

3.2.14 Ellenburger-San Saba

The Ellenburger-San Saba aquifer is a Cambrian age limestone and dolomite aquifer that occurs in parts of 15 counties in the Llano Uplift area of Central Texas, as shown in Figure 53. Most of the water produced from this aquifer is used for municipal water supply, mainly in Mason, McCulloch, and Menard Counties. The cities of Fredericksburg, Johnson City, Bertram, and Richland Springs have all used the Ellenburger-San Saba aquifer as a public water supply. It is important to note that the extent of the aquifer shown in Figure 53 is only that portion in the Llano Uplift area, where the fresh water aquifer occurs. The Ellenburger is also a very extensive formation throughout West Texas, and may contain substantial brackish groundwater beyond the area shown in Figure 53.

The Ellenburger-San Saba aquifer consists of limestones and dolomites of the San Saba Member of the Wilberns Formation and the Ellenburger Group. The Ellenburger-San Saba was highly eroded prior to being covered by sediments, which results in a large variation in thickness, ranging from 0 to 1,000 feet. The aquifer generally encircles the Llano Uplift, and the down-dip portion extends to depths of approximately 3,000 feet below land surface, as shown in Figure 54. In some areas the overlying beds are thin or absent, and here the Ellenburger-San Saba aquifer may be hydrologically connected to the Marble Falls aquifer. Local and regional block faulting has significantly compartmentalized the Ellenburger-San Saba, but dissolution along such faulting and related fractures has formed various sized cavities that are the major water-bearing features of the aquifer.

Groundwater in the aquifer is found mostly under artesian conditions, even in much of the outcrop area. The depth to groundwater varies from 30 to over 200 feet below ground surface. Transmissivity estimates range from 50,000 to 125,000 gpd/ft, storage coefficients are estimated to be 1×10^{-3} to 1×10^{-4} , and specific yields are estimated to be 0.03 to 0.05. Production from public supply and irrigation well yields range from 200 to 1,500 gpm, although most other wells generally yield less than 100 gpm. The average well yield from all types of wells is about 65 gpm.

As shown in Figure 53, groundwater near the outcrop of the Ellenburger-San Saba aquifer, and in some cases up to 20 miles down-dip, is generally fresh. TDS concentrations in the Ellenburger-San Saba aquifer generally increase with distance down-dip. Fresh groundwater is found mainly in areas where active recharge and flow occurs in the aquifer near the outcrop. While fresh groundwater is mostly found in areas near the outcrop, the aquifer also contains irregular occurrences of slightly-saline groundwater near the outcrop area. The down-dip extent of water containing more than 3,000 mg/L TDS ranges from about 10 miles on the south side of the outcrop to over 60 miles to the northwest of the outcrop. The down-dip extent of water containing greater than 3,000 mg/L TDS is limited on the south, east, and southwestern side of the uplift due to structural controls that limit the extent of the aquifer in those regions.

Summary

The Ellenburger-San Saba aquifer may be a potential source for small to moderate volumes of brackish groundwater in the Llano Uplift area. However, the development of brackish groundwater from the down-dip sections will require relatively deep production wells. In addition, elevated concentrations of radium and radon also occur in the Ellenburger-San Saba aquifer as it occurs in the underlying Hickory, and this would have to be addressed if this aquifer is considered as a brackish water resource.

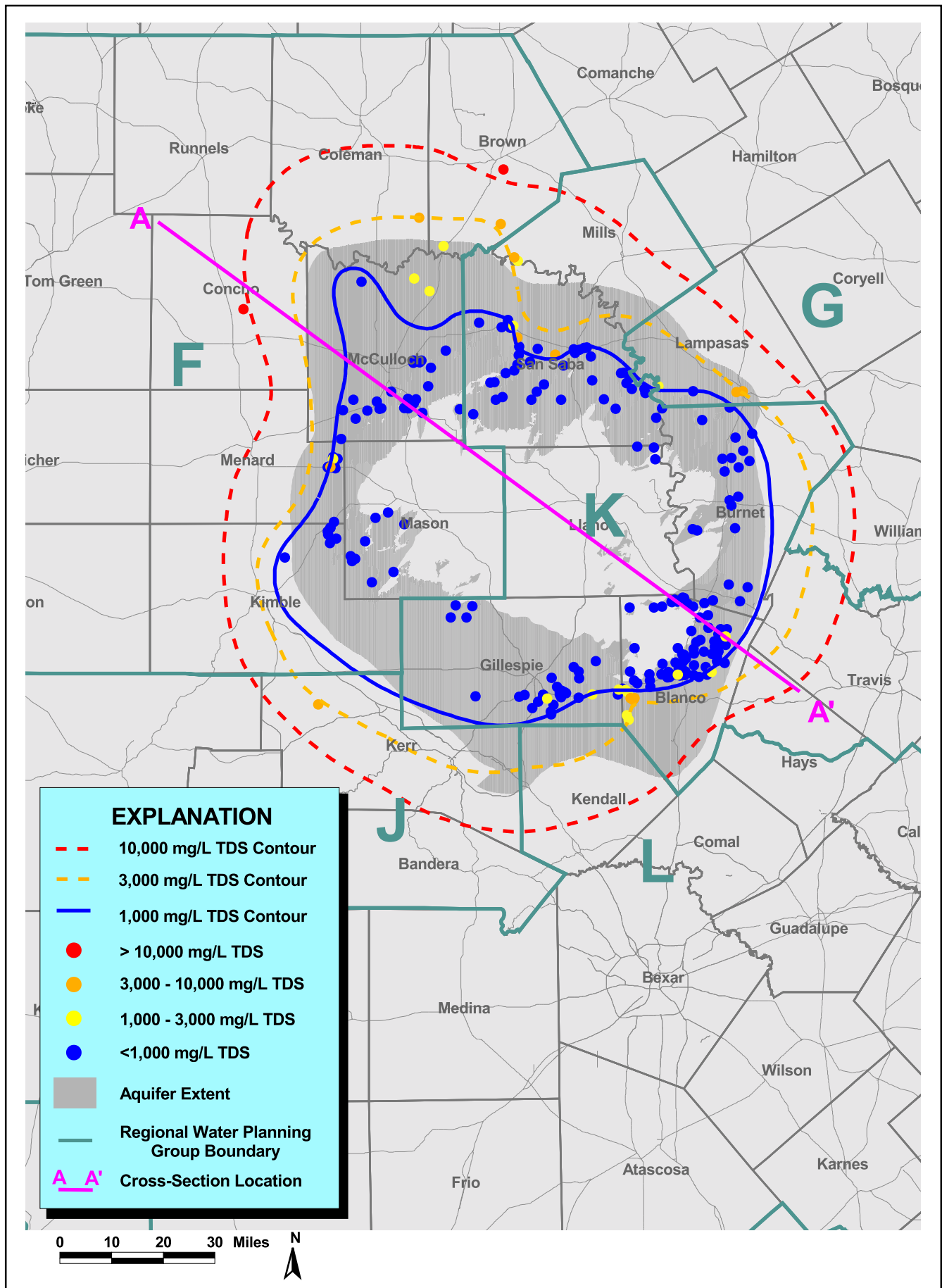
As noted above, the Ellenburger Formation may also provide a brackish groundwater resource beyond the extent of the aquifer in Central Texas. The Ellenburger is present extensively throughout West Texas, and is often used as a source of water for secondary recovery operations.

Availability- LOW to MODERATE- In many of the regions included in the table below, very little of the aquifer is present. Where substantial portions of the Ellenburger-San Saba aquifer are present, low to moderate availability is expected.

Productivity- MODERATE- Due to lower transmissivities, the productivity of the Ellenburger-San Saba aquifer is only moderate.

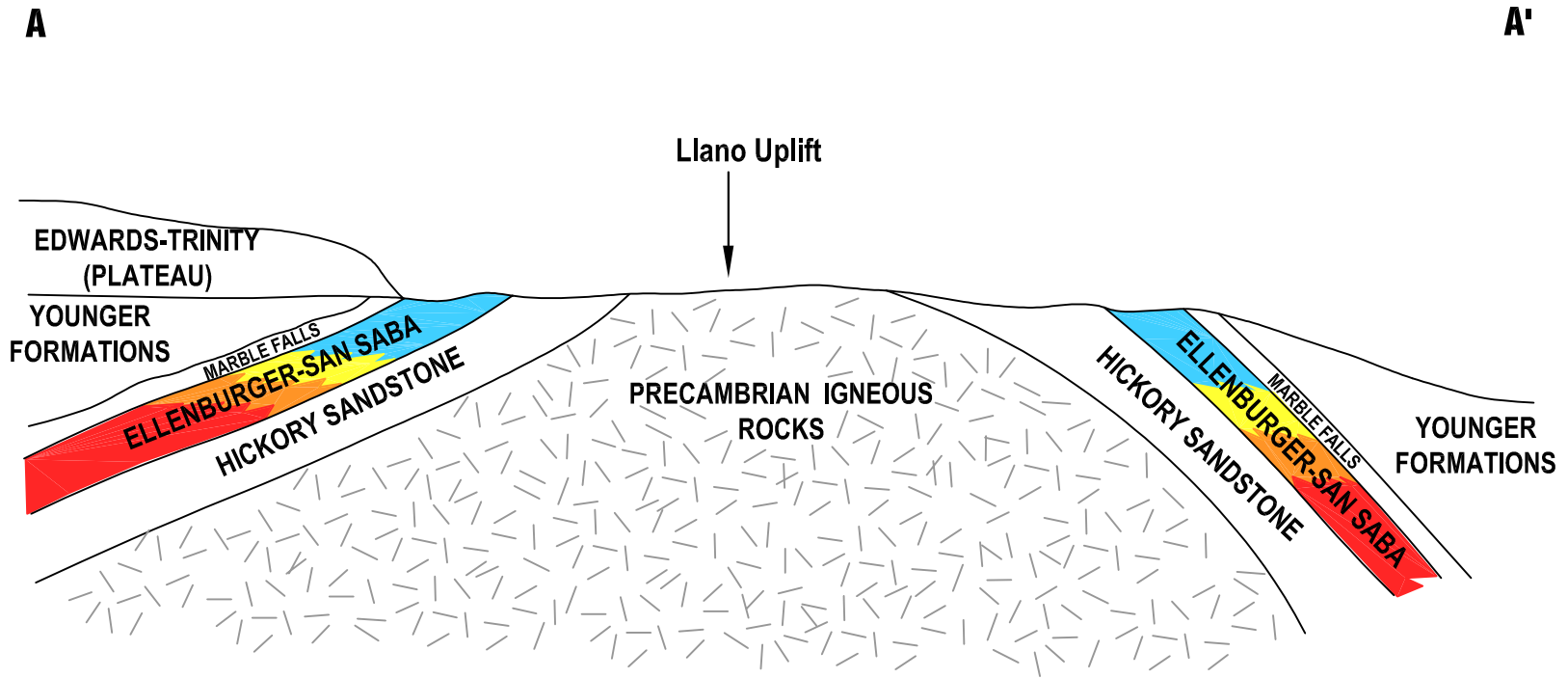
Source Water Production Cost- MODERATE to HIGH- The deep nature of the Ellenburger-San Saba aquifer in Central Texas, combined with the moderate yields that can be expected from wells, make the relative production cost from the aquifer moderate to high.

Summary of Brackish Water In the Ellenburger-San Saba Aquifer			
<i>Region</i>	<i>Availability</i>	<i>Productivity</i>	<i>Source Water Production Cost</i>
F- Region F	Moderate	Moderate	Moderate to High
G- Brazos	Low	Moderate	Moderate
J- Plateau	Low	Moderate	High
K- Lower Colorado	Moderate	Moderate	Moderate to High
L- South Central Texas	Low	Moderate	High



GROUNDWATER QUALITY IN THE ELLENBURGER-SAN SABA AQUIFER

FIGURE 53
LBG-GUYTON ASSOCIATES



EXPLANATION	
■	< 1,000 mg/L TDS
■	1,000 - 3,000 mg/L TDS
■	3,000 - 10,000 mg/L TDS
■	> 10,000 mg/L TDS

**SIMPLIFIED CROSS SECTION OF THE ELLENBURGER-SAN SABA
AQUIFER WITH GENERALIZED WATER QUALITY RANGES**
(Modified from Barker and others, 1994)

FIGURE 54