



Methodology for Housing Unit Historic Estimates and Projections

All calculations are anchored on 2010 block groups, the smallest available Census geography. To produce these housing unit historic estimates and projections we used county-level housing count data from the 1940-2010 decennial Census and block group housing characteristics from the 2007-2011 5-Year American Community Survey.

1. Methodology for Housing Unit Historic Estimates, 1940-2010

a. Standardize Block Group Housing Unit Characteristics to 2010 Census Count

Table B25034 (“Year Structure Built”) in the American Community Survey contains information on the decade in which a given housing unit was built. For each block group, this distribution was standardized to the 2010 Census count of housing units.

b. Historic Estimates and Adjustments

For each block group, housing units (HU) built between the historic estimating year (t-10) and current year (t) were subtracted from the current year total:

$$estHU_{BG,t-10} = HU_{BG,t} - HU_{Built}_{BG,(t-10)-t}$$

To prevent underestimation, the block group’s estimated share of county housing units was controlled to the historical Census 100% count of housing units.

$$c_estHU_{BG,t} = \left(\frac{estHU_{BG,t}}{estHU_{county,t}} \right) \times censusHU_{county,t}$$

This controlled estimate was used as the starting point for the next cycle of subtraction ($HU_{BG,t} = c_estHU_{BG,t}$).

2. Methodology for Housing Unit Projections, 2020-2050

a. Project County Housing Units, 2020-2050

Projections of larger, more populous areas tend to have higher accuracy, so we began our projections with an examination of various methods to project housing units at the county level.

After testing a variety of methods, we chose to use a linear extrapolation

methodology that incorporated the average change observed for each decade between 1970 and 2010.

- i. The average decadal change (ADC) in housing units between 1970 and 2010 was calculated for each county:

$$ADC_{county} = \frac{HU_{county,2010} - HU_{county,1970}}{4}$$

The ADC represents the average number of housing units added per decade over the past 40 years.

- ii. We used the ADC to project county housing units for 2020, 2030, 2040, and 2050 by the formula:

$$HU_{county,t+10} = ADC_{county} + HU_{county,t}$$

b. Project Block Group Housing Units, 2020-2050

We projected block group housing units by applying the block group's share of county housing units in 2010 to the county's projected total housing units for 2020-2050.

$$HU_{BG,t} = \left(\frac{HU_{BG,2010}}{HU_{county,2010}} \right) \times HU_{county,t}$$

Acknowledgments

The methodology employed in this analysis draws upon work by Hammer et al.:

2004 Hammer, Roger B., Susan I. Stewart, Richelle L. Winkler, Volker C. Radeloff, and Paul R. Voss. "Characterizing Dynamic Spatial and Temporal Residential Density Patterns from 1940-1990 across the North Central United States." *Landscape and Urban Planning*, 69(2-3): 183-99.

Contact Information

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