



# Population Estimates for Puerto Rico and the Outlying Areas: 1980 to 1987

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(This report supersedes Current Population Reports, Series P-25, No. 1009. Estimates for Puerto Rico and the outlying areas for the 1970's, 1960's, and 1950's appear in Current Population Reports, Series P-25, Nos. 943, 603, and 336, respectively)

This report presents estimates of the population for July 1, 1980, to 1987 for the outlying areas of the United States. These include the Caribbean areas of the Commonwealth of Puerto Rico and the Virgin Islands of the United States, and the Pacific areas of American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands. Census counts for 1980 are also shown for each of the areas. Small areas under American jurisdiction in the Pacific Ocean such as Midway, Wake, and Canton Islands, and Johnston Atoll are excluded; there were 1,082 persons on these islands at the time of the 1980 census.

The report also presents the components of population change for these areas for the 1980-87 period. The components of population change are natural change (births minus deaths) and net migration (the number of persons migrating into a particular area minus the number migrating from the area). In some of the areas shown, net migration is not estimated directly but is derived as a residual, that is, the difference between the total amount of change and natural change.

Except for Puerto Rico and the island of St. Croix in the Virgin Islands, all of the areas estimated are growing at a rate well above that of the United States (7.4 percent from April 1, 1980, to July 1, 1987). In the Caribbean areas, the Virgin Islands have shown the highest growth rate (9.8 percent) since 1980. The growth in St. Thomas and St. John has accounted for 72 percent of the total Virgin Islands growth. While these two islands combined have experienced a slight net immigration rate of just under 1 percent, St. Croix showed a 1980-87 net outmigration rate of nearly 10 percent. Puerto Rico's population has increased by 95,000 persons since 1980, though it has experienced net outmigration of -227,000 persons, or -7.1 percent.

Of the Pacific areas, Guam has exhibited the largest percent population growth since 1980—23 percent.

About a fifth (21 percent) of its growth was attributable to net immigration. All three areas in the Pacific grew between 1980-87 and their overall growth rate was 23 percent, compared with 3 percent for the Caribbean areas.

## METHODOLOGY

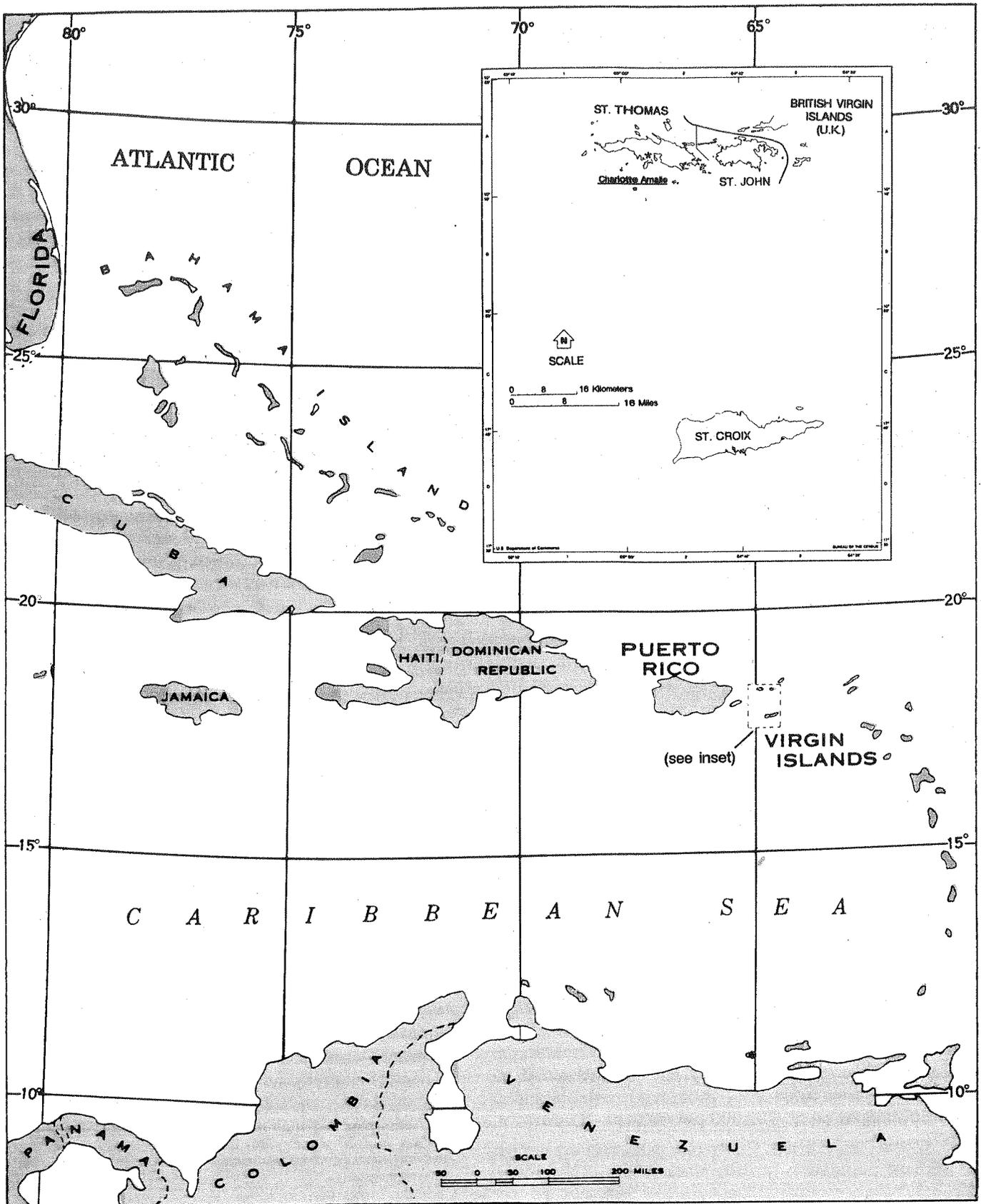
Because of differences in the availability of data relating to population change, and the large concentration of special population groups in some areas, estimating procedures vary by area.

**Puerto Rico.** The estimates for Puerto Rico were based on the 1980 census and on reported statistics for each of the components of population change. The migration component was derived from summing the monthly net arrivals minus departures from passenger statistics reported by the Commonwealth of Puerto Rico government.<sup>1</sup>

**Virgin Islands.** The estimates for St. Croix and St. Thomas-St. John were developed using a method called Component Method II. Components of change were added to the 1980 census base population to obtain a current estimate. In this method, net migration is estimated on the basis of school enrollment data, using the difference between the estimated population of elementary school age and the population of school age expected on the basis of the most recent census and births since the census. A more detailed discussion of the method can be found in Current Population Reports, Series P-25, No. 640.

<sup>1</sup>Whenever migration data are not summed to totals for years ending June 30, the monthly data are smoothed using a 12-month moving average, to compensate for seasonal movement of tourists and transients.

# CARIBBEAN AREA



St. Thomas and St. John were estimated as a unit because the school enrollment data do not permit separate reliable estimates of migration for them (1980 population 44,372 and 2,472, respectively). As a last step, estimates were also prepared for the islands as a whole (using Component Method II), and used as a control total for the St. Croix and St. Thomas-St. John estimates.

**American Samoa.** The estimates for American Samoa were based on the 1980 census and births and deaths reported by the Government of American Samoa. Since there is no reporting system for migration, net migration must be estimated indirectly. For April 1, 1980, through July 1, 1987, the average annual amount of net migration was estimated based on the level of residual net migration for the 1977-80 period. The 1977-80 period was chosen because the Government of American Samoa conducted a survey in 1977 which could be used in conjunction with the 1980 census to estimate net migration.

**Guam.** The estimates of the population of Guam were developed by adding the components of change to the relevant 1980 population base. The July 1, 1980, through 1987 estimates were derived using a base composed of the 1980 census count less an estimate of the population residing in Guam on April 1, 1980, who were born in the United States.<sup>2</sup> The population base was restricted because of the large and relatively transient Federally affiliated population for which migration is substantial and difficult to estimate. Rather than estimate migration for this population group, administrative records were used to determine the number of Federally affiliated persons on each estimate date. The following were then added to the population base:

1. *Natural change.* The excess of births over deaths to the population is based on reported births and deaths. Births and deaths occurring in the U.S. Naval Hospital are excluded because they are included in step 4.
2. *Change in alien contract workers.* This category is primarily composed of contract workers brought in from the Philippines by the Department of Defense, and reported by the Guam Department of Commerce.
3. *Net alien immigration.* This component is composed of persons accepted for permanent residence in the United States. It is estimated based on Immigration and Naturalization Service (INS)

figures on immigrants intending to live on Guam. About 40 percent of the immigrants each year are assumed to either leave Guam or inaccurately report their intention of living on Guam, based on analysis of expected versus actual change in the alien population between 1970 and 1980.<sup>3</sup> Expected change was derived from INS records on immigrants and naturalizations plus the change in alien contract workers (item 2 above). Actual change was based on the net change in the annual alien registration data collected by INS until 1982.

4. *Federally affiliated population.* The number of Armed Forces stationed on Guam was obtained from the U.S. Department of Defense. The Guam Department of Commerce provided data on the numbers of Federal civilian employees and dependents of both Federal civilian employees and the military.
5. *Guamanian inductions less discharges.* The number of persons in the United States Armed Forces who lived on Guam before joining the military (i.e., Guam is their preservice residence) is available from the Department of Defense. One-half the change in the successive July 1 preservice residence figures is used to approximate inductions less discharges on Guam.

No data are available on the movement of the nonfederally affiliated population who are not covered above, but this component of net migration is not thought to be large.

**Northern Mariana Islands.** The net migration component is a residual number based on 1973-80 residual migration derived from the Island's 1973 Census of Appointment and the 1980 census. The estimates for July 1, 1980, through 1987 were then computed by adding the components of population change to the 1980 census count. Since net migration is computed as a residual and vital statistics are likely to be underreported, the residual probably includes underreported births and deaths to a much greater extent than in American Samoa. For this reason, net migration is not shown separately for the Northern Marianas in table 1.<sup>4</sup>

## LIMITATIONS OF THE ESTIMATES

The areas for which estimates are presented in this report are unique in the United States in terms of size, location, and composition, creating difficulty in developing appropriate estimating procedures, and precluding the use of standard procedures for all the areas.

<sup>3</sup>No data are available to account for emigration of native-born Guamanians.

<sup>4</sup>Substantial immigration has occurred in the Northern Marianas in recent years. However, no reliable data are available to measure it.

<sup>2</sup>The April 1, 1980, United States born population on Guam was estimated based on data furnished by the Guam Department of Commerce and the U.S. Department of Defense.

Absence of data and poor quality data make it difficult to prepare accurate estimates. The estimation techniques used in this report were selected on the basis of a test of methods against the 1970 census or 1980 census<sup>5</sup> or on the ability to use additional data sources not previously available. A comparison of the 1980 census results and the estimates for 1980 is shown in table A..

**Table A. Comparison of 1980 Census and Population Estimates for Puerto Rico and Outlying Areas**

Area	1980 census	1980 population estimate	Error <sup>1</sup>	Percent error <sup>2</sup>
Puerto Rico .....	3,196,520	3,195,130	-1,390	-
Virgin Islands .....	96,569	96,546	-23	-
St. Croix .....	49,725	45,911	-3,814	-7.7
St. Thomas and St. John .....	46,844	50,635	3,791	8.1
American Samoa .....	32,297	32,260	-37	-0.1
Guam .....	105,979	116,251	10,272	9.7
Northern Mariana Islands .....	16,780	18,574	1,794	10.7

- Represents zero.

<sup>1</sup>The error is the difference between the 1980 population estimate and the 1980 census count.

<sup>2</sup>Base for percent is 1980 census count.

For Puerto Rico, the estimating technique now used remains essentially unchanged from that used for the 1960's and 1970's. The accuracy of the estimate depends very heavily on the accuracy of the migration data which in turn depends on the numeric cancellation of the large number of visitors who travel between Puerto Rico and the mainland of the United States. Since gross arrival and departure data contain a large number of tourists, net monthly figures are computed and

<sup>5</sup>For more information on the 1970 test, see Current Population Reports, Series P-25, No. 731. The 1980 test results are reported in Series P-25, No. 919.

summed to 12-month periods ending June 30.<sup>6</sup>This process provides rough approximations of net migration for Puerto Rico. When compared with results of the 1980 census, the procedure estimated Puerto Rico's population to within 0.1 percent.

In the case of the Virgin Islands, where Component Method II is employed, the difference between the April 1, 1980, estimate and the census count was only 23 persons for the Territory as a whole. For the island estimates, however, the estimating error was much higher (-7.7 percent for St. Croix and +8.1 percent for St. Thomas-St. John).

The estimating procedure used for American Samoa is a means of bridging a period when no independent migration estimates can be developed. The 1980 census and the 1977 survey provide reference points which, in combination with reported vital statistics, are used to yield acceptable estimates of net migration for the intervening period. The actual migration for each year in the period is unknown. In the absence of any other information concerning the annual migration pattern, a smooth annual net outmigration during this period is assumed.

The Government of American Samoa conducted a 20-percent sample household survey in 1985 which yielded a population estimate for May 1 of 35,277. The Bureau's estimate for July 1, 1985, is 36,300. Even without adjusting for the 2-month discrepancy, the Bureau's estimate falls within the 95-percent confidence interval of the survey estimate, suggesting that the Bureau's immigration assumption for American Samoa is reasonably accurate. Also, since the survey

<sup>6</sup>See footnote 1.

**Table 1. Estimates of the Components of Change in the Resident Population of Puerto Rico and the Outlying Areas of the United States: April 1, 1980 to July 1, 1987**

(Resident population includes persons in the Armed Forces stationed in each area. Each estimate has been rounded to the nearest thousand for Puerto Rico and to the nearest hundred for the outlying areas)

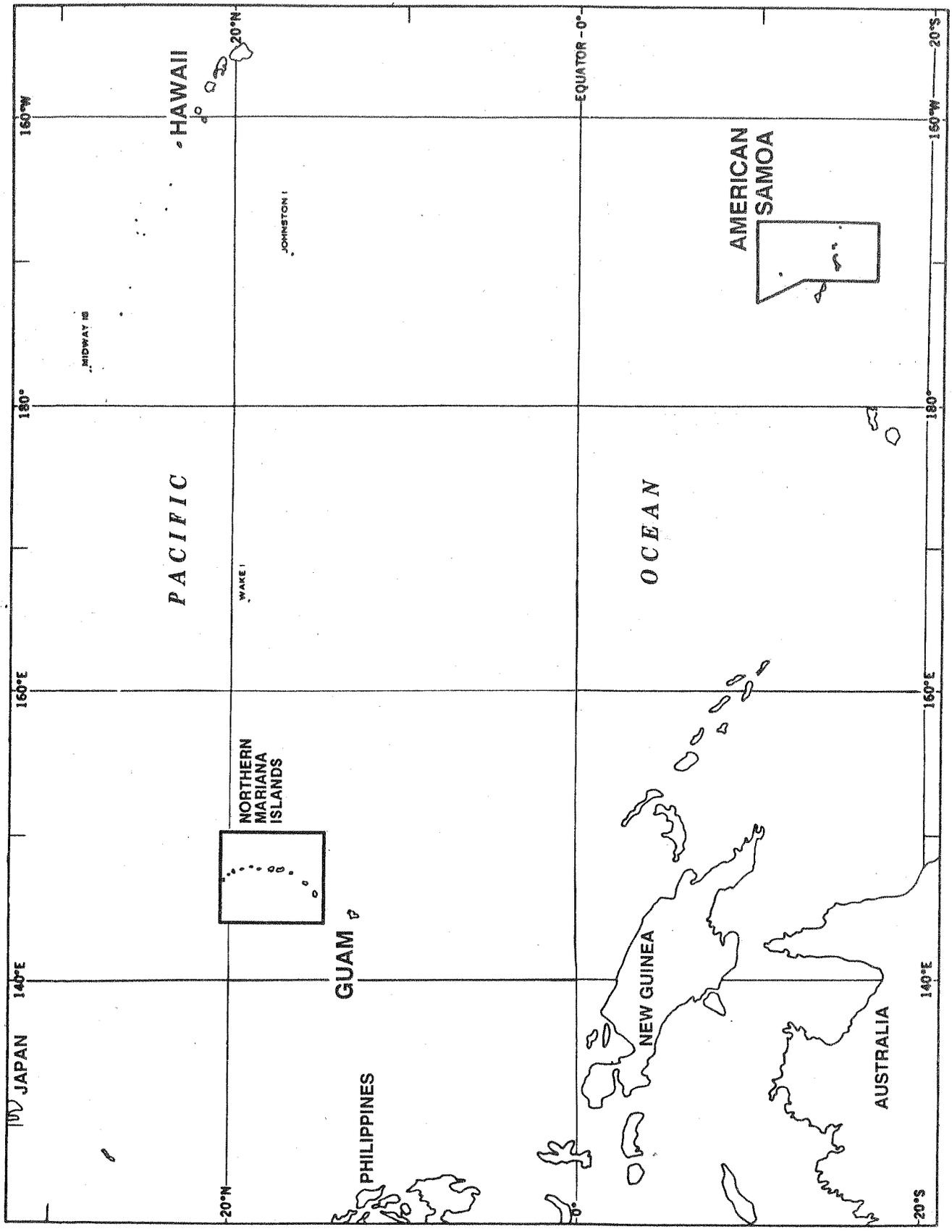
Area	Population at end of period	Change		Components of change		
		Number	Percent	Births	Deaths	Net migration
<b>Caribbean areas:</b>						
Puerto Rico .....	3,292,000	95,000	3.0	482,000	160,000	-227,000
Virgin Islands .....	106,100	9,500	9.8	17,700	3,800	-4,400
St. Croix .....	52,400	2,700	5.4	9,300	1,800	-4,800
St. Thomas and St. John .....	53,600	6,800	14.5	8,400	2,000	400
<b>Pacific areas:</b>						
American Samoa .....	38,400	6,100	19.0	9,600	1,100	-2,400
Guam .....	130,400	24,400	23.1	<sup>1</sup> 22,500	<sup>1</sup> 3,200	<sup>2</sup> 5,200
Northern Mariana Islands .....	20,300	3,500	21.1	-4,900	800	**

\*\* Because part of the residual migration in this area reflects underregistration of vital statistics, migration figures are not shown.

<sup>1</sup>Total births and deaths.

<sup>2</sup>Includes movement of members of the Armed Forces and their dependents.

PACIFIC AREA



results and the Bureau's estimates do not vary significantly, the survey results have not been incorporated into the estimation process.

For Guam, as indicated earlier, the estimates are based on a special estimating method which yields point estimates of the various subcategories of the population. The test of this method for the 1960-70 period showed an overestimate of about 10 percent. This level and direction of error still existed in the estimates in 1980. Likely explanations for this include the lack of accurate migration data as well as conflicting information on persons who were born in the 50 States and on the special populations employed in the current methodology.

The estimates for the Northern Mariana Islands contain a similar level of error and are biased in the same direction. The 1980 error was 1,794 persons, or 10.7 percent. As was the case for Guam, the lack of any migration data combined with the lack of censuses or surveys during the intercensal period pose a serious problem in estimating the Northern Marianas population.

Efforts will continue to be made to correct the estimation errors to the degree that available methodologies and data will permit.

## SOURCES OF DATA

Most of the statistics used to prepare the area estimates presented in this report were obtained from the local governments of the outlying areas. Data on births and deaths were obtained from the local governments for Puerto Rico and the outlying areas. Armed Forces data are based on figures provided by the Coast Guard and the Department of Defense. School enrollment data for the Virgin Islands were supplied by the Virgin Islands Department of Education.

For Puerto Rico, data on migration were supplied by the Puerto Rico Planning Board. The number of Federal civilian employees on Guam was obtained from the Guam Department of Commerce.

## ROUNDING OF ESTIMATES

Each estimate in this report has been rounded independently to the nearest thousand (Puerto Rico) or hundred (other areas) from figures computed to the last digit. Hence, the sum of the parts may differ from the total shown. Percentages are based on unrounded numbers.

**Table 2. Estimates of the Resident and Civilian Populations of Puerto Rico and the Outlying Areas: 1980 to 1987**

(Each estimate has been rounded to the nearest thousand for Puerto Rico and to the nearest hundred for the outlying areas)

Date (July 1, except as noted)	Puerto Rico	Virgin Islands			American Samoa	Guam	Northern Mariana Islands
		Total	St. Croix	St. Thomas and St. John			
<b>RESIDENT POPULATION</b>							
1987.....	3,292,000	106,100	52,400	53,600	38,400	130,400	20,300
1986.....	3,273,000	109,500	54,300	55,200	37,300	126,800	19,700
1985.....	3,282,000	110,800	55,300	55,500	36,300	123,900	19,100
1984.....	3,269,000	107,500	55,000	52,500	35,300	119,900	18,600
1983.....	3,265,000	103,700	53,800	49,900	34,500	116,000	18,200
1982.....	3,262,000	101,500	52,300	49,200	33,800	110,500	17,800
1981.....	3,245,000	98,300	50,800	47,500	33,100	109,900	17,300
1980.....	3,206,000	97,700	50,300	47,400	32,400	106,900	16,900
1980 (April 1) census.....	3,196,520	96,569	49,725	46,844	32,297	105,979	16,780
<b>CIVILIAN POPULATION</b>							
1987.....	3,288,000	106,000	52,400	53,600	38,400	120,900	20,300
1986.....	3,270,000	109,500	54,300	55,200	37,300	117,500	19,700
1985.....	3,277,000	110,800	55,300	55,500	36,300	114,300	19,100
1984.....	3,265,000	107,300	54,800	52,500	35,300	112,200	18,600
1983.....	3,261,000	103,700	53,800	49,900	34,500	108,000	18,200
1982.....	3,259,000	101,500	52,300	49,200	33,800	102,500	17,800
1981.....	3,242,000	98,200	50,700	47,500	33,100	101,400	17,300
1980.....	3,202,000	97,700	50,300	47,400	32,400	97,400	16,900
1980 (April 1).....	3,192,000	96,600	49,700	46,800	32,300	96,700	16,800