Brazos Valley Groundwater Conservation District

Status of Water Levels compared to Desired Future Conditions

2024

July 11, 2024

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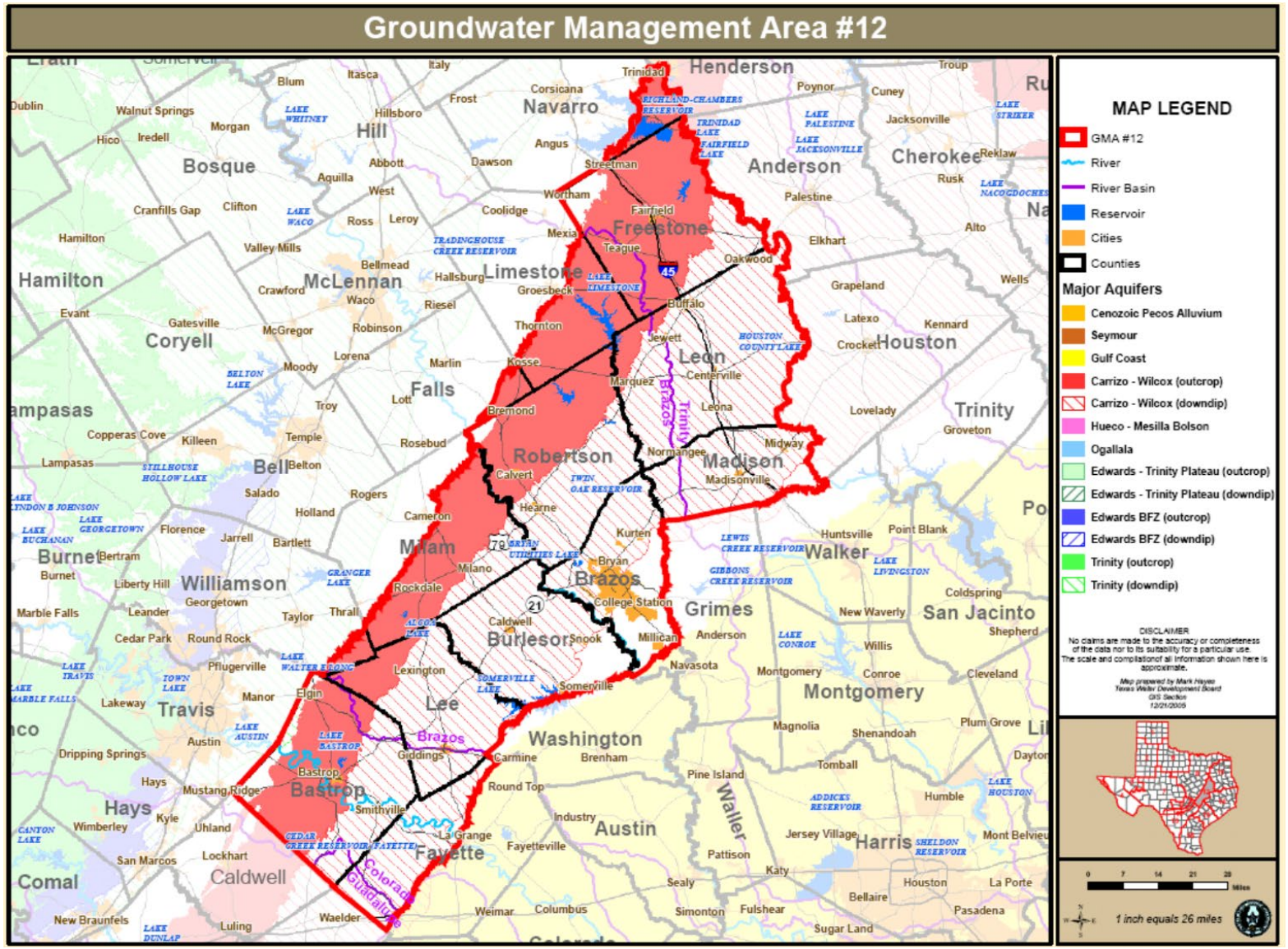
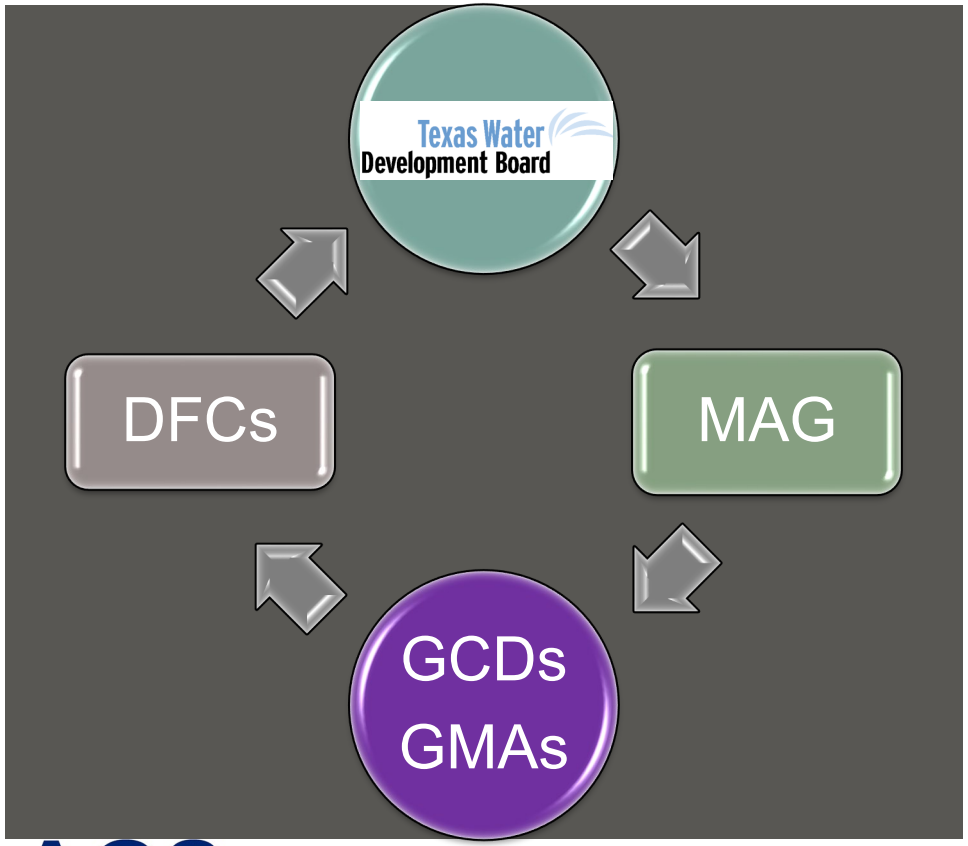
Groundwater Management Area 12

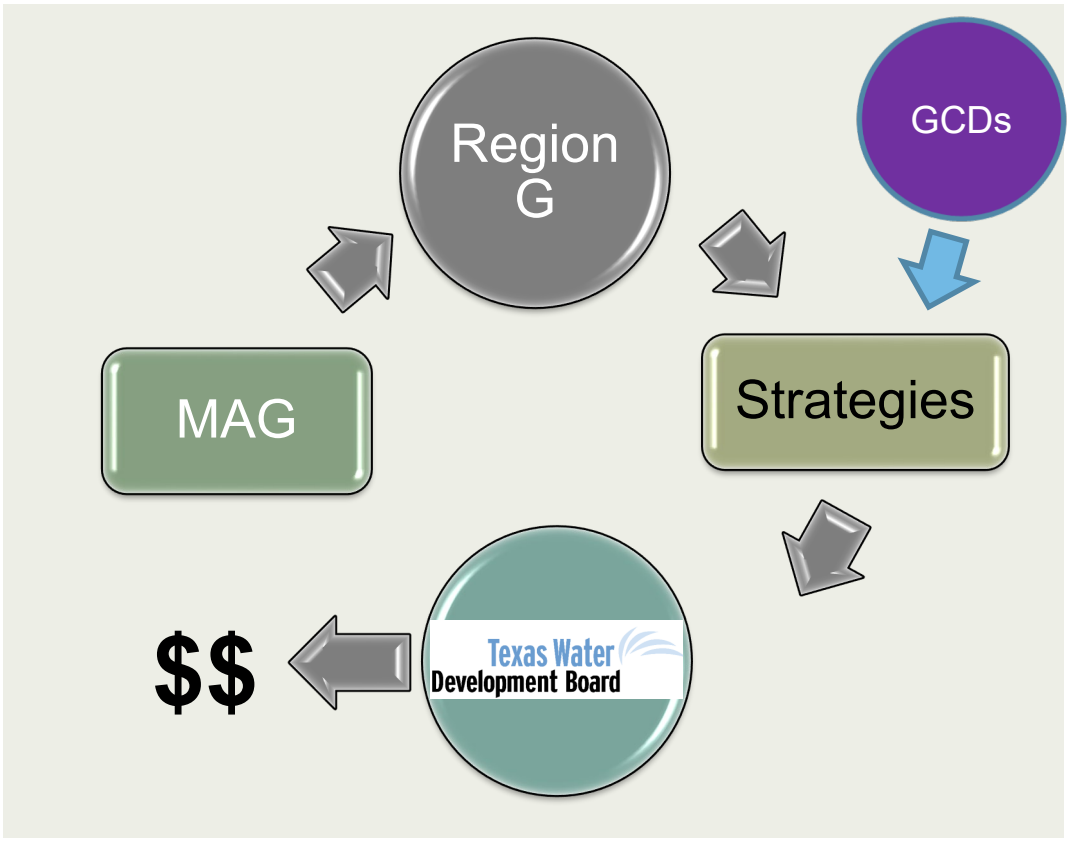


The Texas Groundwater Planning Cycle

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
- Are DFCs planning or regulatory? Different perspectives

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

- Additional Observation Well in BVGCD Monitoring Program

Sparta Aquifer Example:

59-22-509 State Well Number

-25 Artesian Head Change in Well Between about 1999 and 2024, ft

+ = Increase in Artesian Head
- = Decline in Artesian Head

BVGCD Sparta Observation Well

Sparta Aquifer DFC Wells

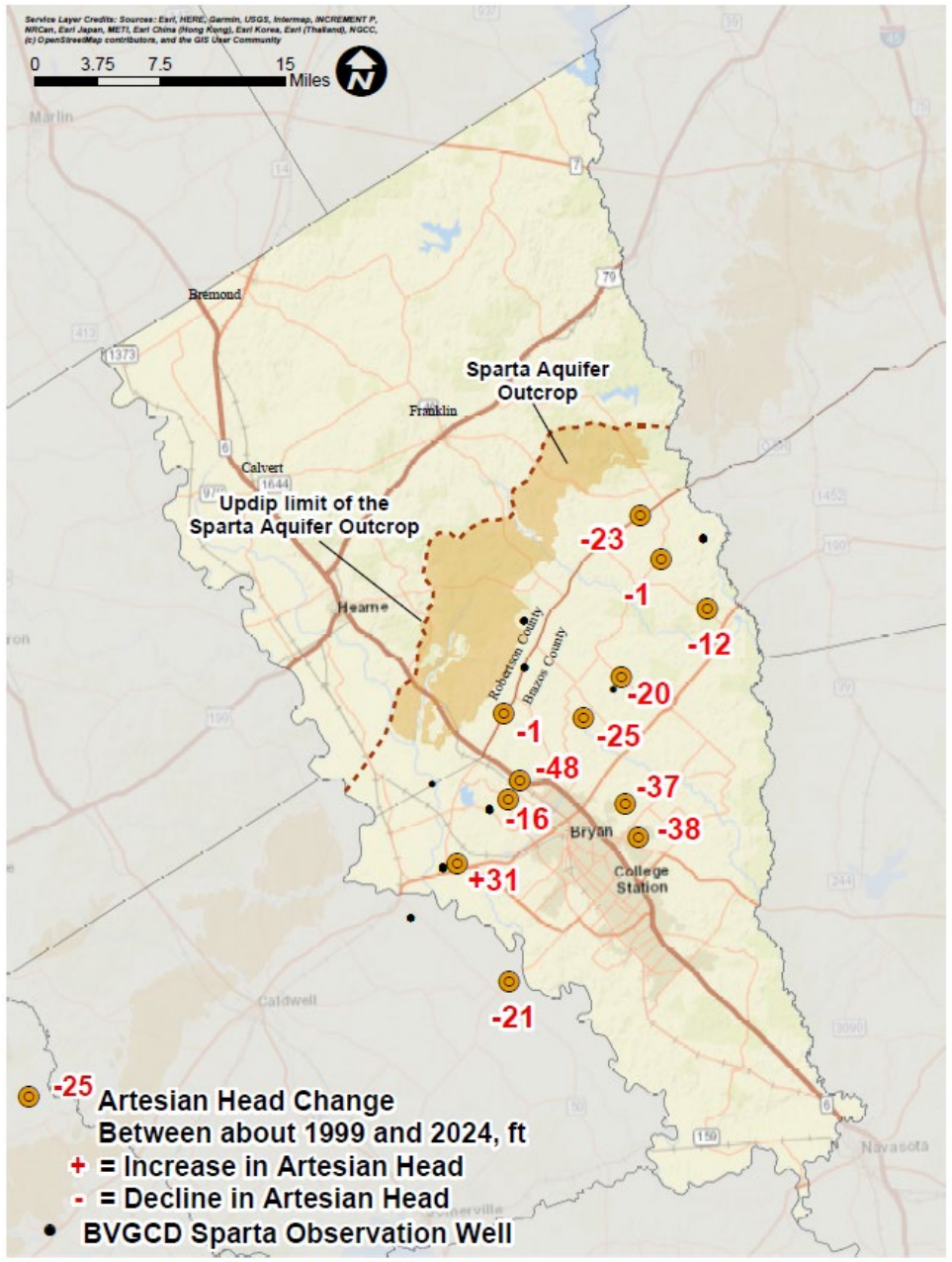
State Well Number	Owner
59-06-606	Private
59-06-903	Private
59-13-803	Private
59-14-505	Private
59-14-709	Private
59-15-102	Private
59-21-201	City of Bryan Well 6
59-21-511	Private
59-21-705	TAMU Well 2
59-22-509	Private
59-22-512	Private

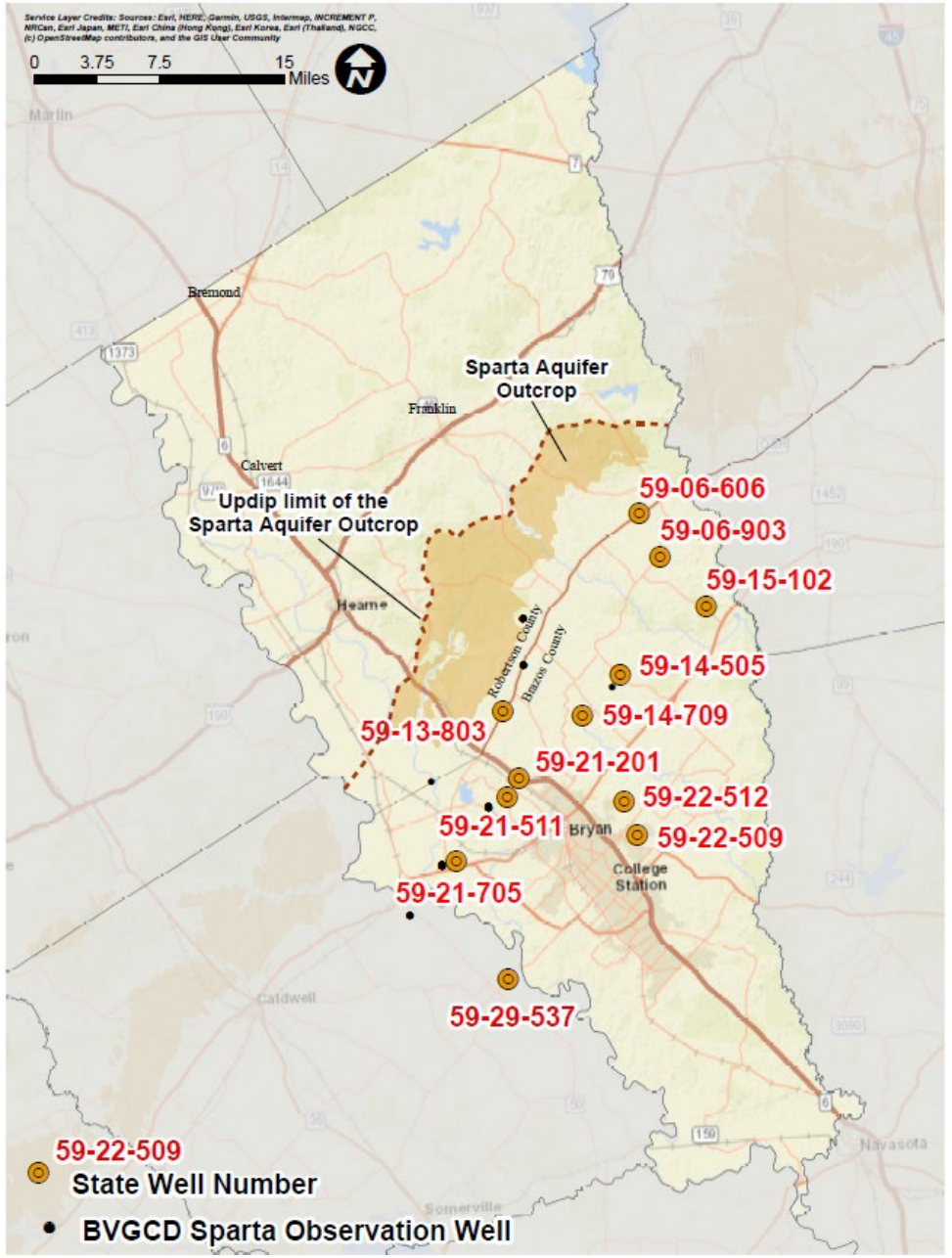
Sparta Aquifer

Arithmetic Average Artesian Head Change 2000-2024: 17 feet decline

Spatially Weighted Average Artesian Head Change 2000-2024: 13 feet decline

2070 DFC Average Artesian Head 53 feet decline





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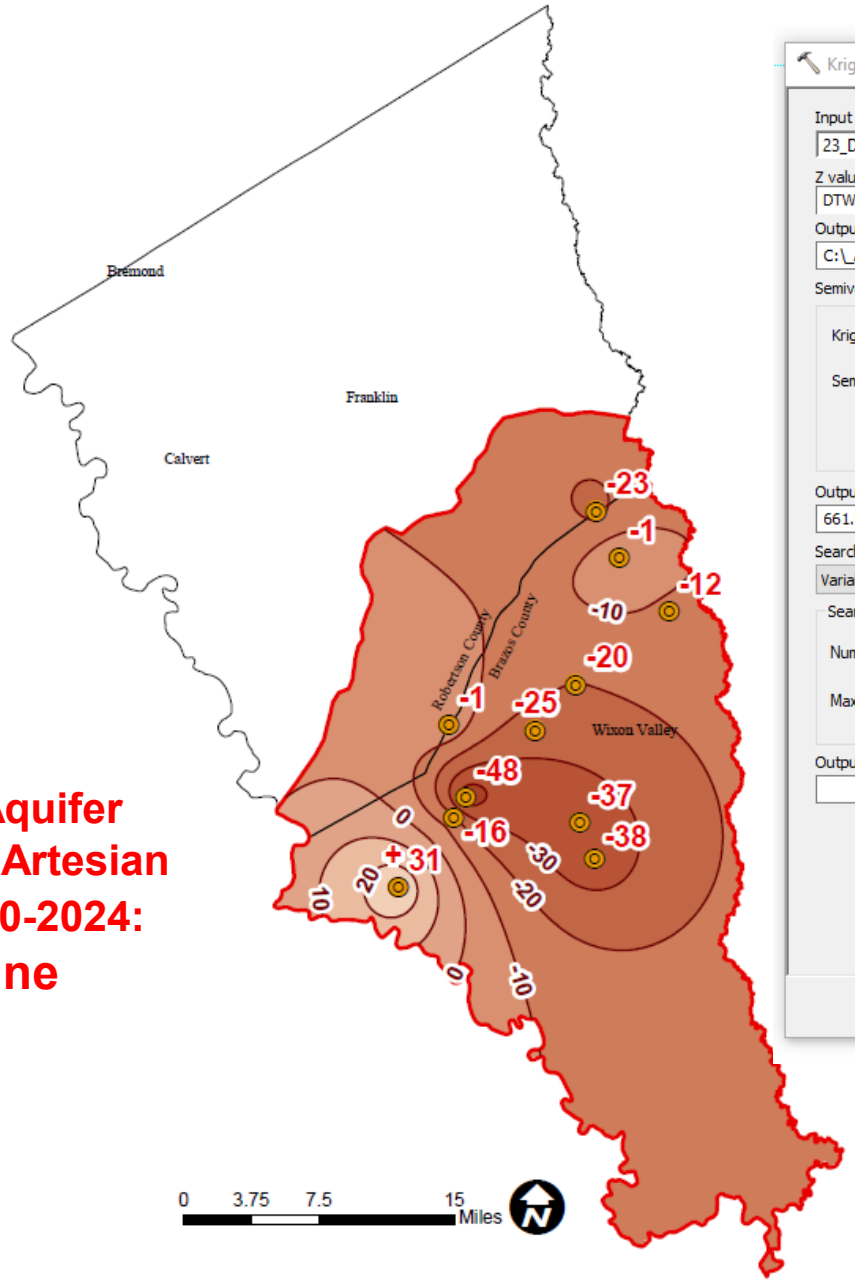
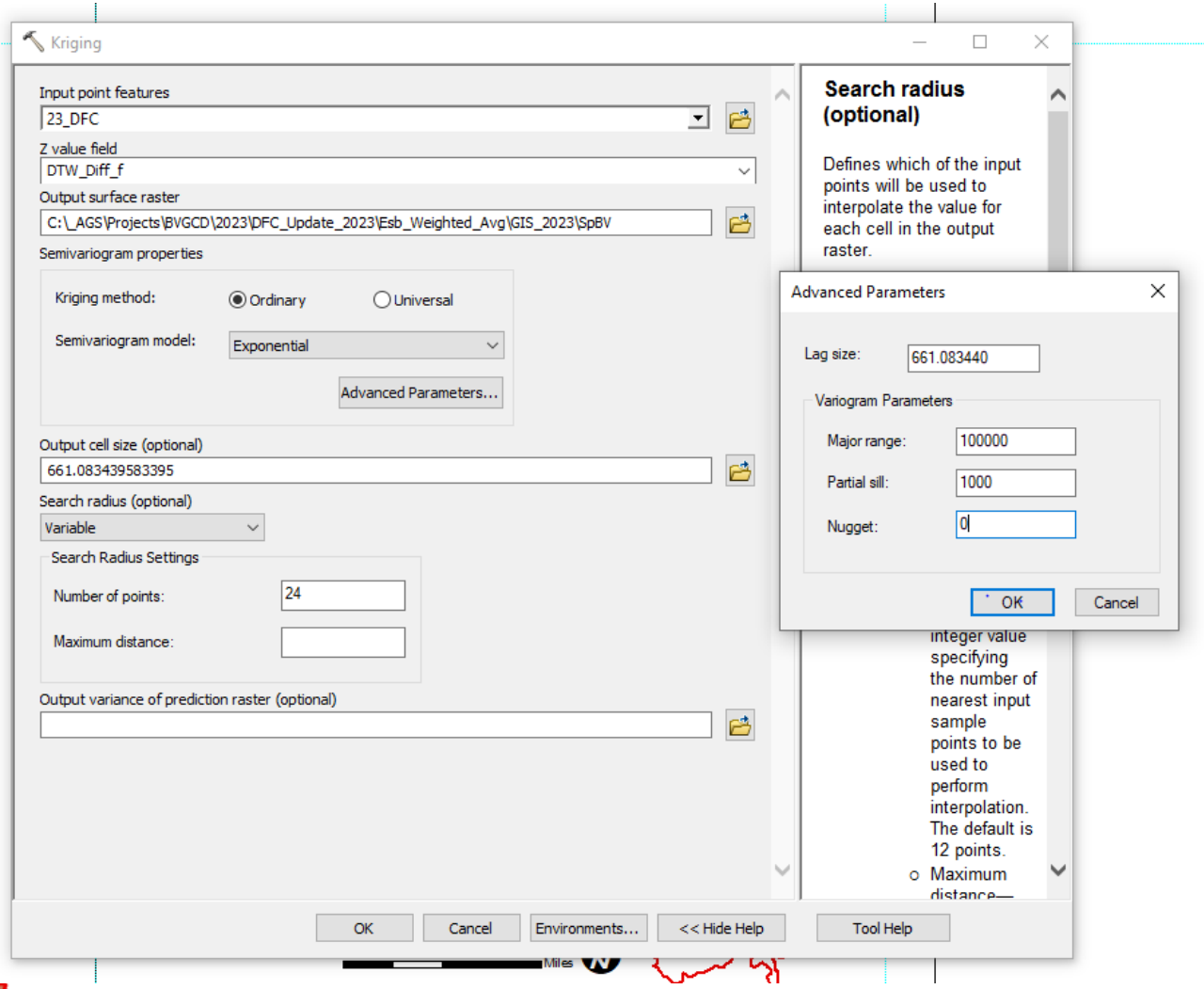
Spatially Weighted Sparta Aquifer Heac Change Estimate



BVGCD Sparta Aquifer Weighted Average Artesian Head Change 2000-2024: 13 feet decline



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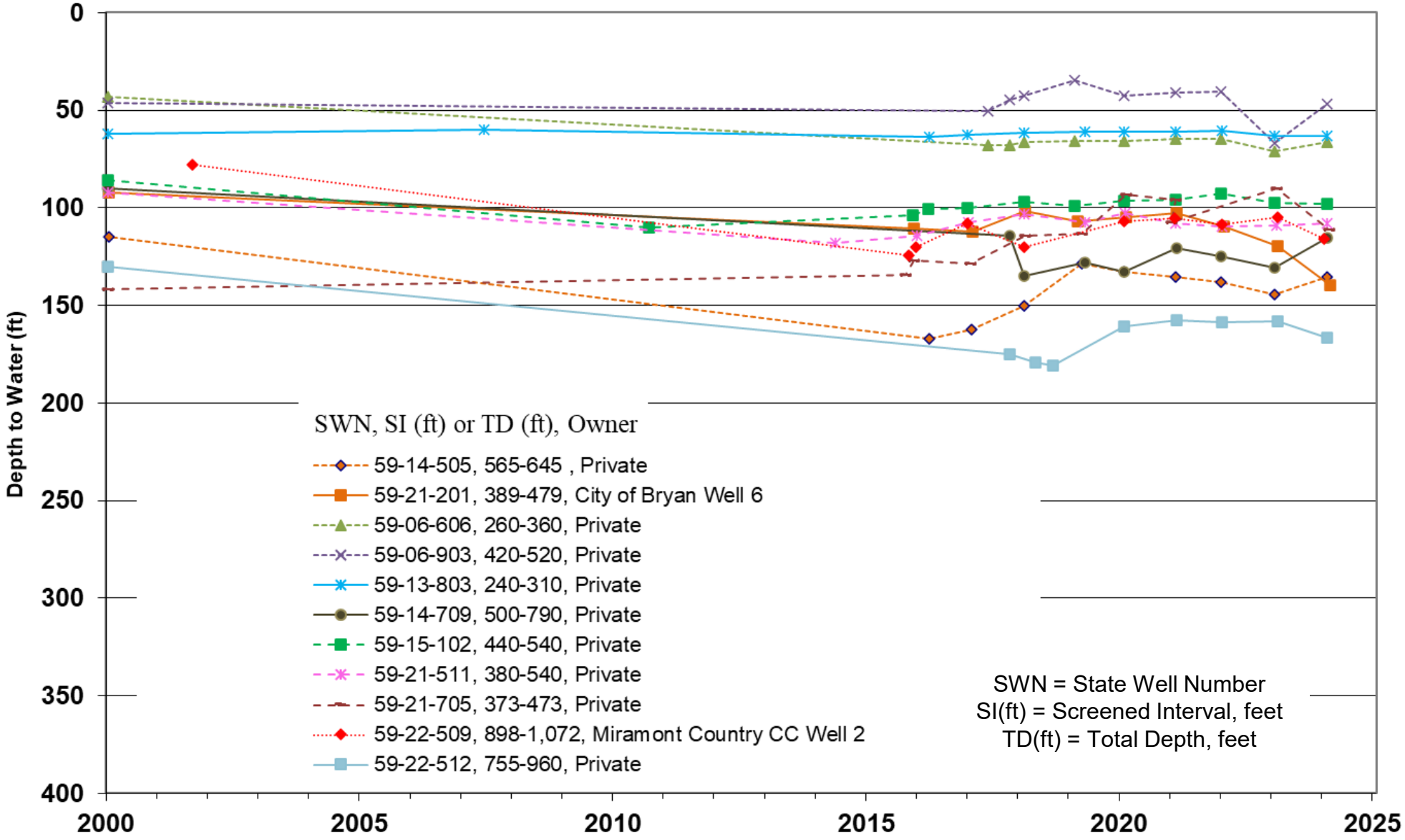
Sparta Aquifer Observation Wells

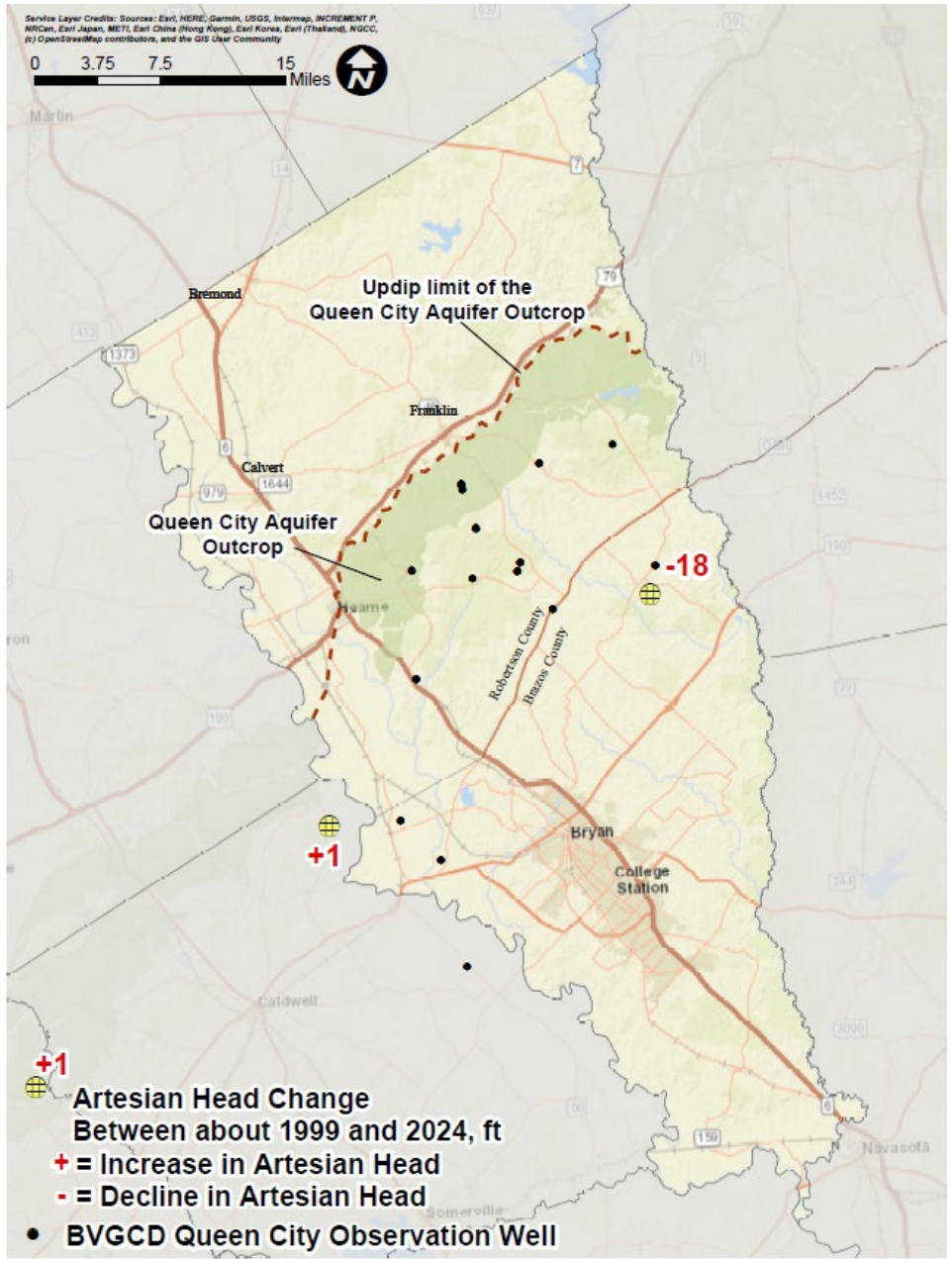


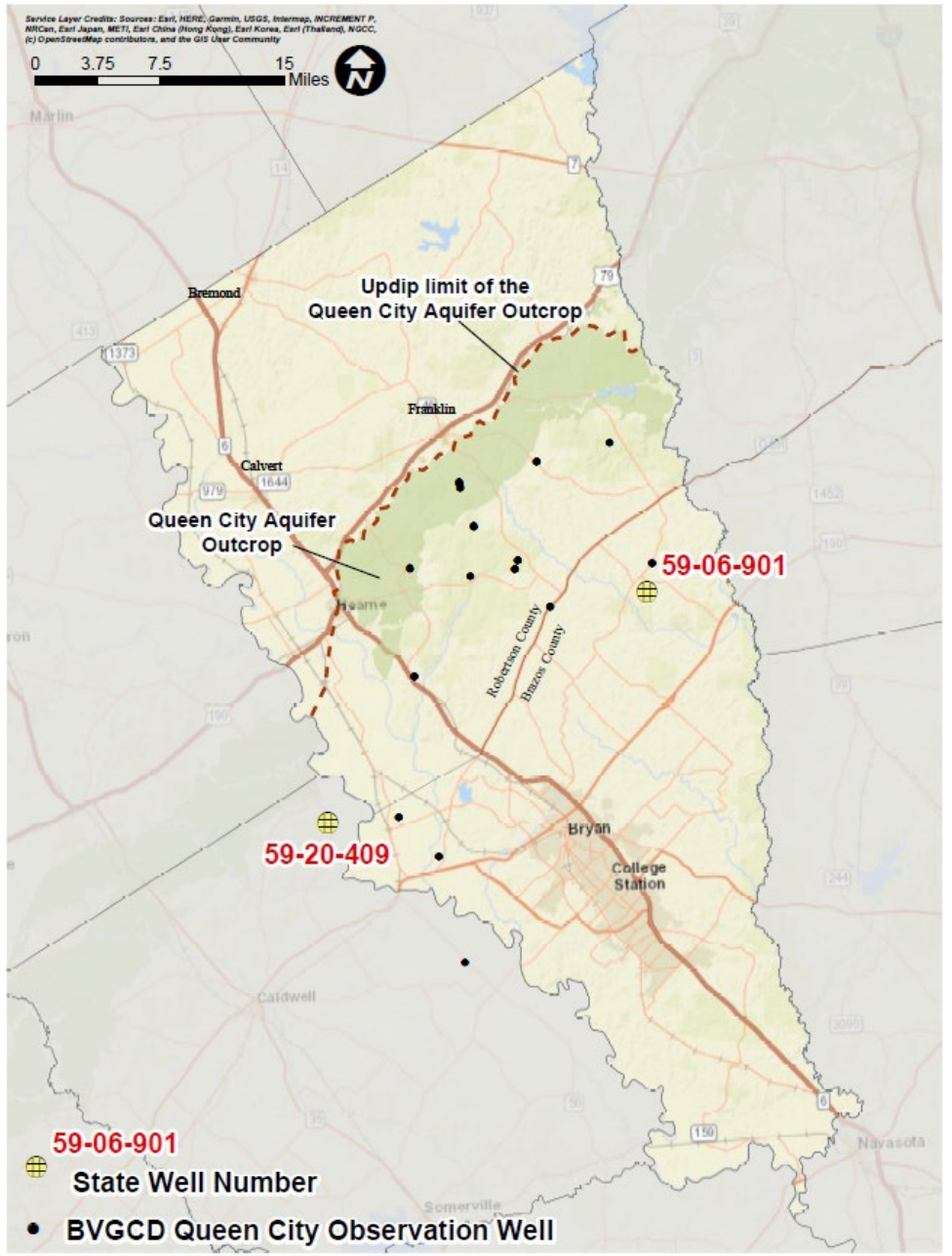
Queen City Aquifer DFC Well

State Well Number	Well Owner
59-06-901	Private

Queen City Aquifer

2070 DFC
Average Artesian Head
44 feet decline





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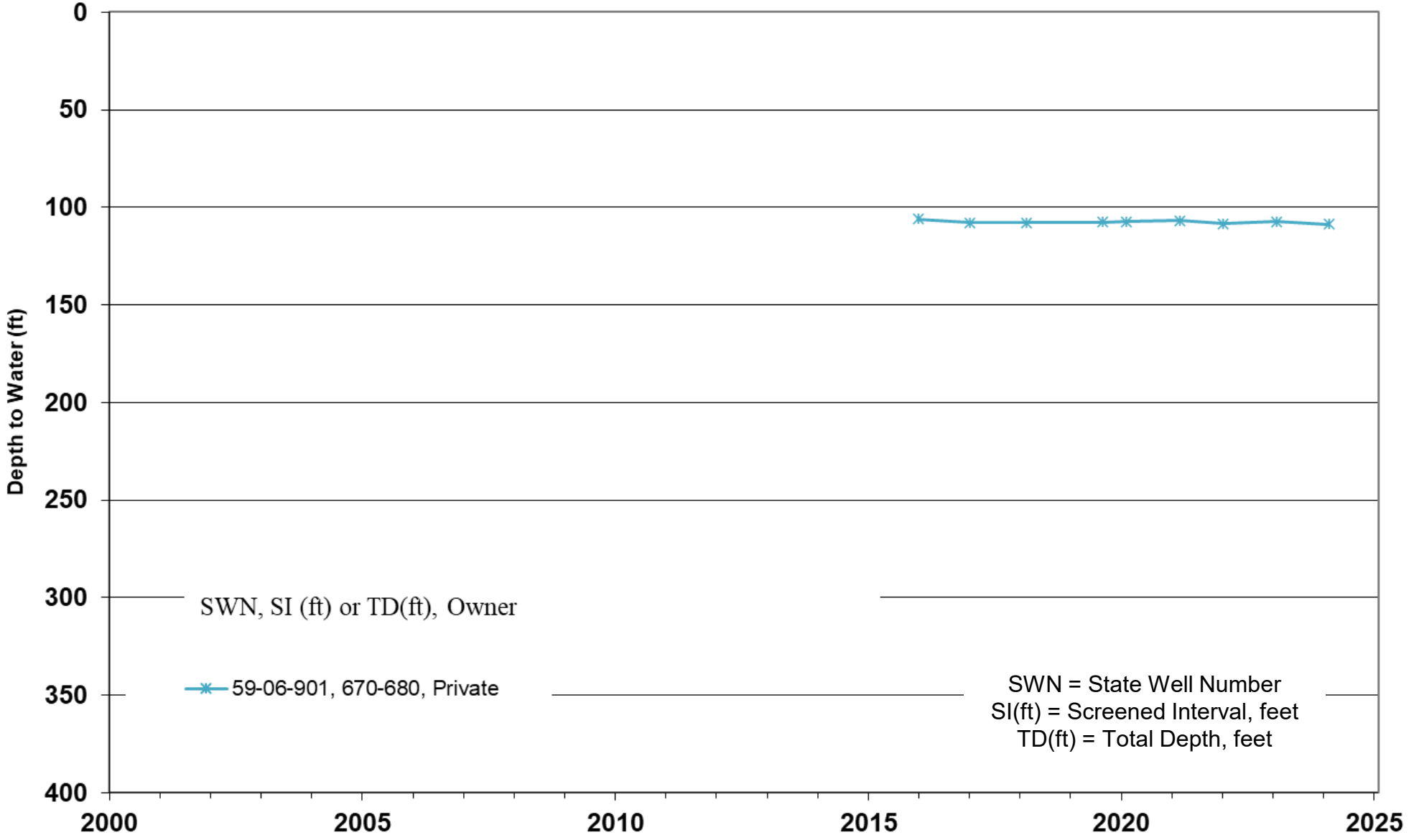
Queen City Aquifer Observation Wells



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Carrizo Aquifer DFC Wells

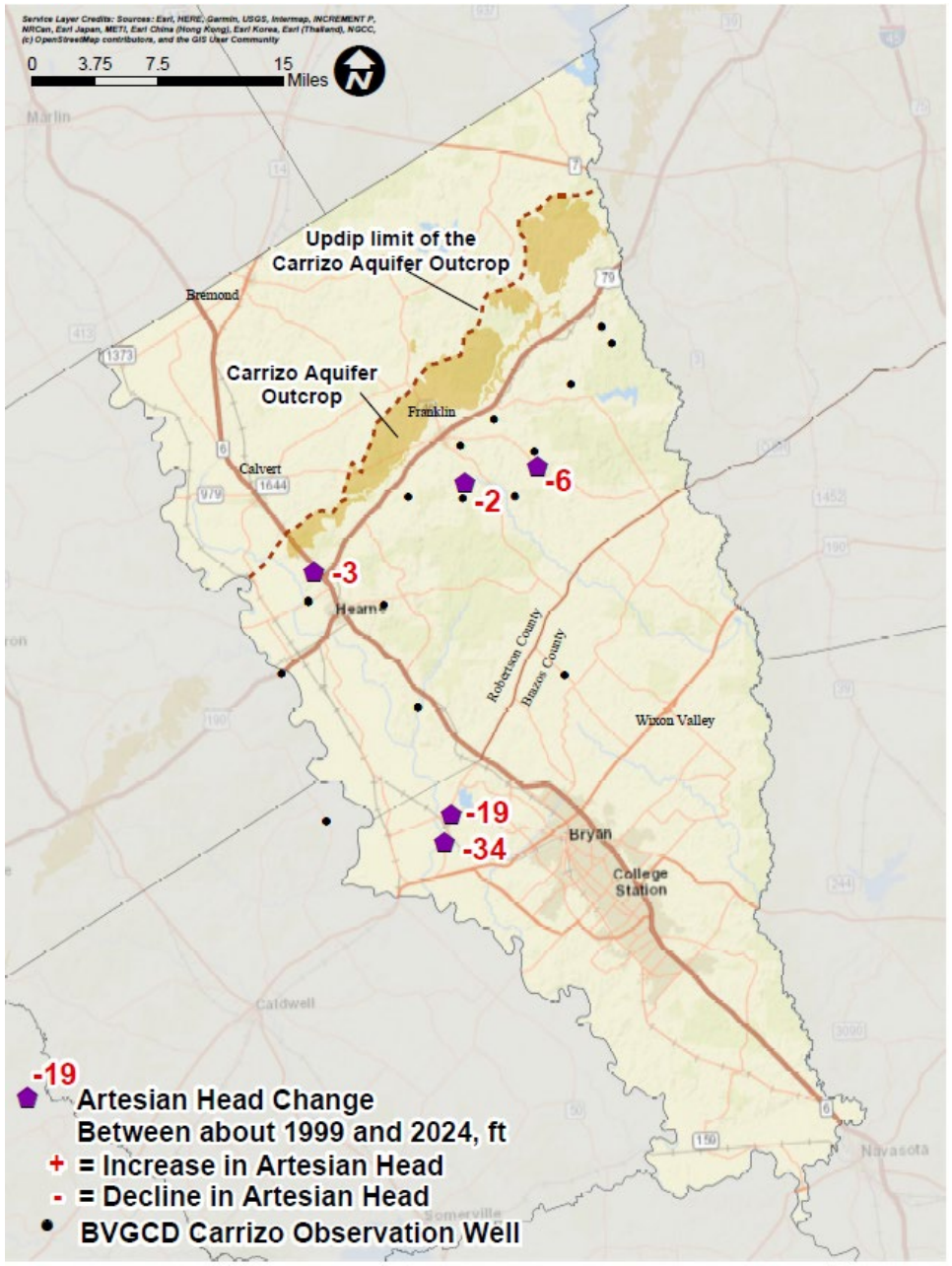
State Well Number	Well Owner
59-04-708	Private
59-05-105	Private
59-05-301	Private
59-21-402	TAMU Well 5
59-21-416	City of College Station Carrizo #1

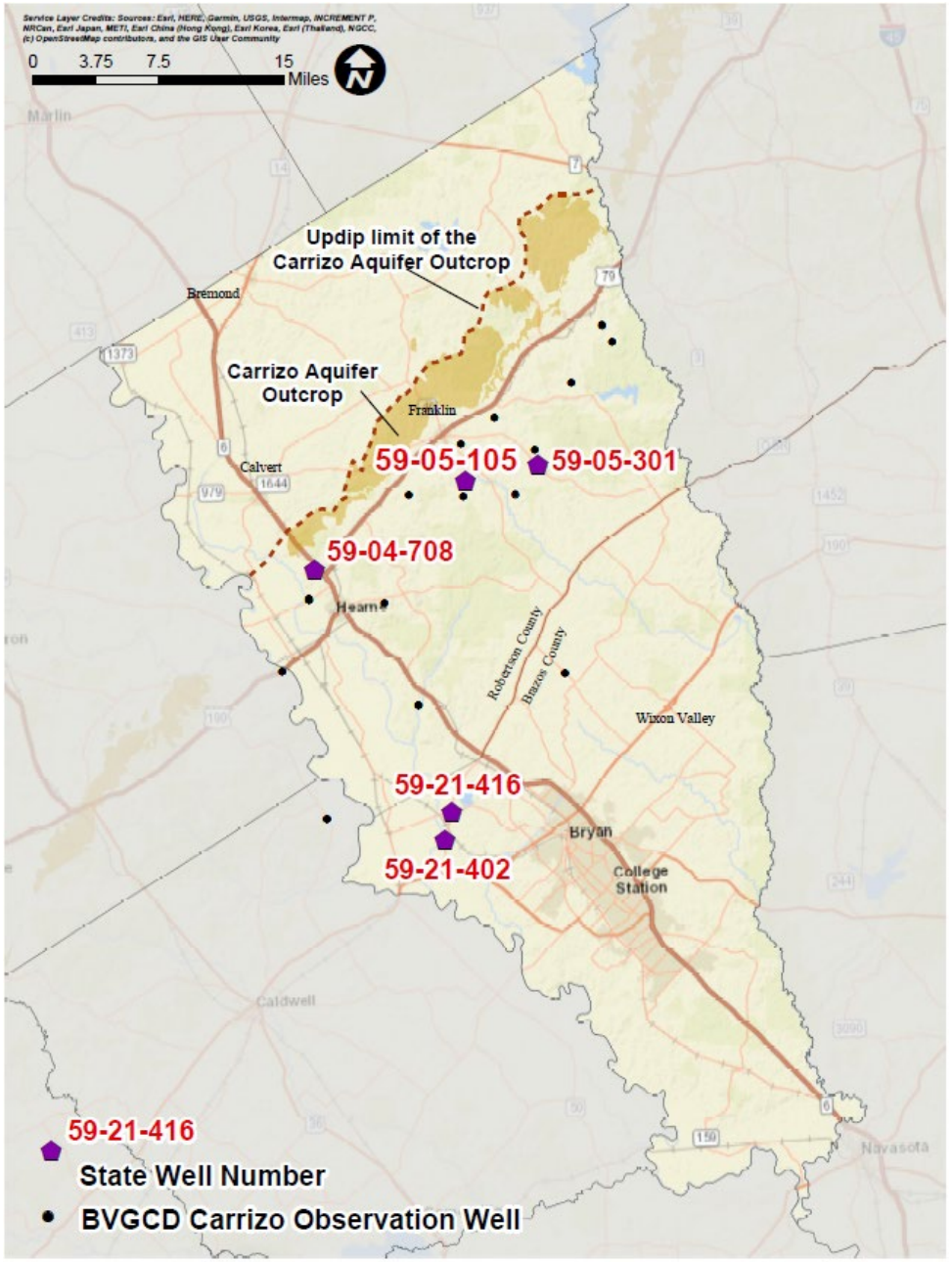
Carrizo Aquifer

Arithmetic Average Artesian Head Change 2000-2024: 13 feet decline

Spatially Weighted Average Artesian Head Change 2000-2024: 12 feet decline

2070 DFC Average Artesian Head 84 feet decline





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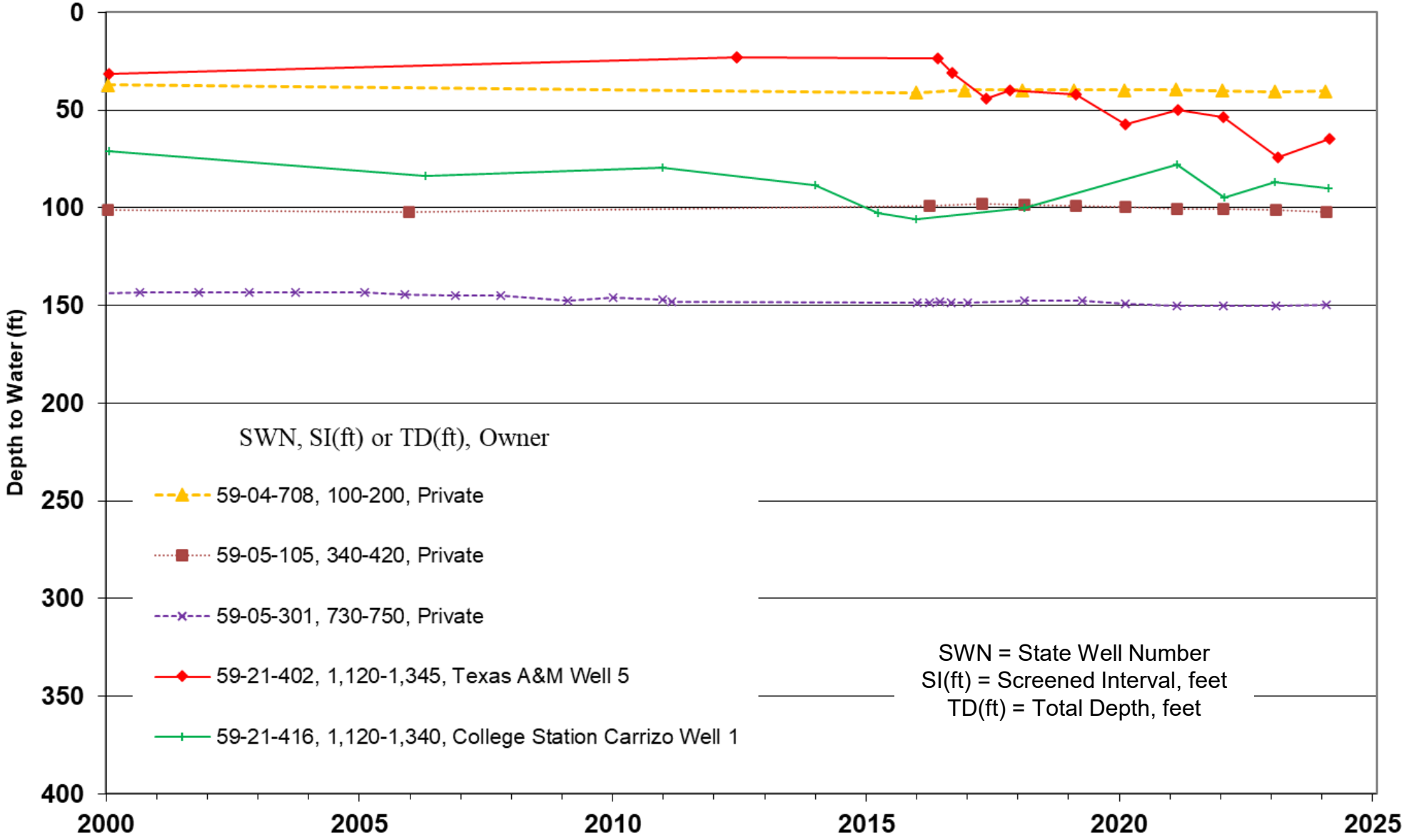
Carrizo Aquifer Observation Wells

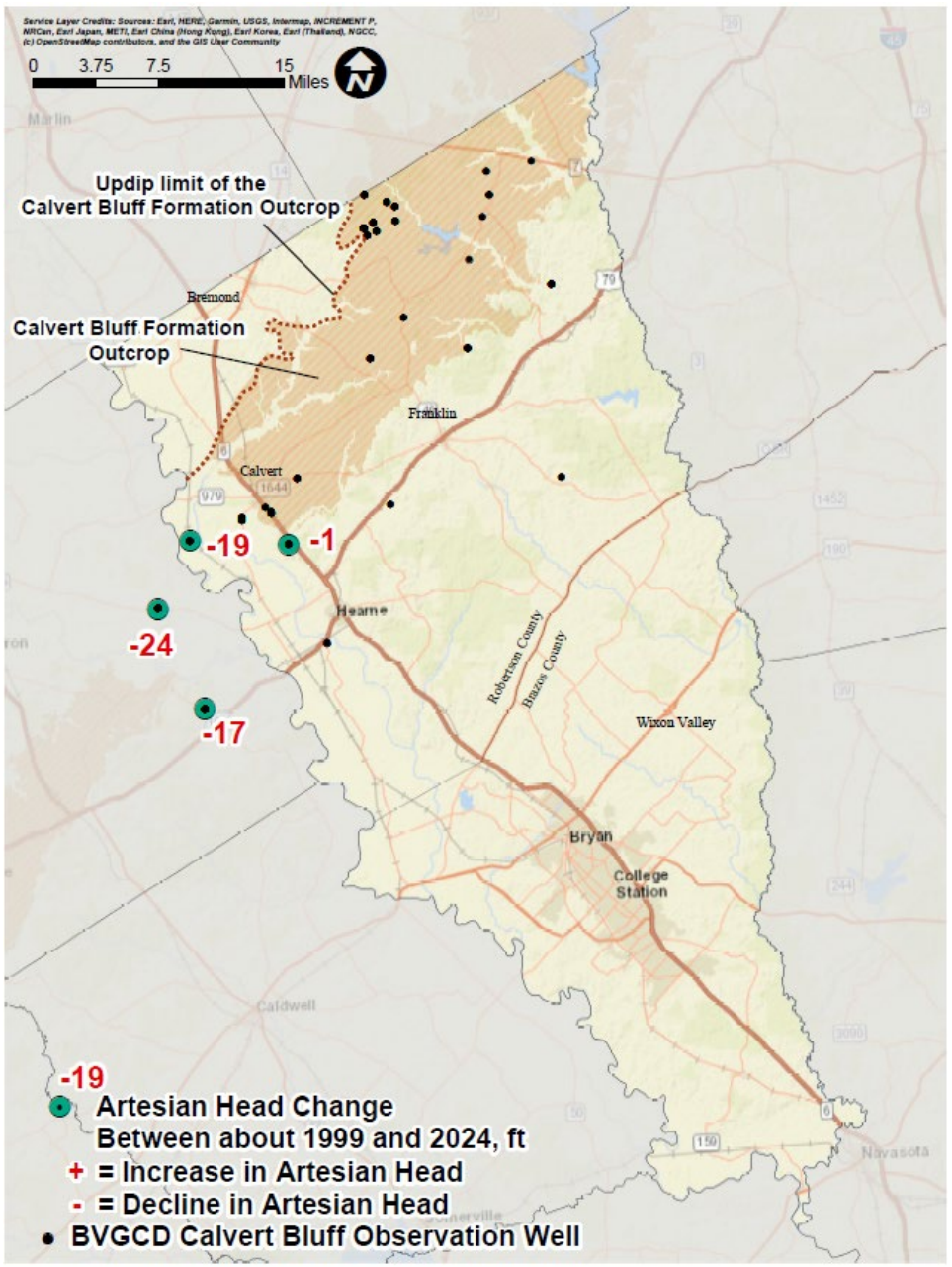


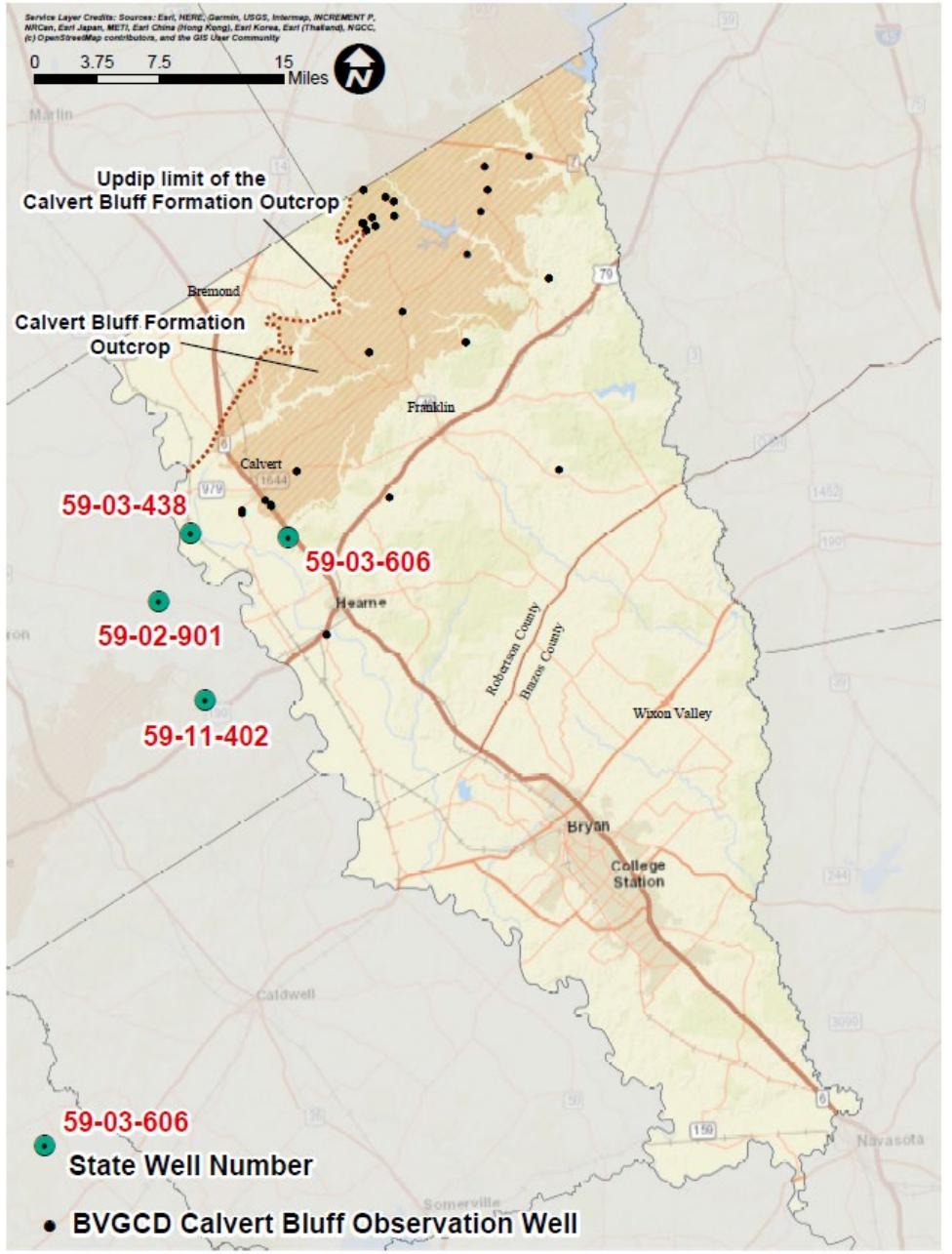
Calvert Bluff Formation DFC Wells

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

Calvert Bluff Formation

2070 DFC
Average Artesian Head
111 feet decline





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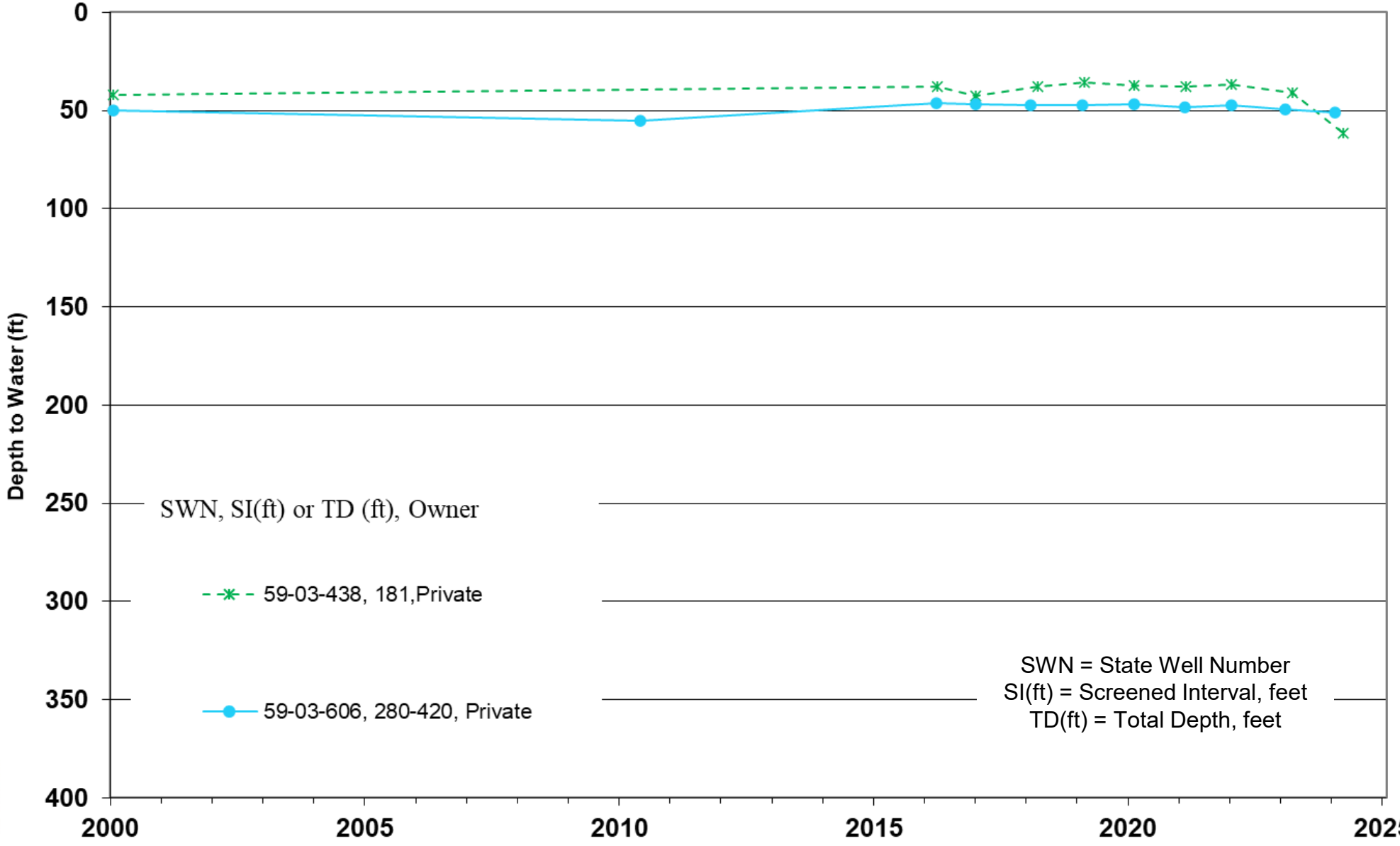
Calvert Bluff Formation Observation Wells



Simsboro Aquifer DFC Wells

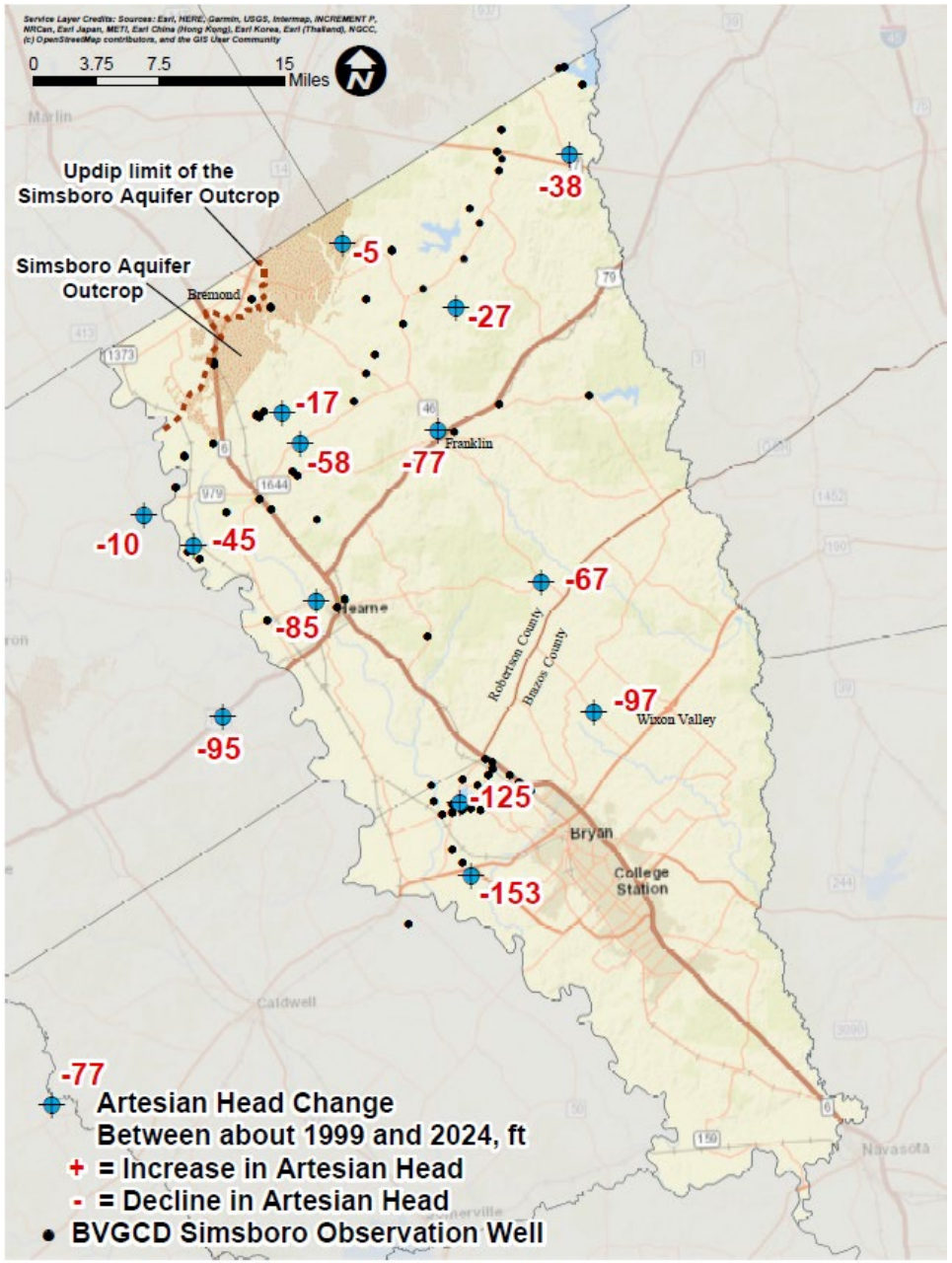
State Well Number	Well Owner
39-46-702	Private
39-52-504	Private
39-53-703	Private
39-59-601	Private
39-59-905	Private
39-61-706	City of Franklin Well 4
59-03-437	Private
59-04-701	City of Hearne Well 4
59-05-901	Wickson Creek SUD Wheelock Well
59-14-706	Wickson Creek SUD Well 1
59-21-412	City of Bryan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

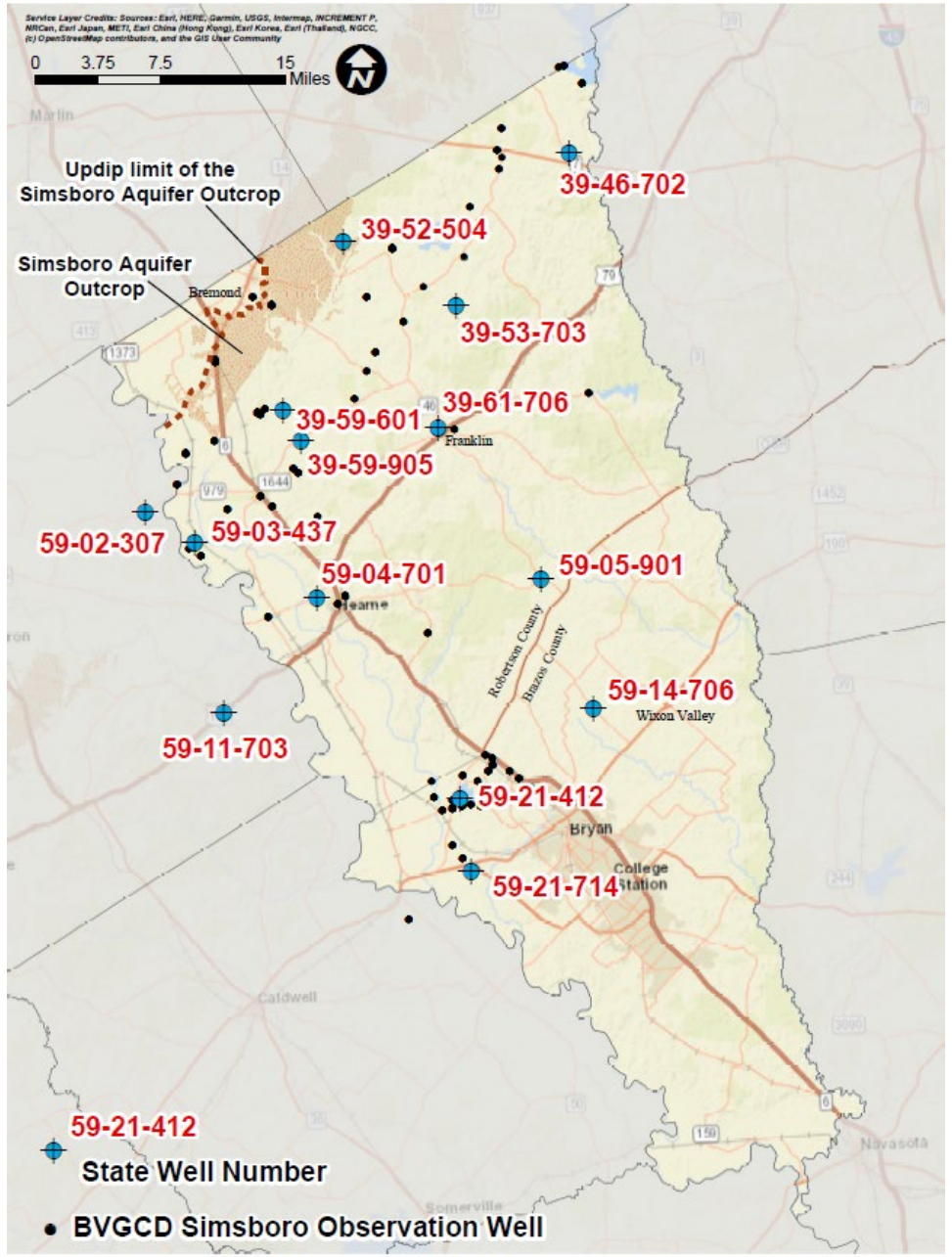
Simsboro Aquifer

Arithmetic Average Artesian Head Change 2000-2024: 66 feet decline

Spatially Weighted Average Artesian Head Change 2000-2024: 68 or 70 feet decline

2070 DFC Average Artesian Head 262 feet decline





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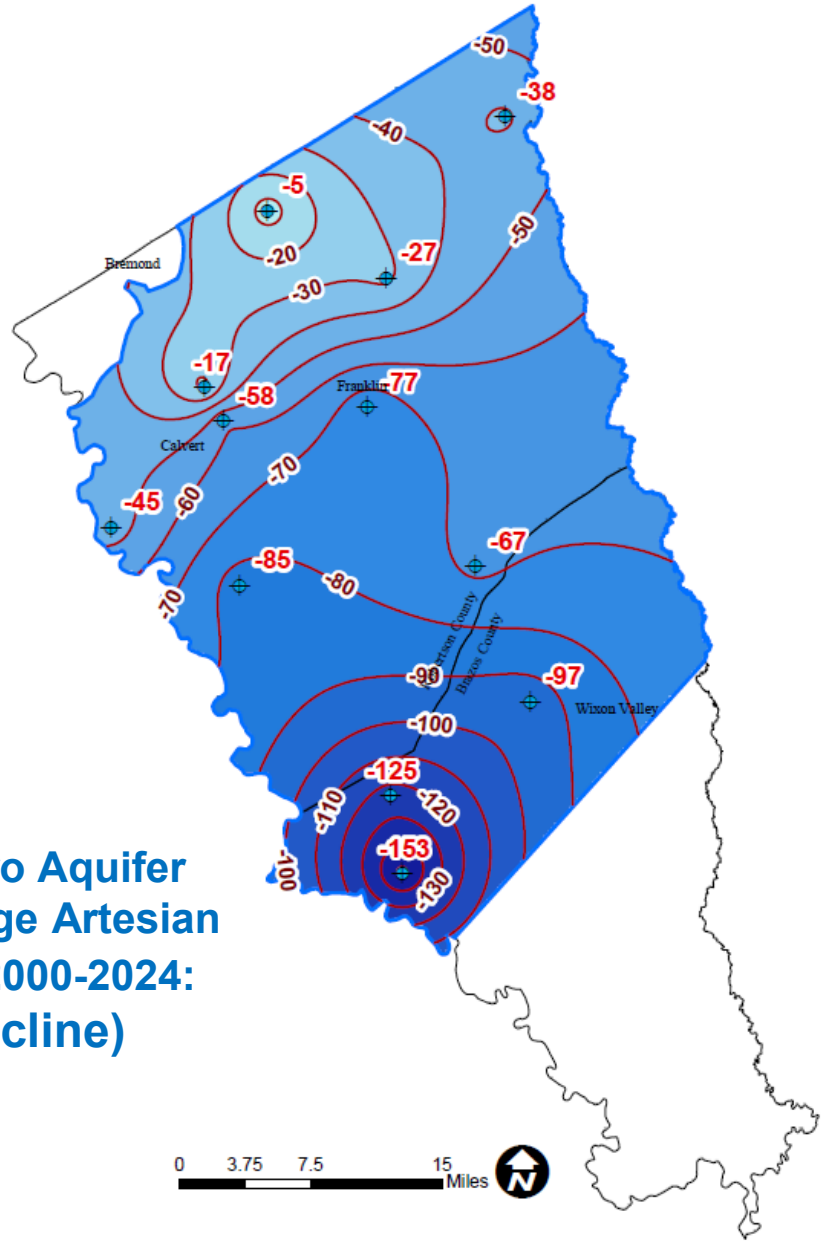
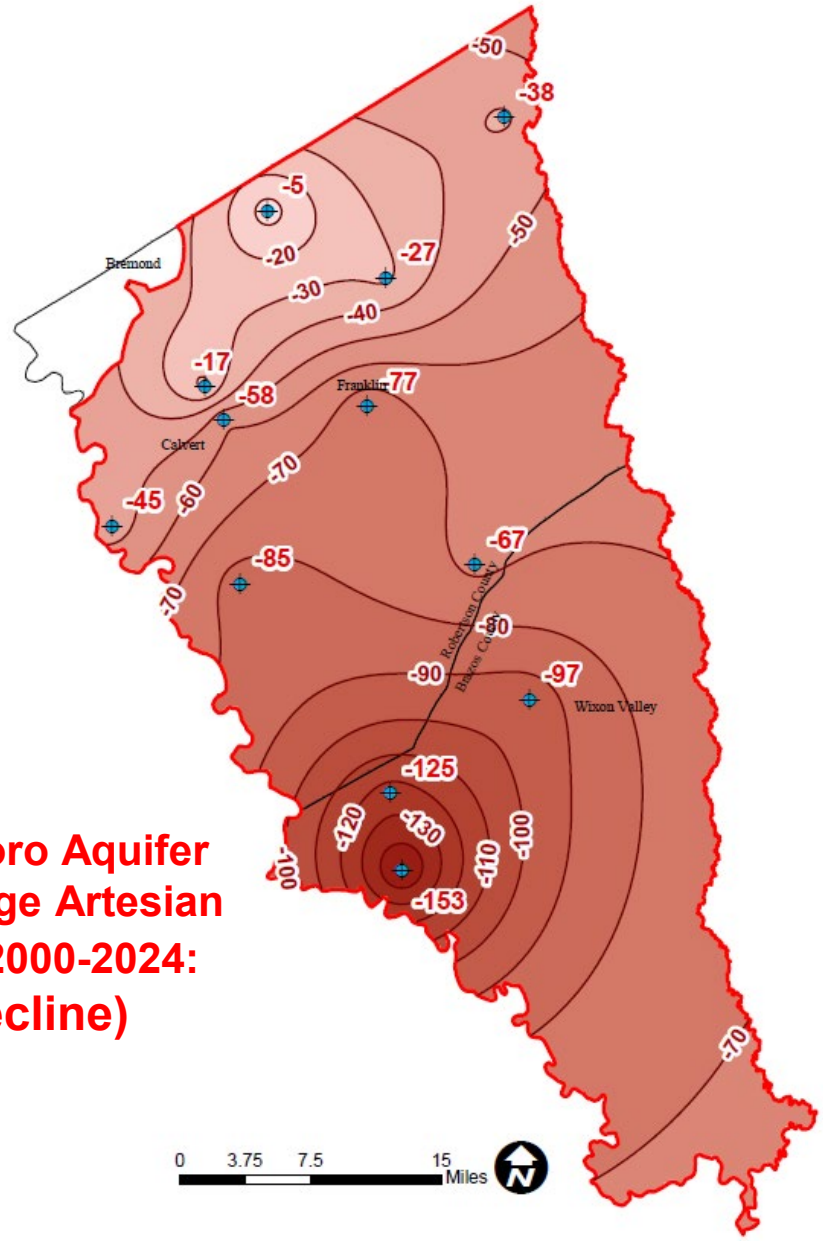
Spatially Weighted Simsboro Aquifer Head Change Estimates



Fresh Simsboro Aquifer Weighted Average Artesian Head Change 2000-2024: 68 feet (decline)



BVGCD Simsboro Aquifer Weighted Average Artesian Head Change 2000-2024: 70 feet (decline)

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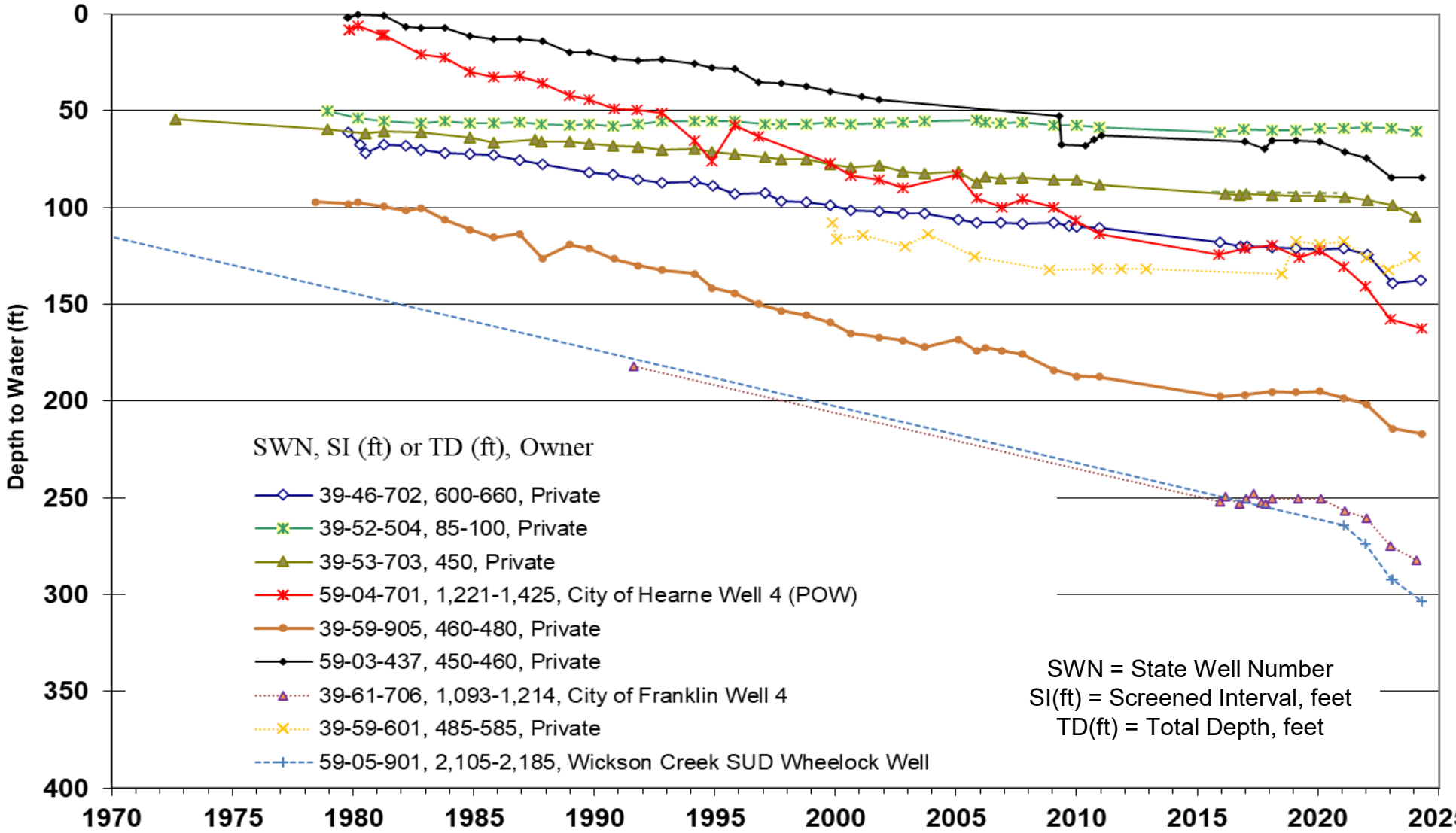
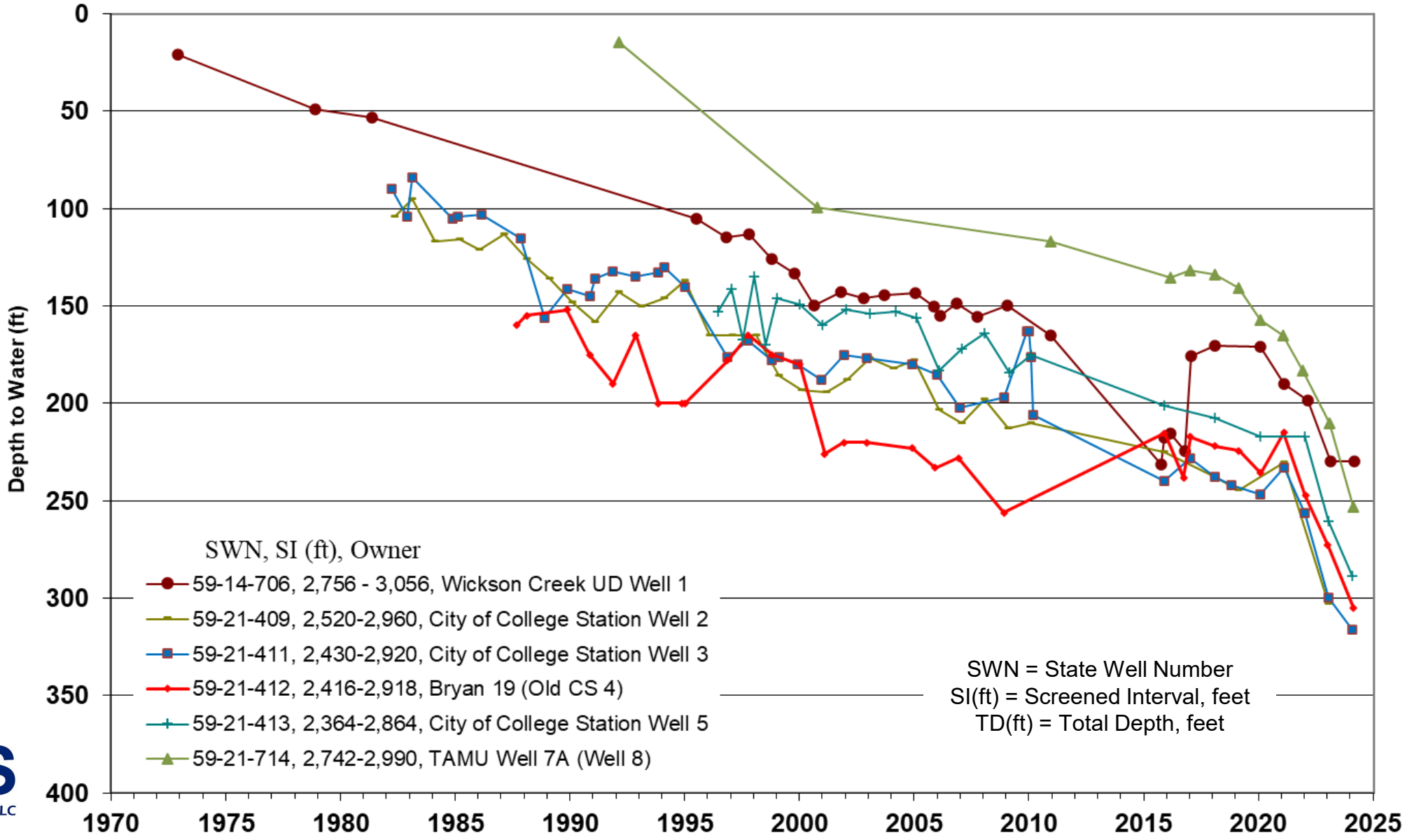
Simsboro Aquifer Observation Wells (Robertson County)



Simsboro Aquifer Observation Wells (Brazos County)



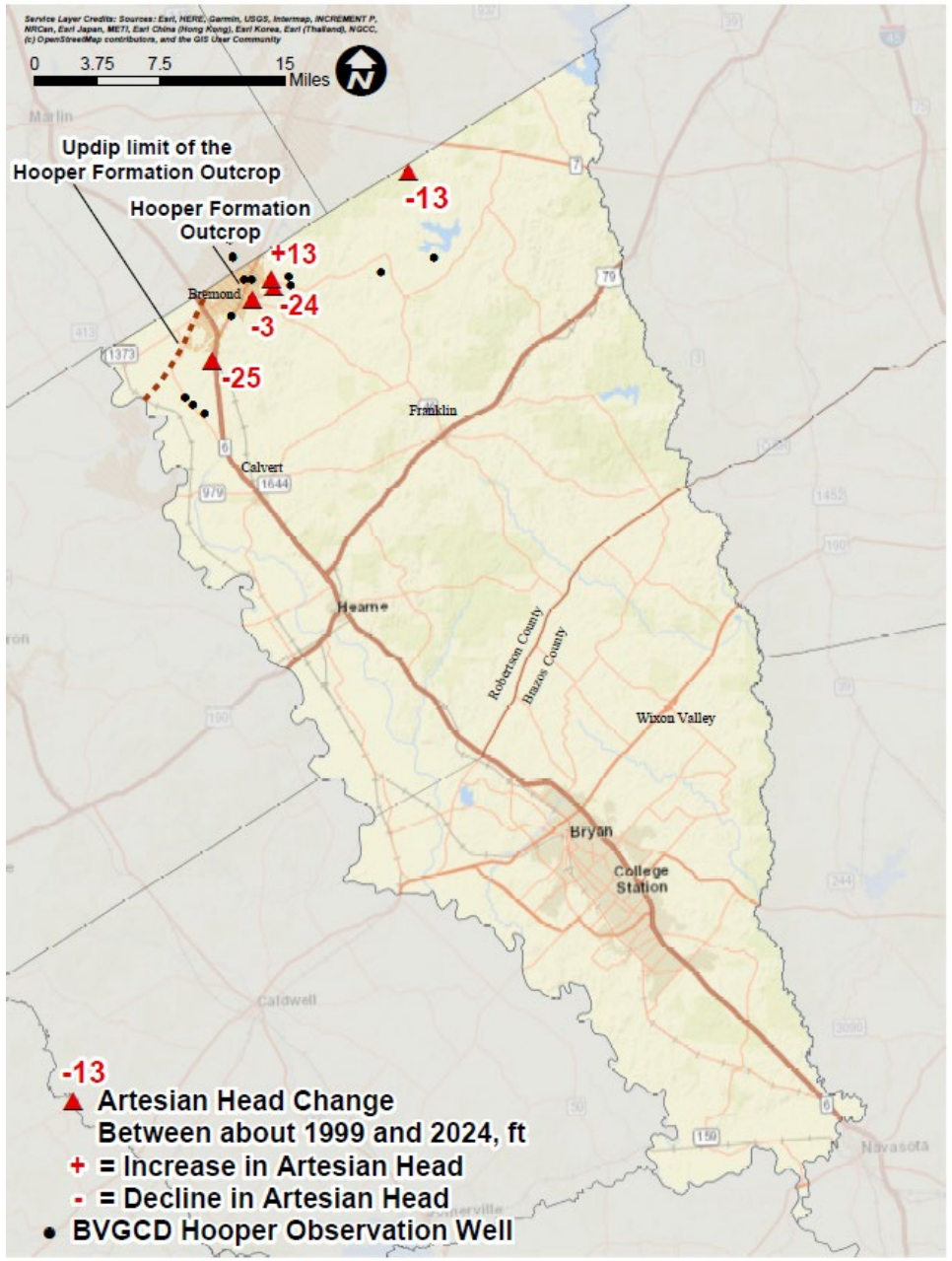
Hooper Formation DFC Wells

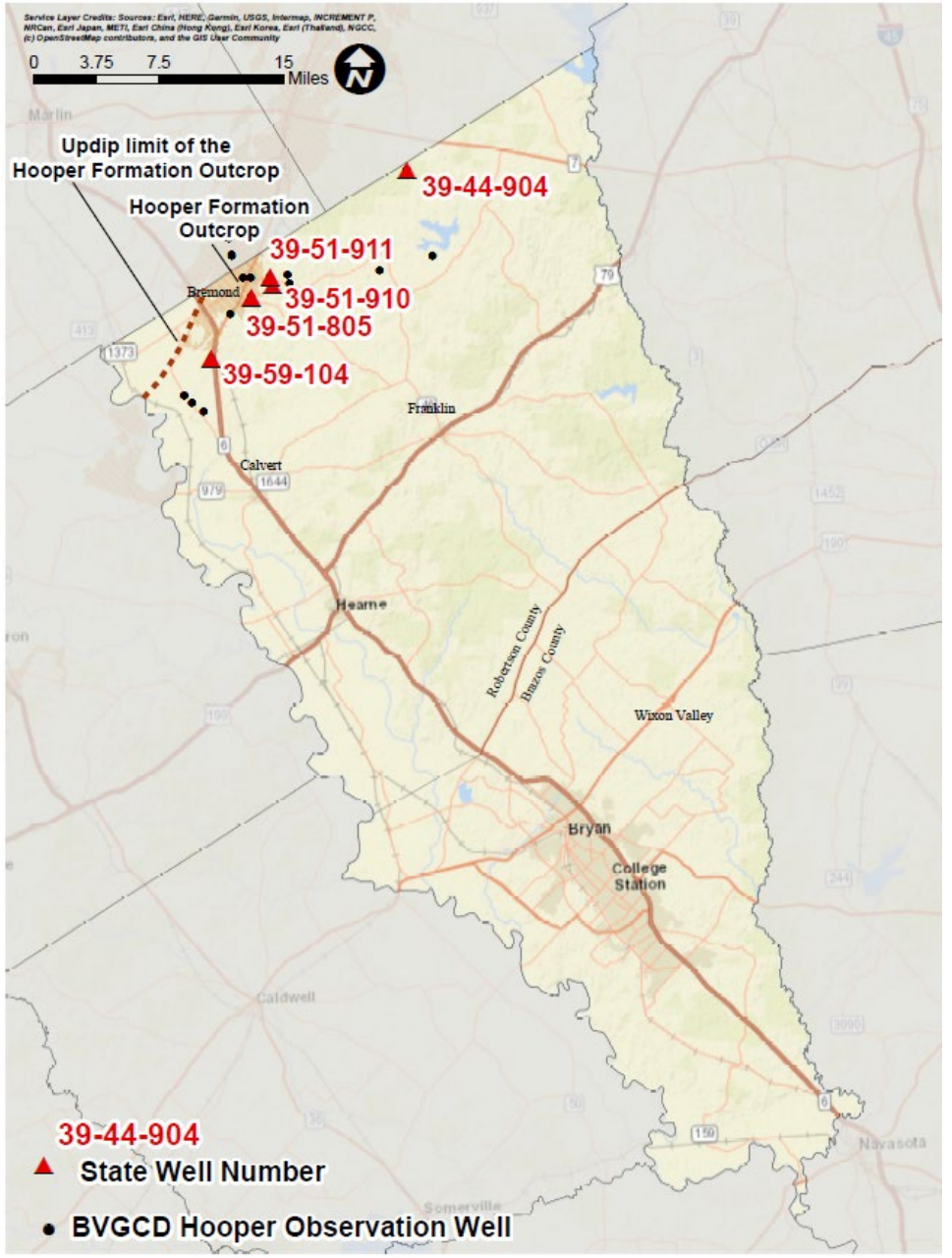
State Well Number	Well Owner
39-44-904	Private
39-51-805	Private
39-51-910	City of Bremond Well 4
39-51-911	City of Bremond Well 5
39-59-104	Private

Hooper Formation

Arithmetic Average Artesian Head Change 2000-2024: 11 feet decline

2070 DFC Average Artesian Head 167 feet Decline





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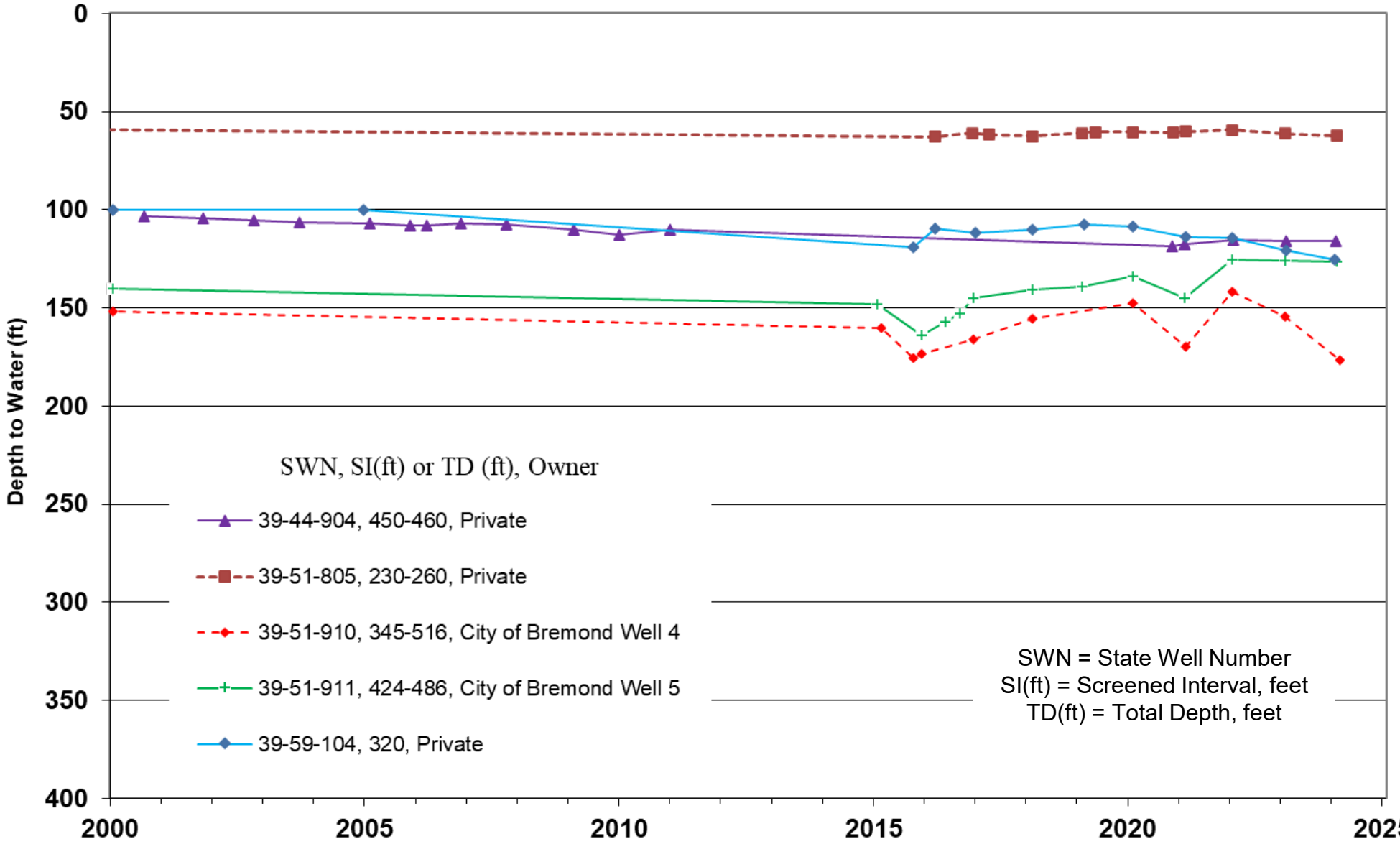
Hooper Formation Observation Wells



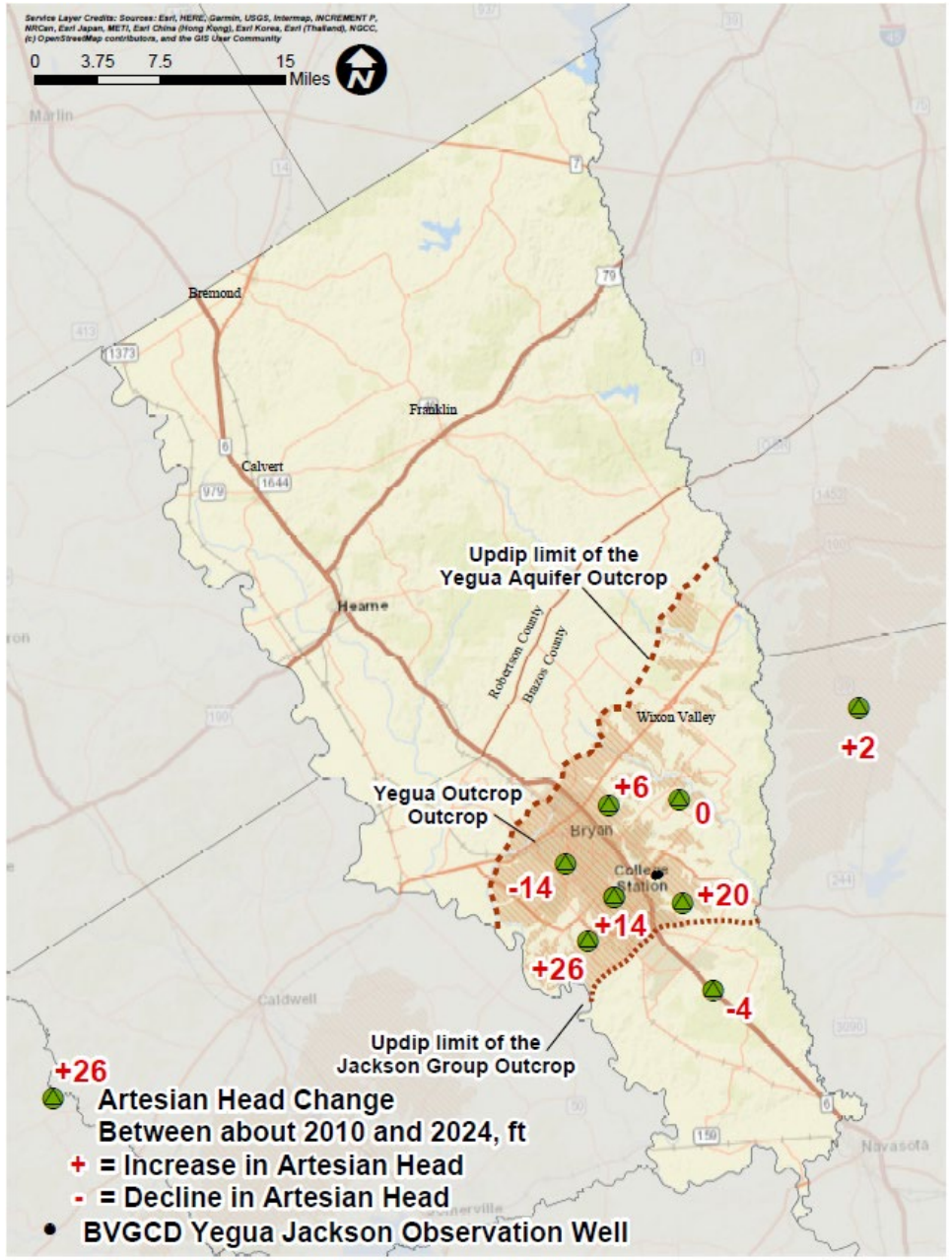
Yegua-Jackson Aquifer DFC Wells

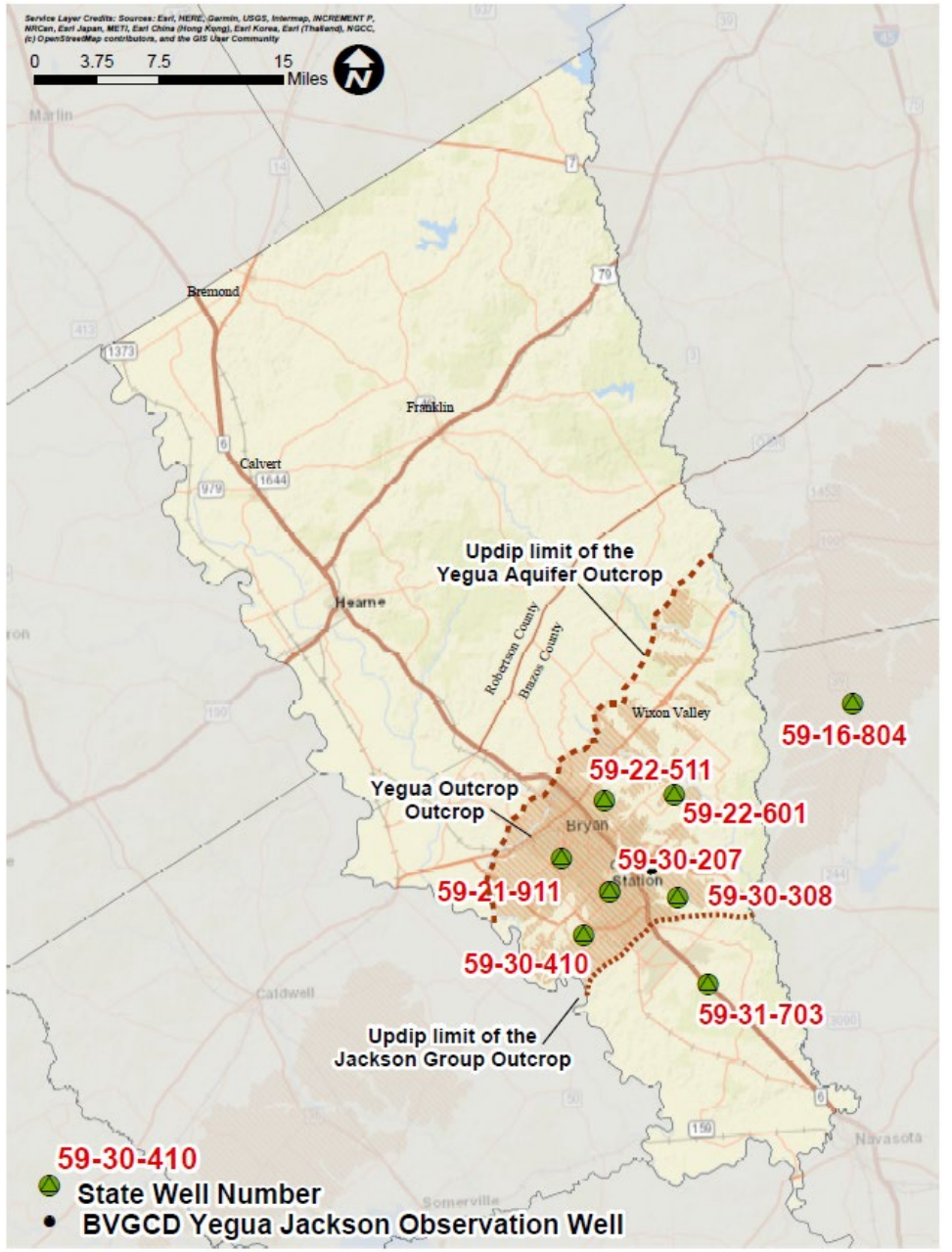
State Well Number	Well Owner
59-21-911	Private
59-22-511	Private
59-22-601	Private
59-30-207	TAMU Golf Course
59-30-308	Wellborn SUD Well 1
59-30-410	TAMU Brayton Training Field
59-31-703	Private

Yegua-Jackson Aquifer

Arithmetic Average Artesian Head Change 2010-2024: 7 feet increase

2070 DFC Average Artesian Head 67 feet Decline





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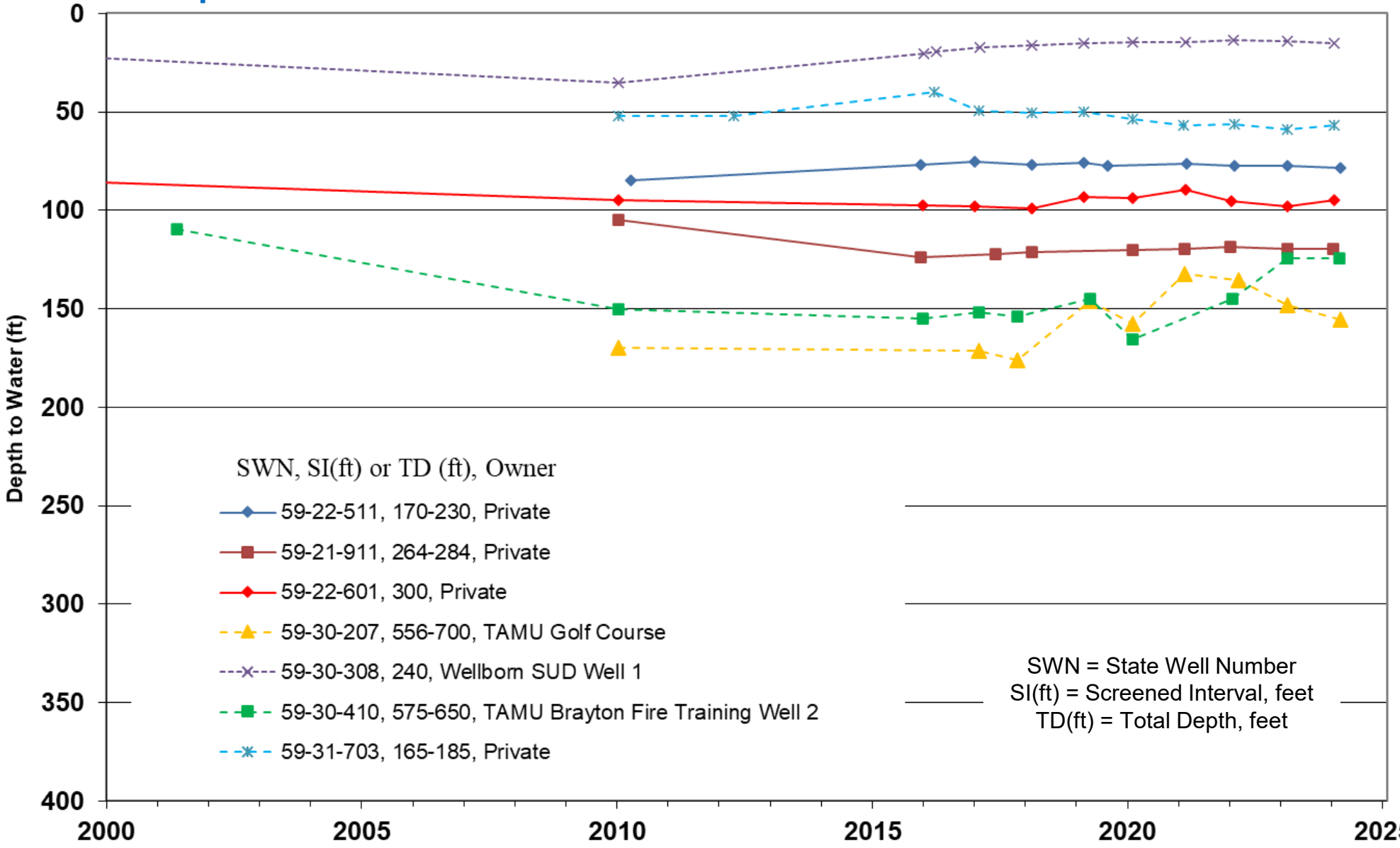
Yegua-Jackson Aquifer Observation Wells



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

Span of Years	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper	Yegua-Jackson (2010)
2000-2018	-7	-	-14	-	-31	-6	-6
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
DFC 2000-2070 (water level decline)	-53	-44	-84	-111	-262	-167	-67

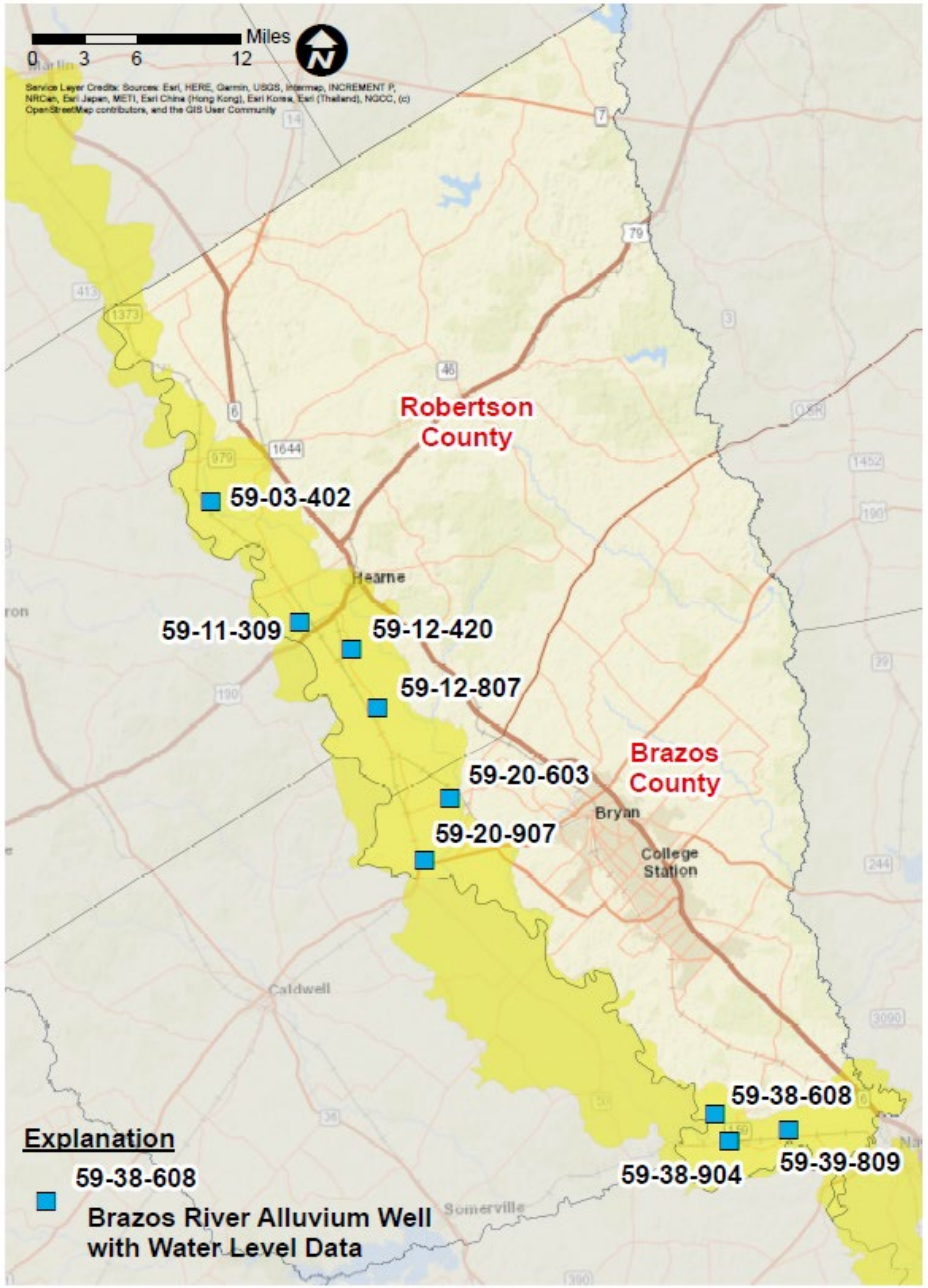
Comparison of Simsboro DFCs and Rate of Decline Over Last Seven Yea

Span of Years	Simsboro Average Artesian Head Change, feet	Simsboro Rate of Decline During Current Year, feet
2000-2018	-31	-
2000-2019	-32	1
2000-2020	-33	1
2000-2021	-34	1
2000-2022	-43	9
2000-2023	-58	15
2000-2024	-66	8
DFC (2000-2070)	-262	

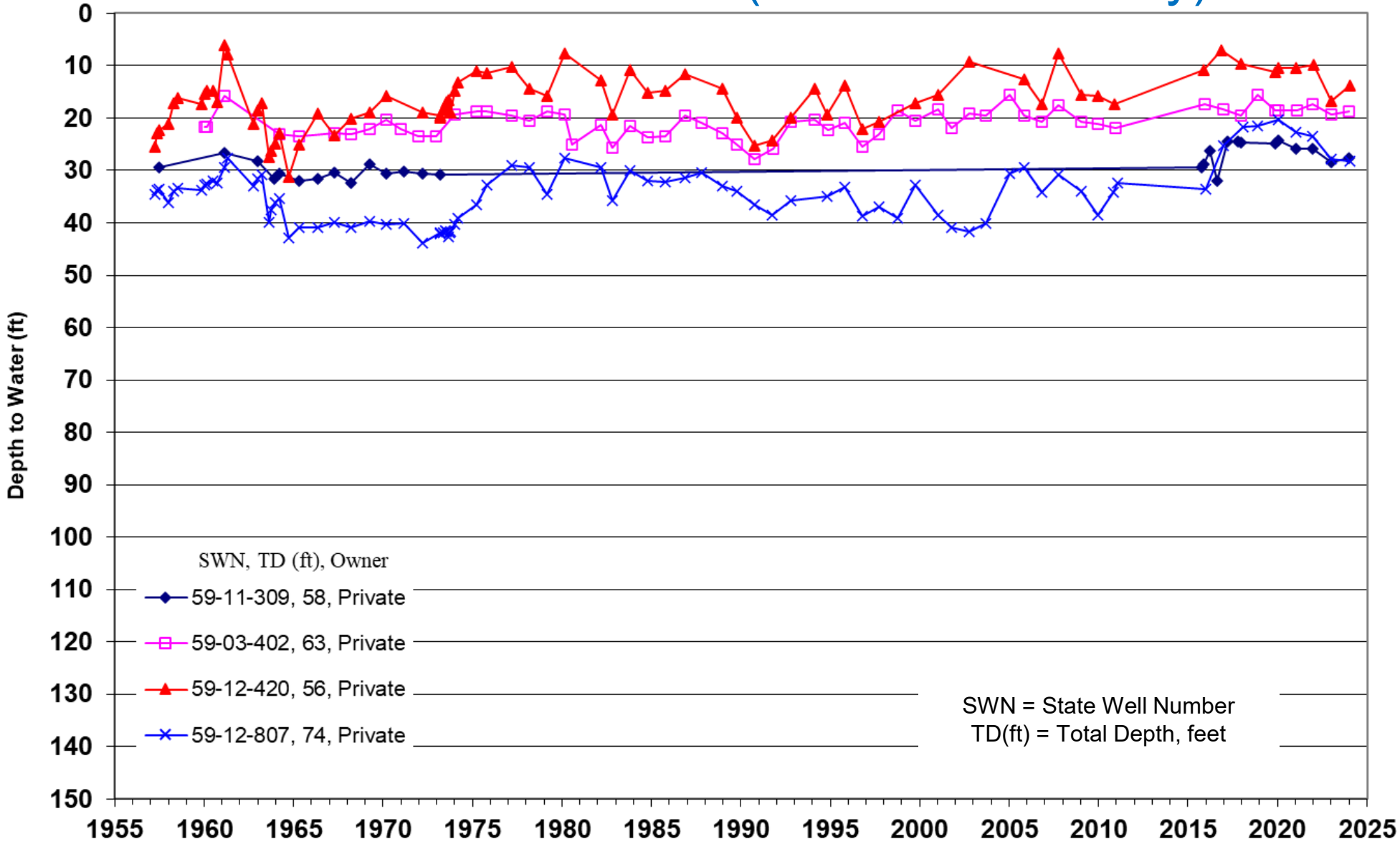
Brazos River Alluvium Aquifer DFC Wells

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

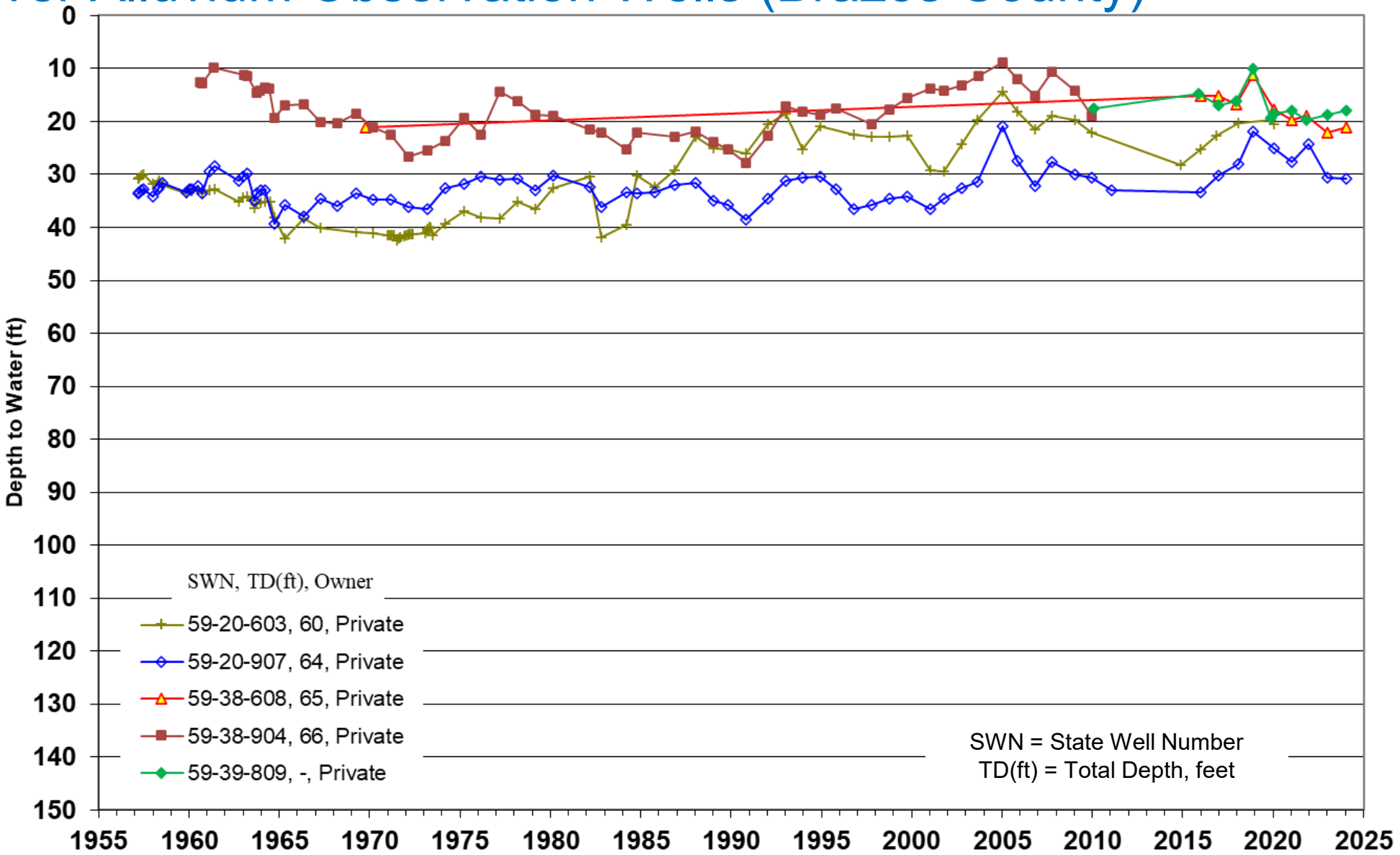
Location of Brazos River Alluvium Well with Water Level Hydrographs



Brazos River Alluvium Observation Wells (Robertson County)



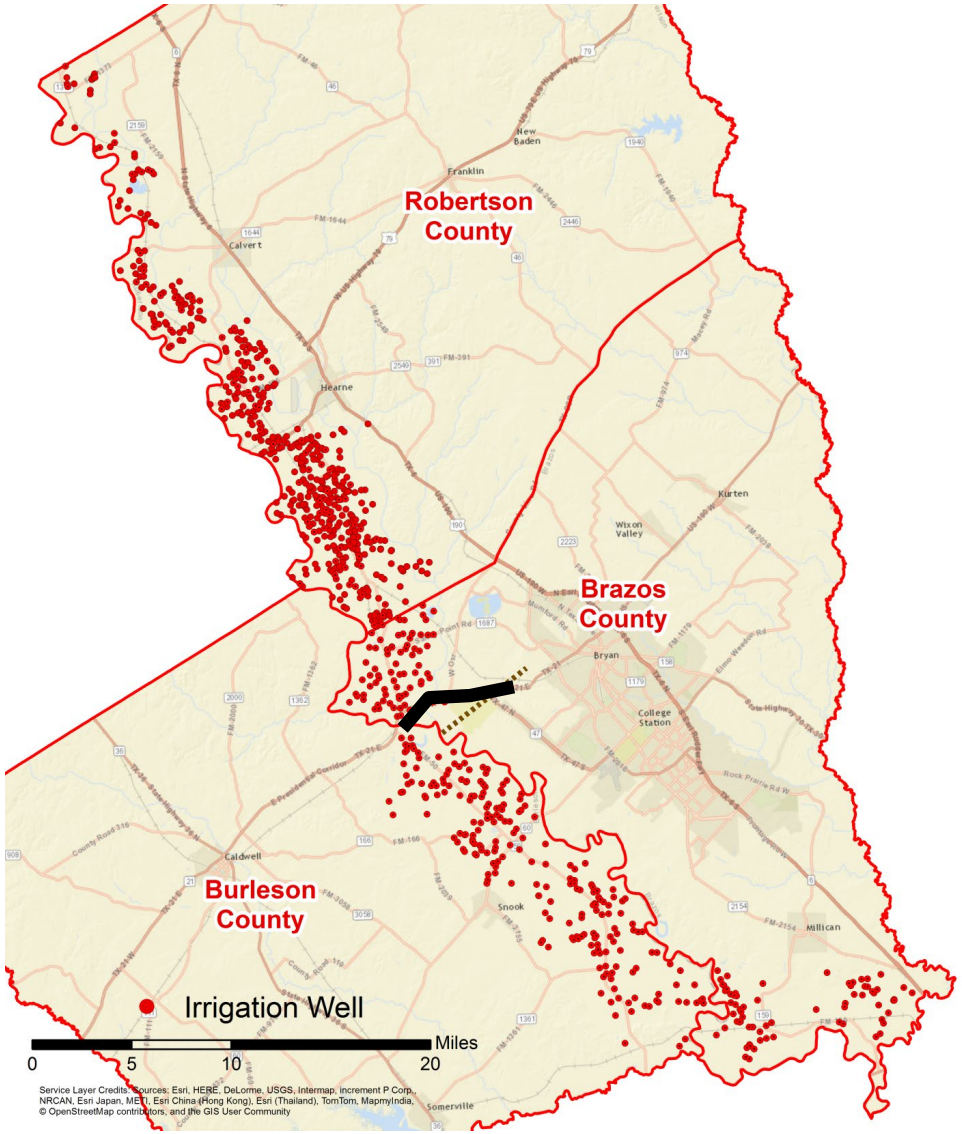
Brazos River Alluvium Observation Wells (Brazos County)



Brazos River Alluvium Well Data

Arithmetic Average Percent Saturation in 2024
64%

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



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Summary

- The rate of average artesian head decline slightly decreased in the Simsboro in 2024
- District staff continues to add wells to monitoring network

Questions?

Simsboro Aquifer Pumping Estimates Through 2023 (draft)