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December 4, 2012

## **2010 CENSUS PLANNING MEMORANDA SERIES**

**No. 248**

MEMORANDUM FOR      The Distribution List

From:                      Burton Reist *[signed]*  
                                 Acting Chief, Decennial Management Division

Subject:                    2010 Census Late Adds Mailout Operation Assessment Report

Attached is the 2010 Census Late Adds Mailout Operation Assessment Report. The Quality Process for the 2010 Census Evaluations, Experiments, and Assessments was applied to the methodology development, specifications, software development, analysis, and documentation of the analysis and results, as necessary.

If you have questions about this report, please contact Karen Owens at (301) 763-1989.

Attachment

# 2010 Census Late Adds Mailout Operation Assessment Report

Census Bureau standards and quality process procedures were applied throughout the creation of this report.

Karen L. Owens

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2020 Research and Planning Office



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## Executive Summary

Traditional census design allows for late additions to the address list. Although the primary address list building activities occur prior to the enumeration stage, addresses may be added later from the United States Postal Service files, local government updates for new construction, the Local Update of Census Addresses Appeals program, and other operations designed to improve coverage. During the 2010 Census, these types of addresses were added to the list while census enumerations were already occurring in the spring of 2010. Under the original plan for the 2010 Census, which was similar to the Census 2000 design, these late additions would not have received a census questionnaire. Instead, their first chance for a census-initiated enumeration would have been during the Vacant Delete Check operation in July 2010.

In January 2010, the United States Census Bureau Director expressed concerns regarding the workload for the Vacant Delete Check operation. At the time, the Local Update of Census Addresses Appeals universe was approaching 1.8 million cases, a larger than expected workload. The Director was concerned about our plan to enumerate these cases so late in the process and potential respondent recall bias given the enumeration would occur three months after Census Day (April 1, 2010). During that time, the Census Bureau was also heavily promoting mail response through the March to the Mailbox campaign. This caused additional concerns regarding public reactions to the campaign for those respondents who had not yet received a questionnaire to return.

To address these concerns, the Director tasked the Decennial Management Division with developing a plan that would allow for an earlier enumeration of these cases slated for the Vacant Delete Check operation. The Decennial Management Division organized an interdivisional team to explore the options and make a recommendation. On January 29, 2010, with the Director's approval, the team proceeded to implement the 2010 Census Late Adds Mailout operation. The operation would allow a subset of the "late adds" addresses from the Spring 2010 Delivery Sequence File, the Ungeocoded Resolution operation and the Local Update of Census Addresses Appeals operation the opportunity to receive a questionnaire return in the mail.

A total of 2,044,451 addresses were mailed questionnaires as part of the 2010 Census Late Adds Mailout operation. Questionnaires were mailed between March 23, 2010 and April 8, 2010. Local Update of Census Addresses Appeals reinstated addresses accounted for 66.2 percent of the universe. Ungeocoded Resolution addresses accounted for 25.3 percent, and addresses from the Spring 2010 Delivery Sequence File accounted for the remaining 8.6 percent.

Although approximately 2.04 million addresses were mailed questionnaires, reports indicate that at least 29 percent of the mailout universe were undeliverable as addressed. Although specific data on questionnaires that were undeliverable as addressed were not available, an investigation of the status of the addresses on the Spring 2010 Delivery Sequence File indicates that only 27.8 percent of the Local Update of Census Addresses Appeals addresses appeared on the file as potentially deliverable.

Given the high rate of undeliverable as addressed addresses, questionnaire return rates were not surprising. Overall, about 31.5 percent of the housing units in the Late Adds Mailout operation returned the questionnaire. The overall return rate adjusted for the approximate number of undeliverable as addressed records was 44.4 percent. The unadjusted return rates were highest for the “Ungeocoded Resolution” housing units at 50.5 percent, and lowest for the “Local Update of Census Addresses Appeals” housing units at 22.7 percent.

The hope was that returns from the Late Adds Mailout operation would significantly reduce the Vacant Delete Check workload, however that was not the case. Approximately 69 percent of the Late Adds Mailout addresses (1,406,421 addresses in total) were included in the Vacant Delete Check workload. The majority of those addresses were Local Update of Census Addresses Appeals Reinstates. Approximately 78 percent of the original Local Update of Census Addresses Appeals ended up in the Vacant Delete Check universe. Vacant Delete Check universe rates for the “Spring 2010 Delivery Sequence File” and “Ungeocoded Resolution” housing units were 57.3 percent and 50.2 percent respectively.

Final census results indicate that 1,351,091 housing units from the Late Adds Mailout universe were included in the final 2010 Census counts. This represents 66.1 percent of the Late Adds Mailout universe. Inclusion could have resulted from the mailback of a questionnaire or through enumeration in the Vacant Delete Check operation. Results for the “Spring 2010 Delivery Sequence File” and “Ungeocoded Resolution” housing units were higher than the overall, with 83.7 percent of housing units and 90.5 percent of housing units in the final census respectively.

The results for “Local Update of Census Addresses Appeals” housing units were much lower than the other two sources at 54.5 percent. Through all stages, the appealed housing units appeared to have less success than the addresses from the other two sources. Presumably high undeliverable as addressed rates affected the overall response rates and led to the inclusion of most of these addresses in the Vacant Delete Check operation which ultimately resulted in low in-census success rates.

Overall, the Late Adds Mailout operation met with some successes. Namely:

- Census Bureau staff were able to successfully work together to plan and implement a mailout operation for over two million addresses during the height of 2010 Census activities.
- The operation reduced the Vacant Delete Check workload by more than half for two of the “late adds” sources, the Spring 2010 Delivery Sequence file and the Ungeocoded Resolution. Had these sources represented more of the Late Adds universe, results could have been significant.
- Approximately \$2.5 million was spent for the Late Adds Mailout operation and it generated approximately \$20.6 million in savings.

These results indicate that the census should consider strategies for self-response for late census adds in the future. With careful planning, this strategy could generate cost savings. However, Local Update of Census Addresses Appeals results emphasize the need for more thought into the types of addresses that should be included in specific strategies. The results for the Delivery Sequence File adds and Ungeocoded Resolution adds were encouraging. Both sources of addresses had higher response rates than the Local Update of Census Addresses Appeals records and both had high in-census rates. Although the Ungeocoded Resolution addresses were also from the Delivery Sequence File, they represented addresses that Geography Division was not able to geocode and include in earlier processes. Geocodes applied by regional geographers allowed for their successful inclusion in the census.

Specific recommendations to help shape future planning include:

- **Investigate which categories of “late adds” to the census should be allowed the opportunity for self-response before an in-person visit.** This overall strategy has been proven to work in the 2010 Census; however, future iterations should be carefully planned.
- **Conduct more research into the Local Update of Census Appeals process to determine what factors lead to “good” versus “bad” appeals.** The Late Adds Mailout results for appealed addresses indicate that many of these addresses may have been of poor quality. Further investigations may help form a better strategy for dealing with appealed addresses in the future.
- **Continue planning for operations and/or processes that will assign geocodes to ungeocoded addresses on the Master Address File.** The Ungeocoded Resolution result highlights the need for an operation to interactively geocode addresses before and during the address list building for future censuses. The Geographic Support System Initiative currently has a plan for this type of operation.
- **Conduct more research into the overall impact of including Late Add addresses in the self-response process later.** Although responses were received for a subset of the Late Add addresses, the overall impact on census duplication, a risk that was identified during the planning stages of this operation, is not known. Results of the Census Coverage Measurement Program may help assess the Late Adds Mailout impact on census errors.

# **1 Introduction**

## **1.1 Scope**

The purpose of the Late Adds Mailout Assessment is to document the results and major findings from the operation, including topics such as workload, schedule, and cost. This assessment will inform the Address List Development Operation Integration Team, the Housing Unit Enumeration Operation Integration Team, stakeholders, and decision makers of recommended changes or improvements for future ad hoc census operations.

## **1.2 Intended Audience**

This document assumes that the reader has at least a basic understanding of census operations. The goal is to use this document to record the activities and results of the Late Adds Mailout operation, an ad hoc census operation that was mostly undocumented due to time constraints. This document will also help research, planning, and development teams plan the 2020 Census.

# **2 Background**

Similar to the Census 2000 design, the design of the 2010 Census allowed for late additions to the address list. The addresses were added to the list while census enumerations were already occurring in the spring of 2010. Under the original plan for the census, these late additions would not have received a census questionnaire. Instead, with the exception of Update/Leave adds, their “first” chance for enumeration would have been during the Vacant Delete Check (VDC) operation. The full scope of operations that added addresses to the VDC universe is as follows:

- New Construction Program
- Housing Unit Count Review Program
- Spring 2010 Delivery Sequence file (DSF) Refresh Updates
- Local Update of Census Addresses (LUCA) Appeals
- Nonresponding adds from the Update/Leave Operation
- Address Canvassing Information Communication (INFO-COMM) process
- Ungeocoded Resolution operation

Due to an unexpected number of LUCA appeals, and concerns that a number of households would not receive a census form or have a chance to be enumerated until the VDC operation in July 2010, census management was tasked with exploring options for getting these addresses in the enumeration process earlier. In January 2010, an interdivisional team led by the Decennial Management Division (DMD) met to discuss options. As a result, a new process was developed to get a subset of the records originally intended for the VDC universe into a Late Adds Mailout operation. Section 2.1 describes the original design and section 2.2 describes the new design for the Late Adds Mailout.

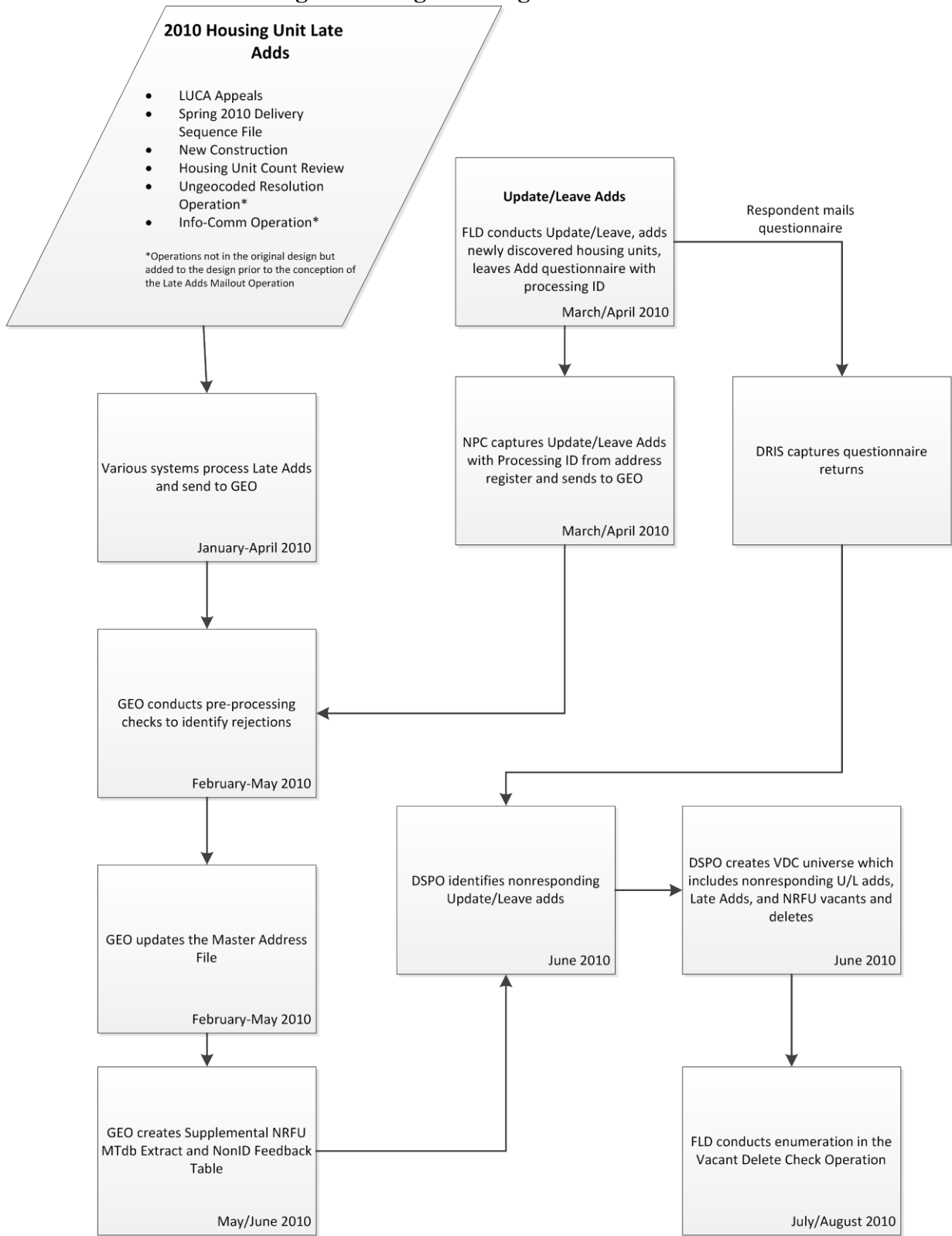
## **2.1 Original Design for Late Adds**

### **2.1.1 Original Design Overview**

The original design of the 2010 Census allowed for adds to the census address list just prior to or during enumeration activities but too late to be included in the initial enumeration operations such as Mailout/Mailback, Update/Leave, or Nonresponse Followup (NRFU). As adds to the census universe came in from field work, postal service files, and other operations, they were processed in the Geography Division (GEO) and provided to the Decennial Systems Processing Office (DSPO) in a Master Address File (MAF)/Topologically Integrated Geographic Encoding and Referencing (TIGER) database (MTdb) extract file known as the Supplemental NRFU Universe Extract. DSPO used the information on the extract file and information from the Decennial Response File (DRF) to identify the universe to be worked in the VDC operation.

Figure 1 provides a high-level flow of activities. Section 2.1.2 provides more details about the sources of addresses that were added to the census at that time. Section 2.1.3 provides more information about VDC.

**Figure 1: Original Design for Late Adds**



## 2.1.2 Original Design Sources

A brief summary of each of the sources of “late adds” addresses is provided below.

- New Construction Operation

The New Construction Operation provided tribal and local governments the opportunity to report newly constructed living quarters in the enumeration areas where the U.S. Census Bureau delivered questionnaires by mail (Mailout/Mailback areas). Eligible housing units were those where basic construction was expected to be completed after the Address Canvassing Operation and before Census Day (DMD, 2011). New addresses were sent to GEO to update the MTdb so that they could be included on the census address list.

- LUCA Appeals

The LUCA program offered an appeal process to allow governmental units the opportunity to correct any discrepancies between LUCA participants’ records and 2010 Census Address Canvassing results. Any appeals that were approved by the LUCA Appeals Staff were sent to GEO for updating the MTdb. An appeal could result in a “reinstate,” where a record that was originally confirmed by LUCA but deleted in Address Canvassing was determined to be valid during the appeals process. In this situation, the record was already on the MTdb, but it needed to be “reinstated” to the census address list. An appeal could also result in a brand new address added to the MTdb. Both situations resulted in “adds” to the census address list at the time.

- Spring 2010 DSF Refresh update

The DSF is a United States Postal Service (USPS) file containing all mailing addresses serviced by the USPS. The file is used as a source for maintaining and updating the MTdb every six months. Each update was referred to as a “Refresh.” Any new addresses added to the MTdb during the Spring 2010 DSF Refresh would be included in the census address list for VDC as long as GEO was able to assign a collection block code (geocode) to the address.

- Housing Unit Count Review program

The Housing Unit Count Review program was designed to enhance the accuracy of the census and provide the Federal-State Cooperative Program for Population Estimates with

the opportunity to review and provide feedback on housing counts. In February 2010, Federal-State Cooperative Program for Population Estimates representatives worked with staff in the Population Division to conduct the review and identify clusters of addresses that were potentially missing from the census address list. City-style addresses in Mailout/Mailback areas that were identified as missing were sent to GEO to update the MTdb in time for VDC (DMD, 2011).

The next two operations were not in the original census design, but were developed and implemented after the Address Canvassing operation. The addresses added from these operations were also considered “late adds” and were scheduled to follow the same process as those listed above.

- Address Canvassing INFO-COMM process

During the Address Canvassing Operation, field staff completed an INFO-COMM (D-225) report if a Quality Control Lister discovered an address or addresses missing from the list after their assignment area had already passed the Dependent Quality Control check.<sup>1</sup> This information was keyed into a spreadsheet and provided to Census Bureau Headquarters.

- Ungeocoded Resolution operation

Address records on the MTdb that do not have a block code assigned to them (ungeocoded records) were identified by Census Bureau Headquarters and provided to the Regional Census Centers (RCCs). The RCCs used existing source material and local knowledge to attempt to geocode these records to a collection block in Mailout/Mailback areas. Research was also conducted at the RCCs to ensure duplicate records were not included in the 2010 Census.

In addition to the “late adds” listed above, the universe for the VDC operation would include the added units from the Update/Leave and Urban Update/Leave operations that had not yet returned the questionnaire that the census enumerator left at the housing unit. Section 2.1.3 provides more information about the VDC operation.

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<sup>1</sup> The Dependent Quality Check was based on a sample of the units in an assignment area. Once the sample was completed, the software on the hand-held computer determined whether the assignment area passed or failed the Quality Check. After this determination, the Lister continued to work in their assigned area to complete their verification of all the deleted units (if the assignment area passed the Dependent Quality Check) or checked all of the units on the list in their assignment area (if the assignment area failed the Dependent Quality Check). When instructed to only verify the deleted units, the software did not allow the Lister to add any additional units they may have discovered.



### **2.1.3 Enumeration through Vacant Delete Check**

The NRFU Operations (NRFU, NRFU Reinterview, VDC, and NRFU Residual) were the Census Bureau's effort to enumerate housing units and persons who did not respond to the census by mail. The enumerators used the paper enumerator questionnaire to conduct these interviews. The VDC operation began after a Local Census Office completed its NRFU workload (Walker, et al).

One purpose of VDC was to verify the status of cases identified during NRFU as being vacant or nonexistent on Census Day. Vacant and nonexistent housing units are required to have their status verified to ensure that housing units are not misclassified and people are not missed. However, not all cases marked in NRFU as being vacant and nonexistent were eligible for VDC. Some were checked in NRFU Reinterview. Some were not required to go to VDC because either the assigned NRFU status did not need to be checked (e.g., empty mobile home sites) or there was another acceptable source of information that was used to verify the case status (Walker, et al).

In addition to eligible vacant housing units and deleted housing units from NRFU, the VDC workload included the "late adds" from the sources described in section 2.1.2. In summary, the original VDC workload, which is referred to as the Supplemental NRFU workload, included:

- the Spring 2010 DSF Refresh adds,
- the New Construction operation adds,
- the LUCA Appeals Reinstates,
- the Ungeocoded operation adds,
- the Address Canvassing INFO-COMM operation adds,
- the Housing Unit Count Review operation adds, and
- the nonresponding adds from Update/Leave operations.

Aside from cases added during Update/Leave operations, the addresses above would not have received a census questionnaire. Instead, they would have been processed, added to the address list, and sent to VDC for an in-person enumeration.

The VDC workload also consisted of housing units that had mail returns that were determined to be blank after data capture (also known as reverse check-in cases). VDC followed similar field procedures as NRFU and utilized the Paper-Based Operations Control System for case management (Walker, et al). For further information about the VDC operation, please refer to the *2010 Census Nonresponse Operations Assessment*.

## **2.2 New Design for Late Adds**

### **2.2.1 The Issue**

In January 2010, the U.S. Census Bureau Director expressed concerns regarding the workload for the VDC operation that was scheduled to start in July. At the time, the LUCA Appeals universe was approaching 1.8 million cases, a larger than expected workload. The Director's concerns centered around:

- Our plan to enumerate these cases for the first time so late in the process
- Potential respondent recall bias given the enumeration would occur three months after Census Day
- Public reactions to the March to the Mailbox campaign for those respondents who had not yet received a questionnaire to return.
- Concerns expressed by regional office staff in the Field Division (FLD) who were also willing to try to get these cases into the process earlier

To address these concerns, the Director tasked census management with developing a plan that would allow for an earlier enumeration of these cases slated for the VDC operation. DMD organized an interdivisional team to explore the options. In addition to DMD, the team had representation from the Decennial Statistical Studies Division (DSSD), DSPO, the Decennial Response Integration System (DRIS) Program Management Office, the National Processing Center (NPC), GEO, and FLD.

### **2.2.2 The Options**

The interdivisional team commenced in the fourth week of January to discuss the following options for getting the "late adds" enumerated before the VDC operation. A brief summary of the options and relevant discussion topics is provided below.

#### **A. Questionnaire mailout**

This option involved the mailing out of self-response questionnaires to the Late Add cases. Either the print vendor that was used for the other census mailings or the NPC would have conducted the labeling of questionnaires and the mailout. Discussions centered around:

- Modifications to the GEO processing and update process in order to identify cases earlier
- Creation of address label files
- Availability of questionnaire packages

- Pros and cons of having the print vendor versus NPC label and mail out questionnaires
- Potential modifications to existing contracts for printing and tracking
- Potential new software development for DSPO, GEO, and NPC
- Impacts to downstream census activities (e.g. questionnaire scanning, questionnaire tracking, and identification of the VDC universe based on nonresponse)

## B. Early in-person enumeration

This option involved getting the “late add” cases out to the field during the NRFU operation. Since the systems and processes for identification of the NRFU universe were already in place (and did not include these cases), the team’s discussion centered around:

- Modifications to GEO processing to identify eligible addresses
- Methods for delivery of cases to the field
- Methods for tracking and managing work (e.g., FLD would need to use spreadsheets in lieu of the existing operational control system)
- Labeling NRFU questionnaires
- Integration of these cases with existing NRFU workload
- Options for quality control (a new design versus nothing)

### 2.2.3 The Assumptions

There were several assumptions that helped guide team discussion regarding the options. Namely:

- The only “late add” cases under consideration were those in Mailout/Mailback areas.
- Only “late add” cases that were already on the MTdb would be included in the new operation.
- Only those Ungeocoded Resolution addresses that were worked and resolved (i.e., geocoded) in the RCCs were eligible for the new operation.
- GEO would conduct pre-processing quality checks for all addresses regardless of the selected option.

## 2.2.4 The Recommendation and Risks

The interdivisional team met frequently to finalize the options and make recommendations based on schedule, costs and risks. Option A (questionnaire mailout) was selected as the final recommendation based on a majority vote on January 27, 2010. The team identified the following risks associated with this option:

- The new operation was a late design change and there may have been impacts to the census that the team did not identify.
- There was a potential for increased duplication in the census. Although GEO would conduct traditional matching against the MTdb for these addresses, there would be duplicate situations that are more easily resolved by an enumerator in the field. Allowing a self-response option for these adds eliminated that field resolution for the subset that chose to respond.
- The new operation would require new software and modifications to existing systems. Resources that were working on developing systems for downstream census operations were now required to focus their efforts on this operation and this had the potential to put other systems in jeopardy.
- Although the team developed a plan and all parties involved were committed to making it work, there were no guarantees that the operation would be implemented as planned.

## 2.2.5 The Solution

As a result of many interdivisional meetings to explore options and a final consultation with the Director on January 28, 2010, a new process was developed to mail a census form to a subset of the Late Add addresses originally intended for the VDC universe. This would provide people with the opportunity to self-respond via mail. The new operation was referred to as the Late Adds Mailout operation (Hanks, 2010).

The scope of the Late Adds Mailout operation was limited to the areas defined as Mailout/Mailback for the 2010 Census. Also, due to very tight time constraints, the addresses that were included in the Late Adds Mailout were limited to those that were already on the MTdb at the time of the mailout. This allowed the mailout to occur prior to several MTdb update processes that were scheduled later. This limited the mailout universe to:

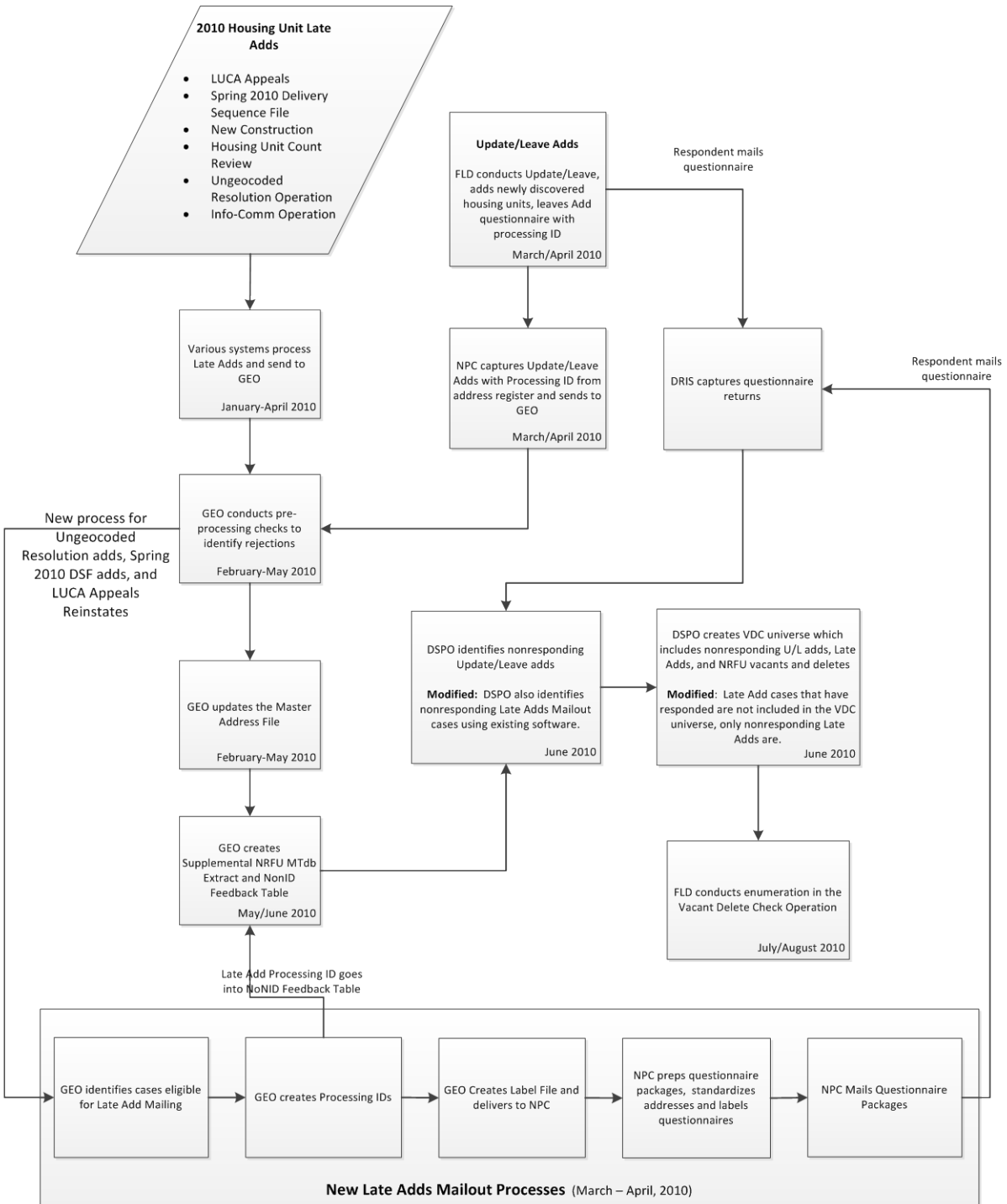
- Addresses assigned to a collection block code during the Ungeocoded Resolution operation
- Addresses reinstated by LUCA Appeals which already had a block code assigned prior to the Address Canvassing operation
- Addresses added and geocoded during the Spring 2010 DSF Refresh

Selected addresses received the questionnaire in the mail two to five weeks after the primary census questionnaire mailing. If a Late Adds Mailout respondent returned a questionnaire prior

to the cut-off for the VDC universe creation, the address was removed from the VDC operation, thus reducing the field workload. Otherwise, the address was included in the VDC operation.

Existing systems were modified and new systems were developed to accommodate the new operation (see section 2.2.6 for more information). Figure 2 depicts a high-level overview of the new flow for “late adds” with indications of modifications and new processes.

**Figure 2: New Design for Late Adds**



## 2.2.6 Late Adds Mailout Systems

The success of the Late Adds Mailout was dependent on both our ability to reuse existing systems with some modifications and build new systems in a short timeframe. This section documents all major systems used for the operation.

### 2.2.6.1 Existing Decennial Systems (Reused/Modified)

#### MAF/TIGER Systems

The MAF/TIGER system provided geographic services required by the Late Adds Mailout operation. This included:

- Preprocessing quality checks for MTdb updates

These checks are a set of rules applied to the updates for LUCA Appeals and Ungeocoded Resolution cases that identifies any errors. For example, an Ungeocoded Resolution case may have been resolved and submitted, but the block code that was captured may have been invalid. Cases with errors were rejected before updates could affect the MTdb. Although the Late Adds Mailout operation did not require an updated MTdb, it was decided that the quality checks should still take place before mailout.
- Creation of the Non-ID Feedback Table

The Non-ID Feedback Table (NIFT) is a product that GEO provided to DSPO that facilitated the linking of census adds to the address list back to their respective census questionnaire data. Adds are submitted with a unique processing identification number (ID) and are provided back with their associated permanent MAF ID. In the original design, DSPO would not have received adds from LUCA Appeals, Ungeocoded Resolution, or the DSF Refresh in the NIFT since those units had not been supplied with a questionnaire<sup>2</sup>. In the new design, DSPO would receive the Late Adds Mailout cases in the NIFT with the processing ID as the MAFID assigned by GEO.
- Creation of geographic address extracts

MAF/TIGER systems produced several MTdb address extracts during census operations. The extracts generally include address and geographic information for eligible census cases. For the VDC operation, GEO provided Late Adds to DSPO via the Supplemental NRFU Extract. The original software for this extract remained unchanged with one exception. Since the NIFT was not scheduled to be delivered until later in the census process and DSPO required the Late Adds Mailout processing ID to MAFID link in order

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<sup>2</sup> In some cases the original design may have included a addresses from LUCA Appeals, Ungeocoded Resolution, or the Spring 2010 DSF due to respondent generated returns from the Be Counted or Telephone Questionnaire Assistance operations that were associated with the address.

to identify VDC eligible cases in the new design; the Supplemental NRFU Extract was modified to include this linkage.

### Universe Control and Management (UCM) System

The UCM system, developed and managed by DSPO, provided the capability to create, maintain, distribute, and update all census operations universes. The UCM system was responsible for taking information from the MTdb extracts to create census operational universes. The UCM system was slightly modified for the Late Adds Mailout operation in order to accept the returned questionnaires with processing IDs. UCM also identified responding households as ineligible for VDC. This process required GEO to supply DSPO with the processing IDs for the Late Adds Mailout questionnaires on the Supplemental NRFU Extract.

### Response Processing System

The Response Processing System received all questionnaire and interview response data from the DRIS and was the repository for all such data for the Late Adds Mailout operation.

### Decennial Response Integration System

DRIS data captured questionnaire response data from paper questionnaires and telephone interviews and updated the universal response database schema with questionnaire response data, and passed this information to the Response Processing System.



## 2.2.6.2 New Decennial Systems

### MAF/TIGER Systems

MAF/TIGER systems were developed to “filter” the appropriate “late adds” addresses, create processing IDs, and create the address label file.

- Software to identify valid cases

GEO developed software to identify cases deemed appropriate for the Late Adds Mailout. The rules for inclusion follow:

- The address was required to be in Type of Enumeration Area 1 (Mailout/Mailback) or Type of Enumeration Area 6 (Military- Mailout/Mailback).
- The address had to have complete city-style information (house number, street name, and Zone Improvement Plan (ZIP) code).
- The addresses from the Spring 2010 DSF should have met the traditional census requirements for inclusion (e.g., the address is residential and not an old form of the address).

Once GEO created the first Late Adds Mailout Label File and conducted a quality check, it was discovered that some addresses appeared to be exact duplicates. This was not surprising since the Late Adds Mailout addresses did not follow the normal MTdb update process path that would have resolved some duplication through matching. In order to avoid sending multiple forms to the same address, the criterion below was added to the software.

- Addresses that appear to be an exact duplicate of another address record already identified for the universe should be excluded.
- The creation and assignment of a unique processing ID for all Late Adds cases

GEO assigned processing IDs for tracking all addresses identified for the Late Adds Mailout operation. DSPO supplied GEO with the software tool for generating unique processing IDs. It is important to note that the census process would traditionally call for the DSPO to assign “Census IDs” to these records for later tracking, like all other pre-addressed questionnaires. However, timing did not allow for that to happen. Since processing IDs were assigned in GEO, the records were not managed by or even known to the 2010 Census UCM system until after the mailout had taken place. As a result, UCM needed to be able to accept these Non-ID cases and link them to a MAFID via information provided in the Supplemental NRFU Extract.

- The creation of a label file

Once the processing IDs were assigned, GEO created the address label files for the NPC to use for the questionnaire packages. The file layout was a modified version of the file that DSPO created for the previous census mailouts. The Late Adds address label files were delivered to NPC in three waves.

### Questionnaire Acquisition and Preparation

A key factor in the implementation of the Late Adds Mailout operation was the acquisition of census self-response questionnaires and preparing them for the mailout. Although NPC systems would handle the address labeling, making the questionnaires available for that process was not a trivial pursuit. Through discussions with existing contract representatives, the team determined that there were three million self-response questionnaire packages available for use. These questionnaires required two processing steps in order to ready them for NPC labeling:

- the application of postal indicia to indicate postage paid first class mail; and
- the shipment of the questionnaires from the contractor facility in Chicago, Illinois to the NPC facility in Jeffersonville, Indiana.

### NPC – Questionnaire Labeling and Mailout Systems

The NPC systems that were already in place for non-decennial mailout operations were used to mailout the Late Adds questionnaires. Although the systems were in place for other operations, there was much planning and preparation necessary to ready the systems for a census mailout in a short timeframe, thus it is included as a new system for census mailout. Database interfaces and Interface Control Documents between NPC and MAF/TIGER systems were updated to facilitate file deliveries. Necessary systems included:

- Questionnaire Package Labeling

NPC Systems were responsible for labeling the questionnaire packages with addresses from the Late Adds Mailout Label File. New staff were hired and trained to run the labeling equipment. The labeling activity included a series of steps:

1. Receive and process the Late Adds Mailout Label File.
2. Validate and standardize addresses for mailing using Coding Accuracy Support System certified postal software.

This process for the Late Adds Mailout allowed for NPC to make changes to the ZIP code, City/Place Name and State Name based on software suggestions. This

was a deviation from the process allowed for the original census mailout where the print vendor was only allowed to make changes to the ZIP code. This change was implemented for the Late Adds Mailout in order to address the City/Place Name complaints experienced during prior census mailings. Any address that was deemed unmailable by the software was still included in the Late Adds Mailout.

3. Run Inkjet labeling equipment to spray addresses on questionnaire packages.
  4. Conduct a quality check of the label process.
- Questionnaire Mailing

Once the questionnaires were labeled, NPC readied the packages for USPS pick up and delivery. The first questionnaires were sent out on March 26, 2010. The last mailings were completed on April 9, 2010.

### 3 Methodology

#### 3.1 Research Questions

Table 1 outlines the questions in the Late Adds Mailout Study Plan and shows where we answered these questions in the Late Adds Mailout Assessment. This table also notes any revisions to the original question as stated in the Study Plan.

**Table 1: Late Adds Mailout Study Plan Questions Mapped to Assessment Sections**

<b>Questions</b>	<b>Results Section</b>
1. How many addresses were mailed questionnaires in the Late Adds Mailout operation?	5.1.1
2. How many of the addresses that were mailed questionnaires in the Late Adds Mailout were removed from eligibility prior to VDC? <small>Revised from original study plan version to exclude “due to duplication with group quarters” clause which did not accurately reflect all reasons for removal from eligibility.</small>	5.1.2
3. How many of the Late Adds Mailout questionnaires were returned as “undeliverable as addressed”?	5.1.3
4. How many of the Late Adds Mailout questionnaires were returned? <small>Revised from the original study plan version to exclude “as complete (not blank and not “undeliverable as addressed”)” clause.</small>	5.1.4
5. How many of the returned questionnaires were received in time to be removed from the VDC universe?	5.1.5
6. What was the final outcome for the addresses in the Late Adds Mailout?	5.1.6
7. Are there data trends for the Late Adds Mailout operation results that are associated with regional (or lower level) geographic trends?	5.1.8
8. Are there any data trends for the LUCA Appeals Reinstated records results that are associated with the type of governmental entity?	5.1.9

#### 3.2 Data File Sources

##### 3.2.1 Late Adds Mailout Assessment File

GEO and DSPO produced a Late Adds Mailout Assessment File for the purpose of analysis. DSPO provided information to GEO and GEO created the final file. The primary sources of this assessment file are documented below.

## GEO Data

GEO provided data in order to analyze data related to the universe of Late Adds, geographic breakdowns and operational history.

- The Late Adds Mailout Universe File

This file was created prior to the Late Adds Mailout and contains all the address records that were mailed a questionnaire. The file was the input for the Late Adds Mailout Label File.

- The 2010 Census Tabulation MAF Extract

This extract was the final extract created for the 2010 Census. The extract contained final geographic allocation codes and operational history for all addresses in the census.

- LUCA Appeals Data

In addition to populating the Late Adds Mailout Assessment File with information from the files above, GEO also supplied information from the LUCA Appeals process and entity types.

## DSPO Data

DSPO provided data in order to analyze Late Adds Mailout returns and VDC eligibility.

- DRF

The DRF includes the core response data that made up the Universal Response Database from all questionnaires and telephone interviews that were data captured. DSPO created the DRF.

- Universe Control Table

The Universe Control Table, as part of DSPO's UCM System, contained the universe information for the VDC operation.

### **3.2.2 Costs and Schedule**

Due to the unplanned nature of the Late Adds Mailout operation, the schedule of all activities associated with the operation was not documented in the 2010 Census Master Activities Schedule (MAS). The schedule information provided in this report was garnered from DMD schedule documentation and GEO requirements memoranda. Cost information was obtained from DMD managers.

### **3.2.3 Lessons Learned**

After the Late Adds Mailout operation was completed, lessons learned sessions were not conducted as they were for other 2010 Census operations. This was likely due to the uniqueness of this operation in terms of planning and implementation. The lessons learned documented in this report reflect topics that arose during ad hoc discussions regarding the operation as well as submissions during the early review process for the report.

## **3.3 Universe Identification**

### **3.3.1 Housing Units**

The universe of the Late Adds Mailout was identified from the GEO universe file created at the time of the operation. This file included all records in the mailout. It was later discovered that some cases were mailed to in error.<sup>3</sup> Therefore, the universe of records displayed in most of the tables in this report was revised to include only those Late Adds Mailout records that were:

- Eligible for VDC or
- Already in the census as a housing unit

For more information regarding the number of units mailed to in error and excluded from later analysis, see section 5.1.2.

### **3.3.2 Questionnaire Returns**

The questionnaire return data for this report came primarily from the DRF. The DRF contained information for every data captured questionnaire completed by a respondent or an enumerator for a housing unit during the 2010 Census. The data on the DRF contained some operation code and form type discrepancies. The analysis from the DRF was limited to

- reporting on the total number of returns associated with the Late Adds Mailout records, and
- reporting on the number of form type 111 Mailback-English Update/Leave (addressed) returns which is the form used for the Late Adds Mailout operation.

Information regarding the records that also had returns from the NRFU and Non-ID operations was obtained from the operational action codes on the MTdb.

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<sup>3</sup> After the mailing, it was discovered that the Late Adds Mailout universe included units that were already in the census, some as Group Quarters addresses.

## 3.4 Analysis Definitions and Recodes

### 3.4.1 DSF Categories

For the DSF Categories reported in the undeliverable as addressed (UAA) section, an investigation of the status of the record on the four DSFs prior to the Late Adds Mailout (Fall 2008, Spring 2009, Fall 2009 and Spring 2010) was conducted. Note that the Ungeocoded Resolution operation included records from the Fall 2008, Spring 2009 and Fall 2009 DSFs.

In order to determine whether an address was potentially deliverable by the USPS, the four categories of the Spring 2010 DSF status were coded as follows:

- If the record had a residential or commercial status on the DSF, then it was coded as “Potentially Deliverable.”
- If the record was not on the DSF or had a status of “Exclude from Delivery Statistics”<sup>4</sup> (EDS) then it was not coded as “Potentially Deliverable.”

The logic behind these criteria is that the USPS could deliver all valid records on the DSF, regardless of whether or not they are residential or commercial. Although the intent is not to mail to commercial addresses, the status of an address on the DSF can change over time. Therefore, an address may have been residential when it entered the census universe, but at the time of the Late Adds Mailout operation, it had a commercial status. Records are only identified as “Potentially Deliverable” instead of “Definitely Deliverable” since there are factors that could still render it undeliverable at the time of the mailing. The same is true in the opposite direction. That is there may be records that were not coded as “Potentially Deliverable” that ended up being deliverable.

Summary information for the three DSFs prior to the spring of 2010 were coded for this assessment using the following rules:

- If the record never appeared on any of the three DSFs then it was “Not on a Prior DSF.”
- If the record had appeared on at least one of the three DSFs, but only with a commercial status, then it was coded as “Always Commercial.”
- If the record had appeared on at least one of the three DSFs, but only with a status of EDS, then it was coded as “Always EDS.”
- If the record had appeared on at least one of the three DSFs, but only with a residential status, then it was coded as “Always Residential.”
- Otherwise, the record was coded as “Mixed Status.”

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<sup>4</sup> EDS records generally indicate that the status of the unit is unknown. The USPS may not be currently delivering to these units for a variety of reasons including new construction units and demolished units.

### 3.4.2 Late Adds Mailout Return Rates

The results section of this report includes the number of Late Adds Mailout questionnaires returned, a simplified return rate, and an adjusted simplified return rate. The return rates provided in this report are based on the following formulas:

Late Adds Mailout Simplified Return Rate =

$$\frac{\text{Unique Form Type 111 Mailback-English Update/Leave (addressed) returns}}{\text{Housing Units in the Late Adds Mailout Universe}} * 100 \text{ percent}^5$$

Late Adds Mailout Adjusted Simplified Return Rate =

$$\frac{\text{Unique Form Type 111 Mailback-English Update/Leave (addressed) returns}}{\text{Final Census Occupied Housing Units}^6 \text{ in the Late Adds Mailout Universe}} * 100 \text{ percent}$$

Note that the rates used in this report are not exactly comparable to the *2010 CPEX Mail Response and Return Rates Assessment* (Letourneau, 2012), as the formula for that report differed from the formula used in this report. The former is a simplified calculation and the latter had additional comparability requirement with previous decennial census rates.

## 4 Limitations

### 4.1 Detailed Undeliverable As Addressed Data Not Available

Although UAA information for census questionnaire mailouts was captured by DRIS, systems did not allow for the information to be passed to DSPO so late in the process. Hence that data were not available for this report. Minimal UAA information was obtained from census meeting notes which contained the overall counts reported by DRIS.

### 4.2 DSF Status is a Slightly Flawed Indication of Deliverability

In lieu of detailed UAA information, this report provides information about the status of an address on the DSF and the potential for deliverability (see section 3.4.1 for more information). Although the status of a record on the DSF is often a good indicator, there are limitations with the interpretation of this information:

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<sup>5</sup> An adjustment for the overall return rate was made for the approximate number of UAA returns (adjusted denominator: Housing Units in the Late Adds Mailout Universe – Approximate UAAs from DRIS reports), however no adjustment was made within specific address source categories since UAA data was not available at the address level.

<sup>6</sup> Occupied housing units were defined by the final census status codes (censtat2010 and popdec2010) on the MTdb.



- The status code is from the Spring 2010 DSF Refresh (a January 2010 vintage of the DSF) and it may have changed by time of the mailing
- The record may be valid on the DSF, however, other factors may render it undeliverable at the time of the mailing
- The record may be an unlinked duplicate of another DSF record on the MTdb. Therefore, it may be coded as not “Potentially Deliverable” in error.

### **4.3 Full Assessment of Duplication not Possible**

A major concern regarding the implementation of the Late Adds Mailout operation was the possibility of increasing census duplication. Although GEO matching processes were put in place to minimize the possibilities, the VDC field visit was to serve as the verification of the true status of the unit. Since a subset of the Late Adds never had the field visit due to forms returned in the mail, the extent of the duplication introduced is not known.

## **5 Results**

This section presents the answers to each of the research questions mentioned in Section 3, Methodology. The research questions are answered in order in section 5.1 (Workloads and Outcomes). Section 5.2 discusses the costs and schedule for the Late Adds Mailout operation.

### **5.1 Workload and Outcomes**

This section presents the workload for the Late Adds Mailout operation and results to the specific assessment questions.

#### **5.1.1 Late Adds Mailout Initial Universe**

The universe of records included in the Late Adds Mailout operation was limited to LUCA Appeals Reinstates, Ungeocoded Resolution cases, and Spring 2010 DSF Refresh records. Addresses were also required to be complete city-style and in an area assigned to the census Mailout/Mailback universe.

#### **Question 1: How many addresses were mailed questionnaires in the Late Adds Mailout operation?**

GEO created the Late Adds Mailout universe in three waves based on the records that were available for processing at the time. Table 2 below shows the number of records included on the Late Adds Mailout Label File that were ultimately mailed questionnaires for each of the three waves by address source.

**Table 2: Late Adds Mailout Workload by Wave**

Source	Number of Questionnaires Mailed				Percent of Total
	Wave 1	Wave 2	Wave 3	All Waves	
Spring 2010 Delivery Sequence File	0	174,868	0	174,868	8.6
Ungeocoded Resolution	344,008	123,772	48,695	516,475	25.3
LUCA Appeals Reinstates	1,351,715	1,393	0	1,353,108	66.2
<b>Total</b>	<b>1,695,723</b>	<b>300,033</b>	<b>48,695</b>	<b>2,044,451</b>	<b>100.0</b>

Source: 2010 Late Adds Mailout Assessment File

\*This column does not total 100.0% due to rounding.

Approximately 2.04 million addresses were mailed questionnaires as part of the 2010 Late Adds Mailout operation. LUCA Appeals reinstated records accounted for more than two thirds of the universe. It was mentioned in section 2.2.1 that one impetus for the Late Adds Mailout operation was that the LUCA Appeals workload was approaching 1.8 million. That number included both records that were added as well as reinstated by LUCA Appeals. A decision was made to limit the new operation to reinstated records which were already on the MTdb at the time. Thus, approximately 1.35 million LUCA Appeals Reinstates were mailed questionnaires.

The remaining Late Adds Mailout universe was made up of records from the DSF. The Ungeocoded Resolution cases, which were adds from the Fall 2008, Spring 2009, and Fall 2009 DSF that were assigned census block codes by regional geographers, accounted for 25.3 percent of the universe. The new “adds” from the Spring 2010 DSF accounted for 8.6 percent of the universe.

Geographically, there were Late Adds Mailout addresses in all 50 states and the District of Columbia. However, as can be seen in Table 3, eight states contained over 51 percent of the total universe.

**Table 3: Top States for Late Adds Mailout Universe**

<b>State</b>	<b>Total</b>	<b>Percent of Stateside Universe</b>
Florida	221,200	10.8
New York	204,963	10.0
Texas	134,775	6.6
Georgia	117,247	5.7
California	112,120	5.5
North Carolina	100,355	4.9
Virginia	81,443	4.0
Alabama	75,509	3.7
<b>Total Top States</b>	<b>1,047,612</b>	<b>51.2</b>

Source: 2010 Late Adds Mailout Assessment File

California, Texas, Florida and New York are states with very high overall population counts, so it is not surprising to see them at the top of the list. Table 4 shows that the majority of the universe for these four states, with the exception of Texas, was driven by reinstated records from the LUCA Appeals operation. Although the percentage of LUCA Appeals Reinstates for Texas was also high at 41.2 percent, it did not exceed the overall universe percentage of LUCA Appeals Reinstated addresses at 66.2 percent. Approximately 43 percent of the addresses in Texas came from the Ungeocoded Resolution operation, indicating that there were a large number of DSF address adds in Texas<sup>7</sup> and the regional geographers were particularly successful in assigning geocodes to addresses in that state. The trends related to address sources in Georgia and Alabama, two more top states, were similar to that of Texas.

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<sup>7</sup> Texas had the largest number of Ungeocoded Resolution addresses in the universe overall, with 57,854 addresses representing 11.2 percent of the Ungeocoded Resolution universe. Texas also had the largest number of addresses from the Spring 2010 DSF addresses with 21,347 addresses representing 12.2 percent of the Spring 2010 DSF universe.

**Table 4: Top States for Late Adds Mailout Universe by Source**

State	Total	Percent of Address Source Records in Universe		
		Spring 2010 DSF	Ungeocoded Resolution	LUCA Appeals Reinstates
Florida	221,200	5.1	21.0	73.9
New York	204,963	4.8	5.1	90.1
Texas	134,775	15.8	42.9	41.2
Georgia	117,247	5.5	42.3	52.3
California	112,120	8.4	9.4	82.2
North Carolina	100,355	10.6	19.1	70.4
Virginia	81,443	6.5	26.6	67.0
Alabama	75,509	6.7	47.2	46.1

Source: 2010 Late Adds Mailout Assessment File

### 5.1.2 VDC Eligibility for Late Adds

GEO supplied the VDC eligible records to DSPO via the Supplemental NRFU extract. The creation of the extract was subsequent to the Late Adds Mailout operation and all other MAF update activities for the full scope of Late Adds to the census as detailed in section 2.1.2. The universe of eligible records on the extract was defined by address filter rules supplied by the DSSD in the *Supplemental NRFU Extract Customer Requirements Document* (Zhang, 2010).

Soon after the Late Add questionnaires were mailed, Census Bureau Headquarters received notification from a Census Regional Office that a couple of group quarters addresses had received Late Add questionnaires<sup>8</sup>. After some investigation, it was determined that some of the filter rules documented for the Supplemental NRFU Extract were not used for the Late Adds Mailout Label File described in section 2.2.6.2. These conflicts meant that some of the Late Adds Mailout cases that received questionnaires were not ultimately identified as eligible for the VDC operation.

<sup>8</sup> This particular region was able to collect the questionnaires from the Group Quarters they had identified as having this issue.

**Question 2: How many of the addresses that were mailed questionnaires in the Late Adds Mailout operation were removed from eligibility prior to VDC?**

Table 5 shows the number of records that were ultimately identified as ineligible for the Supplemental NRFU Extract even though they had been mailed a questionnaire in the Late Adds Mailout operation.

**Table 5: Late Adds Mailout Units Not Eligible for the Supplemental NRFU Extract**

Address Source	Total Addresses in the Late Mailout	Units that Were Not Eligible for Supplemental NRFU Extract	
		Number	Percent
Spring 2010 Delivery Sequence File	174,868	57	0.03
Ungeocoded Resolution	516,475	125	0.02
LUCA Appeals Reinstates	1,353,108	927	0.07
<b>Total Units</b>	<b>2,044,451</b>	<b>1,109</b>	<b>0.05</b>

Source: 2010 Late Adds Mailout Assessment File

There were a total of 1,109 discrepant records, the majority of which were LUCA Appeals cases. Table 6 shows the probable reasons for ineligibility identified during analysis of the data.

**Table 6: Reasons for Ineligibility of Late Adds Mailout Units**

Reason for Ineligibility	Units that Were Not Eligible for Supplemental NRFU Extract	
	Number	Percent
Already in the Census Universe	219	19.7
Housing Unit	27	2.4
Group Quarters	189	17.0
Transitory Location	3	0.3
Duplicates	868	78.3
Other	22	2.0
<b>Total Units</b>	<b>1,109</b>	<b>100.0</b>

Source: 2010 Late Adds Mailout Assessment File and the 2010 Enumeration MTdb Extract

There were 219 cases in the Late Adds Mailout operation that were already in the 2010 Census universe at the time. The cases were included in the 2010 Census enumeration in the following universes:

- 27 were in the housing unit universe,

- 189 were in the group quarters universe, and
- three were in the transitory location universe.

The majority of the ineligible records were identified as duplicates of other in-census records at some point in the census process. The remaining 22 cases are unexplained at this time.

A total 2,043,342 were sent to DSPO in the Supplemental NRFU extract as newly eligible for census. Moving forward in this report the universe of records for the Late Adds Mailout operation is limited to those that were believed to be valid housing units at the time of the mailout. Therefore the universe of interest is 2,043,342 housing unit adds eligible for the Supplemental NRFU extract plus the 27 housing units that were already in the census enumeration universe. Table 7 shows the address source breakdown for the universe of 2,043,369 Late Adds Mailout housing units.

**Table 7: Housing Unit Universe Information for Late Adds Mailout Universe by Source**

Address Source	Housing Unit Universe for Late Adds Mailout	
	Number	Percent*
Spring 2010 Delivery Sequence File	174,811	8.6
Ungeocoded Resolution	516,350	25.3
LUCA Appeals Reinstates	1,352,208	66.2
<b>Total Housing Units</b>	<b>2,043,369</b>	<b>100.0</b>

Source: 2010 Late Adds Mailout Assessment File

\*This column does not total 100.0 percent due to rounding.

Note that the overall universe percentages remain unchanged from what was previously reported in section 5.1.1.

### 5.1.3 Late Adds Mailout UAA Results and DSF Status

Although the Late Adds Mailout operation mailed to over two million housing units that appeared to have complete city-style address information, there was no guarantee that the questionnaire would be delivered. The addresses were standardized and validated by postal software as described in section 2.2.6.2. However, the questionnaire was mailed regardless of the certification outcome. A subset of the Late Adds Mailout housing units was determined to be UAA by the USPS.

#### Question 3: How many of the Late Adds Mailout questionnaires were returned as Undeliverable as Addressed?

Due to the fact that this operation was planned after most census processes had already been baselined, it was not possible to track this data in the same way as previous census mailings. The UAA data that was delivered to DSPO for other mailouts was not delivered for the Late Adds Mailout. Therefore, the final UAA rate is unknown.

However, DRIS reports indicate that as of June 19, 2010<sup>9</sup> there were a total of 591,502 UAAs from the Late Adds Mailout operation. This would account for approximately 29 percent of the Late Adds Mailout universe. This number was unusually high. As a comparison, the final national UAA rate for the 2010 Census Mailout/Mailback universe was 11.6 percent (Letourneau, 2012).

Although no information is available for which particular Late Adds Mailout records were returned as UAA, an investigation of the USPS delivery status as of Spring 2010 helps provide some insight into the categories of records that may have contributed to the high UAA rate. Table 8 shows the number of records that were identified as residential or commercial, and therefore potentially deliverable, on the Spring 2010 DSF.

**Table 8: Late Adds Mailout Spring 2010 DSF Status**

Address Source	Housing Units in the Late Mailout	Housing Units that Were Potentially Deliverable	
	Number	Number	Percent
Spring 2010 Delivery Sequence File	174,811	174,811	100.0
Ungeocoded Resolution	516,350	507,603	98.3
LUCA Appeals Reinstates	1,352,208	568,934	27.8
<b>Total Units</b>	<b>2,043,369</b>	<b>1,251,348</b>	<b>61.2</b>

Source: 2010 Late Adds Mailout Assessment File

About 61 percent of the Late Adds Mailout records were potentially deliverable. However, a look at the rates for each of the address sources indicates that only 27.8 percent of the LUCA Appeals Reinstates had a valid DSF status. Given the fact that the other two sources came from the DSF at some point and the LUCA rate is so low, one could conclude that LUCA records were the primary reason the Late Adds Mailout UAA rate was so high.

Note that the Spring 2010 DSF potentially deliverable rate is 100 percent because only residential records on the Spring 2010 DSF were made eligible for the Late Adds Mailout operation. The DSF status of a record can sometimes change between residential, commercial, EDS, and not on the DSF. The uncertainty surrounding records that change status or records with an EDS (or unknown) status can make it difficult to determine when to include various types of records from the DSF in the census process. Table 9 shows the status of the Spring 2010 DSF records on prior DSFs.

<sup>9</sup> This final DRIS UAA report date was selected as the presumed cut date for creation of the VDC universe in order that the impact of the UAAs in this operation not be overstated. Regardless of whether a questionnaire was returned or UAA after the VDC cut, it was still sent to the VDC operation.

**Table 9: Late Adds Mailout Spring 2010 DSF Records Status on Prior DSFs**

Prior DSF Status (Fall 2008, Spring 2009, and Fall 2009)	Late Adds Mailout Spring 2010 DSF Source Housing Units	
	Number	Percent
Not on a Prior DSF	96,968	55.5
Always Exclude from Delivery Statistics	75,590	43.2
Always Commercial	2,064	1.2
Mixed Status	189	0.1
Always Residential	0	0.0
<b>Total Spring 2010 DSF Source Units</b>	<b>174,811</b>	<b>100.0</b>

Source: 2010 Late Adds Mailout Assessment File

Although the majority (55.5 percent) of Spring 2010 DSF records appeared to be brand new records, a large percentage (43.2 percent) had appeared on a prior DSF as EDS. Decennial programs should continue to research DSF information to determine if there are ways to identify records of unknown status that could legitimately be included into the census process earlier.

#### 5.1.4 Late Adds Mailout Questionnaire Returns

NPC started the Late Adds Questionnaire Mailout on March 26, 2010 and mailed the last questionnaires on April 9, 2010. This section presents the results for the number of households that actually returned questionnaires. Information is also provided for some of the other questionnaire returns that were received for the Late Adds Mailout addresses.

#### Question 4: How many of the Late Adds Mailout questionnaires were returned?

A total of 643,964 of the Late Adds Mailout questionnaires were returned. Table 10 shows the breakdown of questionnaire returns by address source.

**Table 10: Late Adds Mailout Questionnaire Returns by Address Source**

Address Source	Housing Units That Returned the Mailing	
	Number	Percent
Spring 2010 Delivery Sequence File	76,024	11.8
Ungeocoded Resolution	260,948	40.5
LUCA Appeals Reinstates	306,992	47.7
<b>Total Housing Units</b>	<b>643,964</b>	<b>100.0</b>

Source: 2010 Late Adds Mailout Assessment File



The LUCA Appeals Reinstates and the Ungeocoded Resolution addresses accounted for the majority of the returns with 47.7 percent and 40.5 percent respectively. Although the LUCA Appeals Reinstates accounted for the largest percentage of returned questionnaires, the large percentage is mostly attributed to the large volume of addresses from that source in the universe.

Table 11 shows the return success rates for the Late Adds Mailout operation for each address source.<sup>10</sup> The rates are not adjusted to account for units that did not receive a form when the USPS was unable to deliver (UAAs).

**Table 11: Late Adds Mailout Questionnaire Return Success Rates\***

Address Source	Housing Units in the Late Mailout	Housing Units That Returned the Mailing	
		Number	Percent
Spring 2010 Delivery Sequence File	174,811	76,024	43.5
Ungeocoded Resolution	516,350	260,948	50.5
LUCA Appeals Reinstates	1,352,208	306,992	22.7
<b>Total Housing Units</b>	<b>2,043,369</b>	<b>643,964</b>	<b>31.5</b>

\*Rates not adjusted to account for UAA questionnaires  
Source: 2010 Late Adds Mailout Assessment File

Late Adds Mailout questionnaires were received back from 31.5 percent of the housing units in the universe. Accounting for the presumed number of UAAs, the overall return rate was approximately 44.4 percent. Making an adjustment to the rate for occupied housing units only<sup>11</sup>, the overall return rate would be 57.1 percent.

Although not directly comparable, the Late Adds Mailout return rate is low when considering the 67.5 percent national response rate for Mailout/Mailback areas (Letourneau, 2012). The LUCA Appeals Reinstated records had the lowest success with 22.7 percent of the housing units returning the questionnaire. The following factors may have contributed to the low number of returns:

- The questionnaire was not delivered to the housing unit (see section 5.1.3 for more UAA information).

<sup>10</sup> The return success rates for the Late Adds Mailout operation as reported in the Nonresponse Followup Operations Assessment will differ slightly from the numbers reported here due to inconsistencies in different sources of data and methods of analysis.

<sup>11</sup> Occupied housing units were defined by the final census status on the MTdb. There were a total of 1,127,561 occupied housing units in the final census from the Late Adds Mailout universe. See section 5.1.6 for more information.

- The Late Adds Mailout housing units did not have the benefit of advance letters, reminder post cards or replacement questionnaires, all factors that tend to boost response.

Since other census activities continued as scheduled without knowledge of the new Late Adds Mailout operation, there was potential for other types of questionnaire returns to impact the Late Adds cases. There are two primary alternative sources of enumerations of interest for this report:

- Non-ID Returns  
These returns represent respondent initiated returns such as Be Counted questionnaires or Telephone Questionnaire Assistance responses.
- NRFU Add Returns  
The enumerators in the NRFU operation may have discovered some of the Late Adds housing units and enumerated them as “adds.”

Table 12 shows the number of Non-ID and NRFU returns by Late Adds Mailout response categories.

**Table 12: Non-ID and NRFU Returns for Late Adds Mailout Housing Units**

Type of Return	Late Adds Mailout Respondents		Late Adds Mailout Non-Respondents		Number of Late Adds Mailout Units	
	Number	Percent	Number	Percent	Number	Percent
Non-ID Return	2,026	0.3	21,050	1.5	23,076	1.1
NRFU Add Return	20,080	3.1	17,218	1.2	37,298	1.8
Both a Non-ID and a NRFU Add Return	110	<0.1	1,060	0.1	1,170	0.1
No other Non-ID nor NRFU Add return	621,748	96.6	1,360,077	97.2	1,981,825	97.0
<b>Total Housing Units</b>	<b>643,964</b>	<b>100.0</b>	<b>1,399,405</b>	<b>100.0</b>	<b>2,043,369</b>	<b>100.0</b>

Source: 2010 Late Adds Mailout Assessment File

Overall, the majority (97 percent) of Late Adds Mailout units did not have a Non-ID or NRFU return. The breakouts by returns for mail respondents versus nonrespondents are slightly interesting. A little over three percent of the Late Adds Mailout respondents were also enumerated as an “add” in NRFU. However, only 1.2 percent of nonrespondents were enumerated as adds in NRFU. More Late Adds Mailout nonrespondents were also picked up through the Non-ID operation.

Although some of these Late Adds Mailout addresses appear to have multiple types of returns, a NRFU add or Non-ID add did not keep the address from moving on to the VDC operation since

the linkage of those adds to the MTdb record was not provided to DSPO until after the VDC universe was identified.

### 5.1.5 Vacant Delete Check Universe for Late Adds Mailout

One major intent of the Late Adds Mailout operation was to reduce the VDC workload. A questionnaire that was returned before the cutoff for the VDC universe creation would serve that purpose. This section presents VDC workload for the Late Adds Mailout housing units.

Table 13 shows the number of housing units from the Late Adds Mailout operation that was included in the VDC workload.

**Table 13: Late Adds Mailout Housing Units in Vacant Delete Check**

Address Source	Housing Units in the Late Adds Mailout	Housing Units That Were in the VDC Universe	
		Number	Percent
Spring 2010 Delivery Sequence File	174,811	100,110	57.3
Ungeocoded Resolution	516,350	259,041	50.2
LUCA Appeals Reinstates	1,352,208	1,047,270	77.4
<b>Total Housing Units</b>	<b>2,043,369</b>	<b>1,406,421</b>	<b>68.8</b>

Source: 2010 Late Adds Mailout Assessment File

A total of 1,406,421 Late Adds Mailout housing units were included in the VDC operation. This represents a large majority (68.8 percent) of the mailout universe. Results by address source show that LUCA Appeals Reinstated records were more likely to end up moving on to VDC. This is due to the low response for this category as reported in section 5.1.4, on top of the presumably high rate of UAAs, reported in section 5.1.3.

**Question 5: How many of the returned questionnaires were received in time to be removed from the VDC universe? How many questionnaires were received after the VDC cutoff?**

Table 14 shows that a total of 9,746 housing units that responded to the Late Adds Mailout ended up in the VDC universe anyway. That is, the questionnaire responses were received too late to be removed from the VDC enumeration.

**Table 14: VDC Universe Status for Late Adds Mailout Response Categories**

VDC Universe Status	Late Adds Mailout Respondents		Late Adds Mailout Non-Respondents		Total Late Adds Mailout Units	
	Number	Percent	Number	Percent	Number	Percent
In the VDC universe	9,746	1.5	1,396,675	99.8	1,406,421	68.8
Not in the VDC universe	634,218	98.5	2,730	0.2	636,948	31.2
<b>Total Housing Units</b>	<b>643,964</b>	<b>100.0</b>	<b>1,399,405</b>	<b>100.0</b>	<b>2,043,369</b>	<b>100.0</b>

Source: 2010 Late Adds Mailout Assessment File

Table 14 also shows that 2,730 of Late Adds Mailout housing units that did not return their questionnaire were not included in the VDC universe. This result may be due to the fact that another type of return was received for the housing unit. These other returns would not include the NRFU “add” or Non-ID returns reported in section 5.1.4 since those returns would have not been associated with the unit until after the creation of the VDC universe. In some cases there were Update/Leave returns associated with the housing unit. This may be due to confusion with block boundaries.

**5.1.6 Final Census Status for Late Adds Mailout**

**Question 6: What was the final outcome for the addresses in the Late Adds Mailout operation?**

Table 15 below shows that approximately 66 percent of the Late Adds Mailout addresses were counted in the final 2010 Census. The cases with a DSF source, both the Spring 2010 and the Ungeocoded Resolution addresses, had very successful overall in-census rates. Over 83 percent of the Spring 2010 DSF addresses and over 90 percent of the Ungeocoded Resolution addresses ended up in the final census counts. The LUCA Appeals Reinstated cases had a much lower in-census rate at 54.4 percent.

In general, the final census was determined by a combination of actions taken during census field operations. In the case of the Late Adds Mailout housing units, VDC would have been the only

field operation to include these addresses.<sup>12</sup> If Late Adds Mailout questionnaires were returned by mail before the VDC cutoff, then, there were no field operations to take action on the addresses. Therefore, given the high response rate for the Spring 2010 DSF and Ungeocoded Resolution housing units, the relatively high final census outcome is not surprising.

**Table 15: 2010 In-Census Status for the Late Adds Mailout Addresses by Source**

Source	In Census		Not In Census		Number of Late Adds Mailout Units
	Total	Percent	Total	Percent	
Spring 2010 Delivery Sequence File	146,362	83.7	28,449	16.3	174,811
Ungeocoded Resolution	467,476	90.5	48,874	9.5	516,350
LUCA Appeals Reinstates	737,253	54.5	614,955	45.5	1,352,208
<b>Total Housing Units</b>	<b>1,351,091</b>	<b>66.1</b>	<b>692,278</b>	<b>33.9</b>	<b>2,043,369</b>

Source: 2010 Late Adds Mailout Assessment File

It is important to note that all of these addresses would have had the chance to be enumerated in the census during VDC regardless of the mailout. The real success of the Late Adds Mailout operation should be assessed with consideration for how the housing unit was ultimately enumerated (whether by respondent mail return or enumerator return). Table 16 shows the final census status by type of return and vacancy status for Late Adds Mailout addresses.

<sup>12</sup> There may be a few exceptions for addresses that were matched to updates from other operations such as Update/Leave (when geographic assignments were incorrect or confusing).

**Table 16: Final 2010 Census Status for Late Adds Mailout Addresses**

Final Census Status	Number of Late Adds Mailout Units	
	Number	Percent
Occupied Housing Unit	1,127,561	55.2
Respondent Return*	645,903	31.6
Enumerator Return	481,658	23.6
Vacant Housing Unit	223,530	10.9
Not in Census	692,278	33.9
<b>Total Housing Units</b>	<b>2,043,369</b>	<b>100.0</b>

Source: 2010 Late Adds Mailout Assessment File

\*Represents the final selected return which could include a respondent return other than the Late Adds Mailout, such as a Be Counted return.

The total number of occupied housing units across both types of returns was 1,127,561, accounting for 55.2 percent of the addresses in the Late Adds Mailout universe. Enumerators were able to provide information about vacant units on the enumerator questionnaire and they identified 10.9 percent of the Late Adds Mailout addresses as vacant. Enumerators identified the remaining 33.9 percent of addresses as not valid (either a “delete” or “duplicate”) for the final census.

A total of 645,903 of the occupied housing units were ultimately enumerated by respondent return. The respondent returns presented in this section could represent more than just the Late Adds Mailout questionnaire. This status represents the final selected questionnaire for the housing unit which in some cases may be some other type of respondent return (such as a Be Counted return).

About 481,658 addresses were counted in the census by enumerator returns primarily from the VDC operation.<sup>13</sup> These addresses, in combination with those with a vacant or not in census status represent the full universe of cases that were resolved by a field visit. Therefore, a total of 1,397,466 addresses (68.4 percent of the Late Adds Mailout housing unit universe) ultimately required a field visit for final census resolution.

<sup>13</sup> There are some cases that were also added by another enumeration operation such as NRFU and the return represented here may be that one instead of the VDC return.

### **5.1.7 Status for Records Ineligible for Supplemental NRFU Extract**

As reported in section 5.1.2, there were a total of 1,109 addresses in the Late Adds Mailout universe that were not eligible for the Supplemental NRFU extract. Of those, 27 were already in the census as housing units and included in the final census results provided above. Below is a summary of the outcomes for the remaining 1,082 addresses:

- Of the 189 group quarters addresses that were already in the census universe, 98 were counted as group quarters in the final census and the remaining were deleted during the group quarters enumeration operations.
- Of the 890 addresses that were either duplicates (868 addresses) or unexplained (22 addresses), one ended up as an in-census vacant housing unit that was added by an enumerator in one of the Update/Enumerate operations.
- Of the three transitory location addresses that were already in the census universe, the ultimate outcomes are not known since transitory location records merely served to get the enumerator to the location so that individual occupied units could be added to the census and linkages between the location and unit were not retained.

### **5.1.8 Additional Information for Lower Geographic Levels**

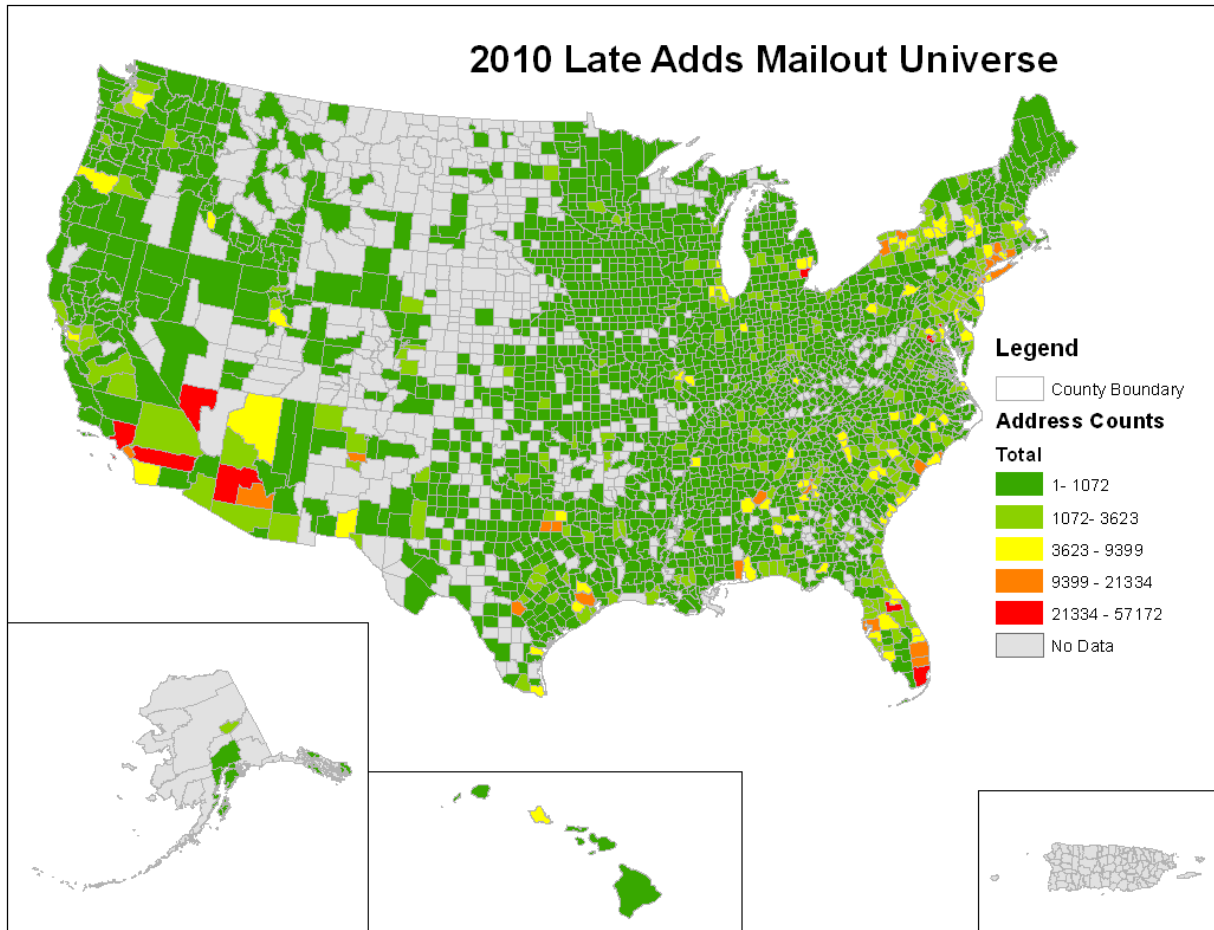
**Question 7: Are there any data trends for the LUCA Appeals records results that are associated with regional (or lower level) geographic trends?**

#### **5.1.8.1 Universe**

As reported in section 5.1.1, there were Late Adds Mailout addresses in all 50 states and the District of Columbia. A total of eight states (Florida, New York, Texas, Georgia, California, North Carolina, Virginia, and Alabama) contained the majority (51.2 percent) of the universe. State level totals are shown in Appendix A. Top states were primarily those with large population and/or large numbers of LUCA Appeals reinstated addresses. New York, Florida, and California in particular had both. Those three states accounted for nearly 33 percent of the LUCA Appeals reinstated addresses in the universe. Texas, Georgia, Florida and Alabama also had large numbers of Ungeocoded Resolution addresses, together accounting for almost 37 percent of the Ungeocoded Resolution addresses in the universe.

A display of the Late Adds Mailout addresses by county is shown in Figure 3 below.

**Figure 3: Late Adds Mailout Universe Addresses by County<sup>14</sup>**



Source: 2010 Late Adds Mailout Assessment File

There were Late Adds Mailout addresses in a total of 2,548 counties in the United States. The display of county level counts highlights several counties in states that were not mentioned in the state breakdowns above. In particular, counties in the states of Nevada, Michigan, Arizona, and Maryland are highlighted. The counts for the top ten counties with the largest number of Late Adds Mailout addresses are shown in Table 17 below.

<sup>14</sup> Address count breakdowns reflect “natural breaks” determined by ESRI mapping software.



**Table 17: Top Ten Counties for Late Adds Mailout Universe**

<b>County</b>	<b>Total</b>	<b>Percent of Stateside Universe</b>
Clark County, Nevada	57,172	2.8
Wayne County, Michigan	41,345	2.0
Los Angeles County, California	36,456	1.8
Fairfax County, Virginia	32,021	1.6
Maricopa County, Arizona	29,766	1.5
Miami-Dade County, Florida	26,396	1.3
Riverside County, California	25,212	1.2
Baltimore County, Maryland	25,086	1.2
Orange County, Florida	24,364	1.2
Suffolk County, Massachusetts	21,334	1.0
<b>Total Top Counties</b>	<b>319,161</b>	<b>15.6</b>

Source: 2010 Late Adds Mailout Assessment File

The top ten counties accounted for 15.6 percent of the overall Late Adds Mailout universe. The county with the largest number of Late Adds Mailout addresses was Clark County, Nevada and approximately 91 percent of these addresses were LUCA Appeals Reinstates. The pattern was similar for the remainder of the top four counties (Wayne, Los Angeles, and Fairfax) with over 90 percent of the records coming from LUCA Appeals. Maricopa County, Arizona had slightly less of its universe coming from LUCA Appeals (approximately 77 percent).

### **5.1.8.2 Final Census Status**

The overall in-census rate for the Late Adds Mailout housing units was 66.1 percent as reported in section 5.1.6. To assess results at the state level, results are presented in two ways, first as a percentage of the overall in-census housing units in Table 18, and second as a percentage of housing units in the Late Adds Mailout universe for the state in Table 19.

**Table 18: Top States for In Census Late Adds Mailout Addresses**

<b>State</b>	<b>Total In Census Housing Units</b>	<b>Percent of Stateside Universe</b>
Florida	169,376	12.5
Texas	109,261	8.1
Georgia	94,088	7.0
New York	79,858	5.9
California	71,922	5.3
Alabama	62,858	4.7
North Carolina	56,530	4.2
Virginia	51,627	3.8
Total In Census Housing Units Stateside	1,351,091	100.0

Source: 2010 Late Adds Mailout Assessment File

As can be seen by comparing the eight states in Table 18 to the top eight states with Late Adds Mailout addresses in Table 3, the states with the largest volume of records in the universe provided the largest counts of in-census housing units. There was some slight reordering in the top five states, with New York falling below Georgia and Texas when it came to in-census results.

**Table 19: Top States for Late Adds Mailout Universe In-Census Rates**

<b>State</b>	<b>Total Housing Units</b>	<b>Total In Census Housing Units</b>	<b>Percent In Census Records</b>
Delaware	10,550	9,940	94.2
Oklahoma	8,280	7,665	92.6
South Dakota	2,702	2,445	90.5
West Virginia	4,761	4,300	90.3
New Jersey	35,713	31,808	89.1
Total Stateside	2,043,369	1,351,091	66.1

Source: 2010 Late Adds Mailout Assessment File

Looking at the states individually, in-census rates were generally better for states with fewer LUCA Appeals Reinstates in the Late Adds Mailout universe. Delaware, Oklahoma, South Dakota, and West Virginia all had in-census rates that were greater than 90 percent. LUCA Appeals reinstated records accounted for less than 23 percent of the mailout universe in all of these states. Of the four, Oklahoma had the highest percent of LUCA Appeals Reinstates with 22.9 percent and the top state, Delaware, had the lowest with 3.5 percent. These results are consistent with the in-census rates by source shown in Table 15. That is, since the Ungeocoded Resolution and Spring 210 DSF sources had better in-census rates than LUCA Appeals, areas with more of the former categories and fewer of the latter would have better in-census rates.

### **5.1.9 More LUCA Appeals Information**

In general, the results presented in previous sections of this report indicate that the LUCA Appeals Reinstates had less success than addresses from the other two sources. In particular:

- Results from section 5.1.3 indicate that LUCA Appeals addresses may have had a high UAA rate.
- Results from section 5.1.4 indicate that LUCA Appeals addresses had comparably low return rates, likely due at least in part to the supposed UAA rates.
- Results from section 5.1.6 indicate that the LUCA Appeals addresses had comparably low in-census rates. As a result of the low mail response, the majority of the LUCA Appeals records received a VDC field visit and ultimately ended up not in-census.

It is important to note that VDC was not the first field visit for these LUCA Appeals addresses. In general, LUCA Appeals Reinstates are addresses that were originally deleted

in the Address Canvassing operation and later appealed by the governmental entity that originally submitted the address. The low in-census rate indicates that these addresses were likely correctly deleted during Address Canvassing.

**Question 8: Are there any data trends for the LUCA Appeals Reinstated records results that are associated with the type of governmental entity?**

Of some interest are the results of the Late Adds Mailout LUCA Appeals addresses by the type of governmental entity that appealed the address. Table 20 shows the universe breakdowns for type of governmental entity.

**Table 20: Late Adds Mailout LUCA Appeals Reinstates by Governmental Entity Type**

<b>State</b>	<b>Total Housing Units</b>	<b>Percent</b>
State	181,830	13.4
County	583,397	43.1
Place	552,698	40.9
Minor Civil Division	34,205	2.5
Tribal	78	<0.1
Total LUCA Appeals Reinstates	1,352,208	100.0

Source: 2010 Late Adds Mailout Assessment File

About 84 percent of the LUCA Appeals addresses in the Late Adds Mailout were appealed by the governmental entity for either a county or place. Table 21 presents the final census outcome for these addresses.

**Table 21: Late Adds Mailout LUCA Appeals Reinstates In-Census Status by Governmental Entity Type**

<b>State</b>	<b>Total Housing Units</b>	<b>Total In Census Housing Units</b>	<b>Percent In Census Records</b>
State	181,830	68,246	37.5
County	583,397	329,322	56.4
Place	552,698	313,300	56.7
Minor Civil Division	34,205	26,340	77.0
Tribal	78	45	57.7
Total LUCA Appeals Reinstates	1,352,208	737,253	54.5

Source: 2010 Late Adds Mailout Assessment File

As can be seen in Table 21, governmental entities lower than the state level tended to have more success with LUCA Appeals submissions. Minor Civil Divisions in particular had 77 percent of their LUCA Appeals Reinstates remain in-census. County, Place and Tribal governments all had in-census success rates over 56 percent.

## **5.2 Schedule and Costs**

### **5.2.1 Schedule**

Although all the activities for the Late Adds Mailout operation were not entered into the 2010 DMD MAS, the DMD managers on the planning team established a high-level schedule of activities in order to monitor system handoffs and overall progress. In addition, NPC and GEO established schedules for internal software development, testing, and production activities. Since final planning for this operation often occurred during the actual implementation stages, schedule dates could change from day to day. This report will document actual implementation dates for posterity, and note any changes from “planned” to actual dates that are of interest.

The schedule for the Late Adds Mailout operation was driven by the availability of updates from the three sources of interest (LUCA Appeals, Ungeocoded Resolution, and the Spring 2010 DSF) as well as questionnaire preparation activities on the front end. In terms of preparation activities, of most concern was the acquisition of questionnaires and the development and testing of new software systems.

Table 22 shows the key start-up activities and dates.

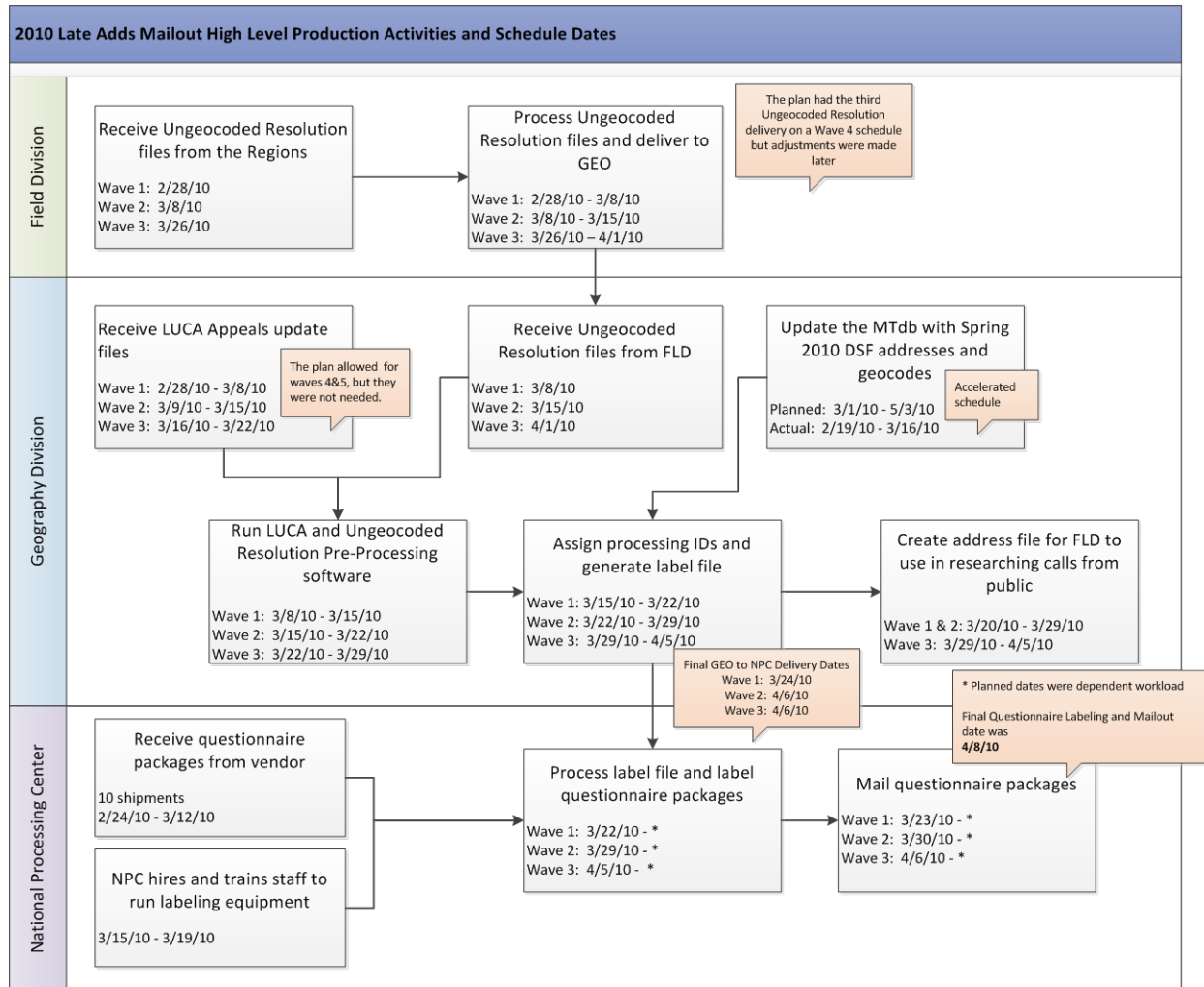
**Table 22: 2010 Late Adds Mailout Key Start-Up and Development Activities**

<b>Start-Up Activity</b>	<b>Start Date</b>	<b>End Date</b>
Develop pre-processing and filter software for LUCA Appeals and Ungeocoded Resolution addresses	2/1/2010	2/12/2010
Develop software to assign processing IDs and generate label file	2/1/2010	2/19/2010
Test and quality check label file creation	2/19/2010	3/2/2010
Deliver test label file to NPC		3/2/2010
Ship questionnaire packages from Chicago vendor facility to NPC (10 separate shipments)	2/24/2010	3/12/2010
Set-up, Test, and quality check labeling of packages	3/11/2010	3/11/2010
Hire and train staff to run labeling equipment	3/15/2010	3/19/2010
Test questionnaire labeling	3/11/2010	3/11/2010

Development activities started very soon after the January 28, 2010 decision to proceed (as mentioned in section 2.2.5). The work hours between the final decision and the start of software development were used to document more robust requirements for the software programmers. All start-up activities were completed as planned.

The remaining schedule lines reflect actual production activities for receipt of the address updates in GEO, processing the addresses, creation of the address label file, receipt and processing of the label file in NPC, and mailing the questionnaires. The timing of the LUCA Appeals updates presented the biggest challenge of the three sources in terms of scheduling since GEO was scheduled to receive those updates through March 31, 2010 and the volume of later deliveries was unknown. In order to get questionnaires in the mail stream as soon as possible while accounting for the delivery of addresses to GEO on a flow basis, the mailout operation was planned in waves. There was a potential for up to five waves of deliveries with the final delivery date of April 19, 2010 for the fifth label file. In the end, all updates and mailings were completed in three waves. Figure 4 presents the operational flow of data between FLD, GEO, and NPC as well as key dates for each wave.

**Figure 4: Late Adds Mailout High Level Schedule of Production Activities**



The entire process for the Late Adds Mailout operation was completed in three waves of activities. The final Late Adds Mailout Label Files were delivered to NPC on April 6, 2010 and the final questionnaire labeling and mailout occurred on April 8, 2010. For the most part, activities occurred on or near the agreed upon dates with a few exceptions worth noting:

- The original plan for processing Spring 2010 DSF updates, which included pre-processing, address updating and geocoding steps, was to start at the beginning of March 2010 and end in May 2010. To accommodate the Late Adds Mailout operation, GEO reprioritized all activities and pushed forward the Spring 2010 DSF processing to an early start.
- The first Late Adds Mailout Label File delivery was delayed by two days due to software changes needed to address the duplication problem described in section 2.2.6.2.

- Although the second Late Adds Mailout Label File was delivered on schedule on March 29, 2010 NPC noted some spacing issues with the unit designations for some of the Ungeocoded Resolution addresses. The problem was fixed and the file was redelivered on the same day as the third and final file on April 6, 2010.
- The third Late Adds Mailout Label File delivery was delayed by one day (from April 5, 2010 to April 6, 2010) to accommodate late processing for the Ungeocoded Resolution cases originally scheduled for delivery in Wave 4. Since the LUCA updates were completed earlier than expected, and Spring 2010 DSF updates were also complete, the consensus was to wait to deliver all remaining addresses in one final file delivery.
- NPC production for questionnaire labeling averaged 7,671 packages per hour overall and NPC was therefore able to complete production for the second and third deliveries in two days. See Appendix B for a chart of NPC questionnaire labeling production by date.

### **5.2.2 Costs**

The 2010 Late Adds Mailout operation was an unexpected endeavor that was designed and implemented well after other census operations had been planned and budgeted for. Therefore, anticipated cost implications were an important factor in the decision to implement. The estimated costs for the operation are provided in Table 23 below.



**Table 23: Estimated Costs for the 2010 Late Adds Mailout Operation**

<b>Item/Activity</b>	<b>Estimated Cost<sup>15</sup></b>
Return postage fees	\$1,976,500
Outgoing postage fees	\$1,347,500
Staffing and supplies to handle the receipt, labeling and quality check of questionnaire packages by NPC	\$523,000
Image and application of postal indicia on three million questionnaire packages	\$80,000
Overtime for NPC staff to label and quality check mail packages	\$55,312
Shipment of three million questionnaire packages between print vendor facility in Chicago, Illinois and NPC in Jeffersonville, Indiana	\$20,650
Additional postal fees: annual permit, account maintenance, high volume mailing	\$2,695
DRIS contract modification to accept receipt of questionnaires	\$0
Census Headquarters system and software modifications, development and testing	\$0 <sup>16</sup>
<b>Total Estimated Cost Prior to Operation</b>	<b>\$4,005,657</b>

Source: 2010 Late Add Mail Delivery: Cost Estimates

The overall estimated cost for the operation was \$4,005,657. For the most part, funds were available to cover the costs within existing projects or 2010 Census surplus. The costs associated with Census Bureau Headquarters systems and staff efforts were absorbed within existing staff. New staff was required at NPC for the labor associated with the receipt, labeling (machine operation and quality checks), and handling of questionnaire packages for the mailout. NPC staffing costs were estimated at \$523,000.

The majority of the cost was driven by the postage associated with the mailout and return of questionnaires. The estimates for postage in both directions were established by anticipating a maximum of 2.5 million questionnaires mailed out and a 67 percent response rate. The actual postage costs for the outgoing mail (2,044,451 questionnaires) was \$1,101,959. The return

<sup>15</sup> Estimated costs related to the postage, shipment and labeling of questionnaire packages were based on three million questionnaires shipped and 2.5 million questionnaires mailed. The actual number of questionnaire packages mailed out from NPC was 2,044,451.

<sup>16</sup> Time and effort were absorbed within existing staff.

postage fee (based on 643,964 questionnaires returned) was \$759,878. Actual costs for the remaining items are not available at this time. Final estimated costs accounting for actual postage is \$2,543,494.

## **6 Related Evaluations, Experiments, and/or Assessments**

The following assessments, evaluations, and experiments are related to the Late Adds Mailout assessment.

- 2010 Census Local Update of Census Addresses Assessment
- 2010 Census Count Review Program Assessment
- 2010 Census New Construction Assessment
- 2010 Census Nonresponse Followup Operations Assessment
- 2010 Census Mail Response/Return Rates Assessment

## **7 Key Lessons Learned, Conclusions, and Recommendations**

### **7.1 Lessons Learned**

Although Census Bureau staff were able to implement an ad hoc operation to mailout questionnaires to over two million addresses during the height of census activities, there are a few lessons learned from this process that are worth noting. In general, the lack of sufficient time to properly plan and mature a process can lead to the following:

#### Insufficient Requirements for Software Development

The timing of this operation did not allow for a thorough development and review process for new software requirements. Although software worked as specified, lack of proper vetting meant that requirements were missed which introduced errors in the operation.

#### Inability to Understand the Impacts to the Census

During the planning stages of the Late Adds Mailout operation, the team identified a risk of introducing unknown error into the census process by allowing this universe of addresses the opportunity to self-respond without a field visit. The team was not able to estimate potential error during the planning stages and those errors remain unknown.

## 7.2 Conclusions and Recommendations

The Late Adds Mailout operation met with some successes. Namely, the operation reduced the VDC workload by more than half for two of the late adds sources, the Spring 2010 Delivery Sequence file updates and the Ungeocoded Resolution updates. Had the volume of addresses for these sources been greater, the impact on the VDC workload could have been significant. However, that was not the case. Overall, 68.8 percent (1,406,421 addresses) of the Late Adds Mailout addresses ended up in the VDC workload. The majority of those addresses were LUCA Appeals Reinstates. Considering the VDC cost per case of \$32.30, the Late Adds Mailout responses saved the census approximately 20.6 million dollars. However, approximately 45.4 million dollars was still spent to enumerate nonresponding cases in VDC in addition to the estimated 2.5 million dollars in printing and overhead costs.

The LUCA Appeals Reinstates represented the majority of the Late Adds Mailout universe and had the biggest impact on results. From the start, the reinstated addresses appeared to have less success than the addresses from the other two sources. Presumably high UAA rates affected the overall response rates and led to the inclusion of most of these addresses (77.4 percent) in the VDC operation. The LUCA results highlight the need for more research into the LUCA Appeals process to determine what factors lead to “good versus bad” appeals and to help form a better strategy for dealing with appealed addresses in the future.

Overall, these results indicate that the Census Bureau should consider strategies for self-response for late census adds in the future. Although LUCA Appeals results were somewhat poor, the results for the Spring 2010 DSF adds and Ungeocoded Resolution adds were encouraging. Both sources of addresses had higher return rates than LUCA. Both sources also had very high in-census rate, at 83.7 percent for the Spring 2010 DSF and 90.5 percent for the Ungeocoded Resolution. Although the Ungeocoded Resolution addresses were also from the DSF, they represented addresses that the GEO was not able to geocode and include in earlier processes. Geocodes applied by regional geographers allowed for their successful inclusion in the census. This result highlights the need for an operation to interactively geocode addresses before and during the address list building for future censuses.

In summary, specific recommendations to help shape future planning include:

- Investigate which categories of late adds to the census should be allowed the opportunity for self-response before an in-person visit.
- Conduct more research into the Local Update of Census Appeals process to determine what factors lead to “good versus bad” appeals.
- Continue planning for operations and/or processes that will assign geocodes to ungeocoded addresses on the Master Address File.
- Conduct more research into the overall impact of including Late Add addresses in the self-response process later.

Results from this report are not complete in the sense that more investigation is needed into the overall impact of allowing these late add addresses the opportunity to self-respond in the 2010 Census. The risk of duplication noted by the planning and implementation team has not been assessed. However, some information may be gained from looking at the Late Adds Mailout addresses in the results of the Census Coverage Measurement survey.

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## Appendix A: 2010 Late Adds Mailout State Level Universe

**Table 24: 2010 Late Adds Mailout Universe by State**

State	Total	Percent of Universe	Cumulative Total	Cumulative Percent
Florida	221,200	10.82	221,200	10.82
New York	204,963	10.03	426,163	20.84
Texas	134,775	6.59	560,938	27.44
Georgia	117,247	5.73	678,185	33.17
California	112,120	5.48	790,305	38.66
North Carolina	100,355	4.91	890,660	43.56
Virginia	81,443	3.98	972,103	47.55
Alabama	75,509	3.69	1,047,612	51.24
South Carolina	74,583	3.65	1,122,195	54.89
Connecticut	69,906	3.42	1,192,101	58.31
Michigan	69,546	3.40	1,261,647	61.71
Nevada	59,458	2.91	1,321,105	64.62
Arizona	57,432	2.81	1,378,537	67.43
Maryland	56,959	2.79	1,435,496	70.21
Pennsylvania	52,046	2.55	1,487,542	72.76
Illinois	46,439	2.27	1,533,981	75.03
Tennessee	42,204	2.06	1,576,185	77.10
Massachusetts	36,625	1.79	1,612,810	78.89
Indiana	35,869	1.75	1,648,679	80.64
New Jersey	35,714	1.75	1,684,393	82.39
New Mexico	35,015	1.71	1,719,408	84.10
Ohio	34,001	1.66	1,753,409	85.76
Kentucky	27,684	1.35	1,781,093	87.12
Missouri	27,252	1.33	1,808,345	88.45
Louisiana	22,121	1.08	1,830,466	89.53
Washington	21,686	1.06	1,852,152	90.59
Wisconsin	21,186	1.04	1,873,338	91.63
Arkansas	19,102	0.93	1,892,440	92.56
Mississippi	15,361	0.75	1,907,801	93.32
Minnesota	15,306	0.75	1,923,107	94.06
Oregon	12,320	0.60	1,935,427	94.67
Utah	10,595	0.52	1,946,022	95.19
Delaware	10,550	0.52	1,956,572	95.70
Kansas	9,123	0.45	1,965,695	96.15
Colorado	8,975	0.44	1,974,670	96.59

State	Total	Percent of Universe	Cumulative Total	Cumulative Percent
Idaho	8,921	0.44	1,983,591	97.02
Oklahoma	8,281	0.41	1,991,872	97.43
District of Columbia	7,185	0.35	1,999,057	97.78
Iowa	5,800	0.28	2,004,857	98.06
Hawaii	4,897	0.24	2,009,754	98.30
West Virginia	4,764	0.23	2,014,518	98.54
New Hampshire	4,313	0.21	2,018,831	98.75
Nebraska	4,221	0.21	2,023,052	98.95
Alaska	3,743	0.18	2,026,795	99.14
Maine	3,699	0.18	2,030,494	99.32
North Dakota	3,413	0.17	2,033,907	99.48
Wyoming	3,067	0.15	2,036,974	99.63
South Dakota	2,702	0.13	2,039,676	99.77
Montana	2,277	0.11	2,041,953	99.88
Rhode Island	1,546	0.08	2,043,499	99.95
Vermont	952	0.05	2,044,451	100.00
<b>Late Adds Mailout Total Addresses</b>	2,044,451	100.00	-	-

Source: 2010 Late Adds Mailout Assessment File

## Appendix B: 2010 Late Adds Mailout Daily Questionnaire Label Production

### 2010 Late Adds Daily Inkjet Production 04/09/10

