U.S. Army Corps
of Engineers
Alaska District

Economic Value of Subsistence Activity
Little Diomede, Alaska

Main Report

Prepared by:

ResourceEcon
Stephen R. Braund & Associates
Dr. Steve J. Langdon
Tetra Tech, Inc.

December 2011

Under contract to:

TETRA TECH, INC.
1420 5th Avenue,
Suite 550 Seattle, WA 98101

This page intentionally left blank.

TABLE OF CONTENTS

CHAPTER 1. INTRODUCTION 1

1.1 BACKGROUND 1
1.2 STUDY GOALS 2
1.3 STUDY APPROACH 3
1.4 COMMUNITIES SELECTED FOR THIS STUDY 4
1.4.1 Diomede 4
1.4.2 Wales 5
1.5 ORGANIZATION OF THIS REPORT 7

CHAPTER 2. SUBSISTENCE LITERATURE SEARCH AND REVIEW 11

2.1 INTRODUCTION 11
2.2 SCREENING CRITERIA 11
2.3 KEYWORDS 12
2.4 RESULTS 13

CHAPTER 3. KEY COMPONENTS AND ELEMENTS OF SUBSISTENCE 15

3.1 INTRODUCTION 15
3.2 KEY SUBSISTENCE ELEMENTS AND COMPONENTS 15
3.2.1 Economic Element 15
3.2.2 Social Element 16
3.2.3 Cultural Element 24
3.2.4 Nutritional Element 29

CHAPTER 4. A NEW DEFINITION OF SUBSISTENCE 33

4.1 INTRODUCTION 33
4.2 EXISTING SUBSISTENCE DEFINITIONS 33
4.3 SUBSISTENCE DEFINITIONS – BROAD CONSENSUS 37
4.4 CORPS SUBSISTENCE DEFINITION AND SUBSISTENCE ELEMENTS 42
4.5 PROPOSED DEFINITION OF SUBSISTENCE 42

CHAPTER 5. REVIEW AND SELECTION OF VALUATION METHODS 45

5.1 INTRODUCTION 45
5.2 SUBSTITUTE VALUATION METHODS 46
5.3 EXPANDING THE VALUATION OF SUBSISTENCE 48
5.4 SELECTION OF THE PRODUCTION COST METHODOLOGY 49
5.5 NON-USE BENEFITS OF SUBSISTENCE PRODUCTION IN THE MIXED-SUBSISTENCE COMMUNITY 52
5.6 APPLICATION OF THE PRODUCTION COST METHODOLOGY FOR DIOMEDE AND WALES 53

CHAPTER 6. COMMUNITY SUBSISTENCE SURVEY 55

6.1 INTRODUCTION 55
6.2 PROJECT PLANNING AND COMMUNITY APPROVAL 55
6.3 FIELDWORK DESIGN 56
6.4 IDENTIFYING AND CONTACTING HOUSEHOLDS 57
6.5 INTERVIEW METHOD 58

CHAPTER 7. ANALYSIS OF COMMUNITY DATA – SUMMARY OF RESULTS 63

7.1 POST-FIELD DATA PROCESSING 63
7.2 FIELDWORK SUMMARY 65

TABLE OF CONTENTS *(continued)*

7.3 SURVEY RESULTS AND ESTIMATES OF SUBSISTENCE VALUATION USING PRODUCTION COSTS....66
7.4 APPLICATION OF THE SUBSISTENCE VALUATION TO CORPS OF ENGINEERS BENEFIT/COST ANALYSES....73
7.5 INTERPRETATION OF THE SURVEY RESULTS – CONCLUSIONS FROM THE PRODUCTION COST ANALYSIS....73
Introduction....73
7.5.1 Availability of Market Goods....74
7.5.2 Technology, Tools, and Infrastructure....74
7.5.3 Harvest Methods....75
7.5.4 Availability of Subsistence Resources....75
7.5.5 Community Cohesiveness....75
7.5.6 Results....75

CHAPTER 8. APPLYING THE SUBSISTENCE VALUATION APPROACH AND FRAMEWORK TO OTHER COMMUNITIES....77

8.1 APPLICABILITY OF STUDY RESULTS TO OTHER ALSAKA DISTRICT PROJECTS....77
8.1.1 Approach A – Apply Framework to Develop Subsistence Valuation for a Community....77
8.1.2 Approach B – Adapt Results of an Existing Application of Framework to a new Community....78
8.2 CONSIDERATIONS FOR DETERMINATION OF APPROACH FOR SUBSISTENCE VALUATION IN OTHER ALASKAN COMMUNITIES....79
8.2.1 Extent of Community Participation in Subsistence....79
8.2.2 State of Alaska Standard Criteria....80
8.2.3 Geography....82
8.2.4 Socioeconomic and Demographic Conditions....82
8.2.5 Resource Availability....83
8.3 APPLYING SUBSISTENCE ACTIVITY VALUATION IN COMMUNITIES OUTSIDE ALAKSA....84
8.3.1 Introduction....84
8.3.2 Subsistence Valuation research Recommendations....85

CHAPTER 9. REFERENCES NOT PART OF APPENDIX 1....87

LIST OF APPENDICES

Appendix 1: Annotated Subsistence Bibliography
Appendix 2: Agency Disclosure Notice and Data Collection Protocol used for Valuing Subsistence Production in Diomede and Wales
Appendix 3: Subsistence Valuation Data from Community Surveys in Diomede and Wales
Appendix 4: Marine Economics Data Sheet Example
Appendix 5: Diomede and Wales Spreadsheet Valuation Tool

LIST OF TABLES

Table 3-1: Economic Element: Key Components of Subsistence 16
Table 3-2: Social Element: Key Components of Subsistence 17
Table 3-3: Contribution of Low, Middle, and High Third of Households to Annual Wild Food Harvests 24
Table 3-4: Cultural Element: Components of Subsistence....25
Table 3-5: Nutritional Element: Components of Subsistence 30
Table 7-1: Subsistence Production Variables 64
Table 7-2: Wales and Diomede Household Summary 66
Table 7-3: Summary of Subsistence Valuation from Production Costs in Diomede and Wales....70
Table 7-4: Summary of Production Value of Subsistence in 2010 72

LIST OF FIGURES

Figure 3-1: Subsistence Production and Distribution in Wales 19
Figure 3-2: Subsistence Networks in Wales 20

LIST OF ACRONYMS AND ABBREVIATIONS

ANILCA	Alaska National Interest Lands Conservation Act
CPI	Cost of Living Index
Corps	U.S. Army Corps of Engineers
IWC	International Whaling Commission
MEDS	Marine Economics Data Sheets
NED	National Economic Development
OMB	Office of Management and Budget
SLICA	Survey of Living Conditions in the Arctic
SPSS	Statistical Package for the Social Sciences
SRB&A	Stephen R. Braund and Associates
TK	Traditional Knowledge

CHAPTER 1.
INTRODUCTION

1.1 BACKGROUND

The U.S. Army Corps of Engineers (Corps) has a Civil Works mission to assist in the study and implementation of water resources projects throughout Alaska as well as the rest of the country. The Corps utilizes an evaluation procedure to assess the respective benefits and costs to the nation from development of a proposed project. Typically, Corps water resources projects require a benefit-cost analysis to show benefit to the nation as a result of the proposed project. If the benefit-cost analysis for a project does not show a sufficient net benefit to the nation, it is difficult to obtain Corps approval and recommendation for Federal funding of project implementation. Guidelines for economic analyses for the Corps are summarized in the Corps' Engineering Regulation 1105-2-100 (Corps 2000).

Over the past 20 years, the Alaska District Corps has routinely included evaluation of the subsistence benefits of proposed water resources projects, such as port and harbor navigation improvements, in rural communities in Alaska where subsistence benefits comprise an important portion of overall project benefits or are a significant consideration for the local community.

The economic evaluation methodology applied in past Alaska District Corps projects has included the following steps:

1. Identify and characterize without project level of subsistence production in affected community
2. Determine the increase in subsistence production in the community that is likely to occur, should the proposed project be completed:
3. Determine the 'shadow' price for locally-purchased food items that are purchased and consumed in the community. This is typically accomplished through a market-basket cross section analysis of substitute food items available in the community. Economic analysts recognize that subsistence food products are nutritionally and culturally preferred

to the purchased substitute food products, but there is no functioning market to purchase subsistence products in Alaska.

4. The import substitution value of the increased subsistence production is valued at the average per pound value of the market-basket of substitute food products.

In valuing subsistence production using substitute value, economic analysts have recognized the shortcomings of this approach. Subsistence foods are culturally and nutritionally preferred to the next best available source: food purchased from stores. In addition, there are other important social benefits from subsistence harvest, preparation, and consumption that are not captured through use of the substitute cost methodology.

To further their understanding of and foster a more inclusive approach to the economic valuation of subsistence in Alaskan communities, the Alaska District Corps contracted with Tetra Tech Inc. (Tetra Tech) to assemble a team of Alaska-experienced professional cultural anthropologists and economists and undertake the *Economic Value of Subsistence Activity, Little Diomede, Alaska* study documented in this report. The team assembled for this study included Tetra Tech senior economists/planners/managers Ridge Robinson and David Broadfoot, and three highly qualified sub-consultants – Stephen R. Braund and Associates (SRB&A), Dr. Steve J. Langdon (Head of Anthropology Dept. University of Alaska, Anchorage), and James Richardson of ResourceEcon. The primary focus of the study was the development of a subsistence evaluation framework, including a prototype model framework, which could be applied by the Alaska District Corps for future water resources projects to help evaluate the economic and social benefits of the range of subsistence activities in a community.

1.2 STUDY GOALS

This study had two primary goals: (1) to assist the Alaska District Corps in providing data on the value of subsistence for the community of Diomede; and (2) to develop a better and more equitable method for determining the economic value of subsistence that could be applied to evaluate the impacts on subsistence activities and values from the proposed changes (e.g., future water resource projects such as proposed port and harbor projects) identified in the study. An underlying goal for the study was to further the understanding of the role and importance of

subsistence activity in Alaska communities by establishing a working definition of subsistence and explanations of how the various elements and components of subsistence function and interrelate. It was intended that the approach, data, and subsistence evaluation framework developed in this study could also be applied (with appropriate modifications) to other communities in Alaska and elsewhere who substantially engage in subsistence activities.

The Alaska District Corps is currently studying the feasibility of a project to increase marine access through development of a small boat harbor or similar infrastructure in the community of Diomede, Alaska. Diomede has limited employment opportunities, and relies almost totally on subsistence foods they harvest and process for food their families consume. To address the goals of this study, the study team developed an estimate of the existing value of subsistence production in Diomede using the new method developed. To further evaluate the applicability of the method to other Alaska communities, subsistence valuation was also performed using the same method for Wales, Alaska.

1.3 STUDY APPROACH

During the initial phases of this study, the study team conducted a series of meetings to discuss their combined anthropological/economic perspectives on subsistence valuation, and to determine the best approach for achieving the study goals. It was decided that the following approach would be taken in the study:

1. Conduct a literature search and review of existing available subsistence documents;
2. Identify the elements and components of subsistence based on the literature review;
3. Develop a definition of subsistence that includes all elements and components of subsistence;
4. Create a matrix to review the various methods for valuing the elements and components of subsistence;
5. Identify the components of subsistence that can be valued based on available data (or with data that can be collected);
6. Develop a methodology to collect data and estimate the cost of subsistence production that could be applied to other regions with appropriate modifications.

1.4 COMMUNITIES SELECTED FOR THIS STUDY

Based on the current feasibility study in progress, the vital importance of subsistence to the local community, and interest by the feasibility study's local sponsor, Kawerak (the regional non-profit corporation for the Bering Straits Region), this current study focuses primarily on the community of Diomede (population 115). However, the study team decided that the project should also include another similar community in the same region for comparative purposes. Originally, the study team had intended on including Gambell or Savoonga on St. Lawrence Island as potential study communities. However, following the literature review and after further discussion with the study team members and the Corps, it was decided that the community of Wales (population 145) would be included for analysis because of its size, proximity to Diomede, and similar dependency upon subsistence for their economy and way of life. These two selected communities are briefly described in the following paragraphs.

1.4.1 Diomede

The village of Diomede is located on the smaller of the two Diomede Islands in the Bering Strait. The larger island, Big Diomede (also known as Ratmanof), is Russian territory, and the passage between the islands also marks the International Date Line. Diomede, and nearby Fairway Rock are American possessions. The Iñupiaq name for the village on Little Diomede has been represented in a number of ways by European and American explorers, including Ignalook, Ingulikh and Ingalik (Baker 1906; Dall 1881; Ellanna 1983b). At the time of contact the Diomede Islands were key middlemen in trade between Siberia and Alaska, occupying a geographically central location in the Bering Straits trade routes then traveled by Iñupiat, Siberian Yupik and Chukchi traders who traveled in a grand circle to trade at fairs such as at Sheshalik in Kotzebue Sound (Nelson 1899; Dall 1881; Ray 1975). Diomede men hunted whales, seals, and walrus from the islands and could travel to the mainland for caribou and other subsistence foods. Fishing and bird hunting and gathering were undertaken by both genders from the island (Ellanna 1983a). Diomede people were closely related to other Bering Straits area groups including those at Cape Prince of Wales, King, Sledge, and St. Lawrence islands, and villages in Siberia. These groups also fought wars, wore armor to protect themselves in combat and some lived in fortified villages to defend themselves (Nelson 1899).

Diomede's trade advantages were challenged by Yankee Whalers who brought novel and valuable goods for trade directly to villages and trade fairs, offered employment in commercial whaling with payment in goods, and saturated local markets with traditional trade items and manufactured goods from burgeoning industrial cities on the East Coast of the United States and from markets world-wide. Immediately prior to World War II, the Soviet Union began building an airfield on Big Diomede and began excluding Diomede residents from their traditional travel and trade locations in the Bering Straits, including Big Diomede where walrus hauled out on the beach and two related villages were located (Burg 1952; Life 1940). During the Cold War, the members of Diomede's National Guard unit were the front line of defense, while the Big Diomede residents were forcibly relocated to Naukan on the Siberian coast (Jolles 2006).

The U.S. Census found 115 residents on Diomede in 2010, 92 percent of whom were Alaska Native. Diomede remains primarily a Iñupiaq community. The economy of Diomede is largely based on subsistence hunting and harvesting, with residents relying heavily on locally available resources such as seals, walrus, polar bear, sea birds, eggs, crabs, and vegetation. Local sources of employment include the school, the small local store, the post office, and tribal and city governments. Transportation to the island is limited to boat and helicopter in the ice-free months, and helicopter and plane (when the ocean is firm enough for an air strip) during the winter months. Recently, passenger service to and from the island was limited due to mechanical problems with the helicopter and therefore a number of residents were stuck on or off the island for many months.

1.4.2 Wales

Located near the end of Cape Prince of Wales, the modern village of Wales grew from what was one of the largest known Iñupiat villages in Northwest Alaska, Kingigamiut. The village was an amalgamation of several smaller affiliated settlements with two groups located on either side of a creek below the mountain that makes up Cape Prince of Wales; the Kigiataanaimiut or "people in front" on the north side of the stream and the Agianaimiut or "people opposite" on the south side (Magdanz, Utermohle, and Wolfe 2002). Geographically the community was ideally situated to intercept migrating sea mammals as they cycled north and south with the ice pack as well as

acting as middlemen for trade originating in Siberia with the Chukchi both directly and through intermediaries such as the Diomede Island people (Magdanz, Utermohle and Wolfe 2002).

Commercial whalers rapidly depleted local stocks of marine mammals, which impeded traditional trade as well as causing privation for subsistence marine mammal hunters, although some authors dispute this (Ellanna 1983b; Jackson 1894; Ray 1975). In 1860 (some accounts claim 1877) the Kingigamiut attacked a whaling ship; soon after whalers no longer visited there (Olsen 1969; Ray 1975). In 1890, a mission and school were established to provide education, health care and training for the Kingigamiut. Increased harvests of caribou to feed whalers and natural cycles of caribou abundance created a food crisis the Bureau of Education solved by importing reindeer and herders from Siberia in 1892 to Port Clarence, with the intention of training Kingigamiut to become herders themselves (Jackson 1894; Ray 1975). This was a problematic undertaking in some respects as it subverted the existing relationships between the Siberians, the Diomeders, and the Kingigamiut (Stern, Arobio, Naylor, and Thomas 1980). In 1893 Harrison Thornton, missionary in charge at Wales, was murdered by three Kingigamiut men with a whaling bomb gun, and the Siberian reindeer herders left for home soon after (Olson 1969; Ray 1975). In 1894 Wales received 118 reindeer from Port Clarence for use in training the Kingigamiut (Jackson 1894). Reindeer herding would develop in the Wales vicinity with a structure much like the traditional social order that already existed as wealthy umialiq families accumulated the largest herds, with one distinction: the Saami herders who replaced the Siberians in the task of training Iñupiat herders were themselves paid in reindeer and competed with the Iñupiat herders (Olson 1969).

The arrival of prospectors following the Klondike Gold Rush in 1899 provided a market for reindeer products, but further shifted the economic center of the region to new centers at St. Michaels, Nome, and Kotzebue (Magdanz, Utermohle, and Wolfe 2002). With the rush of people moving into the area for the Gold Rush came a number of diseases new to the Kingigamiut, and epidemics in 1900 and 1918 would devastate the Native population of the region; Wales' population dropped from 337 in 1910 to 136 in 1920, with some sources indicating only 98 people left alive in Wales after the epidemic hit on Christmas Eve, 1918 (Fortuine 1992; Stern et al. 1980). Missionaries buried the dead in a mass grave and created new families from the

survivors (Griest 2006). Reindeer herding during the period following the epidemics was a source of controversy as non-Native reindeer herders competed with Native herders for range land on the Seward Peninsula, with annual government inspections culminating in the Reindeer Act of 1937, which ended non-Native ownership of reindeer by 1940 (Stern et al. 1980).

Wartime demand for meat in Nome and other locations where defense activity was initiated before and during World War II created markets for reindeer. These activities also provided numerous opportunities for comparatively easy and more remunerative work in construction and operation of defense facilities (Stern et al. 1980). After World War II several families relocated to Nome. In 1950 the last reindeer herd at Wales was lost (Olson 1969; Stern et al. 1980). During the Cold War military facilities were constructed near Wales and at nearby Tin City, and some residents were briefly employed during construction phases of the projects. As the population continued to recover whaling was resumed in 1970, landing the first whale since the 1918 flu epidemic (Durham 1979; Ellanna 1983b). In 1973 a Wales family resumed reindeer herding, and a herd is still managed there today (Alaska Department of Community and Regional Affairs 2011).

According to the U.S. Census, there were 145 residents in Wales in 2010, occupying 43 households. Eighty-five percent of 2010 Wales residents were Alaska Native. The primary sources of employment in Wales are through local government and the local school. As noted above, one family continues to maintain a reindeer herd in Wales. Wales residents actively hunt and harvest subsistence resources throughout the year, focusing on marine mammals (seals, walrus, whales), fish, clams, land mammals (moose, muskox, furbearers), birds, and vegetation.

1.5 ORGANIZATION OF THIS REPORT

In addition to this Introductory Chapter (Chapter 1), the remainder of this report is presented in the following eight chapters and five appendices:

- Chapter 2 – Subsistence Literature Search and Review. This chapter discusses the literature search and review of available subsistence-related documents.

- Chapter 3 – Key Elements and Components of Subsistence. This chapter describes the main elements and components comprising subsistence, and the relative value each provides to those communities who engage in these activities.
- Chapter 4 – A New Definition of Subsistence. This chapter describes the array of subsistence definitions currently in use by the Corps, other federal agencies, the State of Alaska, and others, and offers a new working definition of subsistence based on the literature review and key subsistence elements and components.
- Chapter 5 – Review and Selection of Valuation Methods. This chapter describes the review and selection process undertaken by the study team to determine the subsistence valuation methods that support the approach and framework being developed to reach the study goals.
- Chapter 6 – Community Subsistence Survey. This chapter discusses the steps taken in completing the community subsistence survey at Diomede and Wales, including logistics planning and preparations; design, development and testing of the survey instrument and methods; and the on-site implementation of the survey.
- Chapter 7 – Analysis of Community Data and Summary of Results. This chapter presents a discussion of the processing, compilation, and evaluation of the results from the on-site community surveys in Diomede and Wales.
- Chapter 8 – Applying the Subsistence Valuation Approach and Framework to Other Communities. This chapter provides an overview of the usefulness to the Corps Alaska District of the subsistence valuation approach and framework developed in this study in evaluating other potential projects in Alaska. Also discussed are caveats and possible coefficients (e.g., geographic location, population, ethnic composition, environmental variation) that would need to be considered in applying this subsistence valuation approach and framework to other communities within and outside Alaska.
- Chapter 9 – References not part of Appendix 1. This chapter lists those documents used in preparing this report that were not included in the list of subsistence-related documents reviewed in this study presented in Appendix 1.
- Appendix 1 – Presents an annotated bibliography of the 127 subsistence-related documents reviewed in this study.

- Appendix 2 – Presents the community survey protocol, protocol guide, and interview forms used to conduct the community surveys at Diomede and Wales.
- Appendix 3 – Presents an expanded version of Table 7-3, showing Subsistence Valuation Data compiled from the surveys in Diomede and Wales.
- Appendix 4 – Presents a Marine Economics Data Sheet Example.
- Appendix 5 – Presents the Diomede and Wales Spreadsheet Valuation Tool developed in this study.

This page intentionally left blank.

CHAPTER 2.
SUBSISTENCE LITERATURE SEARCH AND REVIEW

2.1 INTRODUCTION

In preparation for the development of a subsistence evaluation framework, the study team carried out a comprehensive literature review of relevant subsistence literature focusing on, but not limited to, subsistence related publications by federal agencies. More than 200 subsistence-related documents were reviewed during this current study. Although many of the documents referenced subsistence they were more generalized and did not provide a substantive discussion of its components or attributes.

2.2 SCREENING CRITERIA

A set of screening criteria was developed to guide the selection of literature to review for the study. Any literature that related to one or more of the screening criteria was considered eligible to be included in the annotated bibliography. The screening criteria also served to create a list of relevant key words that was used to organize the literature review and later used to search and review the annotated bibliography as well as create a working definition of subsistence. The screening criteria are as follows:

- Definition of subsistence.
- Subsistence species (specific to Diomede and Saint Lawrence Islands [Gambell and Savoonga]).
- Subsistence products (handicrafts, food, clothing, boats).
- Subsistence activities (procurement/harvesting, processing, distribution/sharing, preparation, and consumption).
- Trade, customary trade and/or barter.
- Celebrations, ceremonies, feasts, rituals.
- Cultural and religious meaning and values.

- Traditional knowledge associated with subsistence uses and activities (includes oral traditions, knowledge of resources and the environment, myths, histories, personal experiences).
- Methodologies to value subsistence (valuation).
- Operational constraints to subsistence activities.
- Technologies/tools (boats, snowmachines, sleds, outboard motors, rifles, bird decoys).
- Infrastructure (cellars, cabins, platforms, bird blinds, trap lines).
- Subsistence roles (*umialik* [boat captain], *umialik's* wife, crew member, skin sewer, hide splitter, fish processor, hunter).
- Social and kinship relations.
- Cognitive mindsets for perceptions, stamina, and dealing with difficult situations.
- Key words for communities: Gambell, *Sivuqaq*, Savoonga, Diomede, *Inalik*, Diomede, St. Lawrence Island.

2.3 KEYWORDS

As the literature review progressed, the following keywords were developed and entered under each citation as appropriate:

- Subsistence definition.
- Subsistence species.
- Subsistence products.
- Subsistence activities.
- Trade.
- Subsistence celebrations and ceremonies.
- Cultural values of subsistence.
- Subsistence traditional knowledge.
- Subsistence technologies.
- Subsistence infrastructure.
- Subsistence roles.
- Social and kinship relations.

- Cognitive mindsets.
- Subsistence valuation.
- Nutrition.
- Gambell.
- Savoonga.
- Diomede.

2.4 RESULTS

Appendix 1 presents an annotated bibliography of the 127 documents that met the screening criteria, published over a 50 year time period. These documents include impact assessments, journal articles, statutes and regulations, reports, books, web pages, government documents, doctoral dissertations, conference proceedings, technical reports, and court hearings.

The annotated bibliography contains abstracts and keywords that describe the relevant concepts of subsistence identified in each document. These relevant concepts were used in identifying the key elements and components comprising subsistence activity presented in Chapter 3, and in creating the proposed new definition of subsistence presented in Chapter 4.

This page intentionally left blank.

CHAPTER 3.
KEY COMPONENTS AND ELEMENTS OF SUBSISTENCE

3.1 INTRODUCTION

Using the information gleaned from the literature review and from further discussion, the study team was able to identify and describe the key elements and components comprising subsistence. These key elements and components of subsistence are discussed in the following paragraphs and summarized in Tables 3-1 to 3-5.

3.2 KEY SUBSISTENCE ELEMENTS AND COMPONENTS

Based on the results of the literature review and in-depth discussion, the study team identified economic, social, cultural, and nutritional as the four primary elements of subsistence, and further identified and defined the key components comprising each element. In the case of the social, cultural, and nutritional elements, the individual components were further described in order to provide more context to the meanings and importance of these less quantitative components. The four elements are not mutually exclusive; examples may pertain to more than one element. Within a typical Alaska Native community, the four primary elements and associated components function together as a subsistence culture. Although this study is in the context of Alaska Native communities, the approach, methodologies and evaluation framework presented can be applied to other communities within and outside Alaska who engage substantially in subsistence activity.

3.2.1 Economic Element

The economic element of subsistence focuses on procurement and exchange of resources and production of those resources into goods such as food, clothing, or tools in a non-market system. Today's subsistence exists in a mixed cash-subsistence economy. This system has no middlemen or permanent locations or structures set aside for the exclusive purpose of exchanging goods. Capital gained from participating in the cash economy may be used to further the subsistence economy (i.e., purchasing tools, transportation, infrastructure), and occasionally subsistence

resources or labor are converted to capital; however capital accumulation is not a primary motivator of subsistence activities (Usher et al. 2003). As Usher et al. (2003) notes, well-being in subsistence-based societies is "more associated with system maintenance than individual gain." Table 3-1 provides a list of the key components that comprise the economic element of subsistence.

Table 3-1: Economic Element: Key Components of Subsistence

Economic Component	Examples
Procurement	Harvests of wild renewable resources
Production	Food, clothing, shelter, fuel, construction, home goods, arts and crafts, containers, sleds, tents, skin boats
Distribution	Sharing, *Ningiq* (obligatory sharing practice), product division, exchange, customary trade, barter, selling for cash to maintain subsistence practices,
Technologies/Tools	Boats, snowmachines, sleds, outboard motors, rifles, bird decoys
Infrastructure	Cellars, cabins, platforms, bird blinds, trap lines
Mixed Cash-Subsistence Economy	Part time employment and transfer payments/dividends used to further subsistence pursuits, one partner participates in subsistence while the other partner works for wages, sale of arts and crafts for cash
Source: Tetra Tech study team, 2011	

3.2.2 Social Element

The social element of subsistence includes roles and activities that range from one individual with a special role, to groups of people, to whole communities. While many subsistence activities revolve around kin relationships, social components of subsistence also include friendships, partnerships, fictive kin (e.g., adopted rather than inherited kinships), and villages. These relationships govern access to resources, organization of work, distribution and consumption of goods and services (including networks that often extend beyond individual communities to residents in other communities and states), and the celebration and enjoyment of life. Key in regards to the social element of subsistence is the passing of traditional knowledge through celebrations and ceremonies, education, and other subsistence activities for the purposes of cultural maintenance and reproduction. Table 3-2 presents the key components of the social

element of subsistence and examples. A more detailed discussion of the individual components of the social element of subsistence is presented following Table 3-2.

Table 3-2: Social Element: Key Components of Subsistence

Social Component	Examples
Organization	Kin relationships, clan membership, friendships, lineages, patron-client relationships, partnerships, fictive kin, political affiliations, *Qasgiq* (men's community house) membership, sharing networks
Celebration and Ceremonies	Funerals, potlatches (feasts or ceremonies, usually meant as memorials for the dead, during which food and other items are shared throughout the community) , marriages, *Nalukataq* (whaling festival), Native dances
Education	Child rearing, socialization, oral traditions, observation, developmental participation, mentoring, teaching, language
Special Roles	*Umialik* (literally "boat owner," but also referring to a man of wealth and power such as a whaling captain), active harvesters, financial sponsor, subsistence recipient, trading/hunting partnership
Source: Tetra Tech study team, 2011	

Organization Component

Community members practice subsistence activities systematically, organizing subsistence procurement and distribution activities through relationships that include friendships, kinships, partnerships, inter-community organizations (e.g., community whaling captains association) and intra-community organizations (e.g., the Alaska Whaling Captains Association). Kinship, meaning the institutionalized and terminologically identified system of designating relationships of descent and other recognized affiliations among persons, is the principal foundation for the organization of subsistence activity in Alaska Native communities. Among Iñupiaq (Diomede) and Yup'ik cultural practitioners it is constructed along bilateral and generational lines. A bilateral system is like the American kinship system; where the mother's and father's sides are equal. This type of kinship system is common in certain parts of Alaska, but in other places, matrilineal (tracing descent through the mother's side, particularly in Athabascan, Tlingit, and Haida societies.

Among the Iñupiaq, the basic unit is the "kindred" which is a flexible construct built around a marital couple that comprise a basic social unit of multiple households who engage in

subsistence activities, including production and distribution, as a unit (Burch 2005). Iñupiaq and Yup'ik villages have several such kindred units which consist of multiple households of persons who act collectively in regard to subsistence production and distribution. Recent research in northwest Alaska has demonstrated the nature of subsistence production and distribution using a methodology of network analysis. The research undertaken in Deering and Wales produced the following findings: "The hypothesis that subsistence food production occurred primarily within several identifiable 'subsistence networks' of cooperating household**s** was strongly supported" (Magdanz et al. 2002:72). Figures 3-1 and 3-2 illustrate subsistence production and distribution linkages between households in Wales as well as how the networks are organized on a kinship basis as kindreds.

Figures 3-1 and 3-2, while not described here in detail, illustrate the complex and interconnected nature of distribution and production networks in subsistence-based communities. The following aspects of the organization of subsistence production and distribution in the kinship networks of a subsistence community are represented in the two figures:

- Variability in the cooperative productive activities between households;
- Multigenerational composition of households and networks;
- Variation in subsistence production activity by household and network;
- Interconnections among the kindred networks although the external connections are much less intense that the internal connections;
- While kindreds are kinship based, there are variations in the manner in which they are connected;
- There are households outside networks which also receive distribution; and
- Elder and solitary individuals are also included in distribution.

Figure 3-1: Subsistence Production and Distribution in Wales

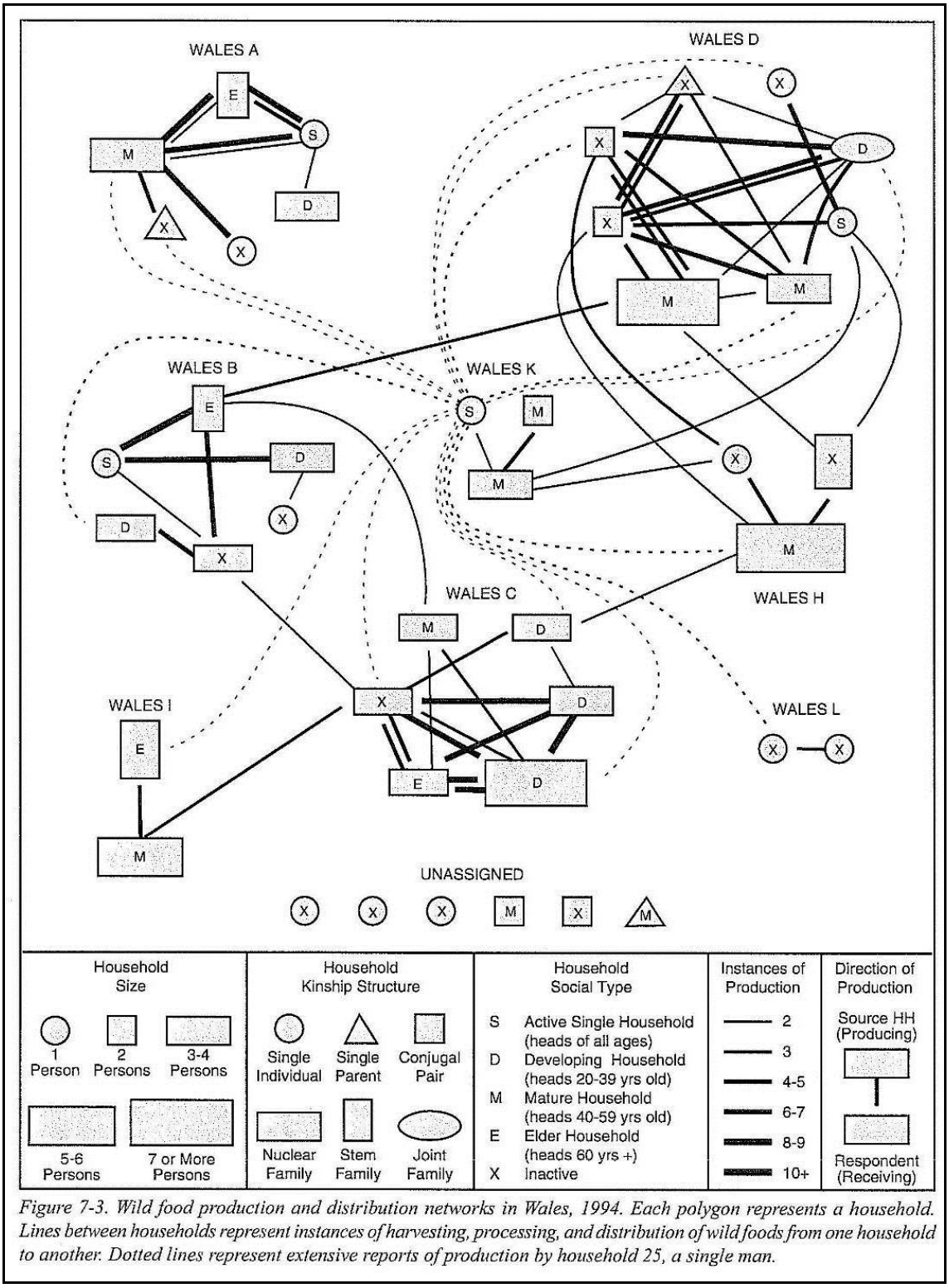

Figure 7-3. Wild food production and distribution networks in Wales, 1994. Each polygon represents a household. Lines between households represent instances of harvesting, processing, and distribution of wild foods from one household to another. Dotted lines represent extensive reports of production by household 25, a single man.

Source: Magdanz et al. 2002

Figure 3-2: Subsistence Networks in Wales

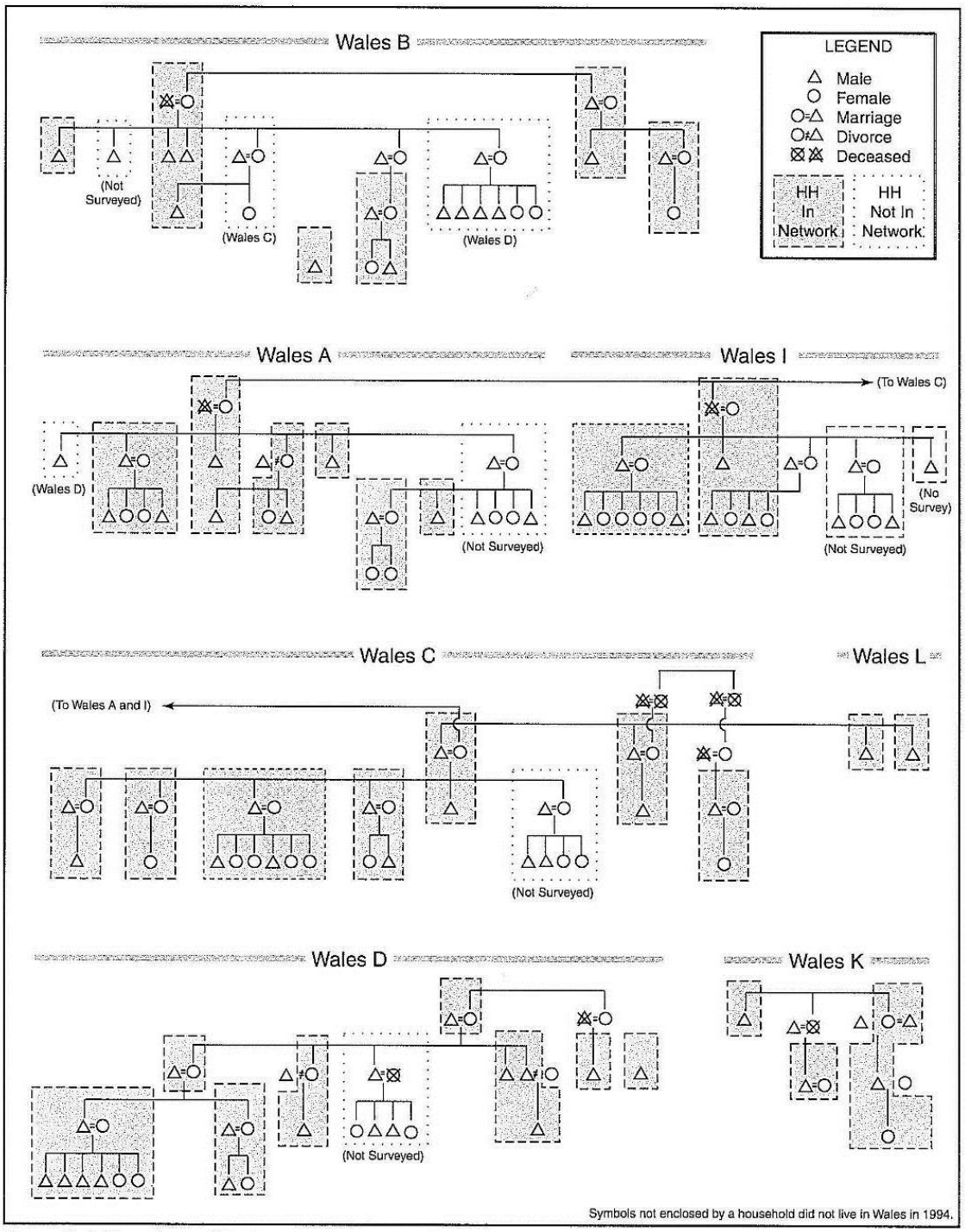

Figure 7-4. Kin relationships in subsistence networks, Wales 1994. In terms of kin relationships, production groups resembled traditional Iñupiaq local family organizations described by Burch (Chapter 3). Wales A was organized around parent-child relationships. Wales B, C, and D were organized around parent-child and sibling relationships.

Source: Magdanz et al. 2002

Celebrations and Ceremonies Component

Ceremonies and celebrations are a critical part of life in Alaska Native cultures and communities and they serve a variety of different purposes. A celebration or ceremony may exist to celebrate a particular subsistence activity or season. Such events can occur at various scales from that involving a few households to involvement of the entire community. A classic example of the latter in the Iñupiat is the celebration at the end of the whaling season known as *Nalukataq*. During this event, all the whaling captains and their crews who have captured bowhead whales during the previous season present themselves and portions of their catch on a designated ground where the entire community gathers. Each captain and crew provide *maqtaq* for the assembled community and the blanket toss is conducted as part of thanks to the whales as well as enjoyment of the people.

Other subsistence celebrations and ceremonies include *Kivgiq* (a winter messenger feast during which residents from North Slope communities gather to exchange goods and subsistence foods), the First Salmon ceremony (to celebrate the first salmon harvested), the Bladder Festival (a ceremony to ensure the return of the seal), potlatches to celebrate major community events or redistribute scarce resources throughout the community, and the tradition of a young hunter giving his first catch to an elder. These celebrations and ceremonies do not exist without subsistence activities and subsistence foods. In addition, subsistence foods have become an integral part of many holidays that originated in western societies (e.g., Thanksgiving, Christmas, and Easter). Ceremonies such as this have both a social and spiritual meanings as they are part of the cultural expression of the value of sharing and the importance of respectful relations (see cultural component - spirituality). Celebrations and ceremonies are not just a means of recreation; they are grounded in residents' personal and cultural identities. *Nalukataq* is done to ensure the future return of whales; likewise, this festival does not exist without the harvest of bowhead whales or geese (which whaling crews harvest for the feast after a successful bowhead whaling season). These celebrations and ceremonies are as important as Christmas or other holidays in western society and are irreplaceable; they sustain and perpetuate subsistence activities. Through collective celebrations and ceremonies, Alaska Native villages express and

generate their existence as social units beyond households and networks thereby recognizing their inescapable mutual interdependency.

Education Component

In a subsistence-based society, gaining proficiency in subsistence practices is akin to excelling at school in Western society. To earn such an education in a subsistence community, a child spends years with relatives learning the skills and knowledge necessary to properly hunt, harvest, process, and distribute subsistence foods. The transmission of the skills, attitudes and values necessary to sustaining subsistence communities is accomplished in various ways. In contrast to western education, in which students primarily listen and learn in a classroom environment, subsistence harvesters learn subsistence skills through watching and participating in subsistence activities. In general, the focus for technical training is on attentive observation, which is verbally reinforced, and on participation at what level one is able to, in the subsistence activities. Listening to stories of parents and elders has traditionally been another mechanism upon which transmission of culture has depended but is used less now than in the past. In addition to these two components, there may be formal instruction in specific types of activities and values under certain circumstances. For example, in Central Yup'ik villages, young men were brought into the *qasigih* (men's room) where they received formal pedagogical instruction on values, attitudes and appropriate behavior from elders. Also, among the Tlingit and Haida, uncles were responsible for the formal training of their nephews (sister's sons) and grandmother's and aunts for the training of young women during a seclusion ceremony. Similar methods of instruction continue in modern Alaska Native societies, in various forms. Bowhead whaling crews on the North Slope of Alaska include “boyers,” young men or boys who assist with basic duties and gradually learn the skills needed to participate in a bowhead whale hunt. Uncles continue to play a major role in young hunters’ education in Alaskan Native communities; Ongtooguk (2012) refers to such arrangements in Iñupiaq society as “apprenticeships.” Inculcation of cultural values is an important aspect of education through which the development of important cognitive mindsets occurs allowing those who successfully acquire the lessons to be valued and productive members of the society.

Special Roles Component

Individuals with particular subsistence roles are an integral part of subsistence-based communities. Examples of special subsistence roles include whaling captains, whaling captains' wives, active harvesters of specific subsistence resources (e.g., winter ringed seal hunters), skin sewers, and processers. Each of these roles supports the subsistence system by ensuring that the community harvests adequate subsistence resources and properly prepares, preserves, and distributes them throughout the community.

The bowhead whale hunt is an example of the importance of special roles. Whaling captains provide the equipment and financial means for their whaling crews to harvest bowhead whales, and whaling captains' wives and other female members of the community sew the skins for the boat, prepare clothing for the whaling crew members, ensure that the crew is fed, as well as multiple other tasks. Each member of a whaling crew has his own special role (harpooner, steersman, boyer), which ensures a successful harvest. Others wait on shore to help butcher, process, and cook the whale for the *Nalukataq* festival, as well as assist in community distribution following traditional, prescribed methods. Through their specialized skills, residents come together to support the community as a whole, provide community-wide food and cohesion, and ensure those who are unable to harvest subsistence foods have those traditional food provided for them.

While there are special technical skills involved in subsistence production, preservation and storage, there are also distinct special roles of leadership in communities that coincide with and are largely based on successful coordination and management in subsistence activities. Wolfe et al. note that "such high-status persons were capable of organizing members of the local group for effective subsistence enterprises like whale hunts or caribou drives" (2005: 4). These significant and important individuals/roles are often recognized with special terms. Among the Iñupiat, the term *umealiq* refers both to the owner of the large open skin boat used in various marine mammal hunting activities and also to a marital unit consisting of a man and his wife who jointly must undertake a wide variety of different behaviors to insure that subsistence production is successful now and seek to insure that subsistence production will be successful in the future (Bodenhorn 1990).

People who are recognized by such terms are often heads of mature, high-producing households that typically harvest and distribute large quantities of subsistence resources in their communities. Wolfe et al. (2005) have recently analyzed subsistence productivity across villages and ethnic groups in Alaska demonstrating that in general, a "30-70" rule operates, meaning that 30 percent of the households produce approximately 70 percent of total production. In fact, the percentages that those 30 percent of households provide are somewhat higher than the hypothesis. Table 3-3 (below) shows the proportion of harvest taken by approximately 30 percent of the households in the various ethnic regions of Alaska.

Table 3-3: Contribution of Low, Middle, and High Third of Households to Annual Wild Food Harvests

Culture Area (HHs)	Low Third	Mid Third	High third
Tlingit-Haida (N=567)	1.6%	16.7%	81.6%
Alutiiq (N=405)	4.1%	21.4%	74.5%
Aleut (N=251)	3.0%	16.8%	80.2%
Yup'ik (N=740)	5.2%	22.7%	72.1%
Iñupiat (N=402)	4.2%	21.5%	74.3%
Athabascan (N=335)	2.8%	17.5%	79.7%
All Areas (N=2,700)	3.8%	20.2%	76.0%
Source: Wolfe et al. (2005)			

3.2.3 Cultural Element

Culture as an element of subsistence is comprised of ethics and values, identities, spirituality, ideologies, traditional knowledge, and cognitive mindsets. Cultural elements of subsistence govern the relationship between Native people and their environment, the relationship of Native people to their past, the relationships among Native peoples, and the practice of subsistence as a way of life. Subsistence is a foundational element of group and individual identities, and forms the basis of Native spiritual beliefs. Cognitive mindsets, which include perceptions, stamina, and conceptions for dealing with difficult situations, guide individual or group behaviors that allow Native people to persist in subsistence activities. Table 3-4 describes the cultural components of

subsistence. Following Table 3-4 is a more in-depth discussion of the individual components of the cultural element of subsistence.

Table 3-4: Cultural Element: Components of Subsistence

Cultural Component	Examples
Ethics and Values	Sharing, cooperative behavior, group unity, respect for elders, appreciation for the harvester, reciprocity, participation in community life, satisfaction, enjoyment of natural environment and subsistence activities, group autonomy/self-determination
Identities	Individual and group cultural identity, traditional food and satisfaction of eating traditional foods, traditional dance and art, language
Spirituality	Beliefs about wild foods and their uses, wildlife have spirits, reciprocal relationship between wildlife and humans established through respectful treatment and attitude
Ideologies	Subsistence way of life representing ethnic identity, resistance to some forms of development
Traditional Knowledge	Knowledge of harvest locations, methods of harvesting, processing, and distributing resources, knowledge of wild resources and the environment, traditional place names
Cognitive Mindsets	Related to ideas of perception, stamina, and dealing with difficult situations, self esteem
Language	Ability to convey concepts not available in other languages, transfer of knowledge in indigenous language, importance of language in establishing identity, maintaining ties with ancestors and traditional practices, place names of important hunting and gathering locations
Source: Tetra Tech study team, 2011	

Ethics and Values Component

Ethics and values are the set of implicit rules by which residents in subsistence communities abide. Ethics and values guide the hunting, harvesting, and sharing of subsistence resources, as well as residents' treatment of one another. Core values of Alaska Native societies have been summarized in recent years by the Alaska Native Knowledge Network as well as other institutions. Ethics is the active demonstration of behaving according to those values. Among the key values shared across Alaska Native societies are the following:

- *Respect* - for family, elders, nature and traditional activities;
- *Sharing* - with families, elders, and needy - crucially linked to success in the ideologies. Among Inupiat, the concept of *ningiq*, refers to the value and obligation

to share. It also describes a specific form of subsistence distribution among the Bering Straits Eskimo; when a successful hunter is returning to the village with a sea mammal in tow, if he is seen and approached by another hunter on the ice outside of the community, upon request he is obliged to share a portion of the catch with the other hunter (Bogjavlensky 1969). The conceptual and practical importance of sharing to the moral and physical quality of existence among Inuit, Inupiaq and Yup'ik populations cannot be overstated and has been demonstrated in numerous publications including Bodenhorn (1989, 2000), Collings et al. (1998), Condon et al. (1995), Jolles (2002), Smith and Wright (1989), Wenzel (1995, 2000) and Wenzel et al. (2000).

- *Empathy and compassion* - for those with needs who should be assisted;
- *Caring* - especially for children and elders;
- *Skill development and demonstration* - in order to become a successful adult contributing to the well-being of family, kin and community;
- *Community solidarity* - recognizing obligations to behave appropriately for the well-being of the community as a whole;
- *Humility* - valuing self-effacing behaviors that facilitate positive interactions and demonstrate respect for others represent core values critical to maintaining social and natural order. In the discussion of hunting for example, a Native hunter is simply "going out to look around" never to harvest seals or whales or whatever species they may in fact hope to find. This is an expression of respect and a recognition that the hunter if successful is the recipient of a gift of the life of the animal, fish or bird, volitionally offered to him (Brower 2004).

Identities Component

In subsistence communities, traditional identities and recognition are built upon the acquisition and deployment of production skills to provide for family and community, the development of appropriate attitudes and behaviors, and contribution to the welfare of the community at large by committed participation in the religious ceremonies and social celebrations of the community. Membership in family groups, respected hunting crews, dance groups, communities and ethnic groups also are materials from which personal identities are constructed. Community members

derive group, personal and cultural identities through personal involvement and participation in individual and communal subsistence activities, including hunting and harvesting activities, processing, sharing, respect for elders, ceremonies and celebrations, language, and traditional dance and art. Components of identity include the satisfaction of eating Native foods, the enjoyment of the natural environment, group autonomy, and self-determination. In order for community members to maintain their cultural identity, they must be able to participate in traditional subsistence activities on traditional lands. It has previously been demonstrated that identity as symbolized and expressed in various subsistence activities is of enormous significance to northern Alaskan Native populations and one would expect similar patterns to be found elsewhere in Alaska among Native village residents.

Spirituality Component

Spiritual beliefs guide the practice of subsistence harvests, inform the manner in which community members interact with their environment, and provide a source of meaning and purpose to community members' lives. Spiritual beliefs in a subsistence community may include the belief that wildlife have spirits; the belief that human actions, including their treatment of the environment and resources, affect their success as subsistence hunters and harvesters; and the belief that humans and animals have a reciprocal relationship established through respectful treatment. Traditional subsistence spiritualities involve the recognition that other entities that are part of existence have essences - minds, feelings, needs, and capacities, that are essentially, but not totally similar to those of humans. Humans, in order to be successful and ethical, must be considerate of these spirits and engage them, particularly when harvesting with behaviors that demonstrate that respect.

Ideologies Component

The ideology of subsistence that is formed out of the spiritual beliefs described above has been referred to as cosmological cycling (Fienup-Riordan 1983). Humans play significant roles but are part of a natural order not the center of it for which they were created as in Biblical ideology. Residents' experiences, beliefs, values and identity within a subsistence community form their ideologies and shape their perception of the world. Subsistence ideology includes strong values on limiting waste by harvesting only what is needed and using all that is acquired. To violate

these principles not only constitute ethical breaches but may endanger the future of family and community if the animals, fish or birds are offended and fail to return. The findings from Survey of Living Conditions in the Arctic (SLiCA) research indicated that beliefs about natural forms and their relationship to humans was the highest rated dimension of the identity of northern Alaska Native interviewees, 96 percent of whom mentioned it (Kruse et al. 2008). A subsistence user's ideology often focuses on respect for animals and the environment, opposition to developments that may harm the environment, protection of cultural identity, and protection of subsistence hunting and fishing rights.

Traditional Knowledge Component

Traditional knowledge (TK) is the corpus of knowledge about one's environment. It is derived from one's education, time, and experience on the land. This element encompasses the oral traditions that have been handed down including familial accounts, tribal histories, legends and myths that comprise the cultural patrimony. TK includes knowledge about the physical, biological, and social environment: traditional hunting or harvesting locations (including local place names); the timing of subsistence activities; methods of harvesting, processing, and distributing subsistence foods; ocean and river currents; ice and snow; climate; wildlife habitat and movements; etc. This suite of knowledge, which community members learn through experience and pass on through oral tradition, makes subsistence possible. In addition to valued information, this corpus includes accounts that establish core values and accepted practices. Critical information related to the cosmological order and previous phases of existence are found in these accounts.

Cognitive Mindsets Component

This element refers to the types of mental skills and approaches one is expected to acquire to be a successful and ethical member of the society. Confidence, stamina, adaptability, the ability to react quickly, the ability to deal with difficult situations and withstand pain and trauma, the ability to observe ones environment with acumen, precision in weaving, sewing, carving, creativity, and ability to solve problems as they emerge constitute mindsets that subsistence harvesters need to be successful and that are valued in subsistence communities. These cognitive mindsets are an essential component of subsistence practices since they provide the

concentration, patience and resilience required to act in rapidly changing and potentially challenging circumstances.

Language Component

An overarching dimension of the elements presented is their linguistic coding and framing. Critical concepts - such as *umealiq*, *nugalpiaq*, *ningiq* - have connotations and implications in usage beyond the superficial translation of meaning. The presence and use of traditional language is an important feature of many subsistence-based societies in part due to the explicit recognition by the people of its ability to convey information of a different kind, that is more nuanced and subtle, that is more precise and that conveys an enormous array of additional meaning that is culturally significant. Myths, legends and other oral traditions have been passed down and are still communicated in the indigenous language. These convey information and values, and assist in establishing identity through demonstrating ties with ancestors and traditional practices. In addition to its instrumental importance in the conduct of daily life, language makes a significant contribution to identity as 84 percent of northern Alaska Natives so indicated in their responses to SLiCA questions, and was clearly demonstrated in the linguistic analysis of Bethel Yup'ik subsistence practice presented in Hensel (1996).

3.2.4 Nutritional Element

The nutritional element of subsistence has both emic (i.e., viewed from inside the culture) and etic (i.e., viewed from outside the culture) values. Emically, nutrition is significant to cultural identity (Hensel 1996) and to concepts of health and to preferred “traditional” tastes. Etically, subsistence is a high quality diet that has been demonstrated to produce healthy, long-lived adults who do not exhibit the cancers, heart disease, arteriosclerosis and diabetes associated with the introduction of the modern diet (Draper 1977, 1978; Bell and Heller 1978). In the specific case of the Inupiaq of Diomede, nutrition in regard to subsistence food references distinctive foods, mostly consumed only by indigenous northern Alaskan populations (Inupiaq, Yup'ik) such as seals, walrus and whales (beluga and bowhead). There are particular high quality aspects of locally obtained fish, birds, animals and plants that are consumed as a significant part of the regular diet of subsistence village residents. In addition to the demonstrable biological qualities

of such foods, their consumption is also culturally conceived and cultural models have demonstrated how such foods are thought of by Inuit, close relatives of the Inupiaq (Borre 1991).

Table 3-5 identifies the nutritional components of subsistence and examples of the emic and etic values they provide. Following Table 3-5 is a more in-depth discussion of the health benefits and cultural identity components of the nutritional element of subsistence.

Table 3-5: Nutritional Element: Components of Subsistence

Nutritional Component	Examples
Health Benefits	High protein, caloric value (fats), nutrients, provides physical exercise, healthy unprocessed food, fresh food source
Availability	Locally available, sufficient quantity, high quality, storage potential
Cultural Identity	Healthy lifestyle, traditional tastes, cultural and physical satisfaction of harvesting, processing, and eating traditional foods daily and on special occasions
Source: Tetra Tech study team, 2011	

Health Benefits Component

The composition of subsistence foods provides higher concentrations of needed minerals, vitamins and other physiologically significant elements such as amino acids. They also provide certain elements that are not typically available in commercial foods. Alaska Native subsistence foods are high in protein content and relatively low in carbohydrates. As noted by Poppel and Kruse (2008:32) "traditional food of the Inuit, apart from contributing to the total energy consumption, is a source of important nutrients like protein, vitamin A, vitamin D, iron, zinc, potassium, phosphorus, selenium and Omega-3 fatty acids."

It is believed by many Alaska Natives that elders who have lived on locally produced subsistence foods for their entire lives have developed physiological and possibly psychological dependence on such foods. For example, Margaret Cooke, a Yupik who testified to the Alaska Native Review Commission chaired by Justice Thomas Berger, remarked, "...believe me, my body must have seal oil. I eat it almost daily...My body is used to seal oil and must have seal oil...no matter

what" (Mander 1991:300). Similar comments can be obtained from Alaska Natives in both urban and rural contexts, particularly elders and those raised on such foods.

In earlier times, the high protein and high fat content characteristic of the diet of high Arctic populations were very important for providing energy and heat necessary to function in the cold environment. These dietary characteristics can still be important for those reasons when out hunting for extended periods now. Likewise, older Alaska Natives who are required to stay for extended periods in hospitals often lose their appetites and require their families to bring them subsistence foods from their village for foodstuffs.

Consumption of certain local foods are regarded as providing medicinal benefits in the form of prevention and healing. An example of this from elsewhere in Alaskan subsistence systems, eulachon grease, a delicacy and product desired by southeast Alaska Natives for which high demand exists such that an extensive trade network, typically involving cash purchase, exists that is international in extent. In the Canadian Arctic, the replacement of subsistence foods by store bought foods has been demonstrated to be associated with deficiencies in A, C, D and folic acid, imbalances of calcium metabolism, and increases in obesity (associated with carbohydrate consumption increase and diabetes), dental caries, acne and iron deficiency anemia.

Availability Component

For subsistence users, the taste of locally available subsistence foods are more stimulating and filling than commercially purchased food. They taste much better than commercially available foods and therefore are preferred by persons raised on them. In addition, the locally available nature of subsistence foods in adequate quantities provides residents with the satisfaction of knowing the source of the food they are eating. Whereas store-bought foods are not always available in adequate or affordable supplies, and options for commercially purchased foods (in subsistence-based communities) are often limited in their diversity, subsistence foods are readily available to subsistence users throughout the year, either in fresh or preserved forms (Ongtooguk 2012).

Cultural Identity Component

As a matter of cultural belief and practice, independent of quality and taste, subsistence foods are preferred by those who have been raised on them, especially in village environments. Reasons for these preferences include identity, health and adherence to elders' advice and practice (Borre 1991). Among the Canadian Inuit, Borre (1991) identified a cultural model of the relationship of the traditional diet to health. The four components include relationships between humans and animals, relationship between the body and soul, life and health, the relationship between seal blood and Inuit blood, and diet choice as a marker of Inuit identity (Borre 1991:54). Seal blood is considered of great importance for feeding both the body and soul, for rejuvenating human blood, for protecting against illness, and is the preferred food when hunting. The liver and blood are the first to be consumed following harvest due to their perceived ability to rapidly warm the hunters.

The consumption of subsistence foods also carry with them a satisfaction component that derives from the fact of self-production, production by family members, receipt from kinsmen or community members, and emblematic representation of identity and chosen lifestyle. This aspect is particularly identifiable in contexts where variability in the valuation and utilization of subsistence foods in a community exists as Hensel's (1996) study of Bethel Yup'ik residents demonstrates.

CHAPTER 4.
A NEW DEFINITION OF SUBSISTENCE

4.1 INTRODUCTION

An objective of the subsistence literature review conducted for this study was to identify the existing definitions of subsistence as well as the various elements (e.g., cultural, economic, nutritional, and social) that characterize subsistence. This Chapter reviews the definitions of subsistence currently in use by the Corps, various other federal agencies, the State of Alaska, and others. It presents a broad consensus approach to defining subsistence, describes commonalities among definitions of subsistence throughout the subsistence literature, and makes a recommendation for a new subsistence definition to be considered for use by the Corps.

4.2 EXISTING SUBSISTENCE DEFINITIONS

In the Scope of Work for this study, the Corps Alaska District acknowledged that the agency's current definition of subsistence is neither clear nor complete, and that the Corps has a need to have subsistence clearly defined in order to effectively evaluate the economic benefits of subsistence activities. The Corps included the following definitions related to subsistence in their Scope of Work and acknowledged that these definitions address only subsistence fishing:

> *"This is fishing, primarily for personal or family consumption, by those whose incomes are at or below the minimum subsistence level set by the Department of Commerce. For cost allocation purposes subsistence fishing is considered commercial fishing. Subsistence fishing is not a high priority output however." (Corps of Engineers Planning Guidance Notebook, Engineer Regulation 1105-2-100, Appendix E, Civil Works Missions and Evaluation Procedures, Section E-14 d, Subsistence Fishing)*
>
> *"Subsistence Fishing. Subsistence fishing is not a high priority output. When allocating costs, subsistence fishing is placed in the commercial fishing category, however. Subsistence fishing is defined as fishing activity carried out by those at or below the minimum subsistence level to obtain food. The minimum subsistence level is as defined by the Department of Commerce. The appropriate evaluation procedure depends on*

site-specific conditions. The basic requirement is to identify benefits based on willingness to pay." (Digest of Water Resource Policies and Authorities, EP1165-2-1, 30 July 1999)

The definition of subsistence as defined in the Alaska National Interest Lands Conservation Act (ANILCA) which is the baseline definition that most federal agencies use was also examined. The ANILCA definition of subsistence is found in Title VIII, §803, and states,

> *As used in this Act, the term "subsistence uses" means the customary and traditional uses by rural Alaska residents of wild renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of nonedible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade. For the purposes of this section, the term--*
>
> *(1) "family" means all persons related by blood, marriage, or adoption, or any person living within the household on a permanent basis; and*
>
> *(2) "barter" means the exchange of fish or wildlife or their parts, taken for subsistence uses--*
>
> *(A) for other fish or game or their parts; or*
>
> *(B) for other food or for nonedible items other than money if the exchange is of a limited and noncommercial nature.*

U.S. Code of Federal Regulations Title 36, Part 242.16 identifies the following factors that are considered when making customary and traditional use determinations:

> *(1) A long-term consistent pattern of use, excluding interruptions beyond the control of the community or area;*
>
> *(2) A pattern of use recurring in specific seasons for many years;*
>
> *(3) A pattern of use consisting of methods and means of harvest which are characterized by efficiency and economy of effort and cost, conditioned by local characteristics;*

> *(4) The consistent harvest and use of fish or wildlife as related to past methods and means of taking; near, or reasonably accessible from, the community or area;*
>
> *(5) A means of handling, preparing, preserving, and storing fish or wildlife which has been traditionally used by past generations, including consideration of alteration of past practices due to recent technological advances, where appropriate;*
>
> *(6) A pattern of use which includes the handing down of knowledge of fishing and hunting skills, values, and lore from generation to generation;*
>
> *(7) A pattern of use in which the harvest is shared or distributed within a definable community of persons; and*
>
> *(8) A pattern of use which relates to reliance upon a wide diversity of fish and wildlife resources of the area and which provides substantial cultural, economic, social, and nutritional elements to the community or area.*

The US Department of Defense in 2001 provided the following statement concerning subsistence in the "DoD American Indian/Alaskan Native Policy: Alaska Implementation Guidance":

> *Under the ANILCA, Public Law 96-487, 1980, 16 USC 3101-3126, Congress granted a subsistence preference for individual Alaska Natives on Native land and for both Native and non-Native rural residents on public land. 16 USC 3111(a)1. ...While Congress acknowledged the importance of subsistence to all rural Alaska residents, it noted that the continuation of the opportunity for subsistence uses is essential to the Native physical, economic, traditional and cultural existence.* (U.S. Department of Defense 2001:6)

The State of Alaska definition of subsistence, contained in AS 16.05.940**,** is nearly identical to the federal ANILCA definition. The most significant point of distinction is the rejection of rural preference in subsistence uses at the state level which resulted from *McDowell vs. Alaska*. The state defines subsistence rural area, fishing, hunting, and uses, as follows:

> ***(28)*** *"rural area" means a community or area of the state in which the noncommercial, customary, and traditional use of fish or game for personal or family consumption is a principal characteristic of the economy of the community or area;*
>
> ***(31)*** *"subsistence fishing" means the taking of, fishing for, or possession of fish, shellfish, or other fisheries resources by a resident domiciled in a rural area of the state for subsistence uses with gill net, seine, fish wheel, long line, or other means defined by the Board of Fisheries;*
>
> ***(32)*** *"subsistence hunting" means the taking of, hunting for, or possession of game by a resident domiciled in a rural area of the state for subsistence uses by means defined by the Board of Game;*
>
> ***(33)*** *"subsistence uses" means the noncommercial, customary and traditional uses of wild, renewable resources by a resident domiciled in a rural area of the state for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation, for the making and selling of handicraft articles out of nonedible by-products of fish and wildlife resources taken for personal or family consumption, and for the customary trade, barter, or sharing for personal or family consumption; in this paragraph, "family" means persons related by blood, marriage, or adoption, and a person living in the household on a permanent basis;*

The National Research Council review of the Community Development Quota Program, which allocates a portion of annual fish harvests of certain commercial species to villages dependent on subsistence lifestyles, defines subsistence as:

> *(1) the relationships of households, extended families, and larger communities constructed through cooperation in production and customs of reciprocal sharing, (2) the division of labor between men and women and the corresponding understanding of their respective competencies; (3) the accumulation of prestige and influence by certain individuals, such as successful hunters or whaling captains, and certain knowledgeable people, such as experienced elders, which constitutes the political contours of the community; (4) the dances, inter-village exchange festivals, and other social celebrations, often integrated in the calendar of Christian religious and American national holidays; and (5) not least, the distinctive relations of*

exchange that people understand to exist between themselves and the natural species on which they depend. (National Research Council 1999).

In 2005, the Alaska Federation of Natives' website described subsistence as:

> *The hunting, fishing, and gathering activities which traditionally constituted the economic base of life for Alaska's Native peoples and which continue to flourish in many areas of the state today. Subsistence is a way of life in rural Alaska that is vital to the preservation of communities, Tribal cultures, and economies. Subsistence resources have great nutritional, economical, cultural, and spiritual importance in the lives of rural Alaskans…. Subsistence, being integral to our worldview and among the strongest remaining ties to our ancient cultures, is as much spiritual and cultural, as it is physical (Alaska Federation of Natives 2005).*

The North Slope Borough is a major northern Alaskan coastal regional governance institution representing the views and interests of Alaskan Iñupiat. The Municipal Code of the North Slope Borough defines subsistence as:

> *"…an activity performed in support of the basic beliefs and nutritional needs of the residents of the borough and includes hunting, whaling, fishing, trapping, camping, food gathering, and other traditional and cultural activities (NSBMC 19.20.020 (67))*

4.3 SUBSISTENCE DEFINITIONS – BROAD CONSENSUS

As was described in the previous section, the definition of "subsistence activity" that has been most commonly utilized is based on the ANILCA language of Title VIII establishing a rural priority for subsistence, on the interpretation and operationalization of "subsistence" in federal agency practice and on the language used by the Alaska Federation of Natives to define the term as equivalent to the "way of life." This definition and approach is broadly recognized throughout the circumpolar north as the examples and discussion that follows will demonstrate. What this broad consensus means is that the definition utilized for this research is not unique or idiosyncratic but corresponds to widely shared understandings among scholars investigating the topic of "subsistence" in northern, especially indigenous, societies.

The Inuit Circumpolar Conference (1992), the international organization representing Inuit from all Arctic areas including Alaska and the Bering Strait Inupiaq of Diomede Island, in a programmatic statement defining their organization stated the following:

> *Subsistence is a highly complex notion that includes vital economic, social, cultural and spiritual dimensions. The harvesting of renewable resources provides Inuit with food, nutrition, clothing, fuel, harvesting equipment and income. Subsistence means much more than mere survival or minimum living standards. It is a way of life that requires special skills, knowledge and resourcefulness. It enriches and sustains Inuit communities in a manner that promotes cohesiveness, pride and sharing. It also provides an essential link to, and communication with, the natural world of which Inuit are an integral part.*

A definition of subsistence found in the National Research Council's (1999) study of the Community Development Quota Program of Western Alaska, is described is Section 4.2. The only elements missing from this definition are those that have been defined in this study as the social characteristics of local and regional traditional knowledge, education (transmission of knowledge) and cognitive mind sets (underlying orientations to natural phenomena and other humans).

The SLiCA is a comprehensive research project undertaken by an international team of survey researchers to identify the critical features and perceptions of contemporary life throughout the circumpolar Arctic communities. Researchers interviewed a sample of northern residents, primarily Inuit/Inupiat, living in Alaska, Canada, Greenland as well as members of various indigenous groups in Chukotka (Russia), and Saami in northern Scandinavia. In northern Alaska, 588 Inupiaq were interviewed in 20 villages and towns of the predominantly Inupiaq areas (Bering Strait, NANA, North Slope) of northwest Alaska. The questions asked in the interviews were organized into five themes, the first of which was defined as – "The importance of a mixed cash- and harvest/herding- based economy to living in the Arctic" (Kruse et al. 2008: 115). The term "subsistence" was used to encompass the set of activities identified as the harvest/herding-based economy however the "subsistence framework" went beyond merely the economy. The SLiCA subsistence framework includes the following aspects:

- *The economic aspect – the importance to the economy of the household*
- *The nutritional aspect – part of the diet of the household*
- *The social aspect – including intergenerational transfer of knowledge*
- *The socio-cultural aspect – principles of sharing and community relations*
- *The identity aspect – markers of identity related to subsistence*
- *The integration aspect – the mix of subsistence and cash activities*

  (Poppel and Kruse 2008: 30)

In their concluding remarks, Poppel and Kruse note that subsistence activity makes inextricable the "intertwined nature of culture and economy in the Arctic" (Poppel and Kruse 2008:40).

The SLiCA framework is fundamentally the same as the subsistence elements and components independently developed in this study. The only differences are that the identity and integration aspects are broken out as discrete elements by Poppel and Kruse (2008), while in this current Corps study, identity was subsumed under the cultural element, and the integration aspect was subsumed under the economic element as "mixed cash-subsistence economy." There are also differences in the internal elements of the major aspects but they do not alter the fundamental similarities in the groupings.

Another component of the SLiCA study involved the development of a model of household production of subsistence that could be used as a framework for understanding the operation of different subsistence systems in the various Arctic regions. In the development of the subsistence household production model, Usher et al. (2003: 179-180) provide the following commentary:

> *In subsistence-based societies...security and well-being tend to be more associated with system maintenance than individual gain. Security and well-being are achieved through cooperative production, wide distribution, and mutual aid, each organized by kinship. This is celebrated, consolidated, reinforced, and reproduced by sharing, feasting, ritual observance, and associated ethical norms.... Through both production and distribution, norms and virtues such as patience, sharing and mutual aid are reinforced and reproduced.*

This characterization clearly parallels the approach taken in this current study in identifying the key importance of social and cultural components and elements to the conduct of subsistence activity and for the definition's focus on cooperation, general welfare, continuity and reproduction.

An issue of major international concern that has been of critical significance to the current and future forms of northern Alaskan (Inupiaq and Siberian Yup'ik) Native societies is that of whaling, both for smaller and larger species. The United States as a signatory to the International Whaling Treaty has agreed to be governed by decisions made by the International Whaling Commission (IWC) about subsistence and commercial whaling. At the center of the controversy is by what standards and criteria is "subsistence" whaling to be distinguished from "commercial" whaling. Freeman (1993:248) articulates the distinction between the two forms through the following characterization of subsistence:

> *Subsistence persists... despite the evident interaction occurring with powerful commercial forces that sustain the dominant society, because subsistence satisfies particularly important non-economic needs...needs that can only be met by either engaging in subsistence or being enabled to consume the products of subsistence. The continuing commitment of members to these (often small, distinct, and peripheral) communities to their multi-dimensionally satisfying and distinctive way of life and identity sustains subsistence production... This valued identity and way of life is ... profoundly related to particular systems of local resource use.*

Freeman's characterization of subsistence as a system of activities that is both made possible by and characterized by community level beliefs and practices (sharing, ceremonies, rituals), multiple satisfactions, and valued identities is congruent in its generality and specificity with the definition developed in this study. Young et al. (1993:122) in an assessment of how the IWC regime might go forward similarly identified the complex integration of local social and cultural beliefs and practices maintained "over long periods of time" involved in subsistence whaling as elements distinguishing this form of harvesting from commercial whaling. They noted "...subsistence is understood as essentially reflecting those cultural values that socially integrate

the economic relations of particular groups of people" (Young et al. 1993:125). The authors found these characteristics the basis for both insuring sustainability and justifying its authorization by the IWC (Young et al. 1993:122).

In a recent discussion of the meaning of subsistence and its operationalization in various regulatory regimes, Schuman and Macinko (2007:708) identified a typology of "subsistence definitions" which include the notions of 1) "an economy" that "doesn't include money exchange" 2) operated through "institutions that accord special social meanings to sharing and exchanges" and 3) have significant cultural "activities that don't have a strictly material motivation" (Schuman and Macinko 2007:708). In considering these various essential elements of "subsistence", the authors conclude: "An ideal measurement of subsistence value will also include the non-material benefits experienced by participants in subsistence activity" (Schuman and Macinko 2007:712).

In all of these definitions, it is evident that "subsistence" is characterized in broad fashion as encompassing and characterizing a distinctive form of human experience that is the result of interlocking and integrated elements of which the most important is the high degree of use and dependence upon production from locally available fish, animal, bird and plant resources. As such it is neither treated as "de minimus" (at the level of survival) nor as merely an economy of self-production and consumption without the presence of markets and cash. It is a way of life made possible by the constellation of elements which comprise it. Langdon expressed this concept of the inextricability of subsistence from its economic, social, cultural, and nutritional elements as follows:

> *It is through capturing, processing, distributing, celebrating and consuming naturally occurring fish and animal populations that subsistence societies define the nutritional, physical health, economic, social, cultural and religious components of their way of life. (Langdon 1984:3)*

Subsistence is inextricably dependent upon a natural environment that continues to make available the life forms that are required and upon a larger, economic and political environment

that provides an opportunity to acquire the technical wherewithal to harvest, transport, process, store and consume.

4.4 CORPS SUBSISTENCE DEFINITION AND SUBSISTENCE ELEMENTS

As described above, the Corps definition of subsistence only addresses fishing. Based on the results of the literature review conducted for this current study, and the resulting identification of all the key elements and components of subsistence, the study team recommends this definition should be revised to address all of these elements and components. It has become clear during this present study that the current Corps definition does not include all subsistence resources or activities, focuses only on the economic element of subsistence fishing, and equates subsistence fishing to commercial fishing for the purposes of cost allocation. Moreover, the definition does not address the social, cultural, and nutritional elements of subsistence and the many individual components that define those elements. The needed additions to the existing definition of subsistence are addressed in the proposed definition of subsistence in the next section.

4.5 PROPOSED DEFINITION OF SUBSISTENCE

Taking into account the key economic, social, cultural, and nutritional elements and components of subsistence identified during the literature review and the deficiencies identified in the Corps definitions of subsistence, a new working definition of subsistence has been created in this study. Because the ANILCA definition of subsistence is the definition used in the majority of federal literature, it was used as a template, with additions made where the ANILCA definition does not capture the full range of subsistence components.

The proposed definition for subsistence derived from this current study is as follows:

> *Subsistence refers to a way of life in which wild renewable resources are obtained, processed, and distributed for household and communal consumption according to prescribed social and cultural systems and values.*

The harvest, distribution, and consumption of subsistence resources are governed by technology, infrastructure, cognitive mindsets, and traditional knowledge. These resources may be used as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of nonedible plants and byproducts of fish and wildlife resources; for barter, or sharing for personal or family consumption; for customary trade; and for celebrations and ceremonies.

Subsistence activities are primarily organized through kin relations, special roles, and communal values within and among specific communities. These communal values emphasize reciprocity between individual community members and the community as a whole through sharing and with respect for the environment and relations with non-human species. Subsistence activities are reproduced across generations through both formal and informal training of descendants in the concepts, behaviors, values, and skills necessary to successfully sustain the community and the resources upon which they depend.

The Subsistence way of life satisfies to various degrees and in various contexts, the economic, social, cultural, and nutritional needs of subsistence-based communities.

Although this definition of subsistence is based on the circumstances of Alaska Native communities, the study team believes that subsistence evaluation approach and framework developed in this study can also be applied to other communities who engage in subsistence activities, as long as appropriate modifications are made to reflect specific characteristics of communities being examined.

This page intentionally left blank.

CHAPTER 5.
REVIEW AND SELECTION OF VALUATION METHODS

5.1 INTRODUCTION

There are different terms used to describe rural Alaskan communities that have at least a portion of their economic activity focused on harvest and production of subsistence foods for their own consumption. The term 'subsistence economy' is probably the most commonly used term. For an economist, one of the important aspects of a subsistence economy is that it does not involve production and export from the community, with the exception of art objects and some level of trade and/or barter.

The community of Diomede is characterized by a large proportion of overall economic activity being devoted to subsistence production. With the community needing to produce almost 100 percent of the food it consumes, the production of sufficient food for its residents is paramount. There are limited jobs available in the community, centered on local, state, or federally supported positions. The school is a main locus for jobs in the community. The basic character of these jobs is that they provide services to residents of Diomede. Exports of goods or services outside the community are not a characteristic of the Diomede economy.

There is a wide range of "mixes" exhibited by rural Alaskan economies between activity and production related to subsistence, and traditional wage-based employment. A community with an economy that is supported by resource production (such as commercial fishing), tourism-related economic activity or other export-related employment may have a lesser focus on subsistence production. Diomede, however, is on the other end of the spectrum as perhaps the most pure example in Alaska of an economy that is largely focused on subsistence production (see Section 5.5 for a discussion of non-use [passive use] value of Diomede as a unique place).

When the Corps evaluates potential port and harbor projects, they are required to complete a specific economic analysis to evaluate potential alternatives. By looking at the specific benefits and costs that may result from selection and completion of an alternative, the process ensures that

(a) the needs of the community are indeed going to be met by the project being proposed, and (b) the project is in the best interests of the nation as a whole. This latter requirement is called national economic development (NED) benefits and costs. The accounting stance for NED benefits and costs is to the nation as a whole. Efficiencies and overall increases in production are what count in this analysis, and regional shifts of employment and economic activity are of lesser importance.

At a basic economic level, subsistence is household production of food. Since this household production's value is not exchanged for money, its economic value needs to be evaluated by indirect methods or 'non-market' valuation methods. These methods are reviewed in the following sections for their applicability to the study problem.

5.2 SUBSTITUTE VALUATION METHODS

In the early 1990s two of the study team members developed a method for including evaluation of subsistence benefits in a feasibility study for a proposed Corps project. They utilized ideas from a couple of sources to develop a substitute valuation method to at least partially value improvements in subsistence production that would result from completion of the project.

A study by Peter Usher, completed in the 1970s, investigated the use of substitution cost for evaluation of subsistence values. The method and approach proposed by Usher to address the problem of valuing subsistence provided a guideline for application of substitute valuation to Alaskan communities. He also addressed the implicit shortcomings of the approach. In his 1976 article, Usher stated:

> *In conclusion, the use of substitution cost is the most appropriate method for imputing values to country foods……..Actual cash values derived are necessarily imprecise, due to the absence of completely comparable substitutes. There are also a number of highly important, but non-quantifiable considerations to be borne in mind when cash values are being imputed by the methods indicated above. Such figures are useful only in that they provide some estimate of the monetary values of specific commodities to their producers in comparison to alternatives in the context of a modern*

> *market economy. Even this statement must be qualified, however; the monetary valuations do not, and cannot, indicate the value of hunting as a social or cultural activity or as a way of life, and they do not, and cannot, indicate the value to the native hunter of the environment which provides these resources*. (Usher 1976)

A report by Brown and Burch (1992) entitled "Estimating the Economic Value of Subsistence Harvest of Wildlife in Alaska" also focused on applying valuation to subsistence in Alaska and was helpful in developing substitute valuation methodology for Corps' feasibility analyses in Alaska. This study reinforced the methods used by Usher, which was directed to the Northwest Territories, for subsistence valuation in Alaskan communities.

With the guidelines provided by these two studies, a procedure was developed to use a shadow price to calculate a substitute value for food production in villages. Using a market basket of foods available in the target community, this method utilizes a per pound cost (obtained via a cross-sectional survey) for the next best available alternative to the preferred subsistence foods. Using the cross-section calculation of average cost per pound and applying it to an estimated per capita production (and consumption) for subsistence foods results in a reasonable and straightforward method for partial valuation for household subsistence production.

From an economic perspective, household subsistence production can be regarded as import-substitution. Each pound of food produced by a family means that they do not have to purchase an equivalent pound of food that has to be imported into the community, typically at high cost relative to urban areas.

In addition to the shortcomings of not addressing valuation of the important social and cultural values of subsistence production, the study team also considered that past applications of substitute valuation may have resulted in underestimating the whole food value of culturally and nutritionally preferred subsistence foods.

It was recognized that the substitute valuation methodology has an inherent bias to undervalue food values. Because village residents have a lower-per capita income than their urban counterparts, and because village stores are forced to purchase foods from far-away distributors,

they tend to purchase inexpensive foods that are less than equal substitutes for higher quality locally produced subsistence foods. For example, frozen chicken breasts are probably not an equal substitute for caribou steak, but they may be the best available alternative. To more fully capture the substitute valuation of subsistence foods, the value of 'organic' or higher quality foods than may actually be available for purchase in small villages is appropriate and would be a better market equivalent to subsistence foods.

5.3 EXPANDING THE VALUATION OF SUBSISTENCE

Subsistence impact analyses completed for the Corps Alaska District in the past using the substitute valuation method have typically provided a caveat that the valuation was limited only to the portion of total subsistence valuation associated with providing food. The focus of this study was to examine the practicality of alternative methods that would provide a more holistic valuation of other use benefits of subsistence, such as social and cultural and nutritional values.

Chapter 3 of this report discusses the economic, social, cultural, and nutritional elements of subsistence, along with descriptions of the various components of these four elements. In summary the four identified elements of subsistence and their resulting components are:

- Economic Element of Subsistence (see Table 3-1)
    - Procurement
    - Production
    - Distribution
    - Technologies/tools
    - Infrastructure
    - Mixed cash-subsistence economy
- Social Element of Subsistence (see Table 3-2)
    - Organization
    - Celebration and ceremonies
    - Education
    - Special roles

- Cultural Element of Subsistence (see Table 3-3)
    - Ethics and values
    - Identities
    - Spirituality
    - Ideologies
    - Traditional Knowledge
    - Language
- Nutritional Element of Subsistence (see Table 3-4)
    - Health Benefits
    - Availability
    - Cultural Identity

The study team worked with this list of subsistence elements and components to evaluate potential valuation methods to utilize in the project. A review of a substantial body of literature on the issue of economic valuation of non-market resources was conducted. Non-market methods evaluated by the study team included:

- Qualitative measures of value
- Household production function
- Contingent valuation (willingness to pay, willingness to accept)
- Choice experiments

Each specific component of each of the four subsistence elements was evaluated to identify which (if any) valuation methods might be practically applied to derive a monetary estimate of value. It was determined that the nature of the social and cultural elements of subsistence defied practical quantitative monetary valuation and remained best served by qualitative discussion of value derived from subsistence.

5.4 SELECTION OF THE PRODUCTION COST METHODOLOGY

The study team initially considered valuing subsistence activity, consisting of the sum of values for the four elements - economic, social, cultural and nutritional – independently, evaluated and

estimated using various methods for analysis. It was determined that independently measuring the above subsistence elements and associated components using a combination of non-market valuation tools, was not a practical or reasonable approach. If researchers were to visit a community with the intent of gathering data and opinions from residents for the social, cultural, and nutritional components of subsistence described above, it could be a bewildering experience for residents and would most likely have an unsuccessful result for the researchers. In addition, there are undoubtedly levels of correlation between and among the respective components of subsistence identified above that would inhibit the application of non-market valuation methods to each component individually.

The study team decided to utilize a production cost approach to subsistence valuation. We know that subsistence products should at least be worth as much as the participants invest in them through expenditures of cash and labor. This approach does not specifically ascribe any portion of value to any specific component of subsistence. For example, we cannot tell how much of the total valuation should be ascribed to food values and how much to cultural values. We also need to recognize that production cost is only a partial proxy for total subsistence value. We undoubtedly ignore a large share of the social and cultural aspects of subsistence through application of production cost. However, the method is theoretically defensible, practically applicable, and can be updated and replicated. These last two features are of special significance to the Corps, who hopes to apply this method to similar valuation problems in other communities and regions.

Production cost analysis results from one community could be applied in other similar settings and situations, without having to resort to extensive surveys or interviews with each application. A similar method was developed by Oregon State University (called the Marine Economics Data Sheets or MEDS) to be able to modify operational costs for fishermen to similarly outfitted commercial fishing vessels in other locations or fisheries. The MEDS program provided cost of production information for marine-related businesses, based on their general characteristic. An example of a MEDS profile for a 26-foot Florida commercial crab fishing operation is provided as an example in Appendix 4 (http://ir.library.oregonstate.edu/jspui/bitstream/1957/13240/1/MED-26-FootFloridaCrab.pdf).

MEDS researchers gathered cost data in field research to compile an average, or typical, cost profile for a commercial fisherman. The study team completed a similar exercise for costs in subsistence households within the study communities of Wales and Diomede. These data were compiled into a MEDS-style cost of subsistence production summary.

The subsistence cost profile can be updated for a number of years by merely updating the costs with a cost of living multiplier. Beyond five years or so from the initial data collection, it would be prudent to update them based on selected key informant interviews to update costs in the community and ensure that there have not been any basic structural changes to the subsistence production framework within the community.

The cost profile for subsistence users could be reasonably applied to other similar communities in the future. To apply the methodology to a new region or community, the survey protocol and calculation methods are relatively straightforward to implement.

It should be noted that the methodology applied to determine production cost is based upon the household. The household is the basic socio-economic unit in a mixed, subsistence-based economy. In this type of economy, production and consumption are combined in the basic household unit. As noted in a 2003 report on the household as an economic unit in arctic aboriginal communities,

> *In this economy* (the household in a community characterized by a mixed subsistence-based economy), *there are neither families as pure consuming units, maximizing their utility, nor firms as producing units maximizing their profits. Production and consumption are combined in the one basic unit, the household, which functions as a micro-enterprise, except that instead of maximizing profits and accumulation, it minimizes costs (or maximizes efficiency), in order to maximize utility.* (Usher, Duhaime, and Searles 2003)

The limitations of the production cost model to fully capture the value of subsistence are fully recognized, however, the method was selected for application in this study as the best approach to meet the goals of the Corps in furthering their incorporation of subsistence value into future

potential project evaluations. See Chapter 6 for further discussion on the implementation of this production cost model for this project.

5.5 NON-USE BENEFITS OF SUBSISTENCE PRODUCTION IN THE MIXED-SUBSISTENCE COMMUNITY

The production cost approach is based on valuation of the use values for subsistence resources and products. As a final note in the evaluation of the production cost methodology is the consideration of passive use values that <u>are not</u> addressed or included in this type of analysis.

The existence of Diomede is only possible due to the proximity and abundance of wildlife and fish resources. To the modern world, the very existence of Diomede is rare and unique, something that has value itself even to those who will never visit it.

Passive valuation of non-market resources is more commonly used for wilderness areas or fish and wildlife resources. Examples of passive valuation of non-market resources included Loomis (2001) and Carson et al. (1992). Examples of the application of passive use valuation by various federal agencies, such as the National Marine Fisheries Service or U.S. Fish and Wildlife are readily available. However, as important are the recommendations and requirements for economic analyses prescribed in OMB's Circular A-4. This memorandum provides guidance to Federal agencies for development of regulatory analysis required under a number of federal guidelines. Passive use is one of the methods covered in this report. Passive uses are viewed in two categories: existence values (the benefits people receive from knowing that a particular resource exists), and bequest values (the value of satisfaction from preserving a natural environment for future generations). Both of these are appropriate considerations for considering the value of subsistence production in a community such as Diomede. The Corps of Engineers has been cautious in the past about including passive use values into its benefit/cost calculations, but this may be an area for future research.

5.6 APPLICATION OF THE PRODUCTION COST METHODOLOGY FOR DIOMEDE AND WALES

- In order to estimate value of subsistence activity in Diomede and Wales, the following steps of analysis were conducted: Development of data collection instrument to obtain household production cost by community
- Federal approval of data collection instrument
- Field Data collection
- Data processing
- Economic valuation analysis
- Interpretation of results

The application of these steps for this study is documented in the following Chapters.

This page intentionally left blank.

CHAPTER 6.
COMMUNITY SUBSISTENCE SURVEY

6.1 INTRODUCTION

This chapter describes the implementation of the production cost model used to value the cost of subsistence production in the study communities of Diomede and Wales. The steps taken to implement this model included gaining community approval, designing a data collection protocol, identifying and contacting households in Diomede and Wales, and conducting the household interviews. The analysis and results of the community subsistence survey are presented in Chapter 7.

6.2 PROJECT PLANNING AND COMMUNITY APPROVAL

In July 2010, the study team sent introductory letters describing the current subsistence valuation study to the following organizations in Diomede, Wales, and Nome:

- Native Village of Diomede
- Native Village of Wales
- City of Diomede
- City of Wales
- Inalik Native Corporation
- Wales Native Corporation
- Kawerak, Inc.

The study team followed up with phone calls to the above organizations and determined that the Native Village of Diomede and Native Village of Wales were the appropriate organizations with whom to plan and coordinate fieldwork in those communities. The study team received a written letter from the Native Village of Diomede supporting the study on August 12, 2010 and received verbal confirmation from the Native Village of Wales on February 18, 2011 that the village council had approved participation in the study during an August 2010 council meeting.

Although the introductory letter was sent in July 2010, fieldwork was delayed until March 2011 due to: (1) a lack of viable safe transportation to the community of Diomede; (2) the need to gain United States Office of Management and Budget (OMB) approval of the field protocol; and (3) to conduct pre-tests of the interview protocol (in Nome) prior to initiating fieldwork in Diomede and Wales. The study team kept in contact with the Native Village of Diomede and with the companies that provide fixed-wing and helicopter service to Diomede to stay updated on a possible schedule for traveling to Diomede. Once air service to Diomede resumed in February 2011, the study team began actively planning fieldwork in the two study communities.

The study team worked with representatives of the coordinating organizations to plan trips and identify a local community liaison to assist in developing a current household list, contacting residents, and scheduling interviews. After arriving in the study communities, researchers met with a representative from the coordinating organizations to discuss the study and answer any questions. In the case of Diomede, the Native Village of Diomede called a council meeting where researchers provided an overview of the purpose of the study and answered questions. The study team kept in contact with the coordinating organizations throughout the field process to update them on their progress and address any issues. A local liaison in Diomede was available for the entirety of the field trip. A community liaison was not available in Wales at the time of fieldwork; consequently the study team worked with personnel from the Native Village of Wales to develop a household list and gather contact information for local residents.

6.3 FIELDWORK DESIGN

The study team developed an interview protocol to gather data from Wales and Diomede households related to the cost of subsistence production and submitted this protocol to the Alaska District Corps who presented it to OMB in July 2010 for approval. The protocol was designed to capture costs of subsistence production in the two communities, both in monetary expenses (i.e., money spent purchasing and maintaining tools, technologies, and infrastructure associated with subsistence) and in labor (i.e., time spent maintaining subsistence tools, technologies, and infrastructure; actively hunting and harvesting subsistence resources; and processing subsistence resources).

After development of the initial protocol, the study team determined that a pre-test of the instrument would be useful in addressing any problems and finalizing the protocol. The study team worked with the Kawerak, Inc., Subsistence Resources Program to identify potential respondents in Nome who would be willing to participate in a pretest of the data collection protocol. These individuals were selected by Kawerak, Inc., as active harvesting households some of who were originally from Diomede or Wales. The study team received a list of five potential respondents from Kawerak Inc., and traveled to Nome from September 14-15, 2010. Researchers coordinated with a representative of the Kawerak, Inc. Subsistence Resources Program and successfully conducted pretest interviews with four of the five potential respondents. OMB approved the survey on October 14, 2010, and within the approved boundaries of the interview protocol, the study team produced a revised protocol based on the results of the pretest interviews. This protocol was finalized and approved by the Corps in January 2011 (see Appendix 2.2).

The data collection protocol for valuing subsistence production consisted of five parts:

- Section A: Household Information
- Section B: Technologies
- Section C: Boats and Infrastructure
- Section D: Harvesting and Processing – 2010
- Section E: Subsistence Activities – 2010

In addition to the field protocol, the study team developed a field protocol guide, which provided detailed instructions on conducting interviews and recording data, by protocol section. A description of the household interviews is provided below ("Interview Method").

6.4 IDENTIFYING AND CONTACTING HOUSEHOLDS

The study team attempted to interview a representative from each occupied household in Wales and Diomede. Researchers printed satellite images of each study community prior to the field trips to aid in the identification of households. Once in each community, the field team worked closely with local liaisons or with Native Village representatives to develop a current list of

occupied households and assigned each household a unique Household ID. The study team did not include households that had moved out of the community indefinitely or households who were staying in another community for an indefinite amount of time (e.g., on medical leave, working out of town and not expected to return before the field season ended).

With the help of the local liaison and Native Village representatives, study team members identified the head of each household or the individual in each household that would be best suited to answer questions regarding the cost of subsistence production. The study team focused on interviewing these individuals, but interviewed other adult household members when they were unavailable. Researchers either contacted households directly or conducted interviews that had been scheduled by local liaisons.

In Wales, interviews took place at the Native Village office, at the school (generally for evening interviews), or at the respondent's home. In Diomede, interviews took place at the Native Village office, at the school (generally for evening or weekend interviews), at the city office, or at the respondent's home.

6.5 INTERVIEW METHOD

As discussed above, the fieldwork consisted of a five-part interview: (1) Household Information; (2) Technologies; (3) Boats and Infrastructure; (4) Harvesting and Processing – 2010; and (5) Subsistence Activities – 2010. Prior to beginning each interview, the researcher provided the respondent with an agency disclosure notice and statement of purpose (see Appendix 2.1), which explained the purpose of the study, ensured anonymity of study participants, and provided agency contact information if participants had questions.

One researcher conducted each interview and recorded respondents' answers on the field protocol. Respondents' names were not written on the protocol form; instead, researchers recorded the respondent's Household ID. Section A (Household Information) gathered the following data on each member of the household who occupied the respondent's household during the 2010 study year:

- Birth year
- Birth residence
- Years of residence
- Sex
- Ethnicity
- Participation in subsistence activities (hunting, fishing, gathering, processing) in 2010

Section B documented the technologies and tools owned and in use by members of each household. The technologies and tools were discussed under the following categories:

- Transportation (e.g., snowmachines, ATVs, canoes, sleds)
- Rifles and shotguns (including gun cases, scopes, and ammunition)
- Hunting accessories (e.g., GPS, binoculars, life vests, tents)
- Hunting/harvesting gear (e.g., nets, jigging poles, harpoons, buckets for berries)
- Processing equipment (e.g., freezers, canning accessories, ulus/knives)
- Clothing (e.g., parka, snow pants, mud boots)
- Subsistence and travel accessories (e.g., safety equipment, bug spray, ropes)
- Other items used for subsistence

A number of tools and technologies that were not included on the protocol were identified by respondents during the course of fieldwork. These included walking sticks/ice testers, ice strainers, egging spoons, bird lines and nets, seal hooks, crab lines, and whale hunting and butchering tools. Because the regular use of these items was not recognized until field efforts were well underway, they are likely underrepresented in the study results.

The study team gathered the following variables for each reported technology or tool:

- Number owned and in use
- Labor hours to make (for items such as clothing, skin boats, sleds, etc.)
- Household maintenance hours per year
- Maintenance and material costs per year

- How often does the household purchase one of these items?
- Costs per year (for items such as ammunition and clothing that are yearly expenses)
- Percent used for subsistence

The study team noted on the protocol (by graying out the data boxes) where variables were not relevant to certain technologies/tools or would likely be minimal for those technologies/tools. For example, the study team did not ask respondents to estimate yearly household maintenance hours and costs for hunting accessories (e.g., binoculars, tarps, life vests, etc.). If a respondent was unable to answer a question or provide a reasonable estimate, the researcher left the cell blank or wrote N/A for "not ascertained."

Section C of the field protocol gathered information on boats (including outboards), and infrastructure (e.g., cabins, property, tent platforms, and drying racks). For each boat or infrastructure owned and in use by a household, researchers gathered the following data:

- Purchase cost
- Purchase year
- Labor hours to make (where applicable)
- Household maintenance hours per year
- Maintenance and material costs per year
- How often does the household purchase a new boat or infrastructure (where applicable)?
- Percent used for subsistence

Section D of the household interview ("Harvest and Processing -2010") focused on harvest amounts and processing activities between January and December 2010. Researchers gathered data on harvested resources, received resources, and processing times for marine mammals, terrestrial mammals, birds, eggs, fish, marine invertebrates, berries, and plants. Because the primary purpose of Section D was to determine household effort in terms of processing times, the study team gathered certain data at a more general resource level rather than at the species level (i.e., rather than asking respondents whether they harvested cormorants, auklets, and murre eggs, researchers asked about geese, sea birds, ducks, and eggs). However, if respondents provided

species-level harvest amounts, researchers readily gathered these data. For each subsistence resource, Section D gathered the following data:

- Did the household try to harvest the resource?
- Amount harvested
- Was the amount harvested typical of usual harvests, more, or less?
- Amount received
- Hours spent processing per unit harvested
- Number of household members processing
- Did the household give any of the resource away?

During Section E of the household interview ("Subsistence Activities – 2010"), researchers asked household respondents to review each of the subsistence activities household members engaged in between January and December 2010. The primary purpose of this section of the interview was to determine the overall number of trips taken by household members to hunt or harvest subsistence resources, as well as the overall time spent preparing for or actively hunting or harvesting subsistence resources during these trips. Researchers generally asked respondents to describe their subsistence harvesting activities chronologically starting in January 2010 (i.e., "What was the first subsistence activity you or a household member took part in starting in January 2010?"). If a resident reported hunting or harvesting multiple resources at the same time, this was recorded as a single subsistence activity (e.g., fall berry harvesting and fishing). For each 2010 subsistence activity reported by a household, researchers gathered the following information:

- Months of subsistence activity
- Number of trips taken for that subsistence activity during the study period
- Number of hours spent preparing for each trip
- Typical hours spent on each trip
- Number of household participants on each trip

After recording all of the household's subsistence activities for 2010, researchers asked respondents to estimate the average annual amount spent on fuel for snowmachines/ATVs, fuel for boats, and store-bought food supplies for subsistence hunting and harvesting trips. These questions concluded the household interview for valuing subsistence production. Each respondent received a $75 honorarium upon completing the interview.

CHAPTER 7.

ANALYSIS OF COMMUNITY DATA – SUMMARY OF RESULTS

7.1 POST-FIELD DATA PROCESSING

Upon completion of fieldwork, the study team reviewed and edited each of the completed protocol forms to ensure accuracy and clarity for data entry, and compiled additional data that had been gathered in the field (e.g., cost estimates from local stores, community-wide harvest estimates, key-informant information). The study team developed an Access database for data entry, which included one data entry form per interview section. Researchers entered the data from each completed protocol into the Access database, and then conducted a quality control check of the entire database.

The Access Database resulting from entry of field data consists of six related tables: (1) Household Information; (2) Technologies; (3) Infrastructure; (4) Harvest and Processing; (5) Subsistence Activities; (6) Procurement Expenses. Study team analysts exported the database from Access to the Statistical Package for the Social Sciences (SPSS) and used SPSS to run frequencies and calculations to determine community and households totals for the variables collected for this study.

To aid in the determination of costs per year related to tools and technologies, the study team researched and developed cost estimates for each of the technology and tools reported and assigned these estimates to each reported item in the two study communities.

After running SPSS, the study team created the analytical variables that aggregated by household the dollars and hours spent engaging in subsistence production as related to technology and tools, infrastructure, harvesting and processing, and subsistence activities. Table 7-1 shows the list of variables, a definition of each variable, and which pieces of fieldwork data were used to create the analytical variable. The data in column three of Table 7-1 correspond to the data collected on the field protocol shown in Appendix 2.2.

Table 7-1: Subsistence Production Variables

Variable	Definition	Data Used from Field Protocol & Post-field Price Data
Household ID	Random household number assigned during fieldwork	Wales – Household Number 1-46 Diomede – Household Number 101-135
Community	Community where household was located	Wales or Diomede
Hours to Make Technology/Tool	Sum of hours per year spent making technology and tools	(Labor Hours to Make/How Often Purchased)* (Percent Used for Subsistence)
Purchase cost for Technology/Tool	Sum of dollars per year spent purchasing technology and tools	(Purchase Price/How Often Purchased)* (Percent Used for Subsistence)
Material Cost for Technology/Tool	Sum of dollars per year spent on materials to make technology and tools	(Material Cost Per Year/How Often Purchased)* (Percent Used for Subsistence)
Hours to Maintain Technology/Tool	Sum of hours per year spent maintaining technology and tools	(Household Maintenance Hours Per Year * Percent Used for Subsistence)
Maintenance Cost for Technology/Tool	Sum of dollars per year spent maintaining technology and tools	(Maintenance Cost Per Year * Percent Used for Subsistence)
Costs Per Year for Technology/Tool	Sum of dollars per year spent using technology and tools	(Costs Per Year * Percent Used for Subsistence)
Hours to Make Infrastructure	Sum of hours per year spent making infrastructure	(Labor Hours to Make/How Often Purchased)* (Percent Used for Subsistence)
Purchase Cost for Infrastructure	Sum of dollars per year purchasing infrastructure	(Purchase Cost/How Often Purchased)* (Percent Used for Subsistence)
Hours to Maintain Infrastructure	Sum of hours per year maintaining infrastructure	(Household Maintenance Hours Per Year * Percent Used for Subsistence)
Maintenance Cost for Infrastructure	Sum of dollars per year maintaining infrastructure	(Maintenance Cost Per Year * Percent Used for Subsistence)
Pounds Harvested	Sum of edible pounds harvested per year	SUM Amount Harvested
Hours Processing Amount Harvested	Sum of hours spent processing harvest per year	(Amount Harvested * Hours Process Per Unit)* (Number of Participants)
Pounds Received	Sum of edible pounds received per year	SUM Amount Received
Hours Processing Amount Received	Sum of hours spent processing received subsistence per year	(Amount Receive * Hours Process Per Unit Received) * (Number of Participants)
Hours to Prepare for Trip	Sum of hours spent per year preparing for subsistence trips	(Number of Trips * Number of Participants) * (Number of Hours Preparation)
Hours Per Trip	Sum of hours spent per year on subsistence trips	(Number of Trips * Number of Participants) * (Number of Hours Per Trip)
Costs of Terrestrial Fuel	Sum of dollars spent per year on fuel for terrestrial travel	SUM Terrestrial Fuel Expense
Costs of Boat Fuel	Sum of dollars spent per year on fuel for boat travel	SUM Boat Fuel Expense
Costs of Food Expenses	Sum of dollars spent per year on food while on subsistence trips	SUM Food Expense

Variable	Definition	Data Used from Field Protocol & Post-field Price Data
Costs of Rental Expenses	Sum of dollars spent per year on rental of equipment for subsistence	SUM Rental Expense
Costs of Fuel for Rental Equipment	Sum of dollars spent per year on fuel for rental equipment for subsistence	SUM Fuel for Rental Equipment
Hours Spent on Subsistence	Hours spent on subsistence per year	SUM of all Hours Variables
Costs of Subsistence	Dollars spent on subsistence per year	SUM of all Cost Variables
Source: Tetra Tech study team, 2011		

7.2 FIELDWORK SUMMARY

As shown in Table 7-2, researchers interviewed 32 households in Wales and 23 households in Diomede. The U.S. Census Bureau found 38 occupied households in Diomede and 43 occupied households in Wales at the time of their 2010 U.S. Census. At the time of the field research in March 2011, the study team found a total of 30 occupied households in Diomede and 40 occupied households in Wales. U.S. Census numbers generally include temporary teacher housing when counting occupied households in a community. For this study, the study team only included permanently occupied households; this included teachers if they stayed in the community year-round rather than returning home for the summer or if they had taken up permanent residence in the community. The study team also did not count households whose occupants had moved out of the community indefinitely for medical or other reasons.

While researchers were in Diomede, air service to the island had just recently resumed and a number of residents had left the community to tend to medical, employment, or other needs. Residents who were gone temporarily were included toward the count of occupied households; however, if local residents were unsure if or when a household would be returning to the community, these households were not counted as currently occupied households.

In March 2011, the study team interviewed 23 of the 30 currently occupied households in Diomede (76 percent) and 32 of the 40 currently occupied households in Wales (80 percent). Four currently occupied Diomede households declined to participate in the study and three were out of town for the duration of fieldwork. In Wales, three currently occupied households

declined, three were unavailable (i.e., the study team was unable to secure interviews with them), and two were out of town. In addition to conducting interviews from 23 households in Diomede, the study team gathered proxy data for households who were out of town; in particular, two crew members on marine mammal hunting crews provided information about tools and technologies owned and in use by their boat captains.

Table 7-2: Wales and Diomede Household Summary

	Number of Occupied Households (2010 U.S. Census)	Population (2010 U.S. Census)	Occupied Households (March 2011 Fieldwork) [1]	Number (%) of Occupied Households Interviewed
Diomede	38	115	30	23 (76.7%)
Wales	43	145	40	32 (80%)
[1]Includes only households occupied at the time of fieldwork (March 2011).				
Source: Tetra Tech study team, 2011				

7.3 SURVEY RESULTS AND ESTIMATES OF SUBSISTENCE VALUATION USING PRODUCTION COSTS

Following completion of the field data collection, the study team embarked on review and processing of the data for estimating the subsistence production costs for the two study communities. This section provides a discussion of the conversion of survey data on subsistence hours and production costs into an economic value estimate, and a summary of the resultant subsistence valuation estimates for each community.

Table A-1 in Appendix 3 includes data collected for all variables summed by household from the survey respondents. Three summary columns in Appendix 3 Table A-1 form the basis for estimates of production value. These three columns sum the household annual subsistence costs; the household subsistence hours, and the total harvest of subsistence foods. The data on household annual subsistence costs and household subsistence hours were used to estimate the production costs for the harvest.

Costs for technologies, tools, supplies and materials were collected directly by the subsistence survey. Labor cost was calculated based on the surveyed hours spent on subsistence activities multiplied by a representative hourly wage rate as described below. The following are the main steps in the analysis:

- Sum cost variables from survey
- Sum labor hours from survey
- Extrapolate survey sample to community
- Multiply labor hours by representative wage rate to yield labor value
- Sum production cost and labor value to yield total annual subsistence value
- Compute present value of annual value over period of analysis

All the survey data and analyses are based on data representing the calendar year 2010. All estimates, including the production cost estimates, should be regarded as cross-sectional point estimates that best represent the target year. For purposes of applying the results to future analyses for similar communities the data could be utilized to value subsistence, but the further in time from the data collection year of 2010, the less confidence one should have in the estimate. As will be discussed below, it is possible to update the estimates using a combination of key informant interviews and cost of living (CPI) indexes.

The underlying assumption in our calculations of economic value is that subsistence is an economic choice. Each resident in a household makes individual choices on the mix between subsistence production and wage-based activities, based on what will maximize satisfaction to the household. Most rural Alaska households, including those in Diomede and Wales, integrate subsistence production with wage-based activities.

The study team recognizes and acknowledges that employment opportunities in rural communities such as Diomede and Wales are somewhat constrained, compared with areas of the state that have resource-based or tourism-based economic activities. However, the study team also recognizes that subsistence production requires a wide range of training and skills to be successful. Activities such as berry picking are relatively straightforward. Being a whaling

captain, on the other hand, requires very complex skills to be successful, including a high degree of technical, organizational, managerial and bookkeeping skills in addition to the required hunting skills. For example, as one study team member articulated, "If you were in the Bering Strait on an ice pan, in a skin boat, and the ice broke away from shorefast ice, the skin covered boat began to leak profusely and you were caught in a strong current carrying you to the Arctic Ocean, how much would you pay for the knowledge that the hunter would use to keep you dry, warm, fed, afloat, save your life and get you back to shore?"

Our conclusion is that individuals within households could, based upon the general skills required, at least be expected to earn at least as much as all Alaskans as a whole, should they choose to shift entirely to wage-based economic activities. To take advantage of wage-based economic activities could require household residents to move to another part of Alaska, but individuals have that choice available.

As noted earlier in the report, it is desirable for the methodology in the valuation method to utilize available data to be able to replicate the results of the production cost estimates in other communities. Average wage data was obtained from the Alaska Department of Labor, which accurately represents a cross-section for all working Alaskans over a calendar year, in this case 2010.

The Alaska Department of Labor data is based on actual monthly earnings averaged over 2010 for 323,410 workers throughout Alaska. The total earnings for these workers totaled $15,430,000,000 for average monthly earnings of $3,977. To translate this average monthly earning for all Alaskans to an average hourly wage rate required one assumption on the part of the study team. That assumption is for the average number of hours worked during a month. While the Alaska Department of Labor data is based on actual earnings, they do not tabulate the actual number of hours worked. The study team utilized a standard 2,080 annual work year as our basic assumption in making this calculation (40 hours a week times 52 weeks per year), yielding an average of 173.33 hours per month. The resulting average wage rate for all Alaskans in calendar year 2010 is $22.94 per hour. This figure was used in the calculations shown below for valuing subsistence hours in Diomede and Wales. We need to recognize that there are at least

a couple of factors that make the choice of the average wage for all Alaskans a conservative one. First, we did not account for holidays and vacation time, because the Alaska Department of Labor does not account for actual hours worked. While recognizing that there is a conservative bias in the estimate in the calculation of average wage, the study team did not have a basis for accounting for holidays and vacation hours that are undoubtedly part of the Alaska Department of Labor data files.

It should be noted that the study team not only wanted to use the average Alaska wage, but also as a comparison to look at percentiles of the Alaska wage rates to match with percentiles of subsistence production. It is recognized that the high producing subsistence households are responsible for a disproportionate portion of subsistence harvests in the respective communities. Thus, it might be instructive to match the 70th percentile subsistence producer with the 70th percentile Alaska wage earner. However, due to the categories for the data files provided by the U.S. Census Bureau, that comparison was not possible. It may be possible in future applications of this method, if a special data base on Alaskan worker earnings could be obtained.

Next, the average wage rate represents direct pay and does not account for benefits, such as retirement that may be a part of compensation for at least part of the State of Alaska workers in the Alaska Department of Labor data files. Again, however, while recognizing the conservative bias in the utilization of the direct average wage rate for all Alaskans, we do not have data to support an adjustment for average annual benefits.

All of the summarized results of the production valuation for Wales and Diomede are shown in Appendix 3 Table A-1. Looking at the upper portion of Table A-1 shows that in Wales, there were 32 households that participated in the survey. Table 7-2 tells us that the 2010 Census showed a total of 43 households in the community, leaving 11 households that were not surveyed (see lines 1-3 in Table 7-3, below).

The total subsistence costs in 2010 for the 32 Wales households surveyed was $172,000 (see line 1). Using the average per household expenditure to extrapolate the survey results to the 11 Wales households that did not participate in the survey increases the total annual expenditure on

subsistence in Wales to be $231,000 for 2010 (see line3). This calculates out to a household average of $5,360 per household (see line 4).

Table 7-3: Summary of Subsistence Valuation from Production Costs in Diomede and Wales

				Number of Households
1	Wales	$172,000	sum of subsistence costs (survey)	32
2		$59,000	estimation for unsurveyed households	11
3		$231,000	total 2010 subsistence costs	43
4		$5,360	per household subsistence costs	43
5	Diomede	$69,500	sum of subsistence costs (survey)	25
6		$36,200	estimation for unsurveyed households	13
7		$106,000	total 2010 subsistence costs	38
8		$2,780	per household subsistence costs	38
9	Wales	23,689	sum of subsistence hours (survey)	32
10		8,143	estimation for unsurveyed households	11
11		31,832	total 2010 subsistence hours	43
12		740	per household subsistence hours	43
13		$17,000	calculated value of subsistence hours per household	
14		$730,000	calculated value of subsistence per community	
15	Diomede	15,630	sum of subsistence hours (survey)	25
16		8,128	estimation for unsurveyed households	13
17		23,758	total 2010 subsistence hours	38
18		625	per household subsistence hours	38
19		$14,300	calculated value of subsistence hours per household	
20		$545,000	calculated value of subsistence per community	
21	Wales	31,392	total reported subsistence harvest production in 2010 in pounds	
22	Wales	981	reported per household harvest production in 2010 in pounds	
23	Diomede	53,183	total reported subsistence harvest production in 2010 in pounds	
24	Diomede	2,127	reported per household harvest production in 2010 in pounds	

Note: Displayed numbers are rounded.
Source: Tetra Tech study team, 2011

The lower portion of Table 7-3 shows a total of 23,689 hours in 2010 (see line 9) that were used in subsistence harvesting, food processing and other support activities in Wales. Again, extrapolating for the 11 households that did not participate in the survey increases the total number of subsistence hours in 2010 to 31,832, (see line 11) or an average of 740 hours per household (see line 12). Applying the State of Alaska 2010 average wage rate of $22.94 per hour, the total estimated cost of production for subsistence activities in Wales in 2010 totaled $730,000, a household average of $17,000 (see lines13 and 14).

Summing the two production cost components (for production expenditure see line 3 and for value of subsistence hours expended see line 14) for Wales gives a total estimated cost of production for subsistence in Wales of $961,000, or a household average of $22,300 (Table 7-4, below). These figures are the end result of the calculations of production cost value of subsistence value in Wales for 2010.

The same calculations were made for Diomede, based on the surveys completed in that community. The top portion of Table 7-3 shows that 25 households were surveyed out of the total number of households from Table 7-2 of 38 (see lines 5-7). This leaves a total of 13 households that were not surveyed. The total subsistence costs for these 25 surveyed households were $69,500 (see line 5). Extrapolating the average expenditure per household to the total number of households yields a total estimated subsistence expenditure in Diomede in 2010 to be $106,000 (see line 7) and a household average of $2,780 (see line 8).

The lower portion of Table 7-3 shows a total of 15,630 hours per household (see line 15) that were used in subsistence harvesting, food processing and other support activities in Diomede in 2010. Extrapolating for the 13 households that were not surveyed yields a total number of subsistence hours in 2010 to 23,758 (see line 17), or an average of 625 hours per household (see line 18). Applying the State of Alaska 2010 average wage rate of $22.94 per hour, the total estimated cost of production for subsistence activities in Diomede in 2010 totaled $545,000, a household average of $14,300 (see lines 19 and 20).

Summing the two production cost components (for production expenditure see line 7 and for and value of subsistence hours expended see line 20) for Diomede gives a total estimated cost of production for subsistence in 2010 of $651,000 or a household average of $17,100 (see Table 7-4). These figures are the end result of the calculations of production cost of subsistence in Diomede for 2010.

Table 7-4: Summary of Production Value of Subsistence in 2010

	Community Estimated Value	Estimated Value per Household
Wales	$961,000	$22,300
Diomede	$651,000	$17,100
Source: Tetra Tech study team, 2011		

A final component of subsistence data for Diomede and Wales from the community survey provides an estimate for overall pounds of subsistence production for calendar year 2010. This production includes reported species and food items harvested during calendar year 2010, for each household surveyed and is not expanded for the entire community. While the study team did not expand the data for the entire community, it is worth noting that reported marine mammal harvests may be high due to the fact that multiple households may have reported the same marine mammal harvest due to the nature of their group marine mammal harvesting activities. In Diomede, the study team received a community-wide marine mammal harvest estimate from the Native Village of Diomede and this estimate was lower than the reported harvest for the sample. These figures are shown at the bottom of Table 7-3 and are: Wales 31,392 pounds of subsistence production in 2010, a household average of 981 pounds; and Diomede 53,183 pounds; a household average of 2,127 pounds.

7.4 APPLICATION OF THE SUBSISTENCE VALUATION TO CORPS OF ENGINEERS BENEFIT/COST ANALYSES

Taking the total annual estimate of subsistence production of Diomede ($651,000 per Table 7-4), we can estimate the potential benefit to the community from an increase in subsistence production, despite the fact that it is a non-market commodity. For example, if a proposed project would result in a hypothetical increase of 20 percent in annual subsistence production, due to increased efficiency and safety, the annual benefit to accrue to subsistence production would be 20 percent of $651,000, or $130,000 on a recurring annual basis.

Corps economic evaluations are typically performed for a 50 year period of analysis with future values discounted to a present value using the current Federal discount rate for water and related land resources studies. This approach was applied to the results of the subsistence evaluation study using FY2011 price levels and the FY2011 discount rate of 4.125%.

Combining labor value and production cost results in a total average annual cost of production of subsistence for Diomede of $651,000. Assuming this value was to remain constant over the 50 year period of analysis, cost of production for Diomede subsistence would have a net present value of $13,691,000.

Combining labor value and production cost results in a total average annual cost of production for Wales of $961,000. Assuming this value was to remain constant over the 50 year period of analysis; subsistence for Wales would have a net present value of $20,210,000.

7.5 INTERPRETATION OF THE SURVEY RESULTS – CONCLUSIONS FROM THE PRODUCTION COST ANALYSIS

Introduction

The overriding conclusion from this study is that a production cost model is one method of characterizing the economic value of subsistence but does not fully account for the social, cultural, and nutritional value of subsistence. The benefits of the production costs methodology

are that it is theoretically defensible, practically applicable, and can be updated and replicated. Recognizing that the social, cultural, and nutritional elements of subsistence are important in understanding the overall value of subsistence to a community, this study does present an improved approach to valuing subsistence that the Corps can use for future projects.

Examining the results of the study (Table 7-4), the variability in total costs and household costs between Diomede and Wales are not surprising given the multitude of factors that are involved in subsistence production. On reflection, the study team identified a number of factors that may influence total production costs in communities. These factors include such things as availability of market goods; technology, tools, and infrastructure; harvest methods; and availability of subsistence resources. The following text describes these factors. Further analysis would be needed to determine which of these factors, if any, influence production costs in Wales and Little Diomede:

7.5.1 Availability of Market Goods

A subsistence community with ready access to market goods (e.g., well stocked stores or regular shipments of produce) may have less reliance on subsistence foods. A community that harvests fewer edible pounds of subsistence resources due to the availability of market goods may also spend less time and money on subsistence activities resulting in lower production costs.

7.5.2 Technology, Tools, and Infrastructure

The types of technologies, tools, and infrastructure used by a community vary depending on geographic and economic factors. Communities limited to fewer technology, tools, and infrastructure due to these factors have fewer expenses associated with those items (e.g., purchase and maintenance costs of snowmachines). For example, communities not located near water, would likely have fewer residents owning boats and therefore fewer costs associated with purchasing and maintaining these items.

7.5.3 Harvest Methods

The methods used by a community to harvest subsistence resources (e.g., organization of the hunt, harvest gear) affect the efficiency with which subsistence resources are harvested and may indirectly affect the costs of subsistence production. Group based subsistence activities consolidate harvest effort so that they require fewer supplies (e.g., gas), fewer tools (including transportation), and in some cases less labor (e.g., more efficient harvesting, butchering, and processing). In addition, certain types of harvest gear (e.g., fish wheel versus rod and reel) are more efficient for harvesting large quantities of a resource and the use of more efficient technologies may result in lower production costs.

7.5.4 Availability of Subsistence Resources

The availability of subsistence resources within close proximity to a community may affect the costs and time associated with harvesting. If residents have to travel farther to access productive subsistence harvest locations, then the costs of production may be higher than in communities where subsistence resources are readily available in close proximity to the community.

7.5.5 Community Cohesiveness

As discussed earlier in this document (Section 3.2.2 - *Special Roles Component*), members of a subsistence-based community often hold special roles that are integral in ensuring the proper harvesting, processing, and distribution of subsistence resources. In particular, certain households often provide a majority of subsistence products, which are distributed throughout the community. The loss of such a household or of a particularly active harvester during any given year due to relocation, illness, death, or other factors, may temporarily affect the overall productivity of a community.

7.5.6 Results

Table 7-4 shows the 2010 production costs of subsistence is higher in Wales than Diomede. However, <u>we cannot conclude that the total value of subsistence in Diomede is less than Wales</u>. As pointed out in earlier sections of this report, there are social, cultural, and nutritional

components of subsistence that are difficult to quantify and not included in this valuation. These production costs should only be regarded as a partial estimate of total subsistence value. As discussed above, the production cost methodology itself may inject a bias for inefficient production into the process of valuation based on location (i.e., proximity to available resources) and harvest methods (e.g., harvest gear, consolidated hunting efforts that result in large harvests). The study team considered whether there might be a way to factor efficiency into the production cost method, but was unable to develop a calculation tool to accomplish this, without adding uncertainty, and perhaps injecting arbitrary changes into the estimates of subsistence valuation.

Considering the factors described above, the discrepancy in subsistence costs found in this study could be related to the location of Diomede and number of group based subsistence activities. Another potential reason for the discrepancy in costs could simply be the greater number of high cost means of transportation in Wales (snowmachines and four wheelers) compared to Diomede, and the extra capital that is required to purchase and operate expensive four wheelers and snowmachines and the parts, labor, and maintenance associated with their upkeep. Finally, differences in production costs for the two study communities may be due to anomalies associated with the use of a single study year to represent the cost of production. For example, a number of households in Diomede were gone for the duration of the field effort due to the recent resumption of transportation to and from the community. These included two boat captains whose production costs were not factored in to the community estimate. Further analysis of the study's data would be needed to more fully ascertain the causes for the difference in subsistence costs between these two study communities. Although the production cost estimate is less than perfect, it is more comprehensive than methods, such as substitute valuation for food, which the Corps Alaska District has used in the past.

CHAPTER 8.
APPLYING THE SUBSISTENCE VALUATION APPROACH AND FRAMEWORK TO OTHER COMMUNITIES

8.1 APPLICABILITY OF STUDY RESULTS TO OTHER ALSAKA DISTRICT PROJECTS

A goal of Alaska District in conducting this study was to develop a framework for use in systematically accounting for the effects on subsistence activity when evaluating the effects of proposed water resources projects. As described in this report, the study team determined that a more holistic approach to valuation of subsistence activity was to apply a cost of production valuation approach as opposed to substitute valuation approaches applied in the past. A methodology was developed and applied to two communities: Diomede and Wales, Alaska.

The subsistence valuation framework developed and presented in this report is applicable for valuation in other Alaska communities. It could be applied in two primary approaches. First, if a project is proposed in a community that is determined not to be sufficiently similar to a community already evaluated (at this time Diomede and Wales) then an application similar to what was conducted for Diomede and Wales in this study could be applied to that community. The second approach could be applied when the new community being studied is determined to be similar enough to a previously evaluated community that results of a previous application could be transferred in an appropriate manner. These two approaches are described below.

8.1.1 Approach A – Apply Framework to Develop Subsistence Valuation for a Community

As described above, in situations where a community under study is dissimilar to previously evaluated communities in terms of its subsistence characteristics, the same framework as applied for Diomede and Wales could be applied to estimate the value of subsistence in the community. This would involve researching the general subsistence characteristics of the community,

reviewing the survey instrument to determine if update was necessary, conducting field data collection and post processing data to derive the subsistence valuation estimate.

Operationally, the survey team found that the best way to obtain production data depended on the object in question (e.g. ammunition versus sled). Differences in the production technologies, tools, and objects used in production across communities would have to be taken into account in determining how each object is treated in the interview. That said, the procedures to be followed can be replicated with little or no change.

The survey itself is not generic, and does not apply to all types of subsistence communities in all areas of Alaska. The survey was developed to get the necessary data for Diomede and Wales. Both communities are remote, highly dependent on marine mammals, have difficult access, and few employment opportunities. If you were going to apply the problem to evaluating the value of subsistence production in a nearby community such as Point Lay, the application would be similar to Wales or Diomede.

If it is desired to apply the method to another area with different characteristics, one would need to make some modifications to the survey, but those would be relatively modest. Modifications may include updated lists of resources, technologies, tools, and infrastructure. It would be best to conduct a literature review and key informant interviews prior to replicating this survey in another community in order to identify the universe of technologies/tools used and species harvested.

As more communities undergo subsistence valuation, and the database of community information is expanded, the likelihood of being able to successfully apply Approach B would be expected to increase.

8.1.2 Approach B – Adapt Results of an Existing Application of Framework to a new Community

As water resources projects are considered by Alaska District, the results of the valuation for these communities may be considered for appropriateness for application the new community

under study. For example, if a community under study was determined to have similar general characteristics on community subsistence participation percentages, similar type of geographic setting, and/or similar types of resource collection patterns, then portions of the results such as per household production costs and harvest quantities may be appropriate for extension to that community.

A spreadsheet tool has been completed for each community to easily allow Alaska District to update results for future price levels and Federal discount rates. If it was desired to update the base data in a previous applications (like the ones completed for Diomede and Wales), it could likely be accomplished with selected key informant interviews to update the cost items, and see if any patterns had changed in subsistence production and processing. The spreadsheet valuation tool developed in this study for Diomede and Wales is presented and discussed in Appendix 5.

8.2 CONSIDERATIONS FOR DETERMINATION OF APPROACH FOR SUBSISTENCE VALUATION IN OTHER ALASKAN COMMUNITIES

As described above, the framework to the valuation of subsistence activities developed in this current study for testing at Diomede and Wales can be applied with modifications to various contexts where subsistence activities are a significant and general characteristic of local populations. There are some important considerations when determining which of the two outlined approaches is appropriate for a community. A discussion of some of these considerations is provided below.

8.2.1 Extent of Community Participation in Subsistence

When determining if the results of a previously evaluated community are applicable to a different community an important consideration is the extent of community participation in subsistence production. For example, consider the case study at Diomede where nonmarket production from local resources was a predominant feature of the community. Diomede is a community in which subsistence activities are inextricably integrated with the economy. Social and cultural activities are both tightly linked to subsistence and fundamental to the existence of the community. Therefore, the value found in all components of subsistence will contribute to the welfare,

maintenance and well-being of the community. Not all rural communities fit this profile and therefore it is important to be able to identify where differences lie and what their significance is. The place of subsistence in the community can vary and its assessment requires research using concepts and tools that can provide important distinctions some of which can be quantified and some of which are qualitative.

Subsistence-based communities demonstrate mixed economies combining subsistence production with sources of cash; however, the characteristics of daily life are driven by subsistence activities. Cash in these communities is a means used primarily to make subsistence possible or to improve productive capabilities. A ratio of household income to the value of functioning technology used for subsistence would be an illustrative measure of how cash was being used in a community.

Another important way to identify the extent of subsistence in a community is to develop a list of the subsistence activities locally recognized and determine the range of activities practiced and the average number of activities engaged in by members of the community. Other significant measures which distinguish subsistence-based communities are the number of resources utilized, the average number of resources harvested per household, the amount of edible pounds harvested per capita, and the number (kinds) of resources distributed to other households. Another criteria may be the extent to which a community is characterized by "super" households whose production supplies the aged, indigent and injured through sharing. In Alaska Native subsistence-based communities, sharing is a deeply held and demonstrated value, and occurs more frequently than in other communities. In subsistence-based communities, there are typically cultural models of a number of elements which distinguish local concepts from those found in urban, predominantly non-Native communities. The beliefs discussed earlier of how specific foods, such as seal meat and blood, are important to mental and physical health is an example of a distinctive cultural model found among various Arctic populations.

8.2.2 State of Alaska Standard Criteria

After the passage of the Alaska State law in 1978 designating subsistence as the first priority of natural resource allocation, eight criteria were established and communities were evaluated on

the extent to which they met these criteria. Those criteria evolved somewhat as they were incorporated into the standards used to make customary and traditional determinations about subsistence status when federal regulation of subsistence that began in 1994. These criteria as defined today in U.S. Code of Federal Regulations Title 36, Part 242.16 are as follows:

> *(1) A long-term consistent pattern of use, excluding interruptions beyond the control of the community or area;*
>
> *(2) A pattern of use recurring in specific seasons for many years;*
>
> *(3) A pattern of use consisting of methods and means of harvest which are characterized by efficiency and economy of effort and cost, conditioned by local characteristics;*
>
> *(4) The consistent harvest and use of fish or wildlife as related to past methods and means of taking; near, or reasonably accessible from, the community or area;*
>
> *(5) A means of handling, preparing, preserving, and storing fish or wildlife which has been traditionally used by past generations, including consideration of alteration of past practices due to recent technological advances, where appropriate;*
>
> *(6) A pattern of use which includes the handing down of knowledge of fishing and hunting skills, values, and lore from generation to generation;*
>
> *(7) A pattern of use in which the harvest is shared or distributed within a definable community of persons; and*
>
> *(8) A pattern of use which relates to reliance upon a wide diversity of fish and wildlife resources of the area and which provides substantial cultural, economic, social, and nutritional elements to the community or area.*

Making a comparison of some of these criteria between previously evaluated communities and a new community under study could provide a means and defensible basis for appropriately applying previous valuation results to that community. Some of the key variables to consider in making these comparisons are presented below.

8.2.3 Geography

Geographic connectedness is certainly a key variable to consider in making the comparisons, because it affects how a community functions and the manner in which subsistence activities are positioned. Throughout rural Alaska, communities fall into several categories and types. Economist Scott Goldsmith distinguishes between small rural communities on the basis of their connectedness to the rest of Alaska. Those he terms remote rural communities are those which are only connected to other communities through occasional air or vessel connections. Diomede may in fact be the most isolated of the remote rural communities in Alaska. At the opposite end of the continuum are rural communities that are well-connected to transportation systems; the most accessible are those on the paved highway system. Connectedness is important in establishing the reliability of services and goods that must be acquired via transportation. Distance and means of transportation affect the costs of goods and services to village communities and may play an important role in determining the level of use of local resources for subsistence.

8.2.4 Socioeconomic and Demographic Conditions

The local economic conditions present another set of variables to consider in comparing rural communities. The nature of wage employment and cash earning opportunities are important to consider as they relate to how subsistence activities can fit into the seasonal rhythm. For example, commercial fishing as a source of cash may present much greater opportunities for engaging in subsistence than working in a mine. In addition, increased employment opportunities and higher incomes may support subsistence activities (e.g., through the purchase of snowmachines and fuel).

The size of a community is another key variable to consider. Regional centers such as Kodiak, Dillingham, Bethel, Nome, Kotzebue and Barrow are more complex economically due to the larger amounts of wage labor or cash earning opportunities from commercial fishing and from various sources of office employment (state, federal, corporate) than are the smaller outlying communities. Also, their transportation linkages are more reliable and frequent. How subsistence functions in these communities is likely different than in smaller villages. More

significantly, the integration with the market economy is much tighter which affects many social and cultural aspects of daily life. However, it should be recognized that there may be subcommunities in these regional centers which closely resemble through their behaviors the characteristics of subsistence villages. Such conditions appear to be the case in ethnically mixed regional centers such as Dillingham, Bethel, Nome, and Barrow.

Ethnic composition of the community is also a key variable to consider. Census figures demonstrate that Alaska's smaller remote rural villages have predominantly (80 percent or more) Alaska Native populations. Most residents in such communities have deep social and cultural ties to their village and nearby environment in which customary and traditional use patterns are well-known and transmitted from one generation to the next. Alaska Native villages are distinguished by, among other indicators, significantly higher numbers of species used, significantly greater levels of subsistence poundage produced and significantly higher levels of sharing among households.

8.2.5 Resource Availability

Another key variable to compare between communities already studied and those being newly studied would be the availability of resources. Since Alaska has a significant amount of environmental variation from coastal to interior from Arctic to Aleutian, the types of resources available and the manner in which they are harvested and integrated with the social and cultural elements of subsistence varies significantly between villages and regions. Regional models in Alaska could be developed that provide a basic profile of the kinds of resources available, the types of technologies generally employed in harvesting and storage, the kinds of subsistence activities that are characteristic, and the general patterns of social institutions and cultural activities that have been documented over the past 30 years. These could then be applied to villages to identify the specifics of local subsistence patterns.

8.3 APPLYING SUBSISTENCE ACTIVITY VALUATION IN COMMUNITIES OUTSIDE ALAKSA

8.3.1 Introduction

In many parts of the United States, subsistence production of food and other resources is an important characteristic of small, rural, isolated communities. This is certainly true in coastal regions of the Gulf of Mexico and the Pacific Northwest. For example, Gramling et al. (2006:2) report research on subsistence activities of rural coastal communities in Louisiana noting "that in the Louisiana coastal marsh a relatively large proportion of the support of the people is by means of non-market activities - what we are calling 'subsistence' activities." Gramling et al. (2006:9) developed a research instrument based on studies of the Alaska Department of Fish and Game Division of Subsistence and mailed out a survey to a random sample of residents of Bayou Lafourche to which they received 180 responses. The survey asked questions about subsistence activities such as harvesting, receiving, consuming, trading and buying for 45 species. Over 50 percent of respondents indicated they ate or consumed 11 of the species with the largest number of individuals reporting consumption of 13 species. More than a quarter (27 percent) indicated they consumed alligator (Gramling et al. 2006:12). Only six of the respondents reported eating none of the subsistence species. Significant levels of distribution, trade and purchase of these species were also reported. The returns compiled in Gramling et al. (2006:19) led to the following conclusion:

> *Given the findings...of a...fairly intense, widespread, diverse, extensive and complex network of use, sharing, barter and sale of subsistence resources, the safest hypothesis remains that the subsistence economy is too important and too large to be simply ignored, as it is by some of the rather blunt measures of economic activity/costs and benefits typically used in economic impact assessments. Yet they may be worth more to coastal residents and communities than all the reported resource harvest economic activity, which can be estimated through existing data sources.*

Further, the report noted that these subsistence activities and the resources upon which they depend "are at risk, but...do not appear in any existing data" (Gramling et al. 2006:3).

There are several implications of this example for research on subsistence activities in areas outside Alaska. First, subsistence activities are important but undocumented, probably in many areas, but especially in coastal regions and for small, rural communities. Second, subsistence activities make a substantial contribution to the economy and cultural welfare based on measures of economic and likely cultural value. Third, inclusion of subsistence-related data in considerations about tradeoffs, regulations, and infrastructural development would create more accurate and complete pictures of what is at risk and why investments to protect subsistence activity are important and sensible.

8.3.2 Subsistence Valuation research Recommendations

Although there are apparent limitations to the production costs estimates for this study, it is more comprehensive than substitute valuation methods that the Corps has used in past projects. As this is the initial attempt to apply a production cost methodology for a Corps project, future applications may yield results that more closely approach a comprehensive economic value. In summary, keeping in mind the limitations discussed in Chapter 7 and the lack of a method of valuing the social, cultural, and nutritional elements of subsistence, this study does provide a foundation for future Corps subsistence evaluation projects in Alaska and elsewhere. The study team framework and approach identified in Chapter 1.3 is recommended as a useful framework for future Corps projects. The approach and valuation framework developed for this study to estimate the costs of subsistence production could be applied to other communities in Alaska and elsewhere with appropriate modifications to the study design. Such modifications would include updating the list of technologies/tools and boats/infrastructure to reflect local use patterns (see Appendix 2.2, Sections B and C); updating the list of subsistence resources (see Appendix 2.2, Section D) based on locally available/used resources; and updating variables for the calculation of the cost of subsistence production, including cost and wage estimates, to reflect local economic conditions.

This page intentionally left blank.

CHAPTER 9.

REFERENCES NOT PART OF APPENDIX 1

Alaska Department of Community and Regional Affairs
2011 Community Database on line. Consulted June 15, 2011 for Wales and Diomede. http://www.commerce.state.ak.us/dca/commdb/CF_BLOCK.htm

Alaska Department of Labor, Research and Analysis,
2011 Preliminary Annual Employment and Earnings – 2010. Accessed September 2011 at http://labor.alaska.gov/research/qcew/qcew.htm.

Baker, M.
1906 Geographic Dictionary of Alaska. Second Edition prepared by James McCormick Department of the Interior, U.S. Geological Survey Bulletin No. 299, Series F, Geography, 52. U.S. Government Printing Office, Washington, D.C.

Burg, A.
1952 North Star Cruises Alaska's Wild West. National Geographic, Volume 102, July 1952.

Carson, R. et. al.
1992 A Contingent Valuation Study of Lost Passive Use Values Resulting from the Exxon Valdez Oil Spill, A report to the Attorney General of the State of Alaska.

Dall, W.
1881 Correspondence: The Chukches and their Neighbours in the North-Eastern Extremity of Siberia. In *Proceedings of the Royal Geographical Society and Monthly Record of Geography.* Volume III, 1881, Pages 568-570. Edward Stanford, London.

Durham, F.
1979 The catch of bowhead whales (Balaena mysticetus) by Eskimos, with emphasis on the western Arctic. Natural History Museum of Los Angeles County, Contributions in Science No. 314.

Ellanna, L.
1983a Technological and Social Change of Marine Mammal Hunting Patterns in Bering Strait. Paper presented at the 10th annual Alaska Anthropological Association Meeting, Anchorage, March 12, 1983.

1983b Bering Strait Insular Eskimo: A Diachronic Study of Economy and Population Structure. Technical Paper No. 77. Alaska Department of Fish and Game, Division of Subsistence. Juneau, AK

Executive Office of the President of the United States, Office of Management and Budget.

2003 OMB Circular A-4, Regulatory Analysis, September 17, 2003.

Fortuine, R.
1992 Chills and Fever: Health and Disease in the Early History of Alaska. Fairbanks, Alaska, University of Alaska Press.

Griest, H.
2006 The Big Sickness. Web page accessed June 15, 2011. http://arcticcircle.uconn.edu/HistoryCulture/Sickness/sickness.html

Jackson, S.
1894 Report on the Introduction of Domesticated Reindeer into Alaska, 1894. U.S. Bureau of Education Report 215. Reprint of Senate Executive Document No. 70, Fifty-third Congress, Second Session. U.S. Government Printing Office, Washington, D.C.

Jolles, C
2006 Iñupiaq Maritime Hunters: Summer Subsistence Work in Little Diomede. Pages 263-286 in *Circumpolar Lives and Livelihood: A Comparative Ethnoarchaeology of Gender and Subsistence.* Edited by Robert Jarvenpa and Hetty Jo Brumbach. University of Nebraska Press, Lincoln, NE

Life Magazine
1940 Russians are Reported Building an Air Base a Mile from U.S. Soil. Life Magazine, July 15, 1940, pages 28-29.

Loomis, J.
2001 Passive Use Values of Wild Salmon and Free Flowing Rivers. In Lower Snake River Juvenile Salmon Migration Feasibility Study, U.S. Army Corps of Engineers, Walla Walla District.

Magdanz, J., C. Utermohle and R. Wolfe
2002 The Production and Distribution of Wild Food in Wales and Deering, Alaska. Technical Paper No. 259. Alaska Department of Fish and Game, Division of Subsistence, Juneau, AK

Nelson, E.
1899 The Eskimo About Bering Strait. Eighteenth Annual Report of the Bureau of American Ethnology to the Secretary of the Smithsonian Institution, 1896-97. J.W. Powell, Director. U.S. Government Printing Office, Washington, D.C.

Olson, D.
1969 Alaska Reindeer Herdsmen: A Study of Native Management in Transition. Institute of Social, Economic and Government Research, University of Alaska, Fairbanks, AK

Ongtooguk, P.
2012 Aspects of Traditional Inupiat Education. Found online at: http://www.alaskool.org/native_ed/Pauls_doc2.htm

Ray, D.
1975 The Eskimos of Bering Strait, 1650-1898. University of Washington Press, Seattle and London.

Stern, R., E. Arobio, L. Naylor and W. Thomas
1980 Eskimos, Reindeer and Land. UAF School of Agriculture and Land Resources Management, Agricultural and Forestry Experiment Station Bulletin 59.

U.S. Army Corps of Engineers (Corps)
2000 Planning Guidance Notebook No. 1105-2-100, April 22, 2000.

This page intentionally left blank.

APPENDIX 1

ANNOTATED SUBSISTENCE BIBLIOGRAPHY

APPENDIX 1

ANNOTATED SUBSISTENCE BIBLIOGRAPHY

Table A-1: List of Relevant Subsistence Documents

DOC #	AUTHOR	YEAR	TITLE	REFERENCE TYPE
1	--	1980	Alaska National Interest Lands Conservation Act	Statute
2	--	2009	Title 36: Parks, Forests, and Public Property § 242.17 Customary and Traditional Use Determination Process	Regulation
3	--	2009	Alaska Statutes: Fish and Game Code AS 16.05.940	Statute
4	Active	1998	Why Subsistence is a Matter of Cultural Survival	Journal Article
5	Alaska Federation of Natives	2005	Subsistence – Introduction	Web Page
6	Anderson	1998	A View from the Yukon Flats: An Interview with Gwich'in Leader Clarence Alexander	Journal Article
7	Anderson et al.	1998	Kuuvangmiut Subsistence: Traditional Eskimo Life in the Latter Twentieth Century	Book
8	Argonne National Library, Environmental Science Division	2007	Literature and Information Related to the Natural Resources of the North Aleutian Basin of Alaska	Technical Report
9	Bell and Heller	1978	Nutrition Studies: An Appraisal of the Modern North Alaskan Eskimo Diet	Book Section
10	Bennett et al.	1979	Northern Gulf of Alaska Petroleum Development Scenarios Sociocultural Impacts	Technical Report
11	Bennholdt-Thomsen, Faraclas, and von Werlof	2001	There is an Alternative: Subsistence and Worldwide Resistance to Corporate Globalization	Book
12	Bodenhorn, B.	1989	'The Animals Come to Me, They Know I Share' – Inupiaq Kinship, Changing Economic Relations and Enduring View on Alaska's North Slope	Doctoral Dissertation

DOC #	AUTHOR	YEAR	TITLE	REFERENCE TYPE
13	Bodenhorn, B.	1990	'I'm Not the Great Hunter, My Wife Is': Iñupiat and Anthropological Models of Gender	Journal Article
14	Bodenhorn, B.	2000	It's Good to Know Who Your Relatives Are, but We Were Taught to Share with Everybody: Shares and Sharing Among Iñupiaq Households.	Conference Paper
15	Bogojavlensky	1969	Imaangmiut Eskimo Careers: Skinboats in Bering Strait	Doctoral Dissertation
16	Borre	1991	Seal Blood, Inuit Blood, and Diet: A Biocultural Model of Physiology and Cultural Identity	Journal Article
17	Borré	1994	The Healing Power of the Seal: The Meaning of Inuit Health Practice and Belief	Journal Article
18	Braund and Behnke	1980	Lower Cook Inlet Petroleum Development Scenarios Sociocultural Systems Analysis	Technical Report
19	Braund, Stephen R. and Associates	1986	Effects of Renewable Resource Harvest Disruptions on Community Socioeconomic and Sociocultural Systems: King Cove	Technical Report
20	Braund, Stephen R. and Associates & P.J. Usher Consulting Services	1993	Effects of the Exxon Valdez Oil Spill on Alutiiq Culture and People	Report
21	Brower	2004	The Whales, They Give Themselves: Conversations with Harry Brower, Sr.	Book
22	Brower and Hepa	1998	Subsistence Hunting Activities and the Iñupiat Eskimo	Journal Article
23	Brown and Burch	1992	Estimating the Economic Value of Subsistence Harvest of Wildlife in Alaska	Book Section
24	Burch	2005	Alliance and Conflict: The World System of the Iñupiaq Eskimos. University of Nebraska Press: Lincoln, Nebraska.	Book
25	Callaway	1995	Resource Use in Rural Alaskan Communities	Book Section
26	Campbell, C	2009	The Significance of Seabirds to the Iñupiat of Little Diomede Island	Masters Thesis

DOC #	AUTHOR	YEAR	TITLE	REFERENCE TYPE
27	Campbell	1991	Proposed State Legislation Defines What Subsistence Is, Where it Happens, Who Participates	Journal Article
28	Case	1991	Subsistence and Self-Determination: Can Alaska Natives Have a More "Effective Voice?"	Journal Article
29	Case and Voluck	2002	Alaska Natives and American Laws	Book
30	Caulfield	1983	Subsistence Land Use in Upper Yukon-Porcupine Communities	Technical Report
31	Collings,Condon, and Wenzel	1998	Modern Food Sharing Networks and Community Integration in the Central Canadian Arctic.	Journal Article
32	Condon, Collings, and Wenzel	1995	The Best Part of Life: Subsistence Hunting, Ethnicity, and Economic Adaptation Among Young Adult Inuit Males.	Journal Article
33	Craig	1987	Subsistence Fisheries Alaska Arctic, 1970-1986	Technical Report
34	Cultural Dynamics, Ltd.	1983	Chukchi Sea Sociocultural Systems Baseline Analysis	Technical Report
35	Cultural Dynamics, Ltd.	1986	A Description of the Economic and Social Systems of the Kodiak-Shumagin Region	Technical Report
36	Davis	1979	Western Gulf of Alaska Petroleum Development Scenarios Kodiak Native Sociocultural Impacts	Technical Report
37	Draper	1977	The Aboriginal Eskimo Diet in Modern Perspective	Journal Article
38	Draper	1978	Nutrition Studies: The Aboriginal Eskimo Diet—A Modern Perspective.	Book chapter
39	Duffield	1997	Nonmarket Valuation and the Courts: The Case of the Exxon Valdez	Journal Article
40	EDAW and Adams/Russell Consulting	2008	Quantitative Description of Potential Impacts of OCS Activities on Bowhead whale Hunting Activities in the Beaufort Sea	Technical Report
41	Ellanna	1980	Bering-Norton Petroleum Development Scenarios and Sociocultural Impacts Analysis	Technical Report
42	Ellanna	1983	Bering Strait Insular Eskimo: A Diachronic Study of Economy and	Technical Report

DOC #	AUTHOR	YEAR	TITLE	REFERENCE TYPE
			Population Structure	
43	Fall	1990	The Division of Subsistence of the Alaska Department of Fish and Game: An Overview of its Research and Findings	Journal Article
44	Fall et al.	2001	Long-Term Consequences of the *Exxon Valdez* Oil Spill for Coastal Communities of Southcentral Alaska	Technical Report
45	Federal Subsistence Board c/o U.S. Fish and Wildlife Service	1992	Subsistence Management For Federal Public Lands in Alaska Environmental Impact Statement Volume 1	Report
46	Fienup-Riordan	1982	Navarin Basin Sociocultural Systems Baseline Analysis	Technical Report
47	Fienup-Riordan	1983	Symbolic and social aspects of the Nelson Island subsistence system	Book chapter
48	Freeman	1993	The International Whaling Commission, Small-Type Whaling, and Coming to Terms with Subsistence	Journal Article
49	Galginaitis et al.	1984	Nuiqsut Case Study	Technical Report
50	Galginaitis and Funk	2004	Annual Assessment of Subsistence Bowhead Whaling Near Cross Island, 2001 and 2002: ANIMIDA Task 4 Final Report	Technical Report
51	Heller and Scott	1967	Alaska Dietary Survey	Book
52	Hensel	1996	Telling Our Selves: Ethnicity and Discourse in Western Alaska	Book
53	Hughes	1960	An Eskimo Village in the Modern World	Book
54	Human Relations Area Files, Inc.	1992	Social Indicators Study of Alaskan Coastal Villages	Technical Report
55	Human Relations Area Files, Inc.	1995	Social Indicators Study of Alaskan Coastal Villages	Technical Report
56	Huntington	1992	Wildlife Management and Subsistence Hunting in Alaska	Book
57	Huntington	2005	Arctic Climate Impact Assessment	Book
58	Huskey et al.	1982	U.S. Department of the Interior Minerals Management Service	Technical Report

DOC #	AUTHOR	YEAR	TITLE	REFERENCE TYPE
59	Impact Assessment, Inc.	1982	North Aleutian Shelf Non-OCS Forecast Analysis	Technical Report
60	Impact Assessment, Inc.	1984	Sociocultural/Socioeconomic Organization of Bristol Bay: Regional and Subregional Analysis	Technical Report
61	Impact Assessment, Inc.	1985	Workshop Proceedings: Monitoring Sociocultural and Institutional Change in the Aleutian-Pribilof Region	Technical Report
62	Impact Assessment, Inc.	1988	Village Economics in Rural Alaska	Technical Report
63	Impact Assessment, Inc.	1989	Point Lay Case Study	Technical Report
64	Impact Assessment, Inc.	1990	Northern Institutional Profile Analysis: Chukchi Sea	Technical Report
65	Impact Assessment, Inc.	1990	Subsistence Resource Harvest Patterns: Kaktovik	Technical Report
66	Impact Assessment, Inc.	2001	Exxon Valdez Oil Spill, Cleanup, and Litigation: A Collection of Social-Impacts Information and Analysis	Technical Report
67	Inuit Circumpolar Conference	1992	Principles and Elements for a Comprehensive Arctic Policy.	Policy Statement
68	Jolles	1991	Qayuutat and Angyapiget: Gender relations and subsistence activities in Sivuqaq (Gambell, St. Lawrence Island, Alaska)	Journal Article
69	Jolles	2002	Faith, Food and Family in a Yupik Whaling Community	Book
70	Jorgenson	1990	Oil Age Eskimos	Book
71	Kancewick and Smith	1991	Subsistence in Alaska: Towards a Native Priority	Journal Article
72	Kruse et al.	2008	Survey of Living Conditions in the Arctic (SLiCA)	Report
73	LaGory et al.	2007	Proceedings of the North Aleutian Basin Information Status and Research Planning Meeting	Conference Proceedings
74	Langdon	1984	Alaska Native Subsistence: Current Regulatory Regimes and Issues	Technical Report
75	Langdon	1986	Contemporary Alaska Native Economies	Edited Book
76	Langdon	1991	The Integration of Cash and Subsistence in Southwest Alaska Yup'ik Eskimo	Book chapter

DOC #	AUTHOR	YEAR	TITLE	REFERENCE TYPE
			Communities.	
77	Langdon and Worl	1981	Distribution and Exchange of Subsistence Resources in Alaska	Technical Report
78	Little	1984	Effects of Renewable Resource Harvest Disruptions on Socioeconomic and Sociocultural Systems: St. Lawrence Island	Technical Report
79	Lonner	1986	Subsistence as an Economic System in Alaska: Theoretical Observations and Management Implications	Book chapter
80	Lowrey	2008	Incommensurability and New Economic Strategies Among Indigenous and Traditional Peoples	Journal Arcticle
81	Magdanz	2002	The Production and Distribution of Wild Food in Wales and Deering, Alaska	Technical Report
82	Mander	1991	In the Absence of the Sacred. The Failure of Technology and the Survival of the Indian Nations	Book
83	MBC Applied Environmental Sciences	2003	Proceedings of the Ninth MMS Information Transfer Meeting. OCS Study MMS 2003-042	Conference Proceedings
84	Nakazawa and Goldman	1991	Subsistence on Federal Public Lands in Alaska: Some Economic Impacts of Four Management Alternatives	Journal Article
85	National Research Council	1999	The Community Development Quota Program in Alaska	Book
86	National Resources Conservation Service	2006	Environmental Quality Incentives Program: Alaska Agricultural Producer and Land Eligibility Criteria Fact Sheet	Pamphlet
87	Northern Economics, Inc.	2006	North Slope Economy, 1965-2005	Technical Report
88	Poppel	2010	Are Subsistence Activities in the Arctic a Part of the Market Economic, or is the Market Economy a Part of the Subsistence Based Mixed Economy?	Book Section
89	Poppel and Kruse	2008	The Importance of a Mixed Cash – and Harvest Herding Based Economy to Living in the Arctic – An Analysis on the Survey of Living Conditions in the	Report

DOC #	AUTHOR	YEAR	TITLE	REFERENCE TYPE
			Arctic (SLiCA)	
90	Povinelli	2001	Radical Worlds: The Anthropology of Incommensurability and Inconceivability.	Journal Article
91	Ritchie and Gill	2004	Social Capital and Subsistence in the Wake of the Exxon Valdez Oil Spill	Conference Paper
92	Schumann and Macinko	2007	Subsistence in Coastal Fisheries Policy: What's in a Word?	Journal Article
93	Smith	1991	Subsistence Hunting and Fishing: A Handbook on the Federal Regulatory Process	Book
94	Smith and Wright	1989	Economic Status and role of Hunters in a Modern Inuit Village	Journal Article
95	Thorsby	2003	Determining the Value of Cultural Goods: How Much (or How Little) Does Contingent Valuation Tell Us?	Journal Article
96	Turek et al.	2006	Kake Subsistence Salmon Harvest Use Pattern	Technical Report
97	U.S. Army Alaska	2004	Transformation of U.S. Army Alaska Final Environmental Impact Statement	Report
98	U.S. Army Alaska	2005	Draft Environmental Impact Statement: Navigation Improvements Delong Mountain Terminal, Alaska	Report
99	U.S. Army Alaska	2006	Final Environmental Impact Statement for the Construction and the Operation of a Battle Area Complex and a Combined Arms Collective Training Facility within U.S. Army Training Lands in Alaska	Report
100	U.S. Army Corps of Engineers	1999	Digest of Water Resource Policies and Authorities	Government Document
101	U.S. Army Corps of Engineers	2000	Corps of Engineers Planning Guidance Notebook	Government Document
102	U.S. Army Garrison Alaska	2006	Integrated Natural Resources Management Plan 2007-2011	Report
103	U.S. Department of Defense	2001	American Indian/Alaskan Native Policy: Alaska Implementation Guidance	Policy Statement
104	U.S. Department of the Interior Fish and Wildlife Service	1985	Subsistence Management and Use: Implementation of Title VIII of ANILCA	Report

DOC #	AUTHOR	YEAR	TITLE	REFERENCE TYPE
105	U.S. Department of the Interior Fish and Wildlife Service	1988	Subsistence Management and Use: Implementation of Title VIII of ANILCA	Report
106	U.S. Department of the Interior Minerals Management Service	1991	Chukchi Sea Oil & Gas Lease Sale 126 Final Environmental Impact Statement	Report
107	U.S. Department of the Interior Minerals Management Service	2002	Alaska Annual Studies Plan Final FY 2003	Report
108	Usher	1976	Evaluating Country Food in the Northern Native Economy	Journal Article
109	Usher, Duhaime, and Searles	2003	The Household as an Economic Unit in Arctic Aboriginal Communities, and Its Measurement by Means of a Comprehensive Survey.	Journal Article
110	VanStone	1962	Point Hope: an Eskimo Village in Transition	Book
111	Waring, Kevin Associates et al.	1988	Kotzebue Sociocultural Monitoring Study	Technical Report
112	Waring, Kevin Associates et al.	1989	Nome Sociocultural Monitoring Study	Technical Report
113	Wenzel	1995	Ningiqtuq: Resource Sharing and Generalized Reciprocity at Clyde River, Nunavut	Journal Article
114	Wenzel	2000	Sharing, Money, and Modern Inuit Subsistence: Obligation and Reciprocity at Clyde River, Nunavut	Conference Paper
115	Wenzel, Hovelsrud-Broda, and Kishigami	2000	The Social Economy of Sharing: Resource Allocation and Modern Gunter Gatherers	Conference Paper
116	Wheeler and Thornton	2005	Subsistence Research in Alaska: A Thirty Year Perspective	Journal Article
117	Wolfe and Ellana	1983	Resource Use and Socioeconomic Systems: Case Studies of Fishing and Hunting in Alaskan Communities	Report

DOC #	AUTHOR	YEAR	TITLE	REFERENCE TYPE
118	Wolfe	1979	Food Production in Western Eskimo Populations	Doctoral Dissertation
119	Wolfe et al.	1984	Subsistence-Based Economies in Coastal Communities of Southwest Alaska	Report
120	Wolfe	1984	Subsistence-Based Socioeconomic Systems in Alaska: An Introduction	Report
121	Wolfe	1985	Subsistence Economies in Alaska: Productivity, Geography, and Development Impacts	Report
122	Wolfe	1998	Subsistence Economies in Rural Alaska	Journal Article
123	Wolfe, Scott, Simeone, Utermohle, and Pete	2005	The “Super-Household” in Alaska Native Subsistence Economies	Report
124	Worl	2002	Alaska Native Subsistence Cultures and Economy	Hearing
125	Worl Associates	1978	Beaufort Sea Petroleum Development Scenarios Sociocultural Impacts	Technical Report
126	Worl Associates	1978	Beaufort Sea Region Sociocultural Systems	Technical Report
127	Young, Freeman, Osherenko, Anderson, Caulfield, Fried, Langdon, and Usher	1994	Subsistence, Sustainability and Sea Mammals: Reconstructing the International Whaling Regime	Journal Article

Subsistence Literature Review Results

1) --

1980 Alaska National Interest Lands Conservation Act 94 Stat. 2371.

Abstract:

ANILCA was published in 1980 "To provide for the designation and conservation of certain public lands in the State of Alaska, including the designation of units of the National Park, National Wildlife Refuge, National Forest, National Wild and Scenic Rivers, and National Wilderness Preservation Systems, and for other purposes."

Keywords:

subsistence definition

2) --

2009 Alaska Statutes: Fish and Game Code. Definitions AS 16.05.940.

Abstract:

Alaska Statute definitions of subsistence fishing, subsistence hunting, and subsistence use.

Keywords:

subsistence definition

3) --

2009 Title 36: Parks, Forests, and Public Property. Code of Federal Regulations (CFR) 242.16

Abstract:

This regulation identifies the factors used to determine whether a community or area exemplifies customary and traditional use. These factors include the following:

(1) A long-term consistent pattern of use, excluding interruptions beyond the control of the community or area;

(2) A pattern of use recurring in specific seasons for many years;

(3) A pattern of use consisting of methods and means of harvest which are characterized by efficiency and economy of effort and cost, conditioned by local characteristics;

(4) The consistent harvest and use of fish or wildlife as related to past methods and means of taking; near, or reasonably accessible from, the community or area;

(5) A means of handling, preparing, preserving, and storing fish or wildlife which has been traditionally used by past generations, including consideration of alteration of past practices due to recent technological advances, where appropriate;

(6) A pattern of use which includes the handing down of knowledge of fishing and hunting skills, values, and lore from generation to generation;

(7) A pattern of use in which the harvest is shared or distributed within a definable community of persons; and

(8) A pattern of use which relates to reliance upon a wide diversity of fish and wildlife resources of the area and which provides substantial cultural, economic, social, and nutritional elements to the community or area.

Keywords:
subsistence definition

4) Active, John

1998 Why Subsistence is a Matter of Cultural Survival. Cultural Survival Quarterly 22(3): 35-36.

Abstract:
Central Yup'ik intellectual John Active describes the cultural significance of subsistence activities and their crucial role in the cultural survival of the people. He notes the central importance of cultural activities associated with subsistence harvesting to the physical, emotional and mental well-being of the people and the value of the cultural system to future generations.

Keywords:
subsistence definition
cultural values of subsistence

5) Alaska Federation of Natives

2005 Subsistence - Introduction. http://www.nativefederation.org/frames/subsistence.html. Accessed February 8, 2005. Webpage not active.

Abstract:
This webpage included a 2005 definition of subsistence from the Alaska Federation of Natives. This definition incorporated three elements of subsistence including economic, social, and cultural.

Keywords:
subsistence definition

6) Anderson, D. B.

1998 A View from the Yukon Flats: An Interview with Gwich'in Leader Clarence Alexander. Cultural Survival Quarterly 22(3):40-41.

Abstract:
"In the eastern interior of Alaska, the Yukon River pushes out of Canada and arches above the Arctic Circle through a broad lowland called the Yukon Flats. This is the homeland of the Gwich'in Athabaskans who were among the last Native peoples of North America to have direct contact with Europeans when fur traders established Fort Yukon in 1847. Since then, there have been great changes in this remote comer of the north. But in remarkable ways, life on the Yukon Fiats continues as it has for centuries and hunting, fishing, and trapping remain cornerstones of the Gwich'in culture and identity."

"In the morning sun, Fort Yukon resident Clarence Alexander paddles a canoe across the lazy waters of Sucker River and glides silently alongside his fishnet, smiling at the first silver flash of fish through the tea colored water. At 60 years of age, Clarence has risen, through competent, quiet leadership, to a position of influence among his people. He currently heads the Council of Athabaskan Tribal Governments, an entity he helped establish in 1988 to advocate for regional self-sufficiency and to explore ways of integrating customary and traditional values into the contemporary setting. He served as the traditional chief of Fort Yukon from 1980 to 1994 and presently chairs the Alaska delegation of Indigenous Survival International."

"Back at his home in Fort Yukon, we cleaned our morning catch of fish and Clarence offered me his perspective on growing up on the Yukon Flats, the cultural importance of maintaining connections to the land, and on the ongoing subsistence debate in Alaska. What follows are excerpts from this discussion which took place on May 23, 1998."

Keywords:
subsistence definition

7) Anderson, D. D., R. Bane, R. K. Nelson, W. W. Anderson, and N. S. Towarak

1998 Kuuvangmiut Subsistence: Traditional Eskimo Life in the Latter Twentieth Century. National Park Service.

Abstract:
*"*Kuuvanmiut Subsistence: Traditional Eskimo Life in the Latter Twentieth Century *was originally released as a commissioned report giving a detailed description of the lifestyle of the Kobuk River area people in northwestern Alaska as observed in 1974 and 1975. The study was undertaken as part of the National Park Service's interest in learning about the Alaska d-2 proposals (proposed Alaska additions to the national park system) and the natural and human resources, which are integral parts of the land. Recognizing the value of Kuuvanmiut Subsistence to the people of northwestern Alaska, the National Park Service prepared an edited, unpublished version of the original manuscript in 1986. This volume is based on the 1986 edited version."*

Keywords:
subsistence definition
subsistence activities
cultural values of subsistence
subsistence traditional knowledge
social and kinship relations

8) Argonne National Library Environmental Science Division

2007 Literature and Information Related to the Natural Resources of the North Aleutian Basin of Alaska. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region. MMS OCS Study No. 2007-066.

Abstract:
"The North Aleutian Basin Planning Area of the Minerals Management Service (MMS) is a large geographic area with significant natural resources. The Basin includes most of the southeastern part of the Bering Sea Outer Continental Shelf, including all of Bristol Bay. The area supports important habitat for a wide variety of species and globally significant habitat for birds and marine mammals, including a number of federally listed species. Villages and communities of the Alaska Peninsula and other areas bordering or near the Basin rely on its natural resources (especially commercial and subsistence fishing) for much of their sustenance and livelihood. The offshore area of the North Aleutian Basin is considered to have important hydrocarbon reserves, especially natural gas."

Keywords:
subsistence definition
subsistence activities
cultural values of subsistence

9) Bell, R.R., and C.A. Heller

1978 Nutrition Studies: An Appraisal of the Modern North Alaskan Eskimo Diet. *In* Eskimos of Northwestern Alaska: a biological perspective. Paul L. Jamison, Stephen L. Zegura, and Frederick A. Milan, eds. Academic Press. New York.

Abstract:
This article examines present dietary patterns of Alaskan Eskimos. The authors summarize the traditional diet of Alaskan Eskimos, and then follow with a summary of findings pertaining to the contemporary Alaskan Eskimo diet. The authors conducted research in the summer of 1971 and the winter of 1972, during which time they calculated the intake of eleven nutrients.

Keywords:
subsistence species
nutrition

10) Bennett, M. E., S. O. Heasley, and S. Huey

1979 Northern Gulf of Alaska Petroleum Development Scenarios Sociocultural Impacts. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region Social and Economic Studies Technical Report No. 36.

Abstract:
"This report concerns the sociocultural systems of two towns within the arc of the Northern Gulf of Alaska--Cordova-Eyak and Seward [where subsistence activities are important elements of the community character]. Its purpose is to provide both a methodology and a detailed community-based information base about these towns within the context of the broader objectives of the Alaska OCS Socioeconomic Studies Program. As one of several at assessing the effects of Alaska OCS Petroleum Development upon the physical, social and economic environment of the Northern Gulf lease sale area, this study analyzes the social organization, social conflict, social change and recent events occurring within these two towns. In addition, it attempts to place these two towns and the effects of Alaska OCS Petroleum Development on them within a regional context while still maintaining a town focus. Attention is thereby drawn to the response capacity of the social system of these two towns to adapt to changes which have already occurred recently or are likely to occur in the near future."

Keywords:
subsistence definition
subsistence roles
cultural values of subsistence

11) Bennholdt-Thomsen, V., Faraclas, N. and C. von Werlhof

2001 There is an Alternative: Subsistence and Worldwide Resistance to Corporate Globalization. New York and London: Zed Books.

Abstract:
The authors explore the "subsistence perspective," suggesting that subsistence forms of existence be recognized as sites of resistance to modern industrial, globalized, technologically driven forms of existence and valorized based on a model of cultural diversity akin to biological diversity, that is protected as sites of alternative possibilities in a Hardy-Weinberg distribution of human adaptations potentially of benefit to future human existence.

Keywords:
cultural values of subsistence

12) Bodenhorn, B.

1989 'The Animals Come to Me, They Know I Share' – Inupiaq Kinship, Changing Economic Relations and Enduring View on Alaska's North Slope. Ph.D. dissertation, Department of Social Anthropology, University of Cambridge, England.

Abstract:
The author explores the conceptual and practical importance of sharing to the moral and physical quality of existence among the Iñupiat. She discusses Iñupiaq kinship relationships, cultural values, and subsistence roles as they relate to sharing and distribution in Iñupiaq communities.

Keywords:
cultural values of subsistence
subsistence roles
social and kinship relations
trade

13) Bodenhorn, B.

1990 "I'm Not the Great Hunter, My Wife Is": Inupiat and Anthropological Models of Gender. *Etudes/Inuit/Studies* 14(1-2):55-74.

Abstract:
"*Hunter-gatherer societies have often been used to support theoretical discussions about gender relations. This article examines four models, widespread in the anthropological literature, about the relative position of men and women (men hunt; men dominate Inuit societies; men control the public sphere; men "work"). The ethnography of the Alaskan North Slope shows that none of these models works with the Inupiat as they are based on unexamined assumptions about the meaning of hunting, marriage and gender. For example, hunting cannot be reduced to the catching and slaughtering of animals, but rather includes a whole set of activities, both technical and symbolic, in which the interpedence of men and women is fundamental.*"

Keywords:
cultural values of subsistence
subsistence roles
social and kinship relations
trade

14) Bodenhorn, B.

2000 It's Good to Know Who Your Relatives Are but We Were Taught to Share with Everybody: Shares and Sharing Among Inupiaq Households. *In* The Social Economy of Sharing: Resource Allocation and Modern Hunter-Gatherers. G. Wenzel, G. Hovelsrud-Broda and N. Kishigami (eds). Pp. 27-61. Senri Ethnological Studies No. 53. National Museum of Ethnology, Japan.

Abstract:
"The author describes and defines the importance of sharing among Iñupiaq households in Barrow through data collected during interviews with a total of 78 households and in-depth research on the sharing and distribution patterns of two Barrow households. The explores cultural values related to sharing, roles in sharing and distribution activities, the definition of 'shares' and 'sharing,' changes in sharing customs over time, and identifies sharing networks.

Keywords:
cultural values of subsistence
subsistence roles
social and kinship relations
trade

15) Bogojavlensky, S.

1969 Imaangmiut Eskimo Careers: Skinboats in Bering Strait. Doctoral Thesis, Social Relations, Harvard University.

Abstract:
Bogojavlensky examines the institution of the umialik *in Eskimo society. In his dissertation, he attempts to conceptualize how "power, wealth, prestige, and leisure are cornered by a very small number of men at any given time in a much larger population." It includes important information on the social dynamics of crew formation for walrus and whale hunting, on* ningiq *(a distinctive pattern of obligatory sharing practice by Iñupiat in the Bering Straits), and on the ceremonial practices associated with subsistence hunting in this region.*

Keywords:
subsistence activities
cultural values of subsistence
subsistence technologies
subsistence roles
subsistence celebrations and ceremonies
social and kinship relations

16) Borre, K.

1991 Seal Blood, Inuit Blood, and diet: A Biocultural Model of Physiology and Cultural Identity. Medical Anthropology Quarterly 5(1):48-62.

Abstract:
"Inuit models of nutrition constitute an integral part of Inuit cultural identity and influence diet selection. Interviews were conducted among five elders, the adults of three extended families (illagit), *and two other individuals to develop a model of food ingestion and health. The focus of the model is the special relationship between seals and Inuit. The cultural model has four linked components which provide an explanation of why Inuit select the foods they do. Inuit nutritional knowledge, as expressed in the cultural model, complements current scientific nutritional knowledge and can be shown to influence individual behavior under certain circumstances. Cultural models are shown to be useful for articulating the relationship between culture and individual health behaviors, such as diet selection."*

Keywords:
cultural values of subsistence
nutrition
subsistence products

17) Borré, K.

1994 The Healing Power of the Seal: The Meaning of Inuit Health Practice and Belief. Arctic Anthropology 31(1): 1-15..

Abstract:

"Little is known about the production of health in Inuit society. Seal meat, oil, broth, and skin are products of North Baffin Island Inuit subsistence that are used to treat and prevent sickness. By studying the ethnomedical practice of using seal as a medicinal, the Inuit concept of health is revealed. This concept is best viewed as a synthesis of the individual state of being combining the concepts of soul or mind and body, the social well-being of the community maintained through the hunting ritual and food sharing, and the body politic through which individuals exercise political power to provide health and well-being to others in the family and within the larger community. It contrasts with the narrow definition of health offered by western medical experts. The Inuit concept of health influences health-seeking behavior, compliance with western medical treatment plans, and classification of illness. The health status of the community would be better served by open respect and cooperation between the two health care systems."

Keywords:
cultural values of subsistence
nutrition
subsistence products

18) Braund, S. R., and S. R. Behnke

1980 Lower Cook Inlet Petroleum Development Scenarios Sociocultural Systems Analysis. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Office Social and Economic Studies Technical Report No. 47.

Abstract:
"This report is one of several integrated studies which make up the multidisciplinary Alaska Outer Continental Program. Sponsored by the Department Shelf (OCS) Socioeconomic Studies of Interior, Bureau of Land Management (BLM), the overall purpose of and evaluate the potential onshore social, economic, and physical impacts caused by proposed OCS oil and gas exploration and development. The federal government acknowledges that further OCS exploration and development has the potential to greatly impact and change existing social, cultural, economic [including subsistence], and environmental conditions. Therefore, these studies not only provide a baseline description and projection of existing OCS relevant trends, but also an impacts analysis of potential changes likely caused by OCS development."

"The specific purpose of this report is first to describe the past and existing trends in the sociocultural systems of certain Cook Inlet communities and then to project these conditions forward both with and without OCS oil and gas activities resulting from Lease Sale 60. These projections are based on scenarios provided by other subcontractors. The differences between the Base Case and OCS scenarios are then considered the impacts caused by oil and gas development. An analysis and evaluation of the OCS impacts on the sociocultural systems of the study communities is the ultimate goal of this report."

Keywords:
subsistence definition

19) Braund, Stephen R. and Associates (SRB&A) with LZH Associates

1986 Effects of Renewable Resource Harvest Disruptions on Community Socioeconomic and Sociocultural Systems: King Cove. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region Social and Economic Studies Technical Report No. 123. MMS OCS Study No. 86-0037.

Abstract:
"The goals of this research effort were twofold: first, to develop a thorough ethnographic baseline of the Alaska Peninsula community of King Cove; and second, to evaluate the impacts upon King Cove of two hypothetical disruptions [of subsistence and commercial harvests] based on trends identified in the ethnographic baseline, analysis of past responses to harvest disruptions, and assumptions about future conditions and values upon which the disruption would be imposed. This report consists of the study team's research findings following several months of fieldwork in King Cove and associated data analysis."

Keywords:
subsistence definition

20) Braund, Stephen R. and Associates (SRB&A), and P.J. Usher Consulting Services
1993 Effects of the *Exxon Valdez* Oil Spill on Alutiiq Culture and People.

Abstract:
"The purpose of this report is to describe and analyze the effects of the Exxon Valdez oil spill on Alutiiq culture and subsistence. To do this, it is necessary to describe their way of life (i.e., the social and cultural context in which the oil spill occurred) so that the effects of the oil spill can be fully understood. Who are the Alutiiq people? Why do they live where they live? What makes their remote communities viable? Do they have a distinct culture? If so, what is distinctive about it?"

Keywords:
subsistence definition
subsistence products
cultural values of subsistence
subsistence traditional knowledge
social and kinship relations

21) Brower, H.
2004 The Whales, They Give Themselves: Conversations with Harry Brower, Sr. Karen Brewster ed. University of Alaska Press. Fairbanks, Alaska.Brower,

Abstract:
*"*The Whales, They Give Themselves *is an intimate life history of Harry Brower, Sr. (1924-1992), an Inupiaq whaling captain, artisan, and community leader from Barrow, Alaska. In a life that spanned the profound cultural and economic changes of the twentieth century, Brower's vast knowledge of the natural world made him an essential contributor to the Native and scientific communities of the North. His desire to share his insights with future generations resulted in a series of conversations with friend and oral historian Karen Brewster, who weaves Harry's stories with cultural and historical background into this innovative and collaborative oral biography.*

Brower was deeply committed to Native culture, and his life history is a moving expression of the Inupiaq way of life. He was also influential in traditionally non-Native arenas in which Native and non-Native values sometimes collided. Acting as a mediator between Inupiaq whalers and non-Native scientists, Brower communicated a vast understanding of bowhead whales and whaling that became the basis for a scientific research program and helped protect Inupiaq subsistence whaling. He was a central architect of the Arctic Slope Regional Corporation boundaries, and served for over twenty years as a consultant to scientists at the Naval Arctic Research Laboratory. Brower's role in this collaborative research serves as one of the earliest and best examples of how scientists and Native experts can work together to advance knowledge. Such approaches are now promoted by researchers around the world.

The Whales, They Give Themselves *not only conveys Brower's life story, but also is a cross-cultural journey of wisdom and friendship. Whereas academic oral historians once strove to erase the presence of the interviewer in the name of objectivity, Brewster recognizes the influence her specific relationship with Brower had on the way he narrated his life. This volume is a major contribution to our understanding of northern peoples, and a testament to the immense value of collaborative oral history."*

Keywords:
subsistence activities
subsistence traditional knowledge
cultural values of subsistence

22) Brower, H. J., and T. Hepa

1998 Subsistence Hunting Activities and the Iñupiat Eskimo. Cultural Survival Quarterly 22(3):37-39.

Abstract:
"The boundaries of the North Slope Borough (NSB) encompass 89,000 square miles, stretching from the foothills of Alaska's Brooks Range to the coastline of the Arctic Ocean. NSB is a subdivision of the state of Alaska and provides the local government structure (similar to a county in other states). There are eight communities in this region: Anaktuvuk Pass, Atqasuk, Barrow, Kaktovik, Nuiqsut, Point Hope, Point Lay, and Wainwright. The population of the North Slope is approximately 7,000-most of whom are Iñupiat Eskimo. The Iñupiat of the North Slope have a lifestyle that is heavily dependent on the subsistence harvest of marine mammals, land mammals, fish, and migratory birds. Our continued reliance on subsistence hunting is what gives the Iñupiat culture strength, confidence, and meaning."

Keywords:
subsistence definition
subsistence species
subsistence products
subsistence activities
trade
subsistence celebrations and ceremonies
cultural values of subsistence
subsistence roles
social and kinship relations

23) Brown, T. C., and E. S. Burch Jr.

1992 Estimating the Economic Value of Subsistence Harvest of Wildlife in Alaska. *In* Valuing Wildlife Resources in Alaska. G. L. Peterson, C. S. Swanson, D. W. McCollum, and M. H. Thomas, eds. Pp. 203-254. Westview Press. Boulder, Colorado.

Abstract:

"Knowledge of the economic value of wildlife (including fish, as used in this chapter) is useful in setting public policy about wildlife resources. Neoclassical economic methodology includes powerful tools for estimating the value of resources, including wildlife. But can these economic methods be applied to subsistence use of wildlife? Within the framework of economic efficiency and a competitive market economy, can we measure the value of subsistence harvests, and the value of wildlife kept for personal use? If this is possible in general, can we measure total as well as marginal value, and for which species and in which locations? Further, if reasonable estimates of economic value are possible within this framework, what then are the limitations of those estimates? This paper attempts to answer these questions."

Keywords:
subsistence definition

24) Burch, E.

2005 Alliance and Conflict: The World System of the Iñupiaq Eskimos. University of Nebraska Press: Lincoln, Nebraska.

Abstract:
"*Alliance and Conflict combines a richly descriptive study of intersocietal relations in early nineteenth-century Northwest Alaska with a bold theoretical treatise on the structure of the world system as it might have been in ancient times. Ernest S. Burch Jr. illuminates one aspect of the traditional lives of the Iñupiaq Eskimos in unparalleled detail and depth. Basing his account on observations made by early Western explorers, interviews with Native historians, and archeological research, Burch describes the social boundaries and geographic borders formerly existing in Northwest Alaska and the various kinds of transactions that took place across them. These ranged from violence of the most brutal sort, at one extreme, to relations of peace and friendship, at the other. Burch argues that the international system he describes approximated in many respects the type of system existing all over the world before the development of agriculture. Based on that assumption, he presents a series of hypotheses about what the world system may have been like when it consisted entirely of hunter-gatherer societies and about how it became more centralized with the evolution of chiefdoms.*
Accounts of specific people, places, and events add an immediate, experiential dimension to the work, complementing its theoretical apparatus and sweeping narrative scope. Provocative and comprehensive, Alliance and Conflict is a definitive look at the greater world of Native peoples of Northwest Alaska."

Keywords:
social and kinship relations

25) Callaway, D.

1995 Resource Use in Rural Alaskan Communities. *In* Human Ecology and Climate Change: People and Resources in the Far North. David L. Peterson and Darryll R. Johnson, eds. Taylor and Francis. Bristol, Pennsylvania

Abstract:

"Indigenous people have subsisted on natural resources in the Far North for thousands of years. Although technology has changed and cash now plays an important role, this dependence on resources continues today, not only in Alaska Native villages but in many non-Native rural households as well."

Keywords:
subsistence definition
subsistence traditional knowledge
trade
cultural values of subsistence
social and kinship relations
Gambell
Savoonga

26) Campbell, C.

2009 The Significance of Seabirds to the Iñupiat of Little Diomede Island, AlaskA Master's Thesis. University of Alaska Anchorage.

Abstract:
This thesis describes the significance of seabirds to Diomede village Iñupiat. Humans have occupied Little Diomede Island for over 2000 years and have developed a sophisticated and successful subsistence enabling them to sustain and reproduce their society over that time. Contemporary Iñupiat consume the flesh and eggs, utilize skins and beaks for apparel and ornamentation, and incorporate seabird themes in rich ceremonial and intellectual life. Auklet and murres are key species. In addition, stone walls (infrastructure) used as blinds were identified that are used in the subsistence hunting activities of Diomede Islanders.

Keywords:
cultural values of subsistence
subsistence species
subsistence products
trade
subsistence celebrations and ceremonies
subsistence traditional knowledge
subsistence technologies
subsistence infrastructure
Diomede

27) Campbell, M.

1991 Proposed State Legislation Defines What Subsistence is, Where it Happens, Who Participates. Arctic Issues Digest (October):8-11.

Abstract:

Draft State legislation is proposed to resolve the difference between federal and state subsistence law that resulted from the case McDowell vs. Collinsworth.

Keywords:
subsistence definition
cultural values of subsistence
subsistence traditional knowledge
social and kinship relations

28) Case, D. S.
1991 Subsistence and Self-Determination: Can Alaska Natives Have a More "Effective Voice?" Arctic Issues Digest (October):26-39.

Abstract:
"To many people the term 'subsistence' connotes the bare eking out of an existence, a marginal and generally miserable way of life. That is not, however, the standard dictionary definition of the term, nor is it the way in which the word is used in Alaska. There 'subsistence' has come to stand for a class of hunting and fishing rights that, under federal and state laws, enjoy a legal preference superior to competing sports, commercial, and personal use rights."
"For Alaska Natives, 'subsistence' became a political and cultural rallying cry some years before it became a law. The term is a foreign one to many Natives, because it is used by non-Natives to capsulize what is for Natives an entire way of life. Thus, subsistence has come to symbolize unique hunting and fishing rights as well as the complex web of cultural practices, social relationships, and economic rewards associated with those rights."
"In Alaska, the term has come to stand for the traditional Alaska Native way of life. Accordingly, the ability of Alaska Natives to maintain subsistence as a way of life is a measure of their ability to achieve self-determination. Without subsistence, the way Alaska Natives live would inevitably be defined by standards external to their own cultural values. As wage employment and the accumulation of wealth compete with Native values associated with hunting, gathering, and sharing, the evolution of Native cultures will tend to be determined by forces outside those cultures rather than 'self-determined' from within. Forestalling that possibility by promoting self-determination is the official policy of the federal government."

Keywords:
subsistence definition
cultural values of subsistence
social and kinship relations

29) Case, D. S., and D. A. Voluck
2002 Alaska Natives and American Laws. 2nd Edition. University of Alaska Press. Fairbanks, Alaska.

Abstract:
Chapter 8 of "Alaska Natives and American Laws" contains a history of the term "subsistence" as it has been used in federal Indian law.

Keywords:
subsistence definition

30) Caulfield, R. A.

1983 Subsistence Land Use in Upper Yukon-Porcupine Communities. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 16.

Abstract:
"This report documents the extent of land used for the harvest of wild resources by residents of the Upper Yukon-Porcupine communities of Arctic Village, Birch Creek, Chalkyitsik, Fort Yukon, and Venetie. Land use maps depict areas used over the lifetimes of residents currently living in those communities. A brief overview of historic and prehistoric land use patterns is included to provide a context for understanding contemporary use. A summary of resource harvest activities for each community is presented. Finally, factors which influence land and resource use patterns in the region and concerns of local residents about wild resources are discussed. The data for this report were gathered between 1980 and 1982 using formal and informal interviews and participant-observation. Land use by non-community based households, an important element in regional land use patterns, was not included in this report due to funding and time limitations."

Keywords:
subsistence definition
subsistence activities
subsistence traditional knowledge
cultural values of subsistence

31) Collings, Condon, and Wenzel

1998 Modern Food Sharing Networks and Community Integration in the Central Canadian Arctic. *Arctic* 51: 301-314.

Abstract:
"From June 1992 to July 1993, research on wildlife harvesting and subsistence relations was conducted among a sample of householders in the Inuit community of Holman. In an earlier paper, the authors examined the involvement of younger Inuit in subsistence hunting, noting that despite the sweeping political, social, and economic changes that have been experienced in Holman and across the Canadian North, hunting remained an important sociocultural and economic activity for some members of the sample group. This paper focuses specifically on the informal socioeconomic aspects of subsistence in Holman. Using primary data from the 1992–93 sample, we examine the range of economic mechanisms employed by Holman Inuit for the distribution of wild resources and compare the present range of such activity to that observed by Stefansson, Jenness, Rasmussen, and Damas in their work on Copper Inuit food sharing. These data indicate 1) that the sharing form most frequently cited ethnographically, obligatory seal-sharing partnerships, is more irregular than formerly; and 2) that voluntary,

nonpartnershipbased sharing remains an important element in the contemporary economic system."

Keywords:
subsistence activities
subsistence roles
social and kinship relations
subsistence activities

32) Condon, Collings, and Wenzel

1995 The Best Part of Life: Subsistence Hunting, Ethnicity, and Economic Adaptation Among Young Adult Inuit Males. *Arctic* 48: 31-46.

Abstract:
"This paper examines the economic adaptations and subsistence hunting involvement of householders between the ages of 20 and 35 in the Copper Inuit community of Holman. Social, economic, and political changes throughout the Canadian Arctic have made it impossible for young adults to pursue the same mixed economic strategies as previous generations. A general decrease in subsistence hunting involvement is characteristic of the younger generation. Nevertheless, some young householders have made a conscious effort to remain active in subsistence hunting and fishing to provide for themselves and related households. Some have even increased subsistence hunting involvement as their own parents age and become increasingly infirm. Other householders are less active in hunting and fishing, but continue to view land-based harvesting as central to a sense of Inuit identity. The motivations, economic position, and family background of a sample of active and less active young adult hunters are explored in an attempt to understand the pressures experienced by young adults as they strive to make a place in a northern society radically different from that of their parents at a similar age. While the authors recognize the economic value of subsistence harvesting and the foods that result from it, we also emphasize the less easily quantified dimensions of subsistence ideology and its impact upon physical health, psychological well-being, and community integration."

Keywords:
subsistence activities
subsistence products
subsistence roles
social and kinship relations
subsistence activities
cultural values of subsistence
nutrition

33) Craig, P. C.

1987 Subsistence Fisheries Alaskan Arctic, 1970-1986. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Socioeconomic Studies Program Technical Report No. 129. MMS OCS Study No. 87-0044.

Abstract:

"Subsistence fisheries in the Alaskan Arctic provide an important food source for the coastal communities of Barrow, Point Lay, Wainwright, Atqasuk, Nuiqsut, and Kaktovik. The total annual harvest (villages combined) is roughly 210,000 lb of fish, which in terms or utilizable weight almost equals the villages' annual harvest of' bowhead whales."

"The fisheries concentrate on anadromous species (whitefish, char, salmon) although freshwater species (grayling) are also taken. The species caught at each village differ as would be expected based on distribution patterns of fishes in the study area. The fisheries are fairly well-described in terms of timing and location but not harvest quantity. In some cases, the only available information about harvest quantity consists of a rough estimate made 15 years ago."

Keywords:
subsistence definition
cultural values of subsistence

34) Cultural Dynamics, Ltd.

1983 Chukchi Sea Sociocultural Systems Baseline Analysis. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region Social and Economic Studies Technical Report No. 74.

Abstract:
"This report is about the people in northwestern Alaska who live from Deering to Kivalina. It includes eleven villages and approximately 5,000 people located within the boundaries of the Northwest Alaska Native Association (NANA) region. This baseline description was written to provide background information for later study of likely responses to potential Outer Continental Shelf (OCS) exploration and other developments related to Lease Sale 85, the Barrow Arch, scheduled for 1985."

Keywords:
subsistence definition
subsistence species
subsistence activities
trade
cultural values of subsistence
social and kinship relations

35) Cultural Dynamics, Ltd.

1986 A Description of the Economic and Social Systems of the Kodiak-Shumagin Region. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region Social and Economic Studies Technical Report No.122. MMS OCS Study No. 86-0036.

Abstract:
"Seven studies are presented on social and economic topics important to the Kodiak-Shumagin area of the central North Pacific, a major coastal region of Alaska. Data is examined for a

period from the 1970s to the early-1980s. Themes underlying the research include change in the socioeconomic framework of the regional city (Kodiak) and in the unique economic patterns of eleven smaller Koniag villages in the Kodiak Island archipelago and on the Alaska Peninsula [where subsistence activities are important elements of life]. Limited information is given for Cold Bay, an enclave community in the Aleutians."

Keywords:
subsistence definition
subsistence species
subsistence activities
trade
cultural values of subsistence
subsistence traditional knowledge
social and kinship relations

36) Davis, N. Y.

1979 Western Gulf of Alaska Petroleum Development Scenarios Kodiak Native Sociocultural Impacts. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Socioeconomic Studies Program Technical Report No. 41.

Abstract:
"The Alaska Outer Continental Shelf Socioeconomic Studies Program is a multi-year research effort which includes, among other things, developing information about the unique cultural differences in Alaska. This particular report is directed toward understanding potential changes among the Native populations in the Western Gulf area as a result of the proposed Outer Continental Shelf (OCS) lease sale #46 scheduled for December 1980. The specific objectives of this study also include: 1) Presenting background information on the sociocultural systems of the Kodiak Native populations and 2) Developing a methodology for addressing issues concerning what might happen in the future, given certain circumstances relating to different levels of projected petroleum development."

Keywords:
subsistence definition
subsistence species
social and kinship relations
cultural values of subsistence

37) Draper, H. H.

1977 The Aboriginal Eskimo Diet in Modern Perspective. American Anthropologist 79:309-316.

Abstract:
"The aboriginal diet of the Arctic Eskimo, which consisted mainly of land and sea mammals and fish, is analyzed with respect to its capacity to provide the nutrients now regarded as essential

for nutritional health. It is concluded that, despite its remarkably restricted composition, the native diet is capable of furnishing all the essential nutritional elements when prepared and consumed according to traditional customs. However, its low carbohydrate and high protein content necessitated major metabolic adaptations in energy and nitrogen metabolism. Erosion of the traditional diet culture and life style has been accompanied by a decline in nutritional status."

Keywords:
nutrition

38) Draper, H.H.

1978 Nutrition Studies: The Aboriginal Eskimo Diet--A Modern Perspective. In Eskimos of Northwestern Alaska: a Biological Perspective. Paul L. Jamison, Stephen L. Zegura, and Frederick A. Milan, eds. Pp. 139-144. US/IBP Synthesis Series, Vol. 8. Academic Press. New York.

Abstract:
"Eskimos have maintained a vigorous lifestyle on a diet consisting almost entirely of meat and fish. Modern nutritionists, however, generally recommend a mixed diet of fruit, vegetables, cereals, meat, and dairy products. The authors suggest that the traditional Eskimo diet contains all essential nutrients despite its narrow range of foods. Proof of this argument is found in the observation that Eskimos typically experienced nutritional stress during times of resource scarcity--not due to deficiencies in the nutritional content of the diet."

Keywords:
subsistence species
nutrition

39) Duffield, J.

1997 Nonmarket Valuation and the Courts: The Case of the *Exxon Valdez*. Contemporary Economic Policy 15:98-110.

Abstract:
"This paper examines a natural resource damages case, the Exxon Valdez, and contrasts the use and acceptance of market and nonmarket valuation methods in two related sectors: commercial fishing and Alaska Native subsistence use of fish and wildlife. Much economic literature focuses on how, in principle, one should value environmental injury. These principles and methods have been codified in the Department of Interior and National Oceanic and Atmospheric and Administration natural resource damage regulations that implement the Comprehensive Environmental Response, Compensation, and Liability Act and the Oil Pollution Act of 1990. However, these liability rules are fairly new, and thus little evidence exists on the acceptance of valuation methods by the courts and juries. In this regard, the Exxon Valdez case is of particular interest because substantial resources were at stake and much of the case went all the way through to a jury verdict. The two major plaintiff classes--commercial fishermen and

Alaska natives--are market and nonmarket versions, respectively, of otherwise fairly similar economic sectors. However, the court's acceptance of the "correct in principle" valuation methods appropriate to each sector was asymmetric. The court accepted as admissible the market valuation procedures (primarily "diminution in market price") used by the commercial fish experts but rejected the nonmarket valuation procedure applied to subsistence uses (a hedonic price model)."

Keywords:
subsistence valuation

40) EDAW, Inc., and Adams/Russell Consulting

2008 Quantitative Description of Potential Impacts of OCS Activities on Bowhead Whale Hunting Activities in the Beaufort Sea. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region Social and Economic Studies Program. MMS OCS Study No. 2007-062.

Abstract:
"The origins of this study may be traced to a March 2000 memorandum from the Alaska Eskimo Whaling Commission (AEWC) and the North Slope Borough (NSB) to the Minerals Management Service (MMS) describing the need for additional research regarding cultural, social, and economic impacts to Alaska Eskimo subsistence communities from ongoing Arctic oil and gas exploration and production."
"A central point of the memo was that residents of the communities of Barrow, Nuiqsut, and Kaktovik perceive that oil and gas development-related activities have resulted in positive and negative social, economic, and cultural impacts. The memo cited the need to quantify perceptions of both positive and negative impacts in those communities. As it was felt that traditional economic analysis was not adequate, an interdisciplinary approach to such a study was recommended. Specifically, the memorandum urged that a survey be conducted in these three communities to identify and quantify perceived impacts in such a manner that a comparative analysis could be done on the prevalence and distribution of different types of perceived impacts. MMS was asked to fund such a study that would then be conducted in cooperation with the AEWC and NSB in the form of direct consultation on the study design and review of all work by representatives of the AEWC and the NSB."

Keywords:
subsistence definition
subsistence species
subsistence products
subsistence activities
trade
subsistence celebrations and ceremonies
cultural values of subsistence
subsistence roles
subsistence technologies
social and kinship relations

Gambell
Savoonga

41) Ellanna, L. J.

1980 Bering-Norton Petroleum Development Scenarios and Sociocultural Impacts Analysis. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region Social and Economic Studies Technical Report No. 54, Vol. 1.

Abstract:
*"This is the first of two studies designed to analytically describe the sociocultural systems of the coastal areas adjoining the Bering-Norton Outer Continental Shelf (hereafter referred to as OCS) and to subsequently assess the potential impacts of projected OCS petroleum development on these sociocultural systems. These studies have been undertaken in response to Tentative Sale #57, presently anticipated to occur in September of 1982. The coastal and insular areas either adjacent to and/or potentially affected by the Bering-Norton OCS lease sale (i.e. the study area) extend from the coastal village of Shishmaref in the north to and including the entire coastline of the Seward Peninsula, Norton Sound, and the Yukon Delta to the south, including the Bering Strait islands of Little Diomede (*Inalik*), King (*Ukiuvok*), St. Lawrence (*Sevoukak*), and Sledge (*Ayak*) (see Map I & 11)."*
"The focus of this study is basically a relatively qualitative analysis of the rural, primarily but not exclusively Iñupiat or Yuit (northern and southern Eskimo respectively) sociocultural systems of this area, and the articulation of these systems with the more urban, internal and external, primarily non-Native components of the area's systems in their entirety."

Keywords:
subsistence definition
cultural values of subsistence
social and kinship relations

42) Ellanna, L. J.

1983 Bering Strait Insular Eskimo: A Diachronic Study of Economy and Population Structure. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 77.

Abstract:
"The purpose of this study was to systematically describe and analyze interrelated changes in population structures and ecological adaptations from 1650 to 1980 of five insular and insular-like Bering Strait Eskimo populations, including Gambell and Savoonga on St. Lawrence Island, King and Diomede islands, and Wales. More specifically, the problem was to assess interconnections between demographic characteristics and processes and ecological adaptations focused on the cooperative hunting of large marine mammals by boat crews. Data were derived from ethnohistoric and historic sources for the period prior to 1970 and from extensive fieldwork from 1970 to 1980."

Keywords:
subsistence species
Little Diomede

43) Fall, J.A.
1990 The Division of Subsistence of the Alaska Department of Fish and Game: An Overview of its Research and Findings. Arctic Anthropology 27(2):68-92

Abstract:
"This article discusses the State of Alaska's definition of subsistence, the components of subsistence and the research designs used to acquire data about subsistence activities. It describes findings of the Subsistence Division research program at the community level and discusses patterns of species harvest, quantities, storage, distribution, sharing and other uses for different regions of Alaska. It provides a general overview and description of subsistence as a distinctive system of natural resource utilization in Alaska."

Keywords:
subsistence definition
subsistence species
subsistence products
subsistence activities

44) Fall, J. A., R. Miraglia, W. Simeone, C. J. Utermohle, and R. J. Wolfe
2001 Long-Term Consequences of the *Exxon Valdez* Oil Spill for Coastal Communities of Southcentral Alaska. U.S. Department of the Interior, Minerals Management Service Technical Report No. 163. MMS OCS Study No. 2001-032.

Abstract:
"Industrial disasters are a potential, perhaps inevitable, consequence of natural resource development. In Alaska, development of oil fields on the arctic North Slope has produced wealth for a broad spectrum of groups during the late 20th century. Beneficiaries include oil companies, subsidiary businesses, state and local governments, and the citizens of Alaska as a whole through a stimulated state economy and annual dividends from state-invested oil royalties. Yet injury has accompanied wealth. In 1989, an industrial failure produced one of the worst environmental disasters in American history. The wreck of the tanker Exxon Valdez on March 24, 1989, spilled 11 million gallons of crude oil into the Pacific Gulf of Alaska. The disaster occurred eight hundred miles to the south of the oil fields, near the terminus of the Trans-Alaska Pipeline at Valdez. The spill contaminated over 1,200 miles of coastline from Prince William Sound to Kupreanof Point on the Alaska Peninsula. The oil caused massive injuries to the natural environment, including populations of fish, marine mammals, and birds. It disrupted human uses of these natural resources. Exxon was assessed $1.15 billion by the federal US District Court for these damages (EVOSTC 1999:8)."

"The Exxon Valdez oil spill (EVOS) had profound implications for human communities in the spill area. The oil spill posed an unexpected threat of uncertain dimensions for cities, towns, and villages of the Pacific Gulf region. The Alutiiq villages of the Pacific Gulf appeared particularly threatened, because the culture, economy, and way of life of small Alaska Native villages are directly tied to healthy, productive ecosystems (Wolfe and Walker 1987). The people of the Pacific Gulf were forced to respond to a series of external challenges triggered by the disaster – drifting oil, oiled coastlines, disrupted fisheries, contaminated wild foods, damaged fish stocks, and protracted litigation. In the aftermath of the spill, they also had to respond to changing economic and political conditions, some a direct result of EVOS and others independent of the spill itself but part of the broader context in which spill response took place. Some challenges and responses lasted for years, and some continue 10 years and more after the Exxon Valdez hit Bligh Reef."
"This report explores these immediate and longer-term effects on human communities in the Pacific Gulf. The report was prepared by the Division of Subsistence of the Alaska Department of Fish and Game (ADF&G) under a cooperative agreement with the US Department of the Interior, Minerals Management Service (MMS) (Cooperative Agreement No. 14-35-0001-30788) entitled "Sociocultural Consequences of Alaska Outer Continental Shelf Activities: Data Analysis/Integration." Detailed information on the impacts of the EVOS was collected under two previous agreements between MMS and ADF&G (Cooperative Agreements 14-35-0001-30539 and 30622). Basic descriptive and univariate analysis drawing from these data sets was presented in Fall and Utermohle (1995). The general purpose of the new cooperative agreement was to conduct a comparative analysis that collected new ethnographic materials and integrated existing quantitative and qualitative data across communities, cultural groups, local socioeconomic systems, and households. The project consisted of seven interrelated tasks, as described below. The cooperative agreement was amended in 1998 to support the addition of data from a new round of systematic household interviews in eight communities of the EVOS area, funded by the Exxon Valdez Oil Spill Trustee Council (EVOSTC) (Fall and Utermohle 1999)."

Keywords:
subsistence definition
subsistence activities
cultural values of subsistence
subsistence traditional knowledge
social and kinship relations
subsistence valuation

45) Federal Subsistence Board c/o U.S. Fish and Wildlife Service
1992 Subsistence Management For Federal Public Lands in Alaska Final Environmental Impact Statement, Vol. 1.

Abstract:
"This draft environmental impact statement (EIS) describes four alternatives for developing a Federal Subsistence Management Program in Alaska and examines the consequences of these alternatives. The document also describes the major issues associated with Federal subsistence

management that were identified through public meetings and staff analysis. In addition, the document includes in the appendices the proposed programmatic regulations that would implement the preferred alternative after the final EIS is issued."

Keywords:
subsistence definition
trade
subsistence celebrations and ceremonies
cultural values of subsistence
subsistence roles
social and kinship relations

46) Fienup-Riordan, A.

1982 Navarin Basin Sociocultural Systems Baseline Analysis. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region Social and Economic Studies Technical Report No. 70.

Abstract:
"This document attempts to bring together baseline information on the sociocultural systems of the onshore communities contiguous to the Navarin Basin lease sale area, especially such information as is pertinent to the evaluation of the effects of projected Outer Continental Shelf (OCS) development in the Navarin Basin. The goal is first to identify those systems of human activity potentially affected by OCS development, to specify the current trends within those systems, and finally to specify the susceptibility for change within those identifiable trends. Attention will be given to the sociocultural systems of the coastal communities adjacent to the Navarin Basin, as well as to the riverine and tundra communities surrounding Bethel, the regional center for the study area. The sociocultural systems of Bethel will also be described in detail, as well as the interrelation between Bethel sociocultural systems and those of the surrounding villages."

Keywords:
subsistence definition
cultural values of subsistence
social and kinship relations

47) Fienup-Riordan, A.

1983 Symbolic and social aspects of the Nelson Island subsistence system. In A. Fienup-Riordan, The Nelson Island Eskimo: Social Structure and Ritual Distribution. Anchorage:Alaska Pacific University Press.

Abstract:
"Key symbolic and spiritual relations between the Nunivak Island Eskimo and the non-human species on which they depend are described. The ritual practices and the central role of distribution and sharing in the continuous reproduction of the society are portrayed. The concept of "cosmological cycling" that is the spiritual return of life forces in human and other

living entities is highlighted. The chapter also discusses the development of the ideology of subsistence as a way of life that has resulted from the Nunivak Island Yup'ik Eskimos articulation with modern processes. In regard to the impact of money in this subsistence economy, the author states: 'A preliminary analysis [of the impact of money] indicates that at least in the smaller coastal communities, the money spheres of the economy are subservient to and separate from subsistence activities. Money does not seem to constitute the category of money as we [Euroamericans] understand it, that is, as capable of reducing all value to a universal exchange value.'"

Keywords:
subsistence products
subsistence celebrations and ceremonies
cultural values of subsistence
social and kinship relations
cognitive mindsets

48) Freeman, M. R.

1993 The International Whaling Commission, Small-Type Whaling, and Coming to Terms with Subsistence. Human Organization. 52:243-251.

Abstract:
An issue of major international concern that has been of critical significance to the current and future forms of northern Alaskan (Inupiaq and Siberian Yup'ik) Native societies is that of whaling, both for smaller and larger species. The United States as a signatory to the International Whaling Treaty has agreed to be governed by decisions made by the International Whaling Commission (IWC) about subsistence and commercial whaling. At the center of the controversy is by what standards and criteria is "subsistence" whaling to be distinguished from "commercial" whaling. Freeman (1993: 248) articulates the distinction between the two forms through the following characterization of subsistence:
'Subsistence persists... despite the evident interaction occurring with powerful commercial forces that sustain the dominant society, because subsistence satisfies particularly important non-economic needs…needs that can only be met by either engaging in subsistence or being enabled to consume the products of subsistence. The continuing commitment of members to these (often small, distinct, and peripheral) communities to their multi-dimensionally satisfying and distinctive way of life and identity sustains subsistence production... This valued identity and way of life is... profoundly related to particular systems of local resource use.'
Freeman's characterization of subsistence as a system of activities that is both made possible by and characterized by community level beliefs and practices (sharing, ceremonies, rituals), multiple satisfactions, and valued identities is congruent in its generality and specificity with the definition used in this study.
"The International Whaling Commission (IWC) classifies whaling operations as either aboriginal-subsistence or commercial for purposes of regulation. At the present time a "pause" in commercial whaling is in effect, although subsistence whaling continues under an exemption granted to aboriginal whalers. The IWC operates with ambiguous definitions of the key terms "subsistence" and "commercial" and requires that whaling be one or the other. This policy

creates serious problems for various groups of smalltype coastal whalers who engage in subsistence yet are not aboriginal people. The difficulty the IWC is experiencing in resolving this problem appears to adversely affect not just the whalers and their small coastal communities, but also the credibility, effectiveness, and perhaps the viability of the IWC itself."

Keywords:
subsistence definition
subsistence activities
cultural values of subsistence
subsistence celebrations and ceremonies

49) Galginaitis, M., C. Chang, K. M. MacQueen, A. A. Dekin Jr., and D. Zipkin
1984 Nuiqsut Case Study. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region Social and Economic Studies Technical Report No. 96.

Abstract:
"Nuiqsut is a traditional Iñupiat village on the North Slope of Alaska. It was resettled in April 1973. The Alaska Native Claims Settlement Act and the formation of the North Slope Borough (NSB) created a fiscal, social, and political environment to make it a viable undertaking. Many of the founding families were closely related. Approximately 2/3 of the (approximately) 170 settlers remain among the 270 residents of the present village. The founding population has aged demographically and because of the uneven age distributions the numbers of births and young children are expected to increase."
"Most of the 1973 settlers had kinship links to traditional users of the Nuiqsut area. This pattern continues as families intermarry and relatives move into the village. Harvested resources comprise somewhat over 50% of the food consumed in an average Nuiqsut Iñupiat household. All households have some access to wage income. Most households include at least one full-time wage earner. Nearly all include at least one seasonal wage earner."
"Oil development, as such, has had little direct effect on Nuiqsut. Few Iñupiat work for oil companies. However, the money which supports (and is building) Nuiqsut is derived from oil through taxes imposed by the NSB. These funds (along with bond issues) are used to fund construction projects within the villages. Iñupiat perceive oil development as decreasing the availability of subsistence resources, both in absolute terms and in terms of access. However, cash is now absolutely essential for the harvest of subsistence resources. Such harvesting activity is also essential as a diet consisting of all "store" food is at present neither economically possible nor socially acceptable."
"About 25% of all adult Iñupiat have permanent, full-time wage positions. In addition, another 40% of adult Iñupiat males are seasonally employed. Few adult Iñupiat females work seasonally. Females are specializing in professional type full-time positions while men continue a construction/laborer pattern. This sexual differentiation within the cash economy is also evident within the traditional economy. Women's roles are being replaced while those of men are still ideologically the center of Iñupiat values. Population composition and wage/subsistence labor force characteristics are two of the most fundamental sources of present-day social dynamics."

"Although unfamiliar institutional structures have been introduced, traditional leadership and decision-making patterns are being maintained. There is a shortage of Iñupiat individuals to fill the available leadership roles, however, as the boundaries of the social system have expanded. Thus, non-Iñupiat have become increasingly visible. Permanent non-Iñupiat populations in the villages outside of Barrow can be expected to increase the pace of social change. Traditional Iñupiat values remain strongly held. Successful development will require change consistent with these values. New organizational and structural forms must continue to reflect such values if Nuiqsut is to remain a viable Iñupiat community."
"It is recommended that a program to systematically collect information monitoring these changes be implemented. This methodology should and must include the study populations as active participants. Significant variables and potential relationships are proposed, and the question of measurement (operationalization) discussed."

Keywords:
subsistence definition
subsistence technologies
cultural values of subsistence
subsistence traditional knowledge

50) Galginaitis, M., and D. W. Funk

2004 Annual Assessment of Subsistence Bowhead Whaling Near Cross Island, 2001 and 2002: ANIMIDA Task 4 Final Report. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region. MMS OCS Study No. 2004-030.

Abstract:
"This Task Order, funded by the Minerals Management Service (MMS) describes subsistence whaling as currently conducted near Cross Island by residents of Nuiqsut. While "traditional" subsistence whaling has been well documented in a number of locations, contemporary subsistence whaling is not as well documented, especially in terms of change over time. This effort is designed to measure basic parameters of Cross Island whaling so that observed changes (if any) can in the future be analyzed in relation to such factors as oil and gas activities, weather and ice conditions, or other variables. Observations, and the narrative annual report summarizing them, focus on descriptive measures of activities associated with whaling. Special attention is devoted to geospatial information through the sharing of GIS information by participating whaling crews. Project reports are only for the purposes of reporting information collected, with no analysis of the information either as a self-contained database or in conjunction with the many pertinent external databases (for example, weather records, sea ice condition remote sensing photographs, AEWC historical bowhead whale harvest records). Also, the project is designed as a collaborative effort of MMS and its contractor, Applied Sociocultural Research (ASR), the subsistence whalers from Nuiqsut, and the Alaska Eskimo Whaling Commission (AEWC). Beyond the goal of two (now expanded to six) years of descriptive

information on Cross Island subsistence whaling activities, the project will develop a system for collecting such information that local whalers themselves can adopt, adapt, and maintain."

Keywords:
subsistence definition
subsistence species
cultural values of subsistence
social and kinship relations

51) Heller, C.A., and E. M. Scott

1967 Alaska Dietary Survey. U.S. Department of Health, Education, and Welfare Public Health Service. Anchorage.

Abstract:
"The diet of Eskimos has always been of interest because these people have managed to survive under adverse circumstances by utilization of unusual natural resources. Previous studies of Alaskan diets were limited to a series of weighed studies at Gambell and Anaktuvuk Pass by Rodahl; to a limited diet record study at Nikolski by Moorrees and a study based on one-day diet records from four Eskimo villages by Heller."
"The present study was begun in 1956 with the following objectives:
1) To determine the present food habits of Alaskan Eskimos and Indians;
2) To estimate the degree of their dependence on local food;
3) To estimate the adequacy of the diet;
4) To predict medical or public health problems which might arise from inadequate diet"

Keywords:
nutrition

52) Hensel, C.

1996 Telling Our Selves: Ethnicity and Discourse in Western Alaska. Oxford University Press. New York.

Abstract:
The author examines how Yup'ik Eskimos and non-natives construct and maintain gender and ethnic identities through strategic talk about hunting, fishing, and other subsistence activities. Although ethnicity is overtly constructed in terms of either/or categories, the discourse of Bethel residents suggests that their actual concern is less with whether one is native or non-native, than with how native one is in a given context. In the interweaving of subsistence practices and subsistence discourse, ethnicity is constantly recreated.
The author's work among the Central Yup'ik demonstrates that conversations and behaviors by men and women often focus on demonstration of subsistence activities, especially food consumption, in order to display commitment to Yup'ik ethnic identity.

Keywords:
subsistence definition

subsistence species
subsistence products
subsistence activities
trade
cultural values of subsistence
subsistence traditional knowledge
subsistence technologies
subsistence infrastructure
subsistence roles
social and kinship relations
cognitive mindsets
nutrition

53) Hughes, C.

1960 An Eskimo Village in the Modern World. Ithaca, NY: Cornell University Press.

Abstract:
"This is the classic ethnographic overview of the culture and history of the Siberian Yup'ik people of St. Lawrence Island based on fieldwork in the communities in the 1950s. It includes descriptions of subsistence activities and establishes the social, cultural and spiritual contexts of those activities. It describes the distinctive social relations of subsistence walrus and whaling that arise from the patrilineal clan structure of the Siberian Yup'ik of St. Lawrence Island [including measures of subsistence activity]."

Keywords:
subsistence species
subsistence products
subsistence activities
subsistence celebrations and ceremonies
subsistence roles
subsistence technologies
subsistence infrastructure
social and kinship relations
Gambell
Savoonga

54) Human Relations Area Files, Inc.

1992 Social Indicators Study of Alaskan Coastal Villages. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region Social and Economic Studies Technical Report No. 152, Vol. 2. MMS OCS Study No. 92-0032.

Abstract:
"Alaska is one of the most promising areas in the world for petroleum exploration and development. At the same time, however, it is one of the richest commercial fishing regions in

the world; its offshore waters (such as the Bering Sea) host diverse and extremely productive biological resources aside from commercially valuable fish; and the economic, social, and cultural roles of these resources are significant. Alaska Natives who live in proximity to remote exploration areas and who rely on renewable biological resources may be particularly susceptible to social impacts of petroleum exploration and development. These factors have motivated a series of social and economic studies in rural Alaska designed to assess potential human impacts on development. One recent thrust of these studies has aimed towards the development of monitoring strategies that use discrete social measurements (social indicators)."

Keywords:
subsistence definition
cultural values of subsistence
social and kinship relations
Gambell
Savoonga
Diomede

55) Human Relations Area Files, Inc.

1995 Social Indicators Study of Alaskan Coastal Villages. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region Social and Economic Studies Technical Report No. 157, Vol. 6. MMS OCS Study No. 94-0064.

Abstract:
"The Exxon Valdez foundered on Bligh Reef, just outside the Valdez Arm of Prince William Sound, on March 24, 1989. That accident, which spilled nearly 11 million gallons of North Slope crude oil in and around Prince William Sound, affected the biological, abiological, and social environments of a large area in south central Alaska. Coincidentally, when the accident occurred, my research associates and I were completing a third wave of research begun in 1987 among 31 villages in coastal Alaska; our goal was to determine the consequences from oil-related activities on village economies and societies."
"The spill site was located about 300 miles northeast of Kodiak City and 160 miles northeast of Old Harbor on Kodiak Island in an area beyond the periphery of our sample. These two Kodiak Island communities were the sole villages among the 31 in the original study whose traditional territories were affected by the vast slick and blobs of oil that spread southwest along the Kenai Peninsula and Kodiak Island by currents and wind, then northeast up Cook Inlet toward Anchorage by currents and tides. Oil began washing up on Kodiak Island beaches on April 17, about 3 weeks after the spill. In the winter of 1988, we had conducted 68 interviews in the two Kodiak Island villages. We had conducted another 30 interviews among panel members (sample respondents who had been interviewed initially in the winter of 1988) immediately prior to the spill."
"Five months after the spill, we returned to the Kodiak Island villages, but we also expanded our research to eight other villages directly affected by the oil.2 In the late summer of 1989, about the time that the Exxon Corporation and VECO, their principal cleanup contractor, were closing down their cleanup operations for the year, our teams began interviewing in 10 villages in the

oiled area and 2 villages outside the oiled area. Between the late summer of 1989 and the early winter of 1991, we made two more research trips to the affected villages. In the course of these three research trips, we interviewed 1,216 respondents, 724 with questionnaires and 394 with protocols. Some persons were interviewed and reinterviewed (panel members). We also interviewed public officials--appointed and elected--and other public people in the villages, such as school principals, leaders of civic organizations, and the like. The results of those interviews are incorporated in SIS IV."

Keywords:
subsistence definition
subsistence activities
trade
social and kinship relations
Gambell
Savoonga

56) Huntington, H.
1992 Wildlife Management and Subsistence Hunting in Alaska. Seattle: University of Washington Press.

Abstract:
"This volume describes the practices of various federal and state agencies in attempting to coordinate western biological principles of wildlife management with the subsistence hunting practices of Alaska Natives. One of the strengths of the volume is in identifying the different relationships with Alaska Natives that have emerged as a result of the history of different agencies in their dealings with Alaska Natives."

Keywords:
subsistence definition
subsistence species
subsistence traditional knowledge

57) Huntington, H., and G. Weller
2005 Arctic Climate Impact Assessment. Cambridge University Press. New York, New York.

Abstract:
"The Arctic Climate Impact Assessment (ACIA) is the first comprehensive, integrated assessment of climate change and ultraviolet (UV) radiation across the entire Arctic region. The assessment had three main objectives: 1) To provide a comprehensive and authoritative scientific synthesis of available information about observed and projected changes in climate and UV radiation and the impacts of those changes on ecosystems and human activities in the Arctic. 2) To provide an accessible summary of the scientific findings, written in plain language but conveying the key

points of the scientific synthesis. 3) To provide policy guidance to the Arctic Council to help guide the individual and collective responses of the Arctic countries to the challenges posed by climate change and UV radiation."

Keywords:
subsistence definition
cultural values of subsistence
social and kinship relations

58) Huskey, L., W. Nebesky, B. Tuck, and G. Knapp

1982 Economic and Demographic Structural Change in Alaska. Institute of Social and Economic Research. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region Social and Economic Studies Technical Report No. 73.

Abstract:
"This collection of five papers analyzes a number of aspects of structural change associated with economic growth and OCS development in Alaska. The first two papers, by Lee Huskey, examine two related factors which determine rural local economic impacts. The first paper addresses local economic response in the form of support sector expansion as additional basic employment is "multiplied." The strength of the multiplier appears to be related to both community income and population. The second paper addresses local labor force response to additional employment opportunities. A model of rural labor markets is developed, which suggests that local labor force response to OCS employment opportunities will increase as subsistence costs increase, tastes change in favor of market goods, and opportunities for spending money increase."
"The third paper, by Will Nebesky, examines residency patterns of OCS workers in Alaska. The proportion of workers who are local residents increases as the size of the local community increases. The final two papers, by Lee Huskey and Bradford Tuck, address statewide patterns of structural change which occur with economic growth in general, and with oil development in particular. Economic growth is accompanied both by export expansion and by import substitution, which occurs in response to economies of scale. Bradford Tuck's paper on structural change with petroleum industry expansion uses input-output models which have been developed of other regions. He concludes that relatively little structural change will occur in the Alaska economy due to petroleum development, although forward linkages will be stronger than backward linkages."

Keywords:
subsistence definition

59) Impact Assessment, Inc.

1982 North Aleutian Shelf Non-OCS Forecast Analysis. Prepared by J.S. Petterson, L.A. Palinkas, B.M. Harris, L.A. Palinkas, S. Langdon. U.S.

Department of the Interior, Minerals Management Service Technical Report No. 75, Vol. 1.

Abstract:
"This report discusses projected changes in the North Aleutian Shelf Region of Alaska over the next twenty years based on a scenario of nondevelopment of Outer Continental Shelf resources. Volume I (this volume) examines social change at the regional and village-cluster level. Volume II presents a community-by-community examination of those features of change which particularly apply at that level. Projected changes are discussed along the dimensions of ecology, demography, economics, politics, social networks, education, health care, and religion. In each of these areas there are certain general trends which will characterize the region as a whole, while at the sub-regional and local level there are instances in which the peculiar structure of the local system leads to projections at variance with these overall regional projections."

Keywords:
subsistence definition
subsistence species
cultural values of subsistence

60) Impact Assessment, Inc.

1984 Sociocultural/Socioeconomic Organization of Bristol Bay: Regional and Subregional Analysis. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region Social and Economic Studies Technical Report No. 103.

Abstract:
"The social, cultural and economic evolution of the Bristol Bay region is seen to be dominated by tie cycle of resource availability, and focused primarily on the red salmon runs of summer. The non-summer cycle is seen to vary by subregion and by differential reliance on mastal (small sea mammals) or lacustrine/riverine (caribou and moose) adaptations."
"While these patterns continue to exert a controlling influence on the socioeconomic and sociocultural relations of the study region, significant changes have occurred as a result of four factors; first, from increased time devoted to commercial fishing, second, an increased level of cash income has altered the context of subsistence pursuits, third, state and federal regulations (e.g., Limited Entry) which have created new structural limitations to resource utilization and, fourth, the introduction of capital-intensive, highly efficient technology that has served to maintain the traditional distribution of returns between resident and non-resident fishermen."

Keywords:
subsistence definition
cultural values of subsistence
social and kinship relations
subsistence valuation

61) Impact Assessment, Inc.

1985 Workshop Proceedings: Monitoring Sociocultural and Institutional Change in the Aleutian-Pribilof Region. Prepared by J.S. Petterson and M.A. Downs. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region Social and Economic Studies Technical Report No. 126. MMS OCS Study No. 86-0098.

Abstract:
"This document is a report of the results of two days of workshop sessions designed to identify and resolve some of the more thorny problems involved in monitoring sociocultural change in rural Alaska. The workshops were held at the Anchorage Sheraton Hotel between December 16-17, 1985 and attended by ten representatives from the Minerals Management Service (MMS), the Phase I contractors, and the current Phase II contractors including five leading authorities from the fields of anthropology, sociology, economics, and social impact assessment who were invited to address problems involved in measuring sociocultural and institutional change. The objectives of the meetings were (1) to assure a thorough understanding of the MMS objectives for the project, (2) to guarantee effective integration of the two phases of the project, and, (3) to enhance the technical, theoretical and methodological approach of Phase II contractors. While not called for in the contract, the need of the members of the EA staff to cite information contained in these workshop materials led us to agree to prepare these proceedings for publication as a technical report."

Keywords:
subsistence definition
social and kinship relations

62) Impact Assessment, Inc.

1988 Village Economics in Rural Alaska. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region Social and Economic Studies Technical Report No. 132. MMS OCS Study No. 88-0079.

Abstract:
"The goal of this study is to describe and analyze relationships between the subsistence and commercial use of resources in three rural Alaskan coastal villages. This study was conducted for the Environmental Studies Program (ESP) of the Department of Interior, Minerals Management Services (MMS)."

Keywords:
subsistence definition
Gambell
Savoonga

63) Impact Assessment, Inc.

1989 Point Lay Case Study. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region Social and Economic Studies Technical Report No. 139. MMS OCS Study No. 89-0093.

Abstract:
"The need of the Minerals Management Service to understand the dynamics of change has spawned the use of several methodological approaches, including econometric modeling (Knapp et al., 1986), systems analysis (Impact Assessment 1982a, 1982b; Palinkas, Harris, and Petterson 1985), quantitative analyses of social indicators (Berger and Associates 1983; HRAF ongoing), and methodologies designed to monitor institutional change (Smythe and Worl, 1985; Impact Assessment 1985, 1987a, 1987 b). One of the most durable methodologies for studying the dynamics of change, however, has been the ethnographic case study. Examples from past MMS studies include Ellanna (1980), Impact Assessment (1983a, 1983 b), Galginaitis et al. (1984), and Little and Robbins (1984). It is well recognized that many of the changes which have occurred in rural Alaska over the past fifteen to twenty years are a direct or indirect result of oil-related development, particularly in near- and on-shore environments of Alaska's North Slope. Thus, a very broad-based examination of change in rural Alaska is required in order to understand the diverse consequences and multicausal nature of recent changes."
"This report is an ethnographic case study of the community of Point Lay, located on the northwest coast of Alaska, by the Chukchi Sea. The Point Lay Case Study has three objectives. The first is to provide an ethnographic description and analysis of the dynamics of change in the North Slope community of Point Lay. The second objective is to provide a comparative analysis involving other communities, in particular, Point Hope, in order to determine the extent to which conditions in Point Lay are paradigmatic of change in other North Slope Borough (NSB) communities. The third objective is to illustrate and examine changes in life styles and life cycles occurring in this region of Alaska over the last half-century."

Keywords:
subsistence species
cultural values of subsistence

64) Impact Assessment, Inc.

1990 Northern Institutional Profile Analysis: Chukchi Sea. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region Social and Economic Studies Technical Report No. 141. MMS OCS Study No. 90-0022.

Abstract:
"The Northern Institutional Profile Analysis (NIPA) technical report is necessarily a large document. Thus, a guide to its organization will be helpful to the reader. This structure is actually quite simple and is dictated by the main purpose of the study. Each North Slope community has been described, in as standard a manner as possible, using existing published information supplemented by a short period of fieldwork. A separate chapter is devoted to each community. These mainly descriptive and community-specific chapters are preceded by a regional chapter which describes the North Slope Borough in general and synthesizes the village-specific information in a comparative way to discuss village similarities and differences, many of which facilitate the discussion of regional issues. The decision was made to have this

regional/comparative chapter before the more descriptive village chapters so that this information is more readily available and to encourage its dissemination. The length of the document makes it unreasonable to expect a reader to become familiar with all the village data before encountering a synthetic regional discussion. The discussion contained in the North Slope Region chapter should enable the user to decide which of the more detailed sections of the report it will be useful to consult. If a regional treatment or a summary discussion is all that the reader requires, the introduction and North Slope chapter should adequately fulfill these needs."

"The objectives of the NIPA project are to provide, in a single source, information on population, economy, both formal and informal sociocultural institutions, and infrastructure for all communities of the North Slope. It does so within a framework which will enable comparable monitoring efforts in the future so that the information can be periodically updated. The major emphasis of the study has been on the collection and use of the published literature on the region, supplemented by some work with unpublished documents and very short periods of fieldwork. This emphasis was dictated by limitations on the time and money available for this research, as well as a desire to collect as far as possible the descriptive results of previous MMS studies in the region. The study is not primarily original research in the sense that one of its intentions was the collection of a substantial body of new data. Rather, its explicit goal was the gathering together of the information that already existed and to make this information easier to access and use."

Keywords:
subsistence definition
subsistence species
cultural values of subsistence

65) Impact Assessment, Inc.

1990 Subsistence Resource Harvest Patterns: Kaktovik. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region Social and Economic Studies Special Report No. 9.

Abstract:
"The Minerals Management Service (MMS) had conducted a good deal of research on the North Slope prior to this study, much of it having a direct bearing on subsistence activity. Other than for the ongoing studies in Barrow and Wainwright, however, such research has taken a general approach to subsistence and has provided little information on the spatial dimensions of North Slope subsistence harvest activity. Non-MMS research has approached subsistence activity from this viewpoint, but is either relatively inaccessible or not oriented towards MMS concerns for EIS purposes. This project was to document such land use patterns for the community of Kaktovik for MMS, using the work that presently exists supplemented by a short (one month) period of field work."
"The ultimate goal of the Kaktovik subsistence harvest areas study was to describe the pattern of harvests of wild resources by Kaktovik residents, emphasizing a geographical perspective. There were three explicit components to this ultimate goal. The first was to compile site-specific information on Kaktovik hunting sites, both from the literature and from field work in the village.

The second was to contextualized this site-specific information by gathering information on several broader research questions concerning site use, changes in the pattern of use through time (potentially both for individuals and the community as a whole), and the role of subsistence in village life. The third component was to produce the actual report integrating the material from the first two components with the work partially completed for Part A of this project."

Keywords:
subsistence definition
trade
cultural values of subsistence

66) Impact Assessment, Inc.

2001 *Exxon Valdez* Oil Spill, Cleanup, and Litigation: A Collection of Social-Impacts Information and Analysis. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region Social and Economic Studies Technical Report No. 161, Vol. 1.

Abstract:
"The events of March 24, 1989 changed perceptions about who is at risk as well as the costs and consequences to all Alaskans of a major oil spill. What should not have happened, did. What could have been prevented was not. A low probability of occurrence event became a reality. The "big one" happened and set in motion unpredictable events with consequences for human and biological communities in the Alaskan ecosystem. Neither the most vigilant fisherman nor the most concerned stewards of Alaska's resources could predict the range of impacts from nearly 11 million gallons of oil spilled into a complex ecosystem with commercial, spiritual, and cultural importance for Alaska's residents. With hindsight, there are lessons to carry forward about the human and social dimensions of these effects. In this Comprehensive Report we examine some of these lessons as indicated by our analysis of the published literature about the oil spill and its aftermath presented in the Factor by-Factor Analysis. We also develop the implications of these lessons for those who live in Alaska's at risk communities and for those who are the developers, managers, and stewards of Alaska's natural resources."
"These "implications" are presented as recommendations to natural resource managers and others who need information about how social factors affect the response of communities to a technological disaster such as the EVOS. To construct these recommendations, we summarize the major analytical points about each social factor (culture, social organization, subsistence, social health, and economics) and then derive "demand conditions." For our purposes a demand condition is the responses required by social and cultural resources for adaptation to the EVOS event. These demand conditions are simply an intermediate step in deriving recommendations that are based on the nature of the EVOS and the particular characteristics of social factors in Alaskan communities. We then suggest "information" and "action" recommendations based on our assessment of demand conditions and the "lessons learned." Since any future event is likely to have a different context and different characteristics, any set of recommendations we can propose should be more general than specific. That is, in proposing recommendations our intention is to foster a process of how to think about social factors rather than to make highly specific recommendations that may not fit the context or characteristics of any future event. We

intend to suggest a "way of thinking" about social effects that can be applied to any future circumstances where agencies must respond to the social as well as the biophysical consequences of a technological disaster event."

Keywords:
subsistence definition
trade
cultural values of subsistence
subsistence traditional knowledge
social and kinship relations

67) Inuit Circumpolar Conference (ICC)

1992 Principles and Elements for a Comprehensive Arctic Policy. Centre for Northern Studies and Research. Montreal, Quebec, Canada.

Abstract:
"Compilation of all the principles approved at Inuit Circumpolar Conference General Assemblies and additional draft principles prepared to date, including goasl and objectives, Inuit rights, issues of peace, security, environment, social matters, culture, economy, education, scientific research and implementation."
"This extensive work on a wide range of Arctic-related issues is a vivid means by which Inuit values, perspectives and concerns have been effectively elaborated. However, additions and improvements are needed in order to reflect the evolving economic, social and political circumstances in the circumpolar region.
The Arctic policy principles provide direction for the ICC in its activities. The ICC also encourages national governments and others who are involved in Arctic affairs to make use of the principles outlined in the policy document. Furthermore, the ICC strongly advocates international co-operation among governments and circumpolar indigenous peoples in implementing cohesive Arctic policies."

The Inuit Circumpolar Conference (1992), the international organization representing Inuit from all Arctic areas including Alaska and the Bering Strait Inupiaq of Little Diomede Island, in a programmatic statement defining their organization stated the following:

> *Subsistence is a highly complex notion that includes vital economic, social, cultural and spiritual dimensions. The harvesting of renewable resources provides Inuit with food, nutrition, clothing, fuel, harvesting equipment and income. Subsistence means much more than mere survival or minimum living standards. It is a way of life that requires special skills, knowledge and resourcefulness. It enriches and sustains Inuit communities in a manner that promotes cohesiveness, pride and sharing. It also provides an essential link to, and communication with, the natural world of which Inuit are an integral part.*

Keywords:
subsistence definition
cultural values of subsistence

68) Jolles, C. Z.

1991 Qayuutat and Angyapiget: Gender relations and subsistence activities in Sivuqaq (Gambell, St. Lawrence Island, Alaska). Études Inuit Studies 15(2):23-54.

Abstract:
"Gambell or Sivuqaq, *St. Lawrence Island, Alaska, a community of Yup'ik (Eskimo) Americans, has always utilized marine mammal resources. Residents now shop in the cooperative grocery for food and in the Sears Roebuck catalog for clothing, but men's subsistence activities, especially whaling, remain critical to concepts of local identity. We suggest here that such conceptions are most appropriately described in terms of complementary gender roles embedded in the patriclan system and articulated through subsistence activities. The* qayuutaq *(serving tray) and the* angyapik *(split walrus hide boat) symbolize these roles and provide images basic to understanding how contemporary* Sivuqaq *society 'works.'"*

Keywords:
subsistence species
subsistence activities
cultural values of subsistence
subsistence roles
social and kinship relations
Gambell

69) Jolles, C. Z., and E. M. Oozeva

2002 Faith, Food and Family in a Yupik Whaling Community. University of Washington Press. Seattle.

Abstract:
The author uses oral history, ethnography and ethnohistory to view contemporary Yupik people in terms of the enduring beliefs and values that have contributed to the survival and adaptability of Gambell. The author draws on extensive interviews with villagers, archival records, and scholarly studies, as well as her own ten years of fieldwork in Gambell, to demonstrate the central importance of three aspects of Yupik life: religious beliefs, devotion to a subsistence life way, and family and clan ties. The author documents the life and livelihood of this modern community of marine mammal hunters and explores the ways in which religion is woven into the lives of community members, paying particular attention to the roles of women.

Keywords:
subsistence species
subsistence activities
subsistence roles
subsistence celebrations and ceremonies
cultural values of subsistence
social and kinship relations
nutrition

Gambell

70) Jorgenson, J. G.

1990 Oil Age Eskimos. University of California Press. Los Angeles.

Abstract:
The author analyzes the impact of Alaskan oil extraction on Eskimo society. The author investigated three communities representing three different Alaskan environments: Gambell (St. Lawrence Island, Bering Sea), Wainwright (North Slope, Chukchi Sea), and Unalakleet (Norton Sound). The Alaska Native Claims Settlement Act (ANCSA), which facilitated oil operations, dramatically altered the economic, social, and political organization of these villages and others like them. Their economies are much more dependent on public sector transfers than they were two years ago. Subsistence activities are identified as the foundation on which these communities are built.

Keywords:
subsistence definition
subsistence species
subsistence activities
trade
cultural values of subsistence
subsistence traditional knowledge
subsistence technologies
subsistence infrastructure
subsistence roles
social and kinship relations
Gambell

71) Kancewick, M., and E. Smith

1991 Subsistence in Alaska: Towards a Native Priority. UMKC Law Review 59(3):645-677.

Abstract:
"Alaska Native use of the word 'subsistence' is not minimalist. Rather, the Native use of this word has more to do with mental health and spiritual well-being than it does with economic security. Alaska Natives speak of subsistence not just as a way to feed their families, but as a way to be themselves--a way to be land-linked tribal peoples. Many White persons imagine that subsistence is merely the act of an individual going hunting or fishing. Subsistence, in actual fact, is a complicated economic system, and it demands the organized labor of practically every man, woman, and child in a village."
"Native management reflects a very different attitude and very different ways. People hunt and fish 'tribally' -- not merely for themselves, but for many others in the village: the old, the sick, the infirm, single mothers, etc. Native culture also fundamentally prizes conservation; fish and animals are taken strictly on an as-needed basis and as-available basis. Because of these very different cultural practices and expectations, much of the western management style is irrelevant, and even dysfunctional, with regard to Native take."

Keywords:
subsistence definition
subsistence activities
trade
subsistence celebrations and ceremonies
cultural values of subsistence
subsistence traditional knowledge
subsistence technologies
subsistence infrastructure
subsistence roles
social and kinship relations

72) Kruse, J., B. Poppel, L. Abryutina, G. Duhaime, S. Martin, M. Poppel, M. Kruse, E. Ward, P. Cochran, and V. Hanna.

2008 Survey of Living Conditions in the Arctic (SLiCA). *In* Møller, V., Huschka, D, and Michalos, A.C. (eds.). Barometers of Quality of Life around the Globe. Pp. 107-133. Springer Social Indicators Research Series. Springer, Dordrecht.

Abstract:

"The Survey of Living Conditions in the Arctic (SLiCA) is a partnership of indigenous peoples and researchers from the United States, Canada, Greenland, Norway, Sweden, Finland and the indigenous peoples of the Kola Peninsula and Chukotka in Russia. SLiCA is a Sustainable Development initiative of the Arctic Council and is supported by the Inuit Circumpolar Council, the Saami Council, and the Russian Association of Indigenous Peoples of the North."

"The aims of SLiCA are to:

- *Measure living conditions in a way relevant to Arctic residents*
- *Document and compare the present state of living conditions among the indigenous peoples of the Arctic*
- *Improve the understanding of living conditions to the benefit of Arctic residents"*

Keywords:
subsistence activities
subsistence definition
subsistence celebrations and ceremonies
subsistence roles
nutrition

73) LaGory, K. E., J. R. Krummel, J. W. Hayse, I. Hlohowskyj, E. A. Stull, and L. Gorenflo

2006 Proceedings of the North Aleutian Basin Information Status and Research Planning Meeting. Anchorage, Alaska. 2006. Pp. 264. U.S. Department of the Interior Minerals Management Service.

Abstract:

"The North Aleutian Basin Planning Area of the Minerals Management Service (MMS) is a large geographic area with significant ecological and natural resources. The Basin includes most of the southeastern part of the Bering Sea continental shelf including all of Bristol Bay. The area supports important habitat for a wide variety of species and globally significant habitat for birds and marine mammals including federally listed species. Villages and communities of the Alaska Peninsula and other areas bordering or near the Basin rely on its natural resources (especially commercial and subsistence fishing) for much of their sustenance and livelihood. The offshore area of the North Aleutian Basin is considered to have important hydrocarbon reserves, especially natural gas."
"In 2006, the MMS released a draft proposed program, Outer Continental Shelf Oil and Gas Leasing Program, 2007–2012 and an accompanying draft programmatic environmental impact statement (EIS). The draft proposed program identified two lease sales proposed in the North Aleutian Basin in 2010 and 2012, subject to restrictions. The area proposed for leasing in the Basin was restricted to the Sale 92 Area in the southwestern portion. Additional EISs will be needed to evaluate the potential effects of specific lease actions, exploration activities, and development and production plans in the Basin. A full range of updated multidisciplinary scientific information will be needed to address oceanography, fate and effects of oil spills, marine ecosystems, fish, fisheries, birds, marine mammals, socioeconomics, and subsistence in the Basin."
"This report presents a summary of MMS's North Aleutian Basin Information Status and Research Planning Meeting."

Keywords:
subsistence definition
trade
subsistence traditional knowledge
cultural values of subsistence

74) Langdon, S.
1984 Alaska Native Subsistence: Current Regulatory Regimes and Issues. Vol. XIX. Paper for Roundtable Discussions of Subsistence. Alaska Native Review Commission. Anchorage, AK.

Abstract:
"The volume summarizes definitions of subsistence and efforts at implementation of policies within the state and federal governments to operationalize the subsistence priority required by statute. In addition, it offers case studies of significant efforts at Alaska Native self-regulation including the Alaska Eskimo Whaling Commission, the Alaska Eskimo Walrus Commission and the Porcupine Caribou Commission. The volume points out that governmental and lay definitions of subsistence do not adequately represent the spiritual meanings and relationships which are a core element in Alaska Native conceptualizations of their activities as a way of life."

Keywords:
subsistence definition
subsistence celebrations and ceremonies
cultural values of subsistence

75) Langdon, S. J.

1986 Contradictions in Alaska Native Economy and Society. IN Contemporary Alaska Native Economies, S. Langdon, Ed. Pp. 29-46. University Press of America. Lanham, Maryland.

Abstract:
"The primary purpose of this paper is to examine a contradiction in contemporary Alaskan Native economy and society that derives from the relationship of the essentially subsistence economy of the villages with the economic institutions established by ANCSA. The derivation and present importance of subsistence to Alaskan Natives will be discussed first and then related to the village and regional profit-making corporations established by ANCSA. It will be demonstrated that meeting both the objectives of subsistence and the objectives of profit cannot in most cases be accomplished and that the pursuit of one will often require the denial of the other. This fundamental contradiction stemming from ANCSA generates conflicts in a variety of ways. These conflicts are manifest at different levels of Alaskan Native society and range from factional fights within village corporations to battles between one regional corporation and another. Examples of various types of conflicts are presented."

Keywords:
subsistence definition
cultural values of subsistence

76) Langdon, S. J.

1991 The Integration of Cash and Subsistence in Southwest Alaska Yup'ik Eskimo Communities. IN Cash, Commoditisation and Changing Foragers. Eds. N. Peterson and T. Matsuyama. Pp. 269-291. Vol. 30 Senri Ethnological Series. Natural Museum of Ethnology. Osaka, Japan.

Abstract:
This paper compares the integration of cash in two Yup'ik areas in southwest Alaska where available cash varies significantly between communities based on commercial fishing incomes. The comparison demonstrates that the villages with higher cash income do not substitute store-bought foods for subsistence foods but rather spend money on expanding quality of life including more and better subsistence equipment. No difference in the subsistence species and productivity between the two villages was found only that the geographic range of the more affluent village was greater than that of the less affluent village.

Keywords:
subsistence activities
cultural values of subsistence
subsistence technologies
subsistence valuation

77) Langdon, S., and R. Worl

1981 Distribution and Exchange of Subsistence Resources in Alaska. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 55.

Abstract:
"This is a two-part report on a literature survey of subsistence exchange systems. Part I, by Steve Langdon, contains an introduction to the theory of anthropological economics and a discussion of subsistence studies relevant to the Alaska situation. This theoretical background gives insight into the difficulties of explaining the multifunctional aspects of subsistence distribution and exchange in the context of economics and reviews relevant concepts. Part II, by Rosita Worl, contains a review of ethnographic literature pertinent to distribution and exchange of subsistence resources in Alaska. It reveals that the varied subsistence systems in Alaska exhibit many different types of distribution patterns. Each Native culture has its own set of related customs and values governing the transfer of goods, and these are discussed in the following categories: ceremonial, sharing, partnership, trade, and commercial exchange. The literature indicates that the values which promote ceremonial feasting and distribution of resource goods have persisted in all Alaska groups, but precise descriptions of surviving ceremonies and accountings of the amount of subsistence resources involved have not been done for the contemporary period."

Keywords:
subsistence definition
subsistence products
subsistence activities
trade
cultural values of subsistence
subsistence roles
social and kinship relations

78) Little, R. L., and L. A. Robbins

1984 Effects of Renewable Resource Harvest Disruptions on Socioeconomic and Sociocultural Systems: St. Lawrence Island. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region Social and Economic Studies Technical Report No. 89.

Abstract:
"The aim of this project is to analyze the current and immediate past uses to which renewable natural resources have been and are continuing to be put by the Eskimos residing on St. Lawrence Island in order to accomplish this task and provide an ethnographic baseline against which to judge future conditions it has been necessary to collect a vast amount of information. Data has been collected on family and kinship structures, political institutions, economic activities, religious affiliations, population, resources utilization categorized by species, and a wide variety of topics important to understanding the potential impacts of offshore oil exploration activities on the social and cultural systems of the island."

"The information collected and analyzed in this study will provide the baseline for determining the magnitude and extent of any future disruptions to the naturally-occurring resource base which presently sustains St. Lawrence Island Eskimos. There is a reasonably high probability that there will be significant disruptions in the availability of one or more subsistence species given the number of Alaska outer continental shelf lease sales planned for the near future. Between 1983 and 1987 there were 15 lease sales planned for the region (Blanchard, 7983:25). The recently revised lease sale schedule calls for at least 10 lease sales, several of which can potentially impact the marine mammals, fish and bird populations of St. Lawrence Island."

Keywords:
subsistence definition
subsistence products
subsistence activities
trade
cultural values of subsistence
subsistence roles
social and kinship relations
Gambell
Savoonga

79) Lonner, T.

1986 Subsistence as an Economic System in Alaska: Theoretical Observations and Management Implications. IN Contemporary Alaska Native Economies. S. Langdon, Ed. Pp. 15-27. University Press of America. Lanham, Md.

Abstract:
"This paper views the relationship between subsistence and cash economies as one of articulation in which different sets of values operate in each. Subsistence is seen as a not-for-profit economic system that is organized for reproduction, not growth or transformation. As such, 'a subsistence economy is a highly specialized more of production and distribution of not only goods and services, but also of social forms, culture and 'psychic income', that is non-monetary personal rewards.'"

Keywords:
subsistence definition
cultural values of subsistence
subsistence valuation

80) Lowrey, K.

2008 Incommensurability and new economic strategies among indigenous and traditional peoples. Journal of Political Ecology 15: 61-73.

Abstract:
"This article takes as a central problem why both a tiny laboratory and an enormous national park were almost simultaneously established in a remote tropical Bolivian indigenous

community (Isoso) in the mid-1990s. Both projects – laboratory and the park – were oriented to non-economic values: the laboratory to those of traditional medicine and culture and the park to those of unspoiled nature. However, Isoseño people were particularly attentive to the projects' economic value, exploring the ways these might act as wellsprings of money revenue. The analysis presented here suggests that the tension among divergent orders of value that characterizes the contemporary global situation can present special opportunities, and not just challenges, to indigenous and traditional peoples living in places like Isoso. The essay brings together discussions of "incommensurability" made separately in recent cultural anthropological and ecological economic literature in order to show how and why this is so."

Keywords:
cultural values of subsistence
subsistence valuation

81) Magdanz, J. S., C. J. Utermohle, and R. J. Wolfe
2002 The Production and Distribution of Wild Food in Wales and Deering, Alaska. Alaska Department of Fish and Game Division of Subsistence 259.

Abstract
"This study describes the social organization of the production and distribution of wild food for subsistence in two Iñupiaq Eskimo communities in northwest Alaska, Wales and Deering. Researchers surveyed 42 of 50 occupied households in Wales, and 37 of 44 occupied households in Deering. Kinship information was collected through key respondent interviews."

Keywords:
subsistence species
trade
subsistence roles
social and kinship relations

82) Mander
1991 In the Absence of the Sacred. The Failure of Technology and the Survival of the Indian Nations. San Francisco, CA: Sierra Club Books.

Abstract:
"Mander's book is an angry protest against the uncritical adoption of technology, the expansion of capitalism, and the centralization of political power. He warns that these trends will lead to a New World Order dominated by multinational coprorations, resulting in devastation of the earth's natural environment and native cultures. Mander argues that technologies like television and computers extend corporate control in society and promote the uncaring consumption of natural resources. To avoid imminent environmental catastrophe, he contends that we must adopt the values of Native American cultures that regard the earth as sacred."

Keywords:

cultural values of subsistence

nutrition

83) MBC Applied Environmental Sciences

2003 Proceedings of the Ninth MMS Information Transfer Meeting. OCS Study MMS 2003-042. Ninth Information Transfer Meeting and Barrow Information Update Meeting Final Proceedings. Anchorage and Barrow, Alaska. 2003. Pp. 93. MBC Applied Environmental Sciences.

Abstract:
"The MMS mission is to manage offshore oil and gas leasing, exploration and development in an environmentally sound and safe manner. The specific goals of the 9th Information Transfer Meeting included: 1) Providing and exchanging information obtained by the Environmental Studies Program in Alaska openly. 2) Sharing and integrating information with that of other agencies, researchers, and the public, particularly that which is relevant to Outer Continental Shelf decision making. 3) Obtaining additional input from attendees regarding potential study topics or information exchange useful to MMS decision making."

Keywords:
subsistence definition
subsistence species
subsistence products
subsistence activities
trade
cultural values of subsistence
social and kinship relations

84) Nakazawa, A., and G. Goldman

1991 Subsistence on Federal Public Lands in Alaska: Some Economic Impacts of Four Management Alternatives. Arctic Issues Digest (October):2-7.

Abstract:
"This article presents some of the potential economic impacts of alternative proposals for the federal management of subsistence resources in Alaska. The four management alternatives form the core of a Draft Environmental Impact Statement (DEIS) for subsistence management on federal public lands in Alaska."

Keywords:
subsistence definition
subsistence products
trade
subsistence celebrations and ceremonies
cultural values of subsistence
subsistence technologies
social and kinship relations
subsistence valuation

85) National Research Council

1999 The Community Development Quota Program in Alaska. National Academies Press. Washington, DC.

Abstract:
"In 1992, the North Pacific Fishery Management Council (NPFMC) established a new program to help bring social and economic development opportunities to coastal villages in rural western Alaska. The new program, called the Community Development Quota (CDQ) program, allocates a portion of the annual fish harvest of certain commercial species directly to coalitions of villages, which, because of geographic isolation and limited access to sources of income, have had limited economic opportunities. [The report includes a discussion of the meaning of development in coastal western Alaska where subsistence activities are fundamental to community existence.] In the Magnuson-Stevens Fishery Conservation and Management Act of 1996, Congress mandated that the National Academy of Sciences review the CDQ program in Alaska and evaluate its applicability to the Western Pacific. A committee was set up to accomplish this task, and this report is the result of that review."

"'subsistence' includes: 1) the relationships of households, extended families, and larger communities constructed through cooperation in production and customs of reciprocal sharing; 2) the division of labor between men and women and the corresponding understanding of respective competencies; 3) the accumulation of prestige and influence by certain individuals, such as successful hunters or whaling captains, and certain knowledgeable people, such as experienced elders, which constitutes the political contours of the community; 4) the dances, inter-village exchange festivals, and other social celebrations, often integrated in the calendary of Christian religious and American national holidays; and 5) not least, the distinctive relations of exchange that people understand to exist between themselves and the natural species on which they depend." (1999:39)

Keywords:
subsistence definition

86) National Resources Conservation Service

2006 Environmental Quality Incentives Program: Alaska Agricultural Producer and Land Eligibility Criteria Fact Sheet. United States Department of Agriculture, ed.

Abstract:
"The Environmental Quality Incentives Program (EQIP) was reauthorized in the Farm Security and Rural Investment Act of 2002 (Farm Bill) to provide a voluntary conservation program for Alaskans that promotes agricultural production and environmental quality as compatible national goals. EQIP offers financial and technical help to assist eligible participants install or implement structural and management practices on eligible agricultural land. The Alaska Agricultural Producer and Land Eligibility Fact Sheet provides information on eligibility for the program."

Keywords:
subsistence definition

87) Northern Economics, Inc.

2006 North Slope Economy, 1965-2005. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region Social and Economic Studies. MMS OCS Study No. 2006-020.

Abstract:
"The Minerals Management Service (MMS) commissioned this study to provide a basis for socioeconomic analyses required by the Outer Continental Shelf lands Act and the National Environmental Policy Act (NEPA). Information from this study establishes a baseline for the required analyses for environmental impact statements (EIS's), environmental assessments (EA's), and other NEPA documentation. These analyses are for lease sales, development and production plans, and related OCS activity in the Beaufort Sea, Chukchi Sea, and Hope Basin planning areas. In general, this study is intended to provide a historical region-wide perspective of the changes in the economy of the North Slope from 1965 to 2005."
"While change has been a constant for the inhabitants of the North Slope, several major events occurring during the last few decades contributed to key structural changes that created the North Slope economy as it exists today; these events include Alaska statehood in 1959, the discovery of oil in Prudhoe Bay in 1968, the enactment of the Alaska Native Claims Settlement Act (ANCSA) in 1971, the establishment of the North Slope Borough (NSB) in 1972, passage of the Alaska National Interest Lands Conservation Act in 1980, and opening of the National Petroleum Reserve-Alaska for oil and gas development. This study explores the structural changes that have had significant economic, institutional, and social impacts on the region. The following sections describe some of the major highlights of the report."

Keywords:
subsistence definition
subsistence species
subsistence celebrations and ceremonies
cultural values of subsistence
social and kinship relations

88) Poppel, B.

2010 Are subsistence activities in the Arctic a part of the market economic, or is the market economy a part of the subsistence based mixed economy? *In* Cultural and Social Research in Greenland – selected essays 1992-2010. Ilismatusarfik/Forlaget/Atuagkat. Nuuk.

Abstract:
Greenlandic scholar Birger Poppel, the head of the SLiCA research effort in that country entitled a recent article "Are subsistence activities in the Arctic a part of the reality of the market

economy, or is the market economy a part of the subsistence-based mixed economy?" He provided the following closing assessment as a response to the question:

> *"When the relationship to nature, participation in hunting and fishing and consuming traditional foods are regularly emphasized as significant for Inuit [and Inupiaq] in the Arctic, they...indicate...relationships and activities which are important for the quality of life of people. And, seen in this light, 'market economic activities as parts of the subsistence way of life' offers, perhaps a sufficient description of the mixed economy in many of the Arctic communities when observed through local eyes."*

Keywords:
subsistence definition
cultural values of subsistence
subsistence valuation

89) Poppel, B. and J. Kruse

2008 The Importance of a Mixed Cash- and Harvest Herding Based Economy to Living in the Arctic – An Analysis on the Survey of Living Conditions in the Arctic (SLiCA). *IN* V. Møller and D. Huschka (eds pp. 27-42. *IN* V. Møller and D. Huschka (eds.) Quality of Life and the Millennium Challenge. Springer Science + Business Media B.V.

Abstract:
"The Survey of Living Conditions in the Arctic (SLiCA) is comprehensive research project undertaken by an international team of survey researchers to identify the critical features and perceptions of contemporary life throughout the circumpolar Arctic communities. Researchers interviewed a sample of northern residents, primarily Inuit/Inupiat, living in Alaska, Canada, Greenland as well as members of various indigenous groups in Chukotka (Russia), and Saami in northern Scandinavia. In northern Alaska, 588 Inupiaq were interviewed in 20 villages and towns of the predominantly Inupiaq areas (Bering Strait, NANA, North Slope) of northwest Alaska. The questions asked in the interviews were organized into five themes, the first of which was defined as – "The importance of a mixed cash- and harvest/herding- based economy to living in the Arctic" (Kruse et al. 2008: 115). The term "subsistence" was used to encompass the set of activities identified as the harvest/herding-based economy however the "subsistence framework" went beyond merely the economy. The SLiCA subsistence framework includes the following aspects:

- *The economic aspect – the importance to the economy of the household*
- *The nutritional aspect – part of the diet of the household*
- *The social aspect – including intergenerational transfer of knowledge*
- *The socio-cultural aspect – principles of sharing and community relations*
- *The identity aspect – markers of identity related to subsistence*
- *The integration aspect – the mix of subsistence and cash activities*

Keywords:
subsistence definition
cultural values of subsistence

subsistence activities
subsistence celebrations and ceremonies
subsistence roles
nutrition

90) Povinelli, E.

2001 Radical Worlds: The Anthropology of Incommensurability and Inconceivability. Annual Review of Anthropology Vol. 30:319-334.

Abstract:
"This essay seeks to provide an overview of the anthropology of radical alterity and social commensuration. I begin with critical theoretical discussions of incommensurability and undecidability in the context of radical interpretation. I then resituate these theoretical debates in liberal ideologies of language-use and public reason in order to suggest the delicate and dramatic ways in which institutionalized conventions of risk and pleasure commensurate social worlds. How do incommensurate worlds emerge and how are they sustained? In other words how is the inconceivable conceived? How are these new ethical and epistemological horizons aligned or not in the complicated space and time of global capita and liberal democratic regionalisms and nationalisms? How do publics interpret and decide between competing social visions and practices in the shadow of the seemingly incompatible frameworks of post-foundationalist and fundamentalist enlightenments?"

Keywords:subsistence valuation

91) Ritchie, L. A., and D. A. Gill

2004 Social Capital and Subsistence in the Wake of the *Exxon Valdez* Oil Spill. 2004 Annual Meeting of the Rural Sociological Society. Sacramento, California. Social Science Research Center, Mississippi State University.

Abstract:
"We examine subsistence as a form of social capital in the context of the Exxon Valdez oil spill (EVOS). A subsistence lifestyle represents social capital because it relies on associations, networks, norms of reciprocity, and trust among family, extended kinships, friendships, and community. In subsistence communities, Abstract notions of social capital are manifested in very tangible ways. We focus on subsistence activities in Cordova, Alaska by presenting qualitative data collected in 2002-2003 from local residents and quantitative data collected in 2001 from commercial fishermen and Alaska Natives. Quantitative data indicate diminished participation in subsistence activities in the community with one-third of respondents reporting a decrease in giving subsistence foods to others. Narratives from qualitative interviews reveal how Cordovans view and interpret impacts of the EVOS on subsistence and social capital. We conclude by noting how social capital extends understanding of changes in subsistence activities and other social impacts of technological disasters."

Keywords:
subsistence definition
social and kinship relations

92) Schumann, S., and S. Macinko

2007 Subsistence in Coastal Fisheries Policy: What's in a Word? Marine Policy 31:706-718.

Abstract:

"Consideration of subsistence fishing activities seems particularly relevant to coastal fisheries policy, yet formal recognition of subsistence fishing is often absent from associated policy frameworks. A critical problem is the very meaning of the term ''subsistence.'' A review of the literature on subsistence, dominated until recently by North American research, reveals a schism between interpretations emphasizing material aspects of subsistence and interpretations highlighting cultural aspects. The North American literature on the subject is heavily influenced by a focus on Arctic indigenous populations emphasizing cultural survival. Ultimately, subsistence can be a matter of survival in the belly, the soul, or both. International case studies suggest that different interpretations of subsistence are appropriate in different circumstances, and that appropriate policy can be fashioned only after the local context of subsistence is understood."

Keywords:
subsistence definition
trade
subsistence celebrations and ceremonies
cultural values of subsistence
subsistence roles
social and kinship relations

93) Smith, E.

1991 Subsistence Hunting and Fishing: A Handbook on the Federal Regulatory Process. Rural Alaska Community Action Program, Inc. Anchorage, Alaska.

Abstract:

This handbook is written to help villages to understand the federal law regarding subsistence hunting and fishing and to prepare proposals that will lead to fishing and hunting regulations that are consistent with the customs and traditions of the village.

Keywords:
subsistence definition

94) Smith, T. and H. Wright

1989 Economic Status and role of hunters in a modern Inuit village. Polar Record 25(153):93-98.

Abstract:

"The cash revenues and imputed incomes from country food harvests were calculated from interviews with eight full-time hunting and ten wage-earning Inuit for 1984 at Holman, Northwest Territories. Using a substitution value of Can$10.56/kg ($4.79/lb) for country food

harvests, the combined income (cash + imputed food value) of the two groups was very similar. Full-time hunters produced country food at $1.01/kg ($0.46/lb), while wage earners spent $5.7 I/kg ($2.59/lb) on their harvest. Full-time hunters harvested surpluses of food which would feed another four people outside their immediate family. Wage earners ended the year with almost twice the cash balance of full-time hunters, whose main monetary revenue comes from guiding trophy hunters. The precarious cash economy of the full-time hunters who provide a significant part of the food for the village should be a subject of concern and attention when considering the future well-being of the northern economy."

95) Thorsby, D.

2003 Determining the Value of Cultural Goods: How Much (or How Little) Does Contingent Valuation Tell Us? Journal of Cultural Economics. 27:275-285.

Abstract:

"Contingent valuation methods (CVM) are now well established as a means of measuring the nonmarket demand for cultural goods and services. When combined with valuations provided through market processes (where relevant), an overall assessment of the economic value of cultural commodities can be obtained. Within a neoclassical framework, such assessments are thought to provide a complete picture of the value of cultural goods. But are there aspects of the value of cultural goods which are not fully captured, or not captured at all, within such a model? This paper argues that CVM provides an incomplete view of the nonmarket value of cultural goods, and that alternative measures need to be developed to provide a fuller account."

96) Turek, M. F., A. Paige, E. Cheney, J. Dizard, and N. Soboleff

2006 Kake Subsistence Salmon Harvest Use Pattern. U.S. Fish and Wildlife Service, Office of Subsistence Management Technical Report No. 309. FIS01-104.

Abstract:

*This report describes traditional, historic and contemporary use of sockeye or red salmon (*Oncorhynchus nerka*) resources by the people of Kake, Alaska at Kutlaku Creek in Bay of Pillars on Kuiu Island, and Gut Bay and Falls Creek on southern Baranof Island.*

Keywords:
subsistence definition
cultural values of subsistence

97) U.S. Army Alaska (USARAK) Department of the Army

2004 Transformation of U.S. Army Alaska Final Environmental Impact Statement, Vol. 1. Prepared by Center for Environmental Management of Military Lands, Colorado State University. Fort Collins, Colorado.

Abstract:

"The U.S. Army is streamlining its operations and transforming Fort Wainwright and Fort Richardson into a joint base with additional capabilities. In accordance with the National

Environmental Policy Act of 1969 (NEPA) and the Final Rule Environmental Effects of Army Actions, the U.S. Army must assess the environmental impact of the proposed changes in an EIS. Verbal and written comments received from the public and agencies during the scoping period were used to help determine specific issues of concern to the public. Impact analysis was completed for each significant issue to determine the consequences of the alternatives. Subsistence was identified as an issue of concern and was included in the EIS."

Keywords:
subsistence definition
cultural values of subsistence

98) U.S. Army Alaska (USARAK) Department of the Army
2005 Draft Environmental Impact Statement: Navigation Improvements Delong Mountain Terminal, Alaska. Elmendorf AFB, Alaska.

Abstract:
Preliminary draft of the Environmental Impact Statement (EIS) for the Red Dog Portsite. The EIS includes projected impacts on subsistence in the area surrounding Portsite. The EIS catalogs animals used, quantities harvested, and the importance of subsistence for the economy and culture of Northwestern Alaska.

Keywords:
subsistence definition
subsistence products
subsistence activities
cultural values of subsistence
social and kinship relations

99) U.S. Army Alaska (USARAK) Department of the Army
2006 Final Environmental Impact Statement for the Construction and the Operation of a Battle Area Complex and a Combined Arms Collective Training Facility within U.S. Army Training Lands in Alaska.

Abstract:
EIS documents the existing conditions at Donnelly Training Area East and identifies and evaluates the potential environmental impacts of the proposed actions. Subsistence was cited as a secondary issue of concern based upon public input. The EIS addressed possible effects of the proposed action on subsistence.

Keywords:
subsistence definition
subsistence products
subsistence activities
trade
subsistence celebrations and ceremonies

cultural values of subsistence
Social and kinship relations

100) U.S. Army Corps of Engineers (USACE)
1999 Digest of Water Resource Policies and Authorities. EP1165-2-1. Department of the Army.

Abstract:
Definition of subsistence included in the Scope of Work, Economic Value of Subsistence Activity

Keywords:
subsistence definition

101) U.S. Army Corps of Engineers (USACE)
2000 Corps of Engineers Planning Guidance Notebook. Engineer Regulation 1105-2-100. Appendix E, Civil Works Missions and Evaluation Procedures, Section E-14 d, Subsistence Fishing. Department of the Army.

Abstract:
Definition of subsistence included in the Scope of Work, Economic Value of Subsistence Activity

Keywords:
subsistence definition

102) U.S. Army Garrison Alaska (USAG-AK)
2006 Integrated Natural Resources Management Plan 2007-2011.

Abstract:
"This Integrated Natural Resources Management Plan will guide implementation of the natural resources programs for U.S. Army Garrison, Alaska (USAG-AK) lands from 2007 through 2011. The Integrated Natural Resources Management Plan is designed to support the military mission, manage USAG-AK's natural resources and to ensure compliance with related environmental laws and regulations. The plan also ensures the maintenance of quality training land allowing for the U.S. Army Alaska to accomplish it critical military missions. This document guides the natural resources management program at USAG-AK. It outlines goals, objectives and policies in five general areas: stewardship, military readiness, quality of life, compliance, and program integration. It explains the U.S. Army Alaska military missions in general terms, including the missions' impacts on natural resources."

Keywords:
subsistence definition
subsistence products
subsistence activities
cultural values of subsistence
subsistence traditional knowledge

subsistence technologies
social and kinship relations

103) U.S. Department of Defense

2001 American Indian/Alaskan Native Policy: Alaska Implementation Guidance. 11 May 2001.

Abstract:
"This policy statement provides the legal definitions on which the Department of Defense will develop regulations and practices for dealing with Alaska Natives in association with the US military actions. It includes a definition of subsistence based on ANILCA language as well as the statement that 'DoD agencies must determine whether their activities may have the potential to significantly affect renewable resources relied upon for subsistence.'"

Keywords:
subsistence definition
cultural values of subsistence

104) U.S. Department of the Interior, Fish and Wildlife Service (USDOI, FWS)

1985 Subsistence Management and Use: Implementation of Title VIII of ANILCA.

Abstract:
"Section 813 of ANILCA provides that the Secretary of the Interior, in consultation with the Secretary of Agriculture, periodically shall prepare and submit a report to Congress on the implementation of Title VIII of the Lands Act. The purpose of that title is to ...'provide the opportunity for rural residents (of Alaska) engaged in a subsistence way of life to do so.' This is the first report on the "Subsistence Management and Use" of fish and wildlife by rural residents of Alaska."
"The first major portion of the report provides an introduction to subsistence and appropriate definitions. Next is a section providing information about the role of subsistence uses in the culture and economy of rural Alaska. Subsequent sections provide information on issues affecting the nature and extent of subsistence uses and the status of fish and wildlife populations subject to such uses, and provide recommendations and comments on future studies and actions necessary to assure continuation of the subsistence use of wild resources in Alaska. Chapter V contains the periodic report of the Secretary in accordance with Section 806 of the Lands Act. This is an annual report to the appropriate committees of Congress on the effectiveness of Title VIII implementation."

Keywords:
subsistence definition
subsistence species
subsistence products
subsistence activities
trade
subsistence celebrations and ceremonies

cultural values of subsistence
subsistence infrastructure
subsistence roles
social and kinship relations

105) U.S. Department of the Interior, Fish and Wildlife Service (USDOI, FWS)
1988 Subsistence Management and Use: Implementation of Title VIII of ANILCA.

Abstract:
"Section 813 of ANILCA provides that the Secretary of the Interior, in consultation with the Secretary of Agriculture, periodically shall prepare and submit a report to Congress on the implementation of Title VIII of the Lands Act. The purpose of that title is to ...'provide the opportunity for rural residents (of Alaska) engaged in a subsistence way of life to do so.' This is the second report on the "Subsistence Management and Use" of fish and wildlife by rural residents of Alaska."
"The first major portion of the report provides an introduction to subsistence and appropriate definitions. Next is a section providing information about the role of subsistence uses in the culture and economy of rural Alaska. Subsequent sections provide information on issues affecting the nature and extent of subsistence uses and the status of fish and wildlife populations subject to such uses, and provide recommendations and comments on future studies and actions necessary to assure continuation of the subsistence use of wild resources in Alaska. Chapter V contains the 1987 periodic report of the Secretary in accordance with Section 806 of the Lands Act. This is an annual report to the appropriate committees of Congress on the effectiveness of Title VIII implementation."

Keywords:
subsistence definition
subsistence activities
subsistence celebrations and ceremonies
cultural values of subsistence
subsistence traditional knowledge
subsistence roles
social and kinship relations

106) U.S. Department of the Interior, Minerals Management Service (USDOI, MMS)
1991 Chukchi Sea Oil & Gas Lease Sale 126 Final Environmental Impact Statement, Vol. 1.

Abstract:
This Environmental Impact Statement (EIS) examines a proposal for oil and gas leasing in the Chukchi Sea, three alternatives to the proposal, the major issues identified through the scoping process, and the potential mitigating measures associated with the proposal.

Keywords:

subsistence definition
subsistence species
trade
subsistence celebrations and ceremonies
cultural values of subsistence
social and kinship relations
subsistence valuation

107) U.S. Department of the Interior, Minerals Management Service (USDOI, MMS)
2002 Alaska Annual Studies Plan Final FY 2003.

Abstract:
"The purpose of the ESP is to define information needs and implement studies to assist in predicting, projecting, assessing, and managing potential effects on the human, marine, and coastal environments of the OCS and coastal areas that may be affected by gas and oil development. Lease-management decisions are enhanced when current, pertinent, and timely information is available. To attain program goals, data on specific environmental, social, and economic concerns arising from offshore leasing are required. The ESP then monitors any effects during and after oil exploration and development. It is the largest, single-agency, mission-oriented, marine-studies program in the Federal Government. Since the ESP inception through Fiscal Year (FY) 1999, more than $677 million have been spent on the ESP nationally. More than $265 million of this amount has funded Alaskan studies in 15 planning areas in the Arctic, Bering Sea, and Gulf of Alaska Subregions (see Fig. 1)."

Keywords:
subsistence definition
subsistence activities
cultural values of subsistence

108) Usher, P. J.
1976 Evaluating Country Food in the Northern Native Economy. Arctic 29(2):105-120.

Abstract:
"A means is sought of estimating the value of domestically-produced country food, which is of considerable importance in the northern native economy. The problems involved include the determination of the actual volume of production as well as the uses made of it, the evaluation of income in kind, particularly through the imputation of cash values, and the assessment of the intangibles involved in any direct comparison between the modern and traditional sectors of the northern economy. It is concluded that substitution costs provide the most appropriate measure of value and their use is, therefore, recommended, but with the caution that they cannot serve to measure the value of the activity or environment which produces the country food."

Keywords:
subsistence valuation

109) Usher, J.P., G. Duhaime, and E. Searles

2003 The Household as an Economic Unit in Arctic Aboriginal Communities, and Its Measurement by Means of a Comprehensive Survey. Social Indicators Research. 61:175-203.

Abstract:
"*Northern aboriginal communities are widely recognized as having mixed, subsistence-based economies. The chief characteristic of this economy, aside from the contribution of subsistence harvesting and related activities to household well-being, is that the household operates as a "micro-enterprise" that is the basic unit of production as well as consumption. This economic form has persisted into the present day, contrary to the predictions of many social scientists and policy-makers. This paper outlines a model of the household in mixed, subsistence-based economies, and describes its characteristics and activities. While the discussion focuses on northern Canada, the model is thought to apply generally in the circumpolar North. Quantitative measurement of northern aboriginal household characteristics and activities has been limited, however, because national and regional data collection systems are not designed specifically to capture these phenomena. The model is therefore based primarily on the results of in-depth case studies, and the systematic measurement of subsistence harvesting. This paper describes the development, for the first time, of a questionnaire specifically designed to document quantitatively the key characteristics of the household economy as part of a comprehensive survey of living conditions in the circumpolar Arctic.*"

In the development of the subsistence household production model, the authors provide the following commentary:

> *'In subsistence-based societies...security and well-being tend to be more associated with system maintenance than individual gain. Security and well-being are achieved through cooperative production, wide distribution, and mutual aid, each organized by kinship. This is celebrated, consolidated, reinforced, and reproduced by sharing, feasting, ritual observance, and associated ethical norms.... Through both production and distribution, norms and virtues such as patience, sharing and mutual aid are reinforced and reproduced.'*

110) VanStone, J.W.

1962 Point Hope: an Eskimo Village in Transition. University of Washington Press: Seattle, WA.

Abstract:
"*This is a study of cultural change through the descriptive analysis of a small Eskimo community… Professor VanStone spent a year among the Eskimos at Point Hope."*
This book is an ethnographic exploration of the people of Point Hope and includes a description of the historical background of the community, the seasonal cycle of subsistence activities, subsistence hunting and harvest methods and activities, social and kinship relations, village economies, cultural values, religion, and forces of change.

111) Waring, K. Associates, S. McNabb, E. Busch, P. Wasserman, and Dr. E. Burch Jr.
1988 Kotzebue Sociocultural Monitoring Study. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region Social and Economic Studies Technical Report No. 130. MMS OCS Study No. 88-0077.

Abstract:
"The central purpose of this study is to provide a single source of data on demography and employment, formal and informal social institutions and infrastructure for analysis of sociocultural and socioeconomic conditions in Kotzebue, the administrative and commercial center for a northwest Alaska region of eleven Iñupiat villages with a 1985 population of about 5,790 persons and headquarters for the NANA Regional Corporation and for the recently (1986) formed Northwest Arctic Borough."

Keywords:
subsistence definition

112) Waring, K. Associates, S. McNabb, V. Fischer, P. Wasserman, G. Smythe, and L. Roberts
1989 Nome Sociocultural Monitoring Study. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region Social and Economic Studies Technical Report No. 131. MMS OCS Study No. 88-0078.

Abstract:
"The central purpose of this study is to provide a single source of data on demography and employment, formal and informal social institutions and infrastructure for analysis of sociocultural and socioeconomic conditions in Nome, the administrative and commercial center for a northwest Alaska region of 15 Iñupiat villages with a 1985 population of about 5,790 persons. Historically, the region was marked by a geographic and cultural diversity that may, along with the differences between Nome and the balance of the region's traditional villages, have hindered the emergence of a unified contemporary region."

Keywords:
subsistence definition
Gambell
Savoonga
Little Diomede

113) Wenzel, G.
1995 Ningiqtuq: Resource sharing and generalized reciprocity at Clyde River, Nunavut. Arctic Anthropology 32(2):43-60.

Abstract:
*"Discussion of Inuit subsistence has until recently concentrated on the quantitative evaluation of wildlife harvesting. Because of this concern with food production as the core of subsistence, the social relations of production and consumption that underlie Inuit subsistence activity have often been given secondary attention at best. This paper examines distributive (*ningiqtuq*) mechanisms*

that facilitate the efficient flow and utilization of harvest and other products in the Nunavut community of Clyde River, Baffin Island. It is suggested that contemporary Inuit subsistence, while retaining its essential/traditional cultural goal – shared responsibility for community well-being – does not always conform to commonly held assumptions of hunter-gatherer sharing as generalized reciprocity."

Keywords:
subsistence activities
cultural values of subsistence
subsistence roles
social and kinship relations

114) Wenzel, G.

2000 Sharing, Money, and Modern Inuit Subsistence: Obligation and Reciprocity at Clyde River, Nunavut. *In* The Social Economy of Sharing: Resource Allocation and Modern Hunter-Gatherers. G. Wenzel, G. Hovelsrud-Broda and N. Kishigami (eds). Pp. 61-87.

Abstract:
This is one of a collection of papers presented at the Eighth International Conference on Hunting and Gathering Societies, National Museum of Ethnology, Osaka (Japan) related to subsistence and sharing among residents of Nunavut, Canada.

Keywords:
subsistence activities
cultural values of subsistence
subisistence roles
social and kinship relations

115) Wenzel, G., G. Hovelsrud-Broda, and N. Kishigami

2000 The Social Economy of Sharing: Resource Allocation and Modern Hunter-Gatherers. Senri Ethnological Studies No. 53. Osaka: National Museum of Ethnology.

Abstract:
A collection of papers presented at the Eighth International Conference on Hunting and Gathering Societies, National Museum of Ethnology, Osaka (Japan) related to

Keywords:
subsistence activities
cultural values of subsistence
subisistence roles
social and kinship relations

116) Wheeler, P., and T. Thornton

2005 Subsistence Research in Alaska: A Thirty Year Retrospective. Alaska Journal of Anthropology 3(1):69-103.

Abstract:
"Subsistence hunting, fishing, and gathering has been the foundation of Alaska Natives' historical existence and the most contentious and intractible political issue of Alaska's modern history as a state. As both a basic cultural system and thorny public policy issue, subsistence has provided a rich base for anthropological inquiry, especially in the past thirty years, since the birth of the Alaska Anthropological Association. While anthropological inquiry into subsistence in Alaska certainly did not begin with the inception of the Association, it could be argued that the history of the Association, and the focus of many of its members, are intimately tied to understanding and explaining the unique economic, political, cultural and ideological phenomena associated with subsistence. This review essay highlights important findings and themes in subsistence research over the past 30 years and how they bear on contemporary subsistence policy and research emphases and needs. We close by offering some general conclusions about subsistence research in relation to public policy, as well as some practical directions for future anthropological work on this important, enduring issue."

Keywords:
subsistence definition
cultural values of subsistence

117) Wolfe, R. J., and L. J. Ellanna

1983 Resource Use and Socioeconomic Systems: Case Studies of Fishing and Hunting in Alaskan Communities. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 61.

Abstract:
"The case studies of sixteen communities clearly show that many Alaskan communities are economically and socially dependent on the harvest of wild and renewable resources for local uses. In this chapter, our current understanding of the role of fishing and hunting in rural socioeconomic systems is presented, drawing upon the information from the previous eight chapters. It will be shown that fishing and hunting activities and resource uses in certain communities are components of complex social and economic systems with particular characteristics. The socioeconomic systems illustrated by the case communities display considerable diversity across regions, and are not easily represented by simple generalizations. Nevertheless, some common threads run through the apparent diversity, discussed below in the comparisons and contrasts of cases."

Keywords:
subsistence definition
subsistence activities
trade
cultural values of subsistence
subsistence technologies
subsistence roles

social and kinship relations

118) Wolfe, R.J.

1979 Food Production in a Western Eskimo Population. Doctoral dissertation. University of California, Los Angeles.

Abstract:
This research investigated the costs of production of subsistence food by Central Yup'ik villagers using an economic analysis of cash inputs and valuation of products. While recognizing that the social and cultural values of subsistence were not addressed by the research, the author found that food production was efficiently accomplished by Yup'ik villagers using western economic analyses.

Keywords:
subsistence species
subsistence products
subsistence activities
subsistence technologies
subsistence infrastructure
subsistence roles
subsistence valuations

119) Wolfe, R. J., J. J. Gross, S. J. Langdon, J. M. Wright, G. K. Sherrod, L. J. Ellanna, V. Sumida, and P. J. Usher

1984 Subsistence-Based Economies in Coastal Communities of Southwest Alaska. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region Social and Economic Studies Technical Report No. 95.

Abstract:
"This report describes and analyzes the systems of subsistence and remunerative employment in four traditional Yup'ik communities in southwestern and western Alaska. The report analyzes the influences of cash and cash participation on traditional patterns of economy and social life in the study communities. The report examines what happens to traditional subsistence activities with the infusion of cash through commercial and wage employment opportunities. A theory of culture change is developed to account for the observed changes occurring in the economy and society of the four communities. The theory suggests that only under certain sociopolitical organizations is increased cash market participation associated with the reinforcement of traditional subsistence activities."

Keywords:
subsistence definition
trade
subsistence traditional knowledge
subsistence technologies
subsistence infrastructure

social and kinship relations

120) Wolfe, R. J.

1984 Subsistence-Based Socioeconomic Systems in Alaska: An Introduction. Alaska Department of Fish and Game, Division of Subsistence. Juneau, AK.

Abstract:
"One of the major research endeavors of the Division of Subsistence of the Alaska Department of Fish and Game is to describe and understand a type of socioeconomic system in Alaska which may be termed a 'subsistence-based economic system.' A subsistence-based socioeconomic system is an economy and society where fishing and hunting for local use play important roles. Communities with subsistence-based systems are economically and socially dependent on fishing and hunting for local use. Without access to the natural resource base of fish, game, and plants, the communities could not exist as they do today."

Keywords:
subsistence definition
subsistence products
trade
social and kinship relations

121) Wolfe, R. J., and R. J. Walker

1985 Subsistence Economies in Alaska: Productivity, Geography, and Development Impacts. Alaska Department of Fish and Game, Division of Subsistence. Juneau, AK.

Abstract:
"This paper describes the productivity and geographic distribution of subsistence harvests in Alaska during the 1980s. Subsistence harvests of a statewide sample of 85 communities are presented, analyzed by size, composition, and locations. The analysis indicates that subsistence harvests of fish, land mammals, marine mammals, and other wild resources are making substantial contributions to the economies of many communities in Alaska. Community harvest levels tend to increase in areas away from urban centers, not connected by roads to urban areas, with lower degrees of settlement entry, and with lower community mean household incomes. These relationships suggest that certain types of economic development can create conditions which diminish subsistence productivity. By recognizing the substantial contributions subsistence harvests make to the state's regional economies, economic development might be planned in ways which enhance, rather than erode, the state's subsistence base."

Keywords:
subsistence definition
subsistence activities
cultural values of subsistence
subsistence technologies
social and kinship relations

122) Wolfe, R. J.

1998 Subsistence Economies in Rural Alaska. Cultural Survival Quarterly 22(3):49-50.

Abstract:
"Since 1980, federal law has protected subsistence uses by "rural" Alaska residents. The rural language in ANILCA was a political compromise primarily intended to protect subsistence uses by Alaska Natives. Congress presumed that subsistence fishing and hunting by Alaska Natives would be largely safeguarded by a law protecting fishing and hunting of "rural" residents. Like federal law, the current Alaska state law also protects subsistence uses in rural areas; however, under state law, both rural and urban residents are eligible to participate in the rural hunts and fisheries."

Keywords:
subsistence definition
trade
subsistence traditional knowledge
cultural values of subsistence
subsistence celebrations and ceremonies
subsistence technologies
subsistence infrastructure
social and kinship relations

123) Wolfe, R. J., C. L. Scott, W. E. Simeone, C. J. Utermohle, and M. C. Pete

2005 The "Super-Household" in Alaska Native Subsistence Economies. Final Report, National Science Foundation, ARC 0352611.

Abstract:
"*This report examines the concentration of production of wild foods among Alaska Native households in 67 rural Alaska communities representing Aleut, Alutiiq, Athabascan, Inupiat, Tlingit-Haida, and Yup'ik cultural groups. The analysis finds that during a year, a relatively small proportion of households typically produced most of the wild foods by weight harvested within a given community. High-producing households (the top third, termed "super-households") commonly distributed wild foods to other households, while low-producing households commonly received wild foods produced by others. Household characteristics associated with high wild food production included multiple working-age males, commercial fishing involvement, and higher wage incomes. Factors associated with lower wild food production included female household heads, age of elders, non-Native household heads, and single-person households. Collectively, factors like these accounted for about 36.6% of the variation in household subsistence productivity (R=.605). The concentration of subsistence production among households has implications for wildlife management regulations: individual bag limits and uniform household quotas may not provide for the customary patterns of food production and distribution, and regulations that restrict subsistence harvests to low-income households can undermine the viability of subsistence systems in rural Alaska communities.*"

Keywords:
subsistence valuation
subsistence roles
subsistence activities
social and kinship relations
cultural values of susbistence

124) Worl, R.

2002 Alaska Native Subsistence Cultures and Economy. Oversight Hearing on Subsistence Hunting and Fishing in the State of Alaska, April 17, 2002. U.S. Senate Committee on Indian Affairs. Washington, DC.

Abstract:
Rosita Worl, member of the Board of Directors of the Sealaska Corporation, President of the Sealaska Institute and professor of anthropology at University of Alaska Southeast, addressed the U.S. Senate Committee on Indian Affairs regarding challenges to subsistence protections and the subsistence lifestyles of Alaska Natives. Worl's testimony addressed the necessity of maintaining the federal protections as they exist under the Alaska National Interest Lands Conservation Act of 1980. She defined subsistence broadly as an activity that intersects social, cultural, and economic components. Worl also pointed out the necessity of ANILCA's protection of subsistence rights since the state of Alaska refuses to recognize a rural subsistence hunting and fishing priority.

Keywords:
subsistence definition
subsistence activities
trade
cultural values of subsistence
social and kinship relations

125) Worl Associates

1978 Assessment of Change in the North Slope, Beaufort Sea Region: Sociocultural Systems. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region Social and Economic Studies Technical Report No. 22.

Abstract:
"The Beaufort Sea Region sociocultural systems, as described by Worl Associates (1978), are currently undergoing rapid and intense social, cultural and economic change. Current non-OCS economic development initiated by both external and internal interests will continue to have direct and secondary effects on the sociocultural systems. Social and cultural transformations stimulated by these interests will probably continue beyond the year 2000."

"A non-OCS scenario will be marked by continuous pressure on traditional sociocultural systems. In this scenario, the North Slope Borough and the regional and village Native

corporations will continue to generate institutional growth and economic development. Their activities may enhance, strengthen, or conflict with the present sociocultural systems. State governmental policy decisions regarding use of the trans-Alaska pipeline haul road may further impact sociocultural systems. Additionally, final disposition of the National Petroleum Reserve in Alaska (NPR-A) poses serious ramifications for the survival of the traditional Iñupiat culture."

"The analysis contained within this report attempts to assess the overall effects on traditional values and sociocultural systems to determine whether the Iñupiat can integrate modernizing influences without disrupting their unique sociocultural system."

Keywords:
subsistence definition
subsistence species
subsistence products
subsistence activities
trade
cultural values of subsistence
subsistence technologies
subsistence roles
Social and kinship relations

126) Worl Associates

1978 Beaufort Sea Region Sociocultural Systems. U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region Social and Economic Studies Technical Report No. 9.

Abstract:
"The objective of the following report is to promote an understanding of the sociocultural dynamics of the Beaufort Sea Petroleum Development Region. The report attempts to demonstrate that the social, cultural, and psychological values are as important as the economic values of the environment to the regional population."

Keywords:
subsistence definition
subsistence products
subsistence activities
trade
subsistence celebrations and ceremonies
cultural values of subsistence
subsistence roles
social and kinship relations

127) Young, O., Freeman, M. M. R., Osherenko, G., Andersen, R. R., Caulfield, R. A., Fried, R. L., Langdon, S. J., and Usher, P. J.

1994 Subsistence, sustainability and sea mammals: reconstructing the international whaling regime. Ocean & Coastal Management. 23:117-127.

Abstract:
The authors, in an assessment of how the IWC regime might go forward, identified the complex integration of local social and cultural beliefs and practices maintained "over long periods of time" involved in subsistence whaling as elements distinguishing this form of harvesting from commercial whaling. They noted "...subsistence is understood as essentially reflecting those cultural values that socially integrate the economic relations of particular groups of people." The authors found these characteristics the basis for both insuring sustainability and justifying its authorization by the International Whaling Commission.

Keywords:
cultural values of subsistence
subsistence activities
subsistence valuation

APPENDIX 2

AGENCY DISCLOSURE NOTICE AND DATA COLLECTION PROTOCOL USED FOR VALUING SUBSISTENCE PRODUCTION IN DIOMEDE AND WALES

APPENDIX 2.1: AGENCY DISCLOSURE NOTICE AND STATEMENT OF PURPOSE

Economic Value of Subsistence Activity – Little Diomede, Alaska
March 2011

OMB Control Number 0710-0001
Expires: 30 June 2011

Agency Disclosure Notice

The public report burden for this collection of information is estimated to average 120 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this data collection, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Services, Executive Services Directorate, Information Management Division (OMB 0710-0001), 1155 Defense Pentagon, Washington DC, 20301-1155 and the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, D.C. 20503, Attn.: Desk Officer for U.S. Army Corps of Engineers. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

PLEASE DO NOT RETURN YOUR QUESTIONNAIRE TO THE ABOVE ADDRESSES.

Statement of Purpose

The U.S. Army Corps of Engineers (USACE), Alaska District is conducting a survey of rural residents in Western Alaska. The purpose of this survey is to collect information that will help us evaluate subsistence activity. The time frame this interview will address is your subsistence activities for last year. You have been selected to participate in this survey because you conduct subsistence activity in the Little Diomede or Wales area.

Participation in this survey is completely voluntary. Should you choose to provide your name, title, and e-mail address, this information will be used only to contact you regarding your input, otherwise, responses will be anonymous. Comments provided will only be shared with the planning staff at the USACE during the evaluation of the overall study. Reports generated will develop a subsistence evaluation framework, including a prototype model, which can be used by the Corps for future projects to help evaluate the economic and social benefits of the range of subsistence activities in a community. No information will be released that can be used to identify you or your family. The information collected will be managed in accordance with AR 25-400-2 records retention requirements. The point of contact for the survey is Lorraine Cordova, (907) 753-2672 of the USACE, Alaska District, Planning Branch.

TT09 - Economic Value of Subsistence Activity – Little Diomede, Alaska

Data Collection Protocol for Valuing Subsistence Production

Stephen R. Braund & Associates

Under contract to Tetra Tech, Inc. for the U.S. Army Corps of Engineers

---

Community:_____ Date of Interview:_____ Interviewers:_____ Interview ID:_____

Start Time:_____ Person ID Interviewed: _____ HH ID:_____

Section A: Household Information

Who were members of this household between January 1, 2010 and December 31, 2010?

Person ID#	Head 1	Head 2	3	4	5	6	7	8
A1: Relation to HH Head								
A2: Birth Year								
A3: Residence of Mother when born								
A4: Number of Years in Community								
A5: Male/Female								
A6: Ethnicity								
A7: Hunt								
A8: Fish								
A9: Gather								
A10: Process								

Section B: Technologies

B1: # Owned/In Use	Technology/Tool	B2: Labor Hours to Make	B3: Household Maintenance Hrs/Year	B4: Maintenance and Material Cost/Year	B5: How often purchase? (Years)	B6: Costs Per Year	B7: % Used for Subsistence
Transportation							
	Canoe/Row Boat						
	Skin Boats						
	Snowmachines						
	ATVs						
	Trucks						
	Sleds						
	Wagons						
	Trailers						
Rifles and Shotguns							
	Rifles						
	Shotguns						
	Pistol/Revolver						
	Scopes						
	Gun Cases						
	Ammunition						
Hunting Accessories							
	GPS						
	Binoculars						
	VHF						
	Tents						
	Camp Stoves						
	Ice Picks						
	Gas Tanks						
	Tarps						
	Oars						
	Lanterns						
	Life Vests						

B1: # Owned/In Use	Technology/Tool	B2: Labor Hours to Make	B3: Household Maintenance Hrs/Year	B4: Maintenance and Material Cost/Year	B5: How often purchase? (Years)	B6: Costs Per Year	B7: % Used for Subsistence
	Buoys						
	Coolers and Totes						
Hunting/Harvesting Gear							
	Nets						
	Harpoon & Float						
	Rod & Reel						
	Jigging Poles						
	Buckets						
	Berry Picker						
	Hooks and Lures						
Processing Equipment							
	Freezers						
	Refrigerators						
	Food Savers/Vacuum Bags						
	Ulus/Knives						
	Pressure Cooker						
	Canning Accessories						
	Generator						
	Chainsaws						
Clothing							
	Parka, Winter Boots, Gloves, Hats, Socks, Snow Pants, Mud Boots, Rain Gear						
Subsistence and Travel Accessories							
	Safety Equipment, Bug Dope, Ropes, Bungee Cords						
Other Items Used for Subsistence							

Section C: Boats and Infrastructure

C1: Boats & Infrastructure *[Enter Name Below]*	C2: Purchase Cost	C3: Purchase Year	C4: Labor Hours to Make	C5: Household Maintenance Hours/Year	C6: Maintenance and Material Cost/Year	C7: How often purchase? (Years)	C8: Percent Used for Subsistence
Boats							
Outboards							
Bird blinds							
Tent Platforms							
Cabins including land							
Property (i.e., land for camping or native allotment)							
Drying racks							
Ice cellars							
Other							

Section D: Harvest and Processing – 2010

Subsistence Resource	D1: Tried to Harvest	D2: Amt. Harvest	D3: Unit (lb, gal, ind.)	D4: Hours Process/ Unit (not butchering)	D5:Typical Harvest (More, Same, or Less)	D6: Amt. Receive	D7: Unit (lb, gal, ind.)	D8: Hours Process/ Unit (not butchering)	D9: # of Participants Process/Unit	D10: Give?
Marine Mammals										
Beluga										
Bowhead whale										
Walrus										
Bearded Seal										
Other Seal										
Polar Bear										
Other:										
Other:										
Other:										
Terrestrial Mammals										
Caribou										
Moose										
Furbearers										
Other:										
Other:										
Other:										
Other:										
Birds										
Geese										

Subsistence Resource	D1: Tried to Harvest	D2: Amt. Harvest	D3: Unit (lb, gal, ind.)	D4: Hours Process/ Unit (not butchering)	D5:Typical Harvest (More, Same, or Less)	D6: Amt. Receive	D7: Unit (lb, gal, ind.)	D8: Hours Process/ Unit (not butchering)	D9: # of Participants Process/Unit	D10: Give?
Ducks										
Sea Birds										
Other:										
Other:										
Other:										
Other:										
Eggs										
Fish										
Salmon										
Whitefish										
Tomcod										
Char										
Other:										
Other:										
Marine Invert.										
Berries										
Plants										
Other Resources										

Section E: Subsistence Activities - 2010

Activity Type by Month/Season	1	2	3	4	5	6
E1: Subsistence Resources tried to Harvest during Activity (refer to Section D List)						
E2: Months of Subsistence Activity						
E3: Number of Trips/Last Year						
E4: Number of Hours Prep/Trip						
E5: Number of Hours/Trip						
E6: Number of HH Participants/Trip						

Procurement Expenses (cost in dollars/per year)		
E7: Fuel (gallons x dollars)	Terrestrial (Snowmachine, ATV) Fuel Expense:	Boat Fuel Expense:
E8: Food		

End Time:_____

Section F: Interview Notes

APPENDIX 3

SUBSISTENCE VALUATION DATA FROM COMMUNITY SURVEYS IN DIOMEDE AND WALES

Table A-1: Subsistence Valuation Data

House ID	Community	Hours to Make Technology / Tool	Purchase cost for Technology / Tool	Material Cost for Technology / Tool	Hours to Maintain Technology / Tool	Maintenance Cost for Technology/ Tool	Costs Per Year for Technology / Tool	Hours to Make Infrastructure	Purchase Cost for Infrastructure	Hours to Maintain Infrastructure	Maintenance Cost for Infrastructure	Pounds Harvested	Hours Processing Amount Harvested	Pounds Received	Hours Process Amount Receive	Hours to Prepare for Trip	Hours Per Trip	Costs of Terrestrial Fuel	Costs of Boat Fuel	Costs of Food Expense	Costs of Rent Expense	Costs of Fuel for Rent Equipment	Hours Spent on Subsistence	Costs of Subsistence
6	Wales	1.28	$1,742.92	$36.30	32.45	$424.36	$2,445.00		$2,178.29	47.5	$1,000.00	3,246	116.85	28	2.35	172.50	516.00	$1,200.00	$320.00	$550.00			889	$9,896.86
9	Wales		$188.94		39.52	$69.63	$26.43							4							$0	$0	40	$285.00
10	Wales	6.44	$1,056.18	$20.21	28.08	$183.18	$1,410.00	1.67		40		54	48.51	215	15.77	26.25	160.50	$300.00			$0	$0	327	$2,969.57
11	Wales		$2,339.05		58.34	$270.22	$139.70					662	14.15	2	0.00	0.00	24.00	$375.00	$0	$10.00	$0	$0	96	$3,133.97
12	Wales	0.32	$1,943.57	$22.52	49.90	$669.95	$313.75					163	12.00		0.00	13.96	652.25	$1,237.50		$250.00	$0	$0	728	$4,437.29
13	Wales	1.08	$1,777.15	$10.13	123.10	$657.10	$1,159.00	0.02		2		183	0.00	48	71.98	26.00	172.00	$440.00		$275.00			396	$4,318.38
14	Wales	1.07	$618.80	$3.51	8.20	$15.90	$1,230.00	1.02	$200.00	2	$20.00	2865	84.30	50	1.73	174.00	135.00	$0	$300.00	$300.00	$0	$0	407	$2,688.22
15	Wales	3.31	$1,346.49	$9.25	40.83	$251.83	$227.00	0.74	$116.67	33	$300.00	2,448	84.10	96	9.00	28.30	70.00	$75.00	$112.50	$100.00	$0	$0	269	$2,538.74
16	Wales	2.38	$1,620.45	$7.50	21.10	$291.05	$1,440.00					92	13.57	271	39.27	73.50	338.00	$0	$0	$55.00			488	$3,414.00
17	Wales		$1,699.78		218.91	$855.46	$551.04		$679.03	52	$244.00	33	2.30	2	0.00						$0	$0	273	$4,029.30
18	Wales	2.84	$1,931.06	$49.88	108.07	$663.65	$724.50	3.60	$806.67	28.5	$100.00	3,108	350.00	221	11.25	338.83	1,579.30	$386.50	$773.00	$550.00	$0	$0	2,422	$5,985.25
22	Wales	1.08	$2,489.03	$47.77	103.70	$547.30	$1,016.80	0.10	$1,010.10	82	$294.00	781	68.42	650.5	7.22	23.53	368.00	$848.00	$848.00	$800.00	$0	$0	654	$7,901.00
23	Wales	1.81	$1,675.23	$8.25	39.67	$151.66	$1,973.00	3.50	$439.58	54	$244.00	865	43.42	113	2.74	94.50	206.00		$400.00	$1,000.00	$0	$0	446	$5,891.72
24	Wales	1.33	$3,690.31	$3.33	271.13	$3,461.53	$4,850.00					246	11.19	40	3.00	180.00	880.00	$375.00	$412.50	$1,000.00	$0	$0	1,347	$13,792.67
25	Wales	0.65	$517.08	$8.25	71.48	$54.68	$458.00					2,543	95.34	18	5.34	65.30	251.35		$40.00	$100.00	$0	$0	489	$1,178.01
27	Wales		$674.23		104.06	$84.48	$65.40			9	$355.00	73	36.00		0.00	0.00	33.00	$0	$0	$0	$0	$0	182	$1,179.11
28	Wales	16.22	$3,443.83	$60.16	852.40	$2,480.60	$2,800.00	1.81		4		1,283	463.63	295	0.00	253.00	975.00	$5,500.00		$500.00	$0	$0	2,566	$14,784.58
29	Wales	1.22	$227.66	$10.13	89.81	$154.67	$1,177.00			4		270	95.90	479	63.93	56.46	524.00	$400.00		$1,200.00	$900	$576	835	$4,645.46
30	Wales		$259.47		4.55	$4.15	$339.00							303	3.58	0.25	8.00	$0	$0	$0	$0	$0	16	$602.62
31	Wales	0.64	$901.53	$13.60	11.08	$40.58	$930.05	0.30		0		822	40.70	54	2.50	26.25	269.50	$850.00		$250.00	$0	$0	351	$2,985.75
32	Wales	31.49	$3,664.77	$14.64	81.65	$620.65	$2,225.00	0.06	$3,200.00	63	$599.00	3,135	360.55	77	4.49	286.25	2,909.50	$1,590.00	$900.00	$850.00	$0	$0	3,737	$13,664.05
34	Wales		$1,019.11		13.85	$331.07	$825.00					16	1.68	184	0.68	12.68	92.50		$270.00	$100.00	$0	$0	121	$2,545.18
35	Wales	6.61	$1,172.94	$78.22	203.70	$278.71	$705.00	0.64	$394.29	15.75	$133.50	1,685	61.50	99	5.02	174.06	849.00	$600.00	$750.00	$500.00			1,316	$4,612.66
36	Wales	1.88	$2,753.55	$61.41	115.08	$8,434.80	$1,400.04	0.19	$125.00	38	$510.00	2,811	279.20	90	26.00	171.20	1,418.00	$1,000.00	$450.00	$800.00			2,050	$15,534.79
37	Wales	0.83	$1,753.40	$12.50	141.10	$568.00	$770.00	0.04		0		752	84.35	751	51.70	18.44	231.50	$150.00	$400.00	$200.00	$0	$0	528	$3,853.90
38	Wales	1.09	$2,972.94	$33.10	98.79	$1,002.92	$1,789.30	0.80		4		799	70.83	367	33.09	118.74	618.25	$150.00	$100.00	$300.00	$0	$0	946	$6,348.26
40	Wales	5.10	$2,031.65	$51.86	93.52	$984.35	$3,107.80	0.04	$414.44	29	$0	219	47.50	19	5.40	10.89	167.00	$500.00	$880.00	$200.00	$0	$0	358	$8,170.11
42	Wales	1.05	$2,821.18	$2.40	189.32	$998.78	$1,613.25	1.30		3		621	31.12	21.5	2.50	29.11	173.00	$700.00	$500.00	$800.00	$0	$0	430	$7,435.61
43	Wales	5.83	$121.05	$12.50	44.00	$72.40	$239.20					104	16.00	1010	3.71	10.00	70.00		$250.00	$175.00	$0	$0	150	$870.15
44	Wales		$512.65		18.50	$140.68	$267.40					76	45.23	23.5	2.29	59.50	240.00		$90.00	$200.00	$0	$0	366	$1,210.73
45	Wales	4.93	$4,116.73	$20.92	41.08	$1,109.68	$956.20		$125.00	52	$244.00	1,347	7.16	116	4.18	23.26	203.50	$525.00	$262.50	$1,000.00	$0	$0	336	$8,360.03
46	Wales	0.75	$395.94	$3.79	14.58	$588.96	$743.60	0.14		2		90	6.52	65	4.38	11.86	90.00		$150.00	$400.00	$0	$0	130	$2,282.30
101	Diomede	6.00	$2,485.47	$1.25	444.65	$396.05	$1,310.00		$1,444.44	80	$244.00	7	0.46	857	179.60	0.00	24.00	$500.00	$500.00	$500.00	$0	$0	735	$7,381.22
102	Diomede	16.17	$2,149.86	$35.80	153.70	$883.90	$470.95	0.11		2		3,523	172.83	1010	251.94	106.99	918.00			$0	$0	$0	1,622	$3,540.51
103	Diomede		$68.49		44.23	$74.23	$260.01					1,567	12.46	27.5	0.00	32.00	83.85				$0	$0	173	$402.73

House ID	Community	Hours to Make Technology / Tool	Purchase cost for Technology / Tool	Material Cost for Technology / Tool	Hours to Maintain Technology / Tool	Maintenance Cost for Technology/ Tool	Costs Per Year for Technology / Tool	Hours to Make Infrastructure	Purchase Cost for Infrastructure	Hours to Maintain Infrastructure	Maintenance Cost for Infrastructure	Pounds Harvested	Hours Processing Amount Harvested	Pounds Received	Hours Process Amount Receive	Hours to Prepare for Trip	Hours Per Trip	Costs of Terrestrial Fuel	Costs of Boat Fuel	Costs of Food Expense	Costs of Rent Expense	Costs of Fuel for Rent Equipment	Hours Spent on Subsistence	Costs of Subsistence
104	Diomede		$264.66		3.27	$16.13	$0							42.5	2.26			$0	$0	$0	$0	$0	6	$280.79
105	Diomede	20.18	$7,356.51	$267.69	587.72	$2,085.57	$2,159.25			8	$300.00	7,815	259.52	169	5.92	251.38	3,831.50	$400.00	$400.00	$600.00	$0	$0	4,964	$13,569.01
106	Diomede		$1,671.89		44.21	$495.17	$481.55					837	25.75	56	0.00		28.50				$0	$0	98	$2,648.61
107	Diomede	3.25	$1,537.14	$61.30	33.87	$355.07	$1,520.00		$1,500.00	20	$200.00	1,542	37.35	46	0.00	12.75	121.00	$1,000.00	$750.00	$250.00	$0	$0	228	$7,173.50
108	Diomede		$402.29		17.31	$4.97	$73.15					0		32	0.16								17	$480.41
109	Diomede	7.96	$1,885.96	$20.58	159.53	$1,086.73	$955.40	0.75	$679.03	54	$244.00	264	64.74	114	5.00	23.50	286.75			$0		$0	602	$4,871.69
111	Diomede	2.00	$219.37	$20.00	15.31	$4.67	$192.00					590	22.15	80	6.25	3.66	18.50	$0	$0	$0	$0	$0	68	$436.04
112	Diomede	7.60	$2,235.61	$83.13	102.43	$439.23	$939.88					6,540.7	98.80	21	0.00	102.50	728.00	$50.00	$500.00	$200.00	$0	$0	1,039	$4,447.85
113	Diomede	21.53	$382.25	$45.70	97.67	$1,185.04	$76.00														$0	$0	119	$1,689.00
114	Diomede		$191.45		5.28	$0.54						3		15	6.25	1.05	5.25				$0	$0	18	$191.99
115	Diomede	3.23	$215.59	$13.13	118.88	$90.06	$139.00					100	0.00	66	0.00	6.13	157.50	$112.50	$0	$0	$0	$0	286	$570.28
116	Diomede	7.53	$331.43	$29.50	137.10	$1,034.60	$2,292.50					6,683	65.50	1,676	9.90	89.13	2,036.50	$150.00	$200.00	$0	$0	$0	2,346	$4,038.03
117	Diomede	8.96	$1,859.86	$38.51	93.26	$776.84	$205.00					246	66.27	72	10.01	1.00	99.50	$0	$0	$40.00	$0	$0	279	$2,920.22
120	Diomede	0.41	$55.61	$10.13	21.87	$47.05	$52.50					796	1.50	4	0.00	1.00	14.25		$260.00		$0	$0	39	$425.29
121	Diomede	0.88	$2,174.07	$3.50	55.32	$184.24	$500.00		$547.78	280	$350.00	10,959	41.79	78	1.15	33.00	404.00	$30.00	$75.00	$0	$0	$0	816	$3,864.59
122	Diomede	1.83	$535.61	$15.83	17.43	$71.30	$650.00					2,962	27.35	417	2.40	71.00	347.50	$0	$0	$0	$0	$0	468	$1,272.74
129	Diomede		$307.67		39.00	$284.00			$679.03	52	$244.00										$0	$0	91	$1,514.70
130	Diomede	0.48	$400.69	$2.54	93.14	$121.57	$620.16					1,317	289.84	69	9.62	0.00	618.00	$55.00	$200.00	$0	$0	$0	1,011	$1,399.96
132	Diomede	1.78	$470.72	$34.30	2.16	$93.55	$27.50					65	4.60	21.5	3.00	1.00	15.00	$0	$0	$10.00	$0	$0	28	$636.07
133	Diomede		$2,606.79		77.58	$227.58	$289.45					1,624	43.25		0.00	23.63	261.50		$100.00		$0	$0	406	$3,223.81
134	Diomede		$546.91		45.33	$74.35	$72.50							40	4.00						$0	$0	49	$693.76
135	Diomede	12.33	$876.44	$75.07	6.00	$0.70			$679.03	52	$244.00	5,742	51.60		0.00						$0	$0	122	$1,875.23
Total		**223.32**	**$84,711**	**$1,360.08**	**5,747.71**	**$36,496.08**	**$51,204.26**	**16.82**	**$15,218.37**	**1,112.75**	**$5,869.50**	**84,574.70**	**3,877.77**	**10,626**	**880.54**	**3,238.31**	**24,223.25**	**$19,499.50**	**$11,193.50**	**$14,065**	**$900**	**$576**	**39,319**	**$241,093.27**

Stephen R. Braund & Associates, 2011.

APPENDIX 4:

MARINE ECONOMICS DATA SHEET EXAMPLE

MARINE ECONOMICS DATA SHEET EXAMPLE

As discussed in Chapter 5, a portion of the origin of the cost approach in the methodology was adapted from the Oregon State University, Marine Advisory Program, Marine Economic Data Sheet (MEDS) program. OSU developed this approach to allow fishermen to be able to evaluate their potential costs and earnings, using standard costs for vessels of a similar size and fishery. It was developed for many applications, including a set developed by Sea Grant for the Prince William Sound salmon fisheries. One of the features of the MEDS was the ability to update the cost categories after they were initially established, using a few selected key informant interview, or even applying a cost of living (CPI) index to bring costs to the current year. The example sheets shown below are for a 26 foot Florida Crab Vessel, but as noted, the sheets were developed for many fisheries in a wide geographic area.

OSU SEA GRANT MARINE ADVISORY PROGRAM
OREGON STATE UNIVERSITY CORVALLIS, OREGON 97331

MEDS 48
Rev August 1973

MARINE ECONOMICS DATA - 26-FOOT FLORIDA CRAB VESSEL[a]

Description $1,400 market value, 26 feet by 8 feet, wood flat-bottom hull, 2-ton capacity, 130 HP gasoline engine, compass, and 100 crab traps.

Fishery	Effort (days)	Price: Per ton ($)	Price: Per lb. ($)	Production[b]: Low (tons)	Production[b]: Medium (tons)	Production[b]: High (tons)
Blue crab.....	200	160	.08	37	50	62
(1) Gross returns.....				$5,920	$8,000	$9,920

Variable costs[c]	Season total with: Low production	Medium production	High production
Vessel repairs.....	$ 480	$ 480	$ 480
Gear repairs.....	1,600	1,600	1,600
Bait.....	3,550	3,550	3,550
Fuel.....	820	820	820
Transportation.....	200	200	200
Miscellaneous.....	110	110	110
(2) Total variable costs.....	$6,760	$6,760	$6,760
Fixed costs[d]			
Depreciation.....	$ 70	$ 70	$ 70
Licenses.....	25	25	25
Accounting.....	30	30	30
(3) Total fixed costs.....	$ 125	$ 125	$ 125

Opportunity costs[e]	Low production	Medium production	High production
(4) Operator's labor (15% of gross).....	$ 888	$1,200	$1,488
(5) Operator's management.....	6,000	6,000	6,000
(6) Total investment ($1,400 @ 10%).....	140	140	140
Summary			
Return to labor, management, and investment (1 less 2 and 3).....	-965	1,115	3,035
Return to labor and management (1 less 2, 3, and 6).....	-1,105	975	2,895
Return to investment (1 less 2, 3, 4, and 5).....	-7,853	-6,085	-4,453

[a] Original data developed by selected Adar Keys fishermen, January 1972, in cooperation with the University of Florida and Oregon State University. Costs, landings, and prices have been adjusted to reflect changes since the original data were developed, and is representative of this port.

[b] Low and high are 25% below and above medium.

[c] Costs that vary with fishing effort. May include unpaid crew, operator, and family labor. Some costs, such as gear repair and crewshare, also vary with production.

[d] Costs that do not vary with fishing effort.

[e] Opportunity cost of labor is the estimated value of this operator's time, or what could have been earned working for someone else. Opportunity cost of management is the estimated value of this operator's management (decision-making and risk), or what could have been earned managing another similar business. Opportunity cost of investment is the estimated fair return to total investment in the business, regardless of the actual amount of debt.

APPENDIX 5:

DIOMEDE AND WALES SPREADSHEET VALUATION TOOL

The following pages present the spreadsheet tool implementation for Diomede, then Wales.

The Community and sheet name are noted as follows at the top of each page:

[Community Name] Spreadsheet Tool – [Sheet Name]

Diomede Spreadsheet Tool – Table of Contents

Diomede	Enter the community name at left

Table of Contents

#	Sheet	Description
1	Summary and Update	Summarizes analysis results and provides for simple updating of the results
2	Calc Excel	Calcluates and displays annual subsistence value based on 2011 Tt survey using Excel functions
3	Wage Info	Data for hourly wage used in analysis
4	Data Diomede	Diomede survey data used in functions
5	Stats	Statistics for each survey data variable organized for HLOOKUP functions
6	Data Backup	Copy of original survey data
7	Variables	Defines survey variables

Diomede Spreadsheet Tool – Summary and Update

Diomede

Go to TOC

Summary and Update

Displays results of analysis and allows price level, interest rate, and wage rate updating
Blue-shaded cells incdicate cells to be changed for a price level/wage rate update
Basic Equation: [value of subsistence household 1] + [household 2] + ...[n] = [total community subsistence value]

Summary Metrics	Base Analysis	Update Template 1	Update Template 2
Total Production and Labor Value of Subsistence Net Present Value	$13,691,000	$13,691,000	$13,691,000
Total Production and Labor Value of Subsistence Average Annual	$651,000	$651,000	$651,000

Additional analysis years can be added by copying and pasting years from the left and updating the blue cells in the new year as needed.

Price Level Updating

These rows contain basic analysis information that can be updated by changing values in the blue-shaded cells. Additional /updated analysis years can be added by copying the first year to new columns. Two placeholders for updated analyses are already shown.

	Base Analysis		Update 1		Update 2	
	2011	Analysis Year	0	Analysis Year	0	Analysis Year
	2010	Price Level	0	Price Level	0	Price Level
	4.125%	Interest Rate	4.125%	Interest Rate	4.125%	Interest Rate
Wage Rate Update Factor						
	$ 22.94	=wage old	$ 22.94	=wage old	$ 22.94	=wage old
	$ 22.94	=wage new	$ 22.94	=wage new	$ 22.94	=wage new
	$ 1.00	=New/Old	$ 1.00	=New/Old	$ 1.00	=New/Old
Price Level Update Factor						
	1.00	=Index yr old	1.00	=Index yr old	1.00	=Index yr old
	1.00	=Index yr new	1.00	=Index yr new	1.00	=Index yr new
	1.00	=New/Old	1.00	=New/Old	1.00	=New/Old
	50	Period of Analysis	50	Period of Analysis	50	Period of Analysis

Additional analysis years can be added by copying and pasting years from the left and updating the blue cells in the new year as needed.

Diomede Spreadsheet Tool – Calc Excel

Diomede

Go to TOC

Calculation of Production and Labor Cost Using Excel

Simple Sum of Survey Data for All Households

	Components	Community Diomede
Production Cost		
4	techpurchasecost	$31,230
5	techmaterialcost	$760
7	techmaintcost	$10,030
8	techusecost	$13,290
10	infrapurchasecost	$5,530
12	inframaintcost	$1,830
17	terrestrial_fuel_expenses	$2,300
18	boat_fuel_expenses	$2,990
19	food_expenses	$1,600
20	rental_expenses	$0
21	rental_fuel	$0
Unsurveyed Households		13
Cost per unsurveyed household		$2,780
Net Adjustment		$36,140
Production Cost Subtotal		
23		$105,700
Labor Cost		
3	techmakehrs	$2,800
6	techmainthrs	$55,430
9	inframakehrs	$20
11	inframainthrs	$12,570
13	processhrs	$29,500
14	receive_processhrs	$11,410
15	preparehrs	$17,430
16	harvesthrs	$229,380
Unsurveyed Households		13
Cost per unsurveyed household		$14,340
Net Adjustment		$186,420
Labor Value Subtotal		
22	subsisthrs	$544,960
	TOTAL COST	**$651,000**

Diomede Spreadsheet Tool – Wage Info

Diomede			
Go to TOC			
Hourly Wage Info			
This sheet contains the latest available hourly wage rate for Alaska from the Bureau of Labor Statistics			
	$22.94	State of Alaska 2010 average wage rate	

This page intentionally left blank.

Diomede Spreadsheet Tool – Data Diomede

Data Diomede

This sheet contains the survey data for the Diomede community

Household_ID	Community	techmakehrs	techpurchasecost	techmaterialcost	techmainthrs	techmaintcost	techusecost	How_Often_Purchase_Years	labor_hours_to_maker	Household_Maintenance_Hoursr	Percent_Used_Subsistence	Maintenance_Cost_Year	Costs_Per_Year	inframakehrs
C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Household_ID	Community	techmakehrs	techpurchasecost	techmaterialcost	techmainthrs	techmaintcost	techusecost	How_Often_Purchase_Years	labor_hours_to_maker	Household_Maintenance_Hoursr	Percent_Used_Subsistence	Maintenance_Cost_Year	Costs_Per_Year	inframakehrs
101	Diomede	6.00	$2,485.47	$1.25	444.65	$396.05	$1,310.00	5.27	24	481.20	89	$688.60	$1,375.00	
102	Diomede	16.17	$2,149.86	$35.80	153.70	$883.90	$470.95	7.42	93.67	170.70	98	$1,155.90	$471.00	0.11
103	Diomede		$68.49		44.23	$74.23	$260.01	5.20		45.20	91	$75.20	$263.00	
104	Diomede		$264.66		3.27	$16.13	$0.00	9.60		3.75	96	$17.10	$0.00	
105	Diomede	20.18	$7,356.51	$267.69	587.72	$2,085.57	$2,159.25	5.88	76.5	590.47	98	$2,196.20	$2,165.00	
106	Diomede		$1,671.89		44.21	$495.17	$481.55	5.00		75.10	84	$771.80	$835.00	
107	Diomede	3.25	$1,537.14	$61.30	33.87	$355.07	$1,520.00	6.74	21.5	36.70	95	$381.60	$1,550.00	
108	Diomede		$402.29		17.31	$4.97	$73.15	7.71		20.10	90	$6.10	$95.00	
109	Diomede	7.96	$1,885.96	$20.58	159.53	$1,086.73	$955.40	7.72	63	164.20	98	$1,096.20	$1,038.00	0.75
111	Diomede	2.00	$219.37	$20.00	15.31	$4.67	$192.00	5.90	2	20.00	88	$5.80	$200.00	
112	Diomede	7.60	$2,235.61	$83.13	102.43	$439.23	$939.88	5.04	9.33	107.60	94	$440.20	$962.35	
113	Diomede	21.53	$382.25	$45.70	97.67	$1,185.04	$76.00	7.35	112	102.53	97	$1,187.10	$76.00	
114	Diomede		$191.45		5.28	$0.54		7.13		7.10	92	$0.70		
115	Diomede	3.23	$215.59	$13.13	118.88	$90.06	$139.00	5.92	20	138.30	93	$91.20	$145.00	
116		7.53	$331.43	$29.50	137.10	$1,034.60	$2,292.50	8.31	51	137.10	100	$1,034.60	$2,292.50	
117	Diomede	8.96	$1,859.86	$38.51	93.26	$776.84	$205.00	6.15	38.5	100.25	95	$778.90	$205.00	
120	Diomede	0.41	$55.61	$10.13	21.87	$47.05	$52.50	6.75	3	42.25	84	$83.00	$102.50	
121	Diomede	0.88	$2,174.07	$3.50	55.32	$184.24	$500.00	6.13	5	58.93	96	$346.60	$500.00	
122	Diomede	1.83	$535.61	$15.83	17.43	$71.30	$650.00	5.50	10	17.43	100	$71.30	$650.00	
129	Diomede		$307.67		39.00	$284.00		7.60		39.00	97	$284.00		
130	Diomede	0.48	$400.69	$2.54	93.14	$121.57	$620.16	7.12	4	95.93	96	$122.70	$622.00	
132	Diomede	1.78	$470.72	$34.30	2.16	$93.55	$27.50	2.25	5.3	2.50	90	$112.00	$35.00	
133	Diomede		$2,606.79		77.58	$227.58	$289.45	3.70		80.10	88	$295.10	$385.00	
134	Diomede		$546.91		45.33	$74.35	$72.50	3.20		47.10	83	$75.80	$85.00	
135	Diomede	12.33	$876.44	$75.07	6.00	$0.70		6.45	47	6.00	100	$0.70		

infrapurchasecost	inframainthrs	inframaintcost	estimated_cost_worthr	How_Often_Purchase	poundsharv	processhrs	poundsrec	receive_processhrs	preparehrs	harvesthrs	terrestrial_fuel_expenses	boat_fuel_expenses	food_expenses	rental_expenses	rental_fuel	subsisthrs	subsistcost
R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
infrapurchasecost	inframainthrs	inframaintcost	estimated_cost_worthr	How_Often_Purchase	poundsharv	processhrs	poundsrec	receive_processhrs	preparehrs	harvesthrs	terrestrial_fuel_expenses	boat_fuel_expenses	food_expenses	rental_expenses	rental_fuel	subsisthrs	subsistcost
$1,444.44	80	$244.00	$24,000.00	15	7	0.46	857	179.60	0.00	24.00	$500.00	$500.00	$500.00	$0.00	$0.00	735	$7,381.22
	2			27	3523	172.83	1010	251.94	106.99	918.00			$0.00	$0.00	$0.00	1622	$3,540.51
					1567	12.46	27.5	0.00	32.00	83.85				$0.00	$0.00	173	$402.73
							42.5	2.26			$0.00	$0.00	$0.00	$0.00	$0.00	6	$280.79
	8	$300.00	$7,000.00		7815	259.52	169	5.92	251.38	3,831.50	$400.00	$400.00	$600.00	$0.00	$0.00	4964	$13,569.01
					837	25.75	56	0.00		28.50				$0.00	$0.00	98	$2,648.61
$1,500.00	20	$200.00	$21,000.00	15	1542	37.35	46	0.00	12.75	121.00	$1,000.00	$750.00	$250.00	$0.00	$0.00	228	$7,173.50
					0		32	0.16								17	$480.41
$679.03	54	$244.00	$10,185.00	11	264	64.74	114	5.00	23.50	286.75			$0.00		$0.00	602	$4,871.69
					590	22.15	80	6.25	3.66	18.50	$0.00	$0.00	$0.00	$0.00	$0.00	68	$436.04
					6540.7	98.80	21	0.00	102.50	728.00	$50.00	$500.00	$200.00	$0.00	$0.00	1039	$4,447.85
														$0.00	$0.00	119	$1,689.00
					3		15	6.25	1.05	5.25				$0.00	$0.00	18	$191.99
					100	0.00	66	0.00	6.13	157.50	$112.50	$0.00	$0.00	$0.00	$0.00	286	$570.28
					6683	65.50	1676	9.90	89.13	2,036.50	$150.00	$200.00	$0.00	$0.00	$0.00	2346	$4,038.03
					246	66.27	72	10.01	1.00	99.50	$0.00	$0.00	$40.00	$0.00	$0.00	279	$2,920.22
					796	1.50	4	0.00	1.00	14.25		$260.00		$0.00	$0.00	39	$425.29
$547.78	280	$350.00	$8,610.00	15	10959	41.79	78	1.15	33.00	404.00	$30.00	$75.00	$0.00	$0.00	$0.00	816	$3,864.59
					2962	27.35	417	2.40	71.00	347.50	$0.00	$0.00	$0.00	$0.00	$0.00	468	$1,272.74
$679.03	52	$244.00	$10,185.00	15										$0.00	$0.00	91	$1,514.70
					1317	289.84	69	9.62	0.00	618.00	$55.00	$200.00	$0.00	$0.00	$0.00	1011	$1,399.96
					65	4.60	21.5	3.00	1.00	15.00	$0.00	$0.00	$10.00	$0.00	$0.00	28	$636.07
					1624	43.25		0.00	23.63	261.50		$100.00		$0.00	$0.00	406	$3,223.81
							40	4.00						$0.00	$0.00	49	$693.76
$679.03	52	$244.00	$10,185.00	15	5742	51.60		0.00						$0.00	$0.00	122	$1,875.23

Diomede Spreadsheet Tool – Stats

Summary of Statistics for Lookup

This section summarizes the stat cals below

	Variable Name	Diomede				
		Min	Max	Median	Mean	St Dev
1	Household_ID	0.00	0.00	0.00	0.00	0.00
2	Community	0.00	0.00	0.00	0.00	0.00
3	techmakehrs	0.41	21.53	6.00	7.18	6.77
4	techpurchasecost	55.61	7356.51	535.61	1249.29	1541.79
5	techmaterialcost	1.25	267.69	29.50	44.59	62.47
6	techmainthrs	2.16	587.72	45.33	96.65	136.64
7	techmaintcost	0.54	2085.57	184.24	401.33	512.40
8	techusecost	0.00	2292.50	380.20	603.95	672.46
9	inframakehrs	0.11	0.75	0.43	0.43	0.45
10	infrapurchasecost	547.78	1500.00	679.03	921.55	429.92
11	inframainthrs	2.00	280.00	52.00	68.50	89.49
12	inframaintcost	200.00	350.00	244.00	260.86	48.85
13	processhrs	0.00	289.84	41.79	67.67	83.87
14	receive_processhrs	0.00	251.94	2.40	21.63	62.32
15	preparehrs	0.00	251.38	18.13	42.21	63.94
16	harvesthrs	5.25	3831.50	157.50	526.27	937.29
17	terrestrial_fuel_expenses	0.00	1000.00	50.00	176.73	295.18
18	boat_fuel_expenses	0.00	750.00	100.00	199.00	237.80
19	food_expenses	0.00	600.00	0.00	106.67	197.04
20	rental_expenses	0.00	0.00	0.00	0.00	0.00
21	rental_fuel	0.00	0.00	0.00	0.00	0.00
22	subsisthrs	6.00	4964.00	228.00	625.20	1067.64
23	subsistcost	191.99	13569.01	1689.00	2781.92	3056.04

All Statistics Calculated for Each Variable

This section calcuates the statistics on all variables from the survey data

STATS Diomede

Data Dio	12	36

Variable	1	Household_ID
	Count	25
	Min	
	Med	
	Max	
	Mean	
	St Dev	

Variable	2	Community
		'Data Diomede'!D12:D36
	Min	
	Med	
	Max	
	Mean	
	St Dev	

Variable	3	techmakehrs
		'Data Diomede'!E12:E36
	Min	0
	Med	6
	Max	22
	Mean	7
	St Dev	7

Variable	4	techpurchasecost
		'Data Diomede'!F12:F36
	Min	56
	Med	536
	Max	7,357
	Mean	1,249
	St Dev	1,542

Variable	5	techmaterialcost
		'Data Diomede'!G12:G36
	Min	1
	Med	30
	Max	268
	Mean	45
	St Dev	62

Variable	6	techmainthrs
		'Data Diomede'!H12:H36
	Min	2
	Med	45
	Max	588
	Mean	97
	St Dev	137

Variable	7	techmaintcost
		'Data Diomede'!I12:I36
	Min	1
	Med	184
	Max	2,086
	Mean	401
	St Dev	512

Variable	8	techusecost
		'Data Diomede'!J12:J36
	Min	0
	Med	380
	Max	2,293
	Mean	604
	St Dev	672

Variable	9	inframakehrs
		'Data Diomede'!Q12:Q36
	Min	0
	Med	0
	Max	1
	Mean	0
	St Dev	0

Variable	10	infrapurchasecost
		'Data Diomede'!R12:R36
	Min	548
	Med	679
	Max	1,500
	Mean	922
	St Dev	430

Variable	11	inframainthrs
		'Data Diomede'!S12:S36
	Min	2
	Med	52
	Max	280
	Mean	69
	St Dev	89

Variable	12	inframaintcost
		'Data Diomede'!T12:T36
	Min	200
	Med	244
	Max	350
	Mean	261
	St Dev	49

Variable	13	processhrs
		'Data Diomede'!X12:X36
	Min	0
	Med	42
	Max	290
	Mean	68
	St Dev	84

Variable	14	receive_processhrs
		'Data Diomede'!Z12:Z36
	Min	0
	Med	2
	Max	252
	Mean	22
	St Dev	62

Variable	15	preparehrs
		'Data Diomede'!AA12:AA36
	Min	0
	Med	18
	Max	251
	Mean	42
	St Dev	64

Variable	16	harvesthrs
		'Data Diomede'!AB12:AB36
	Min	5
	Med	158
	Max	3,832
	Mean	526
	St Dev	937

Variable	17	terrestrial_fuel_expenses
		'Data Diomede'!AC12:AC36
	Min	0
	Med	50
	Max	1,000
	Mean	177
	St Dev	295

Variable	18	boat_fuel_expenses
		'Data Diomede'!AD12:AD36
	Min	0
	Med	100
	Max	750
	Mean	199
	St Dev	238

Variable	19	food_expenses
		'Data Diomede'!AE12:AE36
	Min	0
	Med	0
	Max	600
	Mean	107
	St Dev	197

Variable	20	rental_expenses
		'Data Diomede'!AF12:AF36
	Min	0
	Med	0
	Max	0
	Mean	0
	St Dev	0

Variable	21	rental_fuel
		'Data Diomede'!AG12:AG36
	Min	0
	Med	0
	Max	0
	Mean	0
	St Dev	0

Variable	22	subsisthrs
		'Data Diomede'!AH12:AH36
	Min	6
	Med	228
	Max	4,964
	Mean	625
	St Dev	1,068

Variable	23	subsistcost
		'Data Diomede'!AI12:AI36
	Min	192
	Med	1,689
	Max	13,569
	Mean	2,782
	St Dev	3,056

Diomede Spreadsheet Tool – Data Backup

[This sheet is a copy of the “Data Diomede” sheet, and is not shown here]

Diomede Spreadsheet Tool – Variables

Diomede

Go to TOC

Variables

This sheet contains a list of the survey variables

Identifiers
cost variable
labor variable

#	VARIABLE	DEFINITION
1	Household_ID	Household ID
2	Community	Community
3	techmakehrs	Sum of hours per year spent making technology and tools
4	techpurchasecost	Sum of dollars per year spent purchasing technology and tools
5	techmaterialcost	Sum of dollars per year spent on materials to make technology and tools
6	techmainthrs	Sum of hours per year spent maintaining technology and tools
7	techmaintcost	Sum of dollars per year spent maintaining technology and tools
8	techusecost	Sum of dollars per year spent using technology and tools
9	inframakehrs	Sum of hours per year spent makeing infrastructure
10	infrapurchasecost	Sum of dollars per year purchasing infrastructure
11	inframainthrs	Sum of hours per year maintaing infrastructure
12	inframaintcost	Sum of dollars per year maintaining infrastructure
13	processhrs	Sum of hours spent processing harvest per year
14	receive_processhrs	Sum of hours spent processing received subsistence per year
15	preparehrs	Sum of hours spent per year preparing for subsistence trips
16	harvesthrs	Sum of hours spent per year on subsistence trips
17	terrestrial_fuel_expenses	Sum of dollars spent per year on fuel for terrestrial travel
18	boat_fuel_expenses	Sum of dollars spent per year on fuel for boat travel
19	food_expenses	Sum of dollars spent per year on food while on subsistence trips
20	rental_expenses	Sum of dollars spent per year on rental of equipment for subsistence
21	rental_fuel	Sum of dollars spent per year on fuel for rental equipment for subsistence
22	subsisthrs	Hours spent on subsistence per year
23	subsistcost	Dollars spent on subsistence per year

Wales Spreadsheet Tool – Table of Contents

WALES

Enter the community name at left

Table of Contents

#	Sheet	Description
1	Summary and Update	Summarizes analysis results and provides for simple updating of the results
2	Calc Excel	Calcluates and displays annual subsistence value based on 2011 Tt survey using Excel functions
3	Wage Info	Data for hourly wage used in analysis
4	Data Wales	Wales survey data used in functions
5	Stats	Statistics for each survey data variable organized for HLOOKUP functions
6	Data Backup	Copy of original survey data
7	Variables	Defines survey variables

Wales Spreadsheet Tool – Summary and Update

WALES

Go to TOC

Summary and Update

Displays results of analysis and allows price level, interest rate, and wage rate updating
Blue-shaded cells incdicate cells to be changed for a price level/wage rate update
Basic Equation: [value of subsistence household 1] + [household 2] + ...[n] = [total community subsistence value]

Summary Metrics	Base Analysis	Update Template 1	Update Template 2
Total Production and Labor Value of Subsistence Net Present Value	$20,210,000	$20,210,000	$20,210,000
Total Production and Labor Value of Subsistence Average Annual	$961,000	$961,000	$961,000

Additional analysis years can be added by copying and pasting years from the left and updating the blue cells in the new year as needed.

Price Level Updating

These rows contain basic analysis information that can be updated by changing values in the blue-shaded cells. Additional /updated analysis years can be added by copying the first year to new columns. Two placeholders for updated analyses are already shown.

	Base Analysis		Update 1		Update 2	
	2011	Analysis Year	0	Analysis Year	0	Analysis Year
	2010	Price Level	0	Price Level	0	Price Level
	4.125%	Interest Rate	4.125%	Interest Rate	4.125%	Interest Rate
Wage Rate Update Factor			Wage Rate Update Factor		Wage Rate Update Factor	
	$ 22.94	=wage old	$ 22.94	=wage old	$ 22.94	=wage old
	$ 22.94	=wage new	$ 22.94	=wage new	$ 22.94	=wage new
	$ 1.00	=New/Old	$ 1.00	=New/Old	$ 1.00	=New/Old
Price Level Update Factor			Price Level Update Factor		Price Level Update Factor	
	1.00	=Index yr old	1.00	=Index yr old	1.00	=Index yr old
	1.00	=Index yr new	1.00	=Index yr new	1.00	=Index yr new
	1.00	=New/Old	1.00	=New/Old	1.00	=New/Old
	50	Period of Analysis	50	Period of Analysis	50	Period of Analysis

Additional analysis years can be added by copying and pasting years from the left and updating the blue cells in the new year as needed.

Wales Spreadsheet Tool – Calc Excel

WALES

Go to TOC

Calculation of Production and Labor Cost Using Excel

Simple Sum of Survey Data for All Households

	Components	Community Wales
Production Cost		
4	techpurchasecost	$53,480
5	techmaterialcost	$600
7	techmaintcost	$26,460
8	techusecost	$37,920
10	infrapurchasecost	$9,690
12	inframaintcost	$4,040
17	terrestrial_fuel_expenses	$17,200
18	boat_fuel_expenses	$8,210
19	food_expenses	$12,470
20	rental_expenses	$900
21	rental_fuel	$580
Unsurveyed Households		11
Cost per unsurveyed household		$5,360
Unsurveyed Households Adjustment		$58,960
Production Cost Subtotal		
23	subsistcost	$230,510
Labor Cost		
3	techmakehrs	$2,320
6	techmainthrs	$76,430
9	inframakehrs	$370
11	inframainthrs	$12,960
13	processhrs	$59,460
14	receive_processhrs	$8,790
15	preparehrs	$56,860
16	harvesthrs	$326,300
Unsurveyed Households		11
Cost per unsurveyed household		$16,980
Net Adjustment		$186,780
Labor Value Subtotal		
22	subsisthrs	$730,270
	TOTAL COST	**$961,000**

Wales Spreadsheet Tool – Wage Info

WALES

Go to TOC

Hourly Wage Info

This sheet contains the latest available hourly wage rate for Alaska from the Bureau of Labor Statistics

$ 22.94	Mean Hourly Wage Accross All Occupations for Alaska (May 2010) (http://www.bls.gov/oes/current/oes_nat.htm)

Data Wales

This sheet contains the survey data for the Wales community

Household_ID	Community	techmakehrs	techpurchasecost	techmaterialcost	techmainthrs	techmaintcost	techusecost	How_Often_Purchase_Yearsr	labor_hours_to_maker	Household_Maintenance_Hoursr	Percent_Used_Subsistencer	Maintenance_Cost_Yearr	Costs_Per_Yearr	inframakehrs
C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Household_ID	Community	techmakehrs	techpurchasecost	techmaterialcost	techmainthrs	techmaintcost	techusecost	How_Often_Purchase_Yearsr	labor_hours_to_maker	Household_Maintenance_Hoursr	Percent_Used_Subsistencer	Maintenance_Cost_Yearr	Costs_Per_Yearr	inframakehrs
6	Wales	1.28	$1,742.92	$36.30	32.45	$424.36	$2,445.00	6.14	16	71.10	86	$1,535.20	$2,535.00	
9	Wales		$188.94		39.52	$69.63	$26.43	6.00		49.60	65	$85.30	$29.00	
10	Wales	6.44	$1,056.18	$20.21	28.08	$183.18	$1,410.00	11.60	65	38.60	93	$370.70	$1,415.00	1.67
11	Wales		$2,339.05		58.34	$270.22	$139.70	7.55		63.60	90	$276.50	$160.00	
12	Wales	0.32	$1,943.57	$22.52	49.90	$669.95	$313.75	7.02	8	88.50	87	$1,828.20	$315.00	
13	Wales	1.08	$1,777.15	$10.13	123.10	$657.10	$1,159.00	7.43	8	180.50	88	$1,200.60	$1,200.00	0.02
14	Wales	1.07	$618.80	$3.51	8.20	$15.90	$1,230.00	7.04	9.5	8.20	100	$15.90	$1,230.00	1.02
15	Wales	3.31	$1,346.49	$9.25	40.83	$251.83	$227.00	7.61	29	43.70	93	$251.90	$237.50	0.74
16	Wales	2.38	$1,620.45	$7.50	21.10	$291.05	$1,440.00	6.91	25	31.10	92	$293.90	$1,440.00	
17	Wales		$1,699.78		218.91	$855.46	$551.04	7.67		265.00	78	$1,364.10	$574.00	
18	Wales	2.84	$1,931.06	$49.88	108.07	$663.65	$724.50	14.17	30.5	244.60	89	$1,447.50	$750.00	3.60
22	Wales	1.08	$2,489.03	$47.77	103.70	$547.30	$1,016.80	12.74	14	124.70	96	$662.30	$1,037.50	0.10
23	Wales	1.81	$1,675.23	$8.25	39.67	$151.66	$1,973.00	6.92	16	44.20	94	$151.90	$2,003.00	3.50
24	Wales	1.33	$3,690.31	$3.33	271.13	$3,461.53	$4,850.00	5.89	4	410.20	87	$5,635.80	$5,000.00	
25	Wales	0.65	$517.08	$8.25	71.48	$54.68	$458.00	8.08	5.5	71.70	97	$54.70	$460.50	
27	Wales		$674.23		104.06	$84.48	$65.40	6.75		122.10	87	$161.10	$70.00	
28	Wales	16.22	$3,443.83	$60.16	852.40	$2,480.60	$2,800.00	7.80	154	857.20	98	$2,555.60	$2,800.00	1.81
29	Wales	1.22	$227.66	$10.13	89.81	$154.67	$1,177.00	5.36	9	92.60	95	$155.80	$1,200.00	
30	Wales		$259.47		4.55	$4.15	$339.00	7.70		5.50	88	$5.10	$350.00	
31	Wales	0.64	$901.53	$13.60	11.08	$40.58	$930.05	6.77	9	21.60	66	$200.60	$965.00	0.30
32	Wales	31.49	$3,664.77	$14.64	81.65	$620.65	$2,225.00	6.63	46.5	90.10	91	$800.70	$2,400.00	0.06
34	Wales		$1,019.11		13.85	$331.07	$825.00	7.09		29.03	90	$721.10	$840.00	
35	Wales	6.61	$1,172.94	$78.22	203.70	$278.71	$705.00	10.68	87	249.50	94	$407.00	$705.00	0.64
36	Wales	1.88	$2,753.55	$61.41	115.08	$8,434.80	$1,400.04	8.23	30	138.10	94	$10,509.60	$1,474.00	0.19
37	Wales	0.83	$1,753.40	$12.50	141.10	$568.00	$770.00	10.53	5	162.80	92	$2,161.00	$775.00	0.04
38	Wales	1.09	$2,972.94	$33.10	98.79	$1,002.92	$1,789.30	5.81	15	131.70	88	$1,908.00	$1,795.00	0.80
40	Wales	5.10	$2,031.65	$51.86	93.52	$984.35	$3,107.80	8.52	58	116.60	87	$1,306.60	$3,228.00	0.04
42	Wales	1.05	$2,821.18	$2.40	189.32	$998.78	$1,613.25	6.07	11.5	307.10	93	$1,650.80	$1,755.00	1.30
43	Wales	5.83	$121.05	$12.50	44.00	$72.40	$239.20	4.57	35	45.60	100	$75.20	$245.00	
44	Wales		$512.65		18.50	$140.68	$267.40	5.43		28.70	87	$152.00	$290.00	
45	Wales	4.93	$4,116.73	$20.92	41.08	$1,109.68	$956.20	5.26	42	87.10	91	$2,117.80	$990.00	
46	Wales	0.75	$395.94	$3.79	14.58	$588.96	$743.60	10.93	9	16.00	95	$694.40	$750.00	0.14

infrapurchasecost	inframainthrs	inframaintcost	estimated_cost_worthr	How_Often_Purchaser	poundsharv	processhrs	poundsrec	receive_processhrs	preparehrs	harvesthrs	terrestrial_fuel_expenses	boat_fuel_expenses	food_expenses	rental_expenses	rental_fuel	subsisthrs	subsistcost
R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
infrapurchasecost	inframainthrs	inframaintcost	estimated_cost_worthr	How_Often_Purchaser	poundsharv	processhrs	poundsrec	receive_processhrs	preparehrs	harvesthrs	terrestrial_fuel_expenses	boat_fuel_expenses	food_expenses	rental_expenses	rental_fuel	subsisthrs	subsistcost
$2,178.29	47.5	$1,000.00	$19,620.00	13	3246	116.85	28	2.35	172.50	516.00	$1,200.00	$320.00	$550.00			889	$9,896.86
							4							$0.00	$0.00	40	$285.00
	40			27	54	48.51	215	15.77	26.25	160.50	$300.00			$0.00	$0.00	327	$2,969.57
					662	14.15	2	0.00	0.00	24.00	$375.00	$0.00	$10.00	$0.00	$0.00	96	$3,133.97
					163	12.00		0.00	13.96	652.25	$1,237.50		$250.00	$0.00	$0.00	728	$4,437.29
	2			27	183	0.00	48	71.98	26.00	172.00	$440.00		$275.00			396	$4,318.38
$200.00	2	$20.00	$2,400.00	20	2865	84.30	50	1.73	174.00	135.00	$0.00	$300.00	$300.00	$0.00	$0.00	407	$2,688.22
$116.67	33	$300.00	$3,500.00	28	2448	84.10	96	9.00	28.30	70.00	$75.00	$112.50	$100.00	$0.00	$0.00	269	$2,538.74
					92	13.57	271	39.27	73.50	338.00	$0.00	$0.00	$55.00			488	$3,414.00
$679.03	52	$244.00	$10,185.00	15	33	2.30	2	0.00						$0.00	$0.00	273	$4,029.30
$806.67	28.5	$100.00	$4,200.00	25	3108	350.00	221	11.25	338.83	1,579.30	$386.50	$773.00	$550.00	$0.00	$0.00	2422	$5,985.25
$1,010.10	82	$294.00	$15,000.00	16	781	68.42	650.5	7.22	23.53	368.00	$848.00	$848.00	$800.00	$0.00	$0.00	654	$7,901.00
$439.58	54	$244.00	$5,575.00	12	865	43.42	113	2.74	94.50	206.00		$400.00	$1,000.00	$0.00	$0.00	446	$5,891.72
					246	11.19	40	3.00	180.00	880.00	$375.00	$412.50	$1,000.00	$0.00	$0.00	1347	$13,792.67
					2543	95.34	18	5.34	65.30	251.35		$40.00	$100.00	$0.00	$0.00	489	$1,178.01
	9	$355.00			73	36.00		0.00	0.00	33.00	$0.00	$0.00	$0.00	$0.00	$0.00	182	$1,179.11
	4			16	1283	463.63	295	0.00	253.00	975.00	$5,500.00		$500.00	$0.00	$0.00	2566	$14,784.58
	4			27	270	95.90	479	63.93	56.46	524.00	$400.00		$1,200.00	$900.00	$576.00	835	$4,645.46
							303	3.58	0.25	8.00	$0.00	$0.00	$0.00	$0.00	$0.00	16	$602.62
	0			27	822	40.70	54	2.50	26.25	269.50	$850.00		$250.00	$0.00	$0.00	351	$2,985.75
$3,200.00	63	$599.00	$23,000.00	12	3135	360.55	77	4.49	286.25	2,909.50	$1,590.00	$900.00	$850.00	$0.00	$0.00	3737	$13,664.05
					16	1.68	184	0.68	12.68	92.50		$270.00	$100.00	$0.00	$0.00	121	$2,545.18
$394.29	15.75	$133.50	$7,400.00	13	1685	61.50	99	5.02	174.06	849.00	$600.00	$750.00	$500.00			1316	$4,612.66
$125.00	38	$510.00	$35,333.00	19	2811	279.20	90	26.00	171.20	1,418.00	$1,000.00	$450.00	$800.00			2050	$15,534.79
	0			85	752	84.35	751	51.70	18.44	231.50	$150.00	$400.00	$200.00	$0.00	$0.00	528	$3,853.90
	4			12	799	70.83	367	33.09	118.74	618.25	$150.00	$100.00	$300.00	$0.00	$0.00	946	$6,348.26
$414.44	29	$0.00	$7,610.00	22	219	47.50	19	5.40	10.89	167.00	$500.00	$880.00	$200.00	$0.00	$0.00	358	$8,170.11
	3			10	621	31.12	21.5	2.50	29.11	173.00	$700.00	$500.00	$800.00	$0.00	$0.00	430	$7,435.61
					104	16.00	1010	3.71	10.00	70.00		$250.00	$175.00	$0.00	$0.00	150	$870.15
					76	45.23	23.5	2.29	59.50	240.00		$90.00	$200.00	$0.00	$0.00	366	$1,210.73
$125.00	52	$244.00	$2,000.00	15	1347	7.16	116	4.18	23.26	203.50	$525.00	$262.50	$1,000.00	$0.00	$0.00	336	$8,360.03
	2			4	90	6.52	65	4.38	11.86	90.00		$150.00	$400.00	$0.00	$0.00	130	$2,282.30

Wales Spreadsheet Tool – Stats

Summary of Statistics for Lookup

This section summarizes the stat cals below

	Variable Name	Wales				
		Min	Max	Median	Mean	St Dev
1	Household_ID	0.00	0.00	0.00	0.00	0.00
2	Community	0.00	0.00	0.00	0.00	0.00
3	techmakehrs	0.32	31.49	1.33	4.05	6.64
4	techpurchasecost	121.05	4116.73	1687.51	1671.21	1130.29
5	techmaterialcost	2.40	78.22	13.60	24.09	21.86
6	techmainthrs	4.55	852.40	64.91	104.11	151.97
7	techmaintcost	4.15	8434.80	377.72	826.97	1562.87
8	techusecost	26.43	4850.00	943.13	1184.92	1040.68
9	inframakehrs	0.02	3.60	0.64	0.94	1.14
10	infrapurchasecost	116.67	3200.00	427.01	807.42	948.64
11	inframainthrs	0.00	82.00	22.13	25.67	24.84
12	inframaintcost	0.00	1000.00	244.00	311.04	269.34
13	processhrs	0.00	463.63	46.37	86.40	117.68
14	receive_processhrs	0.00	71.98	4.18	12.36	19.35
15	preparehrs	0.00	338.83	28.71	82.62	93.46
16	harvesthrs	8.00	2909.50	235.75	474.14	609.13
17	terrestrial_fuel_expenses	0.00	5500.00	420.00	716.75	1106.54
18	boat_fuel_expenses	0.00	900.00	285.00	342.02	298.57
19	food_expenses	0.00	1200.00	300.00	429.83	356.27
20	rental_expenses	0.00	900.00	0.00	33.33	173.21
21	rental_fuel	0.00	576.00	0.00	21.33	110.85
22	subsisthrs	16.00	3737.00	418.50	740.28	847.78
23	subsistcost	285.00	15534.79	4173.84	5360.79	4260.38

All Statistics Calculated for Each Variable

This section calcuates the statistics on all variables from the survey data

STATS Wales

Data Wales	12	43

Variable	1	Household_ID
	Count	32
	Min	
	Med	
	Max	
	Mean	
	St Dev	

Variable	2	Community
		'Data Wales'!D12:D43
	Min	
	Med	
	Max	
	Mean	
	St Dev	

Variable	3	techmakehrs
		'Data Wales'!E12:E43
	Min	0
	Med	1
	Max	31
	Mean	4
	St Dev	7

Variable	4	techpurchasecost
		'Data Wales'!F12:F43
	Min	121
	Med	1,688
	Max	4,117
	Mean	1,671
	St Dev	1,130

Variable	5	techmaterialcost
		'Data Wales'!G12:G43
	Min	2
	Med	14
	Max	78
	Mean	24
	St Dev	22

Variable	6	techmainthrs
		'Data Wales'!H12:H43
	Min	5
	Med	65
	Max	852
	Mean	104
	St Dev	152

Variable	7	techmaintcost
		'Data Wales'!I12:I43
	Min	4
	Med	378
	Max	8,435
	Mean	827
	St Dev	1,563

Variable	8	techusecost
		'Data Wales'!J12:J43
	Min	26
	Med	943
	Max	4,850
	Mean	1,185
	St Dev	1,041

Variable	9	inframakehrs
		'Data Wales'!Q12:Q43
	Min	0
	Med	1
	Max	4
	Mean	1
	St Dev	1

Variable	10	infrapurchasecost
		'Data Wales'!R12:R43
	Min	117
	Med	427
	Max	3,200
	Mean	807
	St Dev	949

Variable	11	inframainthrs
		'Data Wales'!S12:S43
	Min	0
	Med	22
	Max	82
	Mean	26
	St Dev	25

Variable	12	inframaintcost
		'Data Wales'!T12:T43
	Min	0
	Med	244
	Max	1,000
	Mean	311
	St Dev	269

Variable	13	processhrs
		'Data Wales'!X12:X43
	Min	0
	Med	46
	Max	464
	Mean	86
	St Dev	118

Variable	14	receive_processhrs
		'Data Wales'!Z12:Z43
	Min	0
	Med	4
	Max	72
	Mean	12
	St Dev	19

Variable	15	preparehrs
		'Data Wales'!AA12:AA43
	Min	0
	Med	29
	Max	339
	Mean	83
	St Dev	93

Variable	16	harvesthrs
		'Data Wales'!AB12:AB43
	Min	8
	Med	236
	Max	2,910
	Mean	474
	St Dev	609

Variable	17	terrestrial_fuel_expenses
		'Data Wales'!AC12:AC43
	Min	0
	Med	420
	Max	5,500
	Mean	717
	St Dev	1,107

Variable	18	boat_fuel_expenses
		'Data Wales'!AD12:AD43
	Min	0
	Med	285
	Max	900
	Mean	342
	St Dev	299

Variable	19	food_expenses
		'Data Wales'!AE12:AE43
	Min	0
	Med	300
	Max	1,200
	Mean	430
	St Dev	356

Variable	20	rental_expenses
		'Data Wales'!AF12:AF43
	Min	0
	Med	0
	Max	900
	Mean	33
	St Dev	173

Variable	21	rental_fuel
		'Data Wales'!AG12:AG43
	Min	0
	Med	0
	Max	576
	Mean	21
	St Dev	111

Variable	22	subsisthrs
		'Data Wales'!AH12:AH43
	Min	16
	Med	419
	Max	3,737
	Mean	740
	St Dev	848

Variable	23	subsistcost
		'Data Wales'!AI12:AI43
	Min	285
	Med	4,174
	Max	15,535
	Mean	5,361
	St Dev	4,260

Wales Spreadsheet Tool – Data Backup

[This sheet is a copy of the “Data Wales” sheet, and is not shown here]

Wales Spreadsheet Tool – Variables

WALES

Go to TOC

Variables

This sheet contains a list of the survey variables

Identifiers
cost variable
labor variable

#	VARIABLE	DEFINITION
1	Household_ID	Household ID
2	Community	Community
3	techmakehrs	Sum of hours per year spent making technology and tools
4	techpurchasecost	Sum of dollars per year spent purchasing technology and tools
5	techmaterialcost	Sum of dollars per year spent on materials to make technology and tools
6	techmainthrs	Sum of hours per year spent maintaining technology and tools
7	techmaintcost	Sum of dollars per year spent maintaining technology and tools
8	techusecost	Sum of dollars per year spent using technology and tools
9	inframakehrs	Sum of hours per year spent makeing infrastructure
10	infrapurchasecost	Sum of dollars per year purchasing infrastructure
11	inframainthrs	Sum of hours per year maintaing infrastructure
12	inframaintcost	Sum of dollars per year maintaining infrastructure
13	processhrs	Sum of hours spent processing harvest per year
14	receive_processhrs	Sum of hours spent processing received subsistence per year
15	preparehrs	Sum of hours spent per year preparing for subsistence trips
16	harvesthrs	Sum of hours spent per year on subsistence trips
17	terrestrial_fuel_expenses	Sum of dollars spent per year on fuel for terrestrial travel
18	boat_fuel_expenses	Sum of dollars spent per year on fuel for boat travel
19	food_expenses	Sum of dollars spent per year on food while on subsistence trips
20	rental_expenses	Sum of dollars spent per year on rental of equipment for subsistence
21	rental_fuel	Sum of dollars spent per year on fuel for rental equipment for subsistence
22	subsisthrs	Hours spent on subsistence per year
23	subsistcost	Dollars spent on subsistence per year

Existing Study Updates

The spreadsheet tool is designed to allow for quick updating of results in the future. The "Summary and Update" worksheet contains cells that can be filled in to update the interest rate, the price level, and the wage rate used in the production cost calculation.

Updates are computed in separate columns, allowing multiple updates and values to be contained in a single Excel file, rather than requiring multiple files for each community. On the worksheet, the Base Analysis columns contain the results summary for the original analysis. To the right of the Base Analysis are two columns, Update 1 and Update 2. Each of these columns can be used to update from the Base Analysis to another price level, interest rate, or change in wage rate.

Interest Rate: Changes in the interest rate are accomplished simply by entering the new rate in the corresponding cell. The present value calculation will call upon the revised value.

Price Level: Price level updates are setup to calculate and apply a multiplier based on entered index values. Typically, this might include use of the PPI or CPI indices published by the Bureau of Labor Statistics. The starting and ending index values are entered into the corresponding cells in the Update column, and the update multiplier is calculated and applied.

Wage Rate: Wage rate changes are also setup to use a multiplier, where start and end wages are entered, and the update multiplier is calculated and applied. However, a new wage rate may be hard entered as well without using the multiplier calculation, but this must be done on the "Wage Info" worksheet of the Excel tool.