

Aquifer Desired Future Conditions 2022 Update



Presented to
BVGCD Board of Directors
By
Ground Water Consultants, LLC

April 14, 2022

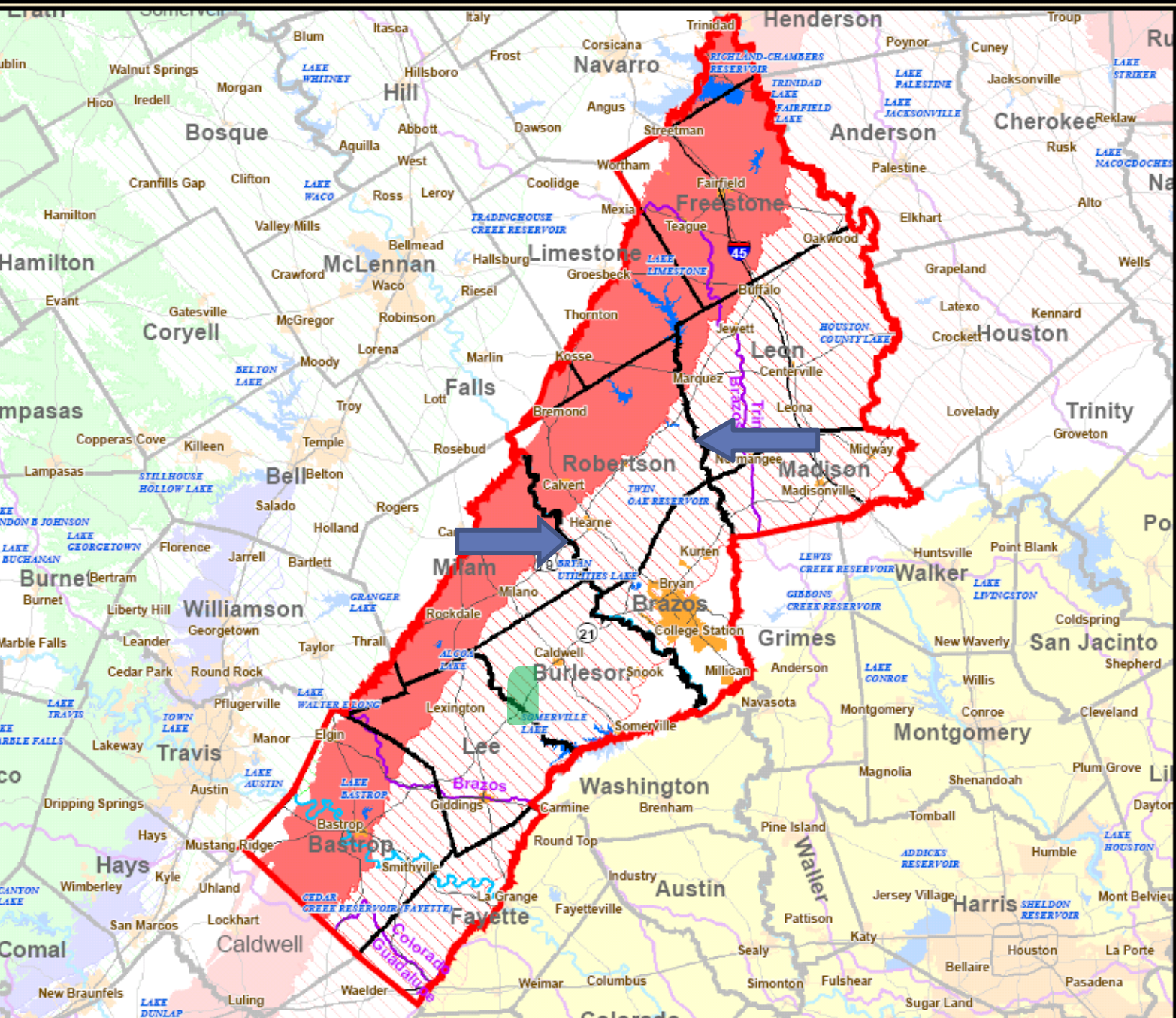
Desired Future Conditions

- Established for 2070 for Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro, Hooper, Yegua, Jackson and Brazos River Alluvium aquifers during 2021 cycle of GMA 12 planning, all DFCs changed from 2016 cycle except for Brazos River Alluvium Aquifer
- Use average artesian head decline over aquifer areas as matrix for quantifying progress toward reaching Desired Future Conditions (DFCs). For Brazos River Alluvium matrix is percent of aquifer saturation
- Well static water-level data used to help monitor aquifer response to pumping and estimate average artesian head changes

Desired Future Conditions (cont'd)

- DFCs established based on estimates of effects of pumping in the District and the effects of pumping in other areas of GMA 12 that extend up to 75 miles from the District
- Monitoring of groundwater pumping essential in understanding changes in artesian head and thus progress toward reaching DFCs

Groundwater Management Area #12

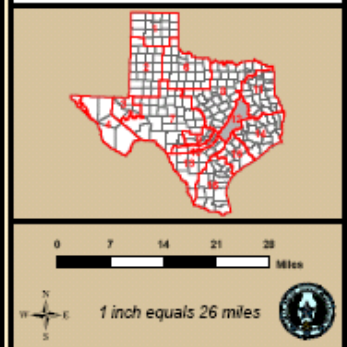


MAP LEGEND

- GMA #12
 - River River
 - River Basin
 - Reservoir
 - Cities
 - Counties
- ### Major Aquifers
- Cenozoic Pecos Alluvium
 - Seymour
 - Gulf Coast
 - Carrizo - Wilcox (outcrop)
 - Carrizo - Wilcox (downdip)
 - Hueco - Mesilla Bolson
 - Ogallala
 - Edwards - Trinity Plateau (outcrop)
 - Edwards - Trinity Plateau (downdip)
 - Edwards BFZ (outcrop)
 - Edwards BFZ (downdip)
 - Trinity (outcrop)
 - Trinity (downdip)

DISCLAIMER
No claims are made to the accuracy or completeness of the data nor to its suitability for a particular use. The scale and compilation of all information shown here is approximate.

Map prepared by Mark Hayes
Texas Water Development Board
GIS Section
12/21/2005



0 7 14 21 28 Miles

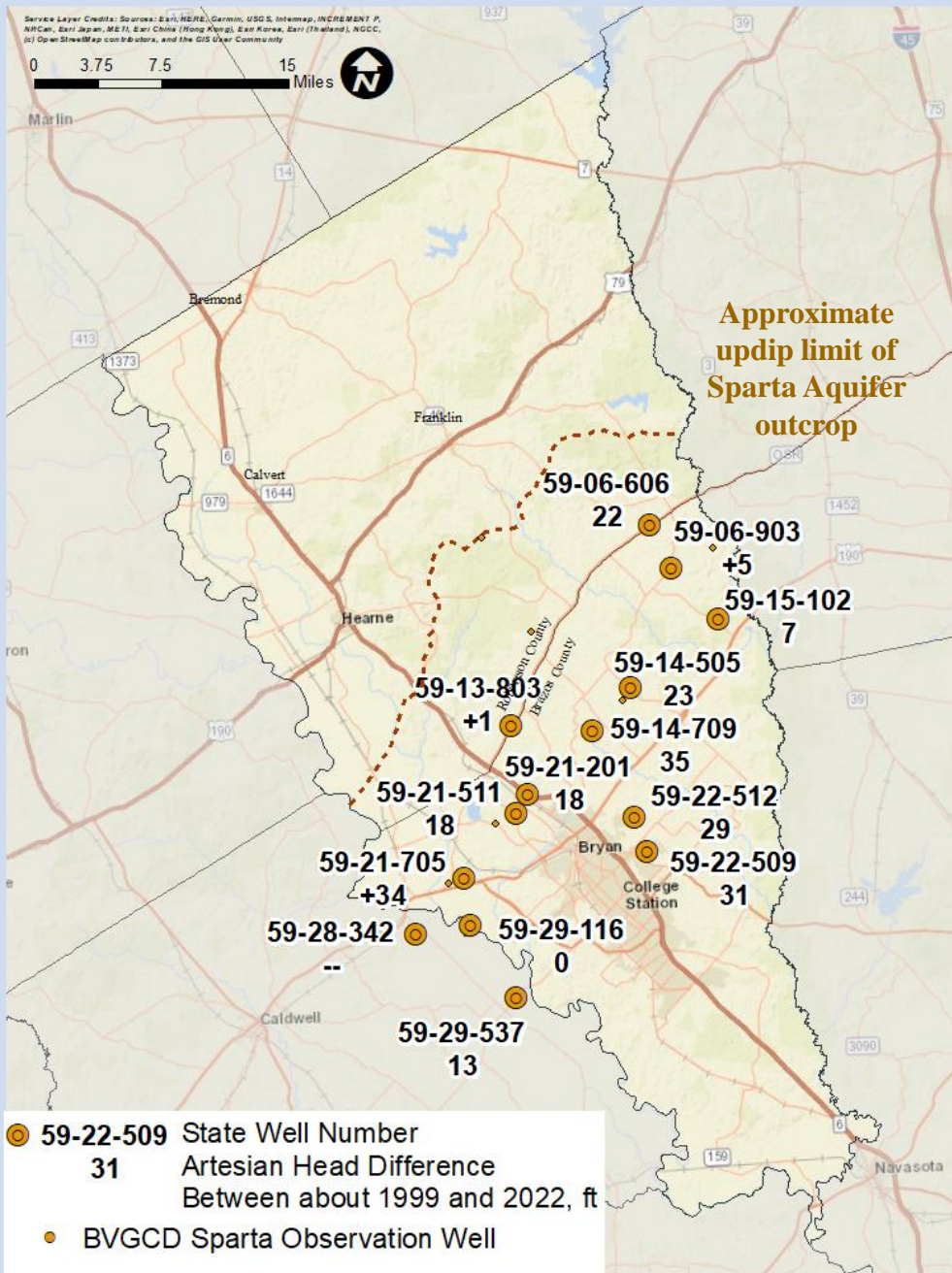
1 inch equals 26 miles

DFC Goals Established During 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

Sparta Aquifer DFC Wells

State Well Number	Owner
59-05-905	Private
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
59-29-116	Private

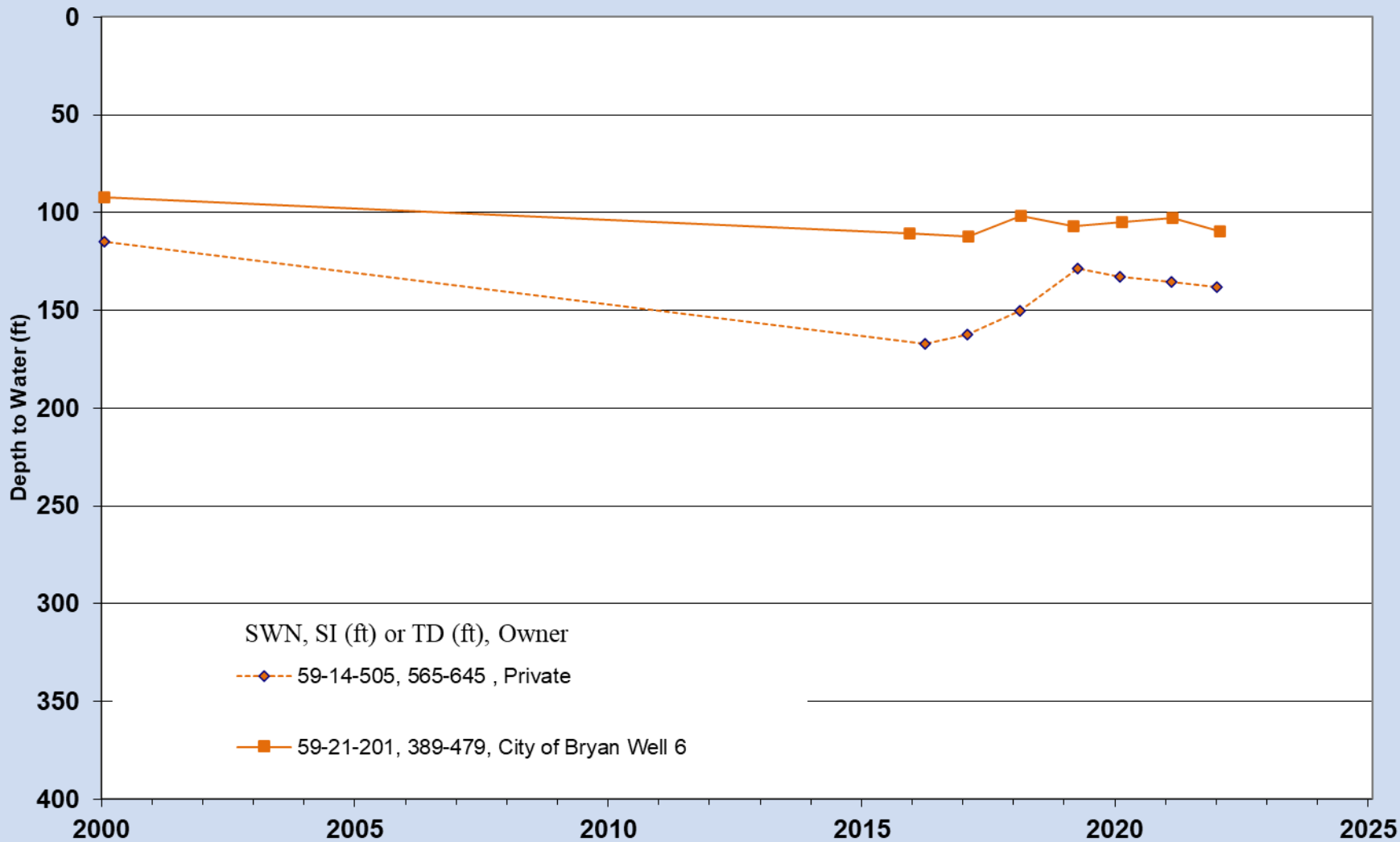


Sparta Aquifer

Average Artesian Head Change
2000-2022 = 12 feet

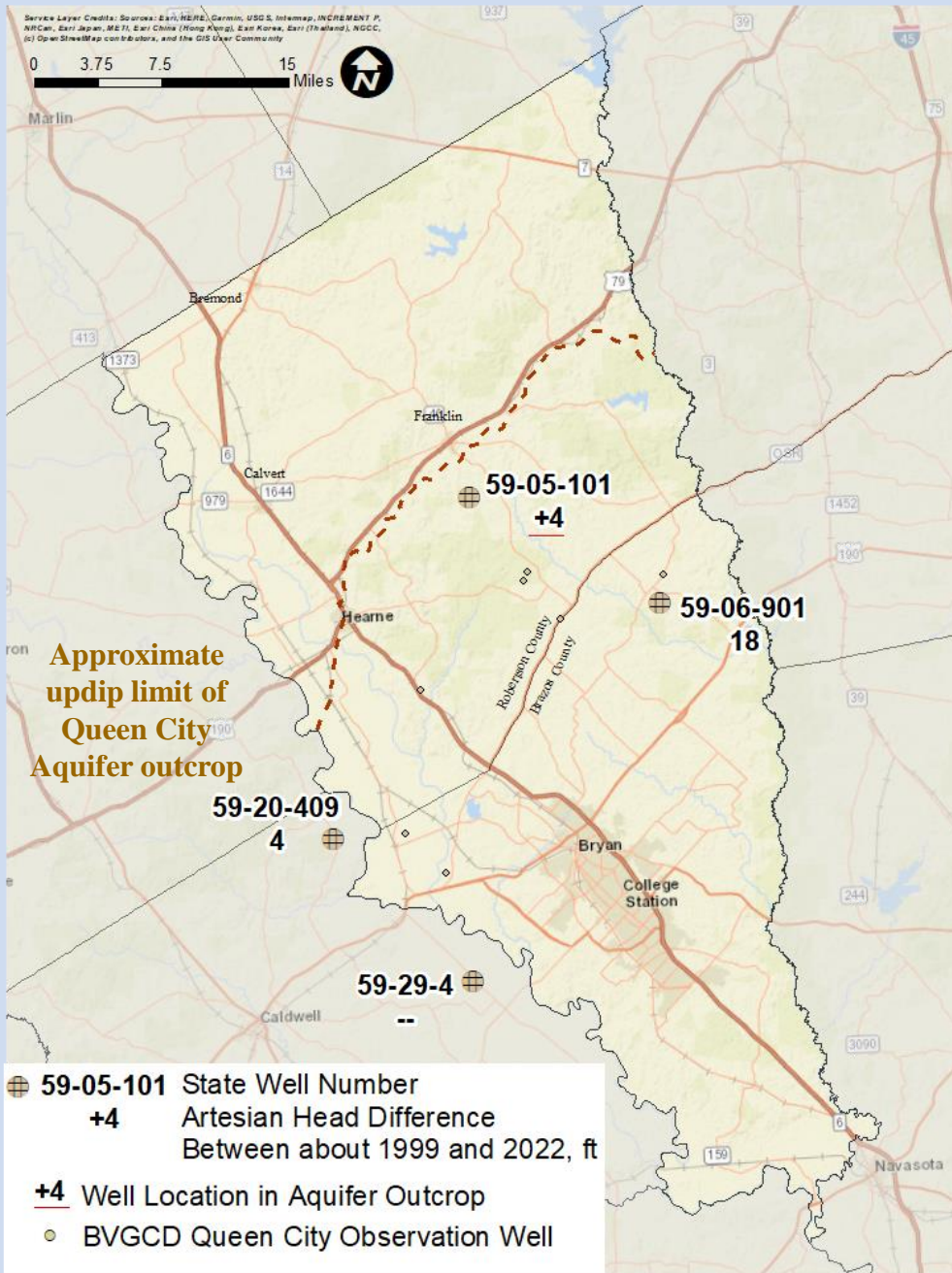
DFC by 2070:
Average Artesian Head Decline 50 feet

SPARTA AQUIFER OBSERVATION WELLS



Queen City, Carrizo and Calvert Bluff Aquifers DFC Wells

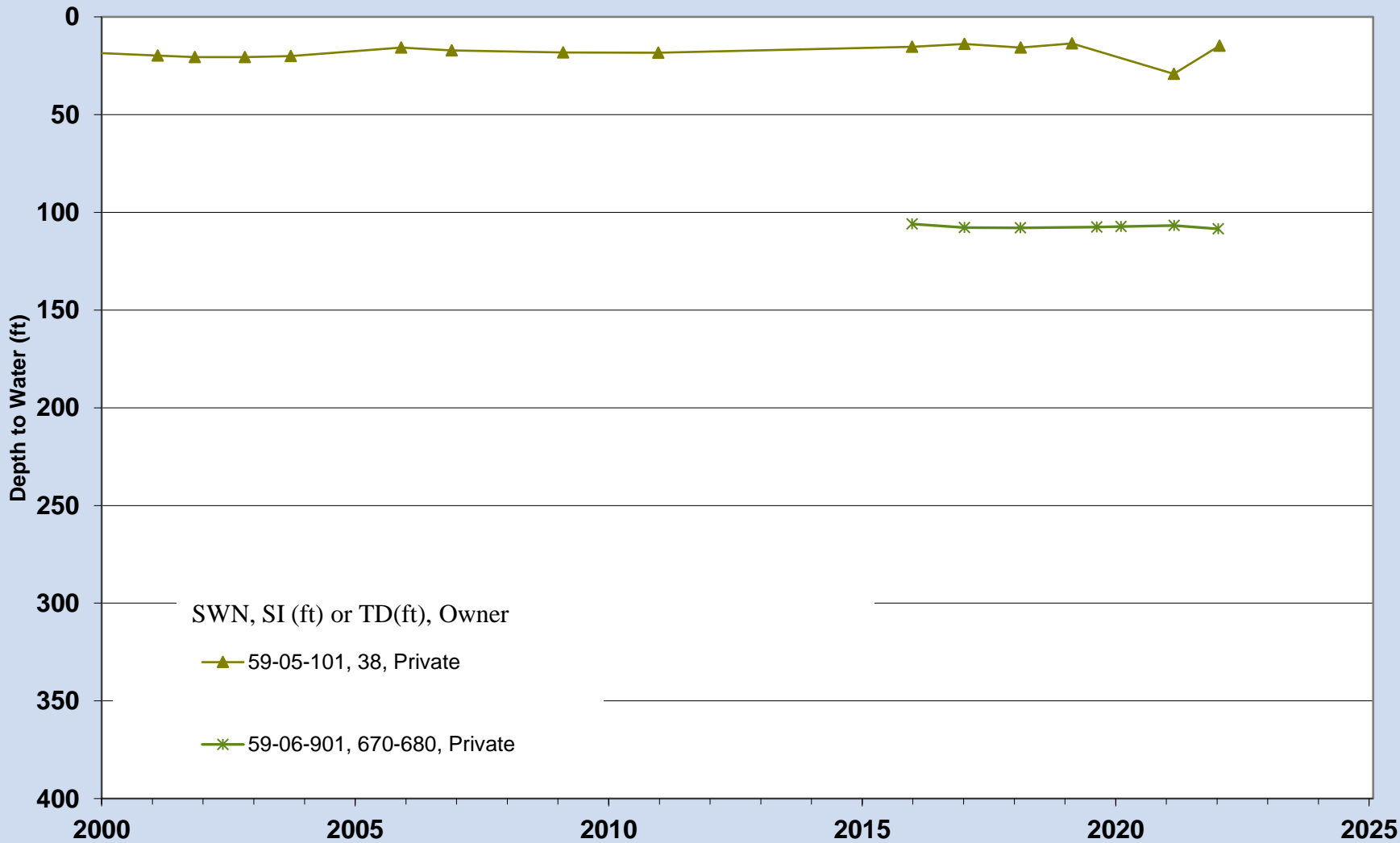
State Well Number	Well Owner
Queen City Aquifer	
59-05-101	Private
59-06-901	Private
Carrizo Aquifer	
59-04-708	Private
59-05-105	Private
59-05-301	Private
59-21-402	TAMU Well 5
59-21-416	City of College Station Carrizo #1
Calvert Bluff	
59-03-438	Private
59-03-606	Private

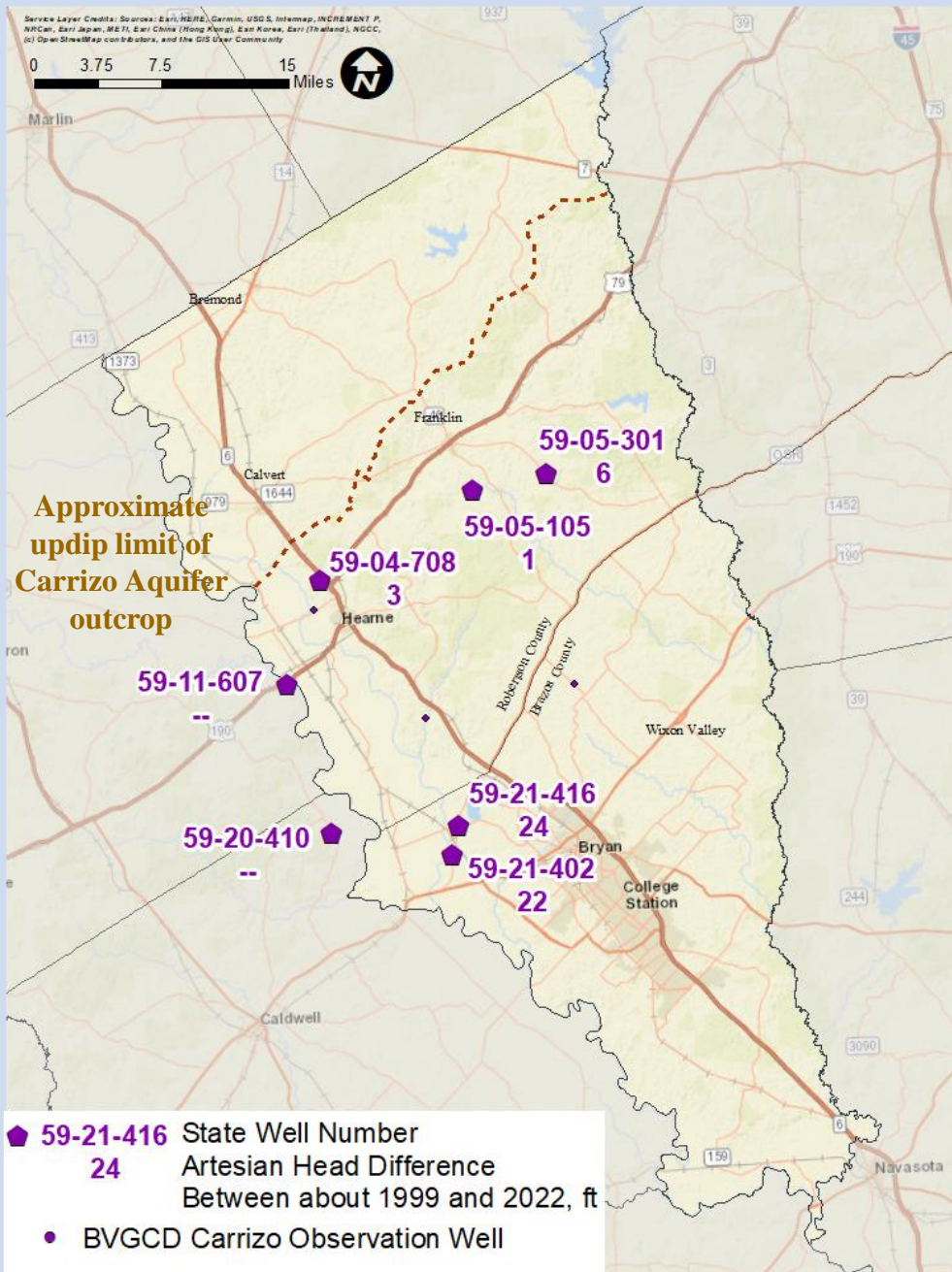


Queen City Aquifer

DFC by 2070:
Average Artesian Head Decline 44 feet

QUEEN CITY AQUIFER OBSERVATION WELLS



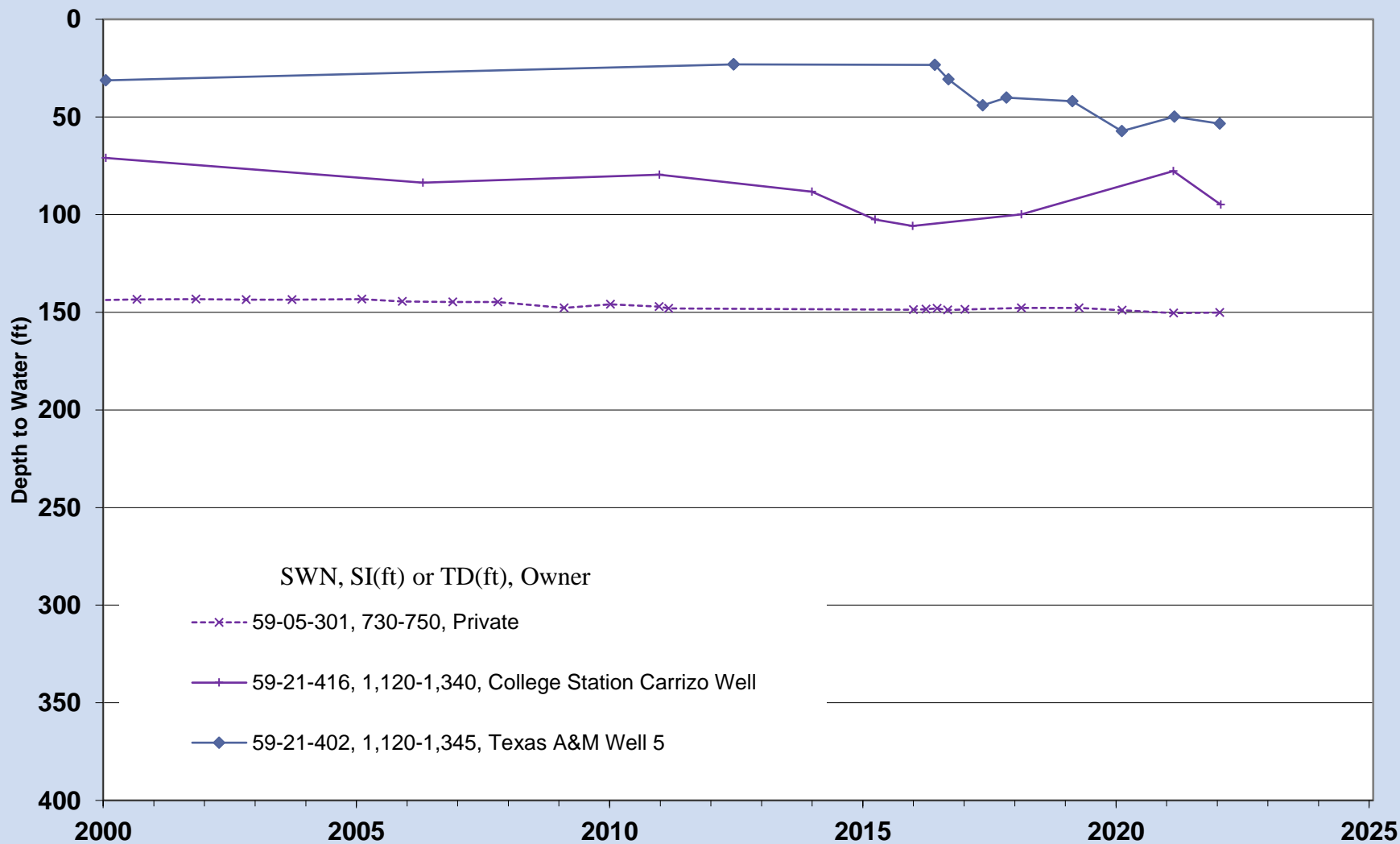


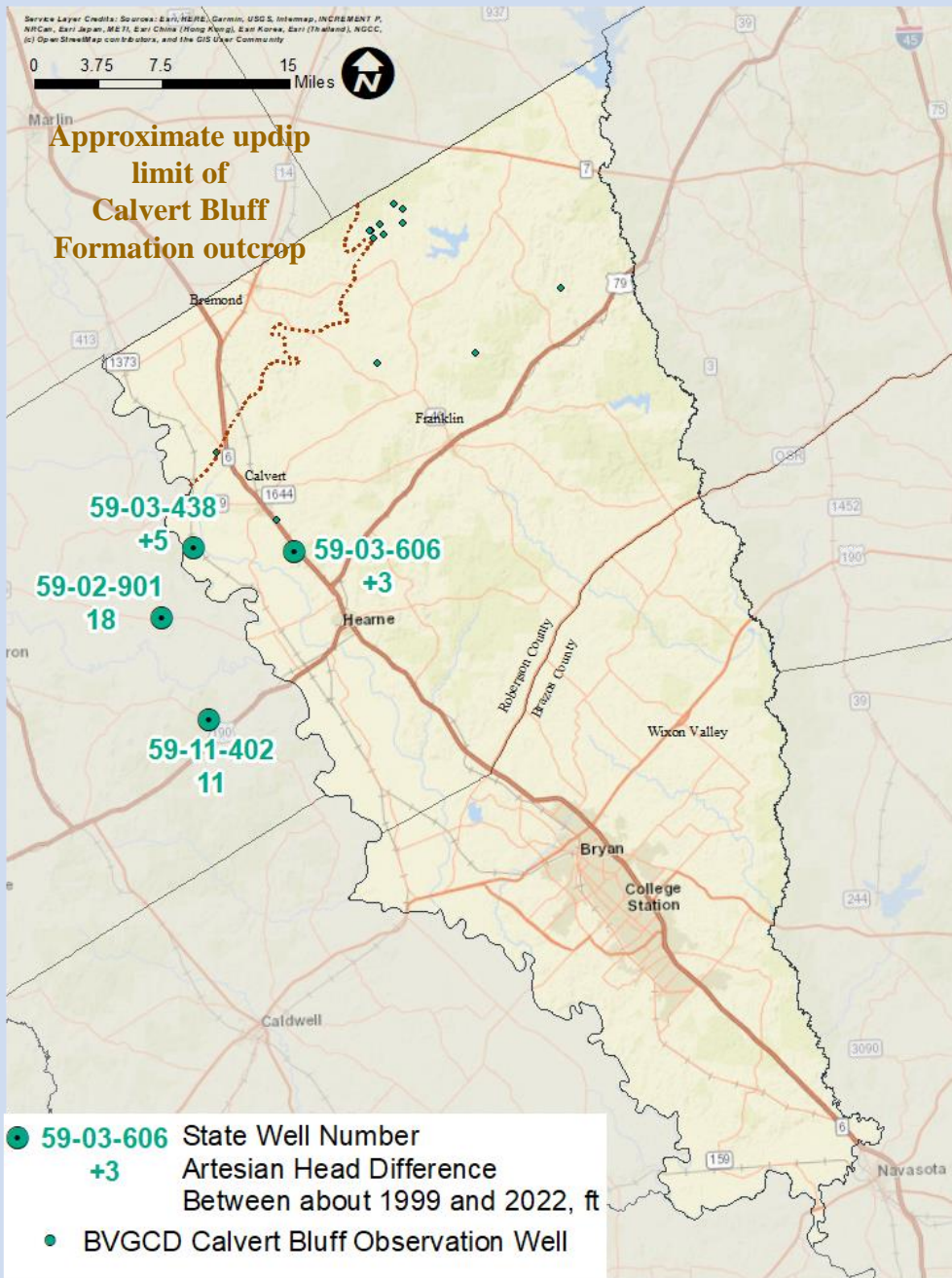
Carrizo Aquifer

Average Artesian Head Decline
2000-2022 = 11 ft

DFC by 2070:
Average Artesian Head Decline of 84 feet

CARRIZO AQUIFER OBSERVATION WELLS

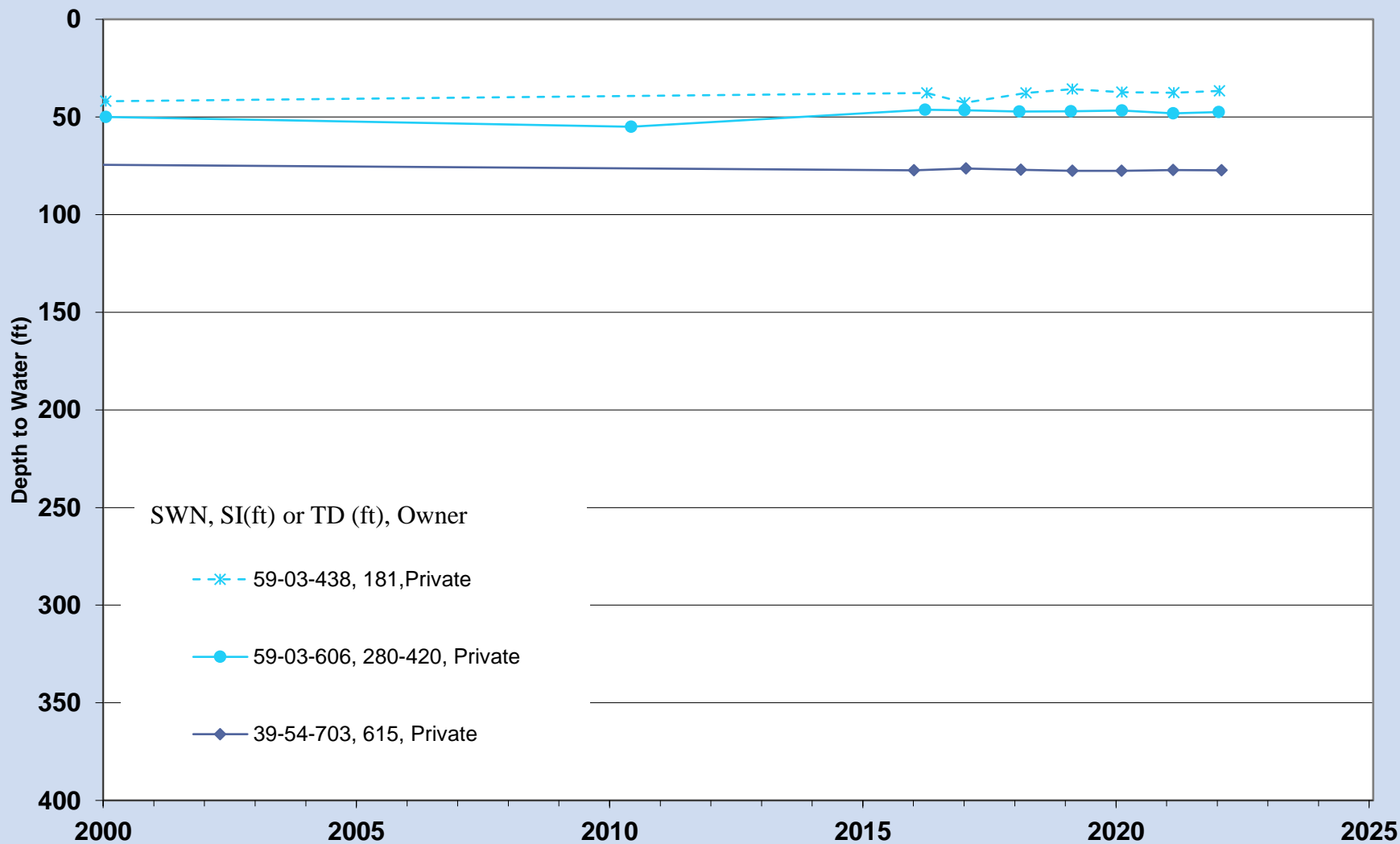




Calvert Bluff Formation

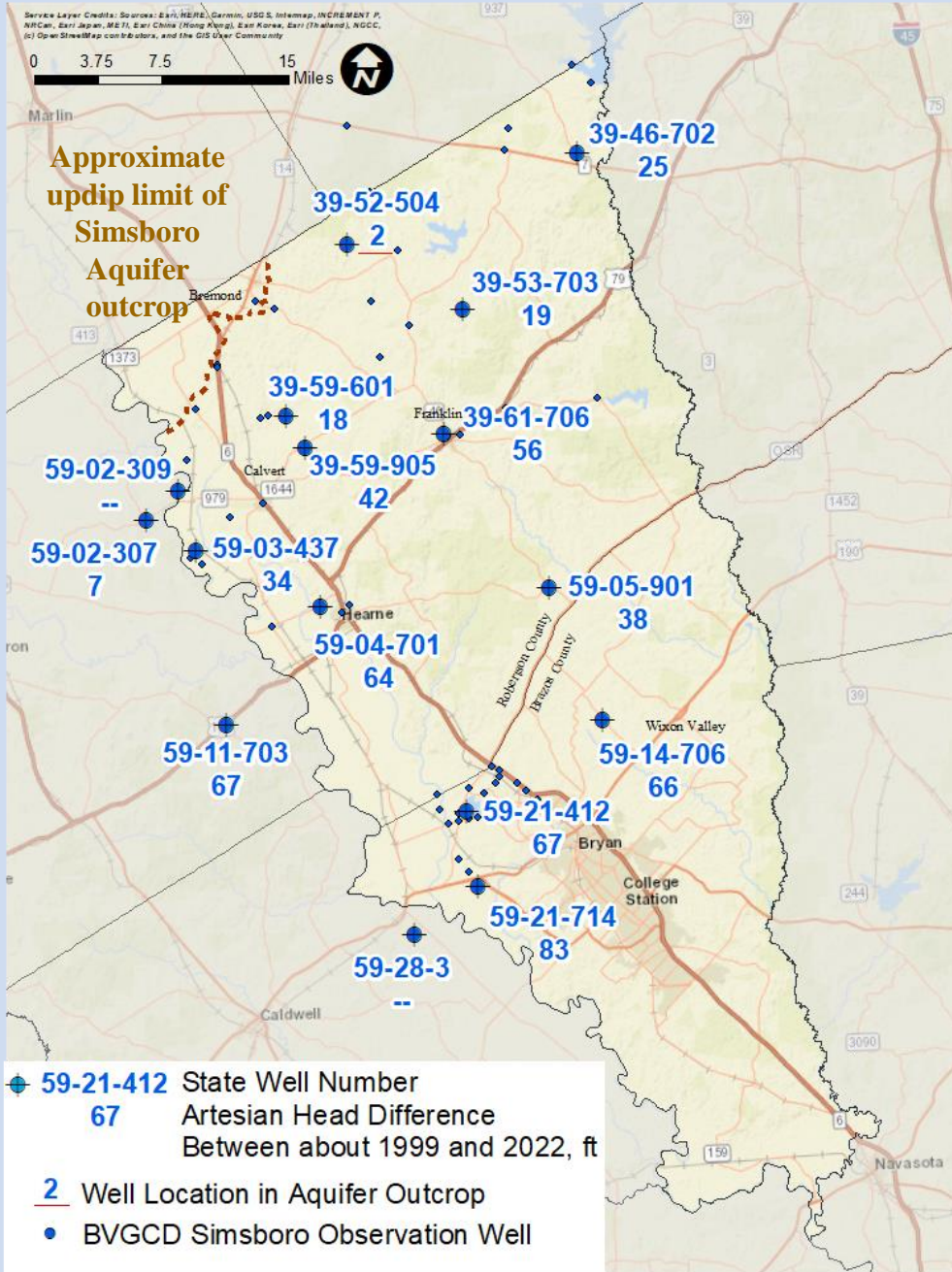
DFC by 2070:
Average Artesian Head Decline of 111 feet

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

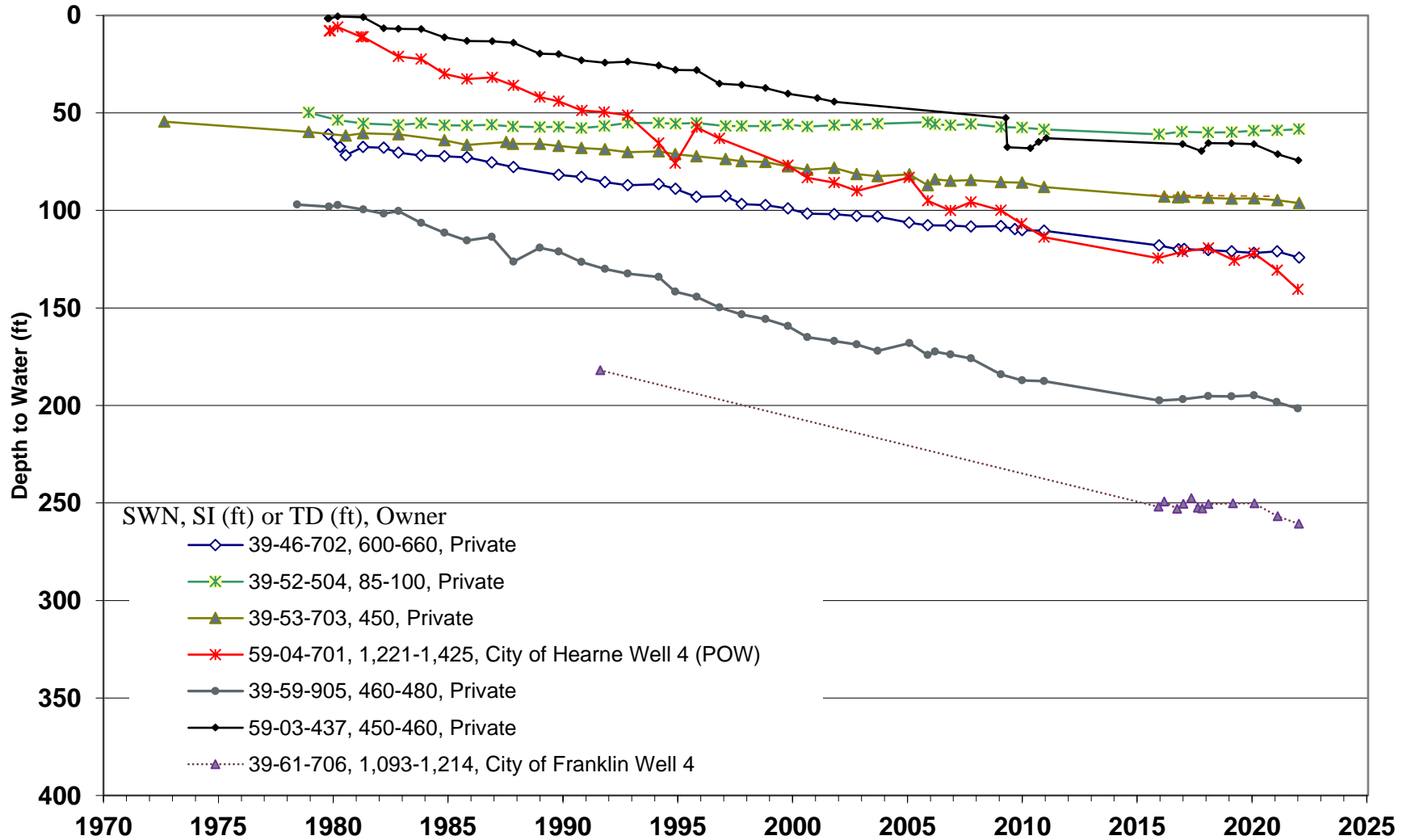
Average Artesian Head Decline
2000-2022 = 43 feet

Weighted Average Artesian Head Decline
1999-2022 = 43 feet

DFC by 2070:
Average Artesian Head Decline of 262 feet

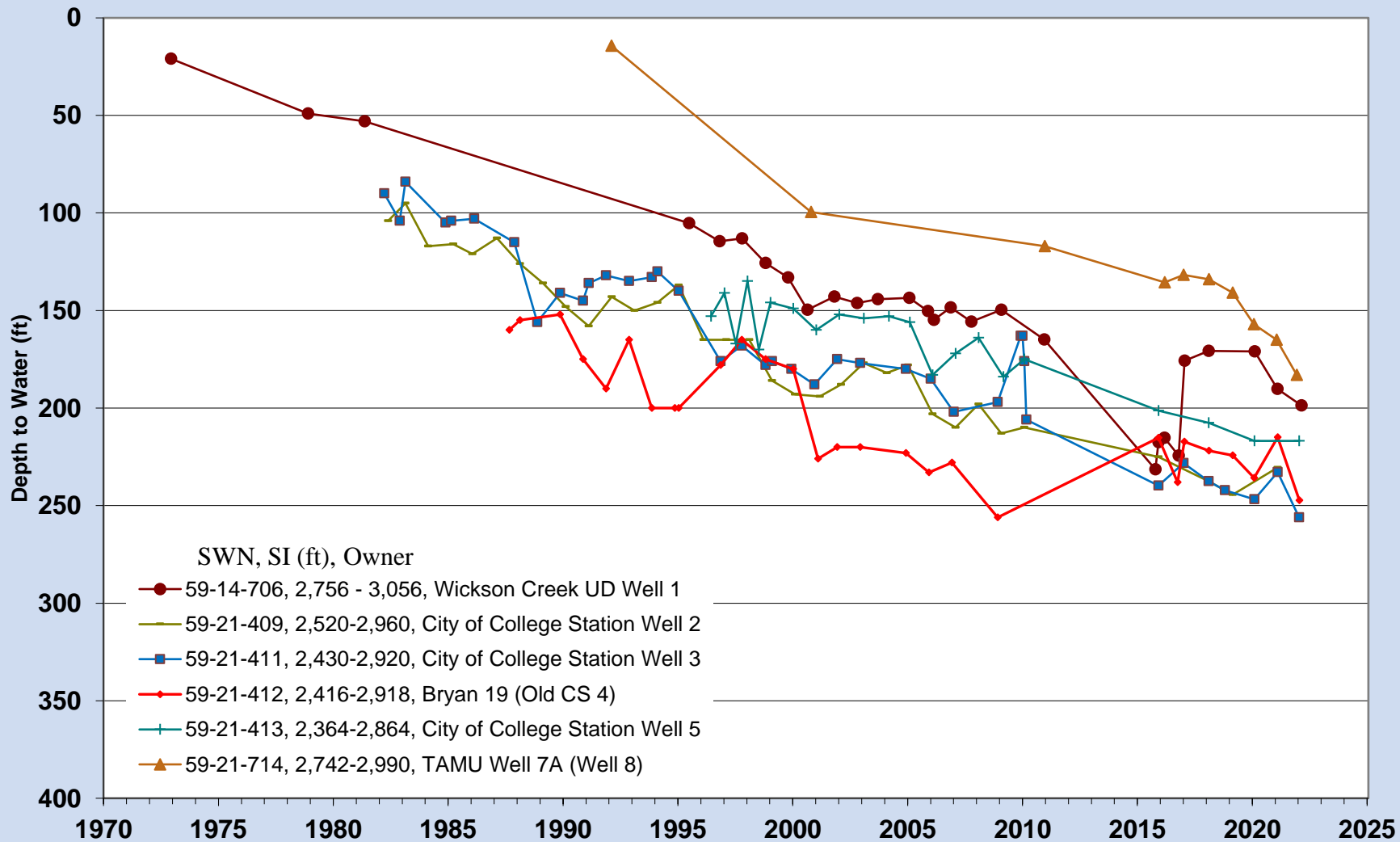
SIMSBORO AQUIFER OBSERVATION WELLS

Robertson County



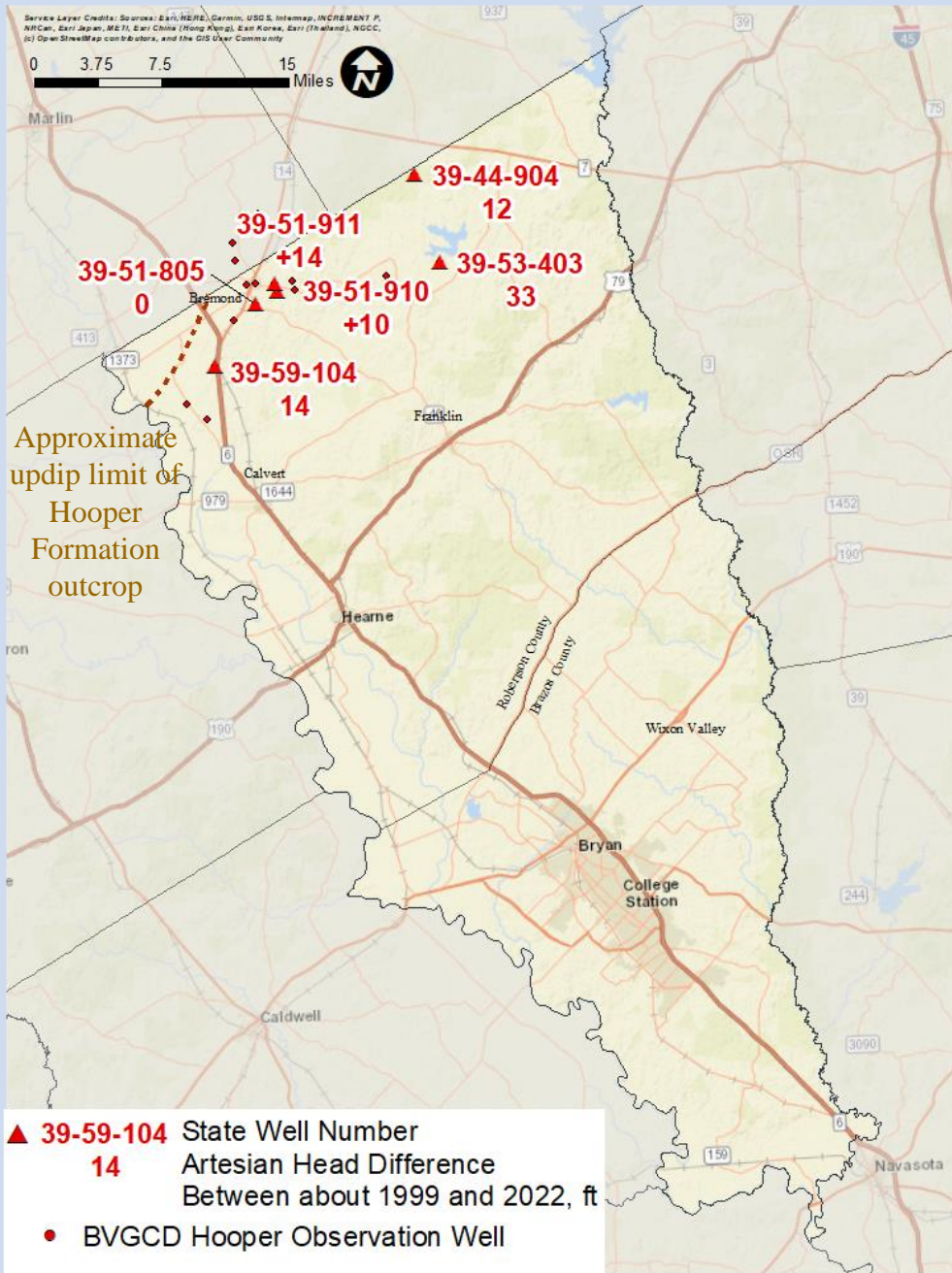
SIMSBORO AQUIFER OBSERVATION WELLS

Brazos County



Hooper and Yegua-Jackson Aquifers DFC Wells

State Well Number	Well Owner
Hooper Aquifer	
39-44-904	Private
39-51-805	Private
39-51-910	City of Bremond Well 4
39-51-911	City of Bremond Well 5
39-59-403	Private
39-59-104	Private
Yegua - Jackson Aquifer	
59-21-911	Private
59-22-511	Private
59-22-601	Private
59-30-207	TAMU Golf Course
59-30-308	Wellborn WSC Agnello Well 1
59-30-410	TAMU Brayton Training Field
59-31-703	Private

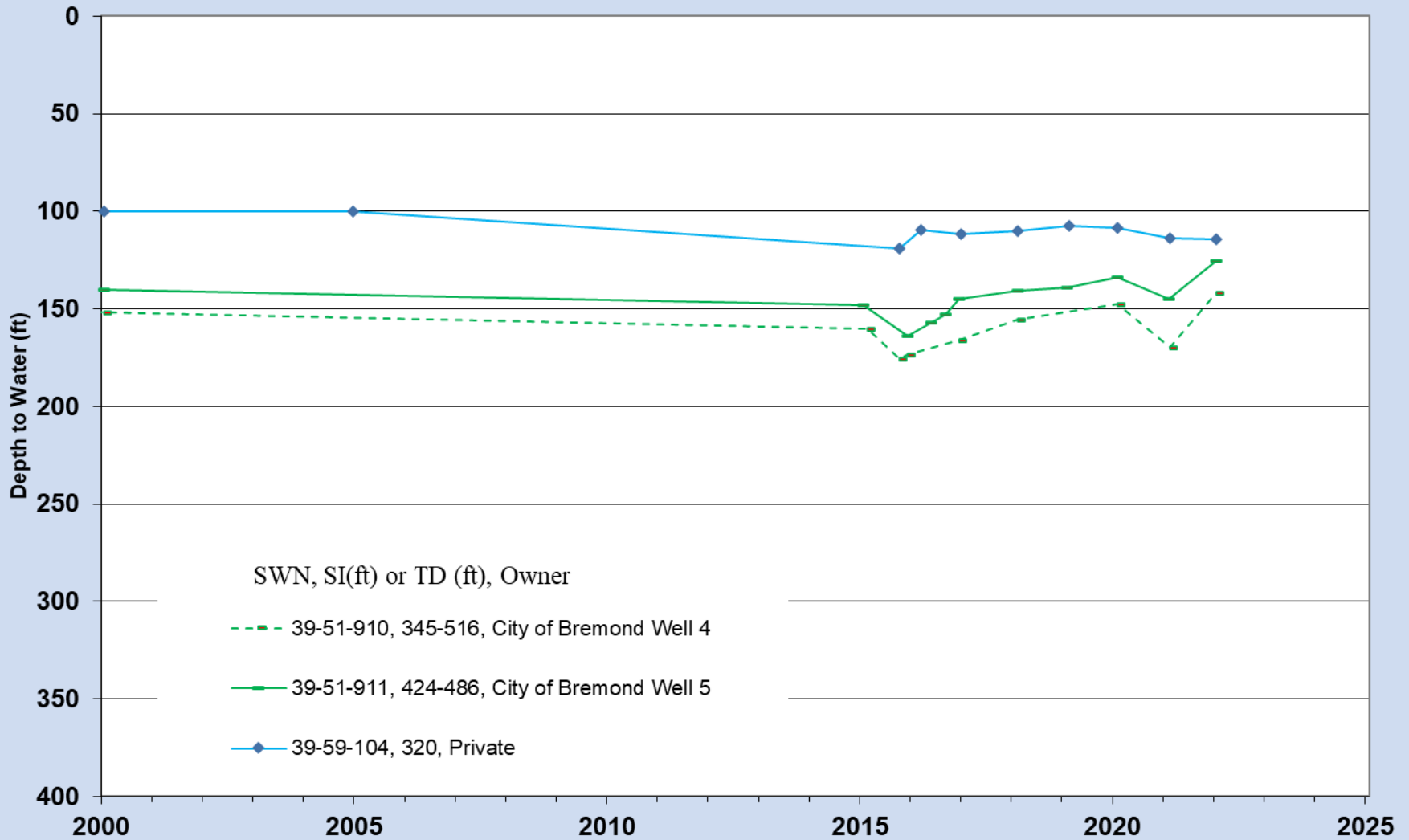


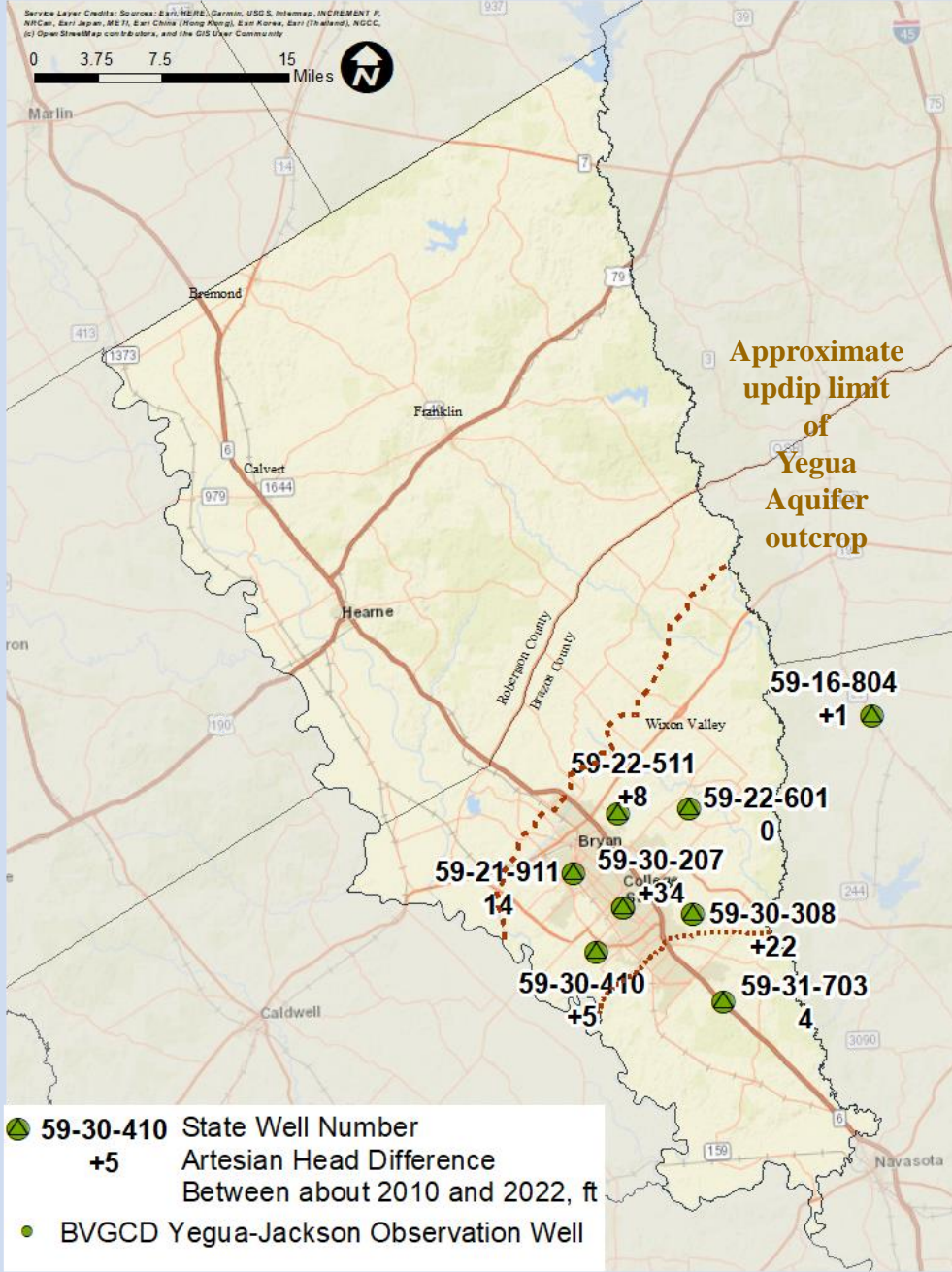
Hooper Formation

Average Artesian Head Decline
 2000-2022 = 6 feet

DFC by 2070:
 Average Artesian Head Decline of 167 feet

HOOPER FORMATION OBSERVATION WELLS



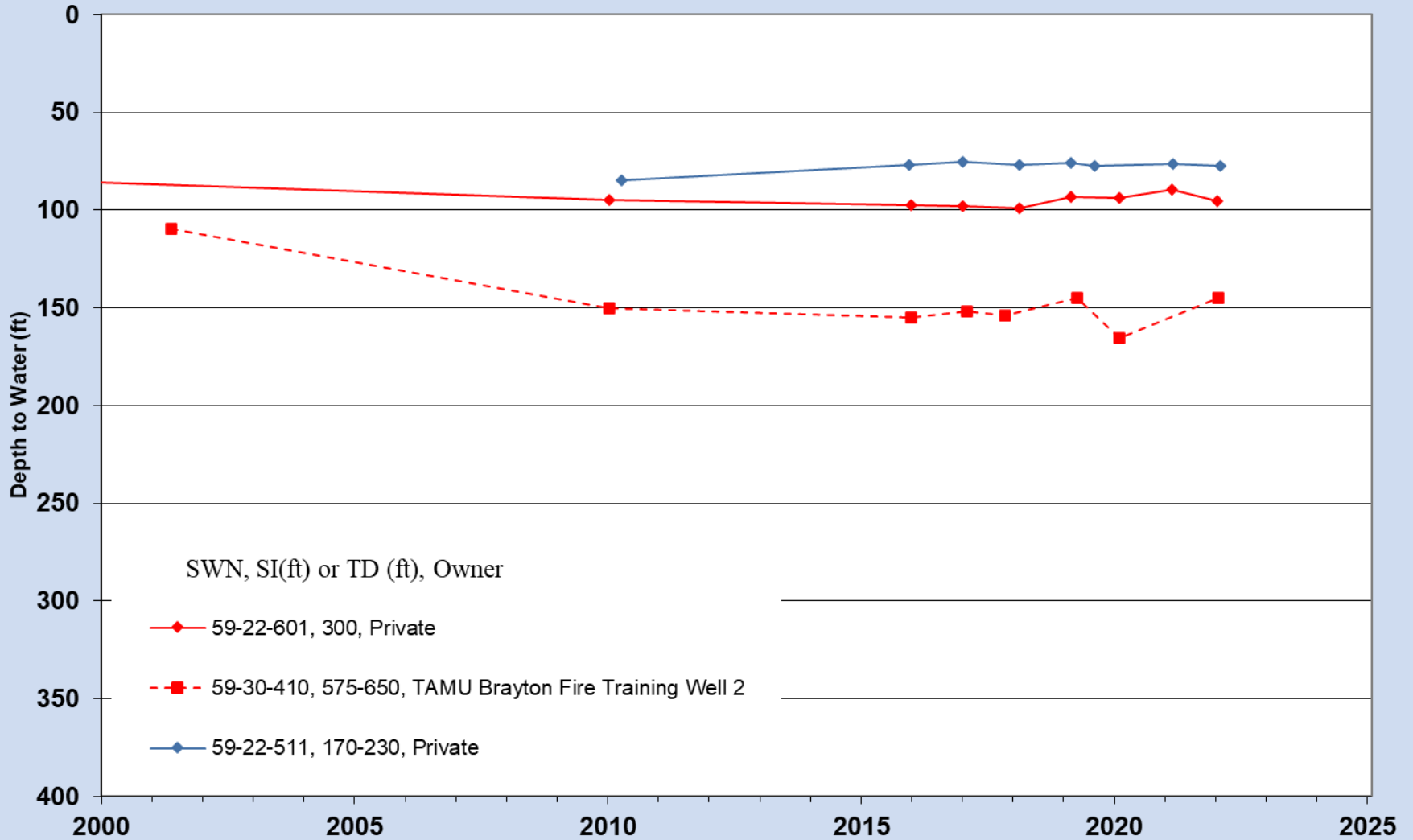


Yegua-Jackson Aquifer

Average Artesian Head Change
2010-2022 = +8 feet

DFC by 2070:
Average Artesian Head Decline
of 67 feet

YEGUA-JACKSON AQUIFER OBSERVATION WELLS



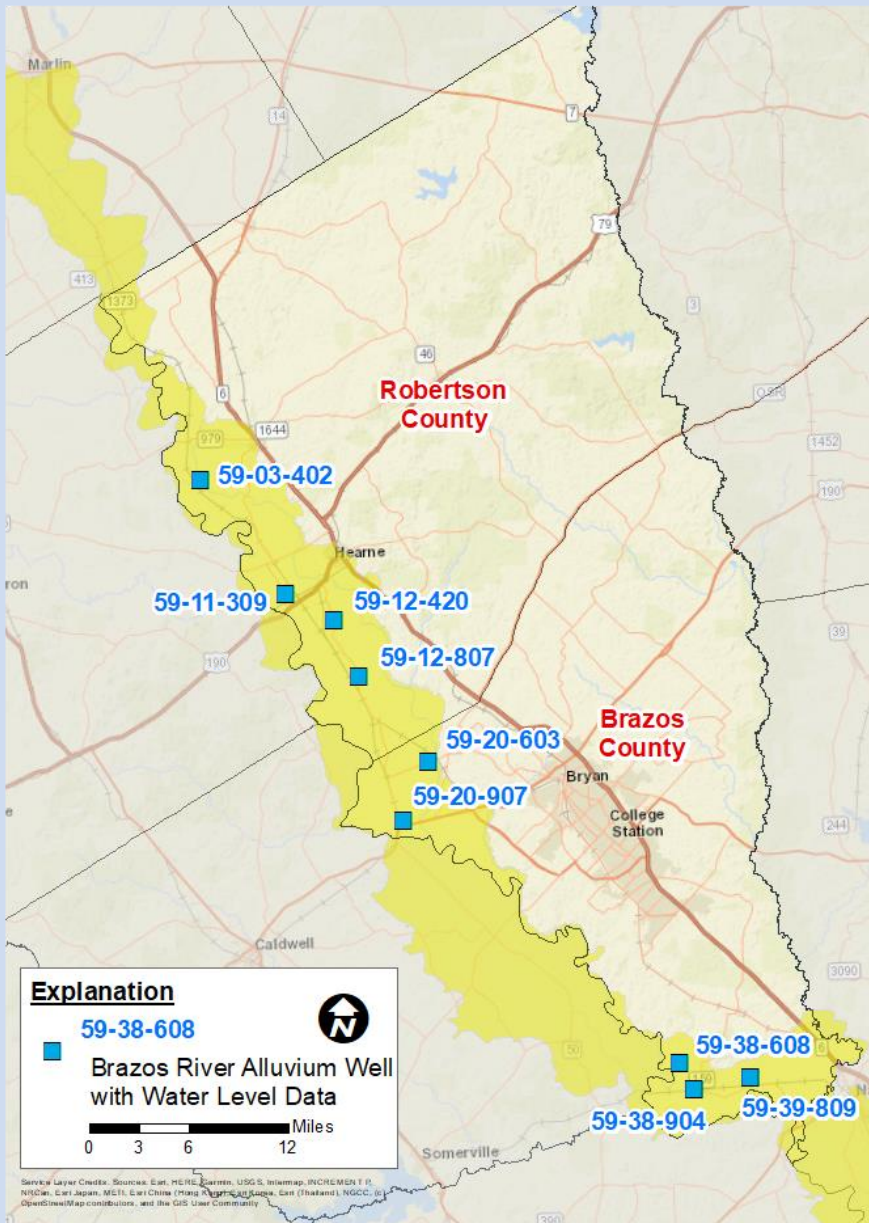
Comparison of DFCs Over Last Five Years, average feet of artesian head change

Span of Years	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper	Yegua-Jackson
2000-2022	12	-	11	-	43	6	+8
2000-2021	9	-	7	-	34	14	+11
2000-2020	7	-	20	-	33	8	+6
2000-2019	+1	-	8	-	32	1	+6
2000-2018	7	-	14	-	31	6	6
DFC 2000-2070	50	44	84	111	262	167	67

Brazos River Alluvium Aquifer DFC Wells

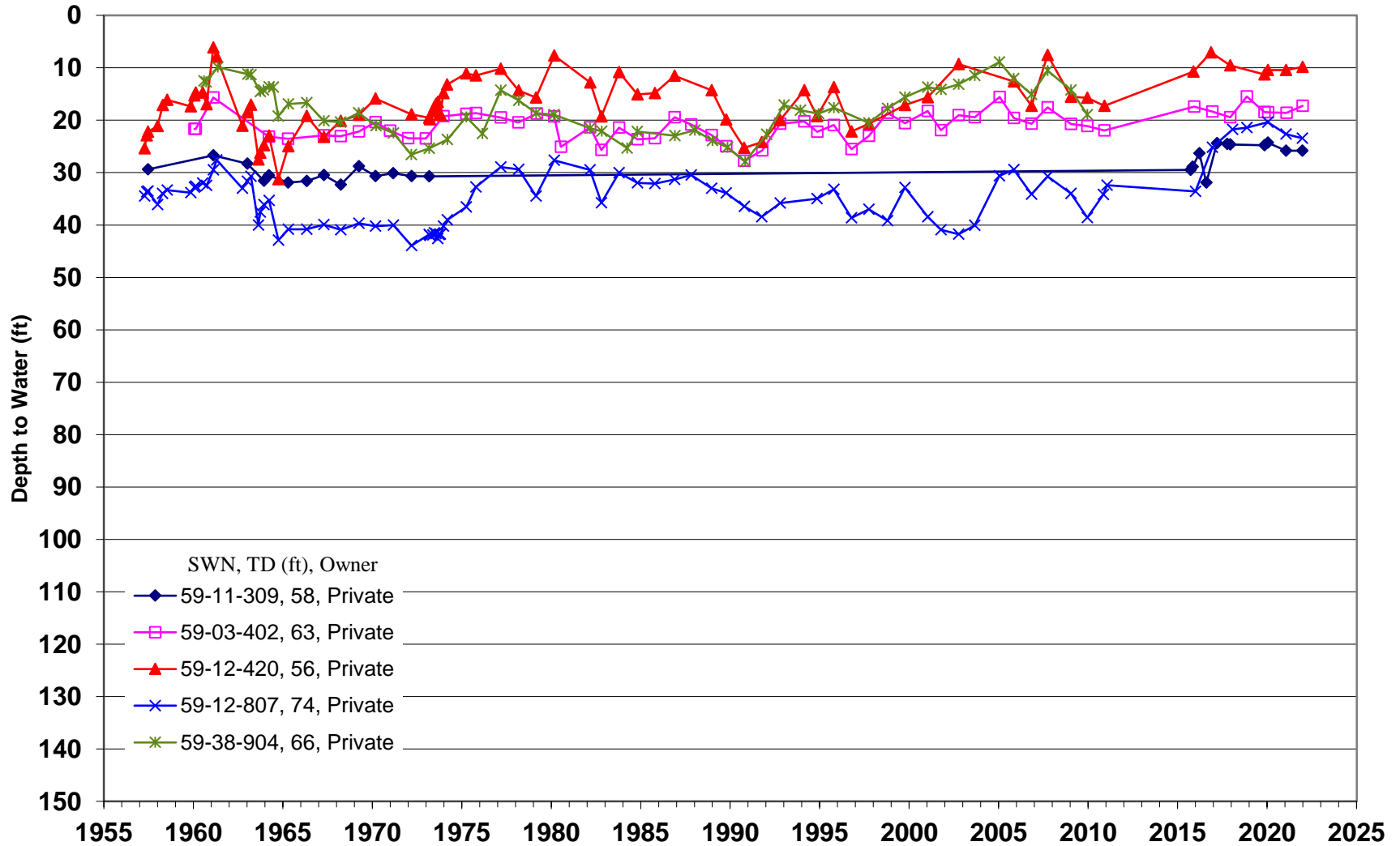
State Well Number	Well Owner
59-03-402	Private
59-11-309	Private
59-12-420	Private
59-12-807	Private
59-20-603	Private
59-20-907	Private
59-38-608	Private
59-38-904	Private
59-39-809	Private

Location of Brazos River Alluvium Wells With Water Level Hydrographs



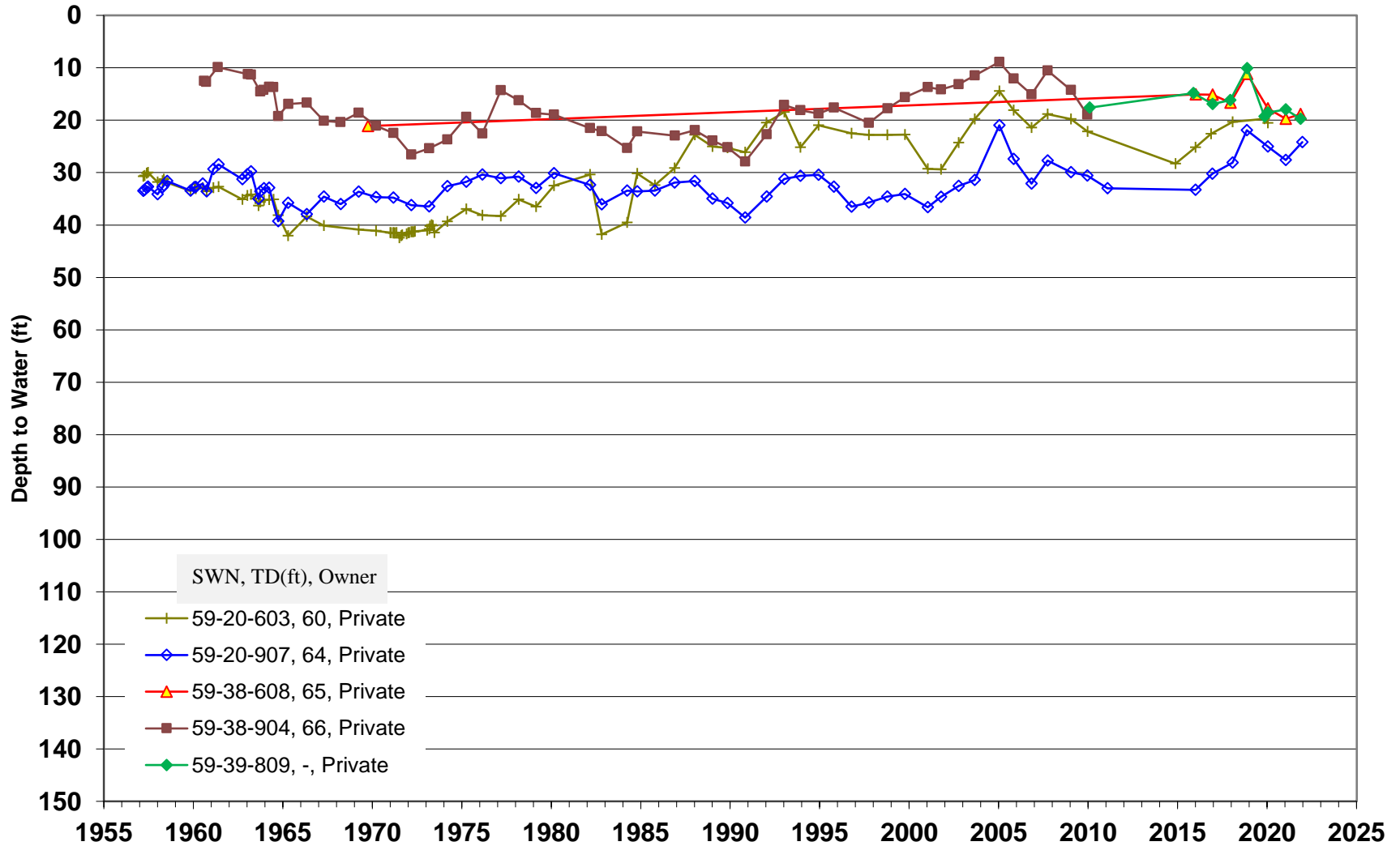
BRAZOS RIVER ALLUVIUM OBSERVATION WELLS

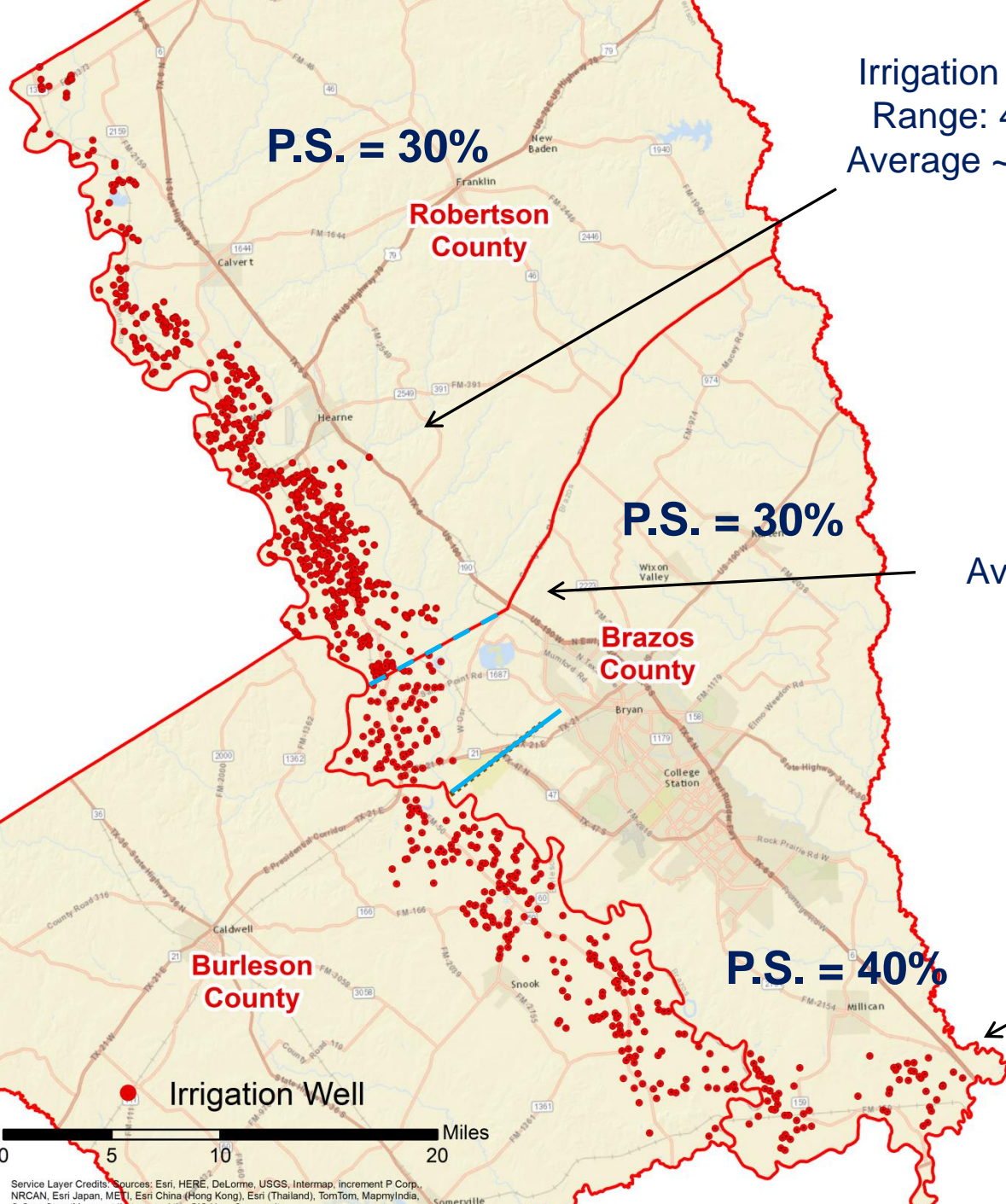
Robertson County



BRAZOS RIVER ALLUVIUM OBSERVATION WELLS

Brazos County





Irrigation Well Depths
 Range: 45 to 72 feet
 Average ~ 55 to 60 feet

Potential DFC Threshold on
 Allowable Percent Saturation
 P.S. \geq 30% or 40%
 depending on location

Average Irrigation Well Depth
 60 to 65 feet

Average Irrigation Well Depth
 60 to 65 feet

Brazos River Alluvium Well Data

Summary

- Based on water level data, average artesian head changes through 2022 are similar to those through 2021 except for Simsboro Aquifer and minorly for the Carrizo Aquifer
- The effects of pumping by the Vista Ridge Project (VRP) from the Simsboro Aquifer have been very small but are beginning to occur in Simsboro Aquifer screened wells water level measurements in parts of Brazos and Robertson counties
- The effects of pumping by the VRP from the Carrizo Aquifer have not been positively observed in water levels measurements in wells in the District
- The addition of observation wells outside the District is assisting with evaluation of the effects of pumping from areas outside the District.

Summary

(cont'd)

- Water level measurements in the Brazos River Alluvium screened wells are generally very similar in 2022 to those measured in 2020 and 2021
- The current DFCs were adopted by GMA 12 at their November 30, 2021 meeting. The DFCs as part of the GMA joint resolution have been forwarded to the TWDB for estimation of Modeled Available Groundwater
- The groundwater pumping in the district has remained reasonably stable over the past few years resulting in limited artesian head changes due to in district pumping



??Questions??

Thank you!