

The Address Listing Operation and Its Impact on the Master Address File

FINAL REPORT

This evaluation study reports the results of research and analysis undertaken by the U.S. Census Bureau. It is part of a broad program, the Census 2000 Testing, Experimentation, and Evaluation (TXE) Program, designed to assess Census 2000 and to inform 2010 Census planning. Findings from the Census 2000 TXE Program reports are integrated into topic reports that provide context and background for broader interpretation of results.

Megan C. Ruhnke
Planning, Research, and
Evaluation Division

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EXECUTIVE SUMMARY

The evaluation of the Address Listing operation for Census 2000 seeks to examine the operation's impact on creating the Master Address File for certain areas of the country.

The U.S. Census Bureau conducted the Address Listing operation from July 1998 to May 1999, and used the results to create the initial address list for areas that would be enumerated using Update/Leave methodology during Census 2000. In the Address Listing operation, census enumerators canvassed door-to-door to identify the mailing address and physical location of addresses in areas where the Census Bureau believed that problems were likely with developing an accurate mailing list and delivering census questionnaires through the mail. The enumerators also located each housing unit with a map spot on a block map and collected an occupant name and telephone number, when possible.

This evaluation looks at the number, geographical location, characteristics, and quality of addresses listed during the Address Listing operation.

How many addresses were added to the Master Address File as a result of the Address Listing operation?

Stateside, about 22 million housing units were listed in the Address Listing operation. Since the Address Listing operation targeted mostly rural areas of the country, the majority of the units from the operation were in the southern and midwestern parts of the United States. The South had close to half of all the units listed during the operation.

An additional 1.4 million addresses were listed in Puerto Rico. All of Puerto Rico was canvassed during the Address Listing operation and was enumerated using Update/Leave methodology.

We listed at least one residential address in over 57 percent of the approximately 3.5 million blocks that we canvassed in this operation.

We listed over 60 addresses in fewer than three percent of the blocks with at least one address in them. We should expect this because, with the exception of Puerto Rico, Address Listing targeted areas of the country where there are not a large number of housing units in a single block.

What are the characteristics of Address Listing adds?

Despite Address Listing occurring in mostly rural areas of the United States, over 73 percent of the adds had complete city-style (house number, street name) addresses. About 14 percent of the units had incomplete or no address information, but location descriptions of the units were recorded for over 95 percent of those. Both city-style address information and location descriptions enable enumerators to locate the units on the ground when they deliver the census forms during Update/Leave and other census field operations. The presence of a map spot, a unique identifier for a housing unit on a census map within a block, is also crucial when trying to locate a unit in rural areas. Over 99 percent of the Address Listing adds have map spots.

In the mostly rural areas in which Address Listing was done, there are not likely to be many large apartment buildings, therefore it should be expected that most of the added addresses were single-unit structures. Single units account for about 90 percent of the total adds in the United States and less than four percent of the adds were in structures with ten or more units.

What was the quality of the addresses added during Address Listing?

To look at the number of "good" addresses that were added during the operation, we can look at Decennial Master Address File deliverability and final status in the census. An address in the Master Address File was deliverable to the Decennial Master Address File if it was eligible to be included on the Decennial Master Address File when it was created. Addresses eligible for the Decennial Master Address File include those that represent (based on the information that the Census Bureau has) potential residential housing units that are coded to census blocks and have a map spot. Over 99 percent of the Address Listing adds were delivered to the Decennial Master Address File and approximately 94 percent of all Address Listing adds were included in the final Census 2000 counts.

Another way to look at the quality of Address Listing adds is to look at how often census personnel went outside of their boundaries when listing. Address Listing was supposed to be done in Update/Leave areas, some of which were subsequently converted to Rural Update/Enumerate areas. Only about 45,500 addresses, or 0.2 percent of the Address Listing adds, were ultimately geocoded to a block in a non-Address Listing enumeration area. Listers could also have stayed in the correct enumeration area and simply placed the address in the wrong block. The extent of that is also small. Address Listing enumerators added about 62,000 addresses (0.3 percent) in blocks that disagree with the final official block code in the Master Address File.

How many Address Listing adds are on the Delivery Sequence File?

In areas where most mailing addresses are city-style (for example, 101 Main Street), we created the Master Address File by combining addresses from the 1990 census Address Control File with addresses in the U.S. Postal Service Delivery Sequence File, which is a national file of individual mail delivery point addresses. In these areas, we enumerated using Mailout/Mailback methodology, which consisted of the Census Bureau delivering questionnaires to housing units through the U.S. Postal Service, and requesting that residents mailback their forms.

Approximately 43 percent of the addresses added in Address Listing matched to addresses that were identified as residential on or before the September 1998 Delivery Sequence File, which is before the time of mailout of census forms. About 280,000 blocks in Update/Leave areas had all of their addresses match to the Delivery Sequence File. This is about 14 percent of all blocks in which there was at least one unit listed during the Address Listing operation.

Recommendation: The existence of these addresses on the Delivery Sequence File suggests that the Census Bureau may want to reassess the methodology of delineation of Mailout/Mailback versus Update/Leave areas of the country for the 2010 Census and subsequent survey work. It also suggests that it may be reasonable in some areas to use the Delivery Sequence File as an address list building tool in some Update/Leave enumeration areas.

How much did the additional callbacks contribute to obtaining additional address information?

Listers were allowed two telephone callbacks to collect mailing address information during the Census 2000 Address Listing operation. There were three additional personal visit callbacks used to obtain address information in 36 of the approximately 3000 counties in which Address Listing was done. The 36 counties were the sites of the 1999 American Community Survey. The additional callbacks were made to maximize mail response in that survey.

The counties in which the additional callbacks were allowed had 6.6 percent of units with complete Post Office Box addresses compared to about 3.7 percent of addresses having Post Office Boxes in the counties without additional callbacks allowed. There is also a slightly higher percent of units with some sort of incomplete address information in the counties where additional callbacks were allowed. The percent of units with no address information was lower in these ACS counties as well. So it does appear that the additional callbacks may have contributed to the success of obtaining additional address information, although not in any significant manner.

Recommendation: Since the impact of the additional callbacks on obtaining additional mailing address information appears small and we were not able to get the necessary cost data to do an effective cost comparison, we cannot recommend additional callbacks for a future Address Listing operation at this time.

1. BACKGROUND

During Census 2000, the U.S. Census Bureau conducted the Address Listing operation to create an address list in areas where we planned to hand-deliver census questionnaires. Address Listing was the first operation in these areas used to build the initial address list. Addresses that were listed during this operation were eligible for inclusion in later operations that occurred in these areas, such as the 1999 Local Update of Census Addresses (LUCA 99) and the Update/Leave (U/L) operation. The Census Bureau used this hand-delivery method, called Update/Leave, in mostly rural areas of the country where it believed that problems were likely with developing an accurate mailing list and delivering census questionnaires through the mail. Update/Leave methodology was also used to enumerate all of Puerto Rico. This evaluation examines the Address Listing operation done in Census 2000 and the impact it had on adding addresses to the Master Address File (MAF).

Similar operations to Address Listing took place in the 1990 census. These operations, the 1988 and 1989 National Prelist operations, were the precursors to the Address Listing operation used in both the Census 2000 Dress Rehearsal and in Census 2000. The methodology used in the 1990 census National Prelist operations is very similar to the methodology used in the Census 2000 Address Listing operation.

1.1 The 1988 National Prelist operation

The 1988 Prelist was the first address compilation operation that the Census Bureau conducted for the 1990 census to obtain address data for small cities, suburban, and some rural areas where census questionnaires would be delivered by mail. The operation took place in these suburban areas and small cities that had a population density of about 50 or more persons per square mile. It did not take place in Puerto Rico. Puerto Rico was enumerated using List/Enumerate methodology in the 1990 census.

The 1988 Prelist operation was conducted in four waves distributed regionally throughout the country. The operation had several objectives:

- Obtain complete mailing address information for each living quarters (LQs) in the Prelist areas
- Record the location description and householder name for any LQs that do not have house number/street name mailing addresses
- Annotate census maps to show the location of the LQs
- Assign each LQ to its correct 1990 census collection geography

An evaluation of the 1988 Prelist involved examining a sample of Prelist Address Registers (PARs) and a review of numerous observation reports, debriefing questionnaires, and Prelist data summaries. The evaluation reported the following summary information:

- About 2.3 million blocks were canvassed during the operation, of which 75 percent contained living quarters (LQs).
- In the blocks containing living LQs, approximately 27.9 million LQs were listed. These LQs were classified into the following address types:
 - ▶ 76 percent of the LQs listed were city-style addresses with house number/street name.
 - ▶ 13 percent of the LQs listed were rural route/box number addresses with road name and household name available.
 - ▶ Five percent of the addresses were Post Office (PO) boxes with road name and householder name available.
 - ▶ The remaining six percent of the addresses were General Delivery, Star Routes or incomplete addresses.

The evaluation of the 1988 National Prelist operation recommended several changes:

- Conduct the operation within “a realistic time frame.” The time spent in the field should be extended beyond the scheduled six weeks, and “flexibility” should be built into the schedule for “unexpected situations and system failures.”
- Create a “task force to identify and examine the usage of the census maps and the problems experienced in the field during the 1990 census.”
- Extend the maximum number of personal visits/callbacks to three. This recommendation was based on research during the 1987 test census in which a third callback was successful in obtaining mailing address information for approximately ten percent of the assigned cases.

1.2 The 1989 National Prelist operation

The 1989 National Prelist operation took place in areas with anticipated postal delivery problems and a population density of approximately less than 50 persons per square mile. It was not conducted in Puerto Rico because for the 1990 census, List/Enumerate was done in all of Puerto Rico. The goal of the 1989 Prelist was to list a projected 11 million addresses, that would be enumerated using the U/L method. The U/L method involved the annotation of census maps, update of address list, and delivery of questionnaires.

The evaluation of the 1989 Prelist involved examining a sample of PARs and a review of numerous observation reports, debriefing questionnaires, and Prelist data summaries. Some of the summary information in the evaluation includes:

- About 1.4 million blocks were canvassed during the operation. Of which, 68 percent contained LQs.

- In the blocks containing living LQs, approximately 10.2 million LQs were listed. These LQs were classified into the following address types:
 - ▶ 31 percent off the LQs listed were city delivery addresses with house number/street name.
 - ▶ 31 percent of the LQs listed were rural route/box number address with an available road name.
 - ▶ Nine percent of the addresses were Post Office (PO) boxes with an available road name and householder name.
 - ▶ The remaining 28 percent were other rural types of addresses, and listings that had only road names or location descriptions.

The 1989 Prelist evaluation suggested that the Address Register Areas be redefined for Census 2000 since it was determined that many of them were too large for the operation.

1.3 Census 2000 Dress Rehearsal

The Census Bureau selected three sites for the Census 2000 Dress Rehearsal: Columbia, South Carolina and eleven surrounding counties, Menominee County, Wisconsin, and Sacramento, California. Address Listing was conducted in the South Carolina and Menominee sites. As in the Prelist operations, the Census 2000 Dress Rehearsal Address Listing operation consisted of census enumerators going door-to-door to identify the mailing address and/or physical location description of housing units. This operation was done in areas where the Census Bureau thought that there would be a high concentration of non-city-style addresses. Housing units with non-city-style addresses, such as rural route/box numbers, are difficult to locate and therefore require a field listing operation. During Address Listing, enumerators also map-spotted each housing unit on a block map and updated census maps.

An evaluation of Dress Rehearsal Address Listing was done by examining the number of addresses listed in each Dress Rehearsal site, the percentage of city-style versus non-city-style addresses, and the percentage of addresses for which enumerators were able to obtain mailing addresses. The Dress Rehearsal Address Listing evaluation concluded that, in the South Carolina site, a large percentage of city-style addresses were found (approximately 61 percent), suggesting that, possibly, some of the block clusters could have been enumerated using Mailout/Mailback methodology.

1.4 Census 2000

The Census 2000 Address Listing operation and the National Prelist operations which were used in the 1990 census used basically the same methodology with one notable exception. Unlike the National Prelist operations which were used in the 1990 census, the Census 2000 Address Listing operation was not done in any areas where we planned to deliver questionnaires by mail.

During the Census 2000 Address Listing operation, listers systematically canvassed each block in their assignment area (AA) to construct a comprehensive list of addresses or physical location descriptions of housing units (HUs). Enumerators also annotated census maps with a corresponding map spot and number as they updated map features to represent ground truth. As the address information was collected, the lister recorded the householder name and mailing address in an Address Register (AR) for each HU from an occupant or knowledgeable person, such as a neighbor. The listers were allowed two telephone callbacks to collect this information.

Originally, the Census Bureau planned to allow personal visit callbacks in all areas where Address Listing was done in order to collect as many mailing addresses as possible for use in subsequent census programs, such as the American Community Survey (ACS). However, in an effort to reduce costs and stay within the overall budget, the use of personal visit callbacks was eliminated from the Census 2000 Address Listing operation.

However, in 36 of the approximately 3000 counties in which Census 2000 Address Listing was done, there were three additional personal visit callbacks used. The 36 counties were the sites of the 1999 ACS. The ACS is a mailback, self-response survey done in a sample of sites throughout the United States. Since the ACS is done largely by mail-response, it is essential to obtain accurate mailing address information for each housing unit that will receive a form. This is the reason that three callbacks were allowed in the 1999 ACS counties. The ACS is a way to provide the economic, demographic, housing and social data communities need every year instead of once in ten years. It is an on-going survey that the Census Bureau plans will replace the long form in the 2010 Census. The success of collecting mailing address information in the 36 ACS counties in which three callbacks were allowed is examined in this evaluation.

To better manage the operation, Address Listing was split into three six-week segments, called "waves." Although there were originally only three waves planned, a fourth was later added. This fourth wave included areas that we originally intended to be Mailout/Mailback but were reassessed when we began to update the address list in those areas. Preparation for Address Listing activities started in January 1997, when forms, manuals, and training materials were designed and written. The operation began in the field on July 30, 1998 and data capture and updates to the MAF were completed on May 12, 1999.

For all areas of the U.S. and Puerto Rico, the MAF was developed to document the address of every housing unit. The Address Listing operation was the first source for documenting addresses on the MAF for Update/Leave areas of the country.

The MAF is a source for the Decennial MAF (DMAF), which is the file of addresses used to conduct Census 2000. An address on the MAF is “DMAF deliverable” if it is eligible to be included on the DMAF. Addresses eligible for the DMAF include those that represent (based on the information that the Census Bureau has) potential residential housing units that are coded to census blocks and have a mapspot. Although the percentage of the Address Listing adds that made it to the DMAF (and which addresses ultimately made it into the census) will be looked at in this evaluation, the overall analysis will be done on all units listed in the operation. The "Evaluation of the Overall Master Address File Building Process -F.14" will look at the relationship of Address Listing to the other MAF building operations.

2. METHODS

2.1 MAF addresses used in this evaluation

We used the November 2000 MAF extracts to produce the majority of the numbers presented in this evaluation. Also, we used the March 2001 MAF extracts to produce counts of addresses by whether or not they were in the final census inventory. The MAF extracts contain housing units, group quarters, and special place addresses provided by every MAF building operation that happened before and during Census 2000. The extracts also contain information about actions taken on the addresses by the different operations.

We limited this evaluation to housing unit addresses, and therefore we removed group quarters and special place addresses from our analysis. Additionally, we excluded from our analysis any units that are known to be a duplicate of another address on the MAF.

2.2 Levels of geography used for analysis

During the Address Listing operation, collection geography, based on physical boundaries, was used to structure the listing of units in the field. For evaluation purposes, we characterize the adds by where the housing units actually are for tabulation purposes. Therefore, in this evaluation we primarily analyze data using tabulation geography. In general, collection state and county would not be different from tabulation state and county, but they could be different, on occasion, because of keying or other errors.

We produced statistics at the national and state levels. We include the District of Columbia (DC) as a state equivalent when producing numbers at the state level, however, DC had no units listed during the Address Listing operation. Puerto Rico is treated separately from the stateside statistics in most counts. Exceptions are noted in the results section.

2.3 Original source of an address

Evaluations of the MAF-building operations required identification of the source of every address on the MAF. An original source variable, which did not exist on the MAF, was defined and created by the Planning, Research, and Evaluation Division and the Decennial Statistical Studies Division. This variable identifies the first operation or file to add the address to the MAF, with the following three qualifications:

- If one operation added an address, but a later operation also identified the address in a different Type of Enumeration Area (TEA), the first operation does not receive credit for adding this address.
- An address may not have sufficient operation information to indicate how the address was added to the MAF.
- In cases where one MAF-building operation overlapped with at least one other MAF-building operation and the address was added independently in each operation, we give credit to each operation. An example of this is the original source category “LUCA 1998 and Block Canvassing.”

Therefore, the original source variable identifies the first operation or operations to add the address to the TEA in which it exists for the census, provided there is sufficient information to identify a TEA and an operation. For additional information on how this variable was defined, see the PRED TXE/2010 Memorandum Series: TXE/2010 MEMORANDUM SERIES: MAF-EXT-S-01, “Determining Original Source for the November 2000 Master Address File for Evaluation Purposes,” March 5, 2001.

Due to the complicated design of the MAF, we had a limited ability to accurately determine the original source of every address.

2.4 Type of address

This evaluation looks at addresses by type of address information. We classify addresses into five categories based on the highest criteria met. The categories are: complete city-style, complete rural route, complete P.O. box, incomplete address and no address information.

- The city-style category includes all units that had complete city-style addresses, which consists of a house number and street name.
- The Rural Route category includes units that did not have a complete city-style address but did have a complete rural route address, such as Rural Route 2, Box 3.

- The P.O. Box category includes units that did not have a complete city-style or rural route address but did have a complete P.O. Box address, such as P.O. Box 5.
- The incomplete category includes units that had some address information but did not have a complete address of any type.
- The no address information category includes units that are missing house number, street name, Rural Route, and P.O. Box information.

Addresses are further delineated by whether or not the address had a physical/location description provided during a census field operation. For additional information on how this variable was defined, see the PRED TXE/2010 Memorandum Series: MAF-EXT-D-01, "Determining Address Classification for Master Address File (MAF) Evaluation Purposes," September 26, 2001.

2.5 Applying quality assurance procedures

We applied quality assurance procedures throughout the creation of this report. They encompassed how we determined evaluation methods, created specifications for project procedures and software, designed and reviewed computer systems, developed clerical and computer procedures, analyzed data, and prepared this report. For a description of these procedures, reference "Census 2000 Evaluation Program Quality Assurance Process."

3. LIMITS

3.1 We used different MAF extracts for analysis

As stated in the methods sections, we are computing a count using final census status from the March 2001 MAF extracts, but we are computing all other counts in this evaluation from the November 2000 MAF extracts. In theory, the records on the November 2000 extracts should be the same as the records on the March 2001 extracts. However, over time, additional information leads to the merging or unmerging of addresses on the MAF. This occurrence can result in small changes to the types of tallies that are in this report. We used the November 2000 extracts for most of the analysis because the March 2001 extracts were not available until late in our analysis.

3.2 Processing of address information for Puerto Rico

The Decennial Systems and Contracts Management Office (DSCMO) had problems processing the keyed listing pages from the Address Listing operation in Puerto Rico. The keyed files had a 60 character address field that could contain a city-style address or a location description. The stateside files also had a flag, "A/D", set by the lister that indicated which it was. In the U.S., field representatives set the flag to "A" for a city-style address or "D" for a location description. In Puerto Rico, the flag was "D/L", and field representatives set the flag to "D" for city-style address and "L" for location description. When the DSCMO processed the files for Puerto Rico, they initially assumed that the "D" in the flag identified a "location description", as it did in the U.S., but the "D" actually stood for address (the word for address in Spanish starts with a "D"). The DSCMO fixed this by re-processing the files.

However, there were still major processing problems since listers could have set the flag incorrectly and there were unexpected address configurations such as urbanization¹ appearing in the address field. As a result, the DSCMO and the Geography Division could not use the stateside standardizer on the address information in order to get the correct information in the appropriate city-style address and location description fields on the MAF.

The GEO and the DSCMO decided to load the entire address field (city-style and location description information) in the location description field on the MAF. This processing decision continued for all address updating operations that the Census Bureau conducted in Puerto Rico after Address Listing. Due to this problem, there are no address records for Puerto Rico with city-style address information in the appropriate city-style address fields on the MAF extracts used for this evaluation.

3.3 The basic street address size variable was overstated

The variable showing the number of units at a basic street address (BSA) on the MAF included all addresses indicated as DMAF deliverable during the census process. Only a subset of these addresses remained in the census. Therefore, the size of BSA variable on the MAF is overstated relative to the size of BSA as of the end of the census.

Additionally, the size of BSA variable was only determined for units with city-style address information. Units with non-city-style addresses are considered single units. Due to the error explained in section 3.2, all units in Puerto Rico have non-city-style address information for them on the MAF and are recorded as single units regardless of their actual BSA size.

¹Urbanization denotes an area, sector, or development within a geographic area. In addition to being a descriptive word, it precedes the name of the area. This descriptor, commonly used in Puerto Rican urban areas, is an important part of the addressing format of Puerto Rico, as it describes the location of a given street

3.4 The additional callback information is limited

In the 36 ACS counties in which three additional callbacks were allowed in the Address Listing operation to obtain address information, we were unable to get the cost per case comparison in order to assess the cost effectiveness of the additional callbacks. Additionally, we are unsure about how representative the ACS sample counties are, therefore the comparison of Address Listing units in ACS counties versus those that are not in ACS counties is limited.

3.5 We are unable to determine whether an address is used to receive mail

In this evaluation, we look at address information in the following categories: complete city-style, complete rural route, complete P.O. box, incomplete or no address. The way the address information is stored on the MAF does not allow us to distinguish between addresses that are used for mailing and those that are used for locating addresses in field operations.

3.6 We cannot determine exactly if information came from the Address Listing operation or later operations

The length of time between the end of the Address Listing operation and the delivery of the MAF extract being used for data analysis makes it difficult to determine exactly what type of information was provided by the Address Listing operation. Address information, map spots, and block codes are examples of information that could have been provided by later operations.

3.7 Comparing results to previous censuses

The type of enumeration areas, enumeration methodologies, and analysis variables for Census 2000 may differ from previous censuses. Caution should be taken when comparing results across censuses. An example of an analysis variable that has changed from 1990 is size of structure--the closest approximation being size of basic street address in Census 2000. In the 1990 census, we had a census question asking the respondent the size of structure. In Census 2000, we defined the size of basic street address based on an address-level algorithm.

3.8 Special place and group quarters addresses may have been miscoded as housing units

Address Listing may have incorrectly added MAF records as housing units when the records actually referred to special places or group quarters. The Address Listing operation did not consist of a verification of this miscoding, and we do not know how often it occurred. This miscoding would generate an overstated count of housing units in the results.

4. RESULTS

4.1 How many addresses were added to the MAF as a result of the Address Listing operation?

Stateside, about 22 million housing units were listed in Address Listing. Since the Address Listing operation targeted mostly rural areas of the country, the majority of the units from the operation were in the southern and midwestern parts of the U.S. The South had close to half of all the units listed during the operation.

An additional 1.4 million addresses were listed in Puerto Rico. All of Puerto Rico was canvassed during the Address Listing operation and was enumerated using Update/Leave methodology.

In the approximately 3.5 million blocks where the Address Listing operation was planned to be done (including Puerto Rico), at least one address was added in about 58 percent of the blocks. Over 1.4 million blocks in which we planned to do Address Listing had no addresses added.

That is, over 42 percent of the blocks where we did Address Listing did not have any units. A table of the number of blocks with a certain range of adds in them is presented below. Note that although the other counts presented in the body of this report look at Puerto Rico separately, we include it in this tally.

Table 1. Counts of blocks by number(range) of adds per block (U.S. & Puerto Rico)*

Number of Units Added	Number of Blocks	Percent of total blocks with HUs
1	340,225	17.10
2 - 9	1,019,804	51.26
10 - 19	336,052	16.89
20 - 59	237,897	11.96
60 - 99	34,767	1.75
100+	20,710	1.04
Total blocks with 1 or more adds (U.S. & Puerto Rico)	1,989,455	100.00

*This table is based on collection geography (see Section 2.2) and is limited to adds in TEAs eligible for Address Listing (see Section 4.3.1 for a distribution of adds by TEA).

As can be seen from Table 1, less than three percent of all the blocks with at least one unit had more than 60 addresses listed. About 68 percent of the blocks had fewer than ten addresses. Given the areas of the country that the Address Listing operation targeted, we would not expect there to be many blocks where hundreds of addresses were listed and would expect that most of the blocks would have a small number of units listed in them.

4.2 What are the characteristics of Address Listing adds?

When we look at the characteristics of Address Listing adds, we consider three things:

- The type of address information obtained during field operations for the units (4.2.1)
- Whether or not a map spot is present on the record (4.2.2)
- The number of units at a basic street address (4.2.3)

4.2.1 Address information

Units listed in the Address Listing operation were eligible for inclusion in the 1999 Local Update of Census Addresses (LUCA 99) and the Update/Leave operation. Since these units would be visited later by field staff in these operations, each unit needed to have "locatable" address information so that field listers could find the address on the ground.

Table 2A shows the magnitude of Address Listing adds that are classified into different types of address categories. City-style addresses are generally easier to locate in the field than non-city-style addresses, because a house number and street name is relatively easy to pinpoint. In situations where an address lister located a housing unit but the house number was not available, he or she was instructed to write down a location description to assist with future visits to the unit. All non-city-style address categories in the table below are broken down by the presence or absence of a location description.

Table 2A. Address Listing adds by type of address information (U.S.)

Type of Address Information	Number of adds	% of total
Complete City-style	16,058,667	73.27
Complete Rural Route	1,981,039	9.04
With Location Description	1,954,372	8.92
Without Location Description	26,667	0.12
Complete P.O. Box	827,284	3.77
With Location Description	797,305	3.64
Without Location Description	29,979	0.14
Incomplete address information	248,389	1.13
With Location Description	117,477	0.53
Without Location Description	130,912	0.60
No address information	2,802,878	12.79
With Location Description	2,785,849	12.71
Without Location Description	17,029	0.08
Total adds in U.S.	21,918,257	100.00

The majority of Address Listing adds did have a “complete city-style” address type. These types of addresses would presumably be easier for enumerators to find on the ground. Of the housing units listed, over 73 percent had a complete city-style address, and about 13 percent had a complete non-city-style address (P.O. Box or Rural Route), while about 14 percent had no or incomplete address information. For the units with incomplete or nonexistent address information, enumerators were probably not able to determine the address because it was not posted and no other address information was available. However, of those addresses, listers recorded a physical location description over 95 percent of the time in order to help staff locate the unit during Update/Leave.

Puerto Rico differs from stateside in that there is no city-style address information on the MAF for any of the units in Puerto Rico that were listed during the Address Listing operation because of a processing error that occurred (see Section 3.6). Therefore, in Table 2B, some units are classified incorrectly as location description only units when in fact it could be possible that they had city-style address information.

Table 2B. Address Listing adds by type of address information (Puerto Rico)

Type of Address Information	Number of Adds	% of Total
Complete City-style	0	0.00*
Complete Rural Route	243,394	17.98
With Location Description	243,025	17.95
Without Location Description	369	0.03
Complete P.O. Box	118,788	8.78
With Location Description	118,671	8.77
Without Location Description	117	0.01
Incomplete address information	300	0.02
With Location Description	300	0.02
Without Location Description	0	0.00
No address information	991,080	73.22*
With Location Description	989,212	73.08
Without Location Description	1,868	0.14
Total adds in Puerto Rico	1,353,562	100.00

*Due to the processing error explained in Section 3.6.

4.2.2 Presence of map spots

In addition to obtaining locatable addresses for each unit, field representatives were asked to provide map spots on the appropriate census block map for each structure containing at least one LQ. Map spots make it easier for an enumerator to locate and enumerate the address during the Update/Leave operation.

Of the approximately 21.9 million addresses listed in the operation, 99.8 percent have map spots. Arizona, New Mexico, and Massachusetts have map spots on over 98 percent of the units that were listed. All other states have map spots on over 99 percent of the units listed in each state (see Appendix C-1). Those addresses that did not have map spots, and also many of the units with no address information or location description, were not likely to be sent to subsequent census field operations and also were probably not deliverable to the DMAF.

4.2.3 Size of basic street address

Table 3 shows the number and percentage of adds in each of the different basic street address (BSA) categories.

Table 3. Address Listing adds by size of basic street address (U.S.)

Number of HUs at the Basic Street Address	Number of Adds	% of Total
Single unit	19,682,428	89.80
Multi-unit Addresses	2,235,829	10.20
2 to 4 units	1,154,386	5.27
5 to 9 units	237,200	1.08
10 to 19 units	207,577	0.95
20 to 49 units	307,063	1.40
50 or more units	329,603	1.50
Total adds in U.S.	21,918,257	100.00

Table 3 shows that single units account for about 90 percent of the total adds. Only about four percent of the adds were in structures with ten or more units. This should be expected because, in the mostly rural areas in which Address Listing was done, there are not likely to be many large apartment buildings, and all non-city-style addresses are in the single unit category (see Section 3.3).

Hawaii had the smallest percent of addresses added in single unit structures, with only about 74 percent of the address listing adds in the state (see Appendix C-2). Most of the remaining adds in Hawaii fell into the 2-4 unit range (about 14 percent of the adds in the state). Rhode Island had the highest percent added in single unit structures, with almost 98 percent. Nevada had the highest percent of addresses added in 50+ structures -- over nine percent (see Appendix F).

Since the BSA size variable was only defined for units with city-style addresses, and there was no city-style information recorded on the MAF for Puerto Rico due to a processing error, Address Listing adds in Puerto Rico (not included in the counts in Table 3) are all reported as single units regardless of actual address size (see Appendix C-2).

4.3 What was the quality of the addresses added during Address Listing?

In order to assess the quality of the units added during the Address Listing operation, we attempt to answer several questions:

- Did the housing unit belong in the Address Listing areas? (4.3.1 & 4.3.2)
- Did the Address Listing operation record the block code for each added unit, and if so, was it the correct block? (4.3.3)
- Were the listers able to obtain enough information about each address for the unit to be delivered to the DMAF and ultimately included in the census? (4.3.4)

4.3.1 Type of enumeration area (TEA)

The Address Listing operation was done to build the address list in three types of enumeration areas -- 2 (Update/Leave), 5 (Rural Update/Enumerate) and 9 (Update/Leave from Mailout/Mailback). The other six types of enumeration areas are considered inappropriate areas for units to be added in by the Address Listing operation.

Table 4. Address Listing adds by enumeration area (U.S.)

	Number of Adds	% of Total
Adds in <i>Appropriate</i> TEAs for the operation (TEAs 2, 5, and 9)	21,872,692	99.79
Adds in <i>Inappropriate</i> TEAs for the operation (TEAs 1, 3, 4, 6, 7, and 8)	45,565	0.21
Total adds in U.S.	21,918,257	100.00

As shown in Table 4, over 99 percent of the adds remained in the appropriate Address Listing TEAs. We tend to believe that the 0.2 percent of addresses in inappropriate Address Listing TEAs were erroneously added by Address Listing listers who went outside of their boundaries or these cases were later geocoded to a different block that was in a different TEA.

Every state has over 98 percent of the Address Listing adds in the appropriate TEAs. All of Puerto Rico was Update/Leave, or TEA 2, so 100 percent of the adds in Puerto Rico were in the appropriate TEA (see Appendix D-1).

4.3.2 Original source

We define the original source of an address to be the census operation that first added an address to the MAF in the appropriate enumeration area. Over 99.8 percent of Address Listing adds had an original source of Address Listing. The remaining 40,660 adds were units that were added by Address Listing in a non-Address Listing enumeration area, such as Mailout/Mailback, and therefore have an operation that was only conducted in other enumeration areas as their original source, such as the the Delivery Sequence File (DSF) or Block Canvassing (see Appendix D-2).

4.3.3 Block code agreement

Table 5A shows the extent that the block code provided by Address Listing for each unit was considered the official block code on the MAF.

Table 5A. Address Listing adds by Address Listing block code agreement (U.S.)

Block Code Agreement	Number of Adds	% of Total
Address Listing did not provide a block code	18,179	0.08
Different than official block	61,888	0.28
Same as official block	16,972,119	77.43
Different block, unit is in a suffixed block	4,866,071	22.21
Total adds in U.S.	21,918,257	100.00

Over 99.9 percent of all Address Listing adds had a block code from the operation. The small number of adds without a block code from the operation are due to listing errors or data capture errors.

About 77 percent of the adds show an Address Listing block code equal to the official block code on the MAF. About 22 percent of the Address Listing adds are in suffixed blocks. Shortly after the Address Listing operation ended, the Census Bureau used new map features collected during Address Listing to split large blocks and create suffixed blocks. For any block that was suffixed after the operation, the block code provided by Address Listing was different than the block code currently on the record when the block agreement variable was defined. However, we should not consider these true block disagreements since it is likely that the address was recorded in the correct block during the Address Listing operation.

There were 61,888 addresses recognized by the MAF as placed in the wrong block during Address Listing, and may represent the following types of addresses:

- Addresses that received block code changes from operations that followed in Address Listing areas, such as the 1999 Local Update of Census Addresses (LUCA 99) or the Update/Leave operation.
- Addresses that actually exist in a different enumeration area but were incorrectly listed by address listers in the field. We recognize these cases when an Address Listing add matches to an address on the MAF that exists in another TEA or when the Address Listing address geocodes to a block that exists in a different TEA.

If Address Listing originally placed a unit in the wrong block, a later operation may have corrected it by deleting the address from the Address Listing block and adding it in the correct block. If the MAF does not recognize that those two actions are affecting the same address (which would most likely be the case with rural addresses), then these situations would not be reflected in the count of block code disagreements.

This problem is magnified in Puerto Rico where city-style addresses were not captured correctly on the MAF, as can be seen in Table 5B. Therefore, the matching of addresses that were deleted in one block and added in another was extremely difficult, and there is most likely an undercount of cases in Puerto Rico where a unit was listed in the wrong block during the Address Listing operation.

Table 5B. Address Listing adds by address listing block code agreement (Puerto Rico)

Block Code Agreement	Number of Adds	% of Total
Address Listing did not provide a block code	0	0.00
Different than official block	9	<0.01
Same as official block	1,110,791	82.06
Different block, unit is in a suffixed block	242,762	17.94
Total adds in Puerto Rico	1,353,562	100.00

In Puerto Rico, all units had a block code from the Address Listing operation, and about 82 percent of the units had block codes that agreed with the block now on the unit. However, as stated above, this block agreement is probably overstated.

4.3.4 DMAF deliverability and final census status

The Decennial Master Address File (DMAF) is the file used for the printing and delivery of census forms. An address on the MAF was DMAF deliverable if it was eligible to be included on the DMAF when the DMAF was created. Addresses eligible for the DMAF include those that represent (based on the information that the Census Bureau has) potential residential housing units that are coded to census blocks and have a map spot.

The percentage of Address Listing adds in the nation that were DMAF deliverable on the November 2000 MAF extracts is 99.1 percent, or about 21.7 million addresses. 99.5 percent, about 1.3 million, of the Address Listing adds in Puerto Rico were DMAF deliverable.

Except for South Carolina, which had about 97 percent deliverable, over 98 percent of Address Listing adds in every other state are DMAF deliverable. These results tell us that a very small percentage of addresses added by Address Listing remained ungeocoded or non-residential as of the creation of the DMAF (see Appendix D-3).

An address on the DMAF was assigned a status of "in the census" if it was considered to be an existing housing unit at the end of all Census 2000 processes. Although there are errors in the census results, we suspect the magnitude of errors to be relatively small. Therefore, we believe we can get an indication of the quality of Address Listing adds by looking at their final status in the census.

The number of Address Listing adds in the nation that were included in the final Census 2000 housing units counts is about 20.7 million. This means that over 94 percent of all the addresses listed during the Address Listing operation were good, residential addresses as of census day. Puerto Rico also had over 94 percent of the adds in the final census counts -- 1,282,802 Address Listing adds were included in the final Census 2000 counts for Puerto Rico.

4.4 How many Address Listing adds are on the Delivery Sequence File?

In areas where most mailing addresses are city-style (for example, 101 Main Street), we created the address list by looking at the U.S. Postal Service DSF, which is a national file of individual mail delivery point addresses. In order to determine the extent to which Address Listing adds potentially could have been enumerated using this other methodology, we look at the number of Address Listing adds that were present on the DSF at the time of the mailout of census forms.

Table 6. Address Listing adds by status on September 98 and previous DSFs (U.S.)

Match Status	Number of Adds	% of Total
DSF is not available in Address Listing Area	1,955	<0.01
Address Listing Add does not match to DSFs (9/98 or before)	12,594,417	57.46
Address Listing Add matched to a residential unit on the DSFs	9,314,519	42.50
Address Listing Add matched to a nonresidential unit on the DSFs	7,366	0.03
Total adds in U.S.	21,918,257	100.00

Table 6 shows that about 42.5 percent of the addresses added in Address Listing matched to addresses that were identified as residential on or before the September 1998 DSF. This percent varies greatly from state to state. For instance, Rhode Island, Delaware, Alaska, Washington, West Virginia, and Idaho all have under 25 percent of their adds matching to the DSF, while Connecticut, Nevada, New Jersey, Tennessee, and Maryland all have over 60 percent matching (see Appendix E).

Since the Census Bureau does data collection on a block level rather than a unit by unit basis, it is more helpful to look at how many blocks have all their addresses recognized by the Postal Service. We look at this below in Table 7.

Table 7. Block counts for Address Listing adds that match to the DSF (U.S.)

Percentage of HUs in block that match to DSF	Number of Blocks	% of Total blocks with at least one add
0-29% of addresses matched	1,074,747	55.18
30-59% of addresses matched	240,158	12.33
60-89% of addresses matched	304,296	15.62
90-99% of addresses matched	49,819	2.56
100% of addresses matched	278,750	14.31
Total blocks in U.S. with at least one add	1,947,770	100.00

The total number of blocks in Address Listing with at least one add (excluding Puerto Rico) was about 1.9 million. Of those 1.9 million blocks, over 14 percent had all addresses that were on the Delivery Sequence File at the time of the mailout of census forms. Those 278,750 blocks contained approximately 1.3 million Address Listing adds, which is about six percent of units listed in Address Listing areas during the operation.

Recommendation: The existence of these addresses on the Delivery Sequence File suggests two points:

- The Census Bureau may want to reassess the methodology of delineation of Mailout/Mailback versus Update/Leave areas of the country for the 2010 Census and subsequent survey work. Additional research to see if blocks with a high percentage of DSF matches are contiguous may help this effort.
- It may be reasonable in some areas to use the DSF as an address list building tool in Update/Leave enumeration areas.

4.5 How much did additional callbacks contribute to obtaining additional address information?

Listers were allowed two telephone callbacks to collect information during the Census 2000 Address Listing operation. There were three additional personal visit callbacks used in 36 of the approximately 3000 counties in which Address Listing was done. The 36 counties were the sites of the 1999 ACS (see Appendix A). To evaluate the effectiveness of the additional callbacks in obtaining additional mailing address information, we compare the types of addresses obtained for address listing adds in the ACS counties versus those obtained for address listing adds in the remaining U.S. counties (excluding Puerto Rico). However, we cannot say with certainty that the ACS counties are representative of all the U.S.

Table 8. Address Listing adds by address information vs. number of callbacks (U.S)

Type of Address Information	In ACS counties (Additional callbacks allowed)		NOT in ACS counties (Only 2 callbacks allowed)	
	# of Adds	% of Total	# of Adds	% of Total
Complete City-style	204,728	72.71	15,853,939	73.27
Complete Rural Route	24,642	8.75	1,956,397	9.04
Complete P.O. Box	18,575	6.60	808,709	3.74
Incomplete Address Info.	7,760	2.76	240,629	1.11
No Address Information	25,865	9.19	2,777,013	12.83
Totals	281,570	100.00	21,636,687	100.00

As shown in Table 8, the areas in which additional callbacks were allowed had 6.6 percent of units with complete P.O. Box addresses compared to about 3.7 percent of addresses having P.O. Boxes in the counties where the additional callbacks were not allowed. There is also a slightly higher percent of units with some sort of incomplete address information in the counties where additional all callbacks were allowed. The percent of units with no address information was lower in these ACS counties as well. So it does, in some sense, appear that additional callbacks may have contributed to the success of obtaining additional mailing address information, although not in any significant manner.

Recommendation: We cannot recommend additional callbacks for a future Address Listing operation at this time for two reasons:

- The impact of the additional callbacks on obtaining additional mailing address information appears small since there are no big differences between the percentages of address type for units in the ACS counties versus those not in the ACS counties.
- We were unable to get the cost per case data in the ACS counties, which would be necessary to evaluate the cost-effectiveness of doing additional callbacks.

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Appendix A: 1999 American Community Survey counties

	COUNTY / STATE	ST / CO CODE	RO
1	Pima County, AZ	04019	DEN
2	Jefferson County, AR	05069	KC
3	San Francisco County, CA	06075	SEA
4	Tulare County, CA	06107	LA
5	Broward County, FL	12011	ATL
6	Upton County, GA	13293	ATL
7	Lake County, IL	17097	CHI
8	Miami County, IN	18103	CHI
9	Black Hawk County, IA	19013	KC
10	De Soto Parish, LA	22031	DAL
11	Calvert County, MD	24009	PHI
12	Hampden County, MA	25013	BOS
13	Madison County, MS	28089	DAL
14	Iron County, MO	29093	KC
15	Reynolds County, MO	29179	KC
16	Washington County, MO	29221	KC
17	Flathead County, MT	30029	DEN
18	Lake County, MT	30047	DEN
19	Douglas County, NE	31055	DEN
20	Otero County, NM	35035	DEN
21	Bronx Borough, NY	36005	NY
22	Rockland County, NY	36087	NY
23	Franklin County, OH	39049	DET
24	Multnomah County, OR	41051	SEA
25	Fulton County, PA	42057	PHI
26	Schuylkill County, PA	42107	PHI
27	Sevier County, TN	47155	CHA
28	Fort Bend County, TX	48157	DAL
29	Harris County, TX	48201	DAL
30	Starr County, TX	48427	DAL
31	Zapata County, TX	48505	DAL
32	Petersburg City, VA	51730	CHA
33	Yakima County, WA	53077	SEA
34	Ohio County, WV	54069	DET
35	Oneida County, WI	55085	CHI
36	Vilas County, WI	55125	CHI

Appendix B: Address Listing adds by state

	# of adds	% of total adds
Nation (including Puerto Rico)	23,271,819	100.00
STATE		
Alabama	715,734	3.08
Alaska	73,645	0.32
Arizona	418,412	1.80
Arkansas	650,113	2.79
California	586,787	2.52
Colorado	454,596	1.95
Connecticut	89,047	0.38
Delaware	64,456	0.28
District of Columbia	---	---
Florida	603,749	2.59
Georgia	901,691	3.87
Hawaii	80,806	0.35
Idaho	104,310	0.45
Illinois	370,486	1.59
Indiana	230,343	0.99
Iowa	426,683	1.83
Kansas	303,309	1.30
Kentucky	681,074	2.93
Louisiana	500,617	2.15
Maine	351,799	1.51
Maryland	192,748	0.83
Massachusetts	125,255	0.54
Michigan	611,179	2.63
Minnesota	551,033	2.37
Mississippi	440,992	1.89
Missouri	778,171	3.34
Montana	285,745	1.23
Nebraska	218,976	0.94
Nevada	181,179	0.78
New Hampshire	192,119	0.83
New Jersey	102,596	0.44
New Mexico	342,622	1.47
New York	1,034,260	4.44
North Carolina	1,577,814	6.78
North Dakota	148,085	0.64
Ohio	440,034	1.89
Oklahoma	606,046	2.60
Oregon	137,981	0.59
Pennsylvania	971,123	4.17
Rhode Island	1,528	0.01
South Carolina	506,257	2.18
South Dakota	162,966	0.70
Tennessee	642,270	2.76
Texas	1,750,957	7.52
Utah	151,900	0.65
Vermont	168,395	0.72
Virginia	836,790	3.60
Washington	156,458	0.67
West Virginia	615,474	2.64
Wisconsin	314,612	1.35
Wyoming	65,035	0.28
Puerto Rico	1,353,562	5.82

Appendix C-1: Address Listing adds by existence of map spots

	Total	Without Map Spots		With Map Spots	
		Number	Percent	Number	Percent
Nation (including Puerto Rico)	23,271,819	44,532	0.19	23,227,287	99.81
STATE					
Alabama	715,734	719	0.10	715,015	99.90
Alaska	73,645	12	0.02	73,633	99.98
Arizona	418,412	5,383	1.29	413,029	98.71
Arkansas	650,113	22	<0.01	650,091	100.00
California	586,787	4,760	0.81	582,027	99.19
Colorado	454,596	2,000	0.44	452,596	99.56
Connecticut	89,047	2	<0.01	89,045	100.00
Delaware	64,456	---	---	64,456	99.19
District of Columbia	---	---	---	---	---
Florida	603,749	2,802	0.46	600,947	99.54
Georgia	901,691	267	0.03	901,424	99.97
Hawaii	80,806	6	0.01	80,800	99.99
Idaho	104,310	406	0.39	103,904	99.61
Illinois	370,486	69	0.02	370,417	99.98
Indiana	230,343	20	0.01	230,323	99.99
Iowa	426,683	67	0.02	426,616	99.98
Kansas	303,309	53	0.02	303,256	99.98
Kentucky	681,074	422	0.06	680,652	99.94
Louisiana	500,617	491	0.10	500,126	99.90
Maine	351,799	370	0.11	351,429	99.89
Maryland	192,748	10	0.01	192,738	99.99
Massachusetts	125,255	2,483	1.98	122,772	98.02
Michigan	611,179	8	<0.01	611,171	99.99
Minnesota	551,033	337	0.06	550,696	99.94
Mississippi	440,992	31	0.01	440,961	99.99
Missouri	778,171	36	<0.01	778,135	99.99
Montana	285,745	830	0.29	284,915	99.71
Nebraska	218,976	93	0.04	218,883	99.96
Nevada	181,179	807	0.45	180,372	99.55
New Hampshire	192,119	---	---	192,119	100.00
New Jersey	102,596	6	0.01	102,590	99.99
New Mexico	342,622	4,187	1.22	338,435	98.78
New York	1,034,260	1,322	0.13	1,032,938	99.87
North Carolina	1,577,814	1,292	0.08	1,576,522	99.92
North Dakota	148,085	712	0.48	147,373	99.52
Ohio	440,034	27	0.01	440,007	99.99
Oklahoma	606,046	18	<0.01	606,028	99.99
Oregon	137,981	156	0.11	137,825	99.89
Pennsylvania	971,123	5,841	0.60	965,282	99.40
Rhode Island	1,528	5	0.33	1,523	99.67
South Carolina	506,257	76	0.02	506,181	99.98
South Dakota	162,966	761	0.47	162,205	99.53
Tennessee	642,270	27	<0.01	642,243	99.99
Texas	1,750,957	4,227	0.24	1,746,730	99.76
Utah	151,900	753	0.50	151,147	99.50
Vermont	168,395	2	<0.01	168,393	99.99
Virginia	836,790	30	<0.01	836,760	99.99
Washington	156,458	305	0.19	156,153	99.81
West Virginia	615,474	20	<0.01	615,454	99.99
Wisconsin	314,612	2,080	0.66	312,532	99.34
Wyoming	65,035	174	0.27	64,861	99.73
Puerto Rico	1,353,562	5	<0.01	1,353,557	99.99

Appendix C-2: Address Listing adds by size of basic street address (single vs. multi)

	Total	Single Unit Structures		Multi-Unit Structures	
		Number	Percent	Number	Percent
Nation (including Puerto Rico)	23,271,819	21,035,990	90.39	2,235,829	9.61
STATE					
Alabama	715,734	638,413	89.20	77,321	10.80
Alaska	73,645	62,289	84.58	11,356	15.42
Arizona	418,412	349,698	83.58	68,714	16.42
Arkansas	650,113	584,713	89.94	65,400	10.06
California	586,787	484,311	82.54	102,476	17.46
Colorado	454,596	360,185	79.23	94,411	20.77
Connecticut	89,047	72,896	81.86	16,151	18.14
Delaware	64,456	61,533	95.47	2,923	4.53
District of Columbia	---	---	---	---	---
Florida	603,749	514,116	85.15	89,633	14.85
Georgia	901,691	812,511	90.11	89,180	9.89
Hawaii	80,806	59,856	74.07	20,950	25.93
Idaho	104,310	95,303	91.37	9,007	8.63
Illinois	370,486	347,928	93.91	22,558	6.09
Indiana	230,343	214,831	93.27	15,512	6.73
Iowa	426,683	384,564	90.13	42,119	9.87
Kansas	303,309	283,314	93.41	19,995	6.59
Kentucky	681,074	622,455	91.39	58,619	8.61
Louisiana	500,617	446,512	89.19	54,105	10.81
Maine	351,799	313,513	89.12	38,286	10.88
Maryland	192,748	176,256	91.44	16,492	8.56
Massachusetts	125,255	106,937	85.38	18,318	14.62
Michigan	611,179	562,112	91.97	49,067	8.03
Minnesota	551,033	509,392	92.44	41,641	7.56
Mississippi	440,992	401,714	91.09	39,278	8.91
Missouri	778,171	722,478	92.84	55,693	7.16
Montana	285,745	244,183	85.45	41,562	14.55
Nebraska	218,976	203,126	92.76	15,850	7.24
Nevada	181,179	144,066	79.52	37,113	20.48
New Hampshire	192,119	162,307	84.48	29,812	15.52
New Jersey	102,596	93,257	90.90	9,339	9.10
New Mexico	342,622	296,004	86.39	46,618	13.61
New York	1,034,260	894,325	86.47	139,935	13.53
North Carolina	1,577,814	1,426,985	90.44	150,829	9.56
North Dakota	148,085	129,664	87.56	18,421	12.44
Ohio	440,034	390,567	88.76	49,467	11.24
Oklahoma	606,046	571,750	94.34	34,296	5.66
Oregon	137,981	119,221	86.40	18,760	13.60
Pennsylvania	971,123	928,646	95.63	42,477	4.37
Rhode Island	1,528	1,493	97.71	35	2.29
South Carolina	506,257	462,359	91.33	43,898	8.67
South Dakota	162,966	147,619	90.58	15,347	9.42
Tennessee	642,270	584,891	91.07	57,379	8.93
Texas	1,750,957	1,604,666	91.65	146,291	8.35
Utah	151,900	128,463	84.57	23,437	15.43
Vermont	168,395	148,594	88.24	19,801	11.76
Virginia	836,790	778,261	93.01	58,529	6.99
Washington	156,458	134,582	86.02	21,876	13.98
West Virginia	615,474	575,770	93.55	39,704	6.45
Wisconsin	314,612	268,868	85.46	45,744	14.54
Wyoming	65,035	54,931	84.46	10,104	15.54
Puerto Rico	1,353,562	1,353,562	100.00	---	---

Appendix D-1: Address Listing adds by type of enumeration area

	Total	Appropriate TEA		Inappropriate TEA	
		Number	Percent	Number	Percent
Nation (including Puerto Rico)	23,271,819	23,226,254	99.80	45,565	0.20
STATE					
Alabama	715,734	714,912	99.89	822	0.11
Alaska	73,645	73,549	99.87	96	0.13
Arizona	418,412	418,177	99.94	235	0.06
Arkansas	650,113	647,534	99.60	2,579	0.40
California	586,787	584,429	99.60	2,358	0.40
Colorado	454,596	454,114	99.89	482	0.11
Connecticut	89,047	88,981	99.93	66	0.07
Delaware	64,456	64,209	99.62	247	0.38
District of Columbia	---	---	---	---	---
Florida	603,749	602,598	99.81	1,151	0.19
Georgia	901,691	900,773	99.90	918	0.10
Hawaii	80,806	80,673	99.84	133	0.16
Idaho	104,310	104,059	99.76	251	0.24
Illinois	370,486	368,795	99.54	1,691	0.46
Indiana	230,343	229,066	99.45	1,277	0.55
Iowa	426,683	425,188	99.65	1,495	0.35
Kansas	303,309	302,330	99.68	979	0.32
Kentucky	681,074	680,403	99.90	671	0.10
Louisiana	500,617	499,142	99.71	1,475	0.29
Maine	351,799	351,698	99.97	101	0.03
Maryland	192,748	192,179	99.70	569	0.30
Massachusetts	125,255	125,046	99.83	209	0.17
Michigan	611,179	610,329	99.86	850	0.14
Minnesota	551,033	549,809	99.78	1,224	0.22
Mississippi	440,992	440,093	99.80	899	0.20
Missouri	778,171	776,710	99.81	1,461	0.19
Montana	285,745	285,510	99.92	235	0.08
Nebraska	218,976	218,681	99.87	295	0.13
Nevada	181,179	180,779	99.78	400	0.22
New Hampshire	192,119	191,979	99.93	140	0.07
New Jersey	102,596	102,122	99.54	474	0.46
New Mexico	342,622	338,025	98.66	4,597	1.34
New York	1,034,260	1,033,051	99.88	1,209	0.12
North Carolina	1,577,814	1,576,315	99.90	1,499	0.10
North Dakota	148,085	148,015	99.95	70	0.05
Ohio	440,034	438,531	99.66	1,503	0.34
Oklahoma	606,046	604,472	99.74	1,574	0.26
Oregon	137,981	137,315	99.52	666	0.48
Pennsylvania	971,123	968,376	99.72	2,747	0.28
Rhode Island	1,528	1,528	100.00	---	---
South Carolina	506,257	505,005	99.75	1,252	0.25
South Dakota	162,966	162,694	99.83	272	0.17
Tennessee	642,270	641,538	99.89	732	0.11
Texas	1,750,957	1,748,131	99.84	2,826	0.16
Utah	151,900	151,496	99.73	404	0.27
Vermont	168,395	168,218	99.89	177	0.11
Virginia	836,790	836,651	99.98	139	0.02
Washington	156,458	155,945	99.67	513	0.33
West Virginia	615,474	614,909	99.91	565	0.09
Wisconsin	314,612	313,752	99.73	860	0.27
Wyoming	65,035	64,858	99.73	177	0.27
Puerto Rico	1,353,562	1,353,562	100.00	---	---

Appendix D-2: Address Listing adds by original source, excluding Puerto Rico

Original Source	Number of Adds	Percent of Total Adds
Address Listing	21,877,597	99.81
1990 Address Control File	17,575	0.08
Census 2000 Dress Rehearsal	42	<0.01
Block Canvassing and/or Local Update of Census Addresses (LUCA) 1998	2,469	0.01
April 2000 or any earlier Delivery Sequence File (DSF)	20,323	0.09
New Construction	33	<0.01
Questionnaire Delivery	9	<0.01
Special Place/Group Quarters Master File	1	<0.01
Non-Response Follow-up (NRFU)	83	<0.01
Coverage Improvement Follow-up (CIFU)	50	<0.01
Be Counted or Telephone Questionnaire Assistance (TQA)	21	<0.01
Unknown Original Source	54	<0.01
Total of All Addresses	21,918,257	100.00

Appendix D-3: Address Listing adds by DMAF deliverability

	Total	Delivered To DMAF		Never delivered to DMAF	
		Number	Percent	Number	Percent
Nation (including Puerto Rico)	23,271,819	23,071,558	99.14	200,261	0.86
STATE					
Alabama	715,734	711,858	99.46	3,876	0.54
Alaska	73,645	72,845	98.91	800	1.09
Arizona	418,412	410,816	98.18	7,596	1.82
Arkansas	650,113	644,811	99.18	5,302	0.82
California	586,787	580,013	98.85	6,774	1.15
Colorado	454,596	449,363	98.85	5,233	1.15
Connecticut	89,047	88,721	99.63	326	0.37
Delaware	64,456	64,236	99.66	220	0.34
District of Columbia	---	---	---	---	---
Florida	603,749	597,080	98.90	6,669	1.10
Georgia	901,691	883,768	98.01	17,923	1.99
Hawaii	80,806	79,534	98.43	1,272	1.57
Idaho	104,310	103,281	99.01	1,029	0.99
Illinois	370,486	367,949	99.32	2,537	0.68
Indiana	230,343	229,350	99.57	993	0.43
Iowa	426,683	423,329	99.21	3,354	0.79
Kansas	303,309	301,500	99.40	1,809	0.60
Kentucky	681,074	679,411	99.76	1,663	0.24
Louisiana	500,617	498,072	99.49	2,545	0.51
Maine	351,799	349,854	99.45	1,945	0.55
Maryland	192,748	191,338	99.27	1,410	0.73
Massachusetts	125,255	124,724	99.58	531	0.42
Michigan	611,179	606,932	99.31	4,247	0.69
Minnesota	551,033	546,496	99.18	4,537	0.82
Mississippi	440,992	436,714	99.03	4,278	0.97
Missouri	778,171	774,429	99.52	3,742	0.48
Montana	285,745	284,343	99.51	1,402	0.49
Nebraska	218,976	218,156	99.63	820	0.37
Nevada	181,179	178,461	98.50	2,718	1.50
New Hampshire	192,119	191,152	99.50	967	0.50
New Jersey	102,596	101,130	98.57	1,466	1.43
New Mexico	342,622	338,836	98.89	3,786	1.11
New York	1,034,260	1,027,153	99.31	7,107	0.69
North Carolina	1,577,814	1,564,135	99.13	13,679	0.87
North Dakota	148,085	146,888	99.19	1,197	0.81
Ohio	440,034	438,286	99.60	1,748	0.40
Oklahoma	606,046	603,067	99.51	2,979	0.49
Oregon	137,981	136,529	98.95	1,452	1.05
Pennsylvania	971,123	961,246	98.98	9,877	1.02
Rhode Island	1,528	1,527	99.93	1	0.07
South Carolina	506,257	490,310	96.85	15,947	3.15
South Dakota	162,966	161,657	99.20	1,309	0.80
Tennessee	642,270	638,812	99.46	3,458	0.54
Texas	1,750,957	1,730,936	98.86	20,021	1.14
Utah	151,900	150,803	99.28	1,097	0.72
Vermont	168,395	167,758	99.62	637	0.38
Virginia	836,790	831,581	99.38	5,209	0.62
Washington	156,458	154,960	99.04	1,498	0.96
West Virginia	615,474	613,508	99.68	1,966	0.32
Wisconsin	314,612	311,993	99.17	2,619	0.83
Wyoming	65,035	64,576	99.29	459	0.71
Puerto Rico	1,353,562	1,347,331	99.54	6,231	0.46

Appendix E: Address Listing adds by status on September 1998 and previous DSFs

Nation (including Puerto Rico)	Total	Matched To Sept. 98 or previous DSFs		Not Matched to Sept. 98 or previous DSFs	
		Number	Percent	Number	Percent
	23,271,819	9,314,519	42.50	12,603,738	57.50
STATE					
Alabama	715,734	335,444	46.87	380,290	53.13
Alaska	73,645	10,082	13.69	63,563	86.31
Arizona	418,412	173,690	41.51	244,722	58.49
Arkansas	650,113	318,265	48.96	331,848	51.04
California	586,787	200,270	34.13	386,517	65.87
Colorado	454,596	227,709	50.09	226,887	49.91
Connecticut	89,047	59,995	67.37	29,052	32.63
Delaware	64,456	13,093	20.31	51,363	79.69
District of Columbia	---	---	---	---	---
Florida	603,749	293,152	48.56	310,597	51.44
Georgia	901,691	461,281	51.16	440,410	48.84
Hawaii	80,806	22,595	27.96	58,211	72.04
Idaho	104,310	16,150	15.48	88,160	84.52
Illinois	370,486	108,419	29.26	262,067	70.74
Indiana	230,343	72,610	31.52	157,733	68.48
Iowa	426,683	248,008	58.12	178,675	41.88
Kansas	303,309	133,473	44.01	169,836	55.99
Kentucky	681,074	302,641	44.44	378,433	55.56
Louisiana	500,617	251,954	50.33	248,663	49.67
Maine	351,799	120,721	34.32	231,078	65.68
Maryland	192,748	124,446	64.56	68,302	35.44
Massachusetts	125,255	46,424	37.06	78,831	62.94
Michigan	611,179	300,007	49.09	311,172	50.91
Minnesota	551,033	198,918	36.10	352,115	63.90
Mississippi	440,992	171,011	38.78	269,981	61.22
Missouri	778,171	302,220	38.84	475,951	61.16
Montana	285,745	149,711	52.39	136,034	47.61
Nebraska	218,976	66,407	30.33	152,569	69.67
Nevada	181,179	115,279	63.63	65,900	36.37
New Hampshire	192,119	91,526	47.64	100,593	52.36
New Jersey	102,596	64,989	63.34	37,607	36.66
New Mexico	342,622	118,563	34.60	224,059	65.40
New York	1,034,260	515,010	49.80	519,250	50.20
North Carolina	1,577,814	815,989	51.72	761,825	48.28
North Dakota	148,085	60,790	41.05	87,295	58.95
Ohio	440,034	243,631	55.37	196,403	44.63
Oklahoma	606,046	164,548	27.15	441,498	72.85
Oregon	137,981	51,263	37.15	86,718	62.85
Pennsylvania	971,123	247,086	25.44	724,037	74.56
Rhode Island	1,528	---	---	1,528	100.00
South Carolina	506,257	240,998	47.60	265,259	52.40
South Dakota	162,966	66,107	40.56	96,859	59.44
Tennessee	642,270	389,978	60.72	252,292	39.28
Texas	1,750,957	539,578	30.82	1,211,379	69.18
Utah	151,900	68,610	45.17	83,290	54.83
Vermont	168,395	52,852	31.39	115,543	68.61
Virginia	836,790	392,545	46.91	444,245	53.09
Washington	156,458	35,232	22.52	121,226	77.48
West Virginia	615,474	149,362	24.27	466,112	75.73
Wisconsin	314,612	138,871	44.14	175,741	55.86
Wyoming	65,035	23,016	35.39	42,019	64.61
Puerto Rico	1,353,562	---	---	1,353,562	100.00

Appendix F: Address Listing adds by size of basic street address (ranges)

STATE	1	2-4	5-9	10-19	20-49	50+	State Total
	Count %	Count %	Count %	Count %	Count %	Count %	
Nation (including Puerto Rico)	21,035,990	1,154,386	237,200	207,577	307,063	329,603	23,271,819
Alabama	638,413 89.20	42,008 5.87	8,014 1.12	7,134 1.00	11,645 1.63	8,520 1.19	715,734
Alaska	62,289 84.58	6,296 8.55	1,515 2.06	1,083 1.47	1,658 2.25	804 1.09	73,645
Arizona	349,698 83.58	22,994 5.50	4,084 0.98	4,487 1.07	9,847 2.35	27,302 6.53	418,412
Arkansas	584,713 89.94	35,613 5.48	6,383 0.98	7,520 1.16	9,687 1.49	6,197 0.95	650,113
California	484,311 82.54	48,933 8.34	8,534 1.45	6,722 1.15	14,517 2.47	23,770 4.05	586,787
Colorado	360,185 79.23	35,653 7.84	12,396 2.73	11,154 2.45	16,726 3.68	18,482 4.07	454,596
Connecticut	72,896 81.86	10,183 11.44	1,718 1.93	930 1.04	1,522 1.71	1,798 2.02	89,047
Delaware	61,533 95.47	2,294 3.56	434 0.67	102 0.16	21 0.03	72 0.11	64,456
District of Columbia	---	---	---	---	---	---	---
Florida	514,116 85.15	33,072 5.48	5,981 0.99	6,376 1.06	10,614 1.76	33,590 5.56	603,749
Georgia	812,511 90.11	47,671 5.29	7,608 0.84	7,058 0.78	13,386 1.48	13,457 1.49	901,691
Hawaii	59,856 74.07	10,984 13.59	1,385 1.71	665 0.82	1,971 2.44	5,945 7.36	80,806
Idaho	95,303 91.37	4,674 4.48	1,286 1.23	1,325 1.27	1,130 1.08	592 0.57	104,310
Illinois	347,928 93.91	13,505 3.65	3,783 1.02	2,146 0.58	2,264 0.61	860 0.23	370,486
Indiana	214,831 93.27	7,627 3.31	1,944 0.84	1,899 0.82	2,419 1.05	1,623 0.70	230,343
Iowa	384,564 90.13	16,552 3.88	5,772 1.35	5,433 1.27	7,036 1.65	7,326 1.72	426,683
Kansas	283,314 93.41	8,234 2.71	2,505 0.83	3,071 1.01	3,417 1.13	2,768 0.91	303,309
Kentucky	622,455 91.39	35,712 5.24	6,619 0.97	5,132 0.75	7,200 1.06	3,956 0.58	681,074
Louisiana	446,512 89.19	32,004 6.39	4,346 0.87	4,235 0.85	9,364 1.87	4,156 0.83	500,617

STATE	1	2-4	5-9	10-19	20-49	50+	State Total
	Count %	Count %	Count %	Count %	Count %	Count %	
Maine	313,513 89.12	22,249 6.32	4,876 1.39	3,021 0.86	5,471 1.56	2,669 0.76	351,799
Maryland	176,256 91.44	9,887 5.13	2,353 1.22	1,905 0.99	1,454 0.75	893 0.46	192,748
Massachusetts	106,937 85.38	12,658 10.11	1,928 1.54	1,003 0.80	1,602 1.28	1,127 0.90	125,255
Michigan	562,112 91.97	27,422 4.49	7,035 1.15	5,855 0.96	5,380 0.88	3,375 0.55	611,179
Minnesota	509,392 92.44	17,408 3.16	5,925 1.08	7,625 1.38	8,548 1.55	2,135 0.39	551,033
Mississippi	401,714 91.09	25,141 5.70	2,967 0.67	2,560 0.58	6,010 1.36	2,600 0.59	440,992
Missouri	722,478 92.84	27,001 3.47	5,900 0.76	7,907 1.02	9,023 1.16	5,862 0.75	778,171
Montana	244,183 85.45	21,340 7.47	5,415 1.90	4,488 1.57	5,878 2.06	4,441 1.55	285,745
Nebraska	203,126 92.76	5,746 2.62	1,839 0.84	2,132 0.97	3,713 1.70	2,420 1.11	218,976
Nevada	144,066 79.52	10,795 5.96	2,426 1.34	2,484 1.37	4,453 2.46	16,955 9.36	181,179
New Hampshire	162,307 84.48	16,648 8.67	4,592 2.39	2,503 1.30	3,735 1.94	2,334 1.21	192,119
New Jersey	93,257 90.90	6,213 6.06	1,754 1.71	958 0.93	215 0.21	199 0.19	102,596
New Mexico	296,004 86.39	27,271 7.96	4,397 1.28	3,374 0.98	5,663 1.65	5,913 1.73	342,622
New York	894,325 86.47	82,993 8.02	14,775 1.43	10,394 1.00	15,554 1.50	16,219 1.57	1,034,260
North Carolina	1,426,985 90.44	87,014 5.51	16,795 1.06	15,530 0.98	19,107 1.21	12,383 0.78	1,577,814
North Dakota	129,664 87.56	6,530 4.41	2,880 1.94	2,866 1.94	3,566 2.41	2,579 1.74	148,085
Ohio	390,567 88.76	27,930 6.35	4,760 1.08	4,031 0.92	6,779 1.54	5,967 1.36	440,034
Oklahoma	571,750 94.34	14,982 2.47	3,185 0.53	3,339 0.55	6,492 1.07	6,298 1.04	606,046
Oregon	119,221 86.40	8,947 6.48	1,750 1.27	1,675 1.21	3,019 2.19	3,369 2.44	137,981
Pennsylvania	928,646 95.63	30,128 3.10	4,922 0.51	2,387 0.25	3,305 0.34	1,735 0.18	971,123
Rhode Island	1,493 97.71	29 1.90	6 0.39	---	---	---	1,528

STATE	1	2-4	5-9	10-19	20-49	50+	State Total
	Count %	Count %	Count %	Count %	Count %	Count %	
South Carolina	462,359 91.33	25,909 5.12	3,808 0.75	3,287 0.65	5,867 1.16	5,027 0.99	506,257
South Dakota	147,619 90.58	5,409 3.32	2,370 1.45	2,282 1.40	3,203 1.97	2,083 1.28	162,966
Tennessee	584,891 91.07	34,662 5.40	5,818 0.91	5,633 0.88	7,060 1.10	4,206 0.65	642,270
Texas	1,604,666 91.65	70,982 4.05	10,363 0.59	10,068 0.57	21,463 1.23	33,415 1.91	1,750,957
Utah	128,463 84.57	6,802 4.48	1,789 1.18	2,262 1.49	4,533 2.98	8,051 5.30	151,900
Vermont	148,594 88.24	13,202 7.84	3,428 2.04	1,414 0.84	1,156 0.69	601 0.36	168,395
Virginia	778,261 93.01	35,536 4.25	6,948 0.83	6,014 0.72	5,380 0.64	4,651 0.56	836,790
Washington	134,582 86.02	9,998 6.39	2,869 1.83	2,847 1.82	3,638 2.33	2,524 1.61	156,458
West Virginia	575,770 93.55	21,891 3.56	5,561 0.90	3,638 0.59	4,709 0.77	3,905 0.63	615,474
Wisconsin	268,868 85.46	22,493 7.15	8,131 2.58	6,666 2.12	5,807 1.85	2,647 0.84	314,612
Wyoming	54,931 84.46	5,161 7.94	1,328 2.04	957 1.47	856 1.32	1,802 2.77	65,035
Puerto Rico	1,353,562 100.00	---	---	---	---	---	1,353,562