



Year-to-Year Changes in County-to-County Commute Patterns Lessons from the American Community Survey Public Use Microdata Sample

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Start with the Full One-Year ACS Data from American FactFinder!

- **Table B08007: County-of-Residence, Intra-County, Intra-State, Total Resident Workers**
- **Table B08501: County-of-Work (i.e., the Workplace County)**
- **Table B08008: Place-of-Residence, Intra-Place, Total Resident Workers**
- **Table B08501: Place-of-Work (i.e, Workplace City/CDP)**
- **Annual ACS Sample Size = 1.45% to 1.78%**

Use the 5-Year ACS and Older Decennial Data, Too

- 2009-2013 5-Year ACS County-to-County Commuting Flows
- 2006-2010 5-Year ACS County-to-County Commuting Flows
- Census 2000
- Census 1990
- Census 1980 (from your agency's UTPP)
- Census 1970 (from your agency's UTP)
- <https://www.census.gov/topics/employment/commuting/guidance/flows.html>
- Or search on “Guidance for Commuting Data Users: Commuting Flows”

The One-Percent, Annual Public Use Microdata Sample (PUMS)

- **PUMA = Residence PUMA (Defined Areas of 100,000+ Population)**
- **POWPUMA = Place-of-Work PUMA**

- **ACS PUMS 2005-2011 = Census 2000-based 5% PUMAs**
- **ACS PUMS 2012-2016 = Census 2010-based PUMAs**

- **Need to concatenate State+POWPUMA codes (Many POWPUMAs “100” in the USA!)**

California PUMAs and POWPUMAs

Which Census?	ACS Years	PUMAs-of-Residence	POWPUMAs-of-Work
Census 2000	2005-2011	233	71
Census 2010	2012-2016	265	41

- **58 California Counties**
- **24 Counties in Seven (7) Multi-County PUMAs**
- **34 Counties with one-of-more PUMAs**
- **Goal = Produce a 41-to-41 matrix of county/ies-to-county/ies**

San Francisco Bay Area PUMAs and POWPUMAs

Which Census?	ACS Years	PUMAs-of-Residence	POWPUMAs-of-Work
Census 2000	2005-2011	54	9
Census 2010	2012-2016	55	9

- **MTC/ABAG/Local Planners designed the Bay Area PUMAs with encouragement from the California State Data Center (SDC)**

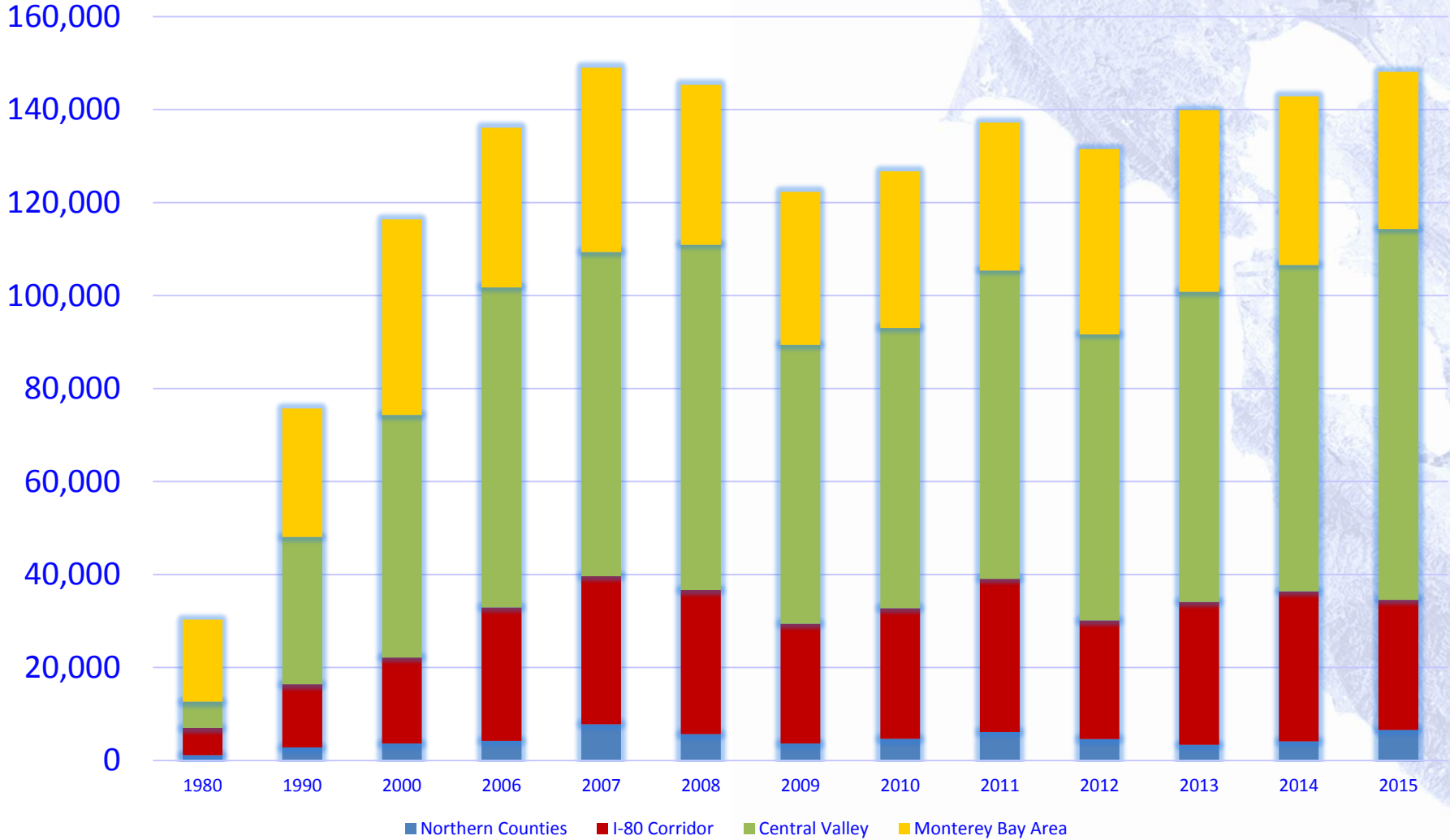
Los Angeles County POWPUMAs

- **Census 2000:** Thirteen (13) POWPUMAs in Los Angeles County:
 - Lancaster City, Palmdale City, Santa Clarita City, El Monte City, Pomona City, East Los Angeles CDP, Inglewood City, Torrance City, Long Beach City, West Covina City, Downey City, Norwalk City, and “Balance of Los Angeles County” (i.e., Los Angeles City and other unincorporated and incorporated places.)
- **Census 2010:** One POWPUMA in Los Angeles County!!!

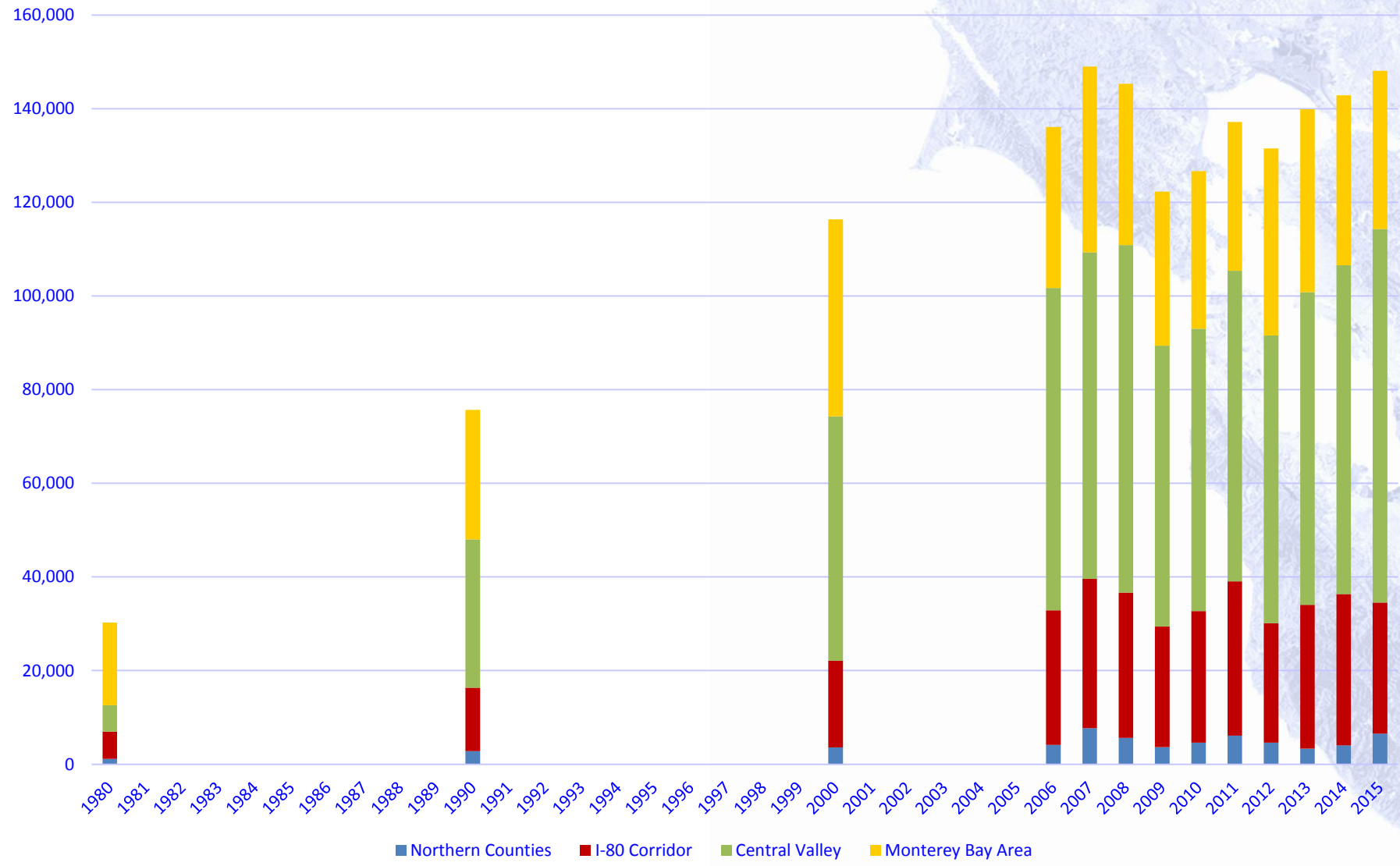
Focus on San Francisco Bay Area

- **Intra-Regional (9 by 9) Commuting: 1970-2016**
- **Inter-Regional (18 by 18) Commuting: 1980-2016**
 - Inter-regional county-to-county commuting first available in the 1980 UTPP
 - Inter-regional tract-to-tract commuting first available in the 1990 CTPP
- **Bay Area Counties:**
 - San Francisco, San Mateo, Santa Clara, Alameda, Contra Costa, Solano, Napa, Sonoma, Marin
- **Bay Area Neighbor Counties:**
 - Mendocino+Lake, Yolo, Placer, Sacramento, San Joaquin, Stanislaus, Merced, Monterey+San Benito, Santa Cruz

Total Workers In-Commuting to the San Francisco Bay Area, 1980-2015



Total Workers In-Commuting to the San Francisco Bay Area, 1980-2015



Replicate Weights in PUMS to Estimate Standard Error (SE) and Coefficient of Variation (CV)

- **PWGT = Person Weight in PUMS**
- **PWGT1 through PWGT80 = Replicate Weights in PUMS**
- **Previous PUMS didn't have replicate weights!**
- **Sum up the PWGT, PWGT1-PWGT80 in standard stat package**
- **Calculate other variables in spreadsheets**

Key Statistics to Keep!

- **Estimate (e.g., Total Workers)**
- **Sample Size**
- **Average Weight (Estimate / Sample Size)**
- **Sum of Squared Differences, PWGT less PWGT<n>**
- **Variance = previous calculation * 4, then divided by 80**
- **Standard Error = Square Root of Variance**
- **Coefficient of Variation = Standard Error divided by Estimate**
- **Margin of Error, 90% or 95%**

Inform Readers about Small Sample Sizes!

- **If Coefficient of Variation is High, say, > 0.15 , then flag:**
 - **Conditional Formatting**
 - **Footnoting: “Values are Based on Very Small Sample Sizes. Analyze with caution.”**
- **If CV is too high, then consider collapsing the data:**
 - **Group counties into corridors, and re-calculate estimates, standard errors and coefficient of variation**
 - **There are better “stories to tell” by collapsing data into corridors!**

Know Your Waffle / Weasel Words?

- **YES**
 - **Very small sample size (i.e., accurate but imprecise)**
 - **Rare behavior**
 - **Proceed with caution**
 - **Warm but fuzzy**
- **NO**
 - **Unreliable**
 - **Inaccurate**
 - **Bad**
 - **Do Not Use**

Conclusions: County-to-County Commute Flow with PUMS

- **Is it right for you?**
 - **Great for large metropolitan areas with large (100,000+) population counties!**
 - **Great for large commuting flow trends:**
 - **Trans-Hudson River Commuters to New York**
 - **Borough-to-Borough in New York City**
 - **Trans-Potomac River Commuters to Washington, DC**
- **Standard Errors are High with the 1% PUMS**
 - **Be wary of flow cells with high CVs, say, > 0.15**

Conclusions: Have a Story to Tell....

- <https://censusmaven.wordpress.com/>
- **Commuting to Silicon Valley (blog post)**
 - <https://censusmaven.wordpress.com/2017/09/07/commuting-to-silicon-valley-part-2/>