In-Office Address Canvassing for the 2020 Census: an Overview of Operations and Initial Findings

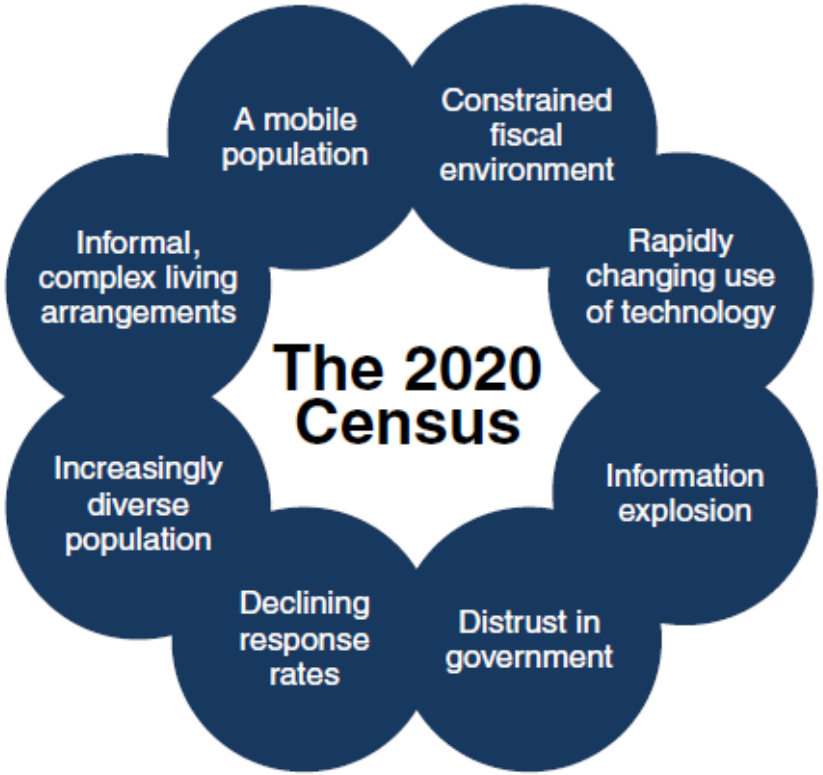
Michael Commons
Address and Spatial Analysis Branch
Geography Division
U.S. Census Bureau

United States Census Bureau
U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
census.gov

In-Office Address Canvassing for the 2020 Census: an Overview of Operations and Initial Findings

- Overview of 2020 Census Operations
  - Ongoing Maintenance and Updates
  - Reengineered Canvassing
  - LUCA
- Preliminary Results of Changes in the Built Landscape

2020 Census Operational Plan



Decennial Census

The purpose is to **conduct** a census of population and housing and **disseminate** results to the President, the States and the American People

Uses of Census data:

- **Apportioning** representation among states as mandated by Article 1, Section 2 of the US Constitution
- **Drawing** congressional and state legislative districts, school districts and voting precincts
- **Enforcing** voting rights and civil rights legislation
- **Distributing** federal dollars
- **Informing** planning decisions of tribal, federal, state and local government and organizational decisions of businesses and non-profits (e.g., where to locate, size of market, etc.)

The 2020 Census: A New Design for the 21st Century

Motivate People to Respond

Conduct a nation-wide communications and partnership campaign

Maximize outreach using traditional and new media

Target ads to specific audiences

Work with trusted sources to inspire participation.

TELEPHONE AND PAPER SELF-RESPONSE

NONRESPONSE FOLLOWUP

INTERNET SELF-RESPONSE

Count the Population

Collect data from all households, including group and unique living arrangements

Make it easy for people to respond anytime, anywhere

Encourage people to use the new online response option

Use the most cost-effective strategy to contact and count nonrespondents

Knock on doors only when necessary

Streamline in-field census-taking

Establish Where to Count

Identify all addresses where people could live

IN-FIELD

IN-OFFICE

Conduct a 100% review and update of the nation's address list

Minimize field work with in-office updating

Use multiple data sources to identify areas with address changes

Get local government input

Release Census Results

Process and Provide Census Data

Deliver apportionment counts to the President by December 31, 2020

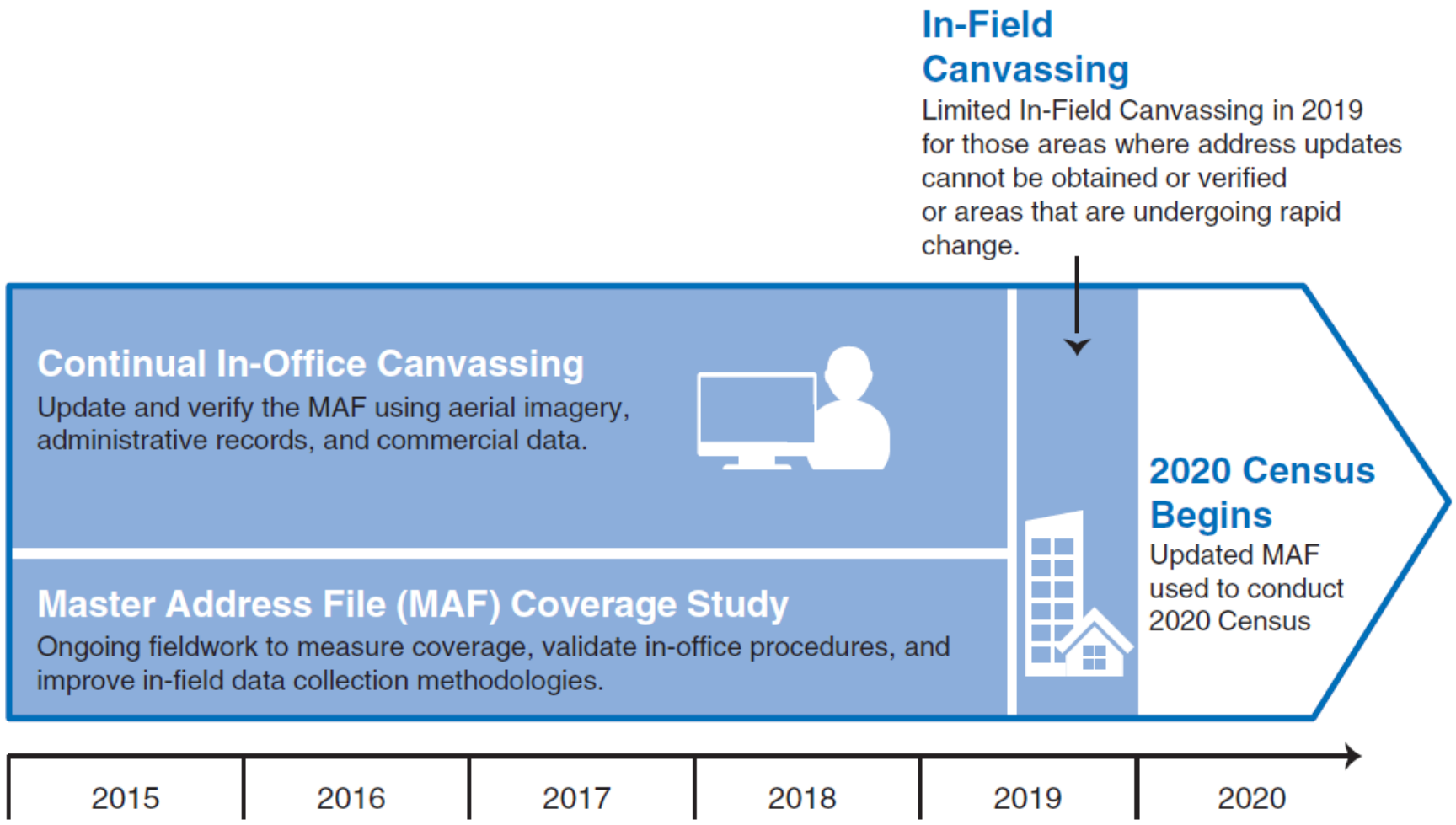
Release counts for redistricting by April 1, 2021

Make it easier for the public to get data

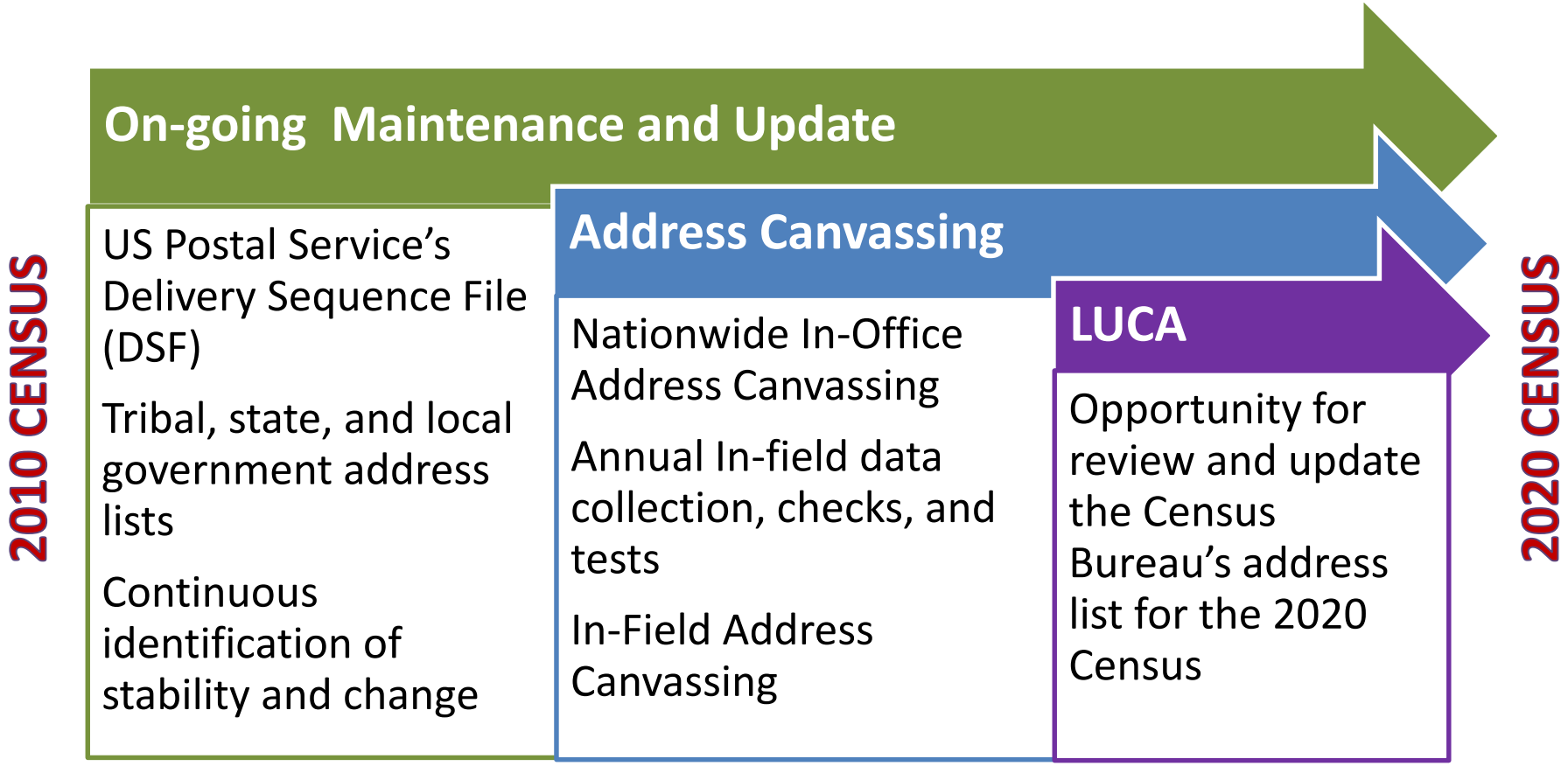
United States Census Bureau

U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
census.gov

Summary of Reengineering Address Canvassing

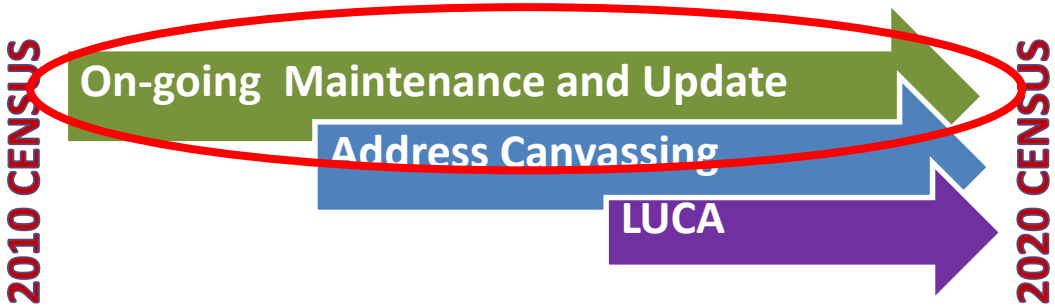


Maintaining an Accurate Address List



Datasets Used in Updating, Maintaining, and Evaluating the Master Address File (MAF)

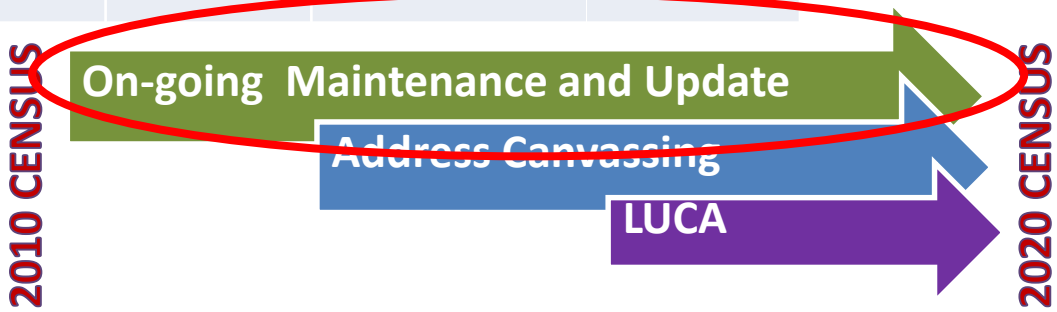
- US Postal Service Delivery Sequence File (DSF) and related products
  - Locatable Address Conversion Service (LACS) file
  - Enhanced Line of Travel (eLot)
- Tribal, state, and local government address lists and parcel (cadastre) files
  - Provided through Geographic Support System partnership activities
  - Accessed on-line for in-office update programs
  - Provided through the Local Update of Census Addresses (LUCA) program
- Building permits data (change detection; MAF analysis)
- Commercial address lists



Delivery Sequence File

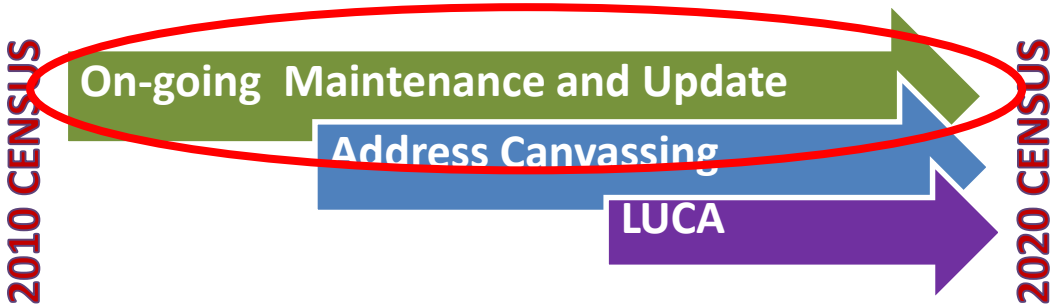
Records Added or Matched to the MAF, 2010-2017

Year	Number of DSF Residential Addresses	Residential Addresses that are New to the DSF	New DSF Residential Addresses Matched to the MAF		New DSF Residential Addresses Added to the MAF	
			Number	Percent	Number	Percent
2017	128,674,723	894,069	148,293	16.6	745,776	83.4
2016	127,228,148	1,681,768	745,092	44.3	936,676	55.7
2015	125,109,346	719,483	138,532	19.2	580,951	80.8
2014	124,093,231	1,074,852	222,985	20.7	851,867	79.3
2013	122,165,378	323,957	87,008	26.9	236,949	73.1
2012	122,319,728	626,494	183,328	29.3	443,166	70.7
2011	121,591,739	625,495	220,209	35.2	405,286	64.8
2010	121,209,935	873,429	420,198	48.1	453,231	51.9
Total 2010-2017		6,819,547	2,165,645	31.8	4,653,902	68.2



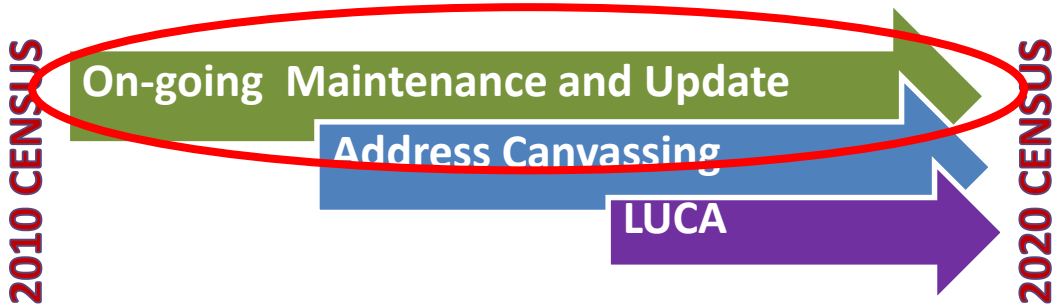
Address Improvements from Tribal, State, and Local Government Address Lists, 2012-2017

Address Improvement	Number of Addresses
Addresses received	104,363,558
Addresses accepted for use in updating the MAF	83,312,316
Addresses updating information for existing addresses in MAF	82,976,258
New addresses added to the MAF	336,058
Addresses for which partner files provided new or improved latitude/longitude coordinates	65,095,658
MAF addresses for which geocodes were corrected by partner data	1,434,342
Previously un-geocoded MAF addresses geocoded using partner data	1,245,832



Commercial Address Lists Matched to the MAF, 2016

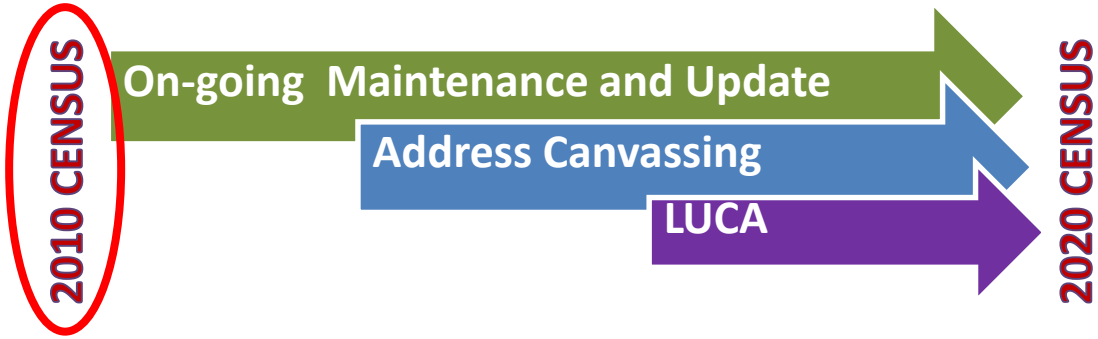
Vendor	Usable Addresses	Number of Usable Addresses Matched to MAF Addresses	Percentage of Usable Addresses Matched to MAF Addresses	Number of Usable Addresses Matching DSF Addresses	Percent of Usable Addresses Matching to DSF-confirmed Addresses
1	120,270,430	119,529,128	99.4	109,628,663	91.1
2	102,313,410	95,822,185	93.6	86,407,653	84.4
3	152,581,321	148,730,349	97.5	140,071,903	91.8
4	98,037,776	90,919,679	92.7	81,894,085	83.5
5	111,040,589	109,148,391	98.3	100,483,496	90.5



2010 Census Address Canvassing

Setting the Stage for Reengineered Address Canvassing

- Covered the entirety of the U.S. and Puerto Rico
  - Exceptions: Remote Alaska and northern Maine, which account for nearly 12 percent of the US land area, but less than 1 percent of housing units
- Created a critical baseline set of information
  - In 2009, more than 150,000 field staff drove every mile of road in the nation
  - Verified and updated over 155 million address records
  - Collected GPS points for all housing units visited
  - Added more than 2.5 million new roads segments
- One of the most expensive decennial census field operations
  - Two-thirds of the updates were concentrated in 4 percent of the blocks canvassed
  - Cost over $450 million



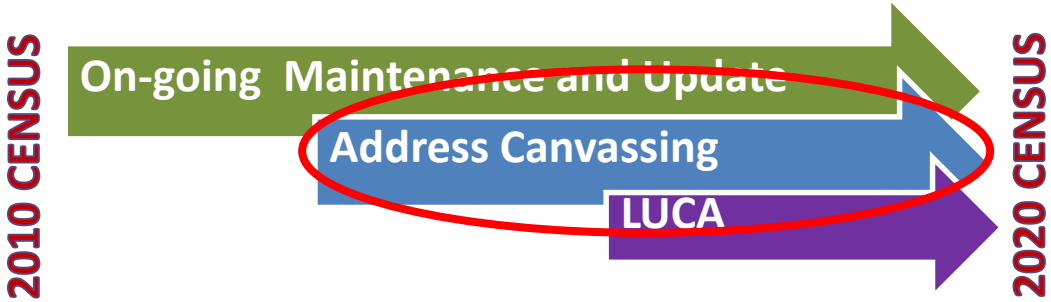
Reengineered Address Canvassing

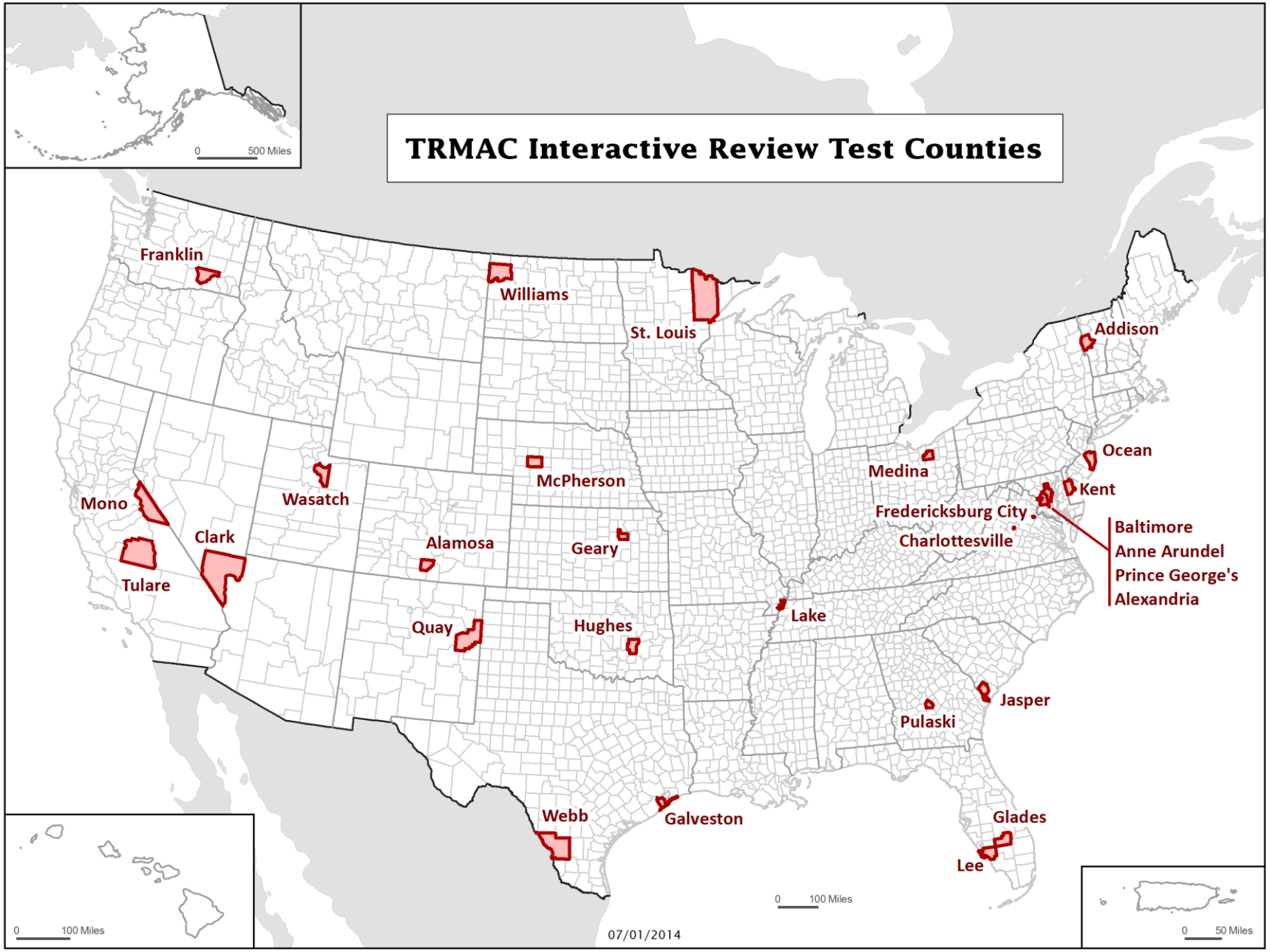
General Questions:

- Is a traditional, on-the-ground canvassing operation necessary nationwide to ensure a complete and accurate address list for the decennial census?
- Are there areas of the country in which the address list and locational information can be kept current without canvassing in the field?

Goals:

- Manage 70 percent or more of the addresses in the office; up to 30 percent of addresses canvassed in the field.
  - What is 30 percent? Approximately 42.1 million addresses.
  - To put into context: the 85 U.S. places with 100,000 or more population in 2015 contain a total of 24.7 million housing units (source: ACS 2011-2015 5-year data).

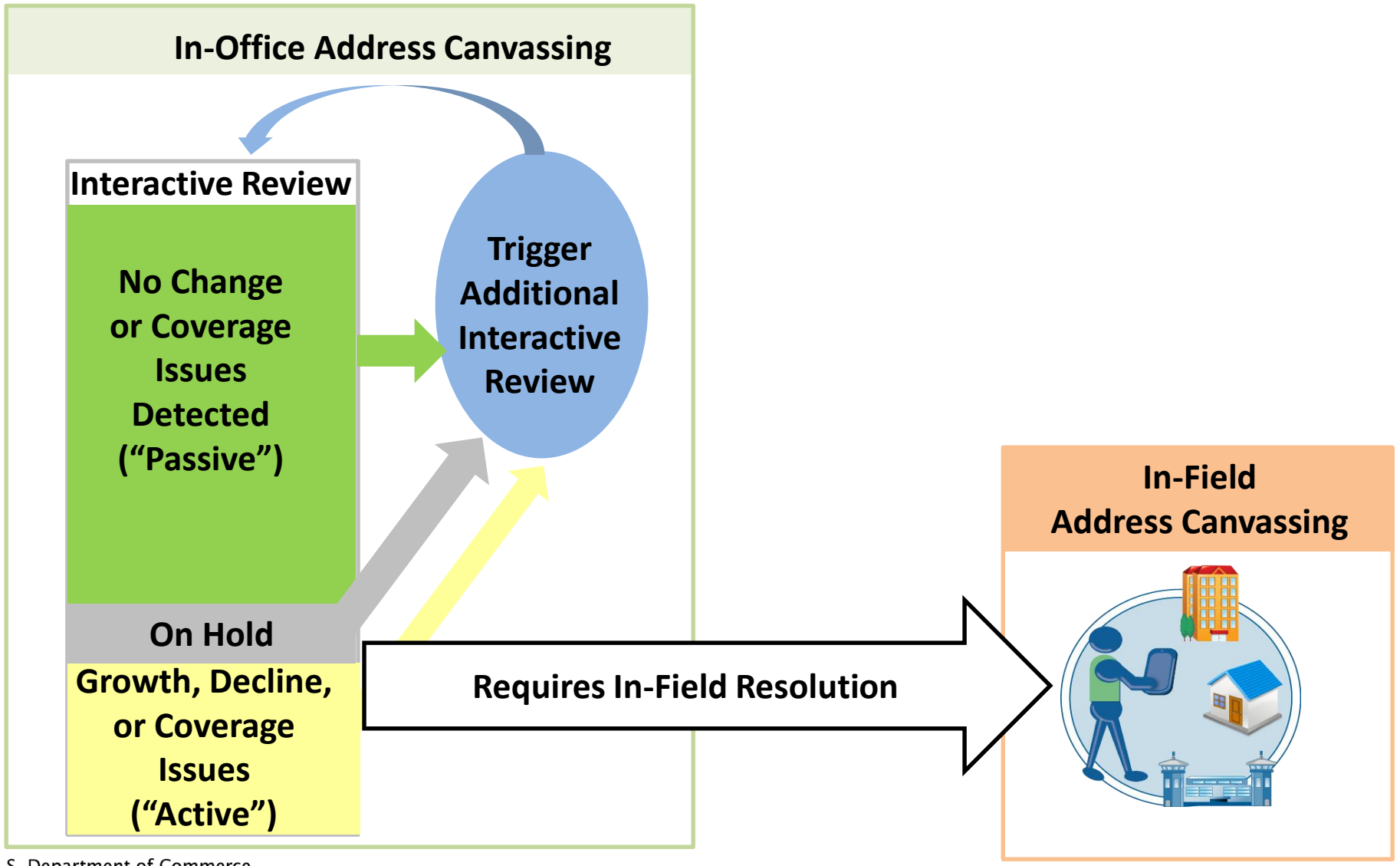




United States Census Bureau

U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
census.gov

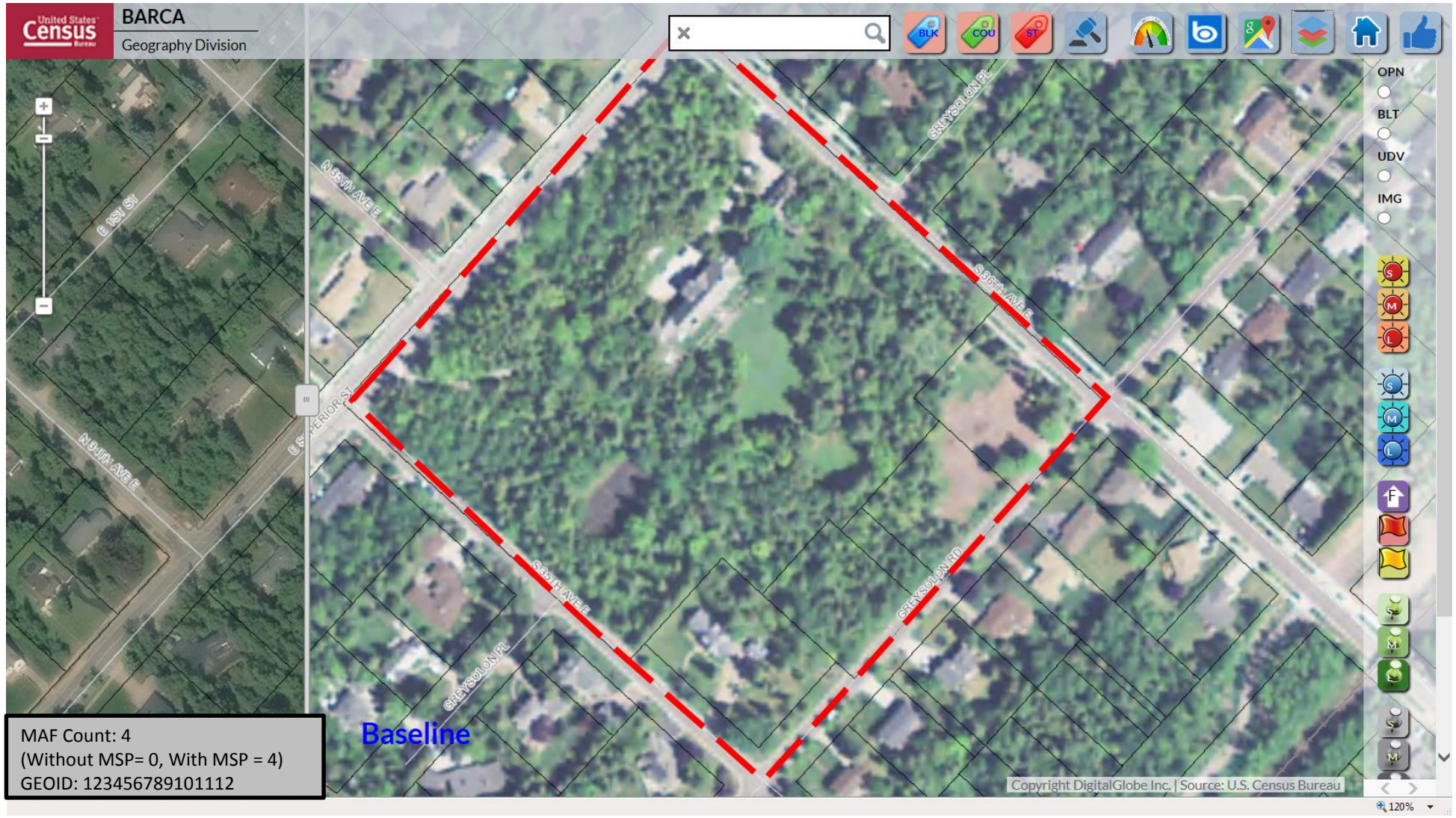
In-Office Address Canvassing Overview



Block Assessment Review and Classification Application (BARCA)

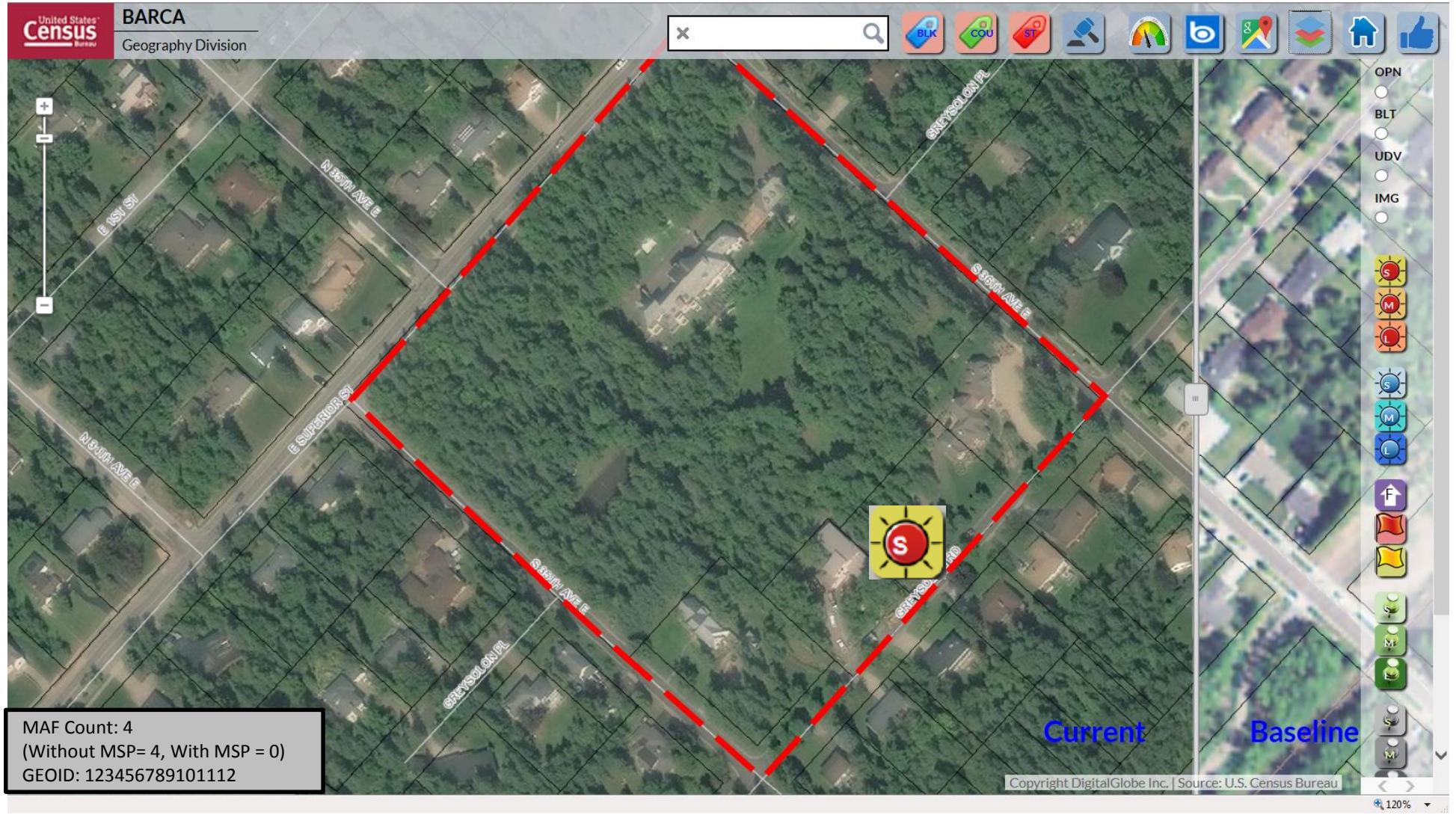
Note: This slide does not contain Title 13 data.

Baseline Imagery (circa 2009/2010)



Note: This slide does not contain Title 13 data.

Current Imagery (as of time of review)



Note: This slide does not contain Title 13 data.

Interactive Review: Block Status

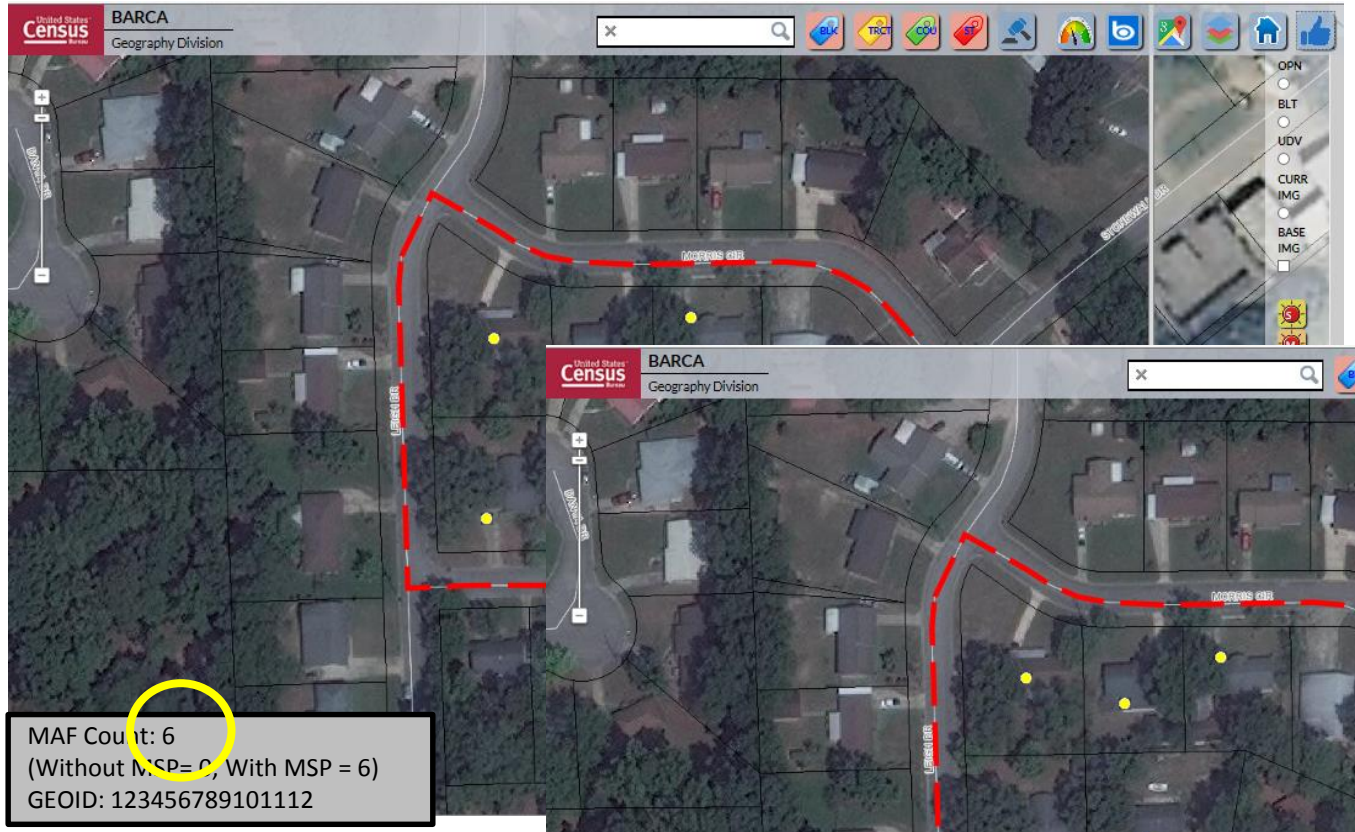
Built-Out

Open Space

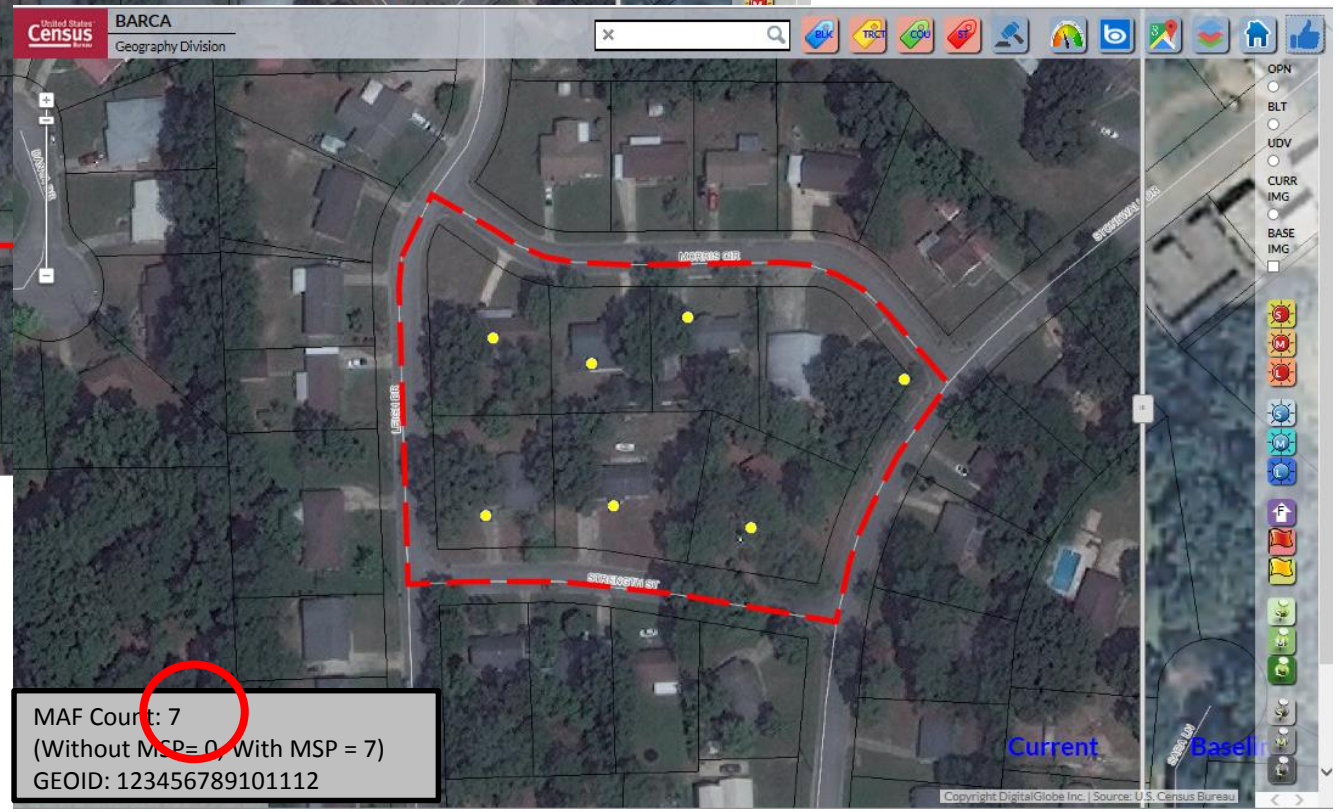
Note: This slide does not contain Title 13 data.

Triggers: Bringing Blocks Back into Interactive Review

- A trigger is an “event” that provides information and/or data that suggest the need to send a block back through IR. Examples include:
  - New, or better resolution, imagery becomes available
  - Results from processing DSF or GSS partner files
  - Results from Ungeocoded Resolution and other MAF update and clean-up activities
  - Automated imagery review/analysis that detects, or suggests, the existence of new housing
  - A natural disaster (hurricane, flood, tornado) affects housing stock in an area to the extent that inhabitability, deliverability of mail, and existence of structures may be affected



Reviewed:
December 2016



MAF Count Changed:
June 2017

Note: This slide does not contain Title 13 data.

In-Office Address Canvassing Interactive Review Status: All Blocks

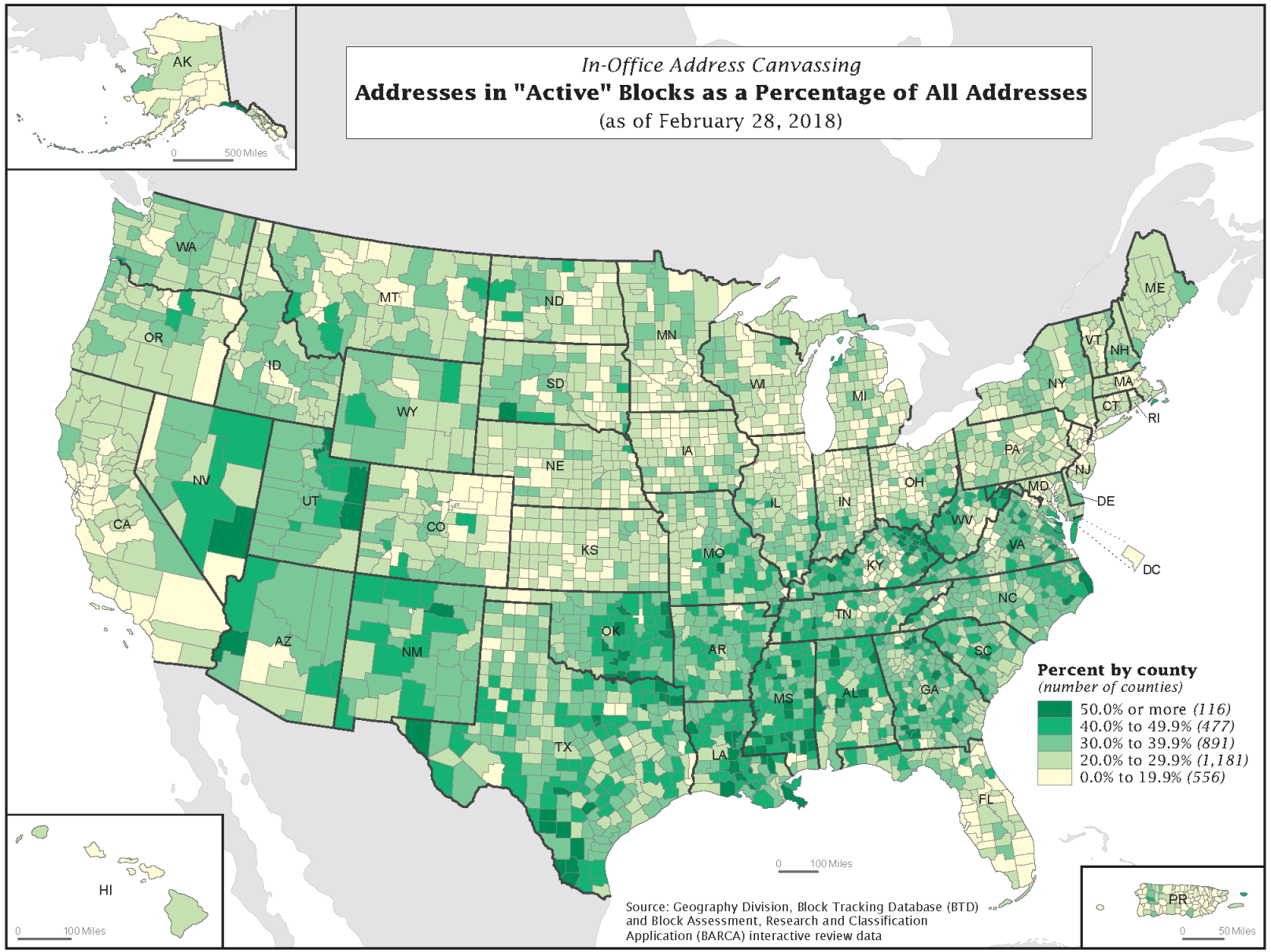
(as of September 10, 2018)

	Blocks		Housing Units	
	Number	Percentage	Number	Percentage
Total US and Puerto Rico	11,155,486	100.0	144,285,336	100.0
Total Passive	8,878,326	79.59	87,433,792	60.60
Total Active	1,692,830	15.17	36,586,776	25.36
Total On-Hold	474,363	4.25	11,938,798	8.27
Total Triggered	109,967	0.99	8,325,970	5.77

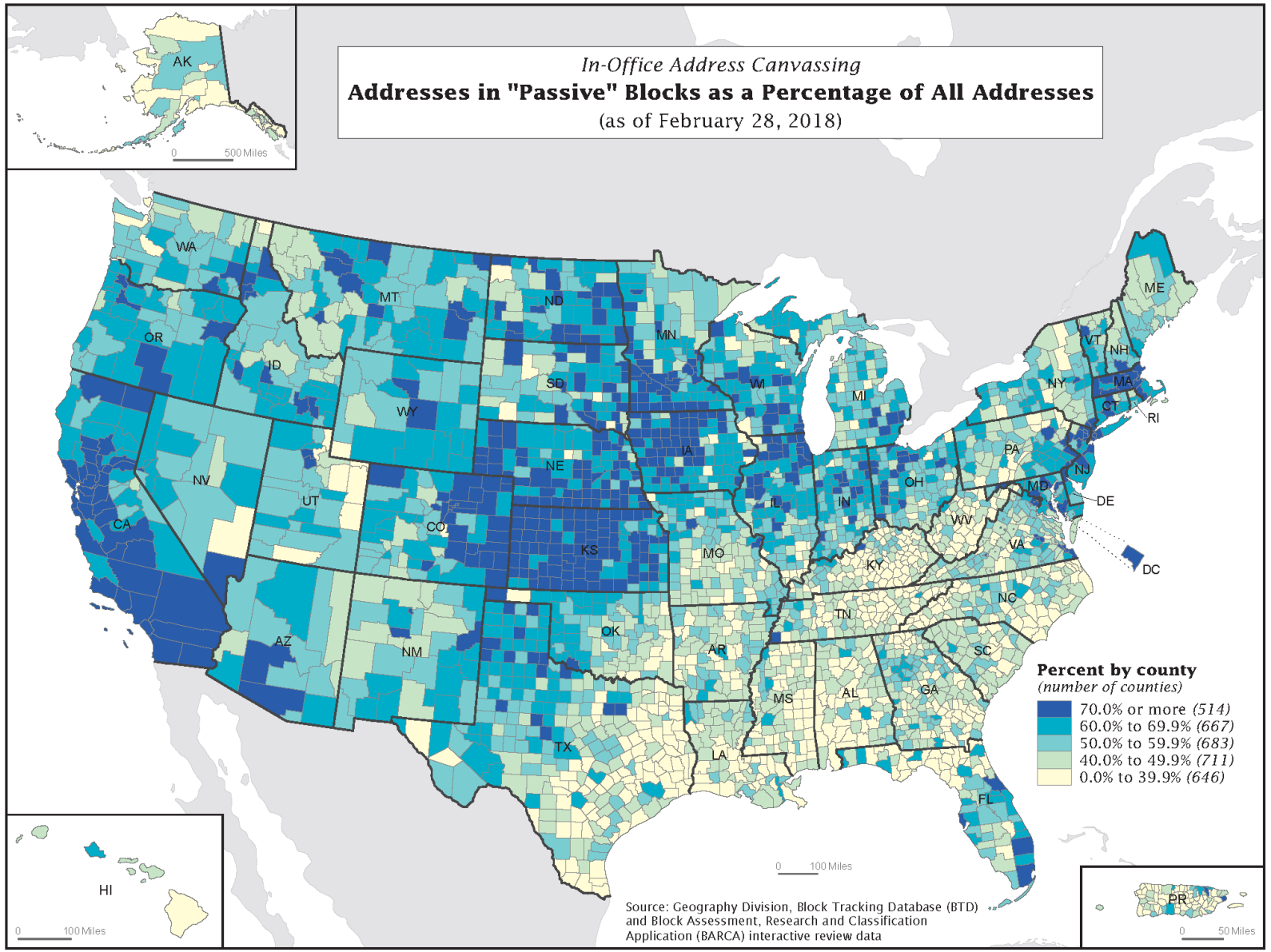
In-Office Address Canvassing Interactive Review Status: Mail-out/Mail-back Blocks

(as of September 10, 2018)

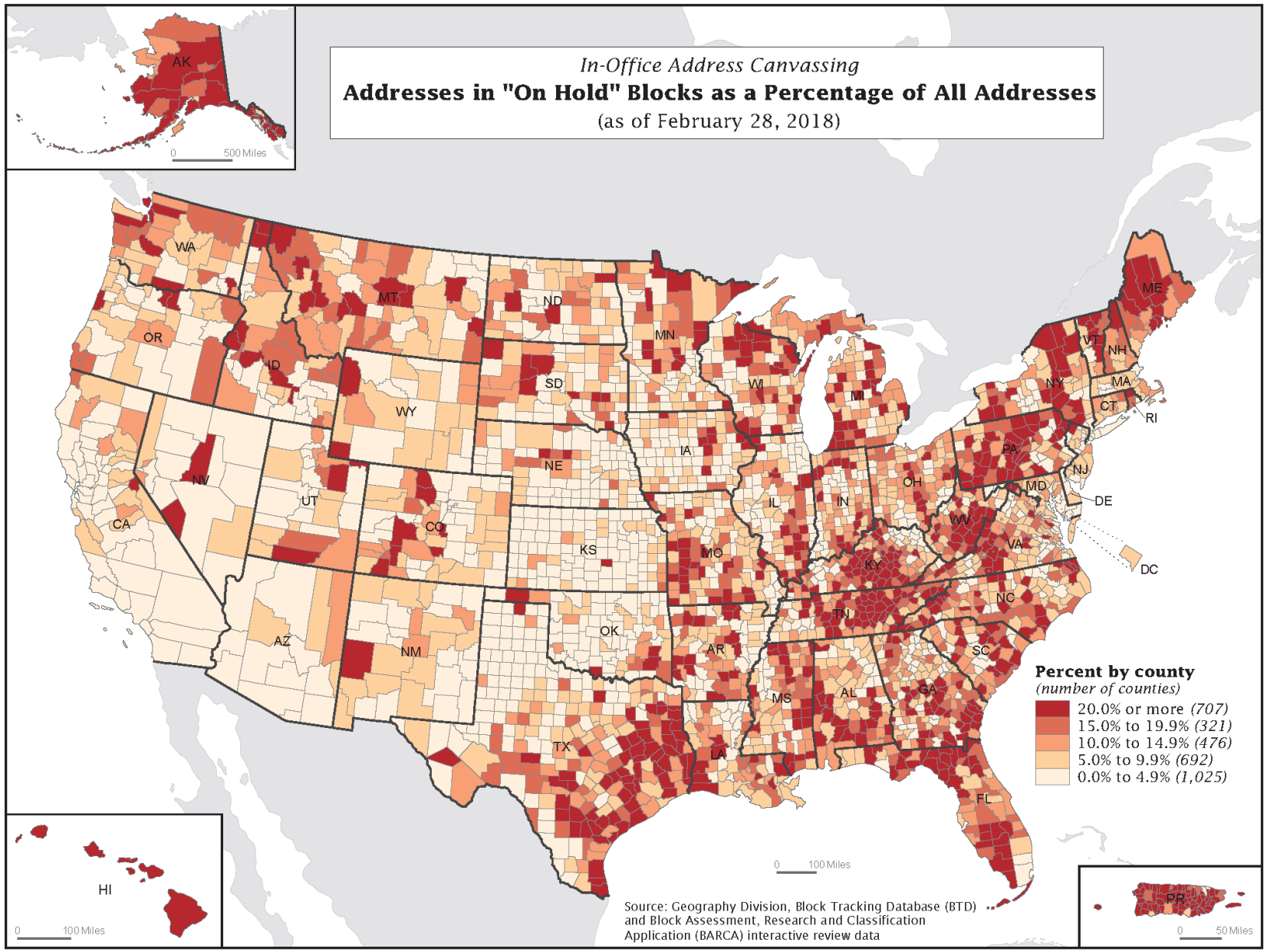
	Blocks		Housing Units	
	Number	Percentage	Number	Percentage
Total US and Puerto Rico	9,943,346	100.0	137,888,784	100.0
Total Passive	7,947,496	79.93	84,395,054	61.21
Total Active	1,524,191	15.33	34,670,842	25.14
Total On-Hold	372,171	3.74	10,570,993	7.67
Total Triggered	99,488	1.00	8,251,895	5.98



United States Census Bureau
U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
census.gov

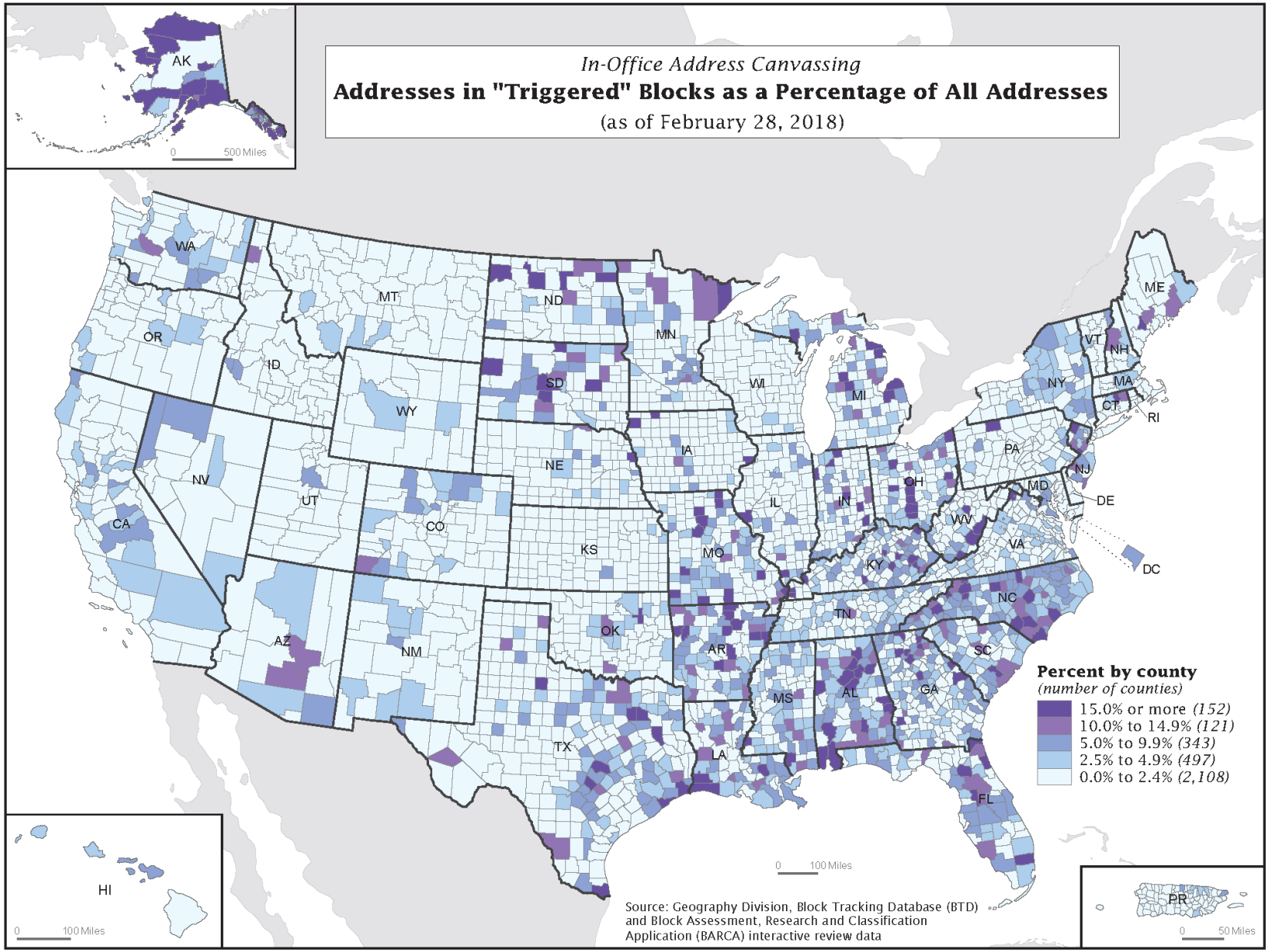


United States Census Bureau
U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
census.gov



United States Census Bureau

U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
census.gov



United States Census Bureau

U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
census.gov

LUCA

A?

pportunity offered to tribal,
vernments to review and
.S. Census Bureau's
s list for their jurisdiction
ensus. The Census
complete and accurate
ch every living quarters
pulation for inclusion in the

ate in LUCA?

e an accurate decennial census count in your co

deral government distribute more than $400 billi
ly for infrastructure, programs, and services.

ommunity plan for future needs.

ticipate in LUCA?

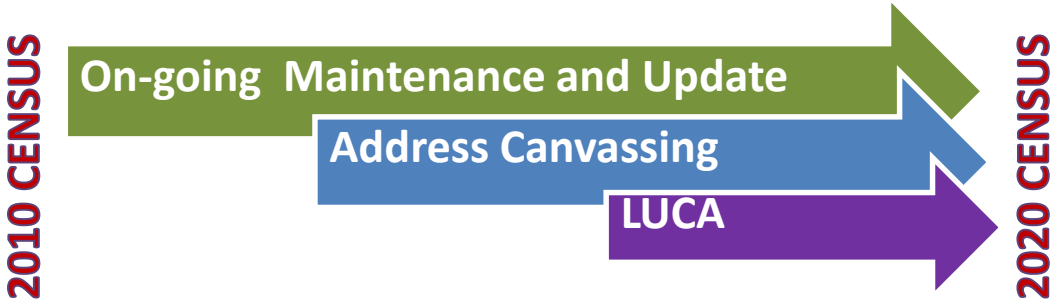
. legal governments can participate in LUCA. Th

gnized tribes with a reser

Summary

Building and maintaining the address list for the 2020 Census relies upon multiple administrative sources of addresses and multiple methods for reviewing, updating, and validating the MAF

- On-going maintenance and updates from multiple sources, anchored by the USPS' Delivery Sequence File and local government address lists
- In-Office imagery-based Interactive Review to detect areas of stability and areas of change
- In-office resolution processes to resolve and update as many addresses as possible in the office prior to identifying areas to canvass in the field in 2019
- Local Update of Census Addresses to provide tribal, state, and local governments the opportunity to review the Census Bureau's address list and provide updates



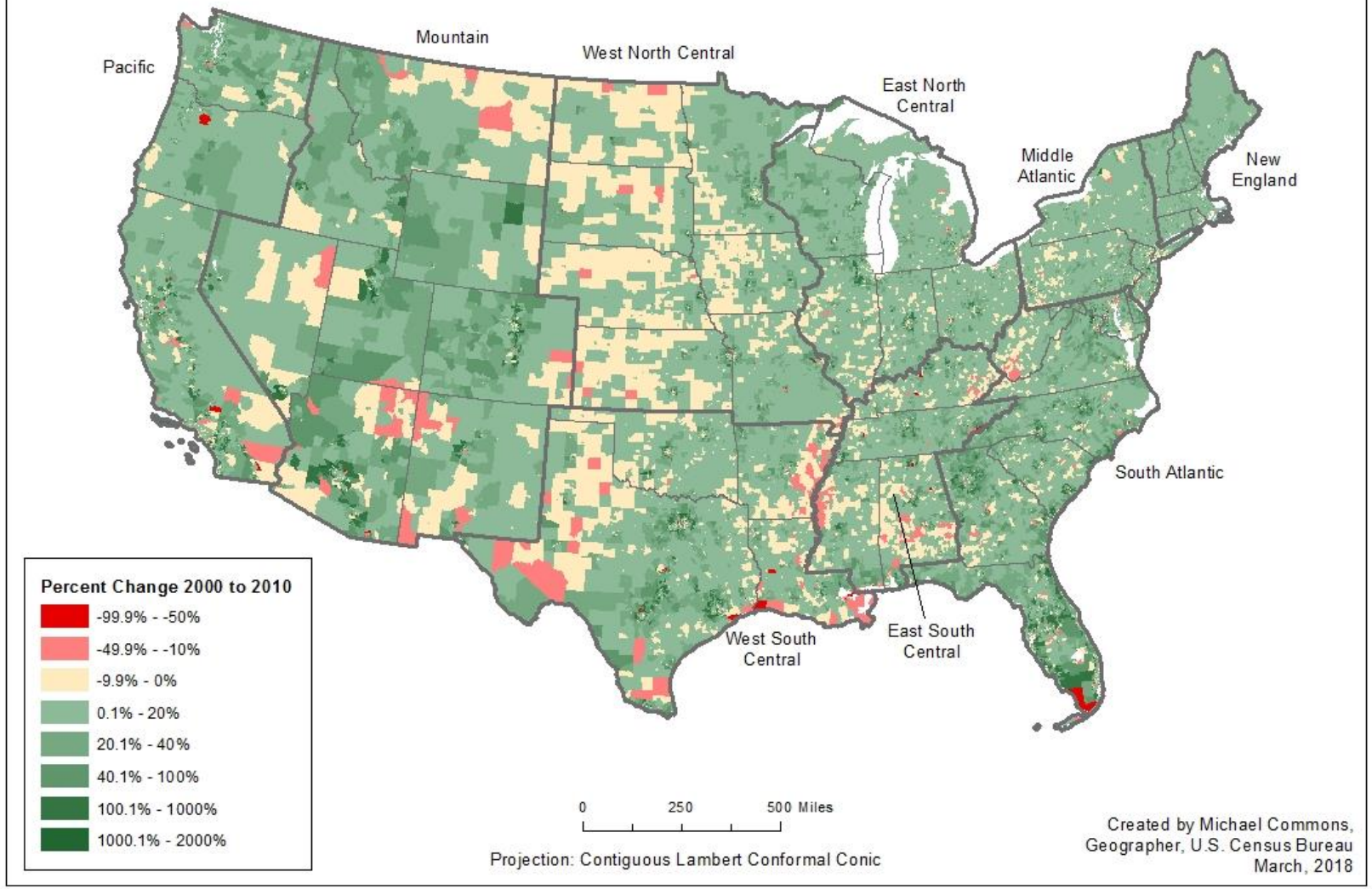
Changes in the Built Landscape

- Purpose of research
- Review of changes from 2000 to 2010
- Data sources and methodology
- Results by geographic location and urban-rural type
- Comparison with demographic data
- Findings

Purpose of Research

- Summarize IR detection of change and compare to Housing Unit Estimates (HUE)
- Increase efficacy of ongoing in-office canvassing operations (2020 and beyond)
  - Target specific areas of change
    - More frequent in-office canvassing
    - Pursue and acquire local data sources
  - Avoid redundancy in areas with high likelihood of stability

Percent Change in Housing Units 2000 to 2010



Proportion of the Growth in Housing Units

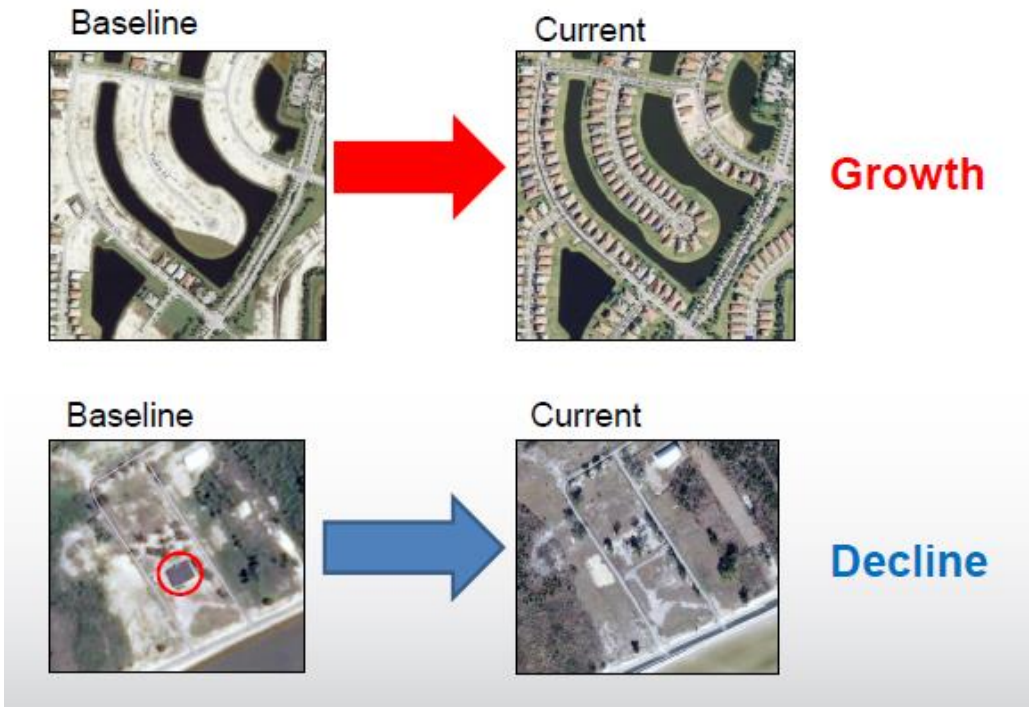
Census Divison	2000 to 2010
Middle Atlantic	6.3%
East South Central	5.5%
East North Central	10.3%
Mountain	12.7%
New England	3.0%
Pacific (not AK, HI)	13.5%
South Atlantic	28.7%
West North Central	5.7%
West South Central	14.2%

United States Census Bureau
U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
census.gov

Data Sources

Interactive Review (IR)

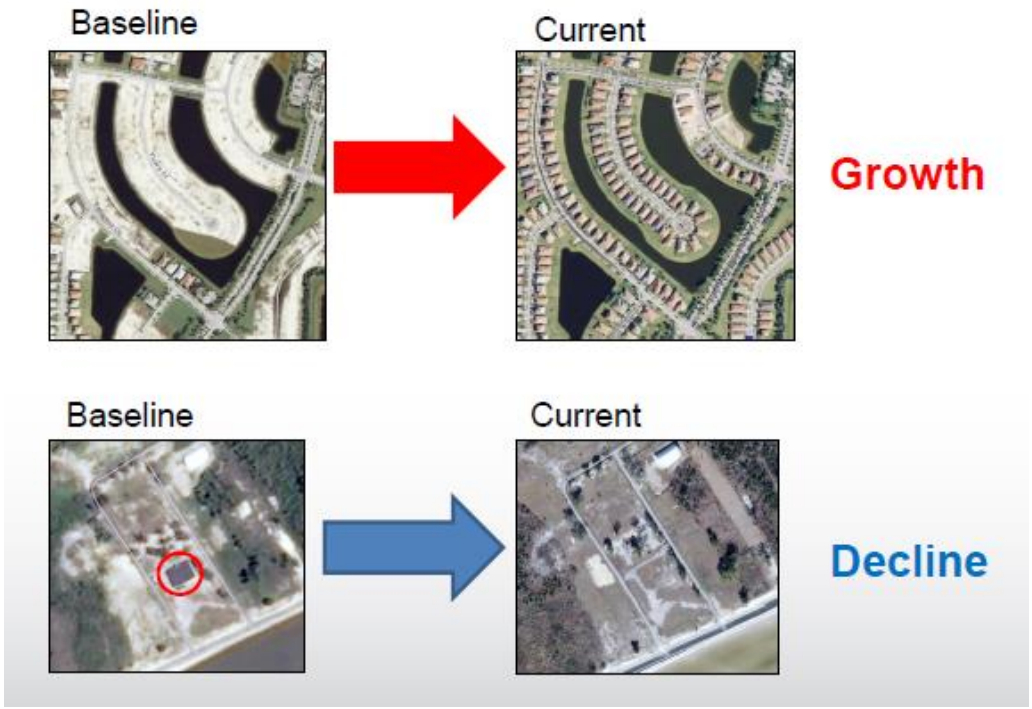
- Staff compare 2010 imagery to the most current imagery
- In addition to verifying the housing counts are correct, they also note changes in the landscape, including the removal or addition of housing units



Data Sources

Interactive Review (IR)

- Staff compare 2010 imagery to the most current imagery
- In addition to verifying the housing counts are correct, they also note changes in the landscape, including the removal or addition of housing units
  - Use a 3-class pin system
    - Small (1) = 1 HU
    - Medium (2) = 2-9 HU
    - Large (3) = 10+ HU



Data Sources

Housing Unit Change

- New addresses added since 2010
  - US Postal Service Delivery Sequence File (DFS)
  - Geographic Support System (GSS)
- Housing Unit Estimates (Population Estimates Program)

Demographic Data

- Demographic data extracted from American Community Survey 3-year (2009-2011)

Data Sources

Housing Unit Change

- New addresses added since 2010
  - US Postal Service Delivery Sequence File (DFS)
  - Geographic Support System (GSS)
- Housing Unit Estimates (Population Estimates Program)

Demographic Data

- Demographic data extracte
  year (2009-2011)

NOTE: Alaska, Hawaii, Puerto Rico, and Island Areas were removed from the analysis because of significant differences in development patterns and urban classifications.

Methodology

- Data Analysis at multiple scales and geographies
  - Census tract
  - Census division
  - 2010 Rural-Urban Commuting Area Codes (RUCA)
    - Ten classes
      - Created by USDA using Census urban areas
      - Based on population density and functional connections (commuter patterns)

Methodology

- 2010 Rural-Urban Commuting Area Codes (RUCA)

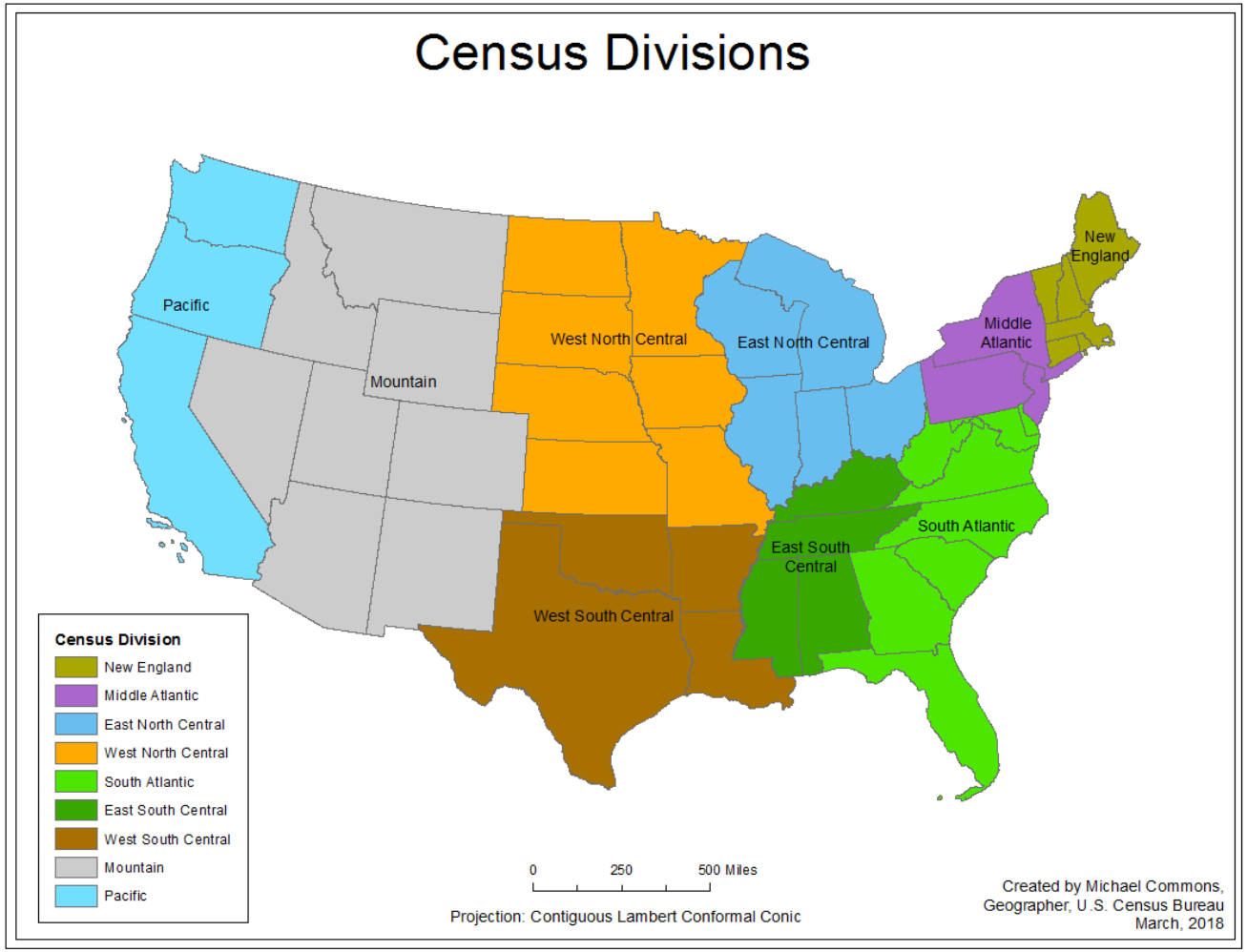
1	Metropolitan area core: primary flow within an Urbanized Area (UA)
2	Metropolitan area high commuting: primary flow 30% or more to a UA
3	Metropolitan area low commuting: primary flow 10% to 30% to a UA
4	Micropolitan area core: primary flow within an Urban Cluster of 10,000 to 49,999 (large UC)
5	Micropolitan high commuting: primary flow 30% or more to a large UC
6	Micropolitan low commuting: primary flow 10% to 30% to a large UC
7	Small town core: primary flow within an Urban Cluster of 2,500 to 9,999 (small UC)
8	Small town high commuting: primary flow 30% or more to a small UC
9	Small town low commuting: primary flow 10% to 30% to a small UC
10	Rural areas: primary flow to a tract outside a UA or UC

Methodology

- IR Growth and Decline Pins multiplied by number of housing units expected
  - Expected housing unit numbers based on analysis of Active Block Resolution (ABR) results
    - Small (1) * 1
    - Medium (2) * 5.5
    - Large (3) * 15

Methodology

- IR Growth and Decline Pins multiplied by number of housing units expected
  - Expected housing unit numbers based on analysis of Active Block Resolution (ABR) results
    - Small (1) * 1
    - Medium (2) * 5.5
    - Large (3) * 15
- Summed to the Census Tract
- New addresses can supplement IR Pins



Proportion of the Growth in Housing Units

Census Divison	2000 to 2010	2010 to Current
Middle Atlantic	6.3%	5.5%
East South Central	5.5%	8.7%
East North Central	10.3%	7.1%
Mountain	12.7%	14.5%
New England	3.0%	3.4%
Pacific (not AK, HI)	13.5%	10.0%
South Atlantic	28.7%	22.6%
West North Central	5.7%	8.5%
West South Central	14.2%	19.7%

Tracts with Growth and Decline 2010 to Current by Census Division

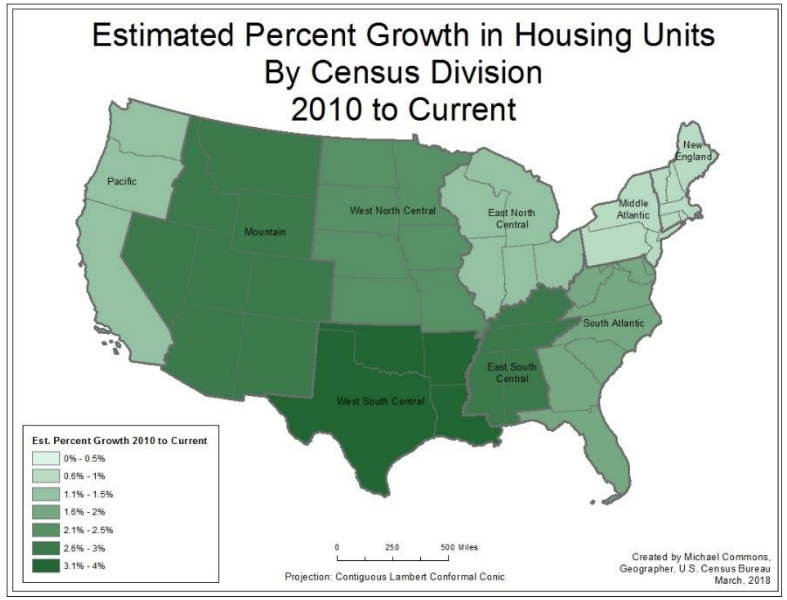
	All Tracts	Growth Tracts	Decline Tracts	Pct Tracts with Growth	Pct Tracts with Decline
Middle Atlantic	10,147	6,214	4,885	61.2%	48.1%
East South Central	4,457	3,942	3,735	88.4%	83.8%
East North Central	11,808	8,286	8,306	70.2%	70.3%
Mountain	5,250	4,082	2,958	77.8%	56.3%
New England	3,392	2,733	2,057	80.6%	60.6%
Pacific (not AK, HI)	10,349	6,152	4,414	59.4%	42.7%
South Atlantic	13,706	10,947	8,940	79.9%	65.2%
West North Central	5,285	4,398	4,133	83.2%	78.2%
West South Central	8,145	6,877	6,202	84.4%	76.1%
All Divisions	**72,539**	**53,631**	**45,630**		

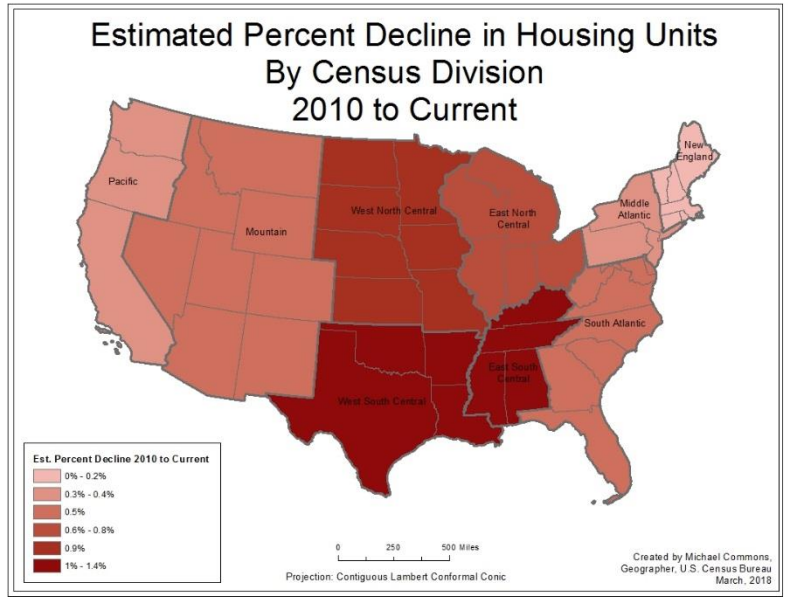
United States Census Bureau
U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
census.gov

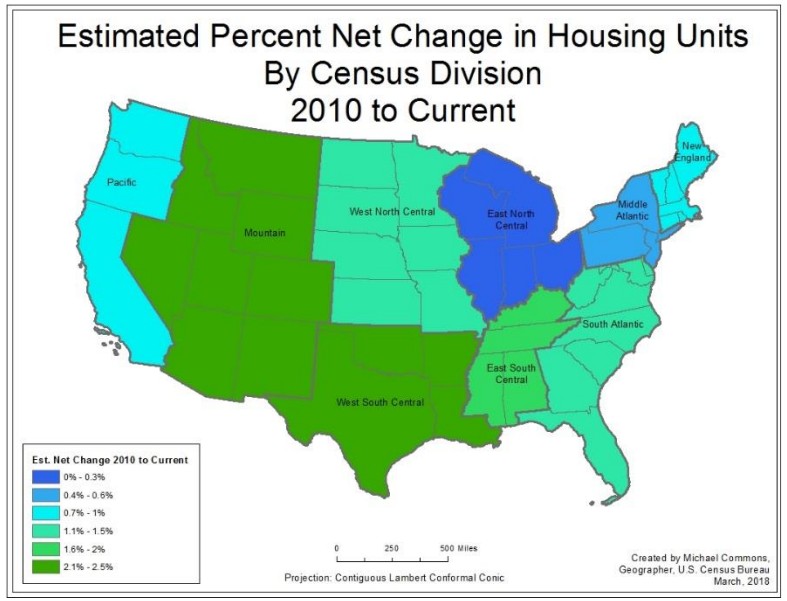
Housing Unit Estimates

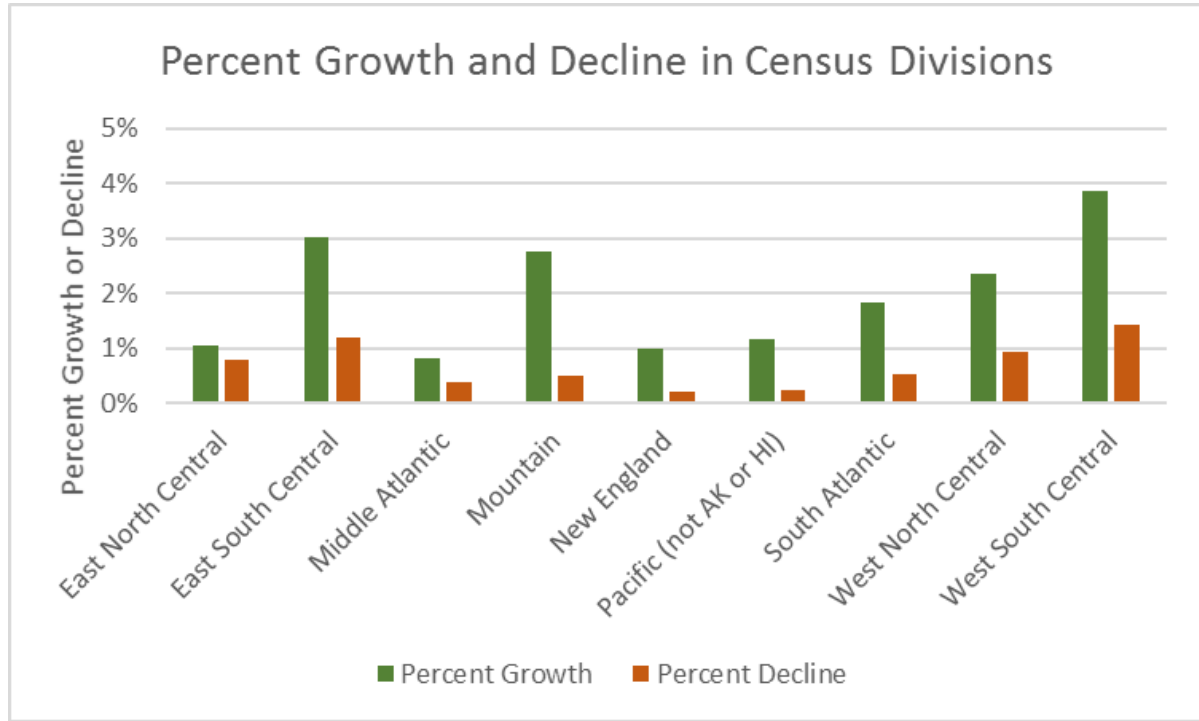
Proportion of the Growth in Housing Units

Census Divison	2000 to 2010	2010 to Current	HUE
Middle Atlantic	6.3%	5.5%	4.7%
East South Central	5.5%	8.7%	3.5%
East North Central	10.3%	7.1%	2.7%
Mountain	12.7%	14.5%	12.4%
New England	3.0%	3.4%	2.2%
Pacific (not AK, HI)	13.5%	10.0%	19.4%
South Atlantic	28.7%	22.6%	29.2%
West North Central	5.7%	8.5%	4.7%
West South Central	14.2%	19.7%	21.2%





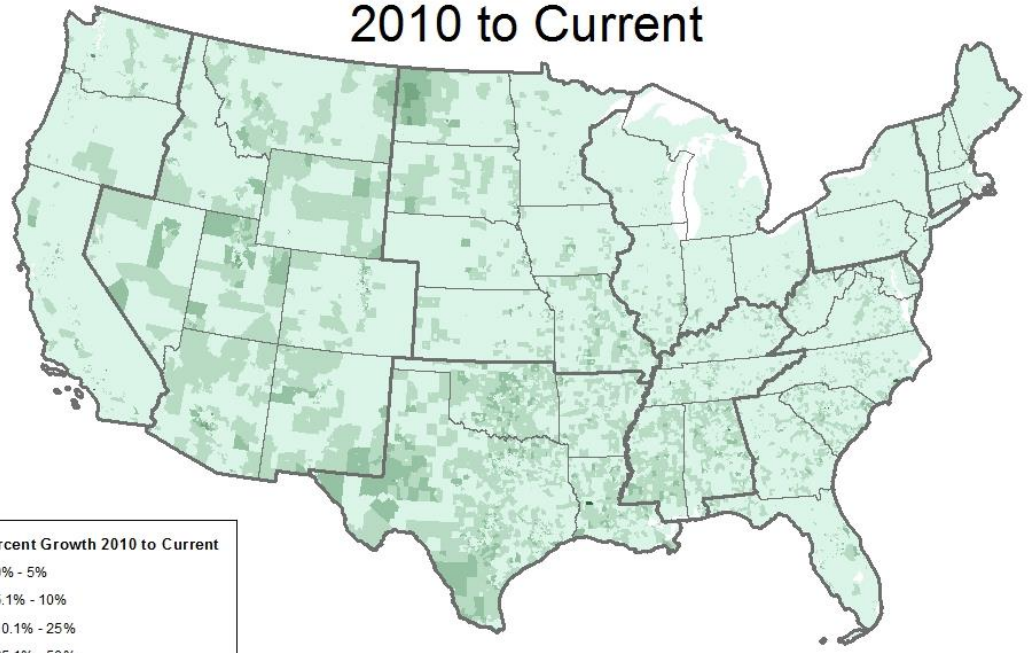




United States Census Bureau

U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
census.gov

Estimated Percent Growth in Housing Units By Census Tract 2010 to Current



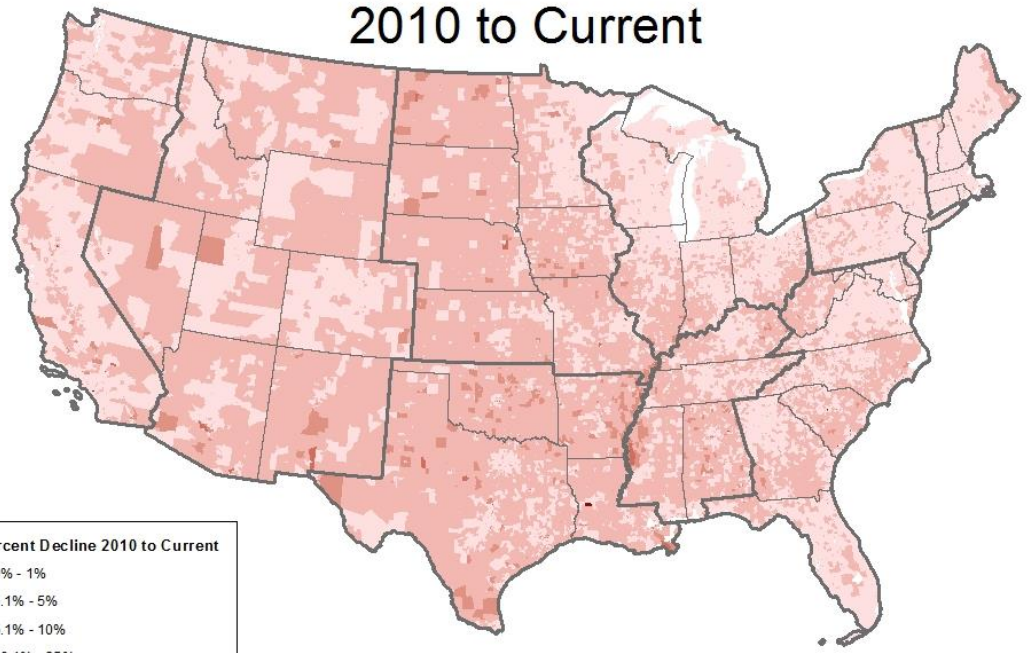
Est. Percent Growth 2010 to Current
- 0% - 5%
- 5.1% - 10%
- 10.1% - 25%
- 25.1% - 50%
- 50.1% - 100%
- 100.1% - 200%
- 200.1% - 6000%

0 250 500 Miles

Projection: Contiguous Lambert Conformal Conic

Created by Michael Commons, Geographer, U.S. Census Bureau
March, 2018

Estimated Percent Decline in Housing Units By Census Tract 2010 to Current



Est. Percent Decline 2010 to Current
- 0% - 1%
- 1.1% - 5%
- 5.1% - 10%
- 10.1% - 25%
- 25.1% - 50%
- 50.1% - 75%
- 75.1% - 100%

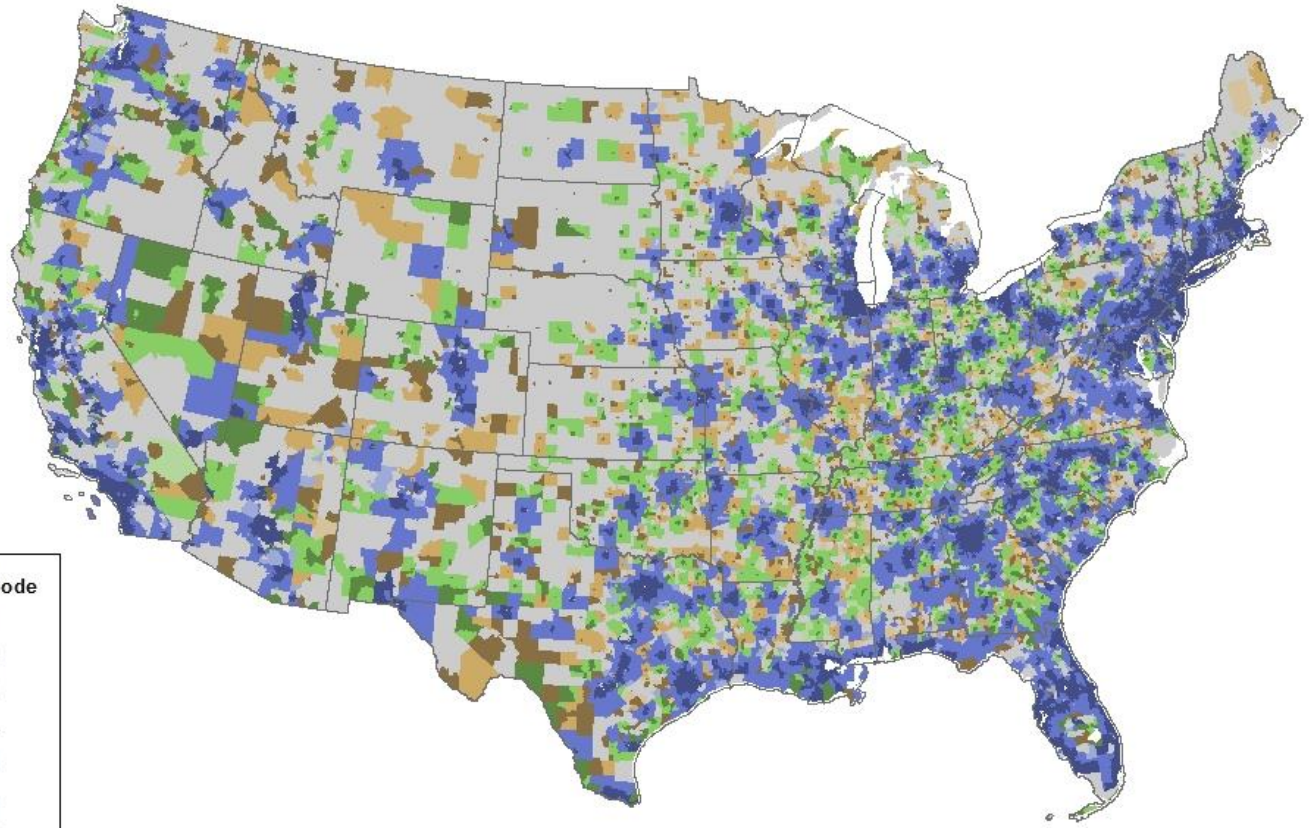
0 250 500 Miles

Projection: Contiguous Lambert Conformal Conic

Created by Michael Commons, Geographer, U.S. Census Bureau
March, 2018

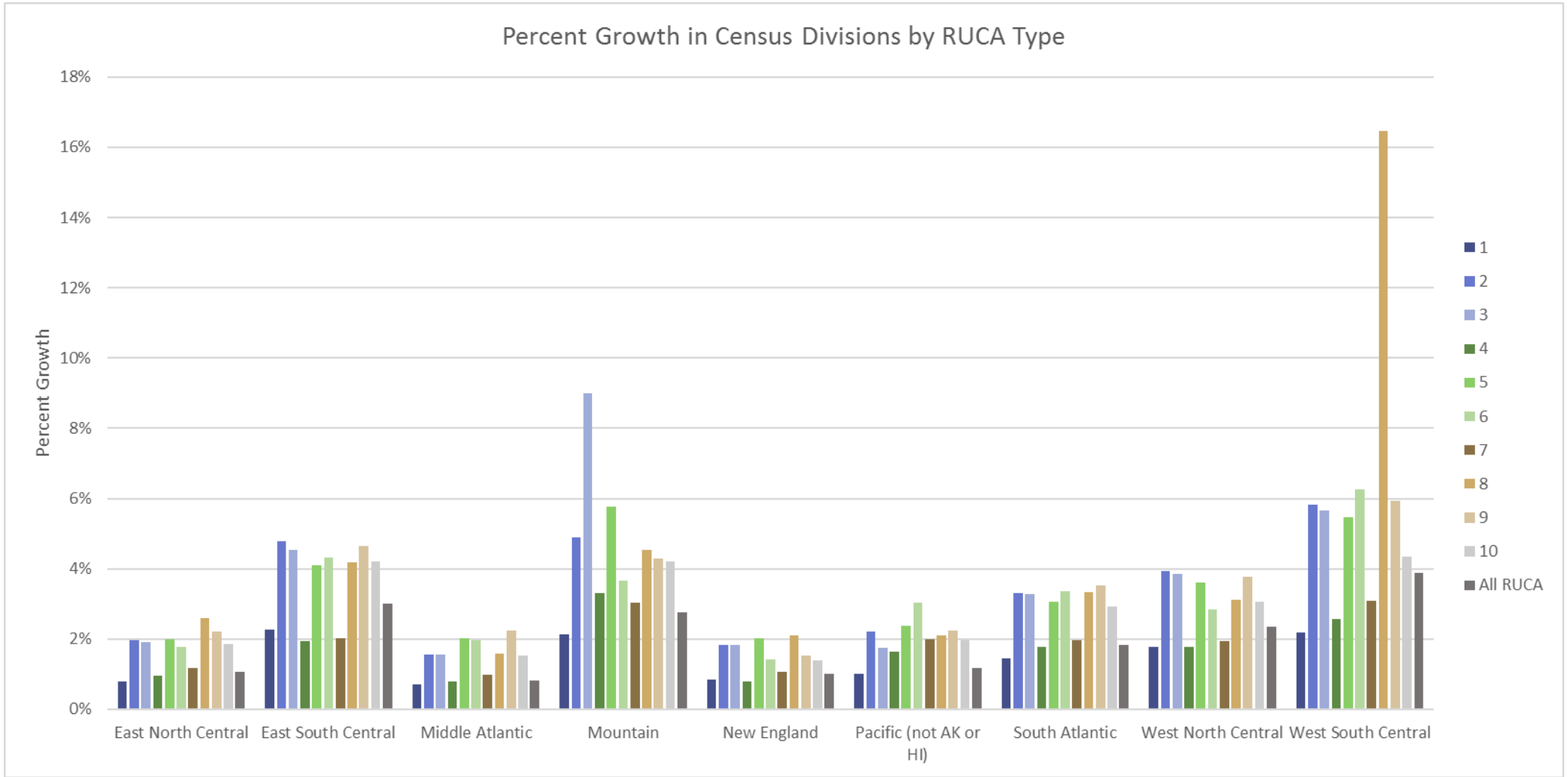
United States Census Bureau
U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
census.gov

RUCA Codes by Census Tract



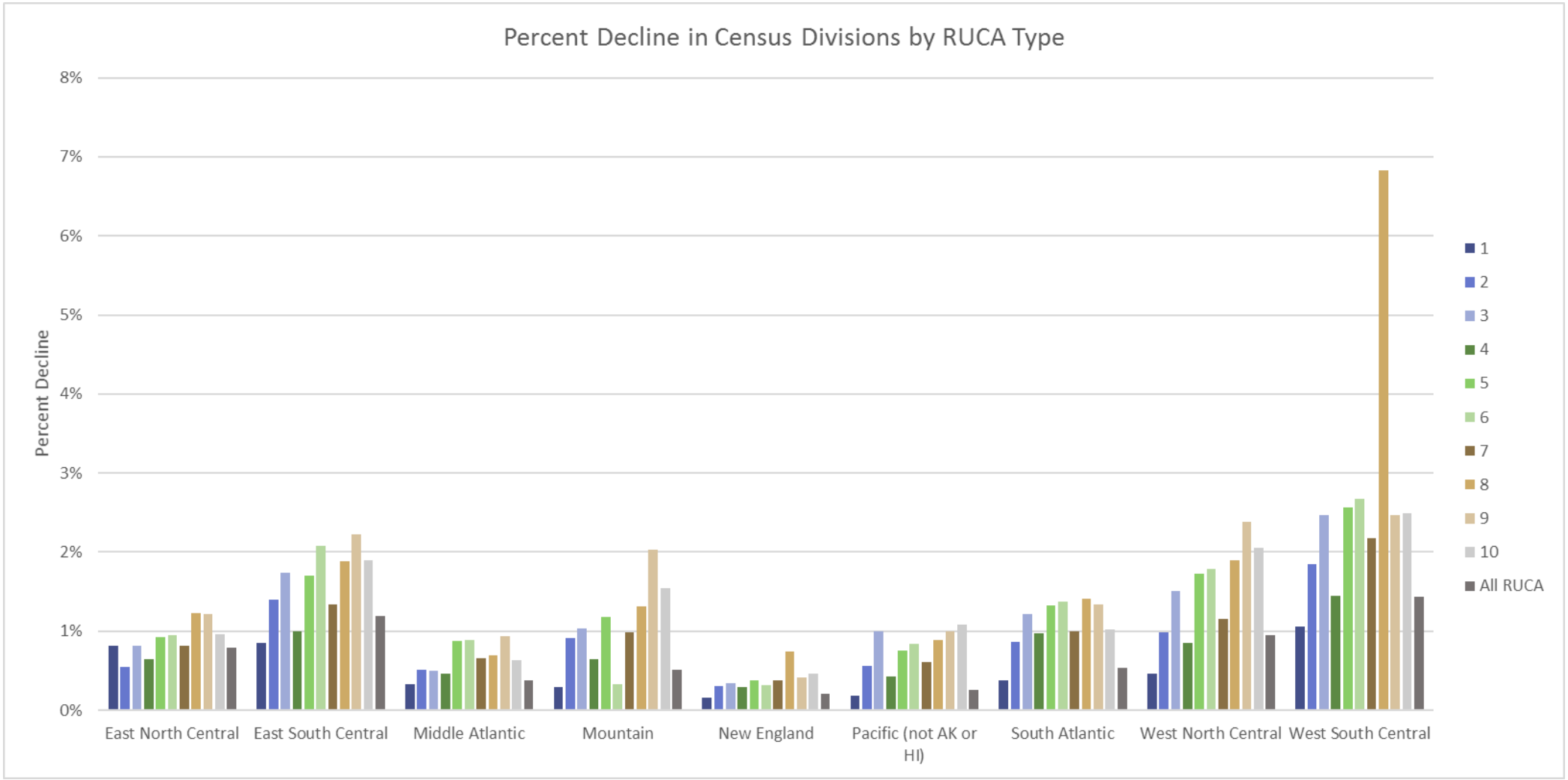
RUCA Code	Proportion of Tracts
1 Metropolitan area core: primary flow within an Urbanized Area (UA)	71.4%
2 Metropolitan area high commuting: primary flow 30% or more to a UA	9.4%
3 Metropolitan area low commuting: primary flow 10% to 30% to a UA	0.9%
4 Micropolitan area core: primary flow within an Urban Cluster of 10,000 to 49,999 (large UC)	5.8%
5 Micropolitan high commuting: primary flow 30% or more to a large UC	2.7%
6 Micropolitan low commuting: primary flow 10% to 30% to a large UC	0.6%
7 Small town core: primary flow within an Urban Cluster of 2,500 to 9,999 (small UC)	3.0%
8 Small town high commuting: primary flow 30% or more to a small UC	1.1%
9 Small town low commuting: primary flow 10% to 30% to a small UC	0.5%
10 Rural areas: primary flow to a tract outside a UA or UC	4.7%

United States Census Bureau
U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
census.gov



1	Metropolitan area core: primary flow within an Urbanized Area (UA)
2	Metropolitan area high commuting: primary flow 30% or more to a UA
3	Metropolitan area low commuting: primary flow 10% to 30% to a UA
4	Micropolitan area core: primary flow within an Urban Cluster of 10,000 to 49,999 (large UC)
5	Micropolitan high commuting: primary flow 30% or more to a large UC
6	Micropolitan low commuting: primary flow 10% to 30% to a large UC
7	Small town core: primary flow within an Urban Cluster of 2,500 to 9,999 (small UC)
8	Small town high commuting: primary flow 30% or more to a small UC
9	Small town low commuting: primary flow 10% to 30% to a small UC
10	Rural areas: primary flow to a tract outside a UA or UC

United States Census Bureau
U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
census.gov



1	Metropolitan area core: primary flow within an Urbanized Area (UA)
2	Metropolitan area high commuting: primary flow 30% or more to a UA
3	Metropolitan area low commuting: primary flow 10% to 30% to a UA
4	Micropolitan area core: primary flow within an Urban Cluster of 10,000 to 49,999 (large UC)
5	Micropolitan high commuting: primary flow 30% or more to a large UC
6	Micropolitan low commuting: primary flow 10% to 30% to a large UC
7	Small town core: primary flow within an Urban Cluster of 2,500 to 9,999 (small UC)
8	Small town high commuting: primary flow 30% or more to a small UC
9	Small town low commuting: primary flow 10% to 30% to a small UC
10	Rural areas: primary flow to a tract outside a UA or UC

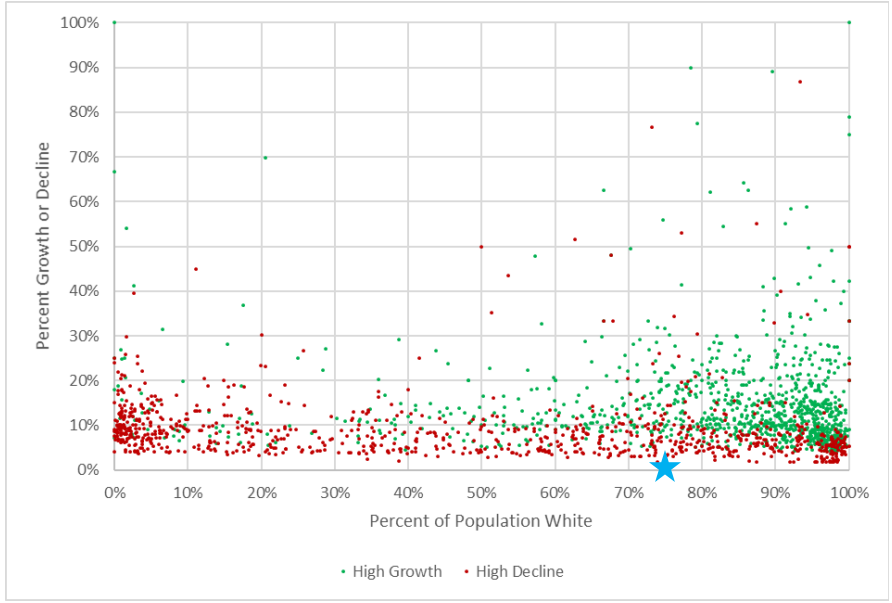
United States Census Bureau
U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
census.gov

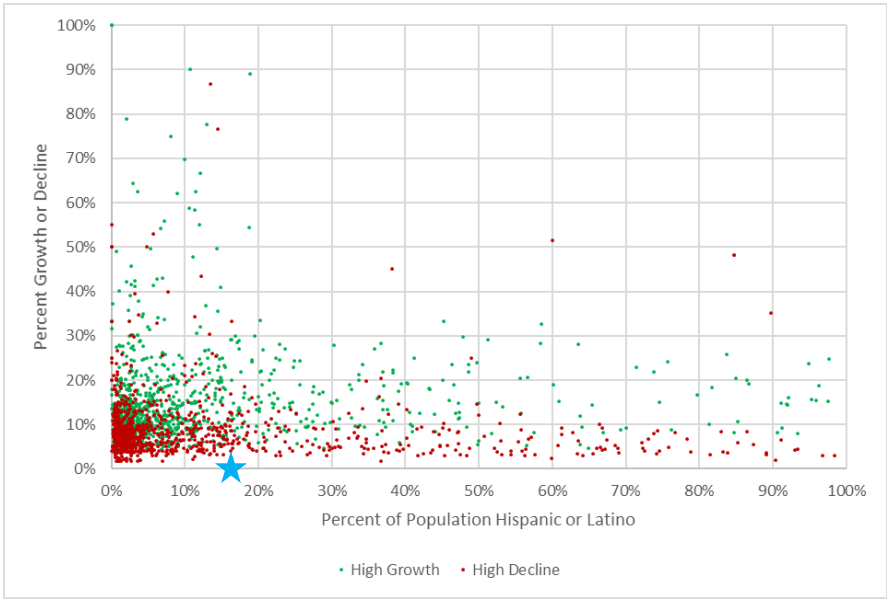
Comparison with Demographic Variables

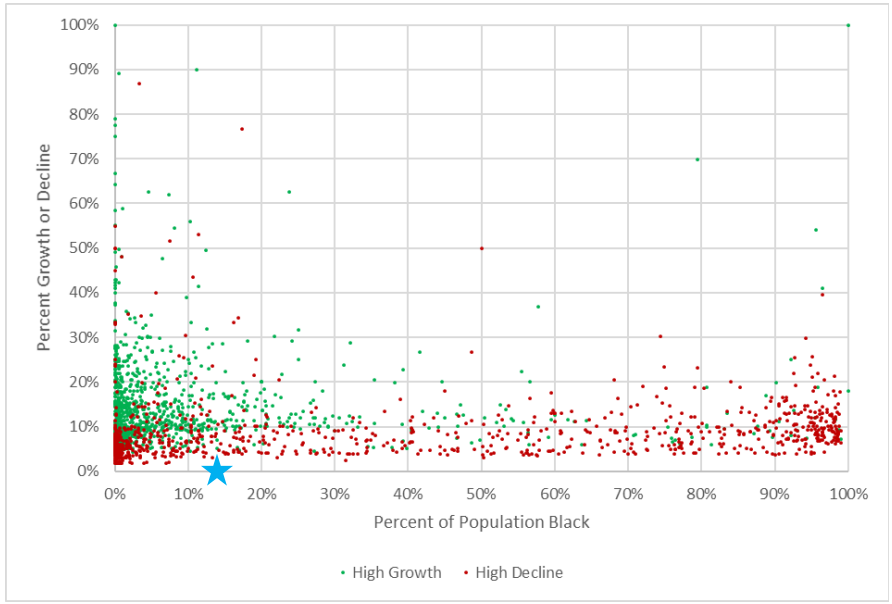
- High Growth tracts: two percent with highest growth rate
- High Decline tracts: two percent with highest decline rate
- Comparisons made at the census division level and for the entire country (excluding AK, HI, PR, and Island Areas)
- Mean of demographic variables compared with the percent growth or percent decline for those tracts

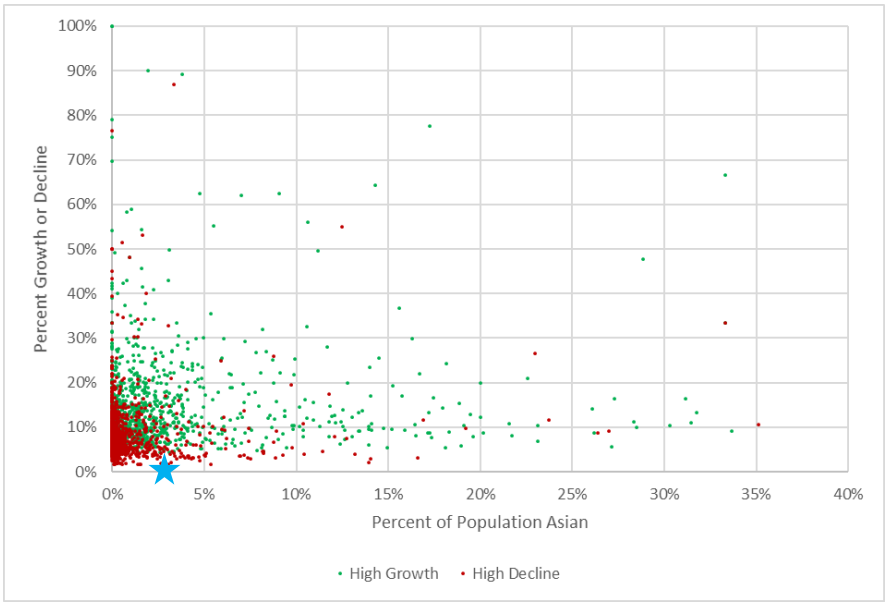
Tract Average

White	74.5%
Hispanic or Latino	16.2%
Black	13.4%
Asian	3.8%





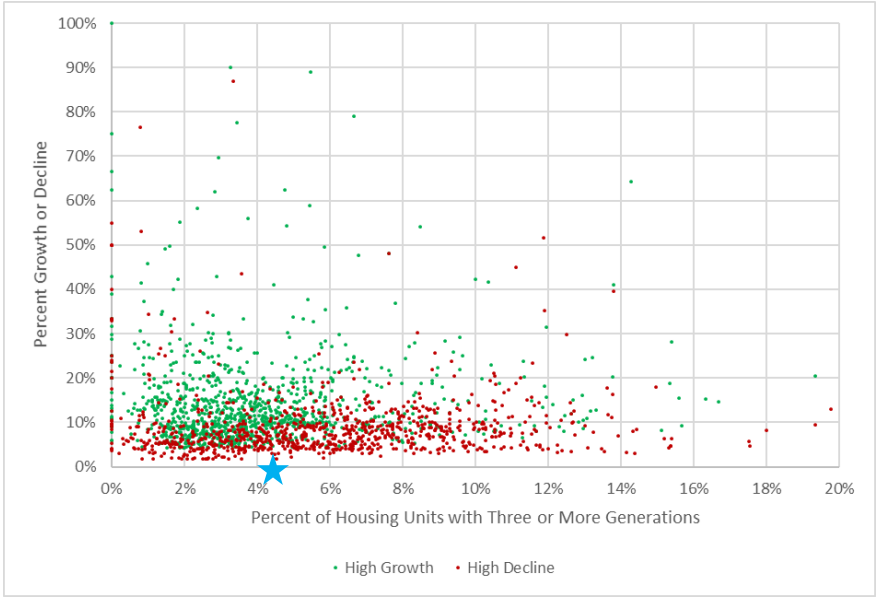


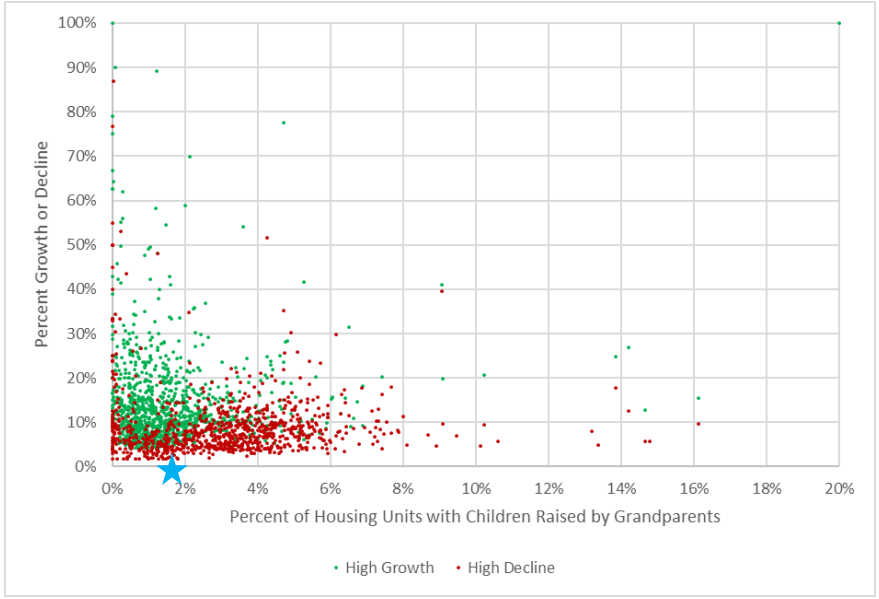


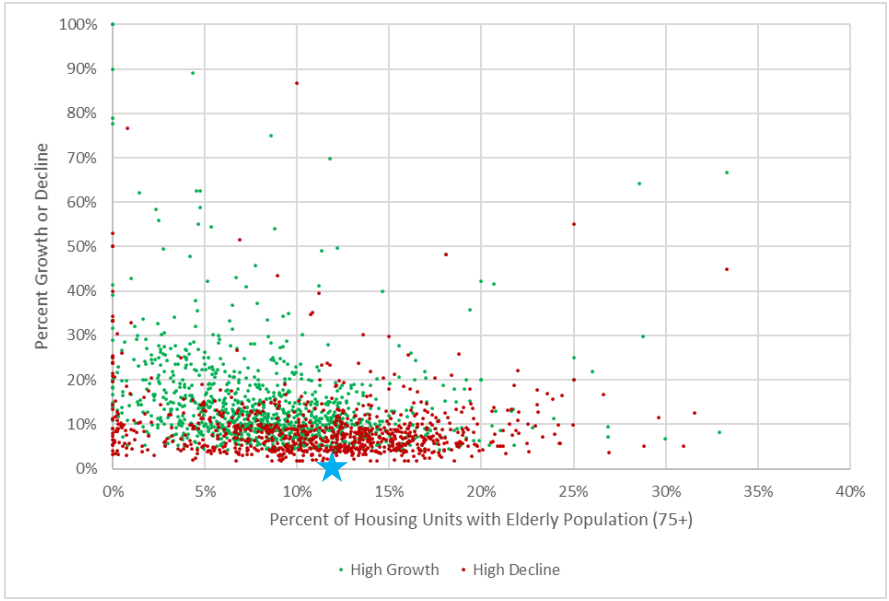
United States Census Bureau
U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
census.gov

Tract Average

Multi-generation	4.6%
Children w/grandparents	1.9%
HU with age 75+	12.2%

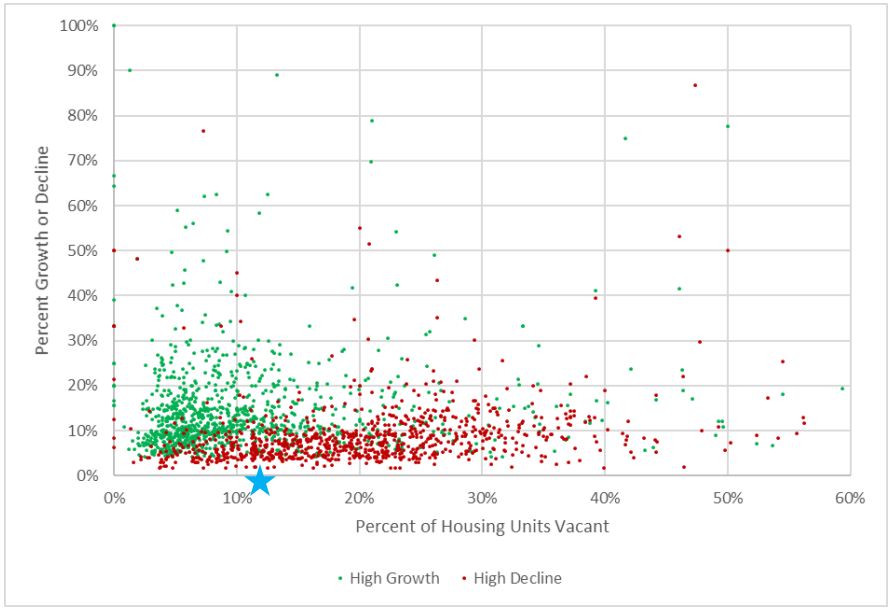


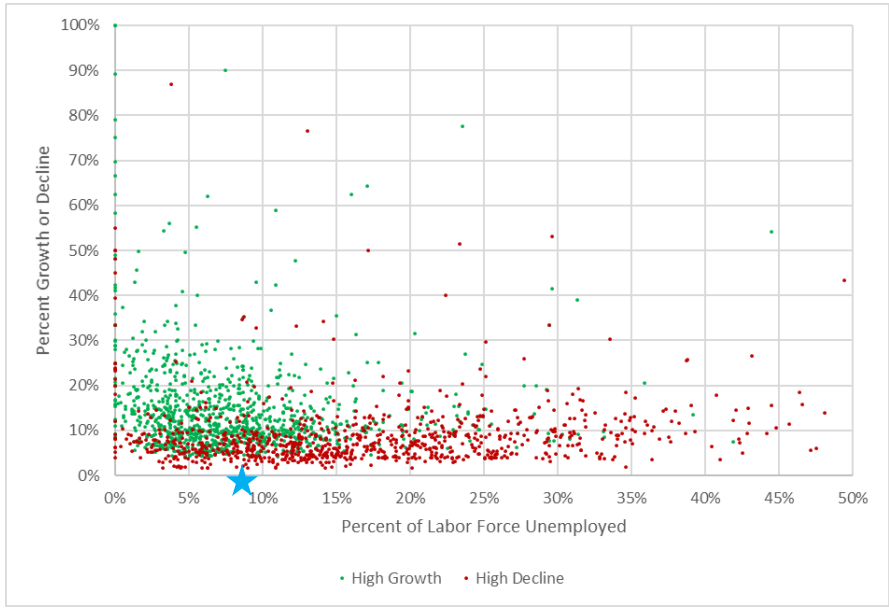


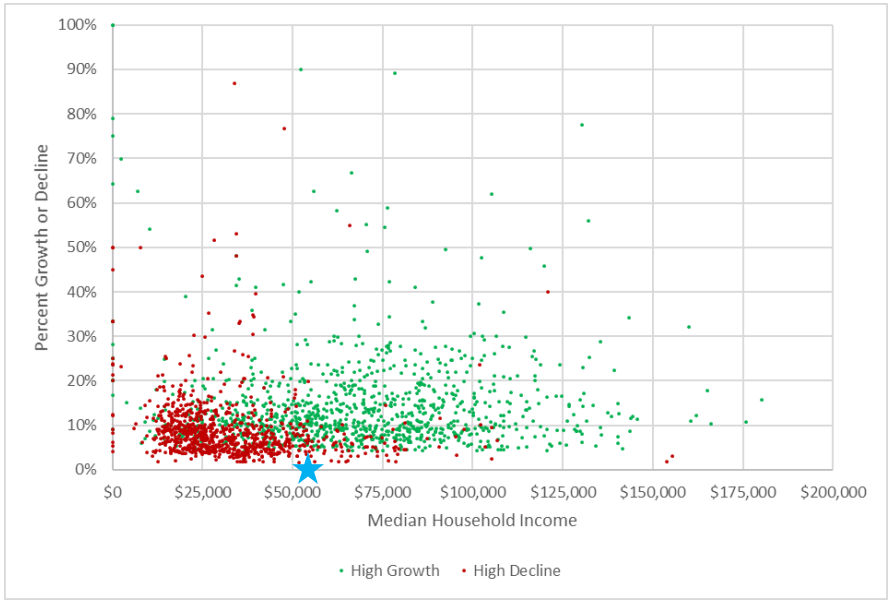


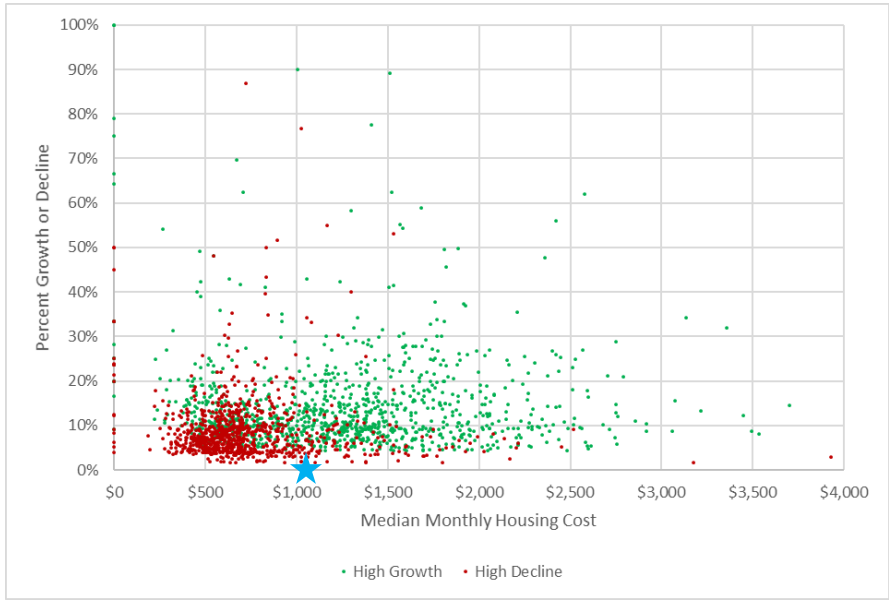
Tract Average

HU vacant	10.90%
Unemployed	9.90%
Median income	$55,457
Monthly housing cost	$1,089









United States Census Bureau
U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
census.gov

Sample of Findings

Substantial change (growth and decline) occurring in small towns of East South Central and West South Central divisions

- Areas where new addresses may be lacking and require additional local data sources

Sample of Findings

Decline:

- Lower than average median household income
- Housing unit vacancy greater than 15 percent
- Unemployment greater than 10 percent

Growth:

- Higher than average median income
- Housing unit vacancy less than eight percent
- Median monthly housing cost greater than $1,000
- Population less than 15 percent Hispanic or Latino in Mountain Division

Moving Forward

Results of this research:

- Feed back into the In-Office Address Canvassing operations
  - Re-review areas where changes are most likely
- Identify areas of change where address sources may not be sufficient

Questions or Comments?

Michael Commons

michael.commons@census.gov

301-763-7823