

Block Canvassing 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

This evaluation quantifies the impact of the Census 2000 Block Canvassing Operation on the Master Address File by profiling the housing units that Block Canvassing added to, deleted from, and corrected on the Master Address File. This evaluation does not provide a thorough comparison of Block Canvassing results to final census results or to the MAF building process as a whole. A more thorough analysis of these comparisons will be provided in the Address List Development Topic Report.

The Master Address File is the U.S. Census Bureau's list of residential addresses in the country. It also contains many nonresidential addresses as a by-product of its development. The Block Canvassing operation was one of the largest operations the Census Bureau conducted to update the Master Address File in preparation for Census 2000. It occurred in the winter/spring of 1999. The operation required field listers to conduct a 100 percent canvass of residential addresses in areas containing predominantly city-style addresses.

For each housing unit located in the Block Canvassing search area, results from the Block Canvassing listers were used to assign each housing unit to one of six basic action code categories:

- *Verify*
- *Add*
- *Delete*
- *Address Corrected*
- *Geographic Corrections*
- *Add and Verify*

We used the extracts of the Master Address File from November 2000 and March 2001 to produce all of the numbers presented in this evaluation. Our major results follow.

What is the profile of Block Canvassing Adds?

Block Canvassing listers added a total of 6,389,271 addresses to their listing pages. About 95 percent of the added units had city-style addresses.

Geocoding - the assignment of addresses to census blocks

Based on preliminary results, Block Canvassing appears to have a high level of geocoding accuracy. Over 94 percent of the adds show a Block Canvassing block code equal to the official block code on the Master Address File.

Original Source

Around 29 percent of addresses added by Block Canvassing actually were on the Master Address File before Block Canvassing occurred but were either:

- ungeocoded until Block Canvassing geocoded them,
- moved to different blocks by Block Canvassing, or
- considered non-residential until Block Canvassing determined that they were residential units

What is the profile of Block Canvassing Deletes?

Block Canvassing listers deleted a total of 5,146,320 addresses from their listing pages.

Original Source

The original source of an address is the first source that added the address to the Master Address File. In general, Block Canvassing deleted a larger proportion of addresses that had a newer original source than addresses with an older original source. For example, the 1990 Address Control File showed a lower percentage of deletes than the November 97 Delivery Sequence File.

Size of Basic Street Address

Around 48 percent of all Block Canvassing deletes occurred in multi-unit basic street addresses. About 35 percent of adds occurred in multi-unit basic street addresses. We suspect that there are so many more multi-unit deletes than multi-unit adds due to many duplicate addresses in multi-units showing different unit designations for the same unit.

How do Block Canvassing results compare to Census Results?

Around 78 percent of the added units were valid housing units in Census 2000, while almost 24 percent of the deleted addresses actually were later enumerated as housing units in the census. About 96 percent of addresses coded as existing by Block Canvassing ended up as valid housing units in the census. Also, 96 percent of all addresses sent to Block Canvassing to be verified showed consistent results between Block Canvassing and the census.

How many blocks did not receive any updates from Block Canvassing?

A total of 1,186,240 blocks did not receive any updates from Block Canvassing.

These blocks had an accurate address list before Block Canvassing, and did not gain anything from Block Canvassing. Some blocks did not contain any residential units and other blocks had actions of “verified” for all residential units in the block.

These 1,186,240 blocks represent about 31 percent of the total blocks in the universe.

Conclusions

Block Canvassing was a large operation that provided a large number of updates to the Master Address File.

Block Canvassing not only played a large role in improving the coverage of addresses on the Master Address File but also in improving the geocoding of addresses on the Master Address File.

Block Canvassing played a significant part in correcting unit designations in multi-unit basic street addresses. If the Block Canvassing listers had not checked individual addresses within multi-units, but only verified the number of units at the multi-units, the Master Address File would not have this added improvement.

The results of clustering by block size in this report show us that almost one third of the blocks inside the blue-line did not have any updates from Block Canvassing. Also, a small percentage of the blocks are blocks with ten or more updates. These results suggest that we can improve the highest concentration of coverage errors by visiting a small number of blocks.

A relatively large amount of Block Canvassing adds and deletes turned out to be inconsistent with census results (22 and 24 percent, respectively). However, the consistency between Block Canvassing and the census, as a whole, appears to be relatively good.

Recommendations

In keeping the MAF as up-to-date as possible, the Census Bureau should continue to explore the possibility of targeting areas with certain characteristics as priority areas for updating the file. The clustering results in this report should be a first step to showing how we could target areas for MAF updates.

Based on the high percentage of adds and deletes that were inconsistent with census results, we recommend that the Census Bureau make additional efforts in the future to see if quality review programs can reduce inconsistencies for added and deleted addresses.

Additional recommendations will be provided in the Address List Development Topic Report.

1. BACKGROUND

This evaluation quantifies the impact of the Census 2000 Block Canvassing Operation on the Master Address File (MAF) by profiling the housing units that Block Canvassing added to, deleted from, and corrected on the Master Address File. This evaluation does not provide a thorough comparison of Block Canvassing results to final census results or to the MAF building process as a whole. A more thorough analysis of these comparisons will be provided in the Address List Development Topic Report.

1.1 Similar Operations in Past Censuses and Tests

For the 1990 census, the Census Bureau conducted an operation called Precanvass to improve its address list in Tape Address Register (TAR) mailout/mailback areas. TAR areas were areas in which the initial address list was purchased from commercial vendors, and were located in densely populated urban areas and areas surrounding these central cities. In the Precanvass operation, census workers canvassed streets in order to update the census address list with missing addresses, made corrections to existing addresses, corrected census geography, and identified duplicate, nonexistent, and commercial addresses.

The evaluation of the 1990 Precanvass operation included a summary of the impact of the operation on the address list. Specifically, tallies were computed for addresses for which Precanvass listers added, deleted, or corrected geographic assignments. In addition, tallies were computed for different characteristics of those addresses. For 1990, Precanvass listers added a total of 5,962,985 addresses to the address list, deleted 2,222,195 addresses, and corrected geographic assignments for 1,367,029 addresses. For more information on 1990 Precanvass, see *Programs to Improve Coverage in the 1990 Census, 1993*.

Block Canvassing was not conducted in the Census 2000 Dress Rehearsal.

1.2 Description of the Census 2000 Block Canvassing Operation

The Census Bureau conducted the Block Canvassing operation, similar to Precanvass, to update the MAF for Census 2000. Block Canvassing was one of the largest MAF building operations that the Census Bureau conducted for Census 2000. Block Canvassing was not limited to densely populated urban areas and surrounding areas, and therefore covered more land area than the 1990 Precanvass operation covered. It occurred in the winter/spring of 1999. The operation required field listers to conduct a 100 percent canvass of addresses within areas that are “inside the blue-line.” Areas “inside the blue-line” are areas that contain predominantly city-style (house number and street name) addresses. See section 1.5 for a detailed description of areas that are inside and outside the blue-line.

A total of 91,612,770 addresses were in the universe of addresses to be verified in Block Canvassing. The operation occurred in 3,801,560 blocks in the nation. This number represents

51 percent of the total 7,421,899 blocks in the nation (not including water blocks). Block Canvassing occurred in parts of 2,119 counties out of a total 3,141 counties in the nation.

In Block Canvassing, listers canvassed addresses printed in their listing books and used maps as aids in locating structures that contain living quarters. The listers compared each address found on the ground with those in the listing book and recorded all corrections, additions, and deletions on its listing pages. The listers also updated census maps to show additions, corrections, and deletions to road features. The listers stopped at every third door to inquire about the addresses on either side of that address as well as to identify any “hidden” units.

1.3 Updating the Master Address File

The MAF is the Census Bureau’s list of residential addresses in the country. It also contains many nonresidential addresses as a by-product of its development. For Census 2000, the Census Bureau departed from the past approach of creating a census address list from scratch and decided to create a continuously updated MAF. This is the first Census to use the previous census’ address list as a starting point. The Census Bureau will maintain the MAF as a sampling frame throughout the next decade.

1.3.1 Operations and Address Sources

For areas that are inside the blue-line, the Census Bureau used the 1990 census Address Control File (ACF) as the starting point for creating the MAF. Then the Census Bureau used addresses from a series of files and operations to update the MAF. Some of these files and operations included:

- the November 1997 Delivery Sequence File (DSF) from the U.S. Postal Service (USPS) (in some areas of the country we used earlier versions of the DSF to update the MAF),
- the September 1998 DSF,
- the Block Canvassing Operation,
- the Local Update of Census Address 1998 (1998 LUCA), and
- 1998 LUCA Field Verification.

The Census Bureau incorporated the September 1998 DSF and all earlier DSFs into the MAF before producing address registers to be used in Block Canvassing. In some areas of the nation, address information from the 1998 LUCA updated the MAF before Block Canvassing materials were produced. In other areas of the nation, address information from Block Canvassing updated the MAF before the 1998 LUCA materials were produced. In even other areas, Block Canvassing and the 1998 LUCA used the same version of the MAF to provide updates. Once we incorporated the results of Block Canvassing and the 1998 LUCA into the MAF, 1998 LUCA Field Verification could take place. In this operation, we reconciled inconsistencies between Block Canvassing and the 1998 LUCA.

The Census Bureau used several other sources of addresses to update the MAF inside the blue-line, but we will not discuss them in this evaluation. This evaluation is limited to the Block Canvassing operation and its effect on the MAF. The Address List Development Topic Report will look at all of the operations that affected the MAF during Census 2000 to determine what their individual impact was to the final census inventory of housing units.

Even though this evaluation is limited to Block Canvassing, when reviewing some of the results in this evaluation it is necessary to understand what the sources were that preceded or occurred at the same time as Block Canvassing. All of the sources mentioned above either preceded or occurred at the same time as Block Canvassing with the exception of the 1998 LUCA Field Verification (results from LUCA Field Verification are used in the calculation of some statistics in this evaluation).

1.3.2 Updating the MAF with Block Canvassing Results

Each address was placed into one of the following action code categories:

- Add (address referred to an existing housing unit but did not appear on the listing pages; the lister had to add it to the listing pages)
- Verified as an existing housing unit
- Address Correction Needed
- Delete (address does not exist in the block)
- Duplicate Address
- Uninhabitable address
- Nonresidential address
- Geographic Correction
- Add and Verify

Field listers identified addresses in the first seven categories. The Census Bureau created the “Geographic Correction” and “Add and Verify” categories when the MAF was updated with Block Canvassing results. A geographic correction resulted from an address indicated as an add in one block merging with an address indicated as a delete in a different block. An “Add and Verify” address resulted from an address indicated as an add merging with an address indicated as a verify. We considered these addresses as being located in the blocks in which they were added. For some of these addresses the add and verify were originally in the same block. For others, the add and verify were originally in different blocks.

1.4 Geocoding

Geocoding is the assignment of addresses on the MAF to census blocks. There are two ways in which addresses can be geocoded:

1. A MAF building operation can indicate the block in which a particular address is located.
2. An address on the MAF can link to an address range in the Topologically Integrated Geographic Encoding and Referencing System (TIGER) database.

An *ungeocoded* address is an address on the MAF that we could not geocode by either of the two methods. When two or more operations provide disagreeing block codes for a particular address, the Census Bureau uses a scoring hierarchy to determine the official block.

1.5 Inside vs Outside the Blue-Line

To prepare for Census 2000, the Census Bureau classified each census block in the nation into one of nine enumeration areas:

- Mailout/Mailback
- Update/Leave
- List/Enumerate
- Remote Alaska
- Rural Update/Enumerate
- Military
- Urban Update/Leave
- Urban Update/Enumerate
- Additions to Address Listing Universe of Blocks

Most MAF building operations occur within a unique subset of these enumeration areas. Block Canvassing occurred in the Mailout/Mailback, Military, Urban Update/Leave, and Urban Update/Enumerate areas. This subset of enumeration areas is known as the *inside the blue-line* areas. As stated before, addresses in these areas are predominantly city-style addresses. The remaining subset of enumeration areas is known as the *outside the blue-line* areas. The areas outside the blue-line contain a large percentage of non-city-style addresses, such as P.O. Box and Rural Route addresses. These areas also contain city-style addresses.

Even though we only conducted Block Canvassing inside the blue-line, it was possible for Block Canvassing addresses to geocode to a block outside the blue-line. This could happen if a Block Canvassing address matched to an address on the MAF outside the blue-line and the scoring hierarchy gave a higher precedence to the block code provided by the outside the blue-line source. For a Block Canvassing add that matched to an address that is outside the blue-line, we believe that the Block Canvasser went outside his or her boundaries and incorrectly added the

address.

1.6 Original Source of Address

Evaluations of the MAF-building operations required identification of the source of every address on the MAF. An Original Source variable, which did not exist on the MAF, was defined and created by the Planning, Research, and Evaluation Division (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:

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

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

2. METHODS

2.1 MAF Addresses used in this evaluation

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

2.2 Levels of geography used to analyze numbers

The Census Bureau uses *collection geography* for taking a census. Collection geography reflects boundaries that are physical features such as roads and rivers. *Tabulation geography* reflects the entities for which the Census Bureau tabulates and presents data.

In this evaluation we primarily analyze data using tabulation geography. The tabulation state, county, and block codes on the November 2000 MAF extracts were the most accurate geography codes for addresses on the MAF at the time the extracts were created.

We produced all statistics at the national and state levels, and in some instances we produced statistics at the county level. We included Washington, D.C. as a state equivalent when producing numbers at the state level. Block Canvassing did not occur in Puerto Rico, so we excluded Puerto Rico from the analysis.

2.3 Action code categories used to analyze numbers

For the purpose of this evaluation, we collapsed the nine original action code categories into six categories:

- Verifies
- Adds
- Deletes - includes deletes, duplicates, uninhabitable addresses, and nonresidential addresses. There was some indication that addresses in this category were housing units before Block Canvassing but Block Canvassing classified them as not being housing units in the blocks in which they were geocoded.
- Addresses Corrected
- Geographic Corrections - includes the adds matched to deletes
- “Add and Verify” Addresses - includes the adds matched to verifies

We did produce some calculations for the individual delete categories, but we grouped the

different types of deletes together for most calculations. We did not produce any calculations for the verified addresses in this evaluation.

For “Add and Verify” addresses where the add and verify were in the same block, we would ideally like to treat these addresses as verified in the block. For “Add and Verify” addresses where the add and verify were in different blocks, we would ideally like to treat these addresses as geographic corrections. However, both types were originally included in the same category and we have no way of separating them.

2.4 Original source categories used to analyze numbers

Neither the MAF nor any other file included a variable showing the original source that placed an address on the MAF. We developed rules and attempted to create our own original source variable. Due to the variety and complexity of source information in the MAF, the “original source” could not always be determined with certainty.

When computing statistics of interest for this evaluation, we grouped the different values of original source into five categories defined by their relation to Block Canvassing:

- Pre-Block Canvassing - contains addresses that were originally added to the MAF by a source that was valid inside the blue-line and that occurred before Block Canvassing
- Block Canvassing - contains addresses that were originally added to the MAF by Block Canvassing
- Block Canvassing and LUCA 98 - contains addresses that were originally added to the MAF by Block Canvassing and the 1998 LUCA at the same time
- Unknown /Inside the blue-line - contains addresses that are located inside the blue-line but have an unknown original source
- Outside the blue-line - contains:
 - addresses that are located outside the blue-line and were originally added to the MAF by a source that is only valid outside the blue-line, and
 - addresses that are located outside the blue-line but have an unknown original source

2.5 Type of Address Categories used to analyze numbers

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

- The city-style category includes all units that had complete city-style addresses, which consists of a house number and street name.
- The Rural Route category includes units that did not have a complete city-style address but did have a complete rural route address, such as Rural Route 2, Box 3.
- The P.O. Box category includes units that did not have a complete city-style or rural route address but did have a complete P.O. Box address, such as P.O. Box 5.
- The incomplete category includes units that had some address information but did not have a complete address of any type.
- The no address information category includes units that are missing house number, street name, Rural Route, and P.O. Box information.

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

It should be noted that not all city-style addresses can be used for mail delivery. Many housing units have a non-city-style address which is used for mail delivery and a city-style address used for a different purpose (such as an E-911 address).

2.6 Applying Quality Assurance Procedures

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

3. LIMITS

3.1 We did not use the March 2001 MAF extracts for all of our statistics

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

3.2 The size of basic street address (BSA) variable was overstated

The variable showing the number of housing units at a basic street address on the MAF included all addresses indicated as Decennial Master Address File (DMAF) deliverable during the census process. See section 4.1.7 for a definition of “DMAF deliverable.” Only a subset of these addresses remained in the census. Therefore, the size of BSA variable on the MAF is overstated relative to the size of BSA as of the end of the census. Additionally, the size of BSA variable was only determined for units with city-style address information. Units with non-city-style addresses are considered single units.

3.3 Addresses in the Block Canvassing universe that received no action from Block Canvassing were coded as “verified”

When Block Canvassing listers took no action on an address, the Block Canvassing action code for that address was supposed to remain blank on the MAF. However, we received information that sometimes these blank values were converted to “V” (verified as existing unit) on the MAF. We do not know the magnitude of this occurrence. We do not have the ability to distinguish between addresses that were verified from addresses that received no action from Block Canvassing.

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

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

3.5 Comparing results to previous censuses

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

4. RESULTS

The six basic action codes assigned to addresses based on the results of Block Canvassing include (with total addresses assigned to each action code):

- *Verify*.....81,115,466 addresses
- *Add*.....6,389,271 addresses
- *Delete*.....5,146,320 addresses
- *Address Corrected*.....2,295,168 addresses
- *Geographic Correction*.....2,948,414 addresses
- *Add and Verify*.....107,402 addresses

We did not produce any additional calculations for the verified addresses or for the “add and verify” addresses. In the following sections, we present calculations for the adds, deletes, addresses corrected, and geographic corrections. Unless otherwise noted, we base all results on the November 2000 MAF extracts.

4.1 What is the profile of Block Canvassing Adds?

Total Adds: 6,389,271

Percent Increase: 7%

Percent increase is the total number of adds (6,389,271) divided by the number of addresses in the initial Block Canvassing universe (91,612,770).

The state level percent increase of adds ranges from 22 percent in Vermont to 1.5 percent in Washington, D.C. The 22 percent number is very high, with the second highest state, Alaska showing a 14 percent increase. Vermont experienced E-911 address conversions throughout the state. Block Canvassing listers were not allowed to change house numbers on the listing pages. If the house number of a unit changed due to E-911 conversion, the Block Canvassing lister was supposed to add a record for the new house number. If this situation occurred many times in Vermont, it could explain the high concentration of adds in that state.

See state level counts in Appendix A, Table 1.

4.1.1 Block Code Agreement of Adds

Several different operations provided block codes for addresses on the MAF as of November 2000. When two or more operations provided disagreeing block codes for a particular address, the Census Bureau used a scoring hierarchy to determine the official block. Table 1 shows the extent that the block code provided by Block Canvassing for each add agreed with the official block code as determined by the scoring hierarchy:

Table 1. Percentage of Block Canvassing Adds by Block Canvassing Block Code Agreement

Level of Agreement	# of Addresses	% of Total
Same as official block	6,033,606	94.43
Different from official block	344,134	5.39
Block Canvassing provided no block code	11,531	0.18
Total Adds	6,389,271	100.00

Percentages may not sum to 100 due to rounding

Over 94 percent of the adds show a Block Canvassing block code equal to the official block code on the MAF. At the state level, every state shows a percentage of 86 or greater. We expect high percentages for this statistic because:

- 1) other operations inside the blue-line were small relative to Block Canvassing and therefore had fewer opportunities to disagree with the block code provided by Block Canvassing, and
- 2) unlike some other operations, in Block Canvassing listers actually visited the areas to determine which block the units were in.

The roughly five percent of adds identified as “different from official block” are cases where the Block Canvassing lister provided a block code that disagrees with the official block code as determined by the scoring hierarchy. Specifically, these adds could be:

- Addresses that received block code changes from operations inside the blue-line (not Block Canvassing)
- Addresses that actually exist outside the blue-line but were incorrectly added by Block Canvassing. We recognize these cases when a Block Canvassing add matches to an address on the MAF that exists outside the blue-line or when the Block Canvassing address geocodes to an address that exists outside the blue-line

See state level counts in Appendix A, Table 2.

4.1.2 Enumeration Area of Adds

Table 2 shows the magnitude of Block Canvassing adds in the two basic enumeration areas as well as the magnitude of adds that are ungeocoded.

Table 2. Percentage of Block Canvassing Adds by Basic Enumeration Area

Enumeration Area	# of Addresses	% of Total
Inside the blue-line	6,370,707	99.71
Outside the blue-line	16,372	0.26
Ungeocoded	2,192	0.03
Total Adds	6,389,271	100.00

Percentages may not sum to 100 due to rounding

Over 99 percent of the adds remained inside the blue-line. Block Canvassing listers went outside of their boundaries to erroneously list the 0.3 percent of addresses that we consider to be outside the blue-line. For these addresses, an outside the blue-line source determined the official block code according to the scoring hierarchy. For example, the Census Bureau may have geocoded these addresses to blocks outside the blue-line through mapspot geocoding. Mapspot geocoding has a higher priority than Block Canvassing adds in determining block code. We are not overly concerned with addresses being classified to the wrong enumeration area, because of the small impact of these cases reported here. Ungeocoded addresses also do not appear to be a major concern. Only about 0.03 percent of the adds remained ungeocoded as of the November 2000 extracts.

Every state has over 93 percent of the Block Canvassing adds inside the blue-line.

See state level counts in Appendix A, Table 3.

Table 3 shows the magnitude of Block Canvassing adds in the individual enumeration areas inside the blue-line.

Table 3. Percentage of Block Canvassing Adds by Inside the Blue-Line Enumeration Area

Enumeration Area	# of Addresses	% of Total
Mailout/Mailback	6,318,157	99.18
Military	12,269	0.19
Urban Update/Leave	27,831	0.44
Urban Update/Enumerate	12,450	0.20
Total Adds Inside the Blue-Line	6,370,707	100.00

Percentages may not sum to 100 due to rounding

As stated in the background section, the Census Bureau conducted Block Canvassing in all of the enumeration areas in the above table. The Mailout/Mailback enumeration area had the largest workload, by far, of any enumeration area where Block Canvassing was conducted.

4.1.3 Address Type of Adds

Table 4 shows the magnitude of Block Canvassing adds that are classified into different type of address categories. See section 2.5 for a more detailed description of the address type categories.

Table 4. Percentage of Block Canvassing Adds by Address Type

Address Type	# of Addresses	% of Total
Complete City-style	6,084,846	95.24
Complete Rural route	26,773	0.42
with location description	26,655	0.42
without location description	118	<0.01
Complete PO Box	5,639	0.09
with location description	5,500	0.09
without location description	139	<0.01
Incomplete address	271,285	4.25
with location description	264,404	4.14
without location description	6,881	0.11
No address information	728	0.01
with location description	728	0.01
without location description	0	0
Total Adds	6,389,271	100.00

Percentages may not sum to 100 due to rounding

According to the table, over 95 percent of the adds have city-style addresses. This result leads us to believe that the Census Bureau did a good job at minimizing units with only non-city-style addresses in the “inside the blue-line” areas, since the “inside the blue-line” areas are supposed to contain predominantly city-style addresses. However, as stated before, not all housing units with city-style addresses receive mail at the city-style addresses. Currently, we do not have a way to compute the percentage of adds inside the blue-line with city-style addresses used for mail delivery.

A little over four percent of the adds have incomplete address information. Units that have non-city-style addresses with no location descriptions and units that have incomplete addresses and no location descriptions are of the biggest concern in terms of the ability to locate the units. However, the magnitude of these addresses is very small (about 0.1 percent of the total).

4.1.4 Original Source of Adds

Table 5 below shows the magnitude of adds in each of the original source categories:

Table 5. Percentage of Block Canvassing Adds by Original Source Category

Original Source	# of Addresses	% of Total
Pre-Block Canvassing	1,853,037	29.00
Block Canvassing	3,961,761	62.01
Block Canvassing and LUCA 98	568,915	8.90
Outside blue-line	5,558	0.09
Total Adds	6,389,271	100.00

Percentages may not sum to 100 due to rounding

As shown in the table, over 99 percent of the adds originally came from expected sources that are valid inside the blue-line (Pre-Block Canvassing, Block Canvassing, and Block Canvassing/LUCA 98). The remaining adds represent addresses that were originally added by sources that are only valid outside the blue-line or that were added by an unknown original source and remained outside the blue-line (for an address located outside the blue-line, the original source is the first source that added the address to the MAF outside the blue-line). Over 99 percent of the adds originally came from expected sources inside the blue-line in every state except Wyoming (about 98 percent). As stated before, there does not appear to be a big problem with Block Canvassing listers erroneously adding addresses that exist outside the blue-line.

One interesting result from Table 4 is the fact that of all addresses added by the Block Canvassing listers, about 71 percent of the addresses have Block Canvassing as the original source (Block Canvassing and Block Canvassing/LUCA 98). The 29 percent are addresses that were added to the MAF by a source that preceded Block Canvassing but were one of the following:

- ungeocoded until Block Canvassing geocoded them,
- moved to different blocks by Block Canvassing, or
- considered non-residential until Block Canvassing determined that they were residential units

The Census Bureau only included residential addresses that were geocoded to Census 2000 collection blocks to be verified in Block Canvassing. Therefore, addresses that were ungeocoded or coded as non-residential prior to Block Canvassing did not appear on the Block Canvassing listing books. The Block Canvassing listers added any existing residential units that were missing from their listing pages.

Some of the addresses that moved to different blocks represent geocoding errors on the MAF that

were corrected by Block Canvassing, while others represent geocoding errors that were created by Block Canvassing (a Block Canvassing lister may have erroneously added an address to his or her search area).

When the Census Bureau placed the Block Canvassing adds onto the MAF, we could recognize about 1.8 million of them to be addresses that were already on the MAF but were previously ungeocoded, coded to a different block, or coded as non-residential.

At the state level, the percentage of Block Canvassing adds that were new to the MAF ranges from about 89 percent in Alaska to 55 percent in Tennessee. This result shows us that prior to Block Canvassing, the extent of ungeocoded addresses and addresses miscoded as non-residential on the MAF varied a great deal among the states.

See state level counts in Appendix A, Table 4.

4.1.5 Size of Basic Street Address (BSA) for Adds

Table 6 shows the number and percentage of adds in each of the different basic street address (BSA) categories.

Table 6. Percentage of Block Canvassing Adds by Size of BSA

Size of BSA	# of Addresses	% of Total
Blank	19,777	0.31
Single unit	4,106,666	64.27
Multi-unit	2,262,828	35.42
2-4 units	1,220,453	19.10
5-9 units	447,102	7.00
10-19 units	450,673	7.05
20-49 units	107,321	1.68
50+ units	37,279	0.58
Total Adds	6,389,271	100.00

Percentages may not sum to 100 due to rounding

As noted in the table, single units account for about 64 percent of the total adds. Some of the adds in multi-unit BSAs can be attributed to entire multi-units that are missing from the listing pages. Other adds result from situations where a multi-unit is on the listing pages but some of the units are missing. We do not have information to determine the magnitude of these situations relative to one another.

4.1.6 Clustering of Adds by size of block

Results show that 2,933,457 blocks did not have any adds from Block Canvassing. This represents about 77 percent of the 3,801,560 blocks inside the blue-line. Some of the blocks with zero adds may contain only commercial units. Other of these blocks may be residential blocks that were up-to-date on the MAF and required no change.

Table 7 shows the percentage of inside the blue-line blocks in each of the categories showing the number of units that Block Canvassing added. The table is limited to blocks with at least one add.

Table 7. Percentage of Blocks Inside the Blue-Line by Number of Block Canvassing Adds

Number of Adds Category	# of Blocks	% of Total
1 unit	351,691	40.51
2-9 units	396,149	45.63
10-19 units	63,279	7.29
20-59 units	41,044	4.73
60-99 units	7,638	0.88
100+ units	8,302	0.96
Total Blocks Inside the Blue-Line with at least one Add	868,103	100.00

Percentages may not sum to 100 due to rounding

As shown in the table, over 86 percent of the blocks with at least one add received nine or fewer adds from Block Canvassing.

As stated in the methods section, we used tabulation state, county, and block codes whenever possible in data analysis. However, we had to use collection state, county, and block codes for the results in the table above. We had to use the enumeration area code on the MAF to determine blocks inside the blue-line. The enumeration area code is available for collection blocks but not for tabulation blocks.

4.1.7 DMAF Deliverability of Adds

The Decennial Master Address File (DMAF) is the file used for the delivery of Census forms to respondents. An address on the MAF was DMAF deliverable if it was adequate to include in the census enumeration. The rules for determining the DMAF deliverability of an address were relatively complex. In general, the DMAF included MAF addresses that represented potential residential units that were geocoded to census blocks.

The percentage of Block Canvassing adds in the nation that were DMAF deliverable on the November 2000 MAF extracts is over 99.9 percent.

In each state, over 99 percent of Block Canvassing adds are DMAF deliverable. These results tell us that a very small percentage of addresses added by Block Canvassing remained ungeocoded or non-residential as of the creation of the DMAF.

See state level counts in Appendix A, Table 5.

4.1.8 “In Census” Status of Adds

An address on the DMAF was assigned a status of “in the Census” if it was considered to be an existing housing unit at the end of all Census 2000 processes. Although there are errors in the census results (units being erroneously included in or excluded from the census), we expect the magnitude of errors to be relatively small. Therefore, we believe we can get an indication of the quality of Block Canvassing adds by looking at their final status in the census.

There were a total of 4,989,440 Block Canvassing adds in the nation that were valid housing units in the Census. This number represents 78 percent of the total Block Canvassing adds.

This result leads us to believe that approximately 22 percent of the Block Canvassing adds were one of the following:

- erroneously added by Block Canvassing listers,
- demolished or made unfit for habitation before the census occurred, or
- duplicates of other addresses

The Address List Development Topic Report will present a detailed analysis of actions taken on the adds by the different census operations.

4.2 What is the profile of Block Canvassing Deletes?

For the purpose of this evaluation, all addresses we consider “Block Canvassing deletes” include addresses that Block Canvassing listers identified as “delete,” “duplicate,” “non-residential,” and “uninhabitable.” Unless otherwise noted, all delete calculations in this section include all four types of actions.

Total Deletes: 5,146,320

Percent of Universe Deleted: 6%

The percentage was computed by dividing the total number of deletes (5,146,320) by the total addresses in the initial Block Canvassing universe (91,612,770).

The state level percentage of addresses in the initial universe that were deleted ranges from about 17 percent in Vermont to about 3 percent in Nevada. The 17 percent number is very high, with the second highest state showing around 10 percent. Vermont has a high percentage of both units added and units deleted. The high number of E-911 conversions in the state of Vermont could explain both of these phenomena. Block Canvassing listers were not allowed to change house numbers on the listing pages. If the house number of a unit changed due to E-911 conversion, the Block Canvassing lister was supposed to add a record for the new house number and delete the record with the old city-style address. If this situation occurred many times in Vermont, it could explain the high concentration of deletes in that state.

See state level counts in Appendix B, Table 1.

4.2.1 Type of Block Canvassing Delete

As mentioned above, all addresses we considered “Block Canvassing deletes” were addresses that we initially suspected were housing units but Block Canvassing determined that they actually were not housing units in the blocks to which they were geocoded. Different types of deletes fit this criteria. See table 8 for the magnitude of the different types of deletes.

Table 8. Percentage of Block Canvassing Deletes by Type of Delete

Type of Delete	# of Addresses	% of Total
Field Delete	4,452,888	86.53
Duplicate	154,869	3.01
Uninhabitable	174,279	3.39
Non-residential	364,284	7.08
Total Deletes	5,146,320	100.00

Percentages may not sum to 100 due to rounding

As shown in the table, the majority of Block Canvassing deletes were addresses that the listers actually identified as “delete”. The listers identified the following situations as “deletes”:

- units that did not exist in the blocks to which they were geocoded (includes units that did not appear to exist and units that were geocoded in error to the blocks)
- units that were demolished.

At the state level:

- The proportion of deletes that are field deletes ranges from 96 percent in New Hampshire to 57 percent in Washington, D.C.
- The proportion of deletes that are duplicates ranges from 20 percent in Hawaii to 0.2 percent in New Hampshire
- The proportion of deletes that are uninhabitable ranges from 24 percent in Washington, D.C. to 0.6 percent in Vermont
- The proportion of deletes that are non-residential ranges from 24 percent in California to two percent in Vermont

The types of deletes identified as “duplicates,” “uninhabitable,” and “non-residential” account for only a small portion of the total Block Canvassing deletes. However, these types are clustered at the state level:

- In Hawaii, the 20 percent duplicate number is very high compared to other states. The next highest state, Virginia, shows about seven percent of its deletes as duplicates. Of the roughly 5,300 duplicate deletes in Hawaii, approximately 4,900 of them are in Honolulu County.
- In Washington, D.C., the 24 percent uninhabitable number is very high compared to other states. The next highest state, New Mexico, shows about seven percent of its deletes as uninhabitable.

- In California, the 24 percent non-residential number is very high. Most of the remaining states show less than ten percent of their deletes as non-residential. Of the 116,000 non-residential deletes in California, approximately 96,000 of these are in Los Angeles County.

We do have a possible explanation of the high non-residential delete clustering in Los Angeles County. Los Angeles City, which is contained in Los Angeles County, was one of the few areas that conducted LUCA 98 before Block Canvassing occurred. LUCA added about 85,000 addresses before Block Canvassing that were indicated as non-residential deletes in Block Canvassing in this county.

See state level counts in Appendix B, Table 2.

4.2.2 Enumeration Area of Deletes

Table 9 shows the magnitude of Block Canvassing deletes by basic enumeration area in which they are now located.

Table 9. Percentage of Block Canvassing Deletes by Basic Enumeration Area

Enumeration Area	# of Addresses	% of Total
Inside the blue-line	5,066,954	98.46
Outside the blue-line	79,366	1.54
Total Deletes	5,146,320	100.00

Percentages may not sum to 100 due to rounding

About 98 percent of the deleted addresses were geocoded inside the blue-line on the MAF as of the November 2000 extracts. The deletes in the table labeled “outside the blue-line” represent addresses that were geocoded inside the blue-line when the Block Canvassing universe was created, were deleted by Block Canvassing, and were added outside the blue-line by a source other than Block Canvassing. We believe that Block Canvassing may have deleted these addresses because the units actually existed in blocks outside the blue-line.

Every state shows at least 87 percent of its deletes inside the blue-line. The majority of the states have percentages in the high nineties.

See state level counts in Appendix B, Table 3.

Table 10

Table 10 shows the magnitude of Block Canvassing deletes in the individual enumeration areas inside the blue-line.

Table 10. Percentage of Block Canvassing Deletes by Inside the Blue-Line Enumeration Area

Enumeration Area	# of Addresses	% of Total
Mailout/Mailback	5,025,779	99.19
Military	9,450	0.19
Urban Update/Leave	25,512	0.50
Urban Update/Enumerate	6,213	0.12
Total Deletes Inside the Blue-Line	5,066,954	100.00

Percentages may not sum to 100 due to rounding

The results in this table are similar to the corresponding table of adds by inside the blue-line enumeration area. The Mailout/Mailback enumeration area had the largest workload, by far, of any enumeration area where Block Canvassing was conducted.

4.2.3 Address Type of Deletes

Table 11 shows the magnitude of Block Canvassing deletes that are classified into different type of address categories. See section 2.5 in the Methods section for a detailed discussion on each of the address types.

Table 11. Percentage of Block Canvassing Deletes by Address Type

Address Type	# of Addresses	% of Total
Complete City-style	5,146,149	almost 100.00
Complete Rural route	1	< 0.01
with location description	0	0
without location description	1	< 0.01
Complete PO Box	1	< 0.01
with location description	0	0
without location description	1	< 0.01
Incomplete address	169	< 0.01
with location description	16	< 0.01
without location description	153	< 0.01
No address information	0	0
with location description	0	0
without location description	0	0
Total Deletes	5,146,320	100.00

Percentages may not sum to 100 due to rounding

As shown in the table, over 99 percent of the deletes have city-style addresses. This result supports the idea that the majority of addresses in the Block Canvassing universe were city-style and, therefore, that the determination of “inside the blue-line” was accurate. Otherwise, we would expect a lot of Block Canvassing deletes to be units with non-city-style addresses or with no address information. As stated before, not all housing units with city-style addresses receive mail at the city-style addresses. Currently, we do not have a way to compute the percentage of deletes inside the blue-line with city-style addresses used for mail delivery.

The distribution of address type for Block Canvassing deletes is equivalent to the distribution of address type for all addresses in the initial Block Canvassing universe (over 99 percent city-style). Therefore, address type does not appear to have influenced whether or not addresses were deleted.

4.2.4 Original Source of Deletes

Table 12 shows the magnitude of deletes in each of the original source categories.

Table 12. Percentage of Block Canvassing Deletes by Original Source Category

Original Source	# of Addresses	% of Total
Pre-Block Canvassing	5,086,771	98.84
Outside blue-line	59,532	1.16
Unknown - Inside blue-line	17	<0.01
Total Deletes	5,146,320	100.00

Percentages may not sum to 100 due to rounding

Almost 99 percent of the addresses deleted were originally provided by valid sources inside the blue-line. The deletes labeled with an original source of “outside the blue-line” represent addresses that were originally added by sources that are only valid outside the blue-line or that were added by an unknown original source and remained outside the blue-line.

Every state showed that at least 89 percent of its deletes originally were provided by a valid source inside the blue-line.

The 17 addresses with unknown original source represent rare situations of ways that addresses are added to the MAF. We still do not know what the original source was for these cases. At the time of developing the original source definition, we did not create rules for handling some rare situations like these.

See state level counts in Appendix B, Table 4.

Table 13 looks at addresses with Pre-Block Canvassing original source but were later deleted by Block Canvassing. Specifically, the table breaks down the addresses by original source.

Table 13. Block Canvassing Deletes by Pre-Block Canvassing Original Source

Original Source	# of Addresses in Block Canvassing universe	# of Addresses deleted by Block Canvassing	% of universe deleted
1990 ACF	75,183,729	3,624,027	4.82
November 97 DSF (or earlier)	14,579,494	989,848	6.79
September 98 DSF	785,640	77,925	9.92
LUCA 98	531,830	382,550*	71.93*
LUCA 98 and September 98 DSF	246,474	5,853	2.37
Dress Rehearsal	13,271	6,568	49.49
Total Addresses	91,340,438	5,086,771	5.57

*The majority of these addresses are found in Cook County, IL

According to the table, a larger proportion of addresses were deleted that were first provided by the DSF than addresses first provided by the ACF. Also, a larger proportion were deleted that were first provided by the second DSF than addresses first provided by the first DSF. At first glance, these results may seem surprising because the newer original sources show more deletes. We would expect older units to have a greater chance of becoming deleted than newer units. However, we have some possible explanations for this occurrence:

The 1990 ACF, the oldest source in the table, generally represents known housing units from 1990. Possible reasons that the percentage of units deleted that first came from a DSF is higher than the percentage of units deleted that first came from the ACF are as follows:

- some records on the DSFs list only one record for an entire multi-unit BSA. If records for the individual units in a multi-unit already exist on the MAF, and a DSF record referring to an entire multi-unit BSA is placed on the MAF later, Block Canvassing would verify the records that refer to the individual units and delete the record referring to the entire multi-unit. If this situation occurred a great deal, it would generate additional Block Canvassing deletes for addresses originally provided by a DSF.
- although Block Canvassing listers were instructed to list housing units that were under construction, it is possible that the U.S. Postal Service had information that a housing unit would be built even before construction started. In this scenario, the address would be on the DSF, therefore would appear on the MAF, and the Block Canvassing lister would not locate it and would delete it from his or her listing. If this situation occurred a great deal, it would generate additional Block Canvassing deletes originally provided by a DSF.

If the second scenario actually occurred, it may explain the reason why the percentage of units deleted that first came from the September 98 DSF is higher than the percentage of those deleted that first came from the November 97 DSF. Housing units on the November 97 DSF had more time to be built before Block Canvassing, causing Block Canvassing to verify more of the November 97 DSF units than the September 98 units.

There were a total of 2,615,296 addresses on the MAF with an original source of LUCA 98. About 532,000 of these (20%) were sent to Block Canvassing for verification. Of the approximately 532,000 addresses with an original source of LUCA 98, about 383,000 of them were deleted by Block Canvassing. Cook County, Illinois accounts for 67 percent of these. The local government in Chicago, Illinois (within Cook Co.) hired a vendor to provide addresses to the Census Bureau. The vendor incorrectly geocoded a lot of the addresses that it provided. Block Canvassing listers are instructed to delete any addresses that are geocoded to but do not exist in the blocks being canvassed. These addresses in Cook County, Illinois could be geocoding errors but were not recognized as such when they were added to the MAF (did not link to Block Canvassing adds). One point to emphasize is the fact that there is a large clustering of LUCA addresses deleted in Cook County, Illinois. If we dropped that county from the statistic, the percentage of LUCA addresses deleted nationwide would be 23.71, which is still relatively high.

4.2.5 Size of Basic Street Address for Deletes

Table 14 shows the number and percentage of deletes in each of the different BSA categories.

Table 14. Percentage of Block Canvassing Deletes by Size of BSA

Size of BSA	# of Addresses	% of Total
Blank	17,691	0.34
Single unit	2,661,950	51.73
Multi-unit	2,466,679	47.93
2-4 units	1,206,604	23.45
5-9 units	581,737	11.30
10-19 units	522,502	10.15
20-49 units	115,045	2.24
50+ units	40,791	0.79
Total Deletes	5,146,320	100.00

Percentages may not sum to 100 due to rounding

Single units account for about 52 percent of the total deletes. Some of the deletes in multi-unit BSAs can be attributed to entire multi-units that are deleted (due to multi-units that no longer exist, etc). Other deletes result from individual units being deleted from a multi-unit (due to the listing pages overstating the number of existing units in the BSA). We do not have information to determine the magnitude of these situations relative to one another.

These results tell us that about 48 percent of all Block Canvassing deletes occurred in multi-unit BSAs. Looking back to the section on Block Canvassing adds, about 35 percent of adds occurred in multi-unit BSAs. We suspect that there are so many more multi-unit deletes than multi-unit adds because of a lot of duplication of addresses in multi-units. I will give an example to illustrate this duplication problem:

Before Block Canvassing, the Census Bureau used several different files of addresses to update the MAF. For a given multi-unit address, one source may have provided unit designation "1" and unit designation "2", while another source may have provided a single record for the BSA, with no unit designation. When the Block Canvassing lister visited the BSA, he/she located the unit with designation "1" and the unit with designation "2", verified those addresses on the listing pages, and deleted the address with no unit designation. If these scenarios occurred many times, we could see an increase in the number of deletes relative to adds.

4.2.6 Clustering of Deletes by size of block

Results show that 2,772,525 blocks did not have any deletes from Block Canvassing. This represents the majority of the 3,801,560 blocks inside the blue-line.

Table 15 shows the percentage of inside the blue-line blocks in each of the categories showing the number of units that Block Canvassing deleted. The table is limited to blocks with at least one delete.

Table 15. Percentage of Blocks Inside the Blue-Line by Number of Block Canvassing Deletes

Number of Deletes Category	# of Blocks	% of Total
1 unit	452,217	43.95
2-9 units	482,593	46.90
10-19 units	57,237	5.56
20-59 units	28,509	2.77
60-99 units	4,346	0.42
100+ units	4,133	0.40
Total Blocks Inside the Blue-Line with at least one Delete	1,029,035	100.00

Percentages may not sum to 100 due to rounding

As shown in the table, the category with two to nine units deleted showed more blocks than any other category. Almost 91 percent of the blocks received nine or fewer deletes from Block Canvassing.

As stated in the methods section, we used tabulation state, county, and block codes whenever possible in data analysis. However, we had to use collection state, county, and block codes for the results in the table above. We had to use the enumeration area code on the MAF to determine blocks inside the blue-line. The enumeration area code is available for collection blocks but not for tabulation blocks.

4.2.7 1998 LUCA Field Verification Results for Deletes

As stated earlier in this report, Block Canvassing occurred before 1998 LUCA Field Verification. Any Block Canvassing field deletes that were identified as being DMAF deliverable in time for the creation of the LUCA Field Verification universe were sent to be verified in LUCA Field Verification. The Census Bureau required a second confirmation of deletes in order to exclude them from the census address universe. Over 2.3 million Block Canvassing deletes were sent to LUCA Field Verification (46 percent of the total Block Canvassing deletes).

See table 16 for the magnitude of LUCA 98 Field Verification actions on the Block Canvassing deletes.

Table 16. Percentage of Block Canvassing Field Deletes by LUCA Field Verification Result

LUCA Field Verification Result	# of Addresses	% of Total
Field Delete	1,142,547	48.28
Non-residential	53,022	2.24
Uninhabitable	3,718	0.16
Verified	789,277	33.35
Address Corrected	378,017	15.97
Total Block Canvassing Field Deletes sent to LUCA Field Verification	2,366,581	100.00

Percentages may not sum to 100 due to rounding

About 48 percent of the Block Canvassing field deletes sent to LUCA Field Verification were indicated as field deletes again. Almost 2.5 percent were indicated as non-residential or uninhabitable in LUCA Field Verification. About 33 percent of the Block Canvassing field deletes were verified as existing housing units where no address correction was needed. Almost 16 percent of the Block Canvassing field deletes were verified as existing housing units and received a corrected address.

A high number of deletes sent to LUCA Field Verification (49 percent) were verified as existing units in LUCA Field Verification. This result appears to confirm the need for validating deletes before dropping them from the census. However, at this time we do not know the number of deletes that LUCA Field Verification correctly reinstated compared to the number that it erroneously reinstated.

One factor that contributed to the high number of Block Canvassing deletes that were verified as existing in LUCA Field Verification is the fact that some Block Canvassing duplicate addresses were disguised as field deletes. Duplicate addresses coded as field deletes that were sent to LUCA Field Verification had a high probability of getting reinstated, due to the fact that LUCA Field Verification was not a comprehensive check of the list, but a search for selected addresses. If an address was a duplicate, there was a good chance that the listers would find it and mark it as “verify,” even though another version of the address was already on the list.

At the state level, the percentage of Block Canvassing field deletes sent to Field Verification that were deleted again ranges from approximately 81 percent in Illinois to about nine percent in Washington, . This wide range suggests that the effectiveness of Block Canvassing listers in deleting units and/or the effectiveness of LUCA Field Verification listers in verifying the deleted units varied a good deal between states.

See state level counts in Appendix B, Table 5.

The Address List Development Topic Report will present further analysis of Block Canvassing deletes sent to be verified in LUCA Field Verification.

4.2.8 DMAF Deliverability of Deletes

As stated previously, the DMAF is the file used for the delivery of Census forms. An address on the MAF was DMAF deliverable if it was adequate to include in the census enumeration. In general, the DMAF included MAF addresses that represented potential residential units that were geocoded to census blocks.

The inclusion criteria for the initial creation of the DMAF required a second confirmation of deletes in order to exclude an address from the census address universe. Therefore, Block Canvassing deletes that were not confirmed as deletes from some other operation before the creation of the DMAF were considered to be DMAF deliverable. Any Block Canvassing field deletes that were identified as being DMAF deliverable in time for the creation of the LUCA Field Verification universe were sent to be verified in LUCA Field Verification. See results for LUCA Field Verification in section 4.2.7 above. LUCA Field Verification occurred after the first delivery of the DMAF, therefore the number of Block Canvassing deletes that were DMAF deliverable is higher than the number of Block Canvassing deletes that turned out to be valid units in the census.

The percentage of Block Canvassing deletes in the nation that were DMAF deliverable on the November 2000 MAF extracts is 54 percent.

The percentage of Block Canvassing deletes that were DMAF deliverable at the state level ranges from about 75 percent in Illinois to about 39 percent in Nevada. The deletes that were identified as not DMAF deliverable are addresses that were added by a source previous to Block Canvassing but Block Canvassing identified them as duplicates or non-residential units, and some other operation confirmed the delete.

See state level counts in Appendix B, Table 6.

4.2.9 “In Census” Status of Deletes

An address on the DMAF was assigned a status of “in the Census” if it was considered to be an existing housing unit at the end of all Census 2000 processes. Although there are errors in the census results (units being erroneously included in or excluded from the census), we expect the magnitude of errors to be relatively small. Therefore, we believe we can get an indication of the quality of Block Canvassing deletes by looking at their final status in the census.

The percentage of Block Canvassing deletes in the nation that were enumerated as housing units

in the Census is about 24 percent.

This result leads us to believe that approximately 24 percent of the Block Canvassing deletes were one of the following:

- erroneously deleted by Block Canvassing listers,
- correctly deleted by Block Canvassing listers and erroneously reinstated to the census by other coverage improvement operations, or
- on the MAF before they were constructed and were constructed after Block Canvassing but before Census 2000

The Address List Development Topic Report will present a detailed analysis of actions taken on the deletes to determine the influence that different coverage improvement operations had on these addresses being enumerated in the census.

4.3 What is the profile of Block Canvassing Addresses Corrected?

Total Addresses Corrected: 2,295,168

Percentage of Addresses Corrected in Universe: 2.5%

The percentage was computed by dividing the total number of addresses corrected (2,295,168) by the total addresses in the initial Block Canvassing universe (91,612,770).

The state level percentage of addresses in the initial universe that received address corrections ranges from seven percent in New York to 0.9 percent in Washington, D.C..

See state level counts in Appendix C, Table 1.

4.3.1 Original Source of Addresses Corrected

Table 17 looks at addresses with Pre-Block Canvassing original source that later received address corrections from Block Canvassing. Specifically, the table breaks down the addresses by original source.

Table 17. Block Canvassing Addresses Corrected by Pre-Block Canvassing Original Source

Original Source	# of Addresses in Block Canvassing universe	# of Addresses corrected by Block Canvassing	% of universe corrected
1990 ACF	75,183,729	1,834,344	2.44
November 97 DSF (or earlier)	14,579,494	387,046	2.65
September 98 DSF	785,640	22,326	2.84
LUCA 98	531,830	45,285	8.51
LUCA 98 and September 98 DSF	246,474	4,933	2.00
Dress Rehearsal	13,271	554	4.17
Total Addresses	91,340,438	2,294,488	2.51

As shown in the table, four of the values of original source show that less than three percent of their addresses were corrected by Block Canvassing. Addresses originally provided by LUCA 98 received a larger percentage of corrections than any of the other major sources.

Of the approximately 532,000 addresses with an original source of LUCA 98, about 45,000 of them received address corrections by Block Canvassing. Cook County, Illinois accounts for 48 percent of these. This high amount of clustering in Cook County could be related to the geocoding problem caused by the vendor that conducted LUCA 98 in this county. If we dropped that county from the statistic, the percentage of LUCA addresses corrected nationwide would be around four percent.

4.3.2 Size of Basic Street Address for Addresses Corrected

Table 18 shows the number and percentage of addresses corrected in each of the different basic street address (BSA) categories.

Table 18. Percentage of Block Canvassing Addresses Corrected by Size of BSA

Size of BSA	# of Addresses	% of Total
Blank	7,470	0.33
Single unit	976,529	42.55
Multi-unit	1,311,169	57.13
2-4 units	755,966	32.94
5-9 units	284,165	12.38
10-19 units	213,235	9.29
20-49 units	43,275	1.89
50+ units	14,528	0.63
Total Addresses Corrected	2,295,168	100.00

Percentages may not sum to 100 due to rounding

These results tell us that single units account for about 43 percent of the total addresses corrected and multi-units account for about 57 percent of addresses corrected. In the deletes section, I pointed out the fact that the percentage of total deletes in multi-unit BSAs was much higher than the percentage of adds in multi-unit BSAs. The percentage of addresses corrected in multi-unit BSAs is even higher than that of the deletes.

The high percentage of addresses corrected in multi-units may be telling us that many unit designations were incorrect in multi-units, resulting in Block Canvassing listers correcting unit designations.

4.3.3 Clustering of Addresses Corrected by Size of Block

Results show that 3,473,958 blocks did not receive any corrected addresses from Block Canvassing. This represents the large majority of the 3,801,560 blocks inside the blue-line.

Table 19 shows the percentage of inside the blue-line blocks in each of the categories showing the number of addresses corrected by Block Canvassing. The table is limited to blocks with at least one address corrected.

Table 19. Percentage of Blocks Inside the Blue-Line by Number of Block Canvassing Addresses Corrected

Number of Addresses Corrected Category	# of Blocks	% of Total
1 unit	115,551	35.27
2-9 units	158,995	48.53
10-19 units	31,277	9.55
20-59 units	17,226	5.26
60-99 units	2,435	0.74
100+ units	2,118	0.65
Total Blocks Inside the Blue-Line with at least one Address Corrected	327,602	100.00

Percentages may not sum to 100 due to rounding

As shown in the table, the category with two to nine units showed more blocks than any other category. Almost 84 percent of the blocks had nine or fewer addresses corrected from Block Canvassing.

As stated in the methods section, we used tabulation state, county, and block codes whenever possible in data analysis. However, we had to use collection state, county, and block codes for the results in the table above. We had to use the enumeration area code on the MAF to determine blocks inside the blue-line. The enumeration area code is available for collection blocks but not for tabulation blocks.

4.4 What is the profile of Block Canvassing Geographic Corrections?

Total Geographic Corrections: at least 2,948,414

Percent of Geographic Corrections in Universe: at least 3%

The percentage was computed by dividing the total number of geographic corrections (2,948,414) by the total addresses in the initial Block Canvassing universe (91,612,770).

As stated in the methods section, some the addresses identified as “add and verify” could be thought of as geographic corrections if the added address came from a different block than the verified address. However, the addresses identified as “add and verify” were given the same action code, regardless of whether the add and verify were in same or different blocks.

The true number of geographic corrections is equal to the known geographic corrections plus some unknown subset of the “add and verify” addresses.

Given this fact, results from Block Canvassing were used to correct the geography for between 2,948,414 and 3,055,816 addresses on the listing pages.

The remaining results for geographic corrections include only the addresses that are known geographic corrections and exclude the “add and verify” addresses.

The state level percentage of addresses in the initial universe that had geographic corrections ranges from 11 percent in Vermont to 0.03 percent in Washington, D.C. See state level counts in Appendix D, Table 1.

4.4.1 Block Code Agreement of Geographic Corrections

Table 20 shows the extent that the block code to which Block Canvassing moved addresses agreed with the official block code on the MAF.

Table 20. Percentage of Block Canvassing Geographic Corrections by Block Code Agreement

Level of Agreement	# of Addresses	% of Total
Same as official block	2,825,658	95.84
Different from official block	122,756	4.16
Total Geographic Corrections	2,948,414	100.00

Percentages may not sum to 100 due to rounding

Almost 96 percent of the geographic corrections show a Block Canvassing block code equal to the official block code on the MAF. At the state level, every state shows a percentage of 87 or greater. We expect high percentages for this statistic because other operations inside the blue-line were small relative to Block Canvassing and therefore had fewer opportunities to disagree with the block code provided by Block Canvassing.

The roughly four percent of geographic corrections that had a Block Canvassing block code different from the official block code may represent geocoding errors caused by the Block Canvassing lists.

See state level counts in Appendix D, Table 2.

4.4.2 Original Source of Geographic Corrections

Table 21 looks at addresses with Pre-Block Canvassing original source that later were moved to a different block by Block Canvassing. Specifically, the table breaks down the addresses by original source.

Table 21. Block Canvassing Geographic Corrections by Pre-Block Canvassing Original Source

Original Source	# of Addresses in Block Canvassing universe	# of Geographic Corrections by Block Canvassing	% of universe corrected
1990 ACF	75,183,729	2,059,359	2.74
November 97 DSF (or earlier)	14,579,494	831,847	5.71
September 98 DSF	785,640	41,985	5.34
LUCA 98	531,830	1,652	0.31
LUCA 98 and September 98 DSF	246,474	12,780	5.19
Dress Rehearsal	13,271	245	1.85
Total Addresses	91,340,438	2,947,868	3.23

The addresses originally provided by the 1990 ACF had the highest number of geographic corrections while the addresses originally provided by one of the DSFs had the highest percentage of geographic corrections from Block Canvassing. The fact that addresses originally provided by one of the DSFs had the highest percentage of geographic corrections could be due to the fact that DSF addresses were new addresses relative to the address ranges in the TIGER database. When DSF addresses were added to the MAF, they were geocoded to address ranges as they existed in the TIGER database at that point. Block Canvassing results, the first results used to update the TIGER database in all inside the blue-line areas of the nation, provided many updates to features in the TIGER database. So, many of the initial geocodes given to DSF addresses were later corrected by Block Canvassing.

See section 1.4 for a general description of the TIGER database.

4.4.3 Size of Basic Street Address for Geographic Corrections

Table 22 shows the number and percentage of geographic corrections in each of the different basic street address (BSA) categories.

Table 22. Percentage of Block Canvassing Geographic Corrections by Size of BSA

Size of BSA	# of Addresses	% of Total
Blank	15,419	0.52
Single unit	1,921,738	65.18
Multi-unit	1,011,257	34.30
2-4 units	422,554	14.33
5-9 units	235,752	8.00
10-19 units	276,808	9.39
20-49 units	55,003	1.87
50+ units	21,140	0.72
Total Geographic Corrections	2,948,414	100.00

Percentages may not sum to 100 due to rounding

These results tell us that single units account for about 65 percent of the total geographic corrections.

4.4.4 Clustering of Geographic Corrections by Size of block

Results show that 3,410,980 blocks did not have any geographic corrections from Block Canvassing. This represents the large majority of the 3,801,560 blocks inside the blue-line.

Table 23 shows the percentage of inside the blue-line blocks in each of the categories showing the number of Block Canvassing geographic corrections. The table is limited to blocks with at least one geographic correction.

Table 23. Percentage of Blocks Inside the Blue-Line by Number of Block Canvassing Geographic Corrections

Number of Geographic Corrections	# of Blocks	% of Total
1 unit	116,762	29.89
2-9 units	200,970	51.45
10-19 units	44,328	11.35
20-59 units	22,939	5.87
60-99 units	3,025	0.77
100+ units	2,556	0.65
Total Blocks Inside the Blue-Line with at least one Geographic Correction	390,580	100.00

Percentages may not sum to 100 due to rounding

As shown in the table, the category with two to nine units with geographic corrections showed more blocks than any other category. Over 81 percent of the blocks had nine or fewer geographic corrections from Block Canvassing.

As stated in the methods section, we used tabulation state, county, and block codes whenever possible in data analysis. However, we had to use collection state, county, and block codes for the results in the table above. We had to use the enumeration area code on the MAF to determine blocks inside the blue-line. The enumeration area code is available for collection blocks but not for tabulation blocks.

4.5 How do Block Canvassing results compare to Census results?

Table 24 below shows percentages of addresses that were consistent with census results. The addresses are classified by different Block Canvassing actions. Block Canvassing is consistent with the census for an address if the action given by Block Canvassing to the address is the same type of action given to the address as of the end of the census. For example, if an address was added by Block Canvassing and the unit ended up being a valid unit in the census, then Block Canvassing was consistent with the census. If an address was deleted by Block Canvassing and the unit ended up not being a valid unit in the census, the Block Canvassing was consistent with the census.

Table 24. Percentage of Block Canvassing Addresses That Were Consistent with Census Results

Block Canvassing Actions	Total Addresses with this(these) action(s)	# of these addresses that were consistent with census results	% of addresses that were consistent with census results
Adds	6,389,271	4,989,440	78.09
Deletes	5,146,320	3,932,904	76.42
Verified as Existing	86,466,450	84,234,220	97.42
Adds + Verified as Existing	92,855,721	89,223,660	96.09
Deletes + Verified as Existing	91,612,770	88,167,124	96.24

The “Verified as Existing” category includes all of the following basic action codes:

- Verified
- Address Corrected
- Geographic Correction
- Add and Verify

All addresses with one of these actions were verified as existing HUs by Block Canvassing.

As shown in the table, a sizeable amount of Block Canvassing adds and deletes turned out to be inconsistent with census results (22 and 24 percent, respectively). The units verified as existing in Block Canvassing turned out to be very consistent with census results.

When looking at the add or delete percentage separately, one would conclude that the Census Bureau should make additional efforts in the future to see if quality review programs can reduce inconsistencies in these groups.

The “Adds + Verified as Existing” statistic shows us that 96 percent of addresses coded as existing by Block Canvassing ended up as valid HUs in the census. The adds are included in this statistic. The consistency between Block Canvassing and the census, as a whole, appears to be relatively good.

The “Deletes + Verified as Existing” statistic shows us that 96 percent of all addresses sent to Block Canvassing to be verified showed consistent results between Block Canvassing and the

census. The deletes are included in this statistic. The statistic also supports the idea that the consistency between Block Canvassing and the census, as a whole, appears to be relatively good.

4.6 How many blocks inside the blue-line did not receive any updates from Block Canvassing?

1,186,240 blocks

These blocks had an accurate address list before Block Canvassing, and did not gain anything from Block Canvassing. Some blocks did not contain any residential units at the end of Block Canvassing and other blocks received Block Canvassing actions of “verified” for all residential units in the block.

These 1,186,240 blocks represent about 31 percent of the total blocks inside the blue-line. This result may be important in showing us how to target areas for MAF updating. If we were able to target areas in which we suspect that no updates are needed, we would save cost by visiting fewer blocks. It should be noted, however, that visitation of blocks that did not contain any residential units would require less cost than visitation of blocks containing many units but not requiring any updates. Further analysis is needed to determine the impact of this 31 percent of blocks on targeting decisions.

4.7 Conclusions

First of all, Block Canvassing was a large operation that provided a large number of updates to the MAF.

Block Canvassing not only played a large role in improving the coverage of addresses on the MAF but also in improving the geocoding of addresses on the MAF.

Because areas inside the blue-line are supposed to contain predominantly city-style addresses, it appears that the Census Bureau did a good job at minimizing units with only non-city-style addresses in the “inside the blue-line” areas. We know this because about 95 percent of the Block Canvassing adds had city-style addresses.

Block Canvassing played a part in correcting unit designations in multi-unit basic street addresses. If the Block Canvassing listers had not checked individual addresses within multi-units, but only verified the number of units at the multi-units, the Master Address File would not have this added improvement.

There were some errors in the updating. Examples of errors in the updating include listers crossing their boundaries to add units and listers erroneously deleting valid addresses.

There was some clustering of certain characteristics. One example of clustering is the high

number of adds and deletes in Vermont.

The results of clustering by block size in this report show us that almost one third of the blocks inside the blue-line did not receive any updates from Block Canvassing. Also, a small percentage of the blocks are blocks with ten or more updates. These results may suggest that we can improve the highest concentrations of coverage errors by visiting a small number of blocks.

A relatively large amount of Block Canvassing adds and deletes turned out to be inconsistent with census results (22 and 24 percent, respectively). However, the consistency between Block Canvassing and the census, as a whole, appears to be relatively good.

4.8 Recommendations

In keeping the MAF as up-to-date as possible, the Census Bureau should continue to explore the possibility of targeting areas with certain characteristics as priority areas for updating the MAF. The clustering results in this report should be a first step to showing how we could target areas for MAF updates.

Based on the high percentage of adds and deletes that were inconsistent with census results, we recommend that the Census Bureau make additional efforts in the future to see if quality review programs can reduce inconsistencies for added and deleted addresses.

Additional recommendations will be provided in the Address List Development Topic Report.

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Appendix A - State Level Counts for Block Canvassing Adds

Table A-1. Percent Increase of Block Canvassing Adds Relative to Initial Block Canvassing Universe

State	Addresses in Universe	Adds	Percentage
Alabama	1155956	160094	13.85
Alaska	146965	20677	14.07
Arizona	1578914	175001	11.08
Arkansas	516754	40065	7.75
California	11554587	521802	4.52
Colorado	1259842	99980	7.94
Connecticut	1320217	56973	4.32
Delaware	264236	27929	10.57
District	287218	4268	1.49
Florida	6417359	541679	8.44
Georgia	2215354	234824	10.60
Hawaii	366167	40369	11.02
Idaho	380794	50659	13.30
Illinois	4814754	233830	4.86
Indiana	2261135	172658	7.64
Iowa	810533	36215	4.47
Kansas	827794	40796	4.93
Kentucky	1025719	108865	10.61
Louisiana	1398381	99265	7.10
Maine	209902	28096	13.39
Maryland	1905825	98443	5.17
Massachusetts	2500212	131563	5.26
Michigan	3588189	195558	5.45
Minnesota	1488308	78822	5.30
Mississippi	730039	71687	9.82
Missouri	1684678	82297	4.89
Montana	112309	3792	3.38
Nebraska	493668	24946	5.05
Nevada	561205	47712	8.50
New Hampshire	300948	28693	9.53
New Jersey	3179844	195219	6.14
New Mexico	410005	31863	7.77
New York	6525045	378042	5.79
North Carolina	1772546	233377	13.17
North Dakota	138169	6698	4.85
Ohio	4311180	211458	4.90

State	Addresses in Universe	Adds	Percentage
Oklahoma	912932	47532	5.21
Oregon	1226307	126346	10.30
Pennsylvania	4237883	308954	7.29
Rhode Island	444067	23910	5.38
South Carolina	1150407	160614	13.96
South Dakota	156144	5396	3.46
Tennessee	1641899	223255	13.60
Texas	6164370	430892	6.99
Utah	577784	46675	8.08
Vermont	74867	16242	21.69
Virginia	2003236	109344	5.46
Washington	2202766	209452	9.51
West Virginia	240221	13324	5.55
Wisconsin	1943965	144874	7.45
Wyoming	121171	8246	6.81
Total	91612770	6389271	6.97

Table A-2. Percentage of Block Canvassing Adds by Block Canvassing Block Code Agreement

State	Block Canvassing provided no block code	Different from official block	Same as official block	State Total
	number percentage	number percentage	number percentage	
Alabama	242 0.15	8411 5.25	151441 94.60	160094
Alaska	9 0.04	877 4.24	19791 95.72	20677
Arizona	338 0.19	11780 6.73	162883 93.08	175001
Arkansas	101 0.25	2952 7.37	37012 92.38	40065
California	868 0.17	27776 5.32	493158 94.51	521802
Colorado	78 0.08	8178 8.18	91724 91.74	99980
Connecticut	122 0.21	2545 4.47	54306 95.32	56973
Delaware	36 0.13	2244 8.03	25649 91.84	27929
District	5 0.12	130 3.05	4133 96.84	4268
Florida	894 0.17	30974 5.72	509811 94.12	541679
Georgia	246 0.10	14213 6.05	220365 93.84	234824
Hawaii	7 0.02	1614 4.00	38748 95.98	40369
Idaho	52 0.10	2164 4.27	48443 95.63	50659
Illinois	770 0.33	13974 5.98	219086 93.69	233830
Indiana	502 0.29	10819 6.27	161337 93.44	172658
Iowa	36 0.10	2796 7.72	33383 92.18	36215
Kansas	47 0.12	2125 5.21	38624 94.68	40796
Kentucky	114 0.10	5113 4.70	103638 95.20	108865
Louisiana	227 0.23	5744 5.79	93294 93.98	99265
Maine	3 0.01	1204 4.29	26889 95.70	28096

State	Block Canvassing provided no block code	Different from official block	Same as official block	State Total
	number percentage	number percentage	number percentage	
Maryland	148 0.15	5823 5.92	92472 93.93	98443
Massachusetts	317 0.24	4996 3.80	126250 95.96	131563
Michigan	336 0.17	13083 6.69	182139 93.14	195558
Minnesota	128 0.16	3904 4.95	74790 94.88	78822
Mississippi	239 0.33	3527 4.92	67921 94.75	71687
Missouri	227 0.28	3845 4.67	78225 95.05	82297
Montana	3 0.08	179 4.72	3610 95.20	3792
Nebraska	19 0.08	1594 6.39	23333 93.53	24946
Nevada	13 0.03	1963 4.11	45736 95.86	47712
New Hampshire	20 0.07	1292 4.50	27381 95.43	28693
New Jersey	346 0.18	11848 6.07	183025 93.75	195219
New Mexico	67 0.21	2121 6.66	29675 93.13	31863
New York	534 0.14	20825 5.51	356683 94.35	378042
North Carolina	463 0.20	10562 4.53	222352 95.28	233377
North Dakota	2 0.03	718 10.72	5978 89.25	6698
Ohio	485 0.23	10586 5.01	200387 94.76	211458
Oklahoma	112 0.24	2774 5.84	44646 93.93	47532
Oregon	279 0.22	6255 4.95	119812 94.83	126346
Pennsylvania	578 0.19	17825 5.77	290551 94.04	308954
Rhode Island	49 0.20	1306 5.46	22555 94.33	23910
South Carolina	592 0.37	9778 6.09	150244 93.54	160614
South Dakota	1 0.02	353 6.54	5042 93.44	5396

State	Block Canvassing provided no block code	Different from official block	Same as official block	State Total
	number percentage	number percentage	number percentage	
Tennessee	278 0.12	8757 3.92	214220 95.95	223255
Texas	581 0.13	19332 4.49	410979 95.38	430892
Utah	163 0.35	3339 7.15	43173 92.50	46675
Vermont	15 0.09	850 5.23	15377 94.67	16242
Virginia	92 0.08	3603 3.30	105649 96.62	109344
Washington	361 0.17	8660 4.13	200431 95.69	209452
West Virginia	12 0.09	785 5.89	12527 94.02	13324
Wisconsin	357 0.25	6942 4.79	137575 94.96	144874
Wyoming	17 0.21	1076 13.05	7153 86.75	8246
Total	11531	344134	6033606	6389271

Table A-3. Percentage of Block Canvassing Adds by Basic Enumeration Area

State	Ungeocoded	Inside the Blue-Line	Outside the Blue-Line	State Total
	number percentage	number percentage	number percentage	
Alabama	94 0.06	159750 99.79	250 0.16	160094
Alaska	2 0.01	20671 99.97	4 0.02	20677
Arizona	25 0.01	174634 99.79	342 0.20	175001
Arkansas	12 0.03	39577 98.78	476 1.19	40065
California	107 0.02	520479 99.75	1216 0.23	521802
Colorado	6 0.01	99786 99.81	188 0.19	99980
Connecticut	12 0.02	56948 99.96	13 0.02	56973
Delaware	9 0.03	27898 99.89	22 0.08	27929
District	0 0.00	4268 100.00	0 0.00	4268
Florida	197 0.04	540298 99.75	1184 0.22	541679
Georgia	99 0.04	234382 99.81	343 0.15	234824
Hawaii	2 0.00	40339 99.93	28 0.07	40369
Idaho	15 0.03	50530 99.75	114 0.23	50659
Illinois	139 0.06	233129 99.70	562 0.24	233830
Indiana	158 0.09	172083 99.67	417 0.24	172658
Iowa	3 0.01	35923 99.19	289 0.80	36215
Kansas	5 0.01	40602 99.52	189 0.46	40796
Kentucky	31 0.03	108611 99.77	223 0.20	108865
Louisiana	62 0.06	98909 99.64	294 0.30	99265
Maine	2 0.01	28074 99.92	20 0.07	28096
Maryland	24 0.02	98304 99.86	115 0.12	98443

State	Ungeocoded	Inside the Blue-Line	Outside the Blue-Line	State Total
	number percentage	number percentage	number percentage	
Massachusetts	30 0.02	131518 99.97	15 0.01	131563
Michigan	48 0.02	195153 99.79	357 0.18	195558
Minnesota	9 0.01	78452 99.53	361 0.46	78822
Mississippi	46 0.06	71515 99.76	126 0.18	71687
Missouri	24 0.03	81706 99.28	567 0.69	82297
Montana	0 0.00	3764 99.26	28 0.74	3792
Nebraska	3 0.01	24894 99.79	49 0.20	24946
Nevada	1 0.00	47451 99.45	260 0.54	47712
New Hampshire	8 0.03	28671 99.92	14 0.05	28693
New Jersey	63 0.03	195074 99.93	82 0.04	195219
New Mexico	18 0.06	31768 99.70	77 0.24	31863
New York	71 0.02	377727 99.92	244 0.06	378042
North Carolina	88 0.04	232669 99.70	620 0.27	233377
North Dakota	0 0.00	6550 97.79	148 2.21	6698
Ohio	89 0.04	211019 99.79	350 0.17	211458
Oklahoma	21 0.04	47031 98.95	480 1.01	47532
Oregon	50 0.04	126004 99.73	292 0.23	126346
Pennsylvania	110 0.04	308191 99.75	653 0.21	308954
Rhode Island	5 0.02	23905 99.98	0 0.00	23910
South Carolina	97 0.06	159948 99.59	569 0.35	160614
South Dakota	0 0.00	5276 97.78	120 2.22	5396
Tennessee	67 0.03	222878 99.83	310 0.14	223255
Texas	112 0.03	428253 99.39	2527 0.59	430892

State	Ungeocoded	Inside the Blue-Line	Outside the Blue-Line	State Total
	number percentage	number percentage	number percentage	
Utah	31 0.07	46270 99.13	374 0.80	46675
Vermont	0 0.00	16203 99.76	39 0.24	16242
Virginia	8 0.01	109284 99.95	52 0.05	109344
Washington	92 0.04	208969 99.77	391 0.19	209452
West Virginia	0 0.00	13254 99.47	70 0.53	13324
Wisconsin	87 0.06	144374 99.65	413 0.29	144874
Wyoming	10 0.12	7741 93.88	495 6.00	8246
Total	2192	6370707	16372	6389271

Table A-4. Percentage of Block Canvassing Adds by Original Source Category

State	Pre-Block Canvassing	Block Canvassing Plus	Outside blue-line	State Total
	number percentage	number percentage	number percentage	
Alabama	63317 39.55	96721 60.42	56 0.03	160094
Alaska	2249 10.88	18426 89.11	2 0.01	20677
Arizona	47137 26.94	127647 72.94	217 0.12	175001
Arkansas	13579 33.89	26325 65.71	161 0.40	40065
California	145308 27.85	375860 72.03	634 0.12	521802
Colorado	18378 18.38	81509 81.53	93 0.09	99980
Connecticut	15296 26.85	41676 73.15	1 0.00	56973
Delaware	5343 19.13	22580 80.85	6 0.02	27929
District	1461 34.23	2807 65.77	0 0.00	4268
Florida	179600 33.16	361492 66.74	587 0.11	541679
Georgia	75815 32.29	158849 67.65	160 0.07	234824
Hawaii	8281 20.51	32082 79.47	6 0.01	40369
Idaho	8315 16.41	42309 83.52	35 0.07	50659
Illinois	60982 26.08	172689 73.85	159 0.07	233830
Indiana	45533 26.37	126984 73.55	141 0.08	172658
Iowa	8899 24.57	27202 75.11	114 0.31	36215
Kansas	9273 22.73	31450 77.09	73 0.18	40796
Kentucky	41190 37.84	67664 62.15	11 0.01	108865
Louisiana	31031 31.26	68139 68.64	95 0.10	99265
Maine	6899 24.56	21187 75.41	10 0.04	28096
Maryland	36454 37.03	61912 62.89	77 0.08	98443

State	Pre-Block Canvassing		Block Canvassing Plus		Outside blue-line	State Total
	number percentage	number percentage	number percentage	number percentage		
Massachusetts	28932		102623		8	131563
	21.99		78.00		0.01	
Michigan	49533		145876		149	195558
	25.33		74.59		0.08	
Minnesota	17621		61029		172	78822
	22.36		77.43		0.22	
Mississippi	20156		51511		20	71687
	28.12		71.86		0.03	
Missouri	28082		53990		225	82297
	34.12		65.60		0.27	
Montana	810		2967		15	3792
	21.36		78.24		0.40	
Nebraska	5841		19096		9	24946
	23.41		76.55		0.04	
Nevada	11837		35706		169	47712
	24.81		74.84		0.35	
New Hampshire	4659		24025		9	28693
	16.24		83.73		0.03	
New Jersey	57995		137201		23	195219
	29.71		70.28		0.01	
New Mexico	6591		25228		44	31863
	20.69		79.18		0.14	
New York	83132		294846		64	378042
	21.99		77.99		0.02	
North Carolina	87792		145412		173	233377
	37.62		62.31		0.07	
North Dakota	1091		5586		21	6698
	16.29		83.40		0.31	
Ohio	69339		142022		97	211458
	32.79		67.16		0.05	
Oklahoma	16349		30958		225	47532
	34.40		65.13		0.47	
Oregon	27317		98865		164	126346
	21.62		78.25		0.13	
Pennsylvania	86066		222698		190	308954
	27.86		72.08		0.06	
Rhode Island	6634		17276		0	23910
	27.75		72.25		0.00	
South Carolina	58925		101522		167	160614
	36.69		63.21		0.10	
South Dakota	1831		3524		41	5396
	33.93		65.31		0.76	
Tennessee	99374		123794		87	223255
	44.51		55.45		0.04	
Texas	121275		309347		270	430892
	28.15		71.79		0.06	

State	Pre-Block Canvassing		Block Canvassing Plus		Outside blue-line	State Total
	number	percentage	number	percentage		
Utah	12131	25.99	34396	73.69	148	46675
Vermont	3624	22.31	12610	77.64	8	16242
Virginia	36690	33.55	72648	66.44	6	109344
Washington	45136	21.55	164251	78.42	65	209452
West Virginia	4212	31.61	9080	68.15	32	13324
Wisconsin	33169	22.90	111561	77.01	144	144874
Wyoming	2553	30.96	5518	66.92	175	8246
Total	1853037		4530676		5558	6389271

Table A-5. Percentage of Block Canvassing Adds by DMAF Deliverability

State	Non-DMAF Deliverable		DMAF Deliverable		State Total
	number	percentage	number	percentage	
Alabama	127	0.08	159967	99.92	160094
Alaska	4	0.02	20673	99.98	20677
Arizona	37	0.02	174964	99.98	175001
Arkansas	21	0.05	40044	99.95	40065
California	296	0.06	521506	99.94	521802
Colorado	6	0.01	99974	99.99	99980
Connecticut	12	0.02	56961	99.98	56973
Delaware	9	0.03	27920	99.97	27929
District	0	0.00	4268	100.00	4268
Florida	543	0.10	541136	99.90	541679
Georgia	99	0.04	234725	99.96	234824
Hawaii	2	0.00	40367	100.00	40369
Idaho	24	0.05	50635	99.95	50659
Illinois	147	0.06	233683	99.94	233830
Indiana	161	0.09	172497	99.91	172658
Iowa	14	0.04	36201	99.96	36215
Kansas	5	0.01	40791	99.99	40796
Kentucky	41	0.04	108824	99.96	108865
Louisiana	74	0.07	99191	99.93	99265
Maine	2	0.01	28094	99.99	28096
Maryland	30	0.03	98413	99.97	98443

State	Non-DMAF Deliverable		DMAF Deliverable		State Total
	number		number		
	percentage		percentage		
Massachusetts	30		131533		131563
	0.02		99.98		
Michigan	99		195459		195558
	0.05		99.95		
Minnesota	21		78801		78822
	0.03		99.97		
Mississippi	51		71636		71687
	0.07		99.93		
Missouri	36		82261		82297
	0.04		99.96		
Montana	0		3792		3792
	0.00		100.00		
Nebraska	3		24943		24946
	0.01		99.99		
Nevada	80		47632		47712
	0.17		99.83		
New Hampshire	11		28682		28693
	0.04		99.96		
New Jersey	73		195146		195219
	0.04		99.96		
New Mexico	18		31845		31863
	0.06		99.94		
New York	143		377899		378042
	0.04		99.96		
North Carolina	209		233168		233377
	0.09		99.91		
North Dakota	66		6632		6698
	0.99		99.01		
Ohio	103		211355		211458
	0.05		99.95		
Oklahoma	22		47510		47532
	0.05		99.95		
Oregon	51		126295		126346
	0.04		99.96		
Pennsylvania	117		308837		308954
	0.04		99.96		
Rhode Island	5		23905		23910
	0.02		99.98		
South Carolina	135		160479		160614
	0.08		99.92		
South Dakota	3		5393		5396
	0.06		99.94		
Tennessee	101		223154		223255
	0.05		99.95		
Texas	193		430699		430892
	0.04		99.96		

State	Non-DMAF Deliverable		DMAF Deliverable		State Total
	number	percentage	number	percentage	
Utah	84	0.18	46591	99.82	46675
Vermont	0	0.00	16242	100.00	16242
Virginia	10	0.01	109334	99.99	109344
Washington	196	0.09	209256	99.91	209452
West Virginia	0	0.00	13324	100.00	13324
Wisconsin	90	0.06	144784	99.94	144874
Wyoming	10	0.12	8236	99.88	8246
Total	3614		6385657		6389271

Appendix B - State Level Counts for Block Canvassing Deletes

Table B-1. Percentage of Addresses in Initial Block Canvassing Universe that were Deleted

State	Addresses in Universe	Deletes	Percentage
Alabama	1155956	94124	8.14
Alaska	146965	10085	6.86
Arizona	1578914	74180	4.70
Arkansas	516754	52483	10.16
California	11554587	481455	4.17
Colorado	1259842	44285	3.52
Connecticut	1320217	73324	5.55
Delaware	264236	13894	5.26
District	287218	10252	3.57
Florida	6417359	316790	4.94
Georgia	2215354	125948	5.69
Hawaii	366167	26481	7.23
Idaho	380794	20064	5.27
Illinois	4814754	496601	10.31
Indiana	2261135	129546	5.73
Iowa	810533	45838	5.66
Kansas	827794	41365	5.00
Kentucky	1025719	80899	7.89
Louisiana	1398381	99020	7.08
Maine	209902	20715	9.87
Maryland	1905825	67628	3.55
Massachusetts	2500212	134733	5.39
Michigan	3588189	170534	4.75
Minnesota	1488308	67658	4.55
Mississippi	730039	55703	7.63
Missouri	1684678	103368	6.14
Montana	112309	6729	5.99
Nebraska	493668	19767	4.00
Nevada	561205	17822	3.18
New Hampshire	300948	26679	8.87
New Jersey	3179844	180829	5.69
New Mexico	410005	22545	5.50
New York	6525045	406736	6.23
North Carolina	1772546	133340	7.52
North Dakota	138169	7042	5.10
Ohio	4311180	180295	4.18
Oklahoma	912932	54831	6.01

State	Addresses in Universe	Deletes	Percentage
Oregon	1226307	47891	3.91
Pennsylvania	4237883	270647	6.39
Rhode Island	444067	29397	6.62
South Carolina	1150407	112388	9.77
South Dakota	156144	8285	5.31
Tennessee	1641899	104166	6.34
Texas	6164370	311573	5.05
Utah	577784	25057	4.34
Vermont	74867	12394	16.55
Virginia	2003236	75725	3.78
Washington	2202766	116881	5.31
West Virginia	240221	22135	9.21
Wisconsin	1943965	89557	4.61
Wyoming	121171	6636	5.48
Total	91612770	5146320	

Table B-2. Percentage of Block Canvassing Deletes by Type of Delete

State	Duplicate	Field Delete	Non-residential	Uninhabitable	State Total
	number percentage	number percentage	number percentage	number percentage	
Alabama	1404 1.49	88068 93.57	2413 2.56	2239 2.38	94124
Alaska	262 2.60	9106 90.29	585 5.80	132 1.31	10085
Arizona	2466 3.32	68015 91.69	2848 3.84	851 1.15	74180
Arkansas	874 1.67	49509 94.33	1503 2.86	597 1.14	52483
California	19490 4.05	331338 68.82	115779 24.05	14848 3.08	481455
<i>Los Angeles County</i>			95631 47.51		
Colorado	664 1.50	40361 91.14	2338 5.28	922 2.08	44285
Connecticut	3145 4.29	62268 84.92	4299 5.86	3612 4.93	73324
Delaware	193 1.39	12818 92.26	757 5.45	126 0.91	13894
District	240 2.34	5796 56.54	1742 16.99	2474 24.13	10252
Florida	11038 3.48	288304 91.01	10626 3.35	6822 2.15	316790
Georgia	4874 3.87	112785 89.55	4011 3.18	4278 3.40	125948
Hawaii	5291 19.98	19854 74.97	1069 4.04	267 1.01	26481
<i>Honolulu County</i>	4928 20.72				
Idaho	477 2.38	17396 86.70	1913 9.53	278 1.39	20064
Illinois	11081 2.23	444881 89.59	30505 6.14	10134 2.04	496601
Indiana	2597 2.00	116579 89.99	6582 5.08	3788 2.92	129546
Iowa	562 1.23	41930 91.47	2320 5.06	1026 2.24	45838
Kansas	873 2.11	37422 90.47	1897 4.59	1173 2.84	41365
Kentucky	2163 2.67	74405 91.97	3423 4.23	908 1.12	80899
Louisiana	1642 1.66	89703 90.59	3158 3.19	4517 4.56	99020

State	Duplicate		Field Delete		Non-residential		Uninhabitable		State Total
	number	percentage	number	percentage	number	percentage	number	percentage	
Maine	315		19264		828		308		20715
	1.52		93.00		4.00		1.49		
Maryland	1711		55165		6457		4295		67628
	2.53		81.57		9.55		6.35		
Massachusetts	4130		118902		5932		5769		134733
	3.07		88.25		4.40		4.28		
Michigan	7076		147040		7624		8794		170534
	4.15		86.22		4.47		5.16		
Minnesota	1967		60657		3354		1680		67658
	2.91		89.65		4.96		2.48		
Mississippi	1434		50870		1536		1863		55703
	2.57		91.32		2.76		3.34		
Missouri	1951		89636		5080		6701		103368
	1.89		86.72		4.91		6.48		
Montana	79		5902		622		126		6729
	1.17		87.71		9.24		1.87		
Nebraska	725		17614		859		569		19767
	3.67		89.11		4.35		2.88		
Nevada	696		15873		913		340		17822
	3.91		89.06		5.12		1.91		
New Hampshire	61		25486		779		353		26679
	0.23		95.53		2.92		1.32		
New Jersey	5026		159334		9839		6630		180829
	2.78		88.11		5.44		3.67		
New Mexico	229		19713		1016		1587		22545
	1.02		87.44		4.51		7.04		
New York	12922		345170		28283		20361		406736
	3.18		84.86		6.95		5.01		
North Carolina	3001		121050		6945		2344		133340
	2.25		90.78		5.21		1.76		
North Dakota	33		6680		247		82		7042
	0.47		94.86		3.51		1.16		
Ohio	5064		154010		13651		7570		180295
	2.81		85.42		7.57		4.20		
Oklahoma	1104		48815		2476		2436		54831
	2.01		89.03		4.52		4.44		
Oregon	1974		39765		4439		1713		47891
	4.12		83.03		9.27		3.58		
Pennsylvania	5693		233089		20574		11291		270647
	2.10		86.12		7.60		4.17		
Rhode Island	788		26922		1303		384		29397
	2.68		91.58		4.43		1.31		
South Carolina	4390		102830		2902		2266		112388
	3.91		91.50		2.58		2.02		
South Dakota	182		7512		441		150		8285
	2.20		90.67		5.32		1.81		

State	Duplicate	Field Delete	Non-residential	Uninhabitable	State Total
	number percentage	number percentage	number percentage	number percentage	
Tennessee	3111	92683	3946	4426	104166
	2.99	88.98	3.79	4.25	
Texas	7995	275887	15029	12662	311573
	2.57	88.55	4.82	4.06	
Utah	542	22311	1893	311	25057
	2.16	89.04	7.55	1.24	
Vermont	301	11779	242	72	12394
	2.43	95.04	1.95	0.58	
Virginia	5518	61495	4443	4269	75725
	7.29	81.21	5.87	5.64	
Washington	3938	102373	7242	3328	116881
	3.37	87.59	6.20	2.85	
West Virginia	788	19315	1438	594	22135
	3.56	87.26	6.50	2.68	
Wisconsin	2752	79319	5714	1772	89557
	3.07	88.57	6.38	1.98	
Wyoming	37	5889	469	241	6636
	0.56	88.74	7.07	3.63	
Total	154869	4452888	364284	174279	5146320

Table B-3. Percentage of Block Canvassing Deletes by Basic Enumeration Area

State	Inside blue-line	Outside blue-line	State Total
	number percentage	number percentage	
Alabama	92648 98.43	1476 1.57	94124
Alaska	10069 99.84	16 0.16	10085
Arizona	73185 98.66	995 1.34	74180
Arkansas	46066 87.77	6417 12.23	52483
California	478511 99.39	2944 0.61	481455
Colorado	43925 99.19	360 0.81	44285
Connecticut	72148 98.40	1176 1.60	73324
Delaware	13467 96.93	427 3.07	13894
District	10252 100.00	0 0.00	10252
Florida	315448 99.58	1342 0.42	316790
Georgia	123837 98.32	2111 1.68	125948
Hawaii	26268 99.20	213 0.80	26481
Idaho	19544 97.41	520 2.59	20064
Illinois	493787 99.43	2814 0.57	496601
Indiana	127772 98.63	1774 1.37	129546
Iowa	42051 91.74	3787 8.26	45838
Kansas	39894 96.44	1471 3.56	41365
Kentucky	79202 97.90	1697 2.10	80899
Louisiana	96685 97.64	2335 2.36	99020
Maine	20434 98.64	281 1.36	20715
Maryland	67092 99.21	536 0.79	67628
Massachusetts	134314 99.69	419 0.31	134733

State	Inside blue-line		Outside blue-line		State Total
	number	percentage	number	percentage	
Michigan	168775	98.97	1759	1.03	170534
Minnesota	65810	97.27	1848	2.73	67658
Mississippi	53868	96.71	1835	3.29	55703
Missouri	98927	95.70	4441	4.30	103368
Montana	6644	98.74	85	1.26	6729
Nebraska	18858	95.40	909	4.60	19767
Nevada	17293	97.03	529	2.97	17822
New Hampshire	26279	98.50	400	1.50	26679
New Jersey	179805	99.43	1024	0.57	180829
New Mexico	21863	96.97	682	3.03	22545
New York	403584	99.23	3152	0.77	406736
North Carolina	129632	97.22	3708	2.78	133340
North Dakota	6589	93.57	453	6.43	7042
Ohio	177906	98.67	2389	1.33	180295
Oklahoma	51022	93.05	3809	6.95	54831
Oregon	47288	98.74	603	1.26	47891
Pennsylvania	266376	98.42	4271	1.58	270647
Rhode Island	29397	100.00	0	0.00	29397
South Carolina	110138	98.00	2250	2.00	112388
South Dakota	7212	87.05	1073	12.95	8285
Tennessee	102161	98.08	2005	1.92	104166
Texas	307423	98.67	4150	1.33	311573
Utah	24464	97.63	593	2.37	25057

State	Inside blue-line	Outside blue-line	State Total
	number percentage	number percentage	
Vermont	12132 97.89	262 2.11	12394
Virginia	75546 99.76	179 0.24	75725
Washington	116232 99.44	649 0.56	116881
West Virginia	21064 95.16	1071 4.84	22135
Wisconsin	88044 98.31	1513 1.69	89557
Wyoming	6023 90.76	613 9.24	6636
Total	5066954	79366	5146320

Table B-4. Percentage of Block Canvassing Deletes by Original Source Category

State	Pre-Block Canvassing		Outside blue-line	Unknown - Inside blue-line	State Total
	number percent	number percent	number percent	number percent	
Alabama	92991 98.80	1133 1.20	0 0.00		94124
Alaska	10075 99.90	10 0.10	0 0.00		10085
Arizona	73339 98.87	841 1.13	0 0.00		74180
Arkansas	47709 90.90	4774 9.10	0 0.00		52483
California	479143 99.52	2308 0.48	4 0.00		481455
Colorado	43961 99.27	324 0.73	0 0.00		44285
Connecticut	72659 99.09	665 0.91	0 0.00		73324
Delaware	13636 98.14	258 1.86	0 0.00		13894
District	10252 100.00	0 0.00	0 0.00		10252
Florida	315899 99.72	891 0.28	0 0.00		316790
Georgia	124363 98.74	1585 1.26	0 0.00		125948
Hawaii	26288 99.27	193 0.73	0 0.00		26481
Idaho	19635 97.86	429 2.14	0 0.00		20064
Illinois	494337 99.54	2264 0.46	0 0.00		496601
Indiana	128272 99.02	1274 0.98	0 0.00		129546
Iowa	42838 93.46	3000 6.54	0 0.00		45838
Kansas	40121 96.99	1244 3.01	0 0.00		41365
Kentucky	79790 98.63	1109 1.37	0 0.00		80899
Louisiana	97295 98.26	1725 1.74	0 0.00		99020
Maine	20537 99.14	178 0.86	0 0.00		20715
Maryland	67169 99.32	459 0.68	0 0.00		67628

State	Pre-Block Canvassing		Outside blue-line		Unknown - Inside blue-line		State Total
	number	percent	number	percent	number	percent	
Massachusetts	134448	99.79	285	0.21	0	0.00	134733
Michigan	169172	99.20	1362	0.80	0	0.00	170534
Minnesota	66270	97.95	1388	2.05	0	0.00	67658
Mississippi	54328	97.53	1375	2.47	0	0.00	55703
Missouri	99827	96.57	3541	3.43	0	0.00	103368
Montana	6676	99.21	53	0.79	0	0.00	6729
Nebraska	19004	96.14	763	3.86	0	0.00	19767
Nevada	17573	98.60	249	1.40	0	0.00	17822
New Hampshire	26410	98.99	269	1.01	0	0.00	26679
New Jersey	180243	99.68	586	0.32	0	0.00	180829
New Mexico	21968	97.44	577	2.56	0	0.00	22545
New York	404292	99.40	2444	0.60	0	0.00	406736
North Carolina	130814	98.11	2526	1.89	0	0.00	133340
North Dakota	6678	94.83	364	5.17	0	0.00	7042
Ohio	178331	98.91	1964	1.09	0	0.00	180295
Oklahoma	52032	94.90	2799	5.10	0	0.00	54831
Oregon	47376	98.92	515	1.08	0	0.00	47891
Pennsylvania	267138	98.70	3509	1.30	0	0.00	270647
Rhode Island	29397	100.00	0	0.00	0	0.00	29397
South Carolina	110772	98.56	1604	1.43	12	0.01	112388
South Dakota	7408	89.41	877	10.59	0	0.00	8285
Tennessee	102680	98.57	1486	1.43	0	0.00	104166
Texas	308567	99.04	3006	0.96	0	0.00	311573

State	Pre-Block Canvassing	Outside blue-line	Unknown - Inside blue-line	State Total
	number percent	number percent	number percent	
Utah	24575 98.08	482 1.92	0 0.00	25057
Vermont	12228 98.66	166 1.34	0 0.00	12394
Virginia	75606 99.84	119 0.16	0 0.00	75725
Washington	116428 99.61	453 0.39	0 0.00	116881
West Virginia	21553 97.37	582 2.63	0 0.00	22135
Wisconsin	88396 98.70	1160 1.30	1 0.00	89557
Wyoming	6272 94.51	364 5.49	0 0.00	6636
Total	5086771	59532	17	5146320

Table B-5. Percentage of Block Canvassing Field Deletes by LUCA Field Verification Result

State	Address Corrected	Field Delete	Non-residential	Uninhabitable	Verified	State Total
	number percent	number percent	number percent	number percent	number percent	
Alabama	9128 21.68	16845 40.00	392 0.93	47 0.11	15699 37.28	42111
Alaska	336 6.92	3352 68.99	55 1.13	2 0.04	1114 22.93	4859
Arizona	6741 17.75	11776 31.01	433 1.14	51 0.13	18977 49.97	37978
Arkansas	8279 33.81	7331 29.94	279 1.14	25 0.10	8571 35.01	24485
California	25018 13.84	82516 45.66	14232 7.88	565 0.31	58391 32.31	180722
Colorado	3565 17.27	7539 36.53	443 2.15	19 0.09	9072 43.96	20638
Connecticut	2581 9.06	13126 46.10	567 1.99	6 0.02	12194 42.83	28474
Delaware	1561 19.73	1540 19.46	157 1.98	0 0.00	4655 58.83	7913
District	22 0.91	175 7.27	37 1.54	0 0.00	2174 90.28	2408
Florida	26648 22.80	38386 32.84	1954 1.67	80 0.07	49809 42.62	116877
Georgia	9758 16.76	22219 38.17	808 1.39	66 0.11	25362 43.57	58213
Hawaii	2586 21.46	6783 56.29	66 0.55	5 0.04	2610 21.66	12050
Idaho	2385 22.14	4946 45.92	284 2.64	7 0.06	3149 29.24	10771
Illinois	18367 5.46	268966 79.98	1389 0.41	629 0.19	46926 13.95	336277
Indiana	10818 18.23	22770 38.36	1001 1.69	32 0.05	24731 41.67	59352
Iowa	4621 22.16	8977 43.04	767 3.68	6 0.03	6484 31.09	20855
Kansas	3455 18.08	8352 43.70	355 1.86	66 0.35	6884 36.02	19112
Kentucky	8706 21.59	18692 46.36	1050 2.60	60 0.15	11815 29.30	40323
Louisiana	8013 19.93	16396 40.78	463 1.15	152 0.38	15183 37.76	40207
Maine	1539 16.38	5442 57.93	158 1.68	1 0.01	2254 23.99	9394
Maryland	3255 11.22	9422 32.47	569 1.96	11 0.04	15757 54.31	29014

State	Address Corrected		Non-residential		Uninhabitable		Verified		State Total
	number	percent	number	percent	number	percent	number	percent	
Massachusetts	7100		21848		651		8		49701
	14.29		43.96		1.31		0.02		
Michigan	12479		37206		1437		351		79502
	15.70		46.80		1.81		0.44		
Minnesota	7491		14329		815		127		33820
	22.15		42.37		2.41		0.38		
Mississippi	4196		9455		245		18		24177
	17.36		39.11		1.01		0.07		
Missouri	9812		20031		900		48		43696
	22.46		45.84		2.06		0.11		
Montana	264		1400		73		1		3253
	8.12		43.04		2.24		0.03		
Nebraska	2756		3841		211		14		8650
	31.86		44.40		2.44		0.16		
Nevada	1097		2309		167		2		5619
	19.52		41.09		2.97		0.04		
New Hampshire	3066		4784		99		2		12656
	24.23		37.80		0.78		0.02		
New Jersey	15475		37286		1337		17		83671
	18.50		44.56		1.60		0.02		
New Mexico	2242		5924		200		34		11914
	18.82		49.72		1.68		0.29		
New York	25151		88983		4146		525		188673
	13.33		47.16		2.20		0.28		
North Carolina	11922		30122		4590		52		65664
	18.16		45.87		6.99		0.08		
North Dakota	424		2204		50		20		3775
	11.23		58.38		1.32		0.53		
Ohio	13564		33219		2034		35		82087
	16.52		40.47		2.48		0.04		
Oklahoma	7412		8063		337		10		22194
	33.40		36.33		1.52		0.05		
Oregon	2985		10141		550		55		22542
	13.24		44.99		2.44		0.24		
Pennsylvania	23571		63434		2727		199		137040
	17.20		46.29		1.99		0.15		
Rhode Island	1735		4050		185		32		10273
	16.89		39.42		1.80		0.31		
South Carolina	11812		19568		705		33		50510
	23.39		38.74		1.40		0.07		
South Dakota	1165		1448		92		3		3459
	33.68		41.86		2.66		0.09		
Tennessee	9032		16918		635		27		41332
	21.85		40.93		1.54		0.07		
Texas	19457		57857		2125		141		125368
	15.52		46.15		1.70		0.11		

State	Address Corrected		Non-residential		Uninhabitable		Verified		State Total	
	number	percent	number	percent	number	percent	number	percent		
Utah	2837		6988		353		24		14925	
	19.01		46.82		2.37		0.16			31.64
Vermont	604		7125		15		3		9013	
	6.70		79.05		0.17		0.03			14.05
Virginia	2914		11880		611		21		26598	
	10.96		44.67		2.30		0.08			42.00
Washington	10255		22111		959		24		49591	
	20.68		44.59		1.93		0.05			32.75
West Virginia	1512		5271		293		17		10846	
	13.94		48.60		2.70		0.16			34.60
Wisconsin	7195		17776		929		36		40231	
	17.88		44.18		2.31		0.09			35.53
Wyoming	1110		1425		92		9		3768	
	29.46		37.82		2.44		0.24			30.04
Total	378017		1142547		53022		3718		789277	2366581

Table B-6. Percentage of Block Canvassing Deletes by DMAF Deliverability

State	Non-DMAF Deliverable		DMAF Deliverable		State Total
	number	percent	number	percent	
Alabama	48426	51.45	45698	48.55	94124
Alaska	4734	46.94	5351	53.06	10085
Arizona	33177	44.72	41003	55.28	74180
Arkansas	26818	51.10	25665	48.90	52483
California	180251	37.44	301204	62.56	481455
Colorado	21466	48.47	22819	51.53	44285
Connecticut	38885	53.03	34439	46.97	73324
Delaware	5053	36.37	8841	63.63	13894
District	4715	45.99	5537	54.01	10252
Florida	189518	59.82	127272	40.18	316790
Georgia	62648	49.74	63300	50.26	125948
Hawaii	13615	51.41	12866	48.59	26481
Idaho	7622	37.99	12442	62.01	20064
Illinois	122240	24.62	374361	75.38	496601
Indiana	61844	47.74	67702	52.26	129546
Iowa	23202	50.62	22636	49.38	45838
Kansas	20353	49.20	21012	50.80	41365
Kentucky	36988	45.72	43911	54.28	80899
Louisiana	53165	53.69	45855	46.31	99020
Maine	10638	51.35	10077	48.65	20715
Maryland	30663	45.34	36965	54.66	67628
Massachusetts	76921	57.09	57812	42.91	134733

State	Non-DMAF Deliverable		DMAF Deliverable		State Total
	number	percent	number	percent	
Michigan	77058	45.19	93476	54.81	170534
Minnesota	30026	44.38	37632	55.62	67658
Mississippi	28666	51.46	27037	48.54	55703
Missouri	50811	49.16	52557	50.84	103368
Montana	2949	43.83	3780	56.17	6729
Nebraska	10230	51.75	9537	48.25	19767
Nevada	10894	61.13	6928	38.87	17822
New Hampshire	13271	49.74	13408	50.26	26679
New Jersey	87867	48.59	92962	51.41	180829
New Mexico	8321	36.91	14224	63.09	22545
New York	183578	45.13	223158	54.87	406736
North Carolina	61190	45.89	72150	54.11	133340
North Dakota	2798	39.73	4244	60.27	7042
Ohio	83184	46.14	97111	53.86	180295
Oklahoma	28772	52.47	26059	47.53	54831
Oregon	20171	42.12	27720	57.88	47891
Pennsylvania	111752	41.29	158895	58.71	270647
Rhode Island	17831	60.66	11566	39.34	29397
South Carolina	54161	48.19	58227	51.81	112388
South Dakota	4389	52.98	3896	47.02	8285
Tennessee	55327	53.11	48839	46.89	104166
Texas	167551	53.78	144022	46.22	311573
Utah	8751	34.92	16306	65.08	25057

State	Non-DMAF Deliverable		DMAF Deliverable		State Total
	number	percent	number	percent	
Vermont	3114	25.13	9280	74.87	12394
Virginia	42008	55.47	33717	44.53	75725
Washington	57180	48.92	59701	51.08	116881
West Virginia	9804	44.29	12331	55.71	22135
Wisconsin	44082	49.22	45475	50.78	89557
Wyoming	2449	36.90	4187	63.10	6636
Total	2351127		2795193		5146320

Appendix C - State Level Counts for Block Canvassing Addresses Corrected

Table C-1. Percentage of Addresses in Initial Block Canvassing Universe that were Corrected

State	Addresses in Universe	Addresses Corrected	Percentage
Alabama	1155956	19124	1.65
Alaska	146965	5151	3.50
Arizona	1578914	25897	1.64
Arkansas	516754	11369	2.20
California	11554587	257591	2.23
Colorado	1259842	27014	2.14
Connecticut	1320217	33082	2.51
Delaware	264236	4532	1.72
District	287218	2499	0.87
Florida	6417359	93939	1.46
Georgia	2215354	27012	1.22
Hawaii	366167	9589	2.62
Idaho	380794	11364	2.98
Illinois	4814754	155570	3.23
Indiana	2261135	34680	1.53
Iowa	810533	8429	1.04
Kansas	827794	11670	1.41
Kentucky	1025719	22201	2.16
Louisiana	1398381	28736	2.05
Maine	209902	6056	2.89
Maryland	1905825	29588	1.55
Massachusetts	2500212	49857	1.99
Michigan	3588189	128554	3.58
Minnesota	1488308	39899	2.68
Mississippi	730039	10670	1.46
Missouri	1684678	31508	1.87
Montana	112309	3259	2.90
Nebraska	493668	7708	1.56
Nevada	561205	26375	4.70
New Hampshire	300948	9112	3.03
New Jersey	3179844	81835	2.57
New Mexico	410005	15121	3.69
New York	6525045	424860	6.51
North Carolina	1772546	46351	2.61
North Dakota	138169	5688	4.12
Ohio	4311180	77175	1.79

State	Addresses in Universe	Addresses Corrected	Percentage
Oklahoma	912932	31888	3.49
Oregon	1226307	19693	1.61
Pennsylvania	4237883	105800	2.50
Rhode Island	444067	9740	2.19
South Carolina	1150407	22295	1.94
South Dakota	156144	4934	3.16
Tennessee	1641899	33950	2.07
Texas	6164370	152837	2.48
Utah	577784	15163	2.62
Vermont	74867	1536	2.05
Virginia	2003236	25058	1.25
Washington	2202766	50884	2.31
West Virginia	240221	6480	2.70
Wisconsin	1943965	30499	1.57
Wyoming	121171	1346	1.11
Total	91612770	2295168	

Appendix D - State Level Counts for Block Canvassing Geographic Corrections

Table D-1. Percentage of Addresses in Initial Block Canvassing Universe that received Geographic Corrections

State	Addresses in Universe	Geographic Corrections	Percentage
Alabama	1155956	63021	5.45
Alaska	146965	3818	2.60
Arizona	1578914	100773	6.38
Arkansas	516754	39193	7.58
California	11554587	244356	2.11
Colorado	1259842	56751	4.50
Connecticut	1320217	32304	2.45
Delaware	264236	16817	6.36
District	287218	88	0.03
Florida	6417359	197906	3.08
Georgia	2215354	66296	2.99
Hawaii	366167	18425	5.03
Idaho	380794	12880	3.38
Illinois	4814754	119860	2.49
Indiana	2261135	88747	3.92
Iowa	810533	31656	3.91
Kansas	827794	38979	4.71
Kentucky	1025719	53648	5.23
Louisiana	1398381	58806	4.21
Maine	209902	9733	4.64
Maryland	1905825	45820	2.40
Massachusetts	2500212	50546	2.02
Michigan	3588189	129828	3.62
Minnesota	1488308	69054	4.64
Mississippi	730039	27138	3.72
Missouri	1684678	71778	4.26
Montana	112309	4220	3.76
Nebraska	493668	21185	4.29
Nevada	561205	20833	3.71
New Hampshire	300948	17857	5.93
New Jersey	3179844	98531	3.10
New Mexico	410005	25373	6.19
New York	6525045	112359	1.72
North Carolina	1772546	76942	4.34
North Dakota	138169	5782	4.18
Ohio	4311180	119072	2.76
Oklahoma	912932	39643	4.34

State	Addresses in Universe	Geographic Corrections	Percentage
Oregon	1226307	23864	1.95
Pennsylvania	4237883	201854	4.76
Rhode Island	444067	15870	3.57
South Carolina	1150407	83845	7.29
South Dakota	156144	6308	4.04
Tennessee	1641899	69304	4.22
Texas	6164370	160013	2.60
Utah	577784	19775	3.42
Vermont	74867	8459	11.30
Virginia	2003236	34425	1.72
Washington	2202766	57451	2.61
West Virginia	240221	8791	3.66
Wisconsin	1943965	61436	3.16
Wyoming	121171	7001	5.78
Total	91612770	2948414	0.03218

Table D-2. Percentage of Block Canvassing Geographic Corrections by Block Code Agreement

State	Block Codes do not Agree		Block Codes Agree		State Total
	number	percentage	number	percentage	
Alabama	1085	1.72	61936	98.28	63021
Alaska	115	3.01	3703	96.99	3818
Arizona	8522	8.46	92251	91.54	100773
Arkansas	972	2.48	38221	97.52	39193
California	10323	4.22	234033	95.78	244356
Colorado	2533	4.46	54218	95.54	56751
Connecticut	902	2.79	31402	97.21	32304
Delaware	752	4.47	16065	95.53	16817
District	0	0.00	88	100.00	88
Florida	6962	3.52	190944	96.48	197906
Georgia	3738	5.64	62558	94.36	66296
Hawaii	511	2.77	17914	97.23	18425
Idaho	322	2.50	12558	97.50	12880
Illinois	6364	5.31	113496	94.69	119860
Indiana	5381	6.06	83366	93.94	88747
Iowa	813	2.57	30843	97.43	31656
Kansas	2172	5.57	36807	94.43	38979
Kentucky	1654	3.08	51994	96.92	53648
Louisiana	1531	2.60	57275	97.40	58806
Maine	147	1.51	9586	98.49	9733
Maryland	2598	5.67	43222	94.33	45820

State	Block Codes do not Agree	Block Codes Agree	State Total
	number percentage	number percentage	
Massachusetts	1199 2.37	49347 97.63	50546
Michigan	5679 4.37	124149 95.63	129828
Minnesota	1789 2.59	67265 97.41	69054
Mississippi	1087 4.01	26051 95.99	27138
Missouri	1562 2.18	70216 97.82	71778
Montana	180 4.27	4040 95.73	4220
Nebraska	428 2.02	20757 97.98	21185
Nevada	997 4.79	19836 95.21	20833
New Hampshire	196 1.10	17661 98.90	17857
New Jersey	3374 3.42	95157 96.58	98531
New Mexico	701 2.76	24672 97.24	25373
New York	9073 8.08	103286 91.92	112359
North Carolina	3621 4.71	73321 95.29	76942
North Dakota	268 4.64	5514 95.36	5782
Ohio	5200 4.37	113872 95.63	119072
Oklahoma	986 2.49	38657 97.51	39643
Oregon	1038 4.35	22826 95.65	23864
Pennsylvania	7019 3.48	194835 96.52	201854
Rhode Island	386 2.43	15484 97.57	15870
South Carolina	4178 4.98	79667 95.02	83845
South Dakota	217 3.44	6091 96.56	6308
Tennessee	2552 3.68	66752 96.32	69304
Texas	5001 3.13	155012 96.87	160013

State	Block Codes do not Agree		Block Codes Agree		State Total
	number	percentage	number	percentage	
Utah	2462	12.45	17313	87.55	19775
Vermont	57	0.67	8402	99.33	8459
Virginia	946	2.75	33479	97.25	34425
Washington	1958	3.41	55493	96.59	57451
West Virginia	153	1.74	8638	98.26	8791
Wisconsin	2490	4.05	58946	95.95	61436
Wyoming	562	8.03	6439	91.97	7001
Total	122756		2825658		2948414