

**The Demographic History of Two British Columbian Native
Reserve Populations.**

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ABSTRACT

It was hypothesized that disparities in the prehistoric ways of life of two British Columbian Indian bands would be reflected to some degree by differences in their historic and present demographic trends. This historical-demographic study delineated, quantified, and compared fertility and mortality schedules of the Ahousaht and Anaham reserve populations. In addition, historical-demographic trends were assessed and stable and prospective (future) population simulations were completed. Recent demographic differences between these two communities were generally shown to be insignificant and not influenced directly by cultural, environmental, or historical circumstances. In both populations basic demographic processes inherent in the past and present were often better explained by pan-cultural changes in the lifestyles of native British Columbians and by demographic irregularities characteristically found in small populations.

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Chapter I

INTRODUCTION AND OVERVIEW.

1.1 Introduction.

Since Euro-Canadian contact, the Indians of British Columbia have experienced a remarkably rapid degree of change in their lifestyles and cultural beliefs. This abrupt and incomplete acculturation has been accompanied by significant historical-demographic change. While various recent demographic studies of British Columbian Indians exist (Alfred 1976; Graham-Cummings 1968; Schmitt and Barclay 1962; Schmitt et al. 1966; Signer and Locatelli 1981; Termansen and Ryan 1970; Thomas 1968), the present body of historical-demographic literature is relatively meager (Boas 1887; Cybulski 1978; Duff 1965; Fisher 1977b; Graham-Cummings 1967; Hawthorn et al. 1958; Keddie 1982; Kroeber 1939; Taylor 1963). The purpose of this historical-demographic study is to investigate how cultural, environmental, and historical circumstances have affected British Columbian native populations through time. The exercise hopes to provide some insights into how the present structures of two British Columbian Indian populations were obtained.

This project is an outgrowth of a 1968 multidisciplinary investigation under the auspice of Dr. Melvin Lee of the School of Home Economics at the University of British Columbia (Alfred et al. 1969, 1970, 1972; Birkbeck et al. 1971; Desai and Lee 1971, 1974; Lee and Birkbeck 1977; Lee, Reyburn and Carrow 1971; Lee et al. 1971). The primary objective of Lee's research was to provide useful background information on the

nutritional status of British Columbian Indians, specifically the Ahousaht and the Anaham. The nutritional status of both bands was assessed from dietary, biochemical, anthropometric, and cultural data collected from individual subjects. Cultural data, specifically genealogies, obtained from Lee's nutritional study are the initial focus of this research.

This investigation attempts to understand the dynamic nature of Ahousaht and Anaham reserve populations by evaluating and comparing the fertility and mortality schedules of these two bands. The study provides a rare opportunity to systematically evaluate changes in secular demographic trends of Coastal and Interior British Columbian native groups. It is hypothesized that fundamental differences in the prehistoric and historic ways of life of the Ahousaht (semi-sedentary hunter-gatherers) and Anaham (mobile hunter-gatherers) should be reflected by disparities in their historic and prospective demographic trends. In both populations it is assumed that basic demographic processes inherent in the past and historic present are closely reflected by changes in native lifestyles. Demographic differences between and within these two communities are assumed to be a function of real underlying cultural, environmental, and historical differences.

This study of the Ahousaht and Anaham reserves has several prime objectives: (1) to document and evaluate historical-demographic population trends, (2) to delineate, quantify, and compare fertility and mortality schedules and, (3) to evaluate stable and prospective (future) population simulations. These research objectives are seen as being crucial for the better understanding of factors which may have affected Ahousaht, Anaham, and other British Columbian native populations.

1.2 The Populations.

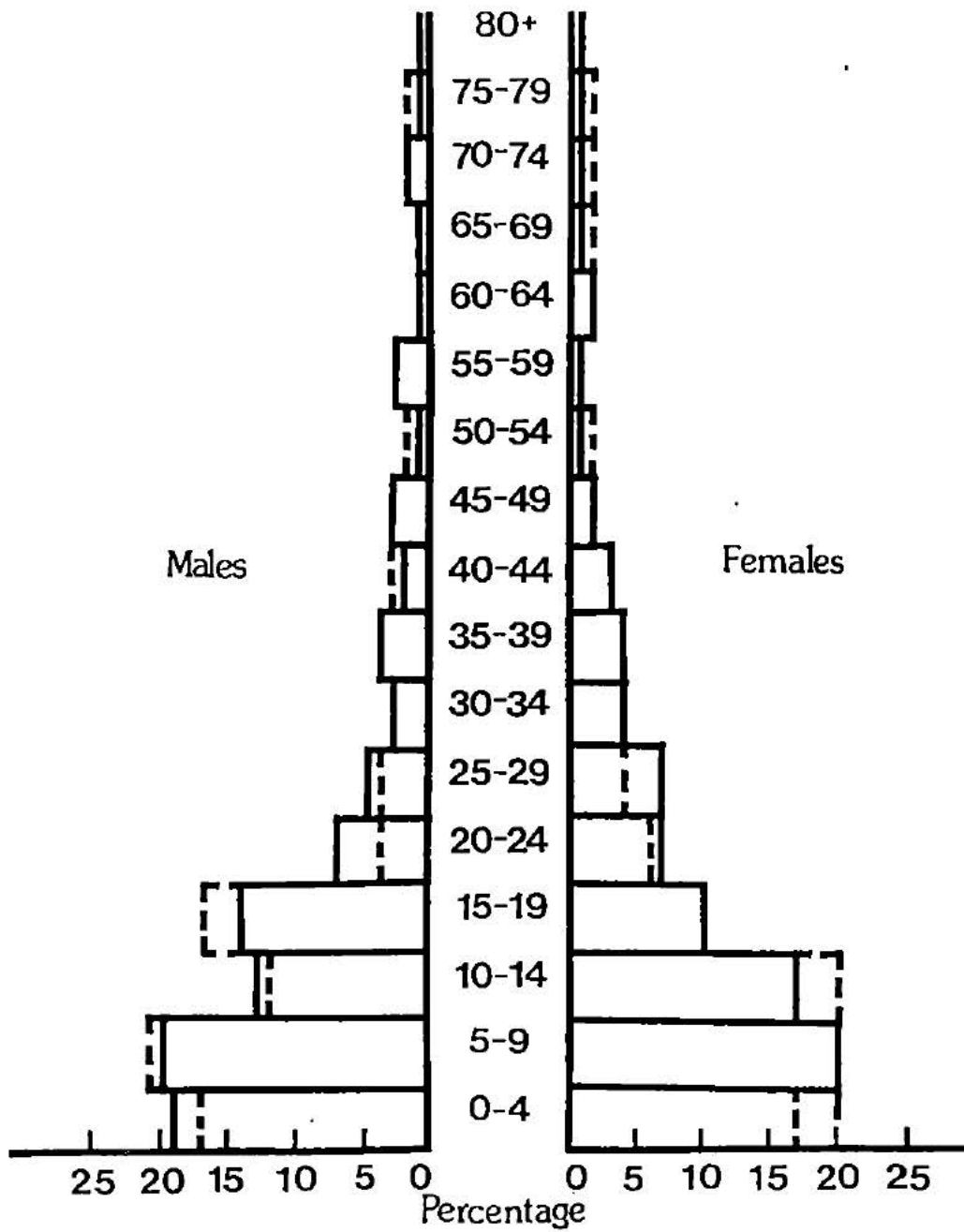
The data base for this exercise consists of genealogies and life tables for the Ahousaht and Anaham bands. In 1968 Dr. Melvin Lee (Alfred et al. 1969, 1970) collected genealogies and serological specimens from a sample of 198 Ahousaht (54 percent of the *de facto* population) and 195 Anaham (37 percent of the *de facto* population). At both reserves, subjects were not randomly drawn and no attempt was made to exclude relatives. These genealogies possess a time depth of approximately 100 years (three generations) and record age-specific vital event data (births and some deaths) for 302 Ahousaht and 517 Anaham. Alfred (1976) utilized the FORTRAN program LIFE (Keyfitz and Flieger 1971) to produce life tables from census data.

1.2.1 Ahousaht.

In 1968 the principal Ahousaht reserve, Marktosis ($49^{\circ} 9'N$, $126^{\circ} 1'W$), consisted of approximately sixty woodframe houses (not all occupied), an elementary school, a community centre suitable for public gatherings, and two churches (one Anglican and one Catholic). Band membership included 696 registered Indians, of whom 367 made up the *de facto* population (see Figure 1). Marktosis reserve is located off the coast of Vancouver Island on Flores Island, northwest of Tofino. The Ahousaht, a Nuu-chah-nulth-aht (Nootka) Wakashan group, own reserve land from Meares and Vargas Islands to the entrance of Hesquiat Harbour (see Figure 2 and Table 26 in Appendix A).

In the early historic period the Ahousaht were a small local group, confined to the foreshore of Vargas Island and to a small area across Calmus Pass below Guemes Mountain. They owned no important dog salmon streams and are therefore believed to have suffered from privation (Drucker 1951). By the mid-nineteenth century the Ahousaht had arrived at their present location at the expense of other Nuu-chah-nulth-aht groups, especially the Otsosat.

Figure 1: 1968 Ahousaht age-sex distributions.
 --- de jure (334 males and 362 females) populations.
 — defacto (183 males and 184 females) populations.



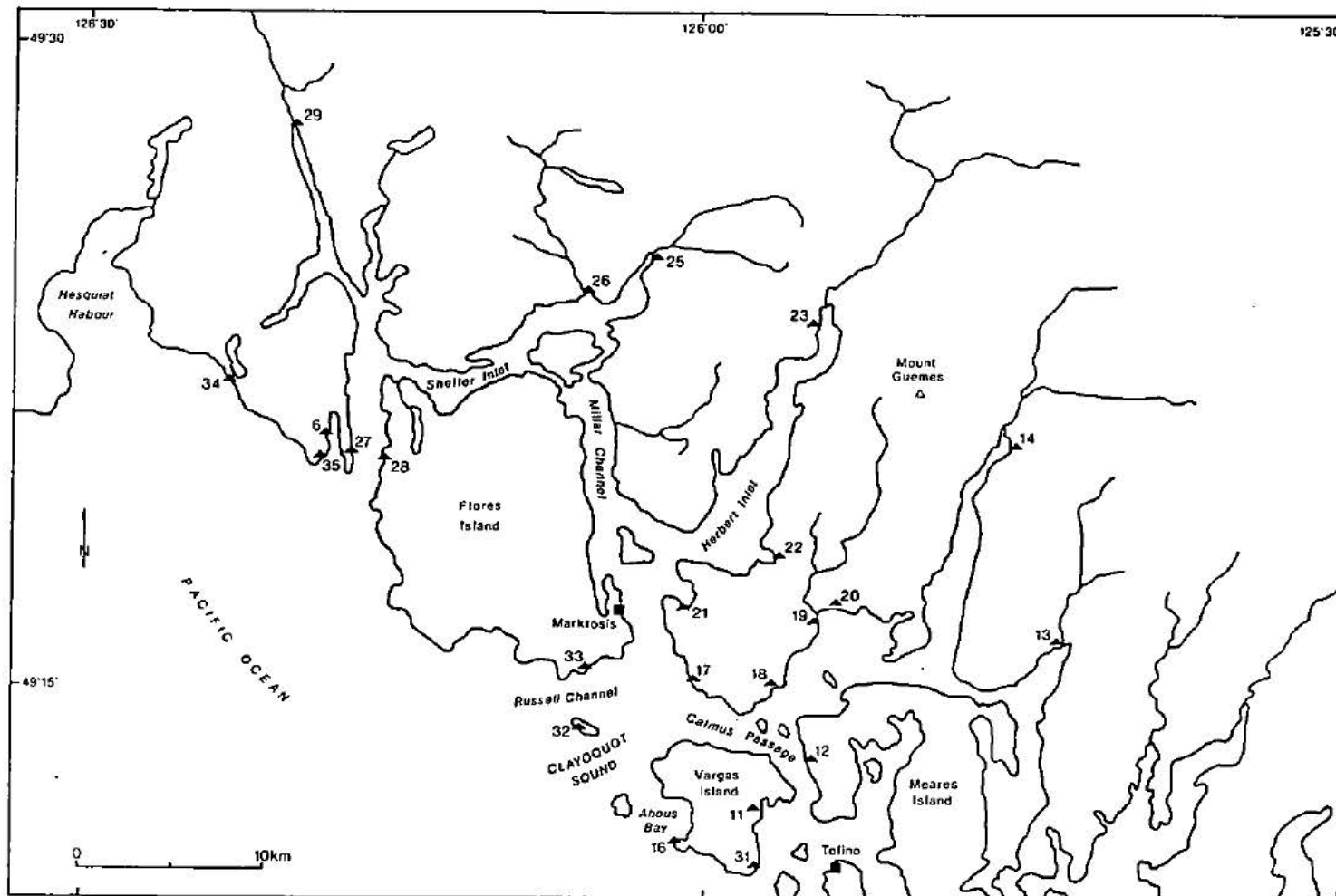


Figure 2: Ahousaht Reserves.

The Ahousaht are one of the numerous Nuu-chah-nulth-aht bands that presently live and traditionally occupied the West Coast of Vancouver Island from Cape Cook to Jordan River and Cape Flattery as far south as Ozette across the Strait of Juan de Fuca in Washington State. Recent archaeological work on the Northwest Coast of Vancouver Island (Dewhirst 1980; Haggarty 1982; McMillan and St. Claire 1972) and on the Olympic Peninsula (Croes and Blinman 1980) seems to demonstrate a single indigenous culture in the process of gradual adaptation to the rugged coastal environment. Aboriginally, the Nuu-chah-nulth-aht were bordered by the Southern Kwakiutl (Wakashan) on the north and northeast and by various Coast Salish groups on the east, southeast, and south.

As most subsistence resources were seasonal, Nuu-chah-nulth-aht occupied most sites on a semi-permanent seasonal basis and rarely travelled any considerable distance. Winter villages were situated on the upper reaches of coastal inlets in coves sheltered from winter storms and summer villages, often fishing stations, were located on the lower parts of coastal inlets and on the coast. During the early historic period summer villages, being nearer to schooner routes and later those of steamships, increasingly became more economically important.

Nuu-chah-nulth-aht society was stratified into title holders, commoners, and captive slaves. The basic unit of political and social organization was the local group consisting of two or more non-unilineal descent groups (Donald 1983). The local groups were not autonomous, but were formally united with several others in one winter village. Several of these villages were often bound together into a confederacy which occupied the same summer village or fishing station.

Well documented European contact with the Nuu-chah-nulth-aht occurred in the late sixteenth century. In 1774, Spanish explorer Juan Jose Perez Hernandez Santiago put

into Nootka Sound in his frigate Santiago; Captain James Cook followed in his ships Resolution and Discovery. By 1792 Spanish, British, and Americans were extensively involved in a lucrative maritime sea otter fur trade with the Nuu-chah-nulth-aht and other coastal indigenous groups; however, by 1825 the sea otters were becoming scarce and the maritime fur trade virtually ceased as a commercial entity. This early trade had contributed mainly to the elaboration of existing native cultural patterns rather than to extensive acculturation of traditional aboriginal values (Fisher 1977a, b). In the 1850's, though, when a brisk dogfish oil trade arose in connection with an incipient sawmill industry, traditional patterns began to erode and European diseases became endemic. Alberni, the first white settlement in Nuu-chah-nulth-aht territory, was established in 1860, which led to further acculturation.

In the 1880's several reserves--former summer and winter villages and fishing stations--were set aside for the Ahousaht by the Dominion of Canada. Marktosis became the permanent Ahousaht reserve community. During this period the pace of culture change was greatly accelerated. When commercial fur seal hunting began to flourish recruited Ahousaht and other Nuu-chah-nulth-aht hunters boarded schooners bound for the Bering Strait, Japan, China, and San Francisco. Ahousaht natives also resided temporarily in Victoria, among the Fraser River canneries, and in the Puget Sound hopfields (Drucker 1951). Further Ahousaht acculturation was influenced by: (1) the establishment of a Presbyterian elementary school at Ahousaht in 1897 (McFadden 1971), (2) the establishment of Tofino and various other white settlements and enterprises along the West Coast, (3) the start of regular steamship service up and down the coast and, (4) the prohibition of the potlatch in 1884 (Drucker 1951). Traditional native life of the Ahousaht, like other Nuu-chah-nulth-aht groups, was suppressed on all fronts by

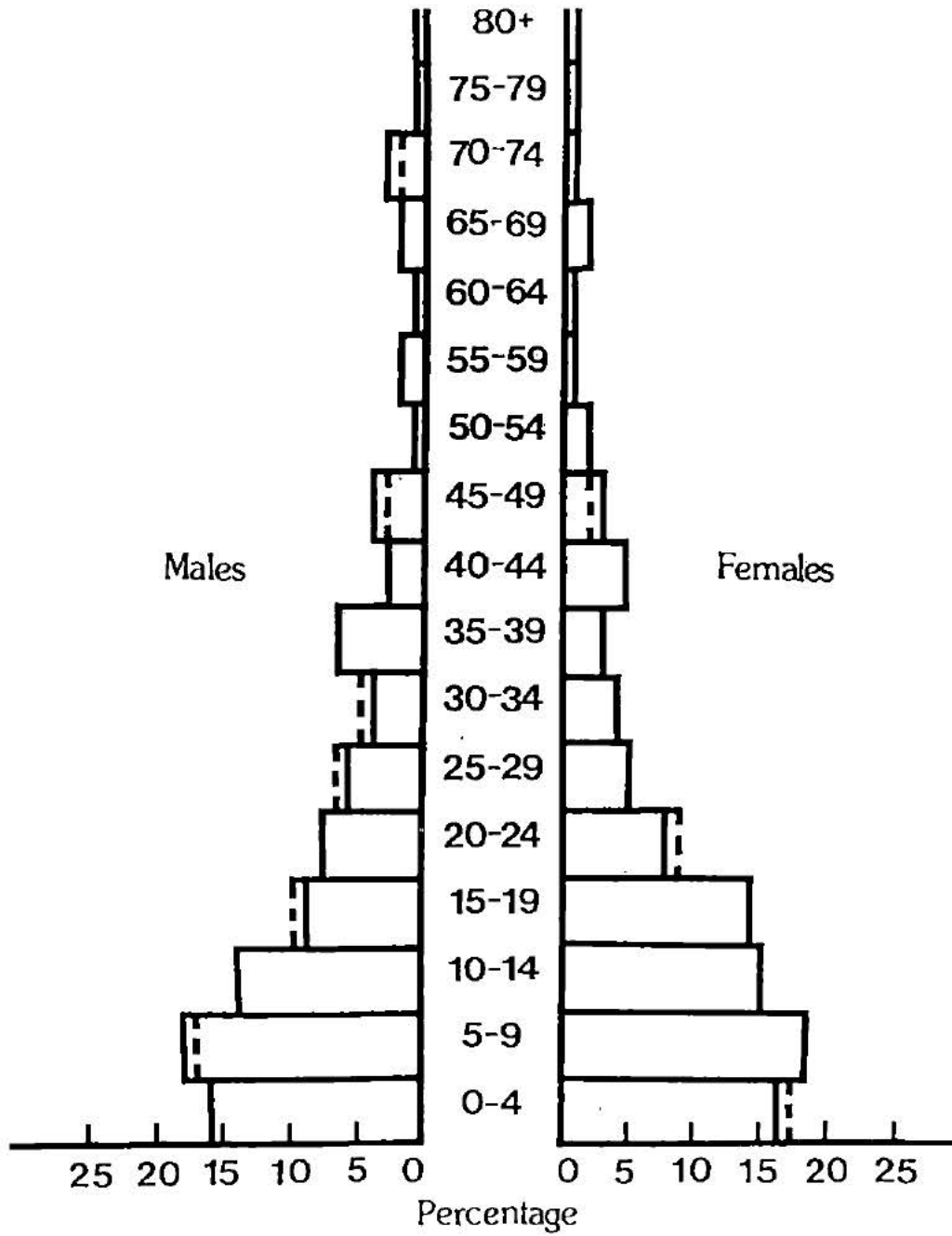
missionaries, Indian agents, and others because they believed that native culture was primitive, wicked, and an obstacle to the general introduction of Christianity and "civilization" (Arima 1983).

1.2.2 Anaham.

In 1968 Anaham village ($123^{\circ} 6'W$, $52^{\circ} 5'N$) had approximately forty woodframe houses, an elementary school with a health clinic in the basement, a residence for eight Catholic sisters, a residence for the Catholic priest, and a Catholic church. Band membership included 596 registered Indians, of whom 533 made up the *de facto* population (see Figure 3). Anaham village is located on Anahim's Flat, the principal Anaham reserve, and is located 112 kilometers northwest of Williams Lake on the Chilcotin River, a tributary of the Fraser River. The Anaham, a Chilcotin Athapaskan Band, own reserves from the Chilcotin River north to Rosita Lake (see Figure 4 and Table 27 in Appendix A).

In the late nineteenth century the Chilcotin occupied the Chilcotin River watershed and the upper reaches of the Homalco, Klinahlini, and Dean rivers, which lie between the Chilcotin River drainage system and the Coast Mountain Range. The Chilcotin were bound on the east and south by Shuswap (Interior Salish) and Lillooet (Interior Salish), on the southwest and northwest by Kwakiutl (Wakashan), and on the west by Bella Coola (Coastal Salish). Prior to contact, the Chilcotin territory did not extend as far eastward (Lane 1981). Their gradual movement eastward after European arrival was influenced by several factors: (1) the discovery of gold on the Fraser River and subsequent Euro-Canadian settlement of the surrounding countryside, (2) the extensive abandonment by Shuswap of territory west of the Fraser River and, (3) the coercion of natives by the British Columbian government to settle in areas where they could be more easily observed and controlled (Teit 1909).

Figure 3: 1968 Anaham age-sex distributions.
 --- de jure (294 males and 302 females) populations.
 — defacto (262 males and 271 females) populations.



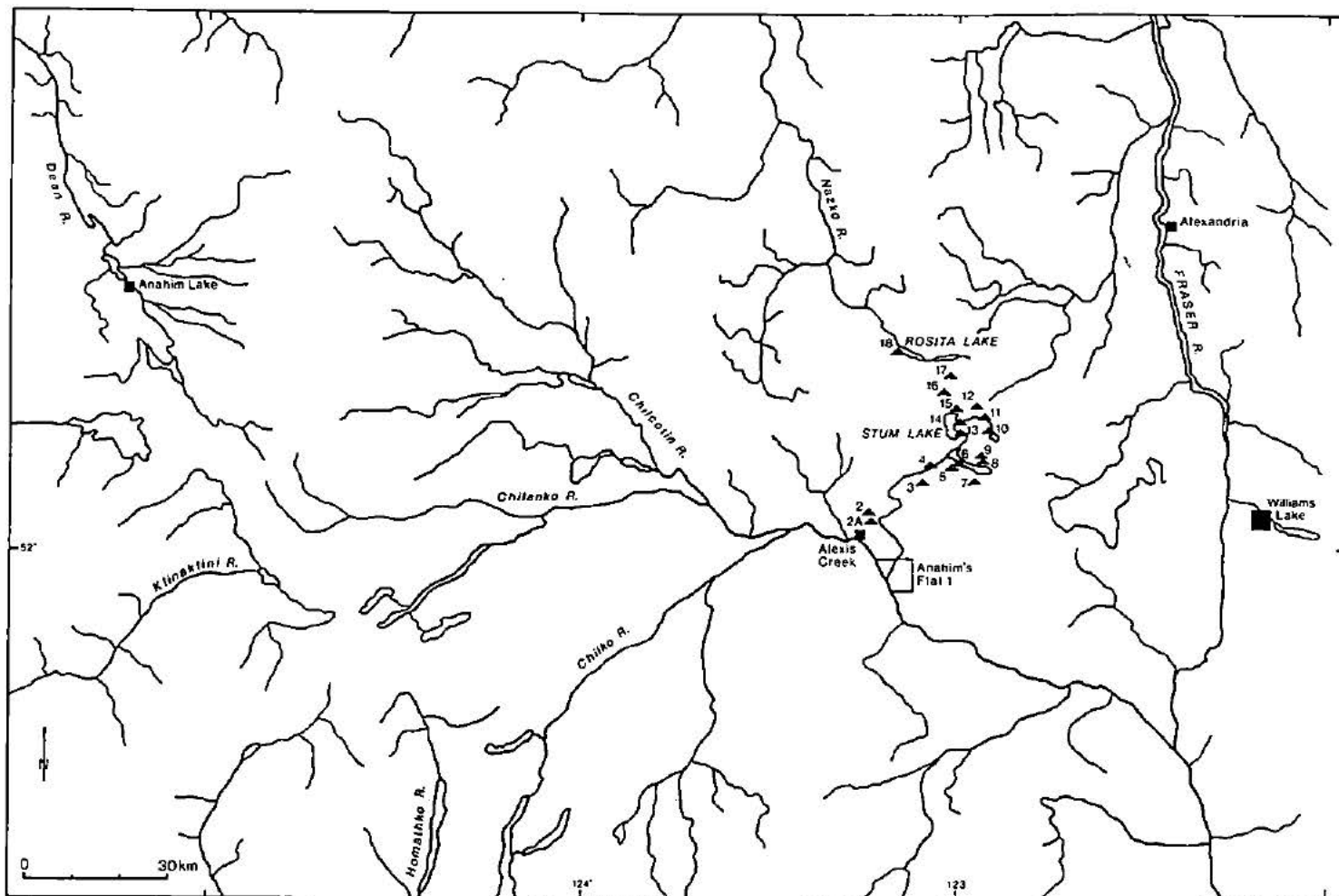


Figure 4: Anaham Reserves.

The Chilcotin are believed to be a recent derivative of a northern Athapaskan antecedent which migrated into the Chilcotin Plateau approximately 500 to 600 years ago (Helmer 1977; Wilmeth 1977, 1978). Aboriginally, the Chilcotin were a nomadic people. Their subsistence economy was based on fishing, hunting and gathering. The nuclear family was the basic unit of social organization. This minimal social unit could operate independently; however, most often a small collection of families, usually brothers or other forms of associated kin, organized themselves into camps. Such camps cooperated closely in daily activities, but usually were informal and of indefinite duration. A number of interrelated camps formed bands which had informal leadership and which occupied but did not control territory (Lane 1981; Wilmeth 1978).

First recorded European contact did not occur until the early nineteenth century. In 1821 Fort Alexandria, the first trading post in the Cariboo, was erected on the Fraser River in Carrier territory. Chilcotin trade and contact with the fort was minimal. In 1829 Fort Chilcotin, a small subsidiary of the first post, was established on the Chilcotin River. A year later the fort was abandoned because of threats of native violence and was subsequently burnt to the ground by the Chilcotin. Two more trading posts were attempted by the Hudson's Bay Company in Chilcotin country--a replacement for Fort Chilcotin and another at Kluskus. Both were finally abandoned in the late 1840's (Whitehead 1979, 1981b). The Chilcotin had opted out of the fur trade mainly because European trade was regarded as a threat to traditional indigenous patterns (Hewlett 1973).

In 1858 the Cariboo gold rush brought miners and settlers into the Chilcotin territory when a new route was established from the Bella Coola Valley through the Chilcotin Plateau to Alexandria and the gold fields beyond. The Chilcotin were openly opposed to the newcomers who often treated them harshly and arrogantly (Lane 1981).

The missionization of the Chilcotin by Roman Catholic Oblate Fathers was first initiated in 1841 but not until the 1870's did serious missionary work begin. Oblate Fathers were responsible for establishing regular mission centres which later became villages and centres for reserves (Lane 1981; Whitehead 1979, 1981b). As a result of this missionary work, most Chilcotin were nominally Catholic by the 1880's.

In the late 1870's a substantial number of Chilcotin Indians established themselves in the present Anaham village at Anahim's Flat. By the 1890's Anaham was an established village, reserve centre, and Catholic mission centre regularly visited by Oblate Missionaries. But the natives were still nomadic. They roamed the country, living in tents and hunting, fishing, and trapping much as before. Most families owned small cattle herds; the sale of cattle and furs provided them with extra income. Others labored on local ranches for extra income during parts of the year. The established village remained unoccupied most of the time and the nomadic lifestyle of the Anaham was largely unchanged until after the Second World War.

In the late 1940's this traditional way of life slowly began to erode. The Sisters of Christ the King, who had just recently established themselves on the reserve, were influential in initiating a sedentary lifestyle among the Anaham (Whitehead 1981a, 1984). Thus the pace of cultural change from the 1950's onwards quickened. Modern forms of communication and transportation seem to have influenced the Anaham's increased contact with Canadian society and their rapid acculturation (Hosgood 1982). Subsistence resources and economic opportunities available declined; activities that were once carried out on public land--fishing, grazing, haying, hunting, and trapping--are now mainly confined to reserve land because of non-Chilcotin interests and developments (Lane 1981).

1.2.3 Historic Population Estimates.

Since contact the Ahousaht and Anaham bands have undergone substantial demographic change, but these historic changes are not well documented. Population estimates and censuses tend to be unreliable and inaccurate, making evaluation of demographic changes through time difficult. Early population estimates are often crude and are usually not band specific. Census data suffer from chronic underreporting of vital rates. These next two sections attempt to assess the accuracy of contact and early historic population estimates and reserve census data. The resulting analyses hopes to provide some useful generalizations about the demographic history of these two bands.

Early historic population estimates of the Ahousaht and Anaham bands are incomplete--usually just estimating adult male populations (see Sproat 1868)--or are nonexistent. Available population estimates of the Nuu-chah-nulth-aht and Chilcotin (Duff 1965; Mooney 1928; Taylor 1963) demonstrate that initial contact population levels were much reduced several generations later (see Table 1). Scholars still disagree on the actual size of these contact populations and on how fast contact-induced demographic decline proceeded. Generally then, the mechanism of population decline in the Nuu-chah-nulth-aht and Chilcotin populations is not well known.

Depopulation among these British Columbian native groups was recognized to have been influenced by the lethal nature of new infectious diseases (smallpox, measles, influenza, tuberculosis, and venereal disease), by the impact of prolonged intertribal conflicts, and by the processes of cultural assimilation. The impact of European contact and disease on coastal aboriginal cultures during the maritime fur trade period which peaked between the years 1792 and 1812 is questionable (Fisher 1977a, b), but the subsequent impact of virulent diseases on these two native populations is better

Table 1: Published estimates of Nuu-chah-nulth-aht (Nootka) and Chilcotin populations.

<u>Author and Date</u>	<u>Native groups</u>	<u>Estimates</u>	<u>Chronology</u>
Mooney (1928)	Nootka Chilcotin	6,000 2,500	Circa 1780 Circa 1780
Taylor (1963)	Nootka	14,000	Circa 1780
Duff (1965)	Nootka	7,500	Circa 1835
Morice (1928)	Chilcotin	1,500	Circa 1864

documented. Smallpox in 1852 accelerated the fall in the Nuu-chah-nulth-aht's already declining population (Drucker 1951); and in 1864 an epidemic which spread from the coast reduced the Chilcotin population of approximately 1500 by about two-thirds (Morice 1928). Among the Nuu-chah-nulth-aht, intertribal disputes supposedly had considerable effect. Ahousaht extended their territory in the early nineteenth century largely at the expense of other Nuu-chah-nulth-aht groups--an expansion documented in Ahousaht oral culture (see Webster 1983) and historical records (see Arima 1983; Drucker 1951). White contact and processes of cultural assimilation had tremendous effect on both the Nuu-chah-nulth-aht and Chilcotin populations subsequent to 1860.

Contact and early historic Chilcotin and Nuu-chah-nulth-aht population estimates are largely based on a piecemeal of assorted soft demographic data of questionable validity. Available historical source materials upon which these assumptions and population estimates are based are largely non-quantitative and are inherently biased by their ethnocentric focus.

The Hesquiat Harbour burial relocation project provides a unique opportunity to evaluate early historic demographic trends of the Nuu-chah-nulth-aht (Cybulski 1978). Human skeletal remains representing a minimum of 108 individuals were collected and analyzed from several exposed caves and rock shelters dating to the early historic period. This recent research investigation suggests: (1) the combined life expectancy for both sexes was about 21.6 years, although adult females may have outlived adult males by approximately four years, (2) mortality for both sexes was highest in infancy and early childhood (see Table 2) and, (3) the mortality profile of Hesquiat Harbour seems to closely resemble that of other prehistoric North American Indian population samples--like Dickson Mounds (Blakely 1971), Leavenworth (Bass et al. 1971), and Point of Pines (Bennett

1973)--than that of groups subjected to severe post-contact decimation. At Hesquiatic Harbour low life expectancies are further supported by recent research in palaeopathology (Buikstra and Cook 1980; Browman 1980) which suggests that aboriginally, North American natives were victims of a variety of diseases and that their overall health was relatively poor. The validity of Hesquiatic mortality estimates, however, is still questionable. These profiles are biased by shortcomings inherent in aging and sexing techniques and are hampered by unrealistic assumptions--like the prevalence of closed and stationary populations--inherent with life table models (see Bocquet-Appel and Masset 1982; Howell 1982).

Table 2: Mortality profiles of Hesquiatic Harbour adult males and females (in percent).

From Cybulski (1978).

<u>Age group</u>	<u>Males</u> n=28	<u>Females</u> n=22
20-29	48.7	34.8
30-39	30.9	28.7
40-49	14.5	19.6
50 plus	5.9	16.9
Mean age (years)	32.3	36.4

1.2.4 Reserve Populations.

The collection of demographic data about the Ahousaht and Anaham Reserves can be broken down into two distinct eras: (1) band censuses taken as early as the 1880's and, (2) reserve censuses taken from 1965 onwards. Band censuses taken by the Department of Indian Affairs prior to 1960 were done in an irregular manner and tend to be unreliable (McCardle 1983; Romaniuk and Piché 1972). These censuses could simply be head-counts of the total population or more detailed demographic statements broken down by age, sex, and religion. Before 1920, yearly population figures were based on periodical detailed censuses and in each subsequent year births and deaths were added or deducted. In 1924 quinquennial band censuses were established. By 1951 the Department of Indian Affairs had created a Central Indian Registry to formally record the vital events of each Registered Indian (McCardle 1983). Registered Indians form an unnatural group, defined by the Indian Act, which gains members by marriage as well as by birth, and loses members by marriage and disenfranchisement as well as by death (Duff 1965). The Central Indian Registry includes information about each Registered Indian's dates of birth, marriage, and death, children's names and birth dates, transfers to other registration numbers or bands, and other status changes. Finally, in 1965 annual band censuses were established.

Several anomalies are apparent in all of these demographic records: (1) censuses of Registered Indians do not recognize those of mixed origin, Indians by racial origin who are not registered under the Indian Act (Romaniuk and Piché 1972), (2) demographic comparisons with earlier censuses are difficult because of non-standardized age and sex categorizations and, (3) late registrations of births and deaths are a growing problem, possibly because of an increasing migration of natives from their reserves (Piché and George 1973; Romaniuk and Piché 1972).

The demographic Reserve histories of the Ahousaht and Anaham bands, reconstructed from data provided by the Department of Indian Affairs, are imperfect and incomplete (see Tables 3 and 4). However, one can cautiously make general statements about the demographic trends of these two bands. Historically, the annual growth rate of the Ahousaht population has varied considerably. Ahousaht band experienced negative growth from 1881-1929. The average annual growth rate decreased by approximately 0.68 percent per year from 1881-1899 and 0.88 percent per year from 1900-1929. Since 1930, the Ahousaht have experienced periods of varying population growth. The population grew slowly, about an average of 0.52 percent per year, from 1930-1949. During the 1950-1965 period, the Ahousaht band grew rapidly, the average annual growth rate being about 2.9 percent per year. In the final period, 1966-1984, the average annual growth rate dropped considerably to about 1.4 percent per year. Ahousaht historical demographic trends fit well with those described by Duff (1965) for the total British Columbian Indian population.

In contrast, the historical demographic trends of the Anaham band do not conform to this generalized British Columbian native pattern (see Duff 1965). Since the 1880's, Anaham has experienced varying periods of population growth intermixed with periodical declines. The most severe was between 1914-1924 when the average annual growth rate dropped to 0.85 percent per year. Anaham did not experience prolonged historical periods of population decline like those occurring among the Ahousaht or among the total British Columbian native population. Since 1939, however, Anaham has generally conformed to the growth pattern established by Duff (1965) for the British Columbian native population as a whole. During the period from 1939-1965, the Anaham increased by an average growth rate of 1.3 percent per year. The average annual growth rate declined somewhat to 0.95 percent per year from 1965-1984.

Table 3: Ahousaht population 1881-1984.

<u>Year</u>	<u>Population</u>	<u>Annual growth rate</u> <u>(Percent)</u>
1881	300	
1884	296	-0.3
1889	282	-0.5
1894	261	-0.7
1899	266	-0.2
1904	262	-0.2
1909	224	-1.6
1914	195	-1.4
1929	178	-0.3
1934	183	+0.3
1939	187	+0.2
1944	217	+1.4
1949	222	+0.2
1954	392	+5.7
1959	482	+2.1
1965	625	+2.2
1969	709	+1.3
1974	838	+1.7
1979	971	+1.5
1984	1083	+1.1

Sources: Annual Reports of the Department of Indian Affairs (1881-1916); quinquennial band censuses (1924-1959); annual censuses of Registered Indians (1965-1984).

Note: Population figures from 1959 onwards are equal to the sum of both on and off reserve population estimates.

Table 4: Anaham population 1884-1984.

<u>Year</u>	<u>Population</u>	<u>Annual growth rate</u> <u>(Percent)</u>
1884	196	
1889	186	-0.1
1894	198	+0.6
1899	207	+0.4
1904	223	+0.7
1909	224	+0.1
1914	280	+2.3
1924	197	-1.7
1929	228	+1.5
1934	277	+1.9
1939	269	-0.3
1944	324	+1.9
1949	336	+0.4
1954	373	+1.0
1959	443	+1.7
1965	556	+1.9
1969	607	+0.9
1974	675	+1.1
1979	741	+0.9
1984	810	+0.9

Sources: Annual Reports of the Department of Indian Affairs (1881-1916); quinquennial band censuses (1924-1959); annual censuses of Registered Indians (1965-1984).

Note: Population figures from 1959 onwards are equal to the sum of both on and off reserve population estimates.

Since 1959, off-reserve populations of both communities have dramatically increased, especially at Ahousaht where the off-reserve populations in 1984 accounted for nearly 50 percent of the total population (see Table 5). The composition of Ahousaht and Anaham off-reserve populations does not seem to conform with that of the total off-reserve native population in British Columbia (see Siggner and Locatelli 1981; Stanbury 1974). The age and sex distributions of Ahousaht and Anaham on and off reserve populations from 1959-1984 are similar, with any differences in age and sex compositions being accounted for by processes of stochastic fluctuation.

Ahousaht and Anaham census data are to some degree inaccurate because of the way the population universe has been enumerated. In any particular census the actual number of people counted, their sex, age or residence may be incorrect. These errors can be controlled for by statistical analyses evaluating the internal consistency of each data set (see Meister 1980; Myers 1940; Shryock and Seigel 1973); however, these analyses are often impractical for small populations, like Ahousaht and Anaham, where the demographic signal may be washed out by stochastic noise (see Weiss 1975). Implementation of these measures of internal consistency are also hampered by inconsistencies found in Ahousaht and Anaham population data (see McCardle 1983; Romaniuk and Piché 1972). Any generalizations about these two reserve populations must be made with caution as the historical-demographic record probably does not accurately reflect the tremendous changes which have occurred among Ahousaht and Anaham populations since contact.

Table 5: Ahousaht and Anaham on and off reserve, and total populations 1959-1984.

<u>Year</u>	<u>Ahousaht</u>			<u>Total Population</u>
	<u>On Reserve</u>	<u>Off Reserve</u>	<u>Not Stated</u>	
1959	469	8	5	482
1965	611	10	4	625
1969	373	336	0	770
1974	406	432	0	838
1979	477	494	0	971
1984	554	525	4	1083

<u>Year</u>	<u>Anaham</u>			<u>Total Population</u>
	<u>On Reserve</u>	<u>Off Reserve</u>	<u>Not Stated</u>	
1959	438	3	2	443
1965	550	2	4	556
1969	525	82	0	607
1974	611	64	0	675
1979	578	163	0	741
1984	707	101	2	810

Sources: 1959 quinquennial census of Registered Indians; Annual censuses of Registered Indians (1965-1984).

Chapter II

METHODS AND MATERIALS.

This investigation re-examined genealogies gathered by Dr. M. Lee (Alfred et al. 1969, 1970) and life tables produced by Dr. B. Alfred (1976) in order to complete an historical-demographic study on two British Columbian Indian reserve populations. The next three sections outline how these genealogies and life tables were analyzed. It was hypothesized that fundamental disparities in prehistoric and historic ways of life of the Ahousaht and Anaham communities should be reflected to a degree by differences in their historic and prospective demographic parameters. Basic demographic processes inherent in the past and historic present were assumed to be closely reflected in both communities by changes in native lifestyle. Demographic differences between and within these two communities were assumed to be a function of real underlying cultural, environmental, and historic differences.

2.1 Analysis.

2.1.1 Fertility.

Retrospective fertility schedules for Ahousaht and Anaham women between the ages of 15 and 49, and 50 plus were determined from the genealogies. These schedules provided a unique opportunity to systematically evaluate incremental changes in Ahousaht and Anaham fertility rates. These retrospective fertility patterns were assumed to be influenced by underlying changes in cultural, environmental, and historical circumstances.

Retrospective fertility patterns of reproductive women (15-49) and post-reproductive women (50 plus) were quantified and delineated by age-specific and total fertility rates and by parity distributions. The age-specific fertility rate was a valuable comparative measure used to record retrospective age-specific changes in childbearing performance of Ahousaht and Anaham women. The total fertility rate, a summary measure of retrospective age-specific fertility, was used as an indicator of the past fertility change incurred by both Ahousaht and Anaham women. Parity distributions were a useful means of comparing and isolating the differences in the reproductive processes of these two populations.

Fertility patterns of women between the ages of 15 and 49 were also examined and quantified by Coale's (1965) fertility indices. Coale's indices are three separate measures: (1) Index of Overall Fertility (I_f), (2) Index of Marital Fertility (I_g) and, (3) Index of Proportion Married (I_m). They are calculated as:

$$(2) I_f = \frac{\sum f_i w_i}{\sum F_i w_i}$$

$$(3) I_g = \frac{\sum g_i m_i}{\sum F_i m_i}$$

$$(4) I_m = \frac{\sum F_i m_i}{\sum F_i w_i}$$

where

f_i = births per woman in the i th age interval;

g_i = births per married woman in the i th age interval;

w_i = number of women in the i th age interval;

m_i = number of married women in the i th interval;

F_i = births per woman in the i th interval in the standard population of married

Hutterites, 1921-1930. These are:

15-19	.300
20-24	.550
25-29	.502
30-34	.447
35-39	.406
40-44	.222
45-49	.061

These measure the degree to which a population approaches maximum fertility, either through the population of women in the reproductive period or through levels of fertility achieved within marriage (Ray et al. 1984).

Recent ethnographic literature (Howell 1979; Lee 1972) suggests that nomadic hunter-gatherers (like the Anaham), in comparison with sedentary populations (like the Ahousaht), are characterized by shortened mean reproductive spans and increased mean birth intervals. Howell (1979) proposes that both variables are involved in producing differences in total fertility rates between populations. Explanations like the critical fat hypothesis (Frisch 1975, 1977), child transport stress (Lee 1972; Roth 1981b), and duration of lactation (Romaniuk 1981) help one understand these inherent differences in fertility patterns of nomadic and sedentary peoples. Prehistoric ways of life for the Ahousaht and the Anaham, then, should be reflected historically by apparent differences in the mean reproductive span, mean birth interval, and total fertility rate.

To examine this heterogeneity the methodology developed by Howell (1979) was employed. She has shown that both the reproductive span, as measured by the mean duration of childbearing period, and the rate of childbearing, as determined by the mean

population birth interval, can be calculated if the mean age at first and last births, plus total fertility, are known. To arrive at the mean length of the reproductive period, the mean age at first birth was subtracted from the mean age at last birth. To determine the mean birth interval, the mean reproductive span was divided by the total fertility rate minus one. These factors were used to make an extensive comparison of the historical Ahousaht and Anaham populations.

2.1.2 Mortality.

Mortality schedules, in the form of life tables, have already been determined from census data by Alfred (1976). These schedules provide this study with an opportunity to compare Ahousaht and Anaham mortality schedules with other indigenous and non-native populations. Differences in the mortality schedules of Ahousaht and Anaham populations were assumed to be influenced by historical, cultural, and environmental circumstances. LIFE, a FORTRAN program (Keyfitz and Flieger 1971), was employed by Alfred to produce life tables from vital events data provided by the Department of Indian Affairs and Northern Development (for the years 1966, 1967, 1968), from a 1967 vital statistics report for British Columbia, and from Keyfitz and Flieger (1968). The life tables for British Columbia natives were determined from three year census totals (1966, 1967, 1968) rather than one year in order to minimize random fluctuations and zero frequencies. The output of LIFE presents sex-specific mortality information on the following populations: (1) Ahousaht, (2) Anaham, (3) Athapaskan, (4) Wakashan, (5) total reserve population, (6) British Columbia population 1967 and, (7) Canada 1965. These life tables yield information on the number of people who survive to a certain age interval, l_x , the probability of dying in the interval, q_x , the number of deaths in the interval, d_x , and the life expectancy at that interval, e^0_x . The assumptions behind life tables are: (1) migration

is not occurring, (2) each population's growth rate is zero, (3) age-specific mortality and fertility rates are constant and, (4) age-structure has remained constant. These life tables provide a way of linking observable events to the consequence these events would have in an "ideal" population, free of demographic disturbances (Howell 1979).

2.1.3 Computer Simulation.

This study also incorporated computer simulation methodology (Dyke and MacCluer 1973) to approach obstacles--such as small data bases, incomplete vital events, and stochastic noise--that are characteristically found in small populations (Howell 1979; Weiss 1975) and to simulate stable population and prospective (future) demographic trends. It was proposed that basic differences in the ways of life of the Ahousaht and Anaham communities should be reflected by disparities in their demographic trends. FIVFIV (Shorter 1974), a deterministic macrosimulation, was employed to elicit information about recent demographic trends (circa 1968) of the Ahousaht and Anaham. FIVFIV closely modeled the features of stable population theory (Coale 1972; Lotka 1907) by converting known fertility and mortality (sex-specific) schedules to corresponding stable models (Coale and Demeny 1966; Coale et al. 1983) and by extending the regular simulation cycle to 140 years. AMBUSH (Howell 1979; Howell and Lehotay 1977, 1978), a stochastic microsimulation, linked the features of stable population models with randomness of stochastic noise to assess the range of variability apparent within and between recent Ahousaht and Anaham demographic schedules. The outcomes of AMBUSH simulations, unlike FIVFIV, are subject to the cumulative effects of random variation over time. Similar input parameters, start populations, sex ratios, and fertility and mortality parameters characterize all Ahousaht and Anaham AMBUSH and FIVFIV simulation runs. Output stable population measures, crude birth and death rates, total fertility rates, and dependency ratios were generated by these runs.

"Student's *t*" distributions were employed to test whether observed differences in Ahousaht and Anaham vital rates, as generated by AMBUSH simulation runs, were similar enough to be accounted for by the processes of random variation or were significantly different. The relationship is given by the expression:

$$(1) \quad t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{n_1 s_1^2 + n_2 s_2^2}{n_1 + n_2 - 2}} \sqrt{\frac{n_1 + n_2}{n_1 n_2}}}$$

The "student's *t*-test" was applied to Ahousaht and Anaham data, because it is an applicable statistical measure for data bases characterized by small sample sizes. The critical values of *t* were selected from a 0.05 probability level.

Confidence intervals, at a 95 percent level of probability, were computed around the observed means of Ahousaht and Anaham vital measures, as generated by AMBUSH, to make allowances for sampling error. These interval estimates were determined by: (1) computing the standard error around the mean, (2) multiplying the standard error by the number of sigma units to be added and subtracted for the agreed confidence interval (for example, 1.96 for the 95 percent level) and, (3) attaching the requisite multiple of the standard error to the observed mean. The construction of confidence intervals assumed a normal distribution around the population mean, which is usually the case in samples larger than 30.

FIVFIV was again employed to simulate prospective (future) demographic trends of Ahousaht and Anaham Registered Indians from 1982-1996. These deterministic simulations were helpful in "fleshing-out" existing Indian and Northern Affairs' (Norris 1985; Perreault et al. 1985; Ram and Romaniuk 1985; Rowe and Norris 1985) Ahousaht

and Anaham projections. Different input parameters, start populations, sex ratios, and fertility and mortality parameters distinguished prospective Ahousaht and Anaham FIVFIV simulation runs. Output measures, like crude birth and death rates, rate of natural increase, and dependency ratios were determined by both simulations in order to complement existing Indian Affairs' population projections.

Chapter III

RESULTS.

3.1 Retrospective Fertility Performance.

The genealogical method of anthropological inquiry (Rivers 1900, 1906, 1910, 1912) allows anthropologists to vigorously apply demographic measures to genealogies collected during community field studies. These measures allow the reconstruction of the fertility records of reproductive and post-reproductive women without dealing with incomplete vital event registries. Rivers' influence can be seen in more recent demographic inquiries of anthropologists like Chagnon (1974), Howell (1979), and Roth (1981a). The genealogical method of inquiry was utilized in this study to evaluate the cumulative fertility performance of Ahousaht and Anaham women ages 15 to 49 and 50 plus over a period of approximately 100 years. These genealogies, collected in 1968, record age-specific vital events data for a sample of 163 Ahousaht and 273 Anaham women and provide this study with a unique opportunity to record in detail changing fertility patterns of Ahousaht and Anaham populations.

In demographic studies based on genealogical information a common finding is that older women frequently omit earlier births, particularly if these offspring die in infancy (Brass 1975; Howell 1979). To ascertain whether determined Ahousaht and Anaham fertility levels (circa 1968) were plausible three indirect estimate techniques were employed. The first, the P/F technique (Brass et al. 1968), failed to correct Ahousaht and Anaham overall fertility levels with a proper adjustment factor, because yearly age-

specific fertility rates were not accurate in age-structure and were not constant over time. The second, the $(P_3)^2/P_2$ technique (United Nations 1967), also failed to correct discrepancies in the overall fertility rates of Ahousaht and Anaham women--for example, the total fertility rate (circa 1968) for Ahousaht women was estimated at 22.5. The presumed linear ratio between the average parity at the end of childbearing and the cumulative parity of women at earlier age intervals was found not to hold for Ahousaht and Anaham samples. The third, Coale and Trussell's (1974) model fertility schedules, could not account for observed Ahousaht and Anaham fertility patterns. Irregularities in the estimations of these three indirect measures were assumed to reflect the inability of these measures to deal with stochastic and retrospective change in yearly fertility schedules for these small populations. In this study computer simulation models were found to be a better means of assessing the completeness, internal consistency, and variability of Ahousaht and Anaham fertility data. Unlike indirect estimation techniques, simulation models can cope with random and retrospective changes in yearly fertility schedules.

3.1.1 Direct Fertility Measures.

The retrospective cumulative careers of Ahousaht and Anaham women were analyzed by a series of fertility measures. These measures were utilized to reconstruct the fertility careers of reproductive (15-49) and post-reproductive (50 plus) women. They provided a rough picture of past Ahousaht and Anaham fertility performance--an average estimation of underlying retrospective fertility levels. They also conveniently provided a framework for comparing Ahousaht and Anaham populations with themselves and with other anthropological as well as larger non-aboriginal populations.

3.1.2 Reproductive Women.

As seen in Tables 6 and 7 Ahousaht and Anaham total and age-specific fertility rates for reproductive women were respectively based upon the cumulative retrospective fertility careers of 53 Ahousaht (with 202 recorded birth events) and 118 Anaham (with 337 recorded birth events) women. Person-years at risk was defined as years exposed to pregnancy based on years in the reproductive period. In an attempt to control for stochastic fluctuations, single yearly fertility levels were smoothed into standard five-year age groupings. Total fertility rates of both cohorts, based on the sums of age-specific fertility levels, are notably high.

The mean number of children ever born to Ahousaht and Anaham women of a specified age interval are given in Table 8. The unique feature of both Ahousaht and Anaham parity distribution was the extremely high average parity achieved by reproductive women.

Coale's (1965) fertility indices were utilized to assess whether Ahousaht and Anaham fertility levels arose from differential mating and marital fertility patterns. As noted earlier three separate indices--index of overall fertility (I_f), index of marital fertility (I_g), and index of proportion married (I_m)--measured the degree to which these two populations approached maximum fertility. Maximum marital fertility levels are designated by 1921 to 1930 Hutterite (Eaton and Mayer 1953) age-specific and total fertility rates. Tables 9 and 10 present the calculations for and recording of the resulting Coale's indices for Ahousaht and Anaham groups. These standardized fertility indices appear to suggest that a large proportion of recent Ahousaht and Anaham birth events occurred outside marriage.

As shown in Table 11 there are three distinctive ways in which natural fertility populations can regulate fertility behaviour (Howell 1979). High fertility populations, like

Table 6: Cumulative age-specific fertility (A.S.F.) rates for Ahousaht women ages 15 to 49.

<u>Age</u>	<u>Person -years</u>	<u>Births</u>	<u>Annual A.S.F. rates</u>	<u>5-Year A.S.F. rates</u>
15	53	0	.000	
16	50	2	.040	
17	47	3	.064	
18	43	11	.256	
19	41	9	.220	
15-19	234	25		.107
20	37	11	.297	
21	35	10	.286	
22	33	11	.333	
23	32	11	.344	
24	29	12	.414	
20-24	166	55		.331
25	28	16	.571	
26	28	12	.429	
27	28	11	.393	
28	27	8	.296	
29	25	13	.520	
25-29	136	60		.441
30	24	6	.250	
31	21	14	.667	
32	19	6	.316	
33	17	4	.235	
34	16	4	.250	
30-34	97	34		.351
35	15	6	.400	
36	14	5	.357	
37	12	3	.250	
38	11	4	.364	
39	9	4	.444	
35-39	61	22		.361
40	8	2	.250	
41	6	0	.000	
42	5	3	.600	
43	5	0	.000	
44	5	1	.200	
40-44	29	6		.207
45	2	0	.000	
46	2	0	.000	
47	1	0	.000	
48	1	0	.000	
49	0	0	.000	
45-49	6	0		.000
Totals	729	202	8.990	1.798

Total fertility Rate = $1.798 \times 5 = 8.990$

Table 7: Cumulative age-specific fertility (A.S.F.) rates for Anaham women ages 15 to 49.

<u>Age</u>	<u>Person -years</u>	<u>Births</u>	<u>Annual A.S.F. rates</u>	<u>5-Year A.S.F. rates</u>
15	118	3	.025	
16	105	1	.010	
17	101	9	.089	
18	93	3	.032	
19	89	8	.090	
15-19	506	24		.047
20	84	13	.156	
21	83	19	.229	
22	80	26	.325	
23	72	19	.264	
24	67	20	.298	
20-24	386	97		.251
25	63	24	.381	
26	62	21	.339	
27	55	17	.309	
28	52	18	.346	
29	50	14	.280	
25-29	282	94		.333
30	49	16	.326	
31	43	15	.349	
32	41	11	.268	
33	39	12	.308	
34	36	10	.278	
30-34	208	64		.308
35	35	14	.400	
36	33	12	.364	
37	33	4	.121	
38	29	7	.241	
39	27	8	.296	
35-39	157	45		.287
40	24	1	.042	
41	20	3	.150	
42	16	4	.250	
43	14	1	.071	
44	9	3	.333	
40-44	83	12		.145
45	8	1	.125	
46	6	0	.000	
47	5	0	.000	
48	4	0	.000	
49	3	0	.000	
45-49	26	1		.039
Totals	1648	337	7.050	1.410

Total fertility Rate = $1.410 \times 5 = 7.050$

Table 8: Cumulative age-specific average parities for Ahousaht and Anaham women ages 15 to 49.

<u>Ahousaht</u>			
<u>Age interval</u>	<u>Women</u>	<u>Births</u>	<u>Mean parity</u>
15-19	13	2	0.15
20-24	9	10	0.90
25-29	4	18	4.50
30-34	9	49	5.44
35-39	7	56	8.00
40-44	6	51	8.50
45-49	2	16	8.00
Totals	50	202	

<u>Anaham</u>			
<u>Age interval</u>	<u>Women</u>	<u>Births</u>	<u>Mean parity</u>
15-19	34	2	.06
20-24	21	18	.86
25-29	14	24	1.71
30-34	14	59	4.21
35-39	11	71	6.46
40-44	16	96	6.00
45-49	8	67	8.38
Totals	118	337	

Table 9: Coale's fertility indices for Ahousaht women ages 15 to 49.

<u>Age interval</u>	<u>Wi</u>	<u>Mi</u>	<u>fi</u>	<u>gi</u>	<u>Fi</u>
15-19	13	0	.107	.108	.300
20-24	9	0	.331	.350	.550
25-29	4	3	.441	.453	.502
30-34	9	7	.351	.368	.447
35-39	7	6	.361	.375	.406
40-44	6	6	.207	.207	.222
45-49	2	2	.000	.000	.061
Totals	50	24	1.798	1.861	2.488

<u>Age interval</u>	<u>fiwi</u>	<u>FiWi</u>	<u>giMi</u>	<u>FiMi</u>
15-19	1.39	3.90	0.00	0.00
20-24	2.98	4.95	0.00	0.00
25-29	1.76	2.01	1.36	1.51
30-34	3.16	4.02	2.58	3.13
35-39	2.53	2.84	2.25	2.44
40-44	1.24	1.33	1.24	1.33
45-49	0.00	1.22	0.00	0.12
Totals	13.06	20.27	7.43	8.53

$$I_f = .6443$$

$$I_g = .8710$$

$$I_m = .4208$$

Table 10: Coale's fertility indices for Anaham women ages 15 to 49.

<u>Age interval</u>	<u>Wi</u>	<u>Mi</u>	<u>fi</u>	<u>gi</u>	<u>Fi</u>
15-19	34	0	.047	.070	.300
20-24	21	1	.251	.357	.550
25-29	14	6	.333	.418	.502
30-34	14	8	.308	.352	.447
35-39	11	9	.287	.336	.406
40-44	16	12	.145	.172	.222
45-49	8	7	.039	.048	.061
Totals	118	43	1.410	1.753	2.488

<u>Age interval</u>	<u>fiwi</u>	<u>FiWi</u>	<u>giMi</u>	<u>FiMi</u>
15-19	1.60	10.20	0.00	0.00
20-24	5.27	11.55	0.36	0.55
25-29	4.66	7.03	2.51	3.01
30-34	4.31	6.26	2.82	3.58
35-39	3.16	4.47	3.02	3.65
40-44	2.32	3.55	2.06	2.66
45-49	3.12	0.49	0.33	0.42
Totals	21.63	43.55	11.10	13.88

$$I_f = .4967$$

$$I_g = .7997$$

$$I_m = .3187$$

Table 11: Fertility indices for Ahousaht, Anaham, and other populations.

<u>Population</u>	<u>If</u>	<u>Ig</u>	<u>Im</u>
Hutterites (1925)	0.70	1.00	0.70
Taiwan (1930)	0.54	0.66	0.78
Chinese farmers (1930)	0.45	0.51	0.87
India (1945)	0.50	0.57	0.88
!Kung (1968)	0.34	0.40	0.86
Norway (1900)	0.33	0.73	0.42
Ahousaht (1968)	0.64	0.87	0.42
Anaham (1968)	0.49	0.80	0.32

Data Sources: Chinese farmers (Barclay et al. 1976); Hutterites, India, Norway, and Taiwan (Coale 1965); !Kung (Howell 1979).

the Hutterites (1925) and Taiwan (1930), are alike in that they are characterized by a relatively high proportion of women in their fertility years who are married and by a high level of fertility within marriage. The next three, the Chinese farmers (1930), India (1945), and the !Kung (1968), are populations where a substantially higher proportion of the fertile women are married as compared to the above group. These populations are characterized by early and near universal marriage of women and by low levels of fertility within marriage. Finally, low fertility populations, like Norway (1900), observe a classic European fertility pattern which is characterized by an extremely low proportion of marriages and high fertility within those marriages.

Ahousaht and Anaham fertility behaviour most closely resembled the European fertility pattern. Both British Columbian native populations were characterized by a relatively low proportion of married women and by a relatively high marital fertility. However, high overall general fertility levels of the Ahousaht and Anaham do not correspond with low levels associated with the European fertility pattern. These high overall fertility levels, therefore, seem to suggest that premarital birth events were an important mechanism underlying Ahousaht and Anaham high fertility levels.

3.1.3 Post-Reproductive Women.

The reproductive careers of 14 Ahousaht (mothers of 46 children ever born) and 19 Anaham (mothers of 95 children ever born) post-reproductive women were reconstructed from their respective genealogies. These fertility histories were useful in assessing the degree to which Ahousaht and Anaham fertility patterns have changed. The results of fertility analyses--age-specific and total fertility levels, as well as total parity distributions--determined for both post-reproductive cohorts are given in Tables 12 and 13. While these results cannot be looked at uncritically they do provide a rough gauge of past Ahousaht and Anaham fertility patterns.

Table 12: Fertility performance of Ahousaht and Anaham women ages 50 plus.

<u>Ahousaht</u>													
<u>Parity number</u>													
<u>Age</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>Sum</u>	<u>Risk</u>	<u>A.S.F.</u>
15-19											0	70	.000
20-24		4	1								5	70	.071
25-29		6	3	1							10	70	.143
30-34		2	3	2	2	1	1				11	70	.157
35-39		1	2	2	3	3		1			11	70	.171
40-44		1	1	1	1		1		1	1	7	70	.100
45-49				1							1	70	.014
Total	0	14	10	7	6	4	2	1	1	1	46	70	.656

Total Fertility Rate = 5 x .656 = 3.280

<u>Anaham</u>														
<u>Parity number</u>														
<u>Age</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>Sum</u>	<u>Risk</u>	<u>A.S.F.</u>
15-19		6	1									7	95	.074
20-24		5	6	3								14	95	.147
25-29		4	5	3	4	1	1					18	95	.190
30-34		1	2	6	5	3	2	1	1			22	95	.232
35-39			2	2	4	7	4	1	1	1	1	22	95	.232
40-44							4	2	1	1		8	95	.084
45-49		1						1	1		1	4	95	.042
Total	2	17	16	14	13	11	11	5	4	2	2	95	95	1.001

Total Fertility Rate = 5 x 1.00 = 5.00

Table 13: Parity distributions for Ahousaht and Anaham women ages 50 plus.

<u>Ahousaht</u>												
<u>Number of live births</u>												
<u>Age group</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>Mean</u>	<u>Variance</u>
50-54 (4)		1			1	1	1				4.0	4.67
55-59 (1)					1						4.0	0.00
60-64 (2)					1					1	6.0	18.00
65 plus (7)	3	3				1					2.0	2.00
Total (14)	4	3	1	2	2	1				1	3.2	5.60

<u>Anaham</u>													
<u>Number of live births</u>													
<u>Age group</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>Mean</u>	<u>Variance</u>
50-54 (6)			1		1		1	1			2	6.5	10.30
55-59 (3)	1		1		1							2.0	4.00
60-64 (2)							2			1		6.0	0.00
65 plus (8)	1	1		1			3		2			4.8	9.36
Total (19)	2	1	2	1	2		6	1	2		2	5.0	3.05

The authenticity of overall low fertility levels determined for Ahousaht and Anaham women who have completed their reproductive careers is questionable. Fertility trends at all levels may be an artifact of the small sample sizes taken to represent both cohorts and of genealogical truncation. Determined fertility levels may, therefore, reflect inherent sampling errors rather than the real fertility properties of both post-reproductive cohorts. Age-specific fertility rates determined for both post-reproductive cohorts, especially between the ages of 15 and 30, seem to suffer from the underreporting of births (see Table 12). The degree to which this underreporting has occurred, as mentioned previously, cannot be effectively measured by indirect means. Small sample size may also tend to obscure some fertility patterns. As shown in Table 13 parity data for both cohorts were rather irregularly distributed, even when age was broken down into successive groupings.

3.1.4 Mean Reproductive Period and Birth Intervals.

Howell's (1979) methodology was employed to measure both the reproductive span, as ascertained by the mean duration of the childbearing period, and the rate of childbearing, as defined by the mean population birth interval. However, the mean reproductive spans and mean birth intervals of Ahousaht and Anaham women under 49 years could not be calculated directly, because mean ages at final birth were not known. Instead, birth spacing was observed and the mean reproductive span was indirectly determined by multiplying the observed birth interval by the respective total fertility rate and then dividing this figure by 12. As shown in Tables 14 and 15 increases in Ahousaht and Anaham total fertility levels have been associated with substantial decreases in spacing between births--in both populations this spacing has nearly halved. The mean duration of the Ahousaht reproductive span seems related to increases in total fertility. In this case, the reproductive span has nearly doubled in length. For Anaham women, it is not clear

whether the length of the reproductive span adds an independent component to the differences observed between respective cohorts. These fertility measures--especially the mean reproductive span--seem highly susceptible to problems of truncation. The mean reproductive span for Ahousaht post-reproductive women is highly questionable, because it seems to reflect a problem with underreporting rather than with underlying trends in natural fertility. These measures provide a rough gauge of how birth spacing and reproductive span affects the underlying historic Ahousaht and Anaham fertility patterns but they are inconclusive.

Table 14: Mean length of reproductive period and mean birth intervals for Ahousaht women.

<u>Ahousaht women</u>	<u>Mean age at first birth</u>	<u>Mean age at last birth</u>	<u>Mean length of reproductive span</u>
	(1)	(2)	(2)-(1) (3)
15-49	20.20		18.34
50 plus	27.29	35.21	7.92

<u>Ahousaht women</u>	<u>T.F.R.</u>	<u>Mean birth space in months</u>	<u>Mean observed birth space</u>
	(4)	(3) x 12/(4) - 1 (5)	(6)
15-49	8.99		24.48
50 plus	3.28	41.78	42.00

Table 15: Mean length of reproductive period and mean birth intervals for Anaham women.

<u>Anaham women</u>	<u>Mean age at first birth</u>	<u>Mean age at last birth</u>	<u>Mean length of reproductive span</u>
	(1)	(2)	(2)-(1) (3)
15-49	20.97		14.73
50 plus	23.29	39.82	16.53

<u>Anaham women</u>	<u>T.F.R.</u>	<u>Mean birth space in months</u>	<u>Mean observed birth space</u>
	(4)	(3) x 12/(4) - 1 (5)	(6)
15-49	7.05		25.08
50 plus	5.00	47.09	42.84

3.1.5 Overall Evaluation of Fertility Performance.

The genealogical method of anthropological inquiry was used to apply various direct and indirect demographic fertility measures to Ahousaht and Anaham genealogies. The retrospective cumulative fertility performances of Ahousaht and Anaham reproductive and post-reproductive women were evaluated over a period of approximately 100 years. It is obvious from the above analyses that the fertility performance of Ahousaht and Anaham women was not sufficiently outlined. In general, this demographic inquiry was only able to roughly outline changes in Ahousaht and Anaham fertility schedules, rather than determine specific levels. However, inconsistencies found in these fertility schedules can be successfully gauged with the use of computer simulation models. Unlike indirect estimation techniques simulation models, like AMBUSH (Howell 1979; Howell and Lehotay 1977, 1978), can deal with random and retrospective changes in yearly fertility schedules. In this study computer simulation models were utilized to re-examine the internal consistency, completeness, and variability of Ahousaht and Anaham fertility schedules for reproductive women (15-49). However, the fertility patterns associated with post-reproductive women (50 plus) could not be simulated because of the lack of adequate mortality data (see Section 2.1.2).

3.2 Mortality Schedules.

Discussion in this section centres on placing contemporary Ahousaht and Anaham mortality experience within a comparative continuum. Genealogies available for this study did not contain sufficient mortality data to reconstruct retrospective trends. The evaluation of Ahousaht and Anaham mortality experience was, therefore, confined to the analysis and the comparison of abridged life tables constructed by Alfred (1976). LIFE, a

FORTTRAN program (Keyfitz and Flieger 1971), was employed by Alfred to produce mortality schedules from vital events data provided by Indian and Northern Affairs (for 1966, 1967, and 1968), from a vital statistics report for British Columbia (1967), and from Keyfitz and Flieger (1968). LIFE output (see Table 16 and Tables 28 through 41 in Appendix B) presents mortality information on the following populations: (1) Ahousaht, (2) Anaham, (3) Athapaskan, (4) Wakashan, (5) total reserve population, (6) British Columbia 1967, and (7) Canada 1965. These tables summarize by sex the combined age-specific mortality experience of several generations rather than any particular cohort.

The comparison of Ahousaht and Anaham sex-specific mortality regimes with other abridged life tables was problematic given the effects of small numbers and varying quality of data. The total annual deaths (during 1966, 1967, and 1968) recorded for the Ahousaht and Anaham in their respective life tables was extremely small. With only a small number of deaths observed for each sex many single years of age have no deaths in them, and consequently the probability of dying will be zero--a condition that was recognized to be false. There is no segment of the human life span in which the probability of death is zero (Howell 1979). Late reporting of deaths may also seriously affect the quality of Ahousaht and Anaham data. Delays in the reporting of known vital events are common among Canadian native populations (see Piché and George 1973; Romaniuk and Piché 1972). Ahousaht and Anaham mortality schedules were not considered to be immune to this phenomenon.

Life tables are recognized by demographers as a means of portraying in depth a population's mortality experience and of linking observable vital events to the consequences these events would have upon a hypothetical stationary population free of demographic disturbances (Howell 1979). The applications of life table analysis in this

Table 16: Life expectancy at birth, male and female, Ahousaht, Anaham, and other populations (circa 1968).

From Alfred (1976).

	<u>Male</u>	<u>Female</u>
Ahousaht	53.4	68.6
Anaham	56.3	65.9
Athapaskan	48.7	57.9
Wakashan	51.0	60.2
British Columbia Reserve Population	53.2	58.7
British Columbia (1967)	69.4	76.3
Canada (1965)	68.8	75.0

study are limited by the lack of data and hampered by its quality. Contemporary Ahousaht and Anaham mortality experiences were not successfully placed within a comparative continuum with other native and non-native mortality regimes. Ahousaht and Anaham mortality regimes (see Tables 28 through 31 in Appendix B) were assumed to be inconsistent with their underlying observable vital events. Again, computer simulation methodology was seen as an effective means of clarifying these inconsistencies as well as a suitable means of placing Ahousaht and Anaham mortality regimes within a comparative continuum. In this study AMBUSH (Howell 1979; Howell and Lehotay 1977, 1978) and FIVFIV (Shorter 1974) were applied to simulate underlying Ahousaht and Anaham mortality schedules (circa 1968). Finally, the lack of retrospective mortality data made it impossible to generalize about past Ahousaht and Anaham conditions and the effects of cultural, environmental, and historical circumstances on mortality.

3.3 Computer Simulation

In anthropology computer simulation models have been beneficial to the study of palaeolithic populations (Wobst 1974, 1976), skeletal populations (Howell 1982; Weiss 1973), contemporary hunter-gatherer populations (Chapman 1980; Howell 1982), and historic village population reconstructions (Roth 1981a). Unlike other methodological approaches computer simulation (Dyke and MacCluer 1973) is an effective means of clarifying sources of inconsistencies--like stochastic noise, small data bases, and incomplete vital events--that are characteristically found in the demographic records of small populations (Howell 1979; Weiss 1975). This enquiry incorporates computer simulation methodology to test the internal consistency of earlier generalizations made about Ahousaht and Anaham vital rates, to assess the variability of these rates, and to

determine the implications of recent (circa 1968) and prospective (future) secular demographic trends. FIVFIV (Shorter 1974), a deterministic macrosimulation, was implemented to elicit information about recent demographic trends (circa 1968) of Ahousaht and Anaham populations modelled under the assumptions of stable population theory (Coale 1972; Lotka 1907). AMBUSH, (Howell 1979; Howell and Lehotay 1977, 1978), a stochastic microsimulation, was applied to link the features of stable population models with the randomness of stochastic noise in order to assess the range of variability apparent within and between recent Ahousaht and Anaham demographic schedules. FIVFIV represents the deterministic signal of demographic parameters, the "ideal", while AMBUSH incorporates the stochastic fluctuation inherent in small populations and thus exemplifies "the shadow of the ideal" (Roth 1981a).

FIVFIV was again employed to simulate the prospective (future) demographic trends of Ahousaht and Anaham Registered Indians from 1982-1986. These deterministic simulations were helpful in "fleshing out" existing Ahousaht and Anaham projections of Registered Indian populations compiled by the Indian and Northern Affairs (Norris 1985; Perreault et al. 1985; Ram and Romaniuk 1985; Rowe and Norris 1985) with additional demographic information--such as crude birth and death rates, a rate of natural increase, and dependency ratio.

3.3.1 Stable Population and Probabilistic Simulations.

Stable population theory (Coale 1972; Lotka 1907) is an implicit framework for evaluating the demographic schedules that would be generated by the prolonged continuation of existing conditions--mortality and fertility parameters--within a closed system. The assumptions behind stable population theory are: (1) crude birth and death rates are constant, (2) age structure is fixed, (3) growth rate of a population is uniform

and can be measured and, (4) migration is not occurring. FIVFIV (Shorter 1974) closely approximates the features of stable population models by converting known fertility and mortality (sex specific) schedules to corresponding stable models (Coale and Demeny 1966; Coale et al. 1983) and by extending the regular 35-year simulation cycle to 140 years-- thus giving a closed population with a set of age specific and death rates ample time to converge toward stable demographic rates.

FIVFIV, utilizing a modified-component method, was programmed to generate projections of Ahousaht and Anaham stable demographic rates by five-year age groups spaced at five-year intervals of time. FIVFIV is a modified method in the sense that the effects of fertility and mortality are projected integrally, rather than separately. The input specifications characterizing both the Ahousaht and Anaham FIVFIV 140-year stable population simulation runs are as follows. One, Ahousaht and Anaham base populations-- a sample consisting of 302 Ahousaht (139 men and 163 women) and 517 Anaham (244 men and 273 women)--were directly drawn from the genealogies. Two, the sex ratio at birth in each simulation was left at FIVFIV's default value of 105 males per 100 females. Three, fertility schedules were drawn from the cumulative fertility experience of reproductive Ahousaht and Anaham women (15-49) as shown in Tables 6 and 7. Four, Ahousaht and Anaham model life tables were based on the mortality schedules found in sex-specific life tables compiled by Alfred (1976) for the Wakashan and Athapaskan linguistic groups (see Tables 32 through 35 in Appendix B). It was assumed that Wakashan and Athapaskan sex-specific mortality regimes better reflect Ahousaht and Anaham mortality experience, because they were directly drawn from substantially more deaths than tables compiled by Alfred (1976) for the Ahousaht and Anaham (see Tables 28 through 31 in Appendix B). Finally, Ahousaht and Anaham populations were closed.

Output stable demographic measures, crude birth and death rates, and dependency ratio were determined by both FIVFIV simulations (see Tables 17 and 18).

Stable population models give no true indication of the variation which can occur in the features of small populations. AMBUSH (Howell 1979; Howell and Lehotay 1977, 1978) links the principles of stable population models with the randomness of stochastic fluctuation to investigate the variable range found in the demographic features of small populations. AMBUSH was repeatedly run to simulate and assess the range of variability expected within and between Ahousaht and Anaham demographic parameters. The outcomes of AMBUSH simulations, unlike FIVFIV, were subject to the cumulative effects of random variation over time--they were not based upon the input schedules alone. The results of several AMBUSH simulation runs provided a mean measure of--an average comparable to stable population models with similar probability schedules--and additional information on the variability that can be expected in the features of small populations.

Empirically, AMBUSH is a useful means of evaluating the amount of variability found in particular parameters of the Ahousaht and Anaham populations and of testing whether this variability is truly independent of the demographic schedules observed. Differences between simulated and real populations may direct attention not only to errors of recording but also to important ways in which real populations violate the probabilistic assumptions of simulation. AMBUSH simulations, then, can serve as the "null hypotheses" against which observed Ahousaht and Anaham populations can be compared.

Five simulation runs of Ahousaht and five of Anaham start populations, each running for a period of approximately sixty years, were completed. AMBUSH operated by retaining the individuality of Ahousaht and Anaham persons and by generating future events for each of these individuals through a Monte-Carlo process. The input

specifications which characterize each AMBUSH simulation run are as follows. First, Ahousaht and Anaham base populations were again directly drawn from the genealogies. Second, the sex ratio at birth, in all simulations, was designated as 105 men per 100 women to conform to the guidelines of stable population theory. Third, fertility schedules were drawn from the cumulative fertility experience of reproductive Ahousaht and Anaham women (15-49) as shown in Tables 6 and 7. Fourth, Ahousaht and Anaham sex-specific mortality schedules were directly drawn from the Wakashan and Athapaskan life tables (see Tables 32 through 35 in Appendix B) compiled by Alfred (1976). It was assumed that Ahousaht and Anaham sex-specific mortality regimes (see Tables 28 through 31 Appendix B) were inconsistent with underlying real rates in both populations. Finally, in all simulations the populations were closed to the forces of migration. Output stable demographic measures, crude birth and death rates, total fertility rate, and dependency ratio were determined by all AMBUSH simulations (see Tables 17 and 18). Output measures were tabulated after 50 years of simulation in order to avoid tabulating simulation features that were directly derived from the peculiarities of the start population.

"Student's t" distributions were employed to test whether observed differences in Ahousaht and Anaham vital rates, as generated by AMBUSH, were significantly different, or were similar enough to be accounted for by processes of random variation (see Table 19). The shape of the student's t distribution is similar in appearance to the bell-shaped curve of a normal distribution. As sample size increases, the more identical the distribution of student's t becomes with the normal distribution of z. Values of t were compared with their corresponding critical values. These critical values of t were selected at a 0.05 probability level, to conform with standards of most social science statistical inquiries.

Table 17: Probability (AMBUSH) and stable population (FIVFIV) vital measures for simulated Ahousaht populations (circa 1968).

	<u>AMBUSH</u>			<u>FIVFIV</u>
	<u>Mean</u>	<u>Variance</u>	<u>Range</u>	
Crude birth rate	56.01	19.35	45.45- 70.21	56.10
Crude death rate	10.00	2.31	6.56- 14.21	11.60
Total fertility rate	8.90	0.45	7.10- 10.93	9.00
Dependency ratio	134.38	21.31	125.10-144.20	122.40

Note: Vital rates were determined from 20 AMBUSH simulation runs of 60 years each and one FIVFIV run of 140 years.

Table 18: Probability (AMBUSH) and stable population (FIVFIV) vital measures for simulated Anaham populations (circa 1968).

	<u>AMBUSH</u>			<u>FIVFIV</u>
	<u>Mean</u>	<u>Variance</u>	<u>Range</u>	
Crude birth rate	48.16	15.91	38.02- 61.02	46.60
Crude death rate	14.16	3.73	9.07- 22.26	13.20
Total fertility rate	6.93	0.33	5.33 - 8.79	7.00
Dependency ratio	103.98	16.16	94.53-112.20	97.00

Note: Vital rates were determined from 20 AMBUSH simulation runs of 60 years each and one FIVFIV run of 140 years.

Table 19: Values of t for simulated Abousaht and Anaham populations as generated from AMBUSH simulation data.

	<u>t-values</u>	<u>Degrees of freedom</u>
Crude birth rate	0.1647 N.S.	539
Crude death rate	0.2014 N.S.	539
Total fertility rate	0.0875 N.S.	539
Dependency ratio	0.0960 N.S.	160

N.S. Not significant at a 0.05 probability level.

The task of drawing inferences from the observed means of Ahousaht and Anaham vital measures, as generated by AMBUSH simulation runs, was complicated by the constant presence of sampling error. Observed means could only be seen as point estimates which give no indication of sampling error. Consequently little confidence could be accorded to them. Confidence intervals were therefore compiled at a 95 percent probability level to overcome this disadvantage (see Table 20). These intervals do not disclose the exact whereabouts of the true mean, but furnish an interval with a specific probability of encompassing it.

Tables 17 and 18 reveal a good fit between AMBUSH and FIVFIV simulations. FIVFIV output values--crude birth and death rates, total fertility rates, and dependency ratios--generally fell within the probabilistic value ranges determined by AMBUSH and within the 95 percent confidence intervals shown in Table 20. The close fit between simulated FIVFIV and AMBUSH output values strengthens their validity and reliability. Also, confidence intervals provided probabilistic ranges of statistical significance in which Ahousaht and Anaham vital rates would have likely fluctuated. Although Ahousaht and Anaham confidence intervals sometimes differed, "student t-tests" proved that observed differences between simulated secular demographic rates, as generated by AMBUSH, were not significant at a 0.05 probability level (see Table 19). Instead, differences in Ahousaht and Anaham simulated demographic rates were seen as small enough to be accounted for by processes of random variation. In general, AMBUSH and FIVFIV output measures demonstrated that the Ahousaht and Anaham (circa 1968) had relatively high fertility and low mortality levels and were heavily youth-biased populations.

Table 21 provides a comparative continuum, based on native and non-native vital events data, in which simulated Ahousaht and Anaham measures were placed. All indices

Table 20: Confidence intervals for Ahousaht and Anaham vital rate means as generated from AMBUSH simulation data.

	<u>Ahousaht</u>	
	<u>Mean</u>	<u>Confidence interval</u>
Crude birth rate	56.01	48.58- 63.44
Crude death rate	10.00	8.67- 11.33
Total fertility rate	8.90	7.72- 10.08
Dependency ratio	134.38	105.10-163.66
	<u>Anaham</u>	
	<u>Mean</u>	<u>Confidence interval</u>
Crude birth rate	48.16	38.02- 61.02
Crude death rate	14.41	9.07- 22.26
Total fertility rate	6.92	5.33 - 8.79
Dependency ratio	103.98	94.53-112.20

Note: Confidence intervals were constructed at a 95 percent level of probability.

Table 21: Selected vital rate measures for Ahousaht, Anaham, and other populations (circa 1968).

After Alfred (1976).

	<u>Crude birth rate</u>	<u>Crude death rate</u>	<u>Dependency ratio</u>	<u>Total fertility rate</u>
Ahousaht	33.14	11.36	1.62	8.99
Anaham	35.22	9.43	1.18	7.05
Athapaskan	48.88	10.15	1.17	7.37
Wakashan	35.93	9.53	0.86	7.74
British Columbia Reserve Population	41.29	9.54	0.96	5.48
British Columbia (1967)	16.82	10.32	0.60	2.52
Canada (1965)	22.47	7.78	0.64	3.19

in Table 21, except for Ahousaht and Anaham observed measures, were generated by Alfred (1976) from either of two FORTRAN simulation programs (Keyfitz and Flieger 1971). PROJECT, a stable population projection model, was responsible for generating crude birth and death rates as well as dependency ratios. LOTKA, a reproduction analysis model, was responsible for deriving total fertility rates. These simulated vital measures were based originally on vital events data obtained from Indian and Northern Affairs (1966, 1967, and 1968), from a vital statistics report for British Columbia (1967), and from Keyfitz and Flieger (1968). Observed Ahousaht and Anaham vital measures were directly determined by Alfred from Indian and Northern Affairs vital events data (1966, 1967, 1968).

Confidence intervals for simulated Ahousaht and Anaham vital measures, as generated from AMBUSH output, served as null hypotheses against which all vital measures in Table 21 were compared. Ahousaht and Anaham simulated fertility measures--crude birth rates and total fertility rates--were generally similar in value to their observed and other native fertility rates, and higher in value than non-native rates. However, Ahousaht and Anaham simulated crude birth rates were shown to be statistically higher in value than their observed counterparts, but this is probably because of underreporting. Also, the British Columbian Reserve population's total fertility rate was significantly lower than observed and simulated Ahousaht and Anaham rates and their linguistic counterparts. Ahousaht and Anaham simulated crude death rates did not discriminate nicely between native and non-native rates. Although no pattern was observed, Anaham confidence intervals were significantly higher than the rates for its observed and linguistic counterparts. Again, this observed difference was probably caused by underreporting. Finally, Ahousaht and Anaham dependency ratios, and native ratios in general, were higher than non-native ones.

3.3.2 Prospective Population Simulations.

Prospective population simulations are a useful means of estimating future changes in a population's demographic regimes. Prospective projections, unlike stable population simulations, are designed to highlight the effects of changing demographic rates on a stationary population over time. FIVFIV (Shorter 1974) was again employed to simulate Ahousaht and Anaham future demographic trends. The range of mortality and fertility assumptions acceptable to FIVFIV is sufficiently large enough to allow the computation of almost any type of nonstable two-sex model, including models with split-level mortality--sex-specific mortality schedules.

FIVFIV was programmed to generate prospective moderate growth population projections of Ahousaht and Anaham Registered Indians from 1982-1996. In this scenario, like the Indian and Northern Affairs' medium-growth scenario (Perreault et al. 1985), fertility rates declined slowly while mortality rates decreased moderately. FIVFIV simulations, unlike the projections completed by Indian and Northern Affairs, were characterized by input parameters that were assumed to more closely reflect underlying Ahousaht and Anaham demographic secular trends (see Table 22). First, Ahousaht and Anaham base populations were taken from 1981 estimates of their Registered Indian populations, by residence, and by age and sex. Second, a sex ratio was calculated from each base population. Third, fertility and mortality schedules were extrapolated from known past Ahousaht and Anaham trends (Tables 6 and 7, and Tables 32 through 35 in Appendix B) and from existing national and regional estimates of demographic events for Registered Indians (Perreault et al. 1985; Ram and Romaniuk 1985; Rowe and Norris 1985). Last, both base populations were assumed to be closed. Output demographic measures such as crude birth and death rates, rates of natural increase, and dependency ratios were generated by FIVFIV at five-year intervals--1986, 1991, 1996.

Table 22: Fertility and mortality assumptions of the FIVFIV medium-growth scenarios (1981-1996).

	<u>Ahousaht</u>			
	<u>1981</u>	<u>1986</u>	<u>1991</u>	<u>1996</u>
Life expectancy				
Female	63.1	65.0	66.8	68.6
Male	52.6	53.8	55.4	57.1
Total fertility rate	5.3	5.1	4.9	4.7
	<u>Anaham</u>			
	<u>1981</u>	<u>1986</u>	<u>1991</u>	<u>1996</u>
Life expectancy				
Female	60.8	62.6	64.4	66.2
Male	50.2	51.3	52.8	54.4
Total fertility rate	4.2	4.0	3.8	3.6

FIVFIV was employed to "flesh-out" existing Ahousaht and Anaham medium-growth scenario projections of Registered Indian populations, as compiled by Indian and Northern Affairs (Norris 1985; Perreault et al. 1985; Ram and Romaniuk 1985; Rowe and Norris 1985), with additional demographic information (see Table 23). These projections of Canada's Registered Indian population were based on a composite approach. At the national and regional level, projections were based on a component method in which natural increase and migration were explicitly taken into account. At the sub-regional levels (residence, district, and bands), a ratio method was then employed to disaggregate projections of national and regional populations: first, projected populations were broken down by place of residence (on and off reserve), second, projected populations were distributed by district and, third, each district projection was then disaggregated by band. Ahousaht and Anaham population projections were generated from this process. Projections were based on adjusted 1981 estimates of Registered Indian populations by region, and by age and sex. All input schedules were based on projected estimates of future regional and national demographic trends.

FIVFIV and Indian and Northern Affairs population projections presented in Table 23 take into consideration what impact estimated recent demographic trends have on the future trends of Ahousaht and Anaham registered Indians. In general, both populations will continue to be characterized by relatively high birth and death rates. Both Ahousaht and Anaham dependency ratios are high and are still heavily youth-biased. These rates are still relatively higher than those simulated for the Canadian Registered Indian population (1981-1996) in Table 24. In addition, simulated Ahousaht and Anaham future vital rates, except for mortality levels, are different from those projected by George and Perreault (1985) for British Columbians and Canadians as a whole (see Table 25).

Table 23: Components of Ahousaht and Anaham Registered Indian population projections (1981-1996).

<u>Ahousaht</u>			
<u>Medium growth scenario</u>			
	<u>1986</u>	<u>1991</u>	<u>1996</u>
Population	1158	1251	1330
Crude birth rate	44.9	43.4	39.5
Crude death rate	10.7	9.3	7.9
Natural increase	34.2	34.1	31.6
Dependency ratio	78.80	83.20	89.00

<u>Anaham</u>			
<u>Medium growth scenario</u>			
	<u>1986</u>	<u>1991</u>	<u>1996</u>
Population	856	925	990
Crude birth rate	34.7	34.0	31.3
Crude death rate	11.9	10.8	9.7
Natural increase	22.8	23.2	21.6
Dependency ratio	70.60	69.00	68.90

Note: Ahousaht and Anaham Registered Indian populations were simulated Indian and Northern Affairs and their vital rates by FIVFIV. Also, all indices except for dependency ratio are mid-period measures.

Table 24: Projection of Canadian Registered Indians and their vital rates by Indian and Northern Affairs (1981-1996).

From Perreault et al. (1985).

	<u>Medium growth scenario</u>		
	<u>1986</u>	<u>1991</u>	<u>1996</u>
Population (in 1000's)	374	416	456
Crude birth rate	28.3	26.0	23.2
Crude death rate	6.7	6.0	5.5
Natural increase	21.6	20.0	17.7
Dependency ratio	69.10	64.83	60.63

Note: All indices are year end measures.

However, no statistically significant conclusion can be drawn here because the probabilistic variation in future Ahousaht and Anaham vital rates was not determined.

Computer simulation methodology (Dyke and MacCluer 1973) was incorporated into this study to approach demographic irregularities in Ahousaht and Anaham populations and to simulate their stable population and future secular demographic schedules.

AMBUSH (Howell 1979; Howell and Lehotay 1977, 1978) and FIVFIV (Shorter 1974) simulations should be seen as a reliable means of modelling past or prospective Ahousaht and Anaham demographic events.

Table 25: Components of a British Columbian and Canadian population projection Scenarios (1984-1996).

From George and Perreault (1985).

	<u>British Columbia</u>		
	<u>Projection Number 1</u>		
	<u>1986</u>	<u>1991</u>	<u>1996</u>
Population (in 1000's)	2942	3091	3191
Crude birth rate	13.7	11.6	9.9
Crude death rate	7.4	7.6	7.9
Natural increase	6.3	4.0	2.0
Dependency ratio	59.60	60.10	59.50

	<u>Canada</u>		
	<u>Projection Number 1</u>		
	<u>1986</u>	<u>1991</u>	<u>1996</u>
Population (in 1000's)	25583	26613	27349
Crude birth rate	14.0	12.5	10.4
Crude death rate	7.2	7.4	7.7
Natural increase	6.8	5.1	2.6
Dependency ratio	58.60	58.70	57.90

Note: Projection number 1 was chosen because it incorporated the most plausible course of events in the short term. All indices are mid-period measures.

Chapter IV

DISCUSSION AND CONCLUSIONS.

This study attempted to evaluate how the present structures of the Ahousaht and Anaham populations were obtained, and how specific cultural, environmental, and historical circumstances affected these two native British Columbian populations through time. It was hypothesized that fundamental differences in the prehistoric and historic ways of life of the Ahousaht (semi-sedentary hunter-gatherers) and Anaham (mobile hunter-gatherers) should reflect to some degree inherent disparities in their historic-demographic trends. In both populations basic secular demographic trends apparent in the past were assumed to be reflected in the historic present. Demographic differences between and within these two communities were believed to be a function of real underlying cultural, environmental, and historical differences.

This investigation has shown that historic-demographic trends of the Ahousaht and Anaham populations are strikingly similar. As shown by computer simulation, one cannot assume that recent demographic differences between these two native communities are strongly affected by the real underlying cultural, environmental, or historical differences which characterize them. Instead, in both populations basic demographic processes inherent in the past and present seem to be better explained by pan-cultural changes in native British Columbian lifestyles and by demographic irregularities characteristically found in small populations.

The early historical demographic records available for this study were relatively meager and were often not band specific. For this reason it is futile to try and discern the mechanism of demographic change among the Ahousaht and Anaham communities prior to the historic reserve period. However, some cautious generalizations can be drawn from historic changes in Nuu-chah-nulth-aht and Chilcotin populations. Early population decline among the Chilcotin and Nuu-chah-nulth-aht, like other tribal populations in British Columbia, was recognized to be influenced by the introduction of virulent European diseases, such as smallpox, measles, influenza, tuberculosis, and venereal disease, by the impact of prolonged intertribal and tribal conflicts, and by the processes of cultural assimilation (see Duff 1965; Fisher 1977b). How fast this contact-induced decline proceeded and the actual size of these contact tribal populations is still unknown.

For both the Ahousaht and Anaham reserves reasonable censuses have existed since the 1880's, but the quality of these censuses does not inspire confidence in any specific generalizations which might be made from the available population data. However, they seem to crudely describe the gradual rebounding of historic Ahousaht and Anaham populations, which generally correspond with those outlined by Duff (1965) for several British Columbian native populations. Although only roughly outlined, the retrospective fertility performance of Ahousaht and Anaham women seems to correspond with the general rise in fertility rates of other British Columbian native populations. Differences between Ahousaht and Anaham fertility schedules were found to be not important, as a rule. However, the recent transition among Canadian native communities from traditionally high to low fertility levels cannot be documented, because no Ahousaht or Anaham genealogical data were available for that time period. Finally, no significant conclusions can be drawn about Ahousaht and Anaham mortality experience because of the lack of temporal data.

Simulated prospective (future) trends of Ahousaht and Anaham populations are converging towards rates held by Canadians as a whole. Again, these trends demonstrate that the demographic schedules of Ahousaht and Anaham natives are strongly influenced by pan-cultural circumstances rather than particularistic ones.

In conclusion, several significant generalizations can be drawn from this study. They are as follows:

One, demographic change among the Ahousaht and Anaham, like other British Columbian native populations, seems to have been heavily influenced by processes of Euro-Canadian acculturation.

Two, differences in Ahousaht and Anaham secular demographic trends can be attributed to the effects of stochastic fluctuation, because differences in simulated Ahousaht and Anaham vital rates were not statistically significant.

Three, regional historical-demographic differences in British Columbian native populations, as demonstrated by Ahousaht and Anaham secular rates, are minimal.

Four, computer simulation is an effective means of clarifying sources of inconsistencies, such as stochastic noise, small data bases, and incomplete vital events, that are characteristically found in the demographic records of the Ahousaht and Anaham communities.

Five, more original research is needed to back some of the generalizations made in this study. This research should attempt to quantify and delineate historical and interregional differences in the vital rates of British Columbia's native population. At a micro-level, more anthropological community studies are needed, in order to develop a better band-specific model of historical-demographic change. At a macro-level, more effort is needed in coordinating the historical demographic record-compiling efforts of the local, provincial, and federal levels of government.

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APPENDIX A
AHOUSAHT AND ANAHAM RESERVES AND
SETTLEMENTS.

Table 26: Ahousaht reserves and settlements.

From Canada (1985).

<u>Number</u>	<u>Name</u>	<u>Hectares</u>
11	Yarksis	41.8
12	Cloolthpich	23.7
13	Oinimitis	10.1
15	Marktosis	105.2
16	Ahous	13.8
17	Chetarpe	14.2
18	Sutaquis	11.0
19	Wahous	58.0
20	Wahous	13.7
21	Tequa	2.4
22	Peneetle	38.4
23	Moyehai	5.3
24	Seektukis	14.0 *
25	Watta	4.8
26	Wappook	4.4
27	Openit	31.1
28	Tootoowiltena	8.5
29	Kishnacous	13.7
30	Indian Island	37.7 *
31	Vargas Island	11.0
32	Bartlett Island	69.6
33	Kutcous Point	39.7
34	Hisnit Fishery	3.6
35	Swan	2.0
	Total:	592.3

* Not indicated in Figure 2.

Table 27: Anaham reserves and settlements.

From Canada (1985).

<u>Number</u>	<u>Name</u>	<u>Hectares</u>
1	Anahim's Flat	3757.6
2	Anahim's Meadow	257.8
2A	Anahim's Meadow	161.9
3	Anahim	65.0
4	Anahim	12.5
5	Anahim	62.0
6	Anahim	139.6
7	Anahim	46.5
8	Anahim	59.0
9	Anahim	48.6
10	Anahim	144.5
11	Anahim	132.3
12	Anahim	56.6
13	Anahim	64.0
14	Anahim	62.7
15	Anahim	57.5
16	Anahim	242.8
17	Anahim	139.6
18	Anahim	145.7
	Total:	5656.2

APPENDIX B
LIFE TABLES

Table 28: Abridged life table for Ahousaht male total mortality 1966-1968.

From Alfred (1976).

<u>Age</u>	<u>N</u>	<u>Died</u>	<u>q(x)</u>	<u>l(x)</u>	<u>d(x)</u>
0	15	1	.063	100000	6323
1	75	1	.052	93678	4835
5	111	1	.044	88843	3914
10	69	0	.000	84929	-34
15	78	0	.000	84963	0
20	21	0	.000	84963	0
25	18	0	.000	84964	0
30	21	0	.000	84964	0
35	21	0	.000	84964	0
40	18	0	.001	84964	96
45	15	1	.290	84868	24641
50	6	0	.000	60226	0
55	15	0	.000	60226	0
60	9	0	.005	60226	285
65	6	2	.910	59941	54552
70	12	2	.347	5389	1870
75	9	1	.426	3519	1501
80	3	0	.006	2019	-11
85	0	0	1.000	2031	2031

<u>Age</u>	<u>L(x)</u>	<u>T(x)</u>	<u>E_x⁰</u>
0	94837	5341638	53.4
1	362623	5246802	56.0
5	434428	4884180	55.0
10	423915	4449752	52.4
15	424824	4025838	47.4
20	424818	3601014	42.4
25	424819	3176196	37.4
30	424819	2751377	32.4
35	424838	2326559	27.4
40	429711	1901721	22.4
45	362714	1472010	17.4
50	295997	1109296	18.4
55	301190	813300	13.5
60	311783	512109	8.5
65	163656	200326	3.3
70	11219	36670	6.8
75	13453	25451	7.2
80	9967	11998	5.9
85	2031	2031	1.0

Table 29: Abridged life table for Ahousaht female total mortality 1966-1968.

From Alfred (1976).

<u>Age</u>	<u>N</u>	<u>Died</u>	<u>q(x)</u>	<u>l(x)</u>	<u>d(x)</u>
0	15	0	.000	100000	0
1	78	1	.050	100000	4969
5	108	0	.000	95031	0
10	99	0	.000	95031	0
15	54	0	.000	95031	0
20	33	0	.000	95031	0
25	24	0	.000	95031	0
30	24	1	.189	95031	17930
35	21	0	.000	77101	0
40	15	0	.000	77101	0
45	12	0	.000	77100	0
50	6	0	.000	77100	0
55	0	0	.000	77100	0
60	12	1	.345	77100	26586
65	9	0	.000	50514	0
70	9	0	.000	50514	0
75	9	0	.000	50514	0
80	0	0	.000	50514	0
85	6	1	1.000	50514	50514

<u>Age</u>	<u>L(x)</u>	<u>T(x)</u>	<u>E⁰_x</u>
0	100000	6859772	68.6
1	387578	6759773	67.6
5	475155	6372196	67.1
10	475155	5897041	62.1
15	475155	5421887	57.1
20	475155	4946733	52.1
25	478890	4471579	47.1
30	430329	3992689	42.0
35	381767	3562361	46.2
40	385502	3180594	41.3
45	385502	2795092	36.3
50	385502	2409591	31.3
55	391040	2024090	26.3
60	319035	1633050	21.2
65	247031	1314015	26.0
70	252570	1066985	21.1
75	252570	814415	16.1
80	258761	561845	11.1
85	303084	303084	6.0

Table 30: Abridged life table for Anaham male total mortality 1966-1968.

From Alfred (1976).

<u>Age</u>	<u>N</u>	<u>Died</u>	<u>q(x)</u>	<u>l(x)</u>	<u>d(x)</u>
0	33	6	.163	100000	16337
1	96	0	.000	83663	0
5	138	0	.000	83663	0
10	99	0	.000	83663	0
15	81	0	.000	83663	0
20	57	0	.000	83663	28
25	63	1	.077	83636	6476
30	39	1	.120	77160	9262
35	48	0	.000	67898	-26
40	30	0	.000	67925	0
45	24	0	.000	67925	0
50	9	0	.002	67925	120
55	15	1	.286	67805	19371
60	9	0	.000	48434	0
65	15	0	.000	48434	0
70	21	1	.214	48434	10344
75	9	0	.000	38089	-116
80	3	0	.000	38206	1
85	3	0	1.000	38205	38205

<u>Age</u>	<u>L(x)</u>	<u>T(x)</u>	<u>E⁰_x</u>
0	89856	5631670	56.3
1	334650	5541815	66.2
5	418313	5207165	62.2
10	418314	4788853	57.2
15	418321	4370540	52.2
20	419596	3952219	47.2
25	403913	3532623	42.2
30	361291	3128710	40.6
35	337628	2767420	40.8
40	339631	2429792	35.8
45	339650	2090161	30.8
50	343360	1750512	25.8
55	290572	1407152	20.8
60	238133	1116580	23.1
65	244324	878448	18.1
70	216283	634124	13.1
75	188584	417841	11.0
80	191051	229256	6.0
85	38205	38205	1.0

Table 31: Abridged life table for Anaham female total mortality 1966-1968.

From Alfred (1976).

<u>Age</u>	<u>N</u>	<u>Died</u>	<u>q(x)</u>	<u>l(x)</u>	<u>d(x)</u>
0	18	0	.000	100000	0
1	120	0	.000	100000	0
5	147	0	.000	100000	0
10	120	0	.000	100000	18
15	105	1	.047	99982	4681
20	69	0	.001	95301	-52
25	39	0	.000	95355	1
30	27	0	.001	95354	111
35	24	1	.189	95243	17968
40	45	0	.000	77275	-202
45	12	0	.000	77478	2
50	15	0	.000	77476	0
55	9	0	.000	77476	0
60	9	0	.000	77477	0
65	15	1	.289	77477	22417
70	9	1	.428	55060	23572
75	6	0	.001	31488	-14
80	3	1	.909	31503	28641
85	6	0	1.000	2862	2862

<u>Age</u>	<u>L(x)</u>	<u>T(x)</u>	<u>E⁰_x</u>
0	100000	6585697	65.9
1	400000	6485698	64.9
5	500000	6085698	60.9
10	500930	5585698	55.9
15	488193	5084768	50.9
20	475664	4596575	48.2
25	476805	4120911	43.2
30	480234	3644107	38.2
35	431229	3163873	33.2
40	383140	2732644	35.4
45	387428	2349505	30.3
50	387380	1962077	25.3
55	387382	1574697	20.3
60	392053	1187316	15.3
65	336251	795264	10.3
70	211695	459013	8.3
75	158533	247317	7.9
80	85922	88784	2.8
85	2862	2862	1.0

Table 32: Abridged life table for Athapaskan male total mortality 1966-1968.

From Alfred (1976).

<u>Age</u>	<u>N</u>	<u>Died</u>	<u>q(x)</u>	<u>l(x)</u>	<u>d(x)</u>
0	246	42	.153	100000	15392
1	945	5	.021	84608	1767
5	1023	7	.034	82841	2787
10	882	2	.011	80054	895
15	729	3	.020	79159	1645
20	522	7	.066	77514	5089
25	420	7	.080	72426	5798
30	303	4	.064	66627	4243
35	303	4	.064	62385	3978
40	285	1	.017	58407	1012
45	210	3	.070	57395	4019
50	186	5	.126	53376	6733
55	180	5	.130	46643	6053
60	117	3	.139	40590	5629
65	108	2	.089	34962	3099
70	141	7	.222	31862	7073
75	75	5	.287	24790	7105
80	45	4	.360	17684	6368
85	33	2	1.000	11316	11316

<u>Age</u>	<u>L(x)</u>	<u>T(x)</u>	<u>E⁰_x</u>
0	90153	4866818	48.7
1	334014	4776666	56.5
5	407237	4442653	53.6
10	397795	4035416	50.4
15	392557	3637622	45.9
20	375715	3245066	41.9
25	347455	2869352	39.6
30	322150	2521897	37.9
35	301306	2199747	35.3
40	289514	1898442	32.5
45	278120	1608928	28.0
50	250471	1330809	24.9
55	217853	1080339	23.2
60	188264	862487	21.2
65	167360	674223	19.3
70	142464	506862	15.9
75	106038	364398	14.7
80	71644	258360	14.6
85	186716	186716	16.5

Table 33: Abridged life table for Athapaskan female total mortality 1966-1968.

From Alfred (1976).

<u>Age</u>	<u>N</u>	<u>Died</u>	<u>q(x)</u>	<u>l(x)</u>	<u>d(x)</u>
0	252	23	.085	100000	8524
1	966	3	.012	91476	1128
5	1089	3	.014	90348	1236
10	873	3	.017	89112	1519
15	741	3	.020	87594	1755
20	516	1	.010	85839	828
25	351	1	.014	85011	1205
30	252	3	.058	83806	4862
35	264	6	.107	78945	8473
40	240	1	.020	70471	1449
45	159	2	.061	69022	4211
50	129	1	.038	64810	2465
55	126	2	.076	62345	4764
60	69	1	.070	57581	4032
65	111	3	.127	53549	6829
70	87	6	.293	46719	13697
75	48	1	.099	33022	3271
80	24	3	.481	29751	14305
85	30	6	1.000	15445	15445

<u>Age</u>	<u>L(x)</u>	<u>T(x)</u>	<u>E_x⁰</u>
0	93395	5790610	57.9
1	363084	5697215	62.3
5	448651	5334131	59.0
10	441873	4885480	54.8
15	433438	4443607	50.7
20	427011	4010170	46.7
25	422884	3583160	42.1
30	408391	3160276	37.7
35	372828	2751885	34.8
40	347844	2379058	33.8
45	334792	2031215	29.4
50	318004	1696424	26.2
55	300143	1378420	22.1
60	278255	1078278	18.7
65	252684	800024	14.9
70	198612	547340	11.7
75	157058	348728	10.6
80	114443	191669	6.4
85	77226	77226	5.0

Table 34: Abridged life table for Wakashan male total mortality 1966-1968.

From Alfred (1976).

<u>Age</u>	<u>N</u>	<u>Died</u>	<u>q(x)</u>	<u>l(x)</u>	<u>d(x)</u>
0	249	20	.075	100000	7551
1	1143	7	.024	92449	2231
5	1335	6	.022	90218	2005
10	1200	1	.004	88214	369
15	1020	7	.034	87845	3007
20	744	9	.059	84838	4999
25	612	5	.040	79839	3197
30	507	8	.076	76643	5837
35	390	4	.050	70805	3511
40	345	2	.029	67295	1942
45	249	6	.115	65353	7508
50	177	3	.081	57845	4718
55	183	8	.197	53127	10478
60	168	5	.138	42649	5873
65	150	4	.126	36776	4624
70	123	10	.342	32152	10989
75	60	10	.579	21163	12244
80	39	3	.298	8918	2655
85	9	2	1.000	6263	6263

<u>Age</u>	<u>L(x)</u>	<u>T(x)</u>	<u>E⁰_x</u>
0	94009	5095937	51.0
1	364220	5001929	54.1
5	446080	4637710	51.4
10	440355	4191630	47.5
15	432672	3751275	42.7
20	411733	3318603	39.1
25	391380	2906870	36.4
30	368685	2515491	32.8
35	344438	2146806	30.3
40	332452	1802368	26.8
45	308574	1469917	22.5
50	278050	1161343	20.1
55	239682	883293	16.6
60	197344	643611	15.1
65	173387	446267	12.1
70	134876	272880	8.5
75	73467	138005	6.5
80	36353	64538	7.2
85	28184	28184	4.5

Table 35: Abridged life table for Wakashan female total mortality 1966-1968.

From Alfred (1976).

<u>Age</u>	<u>N</u>	<u>Died</u>	<u>q(x)</u>	<u>l(x)</u>	<u>d(x)</u>
0	225	11	.047	100000	4695
1	1083	8	.029	95306	2765
5	1425	1	.004	92540	324
10	1233	2	.008	92216	747
15	954	1	.005	91469	476
20	651	1	.008	90993	728
25	504	6	.058	90266	5278
30	384	4	.050	84987	4290
35	369	1	.013	80697	1055
40	243	1	.020	79642	1655
45	213	3	.069	77988	5386
50	129	3	.110	72602	7998
55	153	3	.093	64603	6015
60	126	1	.039	58588	2289
65	114	4	.163	56299	9175
70	78	4	.229	47124	10775
75	57	5	.360	36348	13081
80	39	5	.482	23267	11212
85	21	5	1.000	12055	12055

<u>Age</u>	<u>L(x)</u>	<u>T(x)</u>	<u>E_x⁰</u>
0	96024	6021881	60.2
1	374309	5925857	62.2
5	461892	5551548	59.9
10	459246	5089657	55.2
15	456153	4630412	50.6
20	454147	4174260	45.9
25	438874	3720113	41.2
30	413331	3281240	38.6
35	400300	2867909	35.5
40	394977	2467610	31.0
45	377795	2072633	26.6
50	343144	1694838	23.3
55	306788	1351695	20.9
60	287876	1044908	17.8
65	260325	757032	13.4
70	209494	496707	10.5
75	149129	287213	7.9
80	87454	138084	5.9
85	50630	50630	4.2

Table 36: Abridged life table for British Columbian Indian male total mortality 1966-1968.

From Alfred (1976).

<u>Age</u>	<u>N</u>	<u>Died</u>	<u>q(x)</u>	<u>l(x)</u>	<u>d(x)</u>
0	1365	122	.084	100000	8357
1	5832	34	.023	91643	2106
5	7371	25	.017	89537	1506
10	6414	6	.004	88031	413
15	5424	30	.028	87619	2420
20	4053	34	.041	85199	3524
25	3084	35	.055	81675	4518
30	2370	24	.049	77157	3808
35	2073	25	.059	73349	4290
40	1758	14	.039	69058	2697
45	1455	22	.073	66362	4862
50	1203	22	.088	61500	5400
55	1038	30	.135	56099	7569
60	996	31	.144	48530	6992
65	891	23	.122	41538	5058
70	687	50	.311	36480	11330
75	393	37	.379	25149	9519
80	249	28	.434	15630	6782
85	153	26	1.000	8848	8848

<u>Age</u>	<u>L(x)</u>	<u>T(x)</u>	<u>E⁰_x</u>
0	93498	5321816	53.2
1	361308	5228318	57.1
5	443921	4867011	54.4
10	439315	4423091	50.3
15	432691	3983777	45.5
20	417621	3551087	41.7
25	397138	3133466	38.4
30	376215	2736329	35.5
35	355786	2360114	32.2
40	338669	2004328	29.0
45	320217	1665659	25.1
50	294562	1345443	21.9
55	261905	1050882	18.7
60	224646	788977	16.3
65	195948	564331	13.6
70	155002	368383	10.1
75	101001	213381	8.5
80	60315	112380	7.2
85	52065	52065	5.9

Table 37: Abridged life table for British Columbian Indian female total mortality 1966-1968.

From Alfred (1976).

<u>Age</u>	<u>N</u>	<u>Died</u>	<u>q(x)</u>	<u>l(x)</u>	<u>d(x)</u>
0	1326	89	.064	100000	6363
1	5922	27	.018	93637	1688
5	7521	7	.005	91948	427
10	6399	7	.006	91521	505
15	5109	18	.018	91016	1598
20	3444	7	.010	89418	911
25	2355	18	.037	88507	3359
30	1836	19	.051	85148	4304
35	1701	17	.049	80844	3941
40	1395	15	.053	76903	4037
45	1194	19	.077	72866	5599
50	855	14	.079	67267	5299
55	876	19	.103	61968	6376
60	747	16	.102	55592	5652
65	720	20	.131	49941	6518
70	501	29	.254	43423	11036
75	324	17	.232	32387	7503
80	174	20	.447	24884	11131
85	204	38	1.000	13752	13752

<u>Age</u>	<u>L(x)</u>	<u>T(x)</u>	<u>E⁰_x</u>
0	94808	5865572	58.7
1	370325	5770764	61.6
5	458674	5400439	58.7
10	456588	4941766	54.0
15	451171	4485179	49.3
20	445180	4034008	45.1
25	434843	3588828	40.6
30	415100	3153985	37.0
35	394312	2738885	33.9
40	374768	2344573	30.5
45	350595	1969806	27.0
50	323250	1619212	24.1
55	293975	1295962	20.9
60	263862	1001987	18.0
65	234531	738126	14.8
70	189729	503595	11.6
75	143195	313866	9.7
80	96842	170671	6.9
85	73829	73829	5.4

Table 38: Abridged life table for British Columbian non-native male total mortality 1967.

From Alfred (1976).

<u>Age</u>	<u>N</u>	<u>Died</u>	<u>q(x)</u>	<u>l(x)</u>	<u>d(x)</u>
0	16600	398	.024	100000	2348
1	78700	79	.004	97652	391
5	106400	75	.004	97261	342
10	98100	43	.002	96919	213
15	85500	121	.007	96706	687
20	72200	159	.011	96019	1054
25	62300	115	.009	94966	872
30	61700	124	.010	94094	941
35	64600	139	.011	93153	997
40	62300	226	.018	92156	1660
45	55300	282	.025	90495	2286
50	52700	478	.045	88210	3925
55	44300	581	.064	84284	5386
60	35600	807	.108	78899	8528
65	27700	945	.158	70371	11118
70	22300	1082	.217	59253	12851
75	18200	1352	.314	46402	14547
80	12200	1349	.432	31855	13751
85	6900	1362	1.000	18104	18104

<u>Age</u>	<u>L(x)</u>	<u>T(x)</u>	<u>E⁰_x</u>
0	97912	6941809	69.4
1	389632	6843897	70.1
5	485451	6454266	66.4
10	484135	5968815	61.6
15	481988	5484681	56.7
20	477500	5002693	52.1
25	472624	4525193	47.7
30	468142	4052569	43.1
35	463421	3584427	38.5
40	456896	3121007	33.9
45	447234	2664112	29.4
50	431880	2216878	25.1
55	408916	1784999	21.2
60	374369	1376084	17.4
65	324960	1001716	14.2
70	264852	676756	11.4
75	195830	411904	8.9
80	124358	216074	6.8
85	91717	91717	5.1

Table 39: Abridged life table for British Columbian non-native female total mortality 1967.

From Alfred (1976).

<u>Age</u>	<u>N</u>	<u>Died</u>	<u>q(x)</u>	<u>l(x)</u>	<u>d(x)</u>
0	16150	305	.019	100000	1857
1	74450	65	.004	98143	342
5	102700	44	.002	97801	209
10	93800	34	.002	97592	177
15	82200	46	.003	97415	273
20	69900	35	.003	97142	244
25	60400	54	.004	96898	434
30	56300	72	.006	96464	615
35	59100	73	.006	95849	590
40	62400	113	.009	95259	859
45	58300	180	.015	94400	1449
50	53500	265	.025	92950	2283
55	43000	313	.036	90667	3263
60	34100	385	.055	87404	4833
65	28700	489	.082	82571	6786
70	25300	702	.130	75785	9882
75	20100	935	.210	65902	13849
80	13000	1047	.337	52054	17531
85	8000	1293	1.000	34523	34523

<u>Age</u>	<u>L(x)</u>	<u>T(x)</u>	<u>E⁰_x</u>
0	98333	7633887	76.3
1	391717	7535555	76.8
5	488481	7143839	73.1
10	487529	6655358	68.2
15	486406	6167830	63.3
20	485135	5681425	58.5
25	483483	5196291	53.6
30	480815	4712808	48.9
35	477820	4231994	44.2
40	474325	3754175	39.4
45	468672	3279850	34.7
50	459421	2811178	30.2
55	445708	2351757	25.9
60	425669	1906050	21.8
65	396939	1480381	17.9
70	355689	1083442	14.3
75	296484	727754	11.0
80	217674	431271	8.3
85	213597	213597	6.2

Table 40: Abridged life table for Canadian non-native male total mortality 1965.

From Alfred (1976).

<u>Age</u>	<u>N</u>	<u>Died</u>	<u>q(x)</u>	<u>l(x)</u>	<u>d(x)</u>
0	214184	5390	.025	100000	2462
1	903725	940	.004	97538	405
5	1100474	731	.003	97133	322
10	1013558	490	.002	96811	234
15	882958	1040	.006	96577	571
20	678142	1187	.009	96005	839
25	576792	917	.008	95167	753
30	610792	1017	.008	94413	783
35	631625	1405	.011	93630	1036
40	601933	2101	.017	92595	1607
45	525525	2933	.028	90988	2516
50	476908	4673	.048	88472	4252
55	398333	6001	.073	84219	6155
60	314675	7628	.115	78065	8984
65	245133	8796	.166	69081	11440
70	188800	10385	.243	57641	13982
75	137958	11297	.340	43659	14842
80	78675	9716	.469	28817	13512
85	41042	8660	1.000	15304	15304

<u>Age</u>	<u>L(x)</u>	<u>T(x)</u>	<u>E⁰_x</u>
0	97816	6876172	68.8
1	389140	6778357	69.5
5	484861	6389217	65.8
10	483522	5904356	61.0
15	481581	5420835	56.1
20	477968	4939254	51.4
25	473938	4461287	46.9
30	470168	3987349	42.2
35	465734	3517181	37.6
40	459264	3051448	33.0
45	449200	2592184	28.5
50	432485	2142985	24.2
55	406696	1710500	20.3
60	368965	1303805	16.7
65	317846	934840	13.5
70	253958	616994	10.7
75	181091	363036	8.3
80	109414	181945	6.3
85	72532	72532	4.7

Table 41: Abridged life table for Canadian non-native female total mortality 1965.

From Alfred (1976).

<u>Age</u>	<u>N</u>	<u>Died</u>	<u>q(x)</u>	<u>l(x)</u>	<u>d(x)</u>
0	203709	4012	.019	100000	1936
1	863482	758	.003	98064	344
5	1051074	439	.002	97720	204
10	966292	298	.002	97516	151
15	846833	419	.003	97365	242
20	664892	384	.003	97123	280
25	581242	381	.003	96843	318
30	589117	523	.004	96524	428
35	621308	816	.007	96096	630
40	615108	1245	.010	95466	964
45	527450	1734	.016	94502	1549
50	468817	2464	.026	92953	2424
55	388750	2967	.038	90530	3414
60	314517	3883	.060	87116	5258
65	260758	5147	.095	81858	7758
70	211825	7052	.155	74100	11464
75	159742	8701	.242	62636	15171
80	90825	8751	.390	47465	18489
85	53442	10405	1.000	28975	28975

<u>Age</u>	<u>L(x)</u>	<u>T(x)</u>	<u>E_x⁰</u>
0	98265	7503374	75.0
1	391397	7405110	75.5
5	488090	7013714	71.8
10	487210	6525624	66.9
15	486246	6038415	62.0
20	484930	5552169	57.2
25	483448	5067240	52.3
30	481615	4583792	47.5
35	479016	4102177	42.7
40	475111	3623161	38.0
45	468941	3148050	33.3
50	459095	2679109	28.8
55	444704	2220015	24.5
60	423341	1775311	20.4
65	391189	1351970	16.5
70	343384	960781	13.0
75	276715	617397	9.9
80	191874	340683	7.2
85	148808	148808	5.1

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