

# **Methodology for Constructing Population Projections by Age, Sex, Race, and Hispanic Origin for Florida and Its Counties, 2020–2045, With Estimates for 2015**

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The composition of Florida's population has changed substantially in recent decades. Between 1950 and 2010, for example, the proportion of Florida's population younger than age 15 declined from 26.2 to 17.5 percent; the proportion age 65 and older rose from 8.6 to 17.3 percent; and the proportion black declined from 21.7 to 16.9 percent. The Hispanic population increased from 6.0 percent of the total population in 1970 to 22.5 percent in 2010. Changes in demographic composition have been even greater for many counties than for the state as a whole.

These changes have important implications for planning and public policy. They affect the demand for education, healthcare, housing, recreation, transportation, and many other goods and services. They affect the number and characteristics of persons in the labor force and in public and private retirement systems. They affect the allocation of many types of public funds. Consequently, there is a tremendous need for population estimates and projections by age, sex, race, and Hispanic origin. This report provides a description of the methodology used by the Bureau of Economic and Business Research (BEER) to construct these estimates and projections.

## **Definitions of Race and Ethnicity**

The decennial census in the United States is based on self-enumeration. Residents of each household are asked to provide the responses they believe best describe their demographic characteristics, based on guidelines established by the U.S. Census Bureau and the U.S. Office of Management and Budget (OMB). These guidelines allow respondents to identify themselves as Hispanic or non-Hispanic and as belonging to one or more of several racial groups.

It should be noted that "Hispanic" is an ethnic classification rather than a racial category; that is, people can be identified both by Hispanic origin and by race. The OMB defines Hispanic or Latino as "a person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race." For data collection and presentation purposes, federal agencies are required to use a minimum of two ethnicities: "Hispanic or Latino," and "Not Hispanic or Latino." We follow the same guidelines in this report and use the term "Hispanic" to refer to persons of Hispanic, Latino, or Spanish origin.

The three largest racial/ethnic groups in Florida are non-Hispanic whites, non-Hispanic blacks, and Hispanics. These three groups accounted for 97.0 percent of Florida's population in 2010. We made an initial set of estimates and projections by age and sex for these three racial/ethnic groups. Using these estimates and projections as a starting point, we constructed additional sets of estimates and projections for several other race/ethnicity combinations.

## **Data**

Data from the 1990, 2000, and 2010 censuses formed the basis for these estimates and projections. Although census data are generally quite reliable, two issues regarding race and

ethnicity complicate their use. First, in 1990 and all previous censuses, respondents were required to identify themselves as belonging to a single race. Starting in 2000, they were permitted to identify themselves as belonging to one or more races. In Florida, 97.5 percent of the population identified themselves as belonging to a single race in 2010 and 2.5 percent identified themselves as belonging to two or more races. These proportions are very similar to those reported in 2000 (97.6 percent and 2.4 percent, respectively).

Second, although the U.S. Census Bureau defines “Hispanic origin” as an ethnic classification rather than a racial category, many respondents interpreted it as a racial category and listed their race as Hispanic, Latino, Mexican, Spaniard, or a similar response. In Florida, 3.6 percent of the total population in 2010 classified themselves as belonging to some race other than those listed on the census questionnaire; more than 90 percent of those respondents were of Hispanic origin. In 2000, 4.4 percent of the total population classified themselves as belonging to some race other than those listed on the census questionnaire; again, more than 90 percent of those respondents were of Hispanic origin.

Responding to these issues, the National Center for Health Statistics (NCHS) collaborated with the U.S. Census Bureau to create a set of modified 2000 census counts for every state and county in the United States. Using a variety of data sources and techniques, the NCHS assigned people who classified themselves as belonging to more than one race (or who marked “some other race” on the census questionnaire) to a single primary race. These modifications produced data that were consistent over time, prevented double-counting of people belonging to more than one race, and provided a racial classification for Hispanics who did not identify their race. The NCHS released a comparable set of modified census counts for 2010. For 1990, the U.S. Census Bureau made modifications to the 1990 census counts in which persons listing “some other race” were assigned to a specific race – the modified age/race, sex, and Hispanic origin (MARS) files. The estimates and projections described in this report were based on MARS data for 1990 and NCHS data for 2000 and 2010. For 2010, we used an updated April 1, 2010 population that includes Count Question Resolution (CQR) changes for Lake, Marion, and Miami-Dade counties from the Vintage 2013 NCHS bridged-race postcensal population estimates. We also made an additional adjustment for Gadsden County to correct for the institutional facility that the 2010 census failed to enumerate in the county.

Large institutions (e.g., universities, prisons) account for a significant proportion of the total population in many counties in Florida. In such counties, it is important to account for the impact of these institutions when making population estimates and projections. Consequently, we used institutional records and data from the decennial census to estimate the non-institutional population by age, sex, race, and Hispanic origin for 1990, 2000, 2010, and 2015 in the following counties: Alachua, Baker, Bradford, Calhoun, Columbia, DeSoto, Dixie, Franklin, Gadsden, Gilchrist, Glades, Gulf, Hamilton, Hardee, Hendry, Holmes, Indian River, Jackson, Jefferson, Lafayette, Leon, Liberty, Madison, Okeechobee, Santa Rosa, Sumter, Suwannee, Taylor, Union, Volusia, Wakulla, Walton, and Washington counties. In these counties, we made separate projections for the institutional and non-institutional populations. The final estimates and projections for each county were constructed by adding together the institutional and non-institutional populations. The remainder of this report describes the methodology used for making estimates and projections of the non-institutional population.

## **METHODOLOGY**

### **2015 Estimates of Total Population by Race and Ethnicity**

We made estimates of the total number of non-Hispanic whites, non-Hispanic nonwhites, and Hispanics for 2015 using a variety of data sources and techniques. Some relied on extrapolations of previous population trends, whereas others incorporated data on births, deaths, and school enrollment by race and ethnicity. Some estimates were based on averages of several of the individual techniques. The final estimate for each racial/ethnic group in each county was based on our judgment regarding which technique was most likely to provide an accurate estimate of the non-institutional population. Estimates of total population by race/ethnicity were made by adding estimates of the institutional population to estimates of the non-institutional population. As a final step, estimates for the three racial/ethnic groups were controlled to the 2015 estimates of total population published in “Florida Estimates of Population: April 1, 2015,” Bureau of Economic and Business Research, January 2016. A more detailed description of the methodology can be found in an article by Stanley Smith and June Nogle published in the *Social Science Quarterly* in 2004 (volume 85, pp. 731–745).

### **Projections of Total Population by Race and Ethnicity**

Starting with the 2015 estimates, we made projections of the total non-institutional population of each county for non-Hispanic whites, non-Hispanic nonwhites, and Hispanics using the following techniques:

LINE25: linear extrapolation of 1990–2015 non-institutional population change for each racial/ethnic group.

LINE15: linear extrapolation of 2000–2015 non-institutional population change for each racial/ethnic group.

SHARE25: each racial/ethnic group’s share of county non-institutional population change 1990–2015 is applied to projected county non-institutional population change.

SHARE15: each racial/ethnic group’s share of county non-institutional population change 2000–2015 is applied to projected county non-institutional population change.

EXPO25: exponential extrapolation of 1990–2015 non-institutional population change for each racial/ethnic group.

SHIFT25: the change in each racial/ethnic group’s share of county non-institutional population 1990–2015 is linearly extrapolated and applied to county projections of total non-institutional population.

CONST%: each racial/ethnic group’s share of the non-institutional population in 2015 is assumed to remain constant over time.

AVE7: an average of projections from the seven techniques described above.

AVE5: an average of these projections, excluding the highest and lowest.

AVE3: an average of these projections, excluding the two highest and the two lowest.

CTRL AVE7: AVE7 controlled to medium county projection of total non-institutional population.

CTRL AVE5: AVE5 controlled to medium county projection of total non-institutional population.

CTRL AVE3: AVE3 controlled to medium county projection of total non-institutional population.

The final projection of the total population for each racial/ethnic group in each county was based on our judgment regarding which technique was most likely to provide an accurate forecast of the future non-institutional population. In 65 counties, the final projection was based on CTRL AVE3; in Broward and Miami-Dade counties, it was based on CTRL AVE7.

In counties with institutional adjustments, projections of the institutional population were based on institutional records and our judgment regarding future institutional growth. Projections of the racial/ethnic breakdown of the institutional population were made by applying the racial/ethnic distribution from the 2010 census to the projections of the total institutional population, which were adjusted to reflect changes in the racial/ethnic distribution of the non-institutional population over the projection horizon.

Finally, projections of total population by race/ethnicity were made by adding projections of the institutional population to projections of the non-institutional population. In all counties, projections for the three racial/ethnic groups were controlled to the medium projections published in "Projections of Florida Population by County, 2020–2045, with Estimates for 2015," Florida Population Studies, Bulletin No. 174, Bureau of Economic and Business Research, February 2016.

### **Estimates and Projections by Age, Sex, and Race/Ethnicity**

Using modified census and institutional population data for 2000 and 2010, and intercensal population estimates and institutional population data for 2005, we subtracted the institutional population from the total population for each age, sex, racial, and ethnic group to derive estimates of the non-institutional population in each demographic subgroup. We calculated cohort-survival rates by sex for the non-institutional population by dividing the 2010 modified census count for each age, racial, and ethnic group by the 2005 intercensal population estimate for the corresponding group 5 years younger. We also calculated cohort-survival rates by sex for the non-institutional population by dividing the 2005 intercensal population estimate for each age, racial, and ethnic group by the 2000 modified census count for the corresponding group 5 years younger. From these we calculated an average of 2000–2005 and 2005–2010 cohort-survival rates. We chose an average of those two periods because population growth in the first half of the decade was quite different from population growth in the second half. Averaging has generally been found to increase the accuracy of population projections.

Using cohort-survival rates averaged over 2000–2005 and 2005–2010, we made several additional adjustments. First, we applied weighting factors to account for higher survival rates among the older age groups. For many counties, we further adjusted the resulting cohort-survival rates to account for apparent data errors and to smooth out differences among age groups, or between males and females. These adjustments were most frequent in counties with small populations, especially for the non-Hispanic nonwhite and the Hispanic populations.

We applied the adjusted cohort-survival rates to the 2010 non-institutional population by age, sex, race, and ethnicity to produce estimates for 2015 for the population age 5 and older. For the population less than age 5, we used child-woman ratios based on 2010 NCHS data (i.e., population aged 0–4 divided by females aged 15–44). We applied those ratios to the estimated female population in 2015 to provide estimates of children aged 0–4. The population age 0–4 was divided between males and females using proportions of 0.51 and 0.49, respectively. In some

instances, we adjusted the child-woman ratios to account for expected changes in fertility rates. For each of the three racial and ethnic groups, we controlled the non-institutional age and sex estimates to the independent estimates of the total non-institutional population for 2015 described above.

Using these estimates as a base, we repeated the process to produce projections for 2020, 2025, 2030, 2035, 2040, and 2045. These projections were controlled to the independent projections of the non-institutional population described above. As a final step, we added the independent estimates and projections of the institutional population, providing estimates and projections by age and sex for non-Hispanic whites, non-Hispanic nonwhites, and Hispanics. Estimates and projections at the state level were calculated by adding up the county estimates and projections.

We note that this year's projections by age, sex, race, and ethnicity may differ from last year's projections more than is normally the case. This is because we made several changes to the projection methodology. First, the cohort-survival rates used in this year's model project in five-year intervals from 2010 to 2045; projections published in 2011–2015 were made in ten-year intervals for 2020, 2030, and 2040 (projections for 2015, 2025, and 2035 were derived through interpolation). Second, the cohort-survival rates used in this year's model were applied separately for males and females; in the projections published in 2011–2015 we used combined cohort-survival rates for both sexes, and then applied various adjustments to derive projections for males and females. Third, although we used an average of 2000–2005 and 2005–2010 cohort-survival rates this year, the resulting cohort-survival rates were often quite different from the 2000–2010 cohort-survival rates that were used in the projections published in 2011–2015.

### **Estimates and Projections for other Racial/Ethnic Groups**

We developed estimates and projections for several additional racial/ethnic groups. Using the 2010 NCHS data, we calculated the white/nonwhite proportion of the Hispanic population for each county and applied those proportions to the Hispanic estimates and projections to provide a white/nonwhite breakdown of the Hispanic population (in Florida, approximately 76 percent of the Hispanic population identified themselves as white alone in the 2010 census). Adding the Hispanic white population to the non-Hispanic white population provided estimates and projections of the total white population by age and sex for each county.

Using the 2010 NCHS data, we calculated blacks as a proportion of nonwhites for both the Hispanic and non-Hispanic populations. We made those calculations separately for each county and – based on historical trends and the 2010 values – projected those proportions into the future. By applying these proportions to estimates and projections of the nonwhite population (for both Hispanics and non-Hispanics), we developed estimates and projections of the non-Hispanic black population and the total black population by age and sex for each county.

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