

# Estimates and Projections



<b>Version</b>	Release 2019  <b>Expanded Estimates</b> See below under Content for details.
<b>Purpose</b>	The Estimates and Projections database (E&P) is the core data offering of AGS, covering the essentials of demographics including population, household, dwelling, labor force, and income statistics. Most analytical applications require at the very least a sampling of this core data in conjunction with more specialized datasets that AGS offers.
<b>Content</b>	<p>The Estimates and Projections (E&amp;P) database is the most extensive update available, covering a broad range of demographic characteristics for the current year, and 5-year projections. Variables include:</p> <p>Population</p> <ul style="list-style-type: none"><li>• Population by household type (family, non-family)</li><li>• Population by group quarters type (institutional, non-institutional)</li><li>• Population by age (19 age breaks)</li><li>• Population by age and sex (38 breaks)</li><li>• Population by sex</li><li>• Population by race</li><li>• Population by Hispanic origin</li><li>• Population by race and Hispanic origin (e.g. white Hispanic, white non-Hispanic)</li><li>• Population by Marital Status</li><li>• Population by Educational Achievement</li></ul> <p>Households</p> <ul style="list-style-type: none"><li>• Households by type (family, non-family)</li><li>• Households by size of household</li><li>• Households by age of head of household</li><li>• Household type (e.g. lone parent male family with children)</li><li>• Average Household Size</li><li>• Length of Residence</li><li>• Total Vehicles Available</li><li>• Households by number of vehicles available</li><li>• Households by number of vehicles available and tenure</li></ul>

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## Labor Force

- Employment Status
- Employment Status by sex

## Income

- Aggregate Income (family, non-family households, group quarters)
- Household income distribution (15 breaks)
- Family income distribution (15 breaks)
- Extended Upper-Income distributions
- Median and average income (family, household)
- Age of head of household by income
- Median income by age of head of household

## Dwellings

- Vacant Dwellings
- Tenure

## Expanded Estimates

Using the American Community Survey's (ACS) most recent 1-year and 5-year databases as input, AGS has updated many of the ACS derived tables from 2010 to the current year, primarily by balancing the most recently available 5-year ACS numbers to current block group estimates, using the 1-year ACS and higher order geography as controls. This provides updates to a wide range of important demographic tables, including –

- School enrollment (private and public, by sex, by grade level)
- Veteran status (by period of service and by age/sex)
- Language spoken at home and linguistic isolation (the inability of household members to converse in English)
- Employment by Occupation (by sex)
- Employment by Industry (by sex)
- Class of Worker (private, public, etc.)
- Time leaving for work
- Travel time to work
- Means of transportation to work

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- Income by type of income (wage, social security, etc.)
- Value of Owner Occupied Housing
- Cash Rent
- Units in Structure
- Year structure built
- Expanded race by origin details (e.g. Native Hawaiian, Samoan, Guamanian, Other Pacific Islanders)
- Hispanic/Latino Origin by Nationality (e.g. Costa Rican)
- Detailed Ancestry (e.g. Albanian, Welsh)

These variables are essentially for 2017, with minor updates to 2019. With many variables, such as housing values, the actual data is quite volatile and it must be understood that these are not current estimates as much as actual 2017 balanced to 2019 using simple methods. That said, these tables provide a valuable addition to our current estimates dataset. They are not projected to 2024.

## Methodology

The estimates and projections methodology combines the best current and projected information from a wide range of data sources. It is supplemented by the extensive experience of Applied Geographic Solutions in creating accurate and reliable estimates and projections. A summary of the methodology for each of the major variable groups is included in the sections that follow.

### Population

The current population of the United States is obtained from the Census population estimate. This is a very accurate and current estimate of the population down to the county level and serves as the basis for projection and estimation at lower levels of geographic detail. The five-year projections have been derived from the National Projections of the Census Bureau.

The current year estimates also rely heavily on the 2010 Census block level population counts, as these provide the most accurate recent data available. The 2010 Census counts provide a baseline for the estimates and projections, and the current year estimates also rely on USPS delivery counts and Zip+4 locations to help track population growth and new housing developments.

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State and county level estimates are based on the compilation of data from a range of Federal and State authorities, including the latest county population estimates from the Census Bureau, the American Community Survey (ACS), the current population survey (CPS), and additional local sources. Where required, the resulting estimates are then ratio-adjusted so that the sum of the county estimates is equal to the state total, and the state estimates equal to the national total. For the five-year projections, a similar method is employed.

At the block group level, the population model consists of the application of a non-linear trend and cohort-survival models which estimates population given historical patterns, the latest Census age distributions and projections of fertility, mortality and international migration rates. The final results are then carefully balanced to the county and population estimates to ensure consistency with current Census Bureau estimates.

The result is a comprehensive set of population estimates and projections which includes the knowledge of State, County, and private agencies about their detailed areas but also ensures that the total population is consistent with the Census Bureau estimates, which have proved extremely reliable over time.

## **Population by Age, Sex, and Race**

National and State level Census bureau projections of age by sex and race/Hispanic origin were used as overall controls to ensure consistency with the Census projections. Detailed forecasts by age, sex, and race, as well as Hispanic origin, were obtained from the Census Bureau National Projections.

At the state level, the projections of individual state agencies and ACS estimates were combined with the results of a cohort survival approach to obtain reliable state estimates by age and sex. The block group estimates were compiled using cohort survival methods, then balanced to both the estimated block group population totals and to the state level control totals. Consistency checks with the annual CPS (Current Population Survey) are used to ensure the validity of the resulting age/sex distributions

Trends in the racial distribution and Hispanic populations were used to derive preliminary estimates at the block group level, which were then

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adjusted to balance with appropriate control totals. This method allows the utilization of the historical changes in race and Hispanic origin distributions and projects those changes into the future while maintaining consistency with national level projections. Again, the CPS is used extensively to assist in the verification of the models.

## **Households and Household Type**

Total households were modeled by:

- projecting trends in the population per household over time at the national level to provide a control total;
- reviewing currently available household size statistics at the State level; and utilizing the current estimates of population by age and sex to determine household formation rates for small areas

Current and historical USPS and Zip+4 data were employed to help determine block groups with significant changes to the number of households since the 2010 Census. ACS data has been used in order to bridge the gap between population estimates and dwelling/postal delivery counts.

All household based numbers are initially estimated / projected separately for family and non-family households. Non-family households have been growing in number at a higher rate than family households have over the past several decades. Average household sizes for family households have been decreasing for several decades. However, during the 1990's, the decline has stopped in most areas and has actually reversed in several states.

The group quarters population, that is population that is not in households (such as persons in institutions, military barracks, nursing homes, college dormitories, and homeless persons), is expected to increase slightly during the decade, but remain relatively constant as a percentage of the total population. This is a reflection of two trends: the decreasing armed forces employment since the 1980's and the longer term increasing elderly population which results in high populations in nursing homes and other institutions which cater to the elderly population. As a result, the total group quarters population has been relatively constant.

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## **Income**

Income estimates include aggregate income by household type and income distributions as well as derived measures include per capita income, and various median income measures.

All income estimates produced by Applied Geographic Solutions are in current, rather than constant, dollars. In other words, an estimate of income for the year 2017 includes both an inflationary component and a 'real' component, the latter being the difference between the change in income and the change in inflation during the period. The 'real' component is normally attributed to productivity gains in the economy and to differences in the international competitiveness of the economy.

Aggregate income estimates for the current year are based on an analysis of income information from the previous ACS releases and by considering various macro-economic statistical data from the Department of Commerce and the Federal Reserve. The projections of aggregate income are based in part on a review of national Bureau of Economic Analysis (BEA) projections combined with historical analyses of the factors affecting comparative income growth at the block group and higher geography levels.

Income distributions are estimated and projected for both family households and non-family households separately. Total household income distributions are simply the aggregate of the two detailed distributions.

Income distributions were derived by using a complex distribution shifting technique which utilizes the changes in per family household and non-family household incomes as a means of adjusting the income distributions over time. The relative ratio between changes in per household average incomes and median incomes were used to adjust for above-average growth in high-income households within some geographic areas. The resulting distributions were then normalized to higher order totals and adjusted to national level expectations and were verified for internal consistency with respect to the mean and median measures.

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## Other Variables

A number of other variables are also projected within the series. In large part, these are derived by using available current estimates and projections at the lowest possible level of geography as the base for the estimation procedures, relying heavily upon the annual release of the ACS. The CPS is used extensively to track changes using available cross-reference information related to age, race, sex, and income.

For example, current marital status estimates are available at the state level ACS from the Census Bureau as “control targets”. The ACS is used in conjunction with the annual CPS surveys (both historical and current) are used to track the changes in marital status dependent upon other symptomatic variables such as age, sex, race, and income levels. These “micro-models” are then applied to the block group level changes between the census and the current period. This results in block group level data which is consistent with higher order levels but also reflects changes in marital status owing to shifting local demography.

On the other hand, vacant housing is tracked using state and regional indicators, then adjusted for seasonally vacant dwellings which are a significant component of the marketing landscape in many areas of the country.

## 2010 Census Special Note

### The Census and American Community Survey Integration

Historically, the Census Bureau has used a two form approach to taking the census. The majority of households would fill out the “short” form, which included questions on the age, race, and sex of the household members, as well as the relationships between them. One in seven households would receive the long form, which included many questions related to income, education, occupation, and housing characteristics.

The 2010 Census, as most are aware, did not include a long form and as a result, the data available from the Census itself is highly limited. For those familiar with the historical releases, there was no SF3 (long form) release, only the SF1 (short form) and the special group quarters population tabulations.

The replacement for the Census long form, known as the American Community Survey (ACS), has been underway for several years. Over the

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past decade, the ACS has been steadily improving, as the geographic coverage and detail level (e.g. from state to county to block group) has become more complete.

We extracted a number of tables from the 2017 American Community Survey releases to make use of two separate series. The “one year” tables cover 2017 for the nation, states and the largest counties and metropolitan areas. The “five-year” tables are for 2013 – 2017 and are released at the block group level and higher.

## Data Sources

AGS uses a wide range of data sources in constructing its estimates and projections, including:

- Census tabulations from the 2010 Census
- USPS and commercial source ZIP+4 level delivery statistics
- The Census Bureau’s American Community Survey results at the national, state, county, tract and block group levels, which are based upon one year samples from 2017 and a five year rolling sample from 2013-2017.
- Census Bureau estimates and projections of population characteristics at various levels of geographic detail, including the latest estimates of population at the county level.
- The Census Bureau’s Current Population Survey, which provides detailed demographic breakdowns and enables a thorough longitudinal analysis of demographic trends.
- The Census Bureau’s National Projections database which provides nationwide rates regarding fertility, mortality and migration rates by race which is critical to project the growth of different ethnic populations.
- The Census Bureau’s Annual Estimate of Housing Units data
- National Center for Education Statistics data on college populations

## Further Information

Contact customer service at 877-944-4AGS or email [support@appliedgeographic.com](mailto:support@appliedgeographic.com).