

Demographic Research Unit

California Population Estimates: Use of Administrative Data to Estimate Migration Flows in Fires Impacted Areas

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Panel Overview

- State and County Population Estimates Methods.
 - DLAC method
 - Ratio-Correlation Method
- Sub-County Population Estimates Method.
- Data sources
- Adjustment for the HU lost due to fire
- Future research topics



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Population Balancing Equation

- Last Year's (revised) Population
- + Births
- + Domestic In-Migrants
- + International Immigrants
(authorized and unauthorized)
- - Deaths
- - Domestic Out-Migrants
- - Emigrants
- = Current Population
- California January 2019 Population Estimates



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State & County Population Estimation Methods

- State
 - Driver License Address Change (DLAC) Model
- Counties
 - Modified DLAC Model
 - Ratio-Correlation Model
 - Tax Return Model



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Driver License Address Change (DLAC) Model

- Cohort-Component Method
 - Cohorts
 - 0-17
 - 18-64
 - 65+
 - Components
 - Births
 - Deaths
 - Net Migration



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County Estimates: Modified DLAC Model

- This model is very similar to the DLAC model just described for the state population estimate.
- The county model adds a measure of county-to-county migration within California.



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Data for 65+ Components

- Census 2010 baseline population
- No births to add to this cohort
- Actual or estimated deaths
- Medicare and Medi-Cal Program Enrollments
- International Immigrants.



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Data for 0-17 Components

- Census 2010 baseline population
- Actual or estimated births
- Actual or estimated deaths
- Public school enrollment in grades 1-8 and elementary ungraded
- International immigrants.



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Data for 18-64 Components

- Census 2000 baseline population
- No births to add to this cohort
- Actual or estimated deaths
- Driver license address change (DLAC) data
- Migration data from the Internal Revenue Service
- Immigration (legal, unauthorized, emigration)
- Group quarters population data



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Ratio-Correlation Method

- Multiple regression model using benchmark data from the last two recent Censuses.
- The ratio-correlation model predicts changes over the intercensal period of 2000 and 2010 and the post-censal period in all counties from the state's total.
- For California, independent variables are: Births, school enrollment in grades I through 8, total numbers of driver license, total civilian labor force, and number of housing units.
- The model is controlled for areas with small population (less than 65,000 people) and counties with prison/college dorm population.



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Ratio-Correlation Method (continued)

- Regression model for household population:

$$P_{i,t} = -0.057 + 0.076*B + 0.233*E + 0.307*DL + 0.131*LF \\ + 0.312*HU - 0.008*S - 0.008*GQ$$

Where:

$P_{i,t}$ = estimated population ratio

B = total number of births

E = School enrollment for grades 1 to 8

DL = Total counts of outstanding driver license.

LF = total civilian labor force

HU = total housing units

S = dummy variable for counties with population size less than 65,000 people

GQ = dummy variable for counties with prison/college dorm.



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Data Sources for Population Estimates

State Agencies

- Health Care Services
- Public Health
- Motor Vehicles
- Education
- Employment Development
- Corrections
- Mental Health
- Developmental Services
- UC and CSU Systems
- Veterans Affairs

Federal Agencies

- Internal Revenue Service
- Centers for Medicare & Medicaid Services
- Department of Defense
- Federal Bureau of Prisons
- Department of Labor
- Veterans Affairs
- Department of Homeland Security
- Census Bureau



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Special Adjustment for Camp Fire Migration

- Camp fires burned down 14,700 housing units in Butte county in November-December 2018.
- January 2019 estimates use data in December 2018 and most of our annual data sources didn't capture migration flow from the fire impacted areas.
- Housing unit loss was captured from DRU housing unit survey 2019.



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Adjustment for Campfire Migration

Background of the issue:

- The fire was active from November to December 2018.
- At the time of the estimate period (December 2018), the campfire was still active.
- Everyone was evacuated from the fire zone and lived in temporary locations.
- Residents weren't allowed to get back to the town of Paradise until early January 2019.



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Adjustment for Campfire Migration (continued)

- Data for DLAC model did not report high migration flow out of the campfire areas to other states/counties.
 - School enrollment didn't report any data of kid's moving to a new location.
 - MediCare and MediCal data didn't update the change of address from the county in February for December enrollment data.
 - Driver license change of address reported modest increase of migration flow from/to Butte county compared to the period year.
 - Minimal update on group quarter movement in the area.



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Adjustment for Campfire Migration (continued)

- Ratio-Correlation model:
 - Housing unit survey from the DRU reported significant housing unit (HU) loss in Butte county.

Total housing units in January 2019:	85,447
New construction:	745
Fire destroyed HU:	14,651
Net change in HU:	-13,906



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Adjustment for Campfire Migration (continued)

County-level adjustment:

- Establish migration flow to/from Butte county using the DLAC data from the DMV.
- Estimates total population of Butte county in Ratio-Correlation (RC) model using all housing units including the fire destroyed units.
- Apply data from the net DLAC migration flow to the county estimates.
- Compare the data with surveys from the local authorities and make adjustment for group quarters data.



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Adjustment for Campfire Migration (continued)

January 2019 Population Estimate for Butte county:

Total population: 226,466

Total population without special adjustment: 224,063

Net migration from Butte to other states: 427

Net Migration from Butte to other CA counties: 1,635

Change from Jan 18 to Jan 19:

	with adjustment	without adjustment
Numeric	1,430	3,833
Percentage	-0.63%	-1.68%



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- City Population and Housing Estimates



Housing Unit Method

- Sub-County Estimates use a Housing Unit Method (HUM)
 - Population and Housing are benchmarked to the 2010 Census
 - Net change in housing units by type are collected through surveying all 482 cities and 57 unincorporated areas in California
 - A Census vacancy rate and person per household are applied to yield a household population
 - The household population is controlled to the independently calculated county population
 - Finally, the group quarters estimate is added to give a total population for each jurisdiction



The 2018 Camp Fire in Butte County

- The Camp Fire in Butte County was the most destructive and deadliest wildfire in state history
 - 154,000 acres burned
 - 14,700 housing units lost
 - 85 fatalities



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Estimating City Population in Disaster Zone

- How can the Housing Unit Method be used to accurately estimate the population in a disaster zone?
- Challenges to estimating...
 - Total available housing
 - Occupancy Rates
 - Persons per household



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Identifying the Displaced Population

- How many people were displaced due to the loss of their homes in the wildfire?
 - The jurisdiction's occupancy rate and persons per household was applied to the number of housing units destroyed
 - The Town of Paradise estimated ~ 21,000 (83 percent)
 - Unincorporated Butte County estimated ~ 4,000 (4 percent)



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Three Options for Displaced Population

- First, displaced residents can occupy previously unoccupied rental and seasonal units.
 - This is represented in a decrease in the Vacancy Rate.
- Second, displaced residents may “double up” by moving into the homes of friends and family.
 - This is represented in an increase in the Persons Per Household in occupied housing.
- Third, displaced residents may seek out temporary housing from a variety of sources.
 - Options include: emergency shelters, trailers, RVs, and tents.



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Results of January Estimates in Butte County

- Incorporating the options for displaced population and in coordination with local jurisdictions an initial estimate of the displaced population is as follows
 - Chico added 19,250 residents (21 percent)
 - Oroville added 3,682 residents (20 percent)
 - Gridley added 303 residents (4 percent)
 - Biggs added 172 residents (9 percent)



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Future Research Topics

- Postal Change of Address data file
- Student level data on school enrollment and exit.
- FEMA data for Campfire area.



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California Estimates and Projections Reports

<http://www.dof.ca.gov/Forecasting/Demographics/Estimates/>

- E-1 Annual Percent Change
- E-4 Historical Population Estimates
- E-5 Population and Housing Estimates
- E-8 Historical Population and Housing Estimates
- County Estimates Reports
 - E-2 California County Estimates and Components of Change by Year
 - E-6 Population Estimates and Components of Change by County
 - E-7 Population Estimates, with Components of Change and Crude Rates



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California Estimates and Projections Reports

• <http://www.dof.ca.gov/Forecasting/Demographics/Projections/>

- Projections Reports
 - State and County Projections by Race, Age, and Gender
 - K-12 Enrollment Projections by County
 - State and County Birth and Fertility Rate Projections by Age and Race



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