



# Population Estimates for Puerto Rico and the Outlying Areas: 1980 to 1988

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(This report supersedes Current Population Reports, Series P-25, No. 1030. 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 1988 for the outlying areas of the United States. These include the Caribbean areas of Puerto Rico and the Virgin Islands of the United States, and the Pacific areas of American Samoa, Guam, and 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, Canton, and Johnston are excluded; 1,082 persons were on these islands at the time of the 1980 census.

The report also presents the components of population change for these areas for the 1980-88 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.

The Caribbean areas of Puerto Rico and the Virgin Islands, have experienced only moderate population growth in the 1980's, and with considerable net outmigration during the decade. By contrast, all of the Pacific areas are estimated to be growing at a rate several times that of the United States rate of 8.5 percent from April 1, 1980, to July 1, 1988.

In the Caribbean areas, the Virgin Islands have shown the highest growth rate (6.9 percent) since 1980, but they are estimated to have been losing population since 1985. The growth on St. Thomas and St. John has accounted for 76 percent of the total Virgin Islands growth during the 1980's. Puerto Rico's population has increased by only 95,000 persons (3 percent) since 1980, although it has experienced a natural increase (surplus of births over deaths) of 361,000. The estimates imply a large net outmigration of 267,000 persons, or -8.3 percent for the 1980's.

Of the Pacific areas, the Northern Mariana Islands have exhibited the largest percent population growth since 1980 (26.1 percent), but Guam and American Samoa also grew substantially between 1980 and 1988. The combined growth rate of the three areas was 24.7 percent. With fertility very high in the Pacific areas, nearly all their growth was accounted for by natural increase, although Guam gained about 5,000 persons through net migration.

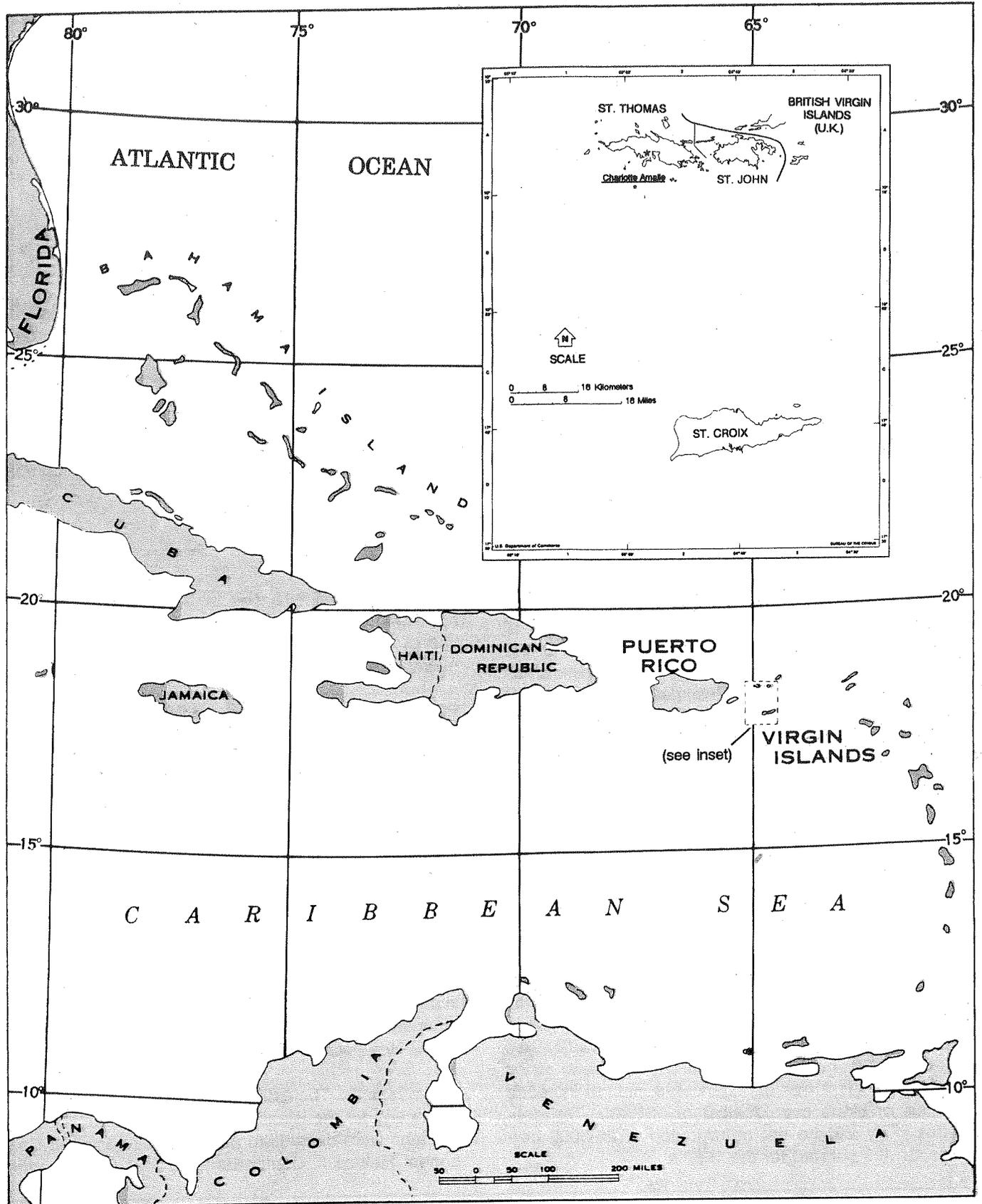
## METHODOLOGY

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 are based on a component procedure used by the Census Bureau since the 1960's. The procedure involves carrying the 1980 census population forward to the estimates date and allowing for births, deaths, and net migration. Vital statistics are collected from the Puerto Rico Department of Health. The migration component is derived from summing the monthly net arrivals minus departures from passenger statistics reported by the Commonwealth of Puerto Rico Planning Board. This 12-month sum is smoothed by using moving averages of the reported monthly arrivals and departures data. Smoothing compensates for bias introduced by short-term fluctuations in passenger data (seasonal movements of tourists and other visitors) rather than the movement of migrants to a new residence.

**Virgin Islands.** The estimates for the Virgin Islands as a whole and for the islands of St. Croix and St. Thomas-St. John were developed using a method called Component Method II. Components of change were added

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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.

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

**American Samoa.** The estimates for American Samoa are based on the 1980 census and births and deaths reported by the Government of American Samoa. In the early 1980's, no reliable migration data were available, therefore net migration was estimated indirectly. For April 1, 1980, through July 1, 1988, 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 1988 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>1</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 composed primarily of contract workers brought in from the Philippines by the Department of Defense, and reported by the Guam Department of Commerce.

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

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>2</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 which is not covered above, but this component of net migration is thought to be small.

**Northern Mariana Islands.** The net migration component is a residual number based on 1973-80 residual migration derived from the Island 1973 census and the 1980 census. The estimates for July 1, 1980, through 1988 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.

## 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

<sup>2</sup>No data are available to account for emigration of native-born Guamanians.

the use of standard procedures for all the areas. Absence of data and poor quality data make it difficult to prepare accurate estimates. The estimation techniques used in

**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.

this report were selected on the basis of a test of methods against the 1980 census or 1970 census<sup>3</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.

For Puerto Rico, the accuracy of the estimate depends very heavily on the accuracy of the migration data which in turn depends on whether the large number of visitors who travel between Puerto Rico and the mainland of the United States are effectively cancelled out in the passenger travel figures. Since gross arrival and departure data contain a large number of tourists, net monthly figures are computed and summed to 12-month periods

<sup>3</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.

ending June 30. 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).

In 1985, the Government of American Samoa conducted a 20-percent sample household survey, 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.

The Census Bureau's estimating procedure for American Samoa was developed at a time when no independent migration estimates for the 1980's could be developed. The 1980 census and the 1977 survey were the most recent reference points available with which to estimate post 1980 net migration. In the absence of any other information concerning the annual migration pattern, a smooth annual net outmigration during the 1980's is assumed.

Results of the 1985 survey have not been incorporated into the Census Bureau's estimation process. The 1985 survey results suggest the 1980-85 annual residual net outmigration may be much higher than the figure currently used by the Census Bureau. However, based on migration statistics available after 1980, American Samoan Government officials believe the current 1980-85 annual net outmigration may be overstated, and net migration may have turned positive. The American Samoan migration statistics will be evaluated after the 1990 census for use in post 1990 population estimates.

**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, 1988**

(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)

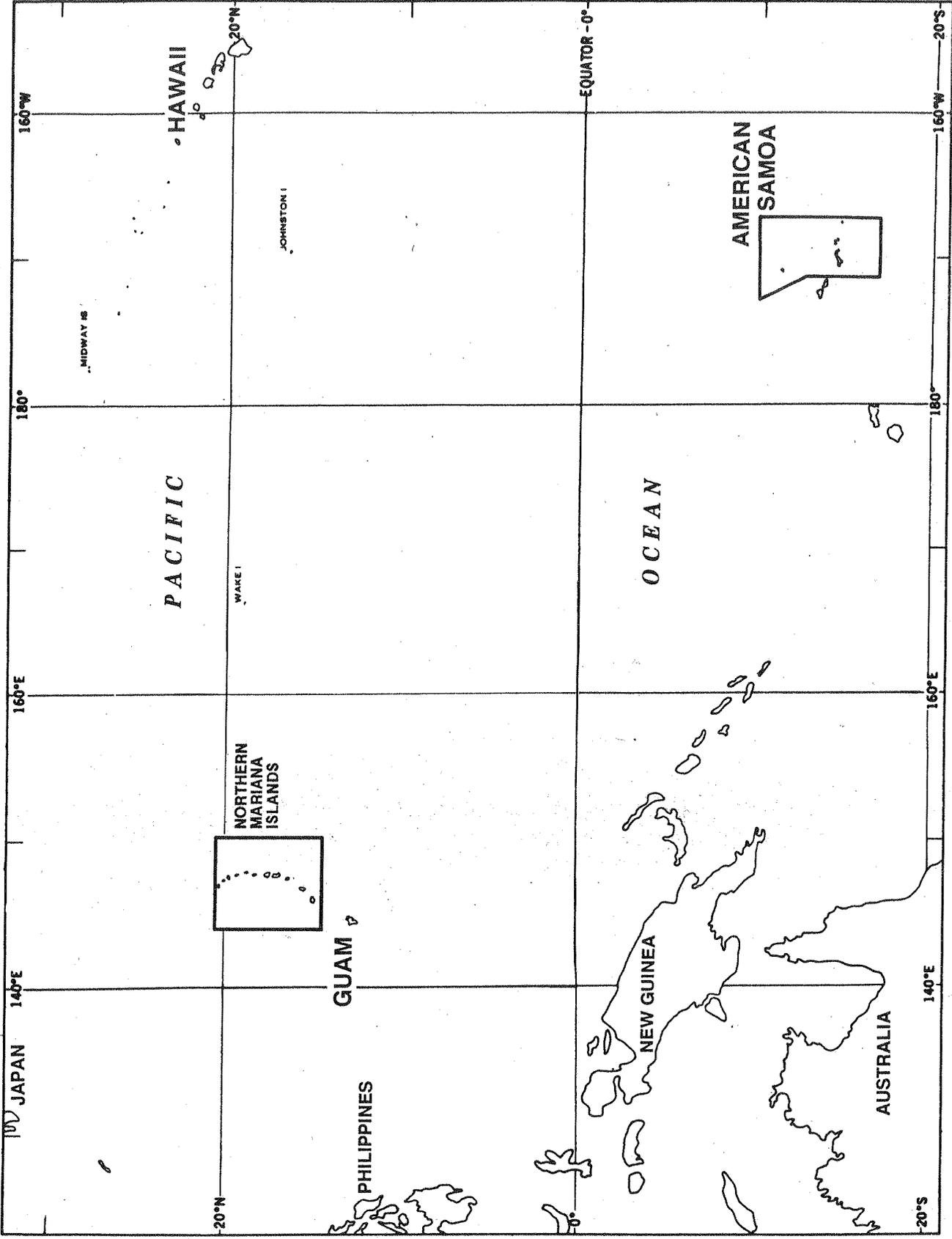
| Period and area                | Population at end of period | Change |         | Components of change |                    |                    |
|--------------------------------|-----------------------------|--------|---------|----------------------|--------------------|--------------------|
|                                |                             | Number | Percent | Birth                | Deaths             | Net migration      |
| <b>Caribbean areas:</b>        |                             |        |         |                      |                    |                    |
| Puerto Rico .....              | 3,291,000                   | 95,000 | 3.0     | 546,000              | 185,000            | -267,000           |
| Virgin Islands .....           | 103,200                     | 6,600  | 6.9     | 20,100               | 4,400              | -9,000             |
| St. Croix .....                | 51,300                      | 1,600  | 3.1     | 10,400               | 2,100              | -6,800             |
| St. Thomas and St. John .....  | 51,900                      | 5,100  | 10.8    | 9,600                | 2,300              | -2,200             |
| <b>Pacific areas:</b>          |                             |        |         |                      |                    |                    |
| American Samoa .....           | 39,500                      | 7,200  | 22.4    | 11,200               | 1,300              | -2,700             |
| Guam .....                     | 133,000                     | 27,000 | 25.5    | <sup>1</sup> 25,900  | <sup>1</sup> 3,700 | <sup>2</sup> 4,900 |
| Northern Mariana Islands ..... | 21,200                      | 4,400  | 26.1    | 5,900                | 900                | **                 |

\*\* 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



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 migration data combined with the lack of censuses or surveys during the intercensal period pose a serious problem in estimating the Northern Marianas population. Local knowledge indicates that substantial immigration has occurred in the Northern Marianas in recent years. After 1990, the Census Bureau will investigate the use of housing units, school enrollment, and migration data collected by the Northern Marianas Government for use in the Northern Marianas estimates.

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 1988**

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

| Date<br>(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>        |             |                |           |                         |                |         |                          |
| 1988 .....                        | 3,291,000   | 103,200        | 51,300    | 51,900                  | 39,500         | 133,000 | 21,200                   |
| 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>        |             |                |           |                         |                |         |                          |
| 1988 .....                        | 3,287,000   | 103,200        | 51,300    | 51,900                  | 39,500         | 122,700 | 21,200                   |
| 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) census .....       | 3,192,000   | 96,600         | 49,700    | 46,800                  | 32,300         | 96,700  | 16,800                   |