

Approaches to Estimating Transient and Rural Population and Water Use in Regional Water Planning

At the March 9, 2023 meeting of the Interregional Planning Council, questions and concerns were raised around the topics of transient populations in rural areas and their associated water use. This document was developed to provide background information on the processes the Texas Water Development Board (TWDB) uses to assess population and water use, including transient populations in rural areas. It also includes related issues that have been noted previously in regional water plan policy recommendations.

TWDB processes to assess population and water use for water systems and water user groups

In order to assess water use and demand, the TWDB annually estimates population of water user groups based upon the permanent (e.g., non-transient) residents within utility service boundaries and those outside of utility service boundaries. Unlike the U.S. Census estimates for cities, there is no one data source that can be solely relied upon for estimating the permanent population served by water utilities because each data source has its limitations. Data sources (and associated data limitations) used to estimate permanent population include:

1. TWDB Water Use Survey (WUS) population and connection data reported by Public Water Systems (PWS)
 - a. Limitations: 1) Population reported in the residential WUS often includes transient population including tourists, seasonal workers, or students. 2) Connections reported in the WUS may include commercial or institutional service. 3) Multi-family housing connections is an imprecise proxy for estimating the number of people since one connection may stand for an entire apartment building, for example.
2. GIS analyses using years 2010 and 2020 Census block data within known utility boundaries
 - a. Limitation: Available service area boundaries sometimes do not coincide with the actual service area.
3. U.S. Census Bureau's annual population estimates by county
4. 2020 Census Household Size
5. Texas Commission on Environmental Quality (TCEQ) PWS population and connection data
 - a. Limitation: Populations are often estimated based on 3-person per connection, which is higher than the Census household size and could overestimate population.

Note: Due to the nature of the self-reported WUS data and small systems, historical estimates can fluctuate considerably for some PWSs even though considerable efforts are made to correct any inconsistencies in reported population and net use data.

TWDB processes to assess population and water use for transient populations and rural areas not served by a water system

This section outlines how water use for the following populations is accounted for:

1. **Transient population** (e.g., tourism, commerce / commuting populations, etc.)
2. **Rural area permanent population** (e.g., primary residence not serviced by a water system / on private exempt well)
3. **Rural area transient population** (e.g., second home or Airbnb properties on exempt wells)

1. **Transient populations in areas served by PWS and associated water use** (e.g., tourism, commerce / commuting populations, etc.)
 - a. **Population estimation** – TWDB does not estimate transient populations in any part of the state due to data limitations. TWDB annually estimates population of permanent (e.g., non-transient) residents based upon utility service boundaries. These estimates are developed using a combination of sources, including WUS reported population and residential connections, Census county growth, Census Place, and historical PWS growth.
 - b. **Water use estimation**
 - i. Transient population water use is considered captured in the self-reported water use from community PWSs that TWDB collects in the annual WUS (e.g., hotels and other commercial facilities served by PWSs).
 - ii. For systems that do not respond to the annual WUS, TWDB estimates the system water use by carrying forward historical WUS data or using relevant data from other sources, such as groundwater conservation districts or water right use data reported to the TCEQ.
2. **Rural area permanent populations in areas NOT served by a community PWS and associated water use** (e.g., primary residence not serviced by a water system / on private exempt well)
 - a. **Population estimation** – No WUS or other data is available for rural domestic-use areas of the state. TWDB estimates rural area permanent population using PWS population and Census county total population estimates. The annual rural area permanent population outside of PWS service boundaries is calculated by subtracting the sum of all PWS populations by county from the Census county total population of each county. County-Other population estimates include this rural area population.
 - b. **Water use estimation** – Estimated county-level rural population is multiplied by the statewide average rural gallons per capita per day (GPCD) to estimate county-level rural water use. The statewide average per-person water use for rural households and rural transient populations has historically been between 95-105 GPCD¹.
3. **Rural area transient populations in areas NOT served by a community PWS and associated water use** (e.g., second home or Airbnb properties on exempt wells)
 - a. **Population estimation** – Transient populations are not estimated by the TWDB. To estimate transient populations that are relying on non-system / private wells only is difficult due to the lack of data to support the estimations, as no WUS or other data is available for rural domestic-use areas of the state. The methodologies described above rely on permanent population data reported by water systems and the Census.
 - b. **Water use estimation** – It is difficult to estimate the per capita water use of rural transient populations because the number of people coming and going is unknown and the total water use is not metered and reported. Water use for transient population is captured

¹ The historic statewide average of 95-105 GPCD was determined from the TWDB WUS and includes average per-person water use (as available) for Water Supply Corporations, mobile home parks, and investor-owned utilities to represent what rural households and rural transient populations might use, including RV parks or other commercial water use activities. This statewide average is higher than the 77 GPCD suggested by USGS for national rural domestic use estimation. The USGS figure may only include rural domestic wells for residential populations but no other types of commercial uses for transient population. It is assumed that the higher state average rural GPCD includes commercial activities for transient population even though transient populations are not included in the population estimates.

through a statewide GPCD estimation described above in 2b. TWDB County-Other water use estimates include both water use for small system served populations and rural domestic areas, including assumed rural area transient population use. It is possible that a groundwater conservation district could have pumping data of each subdivision (with private wells) and rural water user, but the TWDB is not aware of any data collected by a district at that level of detail.

Relevant 2021 RWP policy recommendations from Region J and TWDB’s best available information as of December 2022:

1. ***Transient Population Impact on Water Demand.*** Municipal water use reports capture the total amount of water produced and distributed by the city. In concept, this volume includes water consumed by both permanent and transient populations within the community. However, the counties of the Plateau Region have a high transient influx of vacationers and hunters that frequent the more remote areas and are not likely included in the water demand estimates. Likewise, there are a high percentage of second-home owners in the rural counties that is also not accounted. Officials in the most rural counties in the Region estimate that as much as 70 percent of landowners are not permanent residents. This transient water demand likely has a significant impact on water demand estimates used by the planning group. The PWPG encourages the TWDB to consider this water-use category and develop a method for estimating its impact.

Status: If the transient residents are part of a utility, the water use is captured in the system’s annual water use reported and the water use would be captured in municipal demand projections through the baseline gpcd. If the transient residents are on their own wells, then water use is captured in the demand projections through the ‘County-Other’ water user group gpcds.

2. ***County-Other Demand Distribution.*** In the regional water planning process, water supply demand is determined on a county and river basin basis and is then evenly distributed over the designated area. In some cases, this results in a misrepresentation of the actual rural density within segments of the county-river basin area. The primary disadvantage of this is that a high-density rural area may have a legitimate need of water supply management even though the county-river basin statistical numbers do not indicate a supply shortage. A recommended water management strategy in an area such as this does not register as high of a priority as it realistically should. The PWPG therefore recommends that the TWDB develop a planning process that will justifiably recognize the high-priority needs of such County-Other areas.

Status: The TWDB drafts projections by water user group using statewide methodologies and every water user group is split by region, county, and river basin. The projections as well as the region, county, basin split percentages are reviewed and potentially revised by the RWPG. RWPGs may develop projects and strategies for County-Other water user groups even if no water supply need is identified as a result of the current demand projection methodologies.

3. ***Impact of Transient Water Demand in Rural Counties.*** The concern pertaining to transient population water demand in rural counties was expressed in Section 8.1.8. A study is needed to quantify this impact that is not based solely on the resident population but rather considers the total count of individuals within the respective area.

Status: No TWDB-funded research on this topic as of December 2022.