

# Methods for the Intercensal 2000-2010 Alaska Population Estimates (Vintage 2010)

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## **Introduction**

The Alaska Department of Labor and Workforce Development, Research and Analysis Section (AKDOL), has produced “intercensal” 2000-2009 population estimates for Alaska and its boroughs/census areas and cities/census designated places. These intercensal estimates are distinct from other estimates products in that they take into account information from both the 2000 and 2010 Censuses to improve the time series of annual numbers back to 2000. All of the intercensal estimates are consistent with 2010 Census geography. Data by age and sex is provided for the state as well as all boroughs/census areas.

## **Total Population Estimates**

Production of the intercensal total population estimates began with adjustment of 2000 Census counts by borough/census area and city/census designated place (CDP) to match 2010 Census geography, based on comparison of census blocks (the smallest geographic areas in the 2000 and 2010 Censuses), and data from the U.S. Census Bureau (USCB) Population Estimates Program. Differences between 2010 Census household population counts and “postcensal” household population estimates (2000 Census-based, using the standard AKDOL methodology along with adjustments for geography changes) provided “errors of closure” for each area, which were used for the annual intercensal adjustments.

To apply the adjustments to the annual estimates for each area a standard intercensal adjustment formula for total population was used ([2]):

$$P'_y = (C_c / E_c)^{1/n} * P_y$$

Where

- $P'_y$  is the intercensal estimate for year  $y$
- $C_c$  is the decennial census count for 2010
- $E_c$  is the postcensal estimate for 2010
- $n$  is the number of years between censuses
- $P_y$  is the original postcensal estimate for year  $y$

Group quarters numbers were then added and cities/census designated places were adjusted to sum to their respective borough/census area. The adjustments were applied to the net migration component of population change.

The 2010 Census had much larger counts for the North Slope Borough “group quarters” (shared living areas such as dormitories) population than past censuses. This is primarily due to 2010 Census counts of

employees at remote worksites in the borough, which were not counted in past censuses. It leaves a substantial increase in the North Slope Borough numbers between the 2009 intercensal estimate and the 2010 Census. Group quarters counts within Northwest Arctic Borough around Red Dog CDP, and Southeast Fairbanks census area around Big Delta CDP shifted in location.

### **Population Estimates by Age, Sex, Bridged Race and Hispanic Origin**

Intercensal population estimates by age, sex, bridged race, Hispanic origin (of any race), and borough/census area were developed with a combination of data from AKDOL, USCB, and the National Center for Health Statistics (NCHS).

“Bridged” race estimates are race estimates that adjust data from surveys which allow reporting of more than one race group (such as the 2000 and 2010 Censuses) such that each respondent is assigned a single race. Single-race tabulations are in keeping with data from other sources, including the Alaska Bureau of Vital Statistics.

The intercensal estimates by age, sex, and borough/census area utilized 2000 and 2010 Census data by age, sex, and borough/census area along with geographic adjustments for the 2000 Census data to match 2010 Census geography. The 2000 Census population was aged forward in time with a cohort component method ([1]) along with data on births, survival and migration. The net migration component was controlled with a “plus-minus” method ([1]) and a residual profile from the errors of closure. The boroughs/census areas were finally adjusted with “iterative proportional fitting” ([1]) to sum to exactly to respective borough/census area totals as well as the statewide estimates by age and sex.

2000-2009 bridged race and Hispanic origin data by age, sex, and borough/census area were then downloaded from NCHS ([3]) and adjusted with iterative proportional fitting to match the intercensal 2000-2009 AKDOL age, sex, borough/census area estimates. These race estimates by age, sex, and borough/census area were then extrapolated from July 2009 to April 2010, compared to April 2010 estimates built on ratios of 2009 NCHS bridged to 2009 USCB race-alone estimates ([5]) and iterative proportional fitting, and the entire series of these characteristics was then adjusted with the standard intercensal adjustment formula ([2]) to land on the ratios-based estimates. April 2010 Hispanic origin estimates by age, sex, and borough/census area were separately extrapolated from July 2009, compared to 2010 Census, and also adjusted with the standard intercensal adjustment formula. Finally, iterative proportional fitting was used to match everything to the AKDOL estimates by age, sex, and borough/census area, and this completed the preliminary intercensal estimates.

Final April 2010 bridged race and Hispanic origin data by age, sex, and borough/census area subsequently became available from NCHS ([4]) (intercensal are not available at this time), and these were compared to the AKDOL preliminary April 2010 bridged race and Hispanic origin estimates by age, sex, and borough/census area. The entire time series of characteristics was then adjusted with the standard intercensal adjustment formula to land on the final April 2010 data from NCHS. Lastly, these data were adjusted once more with iterative proportional fitting to exactly match the 2000-2009 AKDOL estimates by age, sex and borough/census area.

### **References**

[1] Smith, S., Tayman, J., and Swanson, D. (2001). *State and Local Population Projections: Methodology and Analysis*. Kluwer Academic/Plenum.

[2] Swanson, D. and Siegel, J. (2004). *The Methods and Materials of Demography, Second Edition*. Elsevier Science and Technology Books.

[3] National Center for Health Statistics. Postcensal estimates of the resident population of the United States for July 1, 2000-July 1, 2009, by year, county, age, bridged race, Hispanic origin, and sex (Vintage 2009). Prepared under a collaborative arrangement with the U.S. Census Bureau; released June 20, 2010. Available from: [http://www.cdc.gov/nchs/nvss/bridged\\_race.htm](http://www.cdc.gov/nchs/nvss/bridged_race.htm) as of July 23, 2010.

[4] National Center for Health Statistics. Estimates of the April 1, 2010 resident population of the United States, by county, single-year of age (0, 1, 2, ..., 85 years and over), bridged race, Hispanic origin, and sex. Prepared under a collaborative arrangement with the U.S. Census Bureau; released November 3, 2011. Available from: [http://www.cdc.gov/nchs/nvss/bridged\\_race.htm](http://www.cdc.gov/nchs/nvss/bridged_race.htm) as of November 17, 2011.

[5] U.S. Census Bureau. Postcensal estimates of the resident population of the United States for July 1, 2000-July 1, 2009, by year, county, age, race alone, Hispanic origin, and sex (Vintage 2009). Available from: <http://www.census.gov/popest/data/counties/asrh/2009/index.html> as of February 12, 2012.