observation Wells (Brazos County)



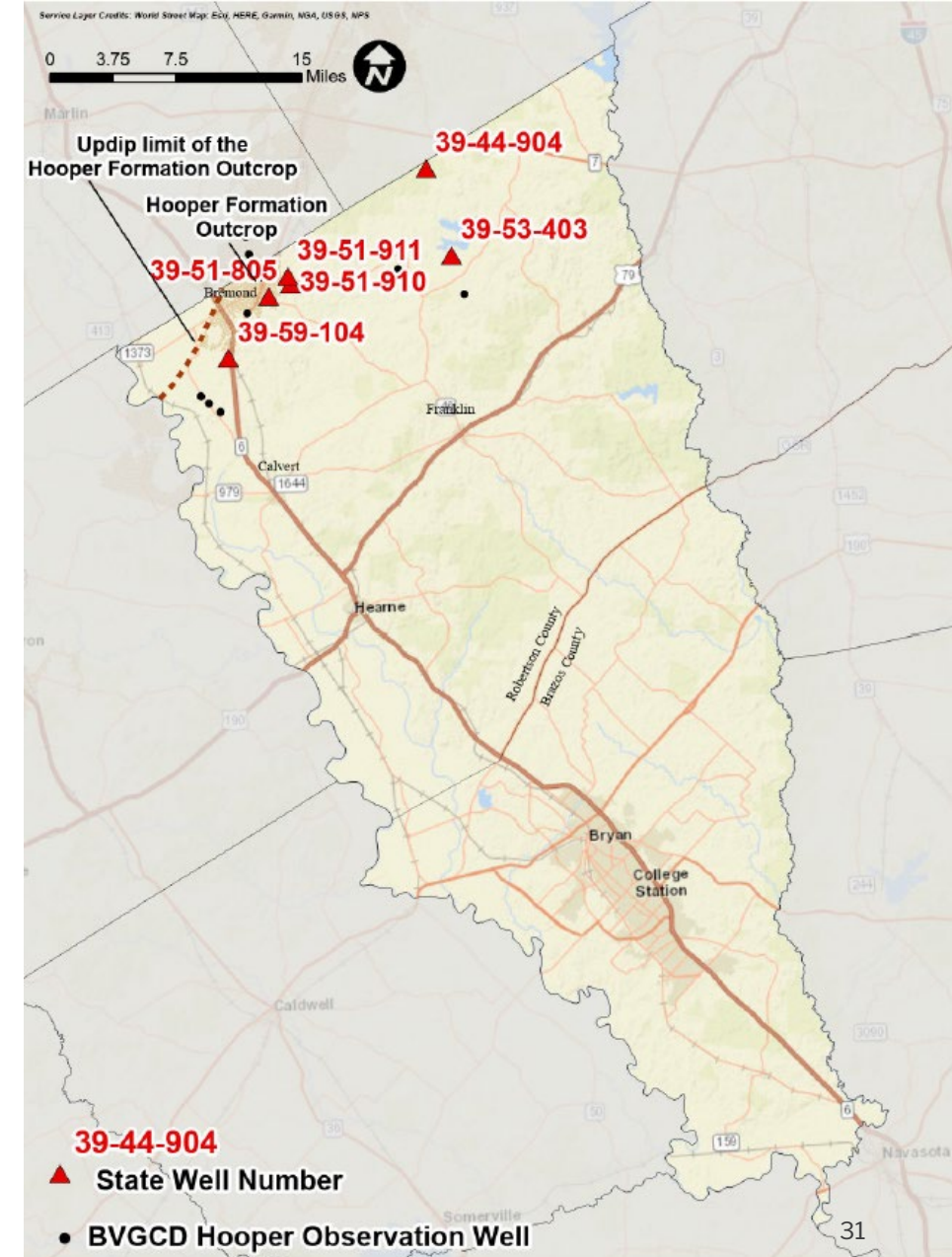
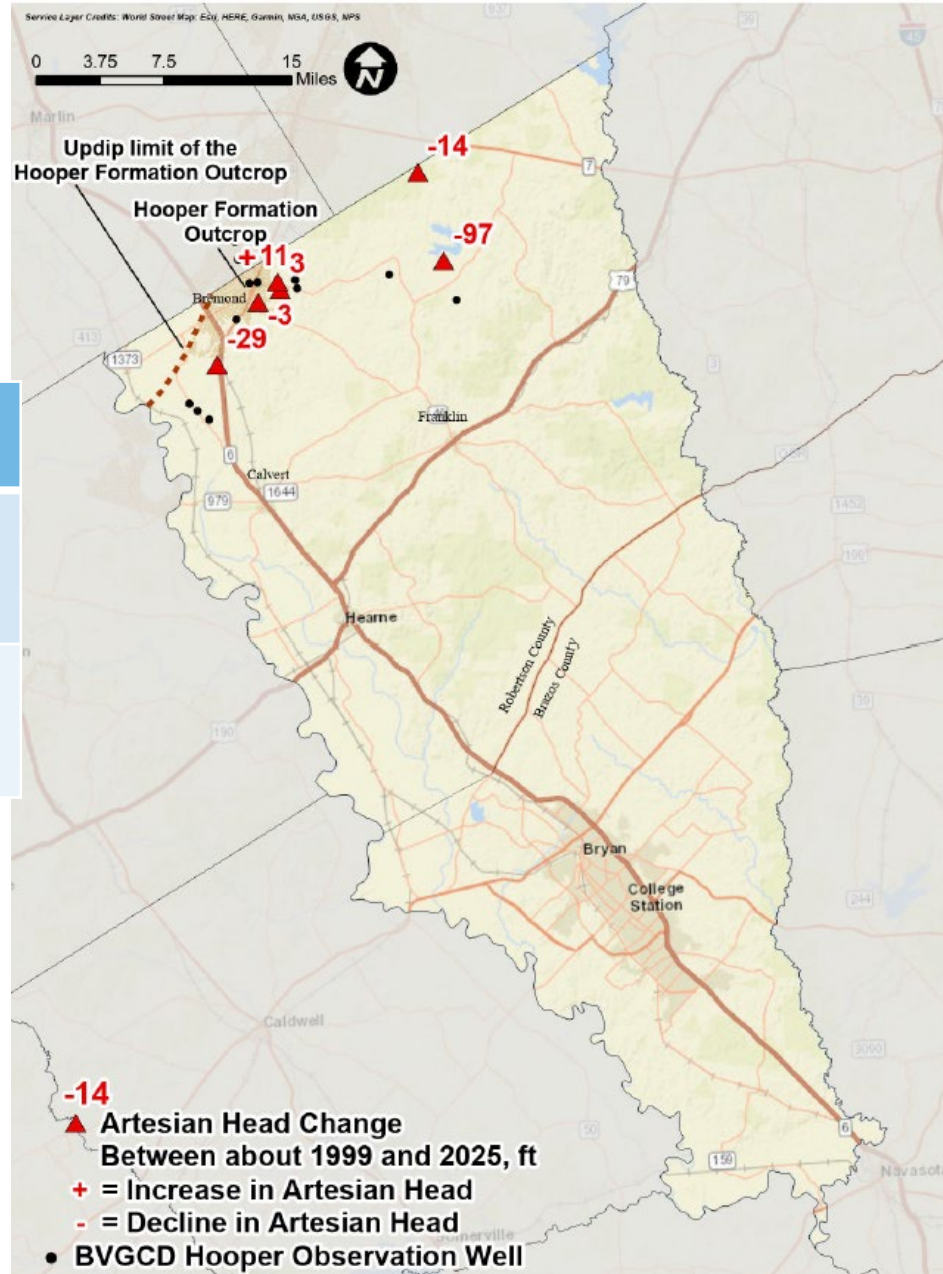
Hooper Formation DFC Wells

State Well Number	Well Owner
39-44-904	Private
39-51-805	Private
39-51-910	City of Bremond Well 4
39-51-911	City of Bremond Well 5
39-53-403	Oak Grove Luminant Well 1
39-59-104	Private

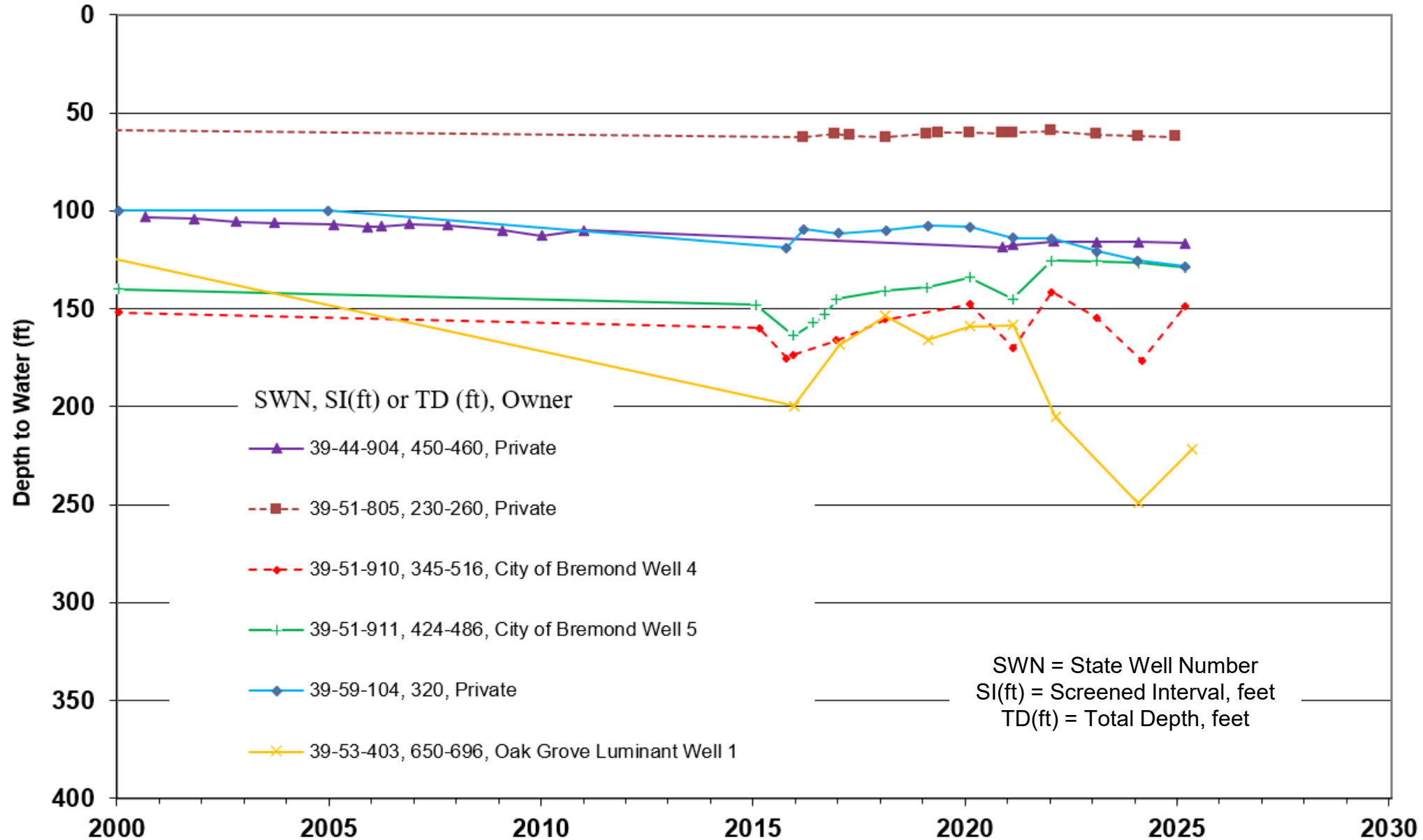
Hooper Formation

Average Artesian Head Change 2000-2025

Arithmetic Average	22 Feet (Decline)
Spatially Weighted Average	--
2070 DFC	167 Feet (Decline)



Hooper Formation Observation Wells



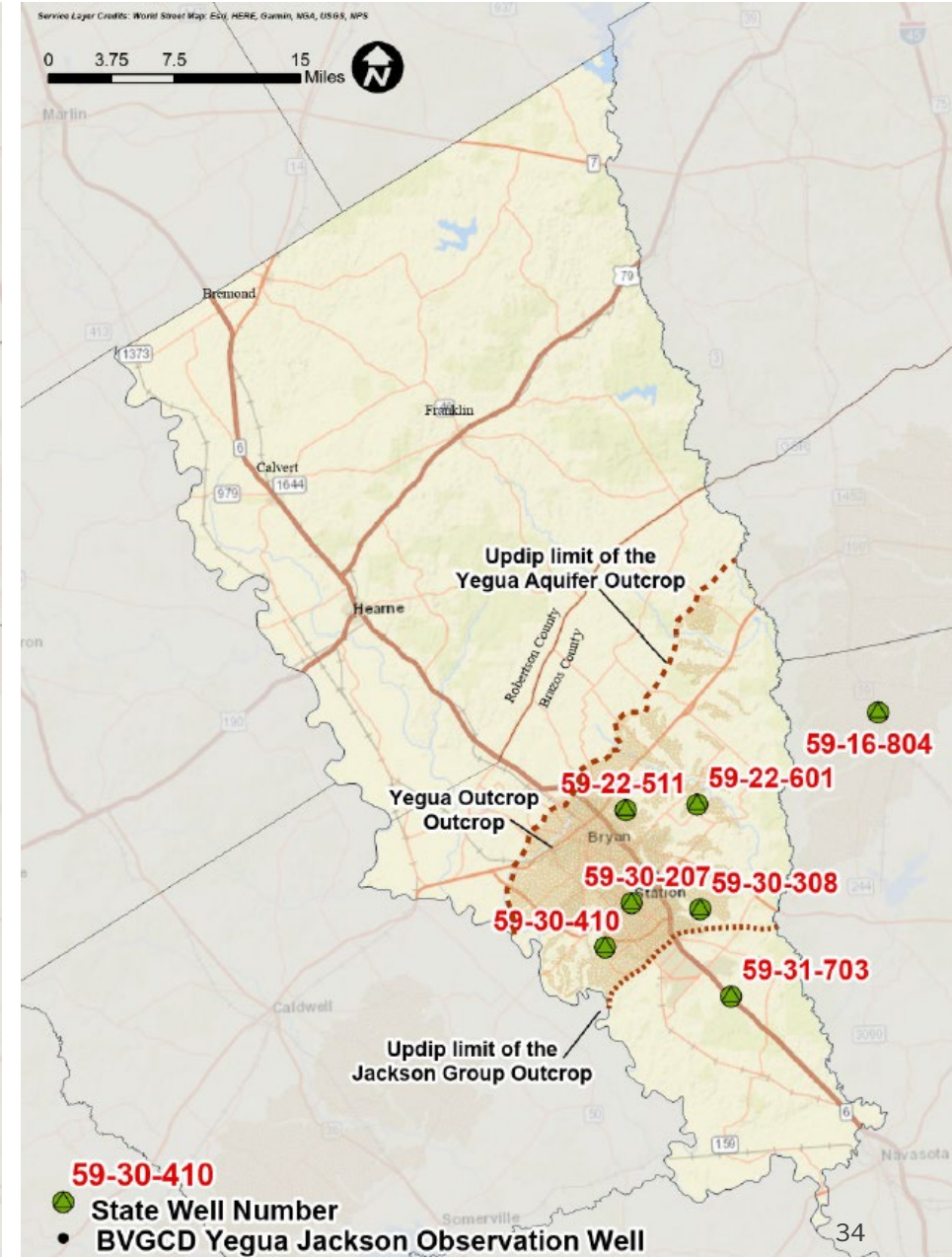
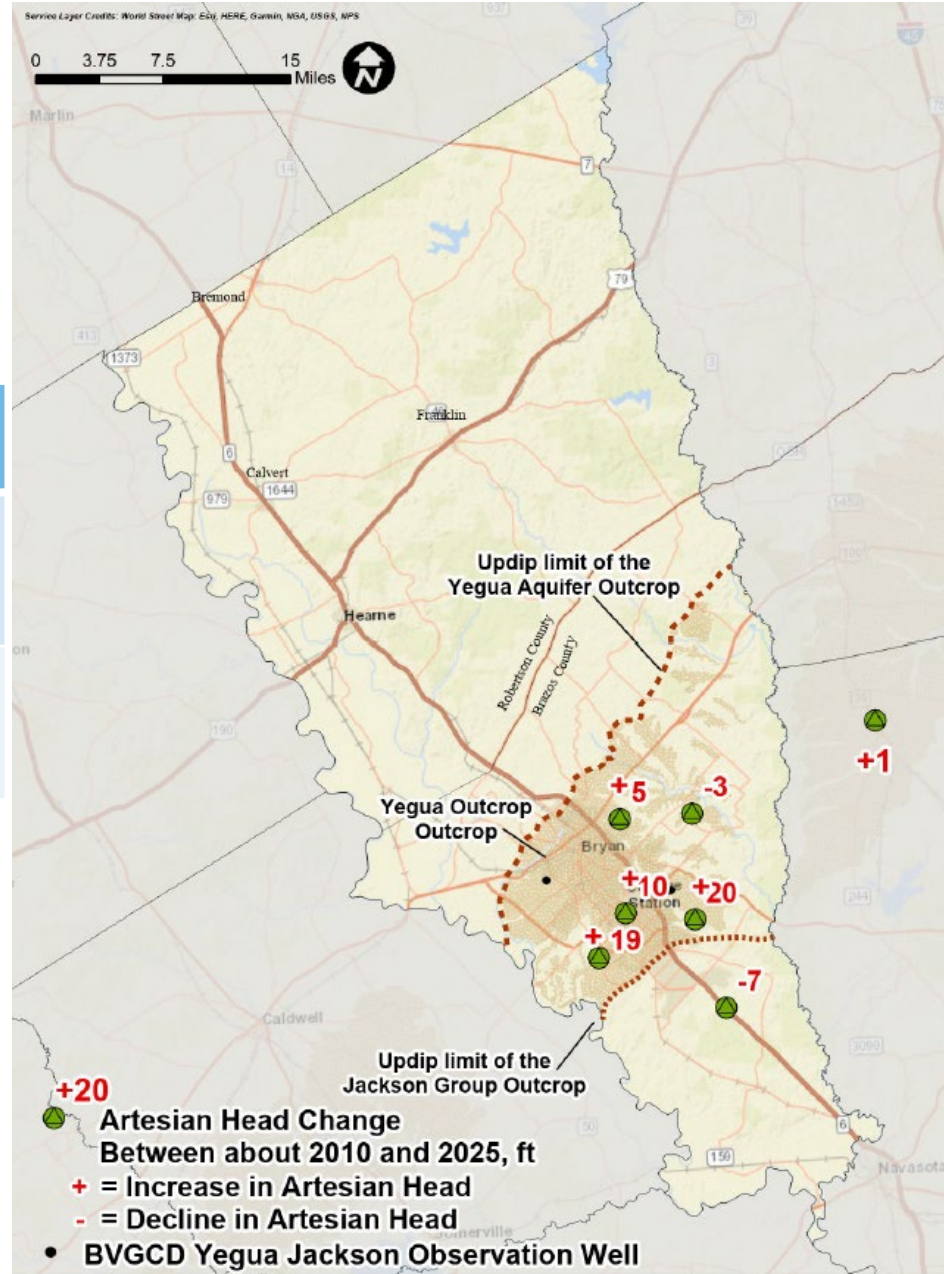
Yegua-Jackson Aquifer DFC Wells

State Well Number	Well Owner
59-22-511	Private
59-22-601	Private
59-30-207	TAMU Golf Course
59-30-308	Wellborn SUD Well 1
59-30-410	TAMU Brayton Training Field
59-31-703	Private

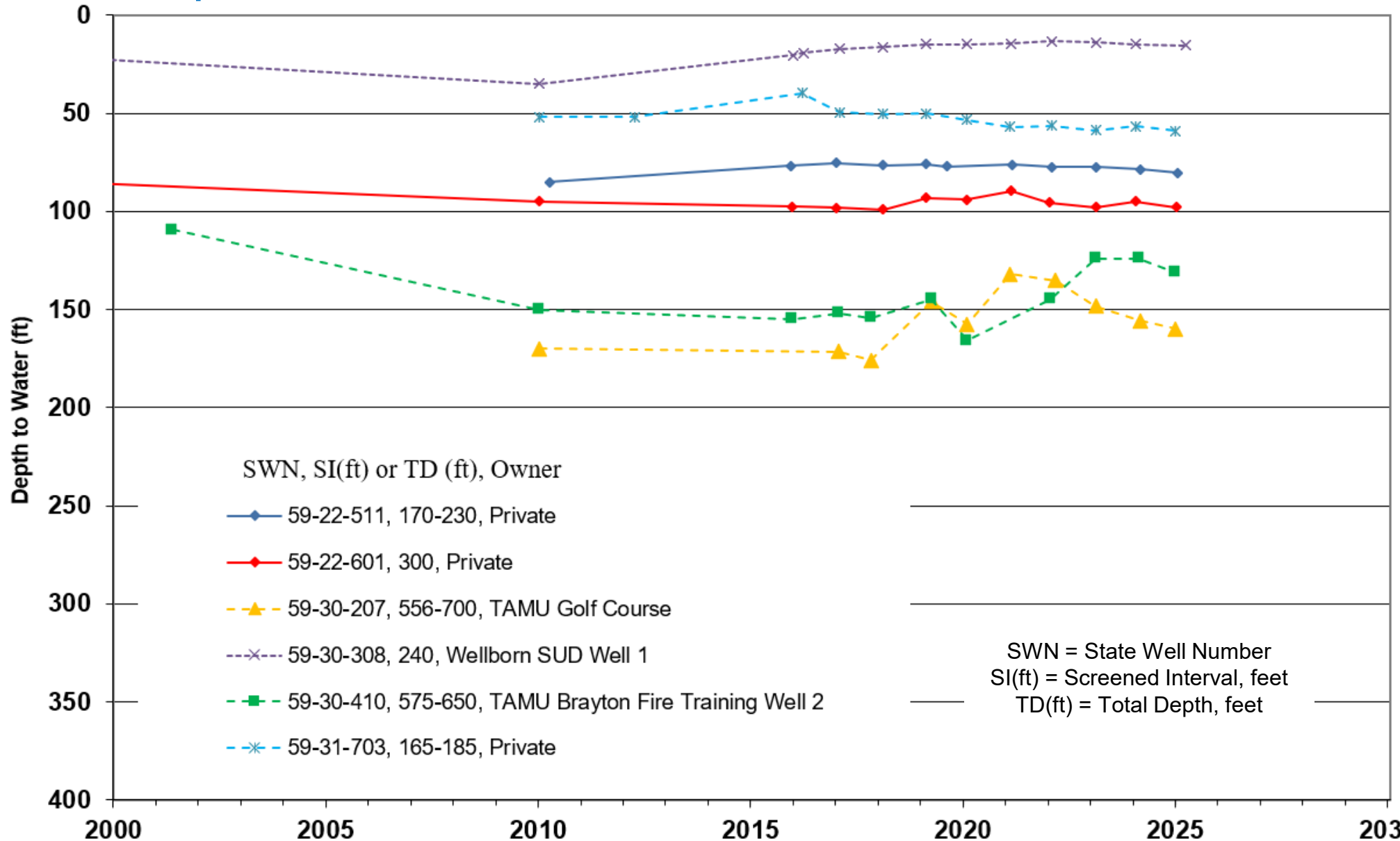
Yegua-Jackson Aquifer

Average Artesian Head Change 2010-2025

Arithmetic Average	7 Feet (Increase)
Spatially Weighted Average	--
2070 DFC	67 Feet (Decline)



Yegua Jackson Aquifer Observation Wells



Comparison of DFCs Over Last Seven Years, arithmetic average feet of artesian head change

Span of Years	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper	Yegua-Jackson (2010)
2000-2019	+1	-	-8	-	-32	-1	+6
2000-2020	-7	-	-20	-	-33	-8	+6
2000-2021	-9	-	-7	-	-34	-14	+11
2000-2022	-12	-	-11	-	-43	-6	+8
2000-2023	-16	-	-14	-	-58	-5	+9
2000-2024	-17	-	-13	-	-66	-11	+7
2000-2025	-12	-	-14	-	-68	-22	+7
DFC 2000-2070 (water level decline)	-53	-44	-84	-111	-262	-167	-67

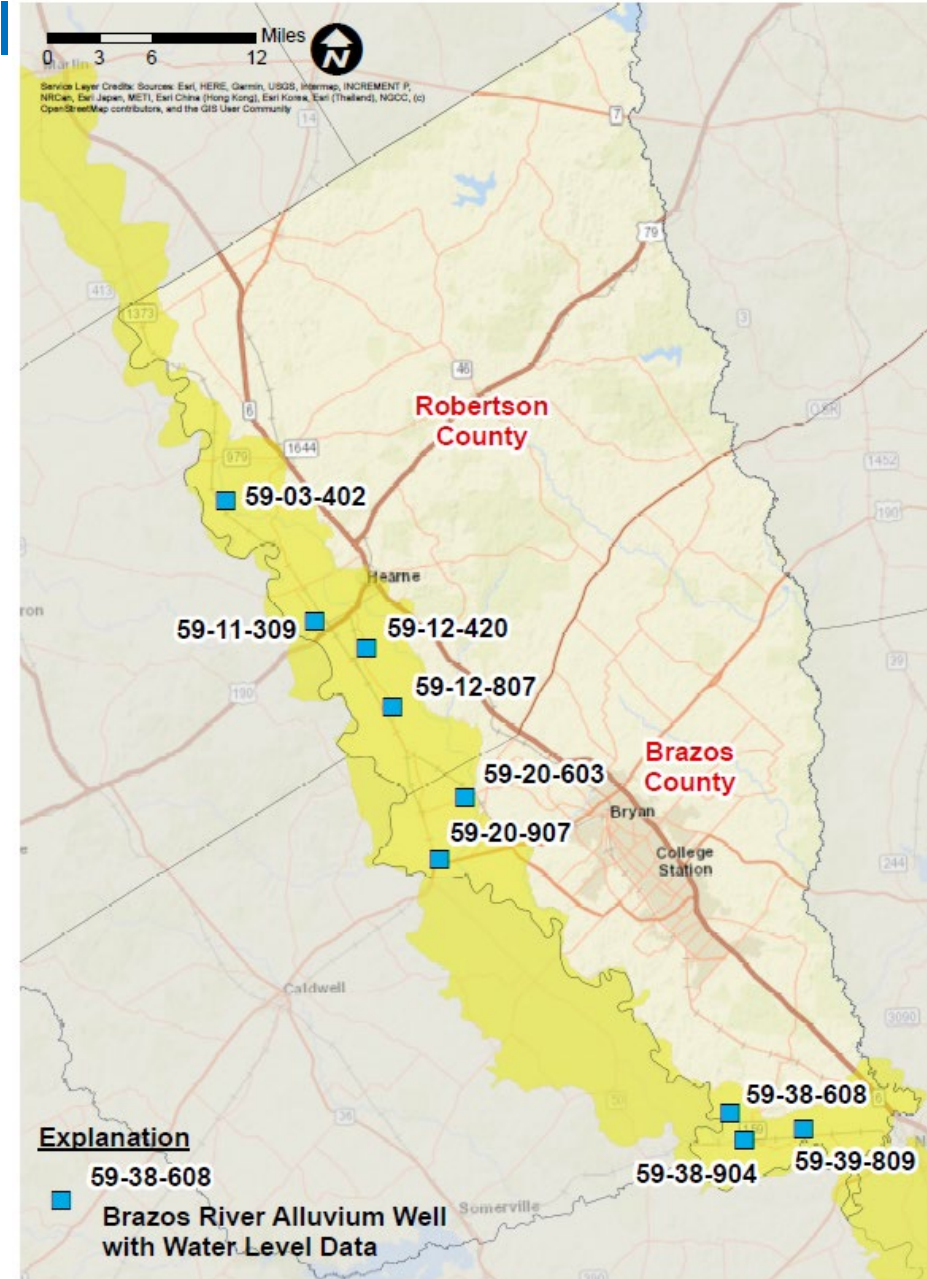
Comparison of Simsboro DFCs and Rate of Decline Over Last Seven Years

Span of Years	Simsboro Average Artesian Head Change, feet	Simsboro Rate of Decline During Current Year, feet
2000-2019	-32	1
2000-2020	-33	1
2000-2021	-34	1
2000-2022	-43	9
2000-2023	-58	15
2000-2024	-66	8
2000-2025	-68	2
DFC (2000-2070)	-262	

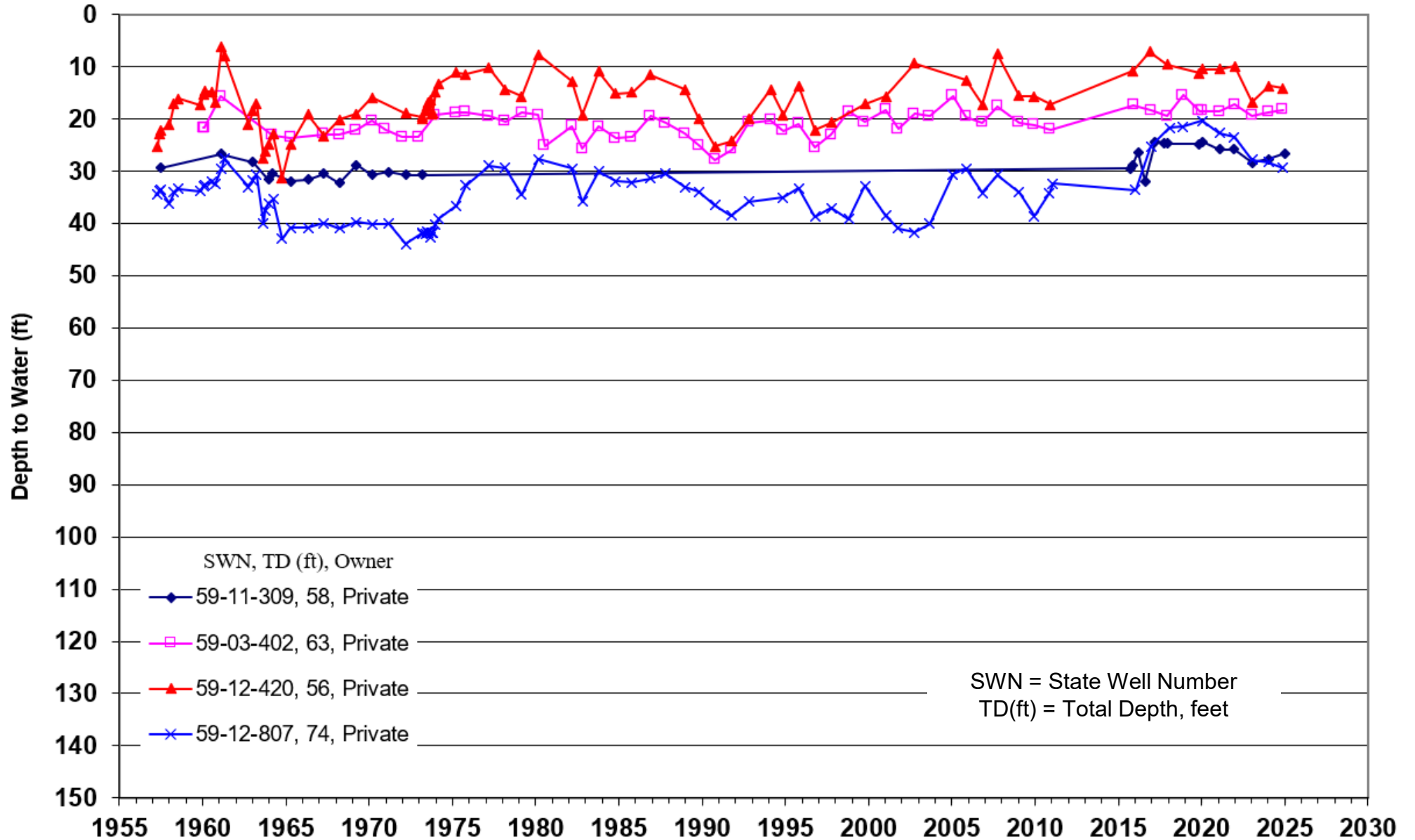
Brazos River Alluvium Aquifer DFC Wells

State Well Number	Well Owner
59-03-402	Private
59-11-309	Private
59-12-420	Private
59-12-807	Private
59-20-907	Private
59-38-608	Private
59-39-809	Private

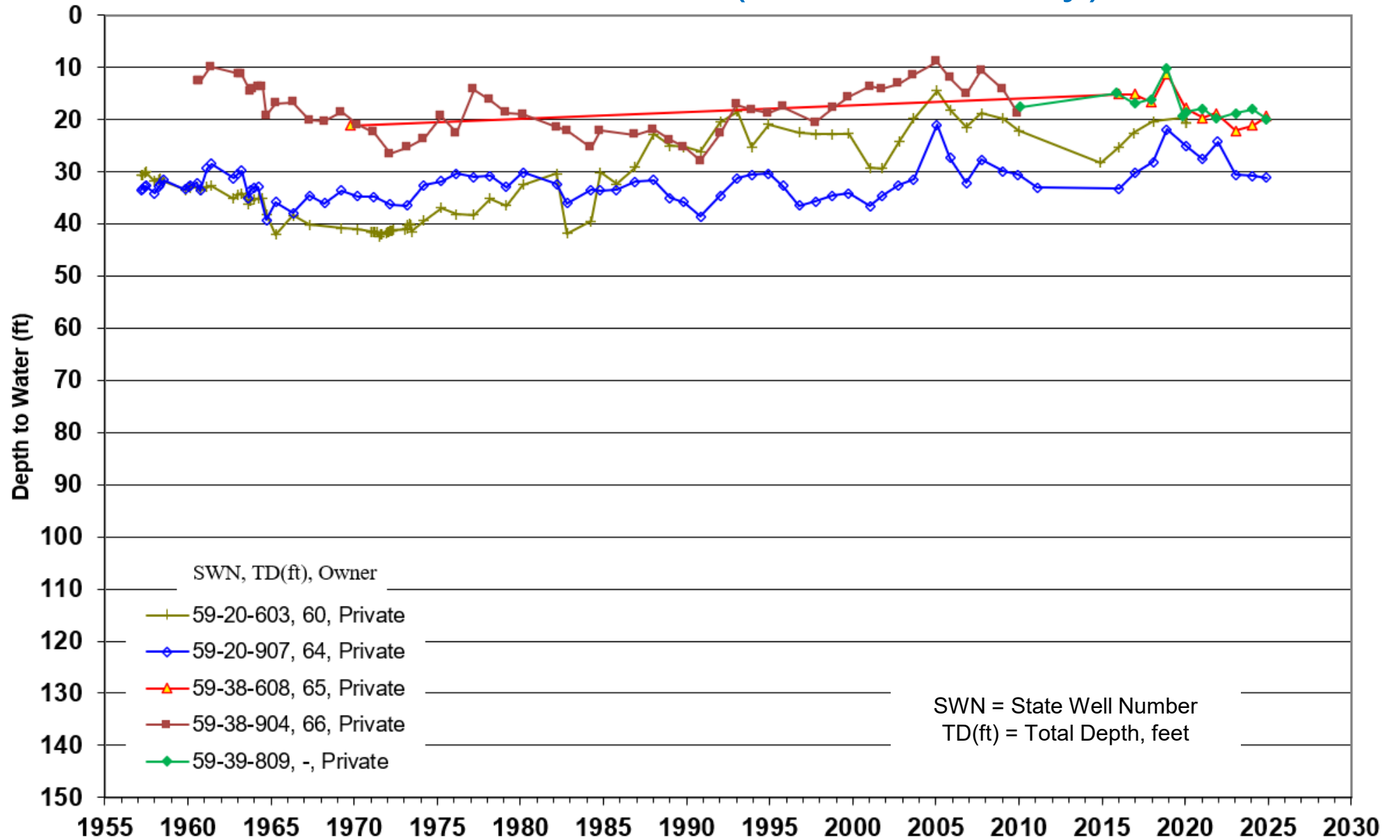
Location of Brazos River Alluvium Well with Water Level Hydrographs



Brazos River Alluvium Observation Wells (Robertson County)



Brazos River Alluvium Observation Wells (Brazos County)



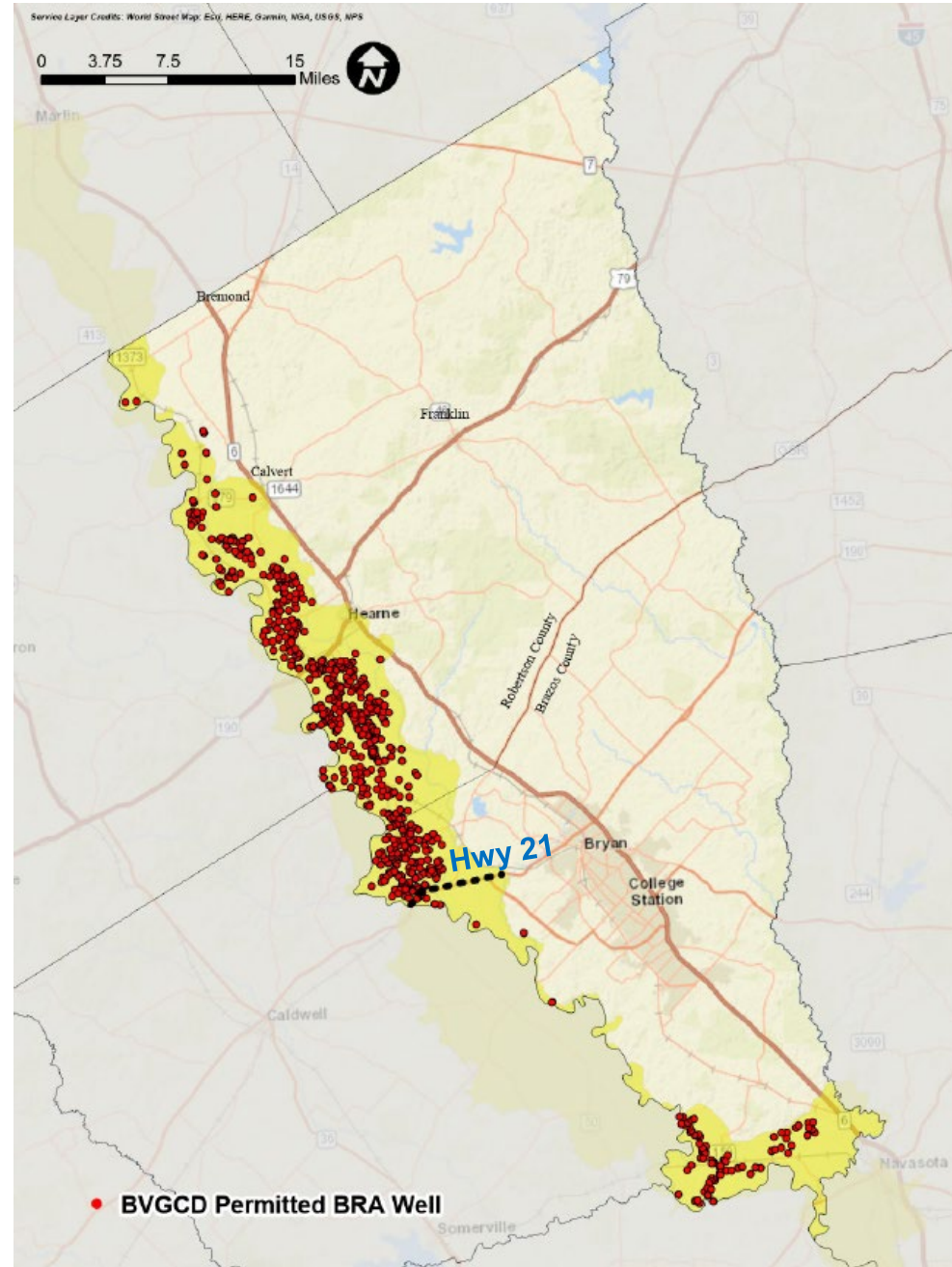
Brazos River Alluvium Well Data

Arithmetic Average Percent Saturation

2021	2022	2023	2024	2025
68%	69%	63%	64%	64%

2070 DFC
Percent Saturation
≥ 30% North of Hwy 21
and
≥ 40% South of Hwy 21

WD = Well Depth, ft
 DTW = Depth to Water, ft
 Percent Saturation (PS) = $\frac{WD-DTW}{WD}$



Summary

- The rate of average artesian head decline slightly decreased in the Simsboro in 2025
- District staff continues to add wells to monitoring network

Questions?

Simsboro Aquifer Pumping Estimates: 2009 Through 2024 (draft)

