



Barton Springs
Edwards Aquifer
CONSERVATION DISTRICT

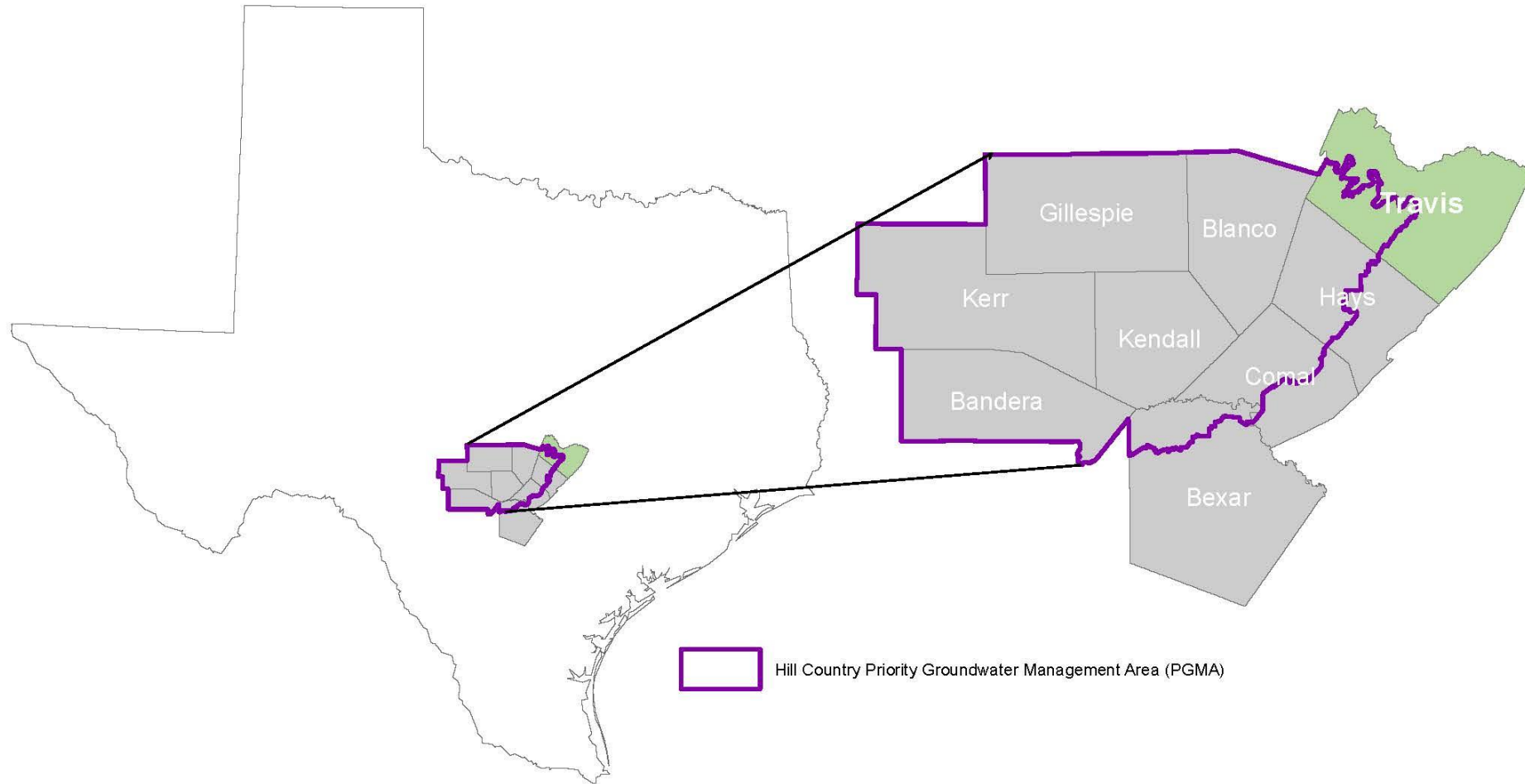


Western Travis County Hydrogeologic Atlas

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Brian Smith, and Justin Camp

Travis County: Vicky Kennedy

Priority Groundwater Management Area



Overview

- A hydrogeologic study of western Travis County and surrounding areas
- Deliverables:
Hydrogeologic Atlas and digital databases
 - Portions of the Atlas are currently under peer review.

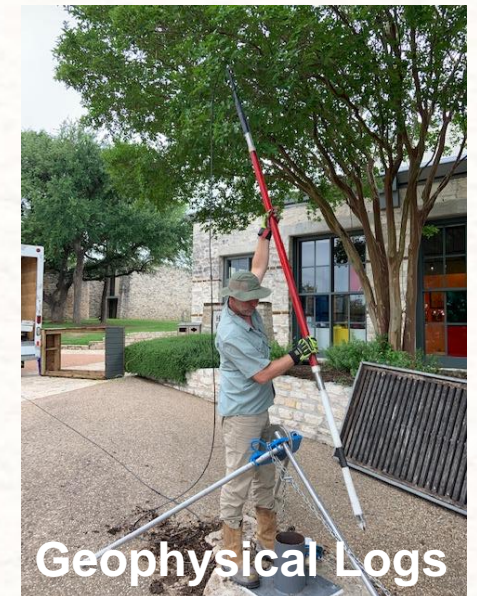


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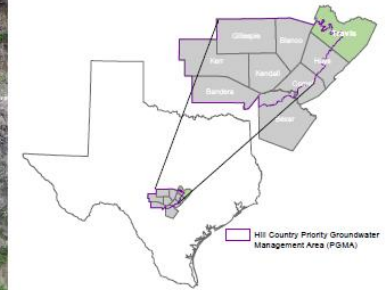
Hydrogeologic Atlas

(peer review in progress)



HYDROGEOLOGIC ATLAS OF WESTERN TRAVIS COUNTY

November 2019



Barton Springs Edwards Aquifer
CONSERVATION DISTRICT



Setting and Study Area

Southwest Travis Co. PGMA

SECTION 1.0 STUDY AREA

Study Area Stratigraphy

Introduction

The preceding section describing the regional tectonics, stratigraphic, and depositional environments underscores the detailed stratigraphy of the study area. The reader is referred to the detailed descriptions in Williams et al., 2016, and references therein, for the detailed stratigraphic descriptions. **Figure 3.3** illustrates the stratigraphy of the study area and includes the stratigraphic column. A notable reference to the stratigraphy described in Williams et al., 2016 with this study are increased thicknesses (see section 8.1) of clastics of the Lower Trinity units, and an apparent increase in clastics within the Middle Trinity units. Accordingly, there appears to be poorly developed patch reefs within the Lower Glen Rose in the PGMA study area when compared to Hays County. The increase in clastics and potential decrease in carbonate reef development could be related to the "Sycamore Reef" that would have been a major source of these clastics. **Figure 3.1** is a photo of the Sycamore sand conglomerate which generally correlates to the location of the "Sycamore River" mapped in **Figure 2.7** and shown in Ising (2016). The Sycamore Sand (Sycamore equivalent) is the primary unit within the Lower Trinity Aquifer.

Figure 2.1 is a photo of an exposure of the upper Cow Creek Limestone at Remer's Ranch. The Cow Creek Limestone grades at the base of the photo from a muddy clastic (red-rich) near shore upward to more massive beach complex containing carbonate and clastic sands. The Cow Creek is a major aquifer unit within the Middle Trinity Aquifer.

Figure 3.4 illustrates the lateral and vertical relationship of the geologic units of the study area. **Figure 3.5** illustrates the relationship of the geologic, depositional setting and facies changes to the aquifer units of the study area in the Hamilton Road #1 well described from Kerans et al., 2016. **Figure 3.6** illustrates map and cross-sectional view of the depositional model for the sequence in **Figure 3.5**. The geologic units are time-equivalent but represent different depositional environments and lateral facies. Figure modified from Ising and Moore, 1983.

References

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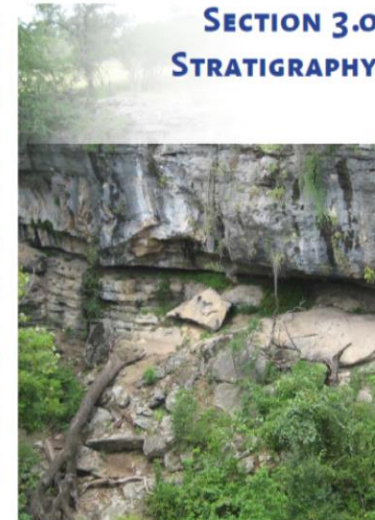
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Regional Tectonics,

Depositional History

SECTION 3.0 STRATIGRAPHY



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Captions

3.1 Photograph of the Sycamore sand. An outcrop of fine to coarse heterolithic sandstone overlain by cobble conglomerate. The

SECTION 2.0 TECTONIC AND PALEOGEOGRAPHIC MAPS



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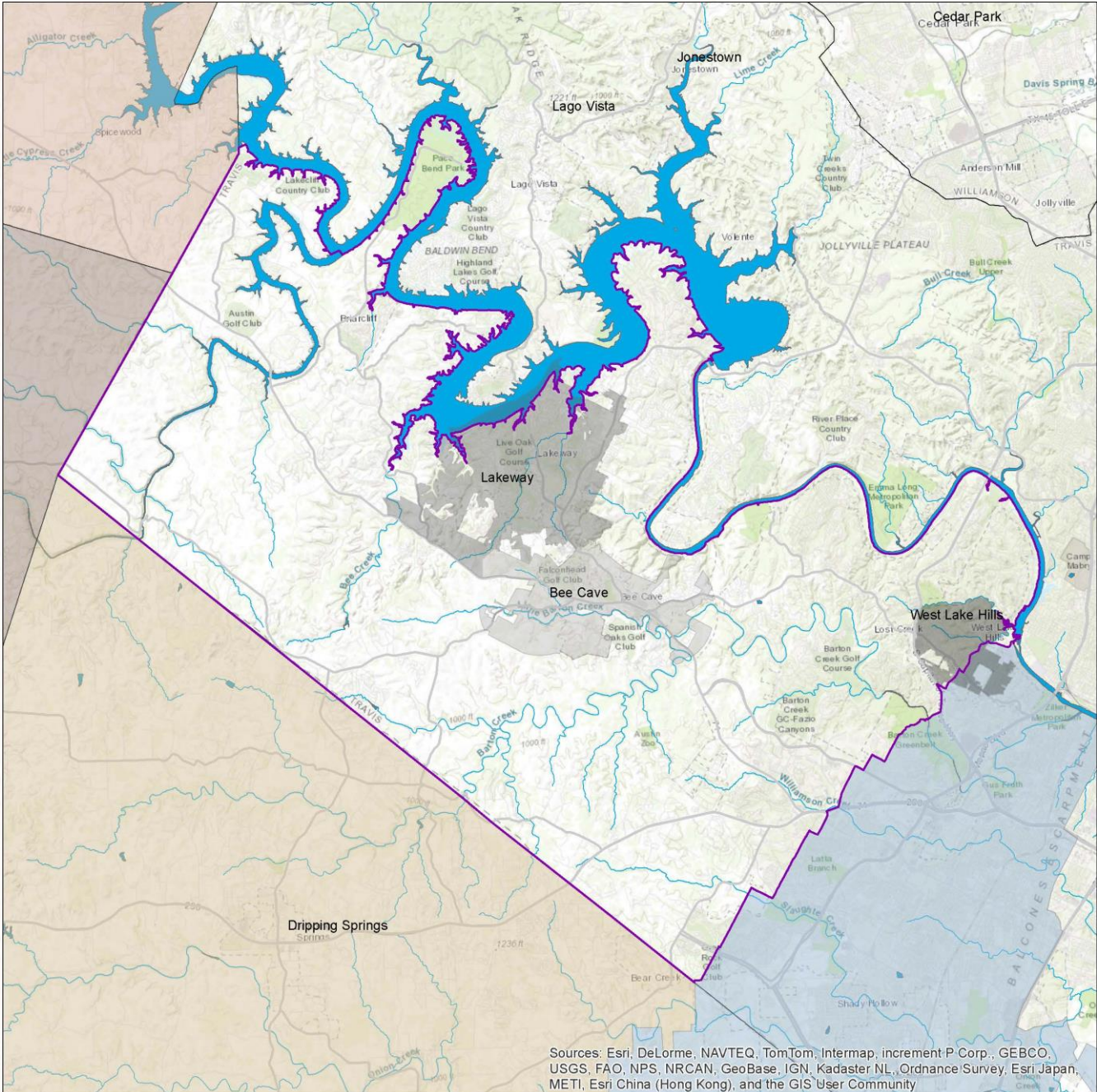


lulae, que orum faus, nonium id pece quod re h Muldem quidi inouret, ne tem lu, viverricium res orasendat. Hils.

Hydrogeologic Column

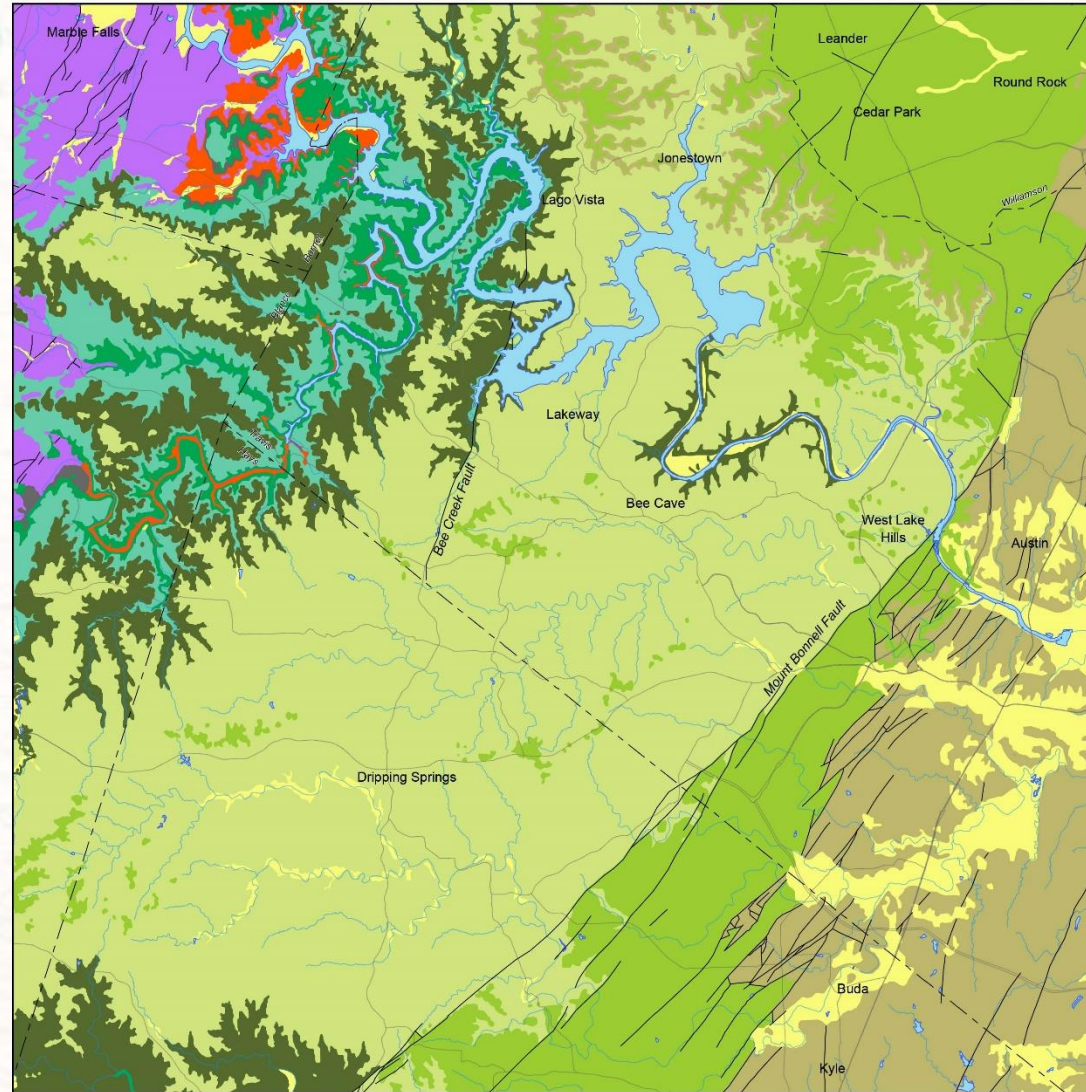
		Stratigraphy	
		Litho	Hydro
Trinity Group	Upper Glen Rose		Upper Trinity
	Lower Glen Rose		Middle Trinity
	Hensel		
	Cow Creek		
	Hammett		confining
	Sligo		Lower Trinity
	Hosston		

Location Map



Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community

Geologic Map



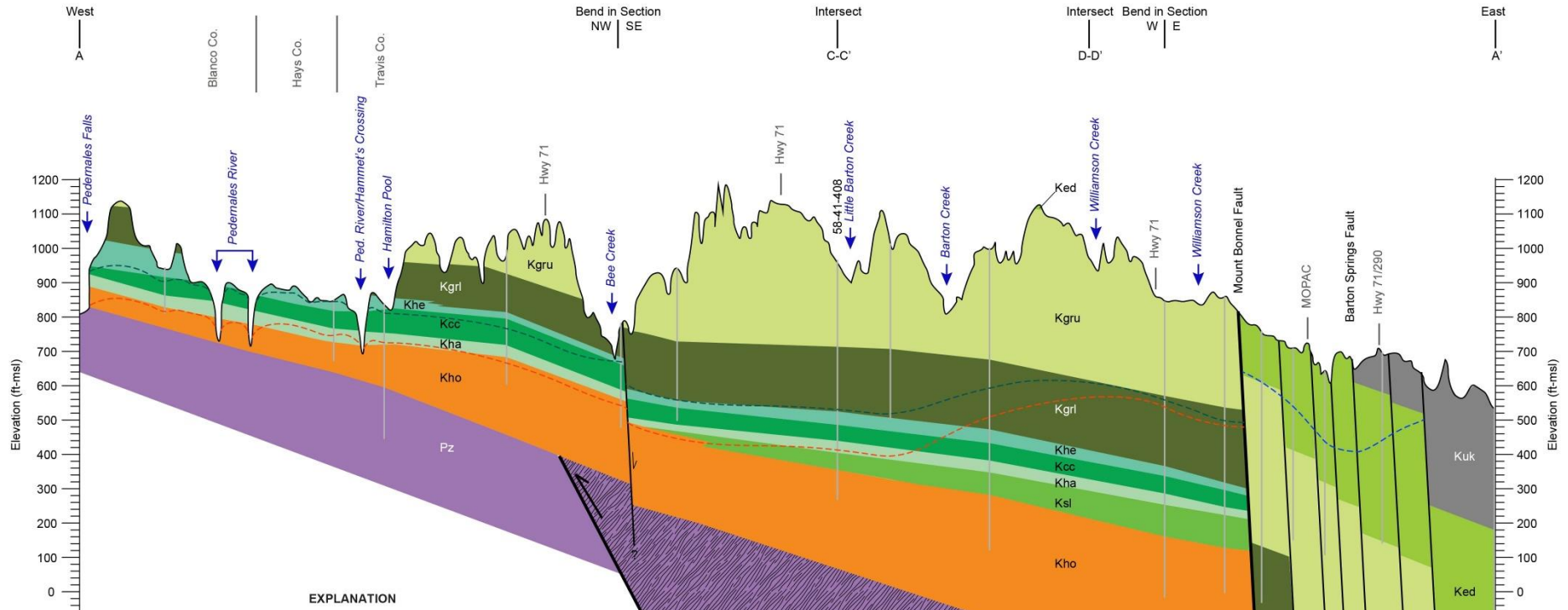
Geologic Explanation

- Gal/
Qtz
Alluvium and Terrace deposits
Gravel, sand and silt
 - "Younger than Edwards"
Predominantly Cretaceous-age marine limestones, claystones, chalks and marls.
 - Ked
Edwards Group
Limestone and dolomitic limestone with chert. Argillaceous and nodular at base.
 - Kgru
Upper Glen Rose Formation
Nodular, micritic limestone, argillaceous with skeletal clasts and interbedded marl, dolomite, and minor evaporite near base.
 - Kgrl
Lower Glen Rose Formation
Skeletal-grain-micritic limestone shale. Two distinct massive limestone "mounds/reef" facies present in south central study area.
 - Khe
Hensel Sand
West: Sand, silt and clay with conglomerate, commonly red-brown. East: Silty claystone and dolomite.
 - Kcu
Kha
Cow Creek/Hammitt Shale, undifferentiated
Cow Creek is generally shaley at base, shaling upwards to a fine- to medium-grained, skeletal-grain-micritic limestone and fine crystalline dolomite. Hammitt is typically a dark gray to olive green gummy claystone.
 - Ksl
Sligo Formation (subsurface formation; does not outcrop)
Limestone and dolomite with basal siltstone and shale. Locally contains relic coarse skeletal fragments and rudists.
 - Ksy
Sycamore (Hosston) Formation
Basal conglomerate and fluvial sands, shoreline sands and siltstones with silty shale overbank deposits. Commonly red-brown. Hosston Fm (Kho) is subsurface equivalent with stacked channel sands and hi-energy "beach" to east.
 - Pz
Paleozoic, undifferentiated
- Inferred fault lines
- $\frac{U}{D}$ Fault (down to the east unless noted otherwise)

Legend

- County lines
 - Creeks
 - Major Creeks
 - Rivers
 - Lakes
 - Roads
 - Springs
- The projection for this and all other maps is Texas Albers.

Llano Uplift ← Texas Hill Country → Balcones Fault Zone → East

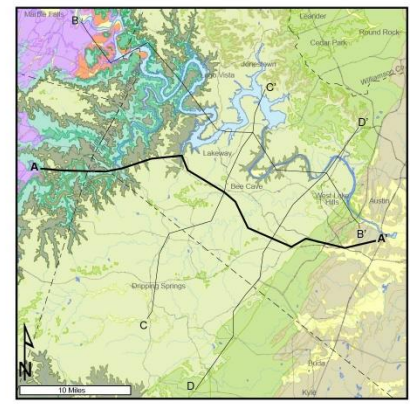
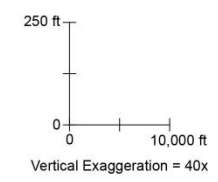


EXPLANATION

Hydrostratigraphy	Formation	Formation
confining units and perched aquifers	Qal	Alluvium
	Kuk	Upper Cretaceous (undivided)
Edwards Aquifer	Ked	Edwards Group (includes Walnut and Georgetown Fms.)
Upper Trinity Aquifer	Kgru	Upper Glen Rose
	Kgrl	Lower Glen Rose
Middle Trinity Aquifer	Khe	Hensel
	Kcc	Cow Creek
	Kha	Hammett
confining unit	Ksl	Sligo
Lower Trinity Aquifer	Kho/Ksy	Hosston/ Sycamore
Paleozoic Aquifers	Pz	Paleozoic Undifferentiated (pattern=Ouachita Facies)

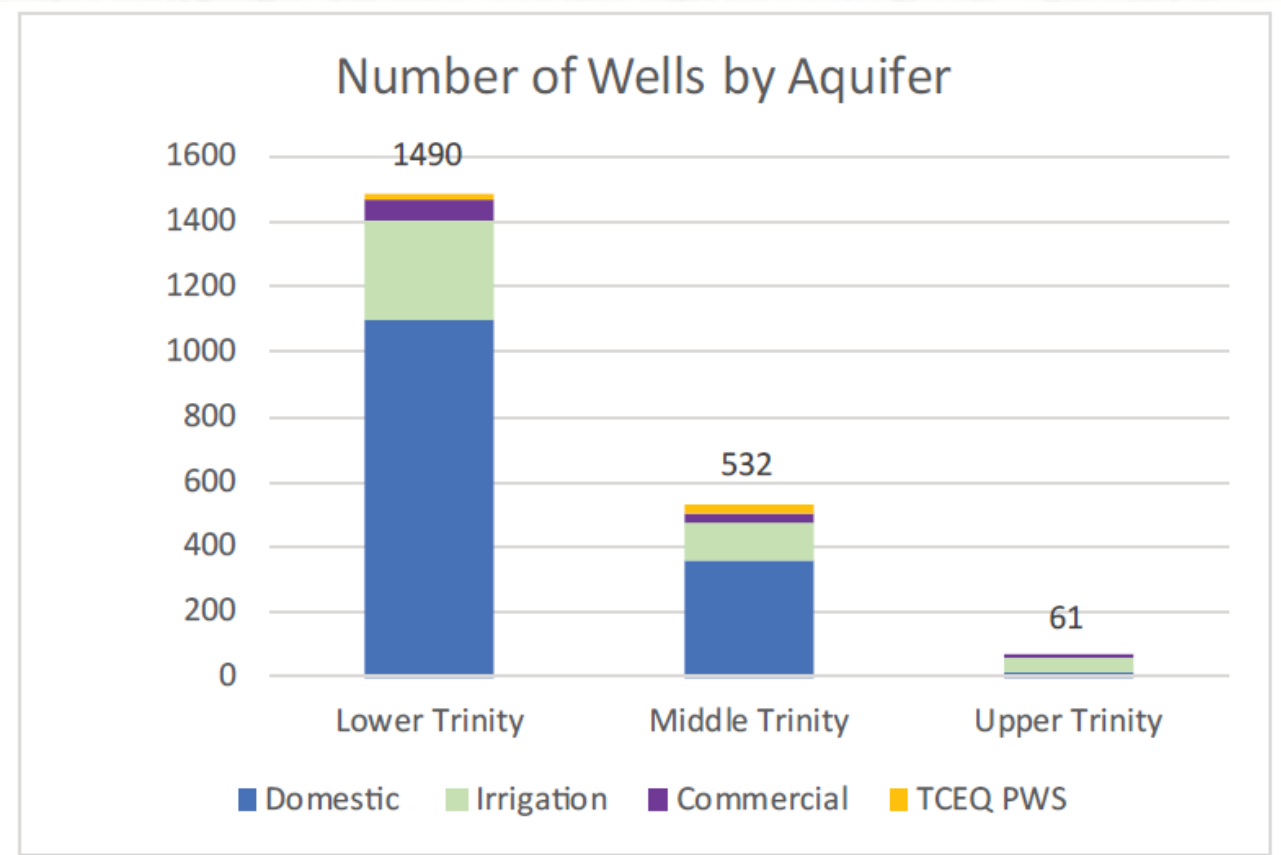
POTENTIOMETRIC LEVELS
(dashed where approximated)

- Edwards Aquifer
- Middle Trinity Aquifer
- Lower Trinity Aquifer

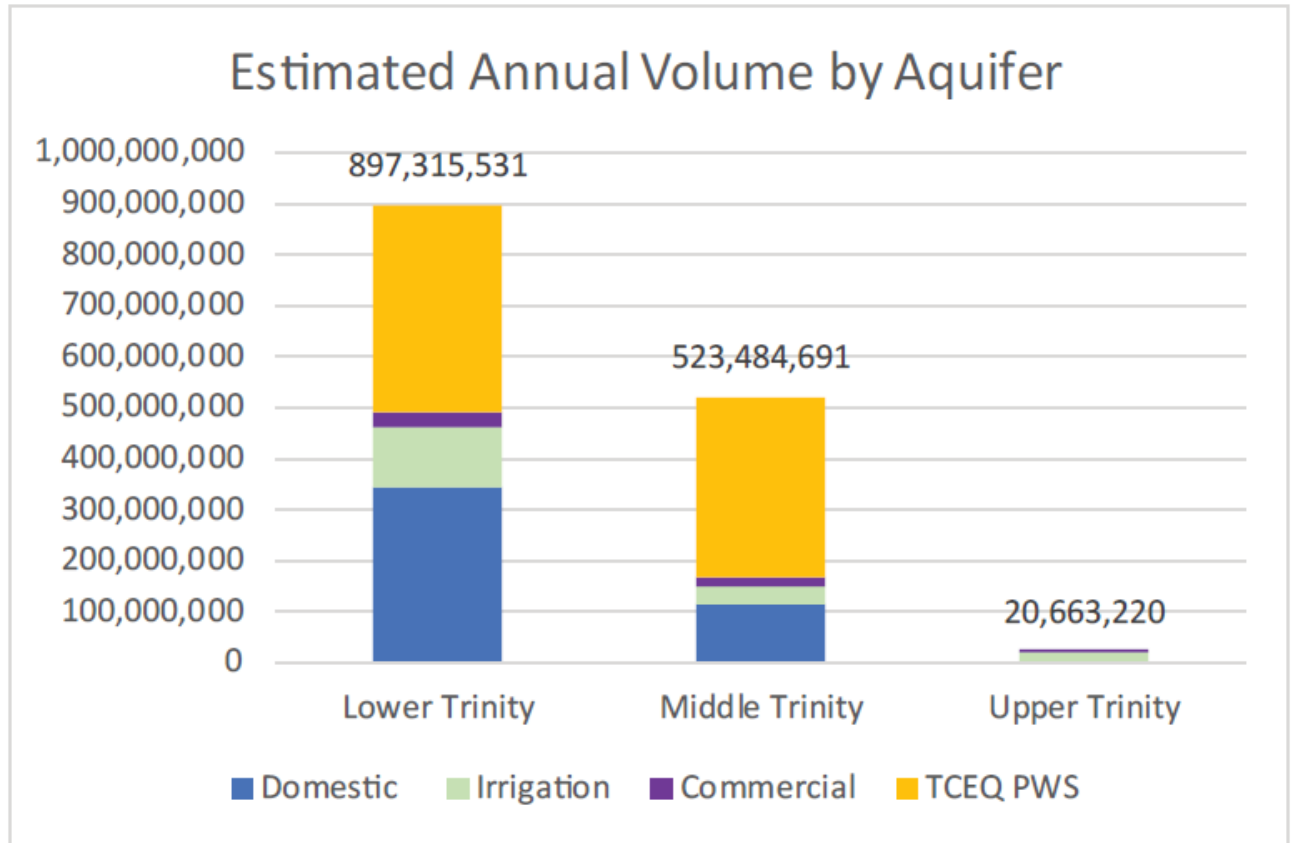


Total Wells by Aquifer

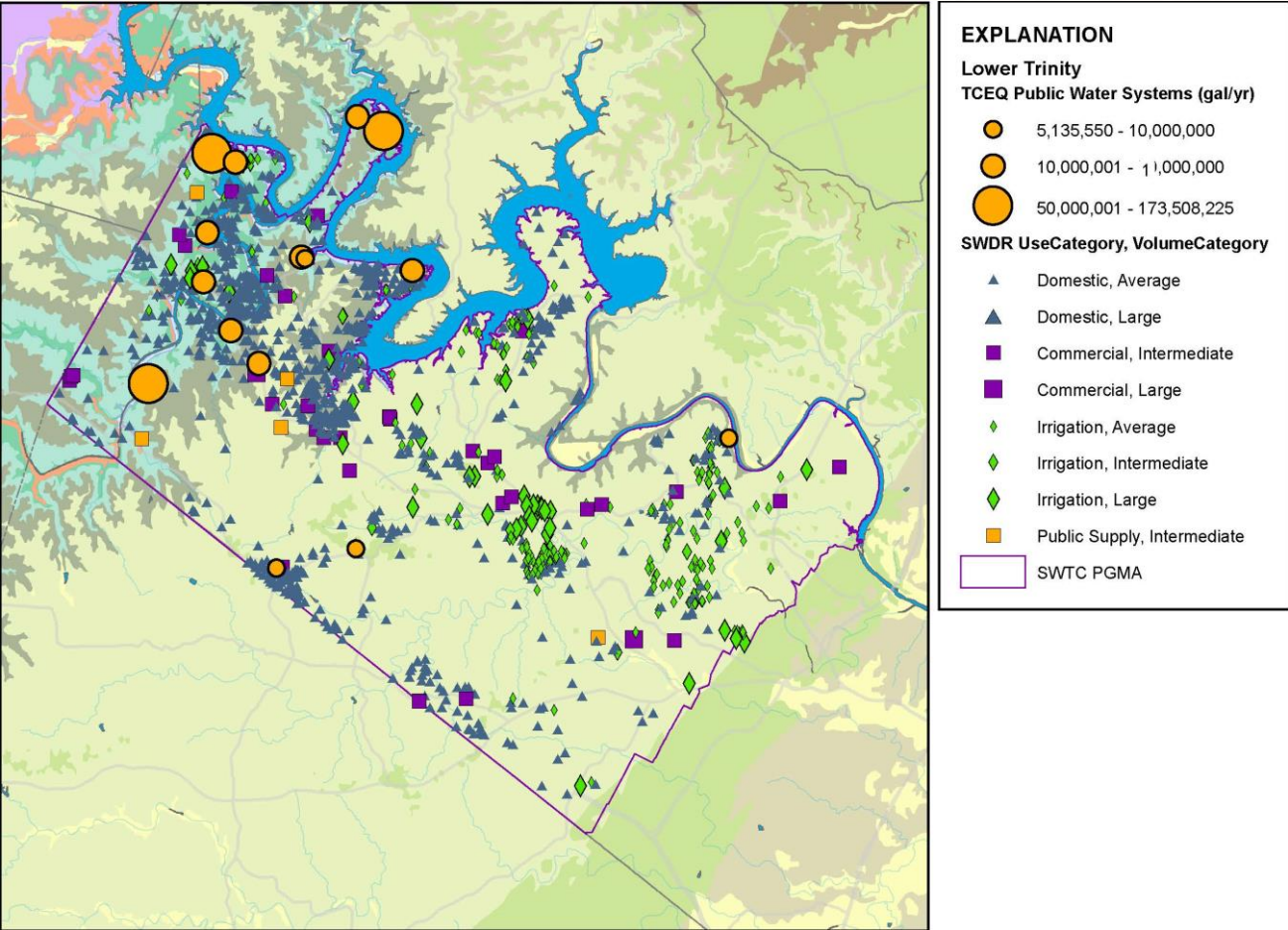
(Since 2003)



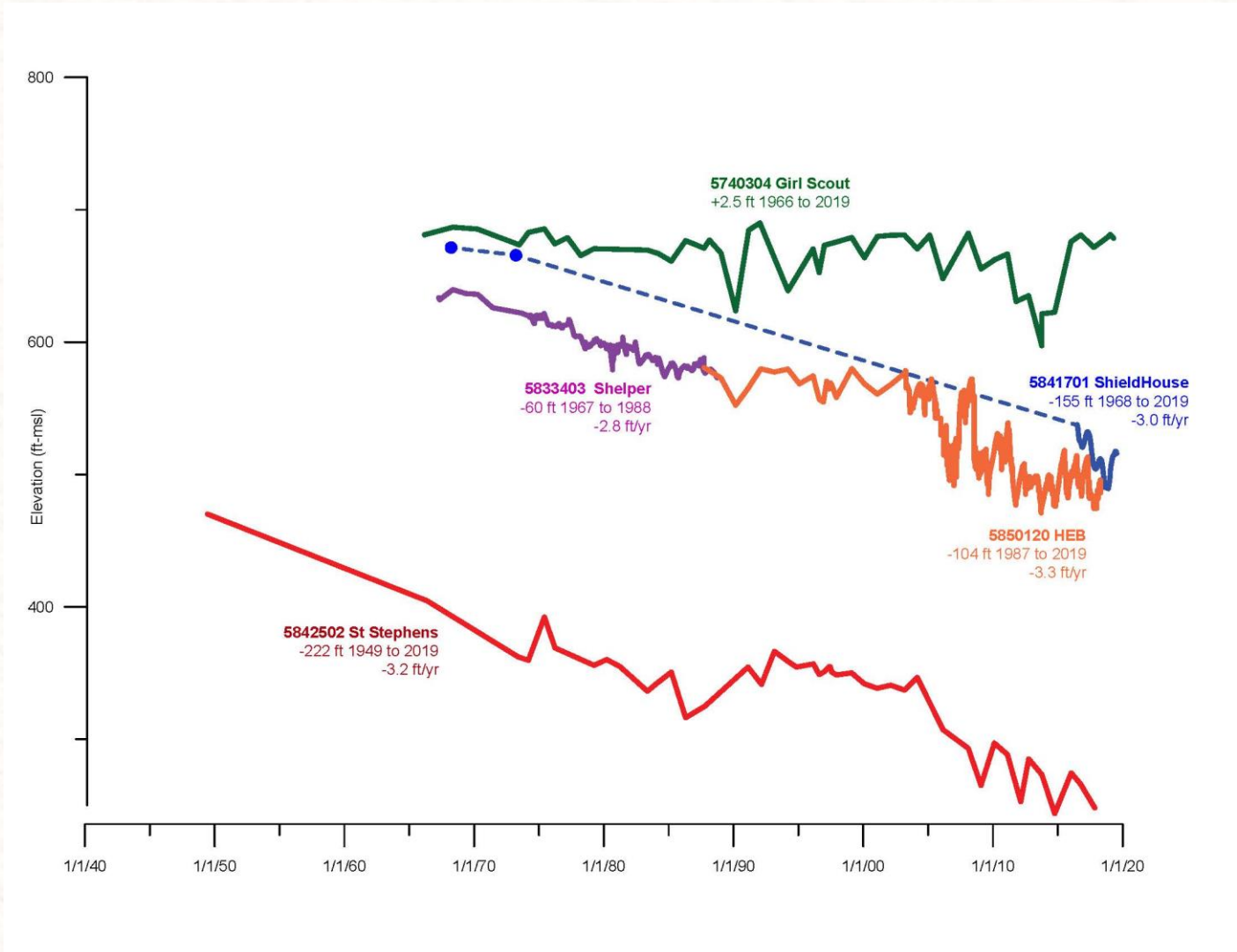
Annual Pumping Volume by Aquifer



Pumping Lower Trinity

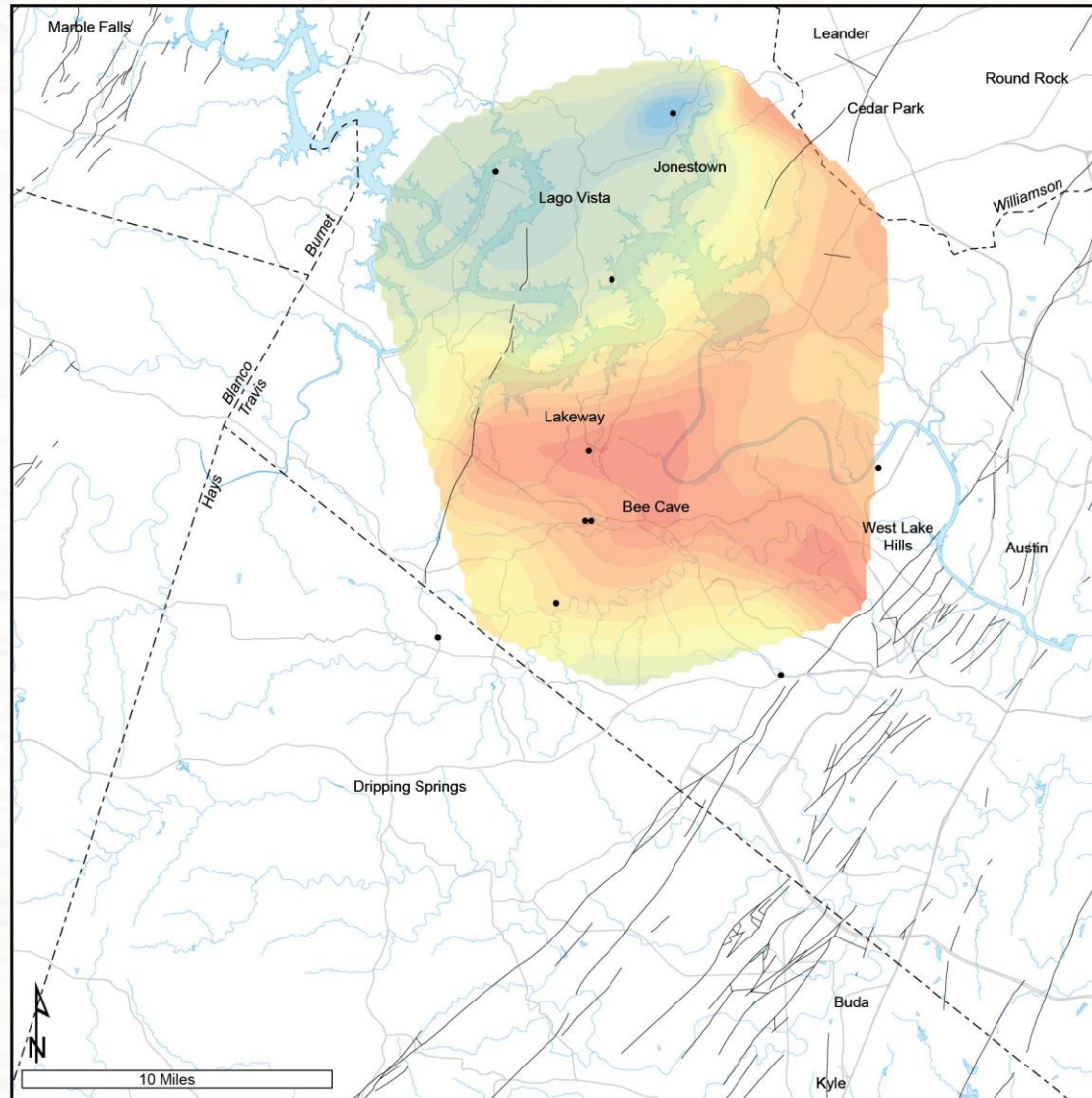


Lower Trinity Hydrographs

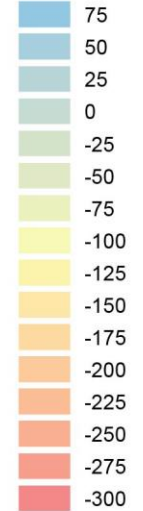


Drawdown Lower Trinity

1978 to present



Estimated Water-Level Change (ft)



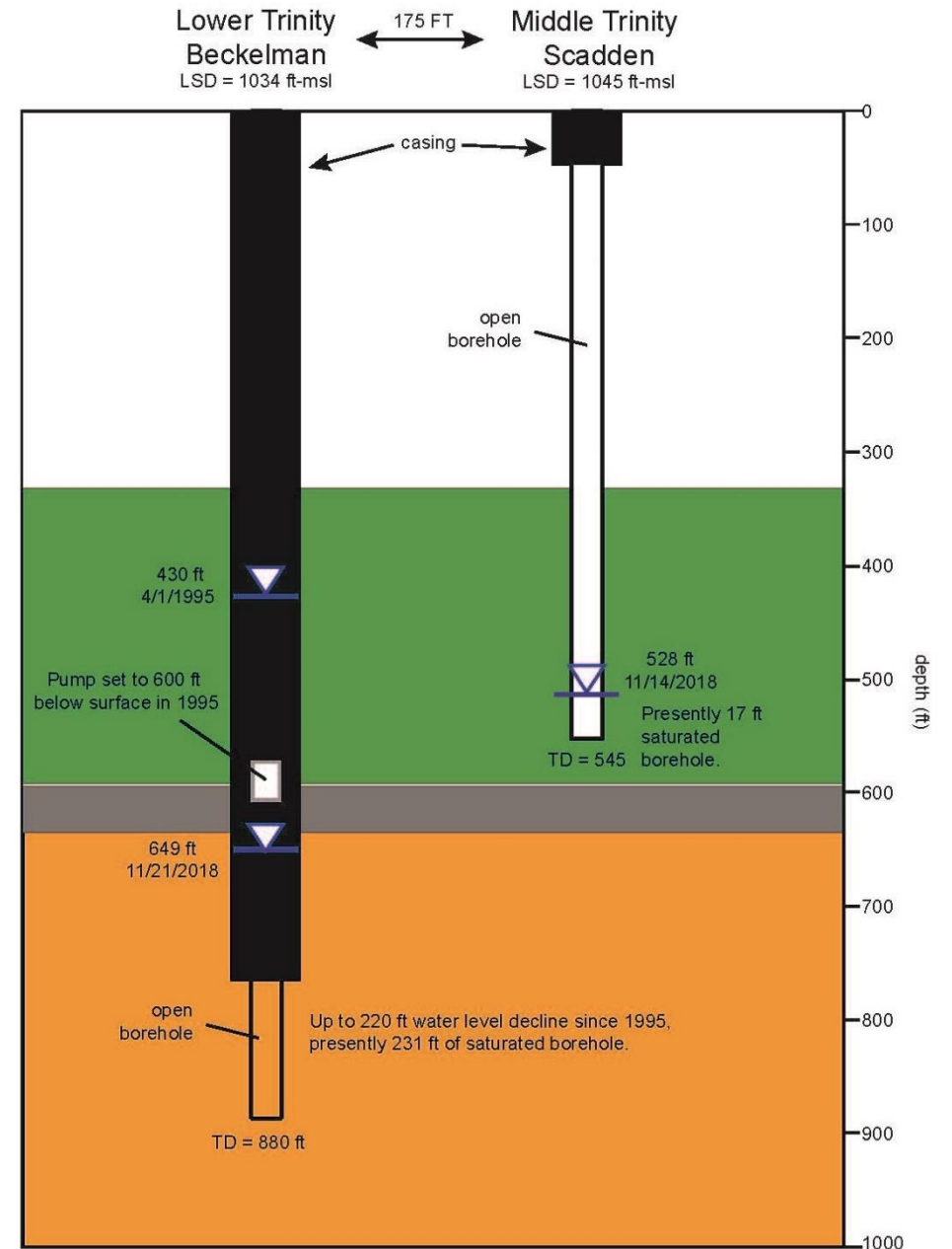
EXPLANATION

- Water-Level Change Control
- County Boundaries
- Roads
- Faults
- Lakes
- Rivers and Creeks

Groundwater Mining

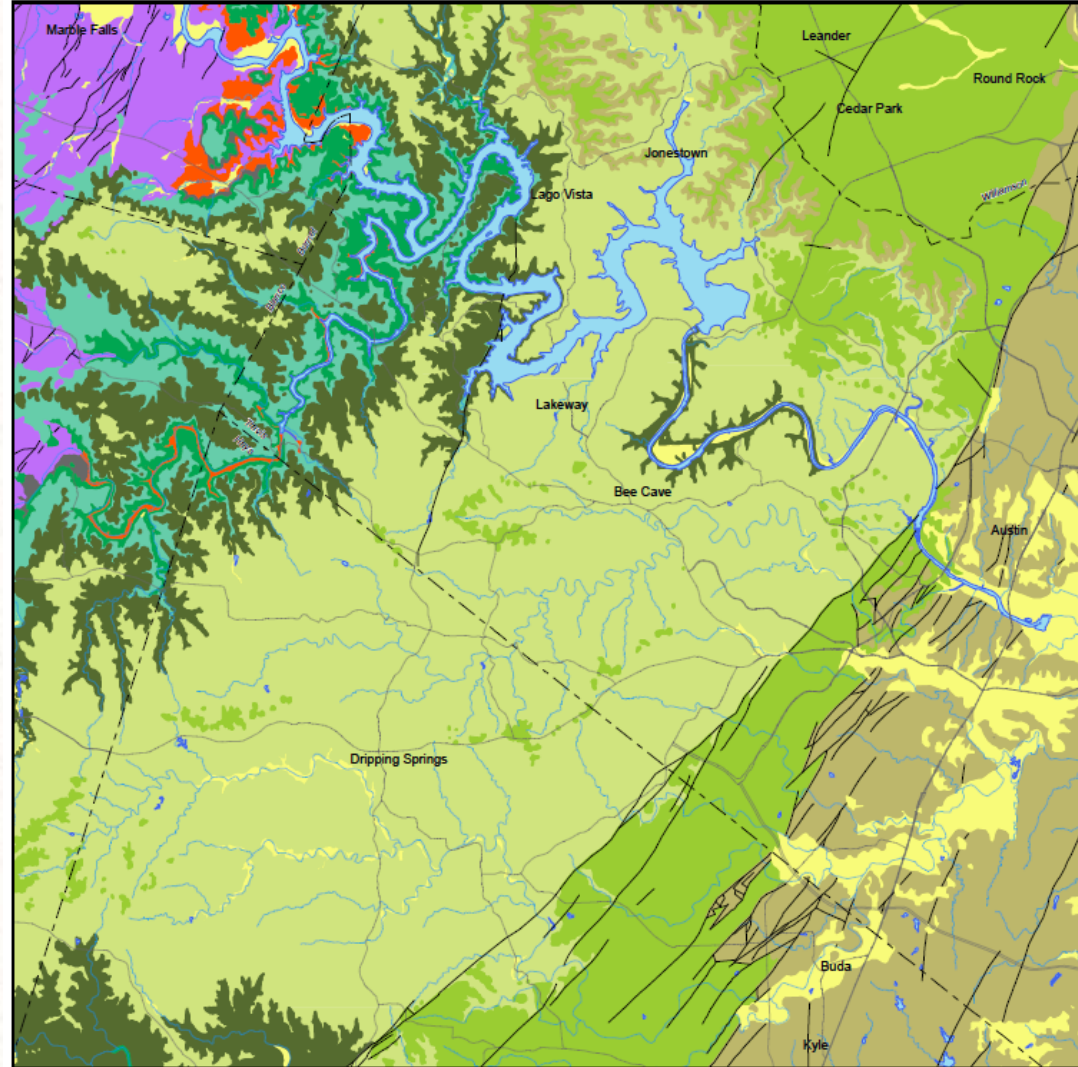
Stratigraphy

	Litho		Hydro
	Upper	Lower	
Trinity Group	Upper Glen Rose		Upper Trinity
	Lower Glen Rose		Middle Trinity
	Hensel		
	Cow Creek		
	Hammett		
	Sligo		confining
	Hosston		Lower Trinity



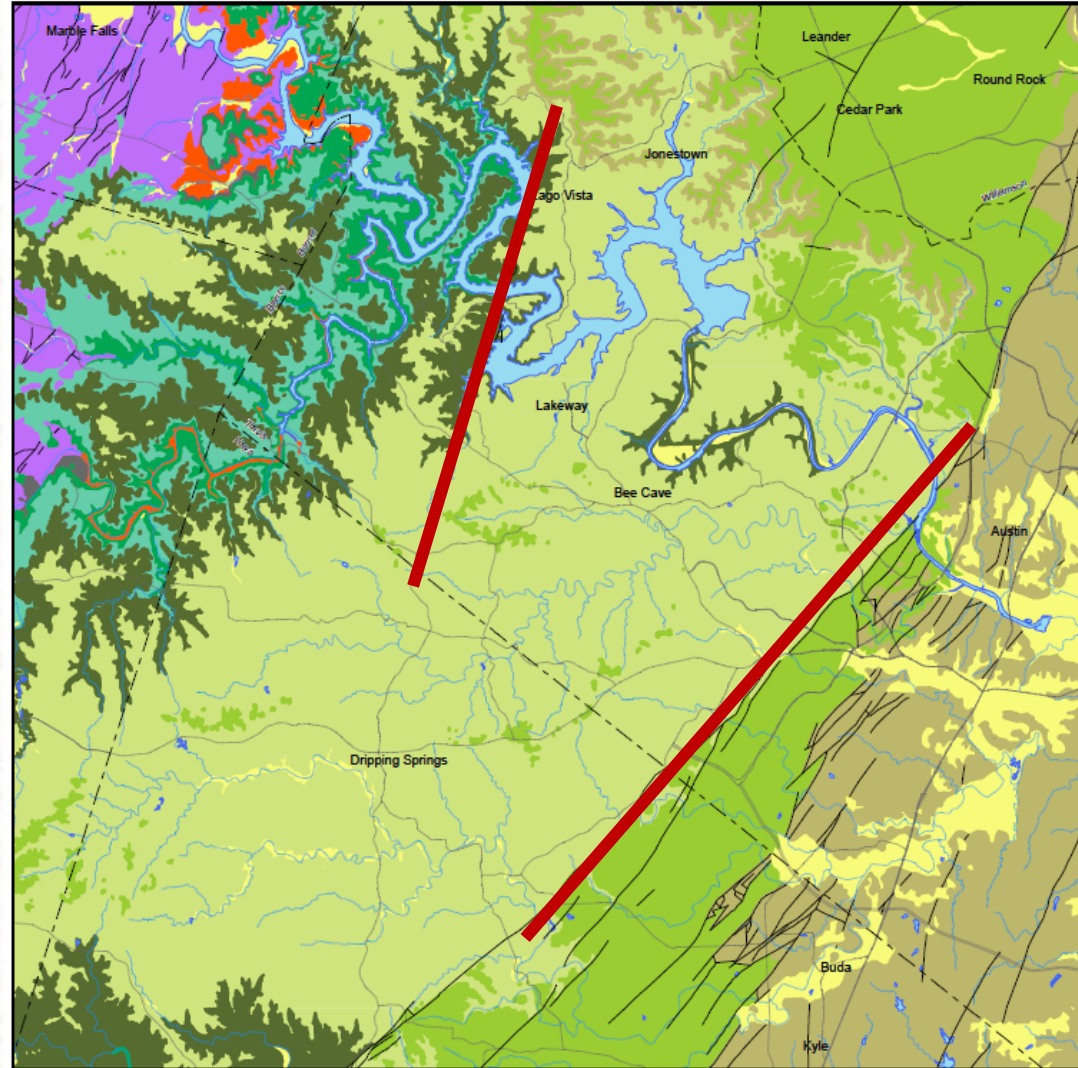
Summary Map

- Yield and quality are lower in the PGMA than in Hays County.
- PGMA designation was valid given the groundwater depletion observed.
- Study has identified two distinct areas in the PGMA.



Summary Map

Fault-bounded areas

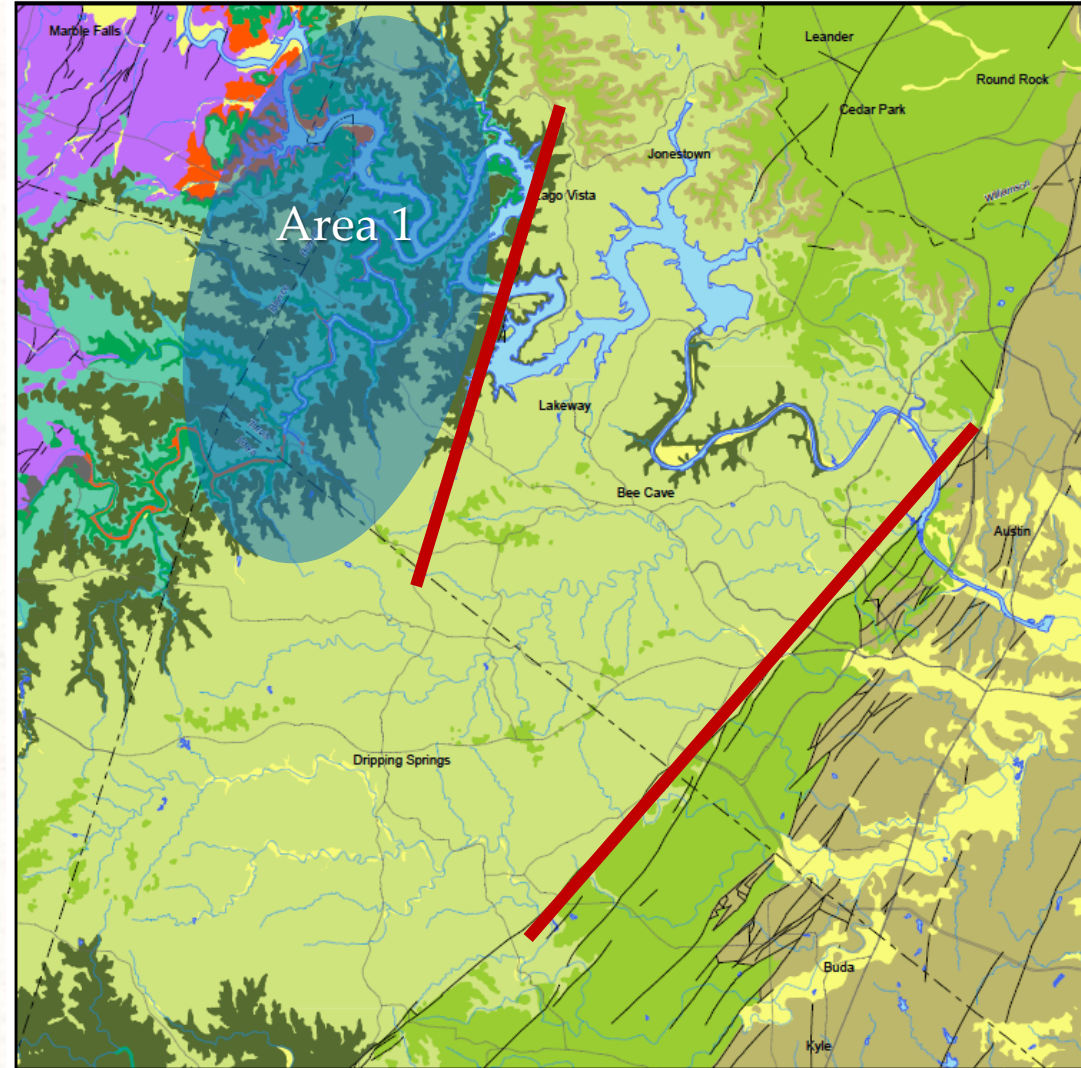


Summary Map

Fault-bounded areas

Area 1

- Recharge zone
- Generally fresh water
- Surface-groundwater interaction
- Locally decreasing groundwater trend



Summary Map

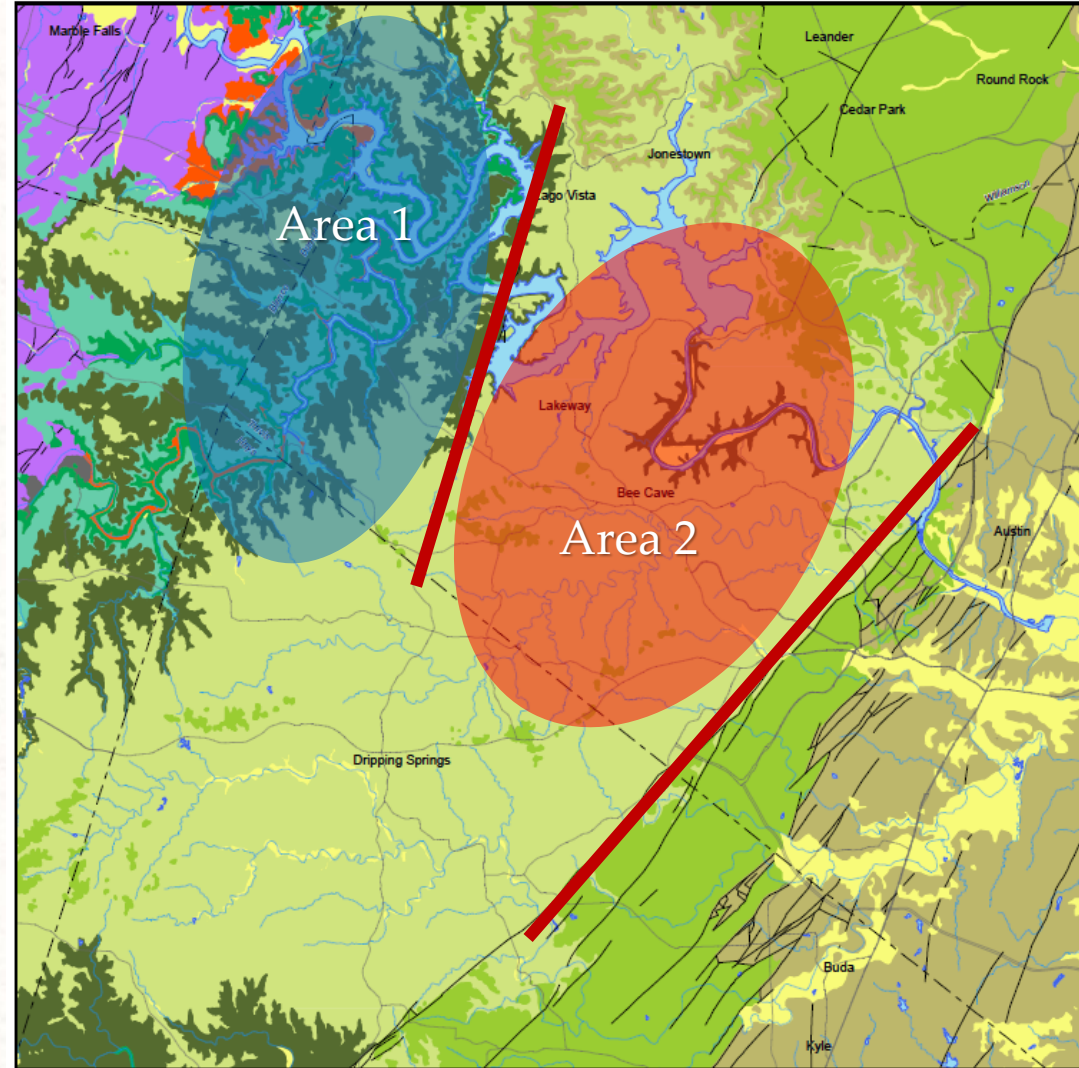
Fault-bounded areas

Area 1

- Recharge zone
- Generally fresh water
- Surface-groundwater interaction
- Locally decreasing groundwater trend

Area 2

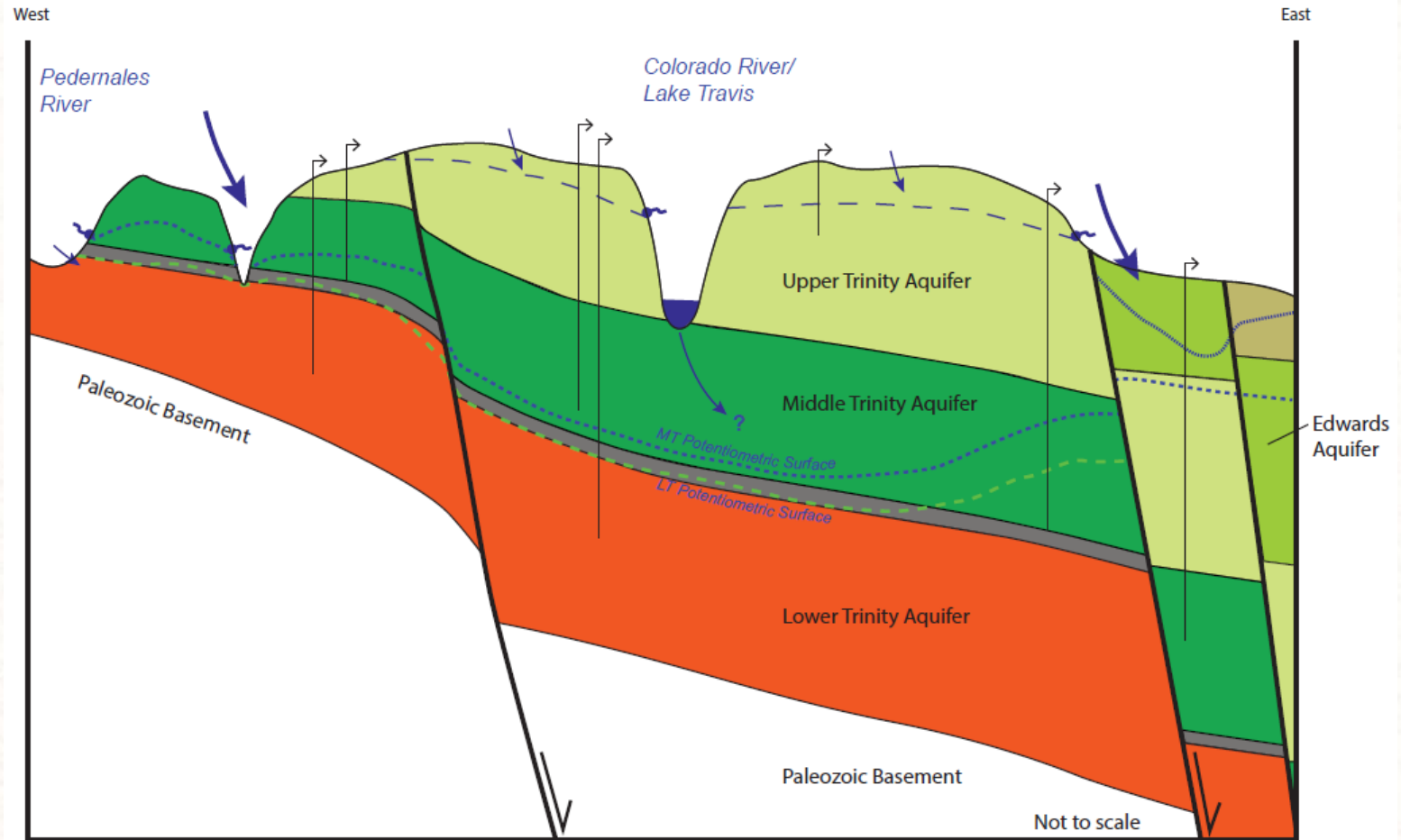
- Confined
- Generally brackish water
- Localized (river) surface-groundwater interaction
- Groundwater Mining



Schematic Summary Cross Section

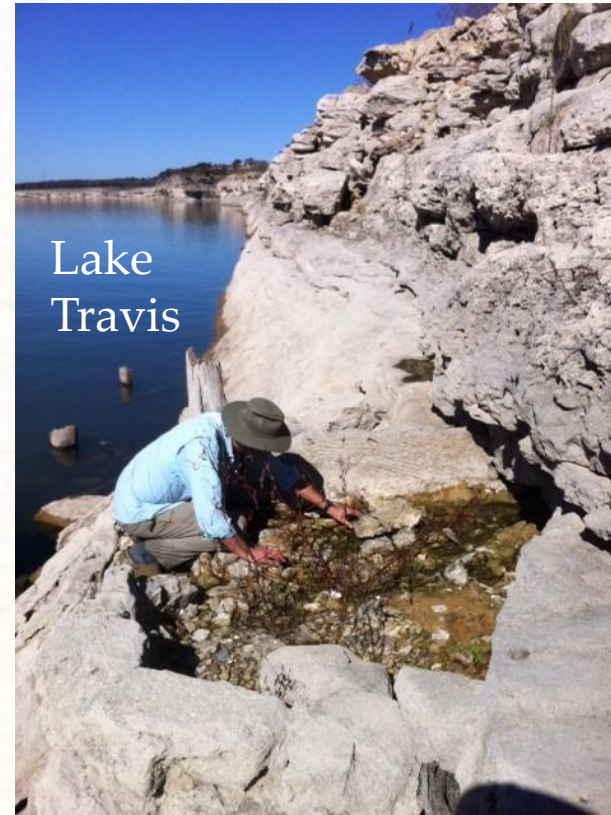
Area 1

Area 2



Phase II

1. Expand the study area to encompass more areas of Travis County north of the Colorado River,
2. Investigate the hydraulic relationships of the Colorado River/Highlands Lakes and the Trinity Aquifer.



Middle
Trinity Spring

Acknowledgements

- Travis County Commissioners
- BSEACD Board of Directors
- Travis County Departments and staff
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- City of Austin Parks
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- TWDB (Janie Hopkins, Chris Muller)
- SWTCGCD Board
- Landowners (Rick Scadden and other Site Visit participants)
- Peer Reviewers (Al Broun, Doug Wierman, Juli Hennings, Kirk Holland, and others)