Population Estimation and Projection Technical Memorandum (2014-2018)

Overview

The Suwannee River Water Management District (SRWMD) estimated population for 2014-2018 and developed population projections from 2020-2045 which will be used for upcoming water supply planning efforts. Estimating an accurate population for the SRWMD is important for planning purposes because it forms the foundation of estimating and projecting water use for different categories within each county. This technical memorandum provides information on the data sources used, methodology and results of the population estimation process.

Data

This section explains the data that were used to estimate population, where the data came from, and how or why data were used.

Bureau of Economic and Business Research (BEBR)

BEBR publishes estimates of population and persons per household in Florida on a county-wide basis. These data are updated and published annually. They also publish population projections by county on a 25-year planning horizon. The SRWMD uses the annual and projected populations (medium series) to estimate population. Additional data sources described below are used to estimate residential populations within the county as well as prepare estimates of residential population on public supply versus self-supply.

Public Supply Utility Data

The SRWMD sent out a public supply (PS) data request in October 2019 to utilities inquiring about estimated population served by the utility, annual water use by category (residential, commercial, institutional, other), water connections by category, per capita rates (if known), and any additional information related to public supply service area boundaries (PSAB) and/or water lines. These data were used to estimate the 2018 residential population being served by the utility's water system and to calculate gross and residential per capita rates.

Public Supply Service Area Boundary (PSAB)

The SRWMD used the existing PSAB data collected for the 2017 North Florida Regional Water Supply Partnership (NFRWSP) Plan and made updates to the boundaries based on information provided by utilities. These data are in a shapefile format and show the extent of public supply service areas. The boundaries are used to estimate the potential served population. The potential served population is estimated to evaluate the maximum number of people that could be served by the utility using parcel data and published estimates of persons per household. This estimate is used to project population growth within the county.

Parcel Layer

The parcel layer data originates from each individual county property appraiser and is sent to the Florida Department of Revenue (FDOR) once a year. The SRWMD's contractors, Quantum Spatial and Panda Consultants, gather the data from the FDOR, compile it, and deliver it back to the SRWMD. Later in the year, they make updates from data received from each property appraiser. All water

management districts (districts) individually contract with Quantum Spatial who uses Panda Consultants to process the data. All districts use the same specifications to ensure a consistent and complete dataset. The SRWMD used these data to estimate population served where utility data was not available, to estimate population distribution within counties served by two districts, and to calculate the potential served population inside of a PSAB.

Methodology

This section describes the methods used for estimating split counties, or counties that are shared with adjacent water management districts, as well as estimating served, non-served, institutional, and projected population.

Total County-wide Population

The BEBR county-wide population estimates, without institutional population, for 2014-2018 were used for the estimation of the total residential population (BEBR 2014, 2015, 2016, 2017, 2018). For split counties in the Western Region, a percent share was used to calculate the total population residing in the SRWMD's portion of the county.

Split Counties

The SRWMD shares five counties with adjacent districts. These counties are Alachua, Baker, Bradford, Jefferson, and Levy counties. For counties in the NFRWSP area, population estimates and projections for Alachua, Baker, and Bradford counties were developed in coordination with the St. Johns River Water Management District (SJRWMD). The total county-wide population estimates came from BEBR. The population model created by the SJRWMD was applied to estimate the population in the SJRWMD portion of NFRWSP counties for 2014-2018. The remainder of the population was assumed to be residing in the SRWMD's portion of shared counties.

For counties that are not located in the NFRWSP area, the SRWMD used the parcel layer to calculate the percent of dwelling units located in the SRWMD's portion of the counties. These counties include Jefferson and Levy counties. The percent share was calculated by taking the number of dwelling units in the SRWMD's portion of the county, dividing it by the total number of dwelling units in the county, and multiplying it by 100. For SRWMD planning efforts, this percent share was calculated annually for 2014-2018 to consider any shifts in dwelling units.

Public Supply and Small Public Supply (Served Population)

The served population is defined as the number of people receiving their water use from a public supply utility. The served population for 2018 was provided by many utilities from the public supply utility data request. For utilities that did not have an estimate of their served population, the SRWMD estimated the population by using the number of residential connections reported by the utility in the 2018 data request and multiplied them by BEBR's estimated persons per household for the corresponding county in which the public supply utility was located.

The potential served population was calculated to estimate the number of people served by a public supply utility from 2014-2017. The potential served population was estimated to evaluate the maximum number of people that could be served by the utility using parcel data and published estimates of persons per household. To calculate the potential served population, the number of residential dwelling units in a PSAB was multiplied by BEBR's estimated persons per household for the corresponding county and year. The percent change of potential served from one year to the next was used to estimate the served population from 2014-2017. To calculate the served population, the potential served population estimates for a given year were divided by the 2018 potential served

population and multiplied by the 2018 utility reported population. Below shows an example of the formula used to calculate the served population for 2017.

$$2017 \text{ } served \text{ } population = \frac{2017 \text{ } potential \text{ } served}{2018 \text{ } potential \text{ } served} \text{ } X \text{ } 2018 \text{ } utility \text{ } reported \text{ } population$$

There are two utilities for which additional data was used to estimate the served population. First, the City of Lake City provided additional data on residential connections that was used to calculate the served population for 2015-2018. The number of residential connections was multiplied by an estimate of 2.5 persons per household.

The second utility that provided additional information was Jefferson Communities Water System (JCWS). JCWS has two different systems located in the SRWMD; the Lloyd system which is split between the SRWMD and the Northwest Florida Water Management District (NWFWMD), and the Lamont system which is wholly encompassed in the SRWMD. To estimate the served population for Lloyd portion of JCWS, the SRWMD calculated the percent of parcels in the PSAB that fell within the SRWMD boundary. The 2018 served population was then multiplied by this percent to estimate the 2018 population served in the SRWMD's portion of the Lloyd system. The formula above was then used to estimate the served population for 2014-2017. JCWS provided estimates of population served for the Lamont system.

Population estimates for the SRWMD's portion of Gainesville Regional Utilities (GRU), Clay County Utility Authority, and Melrose Water Association were provided by the SJRWMD. These estimates were incorporated into the served population estimates for Alachua and Bradford counties and used to more accurately estimate the non-served population.

For small public supply permits that did not have a PSAB (i.e., mobile home parks), the served population was estimated based on the information provided in the permit. This estimate of population was held constant for current and projected years (2014-2018, 2020-2045).

Domestic Self Supply (Non-served Population)

The non-served population is defined as the number of people getting their water use from their own domestic self-supply well. This population was estimated by taking the total BEBR county-wide population estimate, less institutional population, and subtracting the served population.

Institutional Population

Correctional facilities and prisons located in the SRWMD are either connected to a public supply utility or are self-supplied and have an institutional water use permit that is required to report use. This institutional use is therefore already being accounted for in the water use estimates for either the public supply (PS) or commercial/industrial/institutional category (CII). Accounting for the institutional population separately enables the SRWMD to more accurately estimate the non-served population and the water use associated with the DSS category. The SRWMD used the 2014-2018 BEBR published inmate population estimates to determine the institutional population by county. To be consistent with BEBR Volume 53, Bulletin 186, which was used for projections, the 2019 institutional population was used as the projected population and held constant through the 2020-2045 planning period (Rayer, S. and Y. Wang. 2020).

Projections

County population projection estimates published by BEBR in January 2020 were used for estimating population from 2020-2045 (Rayer, S. and Y. Wang. 2020). The percent split calculated for 2018 was used to estimate the future populations of shared counties in the Western Region. In the NFRWSP, the county population estimated for the SRWMD is the difference between the BEBR estimate and the SJRWMD projected estimate for each projected year (2020, 2025, 2030, 2035, 2040, and 2045). Because BEBR's projection estimates include both residential and institutional population, the institutional population was subtracted out to be able to get an accurate estimate of the non-served residential population in the future. The institutional population was held constant through the projection period.

In some counties, the 2020 projected population was less than the estimated 2018 population, therefore there was a negative projection estimate due to the variability in the estimation of the institutional population. For counties with a negative projected population for 2020, the estimated total population was set equal to the 2018 total population and grown by the number of people BEBR projected for each time increment. Counties adjusted included Hamilton, Madison, and Union counties. Counties that had a positive 2020 projected residential population estimate were grown by the BEBR reported population projections, less the estimate of institutional population.

The SRWMD applied the population model created by the SJRWMD to distribute projected future population within the county (SJRWMD. 2021). This model also estimated the projected future served populations within PSABs. The projected future served population estimates were subtracted from the county-wide residential projections to get an estimate of the non-served projected population.

References

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