Census 2000 Evaluation F.10
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Evaluation of the Update/Leave Operation

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.

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EXECUTIVE SUMMARY

For Census 2000 the country was divided into nine type of enumeration areas, determined by address types and special enumeration procedures. The primary enumeration methodology was Mailout/Mailback, used in areas that have predominantly city-style addresses like 121 Main Street. The second largest enumeration methodology, in terms of number of questionnaires, was Update/Leave. Update/Leave is intended for use in areas with some addresses that are not city-style. Noncity-style addresses, such as Rural Route and Box or Post Office Box, are often not linked to the physical location of the housing unit. When there is only a location description for a unit but no address, mail delivery of the questionnaire is not a possibility. Update/leave areas are primarily rural but not too remote or sparsely populated. Designations of update/leave areas are made by block. In Puerto Rico, update/leave was the sole enumeration area.

In the Census 2000 Update/Leave operation, questionnaires with preprinted address labels were hand-delivered to every housing unit on the address list. Existing housing units that were not listed on the address register also required questionnaires, but these questionnaires were hand-addressed and added to the address register. Since staff were in the field delivering the questionnaires, they could also make other updates to the address list and to the maps during the Update/Leave operation.

Our evaluation seeks to quantify the Update/Leave operation as one means of assessing its effectiveness and value to the census-taking process. A profile of the addresses included in the Update/Leave operation is part of our assessment.

How big was the Update/Leave operation?

There were 23,525,257 addresses in stateside Update/Leave operations and 1,471,225 in Puerto Rico. This number represents how many addresses had either a labeled questionnaire that was to be distributed during Update/Leave or a hand-addressed questionnaire for a unit that was added to the address list during the Update/Leave operation. Questionnaires were to be distributed to all housing units appearing within Update/Leave areas. Some of the addresses on the Update/Leave address list were deleted as nonexistent or nonresidential in the Update/Leave operation, and their labeled questionnaires were not delivered. This is included in the workload calculation in this evaluation because it takes time and effort to try to locate such housing units.

Stateside Update/Leave operations added 1,644,174 addresses, while Puerto Rico added 111,787 addresses during Update/Leave. The number of corrections in stateside areas was 9,045,814, with 751,156 in Puerto Rico. The number of deletes, either as nonexistent or as nonresidential, was 1,228,987 in stateside areas and 122,815 in Puerto Rico. In addition, some units that were deleted in Update/Leave were matched up by address matching with Update/Leave adds after processing; this resulted in 24,265 moves, all of which were stateside. Units on the address list for Update/Leave that did not receive any of these field actions were

said to be verified. There were 11,582,017 of these stateside and 485,467 of these in Puerto Rico.

What was the quality of the added addresses?

Not every address added in the Update/Leave operation was included in the census. Some records were not included because they did not contain sufficient address information for adding to the address list or data sufficient to be assigned to a block. Other added records were found in subsequent operations to represent housing units that did not exist in the designated block, either because the unit was nonexistent or because the unit existed in another block.

Of the 1,644,174 Update/Leave adds in the United States, 1,401,169, or 85.2 percent, were in the final Census counts. In Puerto Rico, 93,607 of the 111,787 added addresses, or 83.7 percent, were included in the counts.

What was the cost of the Update/Leave questionnaire delivery operation?

The total cost for all stateside Update/Leave activities as shown in the draft DMD Assessment Report of stateside Update/Leave was $130,005,399 (Medina and Butler, 2001). There were 23,525,257 addresses in the workload for the stateside Update/Leave operation. This gives an average cost per housing unit of $5.53.

Recommendations

Our analysis revealed large numbers of blocks in update/leave areas that were wholly covered on the Delivery Sequence File of addresses. Effort should be put into researching areas that could be converted to a mailout/mailback methodology.

More than half the units in the Update/Leave operation were adds, deletes, or corrections, rather than verified units. The number of corrections was particularly high. Some number of these corrections were to the occupant name and telephone number fields. These fields quickly become out of date. Processing of the Update/Leave operation did not occur in time for results to be fed into the Nonresponse Followup operation, but these fields are sometimes used by the Geography Division for matching after the Census operations. The Census Bureau should assess the value of updates to these fields. In addition, if over half the units required updates and extra processing, there may be some inefficiencies in the design of the address list-building operations in these areas.

Puerto Rico Update/Leave had higher percentages of adds, deletes and corrections than stateside Update/Leave operations Only 33 percent of the operation actions were verifications in Puerto Rico. A problem with the file from the Address Listing operation that preceded

Update/Leave may account for the additional work that was required during the Update/Leave operation in Puerto Rico. Further use of this file will continue to create high processing workloads.

1. BACKGROUND

The Update/Leave (U/L) operation is a major questionnaire delivery and address list-building operation for the decennial census. In general the U/L areas represent the rural but not too remote regions of the country. Determination of U/L areas depends on address types. City-style addresses have a house number and street name. Examples of noncity-style addresses are rural route and box numbers, post office box numbers, and general delivery and star route addresses. Some housing units do not even have addresses but can be identified only with location descriptions. Questionnaires are delivered to U/L units by hand and are to be mailed in by respondents. Updates are made to the address list and the maps while staff are in the field delivering the questionnaires.

1.1 The 1990 census

The plan in 1990 was for approximately 95 percent of the United States population to be enumerated by respondent-mailed questionnaires. Most of these questionnaires were in the mailout/mailback areas, which contained city-style addresses. The U/L areas were defined as areas where a majority of the addresses were noncity-style. The U/L universe constituted approximately 10 percent of the housing units, with more than 10 million questionnaires delivered under the Update/Leave methodology. An additional 400,000 units were added to the census during the Update/Leave operation.

1.2 Census 2000

The percent of housing units covered by the U/L methodology was close to 19 percent in Census 2000. One reason for the significantly higher percent of U/L in Census 2000 is that some areas that required special enumeration procedures in 1990 were designated as update/leave areas in 2000. Also the designation of U/L areas for Census 2000 did not build directly upon the designations used in 1990.

The selection of areas for the U/L enumeration methodology in Census 2000 depended upon address types. Areas known to have noncity-style addresses but not requiring special enumeration procedures were designated as U/L areas.

Those areas originally delineated as U/L areas for Census 2000 were designated as Type of Enumeration Area (TEA) 2 for Census 2000. Some areas that were originally Mailout/Mailback were later believed to have noncity-style addresses, and so were converted to U/L. These areas were designated as TEA 9. The different designation was made in order to be able to evaluate these areas separately for distinguishing characteristics or differences. In Puerto Rico, U/L was the only enumeration methodology, and TEA 2 was the only designation.

Housing units in the U/L areas were listed in a pre-census operation called Address Listing. This operation consisted of a complete canvass and listing of residential addresses in the U/L areas.

Map updates were an additional component of the operation. Housing units were denoted on the maps with location markers known as map spots. Map spot numbers for each housing unit structure were assigned on the address register and written on the maps. Additionally, maps were updated to include new features and changes in features and feature names. Housing unit records from this operation were considered to be invalid for any operation subsequent to Address Listing or for the Census without an address and a map spot number.

There was a cooperative effort with participating governmental units (GUs) to check the address list before the Census. This cooperative program was called Local Update of Census Addresses (LUCA). In the U/L areas, the Census Bureau sent to the GUs housing unit counts for each block in the area covered by the GUs. These block-level housing units counts were determined from Address Listing. The GU could challenge the count for any block, and Census Bureau staff were sent to do a dependent listing of challenged blocks. During this operation, known as LUCA 1999 Relisting, staff could make minor address corrections, delete addresses, and designate units as nonresidential, in addition to adding addresses.

The Master Address File (MAF) is the address list maintained by the Census Bureau. In the different TEAs, it is fed by different address list-building operations. In the U/L areas, the address list-building operations, in chronological order, were Address Listing, LUCA 1999 Relisting, Update/Leave, Nonresponse Followup (NRFU), and Coverage Improvement Followup (CIFU). The initial address list for Census 2000 was created after Address Listing and LUCA 1999 Relisting. This address list was the Decennial Master Address File (DMAF), which is the list of all addresses that were at some point considered to be valid for the Census. It was used for control of Census operations. The initial DMAF was created in July 1999 for the purposes of the printing of questionnaires with address labels; the status of any unit depended upon the action codes assigned in the list-building operations. Updates to the MAF occurred after every operation, and updates to the DMAF were made to support the printing of address lists in subsequent Census operations. Addresses designated as good addresses for the Census during the creation of the initial DMAF were included in the printing of questionnaires with address labels. In the U/L areas, these addresses appeared on the listing pages for the U/L operation and were designated to receive the preprinted questionnaires.

Units that were deleted in LUCA 1999 Relisting were not deliverable to the DMAF[1]. Other address updates and additions from LUCA 1999 Relisting were reflected in the U/L address list and on the labeled questionnaires. There were some LUCA 1999 Relisting updates that occurred after the creation of the initial DMAF and were incorporated into later updates.

There was an appeals process for the LUCA 1999 Relisting operation. Detailed feedback/final

[1] One guiding rule for the creation and maintenance of the DMAF was that addresses with some evidence of their existence had to be deleted by two subsequent operations in order to be kept off the Census 2000 address list or be excluded from later operations. LUCA 1999 Relisting actions of delete are the exception to this rule of two deletes for nondeliverability to the DMAF.

determination materials from the LUCA 1999 Relisting operation were sent to the participating governmental units, which could appeal the status of particular records in blocks that had been challenged. The Census Address List Appeals Office made an independent determination of the status of appealed records; the results of the appeals were incorporated into the DMAF after the initial delivery on a flow basis.

The U/L operation consisted of a dependent listing of the addresses in conjunction with the delivery of a questionnaire to every housing unit. Questionnaire delivery began on March 3, 2000, with the intent that all questionnaires were to be delivered by Census Day, April 1, 2000. In actuality some questionnaires were delivered earlier than March 3 during training exercises. In addition the operation was not complete in some areas until April 6, 2000.

During the U/L operation, field staff could make corrections, deletions and additions on the address lists and maps. The enumerators could also designate units as nonresidential, or commercial. Nonresidential actions are categorized as deletes in this evaluation. Corrections could be made to some of the address data as well as to personal data such as respondent name or telephone number. If an enumerator believed a house number to be in error, a delete and an add were required. Housing units added to the address list required a hand-labeled questionnaire rather than a questionnaire with a preprinted label. The address registers and maps were sent to the National Processing Center for keying and map scanning, respectively. After the keying, if a delete in one block matched an add in another block within the same zip code, according to an address-matching program, the action taken on the unit was considered to be a move.

There was no time for processing and printing the map updates between the U/L operation and NRFU, so U/L maps were copied three times in the Local Census Offices (LCOs) and stored before the U/L operation. Maps with changes from U/L were copied, and the stored copies were then replaced with the copied maps. Maps and address registers from the U/L operation were sent to the National Processing Center for digitization and keying. The keying of the address registers occurred between March 8 and May 15, and map digitization took place from April 17 to September 15. Sometimes the results from the map updates and the address list updates needed to be reconciled at the end.

2. METHODOLOGY

The March 2001 MAF extracts were used to answer questions about the address list for this evaluation. These files indicate the final Census status of all units ever delivered to the DMAF. There are universe and operation flags on these files that are used for tabulations of the characteristics of interest, with limitations brought on by inconsistencies in the determination of flag values. The characteristics are discussed below.

The universe of units in the U/L operation workload is the set of units that appeared on the U/L address listing pages (and had labeled questionnaires) and the units that were added in U/L. Not all U/L adds were ultimately in the Census. Some added units did not have the appropriate data to be included on the Census 2000 address list, while others were deleted in later operations. Also, a certain percent of units included on the U/L address listing pages were deleted or corrected in later operations. This analysis will use the total number of U/L operation adds, since this gives an indication of how much work was required to add units during the operation. We give separate tallies indicating how many of the adds were deliverable to the DMAF and how many were ultimately in the Census. We do not classify those units that appeared on the address list for U/L by their Census status because the units did not originate in U/L, and U/L was only one operation used for the determination of their final status.

There are some errors in the identification of DMAF-deliverable units. The impact on this evaluation is that there are 465 anomalous U/L adds that are flagged as in the Census but were not deliverable to the DMAF. Logically, all units that are in the Census should be DMAF-deliverable. Due to some of these flag inconsistencies, erroneous conclusions result from using the intersections of conditions on variables to define certain universes. This is also a limitation of the results.

For addresses on the operation list, we restrict our analysis to those addresses that were deliverable to the DMAF. Identification of the file of the universe of units in U/L was problematic because of missing verify codes for the Update/Leave action code field. Action codes of verify and blank have to be considered the same for the purposes of this evaluation, but blank action codes have to be identified somehow as units belonging to the U/L operation. There is a flag on the MAF that indicates units that were on the initial address list for U/L questionnaire delivery (ICALUNIV=2). When the universe identified by this flag was compared to the universe created from units that had a nonblank U/L action code, there were more corrections, deletes, moves, and nonresidential units on the file from nonblank U/L actions. Thus, it was necessary to create the universe of addresses in the U/L operation by picking those units in the U/L TEAs, 2 or 9, that met either of the following two conditions - the ICALUNIV flag was set to 2 or the U/L action code was nonblank. By defining this universe using a nonblank action code, U/L adds are part of the list of addresses in the evaluation file, and all units on which action was taken in U/L are included in the analysis.

Data on operation costs come from the draft Assessment Report of Update/Leave and Urban Update/Leave by Medina and Butler.

Definitions of the characteristics that will be profiled in this evaluation:

1. 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 either a complete city-style or a complete 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 U.S. Census Bureau, 2001a.

2. Another variable of interest is the size of basic street address, or number of units at one address. This evaluation looks at the distribution of the size of basic street address for the U/L universe and within the different operation action codes using the variable NUMUNITS from the MAF extract. This variable calculates the number of addresses at the same basic street address that were DMAF-deliverable.

3. 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 jointly by the Planning, Research, and Evaluation Division (PRED) and the Decennial Statistical Studies Division (DSSD). This variable identifies the first operation or file to add the address to the MAF, with the following three qualifications:

1. If one operation added an address, but a later operation also identified the address in a different TEA, the first operation does not receive credit for adding this address.

2. An address may not have sufficient operation information to indicate how the address was added to the MAF.

3. 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 U.S. Census Bureau, 2001b.

4. In this evaluation we look for geographic clustering. Geography has been tallied using the following variables:

The EST (evaluation state), ECO (evaluation county), CBLKN (collection block) and CBLKNS (collection block suffix)

These variables are subject to the following qualifications and limitations:

The EST and ECO variables do not exist on the MAF extracts produced by the Geography Division (GEO). They have been created for evaluations, using the current state and original state variable values on the MAF. They are defined to be the current state and current county when those fields have a value and are otherwise the original state and original county variables values. These variable values represent the values of tabulation state and tabulation county, which do not otherwise appear on the MAF.

The CBLKN and CBLKNS variables are the fields that contain the data about the block numbers that were in use during the U/L operation. There are also tabulation block numbers on the MAF, but there were some changes to the MAF after the U/L operation that have an impact on numbers of units in a block. The Census Block variable also could not be used because it is no longer filled after tabulation block values are assigned.

3. LIMITATIONS

There are several limitations to this evaluation, related to use of the MAF extracts for the analysis and to errors that occurred in the processing of Census 2000 address lists.

3.1 Comparison of 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 the number of units at the basic street address. In Census 2000, we defined the number of units at the basic street address based on an address-level algorithm. In 1990, we defined the number of units at the structure based on the respondent's answer to a census question on this topic.

3.2 Questionnaire Delivery action code of verify

Every existing unit on the U/L address list was supposed to receive a check mark in U/L to verify its existence. These codes were entered in field operations with the expectation that they would be keyed. Unfortunately the verify action codes were not keyed and subsequently were not processed as U/L verifies when the operation action codes were passed back to the MAF. Inexplicably there are 103 U/L verifies in the MAF. Since they do not represent the operation, they can only be tallied, not used for any evaluation. This has implications for the definition of the universe for this analysis, as discussed in the Methodology section.

Thus, it was necessary to create the universe of addresses in the U/L operation by picking those units in the U/L TEAs, 2 or 9, that met either of the following two conditions - the Initial Census Address List flag indicated that the unit was on the initial list (ICENADLF = 2) OR the U/L action code was nonblank, indicating some action was taken during the operation. The problems with the MAF flags are also a limitation of this evaluation. This definition of the universe does not take DMAF-deliverability into account. Although it is logically inconsistent that units listed as being a part of the initial U/L universe or that have an action code from the operation would not be DMAF-deliverable, there are seven records in the stateside U/L universe file that are not DMAF-deliverable. This is a further limitation of these results.

3.3 Processing problems with Address Listing files from Puerto Rico

Almost all units in Puerto Rico are designated as single units because of a file transfer problem that occurred during the processing of the Address Listing files from 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 stateside operation, 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 stateside files, 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 anyway and there were unexpected address configurations such as urbanization[2] appearing in the address field. As a result, the DSCMO and the GEO 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. The effects on the Puerto Rico files are:

1. The U/L operation did not result in any block moves, since address matching could not occur.
2. Almost all units are single units because matching of city-style addresses is used to identify multi-unit structures. Therefore we do not have an accurate indication of the number of multi-unit housing units in Puerto Rico.

3.4 Overstatement of the Size of Basic Street Address

The MAF variable NUMUNITS, which gives the size of the basic street address for every unit on the MAF, was assigned at the time the unit was deliverable to the DMAF. It is possible that some units identified as part of the same structure by this means were duplicates and were deleted during subsequent census operations. The NUMUNITS variable is not recalculated to account for deleted units.

On the other hand, the variable may be understated, as it is determined by matching on street address and is limited by our ability to match such addresses.

[2] Urbanization 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.

3.5 Inconsistency in some of the Deliverability Flags on the MAF

All U/L units that are in the Census should also be deliverable to the DMAF and in the U/L operation. However it was found that 465 U/L adds that were in the Census were not deliverable to the DMAF, according to the flags on the MAF. This is due to an error in the DMAF-deliverability flag. It is necessary at times to use the deliverability flag to define the universe of units for this evaluation. Therefore any error in that flag results in erroneous units in the universe.

3.6 Inclusion of units with surviving MAFIDs in the analysis

It is desired for this evaluation to have a tally of all the units that were included as part of the operation, but the assignment of the flags precludes this from being done correctly. Surviving MAFIDs were assigned when units were merged. When a unit was merged with another, the flags from both units were included on both records. Thus a tally of units with a particular action code will overstate the true number of those actions. However, the exclusion of merged units from the tallies understates the number of units receiving the action in the operation because some of those units are merged at a later point in time.

The number of merged units is comparatively small - only 3,038 U/L adds, 613,802 U/L corrections and 7,123 U/L deletes - so for this evaluation we have chosen to include the merged units in the tallies.

4. RESULTS

4.1 How many addresses were encompassed by the U/L operation?

Addresses included as part of the U/L operation are tallied in Table 1. All of Puerto Rico was handled as a U/L area. In Puerto Rico the universe of units in the U/L operation accounts for all of the census housing units except units added in later operations. Stateside the story is different. While most of the land area is outside of mailout/mailback areas, most of the housing units are handled using the mailout/mailback methodology. Still, a large number of units were processed in U/L areas - more than 23.5 million. We also see from Table 1 that U/L operation adds were about 7.0 percent of the stateside workload but 7.6 percent of the Puerto Rico workload.

Table 1: Addresses in Update/Leave areas

	Total U/L workload	Addresses on the listing pages for the U/L operation	Addresses added during the U/L operation	Percent of U/L workload that is adds
Total	24,996,482	23,240,521	1,755,961	7.0
Stateside	23,525,257	21,881,083	1,644,174	7.0
Puerto Rico	1,471,225	1,359,438	111,787	7.6

Data source: March 2001 MAF extract

Most of the tables that follow give tabulations of the characteristics that will be tallied for U/L action codes as part of this evaluation. The tables in this first section are presented as a means to compare results between U/L action codes. Differences in distribution of these characteristics between the U/L action codes could indicate problems with the address list or changes that occurred between the Address Listing and LUCA 1999 Relisting operations and the U/L questionnaire delivery. The sections that follow will have the stateside tallies of address type, size of BSA, TEA, and Original Source within the specific operation action codes of add, correct, delete or nonresidential, and geographic move. A later section has these same tallies for Puerto Rico.

It is important to understand some details about the assignment of the operation action codes. Any units appearing on the address list in an incorrect block, or misgeocoded units, should have been deleted from the block assignment during the U/L operation and added to the correct block. Identifying the unit as a geographic move depends upon the ability to match the deleted address to the added address. This matching is possible only for units with city-style addresses that match exactly. Misgeocoded units without matchable city-style addresses or that otherwise were not matched will appear in the tallies of the adds and of the deletes. Therefore the adds and deletes represent coverage errors as well as some percentage of the geocoding errors at the time of the creation of the U/L address list. Corrections were assigned whenever any data field for a particular record was changed, including phone number and occupant name. Some places

underwent wholesale telephone area code changes, requiring a correction to almost every unit. It is not possible using the codes on the MAF to separate address corrections from respondent data corrections.

In the next table we have the breakdown of the total U/L operation universe by the operation action codes. Table 1 had results on numbers of U/L adds and their proportion of the U/L workload. In Table 2, we also see that there are many corrections - about 38.5 percent of the stateside workload and 51.1 percent of the workload in Puerto Rico. In Puerto Rico, there was the problem with the address fields, which presumably resulted in the large number of corrections. Starting with Table 2, the delete and nonresidential action codes are grouped together because they were treated similarly in the operation.

Table 2: Update/Leave Actions

	Update/Leave Action Codes					
	Total	**Add**	**Correction**	**Delete***	**Move**	**Verify****
Total	24,996,482	1,755,961	9,796,970	1,351,802	24,265	12,067,484
Stateside	23,525,257	1,644,174	9,045,814	1,228,987	24,265	11,582,017
Puerto Rico	1,471,225	111,787	751,156	122,815	0	485,467

Data source: March 2001 MAF extract

* U/L action delete denotes operation delete and nonresidential actions

** U/L action code verify is mostly blank actions

In Table 3 we show the percent of workload that was in each operation action. We note that the percent of corrections is very high. In Puerto Rico, the percentage of adds, corrections and deletes is even higher than for stateside operations. Corrections account for more than 50 percent of the Puerto Rico workload. This inefficiency likely stems from the processing problem with the files from Address Listing.

Table 3: Update/Leave Actions as a Percent of Operation

	Update/Leave Action Code Percent of Workload					
	Total	**Add**	**Correction**	**Delete***	**Move**	**Verify****
Total	100.0	7.0	39.2	5.4	0.1	48.3
Stateside	100.0	7.0	38.5	5.2	0.1	49.2
Puerto Rico	100.0	7.6	51.1	8.4	0.0	33.0

Data source: March 2001 MAF extract

* U/L action delete denotes operation delete and nonresidential actions

** U/L action code verify is mostly blank actions

In the following table we show the states with the highest U/L workloads. For comparison, we also give the total number of DMAF-deliverable addresses in those states. Determining if the workloads are particularly high in an area involves looking both at total numbers and at relative percents. There is much variation in the total workload even within the highest five states. Texas had twice as many units in its workload as did Pennsylvania. We see that the percent of the state covered by U/L in these states ranges from less than thirteen to more than 45, with the extremes in New York and North Carolina. Puerto Rico's workload is comparable to the highest state workloads, but all of Puerto Rico was covered by U/L.

Table 4: Number of Housing Units in Workload by State - five highest values

State	Total U/L Workload	Total Workload	U/L as percentage of state workload
Texas	1,883,633	8,792,996	21.4
North Carolina	1,743,678	3,857,390	45.2
New York	1,084,600	8,529,607	12.7
Georgia	1,028,963	3,708,750	27.7
Pennsylvania	967,824	5,732,579	16.9

Data source: March 2001 MAF extract

The sections that follow give the attribute distributions by operation action code for stateside units. In the next two tables we have the overall operation counts as a basis for comparison of counts and percents. First we list the distribution of the size of the basic street address for all units included as part of the stateside U/L operation. Here we note that overall a little over 10 percent of units belong to multi-unit structures, as identified by address matching.

Table 5: Size of Basic Street Address for units in Update/Leave

Size of Structure	Number	Percent
Total	23,525,257	100.0
Single unit	21,021,465	89.4
Multi-unit	2,503,792	10.6
2 - 4 units	1,299,840	5.5
5 - 9 units	260,909	1.1
10 - 19 units	230,303	1.0
20 - 49 units	337,109	1.4
50+ units	375,631	1.6

Data source: March 2001 MAF extract

Table 6 gives the distribution of addresses by TEA for stateside U/L areas. The TEA 2 accounts for the vast majority of U/L addresses, about 98 percent.

Table 6: Update/Leave addresses by TEA

TEA	Number	Percent
Total	23,525,257	100.0
2	23,034,580	97.9
9	490,677	2.1

Data source: March 2001 MAF extract

One further tabulation we make in this evaluation is of the operation responsible for adding the units to the MAF. We will show these tallies only by operation action, not for the U/L universe. The operation action of "add" acts as an explanatory variable for the Original Source, thus confounding the results for the universe of cases.

4.2 What is the profile of the address records added during this operation?

To examine the quality of units added in U/L, we tally these units according to DMAF-deliverability and final Census 2000 status. Certain criteria had to be met for operation adds to be included on the Census 2000 address list. More stringent criteria were incorporated at the time of NRFU and CIFU to determine units for inclusion in the census, depending on the status of units included in these followup operations. We see that most units added in U/L are deliverable to the DMAF - 99.6 percent in stateside files and 100 percent of the Puerto Rico

adds. A lower percent of the adds are in the Census - down to 85.2 percent stateside and 83.7 percent in Puerto Rico. We will not be showing the DMAF-deliverable and In Census tallies for the other U/L action codes because other operations are responsible for bringing these units onto the address list.

Table 7: Quality of Update/Leave operation adds

	On the MAF	Deliverable to the DMAF		In Census	
		Number	Percent	Number	Percent
Total Adds	1,755,961	1,748,617	99.6	1,494,766	85.1
Stateside	1,644,174	1,636,830	99.6	1,401,169	85.2
Puerto Rico	111,787	111,787	100.0	93,607	83.7

Data source: March 2001 MAF extract

While logically there should not be any U/L adds in the Census but not deliverable to the DMAF, there are 465 of these in stateside files as of the March 2001 extract.

Below, we profile all the U/L added addresses in stateside files according to Address Type, Size of Basic Street Address, TEA, and the Original Source of the address. First, in Table 8, we give the distribution of address type for U/L adds. All address types other than city-style are supposed to be accompanied by a physical location description. While close to 65 percent of the adds are city-style addresses, still almost 25 percent of the addresses are location description or no address information at all. Most of the units without city-style addresses also have a location description. State numbers are shown in Appendix A.

Table 8: Update/Leave adds by Address Type

Type of Address	Number	Percent
Total	1,644,174	100.0
with location description	520,913	31.7
without location description	1,123,261	68.3
Complete City-Style Address	1,066,050	64.8
with location description	7,492	0.5
without location description	1,058,558	64.4
Complete Rural Route Address	71,677	4.4
with location description	65,681	4.0
without location description	5,996	0.4
Complete Post Office Box Address	41,498	2.5
with location description	37,408	2.3
without location description	4,090	0.2
Incomplete Address	56,379	3.4
with location description	11,016	0.7
without location description	45,363	2.8
No Address Information	408,570	24.8
with location description	399,316	24.3
without location description	9,254	0.6

Data source: March 2001 MAF extract

Table 9 shows the distribution of size of basic street address for the units that were added in U/L. Here we have a higher percent of multi-units than in the U/L universe. For adds, 14.6 percent are multi-units, whereas only 10.6 percent of the units in U/L are multis.

Table 9: Update/Leave adds by Size of Basic Street Address

Size of Structure	Housing Units	
	Number	Percent
Total	1,644,174	100.0
Single unit	1,404,170	85.4
Multi-unit	240,004	14.6
2 - 4 units	132,741	8.1
5 - 9 units	22,881	1.4
10 - 19 units	20,517	1.3
20 - 49 units	23,747	1.4
50+ units	40,118	2.4

Data source: March 2001 MAF extract

In Table 10, we break down the U/L adds by TEA. As in the U/L universe tallied in Table 6, almost all units are in TEA 2. The percents are comparable with the U/L universe tallies.

Table 10: Update/Leave adds by TEA

TEA	Housing Units	
	Number	Percent
Total	1,644,174	100.0
2	1,603,792	97.5
9	40,392	2.5

Data source: March 2001 MAF extract

In Table 11, we show the distribution of Original Source for units added during U/L. Most units added during U/L should have an Original Source of U/L, but because of geographic or processing problems, not all of them do. There are over 53,000 units that show up as Address Listing units, as well as small numbers in other contributing operations. The most likely explanation for the Address Listing units is that the two operations added the units in different blocks, then the units were matched on address after U/L and found to be the same. There are 1274 units that have LUCA Relisting or LUCA Appeals and U/L as original sources; these represent units that would have been found in U/L without the LUCA process. Evaluation of these operations together would yield more complete results about their interactions. The final topic report on Address List Development in Census 2000 will examine operation interactions.

Table 11: Update/Leave adds by Original Source

Original Source	Housing Units	
	Number	Percent
Total	1,644,174	100.0
Address Listing	53,288	3.2
LUCA 99 Relisting	973	<0.1
Update/Leave	1,589,043	96.6
Special Place/Group Quarters	13	<0.1
LUCA 99 Appeals and Update/Leave	301	<0.1
LUCA 1998	6	<0.1
Unknown - TEA 2	1	<0.1
Unknown - TEA 9	1	<0.1

Data source: March 2001 MAF extract

Now we look for geographic clustering of the adds. In Table 12 we show the highest numbers of adds per state and the percent of housing units in the state workload that these adds represent. While Texas has the highest number of adds, North Carolina has almost as many adds, and these adds make up a much larger percentage of the U/L workload.

Table 12: Number of Update/Leave adds per state - five highest values

State	Total Adds	Total workload	U/L adds as percent of workload
Texas	164,128	8,792,996	1.9
North Carolina	125,594	3,857,390	3.3
Georgia	76,526	3,708,750	2.1
New York	62,865	8,529,607	0.7
Virginia	60,783	3,071,978	2.0

Data source: March 2001 MAF extract

4.3 What is the profile of the address records corrected during this operation?

First we profile the address type of units that received corrections in U/L. Almost 77 percent of the address records receiving corrections were city-style addresses. State level data are in Appendix B.

Table 13: Update/Leave corrections by Address Type

Type of Address	Number	Percent
Total	9,045,814	100.0
with location description	4,086,291	45.2
without location description	4,959,523	54.8
Complete City-Style Address	6,957,362	76.9
with location description	2,053,447	22.7
without location description	4,903,915	54.2
Complete Rural Route Address	835,886	9.2
with location description	825,579	9.1
without location description	10,307	0.1
Complete Post Office Box Address	329,058	3.6
with location description	318,529	3.5
without location description	10,529	0.1
Incomplete Address	113,048	1.2
with location description	78,480	0.9
without location description	34,568	0.4
No Address Information	810,460	9.0
with location description	810,256	9.0
without location description	204	<0.1

Data source: March 2001 MAF extract

In Table 14 we give the distribution of size of basic street address for U/L corrections. About 10 percent of the corrected units were in multi-unit structures.

Table 14: Update/Leave corrections by Size of Basic Street Address

Size of Structure	Housing Units	
	Number	Percent
Total	9,045,814	100.0
Single unit	8,142,274	90.0
Multi-unit	903,540	10.0
2 - 4 units	438,232	4.8
5 - 9 units	94,893	1.0
10 - 19 units	87,814	1.0
20 - 49 units	137,808	1.5
50+ units	144,793	1.6

Data source: March 2001 MAF extract

In Table 15 we show the TEA distribution for U/L corrections. Again the great majority are in TEA 2 areas.

Table 15: Update/Leave corrections by TEA

TEA	Housing Units	
	Number	Percent
Total	9,045,814	100.0
2	8,859,785	97.9
9	186,029	2.1

Data source: March 2001 MAF extract

In Table 16, we show the Original Source for U/L corrections. These values will vary dramatically from the Original Source of U/L adds because we expect questionnaire delivery to be the source of addresses that are added in U/L, while other operations have to bring in the addresses that receive corrections in U/L. Here Address Listing added the largest number, but LUCA 99 Relisting also contributed a sizable number of the units that were corrected in U/L. It is not shown here if the number of U/L corrections attributable to LUCA 99 Relisting is disproportionate to the number of addresses contributed by the LUCA 99 Relisting operation.

Table 16: Update/Leave corrections by Original Source

Original Source	Housing Units	
	Number	Percent
Total	9,045,814	100.0
1990 ACF	1	<0.1
Dress Rehearsal	1,924	<0.1
Address Listing	8,918,095	98.6
LUCA 99 Relisting	125,791	1.4
LUCA 98	1	<0.1
LUCA 98 and Delivery Sequence File (DSF) 2	1	<0.1
Block Canvassing	1	<0.1

Data source: March 2001 MAF extract

4.4 What is the profile of the address records deleted during this operation?

As shown in Table 2, there were 1,228,987 deletes in stateside U/L operations. We profile the deletes by address type in Table 17. We see a smaller percentage of city-style addresses among deletes, as compared to adds and corrections. State level data are in Appendix C.

Table 17: Update/Leave deletes by Address Type

Type of Address	Number	Percent
Total	1,228,987	100.0
with location description	608,518	49.5
without location description	620,469	50.5
Complete City-Style Address	697,273	56.7
with location description	97,492	8.0
without location description	599,781	48.9
Complete Rural Route Address	66,688	5.4
with location description	64,582	5.3
without location description	2,106	0.2
Complete Post Office Box Address	31,383	2.6
with location description	29,232	2.4
without location description	2,151	0.2
Incomplete Address	20,652	1.7
with location description	4,246	0.3
without location description	16,406	1.3
No Address Information	412,991	33.6
with location description	412,966	33.6
without location description	25	<0.1

Data source: March 2001 MAF extract

In Table 18 we examine the distribution of single and multi-units for U/L deletes. We see that a larger percent of the deletes are within multi-unit structures, compared to the adds and corrections.

Table 18: Update/Leave deletes by Size of Basic Street Address

Size of Structure	Housing Units	
	Number	Percent
Total	1,228,987	100.0
Single unit	1,008,838	82.1
Multi-unit	220,149	17.9
2 - 4 units	160,610	13.1
5 - 9 units	15,909	1.3
10 - 19 units	11,558	0.9
20 - 49 units	15,228	1.2
50+ units	16,844	1.4

Data source: March 2001 MAF extract

In Table 19 we give the distribution of U/L deletes by TEA. Again, most units are in TEA 2.

Table 19: Update/Leave deletes by TEA

TEA	Housing Units	
	Number	Percent
Total	1,228,987	100.0
2	1,201,977	97.8
9	27,010	2.2

Data source: March 2001 MAF extract

What is the distribution of Original Source for U/L deletes? This is a very interesting issue for U/L deletes, because it gets at the issue of which operations result in incorrect housing units on the address list. Address Listing and LUCA 99 Relisting account for almost all of the units, and other operations contributed only nominal numbers of units that received delete actions in U/L. However, it is simplistic to look at these data strictly in terms of percentages, since Address Listing was the first operation, and subsequent operations dealt with only a fraction of the U/L universe.

The distribution of Original Source for U/L deletes is shown in Table 20. We see that many operations resulted in units that were deleted in U/L. Sometimes the Original Source of a unit does not make logical sense from the perspective of order of operations or TEA. Usually these occurrences represent situations in which the action code flags on a unit do not fit within an expected pattern. We would expect to find higher numbers of such situations within deleted units because a delete action from an operation indicates a problem with that unit.

Table 20: Update/Leave deletes by Original Source

Original Source	Housing Units	
	Number	**Percent**
Total	1,228,987	100.0
1990 ACF	10	<0.1
Address Listing	1,182,157	96.2
LUCA 99 Relisting	45,758	3.7
Dress Rehearsal	908	<0.1
NRFU	2	<0.1
LUCA 1998	9	<0.1
Unknown - TEA 2	2	<0.1
Block Canvassing	123	<0.1
DSF 1	18	<0.1

Data source: March 2001 MAF extract

4.5 What is the profile of the address records that underwent a geographic move in U/L processing?

Table 21 shows the distribution of address type for stateside U/L moves. It is surprising that there are any geographic moves that are not city-style addresses. This address matching should have been limited to complete city-style addresses. State level data are in Appendix D.

Table 21: Update/Leave geographic moves by Address Type

Type of Address	Number	Percent
Total	24,265	100.0
with location description	2,177	9.0
without location description	22,088	91.0
Complete City-Style Address	24,139	99.5
with location description	2,176	9.0
without location description	21,963	90.5
Complete Rural Route Address	1	<0.1
with location description	0	0.0
without location description	1	<0.1
Complete Post Office Box Address	3	<0.1
with location description	0	0.0
without location description	3	<0.1
Incomplete Address	122	0.5
with location description	1	<0.1
without location description	121	0.5
No Address Information	0	0.0
with location description	0	0.0
without location description	0	0.0

Data source: March 2001 MAF extract

In the following three tables we show the distributions of size of basic street address, TEA and Original Source for U/L moves. There are no surprising results here. We compare the distributions of size of basic street address for all the action codes in the conclusion section.

Table 22: Update/Leave geographic moves by Size of Basic Street Address

Size of Structure	Housing Units	
	Number	Percent
Total	24,265	100.0
Single unit	20,607	84.9
Multi-unit	3,658	15.1
2 - 4 units	1,672	6.9
5 - 9 units	325	1.3
10 - 19 units	270	1.1
20 - 49 units	615	2.5
50+ units	776	3.2

Data source: March 2001 MAF extract

In Table 23 we see that there are no significant changes in TEA distribution for geographic moves. The distribution is about the same for adds, corrections, deletes, and moves. TEA did not differentially affect the actions taken in this operation.

Table 23: Update/Leave geographic moves by TEA

	Housing Units	
TEA	Number	Percent
Total	24,265	100.0
2	23,626	97.4
9	639	2.6

Data source: March 2001 MAF extract

In Table 24 we examine the Original Source distribution of the geographic moves. There are no unexpected operations contributing to moves, but we do see that both predecessor operations contributed geocoding errors.

Table 24: Update/Leave geographic moves by Original Source

	Housing Units	
Original Source	**Number**	**Percent**
Total	24,265	100.0
Address Listing	24,252	99.9
LUCA 99 Relisting	13	<0.1

Data source: March 2001 MAF extract

4.6 How many blocks in the U/L universe had city-style address only?

The U/L areas were delineated based on address information from the 1990 census and assigned a TEA of 2. Additional blocks were later added to the U/L operation as blocks with address problems were identified. A separate TEA of 9 was designated for the newly assigned U/L areas. TEAs 2 and 9 were treated the same for the operation, but the separate TEAs allow us to detail differences between the areas. A profile of addresses in U/L blocks yields information about how well the U/L areas were delineated and the differences between the TEAs. Such information is necessary to determine address list-building operations and enumeration methodologies for these areas in advance of the next Census. One criterion for creating TEA 9 blocks was evidence that a large percent of housing units in a block were not city-style. Therefore it is necessary to examine both the TEA 2 and TEA 9 blocks, separately and together, to see what the distribution of city-style addresses is.

The following table gives the distribution of percent of addresses in a block that were city-style. TEAs 2 and 9 are then examined separately. Overall we see that 843,543 blocks, or over 40 percent of the blocks were completely city-style, indicating a possible problem with TEA delineation. While the distributions within TEAs 2 and 9 are similar, TEA 9 has fewer blocks that are less than 50 percent city-style and more blocks that are 100 percent city-style, as compared to TEA 2. Yet there are over 1,000,000 blocks that are not 100 percent city-style, and most of those blocks are less than 50 percent city-style. This shows that there are still many blocks in which hand-delivery of questionnaires was required.

Table 25: Percent of city-style addresses in Update/Leave blocks that have addresses by TEA

Percent Addresses in Block that are City-Style	Total Number of Blocks with addresses	Percent of Blocks with addresses	TEA			
			Number of Blocks in TEA 2	Percent of Blocks in TEA 2	Number of Blocks in TEA 9	Percent of Blocks in TEA 9
Total	1,992,418	100.0	1,954,305	100.0	38,113	100.0
percent < 50	628,696	31.6	623,245	31.9	5,451	14.3
50 ≤ percent < 75	180,178	9.0	175,991	9.0	4,187	11.0
75 ≤ percent < 90	207,663	10.4	202,137	10.3	5,526	14.5
90 ≤ percent < 95	85,228	4.3	82,747	4.2	2,481	6.5
95 ≤ percent < 100	47,110	2.4	45,926	2.4	1,184	3.1
100 percent	843,543	42.3	824,259	42.2	19,284	50.6

Data source: March 2001 MAF extract

4.7 What percent of the Update/Leave universe consists of blocks with all addresses on the Delivery Sequence File?

The presence of city-style addresses is an insufficient indicator of where the mailout/mailback methodology could be used because not all city-style addresses are mailable. In order to get accurate indications of where city-style addresses were mailable, it is necessary to calculate the existence of addresses on the Delivery Sequence File (DSF). A high prevalence of addresses on the DSF is a key indicator of areas in which presumably the mailout/mailback enumeration methodology would have sufficed.

This analysis was performed using all the units in the U/L universe without regard to their final Census status. Therefore the calculations of DSF coverage of these areas are probably underestimates of DSF coverage of the existent addresses in these areas.

Our analysis here is not exhaustive. There were several DSFs from which addresses were taken, and the tallies here indicate only the presence of addresses on some or one of the first four DSFs. What the results in Table 26 indicate is a reasonably high number of blocks that could have been handled in Mailout/Mailback. However it is mostly the blocks with fewer addresses that are 100 percent on some DSF.

The tallies indicate the DSF coverage within blocks but not the geographic relationships between the blocks. For the purposes of efficient operations, the delineation should avoid creating single blocks or small areas using different enumeration methodologies. This analysis is intended only as an indicator of the feasibility of converting some areas to the mailout/mailback methodology.

Table 26: Blocks with 100 percent of addresses on some DSF by number of addresses in a block

Number of addresses in block	TEA 2 blocks that are 100% DSF	TEA 2 Total blocks with addresses	TEA 2 - Percent of blocks that are 100% DSF	TEA 9 blocks that are 100% DSF	TEA 9 Total blocks with addresses	TEA 9 - Percent of blocks that are 100% DSF
Total	295,795	1,954,305	15.1	5,830	38,113	15.3
1	105,021	335,883	31.3	2,218	5,469	40.6
2-9	156,711	1,001,180	15.7	3,170	18,717	16.9
10-19	24,630	331,376	7.4	356	7,447	4.8
20-59	8,849	234,134	3.8	83	5,420	1.5
60-99	424	33,735	1.3	1	723	0.1
100+	160	17,997	0.9	2	337	0.6

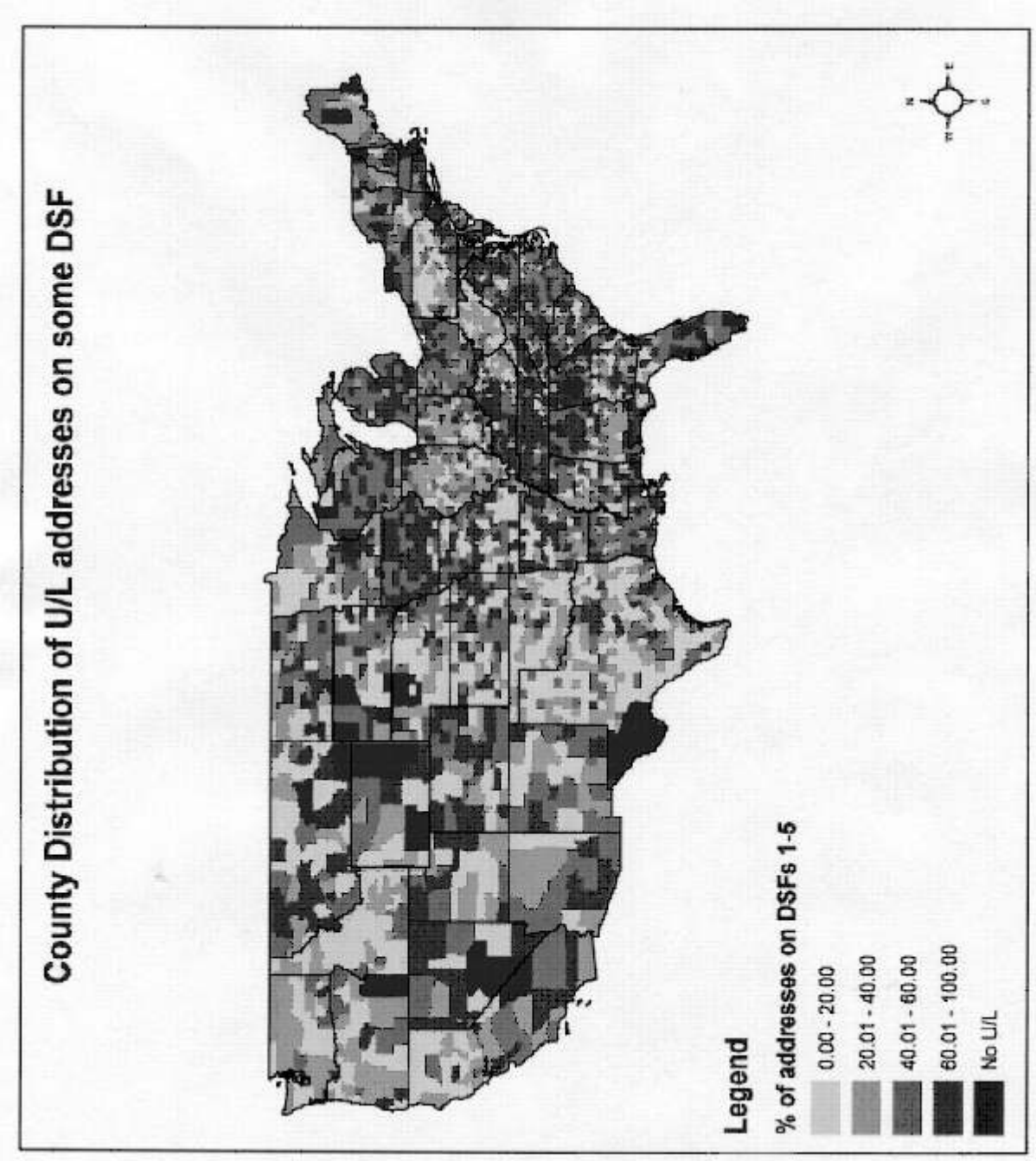
Data source: March 2001 MAF extract

On the map in Figure 1 (page 28) we show county levels of DSF addresses within the entire U/L universe for the lower 48 states. The map gives a starting point for determining U/L areas that could potentially be converted to mailout/mailback areas. Darker shading corresponds to heavier DSF coverage. Counties that are completely shaded did not have any U/L. This is either because the counties were mailout/mailback or because the areas required some special enumeration procedures, or even some combination of these possibilities. No entire U/L county had a higher rate of coverage on DSFs than 95 percent. Delineation of TEAs is done at the block level and depends on address type and geographic proximity of enumeration areas. Because of the variety of situations within every county, we could expect that no county with U/L has 100 percent coverage on the DSF.

By looking at the map we see a number of areas near metropolitan regions that have high levels of DSF coverage. These are prime candidates for conversions of blocks to mailout/mailback. In particular, the Atlanta metropolitan area, which is completely shaded because it is mailout/mailback, is surrounded by areas with high DSF coverage. The dark shading extends across into Alabama, up into Tennessee, and as far as Kentucky. Florida also has patches of these areas, while the circle around Minneapolis appears with high DSF coverage.

Other candidate areas for conversion are within entire states or large geographic areas that have high DSF coverage. For example, Iowa, Wisconsin, Michigan, Ohio, North Carolina and Virginia have large areas of high county-level DSF coverage. The map suggests that these states should be examined for large clusters of blocks or tracts that have 100 percent DSF coverage.

Figure 1: County Distribution of U/L addresses on some DSF



However, some of the areas that are dark on the map are actually List/Enumerate areas. The dark areas in Texas, Nevada, and Montana are remote rather than urban. These are not generally areas for consideration of conversion to the mailout/mailback methodology.

We have used this map to look for patterns of DSF coverage in anticipation of finding areas to convert to the mailout/mailback methodology. Hawaii, Alaska and Puerto Rico are not shown in this map because a map of these selected areas will not show these patterns. Additionally, in these areas the map could misrepresent the situation. In Hawaii the counties are more or less the islands; each one has a slightly different rate of coverage on the DSF. A county-level map of DSF coverage of U/L units in Alaska ignores the List/Enumerate activities and misrepresents the counties. In Puerto Rico, the addresses on our files are not matchable city-style addresses. We have elected to omit these maps rather than present misleading graphics.

4.8 How distributed are operation adds, corrections, and deletes?

We would like to examine the distribution of the number of added units per block, the number of units with corrections per block, and the number of deletes per block. In Table 27 we show that over 95 percent of blocks with adds had small numbers of adds (1-9), although there were 438 blocks that had more than 100 adds. Large numbers of adds can represent massive housing growth but more likely represent problems with the address list, in particular, geocoding errors.

Table 27: Stateside number of adds per block for blocks that have Update/Leave adds

Adds per Block	Blocks	
	Number	Percent
Total Number of Blocks with Adds	537,647	100.0
1 added unit	283,785	52.8
2 - 9 added units	228,586	42.5
10 - 19 added units	17,325	3.2
20 - 59 added units	6,856	1.3
60 - 99 added units	657	0.1
100+ added units	438	<0.1

Data source: March 2001 MAF extract

The number of corrections per block, shown in Table 28, has a more diffuse distribution than the number of adds per block. Corrections were made for both address updates and respondent name or phone number updates. Any area that had a telephone area code conversion would have large numbers of corrections.

Table 28: Stateside number of corrections per block for blocks that have Update/Leave corrections

Corrections per Block	Blocks	
	Number	Percent
Total Number of Blocks with Corrections	1,352,045	100.0
1 corrected unit	350,757	25.9
2 - 9 corrected units	763,979	56.5
10 - 19 corrected units	146,189	10.8
20 - 59 corrected units	79,076	5.9
60 - 99 corrected units	8,358	0.6
100+ corrected units	3,457	0.3

Data source: March 2001 MAF extract

The number of deletes per block, shown in Table 29, is skewed toward small numbers of deletes. The blocks with larger numbers of deletes most likely represent geocoding problems.

Table 29: Stateside number of Deletes per block for blocks that have Update/Leave deletes

Deletes per Block	Blocks	
	Number	Percent
Total Number of Blocks with Deletes	494,678	100.0
1 deleted unit	291,156	58.9
2 - 9 deleted units	190,125	38.4
10 - 19 deleted units	9,947	2.0
20 - 59 deleted units	3,094	0.6
60 - 99 deleted units	240	<0.1
100+ deleted units	116	<0.1

Data source: March 2001 MAF extract

4.9 What are the statistics for Puerto Rico?

In this section we give the same distributions with the same variables for the Puerto Rico file.

Because of the processing problems with the Puerto Rico Address Listing files, no U/L units have city-style addresses. Consequently there are no geographic moves in Puerto Rico. The next table gives the distribution of address type by U/L action for Puerto Rico. Almost all addresses fit into the location description category.

Table 30: Update/Leave action by Address Type - Puerto Rico

	Adds		Corrections		Deletes	
Type of Address	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Total of All Addresses	111,787	100.0	751,156	100.0	122,815	100.0
with location description	110,736	99.1	750,998	100.0	122,713	99.9
without location description	1,051	0.9	158	<0.1	102	0.1
Complete city-style	0	0.0	0	0.0	0.0	0.0
Complete Rural Route	12,924	11.6	159,093	21.2	16,555	13.5
with location description	12,707	11.4	158,980	21.2	16,467	13.4
without location description	217	0.2	113	<0.1	88	0.0
Complete Post Office Box	7,599	6.8	82,246	10.9	6,289	5.1
with location description	7,508	6.7	82,205	10.9	6,275	5.1
without location description	91	0.1	41	<0.1	14	0.0
Incomplete address information	31	0.0	143	<0.1	67	< 0.1
with location description	31	0.0	143	<0.1	67	< 0.1
without location description	0	0.0	0	0.0	0	0.0
No address information	91,233	81.6	509,674	67.9	99,904	81.3
with location description	90,490	80.9	509,670	67.9	99,904	81.3
without location description	743	0.7	4	<0.1	0	0.0

Data source: March 2001 MAF extract

All of the addresses on the Puerto Rico file that received correction or delete actions or were added in U/L are single units because matching of noncity-style addresses does not occur.

Puerto Rico had the same set of address list development operations as stateside U/L areas. The distribution of Original Source is similar to the stateside distribution, except there are no anomalous operations contributing units.

Table 31: Update/Leave action by Original Source - Puerto Rico

Original Source	Adds		Corrections		Deletes	
	Number	Percent	Number	Percent	Number	Percent
Total	111,787	100.0	751,156	100.0	122,815	100.0
Address Listing	0	0.0	747,579	99.5	119,775	97.5
LUCA 99 Relisting	0	0.0	3,577	0.5	3,040	2.5
Update/Leave	111,787	100.0	0	0.0	0	0.0

Data source: March 2001 MAF extract

We would also like to know the workload per block in terms of the number of adds, corrections and deletes. This distribution is shown in the tables below. Nearly 90 percent of the adds occur in blocks with fewer than ten adds.

Table 32: Number of adds per block for blocks that have Update/Leave adds - Puerto Rico

Adds per Block	Blocks	
	Number	Percent
Total Number of Blocks with Adds	21,403	100.0
1 added unit	7,731	36.1
2 - 9 added units	11,321	52.9
10 - 19 added units	1,434	6.7
20 - 59 added units	741	3.5
60 - 99 added units	103	0.5
100+ added units	73	0.3

Data source: March 2001 MAF extract

The numbers of corrections and deletes are more widely distributed, especially corrections. Few blocks had only one correction.

Table 33: Number of corrections per block for blocks that have Update/Leave corrections - Puerto Rico

Corrections per Block	Blocks	
	Number	Percent
Total Number of Blocks with Corrections	37,417	100.0
1 corrected unit	2,737	7.3
2 - 9 corrected units	13,939	37.3
10 - 19 corrected units	9,222	24.6
20 - 59 corrected units	9,241	24.7
60 - 99 corrected units	1,377	3.7
100+ corrected units	901	2.4

Data source: March 2001 MAF extract

Table 34: Number of deletes per block for blocks that have Update/Leave deletes - Puerto Rico

Deletes per Block	Blocks	
	Number	Percent
Total Number of Blocks with Deletes	22,783	100.0
1 deleted unit	7,980	35.0
2 - 9 deleted units	12,178	53.5
10 - 19 deleted units	1,647	7.2
20 - 59 deleted units	850	3.7
60 - 99 deleted units	84	0.4
100+ deleted units	44	0.2

Data source: March 2001 MAF extract

4.10 How much did the operation cost, total and per housing unit?

The total cost for stateside U/L as shown in the draft DMD Assessment Report of Update/Leave was $130,005,399 (Medina and Butler, 2001). There were 23,525,257 stateside addresses included in the U/L operation. This gives an average cost per housing unit of $5.53.

5. CONCLUSIONS

Analysis reveals that there are no huge differences in distributions of the Address Type, Size of Basic Street Address and TEA variables across the action codes. Some of the variation that did appear was in the distribution of Size of Basic Street Address across U/L action codes. Nearly 90 percent of the units in U/L areas in the United States were single units. The percent of multi-unit housing is expected to be lower in U/L areas than in Mailout/Mailback areas because rural regions are less likely than cities to have multi-unit structures, particularly large ones. In addition, the Size of Basic Street Address variable is calculated using address matching, which is used only on city-style addresses.

In Table 36, we have the breakdown of all stateside U/L action codes by whether the unit is a single or a multi.

Table 35: Single units versus Multi-units by Update/Leave Action Codes - Stateside

Size of Structure	Update/Leave Action Codes					
	Total	Add	Correction	Delete*	Move	Verify**
Total	23,525,257	1,644,174	9,045,814	1,228,987	24,265	11,582,017
Single unit	21,021,465	1,404,170	8,142,274	1,008,838	20,607	10,445,576
Multi-unit	2,503,792	240,004	903,540	220,149	3,658	1,136,441

Data source: March 2001 MAF extract

* U/L action delete denotes operation delete and nonresidential actions

** U/L action code verify is mostly blank actions

The percent of single and multi-units by size within each U/L action is shown in the following table. We see that there is some variation but the general trend of most units being single units does not change. There is a slightly disproportionate rate of moves in large multi-units. This problem was traced to a couple localized problems in Florida and Arizona.

More importantly, deletes in small multi-units are disproportionately high. Further research showed that the deletes were disproportionate for both the two-unit structure and the three- or four-unit structure. Deletes in two-unit structures are probable duplicate units on the housing unit list, where only one unit should have ever been listed. Deletes in structures with three or four units may indicate problems with locating and describing all the units in situations in which

there is more than one unit at a site where the units are not necessarily standard apartments.

Table 36: Percent of actions by size of address - stateside

Size of BSA	Total	Add	Correction	Delete*	Move	Verify**
Single unit	89.4	85.4	90.0	82.1	84.9	90.2
Multi-unit	10.6	14.6	10.0	17.9	15.1	9.8
2 - 4 units	5.5	8.1	4.8	13.1	6.9	4.9
5 - 9 units	1.1	1.4	1.0	1.3	1.3	1.1
10 - 19 units	1.0	1.2	1.0	0.9	1.1	1.0
20 - 49 units	1.4	1.4	1.5	1.2	2.5	1.4
50+ units	1.6	2.4	1.6	1.4	3.2	1.5

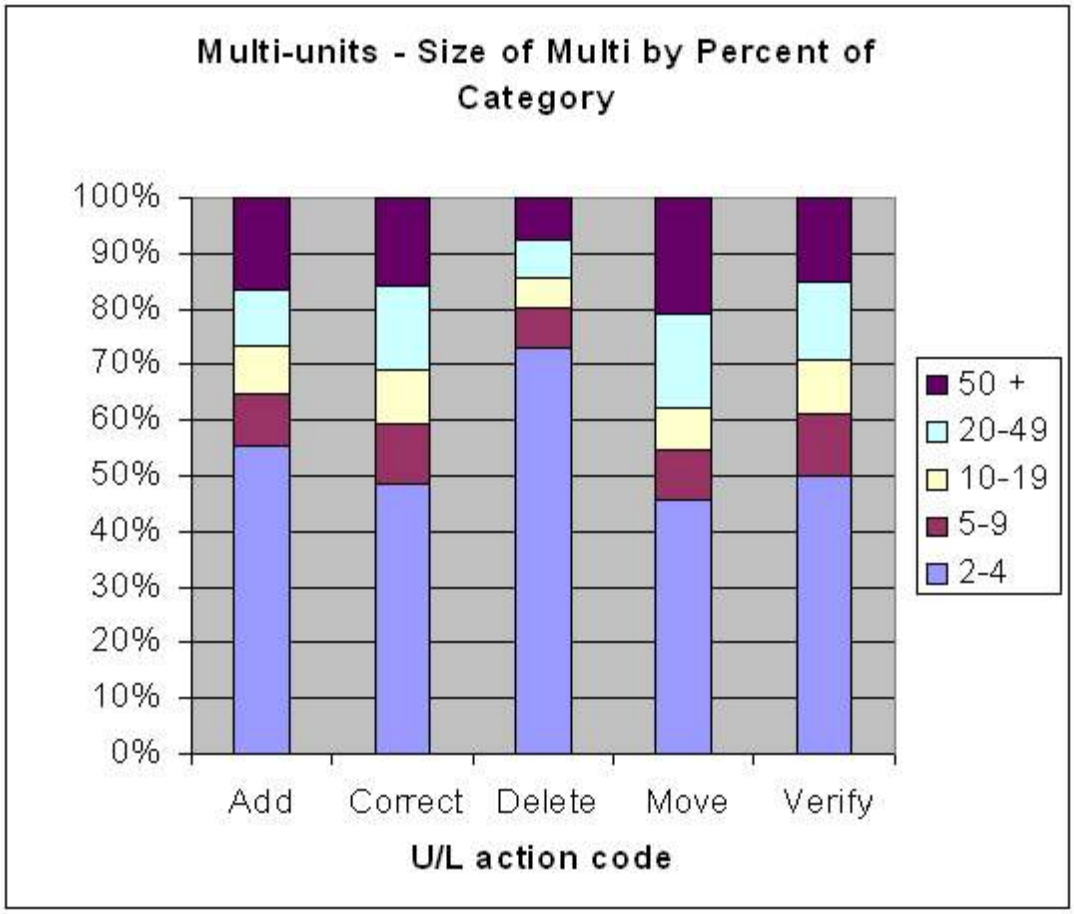
Data source: March 2001 MAF extract

* U/L action delete denotes operation delete and nonresidential actions

** U/L action code verify is mostly blank actions

In Figure 2 below we see the distribution of the size of multi-units within the U/L action codes. Here it is clear that units in multi-unit structures of 2-4 units are deleted at significantly higher rates.

Figure 2: Size of Basic Street Address for Multi-Units by Update/Leave action



There is also a change in the distribution of address type by U/L action, as shown in Table 37. We see that deletes have a significantly higher percentage of no address information addresses. We see in this table that both adds and deletes have high rates of location description-only addresses and lower rates of complete city-style addresses. Corrections and verifies, on the other hand, rarely occur with location description-only addresses; the percent of complete city-style addresses is significantly higher than in other action code categories. These results would seem to indicate general problems with location description-only units. Note that moves are supposed to occur only with city-style addresses, so we expect a low rate of address types other than city-style.

Table 37: Percent of Addresses in Address Type for all Update/Leave action codes

Type of Address	Total	Add	Correction	Delete	Move	Verify
Complete city-style	73.9	64.8	76.9	56.7	99.5	74.7
Complete Rural Route	8.5	4.3	9.2	5.4	<0.1	8.8
with location description	8.4	4.0	9.1	5.3	0.0	8.7
without location description	0.1	0.4	0.1	0.2	0.0	0.1
Complete Post Office Box	3.3	2.5	3.6	2.6	<0.1	3.3
with location description	3.2	2.3	3.5	2.4	0.0	3.2
without location description	0.1	0.3	0.1	0.2	0.0	0.1
Incomplete address information	1.2	3.4	1.3	1.7	0.5	0.9
with location description	0.5	0.7	0.9	0.4	0.0	0.3
without location description	0.7	2.8	0.4	1.3	0.5	0.6
No address information	13.0	24.9	9.0	33.6	<0.1	12.3
with location description	13.0	24.3	9.0	33.6	0.0	12.3
without location description	0.0	0.6	0.0	0.0	0.0	0.0

Data source: March 2001 MAF extract

Tabulations of city-style addresses and of addresses that were on some DSF both indicated that a sizable number of the blocks that were in U/L could have been Mailout/Mailback areas. In addition, many areas will likely be converting addresses to city-style over the coming decade. Research should go into identifying those areas that are completely city-style addresses that are used for mail delivery. Further motivation for that course is the problems that were encountered with duplicate addresses in Census 2000. The U/L operation was so large that results could not be processed and incorporated in time for the first followup operation, NRFU. Any measures that can be taken to have the address list cleaned up in advance of Census Day, rather than after NRFU, should be investigated.

6. RECOMMENDATIONS

The number of corrections in this operation was exceedingly high. One cause for that was that any update to a housing unit record required a correction action. This included respondent name updates, as well as telephone numbers. Much extra keying was required for records with corrections, and it's not clear if the information was used in later operations. Updates from U/L were not available at the time of the NRFU operation because the keying took too long. While the respondent data fields are used for noncity-style address matching, the Census Bureau should assess the costs and benefits of collecting these items. In addition, it should be possible to calculate how many corrections result from address field corrections and how many result from respondent data corrections.

The distribution of address types for a block showed that a large number of blocks in Update/Leave areas could possibly have been in Mailout/Mailback areas. As Mailout/Mailback areas are less expensive to list and to deliver questionnaires to, future delineation efforts should focus on switching over U/L areas.

It is clear that there was a disproportionate amount of work in Puerto Rico. This most likely results from the Address Listing processing problem. At the point of questionnaire delivery, the initial errors in the address list for Puerto Rico have been compounded from the effects of several operations. It might be advisable for future efforts in Puerto Rico to create a new address list rather than do a dependent listing starting from the current list.

7. REFERENCES

Medina, Karen, and Butler, Bennie (2001), "Assessment Report for Update/Leave and Urban Update/Leave," Internal Census Bureau memorandum, *in preparation*.

U.S. Census Bureau, 2001a, *Determining Address Classification for Master Address File (MAF) Evaluation Purposes*, PRED TXE/2010 Memorandum Series MAF-EXT-D-01, September 26, 2001.

U.S. Census Bureau, 2001b, *Determining Original Source for the November 2000 Master Address File for Evaluation Purposes*, PRED TXE/2010 Memorandum Series: MAF-EXT-S-01, March 5, 2001.

Appendix A: State-level tally of address type for U/L adds

		Type of Address									
	Total	City-style with location description	City-style without location description	P.O. box with location description	P.O. box without location description	Rural route with location description	Rural route without location description	Incomplete with location description	Incomplete without location description	location description only	no address information
Total	1,644,174	7,492	1,058,558	37,408	4,090	65,681	5,996	11,016	45,363	399,316	9,254
Alabama	57,468	302	33,787	787	161	1,783	440	560	2,107	17,178	363
Alaska	9,291	26	4,466	870	35	103	7	23	126	3,586	49
Arizona	49,373	84	41,013	686	59	195	43	71	875	6,046	301
Arkansas	50,536	312	32,747	1,181	147	1,860	139	251	1,443	12,226	230
California	45,072	67	34,688	1,115	110	107	69	265	920	7,557	174
Colorado	40,124	110	33,305	356	48	64	19	44	800	5,298	80
Connecticut	4,924	33	4,176	32	4	2	2	35	102	534	4
Delaware	4,191	6	2,250	50	8	525	33	9	144	1,154	12
Florida	58,227	139	40,664	832	105	2,559	214	174	1,399	11,889	252
Georgia	76,526	270	48,781	1,034	163	2,313	324	604	2,679	19,913	445
Hawaii	5,854	15	2,984	571	38	55	5	45	96	2,032	13
Idaho	8,249	25	4,631	353	43	369	29	31	193	2,504	71
Illinois	22,417	179	14,253	483	37	2,243	71	109	569	4,414	59
Indiana	12,954	45	7,681	203	29	1,348	226	83	378	2,891	70
Iowa	20,806	100	16,798	134	16	184	9	24	495	2,954	92

	Type of Address										
	Total	City-style with location description	City-style without location description	P.O. box with location description	P.O. box without location description	Rural route with location description	Rural route without location description	Incomplete with location description	Incomplete without location description	location description only	no address information
Kansas	15,757	95	10,812	208	38	611	68	80	529	3,136	180
Kentucky	50,473	310	28,099	1,947	251	2,620	255	814	1,717	14,225	235
Louisiana	40,658	183	28,729	636	67	244	33	199	1,001	9,486	80
Maine	20,819	85	10,537	776	97	1,152	175	243	765	6,944	45
Maryland	11,726	47	9,600	74	7	1	5	54	248	1,660	30
Massachusetts	3,873	8	3,025	43	2	18	0	26	87	662	2
Michigan	39,775	134	27,247	248	17	229	25	132	778	10,844	121
Minnesota	31,706	185	18,417	429	41	2,089	189	186	692	9,295	183
Mississippi	36,326	193	21,942	870	125	1,597	160	585	1,185	9,521	148
Missouri	53,186	328	28,096	1,066	66	4,773	253	300	1,333	16,769	202
Montana	20,884	129	14,295	642	50	212	10	88	408	4,930	120
Nebraska	9,209	91	5,651	211	13	650	26	54	203	2,258	52
Nevada	15,487	28	13,807	111	18	18	24	24	206	1,056	195
New Hampshire	13,728	74	9,837	297	35	231	24	77	344	2,801	8
New Jersey	7,192	16	6,099	47	52	18	7	18	263	668	4
New Mexico	33,428	82	22,455	1,262	211	412	40	108	1,032	7,422	404
New York	62,865	375	42,627	862	109	734	87	593	2,061	15,292	125
North Carolina	125,594	414	87,572	1,413	297	1,523	226	1,015	4,307	28,386	441

	Type of Address										
	Total	City-style with location description	City-style without location description	P.O. box with location description	P.O. box without location description	Rural route with location description	Rural route without location description	Incomplete with location description	Incomplete without location description	location description only	no address information
North Dakota	6,931	144	4,656	117	14	89	12	5	179	1,680	35
Ohio	24,476	144	18,228	236	30	330	41	129	868	4,396	74
Oklahoma	44,399	247	18,139	2,158	180	6,138	359	396	1,000	15,226	556
Oregon	13,593	65	10,668	261	25	144	13	39	209	2,116	53
Pennsylvania	44,770	440	21,985	1,483	109	5,447	333	630	1,326	12,879	138
South Carolina	56,013	243	37,615	609	110	1,897	245	423	2,313	12,243	315
South Dakota	8,884	116	5,666	234	25	324	24	17	208	2,222	48
Tennessee	59,882	384	39,743	763	83	1,688	45	539	1,630	14,864	143
Texas	164,128	437	90,741	6,015	628	11,372	1,176	662	3,896	48,331	870
Utah	14,769	44	11,969	209	7	44	0	8	143	2,320	25
Vermont	13,598	114	9,715	201	34	75	8	84	415	2,918	34
Virginia	60,783	286	38,547	1,343	124	1,936	123	424	1,899	14,330	1,771
Washington	14,472	75	10,101	290	18	39	3	58	221	3,608	59
West Virginia	33,066	164	9,110	3,335	177	5,221	361	587	992	12,877	242
Wisconsin	20,443	38	16,767	137	12	91	15	63	483	2,820	17
Wyoming	5,269	61	3,837	188	15	4	1	28	96	955	84

Data source: March 2001 MAF extract

** District of Columbia and Rhode Island have no U/L and are not shown in this table.

Appendix B: State-level tally of address type for U/L corrections

		Type of Address									
	Total	**City-style with location description**	**City-style without location description**	**P.O. box with location description**	**P.O. box without location description**	**Rural route with location description**	**Rural route without location description**	**Incomplete with location description**	**Incomplete without location description**	**location description only**	**no address information**
Total	9,045,814	2,053,447	4,903,915	318,529	10,529	825,579	10,307	78,480	34,568	810,256	204
Alabama	284,480	79,410	131,613	6,181	355	20,288	492	3,365	1,473	41,301	2
Alaska	41,837	10,389	15,842	6,310	97	897	2	227	20	8,049	4
Arizona	153,700	19,406	122,231	2,478	227	1,586	174	699	658	6,241	0
Arkansas	282,199	77,745	151,420	8,775	253	22,109	161	2,191	1,131	18,411	3
California	192,953	26,440	148,356	5,569	245	729	21	937	394	10,262	0
Colorado	197,675	34,949	150,435	1,555	131	228	7	648	280	9,441	1
Connecticut	36,972	5,279	30,801	78	6	20	0	104	225	459	0
Delaware	33,680	3,385	10,696	851	29	13,631	318	218	165	4,387	0
Florida	225,699	44,192	137,508	5,188	222	18,121	236	1,567	1,071	17,593	1
Georgia	308,186	71,470	171,129	7,641	406	21,320	1,026	4,800	1,723	28,670	1
Hawaii	36,863	7,097	19,697	4,663	76	611	11	247	194	4,267	0
Idaho	45,728	10,220	23,273	2,116	46	3,219	68	354	97	6,335	0
Illinois	188,767	44,913	96,209	5,533	341	26,758	433	1,189	508	12,882	1
Indiana	90,061	17,398	50,209	1,612	67	14,327	172	520	301	5,455	0

		Type of Address									
	Total	City-style with location description	City-style without location description	P.O. box with location description	P.O. box without location description	Rural route with location description	Rural route without location description	Incomplete with location description	Incomplete without location description	location description only	no address information
Iowa	173,467	25,659	139,982	924	112	3,139	27	323	449	2,852	0
Kansas	124,378	28,104	73,957	2,393	115	12,195	92	527	213	6,781	1
Kentucky	295,304	70,193	142,636	14,101	571	27,774	225	4,120	1,931	33,603	150
Louisiana	217,115	51,411	134,093	3,657	170	4,271	41	1,128	434	21,910	0
Maine	163,174	39,478	54,286	10,032	164	22,480	409	1,697	546	34,078	4
Maryland	77,522	17,010	57,222	476	26	6	0	268	148	2,366	0
Massachusetts	21,521	3,008	17,466	103	22	23	6	117	142	634	0
Michigan	261,445	47,703	176,037	1,663	141	3,649	63	2,355	770	29,063	1
Minnesota	276,642	73,242	118,606	5,655	218	46,945	318	1,768	517	29,371	2
Mississippi	185,567	46,819	93,869	6,412	287	17,729	238	2,017	532	17,662	2
Missouri	345,525	88,509	156,677	9,579	260	54,356	382	3,290	1,802	30,668	2
Montana	121,835	27,562	77,133	5,681	222	2,783	26	700	425	7,301	2
Nebraska	105,486	30,841	48,853	3,563	83	16,880	115	375	211	4,565	0
Nevada	79,006	7,158	69,179	707	51	180	17	147	105	1,462	0
New Hampshire	84,278	16,581	49,706	3,160	148	3,421	92	1,162	409	9,597	2
New Jersey	40,771	4,040	35,072	147	14	144	17	90	149	1,098	0
New Mexico	115,903	21,439	68,386	7,812	890	2,455	233	1,492	1,137	12,059	0

		Type of Address									
	Total	City-style with location description	City-style without location description	P.O. box with location description	P.O. box without location description	Rural route with location description	Rural route without location description	Incomplete with location description	Incomplete without location description	location description only	no address information
New York	438,470	97,078	274,053	10,866	384	12,176	219	3,888	1,943	37,863	0
North Carolina	563,737	113,663	366,801	9,988	689	17,510	431	6,427	3,085	45,140	3
North Dakota	62,947	21,496	32,103	1,821	63	2,294	35	180	148	4,807	0
Ohio	183,160	36,700	131,168	1,997	137	4,537	38	1,112	416	7,055	0
Oklahoma	256,357	49,709	90,201	19,162	374	63,747	675	2,501	711	29,273	4
Oregon	70,780	20,374	44,093	1,494	119	1,127	12	335	240	2,986	0
Pennsylvania	428,313	129,032	128,977	23,814	401	105,458	613	3,801	1,139	35,075	3
South Carolina	196,460	54,666	97,129	4,526	197	17,968	295	2,920	874	17,885	0
South Dakota	65,794	18,218	34,605	2,854	55	6,341	68	313	104	3,236	0
Tennessee	272,969	64,827	166,929	3,840	119	12,672	181	1,932	581	21,888	0
Texas	699,820	156,992	289,711	45,590	951	111,562	1,249	6,214	3,005	84,540	6
Utah	68,260	13,679	49,877	1,091	31	239	5	152	191	2,995	0
Vermont	89,616	50,545	22,658	3,124	35	2,921	39	1,262	141	8,891	0
Virginia	349,350	90,641	176,537	14,332	271	28,505	273	2,939	973	34,877	2
Washington	84,143	23,053	47,400	1,534	76	955	18	605	137	10,364	1
West Virginia	260,139	43,244	57,229	36,741	487	74,411	512	4,447	1,844	41,219	5
Wisconsin	119,289	13,192	100,901	524	103	853	220	531	800	2,165	0

	Total	Type of Address									
		City-style with location description	City-style without location description	P.O. box with location description	P.O. box without location description	Rural route with location description	Rural route without location description	Incomplete with location description	Incomplete without location description	location description only	no address information
Wyoming	28,471	5,288	20,964	616	42	29	2	279	76	1,174	1

Data source: March 2001 MAF extract

** District of Columbia and Rhode Island have no U/L and are not shown in this table.

Appendix C: State-level tally of address type for U/L deletes

		Type of Address									
	Total	City-style with location description	City-style without location description	P.O. box with location description	P.O. box without location description	Rural route with location description	Rural route without location description	Incomplete with location description	Incomplete without location description	location description only	no address information
Total	1,228,987	97,492	599,781	29,232	2,151	64,582	2,106	4,246	16,406	412,966	25
Alabama	50,129	3,892	23,187	733	73	2,445	120	157	799	18,720	3
Alaska	5,439	740	1,561	490	16	70	1	12	17	2,532	0
Arizona	23,107	1,313	15,321	425	32	220	21	36	311	5,428	0
Arkansas	38,333	4,405	17,973	992	44	1,872	28	90	351	12,577	1
California	37,331	1,744	24,223	1,006	69	94	13	186	323	9,673	0
Colorado	23,189	1,939	15,307	251	29	41	0	48	232	5,341	1
Connecticut	3,105	267	2,281	11	4	1	0	2	56	483	0
Delaware	2,438	110	1,098	32	6	323	19	3	45	802	0
Florida	38,923	1,881	21,450	515	65	2,065	111	93	348	12,395	0
Georgia	63,953	4,687	34,007	882	121	2,365	190	173	942	20,585	1
Hawaii	3,661	140	1,926	234	10	36	0	23	64	1,228	0
Idaho	5,642	419	2,576	165	11	172	4	23	69	2,201	2
Illinois	17,067	1,531	7,366	370	39	1,460	72	58	516	5,655	0
Indiana	8,612	405	4,133	166	16	1,115	28	18	88	2,643	0
Iowa	16,901	1,241	12,561	82	13	145	4	13	220	2,622	0

	Total	Type of Address									
		City-style with location description	City-style without location description	P.O. box with location description	P.O. box without location description	Rural route with location description	Rural route without location description	Incomplete with location description	Incomplete without location description	location description only	no address information
Kansas	13,818	1,013	6,092	160	24	641	20	23	183	5,661	1
Kentucky	43,997	5,153	17,354	1,459	93	2,122	34	359	692	16,730	1
Louisiana	36,877	3,081	19,786	524	27	543	9	72	345	12,489	1
Maine	15,270	1,035	6,397	493	25	1,030	34	47	179	6,030	0
Maryland	7,888	822	4,900	104	4	0	0	19	63	1,976	0
Massachusetts	2,714	163	1,849	8	3	4	5	7	70	605	0
Michigan	28,999	1,825	17,561	187	22	195	10	151	282	8,765	1
Minnesota	22,690	1,907	9,440	379	19	1,911	50	100	219	8,665	0
Mississippi	32,877	2,429	15,109	762	65	1,873	49	54	393	12,143	0
Missouri	40,215	3,525	14,032	852	22	3,613	69	302	430	17,368	2
Montana	12,547	1,955	5,779	622	31	227	3	23	157	3,750	0
Nebraska	7,907	964	2,227	174	7	680	7	18	55	3,775	0
Nevada	6,815	459	4,915	112	6	29	25	19	55	1,195	0
New Hampshire	8,817	824	5,217	218	26	182	4	10	255	2,081	0
New Jersey	4,046	265	3,032	29	50	13	6	4	105	542	0
New Mexico	22,645	1,909	11,642	824	260	283	55	224	690	6,758	0
New York	48,942	5,064	27,159	929	53	1,143	56	176	461	13,901	0
North Carolina	95,337	5,133	58,306	875	157	1,778	116	131	1,560	27,279	2

	Type of Address										
	Total	City-style with location description	City-style without location description	P.O. box with location description	P.O. box without location description	Rural route with location description	Rural route without location description	Incomplete with location description	Incomplete without location description	location description only	no address information
North Dakota	6,505	1,232	2,180	162	6	152	3	15	56	2,699	0
Ohio	20,633	1,958	12,197	151	20	202	3	28	421	5,653	0
Oklahoma	33,656	1,715	9,065	1,413	63	5,079	149	96	546	15,530	0
Oregon	10,062	1,161	5,753	261	21	417	12	12	142	2,283	0
Pennsylvania	36,902	3,974	10,708	1,557	45	6,253	60	158	296	13,851	0
South Carolina	43,749	2,361	22,317	530	67	2,923	159	214	1,067	14,111	0
South Dakota	5,803	738	2,212	171	9	319	4	18	59	2,273	0
Tennessee	40,754	4,286	22,089	468	44	1,456	29	60	362	11,960	0
Texas	113,791	8,079	40,694	4,563	257	11,234	350	355	1,125	47,129	5
Utah	6,582	854	4,016	150	2	34	3	9	53	1,461	0
Vermont	10,368	1,242	5,217	344	4	573	4	34	139	2,811	0
Virginia	45,794	2,982	23,232	1,019	62	2,133	77	116	722	15,449	2
Washington	11,419	1,205	5,476	182	15	101	9	18	99	4,314	0
West Virginia	35,365	2,476	5,656	3,024	55	4,927	60	384	402	18,379	2
Wisconsin	13,563	587	10,982	58	25	86	21	39	299	1,466	0
Wyoming	3,810	402	2,220	114	14	2	0	16	43	999	0

Data source: March 2001 MAF extract

** District of Columbia and Rhode Island have no U/L and are not shown in this table.

Appendix D: State-level tally of address type for U/L moves

	Type of Address						
	Total	**City-style with location description**	**City-style without location description**	**P.O. box without location description**	**Rural route without location description**	**Incomplete with location description**	**Incomplete without location description**
Total	24,265	2,176	21,963	3	1	1	121
Alabama	693	51	642	0	0	0	0
Alaska	15	2	13	0	0	0	0
Arizona	634	13	621	0	0	0	0
Arkansas	541	47	494	0	0	0	0
California	895	28	867	0	0	0	0
Colorado	667	40	627	0	0	0	0
Connecticut	157	10	147	0	0	0	0
Delaware	33	0	33	0	0	0	0
Florida	1,131	44	1,084	2	0	0	1
Georgia	963	69	892	0	0	0	2
Hawaii	23	0	23	0	0	0	0
Idaho	72	9	62	0	0	0	1
Illinois	297	29	268	0	0	0	0
Indiana	93	4	89	0	0	0	0
Iowa	322	30	292	0	0	0	0
Kansas	224	25	199	0	0	0	0

	Type of Address						
	Total	City-style with location description	City-style without location description	P.O. box without location description	Rural route without location description	Incomplete with location description	Incomplete without location description
Kentucky	858	118	737	1	0	0	2
Louisiana	895	55	840	0	0	0	0
Maine	197	28	169	0	0	0	0
Maryland	281	27	254	0	0	0	0
Massachusetts	64	0	64	0	0	0	0
Michigan	519	14	504	0	0	0	1
Minnesota	363	58	305	0	0	0	0
Mississippi	710	78	631	0	1	0	0
Missouri	742	79	663	0	0	0	0
Montana	396	45	351	0	0	0	0
Nebraska	143	44	99	0	0	0	0
Nevada	128	3	125	0	0	0	0
New Hampshire	270	20	250	0	0	0	0
New Jersey	287	4	283	0	0	0	0
New Mexico	356	28	326	0	0	1	1
New York	896	141	755	0	0	0	0
North Carolina	2,274	77	2,125	0	0	0	72
North Dakota	226	126	100	0	0	0	0

	Type of Address						
	Total	**City-style with location description**	**City-style without location description**	**P.O. box without location description**	**Rural route without location description**	**Incomplete with location description**	**Incomplete without location description**
Ohio	393	31	362	0	0	0	0
Oklahoma	304	61	243	0	0	0	0
Oregon	174	28	146	0	0	0	0
Pennsylvania	553	111	441	0	0	0	1
South Carolina	1,157	46	1,111	0	0	0	0
South Dakota	103	21	82	0	0	0	0
Tennessee	1,172	145	1,027	0	0	0	0
Texas	1,597	141	1,456	0	0	0	0
Utah	371	26	345	0	0	0	0
Vermont	72	22	50	0	0	0	0
Virginia	1,006	60	906	0	0	0	40
Washington	160	6	154	0	0	0	0
West Virginia	404	111	293	0	0	0	0
Wisconsin	299	4	295	0	0	0	0
Wyoming	135	17	118	0	0	0	0

Data source: March 2001 MAF extract

** District of Columbia and Rhode Island have no U/L and are not shown in this table.

Appendix E: State-level tally of BSA size for U/L adds

			Size of Basic Street Address				
	Total	Single	2-4	5-9	10-19	20-49	50+
Total	1,644,174	1,404,170	132,741	22,881	20,517	23,747	40,118
Alabama	57,468	50,683	4,167	678	446	765	729
Alaska	9,291	7,463	1,083	285	314	67	79
Arizona	49,373	34,886	4,227	532	612	909	8,207
Arkansas	50,536	43,268	4,480	639	832	717	600
California	45,072	33,265	6,366	926	774	1,256	2,485
Colorado	40,124	29,958	4,300	1,077	1,116	1,725	1,948
Connecticut	4,924	3,515	1,043	195	40	44	87
Delaware	4,191	3,871	241	73	5	1	0
Florida	58,227	49,572	3,894	548	690	775	2,748
Georgia	76,526	67,915	5,431	711	680	682	1,107
Hawaii	5,854	4,354	1,032	155	64	78	171
Idaho	8,249	7,192	631	138	80	127	81
Illinois	22,417	20,047	1,601	391	262	78	38
Indiana	12,954	11,153	1,056	174	182	338	51
Iowa	20,806	16,549	2,093	438	581	677	468
Kansas	15,757	13,750	1,028	138	220	129	492
Kentucky	50,473	45,442	3,371	528	316	403	413
Louisiana	40,658	35,264	3,577	482	332	675	328

			Size of Basic Street Address				
	Total	Single	2-4	5-9	10-19	20-49	50+
Maine	20,819	17,397	2,201	598	196	293	134
Maryland	11,726	10,074	1,292	146	66	75	73
Massachusetts	3,873	2,855	688	145	85	88	12
Michigan	39,775	35,425	2,954	576	330	262	228
Minnesota	31,706	28,060	2,140	357	242	709	198
Mississippi	36,326	32,414	2,800	312	284	292	224
Missouri	53,186	48,238	2,953	450	493	806	246
Montana	20,884	16,444	2,205	577	386	476	796
Nebraska	9,209	7,750	471	148	481	283	76
Nevada	15,487	10,903	921	173	249	505	2,736
New Hampshire	13,728	10,864	1,789	278	229	211	357
New Jersey	7,192	5,952	933	161	124	17	5
New Mexico	33,428	27,152	4,260	488	271	519	738
New York	62,865	50,314	8,291	1,481	938	721	1,120
North Carolina	125,594	111,521	9,140	1,299	1,368	1,524	742
North Dakota	6,931	5,668	460	149	235	148	271
Ohio	24,476	20,241	3,067	337	308	248	275
Oklahoma	44,399	40,297	1,691	393	545	353	1,120
Oregon	13,593	10,991	1,455	232	279	473	163
Pennsylvania	44,770	40,258	3,487	409	379	119	118

			Size of Basic Street Address				
	Total	Single	2-4	5-9	10-19	20-49	50+
South Carolina	56,013	45,089	3,507	1,498	1,384	1,169	3,366
South Dakota	8,884	7,854	442	180	112	153	143
Tennessee	59,882	53,403	4,239	495	471	668	606
Texas	164,128	146,142	9,201	1,047	1,125	2,053	4,560
Utah	14,769	12,054	1,113	155	213	461	773
Vermont	13,598	10,412	1,996	529	209	346	106
Virginia	60,783	55,305	3,730	667	554	259	268
Washington	14,472	11,603	1,423	313	467	466	200
West Virginia	33,066	30,943	1,409	328	163	137	86
Wisconsin	20,443	16,314	2,286	689	604	305	245
Wyoming	5,269	4,086	576	163	181	162	101

Data source: March 2001 MAF extract

** District of Columbia and Rhode Island have no U/L and are not shown in this table.

Appendix F: State-level tally of BSA size for U/L corrections

		Size of Basic Street Address					
	Total	Single	2-4	5-9	10-19	20-49	50+
Total	9,045,814	8,142,274	438,232	94,893	87,814	137,808	144,793
Alabama	284,480	258,079	14,977	2,646	2,561	4,113	2,104
Alaska	41,837	34,500	3,985	933	665	1,212	542
Arizona	153,700	122,227	9,157	1,667	2,004	3,974	14,671
Arkansas	282,199	254,352	14,572	2,665	3,202	4,663	2,745
California	192,953	156,214	16,654	3,129	2,467	5,989	8,500
Colorado	197,675	157,919	14,607	4,550	4,253	6,803	9,543
Connecticut	36,972	29,936	3,943	668	289	821	1,315
Delaware	33,680	32,888	585	107	28	0	72
Florida	225,699	197,679	9,574	2,014	2,091	3,083	11,258
Georgia	308,186	278,440	13,967	2,634	2,676	4,831	5,638
Hawaii	36,863	27,544	4,933	595	272	999	2,520
Idaho	45,728	41,882	2,017	565	607	534	123
Illinois	188,767	177,704	6,183	1,900	1,217	1,108	655
Indiana	90,061	83,921	2,873	657	697	960	953
Iowa	173,467	156,776	5,971	2,372	2,420	3,205	2,723
Kansas	124,378	115,970	3,054	1,080	1,384	1,811	1,079
Kentucky	295,304	271,697	13,770	2,649	1,910	3,489	1,789
Louisiana	217,115	194,559	12,840	1,623	1,862	4,422	1,809

	Size of Basic Street Address						
	Total	Single	2-4	5-9	10-19	20-49	50+
Maine	163,174	147,754	9,024	1,915	1,236	2,250	995
Maryland	77,522	71,368	3,452	830	752	632	488
Massachusetts	21,521	18,540	2,129	307	180	344	21
Michigan	261,445	241,156	10,069	2,799	2,709	3,007	1,705
Minnesota	276,642	255,319	7,575	2,991	4,188	5,347	1,222
Mississippi	185,567	169,363	10,136	1,159	1,069	2,660	1,180
Missouri	345,525	319,896	11,757	2,575	3,568	4,908	2,821
Montana	121,835	102,850	9,146	2,251	2,002	3,072	2,514
Nebraska	105,486	97,668	2,486	977	1,183	1,882	1,290
Nevada	79,006	62,585	3,917	1,015	912	2,004	8,573
New Hampshire	84,278	72,011	6,873	1,742	989	1,631	1,032
New Jersey	40,771	37,395	2,366	598	271	75	66
New Mexico	115,903	99,042	8,778	1,626	1,496	2,517	2,444
New York	438,470	377,404	33,490	6,267	5,143	8,144	8,022
North Carolina	563,737	516,175	27,035	5,585	4,805	6,514	3,623
North Dakota	62,947	54,549	2,835	1,447	1,268	1,521	1,327
Ohio	183,160	163,065	10,798	1,773	1,641	3,080	2,803
Oklahoma	256,357	240,279	6,475	1,486	1,761	3,058	3,298
Oregon	70,780	61,379	4,079	860	942	1,678	1,842
Pennsylvania	428,313	408,217	13,639	2,211	1,423	1,935	888

	Size of Basic Street Address						
	Total	Single	2-4	5-9	10-19	20-49	50+
South Carolina	196,460	180,950	8,686	1,414	1,292	2,122	1,996
South Dakota	65,794	58,784	2,443	1,051	967	1,546	1,003
Tennessee	272,969	250,576	12,887	2,140	2,389	3,140	1,837
Texas	699,820	639,793	28,214	4,254	4,447	8,907	14,205
Utah	68,260	57,114	3,228	813	947	2,150	4,008
Vermont	89,616	78,520	7,168	1,931	930	728	339
Virginia	349,350	328,110	12,485	2,413	1,794	2,489	2,059
Washington	84,143	72,067	5,377	1,418	1,496	2,499	1,286
West Virginia	260,139	243,197	8,567	2,321	1,766	2,690	1,598
Wisconsin	119,289	101,383	7,218	3,570	3,203	2,720	1,195
Wyoming	28,471	23,478	2,238	700	440	541	1,074

Data source: March 2001 MAF extract

** District of Columbia and Rhode Island have no U/L and are not shown in this table.

Appendix G: State-level tally of BSA size for U/L deletes

	Size of Basic Street Address						
	Total	**Single**	**2-4**	**5-9**	**10-19**	**20-49**	**50+**
Total	1,228,987	1,008,838	160,610	15,909	11,558	15,228	16,844
Alabama	50,129	42,059	6,455	497	351	471	296
Alaska	5,439	4,603	553	88	78	14	103
Arizona	23,107	16,613	3,664	415	377	646	1,392
Arkansas	38,333	32,290	4,664	375	289	439	276
California	37,331	27,868	6,760	770	509	722	702
Colorado	23,189	16,096	4,411	613	632	746	691
Connecticut	3,105	1,876	960	137	31	62	39
Delaware	2,438	2,132	282	22	0	2	0
Florida	38,923	31,220	4,750	416	494	646	1,397
Georgia	63,953	52,201	8,700	630	414	803	1,205
Hawaii	3,661	2,383	699	104	43	13	419
Idaho	5,642	4,887	520	88	49	21	77
Illinois	17,067	14,902	1,486	163	79	321	116
Indiana	8,612	7,478	828	79	61	138	28
Iowa	16,901	13,079	2,527	279	201	345	470
Kansas	13,818	12,324	1,153	103	91	102	45
Kentucky	43,997	37,665	4,762	360	210	344	656

	Size of Basic Street Address						
	Total	**Single**	**2-4**	**5-9**	**10-19**	**20-49**	**50+**
Louisiana	36,877	30,227	5,258	352	245	561	234
Maine	15,270	12,285	1,953	413	188	359	72
Maryland	7,888	6,109	1,598	69	54	31	27
Massachusetts	2,714	1,924	581	101	20	8	80
Michigan	28,999	23,283	4,543	574	259	145	195
Minnesota	22,690	18,995	2,486	290	191	551	177
Mississippi	32,877	28,468	3,676	228	155	211	139
Missouri	40,215	35,242	3,588	388	368	454	175
Montana	12,547	9,190	2,193	469	220	299	176
Nebraska	7,907	7,062	590	105	76	38	36
Nevada	6,815	4,521	1,093	117	193	244	647
New Hampshire	8,817	6,553	1,600	277	107	102	178
New Jersey	4,046	2,914	1,050	52	12	17	1
New Mexico	22,645	18,037	3,167	341	294	251	555
New York	48,942	36,478	9,570	1,044	591	695	564
North Carolina	95,337	76,685	15,248	1,132	848	991	433
North Dakota	6,505	5,326	810	85	53	112	119
Ohio	20,633	16,082	3,469	275	279	212	316
Oklahoma	33,656	31,071	1,630	215	153	259	328
Oregon	10,062	7,771	1,501	150	143	219	278

	Size of Basic Street Address						
	Total	**Single**	**2-4**	**5-9**	**10-19**	**20-49**	**50+**
Pennsylvania	36,902	32,720	3,666	221	170	78	47
South Carolina	43,749	36,696	5,954	390	290	257	162
South Dakota	5,803	4,955	587	105	61	46	49
Tennessee	40,754	33,380	6,164	291	264	366	289
Texas	113,791	98,678	9,840	708	757	1,532	2,276
Utah	6,582	4,752	984	115	117	235	379
Vermont	10,368	7,991	1,555	397	146	133	146
Virginia	45,794	38,495	6,166	492	270	133	238
Washington	11,419	9,199	1,278	277	271	173	221
West Virginia	35,365	32,171	2,359	422	250	122	41
Wisconsin	13,563	9,094	2,662	544	518	456	289
Wyoming	3,810	2,808	617	131	86	103	65

Data source: March 2001 MAF extract

** District of Columbia and Rhode Island have no U/L and are not shown in this table.

Appendix H: State-level tally of BSA size for U/L moves

	Size of Basic Street Address						
	Total	Single	2-4	5-9	10-19	20-49	50+
Total	24,265	20,607	1,672	325	270	615	776
Alabama	693	606	58	20	6	0	3
Alaska	15	3	4	7	0	0	1
Arizona	634	423	46	27	0	42	96
Arkansas	541	489	38	6	3	0	5
California	895	787	68	9	11	17	3
Colorado	667	554	68	2	6	15	22
Connecticut	157	105	5	0	0	47	0
Delaware	33	33	0	0	0	0	0
Florida	1,131	826	107	7	22	38	131
Georgia	963	830	70	7	21	6	29
Hawaii	23	13	4	5	0	0	1
Idaho	72	44	4	0	6	18	0
Illinois	297	238	46	13	0	0	0
Indiana	93	79	6	3	0	2	3
Iowa	322	288	22	2	0	0	10
Kansas	224	193	8	10	11	0	2
Kentucky	858	782	49	9	0	0	18
Louisiana	895	762	71	4	2	17	39

	Size of Basic Street Address						
	Total	Single	2-4	5-9	10-19	20-49	50+
Maine	197	161	29	2	0	4	1
Maryland	281	269	12	0	0	0	0
Massachusetts	64	55	9	0	0	0	0
Michigan	519	492	19	1	6	0	1
Minnesota	363	313	8	8	0	11	23
Mississippi	710	611	58	2	0	39	0
Missouri	742	612	34	8	7	32	49
Montana	396	281	25	9	18	63	0
Nebraska	143	130	1	0	1	7	4
Nevada	128	118	10	0	0	0	0
New Hampshire	270	239	25	5	1	0	0
New Jersey	287	280	6	0	1	0	0
New Mexico	356	324	25	3	0	3	1
New York	896	725	89	22	9	12	39
North Carolina	2,274	2,046	133	20	18	20	37
North Dakota	226	132	10	0	0	0	84
Ohio	393	356	32	0	0	2	3
Oklahoma	304	260	13	1	6	10	14
Oregon	174	149	19	0	1	2	3
Pennsylvania	553	513	38	2	0	0	0

	Total	Size of Basic Street Address					
		Single	2-4	5-9	10-19	20-49	50+
South Carolina	1,157	1,000	46	71	40	0	0
South Dakota	103	74	29	0	0	0	0
Tennessee	1,172	1,072	76	3	3	18	0
Texas	1,597	1,363	89	5	8	61	71
Utah	371	302	11	6	6	7	39
Vermont	72	58	12	2	0	0	0
Virginia	1,006	879	48	15	28	1	35
Washington	160	130	21	0	8	1	0
West Virginia	404	286	44	3	8	57	6
Wisconsin	299	261	16	0	13	6	3
Wyoming	135	61	11	6	0	57	0

Data source: March 2001 MAF extract

** District of Columbia and Rhode Island have no U/L and are not shown in this table.

Appendix I: State-level tally of Original Source for U/L adds

		Original Source								
	Total	Address Listing	Dress Rehearsal	LUCA 1998	LUCA 99 Appeals and U/L	LUCA 99 Relisting	Special Place/Group Quarters	Unknown - TEA 2	Unknown - TEA 9	Update/Leave
Total	1,644,174	53,288	548	6	301	973	13	1	1	1,589,043
Alabama	57,468	1,967	0	0	12	18	2	0	0	55,469
Alaska	9,291	155	0	0	9	0	0	0	0	9,127
Arizona	49,373	1,115	0	0	2	52	0	0	0	48,204
Arkansas	50,536	1,839	0	0	31	12	0	0	0	48,654
California	45,072	1,459	0	0	0	11	0	0	0	43,602
Colorado	40,124	1,141	0	0	9	14	1	0	0	38,959
Connecticut	4,924	320	0	0	1	2	1	0	0	4,600
Delaware	4,191	105	0	0	0	0	0	0	0	4,086
Florida	58,227	1,709	0	0	1	99	0	0	0	56,418
Georgia	76,526	1,943	0	0	42	29	0	0	0	74,512
Hawaii	5,854	138	0	0	0	1	0	0	0	5,715
Idaho	8,249	169	0	0	0	1	0	0	0	8,079
Illinois	22,417	870	0	0	8	6	4	0	0	21,529
Indiana	12,954	362	0	0	0	8	0	0	0	12,584
Iowa	20,806	1,008	0	0	50	8	0	0	0	19,740
Kansas	15,757	610	0	0	4	2	0	0	0	15,141
Kentucky	50,473	1,543	0	0	1	5	0	0	0	48,924

		Original Source								
	Total	Address Listing	Dress Rehearsal	LUCA 1998	LUCA 99 Appeals and U/L	LUCA 99 Relisting	Special Place/Group Quarters	Unknown - TEA 2	Unknown - TEA 9	Update/Leave
Louisiana	40,658	1,543	0	5	4	37	0	0	0	39,069
Maine	20,819	778	0	0	5	0	0	0	0	20,036
Maryland	11,726	497	0	0	1	2	0	0	0	11,226
Massachusetts	3,873	127	0	0	6	0	0	0	0	3,740
Michigan	39,775	1,894	0	0	8	9	0	1	0	37,863
Minnesota	31,706	1,184	0	0	16	14	0	0	0	30,492
Mississippi	36,326	1,430	0	0	19	14	0	0	0	34,863
Missouri	53,186	1,467	0	0	8	10	0	0	0	51,701
Montana	20,884	867	0	0	2	2	0	0	0	20,013
Nebraska	9,209	306	0	0	0	1	0	0	0	8,902
Nevada	15,487	367	0	0	3	27	0	0	0	15,090
New Hampshire	13,728	647	0	0	0	0	0	0	0	13,081
New Jersey	7,192	428	0	0	0	1	0	0	0	6,763
New Mexico	33,428	1,014	0	0	0	13	0	0	0	32,401
New York	62,865	2,696	0	0	4	15	0	0	0	60,150
North Carolina	125,594	4,251	0	0	17	51	2	0	0	121,273
North Dakota	6,931	400	0	0	0	5	2	0	0	6,524
Ohio	24,476	1,572	0	0	3	1	0	0	0	22,900
Oklahoma	44,399	1,083	0	0	0	17	0	0	0	43,299

		Original Source								
	Total	Address Listing	Dress Rehearsal	LUCA 1998	LUCA 99 Appeals and U/L	LUCA 99 Relisting	Special Place/Group Quarters	Unknown - TEA 2	Unknown - TEA 9	Update/Leave
Oregon	13,593	340	0	0	0	3	0	0	0	13,250
Pennsylvania	44,770	1,241	0	0	2	15	0	0	0	43,512
South Carolina	56,013	1,488	548	0	17	204	0	0	0	53,756
South Dakota	8,884	308	0	0	3	2	0	0	0	8,571
Tennessee	59,882	2,286	0	0	0	9	0	0	0	57,587
Texas	164,128	3,085	0	0	0	104	0	0	1	160,938
Utah	14,769	348	0	0	5	1	0	0	0	14,415
Vermont	13,598	335	0	0	0	1	1	0	0	13,261
Virginia	60,783	2,515	0	0	1	139	0	0	0	58,128
Washington	14,472	363	0	1	1	5	0	0	0	14,102
West Virginia	33,066	733	0	0	0	0	0	0	0	32,333
Wisconsin	20,443	1,057	0	0	6	3	0	0	0	19,377
Wyoming	5,269	185	0	0	0	0	0	0	0	5,084

Data source: March 2001 MAF extract

** District of Columbia and Rhode Island have no U/L and are not shown in this table.

Appendix J: State-level tally of Original Source for U/L corrections

		Original Source						
	Total	1990 ACF	Address Listing	Block Canvassing	Dress Rehearsal	LUCA 1998	LUCA 98 and DSF 2	LUCA 99 Relisting
Total	9,045,814	1	8,918,095	1	1,924	1	1	125,791
Alabama	284,480	0	282,676	0	0	0	0	1,804
Alaska	41,837	0	41,254	0	0	0	0	583
Arizona	153,700	0	144,494	0	0	0	0	9,206
Arkansas	282,199	0	277,816	0	0	0	0	4,383
California	192,953	0	188,406	0	0	0	0	4,547
Colorado	197,675	0	192,186	0	0	0	0	5,489
Connecticut	36,972	0	36,700	0	0	0	0	272
Delaware	33,680	0	33,572	0	0	0	0	108
Florida	225,699	0	223,118	0	0	0	0	2,581
Georgia	308,186	0	297,216	0	0	0	0	10,970
Hawaii	36,863	0	36,154	0	0	0	0	709
Idaho	45,728	0	44,540	0	0	0	0	1,188
Illinois	188,767	0	187,111	0	0	0	0	1,656
Indiana	90,061	0	89,591	0	0	0	0	470
Iowa	173,467	0	170,812	0	0	0	0	2,655
Kansas	124,378	0	122,976	0	0	0	0	1,402
Kentucky	295,304	0	294,850	0	0	0	0	454

	Total	Original Source						
		1990 ACF	Address Listing	Block Canvassing	Dress Rehearsal	LUCA 1998	LUCA 98 and DSF 2	LUCA 99 Relisting
Louisiana	217,115	0	215,956	0	0	1	1	1,157
Maine	163,174	0	162,229	0	0	0	0	945
Maryland	77,522	0	76,636	0	0	0	0	886
Massachusetts	21,521	0	21,429	0	0	0	0	92
Michigan	261,445	0	257,941	0	0	0	0	3,504
Minnesota	276,642	0	272,750	0	0	0	0	3,892
Mississippi	185,567	0	183,242	0	0	0	0	2,325
Missouri	345,525	0	343,592	0	0	0	0	1,933
Montana	121,835	0	121,114	0	0	0	0	721
Nebraska	105,486	0	104,752	0	0	0	0	734
Nevada	79,006	0	70,939	0	0	0	0	8,067
New Hampshire	84,278	0	83,772	0	0	0	0	506
New Jersey	40,771	0	40,218	0	0	0	0	553
New Mexico	115,903	0	115,198	0	0	0	0	705
New York	438,470	0	434,350	0	0	0	0	4,120
North Carolina	563,737	0	555,063	0	0	0	0	8,674
North Dakota	62,947	0	61,910	0	0	0	0	1,037
Ohio	183,160	0	182,053	0	0	0	0	1,107
Oklahoma	256,357	0	254,895	0	0	0	0	1,462
Oregon	70,780	0	69,500	0	0	0	0	1,280

	Total	Original Source					
		1990 ACF	Address Listing	Block Canvassing	Dress Rehearsal	LUCA 1998	LUCA 98 and DSF 2	LUCA 99 Relisting
Pennsylvania	428,313	0	422,494	0	0	0	0	5,819
South Carolina	196,460	0	187,303	0	1,924	0	0	7,233
South Dakota	65,794	0	64,856	0	0	0	0	938
Tennessee	272,969	0	270,716	0	0	0	0	2,253
Texas	699,820	0	689,941	0	0	0	0	9,879
Utah	68,260	0	67,392	0	0	0	0	868
Vermont	89,616	0	89,319	0	0	0	0	297
Virginia	349,350	0	346,494	0	0	0	0	2,856
Washington	84,143	0	83,143	0	0	0	0	1,000
West Virginia	260,139	0	259,947	0	0	0	0	192
Wisconsin	119,289	1	117,270	1	0	0	0	2,017
Wyoming	28,471	0	28,209	0	0	0	0	262

Data source: March 2001 MAF extract

** District of Columbia and Rhode Island have no U/L and are not shown in this table.

Appendix K: State-level tally of Original Source for U/L deletes

		Original Source								
	Total	1990 ACF	Address Listing	Block Canvassing	DSF 1	Dress Rehearsal	LUCA 1998	LUCA 99 Relisting	Nonresponse Followup	Unknown - TEA 2
Total	1,228,987	10	1,182,157	123	18	908	9	45,758	2	2
Alabama	50,129	0	49,564	0	0	0	0	565	0	0
Alaska	5,439	0	5,290	0	0	0	0	149	0	0
Arizona	23,107	0	18,919	0	0	0	0	4,188	0	0
Arkansas	38,333	0	37,009	0	0	0	0	1,324	0	0
California	37,331	3	35,158	2	1	0	0	2,165	2	0
Colorado	23,189	0	20,846	2	0	0	0	2,341	0	0
Connecticut	3,105	0	3,070	0	0	0	0	35	0	0
Delaware	2,438	0	2,382	0	0	0	0	56	0	0
Florida	38,923	0	38,018	0	0	0	0	905	0	0
Georgia	63,953	0	58,680	0	0	0	0	5,271	0	2
Hawaii	3,661	0	3,528	0	0	0	0	133	0	0
Idaho	5,642	0	5,229	0	1	0	0	412	0	0
Illinois	17,067	0	16,724	0	0	0	0	343	0	0
Indiana	8,612	0	8,453	0	0	0	0	159	0	0
Iowa	16,901	0	16,082	0	0	0	0	819	0	0
Kansas	13,818	0	13,525	0	0	0	0	293	0	0
Kentucky	43,997	0	43,881	0	0	0	0	116	0	0

		Original Source								
	Total	1990 ACF	Address Listing	Block Canvassing	DSF 1	Dress Rehearsal	LUCA 1998	LUCA 99 Relisting	Nonresponse Followup	Unknown - TEA 2
Louisiana	36,877	7	36,313	10	14	0	9	524	0	0
Maine	15,270	0	15,115	0	0	0	0	155	0	0
Maryland	7,888	0	7,478	0	0	0	0	410	0	0
Massachusetts	2,714	0	2,685	0	0	0	0	29	0	0
Michigan	28,999	0	27,789	0	0	0	0	1,210	0	0
Minnesota	22,690	0	21,583	0	0	0	0	1,107	0	0
Mississippi	32,877	0	32,166	0	0	0	0	711	0	0
Missouri	40,215	0	39,641	0	0	0	0	574	0	0
Montana	12,547	0	12,225	0	0	0	0	322	0	0
Nebraska	7,907	0	7,713	0	0	0	0	194	0	0
Nevada	6,815	0	4,904	0	0	0	0	1,911	0	0
New Hampshire	8,817	0	8,702	0	0	0	0	115	0	0
New Jersey	4,046	0	3,615	0	0	0	0	431	0	0
New Mexico	22,645	0	22,130	0	0	0	0	515	0	0
New York	48,942	0	47,905	0	0	0	0	1,037	0	0
North Carolina	95,337	0	92,124	0	0	0	0	3,213	0	0
North Dakota	6,505	0	6,236	0	0	0	0	269	0	0
Ohio	20,633	0	20,320	0	0	0	0	313	0	0
Oklahoma	33,656	0	33,151	0	0	0	0	505	0	0

	Original Source									
	Total	**1990 ACF**	**Address Listing**	**Block Canvassing**	**DSF 1**	**Dress Rehearsal**	**LUCA 1998**	**LUCA 99 Relisting**	**Nonresponse Followup**	**Unknown - TEA 2**
Oregon	10,062	0	9,637	0	0	0	0	425	0	0
Pennsylvania	36,902	0	34,240	0	0	0	0	2,662	0	0
South Carolina	43,749	0	39,888	0	0	908	0	2,953	0	0
South Dakota	5,803	0	5,605	0	0	0	0	198	0	0
Tennessee	40,754	0	39,956	0	0	0	0	798	0	0
Texas	113,791	0	110,078	0	0	0	0	3,713	0	0
Utah	6,582	0	5,948	0	0	0	0	634	0	0
Vermont	10,368	0	10,263	0	0	0	0	105	0	0
Virginia	45,794	0	45,265	0	0	0	0	529	0	0
Washington	11,419	0	10,990	103	0	0	0	326	0	0
West Virginia	35,365	0	35,335	0	0	0	0	30	0	0
Wisconsin	13,563	0	13,083	6	2	0	0	472	0	0
Wyoming	3,810	0	3,716	0	0	0	0	94	0	0

Data source: March 2001 MAF extract

** District of Columbia and Rhode Island have no U/L and are not shown in this table.

Appendix L: State-level tally of Original Source for U/L moves

		Original Source	
	Total	**Address Listing**	**LUCA 99 Relisting**
Total	24,265	24,252	13
Alabama	693	693	0
Alaska	15	15	0
Arizona	634	633	1
Arkansas	541	541	0
California	895	895	0
Colorado	667	667	0
Connecticut	157	157	0
Delaware	33	33	0
Florida	1,131	1,131	0
Georgia	963	959	4
Hawaii	23	23	0
Idaho	72	72	0
Illinois	297	297	0
Indiana	93	93	0
Iowa	322	321	1
Kansas	224	224	0
Kentucky	858	858	0

	Total	Original Source	
		Address Listing	LUCA 99 Relisting
Louisiana	895	895	0
Maine	197	197	0
Maryland	281	281	0
Massachusetts	64	64	0
Michigan	519	518	1
Minnesota	363	363	0
Mississippi	710	710	0
Missouri	742	742	0
Montana	396	396	0
Nebraska	143	143	0
Nevada	128	128	0
New Hampshire	270	270	0
New Jersey	287	287	0
New Mexico	356	355	1
New York	896	896	0
North Carolina	2,274	2,273	1
North Dakota	226	226	0
Ohio	393	393	0
Oklahoma	304	304	0
Oregon	174	174	0

	Total	Original Source	
		Address Listing	LUCA 99 Relisting
Pennsylvania	553	552	1
South Carolina	1,157	1,157	0
South Dakota	103	103	0
Tennessee	1,172	1,172	0
Texas	1,597	1,594	3
Utah	371	371	0
Vermont	72	72	0
Virginia	1,006	1,006	0
Washington	160	160	0
West Virginia	404	404	0
Wisconsin	299	299	0
Wyoming	135	135	0

Data source: March 2001 MAF extract

** District of Columbia and Rhode Island have no U/L and are not shown in this table.

Appendix M: MAF variables

Questionnaire Delivery Action Code (QDACT)
A: add
C: correction
D: delete
M: move
N: nonresidential
V: verify

Group Quarters/Housing Unit Flag (GQ_HUF)
0: Housing Unit
1: Special Place
2: Group Quarters
3: GQ Embedded Housing Unit

Initial Census Address List Flag (ICALUNIV)
1: In initial mail universe
2: Sent to Update/Leave
5: Sent to Update/Enumerate
7: Sent to Urban Update/Leave
Blank: Not part of initial Census universe

In Census Flag (INCENSUS)
Y: Final Census 2000 record
N: Not a final Census 2000 record

Delivery Specific Address Flag (DSAF)
Y: Valid address for this delivery
N: Not a valid address for this delivery

Current State (CST)
1-72

Current County (CCO)

Within-County ID (W_COID)
starts with 0000001

Surviving Within-County ID (SW_COID)
starts with 0000001

Type of Enumeration Area (TEA)
Based on 2000 collection block:
1: Mailout/Mailback
2: Update/Leave
3: List/Enumerate
4: Remote Alaska
5: Rural Update/Enumerate (from TEA 2)
6: Military in Update/Leave area
7: Update/Enumerate
8: Urban Update/Enumerate (from TEA 1)
9: Update/Leave (from TEA 1)

Number of Units at this BSA (NUMUNITS)
derived from number of DMAF-deliverable units at a BSA

Additional defined variables

Evaluation State (EST)

Evaluation County (ECO)

MAFID
characters 1-2 = state code when the within county ID was assigned
characters 3-5 = county code when the within county ID was assigned
characters 6-12 = within county ID

Address Type (ADRESTYP)
see U.S. Census Bureau 2001a

Original Source (OS)
see U.S. Census Bureau 2001b