"'Lianne' Elizabeth Sheppard"
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To
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cc

bcc

Subject
Census block boundary info FYI

Angela,

I asked a colleague at UW to help me answer the question of how likely it was for a census block to cross a major road. She compiled the info attached from the Census web site (with some introductory language in the document that is her own). I thought this might be useful to folks at OAQPS if you wish to pass it along.

Here was my question: I want to know if *any* blocks cross major roads because if they don't, their centroids will be systematically farther away than some fraction of the population.

Here's her note on the attached document that provides information to answer the question: Here is a scramble of stuff from the Census web site on how the census defines geographic units, most specifically blocks. The material is a bit dated (not updated since Cen2000) but the criteria will not have changed at all. See especially the table on page 3. Bottom line: no big roads through blocks.

--Lianne--

Geographic Boundaries of Census Blocks

Census blocks do NOT cross major roads, except in unusual circumstances.

Tract boundaries are determined by local advisors, following census guidelines. Usually the Census defines the boundaries of block groups and blocks within the tracts, to assure comparability of boundaries and numbering across censuses.

On page 3 of this material (all lifted from the Census website) there is a list of priority features that define blocks. Major roads follow only 'must-hold' political boundaries (e.g. state, county, reservation boundaries) and bodies of water in priority as block boundaries.

Background on Defining Census tracts:
http://www.census.gov/geo/www/psapage.html

Each census tract must constitute a reasonably compact, continuous land area, all parts of which are internally accessible by road. Population size criteria for census tracts are:

Population Thresholds Census 2000

Area(s)	Optimum	Minimum	Maximum
United States, Puerto Rico, Virgin Islands of the U.S.	4,000	1,500	8,000
*Special place census tract	none	1,000	none

* *Special places are correctional institutions, military installations, college campuses, workers' dormitories, hospitals, nursing homes, and group homes*.

Census tract boundaries should follow visible and identifiable features, such as roads, rivers, canals, railroads, and above-ground high-tension power lines. The following nonvisible, governmental unit boundaries are acceptable as census tract boundaries: All state and county boundaries. American Indian reservation boundaries. (the only ones relevant to Washington)

Census Block Groups (BGs) - Census 2000 Criteria

Block groups are geographic subdivisions of census tracts; their primary purpose is to provide a geographic summary unit for census block data. A block group must comprise a reasonably compact and contiguous cluster of census blocks. Each census tract contains a minimum of one block group and may have a maximum of nine block groups.

Population Thresholds

Area(s)	Optimum	Minimum	Maximum
Standard	1,500	600	3,000
American Indian Reservation	1,000	300	3,000
*Special place	none	300	none

* *Special places are correctional institutions, military installations, college campuses, workers' dormitories, hospitals, nursing homes, and group homes.*

Block group boundaries should follow visible and identifiable features, such as roads, rivers, canals, railroads, and above-ground high-tension power lines. Census tract boundaries are always block group boundaries. The following nonvisible governmental unit boundaries are acceptable as block group boundaries: All state and county boundaries.

When satisfactory features are not available, the Census Bureau may at its discretion approve other nonstandard visible features, such as ridge lines, pipelines, intermittent streams, fence lines, boundaries of National Parks and National Forests, military reservations, cemeteries or other special land-use properties, and the straight-line extensions of visible features or other lines of sight.

Census Blocks and Block Groups

http://www.census.gov/geo/www/GARM/Ch11GARM.pdf

Census blocks, the smallest geographic area for which the Bureau of the Census collects and tabulates decennial census data, are formed by streets, roads, railroads, streams and other bodies of water, other visible physical and cultural features, and the legal boundaries shown on Census Bureau maps

Identifying and Numbering Census Blocks

Although most people intuitively think of census blocks as being rectangular or square, of about the same size, and occurring at regular intervals, as in many cities of the United States, census block configurations actually are quite different. Patterns, sizes, and shapes of census blocks vary within and between areas. Factors that influence the overall

configuration of census blocks include topography, the size and spacing of water features, the land survey system, and the extent, age, type, and density of urban and rural development.

• The minimum size of a census block was 30,000 square feet (0.69 acre) for polygons bounded entirely by roads, or 40,000 square feet (0.92 acres) for other polygons. There was no maximum size for a census block.
• Exceptions to the minimum polygon sizes were made where the polygon was entirely bounded by (politically-defined) *must-hold* features that needed to be maintained as census block boundaries.
    - Features were ranked according to their importance as census block boundaries based on (1) the type of boundary, (2) the feature with which it coincided, (3) the existence of special land use areas (such as military reservations), and (4) the presence of governmental boundaries, in particular, State boundaries. Boundaries were assigned a ranking preference according to these four factors.
• At least one side of a potential census block had to be a road feature.
• Extensions from dead-end roads/streets were used to split oversized polygons into separate blocks; such extensions were made wherever road features protruded into a large polygon and ended within 300 feet of non-road features, such as shorelines and railroads.

Table 11-1. **Hierarchy of Census Feature Classes for Use as Block Boundaries**
Qualifying features ranked from highest to lowest priority:

(1) Must-hold census block boundary *(see "Identifying and Numbering Census Blocks" section)*
(2) Water area *(double-line drainage)*
(3) Named, addressable divided roads *(by road class)*
(4) Named, addressable undivided roads *(by road class)*
(5) Unnamed addressable divided roads *(by road class)*
(6) Unnamed addressable undivided roads *(by road class)*
(7) Other addressable features
(8) Feature extensions *(manually inserted)*
(9) 1980 statistical/governmental unit boundary *(by category)*
(10) Main rail line feature
(11) Railyard
(12) Rail spur and other rail feature
(13) Named perennial stream *(single-line drainage)*
(14) Power transmission line
(15) Pipeline
(16) Unnamed perennial stream *(single-line drainage)*
(17) Named perennial or unclassified canal, ditch, or aqueduct
(18) Unnamed perennial or unclassified canal, ditch, or aqueduct
(19) Named intermittent stream or wash *(single-line drainage)*
(20) Named braided stream *(single-line drainage)*
(21) Unnamed braided stream *(single-line drainage)*
(22) Named intermittent canal, ditch, or aqueduct
(23) Topographic feature *(such as bluffs, cliffs)*
(24) Fence line
(25) Point-to-point line

(26) Feature extension, other than manually inserted extension
(27) Other special transport feature
(28) Physical feature not listed
Note: Examples of features that did not qualify as block boundaries are rail features in tunnel; property line; airport, airfield, or terminal feature; cemetery boundary; golf course boundary; unnamed, intermittent stream or wash; unnamed intermittent canal, ditch, or aqueduct; water boundaries and special water features; and all nonvisible boundary features and statistical boundary features (unless tagged must-hold).

Census Block Configurations

Census Block Patterns in Larger Urban Areas

The core area of most urban agglomerations consists of a grid system of relatively small blocks, disrupted here and there by water features; topographic relief; special land uses such as parks, industrial areas, and commercial areas; transport features such as airports and railyards; and institutions such as hospitals, schools, and detention facilities. The surrounding older suburbs tend to repeat this pattern; however, development since the 1960s often involved larger residential blocks with curvilinear street patterns and cul-de-sacs. This new pattern of urban development reflects the application of urban planning concepts and a concern for residential amenities.

The road patterns in rural areas follow both a branching and a grid pattern, depending on local factors as well as the rural settlement patterns in particular regions of the Nation. Rural patterns greatly reflect the topography and land survey system that was in place at the time of settlement.

Regional Factors

Regional variations in census block patterns are related to the age of the settlement pattern and the relative density of the population. In the urban cores of most older cities, census blocks are small because development preceded the introduction of urban transportation technologies (such as interurban railways, streetcars, and the automobile) and the decentralization of industries and jobs. Surrounding these urban cores in the eastern and southern regions of the Nation, one typically finds dense, irregular street patterns and an extensive system of connecting roads due principally to the metes and bounds survey system.

The presence of coastal and inland water features often influence the settlement pattern. In areas influenced by French settlement, such as within the State of Louisiana, the census block pattern preserves the riparian pattern of elongated strips of land, each having access to a major water feature. Rural areas in the central part of the country usually continue the grid-type road pattern of the urban core areas, primarily because of the introduction of the township and range survey system, but also due to the general lack of topographic relief.

Suburban and rural census block configurations in the West vary from grid to irregular patterns depending on the local topography and the survey system at the time of settlement. The rural census blocks in the West tend to be larger because of the relatively low population densities as well as the lack of a dense system of roads and water features.

There were a few individual census blocks delineated during the 1990 census in the West that were over 250 square miles in area.