

Bristol Bay Native Corporation

Comments related to HHC Formula Input: Fish Consumption Rate

See Attached Comment Letter and Report.



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Brock Tabor
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Division of Water – Water Quality Program
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RE: Scoping Comment Related to Human Health Criteria for WQS

Dear Mr. Tabor,

Bristol Bay Native Corporation (BBNC) appreciates the Department of Environmental Conservation's (DEC) efforts to revise the human health criteria (HHC) components to the state's water quality standards. We agree that revisions to the HHC are in order. We offer the comments in this letter to assist DEC's work to revise the HHC.

BBNC is the Alaska Native Claims Settlement Act of 1971 (ANCSA) regional corporation for the Bristol Bay region – the region that includes the Nushagak-Mulchatna river systems. BBNC currently has approximately 12,000 shareholders, many of whom rely on the region's fisheries for their livelihoods and subsistence. It is BBNC's mission to "Enrich our Native Way of Life," and this includes advocating on behalf of our shareholders on matters that are important to the region, including subsistence, economic, and fishery management issues.

Our comments focus primarily on the Fish Consumption Rate (FCR). Based on DEC's public presentations about the revision, we understand the Human Health Technical Working Group recommends that the FCR be revised to include the consumption of anadromous fish species and to use rural consumers as the target population. We support both recommendations but urge DEC to also consider implementing regional FCRs rather than a single statewide FCR because, even amongst rural populations, fish consumption rates will vary. Case in point, we believe residents of Bristol Bay consume greater amounts of fish than do residents of other parts of the state. This is an

incredibly important consideration for our region because it means our residents have far greater exposure to water-borne pollutants.

The FCR in current regulations does not consider the consumption of anadromous fish species and is only 6.5g/day. This equates to an annual consumption rate of approximately 5.25 pounds of fish consumed per year. We know anecdotally that Alaskans consume fish at a much higher rate.

Fortunately, there is an ample amount of data available regarding fish consumption rates of Bristol Bay residents. The Environmental Protection Agency compiled a significant volume of information regarding fish consumption rates in Bristol Bay in its 2014 “An Assessment of Potential Mining Impacts on Salmon Ecosystems of Bristol Bay Alaska” (Bristol Bay Watershed Assessment or BBWA). Section 5.4.2.2 and Appendix D of the BBWA reflect that subsistence consumption rates across the region vary from 300-900 pounds/per year/per person and, on average, 60% comes from fish.¹ This equates to an annual FCR for Bristol Bay residents between 180-540 pounds per year or 220-665 g/day, these are rates that are exponentially greater than the current FCR.

BBNC commissioned its own statistical assessment of Bristol Bay communities in 2013 from cultural anthropologist Don Callaway. This study entitled, “A Statistical Description of the Affected Environment as it Pertains to the Possible Development of the Pebble Mine – 17 Communities in Bristol Bay,” includes data on subsistence harvests.² The study is based on data collected by the Alaska Department and Fish and Game (ADFG) from 1,710 individuals, from 510 households in 17 different communities in the years 2004-2008. This data suggests that non-Native households in Bristol Bay harvest on average 602 pounds of seafood/year, while Alaska Native households harvest on average 1088 pounds of seafood/year. The study also found that the average size of non-Native households was 2.81 people while the average size of the Alaska Native households was 3.49 people. This suggests a per person consumption rate of 263g-385g/day for Bristol Bay residents, a range that correlates rather well with the seafood consumptions rates detailed in the BBWA.

Important to the revision of the FCR now under consideration, it is abundantly clear that residents of Bristol Bay consume far more than 6.5 g of seafood per day and this criteria should be steeply increased. Moreover, because these consumption rates vary across the state, DEC should implement regional FCR values rather than a single state-wide value. Doing so will help ensure that the new water quality standards implemented will be tailored to specific parts of the state. As Alaskans often stuck with nation-wide

¹ EPA, *An Assessment of Potential Mining Impacts on Salmon Ecosystems of Bristol Bay, Alaska* (2014), Vol. 1 at pp. 5-39 to 43 and Vol. 2 Appx. D at Table 12, available at: <https://www.epa.gov/bristolbay/bristol-bay-assessment-final-report-2014>.

² A copy of Callaway’s report accompanies this letter.

federal standards, we are all too familiar with the dangers of “one-size-fits-all” criteria. We encourage DEC not to adopt such an approach to the FCR.

Thank you for the opportunity to comment and for DEC’s work to consider revisions to the state’s water quality standards.

Sincerely,

Daniel Cheyette

Daniel Cheyette
Senior VP, Lands and Resources

A Statistical Description of the Affected Environment as it Pertains to the Possible Development of the Pebble Mine – 17 Communities in Bristol Bay

Introduction

In order to study the socioeconomic environment in the communities that are near the proposed Pebble mine site, data were aggregated and two programs were developed into a Statistical Package for the Social Sciences (SPSS) format. These two SPSS files were structured as a “Household Master File” and a “Demographic Master File”. The files aggregated data collected from 1,710 individuals living in 510 households across 17 communities in the Bristol Bay region.

The Household Master File contains 381 variables that encompass information relating to: 1) the composition, size, age, length of residence, and other social attributes of households, 2) household income, including sources of wage and unearned income, 3) the industries and types of employment experienced by household members, and 4) the extent to which individuals and households relied on and shared subsistence resources.

The Demographic Master File, contains 174 fields that describe individual attributes. These fields (or variables) contain information about age, ethnicity, participation in subsistence activities, type of job (or jobs), wage income, length of employment, work schedule and so forth.¹

Summary Findings

Demographic

Of the 510 households contacted in this survey research effort in 17 communities in the Bristol Bay region, about 80% (1,361) of the respondents were self-identified as Alaska Native, while 349 or about 20% consisted of a variety of non-Native ethnicities, but mostly Caucasian. As mentioned in the text, households were identified as Alaska Native if either spouse was Alaska Native. Using this criterion, about 80% of the households contained in this data set were identified as Alaska Native.

The average age for non-Natives in this sample was 34.8 years of age, whereas the average age of Alaska Native individuals was 31 years of age. About 40% of the Alaska Native population in this sample was under 18 years of age, compared to 30% of the non-Native population. In general, the Alaska Native residents of Bristol Bay present a younger age profile than other residents, with the exception of the 62+ population cohort which at 10% is almost double the proportion of non-Natives of a similar age.

¹ The underlying empirical results detailed in this study will be used to analyze the potential impacts from the development of the Pebble mine on communities, households, and individuals in the Bristol Bay region in a future report. Some issues to be covered in the future report are mentioned here (e.g., replacement cost of wages and subsistence foods that might result from Pebble’s impact on salmon runs). The future study will also consider impacts to inflation, community infrastructure, local governments, and the aged.

With respect to the length of residency, when measuring the individual in the household who has lived in the region the longest, Alaska Natives average almost 43 years (nearly two and a half times the average residency of non-Natives [16.22 years]). On average, Alaska Native households have 3.5 residents, whereas all others average 2.81 persons.

Subsistence

Although Alaska Native and non-Native households seem to participate in many subsistence activities in similar proportions, the intensity of effort varies considerably between the two groups. On average, Alaska Native households harvest many more species of wildlife than do non-Native households; 65% of non-Native households harvest less than 13 species of wildlife while two-thirds of Alaska Native households harvest more than 13 species, with about 1 in 5 households harvesting more than 25 species. In addition, Alaska Native individuals have per capita harvests of about twice the amount of salmon (roughly 300 pounds (lbs) versus 150 lbs) and more than twice the per capita harvest of all species (roughly 500 lbs versus 200 lbs) when compared to non-Native individuals. Also while Alaska Native households harvest high amounts of a broad range of species, more than three quarters of non-Native harvest come from salmon stocks. Alaska Native households also share a greater variety and amount of subsistence resources than do their non-Native congeners.

Income

There are dramatic differences in income between non-Native and Alaska Native households and individuals and significant differences between Bristol Bay Alaska Native households and the average income for households within the state of Alaska. Table 1 and Table 2 highlight some of these differences.

**Table 1
Bristol Bay 17 Communities – Average Household Income by Source and Ethnicity**

Source of Income	Native Households	Non-Native Households
Total Wages	\$29,349	\$64,043
Income - Entitlements (AFDC, APA)	\$2,551	\$495
Income - Dividends (PFD, Longevity)	\$5,283	\$3,247
Income - Retirement (including Soc. Sec.)	\$2,826	\$2,305
Total Amount of Unearned Income	\$10,737	\$6,134
Total Earned & Unearned Income	\$39,869	\$68,857
Approximate Number of Households (n)	410	97

Notes:

- AFDC = Aid to Families with Dependent Children
- APA = Adult Public Assistance
- PFD = Alaska Permanent Fund Dividend

Table 2
Bristol Bay 17 Communities – Per Capita Income by Ethnicity

	Alaska Native Individuals	Non-Native Individuals	Percent Difference*
Per Capita Wage Income	\$8,776	\$17,433	50%
Per Capita Unearned Income	\$3,234	\$1,705	190%
Total Per Capita Income	\$11,901	\$19,138	62%

*% difference = Alaska Native per capita/non-Native per capita

In addition, more than a third of Alaska Native households were below the poverty line, and nearly 1 in 6 non-Native households were in a similar position. These rates are far higher than the state of Alaska at 9.1%, with the U.S. national rate at 7.6%.

Employment

Two sectors, local government and commercial fishing, account for 70% of all employment for Alaska Natives in the Bristol Bay sample. Although non-Native commercial fishers earn high incomes, they represent only around 10% of the total employment by sector.

Conclusion

Alaska Native households in the Bristol Bay region are particularly vulnerable to any impacts that the Pebble mine may bring to salmon stocks. With low incomes and high rates of poverty, and high dependency on employment in commercial fisheries, high harvests, and salmon for subsistence needs, these households have very little buffer or resources to adapt if significant interruptions in salmon runs occur.

The mining industry provided few local jobs, only ten in the data aggregated and analyzed in this study. Average remuneration for those mining jobs is \$15,000 per year, which is slightly better on average than for fishing (\$14,000/year). However, the fishing sector accounts for nearly \$2 million in revenue (only for this sample, regional population figures will be considerably higher), while mining currently provides about \$150,000 in income (may be considerably more if results from Dillingham were available).

Potential income losses from commercial fishing and canneries in the communities in the Alaska Department of Fish and Game sample would be approximately \$2.5 million. The potential loss of the subsistence salmon resource would exceed \$5 million (685,210 lbs salmon across all communities priced at \$7.50/lb). Accordingly, the potential dollar loss of salmon to these communities exceeds \$7.5 million.

A Baseline Description of 17 Bristol Bay Communities 2004-2008

Background and Research Design

About seven years ago, the National Park Service (NPS) provided funding to the Alaska Department of Fish and Game (ADF&G) subsistence division to implement a subsistence harvest survey in three communities associated with Lake Clark National Park and Preserve. These surveys were part of an overall effort to collect subsistence and other baseline data for 18 communities in the Bristol Bay region. These 18 communities all have the potential to be affected by the proposed Pebble mine. The Canadian mining company, Northern Dynasty Minerals Ltd., through their contractor Stephen R. Braund and Associates (SBA), funded the collection of a substantial amount of Geographic Information System (GIS) data on subsistence use areas for these 18 communities. However, like the NPS, SBA subcontracted harvest and associated social and economic data collection to the ADF&G subsistence unit, which has considerable experience collecting and processing these types of surveys.

In addition, the NPS, under a separate purchase agreement, paid the ADF&G, to convert the harvest surveys obtained in the initial fourteen communities from an Access database format (where each harvest event is a record) to a spreadsheet format (where each record represents the summary harvest for each household) as input for the Statistical Package for the Social Sciences (SPSS). All of this information (minus identifying characteristics of individual respondents) remains in the public domain because public funding was involved in both efforts. Table 3 details the number of household interviews conducted each year between 2004 and 2007 in the Bristol Bay region.

Table 3
Household Subsistence Surveys Conducted in the Bristol Bay Region by ADF&G 2004-2008

Study Year	Number of Interviews	Percent
2004	116	22.7
2005	138	27.3
2007	152	29.7
2008	104	20.3
Total	510	100.0

Following the initial phases of the Pebble interviews in 14 communities, six other communities were contacted by the Pebble Limited Partnership to participate in this baseline research. One of these communities, Ekwok, declined to participate. Another community, Portage Creek, had too few residents to comprise a statistical sample. Three other communities, Aleknagik, Clark's Point, and Manokotak, have had harvest surveys completed and are now integrated in this write-

up. Dillingham, the final community, has been surveyed but data files may not be available until July of 2012.

ADF&G Technical Paper No 368² for the communities of Aleknagik, Clark's Point and Manokotak will be available at the beginning of 2012 and the information from this report (e.g., sampling frame and research design) will be included in this report should the information be available prior to this report's mid-January deadline.

Research Design – Sampling

Table 4 groups the communities to be described in this paper by the year they were surveyed, and include the number of households that were interviewed, the number of households in the community during the survey year, the proportion of households interviewed, and the intended sampling proportion. Although some of this information is now outdated, these data still remain the empirical standard for analyzing the potential impacts of the Pebble mine on subsistence, economic, and social issues.

The 2004 research design focused on communities closest to the proposed Pebble mine site. Subsequent years saw an expansion of research to other communities in the region that may also experience impacts. Geographical proximity is a feature of all phases of this subsistence research as it facilitates reduced logistical costs in the collection of the survey data.

In general, the ADF&G tried to interview every household in the smaller, rural, and mostly indigenous communities to achieve the 100% intended sampling proportion for the 2004 research. However, these intended sampling proportions are seldom met for a variety of reasons, including that the research was conducted during very narrow windows of opportunity, a household's refusal to participate in the research, a household's absence from the community at the time of interview (e.g., due to medical appointments, part-time wage employment, or subsistence activities). Nevertheless, a very high sampling proportion, averaging 66%, was accomplished for Iliamna, Newhalen, Nondalton, Pedro Bay, and Port Alsworth. In addition, Nondalton, the largest community, had a sampling proportion of nearly 80%.

However, once communities have more than about 50 households, the ADF&G employs a random sampling technique, most often attempting a random representative sample of about half the number of households. Another threshold is reached once communities become much larger than 100-120 households (perhaps 500 people), at which point the ADF&G employs a random and/or stratified sampling procedure, e.g., Dillingham.

² Holen, D., T. Krieg, J. Stariwat, and D. Koster. *Subsistence harvests and uses of wild resources in Aleknagik, Clark's Point, and Manokotak*. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No.368, Alaska.

Table 4
Seventeen Bristol Bay Communities – Sample and Sampling Design

Community/Year	#HH's Interviewed	#HH's in Community	% Interviewed	Intended Sample %
2004				
Iliamna	13	23	57%	100%
Newhalen	25	39	64%	100%
Nondalton	38	48	79%	100%
Pedro Bay	18	29	62%	100%
Port Alsworth	22	36	61%	100%
Subtotal	116	175	66%	
2005				
Igiugig	12	13	92%	100%
Kokhanok	35	42	83%	100%
Koliganek	28	42	67%	100%
Levelock	14	19	84%	100%
New Stuyahok	49	96	51%	50%
Subtotal	138	212	66%	
2007				
King Salmon	49	109	45%	50%
Lime Village	7	11	64%	100%
Naknek	75	222	34%	66%
South Naknek	21	27	78%	100%
Subtotal	152	369	41%	
2008				
Aleknagik	32	47	68%	50%
Clarks Point	11	18	61%	100%
Manokotak	61	96	64%	50%
Subtotal	104	161	65%	

Notes:

HH = household

Slightly above 70% (12/17) of the communities in this report had sampling strategies which attempted to contact and interview everyone in the community. The remaining communities had sampling goals of 66% (Naknek) or 50% (New Stuyahok, King Salmon, Aleknagik, and Manokotak). As we shall see, the size of a community can be an influence on its social organization, including ethnic composition, economic opportunity, and subsistence pursuits. In

addition, sample size often speaks to how confident we can be about the results of our generalizations.

Demography

Ethnicity

The Bristol Bay demographic file aggregates specific characteristics of each household member in the sample. Each of the 1,710 individuals that were living in 512 households surveyed in 17 communities has a row (record) of information containing up to 95 variables associated with them. Thus we know for every individual in this data set their age, ethnicity, employment, wage income, and participation in subsistence activities. From this data set, as presented in Table 5, below we can see that nearly 80% of all individuals in our sample are Alaska Native.

Table 5
Bristol Bay Demographic File 17 Communities; Ethnic Affiliation of Sample Population

Ethnicity	Frequency	Percent
Non-Native	349	20.4%
Alaska Native	1361	79.6%
Total	1,710	100%

Using a separate file, where households are the unit of analysis, provides information across a far broader range of topics (355 variables). In the household file, for example, the ethnicity for the household heads and their spouses is included. Table 6 below provides a proportional breakdown of households in each community by ethnicity. Based on the previously discussed criteria, Table 7 shows the proportion of Alaska Native households by community and survey year. For the purposes of this report, and consonant with ADF&G practices, a Native household is defined as any household where the household head and/or a spouse is self-identified as an Alaska Native. Table 6 shows that 14 of the communities are predominantly Native, with 80+ percent of the households having at least one of the household heads as a self-identified Alaska Native. Eight of the communities (Clark’s Point, Igiugig, Kokhanok, Koliganek, Levelock, Lime Village, New Stuyahok, and Newhalen), using the definition from above, are 100% Alaska Native with Nondalton, at 97%, nearly so. The very large community of Naknek, with more than 200 households is about two-thirds Alaska Native. Naknek, with a long history of fish processing, has historically had a significant non-Native population.

Finally, two of the communities, King Salmon and Port Alsworth, for a variety of historical and economic circumstances, have non-Native households in the majority. Ethnicity plays an important role in outcomes such as subsistence use, employment, and income, as seen later in this analysis.

Table 6
17 Bristol Bay Communities - Ethnic Composition of Survey Households

Community	Non-Native	Native	Total	Percent Native
Aleknagik	5	27	32	84%
Clarks Point	0	11	11	100%
Igiugig	0	12	12	100%
Iliamna	4	9	13	69%
King Salmon	34	15	49	31%
Kokhanok	0	35	35	100%
Koliganek	0	28	28	100%
Levelock	0	13	13	100%
Lime Village	0	7	7	100%
Manokotak	5	56	61	92%
Naknek	27	48	75	64%
New Stuyahok	0	49	49	100%
Newhalen	0	25	25	100%
Nondalton	1	37	38	97%
Pedro Bay	2	16	18	89%
Port Alsworth	17	5	22	23%
South Naknek	2	19	21	90%
Total	99	412	511	81%

Table 7
17 Bristol Bay Communities – Population Size and
Ethnic Composition of Survey Households

Community/Year	Estimated Population	#HH's in Community	Percent* HH's Alaska Native
2004			
Iliamna	90	23	69%
Newhalen	183	39	100%
Nondalton	205	48	97%
Pedro Bay	47	29	89%
Port Alsworth	113	36	23%
Subtotal	638	175	
2005			
Igiugig	50	13	100%
Kokhanok	179	42	100%
Koliganek	167	42	100%
Levelock	54	19	100%
New Stuyahok	461	96	100%
Subtotal	911	212	
2007			
King Salmon	246	109	31%
Lime Village	27	11	100%
Naknek	533	222	64%
South Naknek	52	27	90%
Subtotal	858	369	
2008			
Aleknagik	219		84%
Clarks Point	62		100%
Manokotak	442		92%
Subtotal	723		

Note:

*Based on sample results from household file, where a household is classified as Alaska Native if either a household head or his/her spouse is self-identified as Alaska Native.

HH= household

With respect to the 17 communities contained in this analysis we can see some rough dimensions on which to structure our analysis. First are the eleven small predominantly Native communities with populations of about 200 people or less that are also 90-100% Alaska Native (Newhalen, Nondalton, Pedro Bay, Igiugig, Kokhanok, Koliganek, Levelock, Lime Village, South Naknek, Aleknagik and Clark's Point). A second tier, represented by New Stuyahok and Manokotak, are larger with populations of around 450 people, yet are still predominantly Alaska Native. Of the remaining four communities, two are predominantly non-Native (King Salmon and Port Alsworth) and two are about two-thirds Alaska Native (Iliamna and Naknek). These latter four communities range in size from small (Iliamna) to substantial (Naknek).

We could also organize our analysis of communities by proximity to the proposed Pebble mine site or by overlap of subsistence use areas and the proposed mine site. Some of these considerations will be analyzed in the next deliverable; however, a caution should be made that the strength of impacts may not be very well correlated with geographical or distance considerations. For example, impacts to salmon stocks may reverberate in communities far removed from the proposed mine site.

Ethnicity, Age and Gender

Chart 1 provides a population pyramid for all non-Native individuals in the sample for 17 communities in the Bristol Bay region. Note the low representation of girls in the 15-24 age intervals; this is probably an artifact of chance as there are about equal proportions of males and females under the age of 24 in this pyramid. The average age for a non-Native individual in the ADF&G Pebble sample was 34.8 years of age (n=349, SD= 19.4). In Table 8 below, the 65+ age distribution of non-Native individuals comprise less than 5% (16/342) of their total population.

Chart 1
17 Bristol Bay Communities – non-Native Population Pyramid

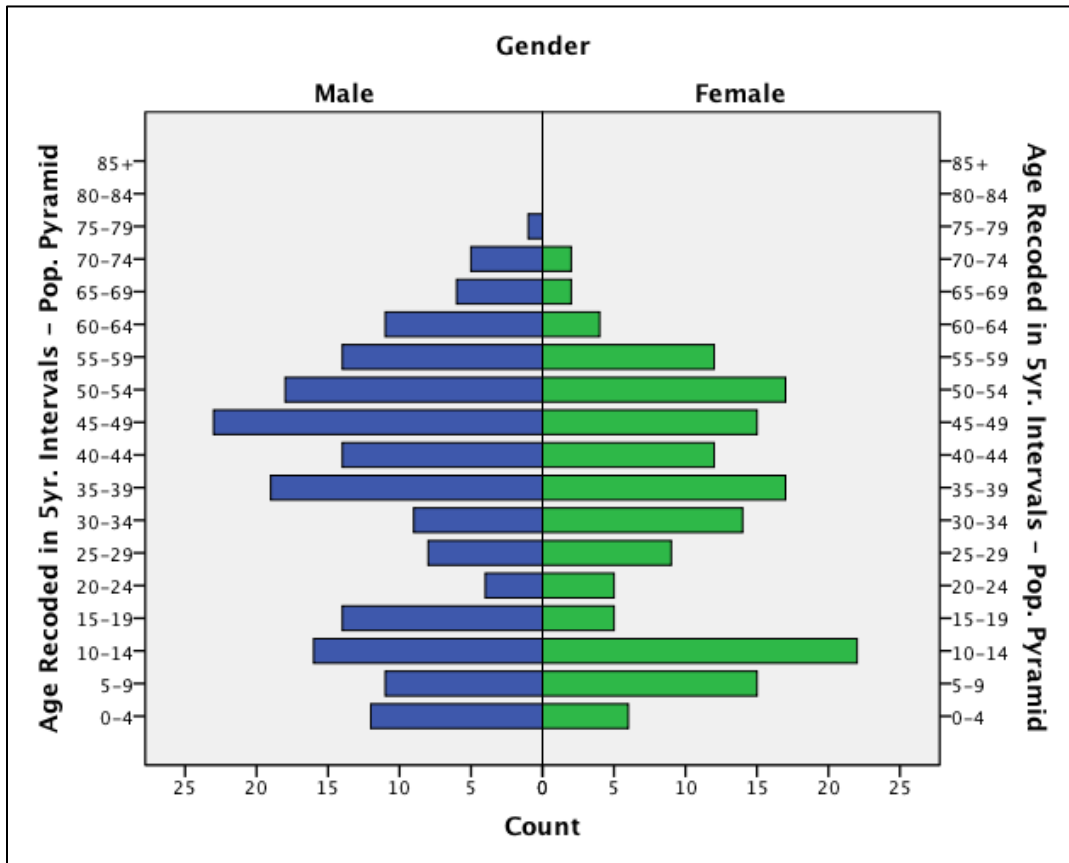


Table 8
17 Bristol Bay Communities non-Native Age Distribution by Gender

Population Pyramid	Gender			
	Male		Female	
	Count	Row %	Count	Row %
0-4	12	66.7%	6	33.3%
5-9	11	42.3%	15	57.7%
10-14	16	42.1%	22	57.9%
15-19	14	73.7%	5	26.3%
20-24	4	44.4%	5	55.6%
25-29	8	47.1%	9	52.9%
30-34	9	39.1%	14	60.9%
35-39	19	52.8%	17	47.2%
40-44	14	53.8%	12	46.2%
45-49	23	60.5%	15	39.5%
50-54	18	51.4%	17	48.6%
55-59	14	53.8%	12	46.2%
60-64	11	73.3%	4	26.7%
65-69	6	75.0%	2	25.0%
70-74	5	71.4%	2	28.6%
75-79	1	100.0%	0	.0%
80-84	0	.0%	0	.0%
85+	0	.0%	0	.0%
Total	185	54.1%	157	45.9%

Chart 2
17 Bristol Bay Communities – Alaska Native Population Pyramid

The population pyramid (Chart 2) for Alaska Native individuals in the ADF&G Pebble sample has a more symmetrical “Christmas Tree” appearance when compared to the non-Native population pyramid. Distributions for 65+ individuals who compose nearly 8% (102/1286) of the total population are noticeable. In addition, there are only 4 non-Native women over the age of 65 and they form only 25% of the population for this age cohort. In contrast, a clear majority of Alaska Natives are females over the age of 65. The average age for an Alaska Native individual is 31 years of age (n=1355, SD=21.1). Table 9 is a detailed description of Chart 2.

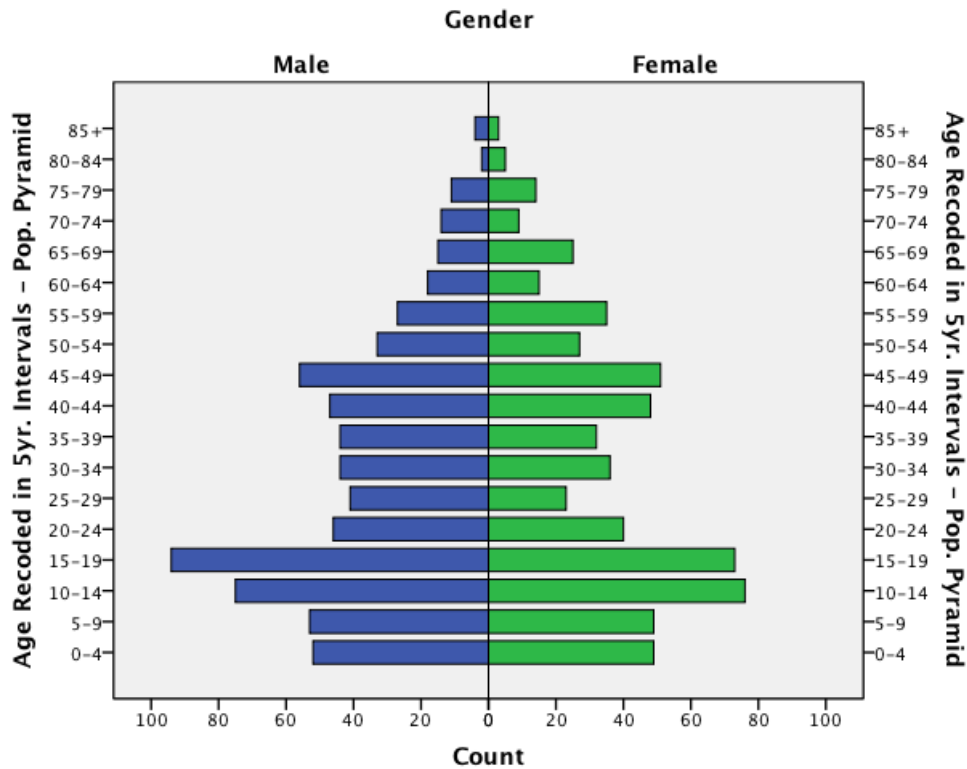


Table 9
17 Bristol Bay Communities Alaska Native Age Distribution by Gender

Population Pyramid	Gender			
	Male		Female	
	Count	Row %	Count	Row %
0-4	52	51.5%	49	48.5%
5-9	53	52.0%	49	48.0%
10-14	75	49.7%	76	50.3%
15-19	94	56.3%	73	43.7%
20-24	46	53.5%	40	46.5%
25-29	41	64.1%	23	35.9%
30-34	44	55.0%	36	45.0%
35-39	44	57.9%	32	42.1%
40-44	47	49.5%	48	50.5%
45-49	56	52.3%	51	47.7%
50-54	33	55.0%	27	45.0%
55-59	27	43.5%	35	56.5%
60-64	18	54.5%	15	45.5%
65-69	15	37.5%	25	62.5%
70-74	14	60.9%	9	39.1%
75-79	11	44.0%	14	56.0%
80-84	2	28.6%	5	71.4%
85+	4	57.1%	3	42.9%
Total	676	52.6%	610	47.4%

Dependency Ratios

Dependency ratios are a statistical yardstick used by many analysts to summarize the relationship between the proportion of individuals in the labor force and their ability to support the dependent and elder cohorts in their community and region. High dependency ratios indicate that considerable amounts of the labor force productivity may be needed to support the more dependent cohorts of the population. In some sense, these measures don't make sense for small indigenous communities, in that, cultural mechanisms, such as extensive sharing of subsistence resources, may smooth out many of the potential inequalities possible in the demographic context. Nevertheless, these measures may provide some insight in a situation where dramatic changes in the environment, e.g., access to subsistence resources or considerable social and cultural impacts, may be in the near future.

Table 10 below compares the proportion (%) of the total Bristol Bay population that falls into various age intervals (cohorts). These age intervals are selected to create a total dependency ratio; in the case of our calculations this is represented by the following equation:

$$\text{individuals } 0\text{-}14 \text{ years of age} + \text{individuals } \geq 65 / \text{individuals } 15\text{-}64 \times 100$$

When initially formulated, and the current standard for the worldwide index, the child-dependency ratio was calculated by dividing the number of individuals 0-14 by the number of individuals 15-64 (times 100). Similarly the age-dependency ratio is calculated by dividing the number of individuals ≥ 65 by the number of individuals 16-64 (times 100). The intention of these ratios is to try and understand how many labor force participants (15-64) are available to support the supposedly dependent age cohorts of the community population, i.e., children (0-14) and elderly (≥ 65).

Undeniably, there are problems with this measure. In Western countries, the 0-14 year-old age category seems to ignore the fact that in our society most children are in school (and thus dependent financially on their parents) until at least 18 years of age. Thus many U.S. and British statistics use a 0-18 year-old age cohort in their calculations. We will present results from both approaches, the first will allow us to make national and international comparisons. However, given that 0-18 seems the most realistic threshold, we will also provide calculations for this index.

The dependency ratio also fails in other areas. In our society, many 65-year-old individuals are still in the workforce. In addition, many commentators note that the ≥ 65 age cohort, due to medical costs and so forth, are actually much more expensive to support. In some indices, the elder cohort are weighted (i.e., equal 1.5 times the number of individuals in the child cohort). We have not weighted our indices.

In comparison, the U.S. and Alaska dependency ratios, using the 15-64 interval for labor force participants, is between 45-50. Thus Alaska Native Bristol Bay families with an index of 55 have a higher dependency on the existing labor force (i.e., fewer workers supporting more dependents) than do non-Native Bristol Bay families (who have very low dependency ratios) or the U.S./Alaska population as a whole. The 55 score is comparable to Mexico (which also has a very young population) and Europe and Scandinavia (which have much higher age dependency ratios). Using the more realistic labor cohort of 19-64 year olds our calculations show a high dependency ratio of nearly 85, which is comparable to countries in Sub-Saharan Africa. However, without calculations from Africa, using a 19-64-worker cohort, this is to some extent comparing apples to oranges.

Table 10
Bristol Bay – Age Cohorts and Dependency Ratios – non-Native and Native

	Bristol Bay Non-Native	Bristol Bay Alaska Native
% 14 Years & Under	23.8%	27.5%
% 18 Years & Under	28.9%	38.3%
% 18-24 Years of Age	2.9%	9.0%
% 55-64 Years of Age	11.7%	7.5%
% 62 Years and Older	6.6%	9.7%
% 65 Years and Older	4.6%	7.9%
%15-64 Years of Age	71.6%	64.6%
% 19-64 Years of Age	66.5%	53.8%
Youth Dependency Ratio (0-14)	33.2	42.5
Youth Dependency Ratio (0-18)	43.5	70.2
Age Dependency Ratio/(15-64)	6.4	12.2
Age Dependency Ratio/(19-64)	6.9	14.5
Total Dependency Ratio/(15-64)	39.6	54.7
Total Dependency Ratio/(19-64)	50.4	84.7
Sample Size (n)	349	1355

Household Size/Length of Residency:

As indicated in Table 11 and Table 12, Alaska Native households are far larger and have lived in the region far longer than their non-Native congeners. With respect to the United States as a whole, the average household size is 2.59 people, with Alaska (heavily influenced by its indigenous population) having a slightly higher average at 2.74. Only two states in the United States (California and Utah) have average household sizes as high as 3.14. Three-quarters of the non-Native households in Bristol Bay have three or fewer persons. In contrast, almost two-thirds of Alaska Native households have three or more persons.

It is also clear, indicated by the average of four decades of residency, that Alaska Native households are long-term residents of the region and indigenous inhabitants of the landscape.

Table 11
17 Bristol Bay Communities – Average Household Size and Maximum Length of Residency By Ethnicity

	Non-Native households (n=97)	Alaska Native households (n=412)
Average household size	2.81	3.49
Average Maximum Residency	16.22 years	42.8 years

Table 12
17 Bristol Bay Communities – Household Size by Ethnicity

Number of People in Household	Household Ethnicity		Total
	Non-Native	Native	
1 person	23 (24%)	68 (17%)	91
2 people	30(31%)	92 (22%)	122
3 people	17 (18%)	66 (16%)	83
4 people	12 (12%)	76 (18%)	88
5 people	7 (7%)	41 (10%)	48
6 people	5 (5%)	33 (8%)	38
7 people	1 (1%)	21 (5%)	22
8 people	0	8 (2%)	8
9 people	1 (1%)	3 (1%)	4
10 people	1 (1%)	2 (.5%)	3
11 people	0	2 (.5%)	2
Total	97 (100%	412 (100%)	509

Subsistence

Introduction

While much of the following description will focus on harvest amounts for subsistence or commercial use, one should not be misled that the economic and dietary impact of subsistence activities is necessarily, as viewed by rural indigenous people, the most important outcome of these endeavors. Subsistence resources do provide sustenance and are a major portion of the diet, especially in small communities where transportation costs make the purchase of store-brought foods prohibitive. However, subsistence resources and the activities associated with the harvest of these resources provide more than food. Participation in family and community subsistence activities, whether it is clamming, processing fish at a fish camp, or caribou hunting with a father or brother, provide the most basic memories and values in an individual's life. These activities define and establish the sense of family and community. These activities teach how a resource

can be identified, methods of harvest, efficient and non-wasteful processing of the resource, and preparation of the resource as a variety of food items.

The distribution of these resources establishes and promotes the most basic ethical values in Native and rural culture - generosity, respect for the knowledge and guidance of elders, self-esteem for the successful harvest of a resource, and family and public appreciation in the distribution of the harvest. No other set of activities provides a similar moral foundation for continuity between generations.

Food preferences are the most conservative behaviors in any culture. The unique preparation and special taste of foods encountered by children as they grow up stays with them forever. Years later, the taste and smell of certain foods evoke memories of family and belonging. However, discussion about the contribution of subsistence activities to the cultural and social well-being of rural Alaska communities will mostly be considered in the next report in this series, which focuses on the social, economic, and cultural impacts that occur should access to these resources and activities be interrupted or severely impacted.

In much of the following description, contrasts will be made between non-Native and Alaska Native households. This comparison is not intended to diminish the importance of the natural landscape and its resources for many non-Native households, nor the potential impacts to these households from the development of the proposed Pebble mine. Nevertheless, as empirical research into the impacts of the Exxon Valdez Oil Spill (EVOS) indicates, there are substantial residential, subsistence, economic, employment, and cultural differences between the two groups. Again, this is not to say there is and can be substantial overlap in behaviors, attitudes, values, and activities between the two groups, especially non-Native households that have long residential histories in the area. However, to fully comprehend the potential impacts to communities in the region from the possible development of such a large-scale mine, these issues have to be addressed.

To highlight this point, we will include a brief digression to show how these differences played out in consequences of the EVOS to communities in the Prince William Sound. One aspect of a multi-method research methodology designed to study the social and cultural impacts of the EVOS involved interviewing (and re-interview) some 2,728 informants from communities in the Gulf of Alaska. This research indicated that personal, psychological, and community impacts resulting from EVOS varied dramatically depending on values imputed to the landscape.

In a telling analysis of the consequences of the EVOS, Joseph G. Jorgensen, in a 1995 article³, demonstrates empirically that Natives and Non-Natives, with respect to environmental ethics (among other ethics), are organized very differently on key social features – ideas, sentiments,

³ Jorgensen, J. G. 1995. Ethnicity, Not Culture? Obfuscating Social Science in the Exxon Valdez Oil Spill Case. *American Indian Culture and Research Journal* 19(4):1-124. University of California, Los Angeles.

and acts. These differences had an important affect on how the outcomes of the spill were perceived.

Jorgensen notes that in the same environment, natives have greater knowledge about species within that landscape than do non-Natives, that natives more frequently identify spiritual values, rather than commodity values as the preeminent attribute of the environment (1995:Table K29), and finally that Natives more frequently report that places in the environment have special meanings for them and their kinspersons (past and present) (1995:Table Q7).

Table 13 and Table 14 below, based on over 2,700 initial and follow-up interviews, contrast indigenous versus Western values and attitudes toward the environment (and inherently views and perspectives on ethnographic landscapes). Note that no culture exhibits a homogenous response from all its members. The understanding is implicit when cultures come in contact with each other; members of both cultures may acquire new values and attitudes. In fact, for some behaviors related to traditional communitarian values, long-term non-Natives seem to adopt many traditional indigenous values.

What is clear from the survey research results is that nearly half the Native respondents viewed the landscape as possessing only spiritual values whereas less than 6% of the Non-Natives felt the same way (1995: Table K29 reproduced below).

Table 13
Results from Survey Research after the Exxon Valdez Oil Spill in Several Communities Within Prince William Sound
(Jorgensen 1995:Table K29. Ethics and Significant Symbols Attached to Environment)

Ethics and Significant Symbols Attached to Environment*	Natives (%)	Non-Natives (%)
1. The environment, or features of it (rivers, forests, coal seams, oil deposits, fish, and sea mammals etc.), is viewed as commodities, that is, items whose values are established in the marketplace and are available for purchase or sale.	0%	31%
2. Combination of commodity and spiritual views.	54%	60%
3. The environment, or features of it, is viewed as being endowed with spirits to which significant cultural symbols are attached (e.g. helpfulness). The general environment is not conceptualized as a commodity.	46%	6%

*Percentages based on approximately 2,700 respondents

Another question (Q7) asked:

Does the respondent have special memories about the wildlife or the places, such as springs, lakes, bays, lagoons, in his/her area that the respondent's family likes to recount?

As the table below indicates, members of both cultural traditions have strong symbolic attachments to the landscape; the clear difference is that traditional indigenous households have many more such symbols that have accumulated over time.

Table 14
Jorgensen 1995 Question Q7: Significant Symbols Attached to Places in Local Environment

Significant Symbols Attached to Places in Local Environment.*	Natives (%)	Non-Natives (%)
1. None	4%	7%
2. A Few	24%	44%
3. Many	28%	44%
4. Many that have accumulated over two or more generations	44%	5%

*Percentages based on approximately 2,700 respondents

As noted above, none of these responses are a 100% for either group. Multivariate analysis seems to indicate that long-term non-Native residents and high-income Native residents seemed to have borrowed more heavily from the other culture's repertoire.

Participation in Subsistence Activities by Ethnicity and Gender

Table 15, below indicates a high degree of similarity in participation in subsistence activities by Native and non-Native individuals. In addition, there are gender differences that also seem to be similar between the two groups. Males, regardless of ethnicity, seem to hunt and fish in similar proportions and at rates more than three times that of females. Surprisingly, and in contrast with traditional Native expectations for division of labor, men and women tend to process these resources at similar percentages, although Native women tend to have slightly higher processing proportions than do their non-Native congeners. In addition, Native women tend to collect and process berries and plants at slightly higher proportions than anyone else. Of course, this question asks only participation, not intensity of participation, i.e., how often or how many resources are harvested and processed.

Table 15
Bristol Bay 17 Communities – All Individuals Participation in Subsistence Activities by
Ethnicity and Gender

Subsistence Activity		Ethnicity							
		Non-Native				Alaskan Native			
		Gender				Gender			
		Male		Female		Male		Female	
		Count	Column %	Count	Column %	Count	Column %	Count	Column %
Attempt to Hunt Game or Birds?	No	87	46.0%	138	86.3%	302	42.6%	532	82.6%
	Yes	102	54.0%	22	13.8%	407	57.4%	112	17.4%
Process Game or Birds?	No	84	44.4%	98	61.3%	331	46.7%	326	50.6%
	Yes	105	55.6%	62	38.8%	378	53.3%	318	49.4%
Attempt to Harvest Fish?	No	27	14.3%	50	31.3%	193	27.2%	239	37.2%
	Yes	162	85.7%	110	68.8%	516	72.8%	403	62.8%
Process Fish?	No	30	15.9%	40	25.0%	239	33.8%	198	30.8%
	Yes	159	84.1%	120	75.0%	469	66.2%	444	69.2%
Attempt to Hunt Furbearers?	No	139	73.9%	155	96.9%	493	69.6%	592	92.4%
	Yes	49	26.1%	5	3.1%	215	30.4%	49	7.6%
Process Furbearers?	No	142	75.1%	143	89.4%	507	71.7%	516	80.5%
	Yes	47	24.9%	17	10.6%	200	28.3%	125	19.5%
Gather Plants?	No	60	31.7%	41	25.6%	188	26.5%	96	14.9%
	Yes	129	68.3%	119	74.4%	521	73.5%	547	85.1%
Process Plants?	No	63	33.9%	40	25.2%	233	33.0%	111	17.3%
	Yes	123	66.1%	119	74.8%	474	67.0%	532	82.7%

Sustainability

Selecting only for Alaska Native respondents, Table 16 provides a breakdown by age and gender of participation in the hunting and processing of subsistence game species. Of the valid 1,283 responses, 795 (62%) said no; although, nearly a quarter of these negative responses were individuals who were under the age of 10. Of the 488 (38%) individuals who responded yes, about 80% were males. Of the 385 males who responded positively, about 40% are between the ages of 5 to 24, slightly more than 40% are between the ages of 25-49, and the remaining 20% are 50+ years of age. By gender, Alaska Native males hunt at a ratio of about 4:1 when compared to females. An important conclusion that can be reached from this distribution is that younger cohorts of males are being trained and participate in this subsistence activity in proportions that ensure a sustainable group of hunters for the community for at least five decades into the future.

The distribution of female participants is more skewed. Over half of all women who participate in hunting are between the ages of 25-49. Women in younger age cohorts comprise only about one-third of the total participants. It might seem that some shortfall exists for female participation in this subsistence activity in the long run. However, consonant with traditional expectations of division of labor, we can see (Table 17) that three times as many Native females process the harvest of game as actually help harvest, and their recruitment for this activity by age cohort is proportional to male hunters.

Confidence about recruitment for both male and female Alaska Natives into subsistence activities is shown in the abbreviated table below (Table 17). Although there is some traditional division of labor in hunting, high numbers of men and women, at all ages, participate in the harvesting of fish, which is, by far the most important subsistence resource. Nearly triple the numbers of women engage in fishing when compared to hunting. In addition, the younger cohorts of women who fish appear to be similar in proportion as men and to have the same potential for sustainable recruitment.

Table 16
Bristol Bay 17 Communities – Alaska Native Individuals Who Hunt and Fish
by Aggregated Age Cohort

Age Cohort	Male Hunting	Female Hunting	Male Fishing	Female Fishing
5-24 years	40%	31%	42%	39%
25-49 years	42%	56%	41%	39%
50+ Years	18%	13%	17%	22%
n=	385	103	492	382

Table 17
Bristol Bay 17 Communities – Participation in Hunting Game & Birds by Alaska Native
Individuals by Age Cohort and Gender

Age Recorded in 5yr. Intervals	Attempt to Hunt Game or Birds?							
	No				Yes			
	Male				Female			
	Count	Column %	Count	Column %	Count	Column %	Count	Column %
0-4	50	17.2%	47	9.3%	2	.5%	1	1.0%
5-9	33	11.4%	45	8.9%	20	5.2%	4	3.9%
10-14	39	13.4%	66	13.1%	36	9.4%	10	9.7%
15-19	34	11.7%	60	11.9%	60	15.6%	13	12.6%
20-24	12	4.1%	36	7.1%	33	8.6%	4	3.9%
25-29	19	6.6%	18	3.6%	22	5.7%	5	4.9%
30-34	16	5.5%	27	5.3%	28	7.3%	9	8.7%
35-39	11	3.8%	23	4.6%	33	8.6%	9	8.7%
40-44	15	5.2%	34	6.7%	32	8.3%	14	13.6%
45-49	10	3.4%	34	6.7%	46	11.9%	16	15.5%
50-54	11	3.8%	21	4.2%	22	5.7%	6	5.8%
55-59	11	3.8%	31	6.1%	16	4.2%	4	3.9%
60-64	5	1.7%	12	2.4%	13	3.4%	3	2.9%
65-69	4	1.4%	23	4.6%	11	2.9%	2	1.9%
70-74	9	3.1%	6	1.2%	5	1.3%	3	2.9%
75-79	9	3.1%	14	2.8%	2	.5%	0	.0%
80-84	1	.3%	5	1.0%	1	.3%	0	.0%
85+	1	.3%	3	.6%	3	.8%	0	.0%
Total	290	100.0%	505	100.0%	385	100.0%	103	100.0%

Table 18 below details participation in the harvesting of fish by Alaska Native individuals based on their age and gender.

Table 18
Bristol Bay 17 Communities – Participation in Harvesting Fish by Alaska Native
Individuals by Age Cohort and Gender

Age Recorded in 5yr. Intervals	Attempt to Harvest Fish							
	No				Yes			
	Male				Female			
	Count	Column %	Count	Column %	Count	Column %	Count	Column %
0-4	42	23.0%	37	16.5%	10	2.0%	11	2.9%
5-9	20	10.9%	22	9.8%	33	6.7%	27	7.1%
10-14	23	12.6%	35	15.6%	52	10.6%	41	10.7%
15-19	18	9.8%	28	12.5%	76	15.4%	44	11.5%
20-24	11	6.0%	13	5.8%	34	6.9%	26	6.8%
25-29	6	3.3%	9	4.0%	35	7.1%	14	3.7%
30-34	12	6.6%	13	5.8%	32	6.5%	23	6.0%
35-39	3	1.6%	5	2.2%	41	8.3%	27	7.1%
40-44	11	6.0%	7	3.1%	36	7.3%	41	10.7%
45-49	9	4.9%	9	4.0%	47	9.6%	41	10.7%
50-54	5	2.7%	4	1.8%	28	5.7%	23	6.0%
55-59	6	3.3%	15	6.7%	21	4.3%	20	5.2%
60-64	2	1.1%	4	1.8%	16	3.3%	11	2.9%
65-69	2	1.1%	8	3.6%	13	2.6%	17	4.5%
70-74	5	2.7%	1	.4%	9	1.8%	8	2.1%
75-79	6	3.3%	9	4.0%	5	1.0%	5	1.3%
80-84	1	.5%	3	1.3%	1	.2%	2	.5%
85+	1	.5%	2	.9%	3	.6%	1	.3%
Total	183	100.0%	224	100.0%	492	100.0%	382	100.0%

Total Number of Subsistence Species Used

Table 19 below clearly indicates that while all ethnicities in the Bristol Bay region engage in the harvest of wildlife resources, the traditional commitment to harvest a wide variety of resources is certainly emphasized in Alaska Native households, although not exclusively. About two-thirds of non-Native households harvest 13 resources or less, in contrast about two-thirds of Alaska Native households harvest more than this number of species. In addition, about one in five Alaska Native households harvest more than 25 species.

Table 19
Bristol Bay 17 Communities – Total # of Subsistence Species
Used by Households by Ethnicity

Total Number of Subsistence Species Used by Household	Household Ethnicity			
	Non-Native		Native	
	Count	Column %	Count	Column %
0-8	37	38.1%	71	17.2%
9-13	27	27.8%	87	21.1%
14-17	12	12.4%	73	17.7%
18-24	15	15.5%	94	22.8%
25-59	6	6.2%	87	21.1%
Total	97	100.0%	412	100.0%

In Table 20 below, values in the bottom row totals run like a pendulum starting with non-Native households heavily represented in the 0-13 species utilized categories and gradually decreasing until they meet the Alaska Native households at the bottom. These Native households gradually gain amplitude until nearly half the households are contained in the 18-59 species-used interval. Six communities (Clark’s Point, Igiugig, Koliganek, Lime Village, Manokotak, and New Stuyahok) stand out in their extensive harvest of a broad range of wildlife resources.

Table 20
Bristol Bay 17 Communities – Number of Subsistence Species Used
By Community and Ethnicity

Community	Household's Ethnicity									
	Non-Native					Native				
	Number of Species Used					Number of Species Used				
	0-8	9-13	14-17	18-24	25-59	0-8	9-13	14-17	18-24	25-59
	Row%	Row%	Row%	Row%	Row %	Row%	Row%	Row%	Row%	Row%
Aleknagik	80%	0%	0%	20%	0%	15%	30%	22%	19%	15%
Clark's Point	0%	0%	0%	0%	0%	0%	9%	9%	36%	46%
Igiugig	0%	0%	0%	0%	0%	0%	33%	8%	17%	42%
Iliamna	50%	50%	0%	.0%	0%	22%	22%	44%	11%	0%
King Salmon	47%	35%	6%	9%	3%	40%	13%	7%	27%	13%
Kokhanok	0%	0%	0%	0%	0%	20%	31%	23%	14%	11%
Koliganek	0%	0%	0%	0%	0%	7%	4%	18%	43%	29%
Levelock	0%	0%	0%	0%	0%	23%	15%	23%	23%	15%
Lime Village	0%	0%	0%	0%	0%	0%	14%	29%	14%	43%
Manokotak	.0%	0%	40%	40%	20%	9%	11%	16%	30%	34%
Naknek	26%	22%	11%	26%	15%	21%	13%	25%	25%	17%
New Stuyahok	0%	0%	0%	0%	0%	10%	20%	14%	27%	29%
Newhalen	0%	0%	.0%	0%	0%	24.%	32%	16%	12%	16%
Nondalton	0%	100 %	0%	0%	0%	30%	35%	5%	16%	14%
Pedro Bay	0%	0%	50%	50%	0%	38%	38%	25%	0%	0%
Port Alsworth	47%	29%	18%	6%	0%	20%	20%	20%	20%	20%
South Naknek	0%	50%	50%	0%	0%	16%	26%	16%	26%	16%
Total	38%	28%	12%	16%	6%	17%	21%	18%	23%	21%

Harvest Quantities

Alaska Native households, on a per capita basis, harvest about twice (Table 21) the salmon and nearly two and a half times the total of all wildlife resources (Table 22) when compared to non-Native individuals in the region. A typical U.S. individual would consume slightly over 200 pounds of meat, fish, and poultry products in a year, almost all of which is purchased.

Table 21
Bristol Bay 17 Communities – Per Capita Harvest Wildlife Resources by Ethnicity

	Alaska Native Individuals	Non-Native Individuals
Per Capita Salmon Harvest	289.4 lbs.	153.1 lbs.
Per Capita Harvest – All Species	481.3 lbs.	203.4 lbs.

Table 22
Bristol Bay 17 Communities - Average Household Harvest in Pounds
Various Resource Categories by Ethnicity

Harvest in Pounds - Wildlife Species	Native	Non-Native	% Difference in Harvest
Salmon Harvested	956	553	58%
Finfish Harvested	126	41	33%
Shellfish Harvested	6	8	130%
Big Game Harvested	316	89	28%
Small Game Harvested	13	5	35%
Caribou Harvested	117	34	29%
Moose Harvested	186	39	21%
Marine Mammals Harvested	39	3	7%
Birds and Eggs Harvested	32	3	9%
Plants and Berries Harvested	100	23	23%
All Resources Harvested	1590	732	46%

The big differences in consumption between Alaska Native and non-Native households in Bristol Bay occur in the salmon, finfish, and big game categories. In addition, non-Native families consume almost no marine mammals, or wild birds or their eggs. Of course, Non-Native households have almost no legal access to marine mammals, unless these resources are gifted to them. It is key to realize that Alaska Native households, which average slightly under four household members, would have to replace a considerable proportion of their diet should their access to wildlife resources be interrupted. Animal protein, given shipping and other expenses, is extremely expensive to purchase in small rural communities. For example, to replace their salmon consumption by purchasing store-bought meat at \$7.50/lb would be \$7,500 for a typical family. As we shall see in a later section, average household income for Alaska Native families in the Bristol Bay region is a little under \$40,000. So the replacement cost for salmon would be about 20% of their total household budget. The average household income for non-Native families is nearly \$70,000. Replacement cost for non-Native households would be slightly over \$4,000, which represents about 6% of their total household budget. Of course, at this point, none

of these calculation currently fold into the budgetary impacts to household income from commercial fishing losses should salmon populations face substantial impacts.

Pie charts 3 and 4 below graphically illustrate dietary dependence on the harvest of wildlife resources. Nearly three quarters of all non-Native household harvest of wildlife resources is salmon.

Chart 3
Bristol Bay 17 Communities – Ave. Pounds of Harvest by Resource Type
Alaska Native Households (Total = 1,590 lbs.)

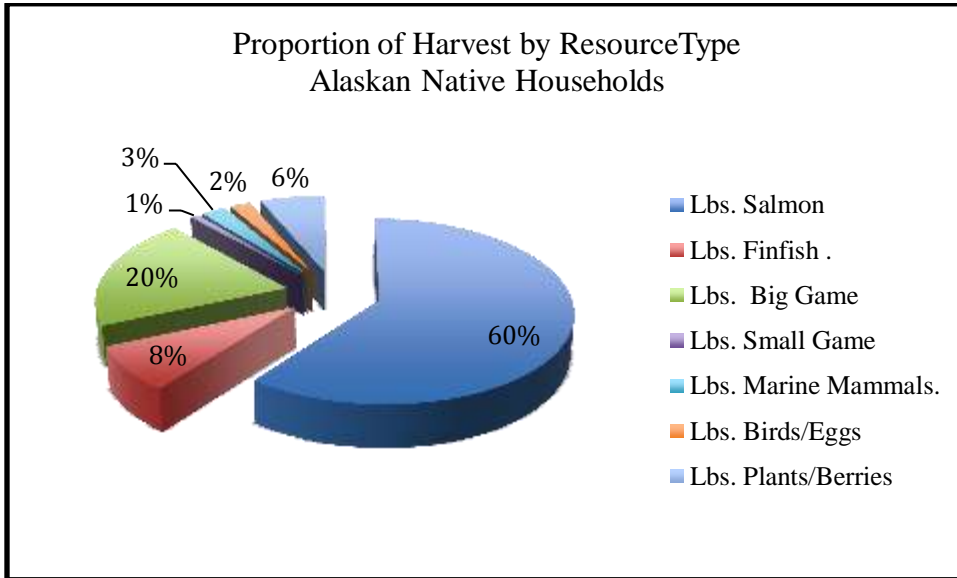


Chart 4
Bristol Bay 17 Communities – Ave. Pounds of Harvest by Resource Type
Non-Native Households (Total = 732 lbs.)

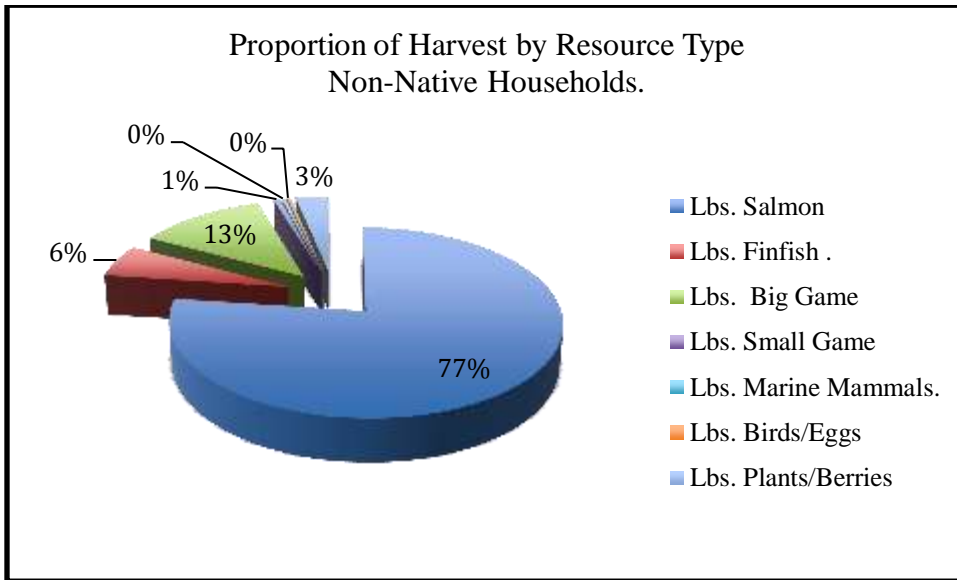


Table 23 and Table 24 illustrate the household dependency on total wildlife harvests by community and ethnicity. Table 23 shows that the majority of the harvesting for the households of the three communities with substantial non-Native households (King Salmon, Naknek and Port Alsworth) is less than 500 pounds of wildlife resources.

Table 24 deals with Alaska Native households by community. As one might expect the six communities identified as harvesting the widest diversity of wildlife species - Clark's Point, Igiugig, Koliganek, Lime Village, Manokotak, and New Stuyahok - also harvest large amounts of wildlife resources. Interestingly, however, we now add the communities of Kokhanok, Newhalen and Nondalton, and their species range, while somewhat attenuated, also harvest large amounts of fewer species.

Table 23
Bristol Bay 17 Communities – Non-Native Households
Harvest Distributions by Community

Community	Recode of Total Lbs. Harvested by Household											
	0-121 lbs.		122-473 lbs.		494-1077 lbs.		1078-2223 lbs.		2224+ lbs.		Total	
	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
Aleknagik	0	0%	3	60%	1	20%	1	20%	0	0%	5	100%
Clark's Point	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Igiugig	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Iliamna	0	0%	0	0%	3	75%	1	25%	0	0%	4	100%
King Salmon	16	47%	9	27%	4	12%	4	12%	1	3%	34	100%
Kokhanok	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Koliganek	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Levelock	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Lime Village	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Manokotak	0	0%	3	60%	1	20%	1	20%	0	0%	5	100%
Naknek	9	33%	8	30%	8	30%	1	4%	1	4%	27	100%
New Stuyahok	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Newhalen	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Nondalton	0	0%	0	0%	1	100%	0	0%	0	0%	1	100%
Pedro Bay	0	0%	1	50%	0	0%	0	0%	1	50%	2	100%
Port Alsworth	3	18%	8	47%	5	29%	1	6%	0	0%	17	100%
South Naknek	0	0%	1	50%	1	50%	0	0%	0	0%	2	100%
Total	28	29%	33	34%	24	25%	9	9%	3	3%	97	100%

Table 24
Bristol Bay 17 Communities – Alaska Native Households
Harvest Distributions by Community

Community	Recode in Five Intervals of Total Lbs. Harvested by Household											
	0-121 lbs.		122-473 lbs.		494-1077 lbs.		1078-2223 lbs.		2224+ lbs.		Total	
	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
Aleknagik	4	15%	4	15%	8	30%	6	22%	5	19%	27	100%
Clark's Point	0	0%	1	9%	2	18%	3	27%	5	45%	11	100%
Igiugig	2	17%	2	17%	1	8%	3	25%	4	33%	12	100%
Iliamna	1	11%	0	0%	0	0%	6	67%	2	22%	9	100%
King Salmon	9	60%	0	0%	1	7%	4	27%	1	7%	15	100%
Kokhanok	4	11%	3	9%	7	20%	5	14%	16	46%	35	100%
Koliganek	2	7%	3	11%	2	7%	10	36%	11	39%	28	100%
Levelock	2	15%	4	31%	2	15%	4	31%	1	8%	13	100%
Lime Village	1	14%	1	14%	0	0%	3	43%	2	29%	7	100%
Manokotak	8	15%	14	25%	13	24%	10	18%	10	18%	55	100%
Naknek	14	29%	11	23%	14	29%	5	10%	4	8%	48	100%
New Stuyahok	9	18%	7	14%	4	8%	10	20%	19	39%	49	100%
Newhalen	1	4%	2	8%	3	12%	9	36%	10	40%	25	100%
Nondalton	5	14%	5	14%	11	30%	7	19%	9	24%	37	100%
Pedro Bay	3	19%	3	19%	6	38%	3	19%	1	6%	16	100%
Port Alsworth	2	40%	1	20%	1	20%	1	20%	0	0%	5	100%
South Naknek	6	33%	6	33%	2	11%	4	22%	0	0%	18	100%
Total	73	18%	67	16%	77	19%	93	23%	100	24%	410	100%

Sharing

About 40% of non-Native households in the Bristol Bay sample give away no subsistence resources. This is about twice the proportion of Alaska Native households who give away no subsistence resources. Of those households that do share subsistence resources, all but one Non-Native household (i.e., 99%) share less than 8% (.08) of the total available resource species (Table 25). In contrast, more than a quarter of the Alaska Native households share 8% (.08) or more of the available subsistence resources. Although the total of available resources varies by community, i.e., coastal communities usually have access to a greater number of resources, the total number of resources (as enumerated on the ADF&G questionnaire) available to any one community is about 125, so 8% represents about 10 species of fish (salmon, finfish), mammals (moose or caribou), marine invertebrates, berries, and so forth.

Table 25
Bristol Bay 17 Communities – Percent of Subsistence Species
Given Away by Ethnicity

Percent of Available Resource Species Given Away	Household's Ethnicity			
	Non-Native		Native	
	Count	Column %	Count	Column %
.00	36	37.1%	68	16.9%
.01	6	6.2%	33	8.2%
.02	16	16.5%	44	10.9%
.03	9	9.3%	37	9.2%
.04	1	1.0%	32	7.9%
.05	13	13.4%	25	6.2%
.06	8	8.2%	26	6.5%
.07	6	6.2%	16	4.0%
.08	1	1.0%	22	5.5%
.09	0	.0%	11	2.7%
.10	0	.0%	20	5.0%
.11	0	.0%	8	2.0%
.12	0	.0%	10	2.5%
.13	0	.0%	10	2.5%
.14	0	.0%	3	.7%
.15	0	.0%	6	1.5%
.16	0	.0%	3	.7%
.17	0	.0%	6	1.5%
.18	0	.0%	3	.7%
.19	1	1.0%	6	1.5%
.20	0	.0%	3	.7%
.21	0	.0%	2	.5%
.23	0	.0%	3	.7%
.24	0	.0%	1	.2%
.26	0	.0%	1	.2%
.27	0	.0%	2	.5%
.28	0	.0%	1	.2%
.31	0	.0%	1	.2%
Total	97	100.0%	403	100.0%

Table 26, below, indicates that far more households receive (are gifted) subsistence resources than give them away. Whereas, about 40% of the non-Native households did not give away resources, this proportion drops to less than a quarter for the reception of wildlife resources. On the Alaska Native household side, the proportion of non-givers, at around 17%, drops to 6% for the proportion of recipients. This means that more than 80% of non-Native households and nearly 95% of Alaska Native households are gifted wildlife resources (most often fish) by some other households in their community. What these variables do not measure is the amount of subsistence resources that are shared.

Table 26
Bristol Bay 17 Communities – Percent of Subsistence Species
Received by Ethnicity

Percent of Available Resource Species Received	Household's Ethnicity			
	Non-Native		Native	
	Count	Column %	Count	Column %
.00	23	23.7%	25	6.2%
.01	5	5.2%	25	6.2%
.02	17	17.5%	54	13.3%
.03	14	14.4%	48	11.9%
.04	7	7.2%	34	8.4%
.05	8	8.2%	31	7.7%
.06	7	7.2%	41	10.1%
.07	4	4.1%	23	5.7%
.08	6	6.2%	17	4.2%
.09	3	3.1%	19	4.7%
.10	0	.0%	21	5.2%
.11	0	.0%	9	2.2%
.12	0	.0%	12	3.0%
.13	0	.0%	6	1.5%
.14	0	.0%	9	2.2%
.15	1	1.0%	8	2.0%
.16	0	.0%	5	1.2%
.17	2	2.1%	2	.5%
.18	0	.0%	4	1.0%
.19	0	.0%	3	.7%

Table 26
Bristol Bay 17 Communities – Percent of Subsistence Species
Received by Ethnicity (continued)

Percent of Available Resource Species Received	Household's Ethnicity			
	Non-Native		Native	
	Count	Column %	Count	Column %
.20	0	.0%	2	.5%
.22	0	.0%	3	.7%
.23	0	.0%	1	.2%
.26	0	.0%	2	.5%
.30	0	.0%	1	.2%
Total	97	100.0%	405	100.0%

The ADF&G, given time constraints and an already extensive questionnaire, often find it difficult to ascertain the amount of subsistence shared. In addition, documenting sharing networks requires an additional module to the questionnaire and an increased burden on community respondents. However, several ADF&G studies in other parts of the state have addressed the issue of sharing networks in great detail. The results of this research and a more detailed consideration of the importance of sharing in Alaska Native and rural American culture will be contained in the second and final report in this series. In general, this other research indicates that considerable quantities of wildlife resources are shared between households in rural communities. In these rural communities, and especially among Alaska Native households, about 70% of the resources gifted are harvested by about 30% of the households. The research also indicates that non-Native households tend to be recipients and that Alaska Native households tend to share a far greater amount of a wider variety of resources than do their non-Native congeners.

Although the issue of sharing subsistence resources will be addressed in much greater detail in the next deliverable, Table 27 seems to suggest an expected pattern. For Alaska Native households, priority in sharing subsistence resources first goes to the elderly and then to households headed by younger women or other individuals who lack active harvesters in their household. Nearly three-quarters of households headed by younger non-Native women receive little if any subsistence resources, while nearly 80% of Alaska Native households headed by younger women with their children receive high numbers of subsistence species.

Households with older Alaska Native women (61+) receive by far the highest amount of subsistence species, with nearly 80% of these households receiving 10-40 different species. In contrast, no non-Native household with elderly females receives this amount, although as Table 28 indicates, the sample size is quite small for this cohort.

Table 27
Bristol Bay 17 Communities – Percent of Total Species Received
By Ethnicity and Age of Female Household Head

Female Household Head Age and Ethnicity			% of Total Species Received									
			0		.01 -.02		.03 -.05		.06 -.10		.11 - .33	
			Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %
19-35	Ethnicity	Non-Native	8	47%	4	24%	2	12%	3	18%	0	0%
		Native	4	6%	17	25%	26	39%	16	24%	4	6%
36-45	Ethnicity	Non-Native	5	21%	6	25%	8	33%	5	21%	0	0%
		Native	7	8%	23	28%	22	27%	20	24%	11	13%
46-50	Ethnicity	Non-Native	1	9%	4	36%	3	27%	3	27%	0	0%
		Native	4	8%	10	21%	12	25%	16	33%	6	13%
51-60	Ethnicity	Non-Native	3	19%	3	19%	6	38%	4	25%	0	0%
		Native	3	4%	10	15%	20	29%	24	35%	12	17%
61+	Ethnicity	Non-Native	1	20%	2	40%	2	40%	0	0%	0	0%
		Native	0	0%	3	5%	14	22%	25	39%	22	34%

Table 28, below indicates there are only 5 non-Native female household heads 61+, whereas there are 54 Alaska Native Households headed by women 61+. Of these 54 Alaska Native households 47 (87%) receive substantial numbers of subsistence species while none of the non-Native female 61+ households receive this high proportion of subsistence species.

Table 28
Bristol Bay 17 Communities – Distribution by Age of Female Household Heads
(or Spouses) by Household Ethnicity

Age	Non-Native Female Household Heads	Alaska Native Female Household Heads
19-35	17	67
36-45	24	83
46-50	11	49
51-60	16	69
61+	5	54
Total	73	323

Income

A more detailed analysis of the potential impacts to income and employment to Bristol Bay households from the establishment of the Pebble mine will be demonstrated in the next deliverable. However, Tables 29 through 33 and Charts 5 through 8 provide a substantial descriptive picture of the economic characteristics of households in Bristol Bay. As a standard for comparison, the median income for households in Anchorage in 2009 was about \$73,000, while the per capita income was about \$33,500. The mean household income in Anchorage was an astounding \$87,500, but some truly wealthy households skew this figure so we will use the “median” for our comparisons. Similar parameters for the state of Alaska show a median household income of \$67,000 and a per capita income of around \$29,000.

Table 29
Bristol Bay 17 Communities – Per Capita Income
by Ethnicity

	Alaska Native Individuals	Non-Native Individuals	Percent Difference*
Per Capita Wage Income	\$8,776.	\$17,433	50%
Per Capita Unearned Income	\$3,234	\$1,705	190%
Total Per Capita Income	\$11,901	\$19,138	62%

*% difference= Alaska Native Per capita/non-Native per capita

In summary, the following tables and charts indicate that Alaska Native households in Bristol Bay have slightly more than half the incomes of Anchorage households and about 60% of a typical statewide Alaska household. Non-Native households do slightly better than the typical Alaska household and slightly worse than an Anchorage household. This of course does not factor in the higher cost of living for households in the Bristol Bay region, where fuel and energy costs and access to retail stores and so forth are quite restricted. Some indices have the cost of living in rural Alaska twice that of Anchorage.

In addition, these summary parameters disguise some other economic disparities both for Alaska Native and non-Native households. For example, Alaska Native per capita income in Bristol Bay is about \$12,000, is only about 40% of the per capita income for Alaska as a whole. Non-Native individuals have only about two-thirds the per capita income of a typical Alaskan. Finally, slightly more than 9% of households in Alaska are below the poverty level (Anchorage = 7.6%). Bristol Bay households, using incomes measured earlier than these parameters and thus may be a slight overestimation of the actual proportion by no more than 5% has dramatically different proportions. Nearly 40% of Alaska Native households are below the poverty threshold and nearly 18% of non-Native households find themselves in a similar situation (see Table 33).

Table 30
Bristol Bay 17 Communities – Average Household Income by Source and Ethnicity

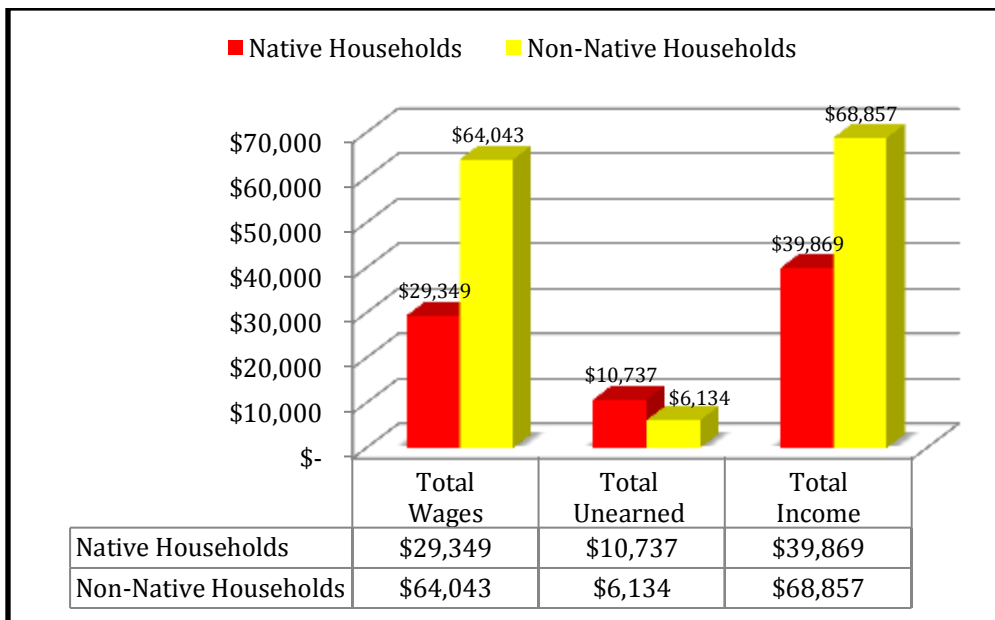
Source of Income	Native Households	Non-Native Households
Total Wages	\$29,349	\$64,043
Income - Entitlements (AFDC,APA)	\$2,551	\$495
Income - Dividends (PFD, Longevity)	\$5,283	\$3,247
Income - Retirement (including Soc. Sec.)	\$2,826	\$2,305
Total Amount of Unearned Income	\$10,737	\$6,134
Total Earned & Unearned Income	\$39,869	\$68,857
Approximate Number of Households (n).	410	97

Notes:

- AFDC = Aid to Families with Dependent Children
- APA = Adult Public Assistance
- PFD = Alaska Permanent Fund Dividend

Chart 5, below graphically illustrates the considerable contrast in wage income between Alaska Native and non-Native households. In addition, non-Native total household income is more than 40% greater the Alaska Native households.

Chart 5
Bristol Bay 17 Communities – Average Household Wage, Unearned & Total Income by Ethnicity



As noted in Table 31, below, while two-thirds of non-Native households have incomes greater than \$44,000, nearly 60% of Alaska Native households have incomes of less than \$44,000. In addition, as indicated in charts 6 and 7 below, non-Native households depend on wage income for more than 90% of their total income, whereas Alaska Native households have a greater dependence on entitlements and other sources of unearned income. Non-wage sources of income often provide a steady source of cash in extended families, which helps support these households where wage income is seasonal or part-time. In current national economic circumstances, state and national programs that provide transfer payments can also be brittle in the sense that they seldom keep pace with inflation and are at the funding whim of political and budgetary forces far beyond local control.

Table 31
Bristol Bay 17 Communities – Distribution of Total Household Income by Ethnicity

Total Household Income	Household's Ethnicity					
	Non-Native		Native		Total	
	Count	Column%	Count	Column%	Count	Column%
\$0-13,000	15	15.6%	85	20.8%	100	19.8%
\$13,001-26,000	5	5.2%	95	23.3%	100	19.8%
\$26,001-44,000	12	12.5%	94	23.0%	106	21.0%
\$44,001-73,000	28	29.2%	73	17.9%	101	20.0%
\$75,001+	36	37.5%	61	15.0%	97	19.2%
Total	96	100.0%	408	100.0%	504	100.0%

Chart 6
Bristol Bay 17 Communities – Alaska Native Households
Proportion of Total Household Income by Source (Total = \$39,869)

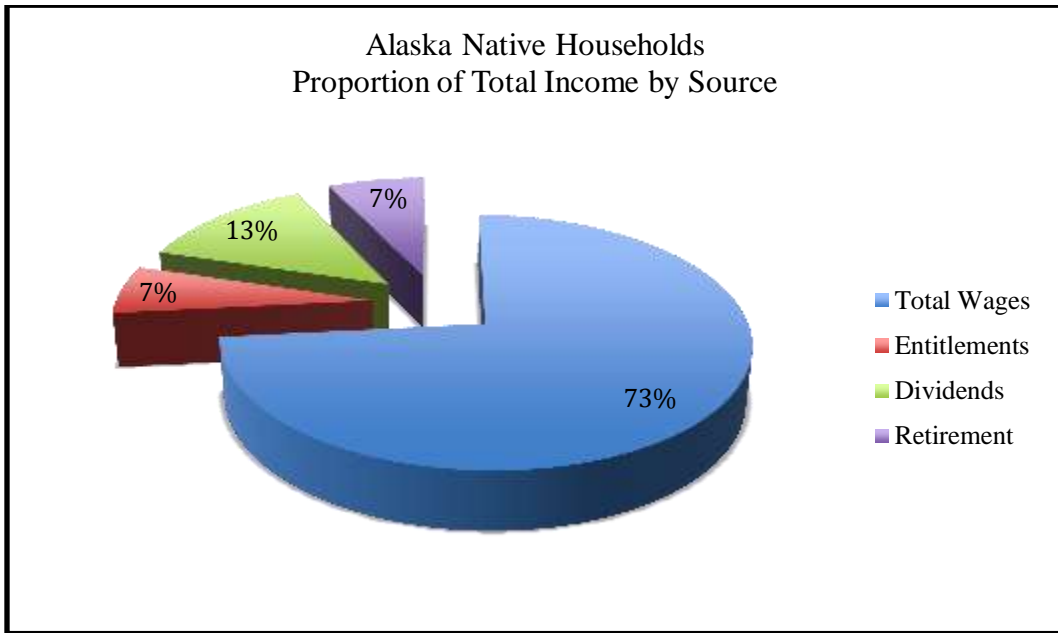
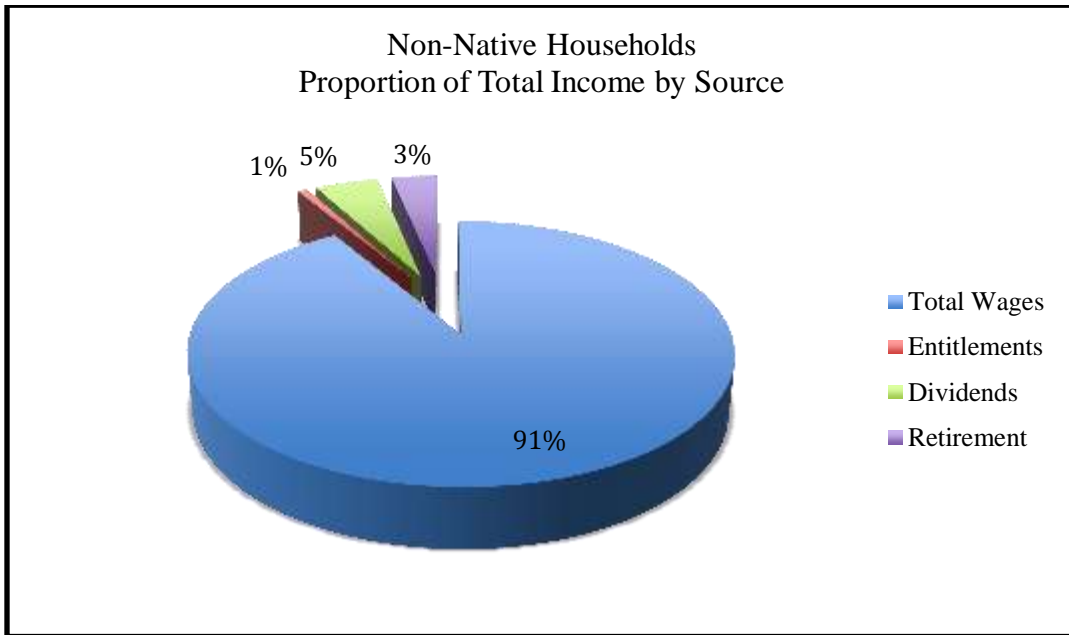


Chart 7
Bristol Bay 17 Communities – Non-Native Households
Proportion of Total Household Income by Source (Total = \$68,857)



As Table 32, below indicates the eight communities identified either as harvesting a wide diversity of wildlife species (Clark’s Point, Igiugig, Koliganek, Lime Village, Manokotak, and New Stuyahok - and/or also harvesting large amounts of wildlife resources - Kokhanok, Newhalen and Nondalton) have, with the exception of Manokotak, modest household incomes, with the vast majority of their households falling in the first three columns (i.e., with household incomes of less than \$44,000). These communities with the highest dependence on wildlife resources, while at the same time having the most modest of backup financial resources, are most likely to suffer substantial impacts should the Pebble mine, in a variety of ways, limit their access to wildlife resources. Analysis of this topic is one of the primary subjects of the next report.

Table 32
Bristol Bay 17 Communities – Distribution of Total Household Income by Community

Community	Recode of Total Household Income					
	\$0-13,000	\$13,001-26,000	\$26,001-44,000	\$44,001-73,000	\$75,001+	Total
	Count	Count	Count	Count	Count	Count
Aleknagik	3	11	5	7	6	32
Clark's Point	9	0	0	1	1	11
Igiugig	4	3	2	2	1	12
Iliamna	1	3	1	3	5	13
King Salmon	4	2	7	9	27	49
Kokhanok	6	10	13	5	1	35
Koliganek	7	6	8	4	3	28
Levelock	5	2	4	3	0	14
Lime Village	3	1	2	1	0	7
Manokotak	10	6	19	18	7	60
Naknek	19	9	10	15	21	74
New Stuyahok	9	20	11	3	4	47
Newhalen	2	3	8	6	6	25
Nondalton	7	16	7	7	0	37
Pedro Bay	2	4	3	6	3	18
Port Alsworth	3	2	5	7	5	22
South Naknek	6	2	2	4	7	21

Poverty Threshold

Table 33 shows the number of households below the poverty threshold (for a household of their size) highlighted in yellow. Alaska Native household counts are in parenthesis.

We have sufficient economic data to determine poverty levels for a total of 507 households out of 510. Out of the 507 households in this table, 409 were Alaska Native and 98 were non-Native. Of the 507 households captured in the Table 33 below, 35.5% (180 households) were below the poverty line. Of the 409 Alaska Native households, 162 or 39.6% were below the poverty line, while 18/98 non-Native households, or 18% were below the poverty line. Given that households were interviewed over a five-year period and the thresholds are from only a one-year period (2008) these proportions may overestimate Alaska Native rates at the time of their interview by a maximum of 5% and the non-Native rate by 2%.

Table 33
Bristol Bay 17 Communities – Household Size by Poverty Threshold
All Households

Household Income by Poverty Level	Recode Household Size for Poverty Comparison								
	1	2	3	4	5	6	7	8	9+
	Count	Count	Count	Count	Count	Count	Count	Count	Count
0-13,530	34 (30)	31 (27)	10 (8)	15 (11)	7 (7)	5 (5)	0	1 (1)	1
13,351-18,210	12	7 (7)	11 (10)	8 (8)	1 (1)	2 (2)	1 (1)	0	0
18,211-22,890	10	7	6 (6)	5 (5)	1 (1)	3 (3)	1 (1)	0	0
22,891-27,570	5	7	5	7 (7)	3 (3)	2 (2)	1 (1)	0	0
27,571-32,250	2	5	4	5	1 (1)	1 (1)	1 (1)	1 (1)	2 (2)
32,251-36,930	5	6	7	5	7	2 (1)	2 (2)	2 (2)	1
36,931-41,610	4	5	7	4	0	3	2 (2)	0	2 (2)
41,611-46,290	2	7	1	7	4	1	2	0	0
46,291-50,970	1	3	1	0	0	2	1	0	0
50,971-55,650	3	2	3	6	3	2	1	1	0
55,651-60,330	1	5	2	4	1	1	0	1	1
60,331-65,010	3	1	3	3	0	1	1	1	0
65,011+	9	35	23	19	20	13	8	1	2
Total	91	121	83	88	48	38	21	8	9

Employment

The description of the employment profile for the 17 communities in Bristol Bay is complex. Table 34 below is derived from the Demographic Master File, where each row of 174 variables in the data matrix represents an individual person. However, using a script within the SPSS program, many of these details are aggregated and transferred to the Household Master File. The intent of this transfer is to take advantage of the much more comprehensive information within the household file that contains extensive variables on harvest, income, and population characteristics.

Table 34 shows age in five-year intervals and provides some numerical standard as to who could be in the workforce. Utilizing the discussion of dependency ratios mentioned in an earlier section, we subtract the 0-14 years of age cohort and those individuals 65+. This leaves 244 non-Native individuals and 835 Alaska Native individuals 15-64 years of age (see Table 35). Now there are some difficulties with this breakdown of age cohorts. We could have used the age interval 18-64, however we chose not to for two reasons: 1) there are Alaska Native individuals 15-19 who are in the workforce (usually as crew members on commercial fishing boats) and 2) to be consistent with the standard worldwide dependency ratios discussed earlier in this report.

Also, we recognize that there are a number of individuals 65+ who are still in the workforce, and many 15-64 who are not (perhaps for reasons of school attendance or health etc.).

So of the 1633 individuals in this sample for which we have both age and ethnicity data, about 900 (actual 896) are in the workforce in some capacity. Table 34 shows the distribution of individuals in five-year intervals by ethnicity. Table 35 summarizes Table 34 and shows the breakdown of the population into traditional “workforce” (15-64) and “dependency” cohorts (0-14 & 65+).

Table 34
Bristol Bay 17 Communities – Age Breakdown by Ethnicity
Demographic Master File

Age Recoded in 5yr. Intervals	Ethnicity		Total
	Non Native	Alaska Native	
0-4	18	101	119
5-9	26	102	128
10-14	38	151	189
15-19	19	167	186
20-24	9	86	95
25-29	17	64	81
30-34	23	81	104
35-39	36	77	113
40-44	26	95	121
45-49	38	108	146
50-54	35	61	96
55-59	26	63	89
60-64	15	33	48
65-69	8	40	48
70-74	7	23	30
75-79	1	25	26
80-84	0	7	7
85+	0	7	7
Total	342	1291	1633

Table 35
Bristol Bay 17 Communities – Summary of Age Distribution into
“Workforce” and “Dependency” Cohorts

	Non-Native Individuals	Alaska Native Individuals
0-14 years of age	82	354
65+ years of age	16	102
Sub-total	98	456
Individuals 15-64	244	835
Total	342	1291

Table 36 is derived from Tables 34 and 35 above, and from additional statistical runs not included in this report. Essentially, this table reconciles the 15-64 “labor force” status between that reported in the Household Master File with Tables 34 and 35, which are derived from the Demographic Master File. In addition, the final row in Table 36 calculates the unemployment rate by ethnicity. If these rates seem unrealistically low, this is partially due to a definitional outcome. Anyone reporting any employment during the year was coded as employed. However, as indicated in Table 37, the majority of Alaska Native employment was part-time or seasonal (“irregular”) and perhaps “underemployment,” rather than “unemployment” characterizes the Alaska Native demographic.

Table 36
Bristol Bay 17 Communities – Workforce Status of Individuals by Ethnicity

	Non-Native Individuals	Alaska Native Individuals
Individuals in workforce Table x.1	189	707
Adults Unemployed	16	56
Adults not in workforce	3	32
15-19 not working/missing information*	~36	~40
Sub-total	~55	~128
Total	~244	~835
Formal % Unemployment	16/189=8.5%	56/707=7.9%

*Derived from tables not included in this report.

Essentially Table 37 shows that about 60% of all non-Native employment is full time, with the other 40% of the workforce employed either as part-time or seasonal work. These proportions are reversed for Alaska Native individuals, where only 40% have found or have chosen to work a full-time job.

Table 37
Bristol Bay 17 Communities – Work Schedule of Employed Adults
by Ethnicity

Work Schedule		Ethnicity		Total
		Non-Native	Alaska Native	
Full Time (35+hrs)	Count	115	224	339
	% Ethnicity	60%	32%	38%
Part Time (<35hrs)	Count	36	212	248
	% Ethnicity	19%	30%	28%
Irregular (Comm. fish)	Count	38	260	298
	% Ethnicity	21%	38%	34%
Total	Count	189	707	896
	% Ethnicity	100%	100%	100%

Employment by Sector

Table 38 clearly demonstrates the dependence of Alaska Natives on employment in local government and commercial fishing as the two most critical industrial sectors, and accounts for over 70% of all their employment. These two sectors, as will be developed in the next report, are also extremely vulnerable to the impacts of industrial mining. Non-Native employment is concentrated in three industrial sectors: local government, transportation, communication and utilities, and services which also account for about 70% of all non-Native employment. Note that these sample results do not include data from Dillingham, which is the community hub for the region and its results might strongly affect the generalizations made in this section.

Table 38
Bristol Bay 17 Communities – Demographic Master File Employment by
SIC (recoded) and Ethnicity

Standard Industrial Classification	Non-Native Total SIC	Alaska Native Total SIC	Total SIC
Federal Government	27	40	67
State Government	15	28	43
Local Government	69	345	414
Agriculture, Forestry & Fishing	27	210	237
Mining	0	11	11
Construction	8	26	34
Manufacturing	2	14	16
Transportation, Communication & Utilities	48	35	83
Retail Trade	3	25	28
Finance, Insurance & Real Estate	1	5	6
Services	71	63	134
Total	271	802	1073

Note:

SIC = Standard Industrial Classification

Note that the totals differ between Table 38 above and Table 39 below. These discrepancies are the result of coding, programming and data entry incongruities between the various waves of survey research. The five Standard Occupational Classification (SOC) categories highlighted in the Alaska Native column account for about 70% of all employment. The three SOC codes highlighted under the non-Native column account for slightly less than 50% of all their employment. Note the high dependence on fishing occupations for Alaska Natives which is not reflected in non-Native employment; although, non-Natives employed in the fishing industry have, on average, substantially higher incomes.

Table 39
Bristol Bay 17 Communities – Demographic Master File
SOC by Ethnicity

Standard Occupational Classification.	Non-Native Total SOC.	Alaska Native Total SOC	Total SOC
Executive, Administrative, and Managerial	30	81	111
Engineers, Surveyors and Architects	2	0	2
Natural Scientists and Mathematicians	5	1	6
Social Scientists, Social Workers, Religious Workers and Lawyers	10	13	23
Teachers, Librarians, and Counselors	31	62	93
Health Diagnosing and Treating Practitioners	3	10	13
Registered Nurses, Pharmacists, Dietitians, Therapists and PAs		3	3
Writers, Artists, Entertainers, and Athletes	1	9	10
Health Technologists and Technicians	1	12	13
Technologists and Technicians, Except Health	9	6	15
Marketing and Sales Occupations	3	27	30
Administrative Support Occupations, Including Clerical	17	56	73
Service Occupations	41	127	168
Agricultural, Forestry, and Fishing Occupations	13	234	247
Mechanics and Repairers	15	27	42
Construction and Extractive Occupations	8	36	44
Precision Production Occupations	2	20	22
Production Working Occupations		3	3
Transportation and Material Moving Occupations	19	42	61
Handlers, Equipment Cleaners, Helpers, and Laborers	10	88	98
Military Occupations		2	2
Miscellaneous Occupations		4	4
Total	220	863	1083

Notes:

PAs – physicians' assistants

SOC = Standard Occupational Classification

Wage Income

A brief discussion of wage income was included in the introductory paragraphs to the income section. What is most striking about Table 40 is the great disparity between Alaska Native and non-Native wage income, with Alaska Native households, on average, receiving less than half

the wage income of non-Native households. Of more concern, as indicated in Table 41, is that these discrepancies occur in the same occupational categories.

In the most important employment industries for Alaska Natives their income is one-third that of non-Natives in fishing and less than half in local government and services. Table 42 and Chart 8, below, details these differences by ethnicity for each Standard Industrial Classification (SIC) code.

There may be a number of reasons for these discrepancies, including differentials in education, high proportions of part-time and seasonal employment, and the skill set and experience required for higher paid administrative and technical positions. The data set contains the specific name of most occupations for each individual, but they have not been included here for reasons of time and concerns about anonymity; although, details from this variable may be included in the next report should a reasonable way (i.e., through re-aggregation) be found to protect anonymity. An interesting aspect of Table 41 is the results from the mining sector. All ten jobs in this sector are held by Alaska Natives with remuneration slightly better on average than fishing. However, the fishing sector accounts for nearly two million dollars in revenue (for the sample, the amount for the regional population will be considerably higher) while mining currently provides about \$150,000 in income.

Table 40
Bristol Bay 17 Communities – Total Wage Income by Ethnicity

	Average Wage Income	Sum of Wage Income
Non-Native Household	\$64,043	\$6,084,130
Alaska Native Household	\$29,349	\$11,944,930
Total		\$18,052,060

Table 41
Bristol Bay 17 Communities – Household Master File
Wage Income by SIC Sector and Ethnicity
Number of Households/Ave. Wage/%Wages Per Sector

SIC Jobs Sector	Non-Native					Alaska Native				
	Count	Column %	Ave Wage	Sum Wages	% Wages per Sector	Count	Column %	Ave. Wage	Sum Wages	% Wages per Sector
Fishing	10	9%	\$42,562	\$425,626	8%	133	25%	\$14,112	\$1,876,993	21%
Mining	0	-	-	-	-	10	2%	\$15,179	\$151,789	2%
Construction	5	5%	\$44,250	\$221,253	4%	29	6%	\$15,622	\$453,049	5%
Cannery (Food)	0	-	-	-	-	7	1%	\$31,500	\$220,500	2%
Trans./Comm./Util.	19	17%	\$65,810	\$1,250,407	24%	22	4%	\$30,863	\$678,999	8%
Trade	9	8%	\$28,695	\$258,262	5%	38	7%	\$8,393	\$318,960	4%
Finance/Insur./RE.	0	-	-	-	-	5	1%	\$30,271	\$151,357	2%
Services	20	18%	\$34,615	\$692,308	13%	47	9%	\$16,678	\$783,884	9%
Federal Govt.	14	13%	\$62,660	\$877,253	17%	19	4%	\$25,481	\$484,154	5%
State Govt.	10	9%	\$49,486	\$494,865	10%	15	3%	\$9,238	\$138,577	2%
Local Govt. Admin.	16	15%	\$45,998	\$735,981	14%	152	29%	\$20,043	\$3,046,605	34%
Local Govt. Educ.	6	6%	\$32,686	\$196,120	4%	49	9%	\$15,242	\$746,870	8%
Total	109	100%		\$5,152,079	100%	526	100%		\$9,051,742	100%

Finally, Table 41 and Chart 8 also provide the sum total of wages for each SIC code an aggregation that will prove useful for the analysis should the initiation of the Pebble mine have a substantial impact on salmon fisheries in the region. For example, loss of income from commercial fishing and canneries (\$2.5 million in the ADF&G sample), plus the replacement cost of subsistence salmon (well above \$5 million for just the 17 communities included in this report), may make it difficult to justify the mine on strictly economic terms for local residents.

Table 42
Bristol Bay 17 Communities – Average Wage Income by Ethnicity
and Proportion of Non-Native/Alaska Native Income by SIC Sector

Jobs Sector	Non-Native Ave. Wage	Alaska Native Ave. Wage	%Native/Non-Native
Fishing	\$42,562.68	\$14,112.73	33%
Mining		\$15,179.00	
Construction	\$44,250.73	\$15,622.39	35%
Cannery (Food)	-	\$31,500.00	-
Trans./Comm./Util.	\$65,810.91	\$30,863.59	47%
Trade	\$28,695.87	\$8,393.71	29%
Finance/Insur./RE.	-	\$30,271.53	-
Services	\$34,615.42	\$16,678.39	48%
Federal Govt.	\$62,660.98	\$25,481.81	41%
State Govt.	\$49,486.50	\$9,238.49	19%
Local Govt. Admin.	\$45,998.87	\$20,043.46	44%
Local Govt. Educ.	\$32,686.67	\$15,242.25	47%

Chart 8
Bristol Bay 17 Communities – Average Wage Income by Sector and Ethnicity

