

Mapping Metro Water Use: Sources, Industries, and Consumption

A deep dive into metro-level data reveals how industry and geography influence Texas's water resources.

BY DANIEL ONEY



TEXAS A&M UNIVERSITY

Texas Real Estate Research Center

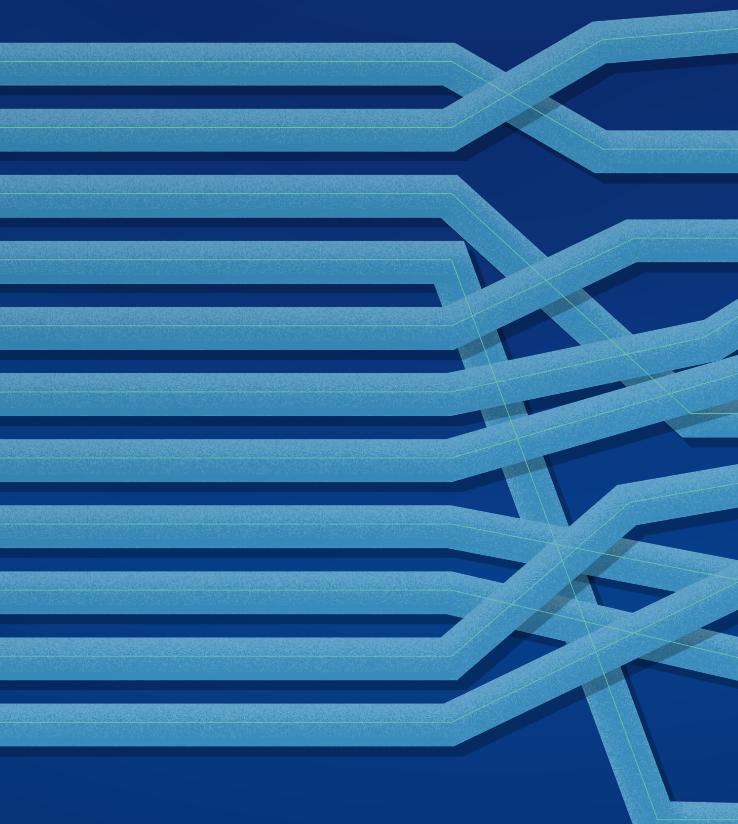
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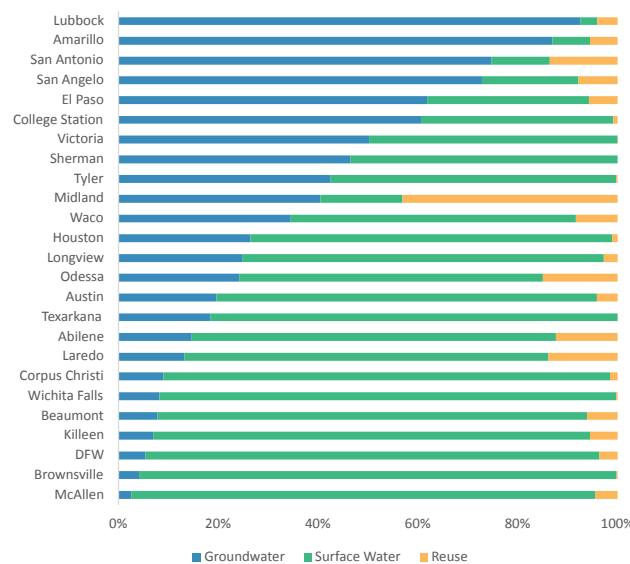


Texas is enormous, sitting where the wet Sunbelt transitions to the dry Sunbelt. This means Texans face different water circumstances depending on where they live. Discussions of water supply and demand at the state level have some conceptual value, but, like real estate market trends, water is local.

Water supply comes from three major sources: groundwater, surface water, and reused water. Overall, groundwater accounts for a little more than half the total water supplied to Texas water users (54 percent.) Aquifers lay under much of Texas, but their importance tends to be higher in the west and south. Groundwater, produced by wells, includes brackish water that may be desalinated before use. Surface water, which comes from rivers and lakes, provides 42 percent and is most plentiful and consistently available in the eastern third of the state. Four percent of total water supplied comes from reuse.

Because of this pattern, none of the state's 25 metropolitan areas find their water sources in the exact same proportions as the state average, although El Paso and College Station-Bryan come the closest (Figure 1). Four of the top five groundwater supply markets are in the western part of the state: Lubbock, Amarillo, San Angelo, and El Paso. San Antonio rounds out this top five. Three of the top five metro areas most reliant on surface water are in South Texas: Brownsville, McAllen, and Corpus Christi. The other two are in North Texas: Dallas-Fort Worth and Wichita Falls. The top water re-users, by share, are in the west and south central part of the state: Midland, Odessa, Laredo, San Antonio, and Abilene.

Figure 1. Share of Total Water Sourced
Most metro areas rely on ground or surface water



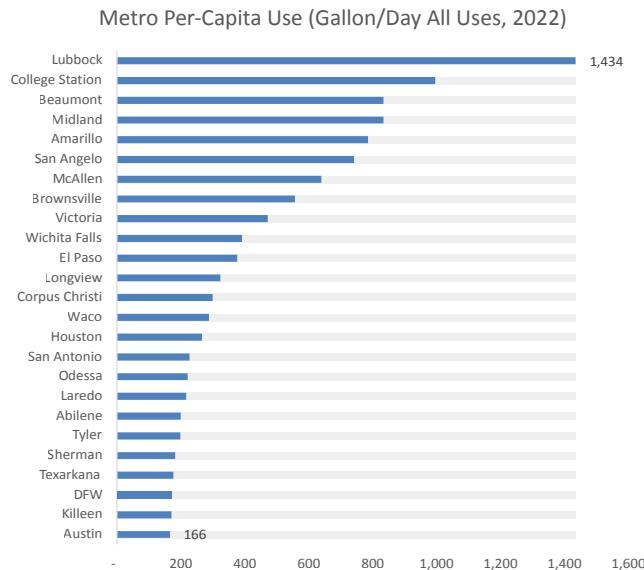
Source: Texas Real Estate Research Center analysis of Texas Water Development Board data

The metro areas differ not only in water source, but in total per-capita water use (Figure 2). The range of Austin's lowest per-day use (166 gallons) to Lubbock's highest (1,434 gallons) is a factor of 8.6. Why such a difference? The answer comes down to the local development patterns and industry differences, especially what happens in the rural portions of a metro area.

A metropolitan area consists of one or more counties where the workforce commutes to inlying central cities. The share of a Metropolitan Statistical Area (MSA) that is developed with cities and suburbs varies. Austin and its suburbs account for far more of its MSA water profile than Lubbock, a small city in a mostly rural multi-county MSA. Further, the rural land surrounding Lubbock is intensely farmed. Since agriculture is a relatively heavy water user, Lubbock's daily use reflects many gallons that irrigate crops.

Figure 2. Per-Capita Water Use

Use per person varies substantially across metro areas



Note: Average gallons per day, 2022. Water use for the Arkansas portion of Texarkana not available.

Source: Texas Real Estate Research Center analysis of Texas Water Development Board data

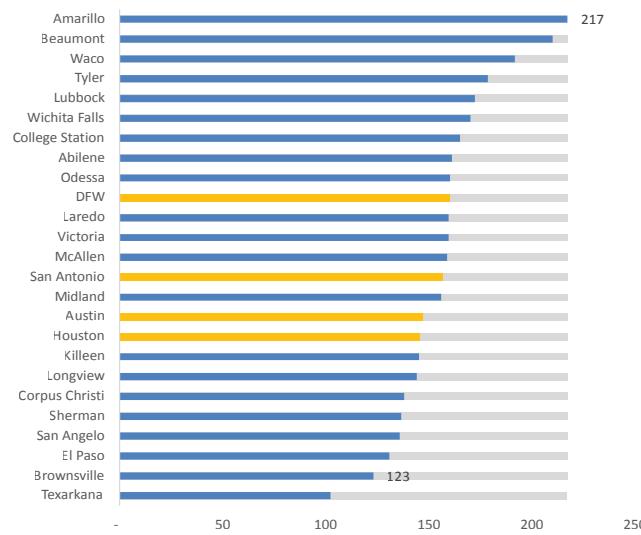
Water use can be summarized into three broad categories: residential and commercial (including manufacturing), energy and power (e.g., mining and cooling water for generators), and agriculture (crop irrigation and livestock). These determine the amount of water a region uses per person. Of the top ten per-capita users, five metros dedicate most of their water to agriculture: Lubbock, Amarillo, San Angelo, McAllen, and Brownsville. In addition, agriculture is the second largest use in College Station, Victoria, and Wichita Falls. College Station's largest use is for power generation. Beaumont's primary use is manufacturing

(falling in the residential and commercial grouping). In Midland the majority goes to oil and gas production. Most of the low water users are metros where households and businesses account for the most use.

Figure 3. Municipal Water Customer Per-Capita Use

The urban customers of public water utilities tend to have similar daily use

Metro Per-Capita Use (Gallon/Day Municipal, 2022)



Note: Municipal use includes mostly residential, commercial and institutional customers. Water use for the Arkansas portion of Texarkana not available.

Source: Texas Real Estate Research Center analysis of Texas Water Development Board data

Residential, commercial, and institutional water use differs little from place to place (Figure 3). Most of these uses are supplied by municipal water utilities. Isolating just the municipal users reveals similar use from MSA to MSA. The highest municipal water-use market, Amarillo, uses only 1.8 times the water of Brownsville, in per-capita terms. Highlighting the four largest metro areas, where residential and commercial uses overwhelm all others, there is only a 10 percent difference from the lowest use in Houston, to the highest in DFW.

It's clear that water policy and planning is complicated in Texas. The geological and economic history of the state's regions and cities means surprising differences in water supply and demand. The state is fortunate to have a rich data set that captures these differences and can inform both private sector practice and public policy at all levels. 

Daniel Oney, Ph.D. (doney@tamu.edu) is research director with the Texas Real Estate Research Center.



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