

Esri 2011/2016 Updated Demographics



Copyright © 2012 Esri
All rights reserved.
Printed in the United States of America.

The information contained in this document is the exclusive property of Esri. This work is protected under United States copyright law and other international copyright treaties and conventions. No part of this work may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or by any information storage or retrieval system, except as expressly permitted in writing by Esri. All requests should be sent to Attention: Contracts and Legal Services Manager, Esri, 380 New York Street, Redlands, CA 92373-8100 USA.

The information contained in this document is subject to change without notice.

Esri, the Esri globe logo, Tapestry, esri.com, and @esri.com are trademarks, service marks, or registered marks of Esri in the United States, the European Community, or certain other jurisdictions. Other companies and products or services mentioned herein may be trademarks, service marks, or registered marks of their respective mark owners.

Esri 2011/2016 Updated Demographics

An Esri White Paper

Contents	Page
Introduction.....	1
2000–2010 Change	1
Sample Data, Then and Now	2
2011/2016 Updated Demographics.....	3
2000–2010 Geographic Change.....	4
Comparing the Data	5
Use of Projections.	5
Esri's Data Development Team.....	6

Esri 2011/2016 Updated Demographics

Introduction

Census 2010 marked the end of a turbulent decade and the beginning of new ways to measure our change. Since 2000, we have experienced both extremes in local change, from rapid growth to the precipitous declines that heralded one of the worst recessions in US history. The decade began with a recession in 2001 that signaled the end of the dot-com boom. Interest rates were lowered, and investors turned to real estate. Housing demand fueled the growth that characterized the first half of the decade into 2006. Home value appreciated rapidly, especially in Sunbelt markets in the South and West, which only strengthened demand and attracted more newcomers. The construction industry—and consumer spending—sustained economic growth until the housing bubble burst.

When interest rates began to rise, the speculative foundation of the mortgage market was revealed. Recent home buyers scrambled to make higher payments. Growth in the hottest housing markets slowed and then reversed. Home buyers defaulted on their mortgages, and foreclosures emptied new neighborhoods.

2000–2010 Change

Census 2010 verified the average annual rate of population growth for counties from 2000 to 2010 at 0.4 percent compared to 1 percent in the previous decade, 1990–2000. However, most of the growth occurred from 2001 to 2006. When the housing market began to contract, demand decreased, and migration receded. When the collapse of the housing market impacted the economy, marriage and birth rates dropped, too. From 2006 through 2010, rates of population change declined in eight out of ten counties. The average annual rate of growth among counties dropped to zero from an average of 0.8 percent in the first half of the decade. The 10-year average obscures the annual fluctuations in demographic change.

Census 2010 also documented the boom/bust in housing. From 2000 to 2010, housing units increased by almost 14 percent. Vacant housing units increased by almost 44 percent. The momentum in housing construction did not slow as quickly as demand. The change in vacant housing exceeded the change in total housing units in one out of four counties. Add foreclosures to already vacant properties, and note that it will take more time to sell off the vacant homes than it took to build them.

Sales of existing homes increased again in December 2011; however, the glut of existing homes continues to depress home prices. The National Association of Realtors estimates that a third of existing homes sold are either short sales or sales of foreclosed properties. This does not include sales that fall through due to low appraisal values or tightened lending standards by banks. New home sales in 2011 hit a record of 302,000, the lowest since the government began tracking sales in 1963.

The Great Recession provided a sharp reality check on the housing market and economic growth. Demographic effects like the increase in vacant housing units, the slowing of population and household growth, or the decrease in owner-occupied units can be

quantified with Census 2010 data. However, the economic fallout in small areas can only be measured indirectly or from five-year averages.

Sample Data, Then and Now

Census 2010 was a game changer in the development of small-area data. Ten years ago, we were looking forward to the release of the sample data from Census 2000, Summary File 3, including variables like income, education, employment, and home value. Census 2010 has no sample data. Today, we already have sample data from the 2010 American Community Survey (ACS), although the single-year data is only reported for areas with a population of 65,000 or more. Data for all levels of geography down to block groups is only available as a five-year average, 2006–2010.

Unlike census sample data, the American Community Survey represents a series of sample surveys with different measures of familiar variables. The differences in measurement include continuous data collection and smaller sample sizes. Naturally, ACS sample sizes are much smaller than a census survey taken once every 10 years. One-year data is actually a 12-month average rather than from a single point in time, April 1. To represent the smallest sample areas—block groups—data must be collected over 60 months.

How does this difference affect the annual demographic updates? Change must be gauged differently now. The period from 2006 through 2010 includes the peak of the housing boom *and* the drop from the Great Recession. The average of the highs and lows shows neither the peak nor the downturn. Since economic recovery must be measured in baby steps, the final assessment for small areas may have to wait for the 2011–2015 ACS data. Intervening data from the ACS will include overlapping years, a consequence of five-year data. Unfortunately, we do not have ACS data for the 2000–2004 period, either. The first full release of ACS data was 2005–2009, in 2000 geography, which is not comparable to the 2010 geography of the 2006–2010 ACS data. So, we have an ACS base of sample data, but no real measures of change for small areas yet.

Unfortunately, the ACS base is also affected by sample size. Statistics show that the smaller the sample, the more variable the estimate. In fact, some estimates are simply not reported due to small sample sizes or missing responses. There are gaps in ACS data. For example, civilian employment is reported for block groups, but labor force participation (including unemployment) is not. The distribution of household income is reported, but aggregate household income, which is commonly used to calculate average household income, is not reported for 1,900 block groups.

Coverage gaps are not unique to ACS data. In the past, census sample data was apparently reported for the whole population, but missing data was commonly imputed by substituting data from a person or housing unit with similar characteristics. The ACS uses a similar imputation technique, but also shows data as missing when sample sizes are small. Data users are just not accustomed to seeing the limitations or the bias inherent in data sources. Now we have an ACS base, albeit with some holes, but no comparable measures of change. Does this represent the future of data updates?

Yes and no. The ACS retains the appearance of past sample data but represents the changing future of data collection. According to Robert Groves, director of the Census Bureau, "The current Census Bureau survey and census methods are unsustainable. Changes must occur in the acquisition of data and construction of statistical information

for the Census Bureau to succeed."¹ Although there will be annual releases of ACS data, only five-year data will be reported for small areas. And there will still be missing data. The ACS cannot be the sole measure of the population for the next decade any more than a single decennial survey could. There will always be a need for alternative data sources to measure the facets of change both demographic and economic.

The good news is the proliferation of data sources, from administrative records to private data sources. Government agencies continue to provide their data in convenient, digital time series, while the private sector has been pioneering the indirect collection of data from a host of sources, including Internet use and social media. Esri has been using a variety of data sources for years to update small areas like block groups. It begins with the latest census base and then adds a mixture of administrative records, like delivery counts from the US Postal Service, and various private sources, like a comprehensive address file, to capture change to the census base.

This approach has been effective in past updates, but it requires a solid census base and a variety of sources and statistical models to capture change. The bad news is that alternative data sources, direct or indirect, do not cover all the variables that were reported from a census and its sample survey. Some variables cannot be updated reliably, even with a solid census base. The ACS can provide yearly updates to all the variables in the sample base as reported, but the base will be a five-year average for all areas, and it will include gaps or missing data. Its comparability is also limited primarily to other five-year ACS databases.

The American Community Survey represents the future, and it, too, is subject to change. The cost of collecting data with traditional techniques is increasing rapidly. Census 2000, including the sample survey, cost \$4.5 billion. Census 2010 and its 10 questions cost \$13 billion. People are simply averse to filling out questionnaires, but they will post their personal lives on Facebook. Data collection can be adapted to new media. Demographic updates must incorporate both traditional and new data sources to remain current. The challenge now is to retool forecast models to integrate changing traditional sources and exploit new data sources.

2011/2016 Updated Demographics

Esri 2011/2016 Updated Demographics begins a new era in data development: retaining the best from our past while adapting to changes in source data. The demographic updates are still point estimates, representing July 1 of the current and forecast years. We have incorporated Census 2010 counts and geography and evaluated and revised our models. Since the last of the Census 2010 counts were released at the end of August 2011, we revised the 2011/2016 update roster to allow enough time to incorporate a new census base and new source data in 2011.

Esri 2011/2016 Updated Demographics reveals some of the changes being made to accommodate the differences in ACS sample data. Due to smaller sample sizes, household income reflects the standard reporting intervals with a top interval of \$200,000 or more. Updates that were based on Census 2000 sample data extended the upper interval of household income to \$500,000 or more. The 2011 income updates are based on multiple sources, including the 2005–2009 data from the American Community Survey.²

¹ Groves, Robert M., "The Future of Producing Social and Economic Statistical Information: Part I." *The Director's Blog*, US Census Bureau, September 2011. <http://blogs.census.gov/directorsblog/2011/09/the-future-of-producing-social-and-economic-statistical-information-part-i.html>.

² The 2006–2010 ACS data was released *after* Esri's 2011/2016 updates.

Forecasts are developed from both Census 2000 and Census 2010 bases, although post-census trends in the population are captured from intercensal estimate series and changes since Census Day, April 1, 2010.³ The 2011 updates are only one year from the census, and trends are still impacted by the collapse of the housing market and the weak recovery from the Great Recession. Ordinarily, the current-year update represents current events, while the five-year forecast illustrates the effects of current events over the next five years. However, Esri expects the pace of recovery to accelerate more in the following years. The housing market is still distressed, but there are also signs that the economy is picking up.

2000–2010 Geographic Change

Changes in the areas for which data is tabulated and reported are critical to the analysis of trends. Census data is reported by geography, whether political districts, statistical areas, or special-purpose polygons like ZIP Codes or metropolitan areas. Statistical areas, like block groups and census tracts, are defined by the Census Bureau (with help from local officials) to collect and report data for neighborhoods. These areas change every 10 years with each new census. Political areas like cities or townships change whenever local governments revise their boundaries. Larger political areas like counties change less often than places, but boundary revisions were common with Census 2010.

Even if the boundaries do not change, the Census Bureau can renumber the geocodes for the areas. All these changes preclude simple comparison of the numbers from Census 2000 to data from Census 2010. The only way to compare the data from census to census is to define a correspondence between the geographic areas in each.

Esri defined the 2000–2010 correspondence by using different sources of data from the Census Bureau. The first step was to create a spatial join with the 2000 blocks and the 2010 boundaries for geographic areas from TIGER 2010. The technique aligns the internal point, expressed as latitude-longitude coordinates, of 2000 blocks with 2010 boundaries. Of course, it is important to extract and define the boundaries from TIGER 2010 accurately. Next, extensive edits of the assignment of 2000 blocks to 2010 areas are necessary to ensure comparability to the Census Bureau's internal process of allocating addresses to specific areas. Assignments were checked against the Census Bureau's 2000–2010 tabulation block correspondence.

The use of more than eight million census blocks to depict the location of the population raises the development of geographic correspondence from an art to a science. By overlaying 2010 boundaries on the landscape of blocks, it is possible to treat the distribution of the population as continuous rather than discrete and unique to each small statistical area. This resolution clarifies the correspondence between 2000 and 2010 geography and provides a consistent 2000 database in 2010 geography.

Metropolitan areas are usually revised annually; however, the Office of Management and Budget revises the definitions decennially with data from the census. The next revision of metropolitan areas is expected in 2013. The 2011/2016 updates reflect the December 2009 Core Based Statistical Areas, including 366 metropolitan and 576 micropolitan areas. Congressional Districts still represent the 112th Congress. The new Congressional Districts allotted by Census 2010 will debut in January 2013.

ZIP Codes, which are defined solely by the US Postal Service to expedite mail delivery, can change monthly, or whenever the Postal Service revises delivery routes. ZIP Codes

³ Intercensal estimates reflect the time series of totals from the previous decade, 2000–2010, which are fitted to the end points—Census 2010 counts—to smooth any discrepancies between the 2010 estimates and the census counts.

do not represent standard census geographic areas for data reporting. ZIP Code boundaries are not contiguous with census geographic areas or stable over time. Data estimated for ZIP Codes is also subject to change. Residential ZIP Code data is estimated from block group data using a correspondence created by assigning Census 2010 block points to ZIP Code boundaries from NAVTEQ. The vintage of the ZIP Code boundaries is December 2010; the total of residential ZIP Codes in this release is 31,890.

Esri presents 2011/2016 forecasts of population that include age by sex, race by Hispanic origin, households and families, housing by occupancy and tenure, and household income. All data represents 2010 geography. Tapestry™, consumer spending, and market potential datasets are also available in 2010 geography. In 2012, our demographic updates will be expanding to include more of the past update variables, like labor force, employment, age by income, net worth, and disposable income. However, the American Community Survey will continue to effect changes in the updates.

Comparing the Data

Data users like time series. They like to know what has happened since the last update. Has the housing market stabilized yet? Has the local economy improved? Has there been any growth, or are the residents simply one year older? Unfortunately, the 2011 updates are only comparable to corresponding Census 2010 counts. Each decennial census effectively restarts demographic time series for the next decade.

Esri's 2010/2015 demographic updates were based on Census 2000, reported in 2000 geography and released several months *before* Census 2010 data. Updated sample variables, like income and employment, are also not comparable to *current* sample data (i.e., ACS data).

- Census 2000 geography is not comparable to Census 2010 areas. The Census Bureau revised or realigned boundaries from the county level to blocks.
- Geographic incompatibility also precludes the comparison of trade areas, which are built from different blocks and block groups in Census 2010.
- ACS is not comparable to Census 2000 as a base. For example, ACS household income is averaged over different surveys spanning 12–60 months, and each respondent's income is adjusted by the Consumer Price Index (CPI). Census 2000 collected income for the previous year (1999) at one point in time. ACS may also include seasonal residents for an area, unlike Census 2000.
- 2011 updates are not comparable to 2010 updates.

The 2011 updates are also not comparable to ACS data. The only data for all levels of geography is the five-year ACS data. First, a five-year average is hardly comparable to a single point in time. Second, the 2006–2010 ACS data was released *after* the 2011 updates. Finally, current forecast models, especially for sample items like income, differ from the models that were used from 2000 to 2010. All models are being revised to incorporate Census 2010 as a base to accommodate the change in ACS sample data and to introduce new data sources.

Use of Projections

Projections are necessarily derived from current events and past trends. The past and the present are known; the future must be extrapolated from this knowledge base. Even though projections represent the unknown, they are not uninformed. Guidelines for the development of projections also inform the use of those projections:

- The recent past provides a reasonable clue to the course of future events, especially if that information is tempered with a historical perspective.
- A stable rate of growth is easier to anticipate than rapid growth or decline.
- The risk inherent in forecasting is inversely related to the size of an area—the smaller the area, the greater the risk.
- The risk increases with the length of the projection interval. Any deviation of the projected trends from actual events is amplified over time.

Esri revises its forecasts annually to draw on the latest data. However, this data can be enhanced with personal knowledge of an area to provide the qualitative, anecdotal detail that is not captured in a national database. It is incumbent on the data user and the producers to incorporate as much information as possible when assessing local trends, especially for areas that are subject to boom–bust cycles.

Esri's Data Development Team

Led by chief demographer Lynn Wombold, Esri's data development team has a 30-year history of excellence in market intelligence. The combined expertise of the team's economists, statisticians, demographers, geographers, and analysts totals nearly a century of data and segmentation development experience. The team develops datasets, including Updated Demographics, Tapestry Segmentation, Consumer Spending, Market Potential, and Retail MarketPlace, that are now industry benchmarks.

For more information about Esri updated demographics, visit esri.com/demographicdata/.



Esri inspires and enables people to positively impact their future through a deeper, geographic understanding of the changing world around them.

Governments, industry leaders, academics, and nongovernmental organizations trust us to connect them with the analytic knowledge they need to make the critical decisions that shape the planet. For more than 40 years, Esri has cultivated collaborative relationships with partners who share our commitment to solving earth's most pressing challenges with geographic expertise and rational resolve. Today, we believe that geography is at the heart of a more resilient and sustainable future. Creating responsible products and solutions drives our passion for improving quality of life everywhere.



Contact Esri

380 New York Street
Redlands, California 92373-8100 USA

1 800 447 9778
T 909 793 2853
F 909 793 5953
info@esri.com
esri.com

Offices worldwide
esri.com/locations