



Population Estimates and Projections

U. S. DEPARTMENT OF COMMERCE • Social and Economic Statistics Administration • BUREAU OF THE CENSUS

Series P-25, No. 603

Issued July 1975

ESTIMATES OF THE POPULATION OF PUERTO RICO AND OTHER OUTLYING AREAS: 1960 to 1973

(Estimates in this report supersede estimates for the 1960's published earlier in *Current Population Reports*, Series P-25, No. 423 and 392)

This report presents estimates of the population of the Commonwealth of Puerto Rico and five other principal outlying areas of American jurisdiction—American Samoa, the Canal Zone, Guam, the Trust Territory of the Pacific Islands, and the Virgin Islands of the United States. Estimates are shown for July 1, 1970 to 1973, together with intercensal estimates for July 1, 1960 to 1969, taking into account the results of the 1960 and 1970 censuses. Excluded are certain small areas of American jurisdiction, such as Midway, Wake, Canton, and Johnston Islands, whose total population numbered 4,896 on April 1, 1970, the date of the last census.

The report also presents the components of population change for these six areas for both the 1960-70 and the 1970-73 periods. The two major components of population change for the areas are natural increase (the number of births minus deaths), and net immigration (the number of persons migrating into a particular area minus the number migrating from the area).

Between 1970 and 1973 the population of the Commonwealth of Puerto Rico and the principal outlying areas of the United States increased by 284,000 persons to 3.3 million (table 1). Puerto Rico, by far the most populous of these areas, had an estimated population of 2,961,000 on July 1, 1973. The other five areas ranged in population from about 100,000 for the Trust Territory and Guam to 28,000 for the smallest, American Samoa.

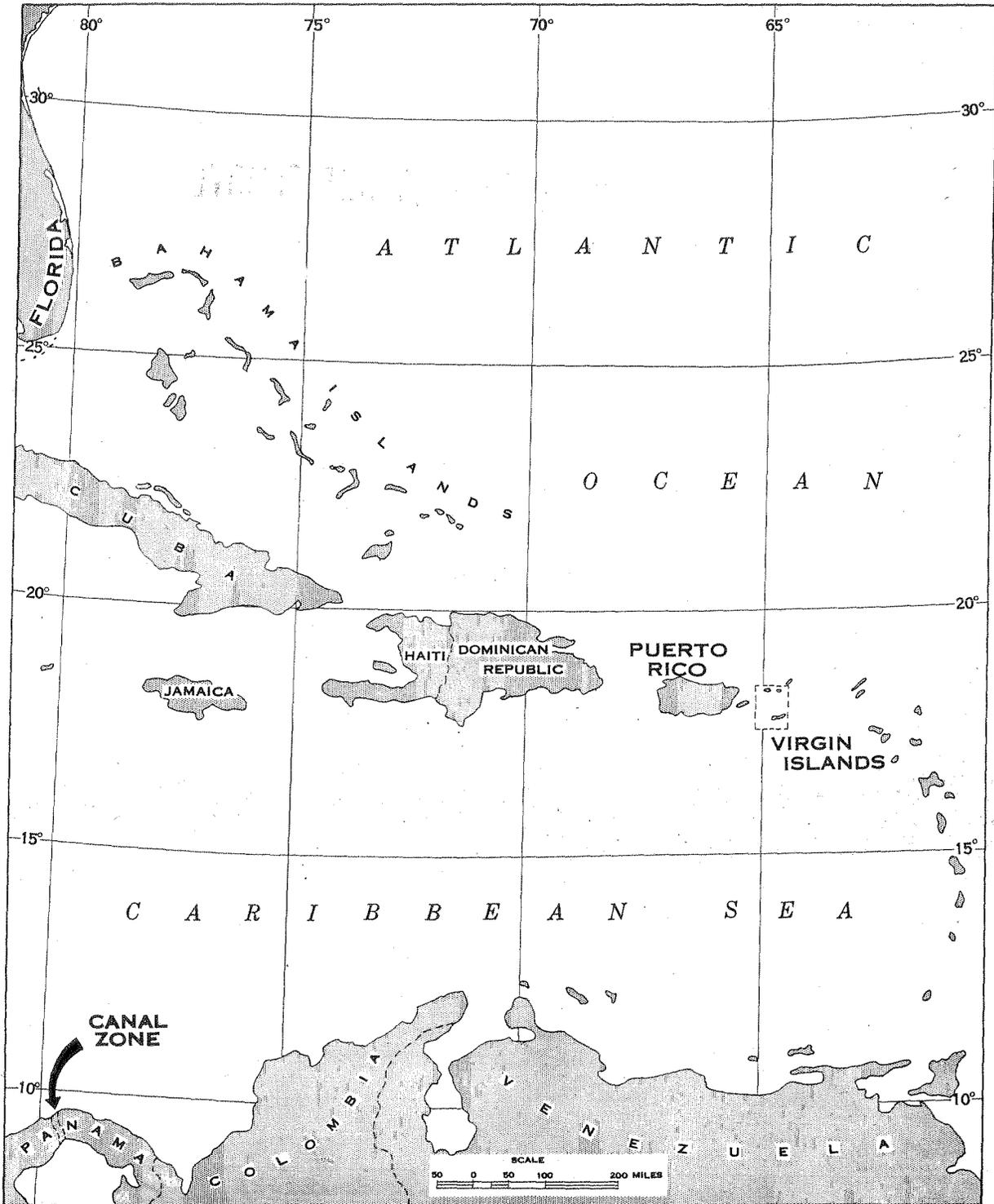
Of the six areas Puerto Rico, the Virgin Islands, and the Canal Zone are located south of the United States on the Caribbean Sea, while Guam, the Trust Territory, and American Samoa are scattered in the vastness of the Pacific Ocean.

As in the past decade, the Virgin Islands of the United States continue to lead the territories in rate of population growth. Between 1970 and 1973, the population of this popular resort area increased by 32 percent, a rate of growth nearly 8 times that of the United States during the same period and nearly 4½ times the rate of all the outlying areas combined.

Guam, a strategic military base in the western Pacific Ocean some 6,000 statutory miles southwest of San Francisco, grew at a rate of 18 percent since the 1970 census. The Trust Territory of the Pacific Islands, located near Guam and comprising three major island groups (the Marshalls, the Carolines, and the Marianas) ranked third among the territories in rate of population growth since 1970 (+13 percent).

Four of the areas—Guam, Puerto Rico, the Virgin Islands, and the Trust Territory—grew at a much more rapid rate between April 1, 1970 and July 1, 1973 than during the previous decade (table A). American Samoa and the Canal Zone grew more slowly. The Canal Zone, with a population decline of 3,000 persons or 7.2 percent in the 1970's, was the only area to lose population over this period.

CARIBBEAN AREA



**Table A. AVERAGE ANNUAL RATE OF INCREASE, BY COMPONENTS OF CHANGE,
FOR OUTLYING AREAS, 1960 TO 1970 AND 1970 TO 1973**

(Figures are expressed as percentages. Minus sign (-) denotes decrease)

Area	Net change ¹		Natural increase ²		Net migration ²	
	1970-73	1960-70	1970-73	1960-70	1970-73	1960-70
CARIBBEAN AREAS						
Puerto Rico.....	2.6	1.4	1.9	2.2	0.7	-0.8
Virgin Islands.....	8.6	6.7	3.2	3.1	5.3	3.3
Canal Zone.....	-2.3	0.5	1.4	1.3	-3.7	-0.8
PACIFIC AREAS						
American Samoa.....	1.2	3.0	3.2	3.7	-2.0	-0.7
Guam.....	5.0	2.4	2.9	2.9	2.1	-0.6
Trust Territory of the Pacific Islands.....	3.8	2.5	3.3	3.2	0.6	-0.7

¹Based on the formula for continuous compounding $P_t = P_o e^{rt}$

²Based on mid-period population.

Population growth in Guam and the Canal Zone is closely related to changes in the Armed Forces, which make up a large portion of each territory's total population. The decline in the Canal Zone population since 1970 has been a reflection of sharp curtailment of the Armed Forces Stationed in the Zone. Guam's rapid growth between 1972 and 1973 resulted from a substantial (but probably temporary) increase in assigned Armed Forces as American military strength in South Vietnam was phased out.

Fertility in the outlying areas is well above U.S. levels. Puerto Rico and the Canal Zone have relatively high fertility, while fertility in the remaining areas is extremely high.

Only the Virgin Islands is gaining more population through migration than through natural increase. It was the only one of the outlying areas to experience any net immigration during the 1960's (33 percent). Since 1970, however, Puerto Rico, Guam, and the Trust Territory also have had some net immigration but not nearly the influx experienced by the Virgin Islands (17 percent in 3½ years).

METHODOLOGY

In developing the estimates for the Commonwealth of Puerto Rico and each of the outlying territories rarely was the same data or uniform method used as a means for deriving the population estimates of the areas. The availability of data relating to population change varies

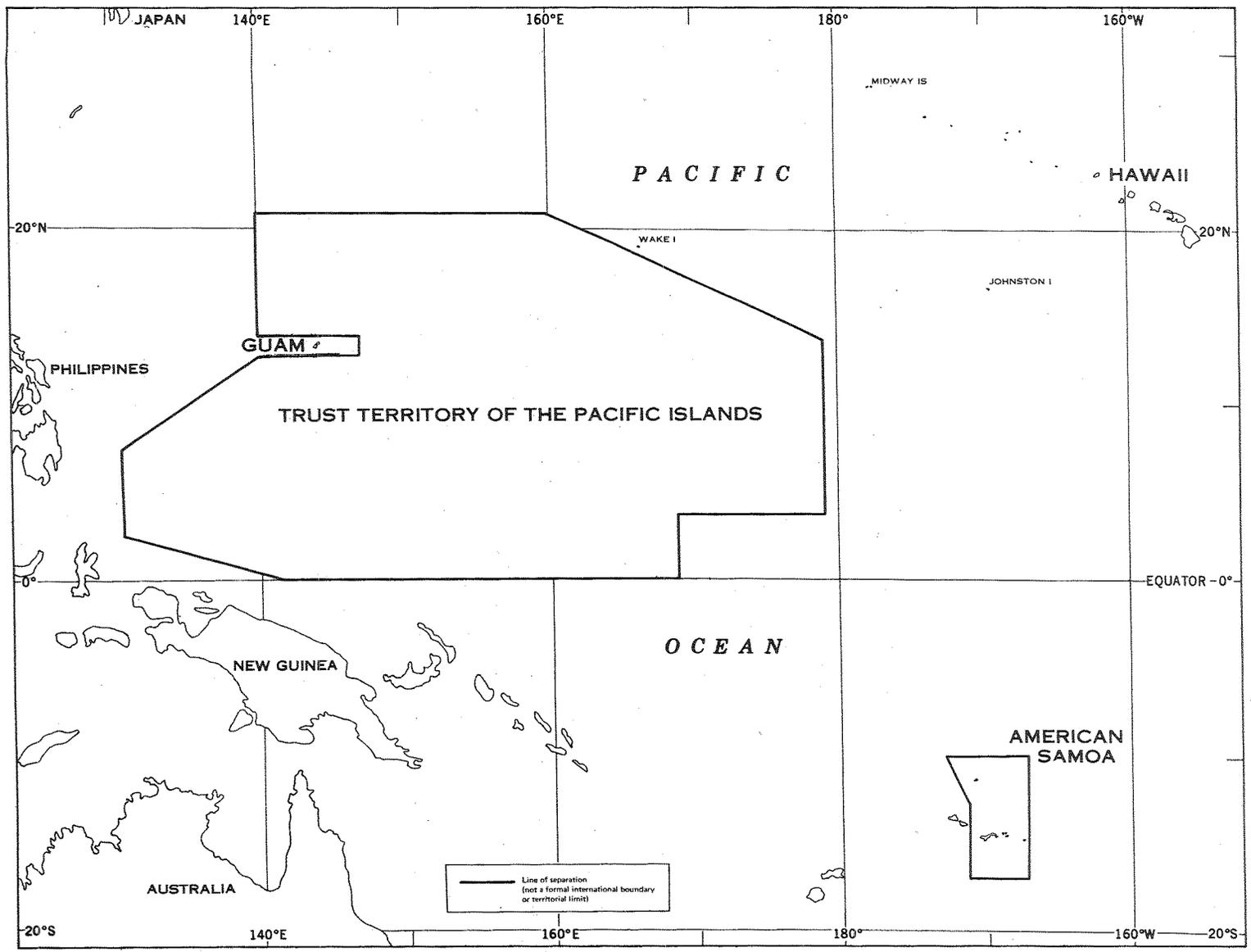
from territory to territory. The concentration of special population groups in some of the areas makes it difficult to rely on certain kinds of symptomatic data or standard methods. In a very broad sense, however, three general approaches to estimating the population were used:

1. A component method for making population estimates which involves:

(1) estimating the civilian population on April 1, 1970, from the census figure for that date, and from figures on the Armed Forces stationed in each area, (2) adding to the civilian population on April 1, 1970, an estimate of births for the period between the census and the estimate date, (3) subtracting an estimate of deaths, (4) adding or subtracting an estimate of net migration, and (5) subtracting an estimate of net loss of civilians to the Armed Forces. The estimate of the total population of each area was obtained by adding an estimate of the number of persons in the Armed Forces stationed there on the estimate date.

2. Special population method—where the population of the area is estimated by summing various subpopulation counts on the estimate date as reported from administrative records for each area.
3. Vital Rates method—two sets of estimates based respectively on current births and deaths and on assumptions concerning the level of the birth and death rates are averaged.

PACIFIC AREA



A brief explanation of the procedure used for each of the areas is as follows:

Puerto Rico. The estimate for Puerto Rico was based on reported statistics for each of the components of population change with the migration component derived from monthly passenger statistics on arrivals to and departures from Puerto Rico on all public transport as collected by the Commonwealth government. The migration estimate for Puerto Rico is the sum of centered 12-month moving averages of the reported monthly data. This compensates for bias as introduced by short term fluctuations in passenger data, which reflect the seasonal movement of transients (tourists and other visitors) rather than the movement of migrants to a new residence. The movement of transients will tend to cancel out over longer periods. Net movement between the civilian population and the Armed Forces is based on the reported number of inductions, enlistments, and separations in Puerto Rico.

The birth statistics used in the estimates no longer include an adjustment for underregistration. The proportion of births occurring outside of hospitals dropped from 25.4 percent in 1960 to 6.8 percent in 1966, suggesting that little or no adjustment needed to be made for underreporting of births. A recent study by the Puerto Rico Planning Board suggests that birth underregistration may still be a problem, however.¹

Virgin Islands. The estimates for the Virgin Islands are based on Component Method II, a variation of the component method developed by the Bureau of the Census. In this method net migration is estimated on the basis of school enrollment or school census data using the difference between the actual 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.

Canal Zone. The estimate for the Canal Zone was based on the average of Component Method II and a summation of special populations which adds to the 1970 census count the estimated change in (1) Armed Forces and United States citizen civilian employees of the Armed Forces, and dependents, (2) U.S. citizen employees of civilian Federal agencies, and dependents, (3) alien employees of civilian Federal agencies and dependents, and (4) other alien dependents.

American Samoa. The estimate for American Samoa was based on a variation of the Vital Rates method in which the 1970 birth and death rate was divided into the current births and deaths to yield a population estimate, making no allowance for a trend in the rates between the census and the estimate date.

Guam. The estimate of the population of Guam was developed, in part, by adding to the 1970 census count of the Asian population (excludes 23,934 persons born in the United States) the following:

1. **Asian natural increase.** The excess of births over deaths to the Asian population based on reported birth and death statistics by place of birth. All births occurring in Guam Memorial Hospital were assumed to be Asian.
2. **Aliens.** This category is comprised primarily of contract workers brought in from the Philippines by the Department of Defense. The estimate is obtained from the Department of Defense.
3. **American Population.** Civilian employees, Armed Forces, and their dependents, also obtained from the Department of Defense.

The results of the above procedure were averaged with the results of a vital rates method in which the 1970 birth and death rate was divided into the current births and deaths to yield a population estimate. Since the 1970 crude birth rate for Guam was more than double the rate for the United States there was no allowance made for a trend in the rate between the census and the estimate date.

Trust Territory of the Pacific. The estimates of the population of the Trust Territory were made by summation of special populations in the same general way as Guam. An annual "census" of residents taken by the Territorial High Commissioner covers all of the indigenous population which excludes only the small number of Federal employees and their dependents. To this total is added an estimate of Federal employees and their dependents based on data from the Civil Service Commission. The estimate is then adjusted downward by the numerical difference between the level of the High Commissioner's census and the Federally conducted census of the Trust Territory in 1970.

Intercensal Estimates for the 1960's. The estimates for each area for 1960 to 1969 were derived by the procedures used for preparing estimates for 1970 to 1973, but an adjustment had to be made to allow for the numerical discrepancy between the 1970 census count and postcensal estimates for 1970 based on 1960 census count. This "error of closure" was prorated over the decade.

For the 1960's intercensal estimates for the Canal Zone have not been prepared because of the lack of an adequate methodology. Postcensal estimates for 1960 to 1967 using Component Method II were published in Series P-25, No. 392, but that method's adequacy for estimating the area became open to serious question (see Limitations section).

¹See *Subregister of Births in Puerto Rico*, Puerto Rico Planning Board, Social Analysis Division, Puerto Rico, June 1970.

LIMITATIONS OF THE ESTIMATES

The areas for which estimates are presented in this report are unique in terms of size, location and composition. This creates difficulty in developing appropriate estimating procedures, much less standard procedures that are applicable for all the areas. The poor quality or absence of data series to be utilized in these procedures create problems that make a reasonable level of accuracy difficult to achieve. The estimation techniques used in this report were selected on the basis of a test of methods against the 1970 census for each of the areas. On the basis of past experience for these areas,

however, it should not be assumed that the best procedure for 1970 will necessarily continue to be effective.

Most of the procedures now used in developing the estimates for these areas differ from what was used during the 1960's. In several cases the level of accuracy by the old procedure was so poor that some change in procedure was mandatory. Table B presents a summary of the relative accuracy in 1970 of the procedures now used for estimating the outlying areas. The table also shows the accuracy in 1970 of procedures used by the Bureau during the 1960's when they differed from the current procedures.

**Table B. PERCENT DEVIATION OF OUTLYING AREAS ESTIMATES
FROM CENSUS COUNTS: APRIL 1, 1970**

(See text for description of methods)

Area	Current method 1970's	Previous method 1960's ¹
CARIBBEAN AREAS		
Puerto Rico.....	+2.9	+2.9
Virgin Islands.....	(Z)	+12.3
Canal Zone.....	(²)	+40.3
PACIFIC AREAS		
American Samoa.....	-2.9	+38.1
Guam.....	+5.5	(Discontinued in 1969)
Trust Territory of the Pacific Islands.....	+9.8	+9.8

Z Less than 0.05 percent.

¹Using methods consistent with those used to develop estimates issued for these areas up to 1968.

²Data series for which special population method is based has only been available since 1970. See text.

For Puerto Rico the estimating technique now used remains essentially unchanged from that used for the 1960's. The accuracy of the estimate depends very heavily upon canceling out in the migration statistics the large number of visitors who move between Puerto Rico and the mainland of the United States. Since gross arrival and departure data obviously contain a large number of tourists, net monthly figures are computed and smoothed using 12-month moving average. This process provides rough approximations of net migration for Puerto Rico. However, the 1970 test suggests an overstatement of the population in the neighborhood of 3 percent, presumably as a result of weaknesses in the migration data.

In the case of the Virgin Islands, where Component Method II is used, the percentage error for that method for 1970 was less than one percent. In the past an average of the results of Component Method II and Composite method was used in generating the estimate, augmented by a separate allowance for immigrant aliens. The percentage difference for the two methods was 4 percent, and the further allowance for aliens increased the difference from the census to 12 percent. Consequently, this procedure was abandoned.

There has been much speculation concerning the number of contract laborers (brought in from the nearby British West Indies under a special program to

work) living in the Virgin Islands which tends to introduce another element of uncertainty in the adequacy of the estimates.² Given the unusual character of this group, it is quite possible that they may not be adequately reflected in conventional estimating procedures. Consequently, in the test a separate allowance for this component was introduced based on figures on the number of aliens reporting under the Alien Address Reports Program of the Immigration and Naturalization Service. The addition of an allowance for estimated aliens to Component Method II (amounting to 5,000 on April 1, 1970) increased the "error" from 1 to 8 percent. The very large net immigration implied in the estimates for the Virgin Islands (almost 16,000 for the 1960's and 12,500 thus far for the 1970's) suggests that a substantial proportion of alien immigrants is already being reflected in the procedure.

Estimates for the Canal Zone in the 1960 decade based on Component Method II were seriously affected by the low enrollment rates in elementary schools and also by the many problems created because of the proximity of the Canal Zone to the Republic of Panama. By 1970, however, enrollment rates in the elementary grades had increased to 98 percent (in 1960 the rate was only 78 percent). Averaging the results of Component Method II with the special population method should yield promising results for the 1970 decade.

For American Samoa there are still many shortcomings to the migration component derived from reported data from the Samoan Office of Immigration which was used for estimating the population in the 1960's. It appears that the passenger data is greatly understating out-movement. Between 1960 and 1970, the reported passenger data indicated a net of +9,972 while the Bureau of the Census estimates of residual migration yielded a figure of nearly 2,000 net out-migrants. Other areas of uncertainty include the movement of tourists and Western Samoans as they enter and leave the country. Consequently, the component procedure used for estimating the territory in the 1960's has been abandoned in favor of a crude vital rates procedure until some improvement in the migration series can be obtained. Recent inquiries to the Office of the Governor indicate that birth and death registrations in American Samoa are complete and that they seem to be reasonably accurate. Most of the births occur in either the Lyndon B. Johnson Memorial Hospital or in dispensaries.

² The Bureau of Alien Affairs in the Virgin Islands reports that thousands of workers from other islands have swelled the population and placed a huge burden on all activities; housing, schools, medical care, etc. See *Annual Report of the Governor of the Virgin Islands* to the Secretary of the Interior, June 1972, pg. 8.

Birth certificates are prepared on all births. Some understatement of deaths, however, may result from the fact that burial permits, although required by law, have never been made available for use.³

For Guam, as indicated earlier, the estimates are based in part on a special population method, which yields point estimates of the various subcategories of the population. Checks of the 1960 local data as supplemented against the 1970 census provide figures reasonably consistent with the 1970 census count.

There is considerable uncertainty about the population level of the Trust Territory of the Pacific Islands. The annual High Commissioner's "census", which has been conducted for a number of years, is the basis for updating the population of the Territory.⁴ This procedure involves merely adding natural increase (births minus deaths) to the last official census figure. Presumably for the period since 1960 the estimates were based on the 1958 census of the Territory. However, when comparisons are made between the High Commissioner's count of the indigenous population and the 1970 Federal census, the High Commissioner's census appears to be about 13,000 (or 14 percent) higher, much of the difference occurring in the Truk district. The Trust Territory took a reapportionment census in May 1973 which showed a preliminary population of 115,251. This number was somewhat lower than the level of the High Commissioner's series but still appreciably higher than the 1970 census would lead one to expect. The Trust Territory is an area where statistical compiling is quite difficult because of the scattered population and vast distances involved. The Bureau is attempting to resolve the differences between the two censuses.

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 territories.

Data on **births and deaths** were obtained from the local governments for American Samoa, Canal Zone, Guam, and the Trust Territory of the Pacific. Estimates of births and deaths for Puerto Rico and the Virgin Islands were derived from data obtained by the National Center for Health Statistics, U.S. Public Health Service for calendar years 1960 to 1966. Provisional births and deaths since 1967 are published in the **Monthly Vital**

³ Jerry W. Combs, Jr., *Population Growth in American Samoa*, Center for Population Research, National Institute of Child Health and Human Development, March 1974.

⁴ No other methods or sets of data are currently available to produce estimates with any degree of reasonableness. Although birth and death registration is compulsory, registration is not complete mainly because of distance and lack of frequent communication between some islands and districts, thus preventing the use of a simple vital rates estimate.

Statistics Report, by the National Center for Health Statistics. Births were not adjusted for underregistration.

Armed Forces data are based on figures provided by the Department of Defense. The Puerto Rico Planning Board supplied figures on the balance of inductions, enlistments and discharges in order to compute the component net loss of civilians to the Armed Forces.

School enrollment data were supplied by the local Departments of Education. For Puerto Rico data on **migration** were supplied by the Puerto Rico Planning Board supplemented by statistics on civilians carried by military transport from the Department of Defense. The number of **Federal civilian employees** was obtained from the United States Civil Service Commission.

RELATED REPORTS

Estimates for Puerto Rico, the Canal Zone, and the Virgin Islands for 1940 to 1949 are shown in **Current Population Reports**, Series P-25, No. 80. Estimates for all outlying areas for 1950 to 1959 appear in Series P-25, No. 336.

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 1. ESTIMATES OF THE COMPONENTS OF CHANGE IN THE RESIDENT AND CIVILIAN POPULATION OF PUERTO RICO AND OTHER OUTLYING AREAS OF THE UNITED STATES: 1970 TO 1973

(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 other areas)

Area and type of population	July 1, 1973	April 1, 1970 (census)	Net change		Components of change, April 1, 1970, to July 1, 1973			
			Number	Percent	Births	Deaths	Net migration	
							Number	Rate ¹
Resident population.....	3,311,000	3,025,754	285,000	9.4	270,000	65,000	80,000	2.5
CARIBBEAN AREAS								
Puerto Rico.....	2,951,000	2,712,033	239,000	8.8	233,000	60,000	66,000	2.3
Virgin Islands.....	82,600	62,468	20,100	32.2	9,300	1,700	12,500	17.3
Canal Zone.....	41,000	44,198	-3,200	-7.2	2,300	300	-5,100	-12.0
PACIFIC AREAS								
American Samoa.....	28,300	27,159	1,100	4.1	3,400	500	-1,800	-6.5
Guam.....	100,000	84,996	15,000	17.7	10,000	1,200	6,200	6.7
Trust Territory of the Pacific Islands	107,500	94,900	12,600	13.2	12,200	1,900	2,300	2.3
Civilian population.....	3,272,000	2,986,000	287,000	9.6	270,000	65,000	82,000	2.6
CARIBBEAN AREAS								
Puerto Rico.....	2,943,000	2,701,000	241,000	8.9	233,000	60,000	68,000	2.4
Virgin Islands.....	82,300	62,500	19,800	31.7	9,300	1,700	12,300	16.9
Canal Zone.....	30,100	29,400	700	2.4	2,300	300	-1,300	-4.2
PACIFIC AREAS								
American Samoa.....	28,200	26,900	1,300	5.0	3,400	500	-1,600	-5.7
Guam.....	82,000	71,300	10,700	15.0	10,000	1,200	1,900	2.5
Trust Territory of the Pacific Islands	107,200	94,700	12,500	13.2	12,200	1,900	2,200	2.2

¹Per 100 mid-period population.

Table 2. ESTIMATES OF THE RESIDENT AND CIVILIAN POPULATION OF PUERTO RICO AND OTHER OUTLYING AREAS OF THE UNITED STATES
JULY 1, 1960 TO JULY 1, 1973

(Puerto Rico rounded to thousands. All other areas to nearest hundred)

Area and type of population	1973	1972	1971	1970	1969	1968	1967	1966	1965	1964	1963	1962	1961	1960
RESIDENT POPULATION														
Caribbean Areas														
Puerto Rico.....	2,951,000	2,866,000	2,775,000	2,718,000	2,717,000	2,669,000	2,645,000	2,624,000	2,594,000	2,550,000	2,495,000	2,447,000	2,402,000	2,358,000
Virgin Islands.....	82,600	75,000	68,800	65,600	60,300	55,700	49,100	46,200	43,500	40,800	39,800	35,000	34,300	32,500
Canal Zone.....	41,000	41,600	42,300	(NA)										
Pacific Areas														
American Samoa.....	28,300	27,700	26,600	28,500	30,400	28,100	25,100	26,700	24,600	23,200	23,100	21,000	19,900	20,000
Guam.....	100,000	94,200	87,600	85,500	83,700	83,800	81,400	79,200	74,100	72,500	72,000	69,100	66,400	66,900
Trust Territory of the Pacific Islands.....	107,500	106,900	99,200	94,900	90,300	87,700	85,800	87,400	86,100	84,200	81,400	78,700	76,300	75,100
CIVILIAN POPULATION														
Caribbean Areas														
Puerto Rico.....	2,943,000	2,859,000	2,769,000	2,708,000	2,704,000	2,657,000	2,632,000	2,612,000	2,582,000	2,540,000	2,484,000	2,437,000	2,392,000	2,346,000
Virgin Islands.....	82,300	75,000	68,800	65,600	59,900	54,900	49,000	42,500	43,200	40,600	37,400	34,700	32,900	32,100
Canal Zone.....	30,100	30,900	31,400	(NA)										
Pacific Areas														
American Samoa.....	28,200	27,700	26,600	28,500	29,600	28,100	25,100	26,700	24,600	23,200	23,100	20,900	19,900	20,000
Guam.....	82,000	81,100	76,600	71,500	71,200	66,700	66,900	65,700	65,300	64,100	63,000	61,300	58,500	57,500
Trust Territory of the Pacific Islands.....	107,200	106,600	99,000	94,700	90,100	87,400	85,200	86,900	86,000	84,100	81,300	78,300	76,000	74,700

NA Not available.

Table 3. ESTIMATES OF THE COMPONENTS OF CHANGE IN THE RESIDENT AND CIVILIAN POPULATION OF PUERTO RICO AND OTHER OUTLYING AREAS OF THE UNITED STATES: 1960 TO 1970

(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 other areas)

Area and type of population	April 1, 1970 (census)	April 1, 1960 (census) ¹	Net change		Components of change, April 1, 1960, to April 1, 1970			
			Number	Percent	Births	Deaths	Net migration	
							Number	Rate ²
RESIDENT POPULATION								
Caribbean Areas								
Puerto Rico.....	2,712,033	2,349,544	362,000	15.4	734,000	172,000	-200,000	-7.9
Virgin Islands.....	62,468	32,099	30,400	94.6	18,600	3,900	15,700	33.1
Canal Zone.....	44,198	42,122	2,100	4.9	7,000	1,400	-3,600	-8.2
Pacific Areas								
American Samoa.....	27,159	20,051	7,100	35.4	10,100	1,300	-1,700	-7.2
Guam.....	84,996	67,044	18,000	26.8	25,600	3,400	-4,200	-5.5
Trust Territory of the Pacific Islands	94,900	74,600	20,300	27.2	30,900	4,800	-5,700	-6.8
CIVILIAN POPULATION								
Caribbean Areas								
Puerto Rico.....	2,701,000	2,338,000	363,000	15.5	734,000	172,000	-199,000	-7.9
Virgin Islands.....	62,500	32,000	30,500	95.2	18,600	3,900	15,800	33.4
Canal Zone.....	29,400	34,500	-5,100	-14.9	7,000	1,400	-10,800	-33.7
Pacific Areas								
American Samoa.....	26,900	20,100	6,900	34.2	10,100	1,300	-1,900	-8.3
Guam.....	71,300	57,100	14,200	24.9	25,600	3,400	-7,900	-12.4
Trust Territory of the Pacific Islands	94,700	74,200	20,500	27.6	30,900	4,800	-5,600	-6.6

¹Except estimate for the Trust Territory, where a census was taken in 1958.

²Per 100 mid-period population.