

# Projections of Florida Population by County, 2020–2045, with Estimates for 2019

Stefan Rayer, Population Program Director

Ying Wang, Research Demographer

The Bureau of Economic and Business Research (BEBR) has been making population projections for Florida and its counties since the 1970s. This report presents our most recent set of projections and describes the methodology used to construct those projections. To account for uncertainty regarding future population growth, we publish three series of projections. We believe the medium series is the most likely to provide accurate forecasts in most circumstances, but the low and high series provide an indication of the uncertainty surrounding the medium series. It should be noted that these projections refer solely to permanent residents of Florida; they do not include tourists or seasonal residents.

## State projections

The starting point for the state-level projections was the April 1, 2010 census population count by age, sex, race, and Hispanic origin, as adjusted by the National Center for Health Statistics (NCHS) in the Vintage 2017 bridged race population estimates. Projections were made in one-year intervals using a cohort-component methodology in which births, deaths, and migration are projected separately for each age-sex cohort in Florida for non-Hispanic whites, non-Hispanic nonwhites, and Hispanics. We applied three different sets of assumptions to provide low, medium, and high series of projections. Although the low and high series do not provide absolute bounds on future population change, they provide a reasonable range in which Florida's future population is likely to fall.

Survival rates were applied by single year of age, sex, race, and Hispanic origin to project future deaths in the population. These rates were based on Florida Life Tables for 2007–2013, using mortality data published by the Office of Vital Statistics in the Florida Department of Health. The survival rates were adjusted upward each year until 2044 to account for projected increases in life expectancy. These adjustments were based on projected increases in survival rates released by the U.S. Census Bureau. We used the same mortality assumptions for all three series of projections because there is less uncertainty regarding future changes in mortality rates than is true for migration and fertility rates.

Domestic migration rates by age and sex were based on Public Use Microdata Sample (PUMS) files from the 2005–2009 and 2013–2017 American Community Survey (ACS) 5-year estimates. We chose an average of those two sets of migration estimates because the recession of 2007–2009 had a substantial impact on migration patterns in Florida, affecting in- and out-migration in both time periods; in addition, projections based on more than one time period tend to be more accurate than those based on a single time period. The 2005–2009 data are the earliest ACS 5-year migration estimates that are available, and the 2013–2017 data were the most recent at the time the state projections were made (early December 2019).

For all three racial/ethnic groups, we applied smoothing techniques to the age/sex-specific migration rates to adjust for data irregularities caused by small sample size. The smoothed in- and out-migration rates were weighted to account for recent changes in Florida's population growth rates. Projections of domestic in-migration were made by applying weighted in-migration rates to the projected population of the United States (minus Florida), using the most

recent set of national projections produced by the U.S. Census Bureau. Projections of out-migration were made by applying weighted out-migration rates to the Florida population. In both instances, rates were calculated separately for males and females by race and ethnicity for each age up to 90 and over.

For the medium projection series, in-migration weights for non-Hispanic whites varied from 1.15 to 1.06, and out-migration weights varied from 0.97 to 0.95; for non-Hispanic nonwhites, in-migration weights varied from 1.12 to 1.03, and out-migration weights varied from 0.99 to 0.96; and for Hispanics, in-migration weights varied from 1.11 to 1.03, and out-migration weights varied from 0.99 to 0.96. For the low projection series, the in-migration weights described above were lowered for all three racial/ethnic groups over time – from 7% in 2020 to 11% in 2045; the out-migration weights were raised by the same margins. For the high projection series, the in-migration weights described above were raised for all three racial/ethnic groups over time – from 7% in 2020 to 11% in 2045; the out-migration weights were lowered by the same margins.

The distribution of foreign immigrants for the three racial/ethnic groups by age and sex was also based on an average of the patterns observed for 2005–2009 and 2013–2017. Again, we smoothed the estimates to account for irregularities in the age/sex distribution of immigrants. For the medium projection series, we held foreign immigration at an average of the 2005–2009 and 2013–2017 levels, with some short-term adjustments based on recent trends. In addition, we made minor adjustments to the racial/ethnic distribution of those migrants based on recent trends. For the low series, foreign immigration was projected to decrease by 1,500 per year from the average of the 2005–2009 and 2013–2017 levels; for the high series, foreign immigration was projected to increase by 1,000 per year. Foreign emigration was assumed to equal 25% of foreign immigration for each series of projections.

Projections were made in one-year intervals, with each projection serving as the base for the following projection. Projected in-migration for each one-year interval was added to the survived Florida population at the end of the interval and projected out-migration was subtracted, giving a projection of the population age one and older.

Births were projected by applying age-specific birth rates (adjusted for child mortality) to the projected female population of each racial/ethnic group. These birth rates were based on Florida birth data for 2007–2013 published by the Office of Vital Statistics in the Florida Department of Health. They imply a total fertility rate (TFR) of 1.66 births per woman for non-Hispanic whites, 2.08 births per woman for non-Hispanic nonwhites, 1.92 births per woman for Hispanics, and 1.83 births per woman for total population. These rates were adjusted in the short-term projections to make them consistent with recent fertility trends. We also raised them long-term, though slightly less than last year. We made this downward adjustment, because recorded resident births in Florida, after having increased each year from 2012 through 2016, have trended downward again over the past three years (the birth data for 2019 are still provisional). By 2033, the adjusted rates imply a total fertility rate of 1.68 births per woman for non-Hispanic whites, 2.12 births per woman for non-Hispanic nonwhites, 1.97 births per woman for Hispanics, and 1.86 births per woman for total population.

As a final step, projections for non-Hispanic whites, non-Hispanic nonwhites, and Hispanics were added together to provide projections of the total population. The medium projections of total population for 2020–2024 were adjusted to be consistent with the state population forecasts for those years produced by the State of Florida’s Demographic Estimating

Conference (DEC) held December 3, 2019. None of the projections after 2024 had any further adjustments. In this publication, we provide projections for 2020, 2025, 2030, 2035, 2040, and 2045. State projections for other years are available by request.

### **County projections**

The cohort-component method is a good way to make population projections at the state level, but is not necessarily the best way to make projections at the county level. Many counties in Florida are so small that the number of persons in each age-sex category is inadequate for making reliable cohort-component projections, given the lack of detailed small-area data. Even more important, county growth patterns are so volatile that a single technique based on data from a single time period may provide misleading results. We believe more useful projections of total population can be made by using several different techniques and historical base periods.

For counties, we started with the population estimate constructed by BEBR for April 1, 2019. We made projections for each county using five different techniques. After 2020, the projections were made in five-year increments. The five techniques were:

1. Linear – the population will change by the same number of persons in each future year as the average annual change during the base period.
2. Exponential – the population will change at the same percentage rate in each future year as the average annual rate during the base period.
3. Share-of-growth – each county's share of state population growth in the future will be the same as its share during the base period.
4. Shift-share – each county's share of the state population will change by the same annual amount in the future as the average annual change during the base period.
5. Constant-share – each county's share of the state population will remain constant at its 2019 level.

For the linear and share-of-growth techniques we used base periods of two, ten, and twenty years (2017–2019, 2009–2019, and 1999–2019), yielding three sets of projections for each technique. For the exponential and shift-share techniques we used base periods of five and fifteen years (2014–2019 and 2004–2019), yielding two sets of projections for each technique. The constant-share method was based on data for a single year (2019).

This methodology produced eleven projections for each county for each projection year (2020, 2025, 2030, 2035, 2040, and 2045). From these, we calculated five averages: one using all eleven projections (AVE-11), one that excluded the highest and lowest projections (AVE-9), one that excluded the two highest and two lowest projections (AVE-7), one that excluded the three highest and three lowest projections (AVE-5), and one that excluded the four highest and four lowest projections (AVE-3). Based on the results of previous research, we designated the average that excluded the three highest and three lowest projections (AVE-5) as the default technique for each county. We evaluated the resulting projections by comparing them with historical population trends and with the level of population growth projected for the state as a whole. For counties in which AVE-5 did not provide reasonable projections, we selected the technique producing projections that fit most closely with our evaluation criteria.

For 66 counties we selected AVE-5, the average in which the three highest and three lowest projections were excluded. For Monroe County, we selected an average of projections made with the exponential technique with a base period of five years and the linear technique with a base period of two years. In addition, we made manual adjustments to the projections in six counties in the Florida Panhandle to account for estimated population losses or slowdowns in growth due to the impacts of Hurricane Michael (Bay, Calhoun, Gadsden, Gulf, Jackson, and Liberty counties).

We also made adjustments in several counties to account for changes in institutional populations such as university students and prison inmates. Adjustments were made only in counties in which institutional populations account for a large proportion of total population or where changes in the institutional population have been substantially different than changes in the rest of the population. In the present set of projections, adjustments were made for Alachua, Baker, Bradford, Calhoun, Columbia, DeSoto, Dixie, Franklin, Gadsden, Gilchrist, Glades, Gulf, Hamilton, Hardee, Hendry, Holmes, Jackson, Jefferson, Lafayette, Leon, Liberty, Madison, Okeechobee, Santa Rosa, Sumter, Suwannee, Taylor, Union, Wakulla, Walton, and Washington counties.

### **Range of county projections**

The techniques described in the previous section were used to construct the medium series of county projections. This is the series we believe will generally provide the most accurate forecasts of future population change. We also constructed low and high projections to provide an indication of the uncertainty surrounding the medium county projections. The low and high projections were based on analyses of past population forecast errors for counties in Florida, broken down by population size and growth rate. They indicate the range into which approximately three-quarters of future county populations will fall, if the future distribution of forecast errors is similar to the past distribution.

The range between the low and high projections varies according to a county's population size in 2019 (less than 30,000; 30,000 to 199,999; and 200,000 or more), rate of population growth between 2009 and 2019 (less than 7.5%; 7.5–15%; 15–30%; and 30% or more), and the length of the projection horizon (on average, projection errors grow with the length of the projection horizon). Our studies have found that the distribution of absolute percent errors tends to remain fairly stable over time, leading us to believe that the low and high projections provide a reasonable range of errors for most counties. It must be emphasized, however, that the actual future population of any given county could be below the low projection or above the high projection.

For the medium series of projections, the sum of the county projections equals the state projection for each year (except for slight differences due to rounding). For the low and high series, however, the sum of the county projections does not equal the state projection. The sum of the low projections for counties is lower than the state's low projection and the sum of the high projections for counties is higher than the state's high projection. This occurs because potential variation around the medium projection is greater for counties than for the state as a whole.

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