

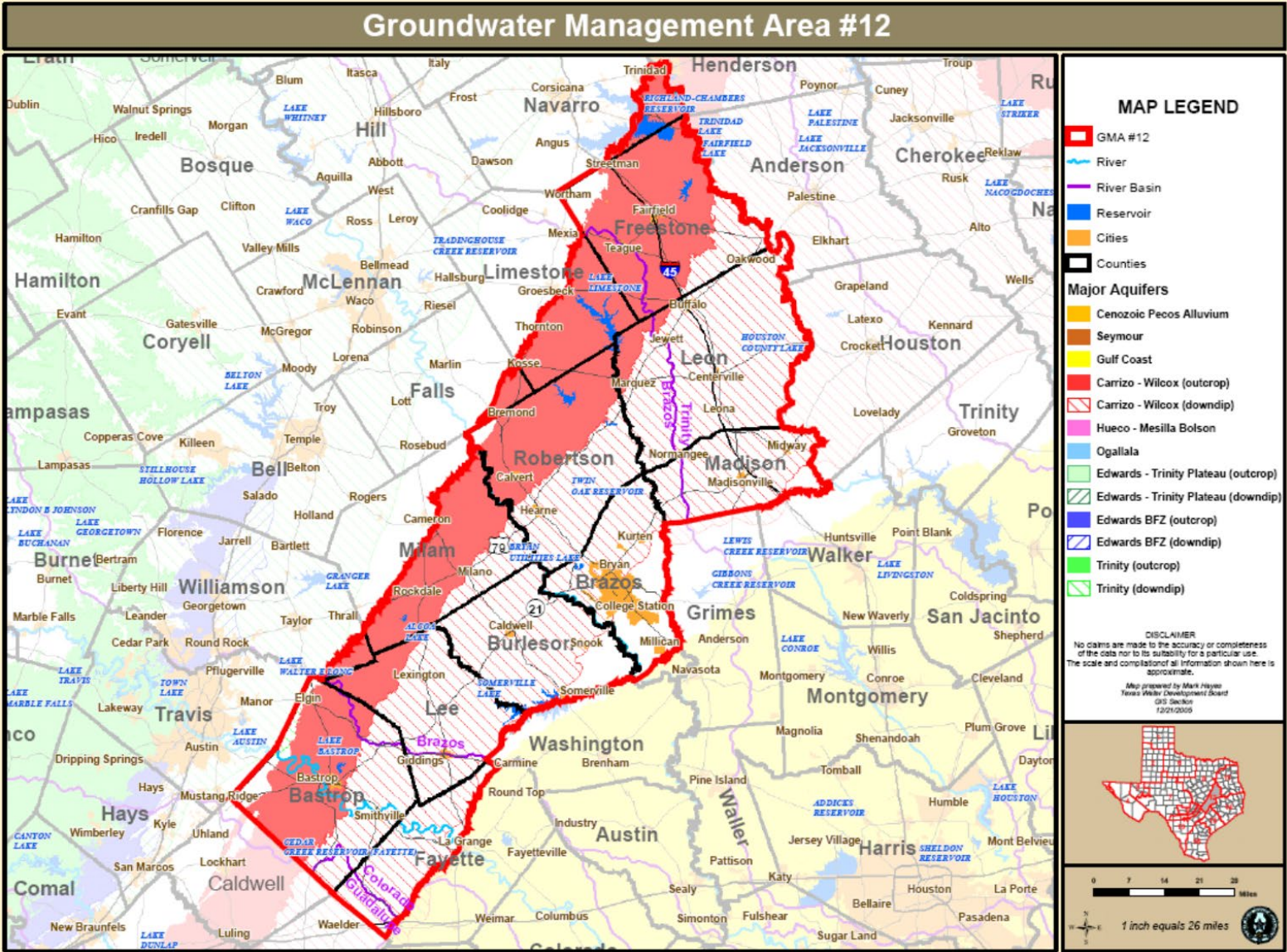
Brazos Valley Groundwater Conservation District

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

2026

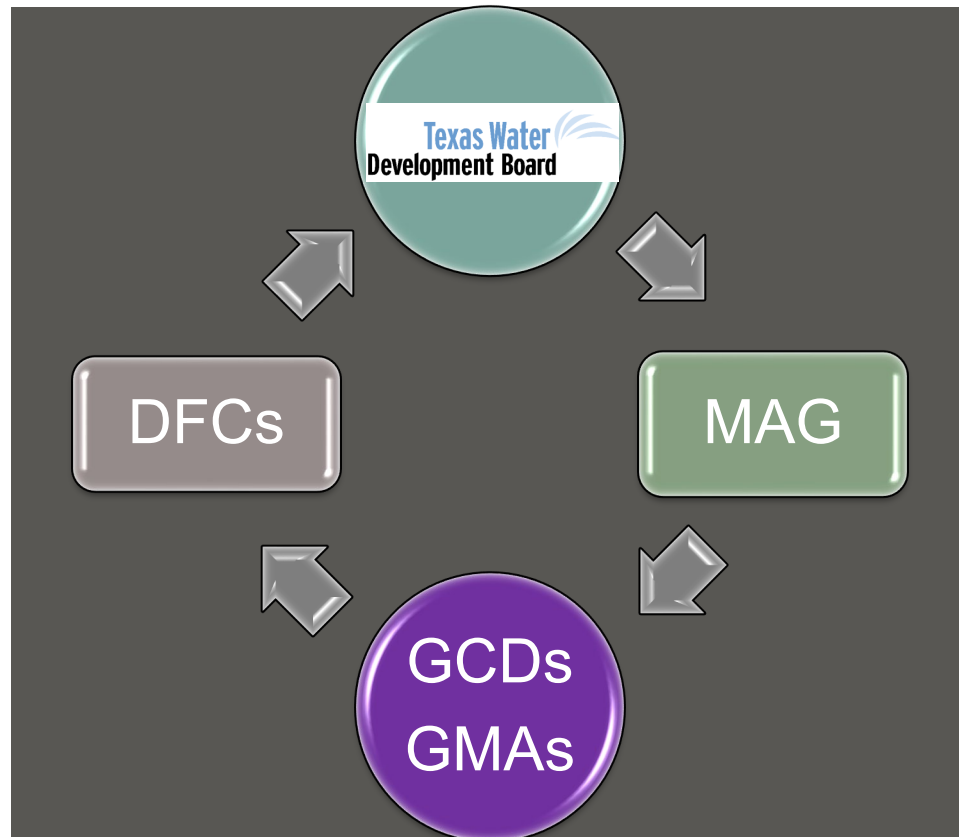
July 15, 2026

Groundwater Management Area 12

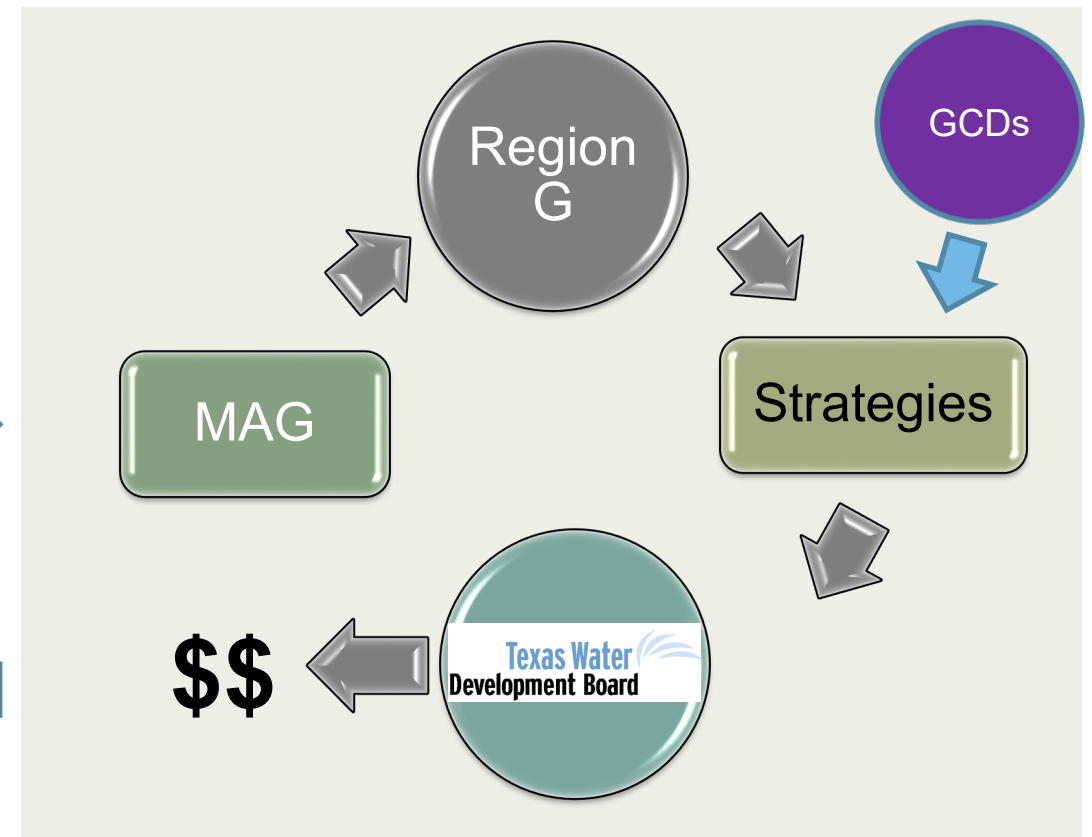


The Texas Groundwater Planning Cycle

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
- Proposed DFCs for the 2026 Planning Cycle have been developed by GMA 12
- The BVGCD DFC baseline date has been updated from 2000 to 2010 for the Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro and Hooper aquifers

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
- House Bill 2078 requires Groundwater Conservation Districts to set interim values to check if they are on track to meet long-term DFC goals

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 and Proposed DFC Goals for the GMA 12 2026 Planning Cycle

Aquifer	Current BVGCD-DFC, ft (2000 – 2070)	Proposed BVGCD-DFC, ft (2010 – 2080)
Sparta	53	57
Queen City	44	46
Carrizo	84	84
Calvert Bluff	111	119
Simsboro	262	330
Hooper	167	146
Yegua-Jackson	67*	68

** Current Yegua-Jackson DFC is from 2010 - 2070*

- 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
- 21 Artesian Head Change in Well Between about 1999 and 2026, 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	Miramont County Club Well 2
59-22-512	Private

Average Artesian Head Change 2000-2026

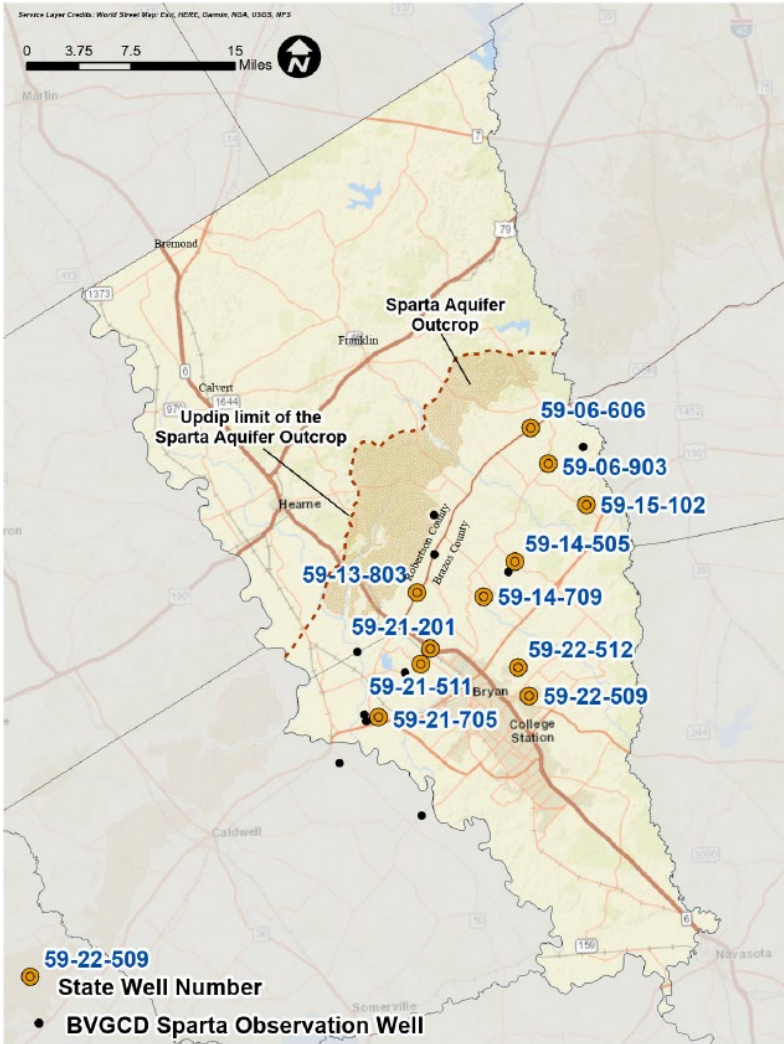
Arithmetic Average	11 Feet (Decline)
Spatially Weighted Average	9 Feet (Decline)

Average Artesian Head Change 2010-2026

Arithmetic Average	3 Feet (Increase)
Spatially Weighted Average	6 Feet (Increase)

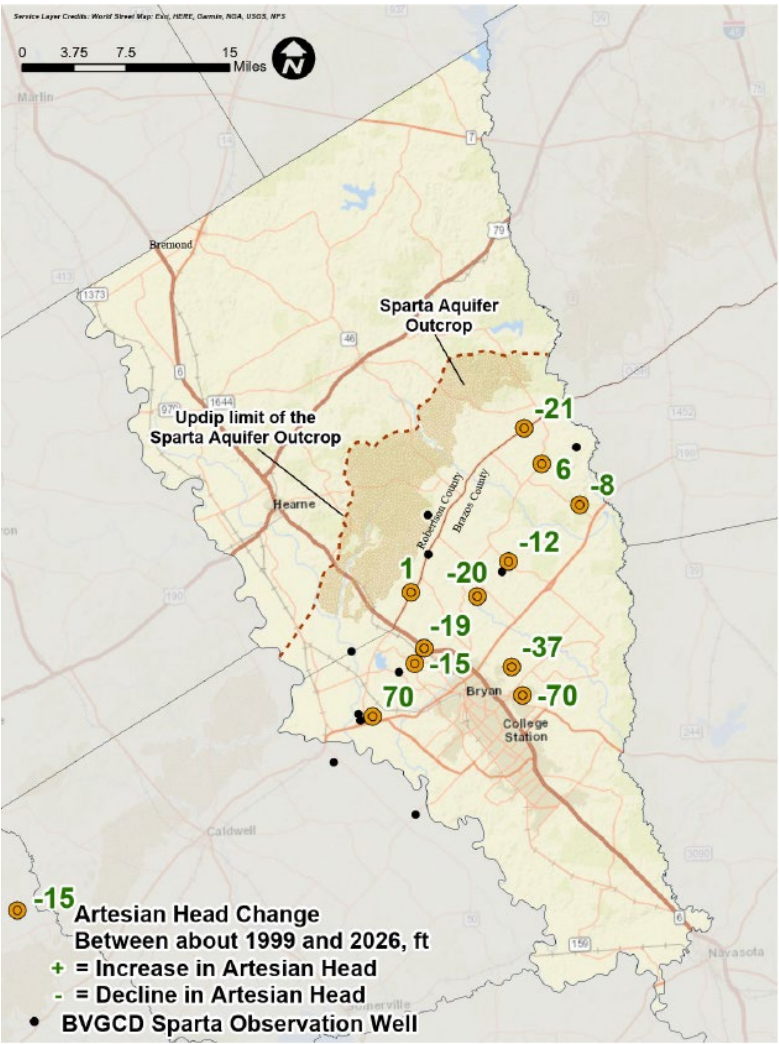
2070 DFC	53 Feet (Decline)
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Sparta Aquifer



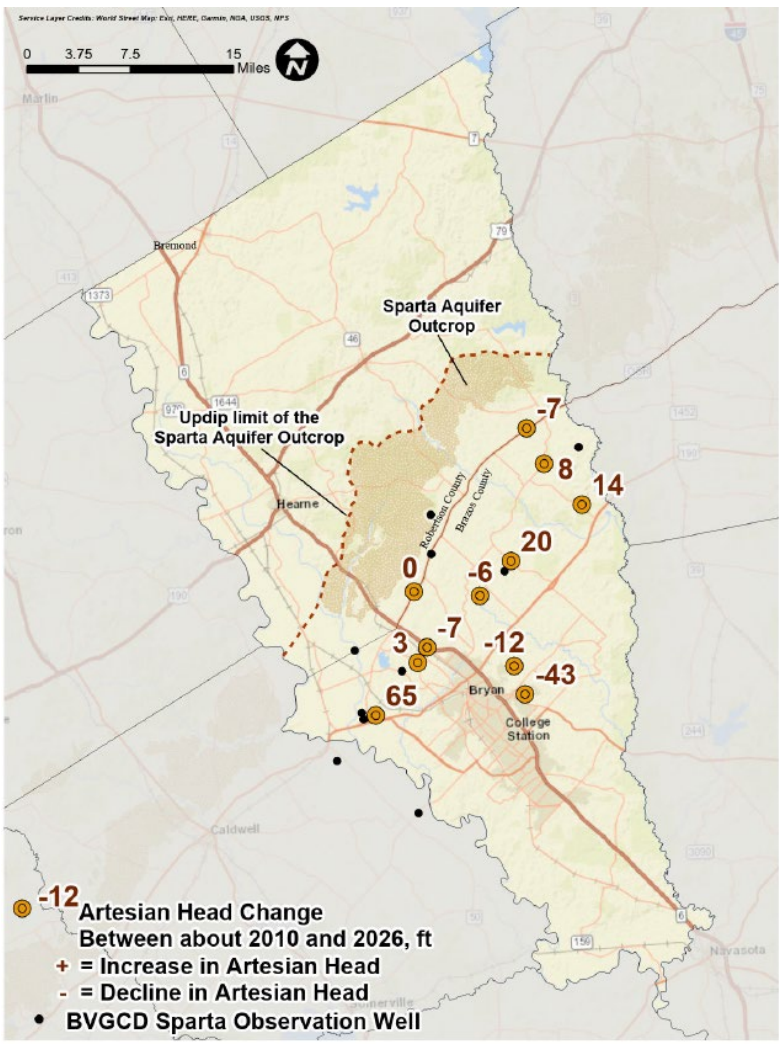
**DFC (2070):
53 feet Decline**

Average Artesian Head Change 2000-2026



**2000-2026
Arithmetic Average: 11 feet (Decline)
Spatially Weighted Average: 9 feet (Decline)**

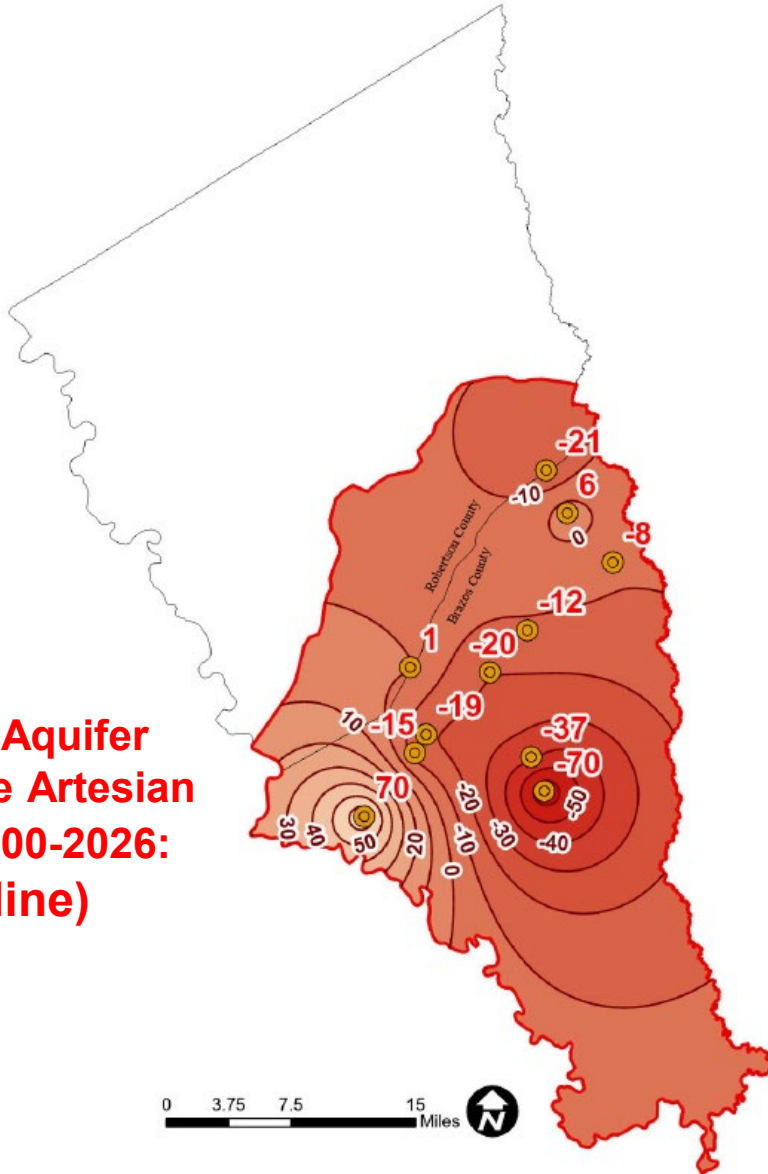
Average Artesian Head Change 2010-2026



**2010-2026
Arithmetic Average: 3 feet (Increase)
Spatially Weighted Average: 6 feet (Increase)**

Spatially Weighted Sparta Aquifer Head Change Estimate

**BVGCD Sparta Aquifer
Weighted Average Artesian
Head Change 2000-2026:
9 feet (Decline)**



Kriging

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...

Output cell size (optional): 661.083439583395
Search radius (optional): Variable
Search Radius Settings
Number of points: 24
Maximum distance:
Output variance of prediction raster (optional):

Search radius (optional)
Defines which of the input points will be used to interpolate the value for each cell in the output raster.

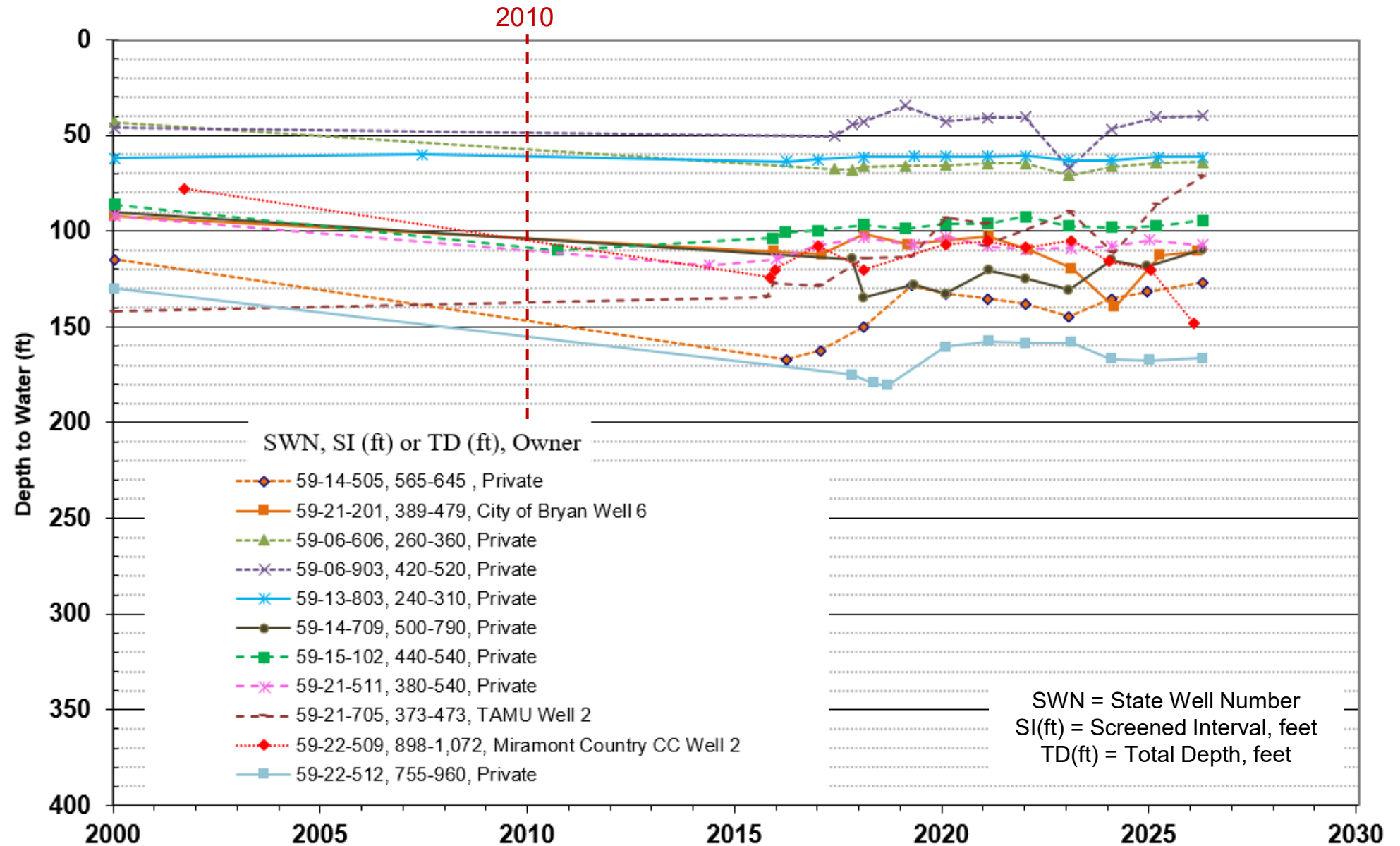
Advanced Parameters

Lag size: 661.083440
Variogram Parameters
Major range: 100000
Partial sill: 1000
Nugget: 0

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 Environments... << Hide Help Tool Help

Sparta Aquifer Observation Wells



Queen City Aquifer DFC Wells

State Well Number	Well Owner
59-05-101	Private
59-05-905	Private
59-06-901	Private
59-20-935	Private

Average Artesian Head Change 2000-2026

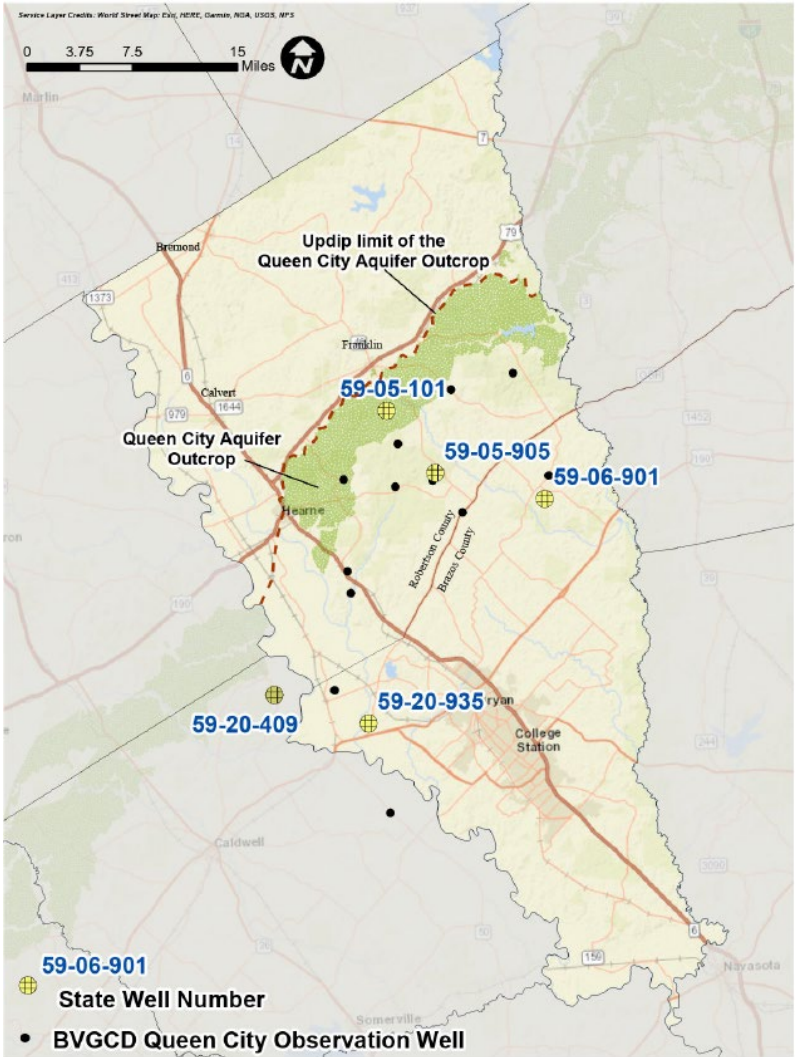
Arithmetic Average	8 Feet (Decline)
Spatially Weighted Average	--

Average Artesian Head Change 2010-2026

Arithmetic Average	3 Feet (Decline)
Spatially Weighted Average	--

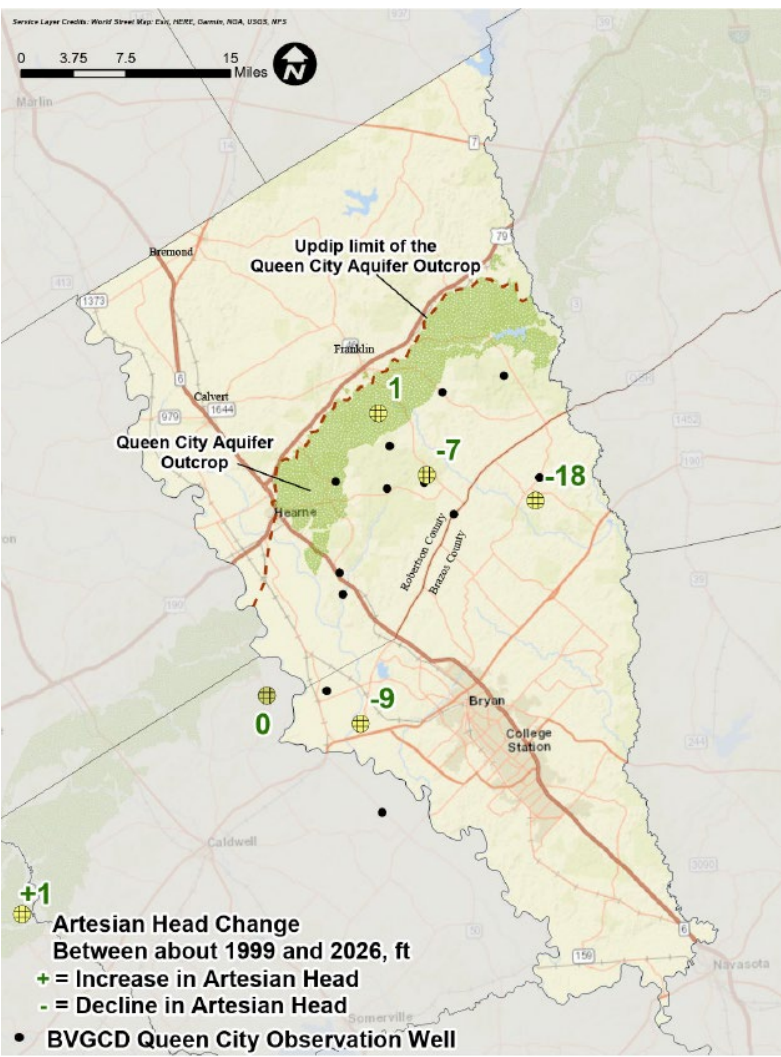
2070 DFC	44 Feet (Decline)
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Queen City Aquifer



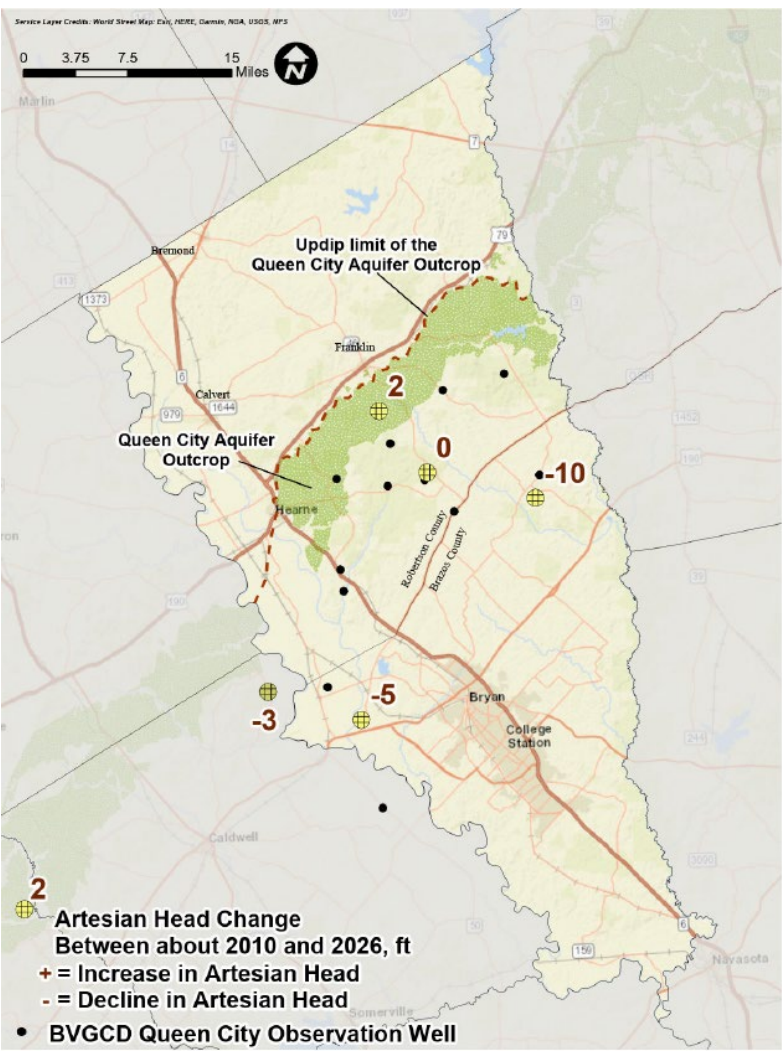
**DFC (2070):
44 feet Decline**

Average Artesian Head Change 2000-2026



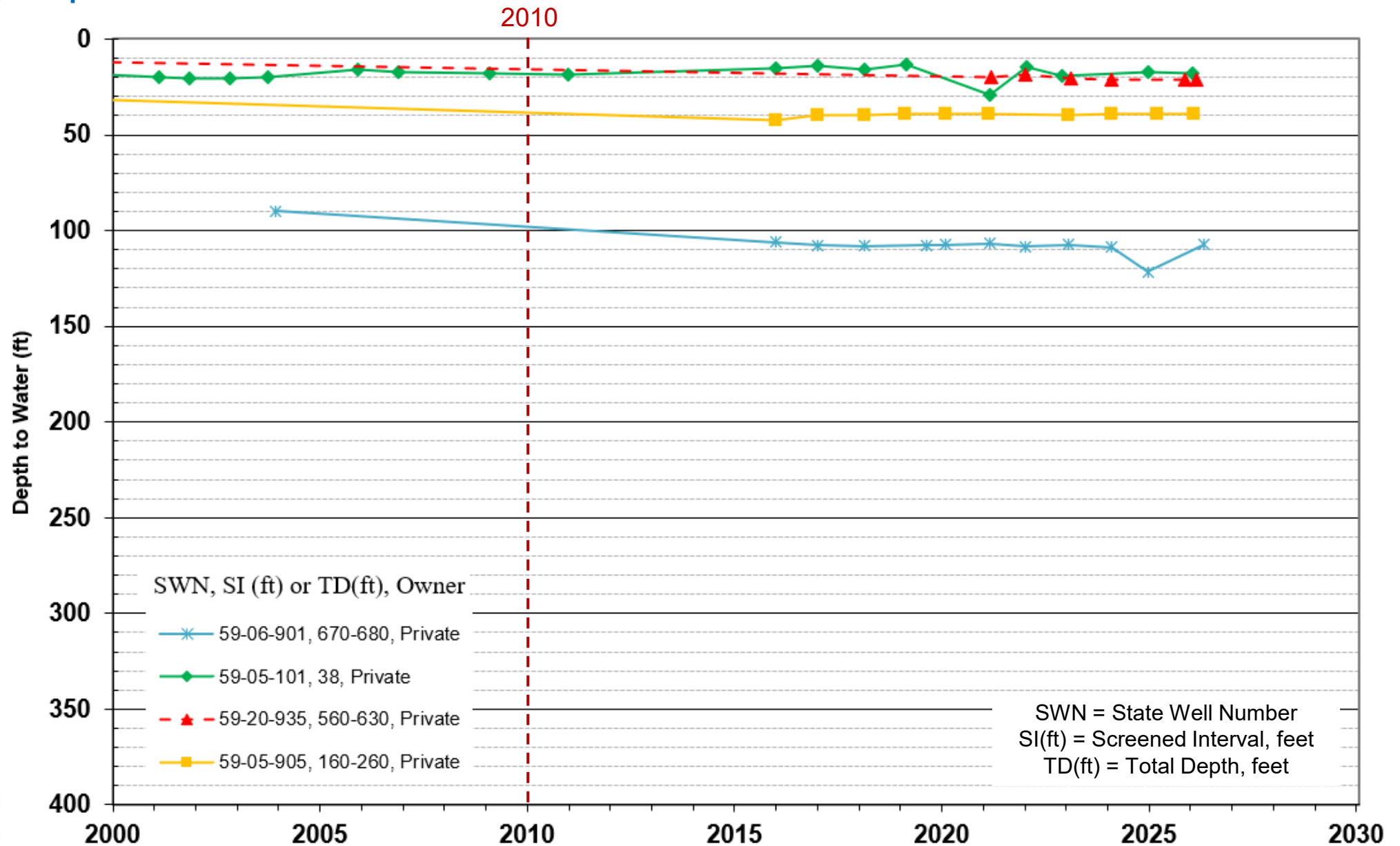
**2000-2026
Arithmetic Average: 8 feet (Decline)
Spatially Weighted Average: --**

Average Artesian Head Change 2010-2026



**2010-2026
Arithmetic Average: 3 feet (Decline)
Spatially Weighted Average: --**

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

Average Artesian Head Change 2000-2026

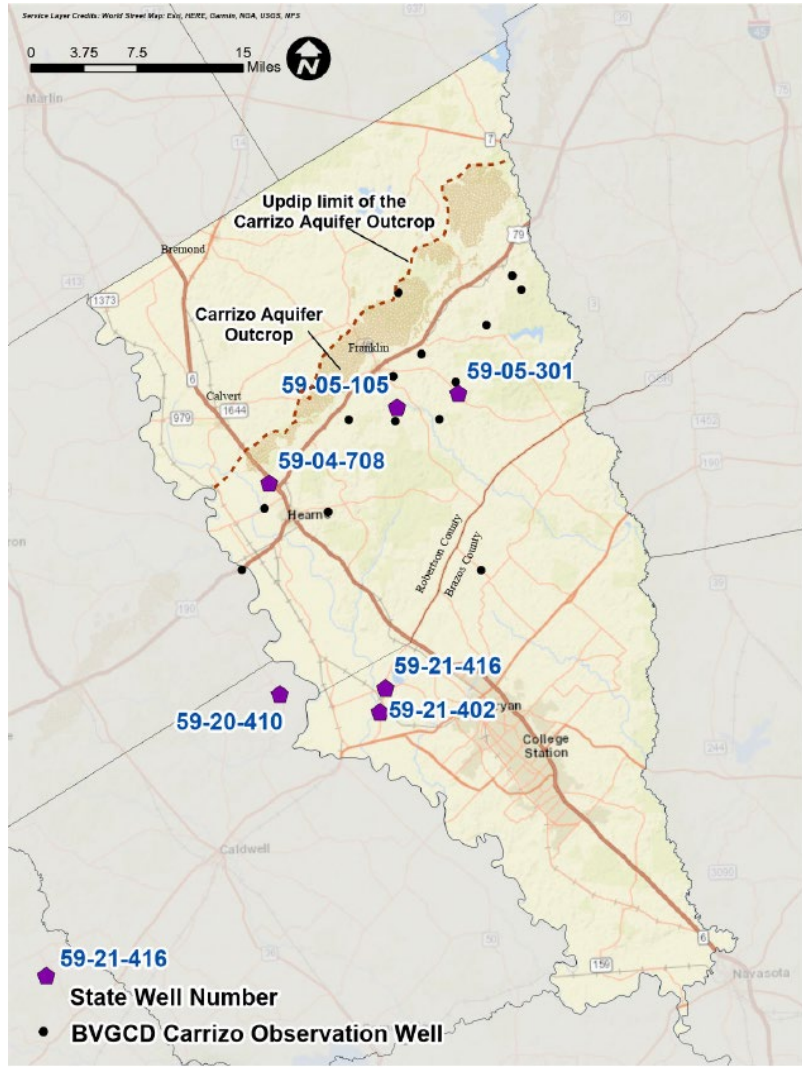
Arithmetic Average	21 Feet (Decline)
Spatially Weighted Average	19 Feet (Decline)

Average Artesian Head Change 2010-2026

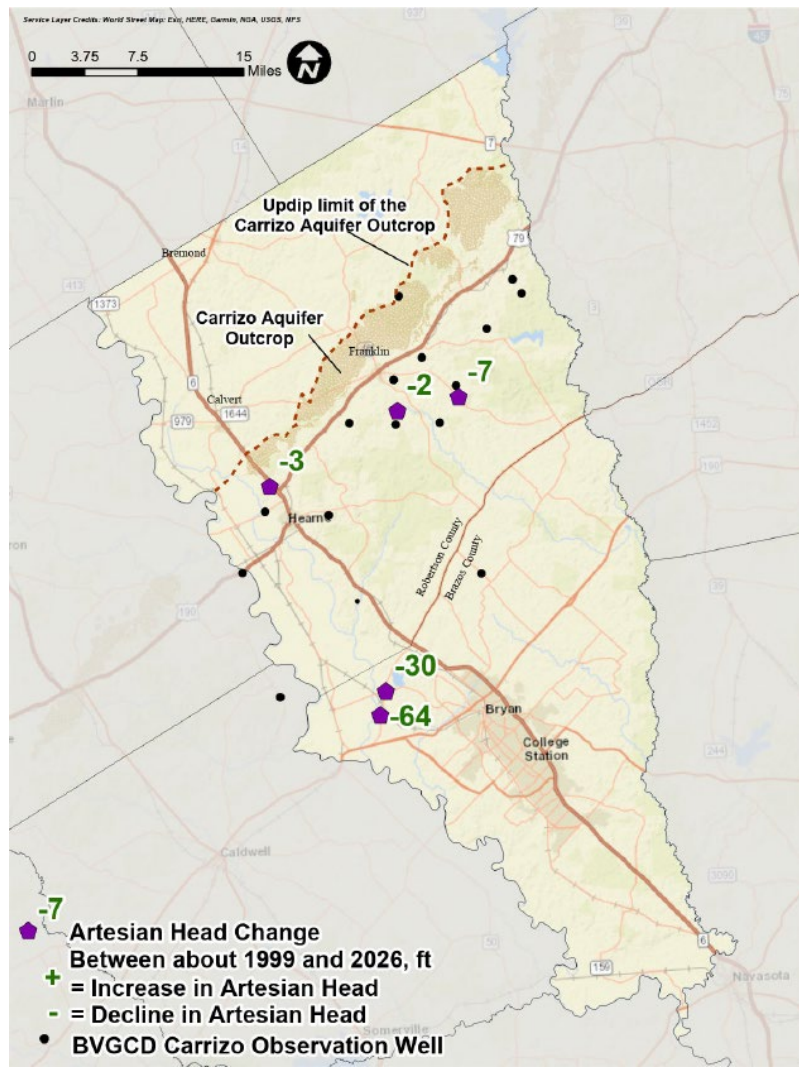
Arithmetic Average	19 Feet (Decline)
Spatially Weighted Average	17 Feet (Decline)

2070 DFC	84 Feet (Decline)
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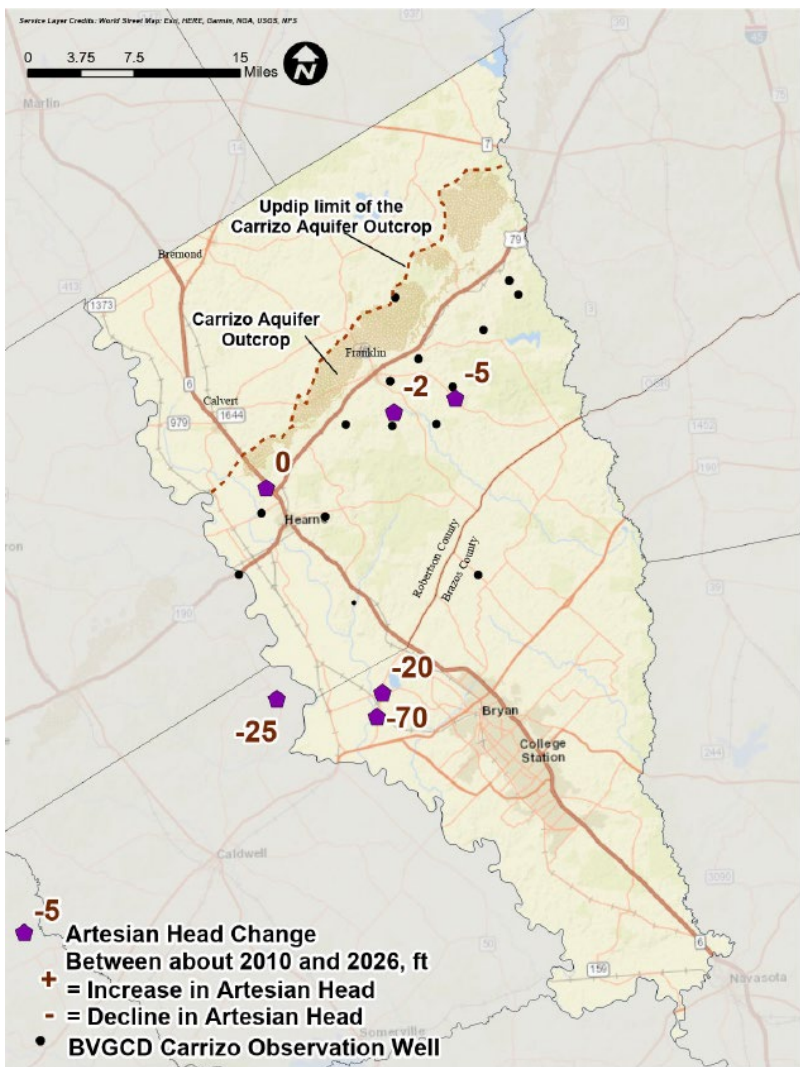
Carrizo Aquifer



Average Artesian Head Change 2000-2026



Average Artesian Head Change 2010-2026

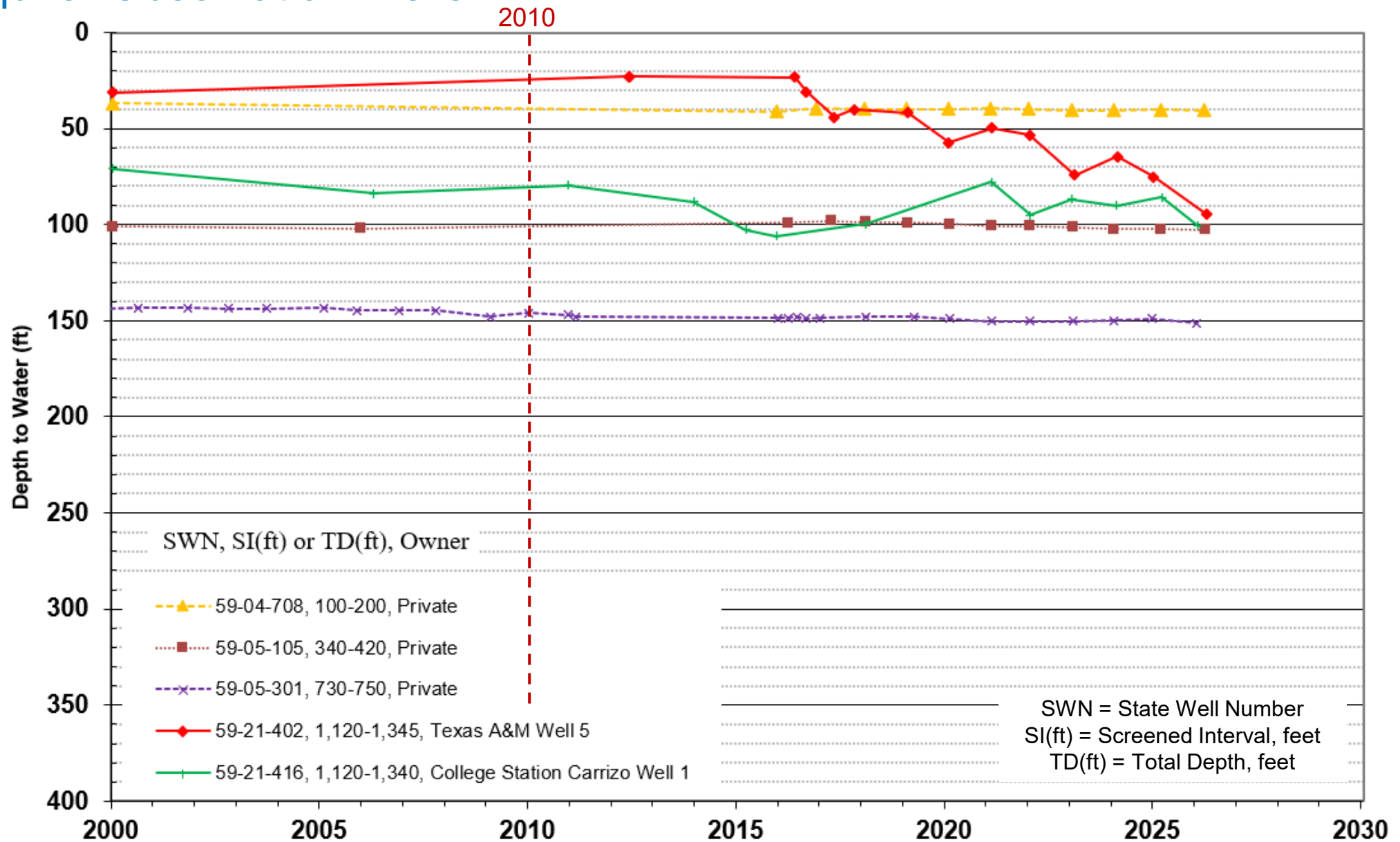


**DFC (2070):
84 feet Decline**

**2000-2026
Arithmetic Average: 21 feet (Decline)
Spatially Weighted Average: 19 feet (Decline)**

**2010-2026
Arithmetic Average: 19 feet (Decline)
Spatially Weighted Average: 17 feet (Decline)**

Carrizo Aquifer Observation Wells



Calvert Bluff Formation DFC Wells

State Well Number	Well Owner
39-54-703	Private
59-03-438	Private
59-03-606	Private
59-06-104	Private

Average Artesian Head Change 2000-2026

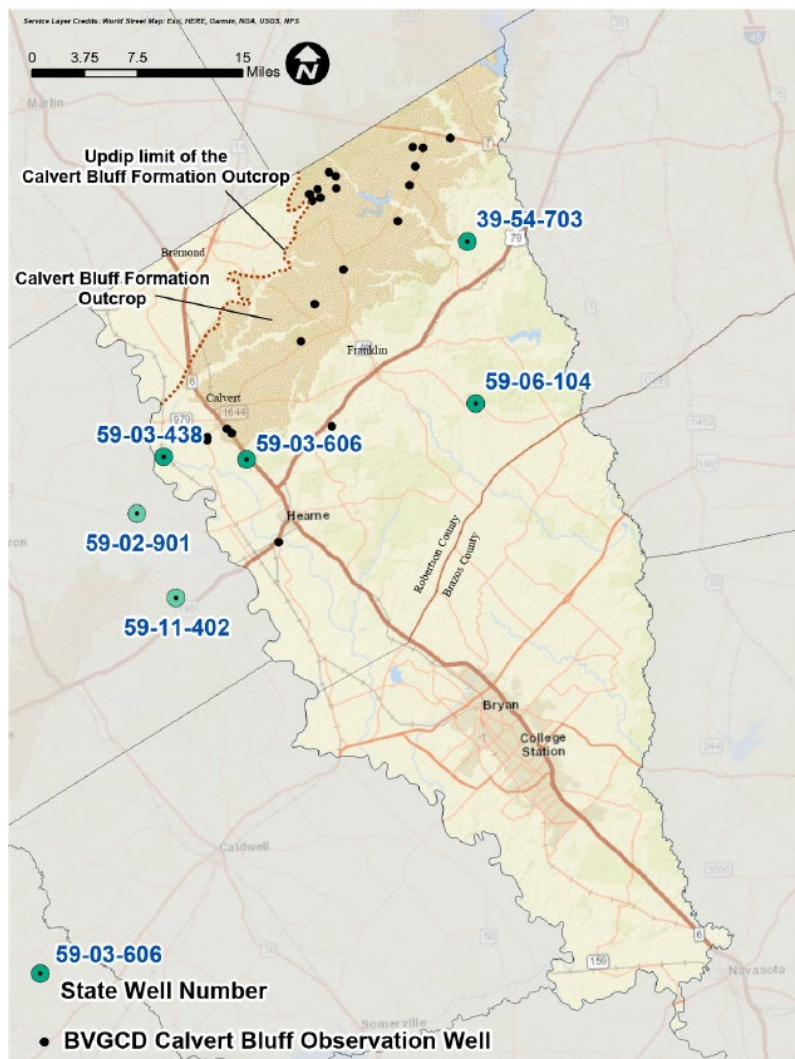
Arithmetic Average	8 Feet (Decline)
Spatially Weighted Average	--

Average Artesian Head Change 2010-2026

Arithmetic Average	5 Feet (Decline)
Spatially Weighted Average	--

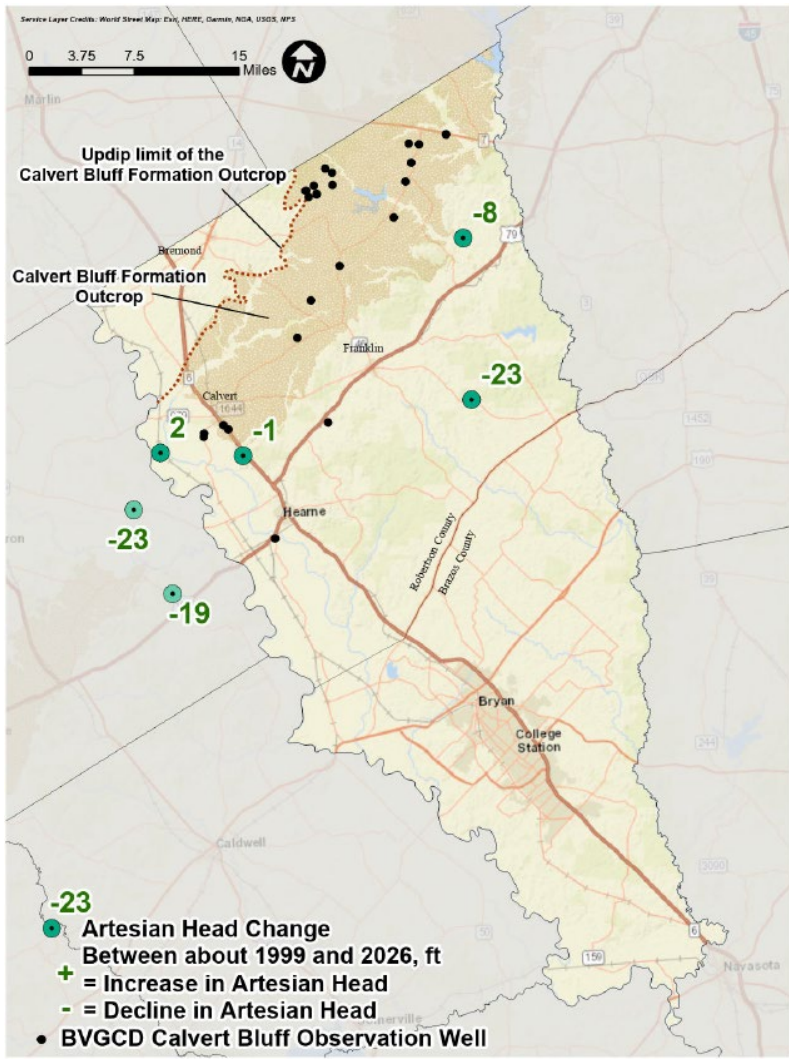
2070 DFC	111 Feet (Decline)
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Calvert Bluff Formation



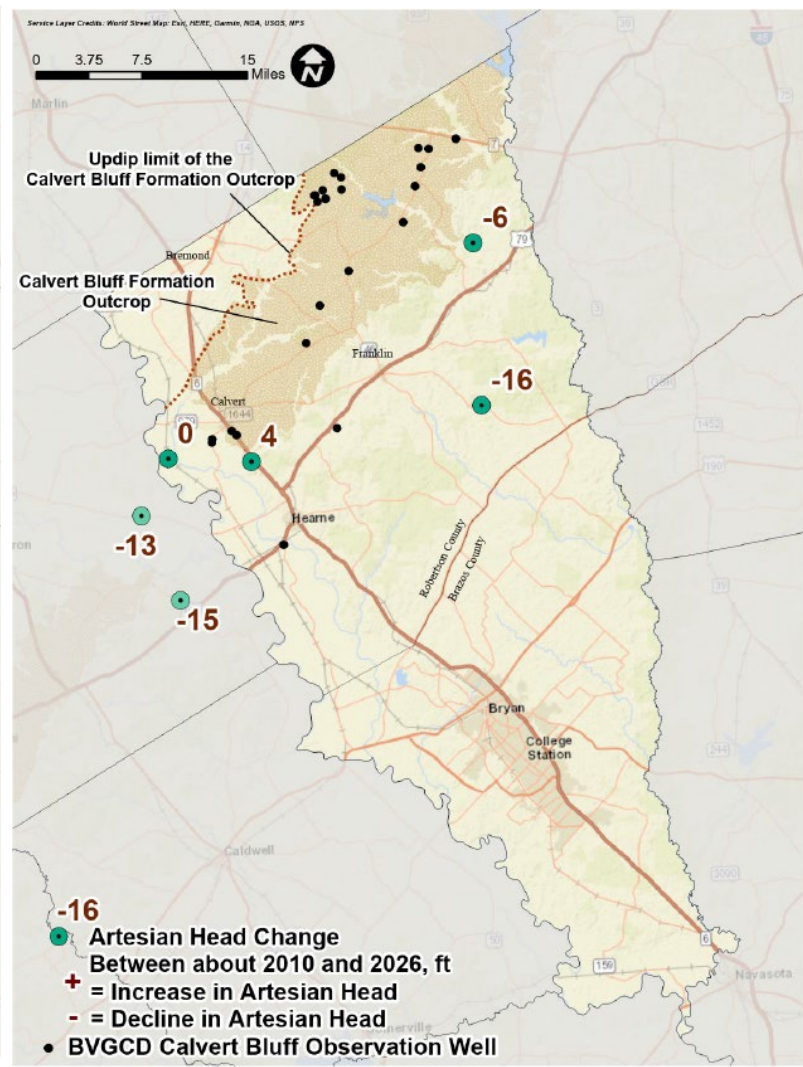
**DFC (2070):
 111 feet Decline**

Average Artesian Head Change 2000-2026



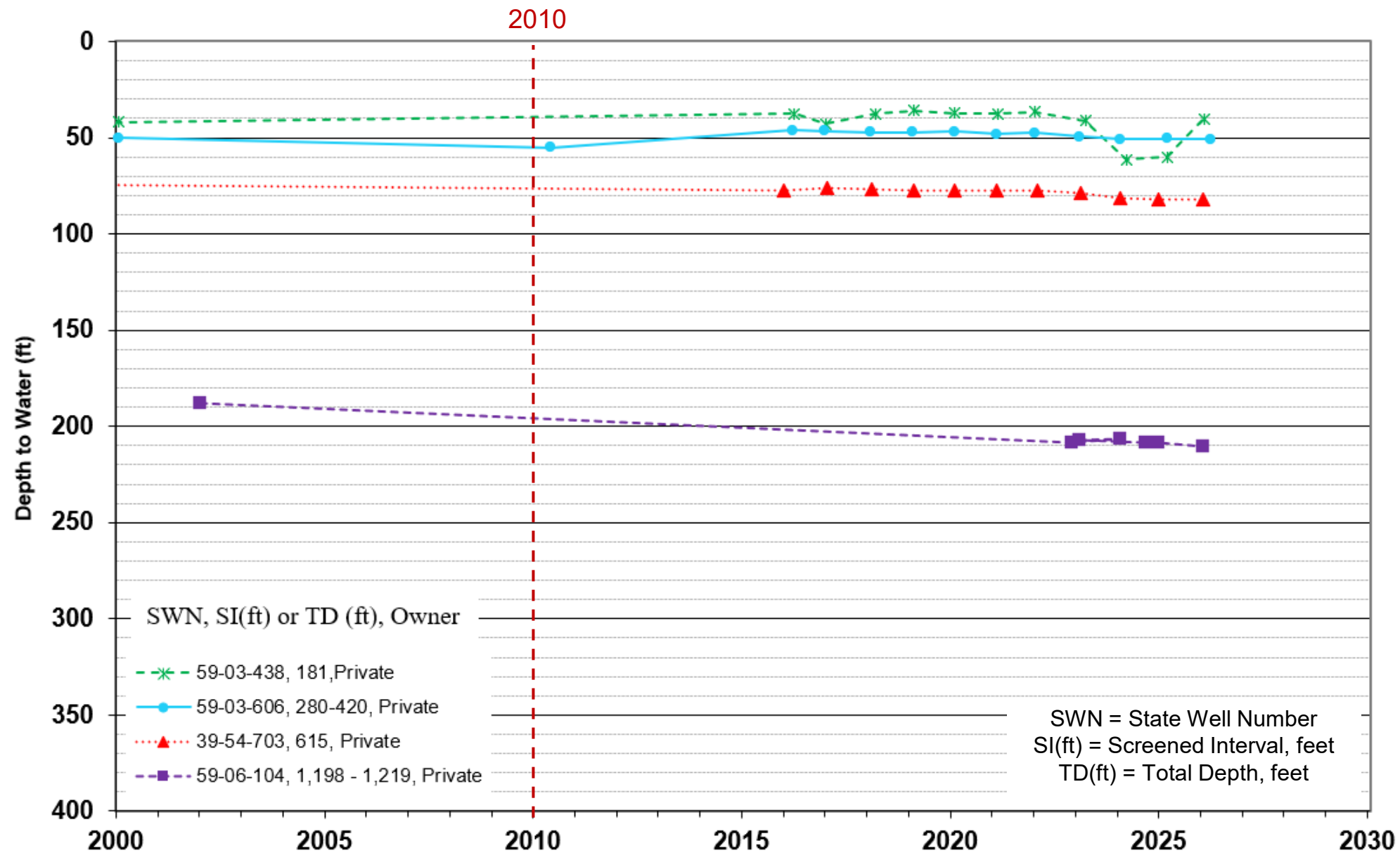
**2000-2026
 Arithmetic Average: 8 feet (Decline)
 Spatially Weighted Average: --**

Average Artesian Head Change 2010-2026



**2010-2026
 Arithmetic Average: 5 feet (Decline)
 Spatially Weighted Average: --**

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

Average Artesian Head Change 2000-2026

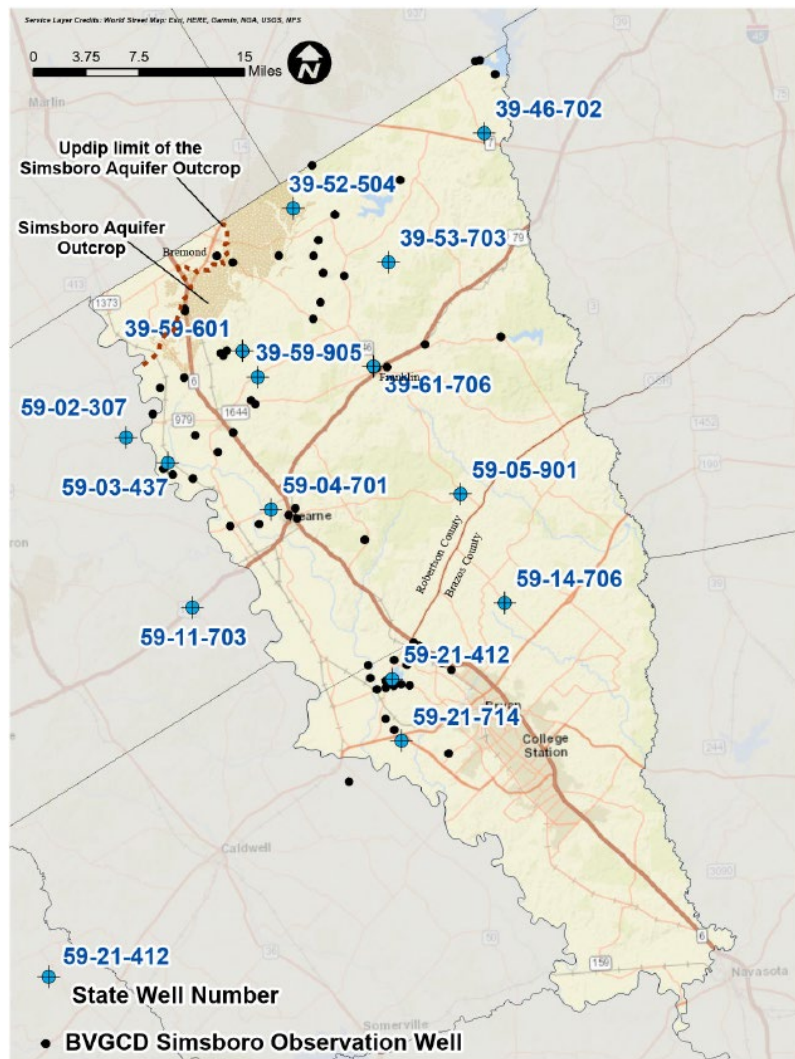
Arithmetic Average	73 Feet (Decline)
Spatially Weighted Average	76 Feet (Decline)

Average Artesian Head Change 2010-2026

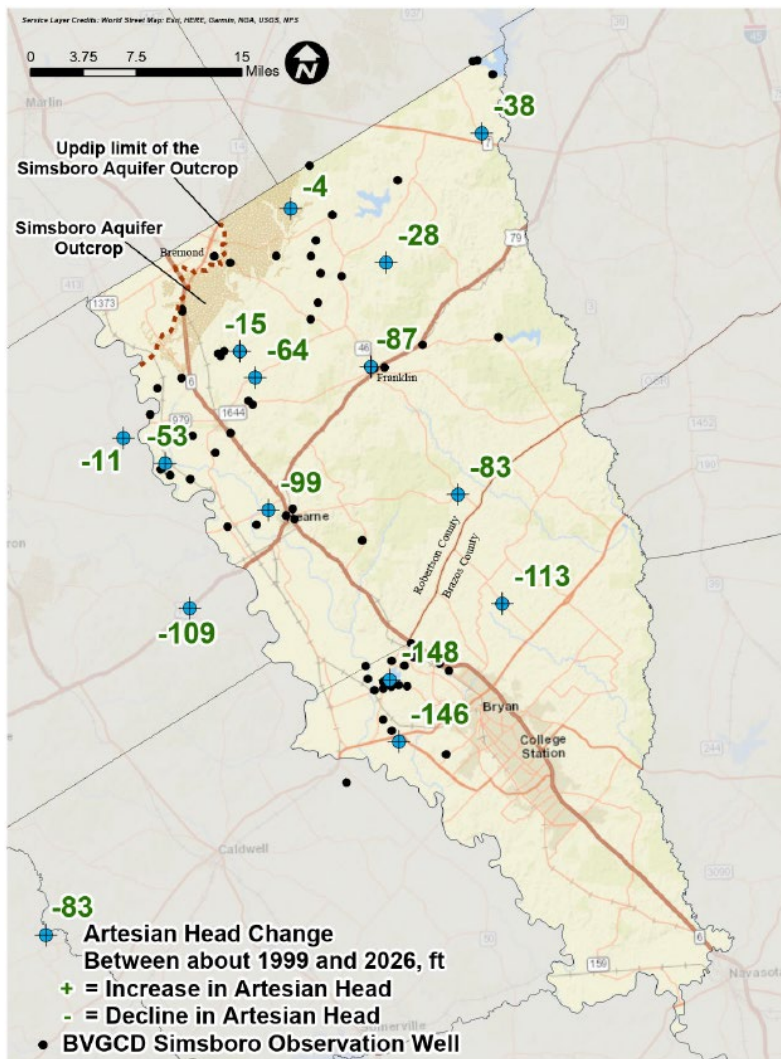
Arithmetic Average	51 Feet (Decline)
Spatially Weighted Average	55 Feet (Decline)

2070 DFC	262 Feet (Decline)
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Simsboro Aquifer

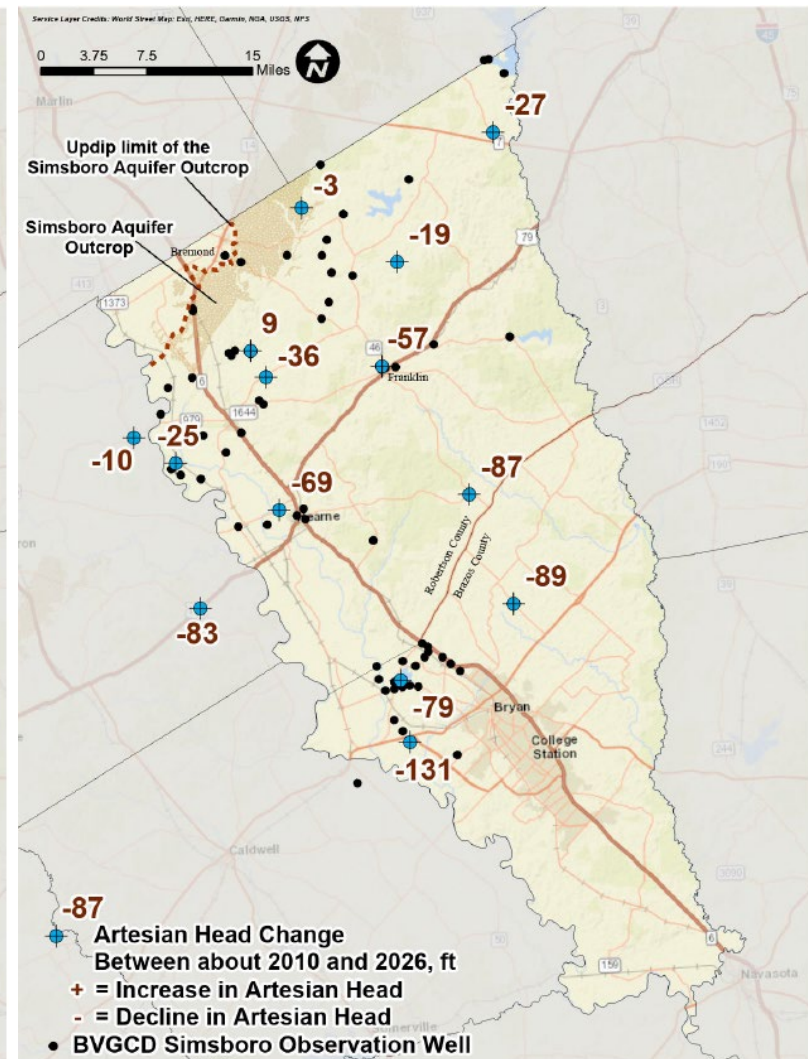


Average Artesian Head Change 2000-2026



2000-2026
Arithmetic Average: 73 feet (Decline)
Spatially Weighted Average: 76 Feet (Decline)

Average Artesian Head Change 2010-2026

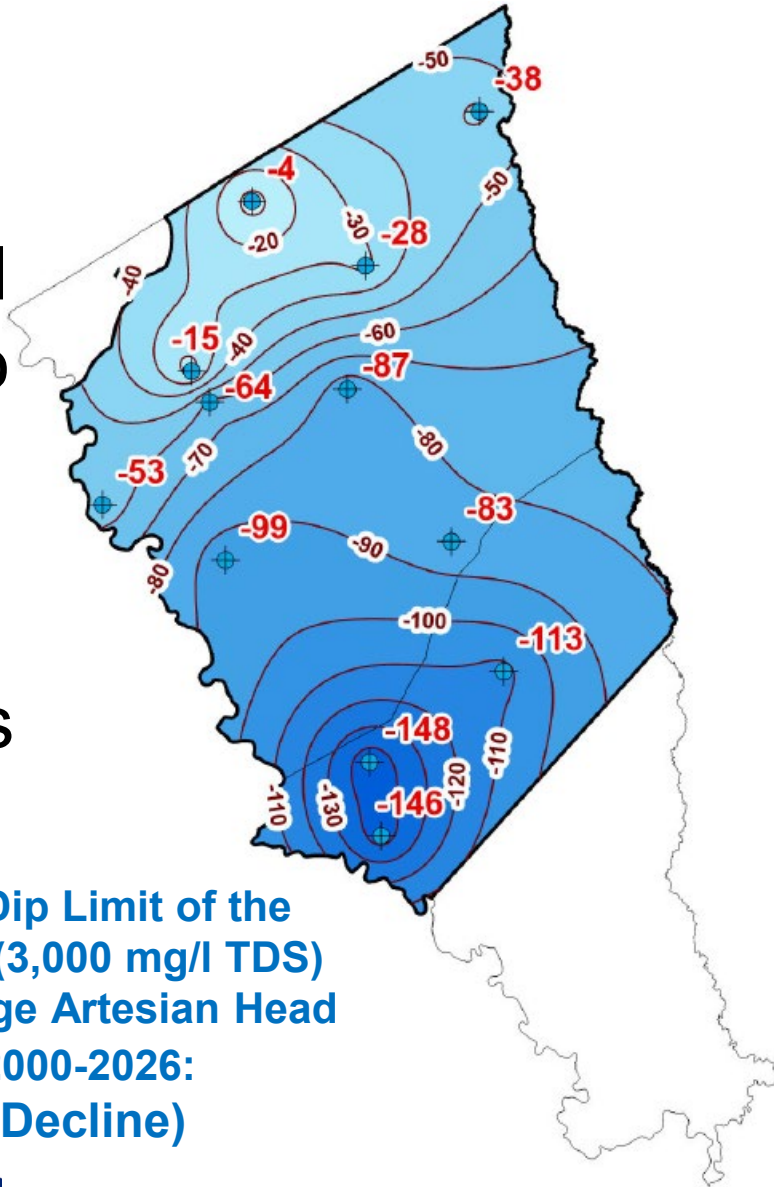


2010-2026
Arithmetic Average: 51 feet (Decline)
Spatially Weighted Average: 55 Feet (Decline)

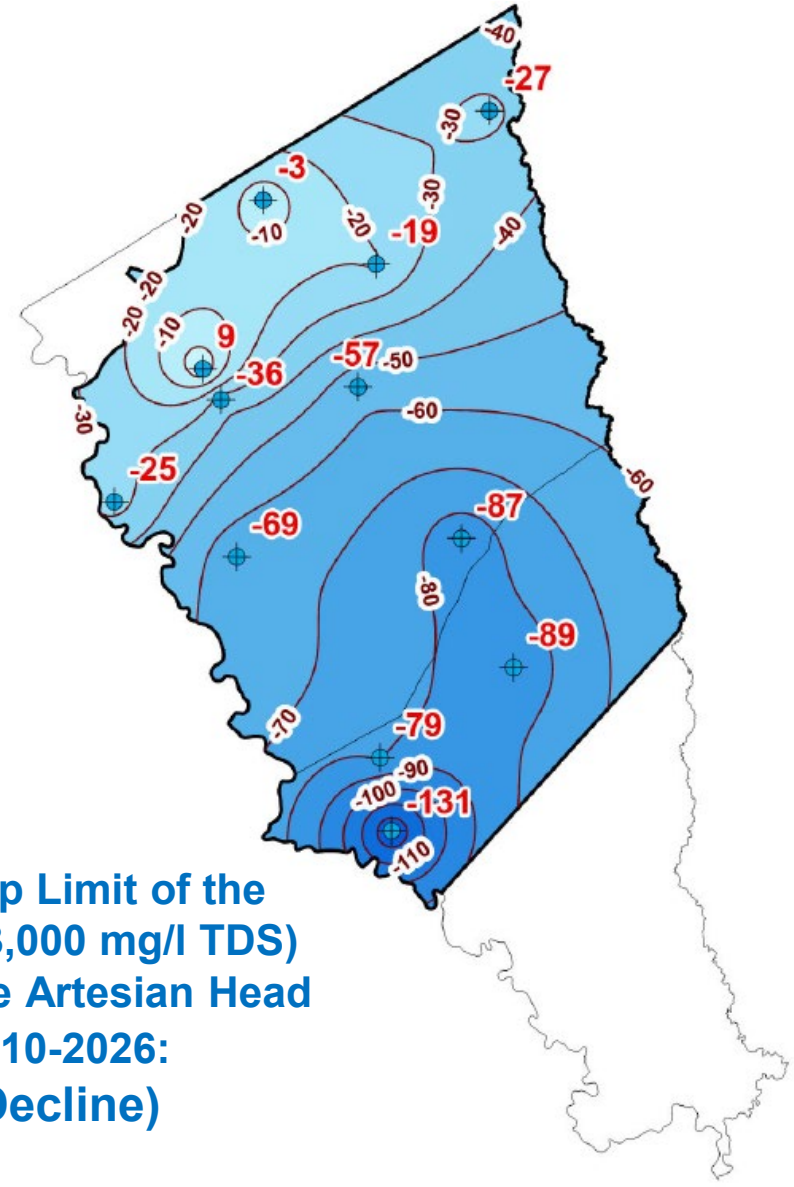
DFC (2070):
262 feet Decline

Spatially Weighted Simsboro Aquifer Head Change Estimates

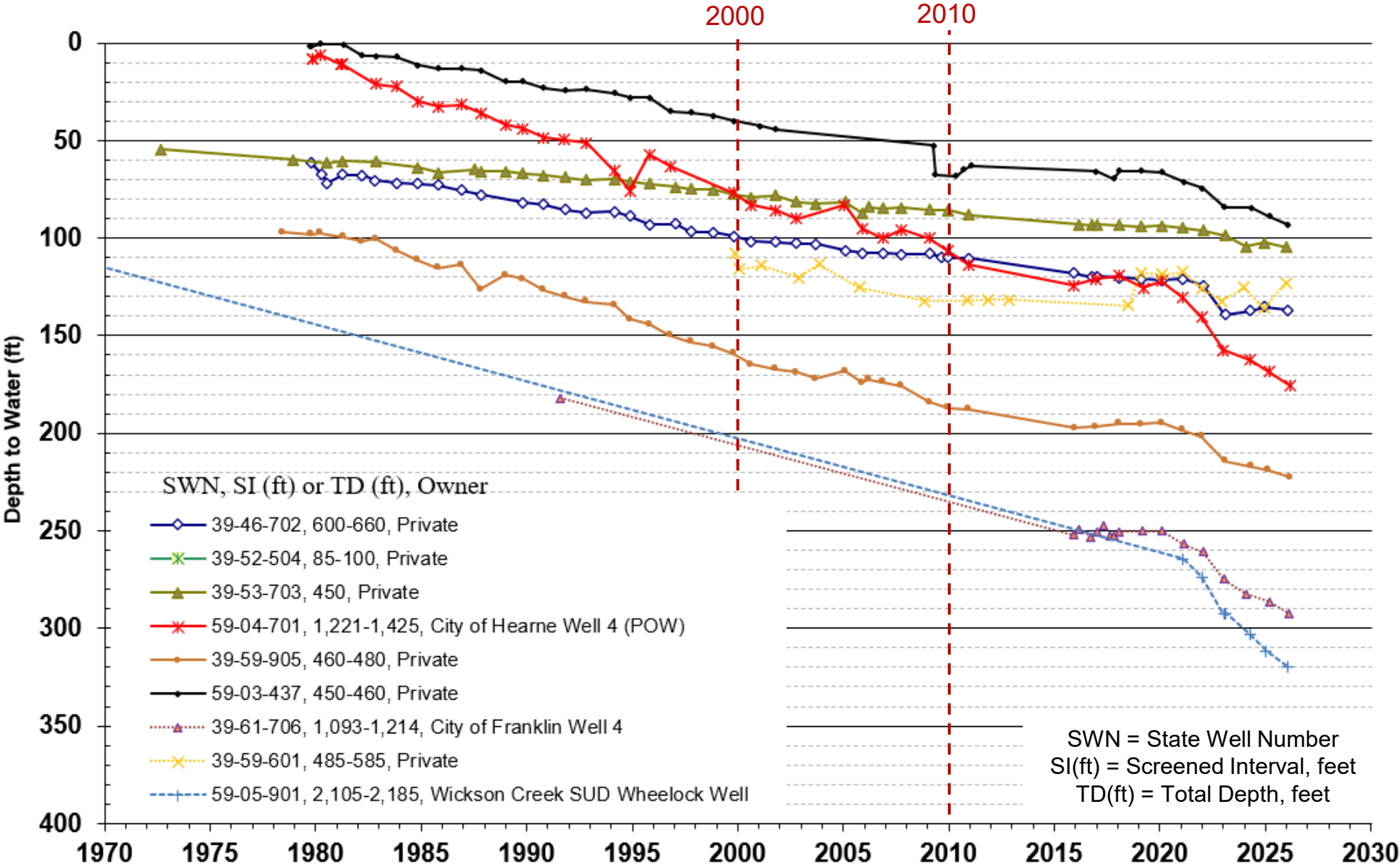
TWDB Down Dip Limit of the
Carrizo-Wilcox (3,000 mg/l TDS)
Weighted Average Artesian Head
Change 2000-2026:
76 feet (Decline)



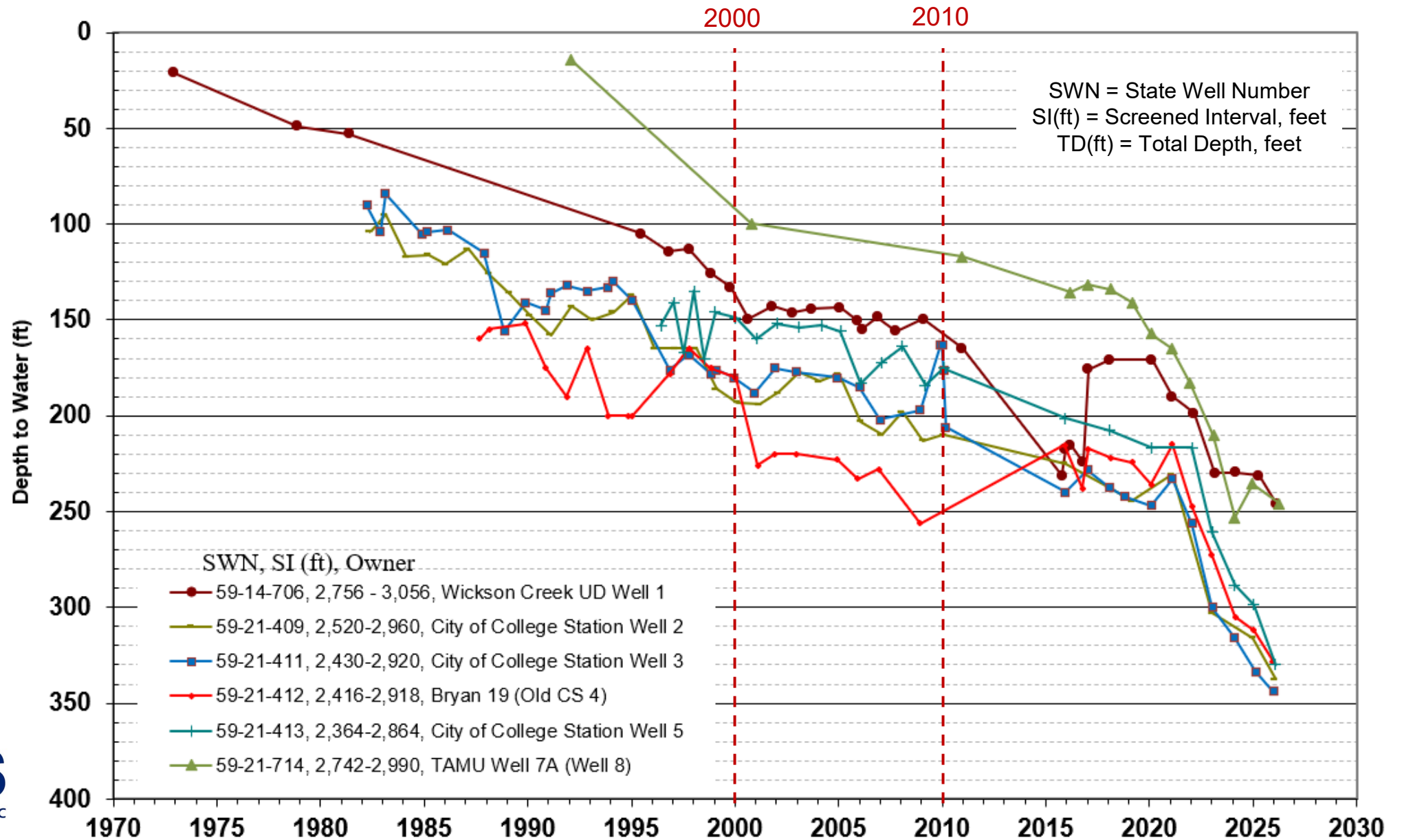
TWDB Down Dip Limit of the
Carrizo-Wilcox (3,000 mg/l TDS)
Weighted Average Artesian Head
Change 2010-2026:
55 feet (Decline)



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

Average Artesian Head Change 2000-2026

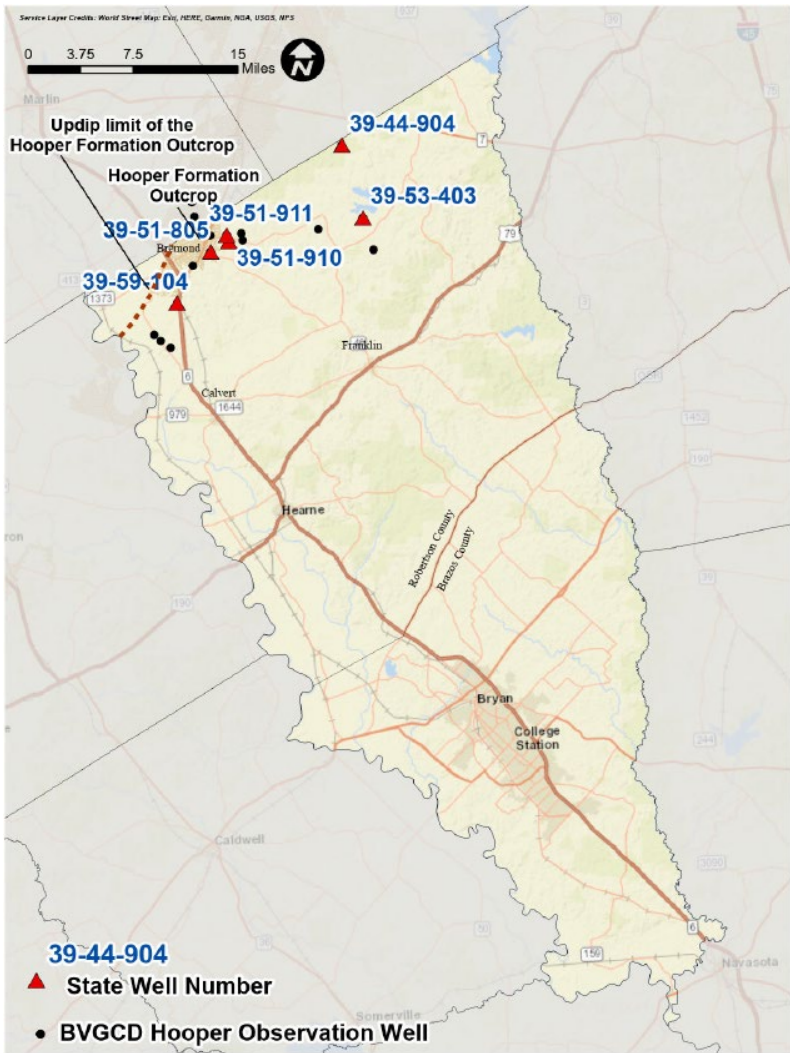
Arithmetic Average	18 Feet (Decline)
Spatially Weighted Average	--

Average Artesian Head Change 2010-2026

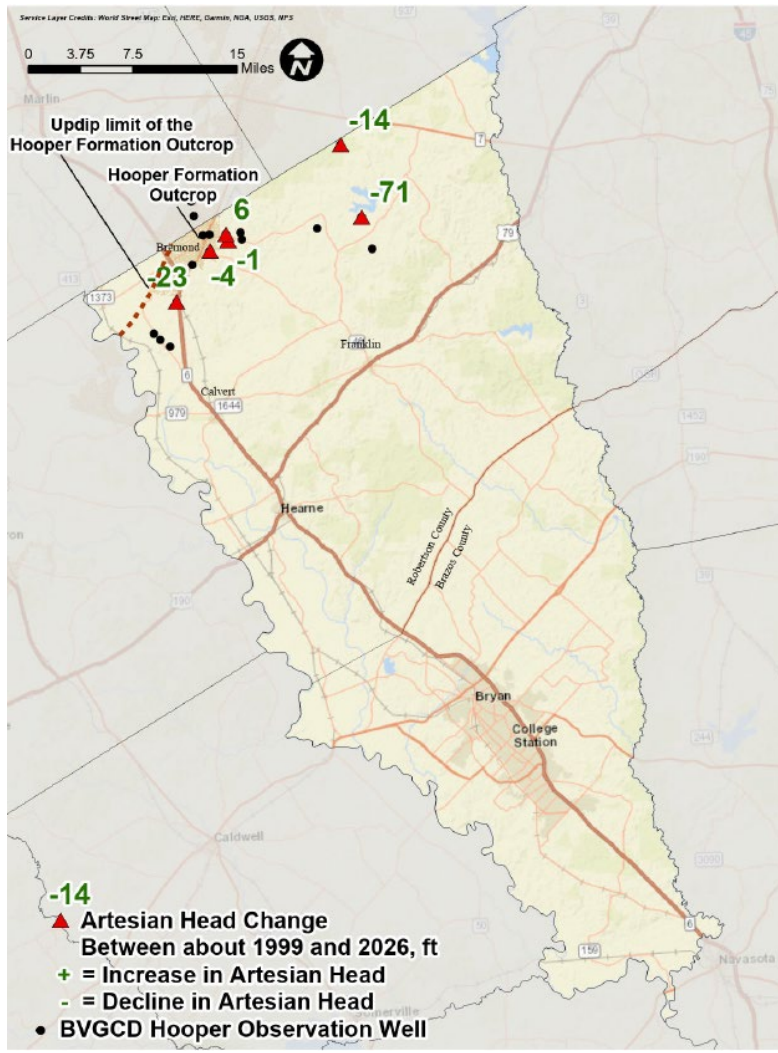
Arithmetic Average	5 Feet (Decline)
Spatially Weighted Average	--

2070 DFC	167 Feet (Decline)
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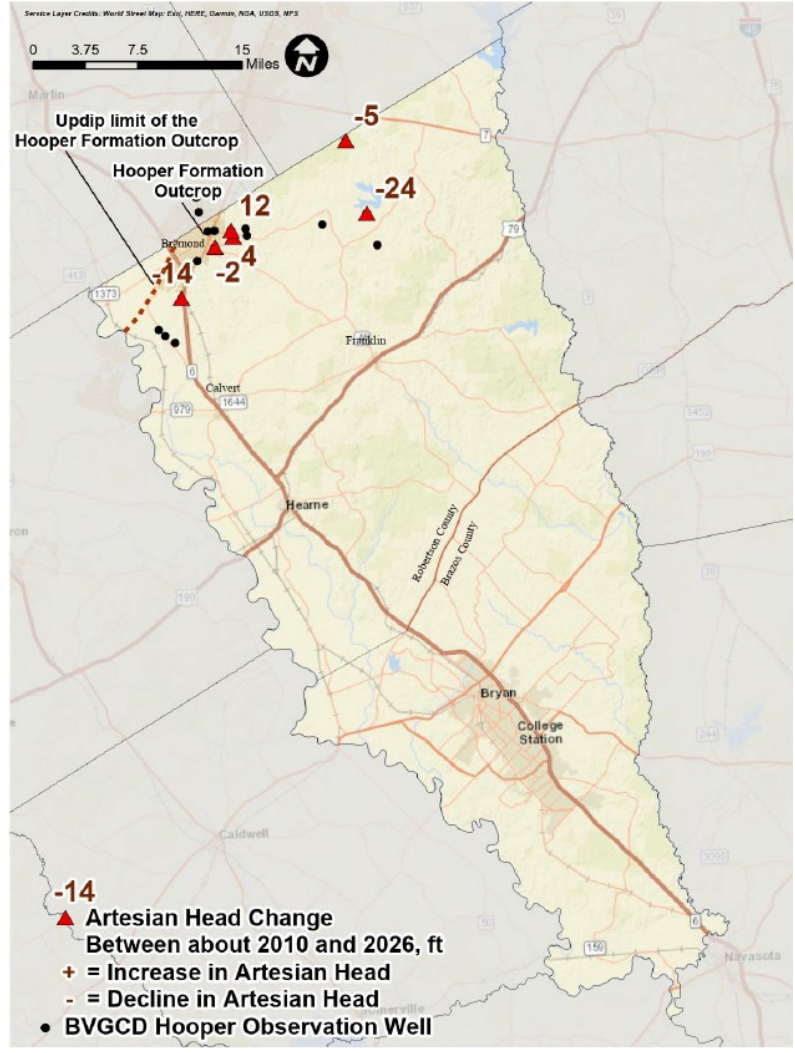
Hooper Formation



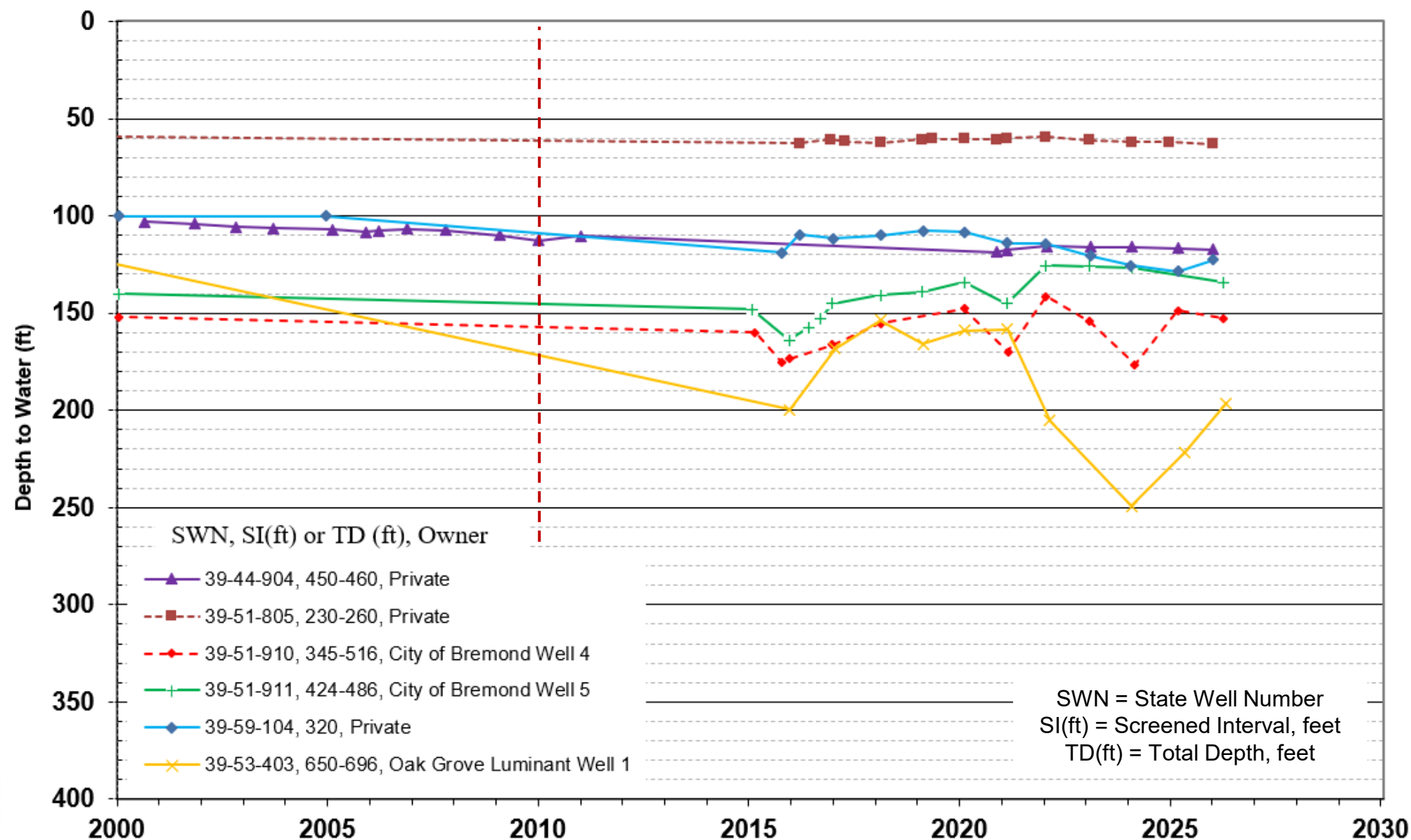
Average Artesian Head Change 2000-2026



Average Artesian Head Change 2010-2026



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
59-21-911	Private
59-30-308	Wellborn SUD Well 1
59-30-410	TAMU Brayton Training Field
59-31-703	Private

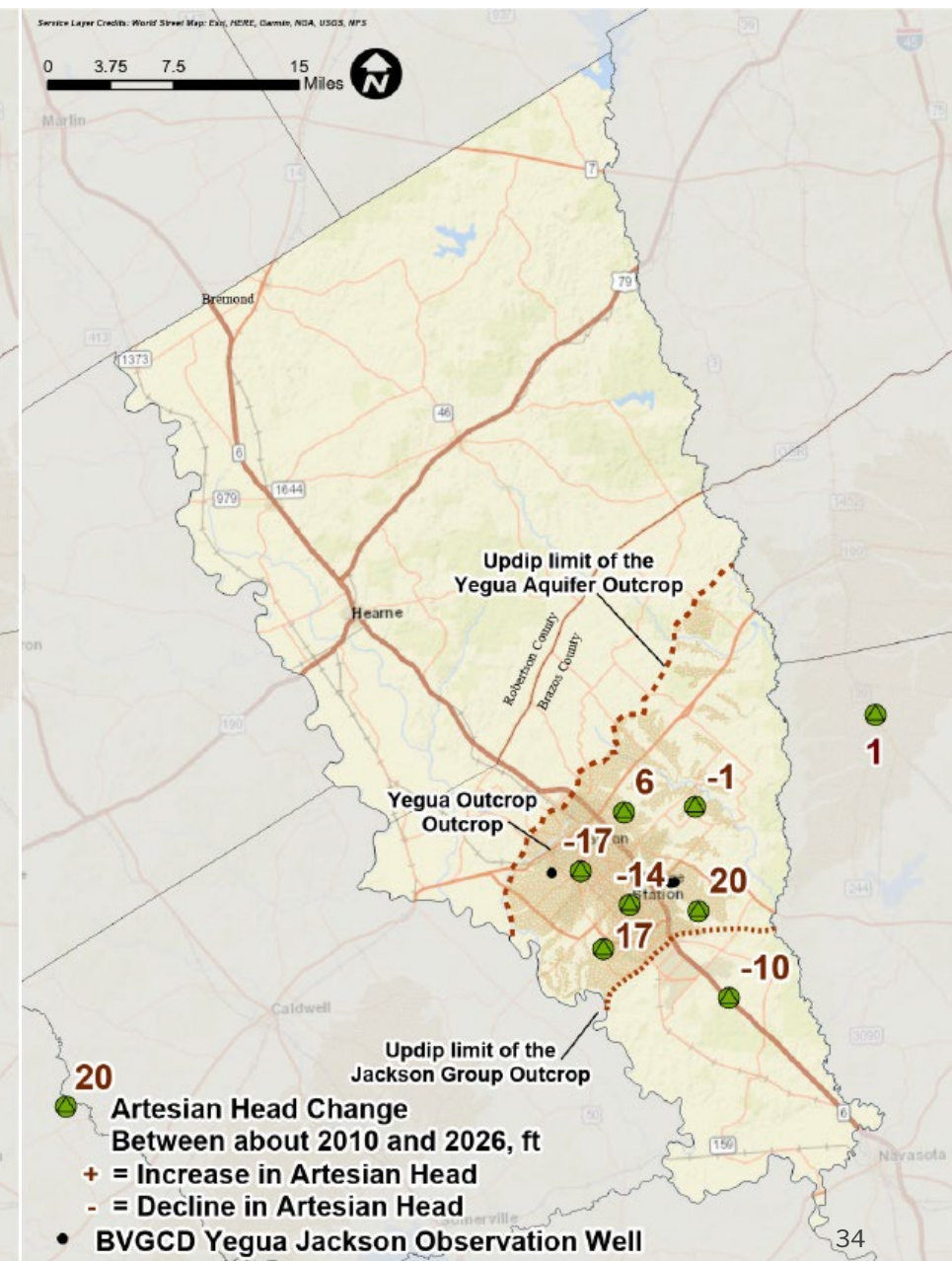
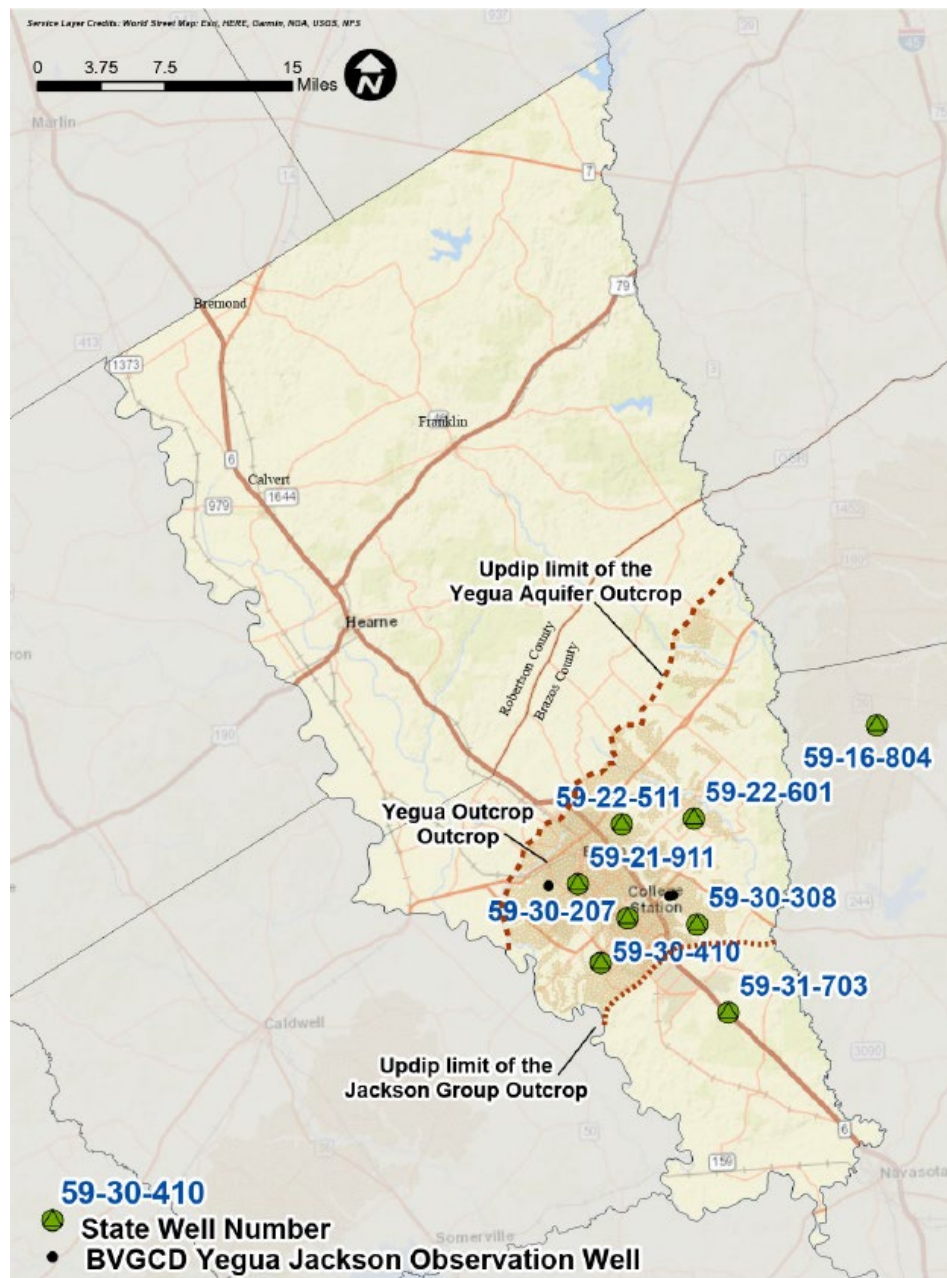
Average Artesian Head Change 2010-2026

Arithmetic Average	0 Feet
Spatially Weighted Average	0 Feet
2070 DFC	67 Feet (Decline)

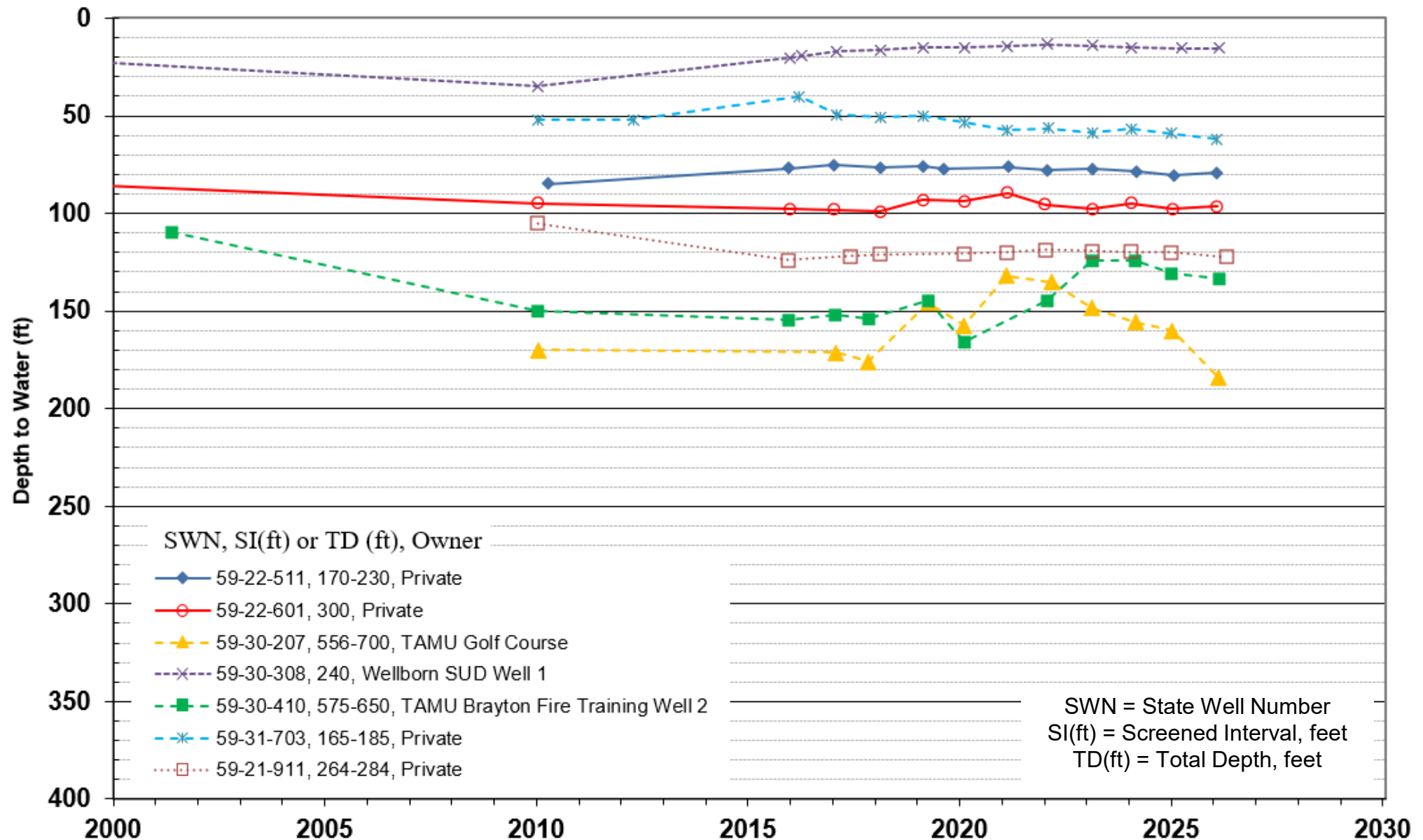
Yegua Jackson Aquifer

Average Artesian Head Change 2010-2026

Arithmetic Average	0 Feet
Spatially Weighted Average	0 Feet
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)
2000-2020	-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
2000-2026	-11	-8	-21	-8	-73	-18	0
DFC 2000-2070 (water level decline)	-53	-44	-84	-111	-262	-167	-67

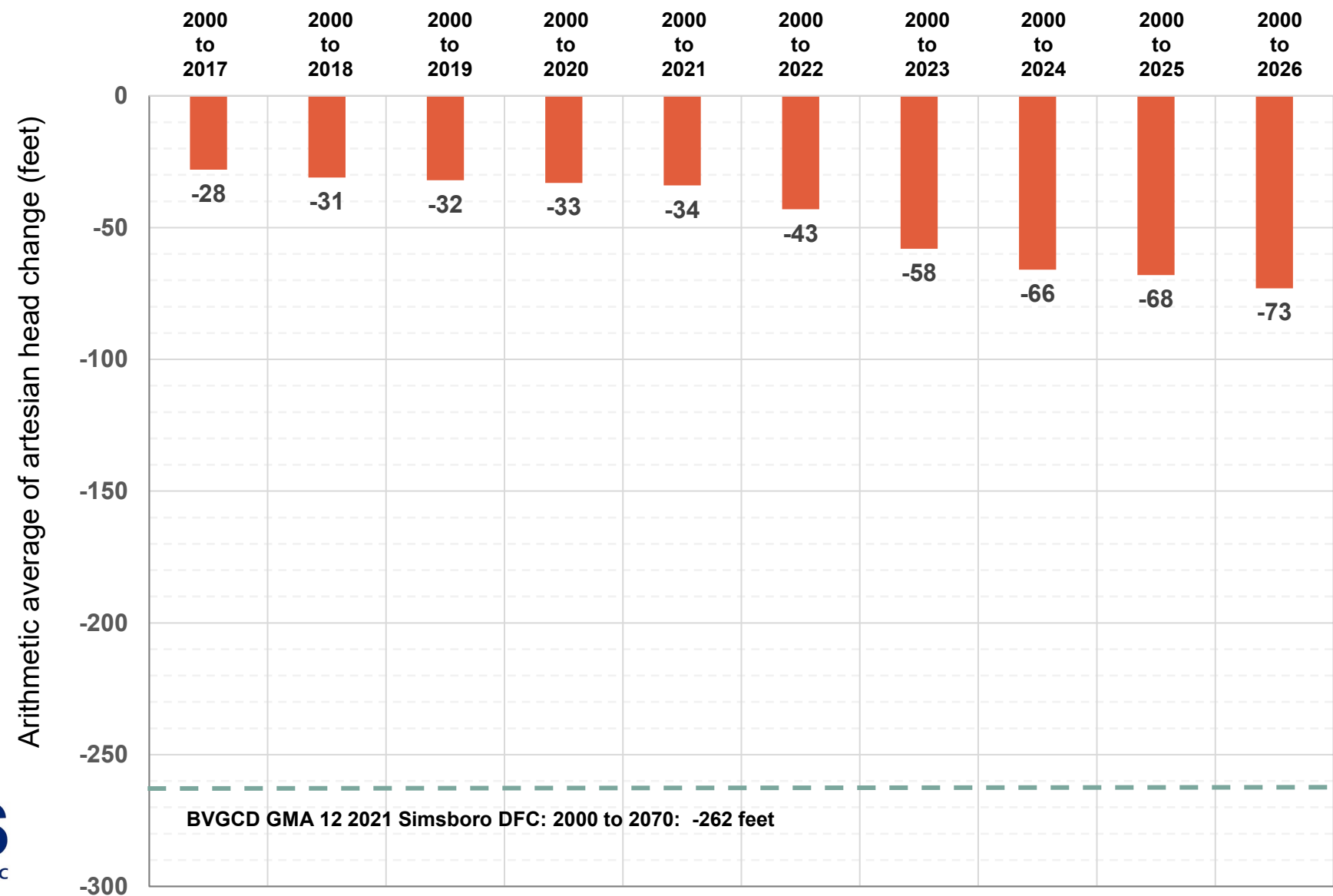
Comparison of DFCs arithmetic average feet of artesian head change from 2010 - 2026

Span of Years	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper	Yegua-Jackson
2010-2026	-3	-3	-19	-5	-51	-5	0
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 Arithmetic Average Artesian Head Change, feet	Simsboro Rate of Decline During Current Year based on Arithmetic Average, feet	Simsboro Spatially Weighted Average Artesian Head Change, feet	Simsboro Rate of Decline During Current Year based on Spatially Weighted Average, feet
2000-2020	-33	-	-33	-
2000-2021	-34	1	-35	2
2000-2022	-43	9	-43	8
2000-2023	-58	15	-59	16
2000-2024	-66	8	-68	9
2000-2025	-68	2	-70	2
2000-2026	-73	5	-76	6
DFC (2000-2070)	-262			

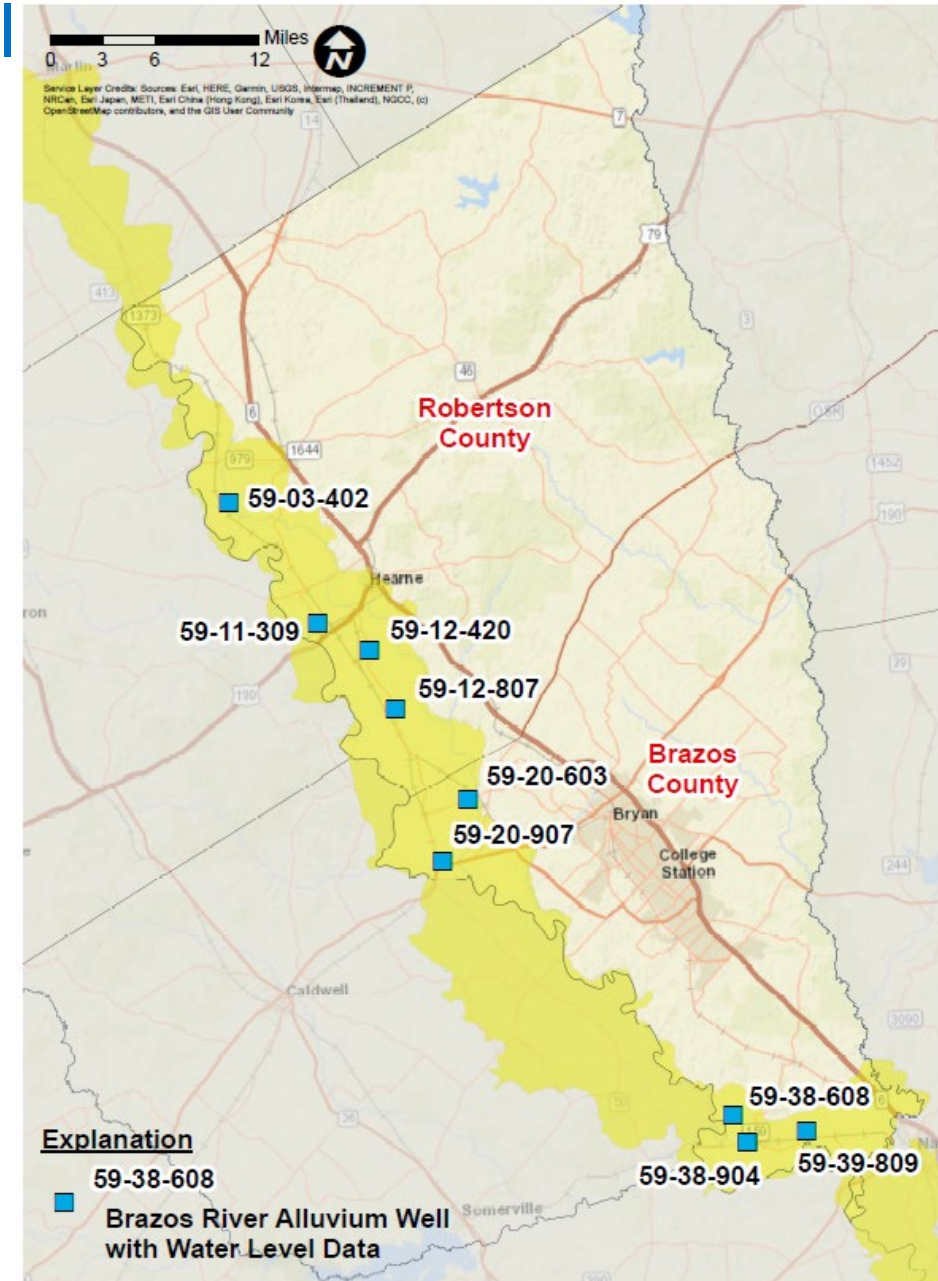
Comparison of the Simsboro Aquifer Average Artesian Head Change and DFC



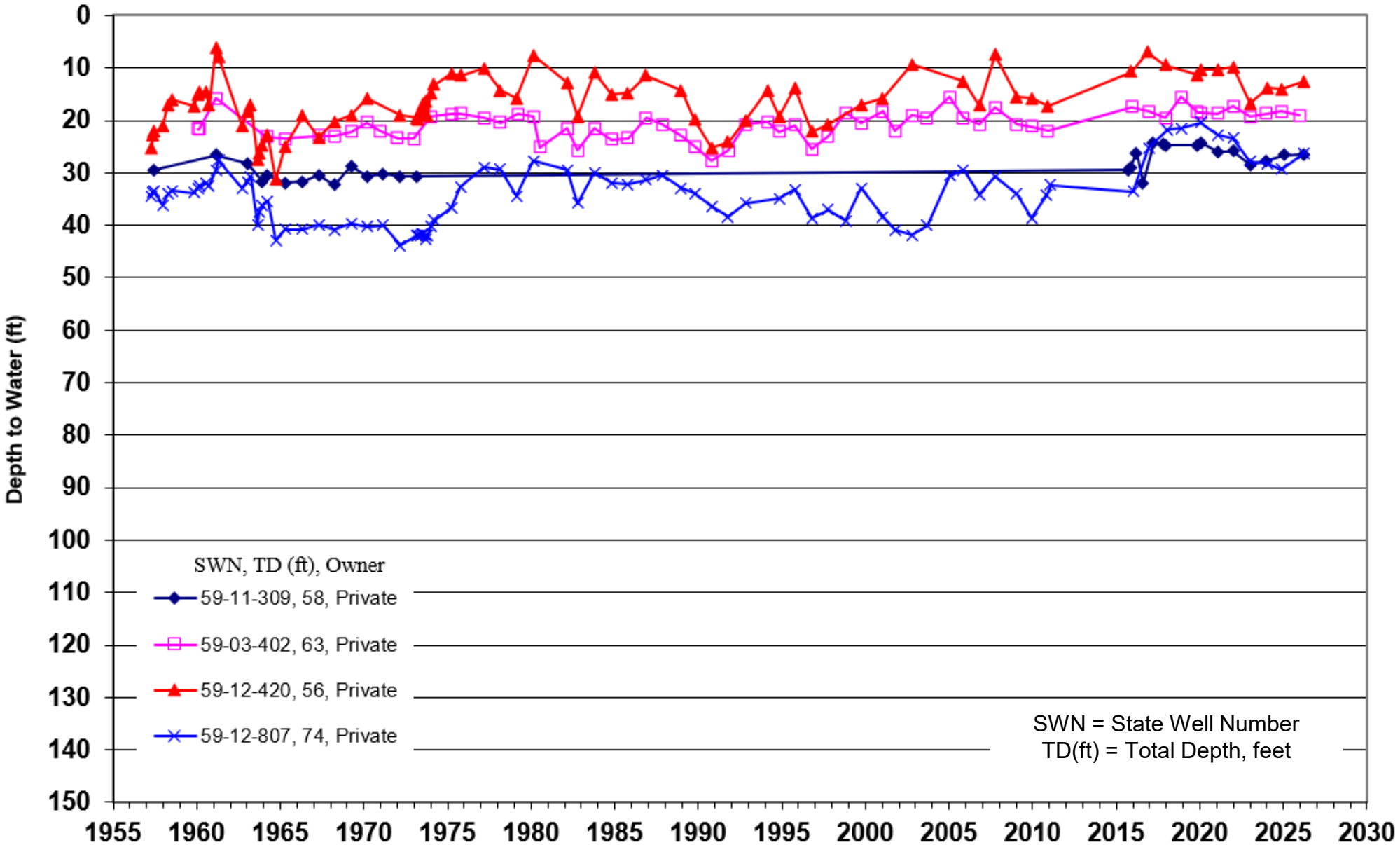
Brazos River Alluvium Aquifer DFC Wells

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

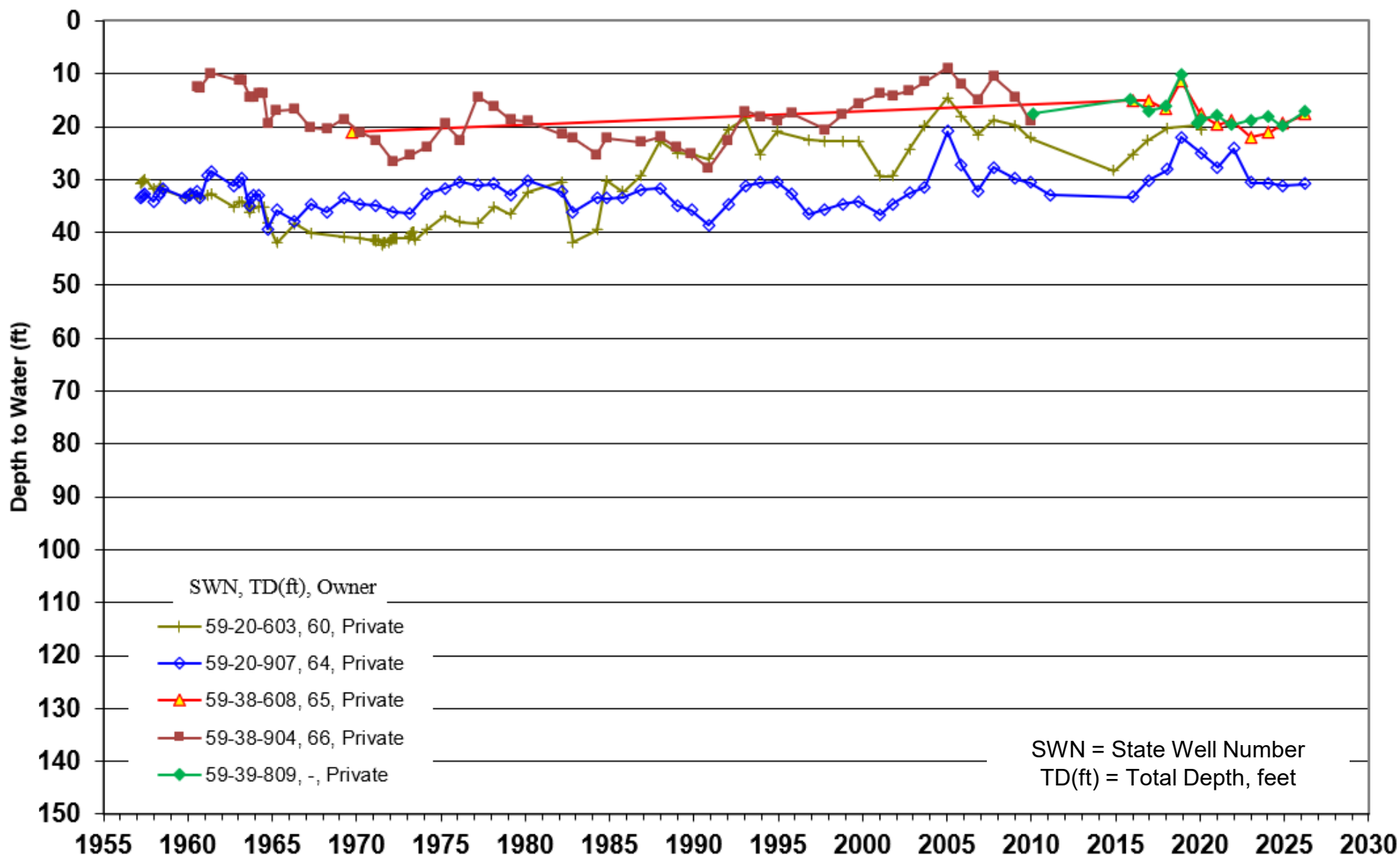
Location of Brazos River Alluvium Well with Water Level Hydrographs



Brazos River Alluvium Observation Wells (Robertson County)



Brazos River Alluvium Observation Wells (Brazos County)



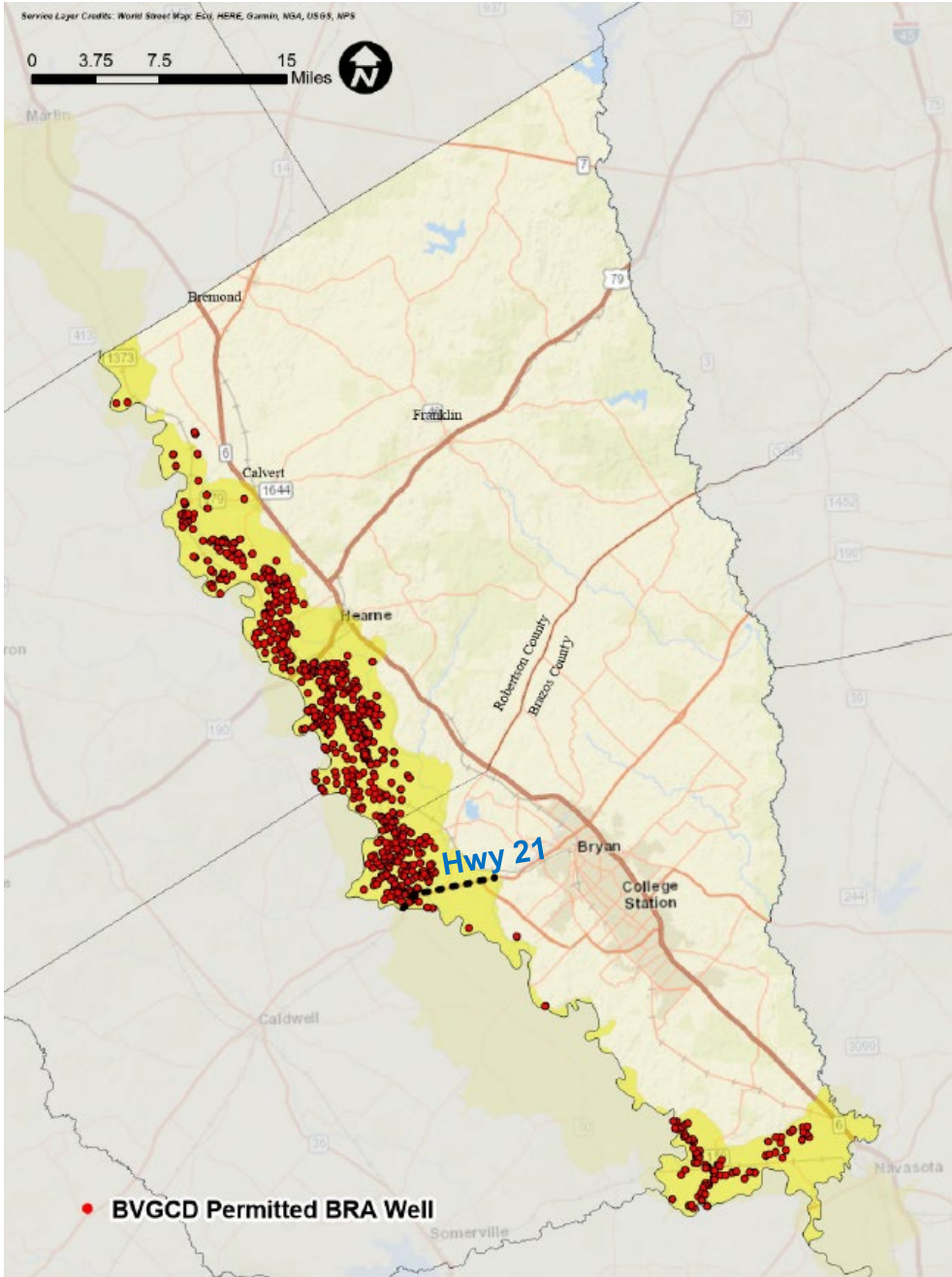
Brazos River Alluvium Well Data

Arithmetic Average Percent Saturation

2021	2022	2023	2024	2025	2026
68%	69%	63%	64%	64%	66%

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 increase in the Simsboro in 2026
- District staff continues to add wells to monitoring network
- Continue to review District well and water level records to add additional data for use in DFC analysis

Questions?

Simsboro Aquifer Pumping Estimates: 2009 Through 2025 (draft)

