

Accuracy of the Data

INTRODUCTION

The data contained in this product are based on the Census 2000 sample. The data are estimates of the actual figures that would have been obtained from a complete count. Estimates derived from a sample are expected to be different from the 100-percent figures because they are subject to sampling and nonsampling errors. Sampling error in data arises from the selection of people and housing units included in the sample. Nonsampling error affects both sample and 100-percent data and is introduced as a result of errors that may occur during the data collection and processing phases of the census. This Appendix provides a detailed discussion of both types of errors and a description of the estimation procedures.

MASTER ADDRESS FILE DEVELOPMENT

The majority of addresses in the country are in what is known for census purposes as Mailout/Mailback areas, which generally consist of city-style addresses. The original source of addresses on the Master Address File (MAF) for the Mailout/Mailback areas was the 1990 Census Address Control File (ACF). The first update to the ACF addresses is a United States Postal Service (USPS) Delivery Sequence File (DSF) of addresses. The November 1997, September 1998, November 1999, and April 2000 DSFs were incorporated into the MAF.

Until shortly before the census, the ACF addresses and the November 1997 and September 1998 residential DSF addresses constituted the MAF. These addresses were tested against Census Bureau geographic information to determine their location at the census block level. The geographic information is maintained in the Census Bureau's Topologically Integrated Geographic Encoding Referencing (TIGER) system. When an address on the MAF can be uniquely matched to the address range in TIGER for a street segment that forms one of the boundaries of a particular block, the address is said to be *geocoded* to that block. Valid and geocoded addresses appeared on each address list used for a field operation.

The Block Canvass operation was the next major address list operation in the Mailout/Mailback areas for Census 2000. Between January and May 1999, there was a 100-percent canvass of every block in these areas. Every geocoded address was printed in a block-by-block address register. Block Canvassing listers identified each address as one of the following: a verified housing unit; a unit with corrections to the street name or directional; a delete; a duplicate, implying the unit exists elsewhere on the list with a different, unmatchable designation, such as a different street name or building name; uninhabitable; or nonresidential. Also, units that were deleted from one block and matched an added unit in another block were called a move.

A cooperative address list check with local governmental units throughout the country, called Local Update of Census Addresses (LUCA) 98, occurred in approximately the same time frame as Block Canvassing. In LUCA 98, the participating governmental units received an address list and were asked for input mostly on added units but also on deleted units and corrected street names or directionals. The outcome of this operation was similar to that of Block Canvassing; units were added to and deleted from blocks, and address corrections were made.

The Decennial Master Address File (DMAF), created in July 1999, was the file used for the main printing of the Census 2000 questionnaires. In Mailout/Mailback areas, the operations that had yielded housing units and their status before this initial printing stage were the ACF, the November 1997 DSF, the September 1998 DSF, LUCA 98, and Block Canvassing.

Updates to the DMAF followed the creation of the initial DMAF. Addresses were added by the November 1999, February 2000, and April 2000 DSFs. The LUCA 98 field verification and appeal processes were address update operations that occurred subsequent to the creation of the initial

DMAF. Units receiving a conflicting status from Block Canvassing and the LUCA 98 operation were sent for field verification by the Census Bureau; the results of the field verification were sent to the governmental units. The governmental unit could appeal the Census Bureau's findings for particular units at this stage. At an appeal, the Census Bureau and the governmental unit submit their evidence of the status of a housing unit for independent review. The Census Address List Appeals Office, a temporary Federal office established outside the Department of Commerce, administered the appeal process. The Director of the Appeals Office (or their designee) was responsible for issuing a written determination that was considered final. Both the field verification and the appeal process had the potential to change the status of a housing unit.

The New Construction operation was another cooperative effort with participating governmental units that added addresses before Census Day. This was a final operation in Mailout/Mailback areas that used governmental units' local knowledge to identify new housing units in February and March of 2000.

After Mailout/Mailback, the second most common method of questionnaire delivery was Update/Leave. Rather than obtaining addresses from the ACF and DSF, the address list for Update/Leave areas was constructed during a Census Bureau field operation called Address Listing. This was due to the fact that addresses in Update/Leave areas were primarily noncity-style. Census employees were sent to the field with maps of their assignment areas and were instructed to record the city-style address, noncity-style address or location description, or possibly some combination of the above, for every housing unit. In addition, the location of the unit was noted on the census map with what is known as a *map spot*. This operation took place in the fall of 1998.

After processing the Address Listing data, the Census Bureau could tabulate the number of housing units in each block. Because the housing units in these areas may have nonstandard mailing addresses and may be recorded in census files solely with a location description, the governmental units participating in the local review operation in these areas were sent lists of housing unit counts by block. This operation was called LUCA 99. When a LUCA 99 participant disagreed with a Census block count, the contested block was sent out for LUCA 99 recanvassing. Census employees were redeployed to make updates to the address list. In addition, there was a LUCA 99 appeal process for settling housing unit status discrepancies that could potentially add units to the address list. The LUCA 99 recanvassing and LUCA 99 appeal process took place at various times during the DMAF updating process. Although most of the LUCA 99 entities had their recanvassing results processed before creation of the initial DMAF, many did not. There were DMAF updates designed specifically for obtaining late recanvassing and appeal results. These updates to the census files occurred in time for USPS delivery of a questionnaire.

The last address list-building operation in the Update/Leave areas was the Update/Leave operation itself. This operation was responsible for having a census questionnaire hand-delivered at every housing unit. The MAF and the maps were updated during this process.

In the most remote regions of the country, housing units were listed at the same time people within them were enumerated for Census 2000. These operations, called List/Enumerate and Remote Alaska enumeration, were the only source of addresses in these regions. All housing units were map spotted at the time of enumeration.

In some other regions of the country where an address list had already been created, the Census Bureau determined that direct enumeration of the population would be more successful than mailback of the forms. This operation was called Update/Enumerate. There were two types of Update/Enumerate areas – urban areas that were formerly Mailout/Mailback and rural areas that were formerly Update/Leave. The urban areas had passed through all the Mailout/Mailback operations up through the point of the creation of the initial DMAF, and the rural areas had passed through Address Listing, and sometimes LUCA 99, by the time of the creation of the initial DMAF. Because of these distinct paths, it was necessary to distinguish between the urban and rural Update/Enumerate areas.

Urban Update/Leave is another special enumeration that took place in areas where mail delivery was considered to be problematic. The addresses had passed through all the operations of the

Mailout/Mailback areas up through the creation of the initial DMAF, but enumerators visited the area during the census. As a result, additions, deletions and corrections to the address list were made.

People who do not receive a questionnaire at their house could submit a Be Counted Form, or they could call Telephone Questionnaire Assistance and have their information collected over the telephone. Addresses from these operations that did not match those already on the DMAF and that were geocoded to a census collection block in an area where census enumeration did not take place were visited in a Field Verification operation to determine if they existed. Verified addresses were added to the address list.

Follow-up operations provided additional information about housing units listed on the DMAF. In Nonresponse Followup (NRFU), enumerators followed up on units that had not returned a preaddressed census form. These units could be enumerated, deemed vacant, or possibly deleted. At the same time, units that did not appear on the address list could be added and enumerated concurrently. Coverage Improvement Follow Up was designated for enumeration at addresses added by New Construction and the later Delivery Sequence Files, as well as a second check on NRFU vacant and deleted units. Adds were also possible. These operations occurred in the Mailout/Mailback, Update/Leave, and Urban Update/Leave areas.

SERVICE-BASED ENUMERATION

Service Based Enumeration was designed to account for people without a usual residence who use service facilities (i.e., shelters, soup kitchens and mobile food vans). Only people using the service facility on the interview day were enumerated. In addition, people enumerated in Targeted Non-Shelter Outdoor Locations (TNSOLS) and people without a usual residence that filed Be Counted Forms (BCF) augmented the count. **This component of the enumeration should not be interpreted as a complete count of the population without a usual residence.**

SAMPLE DESIGN

Every person and housing unit in the United States was asked basic demographic and housing questions (for example, race, age, and relationship to householder). A sample of these people and housing units was asked more detailed questions about items, such as income, occupation, and housing costs. The sampling unit for Census 2000 was the housing unit, including all occupants. There were four different housing unit sampling rates: 1-in-8, 1-in-6, 1-in-4, and 1-in-2 (designed for an overall average of about 1-in-6). The Census Bureau assigned these varying rates based on precensus occupied housing unit estimates of various geographic and statistical entities, such as incorporated places and interim census tracts. For people living in group quarters or enumerated at long form eligible service sites (shelters and soup kitchens), the sampling unit was the person and the sampling rate was 1-in-6.

The sample designation method for housing units depended on the data collection procedures. Approximately 95 percent of the population was enumerated by the mailback procedure. In these areas, the Census Bureau used the Decennial Master Address File (DMAF) to select electronically a probability sample. The questionnaires were either mailed or hand-delivered to selected addresses with instructions to complete and mail back the form.

The housing unit sampling rate varied by census block. Long Form Sampling Entities (LFSEs) were used to determine sampling rates in Census 2000 similarly to the way governmental units were used in the 1990 census sample design. LFSEs were:

- Counties and county equivalents (such as parishes in Louisiana).
- Cities.
- Incorporated places (including consolidated cities).
- Census designated places in Hawaii only.

