



P.O. Box 13231, 1700 N. Congress Ave.
Austin, TX 78711-3231, www.twdb.texas.gov
Phone (512) 463-7847, Fax (512) 475-2053

AGENDA ITEM MEMO

BOARD MEETING DATE: September 10, 2026

TO: Board Members

THROUGH: Bryan McMath, Executive Administrator
Ashley Harden, General Counsel
John Dupnik, P.G., Deputy Executive Administrator, Water Science and Conservation

FROM: Natalie Ballew, P.G., Director, Groundwater Division
Kristie Laughlin, P.G., Manager, BRACS

SUBJECT: Designation of Brackish Groundwater Production Zones in the Southern Portion of the Trinity Aquifer

ACTION REQUESTED

Consider designating four brackish groundwater production zones in the southern portion of the Trinity Aquifer.

BACKGROUND

Texas Water Code § 16.060 directs the Texas Water Development Board (TWDB) to identify and designate brackish groundwater production zones in coordination with groundwater conservation districts and stakeholders. These zones are intended to support the use of brackish groundwater and reduce reliance on fresh groundwater. The original legislation codifying Texas Water Code § 16.060, House Bill 30 (84th Regular Legislative Session), directed the TWDB to identify and designate brackish groundwater production zones in four aquifers by December 1, 2016, and in the remaining aquifers by December 1, 2022. Senate Bill 1041 (86th Regular Legislative Session) extended the deadline for the remaining aquifers to December 1, 2032.

The Board has previously designated 31 brackish groundwater production zones in 6 aquifers to date, with the most recent designation occurring in 2019. Since 2019, staff have focused on improving mapping, aquifer characterization, and assessments of the extent and availability of brackish groundwater resources including an internal upgrade of the wastewater injectate mapping tool to more accurately apply injection well buffers. The zones presented in this memorandum were delineated using enhanced methods and the upgraded mapping tool.

Our Mission

Leading the state's efforts
in ensuring a secure
water future for Texas

Board Members

L'Oreal Stepney, P.E., Chairwoman | W. Brady Franks, Board Member | Ashley Morgan, Board Member
Bryan McMath, Executive Administrator

On March 16, 2026, staff emailed groundwater stakeholders to solicit feedback and comments on four proposed brackish groundwater production zones in the southern portion of the Trinity Aquifer (formerly known as the Hill Country Trinity aquifer), as documented in [Open-File Report 25-01: Recommended Brackish Groundwater Production Zones for the Southern Portion of the Trinity Aquifer and Trinity Group Formations, Texas](#) (Robinson, 2025). The public comment period was open from March 16 through May 8, 2026, with a webinar on April 29, 2026, to present the four proposed zones and solicit feedback. No official public comments were received.

BRACKISH GROUNDWATER PRODUCTION ZONE RECOMMENDATIONS FOR DESIGNATION

The recommended brackish groundwater production zones were identified using a combination of the mapped salinity distributions from *Brackish Groundwater Study of the Hill Country Trinity Aquifer and Downdip Trinity Group Formations* (Robinson and others, 2022), aquifer productivity parameters, protective buffer distances to meet the statutory criteria of zones outlined in Texas Water Code § 16.060(b)(5), and a simplified groundwater flow model. For each zone, TWDB staff determined:

1. hydrogeologic barriers sufficient to prevent significant impacts to water availability or water quality in geologic strata,
2. the volumes of brackish groundwater that the zone is capable of producing over 30- and 50-year periods without causing a significant impact to water availability or water quality in the southern portion of the Trinity Aquifer and surrounding aquifers, and
3. reasonable monitoring recommendations to observe the effects of brackish groundwater production within the zone.

The four proposed brackish groundwater production zones include: two zones in the upper Trinity formation (HCTU1 and HCTU2), one zone in the middle Trinity formation (HCTM1), and one zone in the lower Trinity formation (HCTL1).¹ Proposed zones with estimated brackish groundwater production volumes are summarized in Table 1 (See also Attachment 1, Figures 1 through 3, with maps of the recommended zones).

¹ The naming convention for zones includes an aquifer abbreviation, a hydrologic indicator, and a number. For example, the HCTU2 indicates the second zone in the upper Trinity formation of the southern portion of the Trinity Aquifer.

Table 1. Recommended brackish groundwater production zone volumes.

Zone ID	Annual production volume (acre-feet per year)	30-year production volume (acre-feet)	50-year production volume (acre-feet)
HCTU1	1,679	50,412	84,024
HCTU2	835	25,081	41,803
HCTM1	2,699	80,699	134,476
HCTL1	5,238	156,844	261,374

KEY ISSUES

The TWDB identifies brackish groundwater production zones using the best publicly available data at the time of the analysis. As brackish groundwater production zones are developed and additional information is collected about aquifer characteristics in the brackish parts of the southern portion of the Trinity Aquifer, new subsurface data will improve understanding of aquifer conditions. This enhanced understanding may support future refinements to estimated production volumes and optimal production rates. The TWDB has established guidance for requesting amendments to designated brackish groundwater production zones as new data become available ([Brackish Groundwater Production Zone Amendment Guidance](#)).

RECOMMENDATION

The Executive Administrator recommends designating four brackish groundwater production zones in the southern portion of the Trinity Aquifer.

Attachment:

1. Summary of Open-File Report 25-01: *Recommended Brackish Groundwater Production Zones for the Southern Portion of the Trinity Aquifer and Trinity Group Formations, Texas* (Robinson, 2025).

Summary of [Open-File Report 25-01](#): *Recommended Brackish Groundwater Production Zones for the Southern Portion of the Trinity Aquifer and Trinity Group Formations, Texas* (Robinson, 2025)

Recommended brackish groundwater production zones

In the southern portion of the Trinity Aquifer, TWDB staff recommends four areas for brackish groundwater production zone designation (Figures 1 through 3). The recommended zones are located within the Upper Glen Rose limestone in the upper Trinity; the Lower Glen Rose limestone, the Hensell sandstone, and the Cow Creek limestone in the middle Trinity; and the Sligo limestone and Hosston sandstone in the lower Trinity (Figure 4). There are two zones in the upper Trinity (HCTU1 and HCTU2), one zone in the middle Trinity (HCTM1), and one zone in the Lower Trinity, HCTL1).

Recommended brackish groundwater production zones were identified using a combination of mapped salinity distributions from Report 388, *Brackish Groundwater Study of the Hill Country Trinity Aquifer and Downdip Trinity Group Formations* (Robinson and others, 2022), aquifer productivity parameters, protective buffer distances to meet the statutory criteria of zones outlined in Texas Water Code § 16.060(b)(5), and a simplified groundwater flow model.

The HCTU1 recommended brackish groundwater production zone contains one Class II injection well² (Figure 1). This well appears to have been injecting produced water from oilfield activities into the Edwards Group formations at a rate of 500 to 1,500 barrels per month since 1991. This well was determined to be of concern even though the injection interval is almost 200 feet above the Trinity Aquifer. Previous studies have indicated the possibility of communication between the lower Edwards and the upper Glen Rose formations, and have highlighted the karstic nature of the upper Trinity. Therefore, we created a 3,600-foot buffer around this Class II injection well, which is more than double the maximum migration distance calculated using the TWDB injection buffer tool. The area encompassed by the injection well buffer was excluded from zone HCTU1.

Table 1 shows the minimum, maximum, and average top surface depth and thickness calculated for each recommended zone.

Table 1. Estimated zone minimum, maximum, and average top depth and thickness for the recommended brackish groundwater production zones.

Parameters	HCTU1	HCTU2	HCTM1	HCTL1
Minimum depth (feet)	1,451	3,942	950	941
Maximum depth (feet)	5,810	7,019	7,714	7,165
Average depth (feet)	2,932	5,020	3,353	3,558
Minimum thickness (feet)	504	853	464	400
Maximum thickness (feet)	961	1,134	1,519	1,906
Average thickness (feet)	670	912	719	1,011

² A Class II injection well is a type of well used for underground injection of waste associated with oil and gas production. The [Texas Railroad Commission](#) regulates Class II disposal and injection wells.

Significant vertical hydrologic barriers exist above and below the Trinity Aquifer. The lower Trinity hydrologic unit sits above much older and less transmissive Paleozoic rocks throughout much of the study area. The basal units of the Edwards Group overlie the upper Trinity hydrologic unit. In updip portions of the study area, it has been observed that groundwater can flow between the Edwards Aquifer and the upper Trinity aquifer. No data exists regarding this groundwater interaction for the downdip portions of the aquifers. However, geophysical well logs show that the Walnut (clay) Formation or equivalent shale, at the base of the Edwards Group, is 20 to 40 feet thick and may represent a significant aquitard for the top of the Trinity Aquifer.

The distance from a recommended brackish groundwater production zone to existing water wells is referred to as a horizontal distance hydrogeologic buffer. The horizontal distances of the hydrogeologic buffers for these recommended zones are 5.5, 6.5, and 6.0 miles for the upper, middle, and lower Trinity, respectively (see Figures 1 through 3). Geologic maps show that both normal and reverse geologic faults exist between portions of the brackish groundwater production zones and updip fresh groundwater which may also function as hydrogeologic barriers. Flow properties of individual faults within fault zones in the study were not considered in this analysis.

Volumes of brackish groundwater in the recommended production zones

Estimated brackish groundwater production volumes from the recommended zones range from 41,803 to 261,374 acre-feet over a 50-year period (Table 2). These volumes stipulate constant production at average per-well rates of 76 to 152 gallons per minute over a 50-year period. The estimated production rates are not expected to significantly impact fresh groundwater or existing groundwater wells being used as a source of water supply for municipal, domestic, or agricultural purposes.

Table 2. Recommended brackish groundwater production zone volumes.

Zone ID	Annual production volume (acre-feet per year)	30-year production volume (acre-feet)	50-year production volume (acre-feet)
HCTU1	1,679	50,412	84,024
HCTU2	835	25,081	41,803
HCTM1	2,699	80,699	134,476
HCTL1	5,238	156,844	261,374

Higher production rates could be possible for wells located within brackish groundwater production zones at greater distances from protected fresh groundwater or existing wells. As brackish groundwater production zones become developed over time and more becomes known about the aquifer properties in the brackish parts of the southern portion of the Trinity Aquifer, the cumulative subsurface data will provide greater insight into production volumes and optimum production rates.

Note that these estimates do not consider the effects of land surface subsidence, degradation of water quality, or any changes to groundwater-surface water interaction that may result from extracting groundwater from the aquifer.

Groundwater monitoring in the recommended production zones

For any brackish groundwater development projects from the recommended zones, especially in the upper Trinity aquifer (HCTU1 and HCTU2), the TWDB recommends monitoring in both the Trinity Aquifer and the overlying Edwards (Balcones Fault Zone) Aquifer to ensure that an adequate hydrologic barrier exists, and that production activities do not compromise freshwater resources.

Freshwater resources of the Trinity Aquifer, updip from the zones, should also be monitored to ensure that significant impact from potential production of brackish groundwater is prevented. Monitoring is not required below the basal Lower Trinity Aquifer geological formation because there are no known fresh or brackish aquifers that would be impacted by pumping in the zones. Future wellfields in the brackish zones should include monitor wells to track water levels and water quality during production.

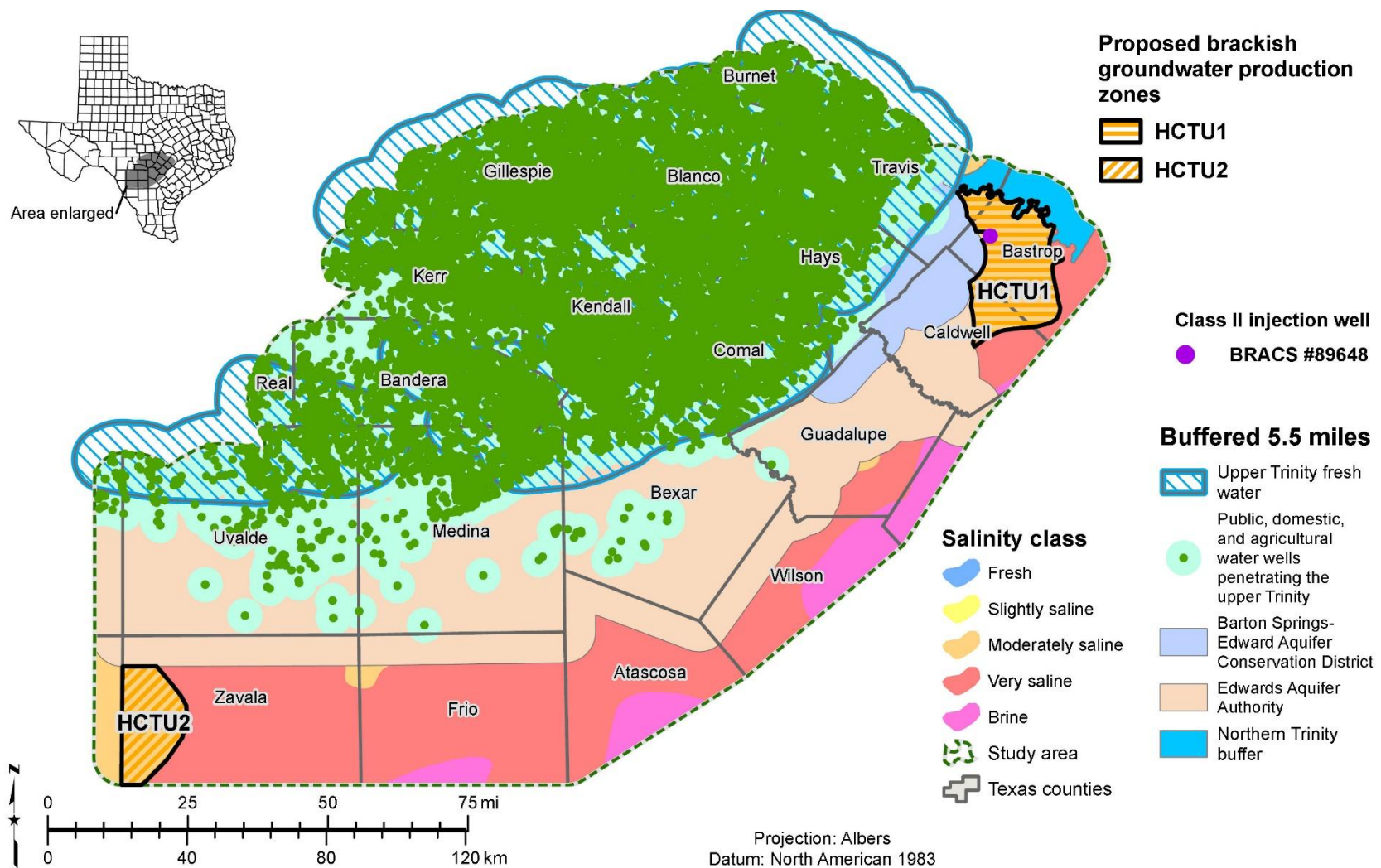


Figure 1. Map showing the recommended zones in the upper Trinity (Upper Glen Rose limestone), with the 5.5-mile buffer around fresh water, key water wells, Barton Springs-Edwards Aquifer Conservation District, and Edwards Aquifer Authority.

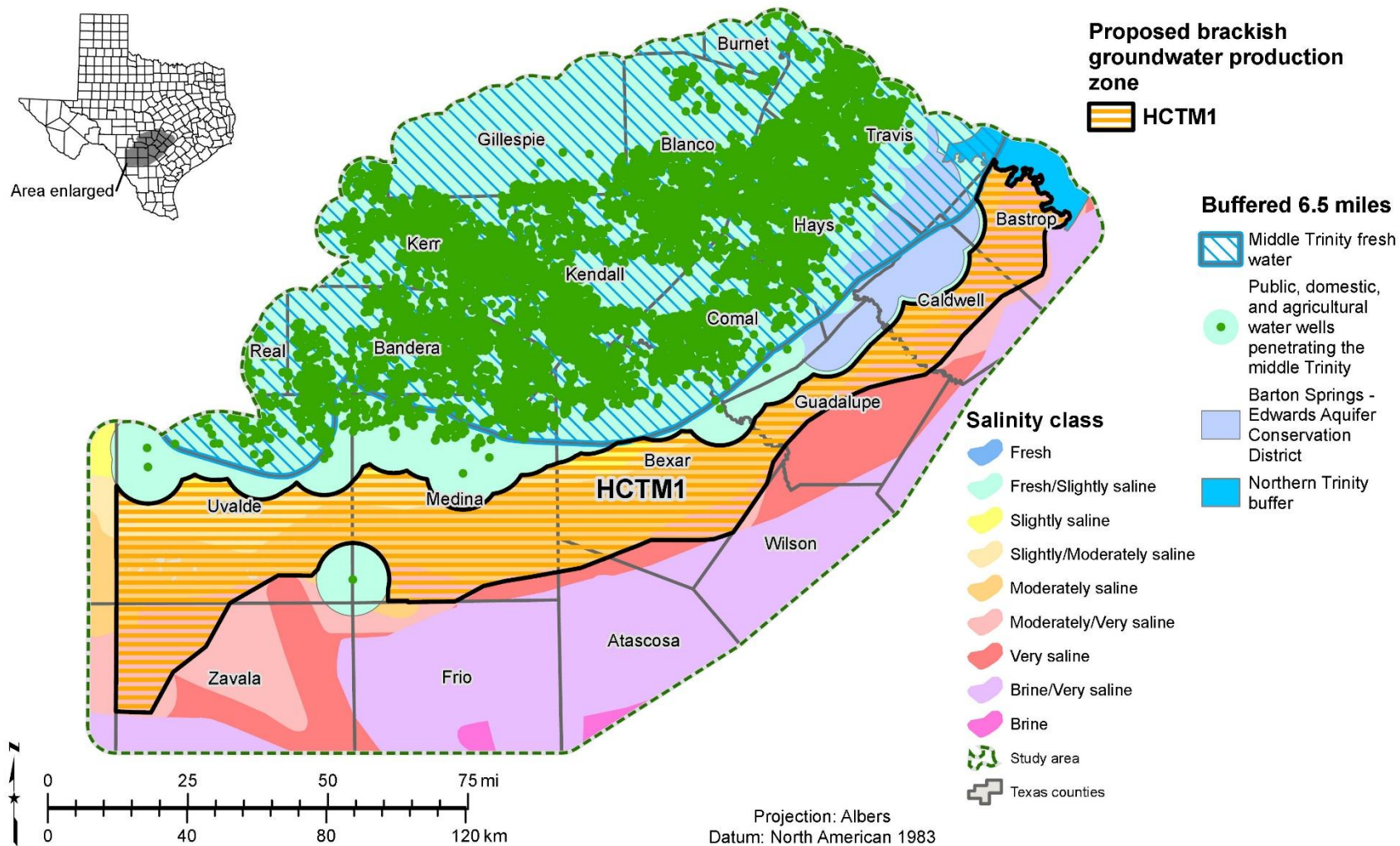


Figure 2. Map showing the recommended zone in the middle Trinity (Lower Glen Rose limestone, Hensell sandstone, and Cow Creek limestone), with the 6.5-mile buffer around fresh water, key water wells, and Barton Springs-Edwards Aquifer Conservation District.

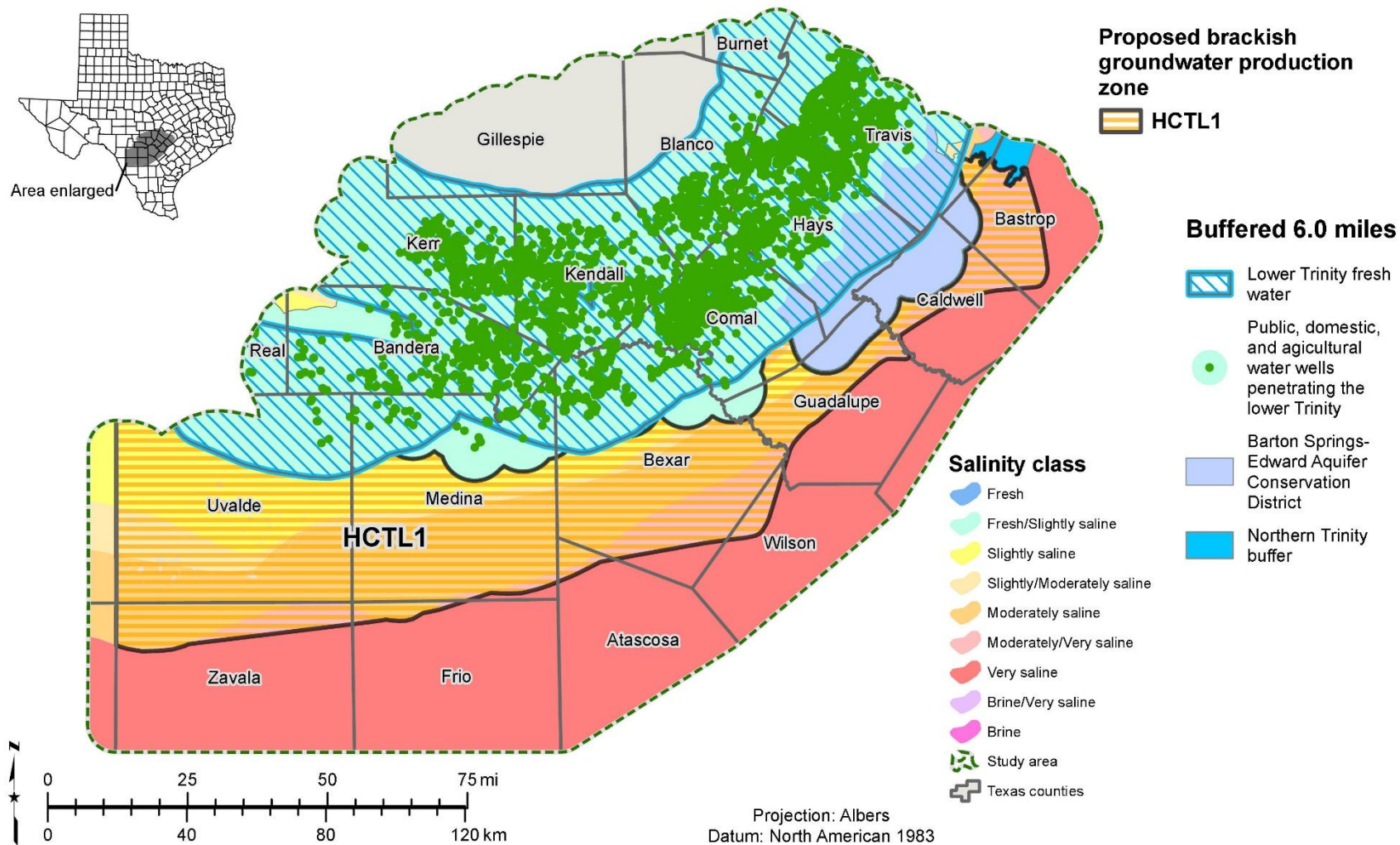


Figure 3. Map showing the recommended zone in the lower Trinity (Sligo limestone and Hosston sandstone), with the 6.0-mile buffer around fresh water, key water wells, and Barton Springs-Edwards Aquifer Conservation District.

Era	System	Group	Stratigraphic unit		Hydrologic unit	
Cenozoic	Quaternary		Alluvium		Alluvium	
Mesozoic	Cretaceous	Edwards	Segovia Formation		Edwards Group	
			Fort Terrett Formation			
		Trinity	Glen Rose Limestone	Upper Member	Trinity Aquifer System	Upper Trinity
				Lower Member		Middle Trinity
			Hensell Sand/Bexar Shale			
			Cow Creek Limestone			Confining unit
			Hammett Shale			
			Sligo Formation			Lower Trinity
			Sycamore Sand/Hosston Formation			
Paleozoic		Undifferentiated Pre-Cretaceous rock				

Figure 4. Stratigraphic and hydrostratigraphic column (from Jones and others, 2011).