Census 2000 Geography Workshop

Tim McMonagle
Geographic Coordinator
Los Angeles Regional Census Center
U.S.Bureau of the Census

2 Key Questions:

- ***How many ?***
- ***Where ?***

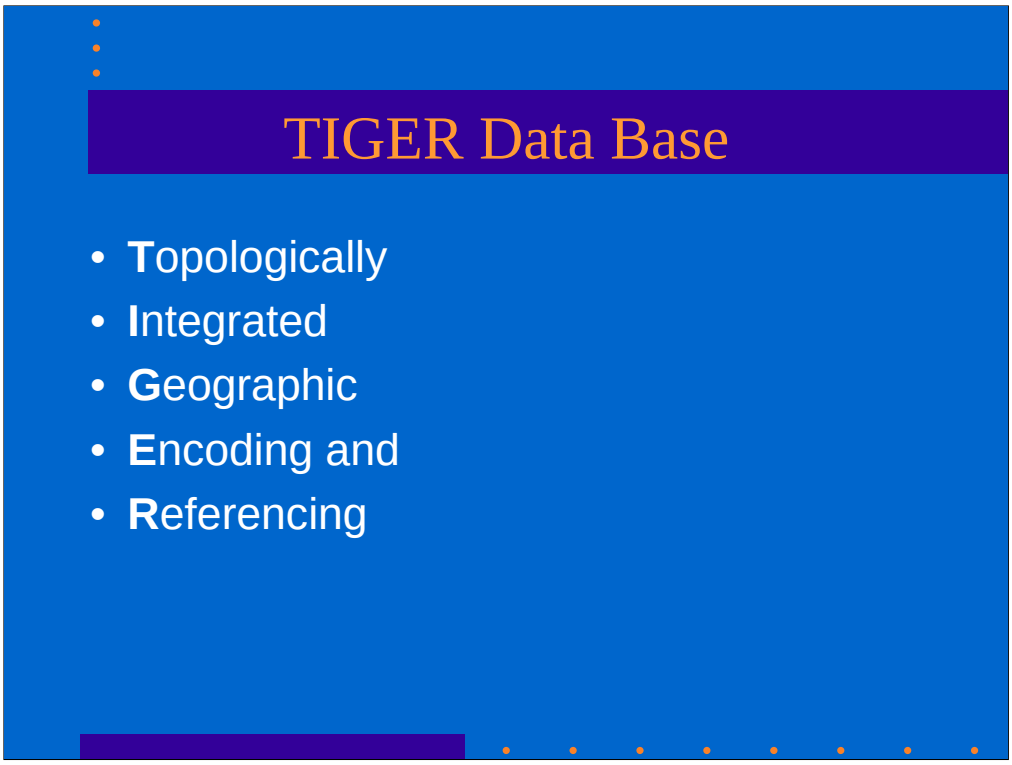
The Role of Geography in the Decennial Census

- Geography provides the framework for the collection, tabulation, and publication of Census Data
- Success of the Census rest not only on collecting data, but also linking data to correct geographic areas
- Anyone using Census Data should have some knowledge of Census Geography

Geocoding

- Linking Housing Units to a piece of geography

- Tools:
  - TIGER
  - MAF



All of the geographic products come from our TIGER data base originally developed for the 1990 census.

We have continued to correct and update the streets and the geographic boundaries in TIGER since 1990 in support of all Census Bureau programs. We are making special efforts to bring TIGER up-to-date to support Census 2000 preparations.

Role of TIGER

- Assignment of location codes to addresses for data collection
- Geographic structure for tabulation and publication
- Cartographic products to support field operations, participant programs, collection and publication

TIGER History

- Built for the 1990 Decennial to provide consistent, accurate maps, geocoded addresses and reference files
- Address range coverage dramatically expanded after 1990 with the ACF
- Further address range expansion with Master Address File (MAF) building
- Maintenance of legal boundary data

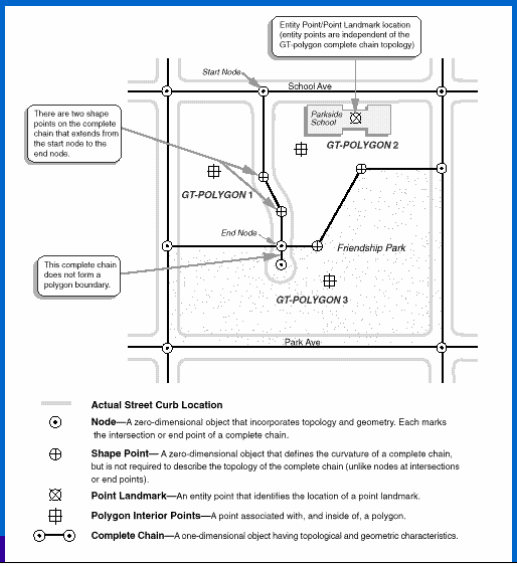
TIGER Contains:

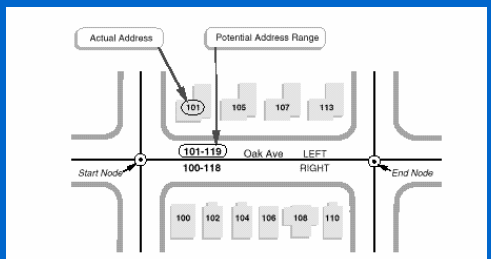
- streets
- water features
- railroads
- political boundaries
- statistical boundaries
- addresses
- zip codes
- spotted housing units
- landmarks

TIGER Content - Geometric Objects

- Points (0-cells)
- Lines (1-cells)
- Polygons (2-cells)
- Coordinate values for geometric objects
- Topological relationships between geometric objects

Basic TIGER Topology





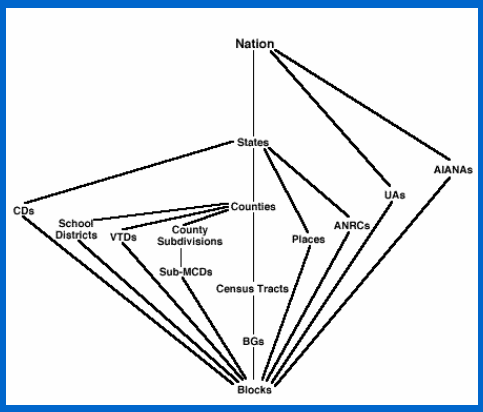
Record Type 1 contains separate data fields for both the start and end of each address range.

Record Type 1				Address Range			
				Left side		Right Side	
				Start	End	Start	End
RT	TLID	FENAME	FETYPE	FRADDL	TOADDL	FRADDR	TOADDR
1	0007654320	Oak	Ave	**101**	**119**	**100**	**118**

TIGER Content - Feature Attributes

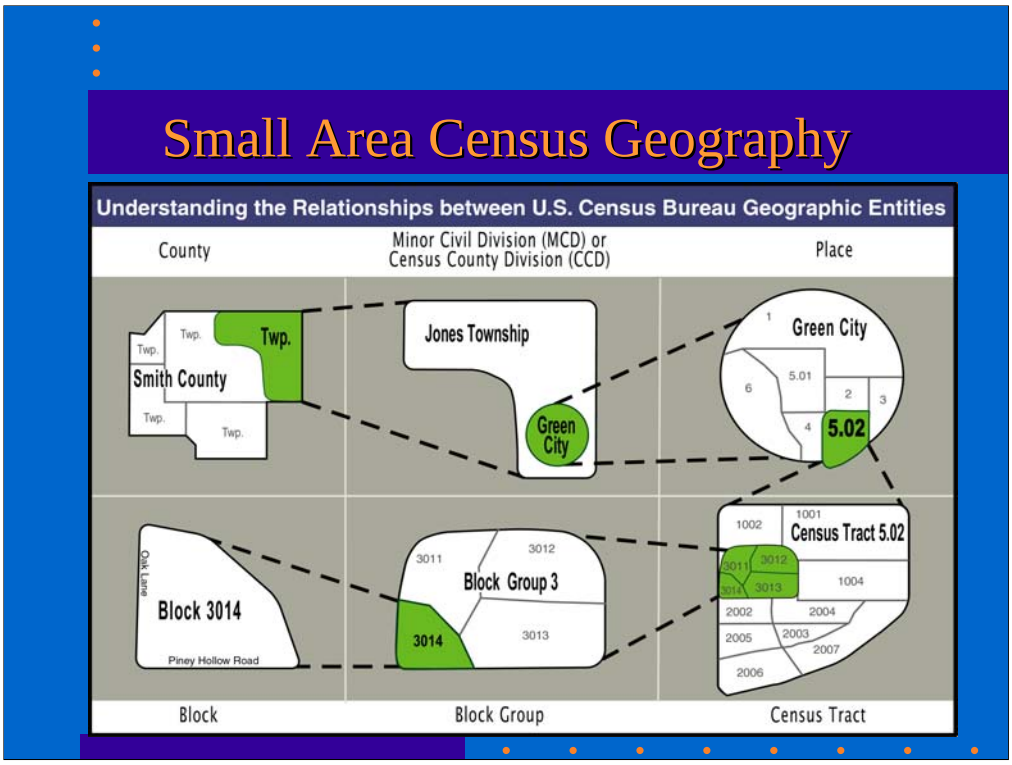
- Feature Names
- Geographic area names, status, area, etc. for each of the 9 million areas of interest to the Census Bureau
- ZIP Code and address ranges for city style addresses
- Map spot ID’s and descriptions for rural addresses

Hierarchical Relationship of Census Geographic Entities



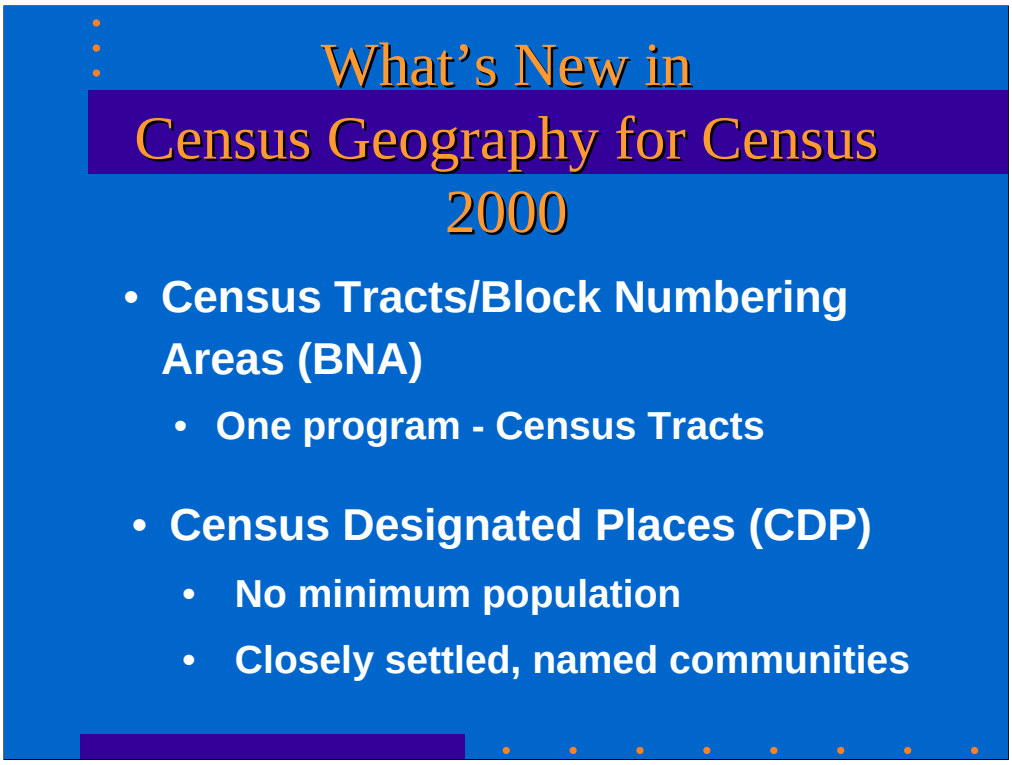
Run through hierarchy. Data is tabulated at all levels. Sample data available at the BG level and above.

Dated map, has three digit block numbers. Better depiction of hierarchy than other map.



Here is a diagram that shows an example of typical Census geographic areas below the county level. Some counties may have additional types of entities such as American Indian areas. However, this graphic will serve as an example of a typical county. (Tracts are unique to counties)

The key point that I want to illustrate with this graphic is the relationship between census tracts, census block groups and census blocks. Census tracts are delineated within a county just before each census, usually with the help of local officials. Note, that unlike this example, they do not necessarily follow the boundaries of entities within a county like townships, places or cities. The census tracts themselves are further subdivided into block groups. The block groups are then divided into census blocks.



Before we discuss the specifics of our proposed Geographic products for Census 2000, it is appropriate to talk about some changes in Census 2000 geography that we believe will make the data more useful to the public.

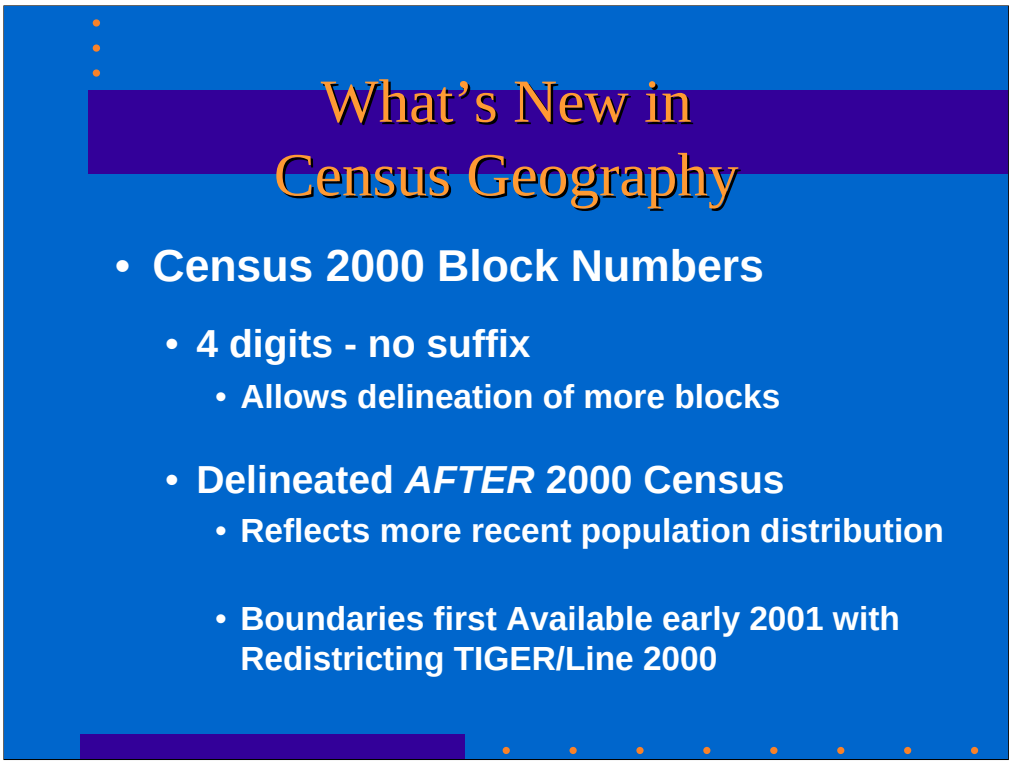
First change is the census tract/BNA terminology. Census Tracts are relatively small statistical areas (about 4,000 population) that we delineated (usually with local input) to provide small area data. Typically they would represent a neighborhood. In 1990, the entire US was divided into over 50,000 census tracts and 11,000 BNAs.

After 1990 , data users told us that they were confused about the distinction between a Block Numbering Area (BNA) and a Census Tract from the 1990 census. The distinction was whether or not locals participated in their delineation. For the vast majority of data users, the distinction is *not relevant* and only caused confusion. For Census 2000, there will only be one geographic term -- the Census Tract for that level of geography.

Second change involves Census Designated Places.

Many localities in this nation function as a place even though they have no legal basis because of the variations in state laws. Local planners still need data by these areas even though they don't have legal boundaries. To deal with this problem the Census Bureau works with local governments to identify and delineate these areas as Census Designated Places (CDP) for which we can provide statistics.

Especially in the more rural portions of this nation, the Census Bureau did not recognize and tabulate data for many of these communities for the 1990 Census. Such places had to have a minimum population of 1,000 before they could be a Census Designated Place. In response to local comments, we have eliminated the minimum population requirements for Census 2000. We believe that this will enable some of the smaller places that do not have a formal government to qualify when they provide the *same mix of functions* as an incorporated place.

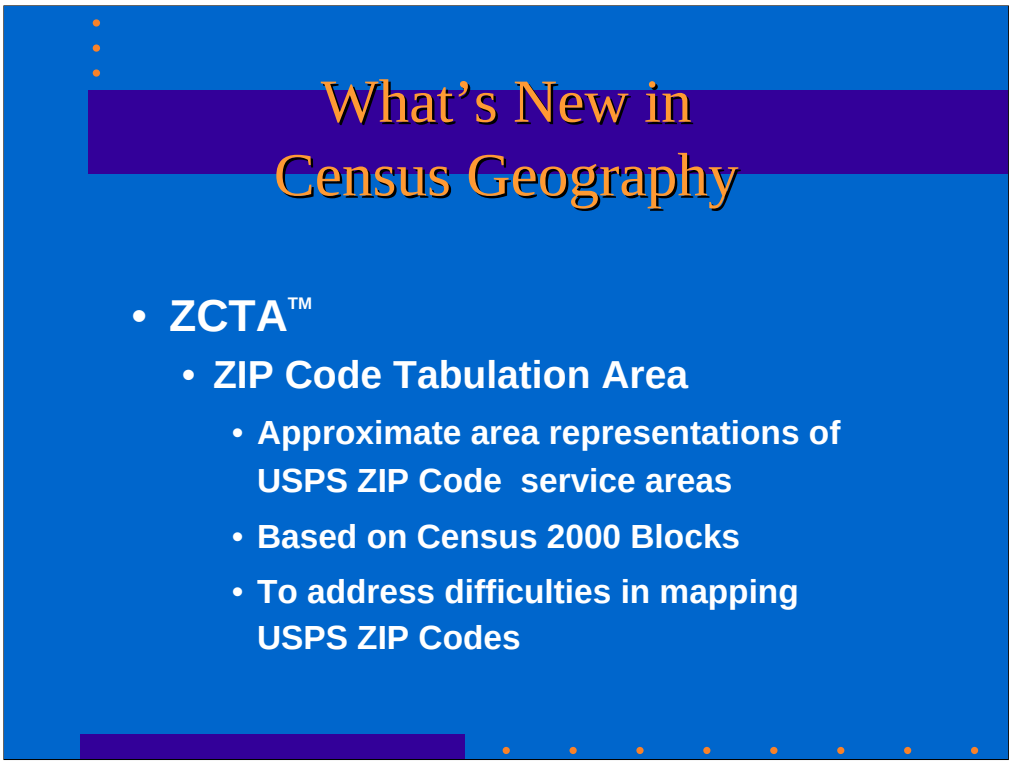


Third area of change involves the Census block number. For Census 2000 we will have 4 digit block numbers.

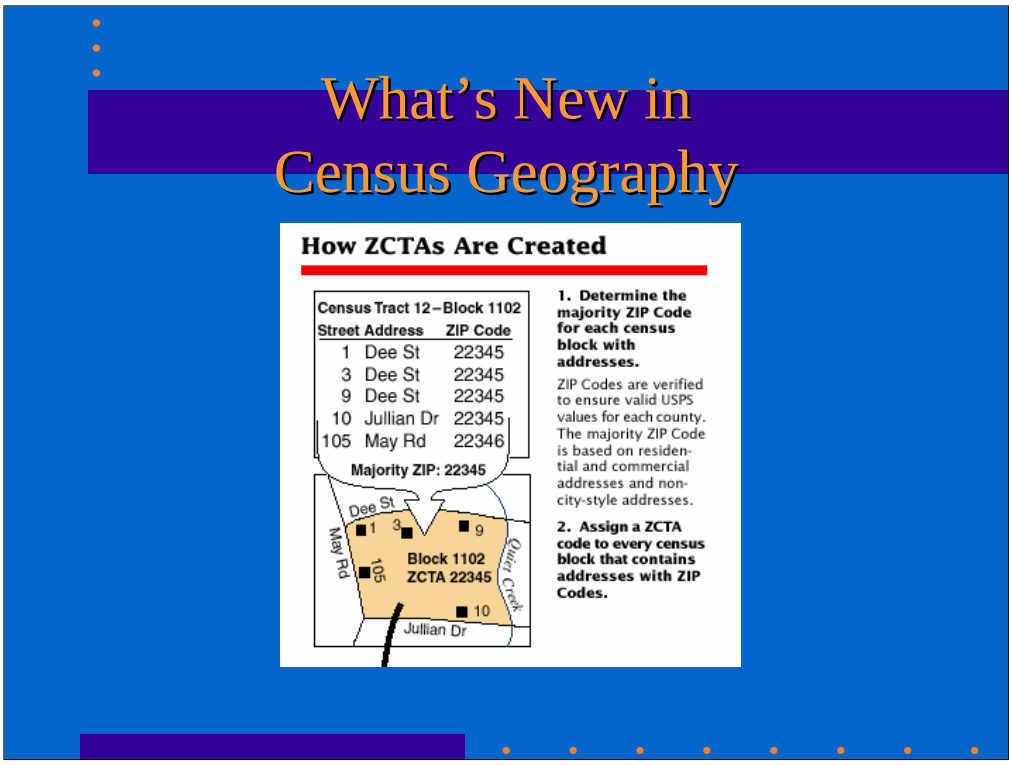
Census Blocks are smaller than Census Tracts and roughly equivalent to city blocks. For the 1990 census, we delineated over 7 million census blocks *nationwide for the first time*. In 1990 about *1 million additional blocks qualified to have an unique block number but did not receive one because we ran out of 3 digit block numbers*.

In addition, because we will not assign these numbers until we have collected and verified with local officials the governmental unit boundaries as of January 1, 2000, we will *not have to add a suffix* to the block number as we had to do in 1990. The blocks were created before the final local boundaries were set for the Census so adjustments (adding suffixes to the pieces that changed) had to be made to accommodate boundary changes.

We also will be able to assign block numbers to qualified blocks within *new subdivisions* we add to our geographic data base late in the census preparation timetable.

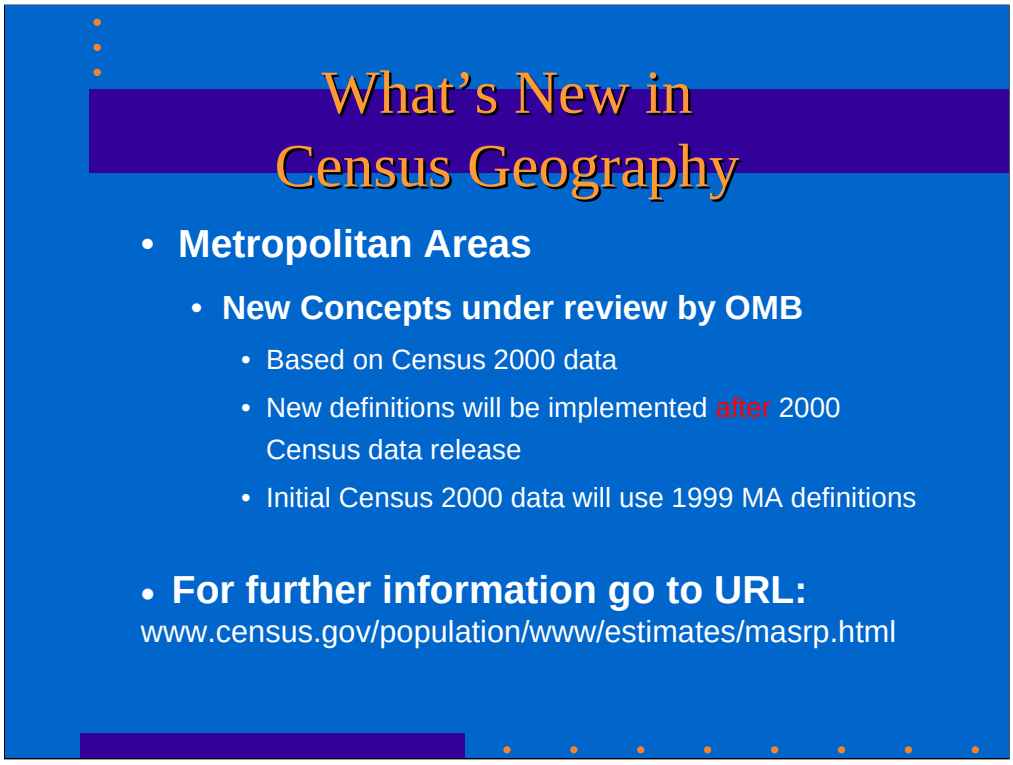


Another new aspect of geography for Census 2000 is the ZIP Code Tabulation Area. This is a new statistical area that the Census Bureau has created to address the problems associated with tabulating data by ZIP Codes. They are generalized representations of USPS ZIP Code areas. Since ZIP Codes are tools for delivering mail and were never intended to provide the basis for statistical tabulations they are often not appropriate for that use. ZIP Codes are usually just collections of streets representing a carrier route and not created to be a polygon with predefined boundaries. What complicates matters is that they can be assigned to just one building, or even to a single company within a building and they can be changed at any time to meet the Post Office's operational needs.

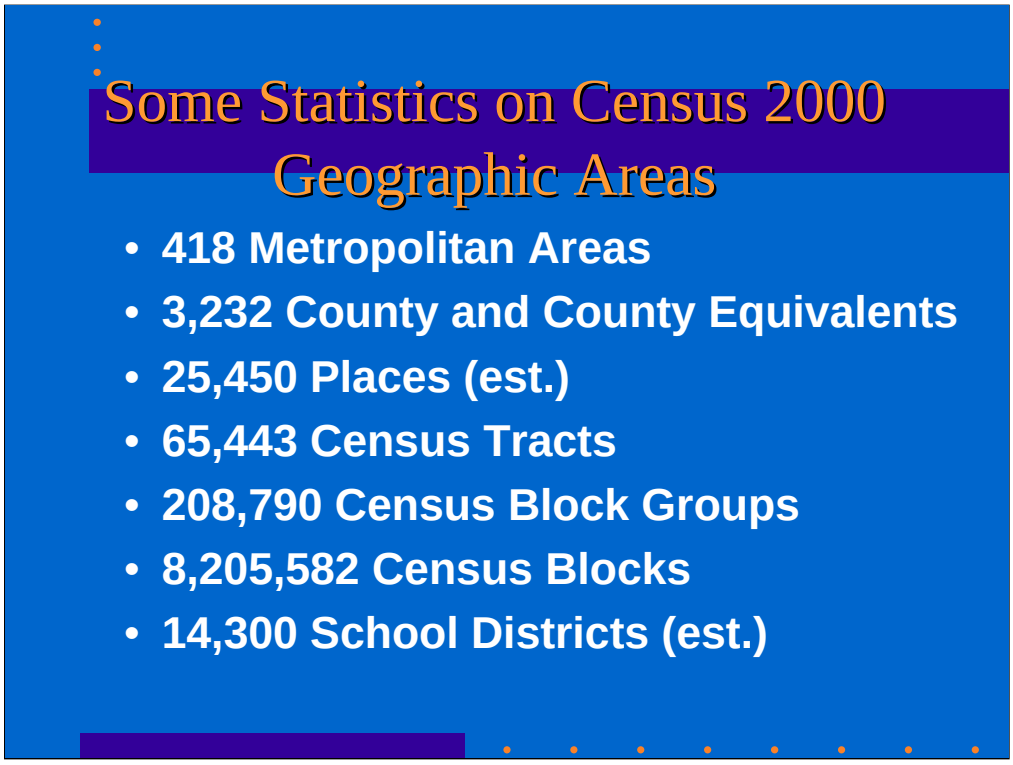


To be able to provide statistical data by ZIP Codes the Census Bureau has created the ZCTA to be as close an approximation to actual ZIP Code coverage as possible but also having the characteristics of other statistical areas, such as definable boundaries. The Census Bureau uses the addresses in it's TIGER and Master Address File data base to determine the areas covered by each ZIP Code and uses that information to interpolate boundaries for these areas as they relate to Census 2000 blocks. This means that Census will create ZCTAs by grouping whole Census blocks. The ZIPCode used by the majority of addresses in a given block will determine the ZCTA code for that block. While there is no legal or operational requirement for the USPS to abide by these boundaries the Census Bureau believes that ZCTAs will closely follow actual ZIP Code coverage.

The Census Bureau plans to update the ZCTA boundaries on a periodic basis, but the frequency would be contingent available resources.



The last geographic area I'm going to discuss today is the Metropolitan Area. The Office of Management and Budget (OMB), who defines metropolitan areas, undertakes a review of the MA standards in the years preceding each decennial census and, if warranted, suggests revisions. Such a review currently is underway and a draft of the new standards was first issued in the Federal Register on October 20, 1999, with a closing period of December 20, 1999. Because of the number of responses from the public, OMB has decided to make some changes to original proposal and a new announcement was made on August 22, 2000. Visit the web site listed here for the latest information. Any changes to the MA standards, however, will not be implemented until approximately 2003.

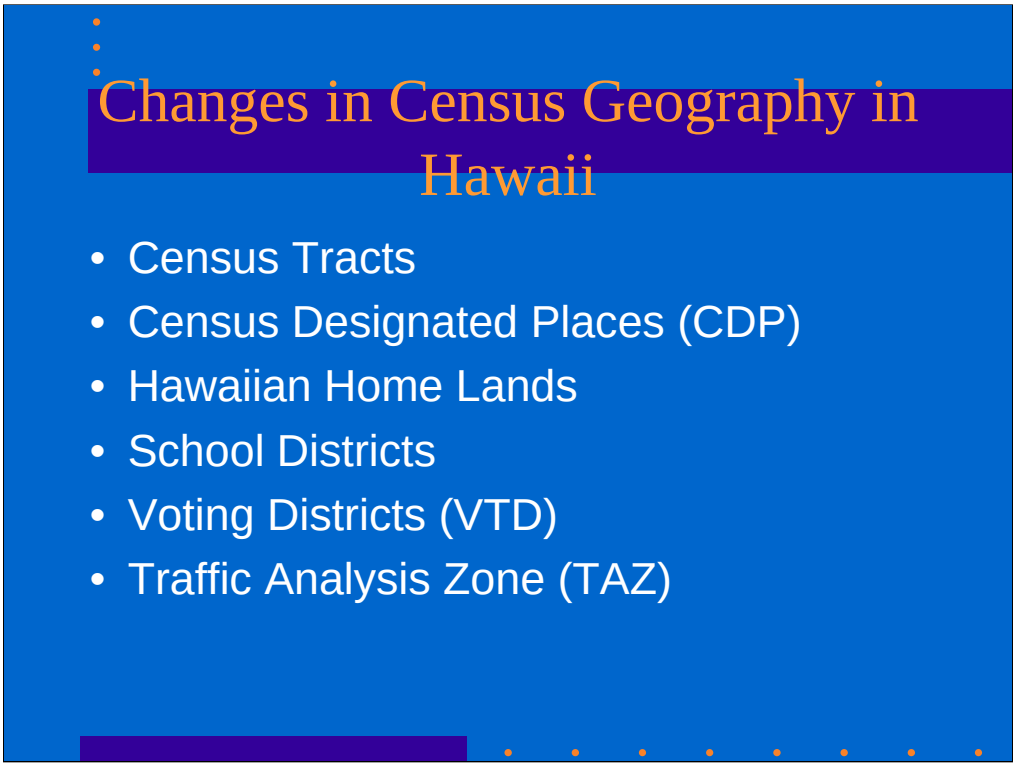


Here are some statistics showing the numbers of some of the types of entities for which Census 2000 will report data.

Linking Data to Geography

CODE	STATEFP	CNTY	TRACTBNA	BLCKGR	POP100	HU100
410459701981	41	045	970198	1	621	280
410459701982	41	045	970198	2	851	322
410459701983	41	045	970198	3	217	117
410459701984	41	045	970198	4	175	93
410459702 1	41	045	9702	1	798	313
410459702 2	41	045	9702	2	375	148
410459702 3	41	045	9702	3	267	109
410459702 4	41	045	9702	4	1108	382
410459702 5	41	045	9702	5	1272	479
410459703 1	41	045	9703	1	805	326
410459703 2	41	045	9703	2	1306	484
410459703 3	41	045	9703	3	674	303
410459703 4	41	045	9703	4	440	209
410459703 5	41	045	9703	5	513	298
410459703 6	41	045	9703	6	164	69
410459704 1	41	045	9704	1	1038	430
410459704 2	41	045	9704	2	1123	448
410459704 3	41	045	9704	3	692	288
410459704 4	41	045	9704	4	700	304
410459704 5	41	045	9704	5	920	334
410459705 1	41	045	9705	1	844	300
410459705 2	41	045	9705	2	1197	449

Use this slide to reinforce that data is all tabulated at some level of geography.



The following slides are specific for Hawaii.

Census Tracts

- All Tracts with suffixes .99, .98, .97, .96, etc have been eliminated, absorbed back into parent tract or assigned old tract number
- New Tracts that were that were created by splitting 1990 tracts:
  - Hawaii County 2 tracts split creating 4 new tracts
  - Honolulu County 11 tracts split creating 28 new tracts
  - Kauai County no change
  - Maui County 3 tracts split creating 9 new tracts

Census Designated Place

- Hawaii County created 8 new CDPs and made modifications to 7 CDPs
- Honolulu County minor modifications to 3 CDPs
- Kauai County minor modifications to 2 CDPs

Hawaiian Home Lands

- Included for the first time. Worked with the Department of Hawaiian Home Lands to get boundaries and names into TIGER
- Statewide 61
- Hawaii 28
- Honolulu 9
- Kauai 7
- Maui 17

School Districts

- Officially there is only one School District in Hawaii
- By request the Bureau has included:
  - High School Administrative Districts as Secondary School Districts
  - Administrative Areas as Elementary School Districts

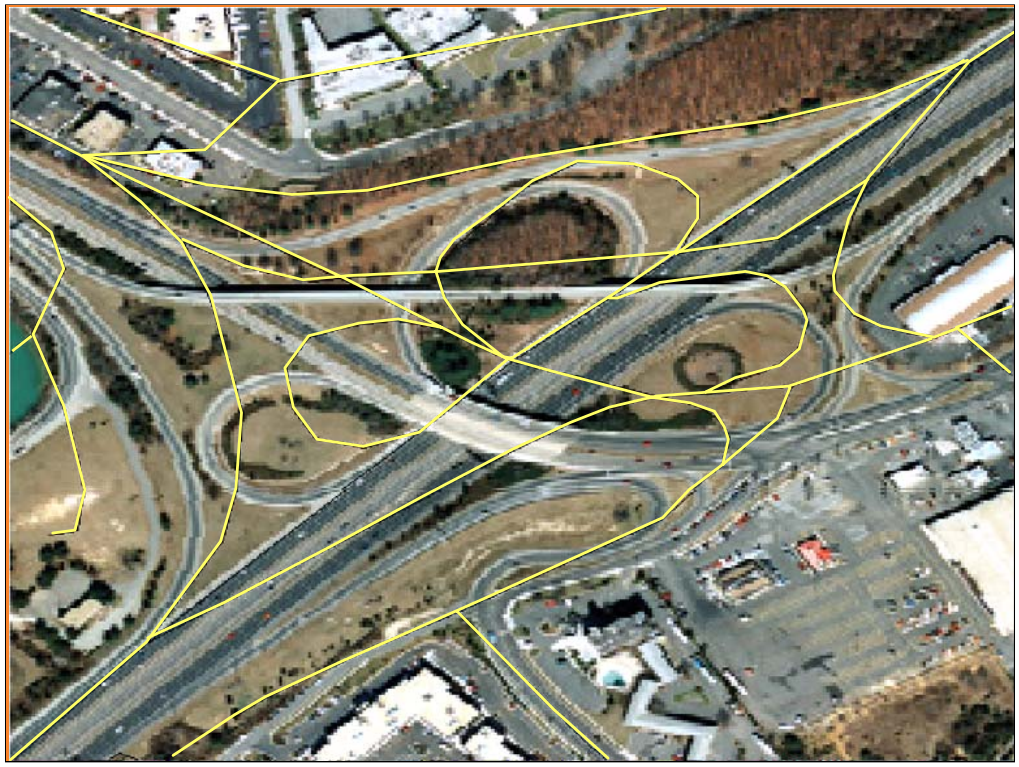
Voting Districts (VTDs)

- Worked with the Office of Elections to delineate VTDs for Hawaii
- VTDs are approximations of Precincts
- Program was requested by states to help with redistricting

Traffic Analysis Zones

- U. S. Department of Transportation program
- Hawaii did not participate in the program for 2000 Census

What does the future hold for TIGER?

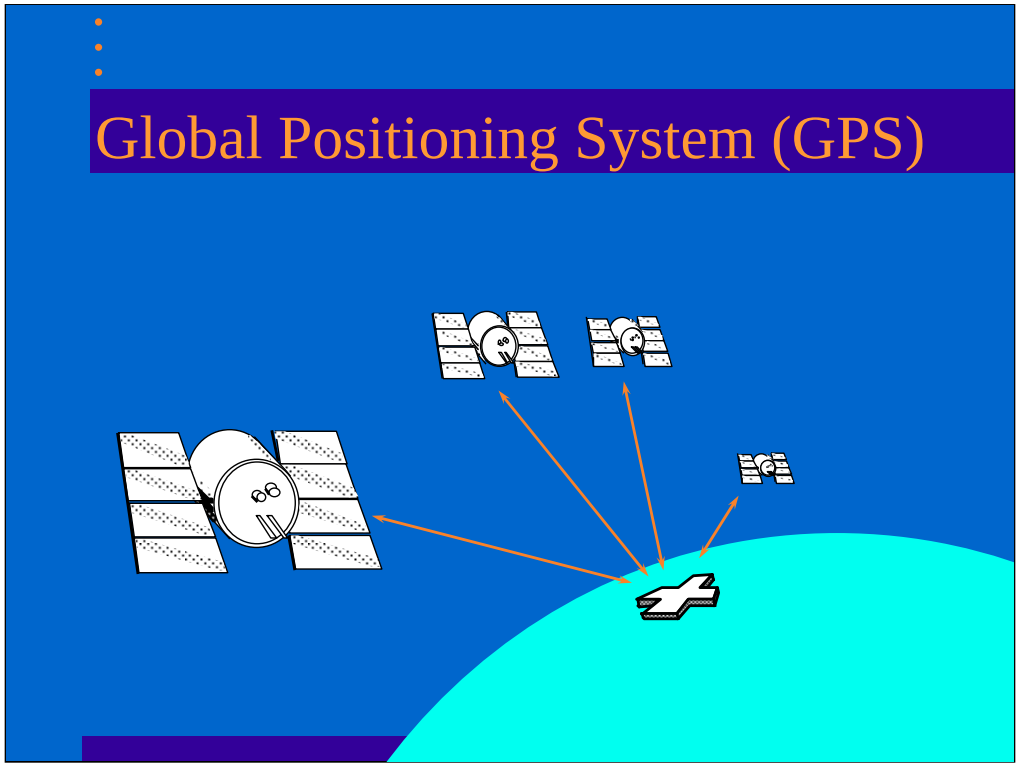


Accuracy of TIGER Coordinates

- Highly accurate data not available (or needed) when TIGER was built
- “Relative” accuracy
- Rural areas created from USGS 100K series maps - approximately 50 meters
- Urban areas created from GBF/DIME files - variable accuracy from 50 meters to several hundred meters
- “Enumerator” updates

New Technologies that Aid TIGER

- Global Positioning System (GPS)
- Satellite Imagery
- Geographic Processing Tools
- Web based internet systems



To understand how GPS works, we can divide the system into five conceptual blocks.

Read the ‘Five Steps’ to attendees.

The next set of slides discusses each step in detail.

Note that SV stands for Space Vehicle (satellite).


USGS

Improve Coordinate Accuracy of TIGER

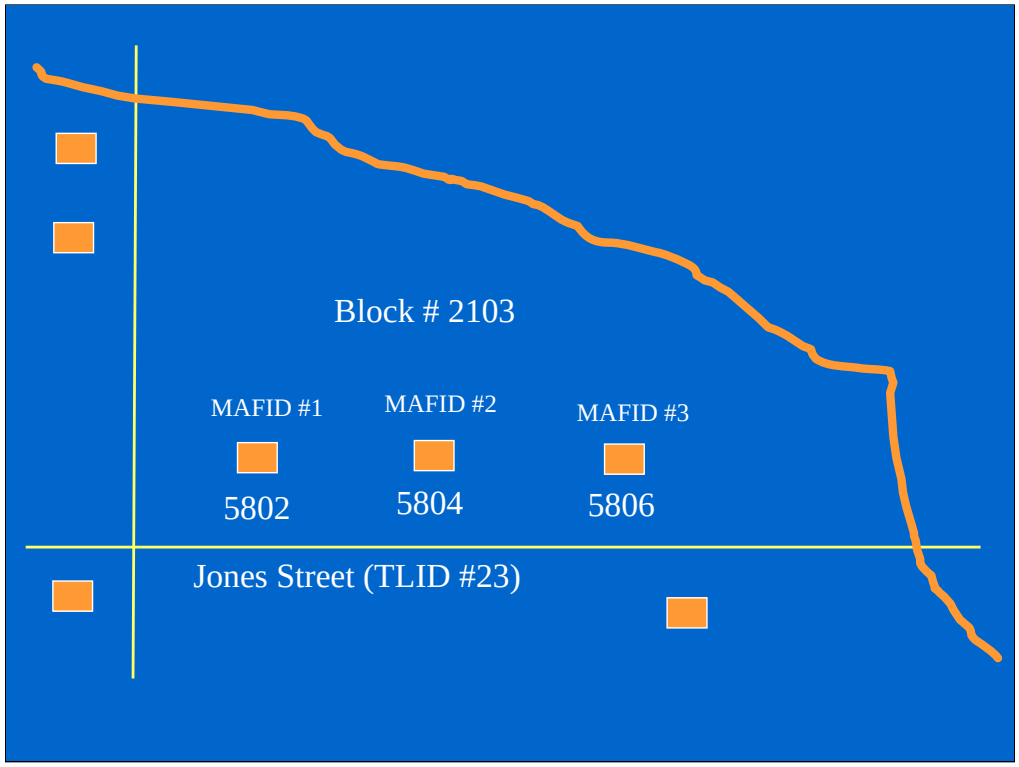
- Allow use of satellite imagery for TIGER maintenance
- Allow use of GPS for structure spotting and navigation
- Make use of available geographic files of state, local and tribal governments
- Use web based Internet systems to allow local, tribal and state partners to update both MAF and TIGER

Allow Automated Field Operations

- MAF/TIGER display on laptop instead of paper maps and listings
- GPS navigation, spotting and updating
- Direct to MAF/TIGER updating from the field

Insert location of every basic street address in TIGER

- Eliminate the requirement that geographic areas be composed of census blocks.
- Instead of defining geographic areas as a collection of census blocks for tabulation, the area will be defined as a collection of MAF ID's.


Block # 2103
MAFID #1
MAFID #2
MAFID #3
5802
5804
5806
Jones Street (TLID #23)

Future of TIGER

- Need to improve positional accuracy
- Work with other partners in building the National Geographic Data Infrastructure
  - OMB Integration Teams (I-Teams)
- Need to keep MAF/TIGER current
  - American Community Survey, Economic Survey, and other surveys conducted by the Census Bureau select their samples from MAF
  - 2010 Census