Methodology for State and County Total Housing Unit Estimates (Vintage 2009): April 1, 2000 to July 1, 2009

NOTE: These estimates include adjustments due to the effects of hurricanes Katrina and Rita. For a description of these adjustments, refer to Special Processing Procedures for the Areas Affected by Hurricanes Katrina and Rita at:
http://www.census.gov/popest/topics/methodology/.

The U.S. Census Bureau produces July 1 estimates of housing units for states and counties on an annual basis. These estimates are released to the public and are used as controls for some of the Census Bureau's surveys, such as the American Community Survey (ACS) and the American Housing Survey (AHS). We develop housing unit estimates for subcounty areas, our lowest level of geography – the state and county housing unit estimates are aggregations of these housing unit estimates. We then produce subcounty population estimates by a housing unit method using intra-county housing unit distributions to distribute county population to subcounty areas.

Overview

Housing unit estimates use building permits, estimates of non-permitted construction, mobile home shipments, and estimates of housing unit loss to update housing unit change since the last decennial census. Census counts of housing units are re-tabulated in current legal boundaries to form the housing base for the estimates.

Method

We produce updated housing unit estimates for each area using a component model of change. In this model we add together the Census 2000 count of housing units, estimated new residential construction (from April 1, 2000 to December 31, 2008), and estimated new residential mobile home placements (from April 1, 2000 to July 1, 2009). From this number we subtract the estimated residential housing loss from April 1, 2000 to July 1, 2009. We combine these data to produce a preliminary set of housing estimates, and after review, a final set. The final housing estimates also may reflect updates from the Federal-State Cooperative for Population Estimates (FSCPE) member agencies and local jurisdictions. Each component in the housing estimates is described below.

Census 2000 Housing Units

Census 2000 housing units compiled at the subcounty level reflect boundary updates that are legally effective as of January 1, 2009. The housing units also include the results of any Count Question Resolution (CQR) actions and geographic program revisions benchmarked in the Master Address File (MAF)/TIGER Database through May of 2009.

Estimated Residential Construction

Residential construction is by far the largest component in the residential housing estimates component model. We estimate new residential construction in two parts: estimates of permitted and non-permitted construction.

Permitted Construction

Building permits cover approximately 98 percent annually of the new housing units nationwide and include data from approximately 20,000 jurisdictions. The Census Bureau's Manufacturing and Construction Division (MCD) compiles the building permit data through its Building Permits Survey. The survey data provide the number of residential building permits reported in calendar years. We aggregate these data for all years from 2000 through 2008. Implicit in this method of selecting and applying permits for whole calendar years is an assumption of an average six-month lag time between when a residential permit is issued and when the residence is completed. Thus, permits that are reported in the first six months of the calendar year for which the mid-year housing estimates are being prepared are excluded in the current year estimates and included in the following year estimates. This method assumes that the building permits are allocated to the appropriate mid-year estimate.[1]

The permitted annual calendar year construction data are reduced by an incompletion rate obtained from the Survey of Construction (SOC) data. The rates are based on residential building permits that later are found to be abandoned or issued for a non-residential construction. The incompletion rate is derived by the number of such permits divided by the total number of building permits in the monthly Building Permits Survey. These rates vary by year and are likely to change each year as new SOC data are introduced. The current annual incompletion rates will reflect the percent of building permits that are issued in a given calendar year but do not result in the completion of housing units through July 2009.

Non-Permitted Construction

We compile estimates for areas of non-permitted residential construction based upon the

SOC data. The survey produces regional estimates of housing units constructed and ready for occupancy in jurisdictions that do not require building or zoning permits for residential construction ("non-permit" jurisdictions). No lag time is applied to these estimates. Within each region, we distribute each year's regional SOC estimate to the jurisdictions that did not issue permits for the corresponding calendar year, based on permit coverage information from MCD. We base the distribution of the regional non-permitted construction to non-permit jurisdictions based upon their share of the regional total of housing units enumerated as of Census 2000.

Combined Permitted and Non-Permitted Construction

Finally, we combine the estimates of non-permitted construction with the estimates of permitted construction to produce an aggregate set of estimated new residential construction. These housing units are expected to be available for occupancy between April 1, 2000 and July 1, 2009 for all jurisdictions nationwide.

Estimated New Mobile Home Placements

The Census Bureau does not have updated mobile home placement data reported at the subcounty level. However, we do acquire mobile home shipment data by state on a monthly basis from MCD. We sum these monthly reports to calculate a July through June total of state mobile home shipments. We then allocate the updated state mobile home shipment data to subcounty jurisdictions based on their share of state mobile homes estimated from Census 2000 sample data. We use the Type of Structure question on the sample questionnaire in Census 2000 to derive an estimate of residences that were mobile homes.[2]

Estimated Housing Loss

We calculate housing unit loss by applying an annual rate of loss to the previous year's housing unit estimate. The 2009 estimates of housing unit loss are based on updated data derived from the 1999-2007 American Housing Survey (AHS) national sample (these data are also for the July to June period each of year). The following three types of AHS housing situations are considered to represent permanent loss of a housing unit.

Type B, 16 -- Interior exposed to the elements
Type C, 30 -- Demolished or disaster loss
Type C, 31 -- House or Mobile Home moved

Annual housing unit loss rates based on these types of housing loss are then developed for housing units based on structure type and age of structure. Type C, 31 houses are excluded

before the final rate is computed. The rates for the categories are as follows:

Category	Rate
House, Apartment, or Flat built in	
1990-1999	0.033 percent
1980-1989	0.067 percent
1970-1979	0.109 percent
1960-1969	0.162 percent
1950-1959	0.245 percent
1940-1949	0.351 percent
Pre-1940	0.307 percent
Mobile Homes	1.137 percent
Other	0.249 percent

The type and age of housing units in Census 2000 for each jurisdiction are used to estimate its housing unit loss. The "Other" housing category includes a variety of situations not defined above, including boats, recreational vehicles, or other housing arrangements. No loss is applied to Housing Units built after 1999.

July 1, 2000 Estimates

We use ¼ of the 2000 permitted and non-permitted construction, mobile home placements, and housing loss to produce July 1, 2000 estimates. We assume these components adequately represent the amount of change in housing stock during the three-month period from April 1, 2000 to July 1, 2000.

Estimates Review

The housing unit estimates are produced in preliminary form and distributed to members of the FSCPE for review. Some FSCPE members provide revisions to the preliminary estimates of housing units based on information they compile from the jurisdictions within their respective states. Submitted revisions to the housing unit estimates are reviewed and result in improvements to the final housing unit estimates.

Estimates for Subcounty Population Estimates Production

The housing unit estimates with revisions are summed to obtain subcounty and county

housing unit totals. These estimates are then complete to use to prepare the subcounty population estimates.

Incorporation of Final Housing Unit Estimate Revisions

Localities that challenge the Census Bureau's population estimates have an option of using components of housing change data (residential, building permits, mobile homes, and demolitions) specific to their area. The revised housing component data used to support a revised population estimate are included in the final housing unit estimates. The challenge program is temporarily suspended until after the 2010 Census operations are complete. For more information, refer to

http://www.census.gov/popest/archives/challenges.html.

Preparation of the Final State and County Housing Unit Estimates

The final housing unit estimates are summed to the county, state, and national levels. This final set of estimates is complete for use as controls in selected Census Bureau surveys and for public dissemination.

[1] The basis for this approach is documented in http://www.census.gov/const/avg_starttocomp.pdf.

[2] The following steps describe the process we use to produce sample data consistent with the 100-percent housing unit data in current geography:

A. Each unit in the Sample Edited Detail File (SEDF) is matched to the geographically updated 100-percent Detail File (HDF) extract, by unit identification number.
B. The updated geographic codes from the HDF (higher level, census tract, and block) are applied to the SEDF records.
C. The sample data are re-tabulated with the sample weights for the primitive geographic areas into which they belong after the geographic update. (Note: Primitive geography describes a partition of the country into the lowest level of mutually exclusive entities that can be aggregated to all higher levels of geography for which the Census Bureau produces estimates.)
D. The sample data tallies in each primitive geographic area are multiplied by the ratio of housing units in the tabulation Census 2000 HDF to the housing units in the tabulation Census 2000 SEDF.
E. The results are aggregated to all estimates geography summary levels.