

Aquifer Desired Future Conditions 2019 Update



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

May 9, 2019



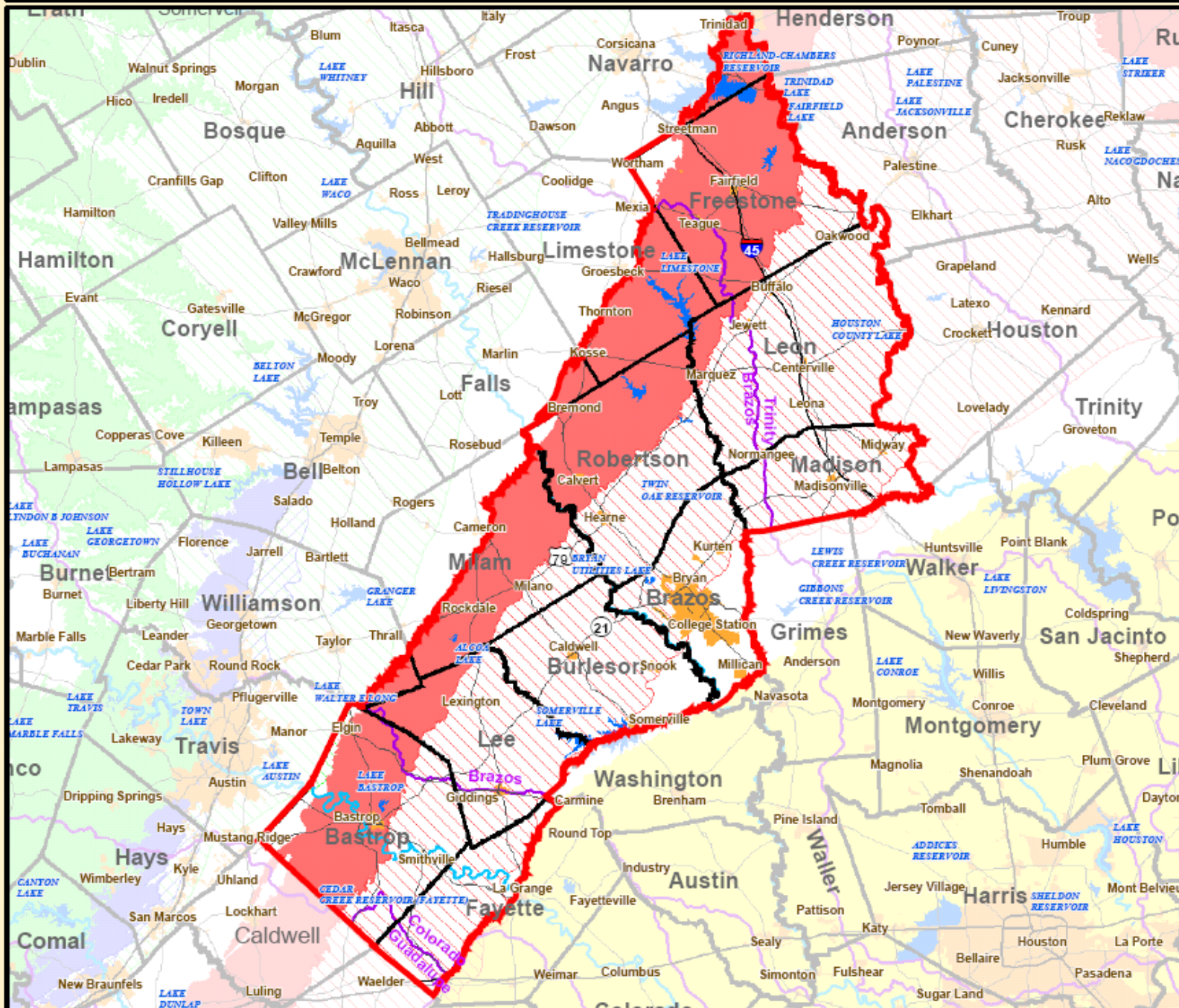
Desired Future Conditions

- ❖ Established for Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro, Hooper, Yegua, Jackson and Brazos River Alluvium aquifers
- ❖ Use average artesian head decline over aquifer areas as matrix for quantifying progress toward reaching Desired Future Conditions (DFCs), except for Brazos River Alluvium where 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
- ❖ 2017 cycle of GMA 12 planning developed DFCs for 2070

Groundwater Management Area #12



MAP LEGEND

- GMA #12
- 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
12/21/2009



0 7 14 21 28 Miles

5/9/2019
1 inch equals 26 miles

DFC Goals

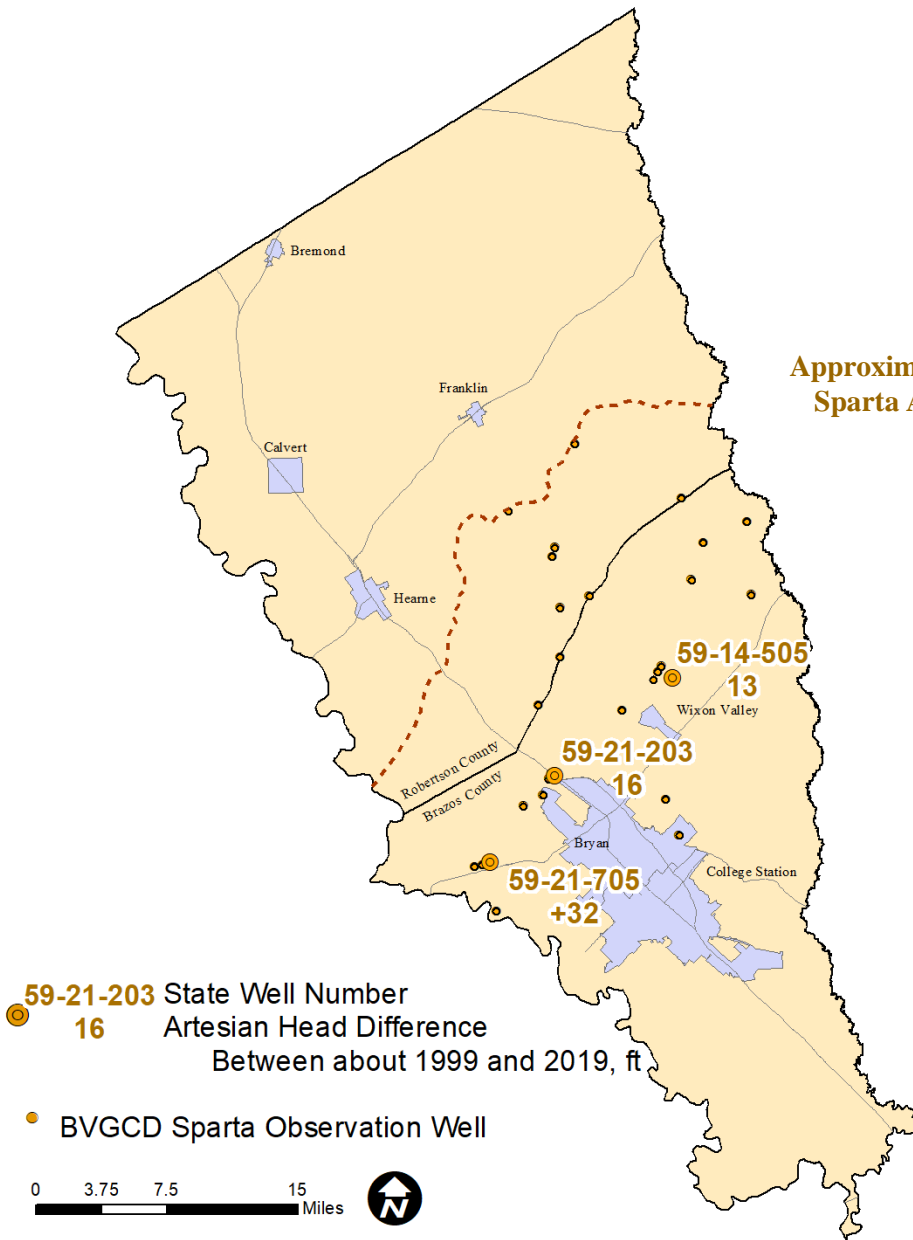
Aquifer	GMA 12 DFC, ft	BVGCD- DFC, ft	Period
Sparta	16	12	2000 - Dec. 2069
Queen City	16	12	2000 - Dec. 2069
Carrizo	75	61	2000 - Dec. 2069
Calvert Bluff	114	125	2000 - Dec. 2069
Simsboro	228	295	2000 - Dec. 2069
Hooper	168	207	2000 - Dec. 2069
Yegua	65	70	2010 - 2069
Jackson	65	110	2010 - 2069

Sparta Aquifer

Average Artesian Head Change = +1 foot

DFC by 2070: Average Artesian Head Decline 12 feet

Approximate updip limit of Sparta Aquifer outcrop



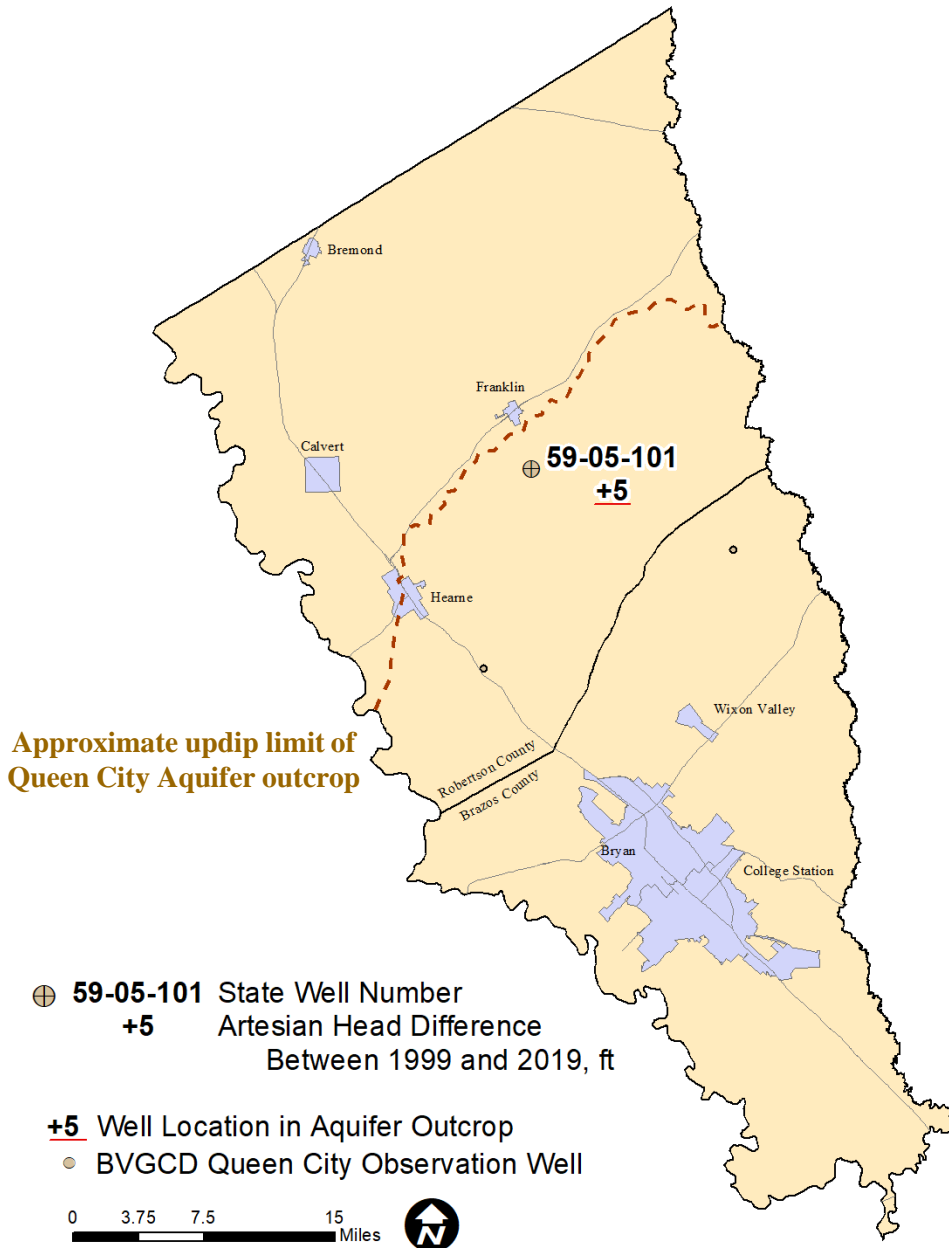
59-21-203 State Well Number
16 Artesian Head Difference
Between about 1999 and 2019, ft

• BVGCD Sparta Observation Well



Queen City Aquifer

DFC by 2070: Average Artesian Head Decline 12 feet

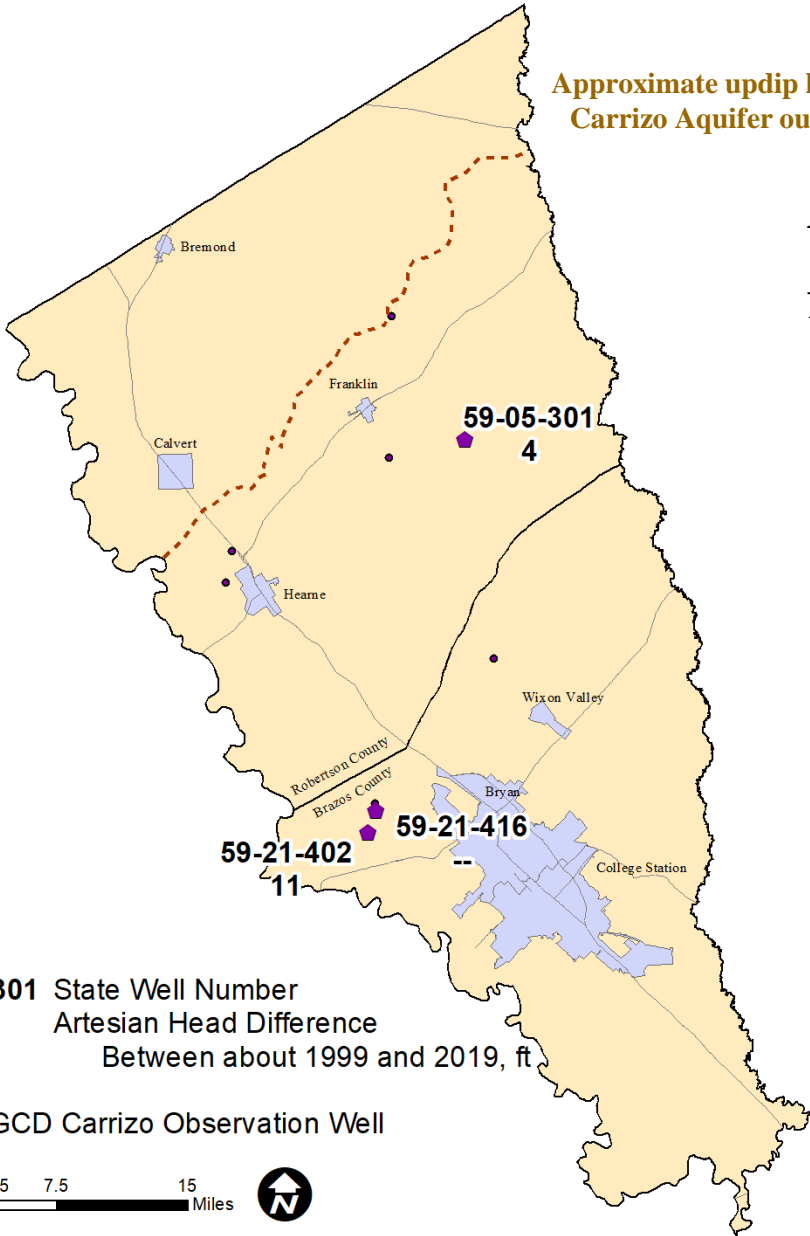


Carrizo Aquifer

Approximate updip limit of Carrizo Aquifer outcrop

Average Artesian Head Decline = 8 feet

DFC by 2070: Average Artesian Head Decline 61 feet



- ◆ 59-05-301 State Well Number
4 Artesian Head Difference
Between about 1999 and 2019, ft
- BVGCD Carrizo Observation Well



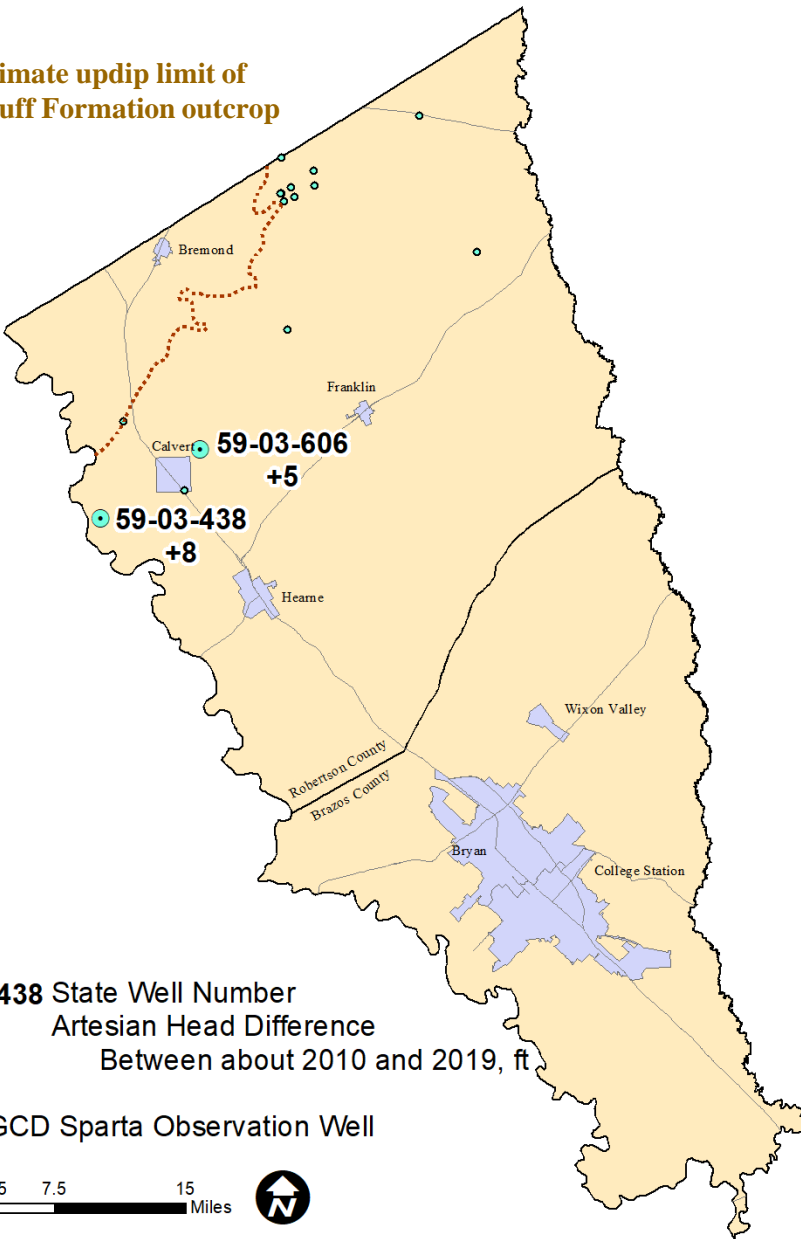
Approximate updip limit of
Calvert Bluff Formation outcrop

Calvert Bluff Formation

DFC by 2070: Average Artesian Head Decline 125 feet

59-03-438 State Well Number
+8 Artesian Head Difference
Between about 2010 and 2019, ft.

BVGCD Sparta Observation Well

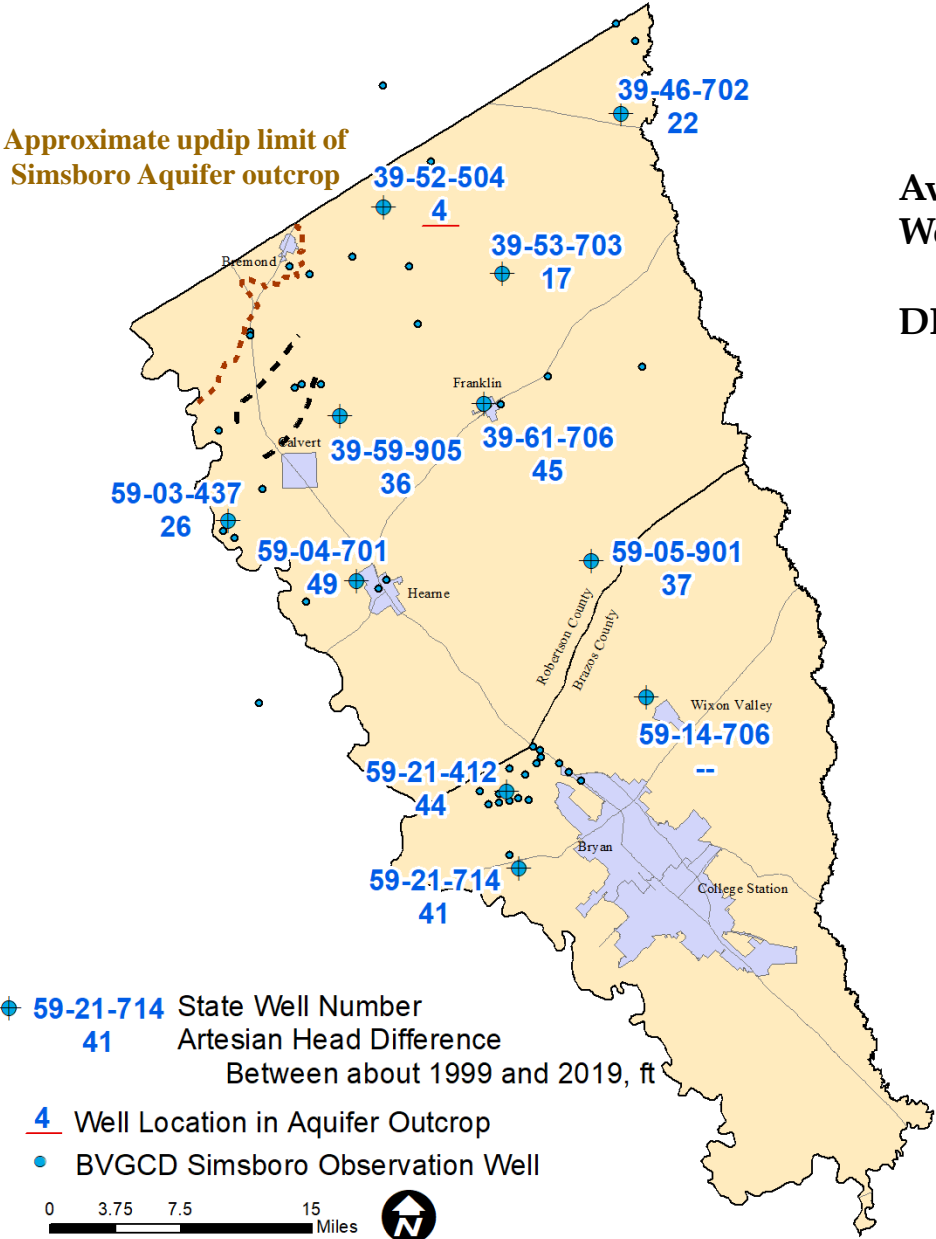


Simsboro Aquifer

Average Artesian Head Decline = 32 feet
 Weighted Average Artesian Head Decline = 35 feet

DFC by 2070: Average Artesian Head Decline 295 feet

Approximate updip limit of
 Simsboro Aquifer outcrop



◆ 59-21-714 State Well Number
 41 Artesian Head Difference
 Between about 1999 and 2019, ft

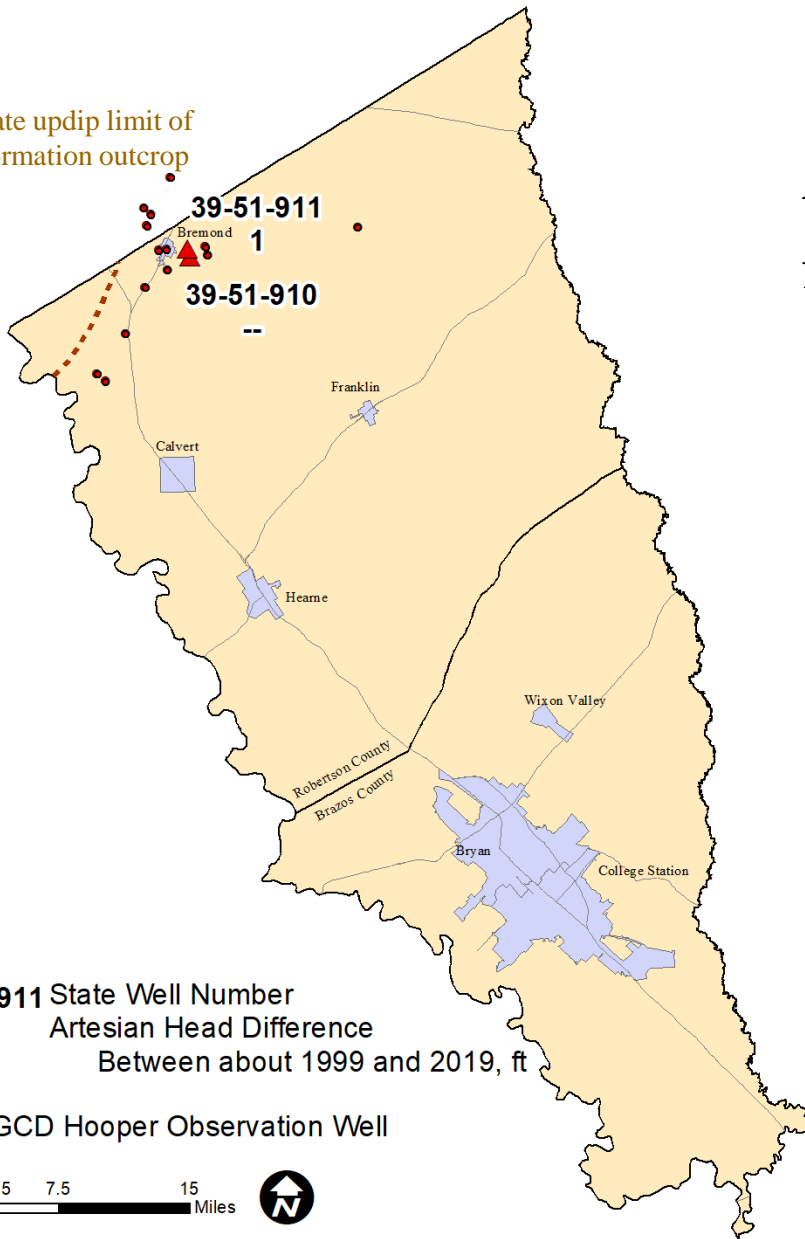
4 Well Location in Aquifer Outcrop
 ● BVGCD Simsboro Observation Well

Hooper Formation

Average Artesian Head Decline = 1 foot

DFC by 2070: Average Artesian Head Decline 207 feet

Approximate updip limit of
Hooper Formation outcrop



▲ 39-51-911 State Well Number
1 Artesian Head Difference
Between about 1999 and 2019, ft

● BVGCD Hooper Observation Well



Yegua-Jackson Aquifer

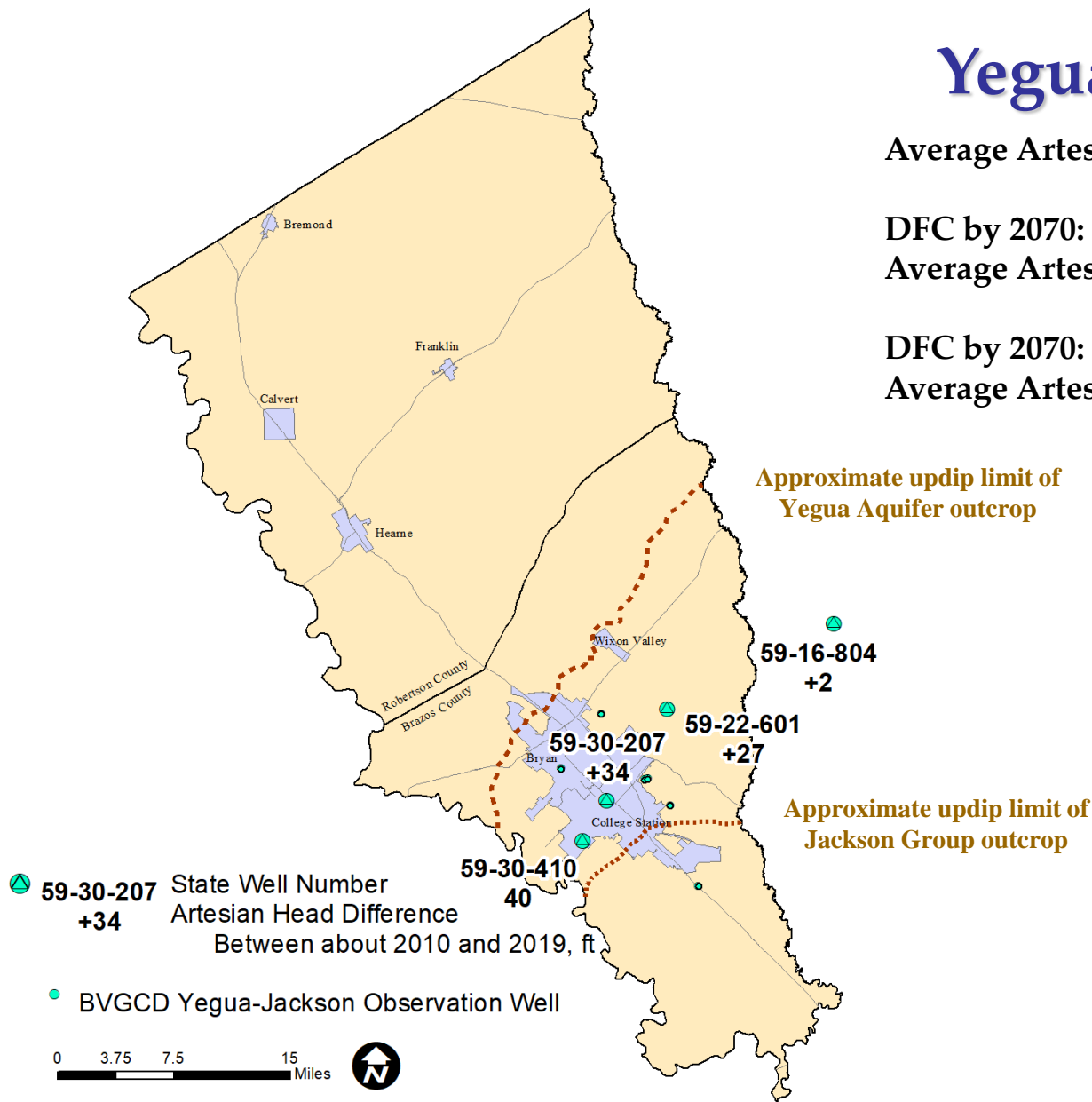
Average Artesian Head Change = +6 feet

DFC by 2070:

Average Artesian Head Decline 70 feet (Yegua)

DFC by 2070:

Average Artesian Head Decline 110 feet (Jackson)



Approximate up-dip limit of Yegua Aquifer outcrop

Approximate up-dip limit of Jackson Group outcrop

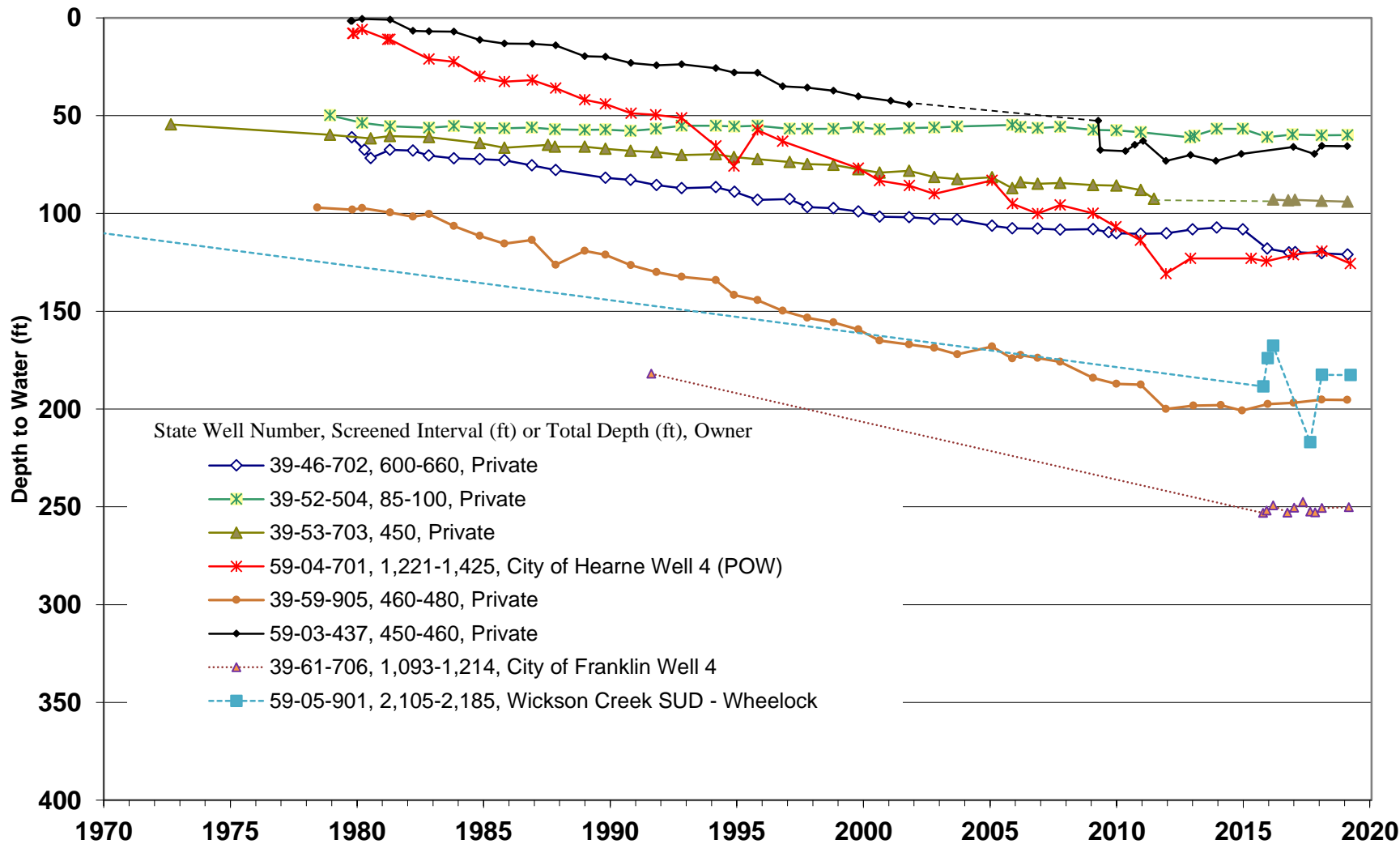
59-30-207 State Well Number
+34 Artesian Head Difference
Between about 2010 and 2019, ft

• BVGCD Yegua-Jackson Observation Well



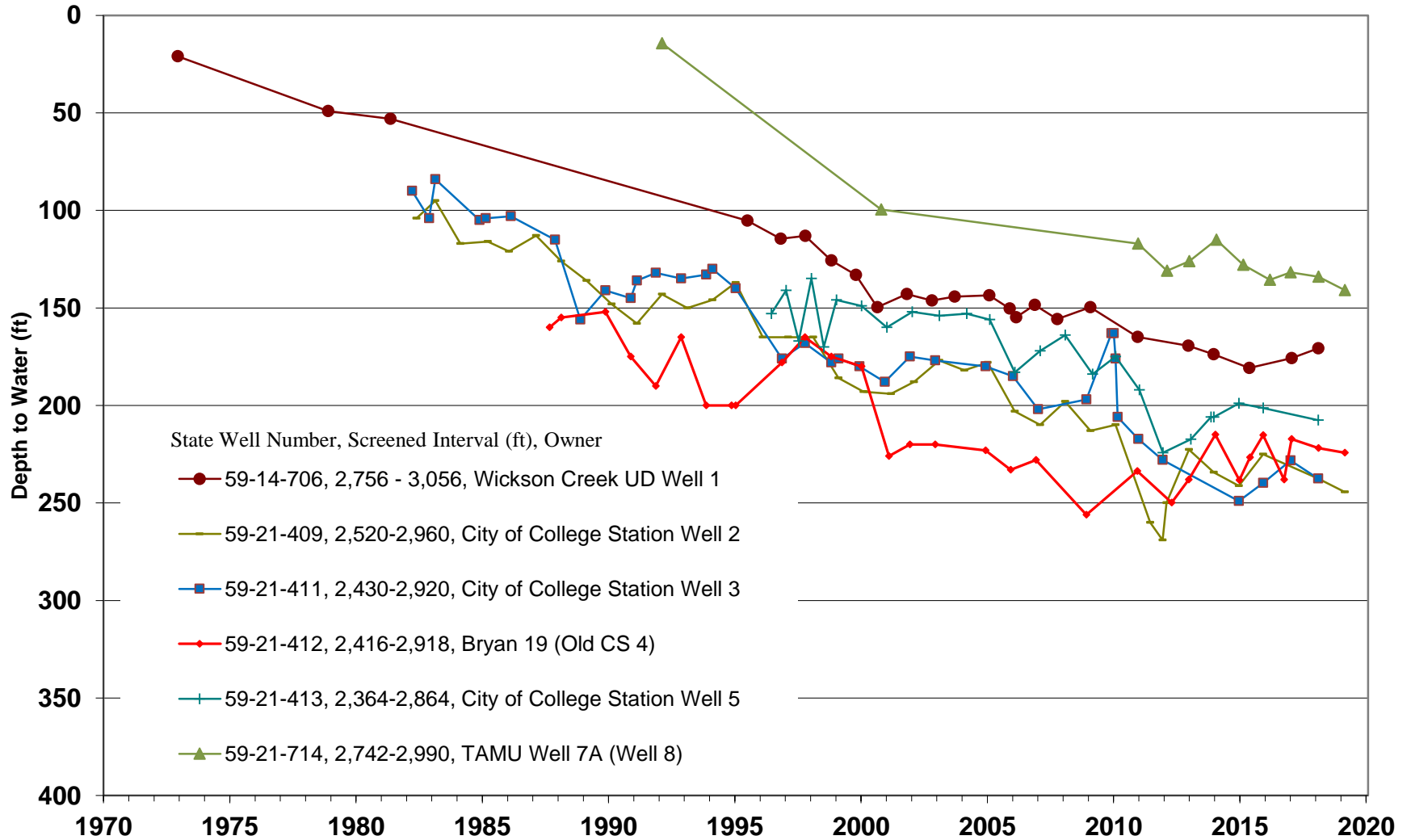
SIMSBORO AQUIFER OBSERVATION WELLS

Robertson County

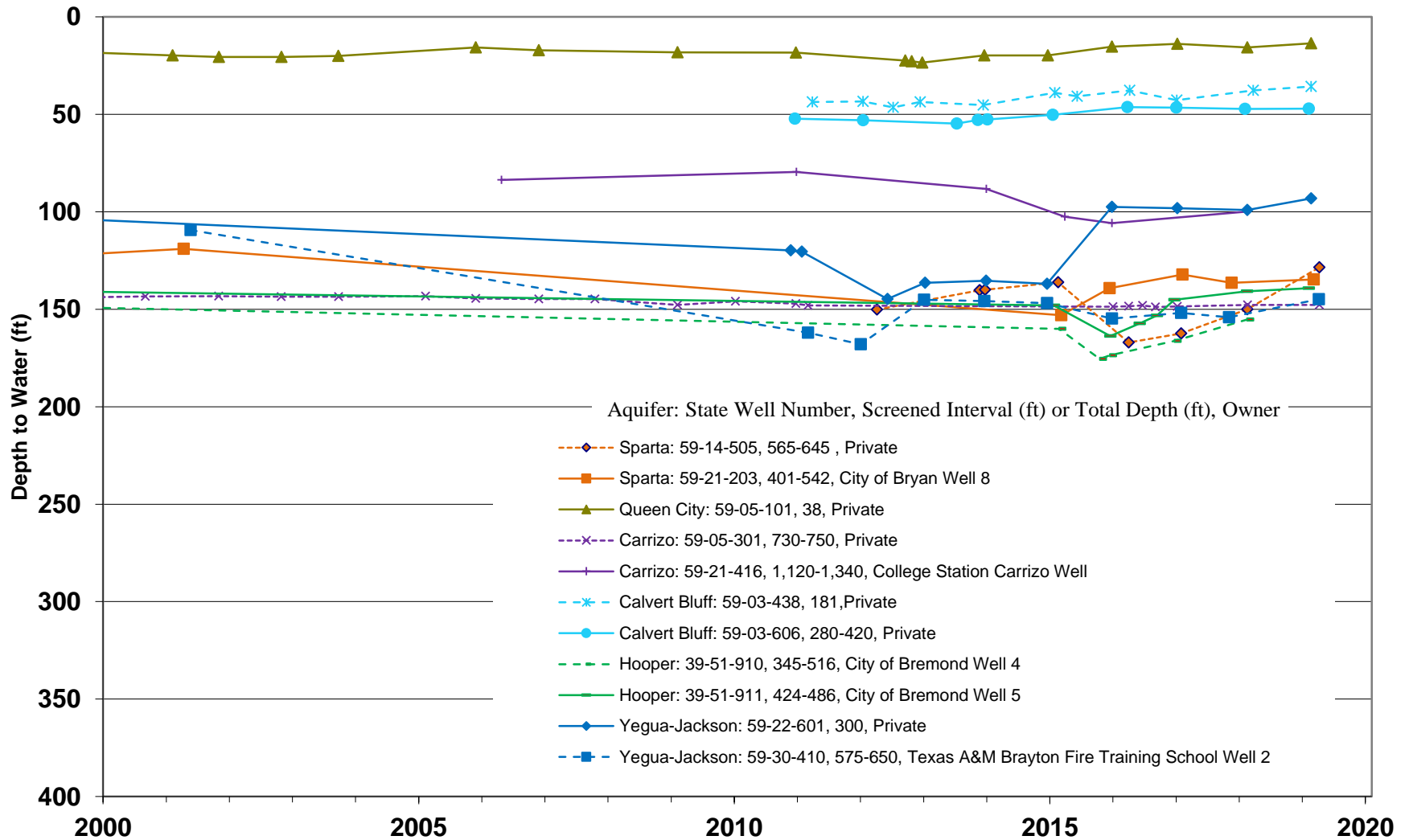


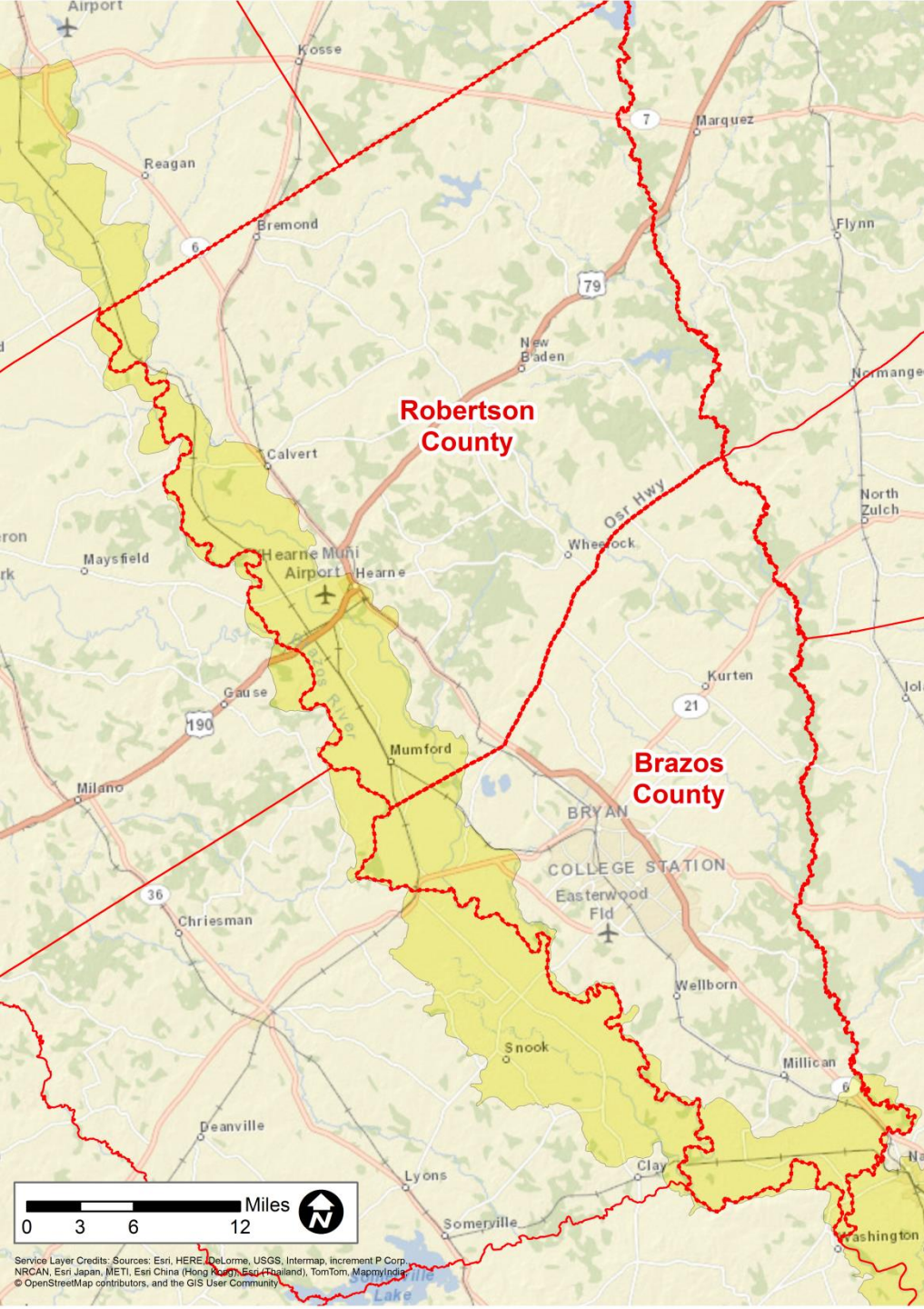
SIMSBORO AQUIFER OBSERVATION WELLS

Brazos County



YEGUA-JACKSON, SPARTA, QUEEN CITY, CARRIZO, CALVERT BLUFF AND HOOPER OBSERVATION WELLS

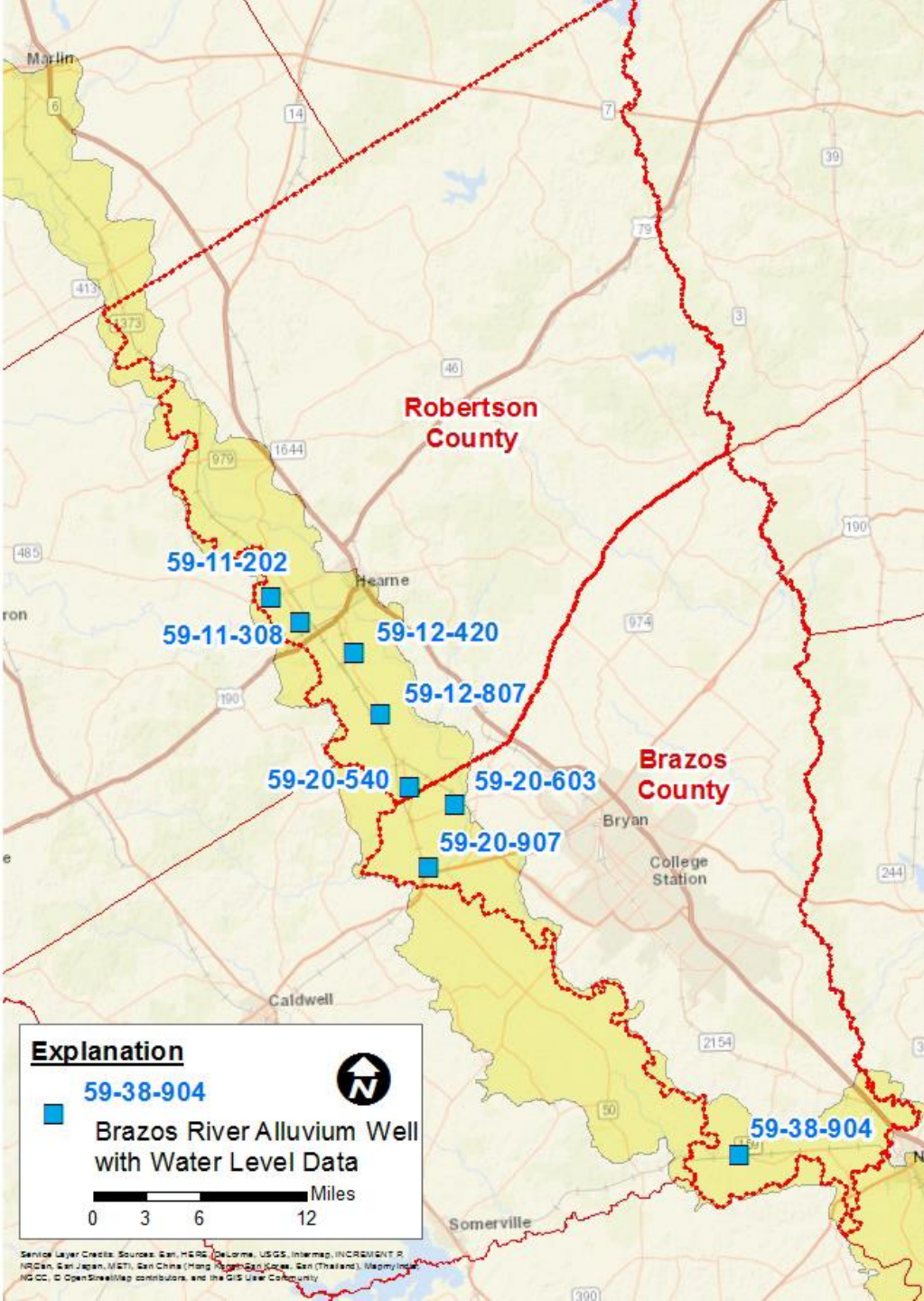




Extent of Brazos River Alluvium

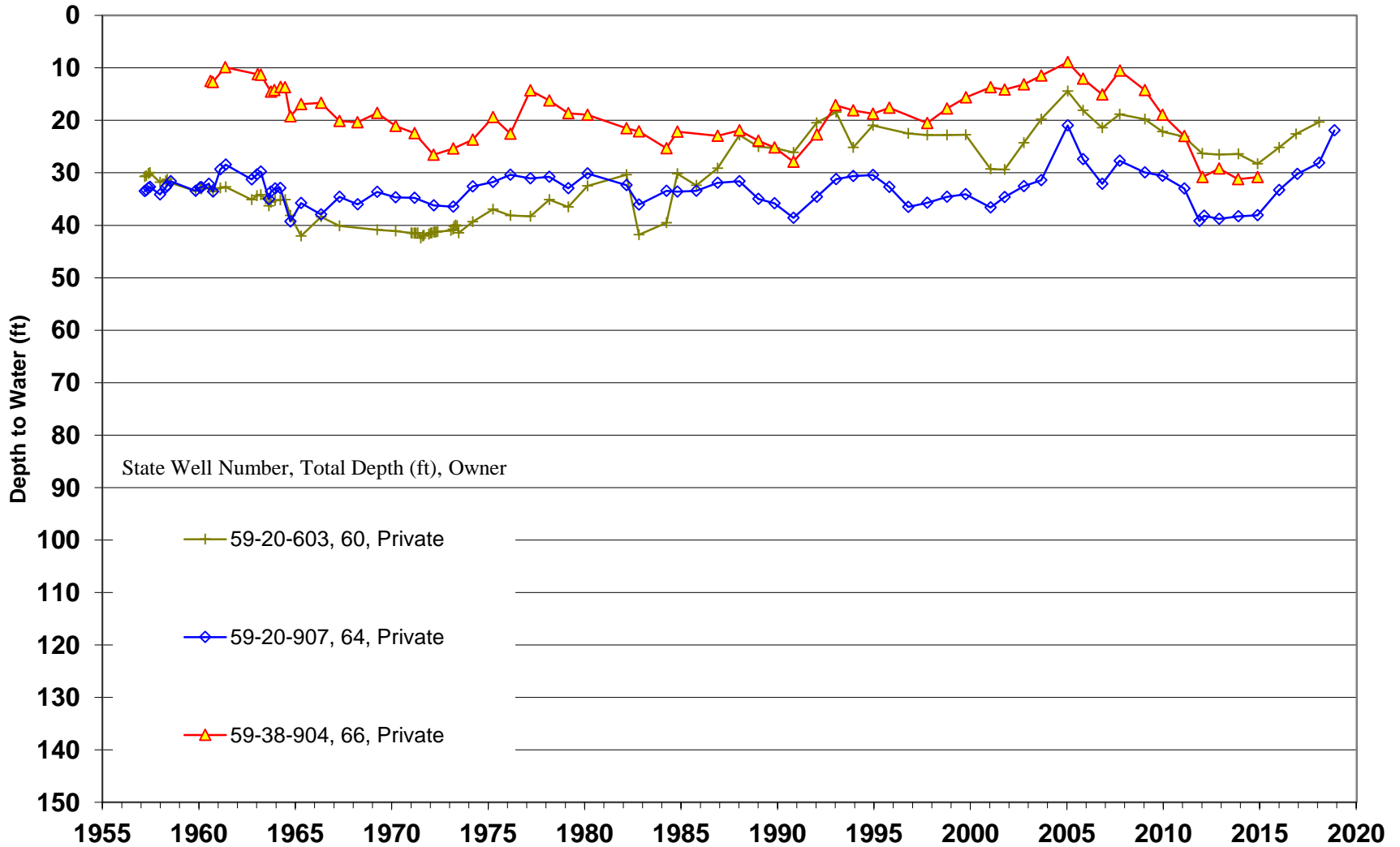
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Location of Brazos River Alluvium Wells With Water Level Hydrographs



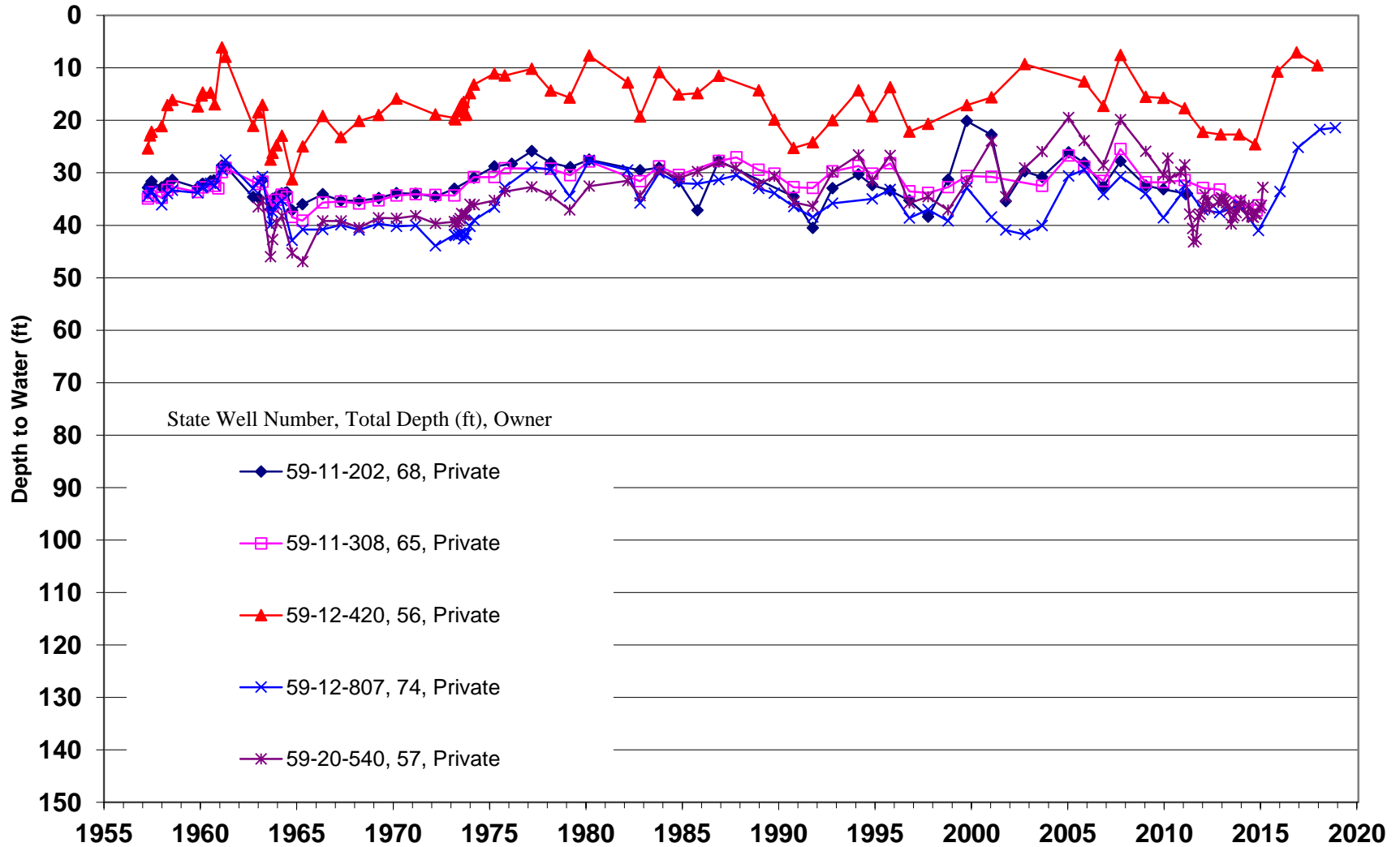
BRAZOS RIVER ALLUVIUM OBSERVATION WELLS

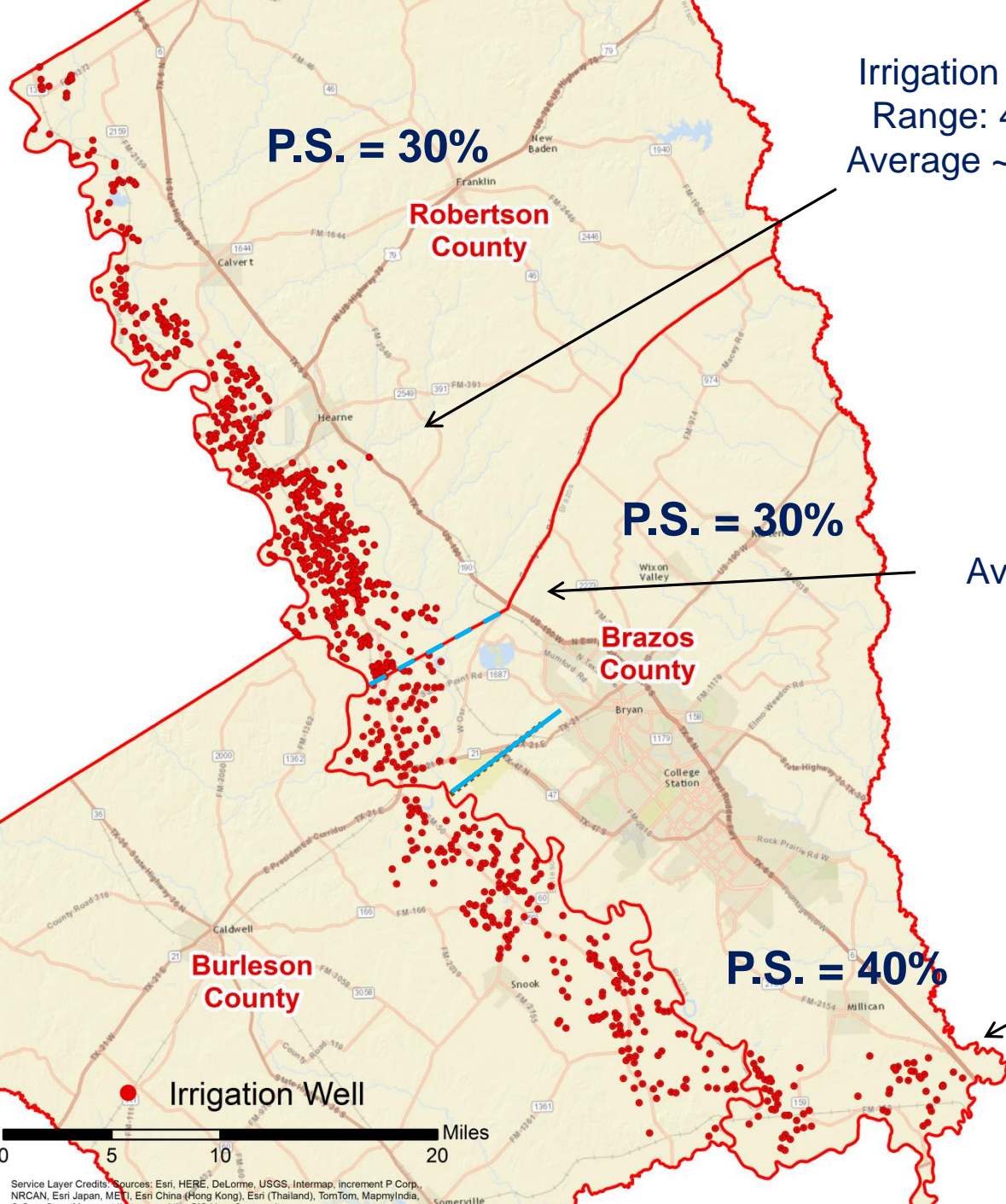
Brazos County



BRAZOS RIVER ALLUVIUM OBSERVATION WELLS

Robertson County





P.S. = 30%

**Robertson
County**

P.S. = 30%

**Brazos
County**

P.S. = 40%

**Burleson
County**

Irrigation Well



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**

5/9/2019

Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Summary

- ❖ Based on water level data, average artesian head changes through 2019 about the same as through 2018
- ❖ A few wells unavailable for water level measuring in the last few months and will be measured when available
- ❖ Water level hydrograph data are overwhelmingly reflective of very limited water level changes in the past few years
- ❖ Water levels measured in Brazos River Alluvium screened wells continue to show an upward to stable water level trend



??Questions??

Thank you!