

Geographic Overview

A modern society has vast informational needs, and a Nation as large as the United States and its territories contains many different kinds of geographic situations and settlement patterns. To respond to these needs and provide statistical data for these diverse situations and patterns, the geographic programs at the Census Bureau include several kinds of entities. This ensures that the Census Bureau can effectively (1) conduct complete enumerations, sample surveys, and other statistical programs, and (2) tabulate, publish, and disseminate to data users, the results of its censuses, surveys, and other statistical programs.

The Census Bureau's Geographic Entities

In its data collection operations, the Census Bureau must assign each person, household, housing unit, institution, farm, business establishment, or other responding entity to a specific location, and then assign that location to the tabulation units appropriate to the particular census or sample survey. This geographic coding (geocoding) process assures that the Census Bureau can provide correct counts for small geographic entities, and that both the Census Bureau and data users can accumulate the data for small entities to provide totals for larger geographic entities. Geography, then, is a basic element of the Census Bureau's system for organizing and presenting statistical data to the public.

There are numerous geographic entities for which the Census Bureau tabulates data (see Tables 2-1 and 2-2). Data users have a stake in the kinds of geographic areas for which the Census Bureau tabulates data. The Census Bureau uses two widely known entities, States and counties, in almost all its censuses, sample surveys, and other programs. Some geographic entities, however, appear in only a few data tabulations or are available only in machine-readable data summaries.

Regardless of their relative importance, the Census Bureau classifies all geographic entities into two broad categories: *legal and administrative entities* and *statistical entities*. Legal and administrative entities generally originate

from legal actions, treaties, statutes, ordinances, resolutions, court decisions, and the like. Local officials and others require data for governmental entities to fulfill a variety of needs. They require the boundaries of legal and administrative entities to manage a wide variety of programs and to conduct elections. The Census Bureau generally accepts, according to documentation by the appropriate authorities, the boundaries of these entities as they exist. Although the Census Bureau's data tabulations for legal and administrative entities are sufficient to satisfy the needs of many data users, information for these jurisdictions alone does not meet all data needs. Therefore, the Census Bureau also presents data for a second geographic category, statistical entities.

Statistical geographic entities usually evolve from practice, custom, usage, or need, and generally the Census Bureau develops the criteria and guidelines for their identification and delineation. In contrast to the legal and administrative entities, whose existence and boundaries are officially prescribed, statistical entities are appropriate in situations where the geographic coverage of the legal areas is incomplete, inadequate, or inconsistent over time, or is nonexistent. The Census Bureau develops statistical units in response to the programmatic or analytical needs of data users. In doing so, the Census Bureau, often in cooperation with State, local, and tribal officials, endeavors to establish a standard set of statistical entities whose size, composition, and boundaries meet the needs of its data presentations. The Census Bureau recognizes statistical entities at all levels in its decennial census geographic hierarchy (see Tables 2-1 and 2-2).

This chapter summarizes some of the more important considerations that enter into the Census Bureau's choice and use of legal/administrative and statistical geographic entities. To provide the data tabulations needed by a majority of users, the Census Bureau intermingles the legal/administrative and statistical entities within a common framework, the geographic hierarchy. The basic hierarchy has several levels (States, counties, and county subdivisions), with each comprising a level. American Indian and Alaska Native areas, metropolitan areas (MAs), urbanized areas (UAs), places, and other entities are interspersed throughout the framework. The diagrams

Table 2-1. **Geographic Entities of the 1990 Census**

Type of Geographic Entity	Status	Number
Nation (the United States)¹	Legal	1
Regions (of the United States)	Statistical	4
Divisions (of the United States)	Statistical	9
States and Statistically Equivalent Entities²	Legal	57
Counties and Statistically Equivalent Entities	Legal	3,248
County Subdivisions and Places		60,228
Minor Civil Divisions (MCDs)	Legal	30,386
Sub-MCDs	Legal	145
Census County Divisions (CCDs)	Statistical	5,581
Unorganized Territories (UTs)	Statistical	282
Other Statistically Equivalent Entities ³	Statistical	40
Incorporated Places ⁴	Legal	19,365
Consolidated Cities	Legal	6
Census Designated Places (CDPs)	Statistical	4,423
American Indian and Alaska Native Areas (AIANAs)		576
American Indian Reservations (no trust lands)	Legal	259
American Indian Entities with Trust Lands	Legal	52
Tribal Jurisdiction Statistical Areas (TJSAs)	Statistical	19
Tribal Designated Statistical Areas (TDSAs)	Statistical	17
Alaska Native Village Statistical Areas (ANVSAs)	Statistical	217
Alaska Native Regional Corporations (ANRCs)	Legal	12
Metropolitan Areas (MAs)		362
Metropolitan Statistical Areas (MSAs)	Statistical	268
Consolidated Metropolitan Statistical Areas (CMSAs)	Statistical	21
Primary Metropolitan Statistical Areas (PMSAs)	Statistical	73
Urbanized Areas (UAs)	Statistical	405
Special-Purpose Entities		404,583
Congressional Districts	Legal	435
Voting Districts (VTDs) ⁵	Legal	148,872
School Districts	Administrative	15,274
Traffic Analysis Zones (TAZs) ⁶	Administrative	200,000
ZIP Codes ⁷	Administrative	40,000

Table 2-1. (cont.)

Type of Geographic Entity	Status	Number
Census Tracts and Block Numbering Areas (BNAs)		62,276
Census Tracts	Statistical	50,690
Block Numbering Areas	Statistical	11,586
Block Groups (BGs)	Statistical	229,192
Blocks	Statistical	7,017,427

¹ Officially, "the United States" consists of the 50 States and the District of Columbia.

² In addition to the 50 States and the District of Columbia (the United States), the 1990 decennial census includes American Samoa, Guam, the Northern Mariana Islands, Palau, Puerto Rico, and the Virgin Islands of the United States.

³ The 40 entities include the 40 "census subareas" in Alaska.

⁴ In agreement with the State of Hawaii, the Census Bureau does not recognize the city of Honolulu, which is coextensive with Honolulu County, as an incorporated place for statistical presentation purposes. Instead, the State delineates, and the Census Bureau tabulates data for, CDPs that define the separate communities within Honolulu County.

⁵ Include only those eligible entities participating under the provisions of Public Law 94-171.

⁶ The number of Traffic Analysis Zones, for which the Census Bureau tabulated data from the 1990 census, is an estimated value.

⁷ The number of ZIP Codes is an estimated value.

Table 2-2. **Number of Geographic Entities of the 1992 Economic and Agriculture Censuses**

Type of Geographic Entity	Status	Economic	Agriculture
Nation (the United States)	Legal	1	1
Regions (of the United States)	Statistical	4	—
Divisions (of the United States)	Statistical	9	—
States and Statistically Equivalent Entities	Legal	55	55
Counties and Statistically Equivalent Entities	Legal	3,227	3,171
County Subdivisions and Places		9,063	—
Incorporated Places	Legal	6,897	—
Consolidated Cities	Legal	7	—
Census Designated Places (CDPs)	Statistical	65	—
Special Economic Urban Areas (SEUAs)	Legal	1,640	—
Balance of Metropolitan Areas	Statistical	454	—
Metropolitan Areas (MAs)		348	—
Metropolitan Statistical Areas (MSAs)	Statistical	253	—
Consolidated Metropolitan Statistical Areas (CMSAs)	Statistical	19	—
Primary Metropolitan Statistical Areas (PMSAs)	Statistical	76	—
Special-Purpose Entities		40,900	40,900
ZIP Codes	Administrative	40,900	40,900

showing the geographic hierarchies used in recent U.S. censuses provide a general picture of the most significant geographic patterns (see Figures 2-1 and 2-2). Figure 2-3 shows how several categories of small-area geographic entities subdivide a county.

The Presentation of Data for Geographic Entities

The value of statistical data is directly related to the appropriateness of the geographic entities for which it is reported. Existing legal and administrative entities suffice for some purposes. For others, it is better to use a set of statistical entities; still other applications require both kinds of entities. Some

users require a stable set of boundaries that permit historical comparisons; others require updated boundaries that delimit the changing situation. Such considerations underlie the choice and use of a geographic area for each and every data use.

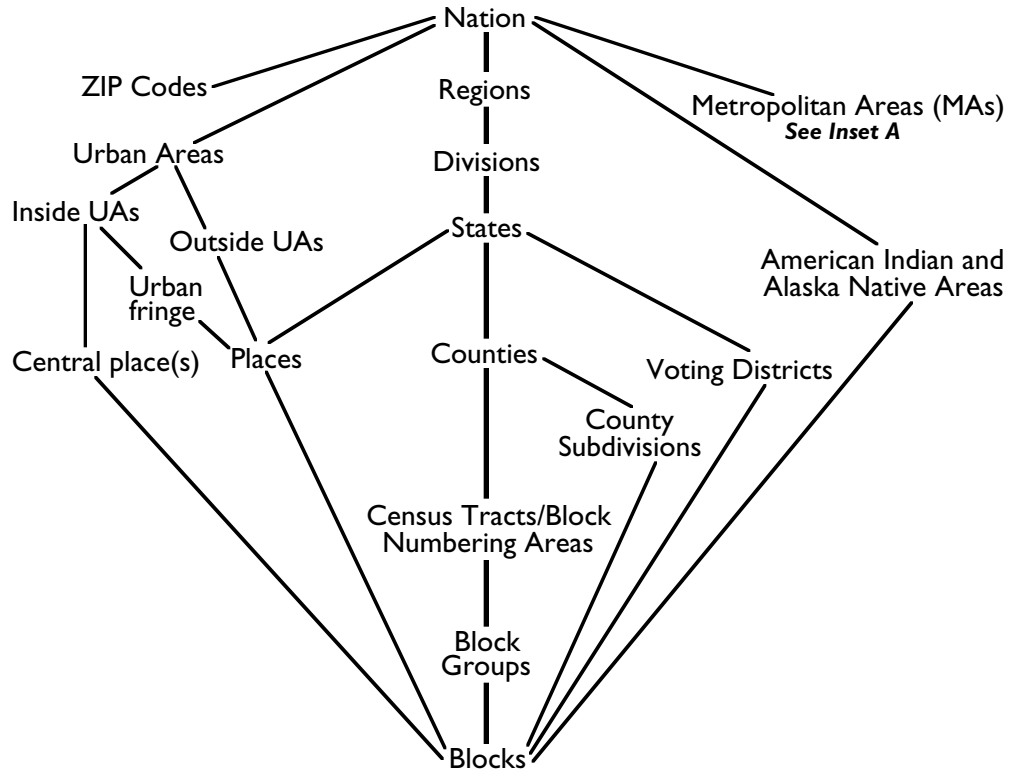
Before undertaking a census or sample survey, the Census Bureau reviews the geographic areas it currently uses. This review may include an evaluation of the entities at each level in terms of established or prevailing statistical practices and needs. Although generally there will be no major changes to most types of geographic entities, the Census Bureau always seeks to find better and more efficient geographic solutions if they exist, to devise new geographic approaches if they can be justified and implemented, and to drop or modify old geographic concepts that no longer serve their original purpose or are no longer cost-effective.

The following factors influence the Census Bureau in selecting an appropriate geographic framework for each of its censuses and sample surveys:

- Legislation
- Federal agency needs
- Tribal, State, local, and other needs
- Census Bureau confidentiality
- Technical and budgetary considerations
- Need for a general consensus on geographic concepts by data users

The weight and importance of any given factor may vary according to the specific purpose at hand and the particular application.

Figure 2-1. **Geographic Hierarchy for the 1990 Decennial Census**



Inset A: MA Components

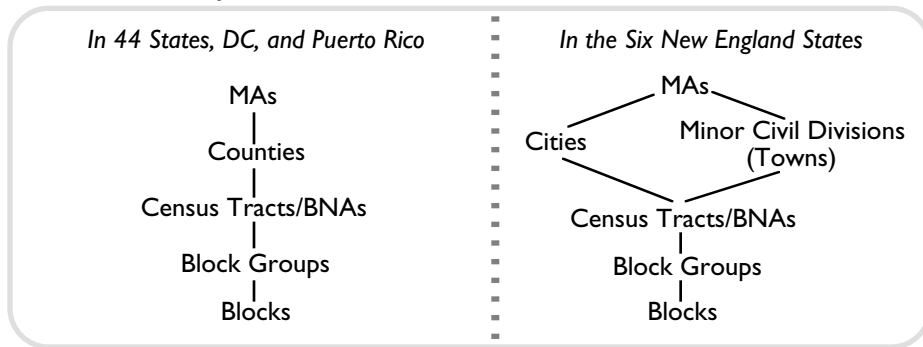
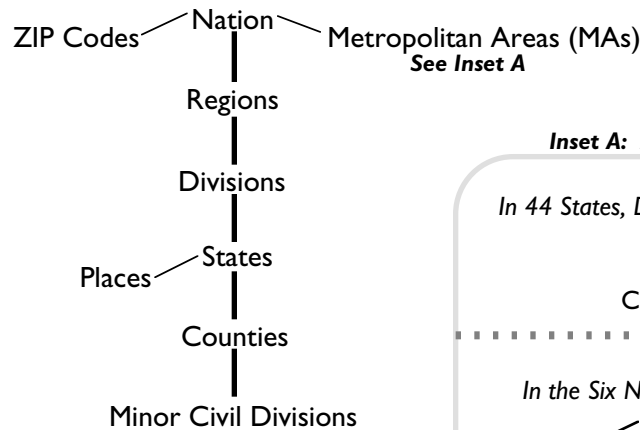
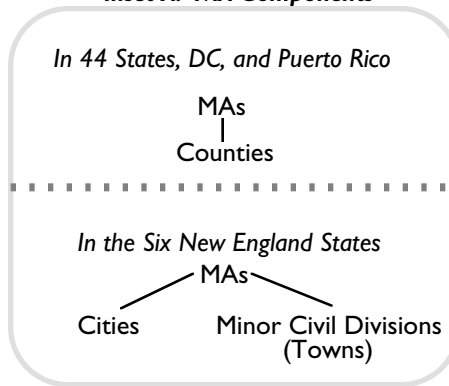


Figure 2-2. **Geographic Hierarchy for Other Censuses (1987, 1992)**

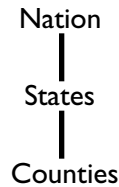
Economic and Governments Censuses



Inset A: MA Components



Agriculture Census

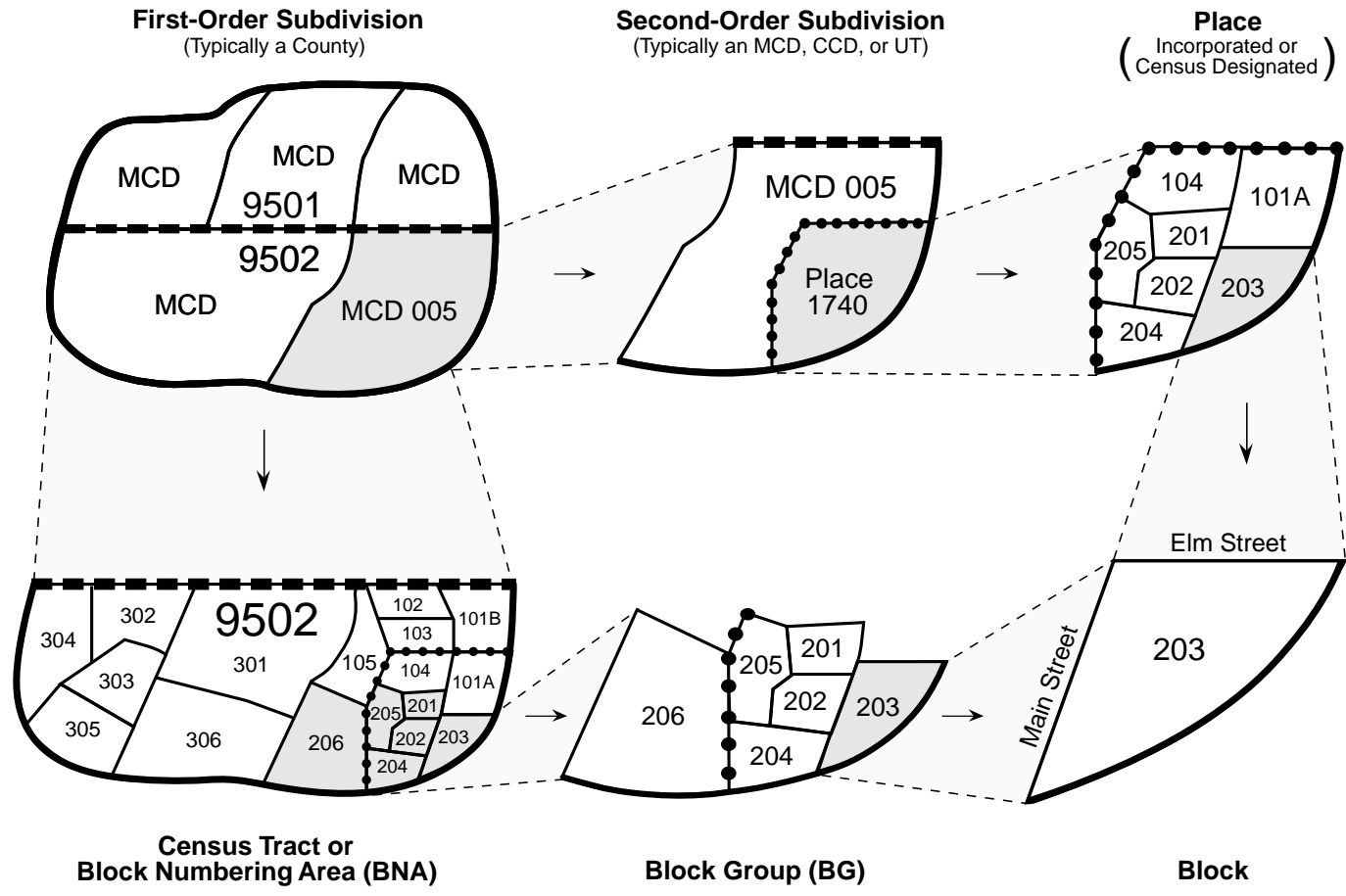


The Economic Census includes the Censuses of Retail Trade, Wholesale Trade, Manufactures, Service Industries, Construction Industries, Mineral Industries, and Transportation, along with the Enterprise Statistics Program and the Minority and Women-Owned Businesses Program.

The Census of Governments reports data for school districts and other special-purpose districts in addition to the geographic entities in the diagram above (except for ZIP Codes). These may exist at various levels of the hierarchy. The Census of Governments includes as places only incorporated places.

Unlike the Economic and Governments Censuses, the Agriculture Census does not provide data for places or MCDs. It does report data for special-purpose entities that may exist at various levels of the hierarchy.

Figure 2-3. Small Area Geography in the 1990 Census



Legislation

Legislation always has had an important influence on the Census Bureau's programs for the collection of data and its presentation of those data for each component geographic entity. Throughout the 1980s, for instance, Title 13 of the United States Code, its amendments, and a number of court decisions shaped the Census Bureau's priorities, plans, operations, and data presentations for the 1990 census. Public Law 94-171, passed by the Congress in 1975 and embodied in Title 13, requires that the Census Bureau release small-area population data within one year after Census Day for purposes of legislative redistricting. Meeting the intent of this legislation influenced the Census Bureau to increase the number of areas for which it tabulated data by census block for the 1980 census and to assign block numbers to the entire Nation for the 1990 census. It also made it possible to provide decennial census data tabulated by voting district (election precinct) in both the 1980 and the 1990 censuses.

Needs of Other Federal Agencies

The needs of the Congress and other Federal agencies have a major influence on the Census Bureau's data collection activities. Federal law often requires the use of Census Bureau data in specific programs, projects, studies, investigations, analyses, and reports. To ensure meeting the data needs of the affected agencies, the Office of Management and Budget (OMB), at the request of the Census Bureau, organized the Federal Agency Council (FAC) in 1974. From the FAC, which was active in the precensus planning periods for both the 1980 and the 1990 decennial censuses, the Census Bureau obtained information about the types of geographic entities that Federal agencies needed for carrying out their programs. In preparation for the next decennial census of population and housing, the OMB and the Census Bureau are conducting a survey of the Federal agency 2000 census data content requirements. Preliminary results on geographic requirements are summarized in Tables 2-3 and 2-4.

Table 2-3. **Entities Needed by Federal Agencies Using Population Data**

Department of Agriculture	County Census Tract/BNA American Indian and Alaska Native Areas
Department of Commerce	State or Nation County Place (with or without MCDs) School District Census Block American Indian and Alaska Native Areas
Department of Defense	ZIP Code Census Block
Department of Education	School District Census Block
Department of Health and Human Services	County Place (with or without MCDs) Census Tract/BNA ZIP Code American Indian and Alaska Native Areas
Department of Housing and Urban Development	Place (with or without MCDs) Census Tract/BNA Block Group
Department of Justice	Place (with or without MCDs) School District Census Block
Department of Labor	County Census Tract/BNA
Department of Transportation	Traffic Analysis Zone Census Block
Department of Veteran Affairs	County
Environmental Protection Agency	Census Tract/BNA
Equal Employment Opportunity Commission	State or Nation Cities with \geq 50,000 People ZIP Code
National Science Foundation	State or Nation

Source: Population Division, U.S. Bureau of the Census "Federal Agency 2000 Census Content Requirements—Summary of Submissions to OMB," (draft), August 16, 1993.

Table 2-4. **Entities Needed by Federal Agencies Using Housing Data**

Department of Agriculture	State or Nation BNA
Department of Commerce	County Census Tract/BNA Census Block
Department of Energy	State or Nation County Census Tract/BNA Block Group
Department of Health and Human Services	County Census Tract/BNA
Department of Housing and Urban Development	State or Nation County Place (with or without MCDs) Census Tract/BNA Block Group
Department of Justice	Block Group
Department of Transportation	Traffic Analysis Zone
Environmental Protection Agency	County Block Group

Source: Population Division, U.S. Bureau of the Census "Federal Agency 2000 Census Content Requirements—Summary of Submissions to OMB," (draft), September 2, 1993.

Tribal, State, Local, and Other Needs

In addition to meeting with Federal agencies, the Census Bureau undertook numerous programs and activities with State agencies and selected tribal, local, and regional officials. These efforts were designed to encourage public awareness of the 1990 census, to build wide public support, to seek participation in the preparatory definitional process, to ensure the maximum return of correctly filled out questionnaires, and to determine the geographic levels for which the officials needed decennial census data to accomplish their decision-making, regulatory, and legislative mandates. As part of this outreach effort, the Census Bureau made a number of efforts to improve or revise the geographic structure for the decennial census. The *Geographic*

Areas Reference Manual represents one of several major ongoing efforts to improve the data user community's understanding of Census Bureau geography and its recognition of the geographic innovations introduced and considered. This manual reflects only one facet of the Census Bureau's attempt to address the many issues associated with Census Bureau geography and its relationship to census-taking and tabulation logistics.

In 1984, the Census Bureau sponsored a National Geographic Areas Conference, followed by three Regional Geographic Areas Conferences, to consider some of the geographic issues needing resolution for future decennial and economic censuses. These conferences also provided a forum in which to gather suggestions concerning both current and possible future geographic approaches. Before these conferences, both data users and Census Bureau staff expressed a need to reexamine the definitions of the geographic areas used in the Census Bureau's data presentations, to reconsider some of the procedures used in delineating the boundaries of those areas, and to ensure that the geographic area definitions reflected both the current and future needs of the data user community.

During 1984 and 1985, the Census Bureau presented a compilation of geographic options as part of its series of 65 Local Public Meetings—there was at least one meeting in each State, the District of Columbia, Puerto Rico, and the Virgin Islands, plus similar meetings in three Pacific Outlying Areas of the United States. In addition, there were 12 regional American Indian and Alaska Native meetings held between May 1985 and September 1986 to obtain advice from American Indian and Alaska Native populations on population and housing items, census geography, and outreach. The geographic program also formed a major component of the planning discussions at the 1986 series of 11 Product Planning Meetings held throughout the Nation, and in numerous meetings held with representatives from the State Data Centers, Census Bureau advisory committees, and officials interested in voting district data.

Census Bureau Confidentiality

In tabulating data, the Census Bureau is concerned with the individual's right to confidentiality. Specifically, Federal law (Title 13, U.S. Code) states that:

- The information gathered by the Census Bureau is solely for statistical purposes.
- The publication of the data must be such that neither individual establishments nor people nor their residences can be identified.
- Only sworn officers and employees of the Census Bureau may examine individual responses.

All geographic statistical entities must be defined and delineated to comply with the legal requirements and the policies specified by the Census Bureau to protect the confidentiality of the collected information. These concerns are not restricted to the geographic classification component of a census or sample survey.

To provide a national structure that supports the first requirement, the Census Bureau devises geographic entities that serve as the statistical equivalents of some legal entities in order to supplement, but not to replace, governmental units. To meet the second requirement, the Census Bureau structures the criteria for the various statistical entities to ensure appropriate population size thresholds. These size criteria generally permit the Census Bureau to provide meaningful demographic and economic data, and at the same time ensure confidentiality through sufficient numbers of responses within a particular geographic entity. In this way, the geographic area criteria support both the Census Bureau's confidentiality mandate and the statistical validity goal by limiting the minimum population size of most subcounty statistical entities.

Technical and Budgetary Considerations

Several technical considerations affect the data presentation for geographic entities. The Census Bureau must (1) ensure that each level of geography becomes a part of the geographic hierarchy, (2) establish a numeric coding scheme to correspond with the names of the entities, and (3) ensure that

the boundaries of the areas are suitable for depiction on maps. It also must provide the statistics and maps within the schedule data users expect. These technical considerations have provided part of the impetus for the Census Bureau's development of automated geographic reference files, address reference files, and digital boundary files. The Census Bureau began developing these files for the 1963 economic censuses, improved and expanded them for subsequent economic and decennial censuses, and increasingly will rely on automated geographic and cartographic processing resources that will provide these linkages as efficiently and accurately as possible.

Budgetary considerations are an important factor in the Census Bureau's ability to provide data. The Census Bureau must select the best overall approach within its available budget, modify its plans as the budget review and approval process changes the level of available funding, and evaluate its ability to deliver the data. The feasibility of implementing programs to tabulate data for new kinds of geographic entities depends, in part, on the ease with which the Census Bureau can integrate a new area into the existing geographic framework without unduly raising the cost of collecting, processing, and presenting the data, and of cartographically depicting the new area.

The Need for a General Consensus by Data Users About Geographic Concepts

To ensure widespread acceptance of new geographic units, it is desirable that there should be a general consensus by various data users about the underlying conceptual issues. Data users also expect the Census Bureau to define its geographic entities precisely, and for such definitions to meet the needs for data comparability over time (comparability of geographic areas from one census to the next often is a major concern of data users). Accordingly, the Census Bureau proceeds with caution in establishing new geographic area definitions because, once adopted, the entities rapidly become etched into the policies and programs of other agencies. They also quickly become additions to the set of tools that researchers use to review, analyze, and portray the Nation. Consequently, the Census Bureau only tabulates data for entities whose definitions are generally accepted by most data users.

The Underlying Foundation of Legal Entities

Legal entities are the primary component of the Census Bureau's geographic hierarchy. States, counties, incorporated places, and minor civil divisions (MCDs) have been used in the Census Bureau's enumerations and data tabulations since the first decennial census of 1790. The U.S. Constitution, Federal legislation, and more recently, Federal court decisions require that the Census Bureau collect and tabulate statistics for these and other legally defined areas.

The Constitution and Federal Law

The Census Bureau's first and most long-standing obligation has been to provide accurate population counts for each State every ten years. This requirement dates from the founding of the Republic. In 1787, the delegates to the Constitutional Convention included a requirement for a census, and implicitly, census geography, in the Constitution:

“Representatives and direct Taxes shall be apportioned among the several States which may be included within this Union according to their respective Numbers. The actual Enumeration shall be made within three Years after the first Meeting of the Congress of the United States, and within every subsequent Term of ten Years in such Manner as they shall by Law direct.”

Congressional statutes provide the legal basis for the taking of the Federal censuses. The first census law (March 1, 1790) directed the Federal marshals, then in charge of taking the census, to assign to their assistants:

“... a certain division of ... one or more counties, cities, towns, townships, hundreds, or parishes, or of a territory plainly and distinctly bounded by water courses, mountains, or public roads.”

Such geographic divisions were the building blocks for taking the early decennial censuses and for presenting statistical totals for States, counties, MCDs, and incorporated places. The Census Bureau always has devoted much effort to fulfilling this commitment; in fact, one of its major geographic efforts today is the periodic Boundary and Annexation Survey (BAS), by means of which it ascertains the legal boundaries, status, and names of these governmental units.

Federal law still makes provision for the Census Bureau's data collection activities and, in a general way, for the scope of the Census Bureau's geographic

hierarchy. The United States Code, a summary of Congressional legislation applying to the activities of the Federal Government, lists the major areas and territories that must be covered by the various Federal censuses:

“Each of the censuses authorized by this chapter shall include each State, the District of Columbia, the Virgin Islands, Guam, the Commonwealth of the Northern Mariana Islands, and the Commonwealth of Puerto Rico, and as may be determined by the Secretary, such other possessions and areas over which the United States exercises jurisdiction, control, or sovereignty. Inclusion of other areas over which the United States exercises jurisdiction or control shall be subject to the concurrence of the Secretary of State.”¹

Other titles of the United States Code contain provisions that specify the use of the Census Bureau’s statistics tabulated by geographic area for various Federal Government programs. Such geographic entities usually are governmental units, but some are statistical entities.

Court Decisions and Redistricting Legislation

Court decisions directly affect Census Bureau geography as well. In the 1960s, the U.S. Supreme Court required that both Federal congressional districts and State legislative districts within each State be of nearly equal population size. The ability of public officials to achieve uniformity in the sizes of their legislative districts stems in part from the Census Bureau’s ability to provide them with population counts for small geographic areas.

In 1975, Congress passed Public Law 94-171, which specified the following amendment to Section 141 of Title 13:

“Tabulations of population for the areas identified in any plan approved by the Secretary [of Commerce] shall be completed by him as expeditiously as possible after the decennial census date and reported to the Governor of the State involved and to the officers or public bodies having responsibility for legislative apportionment or districting of such States, except that such tabulations of population of each State requesting a tabulation plan, and basic tabulations of population of each other State, shall, in any event, be completed, reported, and transmitted to each respective State within one year after the decennial census date.”²

The Census Bureau met the challenge by giving special attention to the small-area geographic framework for the 1980 census and by working with

the data user groups that needed such information. For the 1990 census, the Census Bureau undertook even more extensive efforts to improve the geographic basis of its small-area data tabulation programs. Participants in the Block Boundary Suggestion Project could suggest the addition to the Census Bureau's maps of visible features to be held as 1990 census block boundaries that would permit them to more accurately delimit the voting districts in their States. Another initiative, the 1990 Census Redistricting Data Program, allowed participants to outline their voting districts as groups of whole census blocks so that the Census Bureau could tabulate data for these entities. And finally, the Census Bureau decided to provide data *by block* throughout the Nation (as well as throughout all the territories). These activities provided State governments with timely small-area population counts for use in Congressional and State legislative redistricting. Chapters 11 and 14 provide further information.

New Kinds of Legal and Administrative Entities

During the past several decades, the Census Bureau has tabulated the results of the decennial censuses of population and housing for several additional kinds of legal and administrative units. These entities include several categories of American Indian and Alaska Native areas, as well as school districts, traffic analysis zones, neighborhoods, and ZIP Codes.

For the 1980 and 1990 censuses, the Census Bureau improved its geographic delineations of American Indian reservations, their subdivisions, and related entities. It also reported more data for the Alaska Native Regional Corporations (ANRCs). For the 1990 census, the Bureau of Indian Affairs (BIA) asked tribal governments to identify their off-reservation tribal and individual trust lands; the Census Bureau designated each area of trust land as one or more separate census blocks.

The Nation's approximately 16,000 school districts are another kind of administrative area for which the Census Bureau tabulated and presented socioeconomic information from both the 1980 and the 1990 censuses. In this instance, the Census Bureau worked with the U.S. Department of

Education and the appropriate State authorities to define the geographic extent of school districts throughout the Nation. The powers, responsibilities, organization, and geographic extent of school districts often vary from State to State, or even locally within a State. To accommodate this situation, the Census Bureau devised an approach that permitted classification of school districts into four categories, each of which could constitute a geographic level in the tabulation scheme. A school district could be unified, or it could consist of component subdivisions of elementary, middle, and secondary school districts (sometimes in varying combinations). To accommodate this situation, the Census Bureau identified school districts in terms of their geographic components—counties, incorporated places, MCDs, census tracts/block numbering areas (BNAs), and census blocks. It then aggregated the statistical data for these component entities by individual school districts.

Other user needs for data summaries for a nonstandard set of geographic entities are met by the User-Defined Areas Program (UDAP). The UDAP permits local data users to delineate the areas of entities (such as neighborhoods, planning districts, or service areas) as combinations of adjacent census blocks, block groups (BGs) or parts of block groups, and census tracts/BNAs or parts of census tracts/BNAs. By participating in the UDAP, data users can obtain statistical summaries for a geographic area or areas that are not otherwise presented in the Census Bureau's standard data products.

Another new development has been the situation where an incorporated place consolidates its functions with the government of a county or MCD while this same new governmental unit continues to contain other incorporated places. To improve its representation of such entities, the Census Bureau has recognized a new class of entity, the *consolidated city*. The 1990 census recognizes six such entities, and a seventh is included in the first-time recognition of consolidated cities by the 1992 economic census.

New entities such as those listed above seldom find a straightforward niche within the standard units of the Census Bureau's geographic hierarchy. To

provide data tabulations for these new areas, the Census Bureau's processing operation must subdivide the standard units and recombine their data into sets appropriate for the new geographic areas.

Variations and Regional Differences

Most of the basic legal/administrative areas appearing in the Census Bureau's tabulations are specified in Federal, State, and local law. The Census Bureau must collect information about the boundaries of these areas, understand their legal relationships, organize the names of the areas, and present the hierarchical relationships among them accurately and meaningfully. In many States, the hierarchy of geographic areas follows a straightforward pattern. There are, however, many departures that reflect the highly varied pattern of existing legal and statistical entities. In such situations, the Census Bureau strives for an impartial, neutral statement of an area's geographic status. For example, the Census Bureau treats Puerto Rico and the Outlying Areas as the *statistical equivalents* of States. Counties and entities equivalent to them are treated similarly. In most States, the counties are active, functioning, general-purpose governments that provide basic services to the population; hence, they are legally defined governmental units. There are, however, some exceptions that demand a different approach. See Chapter 4, "States, Counties, and Statistically Equivalent Entities."

At the county subdivision level, the pattern of geographic units is even more varied, consisting of legal entities, statistical entities, places not part of any legal county subdivision, and a combination of these types of entities. Chapter 8, "County Subdivisions," provides detailed explanations for the United States. Chapter 7, "Puerto Rico and the Outlying Areas," discusses similar entities in the U.S. territories. At the place level, the situation also is mixed; that is, the Census Bureau shows concentrations of population as legal entities where incorporated places exist, and as statistical units (CDPs) in situations where the settlements contain a specified minimum population. Chapters 7 and 9 provide further information.

The Importance of Statistical Entities

The development and maintenance of the statistical entities comprise a significant part of the Census Bureau's total geographic effort. There are numerous types of statistical entities, both large and small in population or land area. They include the groupings of States into regions and divisions, the metropolitan areas, the urbanized areas, some types of county subdivisions, and the small-area subhierarchy of census tracts/BNAs and their subdivisions. Table 2-5 provides brief definitions of the most familiar types of statistical areas. Detailed information on the origin, development, function, and relationship of these areas within the Census Bureau's overall system of geographic entities is contained in subsequent chapters.

Census Bureau Considerations

Data users often request that the Census Bureau tabulate its data in terms of a geographic entity that does not correspond with combinations of legal entities. To meet such needs, the Census Bureau offers a variety of statistical entities in its standard data products. It also offers customized data tabulations upon receipt of reimbursement, from the requesting person or agency, for the relevant costs.

The Census Bureau considers introducing new standard statistical entities when two conditions are met: (1) there must be a general consensus in favor of this new kind of geographic unit, and (2) the Census Bureau must secure the funding needed to prepare the geographic area plan, the additional data tabulations, and any required map information. Once the Census Bureau obtains the needed funding, it generally establishes a cooperative program with State, tribal, and/or local agencies to establish meaningful criteria to define the new type of entity. To implement the program, the Census Bureau generally works with State, tribal, and/or local officials to delineate and identify the statistical entities as standard units for data tabulation and dissemination.

Practice and tradition, rather than statute or legislation, have made statistical entities important elements in the Census Bureau's overall geographic

Table 2-5. **The Census Bureau's Most Commonly Used Statistical Entities**

Region and Division¹	Combination of States.
Metropolitan Area (MA)¹	One or more contiguous counties (cities and towns in New England) that are socially and economically integrated with a large densely settled population core.
Urbanized Area (UA)	A continuously built-up area with a population of 50,000 or more.
Census County Division (CCD)	A subdivision of a county that serves as the statistical equivalent of an MCD in 21 States where MCDs either do not exist or are not appropriate for decennial census data-reporting purposes.
Unorganized Territory (UT)	A subdivision of a county that is the statistical equivalent of an MCD for decennial census data-reporting purposes in those MCD States that have counties with part or all of their area not in any MCD.
Census Designated Place (CDP)	A densely settled population concentration which has a name and community identity but is not part of any incorporated place.
Census Tract	A statistical subdivision of selected counties—established by a local committee of data users—that is a relatively stable basis for tabulating decennial census data. Secondarily, it serves as a framework for assigning census block numbers. <i>Tabulated parts</i> occur where a county subdivision or place boundary divides a census tract.
Block Numbering Area (BNA)	A statistical subdivision of counties without census tracts, serving as a framework for assigning census block numbers and for tabulating decennial census data. <i>Tabulated parts</i> occur where a county subdivision or place boundary divides a BNA.
Block Group (BG)	A grouping of census blocks having the same first digit in their identifying number within a census tract or BNA. <i>Tabulated parts</i> occur where a county subdivision or place boundary divides a BG.
Census Block	The smallest Census Bureau geographic entity; it generally is an area bounded by streets, streams, and the boundaries of legal and statistical entities.

¹ The Census Bureau tabulates data for regions, divisions, and MAs in its data presentations for almost all censuses and sample surveys. It tabulates data for other kinds of statistical entities only in its data presentations for the decennial census of population and housing, and selectively for other censuses and sample surveys.

system. In contrast to most legal entities, whose existence and definition the Census Bureau accepts as mandatory, statistical entities tend to undergo long periods of trial by the data user community before gaining acceptance as standard geographic areas for tabulation and dissemination. Because they are defined by criteria or guidelines rather than legal statutes, they also are subject to more contention when the Census Bureau, another governmental agency, or data users want to change them or use them in a way that is inconsistent with their original purpose. To survive, statistical entities must prove satisfactory from a number of perspectives.

The Significance of Contributions from Outside the Census Bureau

Although the Census Bureau often takes the lead in suggesting or promoting new categories of statistical areas when this appears to be an appropriate solution to a particular situation, other Federal, State, and local agencies, tribal officials, as well as other interested data users and groups, often are the source of suggestions and proposals for new kinds of statistical areas. Data users also suggest changes in the criteria and guidelines for the existing statistical areas.

The census tract is a prime example of a statistical area that was initiated by local data users. Local data users in several large cities were early sponsors of these subcity geographic entities. Census tracts became standard entities in decennial census publications only after the Census Bureau prepared data tabulations on a cost-reimbursable basis for these entities in three consecutive decennial censuses (1910 to 1930). During that period of time, census tracts gained recognition among data users. Thereafter, the Census Bureau accepted census tracts as standard geographic entities for its decennial census data presentations, disseminated the definitional criteria widely, and expanded the geographic coverage of the census tract program. Today, the census tract is one of the most commonly used and best known small areas for which the Census Bureau tabulates data. Chapters 3, “Local Census Statistical Areas Committees and Other Local Assistance,” and Chapter 10, “Census Tracts and Block Numbering Areas,” provide more detailed information.

Some geographic entities that served the internal administrative needs of the Census Bureau have become important to the data user community. Census blocks, enumeration districts (EDs), and block numbering areas (BNAs) were first used as operational units for taking and tabulating the census. As data users needed more small-area statistics, these operational units came into use as official entities for the tabulation and dissemination of decennial census statistics. Chapters 3, 10, and 11 provide further information.

Some kinds of statistical entities identify the settlements or territories of specific indigenous populations, the American Indians and Alaska Natives. Before the Census Bureau established boundaries for these new categories of geography, boundaries within which it would aggregate the 1990 decennial census data, the Census Bureau received assistance from tribal and Alaska Native leaders. Chapter 5, “American Indian and Alaska Native Areas,” provides further information. While the tabulation and publication of data for these entities stem from the special needs of, or requests from, the agencies and groups that especially require them, these entities also are of interest to the overall community of data users. Therefore, the Census Bureau has added these entities to the data tapes, technical documentation, maps, and publications it makes available to the general public.

All these developments reflect the Census Bureau’s commitment to provide the data user community with the best possible configuration of geographic units. Before each decennial census, the Census Bureau solicits public reaction to its programs and products. For statistical entities, the interaction that this consultative process entails requires some familiarity on the part of the data users with the specific standards and criteria that guide the creation, maintenance, and update of a particular kind of entity. To ensure future interaction, both the Census Bureau and the data user community plan to continue a periodic review of the criteria for statistical entities to ensure that the conceptual basis for each type remains appropriate and that the entity still provides the data summaries users require.

Concepts, Criteria, and Guidelines

While both categories of geographic units, legal/administrative entities and statistical entities, serve the common purpose of presenting Census Bureau data, the concepts, principles, and criteria for recognizing the entities in each category involve different preparations by the Census Bureau. For both categories, it is critical that the Census Bureau establish and implement standards, guidelines, and criteria for defining, identifying, and delineating the geographic entities it recognizes for each census and sample survey. When the Census Bureau agrees to tabulate information for a new kind of geographic area, it must specify precise criteria for establishing the new component entities. These standards must be somewhat flexible in order to accommodate new trends and developments, yet they also must present a sturdy, consistent application of methodology and criteria that have proven themselves over time.

The status of legal/administrative entities generally is well defined. Legislation or administrative measures create them, specify their governmental or administrative functions, and contain provisions for establishing and changing their names and boundaries. Once the Census Bureau is convinced that a particular category of governmental unit is appropriate for data presentation, it:

- Ascertains the existence of the applicable units by making inquiries of relevant government agencies.
- Identifies an authoritative source of information about entities.
- Obtains names, establishes codes, and locates boundaries for entities.
- Enters this information into the TIGER data base, classifying it to correspond to entity boundaries.
- Presents accurate results for the governmental units in the appropriate data tabulations and presentations.

A similar set of operations applies to statistical entities, but there is an important difference. Once the Census Bureau justifies the need for a new type of geographic area in terms of various principles, it must establish

generally accepted criteria and guidelines for the identification and delineation of the new entity. The Census Bureau also must determine that the resulting geographic areas are suitable for tabulating and disseminating the statistical data it collects. Then it must identify sources to select and delineate the entities, usually local census statistical areas committees, State agencies, and tribal officials. The guidelines and rules for each type of area originate from (1) the requirements, needs, and preferences of the data user community; (2) the Census Bureau's own practices in data collection, processing, and map presentation; (3) the basic methodological principles for delineating geographic areas; and (4) various other criteria for identifying statistical areas. Ultimately, cost and the policies of the Federal Government form a critical underlying consideration with which the Census Bureau must deal in selecting the geographic entities for which it will provide data from its censuses and sample surveys. These elements provide a framework that defines what can be done. Within that framework, data user needs and statistical practice influence the conceptual approaches used by the Census Bureau.

Nationwide Consistency

National consistency is an important consideration for the Census Bureau's geographic classifications and presentations. It is important for legal/administrative entities, particularly those comprising the basic State/county/MCD/place hierarchy. Consistency is especially relevant to statistical areas, where the Census Bureau is largely responsible for establishing and implementing the criteria, standards, and guidelines that define these areas. Using a uniform approach to control the identification and delineation of, and data presentations for, those geographic areas that are numerous and widespread (such as census blocks, BGs, census tracts and BNAs, CCDs, CDPs, UAs, and MAs) ensures a national consistency.

Historical Comparability

One of the great virtues of decennial censuses is that they provide statistics spanning nearly two centuries, thereby making possible many time-series studies. Over the last several decades, the content of the decennial census questionnaire and the methodology used to tabulate and disseminate the

results have been sufficiently consistent to support a wide range of historical studies for entities both small and large in population and/or area; the same is true for many of the other censuses and sample surveys the Census Bureau conducts, although the historical trail exists for a shorter period of time. As a result, it is desirable to maintain comparability of geographic entities from one census or sample survey to the next.

For legally defined entities, such comparability generally is straightforward. To ensure this capability for statistical entities, where possible and appropriate, both the Census Bureau and the local officials participating in the establishment and review of these entities must pay careful attention to the process of delineating and redelineating each type of entity. The Census Bureau cautions against adjusting the boundaries of some statistical units (particularly census tracts and CCDs) merely to accommodate population growth, or changes and revisions in the street network.

On the other hand, it is appropriate for the boundaries of geographic areas such as UAs and CDPs to change with each decennial census. Just as cities change their boundaries as they expand to provide services to, and gain jurisdiction over, additional territory, the people who live there, and the businesses that operate there, UAs and CDPs are delineated to reflect the settlement pattern at a specific moment in time. For these types of entities, the historical comparison from one census to the next considers the areal extent as well as the numbers and characteristics of the people, homes, and institutions located there.

Homogeneity and Functional Integration

The Census Bureau uses two basic principles in establishing and revising statistical entities. One recognizes a statistical entity by the similarity of its component parts, or the homogeneity principle. The functional integration principle views a statistical entity as a nucleus with its surrounding zone of influence. The two principles find various applications, depending on the purpose of the inquiry, the type of geographic area under study, and the population size of the specific geographic entity. For instance, one application may focus on the analysis of internal trends, while another

may require the comparison of external differences among several of the entities. The homogeneity principle involves combining a group of people, housing units, or business establishments with similar characteristics into a single geographic area. The purpose can be either to provide summary statistics or to ensure the statistical validity of the data collected from only a sample of respondents; in both cases, each component entity should have, insofar as feasible, a similar population, economy, land use, and/or physical environment throughout its extent. Conversely, homogeneity means identifying, as separate entities, those adjacent areas that are different. Of course, demarcation of homogeneous areas frequently involves other criteria; factors such as population size (for example, each component entity must contain approximately equal numbers of people), permanence, and the presence of appropriate boundaries usually come into play.

Sometimes the differences between two areas occur gradually throughout a transition or border zone of several blocks or even miles, rather than changing sharply on either side of a boundary line. In such cases, it is critical that the person or group defining the areas use careful and knowledgeable judgment in selecting a boundary. Sometimes several kinds of source materials may point to the existence of homogeneous characteristics within an area, thereby providing an approach to choosing boundaries. For instance, developing a layout of statistical entities may involve the combined use of past census data, maps, aerial photography, field observations, and information from local sources.

The functional integration principle involves the grouping together, into a single statistical area, the people, housing, or business establishments that share a central nucleus along with the surrounding, functionally related entities, such as a large city and its suburbs. Such areas tend to form a single geographic whole that operates as a cohesive functional entity or system. These geographic areas are integrated through the communication, movement, and interaction of persons, goods, and services. Some examples are CCDs, CDPs, and traffic analysis zones. Metropolitan areas, although defined by OMB and not by the Census Bureau, are another example. Functional

integration, like homogeneity, may derive from a single factor or from a group of related factors. Various quantitative measures such as statistics on commuting, traffic flow, trading patterns, and communications, often point to the functional cohesiveness of a particular type of geographic area. Because sources of these data generally involve looking at relationships among smaller entities, statistical entities based on functional integration often are more extensive in size than those based on homogeneity. This is particularly the case with MAs, whose purpose is to make it possible to summarize a variety of statistics from many different agencies, groups, and sources for the same geographic area.

In practice, the distinction between these two concepts is somewhat fluid. Frequently, the creation, maintenance, and update of statistical entities involves considerations of both homogeneity and functional integration. Some geographic applications may stress one concept more than the other, while other applications may aim at a balance between them. For example, while the criteria for establishing census tracts emphasize the need to acknowledge the homogeneity that exists on both sides of a major highway at a point in time, they also recognize the importance of major barriers, railroads, freeways, waterways, and topographic features, that impede functional integration, and thus separate one census tract from another.

Sometimes new uses arise for a geographic area that involve criteria different from those applied at the time the area was defined. As an example, the organizing principle for delineating census tracts has been homogeneity at the time of initial delineation. Over several decades, however, the internal characteristics of many individual census tracts have changed, resulting in greater variation in settlement patterns within each census tract. During the same period, however, the boundaries of the census tracts, which had remained stable throughout this process of internal change, became recognized as useful frameworks for making historical comparisons and analyzing trends covering several decades within the original set of areas. The value of census tracts as a stable framework of

areas came to outweigh the original criterion of homogeneity. Thus, homogeneity is the primary factor only when preparing a plan for an area that previously did not have census tracts, or when an existing, growing census tract is split into two or more parts.

Identification of Geographic Entities

In accepting or devising a new kind of geographic entity, or in maintaining those that already exist, it is important to keep the geographic concept simple enough, insofar as possible, for ready comprehension and acceptance by all members of the data user community. Easy identification and recognition are key aspects in the wide acceptance of any geographic entity for which the Census Bureau presents data in its tabulations and publications. The identification of most major legal entities is a good example. Despite the fact that these areas are well known to local data users, the Census Bureau shows the names and locations of most governmental units, and displays their boundaries on appropriate maps for the benefit of data users who may be unfamiliar with the territory.

Easy identification is a greater concern for most statistical entities. The naming of statistical entities such as the regions and divisions, UAs, CCDs, and CDPs aids in their recognition by a wide audience. (The same is true of MAs, which are defined by the OMB.) In establishing names for statistical entities, the Census Bureau encourages the use of descriptive terms such as names that are known and already in local use. For several categories of statistical units—census tracts, BNAs, BGs, and census blocks—the large number of entities involved, and the diversity of the area they cover, make it easier and more practical to assign identifying numbers rather than names.

The Census Bureau presents the names or numbers of the statistical entities in its data tabulations, but few people have any concept of the extent or location of the boundaries of *Smithbury CDP*, much less the location of *Census Tract 27*. For these reasons, the Census Bureau must provide various types of maps to accompany its data tabulations. Some maps show only the names and general location of the entities in question, but most also show

the boundaries established for these entities, often including the names of the features that constitute the boundaries.

Boundaries, in particular, are an important element in communicating the exact location of a specific geographic entity to data users. State and local governments record the location of legal boundaries following the requirements of law. Such boundaries typically run through space or follow a major physical feature such as a river or ridge. The Census Bureau requires that the boundaries of statistical entities be easily recognizable linear features (roads, railroads, streams) that are identifiable through observation in the field. This requirement originally stemmed from the need for enumerators to know the exact limits of the areas they were assigned to canvass—a condition that still applied to many phases of the 1990 decennial census. The use of such definite, easily recognized boundaries also makes it possible for data users to relate information from local records or other sources to the appropriate statistical entity. To those data users not familiar with a particular area, the boundary information on Census Bureau maps depicts a definite, precise network of small geographic entities.

The Effect of Size, Coverage, and Shape on Statistical Entities

Size is an important consideration in creating statistical entities and in making widespread changes to an existing set of such entities. To many data users, *size* refers to the number of people, housing units, or economic establishments within an area rather than the geographic extent of the area. The Census Bureau provides population size guidelines in its criteria for most types of statistical entities; the size criterion generally determines the maximum number of such entities that someone can establish within a given county or other jurisdiction. The observation of minimum population size guidelines for statistical entities also helps to ensure confidentiality.

In the context of *population size*, the statistical reliability of the data presented for various geographic units also becomes a significant factor. Because many of the Census Bureau's data tabulations involve the use of

sampling (collecting answers from only a selection of people or establishments and subsequently preparing estimates of what a complete count would have shown) rather than the summarizing of complete-count information, the number of sample responses has a direct bearing on the variability of the resulting data and in the confidence data users should place in them. In subdividing larger areas such as counties into smaller entities (for example, census tracts or BNAs), it is important to keep in mind their minimum desirable population size because of the many data items that are based only on sample responses. This often means observing minimum thresholds for the number of items (persons, households, housing units, business establishments) that each small area contains. If individual pieces of geography are too small, with correspondingly few persons, households, housing units, or business establishments in the sample, the resulting statistics will have lower confidence intervals and more sampling error. For such reasons, the Census Bureau recommends that a census tract contain at least 2,500 people.

Size also can refer to the extent of the area contained within a geographic entity, usually the number of square miles or square kilometers. For some purposes, such as developing enumerator assignment areas, the areal extent of a geographic entity can be an important consideration. Physical size also can be an important factor in data analysis. To meet the latter need, the Census Bureau provides area measurements along with many of its 1990 census data tabulations.

The geographic coverage of each type of statistical area varies according to their purpose. To be of use, major regions and subregions usually must cover the entire Nation; that is, they must provide *complete* geographic coverage. By contrast, places and UAs, whose purpose is to distinguish more densely settled areas from the rest of the country, do not attain complete national geographic coverage. (The same is true of MAs.) On the other hand, some census tables provide data for *nonmetropolitan area* and *outside of urbanized area*, thereby suggesting the notion of complete coverage. On the local level, MCDs, CCDs, and other county

subdivisions cover an entire county; census tracts or BNAs must cover an entire county and, concomitantly, so do BGs and blocks.

Compactness of shape is a desirable quality in a statistical entity, particularly for functionally defined ones; thus, it usually makes sense for their peripheries to be approximately equidistant from the centers. Twisted or elongated areas present the possibility that the statistical characteristics of the extremities will differ from those of the center or each other. If there are irregularities of shape, they should reflect geographic peculiarities related to the population, housing units, or establishments the area contains, and there should be a justification in terms of major criteria such as integration or homogeneity. Irregularities in shape result in a distinct handicap for cartographic presentation and may present problems in data analysis as well. Sometimes these irregularities are unavoidable. For example, exclaves (small portions of a legal or administrative area separated from its main part), may exist for various reasons, such as a city including an outlying reservoir or airport within its legal limits. Although the Census Bureau must recognize such legal/administrative boundaries, it generally requires statistical entities to consist of one contiguous piece of territory.

Future Considerations

The successful completion of the 1990 Decennial Census of Population and Housing has brought a vast array of new options to the data user community. Perhaps nowhere within the framework of Census Bureau geography is the effect greater than at the small-area unit level (census tracts/BNAs, BGs, and census blocks). One of the most significant developments has been the extension of census block coverage to include the entire United States, as well as Puerto Rico and the Outlying Areas. For the first time, the entire Nation and its territories have data by census tract or BNA, BG, and census block. This has meant a vast expansion in the number of geographic entities in the data products of the Census Bureau, with the resulting increased opportunities for detailed data analysis.

These developments obviously have far-reaching effects. For the first time, the American public has a vast fund of comparable, nationwide information

available for very small units of geography (the census block) as well as at the next higher levels (the BG and the census tract or BNA). The availability of these low-level geographic entities provides extensive flexibility for data users to obtain counts for geographic units of specific interest to them. These increased capabilities should stimulate much interest in decennial census data throughout the 1990s and beyond. As a result, many of the principles, concepts, and criteria described in this chapter, and in greater detail in the subsequent ones, will find renewed application, while others may become obsolete. Almost certainly, new concepts will emerge. The basic concepts embodied in this chapter, however, will serve to guide the continuing evolution of Census Bureau geography.

Notes and References

- ¹ U.S. Congress, Title 13, United States Code, Chapter 5—"Censuses." Subchapter V, Section 191(a).
- ² U.S. Congress, *op.cit.*, Subchapter II, Section 141(c).