



# **The Number of Native Hawaiians & Part-Hawaiians in Hawai'i, 1778 to 1900: Demographic Estimates by Age, with Discussion.**

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# OVERVIEW

A high level of uncertainty surrounds the size of the Hawaiian population at the time of first European contact in 1778. Estimates range from 200,000 to 1,000,000; Virtually no uncertainty surrounds the size of the Part-Hawaiian population in 1778 – it was zero.\*

\* Although there are arguments that the Spanish visited Hawai'i in the 16<sup>th</sup> century, most evidence suggests that the English were the first Europeans to do so, with the arrival of Cook in 1778 (Nordyke, 1989: 15-18). This paper follows the argument that the English contact in 1778 was the first. Related to the first contact issue, Kirch (1985: 52-66, 87-88) finds that the available evidence points to the Marquesas Islands as the origins of the Hawaiians, with the initial settlements established during the fourth and fifth centuries, although there are others who argue it was later (Dye 1994, Rallu 2007). Kirch (1985: 66) also finds that while there may have been contacts with other island groups, such as the Society Islands, by the time of Cook's arrival the contacts between Hawai'i and other island groups, including the Marquesas, had long since ceased. There appears to be no argument that the contact with other island groups had not ceased long before Cook's arrival.

# OVERVIEW

Here is an example of the range of the estimated number of Hawaiians in 1778\*

200,000 by Captain Dixon, visit of 1787 (Schmitt, 1968: 20)

242,000 by Bligh, with Cook, 1<sup>st</sup> Visit (Schmitt, 1968: 20)

200,000 – 250,000 by Schmitt (Schmitt, 1971)

300,000 by Schmitt and Zane (cited in Nordyke, 1989: 173)

400,000 by King, with Cook, 2<sup>nd</sup> Visit, (Adams, 1937: 1)

450,000 by Hommon (2008: 53)

500,000 by Officers with Cook, 1<sup>st</sup> Visit (Schmitt, 1968: 19)

800,000 - 1,000,000 (Stannard, 1989: 50)

\*There are more, often expressed as opinions concerning the initial estimates by Bligh, Dixon, King, and other British Naval officers, but most are in the range shown above (see, e.g., Schmitt, 1968: 18-23).

# OVERVIEW

While some estimates have more of an empirical base than others, none of them is done using “backcasting,” a demographic forecasting method run in reverse from known data.

Using a commonly used technique for this purpose, the 1910 count of Native Hawaiians by age in Hawai‘i is taken back to 1770 in decennial cycles.

Interpolating between the 1780 and 1770 estimates yields an estimated 683,200 Hawaiians in 1778, which would place it at the “high end” of the range of estimates just shown, above the 500,000 estimated by King and below the 800,000 – 1,000,000 estimated by Stannard.

# OVERVIEW

Starting with 683,200 in 1778, the population of Native Hawaiians in Hawai'i drops to 644,383 in 1780 and by 1900 is only 29,336;

Backcasting, along with extrapolation and regression, is used to assemble the estimate of Part-Hawaiians in 1778 and in decennial cycles from 1780 to 1900.

Starting from zero in 1778, the population grows to 9 Part-Hawaiians in Hawai'i by 1780 and 7,857 in 1900.

# COHORT CHANGE RATIOS (FORWARD)

Before I describe Reverse Cohort Change Ratios, it will be useful to describe their “forward” characteristics and uses. That is, their use to go forward in time.

In the forward sense, Cohort Change Ratios have a long history in demography. They can be traced at least as far back as 1911 when Hardy and Wyatt used this for generating a population projection they needed to assess the cost of the initial beginning of what became the national health insurance program in the UK.



# COHORT CHANGE RATIOS (FORWARD)

Under the rubric of “Census Survival Ratios,” they have been used to estimate adult mortality and under the rubric of the “Hamilton-Perry” method, to make population projections.

# COHORT CHANGE RATIOS (FORWARD)

In general, a CCR can be described as follows:

$${}_n\text{CCR}_x = {}_n\text{P}_{x,t,i} / {}_n\text{P}_{x-k,t-k,i}$$

where

${}_n\text{P}_{x,t}$  is the population aged  $x$  to  $x+n$  at time  $t$  for area  $i$ , which is typically the most recent census

${}_n\text{P}_{x-k,t-k}$  is the population aged  $x-k$  to  $x-k+n$  at a preceding point in time  $(t-k)$  for area  $i$ , which is typically the 2<sup>nd</sup> most recent census

$k$  is the number of years between the most recent census at time  $t$  and the one preceding it at time  $t-k$ .

# COHORT CHANGE RATIOS (FORWARD)

The basic formula for projecting age cohorts is:

$${}_n P_{x+k,t+k,i} = ({}_n CCR_{x,i}) \times ({}_n P_{x,t,i})$$

where

${}_n P_{x+k,t+k}$  is the projected population aged  $x+k$  to  $x+k+n$  at time  $(t+k)$  for area  $i$ ,

$({}_n CCR_{x,i})$  is the cohort change ratio as described earlier, and

${}_n P_{x,t}$  is the population aged  $x$  to  $x+n$  at the most recent census  $(t)$  for area  $i$ .

# COHORT CHANGE RATIOS (FORWARD)

The preceding two steps, are widely known as the Hamilton-Perry method, which projects a population by age (and sex) from time (t) to time (t+k) using CCRs computed from the two most recent censuses. It consists of two steps. The first uses existing data to develop CCRs and the second applies the CCRs to the cohorts of the launch year population to move them into the future.

# COHORT CHANGE RATIOS (FORWARD)

The second step can be repeated infinitely, with the projected population serving as the launch population for the next projection cycle. One also can calculate CCRs over a period of time and measure trends in them, which also can be used to modify expected CCRs and generate projections.

# COHORT CHANGE RATIOS (FORWARD)

Given the nature of the CCRs, 10-14 is the youngest age group for which projections can be made if there are 10 years between censuses. To project the populations aged 0-4 and 5-9, one can use the Child Woman Ratio (CWR), or more generally a “Child Adult Ratio” (CAR). It does not require any data beyond the decennial census. For projecting the population aged 0-4, CAR is defined as the population aged 0-4 divided by the population aged 15-44. For projecting the population aged 5-9, CAR is defined as the population aged 5-9 divided by the population aged 20-49.\*

\*There are both other methods to obtain these age groups and other “adult” age groups that could be used to define CAR.

# COHORT CHANGE RATIOS (FORWARD)

Projections of the oldest open-ended age group differ slightly from the CCR projections for the age groups beyond between the age for which a CAR is needed and to oldest closed age group.

If, for example, the final closed age group is 70-74, with 75+ as the terminal open-ended age group, then calculations for the  ${}_{\infty}CCR_{75,t}$  require the summation of the three oldest age groups to get the population age 75+ at time t and the summation of the age groups that will yield P65+ at time t-k:

$${}_{\infty}CCR_{75,t,i} = {}_{\infty}P_{75+,t,i} / {}_{\infty}P_{65+,t-k,i}$$

# COHORT CHANGE RATIOS (FORWARD)

$$\text{Given then, } {}_{\infty}\text{CCR}_{75,t,i} = {}_{\infty}\text{P}_{75+,t,i} / {}_{\infty}\text{P}_{65+,t-k,i}$$

The formula for projecting the population 75+ for the year t+k is:

$${}_{\infty}\text{P}_{75+,t+k,i} = ({}_{\infty}\text{CCR}_{75+,t,i}) \times ({}_{\infty}\text{P}_{65+,t,i}).$$



# COHORT CHANGE RATIOS (FORWARD)

As you can see, one only needs two census counts (or other sources of good data, such as a population registry) of a population by age to generate a population forecast that can provide age groups, sex, race, and a host of other ascribed and achieved characteristics.

Contrast this with the most widely used method used to generate this information in a population projection, the cohort-component method, which requires not only a census count by age, but vital statistics data and migration data.

# COHORT CHANGE RATIOS (FORWARD)

When using only two census counts of population by age to generate a population forecast, it has become customary to call this process a “Hamilton-Perry” Projection. This is named after C. Horace Hamilton and Josef Perry who (re-)discovered this method and described it in a 1962 article that appeared in the journal, *Social Forces*.

# COHORT CHANGE RATIOS (FORWARD)

Here is an example of a “Hamilton-Perry” forecast of the Native Hawaiian and Part-Hawaiian in Hawai‘i for 2030, using CCRs from 2000-2010 (transition to excel file)

# COHORT CHANGE RATIOS (REVERSE)

When the Hamilton-Perry Method is used for backcasting rather than forecasting, the cohort change ratios are run in reverse.

In general, a reverse cohort change ratio (RCCR) is the reciprocal of the corresponding CCR (Swanson and Tayman 2012: 340-353). That is, if the CCR for those aged 0-4 years in 2000 relative to those aged 10-14 years in 2010 is .858458, then the corresponding RCCR for those aged 10-14 in 2010 relative to those aged 0-4 in 2000 is  $1/.858458 = 1.164878$ .

# COHORT CHANGE RATIOS (REVERSE)

There is no adjustment needed for those aged 0-4 and 5-9 in an RCCR because the people in these age cohorts were aged 10-14 and 15-19 in the subsequent census (i.e., those aged 0-4 in 2000 were aged 10-14 in 2010).

# COHORT CHANGE RATIOS (REVERSE)

However, there is an adjustment needed for the terminal open-ended age group to avoid the fact that every ten years (in the US Census context) this group would be ten years younger and, as such, successively providing less information about the age structure of the population in question.

# COHORT CHANGE RATIOS (REVERSE)

For example, if one takes the ratio of the population aged 80+ in the 2000 census to the population aged 90+ in the 2010 census and applies this to the population aged 90+ in the 2000, the population aged 80+ is backcasted for the year 1990. This is now the “new” terminal open-ended age group so an RCCR for 80+/70+ must be applied to this age group, which, in turn, generates the population 70+ for the year 1980.

# COHORT CHANGE RATIOS (REVERSE)

By the time the backcasting process reached 1910 the only age information would be for the population aged 0+ and 1910 would be the terminal point of the backcast. To avoid this, proportions of the closed age groups that make up a given open-ended age group are calculated and applied to the backcasted number in the terminal open-ended age group.



# COHORT CHANGE RATIOS (REVERSE)

For example, in the 2010 census one can redefine the terminal open-ended age group not only as 90+, but also as 80+ and the latter would have three associated age groups, 80-84, 85-89 and 90+. These proportions can be used to maintain a constant definition of the terminal open-ended age group as the backcast proceeds. That is, as soon as one has backcasted the population 80+ for the year 2000 from the population aged 90+ in 2010, the proportions can be applied to the backcasted 80+ population so that the 2000 population aged 80-84, 85-89 and 90+ can be estimated.

# COHORT CHANGE RATIOS (REVERSE)

In the backcast for the Native Hawaiian population, the 1920 and 1910 US Census data are used to define the RCCRs using five year age groups, 0-4, 5-9, 10-14, ..., 70-74, with a terminal open-ended age group of 75+. This means that the ratio of the population aged 65+ in 1910 to the population aged 75+ in 1920 is used to generate the terminal open-ended age group of 65+, with the latter having 65-69, 70-74 and 75+ as its three associated age groups. The proportions for these three age groups were found by averaging the proportions for them found in the 1930, 1920, and 1910 census counts for Native Hawaiians in Hawai'i.

# COHORT CHANGE RATIOS (REVERSE)

The RCCRs and the adjustments were initially applied to the 1910 census by age to generate a set of backcasted 1900 estimates by age for the Native Hawaiian population in Hawai'i. The same RCCRs were then applied to the 1900 estimates by age to generate a set of backcasted 1890 estimates by age. This process was repeated until the 1770 population of Native Hawaiians by age was generated for Hawai'i. As should be clear, the backcasting proceeded in decennial cycles from 1900 to 1770.

# METHODS USED TO ESTIMATE THE POPULATION OF PART-HAWAIIANS IN HAWAI'I

The second point of departure is the set of decennial estimates developed for the total number of Native Hawaiians in Hawai'i from 1778 to 1900 (Table 1). The third point of departure is the U.S. Census Bureau's decennial data on Part-Hawaiians in Hawai'i from 1910 to 1930. From these data sources, the RCCRs along with extrapolation and a time-based regression method were used to develop preliminary estimates by age that were controlled to known numbers. The result in terms of the total number of Part-Hawaiians in Hawai'i from 1778 to 1900 is found in Table 2.

# METHODS USED TO ESTIMATE THE POPULATION OF PART-HAWAIIANS IN HAWAI'I

To generate the population of Part-Hawaiians in Hawai'i, RCCRs were also employed, but they were supplemented with other methods in some periods because of incomplete data. In addition, there was an important constraint on this population that was not a constraint on the population of Native Hawaiians: At the moment of first European contact there were no Part-Hawaiians, only Native Hawaiians.

# METHODS USED TO ESTIMATE THE POPULATION OF PART-HAWAIIANS IN HAWAI'I

This is a benefit in terms of estimating the population of Part-Hawaiians from 1778 to the present and beyond because unlike the population of Native Hawaiians in 1778, there is no uncertainty about the number of Part-Hawaiians – it was zero. Thus, we know that the backcasting process has to conform to a population of zero by 1778.

# METHODS USED TO ESTIMATE THE POPULATION OF PART-HAWAIIANS IN HAWAII

We know, however, that the Part-Hawaiian population was much smaller than the Native Hawaiian population and all Part-Hawaiians had to be two years or younger in 1780. To begin the construction of the estimates of Part-Hawaiians from 1870 to 1850, a (reverse) rate ( $r$ ) of population change was found for the period from 1860 to 1853 using data provided by Nordyke (1989: 178) on the number of Part-Hawaiians for these two years, 1,337 and 862, respectively.

# METHODS USED TO ESTIMATE THE POPULATION OF PART-HAWAIIANS IN HAWAII

The model in Excel terms is  $r = (\text{POWER}((J12/J13), 1/7)) = 0.939159$ . This model was applied to the 1860 number (1,337) to generate estimated numbers in ten-year cycles back to 1780. The numbers for 1860 to 1780 can be seen in Table 2 as can the number for 1778, which is zero.



# METHODS USED TO ESTIMATE THE POPULATION OF PART-HAWAIIANS IN HAWAII

Using the decennial estimates from 1860 to 1790 generated from the reverse extrapolation, a simple regression model ( $n = 8$ ) was generated in order to develop estimates for 1870 and 1880 using year as the independent variable. Constructed in Excel, the model is  $N = -3101.35 + 167.34 * YR$  ( $r^2 = .92$ ), where  $N$  = number of estimated Part-Hawaiians and  $YR$  = Year.

# METHODS USED TO ESTIMATE THE POPULATION OF PART-HAWAIIANS IN HAWAI'I

For 1870, the model yielded an estimate of 2,785 Part-Hawaiians ( $2,785 \approx -310135 + (167.33371 * 1870)$ ) and for 1880, the model yielded an estimate of 4,459 ( $4,459 \approx -320235 + (167.23371 * 1880)$ ). With these estimates for 1870 and 1880, an initial complete set of decennial estimates of Part-Hawaiians was available for Hawai'i from 1780 to 1900.

# METHODS USED TO ESTIMATE THE POPULATION OF PART-HAWAIIANS IN HAWAII

Once the total population of Part-Hawaiians was constructed, Reverse Cohort Change Ratios (RCCRs) were constructed for the period 1920-1910 and used to generate initial estimates by age back to 1860 in decennial cycles. This step followed what was done for the Native Hawaiian population. These estimates were then “controlled” to the independently estimated total populations for these years, respectively (Table 2). For the estimates by age from 1850 back to 1780, knowledge of the age of Part-Hawaiians was used.

# METHODS USED TO ESTIMATE THE POPULATION OF PART-HAWAIIANS IN HAWAI'I

Of the nine estimated Part-Hawaiians in 1780, all were in age group 0-4 since none was older than two years. By 1790, none could have been older than 10-14, by 1800, none could have been older than 20-24, and so on to 1850 when none could have been older than 70-74. The survival rates described in endnote 4 were used to survive the population each decennial cycle by ten years from 1780 forward to 1850 and the number of births was estimated by finding the difference between the survivors at any given time and the independently estimated total population.

# METHODS USED TO ESTIMATE THE POPULATION OF PART-HAWAIIANS IN HAWAI'I

As an example of this process, in 1790 there were four survivors aged 10-14 remaining of the nine Part-Hawaiians in 1780 (who were aged 0-4). Assuming that births were evenly distributed over the ten year period, of those born between 1780 and 1784, five were estimated to have reached age 5-9 by 1790 and of those born between 1785 and 1789, seven were estimated to have been alive (and aged 0-4) in 1790.

# RESULTS

**TABLE 1. TOTAL POPULATION OF NATIVE HAWAIIANS (IN HAWAI'I): 1900 TO 1770.**

| <b>YEAR</b>    | <b>ESTIMATED</b> | <b>CENSUS COUNT*</b> |
|----------------|------------------|----------------------|
| <b>1900</b>    | <b>29,336</b>    | <b>29,799</b>        |
| <b>1890</b>    | <b>33,457</b>    | <b>34,436</b>        |
| <b>1880</b>    | <b>39,711</b>    | <b>N/A</b>           |
| <b>1870</b>    | <b>48,579</b>    | <b>N/A</b>           |
| <b>1860</b>    | <b>61,931</b>    | <b>67,084**</b>      |
| <b>1850</b>    | <b>80,574</b>    | <b>82,035</b>        |
| <b>1840</b>    | <b>110,948</b>   | <b>N/A</b>           |
| <b>1830</b>    | <b>149,297</b>   | <b>N/A</b>           |
| <b>1820</b>    | <b>200,018</b>   | <b>N/A</b>           |
| <b>1810</b>    | <b>267,971</b>   | <b>N/A</b>           |
| <b>1800</b>    | <b>359,010</b>   | <b>N/A</b>           |
| <b>1790</b>    | <b>480,978</b>   | <b>N/A</b>           |
| <b>1780</b>    | <b>644,383</b>   | <b>N/A</b>           |
| <b>1778***</b> | <b>683,200</b>   | <b>N/A</b>           |
| <b>1770</b>    | <b>863,302</b>   | <b>N/A</b>           |

\* Source: Schmitt(1968).

\*\* The 1860 census did not distinguish between Native Hawaiians and Part-Hawaiians.

\*\*\*  $683,200 = 863,302 * (e^{r*8})$ , where  $r = -0.02925 = [\ln(644,383/863,302)]/10$

**TABLE 2. NUMBER OF PART-HAWAIIANS IN HAWAI'I: 1780-1900**

| <b>YEAR</b> | <b>NUMBER</b> |
|-------------|---------------|
| <b>1778</b> | <b>0</b>      |
| <b>1780</b> | <b>9</b>      |
| <b>1790</b> | <b>17</b>     |
| <b>1800</b> | <b>31</b>     |
| <b>1810</b> | <b>58</b>     |
| <b>1820</b> | <b>109</b>    |
| <b>1830</b> | <b>203</b>    |
| <b>1840</b> | <b>381</b>    |
| <b>1850</b> | <b>714</b>    |
| <b>1860</b> | <b>1,337</b>  |
| <b>1870</b> | <b>2,785</b>  |
| <b>1880</b> | <b>4,459</b>  |
| <b>1890</b> | <b>6,186</b>  |
| <b>1900</b> | <b>7,857</b>  |

Descriptions of sources and methods are found in the text.



**TABLE 3 TOTAL NATIVE HAWAIIAN POPULATION BY AGE IN HAWAII, 1780 TO 1900 (EXCLUDES PART-HAWAIIANS)**

| <b>age</b>   | <b>1780</b>    | <b>1790</b>    | <b>1800</b>    | <b>1810</b>    | <b>1820</b>    | <b>1830</b>    | <b>1840</b>    | <b>1850</b>   | <b>1860</b>   | <b>1870</b>   | <b>1880</b>   | <b>1890</b>   | <b>1900</b>   |
|--------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|---------------|---------------|---------------|---------------|---------------|---------------|
| <b>0-4</b>   | 38,229         | 28,535         | 21,299         | 15,898         | 11,866         | 8,857          | 6,122          | 4,321         | 5,065         | 4,004         | 3,502         | 3,120         | 2,945         |
| <b>5-9</b>   | 39,476         | 29,466         | 21,994         | 16,416         | 12,254         | 9,146          | 6,827          | 3,525         | 4,522         | 3,746         | 3,782         | 3,333         | 3,043         |
| <b>10-14</b> | 43,967         | 32,818         | 24,496         | 18,284         | 13,648         | 10,187         | 7,604          | 5,255         | 3,709         | 4,348         | 3,438         | 3,007         | 2,678         |
| <b>15-19</b> | 46,184         | 34,473         | 25,731         | 19,206         | 14,336         | 10,700         | 7,987          | 5,962         | 3,078         | 3,949         | 3,271         | 3,303         | 2,911         |
| <b>20-24</b> | 49,864         | 37,219         | 27,781         | 20,736         | 15,478         | 11,553         | 8,623          | 6,437         | 4,449         | 3,140         | 3,680         | 2,910         | 2,545         |
| <b>25-29</b> | 47,041         | 35,112         | 26,208         | 19,562         | 14,602         | 10,899         | 8,135          | 6,072         | 4,532         | 2,340         | 3,002         | 2,487         | 2,511         |
| <b>30-34</b> | 46,825         | 34,951         | 26,088         | 19,472         | 14,535         | 10,849         | 8,098          | 6,044         | 4,512         | 3,118         | 2,201         | 2,580         | 2,040         |
| <b>35-39</b> | 51,432         | 38,389         | 28,654         | 21,388         | 15,964         | 11,916         | 8,894          | 6,639         | 4,955         | 3,699         | 1,910         | 2,450         | 2,030         |
| <b>40-44</b> | 45,151         | 33,701         | 25,155         | 18,776         | 14,015         | 10,461         | 7,808          | 5,828         | 4,350         | 3,247         | 2,244         | 1,584         | 1,857         |
| <b>45-49</b> | 53,469         | 39,910         | 29,790         | 22,236         | 16,597         | 12,388         | 9,247          | 6,902         | 5,152         | 3,845         | 2,870         | 1,482         | 1,901         |
| <b>50-54</b> | 40,464         | 30,203         | 22,544         | 16,827         | 12,560         | 9,375          | 6,998          | 5,223         | 3,899         | 2,910         | 2,172         | 1,501         | 1,060         |
| <b>55-59</b> | 39,524         | 29,501         | 22,020         | 16,436         | 12,268         | 9,157          | 6,835          | 5,102         | 3,808         | 2,842         | 2,122         | 1,584         | 818           |
| <b>60-64</b> | 33,304         | 24,858         | 18,555         | 13,850         | 10,338         | 7,716          | 5,759          | 4,299         | 3,209         | 2,395         | 1,788         | 1,334         | 922           |
| <b>65-69</b> | 29,530         | 22,042         | 16,452         | 12,280         | 9,166          | 6,842          | 5,107          | 3,812         | 2,845         | 2,124         | 1,585         | 1,183         | 883           |
| <b>70-74</b> | 16,449         | 12,278         | 9,164          | 6,840          | 5,106          | 3,811          | 2,845          | 2,123         | 1,585         | 1,183         | 883           | 659           | 492           |
| <b>75+</b>   | 23,473         | 17,521         | 13,078         | 9,762          | 7,286          | 5,439          | 4,059          | 3,030         | 2,262         | 1,688         | 1,260         | 941           | 702           |
| <b>TOTAL</b> | <b>644,383</b> | <b>480,978</b> | <b>359,010</b> | <b>267,971</b> | <b>200,018</b> | <b>149,297</b> | <b>110,948</b> | <b>80,574</b> | <b>61,931</b> | <b>48,579</b> | <b>39,711</b> | <b>33,457</b> | <b>29,336</b> |

**TABLE 4. TOTAL PART-HAWAIIAN POPULATION BY AGE IN HAWAII, 1780 TO 1990 (EXCLUDES NATIVE HAWAIIANS)**

| age          | 1780     | 1790      | 1800      | 1810      | 1820       | 1830       | 1840       | 1850       | 1860         | 1870         | 1880         | 1890         | 1900         |
|--------------|----------|-----------|-----------|-----------|------------|------------|------------|------------|--------------|--------------|--------------|--------------|--------------|
| 0-4          | 9        | 7         | 12        | 18        | 29         | 49         | 83         | 145        | 109          | 230          | 393          | 577          | 789          |
| 5-9          | 0        | 5         | 7         | 13        | 22         | 37         | 65         | 116        | 98           | 215          | 425          | 616          | 815          |
| 10-14        | 0        | 4         | 5         | 10        | 19         | 33         | 59         | 107        | 80           | 249          | 386          | 556          | 717          |
| 15-19        | 0        | 0         | 4         | 7         | 14         | 25         | 47         | 86         | 66           | 226          | 367          | 611          | 780          |
| 20-24        | 0        | 0         | 3         | 4         | 11         | 21         | 40         | 75         | 96           | 180          | 413          | 538          | 682          |
| 25-29        | 0        | 0         | 0         | 3         | 6          | 14         | 28         | 53         | 98           | 134          | 337          | 460          | 672          |
| 30-34        | 0        | 0         | 0         | 2         | 4          | 10         | 21         | 42         | 97           | 179          | 247          | 477          | 546          |
| 35-39        | 0        | 0         | 0         | 0         | 3          | 6          | 14         | 29         | 107          | 212          | 214          | 453          | 544          |
| 40-44        | 0        | 0         | 0         | 0         | 2          | 4          | 10         | 23         | 94           | 186          | 252          | 293          | 497          |
| 45-49        | 0        | 0         | 0         | 0         | 0          | 3          | 6          | 16         | 111          | 220          | 322          | 274          | 509          |
| 50-54        | 0        | 0         | 0         | 0         | 0          | 2          | 3          | 10         | 84           | 167          | 244          | 278          | 284          |
| 55-59        | 0        | 0         | 0         | 0         | 0          | 0          | 2          | 5          | 82           | 163          | 238          | 293          | 219          |
| 60-64        | 0        | 0         | 0         | 0         | 0          | 0          | 2          | 3          | 69           | 137          | 201          | 247          | 247          |
| 65-69        | 0        | 0         | 0         | 0         | 0          | 0          | 0          | 2          | 61           | 122          | 178          | 219          | 237          |
| 70-74        | 0        | 0         | 0         | 0         | 0          | 0          | 0          | 1          | 34           | 68           | 99           | 122          | 132          |
| 75+          | 0        | 0         | 0         | 0         | 0          | 0          | 0          | 0          | 49           | 97           | 141          | 174          | 188          |
| <b>TOTAL</b> | <b>9</b> | <b>17</b> | <b>31</b> | <b>58</b> | <b>109</b> | <b>203</b> | <b>381</b> | <b>714</b> | <b>1,337</b> | <b>2,785</b> | <b>4,459</b> | <b>6,186</b> | <b>7,857</b> |

**TABLE 5. TOTAL HAWAIIAN POPULATION BY AGE IN HAWAII, 1780 TO 1900 (INCLUDES BOTH NATIVE HAWAIIANS & PART-HAWAIIANS)**

| <b>age</b>   | <b>1780</b>    | <b>1790</b>    | <b>1800</b>    | <b>1810</b>    | <b>1820</b>    | <b>1830</b>    | <b>1840</b>    | <b>1850</b>   | <b>1860</b>   | <b>1870</b>   | <b>1880</b>   | <b>1890</b>   | <b>1900</b>   |
|--------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|---------------|---------------|---------------|---------------|---------------|---------------|
| <b>0-4</b>   | 38,238         | 28,542         | 21,310         | 15,916         | 11,896         | 8,906          | 6,205          | 4,466         | 5,174         | 4,234         | 3,896         | 3,696         | 3,734         |
| <b>5-9</b>   | 39,476         | 29,471         | 22,001         | 16,429         | 12,275         | 9,184          | 6,892          | 3,641         | 4,620         | 3,961         | 4,206         | 3,950         | 3,858         |
| <b>10-14</b> | 43,967         | 32,822         | 24,501         | 18,295         | 13,666         | 10,220         | 7,663          | 5,362         | 3,790         | 4,597         | 3,823         | 3,563         | 3,395         |
| <b>15-19</b> | 46,184         | 34,473         | 25,735         | 19,213         | 14,349         | 10,726         | 8,034          | 6,047         | 3,145         | 4,175         | 3,639         | 3,913         | 3,690         |
| <b>20-24</b> | 49,864         | 37,219         | 27,784         | 20,741         | 15,488         | 11,574         | 8,664          | 6,512         | 4,545         | 3,320         | 4,094         | 3,448         | 3,227         |
| <b>25-29</b> | 47,041         | 35,112         | 26,208         | 19,565         | 14,608         | 10,913         | 8,163          | 6,125         | 4,630         | 2,474         | 3,339         | 2,947         | 3,183         |
| <b>30-34</b> | 46,825         | 34,951         | 26,088         | 19,475         | 14,538         | 10,859         | 8,119          | 6,087         | 4,609         | 3,297         | 2,448         | 3,057         | 2,586         |
| <b>35-39</b> | 51,432         | 38,389         | 28,654         | 21,388         | 15,967         | 11,922         | 8,908          | 6,668         | 5,062         | 3,911         | 2,124         | 2,903         | 2,573         |
| <b>40-44</b> | 45,151         | 33,701         | 25,155         | 18,776         | 14,017         | 10,465         | 7,818          | 5,851         | 4,444         | 3,433         | 2,496         | 1,877         | 2,354         |
| <b>45-49</b> | 53,469         | 39,910         | 29,790         | 22,236         | 16,597         | 12,391         | 9,253          | 6,918         | 5,263         | 4,066         | 3,192         | 1,756         | 2,410         |
| <b>50-54</b> | 40,464         | 30,203         | 22,544         | 16,827         | 12,560         | 9,377          | 7,001          | 5,233         | 3,983         | 3,077         | 2,416         | 1,779         | 1,343         |
| <b>55-59</b> | 39,524         | 29,501         | 22,020         | 16,436         | 12,268         | 9,157          | 6,837          | 5,107         | 3,890         | 3,005         | 2,360         | 1,876         | 1,037         |
| <b>60-64</b> | 33,304         | 24,858         | 18,555         | 13,850         | 10,338         | 7,716          | 5,761          | 4,302         | 3,278         | 2,532         | 1,988         | 1,581         | 1,169         |
| <b>65-69</b> | 29,530         | 22,042         | 16,452         | 12,280         | 9,166          | 6,842          | 5,107          | 3,813         | 2,907         | 2,245         | 1,763         | 1,402         | 1,120         |
| <b>70-74</b> | 16,449         | 12,278         | 9,164          | 6,840          | 5,106          | 3,811          | 2,845          | 2,124         | 1,619         | 1,251         | 982           | 781           | 624           |
| <b>75+</b>   | 23,473         | 17,521         | 13,078         | 9,762          | 7,286          | 5,439          | 4,059          | 3,030         | 2,310         | 1,785         | 1,402         | 1,114         | 890           |
| <b>TOTAL</b> | <b>644,391</b> | <b>480,994</b> | <b>359,041</b> | <b>268,029</b> | <b>200,126</b> | <b>149,500</b> | <b>111,329</b> | <b>81,288</b> | <b>63,268</b> | <b>51,364</b> | <b>44,169</b> | <b>39,643</b> | <b>37,193</b> |

# DISCUSSION

From 1840 to 1860, the Native Hawaiian population declined by 44.2%, by 1880 the decline from 1840 is 64.2%, and by 1900 the estimated Native Hawaiian population declined by 73.7%.

Again, these declines are consistent with the induced diseases and related factors that affected the Native Hawaiian population from 1840 to 1900 (Cordy 2007, Rallu 2007, Schmitt 1968, Schmitt 1970b, Schmitt 1970c, Schmitt & Nordyke 2001).

# DISCUSSION

From 1778 to 1900, the Native Hawaiian population declined precipitously. There was some outmigration of Native Hawaiians from Hawai'i, but the decline was overwhelmingly due to the fact that deaths consistently outnumbered births each year (Cordy 2007, Nordyke 1989: 13-27, Rallu 2007, Schmitt 1968, Schmitt 1970a, Schmitt 1970b, Schmitt & Nordyke 2001, Stannard 1989, 1990). For the Part-Hawaiian population, the story between 1778 and 1900 is just the opposite, births consistently outnumbered deaths. Why is this so?

# DISCUSSION

Thinking in these terms leads one to realize why today that Part-Hawaiians far outnumber Native Hawaiians. The US Census Bureau estimates, for example, that there are 194,660 Part-Hawaiians in Hawai'i as of 2010 and 78,389 Native Hawaiians (US Census Bureau, 2010). The estimated number of Native Hawaiians in 2010 clearly indicates that this population has made a comeback by more than doubling from 37,193 in 1900, but the growth in the Part-Hawaiian population is much more dramatic, growing from 7,857 in 1900 to nearly 195,000 by 2010, which is almost 24 times the number estimated for 1900.

# DISCUSSION

The growth in both the Native and Part-Hawaiian populations of Hawai'i between 1900 and 2010 is not only due to demographic factors (births, deaths, and migration), but also social factors. As a great deal of research shows, ethnicity and race are social constructs and fluid (see, e.g., Cornell and Hartmann 2007, Goldstein and Morning 2000, Nagel 1994, 1995, Omi and Winant 2015, Perez and Hirschman 2009, Yamashiro 2011).

# DISCUSSION

As such, a population defined on the basis of race or ethnicity is subject to change from factors that are not demographic. Such a change has been documented by Passel (1996), for example in regard to the American Indian population. Given Passel's findings and the "Hawaiian Renaissance" that started in the 1970s, it is likely that some of the recent changes in the numbers of both the Native and Part-Hawaiian populations, especially in Hawai'i, may be due to social and other non-demographic factors (see, e.g., Kana'iupuni, and Liebler 2005, Kana'iupuni, and Malone 2006, Ledward 2007, Stephan 1991).



# DISCUSSION

A focus on “Part-Hawaiian” shows that multiracial classifications also are social and political constructions since there are many other ethnic combinations that are not uniformly classified or debated (Morning 2012). It is equally likely that changes impacting Hawai’i in the past led to changes in the definition of Native Hawaiian and Part-Hawaiian in terms of self-identification, as well as identification by others, and institutions.<sup>3</sup>

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