

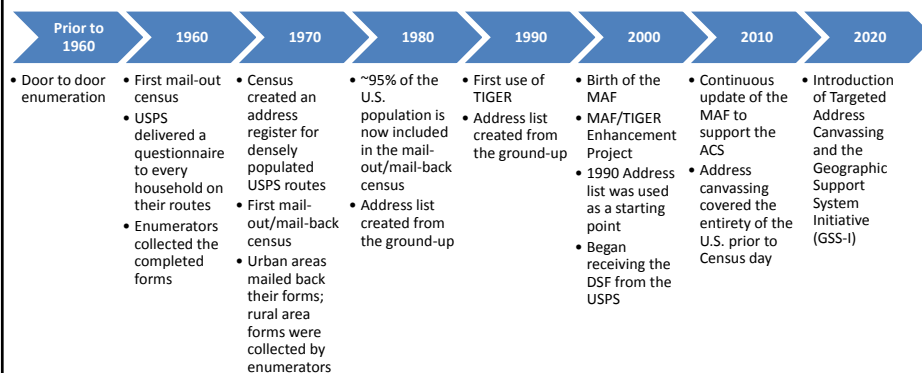
The Geographic Support System Initiative (GSS-I)

Tim McMonagle
Los Angeles Regional Office

California State Data Annual Meeting
June 27, 2013



A Change in Methodology



2010 Census Address List Development



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Facts about 2010 Address Canvassing

- Number of housing unit addresses that needed verification: **145 million**
- Number of census workers hired for address canvassing: **140,000**
- Number of hand-held computers used: **151,000**
- Dates of operation: **March 30 - Mid-July 2009**
- Number of early-opening local census offices (ELCOs) that managed operations: **151**

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A Shift in Focus for the 2020 Census

- From a **complete** address canvassing to a **targeted** address canvassing
- Hinges on establishing an acceptable address list for each level of government

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Why a “Targeted” Address Canvassing?

- Cost – it is expensive to canvass every street in the nation.
- By developing regular address update and change detection processes, we should be able to “target” only those areas of the country where we are uncertain about the quality and currency of our address list.

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Where to go from here?

- For 2020, the Geography Division needs to build upon:
 - ☐ The accomplishments of the MAF/TIGER Enhancement Program (MTEP); including the significant investment of the MAF/TIGER Accuracy Improvement Project (MTAIP) and the improved positional accuracy of TIGER
 - ☐ The contributions (GIS files & imagery) of our partners between 2003 to 2008 and their participation in the MTAIP
 - ☐ The contributions of our partners to the 2010 Local Update of Census Addresses
 - ☐ The recommendations of our stakeholder and oversight communities

Moving Forward...

- Stakeholder and oversight recommendations:
 - The General Accountability Office, the Office of the Inspector General, and the National Academies of Science identified as issues:
 - *The lack of a comprehensive geographic update program between censuses*
 - *Associated negative impact on ongoing programs such as the American Community Survey, other current surveys, and small areas estimates programs*

Key Components of the GSS-I

An integrated program that utilizes a partnership program for:

- Improved address coverage
- Continual address and spatial feature updates
- Enhanced quality assessment and measurement

Address Updates



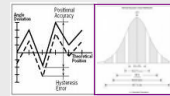
123 Testdata Road
Anytown, CA 94939

Lat 37 degrees, 9.6 minutes N
Lon 119 degrees, 45.1 minutes W

Street/Feature Updates



Quality Measurement



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Goals of the GSS Initiative

Address improvement: *explore methodologies to achieve complete coverage and a current address list, concentrating on rural areas, Puerto Rico, and group quarters, and improving geocoding of all addresses to their location*

Initiate programs with partners to continually receive addresses throughout the decade

Feature improvement: *continual update of the street network and attributes to improve the matching of addresses to their correct geography*

*Broaden participation in existing programs for receiving partner Geographic Information System (GIS) files and imagery
Research change detection techniques*

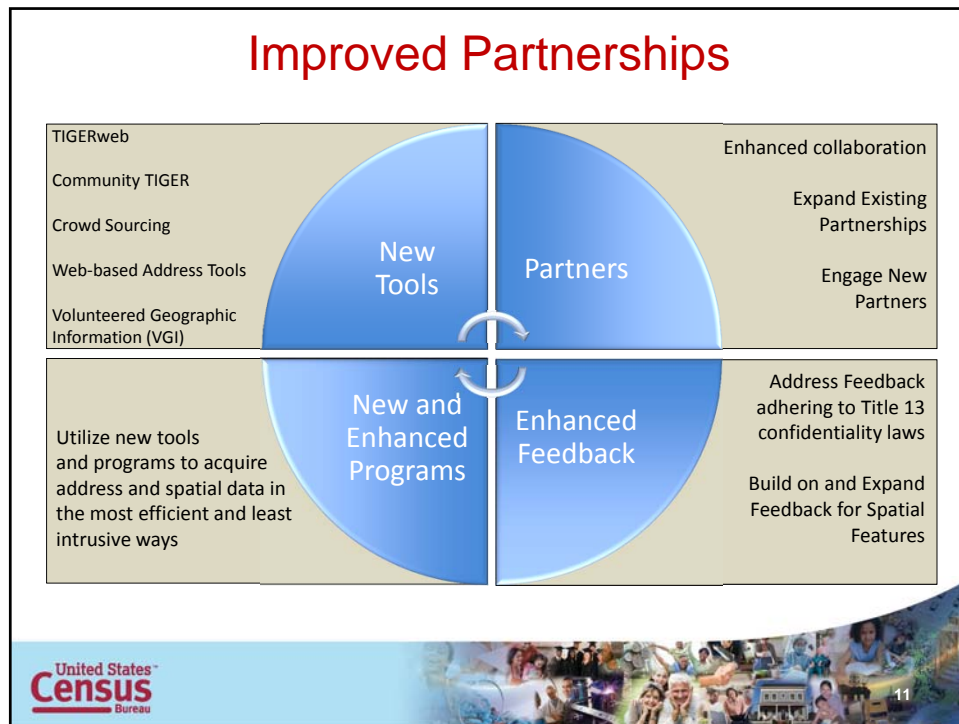
Quality improvement: *broaden quality assessments and provide quantitative measures*

Research effective methods for evaluating existing data, including the use of local data as a benchmark for comparison

Improved Partnerships: *strengthen existing and develop new partnerships*

Research methodologies and develop pilot programs for working with partners in acquiring address and spatial data in the most efficient and least intrusive ways

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What Kind of Address Data?

- **City-style addresses**
and/or
- **Non city-style addresses** (i.e., Rural Route #)
that 'ideally' meet:
 1. **USPS** minimum delivery requirements, and
 2. the '**FGDC Address Standard**' (U.S. Thoroughfare, Landmark, and Postal Address Data Standard)

See the Census Bureau *Address Data Content Guidelines*:

<http://www.census.gov/geo/www/gss/gdlns/addgdln.html>

What Kind of Housing Unit Structure Data?

- Latitude/Longitude Coordinates for a **Housing Unit structure or access point** (i.e., from E-911 or Next-Gen E-911 database)
- **Structure centroids**
- Latitude/Longitude Coordinates for a **real property parcel or parcel centroid**
- **Other points** used by partner?

Again, see the Census Bureau *Address Data Content Guidelines*:

<http://www.census.gov/geo/www/gss/gdlns/addgdln.html>



What Kind of Street Feature Data?

- Street **centerline geometry**
- Street **attributes** – names, address ranges, etc.

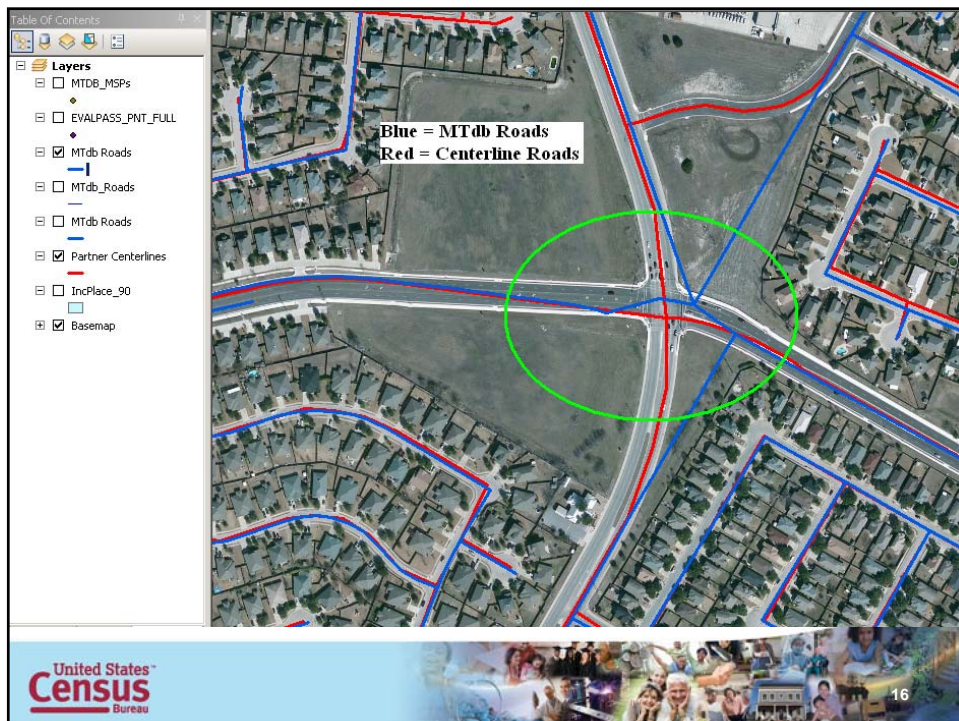
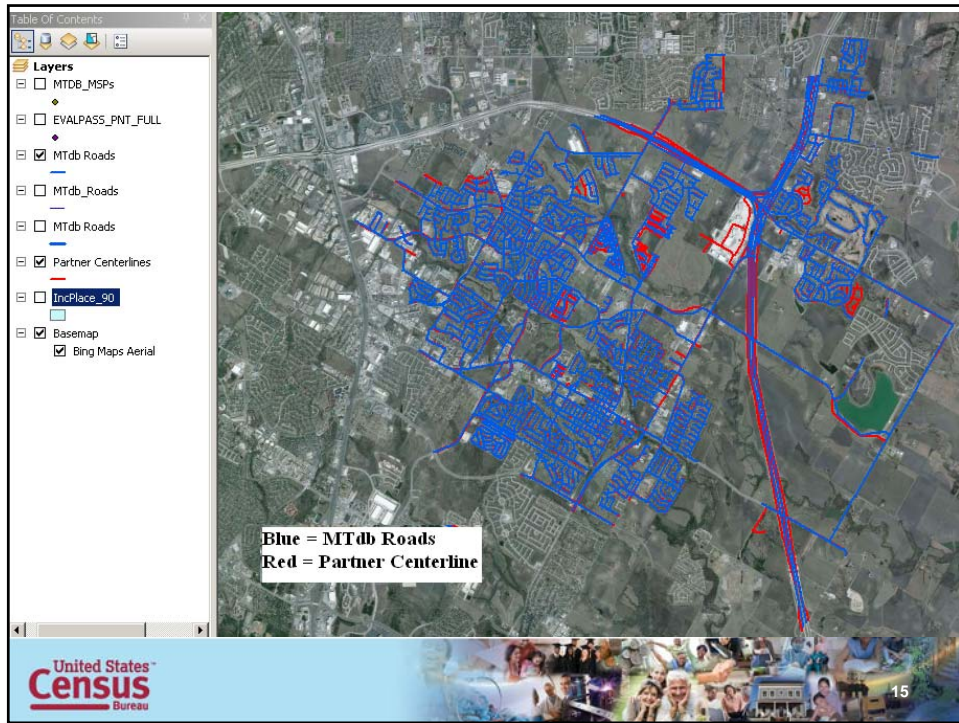
Why?

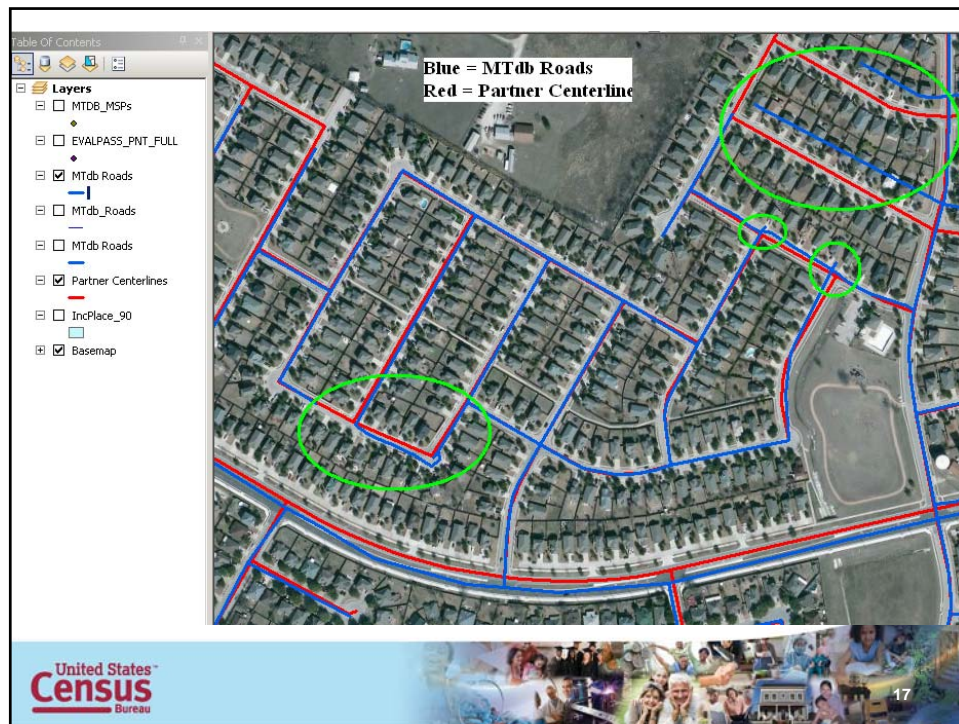
- Expand Census centerline and attribute coverage
- Spatially-correct misaligned streets in conjunction with high-quality imagery

Feature Data and Metadata Content Guidelines

<http://www.census.gov/geo/www/gss/gdlns/addgdln.html>







The GSS-I Partnership Program

- Opportunity for tribal, state, county, and local governments to continually exchange address & spatial data with the Census Bureau
- Recognizes that local governments are the definitive authority for quality address and street data within their communities
- Takes advantage of web-based technology and service-oriented architecture to provide tools and simplify participation



Highlights of the Program

- Open to participation by all levels of government starting in FY14
- Will provide detailed feedback on how partner data was used, where allowed by law
- Will accept data of varying quality in several different formats...
- ...however, we will promote the use of standards and best practices from national organizations and federal agencies

Impact on the 2020 Census

- Partner-provided geospatial data will increase the overall quality and coverage of the MAF/TIGER Database leading up to 2019
- GEO is introducing new processes to measure and report on data quality
- These efforts will contribute to informed, data-driven decisions about the feasibility of a Targeted Address Canvassing

The GSS-I Partner Data Process

1. Acquire partner data and perform Content Verification to determine general usability
2. Standardize, match, and geocode partner addresses and structure points using the MAF/TIGER Database
3. Match street centerline data to TIGER to identify differences, calculate spatial accuracy (CE95 method) of partner data using GPS control points
4. Ideal Scenario: new addresses are added to the MAF, new streets are added to TIGER, spatial inconsistencies are submitted for resolution

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Community TIGER



- High percentage of local partners are Esri users
- This web-based tool will make the process of sharing addresses and spatial data easier for both Census and partners
 - Easier and more efficient to manage the data and the quality of the data
 - Building on the success of the MTPS used in 2010

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Community TIGER (cont.)



- Proof of Concept collaborative project
- Web (cloud) based data exchange and data management portal
- Phased and iterative project
- Leverages COTS technology, existing systems and proven workflows
- Utilizes and builds upon the next generation Esri Community Maps

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UPDATE: GSS-I Partnership Program

- Launched the GSS-I Partnership Program in October 2012
- Identified 56 initial partners to participate in 'Phase 1' by providing their addresses, structure points, and street centerlines
- Goal was to acquire and use partner data for a production test of our process and software in first half FY13

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Realities and Challenges

- Some partners have challenges or concerns providing data to the Census Bureau
- We are working to integrate the goals of the GSS-I with existing investments in boundaries (BAS) and structure points (2010 Census)
- Impact of unresolved policy questions on the GSS-I feedback process for Phase 1

Next Steps

- Identifying potential 'Phase 2' partners
- Phase 2 universe estimated to be 300-500 partners
- Phase 2 universe will be criteria-driven (*Targeted Address Canvassing research, data quality issues in MAF/TIGER, existing partners, whole states*)
- Phase 2 contacts began in March 2013
- Phase 2 feedback expected to be available on a flow starting in summer 2013

MAF/TIGER System Quality Assessment

- Confidence, Analysis, and Tracking Tool (CATT)
 - Assign Quality Indicators to existing MAF/TIGER data
 - Managed at the census tract level

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Address Indicators

- Overall Address QIs
 - Address consistency
 - Mailability
 - Deliverability
 - Locatability
 - Geocode accuracy

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Feature Indicators

- Overall Feature QIs
 - Spatial accuracy
 - Feature naming
 - Address ranges
 - Feature classification

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Geographic Area Indicators

- For each Geographic Area, four major tests or sub-indicators
 - Local review/approval of areas
 - Regional review/approval of areas
 - Program review/approval of areas
 - Independent subject matter review/approval of areas
- Additional tests for statistical criteria, attributes, type of submission, contiguity, etc...
- Also tests for geographic interaction (slivers), and block size and shape

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Geocode Indicators

- Combines specific sub-indicators from each other category
 - Locatability and geocode accuracy (Address)
 - Spatial accuracy & address ranges (Feature)
 - Block size & shape (Geography)

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Overall indicators & weighting

- Addresses, Features, Geographic Areas, and Geocodes QIs are then aggregated according to subject matter formulas
- Each census tract will receive a single overall score, and category scores where relevant
- History and tendency will be tracked

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Tract profiles

- Additional ability to adjust Quality Indicators based upon profile elements of the tract, such as:
 - Natural disaster
 - Unique address types
 - Rapidly changing development
 - Special land use areas

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The Result

- All census tracts will be tested and ranked
- Work and updates can then be targeted to specific areas most in need of update
 - Prioritization of internal work
 - Prioritization of partner contact and file ingestion
 - Improved resource allocation

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The Result

- Improved Products
 - Shapefiles
 - TIGERweb
 - ACS
- Targeted Address Canvassing decision

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Targeted Address Canvassing

- Is a traditional, on-the-ground canvassing operation necessary to ensure a complete and accurate address list for the decennial census?
 - Determine the areas of the country in which the address list and locational information can be kept current without canvassing
 - Identify characteristics for areas that should be targeted for traditional canvassing

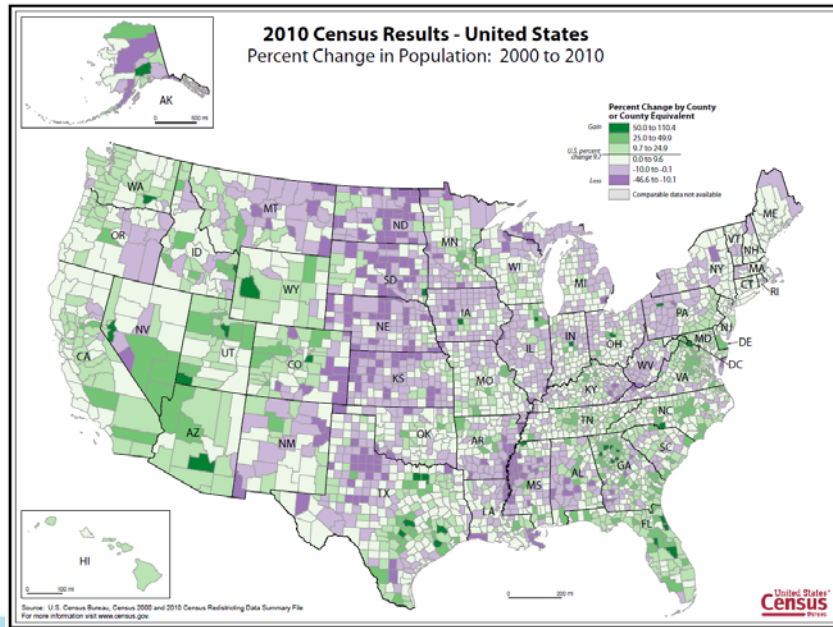
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Targeted Address Canvassing Research Questions

- Where does change in the address list occur?
- Where is the MAF not accurate/complete?
- What causes the MAF to be inaccurate/incomplete?
- What correlates to MAF inaccuracies?
- Are small multi-unit dwellings more likely to contribute to under-coverage in the MAF?
- Are areas with high percentages of single unit residential structures built between certain years more likely to be stable?
- Do areas near college campuses tend to have more unpredictable housing situations?

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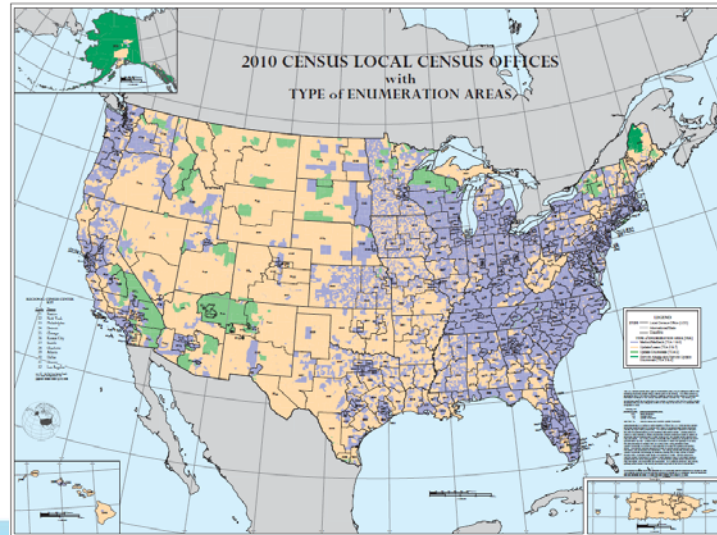


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Type of Enumeration Areas



Data Analysis

- How might we use the Targeted Address Canvassing Continuum categories and associated data to understand characteristics for individual tracts and inform decision-making?

Volunteers?

- Do you have both an address file and road centerline file that we can use during the third wave of Phase 2?
- At this time we are seeking files without use agreements or where the use agreement can be waved, we have a generic Memo of Understanding (MOU)
- No fee for the files
- Contact me if you would like to volunteer the use of you files or if you have questions

Metropolitan/ Micropolitan Statistical Areas

About Areas

- Delineated by U.S. Office of Management and Budget
- Provide nationally consistent geographic areas for collecting, tabulating, and publishing Federal statistics
- Areas established and maintained solely for statistical purposes
- 2010 revised standards for delineation
- 2013 revised standards used for delineation

Core Based Statistical Areas (CBSA)

- Geographic entity associated with one core of 10,000 or more population, Census Bureau delineated urban area.
- Includes adjacent territory that has a high degree of social and economic integration with the core as measured by commuting times
- Consist of counties and equivalent areas
- Is not an urban/rural classification

Core Based Statistical Areas



Micropolitan Statistical Area

- Must have a Census Bureau delineated urban cluster of 10,000-49,999 population

Micropolitan Statistical Areas



Metropolitan Statistical Area

- CBSA with a Census Bureau delineated urbanized area of at least 50,000
- Can be more than single county if urbanized area extends into other counties

Metropolitan Statistical Areas



Combined Statistical Areas

- A geographic entity consisting of two or more adjacent Core Based Statistical Areas with employment interchange measures of at least 15
- The employment interchange is the sum of the percentages of workers living in one county and working in another

Combined Statistical Areas



Metropolitan Division

- A county or group of counties within a CBSA that contain an urbanized area with a population of at least 2.5 million
- One or more counties that represent an employment center or centers plus adjacent counties through commuting ties

Metropolitan Divisions

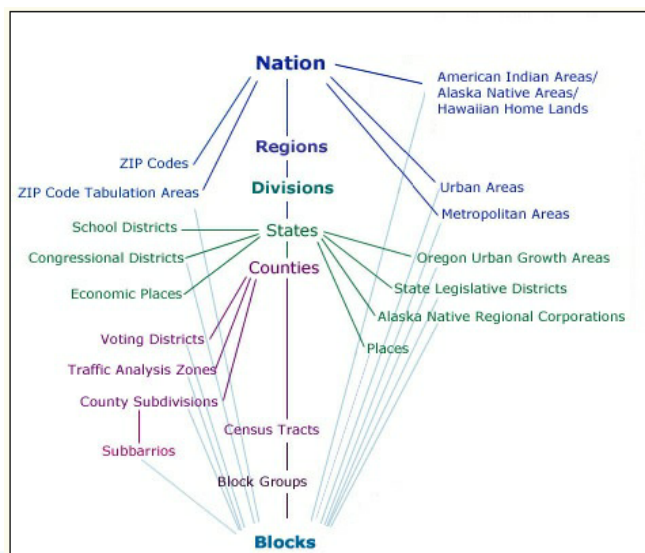


Census Geography Boundary Changes?

Types of Census Geographic Entities

- Legal/Administrative- Incorporated Place, County, American Indian Areas, School Districts, Congressional Districts, State Legislative Districts
- Statistical- Participant Statistical Area Program (Census Tracts, Block Groups, CDPs, CCDs) Voting Districts, PUMAs, Urban Areas, ZCTAs

Hierarchy of Census Geography



Legal/Administrative Area Update Programs

- **Boundary and Annexation (BAS)** participants inform Census of changes to legal boundaries to incorporated cities, counties, American Indian Areas
- **School District Review Program** conducted every two years, state officials review and submit any changes to boundaries and attributes
- **Block changes**- any change in legal boundaries that split existing blocks will result in the creation of new blocks, change is identified with the addition of a suffix to the block number

Statistical Geography

There is no official plan to systematically/programmatically update statistical geographic areas before the standard PSAP/TSAP and other programs centered around the 2020 Census

ZCTAs

- ZIP Code Tabulation Areas may be an exception.
 - Discussion within Geography Division about the possibility of updating ZCTAs two additional times during the decade
 - Need to get agreement within Geography Division and then from other Divisions within Census
 - This will likely be a very lengthy process
 - Should we update ZCTAs more frequently?

Corrections to Statistical Geography Areas

- Census has made corrections to boundaries where errors have been identified, these have included Census Tract, CDP, and CCD boundaries
- These have been very few in number
- Done on a case by case basis
- Identified by partners and internally, Census will consult with local PSAP contact about how to change
- No re-tabulation of released data

Corrections to Statistical Geography Areas

- Minor statistical geographic area updates may be necessary due to changes from BAS and road feature updates
- A boundary on a feature will be moved with the feature
- CDP boundaries will have to be change if a city annexes any portion of it

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