

# Draft Population and Municipal Water Demand Projections Methodology for the 2021 Regional Water Plans

Previous regional and state water plans have been aligned with political boundaries, such as city limits, rather than water utility service areas. Recent TWDB rule changes now defines water user group (WUG) planning as being utility-based, and the emphasis of the development of draft projections for the 2021 regional water plans (RWPs) was on the transition of the 2017 State Water Plan (SWP) population projections and the associated water demand projections from political boundaries to utility service area boundaries.

## WUG Criteria

Municipal WUGs in the 2021 RWPs are defined as:

- (A) Privately-owned utilities that provide an average of more than 100 acre-feet per year for municipal use for all owned water systems;
- (B) Water systems serving institutions or facilities owned by the state or federal government that provide more than 100 acre-feet per year for municipal use;
- (C) All other Retail Public Utilities not covered in paragraphs (A) and (B) that provide more than 100 acre-feet per year for municipal use;
- (D) Collective Reporting Units, or groups of Retail Public Utilities that have a common association and are requested for inclusion by the RWPG; and
- (E) Municipal and domestic water use, referred to as County-Other, not included in paragraphs (A)-(D) of this subsection

The list of WUGs for the 2021 RWPs was prepared based on the rules listed above and TWDB Water Use Survey data for the 2010-2014.

## Population and Municipal Water Demand Projections

TWDB staff prepared draft population and municipal water demand projections for 2020-2070 for all municipal WUGs using projection trends based on the population projections in the 2017 SWP as reassembled by utility service areas. In addition, the municipal water demand projections generally utilize the base gallons per capita daily (GPCD) and water efficiency volumes from the 2017 SWP. However, a new set of 2010 population estimates for each municipal WUG were developed to reflect a utility based boundary (not political boundary) as a baseline population to be projected for the 2021 RWP.

### 1.1 2010 and 2011 Population Estimates for Municipal WUGs for the 2021 RWP

Multiple sources of data were used as proxies for estimating 2010 baseline population (permanent residential population) including:

- TWDB Water Use Survey population and connection data reported by Public Water Systems (PWSs);
- GIS analyses using year 2010 Census block data within known utility boundaries;
- TCEQ population and connection data for PWS; and

## - 2010 Census Household Size

However, unlike the U.S. Census estimates for cities, there is no one data source that can be solely relied upon for estimating the 2010 permanent population served by water utilities because each data source has its limitations: 1) population reported in the residential Water Use Survey often includes transient population including tourists, seasonal workers or students, 2) available service area boundaries sometimes do not coincide with the actual service area, and 3) connections reported in the Water Use Survey may include commercial, institutional or multi-family housing connections. TWDB staff assembled the available data from different sources in a single spreadsheet/GIS framework as proxy to population and determined the initial 2010 baseline population estimates for the 2021 WUGs. Once the initial 2010 values were determined, they were adjusted to be reconciled with the corresponding total county population from the 2017 SWP.

Year 2011 population estimates were required to determine baseline GPCD calculations for new WUGs, and were obtained using the growth rate of population shown in the TWDB Water Use Survey based on the change in the number of connections reported from 2010 to 2011. The resulting percentage change was applied to the initial 2010 population estimate, obtained above, to determine an estimate of the 2011 WUG population.

### 1.2 Region and County-Level Draft Population Projections

Because there will not be new decennial census data available for use in the 2021 RWP, the 2017 SWP region and county-level population projections were carried over and used as draft projections for the 2021 RWP. As noted above, these county-level values were maintained for the upcoming plan, and the initial estimates of the WUG-level populations using the boundaries of the new utility-based planning unit were reconciled so that the original county totals from the 2017 SWP were maintained.

### 1.3 WUG-Level Draft Population Projections

The regional and state water plans require population projections for individual municipal Water Use Groups.

Below are the steps taken to develop WUG-level population projections:

- 1) Establish the bridge table between municipal WUG lists in the 2017 SWP and the 2021 RWP.
- 2) Estimate 2010 population served by a WUG based on the utility service boundary to be used as a baseline population for the 2021 RWP.
- 3) Use the projected trend of the corresponding WUG in the 2017 SWP and apply it to the utility-based WUG's 2010 baseline population to project the population for 2020-2070 to be used in the draft projections for the 2021 RWP. If multiple WUGs in the 2017 SWP became a utility-based WUG in the 2021 RWP, then the projected trend of the primary WUG (largest water user by volume among those WUGs) was used. For a new utility-based WUG that was included in County-Other in the 2017 SWP, draft population projections were developed by allocating growth from the county projections using the share of population and applying the WUG's 2010 share of the county population to the projected county population for 2020-2070.
- 4) Retain any build-out information from the 2017 SWP.
- 5) Apply the geographic splits based on the utilities' service area boundaries. The sum of all WUG populations within a county was then reconciled to the total county projections.

## 1.4 WUG-Level Demand Projections

Draft municipal water demand projections utilize the population projections and a per-person water use (GPCD) volume for each WUG. The GPCD minus the incremental water efficiency savings for each decade is multiplied by the projected draft population to develop the draft municipal projections.

Below are the steps taken to develop WUG-level demand projections in acre-feet/year:

- 1) Use the GPCD and water efficiency savings of the corresponding WUGs in the 2017 SWP to calculate draft water demand projections based on the draft utility-based WUG population projections for 2020-2070. If multiple WUGs in the 2017 SWP became a utility-based WUG in 2021 RWP, then a GPCD of the primary WUG (largest water user by volume among those WUGs) was used. For new WUGs that were part of County-Other WUG in the 2017 plan, the baseline GPCD was calculated based on the 2011 net water use (or 2014) reported in the Water Use Survey. The county average of water efficiency savings were used for these new WUGs.

**Demand Projection =**

$$\text{Population} \times ((\text{base GPCD} - \text{Water Efficiency Savings}) \times 365 \text{ days}) / (325,851 \text{ gal/ac-ft})$$

- 2) TWDB staff applied a minimum of 60 GPCD for all WUGs which was also used as a lower bound for GPCD in the 2017 SWP.
- 3) For all county-other WUGs, the same GPCDs and water efficiency savings in the 2017 SWP were carried over and used to calculate draft demand projections.