

**QUANTIFICATION OF SUBSISTENCE AND CULTURAL NEED  
FOR BOWHEAD WHALES BY ALASKA ESKIMOS**

**2012 Update Based on 2010 U.S. Census Data**

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Prepared for the Alaska Eskimo Whaling Commission  
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## **TABLE OF CONTENTS**

Introduction .....	1
2012 Update based on 2010 U.S. Census data .....	2
References Cited .....	5

## **LIST OF TABLES**

Table 1: Eleven Alaska Eskimo Whaling Villages' Subsistence and Cultural Need For Landed Bowhead Whales, 2010.....	4
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## **LIST OF ACRONYMS**

AEWC	Alaska Eskimo Whaling Commission
IWC	International Whaling Commission
SRB&A	Stephen R. Braund & Associates

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## QUANTIFICATION OF SUBSISTENCE AND CULTURAL NEED FOR BOWHEAD WHALES BY ALASKA ESKIMOS

### 2012 Update Based on 2010 U.S. Census Data

#### INTRODUCTION

This document is similar to the previously prepared *2007 Update Based on 2000 U.S. Census Data* (Stephen R. Braund & Associates [SRB&A] 2007) and is submitted at this time to provide a current (2012) subsistence and cultural need statement. This needs assessment relies on the 2010 U.S. Census. Thus, the quantification of subsistence and cultural need for bowhead whales by Alaska Eskimos has been updated with 2010 population information.

In previous subsistence and cultural needs assessments submitted to the International Whaling Commission (IWC) for years between the decennial U.S. Census, including the 2007 report, the calculation depended on the most current Alaska Department of Labor Data population estimates for the communities multiplied by the percent Native from the 1980 and 1990 U.S. Census. However, the most reliable information for assessing subsistence and cultural need using the IWC accepted method is to rely on the U. S. Census. Thus, the 2012 needs assessment is based on the 2010 U.S. Census.

Like the 2002 and 2007 reports, this document is intended to be an addendum to the *Quantification of Subsistence and Cultural Need for Bowhead Whales by Alaska Eskimos - 1997 Update Based on 1997 Alaska Department of Labor Data* (SRB&A 1997). The 1997 report should be read in conjunction with this document as the former report provides relevant discussion and references for the historic context of this report. That discussion is not repeated in this brief report. In addition, for full discussion of the research on historical whaling and human population data that formed the basis of the calculation of subsistence and cultural need, see Braund, Stoker and Kruse (1988).

This report provides the eighth calculation of subsistence and cultural need for bowhead whales by Alaska Eskimos and is based on the same methodology used in the previous seven “needs” assessments. The first calculation of subsistence and cultural need submitted to the IWC was undertaken in 1983 (U.S. Government 1983). The second calculation was submitted to the IWC in 1988 (Braund, Stoker and Kruse 1988) when more extensive research provided additional historical whaling and human population data. The 1988 study used the most recent Eskimo

population data available at that time, ranging from 1983 to 1987, to calculate current need. The third calculation of need, performed in 1992, was based on 1990 U.S. Census population data. This update was presented to the Alaska Eskimo Whaling Commission (AEWC), but not to the IWC (SRB&A 1992). The fourth calculation of need was conducted in 1994 based on July 1, 1992 population data generated by the State of Alaska, Department of Labor (SRB&A 1994). The fifth calculation (fourth presented to the IWC) was based on July 1, 1997 population data generated by the State of Alaska, Department of Labor (SRB&A 1997). The sixth calculation of need conducted in 2002 (SRB&A 2002) and the seventh calculation of need conducted in 2007 (SRB&A 2007) relied on 2000 U.S. Census data. This 2012 report, that uses the 2010 U.S. Census data, is the fourth time since 1983 that U.S. Census data have been used for the Alaska Eskimo needs calculation. All of the calculations of need since 1988 utilize the same method that was accepted by the IWC in 1986.

#### **2012 UPDATE BASED ON 2010 U.S. CENSUS DATA**

In preparation for the June/July 2012 IWC meeting, the AEWC requested an update of cultural and subsistence need for bowhead whales. Because the most reliable population information is from the U.S. census, this update is based on the 2010 U.S. Census data for the 11 Alaska bowhead whaling communities. Since the previous needs assessment, Point Lay has been added as an Alaska bowhead whaling community (SRB&A 2008). The 2010 U.S. Census has race information, and the Alaska Native population in each of the whaling communities is reported. For this reason, the 2010 U.S. Census is used for the 2012 needs update, rather than more current Alaska State Demographer population estimates that require an additional estimate of the percent American Indian of the state estimates.

Applying the IWC accepted method of calculating need (see Braund, Stoker and Kruse 1988), SRB&A updated need based on 2010 U.S. Census data. Other than the additional communities (i.e., Little Diomed and Point Lay), the only variable that has changed since 1988 for this calculation is the Alaska Native population for the 11 whaling communities. Only the Native population of each community is considered. The 2010 U.S. Census Alaska Native population data represent "American Indian or Alaska Native alone or in combination with one or more other races."

Based on 2010 U.S. Census data, the number of bowheads needed by each community and by the region as a whole (all 11 communities) is derived by multiplying the mean number of whales landed per capita over the base time period (1910-1969) by the 2010 Alaska Native population for each community and for the region as a whole. Using this method, the need for each community is shown on Table 1. Based on the 2010 census data, the cultural and subsistence need in the 11 Alaska Eskimo communities is 55 landed bowhead whales (58 if rounded up and summed for each community). In 1997 the need was 54 landed bowheads (56 rounded up), and in 2002 and 2007, it was 56 landed bowheads (56 and 58 landed bowheads rounded up respectively). Applying the mean of .008515 bowhead landed per capita for all 11 communities for the historical period (1910-1969) to the 2010 regional Native population of 6,674 results in a 2010 **regional** cultural and subsistence need of 57 landed bowhead whales. In 1997, this regional calculation was 56 landed bowhead whales and in 2002 and 2007, it was 57 landed bowhead whales.

**Table 1: Eleven Alaska Eskimo Whaling Villages' Subsistence & Cultural Need For Landed Bowhead Whales, 2010<sup>1</sup>**

Community	Number of Observations <sup>2</sup>	Total Eskimo Population for ea. yr. of a Bowhead Observation <sup>3</sup>	Number of Bowheads Landed 1910-1969 <sup>4</sup>	Mean Landed Per Capita 1910-1969 <sup>5</sup>	2010 Alaska Native Population <sup>6</sup>	2010 Bowhead Need (Landed) <sup>7</sup>	2010 Need (Landed) Rounded <sup>8</sup>
Gambell	39	11,883	68	0.005722	654	3.7	4
Savoonga <sup>9</sup>	0	----	----	0.005722	637	3.6	4
Wales	42	6,907	5	0.000724	136	0.1	1
Diomedes <sup>10</sup>	30	3,250	11	0.003678	110	0.4	1
Kivalina	7	926	3	0.003240	366	1.2	1
Point Hope	50	12,467	209	0.016764	629	10.5	11
Point Lay	34	2,080	8	0.003846	168	0.6	1
Wainwright	49	10,723	108	0.010072	510	5.1	5
Barrow	60	44,687	379	0.008481	2889	24.5	25
Nuiqsut <sup>9</sup>	0	----	----	0.008481	360	3.1	3
Kaktovik	3	327	3	0.009174	215	2.0	2
Totals	314	93,250	794		6,674	54.9	58
Region <sup>11</sup>	314	93,250	794	0.008515	6,674	56.8	57

<sup>1</sup> Subsistence and cultural need is based on historic per capita harvest per community multiplied by the 2010 Alaska Native population of each community.

<sup>2</sup> The number of observations represents the number of years for which data on landed whales were available for each community (See Appendices 1 & 2 of Braund, Stoker & Kruse 1988, Table 1 of Stephen R. Braund & Assoc. 1991, and Table 17 of Stephen R. Braund & Assoc. 2008).

<sup>3</sup> Total Eskimo population represents the sum of the Eskimo population for each year there was an observation of a landed bowhead whale (only includes the 1910-1969 "Base Period;" see Braund, Stoker & Kruse 1988).

<sup>4</sup> Number of bowheads landed represents the sum of the observed bowheads landed between 1910 and 1969.

<sup>5</sup> The mean landed bowhead whales per capita is based on the total number of whales landed between 1910 and 1969 for each community divided by the sum of the total Eskimo population for each village for each year landed whale data existed between 1910 and 1969 (See Appendices 1 & 2 in Braund, Stoker & Kruse 1988, Tables 1 and 3 in Stephen R. Braund & Assoc. 1991, and Tables 2 and 17 in Stephen R. Braund & Assoc. 2008). The sum of the total Eskimo population was calculated by adding the Population estimates for each community for each year that there was a landed whale observation. For example, Barrow's 379 landed whales from 1910-1969 was divided by the total Eskimo population sum of 44,687 for this 60 Year period (i.e., 379 divided by 44,687 = .008481).

<sup>6</sup> 2010 Alaska Native population data for each community are from the 2010 U. S. Census. They represent the category "American Indian or Alaska Native alone or in combination with one or more other races."

<sup>7</sup> The number of bowheads needed is derived by multiplying the mean per capita landed whales (1910-1969) by the 2010 Alaska Native population for each community. The true column total of 54.9 is shown and is less than the sum of its parts because of their being rounded up.

<sup>8</sup> The number of bowhead whales needed per individual community is rounded to the nearest whole number unless the product was less than .5; such cases were rounded up to one.

<sup>9</sup> Because there are no landed bowhead data for either Savoonga or Nuiqsut between 1910-1969, the mean per capita landed whales for Gambell was used for Savoonga and the mean for Barrow was used for Nuiqsut.

<sup>10</sup> Due to uncertainties in the landed whale data for Little Diomedes Island, four different calculations of subsistence and cultural need, ranging from .4 to 1.0 bowheads, were presented (see Table 4 Stephen R. Braund & Assoc. 1991). The Little Diomedes mean landed whale per capita (1910-1969) in this table represents the mean of these four calculations.

<sup>11</sup> The mean per capita landed whales for the region represents the total number of whales landed for all 11 communities between 1910 and 1969 divided by the sum of the total Native population for all communities for each year landed whale data existed between 1910 and 1969 (i.e., 794 whales divided by 93,250 = .008515).

Stephen R. Braund & Associates, 2012.

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## **TABLE OF CONTENTS**

INTRODUCTION .....	1
REVIEW OF THE 1988 STUDY .....	2
NEW SOURCES OF DATA FOR THE 1988 STUDY .....	2
Bowheads Landed .....	3
Eskimo Population .....	4
1988 RESULTS: RECALCULATION OF CULTURAL NEED FOR BOWHEAD WHALES .....	4
Revision of Historical Base Period .....	4
1988 Estimation of Cultural Need Based on the Relationship Between Bowheads Landed and Eskimo Population .....	5
1992 UPDATE BASED ON 1990 U. S. CENSUS .....	7
1994 UPDATE BASED ON 1992 ALASKA DEPARTMENT OF LABOR DATA .....	7
1997 UPDATE BASED ON 1997 ALASKA DEPARTMENT OF LABOR DATA .....	8
REFERENCES .....	16
 Appendix A: DOCUMENTS SUBMITTED BY THE U.S. TO THE IWC RE: ALASKA ESKIMO BOWHEAD WHALING.....	 A-1

## **LIST OF TABLES**

Table 1: Alaska Eskimo Whaling Communities' Subsistence and Cultural Need For Landed Bowhead Whales, 1988.....	6
Table 2: Total Estimated Population of Ten Alaska Eskimo Bowhead Whaling Communities.....	10
Table 3: Estimated Native Population of Ten Alaska Eskimo Bowhead Whaling Communities, 1997.....	10
Table 4: Ten Alaska Eskimo Whaling Villages' Subsistence and Cultural Need For Landed Bowhead Whales, 1997.....	11
Table 5: Comparison of Ten Alaska Eskimo Whaling Communities' mid-1980s Subsistence and Cultural Need for Landed Bowhead Whales with 1990, 1992, and 1997 Need.....	12
Table 6: Comparison of Ten Alaska Eskimo Whaling Communities' Eskimo Population: mid-1980s, 1990, 1992, and 1997.....	14
Table 7: Residential Births and Deaths in Ten Alaska Eskimo Whaling Communities, 1991-96.....	15

## **QUANTIFICATION OF SUBSISTENCE AND CULTURAL NEED FOR BOWHEAD WHALES BY ALASKA ESKIMOS**

### **1997 Update Based on 1997 Alaska Department of Labor Data**

#### **INTRODUCTION**

Inupiat and Yup'ik Eskimos of Alaska have hunted bowhead whales for over 2,000 years as the whales migrate near the communities in the spring and fall. Hunting bowhead whales in Alaska remains a communal activity that supplies important meat and maktak for the entire community as well as for feasts and ceremonies. Formalized patterns of hunting, sharing, and consumption characterize the modern bowhead harvests. Of all subsistence activities in these communities, bowhead whaling represents one of the greatest concentrations of effort, time, money, group symbolism, and significance. In addition to providing a major source of food, bowhead whaling is a large part of these communities' cultural tradition and their modern cultural identity (Braund and Moorehead 1995).

Since the early 1980s, the International Whaling Commission (IWC) has determined the quota for Alaska Eskimo bowhead whale harvests in part by considering the subsistence and cultural need for bowhead whales by Alaska Eskimos. In 1986, the IWC adopted the only method used to date to calculate subsistence and cultural need. This method incorporates the historic and current size of the Eskimo population residing in Alaskan whaling villages and the number of bowhead whales historically landed by each community. Because bowhead whaling is a community-wide activity, it is appropriate to consider the community population in association with the historic harvest levels. Besides abundance of bowhead whales, community population levels are a critical factor that influences harvests because the community population dictates the number and size of whaling crews and the amount of meat and maktak needed to feed the community, share with others, and provide for ceremonial feasts.

The first calculation of subsistence and cultural need submitted to the IWC was undertaken in 1983 (U.S. Government 1983). The second calculation was submitted to the IWC in 1988 (Braund, Stoker and Kruse 1988) when more extensive research provided additional historical whaling and human population data. The 1988 study used the most recent Eskimo population

data available at that time, ranging from 1983 to 1987, to calculate current need. The third calculation of need, performed in 1992, was based on 1990 U.S. Census population data; this update was presented to the Alaska Eskimo Whaling Commission (AEWC), but not to the IWC (Stephen R. Braund & Associates [SRB&A] 1992). The fourth calculation of need was conducted in 1994 based on July 1, 1992 population data generated by the State of Alaska, Department of Labor (SRB&A 1994). This, the fifth calculation (and fourth presented to the IWC) utilizes the same method accepted by the IWC in 1988 for calculating need, presenting revised calculations based on July 1, 1997 population data generated by the State of Alaska, Department of Labor.

### **REVIEW OF THE 1988 STUDY**

The objective of the 1988 study was to quantify the cultural and subsistence need for bowhead whales by Alaska Eskimos (Braund, Stoker and Kruse 1988). We viewed cultural and subsistence need as independent of any biological assessment of bowhead populations and as only one of two parts of any quota request the U.S. government made to the International Whaling Commission (the second part being the biological assessment). Prior to 1988, the estimation of cultural need for bowhead whales by Alaska Eskimos had been based on the historic relationship between the size of the Eskimo population residing in Alaskan whaling villages and both the number of bowhead whales historically landed and the number of crews engaged in whaling (U.S. Government 1983). Based on data available in 1983, the cultural need for bowhead whales was established at 26 bowheads landed per year for the nine Alaska bowhead whaling communities. Assuming 75 percent efficiency, 26 landed converted to 35 strikes requested by the U.S. government at the 1983 IWC meeting. At that time, we knew the historical data on bowhead landings and Eskimo population were incomplete. Furthermore, the Alaska Eskimo whaling community believed that the cultural need for bowheads had been seriously underestimated.

### **NEW SOURCES OF DATA FOR THE 1988 STUDY**

The new sources of data for the 1988 analysis included additional landed bowhead data and Eskimo population data.

### **Bowheads Landed**

The study team began with the lists of landed bowheads in Marquette and Bockstoe (1980) that provided, by location, the number of crews, bowheads landed, struck and lost, killed but lost, and total bowheads killed. Additional research to make this list more complete included hiring Bockstoe and Marquette to make additions they had learned about since 1980, performing additional archival research based on both published and unpublished information (whale ship logs, teacher reports, diaries, magazines, newspapers, books, reports, etc.), researching in libraries and archives throughout the U.S., and performing fieldwork in Wainwright, Wales, Gambell and Savoonga in November and December 1987.

This research resulted in a new, longer list of bowhead landed data for 21 different locations in Alaska representing 1) historic but not current human settlements, 2) traditional whaling sites occupied seasonally, and 3) existing communities (Braund, Marquette and Bockstoe 1988). The bowhead harvest data were presented by each specific location where the activity took place from pre-1900 to 1977. The Scientific Committee reviewed and accepted the new landed data in 1988 (IWC 1989:49).

Next, we consolidated the whale harvest data from the 21 locations within the nine Alaska Eskimo communities that currently participate in bowhead whaling (e.g., whales harvested at Icy Cape, Point Belcher and Point Franklin were attributed to Wainwright, whales harvested at Cape Halkett and Cross Island/Prudhoe Bay were consolidated with Barrow). Hence, eight of the 21 locations were reassigned or consolidated with these nine communities. The last five locations (Little Diomed, King Island, Point Lay, Shaktoolik, and "unlocated") were not included in the analysis.

The reasons for consolidation included 1) the centralization into larger communities such that most of the people who lived and whaled at the smaller sites became residents of the nearby larger villages, and 2) residents of the nine active communities traditionally traveled to many smaller sites on a seasonal basis to hunt bowheads.

Next, the study team linked human population by consolidated location to whale hunting activity from 1910 to 1969. Thus, the human population per year by consolidated location (i.e., the nine whaling villages) was linked to whale hunting activity from 1910 to 1969. In this way, we were able to examine the relation between human population and bowhead harvest data.

### **Eskimo Population**

The second source of new data for the 1988 analysis was more detailed information on the Eskimo population. The 1983 calculation of cultural need for bowheads was based on available decennial census population counts. In order to formally examine the relationship between bowhead landings and human population, however, it was necessary to have annual human population counts which could be compared to the number of bowheads landed on a village basis. Instead of simply assuming a uniform rate of change in population between census counts or assuming a continuation of present growth rates, the study team constructed a human population model incorporating data on 1) age and sex distributions; 2) birth rates; and 3) death rates.

## **1988 RESULTS: RECALCULATION OF CULTURAL NEED FOR BOWHEAD WHALES**

### **Revision of Historical Base Period**

As mentioned above, the 1983 calculation of cultural need was constrained by lack of data. The starting point for the base period used in 1983 varied by village from 1940 to 1950. The end point was uniformly 1970. Additional data gathered for this study and study team members' knowledge of the prevalent living conditions between 1940 and 1970 led the study team to conclude that the most appropriate base period was the 60 year period from 1910 to 1969.

The beginning year of 1910 was selected because data prior to 1900 becomes increasingly sporadic and unreliable related to both bowhead landed and human population, and commercial whaling had an effect on the number of whales landed at certain villages (especially Gambell,

Point Hope, and Barrow). Commercial whaling ceased in 1909 so 1910 begins a period free of commercial influence.

The two or three decades after the end of commercial whaling represent a significant period of heavy reliance on subsistence for the northern Alaska Eskimo. Conditions changed dramatically in the 1940s as military activities and government programs exerted strong influences on local lifestyles. The period 1940 to 1969 can be characterized as a time of increased local employment that conflicted with subsistence activities and of religious and government pressures to abandon traditional lifestyles. Despite these influences, the Eskimo continued to demonstrate an active interest in subsistence whaling. The year 1969 was chosen as the end of the base period because the period from 1970 to 1977 was a time of considerable economic change and cultural revival in the villages. These years (1970 to 1977) represent a time of increase in bowhead whaling effort, in the number of whales taken, and the number of whales struck and lost (Marquette and Bockstoce 1980). Hence, to avoid the influence of this increased harvest period, the study team chose to end the base period in 1969.

### **1988 Estimation of Cultural Need Based on the Relationship Between Bowheads Landed and Eskimo Population**

Table 1 presents the recalculated cultural need for bowhead whales based on the IWC accepted method. The data base included 250 observations matching the Eskimo population with bowhead landed at the community level. As shown in the table, substantial landed whale data were compiled for the 60 year period (1910 to 1969) for Gambell (39 years), Point Hope (50 years), Wainwright (49 years), and for Barrow (60 years).

In Table 1, the number of bowheads needed by each community and by the region as a whole was derived by multiplying the mean number of whales landed per capita over the time period selected (1910 to 1969) by the best estimate of current human population for these communities and the region. "Current" population data was the most recent data available at the time, ranging from 1983 data for three villages, 1985 data for one village, 1986 data for two villages, to 1987

**Table 1: Alaska Eskimo Whaling Communities' Subsistence and Cultural Need  
For Landed Bowhead Whales, 1988.<sup>1</sup>**

<b>Community</b>	<b>Number of Observations<sup>2</sup></b>	<b>Total Eskimo Population for ea. yr. of a Bowhead Observation<sup>3</sup></b>	<b>Number of Bowheads Landed 1910-1969<sup>4</sup></b>	<b>Mean Landed Per Capita 1910-1969<sup>5</sup></b>	<b>1983-87 Eskimo Population<sup>6</sup></b>	<b>1987 Bowhead Need (Landed)<sup>7</sup></b>	<b>1987 Need (Landed) (Rounded)<sup>8</sup></b>
Gambell	39	11,883	68	0.005722	495	2.8	3
Savoonga <sup>9</sup>	0	----	----	0.005722	485	2.8	3
Wales	42	6,907	5	0.000724	154	0.1	1
Kivalina	7	926	3	0.003240	275	0.9	1
Point Hope	50	12,467	209	0.016764	534	9.0	9
Wainwright	49	10,723	108	0.010072	445	4.5	5
Barrow	60	44,687	379	0.008481	1,823	15.5	16
Nuiqsut <sup>10</sup>	0	----	----	0.008481	227	1.9	2
Kaktovik	3	327	3	0.009174	154	1.4	1
Totals	250	87,920	775		4,592	38.8	41
Region <sup>10</sup>	250	87,920	775	0.008815	4,592	40.5	41

- <sup>1</sup> Subsistence and cultural need is based on historic per capita harvest per community multiplied by present village population.
- <sup>2</sup> The number of observations represents the number of years for which data on landed whales were available for each community (See Appendices 1 and 2 in Braund, Stoker and Kruse 1988).
- <sup>3</sup> Total Eskimo population represents the sum of the Eskimo population for each year there was an observation of a landed bowhead whale.
- <sup>4</sup> Number of bowheads landed represents the sum of the observed bowheads landed between 1910 and 1969.
- <sup>5</sup> The mean landed bowhead whales per capita is based on the total number of whales landed between 1910 and 1969 for each community divided by the sum of the total Eskimo population for each village for each year landed whale data existed between 1910 and 1969 (See Appendices 1 and 2 in Braund, Stoker and Kruse 1988). The sum of the total Eskimo population was calculated by adding the population estimates for each village for each year that there was a landed whale observation. For example, Barrow's 379 landed whales from 1910-1969 were divided by the total Eskimo population sum of 44,687 for this 60 year period (i.e., 379 divided by 44,687 = .008481).
- <sup>6</sup> See Table 7 (in Braund, Stoker and Kruse 1988) for the source of Eskimo population data for each community.
- <sup>7</sup> The number of bowheads needed is derived by multiplying the mean per capita landed whales (1910-1969) by the most current Eskimo population figure available for each community.
- <sup>8</sup> The number of bowhead whales needed per individual community is rounded to the nearest whole number unless the product was less than .5; such cases were rounded up to one.
- <sup>9</sup> Because there are no landed bowhead data for neither Nuiqsut nor Savoonga between 1910-1969, the mean per capita landed whales for Gambell was used for Savoonga and the mean for Barrow was used for Nuiqsut.
- <sup>10</sup> The mean per capita landed whales for the region represents the total number of whales landed for all communities between 1910 and 1969 divided by the sum of the total Eskimo population for all communities for each year landed whale data existed between 1910 and 1969 (i.e., 775 whales divided by 87,920 = .008815).

Source: Stephen R. Braund & Associates, 1988.

Stephen R. Braund & Associates, 1997.

population data for three villages. The mean number of whales landed per capita over the time period was calculated from the total number of whales landed between 1910 and 1969 for each community (and for the region as a whole) divided by the total human population, by community and region, summed over all the years for which landed whale data exist between 1910 and 1969. In other words, the total human population by village and region is the sum of all village population estimates for years in which whales were landed. This sum was divided into the total landed whales in each community. Based on a mean of .008815 bowhead landed per capita from 1910 to 1969, the 1988 cultural need was 41 landed bowhead whales.

### **1992 UPDATE BASED ON 1990 U. S. CENSUS**

In 1992, the Alaska Eskimo Whaling Commission (AEWC) asked Stephen R. Braund and Associates (SRB&A) to update the cultural and subsistence need for bowhead whales by nine Alaska Eskimo whaling communities based on more current human population data for the communities. Applying the same IWC accepted method of calculating need as used in the 1988 report (Braund, Stoker and Kruse 1988), SRB&A updated need based on 1990 U.S. Census data (see Stephen R. Braund & Associates 1992). The only variable that had changed for this calculation was the Alaska Native population for the nine whaling communities. The 1988 report was written between U.S. decennial census counts and current U.S. census data were not available. For the 1992 update, the 1990 U.S. Census data for each community was used (Alaska Department of Labor 1991). Only the Native population of each community was considered. Based on the 1990 census data, the cultural and subsistence need in the nine Alaska Eskimo communities was 47 landed bowheads (excluding Little Diomedé; for a discussion of Little Diomedé Island bowhead whaling, see Stephen R. Braund & Associates 1991).

### **1994 UPDATE BASED ON 1992 ALASKA DEPARTMENT OF LABOR DATA**

In 1994, the Alaska Eskimo Whaling Commission again requested an update of cultural and subsistence need for bowhead whales, as the 1990 U.S. Census data were nearly four years old. Because the next U.S. census would not be conducted until the year 2000, the study team reviewed the available sources for current population data.



The Alaska Department of Labor (ADOL) makes annual population estimates for each incorporated community in Alaska for purposes of municipal planning. For 1992, ADOL made these estimates based on the relationship of the 1990 U.S. Census data to the 1990 Alaska Permanent Fund applications for each community. Using this relationship as the base period, ADOL estimated the 1992 community population by knowing the number of 1992 Permanent Fund applications and solving for the 1992 population (Personal communication, J. Gregory Williams April 28, 1994). In addition, the ADOL reviewed other information to ensure the accuracy and consistency of their population estimates. These additional analyses included a similar computation for each community using school enrollment information and a careful review of rural public health nurse records in each community.

The study team reviewed these population data for the 10 Alaska bowhead whaling communities recognized by the AEWC (Alaska Dept. of Labor, Research Analysis 1994).<sup>1</sup> Because these data were not broken down by race, they represented the total population (Alaska Native and other races) for each location. The method accepted by the IWC for calculating need depends on having population data on Alaska Natives only. In order to disaggregate the population data by race, the study team relied on the Alaska State Demographer who provided information on the percentage of Natives in each of the ten communities based on both school enrollment and the 1990 U.S. Census (SRB&A 1994 Table 2). As suggested by the Alaska State Demographer, the study team used the 1990 percent Native American figures and applied these percentages to the 1992 population estimates to arrive at the Native population for the communities.

Using the 1992 total population estimates provided by the Alaska Department of Labor and applying the percentage Native from the 1990 U.S. Census resulted in a 1992 cultural and subsistence need of 51 landed bowhead whales for the 10 communities (SRB&A 1994, Table 3).

### **1997 UPDATE BASED ON 1997 ALASKA DEPARTMENT OF LABOR DATA**

In preparation for the 1997 IWC meeting, the Alaska Eskimo Whaling Commission requested an

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<sup>1</sup> This analysis includes population data for the village of Little Diomed. For a discussion of Little Diomed Island bowhead whaling, see Stephen R. Braund & Associates 1991.

update of cultural and subsistence need for bowhead whales. By 1997, the 1994 update was based on the five year old 1992 population information. The Alaska State Demographer (ADOL 1997a) provided population estimates for each year from the 1990 U.S. Census (Table 2). These updates are prepared annually and include the total population (Native and other) in each of the communities. To arrive at the Native population only, the percent Native American from the 1990 U.S. Census was applied to the annual population data (Table 3). This resulted in an estimated Native population for the ten Alaska bowhead whaling communities.

Using the 7/1/97 total population estimates provided by the Alaska Department of Labor and applying the percentage Native from the 1990 U.S. Census, Table 4 presents the 1997 cultural and subsistence need for bowhead whales in the ten Alaska Eskimo communities. The number of bowheads needed by each community and by the region as a whole (all ten communities) is derived by multiplying the mean number of whales landed per capita over the base time period (1910-1969) by the estimated 1997 Alaska Native population for each community and for the region as a whole. Using this method, the need for each community is shown on Table 4. Applying the mean of .008621 bowhead landed per capita for all ten communities for the historical period (1910-1969) to the estimated 1997 regional Native population of 6,472 results in a 1997 regional cultural and subsistence need of 56 landed bowhead whales.

Table 5 compares the ten Eskimo whaling communities' need in the mid-1980s (i.e., based on 1983-87 Alaska Native population estimates in each community) with the need in 1990, 1992, and 1997. The landed need increased from 41 landed in the mid-1980s (not including Little Diomed Island) to a need of 48 landed based on the 1990 U.S. Census data to 51 landed in 1992 and 56 landed in 1997. The 1990, 1992 and 1997 landed need figures include Little Diomed Island.

Table 6 compares the mid-1980s Alaska Native population for each community with Native population of 1990, 1992 and 1997 (the four years when new population data were gathered to

**Table: 2 Total Estimated Population of Ten Alaska Eskimo Bowhead Whaling Communities.\1,2**

<b>Community\3,4</b>	<b>4/1/90</b>	<b>7/1/91</b>	<b>7/1/92</b>	<b>7/1/93</b>	<b>7/1/95</b>	<b>7/1/95</b>	<b>7/1/96</b>	<b>7/1/97</b>
Gambell	525	551	579	586	616	622	636	653
Savoonga	519	543	562	573	571	603	612	622
Wales	161	158	152	156	162	174	166	162
Diomedel5	178	175	181	177	170	154	171	174
Kivalina	317	331	370	366	376	348	353	357
Point Hope	639	668	685	676	709	719	756	749
Wainwright	492	497	531	536	537	535	560	550
Barrow	3,469	3,609	3,778	3,897	4,055	4,197	4,257	4,380
Nuiqsut	354	387	422	403	411	412	427	435
Kaktovik	<u>224</u>	<u>218</u>	<u>215</u>	<u>211</u>	<u>208</u>	<u>212</u>	<u>221</u>	<u>222</u>
Totals	6,878	7,137	7,475	7,581	7,815	7,976	8,159	8,304

\1 Population numbers represent total community population.  
 \2 The 1992 population data presented in this table reflect minor differences with the 1992 population data presented to the IWC in 1994 (IWC/46/AS6) due to revisions in national and state populations by the U.S. Census Bureau. The demographer's annual update to the Alaska population data results in minor readjustments to previous years' population data back to 1990. Thus, there are minor differences in the 1992 population data as reported in 1994 compared to the 1992 data reported in 1997. These differences do not change the outcome of the needs calculation.  
 \3 1990 population data from the 1990 U.S. Census.  
 \4 1991-1997 population data are from the Alaska Department of Labor, Research & Analysis Section, 1997a.  
 \5 Little Diomed Island was granted membership into the AEWC in 1988.

**Table: 3 Estimated Native Population of Ten Alaska Eskimo Bowhead Whaling Communities, 1997.\1,2**

<b>Community</b>	<b>Percent Native American\3</b>	<b>4/1/90</b>	<b>7/1/91</b>	<b>7/1/92</b>	<b>7/1/93</b>	<b>7/1/94</b>	<b>7/1/95</b>	<b>7/1/96</b>	<b>7/1/97</b>
Gambell	96.19%	505	530	557	564	593	598	612	628
Savoonga	95.18%	494	517	535	545	543	574	583	592
Wales	88.82%	143	140	135	139	144	155	147	144
Diomedede	93.82%	167	164	170	166	159	144	160	163
Kivalina	97.48%	309	323	361	357	367	339	344	348
Point Hope	91.86%	587	614	629	621	651	660	694	688
Wainwright	94.31%	464	469	501	506	506	505	528	519
Barrow	63.91%	2,217	2,307	2,415	2,491	2,592	2,682	2,721	2,799
Nuiqsut	92.66%	328	359	391	373	381	382	396	403
Kaktovik	84.38%	<u>189</u>	<u>184</u>	<u>181</u>	<u>178</u>	<u>176</u>	<u>179</u>	<u>186</u>	<u>187</u>
Totals		5,403	5,605	5,874	5,939	6,112	6,218	6,372	6,472

\1 The 1992 population data presented in this table reflect minor differences with the 1992 population data presented to the IWC in 1994 (IWC/46/AS6) due to revisions in national and state populations by the U.S. Census Bureau. The demographer's annual update to the Alaska population data results in minor readjustments to previous years' population data back to 1990. Thus, there are minor differences in the 1992 population data as reported in 1994 compared to the 1992 data reported in 1997. These differences do not change the outcome of the needs calculation.  
 \2 Based on Percent Native American from the 1990 U.S. Census.  
 \3 From 1990 U.S. Census data.

Stephen R. Braund & Associates, 1997.

**Table 4: Ten Alaska Eskimo Whaling Villages' Subsistence and Cultural Need For Landed Bowhead Whales, 1997.<sup>11</sup>**

<b>Community</b>	<b>Number of Observations<sup>12</sup></b>	<b>Total Eskimo Population for ea. yr. of a Bowhead Observation<sup>13</sup></b>	<b>Number of Bowheads Landed 1910-1969<sup>14</sup></b>	<b>Mean Landed Per Capita 1910-1969<sup>15</sup></b>	<b>1997 Alaska Native Population<sup>16</sup></b>	<b>1997 Bowhead Need (Landed)<sup>17</sup></b>	<b>1997 Need (Landed) (Rounded)<sup>18</sup></b>
Gambell	39	11,883	68	0.005722	628	3.6	4
Savoonga <sup>19</sup>	0	----	----	0.005722	592	3.4	3
Wales	42	6,907	5	0.000724	144	0.1	1
Diomedes <sup>10</sup>	30	3,250	11	0.003678	163	0.6	1
Kivalina	7	926	3	0.003240	348	1.1	1
Point Hope	50	12,467	209	0.016764	688	11.5	12
Wainwright	49	10,723	108	0.010072	519	5.2	5
Barrow	60	44,687	379	0.008481	2,799	23.7	24
Nuiqsut <sup>19</sup>	0	----	----	0.008481	403	3.4	3
Kaktovik	<u>3</u>	<u>327</u>	<u>3</u>	0.009174	<u>187</u>	<u>1.7</u>	<u>2</u>
Totals	280	91,170	786		6,472	54.4	56
Region <sup>11</sup>	280	91,170	786	0.008621	6,472	55.8	56

- <sup>11</sup> Subsistence and cultural need is based on historic per capita harvest per community multiplied by the 1997 Alaska Native population of each community.
- <sup>12</sup> The number of observations represents the number of years for which data on landed whales were available for each community (See Appendices 1 & 2 of Braund, Stoker & Kruse 1988 & Table 1 of Stephen R. Braund & Assoc. 1991).
- <sup>13</sup> Total Eskimo population represents the sum of the Eskimo population for each year there was an observation of a landed bowhead whale.
- <sup>14</sup> Number of bowheads landed represents the sum of the observed bowheads landed between 1910 and 1969.
- <sup>15</sup> The mean landed bowhead whales per capita is based on the total number of whales landed between 1910 and 1969 for each community divided by the sum of the total Eskimo population for each village for each year landed whale data existed between 1910 and 1969 (See Appendices 1 & 2 in Braund, Stoker & Kruse 1988 and Tables 1 and 3 in Stephen R. Braund & Assoc. 1991). The sum of the total Eskimo population was calculated by adding the population estimates for each community for each year that there was a landed whale observation. For example, Barrow's 379 landed whales from 1910-1969 was divided by the total Eskimo population sum of 44,687 for this 60 year period (i.e., 379 divided by 44,687 = .008481).
- <sup>16</sup> 1997 Alaska Native population data for each community are from the Alaska Department of Labor, Research & Analysis Section (1997a) 7/1/97 population estimates of these 10 communities multiplied by the percent Native American in each community from the 1990 U.S. Census. J. Gregory Williams, State Demographer, 10/6/97 and 1990 U.S. Census.
- <sup>17</sup> The number of bowheads needed is derived by multiplying the mean per capita landed whales (1910-1969) by the 1997 Alaska Native population for each community.
- <sup>18</sup> The number of bowhead whales needed per individual community is rounded to the nearest whole number unless the product was less than .5; such cases were rounded up to one.
- <sup>19</sup> Because there are no landed bowhead data for either Savoonga or Nuiqsut between 1910-1969, the mean per capita landed whales for Gambell was used for Savoonga and the mean for Barrow was used for Nuiqsut.
- <sup>10</sup> Due to uncertainties in the landed whale data for Little Diomed Island, four different calculations of subsistence and cultural need, ranging from .4 to 1.0 bowheads, were presented (see Table 4 Stephen R. Braund & Assoc. 1991). The Little Diomed mean landed whale per capita (1910-1969) in this table represents the mean of these four calculations.
- <sup>11</sup> The mean per capita landed whales for the region represents the total number of whales landed for all ten communities between 1910 and 1969 divided by the sum of the total Native population for all communities for each year landed whale data existed between 1910 and 1969 (i.e., 786 whales divided by 91,170 = .008621).

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Table 5: Comparison of Ten Alaska Eskimo Whaling Communities' mid-1980s Subsistence and Cultural Need for Landed Bowhead Whales with 1990, 1992, and 1997 Need.<sup>11</sup>

Community	Mean Landed Per Capita	Mid-1980s Calculation Data						1990 Calculation Data				1992 Calculation Data				1997 Calculation Data			
		Est. 1983-87 AK Na. Pop.	Date of Est <sup>13</sup>	1987 Bowhead Need (Landed) <sup>14</sup>	1987 (Rnded) <sup>15</sup>	1990 AK Native Pop. <sup>16</sup>	1990 Bowhead Need (Landed) <sup>17</sup>	1990 (Rnded) <sup>15</sup>	1992 AK Native Pop. <sup>18</sup>	1992 Bowhead Need (Landed) <sup>19</sup>	1992 (Rnded) <sup>16</sup>	1997 AK Native Pop. <sup>110</sup>	1997 Bowhead Need (Landed) <sup>111</sup>	1997 (Rnded) <sup>16</sup>	Est. 1997	Bowhead Need (Landed)	1997		
Gambell	0.005722	495	1987	2.8	3	505	2.9	3	530	3.0	3	628	3.6	4					
Savoonga	0.005722	485	1985	2.8	3	494	2.8	3	515	2.9	3	592	3.4	3					
Wales	0.000724	154	1987	0.1	1	143	0.1	1	129	0.1	1	144	0.1	1					
Diomedes Is	0.003678	N/A	N/A	N/A	N/A	167	0.6	1	169	0.6	1	163	0.6	1					
Kivalina	0.003240	275	1987	0.9	1	309	1.0	1	356	1.2	1	348	1.1	1					
Point Hope	0.016764	534	1986	9.0	9	587	9.8	10	629	10.5	11	688	11.5	12					
Wainwright	0.010072	445	1983	4.5	5	464	4.7	5	505	5.1	5	519	5.2	5					
Barrow	0.008481	1,823	1986	15.5	16	2,217	18.8	19	2,532	21.47	21	2,799	23.7	24					
Nuqsut	0.008481	227	1983	1.9	2	328	2.8	3	364	3.1	3	403	3.4	3					
Kaktovik	0.009174	154	1983	1.4	1	189	1.7	2	183	1.7	2	187	1.7	2					
Totals		4,592		38.8	41	5,403	45.3	48	5,912	49.7	51	6,472	54.4	56					
Region w/o Dio	0.008815	4,592		40.5	41														
Region w/ Dio	0.008621					5,403	46.6	48	5,912	51.0	51	6,472	55.8	56					

<sup>11</sup> Subsistence and cultural need is based on historic per capita harvest per community multiplied by the Alaska Native population of each community.

<sup>12</sup> See Table 1, footnote 15 for explanation of mean landed bowheads per capita.

<sup>13</sup> See Braund, Stoker & Kruse (1988) Table 7 for source of mid-1980s Alaska Native population data.

<sup>14</sup> The number of bowheads needed in 1987 was derived by multiplying the mean per capita landed whales (1910-1969) by the most current Alaska Native population data available for each community in 1988.

<sup>15</sup> The number of bowheads needed per individual community is rounded to the nearest whole number unless the product was less than .5; such cases were rounded up to one.

<sup>16</sup> 1990 Alaska Native population data for each community are from the 1990 U.S. Census.

<sup>17</sup> The number of bowheads needed in 1990 is derived by multiplying the mean per capita landed whales (1910-1969) by the 1990 Alaska Native population for each community.

<sup>18</sup> 1992 Alaska Native population data for each community are from the Alaska Department of Labor, Research & Analysis Section, Demographics Unit. J. Gregory Williams, State Demographer, 3/15/94.

<sup>19</sup> The number of bowheads needed in 1992 is derived by multiplying the mean per capita landed whales (1910-1969) by the estimated 1992 Alaska Native population for each community.

<sup>110</sup> 1997 Alaska Native population data for each community are from the Alaska Department of Labor, Research & Analysis Section (1997a) 7/1/97 population estimates multiplied by the percent Native American in each community from the 1990 U.S. Census.

<sup>111</sup> The number of bowheads needed in 1997 is derived by multiplying the mean per capita landed whales (1910-1969) by the estimated 1997 Alaska Native population for each community.

Stephen R. Braund & Associates, 1997.

IWC-97.XLS - T5-Compare Need

10/13/97

update the calculation of subsistence and cultural need for bowhead whales). Between the mid-1980s and 1990, the Alaska Native population in these communities grew at an annual rate of a low of -2.4 percent in Wales to a high of 6.4 percent in Nuiqsut. Because the beginning population data year varied (e.g., from 1983 to 1987), it is not possible to calculate the percent change for all of the communities combined. From 1990 to 1992, the Alaska Native population in these 10 communities grew at an annual rate of a low of -4.9 percent in Wales to 7.1 percent and 7.6 percent in Barrow and Kivalina respectively. The average annual growth rate for all ten communities was 4.7 percent during this two year period. Between the mid-1980s and 1997, the annual rate of increase in the communities ranged from -.7 percent in Wales to 4.9 percent and 5.5 percent in Barrow and Nuiqsut respectively. Between 1992 and 1997, the annual growth rate ranged from a low of -.7 percent in Diomedes to a high of 3.7 percent in Gambell. The annual rate of growth for the ten communities combined during the past five years is 1.9 percent per year. This compares with an annual growth rate for the State of Alaska from 6/30/90 to 6/30/96 of 1.65 percent (Alaska Department of Labor 1997c). In addition, the 1.9 percent annual rate of growth between 1992 and 1997 for these 10 communities is substantially lower than the 4.7 percent annual rate of growth between 1990 and 1992.

In an effort to understand the growth rates in these communities, the study team collected data on the births and deaths in the communities from 1991 to 1996, the latest year for which these data are available (Table 7). These data indicate that approximately 77 percent of the regional growth from 1990 to 1996 was due to natural increase (births less deaths) and approximately 23 percent was due to migration. The annual birth rate per 1,000 persons was 26.7 while the annual death rate per 1,000 persons was 5.7. This compares with an average annual birth per 1,000 persons of 18.8 and average annual deaths per 1,000 persons of 4.0 for the State of Alaska from 1990 to 1996 (ibid.).

Table 6: Comparison of Ten Alaska Eskimo Whaling Communities' Native Population: mid-1980s, 1990, 1992, and 1997.

Community	Date of 1983-87 Pop. Est <sup>1</sup>	1983-87 to 1990			1990 to 1992			1992 to 1997			1983-87 to 1997		
		Est. 1983-87 AK Na Pop. <sup>1</sup>	Yrs fr 1983-87 to 1990 <sup>2</sup>	% Change Per Yr fr 1983-87 to 1990 <sup>4</sup>	Est. 1992 AK Na Pop. <sup>5</sup>	% Change Per Year 1990 to 1992 <sup>6,7</sup>	Est. 1997 AK Na Pop. <sup>8</sup>	% Change Per Year 1992 to 1997 <sup>9</sup>	Yrs fr 1983-87 to 1997 <sup>10</sup>	% Change Per Year 1983-87 to 1997 <sup>11</sup>			
Gambell	1987	495	3	0.7%	530	2.5%	628	3.7%	10	2.7%			
Savoonga	1985	485	5	0.4%	515	2.1%	592	3.0%	12	1.8%			
Wales	1987	154	3	-2.4%	129	-4.9%	144	2.3%	10	-0.7%			
Diomedes Is	N/A	N/A	N/A	N/A	169	0.6%	163	-0.7%	N/A	N/A			
Kivalina	1987	275	3	4.1%	356	7.6%	348	-0.4%	10	2.7%			
Point Hope	1986	534	4	2.5%	629	3.6%	688	1.9%	11	2.6%			
Wainwright	1983	445	7	0.6%	505	4.4%	519	0.5%	14	1.2%			
Barrow	1986	1,823	4	5.4%	2,532	7.1%	2,799	2.1%	11	4.9%			
Nuiqsut	1983	227	7	6.4%	364	5.5%	403	2.1%	14	5.5%			
Kaktovik	1983	154	7	3.2%	183	-1.6%	187	0.5%	14	1.5%			
Totals		4,592			5,912		6,472						
Region						4.7%		1.9%					

<sup>1</sup> See Braund, Stoker & Kruse (1988) Table 7 for source of mid-1980s Alaska Native population data.

<sup>2</sup> Number of years between the 1990 U.S. Census and the 1983-87 population figures for each community.

<sup>3</sup> 1990 Alaska Native population data for each community are from the 1990 U.S. Census.

<sup>4</sup> 1990 Alaska Native population minus 1983-87 population divided by the number of years from 1983-87 to 1990.

<sup>5</sup> 1992 Alaska Native population data for each community are from the Alaska Department of Labor, Research & Analysis Section, Demographics Unit. J. Gregory Williams, State Demographer, 3/15/94.

<sup>6</sup> 1992 Alaska Native population minus 1990 population divided by two years (the number of years from 1990 to 1992).

<sup>7</sup> The percent change per year for all communities (i.e., Region) does not represent a sum of community percents, but rather the percent change per year for the total population of all ten communities (i.e., region) between the designated years.

<sup>8</sup> 1997 Alaska Native population data for each community are from the Alaska Department of Labor, Research & Analysis Section (1997a) 7/1/97 population estimates multiplied by the percent Native American in each community from the 1990 U.S. Census.

<sup>9</sup> 1997 Alaska Native population minus 1992 population divided by five years (the number of years from 1992 to 1997).

<sup>10</sup> Number of years between the 1997 estimated Alaska Native population figures for each community and the 1983-87 population estimates.

<sup>11</sup> 1997 Alaska Native population minus 1983-87 population divided by the number of years from 1983 to 1997.

Stephen R. Braund & Associates, 1997.

IWC-97.XLS - T6-Compare Pop

10/13/97



Table 7: Residential Births and Deaths in Ten Alaska Eskimo Whaling Communities, 1991-96.<sup>11</sup>

	Native American Population			Births			Deaths		Natural Increase (Births-Deaths) 1991-96 <sup>15</sup>	Net Migrants	% of Pop. Change Due to Natural Increase <sup>18,9</sup>	% of Pop. Change Due to Migration <sup>19</sup>
	4/1/90	7/1/96	Pop. Change 1990-96 <sup>13</sup>	Births <sup>14</sup> 1991-96 <sup>15</sup>	Rate/1000 Mid Period	Annual Rate/1000	Deaths <sup>14</sup> 1991-96 <sup>15</sup>	Mid Period Population <sup>17</sup>				
Community <sup>12</sup>												
Gambell	505	612	107	102	30.2	5.0	17	5.0	85	22	79%	21%
Savoonga	494	583	89	102	31.2	5.8	19	5.8	83	6	93%	7%
Wales	143	147	4	20	24.1	10.8	9	10.8	11	-7	N/A	N/A
Diomedes Is	167	160	-7	4	4.0	4.0	4	4.0	0	-7	0%	100%
Kivalina	309	344	35	62	29.0	2.8	6	2.8	56	-21	N/A	N/A
Point Hope	587	694	107	97	26.0	5.6	21	5.6	76	31	71%	29%
Wainwright	464	528	64	71	23.4	6.3	19	6.3	52	12	81%	19%
Barrow	2,217	2,721	504	414	27.7	6.1	91	6.1	323	181	64%	36%
Nuiqsut	328	396	68	55	24.5	5.8	13	5.8	42	26	62%	38%
Kaktovik	189	186	-3	24	22.5	3.7	4	3.7	20	-23	N/A	N/A
Totals	5,403	6,371	968	951			203		748	220		
Region <sup>10</sup>					26.7	5.7					77%	23%

<sup>11</sup> Population, birth and death data are for Alaska Natives only.

<sup>12</sup> Refers to community of mother's residence and community of decedent's residence.

<sup>13</sup> 1996 Alaska Native population in each community minus 1990 population.

<sup>14</sup> Birth and death data from the Alaska Department of Health and Social Services, Bureau of Vital Statistics (1997).

<sup>15</sup> 1996 data are provisional and subject to change.

<sup>16</sup> Annual Rate/1000 is calculated by dividing the total births from 1991-96 by 6 years for an average annual number of births. This number is then divided by the 7/1/93 population (the mid period population from 4/1/90 to 7/1/96) multiplied by 1,000 to determine the rate/1000 people.

<sup>17</sup> Annual Rate/1000 is calculated by dividing the total deaths from 1991-96 by 6 years for an average annual number of deaths. This number is then divided by the 7/1/93 population (the mid period population from 4/1/90 to 7/1/96) multiplied by 1,000 to determine the rate/1000 people.

<sup>18</sup> Net natural increase (e.g., births minus deaths) in each community divided by total population change between 1990 and 1996.

<sup>19</sup> The percent of the population change due to natural increase and migration is not applicable when the population change is less than natural increase.

Stephen R. Braund & Associates, 1997.



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- 1980 Interim Report on Aboriginal/Subsistence Whaling of the Bowhead Whale by Alaskan Eskimos.

U.S. Government

- 1983 Report on Nutritional, Subsistence, and Cultural Needs Relating to the Catch of Bowhead Whales by Alaskan Natives. Submitted by the U.S. Government to the International Whaling Commission at its 35th Annual Meeting.

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- 1997 Personal Communication 10/6/97. State Demographer, Alaska Department of Labor, Research & Analysis Section, Demographics Unit.  
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1994b Personal Communication 4/28/94. State Demographer, Alaska Department of Labor, Research & Analysis Section, Demographics Unit.

## **Appendix A: DOCUMENTS SUBMITTED BY THE U.S. TO THE IWC RE: ALASKA ESKIMO BOWHEAD WHALING**

### **1979**

International Whaling Commission

- 1979 Report of the Panel to Consider Cultural Aspects of Aboriginal Whaling in North Alaska. Meeting in Seattle, WA. February 5-9, 1979 under the auspices of the International Whaling Commission.

### **1980**

U.S. Department of the Interior

- 1980 Interim Report on Aboriginal/Subsistence Whaling of the Bowhead Whale by Alaskan Eskimos.

### **1983**

Alaska Consultants, Inc. and Stephen Braund & Associates

- 1984 Subsistence Study of Alaska Eskimo Whaling Villages. Prepared for the Bureau of Indian Affairs, U.S. Department of the Interior.

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U.S. Government

- 1983 Report on Nutritional, Subsistence, and Cultural Needs Relating to the Catch of Bowhead Whales by Alaskan Natives. Submitted by the U.S. Government to the International Whaling Commission at its 35th Annual Meeting. International Whaling Commission TC/35/AB3.

### **1988**

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Braund, S.R., W.M. Marquette and J.R. Bockstoce

- 1988 Data on Shore-Based Bowhead Whaling at Sites in Alaska. Appendix 1 In Braund, S.R., S.W. Stoker, and J.A. Kruse 1988 Quantification of Subsistence and Cultural Need for Bowhead Whales by Alaska Eskimos. Stephen R. Braund & Associates, Anchorage, Alaska. Prepared for the Bureau of Indian Affairs, Department of the Interior. International Whaling Commission TC/40/AS2.

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**1992**

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Braund, Stephen R. and Associates

- 1991 Subsistence and Cultural Need for Bowhead Whales by the Village of Little Diomedé, Alaska. International Whaling Commission report IWC/44/AS 2. Prepared for the Alaska Eskimo Whaling Commission. Barrow, Alaska.

**1994**

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**1997**

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