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
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

The 2020 Census

- A mobile population
- Constrained fiscal environment
- Rapidly changing use of technology
- Informal, complex living arrangements
- Increasingly diverse population
- Declining response rates
- Distrust in government
- Information explosion
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.)
Summary of Reengineering Address Canvassing

In-Field Canvassing
Limited In-Field Canvassing in 2019 for those areas where address updates cannot be obtained or verified or areas that are undergoing rapid change.

Continual In-Office Canvassing
Update and verify the MAF using aerial imagery, administrative records, and commercial data.

Master Address File (MAF) Coverage Study
Ongoing fieldwork to measure coverage, validate in-office procedures, and improve in-field data collection methodologies.

2020 Census Begins
Updated MAF used to conduct 2020 Census

Maintaining an Accurate Address List

On-going Maintenance and Update

US Postal Service’s Delivery Sequence File (DSF)
Tribal, state, and local government address lists
Continuous identification of stability and change

Address Canvassing

Nationwide In-Office Address Canvassing
Annual In-field data collection, checks, and tests
In-Field Address Canvassing

LUCA

Opportunity for review and update the Census Bureau’s address list for the 2020 Census
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

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of DSF Residential Addresses</th>
<th>Residential Addresses that are New to the DSF</th>
<th>New DSF Residential Addresses Matched to the MAF</th>
<th>New DSF Residential Addresses Added to the MAF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Number</td>
<td>Percent</td>
</tr>
<tr>
<td>2017</td>
<td>128,674,723</td>
<td>894,069</td>
<td>148,293</td>
<td>16.6</td>
</tr>
<tr>
<td>2016</td>
<td>127,228,148</td>
<td>1,681,768</td>
<td>745,092</td>
<td>44.3</td>
</tr>
<tr>
<td>2015</td>
<td>125,109,346</td>
<td>719,483</td>
<td>138,532</td>
<td>19.2</td>
</tr>
<tr>
<td>2014</td>
<td>124,093,231</td>
<td>1,074,852</td>
<td>222,985</td>
<td>20.7</td>
</tr>
<tr>
<td>2013</td>
<td>122,165,378</td>
<td>323,957</td>
<td>87,008</td>
<td>26.9</td>
</tr>
<tr>
<td>2012</td>
<td>122,319,728</td>
<td>626,494</td>
<td>183,328</td>
<td>29.3</td>
</tr>
<tr>
<td>2011</td>
<td>121,591,739</td>
<td>625,495</td>
<td>220,209</td>
<td>35.2</td>
</tr>
<tr>
<td>2010</td>
<td>121,209,935</td>
<td>873,429</td>
<td>420,198</td>
<td>48.1</td>
</tr>
<tr>
<td>Total 2010-2017</td>
<td>6,819,547</td>
<td></td>
<td>2,165,645</td>
<td>31.8</td>
</tr>
</tbody>
</table>

*On-going Maintenance and Update Address Canvassing*
## Address Improvements from Tribal, State, and Local Government Address Lists, 2012-2017

<table>
<thead>
<tr>
<th>Address Improvement</th>
<th>Number of Addresses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addresses received</td>
<td>104,363,558</td>
</tr>
<tr>
<td>Addresses accepted for use in updating the MAF</td>
<td>83,312,316</td>
</tr>
<tr>
<td>Addresses updating information for existing addresses in MAF</td>
<td>82,976,258</td>
</tr>
<tr>
<td>New addresses added to the MAF</td>
<td>336,058</td>
</tr>
<tr>
<td>Addresses for which partner files provided new or improved latitude/longitude</td>
<td>65,095,658</td>
</tr>
<tr>
<td>coordinates</td>
<td></td>
</tr>
<tr>
<td>MAF addresses for which geocodes were corrected by partner data</td>
<td>1,434,342</td>
</tr>
<tr>
<td>Previously un-geocoded MAF addresses geocoded using partner data</td>
<td>1,245,832</td>
</tr>
</tbody>
</table>
### Commercial Address Lists Matched to the MAF, 2016

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

In-Field Address Canvassing

No Change or Coverage Issues Detected ("Passive")

On Hold
Growth, Decline, or Coverage Issues ("Active")

Requires In-Field Resolution

Trigger Additional Interactive Review

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)

Baseline

MAF Count: 4
(Without MSP = 0, With MSP = 4)
GEOID: 123456789101112

Note: This slide does not contain Title 13 data.
Current Imagery (as of time of review)

MAF Count: 4
(Without MSP = 4, With MSP = 0)
GEOID: 123456789101112

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
MAF Count: 6
(Without MSP = 0, With MSP = 6)
GEOID: 123456789101112

Reviewed:
December 2016

Note: This slide does not contain Title 13 data.
In-Office Address Canvassing Interactive Review Status: All Blocks
(as of September 10, 2018)

<table>
<thead>
<tr>
<th></th>
<th>Blocks</th>
<th>Housing Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percentage</td>
</tr>
<tr>
<td>Total US and Puerto Rico</td>
<td>11,155,486</td>
<td>100.0</td>
</tr>
<tr>
<td>Total Passive</td>
<td>8,878,326</td>
<td>79.59</td>
</tr>
<tr>
<td>Total Active</td>
<td>1,692,830</td>
<td>15.17</td>
</tr>
<tr>
<td>Total On-Hold</td>
<td>474,363</td>
<td>4.25</td>
</tr>
<tr>
<td>Total Triggered</td>
<td>109,967</td>
<td>0.99</td>
</tr>
</tbody>
</table>
## In-Office Address Canvassing Interactive Review Status:
### Mail-out/Mail-back Blocks
**(as of September 10, 2018)**

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<tr>
<td></td>
<td>Number</td>
<td>Percentage</td>
<td>Number</td>
<td>Percentage</td>
</tr>
<tr>
<td><strong>Total US and Puerto Rico</strong></td>
<td>9,943,346</td>
<td>100.0</td>
<td>137,888,784</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Total Passive</strong></td>
<td>7,947,496</td>
<td>79.93</td>
<td>84,395,054</td>
<td>61.21</td>
</tr>
<tr>
<td><strong>Total Active</strong></td>
<td>1,524,191</td>
<td>15.33</td>
<td>34,670,842</td>
<td>25.14</td>
</tr>
<tr>
<td><strong>Total On-Hold</strong></td>
<td>372,171</td>
<td>3.74</td>
<td>10,570,993</td>
<td>7.67</td>
</tr>
<tr>
<td><strong>Total Triggered</strong></td>
<td>99,488</td>
<td>1.00</td>
<td>8,251,895</td>
<td>5.98</td>
</tr>
</tbody>
</table>
In-Office Address Canvassing
Addresses in "On Hold" Blocks as a Percentage of All Addresses
(as of February 28, 2018)

Percent by county
(number of counties)
- 20.0% or more (707)
- 15.0% to 19.9% (321)
- 10.0% to 14.9% (476)
- 5.0% to 9.9% (692)
- 0.0% to 4.9% (1,025)

Source: Geography Division, Block Tracking Database (BTD) and Block Assessment, Research and Classification Application (BARCA) interactive review data
Addresses in "Triggered" Blocks as a Percentage of All Addresses
(as of February 28, 2018)

Source: Geography Division, Block Tracking Database (BTB) 
and Block Assessment, Research and Classification 
Application (BARCA) interactive review data
On-going Maintenance and Update

Address Canvassing

Opportunity offered to tribal governments to review and update S. Census Bureau's list for their jurisdiction census. The Census Bureau complete and accurate with every living quarters population for inclusion in the.

What is LUCA?

Be an accurate decennial census count in your community plan for future needs.

Participate in LUCA?

Legal governments can participate in LUCA. The recognized tribes with a reservation
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

<table>
<thead>
<tr>
<th>Census Division</th>
<th>2000 to 2010</th>
</tr>
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<tbody>
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<td>6.3%</td>
</tr>
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<tr>
<td>Mountain</td>
<td>12.7%</td>
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<tr>
<td>New England</td>
<td>3.0%</td>
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<tr>
<td>West South Central</td>
<td>14.2%</td>
</tr>
</tbody>
</table>
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 extracted from American Community Survey 3-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)

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

<table>
<thead>
<tr>
<th>Census Division</th>
<th>2000 to 2010</th>
<th>2010 to Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle Atlantic</td>
<td>6.3%</td>
<td>5.5%</td>
</tr>
<tr>
<td>East South Central</td>
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<td>Mountain</td>
<td>12.7%</td>
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</tr>
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<td>New England</td>
<td>3.0%</td>
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</tr>
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</tr>
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<td>14.2%</td>
<td>19.7%</td>
</tr>
</tbody>
</table>

Tracts with Growth and Decline
2010 to Current by Census Division

<table>
<thead>
<tr>
<th>Census Division</th>
<th>All Tracts</th>
<th>Growth Tracts</th>
<th>Decline Tracts</th>
<th>Pct Tracts with Growth</th>
<th>Pct Tracts with Decline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle Atlantic</td>
<td>10,147</td>
<td>6,214</td>
<td>4,885</td>
<td>61.2%</td>
<td>48.1%</td>
</tr>
<tr>
<td>East South Central</td>
<td>4,457</td>
<td>3,942</td>
<td>3,735</td>
<td>88.4%</td>
<td>83.8%</td>
</tr>
<tr>
<td>East North Central</td>
<td>11,808</td>
<td>8,286</td>
<td>8,306</td>
<td>70.2%</td>
<td>70.3%</td>
</tr>
<tr>
<td>Mountain</td>
<td>5,250</td>
<td>4,082</td>
<td>2,958</td>
<td>77.8%</td>
<td>56.3%</td>
</tr>
<tr>
<td>New England</td>
<td>3,392</td>
<td>2,733</td>
<td>2,057</td>
<td>80.6%</td>
<td>60.6%</td>
</tr>
<tr>
<td>Pacific (not AK, HI)</td>
<td>10,349</td>
<td>6,152</td>
<td>4,414</td>
<td>59.4%</td>
<td>42.7%</td>
</tr>
<tr>
<td>South Atlantic</td>
<td>13,706</td>
<td>10,947</td>
<td>8,940</td>
<td>79.9%</td>
<td>65.2%</td>
</tr>
<tr>
<td>West North Central</td>
<td>5,285</td>
<td>4,398</td>
<td>4,133</td>
<td>83.2%</td>
<td>78.2%</td>
</tr>
<tr>
<td>West South Central</td>
<td>8,145</td>
<td>6,877</td>
<td>6,202</td>
<td>84.4%</td>
<td>76.1%</td>
</tr>
<tr>
<td>All Divisions</td>
<td>72,539</td>
<td>53,631</td>
<td>45,630</td>
<td>685.1%</td>
<td>581.5%</td>
</tr>
</tbody>
</table>
## Proportion of the Growth in Housing Units

<table>
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</tr>
<tr>
<td>West North Central</td>
<td>5.7%</td>
<td>8.5%</td>
<td>4.7%</td>
</tr>
<tr>
<td>West South Central</td>
<td>14.2%</td>
<td>19.7%</td>
<td>21.2%</td>
</tr>
</tbody>
</table>
Estimated Percent Growth in Housing Units By Census Tract 2010 to Current

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

Projection: Contiguous Lambert Conformal Conic

Created by Michael Commodore, Geographer, U.S. Census Bureau March, 2018
### RUCA Codes by Census Tract

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

Projection: Contiguous Lambert Conformal Conic

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

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

census.gov
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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%
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
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