

## **Methodology for Constructing Estimates of Total Population for Counties and Subcounty Areas in Florida**

Scott Cody, Stefan Rayer, and Stanley K. Smith  
Bureau of Economic and Business Research  
University of Florida  
February, 2015

The Bureau of Economic and Business Research (BEBR) makes population estimates for every county and subcounty area in Florida, with subcounty areas defined as incorporated cities and the unincorporated balance of each county. County estimates are calculated as the sum of the subcounty estimates for each county and the state estimate is calculated as the sum of the county estimates. The estimates refer solely to permanent residents of Florida; they do not include seasonal or other types of temporary residents.

The estimates are produced using the housing unit method, in which changes in population are based on changes in occupied housing units (or households). This is the most commonly used method for making local population estimates in the United States because it can utilize a wide variety of data sources, can be applied at any level of geography, and can produce estimates that are at least as accurate as those produced by any other method.

The foundation of the housing unit method is the fact that almost everyone lives in some type of housing structure, whether a traditional single family unit, an apartment, a mobile home, a college dormitory, or a state prison. The population of any geographic area can be calculated as the number of occupied housing units (households) times the average number of persons per household (PPH), plus the number of persons living in group quarters such as college dormitories, military barracks, nursing homes, and prisons:

$$P_t = (H_t \times PPH_t) + GQ_t$$

where  $P_t$  is the population at time  $t$ ,  $H_t$  is the number of occupied housing units at time  $t$ ,  $PPH_t$  is the average number of persons per household at time  $t$ , and  $GQ_t$  is the group quarters population at time  $t$ . Estimates of the number of people without permanent living quarters (e.g., the homeless population) are included in estimates of the group quarters population.

This is an identity, not an estimate. If these three components were known exactly, the total population would also be known. The problem, of course, is that these components are almost never known exactly. Rather, they must be estimated from various data sources, using one or more of several possible techniques. In this report, we describe the data and techniques that will be used to develop population estimates for Florida's counties and subcounty areas on April 1, 2015.

### **Households**

Census definitions require a person to be counted as an inhabitant of his/her usual place of residence, which is generally construed to mean the place where he/she lives and sleeps most of the time. This place is not necessarily the same as one's legal or voting residence. A household is the person or group of people occupying a housing unit; by definition, the number of occupied housing units is the same as the number of households. Households refer solely to permanent residents and a housing unit is classified as vacant even when it is continuously occupied, if all the occupants are temporary residents staying only for a few days, weeks, or months.

BEBR uses three different data sources to estimate the number of households in Florida. The first is residential building permits, as collected and distributed by the U.S. Department of Commerce. The housing inventory in 2015 for a city or county that issues building permits can be estimated by adding permits issued since 2010 to the units counted in the 2010 census and subtracting units lost to destruction, demolition, or conversion to other uses. The time lag between the issuance of a permit and the completion of a unit is assumed to be three months for single-family units and fifteen months for multifamily units. Building permits are not issued for mobile homes, but proxies can be derived from records of shipments to mobile home dealers in Florida. Creating a housing inventory for an entire county requires complete permit data for every permitting agency within the county. Although such data are not always available, coverage is sufficient in most Florida cities and counties to provide useful information.

There are no readily available data sources providing comprehensive up-to-date information on occupancy rates. Accurate information can be obtained through special censuses or large sample surveys, but in most instances these methods are too expensive to be feasible. A common solution is to use the occupancy rates reported in the most recent census. This is the procedure we follow in most places, but in some places we make adjustments to account for factors reflecting changes in occupancy rates over time (e.g., changes in the seasonal population).

The product of the inventory figure and the occupancy rate provides an estimate of the number of households. There are several potential problems with this estimate. Time lags between the issuance of permits and the completion of units may vary from place to place and from year to year. The proportion of permits resulting in completed units is usually unknown. Data on demolitions and conversions are incomplete and data on mobile homes must be estimated indirectly. Reliable estimates of changes in occupancy rates are generally unavailable. Certificate-of-occupancy data can eliminate problems related to completion rates and time lags but not those related to occupancy rates, demolitions, and conversions. Although these problems limit the usefulness of the data in some places, building permit data often provide reasonably accurate estimates of households.

Our second data source is active residential electric customers. We collect these data from each of the state's 54 electric utility companies. Households can be estimated by constructing a ratio of households to active residential electric customers using data from the most recent census year (e.g., 2010) and multiplying that ratio times the number of

active residential customers in some later year (e.g., 2015). This procedure assumes that no changes have occurred in electric company bookkeeping practices or in the proportion of customers who are permanent residents. Although changes do occur, they are generally fairly small. In some places we adjust the household/electric customer ratio to account for likely changes in the proportion of housing units occupied by permanent residents. Previous research on BEBR population estimates has shown that household estimates based on electric customer data are—on average—more accurate than those based on building permit data.

We will continue to use a different type of electric customer data this year; namely, data in which limited use customers are excluded. Limited use customers are those using less than a specified amount of electricity during certain months of the year. We believe these customers represent seasonal or other part-time residents and excluding them may give a more accurate measure of permanent residents. These data are not available for all areas of the state, but we will consider using them in conjunction with other data sources in places in which the data are available and appear to be reliable.

We use a third data source for estimates at the county level: the number of homestead exemptions reported by the Florida Department of Revenue. Households can be estimated by constructing a ratio of households to exemptions using data from the most recent census year (e.g., 2010) and multiplying that ratio times the number of exemptions in some later year (e.g., 2015). An important advantage of these data is that they cover only housing units occupied by permanent residents, thereby excluding the impact of seasonal and other non-permanent residents. The primary disadvantage is that the data do not include households occupied by renters or other non-homeowners. Homestead exemption data are not available at the subcounty level.

Building permit, electric customer, and homestead exemption data all provide useful information regarding changes in households. We use our professional judgment to decide which data source(s) to use in each specific county and subcounty area. In many instances, we use averages of estimates from two or even all three data sources.

### **Persons per Household**

The second component of the housing unit method is the average number of persons per household (PPH). Florida's PPH dropped steadily from 3.22 in 1950 to 2.46 in 1990 but then leveled off, remaining constant between 1990 and 2000 before rising to 2.48 in 2010. There is a substantial amount of variation among local areas in Florida, with values in 2010 ranging from 2.1 to 3.1 for counties and from less than 1.5 to more than 4.0 for subcounty areas. PPH values have risen over time in some cities and counties and declined in others.

For each county and subcounty area, we base our PPH estimates on the local PPH value in the most recent census (e.g., 2010), the state-level change in PPH since that census (as measured by the American Community Survey), and the local change in the mix of single-family, multifamily, and mobile home units since that census. For this year, we

will also be investigating whether the American Community Survey can provide guidance regarding changes in PPH at the county level. In some instances, we use indirect indicators of changes in PPH to adjust the estimates (e.g., changes in racial composition). Again, we use our professional judgment to decide which data sources and techniques to use in each county and subcounty area.

### **Group Quarters Population**

The household population is calculated as the product of households and PPH. To obtain an estimate of the total population, we must add an estimate of the group quarters population. In most places, we estimate the group quarters population by assuming that it accounts for the same proportion of total population in 2015 as it did in 2010. For example, if the group quarters population accounted for 2% of the total population in 2010, we assume that it accounted for 2% in 2015. In places where the group quarters population represents a substantial proportion of the total population, we collect data directly from the administrators of the major group quarters facilities. Inmates in state and federal institutions are accounted for separately in all local areas; these data are available from the Federal Bureau of Prisons, the Florida Department of Corrections, the Florida Department of Veteran Affairs, the Florida Agency for Persons with Disabilities, the Florida Department of Health, the Florida Department of Juvenile Justice and the Florida Department of Children and Families. The total population estimate is made by adding the estimate of the group quarters population to the estimate of the household population.

### **Conclusion**

The population estimates produced by BEBR are calculated by multiplying the number of households by the average number of persons per household and adding the number of persons living in group quarters. This methodology is conceptually simple but effective. It utilizes data that are available for all local areas, its components respond rapidly to population movements, and it can be applied systematically and uniformly everywhere in the state. A comparison of population estimates with census results for 1980, 1990, 2000, and 2010 showed the BEBR estimates to be quite accurate, especially when compared to other sets of estimates. We believe the HU method is the most effective method for making city and county population estimates in Florida and that it produces reliable estimates that provide a solid foundation for budgeting, planning, and analysis.