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CENSUS '90

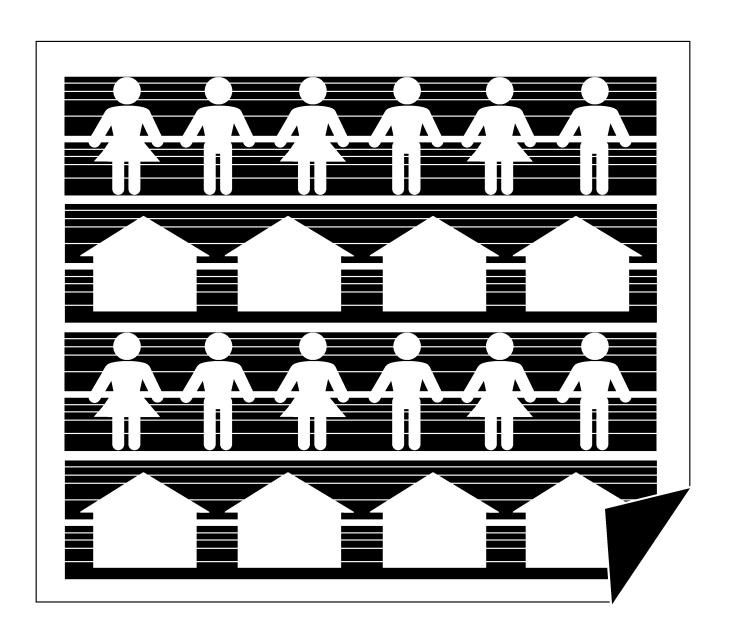


1990 CPH-E-3

1990 Census of Population and Housing

Evaluation and Research Reports

Programs to Improve Coverage in the 1990 Census



ACKNOWLEDGMENTS

The Decennial Planning Division, **Susan M. Miskura**, Chief, coordinated and directed all census operations. **Patricia A. Berman**, Assistant Division Chief for Content and Data Products, directed the development and implementation of the 1990 Census Tabulation and Publication Program. Other assistant division chiefs were **Robert R. Bair**, **Rachel F. Brown**, **James L. Dinwiddie**, **Allan A. Stephenson**, and **Edwin B. Wagner**, **Jr. The following branch chiefs made significant contributions: Cheryl R. Landman, Adolfo L. Paez**, **A. Edward Pike**, and **William A. Starr**. Other important contributors were **Linda S. Brudvig**, **Cindy S. Easton**, **Avis L. Foote**, **Carolyn R. Hay**, **Douglas M. Lee**, **Gloria J. Porter**, and **A. Nishea Quash**.

The Decennial Operations Division, Arnold A. Jackson, Chief, was responsible for processing and tabulating census data. Assistant division chiefs were: Donald R. Dalzell, Kenneth A. Riccini, Billy E. Stark, and James E. Steed. Processing offices were managed by Alfred Cruz, Jr., Earle B. Knapp, Jr., Judith N. Petty, Mark M. Taylor, Russell L. Valentine, Jr., Carol A. Van Horn, and C. Kemble Worley. The following branch chiefs made significant contributions: Jonathan G. Ankers, Sharron S. Baucom, Catharine W. Burt, Vickie L. Cotton, Robert J. Hemmig, George H. McLaughlin, Carol M. Miller, Lorraine D. Neece, Peggy S. Payne, William L. Peil, Cotty A. Smith, Dennis W. Stoudt, and Richard R. Warren. Other important contributors were Eleanor I. Banks, Miriam R. Barton, Danny L. Burkhead, J. Kenneth Butler, Jr., Albert A. Csellar, Donald H. Danbury, Judith A. Dawson, Donald R. Dwyer, Beverly B. Fransen, Katherine H. Gilbert, Lynn A. Hollabaugh, Ellen B. Katzoff, Randy M. Klear, Norman W. Larsen, Peter J. Long, Sue Love, Patricia O. Madson, Mark J. Matsko, John R. Murphy, Dan E. Philipp, Eugene M. Rashlich, Willie T. Robertson, Barbara A. Rosen, Sharon A. Schoch, Imelda B. Severdia, Diane J. Simmons, Emmett F. Spiers, Johanne M. Stovall, M. Lisa Sylla, and Jess D. Thompson.

The Housing and Household Economic Statistics Division, Daniel H. Weinberg, Chief, developed the questionnaire content, designed the data tabulations, and reviewed the data for the economic and housing characteristics. Gordon W. Green, Jr., Assistant Division Chief for Economic Characteristics, and Leonard J. Norry, Assistant Division Chief for Housing Characteristics, directed the development of this work. The following branch chiefs made significant contributions: William A. Downs, Peter J. Fronczek, Patricia A. Johnson, Enrique J. Lamas, Charles T. Nelson, and Thomas S. Scopp. Other important contributors were Eleanor F. Baugher, Jeanne C. Benetti, Robert L. Bennefield, Robert W. Bonnette, William S. Chapin, Higinio Feliciano, Timothy S. Grall, Cynthia J. Harpine, Selwyn Jones, Mary C. Kirk, Richard G. Kreinsen, Gordon H. Lester, Mark S. Littman, Wilfred T. Masumura, John M. McNeil, Diane C. Murphy, George F. Patterson, Thomas J. Palumbo, Kirby G. Posey, John Priebe, Anne D. Smoler, and Carmina F. Young.

The Population Division, Paula J. Schneider, Chief, developed the questionnaire content, designed the data tabulations, and reviewed the data for the demographic and social characteristics of the population. Philip N. Fulton, Assistant Division Chief for Census Programs, directed the development of this work. Other assistant division chiefs were Nampeo R. McKenney and Arthur J. Norton. The following branch and staff chiefs made significant contributions: Jorge H. del Pinal, Campbell J. Gibson, Roderick J. Harrison, Donald J. Hernandez, Jane H. Ingold, Martin T. O'Connell, Marie Pees, J. Gregory Robinson, Phillip A. Salopek, Paul M. Siegel, Robert C. Speaker, Gregory K. Spencer, and Cynthia M. Taeuber. Other important contributors were Celia G. Boertlein, Rosalind R. Bruno, Janice A. Costanzo, Rosemarie C. Cowan, Arthur R. Cresce, Larry G. Curran, Carmen DeNavas, Robert O. Grymes, Kristin A. Hansen, Mary C. Hawkins, Rodger V. Johnson, Michael J. Levin, Edna L. Paisano, Sherry B. Pollock, Stanley J. Rolark, A. Dianne Schmidley, Denise I. Smith, and Nancy L. Sweet.

The Data User Services Division, **Gerard C. lannelli,** then Chief, directed the development of data product dissemination and information to increase awareness, understanding, and use of census data. **Marie G. Argana**, Assistant Chief for Data User Services, directed preparation of electronic data products and their dissemination. **Alfonso E. Mirabal**, Assistant Chief for Group Information and Advisory Services, directed activities related to the National Services Program, State Data Centers, and preparation of training materials. The following branch chiefs made significant contributions: **Deborah D. Barrett, Frederick G. Bohme, Larry W.**

Carbaugh, James P. Curry, Samuel H. Johnson, John C. Kavaliunas, and Forrest B. Williams. Other important contributors were Molly Abramowitz, Celestin J. Aguigui, Barbara J. Aldrich, Delores A. Baldwin, Albert R. Barros, Geneva A. Burns, Carmen D. Campbell, James R. Clark, Virginia L. Collins, George H. Dailey, Jr., Barbara L. Hatchl, Theresa C. Johnson, Paul T. Manka, John D. McCall, Jo Ann Norris, David M. Pemberton, Sarabeth Rodriguez, Charles J. Wade, Joyce J. Ware, and Gary M. Young.

The Geography Division, Robert W. Marx, Chief, directed and coordinated the census mapping and geographic activities. Jack R. George, Assistant Division Chief for Geoprocessing, directed the planning and development of the TIGER System and related software. Robert A. LaMacchia, Assistant Division Chief for Planning, directed the planning and implementation of processes for defining 1990 census geographic areas. Silla G. Tomasi, Assistant Division Chief for Operations, managed the planning and implementation of 1990 census mapping applications using the TIGER System. The following branch chiefs made significant contributions: Frederick R. Broome, Charles E. Dingman, Linda M. Franz, David E. Galdi, Dan N. Harding, Donald I. Hirschfeld, David B. Meixler, Peter Rosenson, Joel Sobel, Brian Swanhart, and Richard Trois. Other important contributors were Gerard Boudriault, Desmond J. Carron, Anthony W. Costanzo, Paul W. Daisey, Beverly A. Davis, Carl S. Hantman, Christine J. Kinnear, Terence D. McDowell, Linda M. Pike, Rose J. A. Quarato, Lourdes Ramirez, Gavin H. Shaw, Daniel L. Sweeney, Timothy F. Trainor, Phyllis S. Willette, and Walter E. Yergen.

The Statistical Support Division, John H. Thompson, Chief, directed the application of mathematical statistical techniques in the design and conduct of the census. John S. Linebarger, Assistant Division Chief for Quality Assurance, directed the development and implementation of operational and software quality assurance. Henry F. Woltman, Assistant Division Chief for Census Design, directed the development and implementation of sample design, disclosure avoidance, weighting, and variance estimation. Howard Hogan and David V. Bateman were contributing assistant division chiefs. The following branch chiefs made significant contributions: Florence H. Abramson, Deborah H. Griffin, Richard A. Griffin, Lawrence I. Iskow, and Michael L. Mersch. Other important contributors were Linda A. Flores-Baez, Larry M. Bates, Somonica L. Green, James E. Hartman, Steven D. Jarvis, Alfredo Navarro, Eric L. Schindler, Carolyn T. Swan, and Glenn D. White.

The 1990 Census Redistricting Data Office, Marshall L. Turner, Jr., Chief, assisted by Cathy L. Talbert, directed the development and implementation of the 1990 Census Redistricting Data Program.

The Administrative and Publications Services Division, Walter C. Odom, Chief, provided direction for the census administrative services, publications, printing, and graphics functions. Michael G. Garland was a contributing assistant division chief. The following branch and staff chiefs made significant contributions: Bernard E. Baymler, Albert W. Cosner, Gary J. Lauffer, Gerald A. Mann, Clement B. Nettles, Russell Price, and Barbara J. Stanard. Other important contributors were Barbara M. Abbott, Robert J. Brown, David M. Coontz, and John T. Overby.

The Data Preparation Division, **Joseph S. Harris**, Chief, provided management of a multi-operational facility including kit preparation, procurement, warehousing and supply, and census processing activities. **Plummer Alston, Jr.,** and **Patricia M. Clark** were assistant division chiefs.

The Field Division, **Stanley D. Matchett**, Chief, directed the census data collection and associated field operations. **Richard L. Bitzer**, **Richard F. Blass**, **Karl K. Kindel**, and **John W. Marshall** were assistant division chiefs. Regional office directors were **William F. Adams**, **John E. Bell**, **LaVerne Collins**, **Dwight P. Dean**, **Arthur G. Dukakis**, **Sheila H. Grimm**, **William F. Hill**, **James F. Holmes**, **Stanley D. Moore**, **Marvin L. Postma**, **John E. Reeder**, and **Leo C. Schilling**.

The Personnel Division, **David P. Warner**, Chief, provided management direction and guidance to the staffing, planning pay systems, and employee relations programs for the census. **Colleen A. Woodard** was the assistant chief.

The Technical Services Division, **C. Thomas DiNenna**, Chief, designed, developed, deployed, and produced automated technology for census data processing.

1990 CPH-E-3

1990 Census of Population and Housing Evaluation and Research Reports

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Issued October 1993



U.S. Department of Commerce Ronald H. Brown, Secretary

Economics and Statistics Administration Paul A. London, Acting Under Secretary for Economic Affairs

BUREAU OF THE CENSUS Harry A. Scarr, Acting Director



Economics and Statistics Administration

Paul A. London, Acting Under Secretary for Economic Affairs



BUREAU OF THE CENSUS Harry A. Scarr, Acting Director

Charles D. Jones, Associate Director for Decennial Census
William P. Butz, Associate Director for Demographic Programs
Bryant Benton, Associate Director for Field Operations
Clifford J. Parker, Acting Associate Director for Administration
Peter A. Bounpane, Assistant Director for Decennial Census

Special Acknowledgments

This report was prepared by Florence H. Abramson, Joy Aso, Diane F. Barrett, Kevin Cecco, Jeffrey S. Corteville, Deborah H. Griffin, John S. Linebarger, Joan M. Pausche, George A. Sledge, Michael C. Tenebaum, James B. Treat, and Susan C. Wajer, under the general supervision of John S. Linebarger, Assistant Division Chief for Quality Assurance and Evaluation and Henry F. Woltman, Assistant Division Chief for Census Design, and under the direction of John H. Thompson, Chief, Decennial Statistical Studies Division. Important contributions were made by O. Annetta Clark, Nancy J. Corbin, Karen A. Cowles, Bonnie J. DeMarr, Robert G. Edson, Tracy A. Ewings, Douglas K. Hallam, Vicki L. Harrison, Tracey McNally, Christopher Moriarity, Emilda Rivers, Chad E. Russell, Carnelle E. Sligh, Gloria Spriggs, Martha L. Sutt, Amy L. Tillman, Eric R. Williams, Pamela A. Windsor and Kent T. Wurdeman, former and current staff of the Decennial Statistical Studies Division; Jonathan G. Ankers, Laura L. Blackwell, Sandra K. Bruner, Patricia A. Berman, Rachel C. Brown, Donald R. Dalzell, Judith A. Dawson, Charles R. Eargle, Alvin L. Etzler, Avis L. Foote, Charles J. Kahn, Karen A. Kane, Ellen B. Katzoff, Edward L. Kobilarcik, Peter J. Long, Susan P. Love, George H. McLaughlin, Laureen H. Moyer, Dan E. Phillip, A. Edward Pike, Gloria J. Porter, Willie T. Robertson, Nancy E. Rogers, Richard A. Schwartz, Judith J. Stryker, Edwin B. Wagner, David C. Whitford and Donna A. Williams, former and current staff of the Decennial Management Division; Adele G. Alvey, Darren F. Althouse, Karen A. Bagwell, Shirley A. Breeland, Janet R. Cummings, Timothy J. Devine, Charles F. Fowler, Rhonda G. Geddings, Christine L. Hough, Claire L. Hovland, Jay K. Keller, Sandra L. Lucas, Lynn I. Minneman, Alicia A. Morris, Sharon M. Neugebauer, William J. Phalen, Glenda M. Pickett, Glenn C. Schneider, Eli S. Serrano, and Karen E. Wyatt, former and current staff of the Field Division; and Frederick L. McKee and the former and current staff of the Evaluations Unit of the Statistical Methods and Quality Control Branch of the Data Preparation Division. (Note that in 1992 the Statistical Support Division was renamed the Decennial Statistical Studies Division and the Decennial Planning Division merged with the Decennial Operations Division to form the Decennial Management Division.)

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CHAPTER 1. Introduction and Background

INTRODUCTION

This report presents the results of evaluations of various components of the 1990 Census Coverage Improvement Program. The coverage improvement program consisted of a series of operations, some of which were redundant by design in order to make the coverage of persons and housing units as complete as possible. A review of the basic methodologies used to conduct the census provides a context for discussing the coverage improvement program and the results of that program.

Prior to the 1970 census, enumeration by mail was considered an experimental procedure. However, in each of the past three censuses (1970, 1980, and 1990), the mailout/ mailback approach has been the basic method of enumeration. Under the mailout/mailback methodology, a questionnaire was mailed out and the respondent returned it by mail to either a local district office or to a centralized processing office. Nonresponding households were visited by an enumerator who completed a questionnaire for the housing unit and/or household. In the 1990 census, the update/leave methodology was used in areas where U.S. Postal Service (USPS) delivery problems were anticipated. Under the update/leave methodology, census enumerators delivered the questionnaires and respondents were asked to return them by mail. Together, the mailout/ mailback and update/leave methodologies are considered mailback techniques. In each census, the mailback approach was supplemented by list/enumerate (previously referred to as conventional census) procedures.

The mailback procedure was used to enumerate the majority of households since 1970. In 1970, the mailout/ mailback approach was used to enumerate about 60.0 percent of the population. About 95.5 percent of the population in 1980 was enumerated under the mailout/ mailback procedure. The percent of the population included in the mailback universe remained at about 95.5 percent in 1990.

TERMINOLOGY

To provide common ground for understanding the 1990 Census Coverage Improvement Program, this section describes the primary approaches used to develop a mailing list and to enumerate persons and housing units. A glossary of census terms also is provided in appendix A at the end of the report.

Types of Enumeration Area

There were four basic types of enumeration areas in the 1990 census:

TAR Mailout/ Mailback—In densely populated urban areas and areas surrounding these central cities, the initial mailing list was purchased from a commercial vendor. The list was updated through two USPS checks (the Advance Post Office Check and the Casing Check) and through a dependent canvass by census enumerators (precanvass). Census questionnaires were mailed out from a central location and respondents were requested to return them to either a local district office or a centralized processing office. Housing units for which questionnaires were not returned by mail were visited by census enumerators.

Prelist Mailout/ Mailback—In suburban areas, Census Bureau enumerators listed addresses to create the initial mailing list. Prelisted addresses in the mailout/ mailback area were updated by the same two USPS checks as the TAR addresses. In place of a precanvass, census enumerators conducted a field reconciliation of the Advance Post Office Check results. Mailout and followup activities were similar to TAR areas.

Prelist Update/ Leave—The Census Bureau anticipated problems with USPS questionnaire delivery in small towns and rural areas (mostly in the South and Midwest) which contained a high proportion of noncity style addresses (such as rural route and box numbers and general delivery). Address lists were developed by prelisting but were updated at the same time that census enumerators delivered questionnaires. Mail return and followup were similar to the TAR and Prelist mailout/ mailback areas.

List/ Enumerate—In very rural areas, census enumerators compiled the basic address list and completed the enumeration in one operation.

Data Collection and Data Processing Offices

There were three types of offices set up to conduct the 1990 census. Regional census centers and district offices were mostly involved in collecting the data. Processing offices were established to provide most of the processing functions for the census.

Regional Census Centers—There were 13 regional census centers temporarily set up to manage the district office activities and to provide administrative, procedural, and geographic support to the district offices. Each of the 13 regional census centers was under the direction of one of the permanent Census Bureau regional offices. With the exception of the San Francisco Regional Census Center,

which was under the Los Angeles Regional Office, each of the remaining 12 regional census centers were located in the regional office city. These 12 regional census centers were located in the cities of Atlanta, GA; Boston, MA; Charlotte, NC; Chicago, IL; Dallas, TX; Denver, CO; Detroit, MI; Kansas City, KS; Los Angeles, CA; New York, NY; Philadelphia, PA; and Seattle, WA. Appendix C provides a map showing the regional census center boundaries.

District Offices—There were five types of district offices for the 1990 census. There were 103 Type 1 district offices which covered large central cities, mostly in TAR areas. There were 197 Type 2 district offices which generally covered smaller city, suburban, and some rural areas. Type 2 district offices covered mailout/mailback areas; about 60 percent of the housing units were in TAR areas and the rest were in prelist mailout/ mailback areas. Seventynine Type 2A district offices covered city, suburban, and rural areas in the South and Midwest. About 20 percent of the housing units in Type 2A district offices were in TAR areas, about 25 percent were in prelist mailout/mailback areas, and about 55 percent were in prelist update/leave areas. Type 3 district offices covered most of rural areas of the West and the most rural parts of the northernmost States. There were 70 Type 3 district offices. About 20 percent of the housing units in Type 3 district offices were in TAR areas, about 30 percent were in prelist mailout/ mailback areas, and the remaining 50 percent were in list/enumerate areas. There were also nine Type 3 district offices in Puerto Rico; all nine were entirely list/enumerate. An additional 38 Type 4 district offices were set up as "outreach offices" but had no formal enumeration responsibilities.

Processing Offices—There were seven processing offices used to process the data and control the 1990 census. The processing offices were located in the cities of Albany, NY; Baltimore, MD; Jacksonville, FL; Kansas City, MO; Jeffersonville, IN; Austin, TX; and San Diego, CA.

ORGANIZATION OF THE REPORT

The coverage improvement methods used in the 1990 census fall into several broad categories:

- Address list development
- · Questionnaire delivery and enumeration techniques
- Post-Census Day coverage improvement operations
- Search/ Match coverage improvement operations

The basic methods used to develop and update the address list, to enumerate persons and housing units, and to improve the coverage of persons and housing units are described in the Operational Descriptions section of this chapter. The remaining chapters in this report discuss results of only the methods that were evaluated as part of the 1990 Census Research, Evaluation and Experimental Program.

Table 1.1. Coverage Improvement Methods

Method	1970	1980
ADDRESS LIST DEVELOPMENT Vendor File	Х	X X
Prelist Update/ Leave Areas	х	Х
Precanvass	Х	X X
Casing Check	Х	X
Rural Update/ Leave Urban Update/ Leave Urban Update/ Enumerate Postmaster Return Delivery Shelter and Street Night		
POST-CENSUS DAY COVERAGE IMPROVE- MENT Telephone Assistance Adds		
Vacant/ Delete/ Movers Check	X	Х
Postcensus Local Review		Х
SEARCH/ MATCH COVERAGE IMPROVEMENT Parolee/ Probationer Coverage Improvement Program and Followup		
Usual Home Elsewhere	x	X X

Many of the methods used in the 1990 census were developed and tested after the 1980 Census; however, others were modifications and improvements to procedures used in 1970 and 1980. For each method evaluated and discussed in this document, table 1.1 indicates if it had been used in 1970 or 1980.

Results of the evaluations of the programs to improve coverage in the 1990 census are organized in this report on the basis of the four basic categories, with each category forming a chapter. Within each chapter, each section discusses the evaluation of one of the coverage improvement operations identified in table 1.1.

SUMMARY COVERAGE IMPROVEMENT AND COST DATA

Table 1.2 summarizes the costs and effectiveness of the major programs to improve coverage in the 1990 census. Only those programs for which evaluation data are available are included. The programs described in this report that were designed to compile the initial address list (that is, vendor file and prelist) rather than to improve the list are excluded from the table.

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Table 1.2. Cost and Effectiveness of 1990 Census Coverage Improvement Programs

	Housing un	its added	Persons	s added	C	ost (1990 dolla	rs)
Coverage improvement method	Number (thousands)	Percent	Number (thousands)	Percent	Total (thousands)	Per added housing unit	Per added person
Programs to Improve the Address List Prior to Enumeration							
Advance Post Office Check I	1,353.3	1.3	-	-	⁵ 7,845	2.17	-
Advance Post Office Check Reconciliation9	¹ 1,171.7	1.1	-	-	19,762	4.54	-
Precanvass	¹ 5,963.0	5.8	-	-	15,886	1.66	-
Yellow Card Coding	394.3	0.4	-	-	785	1.99	-
Precensus Local Review	367.3	0.4	-	-	1,904	⁸ 5.18	-
Casing Check	931.1	0.9	-	-	12,558	2.08	-
Questionnaire Delivery and Enumeration							
Rural Update/ Leave	399.4	0.4	-	-	⁶ 18,556	1.77	-
Urban Update/ Leave	NA	NA	-	-	⁶ 63	NA	-
Urban Update/ Enumerate	NA	NA	NA	NA	⁶ 27	NA	NA
Shelter and Street Night Enumeration	-	-	³ 240.1	0.1	3,886	-	16.18
Post-Census Day Coverage Improvement							
Telephone Assistance Adds	² 158.0	0.2	⁴ 407.0	0.2	⁷ NA	NA	NA
Census Closeout Address Check	-	-	² 0.9	0.0	1	-	1.56
Vacant/ Delete/ Movers Check	344.8	0.3	1,505.4	0.6	67,589	69.05	44.90
Recanvass	138.6	0.1	⁴ 178.2	0.1	14,684	8105.97	82.40
Postcensus Local Review	80.9	0.1	⁴ 124.9	0.1	9,604	34.39	76.89
POP One Reenumeration	-	-	56.3	0.0	⁷ NA	-	NA
Primary Selection Algorithm Review	-	-	350.4	0.1	2,880	-	8.22
Search/ Match Coverage Improvement							
Parolee/ Probationer Coverage Improvement							
Program and Followup	25.0	0.0	447.8	0.2	5,800	232.00	12.95
Other Search/ Match Forms ¹⁰	24.9	0.0	608.6	0.2	6,319	253.76	10.38

NA Not available.

General notes:

- Total 1990 housing unit and population counts, used as base of percentages, were 102,264,000 and 248,710,000, respectively. Many coverage improvement programs were conducted only in some areas of the country. Therefore, coverage improvement rates discussed in other sections of this report may not be comparable to the ones presented here.
- Total cost for most programs includes only USPS or Field costs, unless the operation was conducted only in a processing office (for example, search/match activities). Certain incremental costs, such as those for planning, preparation, processing, and data capture, are not included. Also, the table excludes the cost of enumerating housing units added prior to Census Day.
- Costs per added housing unit are calculated based on the share of the total cost attributable to adds (as opposed to geographic transfers, corrections, etc.).

Footnotes:

¹Housing unit adds include all addresses added during the operation, including those addresses that were deleted in later operations. (Housing unit adds for all other operations include only those addresses with a final census status of occupied or vacant.)During precanvass processing, some geographic transfers were not recognized as such and are included in the count of precanvass adds.

²Estimated number of adds are based on a sample.

³This is a count of the persons enumerated at emergency shelters, shelters for abused women, shelters for runaway and neglected children, and street locations. S-Night was not designed to (and was never intended to be) a complete count of the homeless population.

⁴Estimated number of person adds are based on an average household size of 2.63 persons per household in occupied housing units.

⁵Total cost includes the cost of geocoding the APOC I added addresses, in addition to USPS costs.

⁶The major portion of the total cost for these operations covers delivery of census questionnaires to all housing units in the areas in which the operations were conducted.

⁷Total cost for these operations cannot be separated from other costs.

⁸The number of units transferred during this operation was not available and could not be factored into the per added housing unit cost.

⁹Housing units identified by the USPS as adds during APOC II and III were not added until verified during APOC Reconciliation. Therefore, the number of housing unit adds and cost per housing unit add cannot be separated by APOC and APOC Reconciliation.

¹⁰Other search/ match forms include individual census reports, military census reports, shipboard census reports, usual home elsewhere forms, and were you counted? forms.

As shown in the table, programs to improve the address list prior to enumeration were considerably more cost effective compared to the per unit cost of adding housing units in the Post-Census Day programs. Some of the reasons for this have to do with the way in which the cost data were derived. For example, most of the costs are obtained from the field charges to the operation. The programs conducted during the data collection phase of the census include the cost of enumerating the housing units and the persons residing in the units in addition to the cost of adding the units. Also, as the census was conducted and the files of addresses and persons became more complete, there were fewer available housing units and persons to add. This resulted in higher per unit costs to locate and add missed housing units and persons.

Post-Census Day programs designed to add persons (including the Shelter and Street Night Enumeration and search/ match activities), as opposed to the early coverage improvement programs aimed at improving the address list, added approximately 1.6 percent of the total 1990 population at an average cost of about \$30.00 per added person.

Refer to each section of this publication for the references identifying the results memoranda which document each evaluation. Complete cost data and limitations of the cost data should be presented in these memoranda.

OPERATIONAL DESCRIPTIONS

This section provides a brief description of each of the major coverage improvement operations used in the 1990 census.

Advance Post Office Check

Objective—A USPS coverage improvement operation to verify the accuracy and completeness of the purchased address lists and the lists compiled during prelist.

Where It Occurred—Advance Post Office Check I was completed in TAR areas and Advance Post Office Checks II and III were completed in Prelist mailout/ mailback areas.

Procedure—The addresses of all known living quarters were computer printed on cards. These cards were sorted by ZIP Code and letter carrier route and shipped to the respective Post Office. Letter carriers sorted or "cased" the cards into slots for each address on their route, made corrections, and identified duplicates and undeliverables. For those addresses for which a card was not provided, the letter carrier filled out a blue "add" card.

Advance Post Office Check Reconciliation

Objective—To determine the status of addresses identified by the USPS during Advance Post Office Checks II and III as adds or duplicates and to obtain a better mailing address for undeliverables. In addition, enumerators assigned geographic codes to valid adds.

Where It Occurred—Prelist mailout/ mailback areas.

Procedure—The district offices received the blue "add" cards that contained the addresses of living quarters that the USPS delivers to but for which an Advance Post Office Check card had not been sent to the USPS. The district offices also received listings from the processing office that showed the undeliverables and duplicates. The adds, undeliverables, and duplicates were field checked by enumerators. For each blue card address, the enumerator verified that the address represented a missing housing unit and updated the census map to indicate the physical location of the unit. Enumerators resolved duplicates and tried to obtain more accurate mailing addresses for undeliverables.

Casing Check

Objective—A USPS operation to verify the completeness of the census address list prior to delivering questionnaires to each housing unit in the mailout/ mailback census area.

Where It Occurred—TAR and Prelist mailout/ mailback areas.

Procedure—Between late February and mid-March 1990, each letter carrier cased the census address check cards for his or her route in order to identify deliverable and undeliverable (including duplicate) addresses as well as to identify addresses missing an address card. For each address missing a census address check card, the carrier completed a blue "add" card. All blue cards were checked in the district office or in the field to determine if the addresses were missing from the census address file. The district offices labeled and mailed questionnaire mailing packages to the missing addresses if they were processed early; addresses not sent a mailing package were enumerated during Nonresponse Followup.

Census Closeout Address Check

Objective—To utilize the knowledge of local USPS letter carriers to obtain limited information about unenumerated cases in the final stages of followup operations.

Where It Occurred—All district offices were given the option to use it.

Procedure—Those district offices which participated in this program prepared an address check card for each unenumerated address and submitted the cards to local postal officials. The letter carriers were instructed to provide very limited information about the addresses (type of structure, occupancy status on Census Day, and number of Census Day occupants) based on their knowledge of the living quarters. If the carriers provided usable information for an address, the district office could use that information to classify the address in lieu of information obtained by a field visit.

Field Followup

Objective—To obtain missing questionnaires or more complete information from returned questionnaires and to verify the status of vacant and deleted units.

Where It Occurred—All areas.

Procedures—The following types of cases required field followup:

- Failed Edit—Mail return questionnaires that contained missing, illegible, or incomplete entries that could not be resolved during telephone followup were assigned for a personal visit.
- Vacant/ Delete/ Movers Check—Addresses that were classified as either vacant or delete during List/ Enumerate or Nonresponse Followup were visited by enumerators to verify the Census Day status of the housing unit and to complete questionnaires for deleted housing units converted to vacant or occupied and vacant housing units converted to occupied. Questionnaires were also completed for post Census Day movers who were not previously enumerated.
- Residual Nonresponse—Enumerators visited addresses to complete a questionnaire for those households for which a census questionnaire was not checked in.

The failed Edit and Residual Nonresponse followups were done only in TAR and Prelist mailback areas. The Vacant/ Delete/ Movers Check was done in all areas.

Group Quarters Enumeration

Objective—To enumerate those persons living in institutional and noninstitutional group quarters found at special places, such as hospitals and dormitories.

Where It Occurred—All areas.

Procedure—This operation began the day after Census Day and continued for 2 weeks. Enumerators visited each special place with group quarters and listed the names of the persons staying there. They left Individual Census Reports for each person to complete. They returned at a later date to pick up the forms and, if necessary, conduct interviews to obtain any missing information.

List/ Enumerate

Objective—To list housing units, update maps, and enumerate persons in sparsely populated rural areas.

Where It Occurred—List/ Enumerate areas.

Procedure—About a week before Census Day, the USPS letter carriers delivered Advance Census Reports to all known residential addresses in these areas. A member of the household was asked to complete the questionnaire and hold it for pick-up by an enumerator. Beginning the day before Census Day, enumerators canvassed the address register area, listed the address of each housing unit and updated the census map to indicate the physical location of each unit. The enumerator entered a map spot number on the map and on the corresponding line on the address register page. He or she also picked up or completed a questionnaire for every housing unit in the address register area. The lines on the address register pages were preprinted to indicate whether a household was to receive a long form or a short form. For long form households, the enumerator collected the short form, transferred the information to the long form, and conducted an interview to obtain the rest of the information.

Nonresponse Followup

Objective—To obtain a completed questionnaire for housing units and households for which a questionnaire was not returned by mail and to add housing units not already listed.

Where It Occurred—TAR and Prelist mailout/mailback and update/leave areas.

Procedure—Enumerators visited housing units for which a census questionnaire had not been checked-in and conducted an interview using an "Enumerator-Friendly" version of the census questionnaire. During the course of enumerating nonresponding households, enumerators were also instructed to add units not listed in the address register and to complete a census questionnaire for each added unit.

Parolee/ Probationer Coverage Improvement Program and the Followup Program.

Objective—To improve coverage for a segment of the population that may have been subject to a substantial undercount which could affect the overall differential undercount.

Where It Occurred—All areas.

Procedure—Each State was given the opportunity to participate in this program. If a State chose to participate, it was asked to provide names of Department of Corrections contact persons. Parolee/ Probationer Information Records were distributed and collected through the contact persons and mailed back to the census processing offices. All Parolee/ Probationer Information Records were processed through the Search/ Match operation. Because of the low response rate from the original program, a followup program was initiated using field staff to obtain

administrative records of persons on parole or probation. Parolee/ Probationer Information Records were completed for parolees and probationers that had a verified Census Day address. The Parolee/ Probationer Information Records from the followup program were also processed through the Search/ Match operation.

POP One Reenumeration

Objective—To reenumerate selected housing units which were reported during Nonresponse Followup to contain one-person households.

Where It Occurred—In 24 district offices with high proportions of one-person households enumerated in the closeout phase of Nonresponse Followup. Also, a national sample of 1,000 one-person households enumerated during Nonresponse Followup was selected and included in the POP One Reenumeration.

Procedure—Trained enumerators who usually work on the Census Bureau's ongoing programs reinterviewed the sample households during October 1990. In the 24 district offices, the counts were changed to that found in the reinterview. In the 1,000 case sample, the census counts were not changed.

Postcensus Local Review

Objective—To provide local officials of all functioning governments an opportunity to review housing unit counts and group quarters population counts for their political jurisdiction.

Where It Occurred—All areas.

Procedure—Listings of census counts of housing units and group quarters population at the block level were given to the local officials along with a set of maps showing the current census blocks and statistical areas. The maps also showed political boundaries as of January 1, 1990. Local officials had 15 working days to review these counts to identify and document discrepancies. These listings, along with proper documentation, were returned to the district office. The counts were compared, block by block, to the Census Bureau counts and the differences calculated. For those discrepancies that could not be resolved in the office, blocks were selected to be recanvassed based on specific criteria.

Postmaster Return Delivery

Objective—To hand deliver questionnaires returned by the USPS as undeliverable in order to increase mail response and thus reduce the nonresponse followup workload.

Where It Occurred—TAR and Prelist mailout/ mailback areas.

Procedure—Enumerators attempted to deliver census questionnaires which had been returned by the USPS letter carriers as undeliverable. This operation occurred in April 1990, prior to Nonresponse Followup.

Precanvass

Objective—To update and correct the list of mailing addresses purchased from a vendor by systematically canvassing within an assigned address register area.

Where It Occurred—TAR areas.

Procedure—Eumerators systematically canvassed assigned address register areas and conducted brief interviews to verify residential address information and unit designations, to determine the existence of additional living quarters, and to ensure that each address was coded to the correct address register area and census block. This information was then used to update the pre-printed address registers. Additions, deletions, and corrections were made as needed. Census maps were also updated to reflect any changes or errors in street features.

Precanvass Reconciliation and Yellow Card Coding

Objective—To resolve geographic discrepancies between the precanvass enumerators' coding and the geographic codes assigned by computer and to assign geographic codes to uncoded addresses.

Where It Occurred—TAR areas.

Procedure—There were two types of cases assigned for yellow card coding:

- Enumerators received yellow cards containing addresses added during precanvass whose computer assigned geographic location differed from that observed by a precanvass enumerator. Each address was field checked and assigned an address register area and block number to resolve the discrepancy. These cases are referred to as Precanvass Reconciliation cases.
- Addresses from the original vendor lists and addresses added during Advance Post Office Check I that could not be computer geocoded were also printed on yellow cards and sent to the district offices. Enumerators attempted to locate each address and assign it to an address register area and block.

Precensus Local Review

Objective—To provide local officials of functioning governments the opportunity to check preliminary housing unit and special place counts for their political jurisdiction.

Where It Occurred—TAR and Prelist mailout/mailback areas.

Procedure—Listings of housing unit and special place counts were delivered to local officials for each block within their jurisdiction. Local officials had approximately 45 working days to review these counts to identify and document discrepancies. These listings, along with proper documentation, were returned to the district office. The counts were compared, block by block, to the Census Bureau counts and the differences calculated. For those discrepancies that could not be resolved in the office, blocks were selected to be recanvassed based on specific criteria.

Prelist

Objective—To create the initial census address list, primarily in suburban and rural areas, by identifying and listing the addresses for all places where people live or could live within a specified area and updating census maps to indicate the physical location of each unit.

Where It Occurred—Prelist mailout/ mailback and update/ leave areas.

Procedure—Enumerators canvassed an address register area, one block at a time in a clockwise direction, conducting brief interviews and listing the residential addresses and related information in blank address registers. The enumerator also marked the housing unit locations on census maps and entered map spot numbers on the map and on the corresponding line on the address register page.

Primary Selection Algorithm Review

Objective—To review data records for questionnaires which were not selected to represent a given census household when two or more first form questionnaires were received for the same census identification number.

Where It Occurred—TAR and Prelist mailout/mailback and update/leave areas.

Procedure—The identified cases were processed by sending microfilm copies of the selected and not selected questionnaires through a modified Search/Match operation to determine if the not selected persons were counted in the census. They were added to the census if they were not already counted. Also, in some cases, if the selected persons were found to be counted more than once, the duplicate enumerations were removed.

Puerto Rico Multiunit Coverage Improvement Operation

Objective—To improve coverage of address listings in large multiunit structures in Puerto Rico.

Where It Occurred—In municipios in the four district offices comprising and surrounding San Juan.

Procedure—Census address listing books were clerically matched to a mailing list of residential customers supplied by the Puerto Rico electric company. If the number of units at the basic street address on the electric company list was greater than the number of units at the basic street address on the census list, a unit-by-unit comparison was done and any unit on the electric company list that was not on the census list was field checked. If the unit existed on April 1, 1990, the address was added and the enumerator completed a census questionnaire for the housing unit.

Questionnaire Coverage Edits

Objective—To compare respondent supplied, office coded, and computer interpreted data to determine cases which needed to go to followup.

Where It Occurred—All areas.

Procedure—Coverage edits identified four types of coverage edit failures:

- Count Failures—The count edit was performed on all types of questionnaires except short form enumerator returns which did not fail the vacant-usual home elsewhere edit (see below). A questionnaire failed edit due to a count discrepancy when the "For Census Use" Item A value was not equal to the number of persons for which two or more 100-percent questions (basic characteristics) had been answered.
- Question H1a/H1b failures—This edit was limited to mail return questionnaires. A questionnaire failed if the H1a/H1b question was answered "Yes" or the H1a/H1b question was answered "No" or was "Blank" and had a write-in entry.
- Continuation form failures—The continuation form edit
 was limited to mail return questionnaires. A mail return
 questionnaire failed edit for coverage if the number of
 persons for which two or more 100-percent questions
 had been answered was seven and Item A was seven
 with no continuation form.
- Vacant-Usual Home Elsewhere Failures—The vacantusual home elsewhere edit was performed on all types of questionnaires (mail and enumerator). The questionnaire failed if the circle in question 1b was coded and/ or an address was listed in question 1b which was different from the mailing label, indicating that everyone at the address usually lives somewhere else.

Recanvass

Objective—To improve coverage in areas where research indicated some evidence of deficient housing unit counts.

Where It Occurred—All areas.

Procedure—During Stage 1, enumerators visited targeted areas to identify and list missing addresses. During Stage 2, enumerators determined if each housing unit added during Stage 1 existed on Census Day. If it had, he or she completed a census questionnaire. If not, the enumerator deleted the listing from the address register.

Rural Update/Leave

Objective—To update the prelisted address lists and to deliver questionnaires in areas where the Census Bureau anticipated problems with USPS delivery of the census questionnaires.

Where It Occurred—Prelist update/leave areas.

Procedure—Field staff verified and updated the initial address lists, updated the maps, and hand-delivered pre-addressed census questionnaires. For each housing unit that was missing from the address lists, enumerators hand addressed and delivered the appropriate type of questionnaire and updated the census map to indicate the physical location of the unit.

Search/ Match

Objective—To improve coverage by adding and/or enumerating persons at their correct address.

Where It Occurred—All areas.

Procedure—The Search/Match operation was divided into five parts: sorting the search forms, geocoding the search forms, address control file browse, a USPS deliverability check, and searching for and matching addresses and persons to those on the filmed census questionnaire. Not all search forms went through all five processes. The Search/Match operation processed the following forms: D-190 Search Records that included Whole Household Usual Home Elsewhere cases and Mover-Usual Home Elsewhere cases, Individual Census Reports, Military Census Reports, Shipboard Census Reports, Parolee/ Probationer Information Records, and Were You Counted? forms.

Shelter and Street Night Enumeration

Objective—To improve coverage in the census by enumerating persons in shelters and at pre-identified street locations.

Where It Occurred—All areas.

Procedure—Census enumerators counted persons and collected data at pre-identified locations on March 20, 1990, and March 21, 1990, in two phases; the shelter phase and the street phase. The shelter phase took place on March 20, 1990, from 6:00 p.m. until midnight. It covered enumeration of persons found in shelters, such as emergency shelters, shelters for abused women, shelters

for runaway and neglected children, low cost motels (costing \$12.00 or less), subsidized units at motels, and YMCA's and YWCA's pre-identified by local areas as places where homeless persons stay. The street phase covered enumeration of persons found at selected pre-identified street locations, abandoned buildings, commerce places such as bus depots and train stations, and other places where homeless persons may spend the night, such as all-night restaurants, parks, and vacant lots. Enumerators collected data at street locations and commerce places on March 21, 1990, from 2:00 a.m. until 4:00 a.m. Persons leaving from abandoned buildings were enumerated from 4:00 a.m. until 8:00 a.m. on March 21, 1990.

Special Place Prelist

Objective—To classify special places by type, verify the geographic codes, and list the individual living quarters associated with the special place.

Where It Occurred—All areas.

Procedure—Enumerators visited each pre-identified special place and met with the person in charge. The address was verified and corrected, if necessary, and geographic codes verified or assigned. The type of special place was identified and the living quarters listed and classified as housing units or institutional or noninstitutional group quarters.

Telephone Assistance Adds

Objective—To help respondents complete questionnaires and, where appropriate, to send questionnaires to persons who called to say they had not received one or to ensure enumeration of these persons during followup operations.

Where It Occurred—All areas.

Procedure—Telephone Questionnaire Assistance was provided to help respondents complete their questionnaires. During Telephone Questionnaire Assistance, there was a larger than expected number of calls from persons reporting they had not received a census questionnaire. Procedures were implemented to ensure that addresses missing from the census files were added and that the persons living at these addresses were enumerated.

Transient Night Enumeration

Objective—To enumerate those persons staying in transient quarters, such as hotels, motels, tourist homes, campgrounds, and marinas.

Where It Occurred—All areas.

Procedure—The day after Census Day, enumerators visited certain transient quarters and left an Individual Census Report at each transient unit. Each respondent was asked to fill out an Individual Census Report and mail it back to the district office.

JOBNAME: No Job Name PAGE: 9 SESS: 55 OUTPUT: Mon Oct 25 10:15:44 1993 / pssw01/ disk2/ 90dec/ cphe/ 3/ chapter1

Urban Update/Enumerate

Objective—To improve coverage in pre-identified blocks consisting almost entirely of boarded-up units.

Where It Occurred—TAR areas.

Procedure—Enumerators completed questionnaires for occupied and vacant housing units. They annotated questionnaires for deleted or nonexistent units with a deletion reason. For each unit not in the address register, the enumerator added the address and completed a questionnaire for the household. Units in the Urban Update/ Enumerate blocks were suppressed from all subsequent followup operations.

Urban Update/Leave

Objective—To improve coverage in pre-identified blocks consisting almost entirely of public housing developments.

Where It Occurred—TAR areas.

Procedure—Enumerators hand delivered census questionnaires and updated lists using procedures similar to the rural Update/ Leave procedures.

Vendor File

Objective—To purchase a commercial mailing list which would serve as the initial address list in urban areas.

Where It Occurred—TAR areas.

Procedure—Addresses from commercial vendors were used to develop an address list in areas where all of the following conditions existed: a commercial address list existed, city type mail delivery was provided by the USPS, and the Census Bureau had the ability to assign geographic codes by computer.

CHAPTER 2. Address List Development

VENDOR FILE

Introduction and Background

In densely populated urban areas as well as areas surrounding these central cities (TAR areas), the Census Bureau purchased the initial inventory of addresses from a commercial vendor. The commercial address list for each urban area was selected through a competitive procurement process. To become a part of the census list, each address had to be assigned to specific census geography. This assignment, or "geocoding," included computer, clerical, and field coding, as necessary. Addresses from the commercial vendor were used in areas of the United States where all of the following conditions were present:

- a commercial address list existed.
- city type mail delivery (that is, delivery to house number and street name addresses) was provided by the USPS.
- the Census Bureau had the ability to assign geographic codes by computer.

For these areas, the commercial address list served as the basis of the census address file.

Methodology

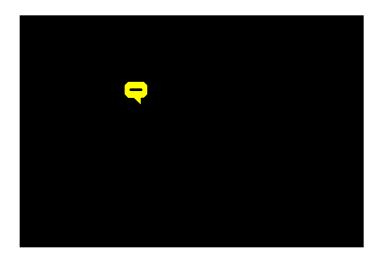
The geocoding of the vendor addresses and the APOC I operation occurred concurrently. The data for this evaluation were supplied with the data which were requested for the APOC I evaluation. The data were supplied prior to Census Day 1990.

Limitations

Special procedures were used to obtain and geocode vendor addresses for Hawaii. The results for Hawaii are not included in this section. Therefore, this section represents the remaining 49 States and the District of Columbia.

Results

Only a portion of the vendor addresses could be used as the initial list in TAR areas (see figure 2.1). A total of 69.3 million addresses were purchased in 1988 by the Census Bureau. These addresses represented the entire commercial vendor's inventory. The Census Bureau identified ZIP Codes that contained areas which receive city type mail delivery from the USPS. About 55.2 million

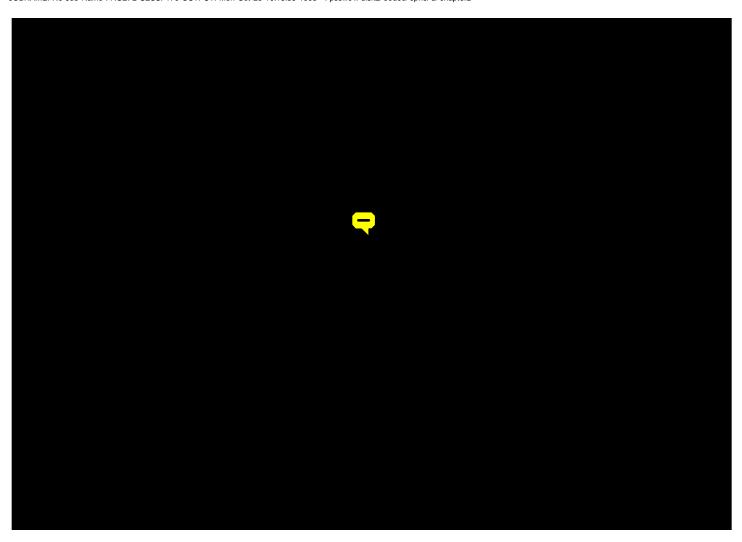


addresses were identified in these ZIP Codes. The remaining addresses were in ZIP Codes without USPS city type mail delivery and therefore were not included in the TAR address list. Within the selected ZIP Codes, about 94.6 percent of the addresses (52.2 million) were identified by the Census Bureau as being complete city type addresses. The remaining addresses (three million) were dropped from the census address file because they were non-city delivery, duplicate, or incomplete addresses. All addresses in the selected ZIP Codes were sent to APOC I since the geocoding of the vendor addresses and the APOC I operation occurred concurrently.

After the geocoding, the census address file included approximately 51.6 million addresses. The Census Bureau was unable to geocode 0.6 million city type addresses. These rates reflect only computer and clerical geocoding. The rates do not include the field geocoding procedures which were implemented prior to questionnaire delivery (see section on Precanvass Reconciliation/ Yellow Card Coding in this chapter). Computer and clerical geocoding resulted in a national geocoding rate of 98.9 percent. The State level geocoding rates ranged from 97.0 to 99.8 percent with a median value of 99.0 percent (see figure 2.2).

Conclusions

The initial address list development activities in TAR areas included compilation and geocoding of addresses from the commercial vendors. These activities resulted in approximately 51.6 million addresses in TAR areas. The final count of TAR addresses was approximately 56.9



million address. The vendor lists contributed approximately 90.7 percent of the addresses. Therefore, the vendor lists were responsible for the majority of the addresses in TAR areas. In addition, the Census Bureau had a high geocoding rate at the State and national levels for the vendor list addresses.

References

[1] Griffin, Deborah H., Joan M. Pausche, Emilda B. Rivers, Amy L. Tillman, and James B. Treat. 1990 Decennial Census Preliminary Research and Evaluation Memorandum No. 33, "Preliminary Results—Improving the Coverage of Addresses in the 1990 Census." U.S. Department of Commerce, Bureau of the Census. December 3, 1990.

PRELIST MAILOUT/ MAILBACK OPERATION

Introduction and Background

The Prelist Mailout/ Mailback operation was the first address compilation operation conducted to obtain address data for small cities and suburban and some rural areas for the 1990 census. The objectives of the Prelist were:

- To obtain a complete and accurate mailing address for each occupied or vacant living quarters and special place within the prelist areas.
- To record the physical location description and householder name for living quarters that do not have house number and street name mailing addresses.
- To annotate census maps to show the location of all living quarters and to identify features and feature name changes and/ or updates.
- To assign each living quarters to its correct 1990 census geography.

The Census Bureau conducted the Prelist in Mailout/ Mailback areas in smaller cities and suburban and rural areas with a population density of approximately 50 persons per square mile or greater. This was accomplished in four waves, distributed regionally throughout the country, during the period of February through August 1988.

Methodology

The evaluation results of the Prelist were obtained by examining a sample of Prelist Address Registers and by reviewing numerous observation reports, debriefing questionnaires, and the prelist data file summaries.

Results

There were a total of 2,271,462 blocks canvassed during the Prelist operation in mailout/mailback areas. Of these blocks, 1,692,835 (75 percent) contained living quarters, and 578,627 (25 percent) contained no living quarters. In the blocks containing living quarters, the prelist enumerators listed a total of 27,895,927 living quarters. The prelisted addresses may be classified into the following address types: 1) Seventy-six percent of the total units listed were city delivery addresses with house number and street name; 2) Thirteen percent of the units listed were rural route and/or box number addresses, with an available road name and householder name; 3) Five percent of the addresses were Post Office (PO) boxes with road name and householder name. 4) Less than 1 percent of the addresses were General Delivery, Star Route, or Highway Contract Routes; 5) Five percent of the units listed had incomplete or partial addresses, most of these listings had just road name and/ or physical location descriptions; and 6) Less than 1 percent of the total units listed were for Special Places and clusters. [1].

Of the 27.9 million prelisted addresses, 5.5 percent (1,544,446) had some combination of characteristics that made them nonmailable. For example, rural route without box number or invalid ZIP Codes. These cases were assigned for reconciliation during later field operations, at which time the Census Bureau attempted to obtain a mailable address.

There were a total of 7,850 clusters (0.1 percent of total listings) listed as a result of buildings or roads that were found to be inaccessible, which made it impossible to determine the exact number of living quarters at the addresses. These clusters were assigned for listing during the delivery phase of the operation.

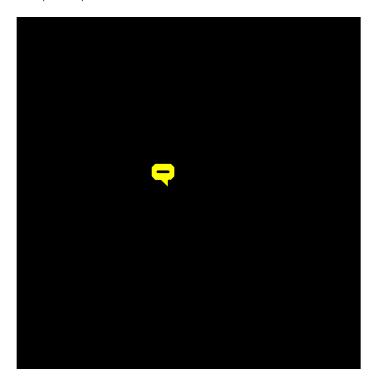
A total of 83,890 Special Places (0.3 percent of total listings) were identified during the Prelist operation. The prelisters were provided with a pre-printed listing of known Special Places within their assignment areas. The prelisters then dependently verified and updated the pre-printed listing. The occupants at these special places were included in the Group Quarters Enumeration for the 1990 census.

For Rural Route, PO Box, General Delivery, Star Route, and Highway Contract Routes, the householder name was obtainable approximately 90 percent of the time. However, for "Other" address types, householder name could only be obtained 22 percent of the time.

Approximately 11 percent (3,158,585) of the prelist units were vacant. Of the vacant units, approximately 25 percent were for "Other" address types.

Even though "Other" address types were undefined, approximately 91 percent of the time a physical location description was obtained which would allow an enumerator to conduct followup operations.

The Prelist Mailout/ Mailback operation was conducted nationwide. The total addresses prelisted were divided among 13 regional census centers. See figure 2.3.



Following are the national and regional census center breakdowns of the major prelist address types: 1) Nationally, urban addresses accounted for approximately 76 percent of all units. The regional census centers ranged from less than 1 percent in New York to 13 percent in Detroit and Atlanta; 2) Nationally, rural route addresses 2accounted for approximately 13 percent of all units and ranged from less than 1 percent in Los Angeles and New York to 21 percent in Chicago; 3) Nationally, PO Box addresses accounted for approximately 6 percent of all units. The Boston and Chicago Regional Census Centers contained the highest percents of PO Box addresses (13 and 15 percent, respectively); and 4) Nationally, "Other" addresses accounted for approximately 5 percent of all units and ranged from 1 percent in Los Angeles to 25 percent in Boston.

Conclusions

While the Prelist Mailout/ Mailback operation successfully obtained addresses for over 27 million living quarters, there are several aspects that need to be re-examined for the 2000 census.

For future censuses, if a Prelist operation is to be used, the Census Bureau needs to ensure that it can be accomplished within a realistic time frame. For example, the Census Bureau may need to extend the field collection phases beyond 6 weeks and build in flexibility for unexpected situations and system failures so that time allotments stay reasonable and realistic.

The Census Bureau needs to establish better channels of communication with the U.S. Postal Service. There were occurrences where the local Post Office refused to cooperate with Census Bureau personnel; this contributed to

prelist addresses being classified as undeliverables. Methodology should be explored to encourage the postal system to convert rural style addresses to city type and to systematically provide address information for persons who maintain Post Office boxes.

In several aspects, the Prelist Mailout/ Mailback was an operational improvement over Test Census and Dress Rehearsal Prelist operations. The crew leaders, advance listers, and enumerators received extensive training on map reading and more practice exercises, although observation reports suggest that more detailed training is required for map orientation and interpretation and the use of multiple map sheets and the reading of map scales.

Reference

[1] Sledge, George. 1990 Decennial Census Preliminary Research and Evaluation Memorandum No. 38, "Evaluation of the 1988 Prelist Operation." U.S. Department of Commerce, Bureau of the Census. August 12, 1992.

PRELIST UPDATE/LEAVE OPERATION

Introduction and Background

The Prelist Update/Leave operation was performed to create an address list in areas where Census Bureau delivery of census questionnaires would be done. This delivery methodology, called update/leave, was used in rural areas in the south and midwest where the Census Bureau had reason to believe that there would be problems associated with developing an accurate mailing list and the USPS would have problems delivering the census questionnaires.

The objectives of the Prelist Update/Leave operation were:

- To obtain a complete and accurate address, or adequate location description if an address was not available, for each occupied or vacant living quarters and special place within the Prelist areas.
- To annotate census maps to show the location of all living quarters and to identify map features and feature name changes and/ or updates. This aspect was important so that census enumerators could locate the units during the Delivery operation.
- To assign each living quarter to its correct 1990 census geography.

The Prelist in update/leave areas was conducted from June through September 1989, primarily in the rural south and in the midwest. The Census Bureau conducted the Prelist in areas with anticipated postal delivery problems and a population density of approximately 50 persons per square mile or less. The goal of the Prelist was to list a projected 11 million addresses, that would be enumerated

using the Update/ Leave method. The Update/ Leave methodology called for Census Bureau personnel, using address registers and the annotated census maps, to deliver the questionnaires and update the listing of addresses. The households were responsible for mailing back the questionnaires.

Methodology

The evaluation results of the Prelist Update/Leave were obtained by examining a sample of Prelist Address Registers and by reviewing numerous observation reports, debriefing, questionnaires, and the prelist data file summaries.

Results

There were a total of 1,364,835 blocks canvassed during the Prelist operation. Of these blocks, 927,995, (68 percent) contained living quarters, and 436,840 (32 percent) contained no living quarters. In the blocks containing living quarters, the prelist enumerators listed a total of 10,157,368 living quarters. The prelisted housing units were classified into the following address types: 1) Approximately 31 percent of the total units listed were "urban," defined as house number and street name addresses; 2) Approximately 31 percent of the units listed were "rural route," with an available road name. About 89.5 percent of these had an available householder name; 3) Approximately 9 percent of the addresses were "PO Box" type. with road name and householder name available; 4) About 0.7 percent of the addresses were General Delivery, and approximately 0.4 percent were Star Route; 5) About 1 percent of the addresses were Highway Contract Routes; 6) Approximately 26 percent of the units listed had Other Types of addresses. Most of these listings had only road name and/or physical location descriptions; 7) Less than 1 percent of the total listings were for Clusters (0.1 percent) and Special Places (0.3 percent). [1]

Twenty-four percent of the prelist addresses (2,418,528) were missing some combination of characteristics; for example, rural route without box number, or no street name, householder name and/ or physical location description. Thirty-one percent (742,426) of these addresses were vacant.

There were a total of 5,704 clusters (0.1 percent of total listings) listed as a result of roads or buildings that were found to be inaccessible, which made it impossible to determine the exact number of living quarters at the addresses. These clusters were assigned for listing during the delivery phase of the operation.

A total of 29,034 Special Places (0.3 percent of total listings) were identified during the Prelist operation. The prelisters were provided with a pre-printed listing of known Special Places within their assignment areas. The prelisters then dependently verified and updated the preprinted listing. The occupants at these Special Places were included in the Group Quarters operation for the 1990 census.

For Rural Route, PO Box, General Delivery, Star Route, and Highway Contract Routes, the householder name was obtainable approximately 91 percent of the time. However, for "Other" address types, householder name could only be obtained 15 percent of the time.

Approximately 10 percent (1,001,696) of the prelist units were vacant. Of the vacant units, approximately 72 percent were for "Other" address types. Even though "Other" address types were undefined, approximately 98 percent of the time a physical location description was obtained which would allow an enumerator to deliver a mailing piece.

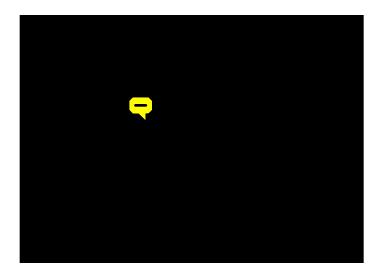
The Prelist operation was conducted nationwide. The total prelisted addresses were divided among 7 of the 13 regional census centers. See figure 2.4.

Following are the national and regional census center breakdowns of the major prelist address types: 1) Nationally, urban addresses accounted for approximately 31 percent of all units. The regional census centers ranged from 22 percent urban addresses in Detroit to 33 percent in Charlotte; 2) Nationally, rural route addresses accounted for approximately 32 percent of all units, with a range from 29 percent in Dallas to 35 percent in Denver; 3) Nationally, PO Box addresses accounted for approximately 9 percent of all units; the Detroit and Denver Regional Census Centers contained the highest percentage of PO Box addresses (17 and 20 percent, respectively); and 4) Nationally, "Other" address types accounted for approximately 26 percent of all units; the distribution was consistent across all regional census centers.

Conclusions

The Prelist operation successfully obtained addresses for over 10 million living quarters in update/leave areas.

Among other operational issues, the Census Bureau needs to redefine and re-examine Address Register Area configurations based on housing unit counts, distances,



terrains, and climates. The Address Register Area configurations, in general, were too large. One solution might be a flexible decentralized address file that can redefine problem Address Register Areas in the field on an as needed basis.

References

[1] Sledge, George. 1990 Decennial Census Preliminary Research and Evaluation Memorandum No. 72, "Evaluation of the 1989 Prelist Operation." U.S. Department of Commerce, Bureau of the Census. September 24, 1991.

[2] Sledge, George. 1990 Decennial Census Preliminary Research and Evaluation Memorandum No. 38, "Evaluation of the 1988 Prelist Operation." U.S. Department of Commerce, Bureau of the Census. August 12, 1992.

ADVANCE POST OFFICE CHECK I

Introduction and Background

This section documents results from the analysis of the 1990 APOC I operation that was conducted for the 1990 census. APOC I was an address list compilation coverage improvement program conducted by the USPS in late summer and early fall, 1988. The purpose of APOC I was to verify and update the address lists the Census Bureau purchased from vendors (vendor lists) for TAR areas. The vendor list addresses were printed on cards, and during APOC I, USPS letter carriers cased (sorted) these cards into slots for each address on their route. The USPS carriers were instructed to make any necessary corrections to the addresses and to identify duplicate and undeliverable addresses. If a card was not provided for an address on their route, the carrier completed a blue card for the missing address (see appendix B for a copy of the blue card). The Census Bureau had to assign these address adds to the correct geography (a process known as geocoding). Any address that could not be geocoded was not added to the census address files. The geocoded APOC I address adds represent the coverage gain from this operation.

The APOC I Suppression Study was designed for the evaluation of the APOC I operation. The purpose of the APOC I Suppression Study was to estimate the ability of the USPS to add residential addresses which were missing. The evaluation involved suppressing a sample of addresses from the APOC I operation and determining whether the USPS returned these addresses as adds.

Methodology

Status of Vendor List Addresses Sent to APOC I—The national level status (deliverable as addressed, deliverable with correction and undeliverable) of vendor addresses sent to the APOC I operation were tallied from the Census Bureau's Address Control File in September, 1988.

APOC I Housing Units Adds—The APOC I housing unit adds and the demographic characteristics of the persons enumerated at the APOC I housing unit adds were identified from various census computer files. The APOC I housing unit adds were assigned a code that reflected that the source of the address was the APOC I operation. All APOC I housing unit adds in two district offices in Hawaii were excluded from this analysis. Because of difficulties in obtaining a vendor list that was on a computer file in the areas in these two district offices prior to the census, the Census Bureau purchased an address list from a vendor that was supplied on printed address cards. Special procedures to process these vendor addresses included giving all of these vendor addresses the code that reflected an APOC I add (although the source of all of the Hawaii addresses was not APOC I). Therefore, the true APOC I housing unit adds cannot be distinguished from the purchased vendor list addresses in these two Hawaii district offices.

APOC I Suppression Study—A two-stage systematic sample design was used to select a sample of addresses from the original address list for TAR areas. All Post Office box addresses were excluded from the sample selection. The first stage sampling rate was .0079. The second stage sampling rate was .0052, and the overall sampling rate was .000041 [3].

Following APOC I, the suppressed addresses were clerically matched to the address add cards (geocoded and ungeocoded) for the sample ZIP Codes to determine which of the suppressed addresses were added during APOC I. After matching, the next step was to determine which of the suppressed addresses that did not match to an address add card were legitimate residential addresses and therefore should have been added during APOC I. The final census status listed on the address control file was the means by which this was determined. If the status for a given address was "accept," it was assumed the address was a legitimate residence at the time APOC I was conducted. A suppressed address was not considered to be a legitimate residential address if the status was "field delete" or if the address was not found on the address control file.

Limitations

APOC I Housing Unit Adds—The number of APOC I housing unit adds reflect the final address control file housing units added in APOC I. That is, some housing units that may have been added to the address control file during APOC I may have subsequently been removed from the file due to the various address list and coverage improvement programs and are not reflected in the final census counts.

Preliminary results from APOC I based on September 1988 address control file data reported that nationally there were 1,622,625 APOC I housing unit adds, excluding Hawaii [1]. Final results from the address control file show

approximately 136,000 fewer APOC I housing unit adds. This difference is mostly due to the time period of about 5 years since the initial APOC I data were tabulated, and as was previously mentioned, due to various precensus and postcensus activities.

Lastly, as previously mentioned, APOC I housing unit adds could not be determined for two district offices in Hawaii.

APOC I Suppression Study—The estimates obtained from this study were from a small sample of census addresses. As such, they are subject to sampling error and variability.

Results

Status of Vendor List Addresses Sent to APOC I-Table 2.1 documents the status of the vendor addresses sent to the APOC I operation. The addresses were classified by the USPS as deliverable as addressed, deliverable with correction, or undeliverable (undeliverable also included any address that had a house number correction, and duplicate addresses). The USPS could correct street name, unit designation and ZIP Code. Note that the correction categories (street name, unit designation, etc.) are hierarchical as shown, so that each corrected address was included in only one category. Thus, "street name" correction represents addresses that had a corrected street name and possibly other corrected address fields. Unit designation corrections refer to addresses that had no change to street name, but had a corrected unit designation, and possibly other corrected fields.

Approximately 95.9 percent of the 55 million vendor addresses sent to the APOC I operation were classified by the USPS as "deliverable as addressed." About 2.1 percent of the vendor addresses received an "undeliverable" flag on the address control file as a result of the APOC I operation. The remaining 2 percent of the vendor addresses were classified by the USPS as "deliverable with correction." The majority of these corrections were to the street name field. The street name corrections were tallied but not data captured to ensure that precanvass address registers and precanvass maps agreed on street name.

Table 2.1. Status of Vendor Addresses Sent to the APOC I Operation: National Level

APOC I status	Total addresses sent to APOC I	Percent
Total vendor addresses Deliverable as addressed Total undeliverable Undeliverable House number correction Duplicate	55,135,935 52,875,283 1,165,502 850,162 93,037 222,303	100.0 95.9 2.1 1.5 0.2 0.4
Total deliverable with correction Street name Unit designation ZIP Code	1,095,150 582,616 358,361 154,173	2.0 1.1 0.6 0.3

APOC I Housing Unit Adds—There were 1,486,645 APOC I housing unit adds. Using address control file summary TAR housing unit counts dated November 9, 1989, these APOC I housing unit adds represent approximately 2.6 percent of all TAR housing units on the address control file as of that date.

About 91 percent of the APOC I housing unit adds, or 1,353,251 housing units adds, had a final status of occupied or vacant unit, and the balance of 9 percent, or 133,394 housing units, were deleted units.

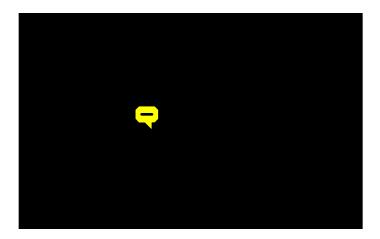
Figure 2.5 displays the distribution of the type of structure of the APOC I housing unit adds. Note that this distribution is only applicable to housing unit adds that were occupied or vacant units (1,353,251 APOC I adds).

A majority of the housing unit adds were within multiunit structures (61.1 percent). According to 1990 census data, only about 27.4 percent of all housing units nationally were multiunits. Therefore, units in multiunit structures were overrepresented in the APOC I housing unit add population by almost 34 percent. Note that there is a higher rate of multiunit structures in TAR areas, which could explain some of this overrepresentation. However, this does indicate that APOC I did a good job increasing coverage of units in multiunit structures in TAR areas.

Single family units, including one family detached and one family attached units, comprised about 34.5 percent of the APOC I housing unit adds. Mobile homes and "other" type units together represented about 4.4 percent of the APOC I housing unit adds.

The majority of the APOC I housing unit adds had a tenure of rented (55.9 percent). This seems to correspond with the majority of these units also being in multiunit structures. The next largest proportion of housing unit adds had a tenure of owned (32.9 percent), and for the balance (11.2 percent), the tenure was unknown. Tenure is only applicable to the housing unit adds that were occupied units.

The next table presents coverage gain within a basic street address. Within basic street address coverage occurs when multiple units are added within the same basic street address. For example, 50 apartments can be added to the



address 101 Main Street; the basic street address is 101 Main Street. The within basic street address coverage is presented by regional census center for all APOC I housing unit adds.

Table 2.2 displays the within basic street address coverage where more than 50 units were added during APOC I at the same basic street address. This table shows, by regional census center, the total number of APOC I adds, the number of these APOC I adds where more than 50 units were added at the same basic street address, and the percentage of the regional census center's APOC I adds that were at a basic street address where more than 50 units were added. The order of the regional census centers is by frequency of the number of housing unit adds where more than 50 units were added at the same basic street address.

The Los Angeles Regional Census Center had the most APOC I adds where more than 50 units were added at the same basic street address (39,054 APOC I housing unit adds). This within basic street address coverage gain represented 18.5 percent of the Los Angeles Regional Center's APOC adds. Note that the Los Angeles Regional Center also had the most APOC adds—210,534 housing units. But notice that it is not always true that the regional census centers with higher numbers of APOC I housing unit adds also had the best within basic street address coverage gain percentage. For example, the Denver Regional Census Center had the best within basic street address coverage gain percentage where more than 50 units were added at the same basic street address with 28.7 percent, yet had only 75,182 total APOC I housing unit adds (which is the third lowest number of APOC I adds by regional census center). This trend is also true for the Seattle and the San Francisco Regional Census Centers; that is, a smaller number of total APOC I housing unit adds, yet a higher percentage of within basic street address coverage

Table 2.2 APOC Adds Within Basic Street Address
Coverage Where More Than 50 Units Were
Added at the Same Basic Street Address—
Regional Census Center Level

Regional census center (RCC)	APOC adds: greater than 50 at same basic street address (BSA)	Total APOC adds	Percent of RCC's APOC adds that were greater than 50 at same BSA
Los Angeles	39,054	210,534	18.5
Atlanta	23,609	122,796	19.2
Boston	23,433	184,628	12.7
Dallas	21,721	105,979	20.5
Denver	21,545	75,182	28.7
New York	19,370	109,975	17.6
Philadelphia	17,464	147,551	11.8
Seattle	17,393	76,867	22.6
Kansas City	16,793	86,530	19.4
Chicago	15,759	134,988	11.7
San Francisco .	15,475	73,386	21.1
Charlotte	15,392	88,042	17.5
Detroit	7,502	70,187	10.7
National	254,510	1,486,645	17.1

gain where more than 50 units were added at the same basic street address. This may indicate poor vendor list coverage of large multiunits in some areas of the western United States (Los Angeles, Seattle, San Francisco and Denver).

Some possible explanations for these areas having the large numbers of adds where more than 50 units were added at the same basic street address are:

- 1. High growth.
- 2. Unusual addressing schemes.
- 3. New ZIP Codes initiated between 1988-1990.
- 4. A large volume of multiunits in some of these areas.
- 5. A changing of unit designations within basic street addresss (for example, from Apartments 1, 2 and 3 to Apartments 1-A, 1-B and 1-C).
- Lack of unit designations on addresses supplied by vendors.

These are all possible reasons why some areas would have high numbers of large multiunit APOC I adds within the same building. It is likely many of these circumstances worked together, which caused initial poor coverage of large multiunits, but which APOC I helped to correct.

This next section discusses the demographics of the persons enumerated in the housing units added during the APOC I operation. The demographic characteristics discussed are sex, age, race, and Hispanic origin. These demographics of the persons enumerated at APOC I housing unit adds are compared to national 1990 census demographic distributions. The purpose of this comparison is to see whether persons enumerated as a result of a coverage program such as APOC I are demographically similar to the general population, or if the persons enumerated at APOC I housing unit adds are more similar to hard-to-enumerate subgroups.

There were 2,864,387 persons enumerated at the APOC I housing unit adds. The sex distribution of the persons enumerated at APOC I housing unit adds was almost identical to the 1990 national sex distribution from the 1990 census (apporximately 49 percent male and 51 percent female).

A review of the age distribution of persons enumerated in APOC I housing unit adds compared to the national age distribution from 1990 census data showed that persons in the age groups 20-29 years old and 30-44 years old were overrepresented in the APOC I population. This overrepresentation of age groups 20-29 and 30-44 years old may be a reflection of the large number of multiunits that comprised the APOC I adds. That is, there are mostly renters in multiunits, and it is likely that many renters are in the age ranges of 20-29 and 30-44 years old.

An examination of the race distribution of persons enumerated in APOC I housing unit adds compared to 1990 census data showed that "other" race persons represented about 14.2 percent of all APOC I persons,

whereas "other" race persons were only 3.8 percent of the national 1990 population. This represents a difference of over 10 percentage points. The same trend, although not quite as large a difference, was shown in the distribution of Black persons. Persons enumerated in APOC I housing unit adds were 17.7 percent Black, whereas Black persons represented about 12.3 percent of the national 1990 population; this is a little more than 5 percentage points difference. Lastly, due to the overrepresentation of Black and "other" race persons, White persons were underrepresented in the APOC I population compared to the national 1990 population (68.1 percent versus 83.9 percent, respectively).

Approximately 15.7 percent of the persons enumerated in APOC I housing unit adds were Hispanic, compared to only 9 percent of the general population in 1990. Thus, the same trend is evident here as for the race distribution; that is, minority persons were overrepresented in the APOC I population.

APOC I Suppression Study—Table 2.3 summarizes the estimated add rates for missing addresses for the USPS. Included are the results for single unit addresses and multiunit addresses.

The estimated overall add rate of the APOC I was 62.6 percent with a standard error of 2.7 percent. The USPS added approximately 66.0 percent of the missing single unit addresses compared to 54.6 percent of the missing addresses within multiunit structures. Contrary to the findings from the analysis of the APOC I housing unit adds previously discussed, this suggests that the USPS was more likely to add missing single unit addresses than missing multiunit addresses.

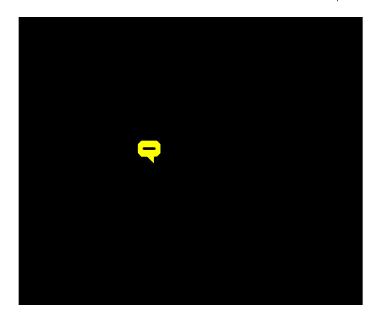
Figure 2.6 shows the estimated add rate for ZIP Codes/ Post Offices grouped according to the number of TAR addresses located in the ZIP Code. It appears that the add rate is not related to Post Office size. There was speculation that larger Post Offices may have had greater difficulty administering the APOC I operation, but the results indicate that this was not true.

Conclusions

Status of Vendor Addresses Sent to APOC I—The 1990 APOC I operation was an effective method of verifying the coverage and accuracy of the purchased vendor list addresses. In addition, the USPS was able to locate a large proportion of the vendor list addresses, both deliverable as addressed and deliverable with corrections.

Table 2.3. Estimated Add Rates from the APOC I Suppression Study

Description	Add rate (percent)	Standard error (percent)
Single units	54.6	2.7 5.0 2.7



APOC I Housing Unit Adds—APOC I increased the number of TAR housing units on the address control file by approximately 2.6 percent. The majority of these housing unit adds were in multiunit structures. Thus, this operation was successful in increasing coverage in multiunits. Since multiunits continue to be difficult structures to enumerate, and enumeration errors and delivery errors are more likely to occur in multiunits (as was shown by the evaluation of the Primary Selection Algorithm Review in chapter 4), the Census Bureau should continue to update its address list utilizing the USPS during the APOC operation.

It also was shown that within basic street address coverage was improved by the APOC I operation. This is another reason to recommend the continuation of the APOC operation. Finally, a review of the demographic characteristics of the persons enumerated in APOC I housing unit adds showed that minorities were enumerated at a greater rate than their representation in the total 1990 population.

APOC I Suppression Study—The estimated USPS add rate for missing addresses was significantly lower than expected given the additional procedures, training, and quality assurance. The addresses that were not added could have had significant coverage implications for the decennial census. Because the APOC I operation did not add these addresses, the Census Bureau had to rely on subsequent coverage improvement programs, such as precanyass and casing, to do so.

The quality assurance plan for the APOC I operation should include a procedure similar to this evaluation (that is, address suppression) in order to monitor the adding of missing addresses on an individual carrier basis.

References

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[2] Wajer, Susan C. 1990 Decennial Census Preliminary Research and Evaluation Memorandum No. 244, "Coverage Gain from the 1990 Advanced Post Office Check I Operation." U.S. Department of Commerce, Bureau of the Census. August 6, 1993.

[3] Wurdeman, Kent. 1990 Decennial Census Preliminary Research and Evaluation Memorandum No. 161, "Evaluation of the 1990 Advanced Post Office Check for Tape Address Register Areas (APOC I)." U.S. Department of Commerce, Bureau of the Census. July 22, 1992.

ADVANCE POST OFFICE CHECK II AND III Introduction and Background

In 1989, the USPS conducted the APOC as part of the 1990 census coverage improvement program. The APOC was the initial coverage check on the list of addresses purchased from vendors or listed in the Prelist Mailout/ Mailback areas. The APOC in urban areas, or TAR areas, was known as APOC I. The APOC II and III operations were conducted in Prelist Mailout/ Mailback areas.

The purpose of the APOC II/III was to have the USPS review the addresses listed in the Prelist Mailout/ Mailback areas in preparation for the 1990 census. The postal carriers were instructed to check the deliverability of each prelist address, identify any duplicate addresses, and complete a form D-702, Report of Missing Address (blue card), for any residential address on their route that was missing from the prelist file (See appendix B for an illustration of the form). Although special places such as hospitals and marinas were excluded from APOC II/III, blue cards completed for special places were keyed into the special place file. In addition, the USPS was instructed to make necessary corrections to improve the deliverability of the addresses obtained during prelist.

Incomplete addresses that were classified as undeliverable during prelist processing (called known undeliverables) were withheld from the APOC II/ III. Also, addresses in ZIP Codes that covered both TAR and prelist areas (split ZIP Codes) were excluded from APOC II/ III but the city delivery portions of these split ZIP Codes were included in the APOC I.

Following the APOC II/III, APOC Reconciliation was conducted in the field to reconcile blue cards, undeliverables, and duplicates and to resolve clusters; that is, living quarters not accessible at the time of Prelist due to situations such as washed out roads or locked gates.

Originally, the Census Bureau planned to include the entire prelist area in one national APOC. However, since the Prelist operation for some parts of the country was completed later than for other areas, it was decided to conduct APOC in two phases, hence, APOC II and APOC III. Selected Prelist Mailout/ Mailback areas were included

in the first phase, APOC II, in February 1989 and field reconciled in June 1989. Addresses for the remaining Prelist Mailout/ Mailback areas were reviewed during APOC III in April 1989 and reconciled in August 1989.

In this section, the results for APOC II and APOC III are combined and referred to as the APOC, since no substantial differences exist between the two phases.

Methodology

Since the blue cards were not counted prior to delivery to the district offices, a sample was taken to obtain estimated totals and estimated proportions of blue cards for the APOC Reconciliation status categories. A multiple-start systematic sample of 30 district offices was taken from 151 district offices containing APOC II workloads. For the APOC III workloads, a multiple-start systematic sample of 30 district offices was taken from 181 district offices.

Limitations

The final status of APOC adds from blue cards is not available for this publication.

Data for blue cards are presented as estimates from a sample of the cards and are subject to sampling error and variability.

Results

Table 2.4. shows the results of the APOC prior to field reconciliation.

Deliverables—As shown in table 2.4., 20,058,057 (72.1 percent) of the prelist addresses were sent to the USPS for casing. Of these, 15,805,103 (78.8 percent) were classified as "deliverable as addressed."

The USPS carriers made acceptable corrections to 825,696 (4.1 percent) of the addresses sent to the APOC. Carriers corrected address items such as unit designations; however, they were instructed to classify addresses with incorrect house numbers as undeliverable.

Table 2.4. APOC Results

Address type	Volume	Percent
Prelist addresses	27,807,872 20.058.057	100.0 100.0
Sent to Ai So	20,030,037	(72.1 percent of total)
Deliverable as addressed	15,805,103	78.8
Deliverable with corrections	825,696	4.1
Unacceptable corrections	863,996	4.3
Undeliverables	2,025,338	10.1
Duplicates	537,924	2.7
Not sent to APOC	7,749,815	100.0 (27.9 percent of total)
Units in split ZIP Codes Known undeliverables	6,210,978 1,538,837	80.1 19.9

During APOC, carriers corrected street name more frequently than other address items. Street name corrections refer to street name suffix changes, such as "Ave." to "St.," as well as rural route or box number corrections. Householder name was the second most frequently corrected address item.

The Census Bureau determined that some corrections made by the carriers during the APOC required field verification. These "unacceptable corrections" were identified during processing. The unacceptable corrections were not changed in the file but were flagged for APOC Reconciliation as undeliverable. About 4.3 percent of the addresses sent to APOC had these types of corrections. Unacceptable corrections included changes made to house numbers and all PO Box corrections. For city delivery addresses, corrections to basic street names were considered unacceptable.

Undeliverables and Duplicates—Of the addresses reviewed by the USPS during APOC, 2,025,338 (10.1 percent) were classified as undeliverable. The carriers were instructed to place an address in the undeliverable stack if it was not recognizable for mail delivery, the house number was incorrect or the structure was not on their route. In addition, approximately 2.7 percent of the addresses reviewed were considered duplicates of another addresses already cased. The undeliverable and duplicate addresses were assigned for APOC Reconciliation; these categories were indistinguishable to the enumerators.

Addresses Withheld from APOC—Of the addresses coming out of prelist, 7,749,815 (27.9 percent) were withheld from the APOC. Approximately 80.1 percent of these were withheld because they were in split ZIP Codes. Although these addresses were withheld from APOC II/ III, the city delivery portions were included in APOC I. These addresses were not included in the APOC Reconciliation workload.

The decision to withhold the split ZIP Codes from the prelist APOC was based on anticipated operational problems and additional costs associated with including split ZIP Codes in both the TAR and prelist APOCs. The Census Bureau concluded that performing both APOCs on the split ZIP Codes potentially would have resulted in substantial control problems, especially in growth areas with shifting delivery route boundaries, and duplicate adds. The inclusion of split ZIP Codes in APOC II/ III, as well as APOC I, would have resulted in an estimated additional cost of \$1.4 million.

Approximately 19.9 percent (1.5 million) of the addresses withheld from APOC did not contain enough address information to be cased by the carriers. Based on prelist data, 83.5 percent of the known undeliverables did not contain a householder name where it was necessary for rural route delivery, 15.3 percent did not have box numbers, and the remaining 1.2 percent did not have street names or rural route numbers.

In addition, 5,634 clusters were withheld from APOC. These are not included in the total Prelist volume in table 2.4.

Blue Cards—The USPS carriers completed an estimated 1,457,351 blue cards (standard error= 2667) during APOC II and an estimated 1,412,169 blue cards (standard error= 4630) for APOC III based on sample data. These cards were sent to the appropriate district offices and assigned for APOC Reconciliation. An estimated 21 percent of the total blue cards (standard error= 2.64) were classified as adds during APOC Reconciliation. Note that this does not include individual added units on blue cards for multiunit addresses.

Conclusions

Of the prelist addresses sent to APOC, about 83 percent were deliverable with or without corrections. The APOC carriers corrected 8.4 percent of the addresses sent to APOC (including unacceptable corrections), classified 10.1 percent as undeliverable and considered 2.7 percent as duplicates. Overall, the APOC operation made a valuable contribution to updating the list of addresses obtained during the Mailout/ Mailback Prelist.

References

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ADVANCE POST OFFICE CHECK RECONCILIATION

Introduction and Background

The APOC and associated field reconciliation operation (APOC Reconciliation) were integral parts of the coverage improvement program. The APOC was conducted in two phases, APOC II and APOC III, in the Prelist Mailout/ Mailback areas, whereas APOC I was conducted in the TAR areas. APOCReconciliation was conducted only in Prelist Mailout/ Mailback areas following APOC II/ III.

During APOC II/ III, the USPS reviewed the addresses listed in the Prelist Mailout/ Mailback areas. The postal carriers checked the deliverability of each Prelist address, identified any duplicate or undeliverable addresses, and completed a Form D-702, Report of Missing Address (blue card), for any residential address on their route that was

missing from the census files (See appendix B for an illustration of the form). In addition, the carriers were instructed to make any necessary corrections to improve the deliverability of the Prelist addresses. Incomplete addresses identified during the Prelist processing (known undeliverables) were withheld from the APOC II/III.

Following the APOC II/ III, a field check known as APOC Reconciliation was conducted to verify that each blue card was for a residential address not already accounted for in the census files. In addition, the APOC Reconciliation enumerators attempted to get a better mailing address for undeliverables, verify the existence of each address classified as a duplicate by the USPS, and resolve clusters; that is, living quarters not accessible at the time of Prelist due to situations such as washed out roads or locked gates.

Similar to APOC, the APOC Reconciliation occurred in two phases, APOC Reconciliation II and III. Originally, the Census Bureau planned to include the entire Prelist Mailout/ Mailback area in one national APOC. However, since the Prelist operation for some parts of the country was completed later than for other areas, it was decided to conduct APOC in two phases, APOC II and APOC III. Selected Prelist Mailout/ Mailback areas were included in APOC II in February 1989 and field reconciled in June 1989. Addresses for the remaining areas were reviewed during APOC III in April 1989 and reconciled in August 1989.

APOC Reconciliation results are presented as combined tallies for the two phases since no substantial differences exist between them.

Methodology

The APOC Reconciliation add rate is defined as the number of addresses added during APOC Reconciliation divided by the number of addresses in the Census Bureau's files following the Prelist in Mailout/ Mailback areas.

Since exact counts of blue cards prepared during the APOC were unavailable, a sample was taken to obtain estimated totals and estimated proportions of blue cards for the APOC Reconciliation status categories. A multiple-start systematic sample of 30 district offices was taken from 151 district offices containing APOC II workloads. For the APOC III workloads, a multiple-start systematic sample of 30 district offices was taken from 181 district offices.

Limitations

The final status of APOC Reconciliation adds is not available for this publication. Add rates for other coverage improvement operations which are based on adds with a final status of occupied or vacant will differ from those presented in this section.

Data for blue cards are presented as estimates from a sample of cards and are subject to sampling error and variability.

The number of blue cards may underestimate the number of blue card adds because 1 blue card could contain up to 12 separate unit designations.

Results

Table 2.5. shows the APOC Reconciliation results of addresses reviewed during the APOC. Note that addresses in split ZIP Codes are excluded since they were not included in the APOC or APOC Reconciliation workload. Although deliverable addresses with and without APOC corrections were not assigned for APOC Reconciliation, enumerators were instructed to correct or delete them if address changes were discovered in the field. Table 2.5. contains data for housing units only; clusters and special places are not included. Note that APOC undeliverables include addresses which were considered unacceptable corrections during processing following APOC; they were flagged as undeliverables for APOC Reconciliation.

Unchanged Reconciliation Cases—APOC undeliverables, duplicates, and known undeliverables were indistinguishable on the APOC Reconciliation field assignment listing. The enumerators were instructed to obtain the correct mailing address for each address assigned for APOC Reconciliation, provided the structure was a valid living quarters. The enumerators also deleted any listings verified as duplicates of valid addresses.

As shown in table 2.5, approximately 38 percent of the APOC undeliverables and known undeliverables assigned for APOC Reconciliation and 56 percent of the APOC duplicates were not changed during the field check. Based on observation reports, many of these addresses were not resolved because the enumerator could not locate the occupant or a knowledgeable person to verify the addresses (revisting the address was not approved for this operation).

Also note that 89 percent (16,048,517/18,043,135) of the addresses that were not changed during APOC Reconciliation had been classified as deliverable during APOC.

Corrections—The APOC Reconciliation enumerators obtained a corrected address for about 56 percent of the APOC undeliverables and 55 percent of the known undeliverables.

Table 2.5. APOC Reconciliation Results

		A	POC status		
Reconcilia- tion status	Total (percent)	Deliver- able (percent)	Undeliv- erable (percent)	Dupli- cate (percent)	Known undeliver- ables (percent)
No change .	18,043,135 (83.5)	16,048,517 (96.5)	1,106,420 (38.3)	300,547 (55.9)	587,651 (38.2)
Correction .	3,153,225 (14.6)	524,479 (3.2)	1,609,980 (55.7)	172,694 (32.1)	846,072 (55.0)
Delete	400,534 (1.9)	57,803 (0.3)	172,934 (6.0)	64,683 (12.0)	105,114 (6.8)
Total	21,596,894 (100.0)	16,630,799 (100.0)	2,889,334 (100.0)	537,924 (100.0)	1,538,837 (100.0)

The enumerators obtained corrections from two sources, respondents and blue cards that matched address listings. Respondents were often able to provide additional address information so that the USPS would recognize the address during questionnaire delivery.

During the APOC, carriers completed blue cards for many of the valid but incomplete addresses withheld from the APOC. If the enumerators were able to match the blue cards to known undeliverable listings in the address register, they used the more complete address information from blue cards to correct the listings.

Street name or rural route/ box number corrections were the most prevalent address item corrections for addresses in the APOC Reconciliation workload. Based on addresses assigned for APOC Reconciliation and corrected in the field, 52.1 percent had street name corrections. House numbers were the second most frequently corrected items. Note that house numbers were not acceptable corrections during the APOC, but were valid corrections during APOC Reconciliation.

Addresses Coded for Deletion—Approximately 6 percent of the APOC undeliverables and 7 percent of the known undeliverables were coded for deletion during APOC Reconciliation. The enumerators were instructed to mark for deletion undeliverable addresses that they were unable to locate, as well as those that had been demolished, condemned or converted to nonresidential use. These addresses were flagged as deletes during processing but remained on the Census Bureau's files.

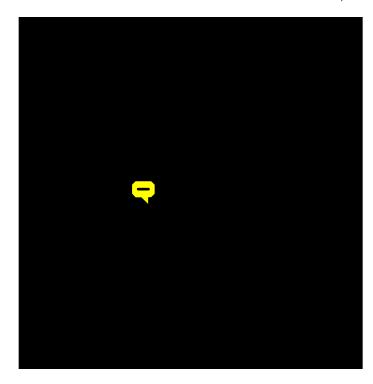
The enumerators were also instructed to delete listings verified as true duplicates. Of 537,924 addresses classified as duplicates during the APOC, 64,683 (12 percent) were verified as true duplicates in the field and removed from the Census Bureau's files.

Clusters—APOC Reconciliation enumerators were assigned 5,634 Prelist clusters for which they were instructed to obtain address information for each of the clustered housing units. They resolved cluster listings by deleting the listings for the cluster and listing the housing unit addresses on the blank add pages in the front of the address register.

Of the total number of cluster listings, the enumerators resolved 1,854 (32.9 percent). The remaining clusters were unresolved and reassigned during later operations.

Adds—Figure 2.7 shows APOC Reconciliation adds and coverage improvement by regional census center. These totals do not account for addresses such as clusters and true duplicates which were removed from the Census Bureau's files during processing.

During APOC Reconciliation, the field staff added nearly 1.2 million addresses (4.2 percent) which were not already in the census files. These added units include addresses missed during Prelist with no corresponding blue cards, as well as blue card addresses verified as adds by the enumerators.



As shown in figure 2.7, the highest APOC Reconciliation add rates are in the western portion of the country, specifically the Los Angeles, San Francisco, and Seattle Regional Census Centers.

The 1990 coverage gain from APOC Reconciliation for the combination of Los Angeles, San Francisco, Seattle, and Denver Regional Census Centers is 6.2 percent, which exceeds the national APOC Reconciliation add rate of 4.2 percent and may indicate a continuation of western growth.

From 1988 through 1989, approximately 30 percent of all building permits for new privately owned housing units were issued in the West. For this period, the authorization of new housing units in the West resulted in the highest regional percent increase (4.8 percent) based on 1980 housing unit stock. Although no definite conclusions can be drawn as to the reason why the add rate was high in the West, the growth data suggests that it may have been in large part due to new construction between Prelist and APOC Reconciliation.

Blue Card Reconciliation Status—Table 2.6 shows the estimated relative outcome of the blue cards assigned for APOC Reconciliation. An estimated 1,457,351 blue cards (standard error= 2667) were assigned for APOC Reconciliation after APOC II and an estimated 1,412,169 (standard error= 4630) were assigned after APOC III.

Approximately 21 percent of the APOC blue cards were classified as housing unit adds (an estimated 4.2 percent coverage gain). In addition to blue cards, APOC Reconciliation adds also resulted from address register repairs, resolved clusters, and missed units; that is, units missed during Prelist and not found until APOC Reconciliation.

Approximately 35 percent of the blue cards matched to undeliverables (or duplicates) already listed in the file. The

Table 2.6. Blue Card Reconciliation Status

Blue card status after APOC Reconciliation	Estimated percent	Standard error
Housing unit adds	20.76 0.14 16.35 35.26 9.72 6.62 3.39 7.76	2.64 0.03 1.76 4.98 0.81 2.12 1.60 5.06

majority of these blue cards were completed for valid known undeliverable addresses that were withheld from APOC and subsequently classified as missing during the APOC casing.

Approximately 16 percent of the blue cards matched deliverable listings. Many of these blue cards were erroneously completed for addresses involved in ZIP Code changes.

If the blue card address was thought to be located in a different address register area from its assigned address register area, the APOC Reconciliation enumerators were instructed to note the correct address register area and return it to their supervisor for reassignment. In some cases, the blue card could not be reassigned because the field materials for the correct address register area had been completed and returned to the district office. An estimated seven percent of the blue cards could not be reassigned.

Approximately 3 percent of the blue cards could not be found by enumerators after reassignment. A clerical review of a sample of the ungeocoded blue cards revealed that 20 percent matched to addresses already on the file in Update/ Leave areas, indicating that APOC carriers had erroneously completed blue cards for housing units outside the Prelist Mailout/ Mailback area. For ZIP Codes containing both Prelist and Update/ Leave areas, the carriers may not have effectively followed the Prelist boundaries shown on the APOC maps when completing blue cards.

Approximately 8 percent of the blue cards were unclassified. The majority of these cards were completed pockets of Prelist Mailout/ Mailback addresses surrounded by Update/ Leave areas. Since the cards were presumably located in surrounding Update/ Leave areas, they were not assigned for APOC Reconciliation.

Conclusions

Following Prelist, the APOC Reconciliation, in conjunction with the APOC, provided additional coverage gains, especially in the Los Angeles, San Francisco, Seattle, and Denver Regional Census Centerss. The APOC and APOC Reconciliation yielded an overall coverage gain of 4.2 percent, although the results of subsequent operations determine the final coverage gain.

The APOC Reconciliation enumerators corrected 55.7 percent of the undeliverable addresses assigned for the field check. The enumerators classified 12 percent of the APOC duplicates as true duplicates during APOC Reconciliation. Overall, the APOC Reconciliation was a valuable part of the precensus coverage improvement effort.

References

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PRECANVASS

Introduction and Background

Following the APOC operation in TAR areas, lists of all addresses were printed in census address registers organized by census geography. About 25,000 census workers travelled all streets in these areas to update the address lists with missing addresses, make corrections to existing addresses, correct census geography, and identify duplicate, nonexistent and commercial addresses. Census workers used maps with census geography during canvassing. Missing addresses were assigned to census geography during this canvassing operation, known as "Precanvass."

Precanvass address registers were keyed during which units were added, deleted, and corrected. Appropriate updates were made to the Address Control File.

During precanvass processing, the normal procedure was to flag a deleted address as a delete. A computer match was conducted to determine which of the precanvass deletes represented geographic corrections. If an address was deleted from one census block and added to another, it was recognized as a geographic transfer. The delete was purged from the Address Control File. All other deletes remained on the Address Control File.

Upon the completion of precanvass processing, it was recognized that the transfer, add, and delete rates were significantly higher than expected for some parts of the country. Approximately 173,000 basic street addresses (representing over 310,000 housing units) in 33 district

offices in Pennsylvania, New York, and New Jersey were removed from the Address Control File. A special operation (the Precanvass Delete Review) was conducted to review the precanvass deletes. If the address was confirmed to represent a geographic transfer, it remained deleted. If this could not be confirmed, the address was "re-added" to the Address Control File.

This section summarizes the impact that the Precanvass operation had on improving housing unit coverage by adding, deleting, and correcting addresses. Data are provided on the results of an independent evaluation of precanvass updating. The results of the Precanvass Delete Review operation are also summarized.

Methodology

Source codes allowed us to identify all updates from precanvass as originating from this operation. Files were created from the Address Control File at various geographic levels summarizing counts of adds, deletes, and corrections. Detailed data were requested on the 33 district offices included in the Precanvass Delete Review. Characteristics of the "re-added" units were included in this request.

As part of the evaluation of the Precanvass operation, a systematic, random sample of housing units was suppressed from the precanvass address registers. A sample of 840 out of 34,840 address registers was selected that covered 387 census district offices. Generally, four housing units were suppressed in each of the sampled address registers.

After the Precanvass operation was completed and all data were keyed, the sample was matched to the address registers to determine whether the suppressed units were added or missed, and to estimate the rate at which units were missed. A suppressed unit was not missed when it was found to have been added to the listing during precanvass. The address was not considered missed if it was deleted by a later operation. Miss rates were calculated as the ratio of the weighted number of missed housing units to the weighted estimate of census housing units with a final status of vacant or occupied. An adjustment was made to account for false nonmatches. Separate estimates were produced for single unit and multiunit structures. Data were also analyzed at the address register level to determine if misses tended to be clustered.

Limitations

Summary tallies from the Address Control File do not have any major limitations. The source codes were assigned by computer based on precanvass keying and therefore are not subject to the limitations of the source codes that were assigned clerically.

The Precanvass Delete Review was conducted only in 33 district offices. The results are therefore only generalizable to that universe. The review operation involved clerical matching and was therefore subject to error.

For the suppression study, selection of the sample units in multiunit structures was not completely random. The "last" unit (that is, the unit with the highest unit designation) was suppressed in all multiunits. As a result, housing units in multiunit structures had a lower probability of selection than those in single unit structures. The clerical matching of suppressed units to precanvass address registers was imperfect and false matches as well as false nonmatches could contribute to some level of error in the miss rates.

Results

Precanvass—Table 2.7 summarizes the effect of Precanvass on the count of addresses and basic street addresses (abbreviated as BSA in table 2.7). Add, delete, and transfer rates are based on the before precanvass address and basic street address counts. Almost 6 million addresses were added at 3.3 million basic street addresses as a result of the Precanvass operation. This represents an 11.5 percent increase in the national list of TAR addresses. About 2.2 million addresses (4.3 percent of the before precanvass addresses) were flagged as precanvass deletes. An additional 1.4 million addresses (0.9 million basic street addresses) were identified as geographic transfers. This reflects a transfer rate of 2.6 percent.

Table 2.7. Precanvass Results

	Number	Percent
Before precanvass BSA's	35,321,500 51,649,482	100.0 100.0
Adds BSA's Addresses	3,347,341 5,962,985	9.5 11.5
Deletes BSA's Addresses	- 2,222,195	- 4.3
Transfers BSA's Addresses	890,925 1,367,029	2.5 2.6

⁻ Not available.

The add rates varied by State (see figure 2.8). The highest add rates occurred in Pennsylvania (26.6 percent), Mississippi (24.0 percent), and South Carolina (18.5 percent). High add rates could indicate areas where the vendor and the USPS updates could not be geocoded. High rates also resulted in areas undergoing address conversions. This was true in Mississippi. Relatively low add rates were found in the District of Columbia (5.5 percent), Wisconsin (6.4 percent), and Louisiana (6.6



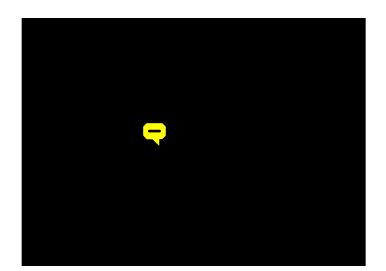
percent). Low growth areas, areas with relatively high geocoding success, and areas with updated vendor files were expected to fall into this category.

Figure 2.9 demonstrates that most census district offices had geographic transfer rates of less than 2 percent; however, over 8 percent of the district offices had rates over 5 percent. The highest transfer rates were found in several offices in Pennsylvania. The extremely high rates in these areas led to the Precanvass Delete Review operation.

Precanvass Delete Review—References [1] and [3] detail the results of this operation. Approximately 33.7 percent of the precanvass basic street address deletes that were reviewed during this operation were confirmed to be duplicates. These addresses represent geographic transfers that were not recognized during precanvass processing. The review confirmed that deleting over 87,000 potential duplicate housing units in over 58,000 basic street addresses was the correct decision. No evaluation was undertaken to see if any of these addresses were deleted in error.

The remaining 66.3 percent were re-added to the ACF. Of these, about 46 percent were eventually deleted in the census. Most were deleted with the explanation of "no such address." Thus, 54 percent of the re-added precanvass deletes were enumerated as occupied or vacant units. These 121,064 housing units and 261,335 persons may have been missed if the Precanvass Delete Review did not take place.

District offices in the New York Regional Census Center had a much higher "re-add" rate than district offices in the Philadelphia Regional Census Center (87.0 percent versus 63.5 percent). This indicates that geographic transfer errors were likely not the cause of the high delete rates in the New York area. A review of the re-added addresses in New York shows that about 68 percent were eventually deleted. It appears that nonresidential addresses, flagged as deletes during precanvass, were the cause of the higher than expected delete rates in New York.



Substantial levels of duplication were identified in several of the Philadelphia district offices. It appears that geographic transfer errors were causing the high delete rates that were noted in this area. The re-add rate was only 63.5 percent, whereas the rate in the New York district offices was 87.0 percent. In these areas, the decision to delete and re-add, after review, is likely to have had a major impact on housing unit data quality. A review of the re-added units indicates that only 35 percent had a final status of delete, the remaining 65 percent were enumerated as occupied or vacant units.

Suppression Study—This study estimates the overall "miss rate" to be approximately 30.0 percent, with a 1.6 percent standard error. Housing units in multiunit structures had a significantly higher miss rate than single units—45.2 percent versus 24.3 percent. The estimated standard errors of these estimates are 4.1 percent (multiunits) and 1.5 percent (single units). Even as high as these rates appear to be, they are still better than initially anticipated. Table 2.8 summarizes the distribution of the number of misses among the 839 sample address registers. Of the address register areas sampled, 63.6 percent contained at most one miss. This suggests that the majority of enumerators did fairly well. In 4.0 percent of the address register areas, all suppressed units were missed. Further information on this study can be found in [2].

Conclusions

The Precanvass operation was effective in adding missed housing units and identifying geographic coding errors. Higher than expected add, delete, and transfer rates were recognized. In some areas it is clear that the list of addresses used in precanvass was very deficient and that this operation was critical to producing an accurate housing unit inventory.

The Precanvass Delete Review operation demonstrated that duplication was a likely byproduct of the procedure that was followed to identify geographic coding errors. This procedure required that adds and deletes match exactly in order for them to be recognized as transfers. The precanvass computer match processing could not handle variations in addresses and intended transfers remained on the census files. In the future, it is recommended that corrections be allowed to the geographic codes in lieu of adding an address into one geography and deleting it from another.

Table 2.8. Distribution of Missed Units

Number of misses	Number of registers	Percent of registers
0	172 99	34.6 29.0 20.5 11.8 4.0
Total	839	100.0

The precanvass suppression study indicates that a fairly high proportion of missed units were not recognized during precanvass. Given that the units that were suppressed originated from the vendor list or APOC, they did not represent 'hidden' units that should be that hard to detect. If 30 percent of these types of housing units were missed, it is likely that a higher rate of hard to locate units also were missed. Although the overall miss rate was high, it is noted that 34.6 percent of the sampled areas missed no suppressed units.

More emphasis needs to be given to the coverage improvement aspect of precanvass—in training and through monitoring and feedback of the precanvasser's performance. It was proposed that a formal quality assurance plan in the 1990 precanvass include some type of suppressed unit check to provide feedback to the precanvassers on their work. Budget considerations led to a dramatic change in the proposed quality assurance plan. It is likely that these changes resulted in a poorer precanvass that did not detect as high a rate of missed units as it might have. In addition, the considerable amount of required corrections to census geography made it harder for the precanvassers to focus on identifying missed units.

References

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PRECANVASS RECONCILIATION AND YELLOW CARD CODING

Introduction and Background

The Yellow Card Coding operation was a precensus activity that was conducted in TAR areas in January 1990 through February 1990. The purpose of the Yellow Card Coding operation was to assign the correct geocode to addresses that were either (1) ungeocoded after prior precensus activities (the yellow card universe) or (2) had conflicting geocodes after the Precanvass operation (the precanvass reconciliation universe). Thus, the Yellow Card Coding operation processed addresses from two sources: yellow cards and precanvass reconciliation.

All cases in the Yellow Card Coding operation (ungeocoded and multiple-geocoded addresses) were printed on yellow cards and sent to the servicing district offices. The ungeocoded yellow card cases were clerically geocoded using block header records (listings of addresses within census blocks) and address control file listings. If the address range for an ungeocoded address was found in a block header record, district office clerks checked to see if the exact address was in an address control file listing. If the ungeocoded yellow card address was in an address control file listing, it was a duplicate of an existing address and therefore required no further processing. If the exact address was not in an address control file listing, the geocode from the block header record was used. If the address range was not in a block header record, and the address was a house number, street name type that was in a TAR area, it was sent to the field for geocoding. If an ungeocoded yellow card address was found to be in a prelist area or a rural type address, then it was not processed further.

In contrast, all of the precanvass reconciliation cases that were processed on yellow cards had primary and secondary geocodes, and in some cases more than two geocodes. These were all sent directly to the field for reconciliation of the geocodes.

This section documents several aspects of the Yellow Card Coding operation. An analysis of the added addresses (from the yellow card portion of the operation) and the reconciled addresses (from the precanvass reconciliation portion) is presented. In addition, selected demographic characteristics of the persons enumerated at the added or reconciled addresses are discussed.

Methodology

Computer data files of all census identification numbers (ID's) and accompanying housing unit and person data that were identified as either yellow card adds or reconciled precanvass addresses were supplied for this evaluation.

In presenting the housing unit characteristics of the added or reconciled addresses, benchmark data from the 1989 American Housing Survey were also used. The data employed from the 1989 American Housing Survey were estimates of central city/ metropolitan area housing unit counts and their characteristics. The reason for using these data for comparison purposes is twofold: 1) The universe of central city/ metropolitan area is very similar to the TAR universe from the Yellow Card Coding operation; and 2) Given that these two populations are similar, it was of interest to see if their respective distributions for a given housing unit characteristic were similar.

Limitations

The yellow card adds were identified by source code (a code on the census computer files that identified the source of the address). Research has suggested the existence of errors in the assignment of source codes.

However, the extent of the error is not known. Also note that some data from the census files did not go through the edit and allocation processes, therefore results that include a "no response" category are presented.

Results

The Yellow Card Coding Operation Combined Results—Workload—The workload for the Yellow Card Coding operation was 2,052,333 addresses. There were 1,316,690 addresses (64.2 percent of the workload) that were ungeocoded yellow cards and 735,642 addresses (35.8 percent of the workload) that were precanvass reconciliation cases [2].

A total of 1,206,376 addresses were identified as either yellow card adds or reconciled addresses. This represents 58.8 percent of the workload. The majority of these were addresses that had multiple geocodes and were reconciled during the Yellow Card Coding operation—714,566 addresses, or 59.2 percent. The balance—491,810 addresses, or 40.8 percent, were yellow card cases. Thus, approximately 37.4 percent of the yellow card workload resulted in adds to the address control file, whereas about 97.1 percent of the precanvass reconciliation workload resulted in reconciled addresses on the address control file.

The lower percentage of adds from the yellow card universe may signify that many of the yellow card cases were duplicate addresses. Also, the yellow card universe likely included more potentially incomplete or nonexistent addresses, whereas precanvass reconciliation addresses were units added in precanvass so they should have been legitimate addresses that were easier to locate and geocode.

There were 57,612,468 TAR addresses on the address control file after the Precanvass operation [2]. Thus, the yellow card adds (491,810 addresses) represent about a 0.9 percent increase of TAR addresses on the address control file.

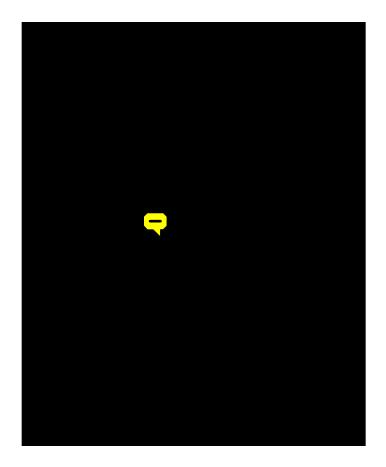
Approximately 75.0 percent of the housing units (904,418 housing units) from the yellow card adds and the precanvass reconciliation addresses combined were occupied units. Vacant units represented 9.8 percent (117,999 housing units) of all added or reconciled housing units. Deleted units represented 15.2 percent (183,959 housing units) of all added or reconciled addresses. The fairly large percentage of deleted units shows that many units that were added or reconciled during the Yellow Card Coding operation were identified as non-existent or duplicate housing units during a later census operation.

The Yellow Card Coding Operation Combined Results—Persons Enumerated at Added or Reconciled Housing Units—There were 2,156,452 persons enumerated at the added or reconciled housing units from the Yellow Card Coding operation. Selected demographics (age, race, and Hispanic origin) of these persons were compared to the demographics of gross national estimates of persons identified by the Post Enumeration Survey as missed by

the census. The reason for the comparison to missed persons is to investigate if persons that were added by this coverage improvement program were demographically similar to persons that were likely to be missed in the census. This comparison showed that the selected demographic distributions of the persons enumerated in added or reconciled housing units were dissimilar to the same demographic distributions of persons likely to be missed in the census and more representative of the total population enumerated in the 1990 census.

The Yellow Card Universe-Housing Unit Characteristics-

Figure 2.10 shows the breakdown by size of basic street address of the housing units added to the address control file from the yellow card universe compared to the basic street address size of 1989 housing unit estimates of central city and metropolitan areas at the U.S. level. Note that the 1989 housing unit estimates are from the 1989 American Housing Survey. The plurality of the housing unit adds had a basic street address size of single unit. There were 239,102 single unit addresses added to the address control file, which represents 48.6 percent of all of the yellow card universe adds. The percentage of single units for the yellow card adds is almost 20 percent less than this same basic street address size category for the 1989 housing unit estimates of central city/metropolitan areas. Structures containing 50 or more units represented the next largest basic street address size category of the yellow card universe adds. There were 96,946 addresses added to the address control file that had a basic street



address size of 50 or more units, which represents 19.7 percent of all of the yellow card universe adds. The percentage of units with a basic street address size of 50 or more units is much larger for the yellow card adds than for the 1989 housing unit estimates for central city/ metropolitan areas. Thus, the Yellow Card Coding operation improved coverage for large multiunits.

Because of the large number of housing unit adds that had a basic street address size of 50 or more units, it was of interest to determine if there was any clustering of units within a building, or if perhaps an entire apartment building was added. Census geography was used (at the block level) to determine clustering. Of the 96,946 yellow card adds with a basic street address size of 50 or more units, 87,573 housing units (90.3 percent) were in blocks that had 50 or more units added during the Yellow Card Coding operation. Although this does not show whether or not entire apartment buildings were added, it is hypothesized that where entire apartment buildings were not added, clusters of units within buildings were.

Approximately 48.4 percent of the occupied housing units (166,127 housing units) added to the address control file from the yellow card universe had a tenure status of rented. About 46.9 percent of the yellow card adds, or 161,102 housing units, had a tenure status of owned. Note that approximately 4.6 percent of the housing units added from the yellow card universe had no response for the tenure item. It is assumed that the distribution of tenure for nonrespondents is similar to that of the respondents.

The Yellow Card Universe—Geographic Distribution of the Added Housing Units—Table 2.9 shows the top 10 States with the highest number of housing unit adds for that State as a percentage of total housing unit adds from the yellow card universe. California had the highest number of housing unit adds—72,497 addresses—which is approximately 14.7 percent of all addresses from the yellow card universe. Florida had the second highest number of housing unit adds from the yellow card universe—63,789 addresses—which is about 13.0 percent of all added addresses from the yellow card universe. According to 1990 census figures, California is the State with the largest number of housing units in the U.S.; Florida ranks fourth. Only 3 of these States with the highest number

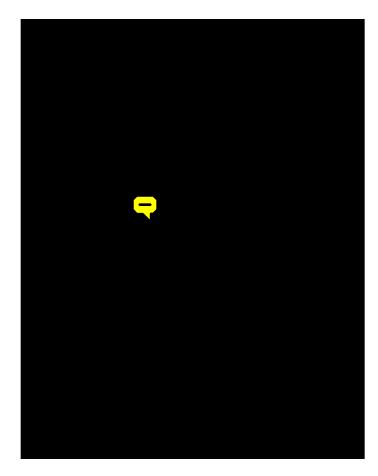
Table 2.9. Top 10 States With Highest Number of Yellow Card Adds

State	Housing unit adds	Percent of housing unit adds
CA	72,497 63,789 45,807 30,282 27,805	14.7 13.0 9.3 6.2 5.7
GA PA. MA TX. AZ.	18,717 18,168 16,218 15,877 14,356	3.8 3.7 3.3 3.2 2.9

of housing unit adds—Georgia, Massachusetts, and Arizona—were not included in the top 10 States with the largest number of housing units nationwide.

The Precanvass Reconciliation Universe—Housing Unit Characteristics—The precanvass reconciliation workload portion of the Yellow Card Coding operation was 735,643 TAR addresses [2]. From this workload, 714,566 housing units had geographic codes reconciled on the address control file. Thus, 97.1 percent of the precanvass reconciliation workload was processed and reconciled. The remaining 2.9 percent of the workload may have been addresses that were found to be outside of TAR areas and thus not processed further, or perhaps during a later census operation it was determined that some of these addresses should be removed from the address control file.

Figure 2.11 shows the distribution by basic street address size of the precanvass reconciliation addresses compared to central city and metropolitan area housing unit estimates from the 1989 American Housing Survey. The distribution by basic street address size of the precanvass reconciliation addresses was similar to the yellow card universe adds. For 2 categories, single units and units with a basic street address size of 50 or more units, the distribution of basic street address size for the precanvass reconciliation addresses is dissimilar to the distribution of the 1989 central city/ metropolitan area housing unit estimates.



About 45.5 percent of the housing units (324,862 housing units) had a basic street address size of single unit. This is in contrast to the estimate of about 67.5 percent of the 1989 central city/metropolitan area housing units having a basic street address size of single unit. The second largest size of basic street address was multiunit structures with 50 or more units; there were 187,017 addresses of this size that were reconciled on the address control file from the precanvass reconciliation universe, which represents approximately 26.2 percent of the precanvass reconciliation housing units. As was true with the yellow card adds, the basic street address size of 50 or more units was much larger for the precanvass reconciliation addresses than for the 1989 estimates of U.S. level central city and metropolitan area housing units.

Again, because of the large number of reconciled units with a basic street address size with 50 or more, an analysis at the block level was conducted to determine geographic clustering of units of this basic street address size. Of the 187,017 addresses from the precanvass reconciliation universe that had a basic street address size of 50 or more units, 98.0 percent (183,189 units) were in blocks that had 50 or more units reconciled within the same block. Therefore, there seems to be clustering of units with this basic street address size, whether the entire unit was geographically reconciled, or whether units within large apartment buildings were reconciled.

The largest tenure category for the precanvass reconciliation occupied housing units was rented. There were 269,358 housing units (48.0 percent) that had a reported tenure status of rented. It seems that the Yellow Card Coding operation did a good job of improving coverage of renters—a group that is missed at a higher rate than owners. Owners comprised about 47.6 percent, or 267,560 occupied housing units. Note that this question had an item nonresponse of approximately 4.4 percent for the precanvass reconciliation addresses. Again, it is assumed that the distribution of tenure for the nonrespondents is similar to that of the respondents.

The Precanvass Reconciliation Universe—Geographic Distribution of Reconciled Housing Units—The top 10 States with the highest number of reconciled housing units from the precanvass reconciliation universe is shown in table 2.10, along with the percentage of reconciled housing units to total number of reconciled housing units.

The top 10 States with the highest number of reconciled housing units has 9 States in common with the top 10 from the yellow card adds. Thus, there were consistent geographic coding problems in these States. Some plausible explanations may be that perhaps purchased address lists were outdated and they did not cover some new construction; or perhaps geographic coding work done by some contractors tended to have errors.

New York had the highest number of reconciled housing units with 99,767. This number represents about 14.0 percent of all reconciled housing units from the precanvass reconciliation universe. Pennsylvania had 88,451

Table 2.10 **Top 10 States With Highest Number of Reconciled Housing Units**

State	Reconciled housing units	Percent of reconciled housing units
NY	99,767	14.0
PA	88,451	12.4
CA	86,042	12.0
FL	58,306	8.2
NJ	44,478	6.2
IL	42,649	6.0
TX	34,922	4.9
MA	27,521	3.9
HI	4,782	2.1
GA	14,200	2.0

reconciled housing units, the second highest number by State representing about 12.4 percent of the total number of precanvass reconciliation housing units. There were extensive geographic coding problems in the Philadelphia area which likely explains why Pennsylvania appears so high on this list.

Conclusions

While most of the workload (97.1 percent) in the precanvass reconciliation universe was reconciled, only 37.4 percent of the yellow card universe resulted in adds to the address control file. From these yellow card adds, 80.2 percent were valid census housing units (occupied and vacant). In contrast, 87.9 percent of the reconciled housing units were valid census housing units (occupied and vacant). Thus, in terms of quality of housing units with respect to true versus deleted housing units, the precanvass reconciliation portion of this coding operation reconciled more valid addresses.

The plurality of the added or reconciled units from the Yellow Card Coding operation had a basic street address size of single unit, and the second most common basic street address size was structures with 50 or more units. It was shown that the added and reconciled units with a basic street address size of 50 or more units were clustered at the block level. For both added and reconciled units, over 90.0 percent of these housing units with a basic street address size of 50 or more units were in blocks that had 50 or more units added within the same block. It is evident that large multiunit structures pose a problem during the census, and it seems that the Yellow Card Coding operation improved the coverage of these structures at a rate higher than their representation (of large multiunits) in the TAR area housing unit population. Perhaps some special procedures should be tested during the census test cycle to help better identify and geocode these units, and thus continue to improve coverage.

This evaluation showed that the demographic characteristics of the persons enumerated at both yellow card added housing units and reconciled housing units reflect those of the general population and do not seem to be similar to the demographics of PES-identified missed persons.

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PRECENSUS LOCAL REVIEW

Introduction and Background

The Precensus Local Review operation was conducted in January and February 1990 in all mailout/mailback enumeration areas of the nation. The operation provided eligible local government officials the opportunity to review Census Bureau counts of housing units and special places as well as boundary maps to identify any major discrepancies in the counts or maps. These counts were provided to the eligible governmental units prior to the operation and each governmental unit was invited to participate in Precensus Local Review.

The regional census centers were responsible for sending a list of housing unit counts to local officials for each block within their jurisdiction. Local officials had approximately 45 days to review these counts, using local estimates derived from documents such as tax records, utility hookups, or building permits, to identify discrepancies.

During Precensus Local Review, each governmental unit could appoint a representative to review the counts and work with Census Bureau staff to resolve any discrepancies. If the housing unit counts in these governmental units differed from the Census Bureau housing unit counts, the local census liaison informed the Census Bureau of these differences. Census Bureau representatives and local officials worked together to resolve the differences. Some discrepancies were resolved through discussions over the telephone or by consulting other sources. If the discrepancies could not be resolved in the office, then additional field review occurred. For some discrepancies, the Census Bureau recanvassed the block. During the recanvass, an enumerator revisited the block and, using the census address registers, made additions, deletions, or geographic transfers to the listing of housing units in that block.

This section documents such data as governmental unit eligibility and participation in Precensus Local Review, the extent of blocks challenged and recanvassed, the coverage improvement, and the final census occupancy status of added units.

Methodology

The data within this evaluation were supplied from two areas within the Census Bureau. A large portion of the data were obtained from the Address Control File which provided data on the extent of coverage from the operation. Data from the regional census centers was also used in the evaluation. These data summarized the participation of governmental units in Precensus Local Review as well as provided results of recanvassing activities during the operation.

The add rate is defined as the ratio of valid added housing units (units added as a consequence of Precensus Local Review which remained either occupied or vacant when final census counts were issued) to the total number of housing units in mailout/ mailback enumeration areas prior to Precensus Local Review.

Limitations

No attempt is made to determine the extent of overlap between Precensus Local Review and other coverage improvement operations.

Results

Eligibility and Participation of Governmental Units in the Precensus Local Review Operation—Eligibility in the Precensus Local Review operation was limited to governmental units which were located in mailout/ mailback enumeration areas. Governmental units in Update/ Leave enumeration areas were not eligible for Precensus Local Review because the address listings were not available in time. Governmental units in List/ Enumerate areas were not eligible because there was no pre-Census Day address listing. Participation in Precensus Local Review could occur in any one of the following three ways. A governmental unit could respond by:

- 1. Agreeing with the census housing unit counts
- Disagreeing with census housing unit counts, but not providing the Census Bureau with the proper documentation to identify these discrepancies
- Disagreeing with the census housing unit counts and providing the Census Bureau with the proper documentation for identifying the discrepancies.

There were a total of 39,198 governmental units nationwide at the time of the Precensus Local Review operation. Of these 39,198 governmental units, 21,048 (53.7 percent) were eligible to participate in the operation since the governmental units were located in mailout/ mailback enumeration areas. The national Precensus Local Review response rate (that is, the ratio of participating governmental units to eligible governmental units) was 16.3 percent, or 3,440 governmental units participated in Precensus Local Review out of the 21,048 eligible governmental units.

Governmental Units which Challenged Census Housing Unit Counts During the Precensus Local Review Operation—Of the 3,440 governmental units which participated, 2,883 (83.8 percent) challenged (with appropriate documentation) the Census Bureau's housing unit counts (that is, disagreed with the census housing unit count and had proper documentation to identify discrepancies). The remaining 557 (16.2 percent) governmental units either responded by agreeing with the census counts or responded by disagreeing with the census counts but did not have the proper documentation to identify the discrepancies.

Challenged and Recanvassed Blocks From the Precensus Local Review Operation—Nationally, there were slightly more than 4 million blocks in the mailout/ mailback enumeration areas. Of the 4 million blocks, governmental unit officials challenged approximately 121,000 (3.0 percent) blocks.

Of the approximately 121,000 challenged blocks, Census enumerators recanvassed 52 percent of the blocks during Precensus Local Review. The remaining 48 percent of the challenged blocks were not recanvassed because the blocks did not meet the recanvassing guidelines for Precensus Local Review. Recanvassing guidelines for Precensus Local Review stated all blocks within the district office with a housing unit count difference (the governmental unit housing unit count minus the census housing unit count for any challenged blocks) greater than five would be recanvassed during the operation. The district offices also had the option, if time permitted, to recanvass the remaining positive discrepancies and as many negative discrepancies as time permitted.

Added Housing Units From the Precensus Local Review Operation—The Precensus Local Review operation added 367,313 housing units to the national housing inventory. This translates into a 0.43 percent add rate when comparing the number of valid added housing units from the operation to the total number of housing units in mailout/ mailback areas before Precensus Local Review.

Figure 2.12 provides a distribution by State of the respective add rates. The shaded areas are defined by the add rates from Precensus Local Review.

Final Occupancy Status of Precensus Local Review Added Housing Units—Figure 2.13 highlights the final occupancy status rates of Precensus Local Review added housing units at the national and census region levels.

Overall, 69.3 percent of the added housing units from Precensus Local Review remained occupied, 14.6 percent of the added housing units were vacant housing units, and the remaining 16.1 percent of the housing units eventually were deleted by later census operations and/ or activities. The figure reveals that the occupancy status rates from the four regions were consistent with the national rates. Results indicate that the Northeast Census Region had the highest occupied rate at 73.2 percent. The South Census Region had the highest vacant rate at 17.8 percent. Both the Midwest and the South region had a delete rate at 18.1 percent.

Conclusions

Precensus Local Review proved to be a successful coverage improvement operation for those governmental units which elected to participate in the program. This local review program gave local governments an opportunity to update address listings prior to Census Day by comparing Census housing unit counts to their estimated housing unit counts. Overall, the Precensus Local Review operation added 367,313 valid housing units to the Address Control File from all mailout/ mailback enumeration areas nationwide.

With the exception of the lower than expected number of governmental units which participated in the operation, overall results reveal that the Precensus Local Review did an excellent job of improving coverage to the 1990 census final housing unit counts. The results of the operation show that Local Review should continue to play a vital role in improving coverage in future decennial censuses.

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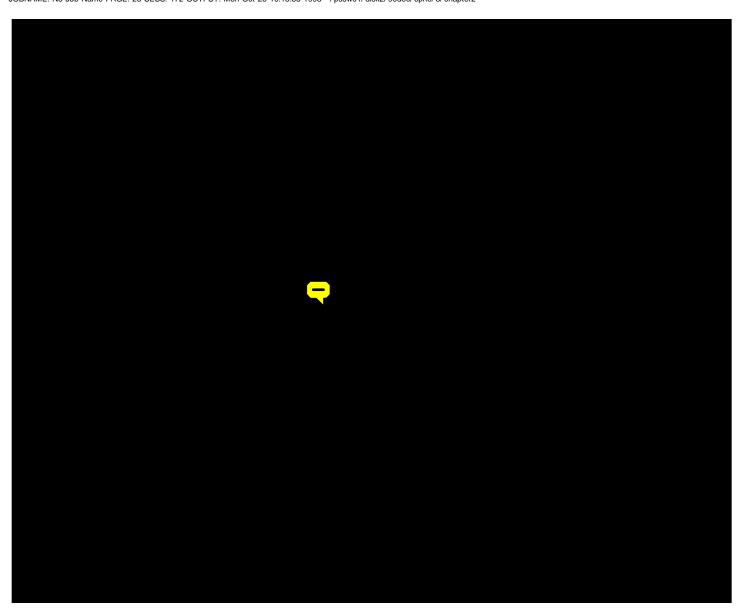
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CASING CHECK

Introduction and Background

The 1990 Casing Check operation was a precensus activity to update the census address file before delivering the census questionnaires. The casing check was done in all TAR and prelist mailout/ mailback areas between February 26, 1990, and March 16, 1990. Casing refers to the sorting process the USPS mail carriers use to put mail in the proper sequence for delivery.





The Census Bureau gave the USPS a form D-701, Census Address Card (buff card), for each address in the census mailout file (see appendix B for a copy of form D-701). The USPS mail carriers cased the buff cards in order to identify the deliverable, duplicate, and undeliverable addresses, as well as to identify residential addresses missing from the census mailout file.

The USPS carriers completed a form D-722, Post Office Report of Missing Addresses (blue card), for each residential address missing a buff card (see appendix B for a copy of form D-722). All blue card addresses were checked in the district offices or in the field to determine if the addresses were missing from the census address file and were valid residential units. The district offices labeled and mailed census questionnaires to the missing addresses if they were processed early; addresses not sent a census questionnaire were enumerated during the Nonresponse Followup operation.

Methodology

The intent of the Casing Check evaluation was to measure the results in terms of coverage yield. Information from the USPS and tabulations from the Census Bureau's data files provided the data for most of the analysis. The remainder of the data came from clerical tabulations of a sample of the duplicate and undeliverable buff cards and the blue cards. There were five separate samples:

- 1. Buff Cards-Duplicates: Buff cards annotated only with "D," "Dup," or "Duplicate."
- 2. Buff Cards-Undeliverables with annotations: Undeliverable buff cards annotated with something other than "D," "Dup," "Duplicate."
- Blue Cards-Matches: Blue Cards with the "Match" box marked.
- 4. Blue Cards-Ungeocoded: Blue Cards without a district office code, address register number, and block number.
- 5. Blue Cards-Adds: Blue cards with the "Add" box marked.

Samples 1 through 4 were selected using a systematic sampling scheme; that is, separate "start with" and "take every" numbers were generated for each sample. For the fifth sample, Blue Cards-Adds, five add cards were purposively selected from each district office. If there were five or fewer blue card adds from the district office, all the cards were included in the sample. Table 2.11 presents the samples and their respective sample sizes.

Limitations

Results pertaining to casing adds are based on data that were extracted from the Census Bureau files using the source code variable. Other research has suggested the existence of errors in the assignment of the source codes. However, the extent of the error is not known.

The number of blue cards may underestimate the number of casing adds because 1 blue card could contain up to 12 separate unit designations.

The count of duplicates may also be underestimated because of clerical errors annotating the duplicate buff cards.

Table 2.11. Sample of Buff and Blue Cards

Type of address card	Estimated cards	Sample size
Buff cards: Duplicates Undeliverables	535,830 74,214	2,022 1,767
Blue cards: Matches Ungeocoded Adds	766,800 259,400 1,679,380	2,556 2,594 2,115

Since detailed information on casing undeliverables was not available, the Postmaster Return indicator from the Census Bureau's files was used as a proxy for the casing data on undeliverables. As a result, the count of undeliverables may be overstated because of errors in using the indicator. In addition, the count of casing deliverables was derived by subtracting the count of undeliverables and duplicates from the count of buff cards sent to casing.

Because some of the duplicates, undeliverables, and blue cards were lost, the Census Bureau and the USPS counts of these cards were different. Also, because of the missing cards, all of the district offices may not be represented in the sample.

At the time this publication went to print, only preliminary results from the Casing Check evaluation were available. Final results may differ from those presented in this section.

Results

USPS—The Census Bureau sent approximately 83,855,000 buff cards to the USPS for casing. As shown in table 2.12, the USPS considered about 93.9 percent as deliverable; 1.3 percent as duplicates of another buff card; and 4.8 percent as undeliverable as addressed.

Characteristics of the Added Units—It is interesting that approximately 23.3 percent (931,097/3,988,818) of the blue cards completed by the USPS were added to the census files. This may indicate that many of the blue card addresses already existed in the files; could not be assigned a district office number, an address register area number, and a block number; or were not valid residential units.

Of the approximately 931,097 housing units added to the census address file from casing, about 47.0 percent were in TAR areas and 53.0 percent were in prelist

Table 2.12. Results of Casing as Reported by the USPS

USPS status of buff cards	Number	Percent
Total	83,855,000	100.0
Deliverable	78,751,180 1,070,781 4,033,039	93.9 1.3 4.8

Table 2.13. Housing Units Added by Casing

	Type of enumeration area					
Tenure		TAR			elist mailback	
	Total	Number	Percent	Number	Percent	
Total	931,097	437,329	100.0	493,768	100.0	
Owner	531,962 269,660 129,475	193,787 176,868 66,674	44.3 40.4 15.3	338,175 92,792 62,801	68.5 18.8 12.7	

JOBNAME: No Job Name PAGE: 25 SESS: 173 OUTPUT: Mon Oct 25 10:15:55 1993 /pssw01/disk2/90dec/cphe/3/chapter2

mailout/ mailback areas. More owner-occupied units were added in prelist mailout/ mailback areas than in TAR areas, but the opposite was true for renter-occupied units. Of the units added in TAR areas, 44.3 percent were owner-occupied and 40.4 percent were renter-occupied; compared to 68.5 percent and 18.8 percent, respectively, in prelist mailout/ mailback areas. The percentage of vacant units was similar in both types of enumeration areas.

As shown in table 2.14, 99.3 percent of the TAR adds had a city delivery address. The majority of the adds had a basic street address size of one unit, 55.8 percent and 64.0 percent for city delivery and noncity delivery, respectively. The size of the basic street address was not collected in the 1990 census as a data item and does not reflect the final census count of units in structure. It is presented only as an indicator of single units and of multiunit structures.

Table 2.15 shows information for added units in prelist mailout/ mailback areas. Of the 493,768 added units, 85.6 percent were for city delivery addresses and 14.4 percent were for noncity delivery addresses. Information on basic street address for prelist mailout/ mailback areas was not available from the census files.

Reasons for Undeliverable Buff Cards—Table 2.16 presents an estimated count of the undeliverables and the reasons addresses were undeliverable. The reasons were provided by the USPS carriers; if the carrier provided more than one reason, the first reason given was considered the primary reason. Of the estimated 74,214 undeliverables over half (60.2 percent) had "No Such Address" as the reason the USPS could not case the buff cards. The next highest category was "Other Reasons" with 34.2 percent;

Table 2.14. Type of Address and BSA for TAR Adds

Type of address and size of basic street address	Number	Percent
Total	437,329	100.0
City delivery	434,455	100.0 (99.3 percent of total)
1 unit	242,522	`
2 to 9 units	82,649	19.0
10 to 19 units	25,208	5.8
20 units or more	84,076	19.4
Noncity delivery	2,874	100.0 (0.7 percent of total)
1 unit	1,838	64.0
2 to 9 units	135	4.7
10 to 19 units	116	4.0
20 units or more	785	27.3

Table 2.15. Type of Address for Prelist Mailout/ Mailback Adds

Type of address	Number	Percent
Total	493,768	100.0
City delivery Noncity delivery	422,744 71,024	85.6 14.4

Table 2.16. Casing Undeliverables

Reasons for undeliverables	Number	Percent	Standard error
Total	74,214	100.0	-
Undeliverables: No such address	44,688 1,680 168 2,268 25,410	60.2 2.3 0.2 3.1 34.2	1.16 0.04 0.10 0.41 1.13

this included reasons such as "Unclaimed," "Undeliverable," "Addressee Unknown," and "No Mail Receptacle."

The data are based on a sample of the undeliverable buff cards discussed earlier under Methodology.

Conclusions

Of the 3,988,818 blue cards completed by the USPS, 23.3 percent were added to the census address file which resulted in a coverage gain of about 0.7 percent in TAR and 1.7 percent in prelist mailout/ mailback areas.

The preliminary results indicate that the casing check is an important tool for updating the census address file. It helped improve the coverage of city delivery addresses in TAR and prelist mailout/ mailback areas.

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CHAPTER 3. Questionnaire Delivery and Enumeration

RURAL UPDATE/LEAVE

Introduction and Background

For the 1990 decennial census, about 38 million residential addresses were obtained by Census Bureau enumerators prior to questionnaire delivery during a canvassing operation called Prelist. During Prelist, enumerators canvassed their assigned areas, listed each address in a register, and spotted each living quarters on a map. If the enumerators could not obtain a complete mailing address for a living quarters, they recorded a location description for the unit.

The Prelist was conducted in two phases. The first phase, known as Prelist Mailout/ Mailback, was conducted from June 1988 through January 1989, primarily in small cities and suburban areas containing city type addresses (house number and street name). Addresses listed during the first phase were enumerated using the mailout/ mailback methodology since, in general, city type addresses are recognized by the USPS as mailing addresses.

The second phase, known as Prelist Update/Leave, was conducted from June through September, 1989 in small towns and rural areas in the South and Midwest where the Census Bureau anticipated problems with the postal delivery of census questionnaires. The majority of the addresses in the Prelist Update/Leave area were rural type addresses. These addresses were later enumerated using the Update/Leave methodology. The Update/Leave methodology called for enumerators to deliver the questionnaires; respondents were responsible for mailing them back.

For the Update/ Leave operation, the enumerators were supplied with prelabeled census questionnaires for each housing unit listed in the address register. The enumerators canvassed census blocks in a clockwise direction, verified address information by brief interviews, and delivered the appropriate questionnaire (short or long form). For each housing unit that they verified as being missing from the address register, the enumerators hand addressed the appropriate blank census questionnaire. For each housing unit at which no one was home, the enumerators were instructed to leave the questionnaire in a safe and secure place.

In addition, the Update/ Leave enumerators updated the address list by adding, deleting, or transferring listings in the address register, as necessary. In conjunction with updating address information, the enumerators were instructed to update and make corrections to the original Prelist maps.

Methodology

The Update/ Leave add rate is defined as the number of addresses added during Update/ Leave with a final status of occupied or vacant divided by the number of addresses in the Census Bureau's files following the Prelist operation (including deletes).

Limitations

Results pertaining to Update/Leave adds are based on data that were extracted from Census Bureau files using the source code variable. Other research has suggested the existence of errors in the assignment of Update/Leave add source codes. However, the extent of the error is not known.

The number of Prelist addresses in table 3.1 is slightly less than that which is presented in the section on the Prelist/ Update Leave operation in chapter 2, due to processing office file maintenance and the exclusion of special places and clusters; that is, living quarters not accessible at the time of Prelist.

Results

Table 3.1 shows Update/Leave coverage improvement results for the regional census centers including all units added by enumerators during Update/Leave and adds remaining on the files after final deletes (true adds).

Table 3.1 shows that 399,404 Update/ Leave addresses were added to and remained on the census file, which resulted in a national increase of 4.0 percent to the Prelist

Table 3.1. Update/ Leave Coverage Improvement Results

Regional			Adds Deleted after Update/ Leave		True adds (not deleted)		
Census Center	Prelist addresses	Update/ Leave adds	Volume	Per- cent of adds	Volume	Per- cent of Prelist	
Detroit	446,163	19,979	1,518	7.6	18,461	4.1	
Chicago	70,010	2,588	159	6.1	2,429	3.5	
Kansas City	2,458,611	68,743	4,285	6.2	64,458	2.6	
Charlotte	3,250,572	176,971	18,608	10.5	158,363	4.9	
Atlanta	1,617,280	85,065	7,834	9.2	77,231	4.8	
Dallas	2,124,026	84,660	7,412	8.8	77,248	3.6	
Denver	53,458	1,254	40	3.2	1,214	2.3	
Total	10,020,120	439,260	39,856	9.1	399,404	4.0	

file. Note that the Charlotte and Atlanta Regional Census Centers had the two highest add rates among Update/ Leave regional census centers. In addition, the Charlotte and Atlanta Regional Census Centers had the two highest rates of building permits issued for new, privately-owned housing units in 1989 among the seven regional census centers shown in table 3.1. These data suggest that the Charlotte and Atlanta Regional Census Centers contained areas of high growth.

The Update/ Leave enumerators added 439,260 addresses to the original 10,020,120 Prelist addresses (4.4 percent before final deletes). Of these adds, 39,856 (9.1 percent) were later deleted from the census as erroneous adds. A unit was considered a final delete if it was deleted during the Field Followup operation.

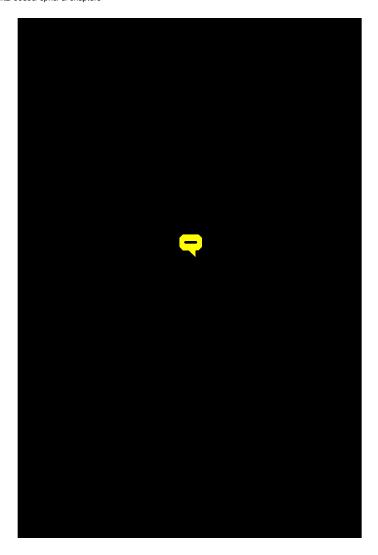
Approximately 50 percent of the erroneous adds were classified as no-such-unit and 32 percent were classified as duplicates. Of the remaining erroneous adds, 7 percent were demolished, condemned, or unclassified, 6 percent were "open to the elements," 3 percent were businesses, and 2 percent were whole special places already on the Census Bureau's files.

Comparison of Rural Addresses in the Update/Leave and Prelist Mailout/Mailback Areas—Figure 3.1 illustrates the differences between the Update/Leave and Prelist Mailout/ Mailback areas in proportion of rural addresses for each regional census center. Rural type addresses include Rural Route and box number addresses, Highway Contract Route, Star Route, Post Office Box, and General Delivery addresses.

Figure 3.1 shows that the Prelist Update/ Leave areas were predominately rural type addresses whereas the Prelist Mailout/ Mailback areas were primarily composed of city type addresses, that is, house number and street name addresses. The proportion of rural addresses shown in figure 3.1 are based on the volume of Prelist addresses. At the national level, 69.1 percent of the Prelist Update/ Leave addresses were rural, compared to 24.2 percent rural addresses for the Prelist Mailout/ Mailback area.

Comparison of Vacancy Rates in the Update/Leave and Prelist Mailout/Mailback Areas—Figure 3.2 illustrates the differences between the Update/Leave and Prelist Mailout/Mailback areas in vacancy rates for each regional census center. The vacancy rate is the proportion of valid census units verified during Field Followup as vacant on Census Day.

For the seven regional census centers shown in figure 3.2 that contain both Update/Leave and Prelist Mailout/Mailback units, the vacancy rates for the Update/Leave area are higher than the vacancy rates for the Prelist Mailout/Mailback area, with the exception of the Atlanta Regional Census Center (the Update/Leave vacancy rate is one percentage point lower than the Prelist Mailout/Mailback vacancy rate in the Atlanta Regional Census Center). The Update/Leave area had an overall vacancy rate of 13.5 percent, compared with the 9.4 percent rate for the Prelist

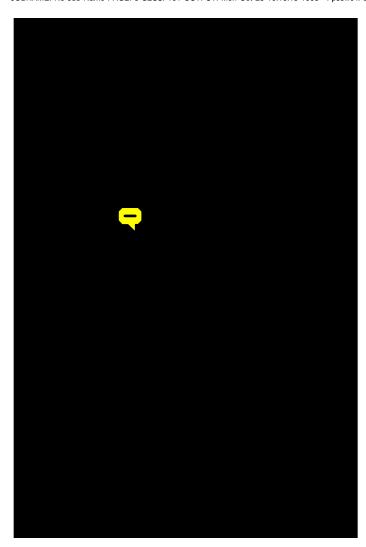


Mailout/ Mailback area. The New York Regional Census Center had the highest Prelist Mailout/ Mailback vacancy rate, which suggests that some of the 235,095 Prelist Mailout/ Mailback units in this regional census center should probably have been included in Update/ Leave.

Vacant addresses may be less recognizable to postal carriers than addresses for occupied units since the USPS generally does not deliver mail to vacant housing units. Based on this assumption, it appears that the Census Bureau generally did a good job of determining which areas should be enumerated using the Update/Leave methodology in lieu of a Mailout/Mailback census.

Comparison of Incomplete Addresses in the Update/ Leave and Prelist Mailout/ Mailback Areas—Figure 3.3 illustrates the differences between the Update/ Leave and Prelist Mailout/ Mailback areas in proportion of Prelist addresses that the Census Bureau classified as incomplete for each regional census center.

During Prelist, the enumerators were sometimes unable to obtain complete addresses. In some cases, the enumerator could not obtain a complete address for a vacant unit or could not find a knowledgeable respondent to provide a complete address for a unit where the occupant was



unavailable. These addresses were flagged as incomplete during processing using a computer algorithm. This algorithm identified Prelist addresses missing certain items that the Census Bureau determined as necessary for USPS questionnaire delivery, such as house number or rural route number.

The incomplete addresses for the Prelist Mailout/ Mailback area were not sent to the APOC since they were presumably undeliverable. The APOC is the first postal check on the Prelist Mailout/ Mailback address list. The algorithm was applied to Prelist addresses in the Update/ Leave area even though the USPS was not involved in questionnaire delivery.

Note that the data in figure 3.3 do not include addresses with only location descriptions since this type of address was considered acceptable during the 1989 Prelist operation

Figure 3.3 shows that in the regional census centers with both Prelist Update/ Leave and Prelist Mailout/ Mailback, the Update/ Leave areas had a consistently higher percentage of incomplete addresses than the Prelist Mailout/ Mailback areas. Overall, 21.2 percent of the Prelist addresses for the Update/ Leave area were incomplete, compared to 3 percent for the Prelist Mailout/ Mailback area.

Conclusions

The Update/Leave enumerators did a good job of updating the 1989 Prelist address list and delivering over 10 million questionnaires. The enumerators added 399,404 valid addresses, which resulted in a 4.0 percent increase.

The high proportion of incomplete Prelist addresses (not including those with only location descriptions) for the Update/ Leave area, along with the high proportions of vacant units and rural addresses, suggest that the Census Bureau accurately identified areas of potential USPS questionnaire delivery problems in delineating the Update/ Leave area.

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URBAN UPDATE/LEAVE

Introduction and Background

The Urban Special Enumeration has two separate components, Urban Update/ Leave and Urban Update/ Enumerate. The Urban Update/ Leave procedures were developed to address potential questionnaire delivery problems in many of the nation's urban areas. This enumeration methodology was implemented within preidentified census blocks consisting almost entirely of inner city public housing developments containing 500 or more units. Census blocks meeting the criteria, especially those containing units with small or broken mail receptacles, were identified by the regional census centers with input from inner city housing authorities.

An integral part of Urban Update/Leave was the outreach program, which provided direct and detailed information to the targeted population. The effort included hiring residents of housing developments to distribute census literature and brochures and to place census posters in high visibility areas of the developments. The outreach staff attended tenant association meetings, local church group meetings, and other local gatherings to raise tenant awareness and answer questions about how the census data would benefit them and their community.

The Urban Update/ Leave operation began on March 8, 1990 and was completed by Census Day, April 1, 1990. Blocks that were part of the Urban Update/ Leave were printed on address registers and enumerators were given precanvass maps. At each address, the enumerator conducted a brief interview to verify the address. Based on this information, the enumerator made corrections to the address register and annotated questionnaires for all deleted units. Respondents were given a prelabeled questionnaire to complete and return to the processing office. For addresses not in the register, the enumerator addressed a blank label questionnaire. Questionnaires followed the same processing route as TAR questionnaires, except those from Los Angeles District Office 3230, which were processed in the district office.

When the Urban Update/Leave workload file was produced for the questionnaire mailing package vendor, some Urban Update/Leave areas were erroneously included in the TAR listings. This problem was twofold in that the district offices were unable to retrieve their missing Urban Update/Leave questionnaires from the Post Offices and the district offices did not have a sufficient supply of blank questionnaires for the units that were missing questionnaires. Based on Census Bureau Headquarters staff observations, many units never received questionnaires during

the Urban Update/ Leave operation since the district offices were unable to obtain additional blank questionnaires in time for delivery by the enumerators.

Urban Update/Leave was conducted in 346 census blocks in Chicago, Detroit, Los Angeles, Baltimore, Cleveland, and Philadelphia, all of which were TAR areas.

Methodology

To assess the effectiveness of the Urban Update/ Leave compared to the TAR mailout/ mailback, whole blocks were chosen from TAR areas as a control group to which the Urban Update/ Leave methodology could be compared.

Initially, New York City and the District of Columbia were included in the Urban Update/Leave workload but their regional census center directors chose to exclude the cities from special urban enumeration procedures. Blocks in these cities that were originally selected for the special urban operation were chosen as the Urban Update/Leave control group.

The mail return rate is defined as the ratio of the number of households that returned a questionnaire by mail to the number of occupied units that should have received a questionnaire by mail or through delivery by an enumerator.

Limitations

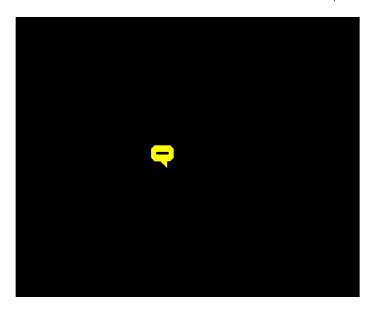
Although the Urban Update/ Leave procedure was intended for inner city public housing developments containing 500 or more units, only 77.2 percent of the units in the Urban Update/ Leave area were in multiunit structures, 20.7 percent were single units, and 2.1 percent were classified as other types of units, such as a basement apartment. Thus definitive conclusions cannot be made about the effectiveness of Urban Update/ Leave in public housing developments based on the data presented in this memorandum.

Conclusions about the Urban Update/ Leave methodology versus the TAR mailout/ mailback enumeration methodology based on comparisons of results from Urban Update/ Leave areas and the control group should be made with caution, considering the limitations inherent in the method used to select the control group.

No data for added units are presented in this evaluation due to problems identifying Urban Update/Leave adds. Since special urban enumeration adds are not distinguished from other address listings on the Address Control File, an attempt was made to extract add data directly from the Urban Update/Leave address registers. However, only 17 address registers from 346 blocks in the Urban Update/Leave workload could be located at the time of the evaluation.

Results

Urban Update/Leave Area Profile—Figure 3.4 shows the types of structures in the Urban Update/Leave blocks within each city. These data are tabulated responses to



question H2 on the census questionnaire, "Which best describes this building?" Figure 3.4 shows only housing units with a final status of occupied or vacant.

In figure 3.4, single units include one-family detached units, one-family attached units, trailers, and mobile homes, as described on the questionnaire. Multiunit structures are buildings with two or more apartments.

In the Urban Update/Leave area, Chicago, Cleveland and Los Angeles have the highest proportions of multiunit structures (93.7 percent, 90.9 percent and 87.3 percent, respectively). Baltimore has the lowest percentage of multiunit structures (53.3 percent) in the Urban Update/Leave area.

In the Urban Update/Leave area, 20.7 percent are single units compared to 2.1 percent for the Urban Update/Leave control group, although the Urban Update/Leave procedure was originally intended for inner city blocks consisting almost entirely of multiunit housing developments.

Figure 3.5 presents the vacancy rates for the Urban Update/ Leave and Urban Update/ Enumerate areas within each city. Figure 3.5 contains only housing units with a final status of occupied or vacant.



As shown in figure 3.5, the vacancy rates vary considerably among cities containing Urban Update/ Leave blocks. Detroit had the highest vacancy rate (53.7 percent) compared to Los Angeles, which had the lowest vacancy rate (3.3 percent).

The proportion of vacant units in the Urban Update/ Leave area (27.1 percent) was substantially higher than the proportion for the Urban Update/ Leave control group (2.4 percent). The method by which the Urban Update/ Leave control group was chosen may explain these large differences in vacancy rate and characteristics of vacant units.

Figure 3.6 shows race distribution in Urban Update/ Leave areas within each city.

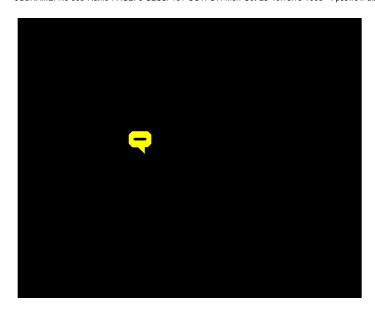
Figure 3.6 shows that Urban Update/Leave blocks in Los Angeles have the most even distribution of Black (31.6 percent), White (30.1 percent), and non-Black minority persons (38.3 percent) compared to Urban Update/Leave areas within other cities. The Urban Update/Leave blocks in Chicago contain the highest proportion of Black persons at 98.8 percent.

The majority of the persons in the Urban Update/Leave area were Black (88.4 percent), while only a small percentage of the persons were White or classified as non-Black minority (6.9 and 4.7 percent, respectively). The Urban Update/Leave control group contained a higher proportion of White and non-Black minority persons (16.6 and 23.8 percent, respectively) than the Urban Update/Leave area. In addition, approximately 5.6 percent of persons in the Urban Update/Leave areas were of Hispanic origin compared to 36.8 percent for the control group.

Mail Return Rates—Figure 3.7 shows mail return rates for Urban Update/ Leave areas in six cities, as well as the control group which is comprised of blocks in the District of Columbia and New York.

Figure 3.7 shows the highest mail return rate for Urban Update/Leave areas in Detroit (65.4 percent) and the lowest for Philadelphia (40.8 percent). Overall, the mail return rate for the Urban Update/Leave areas was 51.5





percent compared to 61.7 percent for the Urban Update/ Leave control group. Results were similar for the shortform and long-form mail return rates. In Urban Update/ Leave areas, the short form rate was 52.4 percent and the long form rate was 47.5 percent. For the control group, the short form and long form mail return rates were consistently higher at 62.5 and 56.9 percent, respectively.

Lower mail return rates in the Urban Update/ Leave area may be due in part to the lack of available blank question-naires for housing units that did not have vendor-labeled questionnaires because of a questionnaire distribution problem. This problem affected the entire Urban Update/ Leave area and was not clustered in certain district offices. In addition, differences between the Urban Update/ Leave area and the control group for race distribution and the proportions of single versus multiunit stuctures may have affected mail return rates.

Conclusions

The mail return rate for the Urban Update/ Leave areas was 51.5 percent compared to 61.7 percent for the Urban Update/ Leave control group. Lower mail return rates in the Urban Update/ Leave area may be due in part to the lack of available blank questionnaires for housing units that did not have vendor-labeled questionnaires because of a questionnaire distribution problem. In addition, conclusions about the Urban Update/ Leave mail return rate versus the mail return rate for the TAR mailout/ mailback control group should be made with caution considering the inadequacies in identifying the target population and the limitations inherent in the method used to select the control group.

Based on Census Bureau Headquarters staff observation reports, conducting Urban Update/Leave in densely populated, urban housing projects ensured the delivery of the appropriate questionnaire to the correct unit, which greatly reduced apartment mixup problems. However, many of the areas where the Urban Update/Leave enumerators were working were dangerous; enumerators worked in groups of two or more. Staff members reported that the enumerators were resourceful and conscientious during Urban Update/ Leave, despite difficult working conditions.

The outreach program in the Urban Update/ Leave area appeared to be successful, based on Headquarters staff reports. The program increased awareness of and enthusiasm toward the 1990 census. Outreach program staff reportedly received positive responses from the communities in which the Urban Update/ Leave outreach was conducted.

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URBAN UPDATE/ENUMERATE

Introduction and Background

The Urban Special Enumeration has two separate components, Urban Update/ Leave and Urban Update/ Enumerate. The Urban Update/ Enumerate procedures were developed to field verify the occupancy status of concentrated areas of boarded up units, thus eliminating the Field Followup vacant/ delete check, and to enumerate persons living in these structures who might otherwise be missed by the 1990 census. This procedure was used in selected cities to enumerate pre-identified whole census blocks of boarded up, presumably vacant units.

The Urban Update/ Enumerate operation was conducted around Census Day. During Urban Update/ Enumerate, enumerators canvassed their areas, returned completed

questionnaires for any occupied and vacant units, and completed a deletion record for each deleted unit. Questionnaires followed the same processing route as TAR mailout/mailback questionnaires, except that Urban Update/ Enumerate questionnaires were excluded from Telephone Followup, Nonresponse Followup, and the Field Followup vacant/ delete check.

Urban Update/ Enumerate was conducted in 96 blocks in Detroit and New York City.

Methodology

Since the Urban Update/ Enumerate operation was conducted in whole blocks, the results presented in this publication are based on questionnaire level data for each housing unit within an Urban Update/ Enumerate block.

Limitations

Although the Urban Update/ Enumerate procedure was intended for blocks consisting entirely of boarded up units, the regional census centers experienced problems in accurately identifying blocks that met this criterion. In New York, census staff selected blocks by driving around areas that presumably consisted of boarded up housing developments. Although the blocks contained what appeared to be vacant, boarded up units, only 8.3 percent of the vacant units were boarded up. In Detroit, census staff selected blocks in which units were to have been vacated in preparation for the building of an airport in one address register area and an automobile manufacturing plant in another address register area. Due to a delay in these construction projects, many of the units were still occupied on Census Day; only 21.3 percent of the vacant units in these blocks were boarded up.

Since only 10.4 percent of the vacant units in the Urban Update/ Enumerate were boarded up and 86.5 percent of all units were occupied on Census Day, definitive conclusions cannot be made regarding the effectiveness of this special enumeration procedure in areas consisting almost entirely of boarded up housing units.

No data for added units is presented in this evaluation due to problems identifying Urban Update/Enumerate adds. Since special urban enumeration adds are not distinguished from other address listings on the Address Control File, an attempt was made to extract add data directly from the Urban Update/Enumerate address registers. However, address registers for only one of the 96 blocks in the Urban Update/Enumerate workload could be located at the time of the evaluation.

Results

The Urban Update/Enumerate area in New York City was almost completely composed of multiunit structures (99.7 percent), whereas only 37.3 percent of the Detroit housing units were multiunit structures. These data are

tabulated responses to question H2 on the census questionnaire, "Which best describes this building?" The results describe only housing units with a final status of occupied or vacant. Multiunit structures are buildings with two or more apartments, whereas single units include one-family detached units, one-family attached units, trailers and mobile homes, as described on the questionnaire.

Overall, 10.9 percent of the structures in the Urban Update/ Enumerate area were single units.

The vacancy rate for Urban Update/ Enumerate blocks in Detroit (12.9 percent) is comparable to the vacancy rate for New York Urban Update/ Enumerate blocks (13.6 percent). The data are based on housing units with a final status of occupied or vacant.

The overall proportion of vacant units that were boarded up in the Urban Update/ Enumerate area was 10.4 percent, although this proportion should have exceeded 95 percent by definition.

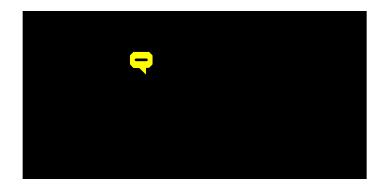
Figure 3.8 shows race distribution in Urban Update/ Enumerate areas within each city. For the Urban Update/ Enumerate areas, the proportion of Black persons in Detroit (88.6 percent) is comparable to New York (91.4 percent), although the proportion of White persons in the Detroit blocks (9.8 percent) is higher than New York (2.2 percent) and the proportion of non-Black minority persons in the Detroit blocks (1.6 percent) is lower than New York (6.4 percent).

Overall, the Urban Update/Enumerate area contained 90.8 percent Black persons and approximately 7.6 percent of the persons in the Urban Update/Enumerate area were of Hispanic origin.

Conclusions

The Urban Update/Enumerate was not conducted in blocks consisting entirely of boarded up units, as was the original intent.

Since only 10.4 percent of the vacant units in the Urban Update/ Enumerate were boarded up and 86.5 percent of all units were occupied on Census Day, definitive conclusions cannot be made regarding the effectiveness of this special enumeration procedure in areas consisting almost entirely of boarded up housing units.



References

[1] 1990 Decennial Census Information Memorandum No. 95, "Operation Requirements Overview—1990 Urban Enumeration." U.S. Department of Commerce, Bureau of the Census. November 8, 1988.

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POSTMASTER RETURN QUESTIONNAIRE DELIVERY

Introduction and Background

The Postmaster Return Questionnaire Delivery operation was an effort by the district offices to deliver census questionnaires. These questionnaires were for addresses identified as undeliverable by the USPS. This project occurred in April 1990 before the Nonresponse Followup operation. Low mail response rates and a high postmaster return questionnaire rate prompted the decision by the Census Bureau to conduct the Postmaster Return Questionnaire Delivery operation.

The operation required the district office staff to attempt to deliver questionnaires that the USPS did not deliver. For the purpose of discussion, "undelivered questionnaires" are postmaster return questionnaires that both the USPS and the district offices were unable to deliver. The district offices attempted to collect all of the postmaster return questionnaires. The district offices were instructed to identify postmaster return questionnaires by geographic area and to get the address listing pages (forms D-108A, see appendix B) for these areas. The postmaster return questionnaires were geographically grouped by ZIP Code or address register area. The district offices furnished the enumerators with postmaster return questionnaires and the corresponding address listing pages. The enumerators were to use the address listing pages to check off each address to which they delivered a postmaster return questionnaire and to mark on the address listing pages if the housing unit was vacant, demolished, or nonexistent [6]. The district offices implemented these procedures to try to increase the mail response rate and thus reduce the nonresponse followup workload. The evaluation of the Postmaster Return Questionnaire Delivery operation is divided into the following three separate components:

Stage I District office survey

• Stage II Undelivered questionnaires

Stage III Address listing pages—forms D-108A

Methodology

District Office Survey—Immediately after the Postmaster Return Questionnaire Delivery operation, the Census Bureau requested each district office to complete and return a

Postmaster Return Questionnaire Delivery project survey (see appendix B). The goals of the survey were to determine how the district offices conducted the operation, to obtain estimates of the workloads, and to determine what materials were available for further analysis. The survey requested information on:

- the number of postmaster return questionnaires received, assigned, and delivered and
- anecdotal information from the district office staff about the reasons for undeliverability.

The results of the survey were examined to fulfill the goals of the Stage I evaluation and to plan for Stage II and Stage III.

Undelivered Questionnaires—After the district offices completed the operation, the undelivered questionnaires were examined. The undelivered questionnaires were stored in cartons on 659 pallets. For the postmaster return questionnaire evaluation, a 10- percent systematic sample of the 659 pallets of undelivered questionnaires was selected. From the 66 sample pallets, 8 cartons of undelivered questionnaires from each pallet were selected with equal probability. This resulted in a total of 528 cartons of undelivered questionnaires for the Stage II evaluation sample processing. The USPS undeliverability reason was annotated on the questionnaire by the postal carrier. The undelivered questionnaires were sorted by the USPS undeliverability reason.

Once the undelivered questionnaires were sorted and batched by USPS undeliverability reason, the batches were sent for data entry. The Census Bureau estimated totals, percents, and sampling variances for each of the USPS undeliverability reasons by final census status and type of enumeration area. The sampling variances were calculated using jackknife replication. Tests for significance were calculated for $\alpha = 10$ percent.

Address Listing Pages—The only available records for assessing the delivered universe were the address listing pages. A review of a sample of the address listing pages and data from the district office survey led the Census Bureau to conclude that they were a reliable source. Therefore, the address listing pages were examined. A total of 187 cartons of address listing pages were reviewed. All the address listing pages having any annotations were pulled for further review. The census ID numbers corresponding to delivered and undelivered postmaster return questionnaires were coded and later keyed. The codes summarized the district office reasons for undeliverability and not the USPS reasons for undeliverability.

The mail response rate was calculated in order to estimate the increase in mail response due to the delivery of the postmaster return questionnaires. For the mail response rate, the denominator is the count of postmaster return ID numbers annotated on an address listing page as having been delivered as a result of this operation. The

numerator includes all of these ID numbers that were checked in on or before May 3, 1990. Additional data allowed the Census Bureau to profile, for the delivered ID numbers, the type of enumeration area and the final census status.

Limitations

District Office Survey—Conclusions about the reasons for USPS undeliverability for delivered postmaster return questionnaires must be based on the district office staff's recollection and any records maintained.

Two of the district offices contained no mailout areas. Therefore, it was impossible for these two district offices to have any postmaster return questionnaires. Thus, the two district offices were removed from the analysis. After removing the two district offices, 410 of the 447 district offices responded to the survey. The figures are not weighted to account for the 37 nonresponding district offices. The nonresponding district offices could distort the data distributions slightly; however, the totals represent lower bounds for each category.

The postmaster return questionnaire rates may understate the scope of the USPS delivery problems. The rates are calculated as a ratio of the postmaster return questionnaires to the total housing counts. The postmaster return questionnaires were only in mailout areas; TAR areas and prelist mailout/mailback areas. The denominator of the ratio included housing counts for all areas, including non-mailout areas.

Undelivered Questionnaires—The Census Bureau can determine the USPS undeliverability reason for only the postmaster return questionnaires that were **not** delivered by the district offices.

After the sample was selected, the questionnaires were sorted by USPS deliverability reason. At that time the information that connected the questionnaire to the sampling unit (pallet and box) was lost. This is not a problem at the first stage, as each pallet had an equal probability of selection. This is a problem at the second stage, due to variation in the number of boxes per pallet. Therefore, there was not a way of computing the second stage sample weights in strict accordance with the sample design. Several possible solutions to the problem were investigated. Based on the investigation, the average of the second stage weights was used.

There were some questionnaires in the boxes for nonmailout areas which were included in the sample. These questionnaires were removed from the analysis since they were not part of the mailout universe.

The count estimates are rounded to the nearest thousand; however, the unrounded values were used when calculating the percentages.

The ID number was not obtained for approximately 900 questionnaires. These questionnaires were probably for addresses added as a result of an operation such as

casing or telephone questionnaire assistance. We did not include these questionnaires in the evaluation. This represented about 0.7 percent of the sampled universe.

Address Listing Pages—The analysis only reflects data from the address listing pages shipped to the processing office. In addition, the district offices might not have correctly annotated the address listing pages. Based on the Stage I analysis (the district office survey) we estimated that between 1.5 million and 2.4 million postmaster return questionnaires were delivered. The data from Stage III represent less than 80,000 cases. Some of the address listing pages may have been shipped erroneously to the regional census centers or destroyed. Therefore, the analysis of the address listing pages is able to identify only a minority of the delivered postmaster return questionnaires.

The evaluation universe does not equally represent all parts of the country. Annotated address listing pages were received from all regional census centers with the exception of New York. A closer look at this universe indicates that only 34 district offices provided address listing pages that identified one or more delivered postmaster return questionnaires. The data should be fairly representative of those 34 district offices. Even though the evaluation universe does not equally represent all parts of the country, the distribution of delivered postmaster return questionnaires with a final census status of occupied or vacant by district office type is close to the national figures. Caution should be used when constructing profiles of the universe of delivered and undelivered postmaster return questionnaires from these data. The true universe of delivered and undelivered postmaster return questionnaires may be quite different.

Results

District Office Survey—The objectives of the district office survey are classified into two areas: first, to quantify the scope of the postmaster return questionnaire workload; and second, to facilitate planning the Stage II and Stage III evaluations.

Postmaster Return Questionnaire Workload—Approximately 45.9 percent, 41.2 percent, and 42.9 percent of the responding district offices provided the actual number of postmaster return questionnaires received, assigned, and delivered, respectively. The remaining district offices checked a range value. Based on these results we estimate that between 5.4 and 7.6 million postmaster return questionnaires were received, between 3.1 and 4.3 million postmaster return questionnaires were assigned for delivery, and between 1.5 and 2.4 million postmaster return questionnaires were delivered.

Table 3.2 shows the district office level distribution of the received, assigned, and delivered postmaster return questionnaires. Of the 410 responding district offices, 95 (23.2 percent) received between 20,001 and 50,000 postmaster return questionnaires. Only four district offices (1.0

Table 3.2. Distribution of Postmaster Return Questionnaires

Number of postmaster	Number of district offices				
return questionnaires	Received	Assigned	Delivered		
None	63 95 4 1	5 36 100 106 64 48 41 1 5	0 122 141 71 33 18 9 0 5		
Total	410	410	410		

percent) received more than 50,000 postmaster return questionnaires. The majority of the responding district offices received 15,000 or less postmaster return questionnaires.

Of the 410 responding district offices, five (1.2 percent) assigned none of the received postmaster return questionnaires for delivery. The majority of the responding district offices assigned 15,000 or less postmaster return questionnaires; however, 42 district offices (over 10 percent) assigned over 20,000 postmaster return questionnaires.

Of the 410 responding district offices, 122 (30.0 percent) delivered less than 1,000 postmaster return questionnaires. For 263 (64.4 percent) responding district offices, the district office staff delivered 5,000 or less postmaster return questionnaires. More than 15,000 postmaster return questionnaires were delivered in 27 (6.6 percent) of the responding district offices.

Stage II Evaluation Planning Data—Approximately 79.5 percent of district offices stated that most or all of the postmaster return questionnaires had the USPS undeliverability reason annotated on the envelope. Based on this finding, the Census Bureau decided to select a sample of undelivered questionnaires and summarize the USPS undeliverability reasons.

Approximately 73.9 percent of the district offices reported that the USPS undeliverability reason of "Vacant Unit" occurred often. In addition, 17.1 percent of the district offices reported the USPS undeliverability reason of "Vacant Unit" occurred sometimes. Similarly, a large proportion of the district offices reported that the USPS undeliverability reasons of "Duplicate Unit," "Demolished or Nonexistent," and "Post Office Box" occurred often and occurred sometimes. Based on these findings, the Stage II undeliverability categories were developed.

Stage III Evaluation Planning Data—Less than 10 percent of the responding district offices reported that accurate records exist of the received postmaster return questionnaire ID numbers and/ or the delivered postmaster return questionnaire ID numbers. In addition, over 50 percent of

the responding district offices stated that no records of the address register areas involved in the delivery existed. However, a large proportion of the district offices stated that the address listing pages (forms D-108A) were used during delivery and that enumerators annotated the address listing pages. This information supported the use of the address listing pages as a way of identifying the delivered questionnaire universe.

Undelivered Questionnaires

USPS Undeliverability Reasons—In TAR and prelist mailout/mailback areas, the Census Bureau mailed out approximately 88.2 million questionnaires [3]. These addresses were added to the census address file from one of the following precensus operations: vendor list, prelist, APOC, precanvass, APOC reconciliation, re-added precanvass deletes, yellow cards, special place prelist, precensus local review, and casing. From table 3.3 there were approximately 5,272,000 (standard error = 460,000) undelivered questionnaires. This represents approximately 6.0 percent of the mailout universe.

Table 3.3 shows that 33.6 percent of the undelivered questionnaires were annotated as "vacant" by the USPS. The procedures for delivery did not specifically instruct the USPS to deliver a census questionnaire to a vacant unit [7] and [8]. In general the USPS does not deliver to vacant units. By removing the questionnaires that the USPS annotated as "vacant," we are examining the questionnaires which are undeliverable by the Census Bureau definition. Therefore, we estimate 3,501,000 (standard error = 334,000) questionnaires were truly undeliverable, representing about 4.0 percent of the mailout universe.

Table 3.3 shows that 36.6 percent of the undelivered questionnaires (excluding vacants) were annotated as "no such address" by the USPS. Note that 12.8 percent of the undelivered questionnaires were annotated as "no such apartment" by the USPS. The "no such apartment" category is a subgroup of "no such address." Collapsing the two categories would result in 49.4 percent (standard error = 2.6 percent) of the undelivered questionnaires (excluding vacants) being annotated as "no such address/apartment" by the USPS.

Table 3.3. Reasons for Undeliverability

USPS undeliverability	Including	Including vacants		g vacants
reason	Percent	Standard errror	Percent	Standard error
1. Vacant	33.6 9.1 3.2 1.9 24.3 8.5 0.4 4.9 5.2 9.0	(2.5) (1.1) (0.4) (0.3) (1.7) (0.8) (0.1) (0.8) (0.5) (1.9)	13.7 4.8 2.8 36.6 12.8 0.6 7.4 7.8 13.5	(1.6) (0.6) (0.4) (2.2) (1.2) (0.1) (1.2) (0.8) (2.8)
Total	100.0	, ,	100.0	, ,

Type of Enumeration Area of the Undelivered Questionnaires—Table 3.4 compares the percentages of undelivered questionnaires by USPS undeliverability reason within TAR and prelist mailout/ mailback areas. Several of the USPS undeliverability reasons are collapsed in table 3.4. The proportion of undelivered questionnaires annotated as "vacant" was slightly higher in TAR areas versus prelist mailout/ mailback areas. The proportion of undelivered questionnaires annotated as "no such address/ apartment" was slightly higher in prelist mailout/ mailback areas versus TAR areas. Two possible reasons for the larger percentage of "no such address/ apartment" in prelist mailout/ mailback areas could be that the addresses are in areas that do not receive city mail delivery and/ or the Prelist operation did not obtain the mailing address.

The only percentages which are not significantly different across type of enumeration area are for the "duplicate" and "other or no reason written" categories. For all the remaining categories the percentages for TAR and prelist mailout/mailback areas are significantly different.

Final Census Status of the Undelivered Questionnaires— Table 3.5 contains the estimates of the percent of undelivered questionnaires by their final census status. Slightly more than one-half of the undelivered questionnaires were enumerated as occupied or vacant; 23.7 percent and 32.7 percent, respectively. Therefore, if the USPS classifies an address as undeliverable it does not automatically follow that the address does not exist.

Table 3.6 contains the percentages of occupied, vacant, and delete by the USPS undeliverability reasons. Several of the USPS undeliverability reasons are collapsed in this table. Approximately 60.6 percent of the undelivered questionnaires annotated as "vacant" by the USPS were enumerated as vacant during the census. This suggests that the USPS is able to identify vacant units at a high rate. It is interesting to note that the Census Bureau wanted the USPS to deliver questionnaires to vacant units. However, the procedures for delivery stated that each carrier should have a census questionnaire for each living quarters (occupied or vacant) on his/her route. The procedures did not specifically tell the USPS to deliver to vacant units [7]

Table 3.4. Type of Enumeration Area Summary

	Percent						
USPS undeliverability reason	TAR	Prelist mailout/ mailback	l	fference standard error)			
Vacant	36.7 9.1	28.9 9.0	7.7 0.2	(3.9) (1.7)			
tion or nonresidential No such address or no such	6.6	2.8	3.8	(0.9)			
apartment	30.5	36.2	-5.7	(2.7)			
receptacle	3.2 13.9	8.5 14.6	-5.3 -0.7	(1.3) (3.2)			
Total	100.0	100.0					

Table 3.5. Final Census Status Summary

Final census status	Percent	Standard error
Occupied		1.1 1.7 1.8
Total	100.0	

and [8]. An estimated 19.8 percent of the undeliverable questionnaires annotated as "vacant" by the USPS were enumerated as occupied. This could indicate erroneous enumerations. The addresses could have been vacant at the time of delivery and sometime between delivery and enumeration the addresses may have become occupied. If so, these units should have been enumerated as vacant. This also could indicate USPS misclassification error.

An estimated 39.6 percent and 11.3 percent of the undelivered questionnaires annotated as "duplicate" had a final status of occupied and vacant, respectively. The percentages could indicate some duplication of both people and housing units. This could also indicate that the USPS erroneously classified these cases as duplicates. About one-half of the undelivered questionnaires annotated as "duplicate" were deleted.

For questionnaires identified by the USPS as "demolished, new construction, nonresidential" or "no such address, apartment," 81.1 percent and 64.1 percent, respectively, were deleted on the census address list. This suggests that the USPS is able to identify nonexistent units at a high rate.

Of the undelivered questionnaires annotated as "Post Office box or no mail receptacle" by the USPS, about three-quarters had a final status of occupied or vacant. This would suggest that the addresses identified with these codes are units that exist; however, they do not receive mail delivery at the unit.

Address Listing Pages

Undelivered Questionnaires—Approximately 57.0 percent of the 181,316 (103,380) postmaster return questionnaires identified on the address listing pages by the district offices were undeliverable. The reasons were annotated on the

Table 3.6. Final Census Status Summary

USPS undeliverability reason	Percent (standard error)						
USPS underiverability reason	Occupied		Vacant		Delete		
Vacant	19.8 39.6	(0.9) (2.2)	60.6 11.3	(1.6) (2.2)	19.5 49.1	(1.2) (2.6)	
tion or nonresidential No such address or no such	6.2	(0.6)	12.8	(1.3)	81.1	(1.8)	
apartment	23.3	(1.6)	12.6	(1.2)	64.1	(2.3)	
receptacle	29.2 28.0	(3.3) (3.2)	45.6 29.2	(4.4) (2.9)	25.2 42.8	(3.0) (3.0)	

address listing pages, coded, and keyed for this evaluation. Table 3.7 summarizes the percent of undelivered questionnaires by district office undeliverability reason. Approximately 30.7 percent of the undeliverables were classified as "vacant" and 21.3 percent were classified as having "no such street number."

Delivered Questionnaires—Approximately 43.0 percent of the 181,316 (77,936) postmaster return questionnaires identified on the address listing pages were delivered by the district offices. Examining the delivery rates within type of enumeration area indicates that only 36.1 percent of the postmaster return questionnaires in the TAR areas were delivered while 51.9 percent of the postmaster return questionnaires in prelist mailout/ mailback areas were delivered.

Table 3.8 contains the delivered postmaster return questionnaires by final census status. The majority of the housing units associated with delivered postmaster return questionnaires (51.5 percent) had a final status of occupied, although 35.2 percent were vacant and 13.3 percent were deletes.

An estimated 26.9 percent of the delivered postmaster return questionnaires resulted in a mail return on or before May 3, 1990. Although questionnaires were not supposed to be delivered to vacant, duplicate, or demolished units, the data suggest that this did occur. We estimate that the rate of response from occupied units was approximately 52.2 percent.

Conclusions

District Office Survey—Between 5.4 and 7.6 million postmaster return questionnaires were received by the district offices. This represents between 5.7 percent and 8.0 percent of the total housing count in these district offices. More than 6 percent of the district offices received postmaster return questionnaires that represented between 15.0 percent to 31.5 percent of the housing units in the district office. For these district offices the received postmaster return questionnaires represented a large percentage of their housing units. These district offices were not geographically clustered; however, 76 percent of them were type 2 district offices.

Table 3.7. Reasons for Undeliverability

District office undeliverability reason	Percent
Vacant	30.7
No such street number	21.3
Demolished/ nonexistent	9.8
Duplicate	3.6
Geocoding problem	0.5
No mail receptacle	0.4
Post office box	0.0
Other undeliverables	33.7
Total	100.0

Table 3.8. Final Census Status Summary

Final census status	Percent
Occupied	35.2
Total	100.0

Since the responding district offices were able to deliver over 50 percent of the assigned postmaster return questionnaires, this raises the question of why the Census Bureau could deliver questionnaires that the USPS classified as undeliverable.

Undelivered Questionnaires— The USPS undeliverability reasons can be used with a high level of accuracy to determine the final status. If the Census Bureau used the USPS undeliverability reasons to classify housing units as vacants or deletes before the Nonresponse Followup operation, this would result in a savings of both time and money.

The USPS annotated an estimated 1,771,000 undelivered questionnaires as "vacant." This represented approximately 33.6 percent of the undelivered universe. The high rate indicates that the USPS did not deliver to vacants.

Address Listing Pages—The last minute decision to implement the Postmaster Return Questionnaires Delivery operation greatly impacted the Census Bureau's ability to collect critical evaluation information. The Census Bureau used all available data but had no supplemental or alternative data sources. The data summarized have major limitations but the data give some insights into the operation.

It is not surprising that this operation was most successful in prelist mailout/mailback areas, for noncity type addresses, and for addresses added to the census address list by Census Bureau field operations. It is likely that additional reference materials, such as map spots and familiarity with the area, helped the enumerators locate the addresses. The Census Bureau maps and address listing pages indicating the locations of prelisted addresses were not available to the USPS.

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THE SHELTER AND STREET NIGHT ENUMERATION

Introduction and Background

The Shelter and Street Night enumeration, which was also known as S-Night, was a one-night operation developed for the 1990 census to include persons not covered by regular Census Bureau procedures for households or persons in the standard enumeration of group quarters. S-Night was conducted nationwide to improve coverage of the census by counting persons in selected locations where homeless persons tend to be found at night.

Census enumerators counted persons and collected data at preidentified locations on March 20, 1990 and the early morning hours of March 21, 1990 in two phases; the shelter phase and the street phase. The shelter phase covered enumeration of persons found in shelters, such as emergency shelters, shelters for abused women, shelters for runaway and neglected children, low cost motels (costing \$12.00 or less), subsidized units at motels, and YMCA's and YWCA's preidentified by local areas as places where homeless persons stay. The shelter phase took place on March 20, 1990, from 6:00 p.m. until

midnight. The street phase covered enumeration of persons found at selected preidentified street locations, abandoned buildings, commerce places such as bus depots and train stations, and other places where homeless persons may spend the night, such as all-night restaurants, parks, and vacant lots. Enumerators collected data at street locations and commerce places on March 21, 1990 from 2:00 a.m. until 4:00 a.m. Persons leaving from abandoned buildings were enumerated from 4:00 a.m. until 8:00 a.m. on March 21, 1990.

Methodology

This report provides the number of persons and the number of "populated" sites enumerated stateside during S-Night. The data do not include counts from Puerto Rico. Counts are also provided by State and for 10 selected cities. Records for group quarters (including S-Night locations) for which no persons were found, were deleted from the census files. The number of sites with "zero population" cannot be determined. Therefore, the data in this report include the number of "populated" sites for which at least one person was enumerated. Tabulations of the data were derived from the 1990 census files.

The "coverage gain percent" is the number of persons enumerated on S-Night compared to the total number of persons counted in the 1990 census.

Census Bureau data products provide counts of persons at selected locations where homeless persons are found. Thus, in this report, the data are shown by the following four types of S-Night locations for each of the various geographical levels.

- Emergency Shelters—include subsidized units at hotels and motels, low cost motels, YMCA's and YWCA's identified as places where homeless persons stay.
- Shelters for Abused Women—include group homes and safe houses for women of domestic violence.
- Shelters for Runaway and Neglected Children—include group homes or youth centers identified as places for runaway and neglected children.
- Street Locations—include various street locations such as parks, street corners, river banks etc., abandoned buildings and commerce places, such as all-night restaurants, train stations, bus depots, subways, etc.

Other locations where homeless persons may be found, such as campgrounds, detoxication centers, carnivals, and prisons, were counted during the standard enumeration of special places and group quarters. Homeless children in foster care and persons temporarily living doubled up with other families could not be separately identified and were enumerated using standard procedures for households. This paper documents the number of persons counted at preidentified locations specified for S-Night only.

Limitations of the Data

The S-Night operation was not designed to (and was never intended to be) a complete count of the homeless population at any given geographical level. The data include the number of persons counted on a single night at specified preidentified locations where homeless persons tend to be found. S-Night represents one of the Census Bureau's efforts to include homeless persons in the 1990 census. There are important factors to understand before using the S-Night data. Some of these factors are discussed below:

- The data may not include persons who were well hidden, moving about, or in shelters or street locations other than those identified as a part of S-Night.
- Some street locations identified for S-Night may have been excluded because of the potential danger to enumerators and homeless persons. Persons living in cars, dumpsters, and on rooftops may have been missed.
- Other factors, such as weather conditions, availability of shelters, and presence of the press and police, may have also influenced the number of persons visible on the street.
- · The overall variability in how the street phase was conducted across the country may have affected the quality of the street counts. Analysis of the S-Night counts of persons visible at street locations disclosed that some of the enumerators did not always follow the procedures designed for the operation. Enumerators were to count all persons at preidentified locations, except those in uniform, on staff with a usual home elsewhere or engaged in obvious moneymaking activities. Reports indicate some enumerators may have been selective in whom they approached to interview, whom to count by observation, or whom to count at all. It is impossible to measure the impact of procedural irreqularities on coverage. Enumerators were not to ask persons if they were homeless or if they had a usual home elsewhere. Persons with a regular place to stay may have been at shelters or visible at street locations during S-Night and may have been included in the counts.

Results

National Level

Table 3.9 provides the overall number of persons enumerated at "populated" sites by enumeration phase and type of S-Night location. It also includes the number of persons counted per 10,000 persons of the United States population, as well as the percent of coverage improvement to the census. The total count of persons from the S-Night operation improved coverage of persons in the 1990 census by 0.1 percent.

Shelter Phase—There were more persons and sites counted during the shelter phase of S-Night than the street phase. There were 168,309 persons counted at 6,664 emergency shelters, 11,768 persons counted at 1,009 shelters for abused women, and 10,329 persons counted at 788 shelters for runaway and neglected children. Emergency shelters accounted for 88.4 percent of the total persons enumerated during the shelter phase and 70.1 percent of the total persons enumerated during S-Night.

There was a total of 248,709,873 [3] persons counted in the United States during the 1990 census. For every 10,000 persons counted in the U.S., about 7 persons were counted on S-Night at emergency shelters. The persons counted at emergency shelters represent a .068 percent coverage gain to the census. There was less than one person counted per 10,000 population for the other two shelter types. The persons counted at shelters for abused women and for runaway and neglected children, together, improved the coverage of persons in the 1990 census by .009 percent.

Street Phase—There were 49,734 persons counted at 6,669 street locations during the street phase. These numbers represent 20.7 percent of the total persons enumerated and 44.1 percent of the total number of "populated" sites visited during S-Night.

Nationally, there were 2 persons per 10,000 population enumerated at street locations. The coverage gain at street locations was .02 percent.

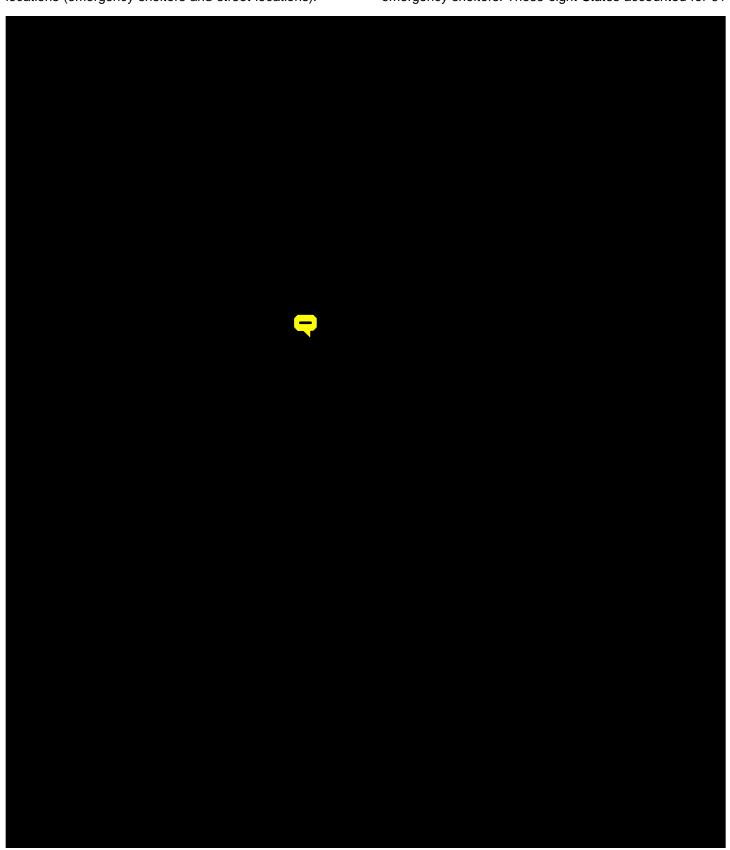
Table 3.9. S-Night—Number of Sites and Persons Counted by Phase and Type of Location

			Sites		Persons				
Phase	Type of location	Number	Percent of phase	Percent of S-Night	Number	Percent of phase	Percent of S-Night	Per 10 thou- sand population	Coverage gain percent
Shelter	Emergency shelters Shelters for abused women Shelters for runaway and neglected children	6,664 1,009 788	78.8 11.9 9.3	44.0 6.7 5.2	168,309 11,768 10,329	88.4 6.2 5.4	70.1 4.9 4.3	6.8 .48 .42	.068 .005
Street	Street locations	6,669	100.0	44.1	49,734	100.0	20.7	2.0	.020

The 50 States and the District of Columbia

See figure 3.9 for an illustration of the number of persons enumerated by State for two of the S-Night locations (emergency shelters and street locations).

The number of enumerations at emergency shelters varied across States. Eight States (New York, California, Pennsylvania, New Jersey, Texas, Illinois, Florida, and Massachusetts) each had over 5,000 persons counted at emergency shelters. These eight States accounted for 61



percent of the nation's population counted at emergency shelters. The 2 States with the highest number of persons counted, New York (31,436 persons) and California (29,830 persons), accounted for about 36 percent of all enumerations at emergency shelters. Wyoming had the least number of persons (129) counted at emergency shelters.

There were less than 1,000 persons counted at street locations for the majority of the States and the District of Columbia. There were 9 States (California, New York, New Jersey, Arizona, Florida, Illinois, Texas, Pennsylvania and Hawaii) that enumerated more than 1,000 persons each during the street phase. These States accounted for 83 percent of all enumerations at street locations. Fifty-eight percent of the total population visible and counted at street locations were in the 2 States with the highest counts (New York—10,732 persons and California—18,081 persons). The least number of persons visible and counted on the street among the States and the District of Columbia was in Maine (seven).

Persons Per State Population—In emergency shelters, there were 73 persons per 10,000 population counted in the District of Columbia. Among the 50 States, New York State had the highest rate, about 17 persons per 10,000 population were enumerated in emergency shelters.

At both shelters for abused women and shelters for runaway and neglected children, the rate was less than 1 person per 10,000 population for all States except Alaska and the District of Columbia. In Alaska, the rate was about 3 persons per 10,000 population at shelters for abused women. In the District of Columbia, 4 persons were counted per 10,000 population at shelters for runaway and neglected children.

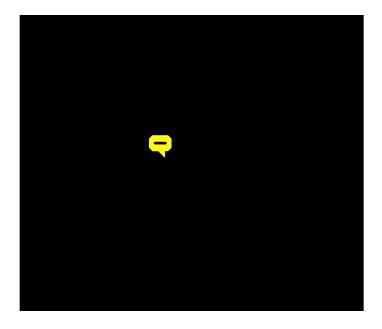
Hawaii had the largest rate of persons counted on the street per 10,000 population among the 50 States and the District of Columbia. There were about 10 persons enumerated per 10,000 population in Hawaii. California had the next to the largest rate of persons counted on the street (6 persons per 10,000 population).

Refer to figure 3.10 which illustrates the percentage of the States (includes the District of Columbia) within a range of the number of persons per 10,000 State population. According to the figure, the majority (about 63 percent and 94 percent) of the States had a rate of less than 6 persons per 10,000 population counted at emergency shelters and at street locations, respectively.

Selected Cities

S-Night tended to favor areas where most of the homeless population is likely to be sheltered; for example, cities versus rural areas. Local jurisdictions with high concentrations of homeless persons generally had more information about their likely locations.

New York City and Chicago had the largest number of persons counted at emergency shelters among the largest cities. About 23,000 persons were enumerated at emergency shelters in New York City and about 4,800 persons



were counted in Chicago. New York City and Los Angeles had the highest number of persons counted at street locations. Over 10,000 persons were enumerated at street locations in New York City and over 3,000 persons were enumerated in Los Angeles.

New York City had the largest number of persons at all four S-Night locations among the largest cities. There were 236 persons counted at abused women shelters and 674 persons enumerated at shelters for neglected children in New York City.

Similar to the national trend, there were more persons counted at emergency shelters than at street locations for each of the largest cities. Ten of the largest cities (New York, Los Angeles, Chicago, Philadelphia, San Diego, San Francisco, Washington, DC, Boston, Seattle, and Atlanta) each had more than 2,000 persons counted at emergency shelters, with a total of 53,122 persons. Six of the 10 cities had more than 1,000 persons counted at street locations during S-Night. A total of 20,654 persons were enumerated at street locations in these 10 cities. These 10 cities accounted for 31.6 percent of the total population counted at emergency shelters and 41.5 percent of the total population enumerated at street locations.

Refer to table 3.10, which shows the number of sites and persons counted on S-Night, as well as the city rank by population size, the city population and the rate of persons per 10,000 population by type of location for 10 selected cities.

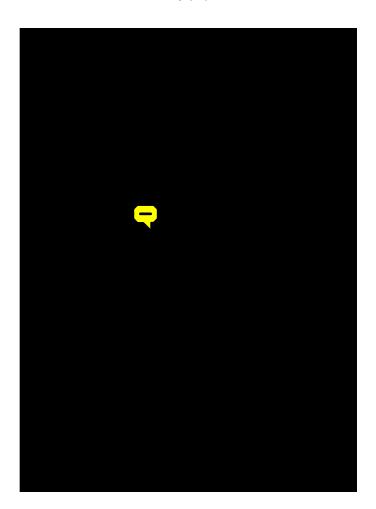
Persons Per 10,000 City Population—Although New York City had the largest number of persons counted among the cities at each type of location, it did not have the largest rate of persons counted per 10,000 population at either shelters or street locations. Washington, DC had the largest rate of persons per 10,000 population counted at emergency shelters and San Francisco had the largest rate of persons per 10,000 population counted at street locations. In Washington, DC, the rate was about 73

Table 3.10. S-Night Enumeration—Number of Sites and Persons Counted by Type of Location for 10 Selected Cities

			Emerç shel (a	ters	Shelte abused (t	women	Shelte runawa negle chilo	ay and ected dren	Street lo	ocations	Persons	s per 10,0	00 city po	opulation
City size	Population	City	Sites	Per- sons	Sites	Per- sons	Sites	Per- sons	Sites	Per- sons	(a)	(b)	(c)	(d)
1	7,322,564	New York	259	22,709	10	236	29	674	849	10,447	31.01	0.32	0.92	14.27
2	3,485,398	Los Angeles	99	4,459	6	102	7	138	416	3,109	12.79	0.29	0.40	8.92
3	2,783,726	Chicago	106	4,806	4	124	18	374	250	1,584	17.26	0.45	1.34	5.69
5	1,585,577	Philadelphia	83	3,366	1	48	5	50	213	1,069	21.23	0.30	0.32	6.74
6	1,110,549	San Diego	50	2,750	4	26	2	96	197	2,101	24.76	0.23	0.86	18.92
14	723,959	San Francisco	100	3,986	3	96	3	17	178	1,566	55.06	1.33	0.23	21.63
19	606,900	Washington, DC	141	4,419	6	49	12	263	38	131	72.81	0.81	4.33	2.16
20	574,283	Boston	39	2,134	3	89	6	111	69	218	37.16	1.55	1.93	3.80
21	516,259	Seattle	58	2,161	6	113	1	9	82	369	41.86	2.19	0.17	7.15
36	394,017	Atlanta	45	2,332	1	5	2	99	9	60	59.19	0.13	2.51	1.52

persons per 10,000 population at emergency shelters. About 22 persons per 10,000 population were counted at street locations in San Francisco.

Figure 3.11 compares the number of persons counted per 10,000 city population at emergency shelters to the number of persons counted per 10,000 city population at street locations for 10 selected cities. The figure also shows the cities in order by population size.



Conclusions

California and New York were the States with the highest number of persons counted on S-Night. New York City and Los Angeles had the largest counts of persons at all four types of locations among the largest cities.

Review of the shelter data indicates that the overall count of persons in emergency shelters is generally reasonable. As part of census coverage improvement operations, local officials had the opportunity to provide the Census Bureau lists of emergency shelters and night time street locations. The local officials were also asked to review the count of persons in shelters before census district offices closed. Relatively few problems were reported. The count of persons at emergency shelters gives some idea of relative differences in the shelter population among areas of the country.

Caution should be exercised when using the counts of persons at street locations. Deviations from the procedures designed for conducting the S-Night street phase may have presented irregularities in coverage of the various sites at street locations. The impact of procedural deviations on coverage is impossible to measure. Users of the evaluation data are encouraged to consider the limitations as discussed earlier.

Although the results from the S-Night enumeration do not represent (and were never intended to be) a complete count of the homeless population, the S-Night operation was an effective coverage improvement method to include persons at locations where homeless persons are found in the 1990 census. The S-Night operation successfully added persons to the overall census count who otherwise would not have been included by using regular Census Bureau procedures. Persons enumerated at emergency shelters improved coverage by .068 percent. Coverage gains at shelters for abused women and shelters for runaway and neglected children were .005 percent and .004 percent,

JOBNAME: No Job Name PAGE: 18 SESS: 102 OUTPUT: Mon Oct 25 10:16:15 1993 /pssw01/disk2/90dec/cphe/3/chapter3

respectively. Persons counted at street locations represent .020 percent gain. Overall, the S-Night enumeration improved coverage of persons in the 1990 census by 0.1 percent.

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CHAPTER 4. Post-Census Day Coverage Improvement

TELEPHONE ASSISTANCE ADDS

Introduction and Background

For the 1990 census, the Census Bureau implemented a Questionnaire Assistance program to encourage response to the census by providing assistance to persons who had questions about how to complete their census questionnaire. The Census Bureau provided telephone and walk-in assistance in various languages and at various locations, including telephone assistance at the district offices and processing offices. Six of the seven processing offices provided telephone assistance for the type 1 district offices and the type 2 and 3 district offices provided on-site telephone assistance. Clerks in the district offices and processing offices were specially trained to help the respondent complete the questionnaire on the telephone or to provide other types of assistance. A toll-free "800" number was provided on the census questionnaire for the use of persons desiring questionnaire assistance.

Soon after the delivery of census questionnaires in March 1990, the district offices and processing offices began to receive a large volume of telephone calls from persons requesting assistance in completing the form. While most of these calls were related to specific assistance with completing the questionnaire or requests for a foreign language questionnaire, it soon became apparent that a much larger than expected number of calls were from persons reporting that they had not received a census questionnaire.

For the first 2 weeks of April, the telephone assistance clerks were instructed to fill a report form (Form D-399, Record of Telephone Contact, see appendix B) for persons calling to request a census questionnaire and then do a records search to determine if the caller's address was already accounted for in the census files. If the clerk found the address in the Address Control File, he/she sent a letter to the caller informing them that a census enumerator would visit to collect the census information. If the caller's address was not found in the Address Control File, a census questionnaire was sent to the address in Tape Address Register areas or the case was assigned for field verification in other areas. The Address Control File maintenance procedure was then used to add the missing address to the census files.

As the number of callers requesting a census questionnaire increased and the redelivery of postmaster return questionnaires (see Postmaster Return Delivery in chapter 3) was completed, the Census Bureau implemented a revised procedure for handling calls from persons requesting a census questionnaire in an attempt to reduce the personal visit followup costs. Starting in mid-April, the telephone assistance clerks sent a census questionnaire (long or short form, as determined by a clerical check-off sheet) to each caller who requested one, with instructions for the household to fill the questionnaire and hold it for pickup by a nonresponse followup enumerator. The clerks continued to search for the callers' addresses in the Address Control File and add those which were missing from the census files. At the end of nonresponse followup, a special check was done to ensure that an enumerator had visited each D-399 case to pick up the questionnaire.

Since the telephone assistance program resulted in the addition of missing addresses to the Address Control File, it can be viewed as a source of coverage improvement for the census, although the program was not intended to be a coverage improvement program when it was designed. This section provides some results of an evaluation of the coverage improvement derived from the telephone assistance program. It provides an estimate of the number of adds that resulted, the characteristics of the added units, an estimate of how many D-399 addresses were already in the census files, and some characteristics of the household respondents who called to request a census questionnaire.

Methodology

After the end of the census field work, the forms D-399 which were filled by the telephone assistance clerks were tabulated. Clerks first sorted the forms and identified those for which the call was to request a census questionnaire. About 2.5 million forms D-399 were received and, of these, about 1 million were requests for a census questionnaire. The 1 million forms D-399 were then sorted by date to identify those filled before April 12 and those filled after April 12. The April 12 date was important because it was the day on which the clerks implemented the revised procedures for handling calls from persons requesting a census questionnaire. Furthermore, it was assumed that the early callers (pre-April 12) were more likely to be accounted for in the Address Control File, since they called before the district offices had a chance to hand deliver the postmaster returned questionnaires or they may have called before the postal service or the update/leave enumerators had a chance to deliver their questionnaire.

A sample of about 0.5 percent of the D-399's filled before April 12 and a 1.0 percent sample of the D-399's filled after April 12 were randomly selected. This resulted in a sample of about 3,000 early forms and 3,000 late forms. The clerks then obtained census identification numbers for

the sample cases. This resulted in finding valid census identification numbers for 2,260 early sample cases and 2,253 late sample cases. The remaining cases were dropped from the analysis because they were not found in the Address Control File under the address shown on the D-399 even after repeated attempts by the matching staff. These cases may be in the Address Control File under an alternative address or may be in list/enumerate areas which were not in the control file as of the time of the clerical search; it also is possible that some percentage of them may have been missed in the census.

The census identification numbers for the sample cases were then used to obtain detailed information for the cases from the census files, such as the source of the unit, the number of units at the basic street address, and so forth.

Table 4.1 shows the universe and sample sizes for the evaluation. The "early" cases are those with call dates before April 12, the "late" cases are those with call dates after April 12.

Limitations

The 2.5 million forms D-399 processed for this evaluation may not be the total of such forms filled during the census. Due to various problems with controlling the disposition of these forms, it is highly likely that some forms were misplaced. To the extent that the D-399's for persons requesting a census questionnaire were not available for sampling, the sample used for this evaluation may be somewhat biased. Another potential bias in the sample is that about 25 percent of the sample cases had to be dropped from further analysis because they could not be found in the Address Control File.

The major limitation to the estimates produced by this evaluation is that there was no definitive way to identify which adds resulted from the telephone assistance program. It was necessary to approximate the telephone assistance adds by identifying the sample cases with post-delivery source codes. Other research has suggested the existence of errors in the assignment of source codes. However, the extent of the error is not known. The data in this evaluation are in error to the extent that the source code information is incorrect or misleading.

Results

Table 4.2 shows the Census Day status of the early and late sample cases, based on the final Address Control File source code data.

Table 4.1. Universe and Sample Sizes

	Early		La	ite	Combined	
	Number	Per- cent	Number	Per- cent	Number	Per- cent
Calls	655,891	64.1 0.5	355,977	35.9 1.0	991,868	100.0 0.6
Sample Valid ID's	3,056 2,260	0.5 0.4	3,028 2,253	0.9 0.6	6,084 4,513	0.6 0.5

Table 4.2. Census Day Status of Sample Cases

	Earl	у	Late	е	Combined	
	Number	Per- cent	Number	Per- cent	Number	Per- cent
Sample cases In ACF at time of	2,260	100.0	2,253	100.0	4,513	100.0
delivery	1,366	60.4	1,339	59.4	2,705	59.9
Casing or update/leave						
add	450	19.9	349	15.5	799	17.7
Potential adds:	444	19.1	565	25.1	1,009	22.4
NRFU adds	146	6.4	199	8.9	345	7.6
Other field adds. Processing	96	4.2	132	5.8	228	5.1
office adds	202	8.9	234	10.4	436	9.7

The table suggests that about 60 percent of the addresses of callers in the sample who requested a census questionnaire before or after April 12 were already accounted for in the census address files prior to questionnaire delivery. Another 20 percent of the sample early callers were time-of-delivery adds; that is, the postal carriers added them during the casing check or the update/leave enumerators added them during the Update/Leave operation. Only about 5 percent of the sample cases were in update/leave areas, so the update/leave adds do not account for very many of the time-of-delivery adds for this sample of cases: the majority were casing adds made by the postal carriers. Based on these data, at least 80 percent of the early callers and 75 percent of the late callers would have eventually received a census questionnaire or been visited during Nonresponse Followup, regardless of whether they called to request a census questionnaire.

The cases which comprise the potential coverage improvement from the telephone assistance program are those which were added to the Address Control File after delivery; that is, the nonresponse followup adds, the other field adds, and the processing office adds. Based on the data in table 4.2, it appears that as an upper bound, about 19 percent of the early callers and about 25 percent of the late callers were added to the census files as a result of the telephone assistance program.

Estimated Coverage Improvement For Housing Units—

Based on the universe totals of about 1 million calls requesting a census questionnaire, a ratio-estimation procedure produced a weighted national estimate that the telephone assistance program may have added as many as 158,000 addresses to the census file (standard error = 6,000 addresses). This is a rough estimate that must be used with caution, given the limitations of this evaluation sample. The potential coverage improvement from the telephone assistance program is estimated at about 0.15 percent of the total housing units in the nation.

Estimated Coverage Improvement For Persons—Based on the estimated 158,000 addresses added to the census files as a result of persons calling to request a census

questionnaire, it is estimated that about 407,000 persons may have been added by the telephone assistance program. This estimate is derived by multiplying 158,000 housing units by 2.63 persons per unit (which represents the average household size for occupied housing units in the Nation) and multiplied by 0.98 to take into account that about 2 percent of the added units had a final status of delete. This estimate represents about 0.16 percent of the total census population count.

Characteristics Of Added Housing Units—The profile for adds derived from this evaluation suggests that they are predominately city delivery single unit structures, which is consistent with the characteristics of the general housing inventory. The only notable deviation from the general housing inventory is that there were substantially fewer small multiunit apartment buildings containing 2-9 units than in the general housing inventory. This is a surprising finding, because the Census Bureau has traditionally had problems compiling an accurate mailing list in small multiunit buildings where the units are often unnumbered and unlettered. In general, the address and structure characteristics of the adds do not shed any light on why they were missed in the census address compilation efforts.

Characteristics Of Added Persons—Similar to the characteristics of the added housing units, the characteristics of the persons occupying the adds were quite similar to the general population characteristics and shed no light on why the households were missed in the census address compilation efforts. Their general profile is that they are predominately White, non-Hispanic households who reported a male as Person 1 on the census questionnaire (indicating a male head of household). One interesting finding is that the percentage of Hispanic households is substantially higher for the early adds (11.4 percent) and slightly higher for the late adds (7.7 percent) than in the general population (6.5 percent). Most likely the Hispanic households called to request a Spanish language census questionnaire rather than calling to say they had not received a census questionnaire. Regardless of the reason for the call, however, the data suggest that the differential undercount of Hispanic households may have been reduced by the telephone assistance program.

Characteristics Of Non-Added Cases—The final aspect of this evaluation involved reviewing the characteristics of the 3,504 sample cases which were in the Address Control File on Census Day; that is, the cases where a person called to request a census questionnaire even though their address was already in the census files. These are cases where the postal service or update/ leave enumerator may have encountered delivery problems.

The evaluation data suggest that the characteristics of callers whose addresses were already in the Address Control File are very similar to those of callers whose address was apparently missing from the Address Control File on Census Day. The same general profile holds for

both groups; that is, the housing units are predominately city delivery single unit structures occupied by White, non-Hispanic households, who reported a male as Person 1 on the census questionnaire. The higher level of Hispanic origin persons in the sample than in the general population shows up in both the adds and the non-adds. In addition, a slightly higher frequency of persons aged 65+reported as Person 1 on the census questionnaire is evident for both groups. It is interesting to note that the percentage of persons reporting their race as "Other" is substantially higher in the group whose addresses were in the Address Control File than it is for the adds or for the general population (11.3 percent for non-adds, 6.4 percent for adds, and 5.6 percent for the general population.)

Conclusions

Within the limitations of this evaluation, the data suggest that the telephone assistance adds improved national housing counts and population counts by an estimated 0.15 percent, as an upper bound. It is clear that the Census Bureau will have to provide some type of questionnaire assistance for the 2000 census, so the coverage improvement aspects of the program may be viewed as a by-product, whose only operational costs are searching for the address in the census files and mailing the appropriate questionnaires.

The characteristics of the housing units and persons presumably added by the telephone assistance program are very similar to those for the general population. However, there seems to have been some impact on reducing the differential undercount of Hispanic households, since the sample cases had a higher frequency of persons who reported their origin as Hispanic than in the general population. These data lend support to various ethnographic studies that suggest the need for a combined English and Spanish questionnaire in areas of high Hispanic concentrations.

The data in this evaluation suggest that about 60 percent of the addresses of persons who called to request a census questionnaire were already accounted for in the address control file as of Census Day. These persons apparently encountered some type of questionnaire delivery problems, although at least some of them may have received a census questionnaire and discarded it or did not realize that someone else in the household had received the questionnaire. The data from this evaluation shed no light on why these households encountered delivery problems, since their characteristics do not differ from those of the general population. It is possible that this evaluation lends credence to the notion that mis-delivery or non-delivery was a fairly random event in the 1990 census.

For 2000 census planning, if a similar telephone assistance program is planned, the Census Bureau needs to implement a way to search for the address in the census files while the caller is on-line and perform the enumeration over the telephone, as appropriate.

The telephone assistance program in the 1990 census was a multi-purpose program that will probably play an increasingly important role in future censuses as the Census Bureau searches for ways to improve the response rate. While it was not intended as a coverage improvement operation, the results of this evaluation suggest that the telephone assistance program can be a valuable source of identifying addresses which are missing from the census files at an early stage in the census process.

Reference

[1] Tenebaum, Michael C. 1990 Census Preliminary Research and Evaluation Memorandum No. 162, "Telephone Questionnaire Assistance Adds Evaluation." U.S. Department of Commerce, Bureau of the Census. May 12, 1992.

CENSUS CLOSEOUT ADDRESS CHECK

Introduction and Background

In response to recommendations from various members of Congress to actively involve the USPS in the data collection process, the Census Bureau designed and implemented a program called the Census Closeout Address Check. During the final days of Nonresponse Followup and subsequent followup operations, the district offices were encouraged to utilize the mail carriers to obtain very limited information about unenumerated cases. The Census Closeout Address Check was targeted at district offices which were late in completing Nonresponse Followup, but all of the district offices were given the option to implement the program.

Those district offices which decided to implement the Census Closeout Address Check prepared a special address card for each unenumerated case and submitted the cards to the local postal officials. The postal carriers were asked to provide limited information about each address for which they received a card. The information consisted of type of structure, Census Day occupancy status, and number of Census Day occupants. The carriers were cautioned not to obtain the information from mail addressed to the unit since this would violate confidentiality, but to rely on their own knowledge and observation. If an address card was returned to the district office with usable information, the carrier information could be used to classify the case on the Address Control File in lieu of information obtained by field visit.

The Census Closeout Address Check was planned and implemented late in the census process so it did not undergo testing during the planning cycle nor did it have the rigorous administrative control that characterized most other census operations. In addition, many district offices did not implement the program due to timing constraints and other administrative problems.

This section describes the results of an evaluation of the Census Closeout Address Check and provides information on the number of cases, the number of cards returned by the USPS with usable information, the clustering of the addresses and the characteristics of the addresses for which the USPS was able to provide useful information. Due to the limitations of the evaluation data, the results cannot be generalized beyond the small number of district offices for which completed address cards were available for the clerical review.

Methodology

After the end of census operations, the completed Forms D-550P, Census Closeout Address Check Cards (see appendix B for an illustration of the D-550P), were reviewed and tabulated.

As discussed in the Limitations section below, only about 28 percent of the expected number of completed cards were received in the clerical unit, and most of these were from the New York Regional Census Center.

One of the issues that this evaluation was designed to measure was whether the Census Closeout Address Check cases were clustered by block or by basic street address within the district offices. This information might be useful in determining whether there were any systematic problems with unenumerated units in specific geographic areas. In order to address this objective, the clerical staff examined 32,574 forms D-550P in the 10 district offices which had the largest number of available cards. The results of this clerical review were then used to determine if the cases were clustered either by block or by basic street address.

The other main objective of this evaluation was to obtain some information about the characteristics of the addresses for which the mail carriers provided useful information. In order to obtain this information, the completed cards were separated into two strata. One stratum included all the cards for the New York Regional Census Center and the other stratum included all the cards from the remaining regional census centers. The clerical review staff pulled every 25th card for the New York stratum and every 7th card for the other stratum. This resulted in a sample of 1,026 cases for the New York stratum and 1,000 cases for the other stratum. The clerical staff then reviewed the sample cards to tabulate various summary data.

Limitations

This evaluation relied primarily on a clerical review of the completed address cards. Based on management reports, we expected to receive and tally information for about 125,000 cards, since about 142,000 cards were reportedly sent to the USPS by the district offices throughout the nation, and we projected about an 85-90 percent return rate. After several months of checking-in the forms, it became apparent that the majority of the forms sent to the USPS were either never returned or not forwarded to the clerical review center from the district offices. Only about 35,000 completed cards were available for clerical review and repeated attempts to locate more cards were unsuccessful.

More than 79 percent of the cards available for clerical review came from 10 district offices within New York City. The remaining cards were spread across seven district offices in five regional census centers. The cards represent about 78 percent of the estimated number of cards sent to the USPS by these 17 district offices.

Based on the small number of available cards and the heavy concentration in one regional census center, the data in this evaluation must be used with caution since the results are not based on a representative sample of district offices or completed cards. The evaluation is a measurement study which provides a snapshot of the results of the program in a small number of district offices. The results are not representative of the nation.

It was not possible to identify the specific followup operation which resulted in the completed cards so the results of the program cannot be compared across the various followup phases.

As mentioned in the Introduction section, the Census Closeout Address Check was implemented late in the census process so it did not have the rigorous administrative control that characterized most other census coverage improvement operations. In addition, many district offices did not implement the program.

Results

A total of 142,356 address cards were reportedly sent to the USPS by the district offices. Of these, 23,040 (16 percent) were sent during the closeout phase of Nonresponse Followup. The remainder were reportedly sent during Field Followup (41 percent), Housing Coverage Check (3 percent) and POP One Reenumeration (40 percent). The cards were used in every regional census center except Kansas City. The vast majority of the cases were in the New York Regional Census Center; that regional census center accounted for 79 percent of the cases sent during Nonresponse Followup and 65 percent of the cases sent during later followups.

Clustering Effects—One of the issues this evaluation was designed to measure was whether the cases were clustered by census block or by basic street address. To obtain this information, the clerical review staff examined 32,574 completed address cards in the 10 district offices with the largest number of available cards (7 of these district offices were in New York City and the remaining 3 were in other regional census centers.) These cards were in 5,364 blocks and 14,829 basic street addresses. The clerical review found that there was at least 1 case in about 31 percent of the total blocks in the 10 district offices. In the seven district offices that were examined in New York City, the cases were evenly distributed among the census blocks which suggests no clustering effects among blocks. In the other district offices, the cases were located in about 23 percent of the blocks, which suggests a slight clustering effect by census block.

For these 10 district offices with the largest number of available cards, about 24 percent of the blocks with cases

had more than 6 cases. For the New York offices, this percentage was 38 percent, which is consistent with the high density of the typical block in New York City.

This evaluation also looked at clustering by basic street address. The 32,574 reviewed cases were found in 14,829 basic street addresses. The clerical review found that, on the average, about 4 percent of the basic street addresses in the 10 district offices with the largest number of available cards had at least 1 case for at least 1 followup operation and these addresses were evenly distributed throughout the district office areas.

About two-thirds of the basic street addresses with cases had only one case. This result suggests that the cards were not clustered by basic street address. For the New York district offices there was a slight clustering effect since 42 percent of the cards were in basic street addresses with two or more cases. This clustering effect is most likely the result of the large number of multiunit buildings in the New York area.

In summary, there was some evidence of slight clustering by block and by basic street address, but the clustering does not seem to be of practical importance.

Address Characteristics—The clerical staff reviewed a sample of 2,026 address cards to tabulate various summary data about the characteristics of the addresses for which the USPS provided usable census data. The results are shown in table 4.3.

Table 4.3. Summary Characteristics Based on Weighted Estimates From the Sample Cases

	Newskaa	Estimated percent of	Standard
	Number	cases	error
Occupancy Status: Occupied on April 1, 1990 Vacant on April 1, 1990 Non-residential Not determined.	1,756	86.1	(1.1)
	96	4.4	(0.6)
	23	0.8	(0.2)
	153	8.7	(0.5)
Type of Structure: Mobile home Detached 1-family Attached 1-family Multiunit Not determined.	2	0.1	(0.1)
	171	4.5	(0.5)
	189	5.4	(0.6)
	1,522	81.5	(1.1)
	142	8.5	(0.8)
Estimated population for occupied units: 1-person	158	8.4	(0.9)
	123	4.3	(0.6)
	51	1.8	(0.4)
	30	1.0	(0.3)
	17	0.5	(0.2)
	21	1.1	(0.3)
	1,356	82.9	(1.2)
Information used for closeout:* Occupancy status Type of structure Estimated population None	261	5.7	(0.5)
	6	0.2	(0.1)
	357	14.0	(0.9)
	1,651	85.6	(0.9)

^{*} Percentage is greater than 100 since more than one data item may have been used.

The table shows that the majority of the sample cases were reported by the mail carriers as occupied on Census Day. For the occupied units, the carriers were able to provide an estimate of the number of Census Day occupants about 17 percent of the time.

Over 80 percent of the sample cases were located in multiunit buildings. This lends support to the notion that multiunit structures are difficult to enumerate.

The mail carriers reported that about 906 persons lived in the 400 units for which they provided an estimate of Census Day population. This suggests an average household size of about 2.27 persons (standard error = 0.17), which is lower than the 2.63 average household size for occupied housing units for the Nation. The smaller household size is most likely the result of the mail carriers reporting only the number of persons to whom mail is addressed at the household. It is important to note that the mail carriers did not record the Census Day population for about 83 percent of the occupied sample cases.

The district offices were supposed to indicate on the address cards which information, if any, they used to help resolve ("closeout") the case. Based on the sample of cards reviewed for this evaluation, it appears that some mail carrier information was used to resolve an estimated 14.4 percent of the total cases available for clerical review. The estimated population was most useful, followed by the occupancy status. The type of structure was not very useful, presumably because it was already available from enumerator observation at the address.

Conclusions

The Census Closeout Address Check was implemented in an attempt to obtain information for unenumerated cases during followup operations. To that end, it is noteworthy that the district offices reported that they used the information provided by the mail carriers to closeout about 14.4 percent of the cases reviewed for this evaluation. While it is not possible to know for sure why the mail carrier information was not used more often (and perhaps it was, but the district offices failed to report it), two hypotheses seem reasonable: 1) the district offices did not stop field work on the cases while the mail carriers were working on them, so the enumerators may have obtained more complete information for the cases, 2) the mail carrier information may have been received too late to be used for closeout. Whatever the reason, it is apparent for the sample cases in this evaluation, the mail carrier information was not the primary source of closeout data, although the information from the mail carriers was used for a substantial number of cases.

The mail carriers reported that about 86 percent of the cases they reviewed were occupied on Census Day. They were unable to report Census Day occupancy status for 8.7 of the sample cases. For the cases where they were able to report Census Day occupancy status (occupied or vacant), they reported that about 95 percent of the units were occupied on Census Day. Since we are unable to

identify which cases came from which specific census followup operation, it is difficult to compare this occupancy rate to other rates. However, internal administrative reports suggest that the final occupancy rate for last resort cases converted by field enumerators was about 72 percent at the end of Nonresponse Followup. This difference in reported occupancy rates suggests that the mail carriers were probably more likely to fill out an address card for units to which they actively deliver mail, thereby inflating the Census Day occupancy rate. In addition, since the majority of the sample cases were in multiunit buildings, it is possible that the mail carriers reported occupancy status for the structure rather than for the specific living quarters identified on the address card.

The average household size reported by the mail carriers for occupied units was somewhat lower than the national average. This is probably the result of the mail carriers reporting the number of persons to whom mail is delivered at the unit. It may also reflect the fact that about 40 percent of the cases may have originated from the POP One Reenumeration, which was a special followup conducted in households reported as being occupied by one person during Nonresponse Followup.

The results of this evaluation suggest that the Census Closeout Address Check provided useful information to help closeout the unenumerated cases. The mail carriers seemed able to provide the very limited information requested on the address card, although the type of structure information was probably not necessary. While the Census Closeout Address Check did not result in any significant savings of field enumeration cost since the enumerators continued to revisit the addresses while the USPS conducted the work, it provided the opportunity for the Census Bureau and the USPS to work together on the data collection phase of the 1990 census.

Reference

[1] Tenebaum, Michael C. 1990 Census Preliminary Research and Evaluation Memorandum No. 89, "Census Closeout Address Check Evaluation." U.S. Department of Commerce, Bureau of the Census. October 7, 1991.

VACANT/ DELETE/ MOVERS CHECK

Introduction and Background

Results from the 1980 census evaluations showed that substantial coverage improvement was obtained through the followup of housing units identified during Nonresponse Followup as vacant and nonexistent housing units. The followup of vacant and nonexistent housing units also provided a technique for identifying and counting post-Census Day movers. This operation, referred to here as the Vacant/ Delete/ Movers Check, was an integral part of the 1990 Census Field Followup operation.

The results of the followup of vacant and deleted units for the 1990 census were evaluated to show how much coverage improvement was obtained from the Vacant/ Delete/ Movers Check and to make recommendations for the 2000 census.

Housing units for which a questionnaire was not returned by mail were visited during Nonresponse Followup to determine the status of the unit and to complete a census questionnaire. Units classified as vacant or deleted (nonexistent) in Nonresponse Followup, or during List/Enumerate field work, were revisited during the Vacant/ Delete/ Movers Check to determine if the unit was classified correctly. If the Vacant/ Delete/ Movers Check status matched the status given to the unit in Nonresponse Followup, no further processing was done. If the Vacant/ Delete/ Movers Check classification was found to be different than the status assigned in Nonresponse Followup, the housing unit and/ or occupants were enumerated and the change in unit status was made to the Address Control File, although vacant units reclassified to delete remained as vacant on the Address Control File.

In the 1980 census and in the early 1990 Test Censuses, the procedure involved de facto enumeration of movers; that is, the unit was enumerated as it was at the time of vacant/ delete followup and the current residents were enumerated if they had not been enumerated at their Census Day address. The method implemented for the 1988 Dress Rehearsal and the 1990 census involved de jure enumeration of movers. This method entailed classifying the unit as it should have been on Census Day and enumerating households who moved to a unit after Census Day at their Census Day address, if they were not already counted there. During the field enumeration, the respondent's word was accepted as to whether they were enumerated at their Census Day address.

The Nonresponse Followup status was accepted as a proxy for Census Day status, unless during the Vacant/ Delete/ Movers Check it was determined that the unit was occupied on Census Day by the current household. If it was occupied by an in-mover, a Mover-Usual Home Elsewhere (UHE) questionnaire was completed for the in-movers (who said they were not counted elsewhere) and a Search/ Match operation was performed to verify that the household was correctly enumerated at their reported Census Day address. The status of a housing unit where in-movers were discovered remained as it was in Nonresponse Followup, unless a Mover-Usual Home Elsewhere questionnaire was received as a result of the Vacant/ Delete/ Movers Check at another address.

Methodology

The results categories were based on vacant and delete counts extracted from the Address Control File. Vacant and deleted units which were converted to occupied were matched to the associated census data files to obtain person counts and demographic information. For postcensus movers, this evaluation used the results generated

by the Search/Match processing of forms D-190, Search Records, completed for Mover-UHE cases. Refer to chapter 5 for details of this operation.

Results

Nationally—A total of 10.2 million vacant and deleted units were followed up. Of these, 2.9 million units were deletes (nonexistent) and 7.3 million units were vacant.

Of the 2.9 million deleted units, 188,591 (6.4 percent) were converted to occupied, 156,198 (5.3 percent) were converted to vacant and 2.6 million (88.3 percent) remained deletes. The Vacant/ Delete/ Movers Check resulted in a total of 344,789 units (11.7 percent) being added back to the census, representing a coverage gain of 0.34 percent.

Of the 7.3 million vacant units, 634,129 (8.7 percent) were converted to occupied, 4,688 (0.1 percent) were converted to delete, and 6.6 million (91.2 percent) remained vacant. The vacant units converted to delete were not reclassified as delete on the ACF.

In the vacant and deleted units converted to occupied, a total of 1,505,415 persons were added to the census representing a coverage gain of 0.6 percent.

Tape Address Register Areas—A total of 5,554,990 vacant and nonexistent units were followed up in the TAR areas. This represented about 54.3 percent of the Vacant/ Delete universe. The followup of 1.7 million deleted units resulted in the addition of 196,749 (0.35 percent increase) housing units to the housing inventory in the TAR areas. Of the 1,682,180 TAR units classified as delete, 90,839 (5.4 percent) were converted to vacant and 105,910 (6.3 percent) were converted to occupied.

Of the 3.8 million TAR units classified as vacant, 402,377 (10.4 percent) were converted to occupied. A total of 508,287 units originally classified as deleted or vacant were converted to occupied. Of these units, 105,910 (6.3 percent) were originally classified as deleted and 402,377

Table 4.4. 1990 Census Vacant/ Delete/ Movers Check

National results	Number	Percent	Percent of U.S. total ¹
Total vacant/ delete housing units	10,231,111	100.0	10.00
Total deletes	2,956,891 2,612,102 188,591 156,198	100.0 88.3 6.4 5.3	2.89 2.55 0.18 0.15
Total vacants	7,274,220 6,635,403 634,129 ² 4,688	100.0 91.2 8.7 0.1	7.11 6.49 0.62 0.00
Total other converted units	³ 231,147	2.3	0.23

¹Percent of total national housing units (102,263,678).

²Vacants converted to deletes remain as vacants on the ACF.

³These conversions are in addition to those made during Vacant/ Delete/ Movers Check and were not made as the direct result of the vacant/ delete followup but were included in the workload.

units (10.4 percent) were originally classified as vacant. As a result of converting vacant and deleted units to occupied, 875,169 persons were added to the census. This figure represents about 0.63 percent of the persons counted in TAR areas.

Non-TAR Areas—A total of 4,676,121 vacant and nonexistent units were followed up in non-TAR areas. These areas include Prelist Mailout/Mailback, Prelist Update/Leave, Prelist Pocket, and List/Enumerate areas. The workload represents approximately 45.7 percent of the Vacant/Delete universe. The followup resulted in an addition of 148,040 (0.33 percent increase) housing units in non-TAR areas. Of the 1,274,711 units classified as delete, 65,359 (5.1 percent) were converted to vacant and 82,681 (6.5 percent) were converted to occupied. Of the 3.4 million non-TAR units classified as vacant, 231,752 (6.8 percent) were converted to occupied.

A total of 314,433 units originally classified as deleted or vacant were converted to occupied. Of these units, 82,681 units (26.3 percent) were misclassified as deleted and 231,752 units (73.7 percent) were misclassified as vacant. As a result of converting vacant and deleted units to occupied, 630,246 persons were added to the census. This figure represents about 0.58 percent of the persons counted in non-TAR areas.

Comparison to 1980—The overall field conversion rate at which vacant units were converted to occupied was 8.7 percent. This rate is substantially lower than the conversion rate of 10.1 percent during the 1980 census. This rate does not reflect conversions made during the Search/Match operation. One reason for a lower conversion rate in the field for the 1990 census versus the 1980 census is that in 1980, all housing units containing in-movers who were not previously enumerated were converted to occupied; but in the 1990 census, the housing unit remained vacant and the in-movers were enumerated at their Census Day address.

The rate at which deleted units were converted to vacant or occupied for the nation was 11.7 percent. This rate was also lower than the 17.3 percent conversion rate in the 1980 census. It is possible that during the 1990 Nonresponse Followup operation the enumerators did a better job of identifying nonexistent units than in the 1980 census. This may be attributed to better training and procedures. Evidence was also provided by observers that when a Vacant/ Delete enumerator converted a deleted unit, it was often one that was difficult to find and/ or one that looked at first to be uninhabitable.

There was an overall average of 2.63 persons per occupied housing unit for the Nation. The average household size for units converted to occupied during the Vacant/ Delete/ Movers Check was 1.83 persons per occupied housing unit, which is 0.80 persons lower than the average household size for occupied housing units for the Nation. For the 1980 census, the average number of

persons per converted occupied unit added by the Vacant/ Delete/ Movers Check was 0.50 persons lower than the average household size for the nation. See table 4.5.

The following tables reflect various demographic characteristics of persons in housing units added by the Vacant/ Delete/ Movers Check for the nation. The data were obtained by matching the Address Control File for housing units added by the operation to the census data file to obtain the characteristics. Total figures do not agree exactly because of rounding.

By adding higher percentages of Blacks (21.6 percent versus 12.1 percent) and Hispanics (11.6 percent versus 9.0 percent) than are found in the overall U.S. counts, the Vacant/ Delete/ Movers Check improved the coverage of certain subpopulations that have historically been undercounted in the census. See table 4.6.

As seen in table 4.7, the Vacant/ Delete/ Movers Check added a higher percentage of White, male, Hispanic (3.2 percent versus 2.3 percent) persons and White, female, Hispanic (3.0 percent versus 2.3 percent) persons than found in the overall U.S. counts. For Black, Hispanic, males and females, there was very little difference. However, when looking at Black, male, non-Hispanic (10.0 percent versus 5.5 percent) and Black, female, non-Hispanic (11.3 percent versus 6.2 percent) persons, the Vacant/ Delete/ Movers Check added a substantially higher percentage than found in the overall U.S. counts.

For other race, the Vacant/ Delete/ Movers Check data show a slightly higher percentage for both male, Hispanic and non-Hispanic persons and for female, Hispanic and non-Hispanic persons.

Post-Census Movers—This evaluation includes the results of the Search/ Match processing of the Mover-UHE forms.

Table 4.5. Average Household Size Per Occupied Unit

Average persons per unit	1990 census	1980 census
Persons per occupied unit	2.63	2.75
occupied unit	1.83 0.80	2.25 0.50

Table 4.6. Race and Hispanic Origin of Added Persons

	Persons in V/D units converted to occupied	Percent	Census population [1]	Percent
Total	1,505,415	100.0	248,709,873	100.0
White	1,035,296	68.8	199,686,070	80.3
Black	324,702	21.6	29,986,060	12.1
Other	145,717	9.7	19,037,743	7.7
Total	1,505,415	100.0	248,709,873	100.0
Hispanic	175,008	11.6	22,354,059	9.0
Non-Hispanic	1,330,407	88.4	226,355,814	91.0

Table 4.7. Race by Sex by Hispanic Origin of Added Persons

Race	Sex	Origin	Added persons	Percent	Census population	Percent
Total			1,505,415	100.0	248,709,873	100.0
White	Male	Hispanic	48,657	3.2	5,819,289	2.3
	Male	Non-Hispanic	486,348	32.3	91,656,591	36.9
	Female	Hispanic	44,490	3.0	5,738,485	2.3
	Female	Non-Hispanic	455,501	30.3	96,471,705	38.8
Black	Male	Hispanic	2,027	0.1	391,024	0.2
	Male	Non-Hispanic	151,022	10.0	13,779,127	5.5
	Female	Hispanic	2,122	0.1	378,743	0.2
	Female	Non-Hispanic	69,531	11.3	15,437,166	6.2
Other	Male	Hispanic	41,509	2.8	5,177,746	2.1
	Male	Non-Hispanic	35,159	2.3	4,415,641	1.8
	Female	Hispanic	36,203	2.4	4,848,772	1.9
	Female	Non-Hispanic	32,846	2.2	4,595,584	1.8

The results are based on clerical tallies and the clerks' ability to sort and search forms correctly. The result categories used during the sort operation were dependent on the results being recorded correctly on the Search/ Match Status Label (see chapter 5). If the clerks did not fill the Search/ Match Status Label correctly, the search form would be included in the "Other" sort category. The true number of search forms in specific categories may be overstated or understated. For this reason, the numbers presented in table 4.8 may differ from those presented in chapter 5.

Search/ Match Results—The following Mover/ UHE results were reported by the processing office Search/ Match staff.

The overall Search/Match workload for movers was relatively small. It was about 3.0 percent of all the search/match work. Of these cases, 8.3 percent were unsearchable (incomplete address or no names or characteristics) and 10.5 percent were ungeocodeable (the clerks could not assign the search address to a geographic location).

Thus, about 18.9 percent of the Mover-UHE cases were not processed beyond the Geocoding operation. This is surprising, given that clerks were instructed to only fill out a D-190 Search Record for Mover-UHE cases if the UHE address was searchable.

Table 4.8. Results for National Mover-UHE's

Search/ Match	Number of mover households [3]	Percent
Total	94,711	100.00
Unsearchable	7,885 9,986 17,871	8.3 10.5 18.9
Matched to questionnaire		29.3 36.0 65.3
Other	14,974	15.8

Approximately 29.3 percent of the Mover-UHE cases were matched to persons already listed on a census questionnaire. Of the total mover addresses sent to Search/Match, a very high proportion resulted in adds (about 36.0 percent). "Adds" include forms for which at least one person was transcribed to the questionnaire at their reported Census Day address. Of the matched and transcribed cases, the add rate is about 55.1 percent. Although the Mover-UHE cases represent only 3.0 percent of the total search forms, they had one of the highest potential coverage improvement rates.

The "other" category includes cases that were not completely processed during the Search/Match operation for various reasons. It also includes cases with clerical coding errors that could not be resolved for this evaluation.

The 1990 Search/ Match operation was instrumental in adding movers who otherwise would have been missed in the Census. If the processing office methodology was improved to reduce the number of uncoded and unsearchable cases, which made up 18.9 percent of the Mover-UHE workload, an estimated 50 percent of these cases would have resulted in additional mover adds. There is still the problem of ensuring that Mover-UHE cases get sent to Search/ Match. If the Vacant/ Delete enumerator did not mark the questionnaire as a Mover-UHE case, no D-190 Search Record was completed. There were no quality assurance checks to ensure that these procedures were properly implemented.

Conclusions

The Vacant/ Delete/ Movers Check was an effective census operation which identified and added missed housing units and persons.

The cost per converted unit and cost per added person was much higher in the 1990 census Vacant/ Delete/ Movers Check than for previous test censuses and in the 1980 census. Some of the increased per unit cost was due to lower conversion rates in the field and to higher wages, more mileage, and the difficulty associated with classifying hard to enumerate units. The de jure method definitely had

some effect on the lower field conversion rates per site. Under the de jure methodology, in-movers would be counted at their Census Day address to the extent possible. Thus, the Vacant/ Delete/ Movers Check address would remain as vacant in the census files unless Search/ Match resulted in assigning another Census Day household to that address. This is in contrast to the 1980 census de facto rules whereby in-movers were enumerated at the followup address.

In both the mailback and List/ Enumerate areas, the proportion of Black and Hispanic persons among the census adds from the Vacant/ Delete/ Movers Check were higher than found in the general census population. It appears that the followup of vacant and deleted units can be beneficial in reducing the differential undercount.

Overall, the Vacant/ Delete/ Movers Check added a substantial number of persons to the 1990 census; however, at relatively great expense. As in 1970 and 1980, there was a coverage problem with units that were incorrectly classified as vacant or nonexistent during Nonresponse Followup. It is recommended that a review of vacant and deleted units be part of the 2000 census.

References

[1] 1990 Census of Population and Housing. 1990 CPH-1-1, "Summary Population and Housing Characteristics of the United States." U.S. Department of Commerce, Bureau of the Census. March 1992.

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[3] Tillman, Amy. DSSD 1990 Research, Evaluation, and Experimental Memorandum No. T-19, "Preliminary Results: 1990 Search/ Match Workloads by Result From the Sample Selection Sort Operation Conducted in the Processing Offices." U.S. Department of Commerce, Bureau of the Census. October 24, 1991.

PUERTO RICO MULTIUNIT COVERAGE IMPROVEMENT OPERATION

Introduction and Background

The Census Bureau implemented a clerical matching operation to improve the coverage of address listings for multiunit structures completed by enumerators in the 1990 Census of Puerto Rico. A clerical matching operation between the census address listing books and the mailing list of residential customers supplied by the Autoridad de Energia Electrica de Puerto Rico (Puerto Rico Electric Company) was conducted in municipios in the four district offices comprising and surrounding the San Juan municipio since the majority of large multiunit structures in

Puerto Rico were located within this area. For this operation, eligible multiunit structures were defined as any structure with at least 50 apartment units located within the boundaries of the San Juan I, San Juan II, Bayamon, or Carolina District Offices.

The Multiunit Coverage Improvement operation was completed in three steps. The first step involved clerks using the basic street address or condominium name on the Puerto Rico Electric Company match list to geocode the multiunit structures to census geography. The clerks used census maps, municipio locator maps, commercial index maps, and other geographic materials to identify the address register area containing the basic street address.

The next step was to complete a two-stage matching operation. In the first stage, clerks compared census address registers completed by the enumerators during the List/Enumerate operation with the mailing lists of the residential customers supplied by the Puerto Rico Electric Company. If the number of units for the structure listed in the address register was greater than or equal to the number of units found on the electric company list, no further action was required. If the number of units for the structure listed in the address register was less than the number of units on the electric company list, clerks then completed the second stage of the matching operation. This was a unit by unit match between the two listings to identify any units listed on the electric company listing, but not listed in the address registers for the respective structure.

Once the matching was completed, any unit identified on the electric company list, but not listed in the address register, was field checked. The enumerators visited the structure to determine if the units missing from the address register existed on April 1, 1990. If the unit existed, the address was added to the address register and a census questionnaire was completed.

Methodology

The data for this evaluation were supplied from the census staff within the four district offices. Along with the electric company address listings from the 262 eligible multiunit structures were 2 forms summarizing the results of the operation. The Summary of Office Geocoding and Matching, D-1021 PR (see appendix B for an illustration of the form) provided the final results of geocoding and matching activities within each district office. The Summary of Field Review operations, D-1022 PR (see appendix B for an illustration of the form) tracked the final results of field enumeration activities from the operation.

The add rate is defined as the ratio of added units (units which existed on April 1, 1990) to the total units within the 262 eligible multiunit structures in the 4 district offices.

Results

Coverage Gain—The Puerto Rico Multiunit Coverage Improvement operation added 143 units (add rate of 0.39

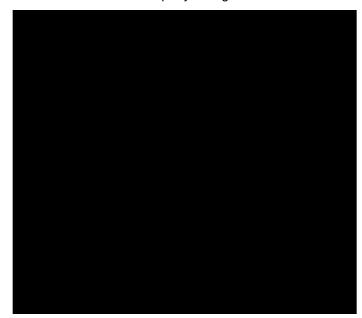
percent) to the 36,388 units in the census address registers for the eligible multiunit structures in the 4 district office areas of San Juan, Puerto Rico.

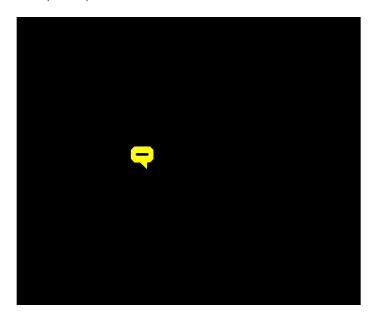
The 4 district offices had 262 eligible multiunit structures involved in the operation. Among the 262 multiunit structures, a total of 34,289 units were listed in the electric company address listings and 36,388 units were listed in the address registers. A comparison of these 2 values shows the census address registers had 2,099 more units listed. This resulted in the address registers having 6.1 percent more listings than the electric company. Figure 4.1 shows that the number of census address listings were higher than the electric company listings in all four district offices.

Geocoding and Matching Operation—During the matching operation, clerks used the form D-1021 PR, to summarize geocoding and matching activities from the operation. Figure 4.2 summarizes the first stage of the matching operation for each district office. Absolute differences in unit counts between the 2 listings ranged from no difference to a difference of 188 units. A summary of the matching activities across the four district offices exhibited:

- 210 of the 262 structures (80.2 percent) had more units listed in the address registers than on the electric company listings. Of these 210 structures, 118 (56.1 percent) had a unit count difference of 5 units or less, and 54 structures (25.7 percent) had a unit count difference of 10 or more units.
- 38 of the 262 structures (14.5 percent) had the same number of units on both listings.
- 14 of the 262 structures (5.3 percent) had more units on the electric company listings than in the address registers.

The clerks completed the second stage of the matching operation for the 14 structures for which there were more units on the electric company listings than in the address





registers. They performed a one-way match comparing the electric company listing to the address register listing on a unit-by-unit basis. Final results indicated there were 162 units listed on the electric company listings that were not in the census address register listings.

Field Enumeration—Enumerators revisited each of the 14 structures in order to resolve the 162 units on the electric company listings which did not appear in the address registers. With the completion of the field enumeration, enumerators identified 143 valid added units and completed census questionnaires for these units. That is, 143 units existed on April 1, 1990 and should have been included in the 1990 census. The remaining 19 non-matched units did not exist on April 1, 1990.

Table 4.9 illustrates the results of field enumeration activities. These data were obtained from the Form D-1022PR, Summary of Field Review operations. The occupancy status for the 143 units revealed that 88 of the 143 units were occupied units, 41 units were vacant units, and 14 units were last resort households. Occupancy status for the 14 last resort units could not be determined for the evaluation.

Conclusions

The goal of this operation was to improve the coverage of address listings completed by the enumerators for the 262 multiunit structures found in the 4 San Juan district

Table 4.9. Occupancy Status of Nonmatched Units
After Field Enumeration

	Occupied units	Vacant units	Last resort units	Units did not exist
San Juan I	69 11	29 2	14	18
Bayamon	1	0	0	0
Carolina	7	10	0	0
Total	88	41	14	19

offices. This was done by matching address listings from the address registers to the mailing list of residential customers supplied by the Puerto Rico Electric Company. The goal of this evaluation was to determine how complete the census enumerators listed addresses at the multiunit structures and determine the effectiveness of using this specific independent list to improve coverage.

The final outcome of this operation brought very minimal coverage improvement to the 1990 Census of Puerto Rico. With the completion of the matching and field operations, a total of 143 units were added to the Address Control File.

Results from this operation illustrated that the census address register listings were more comprehensive than the electric company listings in providing a complete list of possible addresses found in the 262 multiunit structures. This was evident from the 2,099 additional addresses found within the address registers when compared to the electric company listings.

The results of the operation have provided sufficient evidence that the enumerators were successful in listing addresses in their address registers when compared to the electric company address listings. Given these results, the electric company listing could better serve the Census Bureau as an administrative records source of coverage improvement in multiunit structures in Puerto Rico, rather than as the source of a mailing list for Puerto Rico.

Reference

[1] Cecco, Kevin. 1990 Decennial Census Preliminary Research and Evaluation Memorandum No. 86, "Puerto Rico Multiunit Coverage Improvement Operation Evaluation." U.S. Department of Commerce, Bureau of the Census. October 10, 1991.

RECANVASS OPERATION

Introduction and Background

In order to improve coverage for the 1990 decennial census, the Census Bureau implemented the Recanvass operation. The objective of the Recanvass operation was to improve coverage in areas where census research may have indicated evidence of deficient housing unit counts.

The Recanvass operation was conducted in the summer of 1990 and was completed in two stages. During stage 1, pairs of census enumerators visited targeted areas to identify and list missing addresses. During stage 2, enumerators completed census questionnaires at each housing unit added during stage 1, if appropriate. That is, enumerators had to determine if the unit existed on Census Day. If the unit added during stage 1 did not exist on Census Day, then the enumerator deleted the unit from the address register.

To meet the objective of the operation, nine specific census research sources were used to identify areas. These sources provided data indicating which geographic areas (for example, block, address register area, tract, and/or county) may have had deficient housing units counts. Once the areas were identified, census enumerators recanvassed the area to determine if any housing units were omitted from census records. All types of enumeration areas were eligible for the Recanvass operation.

This section provides information on the number of blocks recanvassed, the number of housing units added during the operation, the final occupancy status of these added housing units, and the type of address and structure of the added housing units. The final portion of this section assesses how the distribution of challenged blocks in Postcensus Local Review would have changed if the Recanvass operation had not been implemented.

Methodology

A large portion of the data were obtained from the Address Control File which provided data on the extent of coverage from the operation. Data from the regional census centers were also used in the evaluation. These data summarized the results of recanvassing activities during the operation.

The recanvass rate is defined as the ratio of blocks recanvassed during the Recanvass operation to the total number of blocks.

The add rate is defined as the ratio of valid added housing units (units added as a consequence of the Recanvass operation which remained either occupied or vacant when final census counts were issued) to the total number of housing units in all enumeration areas before the Recanvass operation.

Limitations

Results pertaining to Recanvass added units are based on data that were extracted from Census Bureau files using the source code variable. Other research has suggested the existence of errors in the assignment of Recanvass add source codes. However, the extent of the error is not known.

In areas where the Recanvass and Postcensus Local Review operations were conducted concurrently, this evaluation cannot document the Recanvass coverage yield separately from the Postcensus Local Review yield.

Results

Number of Blocks Which Were Recanvassed During the Recanvass Operation—Table 4.10 provides the number of blocks recanvassed during the Recanvass operation as well as the recanvass rate for the four census regions (see appendix C for an illustration of the four census regions) and nationally. Of the approximately 6.5 million blocks nationwide, enumerators recanvassed over 522,000 (8.1 percent) blocks during the Recanvass operation. The

Table 4.10. Blocks Recanvassed From the Recanvass Operation by Census Region

Census region	Total blocks	Blocks recanvassed	Recanvass rate (percent)
National	975,161	522,805 76,562 170,763 190,762 84,718	8.1 7.9 9.1 7.7 7.5

table shows the largest number of blocks recanvassed was in the South Census Region with 190,762 blocks and the largest recanvass rate was in the Midwest Census Region at 9.1 percent.

Added Housing Units From the Recanvass Operation—

The Recanvass operation added 138,568 housing units to the national housing inventory. This translates into a 0.14 percent add rate when comparing the number of valid added housing units from the operation to the total number of housing units before the Recanvass operation.

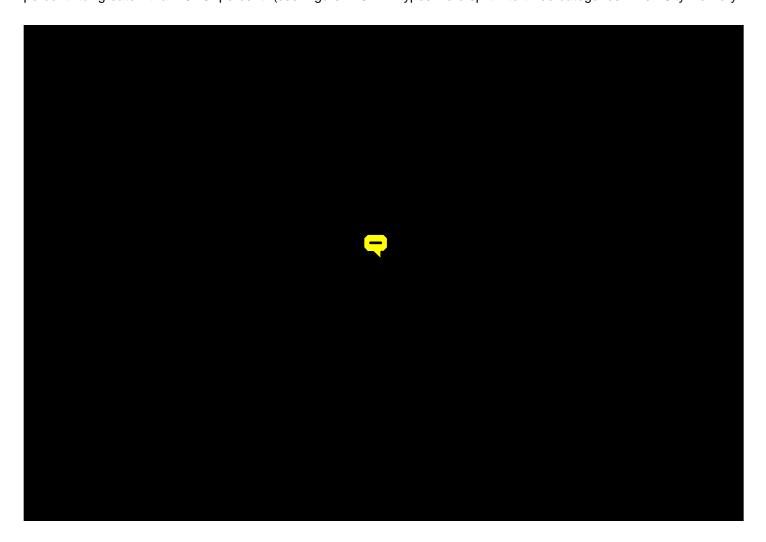
Figure 4.3 provides a distribution by State of the respective add rates. The shaded areas are defined by the add rates from the operation and range from less than 0.10 percent to greater than 0.25 percent (see figure 4.3

legend). The figure shows that the Recanvass operation had the largest impact in the Southeastern States as well as some States in the western portion of the nation. Delaware and Florida had the highest add rates during the Recanvass operation at 0.39 percent.

Final Occupancy Status of Recanvass Added Housing Units—Figure 4.4 highlights the final occupancy status rates of Recanvass added housing units by the four census regions, as well as nationally.

Overall, 48.9 percent of the added units from the Recanvass operation remained occupied, 29.4 percent of the added housing units were vacant housing units, and the remaining 21.6 percent of the added housing units eventually were deleted by later census operations and/or activities. Results indicate that the Northeast Census Region had the highest occupied rate among the four regions at 55.1 percent. The West Census Region had the highest vacant rate at 32.8 percent and the Midwest Census Region had the highest delete rate at 27.3 percent.

Added Units by Type of Address and Type of Structure— Table 4.11 provides the percentage of Recanvass added units by type of address and census region. The address types were split into three categories. The "City Delivery"



type includes added units with house number and street name addresses. The "Rural Delivery" type includes those added units which were of rural route, highway contract route, or star route type. The "Other" category includes added units which were of non-delivery type (that is, PO Box or general delivery) as well as added units listed with physical locations only (no address associated with the added unit).

Results from table 4.11 clearly show that the majority of Recanvass added units were city delivery type addresses. All four census regions had a city delivery type address percentage greater than 80 percent.

Table 4.12 provides the percentage of Recanvass added units by type of structure and census region. The structure types were split into four groups. The "Mobile Home" type

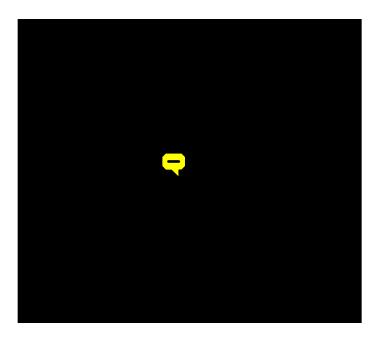


Table 4.11. Percentage of Recanvass Added Units by Type of Address

Census region	City delivery (percent)	Rural delivery (percent)	Other (percent)
National Northeast Midwest South West	86.9	5.1	8.0
	87.3	4.6	8.1
	90.2	5.2	4.6
	80.8	8.1	11.2
	95.4	0.5	4.1

Table 4.12. Percentage of Recanvass Added Units by Type of Structure

Census region	Mobile home (percent)	One-family (percent)	Apartment (percent)	Other (percent)
National	10.4	58.6	29.2	1.9
	3.2	38.0	54.9	4.0
	9.1	62.4	26.5	2.1
	14.6	60.1	24.1	1.2
	8.4	66.8	23.2	1.6

includes added units which were either individual mobile homes or mobile homes in trailer parks. The "One Family" type includes all one-family houses which were either attached or detached from one another. The "Apartment" type includes all structures with two or more units. The "Other" category includes the remaining added units which were not considered to be a mobile home, one-family structure, or a unit within an apartment structure.

Table 4.12 shows that slightly less than 60 percent of the total Recanvass added units were one-family structures. Units within apartment structures accounted for approximately 30 percent of the total Recanvass added units. The highest percentage of added units which were mobile homes were in the South Census Region and the highest percentage of added units within apartment structures were in the Northeast Census Region. The West Census Region had the highest percentage of added units which were one-family structures.

Postcensus Local Review Simulation—The final aspect of the Recanvass evaluation involved a simulation of the Postcensus Local Review as if the Recanvass operation had not occurred. This aspect of the evaluation assessed how the distribution of challenged blocks in Postcensus Local Review would have changed if the Recanvass operation had not been implemented. The goal was to determine the difference in the number of blocks and percentage of housing units which would have been eligible for Postcensus Local Review recanvass if the Recanvass operation had not been implemented.

Two identical files containing all challenged blocks from the Postcensus Local Review operation were created. The first file containing all Postcensus Local Review challenged blocks was not altered. The second file was altered when census staff removed all Recanvass added housing units from the respective Postcensus Local Review challenged blocks. The only difference between the two files was the first file contained Recanvass added housing units and the second file had the Recanvass added housing units removed.

Results from the first file illustrated that using the Postcensus Local Review recanvassing guidelines, 139,312 blocks representing 6.43 percent of the total housing units nationwide were eligible for Postcensus Local Review recanvass. Using the same Postcensus Local Review recanvassing guidelines and removing the Recanvass added housing units from the second file (as if the Recanvass operation had not been implemented), results show that 139,953 blocks, representing 6.44 percent of the total housing units, would have been eligible for Postcensus Local Review recanvass. The difference was 641 blocks or an additional 0.01 percent of housing units being eligible for Postcensus Local Review recanvass if the Recanvass operation had not been implemented.

Challenged blocks from Postcensus Local Review were matched to blocks with valid added units from the Recanvass operation. The purpose of completing this comparison was to determine the extent of valid added housing units from the Recanvass operation which would not have been added to census records if the Recanvass operation had not been implemented.

Results from matching both files showed that 24.4 percent (33,831 out of 138,568 units) of the added units from the Recanvass operation were found in challenged blocks during Postcensus Local Review. The remaining 75.6 percent of the added units from the Recanvass operation were found in blocks which were not challenged during Postcensus Local Review. These results indicate that three quarters of the valid added units during the Recanvass operation would not have been added if the Census Bureau elected only to complete Postcensus Local Review and not the Recanvass operation.

Conclusions

A total of 522,805 blocks were recanvassed during the Recanvass operation. From this recanvassing, the Census Bureau added 176,808 units to the Address Control File, of which 138,568 units remained either occupied or vacant when final census counts were released.

Results from the Postcensus Local Review simulation showed minimal change between the two distributions of challenged blocks (with and without Recanvass added units), indicating that the Recanvass operation was conducted in areas that were not challenged by local government officials. Results from comparing blocks with Recanvass added units to challenged blocks from Postcensus Local Review illustrated that three quarters of the Recanvass added units would not have been added to final census counts if the Census Bureau elected to only complete Postcensus Local Review.

The Recanvass operation was conducted in the later stages of the 1990 decennial census, so it played an important role in the completion of the census. The operation was a valuable coverage improvement operation, but equally important was its role in assuring the Census Bureau that the 1990 decennial census was completed correctly and accurately. Specifically, the completion of the Recanvass operation gave the Census Bureau a measure of assurance prior to Postcensus Local Review that no major areas of geography or segments of housing units were missed.

References

[1] Cecco, Kevin. 1990 Decennial Census Preliminary Research and Evaluation Memorandum No. 191, "Final Evaluation of the 1990 Recanvass Operation." U.S. Department of Commerce, Bureau of the Census. October 16, 1992.

[2] Cecco, Kevin and Florence H. Abramson. 1990 Decennial Census Preliminary Research and Evaluation Memorandum No. 184, "Evaluating the Local Review Operation From the 1990 Decennial Census." U.S. Department of Comerce, Bureau of the Census. October 13, 1992.

POSTCENSUS LOCAL REVIEW

Introduction and Background

The Postcensus Local Review operation was conducted in the fall of 1990 in all enumeration areas of the nation. The operation provided local government officials the opportunity to review Census Bureau counts of housing units and group quarters population, as well as boundary maps to identify any major discrepancies in the counts or maps. Housing unit counts were provided to all 39,198 governmental units prior to the operation and each governmental unit was invited to participate in Postcensus Local Review.

The regional census centers were responsible for sending a list of housing unit counts and group quarters population counts to local officials for each block within their jurisdiction. During the local review program, each governmental unit could appoint a representative to review the counts and work with Census Bureau staff to resolve any discrepancies. Local officials had 15 working days to review these counts, using local estimates derived from documents such as tax records, utility hookups, or building permits to identify discrepancies.

If the housing unit counts in these governmental units differed from the Census Bureau housing unit counts, the local census liaison informed the Census Bureau of these differences. Census Bureau representatives and local officials worked together to resolve the differences. Some discrepancies were resolved through discussions over the telephone or by consulting other sources. If the discrepancies could not be resolved in the office, then additional field review occurred. For some discrepancies, the Census Bureau recanvassed the block. During the recanvass, an enumerator revisited the block and, using the census address registers, made additions, deletions, or geographic transfers to the listing of housing units in that block.

This section documents such data as governmental unit eligibility and participation in Postcensus Local Review, the extent of blocks challenged and recanvassed, the add rates, the final census occupancy status of added units, and the added units by type of address and by type of structure.

Methodology

A large portion of the data were obtained from the Address Control File which provided data on the extent of coverage from the operation. Data from the regional census centers also were used in the evaluation. These data summarized the participation of governmental units in Postcensus Local Review as well as provided results of recanvassing activities during the operation.

The add rate is defined as the ratio of valid added housing units (units added as a consequence of Postcensus Local Review which remained either occupied or vacant when final census counts were issued) to the total number of housing units prior to Postcensus Local Review.

Limitations

Results pertaining to Postcensus Local Review added units are based on data that were extracted from Census Bureau files using the source code variable. Other research has suggested the existence of errors in the assignment of Postcensus Local Review add source codes. However, the extent of the error is not known.

In areas where Postcensus Local Review and the Recanvass operations were conducted concurrently, this evaluation cannot document the Postcensus Local Review coverage yield separately from the Recanvass coverage yield.

Results

Eligibility and Participation of Governmental Units in the Postcensus Local Review Operation—Eligibility in the Postcensus Local Review operation was open to all functioning governmental units within all enumeration areas. Participation in Postcensus Local Review could occur in any one of the following three ways. A governmental unit could respond by:

- 1. Agreeing with the census housing unit counts.
- 2. Disagreeing with census housing unit counts, but not providing the Census Bureau with the proper documentation to identify these discrepancies.
- 3. Disagreeing with the census housing unit counts and providing the Census Bureau with proper documentation for identifying the discrepancies.

Since all enumeration areas were eligible for Postcensus Local Review, all 39,198 functioning governmental units were eligible to participate in the operation. The national Postcensus Local Review response rate (the rate of participating governmental units to eligible governmental units) was 25.1 percent, or 9,847 governmental units participated in Postcensus Local Review out of the 39,198 eligible governmental units.

Governmental Units Which Challenged Census Housing Unit Counts During the Postcensus Local Review Operation—Of the 9,847 governmental units which participated, 6,602 (67.0 percent) challenged (with appropriate documentation) the Census Bureau's housing unit counts. The remaining 3,245 (33.0 percent) were split into governmental units which responded by agreeing with the census counts and governmental units which responded by disagreeing with the census counts but did not have the proper documentation to identify the discrepancies.

Challenged and Recanvassed Blocks From the Postcensus Local Review Operation—Of the approximately 6.5 million blocks delineated by the Census Bureau, governmental unit officials challenged (that is, disagreed with the census housing unit counts and provided documentation showing the differences for) 270,650 blocks (4.2 percent).

Of the 270,650 challenged blocks, Census Bureau enumerators recanvassed 62 percent of the blocks during Postcensus Local Review. The remaining 38 percent of the challenged blocks were not recanvassed because the blocks did not meet the recanvassing guidelines for Postcensus Local Review. Recanvassing guidelines for Postcensus Local Review stated that 2 percent of the total housing units within the governmental unit would be recanvassed, starting with the blocks with the largest positive housing unit count differences and continuing in descending order. In addition, all blocks with a housing unit count difference (the governmental unit housing unit count minus the census housing unit count for any challenged blocks) greater than one or negative five would be recanvassed. The district offices also had the option to recanvass the remaining challenged blocks, if time permitted.

Added Housing Units From the Postcensus Local Review Operation —The Postcensus Local Review operation added 80,929 housing units to the national housing inventory. This translates into a 0.08 percent add rate when comparing the number of valid added housing units to the total number of housing units before the Postcensus Local Review operation.

Figure 4.5 provides a distribution by State of the respective add rates. The shaded areas are defined by the respective add rates from Postcensus Local Review which range from less than 0.10 percent to greater than 0.25 percent (see figure 4.5 legend).

Final Occupancy Status of Postcensus Local Review Added Housing Units—Figure 4.6 highlights the final occupancy status rate of Postcensus Local Review added housing units at the national and census region levels (see appendix C for an illustration of the four census regions).

Overall, 58.7 percent of the added housing units from the Postcensus Local Review operation remained occupied units, 29.6 percent of the added housing units were vacant housing units, and the remaining 11.7 percent of the added housing units eventually were deleted by later census operations and/ or activities. The figure illustrates that the West Census Region had the highest vacancy rate at 38.0 percent. Results also indicate that the South Census Region had the highest occupied rate at 61.7 percent and the Northeast region had the highest delete rate at 17.2 percent.

Added Units by Type of Address and Type of Structure— Another component of the Postcensus Local Review evaluation assessed the percentage of added units by type of address and type of structure.

Table 4.13 provides the percentage of Postcensus Local Review added units by type of address and census region. The address types were split into three categories. The "City Delivery" type includes added units with house number and street name addresses. The "Rural Delivery" type includes those added units which were of rural route, highway contract route, or star route type. The "Other"



category includes added units which were of non-delivery type (that is, PO Box or general delivery) as well as added units listed with physical locations only (no specific address associated with the added unit).



Table 4.13. Percentage of Postcensus Local Review Added Units by Type of Address

Census region	City delivery (percent)	Rural delivery (percent)	Other (percent)
National	86.4	4.1	9.5
	91.2	3.1	5.7
	86.9	4.0	9.1
	78.7	7.3	13.9
	92.7	0.5	6.9

Results from table 4.13 clearly show that the majority of the Postcensus Local Review added units were city delivery type addresses. All four census regions had a city delivery type address percentage greater than 75 percent.

Table 4.14 provides the percentage of Postcensus Local Review added units by type of structure and census region. The structure types were split into four categories. The "Mobile Home" type includes added units which were either individual mobile homes or mobile homes in trailer parks. The "One Family" type includes all one-family houses which were either attached or detached from one another. The "Apartment" type includes all added units within a structure with two or more units. The "Other"

category includes the remaining added units which were not considered to be a mobile home, one-family structure, or a unit within an apartment structure.

Table 4.14 reveals that one-family structures and units within apartment structures accounted for approximately the same percentage of added units nationwide at about 44 percent. The highest percentage of added units in the Northeast and Midwest Census Regions were units within apartment structures. The highest percentage of added units in the South and West Census Regions were one-family structures.

Address Control File Transactions—Table 4.15 documents the Address Control File transactions from the Postcensus Local Review operation. The table provides the number of accepted deletes and accepted geographic transfers at the census region as well as nationally. An accepted delete is defined as a unit which was deleted as a consequence of Postcensus Local Review and was accepted by the Address Control File maintenance edits. An accepted geographic transfer is defined as moving a unit from one block to another block and the process of moving this unit being accepted by the Address Control File maintenance edits.

One of the most important contributions from Postcensus Local Review was the updating of the Address Control File which deleted many unacceptable addresses and corrected numerous geocoding errors. National Address Control File transactions reveal that 101,887 units were deleted as a consequence of Postcensus Local Review and a total of 198,347 units were geographically transferred as a consequence of Postcensus Local Review.

Table 4.15 illustrates that the West Census Region had the highest number of accepted deleted units with 32,945

Table 4.14. Percentage of Postcensus Local Review Added Units by Type of Structure

Census region	Mobile home (percent)	One-family (percent)	Apartment (percent)	Other (percent)
National	9.2	43.4	44.5	2.9
	2.3	28.5	67.7	1.5
	6.5	42.3	48.7	2.6
	16.4	53.5	29.3	0.9
	7.0	43.3	42.7	7.1

Table 4.15. Address Control File Transactions From Postcensus Local Review by Census Region

Census region	Accepted deletes	Accepted geographic transfer
National	101,887 21,275 20,152 27,515 32,945	198,347 38,177 44,352 74,166 41,652

deletes and the South Census Region had the highest number of accepted geographic transfers with 74,166 geographic transfers.

Conclusions

Approximately 25 percent of the governmental units participated in Postcensus Local Review and about 67 percent of participating governmental units challenged census housing unit counts. The Census Bureau had hoped for a larger participation rate, however, because of problems with imposing or confusing local review documentation, many smaller governmental units elected not to participate. In the future, the Census Bureau should develop documentation that can be modified to suit either governmental units with technical capabilities or governmental units which lack extensive resources for the operation. After receiving all legitimate documentation, governmental unit officials challenged 270,650 blocks and the Census Bureau recanvassed 168,255 of these challenged blocks.

More important than the added unit coverage of the operation, was the updating of the Address Control File through the numerous geographic transfers and deletes during the operation. From the recanvassing, the Census Bureau added 91,611 units to the Address Control File, of which 80,929 units remained either occupied or vacant when final census counts were released. Results also revealed that 101,887 units were deleted and 198,347 units were geographically transferred as a consequence of the Postcensus Local Review.

The Postcensus Local Review operation was conducted in the later stages of the 1990 decennial census and played an important role in the completion of the census. The operation's primary success was correcting numerous geocoding problems as well as deleting unacceptable housing units from the Address Control File. However, equally important to the address updates was the Census Bureau's role in providing the local government officials the opportunity to review and improve the housing unit counts within their jurisdictions.

References

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POP ONE REENUMERATION

Introduction and Background

Allegations were made that, during the closeout phase of Nonresponse Followup, enumerators in a few district offices were recording households as one-person households without benefit of an interview. All offices so identified were selected for reenumeration, as well as all district offices with enumeration characteristics similar to the offices so identified. In all, 24 district offices were selected. In these offices interviewers proceeded to reenumerate all one-person households originally enumerated after June 6 under Nonresponse Followup, last resort procedures and, if the number of persons in the household was different, a new questionnaire was completed. For this reason, this operation, called the POP One Reenumeration, is considered a coverage improvement activity.

The Census Bureau also conducted an evaluation of the enumeration of one-person households during the Nonresponse Followup operation of the 1990 census. The evaluation was designed to collect data about all 447 census district offices that conducted a Nonresponse Followup operation. Field interviewers were sent to reinterview a sample of one-person households in the fall of 1990, 6 months after Census Day (April 1, 1990).

Results of this evaluation [1] show the effect of potential errors in one-person household enumeration on the total population count and the effectiveness of our quality assurance efforts during the precloseout phase of Nonresponse Followup operations.

Methodology

In 24 district offices, all households enumerated after June 6 and under last resort procedures as one-person households were reinterviewed. Tabulations from this reenumeration were summarized.

In order to see whether district offices with possible fabrication problems with respect to one-person households had been isolated, a nationwide sample of 1,000 one-person households enumerated during the Nonresponse Followup operation was selected. This sample included cases enumerated on or before the date Nonresponse Followup closeout procedures were authorized and cases enumerated after that date. In this way the sample contained cases subject to our quality assurance process (those cases enumerated before closeout) and cases completed after quality assurance activities were suspended (those cases enumerated during closeout).

Before sampling, the 447 district offices were ranked by the ratio of occupied housing units enumerated using last resort procedures over the total number of occupied housing units enumerated during Nonresponse Followup. Using this ratio, the offices were divided into two strata:

- Stratum "X": Those offices having a high proportion (ratio > .163) of last resort enumerations.
- Stratum "Y": Those offices having a low proportion (ratio < .163) of last resort enumerations.

We then defined a third stratum:

 Stratum "Z": Those 24 offices referred to earlier for which we had completed a reenumeration of all last resort one-person household enumerations completed after June 6, 1990.

For the "Z" stratum, a sample was created from only those cases completed before closeout, regardless of the date at which closeout procedures were begun. Interviewers had already reenumerated all of the households completed after June 6 under last resort procedures (which means some before closeout and all during closeout cases enumerated under last resort procedures). This evaluation sample was limited to the before closeout cases because, for some purposes of comparison with the "X" and "Y" strata cases, only reinterviews of before-closeout one-person household enumerations were needed.

The following table presents the distribution of oneperson households enumerated during Nonresponse Followup as proportions of all addresses enumerated within each stratum.

There were 24 district offices in the "Z" stratum, 88 in the "X" stratum, and 335 in the "Y."

Enumerators from the Census Bureau's ongoing programs reinterviewed the evaluation sample households during the second and third weeks of October 1990. These enumerators were used to maintain independence from the census. Additionally, these staff have more experience than temporary decennial census employees, which gave a greater degree of confidence in the accuracy of their work.

The reinterview data were compared to the data on the census data captured questionnaires for each household. Difference rates were calculated for each stratum and comparisons were made.

Limitations

- An independent reinterview with no validation of differences, conducted 4 to 6 months or more after an original interview, may not provide an accurate assessment of the quality of enumeration conducted during Nonresponse Followup. Experience in earlier research [2] has shown that with further probing, the response difference rates decrease appreciably. Some reasons for this are:
 - a. The interviewer involved in the reinterview, by definition, is different from the nonresponse enumerator. While one interviewer may be better

Table 4.16. Percent One-Person Households by Strata

Stratum	Percent
Z—Intense scrutiny	11.6 7.8 5.2
Total U.S	5.8

trained than another, the nonresponse enumerator being indigenous to the area may be better able to collect accurate responses from householders living there.

- b. The respondent in the nonresponse interview may differ from the respondent in the reinterview.
- c. Even if the respondent is the same, respondents may have a problem, due to recall bias, recalling accurately the situation in the household 4 to 6 months ago.
- d. The respondent may be less willing to report fully and accurately in the reinterview having already given the information to the Census Bureau several months earlier.
- e. The reinterviewer may collect data from the household living there in October rather than trying to reconstruct the roster of Census Day residents.

Therefore, these types of data may be useful to provide insights into possible effects, but should not be used as conclusive measures of data quality during nonresponse enumeration.

- 2. For some study data, it could not be determined whether the reinterviewers were reporting vacancy status as of Census Day or as of the reinterview day. Since it could not be verified these cases in fact were vacant on Census Day, two sets of estimates were calculated based on both vacancy assumptions. The ranges of estimates in the two tables reflect these different sets of assumptions.
- 3. Some of the sample cases were dropped from the evaluation because interviewers were not able to determine Census Day status. When the vacants were treated as unknown, over 22 percent of the cases were dropped. When the vacants were counted as response differences, about 15 percent of the cases were dropped. These missing data were corrected for when estimating the household difference rates and confidence intervals in table 4.17, but not when calculating the effect on the population count shown in table 4.18.
- 4. Sampling errors from these sample results and confidence intervals were determined to inform the reader about the reliability of the estimates from this sample. However, caution against making statements about these results is recommended, especially in comparing differences, when the estimates are within sampling error.

Results

During the reenumeration in the 24 district offices selected for intense scrutiny, 56,785 of the 128,873 one-person households reinterviewed showed a response difference (44.1 percent). These district offices, as a group,

tended to exhibit response difference rates higher than the estimated rates for the other 423 district offices. This suggests that these were the proper offices on which to focus our attention. Table 4.17 shows the response difference rates in the sampled enumerations for every stratum. For the X and Y strata, which represent 423 or 95 percent of all district offices, the response difference rates range from 19.2 percent to 30.0 percent (90 percent confidence interval of 12.2 to 37.1 percent).

In the 24 district office reenumerations, a net number of 56,341 additional persons were added to the count. While most of the reinterviewed households remained as one-person households (55.9 percent), some households contained more than one person and some were classified as vacant. This equates to an effect of 0.71 percent on the total population count for these offices.

Table 4.18 shows that the effect on population counts within each stratum component was small. For the X and Y strata, the net effect on population coverage of the difference in the census enumeration count and the reinterview count of the number of persons in one-person households enumerated during Nonresponse Followup ranged from missing 0.25 percent to 0.59 percent (90-percent confidence interval of –0.05 percent to 0.85 percent) of the total population.

Table 4.17. Estimates¹ of Response Difference Rates by Strata

Strata/ census phase	Response difference (percent)	90-percent confidence interval
"Z"Strata Before closeout	16.7-24.2 44.1	11.8, 29.4 NA
"X" Strata Before closeout During closeout	19.3-26.1 22.9-30.0	14.7, 31.0 16.3, 37.1
"Y" Strata Before closeout During closeout	19.9-23.0 19.2-25.0	15.7, 27.6 12.2, 32.7

¹The estimates are shown as a range due to the two assumptions about Census Day vacancy status.

Table 4.18. Estimated Effect¹on Population Count by Strata

Strata/ census phase	Effect on strata population (percent)	90-percent confidence interval
"Z" strata 100-percent reenumeration of 24 offices	0.71	NA
"X" strata	0.25-0.59	-0.05, 0.85
"Y" strata	0.25-0.38	0.07, 0.54

¹The estimates are shown as a range due to the two assumptions about Census Day vacancy status.

Conclusion

The response differences found in this study cannot be characterized as either within or beyond expectation, because there are no other data comparable to this evaluation. However, because the effect on the overall population coverage (shown in table 4.18) is quite small, the response differences are not believed to be a major problem.

While the evaluation study was designed to assess the error level in the enumeration of one-person households, biases and variances on the estimates inhibited drawing definitive conclusions. Because of the difference in universes (in the 24 district offices, only last resort cases checked in after June 6 were reenumerated, while in the study, all one-person households were sampled), the study estimates cannot be statistically compared with the reenumeration estimates. Also due to incomplete data, the accuracy of the estimates were questioned.

However, it may be concluded from these tables that the stratification and intense scrutiny of the 24 offices was efficient. While direct comparisons cannot be made, all of the rates for the sample reinterview strata are within sampling error, and exclude the point estimate for the 24 district office reenumeration. The response difference rates and effect rates are higher for the 24 district office strata.

It does appear the stratification largely isolated the offices where the potential effect on the population count was nontrivial as shown in table 4.18.

There is no evidence from these results that dropping quality control checks during the one-week closeout period yielded a quality loss. Table 4.18 shows the response difference rates before and during closeout. These rates are generally the same for the 95 percent of district offices comprising strata X and Y. These numbers show there is no cause to believe dropping the reinterview check led to a loss in quality.

References

[1] Linebarger, John S. 1990 Decennial Census Preliminary Research and Evaluation Memorandum No. 41, "An Evaluation of the Enumeration of Households Characterized During the Nonresponse Followup Operations of the 1990 Census as Containing Only One Person." U.S. Department of Commerce, Bureau of the Census. April 9, 1991.

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PRIMARY SELECTION ALGORITHM REVIEW

Introduction and Background

During the 1990 decennial census, some census identification (ID) numbers had multiple first form questionnaires data captured. Multiple data captures of census

questionnaires occurred when more than one questionnaire was received for a given census ID, or when the same questionnaire was recycled through data capture processing. (For brevity and consistency, throughout this report the "multiple data capture records" are referred to as "multiple questionnaires.") The occurrence of multiple questionnaires required a method for choosing which questionnaires would be "selected" to represent a given census ID. The primary selection algorithm was developed to select the best "questionnaires of record" per census ID. The remaining questionnaires were not selected and therefore the person data, when different, were not counted in the census.

The Primary Selection Algorithm Review was conducted to review data captured questionnaires whose data records were not selected by the primary selection algorithm to represent a given census household. The Primary Selection Algorithm Review was conducted from late October 1990 through the end of December 1990 (the end of the census processing cycle). This review was prompted due to concern that the persons reported on the not selected questionnaires may be missed in the census. This section documents coverage gain from the Primary Selection Algorithm Review operation.

The Primary Selection Algorithm Review was initiated due to concern regarding the persons enumerated on the "not selected" questionnaires. There were two categories of the not selected questionnaires defined:

- Those questionnaires for which the number of data defined persons on all not selected questionnaires was equal to the number of data defined persons on the selected questionnaire.¹
- Those questionnaires for which the number of data defined persons on one or more of the not selected questionnaires was not equal to the number of data defined persons on the selected questionnaire.

After reviewing questionnaires in each category, it was decided that the questionnaires in the second category would be the universe for the Primary Selection Algorithm Review.

District office level tallies of the number of census ID's to be included in the Primary Selection Algorithm Review were produced. The ID's were assigned priorities based on specific criteria[1]. The highest priority work was to be completed first; the lowest priority work was to be completed only if time permitted.

The processing of these cases involved sending microfilm copies of the selected and not selected questionnaires through a modified Search/ Match matching operation to determine if the not selected persons were counted in the census. First, a matching operation was performed between the selected and not selected questionnaires to determine if the selected

¹To be "data defined," a person column had to have machine-readable answers to at least two of the six 100-percent population questions.

and not selected persons were the same household. This was the stage 1 portion of the operation. Not selected persons found to be different households that did not match to the selected questionnaire advanced to an "extended" Search/Match operation. This was the stage 2 portion of the operation. The extended Search/Match operation involved identifying up to 10 neighboring addresses to the address of the census ID and searching for the not selected and selected persons at these addresses. These neighboring addresses were referred to as the "extended search area." If it was determined that the not selected persons were not counted in the census, they were added to the census during the Primary Selection Algorithm Review operation. Also, in some cases, if it was determined that the selected persons were counted elsewhere in the extended search area, the duplication of the selected persons was removed from the census. [1].

Methodology

During the matching/ transcription portion of the Primary Selection Algorithm Review operation, clerks were instructed to annotate the census questionnaires with codes that would facilitate processing and evaluation. These codes define the universe of census ID's for this analysis. Data for all census ID's were supplied from various census computer files; demographics of the primary selection algorithm person adds and characteristics of the primary selection algorithm housing units are from these data. Note that these data were unedited and therefore some variables included a "not reported" category. These data have been adjusted proportionately. By doing this, it is assumed that the nonrespondents of a particular question are distributed similarly to the respondents.

The term "add" rate is defined as the number of census ID's where persons were added from this operation divided by the total number of review ID's.² Note that this is not a true "add"; that is, the housing unit was not added to the census address control file as a result of this operation. The "add" rate actually tells us how many census ID's had some sort of data capture activity resulting in a person add from the Primary Selection Algorithm Review. The "add" rates are presented nationally, by regional census center, and by State.

Limitations

Primary selection algorithm adds are identifiable only as a result of the clerical coding. Thus, if clerks did not correctly annotate the census questionnaire during matching/ transcription, the number of primary selection algorithm adds may be understated. In addition, if other operations incorrectly annotated the census questionnaires, the coverage gain could be overstated.

List/ enumerate type of enumeration areas were excluded from this operation because the rural type addresses common in these areas were not on the census address control file; thus the extended search could not be performed. The extended search area was limited to 10 neighboring addresses of the review ID. If the extended search area would have been larger, more not selected persons may have been located and/or more duplicate enumerations of selected persons may have been discovered. Either of these circumstances could have resulted in better quality enumerations from this review.

The primary selection algorithm person adds do not represent a net increase in the 1990 population. The reason is that during the Primary Selection Algorithm Review, duplicate enumerations of persons were deleted. The added persons do not represent a net increase in population, but rather the added persons minus the deleted persons would have been the net population increase. Hence, the person adds stated in this report represent an "upper bound" of coverage gain.

Results

Coverage Gain

U.S. Level—There were 401,174 review ID's. The Primary Selection Algorithm Review operation added at least one person to 161,541 census ID's. Thus, we can define the "add" rate for this operation to be about 40.3 percent. Nationally, there were 350,448 Primary Selection Algorithm Review person adds. Demographics of Primary Selection Algorithm Review person adds are discussed further in this section.

Regional Census Center Level—Table 4.19 shows "add" rates by regional census center. The Chicago Regional Census Center had the highest "add" rate—58.2 percent. The New York Regional Census Center was a close second with a 57.2 percent "add" rate, and the New York

Table 4.19. Primary Selection Algorithm Review "Add" Rates by Regional Census Center

Regional Census Center	ID's with added persons	Review ID's	"Add" rate
Chicago	15,477	26,600	58.2
New York	36,007	62,978	57.2
Los Angeles	24,071	45,711	52.7
Atlanta	21,667	42,432	51.1
Detroit	10,039	21,722	46.2
San Francisco Bay area	8,775	20,223	43.4
Charlotte	12,770	35,273	36.2
Boston	6,534	24,908	26.2
Philadelphia	11,022	43,394	25.4
Dallas	7,179	31,194	23.0
Kansas City	4,521	20,096	22.5
Seattle	2,654	13,248	20.0
Denver	825	13,395	6.2
Total	161,541	401,174	40.3

²The "review ID's" were the Primary Selection Algorithm Review workload.

Regional Census Center had more than double the number of census ID's where persons were added than did the Chicago Regional Census Center. There were 15 district offices in New York City that conducted a second mailout of census questionnaires. The workload from this second mailout likely contributed to the primary selection algorithm workload for the New York Regional Census Center. This is one result that can be applied to the 2000 census: if we plan on multiple mailouts and/ or multiple modes of data collection for 2000, we must also maintain the best possible questionnaire selection algorithm.

Some other points of interest from table 4.18 include:

- Seven regional census centers had "add" rates either close to or greater than the U.S. overall rate of 40.3 percent.
- Many of the regional census centers with the lower "add" rates also had a lot of low priority work in their jurisdiction. For the most part, low priority work had lower "add" rates, thus they affected the regional census center level "add" rates.
- The Seattle and Denver Regional Census Centers had a
 lot of list/enumerate areas within their jurisdiction. As
 previously mentioned, list/enumerate areas were excluded
 from the Primary Selection Algorithm Review. This helps
 to explain why these regional census centers had relatively low "add" rates.

State Level—All 50 States and Washington, DC had at least one census ID where persons were added. The State level "add" rates ranged from a high of 63.7 percent in Illinois to a low of 1.7 percent in Idaho. The State level "add" rates take into account size differences between States. For instance, even though a State may have had a small number of review ID's, if most of these cases resulted in a questionnaire that had a person add, this would result in a high "add" rate for that State. An example is the District of Columbia, which is among the top States in terms of the highest "add" rates. Note that the States with lower "add" rates may have had a large amount of low priority work, which may not have been completely processed.

Table 4.20 shows the top States with the highest "add" rates. All other States had "add" rates less than 47 percent.

Most of these States had district offices with high "add" rates. Also, half of these top States also had high workloads. Some other plausible explanations for high "add" rates are:

 It is likely that complex households helped to contribute to high "add" rates. Consider that one household member may have completed a mail return census questionnaire a few weeks late. The address was then probably in the Nonresponse Followup workload. When visited by an enumerator, a different household member may have

Table 4.20. Primary Selection Algorithm Review "Add" Rates—Top States

State	ID's with added persons	Review ID's	"Add" rate
Illinois. Indiana. Alabama Ohio New York California Georgia Florida District of Columbia.	11,356 3,041 4,378 4,947 37,515 32,846 5,882 11,407 1,571	17,826 4,801 7,483 8,569 68,894 65,934 11,850 23,099 3,210	63.7 63.3 58.5 57.7 54.4 49.8 49.4 48.9
South Carolina	2,401	5,000	48.0

been the respondent, and this respondent may have reported a slightly different roster, resulting in multiple questionnaires with different rosters for the same household

- The presence of movers near Census Day may have helped contribute to high "add" rates as well. Persons may have had trouble recalling when they moved. They may have reported an old address as a Census Day address, when in fact another household was at the old address on Census Day. This would result in two different rosters for one address.
- Poorly conducted field activities in some areas may have resulted in multiple questionnaires with different reported household rosters for some ID's. For example, unit mix-ups, or two or more enumerators working the same area.

These situations, as well as others, could have resulted in different household rosters for a given address.

Characteristics of Primary Selection Algorithm Review Housing Units—This section discusses characteristics of the housing units in the Primary Selection Algorithm review universe. Primary selection algorithm housing units are defined as having had at least one selected questionnaire where at least one person was added. The characteristics discussed are average household size, type of enumeration area, type of address, and size of basic street address.

There were 161,541 housing units that had at least one person add during the Primary Selection Algorithm Review. The overall average household size after the person adds were processed was 4.22 persons. This is higher than the published average household size for occupied housing units for the 1990 census, which was 2.63 persons. The difference in average household size for the primary selection algorithm households is likely due to doubling up households if the not selected persons were not located in the extended search area and no vacant unit was available to add them to.

Table 4.21 displays the type of enumeration area distribution of the Primary Selection Algorithm Review housing units compared to the 1990 U.S. level type of enumeration

Table 4.21. Type of Enumeration Area Distribution of Primary Selection Algorithm (PSA) Review Housing Units Compared to U.S. Level Type of Enumeration Area Distribution

Type of enumeration area	Percent of PSA housing units	Percent of U.S. housing units ¹
TAR	75.8 14.7 1.3 8.2	55.7 24.9 3.7 10.1

¹Reference 1

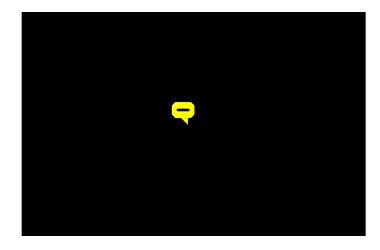
area distribution. There was no list/enumerate in the Primary Selection Algorithm Review universe; this type of enumeration area was excluded from the operation. Therefore, the percentages for the U.S. do not total 100 percent, since list/enumerate also is excluded from this table for comparison purposes.

The majority of Primary Selection Algorithm Review housing units had a type of enumeration area of "tape address register" (TAR—75.8 percent). This is about 20 percentage points higher than for the 1990 U.S. level TAR distribution. It seems that multiple data captures occurred more often in TAR areas. This could be due to several factors; for example, many multiunits in TAR areas, which are more likely to have unit designation mix-ups during field activities and therefore result in multiple questionnaires data captured per census ID. Also, there is a greater potential for duplicate enumerations and/or duplication of ID numbers in mailback areas due to Field Followup and Nonresponse Followup, since mail return households may have been visited by an enumerator if they mailed in their census questionnaire a little late.

Primary Selection Algorithm Review housing units were 89.8 percent city type addresses. For the U.S., 84 percent of addresses were city type [3]. The overrepresentation of TAR addresses in the Primary Selection Algorithm Universe contributed to the higher rate of city type addresses since most TAR area addresses are also city type addresses. Rural type addresses comprised 5.8 percent of the Primary Selection Algorithm Review housing units, and "other" type addresses made up the balance of the primary selection algorithm housing units—4.4 percent ("other" type addresses were defined here as P.O. boxes, general delivery and location description addresses).

Figure 4.7 displays the distribution of basic street address size for the primary selection algorithm housing units compared to the same distribution for 1990 census housing units. Multiunits constituted 46.6 percent of all primary selection algorithm housing units. This is almost double the percentage of multiunits nationally. The balance of the Primary Selection Algorithm Review housing units were single units—53.4 percent.

These data suggest that it may be more likely for multiple questionnaires with different household rosters to be received from multiunit households than from single units. This is probably due to USPS delivery errors or field



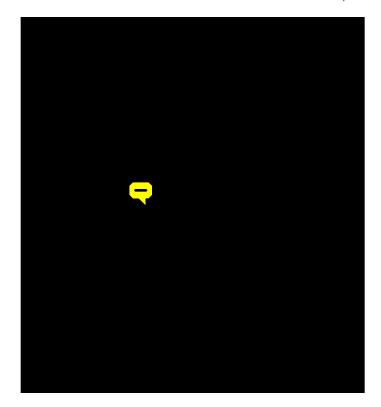
operations such as Nonresponse Followup. That is, during field operations, enumerators may have visited a unit that had already sent in their census questionnaire and completed a second questionnaire for the unit, when in fact they should have visited a different unit. In addition, research conducted prior to the beginning of the Primary Selection Algorithm operation showed that some of the multiple questionnaires were a result of incorrectly processed housing unit adds.

Some of the multiple questionnaires received per housing unit may be attributable to movers. That is, the Census Bureau may have received questionnaires for both old tenants and new tenants from the same housing unit. Given the high occurrence of multiple data captures in multiunits, it is very important that the best possible selection algorithm be developed for the 2000 census. It also is important to improve field operations so time and money are not wasted and errors are not introduced by enumerating a household twice.

Demographics of Primary Selection Algorithm Review Person Adds—There were 350,448 persons added to the census or moved in the census nationwide during the Primary Selection Algorithm Review. This section discusses selected demographics of these person adds and compares them to 1990 census data at the national level. The demographics discussed are race and Hispanic origin. As previously mentioned in the Methodology section, the data for the Primary Selection Algorithm Review person adds have been proportionately adjusted for item nonresponse.

Figure 4.8 shows the race distribution for Primary Selection Algorithm Review person adds and U.S. level 1990 census data. The item nonresponse rate for the race question was about 12.9 percent for the Primary Selection Algorithm Review persons adds. These nonrespondents were proportionately allocated to the race groups.

Nationally, Primary Selection Algorithm Review person adds were 53.9 percent White; national census figures show that the 1990 census population was about 83.9 percent White. About 32.5 percent of the Primary Selection



Algorithm Review persons adds were Black, compared to about 12.3 percent of the 1990 census population. "Other" race persons comprised about 13.6 percent of all Primary Selection Algorithm Review persons adds, whereas "other" race persons were about 3.8 percent of the 1990 census population.

Some of the possible reasons that minorities (Black and "other" race persons) were overrepresented in the Primary Selection Algorithm Review person adds population are:

- There were many multiunit structures in the Primary Selection Algorithm Review universe and a large portion of the Primary Selection Algorithm Review universe was in urban areas. Urban areas tend to have large percentages of minority persons.
- Urban, high minority areas, which may also be low income areas, are traditionally more difficult to enumerate, contributing to the large number of ID's for which multiple questionnaires were received. That is, these units may have been visited multiple times during Nonresponse Followup or Field Followup or there may have been apartment mixups during these field operations.
- Finally, enumerators may have experienced language barriers in high minority areas. Language barriers could have resulted in incomplete questionnaires or apartment mixups. Both of these could have contributed to multiple questionnaires per ID.

Figure 4.9 displays the distribution of Hispanic origin at a national level for the Primary Selection Algorithm Review person adds compared to 1990 census data. The item



nonresponse rate for the Hispanic origin question for Primary Selection Algorithm Review persons adds was 17.3 percent.

Primary Selection Algorithm Review person adds were 25.7 percent Hispanic, whereas persons in the 1990 census were only 9 percent Hispanic, nationally. Thus, Hispanic persons were represented at a greater rate in the Primary Selection Algorithm Review universe. This is likely due, in part, to the large number of district offices in urban areas that were assigned a high priority during the Primary Selection Algorithm Review. Other explanations for the high percentage of Hispanic persons in the Primary Selection Algorithm Review universe include those previously discussed for the high percentage of minorities.

Conclusions

Both the Nonresponse Followup workloads and the second mailout in New York City helped to contribute to the number of not selected questionnaires per census ID. Thus, these operations contributed to the workload for this coverage improvement operation. It is obvious that the Census Bureau must have an algorithm to select the "best" questionnaire per census ID; this is especially true if we plan to conduct multiple modes of data collection for the 2000 census.

The Primary Selection Algorithm Review was successful at adding to the census persons who likely would have been missed if we had not reviewed the not selected questionnaires. In addition, it was shown that the person adds included a high percentage of minorities (Black and Hispanic persons). This seems to indicate that enumeration methods, and perhaps outreach and education, for these racial and ethnic groups need to be improved.

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Finally, these results show that multiple questionnaires with varying rosters per census ID occurred more often in multiunit structures. Multiunit structures are another area where enumeration methods need improvement. We recommend that research be conducted into obtaining administrative records to improve coverage of multiunit structures. If we have more complete coverage of multiunits, including accurate unit designations, it should help to improve enumeration of persons within these structures.

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CHAPTER 5. Search/ Match Coverage Improvement

CHARACTERISTICS OF SEARCH/ MATCH ADDITIONS

Introduction and Background

The Search/ Match operation was conducted during the 1990 decennial census to help ensure that all persons were enumerated at what is defined as their "usual residence." All persons must be counted at their usual residence for apportionment purposes. A usual residence is "the place where the person lives and sleeps most of the time." Search/ Match was designed to improve both within household and housing unit coverage.

There were six different search forms processed during Search/ Match. Many persons listed on a search form were not at their usual residence on Census Day; for example, they may have been at a hotel on Census Day. In order to ensure that they were counted at their usual home, the Census Bureau searched the census questionnaire at their reported usual residence to determine if they were counted there. If they were not counted at their reported usual residence, they were added to the census at that address.

The concept of the Search/ Match operation is to verify that persons reported on any of the search forms (the search forms are described later in this section) were enumerated at their Census Day address. If any of the persons were not found at their reported Census Day address, they were added to the census at this address. Although the concept seems simple, the Search/ Match operation was long and complex. Search/ Match took place from July 1990 through December 1990. The following is a brief description of the Search/ Match operation.

All search forms were sent to the census processing offices. All search forms were sorted by form type (the form types being the six different search forms), and from there on were organized by form type during all later stages of processing. A search/match status label was affixed to each form to record the results of the search/match processing steps. This processing information would tell the disposition of each search form, and the data recorded on the label would later be used for various analyses.

After the search/match status label was affixed to the search form, the form was reviewed to determine if it was searchable. A searchable form had to contain both of the following:

• Complete data: A name and at least two responses to the 100 percent population questions (sex, age, race, hispanic origin, marital status or relationship) for at least one person. Searchable address: The search address reported on the search form had to have either: house number, street name, city, State, ZIP Code, or rural route (or comparable route), box number, city, State, ZIP Code.

If the search form did not contain these necessary items, it was not processed further. If the search form contained the required items, it went to the next step of processing called geocoding. The geocoding step was usually performed simultaneously with the Address Control File address match, or Address Control File browse.

The geocoding and the Address Control File browse processing steps involved searching, or browsing the Address Control File to see if:

- · The search address could be geocoded.
- The exact search address or the basic street address (if the search address was a multiunit) was on the Address Control File.

If the address could not be geocoded, no further processing was done on the case. If the address was geocoded, it fell into one of two categories—geocoded but not found on the Address Control File or found on the Address Control File. If the exact address was on the Address Control File, a copy of the census questionnaire for that address was printed. From there, the search form and the copy of the census questionnaire were sent to the next step of Search/Match—matching/transcription.

If the exact address was geocoded but not found on the Address Control File, the address was sent to the USPS to check if the address was correct and deliverable. Once it was verified by the USPS as deliverable, the process of searching the Address Control File was again repeated, in case there were changes made to either the address by the USPS or to the Address Control File since it was last checked. If the address was still not found on the Address Control File, the address was added and the search form was sent to the next step of search/match processing-matching/transcription.

If the address was found on the Address Control File, a copy of the census questionnaire was printed, and the search form and the census questionnaire copy were sent to matching/transcription. If the address was returned from the USPS classified as undeliverable, no further processing of the case was done.

The matching/ transcription portion of the Search/ Match operation involved reviewing a copy of the census questionnaire for the search address to determine if the persons reported on the search forms had been enumerated

on the actual census questionnaire for their reported Census Day address. Any search persons not found to be counted at their reported Census Day address were added to the census at that address.

There were six different search forms processed during the Search/ Match operation, each designed to enumerate either persons staying temporarily at a special place, but who had a usual home elsewhere (UHE), or to ensure accurate coverage of certain subpopulations. The different search forms are listed below.

- 1. Individual Census Report
- 2. Military Census Report
- 3. Shipboard Census Report
- 4. Parolee/ Probationer Information Record
- 5. Were You Counted? Form
- 6. D-190 Search Record

The Parolee/Probationer Information Record is discussed in the Parolee/Probationer Coverage Improvement Program and Followup section of this chapter.

The following describes each of the other five search form types that are discussed in this section and the purpose of each in the 1990 Search/Match operation.

Individual Census Reports—Enumeration of special places such as hotels, and the Nonresponse Followup and Field Followup operations, generated Individual Census Reports. Individual Census Reports were completed for individuals found at a special place, or for visitors or nonfamily residents found at housing units during the Nonresponse Followup and Field Followup operations who felt they may not have been counted. An Individual Census Report listed only one person. If the respondent indicated that they were at the housing unit or special place temporarily and usually lived somewhere else, the Individual Census Report was processed during Search/ Match.

Military Census Reports—Group Quarters enumeration generated Military Census Reports. Military Group Quarters are a large subset of all Group Quarters. Military personnel completed a Military Census Report. The Military Census Report listed only one person. If the respondent listed an off-base UHE address and they indicated that the address was not a barracks but a family-type housing unit, the form was processed during Search/Match.

Shipboard Census Reports—Group Quarters enumeration also generated Shipboard Census Reports. Shipboard personnel, both military and maritime, completed a Shipboard Census Report. The Shipboard Census Report listed only one person. If a respondent listed a UHE address, the Shipboard Census Report was processed in Search/Match.

Were You Counted?—The print and electronic media generated Were You Counted? forms. Respondents who believed their household, or persons within their household, were missed in the 1990 decennial census either completed a Were You Counted? form that was displayed in local print media or called the Census Bureau's processing offices or district offices. In some cases, the processing office or district office staff completed Were You Counted? forms for the respondents who called to report that they had not been counted. The Were You Counted? form could list more than one person. All searchable Were You Counted? forms were processed during the Search/ Match operation.

The D-190 Search Record—A D-190 Search Record was generated for either whole households that usually lived elsewhere, or for recent mover whole households that lived elsewhere on Census Day. All searchable D-190 Search Records were processed during the Search/Match operation.

If a respondent indicated on his/her census questionnaire that the usual residence of the entire household was somewhere other than the address where they received their census questionnaire, the district office or processing office staff completed a D-190 Search Record for the household. After verification, the household was removed from the census questionnaire where they reported that they do not usually reside. The persons were listed on the D-190 Search Record and the D-190 Search Record was sent to Search/Match to determine whether they were counted at their usual residence, and if not, to add them there.

The vacant/delete/movers check generated mover-UHE cases. This operation revisited vacant and deleted housing units. If an enumerator located a respondent who indicated that the entire household moved into the unit sometime after Census Day and did not complete a questionnaire at the Census Day address, the enumerator completed a census questionnaire for the household, indicating that this household recently moved. District office or processing office staff then completed a D-190 Search Record for the household. The mover-UHE box on the D-190 Search Record distinguished whole household usual home elsewhere cases from mover-UHE cases.

Methodology

The data used in these analyses are from census files that identified housing units and persons that were added to the census files by the Search/Match operation. A person add or a housing unit add from the Search/Match operation is defined as a person or a housing unit reported on a census questionnaire that had certain codes completed on the census questionnaire. (Refer to [1] for the definitions of these codes.)

This section compares the characteristics of the housing units and persons added to the census file as a result of the five Search/Match forms described earlier to all the

housing units and persons in the census file. Additions made to the census file as a result of the Parolee/ Probationer Coverage Improvement Program are excluded from this section, but can be found in the Parolee/ Probationer Coverage Improvement Program and Followup section of this chapter.

Limitations

The primary limitation of this analysis is that the census file does not identify which search form resulted in the persons added to the census during Search/Match. This limits the analysis by making it impossible to determine which search form added more persons in which demographic group.

The data used in this analysis were unedited. This accounts for high rates of "unknown" responses for some of the person characteristics.

The Search/ Match operation was conducted using many clerical operations such as the filling in of the search/ match circle and the transcription of data to a census form. The data obtained from these operations are subject to clerical errors.

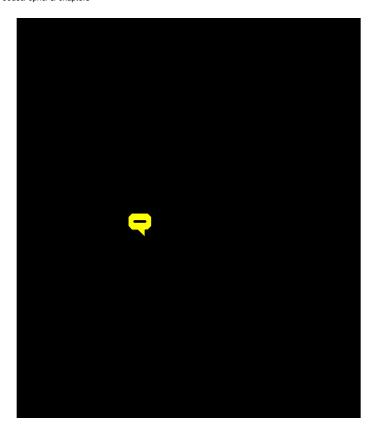
Results

Characteristics of Housing Units Added—The 24,875 housing unit addresses that were added to the census file as a result of the Search/Match operation (excluding Parolee/ Probationer added housing units) can be classified by type of enumeration area and type of mailing address. A comparison can be made between the Search/Match operation and the 1990 census with regard to these two housing unit classifications.

Type of Enumeration Area—Addresses in the 1990 decennial census address list were classified as to which type of enumeration area they came from. The different type of enumeration areas were TAR, Prelist Mailout/ Mailback, Prelist Pocket, Prelist Update/ Leave, and List/ Enumerate.

As shown above in figure 5.1, the Search/ Match operation produced a higher percentage of prelist addresses and a lower percentage of TAR addresses, indicating that the search/ match housing units that were added to the 1990 census were more likely to have come from a prelist or rural address area. The high add rate of prelist addresses during the Search/ Match operation was probably due to the fact that housing units in rural areas were the most likely to have been missed in the 1990 census.

Type of Mailing Address—Addresses were also classified by type of mailing address. For this analysis the categories have been collapsed into city style, rural, and other. Rural addresses are rural route, highway contract, or star route addresses while the other category contains Post Office box, general delivery, and location description addresses.



Shown are the percentages of each type of mailing address category for both the Search/Match operation and the 1990 census.

Figure 5.2 shows that the Search/Match operation added a higher percentage of city style addresses than the 1990 census. Approximately 91 percent of the addresses



added during Search/Match were city style addresses while only about 83 percent of all addresses in the 1990 census file were city style addresses.

Characteristics of Added Persons—The five search forms described previously in this section accounted for 608,557 persons. Sample-based estimates described in later sections of this chapter allow us to estimate that the Were You Counted? form produced the most adds with an estimated 260,000 person adds while the D-190 Search Records produced an estimated 236,000 adds. Only about 70,000 person adds came from the two military forms, the Military Census Report and the Shipboard Census Report.

The characteristics of the 608,557 persons added to the census file as a result of the Search/Match operation (excluding Parolee/ Probationer person adds) can be compared to the characteristics of all persons on the census file. This comparison shows if any specific race, age group, or sex was more likely to be added to the census by the Search/Match operation.

Sex—Figure 5.3 shows the sex of the Search/Match added persons compared with the sex of all persons in the census file.

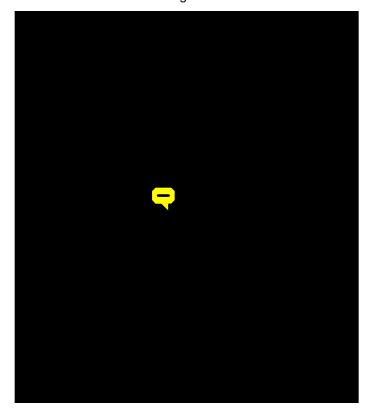
A higher percentage of persons added during Search/ Match were male. This is different from the census file which contains a higher percentage of females. This suggests that males were more likely to be missed initially by the census

Age—The age of the persons added during Search/ Match is compared with the age of all persons in the census.

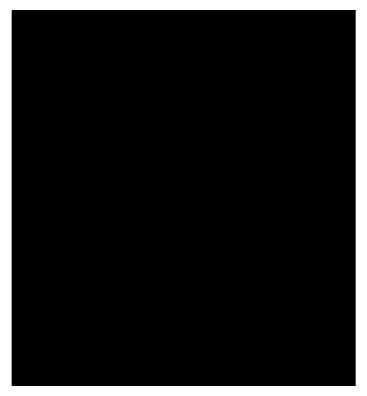
If the percentage of unknown ages shown in figure 5.4 is distributed proportionately among the age groups, most age group percentages for Search/ Match adds are close

to the percentages from the 1990 decennial census. The age group in which Search/Match produced a higher percentage was the 18-24 age group. This suggests that Search/Match contributed to adding missed persons from this age group.

Race—The race of the persons added by the Search/ Match operation is compared to the race of all persons in the 1990 decennial census in figure 5.5.







The Search/Match operation added a higher percentage of Black and Hispanic persons and a lower percentage of White persons than were enumerated in the 1990 census. This indicates that Search/Match contributed to adding missed persons in these race categories.

Conclusions

The overall conclusion is that the Search/Match operation was able to add persons to the census from demographic groups that are traditionally undercounted during the census. These groups include Black males and persons in the 18-24 age group.

Reference

[1]Beverage, Susan C. DSSD 1990 Research, Evaluation, and Experimental Memorandum No. T-2, "Data Needs From the 1990 Search/ Match Operation and the Primary Housing Unit Selection Study." U.S. Department of Commerce, Bureau of the Census. April 16, 1991.

[2] Wajer, Susan C. 1990 Decennial Census Preliminary Research and Evaluation Memorandum No. 214, "Results from the 1990 Search/Match Operation: Add Rates and Erroneous Enumeration Rates by Search Form Type." U.S. Department of Commerce, Bureau of the Census. February 1, 1993.

PAROLEE/ PROBATIONER COVERAGE IMPROVEMENT PROGRAM AND FOLLOWUP

Introduction and Background

The Parolee/ Probationer Coverage Improvement Program and the Parolee/ Probationer Coverage Improvement Followup Program were conducted during the 1990 decennial census to help ensure complete enumeration of all persons. These programs targeted parolees and probationers, a subset of the population that the Census Bureau believes is subject to substantial undercount. In addition, because of overrepresentation of Black males in the parolee and probationer populations, the Census Bureau also felt that targeting this population would help to address the problem of differential undercount.

The following is a brief background description of the Parolee/ Probationer Coverage Improvement Program and the subsequent followup program. For a more detailed background description of these programs, refer to [1]. Briefly, operations were conducted as follows:

 Parolee/ Probationer Information Records were sent to State parole and probation departments to be distributed to parolees and probationers when they visited (see appendix B for a copy of a Parolee/ Probationer Information Record).

- After the parolees and probationers completed the Parolee/ Probationer Information Records, the corrections offices returned them to the Census Bureau's processing offices.
- The Parolee/ Probationer Information Records were processed through the Search/ Match operation. If the parolee or probationer was not counted at their reported Census Day address, they were added to the census.

The Parolee/ Probationer Coverage Improvement Followup Program was developed due to a low response rate from the Parolee/ Probationer Coverage Improvement Program. The Census Bureau anticipated a 50 percent response rate from the initial program, but as of August 1990, the response rate was estimated at only about 25 percent [1]. Due to the importance of this program in addressing differential undercount, the low response rate could not be ignored. Therefore, a followup program was developed.

The followup program was different from the initial program in that the followup program employed knowledge from States' Departments of Corrections and their administrative lists of parolees and probationers to obtain name, the parolee or probationer's Census Day address, and a minimum of two demographic characteristics. These data were certified by State Department of Corrections officials that they were the parolee or probationer's April 1, 1990, address. Note that parolees and probationers are required to keep their parole and probation officers informed of their residence. In many States, a verified address is required of all parolees before they are released from jail [3].

Census Bureau field personnel collected the administrative lists from the States' Departments of Corrections offices and completed a Parolee/ Probationer Information Record for each person on the list who had a verifiable Census Day address. The processing of the Parolee/ Probationer Information Records from the followup program was the same as for the initial program. Note that while the initial program was a nationwide effort, the followup program targeted only selected counties that satisfied certain criteria, mainly urban, high minority areas (for more details on the criteria, refer to [1]). Also note that by conducting the followup program mainly in high minority areas, the Census Bureau hoped to obtain a larger representation of minority persons, specifically Black males. This was in accordance with the main objective of the program of reducing differential undercount.

Methodology

Coverage Gain—The results from the combination of these two programs for the number of persons and housing units added to the census, as well as person and housing unit characteristics, are from final census files. A person add or a housing unit add from either of these programs is defined as a person (or a housing unit) reported on a census questionnaire that had certain codes completed on the census questionnaire (for the specific definitions of these codes, refer to [5].

After some preliminary analysis of these data, it was discovered that there was a large portion of housing units that resembled a housing unit add, but were lacking a certain code. Many of these housing units previously had a status of deleted unit, which was changed when a Parolee/Probationer Information Record was processed for that census identification number (ID). For this evaluation, these are not considered housing unit "adds." Results are discussed separately for housing unit adds and for units that were converted from a deleted or vacant status.

Erroneous Enumeration Rates—The Post Enumeration Survey (PES) was a national survey that was conducted after the census to measure errors in the census. Data from the PES were used to estimate the erroneous enumeration rate of the persons added to the census from these two programs.

The Parolee/ Probationer Information Records that identified persons to be added to the census were geographically sorted into PES and non-PES blocks. Data from these search forms that were in PES sample blocks were keyed. The PES files include a set of codes that represent the conclusion from the PES of whether persons were correctly or incorrectly enumerated in the census. These sample data were merged with the PES files; the merged data file was used to generate the estimated erroneous enumeration rate. An erroneous enumeration is defined as an enumeration that was considered incorrect because the person should not have been counted at the specified address on Census Day. For example, they may have been born after, or died before, Census Day, or they may have had a usual residence elsewhere. Erroneous enumerations are also duplicate enumerations (that is, persons who were counted more than once), fabricated enumerations, and enumerations that were assigned to the wrong census geography due to a geocoding error. The PES final enumeration status for these person adds (that is, erroneous enumeration versus correct enumeration) was deemed to be the "truth."

A 90 percent confidence interval on the erroneous enumeration rate is presented. Rather than the traditional confidence interval formula, the Bonferroni Method for multiple confidence statements (Johnson and Wichern, 1988) was used. (Later in this chapter, other components of the Search/Match operation are presented; hence the use of the multiple confidence statements.) With this method, confidence statements about multiple intervals can be made simultaneously with 90 percent confidence. Note that this method makes the interval more conservative (that is, larger). For p simultaneous confidence statements, the Bonferroni method uses z $\frac{\alpha}{2p}$ instead of z $\frac{\alpha}{2p}$, yielding longer confidence intervals.

Limitations

There are several limitations to these results that must be taken into consideration when using these data.

First, the data that were used were unedited; therefore the results include a "not reported" category for the demographic characteristics.

Second, correctly identifying person adds from these programs was dependent upon the clerks in Search/ Match transcribing the person data from a Parolee/ Probationer Information Record to a census questionnaire and correctly completing certain codes on the census questionnaire.

Next, it is possible that the late initiation of the followup program might have had an impact on the quality of the data. While the processing deadline approached, the number of Parolee/ Probationer Information Records received from the followup program approached one million. Some of these forms may have been "rushed" through processing in order to meet deadlines.

The PES was not designed to measure enumeration errors from the Search/ Match operation. Any person adds from the Search/ Match operation that were in the PES sample fell in sample by chance, not design. Therefore, this is not the best possible measurement of erroneous enumeration rates. However, this is the only available measurement of erroneous enumeration rates.

Lastly, for the purposes of the calculation of estimated erroneous enumerations, the PES final enumeration status was deemed to be the correct determination. It must be recognized that there were errors in the PES that led to limitations in these results. PES followup activities occurred in the fall of 1990. It is possible that the time between April 1, 1990 and PES followup resulted in recall and other errors. In some instances response error could lead to an incorrect categorization of an enumeration as erroneous. These factors should be taken into consideration before drawing conclusions from these results.

Results

U.S. Level Coverage Gain-

Person Adds—The total number of persons added to the census from the Parolee/ Probationer Coverage Improvement Program and the subsequent followup program was 447,757. This represents an approximate 0.2 percent increase in the total 1990 population. Based on estimates from data from the Search/ Match sorting and keying operations, it was estimated that approximately 73.7 percent of the person adds were generated from the followup program, and the balance, about 26.3 percent, were from the initial program [6].

Housing Unit Adds—There were housing units added to the census from these two programs. The breakdown by address type for the 10,937 housing unit adds was 88.8 percent were city type addresses (that is, house number and street name), approximately 10.0 percent were rural type addresses (including rural routes, highway contract routes, and star routes) and about 1.2 percent were other

type addresses, (which were defined here to be descriptions such as "green house behind the barn at the end of dirt road," as well as Post Office boxes).

Converted Housing Units—There were 18,810 housing units that were converted from a deleted or a vacant status as a result of these programs. About 74.9 percent of these, or 14,079 housing units, had a status of delete at an earlier point in the census processing cycle. These prior deletes are the universe of converted housing units (converted from a delete status to an occupied housing unit). The remaining 4,731 housing units (about 25.1 percent) did not have a prior status of delete; most of these were previously vacant units. The following is an analysis of these housing units. First the deletes (14,079 housing units) are discussed, followed by some discussion of the previously vacant units (4,731 housing units).

The reasons why these housing units were deleted gives some insight into different errors that may have occurred during Search/Match. Note that errors could have also occurred during field operations where these units may have been misclassified as deletes.

There were eight delete reasons allowed during the various field operations. In examining the delete reasons, it was discovered that over 75.0 percent of them utilized only three of the eight delete reasons; these three reasons were:

- 1. No such address (5,930 housing units, or 42.1 percent of the deletes)
- 2. Duplicate address (2,979 housing units, 21.2 percent of the deletes)
- 3. Business/commercial address (1,700 housing units, or 12.1 percent of the deletes)

The Parolee/ Probationer Coverage Improvement Programs added persons to housing units that at least one field operation identified as nonexistent. We can only speculate as to which was correct: the delete status or the parolee or probationer that reported they lived at one of these housing units. Perhaps enumerators could not locate an address and assumed it did not exist. On the other hand, perhaps bad addresses were obtained from the parolees and probationers themselves, or from the administrative records.

Another concern for the Search/ Match operation is the number of potential duplicate addresses where persons were added (note these were duplicates as defined by field operations). One reason for this may be slight variations in the spelling of a street name or street designation variation (that is, street versus road versus avenue). The large number of duplicate addresses also suggests that improvement is needed in Address Control File maintenance, such as address standardization.

A fairly large percentage of the prior deletes (12.1 percent) had a delete reason of "business or commercial." This raises concern over the difficulty of locating housing

units within business establishments. Identifying these types of housing units has always been a problem and will continue to be for future censuses.

About 94.6 percent of the housing units that were converted from a delete status had a final census household size of one person. Thus, the added parolee or probationer was the only person counted at the housing unit.

There were 4,731 housing units that were previously vacant units out of the 18,810 converted housing units. These housing units represent about 25.1 percent of this universe. About 63.0 percent of these housing units were in Field Followup. Of the housing units that were in Field Followup, a majority were in Field Followup due to the vacancy check and remained vacant after Field Followup. Thus, we added parolees and probationers to previously vacant units.

About 88.1 percent of these units had a final census household size of one person. Again, this indicates that the parolee or probationer that was added to the housing unit during these operations was the only person enumerated at the unit.

Average Household Size—This section discusses the average household size of the housing units in the Parolee/ Probationer Coverage Improvement Program and the followup program universe. This universe is divided into the following subgroups:

- Existing enumerated housing units where a parolee or probationer was added
- 2. Housing unit adds from these programs
- 3. Converted housing units—prior deletes
- 4. Converted housing units—vacants.

The average household size for existing enumerated housing units where a parolee or probationer was added during these programs was 3.64 persons. This is larger than the U.S. level average household size of approximately 2.63 persons. For all of the remaining groups (the housing unit adds, the prior deletes, and the vacants), the average household sizes are much smaller. This is expected since it was usually the enumeration of the parolee or probationer that generated either the housing unit add or the conversion of the unit from a delete or a vacant status. Note that procedures did allow for the enumeration of more than one parolee or probationer to be added to a single address (even though only one parolee or probationer could be reported per Parolee/ Probationer Information Record).

For the housing unit adds, the average household size was about 1.07 persons; for the prior deletes the average household size was approximately 1.05 persons; and for the nondeletes the average household size was slightly higher—about 1.24 persons.

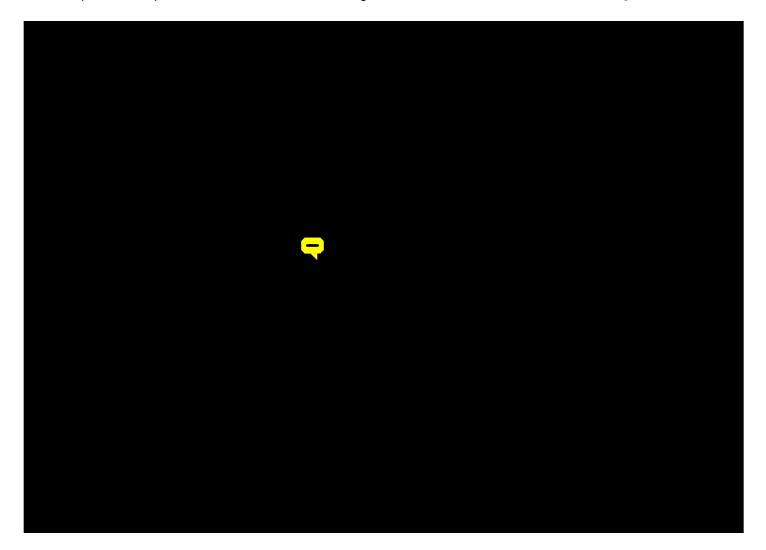
State Level Person and Housing Unit Data—The person add rates by State as a percentage of the 1989 population of parolees and probationers in each State are shown in figure 5.6. (The 1989 parolee and probationer population was obtained from [4].)Seven States had person add rates greater than 20 percent— Mississippi, Connecticut, Rhode Island, New Jersey, California, Massachusetts, and Virginia. Mississippi had a person add rate greater than 40 percent; this State had the highest person add rate as a percentage of its 1989 eligible parolee and probationer population-48.6 percent. In other words, 48.6 percent of all of Mississippi's eligible parolees and probationers were added to the census from these programs. Three States, Connecticut, Rhode Island, and New Jersey, had person add rates between 30 percent and 40 percent. The last three States, California, Massachusetts, and Virginia, had person add rates between 20 percent and 30 percent.

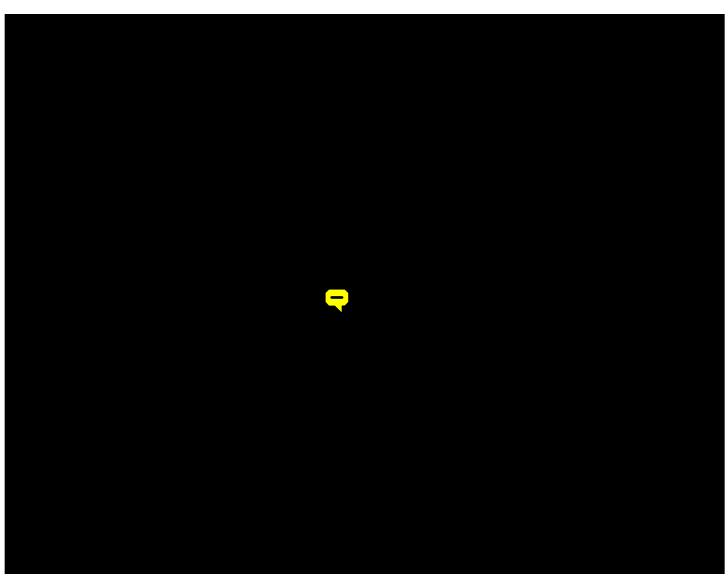
Keep in mind that about 73.7 percent of the person adds were generated by the followup program, which used administrative lists. It is uncertain whether the high person add rates experienced in many States (for example, Mississippi, Connecticut, Rhode Island, and New Jersey) meant that these States had good quality administrative records, or if the administrative records were so outdated that the parolee or probationer was not found during

Search/ Match because they had moved from the search address, and therefore were added to the census. However, we can probably conclude that many of these persons would have remained missed in the census if they hadn't been added during these programs. Prior research suggested that the subpopulation of parolees and probationers were not very likely to participate in the census. It also suggested that these persons were likely to be deliberately concealed from the census. There were various reasons cited for concealment, from the fear of interference with social service benefits such as welfare, to a need for concealment due to various past, present, or future illegal economic activities [7]. Given that many of these persons did not want to be counted, the Census Bureau did improve coverage of this population.

Note that the participation of only selected States in the followup program affected the person and housing unit add rates. For example, 10 States did not have any targeted areas in the followup program [1]. These States likely had the lowest person and housing unit add rates.

Figure 5.7 shows the State level distribution of the housing unit adds from this program as a percentage of the total housing unit adds generated from this program. Note that this is for the 10,937 true housing unit adds.





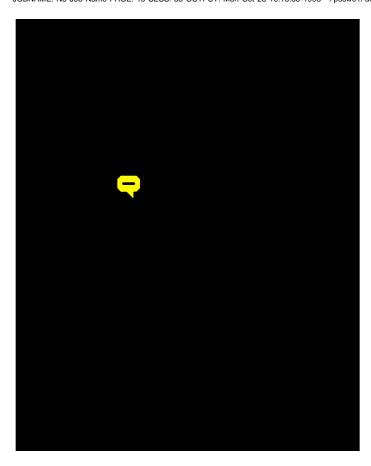
As expected, States with large numbers of housing units also had high numbers of housing unit adds. There were three States that had a housing unit add rate greater than 10 percent—Texas, Florida, and California. Texas had 1,765 housing unit adds, representing about 16.1 percent of all housing unit adds. Texas was the only State with a percentage greater than 15 percent. Florida had about 11.1 percent of all housing units added from these two programs and California had about 10.8 percent of all housing unit adds.

Demographics of Added Persons—This section presents an examination of the demographic characteristics of the persons added to the census from the Parolee/ Probationer Coverage Improvement Program and the Parolee/ Probationer Coverage Improvement Followup program. The demographics presented are age, race, and cross tabulations of sex and race. In some instances, the demographics of the persons added to the census are compared to selected demographics of the 1989 parolee/ probationer population or to 1990 census population demographics.

Recall that there were 447,757 persons added to the census from these two programs. The age breakdown of

persons added to the census from the Parolee/ Probationer Coverage Improvement Program and the subsequent followup program showed no surprises, with the age groups that are likely to include persons on parole or probation being the most represented. Of those that reported age, the age group 30-44 years old was the largest, with 29.7 percent of all person adds in this group. The second largest age group of those that reported age was the 20-29 year olds, representing about 28.5 percent of all parolees and probationers added to the census. The age item had a very high unreported rate-32.9 percent. A contributing factor to this high unreported rate may be the use of administrative records in the followup program, which generated a majority of the adds. From looking at these data, it seems that age is unlikely to be a characteristic reported on parolee and probationer administrative records. Note that the age item had a very small percentage (0.4 percent) of person adds that had a reported age less than 10 years old. These are likely due to transcription errors.

Figure 5.8 shows the distribution of race for the parolee and probationers added to the census compared to the racial composition of the 1989 parolee and probationer



population. Recall that one of the major objectives of these programs was to help address differential undercount. As the graph shows, the majority of the person adds were White—about 44.9 percent, which is slightly lower than the percentage of Whites in the 1989 parolee/probationer population. But the percentage of person adds that were Black—about 33.8 percent—was over 10 percentage points higher than Black representation in the 1989 parolee/probationer population, which was about 23.2 percent. This may be a direct result of the followup program design, which targeted high minority areas.

There was also a slightly higher representation of "other" race for the parolee/ probationer person adds than there was for "other" race in the 1989 parolee and probationer population, 4.2 percent versus 2.1 percent, respectively. Lastly, there is a "not reported" category for race. About 17.1 percent of the person adds were in this category, whereas a much larger percentage of the 1989 parolee/ probationer population did not report race—28.5 percent. Note that the differences in percentage of persons for each category of race for the person adds versus the 1989 parolee/ probationer population could be attributable to the large "not reported" category for the 1989 parolee/ probationer population.

The next graph displays selected sex and race characteristics of the parolees and probationers added to the census and compares them to 1990 census data. These data help determine whether the Parolee/ Probationer Coverage Improvement Program and the subsequent followup

program addressed differential undercount. As figure 5.9 shows, a smaller percentage of White males were added than their representation in the 1990 population. Approximately 36.2 percent of the persons added were White males, whereas White males comprised about 41.1 percent of the 1990 population. On the other hand, 27.1 percent of the person adds were Black males, in contrast to 5.8 percent of the 1990 population being Black males. Given that the definition of differential undercount is missing persons (in this context, specifically Black males) at a disproportionately higher rate than their representation in the total population, these programs did indeed seem to address differential undercount, since the programs added Black males at a disproportionately higher rate than their representation in the 1990 census population.

Erroneous Enumeration Rate—The estimated erroneous enumeration rate for all parolee/probationer person adds is approximately 57.24 percent. A 90 percent confidence interval for the true erroneous enumeration rate is 48.87 percent to 65.61 percent.

Although this erroneous enumeration rate seems high, the converse implies that over 40 percent of all the parolees/probationers added to the census were confirmed to be correctly enumerated. Given that these persons are believed to be a traditionally hard to enumerate population, it is likely that many of these persons would have remained missed in the census if we had not added them during this program. It also is reasonable to assume



that some of the erroneously enumerated persons would have remained uncounted if we had not added them to the census, even though we may have ended up adding them in the wrong block. It must also be reiterated that these erroneous enumeration estimates obtained from the PES are not the best measurement of erroneous enumeration rates since the PES sample was not designed to measure errors in search/ match enumerations.

One reason for this high erroneous enumeration rate may be the source of the addresses that were reported on Parolee/ Probationer Information Records from the followup program—State parole/ probation offices' administrative records. No verification of the accuracy of the administrative lists was conducted by the Census Bureau prior to its use.

Additional errors could have occurred if the person completing the Parolee/Probationer Information Record did not accurately identify his or her "usual residence" according to census rules. This would occur if a parolee or probationer gave us the address where he or she received mail, versus where he or she lived. It also is possible that the original household respondent was in error in leaving this person off of the census form. Most errors seem to result from a misunderstanding on the part of the parolee or probationer and the household respondent about whether or not that was their "usual residence." The concept of usual residence may be especially difficult to apply for persons with tenuous or multiple attachments to households such as parolees or probationers.

Conclusions

These programs were successful in adding many persons from the targeted parolee and probationer population to the census. These persons represent a subgroup of the population that are not very likely to participate in the census. Thus, targeting parolees and probationers helped to increase coverage of this population, especially young men ages 20-44. In addition, given the percentage of young Black males added to the census from these programs (about 27.1 percent of all parolee/ probationer person adds), the Census Bureau seemed to be successful in addressing differential undercount.

The 447,757 persons added to the census from these two programs represented about 15 percent of the 1989 national parolee/ probationer population. By State, the person add rates ranged from a high of 48.6 percent of all eligible parolees/ probationers per State, to a low of about 0.2 percent. Again, it can be seen that coverage of this population was increased, even if it was only marginal in some States. The disparity in the person add rates is likely a reflection of which States had large parolee/ probationer populations, and if a given State participated either partially or fully in one or both of the programs.

The Census Bureau used two different sources of addresses in these programs—the parolees and probationers themselves, and the administrative lists. It is recommended that in the future, the Census Bureau should use

only one source. It is obvious that the use of administrative lists produced more person adds. However, if it is decided to utilize administrative lists of this sort in the future, they must be researched and tested. In addition, any administrative lists that may be used in the future should be verified as up-to-date, and the Census Bureau must request them and use them close to Census Day. Given the high estimated rate of erroneous enumerations, it is recommended that this program be carefully scrutinized before any future implementation, in order to capitalize on adding a large number of persons to the census from this subgroup, but to also improve on the quality of the enumerations.

It is clear from these results that we need to examine the methodology for adding persons from this type of operation to improve census coverage. Forms that collect this type of data must clarify the importance of collecting the address that corresponds to the individual's "usual residence" on Census Day. Clearly defining where persons should be counted and developing the tools and procedures to collect sufficient information to ensure their correct enumeration is critical to the success of programs such as this in the future.

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USUAL HOME ELSEWHERE

Introduction and Background

This section of the Search/Match Coverage Improvement Chapter discusses the rates at which persons were added to the census from certain search forms, as well as the estimated rates of erroneous enumerations from the specified search forms. The specified search forms discussed in this section are ones in which respondents reported a "usual home elsewhere." These search forms are: Individual Census Reports, Military Census Reports, Shipboard Census Reports, and D-190 Search Records, which included whole households that usually live elsewhere and movers that lived elsewhere on Census Day. Copies of these search forms are shown in appendix B. For detailed background information on the Search/Match Additions section of this chapter.

Methodology

Person Adds—After the Search/ Match operation, a sampling plan was developed for this evaluation. The sampling plan involved a two-stage sort of all search forms and systematic sampling. The two-stage sort was by form type and processing outcome. Dependent upon the total number of forms in each category, a random start and a take every interval were assigned. The sample sizes were determined such that we would be able to calculate reliable estimates of person adds by form type. Data from the sampled search forms were keyed. The estimates of the number of persons added to the census are from these keyed data. The estimates are rounded to the nearest hundred.

The estimates of the number of persons added to the census from each form type are weighted estimates (based on the take every interval described above). There is no standard error due to sampling associated with the estimates of persons added from the form types that had only one person listed on them (Individual Census Reports, Military Census Reports, and Shipboard Census Reports). This is because there is no variation in the data; that is, all of these search forms could have only one person added to the census. However, there is nonsampling error associated with these estimates which cannot be measured for this analysis (for example, errors in the sorting and sampling operation described above). Note that the standard errors that are measurable are not rounded (although the estimates of the number of person adds are).

The add rates were defined as the number of search forms that produced at least one person add divided by the total number of search forms received for a given type of search form.

Error Rates—The PES was a national survey that was conducted after the census to measure errors in the census. Data from the PES were used for this analysis.

The search forms that identified persons to be added to the census from the Search/Match operation were geographically sorted into PES and non-PES blocks. Data from the search forms that were in PES sample blocks were keyed. The PES files include a set of codes that represent the conclusion from the PES of whether persons were correctly or incorrectly enumerated in the census. The sample data were merged with the PES files; the merged data file was used to generate the estimated erroneous enumeration rates. An erroneous enumeration is defined as an enumeration that was considered incorrect because the person should not have been counted at the specified address on Census Day. For example, they may have been born after, or died before, Census Day, or they may have had a usual residence elsewhere. Erroneous enumerations are also duplicate enumerations (that is, persons who were counted more than once), fabricated enumerations, and enumerations that were assigned to the wrong census geography due to a geocoding error. The PES final enumeration status for these person adds (that is, erroneous enumeration versus correct enumeration) was deemed to be the "truth."

Note that this analysis did not include estimates of the erroneous enumeration rates for the persons added to the census from Military Census Reports or Shipboard Census Reports. This is due to the PES sample being used for our analysis. The erroneous enumeration rate estimates are from PES data and by design, the PES sample did not include barracks on military bases or ships.

Ninety percent confidence intervals on the erroneous enumeration rates are presented. Rather than the traditional confidence interval formula, the Bonferroni Method for multiple confidence statements (Johnson and Wichern, 1988) was used. With this method, confidence statements about all of the intervals can be made simultaneously with 90 percent confidence. Note that this method makes the intervals more conservative (that is, larger). For p simultaneous confidence statements, the Bonferroni method uses z $\frac{\alpha}{2D}$ instead of z $\frac{\alpha}{2D}$, yielding longer confidence intervals.

Limitations

There are several limitations to these results that should be taken into consideration when using these data.

First, the Search/Match operation, the sorting and sampling of the search forms, and the keying of the sampled forms were all clerical operations. Thus, the data obtained from these operations are subject to clerical errors.

Second, estimates of the number of persons added to the census by each form type are presented (exact counts are unknown). The reason that exact counts of the number of persons added to the census by form type are unknown (even though counts of the total number of search forms by category are known) is that these persons were potentially added to the census. The person data were transcribed from the search form onto a census questionnaire and the census questionnaire was data captured. However, if there were transcription errors, the census questionnaire was not accepted and the person was not added to the census. Also, only one search form was accepted per household. Thus, if more than one search form was processed for a household, only the persons on the last processed form were added to the census. These types of circumstances necessitate the use of the estimates, rather than exact counts.

Third, the PES was not designed to measure Search/ Match errors. Any Search/ Match person adds that were in the PES sample fell in sample by chance, not design. Therefore, this is not the best possible measurement of erroneous enumeration rates. However, this is the only available measurement of erroneous enumeration rates.

Lastly, for the purposes of this analysis, the PES final enumeration status is deemed to be the correct determination. It must be recognized that there were errors in the PES that led to limitations in these results. PES followup activities occurred in the fall of 1990. It is possible that the time between April 1, 1990 and PES followup resulted in recall and other errors. In some instances response error could lead to an incorrect categorization of an enumeration as erroneous. These factors should be taken into consideration before drawing conclusions from these results.

Results

Individual Census Reports—There were about 203,000 Individual Census Reports received for processing during Search/ Match. Approximately 36,100 persons were added to the census from Individual Census Reports. About 17.8 percent of the Individual Census Reports received for processing during Search/ Match resulted in a person add.

As previously discussed, the estimate of the number of persons added to the census from Individual Census Reports does not have a standard error due to sampling since only one person could be reported on a form.

The estimated erroneous enumeration rate for persons added to the census on Individual Census Reports is about 15.6 percent. This form type had the second smallest representation in the sample, which contributed to a high standard error (10 percent). As a result, the 90 percent confidence interval includes zero; the 90 percent confidence interval is between zero and 42.5 percent. The erroneous enumeration rate is different from zero since enumeration errors were found and measured.

Military Census Reports—During Search/ Match, about 697,400 Military Census Reports were received. The Census Bureau added approximately 56,000 persons to the

census from Military Census Reports, which represents about an 8.0 percent person add rate. Again there is no associated sampling standard error for this estimate, only unmeasurable nonsampling error as previously described.

As mentioned earlier in this section, there are no erroneous enumeration rates for persons added to the census from Military Census Reports.

Shipboard Census Reports—This form type had the smallest number of processed forms during Search/ Match—the Census Bureau received only about 79,600 Shipboard Census Reports. From these, about 14,000 persons were added to the census. Thus, about 17.6 percent of all the Shipboard Census Reports received resulted in a person add. As was the case for the Individual Census Reports and the Military Census Reports, only one person could be enumerated on a Shipboard Census Report; therefore there is no standard error for this estimate.

The PES sample did not include any ships; therefore, there is no estimate of the erroneous enumeration rate for persons added to the census from Shipboard Census Reports.

D-190 Search Records—Whole Household Usual Home Elsewhere Cases and Mover Usual Home Elsewhere Cases—About 375,300 D-190 search records that were whole household usual home elsewhere cases were received and processed during Search/Match. From these, about 162,800 persons were added to the census. This estimate has a standard error of 2,645 persons. The estimated erroneous enumeration rate of the persons added to the census that were whole household usual home elsewhere cases is 40.5 percent. This estimate also had a high standard error (11.1 percent), contributing to a very wide 90 percent confidence interval. A 90 percent confidence interval for the true erroneous enumeration rate is between 10.6 percent and 70.4 percent.

Approximately 85,300 of the D-190 search records that were whole household usual home elsewhere cases resulted in a person add. Thus, about 22.7 percent of all whole household usual home elsewhere cases resulted in at least one person being added to the census during Search/Match.

The Census Bureau received about 95,600 D-190 search forms that were mover usual home elsewhere cases. From these cases, we estimate that approximately 73,100 persons were added to the census. The standard error of this estimate is 1,282 persons.

Approximately 34,900 D-190 search records that were mover usual home elsewhere cases resulted in a person add. Thus, about 36.5 percent of all mover usual home elsewhere cases resulted in a person add.

The estimated erroneous enumeration rate for the persons identified as movers that had a usual home elsewhere is high—about 58.2 percent. A 90 percent confidence interval for the true erroneous enumeration rate is between 37.3 percent and 79.1 percent. This high error rate may suggest that the training and procedures used

during the 1990 Vacant/ Delete/ Movers Check need review. This high estimated erroneous enumeration rate for movers also suggests that there may have been recall bias during PES followup operations. That is, persons may have had difficulty recalling exactly when they moved. In addition, this mobile group of movers may also be difficult to enumerate in the PES.

Figure 5.10 summarizes the estimated number of persons added to the census by each of the search form types discussed.

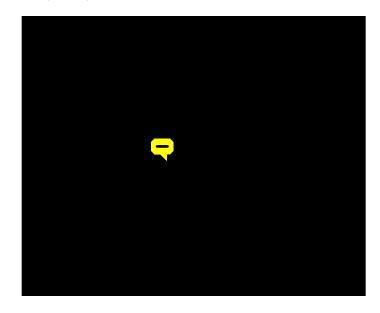
Add Rates—This section presents some discussion about the previously mentioned add rates. Recall that the add rate is defined as the ratio of the number of forms that produced a person add to the total number of forms received. Figure 5.11 summarizes these add rates by form type.

It was expected that both the Military Census Reports (8.0 percent add rate) and the Shipboard Census Reports (17.6 percent add rate) would have relatively low add rates. Most persons reported on these forms tended to have been enumerated at their usual residence. We hypothesize that these persons were more aware of their responsibility to be included on the census questionnaire for their usual residence.

The relatively low add rate for the Individual Census Reports (17.8 percent) seems to verify that most persons who were temporarily away from their residence and identified a usual home elsewhere were correctly enumerated at their usual residence.

The whole household usual home elsewhere add rate of 22.7 percent seems to imply that for a large majority of these cases, the persons were counted at their usual residence. That is, they received census questionnaires at more than one residence, and were likely to have been counted at the residence they live at most of the year. However, this also suggests that a small percentage of persons with multiple residences are at risk of not being counted at their usual residence.





On the other hand, the higher add rate for movers (36.5) percent) was not expected. This is a difficult subgroup to enumerate, especially if they move on or near Census Day. There could be many reasons why movers were difficult to enumerate. For example, moving is a hectic time; persons may not have taken the time to complete a census questionnaire at their old residence, yet when they got to their new residence and were visited by an enumerator, they were eventually added to the census. We should not assume that movers will complete a census questionnaire at their old residence before moving. Also consider that many movers are mobile in general; that is, they may have multiple residences within a one year period. These persons seem to represent a hard-to-enumerate group. These data confirm that special procedures are needed to correctly enumerate movers.

Conclusions

The individual estimates of erroneous enumeration rates by form type are not very reliable; they have relatively high standard errors caused by small sample sizes. In addition, almost all of the intervals for the individual erroneous enumeration rates are overlapping, suggesting that the rates may not be significantly different.

Although evidence exists that confirms errors were introduced from the Search/Match operation, data also show that in most cases, and for most form types, persons added to the census from these search forms were correctly enumerated. This point must not be overlooked when examining erroneous enumeration rates.

It is clear from these results that we need to examine the methodology for adding persons from this type of operation to improve census coverage. All search forms that collect this type of data must clarify the importance of collecting the address that corresponds to the individual's "usual residence" on Census Day. Clearly defining where persons should be counted and developing the tools and

procedures to collect sufficient information to ensure their correct enumeration is critical to the future success of programs such as Search/Match.

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WERE YOU COUNTED?

Introduction and Background

This section of the Search/Match Coverage Improvement Chapter documents some results of the Were You Counted? Campaign. Included in this section are the number of forms received, the rate at which persons were added to the census from these forms, and the estimated rate at which persons were erroneously added to the census. For a detailed background description of the Search/Match operation (which was the operation that processed the Were You Counted? forms), refer to the Characteristics of Search/Match Additions section of this chapter.

The print and electronic media generated Were You Counted? forms. Respondents who believed their household, or persons within their household, were missed in the 1990 decennial census either completed a Were You Counted? form that was displayed in local print media or called the Census Bureau's processing offices or district offices. In some cases, the processing office or district office staff completed Were You Counted? forms for the respondents who called to report that they had not been counted. These forms could list more than one person at

the same address. All searchable Were You Counted? forms were processed during the Search/ Match operation. Refer to appendix B for a copy of a Were You Counted? form.

Methodology and Limitations

Refer to the Usual Home Elsewhere section of this chapter for the methodology used and the limitations of these results.

Results

The Census Bureau received about 352,800 Were You Counted? forms. From these forms, about 260,000 persons were added to the census. The standard error of this estimate is 2,511 persons. The estimated erroneous enumeration rate for the persons added to the census from Were You Counted? forms is 35.2 percent. A 90 percent confidence interval for the erroneous enumeration rate is between 20.4 percent and 50.1 percent.

Approximately 34.6 percent of all Were You Counted? forms resulted in at least one person being added to the census. This is a fairly high add rate compared to other search forms that were processed during the 1990 Search/Match operation (see the Usual Home Elsewhere section of this chapter for comparisons to other search form types). But it is also reasonable, given that most persons reported on these forms believed they were not counted in the census.

Conclusions

The Were You Counted? Campaign seemed to be successful at adding persons to the census. Specifically, this campaign was a mechanism for persons who believed that they had been missed to be included in the census. In addition, an estimated 65 percent of all persons added to the census from this campaign were confirmed to be correctly enumerated. Given these results, it is recommended that this campaign be continued for future censuses.

Reference

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APPENDIX A. Glossary

ACF—Address Control File

ACR—Advance Census Report

Address Control File—The 1990 decennial census automated address control list used as an inventory of all housing units within specified geographic areas.

Address Register—A book used by census enumerators that contains listings of each housing unit and special place within the enumerator's assigned area.

Address Register Area—A small geographic area used as a basic unit for data collection by a census enumerator.

Advance Census Report—An unaddressed short-form questionnaire delivered by the USPS in list/enumerate areas. The respondent completes the questionnaire and holds it for pickup by a census enumerator.

Advance Post Office Check I—Defined in Chapter 1, Advance Post Office Check.

Advance Post Office Check II/ III—Defined in Chapter 1, Advance Post Office Check.

Advance Post Office Check Reconciliation—Defined in Chapter 1, Advance Post Office Check Reconciliation.

APOC-Advance Post Office Check

Basic Street Address—The house number and street name address representing a structure or group of structures (such as a single family house, an apartment building, or an apartment complex).

Casing Check—Defined in Chapter 1, Casing Check.

Census Closeout Address Check—Defined in Chapter 1, Census Closeout Address Check.

Census Day—April 1, 1990

Census Region—One of four areas resulting from a partition of the 50 States and the District of Columbia. The four regions are labelled Northeast, Midwest, South, and West.

Closeout Procedures—Procedures used during the last phase of Nonresponse Followup as a final effort to obtain an acceptable questionnaire for any remaining unenumerated cases.

Delete—An address was deleted if it did not qualify as a housing unit, if it was a duplicate of another address, or if the address did not exist.

District Office—A temporary office established during the census for data collection purposes.

EFQ—Enumerator Friendly Questionnaire

Enumerator Friendly Questionnaire—A questionnaire written in a form to be read by an enumerator to a respondent.

Field Followup—Defined in Chapter 1, Field Followup.

Geocode—A process of assigning addresses to their correct census geography.

GQ—Group Quarters

Group Quarters—A place where people live that is not a typical household-type living arrangement. There are institutional and noninstitutional group quarters.

Group Quarters Enumeration—Defined in Chapter 1, Group Quarters Enumeration.

Housing Coverage Check—Defined in Chapter 1, Recanvass/ Housing Coverage Check.

Housing Unit—A house, apartment, mobile home, or other dwelling that is occupied as a separate living quarters or, if vacant, is intended for occupancy as a separate living quarters.

HU—Housing Unit

ICR—Individual Census Report

ID—Identification Number

Individual Census Report—A census questionnaire used to obtain population information for persons in group quarters and for individuals who are not enumerated as part of a household.

Last resort procedures—Procedures used during the later phases of Nonresponse Followup. The completion of "last resort" questions represents the least amount of information for the questionnaire to be acceptable.

L/ E—List/ Enumerate

List/ Enumerate—Defined in Chapter 1, List/ Enumerate.

Long Form—The census questionnaire containing 100 percent and sample questions.

Mail Response Rate—The total number of census questionnaires returned by mail divided by the number of questionnaires mailed by the USPS or delivered by census enumerators; this is sometimes referred to as a Check-In Rate.

Mail Return Rate—The total number of questionnaires returned by mail divided by the number of occupied housing units included in the mailback universe.

Mailout/ Mailback—The type of enumeration method in which the USPS delivers census questionnaires and the respondents return them by mail.

Map Spot—A dot with a number to identify the physical location of housing units on a map, mostly used in rural areas.

MCR—Military Census Report

Military Census Report—A census questionnaire used to obtain population information for military personnel residing at military installations.

MSA—Metropolitan Statistical Area

Metropolitan Statistical Area—An area qualifies for recognition as an MSA if it includes a city of at least 50,000 population or an urbanized area of at least 50,000 with a total metropolitan area population of at least 100,000.

Nonresponse Followup—Defined in Chapter 1, Nonresponse Followup.

Occupied Unit—A housing unit was classified as occupied if anyone lived there on Census Day or considered it their usual place of residence on Census Day.

Parolee/ Probationer Coverage Improvement Followup Program—Defined in Chapter 1, Parolee/ Probationer Coverage Improvement and the Followup Program.

Parolee/ Probationer Coverage Improvement Program—Defined in Chapter 1, Parolee/ Probationer Coverage Improvement and the Followup Program.

Parolee/ Probationer Information Record—A type of questionnaire completed by or for parolees and probationers and then processed through the Search/ Match operation.

PES—Post Enumeration Survey

POP One Reenumeration—Defined in Chapter 1, POP One Reenumeration.

Postcensus Local Review—Defined in Chapter 1, Postcensus Local Review.

Post Enumeration Survey—A coverage measurement survey conducted as part of the 1990 census.

Postmaster Return—A mailed out questionnaire returned by the USPS as undeliverable.

Postmaster Return Delivery—Defined in Chapter 1, Postmaster Return Delivery.

PPIR—Parolee/ Probationer Information Record

Precanvass—Defined in Chapter 1, Precanvass.

Precanvass Reconciliation—Defined in Chapter 1, Precanvass Reconciliation and Yellow Card Coding.

Precensus Local Review—Defined in Chapter 1, Precensus Local Review.

Prelist Mailout/ Mailback—Defined in Chapter 1, Prelist.

Prelist Pocket—A geographic area in which prelist mailout/ mailback procedures were used but which was located in either an update/ leave or list/ enumerate county.

Prelist Update/Leave—Defined in Chapter 1, Prelist.

Primary Selection Algorithm—A computer algorithm used to select the best data capture record when two or more questionnaires were data captured or a questionnaire was recycled through processing for the same identification number.

Primary Selection Algorithm Review—Defined in Chapter 1, Primary Selection Algorithm Review.

Processing Office—A temporary office established for the census to process the data.

Puerto Rico Multiunit Coverage Improvement Operation— Defined in Chapter 1, Puerto Rico Multiunit Coverage Improvement operation.

Recanvass—Defined in Chapter 1, Recanvass/Housing Coverage Check.

JOBNAME: No Job Name PAGE: 3 SESS: 13 OUTPUT: Mon Oct 25 10:02:17 1993 / pssw01/ disk2/ 90dec/ cphe/ 3/ appa

Regional Census Center—A temporary office established during the decennial census to manage and support district office activities.

Regional Office—A permanent office used to manage and support the collection of data for ongoing programs.

Reinterview—A quality control procedure to verify that enumerators collected accurate information.

REX—Research, Evaluation, and Experimental Program

SCR—Shipboard Census Report

Search/ Match—Defined in Chapter 1, Search/ Match.

Shelter and Street Night Enumeration—Defined in Chapter 1, Shelter and Street Night Enumeration.

Shipboard Census Report—A questionnaire used to collect population information for persons on military and maritime vessels.

Short Form—The census questionnaire containing only 100 percent questions.

Source Code—A designation on the Address Control File used to indicate the origin of each address on the file.

Special Place—A place where people either live or stay other than the usual house, apartment or mobile home; requiring special census procedures because it contains group quarters. A special place may also contain separate housing units for staff or other persons.

Special Place Prelist—Defined in Chapter 1, Special Place Prelist.

S-Night—Shelter and Street Night Enumeration

Tape Address Register area—An area where the initial address list is a purchased vendor file.

TAR—Tape Address Register area

Telephone Assistance Adds—Defined in Chapter 1, Telephone Assistance Adds.

TIGER—Topologically Integrated Geographic Encoding and Referencing System

T-Night—Transient Night

Topologically Integrated Geographic Encoding and Referencing System—A computer database that contains all census required map features and attributes.

Transient Night Enumeration—Defined in Chapter 1, Transient Night Enumeration.

UHE—Usual Home Elsewhere

Update/Leave—Defined in Chapter 1, Rural Update/Leave.

Urban Update/ Enumerate—Defined in Chapter 1, Urban Update/ Enumerate.

Urban Update/Leave—Defined in Chapter 1, Urban Update/Leave.

USPS—United States Postal Service

Usual Home Elsewhere—The questionnaire classification used for a housing unit that is temporarily occupied by a person or household that usually resides at another address.

Vacant Unit—A housing unit was classified as vacant on Census Day if no one lived there on Census Day.

Vacant/ Delete/ Movers Check—Defined in Chapter 1, Field Followup.

Vendor File—An automated address list purchased from a commercial vendor.

Were You Counted? Campaign—A program aimed at identifying and enumerating persons through self-identification.

WYC?—Were You Counted?

Yellow Card Coding—Defined in Chapter 1, Precanvass Reconciliation and Yellow Card Coding.

APPENDIX B. Facsimiles of Decennial Forms and Questionnaires

Form number	Page
D-1, Official 1990 U.S. Census Form	B-2
D-20A, 1990 Individual Census Report	B-9
D-21, 1990 Military Census Report	B-11
D-23, 1990 Shipboard Census Report	B-16
D-25, Were You Counted?	B-21
D-59B, Parolee-Probationer Information Record	B-22
D-108A, Address Listing Page	B-23
D-190, Search Record	B-24
D-399, DO/ PO Record of Contact/ Referral—Questionnaire Asistance	B-25
D-550P, Census Closeout Address Check	B-26
D-701, Census Address Card	B-27
D-702, Post Office Report of Missing Addresses	B-28
D-722, Post Office Report of Missing Addresses	B-29
D-1021 PR, Summary of Office Geocoding and Matching	B-30
D-1022 PR, Summary of Field Review Operation	B-31
D-2037, Search/ Match Status	B-32
Hand Delivery of Postmaster Return Questionnaires (Debriefing Questions)	B-33

CENSUS '90

OFFICIAL 1990 U.S. CENSUS FORM



Thank you for taking time to complete and return this census questionnaire. It's important to you, your community, and the Nation.

The law requires answers but guarantees privacy.

By law (Title 13, U.S. Code), you're required to answer the census questions to the best of your knowledge. However, the same law guarantees that your census form remains confidential. For 72 years—or until the year 2062—only Census Bureau employees can see your form. No one else—no other government body, no police department, no court system or welfare agency—is permitted to see this confidential information under any circumstances.

How to get started-and get help.

Start by listing on the next page the names of all the people who live in your home. Please answer all questions with a black lead pencil. You'll find detailed instructions for answering the census in the enclosed guide. If you need additional help, call the toll-free telephone number to the left, near your address.

Please answer and return your form promptly.

Complete your form and return it by April 1, 1990 in the postage-paid envelope provided. Avoid the inconvenience of having a census taker visit your home.

Again, thank you for answering the 1990 Census. Remember: Return the completed form by April 1, 1990.

Para personas de habla hispana –

(For Spanish-speaking persons)

Si usted desea un cuestionario del censo en español, llame sin cargo alguno al siguiente número: 1-800-CUENTAN (o sea 1-800-283-6826)

U.S. Department of Commerce BUREAU OF THE CENSUS

FORM D-1

OMB No. 0607-0628 Approval Expires 07/31/91

How to Fill Out Your Census Form

Please use a black lead pencil only. Black lead pencil is better to use than ballpoint or other pens. Most questions ask you to fill in the circle, or to print the information. See **Example** below.

Make sure you print answers for everyone in this household. If someone in the household, such as a roomer or boarder, does not want to give you all the information for the form, print at least the person's name and answer questions 2 and 3. A census taker will call to get the other information directly from the person.

There may be a question you cannot answer exactly. For example, you might not know the age of an elderly person or the price for which your house would sell. Ask someone else in your household; if no one knows, give your best estimate.

Instructions for individual questions begin on page 3 of this guide. They will help you to understand the questions and answer them correctly.

If you have a question about filling out the census form or need assistance, call the local U.S. census office. **The telephone number is given on the cover of the questionnaire.**

If you do not mail back your census form, a census taker will be sent out to assist you. But it saves time and your taxpayer dollars if you fill out the form yourself and mail it back.

Example

a. Age	b. Year of birth	a. Age	b. Year of birth
4//	1 9 4 9	09	1981
000000	1 • 8 • 0 0 0 0	000 • 00	19800000
101010	9 • 1 0 1 0	101010	9 ● 1 ○ 1 ●
2020	2020	2020	2020
3 0 3 0	3 0 3 0	3030	3030
4 • 40	4 ● 4 ○	4040	4040
. 5 0 5 0	5050	5050	5050
6060	6060	6060	6060
7070	7070	7070	7070
8080	8080	8080	8 ● 8 O
9090	9 ○ 9 ●	9 ○ 9 ●	9090

Your Answers Are Confidential

The law authorizing the census (Title 13, U.S. Code) also provides that your answers are confidential. No one except census workers may see your completed form and they can be fined and/or imprisoned for any disclosure of your answers. Only after 72 years can your individual census form become available to other government agencies (whether federal, state, county, or local). Until then, no other person or business can see your individual report.

The same law that protects the confidentiality of your answers requires that you provide the information asked in this census to the best of your knowledge.

Information collected from the decennial census is used for a variety of statistical purposes. Census information is used to find out where funding is most needed for schools, health centers, highways, and other services. Census results are used by members of public and private groups--including community organizations--and by businesses and industries, as well as by agencies at all levels of government.

Instructions for Questions 1a through 7

1a. List everyone who lives at this address in question 1a. If you are not sure if you should list a person, see the rules on page 1 of the census form. If you are still not sure, answer as best you can and fill in "Yes" for question H1a or H1b, as appropriate.

If there are more than seven people in your household, please list all the persons in question 1a, complete the form for seven people, and mail it back in the enclosed envelope. A census taker will call to obtain the information for the additional persons.

- b. If everyone listed in question 1a usually lives at another address(es), print the address(es) in 1b.
- **2.** Fill one circle to show how each person is related to the person in column 1.

If **Other relative** of the person in column 1, print the exact relationship such as son-in-law, daughter-in-law, grandparent, nephew, niece, mother-in-law, father-in-law, cousin, and so on.

If the **Stepson/stepdaughter** of the person in column 1 also has been legally adopted by the person in column 1, mark **Stepson/stepdaughter** but do not mark **Natural-born or adopted son/daughter**. In other words, **Stepson/stepdaughter** takes precedence over **Adopted son/daughter**.

4. Fill ONE circle for the race each person considers himself/herself to be.

If you fill the **Indian (Amer.)** circle, print the name of the tribe or tribes in which the person is enrolled. If the person is not enrolled in a tribe, print the name of the principal tribe(s).

If you fill the **Other API** circle [under **Asian or Pacific Islander (API)**], **only** print the name of the group to which the person belongs. For example, the **Other API** category includes persons who identify as Burmese, Fijian, Hmong, Indonesian, Laotian, Bangladeshi, Pakistani, Tongan, Thai, Cambodian, Sri Lankan, and so on.

If you fill the **Other race** circle, be sure to print the name of the race.

If the person considers himself/herself to be White, Black or Negro, Eskimo or Aleut, fill one circle only. Please do not print the race in the boxes.

The **Black or Negro** category also includes persons who identify as African-American, Afro-American, Haitian, Jamaican, West Indian, Nigerian, and so on.

All persons, regardless of citizenship status, should answer this question.

- 5. Print age at last birthday in the space provided (print "00" for babies less than 1 year old). Fill in the matching circle below each box. Also, print year of birth in the space provided. Then fill in the matching circle below each box. For an illustration of how to complete question 5, see the Example on page 2 of this quide.
- **6.** If the person's only marriage was annulled, mark **Never married**.
- 7. A person is of Spanish/Hispanic origin if the person's origin (ancestry) is Mexican, Mexican-Am., Chicano, Puerto Rican, Cuban, Argentinean, Colombian, Costa Rican, Dominican, Ecuadoran, Guatemalan, Honduran, Nicaraguan, Peruvian, Salvadoran, from other Spanish-speaking countries of the Caribbean or Central or South America, or from Spain.

If you fill the Yes, other Spanish / Hispanic circle, print one group.

A person who is not of Spanish/Hispanic origin should answer this question by filling the **No (not Spanish/Hispanic)** circle. Note that the term **"Mexican-Am."** refers only to persons of Mexican origin or ancestry.

All persons, regardless of citizenship status, should answer this question.

Instructions for Questions H1a through H6

- **H1a.** Refer to the list of persons you entered in question 1a on page 1. If you left anyone out of your list because you were not sure if the person(s) should be listed, answer question H1a as **Yes**. Then enter the name(s) and reason(s) why you did not list the person(s) on the lines provided. Otherwise, answer question H1a as **No**.
 - **b.** If you included anyone on your list even though you were not sure that you should list the person(s), answer question H1b as **Yes**. Then enter the name(s) and reason(s) why you listed the person(s) on the lines provided. Otherwise, answer question H1b as **No**.
- **H2.** Fill only one circle.

Count all occupied and vacant apartments in the house or building. Do not count stores or office space.

Detached means there is open space on all sides, or the house is joined only to a shed or garage. Attached means that the house is joined to another house or building by at least one wall that goes from ground to roof. An example of **A one-family house attached to one or more houses** is a house in a row of houses attached to one another.

A mobile home or trailer that has had one or more rooms added or built onto it should be counted as a *one-family detached house*; a porch or shed is not considered a room.

- H3. Count only whole rooms in your house, apartment, or mobile home used for living purposes, such as living rooms, dining rooms, kitchens, bedrooms, finished recreation rooms, family rooms, etc. Do not count bathrooms, kitchenettes, strip or pullman kitchens, utility rooms, foyers, halls, half-rooms, porches, balconies, unfinished attics, unfinished basements, or other unfinished space used for storage.
- H4. Housing is owned if the owner or co-owner lives in it. Mark Owned by you or someone in this household with a mortgage or loan if the house, apartment, or mobile home is mortgaged or there is a contract to purchase. Mark Owned by you or someone in this household free and clear (without a mortgage) if there is no mortgage or other debt. If the house, apartment, or mobile home is owned but the land is rented, mark this question to show the status of the house, apartment, or mobile

Mark **Rented for cash rent** if any money rent is paid, even if the rent is paid by persons who are not members of your household, or by a federal, state, or local government agency.

Mark Occupied without payment of cash rent if the unit is not owned or being bought by the occupants and if money rent is not paid or contracted. The unit may be owned by friends or relatives who live elsewhere and who allow occupancy without charge. A house or apartment may be provided as part of wages or salary. Examples are: caretaker's or janitor's house or apartment; parsonages; tenant farmer or sharecropper houses for which the occupants do not pay cash rent; or military housing.

- H5a. Answer H5a and H5b if you live in a one-family house or mobile home; include only land which you own or rent.
 - b. A business is easily recognized from the outside; for example, a grocery store or barber shop. A medical office is a doctor's or dentist's office regularly visited by patients.
- H6. If this is a house, include the value of the house, the land it is on, and any other structures on the same property. If the house is owned but the land is rented, estimate the combined value of the house and the land. If this is a condominium unit, estimate the value for your house or apartment including your share of the common elements. If this is a mobile home, include the value of the mobile home and the value of the land. If you rent the land, estimate the value of the rented land and add it to the value of the mobile home.

Instructions for Questions H7a and H7b

H7a. Report the rent agreed to or contracted for, even if the rent for your house, apartment, or mobile home is unpaid or paid by someone else.

If rent is paid:	Multiply rent by:	If rent is paid:	Divide rent b
By the day	30	4 times a year	3
By the week	4	2 times a year	6
Every other weel	2	Once a year	12

b. Answer Yes if meals are included in the monthly rent payment, or you must contract for meals or a meal plan in order to live in this building.

What the Census Is About —

Some Questions and Answers

Why are we taking a census?

The most important reason for taking a decennial census is to determine how many representatives each state will have in Congress.

What does the Census Bureau do with the information you provide?

The individual information collected in the census is grouped together into statistical totals. Information such as the number of persons in a given area, their ages, educational background, the characteristics of their housing, etc., enable government, business, and industry to plan more effectively.

How long have we been taking the census?

The first census was taken in 1790 in accordance with the requirement in the first article of the constitution. A census has been taken every 10 years since. The 1990 Decennial Census marks the 200th anniversary of the census.

How are you being counted?

Census forms are delivered to all households a few days before census day. Households are requested to fill out the form and mail it back to the census office.

Why the Census Asks Certain Questions

Here are a few reasons for asking some of the questions.

It is as important to get information about people and their houses as it is to count them.

Name? Names help make sure that everyone in a household is counted, but that no one is counted twice.

Value or rent? Government and planning agencies use answers to these questions in combination with other information to develop housing programs to meet the needs of people at different economic levels.

Page 1

The 1990 census must count every person at his or her "usual residence." This means the place where the person lives and sleeps most of the time.

1a. List on the numbered lines below the name of each person living here on Sunday, April 1, including all persons staying here who have no other home. If EVERYONE at this address is staying here temporarily and usually lives somewhere else, follow the instructions given in question 1b below.

Include

- Everyone who usually lives here such as family members, housemates and roommates, foster children, roomers, boarders, and live-in employees
- Persons who are temporarily away on a business trip, on vacation, or in a general hospital
- College students who stay here while attending college
- Persons in the Armed Forces who live here
- Newborn babies still in the hospital
- Children in boarding schools below the college level
- Persons who stay here most of the week while working even if they have a home somewhere else
- Persons with no other home who are staying here on April 1

Do NOT include

- Persons who usually live somewhere else
- Persons who are away in an institution such as a prison, mental hospital, or a nursing home
- College students who live somewhere else while attending college
- Persons in the Armed Forces who live somewhere else
- Persons who stay somewhere else most of the week while working

Print last name, first name, and middle initial for each person. Begin on line 1 with the household member (or one of the household members) in whose name this house or apartment is owned, being bought, or rented. If there is no such person, start on line 1 with any adult household member.

LAST	FIRST	INITIAL	LAST	FIRST	INITIAL
1			7		
2			8		
3			9		
4			10		
5			11		
6			12		

1b. If EVERYONE is staying here only temporarily and usually lives somewhere else, list the name of each person on the numbered lines above, fill this circle and print their usual address below. DO NOT PRINT THE ADDRESS LISTED ON THE FRONT COVER.

House number	Street or road/Rural route and box number	Apartment number	
City	State	ZIP Code	
County or foreign country	Names of nearest intersecting streets of	or roads	

NOW PLEASE OPEN THE FLAP TO PAGE 2 AND ANSWER ALL QUESTIONS FOR THE FIRST 7 PEOPLE LISTED. USE A BLACK LEAD PENCIL ONLY.

Page 2 PLEASE ALSO ANSWER HOUSING QUESTIONS ON PAGE 3 **PERSON 1 PERSON 2** Please fill one column for each person listed in Middle initial First name Middle initial First name Question 1a on page 1. 2. How is this person related If a RELATIVE of Person 1: to PERSON 1? O Husband/wife Brother/sister 0 START in this column with the household O Natural-born Father/mother Fill ONE circle for each person. member (or one of the members) in whose name or adopted Grandchild If Other relative of person in column 1, the home is owned, being bought, or rented. Other relative son/daughter fill circle and print exact relationship, such ○ Stepson/ as mother-in-law, grandparent, son-in-law, If there is no such person, start in this column with stepdaughter niece, cousin, and so on. any adult household member. If NOT RELATED to Person 1: O Roomer, boarder, Unmarried partner or foster child Other Housemate. nonrelative roommate 3. Sex O Male Female Male O Female Fill ONE circle for each person. 0 White White \circ Fill ONE circle for the race that the person 0 Black or Negro Black or Negro considers himself/herself to be. Indian (Amer.) (Print the name of the Indian (Amer.) (Print the name of the enrolled or principal tribe.) enrolled or principal tribe.) If Indian (Amer.), print the name of the enrolled or principal tribe. O Eskimo Eskimo \circ Aleut Aleut Asian or Pacific Islander (API) Asian or Pacific Islander (API) Chinese Japanese Chinese Japanese 0 0 Filipino Asian Indian Filipino Asian Indian 0 0 If Other Asian or Pacific Islander (API), Samoan 0 Hawaiian Samoan Hawaiian print one group, for example: Hmong, Korean Guamanian Korean Guamanian Fijian, Laotian, Thai, Tongan, Pakistani, Vietnamese Other API Other API -Vietnamese Cambodian, and so on. If Other race, print race. Other race (Print race) Other race (Print race) a. Age a. Age b. Year of birth b. Year of birth 5. Age and year of birth a. Print each person's age at last birthday. Fill in the matching circle below each box. 0 0 0 0 0 0 0 0 0 0 \circ 0 \circ 0 \circ 0 $0 \circ 0 \circ$ 1 0 1 0 1 0 \circ 1 \circ 1 \circ 1 0 1 0 1 0 01010 2 0 2 0 2020 2 0 2 0 2020 b. Print each person's year of birth and fill the 3 0 3 0 3 0 3 0 3 0 3 0 3030 matching circle below each box. 4 0 4 0 4 0 4 0 4 0 4 0 4 0 4 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 6 0 6 0 6 0 6 0 6 0 6 0 6 0 6 0 7 0 7 0 7 0 7 0 7 0 7 0 7 0 7 0 8 0 8 0 8 0 8 0 8080 8080 9090 9090 9 0 9 0 9 0 9 0 6. Marital status O Now married Separated O Now married Separated Fill ONE circle for each person. Widowed O Never married Widowed Never married Divorced Divorced 7. Is this person of Spanish/Hispanic origin? O No (not Spanish/Hispanic) No (not Spanish/Hispanic) 0 Yes, Mexican, Mexican-Am., Chicano Yes, Mexican, Mexican-Am., Chicano Fill ONE circle for each person. O Yes, Puerto Rican O Yes, Puerto Rican Yes, Cuban Yes, Cuban 0 0 Yes, other Spanish/Hispanic Yes, other Spanish/Hispanic (Print one group, for example: Argentinean (Print one group, for example: Argentinean, Colombian, Dominican, Nicaraguan, Colombian, Dominican, Nicaraguan, Salvadoran, Spaniard, and so on.) Salvadoran, Spaniard, and so on.) -If Yes, other Spanish/Hispanic. print one group. 0 0 FOR CENSUS USE -0 0

PERSON 7					
		oid you leave anyone out of your list of persons for	If this is a ONE-FAMILY HOUSE —		
rst name Middle initial	11	Question 1a on page 1 because you were not sure if	$\underline{\underline{H5}}$ a. Is this house on ten or more acres?		
	11	he person should be listed — for example, someone	○ Yes ○ No		
a RELATIVE of Person 1:		emporarily away on a business trip or vacation, a ewborn baby still in the hospital, or a person who			
		tays here once in a while and has no other home?	b. Is there a business (such as a store or barber shop)		
Husband/wife Brother/sister Natural-born Father/mother		Yes, please print the name(s) No	or a medical office on this property?		
or adopted		and reason(s).	○ Yes ○ No		
son/daughter O Other relative		und reason(s).			
O Stepson/	-		Answer only if you or someone in this household OWNS		
stepdaughter		·	OR IS BUYING this house or apartment —		
IOT RELATED to Person 1:	b. D	bid you include anyone in your list of persons for	H6. What is the value of this property; that is, how much		
Roomer.boarder.	II .	Question 1a on page 1 even though you were not sure	do you think this house and lot or condominium unit		
or foster child partner		hat the person should be listed — for example, a	would sell for if it were for sale?		
O Housemate, O Other	 vi	isitor who is staying here temporarily or a person who	○ Less than \$10,000 ○ \$70,000 to \$74,999		
roommate nonrelative	u:	sually lives somewhere else?	\$10,000 to \$14,999 \$75,000 to \$79,999		
0 M1 0 F 1	1 0	Yes, please print the name(s) O No	○ \$15,000 to \$19,999 ○ \$80,000 to \$89,999		
O Male O Female		and reason(s).	○ \$20,000 to \$24,999 ○ \$90,000 to \$99,999		
O White	1	,	○ \$25,000 to \$29,999 ○ \$100,000 to \$124,999		
Black or Negro	-		○ \$30,000 to \$34,999 ○ \$125,000 to \$149,999		
Indian (Amer.) (Print the name of the	I <u> </u>		○ \$35,000 to \$39,999 ○ \$150,000 to \$174,999		
enrolled or principal tribe.)	<u>H2.</u> W	Which best describes this building? Include all	○ \$40,000 to \$44,999 ○ \$175,000 to \$199,999		
[ap	partments, flats, etc., even if vacant.	○ \$45,000 to \$49,999 ○ \$200,000 to \$249,999		
C Estimo	0	A mobile home or trailer	\$50,000 to \$54,999 \$250,000 to \$299,999		
O Eskimo O Aleut	H	A one-family house detached from any other house	\$55,000 to \$59,999 \$300,000 to \$399,999		
Aleut Asian or Pacific Islander (API)	0	,,	\$60,000 to \$64,999 \$400,000 to \$499,999 \$500,000 or more		
O Chinese O Japanese	0	3	C φυσίουση το φορίουρος φοροίουση more		
O Filipino Asian Indian	0	5 .			
O Hawaiian O Samoan	0				
O Korean O Guamanian	0	3	Answer only if you PAY RENT for this house or apartment —		
○ Vietnamese ○ Other API —		3	$\underline{\underline{H7}}$ a. What is the monthly rent?		
[/////////	0	A building with 50 or more apartments Other	O Less than \$80 O \$375 to \$399		
Ĺ,		- Otter	○ \$80 to \$99 ○ \$400 to \$424		
Other race (Print race)	Н3. Н	low many rooms do you have in this house or apartment?	○ \$100 to \$124 ○ \$425 to \$449		
Age b. Year of birth	∥— D	o NOT count bathrooms, porches, balconies, foyers, halls,	O \$125 to \$149 O \$450 to \$474		
1 1 1	OI OI	r half-rooms.	0 \$150 to \$174		
	0	1 room	0 \$175 to \$199		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	0	2 rooms O 5 rooms O 8 rooms	○ \$200 to \$224 ○ \$525 to \$549 ○ \$225 to \$249 ○ \$550 to \$599		
01010 901010	0	3 rooms 0 6 rooms 0 9 or more	\$250 to \$274 \$600 to \$649		
2 0 2 0 2 0 2 0 2 0	H4. Is	s this house or apartment —	\$275 to \$299 \$650 to \$699		
3 0 3 0 3 0 3 0		•	○ \$300 to \$324 ○ \$700 to \$749		
4040 - 4040		Owned by you or someone in this household	○ \$325 to \$349 ○ \$750 to \$999		
5 0 5 0	_	with a mortgage or loan?	○ \$350 to \$374 ○ \$1,000 or more		
6 0 6 0 6 0 6 0	0	Owned by you or someone in this household free and clear (without a mortgage)?	I Donato and I am I am		
7 0 7 0 7 0 7 0 7		Rented for cash rent?	b. Does the monthly rent include any meals?		
8 0 8 0 8 0 8 0	l ő	Occupied without payment of cash rent?	○ Yes ○ No		
9 0 9 0 9 0 9 0 9	<u> </u>				
O Now married O Separated	1		NSUS USE		
O Widowed O Never married	A. Tota		ant G. DO ID		
O Divorced	pers	Occupied Vacant C Less than 1	O 6 up to 12		
	#! !	1 0 1 up to 2	O 12 up to 24		
O No (not Spanish/Hispanic)		First form C Regular 2 up to 6	O 24 or more		
O Yes, Mexican, Mexican-Am., Chicano	LL	O Cont'n O Usual home	iiiiiiLiL		
Yes, Puerto Rican	0 0	elsewhere E. Complete af			
Yes, Cuban	I		110 1		
Yes, other Spanish/Hispanic	II .	2 O P/F O RE			
(Print one group, for example: Argentinean,		3 For sale only rec/occ O MV C ED			
Colombian, Dominican, Nicaraguan, Salvadoran, Spaniard, and so on.)		Rented or O For migrant	4 4 4 4 4 4 4 4 4 4 4 4		
Zavadoran, Spaniard, and so on.)	11	5 sold, not workers 0 P0 0 P3	rio ol		
	I E	6 occupied Other vacant O P1 O P4			
	41	? P2 O P5	l		
	н :	8 00 14: 11 2 5 6	8888888888		
0 -	16	U.Z. IS THIS HINT DOSTORD HINZ F. U.O.V.			
0	16	S C2. Is this unit boarded up? F. Cov. S Cov.	9999999999		

Please make sure you have . . .

- 1. FILLED this form completely.
- **2. ANSWERED Question 1a** on page 1.
- **3. ANSWERED Questions 2 through 7** for each person you listed in Question 1a.
- 4. ANSWERED Questions H1a through H7b on page 3.

Also . . .

5. PRINT here the name of a household member who filled the form, the date the form was completed, and the telephone number at which a person in this household can be called.

Name			Date
Telephone number	Area code	Number	○ Day ○ Night

Then . . .

- 6. FOLD the form the way it was sent to you.
- 7. MAIL it back by April 1, or as close to that date as possible, in the envelope provided; no stamp is needed. When you insert your completed questionnaire, please make sure that the address of the U.S. Census Office can be seen through the window on the front of the envelope.

NOTE — If you have listed more than 7 persons in Question 1a, please make sure that you have filled the form for the first 7 people. Then mail back this form. A census taker will call to obtain the information for the other people.

Thank you very much.

The Census Bureau estimates that, for the average household, this form will take 14 minutes to complete, including the time for reviewing the instructions and answers. Comments about this estimate should be directed to the Associate Director for Management Services, Bureau of the Census, Washington, DC 20233, Attn: CEN-90, and to the Office of Management and Budget, Paperwork Reduction Project CEN-90, Washington, DC 20503. Please DO NOT RETURN your questionnaire to either of these addresses. Use the enclosed preaddressed envelope to return your completed questionnaire.

		OMB NO. U	01-0028:	Approval E	xpires 07/31/9
FORM D-20A U.S. DEPARTMENT OF COMMERCE BUREAU OF THE CENSUS					
1990 INDIVIDUAL CENSUS REPORT					
1. P	lease p	rint your nam	e –		
	ast nam	-		Middl	e initial
2a. A	re you	- Mark (X) the	box tha	t applies.	
2a. Are you — Mark (X) the box that applies. (1) A person WHO USUALLY LIVES HERE or who stays here most of the week while working? Please continue with question 3, on page 2 (2) A person with NO USUAL PLACE OF RESIDENCE?					
(3) A person AWAY FROM YOUR USUAL HOME FOR A SHORT TIME, such as on a vacation or business trip? Print your home address in b, and continue with question 3, on page 2.					
b.	House	number, street na	me, apa	rtment nun	nber
	Ruralr	oute number		Box numb	oer
	City			!	
	County	or foreign count	ry		
	State			,	ZIP Code
Telephone number — Include area code					
Names of nearest intersecting streets or roads					
		FOR CEN	sus us	E	
DO	ID		ARA	Bloc	k PN
Add Do)	ID	ARA	Bloc	k PN

3.	Sex - Mark (X) ONE b	NOX.
0.		
	1 🏻 Male	2 Female
4.	Race – Mark (X) ONE consider yours	box for the race you elf to be.
	1 White 2 Black or Negro 3 Indian (Amer.) (Prenrolled or princip	
	_	
	4□ Eskimo 5□ Aleut Asian or P	acific Islander (API)
	6□ Chinese 7□ Filipino 8□ Hawaiian 9□ Korean	11 Japanese 12 Asian Indian 13 Samoan 14 Guamanian
	10 Vietnamese	15 Other API 7
	16 Other race (Print r	race) — T
5 .	Age and year of birth	
	•	
a.	Age	b. Year of birth
6.	_ •	1
	Age Marital status — Mar 1 Now married 2 Widowed	k (X) ONE box. 4 Separated 5 Never married
	Marital status — Mar 1 Now married 2 Widowed 3 Divorced	k (X) ONE box. 4 Separated 5 Never married
	Age Marital status — Mar Now married Widowed Divorced Are you of Spanish/H Mark (X) ONE box. No (not Spanish/H 2 Yes, Mexican, Me 3 Yes, Puerto Rican 4 Yes, Cuban Yes, other Spanis group, for example	k (X) ONE box. 4 Separated 5 Never married lispanic origin? Hispanic) exican-Am., Chicano h/Hispanic (Print one e: Argentinean, nican, Nicaraguan,

Page 2

AFTER COMPLETING THIS FORM

- Please check it to be sure you have answered all the required questions completely.
- To return your form, please follow the instructions on the envelope that the form came in.

THANK YOU FOR YOUR COOPERATION.

The Census Bureau estimates that, on average, each respondent will take 2 minutes to complete this form, including the time for reviewing instructions and answers. Comments about this estimate should be directed to the Associate Director for Management Services, Bureau of the Census, Washington, DC 20233, Attn: CEN-90, and to the Office of Management and Budget, Paperwork Reduction Project CEN-90, Washington, DC 20503.

CENSUS '90



FOR CENSUS USE

Person with _____ children under 15 years present with him/her

Page 3

OMB No. 0607-0628: Approval Expires 07/31/91

FORM **D-21**

U.S. DEPARTMENT OF COMMERCE BUREAU OF THE CENSUS

1990 MILITARY CENSUS REPORT

This is your official Census form. Your cooperation in carefully filling out the form will help make the census successful. If you do not know the exact answer to any question, please give your best estimate.

This census is authorized by Title 13, United States Code, and you are required by law to answer the questions to the best of your knowledge.

The same law protects the confidentiality of your answers. Census employees are subject to fine and/or imprisonment for any disclosure of your answers. The person on base collecting your information is sworn in as a census employee and is subject to these same penalties.

Thank you for your cooperation.						
1.	Please print your name — Last name First name		Middle	initial		
2a.	What is	the name	of your unit?			
b.		the addres a week?	ss where you	usually stay at	least	
	Building	or barracks	number or ider	tification (if applic	cable)	
	House n	umber, stree	et name, apartr	nent number		
	City			County or foreign	country	
	State		.,		ZIP Cod	le
	Names o	of nearest int	ersecting street	s or roads		
c.	Is the al	bove addre	ess on a milit	ary installatio	or base	?
	☐ Yes -	— Give nam	e 7	□ No		
d.	d. Is the place where you usually stay family-type housing (house, apartment, etc.) or group quarters (barracks, BOQ, hospital, etc.)? Family-type housing — How many persons, including yourself, were living at the above address on April 1, 1990?					
	Persons — Please complete questions 3 through 7 on page 2. Then return your form to the person in charge of distributing these reports.					
	Group quarters — Continue with question 3 and follow the instructions at the bottom of page 2.					
			FOR CENSU	S USE		
DO		ID		ARA	Block	PN

3. Sex – Mark (X) ONE box.	8. In what U.S. State or foreign country were you born?
1 Male 2 Female	[
4. Race – Mark (X) ONE box for the race you consider	
yourself to be. 1 □ White	(Name of State or foreign country; or Puerto Rico, Guam, etc.)
2 Black or Negro	9. Are you a CITIZEN of the United States?
3 Indian (Amer.) (Print the name of the enrolled or	1 \square Yes, born in the United States — <i>Skip to 11</i>
principal tribe.)	2 Yes, born in Puerto Rico, Guam, the U.S. Virgin Islands,
	or Northern Marianas
4	3 Yes, born abroad of American parent or parents
5 Aleut	4 ☐ Yes, U.S. citizen by naturalization 5 ☐ No, not a citizen of the United States
Asian or Pacific Islander (API)	
6 Chinese 11 Japanese	10. When did you come to the United States to stay?
7 🔲 Filipino 12 🗀 Asian Indian	0 ☐ 1987 to 1990 5 ☐ 1970 to 1974
8 Hawaiian 13 Samoan	1 ☐ 1985 or 1986 6 ☐ 1965 to 1969
9 🔲 Korean 14 🔲 Guamanian	2 🗌 1982 to 1984 7 📗 1960 to 1964 3 🗔 1980 or 1981 8 🔲 1950 to 1959
10 Vietnamese 15 Other API	3 ☐ 1980 or 1981 8 ☐ 1950 to 1959 4 ☐ 1975 to 1979 9 ☐ Before 1950
, '	
16 Other race (Print race)	11. At any time since February 1, 1990, have you attended regular school or college? Include only schooling which leads to a high school diploma or a college degree.
5. Age and year of birth	1 \square No, have not attended since February 1
a. Age b. Year of birth	2 🗌 Yes, public school, public college
4	3 🗌 Yes, private school, private college
	12. How much school have you COMPLETED?
6. Marital status - Mark (X) ONE box.	Mark (X) ONE box for the highest level COMPLETED or degree RECEIVED. If currently enrolled, mark the level of previous grade
1 Now married 4 Separated	attended or highest degree received.
2 Widowed 5 Never married	35 🗌 Less than 9th grade
3 Divorced	36 🔲 9th grade
7. Are you of Spanish/Hispanic origin?	37 🔲 10th grade
Mark (X) ONE box.	38 ☐ 11th grade
1 No (not Spanish/Hispanic)	39 12th grade, NO DIPLOMA
2 Yes, Mexican, Mexican-Am., Chicano	40 HIGH SCHOOL GRADUATE — high school DIPLOMA or the equivalent (For example: GED)
3 Yes, Puerto Rican	41 Some college but no degree
4 ☐ Yes, Cuban	42 🗌 Associate degree in college — Occupational program
	43 Associate degree in college — Academic program
5 L. Yes, other Spanish/Hispanic (Print one group, for example: Argentinean, Colombian, Dominican,	44 Bachelor's degree (For example: BA, AB, BS)
Nicaraguan, Salvadoran, Spaniard, and so on.)	45 Master's degree (For example: MA, MS, MEng, MEd, MSW, MBA) 46 Professional school degree (For example: MD, DDS, DVM,
	LLB, JD)
<u> </u>	47 Doctorate degree (For example: PhD, EdD)
What are the last 4 digits of your Social Security Number?	13. What is your ancestry or ethnic origin?
$\begin{bmatrix} \mathbf{x} & \mathbf{x} & \mathbf{x} \end{bmatrix} - \begin{bmatrix} \mathbf{x} & \mathbf{x} \end{bmatrix} - \begin{bmatrix} \mathbf{x} & \mathbf{x} \end{bmatrix}$	
If the last four digite are 9222 are	(For assembly Common Indian Art A
If the last four digits are 8333 or more, please continue with question 8. Persons who continue with question 8 represent a	(For example: German, Italian, Afro-Amer., Croatian, Cape Verdean, Dominican, Ecuadoran, Haitian, Cajun, French Canadian, Jamaican,
sample randomly selected on the basis of these digits. If the digits are less than 8333, stop here and return the form.	Korean, Lebanese, Mexican, Nigerian, Irish, Polish, Slovak, Taiwanese, Thai, Ukrainian, etc.)

Page 2 Page 3

14a. Did you live at the address reported in question 2b	19.
5 years ago (on April 1, 1985)?	20. If you are female —
1 ☐ Yes — Skip to 15a	How many babies have you ever had, not counting stillbirths? Do not count stepchildren or children you have adopted.
b. Where did you live 5 years ago (on April 1, 1985)?	0 None 1 1 4 1 4 7 7 10 10 10
(1) Name of U.S. State or foreign country $\sqrt{}$	2 2 5 5 8 8 11 11
'	3 □ 3 6 □ 6 9 □ 9 12 □ 12 or more
(If outside U.S., print answer above and skip to 15a.)	21a.
(2) Name of county in the U.S. 7	21b. How many hours did you work LAST WEEK (at all jobs)? Subtract any time off; add overtime or extra hours worked.
	OR 0 Did not work last week — Skip to 28
(3) Name of city or town in the U.S. 7	 22. At what location did you work LAST WEEK? If you worked at more than one location, print where you worked most last week. a. Address (Number and street) 7
(4) Did you live inside the city or town limits? Answer "Yes" if living on a base/post reported above. 1 Yes 2 No. lived outside the city/town limits	(If the exact address is not known, give a description of the location such as the name of the military base or post, the nearest street or intersection, etc.)
	b. Name of city, town, or post office 7
15a. Do you speak a language other than English at home? 1 \square Yes 2 \square No $-$ Skip to 17b	
b. What is this language? $\overline{\mathcal{Y}}$	C. Is the work location inside the limits of that city or town?
	1 Yes 2 No, outside the city/town limits
(For example: Chinese, Italian, Spanish, Vietnamese)	d. County 7
C. How well do you speak English?	
1 \square Very well 2 \square Well 3 \square Not well 4 \square Not at all	e. State 7 f. ZIP Code 7
16. 17a.	
17b. During which of the following periods have you served on active duty in the Armed Forces of the United States? Mark (X) a box for each period in which you served. If the only active duty was for training in the military Reserves or National Guard, mark (X) here 0 AND skip to 20.	23a. How did you usually get to work LAST WEEK? If you usually used more than one method of transportation during your trip, mark (X) the box of the one used for most of the distance. 1
1 L September 1980 or later	3 Streetcar or trolley car 10 Walked or marched
2 ∐ May 1975 to August 1980 3 ☐ Vietnam era (August 1964—April 1975)	4 U Subway or elevated 11 U Worked at home Skip to 28
3 Usetnam era (August 1904—April 1975) 4 Pebruary 1955—July 1964	5 Kairoad
5 Korean conflict (June 1950—January 1955)	6 ☐ Ferryboat 7 ☐ Taxicab
6 World War II (September 1940—July 1947)	If "car, truck, or van" is marked in 23a, go to 23b.
7 🔲 World War I (April 1917—November 1918)	Otherwise, skip to 24a.
8 Any other time	b. How many people, including yourself, usually rode to
c. In total, how many years of active-duty	work in the car, truck, or van LAST WEEK?
military service have you had?	1 \square Drove alone 4 \square 4 people 7 \square 7 to 9 people 2 \square 2 people 5 \square 5 people 8 \square 10 or more
18.	$3 \square 3$ people $6 \square 6$ people $8 \square 10$ of more
D 4	Dono E

Page 5

24a.	What time did you usually leave home to go to work	32. Income in 1989 —
	LAST WEEK?	Mark (X) the "Yes" box below for each income source you received during 1989. Otherwise, mark (X) the "No" box.
	2 □ p.m.	If "Yes," enter the total amount received during 1989.
b.	How many minutes did it usually take you to get from	If exact amount is not known, please give best estimate.
	home to work LAST WEEK?	If net income in 32b, c, or d was a loss, write "Loss" above the dollar amount.
	Minutes — Skip to 28	a. Pay as a member of the ARMED FORCES including
25.		special, incentive, and bonus pay. Also wages, salaries, tips, and commissions from CIVILIAN JOBS —
26.		Report total amount from all jobs BEFORE DEDUCTIONS for taxes, bonds, dues, or other items.
27.		
	What is your branch of service?	1 □ Yes → \$.00
	-	$ \begin{array}{c c} 1 & \text{Yes} & \longrightarrow & \\ 2 & \text{No} & & & \\ \end{array} $ Annual amount — Dollars
	2 Army 5 Coast Guard	
	1 ☐ Air Force 4 ☐ Navy 2 ☐ Army 5 ☐ Coast Guard 3 ☐ Marine Corps 6 ☐ Not in U.S. Armed Forces	 b. Self-employment income from own nonfarm business, including proprietorship and partnership —
29 .	Occupation	Report NET income after business expenses.
a.	What is your primary job specialty? If you have more than	
	one specialty, list the one at which you spend the most time. (1) Title -7	1 ☐ Yes → \$.00 Annual amount — Dollars
	(1) Title 7	2 No Annual amount — Dollars
	(0) 500 (0) 10 10 10 10 10 10 10 10 10 10 10 10 10	
	(2) MOS/Rating/Designator/AFSC 7	C. Farm self-employment income —
		Report NET income after operating expenses. Include earnings as a tenant farmer or sharecropper.
D.	What kind of work are you doing?	$ \begin{array}{c c} 1 & Yes \longrightarrow \\ 2 & No \end{array} $
		2 □ No
	(For example: aircraft engine mechanic, electronic technician, field	Timuda dinodin. Donais
_	artillery surveyor, sonar technician, tactical intelligence officer) What are your most important activities or duties?	d. Interest, dividends, net rental income or royalty
C.	what are your most important activities or duties:	income, or income from estates and trusts — Report even small amounts credited to an account.
	1	
	(For example: repair seaplanes, research on electronic components, survey artillery ranges, repair sonar equipment, edit intelligence manuals)	1 ☐ Yes → \$.00
A	What is your paygrade? Enter two-character code.	2 □ No Annual amount — Dollars
u.	(For example: E-4, 0-3)	
		 Any other income received regularly, such as social security, public assistance or welfare payments,
***************************************	Paygrade	child support, or unemployment compensation —
30.		Do NOT include lump-sum payments such as money from an inheritance or the sale of a home.
31a.	Last year (1989), did you work, even for a few days, at a	1 ☐ Yes — — — — — — — — — — — — — — — — — — —
	paid job, business, farm or on active-duty military service? 1 \square Yes $2 \square$ No $-$ Skip to 32	2 No
h	How many weeks did you work in 1989? Count paid	Annual amount — Dollars
U.	vacation, paid sick leave, and military service.	33. What was your total income in 1989?
		Add entries in questions 32a through 32e; subtract any losses. If total amount was a loss, write "Loss" above amount.
	Weeks	
c.	During the weeks WORKED in 1989, how many hours	\$.00
	did you usually work each week?	Annual amount — Dollars
	Hours	OR 0 \square None
		L

AFTER COMPLETING THIS FORM

- 1. Please check it to be sure you have answered all the required questions completely.
- **2.** Then return your form to the person in charge of distributing these reports.
- 3. Military personnel living away from this installation, but within the census area, also will receive a census form at home. To ensure that such personnel are assigned to the correct jurisdiction, it is important that YOU MAKE SURE YOU ARE INCLUDED ON BOTH FORMS—this report and the census form sent to your home.

THANK YOU FOR YOUR COOPERATION.

The Census Bureau estimates that, on average, each respondent will take either 2 minutes (first seven questions) or 7 minutes (all thirty-three questions) to complete this form, including the time for reviewing instructions and answers. Comments about these estimates should be directed to the Associate Director for Management Services, Bureau of the Census, Washington, DC 20233, Attn: CEN-90, and to the Office of Management and Budget, Paperwork Reduction Project CEN-90, Washington, DC 20503.

CENSUS '90



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Add	DO	ID	ARA	Block	PN	
YN	YN					

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OMB No. 0607-0628: Approval Expires 07/31/91

FORM **D-23**

U.S. DEPARTMENT OF COMMERCE BUREAU OF THE CENSUS

1990 SHIPBOARD CENSUS REPORT

This is your official Census form. Your cooperation in carefully filling out the form will help make the census successful. Estimates may be made where exact answers are not known.

This census is authorized by Title 13, United States Code, and you are required by law to answer the questions to the best of your knowledge.

The same law protects the confidentiality of your answers. Census employees are subject to fine and/or imprisonment for any disclosure of your answers.

Thank you for your cooperation.

	orint your name				
Last nam	e	First name	Mid	dle initial	
b. What is	the name of th	e ship whe	re you are assi	gned?	
C. What is	the name of th	e operator	of the ship?		
If U.S. G	overnment, spec	ify Navy, C	oast Guard, etc.		
					/
		P	ease continue		→
					-
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2a. Do you have a residence (house, apartment) where you usually stay when off duty?	8. In what U.S. State or foreign country were you born?
1 \square Yes $-$ Go to $2b$ \longrightarrow 2 \square No $-$ Skip to 3	
b. What is the address of that residence? Include house number, street name, city, State, and ZIP Code. House number Street name	(Name of State or foreign country; or Puerto Rico, Guam, etc.)
Tiouse number Suger name	9. Are you a CITIZEN of the United States?
Base name (if on-base)	1 🗌 Yes, born in the United States — <i>Skip to 11</i>
City State ZIP Code	2 Yes, born in Puerto Rico, Guam, the U.S. Virgin Islands, or Northern Marianas
City State Zir Code	3 Yes, born abroad of American parent or parents
3. Sex – Mark (X) ONE box.	4 \square Yes, U.S. citizen by naturalization
1 Male 2 Female	5 No, not a citizen of the United States
4. Race - Mark (X) ONE box for the race you consider yourself to be.	10. When did you come to the United States to stay?
1 White	0 □ 1987 to 1990 5 □ 1970 to 1974
2 Black or Negro	1 ☐ 1985 or 1986 6 ☐ 1965 to 1969
3 Indian (Amer.) (Print the name of the enrolled or principal tribe.)	2 ☐ 1982 to 1984 7 ☐ 1960 to 1964
	3 ☐ 1980 or 1981 8 ☐ 1950 to 1959
i; 4 □ Eskimo	4 ☐ 1975 to 1979 9 ☐ Before 1950
5 Aleut Asian or Pacific Islander (API) 6 Chinese 11 Japanese 7 Filipino 12 Asian Indian	11. At any time since February 1, 1990, have you attended regular school or college? Include only schooling which leads to a high school diploma or a college degree.
8 Hawaiian 13 Samoan	1 No, have not attended since February 1
9 Korean 14 Guamanian	2 🔲 Yes, public school, public college
10 Vietnamese 15 Other API	3 🗌 Yes, private school, private college
5. Age and year of birth a. Age b. Year of birth	12. How much school have you COMPLETED? Mark (X) ONE box for the highest level COMPLETED or degree RECEIVED. If currently enrolled, mark the level of previous grade attended or highest degree received. 35 Less than 9th grade 36 9th grade
	37 🗌 10th grade
6. Marital status — Mark (X) ONE box.	38 🗌 11th grade
1 Now married 3 Divorced 5 Never married	39 🔲 12th grade, NO DIPLOMA
2 ☐ Widowed 4 ☐ Separated 7. Are you of Spanish/Hispanic origin?	40 HIGH SCHOOL GRADUATE — high school DIPLOMA or the equivalent (For example: GED)
Mark (X) ONE box.	41 Some college but no degree
1 No (not Spanish/Hispanic)	42 Associate degree in college — Occupational program
2 Yes, Mexican, Mexican-Am., Chicano	43 Associate degree in college — Academic program
3 🔲 Yes, Puerto Rican	44 🔲 Bachelor's degree (For example: BA, AB, BS)
4 🔲 Yes, Cuban	45 Master's degree (For example: MA, MS, MEng, MEd, MSW, MBA)
5 Yes, other Spanish/Hispanic (Print one group, for example: Argentinean,	46 Professional school degree (For example: MD, DDS, DVM, LLB, JD)
Colombian, Dominican, Nicaraguan, Salvadoran, Spaniard, and so on.)	47 Doctorate degree (For example: PhD, EdD)
What are the last 4 digits of your Social Security Number?	13. What is your ancestry or ethnic origin?
$\begin{bmatrix} \mathbf{x} & \mathbf{x} & \mathbf{x} \end{bmatrix} - \begin{bmatrix} \mathbf{x} & \mathbf{x} \end{bmatrix} - \begin{bmatrix} \mathbf{x} & \mathbf{x} \end{bmatrix}$	
If the last four digits are 8333 or more, please continue with question 8. Persons who continue with question 8 represent a sample randomly selected on the basis of these digits. If the digits are less than 8333, stop here and return the form.	(For example: German, Italian, Afro-Amer., Croatian, Cape Verdean, Dominican, Ecuadoran, Haitian, Cajun, French Canadian, Jamaican, Korean, Lebanese, Mexican, Nigerian, Irish, Polish, Slovak, Taiwanese, Thai, Ukrainian, etc.)

Page 2 Page 3

14a. Did you live at the address reported in question 2b 5 years ago (on April 1, 1985)?	21a.
1 \square Yes — Skip to 15a	21b. How many hours did you work LAST WEEK (at all jobs)? Subtract any time off; add overtime or extra hours worked.
√ 2 No or no address in 2b	Hours OR 0 □ Did not work last week —
b. Where did you live 5 years ago? If you had no residence except on a ship, report the home port of that ship on April 1, 1985.	Skip to 28
(1) Name of U.S. State or foreign country 7	22. Did you work on this ship LAST WEEK? 1 Yes
· · · · · · · · · · · · · · · · · · ·	$ \begin{array}{c c} \hline 2 & No, different ship \\ \hline \end{array} $
(If outside U.S., print answer above and <i>skip to 15a</i> .)	3 No 7
(2) Name of county in the U.S. 7	At what location did you work LAST WEEK? If you worked at more than one location, print where you worked most last week. 3. Address (Number and street)
	γ
(3) Name of city or town in the U.S. 7	(If the exact address is not known, give a description of the location such as the name of the building or the nearest street or intersection, etc.)
(4) Did you live inside the city or town limits?	b. Name of city, town, or post office
1 Yes 2 No, lived outside the city/town limits	Ψ
15a. Do you speak a language other than English at home?	C. Is the work location inside the limits of that city or town?
1 ☐ Yes 2 ☐ No — Skip to 17a	1 \square Yes 2 \square No, outside the city/town limits
b. What is this language?	d County –
	u. County 7
(For example: Chinese, Italian, Spanish, Vietnamese)	e. State 7 f. ZIP Code 7
C. How well do you speak English? 1 □ Very well 2 □ Well 3 □ Not well 4 □ Not at all	e. State 7
	
16.	''
17a. Have you ever been on active-duty military service in the Armed Forces of the United States or ever been in the United States military Reserves or the National Guard? Active duty does not include	23a. How did you usually get to work LAST WEEK? If you usually used more than one method of transportation during the trip, mark (X) the box of the one used for most of the distance.
17a. Have you ever been on active-duty military service in the Armed Forces of the United States or ever been in the United States military Reserves or the National Guard? Active duty does not include training in the Reserves or National Guard.	used more than one method of transportation during the trip, mark (X) the box of the one used for most of the distance. 1
17a. Have you ever been on active-duty military service in the Armed Forces of the United States or ever been in the United States military Reserves or the National Guard? Active duty does not include training in the Reserves or National Guard. 1 Yes, now on active duty 2 Yes, on active duty in past, but not now	used more than one method of transportation during the trip, mark (X) the box of the one used for most of the distance. 1
17a. Have you ever been on active-duty military service in the Armed Forces of the United States or ever been in the United States military Reserves or the National Guard? Active duty does not include training in the Reserves or National Guard. 1 Yes, now on active duty 2 Yes, on active duty in past, but not now 3 Yes, service in Reserves or National Guard only	used more than one method of transportation during the trip, mark (X) the box of the one used for most of the distance. 1
17a. Have you ever been on active-duty military service in the Armed Forces of the United States or ever been in the United States military Reserves or the National Guard? Active duty does not include training in the Reserves or National Guard. 1 Yes, now on active duty 2 Yes, on active duty in past, but not now 3 Yes, service in Reserves or National Guard only 4 No	used more than one method of transportation during the trip, mark (X) the box of the one used for most of the distance. 1
17a. Have you ever been on active-duty military service in the Armed Forces of the United States or ever been in the United States military Reserves or the National Guard? Active duty does not include training in the Reserves or National Guard. 1 Yes, now on active duty 2 Yes, on active duty in past, but not now 3 Yes, service in Reserves or National Guard only	used more than one method of transportation during the trip, mark (X) the box of the one used for most of the distance. 1
17a. Have you ever been on active-duty military service in the Armed Forces of the United States or ever been in the United States military Reserves or the National Guard? Active duty does not include training in the Reserves or National Guard. 1 □ Yes, now on active duty 2 □ Yes, on active duty in past, but not now 3 □ Yes, service in Reserves or National Guard only 4 □ No	used more than one method of transportation during the trip, mark (X) the box of the one used for most of the distance. 1
17a. Have you ever been on active-duty military service in the Armed Forces of the United States or ever been in the United States military Reserves or the National Guard? Active duty does not include training in the Reserves or National Guard. 1 Yes, now on active duty 2 Yes, on active duty in past, but not now 3 Yes, service in Reserves or National Guard only 4 No	used more than one method of transportation during the trip, mark (X) the box of the one used for most of the distance. 1
17a. Have you ever been on active-duty military service in the Armed Forces of the United States or ever been in the United States military Reserves or the National Guard? Active duty does not include training in the Reserves or National Guard. 1	used more than one method of transportation during the trip, mark (X) the box of the one used for most of the distance. 1
17a. Have you ever been on active-duty military service in the Armed Forces of the United States or ever been in the United States military Reserves or the National Guard? Active duty does not include training in the Reserves or National Guard. 1 Yes, now on active duty 2 Yes, on active duty in past, but not now 3 Yes, service in Reserves or National Guard only 4 No	used more than one method of transportation during the trip, mark (X) the box of the one used for most of the distance. 1
17a. Have you ever been on active-duty military service in the Armed Forces of the United States or ever been in the United States military Reserves or the National Guard? Active duty does not include training in the Reserves or National Guard. 1	used more than one method of transportation during the trip, mark (X) the box of the one used for most of the distance. 1
Have you ever been on active-duty military service in the Armed Forces of the United States or ever been in the United States military Reserves or the National Guard? Active duty does not include training in the Reserves or National Guard. 1	used more than one method of transportation during the trip, mark (X) the box of the one used for most of the distance. 1
Have you ever been on active-duty military service in the Armed Forces of the United States or ever been in the United States military Reserves or the National Guard? Active duty does not include training in the Reserves or National Guard. 1	used more than one method of transportation during the trip, mark (X) the box of the one used for most of the distance. 1
Have you ever been on active-duty military service in the Armed Forces of the United States or ever been in the United States military Reserves or the National Guard? Active duty does not include training in the Reserves or National Guard. 1	used more than one method of transportation during the trip, mark (X) the box of the one used for most of the distance. 1
Have you ever been on active-duty military service in the Armed Forces of the United States or ever been in the United States military Reserves or the National Guard? Active duty does not include training in the Reserves or National Guard. 1	used more than one method of transportation during the trip, mark (X) the box of the one used for most of the distance. 1
Have you ever been on active-duty military service in the Armed Forces of the United States or ever been in the United States military Reserves or the National Guard? Active duty does not include training in the Reserves or National Guard. 1	used more than one method of transportation during the trip, mark (X) the box of the one used for most of the distance. 1
Have you ever been on active-duty military service in the Armed Forces of the United States or ever been in the United States military Reserves or the National Guard? Active duty does not include training in the Reserves or National Guard. 1	used more than one method of transportation during the trip, mark (X) the box of the one used for most of the distance. 1

28.	4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	32.	
20.	Are you now on active duty in the U.S. Armed Forces?	JZ.	Income in 1989 –
	1 🔲 Yes, Navy	ł	Mark (X) the "Yes" box below for each income source you received during 1989. Otherwise, mark (X) the "No" box.
	2 Yes, Marine Corps	l	If "Yes," enter the total amount received during 1989.
	3 Yes, Coast Guard		·
	4 🗌 Yes, Army	1	If exact amount is not known, please give best estimate. If net income in 32b, c, or d was a loss, write "Loss" above the
	5 Yes, Air Force		dollar amount.
	6 No — Describe the kind of business of your employer	<u> </u>	. Pay as a member of the ARMED FORCES including
	Two — Describe the kind of dusiness of your employer	"	special, incentive, and bonus pay. Also wages, salaries,
	i i		tips, and commissions from CIVILIAN JOBS -
	i i	1	Report total amount from all jobs BEFORE DEDUCTIONS for taxes, bonds, dues, or other items.
		l	laxes, boilds, ddes, of other hems.
	i	i	
29.	Occupation	l	1 ☐ Yes — \$.00
	-	1	0 D N
a.	What kind of work are you doing?		Annual amount — Dollars
		L	
		D.	Self-employment income from own nonfarm business, including proprietorship and partnership —
			Report NET income after business expenses.
	(For example, strength or stre		
	(For example: aircraft engine mechanic, electronic technician, able seaman, sonar technician, tactical intelligence officer)		
			1 Yes
b.	What are your most important activities or duties?		2 D No
			Annual amount — Dollars
	į į		
		C.	Farm self-employment income —
			Report NET income after operating expenses. Include earnings as a tenant farmer or sharecropper.
	(For example: repair seaplanes, research on electronic components,		carmings as a tendin rather of sharecropper.
	maintain ship's gear, repair sonar equipment, edit intelligence manuals)		
c	If Armed Forces:		1 □ Yes → \$.00
C.			$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
	(1) What is your primary job specialty? If you have more than		2 Li No Annual amount — Dollars
	one specialty, list the one at which you spend the most time.		
	MOS/Rating/Designator/AFSC	d.	Interest, dividends, net rental income or royalty
	i i		income, or income from estates and trusts — Report even small amounts credited to an account.
			opon ovon oman amounto oronioa to an account.
	(0)		. —
	(2) What is your paygrade? Enter two-character code.		1 ☐ Yes —
	(For example: E-4, 0-3)		2 No Annual amount — Dollars
	Paygrade	e.	Any other income received regularly, such as social
	C		security, public assistance or welfare payments, child
30.			support, or unemployment compensation — Do NOT include lump-sum payments such as money from an
31a.	Last year (1989), did you work, even for a few days, at a paid		inheritance or the sale of a home.
	job, business, farm or on active-duty military service?		۲
	1 \square Yes 2 \square No $-$ Skip to 32		1 ☐ Yes —— \$.00
L			2 No ''
U.	How many weeks did you work in 1989? Count paid vacation, paid sick leave, and military service.		Annual amount — Dollars
	paid sich touve, und titilitaty service.	33.	What was your total income in 1989?
	· · · · · · · · · · · · · · · · · · ·	JJ.	Add entries in questions 32a through 32e; subtract any losses. If
	Weeks		total amount was a loss, write "Loss" above amount.
C.	During the weeks WORKED in 1989, how many hours did		\$.00
	you usually work each week?		Ψ
			Annual amount — Dollars
	Hours		OR 0 🗆 None
	Page 6		Page 7

AFTER COMPLETING THIS FORM

- 1. Please check it to be sure you have answered all the required questions completely.
- **2.** Then return your form to the person in charge of distributing these reports.
- 3. Military personnel living away from this installation, but within the census area, also will receive a census form at home. To ensure that such personnel are assigned to the correct jurisdiction, it is important that YOU MAKE SURE YOU ARE INCLUDED ON BOTH FORMS—this report and the census form sent to your home.

THANK YOU FOR YOUR COOPERATION.

The Census Bureau estimates that, on average, each respondent will take either 2 minutes (first seven questions) or 7 minutes (all thirty-three questions) to complete this form, including the time for reviewing instructions and answers. Comments about these estimates should be directed to the Associate Director for Management Services, Bureau of the Census, Washington, DC 20233, Attn: CEN-90, and to the Office of Management and Budget, Paperwork Reduction Project CEN-90, Washington, DC 20503.

CENSUS '90



This form may be reproduced before distribution if additional copies are needed.

FOR CENSUS USE										
Add	DO	ID	ARA	Block	PN					
ΥN										

Page 8



CENSUS '90 Were You Counted?

If you believe that you (or anyone else in your household) were NOT counted, please fill out the form below and mail it IMMEDIATELY to:

 I have checked with that one (or more) of t On April 1, 1990, I l 	is was NOT co	unted in t			All f and All I	All family members and other relatives living here, including foster children and babies. All lodgers, boarders, roommates, and other persons living here.							
(House number)	(Street	or road/Ru	ral rout	e and box numbe		trip, on vacation, or in a general nospital.							
(Apartment number or local	tion)				wor	All persons with a home elsewhere but who stay here most of the week while working or attending college. Anyone staying or visiting here who had no other home.							
(City)		······,	(St	ate)	1 1	Anyone staying or visiting here who had no other home. All persons in the Armed Forces who live here.							
(City)			(0.	uic,	Allo	hildren in t	ooarding schools be	low the	college	level.			
(County or foreign country)			(ZI	P Code)		NOT IN		1	.1 1		11		
• This address is loca	ted between _	(S	treet, ro	oad, etc.)	Any	Any college student who lives somewhere else while attending college. Any person away from here in the Armed Forces or in an institution such as a nursing home, mental hospital, or prison.							
and	(Street, ro	ad, etc.)				Any person who usually stays somewhere else most of the week while working there Any person visiting here who has a usual home elsewhere.							
household on April staying or visiting he home. Please list on line 1 member who owns,	I am listing all persons living in this household on April 1, 1990 , and those staying or visiting here who had NO other home. Please list on line 1 the household member who owns, is buying, or rents the home. (PLEASE PRINT)			How is this person related to the person on line 1? For example: Husband/wife Son/daughter Father/mother Grandchild Mother-in-law Roomer/boarder Housemate/ roommate Unmarried partner Other nonrelative	Male or Female M or F	What is the race of this person? (Print name of race group.) White Black or Negro Indian (Amer.) (Also print the name of the enrolled or principal tribe.) Eskimo Aleut Asian or Pacific Islander (API) Chinese Filipino Asian Indian Hawaiian Samoan Korean Guamanian Vietnamese Other API Other race (Print race)		When was		Is this person — Now married? Widowed? Divorced? Separated? Never married?	Is this person of Spanish/Hispanic origin? No — not Spanish/Hispanic Yes — Print one of the following groups: Mexican, Mexican-Am., Chicano Puerto Rican Cuban Other Spanish/Hispanic (Print one group, for example: Argentinean, Colombian, Dominican, Nicaraguan, Salvadoran, Spaniard, and so on.)		
1	i		 						 				
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4	 		! !						 				
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6	1		 										
If more than 6 persons, lis Name of person who filled		ersons on	a blanl	sheet of paper	and att	ach it to th	is form.	Telep	hone r	number			
FOR CENSUS USE	DO	ARA		Block	Мар	spot	ID	I		Results co	de(s)		
NOTICE — For the next 72 years, or (Title 13, United States Code) that pro take 3 minutes to complete, including Washington, DC 20233, Attn: CEN-90 FORM D-25	tects the confidentiality o he time for reviewing the) and to the Office of Mar	f your answers. instructions an nagement and I	This law a d answers Budget, Pa	lso requires that you fu . Comments about this	rnish the inf estimate sh oject CEN-9	ormation requiould be directe 00, Washingtor	ested. The Census Burea d to the Associate Directo n, DC 20503.	ı estimate: r for Mana	s that, for t gement Se	he average hou ervices, Bureau	sehold, this form will		

OMB No. 0607-0689: Approval Expires 12/31/90

FORM **D-59B**

U.S. DEPARTMENT OF COMMERCE BUREAU OF THE CENSUS

PAROLEE-PROBATIONER INFORMATION RECORD

21st Decennial Census — 1990

NOTICE — Your report to the Census Bureau is authorized by law (Title 13, United States Code). The confidentiality of your answers and the information you provide is protected by this law. It may be seen only by sworn Census employees and may be used only for statistical purposes.

The Census Bureau estimates that, on the average, this form will take 3 minutes to complete, including the time for reviewing the instructions and answers. Comments about this estimate should be directed to the Associate Director for Management Services, Bureau of the Census, Washington, DC 20233, Attn: CEN-90 and to the Office of Management and Budget, Paperwork Reduction Project CEN-90, Washington, DC 20503.

Services, Bureau of the Census, Washington, DC 20233, Att Paperwork Reduction Project CEN-90, Washington, DC 2050)3.
1. Name — First, last and middle initial	
Alternate name(s)	
2. Are you a — Mark (X) ONE box. 1 □ Parolee? 2 □ Probationer?	
3. Address (on or about April 1, 1990) House number Street or road/rural route and box nu	mber Apartment or unit designation
City	ziP Code
This address is located between	(Street, road, etc.)
and(Street, ro	ad, etc.)
4. Did you stay anywhere else between March 23 — April 16, 1990, such as in a halfway house, detention center, or other similar facility?	Name of facility
1 ☐ No 2 ☐ Yes — Please specify —	City State
 5. Telephone number — Include area code () 6. Sex — Mark (X) ONE box. 1 ☐ Male 2 ☐ Female 	8. When were you born ? Month Year 1 9
7. What is your race? 1 White 2 Black or Negro 3 Indian (Amer.) (Print the name of the enrolled or principal tribe.)	9. Are you now — Mark (X) ONE box. 1 Married? 2 Widowed? 3 Divorced? 4 Separated? 5 Never married?
4 Eskimo 5 Aleut Asian or Pacific Islander(API) 6 Chinese	10. Are you of Spanish/Hispanic origin? Mark (X) ONE box. 1 No (Not Spanish/Hispanic) 2 Yes, Mexican, Mexican-Am., Chicano 3 Yes, Puerto Rican 4 Yes, Cuban 5 Yes, other Spanish/Hispanic (Print one group, for example: Argentinean, Colombian, Dominican, Nicaraguan, Salvadoran, Spaniard, and so on.)

±U.S. GP0:1990-748-006/20085

ΑT	COMP DATE 2	CL	CDE	1 <u>D</u>	FT	BLK	MAP SPOT	HOUSE NUMBER 9	STREET/ROAD NAME OF RR & BOX OR PO BOX 10	DESIG.	OCCUPANT NAME	LOCATION DESCRIPTION	REMARKS 14
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								Sheet	of	sheets
FORM D-190 (4-18-89)		U.S. DEPARTMENT OF CO BUREAU OF TH	MMERCE IE CENSUS	1. DO			RESS GEOCO			eck if a
	SEARCH RI	ECORD		1.00	2	. ARA		3. BLK	ÜH	
	21st Decennial Cer			4. Map spot	5.	. ID] [
Section A	Enter address shown in c	question 1b on page 1 of	the cen	sus questionnaire						
House number				I route and box nu	mber			Apa	rtment i	number
City							State	ZIP	Code	
County		Names of	nearest	intersecting streets	s or road	ls				
Section B	Enter information from p	organ calumna 1 through	7	and 2 of the		i				
01	Litter information from po	02	03	04	05	questic	06	07		14-4-1
<u></u> -	Name	Relationship Print circle marked and write-in, if any	Sex Mark () one	Race Print circle marked and	Age year	rof	Marital status	Spanish ori	igin arked 1	Match status Mark (X) one
			M F	write-in, if any	Age	Year			`⊢	M NM
1										
2										
3										
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6										
7							-			
Section C	Enter address information	n from front cover of ce	nsus que	estionnaire		FO	R PROCESS	SING OFFICE USE	ONLY	
ID			Ma	rm type S	ACTIO	ON				
DO	ARA	BLK	on Ma	p spot, if any	- 1					
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REMARKS					-					
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FORM D-399 (11-10-88)	U.S. DE	PARTMENT OF COMMERCE BUREAU OF THE CENSUS	1.	. DO c	ode 2	2. /	ARA No.	3. Bi	ock No.	4. ID No.	
DO/PO RECORD (QUESTIONN			5.	. Clerk	nam	е	· · ·		6. PO na	ame	
	nial Census		7.	. Date	· · · · · · · · · · · · · · · · · · ·	M	onth	Day	Year	ľ	a.m. p.m.
instructions - contact. Submit all t end of your shift.			9.	. Type <i>Mark</i>	of fo			-	on't know	10. Type of assis Walk-in Telephone	tance
11 . General problems Mark (X) all that a		tionnaire	1!	the	ques.	tion		List each		ecific questions on n number mentione	
₁ ∐Cannot read/ requested ge					-		on ques	tions			
2 🗆 Did not receiv	ve form — <i>Fill</i>	item 12	l	l	Questic	on_			ASON FOR		
з 🗆 Received two	o forms			-	No.	-	Proble	em	Comme	ent Complair	nt
4 □ Complained o long form	or questioned	receiving a		ŀ		+					-
ธ □Inquired abou	ıt how/where	to mail the form	l	+		+					
6 □Residents say Fill item 12	y they lost the	e form —				-					
7 □Residents say the wrong ad		d a form for					- 41.				
8 □Need assistar <i>Fill item 12</i>	nce with a lan	guage —									
9 □Need Spanish Fill item 12	n-language qu	estionnaire —		b. i	lous	ing	questio	ns			
10 \square Other $-$ Spe	cify		l		Questic	on_			ASON FOR		_
				-	No.	+	Proble	em	Commo	ent Complair	nt
12. Address			1	-		+					
Resident's name		Telephone number	ı								
		() –	•								
House number, street name,	apartment										
City	State	ZIP Code									
Nearest intersecting street			1								
		•	10	6. Call	l/Visit	t no	t related	to quest	ionnaire -	– Mark (X) all that	apply
13. Letter mailed	to resident w	ho did not	1	1	Job	inq	quiry		2 🗌 Oth	er	
receive a que			1:	7. Ren	narks	;					
14. General comment <i>Mark (X) all that a</i>		bout census taking						·-	-		
1 🗆 Census is unn	ecessary – s	erves no purpose	_								
2 \square Census is an i	nvasion of pri	vacy									
з 🏻 Mandatory na	ture of censu	s questioned									
4 🗆 Confidentiality	y questioned										
₅ 🗌 Other — <i>Spec</i>	ify		-			-			-		

POST OFFICE NAME (To be completed	by field operations supervisor)	CARRIER ROUTE	(To be completed by post office)
	SECTION 1 FOR CENSUS	S LISE ONLY	
COMPLETE MAILING ADDRESS F		3 USE ONE	1000000000000000000000000000000000000
A. HOUSE NUMBER B. STREE	TNAME		
C. APARTMENT/UNIT NUMBER	D. CITY/STATE		E. ZIP CODE
F. GEOCODE			
/	//	ARA BLOCK	/
G. FOS NAME		H.	FOS DISTRICT NUMBER
	TION 2 (TO BE COMPLETED		
assistance involves asking thos yourself to what you can answe regulations (Section 115.5, Dor your official duties if the informanyone. The Bureau of the Ce	to assist the Bureau of the Census se of you who serve these address or based on general knowledge of ymestic Mail Manual) prohibit disclostion came from any piece of mail on sus is aware of this limitation on your information requested came from MOBILE HOME OR TRADE IT MOBILE HOME OR TRADE ONE-FAMILY DETACHED APARTMENT BUILDING NUMBER OF UNIT	es to answer three spe your routes. In this cor sing of information obta or concerns any mail so your ability to cooperate looking at the mail, you SCRIBES THE C. HOW LIVI UNIT AILER ED¹ HOUSE ED² HOUSE	cific questions—limiting inection, postal ained while performing ent or received by e. If you are in doubt
	es of the house or the house is joined other house or building by at least one		
Attached—house is joined to an	SECTION 3 FOR CENSUS		unu to 1001.
MARK APPROPRIATE BOXES TH	AT IDENTIFY HOW THE INFORMATIO		OST OFFICE WAS USED
OCCUPANCY STATUS			
CHARACTERISTICS OF	STRUCTURE		
NUMBER OF PEOPLE IN	HOUSING UNIT		
Form D-550P (06-01-90)	CENSUS CLOSEOUT ADDRESS	S CHECK	U.S. DEPT: OF COMMERCE BUREAU OF THE CENSUS

JOBNAME: No Job Name PAGE: 27 SESS: 43 OUTPUT: Mon Oct 25 10:02:22 1993 /pssw01/ disk2/ 90dec/ cphe/ 3/ appb

14012

SUNBIRD AVE

HOUSE NUMBER

STREET NAME

JANE DOE HOUSEHOLDER NAME **COLUMBIA** CITY

UNIT DES.

12345 ZIP

36

CR

MD ST

0123 4567 890 1234

GEO NUMBER

012345678901



FORM **D-701** (4-14-89)

CENSUS ADDRESS CARD 21st Decennial Census — 1990

U.S. DEPARTMENT OF COMMERCE BUREAU OF THE CENSUS

01234567

The release of this information to the Census Bureau is authorized under 39CFR 266.4(b)(2)(v).

Front

									Card	of card			
1 . H	ouse No.	2. Street name	or rural rou	ıte and	d box No.		3. City		4. State	5. ZIP Code			
		ne or type — See						8. GEO No. of nearest DELIVERABLE unit on same side of street					
7. U	nit designation	Fill (a) or (b) a											
Line No.	ine lo. (a) Apartment or trailer No. (b) CENSUS USE ONLY Line No. (a) Apartment or trailer No. (a) Apartment or trailer No. (b)							Docation information for rural route/ box No. type addresses Householder name					
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2	8							b. Street or road na	ame				
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4				10				 c. Nearest intersect side of the housi 		ad on each			
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FORM	и D-702 9-88)		U.	DO	CENSUS US	E ONLY							
,	(2-29-88) BUREAU OF THE CENSU POST OFFICE REPORT OF MISSING ADDRESSES							ARA BI	lock	Map spot			
21st Decennial Census — 1990							CIRCLE ONE:	NF MD MU	A OR	SA OS			

The release of this information to the Census Bureau is authorized under 39CFR 266.4(b)(2)(v).

Back

SPECIAL PLACE NAME OR TYPE

The following are types of Special Places that should be added. **DO NOT** CONSIDER AS SPECIAL PLACES such structures as churches, elementary schools, high schools, libraries, fire stations, taverns, lounges, military recruiting centers and so forth.

- Alcohol and Drug Treatment Centers
- Boarding and Rooming Houses
- Camps (Tourist, Recreational, Religious work)
- Colleges and Universities, Off-campus Dormitories, Fraternities, and Sororities
- Convents, Monasteries, and Rectories
- Dormitories for Workers
- Firehouses with Dormitories
- Group Homes and Maternity Homes
- Halfway Houses (all types)

- Hospitals (all types)
- Hotels and Motels
- Housing and Schools for Mentally and Physically Handicapped, Orphanages, and so forth
- Marinas
- Military Installations and Coast Guard Stations
- Missions, Flophouses, Salvation Army Shelters, YMCA's, YWCA's, and so forth
- Nursing Homes and Homes for the Aged
- Prisons, Reformatories, Jails, Police Lockups, and all other Correctional Facilities

FORM D-702 (2-29-88)

JOBNAME: No Job Name PAGE: 29 SESS: 43 OUTPUT: Mon Oct 25 10:02:22 1993 /pssw01/disk2/90dec/cphe/3/appb

							*		Card	_ of cards			
1. H	ouse No.	2. Street name	or Rural Ro	oute ar	nd Box No.	,	3. City/Pos	t Office	4. State	5. ZIP Code			
6. C	ENSUS USE O	NLY — Special	place name	or typ	е			8. GEO No. of nearest DELIVERABLE unit on same side of street					
7. U	nit designation	— Fill (a) OR (b)											
Line No.	Apartment or trailer No. (a)	Location of unit (b)	CENSUS USE ONLY	Line No.	Apartment or trailer No. (a)	Location of unit (b)	CENSUS USE ONLY	9. Location informa Box No. type add a. Householder nar	resses	Route/			
1				7									
2				8				b. Street or road na	ime				
3				9				c. Nearest intersect	ing street or r	and on each			
4				10				side of the housi		oad on each			
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6				12									
FORM	D-722		U	S. DEI	PARTMENT OF C	THE OFFICE OF	10. CENSUS						
(6-13	•	FICE REPOR			ADDRESSI		DO		ock	Map spot			
		CENSUS A 21st Decenn		_	_		Mark (X) one L ☐ Add ☐ I		r	Form type			

FACSIMILES OF CENSUS FORMS AND QUESTIONNAIRES

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FORM D-1021 PR (3-13-90)							DEPART	MENT OF BUREAU (F COMMERCE OF THE CENSUS	A. DO n	ame				
SUMMARY O					DIN	G								_	
	MA				.				-	B. DO co	ode				
Census of	Puert	to Ric	<u> </u>	1990	<u>, </u>									_	
DATE Number									Number	-6					
Basic street address (e.g., House number and street name)	for		comp	coding vas pleted	fo mate		1	-	of units on PR	of units in address register	Difference between columns (6) and (7)	Number of nonmatches on PR Match List	Is column (6 greater that column (7)? <i>Mark (X) on</i>	n ?	
(1)	Month		Month		Month	Day	Month	Day	(6)	(7)	(8)	(9)	(10)	(10)	
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FORM D-1022 PR (3-13-90)			U	.S. DEF	PARTMENT OF BUREAU O	COMMERCE F THE CENSUS	A. Distr	ict Office	name		
SUMMARY OF FIEL	D RE	VIE	W C	PE	RATION	ı					
Census of Pu							B. Distr	ict Office	code		
					.						
		DA	TE		NUMBE	R OF —		ONNAIRE <u>//ark (X) o</u>	NUMBER OF UNITS THAT —		
Basic street address	for rev	Assigned In fro for field field review revie (2) (3)		eld iew	NM assigned for field review	Added units	occ	VAC	LR	Were not found	Did not exist
(1)	Mo.	Day	Mo.	Day	(4)	(5)	(6)	(7)	(8)	(9)	(10)
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FORM D-2037 (4-5-90) SEARCH/MATCH STATUS (4-5-90) U.S. DEPT. OF COMMERC BUREAU OF THE CENSU 21st Decennial Census — 1990			
A. Sort results — Mark (X) one 1 Searchable non-GQ 2 GQ Search PO 3 Not searchable	D. MCR pop count match 1 ☐ MCR/ACF match 2 ☐ MCR/ACF do not match		
B. Geocoding results — Mark (X) one 1 Geocoded to — DO ARA Block 2 Unable to geocode	E. USPS results — Mark (X) one 1 ☐ Undeliverable Disaster ARA? ☐ Yes ☐ No 2 ☐ Deliverable as addressed 3 ☐ Deliverable with correction		
C. ACF browse results — Mark (X) one Total units	F. Match results — Mark (X) one Total persons on search form Matched 1 \[\] Questionnaire found 2 \[\] Questionnaire not found		

HAND DELIVERY OF POSTMASTER RETURN **QUESTIONNAIRES** (Debriefing Questions) 21st Decennial Census - 1990 DISTRICT OFFICE NUMBER DATE COMPLETED BY TITLE OF PERSON(S) **COMPLETING QUESTIONNAIRE**

1.	How many PMRs did you receive from the USPS and/or Jeffersonville ?	C 100(1) WRITE NUMBER C 101(2) Less than 1,000
	Check a range only if an exact count is unknown.	(3) 1,000 - 5,000 (4) 5,001 - 10,000 (5) 10,001 - 15,000 (6) 15,001 - 20,000 (7) 20,001 - 50,000 (8) More than 50,000 (9) Don't Know (10) NONE - STOP
2.	Did you record the census identification (ID) numbers of the PMRs you received ?	C 102(1) YES (Enclose a copy)(2) NO
3.	Of the PMRs you received, were any address labels self-adhesive rather than preprinted ?	C 103 (1) YES (2) NO
	(Self-adhesive labels represent late adds.)	
1.	How many of the PMR envelopes indicated the USPS reason for undeliverability? (If you did keep a record of the tallies by category of USPS reasons for undeliverability, please enclose a copy.)	C 104(1) All(2) Most(3) About 50%(4) Some(5) None - SKIP TO 6(6) Don't Know - SKIP TO 6

5	Of the total DMDs that you	0 105 (1) 17
٥.	Of the total PMRs <u>that you</u> <u>received</u> , what do you think were the major reasons for the	C 105(1) Vacant Unit C 106(2) Demolished/Non - existent Unit
	USPS not delivering these	C 107(3) Condemned Unit
	questionnaires ?	C 108(4) Duplicate Unit
	•	C 109(5) Nonresidential
	Rate each numbered item	Unit
	(1) - (11) with 1, 2, 3, or 4	C 110(6) Post Office
	from below:	delivers to a
	1 - Occurred often	Post Office Box
	2 - Occurred sometimes	for the address,
	3 - Occurred seldom4 - Did not occur	not to the
	4 - Did not occur	householder's
		residence
		C 111(7) Corrected ZIP Code
		C 112(8) Householder Name
		Incorrect
		C 113 (9) Misspelled
		Streets
		C 114 (10) Incorrect Apt.
		Number
		C 115(11) Incorrect Street
		Designation
	GNMENT PREPARATION	
 6.	How many PMRs did you assign	
6.		(1) WRITE NUMBER
<u> </u>	How many PMRs did you assign for hand delivery ? Check a range only if an exact	(1) WRITE NUMBER
<u> </u>	How many PMRs did you assign for hand delivery ?	(1) WRITE NUMBER C 117(2) Less than 1,000
5.	How many PMRs did you assign for hand delivery ? Check a range only if an exact	(1) WRITE NUMBER C 117(2) Less than 1,000(3) 1,000 - 5,000(4) 5,001 - 10,000(5) 10,001 - 15,000
<u> </u>	How many PMRs did you assign for hand delivery ? Check a range only if an exact	(1) WRITE NUMBER C 117(2) Less than 1,000(3) 1,000 - 5,000(4) 5,001 - 10,000(5) 10,001 - 15,000(6) 15,001 - 20,000
6.	How many PMRs did you assign for hand delivery ? Check a range only if an exact	(1) WRITE NUMBER C 117(2) Less than 1,000(3) 1,000 - 5,000(4) 5,001 - 10,000(5) 10,001 - 15,000(6) 15,001 - 20,000(7) 20,001 - 50,000
6.	How many PMRs did you assign for hand delivery ? Check a range only if an exact	(1) WRITE NUMBER C 117(2) Less than 1,000(3) 1,000 - 5,000(4) 5,001 - 10,000(5) 10,001 - 15,000(6) 15,001 - 20,000(7) 20,001 - 50,000(8) More than 50,000
6.	How many PMRs did you assign for hand delivery ? Check a range only if an exact	(1) WRITE NUMBER C 117 (2) Less than 1,000(3) 1,000 - 5,000(4) 5,001 - 10,000(5) 10,001 - 15,000(6) 15,001 - 20,000(7) 20,001 - 50,000(8) More than 50,000(9) Don't Know
6.	How many PMRs did you assign for hand delivery ? Check a range only if an exact	(1) WRITE NUMBER C 117(2) Less than 1,000(3) 1,000 - 5,000(4) 5,001 - 10,000(5) 10,001 - 15,000(6) 15,001 - 20,000(7) 20,001 - 50,000(8) More than 50,000
6.	How many PMRs did you assign for hand delivery ? Check a range only if an exact	(1) WRITE NUMBER C 117 (2) Less than 1,000 (3) 1,000 - 5,000 (4) 5,001 - 10,000 (5) 10,001 - 15,000 (6) 15,001 - 20,000 (7) 20,001 - 50,000 (8) More than 50,000 (9) Don't Know
	How many PMRs did you assign for hand delivery? Check a range only if an exact count is unknown. How did you decide which PMRs	(1) WRITE NUMBER C 117(2) Less than 1,000(3) 1,000 - 5,000(4) 5,001 - 10,000(5) 10,001 - 15,000(6) 15,001 - 20,000(7) 20,001 - 50,000(8) More than 50,000(9) Don't Know(10) NONE - SKIP to 20 C 118(1) Sent All
	How many PMRs did you assign for hand delivery ? Check a range only if an exact count is unknown.	(1)
	How many PMRs did you assign for hand delivery? Check a range only if an exact count is unknown. How did you decide which PMRs	
	How many PMRs did you assign for hand delivery? Check a range only if an exact count is unknown. How did you decide which PMRs	C 117 (2) Less than 1,000 (3) 1,000 - 5,000 (4) 5,001 - 10,000 (5) 10,001 - 15,000 (6) 15,001 - 20,000 (7) 20,001 - 50,000 (8) More than 50,000 (9) Don't Know (10) NONE - SKIP to 20 C 118 (1) Sent All (2) Sent clusters by ARA (3) Sent clusters by Block (4) Sent clusters by ZIP
	How many PMRs did you assign for hand delivery? Check a range only if an exact count is unknown. How did you decide which PMRs	C 117 (2) Less than 1,000 (3) 1,000 - 5,000 (4) 5,001 - 10,000 (5) 10,001 - 15,000 (6) 15,001 - 20,000 (7) 20,001 - 50,000 (8) More than 50,000 (9) Don't Know (10) NONE - SKIP to 20 C 118 (1) Sent All (2) Sent clusters by ARA (3) Sent clusters by Block (4) Sent clusters by ZIP (5) Sent according to USPS
7.	How many PMRs did you assign for hand delivery? Check a range only if an exact count is unknown. How did you decide which PMRs	C 117 (2) Less than 1,000 (3) 1,000 - 5,000 (4) 5,001 - 10,000 (5) 10,001 - 15,000 (6) 15,001 - 20,000 (7) 20,001 - 50,000 (8) More than 50,000 (9) Don't Know (10) NONE - SKIP to 20 C 118 (1) Sent All (2) Sent clusters by ARA (3) Sent clusters by Block (4) Sent clusters by ZIP (5) Sent according to USPS reason for
	How many PMRs did you assign for hand delivery? Check a range only if an exact count is unknown. How did you decide which PMRs	C 117 (2) Less than 1,000 (3) 1,000 - 5,000 (4) 5,001 - 10,000 (5) 10,001 - 15,000 (6) 15,001 - 20,000 (7) 20,001 - 50,000 (8) More than 50,000 (9) Don't Know (10) NONE - SKIP to 20 C 118 (1) Sent All (2) Sent clusters by ARA (3) Sent clusters by Block (4) Sent clusters by ZIP (5) Sent according to USPS reason for undeliverability
	How many PMRs did you assign for hand delivery? Check a range only if an exact count is unknown. How did you decide which PMRs	C 117 (2) Less than 1,000 (3) 1,000 - 5,000 (4) 5,001 - 10,000 (5) 10,001 - 15,000 (6) 15,001 - 20,000 (7) 20,001 - 50,000 (8) More than 50,000 (9) Don't Know (10) NONE - SKIP to 20 C 118 (1) Sent All (2) Sent clusters by ARA (3) Sent clusters by Block (4) Sent clusters by ZIP (5) Sent according to USPS reason for
	How many PMRs did you assign for hand delivery? Check a range only if an exact count is unknown. How did you decide which PMRs	C 117 (2) Less than 1,000 (3) 1,000 - 5,000 (4) 5,001 - 10,000 (5) 10,001 - 15,000 (6) 15,001 - 20,000 (7) 20,001 - 50,000 (8) More than 50,000 (9) Don't Know (10) NONE - SKIP to 20 C 118 (1) Sent All (2) Sent clusters by ARA (3) Sent clusters by Block (4) Sent clusters by ZIP (5) Sent according to USPS reason for undeliverability
	How many PMRs did you assign for hand delivery? Check a range only if an exact count is unknown. How did you decide which PMRs	C 117 (2) Less than 1,000 (3) 1,000 - 5,000 (4) 5,001 - 10,000 (5) 10,001 - 15,000 (6) 15,001 - 20,000 (7) 20,001 - 50,000 (8) More than 50,000 (9) Don't Know (10) NONE - SKIP to 20 C 118 (1) Sent All (2) Sent clusters by ARA (3) Sent clusters by Block (4) Sent clusters by ZIP (5) Sent according to USPS reason for undeliverability (6) Other

8.	Did you keep a record of the specific ARA's involved in the hand delivery ?	C 119(1) YES (Enclose a copy)(2) NO
ELI	VERY	
9a.	Did you provide instructions and/or training on the processing or the hand delivery of the PMRs to any of the following staff ?	C 120(1) AMOO C 121(2) AMFO C 122(3) Enumerators C 123(4) Other DO Personnel C 124(5) Other
	Check all that apply.	C 125(6) NONE - SKIP TO 10
b.	How long did the instructions and/or training last ?	C 126(1) Less than 5 minutes(2) 5 - 10 minutes(3) 11 - 20 minutes(4) 21 - 30 minutes(5) More than 30 minutes(6) Don't Know
10.	Did you ask the Post Office to assist you with the redelivery of the PMRs ? If yes, check all that apply.	Post Office to redeliver the PMRs that they annotated on the envelope as
		"VACANTS" C 128(2) YES, asked the Post Office to redeliver all of the PMRs
		C 129(3) YES, asked the Post Office to redeliver other PMRs:
		C 130(4) NO

11.	How many persons hand delivered the PMRs ?	C 131(1) Less(2) 3 - 5(3) 6 - 1(4) More	0
12.	Did the enumerators use the Form D-108A during the PMR delivery ?		some of the time all of the time SKIP TO 14
13.	What annotations did they make on the D-108A's ? Check all that apply.	C 134(2)	"Duplicate", "Demolished", or "Condemned" to indicate the reason for undeliverability
14.	If during delivery the enumerator determined a PMR was for a DUPLICATE unit, what action did the enumerator take? Check all that apply.	C 141(5) C 142(6)	No Delivery
	Page 5 of	7	

15.	If during delivery the enumerator determined a PMR was for a VACANT unit, what action did the enumerator take?	C 144(1) C 145(2) C 146(3)	No Delivery Annotated "Vacant"
	Check all that apply.	C 148(5) C 149(6)	on D-108A No Action taken D-160 Completed Vacant Housing Data Collected Other
		C 151(8)	Not Applicable - No Vacant Units
16.	If during delivery the enumerator determined a PMR was for a DEMOLISHED or NON EXISTENT unit, what action did the enumerator take ?		No Delivery
	Check all that apply.	C 156 (5) C 157 (6)	No Action taken D-160 Completed Other
		C 158(/)	Not Applicable - No Demolished or Non Existent Units
17.	Of the PMRs assigned, how many did you actually hand deliver ?	(3) 1,000(4) 5,001(5) 10,00(6) 15,00(7) 20,00(8) More(9) Don't	than 1,000 - 5,000 - 10,000 1 - 15,000 1 - 20,000 1 - 50,000 than 50,000
18.	Did you keep records of the census ID numbers for the hand delivered PMRs ?	C 161 (1) YES ((2) NO	Enclose a copy)
	Page 6 of	7	

19.	Of the PMRs that you actually	C 162(1) Vacant Unit
	<u>delivered</u> , why do you think the USPS did not deliver them ?	Existent Unit
	Rate each numbered item (1) - (11) with 1, 2, 3, or 4 from below:	C 164(3) Condemned Unit C 165(4) Duplicate Unit C 166(5) Non Residential
	1 - Occurred often 2 - Occurred sometimes 3 - Occurred seldom 4 - Did not occur	Unit C 167(6) Post Office delivers to a Post Office Box for the address, not to the household's residence
		C 168(7) Corrected ZIP Code
		C 169(8) Householder Name Incorrect
		C 170(9) Misspelled Streets C 171(10) Incorrect Apt.
		Number C 172(11) Incorrect Street
		Designation
20.	Please provide any additional info evaluation of the hand delivery of	
		·
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APPENDIX C. Maps

Maps start on the following page.



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NOTE TO THE READER

This Census of Population and Housing Evaluation and Research Report is designed to inform the public about the results for the major coverage improvement operations of the 1990 decennial census. If you would like additional information on any of the topics presented in this publication or other information about the coverage improvement program, please write to:

Mr. John H. Thompson Chief, Decennial Statistical Studies Division C/O Coverage Improvement REX Publication Bureau of the Census Washington, DC 20233

We welcome your questions and will provide any requested information, as available.