

CONTENTS

Chapter 13. Puerto Rico, Virgin Islands, and the Pacific Island Territories

[Page numbers listed here omit the prefix that appears as part of the number of each page]

	Page
Introduction	3
Legal Authority	3
Historical Background	3
Puerto Rico	4
Special Agreement with the Commonwealth Government	5
Overview of Geographic Changes for 1990	5
Divisional Responsibility for Conducting the 1990 Census	6
Planning	6
Field Office Organization	7
Logistics	8
Manual and Training Material Preparation	9
Personnel	10
Training	11
Questionnaires	11
Preparatory Work	12
List/Enumerate (L/E) Operation	14
Advance Listing	16
Assignment Control	16
Merge/Sample Tolerance Check	16
Clerical Edit	17
Field, Content, and Coverage Edits	17
Telephone Followup	18
Field Followup (FFU)	18
Special Place Operations	18
Translation of Industry and Occupation (I & O) Information	19
Computer Operations	20
Data Collection Processing	20
Post-Census Local Review	21
Post-Enumeration Survey (PES)	22
Tabulation and Publication (TAB/PUB)	23
Printed Reports	24
1990 Census Machine-Readable Products	25
Maps	26
1990 Puerto Rico Promotional Program (PRPP)	27
Census Evaluation and Coverage Improvement	30

	Page
Virgin Islands and the Pacific Island Territories	31
Introduction.....	31
External Communication	33
Questionnaire Content.....	33
Procedures.....	34
Forms.....	35
Training.....	36
Personnel Recruiting and Management	36
Information Management.....	37
Field Collection	37
Processing	38
Data Product Development and Dissemination.....	39
Dissemination of Products	40
Outreach, Advertising, and Public Relations.....	40
Education Projects.....	41

Appendixes

13A. Training and Instructor's Kits Prepared for Puerto Rico, 1990 Census	A-1
13B. Supply Kits Assembled and Shipped to Puerto Rico During the 1990 Census.....	B-1
13C. 1990 Census Public-Use Forms—Puerto Rico	C-1
13D. Geographic Concepts	D-1
13E. Supply Kits Assembled and Shipped to Virgin Islands, and Pacific Outlying Areas During the 1990 Census	E-1

CHAPTER 13.

Puerto Rico, Virgin Islands, and the Pacific Island Territories

INTRODUCTION

Legal Authority

Title 13 of the U.S. Code states that each of the censuses it authorizes "shall include each State, the District of Columbia, the Virgin Islands [of the United States], Guam, the Commonwealth of the Northern Mariana Islands (CNMI), and the Commonwealth of Puerto Rico, and as may be determined by the Secretary [of Commerce], such other possessions and areas over which the United States exercises jurisdiction, control, or sovereignty. Inclusion of other areas ... shall be subject to the concurrence of the Secretary of State."

Accordingly, for the 1990 Census of Population and Housing, the Bureau of the Census enumerated and tabulated data for these political entities, plus American Samoa and the Republic of Palau, treating each one as the statistical equivalent of a State to be consistent in its data presentations and tabulations (see table 1). All except Palau were included in the 1987 census of agriculture, but only American Samoa and the CNMI were done at the same time as the 1990 decennial census. Both American Samoa and Palau participated in the 1987 economic censuses. For Midway Islands, Johnston Atoll, and Wake Island, the Bureau of the Census obtained population counts from the Department of Defense. Kingman Reef, Navassa Island, and Palmyra Atoll were unpopulated; no population characteristics were collected, tabulated, or published. Note that these territories under the U.S. jurisdiction were not included in the economic or agricultural censuses.

HISTORICAL BACKGROUND

Early in the 20th century, the Census Bureau began using the term "outlying area" to refer to any place under "U.S. sovereignty or control" outside the area now comprising the contiguous 48 States and the District of Columbia. Thus, the reference originally applied to Alaska and Hawaii, now among the 50 States.¹ In recent years, data collection and products for the population and housing

¹After the United States acquired Alaska from Russia in 1867, the War Department took a census of Sitka in 1870; Alaska then was enumerated in the 1880 and subsequent U.S. decennial censuses. Following its annexation in 1898, Hawaii (where the local government took a census every 6 years from 1866 through 1896) was included in the 1900 census, which also had the first count of the U.S. population abroad. For further information on early U.S. censuses, see U.S. Bureau of the Census, *200 Years of U.S. Census Taking: Population and Housing Questions, 1790-1900*, Washington, DC 1989.

Table 1. 1990 Population Counts for Puerto Rico, Virgin Islands, and the Pacific Outlying Areas

Name	Population
Puerto Rico	3,522,037
Virgin Islands	101,809
Pacific Outlying Areas (totals)	238,585
Guam	133,152
American Samoa	46,773
Northern Mariana Islands	43,345
Palau	15,122
Territories under U.S. jurisdiction ¹	193

¹Johnston Atoll (173), Midway Islands (13), Wake Island (7), Baker, Howland, and Jarvis Islands; Kingman Reef; and Palmyra Atoll (0).

censuses of Puerto Rico and the U.S. Virgin Islands have come to resemble more closely that of the 50 States, whereas a greater degree of adaptation continues to exist for the specific needs in the remaining outlying areas.

Spain ceded the island of Puerto Rico to the United States in 1898. Prior to then, Spain had taken censuses in Puerto Rico at irregular intervals between 1765 and 1887. The U.S. War Department took a special census of Puerto Rico in 1899. Puerto Rico, which became a commonwealth in 1952, has been included in every U.S. decennial census since 1910. Beginning in 1960, the census of population and housing of the Commonwealth of Puerto Rico was conducted as a joint project of the U.S. Bureau of the Census and the Puerto Rico Planning Board (PRPB). The Bureau was responsible for the data collection, and PRPB provided input on content and data needs.

The Danish Government took periodic censuses (between 1835 and 1911) of the Virgin Islands before the United States acquired them in 1916. There was a special Federal census in 1917. The islands were included in the 1930 and all subsequent U.S. decennial censuses.

Territories under the U.S. jurisdiction—Beginning in 1980, the Department of Defense provided the Bureau with population counts for Johnston Atoll and for Midway and Wake Islands. This marked a shift from the Bureau's previous procedure of enumerating the populations of these islands separately. Midway Island was enumerated for the first time in 1930, when its population was included with that of Hawaii. In 1940, the Hawaiian census included Johnston Atoll and Midway, Canton, Enderbury, Baker, Howland, and Jarvis Islands; the latter three islands were uninhabited in 1950, 1960, 1970, and 1980. Canton and Enderbury Islands were uninhabited in 1970 and 1980, but the former was populated in 1960, and both were inhabited in 1950. Neither the Swan Islands nor the Canal Zone were enumerated in 1980. Sovereignty over the Swan Islands

passed to Honduras in September 1972 under the terms of a treaty signed in November 1971. On October 1, 1979, the United States transferred sovereignty over the Canal Zone to Panama in accordance with the terms of a treaty signed in September 1977 and ratified the following April. Fletcher's Island, a drifting slab of shelf ice in the Beaufort Sea off the northern coast of Alaska, once used by the U.S. Navy, was enumerated in 1970 but not in 1980.

Other areas—Elsewhere in the Caribbean, U.S. censuses have included such entities as Navassa Island (a U.S. possession since 1856 and the site of a lighthouse under Coast Guard jurisdiction); the Corn Islands (reverted to Nicaragua in 1971); Quita Sueo Bank, Roncador Cay, and Serrana Bank (all transferred to Colombia in 1973); and the Swan Islands (passed to Honduras in 1972).

The Census Bureau took a census of Cuba in 1907 under a provisional U.S. administration. There were earlier periodic censuses under Spanish rule, which ended in 1898. The U.S. War Department also conducted a census in 1899. Subsequent censuses were carried out by the Republic of Cuba (established in 1901), beginning in 1919.

Following U.S. acquisition of American Samoa in 1900, the Governors directed censuses at various times. The population was enumerated in the 1920 and all subsequent decennial censuses; coverage of housing began in 1960.

The first enumeration of the population of Guam, after U.S. Government occupation in 1899, occurred in 1901 under the direction of the second Naval Governor. The Governor's annual reports included population statistics in subsequent years. Guam was included in the U.S. decennial census of population for the first time in 1920 and has participated in the decennial housing census since 1960.

The CNMI and the Republic of Palau were enumerated in the 1990 census. The CNMI was included in the 1980 decennial census and Palau in the Trust Territory of the Pacific Islands (TTPI). For earlier censuses, both were part of the TTPI. The United States administered that area, which covered the Marshall, Caroline, and Northern Mariana Islands, as a United Nations trusteeship beginning in 1947. There had been quinquennial Japanese censuses in these islands from 1920 to 1940. The U.S. Navy enumerated the TTPI in 1950. The Office of the High Commissioner of the TTPI took a census in 1958, and the Census Bureau did so as part of the 1970 and 1980 decennial censuses. (Disagreeing with the 1970 census results, the High Commissioner's office reconvened the TTPI in 1973.) The 1980 U.S. census enumerated and reported the Commonwealth of the Northern Mariana Islands as a separate entity rather than with the other entities that comprised the TTPI. The trusteeship agreement ended in 1986 with the Northern Marianas becoming a commonwealth of the United States, and the Marshall Islands and the Federated States of Micronesia becoming "freely associated states independent of the United States" except for U.S. responsibility for their security and defense. In December 1990, the United Nations Security Council officially terminated TTPI jurisdiction over all areas except Palau.

Following their accession in 1898, the United States compiled and published one census of the Philippine Islands; this was taken under the direction of the Philippine Commission in 1903. Under Spanish rule, there had been censuses in 1818 and 1876. The Philippine legislature directed a census in 1918, and the Commonwealth's statistical office began periodic enumerations in 1939. The Philippines became an independent republic in 1946.

PUERTO RICO

The 1990 census in Puerto Rico was planned with the direct cooperation of the Commonwealth Government, represented by the Puerto Rico Planning Board (PRPB). Implementation of census planning, data collection, and the post-enumeration survey (PES)² was the responsibility of the Bureau's Field Division (FLD), which modified some of the U.S. census methodology to accommodate differences between Puerto Rico and the stateside United States.

1990 decennial highlights for Puerto Rico included—

- The Bureau created the Topologically Integrated Geographic Encoding and Referencing (TIGER) System, which provided products used to control the enumeration and tabulation. TIGER provided several of these products; there were maps, both for collection of data and for the tabulated results; and there were "address matching" abilities (even though Puerto Rico was enumerated by conventional means, the Bureau still used information from other operations). TIGER also contained the geographic frame that produced the geographic reference files that drove the collection of data and the tabulation of the results.
- Questionnaires generally followed the stateside versions (there were both a short and a long form) but had modifications to accommodate socioeconomic, cultural, and climatic differences as outlined under the provisions of the 1958 agreement described in the next section.
- Census district office boundaries were delineated based on 1984 population estimates, which projected 1.1 million housing units in 1990.
- All public-use forms and selected field enumeration and processing materials were produced both in English and Spanish.
- Data were collected using the list/enumerate (L/E) method and a 1-in-6 sample for the long form.
- Coverage improvement operations included unit-status review, multiunit check, and postcensus local review, followed by coverage evaluations.
- There was a content edit of the questionnaires.

²A PES was conducted in Puerto Rico for the first time in 1990.

- The outreach and promotion program³ included state-side materials adapted and translated into Spanish for distribution on the island as well as outreach materials adapted for Puerto Rico such as the Education Project.
- Questionnaires were keyed and clerically coded at the Jacksonville Processing Office (JXPO).
- The tabulation and publication (TAB/PUB) program was comparable in scope to the 1990 stateside program. This included summary tape files (STF's) and printed reports that were published in both English and Spanish. Other files included in the program were public-use microdata sample (PUMS), equal employment opportunity (EEO), STF420 and place of work destination. There was also a file for redistricting purposes equivalent to the PL 94-171 files prepared for the States and a special tabulation CPH-L-155.

Special Agreement With the Commonwealth Government

In October 1958, the Bureau of the Census and the Commonwealth government concluded a special agreement concerning the censuses in Puerto Rico. The basic purposes of the agreement were to assure the efficient operation of the census program, to provide the Commonwealth with a large share of the responsibility for planning the census, and to assure full consideration of its unique statistical needs. Each census thereafter conformed to the basic 1958 agreement with subsequent amendments. Governors of Puerto Rico regularly directed the PRPB to serve as the coordinating agency for the census operations.

On September 5, 1989, the Director of the Census Bureau signed the amendment to the agreement for the 1990 Census of Population and Housing, and on November 6, 1989, the PRPB's chairperson added her signature. Some of the major provisions of this agreement were as follows:

- The Bureau would bear all costs of the 1990 census in Puerto Rico.
- The long form population and housing items would be covered on a 1-in-6 sample basis.
- The Bureau would open a temporary area office (AO) and nine district offices (DO's) in Puerto Rico from which to supervise and coordinate the census enumeration, and before that, a translation office in Puerto Rico where staff would translate field manuals, training guides, and other related materials. The manager of the AO was a permanent Bureau employee, while managers of the DO's were temporary.
- The Bureau would hire and train approximately 10,000 to 11,000 temporary employees: including enumerators,

crew leaders, clerks, supervisors, and managers; establish pay rates; prepare and distribute maps, supplies, equipment, and questionnaires; conduct field enumeration activities; and process, tabulate, and publish the data.

- The Bureau would consult with the Planning Board, other commonwealth agencies, a number of advisory groups, and other data users on such issues as questionnaire content, tabulation categories, and the publications program.
- The Commonwealth government would assist the Bureau in publicizing the census, collecting map and boundary information, designating appropriate statistical areas, and identifying candidates for field positions.

Overview of Geographic Changes for 1990

For the 1990 census for the United States and its territories, including Puerto Rico, the Bureau created TIGER, a digital computer-readable geographic data base that automated the mapping and related geographic products required to support the Bureau's decennial censuses and survey programs. Using this data base, all of Puerto Rico—like the United States and the other territories—was divided into geographic units called census blocks that were used for collection through tabulation.

Island-wide block numbering for collection and tabulation of the 1990 census had several effects on the planning, field collection, and publication aspects of the census. The number of census blocks tabulated in Puerto Rico rose from 15,700 in 1980 to approximately 50,000 in 1990, more than a threefold increase. Since census blocks were tabulated for the whole island, enumeration districts (ED's) were eliminated as tabulation units and replaced with block groups (BG's) and blocks for data dissemination. Also by tabulating data for all blocks, data users could independently aggregate census blocks to define their own statistical areas and receive tabulation data profiles and maps based on these user-defined areas from the Bureau on a cost-reimbursable basis. (See ch. 10, User-Defined Areas Program.)

Several changes were made to the geographic terminology for Puerto Rico for 1990. (See appendix 13D.) The minor civil division equivalent, "pueblo," was changed to "barrio-pueblo." (A barrio is the area from which municipio officials and the Commonwealth legislature are elected; a municipio is the statistical equivalent of a county.) The barrio-pueblo is differentiated from other barrios as the historical center and seat of its municipio. The place equivalent was changed from "aldea" to "comunidad." "Zona urbana" remained for the municipio seat of government and adjacent built-up area. In agreement with the Commonwealth government, the term "ciudad" was deleted for the 1990 census.

Another major change for the 1990 census was that all maps showed uniform terminology in Spanish. All feature

³The 1990 PR Promotion Campaign was the first one produced by an agency on the island and was specifically designed for Puerto Rico.

names and landmarks were consistently labeled in Spanish unless they were part of U.S. military installations or if English names were actually used. In previous censuses, English and Spanish terms often were used interchangeably.

Divisional Responsibility for Conducting the 1990 Census

The Decennial Planning Division (DPLD) and the FLD coordinated support and administrative activities at Bureau headquarters in Suitland, MD. The FLD, through the area office manager in Puerto Rico, directed the onsite program. The Administrative and Publications Services Division (APSD), the Population Division (POP), the Housing and Household Economic Statistics (HHES) Division, and the Statistical Support Division (STSD) provided advice and technical assistance as needed on the development of questionnaire format and content, sampling procedures, tabulation plans, and publications.

The FLD coordinated the logistics of acquiring space and equipment for the nine DO's; translated the field manuals and training materials; and recruited, selected, and trained the field staff who collected the data. The Geography Division (GEO), with support from the FLD and the Geography Branch/Data Preparation Division (GB/DPD), obtained boundary and other geographic information and prepared all census maps and related geographic materials.

Planning

Formal planning for 1990 started in 1984 with the formation in the Bureau of a subcommittee for Puerto Rico and the outlying areas within the DPLD's 1990 Census Committee on Special Enumeration Procedures. The subcommittee identified the issues related to Puerto Rico and made general recommendations. One recommendation was to test new questions and new procedures to be implemented for 1990 at least 2 to 3 years before Census Day to allow enough time for evaluating results. For lack of funding, such testing never occurred. (In January 1985, the DPLD organized the 1990 Puerto Rico Task Force, with representatives from the POP, HHES, STSD, FLD, GEO, the Data User Services Division (DUSD), and the Decennial Operations Division (DOD). The main purpose of the task force was to analyze the 1980 experience and consider the various procedures, with the main goals of improving coverage, reducing costs, and producing data products in a more timely manner for 1990.)

In April 1984, representatives from the Planning Board met with the Bureau staff in Washington, DC, as part of the National Geographic Areas Conference to discuss geographic support issues relative to the decennial census. In December 1984, the DPLD developed a program plan for the census of Puerto Rico which identified all the issues and actions required and the divisions responsible for these actions. This program plan was widely circulated for comments throughout the Bureau before it was finalized

and distributed. Planned and coordinated by the DUSD and the Puerto Rico Census Data Center, a local public meeting was held in San Juan on March 5, 1985. Over 140 representatives from various Commonwealth government agencies, academia, and private organizations participated and heard Bureau personnel discuss the general plans for 1990.

In October 1985, the Bureau asked the Planning Board to organize an interagency committee with representatives from the appropriate Commonwealth organizations to make recommendations on the 1990 questionnaire content, preliminary plans, geographic issues, and data products. The PRPB hosted several meetings in Puerto Rico during the week of June 16-20, 1986, with officials of the Commonwealth government, interagency committee members, and Bureau staff to review census plans and discuss previously distributed issue papers outlining options for 1990 population and housing questions and data uses. The Bureau sent committee members another paper on population and housing issues in October 1986 and received final recommendations early in 1987. The Bureau ultimately incorporated many of these suggestions into the 1990 Puerto Rico questionnaire, keeping such items as parental birthplace, the ability to speak Spanish and/or English, literacy, and the type of fuel used for cooking.

The 1990 planning process also included a joint FLD and DPLD conference in December 1986 to review the 1980 enumeration of Puerto Rico and recommend procedures for 1990. The participants discussed the feasibility of a mailout/mailback operation in selected areas. Based on the results of this conference and subsequent meetings, the recommendation was made to conduct the entire 1990 census in Puerto Rico using the L/E procedure. (See L/E operation and ch. 6 for details.)

The House of Representatives Committee on the Post Office and Civil Service's Subcommittee on Census and Population,⁴ chaired by Congressman Robert Garcia (D-NY), held a hearing in Puerto Rico on January 6, 1986, to examine how censuses were taken on the island. The subcommittee heard how the operations and procedures used in 1980 differed from those used stateside and discussed plans for the 1990 census of Puerto Rico. It also met with the chief justice of the Puerto Rico Supreme Court to discuss block definition issues as they related to election districts. To ensure the ability to tabulate data for these entities, the Bureau offered Puerto Rico the opportunity to participate in the "Block Boundary Definition Project," which allowed them to determine election district boundaries that needed to be held as block boundaries.

In June 1987, the Bureau's Assistant Director for Decennial Census visited Puerto Rico and met with various officials to discuss the implementation of the Governor's offer of participation in the outreach program. (See "Promotional Program.") Planning continued through 1989

⁴In 1993, the subcommittee's name was changed to "Census, Statistics and Postal Personnel."

among Bureau, Planning Board, and local officials on questionnaire content and format, data collection and processing, and promotion.

Field Office Organization

Regional Census Center (RCC)—The Bureau's New York RCC oversaw operations in Puerto Rico's AO and nine DO's. The RCC personnel leased the DO space, trained key DO managers and automation personnel, monitored the cost and progress of DO operations, processed the DO payrolls, and had the responsibility for assuring timely completion and acceptable quality of field work.

In carrying out this management responsibility, the assistant regional census manager was under the New York regional director and had the assistance of an administrative supervisor, an automation supervisor, and the area manager for Puerto Rico. In addition, there was a census recruiter, census information specialist, geographic coordinator, Census Awareness Products and Program (CAPP) coordinator, media specialist, and an EEO specialist (all staff except the assistant regional census manager and the CAPP coordinator were based out of the Puerto Rico AO.)

Liaison with the DO's was carried out through the area manager and his regional technicians. The area manager position was used both in 1980 and 1990; it was established to facilitate contact among the RCC's and their DO's. Area managers were the direct supervisors of the DO managers. They trained the managers and were the primary source of information on operational stages of the census.

Area office configuration—The area office, located in San Juan, operated as a mini-RCC, as an extension of the New York RCC. In this capacity, it provided technical assistance to the DO's. The AO technicians helped the DO's set up and maintain computer equipment and provided technical support on geography, data collection, and the post-census local review program. The AO also helped the DO's process personnel appointments, do payroll, set up and maintain recruiting files, and compile cost and progress reports. As in the stateside DO's, these operations were automated. Management information system reports were processed at the DO level, but forwarded to the RCC via the AO.

The AO staff consisted of seven people: an area manager and six technicians (three specialists for the AO and three generalists for the DO's). As noted before, the area manager was the direct supervisor of the DO managers and was the primary source of information during the operational stages of the census. Three AO technicians—a geography specialist, an administrative specialist (whose duties were performed by the assistant area manager) and a computer specialist—assisted the area manager and the DO's. Although these technicians served as advisors to the managers, they sometimes had line authority in the DO's to handle unusual situations. (When necessary, the area

manager could call on the regional technicians in New York for assistance.) In addition, there were three DO technicians (each responsible for three DO's) and three outreach specialists, who were recruited and hired locally in Puerto Rico. One of them was a CAPP team leader who reported directly to the area manager and supervised the activities of the other specialists (e.g., media specialist).

The allocation for the area office technician staff was part of the overall plan for the New York RCC. Since the island was geographically distant, the AO geographer, administrative technician, and computer technician received their training from the RCC, where they could benefit from contact with experienced Bureau staff. Although the technician for administration was assigned some of the duties for recruiting, there was no full-time technician for recruiting, as in the RCC.

District office configuration—Each of the nine DO's was to enumerate approximately 125,000 housing units. This configuration was comparable to the 1980 census, for which there were 8 DO's with an average housing unit coverage of 124,200 except for the San Juan municipio. (The housing unit workload in Puerto Rico DO's was not comparable to the stateside type 3 DO's 215,000 housing units per DO because of the higher geographic density on the island.) For San Juan, the Bureau set up two DO's because of greater difficulties in collecting data and recruiting personnel. The inner-city area also had to contend with a high crime rate, many buildings that had secured access to occupants only, and a large number of households with both spouses working outside the house. Table 2 reflects the DO workloads in 1980 and 1990.

Table 2. District Office Workloads

District office location		Number of housing units	
1990	1980	1990	1980
San Juan 1	San Juan 1	93,700	104,948
San Juan 2	San Juan 2	91,600	117,775
Bayamón	Bayamón	138,700	115,544
Arecibo	Arecibo	139,000	133,403
Aguadilla	Aguadilla	112,600	139,367
Ponce	Ponce	142,600	132,686
Carolina	Carolina	137,900	128,587
Caguas	San Lorenzo	137,300	121,368
Mayagüez		121,900	—
Total		1,115,300	993,678
Average office size		123,922	124,210

* In 1980, Mayagüez (1990) was handled by the Aguadilla DO.

The district office authorization file provided DO managers with authorized staffing levels and expenses for each operation. The allowable staffing levels and expenses varied as the workloads changed. However, staffing and wages for the DO's were similar to enumeration pay scales. (See table 3 below for Puerto Rico DO positions and wages.)

Table 3. District Office Positions and Wages

Position	Pay rates
District office manager*	\$14.30
Assistant manager field operations*	9.90
Assistant manager office operations*	8.25
Assistant manager administration*	8.25
Administrative assistant*	5.50
Assistant manager recruiting*	8.25
Assistant manager for electronic data processing*	8.80
EDP operations supervisor	8.25
Special place operation supervisor	7.98
Field operations supervisor	7.98
Crew leader	6.88
Enumerator	6.05
Supervisory office clerk	5.78
Administration/collection clerk	5.28
Stock and supply assistant	5.50
Data transcriber	5.28
Supervisory data transcriber	5.78
Office operations supervisor	7.98

*Full-time employees paid biweekly.

Staff were paid \$0.225 for each mile driven on official business, including training. Employees involved in travel were reimbursed for tolls, bus fares, parking fees, official telephone calls, and similar expenses incurred while carrying out their duties. There were no piece rates in Puerto Rico for 1990 or supplemental payment awards; however, all employees received a nonforeign-area cost of living allowance of 10 percent, as established by the Office of Personnel Management (OMB). The additional 10 percent was based on the employee's regular salary, which did not include earnings from overtime hours or other premium hours. (See stateside payroll and reporting procedures in chapter 6 for further details.)

Logistics

Leasing—The process of leasing DO space was similar to that for stateside DO's. (See Chapter 6, "Field Enumeration," for details.) The statutory authority to enter into leases for real property and manage leased space was vested in the Administrator of the General Services Administration (GSA) by the Federal Property and Administrative Services Act of 1949, 63 Stat. 377, as amended. At the Secretary of Commerce's request, the GSA delegated authority to lease space required for the 1990 decennial census to the Department of Commerce, which redelivered it to the Bureau.

The Puerto Rico AO staff, working with the New York RCC's contracting officers, negotiated the Puerto Rico DO space leases. After determining the DO requirements and locations, they placed advertisements in local newspapers within each area to locate suitable facilities for the required space. They recorded each response received on a Form D-4000, Lease Advertisement Response. If the space either met or was capable of meeting the requirements, they sent the owner/agent a sample lease package containing the standard clauses; if not, the owner/agent was so advised. Following the signing of the lease by the lessor and the Government, the contracting officer gave the lessor

space layouts, paint colors, carpet selections, etc., for "buildout." Various inspections followed, with a final inspection made jointly by the leasing specialist and the lessor prior to acceptance of the space. The entire process generally took 3-6 months from advertisement to occupancy for each DO. Regional leasing personnel maintained an official leasing folder for each DO; when the offices closed, these records were forwarded to the APSD for retention.

The New York RCC's average space for stateside DO's was 21,000 square feet, about twice the size of 1980. The extra space was needed because of additional personnel, computer, map, and equipment storage requirements for 1990. The average size for the nine Puerto Rico DO's was 9,272 square feet. (See table 4 for individual square footage.)

Table 4. District Office Space

Number/name	Square feet
2271 San Juan 1	8,190
2272 San Juan 2	7,946
2273 Bayamón	9,975
2274 Arecibo	9,382
2275 Aguadilla	8,600
2276 Mayagüez	9,619
2277 Ponce	9,975
2278 Caguas	9,975
2279 Carolina	9,788

Communication—The approximate telephone line requirement for the type 3 DO was 40 lines on a basic rotary (or comparable centrex) telephone system. The lessor certified that the required number of lines was available in each location. A supply of telephones (including headsets) was provided to ensure timely office opening and continuity of operations. The AO made arrangements for the lines to be installed on the day the office opened. Used telephone instruments were readily available from headquarters and utilized in DO's where the instruments were not provided.

Each DO manager was responsible for overall control of the telephone system and enforcement of the rules. The DO manager monitored the telephone logs, reviewed and certified the telephone bills, submitted them to the RCC for payment by way of the AO, and reported any violations of the telephone regulations to the area manager. Due to limited resources, there was no telephone assistance operation in Puerto Rico for 1990. If a person had a problem with the questionnaire beyond what the enumerator could answer, he or she would call the appropriate DO for further assistance. If the question still could not be answered, it would be dealt with from the AO.

Although the space for the 9 DO's had been leased for 12 months beginning October 1, 1989, staffing and computer equipment were not in place until the latter part of December due to budget constraints and a need to amend the equipment contract. In December 1987, the area office, in San Juan, had already opened for the 1987 agriculture and economic censuses operation, which was completed

before the 1990 activities began, and most of the furniture, equipment, and supplies needed for 1990 were already there. The office was officially turned over to the decennial census operation in July 1989. Some of the Puerto Rico staff had started working in this office in late 1988, translating forms and manuals needed for 1990.

Kits—The Data Preparation Division (DPD) in Jeffersonville, IN, assembled and shipped virtually all the material in units called "kits." Kits were divided into two basic categories—office supply and training—for each census operation. In general, the DPD was able to assemble the Puerto Rico kits and stage them for two bulk shipments (the second and third bulk shipments of the original three planned were sent together), ahead of schedule, so they were on location when needed for training.

The procedures used to decide the quantity of kits for each operation in Puerto Rico were basically the same as those used for the stateside type 3 DO's. However, the quantities were tailored to the smaller Puerto Rico workloads based on the number of housing units for each DO (see DO configuration) and a FLD staffing and budget cost model for type 3 DO's (i.e., those using the L/E procedure for the census). Staff computed the workload and number of kits used in 1980 with the 1990 workload, decided how many kits would be needed for each census operation, and added a backup supply. They then calculated the total number of forms, manuals, training guides, and other materials needed for the kits.

The bulk shipment of kits to Puerto Rico was usually by land and sea. The kits and materials for each DO were loaded by the DPD into individual sea containers, which averaged about 26,000 lbs. each, bulk weight. Some materials required "second-day" air shipments; this was kept to a minimum and approved only for materials of critical need for training or processing.

Public-use forms used in Puerto Rico are listed in appendix 13C. The variety of forms tended to be smaller than those used stateside. While the substantive content of the stateside questionnaires was considered in designing forms for Puerto Rico, there were differences in the population and housing sections between the two sets of forms. For example, all questionnaires used in Puerto Rico would be processed by keyed data entry, requiring a format other than the one needed for FOSDIC (film optical scanning device for input to computers; see ch. 8).

Supplies, furniture, and equipment/kit assembly and shipment—The office supply kits contained supplies, some furniture (most of the furniture was acquired from GSA in Puerto Rico), and equipment that a DO would need to furnish the office or keep in stock. Kits were numbered by kind, with the first digit referring to DO type. Since all DO's in Puerto Rico were type 3 offices, all office supply kits began with "3," for example, kit 301 PR, general office supplies. The second and third digits indicated the type of kit, for example, "04" administrative forms, and "07" manuals, followed by the alpha designation of PR for Puerto

Rico. The letters "A" or "B," behind some kit numbers, indicated kits scheduled for initial or second shipments. (See appendix 13A for a list of the office supply kits and the total number sent to the DO's.)

Crew leader and enumerator supply kits—The supply kits for Puerto Rico crew leaders and enumerators contained the forms and supplies needed to complete most of their jobs. Some enumerator supply kits, containing an initial supply of questionnaires, were packaged in enumerator portfolios. Kit numbers for both crew leaders and enumerators corresponded to the training guide numbers for those positions, except that the first digit of "5" was used for all supply kits (see app. 13A). The following are examples of supply kit numbering:

549 PR L/E - enumerator supply

555 PR L/E - crew leader supply

Training kits—The trainee kits for Puerto Rico contained all the supply items, manuals, forms, training aids, etc. needed during training. The instructor kits contained most of the items in the trainee kits plus any additional items the instructor needed for training. All trainee and instructor kits began with the first digit of "6" (see app. 13B). Most trainee kits had the same numbering as the instructor's kits, but ended with the suffix "A."

Manual and Training Material Preparation

This operation for Puerto Rico began in January 1988, when the Puerto Rico Section (PRS) was established in the Procedures and Training Branch of the FLD. It was responsible for the adaptation, review, editing, and illustration of materials for Puerto Rico. The PRS translated the questionnaire and administrative forms; all other materials such as manuals, training guides, self-studies, workbooks, and related materials for crew leaders and enumerators were translated in Puerto Rico. Supervisory level materials as well as manuals and guides for office operations were in English only, since the Bureau recruited sufficient numbers of bilingual personnel islandwide for those office positions.

The PRS consisted of two newly recruited staffs located in two different geographical locations: one at Bureau headquarters and the other in San Juan. The headquarters staff was under the direction of a team leader, who was the overall coordinator for the operation. He was assisted by five bilingual staff members—two survey statisticians, a training specialist, and two Spanish translators. The San Juan staff, located in the AO, consisted of a team leader, an assistant team leader, and three Spanish translators recruited from a referral source recommended by the University of Puerto Rico. All three held master's degrees in Spanish translation. Completed initial draft translations were shipped on a flow basis to the PRS in Suitland, MD, where illustrations were incorporated into the text before the drafts were circulated to participating divisions for comments.

The project got underway in March 1988, when headquarters staff began to adapt and translate into Spanish almost 120 census forms used for data collection and

personnel administration (such as payrolling and appointing intermittent census workers). In September 1988, this staff started the adaptation of the stateside versions of the manuals and training materials. Typically, the latest version of materials used for the adaptation was the stateside "table review version," before the incorporation of final comments.

A total of 327 forms, manuals, and training guides were translated into Spanish for use by Puerto Rico field personnel (see table 5 below).

Table 5. English-Language Materials Translated into Spanish for Use in Puerto Rico

Series No./form	Form sponsor	Item	Quantity translated
BC	Bureau of the Census	Form	8
CA	Department of Labor	Form	1
CD	Commerce Department	Form	1
D-1-499	Decennial Census	Form	122
D-500-599	Decennial Census	Manual	40
D-600-699	Decennial Census	Training guide	48
D-700-4011	Decennial Census	Miscellaneous	62
SF	Standard Government form	Form	9
All other	All other	Miscellaneous	1

The PRS staff prepared a Form D-476 PR, Forms, Supplies, Equipment, and Materials Required for Census, for each form they translated. The D-476 PR was used to determine the total quantity of each Puerto Rico form needed for kits, office supply, and backup. The D-476's for most stateside operations were computerized, but the Puerto Rico staff did them manually because of the area's uniqueness (number of offices, workload, location, etc.)

The overall quality of the translation, and suitability to the local vernacular, appeared to be better than for that of the 1980 census. However, during the 1990 translation operation, there were a few, difficult to resolve, logistical problems that occasionally affected the timely production of the materials. One was the physical distance between the two staffs. It was not always possible to keep both staffs informed about the latest revisions in stateside procedures and incorporate these changes into the drafts already being translated in Puerto Rico. The other was the dependence of Puerto Rico's field procedures upon the development of stateside procedures. Materials for the various L/E operations were often the last to be produced in the stateside writing schedule. This meant that adaptation and translation into Spanish were occasionally delayed, and in some cases materials were finalized, printed, and shipped to San Juan only a few days before the Puerto Rico operation was to begin.

The manual and training material operation ended in July 1989, and the PRS of the Procedures and Training Branch closed operations. Four (headquarters) staff members, who remained, became the PRS of the Project Management Staff, which coordinated the overall field operations. The PRS translators in Puerto Rico applied and were selected for other positions in the DO's.

Personnel

Introduction—All Puerto Rico management and supervisory personnel had to be bilingual. This was necessary for efficient communications between headquarters and Puerto Rico since important procedural and informational memorandums concerning various operations, and requiring immediate action, were issued from headquarters in English. Thus, the non-Spanish-speaking headquarters and regional staff overseeing the Puerto Rico offices could communicate directly with the appropriate individuals responsible for specific operations.

Staffing—Most temporary census workers were "intermittent" employees in the DO's. They were paid an hourly wage and worked for as long as their services were required. Intermittent employees did not receive benefits of any type, including leave or medical insurance. Hiring for all intermittent jobs was determined by selection-aid results, work experience, and a reference and background check. Intermittent positions, which included office and field jobs, are listed in table 6.

Enumerators, who collected virtually all census data from the public, were the most numerous employees. Team enumeration was used in Puerto Rico at the discretion of the DO manager, the same as stateside. A crew leader supervised a group of enumerators with contiguous assignments. Given the changes and enhancement to the crew leader position, and the fact that the crew leader was responsible for meeting with his or her enumerators on a daily basis, the ratio of enumerators to crew leaders in Puerto Rico was set at 8-to-1. The field operations supervisor oversaw the activities of several crew leaders. Field employees were to work in the area nearest their residence, while office employees performing clerical and administrative tasks typically lived within the DO's commuting area.

Table 6. District Office Staffing by Personnel Type

District office	Personnel type					
	All types	Enumerator	Crew leader	Office clerk	Supervisory office clerk	Field operations supervisor
Total	10,251	7,974	918	1,134	118	107
San Juan 1 ..	861	670	77	95	10	9
San Juan 2 ..	842	655	75	93	10	9
Bayamón	1,275	992	114	141	15	13
Arecibo	1,278	994	115	141	15	13
Aguadilla	1,036	805	93	115	12	11
Mayagüez ...	1,120	871	100	124	13	12
Ponce	1,310	1,019	117	145	15	14
Caguas	1,262	982	113	140	14	13
Carolina	1,267	986	114	140	14	13

Recruitment/selection—The area office had a recruiting operation in place prior to the DO's opening and provided each DO with a file of applicants. The recruiting operations supervisor in each DO, as directed by the district office

manager, placed ads, public service announcements (PSA's), made contacts with civic organizations, and recruited by word of mouth. Also community awareness outreach specialists assisted in passing the word about jobs. There was no focus on hiring teachers as there had been in the past.

In the DO's, the assistant managers for administration selected the staff. After the recruiting clerks submitted the applications from prospective candidates (the testing ratio was—as stateside—four people to each available position), the electronic data processing section in the DO captured the information and submitted the candidates' names and social security numbers for an internal check against Federal Bureau of Investigation (FBI) files. (A temporary problem resulted from the lack of communication between headquarters and the Puerto Rico DO's on how to expedite clearance checks when time schedules had to be met. Just days before enumerator training was scheduled to begin, several thousand applications that had not received FBI clearance had to be manually sorted and assigned to crew leader districts and scheduled to the enumerator training sites.) A list of qualified applicants passing the FBI clearance was then passed back to the assistant manager for administration.

Office clerks interviewed each person by telephone and checked job references for candidates who were still interested in working for the census. Candidates who passed the reference check were recontacted by the office clerks, who made job offers and then assigned those accepting to classroom training for a specific census operation. Past experience had shown that census field work was done best by people who were familiar with, and accepted in, their own neighborhoods. Thus, the DO's attempted to geocode the candidates' residential addresses because the recruiting clerks did not always understand how to use the municipio (county) locator maps or the importance of properly geocoding the home addresses of the applicants.

Due to high unemployment in Puerto Rico, recruiting qualified applicants was not a problem. About 64,000 candidates applied for about 10,000 positions. Training sites were approximately as many as the number of crew leaders hired (918) plus the field operations supervisor districts (107), which also conducted training. (See table 6 for DO staffing.)

Training

Managers—The 54 district office managers, assistant managers, and recruiting office supervisors were trained together over a 2-week period in December 1989. The method of training was a verbatim English training guide designed for the type 3 DO's, which had been adapted for Puerto Rico. There were 5 classroom days with some video presentations and working-group exercises on managerial problem-solving situations. The area managers received additional classroom or on-the-job training from the New York RCC administrative support supervisor; the EDP area manager also received training from the area office EDP technician.

Some of the DO managers were included in these sessions, depending upon their work schedules.

Due to the organizational structure of the training, some DO managers may have had difficulty asserting their roles as managers. Although taught with their subordinates, they were not given the detailed training of census activities and operations their assistants were. In some offices, this may have caused DO managers to be viewed as coworkers. The recruiting office supervisors received the same training package as the assistant managers (although they were not considered assistant managers). They were hired and trained after the office openings, which delayed DO recruitment. (Stateside recruiting office supervisors were hired and housed in the RCC's, and began recruiting for the DO's before the DO openings.)

Field and office staffs—Crew leaders were trained during the week of March 12, 1990. Hindsight revealed that crew leader training needed to be earlier in order to allow additional time to locate enumerator training space and possibly to identify oversized address register areas (ARA's). Also, this would have allowed the DO's some extra time to recruit replacement crew leaders for those persons who resigned after attending training.

After potential enumerators had completed a mandatory self-study course, they received 2 to 2-1/2 days of classroom instruction (which the crew leaders led, using verbatim guides to ensure consistency). This was followed by 1/2 day of listing practice and a final review test that the crew leaders graded. The crew leaders used the test scores, the first six listings matched against the advance listings, and class participation to determine if an enumerator was adequately trained, needed further on-the-job training (OJT), should be kept in reserve, or should be released. Most office staff received OJT from their supervisors.

With a high unemployment rate on the island, census workforce turnover was low, and employees tended to remain on the job. Since the Bureau anticipated the lower turnover, it was able to train fewer persons as replacements for individuals not completing their assignments.

Questionnaires

Chapter 6 details the collection of census data, and both it and Chapter 8 ("Pretabulation Processing") discuss the handling of the questionnaires (see these chapters for further details). As in any other area of the United States and its territories, the decennial census was the single most important vehicle for collecting small-area data. Thus it was of critical importance that the content of the questionnaire be carefully established to ensure that data items needed for political decisionmaking, planning of facilities and services, and allocation of Federal funds were on the questionnaire.

It was the Bureau's policy to follow, as closely as possible, the stateside questionnaires (see ch. 14) so that there were comparable data for both areas. However, since Puerto Rico is not a State, and given the socioeconomic, cultural, and climatic differences between Puerto

Rico and the States, the Bureau tailored the Puerto Rico questionnaires to fulfill specific data needs of the Commonwealth. As stated before, one of the objectives of the agreement was the "recognition of the special needs of Puerto Rico." To determine these special needs, the Puerto Rico government collaborated extensively with the Bureau. The PRPB of the Office of the Governor organized and supported an interagency group to study the proposed stateside census questionnaires and recommend content for the 1990 Puerto Rico forms. The content differences between the Puerto Rico and stateside questionnaires were the result of meeting Puerto Rico's special data needs.

The process of determining census questions for 1990 began with an assessment of 1980 census data use. A local public meeting in March 1985, sponsored by local organizations, afforded a wide variety of users from private and public sectors alike, the opportunity to express critical judgments on the adequacy of the data and to suggest new or modified data elements for the upcoming census.

The 1990 Puerto Rico questionnaires were printed in both English and Spanish and were designed to be keyed documents. There were both short- and long-form questionnaires with formats similar to the stateside questionnaires. The short form contained the 100-percent questions asked of all persons and households, while the long form contained the same 100-percent questions, plus the additional ones asked in a sample of the households. The differences in content between the stateside and Puerto Rico versions of the 1990 census questionnaires fell into three classes: (1) questions asked only on the stateside questionnaire, (2) questions asked only on the Puerto Rico form, and (3) questions on both stateside and Puerto Rico forms for which there were some differences in response categories (see figure 1).

Substantial changes in wording of the instructions, questions, and/or response categories from 1980 to 1990 involved the items on citizenship, veteran status, place of work, class of worker, income in previous year by source, and second or junior mortgage. Items dropped altogether in 1990 were access to unit, weeks looking for work in previous year, electric lighting, and land rent. New questions added included total years of military service, disability-personal care limitation, and time of departure from home to work.

Preparatory Work

Geographic programs—In preparation for each of the past three decennial censuses, the Census Bureau has worked with the PRPB to establish the geographic statistical areas for Puerto Rico. These cooperative efforts have improved the representation of the geographic areas for each census. For the 1990 census, the GEO started the geographic programs for the island earlier than for previous censuses. In addition, members of the PRPB participated

in the National Geographic Areas Conference in April 1984. Most of the geographic work was coordinated by the New York regional office. For the 1990 census, the Bureau and the PRPB were involved in a number of related programs described below.

Block Boundary Definition Project (BBDP)—To ensure the ability to tabulate data for the election districts in Puerto Rico, the Census Bureau asked the Commonwealth government to identify features that either reflected or approximated the district boundaries; these features were then held as the boundaries for 1990 census blocks. The PRPB enlisted participation from 20 municipios for the BBDP. This was the first phase of a three-phase project. During phase 2, the PRPB annotated district codes and highlighted the block boundaries that, as closely as possible, represented the election districts. As a result of the BBDP program, Puerto Rico received data tabulations for 1,606 election districts as part of phase 3.

The Census Tract Program—In Puerto Rico census tracts are small, relatively permanent geographic divisions of municipios that generally have between 2,500 and 8,000 inhabitants. (This criterion is the same in Puerto Rico as on the Mainland.) Census tracts are designed to be socioeconomically homogeneous areas bounded by physical features. For the 1990 census, Puerto Rico established a Census Statistical Areas Committee (CSAC), which represented a broad spectrum of interested data users. The CSAC reviewed the existing 463 census tracts for 1980 and established new tracts in 34 municipios for 1990. The existing census tracts with very low populations were combined; those with high populations were divided. The census tract plans were submitted to the Census Bureau in the spring of 1986.

Block Numbering Areas (BNA's) Project—For those 24 municipios in 1990 that did not participate in the census tract program, the PRPB worked with Bureau staff in 1985 to establish BNA's, which are treated as an equivalent to census tracts. Thus, every municipio in Puerto Rico was subdivided into either census tracts or BNA's. Together, these units provided an islandwide framework for block numbering.

Block Group Definition—Block groups (BG's) are divisions of census tracts and block numbering areas and serve as a guide for block numbering. Although not symbolized on census map products, the boundaries of a BG are derived by looking at the block numbers; all blocks within a census tract or block numbering area with a first digit of "1" (e.g., 101, 102, 107, 108, 109, and 110 together) comprised BG1. The Planning Board and the CSAC delineated for the first time for 1990, BG's for their census tracts and BNA's. BG's provide data users with very small, locally delineated tabulation areas. BG's are the smallest geographic areas (containing approximately 400 housing units) for which sample data are presented.

Figure 1. Comparison of 1990 Puerto Rico and Stateside Questionnaires

Population	Housing
Stateside items not on Puerto Rico:	
	<i>100-percent</i>
Race	Congregate housing (meals included in rent)
Hispanic origin	
	<i>Sample</i>
Ancestry	Heating fuel
Language spoken at home	
Puerto Rico items not on stateside:	
	<i>100-percent</i>
	*Plumbing facilities
	*Condominium status
	<i>Sample</i>
Birthplace of parents	Type of construction
U.S. residency and activity during the last 10 years	No. of bathrooms
Ability to read and write	Cooking fuel
Ability to speak Spanish and English	Air conditioning
Vocational training	Condition of housing unit
	Type of water heater
Common to both, but with minor differences:	
	<i>100-percent</i>
Marital status	Value of home or monthly rent paid
	<i>Sample</i>
Year of immigration	Farm residence
Residence 5 years ago	
Place of work and commuting to work	
Place of birth	

*100-percent for Puerto Rico, but sample stateside.

Census Designated Place (CDP) Program—In November 1988, the CSAC and the Bureau reviewed and updated the 1980 census boundaries for the comunidades (referred to as aldeas in prior censuses) and zonas urbanas, and suggested boundaries for additional potential comunidades for 1990.

Review of Legally Defined Areas—The Bureau also worked with the PRPB to verify the names and boundaries of each legally defined geographic entity for which the decennial census would publish data: municipio and municipio subdivision (barrio, barrio-pueblo, subbarrio). The barrios-pueblo were called pueblos in prior censuses.⁵

The Bureau implemented this review in June 1985 by sending the current list of the names of municipios, barrios, subbarrios, pueblos, and ciudades to the PRPB for certification of spelling accuracy and completeness. After this

initial review, the GB/DPD (Jeffersonville, IN) shipped maps to the New York RCC geographic staff who reviewed them to make sure there were no major errors and that the map coverage was complete before sending them to the PRPB. Any maps with boundary corrections returned to the RCC were forwarded to the GB/DPD.

One of the primary goals of this project, in addition to obtaining correct names and boundaries and providing maps for certification by Puerto Rico officials, was to integrate the Puerto Rico mapping activities into the mainstream TIGER data base planning and production processes. The NY RCC oversaw this review process. The GEO completed the review by June 1989 and inserted any changes into the TIGER file so that the corrected boundaries would appear on the precensus maps.

Urban/Rural Issue—To improve its measure of the urban and rural population, the Bureau in 1950 adopted the urbanized area (UA) concept. The major objective was to provide a better separation of urban and rural populations

⁵See Appendix 13D ("Geographic Concepts") for further clarification of political/legal/administrative entities and statistical entities.

in the vicinity of large cities or, in the case of Puerto Rico, large zonas urbanas.⁶ Prior to the 1990 census, many meetings were held between the PRPB and the Bureau to discuss the appropriateness of using the same urban/rural criteria in Puerto Rico as in the United States. As a result of these discussions, officials in Puerto Rico decided to use the same urban/rural criteria. The most significant component of these criteria is the UA, which comprises a central place and adjacent densely settled surrounding that together have a population of at least 50,000 and generally have an overall population density of at least 1,000 persons per square mile.

Many demographic, geographic, and statistical studies require the classification of population and/or the land area as either urban or rural. The Bureau defined the urban population as those persons living in UA's and non-UA places (zonas urbanas or comunidades) of 2,500 or more inhabitants. A population that is not defined as urban is classified as rural. Therefore, it is possible to have a "rural" zona urbana. Seven zonas urbanas had a population of less than 2,500 and therefore were rural. Based on the 1990 census, two new UA's were added (Cayey and Humacao) and the existing seven from 1980 (Aguadilla, Arecibo, Ponce, Mayagüez, Vega Baja, San Juan, and Caguas) gained additional population and area. Results from the 1990 census showed that 60.3 percent of Puerto Rico's population, or 2.1 million people, lived in UA's.

Map preparation—The map base for the 1990 census was derived from U.S. Geological Survey (USGS) quadrangle ("quad") maps. The "quads" for Puerto Rico, however, had to be manually digitized. Then a digital file was created, and "feature change maps" were produced for updating. Extensive updates were made to these maps by PRPB staff working with Census Bureau 1980 Metropolitan Map Series (MMS) maps and other sources. The NY RCC concurrently updated the feature change maps and assigned key numbers to features. The digitizing process defined all new and changed features and inserted the feature names in the electronic file. Census Bureau regional office geographic staff used aerial photography and local source maps to further enhance the quality of the map base.

Unlike metropolitan areas in the United States, where the Geographic Base File/Dual Independent Map Encoding (GBF/DIME) files were used to construct the TIGER data base, the Census Bureau did not use the GBF/DIME file in Puerto Rico. Thus, the feature network in the TIGER data base may have a more geometrically accurate map base, but it contained less attribute information, e.g., address ranges. All field collection maps used in Puerto Rico were similar to stateside equivalents, e.g. enumerator maps and crew leader maps. There was uniform Spanish terminology for map features and a unique Spanish legend for maps.

⁶A zona urbana was the community around the historic governmental seat of each municipio. See app. 13D.

List/Enumerate Operation

The 1980 census of Puerto Rico used what then was called the "conventional" procedure—house-to-house canvassing. In areas with postal delivery, the Bureau mailed advance census reports (ACR's), form D-13 PR, to each household. ACR's were short-form household questionnaires that asked the householder to complete the form and hold it for an enumerator to pick up. The enumerator systematically canvassed his or her assigned area, listed each housing unit, collected the D-13PR from the household, followed up on any missing information on the D-13 PR and, where instructed, collected additional information for sample-designated households.

A joint FLD and DPLD conference in December 1986 reviewed the 1980 enumeration and considered procedures for 1990. The participants discussed the feasibility of a mailout/mailback operation in selected areas of Puerto Rico for 1990. Later, the GEO evaluated address lists received from several sources in Puerto Rico, then decided that it could not geocode⁷ these addresses by automation. Address conventions in Puerto Rico were so diverse from stateside patterns that they could not be standardized without making extensive modifications to the standardized stateside programs and "look-up" tables already in place. Also, the house number and street names were not always unique within post office/ZIP Code combinations. Clerical geocoding would have been very expensive, and the necessary reference materials were unavailable. The GEO concluded that a straight listing operation would be a more effective approach for creating an address list and recommended that a committee/task force further evaluate automated geocoding-mailout/mailback after the census. Also, the GEO decided not to use the GBF/DIME files to create the TIGER data base for Puerto Rico.

Based on the results of the earlier conference and subsequent meetings, a recommendation was made to conduct the 1990 census in Puerto Rico "conventionally," as it had been in 1980. This type of enumeration was now called L/E. The L/E operation was scheduled to begin after enumeration training during the week of March 26, 1990, and end on April 26. The L/E was a method of collecting housing and population data. Using a census map, an enumerator would travel through his or her assigned geographic area, an ARA,⁸ map spot the location of each housing unit on a census map, list the address and/or location description for each housing unit in an address register and, if necessary, pick up a completed form or enumerate the housing unit and its inhabitants on blank copies of the Spanish versions of short- and long-form questionnaires.

⁷Codes to identify the location of a living quarters. Geocodes for 1990 included the DO code, the ARA number, the block number, and the map spot number.

⁸An ARA was a small geographic area, usually a block group or part of a block group, the basic unit of data collection for a single enumerator during the 1990 census. The ARA was equivalent to a 1980 enumeration district.

During the week before March 23, 1990, the Postal Service delivered ACR's to all residences that received mail on the postal routes. However, there were some remote areas where postal carriers did not deliver the ACR. Enumerators canvassed those areas and completed the questionnaire with the household as they encountered the living quarters in their canvassing. The Bureau referred to these non-ACF versions of the questionnaire as enumerator-friendly questionnaires (EFQ's) because they contained questionnaire wording suitable for personal-visit interviews.

In 1987, local and commonwealth officials and private organizations provided Bureau staff with lists of special places (places where people either lived or stayed other than the usual house, apartment, or mobile home such as colleges and universities, boarding houses, hotels, nursing homes, and prisons). These lists were compiled into a unified inventory at Bureau headquarters, geocoded, and sent to the DO's for update and correction. In January 1990, special place enumerators used telephone books and other local sources of address information to update the special place listing ("local knowledge update"). DO's then sent enumerators into the field to verify the existence and location of each special place (as part of the special place prelist operation). During this operation they listed, geocoded, and map spotted each group quarters and housing unit at the special place, obtained an estimate of the number of people, the person to contact, and other related information about the living quarters at the special place.

On March 29, 1990, enumerators went to their ARA's with address registers or address listing books (ALB's) containing three colored sets of address listing pages. Enumerators canvassed their ARA's on a block-by-block basis and recorded address information (including complete mailing address, occupant's name, geographic information, and physical location) for all housing units encountered in their ARA's on the white pages (form D-104A PR). The yellow pages (form D-104B PR) showed the addresses of all known special places in a given ARA; enumerators added to, deleted from, or corrected these. Addresses of any special places added during the enumeration were turned over to special place enumerators for data collection. The tan pages (form D-104C PR) contained the addresses of all known housing units located in or associated with special places in the enumerator's ARA (e.g., a janitor's living quarters at a hospital, a college president's residence, or a housemother's apartment in a dormitory). The L/E enumerator completed a questionnaire for these HU's and their inhabitants and added the address(es) to the white pages of the address register.

If a respondent had not received or had not completed an ACR, the enumerator conducted an interview using the appropriate EFQ (indicated in column 10, form type "FT," of the listing page). If the housing unit was designated for a long-form questionnaire (an "L" in column 10) and the respondent had filled an ACR, the enumerator checked the ACR for completeness and asked the respondent the sample questions from the long-form EFQ. He or she later

transcribed the data from the ACR to the long-form EFQ. The enumerator also completed a questionnaire for an unoccupied housing unit to obtain information for the census of housing. Enumerators turned in their work daily and filled out Form D-308 PR, Daily Pay and Work Record.

One significant enumeration problem involved the manner of asking and recording a residential address in the address register. Enumerators were trained to obtain first the mailing address by asking the question, "What is the exact mailing address of this living quarters?" at each place they visited. In Puerto Rico, households frequently used post office boxes to receive their mail. Therefore, even though the housing unit also had a city-type address (house number and street name), and even though they were instructed to obtain additional information (name of occupant and physical location of the living quarters), when they recorded a post office box number in the listing book, there was a tendency not to add that information. Problems arose in later census operations when a followup enumerator had to locate that unit, which was only identified by a post office box number and not the other required information.

The ARA—In Puerto Rico, ARA's were subdivisions of block groups designed to facilitate field activities. Similar to the 1980 ED's, they contained approximately 140-160 housing units. The number of ARA's in Puerto Rico for 1990 was approximately 5,700. The size of the ARA was based on an estimate, since the number of housing units in the ARA would not be known until the actual enumeration took place. At the time of enumeration, the field operations supervisor reviewed the ARA's and recommended oversized ARA's be administratively split into two or more pieces for more efficient enumeration. The DO staff did the actual splitting (according to instructions in the D-530 manual) under the supervision of the assistant manager for field operations⁹. This involved determining where to divide the ARA along existing block boundaries so that the area could be enumerated within the time allotted, and making enough copies of the map sheets so that each enumerator assigned to a portion of the ARA had a complete set of map sheets. On each set, clerks color-shaded new ARA boundaries in along existing block boundaries and assigned a letter ("alpha") suffix to each of the new ARA's (for example, ARA 6001B, ARA 6001C, etc.).

In some urbanized areas, however, an ARA could not be split into component blocks because the ARA consisted of only one block. For example, the Isla Verde area in Puerto Rico typically had condominium apartments along the ocean front. The ARA boundaries were not delineated by several blocks, but rather by a single road or street leading into the condominium complex of several buildings. The ARA may have contained 10 buildings with 350 apartments in each building. The assistant manager for field operations split the ARA into buildings, giving one to each enumerator.

⁹See Field Operations Manual, D-530 PR, chapter 3, paragraph 3D.

Rather than having the first enumerator start with map spot 1, the second with 1001, the third with 2001, etc., as directed, each enumerator began numbering his or her part of the split ARA with map spot "1." As a result, each of the 10 enumerators was listing housing units with the same map spots within the same block. Electronic data processing (EDP) accepted the first questionnaire turned in as the one with a valid map spot number. The other nine enumerators' questionnaires with duplicate map spot numbers were rejected as "duplicate" questionnaires. Once this problem was identified, enumerators were instructed to use a unique map spot number range to unduplicate the questionnaires.

Advance Listing

The first field work conducted for the L/E operation was the advance listing of selected addresses. Advance listing, between February 26 and March 12, was a quality assurance (QA) operation that measured the accuracy of the L/E enumerator's address listings. After completing a self-study, all potential advance listers received 3 1/2 to 4 days of training, during which they practiced listing. The field operations supervisors reviewed the results to ensure that the advance listers obtained adequate address information; if not, the advance lister had to obtain more complete information. The listers who successfully finished advance listing became crew leaders or enumerators. If they accepted these positions, they did not work in the same ARA's that they advance listed (each enumerator was supposed to be assigned an ARA close to or in the neighborhood in which he or she lived). The FLD prepared an abbreviated crew leader training package for experienced advance listers; as part of their advance listing training, they had received the crew leaders' enumerator training.

The field operations supervisor designated two blocks to be advance listed in each odd-numbered ARA, for example, ARA's 6001, 6003, 6005, etc. Clerks then indicated the point at which to begin canvassing in each of the two blocks by entering red X's at the spot on the corresponding ARA map. Advance listers began canvassing from the starting point for the first preselected block, listed the mailing addresses, and related information for the first six living quarters on Form D-169 (L/E) PR, Quality Assurance Listing and Matching Record; map-spotted the locations of the six living quarters on a census map; and repeated the process for the second preselected block in the ARA.

The field operations supervisor reviewed the advance lister's work to ensure that it was complete and done according to procedure. The supervisor would travel to a randomly assigned area and do a quality assurance check. Using the advance listing, crew leaders subsequently checked the quality of the enumerator's work for the ARA by matching advance listings against the enumerator's listings and verifying the accuracy and completeness of the address lists. If the number of listing errors was out of tolerance, the crew leader would reassign the area to a new enumerator.

Assignment Control

The assignment control operation's primary function was to check in, review, and distribute the enumerators' work within the DO. Questionnaires not having all the required information were returned to the crew leaders for the enumerators to obtain missing or incomplete information. Assignment control was performed for all field activities in which enumerators interviewed respondents.

The assignment control unit compiled a computerized list of all cases assigned to the field followup operation. The list, Form D-384 PR, Record of Followup, contained cases identified as "missing," cases that required resampling, and cases assigned for vacant/delete followup. The assignment control clerks checked and verified that all the required information on the questionnaire was present. Then they transmitted the materials to the appropriate work area within the DO. The assignment control unit sent completed questionnaires to the ADP unit in the DO for data entry/check-in. Assignment control was supervised by the assistant manager for office operations. Due to the speed of the field operations, in most cases, the assistant managers for office operations found themselves not knowing how much work was accepted/rejected in time to take corrective measures.

There were some backlog problems with generating the D-344 PR, Prelist ARA Directory, on the L/E operation. The D-344 PR report was supposed to be created daily from information keyed from the D-308 PR, Daily Pay and Work Record, and from the information on the questionnaires (occupancy or vacancy status, number of persons in the household). The D-344 PR report was to be used by the crew leaders as a supervisory tool to monitor enumerator cost and production. The EDP sections in the DO's were so occupied with keying personnel and payroll information during the peak period for the L/E operation that they could not cope with the D-344's PR in a timely manner.

Merge/Sample Tolerance Check

The primary purpose of the merge operation was to assure that there was a completed questionnaire in the collection control file (CCF) for each listing in the address listing book. The merge operation was the same one used for the stateside DO's with one exception; the Puerto Rico DO's retained the questionnaires until all operations were completed; whereas, the stateside DO's had already shipped their questionnaires to the processing offices.

After the questionnaire checkout operation was completed, the EDP section produced a merge listing. This was a computer listing of all the questionnaires that had been given an ID number and checked out (which meant that the questionnaire had been physically located). The questionnaires were then numerically sorted and filed in the DO library for one final operation, the translation into English of the industry and occupation entries before shipment to the Bureau's Jacksonville, FL, processing office. During merge, clerks matched the geocodes from the merge listing to

those in the address listing books. Any geocode not found on either the merge listing or the address listing book was added to the source from which it was missing.

In the Isla Verde area, some problems were encountered during the merge operation resulting from having duplicate serial numbers. That is, EDP had checked two forms for the same housing unit with two different geocodes for that unit. Several sources caused this problem. One was the duplicates resulting from the administrative ARA splits (mentioned above); another was the result of some enumerator not following procedures for identifying ACR's (see the Crew Leader Manual, D-555, chapter 3, or D-555 PR, chapter 3) that had been replaced by long-form questionnaires. The EDP section received both a short form (ACR) and a long-form questionnaire for the same housing unit. Not realizing this was the same housing unit and because the two questionnaires were not necessarily received in the DO at the same time, it assigned two different ID's. In order to correct this problem, the DO's were instructed to match the questionnaires to the address listing books and unduplicate questionnaires.

After merge, an automated sample tolerance check was designed to ensure that the population enumerated on long forms was statistically the same as the expected population on those forms: The sample tolerance check compared the distribution of household size (including vacants) for short- and long-form questionnaires and failed an ARA if the distribution was skewed at the low end for long forms. Failed ARA's had selected housing units that had received short forms. These housing units were revisited by an enumerator to obtain long form information. As a result of this resampling process, the DO's received additional long-form questionnaires to replace the short forms. In some ARA's that had been improperly split and had duplicate map spot numbers within the ARA, the sample-tolerance questionnaire did not necessarily agree with the address listing book. In Puerto Rico, it was necessary first to clerically match the questionnaires with the address lists, correct the map spot numbers, and key corrections into the CCF.

Clerical Edit

All DO's in Puerto Rico performed an office edit on all questionnaires, which consisted of a clerical edit that included reviewing each questionnaire, item by item, while looking for missing information and inconsistent entries. Edit clerks used logic tables, one for the short form and another for the long form, describing certain conditions and appropriate actions to be taken. Part of the edit operation was designed to improve within-household coverage and housing unit coverage for the 1990 census of Puerto Rico through a clerical inspection of item D, (household size), questions 1a (household roster), 1b (whole household usual home elsewhere), H1a (possible additions to roster), and H1b (possible deletions from roster) to identify incomplete or inconsistent information on the questionnaires. Procedures for the clerical coverage edits for Puerto Rico

were similar to those used for stateside, type 2 DO mail returns. The total workload for this operation was 1.2 million housing units (HU's). The primary divisions involved with designing and implementing the coverage edits were the FLD, the Statistical Support Division (which specified the processing needs for the evaluation of the coverage questions) and the DPLD (responsible for coordinating the documentation of requirements for evaluation of the coverage edit operation).

The general office edit was performed on all items on each enumerator's questionnaires. These returns had an address box that the enumerator filled at the time of his or her visit with the housing unit address, DO code, questionnaire ID number (filled by the office), and the geographic information (ARA, block, and map spot numbers). In addition, coverage edits performed included a review of questionnaires for potential missed persons. There also was a clerical content edit which failed questionnaires for missed and/or multiple answers and was designed to improve data quality and reduce item nonresponse.

The processing flow for the Puerto Rico DO's was similar to the stateside process. After the ADP staff checked in the questionnaires, created the ID numbers, and transcribed the ID's onto the questionnaires from the batch diary, the clerical staff in the ADP area applied black tape to the last data-filled page of each long-form questionnaire (in the upper right corner) using the specifications provided by the Project Management Staff, FLD. The data transcribers then checked the L/E questionnaires out of the CCF by keying in the box number and the ARA number, block number, map spot number, ID number, and population count from the L/E questionnaire. The FLD programmed the checkout module to be interactive so that if the ID and geographic codes keyed did not match those in the CCF, the data transcribers removed the problem questionnaires before boxing and sending them to the transcription unit for repair. Once repaired, the questionnaires were returned to the ADP unit for check-out. After check-out, the completed questionnaires went to the DO library. The DO's held all questionnaires almost until the end of the completion of all field operations (August 1990) and then sent them to JXPO for processing all at one time. (Unlike stateside's flow-processing to the PO's, questionnaires remained in the DO's until they were almost closed.)

Field, Content, and Coverage Edits

Puerto Rico crew leaders conducted two formal reviews—first and final—of each enumerator to measure the quality of his or her work. During the first review, within 2 or 3 days after the enumerators began working, the crew leader edited the questionnaires for content and verified that the enumerator had filled in the check boxes for item 3, sex, and 4a and 4b, age and year of birth. The crew leader also conducted the coverage edit—reviewing question 1a, comparing the value entered in item D of the "For Census Use" box with the number of data-defined persons, checking for "whole household usual home elsewhere" (WHUHE's) and

additions or deletions to the household roster, checking for ACR's with exactly seven persons,¹⁰ and reminding enumerators to fill continuation forms if necessary. Item D was the greater of the number of persons in the roster (question 1A) and the number of person columns with a name and at least one response. Data-defined person columns contained at least two responses besides name for each column.

If the value of item D and the number of data-defined persons were different, the questionnaire failed the coverage edit. Next, the crew leader checked item 1b (WHUHE) for a marked box or address(es) other than the one on the cover of the questionnaire. If either of these conditions existed, the questionnaire failed edit. The crew leader also checked questions H1A and H1b for a write-in or a mark in the "YES" box. If either condition existed for either question, the questionnaire failed edit. Crew leaders discussed errors/omissions with the enumerators and corrected them during the edit. For the final review when the enumerator completed an ARA, the crew leader used the check list inside the address register. Questionnaires that did not pass the crew leaders review were supposed to be given back to the enumerator, who would follow up and resolve any errors, if possible, and then return them to the DO's. Individual Census Reports (ICR's), Military Census Reports (MCR's), and Shipboard Census Reports (SCR's) did not go through these, but vacant, usual home elsewhere (UHE) and blank questionnaires did.

The office edit was one of the more successful operations in the DO's. Since there was no computer support system to control the flow of failed-edit questionnaires in the stateside L/E operations, a manual system was designed for Puerto Rico. (There was no office clerical edit in stateside L/E areas.)

Telephone Followup

The purpose of this operation was to contact respondents by telephone from the DO's and resolve problems on the questionnaires that failed edit. This operation was to begin approximately when the office edit was completed and before the merge operation started. All failed edit questionnaires were returned to the Office Control in the DO. All forms marked "T" were passed on to the next office operation, "Telephone Followup" (TF). The telephone followup clerks conducted a roster check where they verified that all household members were listed in the person columns, regardless of the edit failure reason.

The telephone clerks looked up telephone numbers in directories or located the respondent's telephone number on the questionnaire. Then the clerks called and tried to obtain answers to those questions that failed edit. If the household was contacted, whether the edit failure was resolved or not, the questionnaire would be considered

complete. If there was no contact during the telephone followup operation after five calls, the questionnaire was sent for personal visit during field followup. In general, this operation followed the same procedures as stateside, with one exception: the DO's in Puerto Rico retained the questionnaires for subsequent operations.

Telephone followup accomplished its purpose, and the problems encountered were minor. The physical space for the telephone callers was less than ideal in the DO's, usually because it lacked adequate sound proofing. Some experience indicated that telephone followup should have begun earlier, possibly synchronized with the flow of work as it was generated from the office edit. Some of the cases scheduled for telephone followup were not completed because, to avoid delaying later census operations, the merge operation took priority.

Field Followup (FFU)

This operation was conducted after the initial L/E and telephone followup activities had been completed. The purpose of field followup, which began on June 6, 1990, and ended 27 days later, was to improve data quality and census coverage by following up on blank and missing questionnaires or those with inconsistent or missing data items, by verifying the status of the units reported as vacant or deleted, and by obtaining additional long-form questionnaires in ARA's whose sample data quotas did not meet the sample tolerance check (resample cases). The total workload for Puerto Rico was approximately 194,000 HU's and involved about 1,500 enumerators and crew leaders. The DO retained some of the L/E staff to perform field followup. Those enumerators who worked during L/E in an ARA did not perform field followup in the same ARA. Combining the various types of cases into one field followup operation maximized the efficiency in time and travel cost.

For those failed-edit cases that required personal visit followup, the enumerator made up to two personal visits at different times of the day before obtaining "last resort" information. Last resort information included population items such as relationship, sex, and marital status; housing items for occupied units (description of unit, tenure, type of unit) or vacant units (description of unit, vacancy status, boarded-up unit status; nonexistent units; duplicate units; apartment mix-ups; or involved adding a new HU.

Field followup was successfully completed in the DO's. Housing units and persons were added to the census based on the Puerto Rico Multiunit Coverage Improvement Operation. (See the Puerto Rico Multiunit Coverage Improvement Operation for further details on field followup.)

Special Place Operations

Special places were places where people lived other than separate living quarters typically a house, apartment, or condominium. For the census, living quarters associated with special places were divided into two types: HU's—such

¹⁰The questionnaire had space for entering data for seven persons; if there were more, the enumerator was supposed to fill out a "continuation" form.

as houses, apartments, or condominiums—and group quarters (GQ's). GQ's were living quarters in places such as college and university dormitories, boarding and rooming houses, homeless shelters, hospitals and nursing homes, prisons, and military installations; however, within such complexes there could be several GQ's and/or separate housing units in which staff might live.

Census Bureau headquarters identified special places in advance of Census Day (April 1, 1990) and provided the DO's with a computer printout (form D-329 PR) listing all special places. Each DO updated its list before taking the census by using local knowledge of the DO staff, conducting telephone directory searches, contacting college housing offices to determine if there were any off-campus dorms or other GQ housing, and conducting a special place prelist to identify all GQ's and HU's for each special place. Also, the special place operation supervisor contacted each military base and Coast Guard station in each DO area.

Special place operations also included Shelter/Street Night Operation (S-Night). This operation consisted of the enumeration of persons staying at shelters for the homeless, at hotels or motels costing \$12.00 or less per night, or in areas the local governments identified as places where homeless people might be staying. Officials from each municipio within the DO area provided additional information about the latter. To identify S-Night places, the New York RCC sent a letter, form D-33 (L) PR, to local officials in Puerto Rico requesting this information and compiled the results for the area office, which assigned the names and addresses of designated S-Night places to each DO.

Group quarters (GQ) Enumeration—GQ enumeration ran from April 2 through April 13. An enumerator visited each GQ and requested a list of the names of the people staying there. Then the enumerator prepared an Individual Census Report (ICR) packet for each person listed, left it for the person to complete, and at a specified date and time, returned to pick up the completed ICR's.

Shelter/Street Night enumeration—S-Night enumeration was on the evening of March 20 and during the early morning hours of March 21. A team of enumerators visited shelters and previously identified street locations, enumerating all visible persons (except those in uniform or persons engaged in money making activities) using the standard ICR.

Transient Night (T-Night) enumeration—The T-Night operation, on March 31, counted persons staying at YMCA's, YWCA's, commercial and public campgrounds, youth hostels, campgrounds at racetracks, fairs and carnivals, and the like, charging less than \$12 a night. The enumerators personally interviewed the guests/residents between 4:00 and 10:00 p.m.

Military enumeration—This consisted of both land-based and vessel enumeration. The Bureau used the unit control method to enumerate the land-based military to ensure that the census counted all personnel assigned to operating

units on the base. As stateside, regular census procedures covered the family housing on base. Each operating unit on base enumerated its own personnel. The local DO provided the base with the required materials for enumeration and conducted a training session for the military personnel who worked on the census. The military personnel were enumerated using Form D-21 PR, MCR's. Military personnel reported a UHE on the MCR if they resided in family-type housing on or off base. The local DO collected the enumeration materials and checked them in. After the DO's closed, the MCR's were sent to JXPO along with the other forms from GQ enumeration.

Military (Navy and Coast Guard) vessels also were self-enumerating. Based on addresses provided by the Navy and Coast Guard, the Bureau mailed Forms D-23 PR, SCR's, and other enumeration materials to each military vessel. The designated official on each vessel did the enumeration and mailed the forms to the Baltimore processing center (BAPO). As military ships were enumerated at their home port, personnel quartered on ships with Puerto Rico home ports were enumerated on Puerto Rico SCR's.

Merchant vessels—Crews of merchant vessels were enumerated using the stateside SCR's. Based on addresses provided by the Maritime Administration (MARAD) and other contacts, the DPD mailed SCR's and other materials to American flag maritime operators who forwarded the materials to the ship captain/masters. Officer, crew members, and passengers on maritime ships filled out their own SCR's. Officers, crew members, and passengers could claim a UHE. The ship's captain also completed a Form D-47 PR, Location Report for the vessel. The captain returned all the completed census materials to the Baltimore processing office. The forms were forwarded to the DPLD, which transcribed them onto the Puerto Rico Shipboard Census Reports, Form D-23 PR, and shipped these forms to the JXPO for processing.

Translation of Industry and Occupation (I & O) Information

Responses to questions on industry and occupation (which appeared only on the sample questionnaire) were write-in entries, usually in Spanish. The Spanish I & O responses were translated into English in each of the nine Puerto Rico DO's following on the job training from the San Juan area office. The clerks were to use their local knowledge in translating the written responses to items 29(a), 29(b), 30(a), and 30(b). If the lists of English terms commonly used in Spanish for industries and occupations did not suffice, as well as dictionaries and other source materials, the clerks referred the case to their supervisor for resolution.

Some of the problems encountered during this translation operation were (1) answers provided by the respondent did not relate to the question asked, (2) some answers were difficult to understand because the respondent used company or professional jargon unknown to the clerks, and

(3) various respondents did not understand question 30(b) "What kind of work was....doing?" Even though the Bureau provided an example of how to answer the question and trained the enumerators to help the respondents, the replies were frequently inconsistent. In some cases, the translation was too literal and caused an incorrect interpretation. For example, the assistant managers for operations claimed that the English terminology of the D-532(H) PR, Translator's Instruction for Translating 1990 Census of Puerto Rico Industry and Occupation Entries, was not accurate. The appendixes of the manual were translated from Spanish to English literally, such as, (1) "Departamento de Servicios Sociales" (Spanish), Department of Social Services (correct English translation), Welfare Department (translation in D-532(H) PR; and (2) "Ejército de Salvación" (Spanish), Salvation Army (correct English translation), Salvatory Army (translation in D-532(H) PR).

At the same time (September 24 through December 27, 1990) the I & O write-in responses on the D-2A PR (S) long-form questionnaire and the D-20B PR (S) long form, ICR, were being translated from Spanish into English, a QA operation (for the English translation) was being performed in the DO's. A sample of questionnaires with I & O entries that had been translated into English were selected and the translation verified by another translation clerk (verifier). Clerks were not to verify their own work. Questionnaires were sorted into work units (WU's) of 30 to 100 questionnaires and had a D-375 PR, "Envío de Trabajo" (work transmittal) accompanying each work unit. After the translation clerk completed a WU, he or she returned it to the supervisor. The supervisor gave the work unit to the assignment control clerk, who used the D-398 PR to control the flow of work units that had been translated and then assigned to verifiers. The verifier requested a work unit of translated questionnaires from the assignment control clerk.

The assistant manager for office operations reviewed the D-421 PR, Quality Assurance Record for the I & O Translation, on a daily basis and counseled any translation clerk with industry and/or occupation question error rates that were greater than 10 percent for a particular WU. During the first week of the translation operation, the assistant manager for office operations met with all the translation clerks each day and discussed particular problems or concerns.

Computer Operations

The nine DO's in Puerto Rico had the same computer system that was installed in the stateside type 3 DO's. The AO, however, did not have all the computer capabilities of an RCC, and was not able to access the DO-level computer programs, reports, etc., to resolve DO problems online. The software programs were designed for the stateside questionnaires and payroll forms and the menus and screens that the keyers in Puerto Rico used were in English. Since the census in Puerto Rico used different questionnaires, primarily in Spanish, the EDP keying instructions were modified so that the keyers would be able to

determine where the comparable information on the Spanish questionnaires was located. However, problems were easier to resolve than stateside because Puerto Rico managers could physically meet to try to take care of any unforeseen situation. As a whole, operations went well.

Automation in Puerto Rico district offices—The stateside automation system, called the collection control system (CCS), was used without any adaptation in the nine DO's in Puerto Rico. The CCS was a relational data base system in the DO computer to support data-collection operations. Its main component was the CCF. The CCF was a group of data relations within a large data base and associated programs used to collect data from questionnaires and forms, process the data, and manage reports and listings. Data from the CCF were also transmitted electronically to the RCC.

The cost and progress system, provided DO managers with reliable and timely information regarding actual expenses in relation to budgeted expenses. This system consisted of the applicant file that ranked the employment status of persons tested for census positions, the payroll file that enabled intermittent employees to be paid on a weekly basis, and the personnel file which contained information from Form BC-50A PR, Notice of Short Term Employment. This system also was used to print special reports on EEO statistics, update the applicant file on the status of employees, and verify social security numbers (SSN's) on payroll forms.

Data Collection Processing

The Bureau's objective for 1990 was to process the Puerto Rico questionnaires (September 4, 1990, to May 31, 1991) concurrently with the stateside ones rather than sequentially as it did in 1980. This approach resulted in more timely release of data for the island. Further, there was a commitment to release by June 30, 1991, data the Puerto Rico government could use for redistricting.

Questionnaires for Puerto Rico were keyable, but unlike those of the Mainland, were not FOSDIC readable. Using the sample of 1-in-6 (as in 1980), where enumerators used a long-form questionnaire for every sixth housing unit to enumerate households, the 1990 workload was about 1,066,000 short and 235,000 long forms in addition to ICR's (long and short), and MCR's and SCR's. Questionnaires were sorted by DO/ARA/block as the DO's completed all field and office operations. The questionnaires were then shipped by air to the JXPO, where the English write-in answers for I & O, place of work (POW), migration (MIG), place of birth (POB), and relationship questions were coded and the questionnaires were keyed for data capture, processing, and storage.

The JXPO began processing Puerto Rico census data on September 4, 1990. At this time Puerto Rico processing used the JXPO's existing processing units for operations that were common with those stateside. For example, keyers handled the stateside keying as well as the Puerto Rico keying. The JXPO had a Puerto Rico section under

the General Operations Branch for those operations that were unique to the Puerto Rico census processing (e.g., search/match and manual coding). The JXPO Puerto Rico staff had designated units for check-in, data preparation, clerical coding, keying, and quality assurance. The library contained separate sections for the Puerto Rico questionnaires. The Administration Branch handled all Puerto Rico staff matters, and the Processing Operations Branch oversaw training and QA (September 24-December 27, 1990) for Puerto Rico. All processing was completed by May 31, 1991.

The Puerto Rico DO's batched questionnaires by short/long form and ARA, using the 10-digit airbill number on the shipping boxes to check out the batched questionnaires. The JXPO keyed that same airbill number to receive/check in the questionnaire batches.

The JXPO checked in Puerto Rico materials through its CATS (control and tracking system) by DO/ARA. Questionnaires from GQ were checked in by their geography and GQ ID numbers. Address registers were checked in and sent immediately to the library for storage. Forms D-190, Search Record, were forwarded to the Search/Match (S/M) Unit, where household questionnaires were sorted by short/long form and by ARA and block. Clerks did the actual search/match between September 17, 1990 and February 15, 1991, using the following "search forms": ICR (D-20); MCR's, D-21; SCR's, D-23; Were You Counted? (WYC)¹¹, D-25; Search Record, (D-190); and census questionnaires classified as WHUHE, D-1A and D-2A. The Parolee-Probationer Information Record (PPIR) was not used in Puerto Rico.

All SCR's were initially processed through the BAPO, but all stateside SCR's claiming a usual residence in Puerto Rico were transcribed onto Puerto Rico SCR's by the Puerto Rico and Outlying Areas Branch (PROAB) at headquarters and then sent to the JXPO for further S/M processing.

For the 1990 census, the Bureau implemented special S/M procedures to count households that were temporarily displaced because their "usual place of residence" was destroyed or damaged by a natural disaster. A number of Puerto Rico ARA's were treated as disaster areas as a result of Hurricane Hugo. Any household reporting a destroyed or damaged and uninhabitable residence in any one of these ARA's as their "usual residence" was counted as living at that location rather than where they were living temporarily. To accomplish this, given that many of these homes were completely destroyed, the JXPO created a "dummy" GQ at the block level in any "disaster ARA" to which a UHE or WYC address was assigned. For example, some households displaced by Hurricane Hugo were reported as UHE's through search forms (D-190's) or through WYC forms. The usual address was searched in the appropriate address register. If the address register corresponded to a

"disaster ARA" and the usual address was not found in the register, a "dummy" group quarters was created for that block to account for the household members missing from that block within that particular ARA. The workload for the S/M operation was approximately 15,200 forms.

Table 7. Estimated Workloads

Forms	Keying	Coding	Search/Match
Short-form questionnaire	1,000,000		8,034
Long-form questionnaire	200,000	200,000	1,646
Short-form ICR	20,750		20,750
Long-form ICR	4,250	4,250	4,250
MCR	3,600	3,600	3,600
SCR	100	100	100
WYC	1,134		1,134

Post-Census Local Review

The post-census local review program, from July 23 to August 20, 1990, provided local officials in Puerto Rico an opportunity to review the initial census counts of HU and GQ population in their jurisdictions, as was done stateside (see ch. 6). Once these officials provided proper documentation of alleged discrepancies in the census counts as of April 1, 1990, the AO determined which blocks to recanvass. The DO recanvassed at least one block per municipio, whose government provided properly documented local estimates. Enumerators listed and interviewed persons at any missed units.

In preparation for this program, the Census Bureau, conducted two workshops with the representatives from the municipio governments on how to participate in the program. One workshop was held in the summer of 1989 and the other in February 1990. They focused on census definitions, geographic concepts, methods for creating comprehensive housing-unit estimates, and program schedules and procedures. These workshops provided the local government liaisons with detailed information on conducting the local review.

The Bureau issued its first of two local review booklets, 1990 Decennial Census Local Review Informational Booklet, for Puerto Rico on October 12, 1988. The FLD was responsible for its distribution. This booklet provided a general overview of the operation. The second booklet, 1990 Decennial Census Local Review Program Technical Guide, for Puerto Rico presented a more detailed discussion of the program. The Bureau distributed the Technical Guide to local officials during the second series of workshops. The DPLD adapted and translated both local review booklets and the training materials used during the workshops from the stateside version. The FLD was responsible for the preparation of all field-use manuals and training guides.

Using the GEO's software, the New York RCC plotted the local review maps and mailed them to the local municipios by certified mail, return receipt requested. The area office and the PRPB received copies of each local

¹¹A campaign to identify and to enumerate those persons who believed they or members of their households were not included in the census.

review map for reference. The municipios received the precensus maps in the summer/fall of 1989 so that they could begin to prepare their housing unit estimates for census blocks.

The precensus local review maps showed the appropriate name, code, and boundary as well as the streets, waterbodies and other features that formed the boundaries of the census blocks and census tract/BNA's for each governmental unit. The political boundaries shown on these maps were based on the Legal Boundary Review. These boundaries would help local officials orient themselves to Bureau maps and geographic units—census tracts and census blocks. Using these maps, the local review officials developed or assigned their counts of housing units to the correct 1990 census geography.

The second set of maps (postcensus local review maps), which the Bureau distributed during the spring of 1990, showed the municipio and barrio (or barrio-pueblo) boundaries that local officials reported as being legally in effect as of January 1, 1990. These were the boundaries to be used to tabulate the data from the 1990 census.

After the DO's completed field operations (including the block split operation), headquarters generated the population and housing counts by computer on Form D-77 PR, Postcensus Local Review Listing. The D-77 PR provided counts at the block level for HU's and GQ population for the local officials to review and compare with their own estimates. This review was designed to identify major differences between the census counts and the local estimates. Preliminary figures were released in late July 1990, and in September, municipio officials had 25 workdays (including Saturdays) to review the census counts and notify the appropriate DO of any problems.

Release of census results—The area manager held a press conference when the local review counts for all municipios were released to the local officials on July 23, 1990. Preliminary population counts at the municipio and Puerto Rico level were provided for informational purposes as part of the Local Review Program. Based on the responses received from municipios, the DO's reviewed the documentation and estimates and determined which blocks to re canvass.

The postcensus local review re canvassing, beginning August 21, 1990, added 407 housing units. A total of 15,352 housing units in 352 blocks were re canvassed. The DO manager, responded to each governmental unit that had requested a review and had provided properly documented local estimate(s). These responses told the local officials how their complaints were handled but did not specify the number of units that were added, deleted, or transferred based on field operations. The latter information was not available at this stage of the operation. The DO manager supplied the number of blocks and/or a list of blocks where re canvassing was conducted. Twenty-eight out of the 78 municipio governments responded with bona fide challenges to the postcensus Local Review Program.

Post-Enumeration Survey (PES)

The PES for Puerto Rico, designed to produce estimates of the net undercount of persons in the census by matching the independent PES records with those in the census, was operationally similar to the PES for the United States (see ch. 11). The survey sample consisted of two parts. The first was a P [population] sample, which consisted of all persons listed in PES sample blocks at the time of the PES interview. The P-sample was used for estimating the percentage of persons not matched to the census, i.e., gross undercount. The second part was the E [enumeration] sample, which consisted of all census enumerations assigned to the sample blocks by the census process. The E-sample was used for estimating the percentage of persons erroneously enumerated in the census, i.e., gross overcount. This overcount included census duplicates, fictitious enumerations, persons born after Census Day, persons enumerated in error, and persons enumerated in the wrong geography. The estimates of gross undercount and gross overcount were combined to form an estimate of the net undercount.

The PES sample of 4,000 housing units in 139 block clusters in 135 ARA's was treated in a similar manner as for stateside list/enumerate areas except that the area office in San Juan did the listing and interviewing. Listing was done during May of 1990; field interviewing was done in June-July. The field office work, quality assurance, and transmittal process were the same as stateside. The subsampling to reduce Puerto Rico's large-sized blocks to manageable workloads was done in the area office instead of in the processing center. As work returned from the field, the interview forms went through an interview QA operation (see ch. 11). A failure occurred when key items failed edit or when there were different people in the QA reinterview roster.

After the interview forms were keyed, the match forms were printed. There was no computer matching in Puerto Rico. One set of match forms was printed with only the P-sample information. Another set of match forms was printed with the E-sample information. The matching clerks matched addresses and then persons within them. The movers were processed basically the same way as stateside movers. Instead of generating copies of the census questionnaires for movers, the original census questionnaires were obtained, since they were geographically sorted. As in stateside, there was a late census-data matching operation. The search area was defined as one "ring" around the sample block(s) in urban and suburban areas and two "rings" around the sample block(s) in rural areas.

The JXPO prepared followup forms for persons requiring additional information and shipped them to the Area Office. The interviewers were assigned households which were close to their homes, if possible. If an interviewer found a case where the housing unit was vacant at the time of followup, he or she attempted to find someone knowledgeable about the household. The interviewer obtained

the name and telephone number of the respondent in case it was necessary to contact that person again. The crew leader met with each interviewer as often as necessary to review progress and collect and distribute work. As in stateside, there was a QA of the followup operation (see chapter 11).

When the followup forms were received in the JXPO, they were processed through after-followup matching and coding the same way as stateside was processed. The after follow-up coding was reviewed by matching review specialists for selected clusters. Missing data were imputed and estimates of the net undercount were produced for 21 poststratification variables. These poststrata were defined by place type (3) and age/sex (7) categories [21]. The three types of place were as follows:

1. Central city areas in MA's and PMA's
2. Noncentral city areas in MA's and PMA's
3. Non-MA/PMA areas

The seven age/sex categories were as follows:

1. Males and females, age 0-17
2. Males, age 18-29
3. Females, age 18-29
4. Males, age 30-49
5. Females, age 30-49
6. Males, age 50 and over
7. Females, age 50 and over

The estimated net undercount for each of these poststrata are given in the following table.

Table 8. Percent Net Undercount by Place Type, by Age/Sex

Age/sex	Central Cities in MA's	Non-Central Cities in MA's	Not in MA's	Total
0-17 M+F	-0.2	6.9	3.7	4.7
18-29 M	3.9	3.5	7.7	4.5
18-29 F	0.4	4.8	6.1	4.1
30-49 M	6.4	9.0	1.2	6.9
30-49 F	-0.5	4.1	1.6	2.5
50+ M	-2.6	4.8	4.9	3.0
50+ F	-4.6	4.2	0.3	0.9
Total	0.1	5.7	3.6	3.9

The net undercount for Puerto Rico was estimated to be 3.9 percent, compared to the 1.6 percent undercount estimated for the Mainland United States. The undercount in non-MA's, estimated at 3.6 percent, approximated that for the entire island. The highest undercount by place type, 5.7 percent, was for noncentral cities in MA's.¹² Percentage estimates for six of the seven age/sex poststrata in

¹²The noncentral cities place type in Puerto Rico is not comparable to the "other urban" place type in the Mainland. In Puerto Rico, noncentral cities in MA's/PMA's included more densely populated areas with difficult to enumerate housing units. In the Mainland, the "other urban" place type included many suburban areas with easier to enumerate housing units.

these areas were higher than the island total, with males 30-49 years old being the most undercounted, at 9 percent. Central cities in MA's, at 0.1 percent, were the least undercounted, attributable in part to apparent overcounts in the 50+ strata.

Tabulation and Publication (TAB/PUB)

The 1990 census TAB/PUB program for Puerto Rico was designed to provide extensive population and housing data to meet a wide variety of needs for different segments of the data-user community—Federal agencies, commonwealth and local government agencies, academic researchers, business and marketing analysts, and private organizations and individuals. Data presentation in the 1990 products followed all or part of the hierarchy of the island's census geography: Commonwealth of Puerto Rico, municipio, municipio subdivision (barrio and barrio-pueblo), place-(zona urbana and comunidad), census tract/block numbering area (BNA), block group, and block. The Bureau also presented data at separate summary levels for other areas including subbarrios, metropolitan areas (MA's), primary metropolitan areas (PMA's), the San Juan-Caguas consolidated metropolitan area (CMA), and urbanized areas (UA's). The Bureau provided redistricting counts at the block level for Puerto Rico by the end of June 1991 to the chief justice of the Puerto Rico Supreme Court and leaders of the Popular Democratic, New Progressive, and Pro Independence Parties.

The 1990 TAB/PUB design was similar in geographic coverage and content to 1980 but produced the data products on an accelerated schedule and in many cases issued the products in additional formats. The formats and sequence for the Puerto Rico data were decided in consultation with the PRPB and the interagency committee. For 1990, the Bureau produced printed reports and machine-readable data in several forms—magnetic tapes for mainframe microcomputers, microfiche, and through its online system, CENDATA™. With the increasingly widespread use of microcomputers and CD-ROM (computer discs, read-only memory) readers, the Bureau decided to limit microfiche for 1990 to the paper reports and just a few of the summary tapes described above, and devote the resources to CD-ROM instead.

For a fee, users could order paper printouts from tape, obtain selected items and excerpts online through CENDATA or facsimile transmission, or utilize their State data centers. (For further information, see ch. 10.) The published maps for Puerto Rico were published in English and Spanish; the TIGER System was used to generate boundary outline maps that showed each geographic area. The DPLD and the DUSD published and distributed free informational brochures (series 1990 CPH-I) that described the various 1990 census products. (See ch. 10.) The following brochures were specifically of Puerto Rico:

- 3PR. "Introduction to 1990 Census Products for Puerto Rico." Two four-page versions, English (E) and Spanish (S), November 1991.
- 4PR. "1990 Census of Population and Housing Tabulation and Publication Program for Puerto Rico." One 32-page brochure in English and Spanish, October 1991.

Printed Reports

Printed reports containing final 1990 census data were issued in paperback—or "soft cover" or "softbound" series described below (with appropriate maps) beginning in January 1992; there were no hardbound volumes. All reports for Puerto Rico were in Spanish and English.¹³ Printed reports were published by the following series, report numbers, and titles:

1990 Census of Population and Housing

100-Percent Data

1990 CPH-1-53:

Summary Population Housing Characteristics. Total population and housing unit counts as well as summary statistics on age, sex, household relationship, units in structure, number of rooms, plumbing facilities, tenure, value of home or monthly rent, and vacancy and characteristics for Puerto Rico, each municipio, barrio-pueblo and barrio, subbarrio, and place. The comparable 1980 census reports were Preliminary Population and Housing Unit Counts (PHC80-P-53), Advance Final Population and Housing Unit Counts (PHC80-V-53), and Summary Characteristics for Governmental Units and Standard Metropolitan Statistical Areas (PHC80-3-53, 100-percent portion only).

1990 CPH-2-53:

Population and Housing Unit Counts. Total population and housing unit counts for 1990 and previous censuses. Data were shown for Puerto Rico, each municipio, barrio-pueblo and barrio, subbarrio, place, MA, UA, and summary geographic area (for example, urban and rural, and metropolitan and nonmetropolitan residence). The comparable 1980 census report was Number of Inhabitants (PC80-1-A53).

100-Percent and Sample Data

1990 CPH-3:

Population and Housing Characteristics for Census Tracts and Block Numbering Areas. Data for most of the population and housing subjects in the 1990

census. Some tables were based on the 100-percent tabulations, others on sample tabulations. One report was published for each MA and PMA, and one for the nonmetropolitan balance of Puerto Rico. Statistics were presented in a geographic hierarchy of municipio-place of 10,000 or more inhabitants-census tract/block numbering area BNA. The 1990 reports for Puerto Rico were: Arecibo-MA (1990 CPH-3-72), Aguadilla-MA (1990 CPH-3-59), Caguas-PMA (1990 CPH-3-295A), Mayagüez-MA (1990 CPH-3-223), Ponce-MA (1990 CPH-3-264), San Juan -PMA (1990 CPH-3-295B), San Juan - Caguas-MA (1990 CPH 3-295), and Puerto Rico-Outside Metropolitan Areas (1990 CPH-3-53). All maps (packaged separately) were issued between November 1992 and January 1993. The comparable 1980 census report was PHC80-2.

Sample Data

1990 CPH-5-53:

Summary Social, Economic, and Housing Characteristics. Sample population and housing data for Puerto Rico, each municipio, barrio-pueblo and barrio, subbarrio, and place. This report was designed to meet those data needs fulfilled by the 1980 Summary Characteristics for Governmental Units and Standard Metropolitan Statistical Areas (PHC80-3-53, sample portion only). The report was released in March 1993.

1990 Census of Population

100-Percent Data

1990 CP-1-53:

General Population Characteristics. Detailed statistics on age, sex, marital status, and household relationship characteristics for the island; each municipio; MA, UA; barrio pueblo and barrio, subbarrios, and place of 1,000 or more inhabitants; and summary geographic areas. The comparable 1980 census data were found in General Population Characteristics (PC80-1-B53).

Sample Data

1990 CP-2-53:

Social and Economic Characteristics. Focused on the population subjects collected on a sample basis in 1990. Data were shown for Puerto Rico; each municipio; MA; UA; barrio-pueblo and barrio, subbarrio, and place of 2,500 or more inhabitants; and summary geographic areas. (The comparable 1980 census report was General Social and Economic Characteristics (PC80-1-C53).

1990 Census of Housing

100-Percent Data

1990 CH-1-53:

General Housing Characteristics. Detailed statistics on units in structure, plumbing facilities, value and

¹³The volumes had double covers, one cover with text and tables on both sides of the pages in one language. The user then could turn the volume over to the other cover and read the same material in the other language.

rent, number of rooms, tenure, and vacancy characteristics for Puerto Rico; each municipio; MA; UA; barrio-pueblo and barrio, subbarrio, and place of 1,000 or more inhabitants; and summary geographic areas. The comparable 1980 census data were found in General Housing Characteristics (HC80-1-A53).

Sample Data

1990 CH-2-53:

Detailed Housing Characteristics. Focused on the housing subjects collected on a sample basis in 1990 for Puerto Rico; each municipio; MA; UA; barrio-pueblo and barrio, subbarrio, and place of 1,000 or more inhabitants; and summary geographic areas. (The comparable 1980 census report was Detailed Housing Characteristics, HC80-1-B53.)

1990 Census Machine-Readable Products

Summary tape files—Four summary tape file (STF) series were prepared for Puerto Rico. The STF's were comparable in subject content and geographic coverage to STF's 1 through 4 produced from the 1980 census.

100-Percent Data

STF 1 STF 1 included 100-percent population and housing counts and characteristics similar in content but with more detail than the 1980 STF 1 for Puerto Rico. There were two files:

File A contained data for Puerto Rico and its component areas in hierarchical sequence down to the block group level. Summaries also were tabulated for each whole barrio-pueblo and barrio, whole subbarrio, whole place, whole census tract/block numbering area, and whole block group. The tape and microfiche were issued in August 1991. The DUSD reproduced extracts from STF 1A on paper on demand in the 1990 CPH-L-4 series. The compact disc, read-only memory (CD-ROM), including "redistricting data," was released in April 1992.

File B provided data for Puerto Rico and its component areas in hierarchical sequence down to the individual block level, and each MA, UA, and summary geographic areas (for example, urban and rural, and metropolitan and nonmetropolitan residence). The release date was November 1991, with extracts on CD-ROM.

STF 2 STF 2 contained 100-percent population and housing characteristics similar to the 1980 STF 2. This file showed more subject detail than STF 1. There were two files:

File A had data for each census tract/BNA in MA's and in the remainder of Puerto Rico in a geographic hierarchy of municipio—place of 10,000 or more inhabitants—census tract/BNA. It also presented a census tract/BNA summary for each split census tract/BNA. The release date was April 1992.

File B was an inventory-type file (each municipio, each place of 1,000 or more inhabitants, and so forth) rather than hierarchical in structure. Data were presented for Puerto Rico; each municipio; MA; UA; barrio-pueblo and barrio, subbarrio, and place of 1,000 or more inhabitants; and summary geographic areas. The release date was August 1992.

Sample Data

STF 3 STF 3 included sample population and housing characteristics similar in content to the 1980 STF 3, but expanded for 1990. There was one file (A) in this series for Puerto Rico, with data for the island and its subareas in hierarchical sequence down to the BG level. There were separate summaries for each MA, UA, whole barrio-pueblo and barrio, whole subbarrio, whole place, whole census tract/block numbering area, and whole block group. The issue date was January 1993. There was no file B (ZIP Codes); the Puerto Rico STF 3 also appeared on CD-ROM and microfiche.

STF 4 STF 4 contained sample population and housing characteristics similar in content to the 1980 STF 4. Showing more subject detail than STF 3, STF 4 had two files, both issued in late 1993: File A provided data for census tracts/BNA's in MA's and in the remainder of Puerto Rico in a geographic hierarchy of municipio—place of 10,000 or more inhabitants—census tract/BNA. It also presented a census tract/BNA summary for each split census tract/BNA. File B was an inventory-type file (each municipio, each place of 2,500 or more inhabitants, and so forth) rather than hierarchical in structure. It had data for Puerto Rico; each municipio; MA; UA; barrio-pueblo and barrio, subbarrio, and place of 2,500 or more inhabitants; and summary geographic areas.

Public-use microdata samples (PUMS)—The PUMS were computerized files containing most population and housing characteristics shown on a sample of individual census records. These files contained no names or addresses, and geographic identification was sufficiently broad to protect confidentiality. Microdata files allowed the user to prepare customized tabulations. Puerto Rico PUMS were released on tape only, in July 1993.

5 Percent—

Municipio Groups. This file presented most population and housing characteristics on the sample questionnaire for a 5-percent sample of housing units. It showed data for municipio groups or smaller areas with 100,000 or more inhabitants in the 1990 census. This file was similar to the 1980 PUMS-A sample.

1 Percent—

This file presented most population and housing characteristics on the sample questionnaire for a 1-percent sample of housing units. It showed data for MA's or smaller areas with 100,000 or more inhabitants in the 1990 census. This file was similar to the 1980 PUMS-B sample.

1990 Census of Population and Housing Equal Employment Opportunity (EEO) File (Puerto Rico)—The 1990 EEO file was based on civilian labor force data from the 1990 decennial census. The file contained two sample-based sets of tabulations. The first set was a cross-tabulation of 512 detailed census occupation by sex. The second set was a cross-tabulation of the same occupations by sex with educational attainment for selected age groupings. The data were issued on tape, CD-ROM, and paper copies in March 1993.

Redistricting Data File—This file presented the counts available from the special computer tape file designed and formatted for use in legislative redistricting. The counts, for areas as small as blocks, block groups, and voting districts, had totals for population; population 18 years and over; and total, vacant, and occupied housing units. This was a new product for 1990. The release date of the tape was July 1991 and CD-ROM, March 1992. (Although the Bureau was not required by law to provide the apportionment counts for Puerto Rico by December 1990 or redistricting (P.L. 94-171) counts by April 1991 (the PL "type" of data file for Puerto Rico did not follow the regular naming conventions), it did so by agreement.

County-to-County Migration File—This file provided summary statistics for Puerto Rico migration streams by municipio. Each record included codes for the geographic area of origin, codes for the geographic area of destination, and selected characteristics of the persons who made up the migration stream.

Special Tabulations—As in the past, there were numerous requests for data that were not available from the standard products (limited uses/users). They required tabulations from the internal detail files and were produced on a cost-reimbursable basis. These tabulations were requested by a wide variety of users, including Federal agencies who had unique data needs for the allocation of funds for a variety of programs. For example, the Department of

Housing and Urban Development (HUD) requested a special tabulation on Puerto Rican poverty, and the Legal Services Corporation, Puerto Rico, requested data useful in serving its constituents.

Topologically Integrated Geographic Encoding and Referencing (TIGER) File—Extracts from the TIGER data base, the automated geographic data base used by the Bureau for producing 1990 census maps, were available to the public in several formats. One series of extracts of selected geographic and cartographic information was called the TIGER/Line™ files. These contained, for each feature (e.g., the various individual segments that make up roads and rivers), information such as geographic areas codes, latitude longitude coordinates of features and boundaries, and the name and type of each feature. These TIGER/Line files were issued on computer tape July 1991 and on CD-ROM September 1992.

Maps

Maps developed for the 1990 census were produced by the TIGER System, as were all other 1990 census geographic products, in 1991-93, in two ways: electrostatically plotted (computer generated) and printed. The maps designed for use with the data the Bureau tabulated appeared in or accompany printed data reports, data microfiche, summary tape files, and CD-ROM's. Electrostatically plotted maps were sold separately from the printed reports, microfiche, computer tapes, and CD-ROM's. They included the following:

Municipio Block Maps (1990)—These large-scale, municipio-based maps showed the greatest detail and the most complete set of geographic information. They displayed block numbers, along with tabulation-area boundaries and ground features (such as roads and streams).

Municipio Subdivision Outline Maps (1990)—Showed the names and boundaries of all municipios, municipio subdivisions, and places for which the Bureau tabulated data in the 1990 census. The maps, published in smaller scale, sectionalized form in some reports, also were available as electrostatic plots.

Census Tract/Block Numbering Area Outline Maps (1990)—These municipio-based maps showed census tract/BNA boundaries and numbers, the features underlying these boundaries, and the names of those features. They also showed the boundaries and names of municipios, municipio subdivisions, and places. These maps were available as electrostatic plots, but were replaced in late 1992 by a printed version that was sold by GPO.

Voting District Outline Maps (1990)—These municipio-based maps showed voting district codes and names, voting district boundaries, the features underlying these boundaries, and the names of those features. They also showed the boundaries and names of municipios, municipio subdivisions, and places. These maps were available

only as electrostatic plots for those municipios for which Puerto Rico delineated voting districts in the Bureau's Voting District Program.

Puerto Rico Urbanized Area Boundary Maps (1990)—An electrostatic plotter map was available for each 1990 census UA showing the UA boundary and the names of those features making up the UA boundary. These maps also displayed the boundaries and names of Puerto Rico, its municipios, municipio subdivisions, and places.

The following maps appeared, as appropriate, in the printed reports:

Puerto Rico Metropolitan Area Outline Maps and Location Index—This page-size, Puerto Rico-based map series displayed the boundaries and names of municipios, MA's, CMA's, and PMA's. It showed the location and name of the capital (San Juan) and the locations and names of each MA central city and other large places in Puerto Rico.

GE-90 Map Series—Municipio Subdivision Outline Map—In addition to the thematic maps included in the printed reports, a wall-size (46" x 30") map of the municipio subdivision displayed various characteristics from the 1990 Puerto Rico census.

1990 Puerto Rico Promotional Program (PRPP)

The effectiveness of a population count or survey depends on the cooperation of the persons providing the requested information. The objective of the 1990 census promotional program was to obtain this cooperation. The Bureau held two outreach meetings in Puerto Rico with local officials and the private sector in 1987. Participants evaluated the 1980 census processes and products and suggested changes to improve public participation in 1990 by increasing awareness of the importance of the census. The Bureau also conducted a number of planning meetings with local officials to examine specific census-related issues. Following their recommendations and those of private-sector representatives, the Bureau embarked on a comprehensive promotion program.

A promotional program tailored to Puerto Rico was developed because of the special census operations and cultural, linguistic (predominantly Spanish instead of English), geographic, and social differences between the Commonwealth and the Mainland. The island population, now about 3.4 million, had been counted in each decennial census since 1910 but had never had a census promotional effort targeted to its particular needs. For an area 100 miles long by 35 miles wide with an extensive road network, the geography of Puerto Rico did not present any significant communication problems. The media were modern and comparable to those elsewhere in the United States. Stateside (i.e., English) promotional functions and tasks had to be replicated, as did support activities, such as the

Community Awareness and Products Program (CAPP). Three locally hired CAPP specialists began in September 1988 to work with civic and social organizations; community, religious, and educational leaders; and the media. The CAPP specialists were based in the San Juan area office and traveled throughout the island.

Program concept and strategy—The basic concept applied was that, given the limitations of time and support resources, the entire 1990 census promotion in Puerto Rico be essentially a community effort. The Bureau would provide technical promotional guidance and support, but the bulk of the work was to be done by the island community. The primary assumption was that every community sector would help disseminate the census message to its members and motivate them to cooperate. The aggregate of constituencies reached would determine the total of the population receiving the message. Under this concept, it was necessary to involve all types of organizations, not only those with funds to support promotional projects or that traditionally provided public service.

From a model involving all sectors, a strategy emerged to utilize the internal communication means of as large a number of organizations as possible to deliver the census message. Rather than rely on a few large projects dependent on scarce promotional resources, the emphasis was on recruiting organizations, motivating them to develop and manage their own promotional program/projects, and providing technical and consultant support in lieu of resources. Well-known and respected organizations would be asked to utilize census promotional logos, slogans, theme, graphics, and wording in their own advertising campaigns. This would ensure that the message was correct, consistent, and continuously reinforced.

Advertising campaign—The advertising or publicity campaign was the cornerstone of the PRPP in that it set the tone, provided a unifying theme, and had the widest reach of all program components. This was one of several campaigns developed under the auspices of the Ad Council on behalf of the 1990 census (see ch. 5). In March 1989, the Ad Council selected West Indies & Grey, a Puerto Rican advertising agency, to specifically design a campaign for the island as a public service. This was a "double first"—the first census advertising campaign in Puerto Rico and the first Puerto Rican agency to carry out an Ad Council-sponsored public-service campaign.

Development of the campaign was completed by early 1990, and it received an early "kickoff" on January 19, 1990. The campaign design was presented to and approved by the Ad Council Campaign Review Board, the Department of Commerce, and the Census Bureau. Presentations were also made to the Bureau's New York regional representatives, a member of its Hispanic advisory committee from Puerto Rico, and representatives from the Commonwealth Governor's staff and agencies.

The basic concept was to keep the message simple, but factual, and to emotionally involve the target audience. The basic message was that the census was of vital importance in ensuring a better future for the community and individuals. The concept was directly aimed at what was seen as a pervasive lack of awareness about the census among the general public. The theme, symbols, and text had to work together to gain not only awareness and understanding, but also identification with the census and its purpose. Accordingly, the campaign stressed that it was a census for the benefit of the island and its future. The public-service announcements (PSA's), for example, used babies as symbols of this future with which all could identify.

Results—PSA's ran in print media and on radio and television from January 19, 1990, through May 1990. Announcements were aired or printed daily, seen or heard during prime time, and occasionally multiple ads would be printed in one edition. The West Indies & Grey media allocation reports to the Ad Council detailed the media presence for the 1990 census. For television and newspapers, the Public Records Service was used as the main source regarding the number of TV spots and column inches for dailies. The media presence was measured in terms of number of insertions and rate-card dollars.

For the key months of February and March (see table 8), some of the specifics were:

- Seven television stations aired 1,293 spots for a total rate-card value of \$349,500.
- The four dailies with island-wide circulation printed during these same months 2,494 column inches of 1990 census advertisements for a value of \$89,526.
- Six magazines printed 20 insertions of full-page color ads in their issues during that period for a total value of \$32,955.
- Only the 9 largest of 95 radio stations were asked for reports; they aired 3,976 spots for a value of \$145,017.
- Outdoor advertising included 33 bus shelter sides and 415 transit advertisements (buses) for 2 months, for a total value of \$44,450.

Table 9. **Media Investment in the 1990 Puerto Rico Promotion Program, January-March 1990**

Medium	January	February	March	Total
Total	\$236,891	\$325,813	\$335,725	\$898,429
Print	39,992	40,539	48,987	129,518
Magazine	19,540	13,940	19,015	52,495
Radio	71,590	71,590	73,427	190,203
Outdoors	15,210	22,270	22,270	59,750
Television	116,963	177,474	172,026	466,463

Not included in the above are the spots aired by 1 of the 11 largest radio stations, which did not keep track of its PSA's, and the contribution of many regional and specialty newspapers, like *Caribbean Business News*. This weekly newspaper donated an estimated \$100,000 in 1990 census advertisements.

Also, the TV and radio spots were aired in many programs sponsored by joint-venture participants as part of their commitment to the PRPP. This advertising was not included in the above results but was considered significant.

Promotional products—Because the predominant language was Spanish instead of English, and social characteristics varied, there had to be a complete set of informational and promotional products. Most of the latter were developed by West Indies & Grey to complement the advertising campaign in the vernacular Spanish of Puerto Rico. Other products, mostly informational in nature, provided basic information that could be reproduced and adapted for a newsletter articles, informational fliers, letters, press releases, etc. The private sector, government agencies, and the census organizations all distributed these products. For example, several wholesalers sent posters and other materials to small neighborhood retailers, along with their deliveries of merchandise, for display and handing out to shoppers. To complement the wholesalers, the American Legion distributed posters to small businesses in the town centers and the CAPP staff supplied them to the local governments.

A products automated distribution system (off-the-shelf Apple software, specifically the mid-level data base program called Filemaker II) was used to allocate and track the diverse products in varying quantities that had to be sent to 86 distributing organizations. Another 37 allocations were managed by another system based on this system and developed by the Puerto Rico Planning Board for its own equipment. The Puerto Rico General Services Administration, provided a driver and a vehicle from time to time during the distribution period (January - February, 1990) and the New York regional office detailed two clerks for 3 weeks to assist. Most of the joint-venture participants collected the products they were to distribute.

Joint ventures—The approach in joint ventures was two-fold: First, reach associations that could involve large numbers of organizations and/or individuals in promoting the 1990 census, e.g., chambers of commerce or similar associations that could act as "multipliers" of the marketing effort. Second, market the joint-venture concept among the largest commercial and civic organizations in Puerto Rico.

The basic approach was personal contact with prospective participants, with the appeal tailored to the type of organization. Staff made a formal proposal with rationale for commitment and a time schedule. All prospective participants contacted agreed to support the 1990 census by developing and implementing promotional projects designed to reach their members, employees, clients, suppliers, and/or the general public in accordance with the schedule and to use the standard census logo and information. A total of 68 private sector organizations participated, for an estimated coverage of 57.3 percent of the population—every individual would receive the census message from five to six times from joint venture activities. Most of the participating businesses were among the 100 largest in Puerto

Rico. A post-promotional effectiveness survey indicated that, for the most part, the participants carried out their commitments, actively promoted the census, and would assist again.

Government participation—The census office in the Planning Board coordinated and managed the total government participation by means of an interagency census promotional committee. A total of 37 government agencies and State data center affiliates participated in the government promotional program and implemented approximately 137 separate initiatives.

On January 19, 1990, the Governor of Puerto Rico proclaimed 1990 as "Year of the Census" in an organized and publicized ceremony. The primary purpose was to signal the start of the promotion effort and energize all government agencies in their participation. The Governor stated that the government would take the lead in promoting the census. Department heads and each agency's member of the Interagency 1990 Census Promotional Committee were invited to attend; the committee met on the next working day to begin its planning.

Individual projects—Additional components, tasks, or projects were designed to meet new or unanticipated requirements.

Religious project—The purpose of this project was for religious leaders to make an appeal to their congregations on Census Day and the following Sundays. The DPLD obtained a commitment from the Roman Catholic Church to support this initiative. Talking points for religious leaders were developed and the project was expanded to hundreds of other churches in urban and rural neighborhoods. CAPP personnel sent letters requesting assistance and provided talking points to the Catholic and other churches via the five largest of their associations. This project significantly increased the reach of the promotion and the credibility of the message.

1990 Census Commemorative Serigraph Project—This project recognized and thanked external organizations and individuals who significantly contributed to the promotion effort. The project was considered a unique opportunity to build on the success of the census in Puerto Rico and enhance the Bureau's image in the following years. West Indies & Grey, under the Ad Council's auspices, sponsored a serigraph (silk-screen poster) contest among students at the University of Puerto Rico School of Plastic Arts. An independent panel selected the winners. The first-place winner then reproduced and signed a limited edition of 400 copies.

In a single ceremony in an outdoor pavilion, national and regional Census Bureau officials spoke, rewarded contest winners, and presented the signed poster copies to representatives of each sector of the island community. Approximately 200 persons, including census personnel, attended. One of the major joint-venture participants, the Bacardi

Corporation, provided the facilities and refreshments at no cost to the Bureau. The PRPP manager acted as liaison and assisted in preparing guest lists and mailing.

Printers project—This was a test project to involve printers in the promotion of the 1990 census through a low-cost mailing effort by having them include the census message and/or logo in printed products, e.g., calendars. In response to 40 letters sent, 7 printers returned a completed form indicating they would participate. There was no followup on this project, but the response indicated that an earlier mass-mailing appeal with personalized followup could result in a large promotional payoff.

Mass mailing project—Like the printers project, the mass mailing project was an effort to involve in joint ventures those organizations that could not be approached directly due to lack of personnel time. They were requested to implement their choice of promotional initiatives and informed that there would be no followup unless they needed assistance. They were also provided with informational and art material they could use. The project consisted of mailing a letter to organizations similar to those recruited personally, formally requesting their support of the promotion effort by disseminating 1990 census information/ messages by their internal means of communication and other promotion projects. A copy of the joint venture information packet and a list of potential projects were included. Addressees were asked to advise if they would participate. A number of firms responded, and one corporation requested assistance (promotional products for display), and as a result of followup expanded its commitment and was included in the joint venture program. The effectiveness of this project was not evaluated.

Census education project—An important activity originated by the DPLD, the 1990 Census Education Project ("Proyecto Escolar para el Censo de Puerto Rico: 1990"), sought to reach primary and secondary students in Puerto Rico's public, private, and parochial schools (about 2,100) through materials that would inform these students about the census. One kit was sent per school, with copies to school district superintendents and other school system officials. It was anticipated that this would increase awareness of the census' importance and stimulate household response. This 1990 packet of educational materials, tailored for Puerto Rico from the stateside version, was reusable in the classroom. It contained nine lesson plans, all in Spanish, for grades K-12 in the areas of social studies, mathematics, sciences, and language. The Bureau hoped to develop in the students, a knowledge and comprehension of the importance of the census, the civic responsibility of responding to the census, the confidentiality of the census responses, and an appreciation of the importance of census statistics in their daily lives.

Planning began in 1987, among the Bureau, the Commonwealth Secretary of Education, and the Puerto Rico Planning Board. The Secretary named a liaison on his staff to aid the Bureau in distributing the education project

materials and implementing the project during the 1989-1990 school year. To evaluate the effectiveness of the CEP, an evaluation was planned, but never implemented due to cost restrictions and the need to allocate census staff to other projects.

Complete count program—This program, similar to the one stateside (see ch. 5), encouraged the involvement of local officials and influential members of the community in promoting census awareness and education to help produce a complete census count. The Bureau invited each municipio to organize a complete count committee (involving local officials, government agencies, members of the community) to coordinate an educational campaign to promote the census.

Private sector project—The Bureau involved corporations and philanthropic organizations in underwriting selected promotional/educational projects for the 1990 census. Some corporations helped finance projects and promotional materials such as buttons, stickers, pencils, and similar items that served to complement and improve census outreach activities. These organizations included promotional messages on their products such as census logos on the employees' checks or on bills to their clients. Of 105 questionnaires sent after the campaign to private-sector and governmental organizations that participated, 39 were returned for a 37-percent response rate. The responses revealed that for the most part, participants met their commitments, were appreciative of the scope and quality of census promotion, and participated over several months.

Census Evaluation and Coverage Improvement

1990 Puerto Rico Content Reinterview Survey—The 1990 Puerto Rico Content Reinterview Survey (PRCRS) contacted 1,600 households and asked in-depth questions about population and housing characteristics to test the quality of data initially collected and to measure response error. The questions included those specific to the Puerto Rico forms—time spent in the States, vocational training, condominium status, and condition of housing unit. This was the first such survey in Puerto Rico. It compared responses from household members who were living in the sample unit on Census Day to responses for the same members during the survey. To reduce extraneous interviewing, population data were collected only in sample households which were determined at survey time to contain at least some of the Census Day occupants. Housing data were collected from every sample unit. The field method for the survey was personal visit or telephone contact, if possible, and used a Spanish version of the special reinterview questionnaire.

The DOD identified the PRCRS sample and generated an output file containing the CCF data for the housing units to be sampled. The STSD provided specifications for the sampling. The DOD coded and keyed the resulting questionnaire survey data and generated an output for the final coded and keyed data. The DOD also produced an extract

of the Puerto Rico Data capture file and the edited detail file for the Puerto Rico sample households. The FLD did the enumeration. This included the formation of interviewer assignments, development of the interviewer's manual and self study, interview training, production of office manuals, data collection, administration of the QA procedures, progress reports, and the shipment of field materials. The DPLD assisted the STSD in the planning and development of the survey. The DPLD translated the 1990 PRCRS questionnaire, advance letter, and the interviewer's manual and self study into Spanish.

The Forms Design and Mail Management Branch of the APSD managed the printing of the PRCRS questionnaire, form D-1010 PR(E) English version and D-1010 PR (S), Spanish version, and the survey advance letter. The questionnaire was approximately equal in length to a standard long-form census questionnaire. It contained 89 respondent questions, 9 interviewer check items, and 4 items to be completed by observation on the condition of the unit.

Operations—Four members of the Bureau's STSD staff went to Puerto Rico during the weeks of July 9 through July 20, 1990, to obtain address information for the PRCRS sample housing units. The mailing addresses collected from the nine DO's ARA listing books were used to mail out the survey advance letter and assisted field representatives in locating the sample unit addresses.

Bureau staff brought two laptop computers with dBASE III software for use in combining the address information for the sample units with a DOD-generated file containing the census geography but not the mailing addresses. The STSD sent three boxes of supplies to the Puerto Rico area office—the printed copies of the Spanish advance letter for the Puerto Rico CRS, pin-feed self-adhesive labels for the advance letter envelopes, 200 copies of the advance letter in English for the survey enumerators, and 2,000 envelopes with the AO return address for mailing the letters. In July, STSD staff used a PC (personal computer), while in the AO, to print the advance letter mailing labels and the questionnaire identification labels and to modify some of the Bureau's programs, and clerks stuffed the advance letter envelopes with the survey advance letter, applied the mailing labels, and attached identification labels to the Spanish PR CRS questionnaires.

FLD interviewers visited each household in August 1990 for the initial contact to collect personal data, but telephone callbacks were encouraged to keep costs low. Up to three personal visits and seven telephone attempts were allowed to complete the questionnaire. Proxy data were acceptable after three contacts failed to obtain complete information. The first adult household member contacted supplied the roster of persons still living in the unit who were living there on Census Day. Demographic data only were collected for the persons listed on the roster. If the whole household had moved since Census Day, no personal data were obtained, but the interviewer was instructed to collect the housing information. Interviewer training involved both self-study and classroom time. The QA recheck was performed by

telephone by the PRCRS field supervisor. If any of the discrepancies for a particular enumerator were unusually high according to the field supervisor's judgment, the interviewer was required to do further followup.

Puerto Rico Multiunit Structures Coverage Improvement Operation—This operation was to determine the effectiveness of using an independent list to improve coverage of multiunit structures during the operation. The addresses for multiunit structures listed in the address listing books by census enumerators were compared to the addresses for multiunit structures from a mailing list of residential customers supplied by the Autoridad de Energía Eléctrica de Puerto Rico (Puerto Rico Electric Company). This operation (July 1990) was conducted in the four DO's comprising and surrounding the San Juan municipio, since the majority of large multiunit structures in Puerto Rico were located within this area. 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, Bayamón, or Carolina DO's.

Methodology—The operation was completed in three steps. The first step was for clerks to use the basic street address or condominium name on the electric company's match list (form D-1020 PR) to geocode the multiunit structures to census geography. They used census maps, municipio locator maps, commercial index maps, and other geographic materials in the DO's to identify the ARA containing the basic street address.

The next step was to complete a two-part matching operation. In the first part, clerks compared the L/E address listings with the company mailing lists of residential customers. If the number of units for the structure listed in the address register was greater than or equal to the number of units for the structure listed in the mailing list, they did nothing. If the address listing book number was less than the number of units on the electric company list, clerks then completed the second step of the matching operation. This was a unit-by-unit match between the two listings to identify any electric company nonmatch(es) (e.g., units listed on the electric company listing, but not listed within the L/E address registers) for the respective structure.

Evaluation and Results—The goal of the Puerto Rico multiunit coverage improvement operation was to improve the coverage of address listings completed by the enumerators for the 262 multiunit structures found in the four DO's. This was done by matching these 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 (office geocoding and matching and field review operation),

there was a final coverage improvement of 143 units or 0.39 percent of the total number of listings. From this operation, the Bureau determined that the address listing books were more comprehensive than the electric company listings in providing a complete list of possible addresses found within the 262 multiunit structures.

VIRGIN ISLANDS AND THE PACIFIC ISLAND TERRITORIES

Introduction

Title 13 of the U.S. Code provided the legal authority to include the Virgin Islands of the United States and the Pacific Outlying Areas—(American Samoa, CNMI, Guam, and by special arrangement, the Republic of Palau) in the U.S. decennial census. It also gave the Secretary of Commerce the option of obtaining census information collected by the governor or highest ranking Federal official, if such information was obtained in accordance with the plans prescribed or approved by the Secretary.

Given the differences in the political, social, and economic characteristics of these areas, as well as their geographic distance from the Mainland, the Census Bureau conducted the 1990 Decennial Census of Population and Housing through agreements with each area government as it had done in the past. In general, the Bureau agreed to consult with the areas during the planning to supply all forms, questionnaires, procedures manuals and training guides, maps, other materials, and the necessary funds for the area governments to do the enumerating themselves. The Virgin Islands and Pacific Island Territories governments agreed to participate and cooperate with the Bureau in the planning process and assumed responsibility for the actual enumeration. For the 1990 census (as for 1980), the Bureau assigned each area a technical advisor to ensure census procedures and methods were followed during the collection and to assist local officials managing the census.

Since there was minimal residential postal delivery in most of the areas, the data were collected using only the list/enumerate method of enumeration, with no advance delivery by mail. Other differences such as lack of street name/house number address conventions, and so forth, meant implementing many census functions in a different way than they were stateside. This involved modifying stateside forms and procedures or developing new ones.

The DPLD had overall responsibility for planning and coordinating the 1990 censuses in these areas. From July 1984 to August 1987, the Special Programs Branch did this work. In August 1987, the PROAB, under the Assistant Division Chief for Content and Products, was established. Under the branch chief, the Outlying Areas Section (a section chief and two survey statisticians) was the focal point for the various tasks: coordination with other Bureau divisions, DPLD branches, and the Virgin Islands and Pacific Island Territories governments; setting up inter-agency committees; and maintaining direct communication

with area officials at all stages of the census. In consultation with the appropriate subject matter divisions, the section developed questionnaire content, budgets, geographic criteria and field procedures, training guides and forms, education projects, outreach and promotion materials, the processing system, and the tabulation/publication program. Given limited staff, some revisions had to be made to the original time schedules. The FLD's regional offices in Seattle (Pacific Island Territories) and New York (Virgin Islands) dealt with mapping and other geographic matters, with assistance from the GEO as needed.

The 1990 censuses were conducted through memorandums of agreement written by the DPLD with reviews by staffs from the Virgin Islands and the Pacific Island Territories and by the legal staff at the Bureau. As in 1980, these agreements established the general management structure for the DO's, as well as the specific responsibilities of the Bureau and the Virgin Island and Pacific Island Territories governments. The Governor or President of each area and a designated representative (the census coordinator or census manager) were given the responsibility of conducting the field enumeration and related activities. The census coordinator managed and supervised all aspects of the enumeration, including interviewing and testing candidates for jobs, selecting and training qualified persons, and arranging for space, equipment, and supplies. (The government provided training facilities and funding for office space.)

One district office was established in each of the Pacific Island Territories and two in the Virgin Islands—one on St. Thomas, and one on St. Croix. (See table 10 below for DO location and staffing by personnel type).

Table 10. District Office Staffing by Personnel Type

District office	Personnel type							
	All types	Enumerator	Crew leader	Office clerk	OOS	FOS	CA	CM
Total	686	507	94	57	6	11	5	6
Pago Pago, Am. Samoa	124	92	18	9	1	2	1	1
Malakal, Palau	61	40	7	10	1	1	1	1
Saipan, CNMI	62	45	7	5	1	2	1	1
Agana, Guam	154	103	24	21	1	3	1	1
Charlotte Amalie, St. Thomas, VI	137	111	18	5	1	1	1	1
Christiansted, St. Croix, VI	147	116	20	7	1	21	—	—

The Virgin Islands and Pacific Island Territories DO organizational structure was similar to that in the stateside DO's, but with fewer employees. The organizational structure of the DO in each area included an assistant census coordinator (optional), an office operations supervisor, field operations supervisors, crew leaders, enumerators, and clerks (see fig. 1). DO activities were divided into three major areas: (1) administrative, (2) field operations, and (3) office operations. The administrative area consisted of the census coordinator, the assistant census coordinator, a

support staff to handle administrative correspondence, mail, payroll, and recruiting. The census coordinator had many of the same duties as a stateside district office manager, but reported directly to the Governor (or President, in the case of Palau), not to the Bureau. The Bureau's census advisor acted as its technical representative, working with the coordinator on the various aspects of the census. The advisor trained and administered the oath of confidentiality to the coordinator and his or her assistants, and assisted them in doing this for all other census employees.

To allow for more effective management, the Virgin Islands government funded the position of assistant census coordinator to oversee the daily census operations in the St. Croix office. One census advisor, appointed for the Virgin Islands, worked out of the St. Thomas office but travelled to St. Croix on an as-needed basis. As the Virgin Islands census progressed at a slower-than-expected rate on both St. Thomas and St. Croix, it became increasingly important for the census advisor to be present on both islands to accelerate activities. In late August, the DPLD asked the FLD to detail an employee from the Philadelphia regional office to act as a full-time technical advisor for St. Croix and help bring data-collection activities to a close. This employee assisted operations on St. Croix until late October.

The field operations area consisted of one or more field operations supervisors who prepared crew leader and enumerator field assignments, trained advance listers¹⁴ and crew leaders, supervised enumerator training, and reviewed the field staff's work. The field operations supervisor's administrative duties pertaining to his or her staff were payroll reporting progress and keeping the operations on schedule. Prior to the census, the field operations supervisors' clerical staffs prepared materials for use in the field, which they stored with the maps in a central bin file located in the field operations area. During the actual enumeration, each of these supervisors were responsible for a team of crew leaders who in turn supervised and trained a group of enumerators, appointed them as census employees, and reviewed and collected their completed work and daily pay and work records. The crew leader also enumerated the special places in his or her crew leader district.

The office operations area had one office operations supervisor and a clerical staff that performed several pre-enumeration office operations, but the majority of the work occurred after enumeration once the questionnaires began to flow into the DO. This meant checking-in questionnaires, clerical editing, field followup assignment preparation, and tallying population and housing counts. The work of the office operations supervisor and his or her staff also included setting up the DO by constructing bin files, arranging furniture into sections by type of work, and

¹⁴The advance lister listed and map spotted the locations of the first six living quarters in two preselected blocks for each ARA assigned to him. During the list/enumerate operation, crew leaders used these completed listings as a check against listings made by enumerators.

controlling materials that arrived in the DO, such as kits and supplies. The office operations supervisor trained and supervised the office operation staff.

Overall, the opening and closing of the DO's occurred from February through December, 1990. The schedule for each outlying area is given below.

<u>Outlying area</u>	<u>Opening date</u>	<u>Closing date</u>
AmSomoa	Feb. 1, 1990	Aug. 30, 1990
CNMI	Feb. 12, 1990	Oct. 15, 1990
Guam	Feb. 22, 1990	Sep. 27, 1990
Palau	April 1990	Aug. 31, 1990
VI	Mar. 1, 1990	Dec. 21, 1990

External Communication

In 1986, the Bureau began communicating with the Virgin Islands and Pacific Island Territories governors regarding 1990 census plans and sent each area's congressional delegate informational copies of all letters to keep them abreast of census activities. Also, since publication of 1980 census data for these areas had lagged until 1983-85, a major objective of 1990 census planning was to speed up report production for all the areas to strengthen relationships with local officials data users. As stipulated in the memorandum of agreement with each area, the Bureau consulted with each government concerning questionnaire content, and in 1986, requested each governor to appoint an interagency committee to work with the Bureau on this. There were planning meetings in the Virgin Islands in 1987 and 1988 in American Samoa, the CNMI, and Guam. Staff from various Bureau divisions participated and obtained input from the attendees regarding questionnaire content and overall census plans. Staff from the GEO (in coordination with the FLD) also visited the areas to ensure that the information shown on the 1990 census maps was portrayed accurately. In preparation for the tabulation and publication of the data, the Bureau sent draft table outlines and product specifications to the areas for review.

During the census, the PROAB communicated directly with the Virgin Islands and Pacific Island Territories census advisors and coordinators by fax, notes, and letters on the status of operations. The extreme time differences between headquarters and the CNMI and Guam made telephone communication very difficult during normal office hours. For this reason, the advisors called the PROAB branch chief at home during late hours. In addition to time zone problems, it was generally difficult to get a good telephone connection with the areas at all, especially with Palau. The DPLD purchased fax machines for the PROAB, Virgin Islands, and Pacific Island Territories offices to facilitate communications between headquarters and the areas, and also to solve the time zone problems that made communication by telephone difficult. The advisors faxed their weekly progress, reports questions and concerns that needed timely answers.

The State Department decided which areas would be included in the census. Prior to the 1990 census, the Bureau corresponded with the State Department to keep

abreast of the changing status of the areas that comprised the TTPI— Northern Mariana Islands, Federated States of Micronesia, Marshall Islands, and Palau. The Bureau was concerned particularly about the status of Palau and the possibility of including it in the 1990 census, but this was resolved in time to take the census as of April 1. The Bureau had sent out periodic reports regarding planning, processing, and tabulation/ publication activities. During field operations, the DPLD sent periodic "Outlying Areas Newsletters" to each of the advisors to update them on the overall census progress and activities in the Virgin Islands and the Pacific Island Territories, and allow them to share ideas and "success" stories among the areas.

Questionnaire Content

Planning for the 1990 censuses of the Virgin Islands and Pacific Island Territories began in 1985, (3 years earlier than it had for 1980). The development of questionnaire content was the responsibility of the Population and Housing Divisions. The Outlying Areas Section of the PROAB of the DPLD served as the coordinating unit between them and the local governments and interagency committees. (In American Samoa and the CNMI, the governments took the agriculture census in conjunction with the population and housing census. The Agriculture Division produced the agriculture questionnaire and other related forms.)

As in 1980, a long-form questionnaire was used for all households. Special questionnaires (ICR's and MCR's—Guam only) were used to enumerate persons in group quarters and on military installations. These forms contained about the same population questions as the household questionnaire, but contained no housing items. The 1990 Virgin Islands and Pacific Island Territories questionnaires were based on the 1980 U.S. census questionnaire, the 1980 censuses of the Virgin Islands and Pacific Island Territories, the 1988 stateside dress rehearsal questionnaire, and current thinking for 1990. Since the Virgin Islands and Pacific Island Territories wanted questionnaires similar to stateside, however, the 1988 dress rehearsal questionnaire was used as the principal basis for determining content. The Virgin Islands and Pacific Island Territories questionnaires also had to comply with the criteria (practical utility and reduction of respondent burden) established by the Paperwork Reduction Act of 1980.

Beginning in 1986, Bureau representatives visited the areas to discuss and obtain recommendations from the local governments and interagency committees on content. The Bureau emphasized the need for documenting the data requirements for Federal or local program participation. The interagency committees included members who could represent the statistical data needs of different segments of the community, such as planning and welfare agencies, law enforcement, health, and education departments, housing authorities, real estate boards, and insurance companies. In developing their recommendations, the committees were asked to weigh the various data needs, taking into account the mandates and program requirements of both Federal and territorial agencies.

An example of a recommendation made by the Virgin Islands Interagency Committee that was rejected by the Bureau involved the inclusion of "cooperative units" in the categories of questions H4 (tenure) and H6 (value of owned unit or rent paid). (The Bureau decided not to have a question on cooperatives on either the Virgin Islands or the stateside questionnaire.)¹⁵ On the other hand, the CNMI's recommendation to add questions on electric power and to modify and/or expand the questions on source of water, source of energy for water heating, vocational training, availability of radios, citizenship, and education were accepted.

As a result of all the modifications, additions, and clarifications, the 1990 population and housing questionnaires used in American Samoa, the CNMI, Guam, and Palau had about 29 basic questions relating to housing characteristics and about 33 basic questions relating to population characteristics. The Virgin Islands population and housing questionnaire had about 26 housing questions and 33 population questions. Some households in American Samoa and the CNMI also had an agriculture questionnaire.

Virgin Islands—The interagency committee was concerned about the late issuance of the data products from the 1980 census. Originally, some members also questioned whether the unique (different from stateside) 1980 questionnaire could have resulted in the exclusion of the Virgin Islands from a number of Federal programs. However, Bureau personnel responded that Federal agencies had requested the inclusion of Virgin Islands data from special tabulations for use in their program-allocation formulas program.

In previous meetings held in the Virgin Islands in the summer of 1986, the interagency committee had initially recommended the use of the stateside questionnaire to ensure integration with the stateside statistical system and the timely release of their data. Based on this recommendation, the Bureau proposed a 1990 Virgin Islands questionnaire that could be processed with the already-established stateside software. Bureau staff traveled to the Virgin Islands again in March of 1988 and met with the committee to discuss the questionnaire. The members revised their previous position and proposed a number of changes that made the questionnaire again unique for the Virgin Islands.

¹⁵The Bureau had tested this question in a variety of formats before the 1980 census and again more recently. The results were consistently shown to be a substantial overstatement of the number of housing units classified as "cooperative." For example, in the 1976 test in Camden, NJ, a city of about 30,000 housing units, the number of cooperative units reported was slightly more than 2,000. Discussions with Camden officials showed that there were no cooperative units in the city. Other tests showed similar although not quite so dramatic results. Overstatements of 150 percent or more were usual. The Bureau concluded that the difficulty was in the term "cooperative" itself. The number of cooperative units was very small. Respondents that lived in cooperatives knew it and reported correctly but most people had never heard the term in the housing context. The term had many more connotations resulting in a large number of false positives.

On review, the Bureau agreed to modify the questionnaire to include most of the recommendations, and transmitted the "final" questionnaire proposal to the Virgin Islands in July 1988. In response to this second proposal, the Virgin Islands committee sent additional changes. The committee's changes were extensive enough that the questionnaire could not be processed using the stateside FOSDIC system without making major changes to the software system, so the Bureau decided to design the Virgin Islands questionnaires as keyable documents. After further review and the incorporation of most recommendations, the Bureau finalized the questionnaire content, and in December 1988, requested concurrence before submitting the form for OMB approval. The Bureau received concurrence in January 1989, and OMB approved the questionnaire in May 1989.

Pacific Island Territories—For ease in processing, comparability/availability of data among all areas, and budget, a decision was made early in the questionnaire development program to have a single questionnaire for all of the Pacific Island Territories and process it so as to expedite release of the data products. Later in 1988, after many discussions and meetings with Pacific Island Territories representatives, a compromise was made to design a questionnaire that was basically the same for all areas, but that incorporated some items that reflected unique circumstances. For example, Guam recommended the modification of the questions on citizenship, military service, the availability of radio, and a number of other questions. In American Samoa, the housing-unit definition was modified to reflect the living arrangements among extended families. The CNMI, recommended adding a question on the type, as well as the location (inside or outside), of cooking facilities used at each housing unit.

The content recommendations were reviewed by the POP and the HHES to determine which items merited consideration. Most of the recommendations were accepted. Those not accepted were documented and the rationale for not accepting the comments provided to the areas. The final questionnaire proposals were sent to the governors for their concurrence in February 1989 before submitting the forms to OMB for approval. The Bureau received OMB clearance for the Pacific Island Territories questionnaires in July 1989.

Procedures

The PROAB adapted the 1990 stateside field and office procedural manuals and forms for the 1990 censuses of the Virgin Islands and Pacific Island Territories, or wrote new ones. Staff members used the 1980 manuals as a reference for obtaining appropriate examples previously tailored to the Virgin Islands and Pacific Island Territories. In cases where corresponding stateside operations were computerized (for example, questionnaire check-in) and where the stateside procedures could not be modified appropriately to the Virgin Islands and Pacific Island Territories because of time and staffing constraints, the PROAB

staff members updated the 1980 Virgin Islands and Pacific Island Territories operations with the help of the subject-matter experts.

There was one principal source of difference between the enumeration plans for stateside and the Virgin Islands and Pacific Island Territories that made modifications necessary. Since postal home deliveries were not as widespread in the Virgin Islands and Pacific Island Territories, the Bureau could not compile an address list for mailout/mailback, so it again adopted a modified list/enumerate procedure, i.e., without advance delivery of the questionnaires.

MCR's were used for all types of military personnel on Guam, including military crews of ships. Since this was the only difference from the stateside procedures and the PROAB staff was faced with time constraints, the staff sent errata sheets listing the modification and did not adapt and retype the entire set of U.S. military manuals. Merchant ships located in the Virgin Islands and Pacific Island Territories on Census Day were enumerated using stateside SCR's. The Bureau sent kits with stateside SCR's directly to shipping companies with American flag merchant vessels (including those companies with American flag vessels located in the Virgin Islands and Pacific Island Territories) for enumerating their crews of ships.

All completed SCR's were mailed to the BAPO. The DPLD made arrangements with the BAPO to sort and send to the DPLD all SCR's filled out by crews of ships located in the Virgin Islands and Pacific Island Territories. The PROAB transcribed the information from the SCR's to the appropriate ICR's (Pacific Islands (PI) or Virgin Islands (VI)) so that the information could be processed with the remaining outlying areas questionnaires. Since the questions on the stateside SCR's were not completely comparable with the questions on the PI/VI ICR's, the DPLD and the Population Division decided what data could be transcribed.

Based on specifications from the International Statistical Programs Center (ISPC), the PROAB assigned the ICR's to dummy group quarters where the ships were docked. After transcription, the PROAB forwarded the PI ICR's to the JFPO and the VI ICR's to the JXPO. Some of the SCR's contained UHE addresses. The SCR's with the UHE addresses in the United States were not transcribed to ICR's and were assumed to have been counted at the UHE addresses in those areas. The information on these SCR's was transcribed to ICR's and sent to the appropriate DO's in Guam and the Virgin Islands for search/match. When a questionnaire or ICR/MCR had a UHE address located in the area covered by the DO, the UHE address was search matched in the DO. After completed questionnaires had been checked-in, clerks completed and geocoded a Search Record, Form D-190 PI, for each WHUHE address. WHUHE questionnaires had the question 1b box marked and an address for the household's "usual home" printed below question 1b.

The geocoded search record went to search/match. The questionnaire for the temporary address was kept in the

office until it closed and then sent for processing to collect the housing data. A UHE address also was identified on an ICR and MCR. However, clerks did not need to complete a search record for ICR's or MCR's that had a UHE address. Office clerks geocoded the UHE address and then conducted search/match; the information for the person was transcribed onto the questionnaire for the UHE address, and the ICR/MCR was set aside to be destroyed with the other Title 13 materials.

A search/match operation had already taken place in the Virgin Islands and Pacific Island Territories DO's. For the Virgin Islands, the initial decision was to geocode the search records (D-190's Outlying Areas) for which the respondent reported a UHE in the Virgin Islands on the questionnaire. These forms were to be geocoded in the DO's to the DO/ARA/block level and the addresses matched in the PO. The STSD and the DPLD later decided that the address/person matching of these forms also would be done in the DO's rather than in the PO, since the DO staff was more familiar with the area and local addressing scheme. The early WYC campaign used ICR's for recording the data for persons claiming they were not counted. These, as well as the WYC forms were included in the search/match operation.

The JXPO sent stateside search records (D-190's Outlying Areas) and WYC forms with a UHE or WHUHE in the Virgin Islands to the St. Thomas DO (St. Thomas sent questionnaires with a St. Croix address to the St. Croix DO) for geocoding and address matching. The DO's shipped Virgin Islands questionnaires containing stateside UHE's and WHUHE's to the PO for search/match processing on a flow basis. The STSD developed situation/action examples of location descriptions for the DO staff because most streets in the Virgin Islands did not have names.

Since many Virgin Islands residents were displaced by Hurricane Hugo, part of the search/match operation was to assign them to "dummy" group quarters at the block level in any ARA where the UHE or WYC address was not found.

Search forms that were transcribed onto enumerator forms were sent to the coding unit and then to the keying unit. Search forms that were matched were sent to the Virgin Islands library.

The Virgin Islands government had a second WYC campaign after the DO's closed, requiring these forms to be geocoded and matched in the PO in order to be processed during search/match. The Jacksonville PO completed most of the processing operations for the Virgin Islands ahead of schedule, partly because its experienced coders had worked earlier on the Puerto Rico processing activities.

Forms

The DPLD adapted the 1990 stateside public-use forms for use in the Virgin Islands and Pacific Island Territories and, in some cases, updated the 1980 Virgin Islands and Pacific Island Territories forms based on the requirements

of the field operations when the corresponding stateside versions were not applicable. The DPLD added OA (outlying areas) after each form number to indicate use in the Virgin Islands and Pacific Island Territories. In a few cases, the stateside forms were used without adaptation and therefore OA was not added.

Separate OMB clearance was required for certain OA public-use forms—D-31 AS/CNMI and VI/G/P, Privacy Act Notice; D-26 OA, and Census Appointment Record. In some cases, the PROAB made minor modifications to existing stateside forms (already cleared through OMB by the FLD for both stateside and the outlying areas) that did not significantly alter their content or format.

The PROAB calculated the quantities of forms for printing before procedural plans were complete and before finalizing the kit specifications. This resulted in having to reprint some field and/or public-use forms to meet the requirements for additional kits.

After the Virgin Islands enumeration was over, representatives felt that the field counts were too low. Since there were no WYC forms for those islands, the PROAB developed a WYC campaign using the ICR. Later, the Virgin Islands government promoted a second WYC effort using the stateside WYC form. In general, there were more forms and manuals for the 1990 outlying areas censuses than in 1980. For example, advance listing was covered in the crew leaders' manual in 1980, but had a separate manual in 1990. Also, there was no field operations manual in 1980.

Training

As with the procedural manuals, the PROAB adapted the training guides, workbooks, etc., from the 1990 stateside training materials and incorporated useful examples from the 1980 Virgin Islands and Pacific Island Territories guides. There were verbatim guides to ensure uniform training and to control the cost and time spent on it. Three training guides were chosen for adaptation for the Virgin Islands and Pacific Island Territories; they were the guides for training advance listers, form D-60; crew leaders, D-655; and enumerators, D649.

As in the 1980 census, no formal training materials were developed for the Virgin Islands and Pacific Island Territories field operations supervisor, office operations supervisor, or the census coordinator. The census advisor trained the coordinator using the latter's manual. The coordinator and/or the census advisor trained the field operations supervisor/office operations supervisor using the field and office operations supervisors' manual.

The PROAB held a "dry run" session for enumerator training only. Attendees included the author of the guide, the census advisors, and the census administrator from the Guam Department of Commerce who was helping the PROAB with data collection and outreach procedures. There were no specific guides or job aids developed for training the office clerks. The supervisors gave them on-the-job training using the appropriate chapters in the field and office operations supervisors' manual.

Personnel Recruiting and Management

With the exception of the census advisors, who were Bureau employees (the advisor to Palau was a retired Bureau employee), all DO recruiting and management were the responsibility of the local government delegated in each area by the Governor or President to the census coordinator. Most other personnel were temporary employees hired by the local government only for the census. These positions included enumerators, crew leaders, office clerks, and supervisory personnel. The office staff was managed by the office operations supervisor, and the crew leaders and enumerators were managed by the field operations supervisor.

The primary recruiting objective was to hire enumerators who lived in the ARA they would be enumerating, but given the low unemployment rate and the inability to hire census workers at the hourly wages offered in some of the Pacific Island Territories, this was not always possible. American Samoa and Palau were the exceptions, since they had larger pools of available workers. To meet recruiting goals, the coordinators and/or their staffs contacted local radio and television stations to advertise census positions. Before they could be hired, all applicants were required to pass a written Bureau test designed to determine whether they could perform census-related tasks. In the CNMI, translators were not tested as a requirement for hiring; the census advisor trained them on the questionnaire itself. In Guam, in an effort to complete the census by September 30, 1990, the local government voluntarily assigned 30 of its regular employees to help take the census.

Personnel clearance and hiring—There were no written security-clearance requirements for hiring census workers in the Virgin Islands and Pacific Island Territories. In Palau, however, all known felons identified by the Attorney General were excluded from consideration. All rules and regulations that applied to the local government positions were extended to census jobs. In most of the Virgin Islands and Pacific Island Territories, persons who passed the written test were hired for a census position. The census coordinator, selected for the position by the local governor, was the only one who required clearance, and this was handled by the local government.

Payroll systems and administration—As noted previously, all census positions (excluding the Bureau-funded advisor) were paid by the local governments from the funds the Bureau provided under the terms of the memorandum of agreement. The local government decided when to pay the employees, although most were paid every 2 weeks. During the course of the enumeration, the hourly wages were increased in Guam and the Virgin Islands in an effort to fill positions to complete the census. In Guam, the wages for crew leaders and enumerators were increased originally by \$0.50 for crew leaders and enumerators, and a further \$1.00 was subsequently granted. In the Virgin Islands, a \$1.00 bonus per completed questionnaire was

implemented in July; however, it did not have the desired effect and was discontinued. The table below shows the initial and final pay rates.

Table 11. Hourly Pay Scales
(in dollars)

Item	OOS	FOS	Crew leader	Enumerator	Clerk
AmSamoa...	8.00	7.00	6.00	5.00	5.25
CNMI.....	9.00	8.00	7.50	6.50	6.50
Guam.....	8.00	7.00	6.44/7.94	5.46/6.96	5.50
Palau.....	6.50	5.50	4.50	3.50	4.00
VI ¹	9.00/11.96	7.87/10.00	7.31/10.28	6.19/9.19	6.19/ 8.19

¹Included a 12.4-percent cost-of-living allowance (COLA) required by law.

Information Management

The Virgin Islands and Pacific Island Territories were included in several parts of the computerized decennial census management information system (MIS)—

Support Operations: Outreach and public-use forms/materials

Puerto Rico and Outlying Areas Operations: Data collection and processing,

Pacific Island Territories data products, and for the Virgin Islands, individual activity lines within the Puerto Rico operations for coding, keying, and processing

Tabulation/Publication: Virgin Islands products

The MIS had support and preparatory outlying area activity lines, but there were no cost and progress reports for data-collection operations from the MIS system because the areas were not electronically connected to headquarters. At the beginning of census operations, each census advisor prepared a weekly report that was faxed to headquarters. When this proved unsatisfactory, given the lack of consistency in the type and amount of information provided by each advisor, a report form was designed. The information in the advisors' reports was then combined and summarized with a chart showing field and office operations progress. The chart helped in monitoring the overall progress of operations and was sent to the senior staff in the DPLD. For Pacific Island Territories processing operations, the DPD prepared weekly reports, by area, showing the number of questionnaires checked in, coded, and data-captured. For the Virgin Islands, the DPD entered similar data in the MIS and added cost and progress data for these operations.

Field Collection

As in 1980, the 1990 censuses of the Virgin Islands and Pacific Island Territories had enumerators visit and list every housing unit, asking questions as worded on the census questionnaire and recording the answers. No sampling was used in the areas. As set forth in the memorandums of agreement, the local governments were responsible for the actual data-collection, but the Bureau bore

most of the incurred costs and also furnished the maps, questionnaires, instructions, training materials, office supplies, and the funds to lease vehicles and office equipment.

A low unemployment rate in Guam and the Virgin Islands made it difficult to recruit enough workers and resulted in a part-time workforce at best. These staffing problems extended data-collection activities significantly in those two areas. The DPLD worked closely with the census coordinator and advisor in the Virgin Islands to expedite data collection.

To compensate for a small workforce, the census advisors in Guam, the CNMI, and Virgin Islands requested and received approval to conduct a telephone followup operation to obtain information that was missing from the questionnaires. Original procedures had excluded this as an option because of recommendations made by previous Virgin Islands and Pacific Island Territories advisors. Contrary to the findings in past censuses, however, the advisors in Guam, the CNMI, and the Virgin Islands now found the telephones were prevalent in their areas and telephone followup proved to be a successful tool for resolving a majority of the followup cases. Followup enumerators, however, still had to return to the field to obtain the missing information from those households that could not be reached by telephone.

Before field followup (FFU) began (in American Samoa and the CNMI only), all population and housing questionnaires and all agriculture questionnaires passed a clerical edit. Clerks separated the questionnaires into work units within an ARA, performed all edit operations for one work unit at a time, and recorded the results on Form D-403 Outlying Areas, Record of Questionnaire Clerical Edit. The edit operation went through a QA plan where clerks verified a sample of edited questionnaires and corrected any errors detected. Then the questionnaires went through a FFU to repair ARA's that had missing persons or housing units, or had failed-edit questionnaires.

The crew leader gave the enumerator the questionnaires that needed followup action. Housing units not listed on the address listing page were added to it. The enumerator completed a questionnaire for units found to be occupied by the same household as of Census Day. For units occupied by a different household, the enumerator got "last resort" information for the Census Day occupants and all the housing unit information, but did not complete any population questions for the new occupants.

The enumerator completed a questionnaire for units vacant on Census Day, regardless of the present status. For nonexistent units or units not meeting the housing-unit criteria, the enumerator deleted the address from the address listing page. For more than one unit at the address, the enumerator added any unlisted units to the address listing page, reviewed the ARA to make sure they were not listed elsewhere and completed a questionnaire. After the FFU, the enumerator returned the census questionnaires, D-376 Outlying Areas, address register, and D-320 Outlying Areas, refusal record, (if any) to the crew leader for review.

Special places—The DPLD obtained lists of special places from each area government in advance of the census, since there were no plans to prelist them (as in the states) in the Virgin Islands and Pacific Island Territories. Enumerators used these lists as the basis for the special place (SP) enumeration. In the case of the CNMI, the government did not have comprehensive lists of all worker's barracks, and some were not easily identifiable.

The procedures specified that the SP enumeration be completed prior to the regular enumeration, but unexpected increases in the number of group quarters since 1980 and limited staff prevented this. Most areas completed it about the same time they finished the regular enumeration. An SP operation concurrent with the regular one presented problems in ARA's that contained special places because there was only one address register, and both the SP and regular enumerators needed to work from the same registers. In the Virgin Islands, SP enumerators used mockup address registers, which later had to be transcribed to the original ones. In the other outlying areas, the SP enumerators either coordinated their work with the regular enumerators or waited until the regular enumeration was completed.

Special 1990 census field procedures were implemented both in counting households and processing the data in the Virgin Islands and American Samoa areas affected by Hurricane Hugo and Hurricane Ofa, respectively. Significant numbers of households were displaced from their usual place of residence ("usual place of residence" described where the Bureau would normally count and geographically list people and households in the census). Specifically, any of these households which reported a destroyed or damaged residence location as their usual residence were shown as living at that location rather than where they were living temporarily. The census questionnaire asked whether the household usually lived somewhere else. Answers to that question were used to count the household at its "normal" area or place of residence. It was important that a household affected by the hurricane report its usual place of residence on the census form. Some affected households doubled up with others, or for some reason did not receive a visit from a census enumerator. In these cases, the household was to ask for assistance to the census office in their area or inform the enumerators, during their visit, that other persons were temporarily staying with the household because of the hurricane.

In the CNMI, the number of group quarters (mainly barracks at hotels, garment factories, and construction sites) was greater than expected. Besides the obvious problems of enumerating so many persons, language barriers existed because most special places were foreign owned/managed. This also made it difficult to communicate to the managers the need to enumerate the persons in the barracks. In SP's where there were no English-speaking workers, the enumeration was done on a one-to-one interview basis between the respondent and an appropriate translator specifically trained to enumerate barracks, about 10 to 30 minutes per ICR.

The crew leaders reviewed each questionnaire and ICR turned in by the enumerators. Crew leaders were required to certify that each questionnaire was complete and contained at least the minimum required information. They also ensured that there was an agriculture questionnaire (in the CNMI and American Samoa only) if the listing in the address register indicated that one or more was collected. When the work in an ARA was finished, crew leaders placed all completed forms in a transmittal envelope and labeled it with the enumerator's name, ID code, and the ARA number. Clerks checked the questionnaires and ICR's for crew leader initials, the date, and crew leader district number, certification on each of the D-2A turned in, and that the crew leader entered "ICR with the address—ready for processing" on each ICR turned in. ICR's that had been copied to a questionnaire were placed in an envelope marked "Confidential materials—to be destroyed." Once the DO clerks checked in the work, they revised the address register counts based on their findings, using a purple-lead pencil to make all changes to the address register. The office operations supervisor then collected the address registers and maps for the bin files.

As soon as all other office operations were completed and the population and housing counts accepted, the packing operation began. The office operations supervisor assigned the packing of the questionnaires along with any ICR's, MCR's, and special place or group-quarter materials to the clerks, one ARA at a time. The address registers, maps, and other miscellaneous materials were packed and shipped to a designated processing office (see below). In American Samoa and the Northern Mariana Islands, the agriculture questionnaires also were packed separately. Assigned clerks verified that the packaging was done correctly.

Processing

In 1980, the Bureau had used the FOSDIC system to capture the data from the Virgin Islands and Pacific Island Territories questionnaires, which were FOSDIC-readable. As those forms differed from the stateside ones, the latter—with their deadlines for producing apportionment and redistricting data—had been processed first. Then FOSDIC had to be reprogrammed for Puerto Rico and yet again for the outlying areas. This meant that their publications also appeared last.

For 1990, the decision was made to use non-FOSDIC forms for these areas, and key the data instead outside the FACT 90 processing system for the Mainland.¹⁶ Doing this would allow for differences in questionnaire form and content immediately, and the data could move in a direct,

¹⁶This system, called FACT 90 (FACT stood for "film and automated camera technology"—see ch. 8), used both FOSDIC and keying. A keyer automatically coded from data bases such written-in entries as income, occupation and industry, and so forth directly to the household record on the computer tape, but could intervene manually as necessary. In the past, all of these entries had to be clerically looked up and coded before microfilming.

time-saving line to the published products. Early in the planning stages for the 1990 Virgin Islands and Pacific Island Territories censuses, the DPLD evaluated several alternative systems to do this. It proposed to the governments the Integrated Microcomputer System (IMPS), a product of the Bureau's International Statistical Programs Center (ISPC). IMPS consisted of software modules for entering, editing, tabulating, analyzing, and managing census and survey data on personal computers.

In meetings in 1986, the Virgin Islands government and its interagency committee emphasized that they wanted their 1990 census to be fully integrated with the stateside process, and the Bureau agreed. Even though the Virgin Islands questionnaires were not FOSDIC-readable, they still were keyed on the FACT 90 system and the records then were put through the processing, tabulation, and publication systems into which FACT 90 led. The Pacific Island Territories, on the other hand, agreed with the Bureau's proposal to use IMPS. This decision freed the Pacific Island Territories from competition with the States for processing and tabulation. As a result, data for the Pacific Island Territories were released much earlier than for the Virgin Islands.

Methods and procedures—Each of the Virgin Islands and Pacific Island Territories DO's sent their questionnaires and registers stateside to the PO's; the 70,000 Pacific Island Territories questionnaires (including ICR's) went to Jeffersonville, IN, and the 40,000 Virgin Islands forms to Jacksonville, FL. Unlike the stateside questionnaires, those from the Virgin Islands and Pacific Island Territories could not be automatically coded because responses to the items that required coding were different from the corresponding stateside data base of responses and there were not sufficient time and resources to build a separate one.

Pacific Island Territories—After data capture, the Jeffersonville PO sent the data files on tape to the ISPC, which utilized the IMPS software to perform edits, disclosure avoidance, tabulations, and a variety of other operations. The Pacific Island Territories data files structure edits to determine the questionnaires' completeness. Using a consistency and correction (CONCOR) program, the edit subsystem of IMPS subjected the data to essentially the same edits as the stateside sample questionnaires. To ensure disclosure avoidance, it systematically blanked data items in a selected portion of the fields and then imputed the items using a set of CONCOR edit programs. The final edited data file contained imputations due both to invalid responses in the questionnaire as well as responses blanked for disclosure avoidance.

The tabulations were produced using the census tabulation system (CENTS) segment of IMPS. Bureau specialists verified the tabulations using frequencies and cross tabulations produced from the IMPS quick tabulation (QUICK-TAB) system. Once the tables had been approved, the ISPC produced a special data file in a format that the Table Image Processing System (TIPS) II could merge into the publication table outlines (see ch. 10).

Virgin Islands—The DOD was responsible for processing the Virgin Islands questionnaires at the JXPO. The POP and the HHES provided the specifications for editing incorrect or inconsistent data and for the clerical coding training. Processing of both the Pacific Island Territories and Virgin Islands questionnaires took place concurrently with the late stateside operations (search/match, PES, and sample write-in keying). This approach addressed the local governments' concern for improving the timeliness of census data products.

Workflow—Virgin Islands and Pacific Island Territories DO's batched the questionnaires by ARA before sending them to the processing offices. At the PO's, the questionnaires were checked in, coded, keyed, and verified. The quality of the coding operations was controlled/estimated using a manual three-way independent verification scheme on a sample of questionnaires from each work unit. The quality of the keying operation depended on a quasi-independent verification process. A sample of questionnaires within each work unit was verified with all detected errors being corrected. The Pacific Island Territories computer files were then sent to the ISPC for editing and tabulation while the Virgin Islands data files were handled by the DOD system.

The PO's checked for still-missing questionnaires by matching incoming ones to the address registers. When a questionnaire was missing, the PO created one to reflect the population count from the address register. The write-in entries for the Virgin Islands and Pacific Island Territories questionnaires required general, place-of-birth, migration, place-of-work, and industry and occupation coding.

Data Product Development and Dissemination

Background—As previously noted, planning the 1990 data products for the Virgin Islands and Pacific Island Territories began early in the decade. After reviewing recommendations from each area, a final census product program was designed and sent to the respective governments in December 1987.

Products—Based on the Virgin Islands interagency committee's recommendation, the 1990 Virgin Islands data products were like those produced for the States, but with modifications because of differences in the geographic entities and questionnaire content. The Pacific Island Territories data products were tailored to meet the areas' program needs. Following recommendations from the areas, each Pacific Island Territories's data appeared in a separate report. Initially, the plan was to replicate in the STF's the same tables included in the printed reports, but to present the geography down to the block level. Ultimately, a decision was made to use the stateside approach for the STF's: The staff wrote specifications for two STF's (STF 1 and 3) for each area, with more geographic and content detail than was possible to include in the printed report.

Throughout the development of the tabulation and publication program, each of the outlying areas was given the opportunity to comment on table specifications before they were finalized. Standard data products were in the form of printed reports, STF's, CD-ROM's and diskettes (based on requests from the outlying area representatives). Also, the HHES published a series of profiles for each of the outlying areas entitled Housing Highlights. These profiles examined housing data from the 1980 and 1990 censuses of housing.

Virgin Islands

Printed reports:

Series	Title
CPH-1-55	Summary of Population and Housing Characteristics
CPH-2-55	Population and Housing Unit Counts
CPH-3-55	Population and Housing Characteristics for Block Numbering Areas
CPH-5-55	Summary Social, Economic, and Housing Characteristics
CP-1-55	General Population Characteristics
CP-2-55	Social and Economic Characteristics
CH-1-55	General Housing Characteristics
CH-2-55	Detailed Housing Characteristics

A special supplementary report, *Detailed Population and Housing Characteristics*, was recommended by the Virgin Islands government and the interagency committee and was released as CPH-L-156 in August 1994. This report provided a series of cross-tabulations of detailed population and housing data. (The Bureau's User-Defined Areas Program (UDAP) offered for-fee population and housing data to participants for their specified Virgin Islands areas. Data users whose needs could not be met by this or other standard products also could order special tabulations.)

Summary tape files:

STF 1A and 1B (100-percent stateside equivalent data)
 STF 2 (100-percent stateside equivalent data)
 STF 3 (stateside sample equivalent data)
 STF 4 (stateside sample equivalent data)
 Public-use microdata sample (PUMS) (10 percent)

Products available on CD-ROM for the Virgin Islands:

Population and housing characteristics from STF 1A
 Population and housing characteristics for blocks from STF 1B
 Social, economic, and housing characteristics from STF 3

Maps:

Caribbean locator map
 County block maps

County subdivision outline map (page-size sectionalized and poster-size)
 Census tract/block numbering area outline maps
 State and county outline map

Pacific Islands

Printed reports:

1990 CPH-6 Social, Economic, and Housing Characteristics

This report includes both 100-percent and sample state-side equivalent data. There was one report for each Pacific Island Territories.

Summary tape files:

STF 1 (100-percent stateside equivalent data)
 STF 3 (stateside sample equivalent data)
 PUMS (Guam only — 10 percent)
 The STF's and PUMS file also were available on flexible diskettes

Maps:

Pacific locator map
 County block maps
 County subdivision outline maps (page-size sectionalized and poster-size)
 Census tract/block numbering area outline maps
 State and county outline map

Dissemination of Products

After the 1980 census, the Bureau and the Virgin Islands negotiated an agreement to establish a data center at the University of the Virgin Islands as part of the DUSD's State Data Center Program (see ch. 10). Although American Samoa, the Commonwealth of the Northern Mariana Islands, and Guam also expressed interest in the data center program, only Guam signed an agreement with the Bureau and established the Guam Territorial Data Center in February 1988. It was expected that the data centers would be the main vehicles for the dissemination of the 1990 data products in these areas.

The DPLD had a mailing list of outlying area governors, area representatives in Washington, and Interagency Committee members and sent them complimentary copies of the printed reports, STF's, and maps. As for stateside, the DUSD priced and sold the computer products and maps for the outlying areas; and the Government Printing Office did the same for the printed reports.

Outreach, Advertising, and Public Relations

The recommendations from the outlying areas interagency committees (Guam, American Samoa, the CNMI, Palau) called for the preparation of a separate promotional campaign for each of the outlying areas. Based on this input, the original overviews for outreach in the outlying areas called for the 1990 Census Promotion Office (CPO)

to tailor a comprehensive outreach campaign to fit the islands' unique ethnic, socioeconomic, and geographic requirements. All production work was to be completed in time to distribute the materials in early 1990.

In actuality, the Virgin Islands campaign was piggy-backed onto the work that was done for Puerto Rico when it appeared that nothing would be produced in time to promote the census. In the Virgin Islands, most materials were received by mid-March. The Pacific Island Territories outreach campaign was an offshoot of the stateside products, with changes in content that reflected procedural differences between the States and the Pacific Island Territories. To help speed up the late development of these products, the area liaisons or their Washington representatives provided translation services. In the Pacific Island Territories, finished materials were not received until the second or third week in March, with some arriving at the end of the month, just before Census Day (April 1).

Education Projects

The PROAB designed separate education kits for American Samoa, the CNMI, Guam, and the Virgin Islands, but not for Palau because the possibility of this area attaining its independence made it uncertain, until late 1989, whether the Bureau would take a census there. The DPLD's education project for the States was the basis for all the kits. Exercises were modified to account for differences in the terminology, living conditions, and geography of each outlying area. The kits were sent in draft form to the interagency committees for their review. All kits were shipped to the census coordinators beginning with those for the Virgin Islands (December 1989) and ending with the kits for the CNMI (March 1990). A PROAB staff member went to the Virgin Islands and met with a member of the Department of Education and teachers from St. Croix and St. Thomas who were using the materials to obtain their reactions to the education kits provided to them. The responses were very positive.

Table 12. Promotional Products Distributed

Virgin Islands	Pacific Outlying Areas	Virgin Islands and Pacific Outlying Areas
<p><i>Brochures</i></p> <ul style="list-style-type: none"> ● Why Should the People of the Virgin Islands Answer the Census?—Form D-3214 VI (English/Spanish) ● Open Your Doors to a Better Future (3" x 6") ● Open Your Doors to a Better Future (5" x 9") 	<p><i>Brochure</i></p> <ul style="list-style-type: none"> ● Why should the People of (Guam, Palau, CNMI, American Samoa) Answer the Census?—Form D-3214 (G, P, CNMI, AS). Produced in languages appropriate to each individual area 	<p><i>Reproduction art</i></p> <ul style="list-style-type: none"> ● Copies of camera ready art work that were from the Communicator's Kit prepared for the States
<p><i>Poster</i></p> <ul style="list-style-type: none"> ● Answer the Census—Form D-3239 VI (English/Spanish) 	<p><i>Poster</i></p> <ul style="list-style-type: none"> ● Answer the 1990 Census—Form D-3239 	<p><i>Novelty items**</i></p> <ul style="list-style-type: none"> ● Coffee mugs ● Pencils ● T-Shirts ● Bumper stickers ● Buttons ● Baseball caps
<p><i>Public service announcements *</i></p> <ul style="list-style-type: none"> ● The Complete Count ● It Counts for All of Us ● The People Reel ● Variety Video ● Ao del Censo 		<p><i>Press releases/newspaper articles</i></p> <p>Press releases announcing special procedures developed to deal with the problems of enumerating residents affected by the hurricanes that hit American Samoa and the VI.</p> <p>The census coordinators and advisors briefed the press and gave interviews for newspaper articles, TV, and radio spots.</p>

* Only the Virgin Islands received copies of the public service announcements. The CPO staff member overseeing the Virgin Islands promotion campaign was familiar with what was prepared for the States and arranged to have copies of original stateside tapes shipped to the Virgin Islands. The television stations in the Virgin Islands edited the tapes for use there.

** Both the Virgin Islands and Pacific Island Territories received the same novelty items produced for the States. The artwork and wording were modified to reflect procedural differences for the areas.

APPENDIX 13A.

Training and Instructor's Kits Prepared for Puerto Rico, 1990 Census

Kit number	Description	Quantity
611 PR	Instructor—Reinterview Crew Leader	20
611A PR	Trainee—Reinterview Crew Leader	100
617 PR	Instructor—Testing and Selecting Clerk	100
617A PR	Trainee—Testing and Selecting Clerk	200
630(L/E)	PR Instructor—List/Enumerate Field Operations Supervisor	75
630(L/E)A PR	Trainee—List/Enumerate Field Operations Supervisor	200
632(A) PR	Instructor—Edit Clerk	150
632(A)A PR	Trainee—Edit Clerk	700
632(B) PR	Instructor—Telephone Followup Clerk	75
632(B)A PR	Trainee—Telephone Followup Clerk	300
632(D) PR	Instructor—Edit QA Clerk	75
632(D)A PR	Trainee—Edit QA Clerk	200
649 PR	Instructor—List/Enumerate Enumerator	1,300
649A PR	Trainee—List/Enumerate Enumerator	9,000
651 PR	Instructor—Field Followup (List/Enumerate) Enumerator	300
651A PR	Trainee—Field Followup (List/Enumerate) Enumerator	1,700
652 PR	Instructor—Field Followup (List/Enumerate) Crew Leader	100
652A PR	Trainee—Field Followup Crew Leader	300
655 PR	Instructor—List/Enumerate Crew Leader	150
655A PR	Trainee—List/Enumerate Crew Leader	1,300
656 PR	Instructor—Reinterview Enumerator	100
656A PR	Trainee—Reinterview Enumerator	450
658 PR	Instructor—Reinterview Crew Leader Assistant	100
658A PR	Trainee—Reinterview Crew Leader Assistant	200
660 PR	Instructor—Advance Listing (List/Enumerate) Enumerator	150
660A PR	Trainee—Advance Listing (List/Enumerate) Enumerator	700
664(L) PR	Instructor—Postcensus Local Review (List/Enumerate) Enumerator	50
664(L)A PR	Trainee—Postcensus Local Review (List/Enumerate) Enumerator	200
665(A) PR	Instructor—Special Place (Early Operations) Supervisor	30
665(A)A PR	Trainee—Special Place (Early Operations) Supervisor	100
665(B) PR	Instructor—Special Place (Late Operations) Supervisor	30
665(B)A PR	Trainee—Special Place (Late Operations) Supervisor	100
668 PR	Instructor—Special Place Prelist Enumerator	50
668A PR	Trainee—Special Place Prelist Enumerator	100
669 PR	Instructor—Group Quarters Enumeration Enumerator	50
669A PR	Trainee—Group Quarters Enumeration Enumerator	200
670 PR	Instructor—Special Place Prelist Crew leader	50
670A PR	Trainee—Special Place Prelist Crew Leader	50
671(P1) PR	Instructor—S-Night Enumerator	50
671(P1)A PR	Trainee—S-Night Enumerator	300
671(P2) PR	Instructor—S-Night Enumerator	50
671(P2)A PR	Trainee—S-Night Enumerator	300
672 PR	Instructor—Group Quarters Enumeration Crew Leader	50
672A PR	Trainee—Group Quarters Enumeration Crew Leader	100

APPENDIX 13B.

Supply Kits Assembled and Shipped to Puerto Rico During the 1990 Census

Kit number	Description	Quantity
301 PR	General Office Supplies	9
302 PR	Furniture and Equipment	9
303 PR	Envelopes, Labels, and Stationery	9
304 PR	Administrative Forms	9
305 PR	D-Series Forms	9
307A PR	Manuals for Office Use and Extras	9
307B PR	Manuals for Office Use and Extras	9
308A PR	Guides for Training and Self Studies	9
308B PR	Guides for Training and Self Studies	9
309 PR	EDP Supplies	10
310 PR	EDP Forms and Manuals	10
517 PR	Testing and Selecting Supplies for District Offices	9
549 PR	List/Enumerate—Enumerator Supply	9,000
551 PR	Field Followup (LE)—Enumerator Supply	1,700
552 PR	Field Followup (LE)—Crew Leader Supply	300
555 PR	List/Enumerate—Crew Leader Supply	1,300
558 PR	Reinterview—Crew Leader Assistant Supply	150
568 PR	Special Place Prelist—Enumerator Supply	100
569 PR	Group Quarters Enumeration—Enumerator Supply	200
570 PR	Special Place Prelist—Crew Leader Supply	100
572 PR	Group Quarters Enumeration—Crew Leader Supply	100
575 PR	Military Installations Self-Enumeration—Census Representative Supply	100
577 PR	Self-Enumerating Places—Crew Leader Supply	100

APPENDIX 13C.

1990 Census Public-Use Forms—Puerto Rico

Form number	Form title	Quantity
D-1 PR (S)	Short-form questionnaire (Spanish)	1,100,000
D-1A PR (E)	Short-form enumerator—administered questionnaire (English)	350,000
D-1A PR (S)	Short-form enumerator—administered questionnaire (Spanish)	1,500,000
D-2A PR (E)	Long-form enumerator—administered questionnaire (English)	250,000
D-2A PR (S)	Long-form enumerator—administered questionnaire (Spanish)	750,000
D-3PR (S)	Short-form instruction guide	1,100,000
D-6 (BR) PR	Short-form outgoing envelope	1,100,000
D-14 PR (S)	Motivational Insert	1,100,000
D-20 A PR (E)	Individual Census Report—short form (English)	250,000
D-20A PR (S)	Individual Census Report—short form (Spanish)	500,000
D-20B PR (E)	Individual Census Report—long form (English)	75,000
D-20B PR (S)	Individual Census Report—long form (Spanish)	250,000
D-21 PR (S)	Military Census Report (Spanish)	25,000
D-22 PR	Special place poster	50,000
D-23 PR	Shipboard Census Report	25,000
D-25 PR (E)	Were You Counted? (English)	3,000
D-25 PR (S)	Were You Counted? (Spanish)	10,000
D-26 PR (E)	Census appointment record (English)	50,000
D-26 PR (S)	Census appointment record (Spanish)	800,000
D-27 PR	Introduction to English-speaking households	75,000
D-30 (L) PR (E)	Special place advance notice letter (English)	3,000
D-30 (L) PR (S)	Special place advance notice letter (Spanish)	50,000
D-31 PR	Privacy Act notice	2,000,000
D-33 (L) PR (S)	Letter—S-Night locations (Spanish)	400
D-40 PR (E)	Envelope—Individual Census Report (English)	250,000
D-40 PR (S)	Envelope—Individual Census Report (Spanish)	1,100,000
D-70 PR (S)	Local Review information booklet	400
D-70 (L) PR (E)	Local Review information letter	400
D-73 PR (S)	Local Review technical guide	50,000
D-561 PR	Questionnaire reference book	2,900
D-806 PR	Reinterview and reconciliation questionnaire	175,000

APPENDIX 13D.

Geographic Concepts

INTRODUCTION

The geographic components of the censuses within the United States and in Puerto Rico and the Outlying Areas varied, based on each entity's history, governmental and administrative structure, and the pattern of population settlement. The Census Bureau presented data for the geographic components in terms of a standard, consistent framework—often this was in a geographic hierarchy. The data for some components also appeared in an inventory listing, which included all places within a "state" or a statistical equivalent of a state (the Commonwealth of Puerto Rico, American Samoa, Guam, the Commonwealth of the Northern Mariana Islands, the Republic of Palau or the Virgin Islands of the United States); all census tracts or block numbering areas were listed within a "county." The high-level geography for each entity is listed in figure 1 (Puerto Rico) and figure 5 (Virgin Islands and Pacific Outlying Areas) and explained later.

CENSUS GEOGRAPHIC UNITS IN PUERTO RICO

The Bureau's U.S. geographic hierarchy generally descended from the State level to county, county subdivision (minor civil division [MCD] and census county division [CCD]), place (incorporated and census designated), census tract or block numbering area (BNA), and block group (BG) and census block. In Puerto Rico, the hierarchy was similar, but there were language differences and the presence of a geographic entity—the subbarrio—that did not correspond to any mainland geographic entity. The highest level was the Commonwealth, the statistical equivalent of a State for census purposes; the next level comprised the municipio, then the barrio and barrio-pueblo, subbarrio, zona urbana and comunidad, census tract and BNA, BG, and block. The island's landscape was divided into both legally-defined and statistical geographic units. Figure 1 compares the census geographic areas in Puerto Rico with those of the States. Puerto Rico's legally-defined geography was the result of historical factors and legal actions taken by the Commonwealth Legislative Assembly, while statistical geography was the result, in most cases, of the interaction of geographic and planning staffs in the Bureau and the Puerto Rico Planning Board (PRPB). The PRPB delineated census statistical areas according to established Bureau guidelines, worked with the municipio governments as appropriate, and verified the legally-defined boundaries used in the census (Junta de Planificacin, 1985).

Figure 1. Comparison of Census Geographic Areas in Puerto Rico and the States

Puerto Rico	States
Commonwealth	State
municipio	county
barrio/barrio-pueblo	county subdivision (MCD/CCD)
subbarrio	no comparable area (sub-MCD)
no comparable area	incorporated place
zona urbana/comunidad	census designated place
census tract/block numbering area	census tract/block numbering area
block group/block	block group/block

Legally-defined Units in Puerto Rico

The legally-defined units in Puerto Rico included both the municipio, which performed governmental functions, and the barrio/barrio(s)-pueblo, which were administrative units of the municipio. These entities underwent changes since their origins in 400 years of Spanish rule. While the municipio system of government predated the acquisition of Puerto Rico in 1898 by the United States, the Foraker Act of 1900 placed the functional existence of the municipio under the authority of the Legislative Assembly. The legal basis for Puerto Rico's current municipio and barrio structure derived from a 1945 statute passed by the Legislative Assembly authorizing the establishment of legal written descriptions and maps for each of the municipios and their constituent barrios. These legal documents, one for each municipio and its constituent barrios, were called memorias and were published between 1946 and 1955. Final boundaries were sent to the U. S. Geological Survey (USGS) for insertion on the first set of topographic quadrangle maps for Puerto Rico.

Approval and funding by the Legislative Assembly of this massive project to legally define all political/administrative boundaries were based on a number of planning and development issues that arose at the end of the Second World War. The primary reasons for implementing this project were stated generally in each of the municipio memorias: to assist legislative actions, to support research on the general welfare of the population, to facilitate the work of the U.S. Bureau of the Census, to assist the registration and measurement of properties, and to serve as the basis for an islandwide cadastral map. The memorias used a number of terms interchangeably, a factor that probably contributed to later confusion relating to the origin and meaning of several terms used for geographic entities

in census tabulations. For instance, the terms *zona urbana* and *barrio-pueblo* were used interchangeably in many of the *municipios*, as were the terms *barrio urbano*, *pueblo*, *ciudad*, and *zona urbana* for some of the more urban *municipios*. Also, the term *subbarrio* was not used consistently.

Figure 2. Hierarchy of Legal/Administrative Units in Puerto Rico

Commonwealth	(State equivalent)
municipio	(county equivalent)
barrio	(minor civil division)
barrio-pueblo	
subbarrio	(no stateside equivalent for the 1990 census)
election district	(election or voting district)

Commonwealth

For all census programs, the Commonwealth (*Estado Libre Asociado*) of Puerto Rico was treated as the statistical equivalent of a State.

Municipio (County, County Subdivision, and Place Equivalent)

For census purposes, the *municipio* was a county equivalent; that is, the Bureau treated it as the statistical equivalent of a stateside county. For 1990, there were 78 *municipios* of varying size and population on a land surface of approximately 3,427 square miles. The *municipio*, represented by an elected mayor and a *municipio* assembly, was the primary legal subdivision of the Commonwealth and the only sub-commonwealth entity with a functioning government. While the Commonwealth government performed most major public works and services such as public safety, sewer and water, health and land use planning and zoning, the *municipio* carried out, but often shared with the Commonwealth, more limited functions such as road maintenance, sanitation, and recreation. Although the Bureau had reported data for Puerto Rico by *municipio* since its inclusion in the decennial census (1910), the boundaries for these geographic areas did not become legal until 1947, following an extensive review by the PRPB. Once the legal boundaries were in place, only an act of the Commonwealth legislature could create or adjust *municipio* boundaries. Since 1947, there had been three such changes: (1) in 1951, San Juan *municipio* annexed Rio Piedras *municipio*; (2) in 1971, Florida *municipio* was established from part of the Barceloneta *municipio*, and (3) in 1973, Canovanas *municipio* was established from part of Loiza *municipio*.

Barrio (Minor Civil Division Equivalent)

For census purposes, *barrio* and *barrio-pueblo* (see following sections) were MCD's. Although they had defined legally established boundaries, these entities were not functioning governmental units. For the 1980 census, the Bureau recognized *ciudades*, *pueblos*, and *barrios* as MCD equivalents. For 1990, the use of the *ciudad* was dropped and the name *pueblo* was changed to *barrio-pueblo*. These terms will be discussed more fully in the following sections.

Figure 3. Changes in Terminology (Cambios de Terminologia)

1980 Census (Censo de 1980)	1990 Census (Censo de 1990)
Ciudad	Eliminated (eliminado)
Pueblo	Barrio-pueblo
Barrio	Barrio

There were 899 *barrios*, including 75 *barrios-pueblo*, which were the primary legal subdivisions of *municipios*. *Barrios* and *subbarrios* were legally established as permanent political and statistical entities. *Barrios* were used as areas for which members of both the Puerto Rico legislature and the *municipio* assemblies were elected. However, *barrios* did not have elected officials; the Commonwealth and *municipio* governments provided all basic services and made all legal decisions. Unlike the case of *municipio* boundaries, none of the traditional *barrio* boundaries of any *municipio* were ever legally amended. (The annexation or separation of *municipios* since 1951 did not affect the integrity of the *barrio* boundaries; they were simply retained in their same location.) Each *municipio* could legally amend the limits of its *barrios* as long as these changes were communicated to the Puerto Rico Planning Board.

Barrio-Pueblo

In the 1990 census, the term *barrio-pueblo* replaced the term *pueblo* used in previous censuses. Consistent with the legal name used in the *memorias*, this term reinforced the fact that what was called the *pueblo* for previous censuses was, like all other *barrios*, a legal subdivision of the *municipio*. The *barrio-pueblo* was differentiated from all other *barrios* because it was the historical center of the *municipio* where the seat of government, central plaza, and church were located. The *barrio-pueblo* also formed the core *barrio* of the *zona urbana* (place).

Since the 1970's, the use of the terms *pueblo* and *zona urbana* as census designated places (CDP's) rather than political/legal terms introduced some confusion into census data. The *pueblos* and *zonas urbanas* described in the *memorias* had legal political boundaries. The Census Bureau, however, used these same terms (*pueblos* in the 1970 census and *zonas urbanas* in the 1980 and 1990 censuses) as statistical terms that did not necessarily conform to legal political boundaries. This confusion between

the MCD and place entities had a severe impact on the validity of statistical tabulations for the 1970 census. Data were allocated incorrectly for several barrio and subbarrio entities throughout the island.

Subbarrio

Subbarrios were unique entities that had no stateside statistical equivalents; subbarrios were areas which "nested" within barrios and were likewise used for electoral and legislative districting. For census statistical purposes, they were referred to as sub-MCD's. There were 145 subbarrios distributed within 23 municipios. Barrios-pueblo were subdivided into subbarrios in 20 municipios. In the other three municipios, barrios (other than the barrios-pueblo) were subdivided into subbarrios (one rural barrio in Salinas, one urban barrio in Ponce, and eight urban barrios in San Juan). In several memorias, subbarrios were listed as barrios (or barrios urbanos) in the table of contents but indented under the respective barrio. If any barrio had subbarrios, then the entire barrio was divided into subbarrios. However, 55 barrios-pueblo and all other barrios in Puerto Rico, including 10 in San Juan, had no subbarrios.

Election District

Election districts were defined by the Commonwealth and municipio governments for election purposes and included 8 senatorial and 40 representative districts. Article 3, Section 4, of the Commonwealth Constitution established the principle of revising the senate and assembly districts after each decennial census and prior to the general elections according to the criteria of balanced population among districts, contiguity, compact shape, and means of communication between all parts of the districts.

Although Puerto Rico was not covered by U.S. Public Law 94-171 (specifying redistricting data the Census Bureau would provide to the States), the Bureau furnished it with similar services. As part of this program, and in light of the fact that all voting-district data from the census were for whole census blocks, the Bureau designated a commonwealth liaison to select nonstandard features (e.g., intermittent streams, fencelines, ridgelines) where needed as 1990 census block boundaries. The PRPB, with resources from the Electoral Commission, annotated voting district boundaries according to 1990 census block boundaries on census maps and sent this information to the Bureau, which then delivered maps and population counts by census block, block group, census tract/block numbering area, place (zona urbana and comunidad), subbarrio, barrio, municipio, and election district for redistricting purposes to the Governor, the chief justice of the Supreme Court, and the legislature of Puerto Rico in July 1991. These data were available to anyone else at the cost of reproduction. (See the Block Numbering Definition Program.)

Statistical Entities

Figure 4 diagrams the most important census statistical units for which data were tabulated in all censuses. Statistical areas were established primarily on the basis of size, shape, contiguity, and socioeconomic and demographic criteria, as well as transportation and commuting flows. However, physical change in settlement patterns or socioeconomic conditions often necessitated changes from census to census. While these entities were first created to better serve the needs of data users by providing reliable data at a submunicipio level (zona urbana, census tract/block numbering area, or block group), statistical areas for 1990 had data tabulated on an inter- and multi-municipio level (metropolitan area, urbanized area, comunidad).

Figure 4. Census Statistical Units in Puerto Rico



Place

For 1990, the Bureau worked with the Puerto Rico Planning Board and the Puerto Rico Interagency Working Group to make two changes to the criteria for recognizing places. For the 1980 census, Ponce and San Juan were represented in census tabulations as ciudades, each consisting of whole barrios. Additionally, Ponce and San Juan also were represented as zonas urbanas. (In the 1980 census, the municipios of San Juan and Ponce had two categories of place—ciudad and zona urbana. Each used the same name but defined a different geographic area within the same municipio). The 1990 census eliminated the ciudad as a separate category of place; therefore, it recognized Ponce and San Juan only as zonas urbanas. The Planning Board defined the 1990 Ponce and San Juan zonas urbanas either by using the 1980 ciudad and/or zona urbana boundaries, or by defining a new set of boundaries in accordance with these guidelines.

The population criteria for recognition of places in Puerto Rico in census publications did not change for the 1990 census. Zonas urbanas had no minimum population but all comunidades had to have at least 1,000 people, and 2,500 or more to be defined as urban. Both zonas urbanas and comunidades are classified as CDP's. The extent of a zona urbana and comunidad could change at each decennial census based on changes in settlement pattern. Data users often used the statistics for zonas urbanas separately from the data for comunidades. Because each had different qualifying criteria and were distinguished from one another in census reports, it was very important that the Planning Board designate whether a place was a zona urbana or a comunidad. The place name listings that the Bureau gave to the Planning Board showed whether a

1980 CDP was classified as a *zona urbana* or an *aldea*. The Planning Board reviewed this listing and made corrections and updates as a first step in defining 1990 CDP's. In addition to annotating this listing as detailed in the program guidelines, it also verified that the *zona urbana* and *aldea* classifications were correct.

Metropolitan Area

Although metropolitan statistical areas (MSA's), consolidated metropolitan statistical areas (CMSA's), and primary metropolitan statistical areas (PMSA's) were important statistical units and were closely related to the delineation and naming of urbanized areas, they were not defined or designated by the Census Bureau or Planning Board staff. Rather, the Federal Office of Management and Budget (OMB) did this according to specified standards published in the *Federal Register*. These areas replaced the standard metropolitan statistical areas (SMSA's) and standard consolidated statistical areas (SCSA's) reported in the 1980 census.

An MSA consisted of a large nucleus (or nuclei) together with adjacent communities that had a high degree of economic and social integration with that nucleus (or nuclei). A municipio or group of municipios qualified as an MSA in two ways: (1) a municipio had a central city (or place) of 50,000 or more inhabitants or (2) it had to contain an urbanized area with 50,000 or more inhabitants and a total metropolitan population of at least 100,000 inhabitants. Similar to the urbanized area, the *zona urbana* served as the "central city" because there were no incorporated places in Puerto Rico.

Adjacent municipios were included in the MSA if they were socially and economically integrated with the central municipio. These adjacent municipios met certain published standards regarding metropolitan characteristics such as population density, urban population and population growth, and a specific percentage of their workforce commuting daily to the central nuclei. Any change in the MSA's depended on the results of the 1990 census. In 1983, when the MSA's were revised in Puerto Rico based on the 1980 census, there were 4 MSA's (Aguadilla, Arecibo, Mayagüez, and Ponce) and 1 CMSA, San Juan-Caguas, comprising 45 municipios, which included 76.4 percent of the population. CMSA's were MSA's with a population of at least 1 million that contained separate definable nuclei and met other criteria. PMSA's were components of a CMSA.

Urbanized Area

Urbanized areas were first established for Puerto Rico in the 1960 census to better separate the rural and urban populations in the vicinity of the larger urban areas (*zonas urbanas*) when the urban population did not necessarily reside in places of 2,500 inhabitants or more. With minor exceptions, all adjacent land included in the urbanized area had to have a minimum population density of 1,000 inhabitants per square mile. Along with this density criterion,

urbanized areas had to have a total population of 50,000 or more inhabitants. Unlike *zonas urbanas*, the urbanized areas did cross municipio boundaries.

The 1990 urbanized area criteria replaced the term central city with central place, in part to accommodate the unique situations in Hawaii and Puerto Rico where incorporated places did not exist. In theory, a *zona urbana* or *comunidad* could have qualified as the central place of an urbanized area if it and its surrounding area met the criteria. In practice, all urbanized areas for the 1990 census had *zonas urbanas* as their central places.

Zona urbana—The *zona urbana* was a community that had developed around the historic governmental seat in each municipio. Each municipio could have only one *zona urbana*. With the exception of Florida (which did not have a true *barrio(s)-pueblo*) and San Juan and Ponce (which contained a group of *barrios* comprising the original urban cores of the municipios), all *zonas urbanas* contained their whole *barrio(s)-pueblo* and additional built-up area from adjacent *barrios*. The *zona urbana* reflected intra- and inter-municipio expansion. Cataño *zona urbana* was coincident with the municipio, indicating that the *zona urbana* had reached its fullest extension and that the municipio was entirely urban.

Comunidad—The *comunidad*, on the other hand, was a community that often had urban characteristics but was a settlement distinct from the *barrio(s)-pueblo*. (The Bureau changed the term *aldea* (village) to *comunidad* (community) after the Planning Board stated that this was a more accurate label for these places.) The majority of *comunidades*, whose initial impetus derived from land reform programs, were built on government-purchased properties. *Comunidades* were called *aldeas* in the 1960, 1970, and 1980 censuses; earlier censuses also used the term *villages*. The use of the term *comunidad* in the 1990 census was broader and less tied to the traditional *aldea* concept of land reform. This was consistent with the social and economic changes that had occurred in Puerto Rico over the past few decades. New *comunidades* were designated for the 1990 census.

Census Tract/Block Numbering Area/Block Group/Block

The entire territory of each municipio was divided into either census tracts or BNA's for 1990. These statistical units provided the primary submunicipio levels of data and were probably the most useful set of statistics for data users. Essentially, census tracts were defined in the more metropolitan municipios. In the 1990 census, 56 of the 78 municipios were covered by census tracts as compared with 22 in 1980.

Census tracts were relatively small geographic areas created for the purpose of providing statistics at the submunicipio level. Ideally, census tracts contained between 2,500 and 8,000 persons, with an overall municipio average of 4,000. Census tracts comprised areas of roughly

similar socioeconomic characteristics at the time of their original delineation. BNA's, on the other hand, occurred outside the metropolitan areas and were areas of 1,500 to 3,000 housing units. All census tracts and BNA's were subdivided into smaller areas of socioeconomic homogeneity called BG's, each of which contained an average of 400 housing units. BG's were used for numbering census blocks and could be identified by the census blocks within a census tract/BNA whose numbers began with the same first digit. Due to the requirements that the block group boundaries use visible physical features rather than property lines and other not well known invisible boundaries, some BG's deviated from the ideal population criterion. BG's were the smallest area for which the census published sample data. (In the 1980 census, in areas that were not block numbered, the smallest level for which sample data was available was the enumeration district (ED).

With PRPB's approval and at the suggestion of the Bureau, census tract, BNA, and BG boundaries were moved off nonvisible barrio boundaries in areas where that could have caused field enumeration problems. This was to facilitate enumeration, reduce the number of collection blocks, and improve the accuracy and quality of the data. Enumerators knew the precise boundaries of their assignment areas (ARA's) because they were based on physical features. The likelihood that an enumerator did not canvass an area because he/she thought it was not in his/her area (and thus cause a potential undercount) was greatly reduced. Some census blocks used to collect data were later split by office and field staff into two or more census tabulation blocks in order to allocate housing units to their respective barrio or subbarrio. This was a change in collection techniques over the 1980 census.

CENSUS GEOGRAPHIC UNITS IN THE VIRGIN ISLANDS AND PACIFIC ISLAND TERRITORIES

The geographic components of the Virgin Islands and the Pacific Island Territories vary as a result of each entity's history, governmental and administrative structure, and the pattern of human settlement. The Census Bureau presents data for the geographic components in terms of a standard framework, the same geographic hierarchy it uses for the States. It also presents the data for some components in an inventory listing, such as all places within an outlying area or all census tract or block numbering areas within a county. The high-level geography for each entity is provided in figure 5 above and explained later in this appendix. (The hierarchy applies only to American Samoa, Guam, the Northern Mariana Islands, Palau, Puerto Rico, and the Virgin Islands. The Census Bureau treats each of the other islands mentioned in this chapter as a single geographic unit.)

Figure 5. 1990 Census Geography for the Pacific Island Territories

Territories	State	First-order subdivision	Minor civil division	Place
American Samoa	American Samoa ¹	district ¹ island ²	county ¹ island ⁴	village ¹
Guam	Guam ¹	Guam ⁴	election district ²	CDP ³
CNMI	CNMI ¹	municipality ¹	municipal district ²	CDP ³
Palau	Palau ¹	state ⁴	state ⁴ municipality ¹	CDP ³
Virgin Islands	Virgin Islands ¹	island ²	census subdistrict ³	town ² , CDP ³

¹Functioning governmental unit. ²Legally defined nonfunctioning geographic entity. ³Statistical entity. ⁴False (redundant) entity.

For purposes of data presentation, the Census Bureau treats the Virgin Islands and each Pacific Island Territory (as well as Puerto Rico) as the statistical equivalent of a State. Each entity is divided into first-order subdivisions, similar to counties in most States; however, they are called a variety of terms, none of which is county. (The legal entities called counties in American Samoa represent county subdivisions.) For the 1990 census, every first-order subdivision is divided into census tracts or BNA's, which in turn consist of BG's and blocks. (Only Puerto Rico has census tracts.) For previous decennial censuses, the smallest level of geography was the ED.

Census Bureau data presentations for the Virgin Islands and the Pacific Island Territories (as well as Puerto Rico) are different from the stateside presentation for geographic entities in several ways:

- The Virgin Islands and the Pacific Island Territories (and Puerto Rico) are not part of any census region or division.
- The census data (such as population and housing) for the Virgin Islands and the Pacific Island Territories are not included with that of the United States.
- Neither the Virgin Islands nor any of the Pacific Island Territories have metropolitan areas (MA's) or urbanized areas (UA's).
- The decennial census does not report ZIP Code data for the Virgin Islands or the Pacific Island Territories.

American Samoa is an unorganized, unincorporated territory of the United States. It consists of five major volcanic islands and two coral atolls that lie in the heart of Polynesia, 2,500 miles south-southwest of Honolulu and 1,800 miles north-northeast of New Zealand. It is the only U.S. jurisdiction that lies south of the equator. Tutuila Island, which contains the historic capital of Pago Pago, the seat of government at Fagatogo, and the office of the Governor at Utulei, encompasses 70 percent of American Samoa's 77.3 square miles and over 95 percent of its 46,773 inhabitants.

There are three districts that make up the first-order subdivisions: Eastern and Western on Tutuila Island (Eastern District also includes the island of Aunu'u) and Manu'a (composed of Ofu, Olosega, and Ta'u Islands). Swains Island and Rose Island are not in any district. The districts are divided into 14 counties that compose the MCD's. All land area of American Samoa except Rose Island is assigned to a village. Each village has a village chief, or pulenuu, whom the Governor of American Samoa appoints from among the chiefs resident in each village, and a village council, which consists of all the chiefs and heads of families resident in the village. Accordingly, the Census Bureau treats the villages as if they were incorporated places.

The Census Bureau, for statistical purposes, recognizes only those villages with both a pulenuu and a village council in accordance with the American Samoa Code. (Some villages have a single council, but have pulenuus associated with separate areas; in those instances, the Census Bureau identified block boundaries that approximately delimited each such area so the data users could allocate 1990 census figures to each portion of the village.) Because the village boundaries are traditional and not fixed by law, the Census Bureau recognizes them on its maps as traditional boundaries rather than as legally documented corporate limits, and does not show village boundaries at all, if possible. Contrary to information that the American Samoa government provided to the Census Bureau for the 1980 census, the county boundaries—but not the district boundaries—change as village boundaries adjust to changing ownership and court decisions. Thus, for the 1990 census, the villages nested within counties except where a village crossed a district line (only Nu'uuli village does so).

As it had in the past, the Economic Development Planning Office of the American Samoa government provided the information necessary for the Census Bureau to identify and delineate the several legal entities. The Census Bureau also worked with that agency to establish BNA's and BG's that would result in 1990 census data for meaningful geographic units. The BNA's were to contain, as an optimum, 300 housing units, but could range from 250 to 900; BG's were to contain 70 housing units as an optimum, but could range from 50 to 100. The BG's also served as the basic geographic units—called ARA's—used as enumerator assignments for performing the enumeration. For the 1980 census, the Census Bureau assigned one ED to each village or village part, with oversized ED's to be split in the field to facilitate the enumeration.

Guam is the largest and southernmost island of a chain of volcanic islands in part of Micronesia known as the Marianas Archipelago. It is an organized, unincorporated territory of the United States and is located in the western Pacific Ocean, 6,000 miles southwest of San Francisco, 3,700 miles west of Honolulu, 1,500 miles south of Tokyo, and 1,500 miles east of Manila.

The Census Bureau recognizes no first-order subdivisions of Guam, so the entire island serves as a single

county equivalent for census statistical purposes. Guam is subdivided into 19 election districts, which the Census Bureau treats as MCD's. These entities do not have functioning governments; they are administrative areas for electing mayors. The island also is divided into 15 municipalities, or villages. By legislation effective August 14, 1956, the 15 municipalities underwent an extensive reorganization to match the current election districts. At the request of the Guam government, the Census Bureau has recognized the current election districts as MCD's since the 1960 census; prior to that time, the decennial census recognized the following:

- 1920—towns, barrios, one city (Agana, the capital), one district, and one municipality.
- 1930—eight municipalities and a naval reservation, the municipalities primarily consisted of towns, barrios, and Agana city.
- 1940—15 municipalities, consisting of towns and barrios; 1 was coextensive with Agana city, which was further divided into 10 districts.
- 1950—15 municipalities, which included 19 villages and 1 city.

Until the 1980 census, the Census Bureau referred to the places in Guam as cities, towns, and villages even though they were not incorporated places in the stateside sense of that term. For the 1980 census, 32 unincorporated settlements were identified more accurately as CDP's. To qualify as a CDP, an area delineated by local officials as a potential CDP had to contain at least 300 people. The same 32 CDP's appeared in the 1990 census; 6 of the CDP's represented military housing areas. To ensure that Agana would appear in the census tabulations, a special criterion permitted it to qualify as a CDP regardless of its population count; as it turned out, the special rule was not needed because instead of an anticipated decline, Agana grew from a population of 896 in 1980 to 1,139 in 1990.

Guam was block-numbered for the first time in the 1990 census. To provide data for locally useful areas, local officials delineated a BNA and BG plan for the Census Bureau. The BNA's for Guam were to contain an optimum of 650 housing units, but could range from 500 to 1,200; BG's were to contain an optimum of 140 housing units and could range from 90 to 190. For the 1980 census, local officials designed the ED's, using an optimum of 140 and a range of approximately 100 to 160 housing units as the criteria. In both censuses, the Census Bureau worked with two Guam agencies—the Bureau of Planning and the Department of Commerce—to obtain information about both legal and statistical entities and to conduct the decennial, economic, and agriculture censuses. In turn, these agencies worked with appropriate territorial agencies to ensure that the census geographic units would be meaningful entities for local data users.

The Northern Mariana Islands, which is part of Micronesia, comprises the former Mariana Islands District of the Trust Territory of the Pacific Islands. It consists of three

main islands—Saipan, Tinian, and Rota—and several small islands and atolls. It is located just north of Guam; Saipan lies about 125 miles northeast of Guam, but southernmost Rota is less than 50 miles from Guam. The islands that constitute the Northern Marianas encompass some 430 miles from Rota in the south to Uracus Island in the north, but it is only 75 miles from Rota to Saipan; the lightly populated Northern Islands (an exodus, primarily due to volcanic activity, reduced the number to only 36 in 1990) stretch over some 300 miles of the Pacific. The Commonwealth's capital is Saipan, but no locality on that island is recognized specifically as the capital; several (but not all) government offices are located in the CDP of Capital Hill, but the legislature meets in Susupe. Almost 90 percent of the population lives on Saipan.

For the 1990 census, the Census Bureau dropped the Mariana Islands District of the TTPI from its records; previously it had served as the county-equivalent, first-order subdivision of the CNMI. Accordingly, each lower-level entity was elevated one step in the hierarchy; that is, municipalities were no longer treated as MCD's but as the statistical equivalents of counties, and municipal districts were recognized as MCD's rather than sub-MCD's (see table). The municipalities of Rota, Saipan, and Tinian each coincided with one of the major islands, except that Tinian also included uninhabited Aguijan (or Aguiguan) Island. The municipalities are governmental units, each with its own elected mayor and municipal council, except that Saipan's municipal council also serves the Northern Islands Municipality and its mayor.

The 11 municipal districts are subdivisions delineated by law, but they no longer serve any governmental function. Nevertheless, late in the 1990 census process, the CNMI government informed the Census Bureau that the districts, though obsolete, were to be retained for the 1990 census, presumably for historical comparability and because they are the basis for defining Saipan's four election districts.

The places in the CNMI are CDP's; there were 16 places in the 1990 census that qualified as CDP's in that they had at least 300 people. The CNMI was block-numbered for the first time for the 1990 census. To provide data for locally useful areas, the Census Bureau tried to delineate BG's that approximated the ED's that the TTPI had used for the 1980 census; the Census Bureau then worked with the CNMI's Department of Commerce and Labor—which also delineated the CDP's and undertook the 1990 census—to review and refine these areas and then group them into statistically useful BNA's.

Palau is the westernmost group of the Caroline Islands. It lies some 500 miles southwest of Guam and 1,000 miles southeast of Manila. It consists of one very large island (Babelthuap, or Babeldaob), three islands that contain most of the population in and near the capital of Koror, and hundreds of other islands, islets, and atolls spread out over some 420 miles of the Pacific. Because it was still under

United States jurisdiction on January 1, 1990, the Census Bureau included Palau in the 1990 census. The Census Bureau treats Palau as the statistical equivalent of a State.

For the 1990 census, the Census Bureau dropped the Palau District of the TTPI—it had served as the county-equivalent, first-order subdivision of Palau—and elevated each lower-level entity one step in the hierarchy. The 16 municipalities, reported as MCD's in the 1980 Census, were superseded by States upon ratification of Palau's constitution on July 9, 1981; the Census Bureau treats the States as the statistical equivalents of counties. Each of the 16 States has its own constitution and officials. Maps certified by the Palau government for the Census Bureau's use in the 1990 census relocated many of the boundaries of the former municipalities, but all the changes—some minor, some substantial—occurred in uninhabited territory. The 1980 census had identified the numerous islands between Koror and Peleliu as unorganized territory; the 1990 census corrected this error by reassigning the islands to the States of Koror (primarily) and Peleliu. Only Sonsorol State is divided into MCD's, called municipalities—one for each of its four islands; for the other States, the Census Bureau represents the MCD level by a coextensive false entity that repeats the State name. The municipal districts, reported as sub-MCD's in the 1980 census, no longer exist.

The 1970 census reported data for only one place—Koror—which was referred to incorrectly as a town. For the 1980 and 1990 censuses, the Census Bureau recognized places as CDP's, provided that they had a census population of at least 300. Three settlements qualified as CDP's for both the 1980 and 1990 censuses. In their constitutions, five of the States identify place-type entities: municipalities in Ngarchelong; villages in Airai; and hamlets in Aimeliik, Ngchesar, and Ngiwal. These very small settlements, which sometimes adjoin one another, are based only on tradition and who lives in which house; each has its own chief, but does not have formal boundaries—nor could Palauan officials draw approximate boundaries that would permit the Census Bureau to recognize these traditional entities for the 1990 census similar to the villages of American Samoa. Palau was block-numbered for the first time for the 1990 census. To provide data for locally useful areas, the Census Bureau tried to delineate BG's that approximated the ED's used for the 1973 and 1980 censuses. It worked with Palau's Office of Planning and Statistics (which delineated the CDP's and conducted the census) to review and refine these areas and for the first time, the Census Bureau selected block boundaries for the 1990 census that would permit approximate separate identification of most of the small settlements, thereby enabling data users to assemble block counts for each one.

The Virgin Islands of the United States is an organized, unincorporated territory of the United States located immediately east of Puerto Rico. Although more than 50 separate islands and cays constitute this westernmost of the Lesser Antilles, only three have a size and population of

any significance: St. Thomas, St. Croix, and St. John. Almost all the other islets are both uninhabited and uninhabitable. Most of the population is shared equally by St. Croix and St. Thomas, although St. Croix is considerably larger in area. The capital is located in Charlotte Amalie on St. Thomas.

The Census Bureau treats the three main islands as the statistical equivalents of counties, but they do not have their own governments. Nearby islands are included with the closest large island; for example, Water Island, offshore from Charlotte Amalie, is included with St. Thomas.

Until the 1980 census, the Census Bureau reported sub-island data by quarters, which primarily and historically serve as areas for land recordation; the quarters are further divided into estates, which the Census Bureau has never recognized in its data presentations. Because these old Danish units have no major legal significance—their boundaries typically are straight lines that follow no visible features and have no relationship to the rugged terrain—and because the Virgin Islands needed a modern geographic unit that was more meaningful for the tabulation of decennial census data, the Virgin Islands government created census subdistricts. Legally established by Act No 4349 on October 1, 1979, the subdistricts are intended to be permanent areas that reflect the territory's land-use planning districts. The Census Bureau first used the subdistricts as the statistical equivalents of MCD's for the 1980 census.

The Census Bureau recognizes three towns for the decennial census of the Virgin Islands—Charlotte Amalie, Christiansted, and Frederiksted. These places were held as separate MCD's and incorrectly referred to as cities prior to the 1980 census. Because these entities have legal boundaries that are defined by chapter 5 of the Virgin Islands Code, and serve specific administrative purposes, the Census Bureau treats them as equivalent to incorporated places; however, they do not have their own governments and are not incorporated places in the same sense as that term applies to such entities in the United States. The Census Bureau may recognize other settlements as CDP's if they have at least 300 inhabitants; 6 CDP's qualified for the 1980 and 1990 censuses.

The Virgin Islands were block-numbered for the first time for the 1990 census. At the request of the Virgin Island's government, the BG's for the 1990 census were required to have 140 to 160 housing units so that they could be designed to approximate the ED's used for the 1980 census. The Virgin Islands Planning Office delineated the BG's and then grouped them into a meaningful set of BNA's for the 1990 census; it also delineated the CDP's for the 1980 census, which were carried forward unchanged for the 1990 census. The census itself actually was conducted under the auspices of the University of the Virgin Islands.

APPENDIX 13E.

Supply Kits Assembled and Shipped to Virgin Islands, and Pacific Outlying Areas During the 1990 Census

Kit number	Description	Quantity
660 (Outlying Areas)	Advance Lister Trainee	143
660A (Outlying Areas)	Advance Lister Instructor	26
555 (AS, CNMI)	List Enumerate—CL Supply	38
555 (G,P,VI)	List Enumerate—CL Supply	100
655 Outlying Areas (AS,CNMI)	List Enumerate—Crew Leader Instructor	8
655 Outlying Areas (G,P,VI)	List Enumerate—Crew Leader Instructor	20
655A Outlying Areas (AS,CNMI)	List Enumerate—Crew Leader Trainee	38
655A Outlying Areas (G,P,VI)	List Enumerate—Crew Leader Trainee	100
549 Outlying Areas (AS)	Enumerator Supplies for American Samoa	138
549 Outlying Areas (CNMI)	Enumerator Supplies/Commonwealth of the Northern Mariana Islands	105
549 Outlying Areas (G)	Enumerator Supplies for Guam	372
549 Outlying Areas (P)	Enumerator Supplies for Palau	62
549 Outlying Areas (St. Croix, VI)	Enumerator Supplies for St. Croix, VI	152
549 Outlying Areas (St. Thomas, VI)	Enumerator Supplies for St. Thomas, VI	142
649 Outlying Areas (AS)	Enumerator Instructor—American Samoa	29
649 Outlying Areas (CNMI)	Enumerator Instructor—Commonwealth of the Northern Mariana Islands	18
649 Outlying Areas (G)	Enumerator Instructor—Guam	54
649 Outlying Areas (P)	Enumerator Instructor—Palau	11
649 Outlying Areas (St. Croix, VI)	Enumerator Instructor—St. Croix, VI	27
649 Outlying Areas (St. Thomas, VI)	Enumerator Instructor—St. Thomas, VI	29
649 Outlying Areas (AS)	Enumerator Trainee—American Samoa	125
649A Outlying Areas (CNMI)	Enumerator Trainee—Commonwealth of the Northern Mariana Islands	105
649A Outlying Areas (G)	Enumerator Trainee—Guam	372
649A Outlying Areas (P)	Enumerator Trainee—Palau	62
649A Outlying Areas (St. Croix, VI)	Enumerator Trainee—St. Croix, VI	152
649A Outlying Areas (St. Thomas, VI)	Enumerator Trainee—St. Thomas, VI	142