

Demographic Findings of the 2010 Census Demonstration Product

Committee on National Statistics

December 11 – 12, 2019

Matthew Spence, Population Division
Marc Perry, Population Division

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Special thanks to Lydia Anderson, David Armstrong, Karen Battle, Laura Blakeslee, Christine Borman, Evan Brassell, Christine Burton, Michael Commons, Molly Cromwell, Jason Devine, James Fitzsimmons, Stephanie Galvin, Christine Hartley, Jacquelyn Harth, Eric Jensen, Colleen Keating, Alexandra Krause, Rose Kreider, Daphne Lofquist, Paul Mackun, Rachel Marks, Chris Mazur, Julie Meyer, Caleb Miller, Jeffrey Ocker, Megan Rabe, Roberto Ramirez, Michael Ratcliffe, Merarys Rios, Andrew Roberts, Zachary Scherer, Jonathan Spader, Danielle Taylor, Dave Waddington, Steven Wilson, et al.

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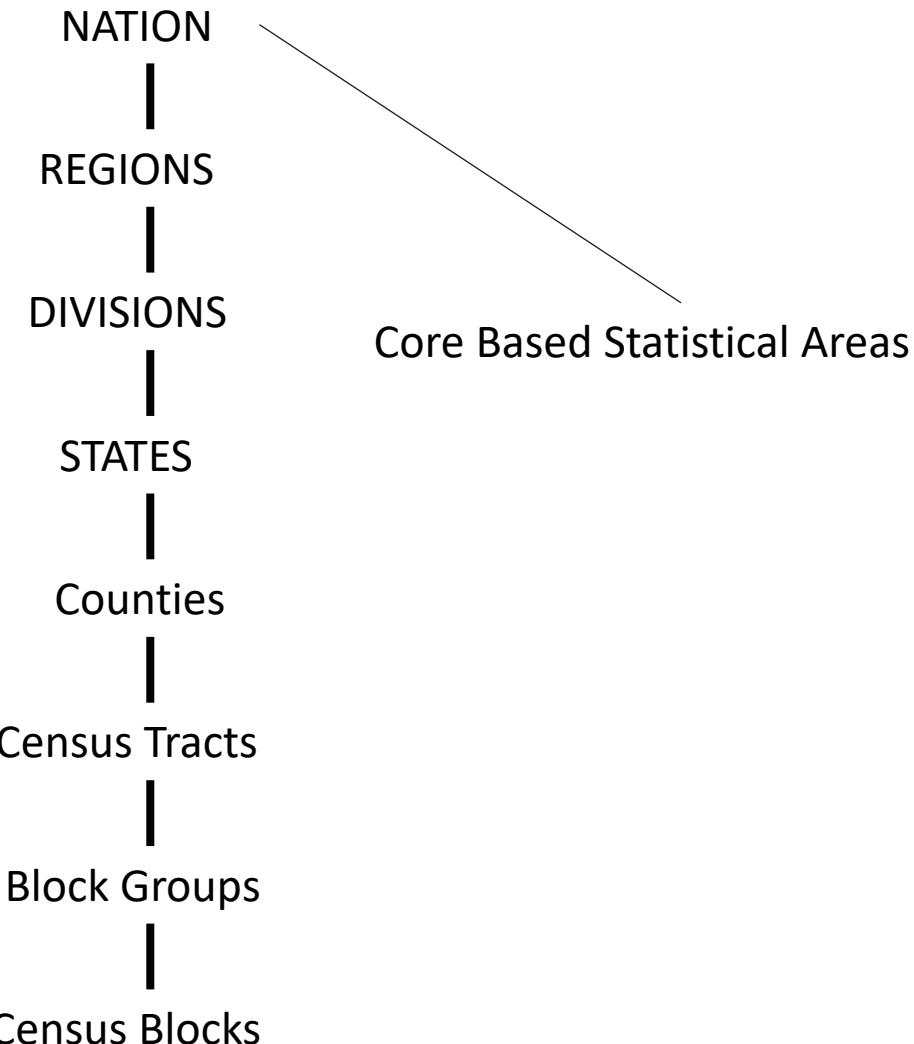
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Introduction – Outline of Our Talk

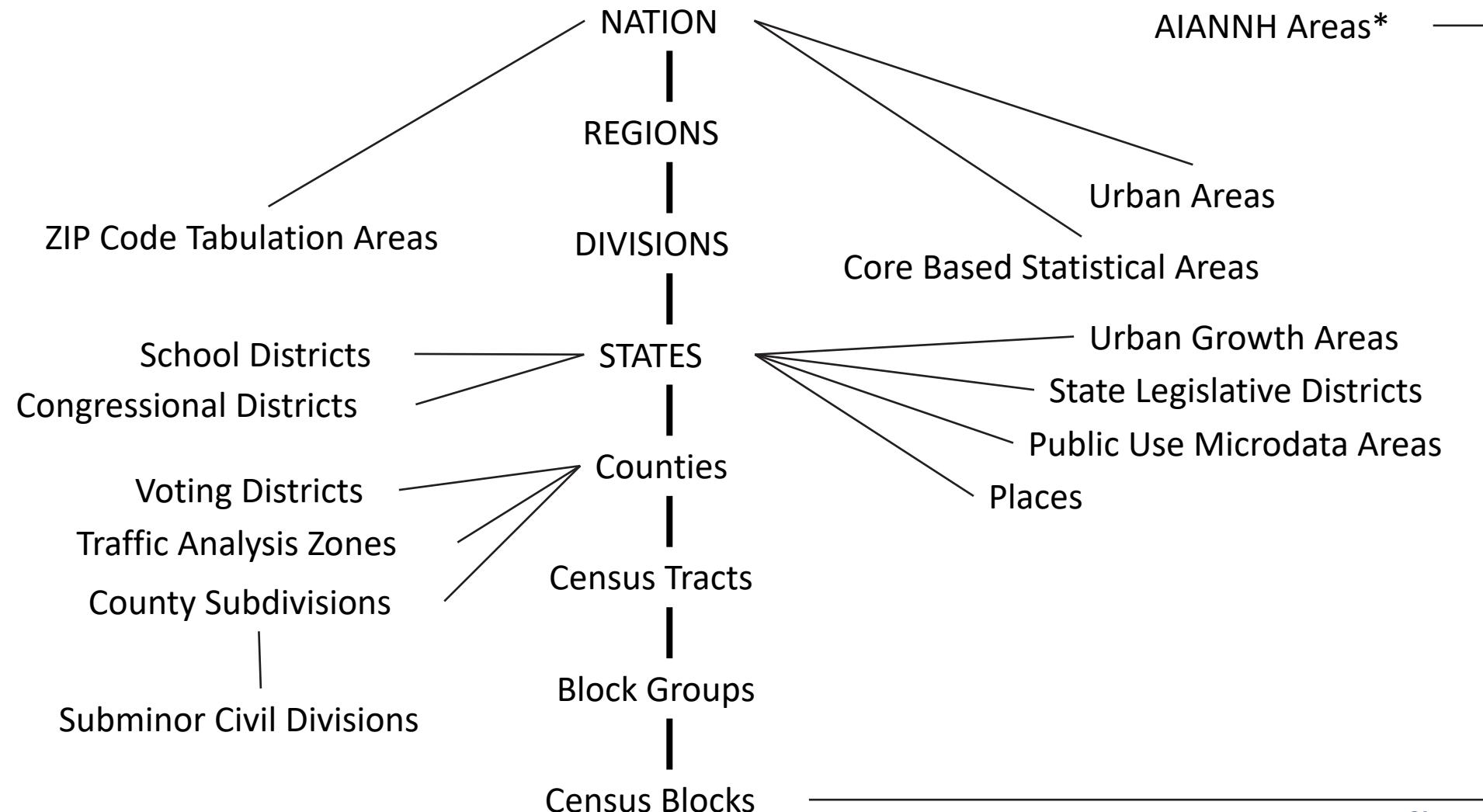
1. Introduction
2. Geography
3. Characteristics
4. Observations

Geography

Census Bureau Geographic Hierarchy



Including Non-Hierarchical Geographies

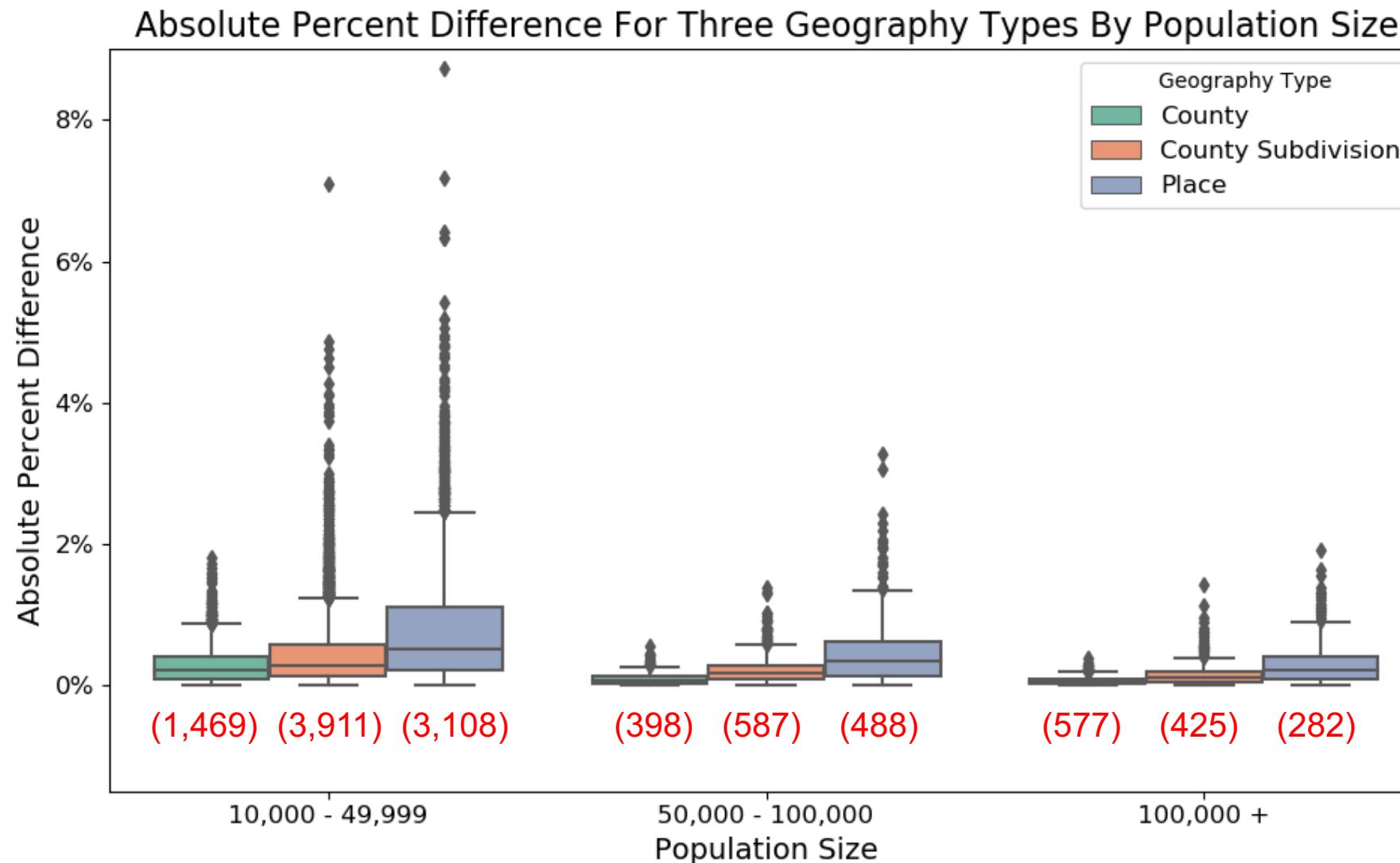


Total Population: Hierarchical Geographies

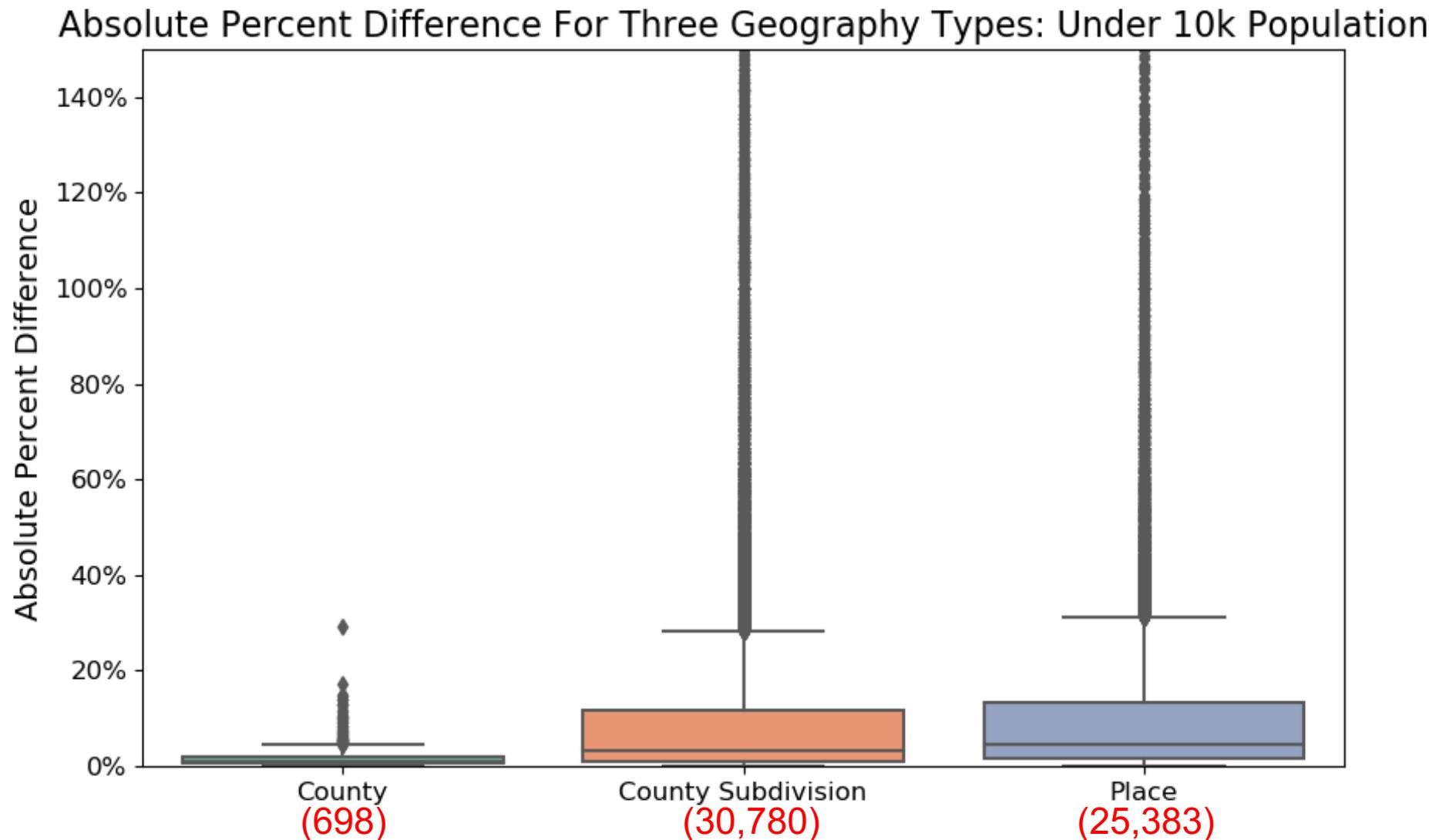
	Blocks	Blocks with Nonzero Population	Block Groups	Tracts	Counties
Median	6%	36%	1.2%	0.5%	0.2%
25 th Percentile	0%	13%	0.5%	0.2%	0.1%
75 th Percentile	46%	100%	2.2%	1.0%	0.5%
95 th Percentile	275%	560%	4.8%	2.3%	2.3%

Absolute Percent Differences

Total Population: Non-Hierarchical



Total Population: Non-Hierarchical



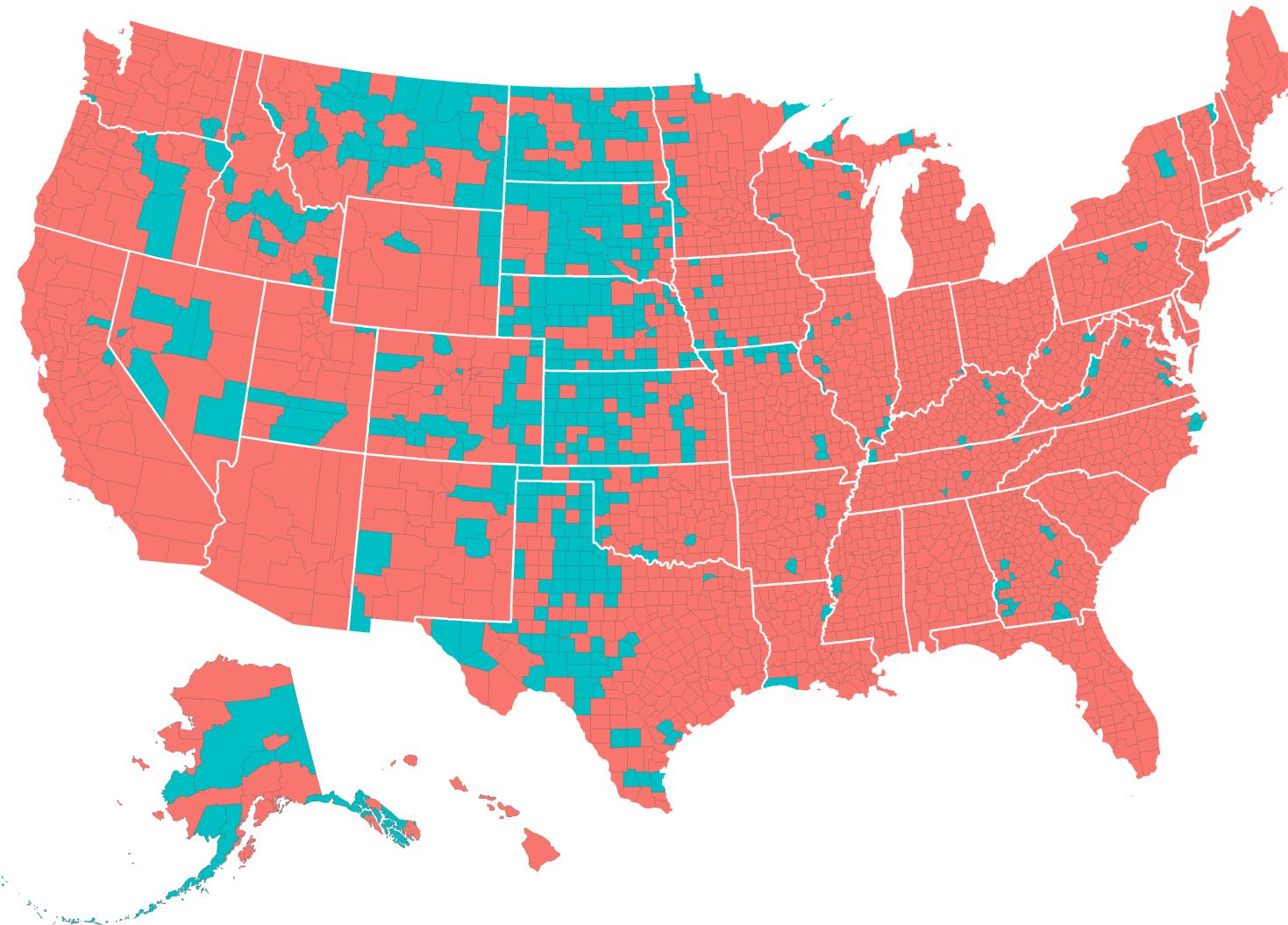
Total Population: Smaller Counties

Of the country's 3,143 counties, 500 have a population below 7,500.

	Counties Below 7,500
Median	1.4%
25 th Percentile	0.67%
75 th Percentile	2.6%
95 th Percentile	7.6%

While this is only 16% of counties nationwide, it is a majority in states such as North Dakota, South Dakota, Nebraska, Alaska, and Kansas.

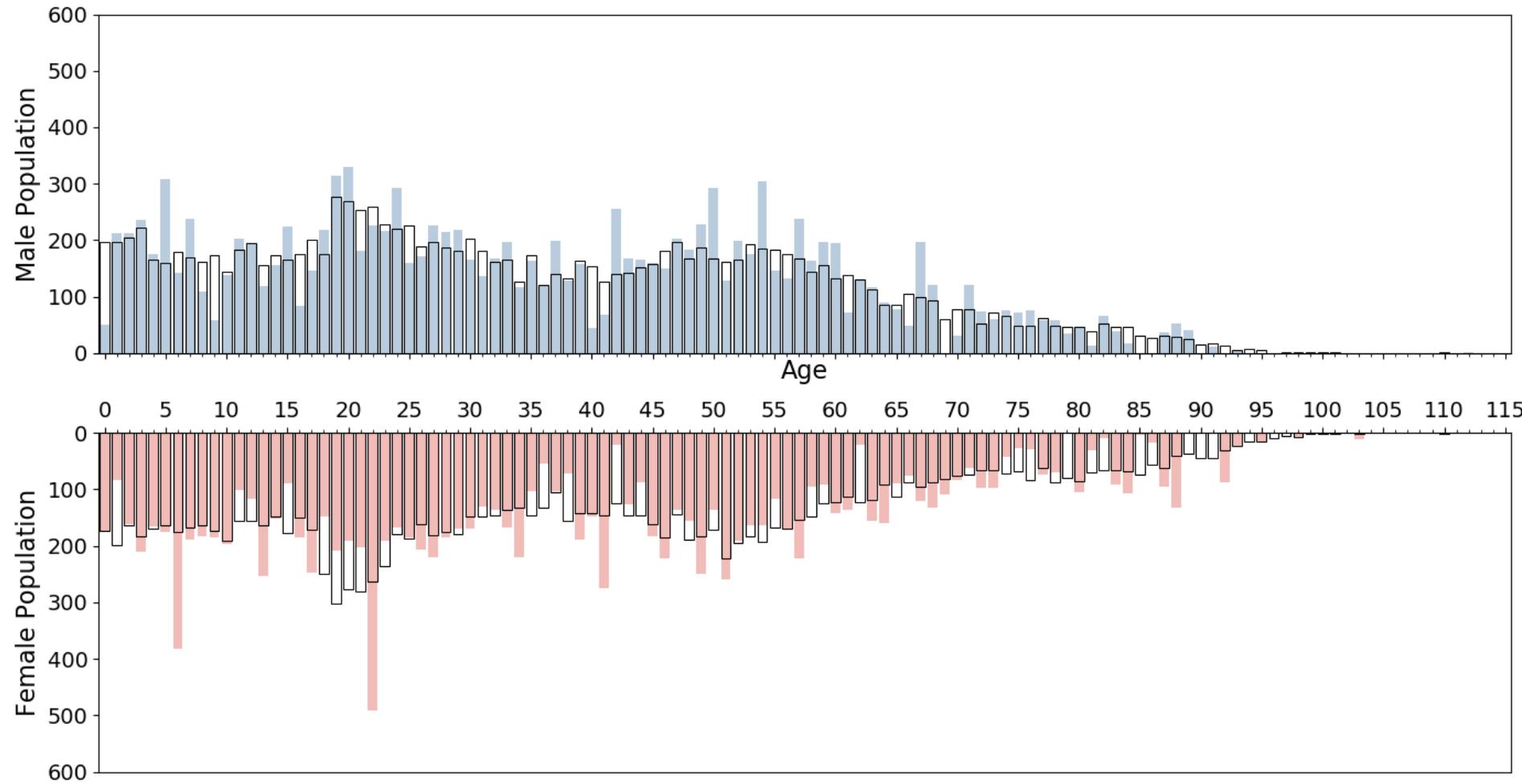
Counties Below 7,500 Total Population



Characteristics

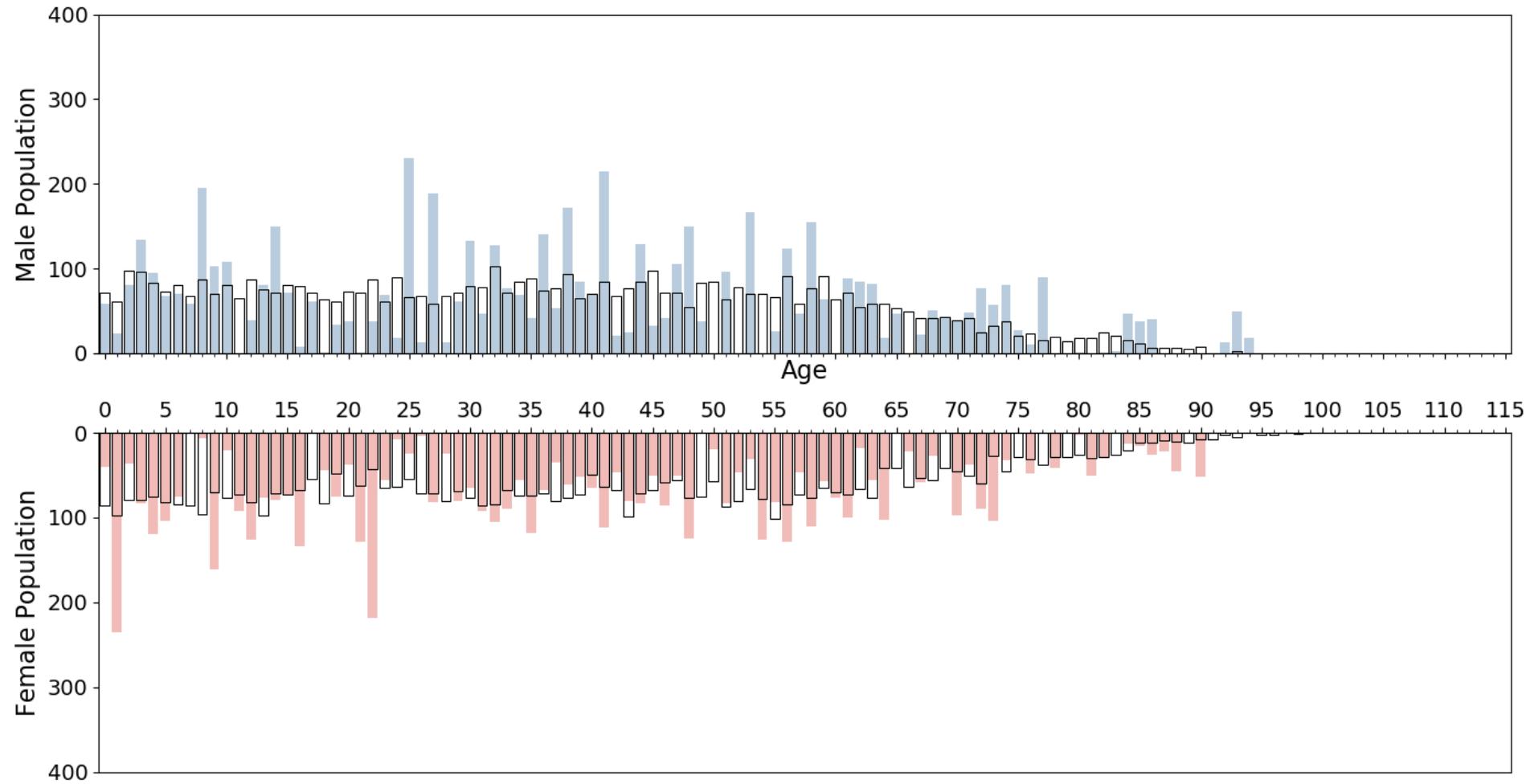
Age & Sex: Median County

Population Pyramid for Lyon County, Minnesota



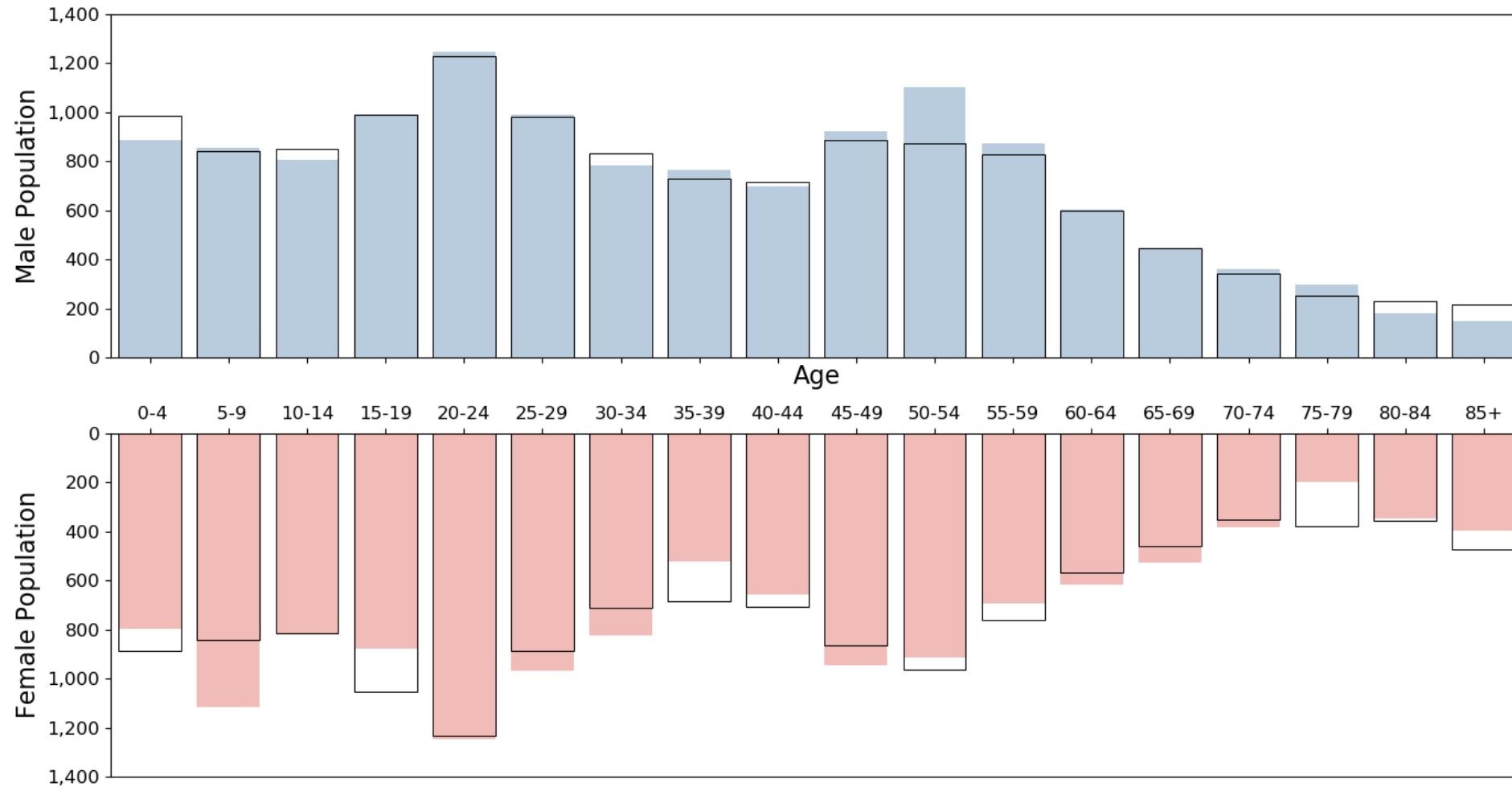
Age & Sex: 25th Percentile County

Population Pyramid for Bacon County, Georgia



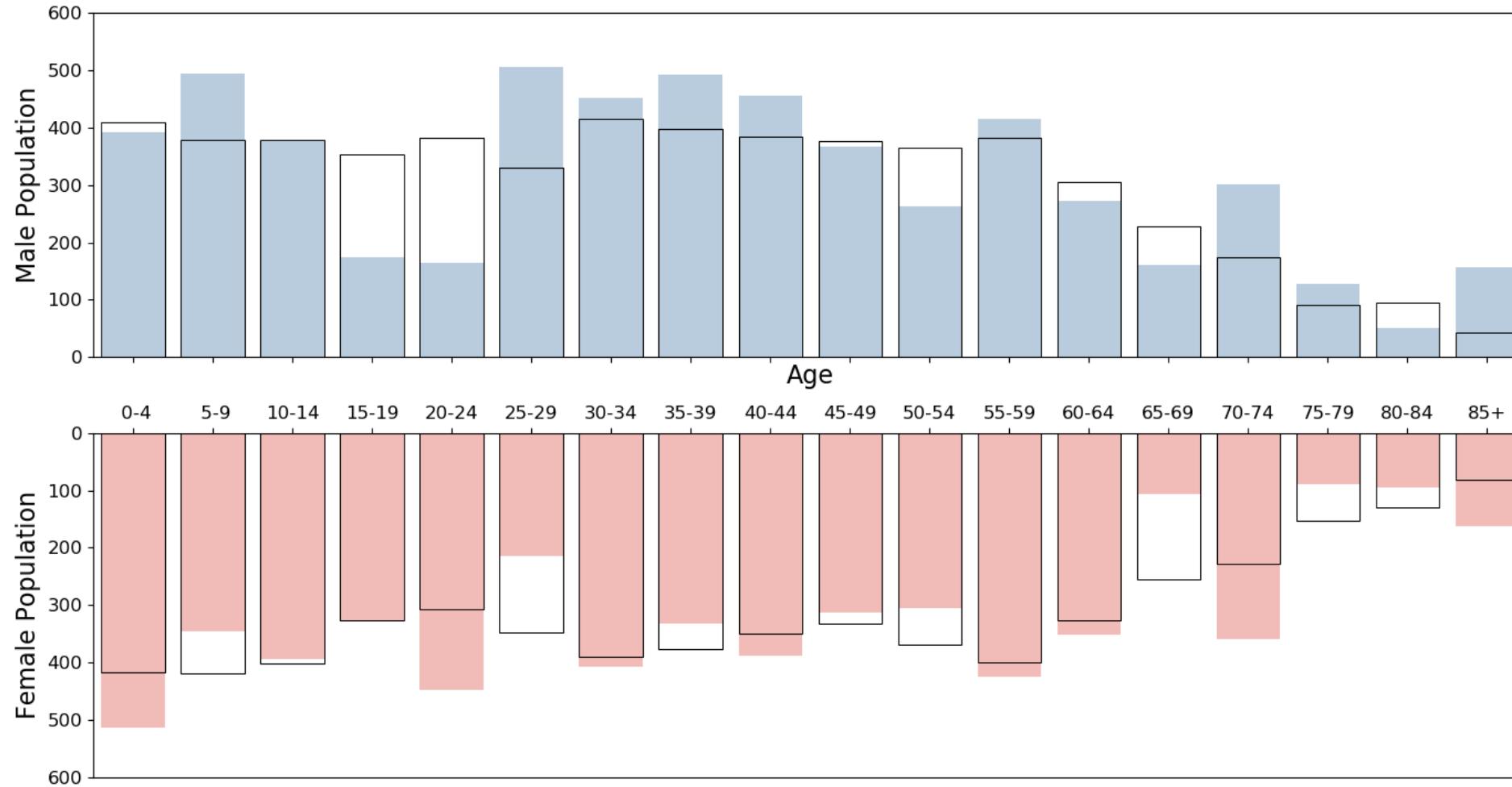
Age & Sex: Median County, 5-Year

Population Pyramid for Lyon County, Minnesota



Age & Sex: 25th Percentile County

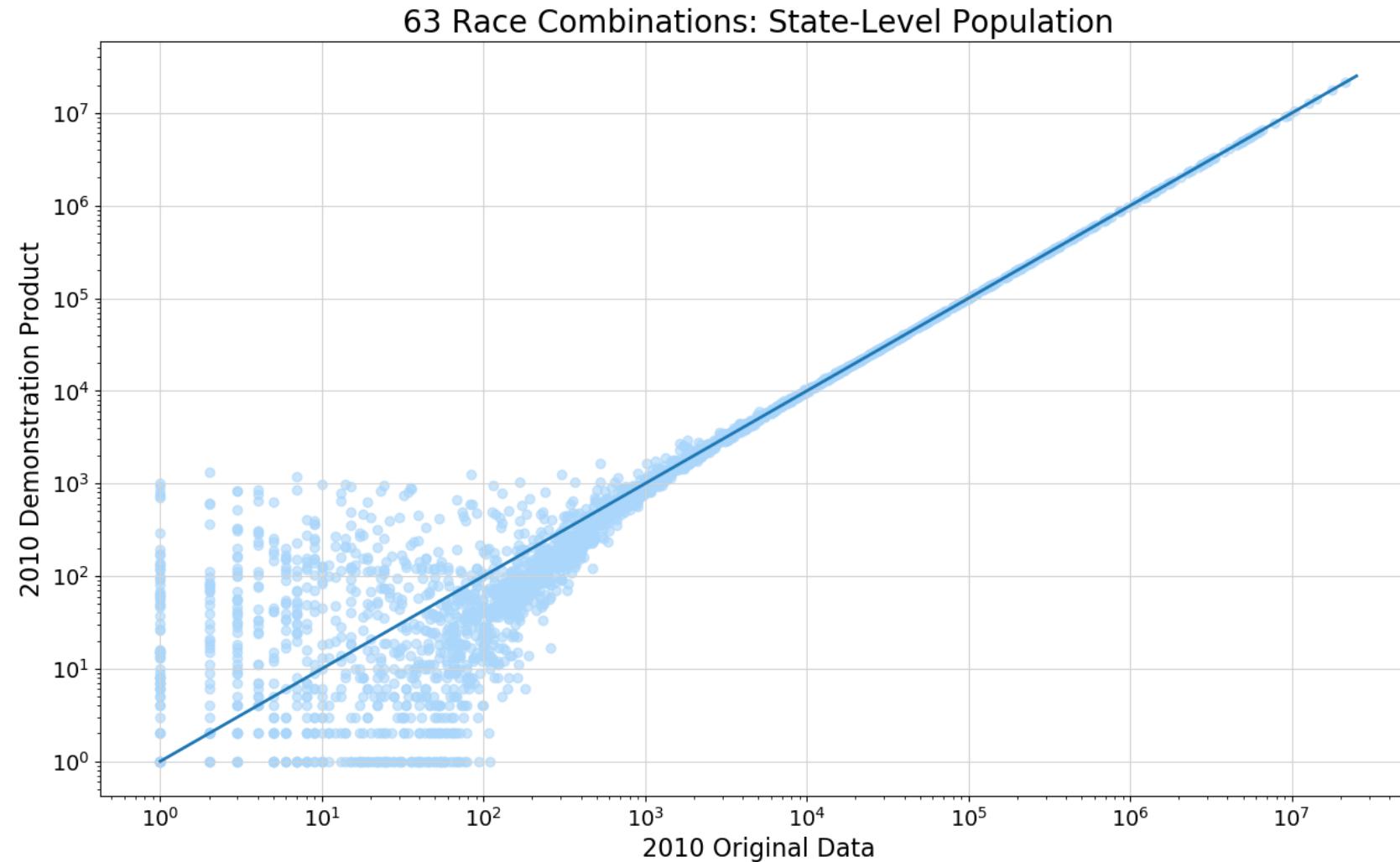
Population Pyramid for Bacon County, Georgia



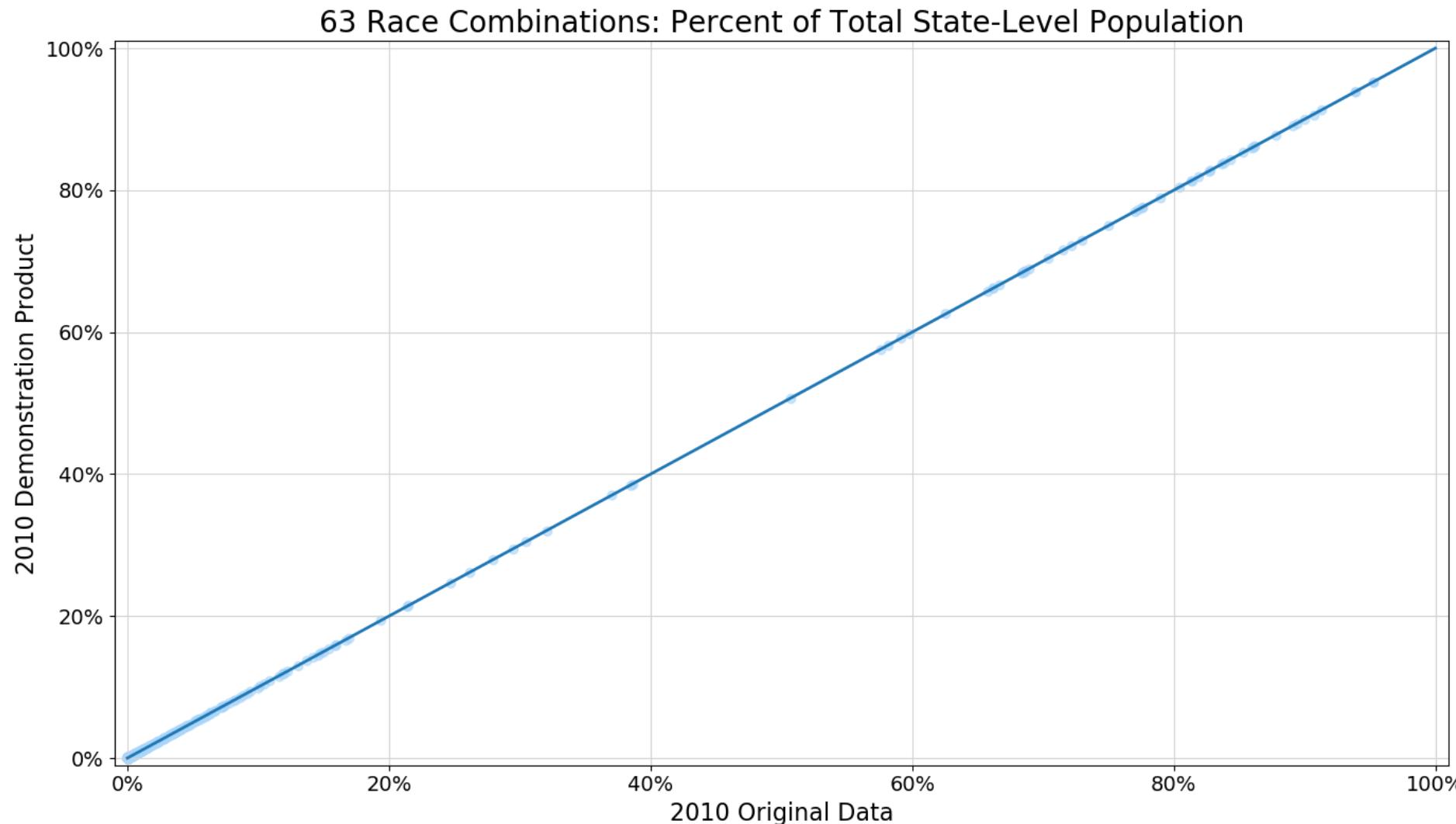
Nation – 63 race combinations

	2010 Census	2010 Test Demo Product	Percent Change	Numeric Change
Total:	308,745,538	308,745,538	0.0%	0
Population of one race	299,736,465	299,724,408	0.0%	-12,057
Population of two races	8,265,318	8,244,135	-0.3%	-21,183
Population of three races	676,469	687,813	1.7%	11,344
Population of four races	57,875	72,578	25.4%	14,703
Population of five races	8,619	13,395	55.4%	4,776
Population of six races	792	3,209	305.2%	2,417

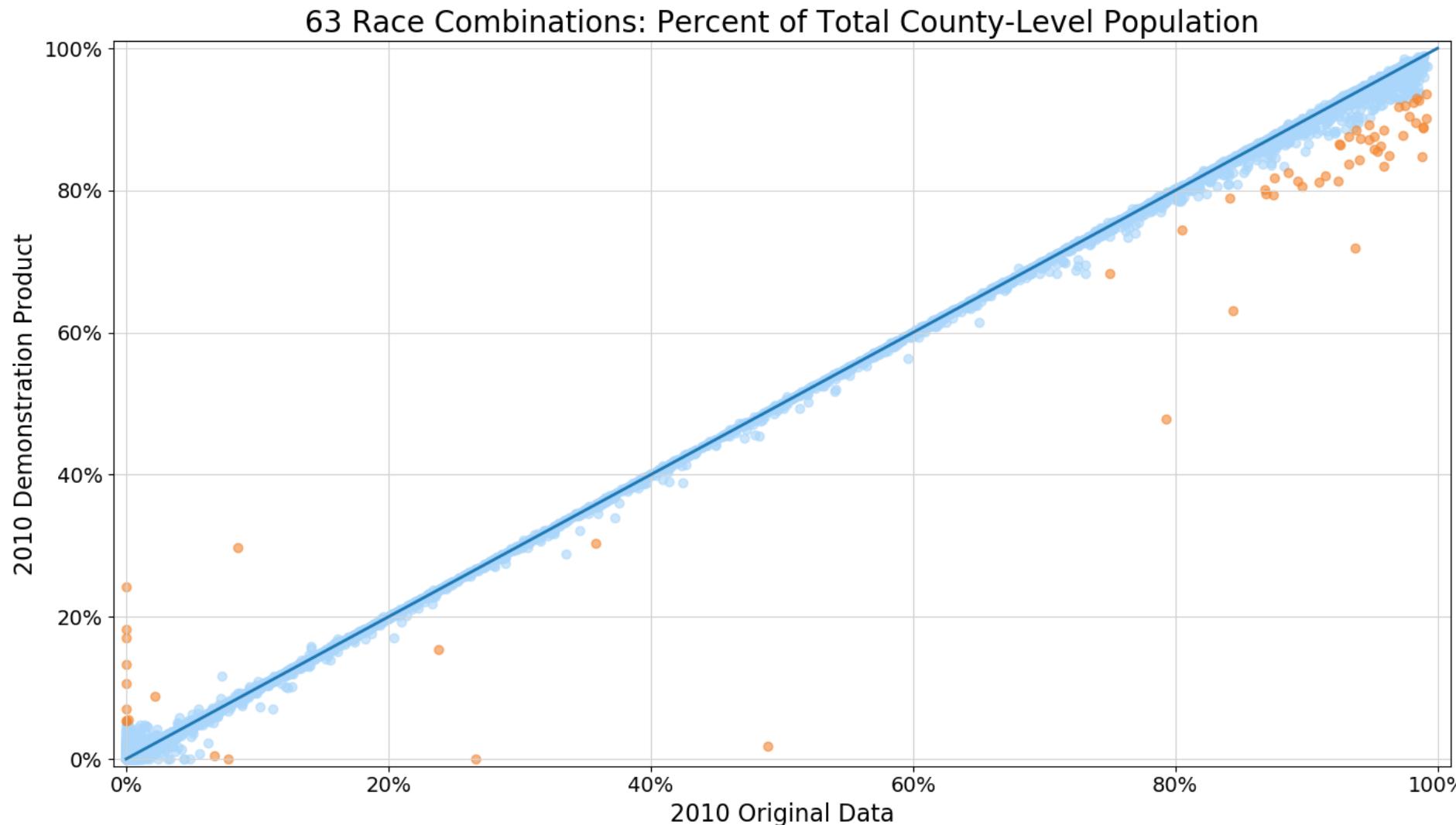
State – 63 race combinations



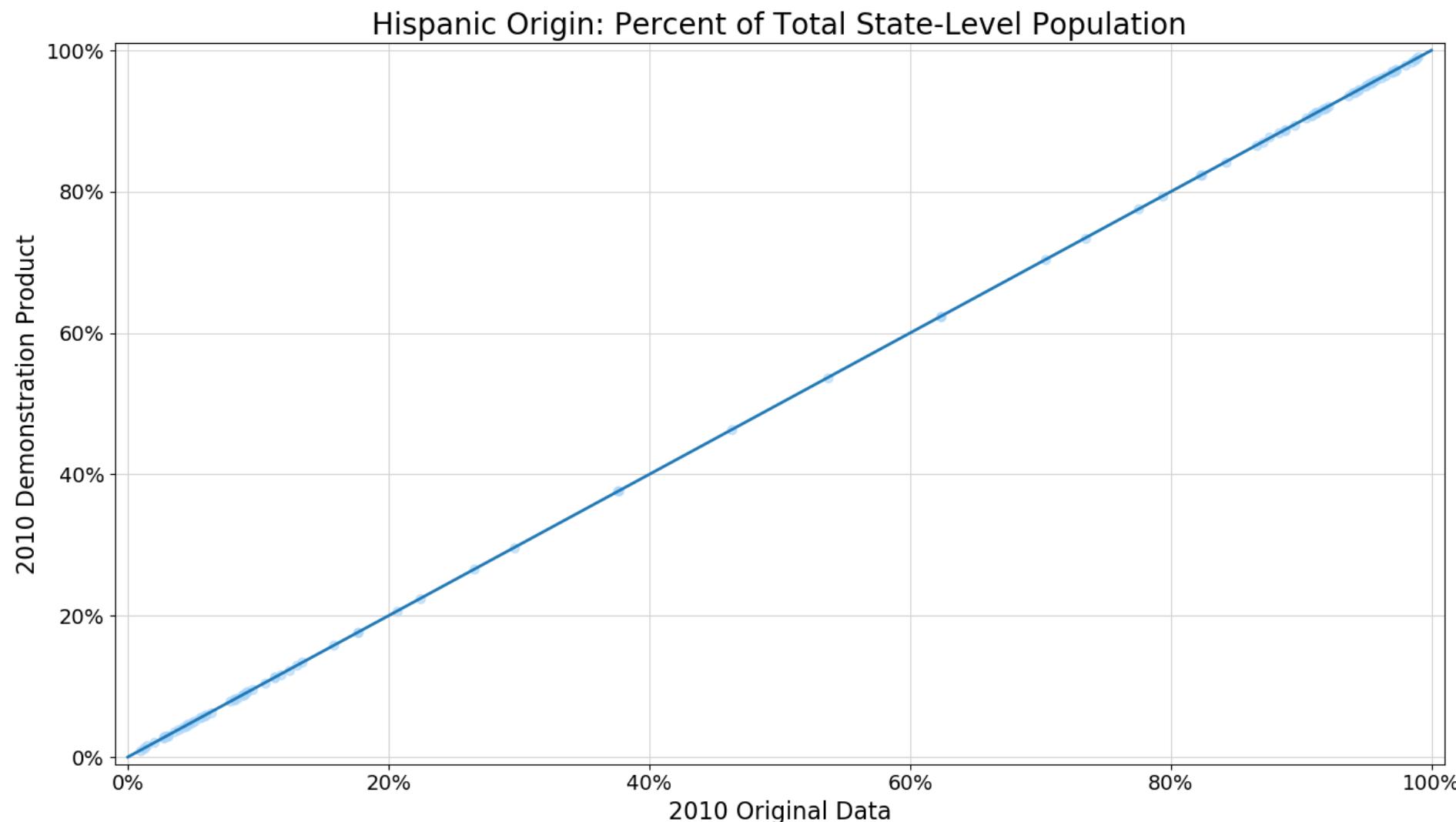
State – 63 race combinations as %



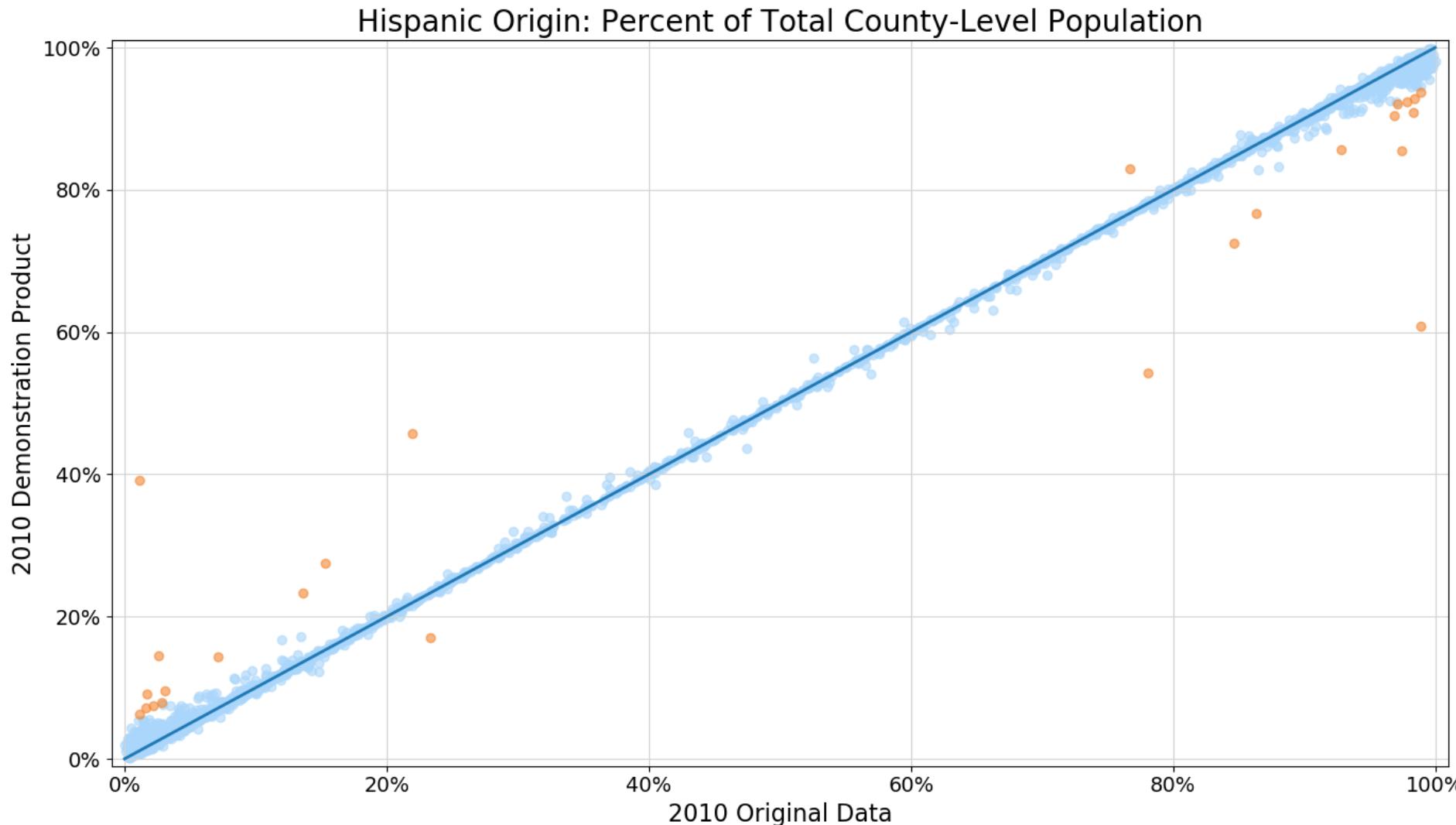
County – 63 race combinations as %



State – Hispanic Origin as %

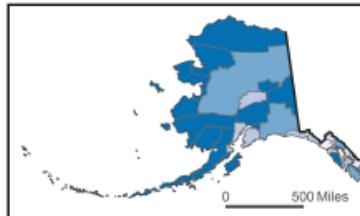


County – Hispanic Origin as %

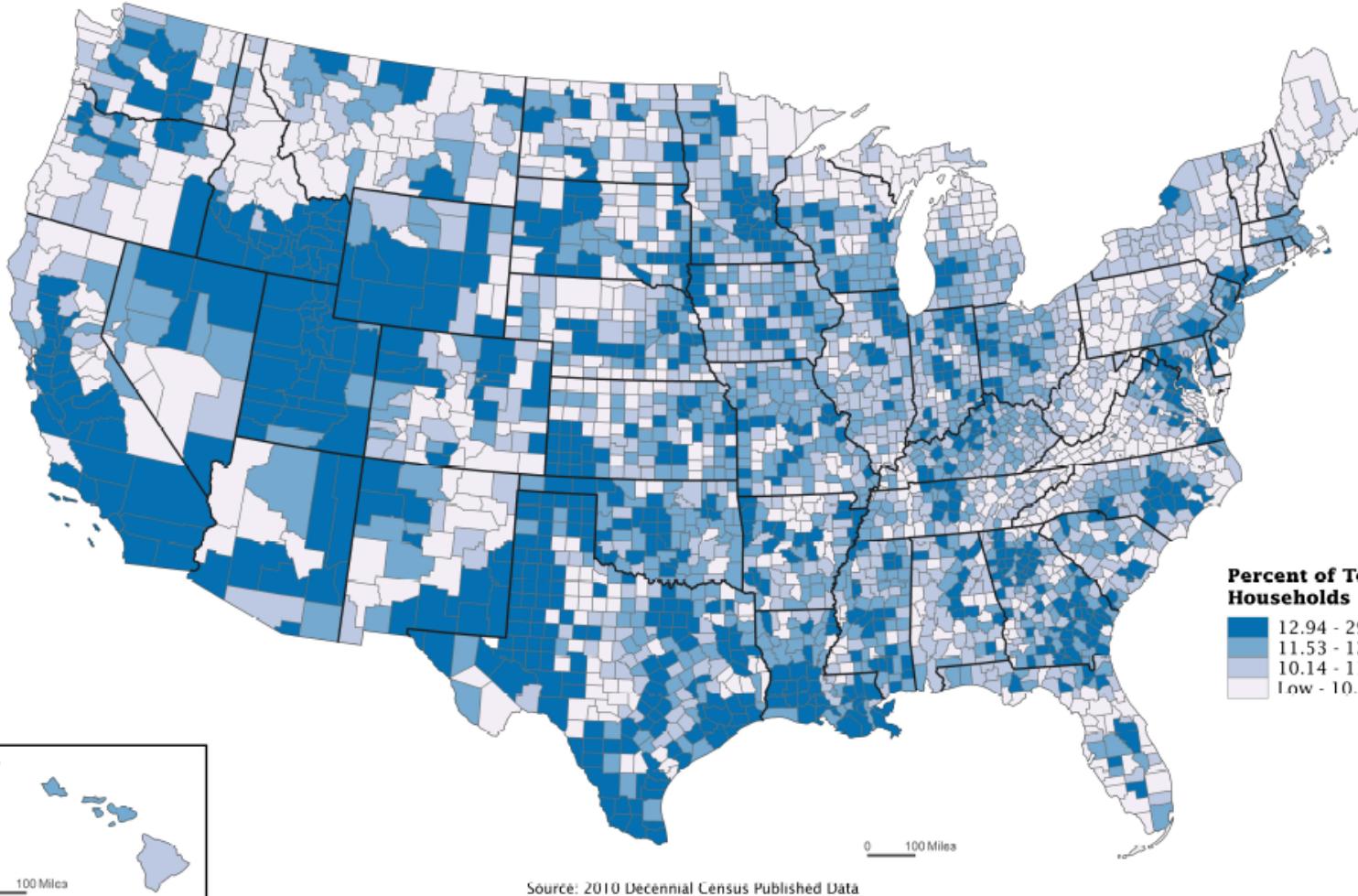


Household and Housing Unit Data

- Not all data from the original 2010 tabulations were replicated
- All of the household characteristics maps come from variables and recodes on the housing unit file



Households with Children Under 6 Years of Age: 2010 Published Data

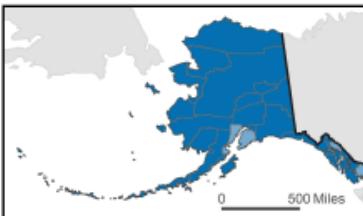


Source: 2010 Decennial Census Published Data

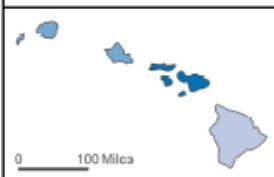
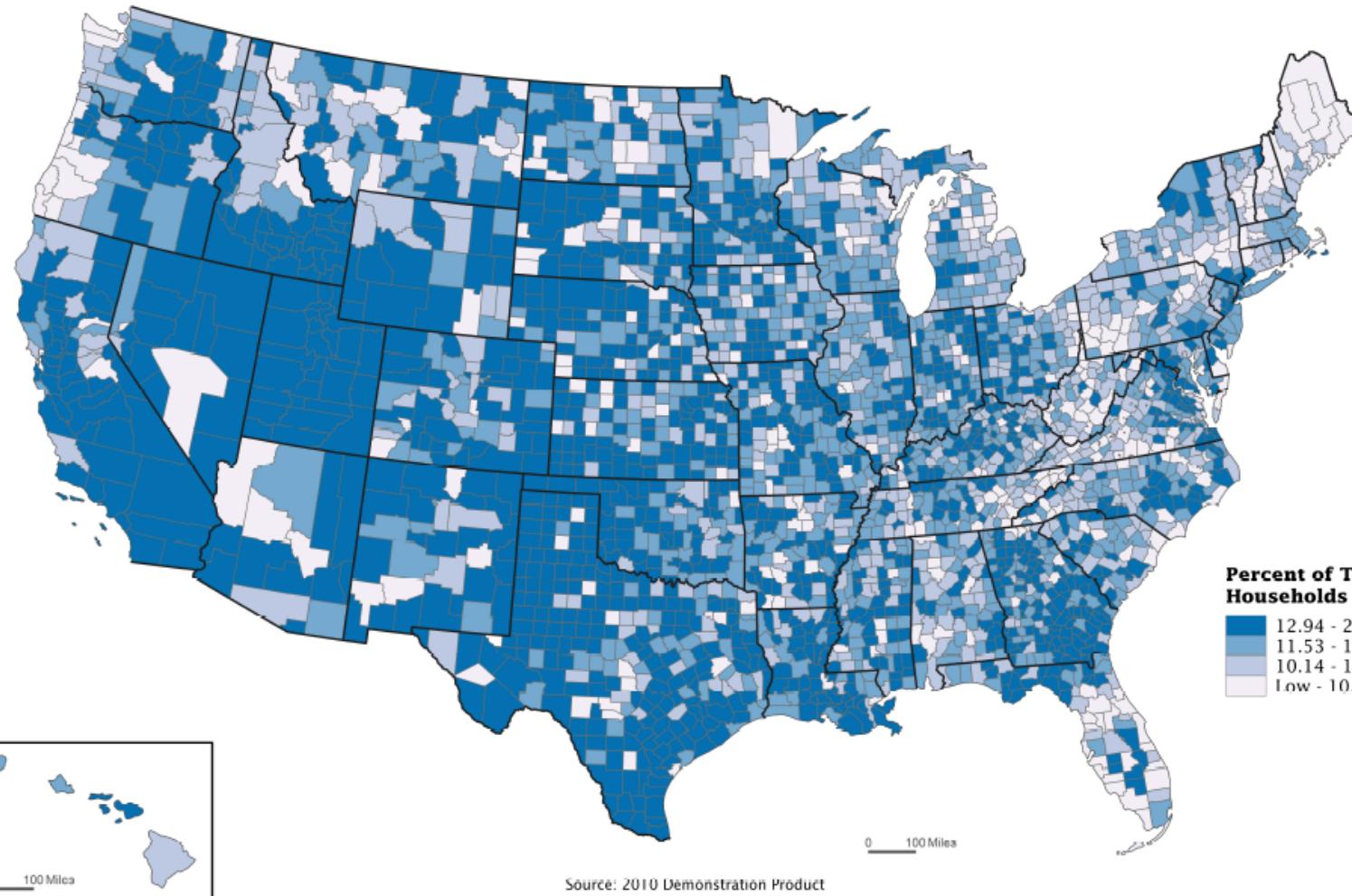
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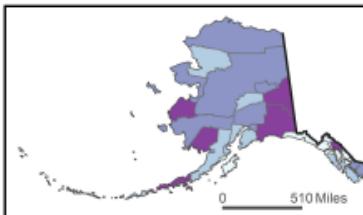
Households with Children Under 6 Years of Age: 2010 Demonstration Product



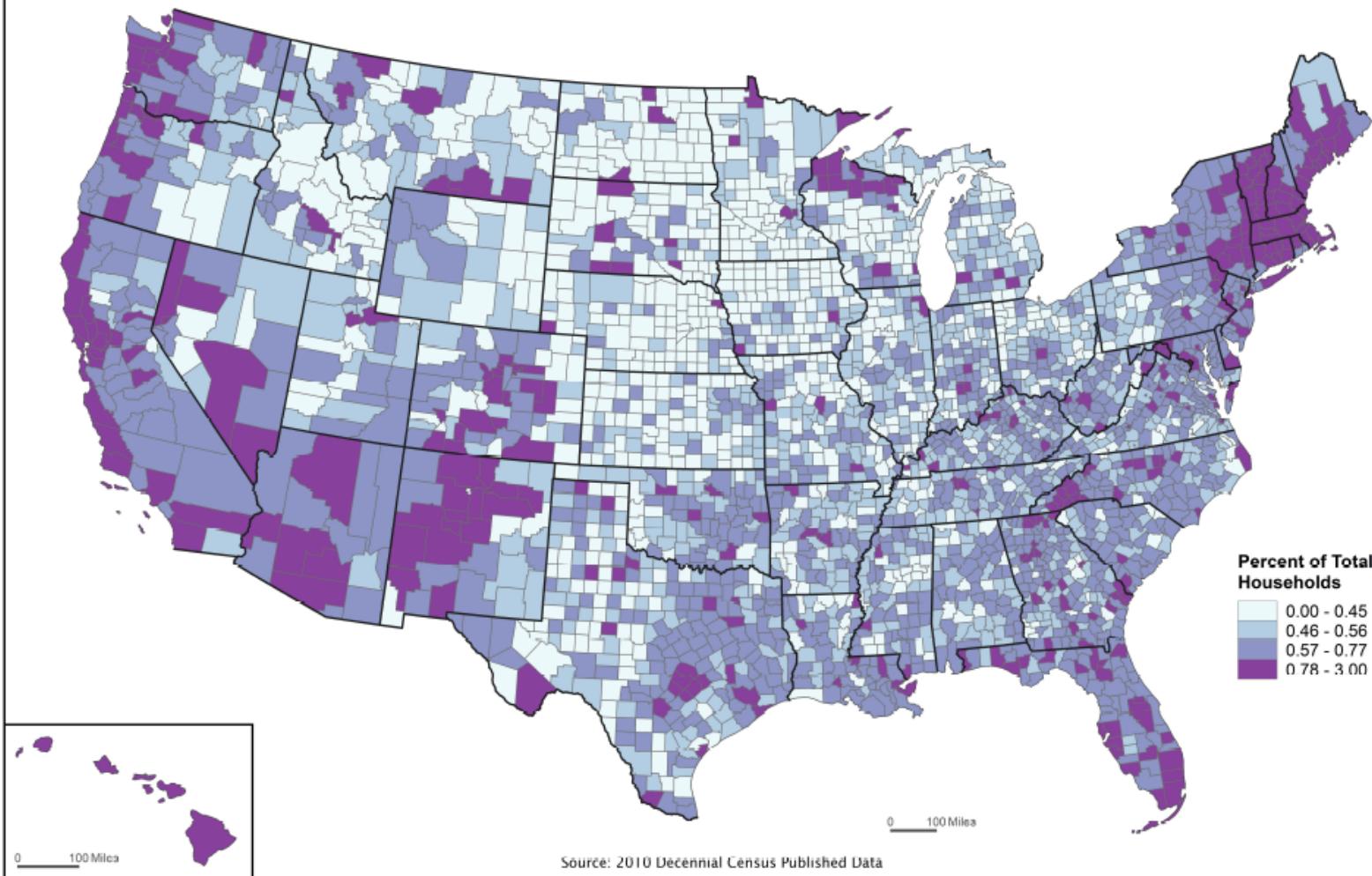
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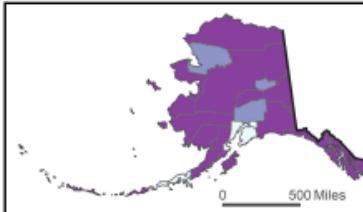
Same-Sex Couple Households: 2010 Published Data



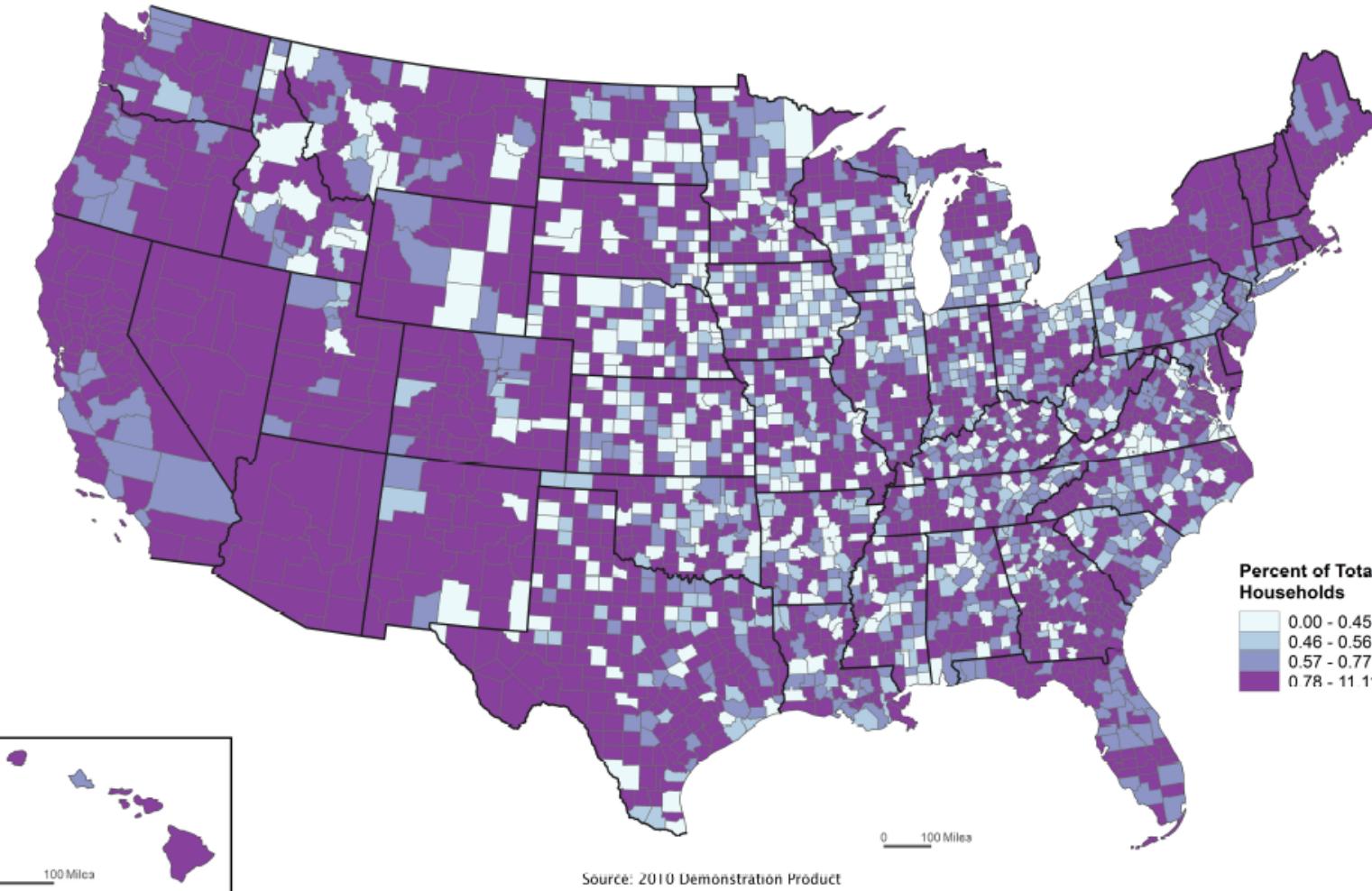
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Same-Sex Couple Households: 2010 Demonstration Product



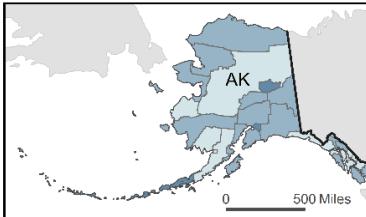
Source: 2010 Demonstration Product

0 100 Miles

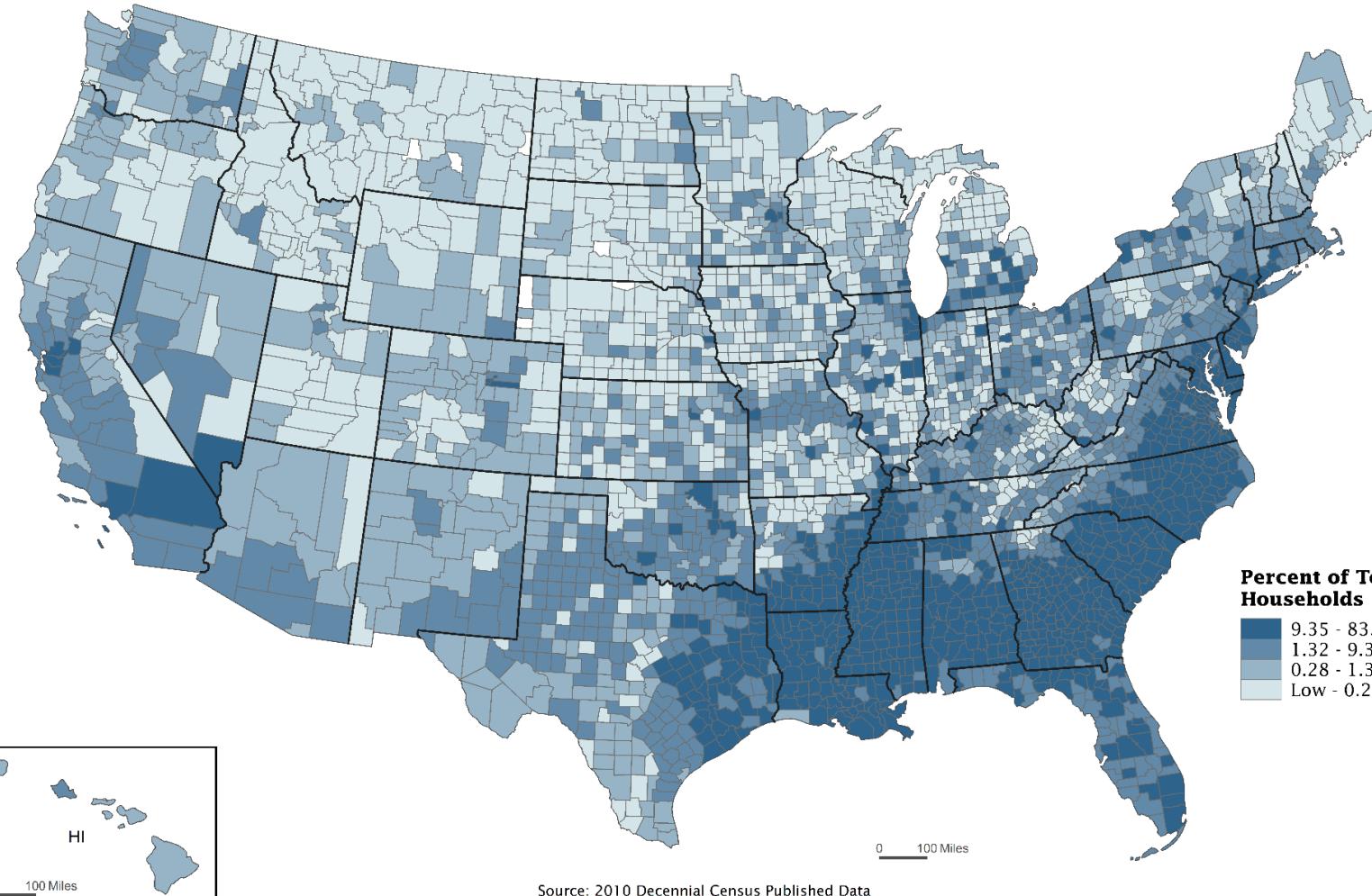
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Householder Race - Black Alone: 2010 Published Data

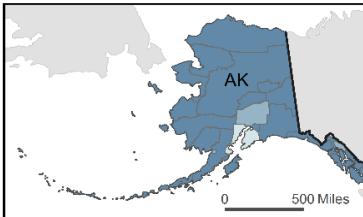


Source: 2010 Decennial Census Published Data

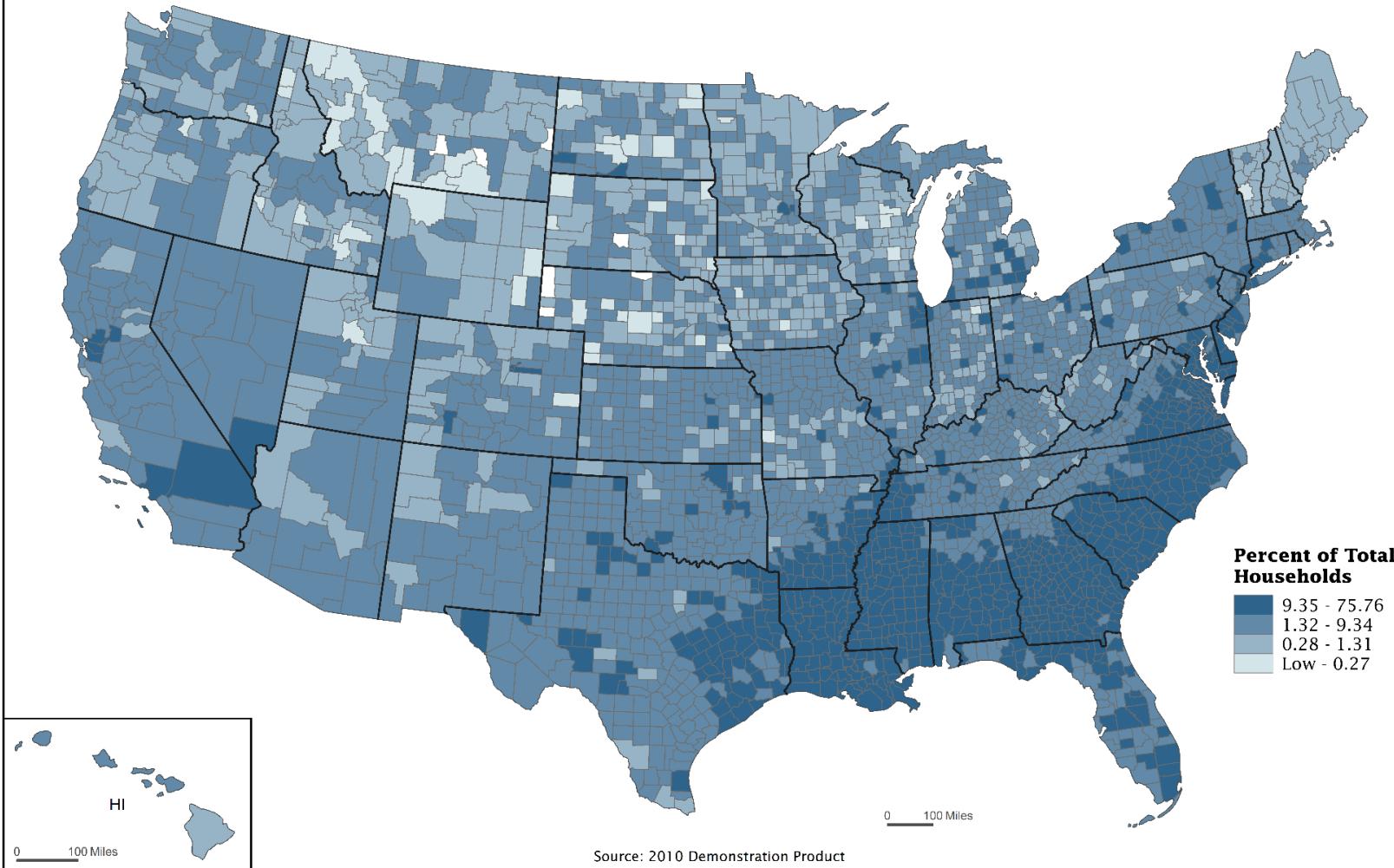
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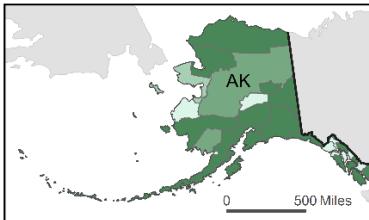
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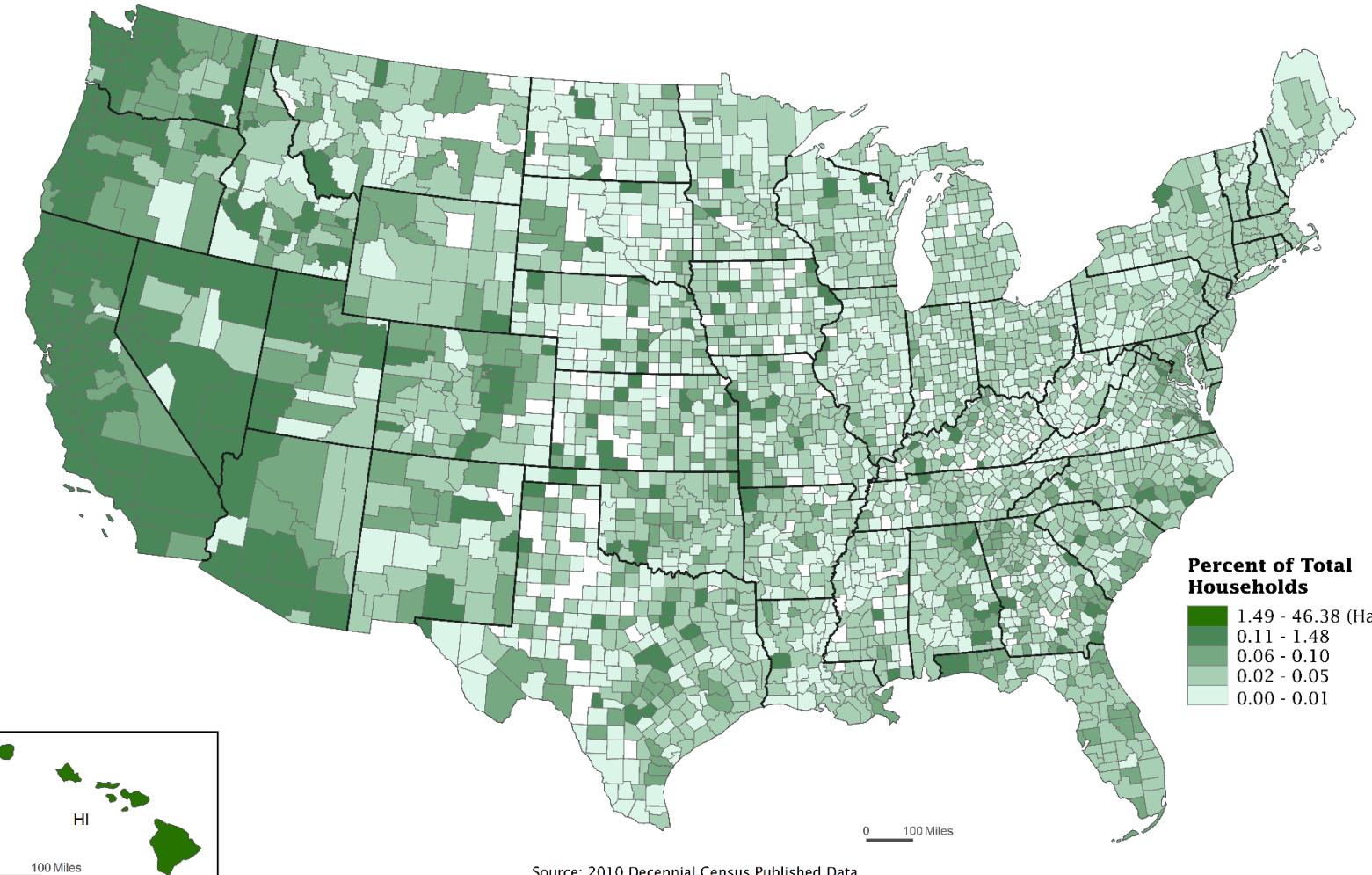


Householder Race - Black Alone: 2010 Demonstration Product





Householder Race - NHPI Alone: 2010 Published Data

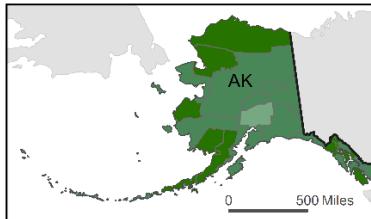


Source: 2010 Decennial Census Published Data

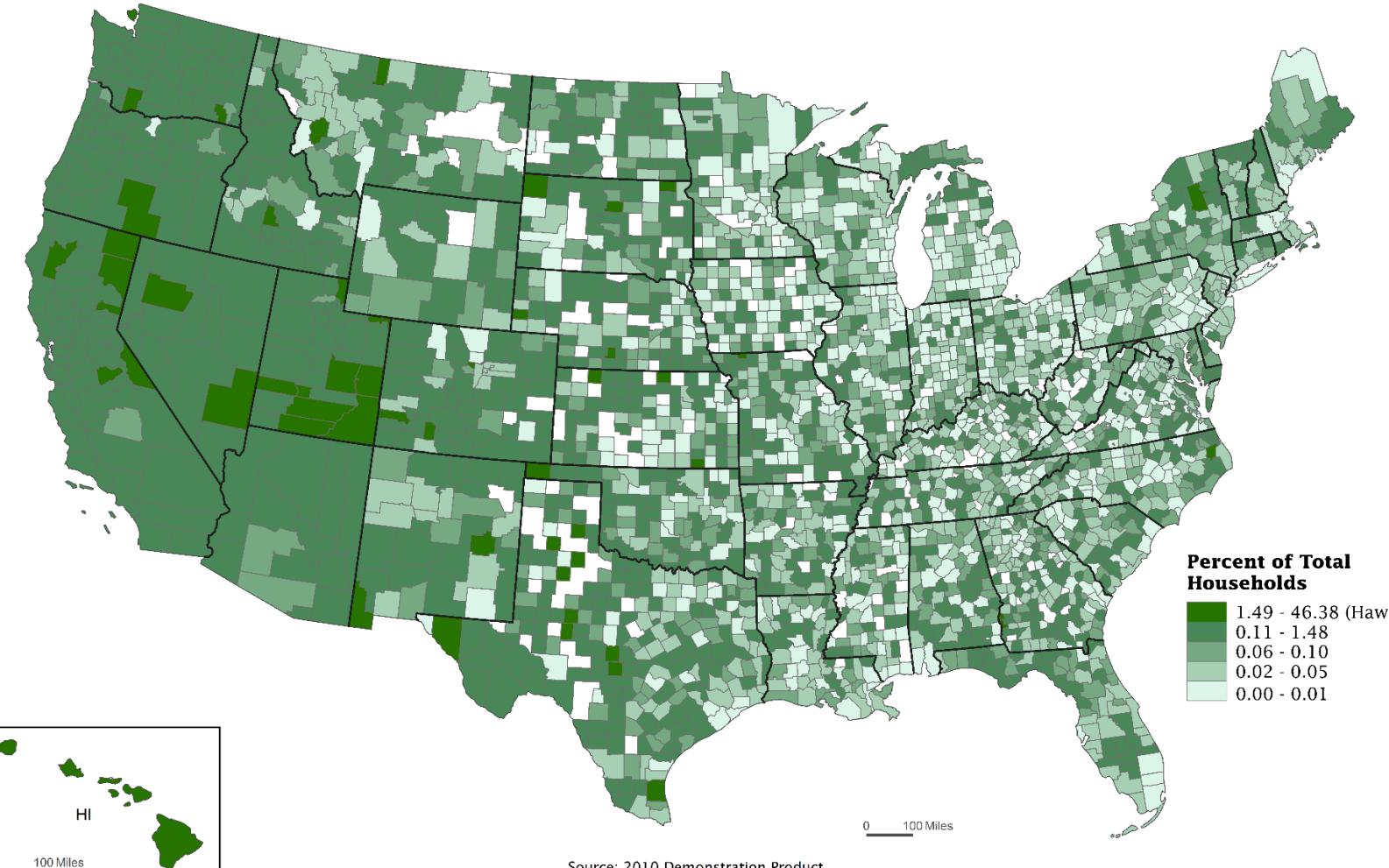
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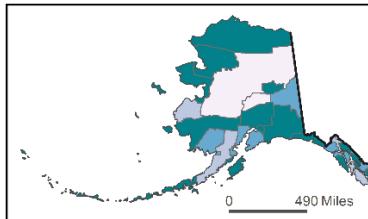
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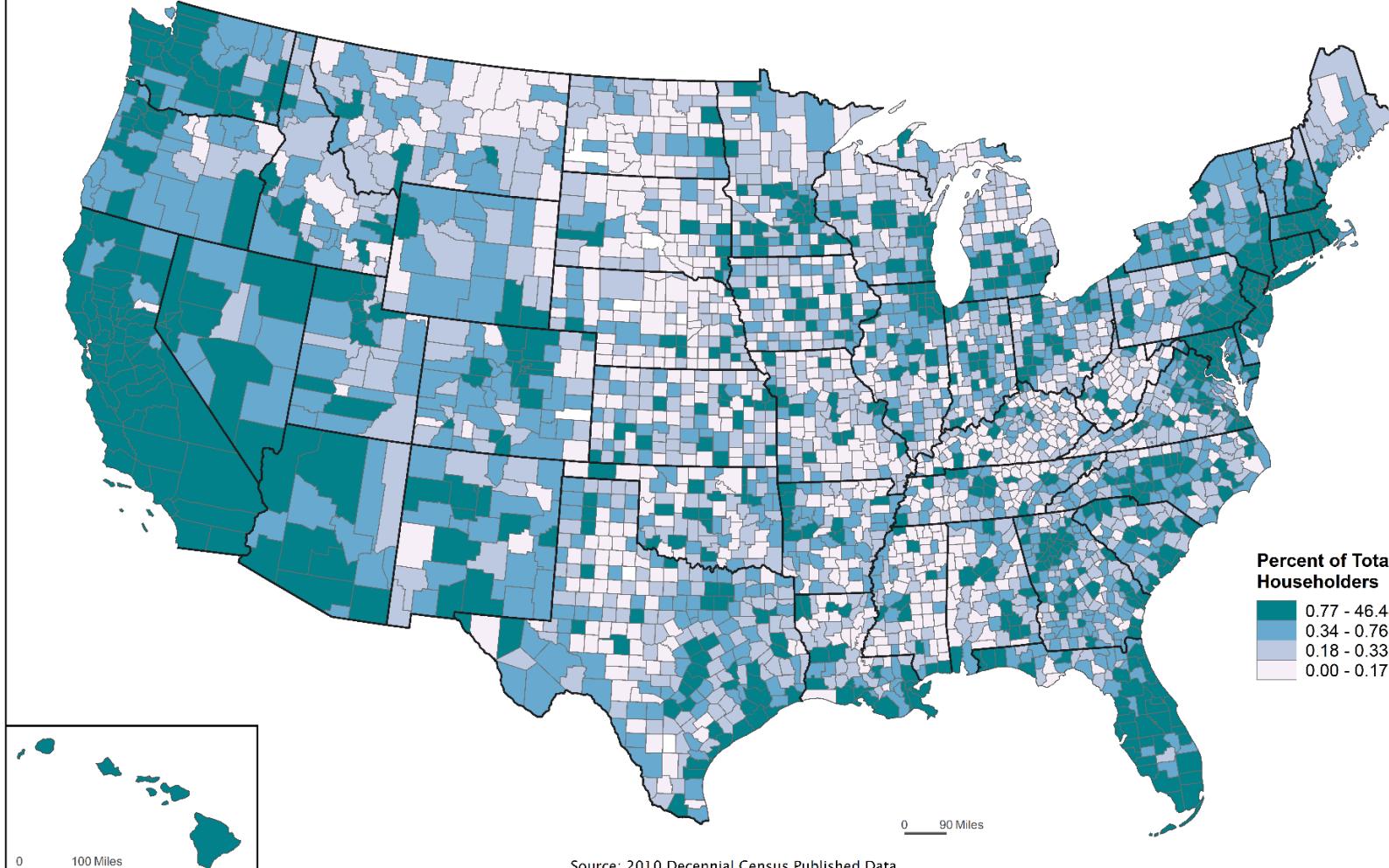


Householder Race - NHPI Alone: 2010 Demonstration Product





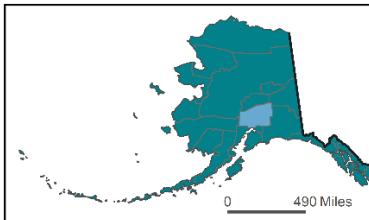
Householder Race - Asian Alone: 2010 Published Data



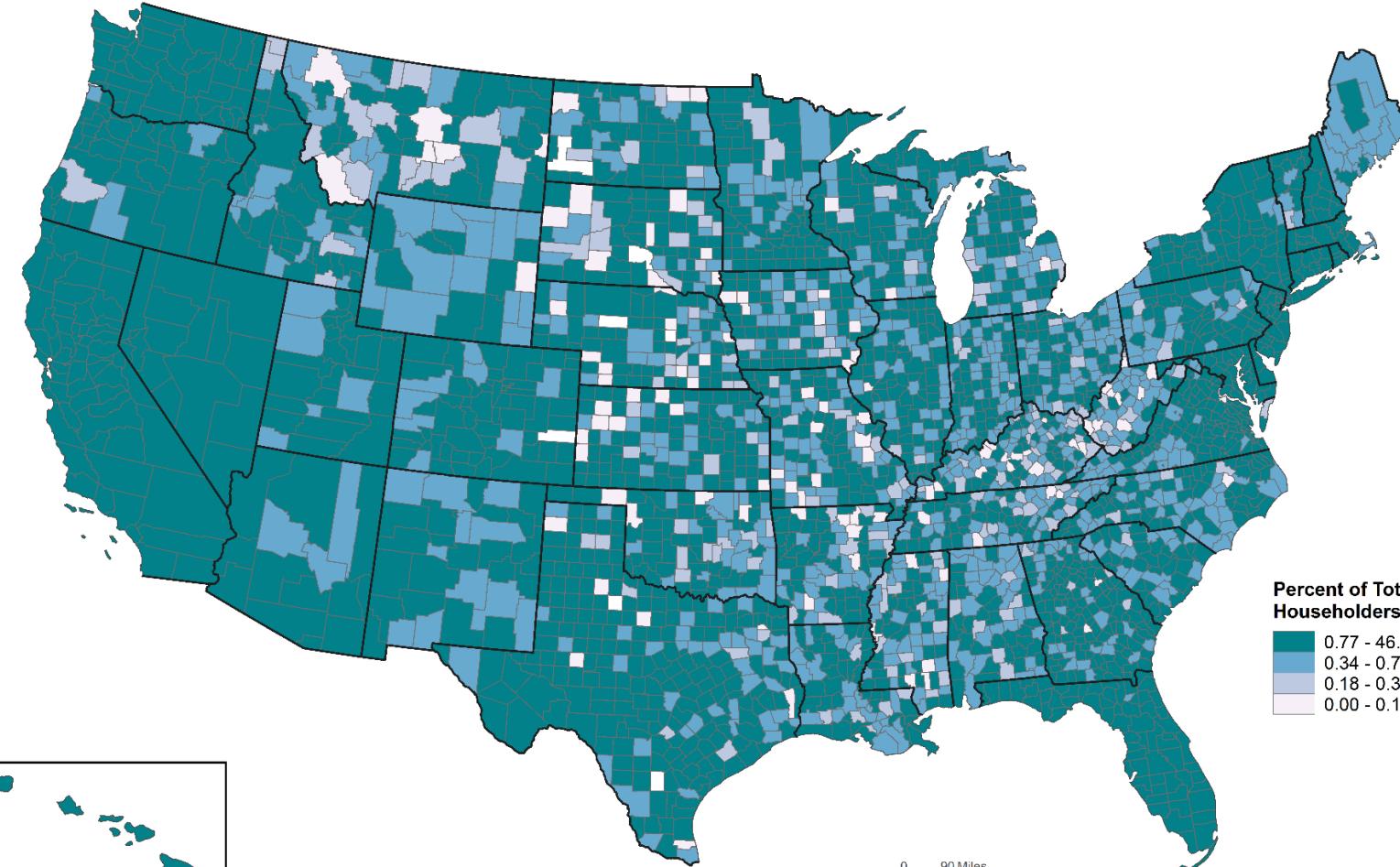
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Householder Race - Asian Alone: 2010 Demonstration Product

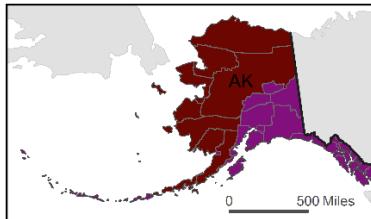


Source: 2010 Demonstration Product

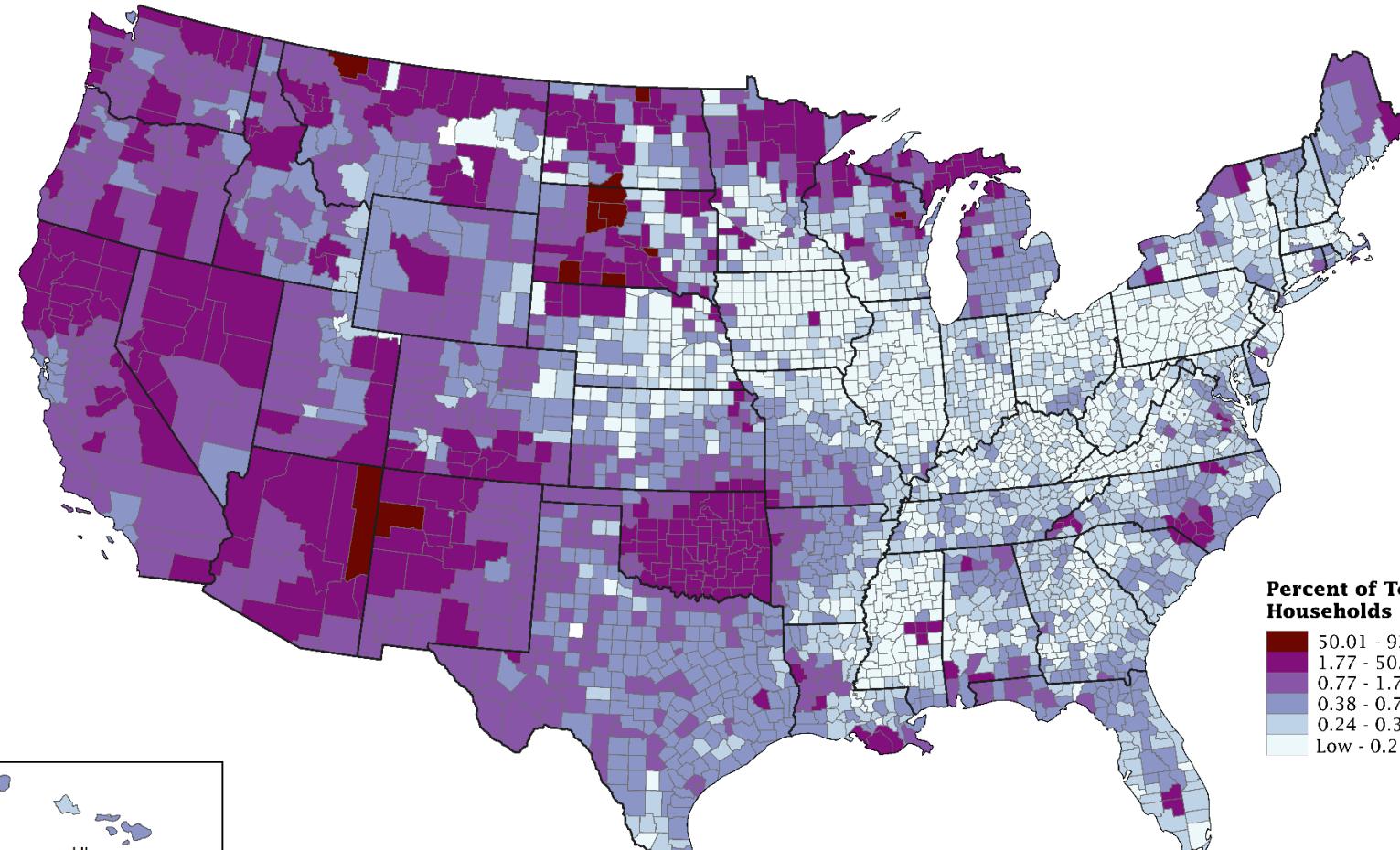
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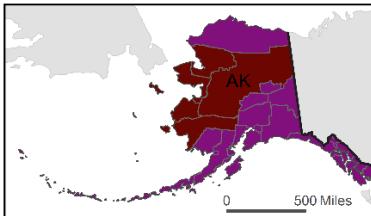
Householder Race - AIAN Alone: 2010 Published Data



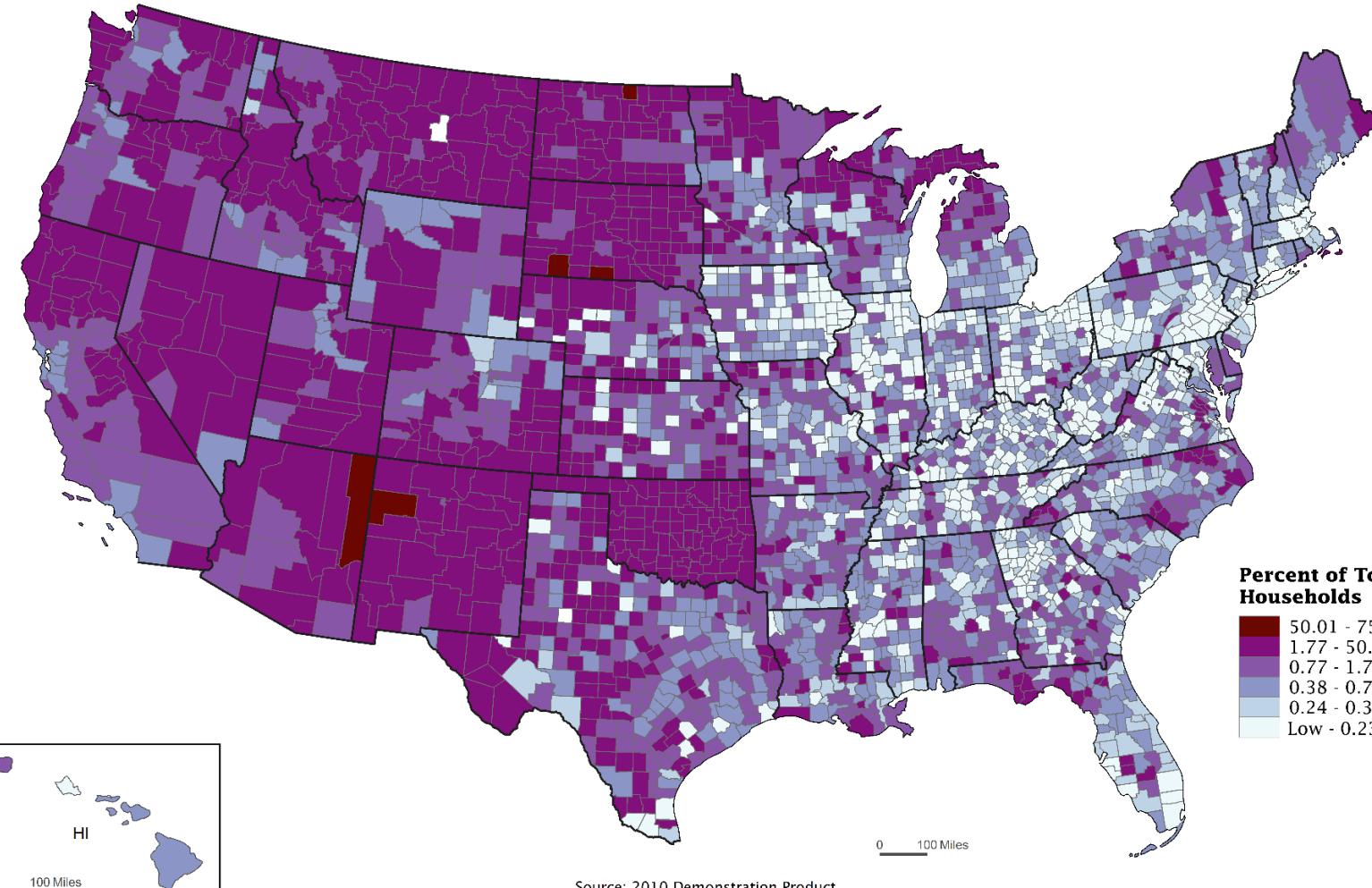
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Householder Race - AIAN Alone: 2010 Demonstration Product



Percent of Total
Households

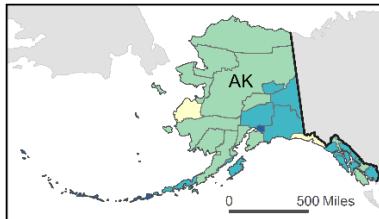
50.01 - 75.32
1.77 - 50.00
0.77 - 1.76
0.38 - 0.76
0.24 - 0.37
Low - 0.23

Source: 2010 Demonstration Product

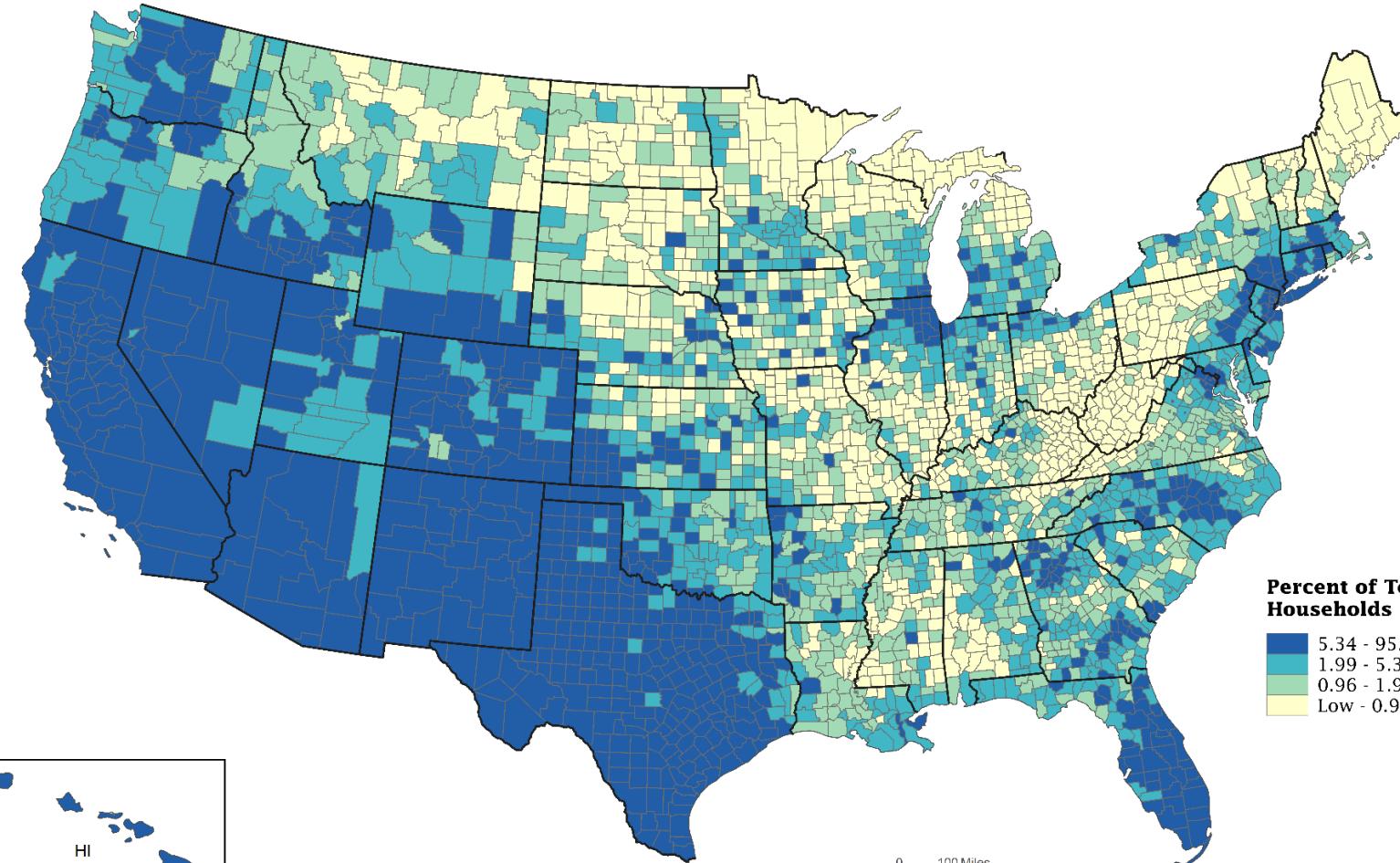
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Hispanic Householders: 2010 Published Data

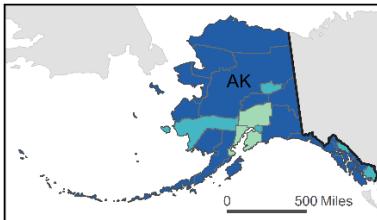


Source: 2010 Decennial Census Published Data

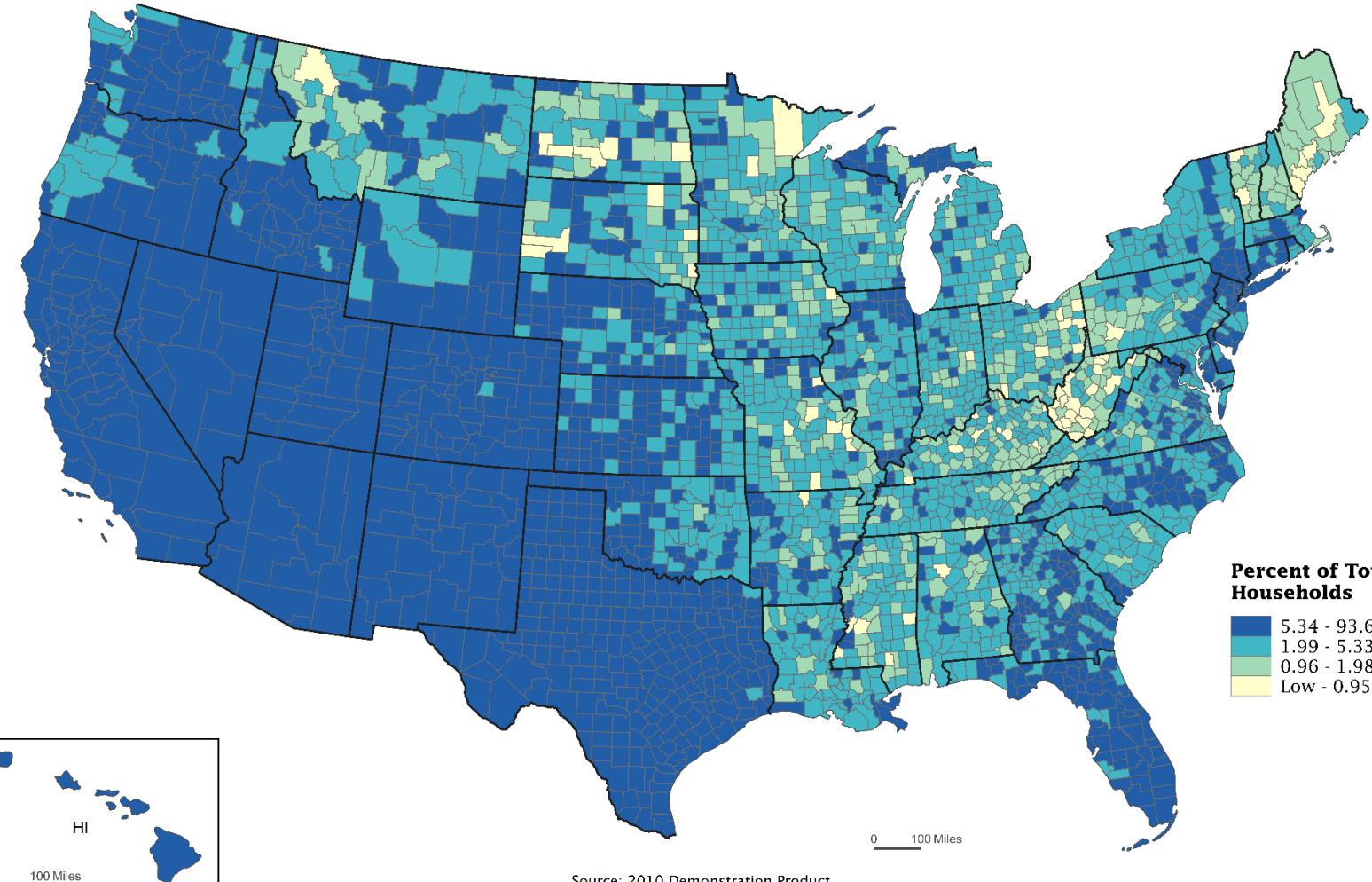
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Hispanic Householders: 2010 Demonstration Product



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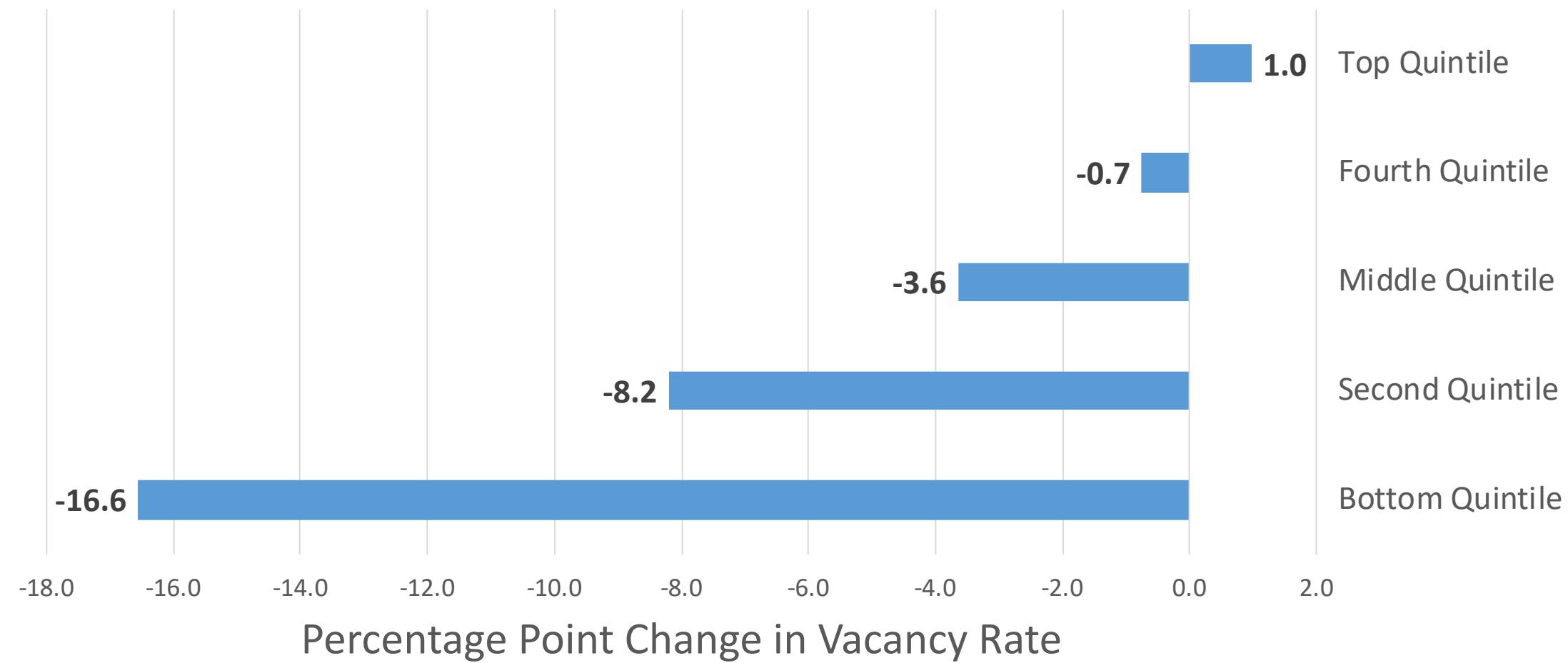
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Observations

Small Populations Increase, Large Decrease

Population Group	Number of Counties	Median Difference	Median Absolute Difference
0 - 7500	500	55.5	56
7500 - 15k	533	51	53
15k - 25k	510	44	49
25k - 35k	301	22	46
35k - 50k	323	4	49
50k - 100k	398	-19	50
100k - max	578	-136	144

Vacancy Rate Changes By Units



The Impact of DP on Accuracy in the Estimates

Overview of Estimates Products

Annual Products

Postcensal Estimates:

- Current data on births, deaths, and migration used to calculate population change since the most recent decennial
- Time series of estimates begins with the most recent decennial census data and extends to the vintage year
- Published at the county level by age, sex, race, and Hispanic origin
- Totals published at the subcounty level (cities and towns)

End-of-Decade Projects

Intercensal Estimates:

- Adjusts the postcensal estimates using a mathematical transformation
- Results in consistent time series across the decades between decennial censuses

Demographic Analysis (DA):

- Census-independent estimates from administrative records
- Coverage measure for the decennial census

Estimates Evaluation (E2):

- Measures error of closure between the postcensal estimates and decennial
- Main benchmark to measure the accuracy of the estimates

The Impact of DP on Accuracy in the Estimates

How the Estimates are Used

Controls for numerous federal surveys, including:

- American Community Survey
- Current Population Survey
- Survey of Income and Program Participation
- American Housing Survey

Denominators for vital rates and per capita statistics

- Birth rates
- Death rates
- Incidence of disease

Allocation of federal funds

- \$675 billion

Other

- Academic research
- Business research
- Public information and education
- Program planning for public and private services

The Impact of DP on Accuracy in the Estimates

Challenges for the Postcensal Estimates

- The postcensal estimates use a cohort-component method based primarily on administrative records and decennial data.
- Issue: the 2020 decennial data (MDF) will not contain all the demographic and geographic characteristics and record linkages necessary to support current processes.
- We are currently researching various approaches to producing differentially private estimates.

The Impact of DP on Accuracy in the Estimates

Findings: MAPEs by Universe for the Nation and Select States by Sex, Hispanic Origin and Age (0 to 85+)

Geography	Resident Population		Household Population		GQ Population		Geography	Resident Population		Household Population		GQ Population	
	Demo.	Census	Demo.	Census	Demo.	Census		Demo.	Census	Demo.	Census	Demo.	Census
United States	13.0	7.7	22.7	7.9	63.9	41.3							
5 Largest Resident Population MAPEs for the Demonstration Product							5 Smallest Resident Population MAPEs for the Demonstration Product						
Vermont	44.3	15.8	113.9	17.1	133.8	43.6	Texas	4.0	4.0	3.9	3.9	29.1	26.1
Maine	42.5	12.8	90.0	12.9	88.9	53.5	Colorado	3.9	3.5	3.9	3.6	41.9	43.5
Mississippi	35.6	11.8	72.4	11.4	60.9	46.7	Illinois	3.6	3.6	3.9	3.7	43.3	33.4
North Dakota	32.5	20.4	110.4	21.8	107.2	36.6	California	3.4	3.4	3.2	3.2	32.1	33.6
West Virginia	29.0	13.0	57.1	14.0	69.9	41.2	New York	3.4	3.4	3.4	3.3	30.6	25.8

External Feedback

- Stakeholders have communicated questions and concerns in a variety of ways
- Common topics of concern include:
 - small populations and non-hierarchical geographies
 - consistency between decennial data and other data sets
 - concern about availability of sufficient county and subcounty demographic data for states to produce their own population estimates
 - availability of microdata
 - questions about the Population Estimates Program

Summary

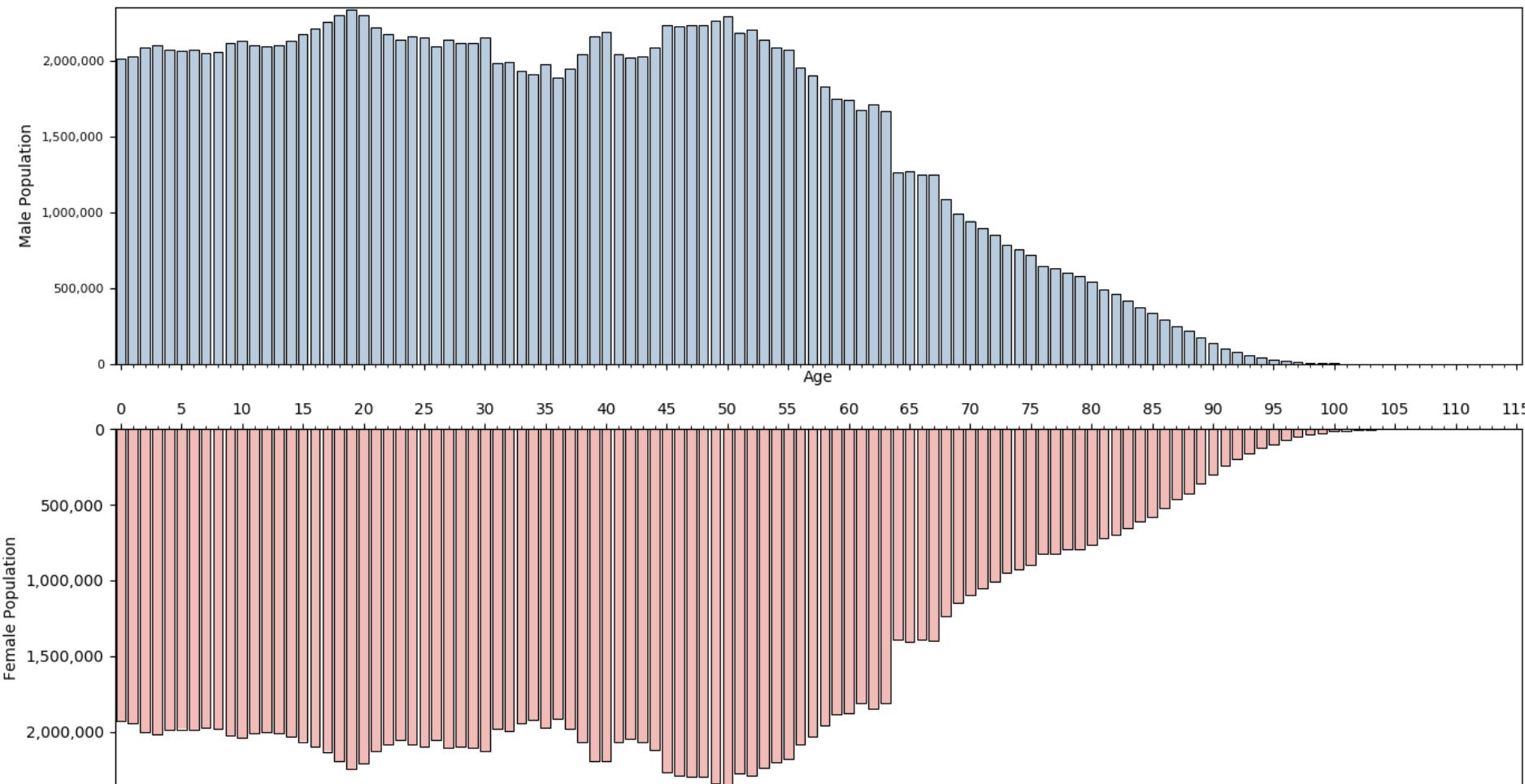
- Total populations or basic characteristics at the national, state, and larger metro area level look similar to published data.
- Less populous/smaller geographic areas or less populous/detailed/smaller characteristics have more noise.
- Research is ongoing to produce some tables not included in the demonstration data, including those requiring household-population joins
- We've identified some items that are demographically implausible: counties with vacancy rate of zero percent; areas with more occupied housing units than total population. These issues are being researched.
- We are taking your feedback into account to create a set of 2020 Census data products that maximize utility for users. Please send feedback to:
dcmd.2010.demonstration.data.products@census.gov.

dcmd.2010.demonstration.data.products@census.gov

Background Slides

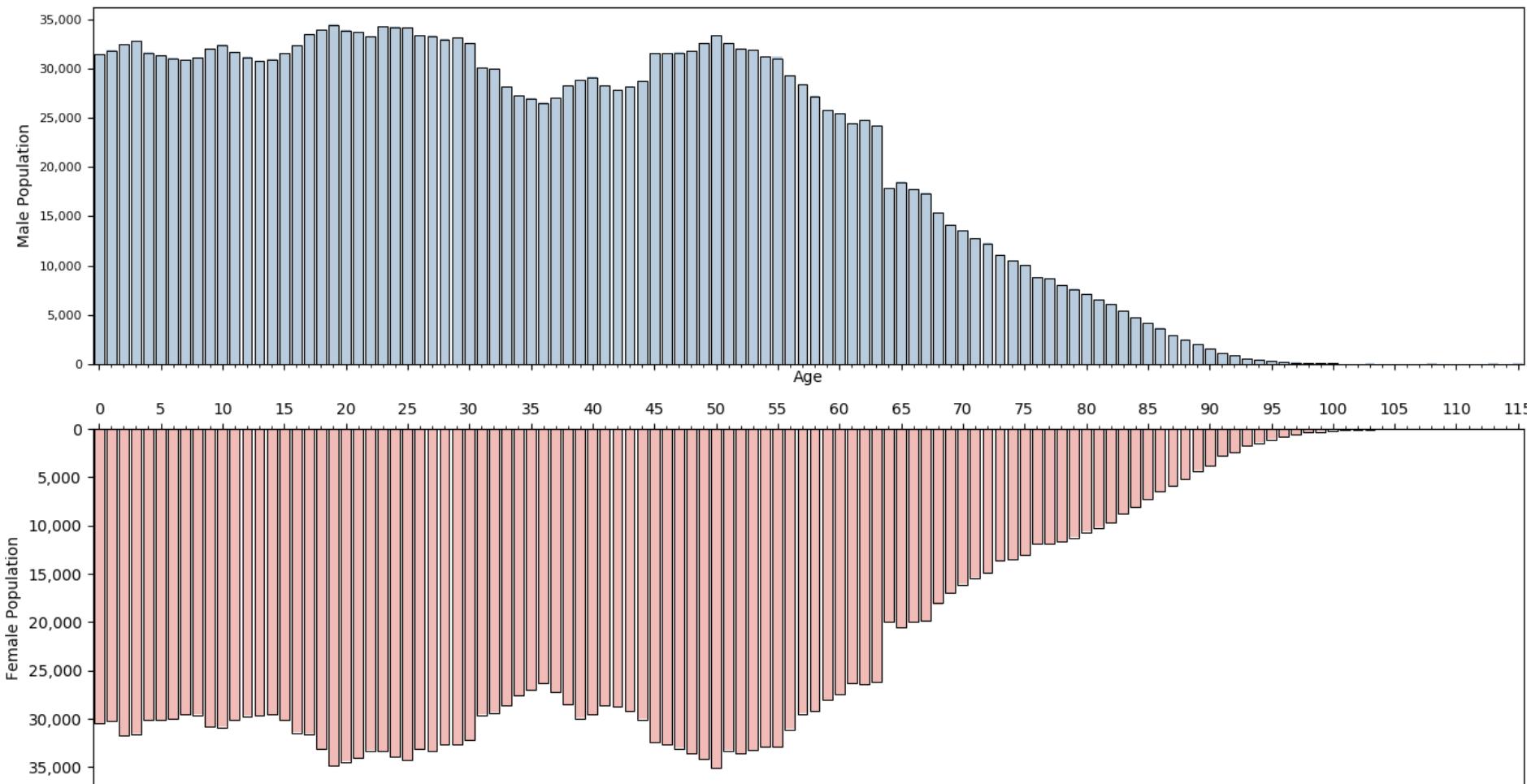
Age & Sex: National

National Population Pyramid



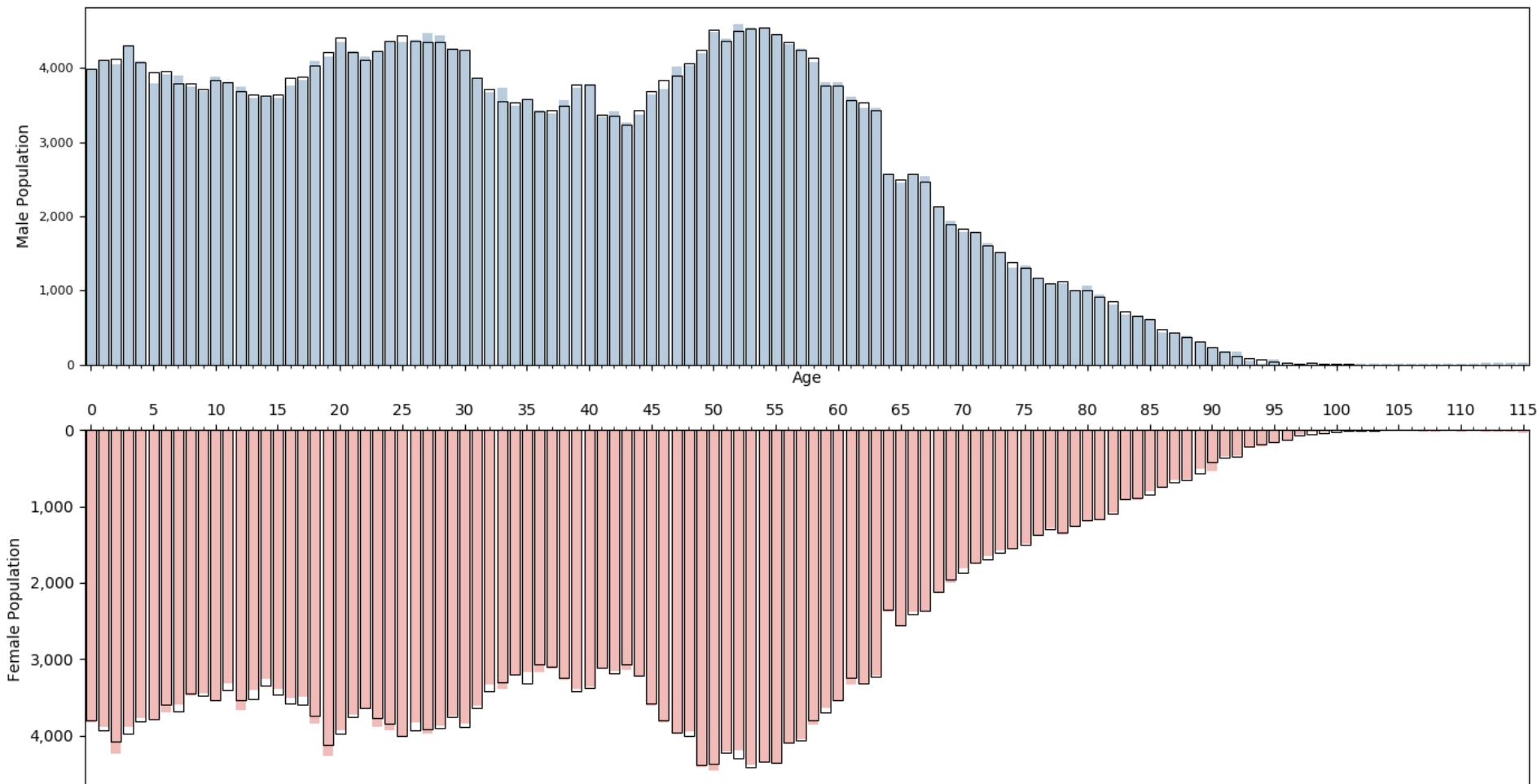
Age & Sex: Medium State

Population Pyramid -- LA



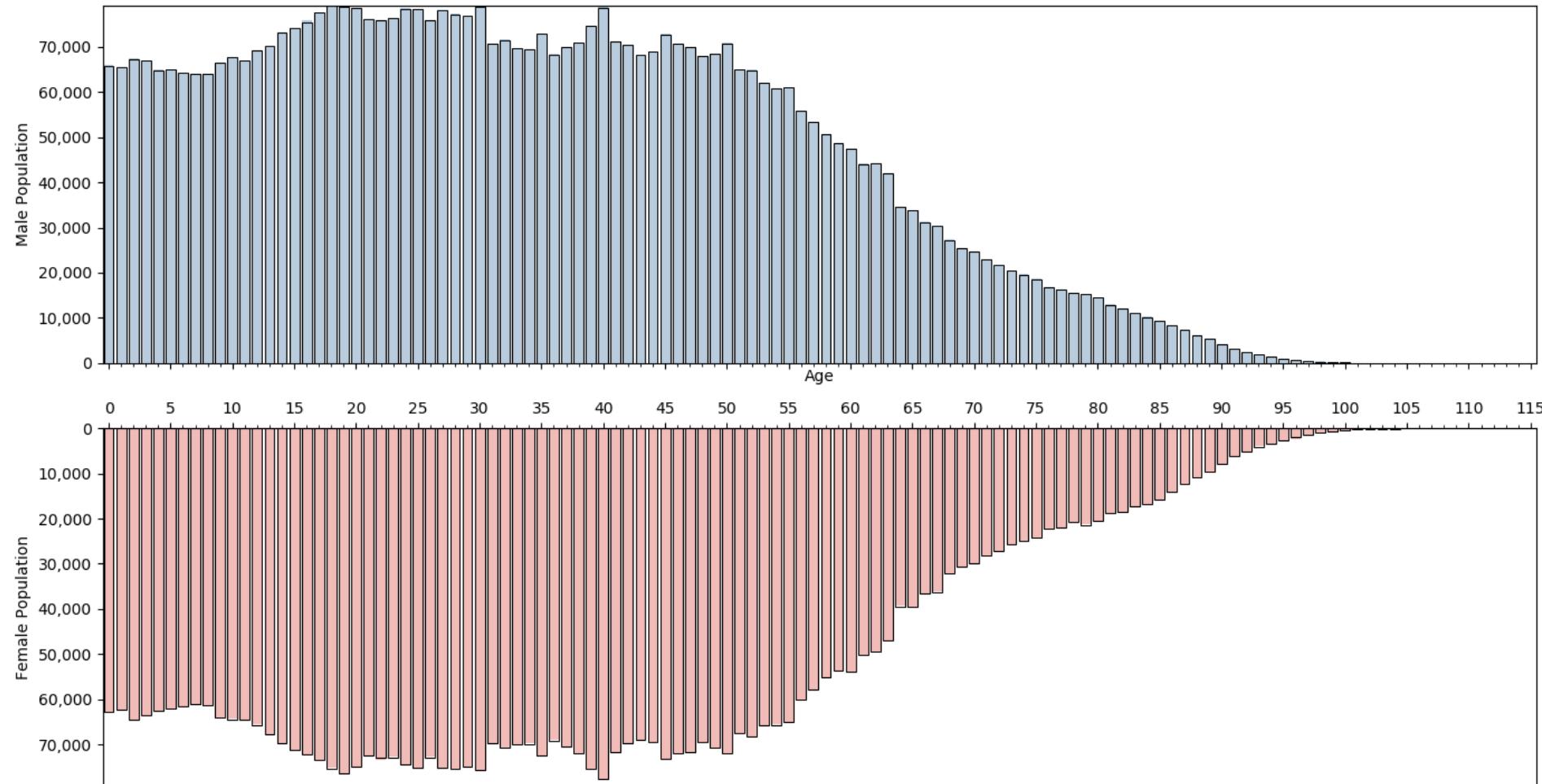
Age & Sex: Small State

Population Pyramid -- WY



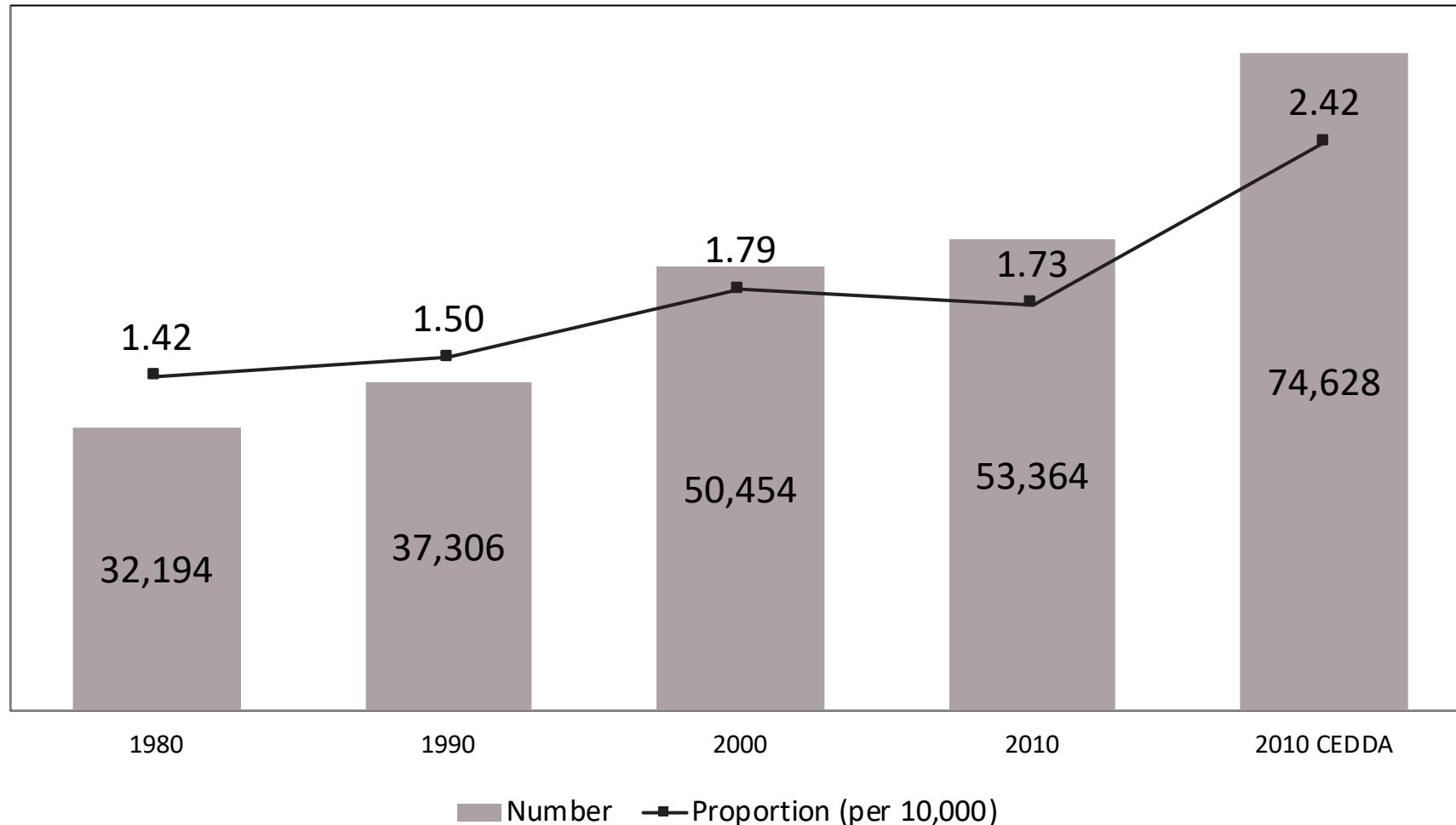
Age & Sex: Populous County

Population Pyramid for Los Angeles County, California



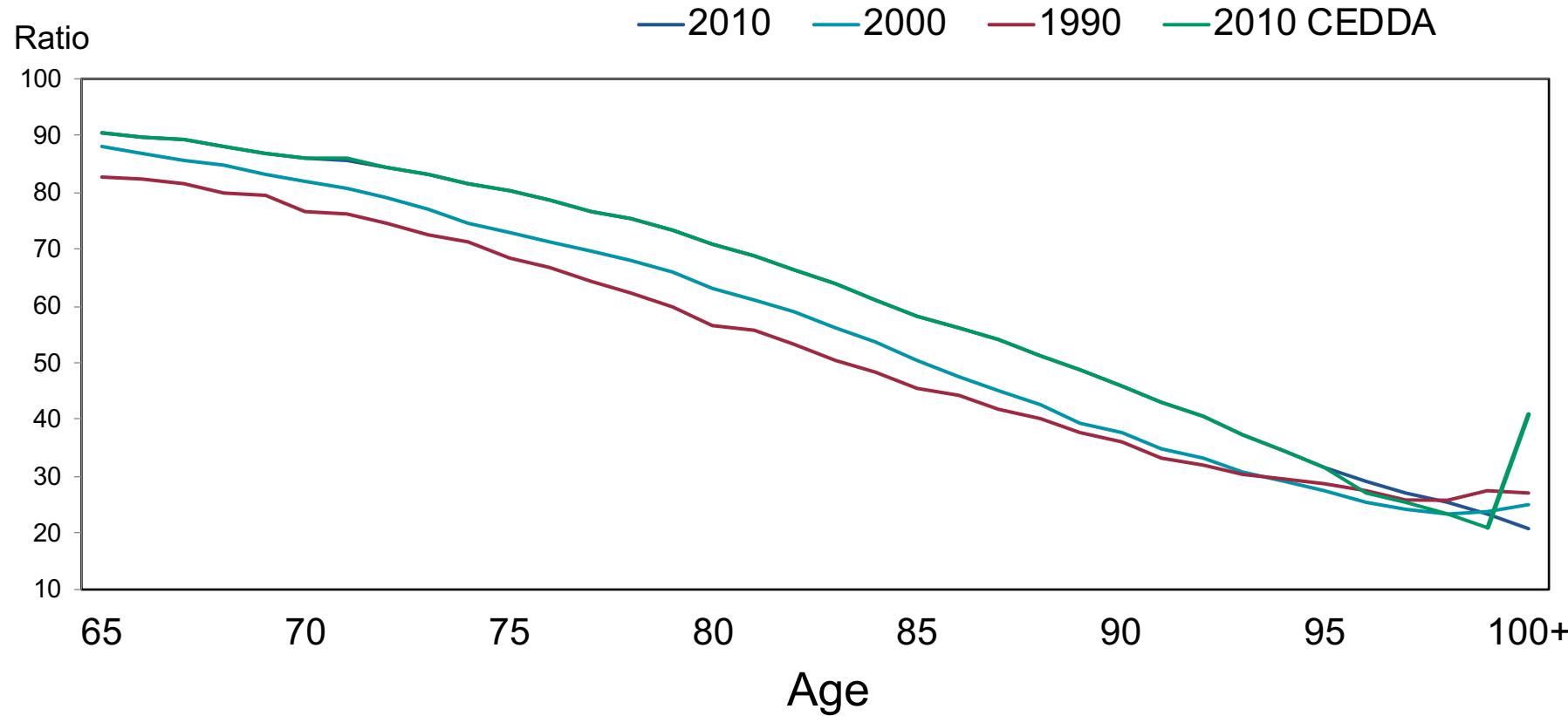
Age & Sex: Centenarians

Centenarians and Their Proportion of Total Population: 1980 to 2010



Age & Sex: Centenarians

Sex Ratio by Age: 1990, 2000, and 2010



Group Quarters – Age

	2010 SF-1	2010 DP	Difference	Percent Diff
Correctional facilities for adults (101-106):				
Under 18 years	11,643	17,132	5,489	47.14%
18 to 64 years	2,223,535	2,158,800	-64,735	-2.91%
65 years and over	28,424	87,866	59,442	209.13%
Juvenile facilities (201-203)				
Under 18 years	122,074	117,284	-4,790	-3.92%
18 to 64 years	29,241	34,658	5,417	18.53%
Nursing facilities/Skilled-nursing facilities (301)				
18 to 64 years	249,629	303,528	53,899	21.59%
65 years and over	1,252,635	1,198,670	-53,965	-4.31%
Other institutional facilities (401-405)				
Under 18 years	10,623	16,307	5,684	53.51%
18 to 64 years	49,060	30,090	-18,970	-38.67%
65 years and over	16,795	26,103	9,308	55.42%
College/University student housing (501)				
Under 18 years	12,085	12,355	270	2.23%
18 to 64 years	2,508,953	2,507,255	-1,698	-0.07%
65 years and over	52	1,962	1,910	3,673.08%
Military quarters (601-602)				
Under 18 years	731	2,106	1,375	188.10%
18 to 64 years	337,454	334,551	-2,903	-0.86%
65 years and over	6	1,431	1,425	23,750.00%
Other noninstitutional facilities (701-702, 704, 706, 801-802, 900-901, 903-904)				
Under 18 years	103,430	112,937	9,507	9.19%
18 to 64 years	871,159	827,735	-43,424	-4.98%
65 years and over	159,794	194,076	34,282	21.45%

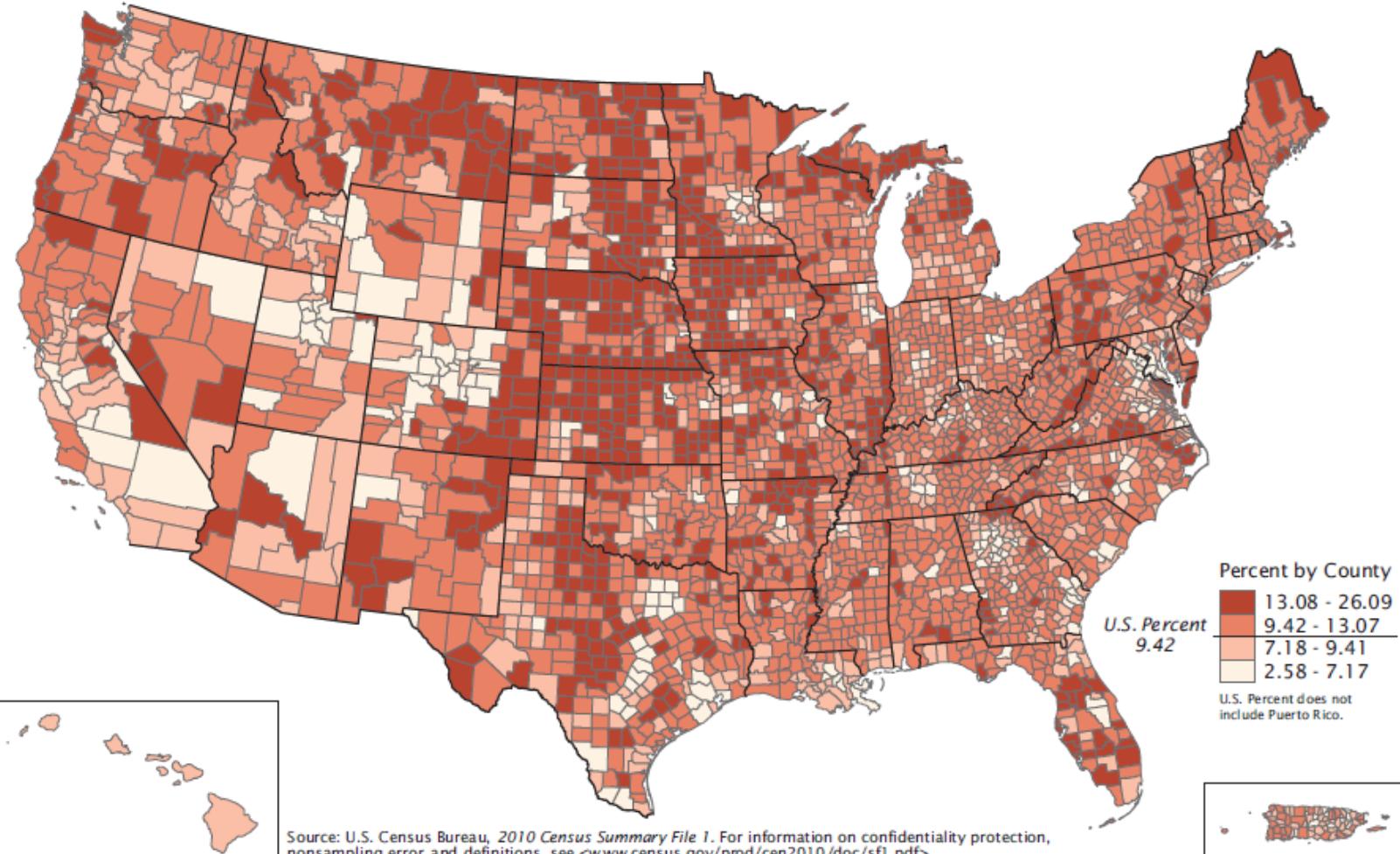
Group Quarters – Sex

	2010 SF-1	2010 DP	Difference	Percent Diff
Correctional facilities for adults (101-106):				
Male	2,059,020	2,003,252	-55,768	-2.71%
Female	204,582	260,546	55,964	27.36%
Juvenile facilities (201-203)				
Male	110,098	104,808	-5,290	-4.80%
Female	41,217	47,134	5,917	14.36%
Nursing facilities/Skilled-nursing facilities (301)				
Male	500,185	508,063	7,878	1.58%
Female	1,002,079	994,135	-7,944	-0.79%
Other institutional facilities (401-405)				
Male	47,574	35,976	-11,598	-24.38%
Female	28,904	36,524	7,620	26.36%
College/University student housing (501)				
Male	1,167,844	1,173,820	5,976	0.51%
Female	1,353,246	1,347,752	-5,494	-0.41%
Military quarters (601-602)				
Male	291,226	271,802	-19,424	-6.67%
Female	46,965	66,286	19,321	41.14%
Other noninstitutional facilities (701-702, 704, 706, 801-802, 900-901, 903-904)				
Male	682,263	672,856	-9,407	-1.38%
Female	452,120	461,892	9,772	2.16%



Figure 3c.

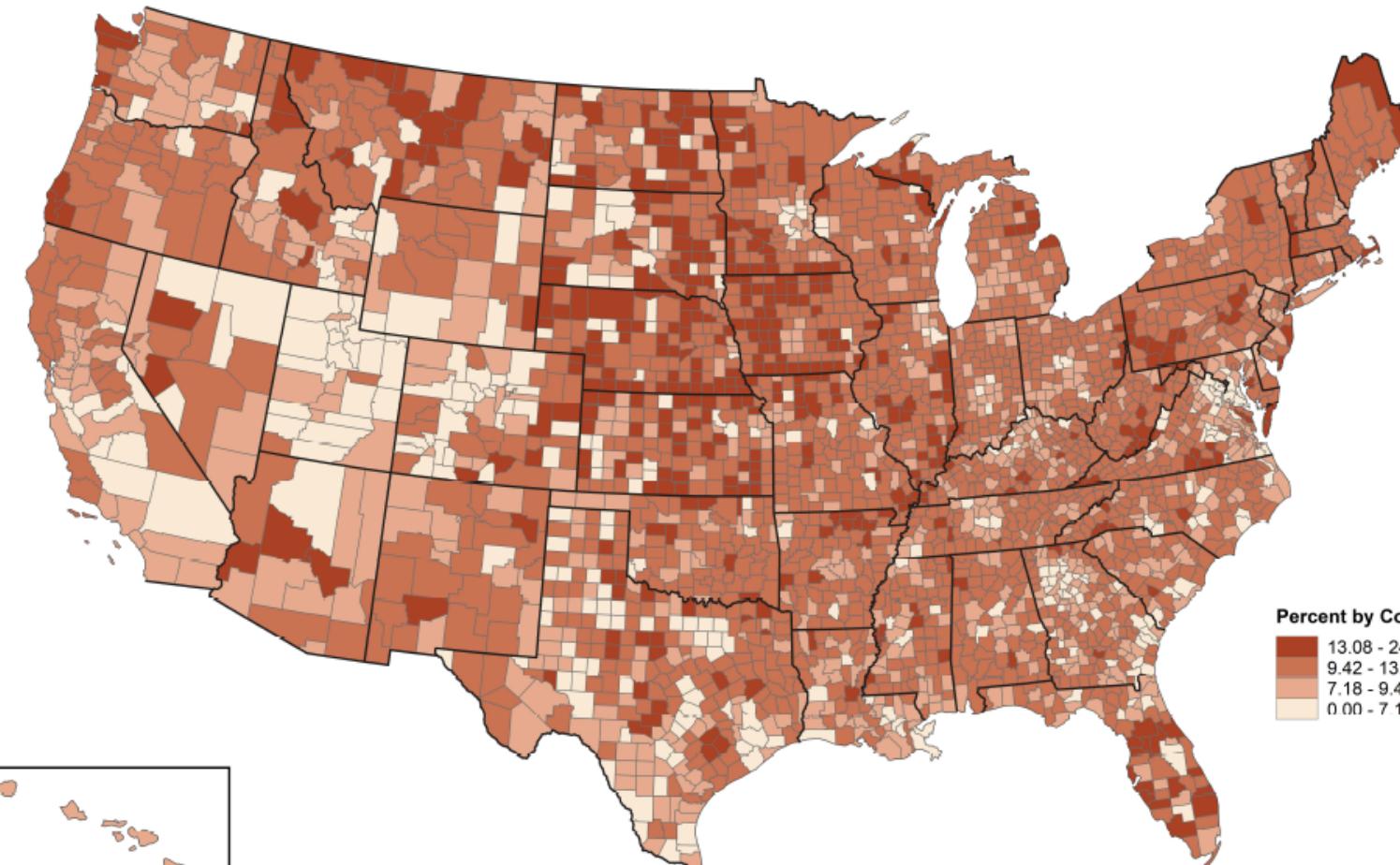
Households with Person Living Alone, Ages 65 and Over: 2010



Source: U.S. Census Bureau, 2010 Census Summary File 1. For information on confidentiality protection, nonsampling error, and definitions, see <www.census.gov/prod/cen2010/doc/sf1.pdf>.



Households With Person Living Alone, Ages 65 and Older: 2010 Demonstration Product

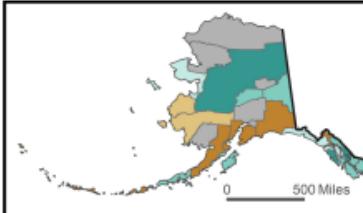


Source: 2010 Demonstration Product

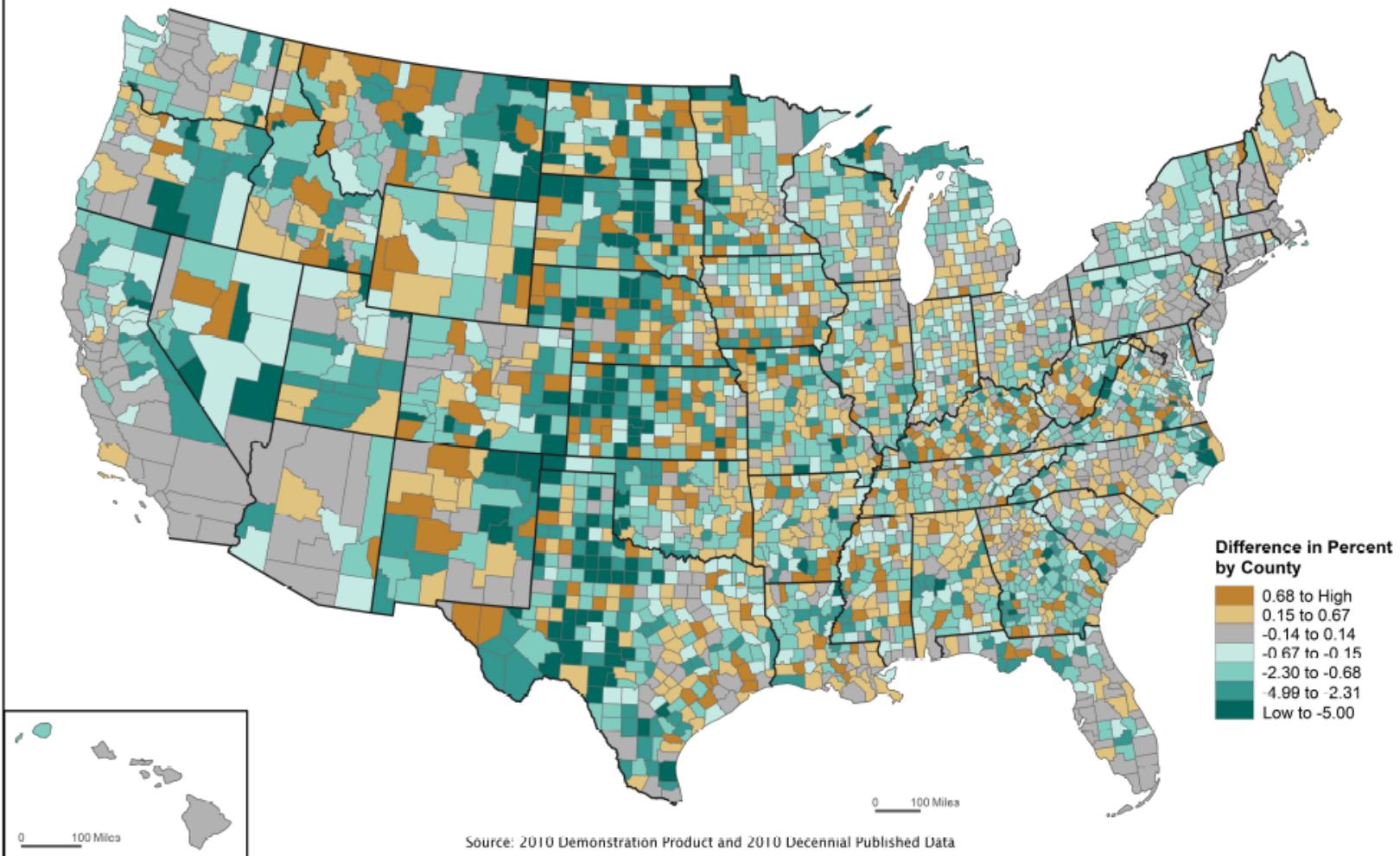
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**Difference in Percent of Households With Person Living Alone,
Ages 65 and Over:
2010 Demonstration Product and 2010 Decennial Published Data**



The Impact of DP on Accuracy in the Estimates

Findings: MAPEs by Universe for the Nation and Select States by County, Sex, Hispanic Origin and Age (0 to 85+)

Geography	Resident Population		Household Population		GQ Population		Geography	Resident Population		Household Population		GQ Population	
	Demo.	Census	Demo.	Census	Demo.	Census		Demo.	Census	Demo.	Census	Demo.	Census
United States	87.5	29.8	67.8	29.9	97.6	61.5							
5 Largest Resident Population MAPEs for the Demonstration Product							5 Smallest Resident Population MAPEs for the Demonstration Product						
Wyoming	144.2	28.3	106.3	28.5	88.3	54.4	Indiana	68.1	27.7	54.5	28.0	84.8	62.6
New Mexico	143.3	22.9	104.0	23.1	92.4	61.0	New Jersey	65.4	10.4	56.3	10.6	205.4	60.6
Nevada	136.3	31.9	124.3	32.1	89.5	47.9	Ohio	61.2	30.1	46.4	30.1	95.5	62.1
Idaho	129.0	30.6	92.3	30.3	83.2	68.6	Hawaii	60.5	14.1	75.3	14.9	98.0	46.9
Alaska	121.0	43.0	78.0	44.2	89.8	45.2	District of Columbia	24.6	12.9	43.1	12.9	118.6	52.2