

Standard Census Products Related to Transportation Planning

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ABSTRACT

The wide variety of standard products of the decennial census that are useful for transportation planning is described. These products are often the only census data known to those local transportation planners and researchers who have either no knowledge of or no access to the special tabulations of the Urban Transportation Planning Package.

To many transportation planners and researchers, census data are available only in the standard publications, tape files, and other regular products of the Bureau of the Census. Even those with ready access to the special census tabulations in the Urban Transportation Planning Package (UTPP) will turn to standard census products for many of their data needs.

The UTPP, which is described in detail later in this Record, differs from the standard census products in two major respects. First, it can be provided by user-specified geographical units. This feature is important to the majority of transportation planning agencies that use traffic analysis zones rather than census tracts and other units of standard census geography. (Zones and tracts are

generally similar in size but rarely have the same boundaries.) Second, the UTPP must be purchased from the Census Bureau at a cost that greatly exceeds that of standard census products. As a consequence, standard census products are far more widely available.

A brief overview of the standard reports and tape files from the 1980 census that are available from the Bureau of the Census is given here. A summary by the Census Bureau appears in Appendix E of this Record.

PRELIMINARY CONSIDERATIONS

The user needs to answer two basic questions before searching for particular data among the many standard census products. First, were the data collected from the full census or the sample census? Second, at what level of geographic detail is the data needed?

100 Percent Versus Sample Data

Two questionnaires were used in the decennial census. Both included the 100 percent population items and the 100 percent housing items shown in the first column of Figure 1 (1). The sample population items and sample housing items appear only on the long form of the questionnaire, which covers roughly one out of every six households nationwide. The long

<p>100-percent population items</p> <ul style="list-style-type: none"> *Household relationship Sex Race Age Marital status *Spanish Hispanic origin or descent <p>100-percent housing items</p> <ul style="list-style-type: none"> Number of housing units at address *Complete plumbing facilities Number of rooms in unit Tenure (whether the unit is owned or rented) *Condominium identification Value of home (for owner occupied units and condominiums) Rent (for renter occupied units) Vacant for rent, for sale, etc., and period of vacancy <p>Sample population items</p> <ul style="list-style-type: none"> School enrollment Educational attainment State or foreign country of birth Citizenship and year of immigration **Current language and English proficiency **Ancestry Place of residence 5 years ago 	<ul style="list-style-type: none"> Activity 5 years ago Veteran status and period of service *Presence of disability or handicap Children ever born Marital history Employment status last week Hours worked last week Place of work **Travel time to work *Means of transportation to work **Persons in carpool Year last worked Industry Occupation Class of worker *Work in 1979 and weeks looking for work in 1979 *Amount of income by source in 1979 **Total income in 1979 <p>Sample housing items</p> <ul style="list-style-type: none"> Number of units in structure Stories in building and presence of elevator Year unit built *Year moved into this house Source of water 	<ul style="list-style-type: none"> Sewage disposal Heating equipment Fuels used for house heating, water heating, and cooking *Costs of utilities and fuels Complete kitchen facilities Number of bedrooms and bathrooms Telephone Air conditioning Number of automobiles **Number of light trucks and vans **Homeowner shelter costs for mortgage, real estate taxes, and hazard insurance <p>Derived items (illustrative examples)</p> <ul style="list-style-type: none"> Families Family type, size, and income Poverty status Population density Persons per room ("over crowding") Household size Institutions and other group quarters Gross rent Farm residence
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*Changed relative to 1970
 **New items

FIGURE 1 Data items from 1980 census (1).

form is reproduced in Appendix G of this Record and includes the questions on vehicle availability, place of work, means of transportation to work, and carpool participation that are of particular interest to transportation planners (see Figure 1).

The distinction between 100 percent and sample questions is important for two reasons. First, only 100 percent questions are published at the block level, which is the smallest geographical unit of census data available. Second, sample data are not completely reliable at the census tract level, even though they are published with the appropriate disclaimers and standard errors. Although these sample data are of high quality generally, they should not be considered absolute.

Level of Geography

One of the more difficult aspects of using census data is selection of the proper level of geography. When sample data are used, reliability problems and the likelihood that some data will be suppressed because of confidentiality problems increase as the geographical unit gets smaller. A large number of small geographical units also requires more complex and expensive data manipulation. On the other hand, the selection of units that are too large or that cross important functional boundaries may distort or eliminate the pattern being investigated. For example, comparisons of urbanized and nonurbanized areas are difficult to make with county-level data because boundaries of urbanized areas rarely coincide with county lines (even remotely).

Standard census products are usually tabulated by political area or by statistical area. Political areas include

1. The United States;
2. The states;
3. Congressional districts;
4. Counties;
5. Minor Civil Divisions (MCDs), which are legal subdivisions of counties, such as townships; and
6. Incorporated places.

Statistical areas include

1. Census regions and divisions, which are aggregations of states (four regions, each containing two or three divisions);
2. Consolidated Metropolitan Statistical Areas (CMSAs), which were formally called Standard Consolidated Statistical Areas (SCSAs) and which are combinations of functionally related Metropolitan Statistical Areas (MSAs);
3. MSAs, which were formally called Standard Metropolitan Statistical Areas (SMSAs) and which consist of counties containing and related to an urbanized area;
4. Primary Metropolitan Statistical Areas (PMSAs), which is another label for an MSA that is part of a CMSA;
5. Urbanized areas, which are population centers of at least 50,000 inhabitants and their suburbs (as defined by population density rather than political boundary, unlike the MSA);
6. Urban areas, which are places with 2,500 or more inhabitants;
7. Census county divisions, which are defined for states where MCDs are not appropriate or available;
8. Census-designated places, which are unincorporated residential concentrations with strong geographic recognition as a place;
9. Census tracts, which are MSA subdivisions of

approximately 4,000 residents and which are aggregates of blocks;

10. Enumeration districts, which are census data collection areas where blocks are not used;

11. Block groups, which fall between tracts and blocks; and

12. Blocks, which are typically city blocks bounded by streets and other linear features and which are the smallest units for which data are tabulated in urbanized areas and in incorporated places with at least 10,000 residents.

PRINTED REPORTS

Printed reports are the most easily obtained and least expensive source of census data unless the user needs considerable detail for a large number of areas. There are four major report series from the 1980 census:

1. Population series--designated PC reports--based on the 100 percent questions;

2. Housing series--designated HC reports--based on both the sample and 100 percent questions and providing some cross classifications of housing and population characteristics in addition to housing data;

3. PHC series, which includes data from both population and housing questions on both 100 percent and sample basis and which includes many of the transportation-related questions; and

4. Subject matter report series, which also carries the PC designation but which includes sample data as well as 100 percent items on specific subjects such as journey to work, type of residence, employment, migration, income, and so forth.

A detailed list of these reports appears in Appendix E. The reports of particular interest to transportation planners are discussed in the following.

Metropolitan Commuting Flows (PC80-2-6C)

Report PC80-2-6C tabulates workers by place of residence and place of work for all workers 16 years and older who work or live in an MSA. The report is organized by place of residence and generally identifies flows by places with a population of 25,000 or more.

Characteristics of Workers in Metropolitan Areas (PC80-2-6D)

Report PC80-2-6D includes sex, age, race, education level, income, and other characteristics of workers by place of residence and place of work for areas with a population of 50,000 or more. This report also includes means of transportation to work, vehicle occupancy, and travel time to work.

Place of Work (PC80-2-6E)

Report PC80-2-6E is an addition to the journey-to-work subject reports. It is the first census publication to be organized by place of work rather than by place of residence. It includes characteristics of workers, means of transportation to work, vehicle occupancy, and travel time. Data are presented for all workers in the place of work and for workers who live outside the area of the workplace. The level of geography generally reaches to places with a population of 25,000 or more.

Number of Inhabitants (PC80-1-A)

Report PC80-1-A is the best source of historic population counts by most levels of census geography. Population counts are given for most areas, from CMSAs and states to incorporated places and MCDs.

General Social and Economic Characteristics (PC80-1-C)

Report PC80-1-C includes the transportation-related items among its wealth of tables of state, CMSA, MSA, county, and urbanized area of residence.

TABLE 1 Overview of Planned Summary Levels for 1980 Census Summary Tape Files (2)

SUMMARY AREA	a, b									c			Summary Level Codes ^d
	STF 1			STF 2			STF 3		STF 4			STF 5	
	100 percent	100 percent	100 percent	100 percent	100 percent	100 percent	sample	sample	sample	sample	sample		
A	B	C	A	B	C	A	C	A	B	C			
United States			*			*		*			*	*	01
Region			*			*		*			*	*	02
Division			*			*		*			*	*	03
State	*	*	*		*	*	*	*	*	*	*	*	04
SCSA			*			*		*			*	*	05
SCSA within State			*		*	*		*		*	*	*	06
SMSA			*			*		*			*	*	07
SMSA within State		*	*	*	*	*		*	*	*	*	*	08
Urbanized Area			*			*		*			*	*	09
Urbanized Area within State			*		*	*		*		*	*	*	10
County within State	*		*		*	*	*	*		*	*	*	11
MCD (CCD) within County within State	*		*		*	*	*	*		*	*	*	12
ED or BG within Tract (BNA) within Place within MCD (CCD) within County within State	*		*			*		*					13, 14, 15, & 16
County within SMSA within State		*	*		*	*		*		*			17
ED or Block within Tract (BNA) within Place within MCD (CCD) within County within SMSA within State		*	*			*		*					18, 19, 20, 21, & 22
Tract (BNA) within Place within County within SMSA within State		*	*		*	*		*		*			23 & 24
ED or Block within Tract (BNA) within Place within County within SMSA within State		*	*		*	*		*		*			25 & 26
Place within State	*		*		*	*	*	*	*	*	*	*	27
MCD (CCD) within State			*		*	*		*		*	*	*	28
Indian Reservation and Alaskan Native Village			*		*	*		*		*	*	*	29
Indian Reservation and Alaskan Native Village for County within State			*		*	*		*		*	*	*	30 & 31
Tract (BNA) within County within SMSA within State			*		*	*		*		*			32
Congressional Districts within State	*		*		*	*	*	*		*			33
Zip Code (5 digit) ^c			*		*	*		*		*			

^aIn addition to summary areas presented in the STF's, geographic area codes are included for areas such as ward, state economic subregion, district office code, Indian subreservation, and standard federal administrative region.

^bPopulation size cutoffs for the presentation of place-level data in the STF's are as follows: STF 1A, all places; STF 1B, all places; STF 1C, 10,000 or more; STF 2A, 10,000 or more; STF 2B, 1,000 or more; STF 2C, 20,000 or more; STF 3A, all places; STF 3C, 10,000 or more; STF 4A, 10,000 or more; STF 4B, 2,500 or more; STF 4C, 10,000 or more; STF 5, 50,000 or more.

^cSTF 3B, which was planned to provide five-digit ZIP code tabulations, has been cancelled. However, private groups are currently discussing the possibility of funding Census Bureau tabulation of these data. The geographic structure of such a file will be decided at a later date.

^dMultiple summary level codes for a summary area indicate a series of similar summary levels that are presented in identical STF files. A specific listing of summary levels that are grouped together from the chart is as follows (a slash mark will be used to indicate "within"): 13, place/MCD(CCD)/county/state; 14 tract(BNA)/place/MCD(CCD)/county/state; 15, BG/tract(BNA)/place/MCD(CCD)/county/state; 16, ED/tract(BNA)/place/MCD(CCD)/county/state; 18, MCD(CCD)/county/SMSA/state; 19, place/MCD(CCD)/county/SMSA/state; 20, tract(BNA)/place/MCD(CCD)/county/SMSA/state; 21, block/tract(BNA)/place/MCD(CCD)/county/SMSA/state; 22, ED/tract(BNA)/place/MCD(CCD)/county/SMSA/state; 23, place/county/SMSA/state; 24, tract(BNA)/place/county/SMSA/state; 25, block/tract(BNA)/place/county/SMSA/state; 26, ED/tract(BNA)/place/county/SMSA/state; 30, Indian reservations and Alaskan Native villages by county within state; 31, Indian Reservations and Alaskan Native villages by county within state.

Census Tracts (PHC80-2)

Report series PHC80-2 is probably the most widely used source of small-area census data for planners. Most of the population and housing questions, including the transportation-related questions, are tabulated by MSA, county, incorporated place, MCD, and tract of residence for each MSA. Number of workers by a limited number of places of work is given for each place of residence.

COMPUTER TAPES

Printed reports on paper or microfiche meet the needs of occasional users or of those interested in a limited number of areas and variables. However, most transportation planners in larger jurisdictions who deal with many geographical units will quickly tire of manual data entry and manipulation.

The Bureau of the Census attempts to meet the needs of the data-intensive user with Standard Tape Files (STFs) and with special tapes. Of the latter, the journey-to-work tape is of particular interest to transportation planners.

Journey-to-Work Tape

The journey-to-work tape contains tabulations of all workers aged 16 and older, including information on their place of residence and work, their socioeconomic characteristics, and the characteristics of their work trip. Characteristics of the worker and the work trip are presented for each origin-destination pair of places with a population of 25,000 or more and for the balance of the county. This geographic detail allows the user to produce data at the place or MCD level and to aggregate the tabulations to the county or MSA. For larger areas, the central city data are divided between central business district (CBD) and balance of the central city. Although tables on the tape are organized by place of residence, the user can sort the data by place of work.

STFs

STFs are the most common machine-readable form of census data used by the transportation community. The five basic STFs are listed in Table 1 (2) and described in Appendix E.

The maximum possible geographic detail available from the Census Bureau is contained in STF 1. Data are provided for individual blocks in block-numbered areas and for enumeration districts elsewhere. The data are from the 100 percent questions.

Like STF 1, STF 2 is based on the 100 percent questions on both population and housing. Tabulations in STF 2 are nearly as geographically de-

tailed, reaching down to census tracts, MCDs, census county divisions (CCDs), and places with a population of 1,000 or more.

STFs 3, 4, and 5 tabulate responses to the sample questions to various levels of geographic detail. The various levels of geographic detail are indicated in Table 1.

The most comprehensive of the STFs, STF 4, also contains the most detailed data on the journey-to-work questions. All transportation-related questions are tabulated down to places of residence with a population of 2,500 or more.

Public-Use Microdata Samples

Transportation researchers are particularly interested in the public-use microdata (PUM) samples, which are one of the more specialized data resources on census tape. The PUM tapes include some unaggregated household records with characteristics of the unit and those in it. Data on individuals within the household are edited out, and all names, addresses, and other geographic identifiers have been removed. The minimum-population criterion is now 100,000 (compared with 250,000 in 1970). Three mutually exclusive samples are available representing 5, 1, and 1 percent of the respondents, respectively.

CONCLUSIONS

A variety of standard products from the 1980 census has been highlighted. The Bureau of the Census has attempted to meet the data needs of a wide variety of users at relatively little cost. Many transportation planners, especially in smaller jurisdictions, may satisfy most or all of their social and economic data requirements with these products.

The place-of-work subject report is a particularly exciting development from the 1980 census. Until now, the only census data organized by place of work have been found in the UTPP. (Of course, the UTPP remains the only source for workforce data at the tract or traffic analysis zone level.) Some planners and analysts hope that these tabulations by larger units of geography will eventually be published at the tract level for a new series of census tract reports. Such a series would bring one of the best features of the UTPP within reach of a much wider constituency of planners and analysts in transportation and allied fields.

REFERENCES

1. Census '80--Introduction to Products and Services. Bureau of the Census, U.S. Department of Commerce, 1980.
2. Summary Tape File Technical Documentation. Bureau of the Census, U.S. Department of Commerce, n.d.