Aquifer Desired Future Conditions 2020 Update

Presented to

BVGCD Board of Directors

By

Ground Water Consultants, LLC

May 14, 2020

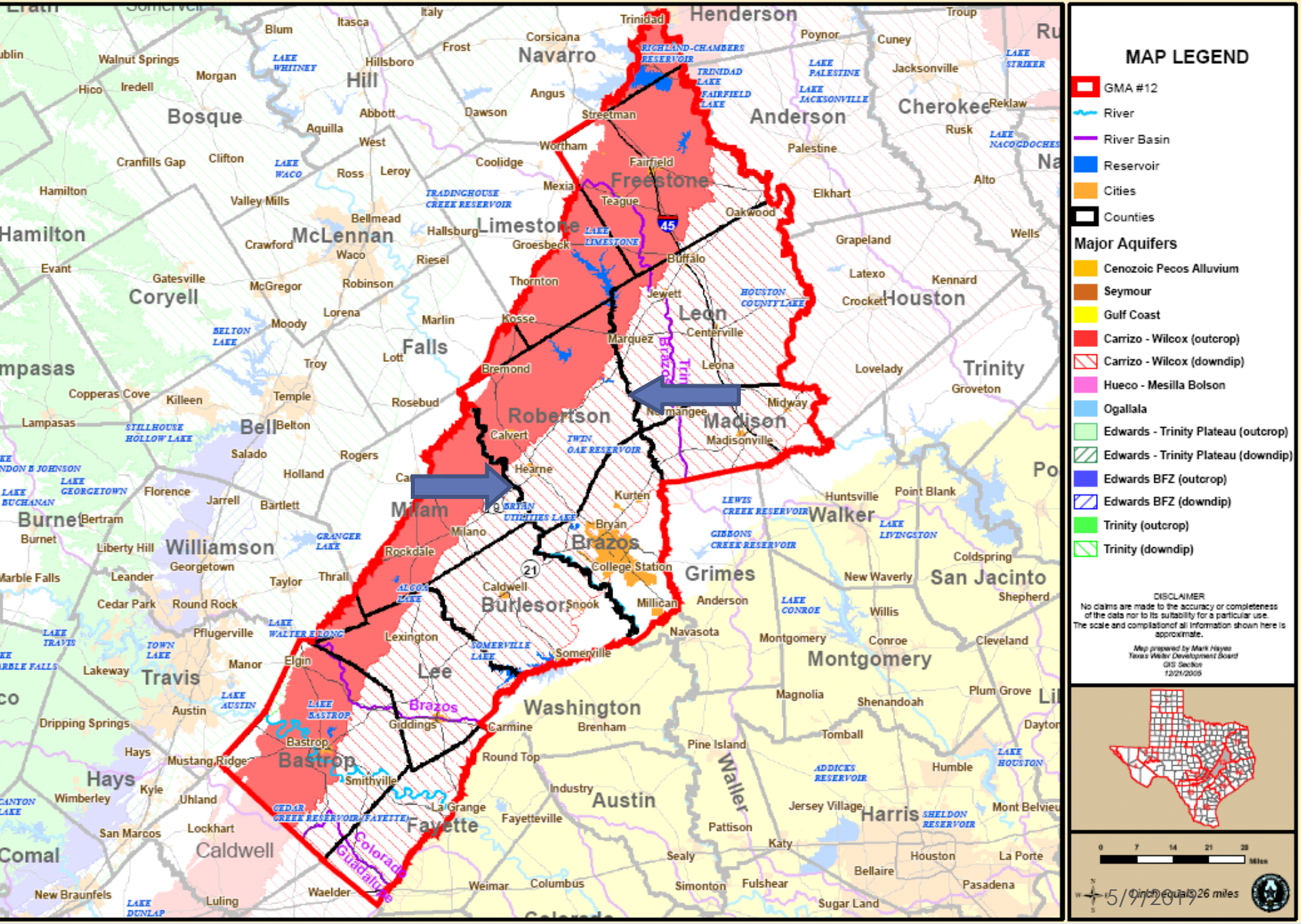
Desired Future Conditions

- Established for Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro, Hooper, Yegua, Jackson and Brazos River Alluvium aquifers during 2016 cycle of GMA 12 planning and subject to revision during 2021 cycle of GMA 12 planning
- 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
- 2016 cycle of GMA 12 planning developed DFCs for 2070. 2021 cycle of GMA 12 planning will develop updated DFCs for 2070

Groundwater Management Area #12



2016 Cycle DFC Goals

Aquifer	GMA 12 DFC, ft	BVGCD-DFC, ft	Period
Sparta	16	12	2000 - Dec. 2069
Queen City	216	12	2000 - Dec. 2069
Carrizo	75	61	2000 - Dec. 2069
Calvert Bluff	114	125	2000 - Dec. 2069
Simsboro	228	295	2000 - Dec. 2069
Hooper	168	207	2000 - Dec. 2069
Yegua	65	70	2010-2069
Jackson	65	110	2010-2069

Additional Wells Added for DFC Monitoring

- Yegua-Jackson Aquifer: Four wells
- Sparta Aquifer: Ten wells
- Carrizo Aquifer: One well
- Simsboro Aquifer: One well
- Hooper Aquifer: Three wells
- Brazos River Alluvium Aquifer: Four wells
- Wells outside the District to the west

Basis for Adding Additional DFC Wells

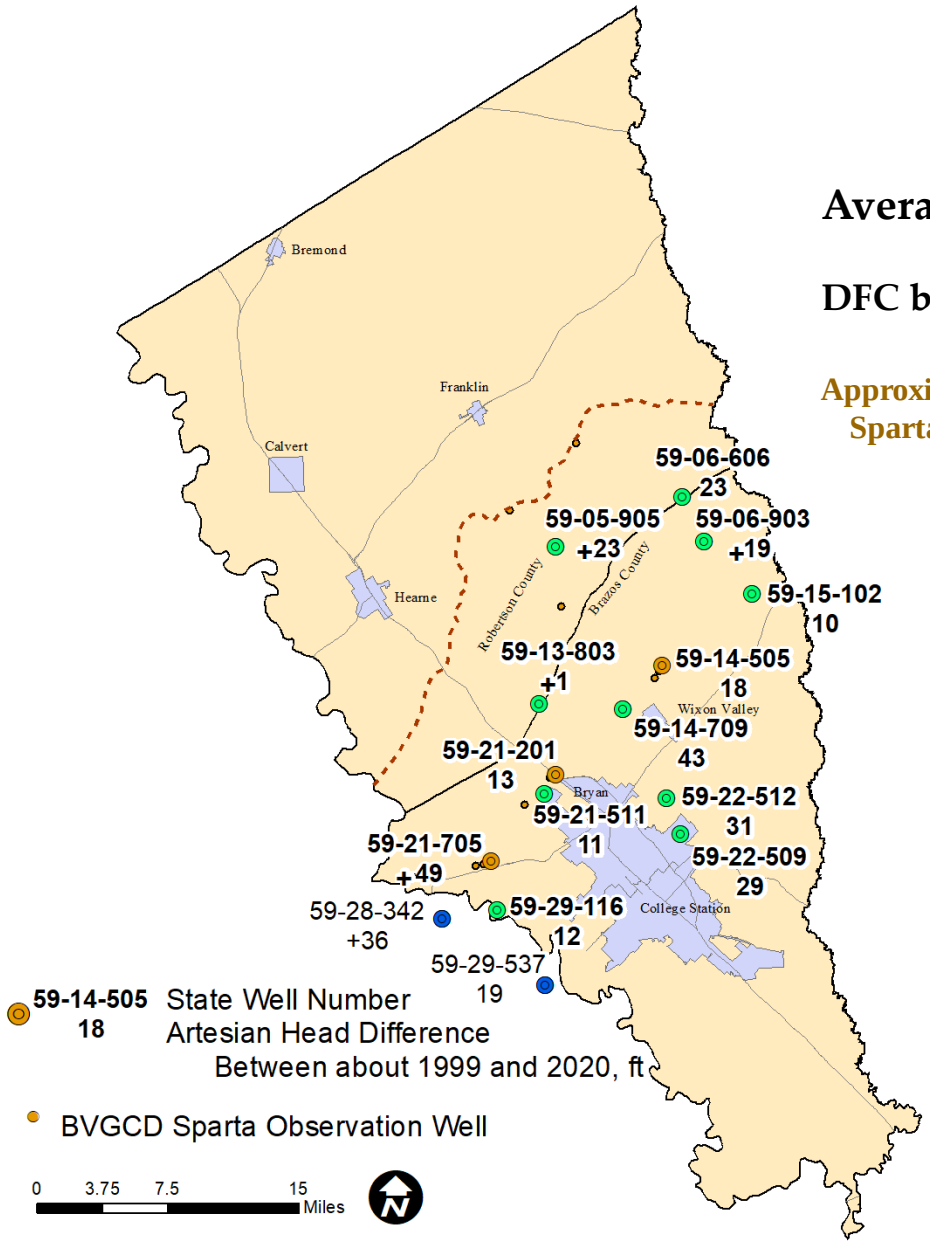
- Additional water level elevation data from updated Qc/Sp Model
- Interpolation of water level data based on years of water level measurements
- Water level data provided by mining company
- Data collected with current extensive aquifer monitoring program

Sparta Aquifer

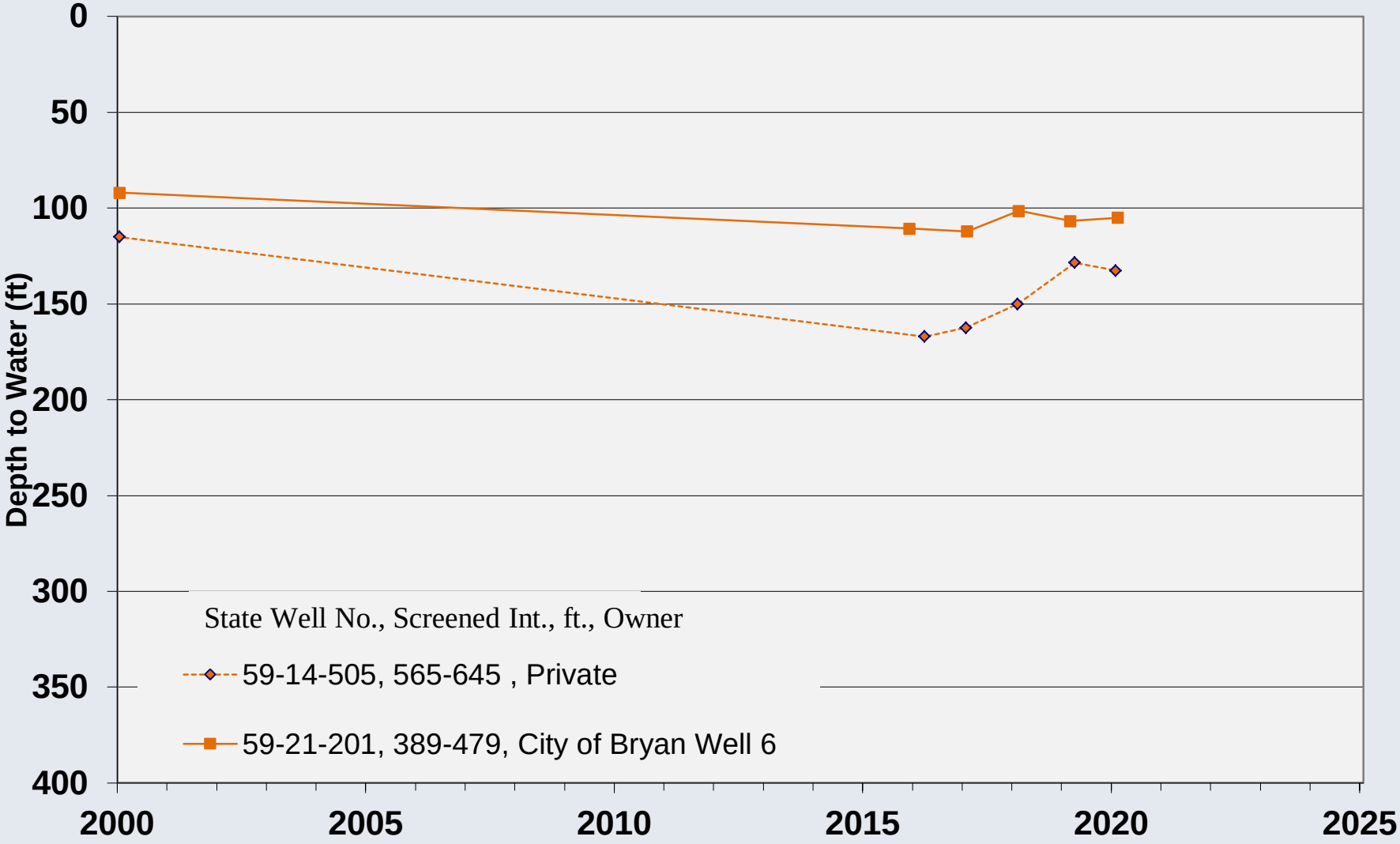
Average Artesian Head Change 1999-2020 = 7 feet

DFC by 2070: Average Artesian Head Decline 12 feet

Approximate updip limit of Sparta Aquifer outcrop

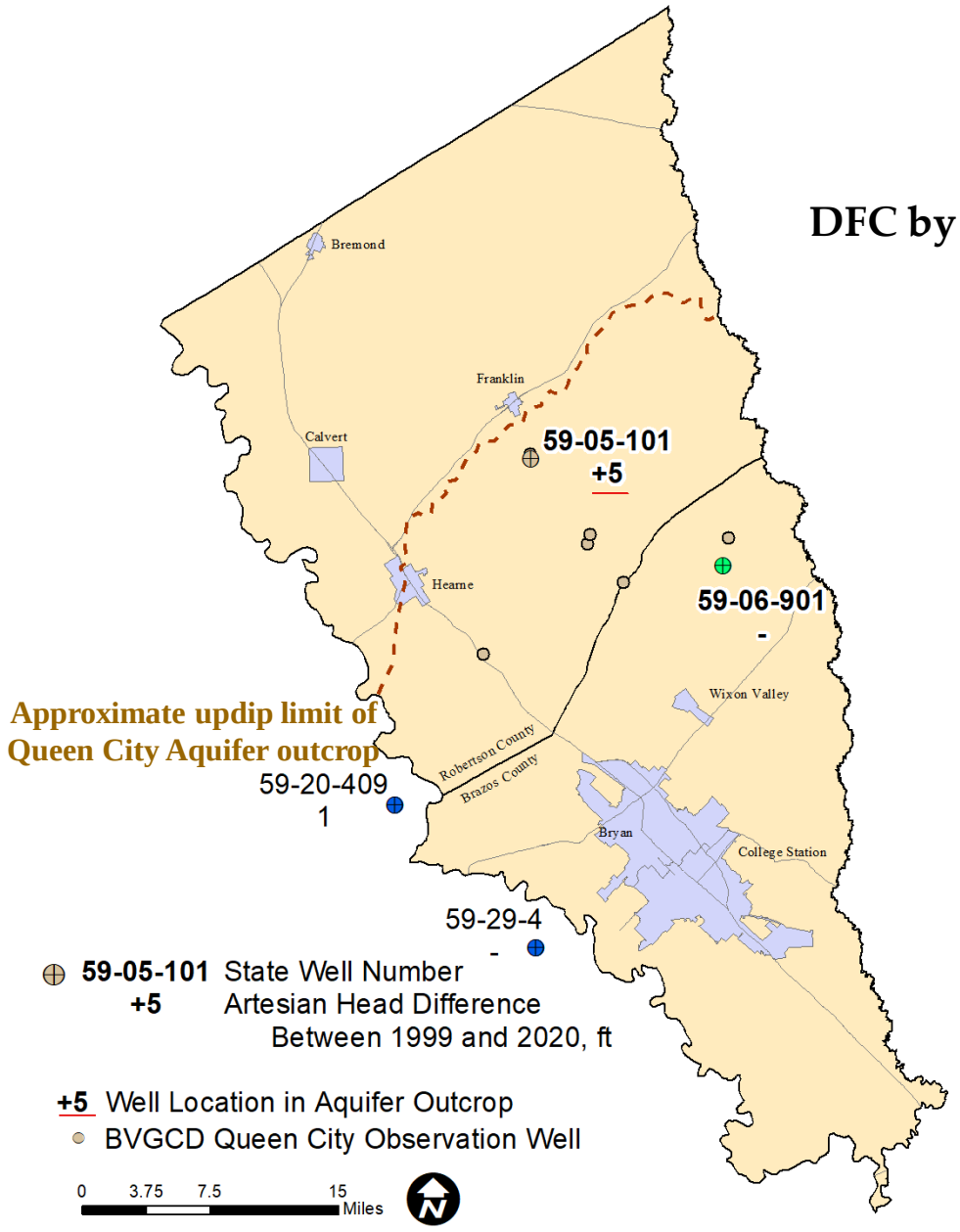


SPARTA AQUIFER
OBSERVATION WELLS

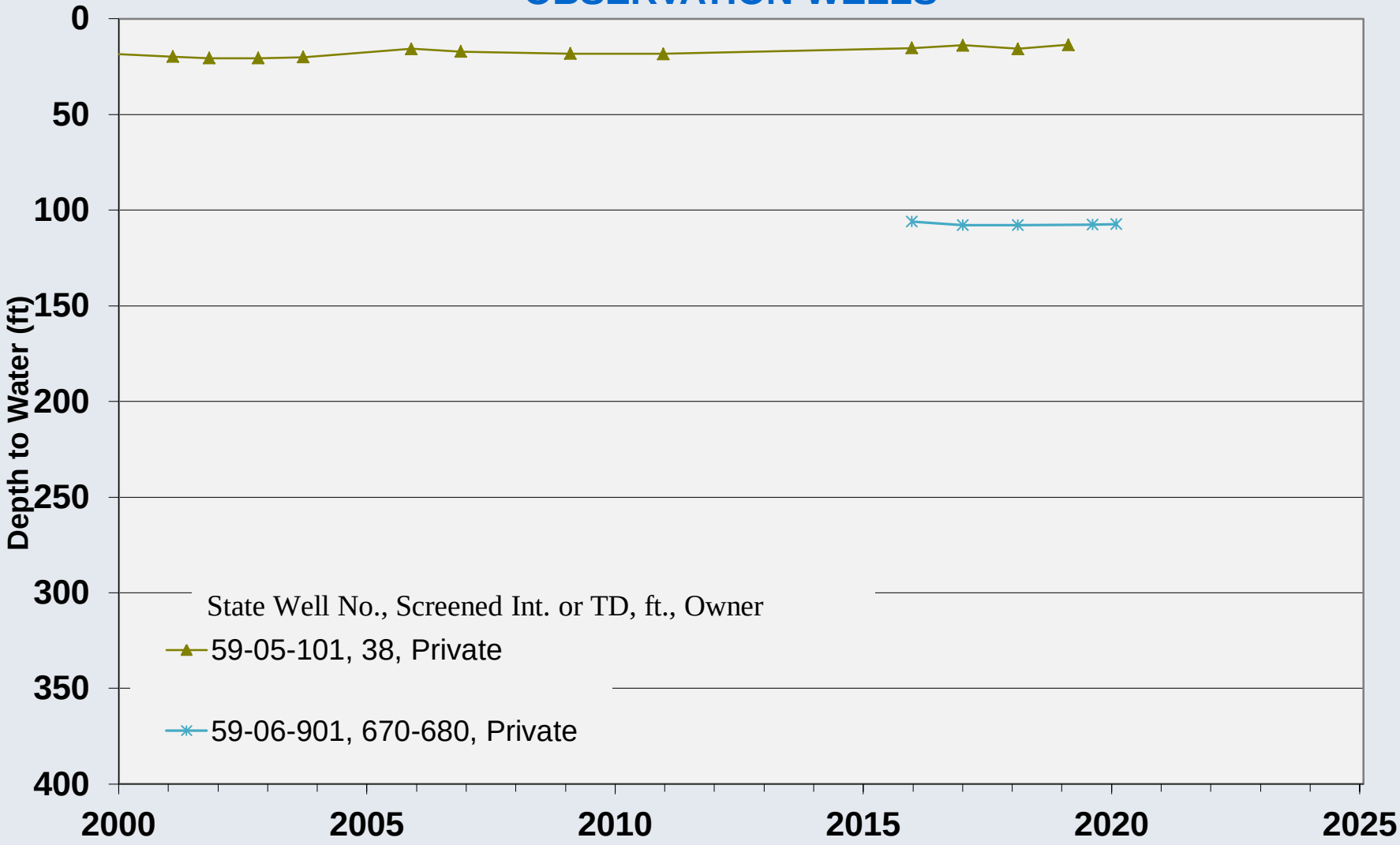


Queen City Aquifer

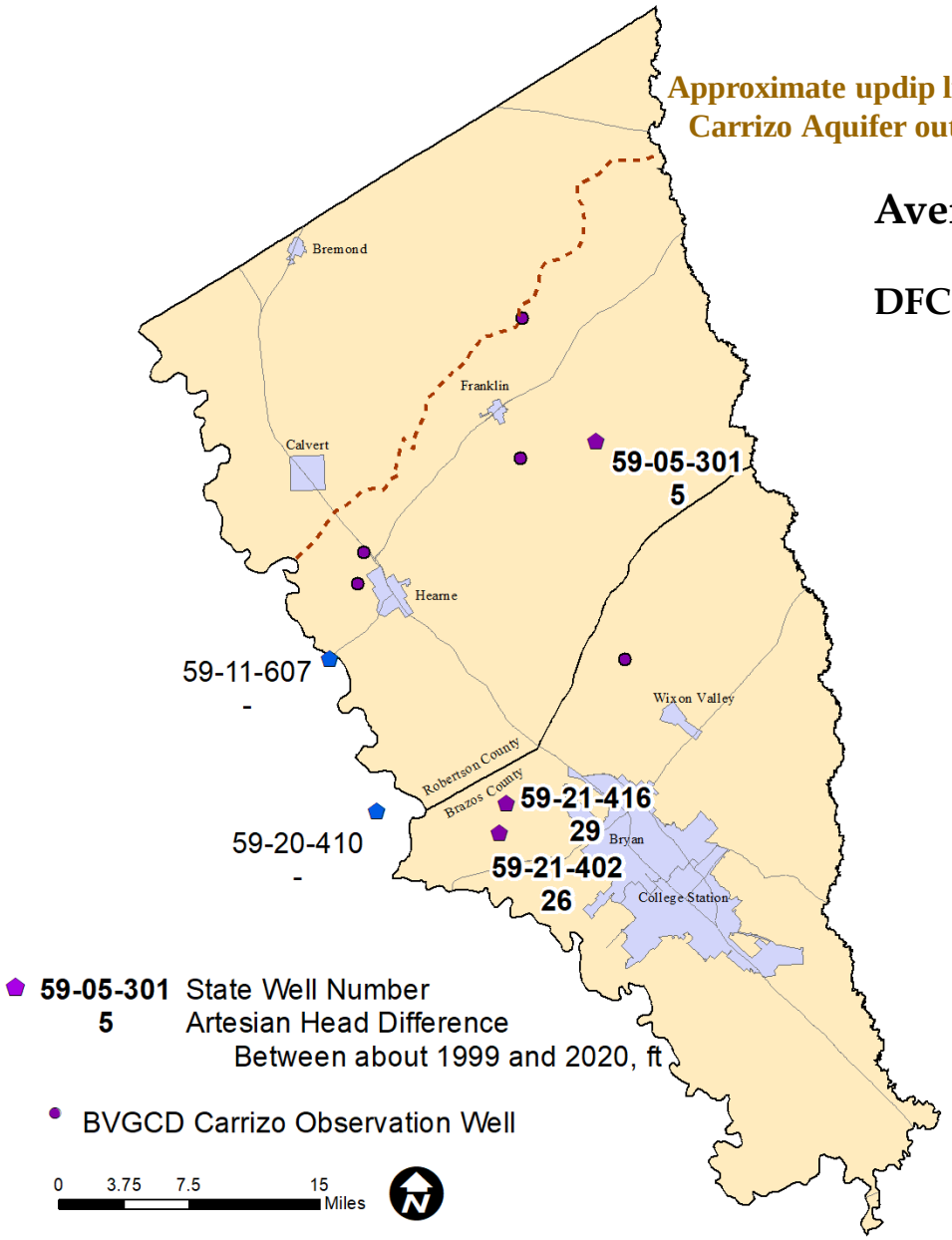
DFC by 2070: Average Artesian Head Decline 12 feet



QUEEN CITY AQUIFER OBSERVATION WELLS



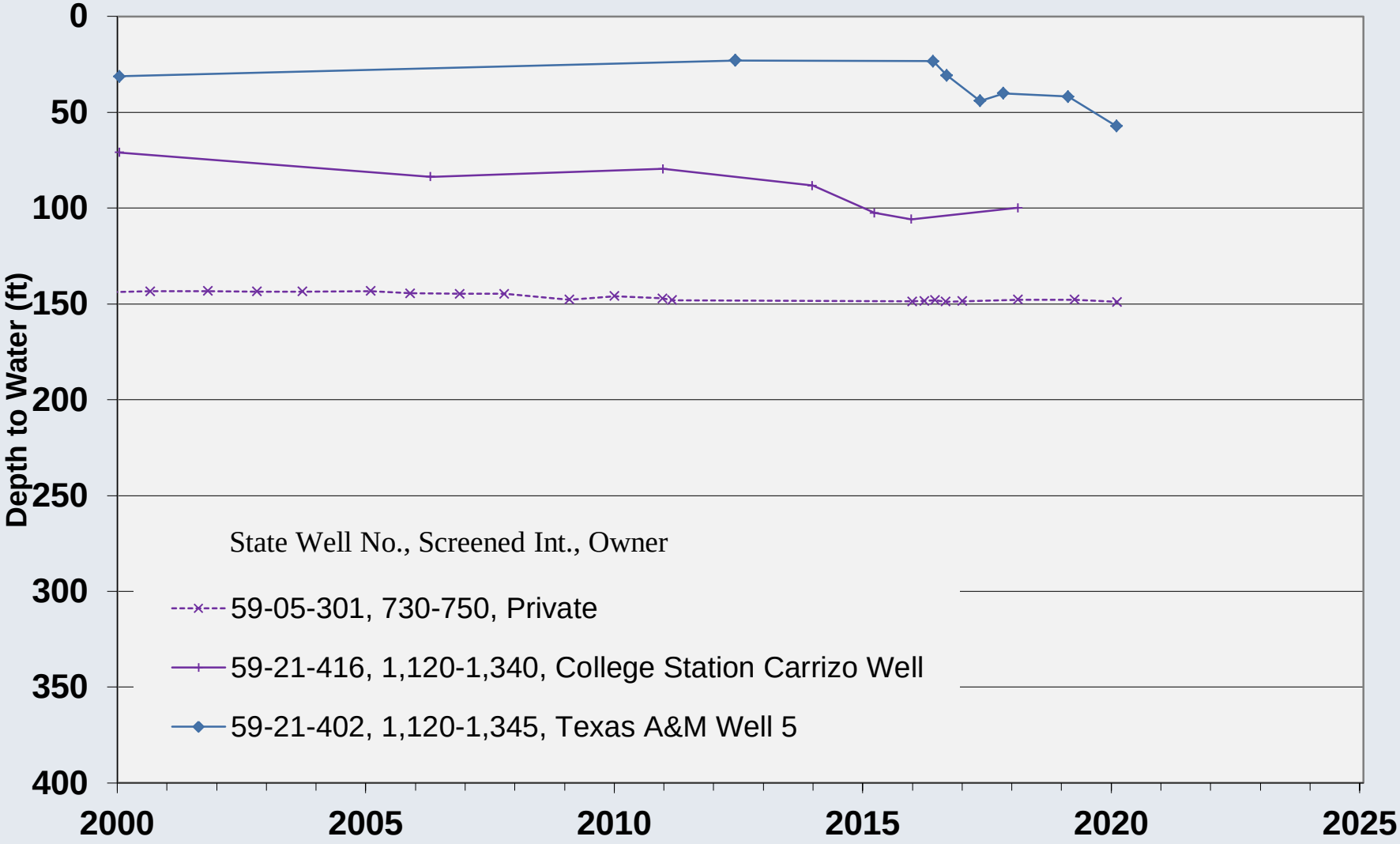
Carrizo Aquifer



Average Artesian Head Decline 1999-2020 = 20 ft

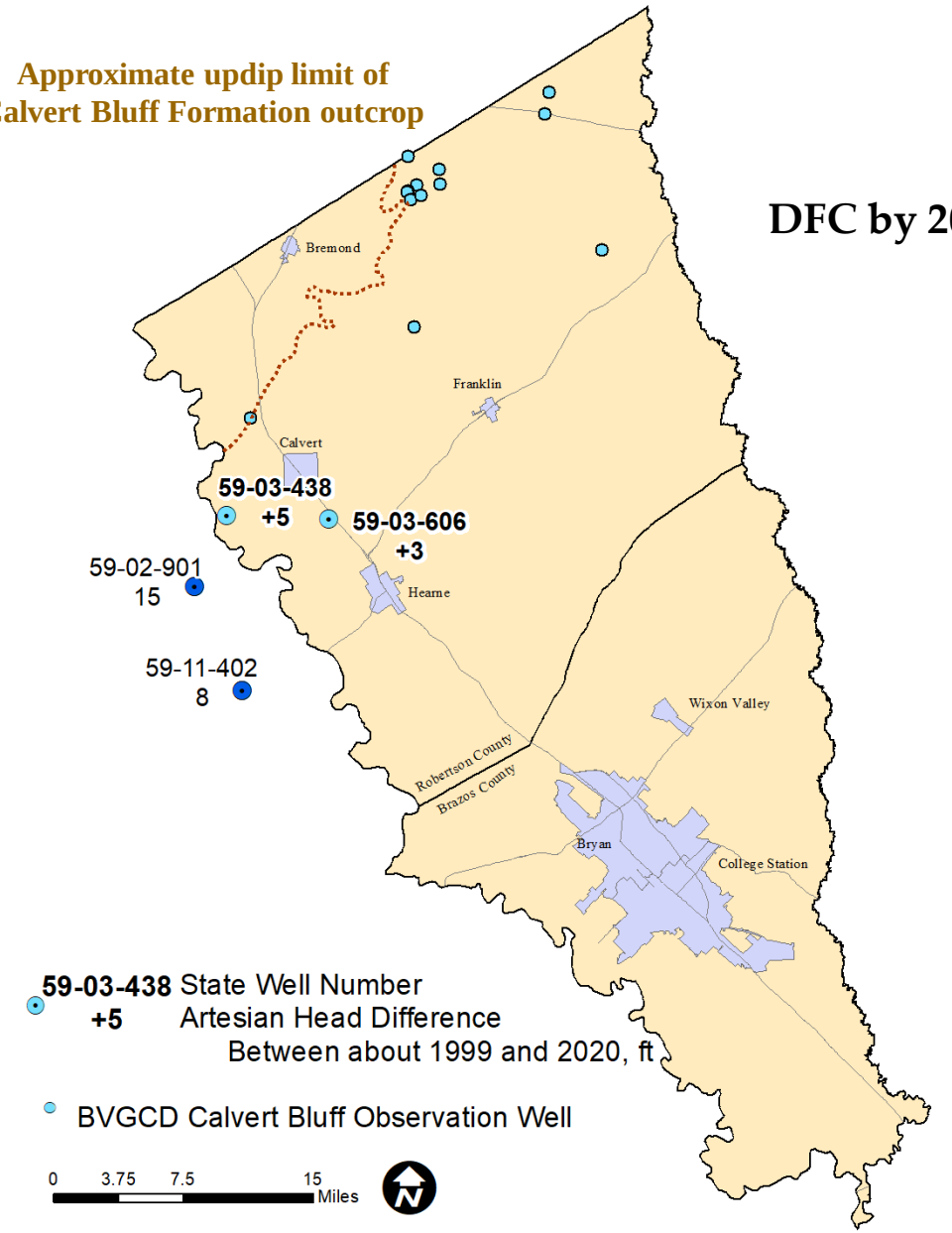
DFC by 2070: Average Artesian Head Decline of 61 feet

CARRIZO AQUIFER
OBSERVATION WELLS

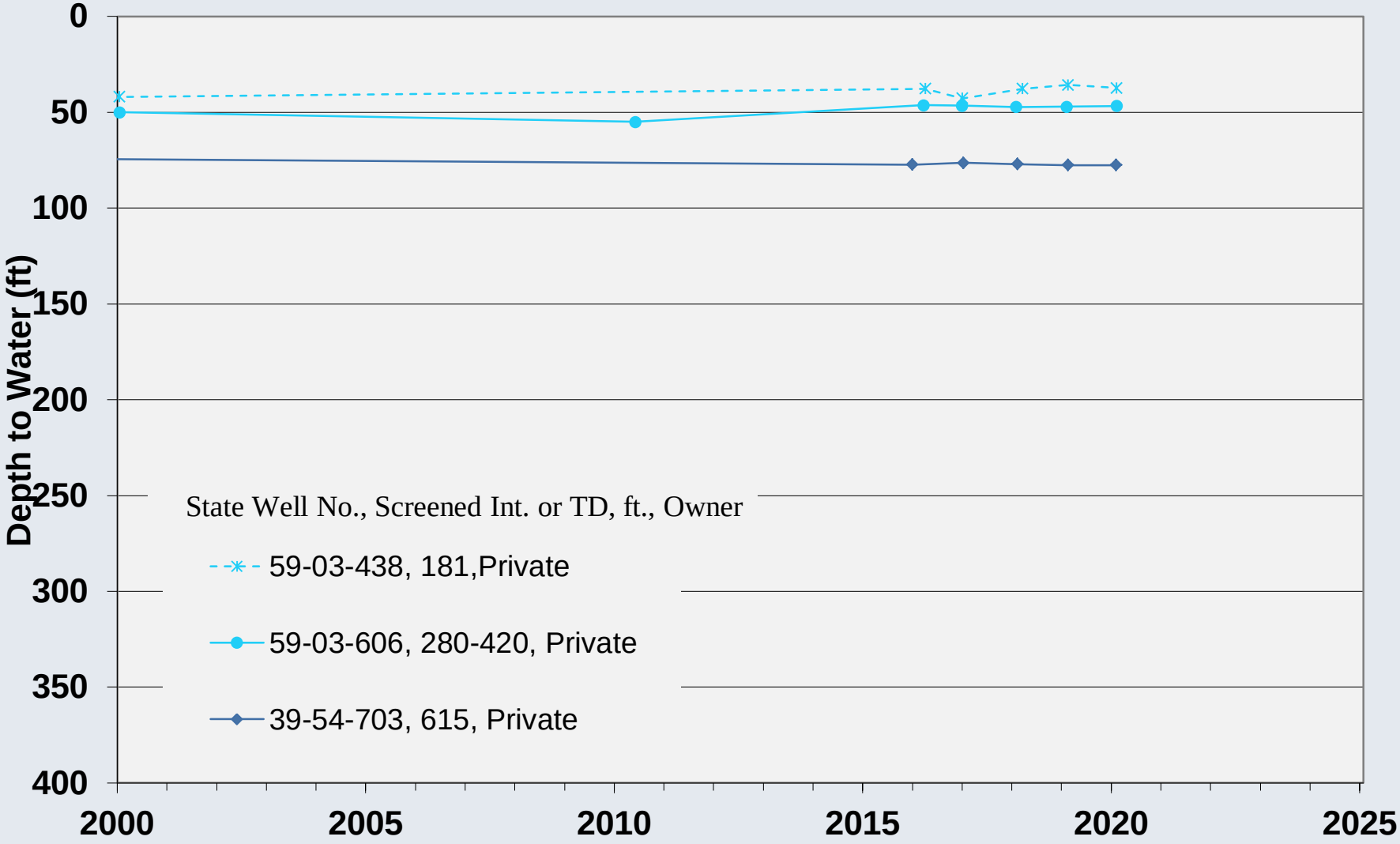


Calvert Bluff Formation

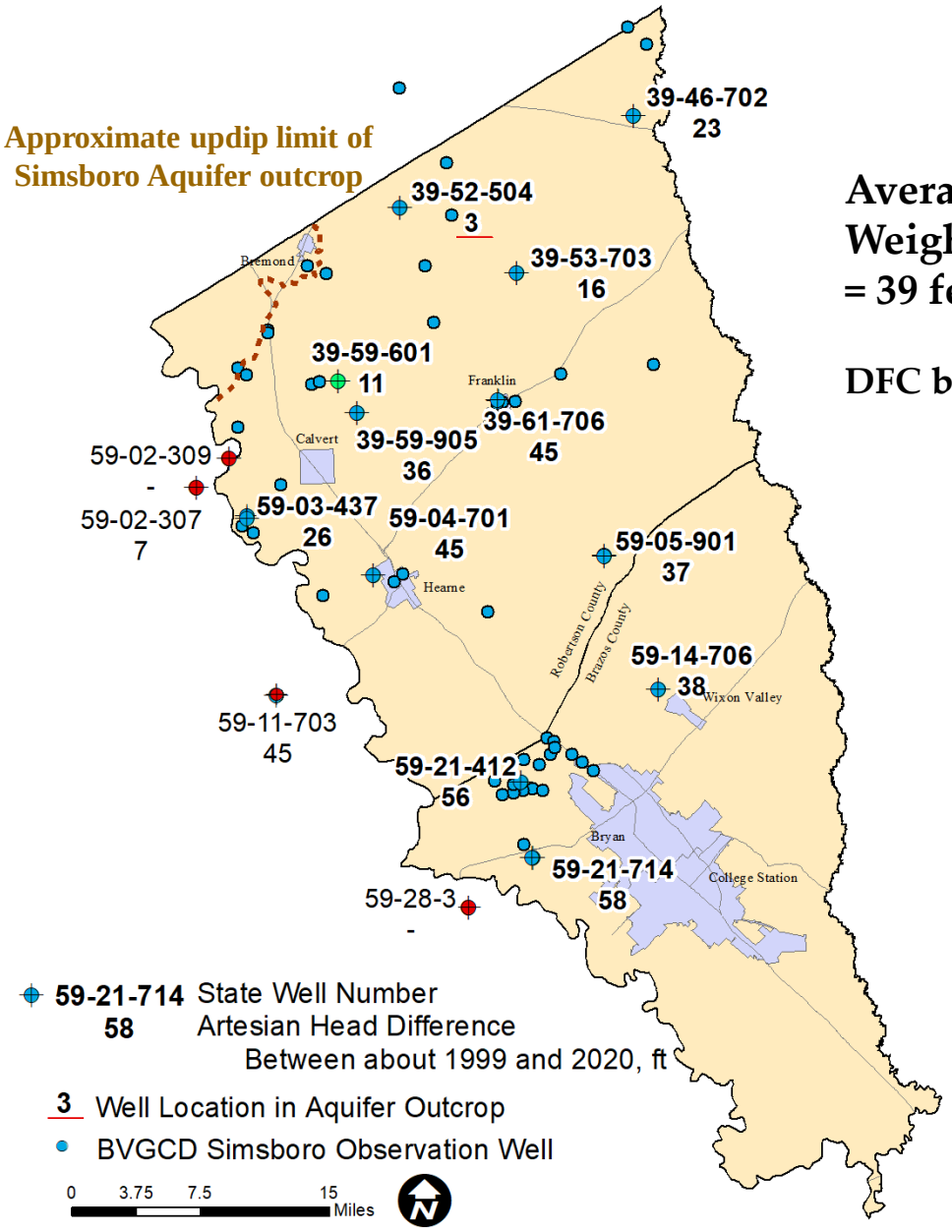
DFC by 2070: Average Artesian Head Decline of 125 feet



CALVERT BLUFF FORMATION
OBSERVATION WELLS



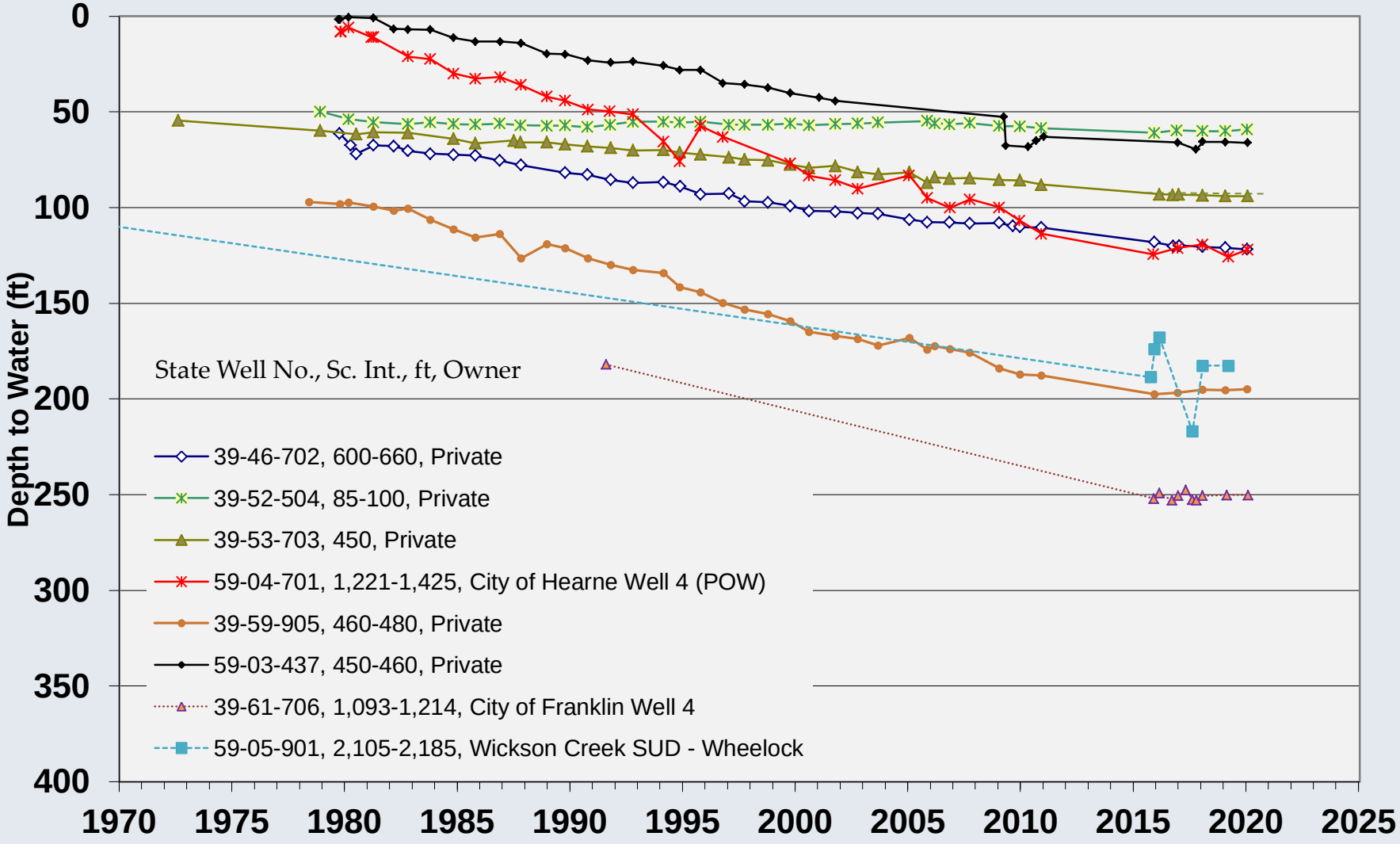
Simsboro Aquifer



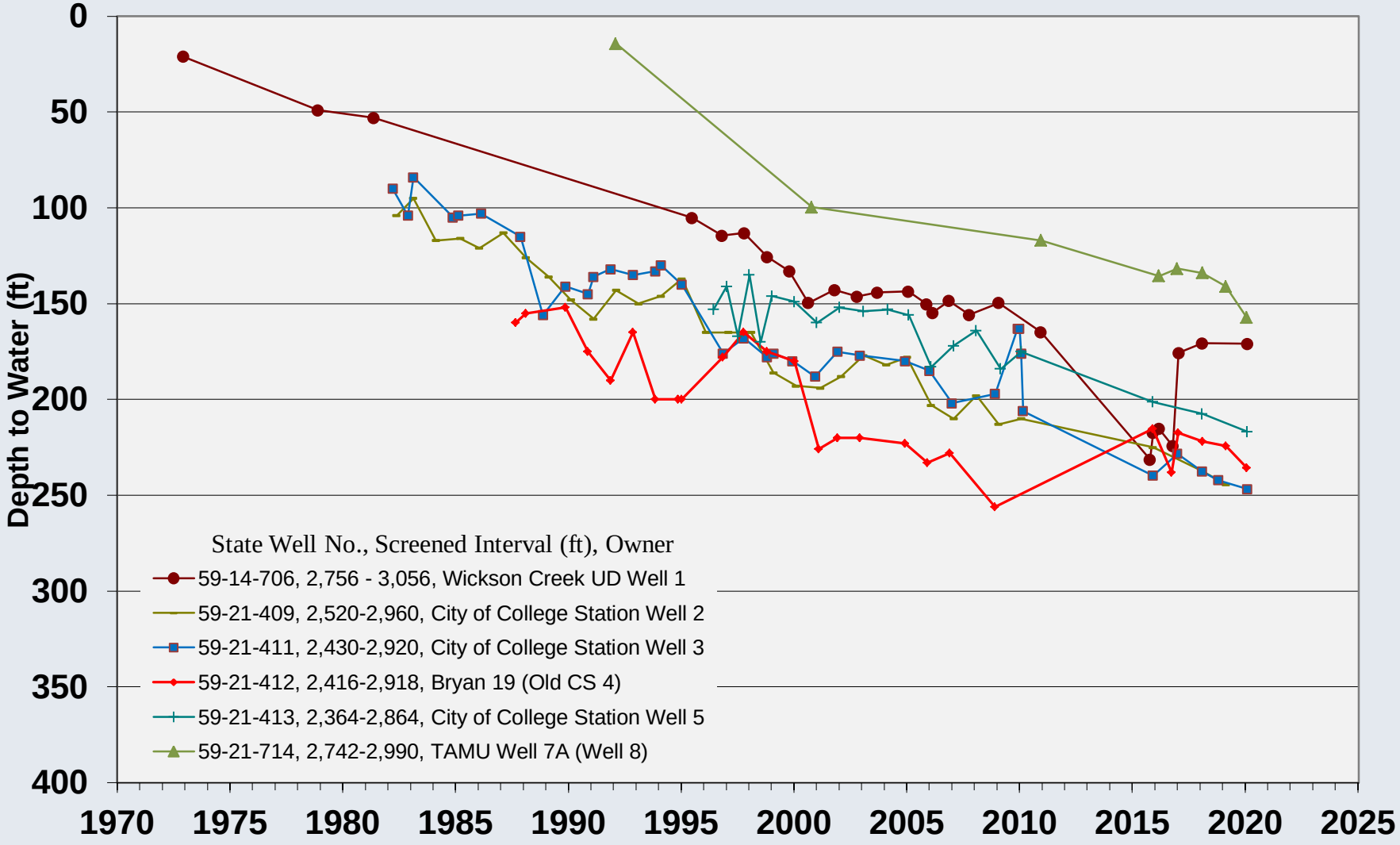
Average Artesian Head Decline 1999-2020 = 33 feet
Weighted Average Artesian Head Decline 1999-2020 = 39 feet

DFC by 2070: Average Artesian Head Decline of 295 feet

SIMSBORO AQUIFER OBSERVATION WELLS
Robertson County



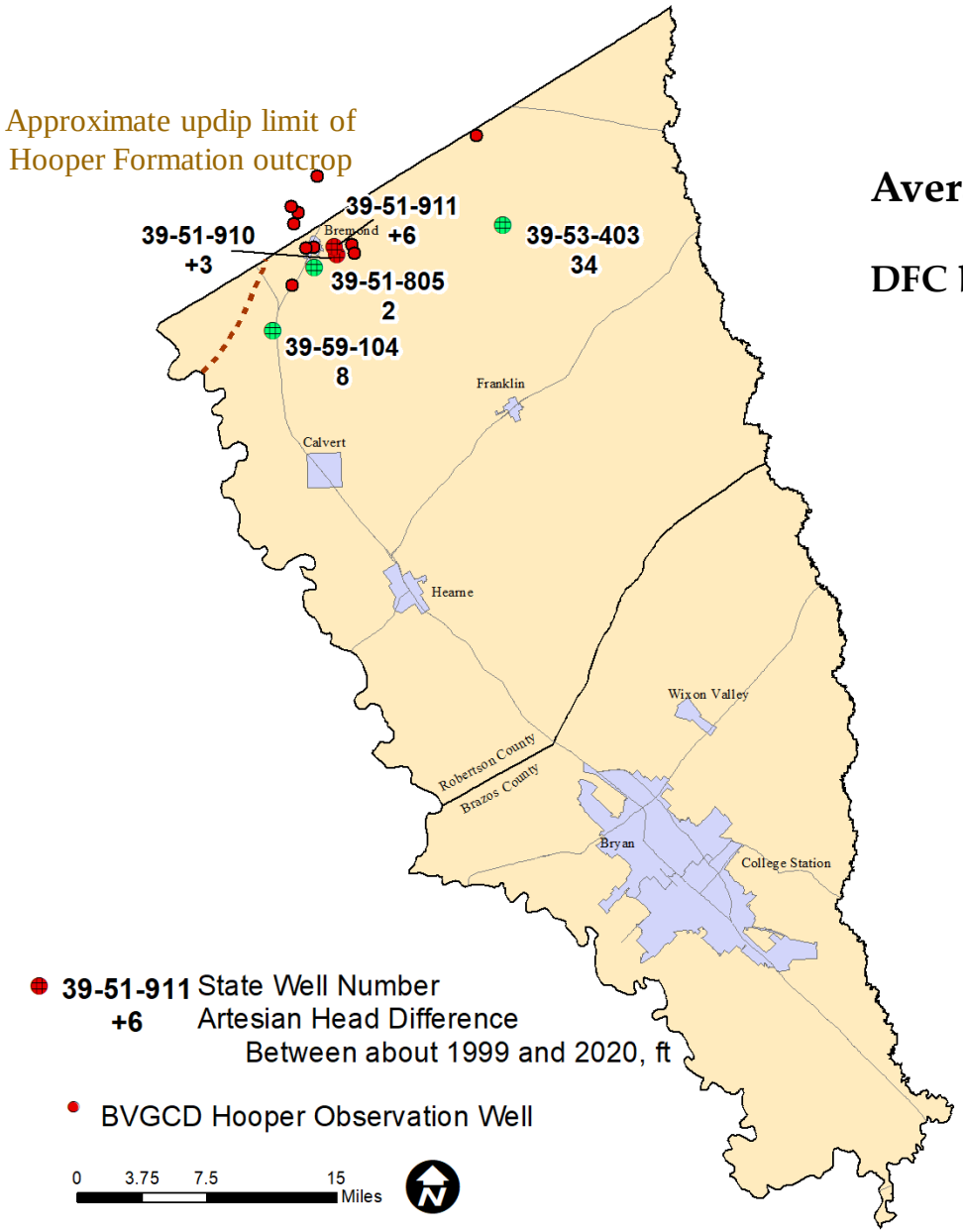
SIMSBORO AQUIFER OBSERVATION WELLS
Brazos County



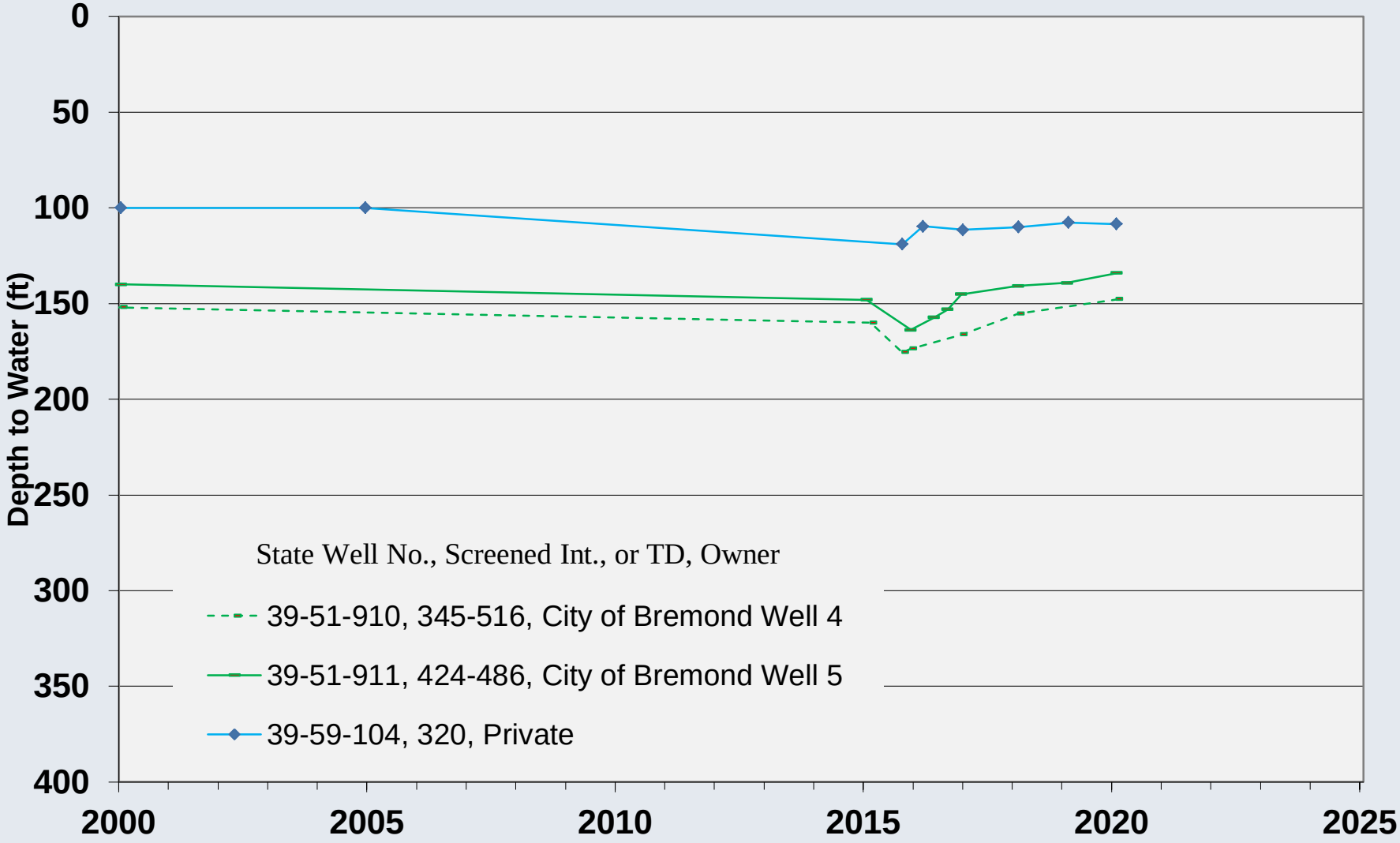
Hooper Formation

Average Artesian Head Decline 1999-2020 = 8 feet

DFC by 2070: Average Artesian Head Decline of 207 feet



HOOPER FORMATION
OBSERVATION WELLS

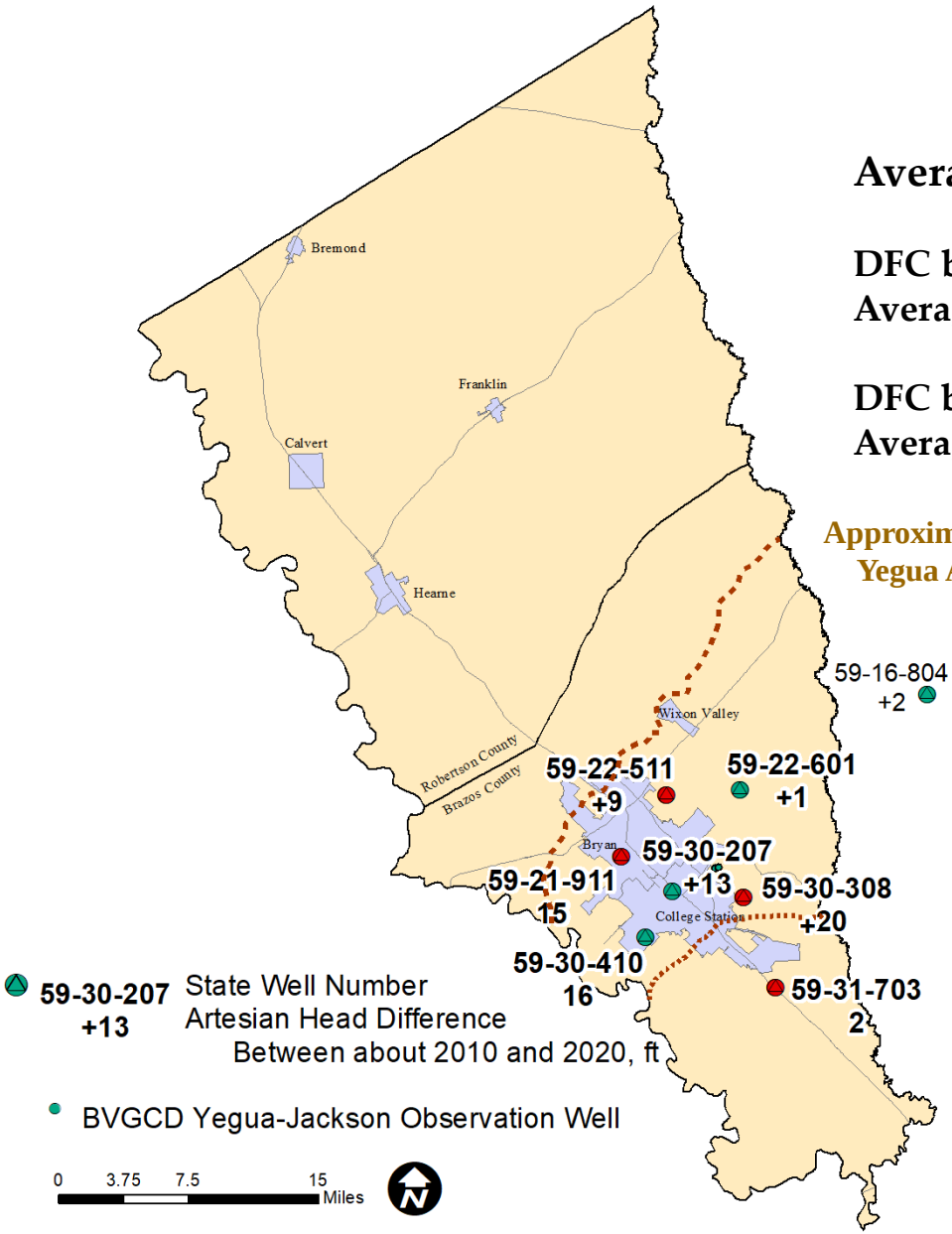


Yegua-Jackson Aquifer

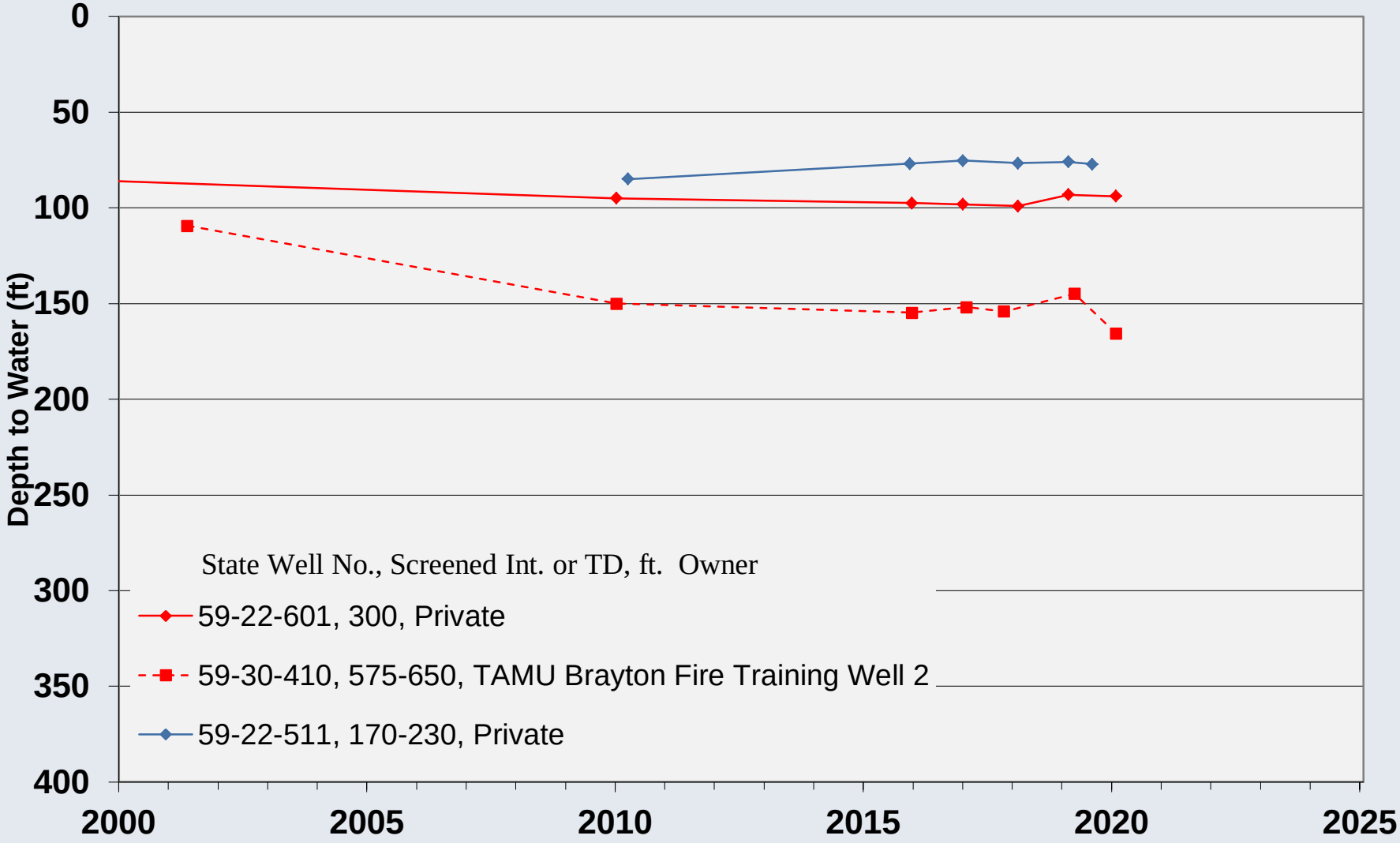
Average Artesian Head Change 2010-2020 = +6 feet

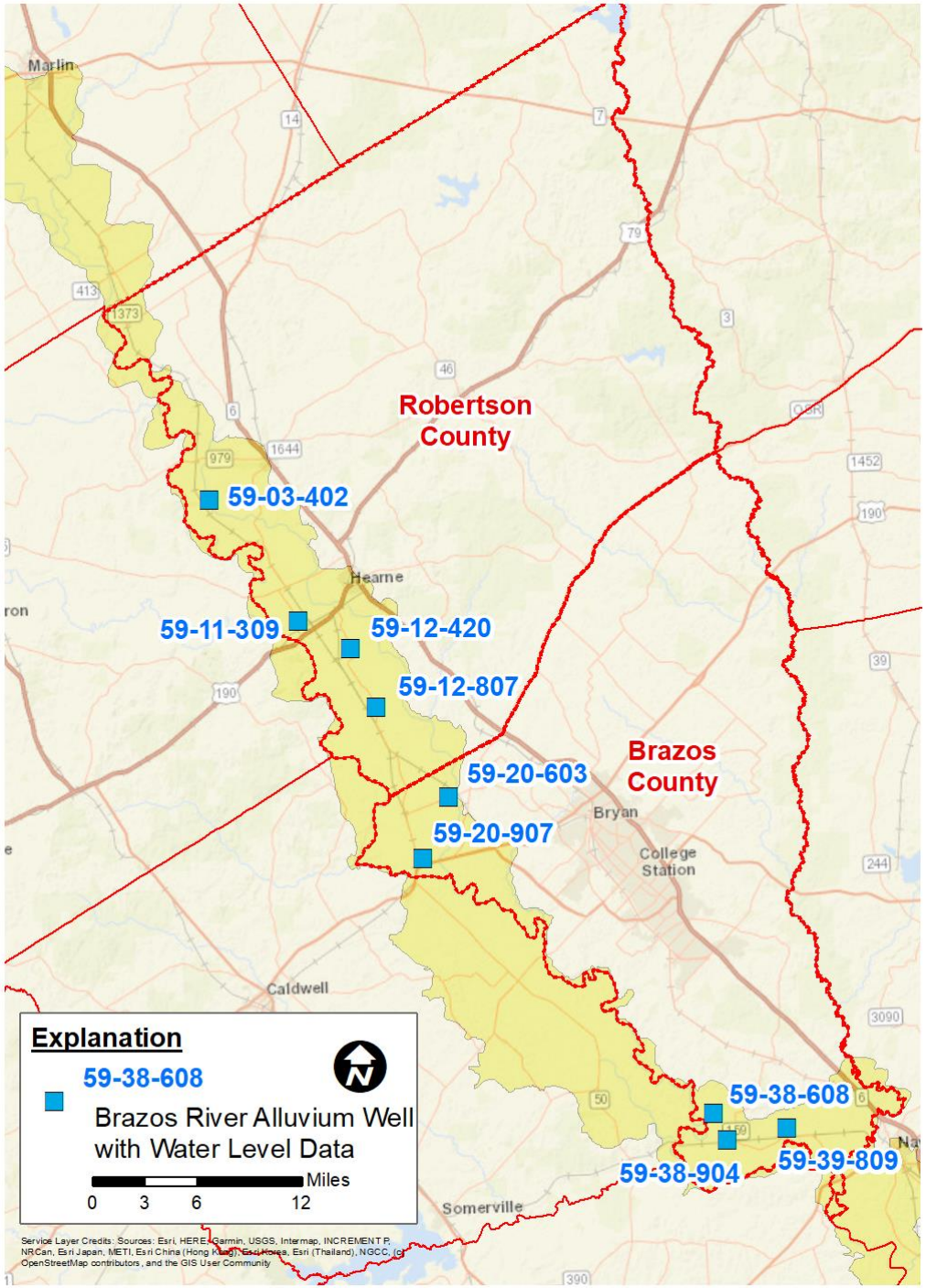
DFC by 2070:
Average Artesian Head Decline of 70 feet (Yegua)

DFC by 2070:
Average Artesian Head Decline of 110 feet (Jackson)



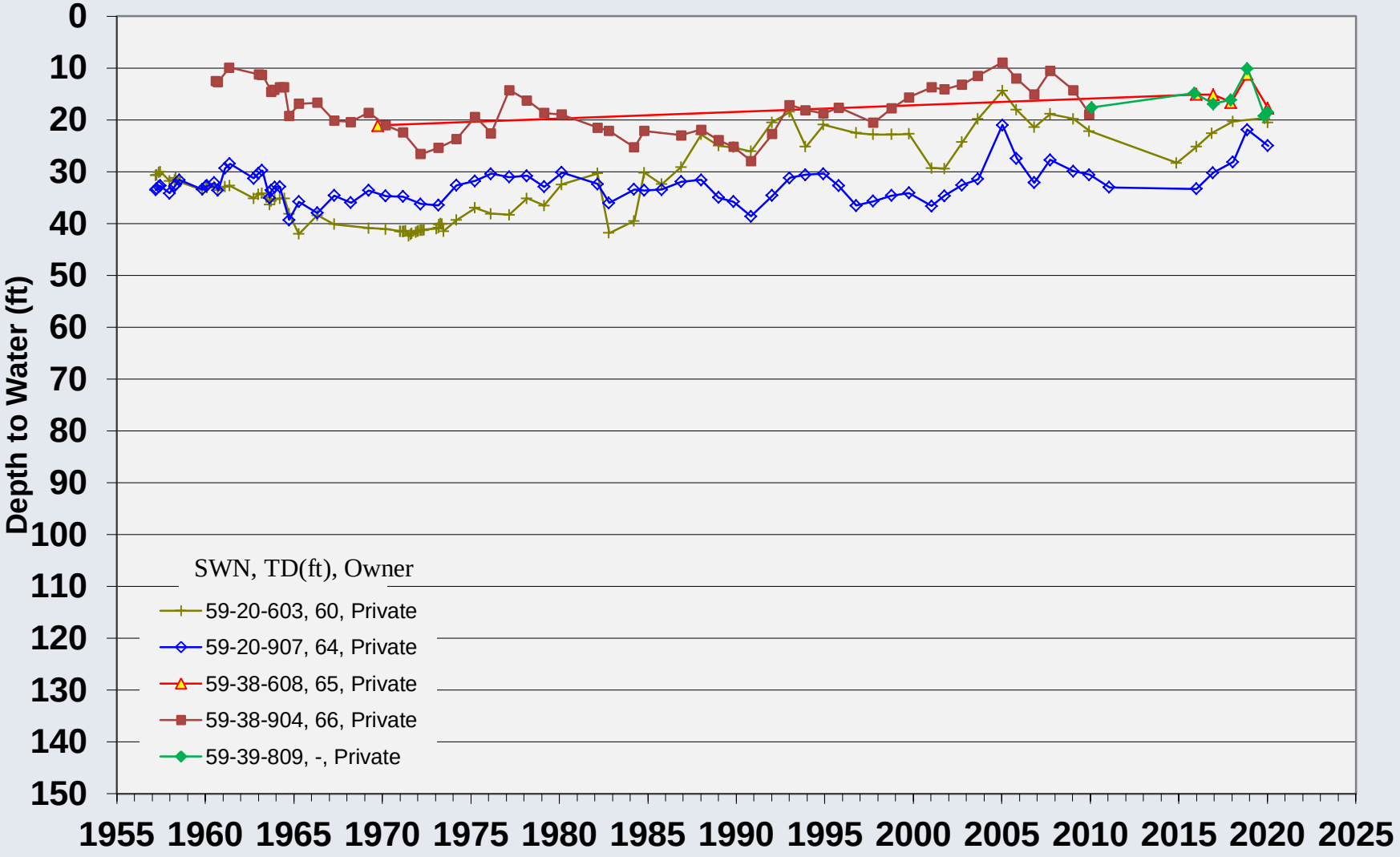
YEGUA-JACKSON AQUIFER OBSERVATION WELLS



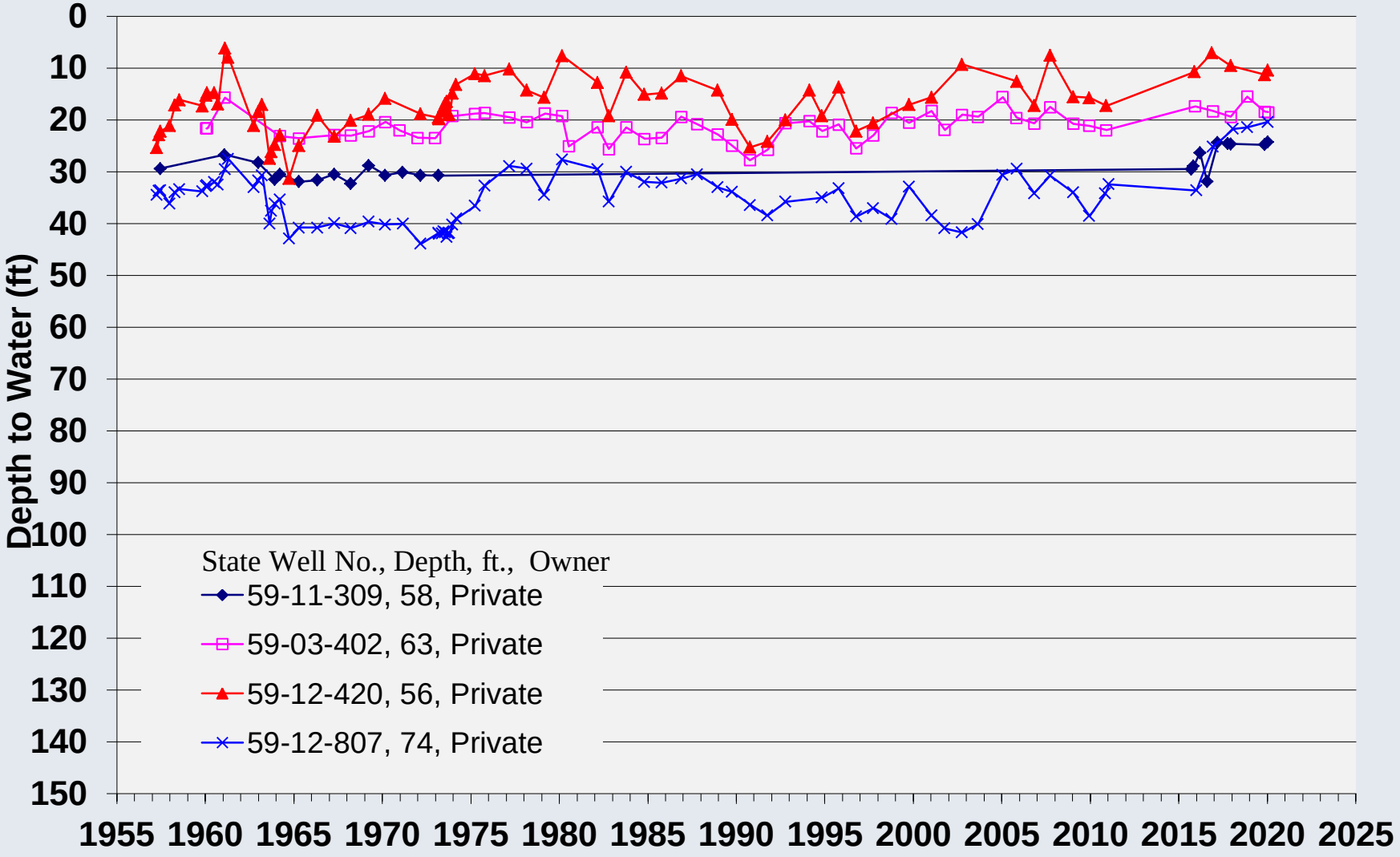


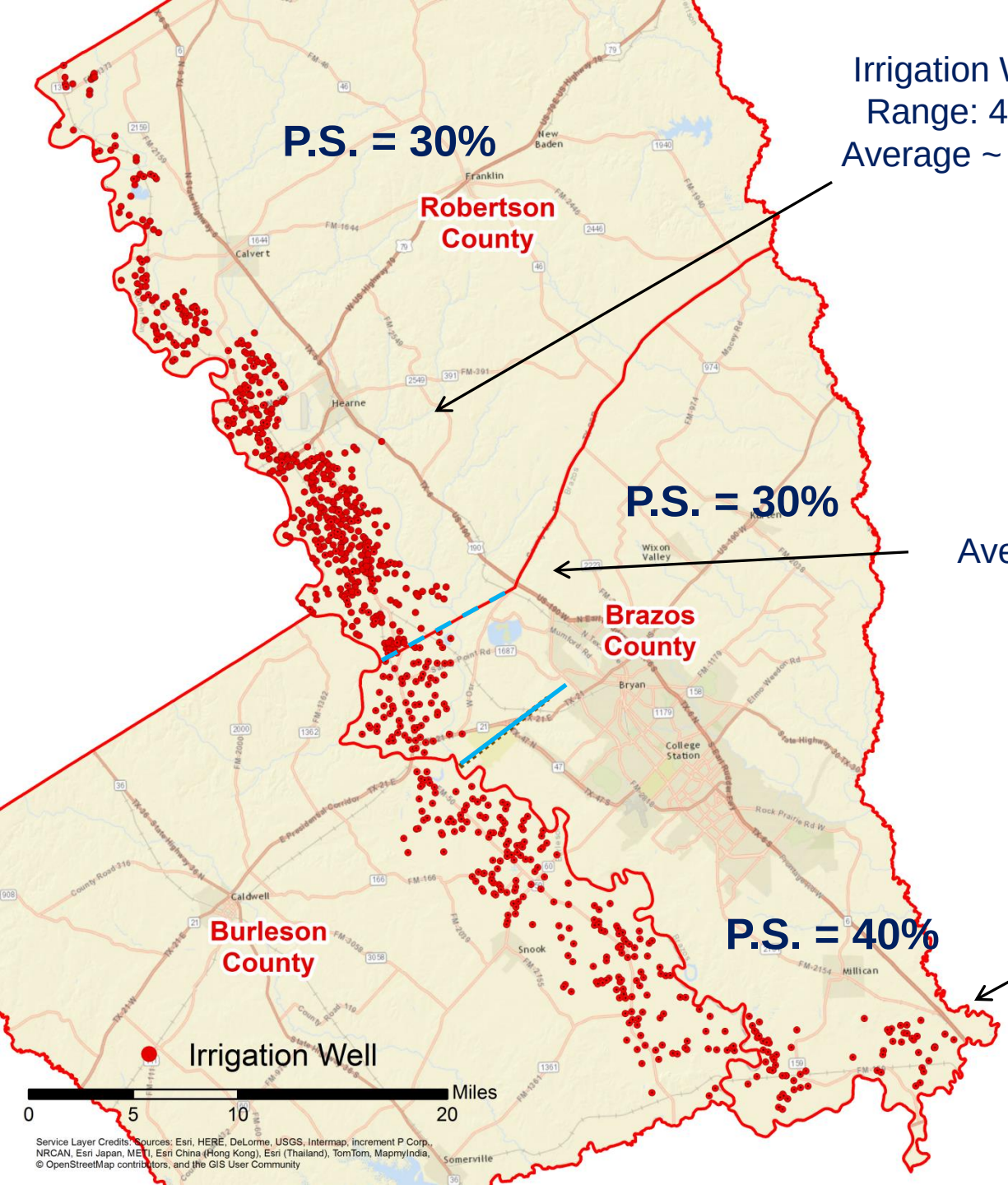
Location of Brazos River Alluvium Wells With Water Level Hydrographs

BRAZOS RIVER ALLUVIUM OBSERVATION WELLS
Brazos County



BRAZOS RIVER ALLUVIUM OBSERVATION WELLS
Robertson County





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

Potential DFC Threshold on Allowable Percent Saturation
P.S. ≥ 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

5/14/2020

Summary

- Based on water level data, average artesian head changes through 2020 about the same as through 2019 reflective of stable pumping from aquifers
- Areal coverage of DFC wells expanded with addition of 23 wells for various aquifers.
- Addition of observation wells outside the District will assist in evaluating artesian head trends and effects of pumping from the Vista Ridge project.
- Water levels measured in Brazos River Alluvium screened wells show a modest downward trend since 2019

Summary

(cont'd)

- Continue evaluating artesian head trends using data from DFC wells and other observation wells
- Anticipate modest changes in DFCs for some aquifers will occur in about two years as a result of the 2021 planning cycle for GMA 12


??Questions??
Thank you!