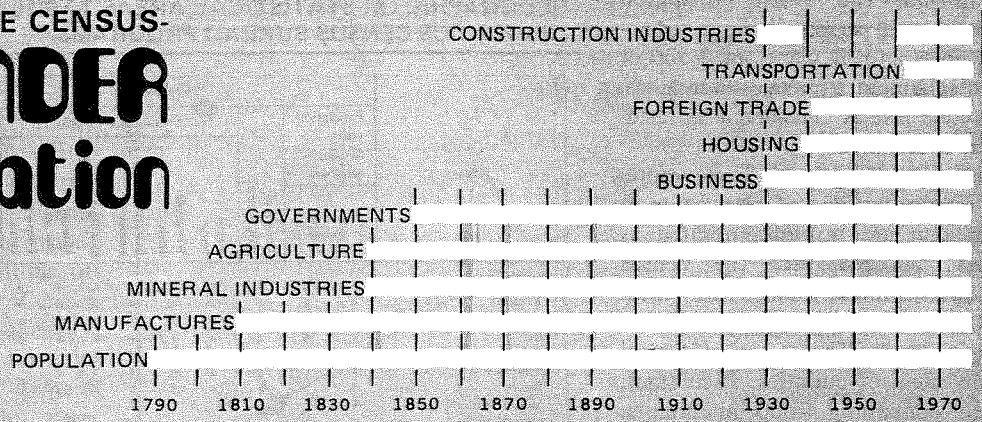
U.S. BUREAU OF THE CENSUS-

# FACTFINDER for the Nation




CFF No. 8

Issued September 1977

# GEOGRAPHIC TOOLS

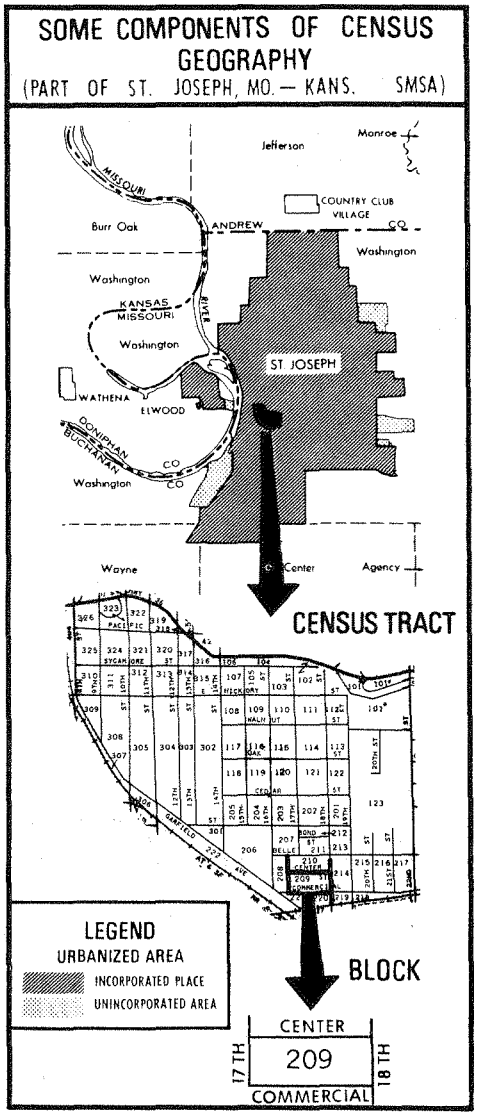
## INTRODUCTION

Geography plays a crucial role in taking censuses and publishing the results for States, counties, cities, and smaller areas down to the size of a city block. The geographic work for a census basically consists of determining political and statistical boundaries, preparing the appropriate maps, and providing the technology for assigning the data collected on each census questionnaire to their proper geographic area(s). This work has resulted in a number of tools and products that are helpful to the data user as well as to the Census Bureau, such as new types of maps; computerized geographic coding, mapping, and graphic display systems; and ways of relating local data with census statistics geographically for a variety of planning and administrative purposes.

Certain symbols (*, +, and ⊕) explain how to obtain the tools and products described in this brochure. The legend to these symbols is on page 3.

## FOR WHAT AREAS ARE CENSUS DATA REPORTED?

Data summaries are presented in printed reports (also available on microfiche*) and on computer tapes,⊕ based on tabulations for the geographic and statistical levels shown on page 2. These levels are describe as follows:




- **United States**—The 50 States and the District of Columbia, plus outlying areas under U.S. sovereignty or jurisdiction.
- **Regions/divisions**—There are four census regions (West, South, Northeast, and North Central) defined for the United States, each composed of two or more geographic divisions. The nine divisions are groupings of States.
- **Governmental units of the Nation**—States, congressional districts, counties, minor civil divisions (MCD's) such as towns and townships, incorporated places (e.g., cities or villages), and wards in some cities. In 21 States, MCD's are not adequate for reporting census statistics. Therefore, Bureau and local officials have designated census county divisions (CCD's) for this purpose.
- **Standard metropolitan statistical areas (SMSA's)**—In 1970, an SMSA comprised a county containing a central city (or twin cities) of 50,000 inhabitants or more, plus contiguous counties that were socially and economically integrated with the central city. (New England SMSA's comprise towns and cities, rather than counties.)
- **Urbanized areas (UA's)**—A UA consists of a central city(s) of an SMSA plus the surrounding closely settled urban fringe (the suburbs).

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BUREAU OF THE CENSUS

For sale by Subscriber Services (Publications), Bureau of the Census, Washington, D.C. 20233, or any U.S. Department of Commerce district office. Postage stamps not acceptable; currency submitted at sender's risk. Remittances from foreign countries must be by international money order or by draft on a U.S. bank. 25 cents per copy. A discount of 25 percent is available on orders of 100 copies or more sent to a single address.

- **Urban/rural**—The urban population comprises all persons living in urbanized areas and in places of 2,500 or more inhabitants outside these areas. Everyone else is considered as residing in a rural area.
- **Unincorporated places**—These represent concentrations of population in areas that are not incorporated as cities, villages, etc. The Census Bureau defines them, with local assistance, for statistical purposes.
- **Census tracts**—These are statistical subdivisions of counties. Each tract, ideally containing 4,000 inhabitants, is delineated (subject to Census Bureau standards) by local committees within SMSA's and other selected areas.
- **Enumeration districts (ED's)**—An ED is a Bureau administrative area within a tract, place, MCD, etc., to be covered by one census enumerator. In 1970, an ED averaged about 750 people.
- **Block groups (BG's)**—In 1970, city blocks in 145 large urbanized areas were grouped into units of about 1,000 inhabitants each for tabulation purposes in place of ED's.
- **Blocks**—Areas generally bounded by streets or some other physical features, defined in urbanized areas and in additional cities that contracted with the Census Bureau for the collection of block statistics.

There are two types of small geographic areas associated with the census of retail trade:

- **Central business districts (CBD's)**—A CBD is an area of high land value, high traffic flow, and a high concentration of retail businesses, offices, theaters, hotels, and service establishments. CBD's are recognized only in an SMSA city of 100,000 or more inhabitants (1972 Economic Censuses) or, for the 1977 censuses, (1) any SMSA central city or (2) any other SMSA city with a population of 50,000 or more.
- **Major retail centers (MRC's)**—An MRC is a concentration of retail stores located in an SMSA, but outside the CBD, which had at least 10 retail establishments and $5 million in retail sales in the 1972 Economic Censuses, or at least 25 retail establishments (with no volume requirement) in the 1977 Economic Censuses. For both the 1972 and 1977 censuses, each MRC must contain at least one general merchandise or department store of a specified minimum size.

## GEOGRAPHIC OR STATISTICAL AREAS TABULATED IN VARIOUS CENSUS BUREAU PROGRAMS

| Areas | Censuses | | | | | | | | | | Current programs | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Population and housing censuses | | Census of governments | Economic censuses | | | | | | Census of agriculture | | | | | | |
| | Area reports | Subject reports | | Retail trade | Wholesale trade | Selected services | Manufactures | Mineral industries | Construction industries | | Population estimates | County Business Patterns | Annual Survey of Manufactures | Retail surveys | Current Population Survey | Annual Housing Survey |
| United States | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a | a |
| Regions | a | s | a | a | a | a | a | a | a | a | c | c | a | | | a |
| Divisions | a | s | a | a | a | a | a | a | a | a | c | c | a | | | |
| States | a | s | a | a | a | a | a | a | a | a | a | a | a | s | | |
| SMSA's | a | s | a | a | a | a | a | | | | a | a | s | s | | a |
| Counties | a | | a | a | a | a | a | a | | a | a | a | | | | |
| Places | a | | a | s | s | s | s | | | | | | s | s | | |
| MCD's and/or CCD's | a | | a | | | | | | | | a | | | | | |
| Census tracts | a | | | | | | | | | | | | | | | |
| *ED's and block groups | a | | | | | | | | | | | | | | | |
| *ZIP code areas | a | | | | | | | | | | | | | | | |
| Wards | a | | | | | | | | | | | | | | | |
| Blocks | a | | | | | | | | | | | | | | | |
| Central business districts | c | | | a | | | | | | | | | | | | |
| Major retail centers | | | | a | | | | | | | | | | | | |

KEY

Note: Other areas unique to the population and housing census are urbanized areas, urban/rural, and congressional districts.

a All areas.
c All, by addition of components.
s Selected areas—larger or with more activity.
* Not in printed reports.

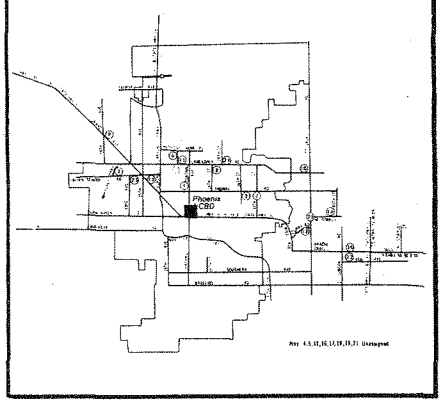
## CENSUS MAPS

Census maps are necessary for virtually all uses of small-area census data. They are needed to locate specific census geographic or statistical areas and to analyze their spatial relationships. There are eight kinds of outline maps, which show boundaries, and three kinds of display maps, that portray data. (Unless otherwise specified, the report series cited are from the 1970 Census of Population and Housing.)

### Outline Maps

- **U.S. map of counties**—Presents the locations and names for all 3,141 counties and county equivalents that existed at the time of the 1970 census.*

**A CENTRAL BUSINESS DISTRICT ■ WITH MAJOR RETAIL CENTERS ● (Phoenix, Ariz., SMSA)**




- **Metropolitan Map Series**—Covers the urbanized areas of SMSA's and shows street names, census tracts, ED's, and blocks. The maps are available separately⊕ or as part of the *Block Statistics* reports, series HC(3).*
- **Tract outline maps**—Show the boundaries of census tracts, counties, and all places with 25,000 or more inhabitants for the 241 SMSA's tracted in 1970. Names of all features (streets, rivers, etc.) that constitute tract boundaries are indicated. These mapsheets are included in the *Census Tracts* report series PHC(1)* and may be obtained separately.⊕
- **Urbanized area maps**—Indicate the extent and components of the urbanized area by shading. They appear in *Number of Inhabitants*, series PC(1)-A, and in *General Housing Characteristics*, series HC(1)-A, reports.* Maps for additional UA's, based on a change in SMSA and UA criteria since 1970, appear in PC(S1)-106.* More detailed information on urbanized area boundaries can be found in the published Metropolitan Map Series (cf).*
- **County subdivision maps***—Show boundaries for counties and subdivisions of counties (MCD's or CCD's) in each State, as well as the location of all places recognized in the 1970 census. There is one mapsheet for each State, with the exception of a few States that are combined on one sheet. Copies of the county subdivision maps appear in sectionalized form in *Number of Inhabitants*, series PC(1)-A.*
- **County maps**—Show portions of counties in SMSA's not covered by the Metropolitan Map Series, and all

counties outside of SMSA's. Boundaries of MCD's and CCD's, places, tracts, and enumeration districts are identified on these maps.⊕

- **Place maps**—Available for every incorporated and unincorporated place that was reported in the 1970 census but was not included on the Metropolitan Map Series. These maps, which usually are reproductions of the ones supplied to the Census Bureau by local agencies, identify streets and show boundaries for enumeration districts, tracts (where applicable), and blocks if the place was under contract with the Bureau for the preparation of block statistics.⊕
- **Central business district/major retail center maps**—Consist of mapsheets indicating CBD's, MRC's, and major streets for each SMSA in which these areas are identified for the economic censuses. The maps appear in the *Major Retail Centers* series RC72-C (1972 Census of Retail Trade).*

### Display Maps

- **GE-50 series**—Consists of statistical maps of the United States that show the geographic distribution, by county, of various social and economic data from the 1970 Census of Population and Housing and the 1972 Census of Retail Trade, as well as from earlier censuses and other sources. Different color schemes are used to depict data values. Each map is a single sheet (generally 30 by 42 inches) at a scale of 1:5,000,000.* (Color-shaded and dotted maps also appear in Census of Agriculture State reports and graphic summary, as well as in the U.S. summary volume I for the 1970 census.*)
- **GE-70 series**—Consists of maps at a smaller scale (1:7,500,000) and size (20 by 30 inches). The first map in this series features a unique nighttime view of the United States, showing urban and rural areas as they would appear from a high altitude.*
- **GE-80 Urban Atlas series**—Portrays data from 65 of the largest SMSA's (500,000 or more inhabitants). The atlases display, on individual maps, a variety of characteristics from the 1970 census and serve as graphic supplements to individual PHC(1) census tract reports. Atlas sheets measure approximately 19 by 22 inches and are printed in color; data for the larger SMSA's are displayed on more than one sheet to provide reasonable resolution for densely populated areas.*

Order forms listing the various maps in the GE-50, GE-70, and GE-80 series are available on request.+

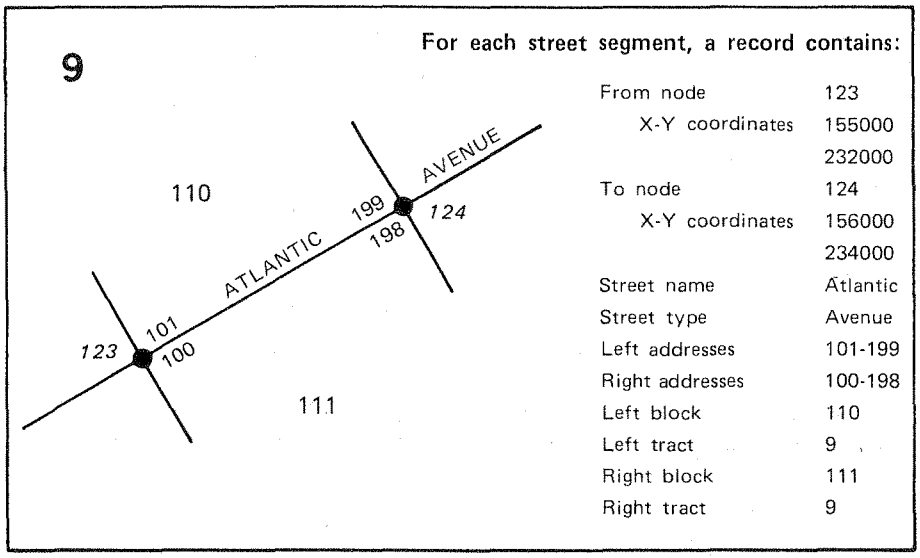
## GBF/DIME FILES

GBF/DIME files (geographic base file/dual independent map encoding) were developed for nearly 200 SMSA's following the 1970 census to assign geographic codes to the census records. They are computerized versions of the Metropolitan Map Series plus block-by-block address ranges, ZIP codes, and X-Y coordinate values at intersections. Each record in a GBF/DIME file identifies a segment of a feature on a map (e.g., Atlantic Avenue, see the record on this page) by its node points, address ranges, and the geographic units (block, census tract, place, county, etc.) identified on both sides. The file covers the central city and contiguous populated suburbs of the SMSA and includes records for nonstreet map features, such as railroads, streams, and political boundaries, as well as streets.

Many other organizations now use GBF/DIME files as analytic tools. For example, a city's parks and recreation department wishes to know how many children in the local school system live in each planning district and their distribution within that district to determine where new playgrounds should be built; the executives of a department store want to know which census tracts their charge account customers live in, as part of the planning for new branch stores. GBF/DIME files, along with related computer programs such as those mentioned below, can be used to assign geographic codes carried on those files to any records containing local street addresses. After the organization's records (such as school enrollment or charge accounts) have been so coded, they can be tallied for analysis, along with census statistics or other local data for the area.

Coordinates included in the GBF/DIME files can be used to produce computer-prepared maps or carry out a number of studies, such as resource allocation (e.g., assigning children to schools) or network routing (for buses or garbage removal).

### THE CONTENTS OF A GBF/DIME-FILE RECORD




### LEGEND

Note: All prices are subject to change without notice.

*Available from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, or through its bookstores in other parts of the Nation. Microfiche may be ordered from the Bureau of the Census Library, Washington, D.C. 20233. Reports are also found in libraries across the country and for reference and/or order at U.S. Department of Commerce district offices and Census Bureau regional offices.

+Available from Subscriber Services (Publications), Bureau of the Census, Washington, D.C. 20233.

⊕Available from Customer Services Branch, Data User Services Division, Bureau of the Census, Washington, D.C. 20233. There are also a number of private summary tape processing centers that are able to provide computer tape copies to their customers. List will be mailed on request.

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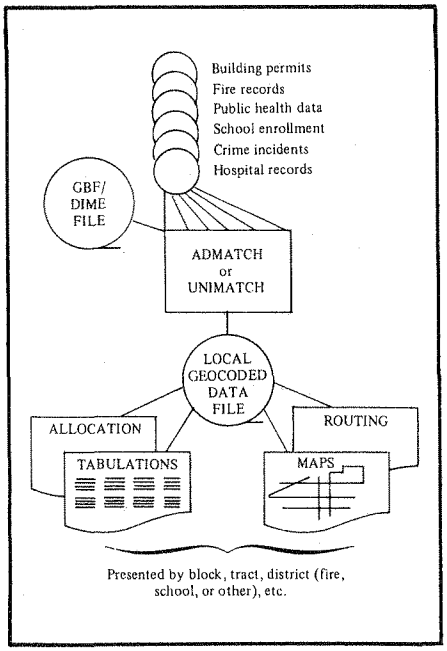
## COMPUTER SOFTWARE FOR GEOGRAPHIC APPLICATIONS

The Bureau has developed a number of computer programs for creating, editing, and maintaining GBF/DIME files and for user applications, such as those previously described. These are used to perform tasks, such as geographic coding of local records (ADMATCH and UNIMATCH), computer mapping, calculating the centroids and areas of geographic units, and developing carpool assignments. A list of these programs is available on request.⊕

## OTHER GEOGRAPHIC REFERENCE PRODUCTS

- **MEDList**—The master enumeration district list contains the names of all States, counties, MCD's, CCD's, and places in the census, with their corresponding geographic codes, ED and BG numbers (with the coordinates of population centroids, by latitude and longitude), and population and housing counts for each of these areas. One computer tape, $80;⊕ also available on photostats without coordinates.⊕
- **DIMECO**—A boundary file of coordinates for counties in the 48 conterminous States in 1960. The DIMECO file is in GBF/DIME format, with each record in the file representing a county boundary segment. The principal use of DIMECO is for computer mapping. The coordinates are supplied in two forms, latitude and longitude for general use, and equal-area projection for thematic mapping. One computer tape, $80.⊕
- **Centers of population file**—This tape was prepared by computing the center of population for each county from all ED's in the county. The county center value is given in decimal degrees of latitude and longitude. Land and water areas for each county also are included. One computer tape, $80.⊕
- **PICADAD**—This is a computer list of place names and their associated geographic codes and coordinates. It permits matching of post office names to places, making it possible to calculate distances between places. It can be used in the analysis and tabulation of movements or relationships between virtually any geographic locations in the United States, such as the location of distribution points relative to production and marketing areas, length of haul, and origins and destinations of passenger travel. One computer tape, $80.⊕
- **SMSA tract boundary files**—These files contain latitude/longitude coordinates for the boundaries of census tracts within more than 200 of the 1970 SMSA's. With a data file of selected population and housing characteristics, for example, a tract boundary file can be used for computer mapping. Available on five reels of tape (in order, by State), $80 per reel.⊕
- **Geographic Identification Code Scheme (GICS), series PHC(R)-3**—A four-volume index, one for each census region, that presents the names of political and statistical subdivisions and their related 1970 census geographic codes. The codes contained in the GICS correspond to those on the 1970 census summary tapes, MED-Lists, and other files.*

### THE GBF/DIME SYSTEM




## FURTHER REFERENCES

Additional explanations and descriptions of census geography and its various aspects can be found in the following sources:

- *Data Access Descriptions* No. 33, "1970 Census Geography: Concepts, Products, and Programs." 1973, $0.50.+
- *1970 Census User's Guide,* Part I. 1970, $2.10.+
- *Reference Manual on Population and Housing Statistics from the Census Bureau.* 1977, $2.00.+
- *Mini-Guide to the 1972 Economic Censuses.* 1973, $1.00.+
- *Factfinder for the Nation,* "History and Organization," CFF No. 4. 1977, $0.30.+

Information about these and other publications and about census geography can be obtained. Write or call:

Data User Services Division
Bureau of the Census
Washington, D.C. 20233
(301) 763-2400