The Production And Distribution Of Wild Food In Wales and Deering, Alaska

by
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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.

Several hypothesis were tested: (1) that subsistence productivity was associated with household maturity, (2) that networks of households cooperated to produce and distribute wild food, (3) that multi-household networks were measurably distinct from one another, and (4) that membership in networks could be explained by kin relationships. A method to measure cooperative relationships among households was developed to analyze these questions.

Survey data showed that in 1994 Wales produced an estimated 744 pounds of wild food per person per year, on the average, while Deering produced 672 pounds. As has been observed in other small Alaska communities, about 30 percent of the households accounted for 70 percent or more of the harvest, by weight. Households' subsistence production tended to increase with the age of household heads and with household size, as predicted by a household development model. Households occupied by an active single man were the most productive type of household on a per capita basis.

In both communities, households cooperated extensively in the production and distribution of wild foods. Cooperation among households was highly patterned, and households could be sorted into multi-household networks. Deering was found to be organized into six multi-household networks; Wales into eight networks. Two methods used to identify subsistence networks — hand-sorting instances of production and distribution, and clustering a matrix of Kendall's Tau-B values – produced similar results. Multi-household subsistence networks resembled traditional *Iñupiaq* "local family" groups described by Burch for the mid-19th century. Viewing production and distribution from the perspective of extended family networks helped explain variation in wild food production, and demonstrated the roles of different individuals and different social types of households in the production and distribution system.

In Wales and Deering in 1994, people were free to organize most wild food production and distribution in ways that were efficient, culturally appropriate, and personally satisfying. That freedom was not the result of informed management by government agencies, whose regulations favored individuals and households but disadvantaged extended family networks, but of Wales' and Deering's remote locations. In times of shortage, government agencies tended to adopt regulations that reorganized subsistence production and distribution, disrupted family networks, and reduced subsistence efficiency, but which may not have reduced actual harvests.

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Acknowledgments

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I
Introduction

Throughout Alaska's history, Alaskans have relied substantially upon local wild foods for subsistence. This dependence continues in the 21st century, and is most evident in rural areas of Alaska, where Alaskans harvest, process, and distribute more than 40 million pounds of local wild food a year, or about 375 pounds per person per year. (Wolfe 2000). In rural Alaska, wild foods provide about 240 percent of the dietary protein requirements and 35 percent of the dietary energy requirements.

This study describes the harvest and distribution of wild foods in Wales and Deering, two small *Iñupiaq* Eskimo communities on the northwest Arctic coast of Alaska, near the Bering Land Bridge National Preserve. In their use of wild foods, Wales and Deering ranked towards the high end of Alaska communities. In 1994, Deering residents harvested 69 different types of animals; the top five by weight included bearded seal, chum salmon, caribou, moose and Dolly Varden (Magdanz 1995; Alaska Department of Fish and Game 1996a). Wales residents harvested 64 types; the top five included bearded seal, bowhead whale, walrus, pink salmon, and ringed seal. Wild food harvests were substantial, on the order of 650 to 740 pounds per person per year. Such harvest levels contained about 60 to 70 percent of the communities' dietary energy requirements and more than four times the dietary protein requirements (Wolfe and Utermohle 2000).

At Deering and Wales, wild foods were harvested, distributed, and consumed within extended family networks that included people living in several households. Such kinship based systems appear to be common in small communities throughout rural Alaska, although rarely have they been systematically documented. The major focus of this study is on the organization of the extended family networks involved in the harvest and distribution of wild foods in Wales and Deering.

In this study, wild food production is described from three perspectives: (1) individual, (2) household, and (3) multi-household networks. From the *individual perspective*, the study explores the age, sex, ethnicity, employment, and other characteristics of community residents who harvested, processed, and distributed wild food. From the *household perspective*, the study examines production by households in different developmental stages, and explored relationships between subsistence production and income. From the *multi-household network perspective*, the study analyzes cooperation among households in the harvesting, processing, and distribution of wild food, and describes kinship relations within and among networks of households.

The surveys were part of a cooperative project involving the National Park Service, the Division of Subsistence of the Alaska Department of Fish and Game, Kawerak Inc., the Deering IRA Council, the Noatak IRA Council, the Shishmaref IRA Council, and the Wales IRA Council. Data analysis was conducted by the Division of Subsistence, with oversight by the National Park Service. Results of the analysis were reviewed Kawerak Inc., by the IRA Councils, and by selected key respondents.

Data from this study were first published in the *Community Profile Database* (Alaska Department of Fish and Game 1996a). That database also includes data from two other northwest communities surveyed during the same time period as Wales and Deering, Shishmaref and Noatak. Surveys in these four communities were part of a larger research project, described in the Bering Land Bridge Research Statement of Work (U.S. National Park Service 1994).

Purpose

The purpose of this study was to describe the social organization of wild food production in Wales and Deering during 1994, and thus assist effective and appropriate management of subsistence hunting and fishing in northwest Alaska. Using information provided by surveyed households, the study describes how

individuals, households, and multi-household networks cooperated in the harvesting, processing, and sharing of wild foods in these two small *Iñupiaq* communities. A secondary purpose of the study was to present a method for identifying multi-household social networks which cooperated in subsistence activities. The method provided a way to measure cooperation in subsistence production and distribution among households or networks of households. The method also provided a way to compare systems over time and among communities.

The objectives of this study were to add the survey data to the Alaska Department of Fish and Game's *Community Profile Database* of subsistence information, and to publish an analysis of the study's results.

Research Questions

The analysis was based primarily on information collected through household surveys. Similar subsistence surveys have been used in more than 100 other harvest studies in Alaska during the 1980s and 1990s (Alaska Department of Fish and Game 1996a). The surveys used in this study included additional questions about the production of subsistence foods. The surveys asked not only how much subsistence food was harvested, but also who in the study communities harvested, processed, and distributed wild food, not only for their own household but for households other than their own. These "network data" were joined with age, sex, employment, and other survey data for individuals and households, allowing researchers to describe subsistence food production from several new perspectives and in greater detail.

In this study, researchers asked each household to name all the people in the study community who harvested, processed, or distributed wild food for their household. As expected, some people were named much more frequently than others. These differences were the basis of several series of research questions.

The first series of research questions explored characteristics of the individual harvesters, processors, and distributors. Were the most frequently named individuals more likely to be men or women, Native or non-Native, teachers or non-teachers? Were they more likely to have higher, average, or lower earned incomes? Were they more likely to be young, middle-aged, or elderly?

A second series of research questions explored similar questions about households. Here, researchers knew not only how frequently a household was named as a producer or distributor of wild foods, they also knew how much of each kind of wild food each household harvested. As they did with individuals, researchers explored the characteristics of the most and least productive households. Which types of households produced and distributed the most wild foods? Were the households that were active in subsistence food production also active in wage employment? What variables could be used to predict subsistence productivity at the household level?

A third series of research questions explored relationships among networks of households. As expected, most households relied in part upon wild foods harvested and processed by people living in other households. To what extent did individuals in each household harvest and process wild foods for households other than their own? Could data about cooperation among households be used to sort households into cooperative networks? Were networks of cooperative households related by kinship and, if so, by what kinds of relationships? What roles did different types of household have in subsistence networks? Were some networks more productive than others and, if so, what characterized the more productive networks? How did the networks of households in Wales and compare with those in Deering?

From published information on *Iñupiaq* social organization, researchers expected to find variation in subsistence production among individuals and households. Researchers also expected to find subsistence production was organized into social groups larger than the household. Hypotheses included:

- Subsistence productivity was associated with household maturity.
- Multi-household networks were measurably distinct from one another.
- Membership in networks could be explained by kin relationships.
- Network organization was similar to 19th century local families.

Finally, researchers were interested in how government regulation of subsistence hunting and fishing might have affected cooperative harvesting, processing, and distribution of wild foods in the study communities. Did regulations facilitate or frustrate cooperation among households? Were patterns of harvest

or distribution different for strictly regulated species like moose? If so, were the stricter regulations likely to have the desired conservation affect?

Social Organization and Subsistence

Many researchers have explored the organization of subsistence production in Alaska and Canada. In rural northern communities, they have found that the household was not an independent economic unit. Households commonly function in cooperation with other, related households. Cooperating households provide labor for one another, and share production with one another. Dwelling and family are not congruent.

> An elderly person may have a house and choose to live alone; a young nuclear family may have a separate residence, and a third family, comprising mother, father, unmarried children, a divorced son or daughter, and a couple of grandchildren, may occupy a third house. Yet the three households may well be the core of a family, i.e., the set of people who most frequently interact in hunting and fishing activities, food preparation, baby-sitting, meals, and the like… A family, then, is not a house or a household. It is an unbounded organization of kinspersons that expands at marriage (Jorgensen 1984).

Robbins and Little (1988) observed cooperation among related households, and suggested economic security was a motivation:

> Very few households in Gambell and Savoonga are able to function and persist without substantial involvement with several other households in the subsistence rounds and cash economy. Manpower needs for subsistence pursuits, crafts production, and the low cash income of most households provide strong motivation for numerous cooperative activities. These activities create mutual aid networks which draw households, families…and villages together (1988).

Collings et al (1998) examined food sharing networks and community integration in Holman, a Copper Iñuit community of 423 people in the western Canadian Arctic. They found contemporary food sharing patterns were coherent with patterns described for the early twentieth century, but less regular. During the same period, however, kinship became a more central and distinct factor in food sharing, which may have been related both to community size and residential stability.

These observations of contemporary extended family organizations are consistent with ethnographic descriptions of 19th century *Iñupiaq* societies in northwest Alaska, as described by Burch (1975). "Not a single goal in life, including the basic one of sheer survival, could be achieved without the help of kinsmen" (Burch 1975:198). Burch has described a social and economic structure in which the primary unit was an extended or "local" family encompassing several dwellings usually connected through parent-child and sibling relationships. In the 19th century, smaller settlements usually were occupied by a single local family, larger settlements were occupied by several.

Ellanna (1983a:346) observed that kinship "has been and continues to be a central theme in the social organization of production and distribution at the levels of individual, household, skin boat crew, community, and inter-community." Ellanna and Sherrod documented the use of kinship in the formation of marine mammal hunting crews in the Bering Strait region, finding that hunting captains generally were identifiable as persons able to recruit large numbers of men from extended local kinship networks (Ellanna 1983a, 1983b Ellanna and Sherrod 1984).

Wolfe (1987) reviewed survey data from several different Alaska communities and noticed that households' wild food harvests varied widely, from no harvest at all to literally tons of wild foods. He observed that only 30 percent of the households accounted for 70 percent of the typical community's harvest. He proposed a model of household development in Alaska's subsistence economies, identifying different stages of household development, ranging from developing to mature to retired, as well as relatively inactive households. Wolfe and others have found stages of household development to be a reliable predictor of the diversity and quantity of wild food harvests (Andrews 1988:277-287, Sumida 1986:66-81, Sumida and Alexander 1986:34-42, Wolfe 1987).

Many research reports on Alaska include kinship diagrams illustrating examples of work groups or family networks whose members cooperate in the production, distribution, and consumption of wild foods (Schichnes 1988:105-116; Stanek 1985:130-137; Sumida 1986:107-115; Wolfe 1981:179-196; Wolfe et al 1984:387f, 430f, 481f; Worl and Smythe 1986:225f). These diagrams are based on key respon-

dent interviews and participant observation. A few researchers have analyzed these materials to describe general rules of social organization, such as matrifocal tendencies among Yup'ik communities (Schichnes 1988:105-116; Wolfe et al 1984:387f, 430f, 481f).

All of these observations – traditional kinship organizations, contemporary extended families, stages of household development – may have been consistent with one another. They suggested an evolving but persistent kinship-based approach to economic organization among northwest Alaskan *Iñupiat*, involving cooperative networks of households.

If wild food production and distribution in northwest Alaska were occurring in kinship-based networks of households, then one might expect researchers would analyze harvest, employment, income, and other data from a multi-household network perspective. This was rarely, if ever, done. National data gathering instruments were designed for the economically independent nuclear households found in most U.S. communities. Census data were collected and reported on a household basis. Income taxes were filed, reported, and analyzed on an individual or household basis. Even researchers who were aware of the multi-household organizations in rural Alaska Native communities followed the same research model, collecting, analyzing, and reporting data on a household basis. As a consequence, there were no systematic, quantitative analyses of cooperative networks in the literature for northwest Alaska.

One reason for the lack of a network approach may have been the difficulty in identifying multi-household networks. Except in some instances of marine mammal hunting crews, cooperative networks of individuals or households were not named. They were not identified by participants, nor were there lists of members. It was not obvious which individuals or households participated in which network. Could one individual participate in several networks? Could individuals in one household participate in different networks? Did membership in networks change with seasons, activities, family developments, and economic circumstances? The challenge was to find a method for identifying multi-household subsistence networks.

In general, most studies of subsistence hunting and fishing in the North have relied upon one of two methodological approaches: (1) systematic participant observation or (2) household surveys. Each approach had characteristic strengths and limitations.

The most insightful descriptions of subsistence hunting and fishing have been obtained through participant observation by researchers living in study communities for long periods (e.g., Anderson et al. 1977, Nelson 1969, VanStone 1967). Participant observers usually collected kinship data, but kinship data alone were not enough to identify wild food production and distribution networks. Most rural Alaska communities were a complex web of kin relationships, some vital, others casual, and still others ignored. Families were intertwined through marriages and fragmented by inevitable personal conflicts. And in some communities, wild food production might not be organized along extended family lines at all.

Systematic household surveys gathered a great deal of data quickly and required only modest training to administer. Survey data also had the apparent advantage of comparability over time and among communities. But the standard subsistence harvest survey failed to account for inter-household relationships, even when respondents explained them to researchers. For example, households often reported cooperative multi-household harvests of fish, land mammals, and marine mammals. Typically, surveyors either allocated all the harvest to one household (a crew captain, perhaps), or divided each household's calculated share among the cooperating households, and entered a fractional harvest on each household's survey.

Thus some of most interesting and significant aspects of rural Alaska's domestic economy – the economic relationships of cooperating households – were being discarded, if not in the field, then during data entry. The richness and complexity of the wild food production system was being ignored. As the Uhls observed, poor subsistence harvest survey methods could "make a hodge-podge of facts and fantasy that is not easily made into useful information" (1979:39).

In the early 1980s, Burch combined both participant observation and survey approaches in his studies of Kivalina. Drawing upon his long familiarity with the community, Burch developed a network of local researchers to collect information about subsistence harvests on a weekly basis. Burch documented variations in harvests among four different years in two decades, as well as seasonal variations. As a result, Kivalina has one of the most thoroughly documented subsistence economies in Arctic Alaska (Burch 1985). But Burch, who has written much on traditional social and political organization in the region, has not

published an analysis of the Kivalina harvest data from an organizational perspective.

In this study, researchers attempted to address some of the limitations of the survey method. They modified a standard household survey to collect data on subsistence production outside the household boundaries. The revised survey included 3 questions for each of 12 resource categories, asking respondents to identify who harvested, processed, or distributed the wild foods used by the household, whether or not the identified individual lived in the respondent household. The responses provided objective reports of inter-household economic relationships for every household in the sample. They provided three categories (harvest, process, distribute) and two scales (number of categories produced, number of households produced for) upon which to measure the activities of every individual in the sample.

These data, combined with demographic and economic data for each individual, allowed researchers to explore the roles of individuals and households in the production and distribution of wild food. Researchers could measure the strength of relationships among different households, identify multi-household subsistence networks, compare networks with one another, and compare the organization of wild food production and distribution between communities or over time in the same community.

In recent years, this kind of social network analysis has been of interest to a diverse group of scholars, including anthropologists, sociologists, psychologists, biologists, and epidemiologists. With advances in computer software, scholars have developed statistical methods for detecting cohesive subgroups, measuring centrality, and determining subsets of equivalent actors. Visual images of social networks, like those in this report, have played an important role, especially point and line images (Freeman 2001).

Scholars' interest in social organization is longstanding, but social network analysis is a relatively recent paradigm that draws on developments in psychology, sociology, and anthropology (Wasserman 1994, Fararo 2001). Social network analysis has been used in analyses as diverse as benthic food webs and the spread of the common cold. "By the end of the 20th century, social network analysis had become a mode of structural analysis with an extensive battery of formal techniques at its disposal" (Fararo 2001).

"Social network analysis is based on an assumption of the importance of relationships among interacting units" (Wasserman and Faust 1994:4). It differs from other social analyses in that "the unit of analysis… is not the individual but an entity consisting of a collection of individuals and the linkages among them (Wasserman and Faust 1994:4-5). Social network analysts view actors and their actions as interdependent, rather then independent and autonomous. Relations between actors are channels for the transfer of resources, and networks are conceptualized as lasting patterns of relationships.

In all these respects, *Iñupiaq* wild food production and distribution networks seemed to be excellent examples of social networks. Anyone familiar with subsistence in rural Alaska knew households cooperated extensively with one another. Family fish camps involved multiple households. Marine mammal crews recruited members from multiple households. People had favorite hunting partners, fishing helpers, and berry picking companions. Sitting in a wall tent sharing a communal meal with an extended family, it was easy to conclude that the social relations developed and maintained by the cooperative harvesting, processing, and distribution of wild foods were even more important than the foods themselves. Social network analysis potentially offered a robust approach to understanding the domestic mode of production in rural Alaska.

The social organization of subsistence production was an interesting question, not only theoretically but practically, as the state and federal governments attempted to provide a legal priority for subsistence in Alaska. Laws have been proposed that would limit subsistence eligibility to certain low-income households. Hunting regulations typically limited harvests on an individual basis, rather than a family or community basis. The inherent assumption of these approaches was that individuals and households functioned independently. This was not consistent with descriptions of traditional and contemporary *Iñupiaq* social organization, and with analyses of subsistence household development, which show multiple households linked together.

Presentation

Subsequent chapters in this study present methods, setting, findings, and discussion. Throughout the study, Wales data usually are presented first, followed by Deering data. The order of presentation in this study simply reflects the order in which survey data were

collected, analyzed, and reported. The Wales portion of this study was completed before Deering.

Chapter 2 describes the sample, variables, survey methods, and data analysis. Chapter 3 describes the regional setting for this study. Chapter 4 summarizes Wales' and Deering's histories, and describes subsistence harvests, wage employment, and personal income in Wales and Deering in the study years.

Chapter 5 presents findings about wild food production by individuals, while Chapter 6 presents findings about food production by households. Chapters 7, 8, 9, and 10 present findings about the existence, structure, kinship, and characteristics of wild food production networks in Wales and Deering. Chapter 11 summarizes and discusses findings for both communities. Appendix 1 contains copies of the community approvals for Wales and Deering. Appendix 2 includes the survey used in this study.

The principal investigators in this study had different roles. James Magdanz, a subsistence resource specialist with the Division of Subsistence, developed the research design, directed the field work, and conducted some of the network analysis. Charles Utermohle, an analyst programmer who directed the Division's data management program, supervised data entry, and conducted most of the statistical analyses. Robert Wolfe, the Division's research director, helped guide data collection and analysis, and wrote portions of the household chapter in this report. Magdanz was the primary author of this report, to which Utermohle and Wolfe made substantial contributions throughout the review process.

2
METHODS

This study used household survey data to explore subsistence food production from several perspectives, taking into account previous research on *Iñupiaq* social organization and subsistence household development. Survey instruments were based on a standard subsistence survey developed by the Division of Subsistence for similar studies in Alaska in the 1980s and 1990s.

In addition to standard inquires, the survey included an additional series of questions. These asked each household to identify the people in the community who harvested, processed, or distributed 12 categories of subsistence resources for the respondent household, whether these individuals lived in the respondent household or not. While a single respondent would not be aware of all the subsistence production and distribution in the study community, he or she likely would know who harvested, processed, or distributed subsistence foods for his or her own household. Responses to these questions were a focus of this analysis.

By asking who produced food for and distributed food to respondents' households, regardless of households of residence, it becomes possible to describe the organization of subsistence production and distribution from a community perspective. It also is possible to compare empirically described food production organizations with models of social organization.

The two communities in this study were expected to have complex but different subsistence production and distribution systems. Wales' subsistence focus was on marine mammals, whereas Deering divided its attention among land mammals, marine mammals, and fish. The two communities had different acculturation histories, and different regional affiliations. But both communities' populations were more than 90 percent *Iñupiat*, and both communities' economies were heavily dependent upon subsistence.

Sample

In both study communities, researchers attempted to obtain a 100 percent sample of occupied households. In Wales, researchers identified 50 occupied households as of December 8, 1994. Of those

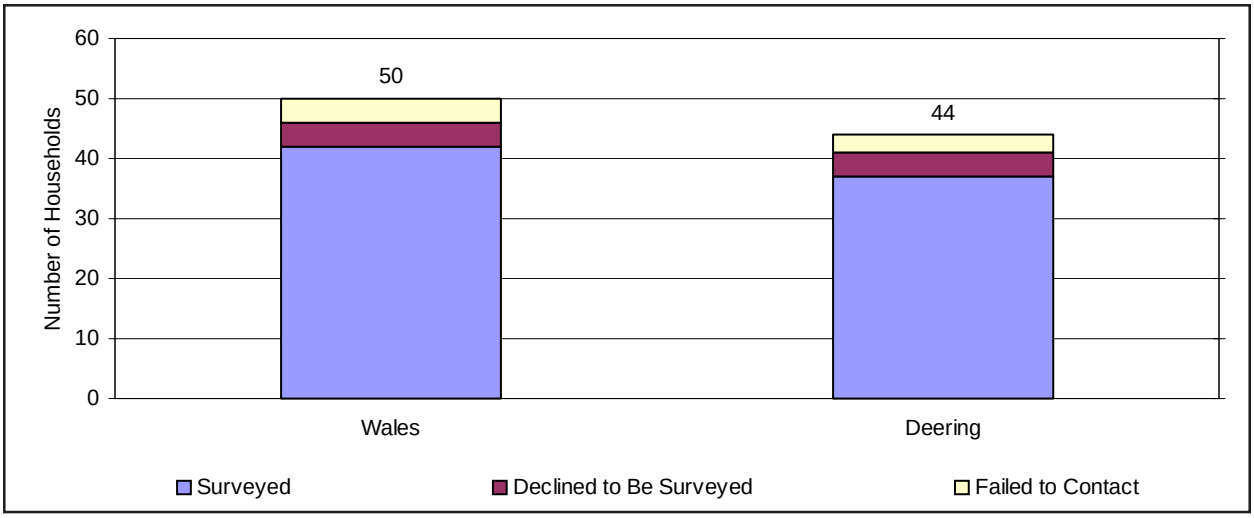

Figure 2-1. Samples, Wales and Deering. In both communities, 84 percent of the occupied households were surveyed and 8 percent declined to be surveyed. Four percent in Wales and three percent in Deering couuld not be contacted.

50 households, 42 households (84 percent) were interviewed, 4 households (8 percent) declined to participate in the survey, and 4 households (8 percent) were not available for the survey (Figure 2-1). Researchers estimated Wales included 168 permanent residents at the time of the survey; sampled households included 128 residents, or 76 percent of the community population.

In Deering, researchers identified 44 occupied households as of March 31, 1995. Of those 44 households, 37 households (84 percent) were interviewed, 3 households (7 percent) declined to participate in the survey, and 4 households (9 percent) were not available for the survey (Figure 2-1). Researchers estimated that Deering included 165 permanent residents at the time of the survey; the sampled households included 124 residents, or 75 percent of the community population.

Variables

The household survey asked questions about the harvests of wild foods by the respondent households during the previous year. The survey also obtained information on the age, sex, employment, and income of each permanent resident of the respondent households. The Deering survey appears as Appendix 1; the Wales survey was similar. Variables are listed in a separate project code book (Alaska Department of Fish and Game 1996b).

In addition to the above standard set of questions, additional questions were used to identify individuals in the study community who produced and distributed subsistence resources for respondent households. For each of 12 resource categories, respondents were asked three questions.

- Between December 1993 and November 1994, who harvested ("caught") the [resource category] your household used?
- Between December 1993 and November 1994, who processed ("cut") the [resource category] your household used?
- Between December 1993 and November 1994, were any of the [resource category] used by your household given to you by someone in another household or community? If yes, who gave [resource category] to your household?

Responses to these three questions were recorded in a series of variables (Table 2-1), with a separate record for each instance of production or distribution reported. Each record included variables identifying the respondent household, the type of production being reported, and the category of resource produced. Many respondent households named more than one harvester, processor, or provider for a given resource category. Respondents were asked to name individuals in the order of importance, which was coded into the "order of production" variable. The next three variables identified the person who produced the resource by community of residence, household of residence, and position in the household of residence. The calculated "producer" variable uniquely identified each person in the study.

In sum, these variables indicated whether or not a particular person produced or distributed a particular resource category for a particular household. However, they did not measure the amount of food produced or distributed. Respondents were asked how much their household harvested, but were not asked to account for those harvests on a person-by-person basis.

Methods

Before research began, approval for the research was obtained from the local IRA governments in each study community. Before surveys were administrated, a research team – representing the Division of Subsistence, the National Park Service, the Alaska Native non-profit corporation Kawerak Inc., and the study communities – assembled for two-day orientation meetings.

During these meetings, researchers verified lists of households and residents, reviewed species lists, reviewed procedures for coding producers, and practiced survey administration on one another. Researchers posted notices of the survey on community bulletin boards and on the cable television "scanner." At the end of the orientation, researchers were assigned a group of households to survey, and began making appointments by telephone and in person to conduct the surveys.

Surveys were all conducted in person, almost always in the respondent's home, at a time selected by the respondent. Surveys were administered to either the male or female head of household, who was asked to provide information about the household as a whole. Sometimes, both heads of house-

TABLE 2-1. PRODUCER VARIABLES

Variable	Label	Description	Contents
HHID	Household ID	Unique numerical code of respondent household.	01-99
PRODTYPE	Type of Production	Type of production reported by the respondent household.	Harvester, processor, provider
RESOURCE	Resource Category	Category of resource provided for the respondent household.	Salmon, non-salmon fish, marine invertebrates, bearded seal, small seal, walrus, moose, caribou, other big game, small game and furbearers, birds, plants
PRODORDR	Order of Production	Sequential order in which this producer was named by the respondent household.	01-16
PRODCOMM	Community of Producer	Community where producer lived, usually the study community.	Wales, Teller, Nome, etc.
PRODHHID	Household ID of Producer	Unique numerical code for household where producer lived.	01-99
PRODID	Person ID of Producer	Unique numerical code for each individual in the household where the producer lived.	01-99
PRODUCER	Producer ID	Unique code for each producer in the study community, calculated by joining Household ID and Person ID of Producer.	0101-9999

NOTE: These variables were used to record responses to the following three survey questions:

1 Between December 1993 and November 1994, who harvested ("caught") the [resource category] your household used? Please list most important harvesters first.
2 Between December 1993 and November 1994, who processed ("cut") the [resource category] your household used? Please list most important processors first.
3 Between December 1993 and November 1994, were any of the [resource] used by your household given to you by someone in another household or community? If yes, who gave [resource category] to your household? Please list most important first.

hold or other family members would assist the respondent by providing information. Surveys required from 15 minutes to two hours to complete.

In Wales, survey administration began the afternoon of December 8, 1994, and continued through December 14. In Deering, survey administration began the afternoon of March 31, 1995, and continued through April 5. At the conclusion of survey administration, researchers convened again for project evaluation meetings. They discussed the performance of the instrument, subjectively assessed the quality of the data gathered, and made suggestions to improve the survey process in the future.

The original harvest surveys provided basic demographic data about all the individuals in the sample, including date and place of birth and relationship to head of household. The harvest survey, however, did not describe kin relationships between households. That was the focus of additional research in 1998.

Researchers returned to each community to gather genealogical data for households in the communities at the time of the survey. Genealogical data were gathered in a series of interviews with paid elder key respondents.

During the key respondent interviews, researchers worked with key respondents to construct family trees, collecting at a minimum the names and relationships of each family member living in the study community at the time of the harvest surveys. Additional notes on date of birth, place of birth,

and cause of death were made when known to the respondent. Although the emphasis was on individuals living in the study communities, researchers also collected information about family members who had died or moved away from the study communities. Researchers attempted to identify at least two generations of ancestors for each household head and spouse, and were able to do so for most individuals with relatives in the study communities.

In Wales, researchers worked April 6-10, 1998, to collect genealogical information from five key respondents. Researchers also reviewed a printed copy of a 1980 Wales family history which included detailed information in standard genealogical notation (Ellanna 1980). Researchers checked the data gathered in 1998 with the data gathered in 1980, and added some 1980 data to the new genealogy.

In Deering, researchers collected genealogical information from three key respondents between November 12-14, 1998. Researchers also reviewed BIA and census records for Deering in the Federal Archives in Anchorage, to obtain and verify names and dates for deceased ancestors of the current Deering population.

Members of some households in each community (associated with the school, the church, and the military) had no kin relationships to any members of other households in the study communities. Genealogical information was not collected for members of these unrelated households.

Limitations and Assumptions

The harvest survey collected information on subsistence activities during the prior 12 months. This assumed that respondents could remember their important activities during the past year. To minimize recall problems, surveys were conducted with household heads on the assumption that household heads were most likely to be aware of all household members' activities. Respondent recall bias was not expected to change significantly over time or from community to community. Its effect on data was expected to be consistent, and it was not expected to affect comparisons of data from this study with other studies employing similar methods.

One function of the agencies involved in this study was to enforce fish and wildlife regulations. Another function of the agencies was to document and provide for subsistence uses. No researcher who conducted surveys in Wales or Deering was involved in enforcement activities. Nonetheless, many residents of northwest Alaska perceived any wildlife agency employee as a "game warden."

During the study, some respondents in Wales were reluctant to provide any information about fish and wildlife harvests for fear of enforcement consequences. Four Wales households (8 percent) declined to participate in the survey altogether. Other Wales households were reluctant to provide information about the harvest of certain species or about the identity of individuals who harvested certain species, such as waterfowl.

Researchers attempted to minimize enforcement bias limitations by thoroughly informing field researchers and respondents of the purpose of the surveys, of the intended use of the data, of the techniques used to protect household identities in published reports, and of respondents' right to refuse to participate in the survey. Information about individuals' activities were kept confidential. In no circumstances have data from this study been provided to enforcement branches of any of the participating agencies. Researchers returned survey results to the communities, and involved members of the communities in the review of this report.

Some respondents were reluctant to provide information about personal and household incomes, in particular about earned income. As a result, income information was missing for 28 percent of the individuals in the sample, and incomplete for 16 percent of the sampled households.

Standardization in data collection procedures was made more difficult because six different people gathered data for this project. The principal investigator was present throughout the administration of the survey and administered a number of surveys himself. The principal investigator was responsible for standardization and quality control, which were accomplished through the initial orientation process, daily reviews of surveys as completed, and post-administration review of all surveys. The principal investigator coded most of surveys for data entry. The Division of Subsistence has developed a series of logical checks to locate internal inconsistencies in households' responses, which were used during data analysis to correct data entry and other errors.

As is often the case with very small but ethnically diverse populations, the distribution of age,

sex, tenure, income, and other characteristics of the individuals in the samples was not uniform. This was partly because most of the certified teachers in the elementary and high schools were non-Native, short-term residents of the community, and were well-paid. The distribution of participation in harvesting activities and in harvest quantities also was not uniform, partly because only coastal Alaska Natives could take marine mammals legally for subsistence. However, not all non-Native residents were short-term teachers. A few had lived in the study communities for many years, and were married into local *Iñupiaq* families.

The non-uniform distribution of these demographic and economic characteristics in the sample population was expected to affect some of the analyses of food production. For example, because of their preponderance in the population, men would be expected to dominate the production of wild food, and they did. The difference in average income by ethnicity would be expected to affect analyses of relationships between income and food production. Marine mammal hunting was not open to non-Natives, while terrestrial mammal hunting was, so average incomes of terrestrial mammal harvesters would be expected to be higher than for marine mammal harvesters, and they were.

To identify subsistence production networks, researchers made the assumption that when a person produced wild food (as a harvester, processor, or provider) for a household in which he or she did not live, then a relationship existed between the producing and consuming households. Researchers also assumed that the number of instances of production could be used as a measure of the strength of the relationship between the two households. The more instances reported, the stronger the relationship was assumed to be. Household pairs with many producers for many resource categories were assumed to have a strong relationship. Household pairs with no common producers for any resource categories were assumed to have no relationship, at least for the purposes of identifying production networks.

The distribution of wild food in *Iñupiaq* societies had many different contexts and purposes, of which generalized sharing was just one (Burch 1988). The survey instrument used in this study did not explore the context or purpose of food production. The focus of the instrument was more basic: to determine the existence of relationships between households and to identify the individuals involved. The data, however, provided opportunities to explore the nature of the relationships through key respondent interviews.

Data Analysis

Several different analysis tools were used. Survey data were analyzed primarily with the *Statistical Program for the Social Sciences* (SPSS) and secondarily with Microsoft *Excel*, a spreadsheet program. Genealogical data were analyzed primarily with Millenia *Legacy*, a genealogical database program, and also with Excel.

SPSS' frequencies, crosstabulation, means, and explore procedures were the primary tools for analyzing production by individuals and households. The analysis of multi-household networks involved additional procedures, described below.

Production and distribution data were collected as "instances" of production or distribution reported by respondent households. An "instance" was a report by one household of the harvesting, processing, or distribution of one category of wild food by one person. The Wales data file, for example, contained 1,299 instances records.

The first step in the analysis was to aggregate survey responses, which occurred three times during the analyses. First researchers aggregated by person to create a file with one record for each person. Next researchers aggregated data by household, to create a file with one record for each household. Finally, after multi-household networks had been identified, researcher aggregated data by network affiliation, to create a file with one record for each network.

Researchers referred to the four kinds of data files as instances, individuals, households, and networks. The files were joined with demographic and economic files which included variables such as income, months employed, wild food harvest, and tenure in the community.

Once the data files were properly structured, researchers explored three different lines of inquiry. The first two inquiries explored the characteristics of the individuals and households that produced subsistence food. SPSS was used to cross tabulate age, sex, ethnicity, employment, earnings, and simi-

TABLE 2-2. COUNT OF INSTANCES FOR ONE PERSON, WALES

	Receiving HH				
	1	10	14	41	Total
N OF HARVESTING INSTANCES					
Salmon	1	1	1		3
Non-Salmon Fish	1	1			2
Birds and Eggs	1				1
Marine Invertebrates	1				1
Total Harvesting Instances	4	2	1		7
N OF PROCESSING INSTANCES					
Salmon	1				1
Non-Salmon Fish	1				1
Moose	1				1
Walrus				1	1
Birds and Eggs	1				1
Marine Invertebrates	1				1
Total Processing Instances	5			1	6
N OF PROVIDING INSTANCES					
Salmon		1			1
Total Providing Instance		1			1
TOTAL PRODUCTION	9	3	1	1	14

lar variables, and (when appropriate) calculate means. The third inquiry explored cooperation among households in the production and distribution of subsistence food. This analysis was guided by the following hypotheses about the existence, structure, and membership of food production networks:

- Networks of households cooperated to produce and distribute wild foods.
- Household networks were measurably distinct from one another.

In this analysis, networks of households were identified using responses to the production and distribution questions. The number of instances of production and distribution by one household for another was used as a measure of the strength of the relationship between households. The strength of these relationships varied across the communities. Tables 2-2, 2-3, and 2-4 illustrate steps researchers followed in the analysis of multi-household networks.

Table 2-2 summarizes instances for one person, the head of Wales household 1 (whom researchers referred to by the code "Wales 0101"). Table 2-2 was calculated from the "instances" data file, without aggregation. The first column in the table summarizes instances of Wales 0101's harvesting and processing for his own household, by species category. Additional columns summarize instances of his harvesting, processing, and distribution reported by other households in Wales, households 10, 14, and 41. These reports were provided by respondents in the receiving households, not by Wales 0101 himself. Altogether, Wales 0101 was reported for 14 instances, 9 for his own household and 5 for other households. A similar table could be constructed for every producer in the sample.

Table 2-3 shows data from the instances file aggregated at the individual level. The table summarizes the responses for six selected households in Wales in 1994. The reports for each person appear in one row. The first row in Table 2-3 summarizes instances for Wales 0101, as shown in Table 2-2. Information about the type of production and the species category is not shown at this level of aggregation.

Apparent in Table 2-3 is a pattern of cooperation among the selected households. Most columns in Table 2-3 are blank, indicating that most Wales households did not report any production or distribution by the five households shown here. When a receiving household did report production or distribution by one of the households included in Table 2-3, that households often reported production by three or four other households in this same group. Household 41, for example, reported production by people living in households 1, 10, 40, and 53. Patterns of cooperation among households, like the one evident here, were the basis for network analysis.

The final stage of aggregation is represented by Table 2-4, which shows instances data aggregated at the household level. Each cell is a count of the number of instances of production and distribution (for all individuals, species categories, and production types) by one household for another household. Researchers termed this count a "cooperation index." It was used as a measure of the strength of relationships between source and receiving households. Table 2-4 includes cooperation indices for all pairs of sampled households in Wales. The central diagonal of higher values represents production by each household for itself.

To continue with the example households shown

TABLE 2-3. COUNTS OF INSTANCES FOR FIVE HOUSEHOLDS, WALES

Source Household		Receiving Household (Respondent)																															Person Total
		1	3	4	6	7	8	9	10	12	13	14	16	17	19	20	24	25	26	27	28	29	40	41	42	44	49	51	53	54	55	
1	Head	9							3			1												1								14
	Spouse	6																						2								8
	Son	18							1			1												5								25
	HH Total	33							4			2												8								47
10	Head	1							2						2																	5
	Spouse								7															1					3			11
	Son	4							4															8								16
	HH Total	5							13						2									9					3			32
14	Head											2							1													3
	Spouse											9																				9
	HH Total											11							1													12
40	Head	9							7														15	10					2			43
	Spouse								1														10									11
	HH Total	9							8														25	10					2			54
41	Head	9							3			3												8								23
	Spouse																							11								11
	Son																							15								15
	Daughter																							11								11
	HH Total	9							3			3												45								60
53	Head																							1					6			7
	Spouse																												4			4
	HH Total																							1					10			11

NOTE: This example table does not include all households in the Wales sample.

in Tables 2-2 and 2-3, in Table 2-4 the first column shows that household 1 reported 33 instances of production by its own members, 5 by household 10, 9 by household 40, and 9 by household 41, for a total of 56 instances by 4 households including itself. Household 10 reported production or distribution by households 1, 10, 40, and 41, as shown in Table 2-3, but also reported production by households 20, 25, and 36 (which were excluded from Table 2-3).

For each pair of households, cooperation was measured in both directions. To continue the example above, household 1 reported 5 instances by members of household 10, so the household 1:household 10 cooperation index would be "5." Household 10 reported 4 instances by household 1, so that cooperation index would be "4." Thus each pair of households had two unique cooperation indices, one in each direction. It was important to remember that the cooperation index did not measure how much food was involved, because households were not asked how much each producer contributed to the household.

For the entire sample of households in Wales, cooperation index values varied from 0 to 69, with the highest values reported for "identity" households (production for respondents' own households). Cooperation index values for household pairs other than identity households ranged from 0 to 15. In Deering, cooperation index values varied from 0 to 48 (including identity households), and from 0 to 22 (not including identity households). Table 8-2 shows cooperation indices for Deering.

Researchers expected that household pairs with strong relationships could be sorted into networks of households. Each household within a network would have relatively strong relationships with some or all the other households in the network, and relatively weak relationships with households in all the other networks. Researchers also expected that a few households would have no strong relationships with any other households in the community, and thus could not be sorted into any network.

Researchers used two different methods to sort households into networks. In the first method, researchers sorted household pairs by hand using a procedure researchers had developed previously for an analysis of subsistence production in Brevig

TABLE 2-4. COUNTS OF PRODUCTION AND DISTRIBUTION INSTANCES, SOURCE HOUSEHOLD BY RECEIVING HOUSEHOLD, WALES

Source	Receiving Household (Respondent)																																					
HH	1	3	4	6	7	8	9	10	12	13	14	16	17	19	20	21	23	24	25	26	27	28	29	33	35	36	37	38	40	41	42	44	46	47	49	51	53	54	55
1	33							4			2																			8									
3		20	2		1																																		
4			24		2	4			4							1				1																			
6				6																																			
7					12	4			7							1																							
8			5			4																													3				
9																																							
10	5							13						2																9							3		
12					1				3							4										6													
13										20																													
14											11									1																			
16												4																											
17		4							2				69																		1				5		2		
19														13														6											
20							3								4																								
21			1		3	2			6							9																							
23																	8	1					9								2								
24																		3																					
25		1			3	3	3	2	6	2			3	2		2			8			2				2		3	4	2	2			2			2		
26			3								2			6						35	10		1																
27											1			2							12																		
28																						4																	
29																	5						18								2	2							
33				4															2			1		20											2				2
35												2								1	8				11														
36		1	2		4	8			4							2										24													
37								3		5													1				20												
38																												2											
40	9							8																					25	10							2		
41	9							3			3																			45									
42																	15	8				3	9								28								
44																																8							
46																																	6						
47																																		7					
49																																			4				
51																																				4			
53																														1							10		
54																																						3	
55		2			1				4																									6					14
Total	56	28	37	10	27	25	6	33	36	27	19	6	72	25	4	19	28	12	10	38	30	10	38	20	11	32	20	11	29	75	35	10	6	15	14	4	19	3	16
Count	4	5	6	2	8	6	2	6	8	3	5	2	2	5	1	6	3	3	2	4	3	4	5	1	1	3	1	3	2	6	5	2	1	3	4	1	5	1	2

Mission. Researchers referred to these manually sorted networks as "groups." This manual analysis involved a series of SPSS and Excel calculations and sorting routines, which although laborious had the advantage of being obvious and intuitive. Following is a summary of the manual analysis. All pairs of households in each study community were ranked by cooperation index in descending order. Household pairs with zero cooperation were dropped from the list. Identity household pairs (production for own household) were dropped from the list. For Wales, the resulting list included 98 household pairs that reported production by other households in the sample, ranked from highest to lowest cooperation index values. For Deering, the list included 139 household pairs.

Then household pairs were grouped, in stepwise fashion. The household pair with the highest cooperation index value became the nucleus of the first group. Then each pair of households was examined sequentially, beginning with the household pair with the next highest cooperation index value. Each pair was sorted as follows:

- If neither household in the pair had been included in an existing group, then the pair became the nucleus of a new group.

TABLE 2-5. METHOD FOR ASSIGNING HOUSEHOLDS TO GROUPS, WALES

	Cooperation Index											Initial Group Assignment											
HH Pair	15	10	9	8	7	6	5	4	3	2	1	A	B	C	D	E	F	G	H	I	J	K	L
42:23	15											42:23											
26:27		10											26:27										
40:41		10												40:41									
10:41			9											10:41									
23:29			9									23:29											
40:01			9											40:01									
41:1			9											41:1									
42:29			9									42:29											
1:41				8										1:41									
35:27				8									35:27										
36:8				8											36:8								
40:10				8										40:10									
42:24				8								42:24											
7:12					7											7:12							
12:36						6									12:36	12:36							
19:38						6											19:38						
21:12						6										21:12							
25:12						6										25:12							
26:19						6							26:19				26:19						
55:47						6												55:47					
10:1							5							10:1									
17:49							5												17:49				

NOTE: This table contains only a portion of the household pairs. Initial groups were consolidated into final groups. See text.

- If one or both of the households in the pair had been included in an existing group, then the pair was added to the existing group.
- If each household in the pair had been included in an existing group but not in the same group, then the pair was added to both groups and marked to indicate the pair had bridged two existing group.

A portion of the sorted table for Wales appears as Table 2-5. The first household listed in a pair is the source household. The second household is the receiving household, also the respondent. Table 2-5 illustrates the sorting process. In the first pair, household 23 reported 15 instances by members of household 42, the greatest number of instances reported for a non-identity household pair. Thus households 42 and 23 became the nucleus of group A. In the second pair, household 27 reported 10 instances by household 26. Neither had been included in an existing group, thus they became the nucleus of group B. In the fourth pair, household 41 reported 10 instances by household 10. Household 41 already was included in group C, so household 10 was added to group C.

This sorting process continued until all the households in the sample had been assigned to groups. In the case of a households assigned to two groups, researchers examined the subject household's relationships with all other households in each group, and assigned it to the group where it had the strongest relationships. If the membership of two different groups was congruent (the same household pairs), then this process resulted in the merger of the two groups. Household instances data sorted by group appear in the findings as Table 7-2, for Wales, and Table 8-2, for Deering.

Researchers also used a statistical method for sorting households into networks. In this second method, researchers calculated Kendall's Tau-B for each household pair, using the cooperation index values as input data. Kendall's Tau-B is a nonparametric measure of association for ordinal variables that take ties into account. The sign of the coefficient indicates the direction of the relationship, and its absolute value indicates the strength, with larger

absolute values indicating stronger relationships. The result of this procedure was a similarity matrix that resembled Table 2-4, except cell values were Kendall's Tau-B. The similarity matrix then was used in an SPSS cluster procedure to generate a hierarchical, single-linkage dendrogram, which sorted households into clusters (see Figures 7-2 and 8-3).

Results of the manual sorting method and the cluster analysis method were then compared. To demonstrate the degree of congruence between the two analysis methods, households are depicted in manually sorted groups in the Wales chapter, and in Kendall's Tau-B clusters in the Deering chapter.

To test the hypothesis that the membership in production groups could be explained by kin relationships, researchers entered genealogical data into *Legacy*, a genealogical database program. In *Legacy*, researchers could set any person as the "source" or "ego" for expressing kin relationships. Researchers compiled a list of all household heads in each study community. Using the genealogy program, researchers selected each household head in turn as the "source," and printed a report listing all relationships of that individual to other individuals in the study community. This process was repeated until individual relationship reports had been generated for all household heads in the study communities.

Individual relationship reports were combined into a single file, which included all known kin relationships between all household heads in the study community. Because researchers were interested primarily in relationships between households and not between individuals in those households, a number of the relationships were not relevant. These were removed from the file, as follows:

- All relationships of the source to his or her spouse in the same household were removed.
- All relationships to individuals who were not household heads or spouses in 1994 were removed, for example, deceased ancestors needed to establish relationships.
- Affinal relationships like "husband to daughter of…" where the daughter was also in the household. Unless an affinal relationship was the only relationship between two households, affinal relationships were removed.

The resulting file included all known, relevant relationships between households heads in the study community.

Burch has ranked the strength of kin relationships in traditional *Iñupiaq* society. Following Burch's model, relationships were sorted into one of six categories: parent to child, sibling to sibling, grandparent to grandchild, nepotic (aunt or uncle to nephew or niece), cousin, or affinal (in-laws). Relationships also were evaluated for the degree of genetic closeness, for consanguines and affines, and for consanguines only. Category, rank, and closeness values were as follows:

- Parent-Child: rank = 1, closeness = .5000
- Sibling: rank = 2, closeness = .5000
- Grandparent-Grandchild: rank = 3, closeness = .2500
- Nepotic: rank = 4, closeness = .2500 or less
- Cousin: rank = 5, closeness = .1250 or less
- Affinal: rank = 6, closeness determined by blood relationship of consanguine

Each relationship was in the database twice, once from each direction. For example, a father would have a parent-child relationship with his son's household, and the son have the same relationship with his father's household. The direction of relationships was kept in a separate variable.

Researchers expected multi-household cooperative groups would contain relatively more of the strong relationships and relatively few of the weaker relationships. The frequency of relationships within each production group was calculated.

3
The Setting

For this study, Northwest Alaska was defined as the lands and waters draining into the Bering and Chukchi seas from Point Romanoff (near Stebbins) to Cape Thompson (near Kivalina), including Norton Sound and Kotzebue Sound (Figure 3-1). This area coincided with the Nome and Northwest Arctic Borough census districts, and with the Bering Straits and NANA regional Native corporation boundaries. Encompassing about 59,000 square miles, northwest Alaska was about the same size as the 25th largest state in the United States, but was home to only 16,404 people (U.S. Census Bureau 2001).

This chapter describes the setting for the study. The first section provides an overview of northwest Alaska. The second section summarizes literature on 19th century *Iñupiaq* social and political organizations, drawing on the work of Burch (1975, 1980, 1994, 1998a, 1998b) and Ray (1964, 1967, 1975). The third section reviews the historical period, beginning with the entry of Yankee whalers into the Bering Sea in 1849. The final two sections discuss subsistence hunting and fishing in Alaska, the basic context for this study.

Overview

Northwest Alaska was a remote, sparsely populated area of a remote, sparsely populated state. It was bisected by the Arctic Circle which passed about 50 kilometers (30 miles) north of Deering. The study area was characterized by extremes of light and dark, with minimal or no sunlight in winter and constant sunlight in summer. Interior temperatures normally ranged from 25° C (77° F) in summer to –50° C (-

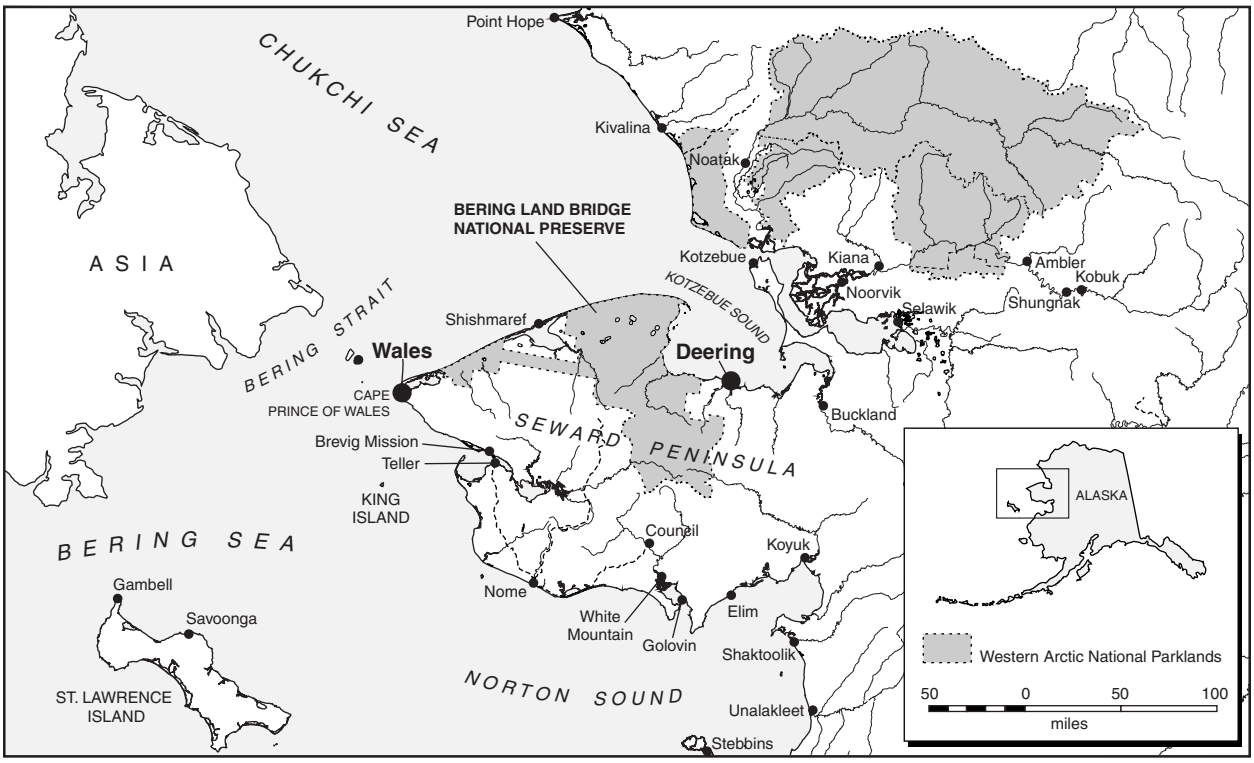

Figure 3-1. Northwest Alaska, including the study communities of Wales and Deering.

58° F) in winter. Coastal temperatures were more moderate, with cooler summers and warmer winters. Annual precipitation was about 25 cm (10 inches), including about 90 cm (36 inches) of snow.

Lakes and rivers usually froze in October and thawed in May. Depending on local conditions, marine waters usually froze between October and December and thawed during May and June. Sea ice cover, especially south of the Bering Strait, was never 100 percent. Offshore, the sea ice was in constant motion throughout the winter.

Most of the study area lay beyond the tree line, although sparse spruce and birch forests could be found along major rivers like the Kobuk, Selawik, Fish, and Unalakleet. Most of the study area was underlain with permafrost.

Throughout the historic period, virtually all the human population of the area lived on the coast or one of the major rivers, usually in traditional locations which provided fish and wildlife for harvest. Contributors to the Smithsonian Institution's *Handbook of North American Indians* estimated that in 1850 approximately 7,350 people lived in northwest Alaska (Burch 1984:316, Hughes 1984:263, Ray 1984:295). About half those people lived in settlements of one to three houses with fewer than 25 people (Burch 1998b:59). Burch has estimated there were 200 settlements in 1800, but only about five settlements had more than 100 people.

Immigration from temperate regions to the Arctic has been minimal and sporadic, most often characterized by boom-and-bust mineral development. The extremes of temperature, the lack of trees, the ice-covered ocean, and the permafrost confounded immigrants' efforts to develop conventional roads, railroads, agriculture, and industry.

In the year 2000, an estimated 16,404 people lived in the study area (U.S. Census Bureau 2001). Two distinct community types emerged during the 20th century. A total of 9,817 (60 percent of the region) lived in one of 26 small isolated communities, with an average population of 364 people, 92 percent of whom were Alaska Native. The remaining 6,587 people (40 percent of the region) lived in the regional centers of Kotzebue and Nome, where 67 percent of the population was Alaska Native. Put another way, 73 percent of the region's non-Native residents lived in either Nome or Kotzebue.

So while the human population doubled over two centuries, the more important change was in the distribution of that population changed. In most of the study area, people were primarily indigenous, lived in small communities, and were only 34 percent more numerous in 2000 than in 1850. But Nome and Kotzebue were a new type of community in northwest Alaska. While both included people who depended primarily upon subsistence, as well as people who depended primarily in the cash economy, most regional center residents relied upon both subsistence harvesting and wage labor to provide for their livelihood.

19th Century Iñupiaq *Society*

This study examined the organization of subsistence production in the 1990s. Researchers were interested in how past and contemporary practices compared. To facilitate that comparison, this section discusses *Iñupiaq* culture in the 19th century. Information about *Iñupiaq* social and political organization is available only for the historic period, that is, from about the beginning of the 19th century. In this section and for the remainder of this report, this 19th century pattern will be referred to as the "traditional" pattern of social organization, in contrast with introduced organizational patterns of the 20th century (e.g. schools, churches, municipal governments, and regional corporations).

People have occupied northwest Alaska for at least 10,000 years. Evidence of Eskimo occupancy of the study area can be found throughout the last four millennia, as early as the Arctic Small Tool tradition 4,200 years ago (Dumond 1984:74). Earlier cultures could have been Eskimo as well, but the evidence was too meager to demonstrate cultural continuity.

At the time of this study, more than 80 percent of the area's residents were indigenous *Iñupiat* and *Yup'ik* Eskimo, most of whom continued to depend upon hunting, fishing, and gathering for much of their food. More than 90 percent of the residents of the two study communities were *Iñupiaq* Eskimo. *Iñupiaq* cultures were evident in the region's archeological record throughout the last 1,500 years, dating back to the Thule tradition (Dumond 1984:77).

In the 19th century, most people in the study area lived along the coast of the Alaska mainland or on one of the large Bering Sea islands, although there were substantial populations along major rivers like

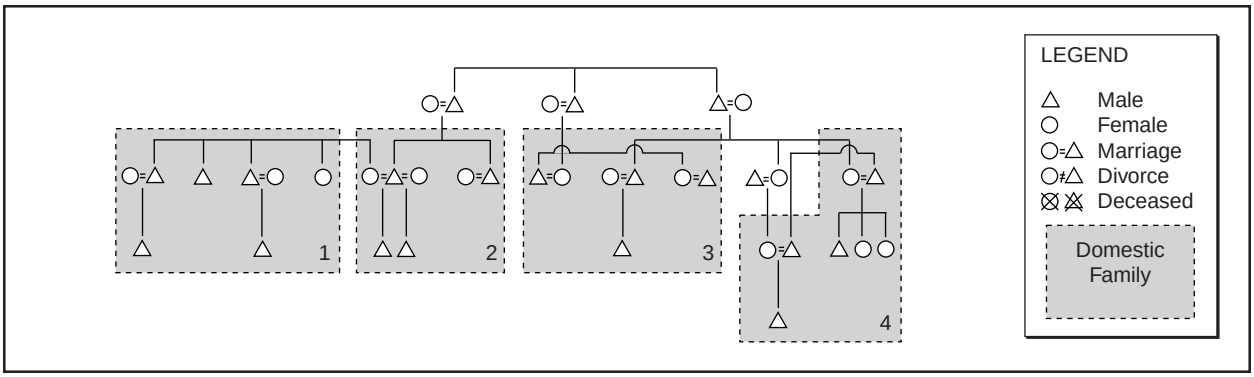

Figure 3-2. Composition of an upper Noatak local family, circa 1885. Membership was based on a variety of sibling and cousin ties, but marital and affinal ties were also present (Burch 1975:256).

the Noatak, Kobuk, Kuzitrin, and Fish Rivers. Residents of coastal areas depended heavily upon marine mammals and fish for subsistence. Residents of inland areas depended upon fish and terrestrial mammals. Most people moved several times a year to take advantage of the seasonal availability of fish, animals, and plants in particular locations.

The Deering area in the early 19th century offered a good example of the seasonal pattern of settlement. In mid- to late March, virtually all the people in the Deering area came together to live in a concentrated series of settlements along 16 kilometers (10 miles) of coast at Cape Espenberg, where they hunted seals, waterfowl, and belukha whales (Burch 1998a:297). In June, the focus of settlement changed to the Inmachuk and Kugruk rivers, where people fished for salmon, gathered eggs, and netted belukha. At fresh-water freeze-up, residents of the area dispersed to more than 15 small, scattered settlements (Burch 1998a:298), where they fished, hunted, and trapped until the spring hunt at Cape Espenberg.

In the early 19th century, *Iñupiaq* society was organized around kin relationships (Burch 1975). Burch, who has provided the most complete description of *Iñupiaq* social organization, described three levels of social organization: domestic families, local families, and nations.

Burch defined a "domestic family" as "a family organization whose members occupy a single dwelling" (Burch 1975:237). The domestic family usually included a husband and wife with children, but often also included parents, grandchildren, siblings, and siblings' spouses. They never consisted of a single individual (Burch 1975:239).

The next level of social organization Burch described was a "local family." "Local families were identical in structure and composition to domestic families, but they were usually larger. Their members were distributed among two or more households instead of being concentrated in just one" (Burch 1975:240). The typical local family included 14-21 individuals living in a single location.

Smaller traditional settlements in Northwest Alaska contained two or three households, consisting of two or three domestic families in one local family. Larger settlements might contain 15 to 20 households, consisting of 15 to 20 domestic families in two or more local families. At places where food was abundant, such as Wales and Kotzebue, a single local family could include as many as 10 domestic families.

"Local families," Burch concluded, "were the major organizational components of a traditional Northwest Alaskan Eskimo society. In other words, for all of the people most of the time, the local family formed *the* social unit in terms of which daily activities were carried out" (Burch 1975:241, emphasis original).

A number of kinds of kin relationships, real and fictive, could be found in local families, but the emphasis was on two basic types. "The first was a unit composed of aged parents, one (or more) adult offspring and spouse(s), and grandchildren. The second major type involved two or more married siblings, their spouses, and their children" (Burch 1975:239). Relationships within a local family could be complex, as shown by the diagram of a Noatak River local family about 1885 (Figure 3-2).

Groups of local families shared common territo-

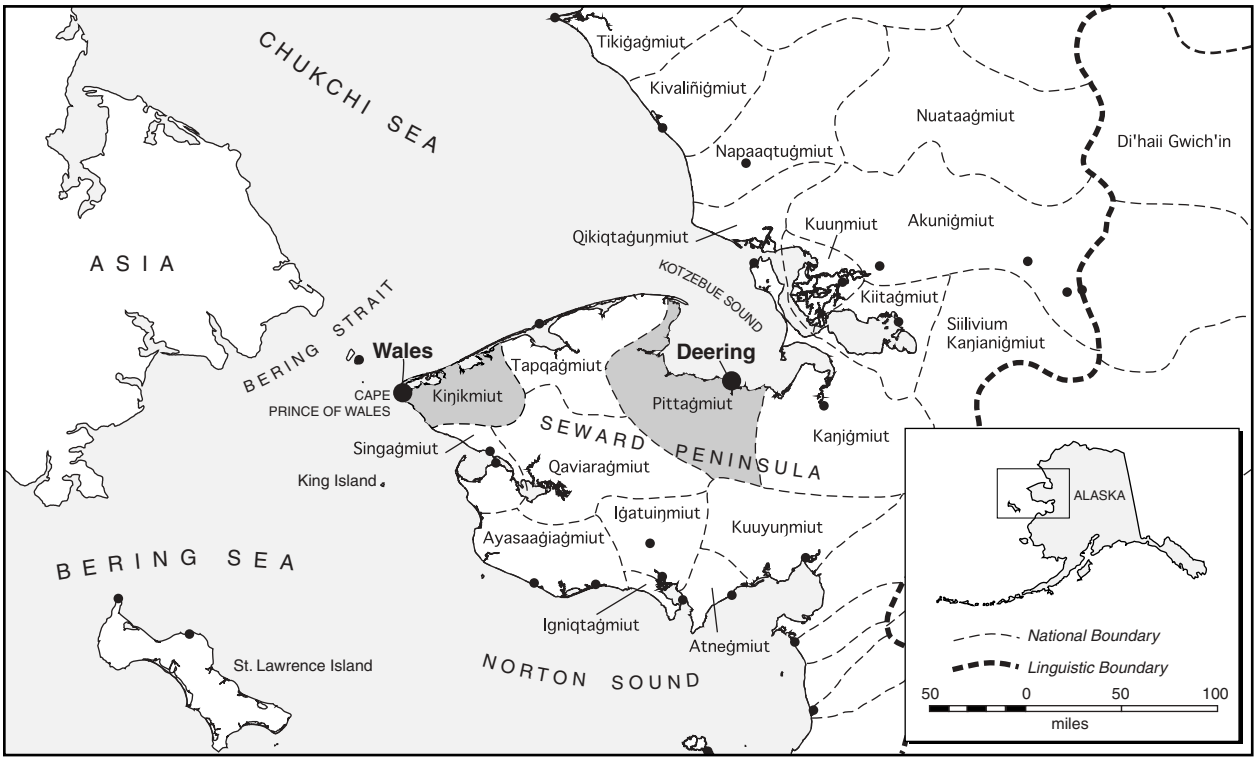

Figure 3-3. Iñupiaq societal boundaires in northwest Alaska, circa 1880. Iupiaq elders described the societies as "nunaqatigiitch," a term they translated as "nations" or "countries" (Burch 1998a:8). The map also shows the location of the two study communities, Wales and Deering. They would have been in the nations of Kiŋikmiut *and* Pittaġmiut*, shown shaded above. (Map drawn from Burch 1994:4)*

ries, and identified themselves with common names. The people of the Wales area were *Kiñikmiut* (Ray 1967:372, 375, Koutsky 1981:5). The people of Deering area, one of the least well documented, may have been *Pittaímiut* (Burch 1998a:285). According to Ray, every group "was as aware of its boundaries as if fences had been erected" (Ray 1967:373).

> The Bering Strait Eskimo…lived in a well-ordered society in which a chief and often a council played an important role. The influence of their government extended over a definitely bounded territory within which the inhabitants were directed by a system of rules and laws (Ray 1967:373).

These groups of local families were called *nunaqatigiitch*, which translates as "people who were related to one another through their (common) possession of land" (Burch 1998b:14). *Iñupiaq* elders characterized *nunaqatigiitch* as "nations" or "countries" (Burch 1998a:8). While domestic and local families within a *nunaqatigiitch* were kinship based, the basis for the *nunaqatigiitch* was not kinship but the "common residence and citizenship conferred by physical association of the group with a certain area" (Ray 1967:374).

In the early 19th century Northwest Alaska was home to more than 20 *nunaqatigiitch* (Figure 3-3). These nations were small compared with modern nation states. In size and population, they were more like modern counties or boroughs than nations. But unlike counties or borough, which are subordinate governments in a state or national system, *nunaqatigiitch* were the highest order of government in northwest Alaska.

Citizens of these nations operated primarily, but not entirely, within their national boundaries and co-existed more or less peacefully with their fellow citizens. Citizens of a particular nation were recognizably distinct in their physical appearance, clothing, and language or dialect. Nations were socially and economically self-sufficient, depending primarily upon resources within their national boundaries,

and trading with citizens of other nations for resources not locally available.

Relationships between citizens of different nations were normally hostile (Burch 1974, Ray 1967:383-384). Citizens of one nation trespassing in the territory of another usually were killed on sight, unless they could identify relatives or trade partners in the penetrated nation, or they were traveling to and from trade fairs.

Based on archeological evidence of cultural continuity from the Birnirk period to the early 19th century, Burch believes the *nunaqatigiitch* system may have been more than 1,000 years old (Burch 1998a:316-317). Nonetheless, *Iñupiaq* nations were essentially invisible to the first explorers and traders who visited northwest Alaska in the late eighteenth century and throughout the 19th century. Most explorers traveled during the trading season and received the privileges of free passage accorded to traders, so national boundaries were not apparent. Some explorers unwittingly documented the existence of traditional nations. They recorded names of *Iñupiaq* nations in their journals and accounts, although they did not understand the names' significance (Burch 1998b:10-13).

Northwest Alaska 1850-2000

Social and economic conditions for most Northwest Alaska *Iñupiaq* began to deteriorate rapidly after Yankee whalers entered the Bering Sea in 1849. Initially, contact with European and Asian explorers and traders had presented new opportunities to acquire valuable trade goods, within the context of traditional social and economic systems. But the whalers competed for natural resources, disrupted traditional trade systems (particularly when trading alcohol), and introduced devastating diseases. In 1890, "the doctor on board the Bear during the Revenue Marine cutter's patrol of the whaling grounds…reported that 85 percent of the several hundred Eskimos he examined during the cruise were syphilitic" (Mitchell 1997:141).

The rate of change accelerated near the end of the 19th century. Famine and disease disrupted, dislocated, and ultimately destroyed entire nations. Burch described the situation in the late 1880s:

> It was a disastrous time for the Eskimos. Newly imported diseases and whisky combined to decimate the populations, and the precipitous decline in the major food resources – the bowhead whale, walrus, and caribou – contributed to widespread famine… Survival, not the pursuit of wealth, power, or happiness, became the primary goal of most of the people in most areas of northwest Alaska during this period" (Burch 1975:253)

By the end of the 19th century, the *nunaqatigiitch* ceased to function as nations. Some, like *Pittaímiut,* were bereft of their citizens. Others, like *Kiñikmiut,* were so disrupted they were unable to maintain their autonomy. Governmental functions of *Iñupiaq* nations were assumed by agents of the federal government and religious organizations, pursuing policies of assimilation.

One of the last widespread epidemics to affect northwest Alaska occurred in 1918, when influenza spread throughout Norton Sound north to Wales. The spread of the epidemic was stopped by a quarantine enforced by armed guards at Shishmaref, so communities to the north of Wales were much less affected. But on the southern Seward Peninsula, hundreds of *Iñupiat* died and hundreds of children were orphaned. When possible, orphans were absorbed into *Iñupiaq* families, but so few survived that many children were raised in orphanages.

In almost every *nunaqatigiitch*, survivors from the numerous small settlements consolidated into a single core community focused around a church, a school, and a store. Most communities became known, even to their own residents, by English rather than *Iñupiaq* names. As *Iñupiaq* populations recovered from the famines and epidemics of the 19th century, most *Iñupiaq* families remained in these core communities. This single-community per nation pattern persisted throughout the 20th century, with only a few exceptions. For *Kiñikmiut*, the surviving community was Wales, and for *Pittaímiut*, Deering.

In several ways, the 1918 influenza epidemic marked the nadir in northwest Alaska. It was the low point in the human populations during the 20th century. It was near the low point in bowhead whale and walrus populations. On the Seward Peninsula, it was a stressful time for traditional families as remnant families, missionaries, and government agents

struggled to cope with hundreds of children orphaned by the epidemic.

By 1920, the gold rush had run its course in most districts. Hordes of unlucky miners abandoned the country, reducing competition for scarce natural resources. The *Iñupiat*, although half as numerous as they had been 75 years earlier, again were the majority people in most of their traditional lands. During the remainder of the 20th century social and economic conditions in northwest Alaska improved – gradually until the passage of the Alaska Native Claims Settlement Act (ANCSA) in 1971 and more rapidly after that.

Government schools were built in most communities, which increased literacy and fluency in English but, sadly, all but destroyed Native languages. Hospitals were built in Nome and Kotzebue. Infant mortality and epidemic diseases were reduced throughout the area.

The technology of subsistence continued to change, making subsistence harvesting more efficient but increasing the need for cash. Rifles and steel traps had been introduced in the 19th century. In the 20th century came outboard motors, manufactured fishing nets, and snowmobiles. Fur trapping was a lucrative enterprise until fur markets collapsed during the 1930s. After that it was hard for earn money to buy new technologies. So some men began to travel to regional and urban centers for summer jobs in construction, mining, and commercial fishing.

Despite the loss of the *Iñupiaq* national system and extensive changes in the material culture, many traditional social and economic patterns persisted in northwest Alaska. Writing about Barrow in 1952 and 1953, Spencer observed that "in virtually every respect the aboriginal family structure carries through to the present (Spencer 1976:62).

Writing about Point Hope in the 1950s, VanStone concluded that "in spite of new equipment and a few new techniques, the basic (subsistence) pattern remains much the same as it was in the pre-contact period" (VanStone 1962:161). VanStone thought large extended families had virtually disappeared from Point Hope, although elsewhere he comments that cousin marriages were preferred because they "tended to reinforce family unity" (Vanstone 1962:91). As in the 19th century, "the most important men in the village are still the good hunters and whaling captains" (VanStone 1962:163).

Foote analyzed Point Hope store receipts for 1958 and interviewed all 48 households in the community. He observed that "the introduction of more dollars into the village economy has not radically altered the traditional annual cycle of Point Hope. It has not shifted the emphasis from food gathering within a local geographical area to a less mobile life based upon purchased items" (Foote 1959:15).

There were exceptions to the traditional pattern. Gold mining contributed to the economies of a few communities – Nome, Deering, Council, Candle, and Kiana – until mining ended in most of northwest Alaska at the beginning of World War II. The United States military also contributed to the economies of a few communities. Nome hosted a lend-lease airport during World War II. Kotzebue hosted an Air Force radar station during the cold war.

In contrast to the other communities in northwest Alaska, Nome and Kotzebue evolved into regional centers of transportation and commerce during the 20th century (Figure 3-4). Both grew to include more than 2,500 people, ten times the average size of the other communities in the region. Both were a mix of Alaska Natives and non-Native immigrants.

Nome developed as a regional center because of its proximity to the gold fields of the Seward Peninsula. Kotzebue's advantage was its location near the mouths of the Kobuk and Noatak rivers, as well as its history as a traditional center of trade and commerce. Military improvements to the airports in these two communities also contributed to their emerging roles as regional centers.

Throughout the historic period in most northwest Alaska communities, however, there has been little economic development and few jobs. Although birth rates have been high, high rates of mortality and emigration meant that as late as 1980, most communities in northwest Alaska had smaller populations than their ancestor nations had had in 1800 (Burch 1984:317). More than 90 percent of the people in the smaller communities were Alaska Native. Remote and isolated, these communities' economies continued to depend on subsistence hunting, trapping, fishing, and gathering.

The discovery of oil at Prudhoe Bay in 1968 and the subsequent passage of the Alaska Native Land

Figure 3-4. Aerial view of Kotzebue, 1992. Kotzebue was the regional center of transportation, commerce, and government in the NANA region. Most people and cargo destined for smaller communities in northwest Alaska landed first in Kotzebue or Nome, then travelled to the smaller communities.

Claims Settlement Act (ANCSA) in 1971 accelerated changes in the economic and political fortunes of northwest Alaska. New political and economic organizations were established, first to negotiate land claims, and then to administer the unprecedented wealth that flowed into northwest Alaska from the claims settlement and from Prudhoe Bay taxes. ANCSA corporations provided new jobs, primarily in the regional centers of Nome and Kotzebue, and gave a strong political voice to Alaska Natives. ANCSA established Native land and capital holdings patterned after a Euro-American capitalist model. At the time, the *Iñupiaq* nations of northwest Alaska were only beginning to be recognized, and ANCSA effectively extinguished *Iñupiaq* claims to national territories.

In northwest Alaska, ANCSA created 28 village corporations and two regional corporations. The corporations received title to 6.2 million acres of land (about 13 percent of the land in northwest Alaska) and $139.4 million in payment for relinquished lands (Naske and Slotnick 1987:303-304).

ANCSA also solidified the separation of northwest Alaska into two regions (Figure 3-5). The boundary between the two regions was just west of Cape Espenberg on the northern Seward Peninsula. Census areas, coastal zone management districts, election districts, and other administrative and political boundaries conformed to the ANCSA boundaries. Deering found itself in the northern region, Wales in the southern. As the history of the two regions unfolded during the next 30 years, substantial differences emerged between them.

By the 1990s, the northern region had become "one of the most economically and culturally unified political subdivisions in the state" (Fried and Windisch-Cole 1999:3). Ten of the eleven ANCSA village Native corporations merged with the NANA Regional Corporation shortly after ANCSA was adopted. Only Kotzebue's village corporation remained independent. Despite its small size and remote location, NANA became one of the most successful regional corporations in the state. In 1998, NANA Regional Corporation, its subsidiaries, and it partnerships provided more than 2,000 jobs and $80 million in annual payroll throughout the state.

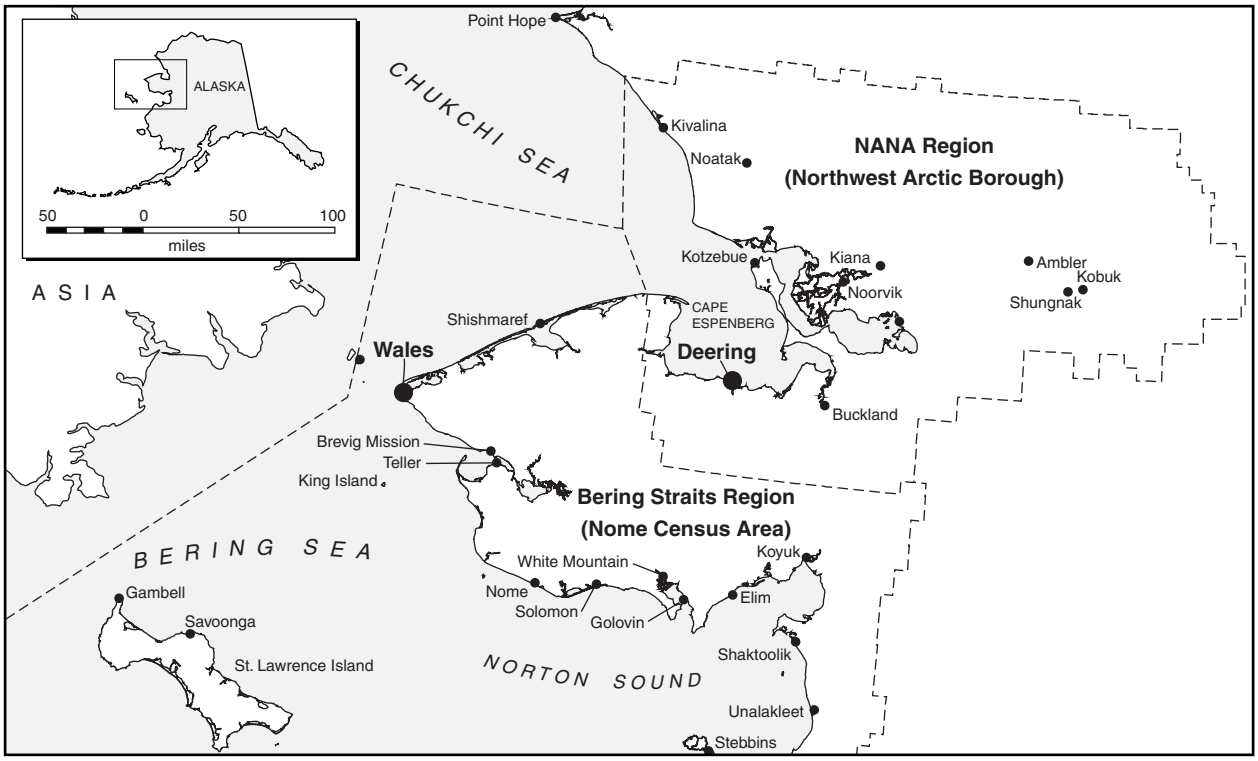

Figure 3-5. Northwest Alaska regional boundaries. For many political, economic, and statistical purposes, Northwest Alaska was divided into two regions. On the north were the NANA Regional Corporation and the Northwest Arctic Borourgh. On the south were the Bering Straits Native Corporation and the Nome Census Area. School districts, coastal zone management programs, and other agencies usually operated with similar or identical boundaries.

The northern region was known as "the NANA Region," a reflection of NANA's economic and political successes.

Many regional governmental functions in the northern region were unified under the umbrella of the Northwest Arctic Borough. The borough was established by a region-wide election in 1986, in part to administer taxes on NANA's new Red Dog Mine. Its first mayor was a retired president of NANA Regional Corporation. The borough, based in Kotzebue, also administered the school district, the coastal zone management program, and other region-wide functions. *Manii–aq* Association, a nonprofit ANCSA Native corporation, assumed control of health and social services throughout the northern region, and operated a $43 million hospital facility in Kotzebue for the Indian Health Service.

In contrast, the southern region was much less unified than the northern. This reflected the larger size and more diverse culture of the southern region. The southern region included 20 communities with three different Eskimo cultures each speaking a different language: 14 *Iñupiaq*, 3 central *Yup'ik* and 2 St. Lawrence Island *Yup'ik* communities. All three cultures were represented in Nome, where most non-Native immigrants also resided.

When ANCSA was adopted in 1971, three of the five *Yup'ik* communities (Elim, Gambell, and Savoonga) opted out of the regional corporation altogether. The remaining communities in the southern region each maintained the separate Native village corporations established by ANCSA, rather than merge with the regional corporation as had their northern counterparts. As a consequence, Wales had its own Native village corporation, while Deering had no Native village corporation.

Another feature of the southern region was a division between Nome, on the one hand, and the numerous smaller communities in the southern region, on the other. Nome opted out of a number of regional organizations and established, for example, a single-site school district and a single-community coastal zone management program. A regional

TABLE 3-1. EMPLOYMENT AND EARNINGS IN THE NOME CENSUS AREA AND THE NORTHWEST ARCTIC BOROUGH, 1998

	Nome Census Area			Northwest Arctic Borough		
	Annual Average Monthly Employment	Annual Earnings ($)	Annual Average Monthly Earnings ($)	Annual Average Monthly Employment	Annual Earnings ($)	Annual Average Monthly Earnings ($)
Agriculture, Forestry & Fishing	5	-	-	0	0	0
Mining	52	3,129,802	5,024	396	31,412,935	6,610
Construction	43	1,791,193	3,505	102	7,387,926	6,046
Manufacturing	24	462,726	1,641	0	0	0
Transportation, Communications, Utilities	327	7,607,544	1,942	258	10,474,367	3,390
Trade	416	7,325,986	3,916	246	5,462,011	1,848
Finance, Insurance, Real Estate	258	5,790,834	1,868	131	5,223,908	3,336
Services	1,022	29,115,189	2,375	666	19,684,813	2,464
TOTAL PRIVATE	2,145	55,308,942	2,149	1,798	79,645,960	3,692
Federal Government	81	3,274,063	3,372	60	2,008,512	2,770
State Government	193	9,493,557	4,104	55	2,878,144	4,328
Local Government	1,106	28,967,873	2,183	821	22,184,182	2,252
TOTAL GOVERNMENT	1,380	41,735,493	2,521	937	27,070,838	2,409
TOTAL	3,525	97,044,435	2,294	2,735	106,716,798	3,252

Source: Alaska Department of Labor and Workforce Development

school district and a coastal zone management program, which served the remainder of the region, were based in Unalakleet. The southern region, unlike the northern, had no borough government.

The largest region-wide organizations in the southern region were Kawerak Inc., the regional non-profit social service corporation, and the Norton Sound Health Corporation. Both served the entire region with educational, health, and social services. They were the second and third largest employers in the region, after the Bering Strait School District (Windisch-Cole 1998:5).

Table 3-1 shows employment and earnings by industry in northwest Alaska in 1998. Government accounted for 39 percent of the jobs in the Nome area, and 34 percent of the jobs in the Northwest Arctic Borough. The next largest category was services, which provided 29% of the jobs in the Nome area, and 24 percent of the jobs in the Northwest Arctic Borough.

No other industry categories accounted for more than 10 percent of the jobs, except that mining provided 15 percent of the jobs in the Northwest Arctic Borough. Most of those jobs were related to the Red Dog lead-zinc mine near Kivalina, operated by Cominco, Inc. in a joint venture with NANA Regional Corporation. Red Dog Mine provided a major tax base for Northwest Arctic Borough. Although Nome was widely known as a gold mining area, mining provided less than 2 percent of the jobs.

Average monthly salaries were 41 percent higher in the Northwest Arctic Borough ($3,252) than in the Nome Census Area ($2,294), a result of higher levels of employment and salaries in mining, transportation, and Native corporations (categorized as finance, insurance, real estate). The cost of living was greater in the Northwest Arctic Borough, so state government salaries also were higher there.

Regional averages obscured substantial differences between the regional centers of Nome and Kotzebue, on the one hand, with those of the smaller communities, on the other. Figure 3-6 shows that while about 60 percent of all adults were employed in Nome and Kotzebue, less than 40 percent of all adults were employed in the smaller communities. Smaller communities in the Nome Census Area had

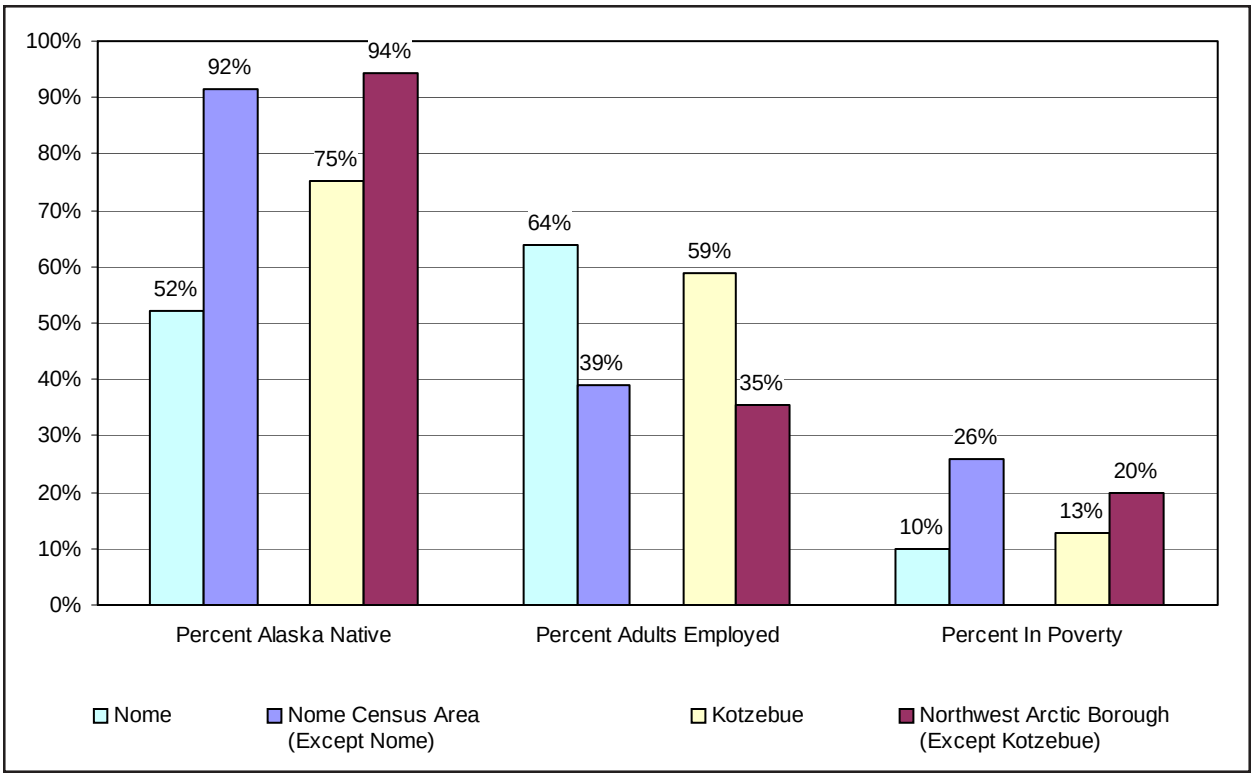

Figure 3-6. Selected demographic and economic characteristics, Northwest Alaska, 1990. The regional centers of Nome and Kotzebue were different from the smaller communities in northwest Alaska. Smaller communities had much higher proportions of Alaska Natives, lower employment, and greater poverty. Source: US Census 1990.

26 percent of their residents in poverty, compared with only 10 percent in Nome. In the Northwest Arctic Borough, 20 percent of the people in smaller communities lived in poverty compared with 13 percent in Kotzebue.

Sustainable Subsistence

A central question regarding subsistence hunting and fishing is whether populations of fish and wildlife are sufficient to meet local demand for wild foods. In northwest Alaska, most evidence suggests that supplies of wild foods are sufficient to meet subsistence demands. This section looks briefly at the status of some fish and wildlife populations in northwest Alaska, then discusses the demands for wild foods.

At this writing, caribou, brown bear, and musk oxen are believed to be near historic population highs. Indications are that whitefish, wolf, beaver, and ptarmigan populations were abundant and in some cases increasing. Walrus and seals are abundant. The bowhead whale population is slowly recovering from their depletion in the 19th century. Managers were concerned about salmon in Norton Sound, moose on the Seward Peninsula and in the Noatak River valley, Dall sheep in the Baird and DeLong Mountains, belukha whale in Kotzebue Sound, and several different migratory bird species. Populations of some species are cyclical, like lynx, snowshoe hare, and caribou. Caribou in particular are actively monitored.

Although they varied over time, most fish and wildlife populations used for subsistence were reasonably abundant in northwest Alaska at this writing. Similar populations had supported indigenous people in northwestern Alaska for thousands of years. So the question becomes, have subsistence demands for fish and wildlife changed since contact and, if so, how? The important variables are the size of the human population, and the per capita demand of that population for wild foods.

Figure 3-7 shows the history of human populations in northwest Alaska. Anthropologists estimated the indigenous population of northwest Alaska about 1850 was approximately 7,350 people (Burch 1984:316, Hughes 1984:263, Ray 1984:295). That

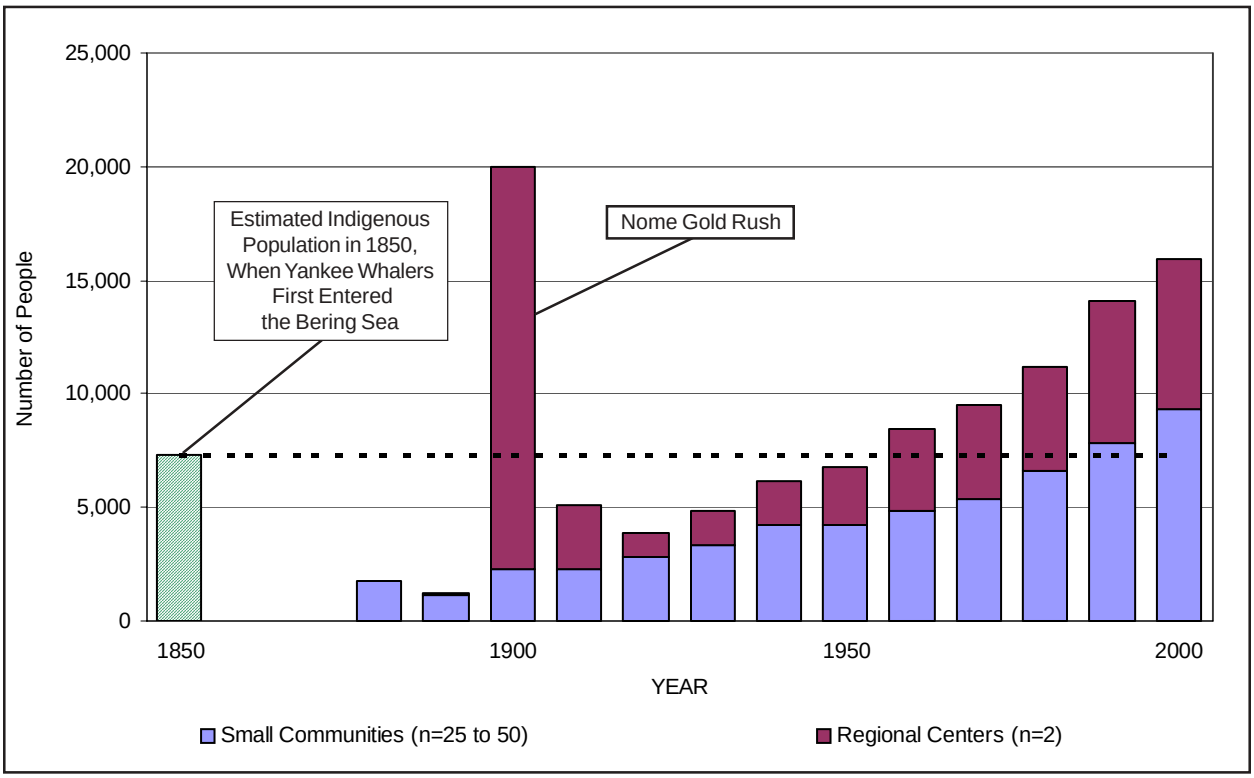

Figure 3-7. Population of northwest Alaska, 1850-2000. In 1850, about 7,350 idigenous people lived in northwest Alaska in an estimated 200 small communities. By2000, the population had doubled to 15,951 people. But 40 percent of the population in 2000 was concentrated in two regional centers, Nome and Kotzebue. The density of the human population in most of the northwest Alaska was only modestly greater in 2000 than in 1850 (the dotted line).

population subsequently was reduced by famine and epidemic disease until, in 1920, the U.S. Census counted only 3,900 persons. By the year 2000, the human population of northwest Alaska had increased to 15,951 (U.S. Census Bureau, 2001), of whom 82 percent identified themselves as Alaska Native. Thus the indigenous population of northwest Alaska increased from 7,350 in 1850 to 13,455 in 2000.

Over that same time, the distribution of the human population changed substantially. The 200 mostly local family settlements of 1850 coalesced into about 25 small communities like Wales and Deering, and into two regional centers of commerce and transportation, Nome and Kotzebue. By the year 2000, Nome and Kotzebue were home to 40 percent of the human population. About 9,400 people lived in the remaining 25 small communities. Excluding the regional centers, the density of the human population in most of northwest Alaska was only about 25 percent higher at the end of the 20th century than it had been in the middle of the 19th century.

In the vicinities of Wales and Deering, human populations probably were less in 2000 than in 1850. Wales' population in 1890 was 488 people; by the year 2000 that had declined to only 152 people. Burch estimated the Deering area population in the early 19th century to be about 400 people. At no point in the 20th century did Deering's population exceed 250, and in the 2000 census, Deering reported only 136 people. Wales' and Deering's population histories were not unique for small northwest Alaska communities. Famines, diseases, and emigration all have moderated population growth in northwest Alaska.

The increase in human populations appears to have been accompanied by a decrease in demand for fish and wildlife on a per capita basis. Time series harvest data were scarce, but five different single-year data sets were available for one northwest Alaska community, Kivalina. Kivalina was first surveyed for wild food harvests in 1964 during the Atomic Energy Commission's Project Chariot. Subsequently it was surveyed four more times, in 1965,

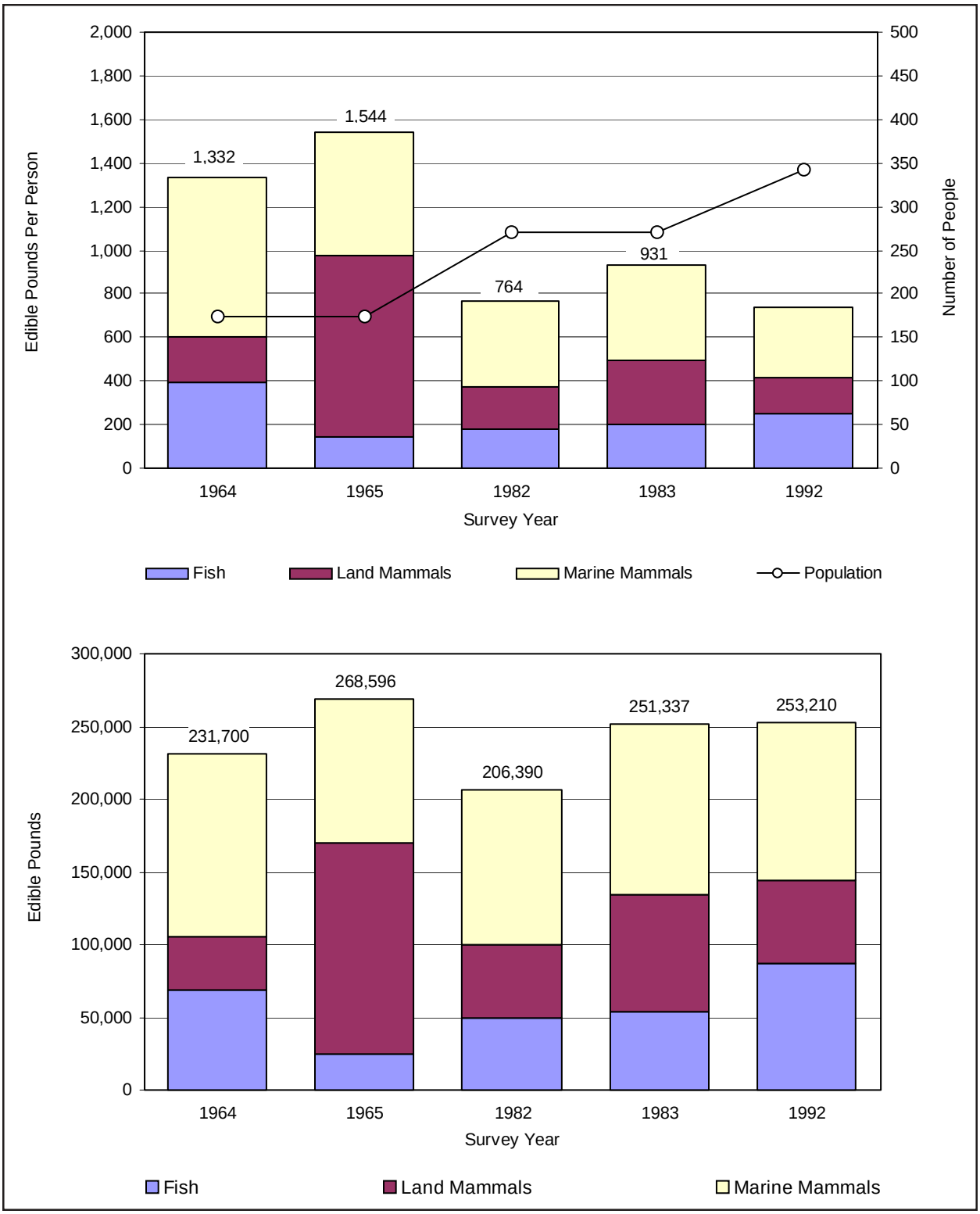

Figure 3-8. Per capita and total harvests for Kivalina. Kivalina had the most thoroughly documented subsistence harvests of any community in northwest Alaska. While Kivalina's population increased from 174 in 1964 to 343 in 1992, per capita harvests declined at a similar rate (top). As a result, the community's demand for fish and wildlife did not change significantly over 30 years (bottom). Chart does not include a small amount of plants and birds.

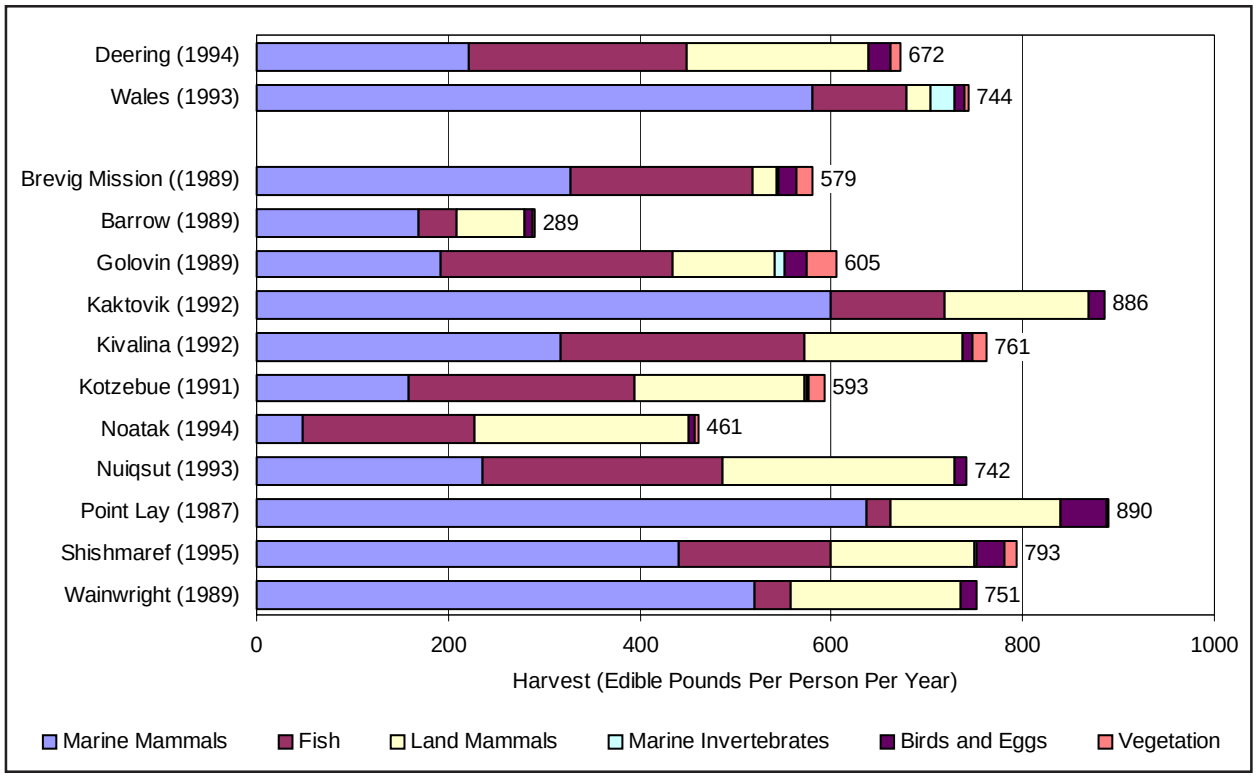

Figure 3-9. Estimated harvests in 14 northwest Alaska communities. Deering's harvest of 672 pounds per person per year and Wales' harvest of 744 pounds per person per year were similar to harvests in other northwest communities.

1982, 1983, and 1992 (Alaska Department of Fish and Game 1996a). No other northwest community had such a long series of comparable harvest survey data. Kivalina was one of the faster growing communities in northwest Alaska; its population increased from 142 in 1960 to 317 in 1990. Over the same time, per capita harvests declined by half (Figure 3-8, top), resulting in a consistent level of community harvests over time (Figure 3-8 bottom).

Several factors accounted for the per capita decline. Between 1964 and 1982, most families gave up their dog teams, which ate wild food, and bought snowmobiles, which did not. The cash sector in the economies developed substantially. The discovery of oil at Prudhoe Bay precipitated the settlement of Native land claims, creating and funding Native Corporations and enriching the State of Alaska. Federal and state services to rural Alaska increased substantially. Especially in the regional centers, but in every other community as well, there were more jobs, more community services like electricity, and better transportation. People could afford more commercial foods, and airplanes were able to deliver it to small community stores. Whatever kind of food people had, they could store it more safely and efficiently in electric freezers.

The near simultaneous discovery of Prudhoe Bay and the introduction of snowmobiles was a fortuitous coincidence. It facilitated the transition from an economy in which families were almost totally dependent upon domestic production of wild foods to an economy in which families relied upon both wild and commercial foods. Families used cash from wage labor both to buy equipment and supplies to produce wild foods more efficiently, and to buy commercial foods to supplement or replace wild foods.

The 1992 harvest estimate for Kivalina fell in the high range of harvests (ranked 4th of 13) estimated for other northwest and Arctic communities in the 1980s and 1990s (Figure 3-9). By comparison, harvests in Deering and Wales were estimated to be 672 pounds per person and 744 pounds per person, respectively. Other communities' harvests ranged from 289 pounds per person in the regional center of Barrow to 890 pounds per person in the much smaller community of Point Lay.

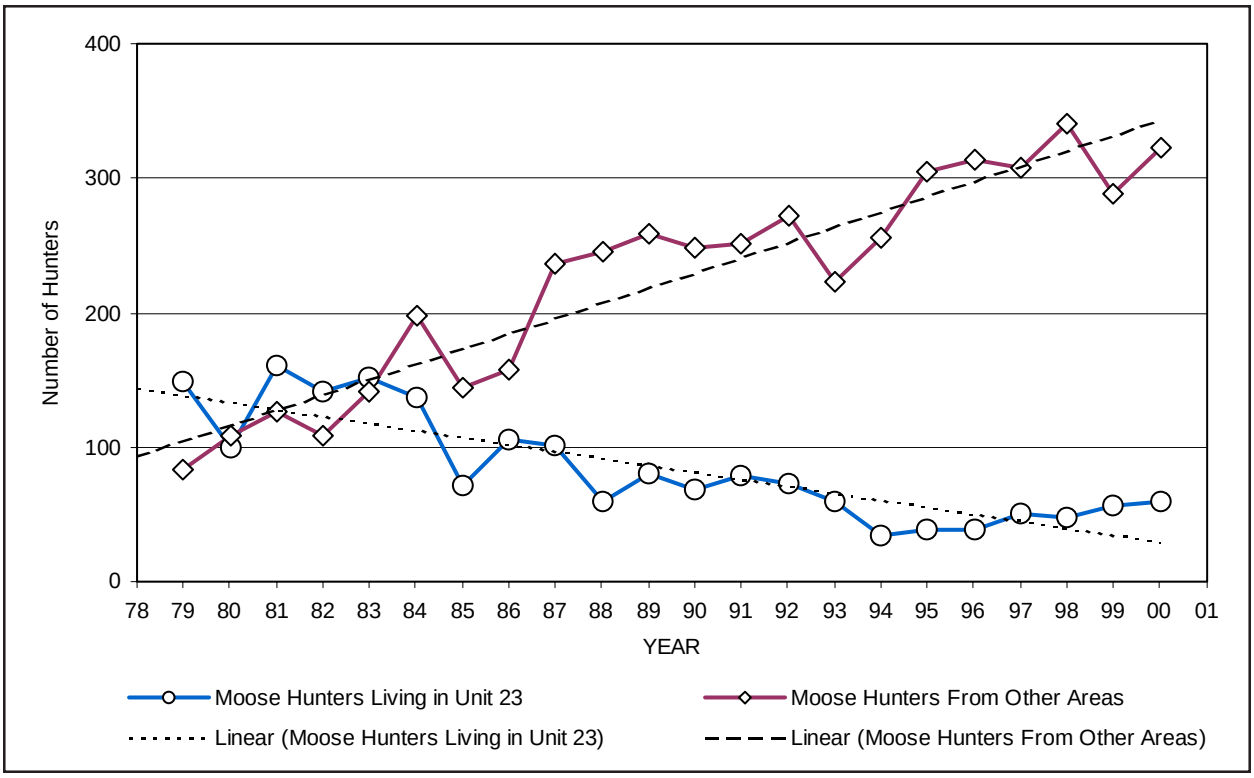

Figure 3-10.Number of moose hunters in unit 23 by year, 1978-2000. Over 22 years, moose hunting effort by local residents declined, partly as a result of increased caribou. Moose hunting effort by hunters from other areas, primarily urban Alaska,increased about 13 percent annually. All Alaska residents were subsistence users under state law.

Managing for Subsistence

While evidence suggests that the supply of local wild foods is generally sufficient to meet local demands in northwest Alaska, important changes occurred in the latter 20th century. First, aboriginal hunting and fishing rights were extinguished and aboriginal land claims were settled by the Alaska Native Claims Settlement Act in 1971. Second, non-subsistence demands for certain fish and wildlife species in northwest Alaska increased substantially.

For example, over the last 22 years the number of non-local moose hunters coming to hunt in game management unit 23 (the northern half of the study area) increased about 13 percent annually (Figure 3-10). During the same period, local residents' demand for moose declined as they shifted their focus to the increasingly numerous caribou.

Recognizing the lack of legal protection for Alaska's subsistence traditions, and mindful of the risks to subsistence posed by competing commercial and recreational uses, both the Alaska Legislature (in 1978) and the U.S. Congress (in 1981) adopted laws that gave subsistence uses of fish and wildlife priority over other consumptive uses.

Table 3-2 summarizes federal and state laws that provided for subsistence. Under law, subsistence hunting for Alaska Natives have been provided for only three groups of species, marine mammals, waterfowl, and halibut. Under the Marine Mammal Protection Act of 1972, "coastal Alaska Natives" were granted an exemption which allowed them to continue to hunt for marine mammals for subsistence. Several federal commissions comprised of Alaska Natives managed hunting of whales, walrus, seals, sea lions, and polar bears.

Under migratory bird treaties adopted in 1999, subsistence hunts were established for "indigenous" residents of Alaska, which could include both non-Native residents of indigenous communities, as well as indigenous Alaskans residing in urban Alaska. In combination, marine mammals and waterfowl comprised about 16 percent of the rural subsistence harvest (Wolfe 2000:2).

In the halibut regulations framework adopted by the North Pacific Fisheries Management Council

TABLE 3-2. SELECTED FEDERAL AND STATE LAWS WITH SUBSISTENCE PROVISIONS

	Federal Laws			State Laws
	Marine Mammal Protection Act "MMPA"	Alaska National Interest Lands Conservation Act "ANILCA"	Migratory Bird Treaty Act	AS 16.05.258 "Subsistence Law"
Date Enacted (Amended)	1972	1980	1916 (1936, 1999)	1978 (1992)
Type of Subsistence Prioirty	Exemption From Moratorium	Customary and Traditional Uses	Customary and Traditional Uses	Customary and Traditional Uses
Subsistence Eligibility	Coastal Alaska Natives	Rural Alaska Residents	Indigenous Alaska Residents	All Alaska Residents
Area of Jurisdiction	United States	Federal Public Lands in Alaska	Canada, Mexico, United States	State, Private, and Native Lands in Alaska
Species	Whales, Seals, Sea Lions (NMFS) Walrus,Sea Otter, Polar Bear (USF&WS)	Fish, Terrestrial Mammals, and Birds Within Area of Jurisdiction	Migratory Birds	Fish, Terrestrial Mammals, and Birds Within Area of Jurisdiction
Regulatory Authorities	Secretary of Interior Secretary of Commerce	Secretary of Interior	Secretary of Interior	Board of Game, Board of Fisheries
Regulatory Bodies	International Whaling Commission, Alaska Eskimo Whaling Commission, Eskimo Walrus Commission, Sea Otter Commission	Federal Subsistence Board	Pacific Flyway Council Federal Subsistence Board	Board of Game, Board of Fisheries
Advisory Bodies (N)		Regional Advisory Councils (10)	Regional Advisory Councils (10)	Fish and Game Advisory Committes (65)
Management Agencies	USF&WS NMFS NOAA	USF&WS NPS BLM BIA	USF&WS ADF&G	ADF&G

Abbreviations: ADF&G: Alaska Department of Fish and Game, BIA: Bureau of Indian Affairs, BLM: Bureau of Land Management, NOAA: National Oceanic and Atmospheric Administration, NMFS: National Marine Fisheries Service, NPS: National Park Service, USF&WS: U.S. Fish and Wildlife Service.

in 2002, subsistence harvests by Alaska Natives and other rural Alaska residents were recognized. These were expected to be signed by the Secretary of Commerce.

For all other subsistence pursuits – the harvest of moose, caribou, deer, salmon, and other species that comprised 84 percent of the rural harvest – indigenous Alaskans had no special subsistence rights. Moreover, Alaska did not have a unified subsistence management system for these other pursuits. Since 1991, because of a conflict between Alaska's constitution and federal law, most subsistence hunting and fishing has been managed under two systems. Most Alaskans supported the concept that subsistence uses should come before commerce and recreation. But they disagreed vehemently about exactly who should have a subsistence priority, where, and under what circumstances. Repeated attempts to amend the state constitution to provide for a rural subsistence priority stalled in the Alaska legislature throughout the 1990s. The result was a patchwork management system.

Except for marine mammals, subsistence management authority did not rest with subsistence users or with indigenous people. Authority rested with citizen boards appointed by the governor of Alaska and agency professionals appointed by the U.S. secretaries of interior and agriculture. Subsistence users and indigenous people were in the minority, and sometimes were not represented at all, on these bodies. The state boards included a majority of citizens whose interests lay primarily with commercial or recreational hunting and fishing.

Under ANILCA, the Federal Subsistence Board managed subsistence on federal public lands (about 60 percent of the state). The Alaska Board of Fisheries and the Alaska Board of Game managed subsistence on state and private lands, as well as commercial and recreational hunting and fishing. Federal and state boards adopted their own regulations, sometimes in conflict with one another.

The ANILCA system allowed only local rural residents to hunt and fish for subsistence. About 20 percent of Alaska's population qualified as rural; 62,646 (51 percent) were indigenous; 60,472 (49 percent) were not (Wolfe 2000:1). The 35,243 indigenous Alaskans who lived in urban areas were not allowed to hunt on federal public lands under subsistence regulations. Because the pool of potential users was relatively small, and federal regulations could limit people to hunting in their own customary and traditional areas, federal seasons and bag limits could be relatively liberal.

ANILCA assumed that subsistence existed, unless the Federal Board specifically found that no customary and traditional uses existed. The state's approach was different. Under the state system, the presumption was that subsistence did not exist until a state board found that subsistence uses of a particular fish stock or game population were "customary and traditional." When subsistence uses were recognized, the boards determined an "amount necessary for subsistence." Harvestable surpluses in excess of the amount necessary for subsistence could be allocated to recreational and commercial uses.

As might be expected, in the state system recreational and commercial interests frequently argued against "customary and traditional" determinations, and in favor of low "amount necessary" determinations. When musk oxen hunting first opened on the Seward Peninsula in 1996, for example, the Alaska Board of Game determined that customary and traditional uses did not exist because the musk oxen were an introduced (or re-introduced) population. The board then opened a registration hunt and a drawing hunt that both were perceived as sport hunts by local residents. The Federal Subsistence Board subsequently opened a federal subsistence hunt and allocated all the available musk oxen to the federal hunt. In response, the state closed both its hunts. Eventually, a compromise was reached. The state board reversed its original negative "customary and traditional" determination, and a state subsistence hunt opened in 1998, followed by a state drawing hunt in 2002.

The musk oxen situation illustrated the substantial costs of the subsistence management situation. In the state system, indigenous people had to prove their subsistence uses were customary and traditional, then defend subsistence from commercial and recreational interests. Stakeholders could propose changes to subsistence regulations that favored their own interests, and other stakeholders had to defend their interests before the boards. "Among the circumpolar states, Alaska is the only political unit in which urban sport and trophy hunters continue to exert significant political influence so as to main-

tain a clear prerogative for sport hunting alongside subsistence" (Lent 1999:268).

Moreover, under state law all Alaska residents hunters had the right to participate in any subsistence hunt or fishery. Thus, a Fairbanks dentist could spend thousands of dollars chartering aircraft to fly out and hunt moose near Deering for "subsistence." He could legally give away all the meat, and return home with only antlers. To discourage such trophy hunting in subsistence hunts, the state sometimes destroyed or defaced horns, antlers, or hides of animals taken in subsistence hunts. The musk oxen hunt near Wales and Deering, for example, required destruction of horns removed from the hunt area.

Most subsistence hunting regulations were the same as, or based on, recreational hunting regulations that existed before the subsistence laws were adopted. The emphasis was on controlling and documenting harvests by individual hunters, and reflected a "fair chase" philosophy. One consequence of this approach was that a typical subsistence hunter in northwest Alaska needed seven different pieces of paper each year from two different agencies. From the Alaska Department of Fish and Game, he needed a hunting license, a moose report and ticket, a caribou report, a brown bear registration permit and ticket, a swan permit and ticket, and a state duck stamp. From the U.S. Fish and Wildlife Service, he needed a federal duck stamp (which was available only in Kotzebue and Nome). He had to purchase the license in January, but the harvest reports and permits had to be obtained after July 1, and the duck stamps in August or September. The moose report, and the bear and swan permits were two part forms, one to be carried in the field, and another to be mailed in after hunting. Technically, if a hunter distributed meat to other households, these other households had to be able to provide written documentation of the source of any meat they had not personally harvested.

The hunting paperwork was designed as much to enforce individual bag limits as it was to document harvests. As far as subsistence was concerned, the system did a miserable job on both counts. Few rural hunters obtained the reports; fewer still returned them. In northwest Alaska, the Alaska Department of Fish and Game estimated that only about 11 percent of the local caribou harvest actually was reported (Georgette 1994).

The regulatory system was so complex that few people knew in whose jurisdiction they were or whether or not they were in compliance with the law. Many just assumed they were not, and lived in fear of the "game warden." When residents of Wales hunted bowhead whales, they operated under one management system. When residents of Deering hunted beluga, there was another system. When they hunted moose or caribou, their hunt was controlled by two more systems. If the moose was standing on federal public lands, only a rural residents with customary and traditional uses could hunt for subsistence. But if that moose stepped across an invisible line onto state or private lands, any Alaska resident could hunt that same moose, also for subsistence. A fish swimming up a river that flowed through state land into federal land had the same fate.

In short, subsistence "management" in Alaska was not developed from any *a priori* understanding of subsistence economies. It was a patchwork and adversarial approach to subsistence management, with regulations reflecting recreational and commercial hunting and fishing by the immigrant majority, not Alaska's indigenous people, and it reflected deep political divisions in Alaska about whether subsistence hunting and fishing should be protected from competition, and, if so, how (Wolfe 1993). As best they could, many rural Alaskans simply ignored it. The situation persisted for more than half a century, and if anything, was deteriorating. Writing about subsistence at Cape Krusenstern near Kotzebue, Robert and Carrie Uhl commented:

> Practical subsistence living has therefore brought about a traditional disregard for the law that has over the years penetrated very deeply in the philosophy by which contemporary people live (Uhl and Uhl 1977:66)

It was all the more ironic to consider that these conflicts were continuing even though most local fish and wildlife populations were more than adequate to support not only local subsistence uses but substantial levels of recreational and commercial harvests by non-local users.

The challenge facing Alaska was not simply to conserve fish and wildlife populations. Alaska needed a rational management system that allowed people to use fish and wildlife for subsistence, recreation, and commerce, with a maximum degree of

freedom and fairness, within the bounds of conservation. Understanding how subsistence uses occurred, and how they were different from recreational or commercial uses, was essential. Accommodating these uses would be a major step toward sustaining Alaska's Native cultures and the environments upon which they depend.

4
The Study Communities

The previous chapter discussed the regional setting for this study; this chapter discusses the communities of Wales and Deering. Deering was located near the mouth of the Inmachuk River, about 225 kilometers northeast of Nome. Wales was located on the western tip of the Seward Peninsula, about 175 kilometers northwest of Nome.

At the time of this study, the two study communities were similar in size, in ethnic composition, and in economic characteristics, but they were in different ecological settings. Wales was on an exposed headland at the Bering Strait. Deering was in a more sheltered bay inside Kotzebue Sound. Prior to contact, Wales was by far the larger and more powerful of the two communities. Both populations diminished after contact. The Deering society had all but disappeared by 1880, and Wales was devastated by the 1918 influenza epidemic (Figure 4-1).

The first two sections of this chapter review Wales' and Deering's histories. The third section summarizes some of the descriptive findings of the 1994 survey, including harvests and incomes.

Wales History

The community of Wales (in *Iñupiaq, Kiñigin*) was located at Cape Prince of Wales, where North American and Asia are in closest proximity. It was a site of considerable strategic significance; both the U.S. Air Force and U.S. Navy had installations there in the 1990s. It has been no less significant in the past, both as a gateway for commerce and as a battleground between Alaskan and Asian people.

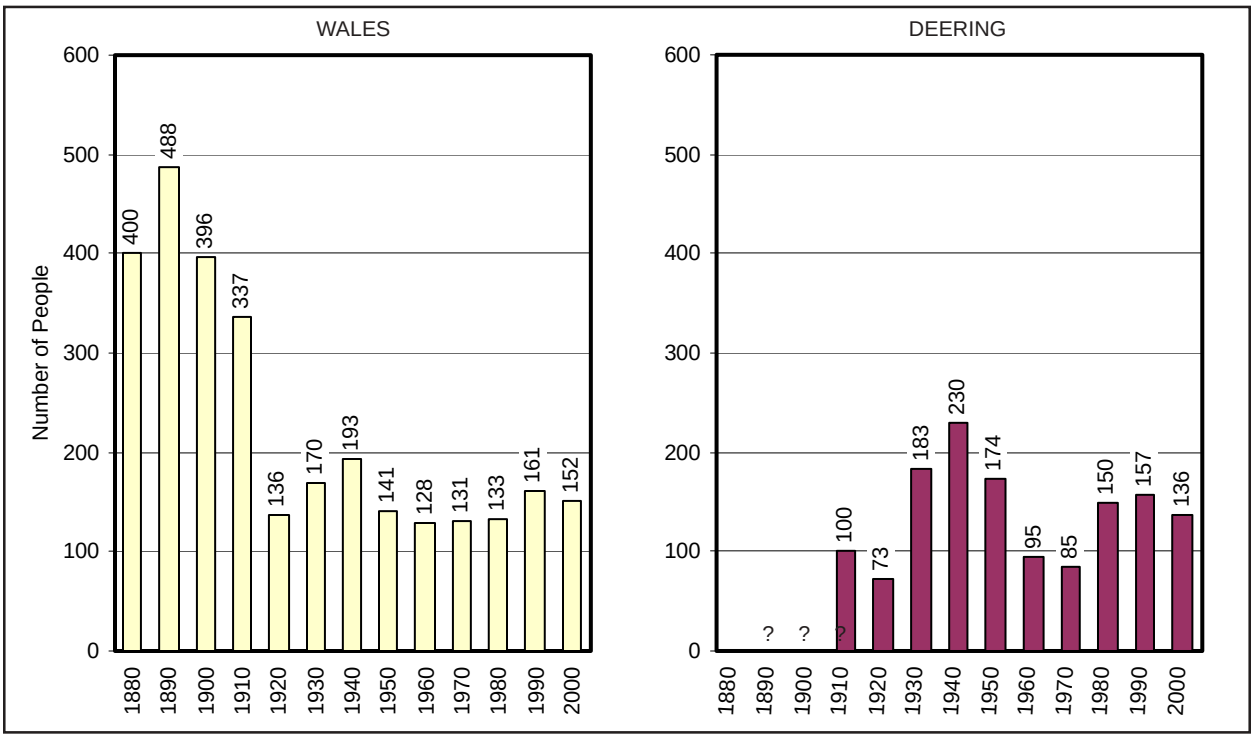

Figure 4-1. Populations of Wales and Deering, 1880-2000. Wales and Deering were almost exactly the same size in 1990, but their population histories were very different. Wales was one of the largest traditional settlements in northwest Alaska before the 1918 influenze epidemic. Deering was not listed in the census prior to 1910.

Figure 4-2. Residents of Wales, 1916. Wales residents, possibly members of a local family, stand in front of a meat cache at Cape Prince of Wales. Numerous other caches in the background attest to Wales' population before the 1918 influenza epidemic. (Robert Steiner Collection, accession number 91-164-64, Archives and Manuscripts, Alaska and Polar Regions Department, University of Alaska, Fairbanks.)

Despite Wales' location and considerable evidence of ancient human habitation, the archeological record is scant. Morrison analyzed artifacts collected by Jenness at Wales in 1926. He found strong stylistic similarities to north Alaska and St. Lawrence Island cultures, and weaker similarities to cultures south of Norton Sound (Morrison 1991:95). Thule and Birnirk, both in evidence at Cape Prince of Wales, are considered ancestral *Iñupiaq* cultures (Morrison 1991:97, Dumond 1984:77). This suggested cultural continuity, and most likely continuous inhabitation, at Cape Prince of Wales by *Iñupiaq* people during at least the last millennium.

In the 19th century, Cape Prince of Wales was occupied by two adjacent settlements separated by a small stream. *Kigiataanaimiut* (literally, "people in front") was north of the stream, *Agianaimiut* ("people opposite") was south, and collectively the two settlements were known as *Kiñigin* (Thornton 1974:20, Ray 1971:20, Koutsky 1981:21). *Kiñigin* translates roughly as "high place," and is also the *Iñupiaq* name for Cape Mountain (elevation 751 m) just behind the settlements.

Kiñigin included four *qargit* (community houses) suggesting the presence of at least four local families (Koutsky 1981:90). Other smaller settlements affiliated with *Kiñigin* were located along the coast in the *Kiñikmiut* nation.

One reason for *Kiñigin*'s large size was its exceptional access to marine mammals. The narrowing of the Bering Strait at Cape Prince of Wales concentrated migrations near the community each spring and fall. Pacific walrus, bearded seal, bowhead whale, as well as salmon, all migrated offshore of Cape Prince of Wales. Coastal lagoons northeast of the strait provided habitat for waterfowl and whitefish, while cliffs southeast of the strait

offered habitat for seabirds. In addition, caribou were available on the Seward Peninsula at least until 1850. *Kiñigin* also was the only *Iñupiaq* community in a position to attempt to control trade with Siberia (Burch 1998b:53). "They not only go to Port Clarence to have dealings with the whalers and traders from the States," Thornton wrote, "but also to Kotzebue Sound, East Cape, and Indian Point (Thornton 1974:46). The latter two communities were on the Siberian coast.

As a consequence of the local abundance of natural resources and its strategic location for trade, *Kiñigin* was one of the largest and most powerful *Iñupiaq* communities in northwest Alaska in the early 19th century. To maintain its prominence, however, *Kiñigin* had to defend its resource and trading advantages against competition from Siberians and, later, from Europeans and Americans.

The first Europeans to observe mainland Alaska, Mikhail Gvozdev and Ivan Fedorov, did so from an anchorage offshore of *Kiñigin* on August 21, 1732 (Ray 1975:21). Captain James Cook named Cape Prince of Wales on August 9, 1778. He observed people upon the coast, but did not go ashore. Ivan Kobelev came ashore in an *umiaq* (traditional skin boat) on June 11, 1791. He found 50 deserted dwellings, and surmised that the inhabitants had fled upon his arrival, fearing attack (Ray 1975:53).

In 1826 near Chamisso Island in Kotzebue Sound, Frederick Beechey encountered several heavily loaded boats of *Kiñigin* residents returning from a trade fair at *Sisualik* (Beechey 1968:290-292). They drew him a map of the coastline, provided names for geographic features, and traded. From their accounts, Beechey described their community:

> The natives have a village upon the low land near the cape called *Eidannoo* and another inland named *King-a-ghee*... These were some of the most cleanly and well-dressed people we had seen anywhere on the coast. Their residence was at *King-a-ghee*, a place which, judging from the respectability of parties from that place, whom we had seen elsewhere, must be important among the Esquimaux villages upon the coast. (Beechey 1831:540)

Kiñigin's fortunes began to turn late in the 19th century. The arrival of Yankee whalers in the Bering Sea in 1849 and the arrival of gold miners on the Seward Peninsula in 1899 created new trade networks and commercial centers.

A serious conflict developed in 1877, when the whaling schooner *Allen* anchored off Cape Prince of Wales and traded alcohol. The next day, 14 *Iñupiaq* men and 1 *Iñupiaq* woman returned to the *Allen*, intoxicated. A fight developed in which a mate on the *Allen* was killed.

The *Allen*'s captain, George Gilley, later described the incident to Charles Brower. Gilley said the *Allen*'s Hawaiian crew "went crazy" after the mate was killed. They drove the *Iñupiaq* men into the forecastle, pulled them out one by one with a boat hook, killed each with a blow to the head, and threw the bodies overboard into an *umiaq* (Brower 1997:78, Mitchell 1997:138). The woman was spared. Fearful of hostile receptions, European and American traders began to avoid Cape Prince of Wales (Brower 1997:79).

As horrible as it was in itself, the Allen incident also was evidence of economic change in the latter 19th century. *Kiñigin* simply could not compete with the mobile and well-financed Yankee whalers and traders, nor defend its historic trade relationships, and *Kiñigin*'s role in trade evaporated. In the 19th century, *Kiñigin* was a regional center for commerce. In the twentieth century, Nome and Kotzebue assumed regional center roles.

In 1890, the American Mission Association of the Congregational Church established a mission at Cape Prince of Wales. Harrison Thornton and William T. Lopp were the first government teachers. On August, 13, 1893, three young men shot and killed Thornton through the door of his home with a whaling gun "to avenge the homicides that George Gilley's crew had perpetrated sixteen years earlier" (Mitchell 1997:138). The next day, two *Iñupiaq* men were summarily executed by their fellows for killing Thornton (Thornton 1931:xxiv).

Caribou on the Seward Peninsula were in decline in the latter half of the 19th century, and with the caribou went an important source of food. To respond to the caribou decline, in 1894 the Congregational Mission received 100 reindeer from the U.S. government, the second herd to be established in Alaska (Stern 1980: 86, 92). By 1902 the herd had grown to 224 animals.

Bowhead whale and walrus populations also had declined, as a result of the intense commercial har-

vests by Yankee ships during the 19th century. When whaling ended about 1914, the Western Arctic stock of bowhead whales may have included fewer than 3,000 individuals, compared with an initial stock size of 10,400 to 23,000 in 1848 (Hill and DeMaster 1998:148-149).

In 1902, a "Wales" post office was established at *Kiñigin* (Orth 1971:1026). In the twentieth century, the community has been known primarily as "Wales." The name *Kiñigin* fell into disuse among non-*Iñupiaq*, but is still used in Wales and by other northwest Alaska *Iñupiaq*.

Epidemics in 1900 and 1918 decimated Native communities on the southern Seward Peninsula, including Wales (Wolfe 1982). The impact of the 1918 influenza epidemic was especially profound. Wales' population declined from 337 people in 1910 to 136 people in 1920. One Wales elder born in 1923 said that only 98 people were alive immediately following the epidemic in 1918 (Oxereok 1998).

Unpublished descriptions of the 1918 epidemic describe a terrible event (Weyapuk 1980, Geist n.d.). The disease arrived with a mail dog team from Nome on Christmas eve. Within a week, 197 people had died. The government nurse was overwhelmed with orphaned children and frightened adults. The homes of the dead were abandoned, many bodies went unburied for weeks, and starving sled dogs roamed the village. Residents of the smaller settlements near Cape Prince of Wales either perished or migrated to Wales, Shishmaref, and other communities.

When a missionary relief party arrived some months later, the remaining bodies were buried in a mass grave. The acting district superintendent called the adults of the community together. He directed the survivors to choose new husbands and wives, and take custody of the orphaned children. Those who did not choose had mates selected for them (Geist n.d.). The disruption to the traditional local family system must have been severe. The epidemic also disrupted bowhead whaling; it was more than 50 years before Wales took another bowhead.

Wales' population increased modestly in the decades following the 1918 epidemic, but the community has never approached its size before the disaster (Figure 4-1). Several large families left Wales for Nome at the end of World War II. The community declined in population from 1950 to 1980, despite an expanding military presence nearby. From 1980 to 1990, the community grew from 133 to 161 people. A third of that growth could be attributed to expanded staff at a new high school. Improved housing, more public services, and modestly increased job opportunities no doubt also contributed to the increase.

The U.S. Navy established a small post to operate a submarine listening station in the Bering Straits. The U.S. Air Force established a large radar installation atop Cape Mountain to monitor aircraft traffic in the vicinity of the Bering Strait. The Air Force installation was supported from Tin City, about 16 kilometers (10 miles east) of Wales on the other side of Cape Mountain. Some Wales residents found seasonal employment during the construction phases of these military projects, but none were employed by the military at the time of this study.

The original reindeer herd in the vicinity of Wales was managed under several different ownership structures until 1950, when the animals dispersed. A local Wales family re-established a reindeer herd in 1973, and was still herding at the time of this study.

In 1970 Charles Christensen, a BIA school teacher, organized a crew of Wales men which successfully landed the first bowhead whale in Wales since the 1918 epidemic. Four more bowhead were taken in the 1980s, and three bowhead were taken in the 1990s (through 1998). By the time of the study, whaling had become a major part of the community's annual round and a significant source of community pride. One whale was taken in the study year.

At the time of this study, three different local organizations managed the affairs of the community. These included a tribal government, a municipal government, and the village Native corporation.

The Native Village of Wales, a tribal government organized under the Indian Reorganization Act, ratified its constitution and by-laws in 1939. A representative of the Native village was a member of the board of Kawerak, Inc. the regional Native nonprofit social service organization.

The Wales Native Corporation was established by the Alaska Native Claims Settlement Act in 1971, and received title to 108,800 acres of land in the vicinity of the community. The corporation employed a local manager, operated the local cable

Figure 4-3. Wales in April, 1998. This view, looking northwest, shows different building styles. Older houses typically have multiple additions, foreground. The middle houses are typical of government-built houses from the 1980s. The white dome in the background is the community building,with IRA Council, City, and Native corporation offices.

television system, rented housing to transient workers, and provided lodging for overnight guests.

The City of Wales was incorporated in 1964. In 1997 the city had operating revenues of $147,057, and funded its operations with a 2 percent sales tax, bingo, state revenue sharing, and other sources (Alaska Department of Community and Economic Development 2001). The city operated a very limited water and sewer system serving the school, health clinic, and laundromat. Only three percent of the residences in the community had complete plumbing. Other residents hauled water from a central watering point or from Gilbert Creek.

There were two sewer systems, one for the school and a second for teachers' housing, the clinic, and the city building. More than 90 percent of Wales residences had "honey-buckets," a five-gallon plastic bucket fitted with a toilet seat.

Electricity was provided by the Alaska Village Electrical Cooperative (AVEC), which operated several diesel generators with a capacity of 359 kilowatts. Electricity cost 17.2 cents per kilowatt hour, and was subsidized in part by the power cost equalization program.

The Bering Straits School District operated the Wales-Kingikmiut School, with six certified teachers. The school offered instruction for 54 students from pre-school through twelfth grade.

At the time of this study, Wales was accessible only by air and sea, although a 6.5 mile road recently was completed between Wales and the U.S. Air Force radar station at Tin City. The state owned and maintained a 4,000-foot gravel runway one mile northwest of the community. Several air taxis offered scheduled service between Nome and Wales on a daily basis, weather permitting. Heavy cargo was delivered by barge, and lightered a half mile to shore (Alaska Department of Community and Economic Development 2001).

In 1994, Wales was outwardly typical of the many *Iñupiaq* communities in Arctic Alaska, with a mix of historic and modern construction (Figure 4-3). Most residents were *Iñupiat* related by blood or marriage to one of several extended families with ancient ties to *Kiñikmiut*.

Deering History

Unlike Wales, the modern site of Deering (in *Iñupiaq, Ipnatchait*) was not a large community historically, and probably was not occupied continuously in the 19th century. Nonetheless, the site has a long history of inhabitation. In 1997, workers installing water and sewer services discovered extensive *Ipiutak* materials (circa 800 A.D.) within the modern village site.

As many as 400 people may have lived in the Deering area prior to 1850, but in a score of smaller settlements, many of them seasonal (Burch 1998a:295-301). Although the evidence is limited, Burch believes they may have called themselves *Pittaímiut* (literally, "people of the *Pitaaq*) after the Goodhope (*Pittaq)* River. Contact between *Pittaímiut* and early explorers was minimal. In 1816, Kotzebue observed eight *umiat* near Cape Deceit, and in 1826 Beechey observed a few residents of the area in a single *umiak* south of Cape Espenberg.

In 1853-54, the *Plover* wintered at Port Clarence on the southern side of the Seward Peninsula. A small party from the Plover traveled overland to the north shore of the peninsula in 1854. As it was winter and the people were scattered in small settlements, they encountered only a few people along the Goodhope River and at Cape Deceit (*Qipalut*), three kilometers (two miles) north of the present site of Deering.

From the historical record, it appears that sometime in the 19th century *Pittaímiut*'s citizens virtually disappeared (Burch 1998a:301-304). Caribou disappeared from the Seward Peninsula sometime after 1850. The *Pittaímiut* may or may not have dispersed then, but there is no evidence of a famine or of a large-scale migration away from the area. As a consequence, reconstructing an early history of Deering was difficult.

The 1880 census reported 42 people living at "Taapkuk," described as Cape Espenberg, and 12 at "Kugalukmute" or the Candle River, but none in the vicinity of the current community of Deering (Petroff 1884:4). The 1890 census reports for southern Kotzebue sound were a muddle of various *Iñupiaq* nations. In the 1900 census, all the residents identified themselves as being from Buckland. The census reports led Burch to conclude that by 1880 the *Pittaímiut* had ceased to exist as a viable independent nation (Burch 1998a:304).

Ray reported that "most of the old village inhabitants died in the 1900 measles and pneumonia epidemic" (Ray 1964:83). In the 1910 census, only four *Iñupiat* in the Deering area were identified as "*Pitukmiut"* (Burch 1998a:304), although other *Iñupiat* had moved to Deering and *Pittaímiut* were located in other northwest Alaska communities.

The contemporary community of Deering dates from 1901, when it was established as a supply station for gold mining camps in the interior Seward Peninsula (Orth 1971:264). Mining activity attracted additional *Iñupiat* from around the area, who settled in Deering and remained after mining ceased. For the 40 years that the mines operated, Deering's local economy was very different from most of the other small communities in northwest Alaska.

Mining camps lined the Inmachuk River. Supplies and personnel for the mines were landed at Deering. Deering had a restaurant, a saloon, and several stores (Figure 4-4). Several hundred horses were used in the mines to dig ditches and roads. In the 1920s, horses were used to level ground at Deering for an airstrip. The government supported two schools, a "public" school for the children of the miners and merchants, and a BIA school for Alaska Natives (Outwater et al. 1992:214-215).

In 1915, many of Deering's *Iñupiaq* residents abandoned the community, with the support and assistance of the government and the Friends Church (Roberts 1978:266). Deering's pastor, Charles Replogle, went with the group and helped build a new community at Noorvik on the Kobuk River.

Some accounts suggested the move was prompted by depleted salmon runs; others said a shortage of wood was a factor (Foster 1992:135, Ray 1964:83-84). Still others blamed the "corrupting" influence of the mining community on the *Iñupiat*. A Friend's Church history mentioned all of these:

> Charles Replogle observed that the fish supply of the local Inmachuk River was depleted. Extensive hydraulic mining operations had filled the river with silt. Hunting became difficult. The coast lacked wood for fuel. Drink and all-night dances constituted the social life of the mining town. (Roberts 1978:266)

Deering's population declined in 1920, probably the

Figure 4-4. Downtown Deering, undated. The building on the right was still standing in 1994, and served as the Deering store. Picture probably was taken in the late 1930s or early 1940s. (Cordelia Noble Collection, accession number 73-203-9, Archives and Manuscripts, Alaska and Polar Regions Department, University of Alaska, Fairbanks.)

result of the *Iñupiaq* migration to Noorvik (Figure 4-1). Mining continued, however, and Deering's population reached its zenith in 1940 with 230 residents. Then, with the start of World War II, mining equipment became impossible to maintain. Most of the mining operations on the Inmachuk River ceased, never to resume. The saloon had been closed by prohibition; the stores and restaurant also closed.

Some of the residents who had moved to Noorvik in 1914 gradually returned to Deering. Some miners and merchants had married *Iñupiat*, and some of their descendents remained in Deering, too. From 1940 to the present, Deering's economy again became reliant primarily upon hunting, fishing, and gathering for food.

A tribal government, the Native Village of Deering, was established in 1945 under the Indian Reorganization Act. The IRA employs an administrator and administers federal grant programs for tribal members.

The City of Deering was incorporated in 1970. The city reported operating revenues of $213,384 in 1999 (Alaska Department of Community and Economic Development). Local revenues came from a 3% local sales tax and from fees paid for water and sewer, Laundromat, and cable television services. State revenue sharing and other state funds contributed about a third of the total revenues. The city operated a limited water and sewer system that supplied the clinic, school, and city offices. An expanded water and sewer system was installed in 1997, after this study was conducted. The city also operated, in cooperation with a private board, a 255-kilowatt diesel electric generating plant. Deering was perhaps the only community of it size in northwest Alaska to operate its own library, open in the afternoons and evenings for children after school.

The Deering School was operated by the Northwest Arctic Borough School District, based in Kotzebue. The school employed 5 certified teachers, and served 40 students in grades kindergarten through 12.

The Deering Native Corporation merged with its parent, the NANA Regional Corporation, shortly after passage of the Alaska Native Claims Settlement Act in 1972. The Deering Corporation received

92,800 acres of land under ANCSA, which were transferred to NANA. NANA was assisting Deering in developing a tourism facility in the abandoned Utica Creek mining camp south of the community.

At the time of this study, Deering was accessible by air. The state owned and maintained an airport 2 miles southwest of the community, with a 2,600-foot main runway and a 2,080-foot crosswind runway. Several air taxis offered daily scheduled service from Kotzebue to Deering. Some fuel and freight was lightered from Kotzebue to Deering on barges.

In 1994, Deering resembled other small, subsistence-oriented communities in northwest Alaska (Figure 4-5). Except for about six short-term residents associated with the school, all but three of the estimated 165 residents were of *Iñupiaq* descent.

Wales and Deering in 1994

The baseline survey administered during this project documented Wales and Deering economies in 1994, including subsistence harvests, household composition, employment, and income. Researchers completed surveys for 84 percent of the occupied households in each community: 42 of 50 households in Wales and 37 of 44 households in Deering. The sampled households in Wales included 128 residents (76 percent of the estimated total population) and in Deering, 124 residents (74 percent of the estimated total population).

Table 4-1 compares some demographic and economic variables for non-teacher households in Wales and Deering. Teacher households were excluded because they had significantly different demographic and economic characteristics (see Chapter 6).

One difference between the two study communities was the maximum number of years any resident of a household had lived in the study community. On average, Wales residents had lived in Wales about 10 years longer than Deering residents had in Deering. The maximum number of years of residency by any member of any household was substantially shorter for Deering than for Wales. This may reflect Deering's history, including the mass

Figure 4-5. Deering in November, 1998. Deering is built on a long narrow beach at the confluence of Smith Creek and the Inmachuk Rive. The Inmachuk River drains into Kotzebue Sound at the east end of the community. This view, taken from Smith Creek near its confluence with the Inmachuk, shows residences in the eastern portion of Deering.

TABLE 4-1. CHARACTERISTICS OF HOUSEHOLDS IN WALES AND DEERING, 1994.

	Wales (N=36)			Deering (N=34)		
	Minimum	Average	Maximum	Minimum	Average	Maximum
Demographics						
Household Size (Number of People)	1	3.3	9	1	3.5	9
Maximum Years in Community (For Any HH Member)	0.5	42.2	87.0	0.6	32.6	65.2
Subsistence Productivity						
Household Harvest (Total Edible Pounds)	0	2,643	15,786	0	2,449	11,573
Household Harvest (Pounds Without Bowhead)	0	1,847	8,617	0	2,449	11,573
Use, Harvest, and Distribution of Wild Foods						
Number of Different Foods Used	0	18.2	49	5	20.3	42
Number of Different Foods Harvested	0	11.5	43	0	13.4	38
Number of Different Foods Given Away	0	9.4	33	0	9.1	27
Number of Different Foods Received	0	9.3	29	1	11.5	25
Employment and Income						
Number of Adults Employed	0	1.3	3	0	1.4	4
Total Number of Jobs	0	2.3	9	0	2.2	7
Total Months Employed by Adults	0	12.1	27	0	11.8	28
Household Income (Wages Only)	$0	$14,116	$40,000	$0	$14,219	$41,400
Total Household Income	$983	$22,921	$45,271	$190	$26,028	$75,705

NOTE: Data do not include households with transient teachers or military personnel.

migration to Noorvik in 1915 and the decline of mining upon the advent of World War II. Some residents of Deering during the study year had been born in Deering, but had lived in other communities for a substantial part of their adult lives.

Subsistence productivity overall was similar, although Deering households reported using, harvesting, and receiving a few more species than Wales households. This reflected the more diverse resource base available to Deering.

Households used a wide range of species. One household in Wales reported using 49 different species, and a Deering household reported using 42. The average numbers of species used per household, excluding teacher households, were 18.2 in Wales and 20.3 in Deering. Wales households (excluding teachers) reported harvesting an average 2,643 edible pounds per household, and Deering households reported 2,449 edible pounds. These harvests put the study communities in the top quartile of household harvests documented in rural Alaska communities to date.

Averages, however, obscured considerable variation among households. Nowhere was this more apparent than in reported harvests, which ranged from 0 to 15,786 pounds for Wales, and from 0 to 11,573 pounds for Deering. Five of 70 non-teacher households reported no wild food harvests, and 13 reported no employment in the study year. Nine households with 17 residents reported annual incomes less than $10,000 each, in communities where food and fuel cost two to three times more than in Anchorage or Seattle. Two of those households reported no subsistence harvests and two more reported harvests of less than 100 pounds per capita, which raises the very interesting question of how they survived.

Wales and Deering had quite different mixes of species in their harvests (Figure 4-6). In Wales, marine mammals contributed 78 percent of the total harvest, by edible weight, followed by fish with 13.3 percent. No other resource category provided more than 4 percent of the total. One 40-foot bowhead whale contributed 25 percent of the total community harvest by weight. (The weight of the bowhead whale was estimated at 28,667 pounds, following an approach developed to estimate whale weights on Alaska's North Slope (Braund 1993:D36-D52)). In a year when no bowhead whales were harvested, presumably fish and land mammals would comprise a more substantial part of the harvest. Aside from the whale, bearded seals accounted for the largest single-species harvest with a total edible weight estimated at 24,625 pounds.

In Deering, marine mammals, land mammals, and fish contributed roughly equivalent portions of

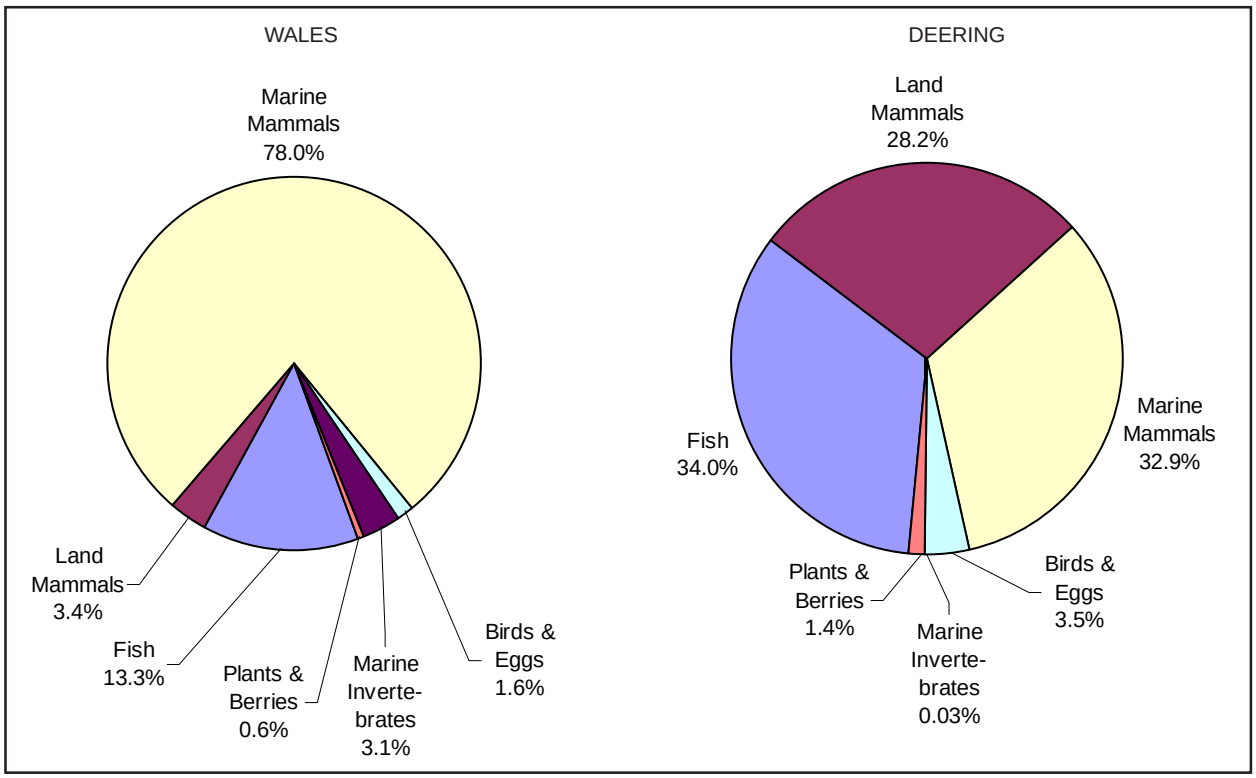

Figure 4-6. Summary of wild food harvests, Wales and Deering, 1994. Marine mammals comprised more than three quarters of Wales' harvest, reflecting Wales' coastal location. Deering harvested marine mammals, fish, and land mammals in nearly equal proportion.

the total harvest. The bird harvest in Deering was twice that in Wales. Of the two communities, Deering had a much more diverse harvest, a function of location.

Every household in the two communities reported some cash income. Income, not including teachers' households, averaged $22,921 per household in Wales and $26,028 in Deering (Table 4-1). Of that, $14,116 (62 percent) in Wales and $14,219 (55 percent) in Deering came from wage employment. Alaska Permanent Fund dividends were the largest single source of unearned income. The purchasing power of household incomes, however, was reduced by the high cost of living. Adjusted for the cost of living, average per capita incomes were less than one sixth the average for Anchorage.

At least one adult was employed in 81.4 percent of the households, not counting teacher households, and 50.0 percent of the households reported two or more employed adults. All those adults worked less then eight months a year per household, on average, and households reported almost twice as many jobs as employed adults, indications that employment was seasonal, temporary, and serial.

Figure 4-7 shows the sources of estimated personal income for Wales and Deering in 1994. Estimated personal income totaled about $1.4 million for Wales, and about $1.5 million for Deering. A quarter of the personal income in Wales and third of the personal income in Deering came from local education, one indicator of the different economic stratum occupied by teachers (Figure 4-7).

About half of all jobs, but two thirds of all earnings, were in the public sector. Even though many jobs were categorized as "local government," local governments depended primarily upon state and federal funding sources. In the private sector, services provided the most earnings, about 14 percent of the total, followed by transportation, communication, and utilities, with about 10 percent of the earnings. Low average monthly earnings, $536 per capita in Wales and $569 per capita in Deering, reflected the high number of seasonal and part-time

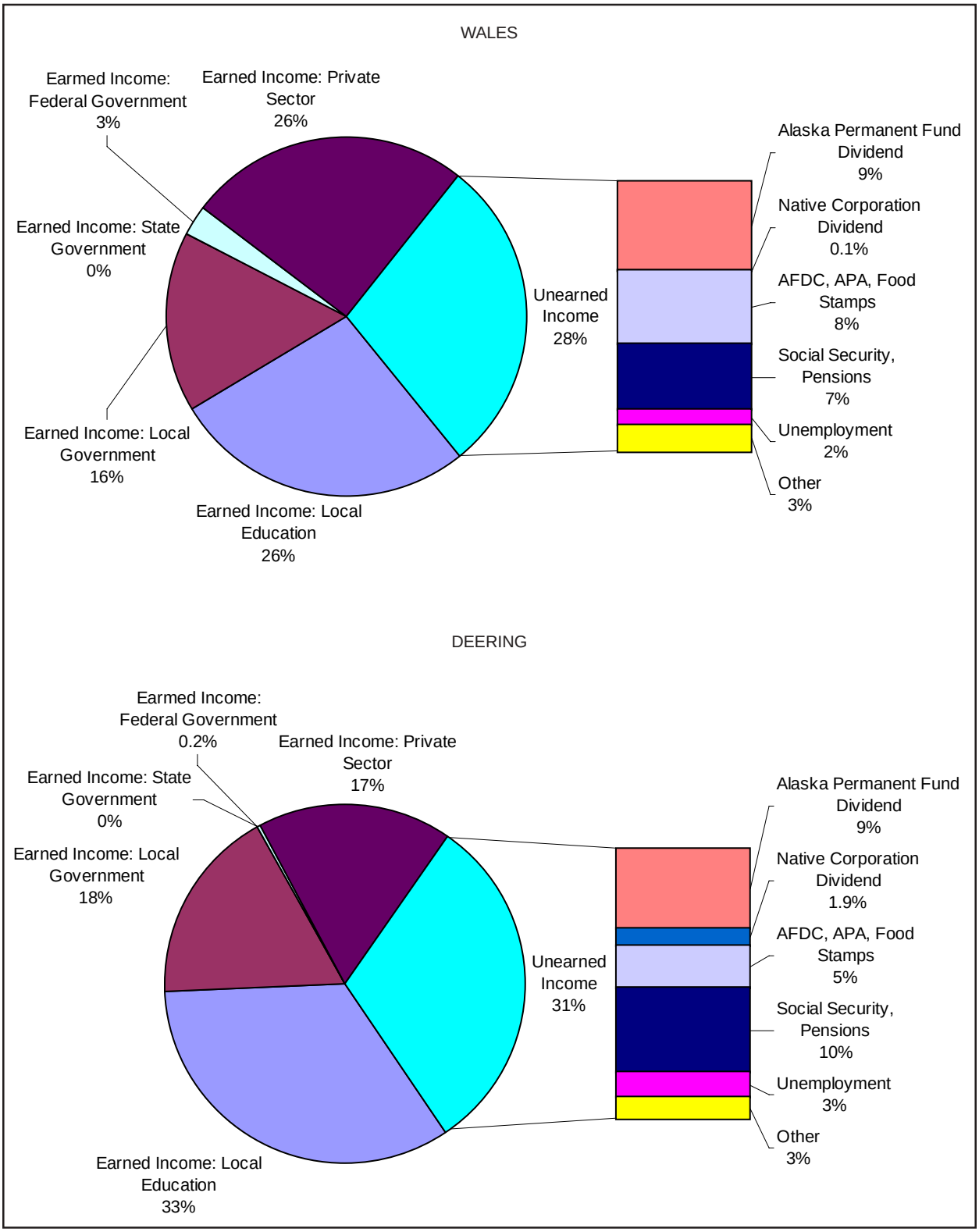

Figure 4-7. Sources of personal income, Wales and Deering, 1994. Government employment was the largest source of personal income. Although earned income accounted for 72 percent of Wales' income and 69 percent of Deering's income, two out of three earned dollars came from public sector employment. The largest sources of unearned income were the Alaska Permanent Fund dividend and retirement programs. Entitlements provided less than 10 percent.

jobs in the economy, such as airline agents and construction workers.

Unearned income contributed 28 percent to the total personal income in Wales, and 31 percent in Deering. The largest source of unearned income was the Alaska Permanent Fund Dividend (PFD), which paid $984 to every eligible Alaskan in 1984. PFDs contributed $127,675 (9 percent) to Wales' and $134,561 (9 percent) to Deering's incomes.

In sum, at the time of this study, both study communities were a small, remote settlements on sites with long histories and dependable access to wild animals, fish, and plants. The cash sector was heavily dependent on government spending, especially for education. Cash incomes were approximately 50 percent less than in Anchorage while the cost of living was more than two times greater. Subsistence harvesting was a mainstay of the local economies.

5
Production by Individuals

Nine out of ten adults in Wales and Deering harvested, processed, or distributed some kind of wild food for one or more households, according to household survey data. A person who was named at least once as a harvester, processor, or distributor on a survey was characterized as a "producer." Some individuals were reported as producers much more frequently than others, while a few people were never named as a producer, not even by their own households. The latter were characterized as "non-producers" of wild foods.

This chapter compares some demographic and economic characteristics of individuals in the two study communities. Then the chapter explores characteristics of individuals at different levels of production. Finally, the chapter discusses some differences between teachers and other adults in the study communities, particularly from the view of harvesting, processing, and distributing wild foods.

Sample Characteristics

Wales and Deering were similar in size, but displayed some demographic differences. The Wales sample included 128 individuals; 81 were adults (16 years old or older). Sixty eight were male (53 percent); 60 were female (47 percent). Residents in sampled households were, on average, 28.7 years old and had lived in Wales 23.6 years. The Deering sample included 124 individuals, 77 of whom were adults. Sixty nine were male (56 percent); 55 were female (44 percent). Residents in the sampled households averaged 30.1 years old and averaged 19.0 years living in the community.

In Wales, 112 residents in the sampled households identified themselves as Alaska Native (87.5 percent), 11 as not Alaska Native (8.6 percent), and 5 were of unknown ethnicity. In Deering, 115 residents identified themselves as Alaska Native (92.7 percent), 8 as not Alaska Native (6.5 percent), and 1 was unknown.

Both communities were composed primarily of people born either in the study community or in another northwest Alaska community (Figure 5-1). Ninety two Wales residents (72 percent) had been born in Wales, while 70 Deering residents (57 percent) had been born in Deering.

One striking demographic characteristic, present in both communities, was the distribution of adults by sex. In Wales, adult men outnumbered adult women 51 to 30. In Deering, men outnumbered

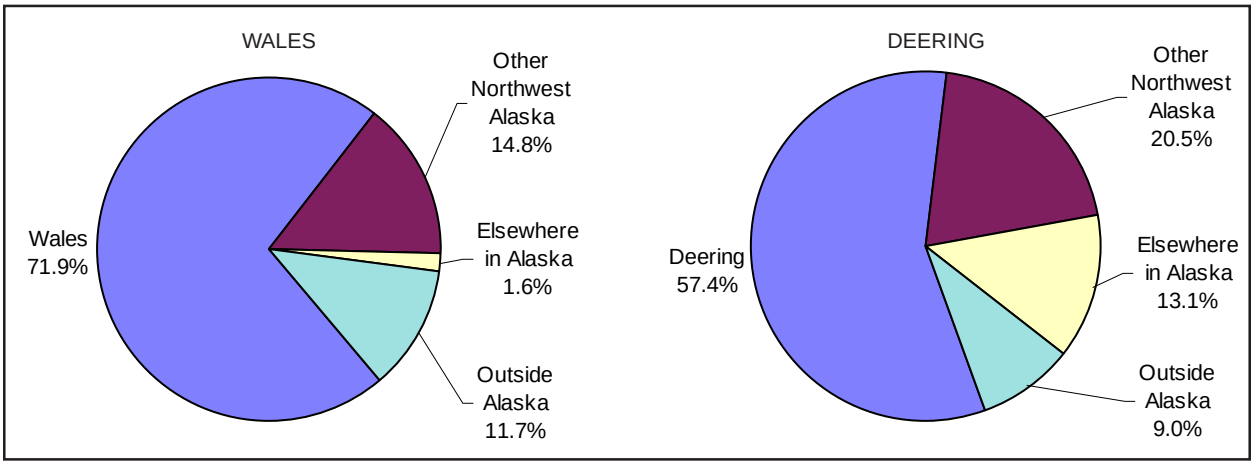

Figure 5-1. Natal communities for residents of Wales and Deering, 1994. More than half the residents of Wales (left) and Deering had been born in those communities, and more than three quarters had been born in northwest Alaska.

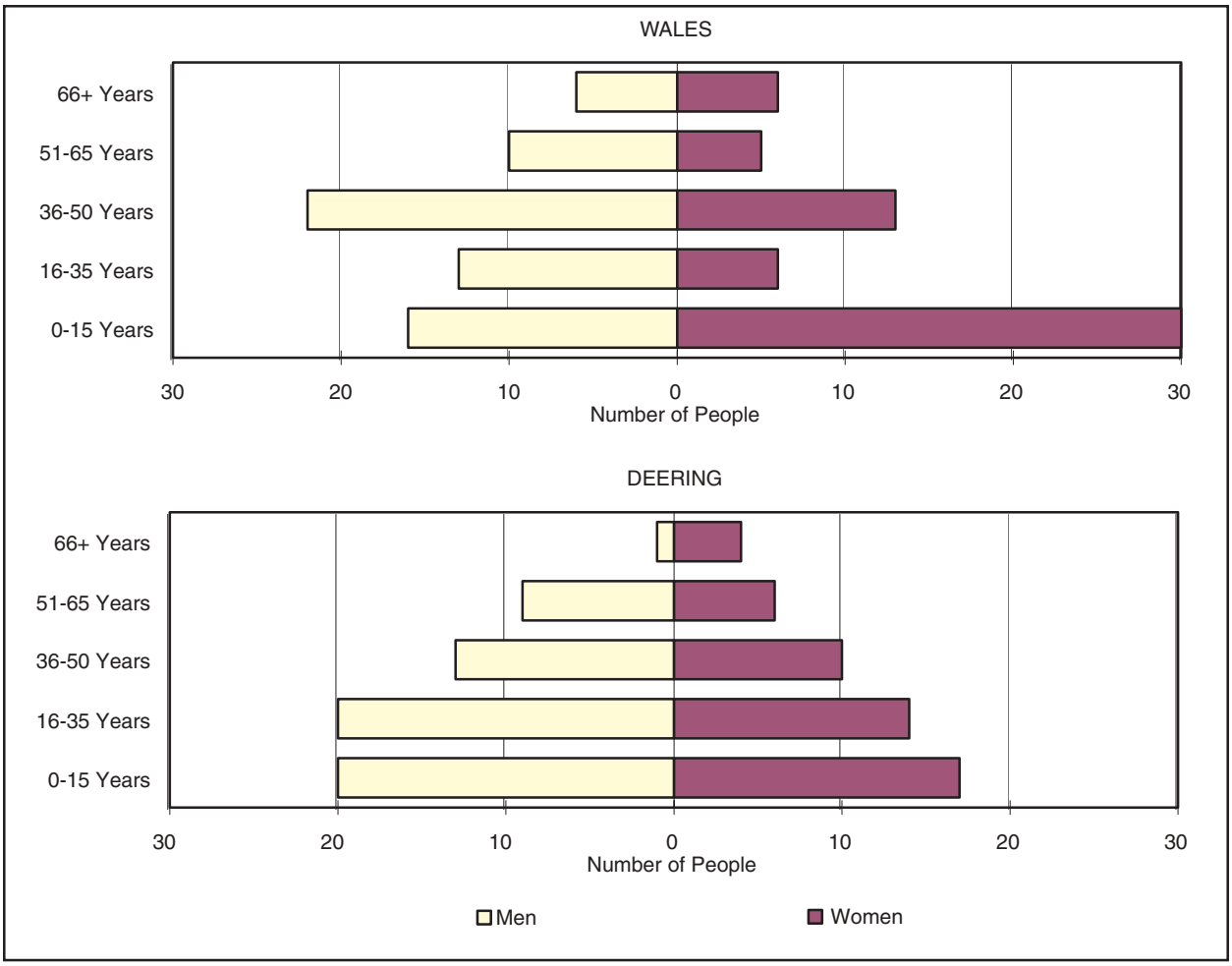

Figure 5-2. Age-sex cohorts,Wales and Deering, 1994. In the 16-65 year-old cohorts, men outnumbered women two to one in Wales. In the same cohorts in Deering, men outnumbered women three to two.

women by 43 to 34. Figure 5-2 compares age and sex cohorts for Wales and Deering.

In Wales, men comprised 63 to 68 percent of the 16-65 year-old cohorts, while females comprised 65 percent of the 0-15 year-old cohort. The high proportion of young girls in Wales appeared to be a chance occurrence in a small population; there was no information suggesting different rates of emigration or mortality by gender among children.

A National Park Service researcher located a list of all Wales residents compiled by teachers in 1937. The list included individuals' ages and relationships to household heads. Interestingly, the age/sex structure of Wales' adult population in 1937 was similar to that in 1994. The 1937 population totaled 189, with 96 women (51 percent) and 93 men (49 percent). There were 92 adults; 55 were men (60 percent) and 37 were women (40 percent).

In the late nineteenth century, however, sex ratios were reversed. One of Wales' first school teachers, Harrison Thornton, conducted a census of all 69 households in Wales, probably in 1891. He reported 307 adults, of whom 135 were men (44 percent) and 172 were women (56 percent). He speculated that "the men are much more liable to lose their lives than the women" while hunting or fishing. Residents told Thornton that 16 men had been carried off on the ice and lost in the previous decade (Thornton 1976:21, 219).

In Deering, sex ratios also favored men, but the situation was not so pronounced (Figure 5-2). Men comprised 57 to 60 percent of the 16-to-65-year-old cohorts in the sample. However, very few elder men lived in Deering; only 20 percent of the adults 66 years old or older were men.

The sex ratios were reflected in the frequency of

adult relationships in households. In Wales, 28 of the 30 adult women (93 percent) in the sampled households were heads of households, while only 35 of the 51 adult men (69 percent) were heads of households. Almost 30 percent of the adult men in Wales lived in their parents' or grandparents' homes, but less than 7 percent of adult women lived with parents or grandparents.

As in Wales, women in Deering were more likely to be heads of households; 25 of the 34 adult women (74 percent) were heads, but only 25 of 43 men (58 percent) were heads. Seventeen Deering men (40 percent) lived in their parents' or grandparents' households, but only six women (18 percent) did so.

Absent evidence of differences in mortality, the preponderance of adult males suggested adult females had been migrating out of the communities. This study did not systematically collect information on migration for Wales and Deering. However, migration information was available for nearby Brevig Mission, where half of the 20-40 year-old females left Brevig Mission between 1978 and 1984 and no women in those cohorts moved in (Magdanz and Conger, ms). The immigration and emigration of Brevig Mission men during the same period was nearly equal. The typical migrant female left Brevig Mission in her twenties for employment or marriage, often accompanied by a child.

Researchers examined Wales genealogical data. Data were incomplete for adults no longer in Wales, but there was evidence of differential emigration by sex. One family living in Wales in the 1940s, for example, included 11 children, 8 girls and 3 boys. Only two of the girls (25 percent) lived out their adult lives in Wales, along with two of the boys (67 percent). Another family from the same period included 10 children, 3 girls and 7 boys. One of the girls (33 percent) and four of the boys (57 percent) lived out their lives in Wales.

The women who left Wales moved to other communities in northwest Alaska, in particular to Nome, as well as to Anchorage and elsewhere in the United States. As was the case in Brevig Mission, the emigrants' Wales families offered jobs and marriage as reasons for the emigrations.

Producer Characteristics

The surveys collected harvest quantities at the household level, not for individuals. Researchers did not know, for example, how many seals or salmon a particular individual might have harvested. Such data were not collected because so much harvesting was cooperative. Apportioning cooperative harvests among households could be difficult; apportioning cooperative harvests among individuals could be virtually impossible for some resource categories.

What was known about individuals, however, was whether or not they participated in the harvesting, processing, or distribution ("sharing") of resources, and for which households. By design, values for producer variables increased with the number of resource categories produced and with the number of households for which an individual produced (see discussion of data analysis in Chapter 2).

Researchers compared selected characteristics of producers and non-producers (Table 5-1). Seventy two of the 81 adults (88.9 percent) in the Wales sample and 72 of the 77 adults (93.5 percent) in the Deering sample were named at least once as a producer. The proportion of males and females reported as producers was similar. In Wales, 90.2 percent of the men and 86.7 percent of the women were producers. In Deering, 93.0 percent of the men and 94.1 percent of the women were producers.

The difference between males and females in Wales could be explained primarily by lower rates of participation among non-Native women than non-Native men. Only 60.0 percent of Wales' non-Native women were named as producers, compared 66.7 percent of non-Native men. By comparison, 91.7 percent of the Alaska Native women were named as producers, compared with 92.9 percent of Alaska Native men. Non-Native men comprised a smaller proportion of the total male population in Wales, and had less effect on the analysis than non-Native women.

Producer data clearly showed a male-female division of labor. Men were reported for twice as many instances of harvesting as women, while women were reported for more instances of processing. In Wales, the average number of harvesting instances reported for men was 5.8, while women were reported only 2.0 times on average (Figure 5-3). The

TABLE 5-1. CHARACTERISTICS OF PRODUCERS AND NON-PRODUCERS, WALES AND DEERING, 1994

	WALES			DEERING		
	Named as Producer	Not Named as Producer	Total	Named as Producer	Not Named as Producer	Total
N of Adults in the Sample	72 (88.9%)	9 (11.1%)	81 (100%)	72 (93.5%)	5 (6.5%)	77 (100.0%)
Sex						
Men	46 (90.2%)	5 (9.8%)	51 (100%)	40 (93.0%)	3 (7.0%)	43 (100.0%)
Women	26 (86.7%)	4 (13.3%)	30 (100%)	32 (94.1%)	2 (5.9%)	34 (100.0%)
Age						
16 to 35 years	15 (78.9%)	4 (21.1%)	19 (100%)	33 (97.1%)	1 (2.9%)	34 (100.0%)
36 to 50 years	35 (100.0%)	0 (0.0%)	35 (100%)	21 (91.3%)	2 (8.7%)	23 (100.0%)
51 to 65 years	12 (80.0%)	3 (20.0%)	15 (100%)	13 (86.7%)	2 (13.3%)	15 (100.0%)
66 or older	10 (83.3%)	2 (16.7%)	12 (100%)	5 (100.0%)	0 (0.0%)	5 (100.0%)
Ethnicity						
Alaska Native	61 (92.4%)	5 (7.6%)	66 (100%)	65 (94.2%)	4 (5.8%)	69 (100.0%)
Not Alaska Native	7 (63.6%)	4 (36.4%)	11 (100%)	7 (87.5%)	1 (12.5%)	8 (100.0%)
Employment (Annual Averages)						
Months Employed	6.1	4.2	5.9	5.7	4.0	5.6
Earnings	$10,699	$7,942	$10,305	$10,609	$17,500	$10,880
Relationship to Household Heads						
Self	37 (88.1%)	5 (11.9%)	42 (100%)	35 (100.0%)	0 (0.0%)	35 (100.0%)
Spouse/Significant Other	19 (90.5%)	2 (9.5%)	21 (100%)	13 (86.7%)	2 (13.3%)	15 (100.0%)
Son	10 (83.3%)	2 (16.7%)	12 (100%)	13 (81.3%)	3 (18.8%)	16 (100.0%)
Daughter	2 (100.0%)	0 (0.0%)	2 (100%)	7 (100.0%)	0 (0.0%)	7 (100.0%)
Grand Children	3 (100.0%)	0 (0.0%)	3 (100%)	1 (100.0%)	0 (0.0%)	1 (100.0%)
Siblings	1 (100.0%)	0 (0.0%)	1 (100%)	1 (100.0%)	0 (0.0%)	1 (100.0%)
Nephews and Nieces	0 (0.0%)	0 (0.0%)	0 (100%)	2 (100.0%)	0 (0.0%)	2 (100.0%)

harvesting situation in Deering was similar, 6.8 for men and 3.1 for women.

In Wales, 40 percent of the men were named six or more times as harvesters, compared with only 7 percent of the women. In Deering, 42 percent of the men were named six or more times as harvesters, compared with only 15 percent of the women. Twenty percent of the women in the Wales sample were never named as harvesters, compared with only 6 percent of Deering women. That may reflect the marine mammal focus of Wales.

In processing, women predominated. Women in Wales were reported as processors in 4.8 instances per person, compared with 3.6 instances for men. In Deering, women were reported as processors in 7.2 instances, compared with 4.0 for men. Fifty percent of Wales women were named 6 or more times as processors, compared with only 24 percent of the men. In Deering, 61 percent of the women were named 6 or more times as processors, compared with only 32 percent of the men. Field dressing of animals was considered processing in this study. Men's role in processing might have been even less had field dressing not been included.

Men were more often named as distributors than women in both communities (distributors distributed wild food from their own house to another house). In Wales, 47 percent of the men were named as distributors, compared with only 30 percent of the women. In Deering, 63 percent of the men were named as distributors, compared with 56 percent of the women.

Researchers combined harvesting, processing, and distribution instances into a single category of production instances. Considered in the aggregate, similar proportions of men and women were involved at each level of production in both communities (Table 5-1), although the average number of production instances reported for women was less than for men in both communities (Figure 5-3).

These findings reflected both marine mammals' role in the local economies, and male and female roles in subsistence production. Marine mammals almost always were hunted and field dressed by crews of men. Most of the processing of marine mammals was completed by women. Distribution occurred both after field dressing (by men) and after final processing (by women).

All age cohorts were involved in subsistence production. In Wales, the age cohort with the highest rate of participation was the 36-50 year-old cohort (Table 5-1). Every person in that cohort was named at least once as a producer. Participation declined slightly to about 80 percent for the cohorts older than 50 years of age. The age cohort with the lowest rate of participation was aged 16-35; 15 of 19 individuals (78.9 percent) were named as subsistence producers. Nonetheless, production values were uniformly high, even for this young cohort.

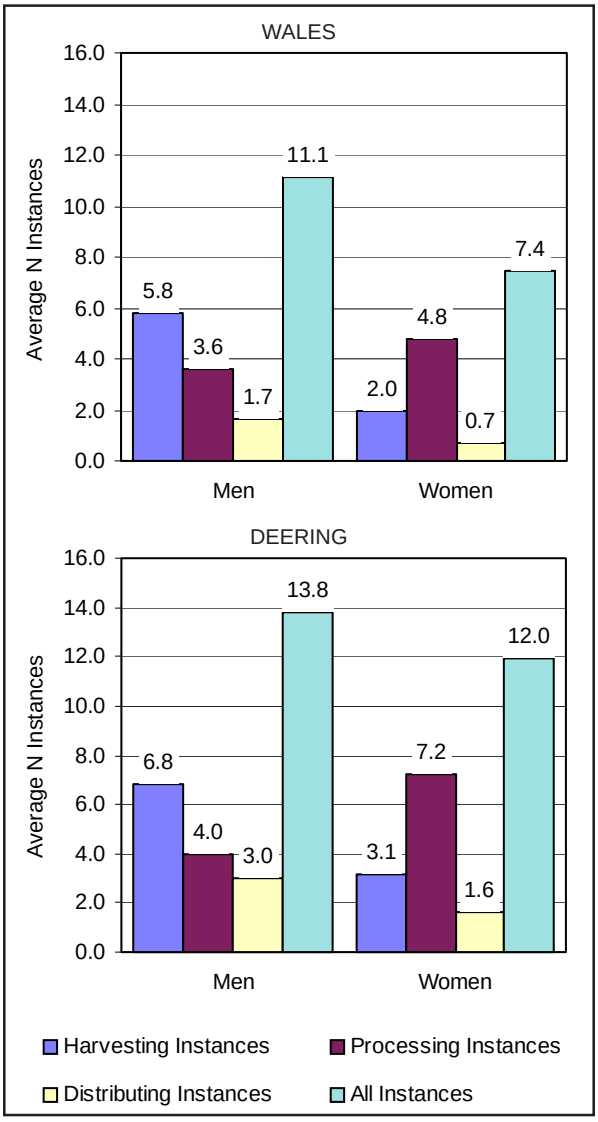

Figure 5-3. Average number of production instances by sex, Wales and Deering, 1994. Men were harvesting and distributing more often; women were processing.

The substantial contribution of the large cohort of 36-50 year-olds in Wales is apparent in Figure 5-4. This cohort comprised 43 percent of the adult population in Wales in 1994. Sixteen of 35 people in the cohort were named 11 or more times. Producers in all age groups were more likely to be named 1 to 5 times or 11 or more times, a bimodal distribution suggesting that although most people participated to some extent in subsistence activities, there were some relatively less active and relatively more active people in all age cohorts. Fewer individuals were named as producers 6 to 10 times for most cohorts.

In Deering, 33 of the 34 people in the 16-35 year-old cohort (97.1 percent) were named as producers (Table 5-1). Participation declined slightly with each successive cohort, except for the elders 66 years old and older, all of whom were named as producers. The contribution of all age cohorts is shown in Figure 5-4. The 11-or-more instances category contained more individuals in every cohort than any other category. A bimodal distribution was most apparent for the youngest cohort, 16-35 years old, where 14 people appeared in the 1-5 instances category.

Production varied by ethnicity in Wales, but not in Deering (Table 5-1). In Wales, 61 of 66 Alaska Natives (92.4 percent) were named as producers, compared with 7 of 11 non-Natives (63.6 percent). Sixty five of 69 Alaska Native adults in Deering (94.2 percent) were named as producers, compared with 7 of 8 non-Alaska Natives (87.5 percent).

One difference between producers and non-producers was the amount of employment and income reported by the two groups. In both communities, people who produced subsistence foods worked almost 2 months more per year than people who did not produce subsistence foods. Producers in the two communities earned almost exactly the same amount, $10,699 and $10,880 (Table 5-1). Non-producers in Wales earned 25 percent less than producers while non-producers in Deering earned 65 per-

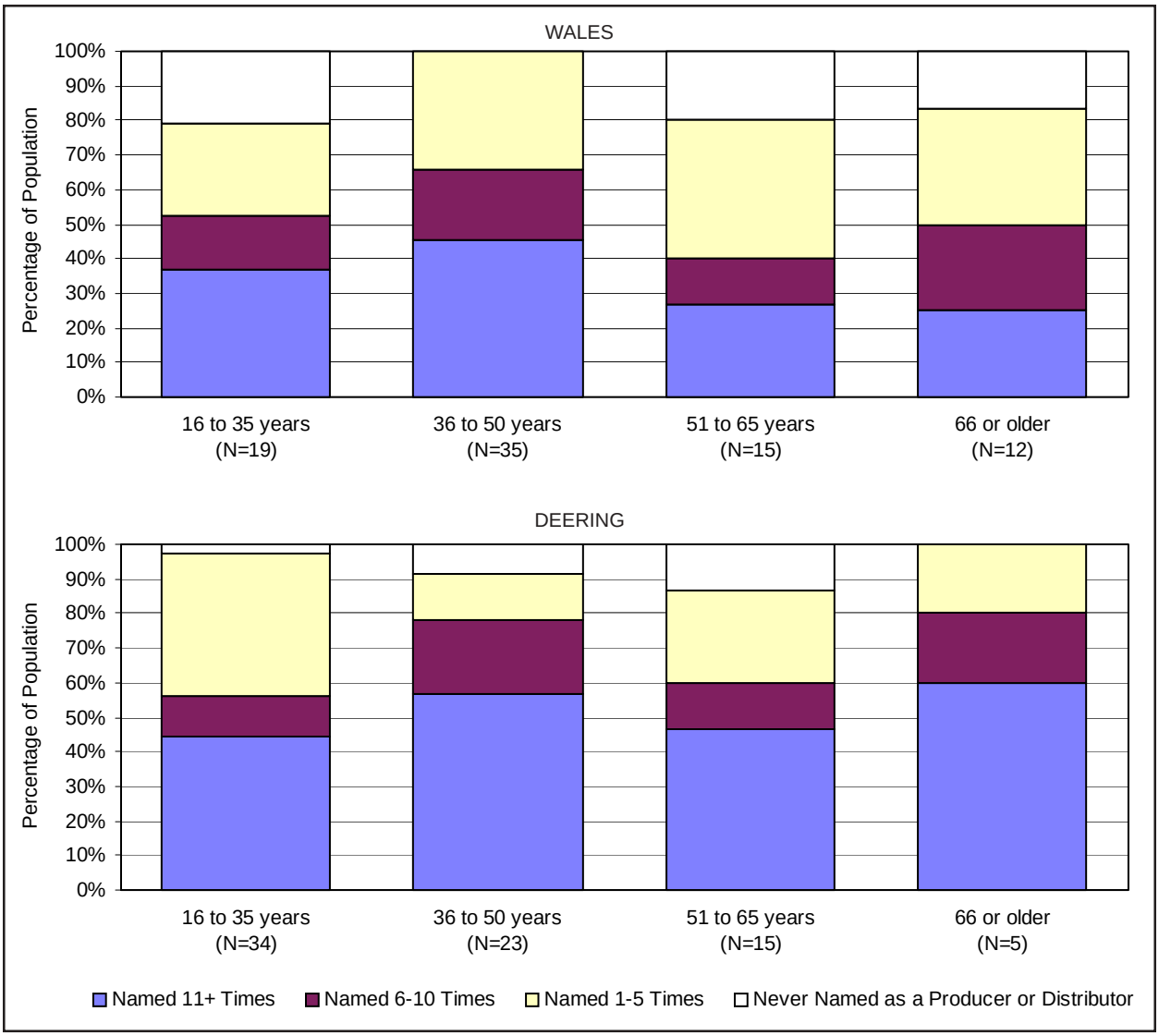

Figure 5-4. Production by age cohorts, Wales and Deering, 1994. In Wales, every person in the large 36-50 year cohort was named as a producer, and 46 percent were in the 11+ instances category. In Deering, every person 66 years or older was named as a producer, although there were only five people in the cohort.

cent more, but the samples were small. In Deering, three of the five non-producer individuals had missing earnings data, and in Wales, one of the non-producers was a new teacher who had been a student during most of the study year. So earnings comparisons between producers and non-producers were not meaningful.

Figure 5-5 shows average months employed and earnings by producer category (non-producers were excluded because of the exceedingly small cohort of non-producers in Deering). In Wales, all cohorts reported a similar number of months employed, while in Deering the 1-5 instances cohort reported less than half the number of months employed. In both communities, producers in the 6-10 instances category reported the highest average annual earnings. Mean monthly incomes for each cohort ranged from about $1,600 to about $2,500, with the 6-10 instances cohort reporting the highest monthly earnings in Wales, $2,091, and the 1-5 instances cohort reporting the highest monthly earnings in Deering, $2,509.

In both communities, the 11+ instances cohort reported the lowest monthly earnings. Seeing this, researchers wondered if frequently reported harvesters had more irregular employment patterns. But

this did not appear to be true. In Wales, 75 percent of the most frequently named producers reported employment each month of the year. More seasonal variation in employment was observed among the less frequently named producers, who were less likely to be employed during June and July, a pattern consistent with school employment.

So it did not appear that the most frequently reported producers were irregularly employed. They were employed to same degree as other individuals, they simply earned less for it.

Researchers examined the characteristics of the individuals named most frequently as producers (Table 5-2). In Wales, all ten of the most frequently named producers were men; seven were between 36 and 50 years of age and seven were heads of households. All had lived in Wales for more than 15 years, and all but one were identified as an Alaska Native. Income data were missing for four individuals; the remainder reported average annual earnings of $11,604. At least eight were employed, and most had at least a high school education.

In Deering, the ten most frequently named producers included seven men and three women (Table 5-2). Eight were heads of households or spouses; one was a son. All were Alaska Native. Four reported no earnings, a greater number than in Wales. The average earnings reported was $7,163. At least four were employed, and one was retired.

In Wales, nine individuals were not named as

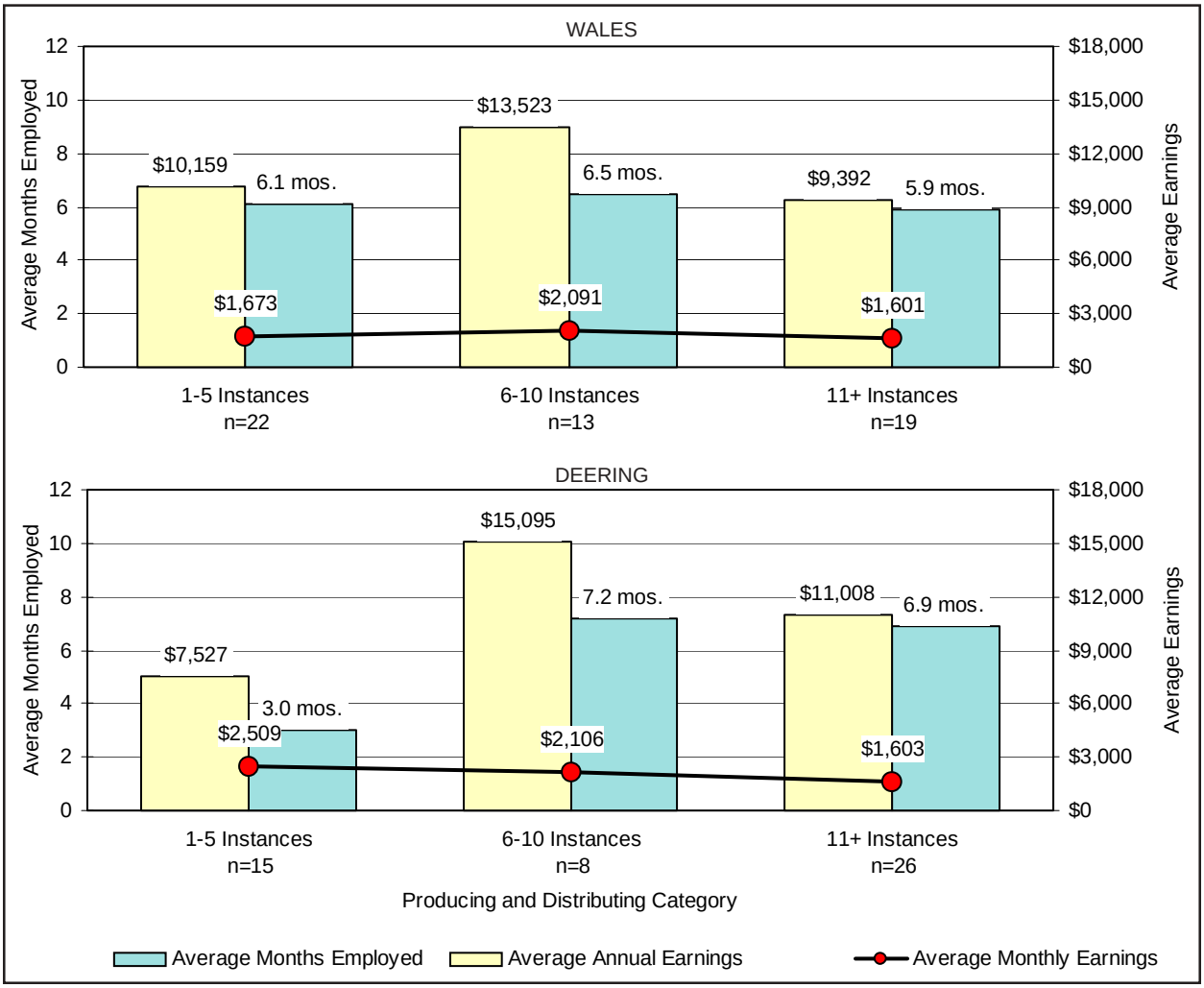

Figure 5-5. Average months employed and average earnings by producing instances category, Wales and Deering 1994. All producers in Wales worked about six months (top), but producers in the 6-10 instances category had significantly higher average monthly earnings. In Deering, average earnings declined as production increased.

TABLE 5-2. INDIVIDUALS NAMED MOST OFTEN AND INDIVIDUALS NEVER NAMED AS PRODUCERS, WALES AND DEERING, 1994

Production Instances	Sex	Age Category	Relationship to Head	Ethnicity	Years in Community	Earnings	Years of Education	Employment Status
WALES INDIVIDUALS NAMED MOST OFTEN AS PRODUCERS								
54	male	51 to 65 years	Self	Alaska Native	15 +	Missing	Some College	Employed
43	male	36 to 50 years	Self	Alaska Native	15 +	Missing	High School Completed	Missing
29	male	36 to 50 years	Self	Alaska Native	15 +	$18,000	Some High School	Employed
28	male	36 to 50 years	Son	Missing	15 +	Missing	High School Completed	Employed
27	male	16 to 35 years	Self	Alaska Native	15 +	$22,000	High School Completed	Employed
27	male	51 to 65 years	Self	Alaska Native	15 +	$3,000	Some College	Employed
25	male	36 to 50 years	Son	Alaska Native	15 +	$5,400	High School Completed	Employed
25	male	36 to 50 years	Self	Alaska Native	15 +	$9,225	Some College	Employed
25	male	36 to 50 years	Brother	Alaska Native	15 +	Missing	Missing	Missing
24	male	36 to 50 years	Self	Alaska Native	15 +	$12,000	High School Completed	Employed
WALES INDIVIDUALS NEVER NAMED AS PRODUCERS								
0	male	51 to 65	Self	Alaska Native	15 +	$0	8 or Less	Not in WF
0	male	16 to 35	Son	Alaska Native	15 +	$18,000	High School Completed	Employed
0	female	66 or older	Self	Alaska Native	15 +	$0	8 or Less	Retired
0	male	66 or older	Self	Alaska Native	15 +	$0	Missing	Retired
0	female	16 to 35	Spouse	Alaska Native	15 +	$11,980	High School Completed	Employed
0	female	16 to 35	Self	Not Native	0 to 3	$30,000	4 Years College/BA/BS	Employed
0	male	16 to 35	Son	Not Native	0 to 3	$0	Education Not Complete	Not in WF
0	male	51 to 65	Self	Not Native	0 to 3	$10,000	4 Years College/BA/BS	Employed
0	female	51 to 65	Spouse	Not Native	0 to 3	$1,500	Post Baccalaureate	Employed
DEERING INDIVIDUALS NAMED MOST OFTEN AS PRODUCERS								
61	male	36 to 50 years	Self	Alaska Native	15 +	$24,500	High School Completed	Employed
47	male	51 to 65 years	Self	Alaska Native	15 +	Missing	High School Completed	Missing
43	male	36 to 50 years	Self	Alaska Native	Missing	$0	Some High School	Unemployed
38	male	16 to 35 years	Self	Alaska Native	15 +	Missing	Some High School	Missing
37	male	16 to 35 years	Son	Alaska Native	15 +	$10,000	Some College	Employed
32	female	66 or older	Self	Alaska Native	15 +	$0	8 or Less	Homemaker
27	female	36 to 50 years	Spouse	Alaska Native	Missing	$21,600	Some College	Employed
26	male	16 to 35 years	Self	Alaska Native	15 +	$0	High School Completed	Unemployed
26	male	16 to 35 years	Self	Alaska Native	15 +	$1,200	High School Completed	Employed
25	female	51 to 65 years	Self	Alaska Native	15 +	$0	8 or Less	Retired
DEERING INDIVIDUALS NEVER NAMED AS PRODUCERS								
0	female	36 to 50	Spouse	Alaska Native	Missing	Missing	High School Completed	Employed
0	male	16 to 35	Son	Alaska Native	Missing	Missing	High School Completed	Missing
0	female	51 to 65	Spouse	Not Native	0 to 3	$35,000	Post Baccalaureate	Employed
0	male	36 to 50	Son	Alaska Native	Missing	Missing	Some College	Missing
0	male	51 to 65	Son	Alaska Native	15 +	$0	Some High School	Not in WF

producers by any households, including their own (Table 5-3). The non-producers included five men and four women. They tended to be in either younger or older cohorts and to have either less or more education than the most frequently named producers. Four were non-Natives who had lived in Wales three years or less. The Alaska Natives in this group included two elders, retired from the workforce. In Deering, five individuals were not named as producers; three men and two women (Table 5-3). All adult cohorts were represented, except elders. Three were sons; two were spouses. All but one were Alaska Native.

In sum, most individuals in the study communities were named as producers in the subsistence sector, but in different degrees. Frequent instances of production were reported for adults of all ages, including elders. The labor of harvesting and pro-

TABLE 5-3. CHARACTERISTICS OF TEACHERS AND OTHER ADULTS, WALES AND DEERING, 1994

	WALES			DEERING		
	Teacher Military	Other Adults	All	Teacher Military	Other Adults	All
Total Number of Adults in Sample	9	72	81	6	71	77
Ethnicity						
Alaska Native	0	66	66	0	69	69
Not Alaska Native	9	2	11	6	2	8
Average Age (Years)	46.7	45.3	45.4	47.6	40.2	40.8
Average Number of Years in Community	2.0	35.3	31.6	5.4	27.7	25.7
Employment (Adults Only)						
Average Months Employed	5.0	6.0	5.9	7.5	5.5	5.6
Average Annual Earnings	$21,944	$8,365	$10,305	$37,324	$7,354	$10,880
Participation in Harvesting (Adults Only)						
Did you hunt game?	11 %	58 %	53 %	17 %	68 %	64 %
Did you fish?	44 %	78 %	74 %	33 %	85 %	81 %
Did you trap furbearers?	11 %	14 %	14 %	0 %	20 %	18 %
Did you gather plants?	22 %	53 %	49 %	50 %	78 %	75 %
Did you harvest any wild resource?	44 %	89 %	84 %	67 %	94 %	92 %
Participation in Processing (Adults Only)						
Did you process game?	33 %	71 %	67 %	67 %	89 %	87 %
Did you process fish?	56 %	75 %	73 %	100 %	86 %	87 %
Did you process fur?	11 %	17 %	16 %	17 %	24 %	23 %
Did you process plants?	22 %	53 %	49 %	50 %	75 %	73 %
Did you process any wild resource?	67 %	90 %	88 %	100 %	94 %	95 %

cessing was allocated, to some extent, between men and women respectively, but the same proportions of women as men were named as producers. The individuals named most frequently as producers were Alaska Natives who had lived in the study communities many years.

The Teacher Factor

Professional employment in education was associated with a number of demographic, economic, and production variables. As a group, certified teachers and administrators had lived in the study communities for only a few years, were born outside Alaska, and reported high earnings relative to other adults. In Wales, there were also several individuals employed by the U.S. military with demographic and economic characteristics similar to teachers. Reports of harvesting, processing, and distribution by teachers and military personnel were substantially less than for other adults in the community.

To explore these differences, researchers grouped adults into two categories: (1) "teachers" which included professional educators and military personnel and (2) "other adults." Table 5-3 presents some comparisons between teachers and other adults in Wales and Deering.

None of the teachers in Wales and Deering were Alaska Natives at the time of the study. Teachers had lived in Wales for an average of only 2.0 years, compared with 35.3 years for other adults. Teachers had lived in Deering for 5.4 years, compared with 27.7 years for other adults, and all teachers had been born outside Alaska.

Teachers were employed for more months than other adults, but not as many months as were expected. Some teachers reported only a few months employment and earnings during the study year, presumably because they had been students themselves or were not working prior to the current school year. On average, teachers reported only one month more employment than other adults in Wales, and two months more employment in Deering.

Nonetheless, the differences in earnings between teachers and other adults was considerable. Teach-

ers, on average, earned more than three times as much as other adults in Wales, and more than eight times as much as other adults in Deering.

Substantial differences also were observed in the reports of harvesting, processing, and distribution of wild foods. In Wales, 4 of 9 teachers (44 percent) were named as harvesters, compared with 67 of 71 other adults (94 percent). In Deering, 4 of 6 teachers (67 percent) were named as harvesters, compared with 64 of 72 other adults (89 percent).

Differences in participation were greater in Wales than in Deering. That could be explained partly by prohibitions on non-Native hunting of marine mammals, which provided nearly 80 percent of Wales' subsistence diet. Teachers, all non-Natives, could not legally hunt marine mammals.

Substantial differences were evident in the frequency of production reports. In Wales, of the 819 instances of production in the sample, teachers accounted for only 17 instances of production (2 percent), or an average of 1.9 instances per person. Other Wales adults accounted for a total of 802 instances (98 percent), or an average 11.3 instances per person. Teachers accounted for only 0.9 and 1.0 instances of harvesting and processing each, on the average, compared with 5.0 and 4.6 instances by other adults.

In Deering, of the 1,002 instances of production, teachers accounted for 28 (3 percent), or an average of 4.7 instances per person. Other Deering adults accounted for a total of 974 instances (97 percent), or an average of 13.7 instances per person. Teachers accounted for 1.3 and 3.3 instances of harvesting and processing each, on average, compared with 5.5 and 5.6 instances by other adults.

The difference in distribution of wild food between households or "sharing," was even more substantial. In Wales, 110 total distribution instances were reported for other adults while not one distribution instance was reported in the entire sample for a teacher, even by other teacher households. In addition, there were no reports of harvesting or processing by a Wales teacher for a household other than his or her own household. More than 40 percent of the producing instances reported for other adults in Wales were for other households.

In Deering, 184 total distribution instances were reported for other adults and, again, not one distribution instance was reported for a teacher. Teachers in Deering were reported twice as harvesters or processors by other households in the community. By comparison, over half of the producing instances reported for other adults in Deering were for other households. Either teachers' production was not recognized by other households in the community or teachers were not producing wild foods for households other than their own.

Thus, the teacher component of the sample population consisted primarily of mature working adults without families, recently moved to the study communities, and originally from outside Alaska. Most teachers and military personnel did not consider the study communities to be their permanent homes, unless they were married to an Alaska Native resident. Although a majority participated in hunting and fishing, their harvests of wild foods were consumed essentially within their own households. Most teachers were not integrated into the system of production and distribution of wild resources in Wales and Deering. Their short tenures and lack of kinship ties in the communities, and the demands of their jobs probably contributed to the infrequent reports of production.

In contrast, the other adults in the sample populations included people of all ages, many of them related to one another by kinship, most of whom had been born in Alaska, many in the study communities themselves. They had lived more than half their lives in one of the study communities, and considered them to be their permanent home. Most, though not all, participated in hunting and fishing, and more than half were named by other households in the study community as harvesters, processors, or distributors.

In this study, researchers were interested in describing the production and distribution of wild foods in the study communities. Because teachers and military personnel were so different from other adults in the study communities demographically and economically, researchers sometimes excluded teachers and military personnel from the analyses in this study. When teachers were excluded, the discussion will note their exclusion.

6
Production by Households

The harvest of wild foods for subsistence was a defining feature of the two study communities. Every household surveyed in Deering reported using wild foods, and 91.9 percent harvested wild food for themselves or for others. In Wales, 92.9 percent of the households surveyed reported using wild foods, and 88.1 harvested at least one kind of wild food in the study year. As has been observed in many communities, 30 percent of the households produced 70 percent or more of the harvest (Figure 6-1).

This chapter explores survey data from the perspective of the household. The first section discusses some characteristics of the households in the study communities. Then a model of household development is used to construct a model of household subsistence production, and to explore some of the differences observed in subsistence productivity in Wales and Deering. The final section discusses active single-person households. These households, which are not accommodated in the subsistence productivity model, were the most productive type of household on a per capita basis.

Subsistence Harvest Patterns

Household harvests, incomes, and demographic composition varied widely in both communities. Professional employment as a teacher or in the military was strongly associated with variables basic to analyses in this study, particularly household harvest. Teacher households in Deering harvested only 30 pounds of wild food, on average, compared with 2,449 pounds for other households, a difference of

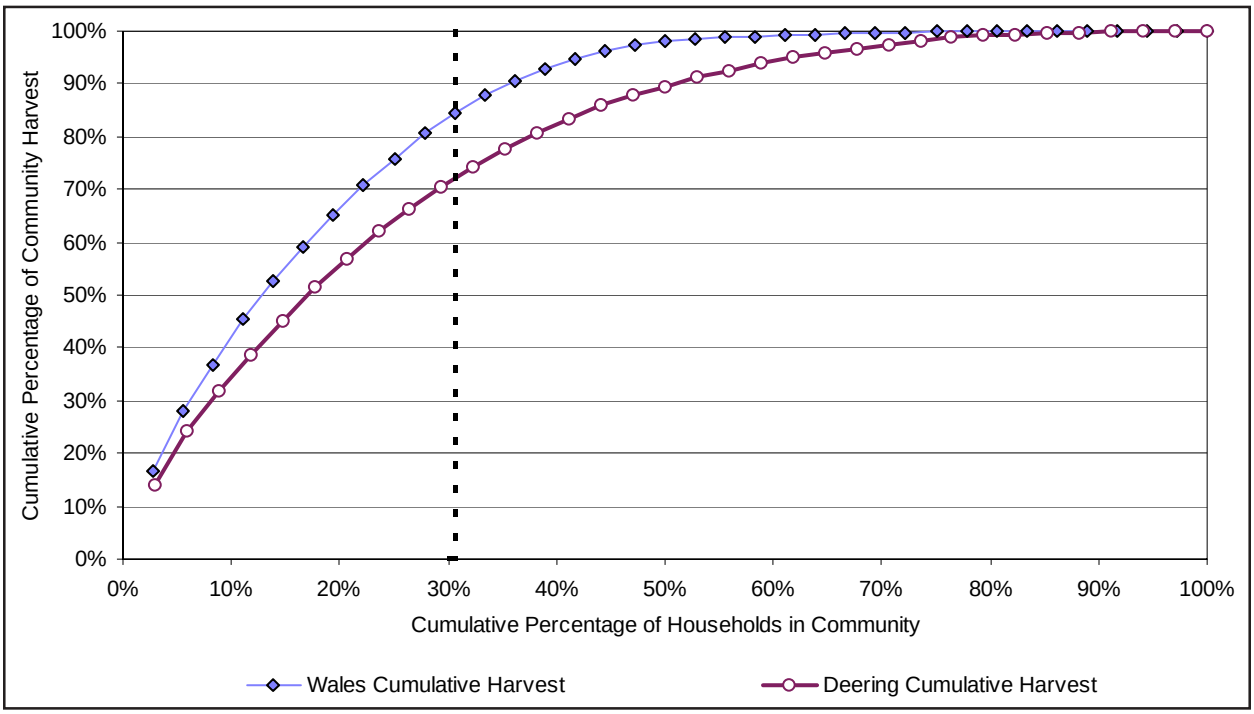

Figure 6-1. Cumulative household harvests, Wales and Deering, 1994. Household harvest data for each community were sorted from highest to lowest, then cumulative totals were calculated. Overall, Wales and Deering resembled many other rural Alaska communities, where 30 percent of the households accounted for 70 percent of the community harvest. The steeper Wales curve is a result of the contribution of four households that harvested a bowhead whale.

TABLE 6-1. CHARACTERISTICS OF HIGH HARVEST HOUSEHOLDS IN DEERING AND WALES, 1994.

	Wales (N=8)			Deering (N=10)		
	Minimum	Average	Maximum	Minimum	Average	Maximum
Demographics						
Household Size (number of people)	1	4.5	9	1	4	9
Maximum Years in Community (For Any HH Member)	16.5	43.6	74.0	23.4	37.6	65.2
Age of Male HH Head	26.5	43.2	52.0	23.4	47.0	63.4
Age of Female HH Head	34.7	48.3	74.0	27.1	58.8	83.3
Subsistence Producivity						
Household Harvest (Total Edible Pounds)	5,096	8,407	15,786	3,443	5,879	11,573
Number of Resource Species Used	18	31	49	15	27	42
Employment and Income						
Number of Adults Employed	1	1.375	2	0	1.7	4
Total Number of Jobs	1	2.125	4	0	2.5	7
Total Months Employed by Adults	12	15.125	24	0	12.1	28
Household Income (Wages Only)	$8,000	$24,396	$50,119	$0	$16,423	$42,200
Total Household Income	$10,952	$34,325	$70,044	$1,309	$26,986	$65,549

NOTE: Table includes only high harvesting households, which accounted for 70 percent of the total community wild food harvest

almost two orders of magnitude. Teacher households in Wales harvested even less, only 16 pounds of wild food, compared with 2,643 pounds for other Wales households. There were other significant associations, as well. Teacher households' average length of residency was only 2.9 years, compared with 37.6 years for other households. Teacher households were 54 percent smaller than other households, but had 46 percent more total income, which translated into approximately four times as much income per capita.

This report focused on the harvest of wild foods, and explored relationships between harvests and other variables. Differences between teacher and non-teacher households were so great as to potentially obscure significant relationships for the rest of the households. Consequently, teacher households were not included in the analyses in this chapter unless a teacher had married into the community. Without teacher households, the sample included 36 households in Wales and 34 households in Deering.

Previous research has shown that in many rural Alaska communities 30 percent of the households commonly generate 70 percent or more of the subsistence harvest; the phenomenon has been termed the "30:70 rule" (Wolfe 1987). Wales and Deering offered further support for the 30:70 rule (Figure 6-1). In Deering, the ten highest harvesting households (29.4 percent of the sampled households) provided 70.6 percent of the total harvest. In Wales, the eleven highest harvesting households (30.6 percent of the sampled households) provided 84.5 percent of the total community harvest.

The substantial contribution of relatively few households in Wales was partly the result of whaling. Four households participated in the harvest of a bowhead whale during the study year. But even when bowhead harvests were removed, the ten high harvesting households accounted for 83.3 percent of the total harvest.

One possible explanation for this greater specialization in household productivity at Wales compared with Deering was that Wales' harvest was primarily marine mammals, while Deering harvested land mammals, marine mammals, and fish in similar proportions. Compared to land mammals and fish, harvesting marine mammals required a substantial investment in equipment and the organization of a crew, which was successfully accomplished by fewer households.

Researchers examined the eight households in Wales that were responsible for 70 percent of the harvest. They included four nuclear families, one joint family, two single individuals, and one single-parent household (an elder woman living with three adult sons). Researchers also examined the ten households in Deering that were responsible for 70 percent of the harvest. They included four stem families (three or more generations), three single individuals, two single-parent families, and only one

nuclear family. Characteristics of these households are summarized in Table 6-1.

Comparing Table 6-1 with Table 4-1, the high-producing households were, on the average, larger than other households and had slightly longer residency in the study community. Harvests, by definition, were larger than other households and, as would be expected, the number of species used was 50 percent larger. High producing households had higher than average incomes in Wales, but lower than average incomes in Deering.

Figure 6-2 shows the mean income and mean harvests per household for three income sectors of the communities. In Wales, households in the top and middle sectors harvested 3,652 pounds and 3,172 pounds respectively, while households in the bottom income sector harvested an average of only 949 pounds, 68 percent less than the average of the other two sectors. In Deering, a bimodal pattern emerged (Figure 6-2, bottom). The average harvests in the middle income sector were 39 percent less than in the other two sectors. So while Wales data suggested a positive linear relationship might exist between income and harvests, Deering data indicated that a relationship, if one existed, was not linear.

In both communities, high harvesting households could be found into all three income sectors. For example, the household with the third highest income in Wales reported the sixth highest subsistence harvest, 6,212 pounds. This four-person household was headed by an elder Native and included

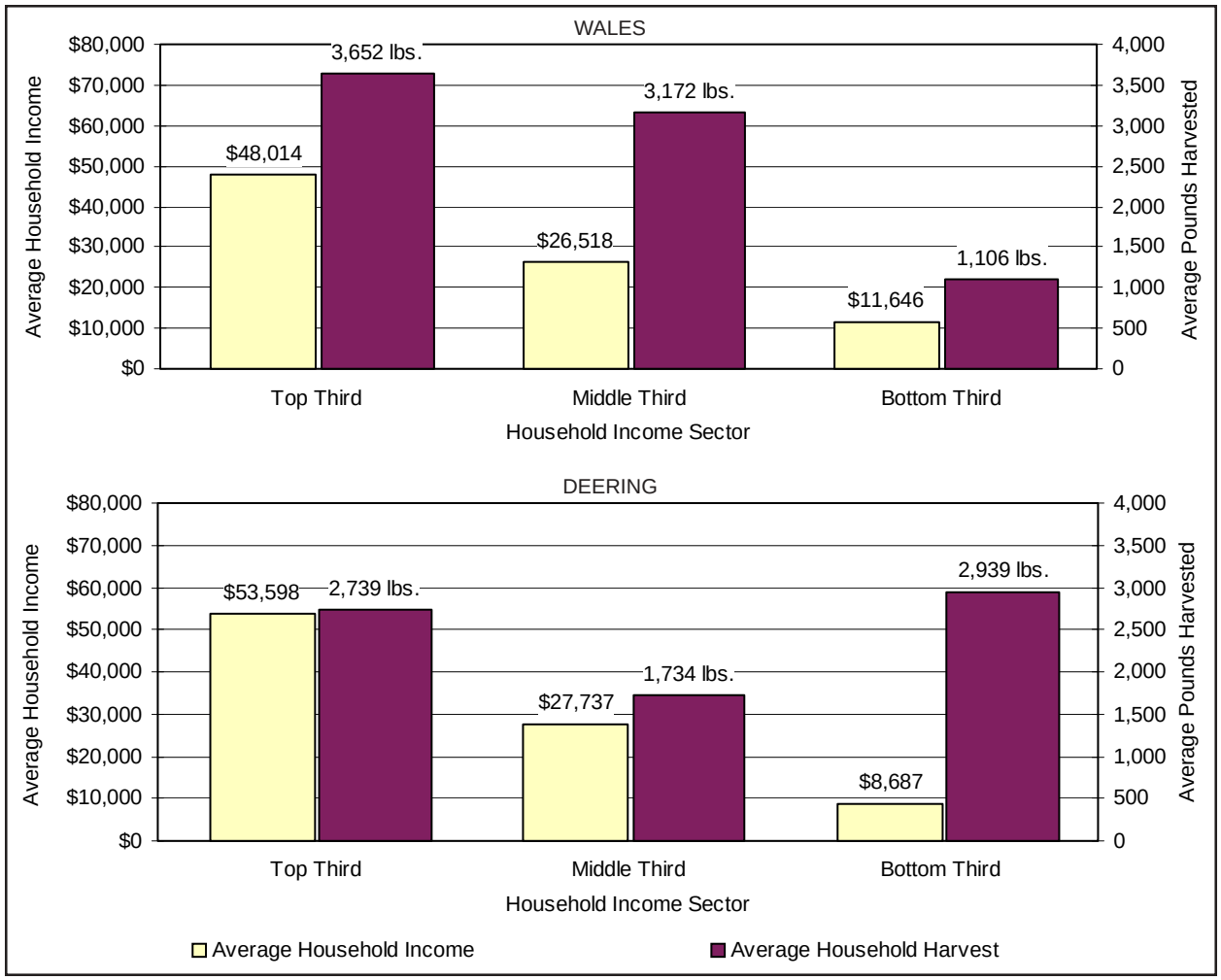

Figure 6-2. Mean household incomes and harvests by income sector. Patterns of incomes and harvests were different in the two communities. In Wales, households in the bottom income sector reported much lower harvests than the other sectors. In Deering, households in the bottom sector were very productive. Teacher and military households excluded.

three adult sons, two of whom had year-round employment. The three sons were all active subsistence producers; together they accounted for 56 instances of production and were reported as producers by five households other than their own.

On the other hand, the household with the tenth lowest income in Wales, a single man, was the sixteenth highest producer, harvesting 1,656 pounds of food. He was named as a subsistence producer by 18 other households in the community, and accounted for 54 instances of production, the highest number of instances reported for any individual in the Wales sample.

Obviously, there were substantial differences among households in Deering and Wales in subsistence production levels, distribution of subsistence resources, and wage incomes. What factors accounted for these differences? Why were some households low producers of wild foods and others high? What was the relationship between subsistence harvesting and the distribution network? How was wage income earned by households in the commercial-wage sector related to subsistence productivity, if at all?

Household Development Model

Subsistence productivity by households may be explained in part by "household development", that is, by the social configuration of a household as it "matures" over time (Wolfe et al 1984; Sumida 1988; Sumida and Alexander 1986; Andrews 1988). Just as individuals mature, households may mature following a normative developmental cycle. As the social configuration of a household changes over time, so may the subsistence productivity of the household and its place in the subsistence distribution system.

According to this model, as a household matures over time, its labor force commonly increases in age, number of members, skills, and social responsibilities within the community. The increasing labor capabilities of maturing households may enable greater subsistence productivity, so subsistence production may be related to household maturation. At some point, as the household matures further, adult children may leave to establish their own households, starting the household cycle once again. The households of elders may or may not "retire" from the system of production, depending upon the household's social configuration and the health of the elder.

While this normative cycle is followed by many households, other households may follow other paths, such as households of single mothers with young children, or households of persons with disabling conditions. These household types may not have the labor to effectively produce subsistence products. According to this model, having developed outside the normative cycle, these households may be more likely to be lower producers in the subsistence sector of the local economy.

To explore the household development model, households in Deering and Wales were categorized into five social types and given a ranked number to reflect their place in a maturational cycle:

1 Single parents with dependent children, retired elders, and inactive single-person households were combined into one group ("Single Parent-Retired Elders-Inactive Single").

2 Households with heads 20-39 years of age were combined ("Developing Households").

3 Households with heads 40-59 years of age were combined ("Mature Household").

4 Households with heads 60 years or more and still active were combined ("Active Elder").

5 Active single-person households were combined ("Active Single").

Overall, the frequency of household types were as follows: Single Parent-Retired Elder-Inactive Single (n=23, 33 percent), Developing Households (n=14, 20 percent), Mature Households (n=16, 23 percent), Active Elder Households (n=9, 13 percent), and Active Single (n=8, 11 percent). The frequency of each household type was similar in each community (Figure 6-3). The households of seasonally-resident teachers were removed from the data set in order to eliminate confounding factors obscuring relationships within the local socioeconomic system. The combined data set without seasonally-resident teacher households contained 70 households, 34 in Deering and 36 in Wales.

Subsistence Productivity Model

Figure 6-4 shows household subsistence harvests by households grouped in the five developmental

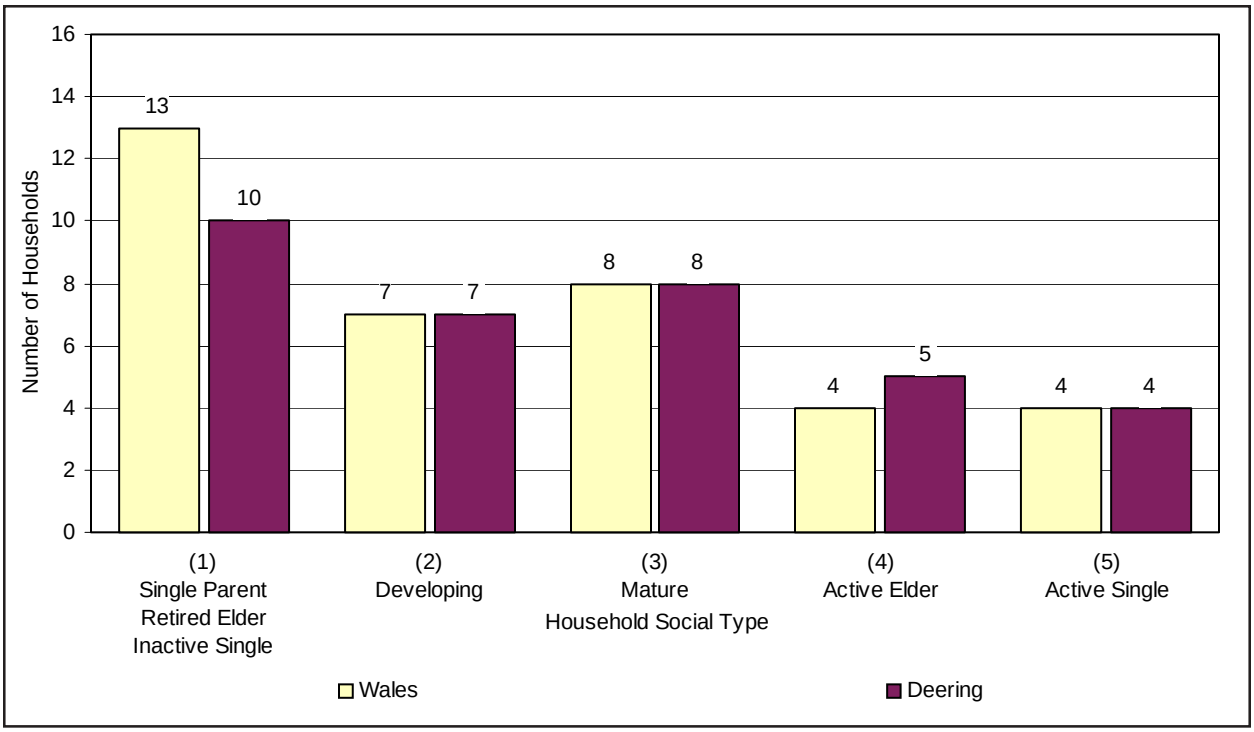

Figure 6-3. Number of household social types by community. The number of households in each social type was similar in Wales and Deering. Numbers (in parentheses) reflected rank in a maturational cycle. Developing households had heads 20-39 years of age; mature households, 40-59 years of age; and retired households, 60 years or more. Some households, such as retired elder and active single person households, did not follow this maturational cycle.

types. The figure depicts the harvest mean (the solid black line), harvest range (the outer brackets), and the 95th percentile range (the box, representing 95 percent of all household harvests) for each group. As predicted by the developmental cycle model, mean harvests increased with the maturity of the household – Developing Households (20-39 years of age) at 1,756 lbs.; Mature Households (40-59 years of age) at 2,987 lbs.; and Active Elders (60+ years of age) at 3,816 lbs. The lowest mean harvest (185 lbs.) was found in the first group containing 23 households of single mothers with dependent children, inactive single-person households, and households of retired elders. The highest mean harvest (4,844 lbs.) was found in the active single-person household, an unexpected finding which is discussed further below. With the active single-person household as the exception, on average subsistence production levels increased with the maturation of the household, presumably because of factors such as older and larger workforces with greater skills and social responsibilities.

Figure 6-4 also shows that, with the exception of the first household type, there is substantial variation in the subsistence harvest levels within each household type. The variation indicates that other factors must be related to subsistence productivity in addition to the age of the household head or the completeness of the household's workforce. Other factors potentially influencing subsistence productivity include household size, income, education levels, and employment levels.

To analyze the potential relationships among factors like these, surveyed households were combined into a single data set. For this analysis, households of teachers were excluded. Active single-person households, a household type that is discussed separately below, were also excluded. Correlations were calculated between variables, including household size, age of household heads, household maturity, level of education within the household, months employed, wage income, total subsistence harvests without bowhead whale (in pounds), number of resource categories ("resources") harvested, resources used, resources given away by the household, and resources received by the household. Significant correlations (<.05) were identified. Figure 6-5 summarizes the significant relationships between these

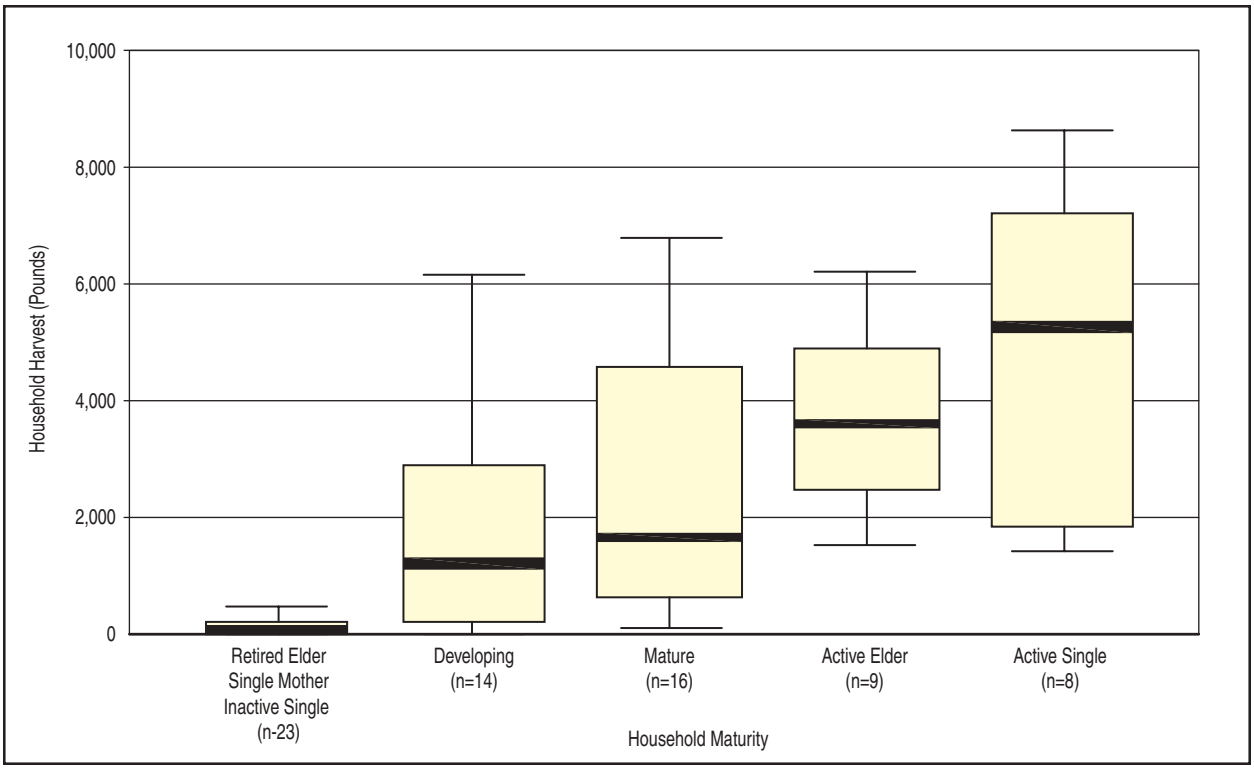

Figure 6-4. Household harvests by household social types, Wales and Deering. The horizontal lines show the minimum, average, and maximum harvests per household for five household types. Ninety five percent of the harvests fell within the shaded boxes. The household development model predicts that as households mature, subsistence production will increase. That held true for developing, mature, and active elder households, but not for active single households.

types of variables, placed into a model. Arrows in the model display the likely direction of causality between variables.

As shown in Figure 6-5, the household characteristic most strongly associated with subsistence productivity was "household maturity" in the developmental cycle. A household's subsistence production increased as the household matured over time (r = .601, sig. <.01). Household size (number of people in a household) also was strongly associated with subsistence productivity (r = .550, sig.<.01). As a household increased in size, so did subsistence production. Household size can reflect the size of the labor force for subsistence production, as well as the number of mouths to feed in a household. There was a strong relationship between household maturity and household size (r = .526, sig. <.01). The relationship between household maturity and per capita subsistence productivity was also strong (r = .514, sig. <.01), indicating that statistically compensating for effects of household size only slightly reduced the positive correlation between the two factors.

Taken together, these two variables (household maturity and household size), accounted for 50.4 percent of the household variation in subsistence production (multiple correlation of r = .710). These findings support the predictions of the household developmental cycle model, stated above.

A household's wage income was related to four household characteristics: the household's education level (the highest level of education in the household, measured by the number of years of schooling), months employed (the total number of months that household members held wage-paying jobs), household size, and household maturity. Residents with more education were more likely to work at higher-paying wage jobs in the community. Larger households contained more employable members, who worked more months, and earned more household income compared with smaller households. There was a moderate positive relationship between household maturity and wage income (r = .333, sig. <.05), indicating that a household's wage income tended to increase as a household matured through the developmental cycle.

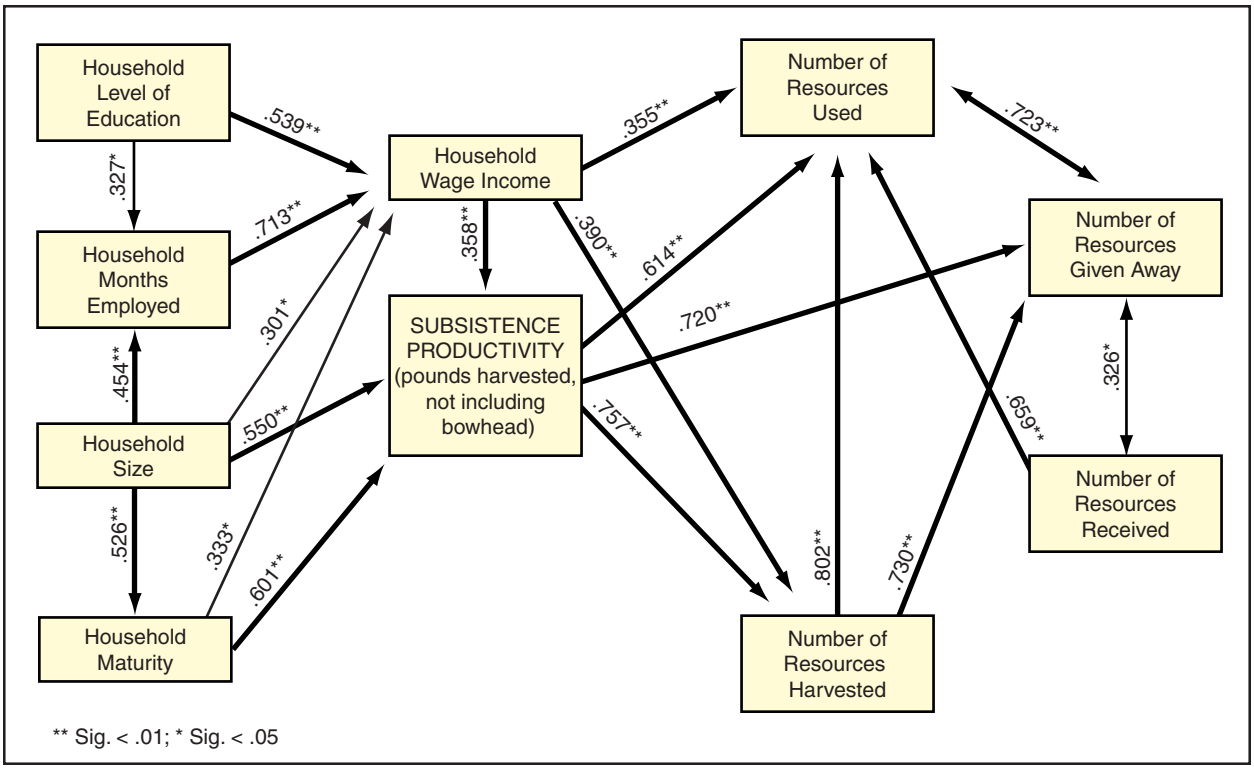

Figure 6-5. Subsistence productivity model. As expected, the number of resources harvested, used, given away, and received (on the right of the diagram) were strongly related to subistence productivity(pounds harvested per household). Of the other variables such as household educational level, employment, and size, household maturity (stages in a household development cycle) was the strongest predictor of productivity in Wales and Deering.

Figure 6-5 depicts the relationship of the wage income and subsistence productivity for households in Deering and Wales. There was a moderately strong, positive relationship between household wage income and household subsistence productivity (r = .358, sig.<.01). As wage income increased, so did a household's subsistence production. This relationship was consistent with findings in other small communities in western Alaska (Wolfe 1984, Wolfe et al 1984) and interior Alaska (Sumida 1988:70; Sumida and Alexander 1986:39; Andrews 1988:281). These studies found positive relationships between subsistence production and monetary income at the household level, particularly if employment (such as seasonal work and commercial fishing) allowed time for household members to hunt and fish. Monetary income can be used by productive households to purchase and operate equipment for subsistence harvesting. The mature labor force that increases a household's income through wage employment can be used for productive employment in the subsistence sector. The relationships in Figure 6-5 suggest that in general, households were using income to capitalize in the subsistence sector of the local economy, through the purchase and operation of equipment for harvesting wild foods. It also suggested that the same household factors related to success in the subsistence sector (maturity and size of the work force) were also related to success in the wage sector of the local economy. Rather than competing, subsistence and wage employment appeared to be mutually supportive at the household level in Deering and Wales in 1994.

As shown in the model, household subsistence productivity was strongly related to a set of variables measuring the use and distribution of subsistence resources. As a household's subsistence productivity increased (total harvests in pounds), so did the number of different types of resources a household harvested (r = .757, sig.<.01). Similarly, the variety of resources used by a household increased with subsistence productivity and the number of resources harvested by a household. These were expected relationships. As a household's harvest

volume increased, so did the types of resources harvested and used.

In subsistence distribution networks, households who gave a greater range of resources to other households were households with larger total harvests, more diverse resource harvests, and more diverse resource uses. The model showed that the more a household produced, the more a household was a giver to others. Resources flowed out from the high producers, and did not flow out as much from low producers. Household maturity and giving also were associated ($r = .515$, sig.<.01); as households matured, giving increased. In contrast, there were no strong predictors of which households received subsistence products in this model. Households with larger subsistence harvests did not receive greater or fewer types of resources from other households ($r = .120$, ns). This may be because receiving was more ubiquitous than giving. While giving flowed out from high producers, households of all stripes were receivers.

There was a moderate association between giving and receiving ($r = .326$, sig.<.01). Households who gave a greater variety of products also tended to receive a greater variety of products. This association may reflect reciprocity in subsistence distribution: a gift given may stimulate a return. If also may reflect the level of reciprocal giving and receiving within a household's extended family group, a pattern discussed in the next chapter. Some family groups had more types of subsistence goods flowing back and forth between households than did other family groups.

Household wage income also was positively associated with the number of resources harvested ($r = .614$, sig.<.01) and used ($r = .355$, sig.<.01). In general, households with higher wage incomes harvested and used a greater breadth of wild resources than households with lower incomes. There appeared no significant relationships between household wage income and resources given ($r = .102$, ns) and resources received ($r = .003$, ns).

Overall, the statistical model provided considerable insight as to which households were high subsistence producers and which households were low subsistence producers in Deering and Wales in 1994. A household's level of subsistence productivity was partially explained by household size: as household's increased in size, so did the volume of subsistence harvests. Of even greater importance, the place of a household in a developmental cycle accounted for the household's productivity. As households matured, their labor forces increased in age, size, skills, and social responsibilities. Subsistence harvests increased with this social maturation. Subsistence harvests were lowest when a household had incomplete or disabled labor, such as households of single mothers with children, households of retired elders, and households of inactive single men. The measures of household size and household maturity together accounted for about half of the variation in household subsistence productivity. This meant that other factors also underlay household subsistence production in Deering and Wales in 1994. While not a complete explanation, the household developmental cycle appeared to be a robust model for understanding subsistence production at the household level.

Single-Person Households

An unexpected finding was the disproportionately high contribution of active single-person households to the community subsistence harvests in Wales and Deering. As shown in Figure 6-6, active single-person households contained only 3.4 percent of the two communities' population, but they produced 25.7 percent of the total subsistence harvests by weight.

In Wales, of the 36 surveyed households, 10 were single-person households (28 percent), all males except one. In Deering, 8 of 34 households were single-person households (12 percent). The relatively large number of solitary men probably was related to the differential out-migration of women from the communities. Their residency in single-person households probably was the result of expanded housing stock in the communities during the 1980s and 1990s.

In Deering, three of the four highest harvesting households were single Native men between 40 and 59 years of age. Their residency in Deering averaged 34 years. Only two of the four adults reported being employed. One of those was only employed for one month, and earned only $600. The other employed adult reported three jobs, which spanned 12 months and generated about $8,000 in wage income. The average household income for the four households was barely $6,000 for the year.

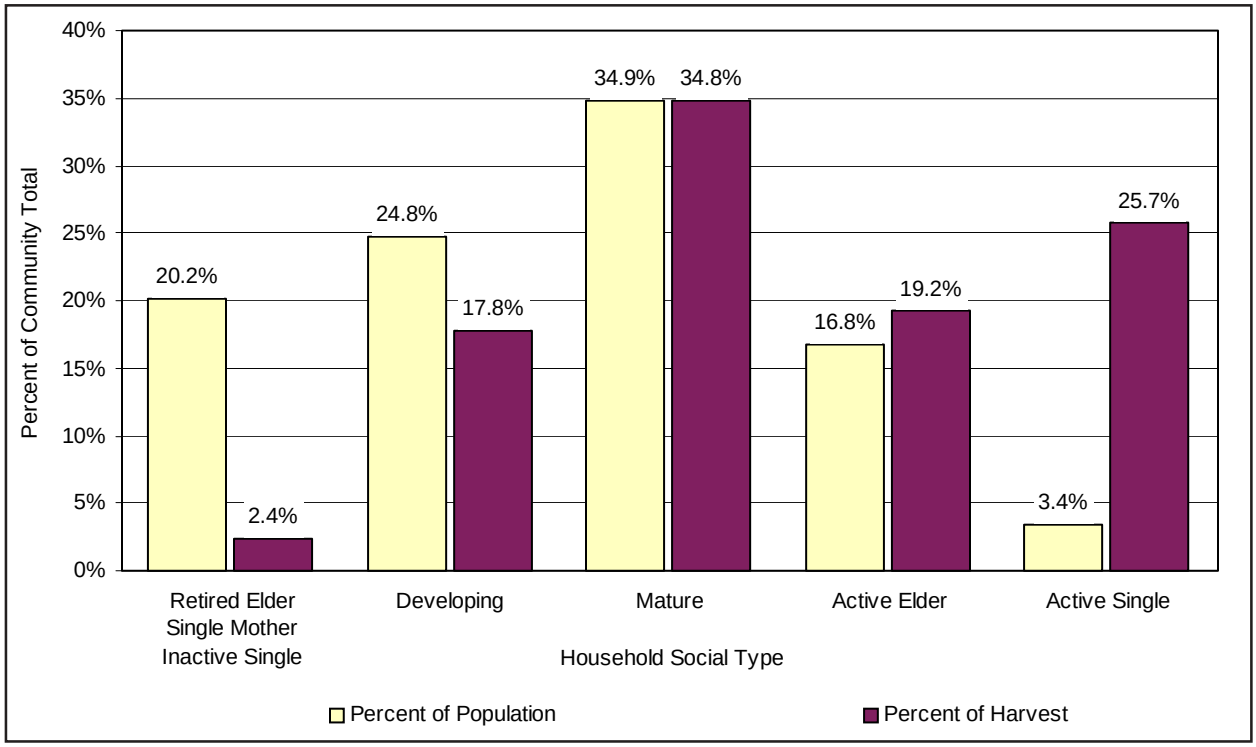

Figure 6-6. Contribution to community harvest and percent of population by household type. Active single men comprised only 3.4 percent of the population, yet they contributed more than a quarter of the total harvest.

While showing low incomes, the harvests of these four Deering households ranged from 5,100 pounds to 8,600 pounds. Their average harvest was 6,300 pounds, including 2,500 pounds of big game and 2,400 pounds of marine mammals. Each household harvested one moose, and each reported substantial harvests of salmon, caribou, and marine mammals. The households also reported harvests of non-salmon fish and birds. Together, they accounted for more than 25,000 of the 83,000 pounds harvested by Deering, or 30 percent of the community total.

Obviously, four men and a child do not each need 5,000 pounds of wild food. The producer data showed that all four households were named as producers by other households, and three of the four were named by many other households.

For example, Deering household 21 was in this group, and was named for 43 instances of production by five other households. Deering household 6 was also in this group and, as was discussed above, was named for 27 instances of production by 12 other households. These four households were reported as producers, on average, twice as often as other households in Deering.

These four Deering households also were relatively self-sufficient in food production. They reported far fewer than average amounts of production by other households for themselves. Two reported that no other Deering household had produced wild foods for their households. Only household 21 reported slightly above average production by other households.

Researchers asked several key respondents in Deering about the high productivity of single-male households. Their reports supported the findings of the survey. Some single-male households' could be very productive, in their experience, providing large amounts of food for parents and siblings. According to key respondents, some single men also participated in barter transactions for caribou. Caribou usually were 25 miles or more south and east of Deering. Consequently, as a matter of efficiency hunters would attempt to take as many caribou as possible on a single hunting trip. Men would return with more caribou than needed for their own households. The excess caribou would be bartered, typically for gasoline. Sometimes, such arrangements would be made before hunting. An elder, for example, would buy a young man ammunition and gasoline so that he could go hunting. In return for

the supplies, the hunter provided the elder with some of the caribou he harvested.

Sometimes when older parents left an old house for a new house, an unmarried adult son would remain in the old house, which then served mostly as bedroom. Functionally, the son continued to be part of his parents' household, eating meals with them, hunting with them or for them, gathering wood, and performing other tasks.

The development of single-person households was not covered in a household developmental model, and how to categorize them was a question. Upon inspection, single-person households appeared to be a bifurcated group – while about half were very active in subsistence production (4 of 10 in Wales; 4 of 8 in Deering), the remainder were almost entirely inactive. To deal with them in analysis, single-person households were divided into two groups (active and inactive). The inactive singles were placed into the group of single mothers and retired elders, presuming that these single men for some reason were not able to hunt and fish, perhaps because of a disabling condition. The active singles were treated as a distinct group and excluded from the statistical analysis of household productivity.

One critique of the household ranking system used in the above analysis was that the household maturity variable was not completely independent of one factor it is intended to predict – subsistence productivity. Single-person households were placed in either rank "one" or excluded from the analysis by observing actual subsistence outputs. This was because the household developmental cycle model provided no obvious way to deal with single-person households. Similarly, an elder's household (persons over 60 years) was given a low ranking of "one" if he/she was "retired" from subsistence production (based on inspection of the household's harvests), and given a high ranking of "four" if not "retired." The *a posteriori* categorization identified a limitation of the household developmental cycle model, because the model could not identify whether or not a household will change classes (to retirement) based solely on age of the household head. Retirement was clearly tied to health factors at least, such as whether an elder is failing in health (the survey did not measure health), and also tied to whether the elder remains or not in a multigenerational household with an effective workforce. So, given the limitation in the survey data in recording health factors, observation of an elder's actual subsistence harvests determined into which group he/she was placed.

Aside from these analytic ambiguities, it was clear that removing active single-person households from the data set removed a major household type from the local subsistence economic system. In Chapter 9, the role of active single-person households will be revisited in the context of multi-household production groups. The development and role of this household type in rural Alaska communities beg further explanation.

7
Subsistence Networks in Wales

The preceding two chapters have described subsistence production from the perspectives of individuals and households. The next three chapters examine subsistence production from the perspective of networks of household that cooperated to produce and distribute wild food.

Researchers began with several predictions about cooperation. Researchers predicted that there would be several identifiable cooperative networks of households in each community. Each network was expected to include two or more households clustered by reciprocal instances of harvesting, processing, and distributing. Researchers expected these networks would be composed of households closely related by kinship. And researchers expected that these subsistence networks might resemble "local families," one of the traditional Iñupiaq social units described by Burch for the 19th century.

The first section of this chapter explains how subsistence networks in Wales were identified and summarizes their characteristics. The second section explores kin relationships within networks.

Network Identification

In this study, the harvesting, processing, and distribution of wild foods was collectively termed "production." An "instance," by definition, was one report of the production or distribution of one category of wild food (e.g. birds and eggs) by one person for one household. Production for one's own household was termed "intra-household production," and production for someone else's household was termed "extra-household production" (Figure 7-1). "Subsistence network" was the term researchers used to describe a set of two or more households that cooperated with one another in the harvesting, processing, and distribution of wild foods.

Researchers measured cooperation between pairs of households by counting the instances of harvesting, processing, and distributing of wild foods by a person in one household for the other household. In the analysis, researchers assumed that a pair of households had a cooperative relationship when one household reported extra-household production by the other household. Researchers also assumed that

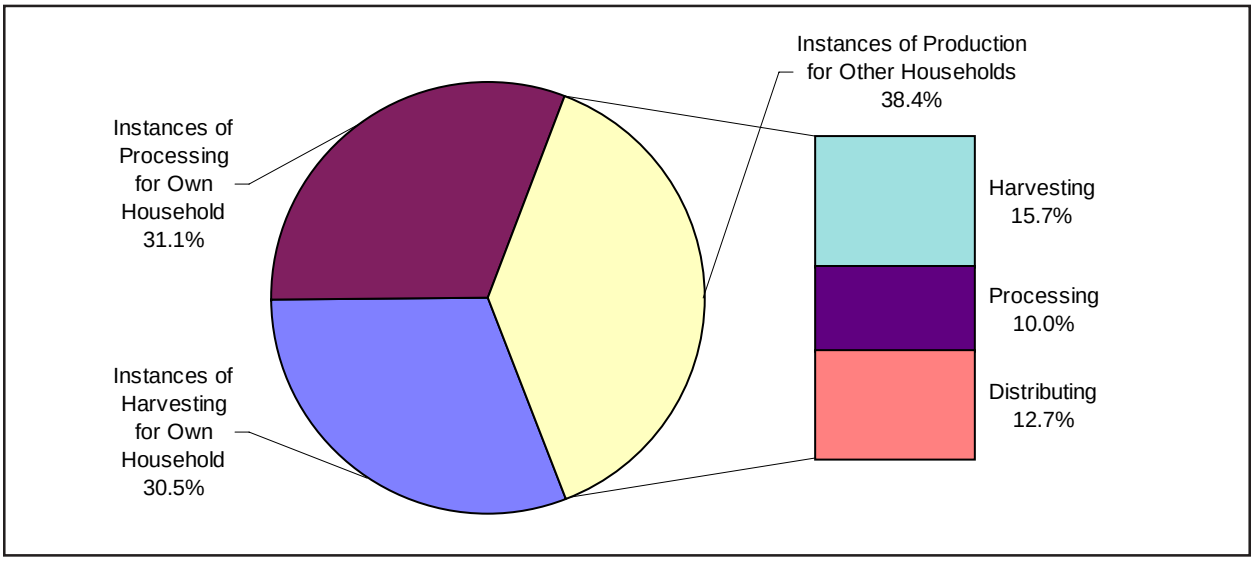

Figure 7-1. Summary of production reports, Wales. Wales households reported 916 instances of production of wild food. About 38 percent were for people living in other households, evidence that cooperation among households was considerable. This "extra-household" production was the basis for identifying groups of cooperating households.

TABLE 7-1. NUMBER OF PRODUCTION INSTANCES REPORTED, WALES, 1994.

	Own Household			Other Households				
Producing HH	Harvesting	Processing	Total	Harvesting	Processing	Distributing	Total	Total
HH 1	12	21	33	8	5	1	14	47
HH 3	10	10	20		1	2	3	23
HH 4	13	11	24	5	3	4	12	36
HH 6	3	3	6					6
HH 7	5	7	12	4	4	4	12	24
HH 8	1	3	4	3	2	3	8	12
HH 9								
HH 10	6	7	13	6	6	7	19	32
HH 12		3	3		7	4	11	14
HH 13	13	7	20					20
HH 14	3	8	11		1		1	12
HH 16	2	2	4					4
HH 17	34	35	69	4	2	8	14	83
HH 19	5	8	13	2	2	2	6	19
HH 20	2	2	4	1	1	1	3	7
HH 21	3	6	9	4	4	4	12	21
HH 23	4	4	8	4	5	3	12	20
HH 24	1	2	3					3
HH 25	5	3	8	23	3	20	46	54
HH 26	21	14	35	13	2	7	22	57
HH 27	6	6	12	2		1	3	15
HH 28	2	2	4					4
HH 29	9	9	18	3	4	2	9	27
HH 33	9	11	20	3	3	5	11	31
HH 34								
HH 35	7	4	11	4	6	1	11	22
HH 36	16	8	24	15		6	21	45
HH 37	10	10	20	4	4	1	9	29
HH 38	1	1	2					2
HH 40	12	13	25	12	6	11	29	54
HH 41	20	25	45	8	3	4	15	60
HH 42	18	10	28	9	15	11	35	63
HH 44	4	4	8					8
HH 46	3	3	6					6
HH 47	3	4	7					7
HH 48								
HH 49	2	2	4					4
HH 51	2	2	4					4
HH 52								
HH 53	4	6	10		1		1	11
HH 54	1	2	3					3
HH 55	7	7	14	7	2	4	13	27
Count	37	38	38	22	24	24	26	38
Sum	279	285	564	144	92	116	352	916
Average	6.6	6.8	13.4	3.4	2.2	2.8	8.4	21.8

pairs of households that shared many instances of extra-household production had a stronger relationship than pairs of households that shared few or no instances of extra-household production. Researchers sorted and clustered households into networks according to the strength of their cooperative relationships. The amount of food produced by one households for another was not measured, and was irrelevant in the classification system.

The 42 households in the Wales sample named 72 individuals for 916 instances of harvesting, processing, and distributing wild foods. Of those 916 instances, 564 (61.6 percent) were production for the individuals' own households, and 352 (38.4 percent) were production for other households (Figure 7-1). Instances of harvesting and processing for residents' own households ("identity households") were essentially equal, 279 harvesting instances (30.5 percent) and 285 processing instances (31.1 percent). There were no distributing instances for identity households, because a "distributor" was defined as someone in another household who gave food to the respondent household. Harvesting was the most commonly reported type of production for other households, 144 instances (15.7 percent), followed by distributing with 116 instances (12.7 percent) and then processing with 92 instances (10.0 percent).

A summary of some of the Wales producer data appears in Table 7-1. These data show that no households in the sample named any residents of households 34, 48, and 52 as producers, including those households themselves. By these measures, they simply were not part of the wild food production and distribution system in Wales. Households 46, 51, and 54 named their own members as producers, but did not name members of any other household as producers. Nor were any members of these three households named by any other household. Households 46, 51, and 54 were self-sufficient in wild food production, as measured by the survey. Because these households had no extra-household production relationships, they were not part of a multihousehold production system.

The remaining 36 households either named members of other households as producers or had members who were named by other households. Cooperation among these 36 households formed the basis for identifying subsistence networks. Note that no households in the sample named any residents of household 9 as producers. However, household 9 did name producers from two other households. The data indicated that household 9 was a consumer

but not a producer of wild foods, and it was included in the analysis.

The first step in testing research hypotheses on cooperation was to identify subsistence networks, which were defined as groups of households who harvested, processed, or distributed wild foods for one another. To do that, researchers used two different methods.

The first method involved manually sorting households into groups using the extra-house production data. Researchers began with the matrix of cooperation indices for pairs of Wales households (shown in Table 2-4). As described in Chapter 2, the pair of households with the strongest cooperative relationship became the nucleus of the first group. Then, in the order of the strength of cooperative relationships, all pairs of households were examined. A pair was added to an existing group if one household in the pair was already in that group. A pair became the nucleus of a new group if neither household in the pair had been sorted into a group previously.

Once logical groups had been determined, the rows and columns of producer data shown in Table 2-4 were sorted by group. The resulting matrix of households and groups is shown in Table 7-2. Group identifications appear in the second row of the banner and the second column of the stub of the table. The shaded portions of the matrix identify the boundaries of the groups. The strength of group relationships tends to decrease from left to right and from top to bottom. Households that could not be sorted into any group appear at the bottom right of the matrix. Researchers labeled the groups, A-D, H, I, K, and L. Households that could not be assigned a network were labeled X.

The second method involved clustering a similarity matrix of Kendall's Tau-B values calculated from the cooperation index, as described in Chapter 2. The Wales cluster dendrogram appears as Figure 7-2. In the clustering process, a few households would cluster strongly, then be joined by one or more additional households with relatively weaker relationships to the cluster, but with stronger relationships to the cluster than to the community as a whole, until ultimately the entire sample of households was contained in a single cluster.

The selection of a cluster combine distance was an important aspect of the comparison, as it affected the number and size of the clusters. A low cluster combine distance resulted in many clusters with few households; a high cluster combine distance resulted in few clusters with many households.

The cluster combine distance used for comparing the results of the two methods was selected after the manual sorting process and the clustering process were both complete. The manual sorting method had identified eight groups ranging in size from two to eight houses. Researchers examined the dendrogram in Figure 7-2 to see whether it contained clusters of similar sizes and with the same households. A high degree of similarity was observed at a cluster combine distance of 18, at which point 35 of the households had been distributed into five clusters.

As in the manual sorting method, researchers marked and labeled the clusters A, B, C, D, and I. Households that had not clustered at a cluster combine distance of 18 or less were labeled "X." Labels for the clusters were based on each cluster's similarity to the groups already identified in the manual sorting method.

Within each cluster, the strength of cooperative relationships could be evaluated with the cluster combine distances. For example, cluster C, at the top of the dendrogram, was completely clustered at a distance of six, evidence of strong cooperative relationships. All clusters included a core of two or more households that clustered at a distance of seven or less. Four households in cluster D (7, 21, 36, and 4) exhibited extremely strong relationships, and clustered at a distance of two. Then, a series of weaker relationships from the core cluster D households to other households increased in stepwise fashion to include the entire sample.

Although the two methods of assigning households to networks were different, the two solutions were similar (Table 7-3). Of the 36 households in eight groups identified by the manual sorting procedure, 26 households were assigned to the same clusters in the hierarchical cluster analysis. In percentage terms, 72 percent of households were assigned to the same group and cluster by the two methods.

In addition, the three households in group H and the three households in group K all were assigned to cluster D. Compared to the other clusters, cluster D included a number of households with fewer production ties. Both methods assigned the strongly clustered core of four households (7, 21, 36, and 4) to the same cluster and group, along with households 55, 8, and 47. Of the remaining households in cluster D, only household 28 appeared in a group corresponding to another cluster. All the other seven households had been manually sorted into additional groups. In other words, manual sorting identified

TABLE 7-2. MANUALLY SORTED PRODUCTION AND DISTRIBUTION GROUPS, WALES 1994

		Receiving Household																																								
Producing		44	23	24	29	42	28	16	26	27	35	19	38	1	10	14	40	41	53	7	8	12	21	36	4	47	55	3	17	49	13	37	6	25	33	9	20	46	51	54		
Household		A	A	A	A	A	A	B	B	B	B	B	B	C	C	C	C	C	C	D	D	D	D	D	D	D	D	H	H	H	I	I	K	K	K	L	L	X	X	X	Sum	Count
44	A																																								0	0
23	A			1	9	2																																			12	3
24	A																																								0	0
29	A	2	5			2																																			9	3
42	A		15	8	9		3																																		35	4
28	A																																								0	0
16	B																																								0	0
26	B				1					10		6				2									3																22	5
27	B											2				1																									3	2
35	B							2	1	8																															11	3
19	B												6																												6	1
38	B																																								0	0
1	C														4	2		8																							14	3
10	C											2		5				9	3																						19	4
14	C								1																																1	1
40	C													9	8			10	2																						29	4
41	C													9	3	3																									15	3
53	C																	1																							1	1
7	D																				4	7	1																		12	3
8	D																								5					3											8	2
12	D																			1			4	6																	11	3
21	D																			3	2	6			1																12	4
36	D																			4	8	4	2		2			1													21	6
4	D								1											2	4	4	1																		12	5
47	D																																								0	0
55	D																			1		4				6		2													13	4
3	H																			1					2																3	2
17	H					1													2			2						4		5											14	5
49	H																																								0	0
13	I																																								0	0
37	I				1										3																5										9	3
6	K																																								0	0
25	K					2	2					2	3		2		4	2	2	3	3	6	2	2		2		1	3		2					3					46	18
33	K						1																				2			2			4	2							11	5
9	L																																								0	0
20	L																																			3					3	1
46	X																																								0	0
51	X																																								0	0
54	X																																								0	0
Sum		2	20	9	20	7	6	2	3	18	0	12	9	23	20	8	4	30	9	15	21	33	10	8	13	8	2	8	3	10	7	0	4	2	0	6	0	0	0	0	352	
Count		1	2	2	4	4	3	1	3	2	0	4	2	3	5	4	1	5	4	7	5	7	5	2	5	2	1	4	1	3	2	0	1	1	0	2	0	0	0	0		39

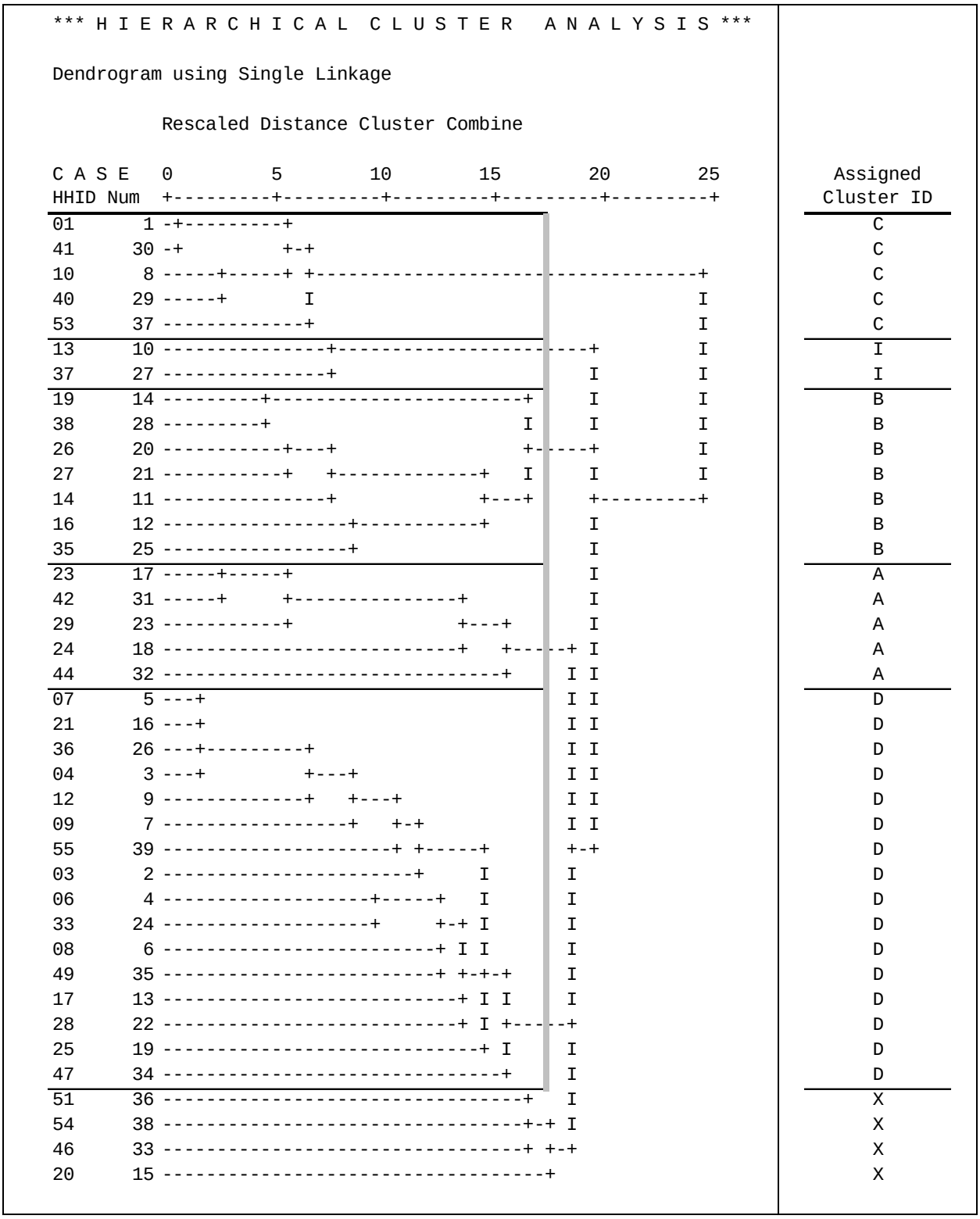

Figure 7-2. Hierarchical cluster analysis of Wales households. Five household clusters (A, B, C, D, and I) were identified at a cluster combine distance of 18 or less. Most clusters have a core set of households that reported many instances of harvesting, processing, or providing for one another, as well as additional households with fewer instances. Compare clusters here with groups shown in Table 7-2, which also shows number of production instances.

TABLE 7-3. NETWORK SOLUTIONS COMPARED, WALES 1994

	Network Assignment Method		
	Manually Sorted Groups	Kendall's Tau-B Clusters	Methods Agree?
HH44	A	A	Y
HH23	A	A	Y
HH24	A	A	Y
HH29	A	A	Y
HH42	A	A	Y
HH28	A	D	N
HH16	B	B	Y
HH26	B	B	Y
HH27	B	B	Y
HH35	B	B	Y
HH19	B	B	Y
HH38	B	B	Y
HH01	C	C	Y
HH10	C	C	Y
HH14	C	B	N
HH40	C	C	Y
HH41	C	C	Y
HH53	C	C	Y
HH07	D	D	Y
HH08	D	D	Y
HH12	D	D	Y
HH21	D	D	Y
HH36	D	D	Y
HH04	D	D	Y
HH47	D	D	Y
HH55	D	D	Y
HH03	H	D	N
HH17	H	D	N
HH49	H	D	N
HH13	I	I	Y
HH37	I	I	Y
HH06	K	D	N
HH25	K	D	N
HH33	K	D	N
HH09	L	D	N
HH20	L	X	N
HH46	X	X	Y
HH51	X	X	Y
HH54	X	X	Y

more groups than the clustering solution. If those seven households were removed from group D, the congruence between methods was 89 percent.

Households that did not group or cluster strongly in either solution were households with few instances of ex-household production. In other words, they did not cluster because they were infrequently named as producers by other households.

One advantage of the manual sorting method was that the underlying data were evident in the solution. Reading across Table 7-2, one can see that no household outside group A reported any production by a group A household. Reading down, one can see that three households in group A reported small amounts of production by five other households, most of whom were in the weaker groups at bottom of the matrix.

The exception to this pattern was household 25, which contained a single man. He was by far the most frequently named producer in the sample, accounting for 46 instances by 18 households. His production was very apparent in Table 7-2. Each summer, this man set a salmon net near the community and after he checked his net he often distributed salmon and other fish to a large number of households in the community. Only 50 percent of Wales households harvested salmon, but 85 percent used salmon, many from household 25.

Household 25 had so many relationships with other households in the community, that neither the manually sorting procedure nor the clustering analysis was able to incorporate household 25 into any of the strongly defined groups or clusters (A, B, D, and I). In the manual sorting method, Household 25 was assigned to one of the last groups to be identified, Group K. The other two households in this group reported no production by household 25. Household 25 was in group K because it reported four instances of production by household 33. In the clustering method, Household 25 was the second to last household to cluster in the most diffuse cluster (D).

The results of the manual sorting procedure are depicted schematically in Figure 7-3. As in the matrix in Table 7-2, the relative internal strength and the relative external weakness of relations was apparent in the diagram.

The hypothesis that subsistence food production occurred primarily within several identifiable "subsistence networks" of cooperating households was strongly supported. Of the 352 instances of ex-household production in Table 7-2, 266 instances (75.6 percent) occurred within the networks. If production by Household 25 was not considered, then 86.9 percent of the production occurred within these networks. These percentages do not take into account production by identity households for themselves. If all 916 instances of production by the sampled households were considered, then 90.6 per cent of all production occurred within subsistence networks (95.4 percent if household 25 is excluded).

There were at least eight identifiable subsistence networks in Wales in 1994. Five networks were identified clearly by both methods. Three additional networks were identified by the manual sorting pro-

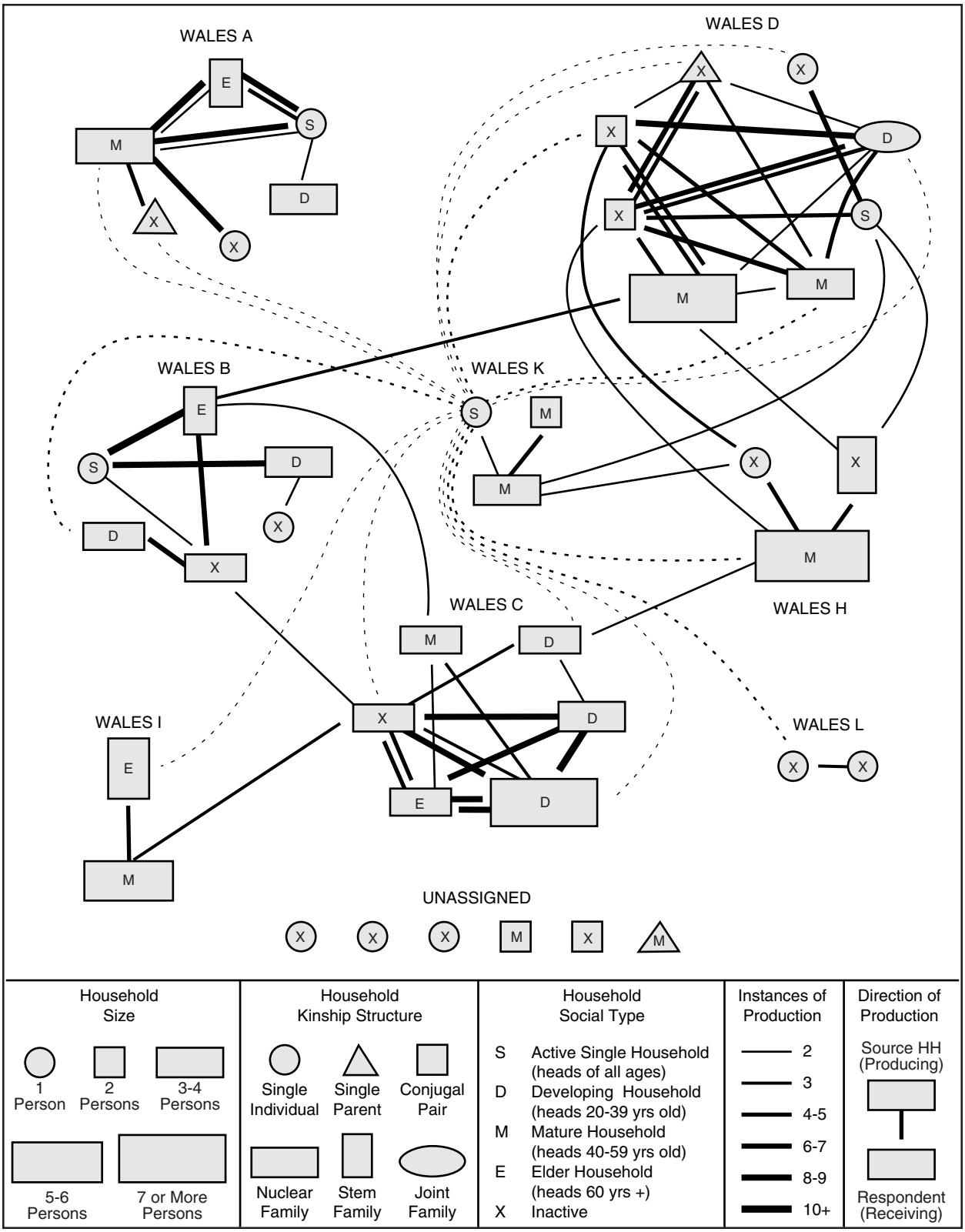

Figure 7-3. Wild food production and distribution networks in Wales, 1994. Each polygon represents a household. Lines between households represent instances of harvesting, processing, and distribution of wild foods from one household to another. Dotted lines represent extensive reports of production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

cedure. Networks ranged in size from 2 to 9 households and included 2 to 26 people. The eight networks encompassed 36 of the 42 households (85.7 percent) and 119 of the 128 people (93.0 percent) in the sample. The six households that were not assigned to any network were one- or two-person households that reported little or no wild food harvests, reported no production by members of other households, and were not reported as producers by any other households.

Genealogy of Subsistence Networks

Researchers had predicted that subsistence networks, if they occurred, would be composed of households closely related by kinship. Households that cooperated extensively should display strong kin relationships. Kin relationships among households in the same network should have been stronger than kin relationships among households in different networks.

To examine this hypothesis, researchers worked with key respondents to diagram kin relationships in each of the eight subsistence networks identified by the manual sorting procedure. Researchers referred to each network by an arbitrary letter assigned in the sorting process, "Wales A," "Wales B," etc.

Figure 7-4 shows kin relationships for seven of the eight subsistence networks in Wales. Wales H – a three-household network that included a single non-Native teacher – was not diagrammed because researchers were unable to determine a kinship basis for its organization.

Wales B, at the top of Figure 7-4, was organized around an elder brother and sister, both of whom were the focus of a group of households headed by their children or grandchildren. In one of these families, two daughters' households were associated with their spouses in Wales C and Wales D. An unrelated single man's household appears in this network. Key respondents said he was the non-local boyfriend of one of the unmarried women in this network.

Wales A was organized around an elder widow, and included in addition to her own household five households headed by her sons, daughter, and grandchildren. A household occupied by one of her daughters was not surveyed, so its production relationships with other households in Wales A could not be determined. One would have expected the elder widow's single son, who lived alone, to have been part of this network, instead of Wales D. Key respondents explained that the elder widow had adopted him many years before when he was a child. He recently had learned of his biological relationships, and in the study year he was attached to his biological kin in Wales D.

An elderly widow in Wales I was supported by a household headed by her son. Wales I was small relative to other networks, which may have been because two households headed by two other sons were not surveyed.

Wales C also was organized around siblings, two brothers and their descendents. Two other brothers were found in a separate network, Wales L, a group within minimal harvests and heavy reliance on transfer payments. Most of the households in Wales C were headed by the sons and daughters of one of the brothers. Wales C also included one household with a more distant relationship; a mother's mother's sister's daughter was spouse to one of the elder brothers. Observing this, a Wales key respondent thought the link to this household heads' mother — who lived in Nome — was key. Households in Wales C, he thought, were distributing food to the elder Nome woman through her son's household in Wales.

Note the sibling relationships between Wales A, I, C, and L. This was an example of how producer data identified networks that would not be obvious from kinship data alone. It also illustrated how networks evolved. When these siblings were young all likely would have been part of the same parent-child network.

Wales D was organized primarily around an elder couple, and included five households headed by their children and grandchildren. A sibling's son was also part of this network, as was an unrelated, short-term resident of the community.

Wales K was sibling based, organized around a brother and two sisters. One sister was deceased, but her son and his wife were associated with this network. The single male household in this network was household 25, responsible for the extensive distribution of fish seen in Figure 7-3.

These diagrams of kin relationships showed that all but one of the subsistence networks had a kinship basis. However, not all households in a particular extended family belonged to the same network, as seen in Wales A, B, and C in Figure 7-4. The diagrams did not address the question: Were kin relationships more numerous and stronger inside or outside of subsistence networks?

To explore that question, researchers calculated relationships for all the households heads in the sample (see Chapter 2). In the 50 occupied households in Wales in 1994, 69 heads and spouses in 42

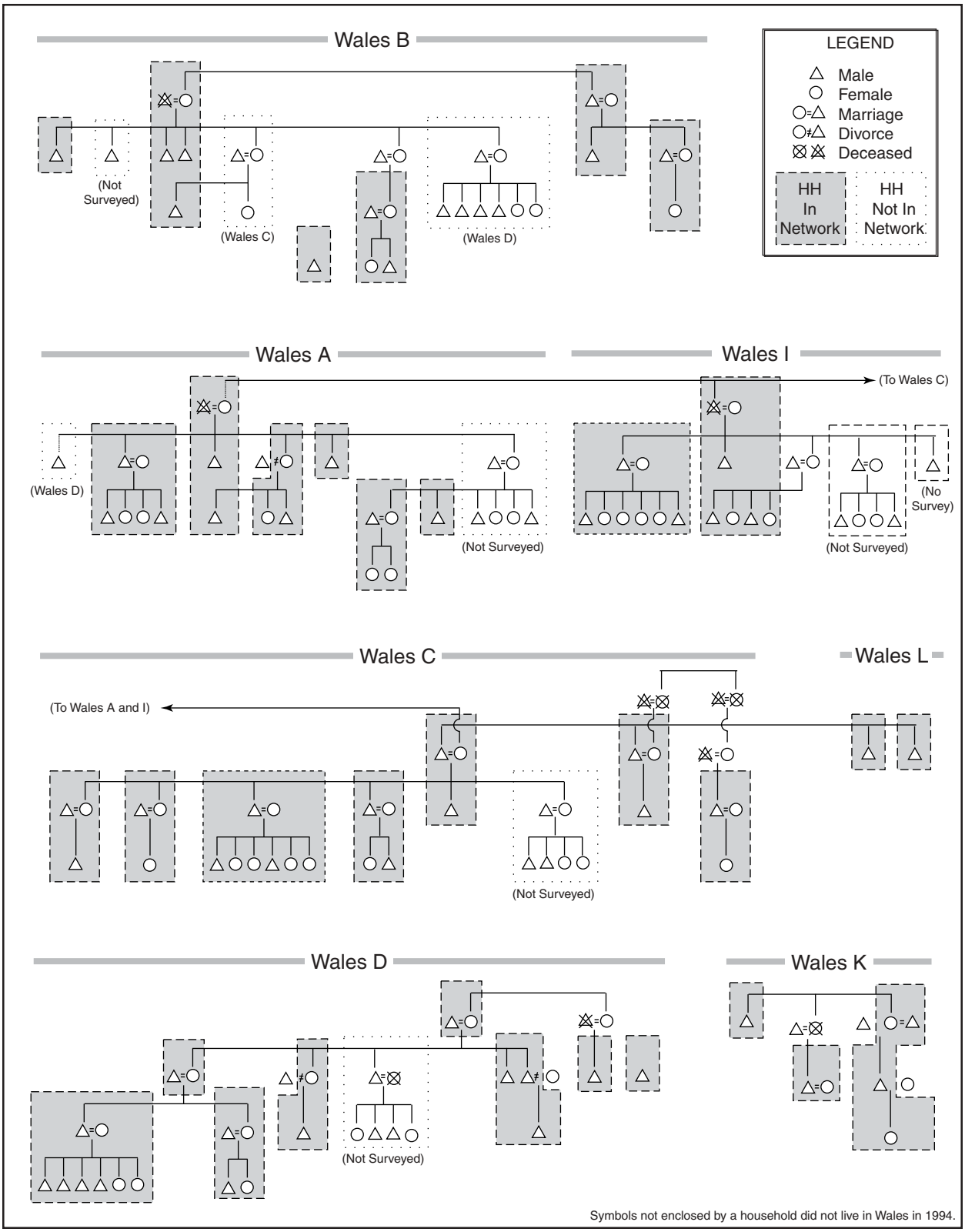

Figure 7-4. Kin relationships in subsistence networks, Wales 1994. In terms of kin relationships, production groups resembled traditional Iñupiaq local family organizations described by Burch (Chapter 3). Wales A was organized around parent-child relationships. Wales B, C, and D were organized around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

households had kinship ties to individuals in other households in Wales. The database contained 340 unique relationships between households heads in the sampled households. A majority of the parent-child and grandparent-grandchild relationships occurred within subsistence networks, 76 percent and 100 percent respectively (Figure 7-5). About half the sibling relationships (47 percent) occurred within networks. A majority of the nepotic, cousin, and affinal relationships occurred outside networks.

Analysis of producer data also supported kinship as an organizing principal for subsistence production and distribution. Of the 475 total instances of ex-house production by Wales individuals, 237 instances (49.9 percent) were for households with parent-child or sibling relationships to the producer, and 113 instances (23.3 percent) were for households with grandparent-grandchild or nepotic relationships to the producer. Interestingly, 109 instances (22.9 percent) were for households with no known kin relationship to the producer.

These statistical analyses demonstrated the kinship basis of the households in subsistence networks. Households were much more likely to be closely related to other households within their networks than to households in other networks. The average strength of relationships was greater within networks. The hypothesis that kin relationships were stronger within subsistence networks was supported.

In sum, the vast majority of households in each subsistence network in Wales were closely related by kinship, either parent-child or sibling relationships. When individuals from two different families had married, as was inevitable in such a small population, the couples' households associated more strongly with one spouse's network than the other. There was no evidence for a matrifocal or patrifocal preference, both men and women could be the link in their networks.

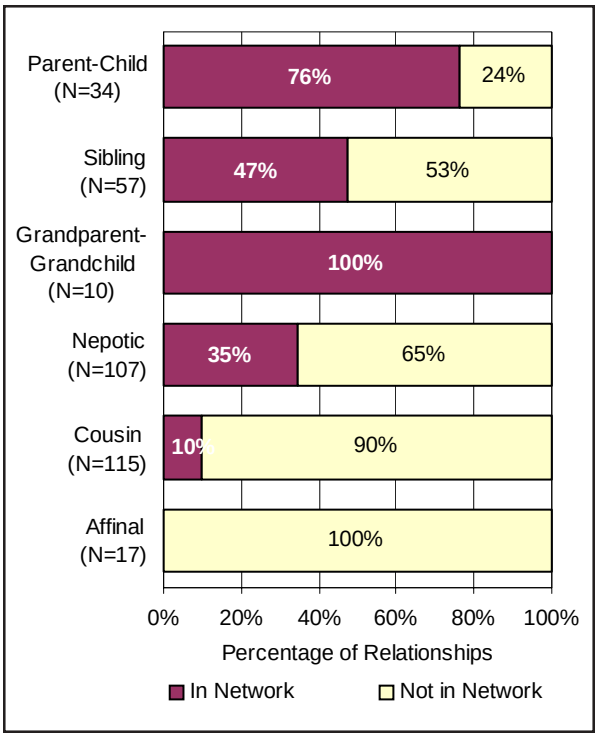

Figure 7-5. Household heads' kin relationships in Wales subsistence networks. Household pairs with close kin relationships (parent-child, grandparent-grandchild) were more likely to occur in the same subsistence networks. Households with weaker kin relationships were more likely to be found in different subsistence networks.

8
Subsistence Networks In Deering

In many ways, the two communities in this study were similar. Wales and Deering both were located on the coast, were similar in size, and were predominantly *Iñupiat*. They depended heavily on wild foods, and used many of the same species of fish and wildlife. In both communities, residents cooperated extensively to produce wild food.

In one respect, however, the two communities were dissimilar. The proportions of species harvested were very different. In Deering, marine mammals, land mammals, and fish each constituted about a third of the total harvest by weight. In Wales, marine mammals provided almost 80 percent of the total harvest, while fish provided about 10 percent and land mammals less than 5 percent.

Because of the different mix of species, researchers thought the social organization of food production in the two communities might be different. Harvesting marine mammals, especially whales, required organized crews of hunters, usually only men. Harvesting land mammals, by comparison, required only one or two hunters, again usually men. Harvesting fish usually involved organized groups of people, but fish harvesters were more likely to be women than men. As expected, production reports reflected these differences in harvesting and processing patterns.

In Wales, 52 percent of the extra-household production involved marine mammals, so marine mammals were the biggest factor in identifying subsistence networks in Wales (Figure 8-1). In Deering, 42 percent of the extra-household production involved fish, so fish were the biggest factor in identifying subsistence networks in Deering.

This chapter explores cooperation among households in Deering. The first section explains how networks were identified, and the second explores kin relationships within networks. The analyses included teacher households, although most teacher households fell to the side because they were not involved in the cooperative production and distribution system.

Network Identification

As in Wales, subsistence networks in Deering were identified through an analysis of individual instances of harvesting, processing, and distribution of wild

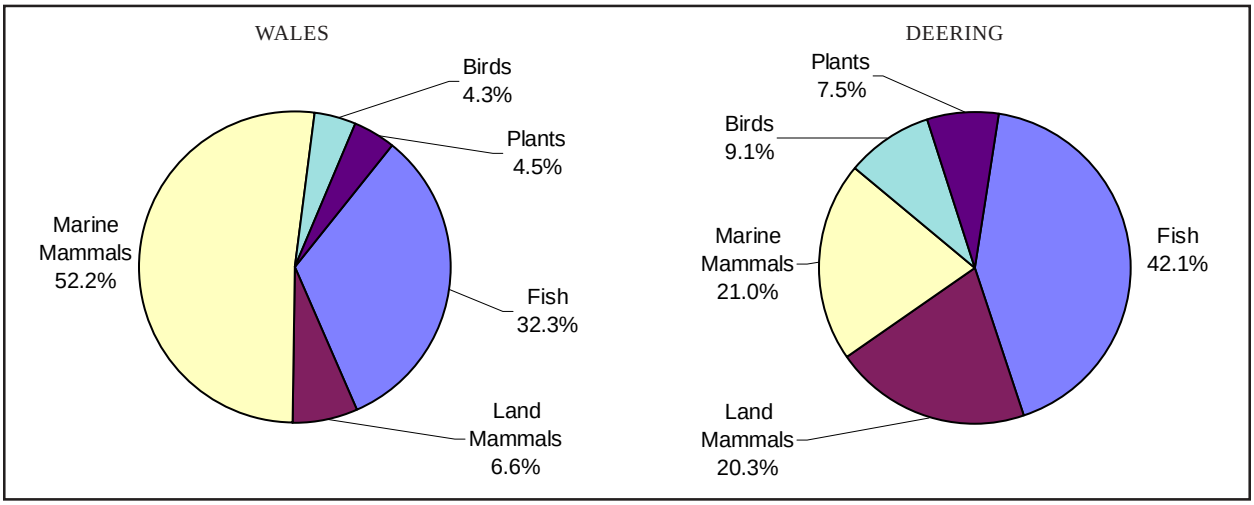

Figure 8-1. Instances of extra-household production and distribution by species, Wales and Deering. The frequency of extra-household reports reflected the species harvested (see Fig. 4-6). The most frequently reported production in Wales involved marine mammals, while the most frequently reported production in Deering involved fish.

foods by members of one household for another household ("extra-household" production). Households were counted as having a relationship when members of one household were named as producers by another household. Households who shared many extra-household producers were assumed to have stronger relationships than those who shared few producers.

The 37 households in the Deering sample named 72 adults (the same number as in Wales) for 1,140 instances of harvesting, processing, and distributing wild foods. As in Chapter 7, an "instance" of production was the production of one category of wild food by one person for one household, not the amount produced.

Of those 1,140 instances, 589 (51.7 percent) were production for an individuals' own households (Figure 8-2). There were 262 reports of harvesting for one's own household (23.0 percent of the total), and 327 reports of processing for one's own household (28.7 percent).

The remainder of the production reports, 551 instances (48.3 percent of the total), were for extra-household production. Harvesting was the most commonly reported activity for other Deering households, with 209 instances (18.3 percent) reported. Processing accounted for 141 instances (12.4 percent), and distribution accounted for 201 instances (17.6 percent).

Overall, Deering reported 24 percent more total instances of production than Wales households, 1,140 compared with 916. Because Deering's harvest was more diverse, a higher count of instances was not unexpected. In Deering, hunters were more likely to have harvested from a number of resource categories – such as small seals, caribou, and salmon – each of which counted as an instance of harvesting. In Wales, hunters were more likely to harvest from only one or two marine mammal categories, which resulted in a lower count of instances.

Resource diversity would not explain, however, why 48 percent of all Deering production reports were extra-household, compared with 38 percent of Wales. This suggested there may be more extensive cooperation among households in Deering than in Wales. Researchers had expected the opposite, that a community organized around marine mammal crews would have evidenced more, not less, cooperation.

A summary of the Deering producer data appears in Table 8-1. Even though some households in Deering reported no harvests, at least one member of every household in Deering was reported as a producer. Household 42, for example, reported no harvest, but one of its members did process some non-salmon fish, presumably fish received from another household.

Six Deering households were not named as producers by any households in the community except themselves. Four of these households did report production by other households in Deering, so they were part of the cooperative system of food pro-

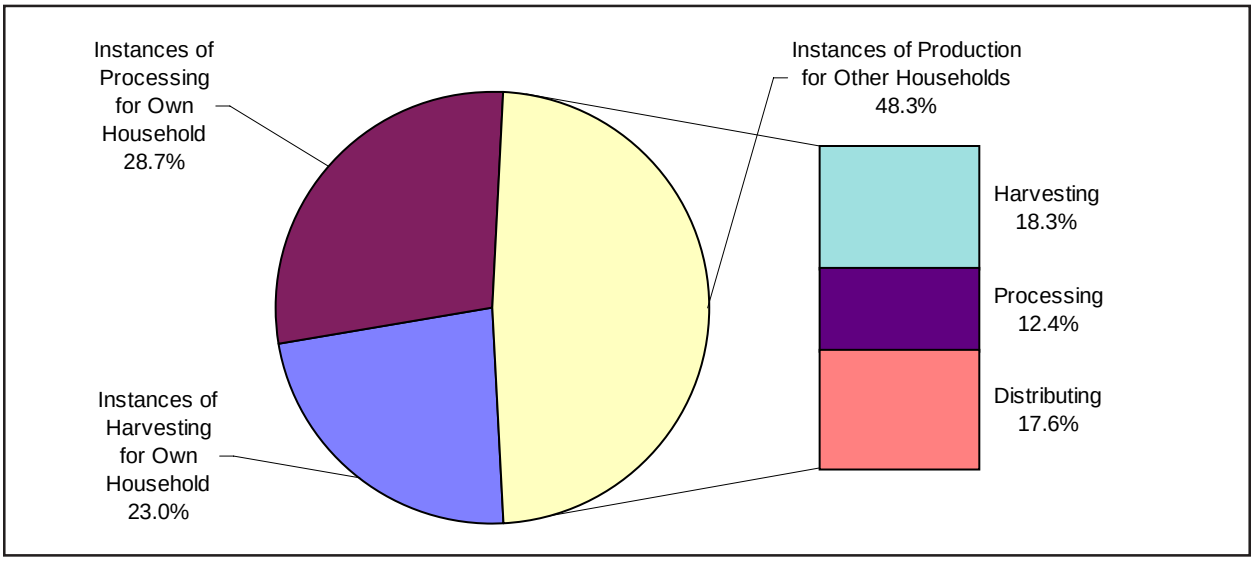

Figure 8-2. Summary of production reports, Deering. Deering households reported 1,140 instances of production and distribution of wild food. More than 48 percent were for people living in other households, compared with 38 percent in Wales. This "extra-house" production was the basis for identifying groups of cooperating households in Deering.

TABLE 8-1. NUMBER OF PRODUCTION INSTANCES REPORTED, DEERING, 1994.

	Own Household			Other Households				
Producing HH	Harvesting	Processing	Total	Harvesting	Processing	Distributing	Total	Total
HH 2	7	9	16	2	2	2	6	22
HH 6	10	10	20	13	2	12	27	47
HH 8	11	11	22	5	1	4	10	32
HH 9		10	10	2	1	2	5	15
HH 10	16	14	30	1		1	2	32
HH 11	13	13	26	5	1	8	14	40
HH 14	4	8	12	1	2		3	15
HH 15	6	16	22	3	8	6	17	39
HH 16	4	7	11	3	6	4	13	24
HH 17	5	7	12	5	4	7	16	28
HH 18	3	3	6					6
HH 19	6	6	12	13	9	17	39	51
HH 20		2	2		1		1	3
HH 21	8	7	15	13	4	11	28	43
HH 22	5	12	17	3	9	2	14	31
HH 23	24	24	48	29	8	23	60	108
HH 24	11	14	25	11	10	9	30	55
HH 25	2	6	8					8
HH 26	11	15	26	2	3	1	6	32
HH 27	10	12	22	2	4	3	9	31
HH 28	8	9	17	11	3	11	25	42
HH 29	10	10	20	4	3	9	16	36
HH 30	1	1	2					2
HH 31	2	2	4					4
HH 32	10	15	25	5	2	5	12	37
HH 33	2	1	3	2		3	5	8
HH 34	16	19	35	22	13	19	54	89
HH 35		8	8	4	10	6	20	28
HH 37	5	10	15	7	10	7	24	39
HH 38	8	4	12	11	7	9	27	39
HH 40	6	8	14	9	8	3	20	34
HH 41	7	7	14	3	3	3	9	23
HH 42		1	1					1
HH 43	11	10	21	7	5	5	17	38
HH 45	8	3	11	6	2	5	13	24
HH 48	9	8	17	5		4	9	26
HH 50	3	5	8					8
Count	33	37	37	30	28	29	31	37
Sum	262	327	589	209	141	201	551	1140
Average	6.2	7.8	14.0	5.0	3.4	4.8	13.1	27.1

duction and distribution. But two of these households did not report production by any other household. These two households — 18 and 25 — were apparently self contained and not part of the cooperative wild food production and distribution system in Deering in 1994. Both were teacher households.

This left 35 households, who named members of other households as producers, whose members were named by other households, or (usually) both. Cooperation among these 35 households formed the basis for identifying subsistence networks.

Researchers used the same two methods for analyzing production data in Deering as in Wales. The first method of identifying networks involved manually sorting households into groups using the extra household production data and several logical rules. The procedure is described in Chapter 2. The results appear in Table 8-2. Group identifications appear in the second row of the banner and the second column of the stub. The shaded portions of the table identify the households in each group. The strength of group relationships tends to decrease from left to right and from top to bottom. Households that could not be grouped appear at the bottom right of the table.

The second method involved clustering a similarity matrix of Kendall's Tau-B values calculated from the cooperation index (see Chapter 2). The Deering cluster dendrogram appears as Figure 8-3. The dendrogram was examined to determine whether it identified clusters of similar to the groups identified in the manual sorting procedure (Table 8-2). As for Wales, a high degree of similarity was evident at a cluster combine distance of about 18 (the shaded vertical line in Figure 8-3). Six clusters including 34 of 37 households could be identified. For comparison purposes, clusters of households were assigned cluster IDs based on their similarity to the groups in Table 8-2. Households that did not cluster were labeled "X."

Table 8-3 compares the clusters and groups identified in Deering by the two analysis methods. As with Wales, with Deering the two methods gave generally congruent results. Of the 34 households that clustered or grouped in both methods, 27 households (79 percent) were in the same clusters or groups. The two methods were even more congruent (91 percent) if one considered that Tau-B cluster D included all of group J. Not apparent in Table 8-3 is that households that clustered most strongly in the Kendall's Tau-B analysis were also the first

TABLE 8-2. MANUALLY SORTED PRODUCTION AND DISTRIBUTION GROUPS, DEERING 1994

		Receiving Household																																						
Producing		2	19	21	31	32	27	17	25	30	37	38	41	22	34	16	40	9	23	35	45	48	6	42	15	28	29	50	14	24	43	11	26	8	10	20	33	18		
Household		A	A	A	A	A	A	B	B	B	B	B	B	D	D	D	D	D	D	D	D	D	D	F	F	F	F	F	G	G	G	H	H	J	J	J	J	X	Sum	Count
2	A				3	1	2																																6	3
19	A	7		22		6	4																																39	4
21	A		11			6	4								3																	4							28	5
31	A																																						0	0
32	A	2	1	5											2													2											12	5
27	A		1	3		1																									1						3		9	5
17	B					2			2		3	1	1					3		2								2											16	8
25	B																																						0	0
30	B																																						0	0
37	B							7		6		6	1					3					1																24	6
38	B							3			19																				5								27	3
41	B		2	2						3								2																					9	4
22	D	1													1					3	9																		14	4
34	D	5	4	1		2	4							14						13	8		3																54	9
16	D																10												3										13	2
40	D															16				4																			20	2
9	D									3			2																										5	2
23	D													5		11	10	9		11	2		1				1		5		2						3		60	11
35	D													1	1	3					15																		20	4
45	D														4					7											2								13	3
48	D																	5										4											9	2
6	D				2			2			2	2		2	2		2	3		2				5							1	2							27	12
42	F																																						0	0
15	F																							3			5	6		3									17	4
28	F						2																1	3	8		5	2		2		2							25	8
29	F																								10				4	2									16	3
50	F																																						0	0
14	G																														3								3	1
24	G				3							2						2		2					5		2		10		2	2							30	9
43	G											1						3											7	4		2							17	5
11	H																							3					2				9						14	3
26	H																												2			4							6	2
8	J														2				2				1												2		3		10	5
10	J																																			2			2	1
20	J																															1							1	1
33	J												2							2											1								5	3
18	X																																						0	0
Sum		15	19	33	8	18	16	12	2	12	24	12	6	22	15	30	22	30	2	46	34	0	7	14	23	0	13	16	33	11	17	17	9	0	2	2	9	0	551	
Count		4	5	5	3	6	5	3	1	3	3	5	4	4	7	3	3	8	1	9	4	0	5	4	3	0	4	5	7	4	8	7	1	0	1	1	3	0		139

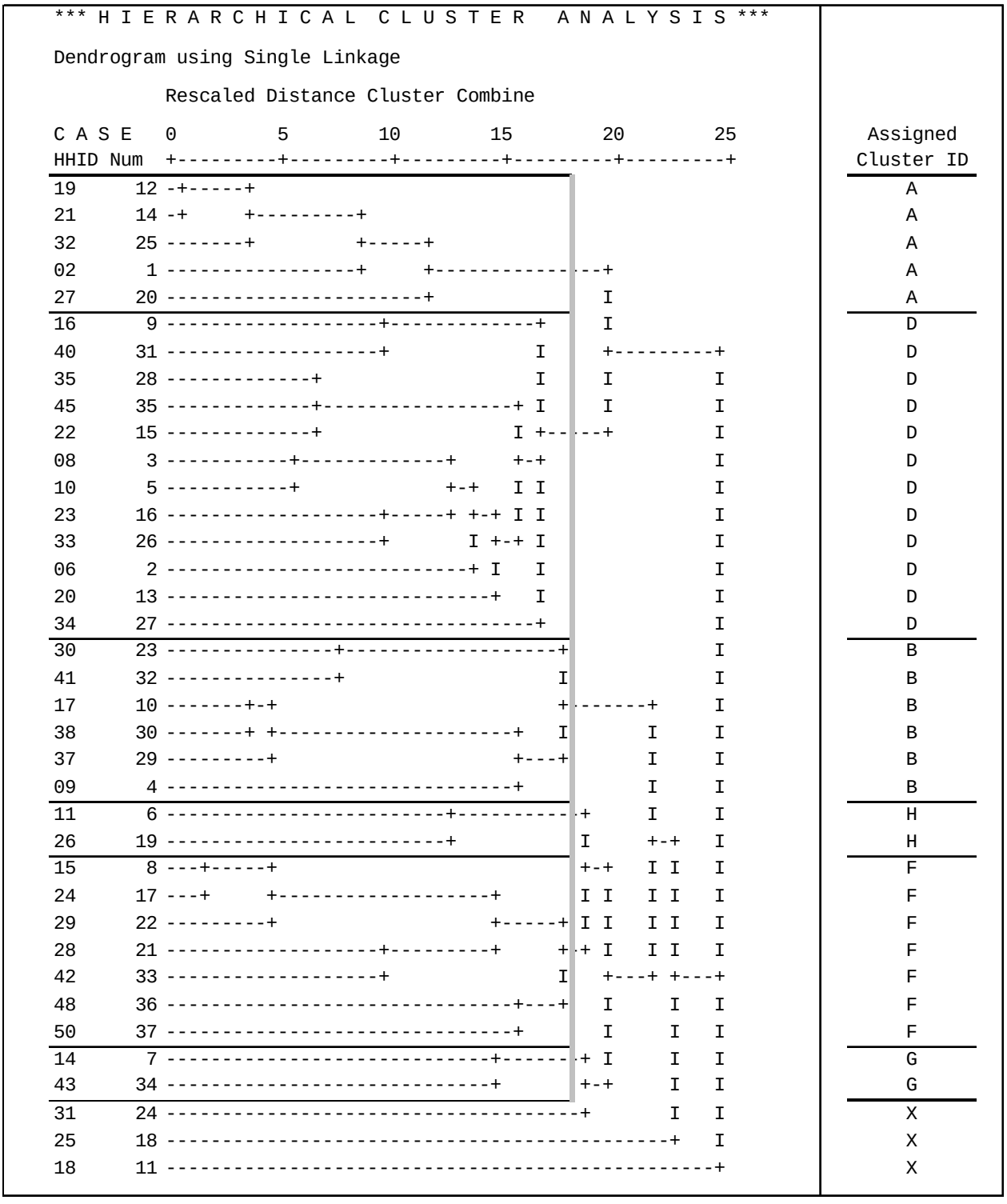

Figure 8-3. Hierarchical cluster analysis of Deering households. Six household clusters (A, D, B, H, F, and G) were identified in Deering at a cluster combine distance of 18 or less (the shaded vertical line). Wales clusters also were identified at a cluster combine distance of 18 or less. Fewer households in Wales clustered at that distance, but those that did tended to cluster at lower distances. In other words, the boundaries between most clusters were more clearly defined in Wales than in Deering. Compare clusters above with groups in Table 8-2.

TABLE 8-3. NETWORK SOLUTIONS COMPARED, DEERING 1994

	Network Assignment Method		
	Kendall's Tau-B Clusters	Manually Sorted Groups	Methods Agree?
HH 19	A	A	Y
HH 21	A	A	Y
HH 32	A	A	Y
HH 02	A	A	Y
HH 27	A	A	Y
HH 16	D	D	Y
HH 40	D	D	Y
HH 35	D	D	Y
HH 45	D	D	Y
HH 22	D	D	Y
HH 08	D	J	N
HH 10	D	J	N
HH 23	D	D	Y
HH 33	D	J	N
HH 06	D	D	Y
HH 20	D	J	N
HH 34	D	D	Y
HH 30	B	B	Y
HH 41	B	B	Y
HH 17	B	B	Y
HH 38	B	B	Y
HH 37	B	B	Y
HH 09	B	D	N
HH 11	H	H	Y
HH 26	H	H	Y
HH 15	F	F	Y
HH 24	F	G	N
HH 29	F	F	Y
HH 28	F	F	Y
HH 42	F	F	Y
HH 48	F	D	N
HH 50	F	F	Y
HH 14	G	G	Y
HH 43	G	G	Y
HH 31	X	A	N
HH 25	X	B	N
HH 18	X	X	Y

to cluster in the logical approach. This included the first households to cluster, households 2 and 19.

The Kendall's Tau-B clustering solution for Deering is depicted schematically in Figure 8-4. Based on the cluster analysis, there were six subsistence networks in Deering. Networks were labeled "Deering A," "Deering B," arbitrary labels assigned during the clustering analysis. The relatively high degrees of cooperation among households within the same network is readily apparent. Also clear is the degree of cooperation between networks. This diagram is similar to Figure 7-3.

There were two methodological differences between the Wales and Deering schematics. First, the Wales schematic depicted networks identified by the manually sorting procedure. The Deering schematic depicted networks identified by the Kendall's Tau-B dendrogram. Second, the Wales schematic depicted production at the level of two or more instances. The Deering schematic depicted production at the level of three or more instances. Researchers drew schematics with greater detail, but these were hard to interpret because the higher level of detail obscured the significant relationships that identified the networks. In other words, at a level of one or two instances, generalized cooperation among many households became "noise." Low level cooperation data are included, however, in Tables 7-2 and 8-2.

Deering D (upper right in Figure 8-4) included two households (20, 10) that appear to have no ties to any households in any groups. These households did report production by other households or were reported as producers by other households, but only at the level of one or two instances. Their assignment to Deering D was based on these low levels of production, which can be seen in Table 8-2.

All the networks contained more than one type of household. Every network except Deering B contained a stem household with three or more generations, and most groups contained single parent or single person households.

The most frequently named producers included Household 23, a mature stem household in Deering D named in 60 instances of production by 11 households in 4 groups. Household 34, a mature nuclear household also in Deering D, was named 54 times by 9 households in 2 groups. (Some of that production is not depicted in Figure 8-4, see Table 8-2.) These households served not only as the nucleus of their own networks, but also supported other networks. Such extra-network production was more common in Deering than in Wales.

In Chapter 6, researchers noted the existence of nine households in Wales and Deering with very low incomes and very low wild food harvests. Researchers wondered how they managed. At least part of the answer was apparent in Figure 8-4. For example, household 9 in Deering B, an elder woman and her unmarried son, reported less than $5,000 in income and harvested only 105 pounds of wild food. They also reported 30 instances of production by eight other households in four networks, including their own (some of that production is not depicted in Figure 8-4, see Table 8-2). Another example of substantial extra-household support was household 14, a single parent household in Deering G. This

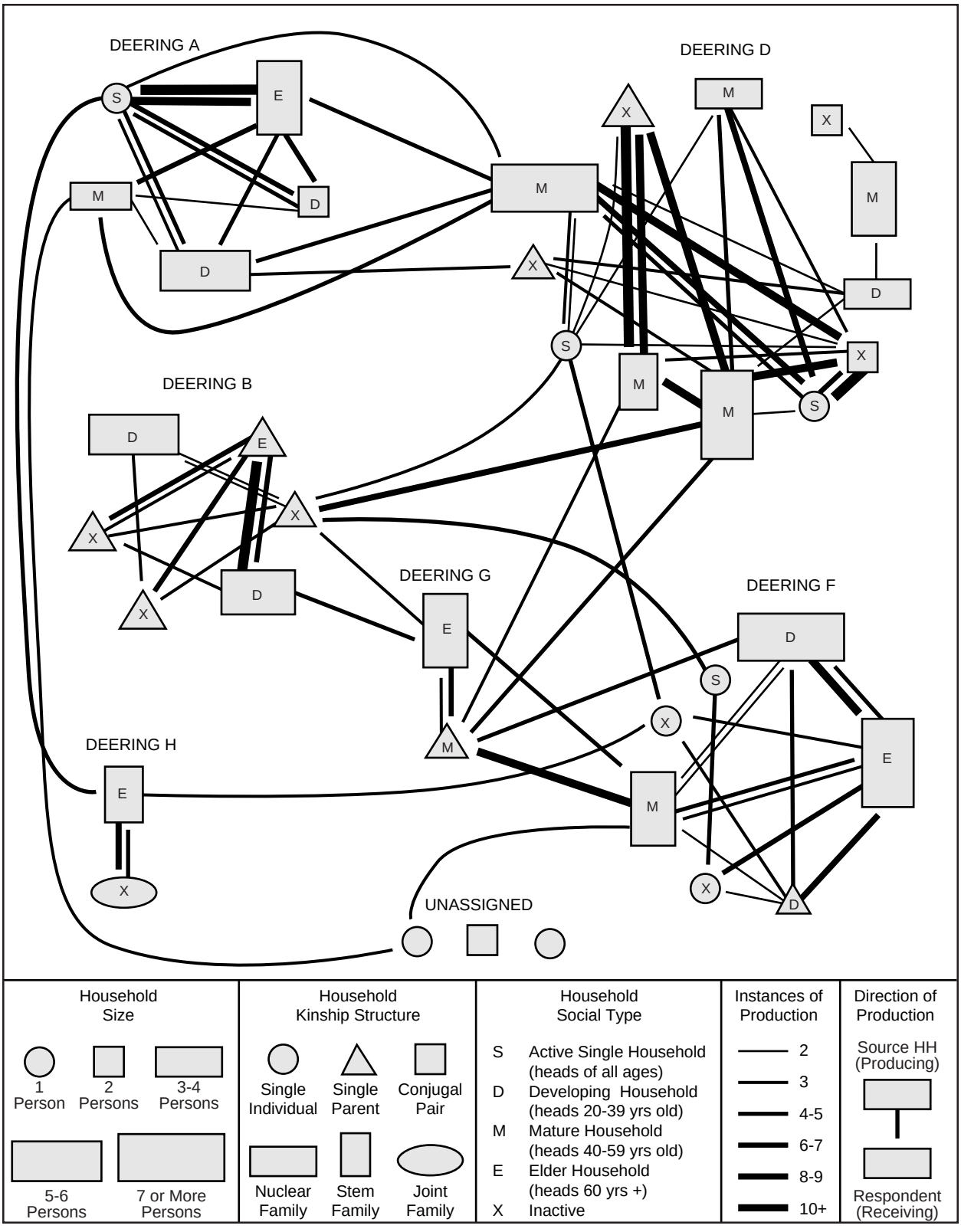

Figure 8-4. Wild food production and distribution networks in Deering, 1994. Each polygon represents a household. Lines between households represent harvesting, processing, and distribution of foods by one household for another household. This diagram was drawn from a dendrogram of Kendall's tau-B values (see text).

household produced only for the other household in its network. But it reported 33 instances of extra-household production from seven other households in four networks, including its own. Together, these two single-parent households reported 63 instances of production from other 12 other households.

Inactive single-person households are illustrated by household 42 in Deering F. A single Native man in his 50s, household 42 had less than $1,000 in total income and reported no harvest. Except for household 42 itself, no households in Deering reported any production by Household 42. Household 42 reported 14 instances of production by four other households (the basis for including it Deering E). Household 42 was a net receiver of wild foods.

Active single-person households are illustrated by household 6 in Deering D, a single Native man in his 50s who harvested 5,150 pounds of wild food. Household 6 was reported as a producer in 27 instances by 12 other households, more households than were reported for any other producer in Deering. Most of the production was at the level of two instances (not depicted in Figure 8-4). This man's production for other households included harvesting salmon, non-salmon fish, caribou, moose, and small seals; processing non-salmon fish, and caribou; and distributing salmon, non-salmon fish, caribou, and moose.

Overall, the analysis depicts Deering as a highly cooperative community. At the same time, households worked more extensively with certain households than with others, and these association were used as the basis for identifying subsistence networks. The six Deering networks identified by the Kendall's Tau-B cluster analysis ranged in size from 7 to 43 people, included from 2 to 12 households, and averaged 20 people in 4.5 households. They included 34 of the 37 households and 120 of 124 people in the Deering sample.

Genealogy of Subsistence Networks

Genealogies were collected for most of the households in Deering in 1998, three years after the survey was conducted. All the households classified as "teachers" in 1994 had left Deering by 1998. No teacher households were related to any other sampled households, so no genealogies were collected for teachers. Several other individuals were related in Deering only through their spouses; in these cases the Deering spouses' genealogies were collected, but the non-local individuals' genealogies were not.

Figure 8-5 shows kinship diagrams for Deering's subsistence networks in 1994. Deering A included five households. This group was focused around an elder widow, whose household included an adult son and three grandchildren. The diagram includes all seven of her children who lived in Deering. Five were in the same network, one daughter was associated with her husband's network, and one daughter was in a household not surveyed so her network association was not known.

Deering B also is depicted in Figure 8-5. This network included six households organized around two elderly sisters. The diagram includes all their children and grandchildren in Deering at the time of the study, who occupied seven households. Five of these households were in the network, one was associated with a husband's network, and one was not surveyed. Also shown is a brother to the elderly sisters, who no longer lived in Deering. His son, however, did live in Deering, and was associated with his mother's family. Deering B also included a minister's household, which had no close relatives in the community.

The most complex production was Deering D. In one of the analysis methods — the logical method – Deering D was divided into two groups. In the other analysis method — the Tau-B cluster dendrogram – Deering D was a single group. Deering D included three inter-married families occupying eleven households, and an unrelated teacher. Nine households in the two larger families were organized around elder sibling relationships. Two households in a smaller family had a parent-child relationship. This group included one unrelated household, a teacher, who was associated with the group because one of its members had provided the teacher with two different categories of wild food.

Deering G, F, and H all were organized by parent-child relationships. In each group, an elder couple or widow headed a stem household spanning three generations. Associated with the stem household were one or more households headed by children of the elder couple or widows. Deering F included three unrelated households, who were not related to any other households in Deering either.

The kinship diagrams left no doubt that food production in Deering in 1994 was organized around extended families. The unrelated households in the networks – for example, a minister, a teacher, a health aide – were short-term residents of the community who had no other kin relationships.

To determine whether kin relationships were stronger in than outside subsistence networks, re-

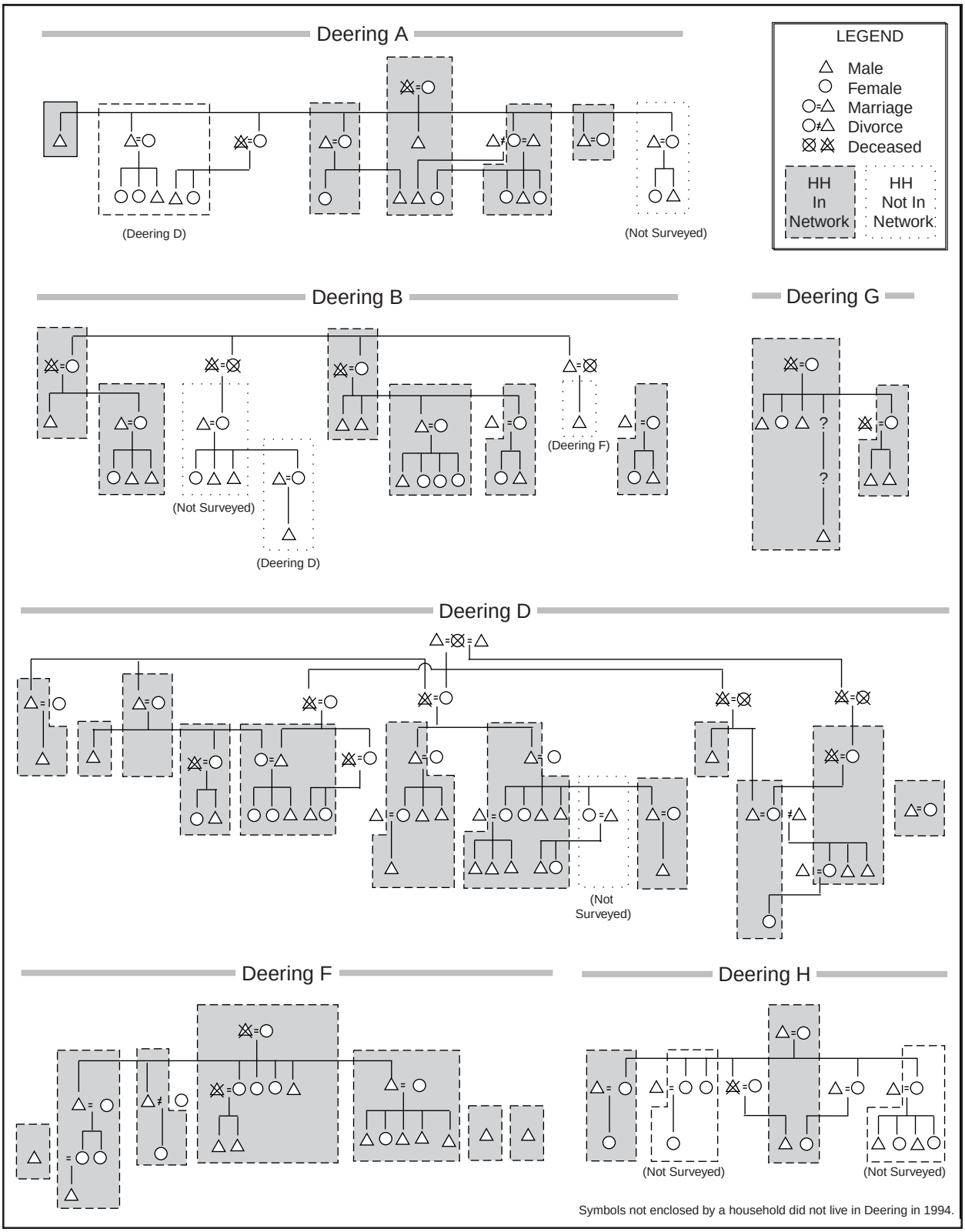

Figure 8-5. Kin relationships in subsistence networks, Deering, 1994. Groups A, G, F, and H were organized around parent-child relationships. Group B included the descendents of two sisters. Group D was the most complex subsistence network in either study community, with both sibling and parent-child structures.

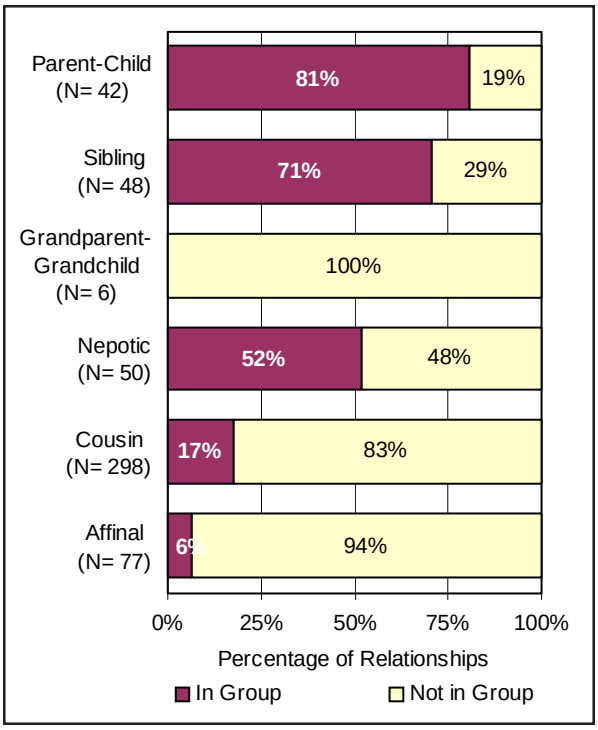

Figure 8-6. Household heads' kin relationships in Deering subsistence networks. As in Wales, households whose heads had close kin relationships were more likely to occur in the same production group.

searchers calculated relationships between all possible pairs of households in Deering in 1994, which included 57 household heads and spouses, 43 of whom were in the survey sample. Relationships among the 43 heads in the sampled households were the basis for the following analysis. *Legacy* calculated 521 relationships for the sample, ranging from "mother" to "husband of second cousin twice removed." As for Wales, relationships for Deering were aggregated into six categories, and ranked (see Chapter 2).

Figure 8-6 shows the frequency of each type of relationship and the household pairs' associations either with the same or with different subsistence networks. Households with parent-child or sibling relationships occurred much more frequently within networks (81 percent and 71 percent, respectively). Nepotic relationships (52 percent in groups) were about equally divided between the same and different networks. Most cousin and affinal relationships occurred between different networks, these were also the most numerous types of relationships in the community. Interestingly, all grandparent-grandchild relationships occurred between different networks. Many more grandparent-grandchild relationships existed in the community, of course, but only three household heads had grandparents who were household heads in Deering.

As in Wales, households were much more likely to be related to other households in the same network than to households in different networks. The average strengths of relationships were greater within networks. The hypothesis that kin relationships were stronger in subsistence networks was supported.

Producer data also supported the hypothesis, to an even greater degree than in Wales. Of 713 total instances of ex-house production and distribution reported by the sample, 455 instances (63.8 percent) were reported by households with parent-child or sibling relationships to the source household. Relatively little production was reported for producers with weaker kinship relationships. But, as in Wales, a significant amount of production was reported by households for unrelated individuals, 168 instances (23.6 percent).

Most production that crossed network boundaries could be categorized into one of three types. As has been discussed, single male households produced for a wide variety of households in the community, sometimes on a barter basis. In addition, single-parent households received a great deal of support from other households, including some not in their own network. Finally, when a household included a married couple whose parents' or children's households were associated with different networks, production crossed network boundaries.

Kinship clearly was an organizing principal behind food production in Deering in 1994. Although production was more likely to cross network boundaries in Deering than in Wales, none of the reasons for extra-network production diluted kinship as a basis for cooperation in food production.

9
Characteristics of Subsistence Networks

Chapters 5 and 6 explored wild food production from two perspectives: the individual and the household. This chapter explores wild food production from a third perspective: the subsistence network. Research questions include: How did networks differ in size, productivity, income, employment, and other variables? How did productivity vary among networks? Did more productive networks differ from less productive networks in type, size, demographics, or economic characteristics?

The first section of this chapter discusses selected demographic and economic characteristics of subsistence networks in Wales and Deering, looking in particular at differences between parent-child and sibling networks. The second section uses three networks, one from Wales and two from Deering, as case examples to describe subsistence networks. The third section examines income and subsistence production within and among networks.

Networks in Wales and Deering Compared

To examine the characteristics of subsistence networks, survey data for all the households in each network were combined by using SPSS' aggregate function to create a new record for each network. Network variables included the number of men, women, children, and households in each network, the number of social types of households in each network, and the amount of employment, income, and subsistence harvests reported by the households in each network.

Not all households in the study community were included in this analysis. Households that did not belong to any network were not included. In addition, teacher and military households were excluded because their economics and demographics were so different from the remainder of the households in the study communities (see Chapter 5). This affected two networks, Wales H and Deering D. Each network contained one teacher household, weakly linked to the group. No other teacher or military households had grouped or clustered in the analyses. To be consistent with Chapters 7 and 8, Wales networks were identified by the manual sorting method, while Deering networks were identified by the Kendall's Tau-B cluster method. There were some important limitations to this approach. First, different methods of sorting households would have resulted in different networks, although comparisons of the two sorting methods suggested those differences would be small. Second, and more significant, the analyses assumed that each household belonged to only one network and that each network was independent. Reality was more complex. For example, 13 households in Wales and 25 households in Deering produced or distributed wild foods for households in other networks. In Wales, household 25 produced fish for at least one household in every network. Obviously wild foods crossed network boundaries.

Nonetheless, approximately 90 percent of the reported instances of production and distribution occurred within networks. Limiting analysis to discrete networks simplified a complex situation.

The final data set included 118 people from 35 households in 8 networks in Wales, and 118 people from 33 households in 6 networks in Deering. Characteristics of these networks appear in Table 9-1 and Table 9-2, where networks are sorted (left to right) in descending order of estimated annual per capita subsistence harvests.

In Wales, network size ranged from 2 to 24 people in 2 to 8 households, with an average of 14.8 people and 4.4 households per network. In Deering, networks ranged from 7 to 41 people in 2 to 11 households, with 19.8 people and 5.5 households per network. However this difference was due entirely to the unusually large size of Deering D, which had 41 people. If Deering D was not included in the analysis or was considered to be two networks, the average size of networks in the two communities would have been very similar.

TABLE 9-1. CHARACTERISTICS OF SUBSISTENCE NETWORKS, WALES, 1994

	A	K	D	B	H	C	I	L
Type and Size								
Local Family Type	Parent	Sibling	Parent	Sibling	No Kin	Sibling	Parent	Sibling
N of People in Group	18	7	23	16	14	24	14	2
N of Households in Group	6	3	8	6	2	6	2	2
Average Household Size	3.0	2.3	2.9	2.7	7.0	4.0	7.0	1.0
Number of Individuals								
N of Men 16 and older	6	3	10	8	6	8	2	2
N of Women 16 and older	4	2	4	4	2	6	3	0
N of Children	8	1	9	4	6	10	9	0
N of Persons of Unknown Age	0	1	0	0	0	0	0	0
Characteristics of Individuals								
Average Age of Men (16 and older)	33	53	50	40	37	47	31	57
Average Age of Women (16 and older)	42	48	51	42	41	46	47	
Age of Oldest Man	48	65	87	64	81	73	45	62
Age of Oldest Women	74	56	80	74	44	68	66	
Ratio of Men to Women (16 and Older)	1.5	1.5	2.5	2.0	3.0	1.3	0.7	
Ratio of Adults to Children	1.3	5.0	1.6	3.0	1.3	1.4	0.6	
First Year Any Member in Community	1930	1929	1907	1920	1967	1921	1928	1932
Average Years Living in Community	19	18	20	32	28	22	11	57
Household Social Type								
N of Retired Elder, Single Parent	2	0	4	2	1	1	0	2
N of Developing	1	0	1	2	0	3	0	0
N of Mature	1	2	2	0	1	1	1	0
N of Active Elder	1	0	0	1	0	1	1	0
N of Active Single	1	1	1	1	0	0	0	0
Employment								
N of Adults Employed	7	4	9	11	5	7	4	1
N of Adults Unemployed	1	0	0	0	0	1	0	0
N of Adults Not In Workforce	1	2	4	1	3	4	0	1
Total Months Employed	53.0	25.5	63.0	63.5	15.5	35.5	16.0	1.0
Annual Income (Dollars)								
Earned Income	93,300	40,565	102,990	139,580	18,450	34,040	22,000	800
Other Income	58,262	13,639	39,829	25,630	39,611	41,379	6,353	20,856
Total Income	151,562	54,204	142,819	165,210	58,061	75,419	28,353	21,656
Earned Income Per Capita	5,183	5,795	4,478	8,724	1,318	1,418	1,571	400
Other Income Per Capita	3,237	1,948	1,732	1,602	2,829	1,724	454	10,428
Total Income Per Capita	8,420	7,743	6,210	10,326	4,147	3,142	2,025	10,828
Wild Food Harvests (Edible Pounds Per Year)								
Salmon	2,351	3,112	704	1,170	837	1,034	644	53
Finfish	641	294	154	572	110	360	520	14
Shellfish	470	207	353	616	151	1,035	129	0
Game	569	0	539	3	538	1,211	408	0
Marine Mammals (Excluding Bowhead)	11,776	3,448	3,479	10,095	4,782	7,415	4,608	0
Bowhead Whale	14,339	0	14,339	0	0	0	0	0
Birds and Eggs	182	138	301	156	498	135	70	0
Plants	117	139	149	15	37	105	35	0
Total Harvest	30,444	7,338	20,018	12,628	6,952	11,295	6,414	66
Wild Food Harvests (Edible Pounds Per Person Per Year)								
Harvest Per Capita (Excluding Bowhead)	895	1,048	247	789	497	471	458	33
Harvest Per Capita	1,691	1,048	870	789	497	471	458	33

TABLE 9-2. CHARACTERISTICS OF SUBSISTENCE NETWORKS, DEERING, 1994

	H	A	F	D	G	B
Type and Size						
Local Family Type	Parent	Parent	Parent	Sibling	Parent	Sibling
N of People in Group	7	16	24	41	8	22
N of Households in Group	2	5	7	11	2	6
Average Household Size	3.5	3.2	3.4	3.7	4.0	3.7
Number of Individuals						
N of Men 16 and older	1	6	6	14	4	8
N of Women 16 and older	4	4	7	8	3	6
N of Children	2	6	10	10	1	8
N of Persons of Unknown Age	0	0	1	9	0	0
Characteristics of Individuals						
Average Age of Men (16 and older)	63	36	33	43	37	30
Average Age of Women (16 and older)	33	43	33	39	58	55
Age of Oldest Man	63	43	54	77	65	36
Age of Oldest Women	61	62	64	72	83	77
Ratio of Men to Women (16 and Older)	0.3	1.5	0.9	1.8	1.3	1.3
Ratio of Adults to Children	2.5	1.7	1.3	2.2	7.0	1.8
First Year Any Member in Community	1970	1960	1940	1931	1929	1937
Average Years Living in Community	30	16	17	25	33	24
Household Social Type						
N of Retired Elder, Single Parent	1	0	2	3	0	3
N of Developing	0	2	2	1	0	2
N of Mature	0	1	1	5	1	0
N of Active Elder	1	1	1	0	1	1
N of Active Single	0	1	1	2	0	0
Employment						
N of Adults Employed	4	8	8	20	4	4
N of Adults Unemployed	0	1	1	3	0	1
N of Adults Not In Workforce	1	1	0	2	3	4
Total Months Employed	12.5	32.5	57.5	64.7	14.7	18.5
Annual Income (Dollars)						
Earned Income	8,000	44,240	81,297	180,396	43,000	8,982
Other Income	20,137	39,786	73,975	86,506	34,315	85,425
Total Income	28,137	84,026	155,272	266,902	77,315	94,407
Earned Income Per Capita	1,143	2,765	3,387	4,400	5,375	408
Other Income Per Capita	2,877	2,487	3,082	2,110	4,289	3,883
Total Income Per Capita	4,020	5,252	6,470	6,510	9,664	4,291
Wild Food Harvests (Edible Pounds Per Year)						
Salmon	1,931	2,435	4,661	7,843	3,623	2,141
Finfish	566	544	947	2,878	617	48
Shellfish	0	9	0	14	0	0
Game	3,252	5,755	5,558	6,491	544	1,620
Marine Mammals (Excluding Bowhead)	1,260	5,324	6,018	12,220	840	1,754
Bowhead Whale	0	0	0	0	0	0
Birds and Eggs	31	521	1,030	1,067	64	204
Plants	40	223	107	553	40	205
Total Wild Food Harvest	7,079	14,810	18,322	31,066	5,727	5,971
Wild Food Harvests (Edible Pounds Per Person Per Year)						
Harvest Per Capita (Excluding Bowhead)	1,011	926	763	758	716	271
Harvest Per Capita	1,011	926	763	758	716	271

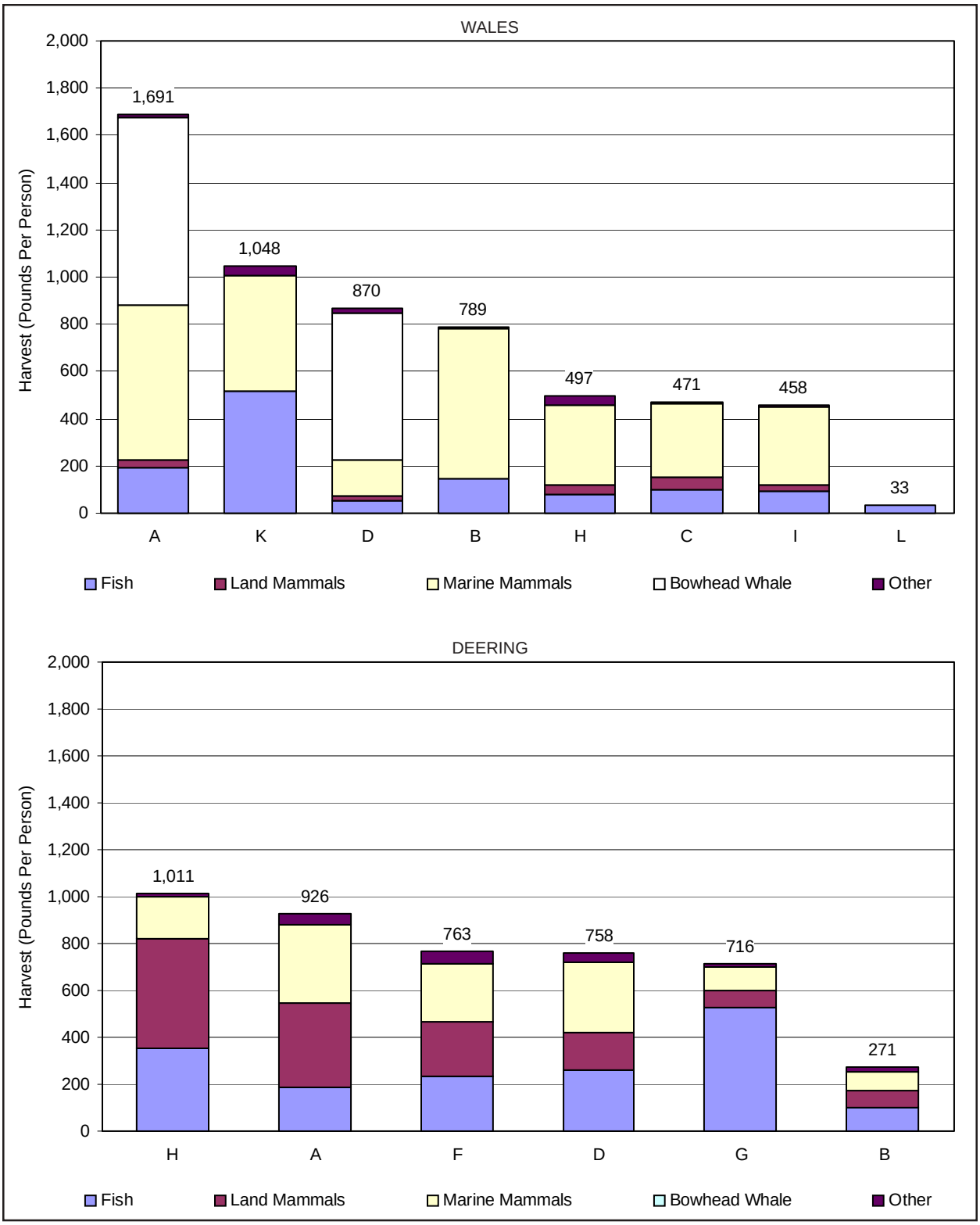

Figure 9-1. Subsistence harvests by network, Wales and Deering. Networks are sorted in order of declining harvests. In both Wales and Deering, one network of households reported substantially lower harvests than other networks. Wales L, a two-person network, reported an average harvest of only 33 pounds per person. Deering B, a 22-person network, reported an average harvest of 271 pounds per serson, less than a third of the average of other networks.

Figure 9-1 shows the estimated subsistence harvests by species category by network for Wales and Deering. Variation in per capita harvests among networks was less than the variation among households. This was especially apparent in Deering where every network, with the exception of Deering B, produced more than 700 pounds per capita (Figure 9-1, bottom). Since networks were, by definition, households that cooperated in wild food production, this illustrated the increased food security networks offered to households.

Variations in estimated harvests by networks were greater in Wales, where harvests ranged from 33 to 1,691 pounds per capita, than in Deering. Some of Wales' variation was caused by the harvest of a bowhead whale in the study year. That whale accounted for almost half the estimated harvest of the highest harvesting network, harvest which was widely distributed in the community. Still, per capita harvests of Wales H, C, and I were substantially lower than other networks, and most of that variation resulted from lower marine mammal harvests. Seventy eight percent of Wales subsistence harvest came from marine mammals. The data suggested that dependence upon a single species category, especially in a highly variable environment like sea ice, resulted in more variation in harvests even at the network level.

Each community had one network with substantially lower per capita production than any other network. Wales L reported a per capita harvest of only 33 pounds. Other Wales networks' harvests ranged from 458 to 1,691 pounds per capita, an order of magnitude greater. Deering B reported a harvest of 271 pounds per capita, compared with 716 to 1,011 pounds per capita estimated for the other networks.

Wales L consisted of two brothers in their 50s, living alone in separate households. Their only reported subsistence harvest was 53 pounds of salmon and 14 pounds of other fish. One brother reported working one month during the study year, and earning $800, otherwise their $21,656 in income was all unearned. The two households in Wales L clustered solely on the basis of three instances of production by one household for the other. One household in Wales L also reported three instances of production from household 25. The households in this network were facing challenging economic circumstances.

Deering B's situation was not so difficult. This network's estimated subsistence harvests, although less than a third the average harvest of the other networks, totaled almost a pound per person per day. Deering B, with 22 people and 6 households, was much larger than Wales L but, like Wales L, more than 90 percent of its income was unearned. Only 28.6 percent of the adults in Deering B reported employment, compared with 77.2 percent in other Deering networks.

The household development theory (Chapter 6) predicts that certain social types of households will be more productive than other types. Household social types included, in order of expected productivity: inactive (retired elder, inactive single person, and single parent), developing (heads 20 to 39 years old), mature (heads 40 to 59 years old), active elder (heads 60 or more years old), and active single persons. Compared with other networks, Deering B had a high proportion of the less productive types of households: three single-parent and two developing households. The sixth household in the network was an active elder household. According to the household development theory, only this house would be expected to be highly productive.

Looking at the other Deering and Wales networks in Tables 9-1 and 9-2, all but two contained more than one of the more productive household social types (mature, active elder, or active single). The two relatively productive networks with only one productive household type, Wales H and Deering H, were two-household networks. In other words, the data suggested that a single highly productive household was not enough to support an average-sized production and distribution network.

In Chapter 3, researchers summarized some of Burch's observations on local family organizations in the 19th century. According to Burch, the emphasis was on two basic types, the first organized around elder parents, their children, and grandchildren, and the second organized around two or more married siblings (1975:239). These same two structures were apparent in the Wales and Deering networks.

Researchers categorized the networks as parent-child or sibling networks on the basis of kin relationships between the eldest household and the other households in each network (see Figure 7-4 and

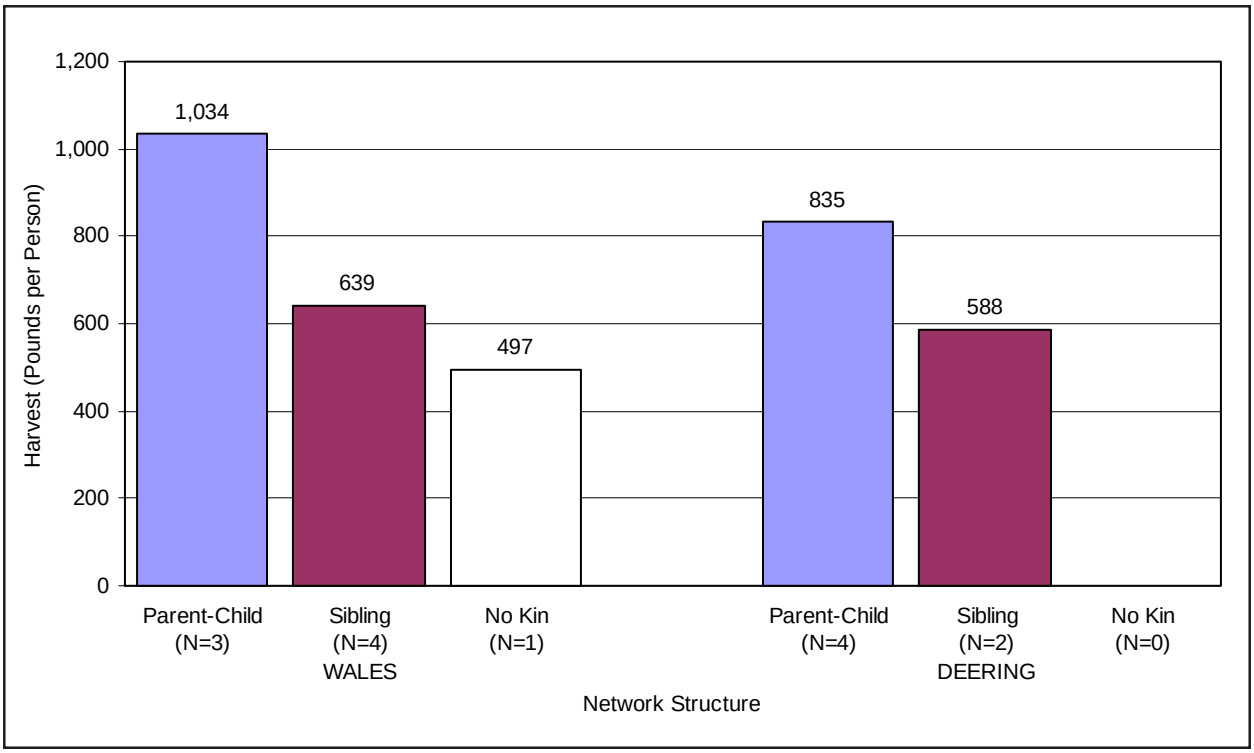

Figure 9-2. Per capita wild food harvests by network type, Wales and Deering, 1994. Controlling for network size, networks of households organized around parent-child relationships reported higher harvests than networks of households organized around sibling relationships. Parent-child and sibling networks reported similar levels of income.

Figure 8-5). A parent-child network – Deering A was typical – included one parent household and one or more additional households headed by the parent household's children or grandchildren. In a sibling network – Wales B was one – the eldest household was joined by one or more sibling's households, and (usually) additional households headed by the parents' and siblings' descendents.

Most networks sorted easily into one category or the other, but two did not. Wales D was categorized as a parent-child network, although it could be considered a sibling network because a nephew of the parent household also sorted into this network. However the nephew's mother, the potential sibling household, no longer lived in Wales and was not part of the network. Deering D was difficult to categorize, and may have deserved its own category. Eight of its 12 households were descended from three siblings, two of whom were still alive and part of the network. So in this analysis it was categorized as a sibling network. Several networks contained households with no kin relationships to the remainder of the network. These were not a factor in categorizing networks. In Wales H, no kin relationships were evident among any of the households, so that network was categorized as "no kin."

Of the eight networks in Wales, three were organized around parent-child relationships, four were organized around sibling relationships, and one did not appear to have a kinship basis. Of the six networks in Deering, four were organized around parent-child and two around sibling relationships.

In Wales, the parent-child networks were bigger, averaging 5.3 households and 18 people, compared with sibling networks, which averaged 4.3 households and 12 members. But in Deering sibling networks, with 8.5 households and 32 people on average, were much larger than parent child networks, with 4.0 households and 14 people on average, because of the exceptional size of Deering D, a sibling network.

Parent-child networks did not contain the eldest people. On the contrary, people in sibling networks were three years older on the average than people in parent-child networks (44.1 years compared to 41.1 years). The eldest men in each network were 5 years older on average in sibling networks than in parent-child networks (62.8 years compared to 57.8

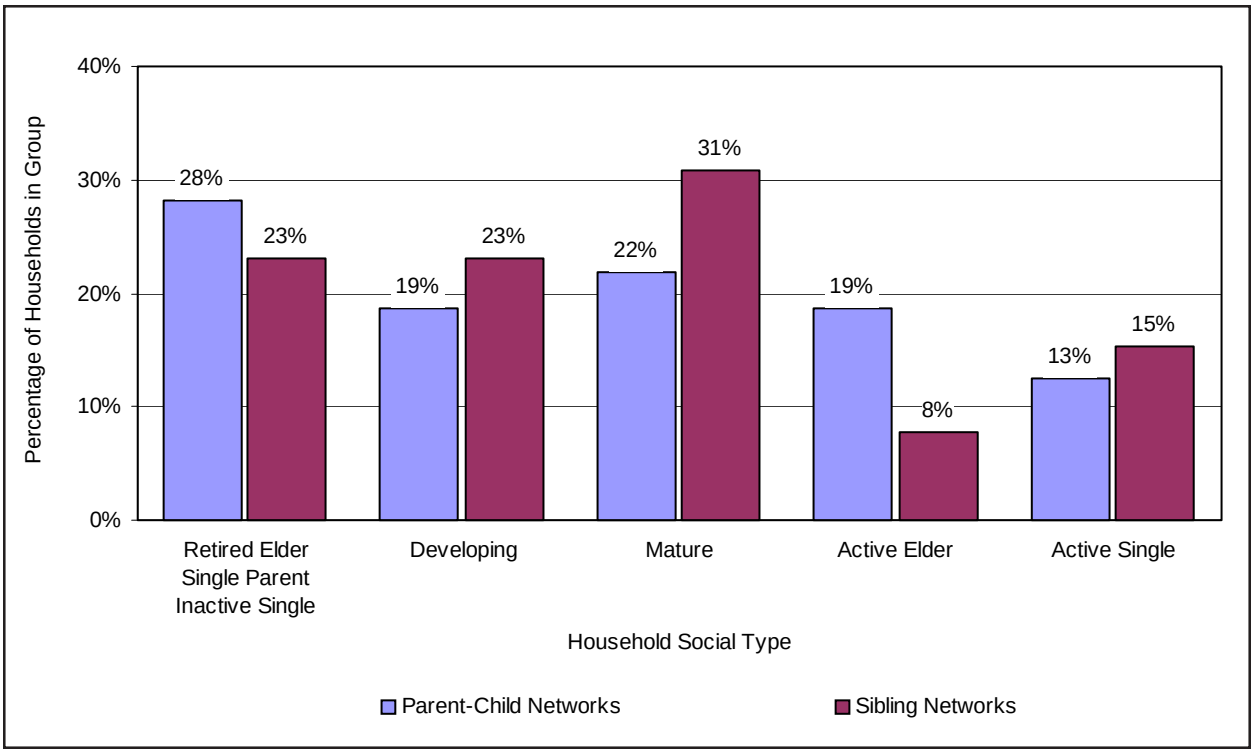

Figure 9-3. Proportion of household social types by network structure. Active elder households were twice as common in parent-child networks as in sibling networks, while mature and developing households were more common in sibling networks.This suggested that active elders played a key role in maintaining parent-child networks.

years). The eldest women in each network were almost exactly the same age on average (69.4 years compared to 70.0 years).

On a per capita basis, parent-child networks harvested substantially more wild food than sibling networks (Figure 9-2). In Wales, parent-child networks harvested 1,034 pounds per person, on average, while sibling networks harvested 639 pounds. The same pattern was evident in Deering, where parent-child networks harvested 835 pounds, and sibling networks harvested 588 pounds per person. The Wales network with no apparent kinship basis harvested less, on an average per capita basis, than the kinship-based networks.

In Wales, the difference in harvest levels by network type could be attributed to the harvest of a bowhead whale by members of two parent-child networks. But that did not explain the difference observed in Deering, where no bowhead whales were taken.

Researchers wondered whether parent-child and sibling networks contained similar proportions of the different social types of households (Figure 9-3). Proportionally, parent-child networks had twice as many active elder households as sibling networks, suggesting active elders were more likely to be associated with their children's households than with their siblings' households. Sibling networks had more mature households, proportionally, than parent-child networks. Otherwise, the two types of networks contained similar proportions of the different household social types.

Income did not vary as much as harvests among the different types of networks. In Wales, parent-child networks reported about 10 percent more earned and other income than sibling networks. In Deering, parent-child networks reported about 10 percent less income than sibling networks. Combining the two communities, parent-child and sibling networks reported almost exactly the same amount of earned and other income on a per capita basis.

In sum, survey data suggested the most productive situation was an active elder household at the head of a parent-child network that included at least one other productive type of household, either a mature or an active single person household.

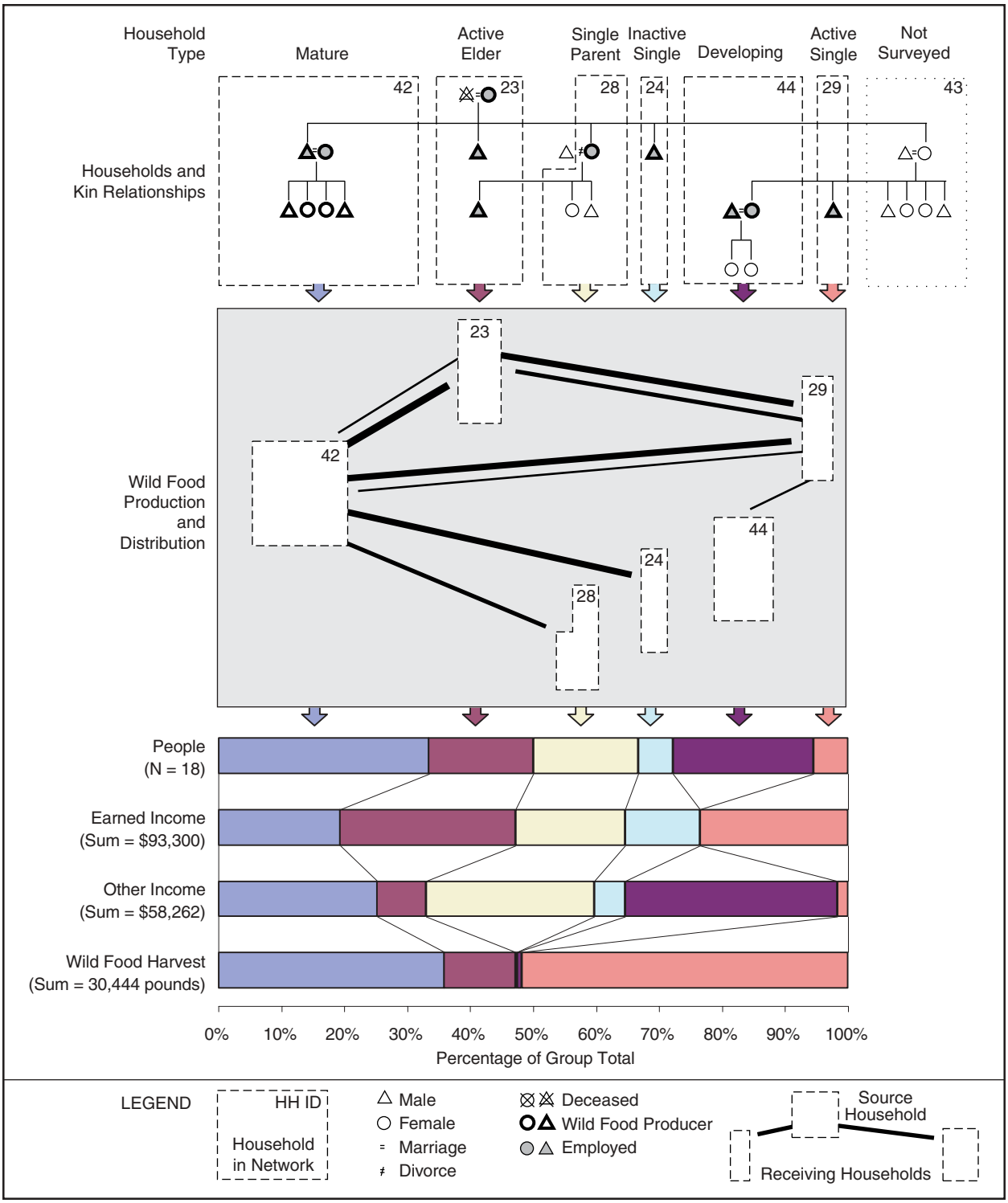

Figure 9-4. Characteristics of Wales A. Eighteen people in six households (top) were part of Wales A (a seventh possible member household was not surveyed). This parent-child network was organized around the elder widow in household 23. Her household and two others (households 42 and 29) accounted for 99 percent of the reported wild food harvest. Members of household 42 were named most frequently by other households in this network as wild food producers, contributing to every household except household 42.Every household except 44 reported some earned income, while households 42, 28, and 44 reported most of the other income.

Network Case Examples

The case examples in this section explore two of the most productive networks, one from Wales and one from Deering, as well as a relatively less productive Deering network. The examples review data on household social types, kinship, production, income, and wild food harvests from a network perspective. The production of the different social types of households in each network was apparent. In particular, the examples illustrated the role of active single households in each network, and highlighted differences between active single households in the two communities. The actual amount of income and wild food distributed among households in each network is unknown. However, networks were defined on the basis of cooperation in wild food production, so wild food was being distributed among the households within each network.

Wales A and Deering A both were parent-child networks headed by elder widows. The other households in each network were headed by the widows' children or grandchildren. Each network included a highly productive active single household, as well as most other household social types. They were of average size. Wales A included 18 people in 6 households. Deering A included 16 people in 5 households.

Deering B was a sibling network organized around two sisters' households, both elderly widows. The network included 22 people in six households. Three of the other households were occupied by the widow's children and grandchildren. The fourth household was occupied by a short-term resident of Deering, who reported receiving food from three of the other households in this network.

Figure 9-4 depicts Wales A, Figure 9-5 depicts Deering A, and Figure 9-6 depicts Deering B. Data about each household in the networks are arranged vertically, beginning at the top with household social type. The dashed boxes represent households, with each household's identification number in the upper right hand corner. The symbols within the boxes represent people in the network and their kin relationships with one other.

The shaded rectangle below the households is a schematic diagram of production data; these same data appear in Table 7-2 and Figure 7-3 for Wales and in Table 8-2 and Figure 8-4 for Deering. Production data for households outside the networks are not shown. The lines depict the level and direction of production between each pair of households in the network. The thicker the line, the more instances of production were reported.

The bars at the bottom of the figures represent the proportional contribution of each household to the network's population, earned income, other income, and wild food harvest. One way to look at the figures is to view the first bar in this chart as each household's available labor, and the next three bars as the production of cash and wild foods by each household. Clearly, some households were more productive than others, and households were productive in different sectors.

Turning now to Wales A and looking at the wild food production schematic in the center of Figure 9-4, household 42 produced wild food for every household in this network except household 44. Household 29 produced wild food for three other households. In particular, these two households helped support the elder widow head of the network in household 23. Households 28, 24, and 44 were not named as producers by any other households in this network or in Wales.

Looking at the bar chart showing people, income, and harvests by household, the mature family in household 42 (on the left of the figure) contributed in every sector. With 33 percent of the network's population, household 42 reported 19 percent of the network's earned income, 25 percent of the network's other income, and 36 percent of the network's wild food harvest. The single parent family in household 28 had 17 percent of the network's population, reported 17 percent of the network's earned income and 27 percent of the other income, but contributed only 0.2 percent of the wild food harvest.

Looking at earned income, the disproportionately small contribution of household 44 and the disproportionately large contribution of household 29 were apparent. Looking at other income, disproportionately large contributions came from the single parent and developing households, who contributed virtually nothing to the network's wild food harvest.

Significant amounts of wild food production were reported by only three households: the mature couple in household 42, the elder widow, her son, and grandson in household 23, and the active single man

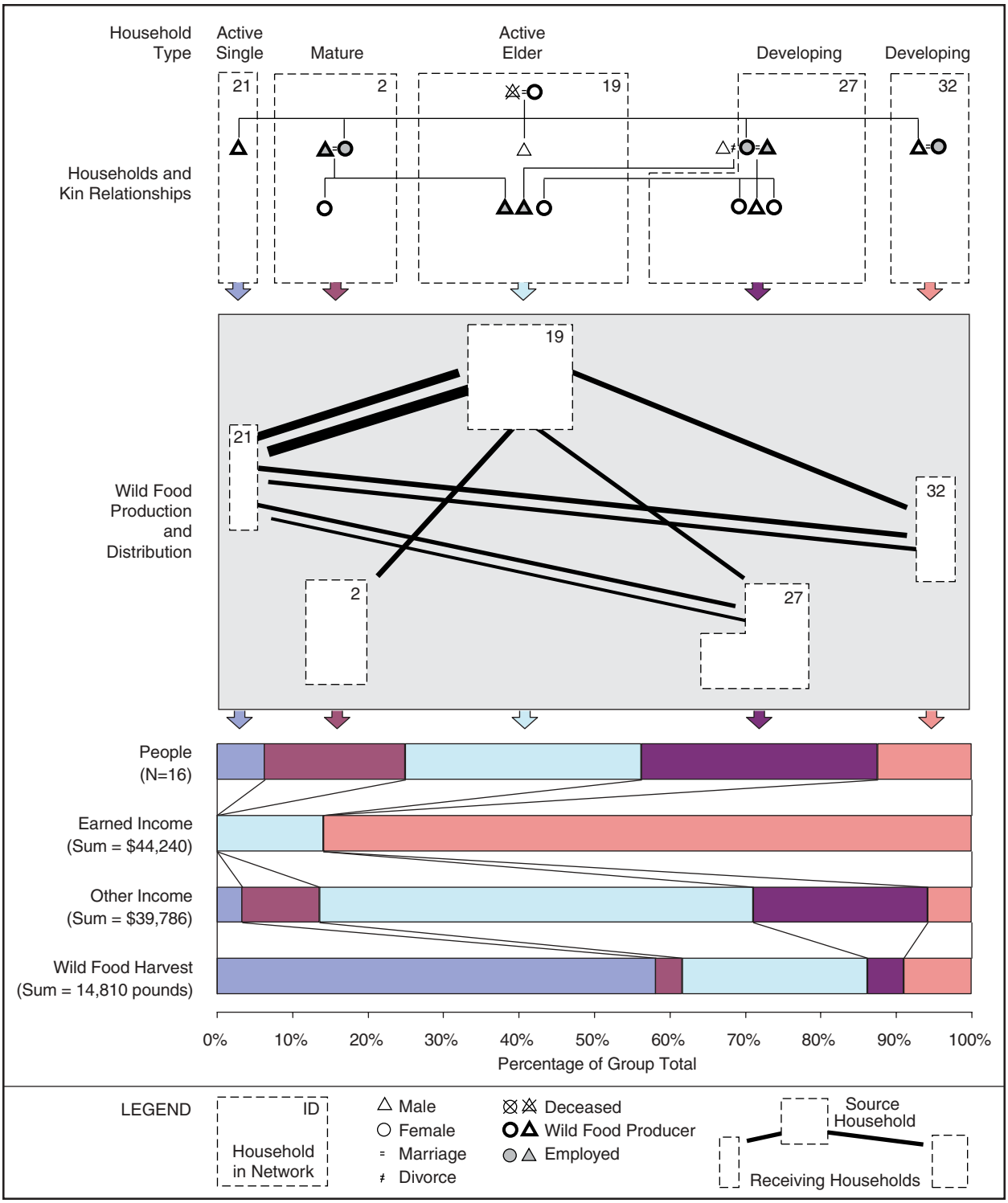

Figure 9-5. Characteristics of Deering A. Sixteen people in five households (top) were included in Deering A. As was Wales A, this network was organized around an elder widow (household 19). This elder and her single son in household 21 reported 82.7 percent of the network's total wild food harvest, which both the elder and the single man redistributed to all the other households in the network. The childless young couple in household 32 (right) accounted for 86 percent of the earned income, while the elder widow accounted for 57 percent of the other income. Note that the single man in Deering household 21 reported little earned income, compared with Wales household 29.

in household 29. Of these, household 42 was most frequently named as a producer by other households in the network, and the active single man in household 29 was by far the most productive, accounting for 52 percent of the network's harvest. Households 28, 24, and 44 were almost totally dependent on households 42 and 29 for their wild food.

Household 29 reported harvesting an estimated 8,617 pounds of wild foods, the largest total harvest of any household in Wales. That does not include his share of a bowhead whale taken in the study year, for which he was credited with an additional 7,169 pounds, for a total estimated harvest of 15,786 pounds. His was by far the most productive household in the entire study.

Three other households in Wales, all in this network, reported that the man in household 29 contributed wild foods to their households: his elder mother in household 23, his uncle and aunt in mature household 42, and his sister and brother-in-law in developing household 44. The survey did not anticipate the harvest of a bowhead whale, and thus did not include questions about whale production. Presumably household 29 shared his portion of the whale with the other households in his network.

Turning now to the second case example, Deering A included every type of household except inactive (Figure 9-5). Again, the network was organized around an elder widow, her children, and her grandchildren. Again, only three households were named frequently as producers of wild foods. Household 19, the elder widow, was named as a producer by all four of the other households in this network, and was named most frequently by her son, a single man living in household 21. This man also was named frequently as a producer by his mother, and by two of the other three households in this network.

In contrast with the households in Wales A, only two households in Deering A reported any earned income, the active elder household 19 and the childless couple in household 32. The active elder household also contributed 57 percent of the other income.

Two households accounted for 82.7 percent of the Deering network's harvest: the active single man in household 21, and the active elder and her descendents in household 19. Two developing households contributed a relatively small proportion of the network's harvest. The mature household, in exception to the household development theory, contributed a relatively small amount of wild food.

The active single man in Deering household 21 reported the second largest total harvest in Deering, 8,605 pounds in 10 of 12 resource categories. The only larger household harvest reported in Deering was 11,574 pounds, by a household of 7 people. Five other households in Deering reported production by household 21, three in his own network and two in other networks. For his mother in household 19, he harvested salmon, other fish, caribou, plants, and berries. For his sister's family in household 27, he harvested caribou, birds, and eggs. For his brother's family in household 32, he harvested caribou, moose, and bearded seal. He also processed salmon for his mother, and caribou for his mother and brother.

In both of these case examples, active single households were by far the biggest contributors to their networks' harvests. But the two example households reported very different employment histories and incomes. On the one hand, Wales household 29 reported 12 months of employment, which earned $22,000. On the other hand, Deering household 21 reported no employment at all during the study year, and only $1,309 in other income.

How could this single man in Deering afford the equipment and supplies to support his high productivity? Presumably, other households were providing him with gasoline, ammunition, and other hunting and fishing supplies. The survey did not ask about the distribution of income and supplies. However, the survey did ask households whether they had used camps and equipment belonging to people in other households and, if so, whose and what type.

No household in Deering reported using as many other households' camps and equipment as household 21. One obvious question was whether Household 21 reciprocated for the use of camps and equipment with wild food. In two of the five cases, he did. Household 21 was named most often as a producer by his mother's household, who provided him with a snowmachine and named him in 11 different instances of production. He used households 34's fish camp, and they named him in three instances of production involving caribou and fur bearers. Households 22, 23, and 35 reported no production by household 21.

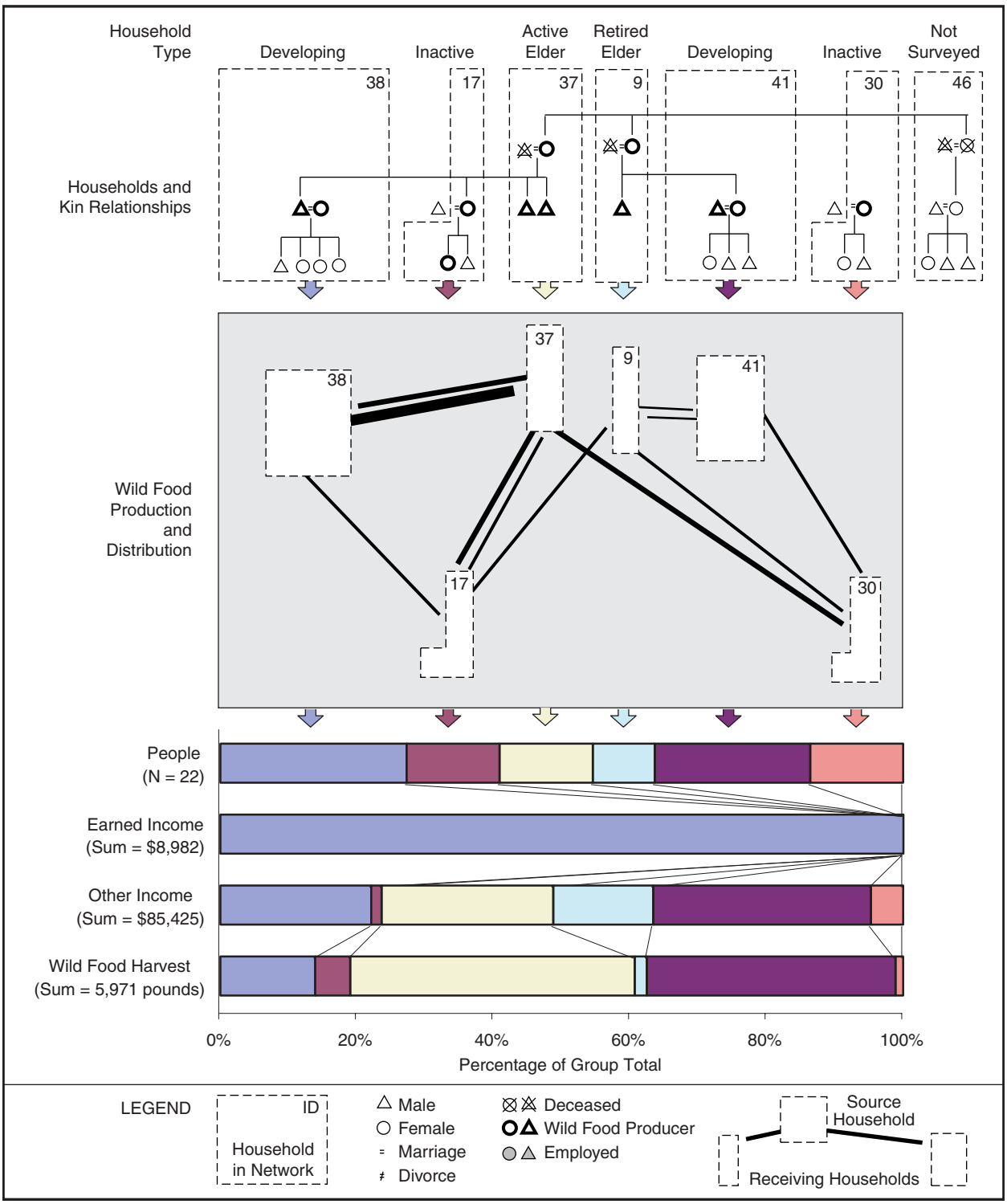

Figure 9-6. Characteristics of Deering B. Twenty two people in six households (top) were included in Deering B. This group was categorized as a sibling group, organized around the two elder sisters in households 37 and 9. This was Deering's least productive network, with a per capita wild food harvest only a third as much as other Deering networks, and its reported earned income only one eighth as much. Household 38 accounted for all the earned income, while households 38, 37, and 41 accounted for 92 percent of the total wild food harvest. Household 30 was a short-term resident with no close relatives in Deering, which sorted into this group because three other members sharedwild food.

Turning now to the third case example, Deering B was headed by elder sisters, one an active subsistence harvester, the other inactive (Figure 9-6). The remaining members of the network were households headed by the sons and daughters of the two sisters, as well as an inactive unrelated, short term resident family in household 30. Household 46 may have belonged in this network, but was not surveyed.

Researchers expected that cooperation between elder siblings would have been a defining characteristic of sibling groups; that was not the case in this group. Rather, the group was defined primarily by the elder siblings' production for and distribution to the relatively unproductive households in the network, households 17 and 30. Households 17 produced for both the elders (the only households in this group to do so). Otherwise, the elders depended primarily on their own children's households.

Missing from this group was a singularly productive household, a role filled in other networks by active single male households. The only type of household expected to be highly productive was the active elder in household 37, and indeed household 37 had the largest single household harvest, 2,487 pounds. In the other two case example networks discussed above, that level of harvest would have been a relatively minor contribution (8 and 17 percent of the total), but in this network it accounted for 42 percent of the network's total harvest.

Every household in this network but household 30 relied substantially on unearned income, which provided 90 percent of the network's total income. It is worth noting that the least productive network in Deering, in terms of subsistence productivity, also had the greatest reliance on transfer payments.

The pattern of wild food production in all three networks was consistent with the household development theory. The developing households had very low subsistence harvests, while the mature, active elder, and active single households accounted for almost all the networks' wild food harvests. This subset of productive households distributed wild foods to other households in the network. In the parent-child networks, the active elder households made substantial contributions in each sector: earned income, other income, and wild food harvests. In these two networks, at least, this was the only type of household to do so.

Income and Subsistence Productivity

Individuals and families in rural Alaska had decide about how to use their limited labor, capital, and resources. They had to decide whether to work for wages (assuming jobs were available) or to harvest wild food. Assuming they had cash, they had to decide whether to invest that cash in equipment and supplies for wild food harvesting, or to spend it for wild foods and household supplies.

Survey data indicated that households used additional income for both purposes. Households with higher incomes harvested more wild foods (suggesting investment), and bought more commercial food. Additional support for the investment hypothesis came from a moderately strong positive relationship between earned income and subsistence productivity at the household level (Chapter 6).

Researchers looked for associations between income and harvests among and within subsistence networks. This analysis first explores data at the household level, then at the network level, and finally at the household level within networks. A limitation to the analysis was incomplete income data for 9 of 55 households, primarily earned income. In Wales, four households from four networks did not report all of their earned income. As an indication of the amount of missing earned income, these households accounted for 9.9 percent of the total months worked in Wales. In Deering, five households from four networks did not report all of their income. These households accounted for about 21.8 percent of the total months worked in Deering.

Figure 9-7 shows per capita subsistence harvests and incomes for households in Wales (top) and Deering (bottom). Households with missing income data are shown separately, at right. In Wales, the two households that reported the highest per capita harvests reported the second and third highest incomes. Also in Wales, the household reporting the highest per capita income reported a very low harvest. In Deering, the two households with the highest per capita harvests reported below average incomes. All four of the high-harvesting outliers were active single person households, whose per capita harvests ranged from 5,362 to 8,605 pounds. Survey data showed these four households were reported as producers 49 times. Of those 49 instances, 44 were reported by other households in their own

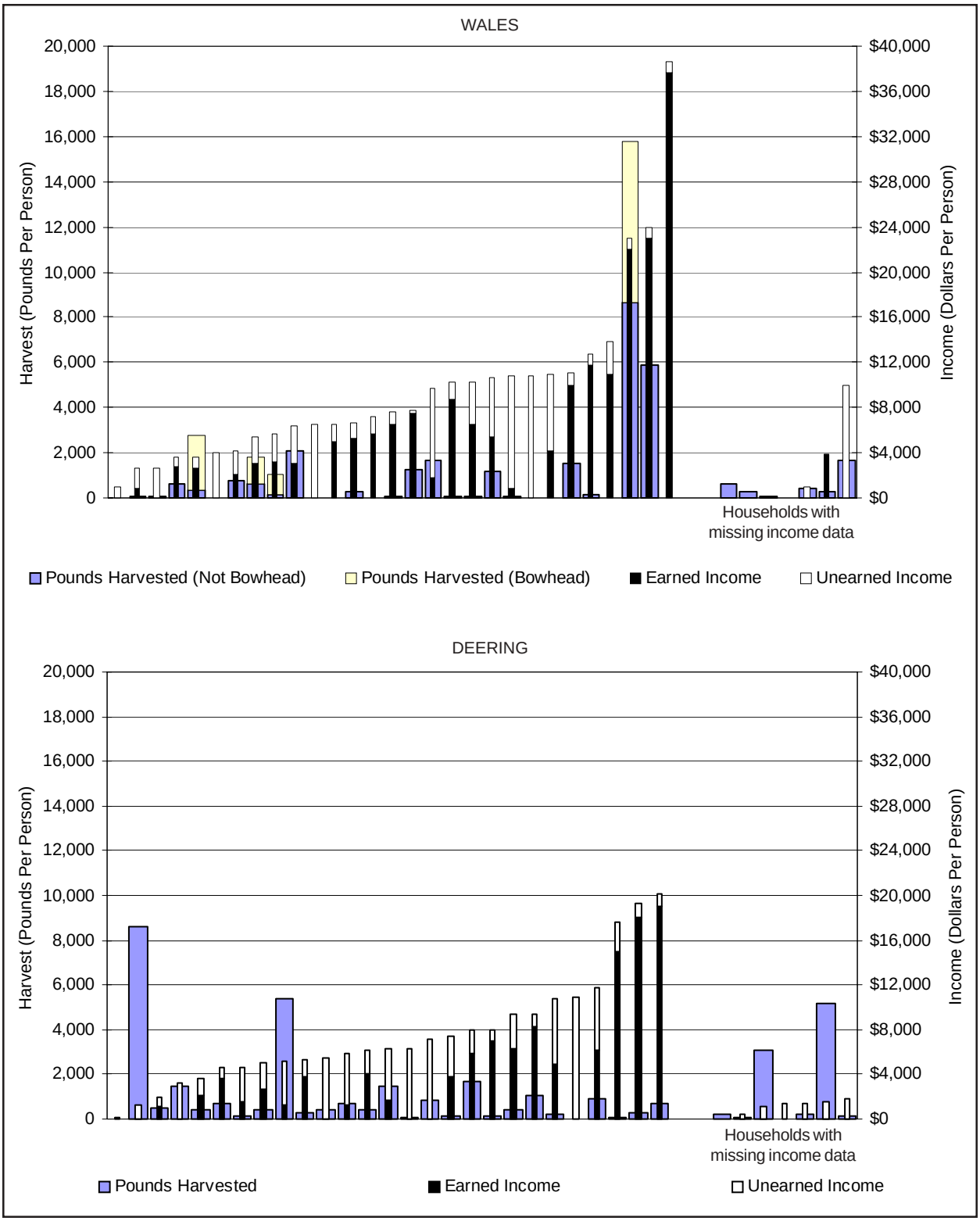

Figure 9-7. Wild food harvest and income by household, Wales and Deering, 1994. Controlling for household size, household harvests in Wales tended to increase as earned incomes increased (top). In Deering, harvests tended to decrease as earned incomes increased. In both communities, relationships were strongly influenced by several outlying households. Households with missing income data for any individual in the household were not included.

networks and only 5 by households outside their networks.

Figures 9-8 (for Wales) and Figure 9-9 (for Deering) show per capita incomes and harvests by network and by household within each network, sorted in order of increasing income. Wales L had the highest per capita income (almost all unearned), and the lowest per capita harvest (Figure 9-8, top). It was an anomalous case, as discussed above. Second in per capita income was Wales B, which reported an average per capita harvest. For the remaining six networks, harvests increased with incomes.

The bottom graph in Figure 9-8 shows incomes and harvests for each household in Wales, sorted by network. The networks are sorted as in the top graph, in order of increasing income. The households in each network also are sorted in order of increasing income. From this perspective, the positive relationship between income and harvests appears much stronger. In almost every network in Wales, the high income households also were the high harvesting households. This was true for Wales I, H, K, A, and B. In Wales C, the second highest income household had the highest harvest. Only one network, Wales D, differed from this pattern.

The data suggested that cash was being used to capitalize subsistence harvesting in Wales. The data also suggested higher income households' cash was not being used to capitalize other households, because the higher income households also reported higher harvests. In other words, the higher income households were using their own cash to capitalize their own wild food production, then redistributing the harvest to other households in their own networks. In some cases, these other households were providing labor for marine mammal crews.

In Deering, a different pattern was apparent (Figure 9-9, top). With the exception of Deering B, network harvests decreased as incomes increased, although variation among networks in both harvests and incomes was less in Deering than in Wales. Looking at incomes and harvests within networks (Figure 9-9, bottom), the lowest income households reported the highest per capita harvests in Deering H, A, and D. Only in Deering G, a small network with the highest per capita income, did the higher income household produce the higher harvest.

What might explain the different patterns of income and harvest in two similar rural communities? Researchers explored that question in interviews with key respondents from the study communities.

The highest per capita harvests reported in both communities were from active single-person households producing for multiple households. Their incomes had a substantial affect on income-harvest relationships at both the household and network levels. In Wales, the four high harvesting networks each included an active single household, but none of the four lower harvesting networks did (Table 9-1). In Deering, active single households also appeared in higher harvesting networks (Table 9-2).

The definition of "household" may have been a confounding factor. Some single person households may have been, functionally, detached bedrooms associated with other households. The low level of personal income reported by Deering active single households, only $4,263 annually on average, seemed insufficient to support an independent household actively engaged in subsistence harvesting. In contrast, Wales active single households reported $17,800, on average, which would have more adequately supported an independent household. This may be an example of the limitation of using households as a unit of analysis in rural Alaska.

Another factor affecting single person households' harvests in Deering may have been barter hunting. The survey did not ask respondents about barter transactions, but key respondents said some Deering men hunted caribou for other households in exchange for gasoline, ammunition, or supplies. Barter hunting would explain some of the higher harvests reported by low income, single person households, who would be motivated to hunt for barter if they had the equipment to do so.

During the study year, temporary jobs cleaning up a military site were available in Wales. Researchers wondered if that might account for higher incomes among single person households in Wales. Survey data showed that the high income single person households in Wales held jobs primarily in local government and education, not clean-up labor. These jobs were more likely to be permanent than jobs in construction or general labor. In other words, high incomes reported by single person households in Wales did not appear to be from temporary jobs.

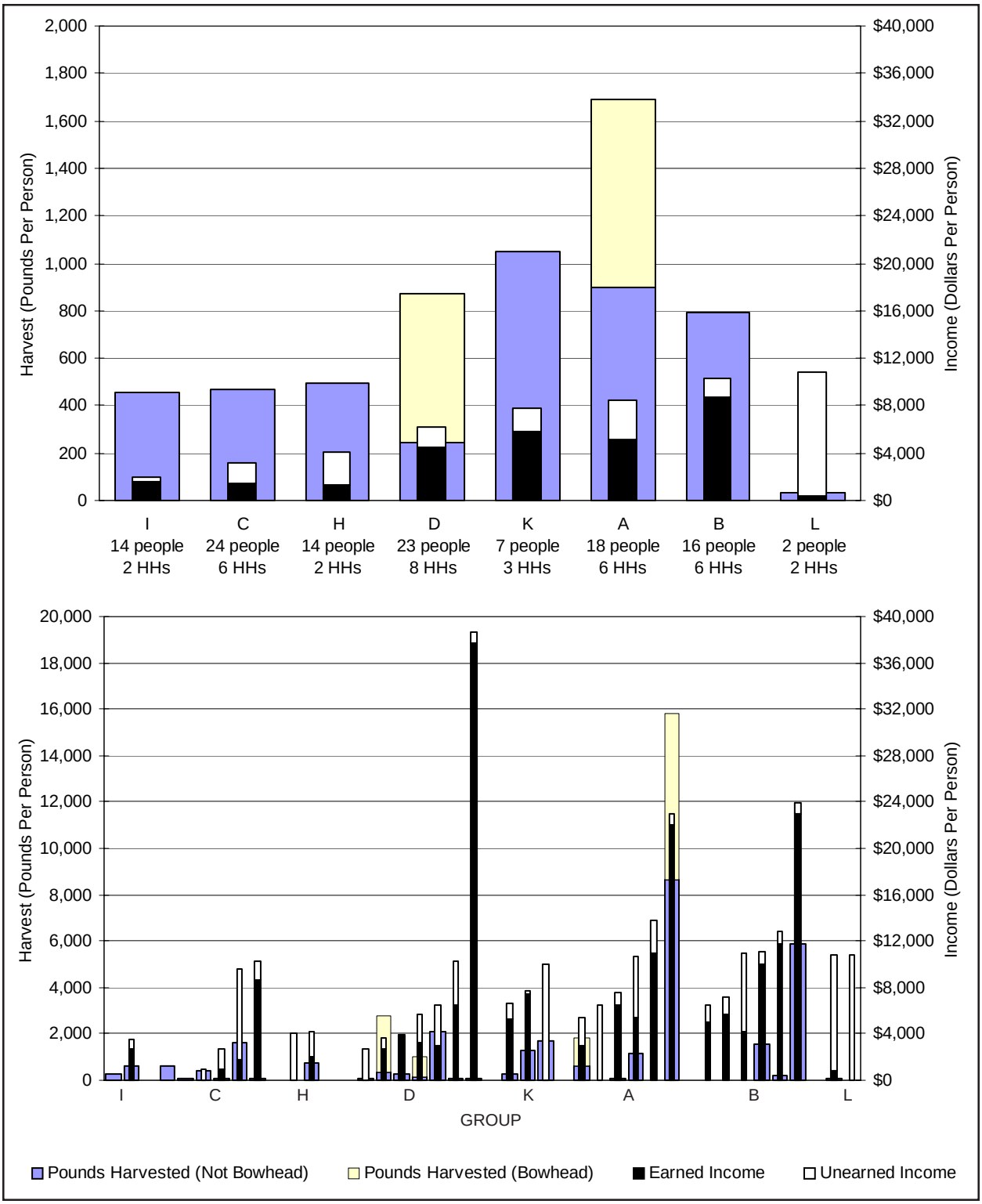

Figure 9-8. Harvests and incomes by network and by household, Wales 1994. Wide columns represent harvests of wild food. Narrow columns represent earned and unearned income. At top, income and harvests are aggregated by network. Network harvests tended to increase with increases in income, except for the two highest income networks (B and L). At bottom, the household data shown in Figure 9-7 are shown again, sorted by income within each network. In Wales I, H, K, A, and B, the highest harvesting households also were the highest income households.

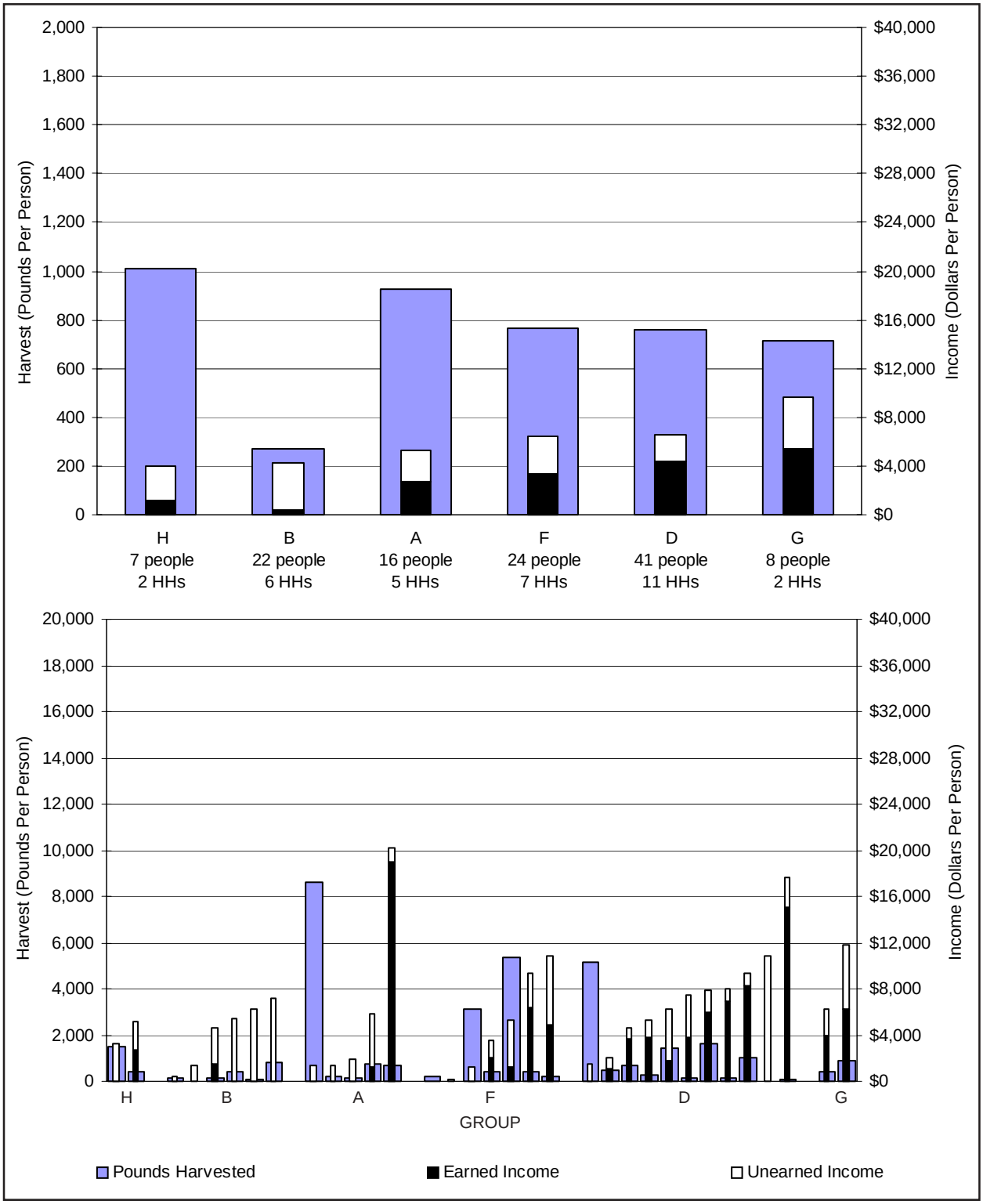

Figure 9-9. Harvests and incomes by network and by household, Deering 1994. In Deering, network harvests tended to decrease with increases in income, except for Deering B. The same pattern was evident within networks (bottom), where high harvesting households tended to be among the low income households in each network. This was the reverse of the situation in Wales (Figure 9-8). The lowest income households had the highest harvests in Deering H, A, and D. Deering B resembled Wales L; both had relatively low earned incomes and wild food harvests.

Key respondents and researchers agreed Wales' marine mammal focus also may have been a factor in income-harvest relationships. That focus was a function of resource abundance, community location, and cultural traditions. Hunting marine mammals required a crew of several men, a seaworthy boat, a dependable outboard motor, and specialized hunting equipment like harpoons and floats. Hunting bowhead whales required additional investment in a skin boat and whaling weapons. A successful whale hunt was followed by a celebratory feast, which could be as expensive as the hunt itself.

Deering also harvested marine mammals, but in calmer seas and with smaller boats. In addition, Deering had a more diverse mix of wild resources, in particular caribou. Caribou were not available near Wales, but near Deering it was possible for a person on a snowmobile to harvest substantial numbers of caribou.

In addition to the missing income data, one of the limitations of this analysis was the small number of networks, eight in Wales and six in Deering. A single anomalous case could substantially affect results.

A criticism of this analysis is that researchers removed some households and networks, including nine households that did not cooperate in wild food production and eight households in two networks that did not fit the general pattern of incomes and harvests in the study population. Researchers were not suggesting that all households cooperated in wild food production, or that all cooperative networks were equally productive. Rather, researchers were attempting to understand how the productive networks were organized and how they functioned.

Wales and Deering networks presented different evidence for an association between income and harvests. In Wales, on the one hand, the higher income households in each network produced the most wild foods. On the other hand, Deering illustrated the important role of lower-income active single households.

10
Management Issues

In theory, how people organized the production and distribution of wild food was a secondary issue for state and federal governments. Managers' ostensible focus was on biological issues – maintaining natural and healthy populations or achieving maximum sustained yield – and not on organizing society.

In practice, governments did control the organization of wild food production and distribution. Managers worked in a legal framework of constitutions and laws and regulations loaded with cultural values and beliefs which impacted the organization of hunting and fishing (Wolfe 1992, Usher 1982, Lent 1999:268). When members of one society managed another society, as was the case in most areas of rural Alaska, there could be profound affects on the organization of hunting and fishing.

For example, it was illegal to sell big game permits, but legal to sell commercial salmon permits or commercial halibut quotas. Subsistence fishing permits were issued on a household basis, while big game hunting permits were issued to individuals. Alaskans' desire to reorganize commercial salmon fishing by wresting control from out-of-state fish packing companies and returning it to individual Alaska fishermen was one of the issues behind Alaska statehood (Naske and Slotnick 1987:102).

So whether harvests occurred in commercial fisheries, recreational hunts, or subsistence hunts, management involved much more than the timing and size of the harvests. Management also affected people's freedom to decide where, how, and even with whom to hunt and fish, and what people could do with wild foods once they were harvested.

Compared to most people in the United States, residents of Wales and Deering were free to organize wild food production as they wished. As coastal Alaska Natives, they were eligible to hunt marine mammals. As rural residents, they were eligible to participate in federal hunts and fisheries. As Alaska residents, they were eligible to participate in state hunts and fisheries. They were remote enough from both urban and regional centers that competition was inconsequential for most species.

But compared to their pre-contact situations, Wales and Deering residents were constrained, especially for big game species. Because of strong hunter demand, big game species were closely managed. Although caribou were not always abundant in northwest Alaska, at the time of this study, the western Arctic herd numbered 450,00 caribou, an historic high. Caribou season was open year round, with a bag limit of 5 to 15 per person per day (depending on the area). Moose were much less abundant, and were more recent immigrants to the northwest Arctic. Moose seasons ranged from two weeks to eight months (depending on the area), with a bag limit of one moose per person per year. Consequently, people were free to organize caribou harvesting more or less as they wished, but were more constrained by regulation in the harvest of moose.

Differences between moose and caribou regulations provided an opportunity to explore how management may affect the organization of production and distribution for two similar species. Deering was much more dependent on big game than Wales. So this chapter looks at some apparent affects of state and federal management on the production and distribution of moose and caribou in Deering. The data illustrated how management may affect subsistence production and distribution, and the efficiency of subsistence systems in general.

Caribou and Moose in Deering

In 1994, Deering residents harvested an estimated 27,768 pounds of large terrestrial mammals ("big game"), 28 percent of the total community harvest of wild foods. The estimated harvest of large mammals included 141 caribou with an edible weight of

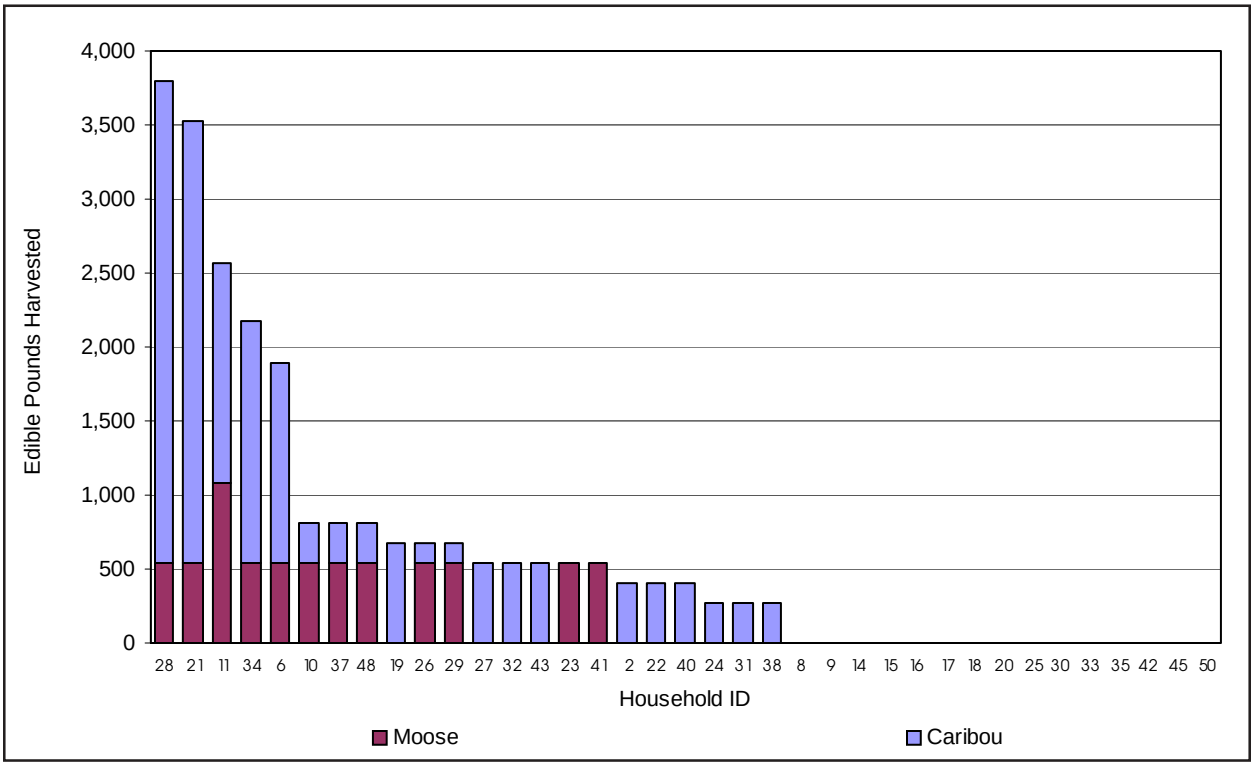

Figure 10-1. Moose and caribou harvests by household, Deering, 1994. About two thirds of the households in Deering harvested caribou, while about one third harvested moose. Caribou harvests varied from 0 to 3,264 pounds per household (0 to 24 caribou), while moose harvests varied from 528 to 1,076 pounds per household (1-2 moose).

about 19,200 pounds, and 15 moose with an edible weight of about 8,300 pounds.

Figure 10-1 shows the harvests of moose and caribou reported to surveyors by Deering households in 1994. Harvests were reported as numbers of animals. Animal numbers were converted to edible pounds using standard conversion factors (136 pounds per caribou and 538 pounds per moose) to allow comparison among species. Variation in individual animals' weights was not known.

Although 95 percent of Deering households used big game, only 62 percent of households harvested big game. In other words, a third of Deering households received their big game through a distribution of the harvest.

Figure 10-2 shows the harvest and distribution of caribou and moose by Deering households in 1994. The households in Figure 10-2 are in the same position as in Figure 8-4, that is, they are sorted into subsistence networks. But in Figure 10-2 households are represented by pie charts rather than polygons. Each pie chart represents a potential harvest of 3,802 pounds (the maximum reported by any one household). The shaded portions of each pie chart represent the edible weight of the caribou and moose harvested by each household (the same data as in Figure 10-1). The clear portion of each pie chart represents no harvest. A clear pie chart with a single vertical line indicates a household which reported no harvest of caribou or moose.

As in Figure 8-4, lines connecting the households represent moose or caribou harvested by one household and distributed to another (the respondent household). The lines are connected to the harvesting household, and disconnected from the consuming household. The precise amount of moose or caribou distributed among households was not known.

Harvests of caribou varied from 0 to 24 animals per household. Harvests of moose varied from 0 to 2 moose per household; only one household took two moose. Sixty percent of the total community harvest of caribou and moose was taken by 14 percent of the households – households 28, 21, 11, 34

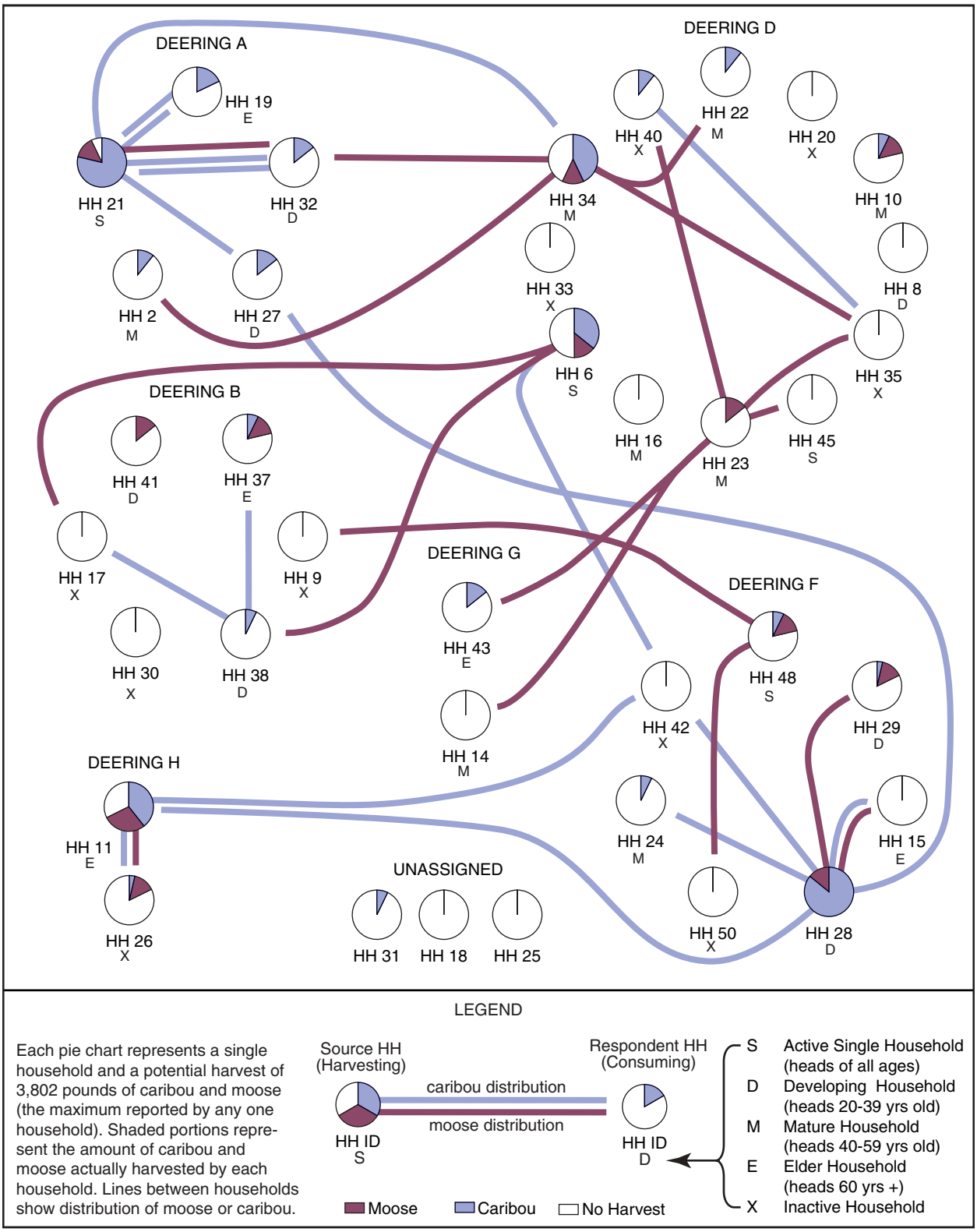

Figure 10-2. Harvest and distribution of large terrestrial mammals, Deering, 1994. Twenty two Deering households harvested moose and caribou in 1994, and half of those households distributed meat to other households. Two households were particularly important in the distribution effort. Households 21 and 28 reported harvesting a third of Deering's total community caribou harvest, and distributed that harvest to eight other households in four networks.

and 6. Of the 20 households that harvested moose or caribou, these 5 households each harvested three to seven times as much moose and caribou as the average harvested by the other 15 households. These five households' productivity was not limited to caribou and moose. They all were active harvesters of marine mammals and fish, and ranked first through fourth and sixth in total wild food harvests among all Deering households surveyed in 1994.

Not all the households that harvested moose or caribou distributed meat. Twenty two households harvested moose or caribou, but only 11 of those households were reported as distributing meat by other households. Of the 20 caribou harvesting households, 10 households (50 percent) distributed caribou to other households. Of the 12 moose harvesting households, 8 households (66 percent) distributed moose to other households.

Six households were named by at least five other Deering households as sources of caribou and moose. These included the five high harvesting households and, in addition, household 23 (which harvested one moose).

For the harvest and distribution of caribou, two households were particularly important. Household 21 in Deering A took 22 caribou and household 28 in Deering F took 24 caribou. Together, these two households accounted for 38.7 percent of the reported caribou harvest, and 32.6 percent of the estimated total caribou harvest by Deering households in 1994. They distributed caribou to nine other households in four networks.

For the harvest and distribution of moose, two different Deering households were particularly significant, households 23 and 34, both in Deering D. Each harvested one moose, and distributed portions of those moose to nine other Deering households. Households 21 and 28 also distributed moose, but not as extensively as caribou.

Household 11 harvested two moose, the only Deering household to do so, and distributed moose to one other household. (Household 11 was the elder head of a parent-child network that probably included two additional households which were not surveyed. These two households probably also received moose from household 11. See Figure 8-5.)

Figure 10-3 shows the cumulative harvests of caribou and moose on a percentage basis, sorted from highest to lowest household harvest. The x-axis is the percentage of households in the community, while the y-axis is the percentage of each species' harvests. It is similar to Figure 6-1, which included all resources in both study communities.

The five high harvesting households (14 percent of Deering's households) harvested 10,744 pounds of caribou (66 percent of Deering's total caribou harvest). By comparison, the same five households harvested 3,228 pounds of moose (46 percent of Deering's total moose harvest).

Figure 10-3 also illustrates differences between the harvests of caribou and moose in Deering. Caribou were harvested by more households than moose, and caribou harvests were much more varied than moose harvests. The concentration of caribou harvests in a few households is indicated by the steep initial slope of the caribou line in Figure 10-3. The variation in caribou harvests was evident in the changing slope of the caribou line. A similar degree of specialization and variation was evident for harvests of bearded seal, whose harvest was minimally regulated. Of all the major species in Deering's subsistence harvest, variation in household harvests was lacking only for moose.

Several factors could account for the differences between caribou and moose harvests. Caribou usually were found in herds while moose were more likely to be solitary or in small groups, so it was more likely that several caribou could be taken at one time. Caribou were farther away from Deering than moose, so it was more efficient to take several caribou at a time. Caribou were smaller than moose, so a typical sled could hold several caribou, but only one moose. But

Harder to explain were the differences between bearded seal and moose harvests. Bearded seal usually were found alone, like moose. Although bearded seal were found in the ocean and moose on land, moose often were taken in the fall and transported home in boats, like bearded seal. Bearded seal could be taken close to Deering, like moose. Bearded seal were slightly smaller than moose, but not nearly as small as caribou.

Another factor in the different harvest patterns was the differences in regulations. There were no regulatory limits on the harvest of bearded seal, and the limits on caribou were so liberal as to have little

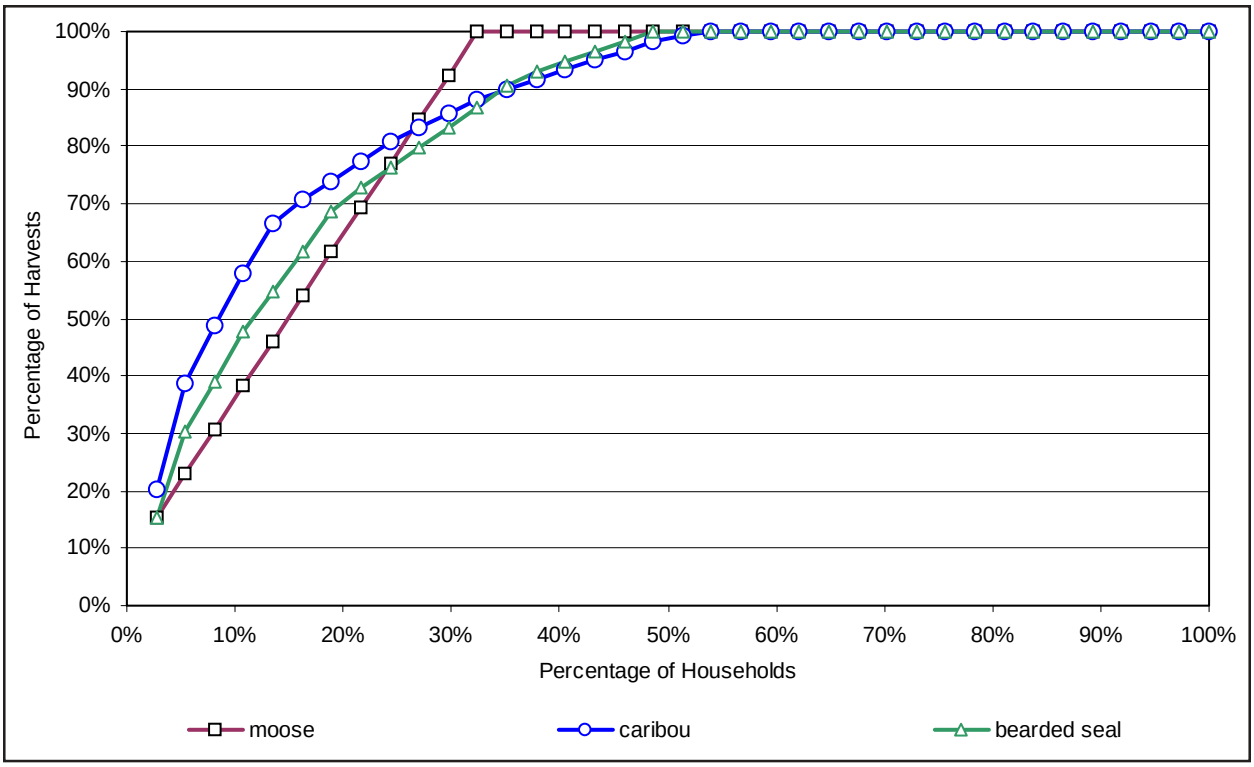

Figure 10-3. Cumulative harvests of moose, caribou and bearded seal, Deering, 1994. Caribou and bearded sesal harvests were much more varied than moose harvests. Three households accounted for 50 percent of the community caribou harvest. Hunting regulations were one likely factor in the differences in hunting patterns observed for moose, on the one hand, and for caribou and bearded seal, on the other.

affect. For moose, each hunter was limited to one moose per year. Because of these regulatory limits, people were free to organize caribou and bearded seal production as they saw fit. They did not have the as much freedom for moose.

Affects of Management

Harvest patterns suggested that bag limits did affect the organization of moose production in Deering in 1994. Bag limits also may have affected caribou production in the past. Until mid June 1976, there had been no closed season and no bag limit for caribou for the Western Arctic Herd. In 1975, Department of Fish and Game biologists reported an unexpected and dramatic decline in the caribou herd. In September 1976, The Alaska Board of Game scheduled a special meeting to consider proposals restricting the caribou hunting.

Robert Newlin, an *Iñupiat* elder and chairman of the board of the NANA Regional Corporation, traveled to Fairbanks to testify on the proposed changes. Newlin recognized the need to reduce harvests, but he disagreed with the state's approach. In his testimony, he told the Board:

> The major and most fundamental difference of opinion we have with the proposed regulations is the proposed limit of one caribou per hunter. It does not make sense to an *Iñupiaq* community…The *Iñupiat* people's way of life has a heavy element of sharing. The best hunters have killed more than they and their immediate families need, and share what is left with relatives, older people, families with sick and injured hunters, and others who need the meat. We certainly do not want to lose the sense of community and helpfulness which our people share.
>
> Secondly, there are a number of large families with only one or two hunters. If the limit per hunter is one caribou, such families would not be able to get much meat. We would like to have the limits per hunter eliminated, and let

> the permits be issued by the Village Councils to hunters so they can provide meat for their families and those who need the meat.
>
> This way, one hunter with a large family could get two or three caribou to feed his family; and a good young hunter with no dependents could be allowed to kill several caribou which would be shared with older people or hunterless families. This would preserve the sharing which is a part of our culture, and also allow the head of a family to provide for his family as best he can. (Newlin 1976)

Newlin understood the patterns of harvest and distribution illustrated in Figure 10-2. He argued for management that would conserve caribou while preserving the organization of harvests and distribution in *Iñupiaq* communities.

The board was responsive to Newlin's request. To address conservation concerns, the Board reduced the season to October 1 to March 31 and set a quota of 3,000 bull caribou. To address social concerns, the Board limited hunting to 16 communities in the range of the herd, and established a system where permits would be issued by village agents on the basis of need.

A Fairbanks sport hunting group filed a lawsuit challenging this regulation, arguing that the permit distribution system was racially restrictive and that the department had no authority to issue permits on the basis of need. A Fairbanks superior court judge agreed, and granted summary judgment restraining the state from issuing permits (Alaska Supreme Court 1978). The state appealed the superior court decision to the Alaska Supreme Court, which affirmed the prohibition against issuing permits based on need.

The Board of Game then adopted a bag limit of one bull caribou per person per year, with a total quota of 3,000 caribou, to be taken during a two-month season. If northwest hunters complied with those restrictive caribou limits, then the court forced a reorganization of caribou production in northwest Alaska. Highly productive hunters were forced to be come less efficient, and would have had fewer caribou to distribute to other households in the community. Where once 5 households could have provided most of Deering's caribou, now it would take 30 or 40 households. The total number of caribou harvested might not change at all, but the efficiency of the harvest would decline dramatically.

Biologically, it made little difference whether Deering's caribou, salmon, bearded seal, or moose were taken by 1 household or by 30 households, as long as harvests were not excessive or improperly timed. If wild foods were widely distributed, the community's nutritional needs could be satisfied either way. If community members perceived that harvesting opportunities were fairly allocated among individuals, households, and families, management worked for that community.

In the late 1990s, the Alaska Board of Game experimented with community bag limits. In Chalkytsik, any Alaska resident could contribute his or her individual bag limit to a designated community organization, then harvest big game under the auspices of that organization. Managers were assured of harvest information, because the organization filed periodic community harvest reports. Extended families could organize their production as they wished, because no one individual's harvest was limited. At this writing, though, Chalkytsik was the only community in Alaska authorized to use a community bag limit system, and only for moose.

While community bag limits could work for smaller communities where hunters and their harvest patterns were known by most residents, they were less appropriate for regional and urban centers in the state with many diverse individual hunters. In the larger communities, it was easier for individuals to act autonomously and anonymously, and to violate community standards or limits. Thus individual bag limits probably were necessary in urban areas and regional centers.

Nor could community bag limits be used in times of shortage, under current law. State subsistence law distinguished among households based on their histories of use and on the availability of alternative resources, and issued permits to individuals.

So while community bag limits offered more flexibility, they still did not reflect the system of extended family networks found in Wales and Deering. Thus the problem faced by Robert Newlin in 1976 – how to maintain the integrity of extended-family-based subsistence economies in times of shortage – was still unresolved a quarter century later.

11
Discussion

People in Wales and Deering produced and distributed wild food primarily within their extended families. Recruiting relatives from different households, they formed whaling crews, fishing groups, hunting parties, and berry picking expeditions. They worked together to butcher seals, to cut and hang fish, and to distribute wild food to others. Subsistence networks encompassed all these activities, summarizing thousands of decisions made by scores of individuals: for whom shall I hunt, with whom shall I cut fish, and with whom shall I share?

In both Wales and Deering, most people depended heavily upon wild foods for subsistence. As has been found elsewhere in Alaska, households harvests varied widely, from no wild food at all to literally tons of wild food per person. Viewing production and distribution from the perspective of extended family networks helps explain this variation in wild food production, and demonstrated the roles of different individuals and different social types of households in the production and distribution system.

This was not unexpected. For decades observers have commented on the persistence of extended families and sharing practices in *Iñupiaq* communities, and on their importance to productivity and economic security (e.g. Burch 1985, Ellanna and Sherrod 1984, Jorgensen 1984, Robbins and Little 1984, Spencer 1976, VanStone 1962). Burch also has described *Iñupiaq* extended family organizations in northwest Alaska for the 19th century (1975). Throughout the non-industrial world, scholars have found domestic production organized above the household level (Netting et al 1984, Wilk 1989).

Yet identifying and describing extended family networks has been a significant challenge. Yes, family networks existed. But which individuals and households belonged to which networks, and under what circumstances? How diffuse and variable were the boundaries between networks? What roles did different individuals and households play in these networks, and how might those roles change over time? How might networks change over time? How did networks vary among different communities, ecosystems, and cultures?

For Wales and Deering, social network analysis proved to be a useful method for exploring the organization of food production and distribution. Although Wales and Deering networks were organized primarily by kinship, empirical production and distribution data – not kinship data – were used to identify the networks. Once networks were identified, economic, demographic, and harvest data could be analyzed on a network basis.

This final chapter reviews and discusses the findings from Wales and Deering. The first section summarizes the findings from Wales and Deering. The second section compares contemporary production and distribution networks with 19th century *Iñupiaq* local families, and considers how local families might evolve over time. In a third section, researchers explore the productivity of some single-person households. The fourth section discusses state and federal management's affects on the organization of wild food production. Then a final section attempts to place these findings in a broader context.

Food Production in Wales and Deering

Wales and Deering proved to be excellent places to explore wild food production by individuals, households, and extended family networks. In both communities, participation in harvesting and processing was extensive, harvests were substantial, and cooperation among households was complex. The most frequently named subsistence producers were Alaska Natives with long tenures in the communities. Most, but not all, were men. They worked at wage labor as many months as other residents, on average, but held lower paying jobs.

The same household factors related to success in the subsistence sector (maturity and size of the workforce) also were related to success in the wage sector of the local economy. Households with higher earned incomes harvested and used a greater breadth of wild resources than households with lower earned incomes.

Households occupied by a single man were the most productive type of household in both communities on a per capita basis. Households with short-term teachers and military personnel were named least often as wild food producers, and their average harvests were less than one percent of the average harvests reported by other households.

In both communities, a relatively small proportion of households accounted for a majority of the harvests. There was a significant association between the age of household heads ("household maturity") and subsistence productivity. Among active subsistence harvesting households, subsistence productivity increased as households heads aged. Household maturity was an even better predictor of subsistence productivity than household size. A general household development cycle was found to be a robust theory for understanding subsistence productivity.

In both communities, households cooperated extensively with one another in the production of subsistence foods. Although Wales' focus was almost exclusively on marine mammals while Deering's focus include a variety of fish, land mammals, and marine mammals, cooperation among households in both communities was similarly patterned. Cooperating groups of households could be sorted into networks. Both of the methods used to identify production and distribution networks – hand-sorting instances of production and clustering a matrix of Kendall's Tau-B values – produced similar results.

Eight production and distribution networks were identified in Wales, and six in Deering. Networks ranged in size from 2 to 41 people occupying 2 to 11 households. On average, networks included 5 households and 17 people, and harvested 12,723 pounds of wild foods (735 pounds per person). Six households in Wales and three households in Deering either did not cooperate with any other households or did not harvest any wild foods, and thus were not included in any networks. All of these were short-term households occupied by teachers or other non-local government employees.

Relationships among households within networks were stronger and boundaries between networks more distinct in Wales than in Deering. This could be seen by comparing Table 7-2 and Table 8-2. In Wales (Table 7-2), 266 of 352 instances of extra-household production and distribution (86.9 percent) occurred within networks. In Deering (Table 8-2) 396 of 551 instances (71.9 percent) occurred within networks.

This also can be seen in Figure 11-1, which includes portions of the clustering diagrams for Wales and Deering (Figures 7-2 and 8-3). In hierarchical cluster analyses, stronger relationship are indicated by lower cluster combine distances. In Wales C, the first cluster to be completely identified, the cluster was complete at a cluster combine distance of six. By comparison, Deering A, the first cluster to be completely identified for Deering, was not complete until a cluster combine distance of 12.

In Wales D, the four core households (7, 21, 36, and 4) clustered at a distance of less than three. No Deering cluster included four households until a cluster combine distance of eight (Deering A, households 19, 21, 32, and 7).

In both communities, households with close kin relationships were much more likely to be in the same network than in different networks. With the exception of one small Wales network, almost all households in each network were related through kinship ties. Of six different types of kin relationships, household heads related by parent-child relationships were most likely to be found in the same network.

Networks organized around one elder parent household were more productive than networks organized around two elder sibling households. On an average per capita basis, households in parent-child networks harvested 53 percent more than households in sibling networks and 88 percent more than households in the one non-kin network. Each community included one relatively unproductive network; both were sibling networks. Even if the two unproductive sibling networks were removed from the analysis, parent-child networks still har-

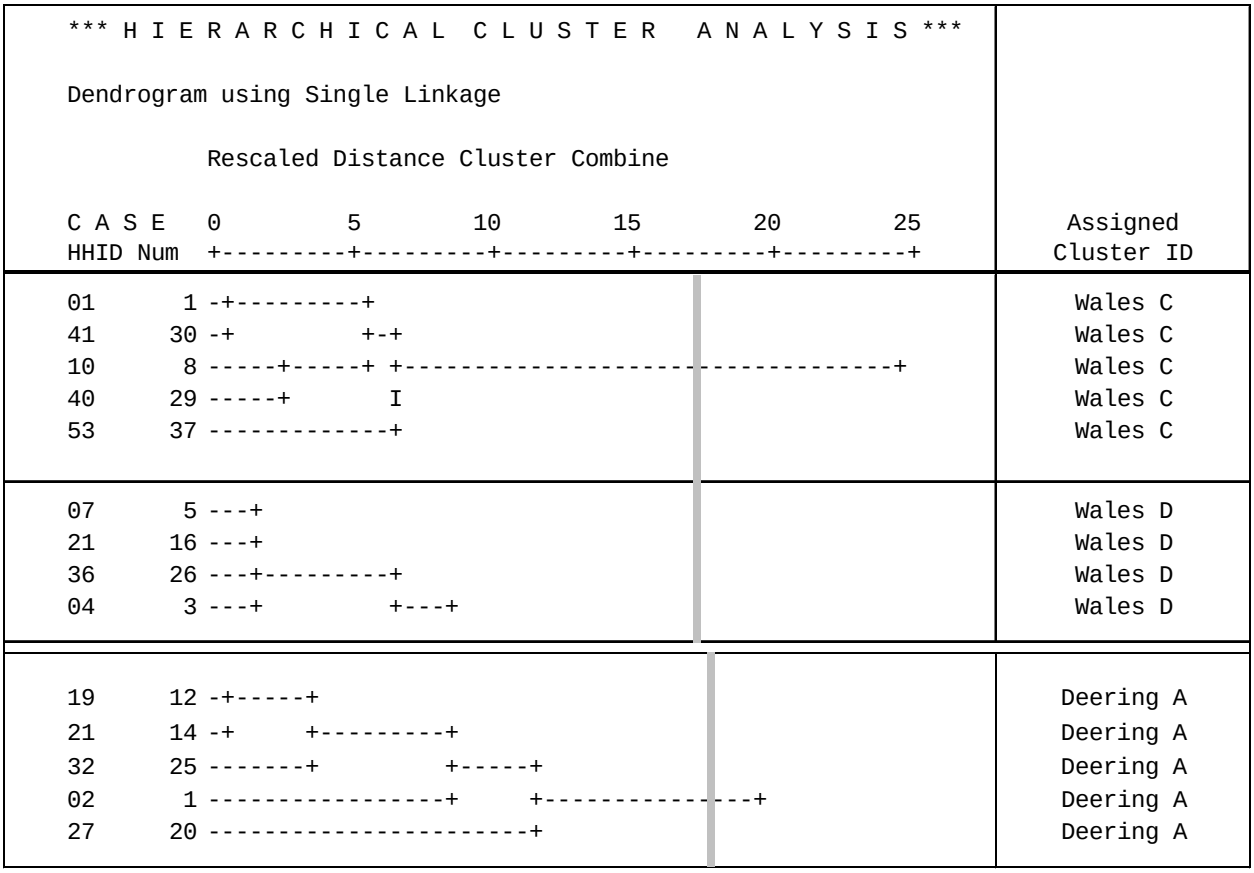

Figure 11-1. Portions of hierarchial cluster analyses for Wales and Deering. Figure compares portions of the cluster analyses for Wales and Dering. Perhaps because of marine mammal crew structures, relationships within networks were stronger and boundaries between networks more distinct in Wales than in Deering. See text.

vested 32 percent more than the remaining sibling groups on a per capita basis.

Researchers explored relationships between network income and wild food harvests at the household and network level. In Wales, wild food harvests tended to increase with increasing income, while in Deering harvests tended to decrease with increasing income. At the household level, relationships were strongly influenced by several outliers, highly productive households occupied by single men.

The strongest positive association between income and harvest was observed within Wales' networks. In five of eight Wales networks, the highest income household also was the highest harvesting household. In two additional networks, the second highest income household was the highest harvesting household, but the differences between the two highest household incomes was less than five percent. In only one Wales network did a relatively low income household report the highest harvest.

In contrast, associations between income and harvest in Deering were influenced by highly productive single men who reported low incomes. In three of six networks, the lowest income household had the highest harvest. Two of those high harvesting households were occupied by single men.

The disparity between study communities was reminiscent of Petterson's findings for Bering Sea communities in the 1980s. "With respect to Alakanuk and St. Paul, households with the greatest effort and success in subsistence also tended to succeed in the labor market. The results for Gambell suggest a reverse pattern" (Petterson et al 1988:301).

Researchers and key respondents speculated on the reasons for the different associations between income and harvest in the two study communities. The difference in available wild foods was a possible factor. In Wales, 79 percent of the harvest came

from marine mammals, which were hunted by crews of men in locally made skin boats and commercially manufactured boats. The relatively high cost of maintaining the equipment and supplying the crew for marine mammal hunting meant that crews were more likely to be organized around higher income households. In Deering, 62 percent of the harvest came from land mammals and fish. Hunting land mammals, especially, was a less costly pursuit than marine mammals, requiring only a single man with a snowmachine and sled.

The definition of "household" also may have been a confounding factor. Some high-harvesting single-person households may have been, functionally, detached bedrooms associated with a parents' household. Single-person households are discussed further below.

Case examples of several production and distribution networks illustrated the interdependence of households, and the roles of households in different stages of development. The flow of wild foods within the networks tended to be from the active single and active elder households to the inactive and developing households. While highly productive single-person households were important to network harvests, active elder households were more likely to make contributions in every economic sector: wild food harvests, earned income, and unearned income.

Networks as Local Families

In this study, "production and distribution network" was the term given to a set of households whose members cooperated with one another in the harvesting, processing, and distribution of wild foods over the course of a year. Defined in this manner, networks were not observable groups which worked together. Nor were they social entities which were named in the social system. Individual members of production and distribution networks worked together at particular times and places, but members of the entire network were almost never seen working together at a particular place and activity.

According to Burch, *Iñupiaq* society in 19th century northwest Alaska was organized around "local families," which was "a family whose members occupy different dwellings (but whose members still operate in terms of a single overriding family organization)" (Burch 1975:237, 241). Burch described two basic types of local families (1975:239). One type was organized around an elder or elder couple's household and included other households headed by the children or grandchildren of the elder or elder couple. The other type was organized around two or more siblings' households, and included children or grandchildren of the siblings.

Although households in 1994 were smaller and less complex than in the 19th century, the kinship organization of subsistence networks resembled the local families described by Burch. In both Wales and Deering, extended family members from different dwellings cooperated to produce wild foods. Like local families, all but 1 of the 14 networks were organized around parent-child or sibling relationships.

Most residents of Wales and Deering were direct descendents of the *Iñupiat* who occupied the Seward Peninsula in the 19th century. In this context, "local families" was an appropriate term for the subsistence networks found in Wales and Deering.

Burch observed that the common view that "everyone in the village used to share" was simply because "everyone in most villages used to belong to a single local family, which is the precise context in which generalized reciprocity (or diffused ownership) did occur" (1988:109). The producer data supported this observation. Indeed had cooperation in subsistence food production been generalized across the communities, it would have been impossible to identify networks. In both communities, approximately 75 percent of the reported instances of exhouse production were by individuals with parent-child or sibling relationships to the respondent household.

In 1850, the six to eight local families in the study communities probably would have spent much of the year living in separate, small, local-family-based settlements spread across their societies' territories. In 1994, there was less need to disperse. With modern transportation, families could fish, hunt, and gather throughout their traditional territories, yet return to their permanent homes in a matter of hours. It was almost impossible not to maintain a permanent home in a community, given that children were required to attend school, every family member

Figure 11-2. Aerial view of two extended family camps near Brevig Mission, 1985. Members of extended families in northwest Alaska often camped together. Cooperation among households in family camps like these contributed to the patterns of cooperation used to identify subsistence networks in Deering and Wales.

appreciated the benefits of electricity and running water, and some family members had to earn the cash to pay the bills.

The 19th century settlement pattern was still in evidence seasonally, when some extended families moved temporarily to hunting and fishing camps. Figure 11-2 shows two spring marine mammal hunting camps maintained by two extended families from Brevig Mission, about 30 miles east of Wales. These families hunted cooperatively, processed wild food cooperatively, and distributed wild foods in patterns similar to those in Wales and Deering (Figure 11-3). These particular families had lived in the Wales area until the influenza epidemic, then moved to Shishmaref, and finally Brevig Mission.

Although half a dozen or more different local families occupied the same communities in 1994, most households continued to harvest, process, and distribute wild food primarily within their own largely autonomous local families. The autonomy was especially apparent in Wales.

Local families may persist for generations. Burch observed that "all of the local families that had operated in Kivalina in the mid-1960s were still operating there twenty years later" (1985:9). Over time, every local family had to adapt to changes in the local abundance of fish and wildlife, in technologies for hunting and fishing, and in the availability of wage labor and other sources of cash income. They also were subject to changes resulting from births, deaths, marriages, and divorces.

Although data were not available to explore local family structure over time, researchers expected that, like households, local families went through a developmental cycle. Local families likely evolved from parent-child to sibling and back to parent-child structures, through the death of elder households, the maturing of developing households, the fission of large local families, and the fusion of small or

Figure 11-3. Marine mammal hunters near Brevig Mission, 1985. Two boats of Brevig Mission hunters included men from four different households. Most of the hunters in these boats were related by parent-child and sibling ties; one hunter was related by marriage. Cooperative hunted provided both greater chance of success and greater safety.

unproductive local families. Specifically, researchers had expected that when both parents died in a parent-child local family, some or all of the children's households would continue to cooperate as a sibling local family until siblings were mature enough to head their own parent-child local families. This might be characterized as a "young sibling local family."

In the study communities, there were two networks which may have been examples of "young sibling local families." Interestingly, both were small and atypical. Wales K included the single man in household 25 who distributed fish to literally every local family in Wales except his own (see Figure 7-3). And Wales L was a exceptionally unproductive local family with no children's households to continue the family tradition.

The data suggested another type of sibling local family was more common and productive, one which might be characterized as an "elder sibling local family." Wales B, Wales C, and Deering B all seemed to be examples. This type of local family included two elder sibling households, one active and one inactive. Such a local family may result from the merger of two parent-child families when one of the elder parent households retired from production and became partly dependent upon the other. This could explain why people in sibling local families were, on the average, three years older than people in parent-child local families.

Presumably an elder sibling local family would persist until one of the elder households passed away, creating a parent-child organization again. If the family became excessively large, presumably a mature household and its associated children's households would separate from the group and form a new parent-child family. In either event, the resulting parent-child families would become more productive, on an average basis, because they would no longer be supporting an inactive elder household. This could explain why average production by sibling families was less than by parent-child families. The retirement of an elder household from active production may be a more critical event, from

a productivity standpoint, than the death of an elder household.

Flexible and adaptive, local families provided a framework for individual households to move through different stages of development. If a developing household was tied to home by school age children, then its members were better able to hold permanent jobs, earn cash, and buy equipment and supplies. If a mature or active elder household was free of the responsibilities of young children, then its members were better able to establish and maintain fishing or hunting camps necessary to lay in the annual food supply. Individual households could be unproductive in one sector or another for some time, because they could depend upon other households in their local families for wild food, for equipment, and for access to hunting and fishing camps.

The differences in productivity between parent-child and sibling networks suggested that local families did not completely insulate their members from economic hardships in changing circumstances. But they could provide more security and continuity than households acting alone.

However local families evolved, their persistence was apparent. Despite the enormous social and economic changes throughout the 20th century, a local family system had survived in Wales and Deering.

Single-Male Households

One interesting difference between 19th century and late 20th century local families was the presence of single-person households. According to Burch, single-person households did not exist in 19th century *Iñupiaq* society (1975:239). Obviously, they existed in Wales and Deering in 1994 and played a major role in production. Who were these single men living alone? Why do we see them in the 1990s and not traditionally?

There were 18 single-person households in the study sample, all but one was a single man, and they were a bifurcated group. Ten were inactive, while eight produced more subsistence food than any other household type, on an average per capita basis. Although the eight active single-person households comprised only 3.4 percent of the sample population, they produced 25.7 percent of the total harvest. Key respondents concurred that active single men could be major producers, both in support of extended families in other households or in barter transactions.

A major reason for the increase in single-male households was an increase in available housing, thanks to government programs and a generally higher standard of living. Even though single men might not qualify for government housing, they could occupy houses vacated by parents or by married siblings who did qualify. So some men lived alone because houses were available. The abundance of houses was recent. Most of the occupied houses in both study communities were built by government agencies during the last 25 years. In Wales a dozen houses were less than one year old at the time of the study.

Figure 11-4 compares a Noatak local family in 1885 with two Wales and Deering local families in 1994. In the 1885 family, individuals' ages are not known. The structure of the 1885 family suggested that there may have been two single adults in household 1, which was organized around married siblings. In the family as a whole, it would appear adults outnumbered children, perhaps as much as two to one. Eleven of 21 apparent adults (52.4 percent) were women, but only two of nine apparent children (22.2 percent) were girls.

Between 1885 and 1994, the size and structure of households in Northwest Alaska changed dramatically. In the 1885 family, the average household contained 7.5 persons. In 1994, the average household in the two study communities contained 3.2 people. In the 1885 family, every household contained two or more marriages. In 1994, no households contained multiple marriages; nuclear families predominated. In the 1885 family, no single-person households were found. In 1994, 9 of 14 local families in Wales and Deering included single adults living in their own households.

In 1994, some of the single-male households were, functionally, detached bedrooms. Meals and social activities occurred primarily at parents' or siblings' homes. One example was Wales household 29, a highly productive single man who harvested 15,786 pounds of wild food. Three other households named him in 9 instances of production. But the single man in household 29 did not

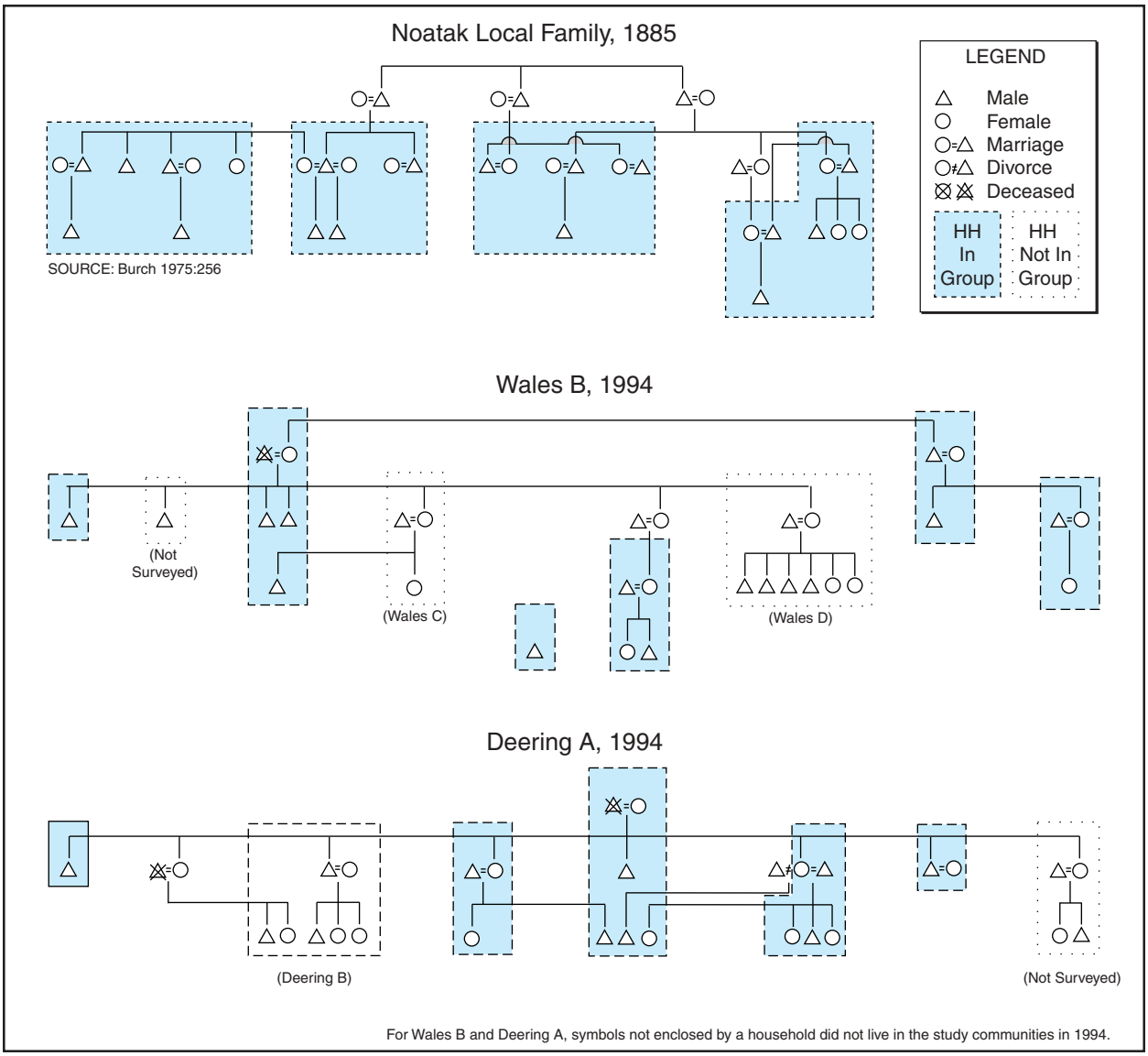

Figure 11-4. Kin relationships in an 1885 Noatak local family, Wales B and Deering A. An 1885 Noatak local family included households with heads related through sibling, cousin, and affinal relationships, not the typical structures described by Burch for the 19th century. Relationships among households in 1994 were more typical, primarily parent-child and sibling. Households in 1885 also were larger and contained multiple marriages.

name himself in a single instance of production for his own house.

An abundance of houses, however, did not explain why there were so many single *Iñupiaq* men in the first place. In Wales, men outnumbered women two to one; in Deering, it was three men to two women. As a consequence, adult men were more likely than women to be unmarried. They were more likely than women to live in their parents' or grandparents' homes after maturity, and much more likely to live alone.

For more than 30 years, researchers have observed that *Iñupiaq* men and women in Northwest Alaska have had different patterns of employment, migration, and education (Institute of Social, Economic, and Government Research 1969, Bloom 1973, Kleinfeld 1981). Examining 1975-1980 migration behavior of Alaska Natives by sex and age, Waring and Smythe found that Native women were far more mobile than Native men in the 20-to-34 age group (1988:37). In Northwest Alaska communities, the median male/female sex ratio for adults aged 15-39

was 132 men to 100 women. In Anchorage, the ratio was 83 men to 100 women, and in Fairbanks, 89 men to 100 women (Hamilton and Seyfrit 1993:262). Several factors have been suggested to explain the differences.

One factor may have been the different roles of *Iñupiaq* men and women in subsistence. Parker observed that "woman's role carried with it more disabilities and less prestige than that of men" (1962, cited in Bloom 1973:448). In Wales and Deering in 1994, men were more often reported for harvesting and distributing activities, while women were more often reported for processing activities. Hunters in general, boat captains in particular, and above all whaling captains, were accorded high stature in their communities. From this viewpoint, the relative prestige assigned to gendered roles was more likely to hold men to a village than women.

Another factor may have been the different experiences of *Iñupiaq* men and women in wage labor. *Iñupiaq* men were involved in wage labor almost from contact. *Iñupiaq* women did not enter the wage workforce in substantial numbers until the 1960s, but they adapted very quickly. By the late 1970s, Kleinfeld found, *Iñupiaq* men and women were employed at similar rates on Alaska's North Slope (1981). Significantly, 81 percent of men were employed in blue collar jobs, while 75 percent of women were employed in white collar jobs. Moreover, women worked almost twice as many months as men. Women who sought higher education were rewarded with higher paying jobs. For men, education above the high school level made little difference, because wages in the trades were so high.

Another factor was the relatively transient population of non-Natives who came to northwest Alaska on military duty, for construction projects, for mining, and for public service jobs in education and health care. They were predominantly male, especially in the earlier 20th century, well paid, and single. As a consequence, *Iñupiaq* women in northwest Alaska had more potential marriage partners than *Iñupiaq* men. Some Iñupiaq women who married non-Native immigrants remained in their communities or the region, but many others left with their husbands.

All these factors made it easier for *Iñupiaq* women to leave the smaller communities and move to regional centers or urban areas. Women's education, stable work histories, and professional job skills likely contributed to their successful adaptation to urban employment.

Different patterns of employment, migration, and education seemed likely to continue. In a study of youth aspirations in Bristol Bay and Northwest Alaska, Hamilton and Seyfrit found that 63 percent of *Iñupiaq* high school students expected to leave. "Young women more often want to leave, and more often succeed in doing so" (1993:261).

One consequence of these different patterns of *Iñupiaq* men and women was that, in most Northwest Alaska communities, there existed a surplus of single men bereft of marriage opportunities but highly motivated to hunt. In Wales and Deering, some of these men harvested large quantities of wild foods, and distributed their excess production among households in their extended families, needy households, and the community at large. Other of these men were almost completely inactive in wild food production.

In the 19th century, an unmarried man likely would have been living in his brother's, sister's, or parents' household. Given men's traditional role as a hunter, he likely would have been a major provider. Given that adult women were more likely to outnumber men because of higher accidental death rates for men, an unmarried man probably would have no trouble finding a spouse.

In the late 20th century, single men's circumstances had changed. Potential partners were much less numerous, and housing was much more available. Their role as hunters was still important. But fewer hunters were required to support an extended family because advances in technology made hunting more efficient, and because imported commercial foods reduced the demand for wild foods. Local families provided an outlet for those single men who were highly productive, and supported those who were not. Without the local family structure, variation in production among single-person households would have been less.

Managing for Families and Communities

As long as fish stocks and game populations are maintained and preserved, wild food production can

be organized in many different ways. Alaska's management systems accommodate commercial, recreational, and subsistence hunting and fishing. In many cases, different kinds of wild food harvests occur simultaneously on the same stocks and populations.

The freedom to organize wild food production in different ways is beneficial to both users and managers. Users benefit from being able to harvest, process, and distribute wild foods in ways that are efficient, socially and culturally acceptable, economically rewarding, and (perhaps most important) personally satisfying. Managers benefit because their efforts are more likely to be successful when they recognize and work within existing social and economic organizations.

Because Wales and Deering are small, remote, indigenous communities, people there are for the most part free to organize their wild food production as they wish. But that freedom resulted more from their being on the very edges of the management system, and less from an informed management approach by government agencies. Other Alaska communities, in particular those on Alaska's road system, have less freedom.

Under current state management, an Anchorage doctor who has lived in Alaska for only one year has the same right to hunt moose for subsistence on state managed lands as an indigenous resident whose ancestors had inhabited an area for thousands of years. The Anchorage doctor can give away all the meat and keep only the antlers as a trophy. Under state law, it is still "subsistence."

From 1978 through 2000, moose hunting effort by non-local hunters in the NANA Region grew an average 13 percent a year, resulting in more restrictive bag limits and shorter seasons for all moose hunters. Every indication was that this trend will continue, and will result in an erosion of subsistence hunting opportunities. The increase in non-local hunting was not unique to northwest Alaska, the same phenomenon was occurring in the Yukon and Kuskokwim areas a well.

When a shortage of resources or an influx of new fishers or hunters occurs, government agencies tend to adopt or are forced to adopt regulations that disable rural communities' complex wild food production systems. As discussed in Chapter 10, this happened with caribou in northwest Alaska in the late 1970s. Despite efforts of the Alaska Board of Game to preserve the traditional organization of the hunt in *Iñupiaq* communities, urban hunters used the courts to force the Board to reorganize the hunt to favor individual rights on a statewide basis, instead of extended families and communities on a local basis.

The specialization in caribou harvesting observed in Deering local families in 1994 would have been illegal in 1977. To the extent that people complied with the 1970s regulations, Deering's wild food production system would have become much less efficient. Restrictive individual bag limits would have hobbled the most productive hunters. People who were contributing to their families in ways other than hunting would have been forced to hunt independently. At that time, pleas from indigenous leaders to accommodate their wild food production and distribution system had no affect in court. This and similar situations have done more to frustrate and anger Alaska's rural public than to conserve fish and wildlife.

Alaska's subsistence management "system" was a disconnected collection of conflicting laws and regulations, some of which were developed and implemented for purposes other than subsistence. ANILCA was a lands act. The MMPA was intended to stop incidental takes of marine mammals in commercial fisheries, and subsistence was an eleventh-hour exemption. Fisheries, wildlife, and birds fell under separate jurisdictions. Although subsistence users have had some voice in the management systems, real authority has never rested with Alaska Natives or with subsistence users. The authority has remained with the state and federal governments. Commercial and recreational fishermen, recreational hunters, and big game guides have been powerful influences in subsistence management decisions.

In some quarters, there is a perception that growth in Alaska Native populations threaten to outstrip Alaska's fish and wildlife. The data do not support this, either from a harvesting or a population perspective.

Time series harvest data from Kivalina, as discussed in chapter 3, suggested that total subsistence harvests have not increased in recent decades. While the population of this rural northwest Alaska com-

munity doubled during the latter half of the 20th century, per capita harvests of wild foods declined by half, resulting in a stable level of subsistence demand over time. The factors in Kivalina's declining per capita harvests – loss of dog teams, increased availability of imported foods, technological changes – were present throughout rural Alaska.

While Alaska's Native population did increase substantially in the 20th century, they previously had been greatly reduced by disease and did not reach pre-contact levels until the mid 1980s. Some scholars have estimated Alaska's Native population in 1750 at about 74,000 (Waring 1988:28). The 2000 census estimated 119,241 Native Americans lived in Alaska (U.S. Census Bureau 2001:1). But 26,995 of those Native Americans lived in Anchorage, 5,108 lived in Mat-Su, 8,174 lived in the Fairbanks North Star Borough, and 5,084 lived in Juneau. That left, by the strangest of statistical coincidences, about 74,000 Alaska Native Americans living in the rest of Alaska in 2000.

During the same 250 years, the non-indigenous population of Alaska increased from zero to 507,691(U.S. Census Bureau 2001:1). In other words, by the year 2000 non-indigenous immigrants and their descendents accounted for four out of five Alaskans. Although on a per capita basis, urban Alaskans harvest much less than rural Alaska, they make up for the lower harvests in sheer numbers. Hunting and fishing competition is greatest along the urban-connected road systems. But the impacts of growing urban populations are felt in increased hunting and fishing pressures throughout the state. They also have a strong voice, because of their numbers and locations, in the fish and wildlife management systems.

Wolfe has observed that two different types of subsistence management existed in Alaska, indigenous and Euro-American, reflecting the two major components of Alaska's population. Indigenous management tended to be "decentralized across a number of subgroups, including kinship groups, clans, moieties, bands, villages and tribal subgroups… The recognized leaders with authority over local subsistence matters are usually elders, heads of kinship groups, and highly productive harvesters and processors" (Wolfe 1993:15).

Extended-family networks were not simply accommodated by indigenous management, they were part of indigenous management. They could facilitate communication among members, encourage responsible harvests and use of fish and wildlife, and discipline members who failed to comply with group norms. In Barrow in the 1980s, an indigenous management system accomplished all these ends while dealing with an errant bowhead whale captain (Huntington 1992:121).

In contrast, Euro-American subsistence management was highly centralized. Management responsibilities rested with one state agency and four federal agencies. Authority typically rested with two centralized boards appointed by state or federal government agencies, whose jurisdictions covered management of particular species.

Euro-American regulations regarding individual bag limits and permits made almost no accommodations for extended-family subsistence networks. Resource managers rarely evaluated harvest data on an extended family basis, electing instead to assess harvests on an individual or household basis. Hunting opportunities in Alaska almost always were allocated to individuals, rather than to households, families, or communities. In both federal and state hunts, each individual hunter had a separate bag limit for each individual big game species, usually one animal per person per year. In times of shortage, the subsistence priorities were awarded on the basis of individual and household characteristics without regard to roles in extended family systems. When a hunt or fishery involved different groups of people organized in different ways, ostensibly neutral management decisions could and did allocate fish or wildlife from one group of people to another.

This did not reflect any particular understanding of subsistence economies, nor was it an attempt to efficiently manage subsistence economies. It primarily reflected the balance of power in Alaska. Alaskans held different beliefs about what was fair and equitable, about whether individuals or families or communities should be the basis for allocating opportunity. The constitutions, laws, and regulations of both the federal and state governments captured the values of the majority Euro-American culture, which favored the rights of individuals over

the rights of families or communities (Wolfe 1993:14).

Although subsistence in Alaska was clearly an indigenous tradition first and foremost, most "subsistence" regulations were designed to manage recreational and commercial hunting and fishing by Euro-Americans, and then relabeled as "subsistence regulations." Although indigenous Alaskans had a voice in subsistence management forums, usually they were a minority voice in a system designed, constructed, and controlled by Euro-Americans. Robert Newlin's experience with the Alaska Board of Game in 1976 was typical, and was repeated throughout the latter 20th century with other witnesses on other issues in other parts of the state.

Indigenous people in Canada faced similar problems, although they did have more protection in law than Alaska Natives. In Canada, Usher observed, "many game mangers see the futility of trying to impose a system of management and enforcement which the majority of harvesters do not acknowledge as legitimate, necessary, or useful… What is being requested is not to be above the law, to do illegal things or to be lawless. It is rather to live by one's own system of laws which has demonstrably worked well" (Usher 1982:7-8,10-11).

If indigenous Alaskans controlled the formal subsistence management system in their own communities or regions, management long would have accommodated extended family networks. That extended family organizations have survived nonetheless was a testament to their importance, efficiency, and effectiveness in producing and distributing wild foods to Alaska families.

Summary

A basic function of a family – whether a nuclear family living in one household or an extended family living in several households – is to provide for its members. Successful families are those who, over time, adapt quickly to changing ecological, social, and economic conditions and thus are able to continue providing for their members.

Healthy communities are comprised of successful families. Conversely, "if you destroy the economies of household and community, then you destroy the bonds of mutual usefulness and practical dependence without which the other bonds will not hold" (Berry 1994).

During the past 150 years, few families in North America have experienced more changes than Eskimo families. In the 19th century virtually everything in *Iñupiaq* society – food, clothing, equipment, dwellings, community buildings – came from local materials shaped by the hands and minds of local people. At the beginning of the 21st century, communities in northwest Alaska are entirely different. Two- and three-bedroom wood-frame houses stand in orderly rows to better serve water and sewer systems. Schools built of steel and plaster, staffed mostly by transient immigrants, teach a standard national curriculum of English, math, and science. Satellite dishes beam in professional basketball games and international news. Snowmobiles made in Minnesota and all-terrain vehicles made in Japan are parked outside bingo halls. Local general stores sell frozen chicken and pizza, breakfast cereal, and soda pop.

Whether these adaptations are sustainable is open to question. Three fourths of the personal income in the study communities came from public sector wages and transfer payments, and the private sector was heavily dependent upon public spending. Alaska's current wealth comes almost entirely from oil discovered on ancestral *Iñupiat* lands, so it is hardly fair to assert that *Iñupiat* are not entitled to benefit from Alaska's great prosperity. But one result is that communities in northwest Alaska, like communities the world over, are no longer self sufficient. They depend on imported goods and services from around the world. Anthropologist Margaret Lantis' observations from the 1950s are still true for the 21st century:

> The substance of the situation is that Eskimos are trying just as hard today to adapt as they did 500 years or 900 years ago; the difficulty is that they are adapting not to an Arctic but to a Temperate Zone way of living. (Lantis 1957:126)

A major exception to this general trend is the use of wild foods. Not only do the *Iñupiat* of northwest Alaska continue to depend primarily upon local wild foods for their sustenance, they produce and distribute these foods within extended family struc-

tures very similar to those of their ancestors. Wales and Deering have different histories, acculturative experiences, and ecological circumstances. Yet extended family networks in the two communities were similar.

Why have local family networks survived when so much else has changed? A strong local family network provides its adult members with a high degree of individual freedom: to work or not work, to hunt or to fish, to raise children or grandchildren, and even to do virtually nothing for years at a time. Such freedom is all but impossible for adults in an economically independent nuclear family. Especially with mature elder parents at its head, a local family network not only efficiently organizes the production and distribution of wild foods, it provides security against rural Alaska's constant economic, ecological, and political uncertainties.

In most areas of rural Alaska, dependence on the cash economy is risky. Especially for men who work in construction, jobs tend to be temporary. Jobs in the schools and health clinics are more permanent, but even those jobs are subject to changes in public funding priorities that are out of local control. It is even more difficult to successfully operate a private business. There is no guarantee that current levels of public spending – upon which most jobs depended – will continue. Most adults remembered growing up without electricity, without running water, with few imported foods, and with little cash. Elders worry that hard times could return.

Readers may recall that two local families had atypical structures. Wales H was an exceptionally small network with no apparent kinship basis, and included a teacher household. Deering D was an exceptionally large network with a complex kin structure. Common to both networks were decisions by core households to increase their reliance upon the cash economy by investing in education and business ventures. They were, to outside observers, examples of cultural integration and local economic development. Despite their efforts, though, per capita incomes in these groups were near average for the communities. By the time this study was published several years later, both groups had suffered tragic reversals. Key job hopes evaporated; businesses failed. Some households left the communities. Others remained and presumably became more dependent up wild foods again.

The availability of wild foods also is uncertain, subject to changes in fish stocks and wildlife populations, and to competition from other users. Caribou herds change their migration routes. Ptarmigan, rabbit, and lynx populations go through natural cycles. Salmon runs fail for inexplicable reasons. Most elder *Iñupiat* have heard stories of death by starvation from their parents, and some had suffered periodic starvation themselves.

Alaska's subsistence politics present another form of uncertainty. Commercial and recreational efforts and harvests are increasing throughout Alaska. Non-subsistence interests compete for the same fish stocks and wildlife populations used for subsistence. Although subsistence uses have a priority over other consumptive uses under law, the authority to decide who qualifies for subsistence uses, and even what subsistence is, rests with the state and federal governments. In most situations, few or none of the actual decision makers are subsistence users themselves. As Robert Newlin found with the Board of Game during the caribou crash in 1970s, as Sam McDowell proved with his lawsuit against the board in 1989, and as the decade-long debate over an Alaska rural priority demonstrated in the 1990s, Alaska and the nation have yet to find the political will to provide a secure regulatory environment for subsistence.

Some of the challenges are fundamental. State and federal constitutions, laws, and regulations favor individual rights and common use of Alaska's fish and wildlife. The legal foundations for fish and wildlife management do not favor extended families or rural communities. Subsistence users, whether they live in rural or urban Alaska, are a slim minority of the population and are at the mercy of the majority.

In such an unpredictable environment, successful strategies are essential. In the daily business of subsistence living, people who are part of a local family network seem better prepared to survive the uncertainties of life in Alaska. A household without employment can depend on other households for food, equipment, and supplies. When hunting is poor, every household in a network benefits from the success of even a single hunter in the network.

Defending the resources upon which subsistence depends from competing commercial and recreational uses is more difficult. Even so, a local family network has more resources than a nuclear family would to send an member to testify in distant public forums for subsistence causes.

Wild foods play an essential role in maintaining the physical and emotional health of thousands of Alaskans. Those foods and the local family organizations that produced and distributed them are one of the strongest ties indigenous Alaskans have with their traditions. Whether Alaska's subsistence economies – and the local family networks who power them – can survive Alaska's ecological, economic and political uncertainties is still an open question.

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Appendix 1
Community Approvals

City of Wales
P.O. Box 489
Wales, Alaska 99783

Ph. (907) 664-3501
Fax (907) 664-3671

Wales City Council
Box 489
Wales, Alaska 99783

RESOLUTION ~~95-17~~ 94-22

A Resolution in support of the 1994 Bering Land Bridge National Monument Subsistence Harvest Survey.

WHEREAS: the Wales City Council is the governing body of the City of Wales; and

WHEREAS: the National Park Service and the Alaska Department of Fish and Game Division of Subsistence, in cooperation with Kawerak, Inc., are conducting a Subsistence Harvest Survey in Northwest Alaska; and

WHEREAS: the results of the survey can be used by Native organizations, the U.S. Fish and Wildlife Service, and other groups in discussions to amend the 1916 Migratory Bird Treaty with Canada to legalize traditional spring subsistence bird hunting in Alaska; and

WHEREAS: participation in the project is voluntary and persons' names will not be used in the report; and

WHEREAS: Local research assistants will be paid under contract to assist in collecting information; and

WHEREAS: the project will document the importance of subsistence harvest of fish and wildlife to village, so that traditional subsistence uses might be protected in the future.

NOW THEREFORE BE IT RESOLVED: that the Wales City Council hereby supports the Bering Land Bridge National Preserve Subsistence Harvest Survey.

FURTHER BE IT RESOLVED: that the Wales City Council will monitor the project in the village.

CERTIFICATION

This resolution was approved by a vote of 4 for and 0 against and 0 not voting on Nov 23, 1994

DATE: Nov 23, 1994 APPROVED: Winton Weygandt
MAYOR

ATTESTED:
CITY CLERK

Deering IRA Council

Resolution in support of
the Bering Land Bridge Monument
Subsistence Harvest Survey

Resolution 95-04

WHEREAS; the Deering IRA Council is the governing body of the Native Village of Deering, and

WHEREAS; the National Park Service and the Alaska Department of Fish and Game Division of Subsistence, in cooperation with the Deering IRA ~~Kawerak Association are~~ conducting a Subsistence Harvest Survey in Northwest Alaska, and

WHEREAS; the results of the survey can be used by Native organizations, the U.S. Fish and Wildlife Service, and other groups in discussions to amend the 1916 Migratory Bird Treaty with Canada to legalize traditional spring subsistence bird hunting in Alaska, and

WHEREAS; participation in the project is voluntary and persons' names will not be used in the report, and

WHEREAS; local research assistants will be paid under contract to assist in collecting information, and

WHEREAS; the project will document the importance of subsistence harvest of fish and wildlife to village, so that traditional subsistence uses will be protected in the future.

NOW THEREFORE BE IT RESOLVED; that the Deering IRA Council hereby supports the Bering Land Bridge National Preserve Subsistence Harvest Survey.

BE IT FURTHER RESOLVED; that the Deering IRA Council will monitor the project in the village.

CERTIFICATION

We the undersigned do swear that the above resolution was approved by a vote of 5 in favor of and 0 against at a duly held meeting on February 17, 1995.

James Moto, Jr. - president

Feb. 7, 1995
date

ATTEST: Roberta Moto
Roberta Moto-secretary

Appendix 2
Deering Harvest Survey

SUBSISTENCE RESOURCE SURVEY

BERING LAND BRIDGE NATIONAL PRESERVE

DEERING, ALASKA

STUDY YEAR: MARCH 1994 THROUGH FEBRUARY 1995

HH ID:		
COMMUNITY:	DEERING	110
START TIME:		
STOP TIME:		
INTERVIEWER:		
DATE:		
CODER:		
SUPERVISOR:		

U.S. NATIONAL PARK SERVICE
SUBSISTENCE DIVISION
BOX 220
NOME, AK 99762

907.443.2252

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF SUBSISTENCE
POUCH 1148
NOME, AK 99762

800.560.2271

HOUSEHOLD INFORMATION.

ID # OF PERSON RESPONDING TO SURVEY: _____

WHO WERE MEMBERS OF THIS HOUSEHOLD BETWEEN MARCH 1994 AND FEBRUARY 1995?

ID#	M/F	RELATION TO HH HEAD	BIRTHDATE MM/DD/YY	RESIDENCE OF PARENTS WHEN PERSON BORN	WHERE ARE PERSON'S PARENTS FROM?		YEAR MOVED		MOVED FROM COMM.	TOTAL YEARS IN WALES	ETHNICITY	EDUCATION LEVEL
					MOTHER	FATHER	TO ALASKA	TO WALES				
1												
HEAD												
2												
HEAD												
3												
4												
5												
6												
7												
8												
9												
10												

BETWEEN MARCH 1994 AND FEBRUARY 1995, DID ANY MEMBERS OF YOUR HOUSEHOLD...

	...HUNT, BUTCHER, "CUT," OR "PUT AWAY" GAME ANIMALS?		...CATCH, "CUT," OR "PUT AWAY" FISH OR SHELLFISH?		...HUNT, TRAP, SKIN, OR TAN FURBEARERS?		...PICK OR "PUT AWAY" BERRIES, PLANTS, OR ROOTS?		...WORK WITH REINDEER, EITHER AS HERD OWNER OR HANDLER?		...HARVEST A LOT OF WILD FOODS?	..TAKE WILD FOODS TO ANY COMMUNITY FEASTS OR CEREMONIES?	...MAKE OR REPAIR HUNTING OR FISHING EQUIPMENT?	...USE NATURAL OR TRADITIONAL MEDICINES FOR HEALING?	...MAKE ARTS OR CRAFTS USING PARTS OF WILD ANIMALS?
	HUNT?	PROC?	FISH?	PROC?	H/T?	PROC?	PICK?	PROC?	OWN?	HAND?					
ID#	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
1															
HEAD															
2															
HEAD															
3															
4															
5															
6															
7															
8															
9															
10															

WAS YOUR HOUSEHOLD'S SEASONAL PATTERN OF SUBSISTENCE ACTIVITIES BETWEEN MARCH 1994 AND FEBRUARY 1995 SIMILAR TO OTHER YEARS, OR DIFFEREN

SIMILAR ____(1)____ DIFFERENT ____(0)____

IF DIFFERENT, WHY WAS IT DIFFERENT? _____

64				

NON-COMMERCIAL FISHING: SALMON.

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE SALMON BETWEEN MARCH 1994 AND FEBRUARY 1995 YES: _____

IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (POUNDS SHOULD INDICATE EDIBLE WEIGHT):

SPECIES	USED? Y/N	TRIED TO HARVEST Y/N	NUMBER HARVESTED BY: GILLNET #	SEINE #	ROD & REEL* #	OTHER GEAR TYPE	OTHER GEAR #	UNITS	RECEIVED Y/N	GAVE AWAY Y/N	NOTES:
CHUM SALMON *QALUGRUAQ*								IND			
110102								1			
COHO SALMON								IND			
110202								1			
KING SALMON *IQALUSUGRUK*								IND			
110302								1			
PINK SALMON (HUMPIES) *AMAKŁUK*								IND			
110402								1			
SOCKEYE SALMON								IND			
110502								1			
UNKNOWN SALMON								IND			
119902								1			

* 'ROD & REEL' INCLUDES TROLLING IN OPEN WATER

NON-COMMERCIAL FISHING: SALMON (CONTINUED)

BETWEEN MARCH 1994 AND FEBRUARY 1995, WHO HARVESTED ("CAUGHT") THE SALMON YOUR HOUSEHOLD USED? PLEASE LIST THE MOST IMPORTANT HARVESTERS FI (1)

	PERSON CODE 01	PERSON CODE 02	PERSON CODE 03	PERSON CODE 04	PERSON CODE 05	PERSON CODE 06	PERSON CODE 07	PERSON CODE 08	PERSON CODE 09	PERSON CODE 10	PERSON CODE 11	PERSON CODE 12	PERSON CODE 13	PERSON CODE 14	PERSON CODE 15	PERSON CODE 16
SALMON HARVESTERS																
110000																

BETWEEN MARCH 1994 AND FEBRUARY 1995, WHO PROCESSED ("CUT") THE SALMON YOUR HOUSEHOLD USED? PLEASE LIST THE MOST IMPORTANT PROCESSORS FIRST (2)

	PERSON CODE 01	PERSON CODE 02	PERSON CODE 03	PERSON CODE 04	PERSON CODE 05	PERSON CODE 06	PERSON CODE 07	PERSON CODE 08	PERSON CODE 09	PERSON CODE 10	PERSON CODE 11	PERSON CODE 12	PERSON CODE 13	PERSON CODE 14	PERSON CODE 15	PERSON CODE 16
SALMON PROCESSORS																
110000																

BETWEEN MARCH 1994 AND FEBRUARY 1995, WERE ANY OF THE SALMON USED BY YOUR HOUSEHOLD GIVEN TO YOU BY SOMEONE IN ANOTHER HOUSEHOLD OR COMMUNITY?
IF YES, WHO GAVE FISH TO YOUR HOUSEHOLD? PLEASE LIST MOST IMPORTANT PROVIDERS FIRST. YES (1) _____ NO (0) _____ (3)

	PERSON CODE 01	PERSON CODE 02	PERSON CODE 03	PERSON CODE 04	PERSON CODE 05	PERSON CODE 06	PERSON CODE 07	PERSON CODE 08	PERSON CODE 09	PERSON CODE 10	PERSON CODE 11	PERSON CODE 12	PERSON CODE 13	PERSON CODE 14	PERSON CODE 15	PERSON CODE 16
SALMON PROVIDERS																
110000																

THIS YEAR, DID YOUR HOUSEHOLD HARVEST LESS, MORE, OR ABOUT THE SAME AMOUNT OF SALMON AS IN THE PAST?

NEVER HARVEST _____(0) LESS: (1) SAME: (2) MORE: (3)

IF LESS OR MORE, WHY? _____

65	110000				

DID YOUR HOUSEHOLD GET ENOUGH SALMON FOR SUBSISTENCE THIS YEAR? YES: (1) NO: (0)

IF NO, WHY NOT? _____

66	110000				

NON-COMMERCIAL FISHING: NON-SALMON FINFISH

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE FISH OTHER THAN SALMON BETWEEN MARCH 1994 AND FEBRUARY 1995?
IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (POUNDS SHOULD INDICATE EDIBLE WEIGHT): YES:_____ NO:_____

SPECIES	USED? Y/N	TRIED TO HARVEST Y/N	NUMBER HARVESTED BY: GILLNET #	SEINE #	ROD & REEL #	ICE FISHING #	OTHER GEAR TYPE	OTHER GEAR #	UNITS	RECEIVED Y/N	GAVE AWAY Y/N	NOTES:
TROUT (CHAR) *IKALUKPIK*									IND			
124292									1			
SHEEFISH *SII*									IND			
120602									1			
BERING CISCO *TIPUK, SIGLITAK*									IND			
120322									1			
ROUND WHITEFISH *SVIGUUTNAQ?*									IND			
120840									1			
HUMPBACK WHITEFISH *QALGIK, KAUGUNAK*									IND			
120832									1			
BROAD WHITEFISH *QAUSILUK*									IND			
120822									1			
LEAST CISCO *IQALUSAAQ?*									IND			
120312									1			
WHITEFISH UNKNOWN									IND			
120892									1			
CISCO, UNKNOWN									IND			
120392									1			
BURBOT (MUDSHARK) *TITTAALIQ*									IND			
120202									1			
PIKE *SIULIK*									IND			
120602									1			
TOM COD *UUGAQ, IGALUAQ*												
121142												

NON-COMMERCIAL FISHING: NON-SALMON FINFISH (CONTINUED)

SPECIES	USED? Y/N	TRIED TO HARVEST Y/N	NUMBER HARVESTED BY: GILLNET #	SEINE #	ROD & REEL #	ICE FISHING #	OTHER GEAR TYPE	OTHER GEAR #	UNITS	RECEIVED Y/N	GAVE AWAY Y/N	NOTES:
ARCTIC (BLUE) COD *AQALUAQ, SIMIANGNIQ*												
121172												
HERRING *KSRUKTUUQ, IGAŁUAQPAQ*												
121502												
SMELT *ILHUAGNIQ*												
122102												
GRAYLING *SULUKPAUGAQ*									IND			
120402									1			
FLOUNDER *NATAANGNAQ*									IND			
121202									1			
SUCKER *MILUGIAQ*									IND			
120702									1			
SCULPIN (BULLHEAD) *KANIIYAUHAQ?*												
122092												

NON-COMMERCIAL FISHING: NON-SALMON FISH (CONTINUED)

BETWEEN MARCH 1994 AND FEBRUARY 1995, WHO HARVESTED ("CAUGHT") THE FISH YOUR HOUSEHOLD USED? PLEASE LIST THE MOST IMPORTANT HARVESTERS FIRST (1)

	PERSON CODE 01	PERSON CODE 02	PERSON CODE 03	PERSON CODE 04	PERSON CODE 05	PERSON CODE 06	PERSON CODE 07	PERSON CODE 08	PERSON CODE 09	PERSON CODE 10	PERSON CODE 11	PERSON CODE 12	PERSON CODE 13	PERSON CODE 14	PERSON CODE 15	PERSON CODE 16
FISH (NON SALMON) HARVESTERS																
120000																

BETWEEN MARCH 1994 AND FEBRUARY 1995, WHO PROCESSED ("CUT") THE FISH YOUR HOUSEHOLD USED? PLEASE LIST THE MOST IMPORTANT PROCESSORS FIRST. (2)

	PERSON CODE 01	PERSON CODE 02	PERSON CODE 03	PERSON CODE 04	PERSON CODE 05	PERSON CODE 06	PERSON CODE 07	PERSON CODE 08	PERSON CODE 09	PERSON CODE 10	PERSON CODE 11	PERSON CODE 12	PERSON CODE 13	PERSON CODE 14	PERSON CODE 15	PERSON CODE 16
FISH (NON SALMON) PROCESSORS																
120000																

BETWEEN MARCH 1994 AND FEBRUARY 1995, WERE ANY OF THE FISH USED BY YOUR HOUSEHOLD GIVEN TO YOU BY SOMEONE IN ANOTHER HOUSEHOLD OR COMMUNITY?
IF YES, WHO GAVE FISH TO YOUR HOUSEHOLD? PLEASE LIST MOST IMPORTANT PROVIDERS FIRST. YES (1) _____ NO (0) _____ (3)

	PERSON CODE 01	PERSON CODE 02	PERSON CODE 03	PERSON CODE 04	PERSON CODE 05	PERSON CODE 06	PERSON CODE 07	PERSON CODE 08	PERSON CODE 09	PERSON CODE 10	PERSON CODE 11	PERSON CODE 12	PERSON CODE 13	PERSON CODE 14	PERSON CODE 15	PERSON CODE 16
FISH (NON SALMON) PROVIDERS																
120000																

THIS YEAR, DID YOUR HOUSEHOLD HARVEST LESS, MORE, OR ABOUT THE SAME AMOUNT OF FISH (OTHER THAN SALMON) AS IN THE PAST?

NEVER HARVEST _____(0) LESS: (1) SAME: (2) MORE: (3)

IF LESS OR MORE, WHY? _____

65	120000				

DID YOUR HOUSEHOLD GET ENOUGH FISH (OTHER THAN SALMON) FOR SUBSISTENCE THIS YEAR? YES: (1) NO: (0)

IF NO, WHY NOT? _____

66	120000				

NON-COMMERCIAL FISHING: MARINE INVERTEBRATES

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE SHELLFISH BETWEEN MARCH 1994 AND FEBRUARY 1995? YES: _____ NO: _____
IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (POUNDS SHOULD INDICATE EDIBLE WEIGHT):

SPECIES	USED? Y/N	TRIED TO HARVEST Y/N	HARVESTED NUMBER #	HARVESTED UNITS	RECEIVED Y/N	GAVE AWAY Y/N	NOTES:
KING CRAB *QAQUQ*				IND			
502392				1			
TANNER CRAB *MIQUAPAIT*				IND			
				1			
CLAMS *PUGUTAURAQ*							
500292							
UNKNOWN WHELK *NAGUNAQ*							
GIANT SCALE WORM *QUVALGUQ*							
BROWNSCALED SEA CUCUMBER *ANGMALUUKUQ*							
501002							
SHRIMP							
501202							
UNKNOWN INVERTEBRATE *YUGUAQ*							

NON-COMMERCIAL FISHING: MARINE INVERTEBRATES (CONTINUED)

BETWEEN MARCH 1994 AND FEBRUARY 1995, WHO HARVESTED (CAUGHT) THE SEAFOOD YOUR HOUSEHOLD USED? PLEASE LIST THE MOST IMPORTANT HARVESTERS FI (1)

	PERSON CODE 01	PERSON CODE 02	PERSON CODE 03	PERSON CODE 04	PERSON CODE 05	PERSON CODE 06	PERSON CODE 07	PERSON CODE 08	PERSON CODE 09	PERSON CODE 10	PERSON CODE 11	PERSON CODE 12	PERSON CODE 13	PERSON CODE 14	PERSON CODE 15	PERSON CODE 16
SHELLFISH HARVESTERS																
500000																

BETWEEN MARCH 1994 AND FEBRUARY 1995, WHO PROCESSED ("CUT") THE SEAFOOD YOUR HOUSEHOLD USED? PLEASE LIST THE MOST IMPORTANT PROCESSORS FIRS (2)

	PERSON CODE 01	PERSON CODE 02	PERSON CODE 03	PERSON CODE 04	PERSON CODE 05	PERSON CODE 06	PERSON CODE 07	PERSON CODE 08	PERSON CODE 09	PERSON CODE 10	PERSON CODE 11	PERSON CODE 12	PERSON CODE 13	PERSON CODE 14	PERSON CODE 15	PERSON CODE 16
SHELLFISH PROCESSORS																
500000																

BETWEEN MARCH 1994 AND FEBRUARY 1995, WERE ANY OF THE SEAFOOD USED BY YOUR HOUSEHOLD GIVEN TO YOU BY SOMEONE IN ANOTHER HOUSEHOLD OR COMMUNITY?
IF YES, WHO GAVE FISH TO YOUR HOUSEHOLD? PLEASE LIST MOST IMPORTANT PROVIDERS FIRST. YES (1) _____ NO (0) _____ (3)

	PERSON CODE 01	PERSON CODE 02	PERSON CODE 03	PERSON CODE 04	PERSON CODE 05	PERSON CODE 06	PERSON CODE 07	PERSON CODE 08	PERSON CODE 09	PERSON CODE 10	PERSON CODE 11	PERSON CODE 12	PERSON CODE 13	PERSON CODE 14	PERSON CODE 15	PERSON CODE 16
SHELLFISH PROVIDERS																
500000																

THIS YEAR, DID YOUR HOUSEHOLD HARVEST LESS, MORE, OR ABOUT THE SAME AMOUNT OF SEAFOOD AS IN THE PAST?

NEVER HARVEST _____(0) LESS: (1) SAME: (2) MORE: (3)

IF LESS OR MORE, WHY? _____

65	500000				

DID YOUR HOUSEHOLD GET ENOUGH SEAFOOD FOR SUBSISTENCE THIS YEAR? YES: (1) NO: (0)

IF NO, WHY NOT? _____

66	500000				

MARINE MAMMALS

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE MARINE MAMMALS BETWEEN MARCH 1994 AND FEBRUARY 1995? YES: _____ NO: _____

IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (POUNDS SHOULD INDICATE EDIBLE WEIGHT):

SPECIES	USED*? Y/N	TRIED TO HARVEST? Y/N	SALVAGE? Y/N	NUMBER HARVESTED FOR FOOD #	NUMBER HARVESTED FOR HIDE ONLY #	SEX OF ANIMALS HARVESTED MALE #	SEX OF ANIMALS HARVESTED FEMALE #	SEX OF ANIMALS HARVESTED UNKNOWN #	RECEIVED Y/N	GAVE AWAY Y/N	HIDES NUMBER SOLD	HIDES AVERAGE PRICE
BEARDED SEAL (SPRING) *UGRUK*												
300210												
YOUNG BEARDED SEAL *UGRUTCHIAQ, UNMIAQ*												
300270												
RINGED SEAL *NATCHIQ, NIQSAQ*												
300250												
SPOTTED SEAL *QASIGIAQ*												
300260												
RIBBON SEAL *QAIGUTLIK*												
300240												
WALRUS *AIVIQ*												
300300												
BELUGA WHALE *SISUAQ, SIɬUAQ*												
300110												
BOWHEAD WHALE *AGVIQ, AGVAK*												
300120												
POLAR BEAR *NANUQ*												
300400												
	65	300000				66	300000					

DID YOUR HOUSEHOLD HARVEST LESS, MORE, OR ABOUT THE SAME AMOUNT OF MARINE MAMMALS AS IN THE PAST?

NEVER HARVEST: (0) _____ LESS:(1) _____ SAME: (2) _____ MORE: (3) _____

IF LESS OR MORE, WHY? _____

WERE YOUR HOUSEHOLD'S SUBSISTENCE NEEDS FOR MARINE MAMMALS MET THIS YEAR?

YES: (1) _____ NO: (2) _____

IF NO, WHY NOT? _____

BETWEEN MARCH 1994 AND FEBRUARY 1995, WHO HARVESTED ("CAUGHT") THE MARINE MAMMALS YOUR HOUSEHOLD USED?
PLEASE LIST THE MOST IMPORTANT HARVESTERS FIRST. (1)

	PERSON CODE 01	PERSON CODE 02	PERSON CODE 03	PERSON CODE 04	PERSON CODE 05	PERSON CODE 06	PERSON CODE 07	PERSON CODE 08	PERSON CODE 09	PERSON CODE 10	PERSON CODE 11	PERSON CODE 12	PERSON CODE 13	PERSON CODE 14	PERSON CODE 15	PERSON CODE 16
BEARDED SEAL HARVESTERS																
300210																
WALRUS HARVESTERS																
300300																
SMALL SEAL HARVESTERS																
300290																

BETWEEN MARCH 1994 AND FEBRUARY 1995, WHO PROCESSED ("CUT") THE MARINE MAMMALS YOUR HOUSEHOLD USED?
PLEASE LIST THE MOST IMPORTANT PROCESSORS FIRST. (2)

	PERSON CODE 01	PERSON CODE 02	PERSON CODE 03	PERSON CODE 04	PERSON CODE 05	PERSON CODE 06	PERSON CODE 07	PERSON CODE 08	PERSON CODE 09	PERSON CODE 10	PERSON CODE 11	PERSON CODE 12	PERSON CODE 13	PERSON CODE 14	PERSON CODE 15	PERSON CODE 16
BEARDED SEAL PROCESSORS																
300210																
WALRUS PROCESSORS																
300300																
SMALL SEAL PROCESSORS																
300290																

BETWEEN MARCH 1994 AND FEBRUARY 1995, WERE ANY OF THE MARINE MAMMALS USED BY YOUR HOUSEHOLD GIVEN TO YOU BY SOMEONE IN ANOTHER HOUSEHOLD OR COMMUNITY? IF YES, WHO GAVE MARINE MAMMALS TO YOUR HOUSEHOLD? PLEASE LIST MOST IMPORT YES _____ NO _____ (3)

	PERSON CODE 01	PERSON CODE 02	PERSON CODE 03	PERSON CODE 04	PERSON CODE 05	PERSON CODE 06	PERSON CODE 07	PERSON CODE 08	PERSON CODE 09	PERSON CODE 10	PERSON CODE 11	PERSON CODE 12	PERSON CODE 13	PERSON CODE 14	PERSON CODE 15	PERSON CODE 16
BEARDED SEAL PROVIDERS																
300210																
WALRUS PROVIDERS																
300300																
SMALL SEAL PROVIDERS																
300290																

LARGE LAND MAMMALS

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE LARGE LAND MAMMALS BETWEEN MARCH 1994 AND FEBRUARY 1995? YES: _____ NO: _____
IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (UNITS SHOULD BE INDIVIDUALS):

SPECIES	USED? Y/N	TRIED TO HARVEST Y/N	HARVESTED FOR FOOD Number	HARVESTED FUR ONLY Number	HARVESTED TOTAL Number	RECEIVED Y/N	GAVE AWAY Y/N	NOTES:
CARIBOU *TUTTU*								
210400								
MOOSE *TINIIKAQ, TUTUVAK*								
210800								
BROWN BEAR *AKŁAQ*								
210300								
DALL SHEEP *IPNIAK*								
211100								

THIS YEAR, DID YOUR HOUSEHOLD HARVEST LESS, MORE, OR ABOUT THE SAME AMOUNT OF LARGE LAND MAMMALS AS IN THE PAST?
NEVER HARVEST(0) _____ LESS: (1) _____ SAME: (2) _____ MORE: (3) _____

IF LESS OR MORE, WHY? _____

65	2E+05				

WERE YOUR HOUSEHOLD'S SUBSISTENCE NEEDS FOR LARGE LAND MAMMALS MET THIS YEAR? YES: (1) _____ NO: (0) _____

IF NO, WHY NOT? _____

66	2E+05				

BETWEEN MARCH 1994 AND FEBRUARY 1995, WHO HARVESTED ("CAUGHT") LARGE LAND MAMMALS YOUR HOUSEHOLD USED? (1)
PLEASE LIST THE MOST IMPORTANT HARVESTERS FIRST.

	PERSON CODE 01	PERSON CODE 02	PERSON CODE 03	PERSON CODE 04	PERSON CODE 05	PERSON CODE 06	PERSON CODE 07	PERSON CODE 08	PERSON CODE 09	PERSON CODE 10	PERSON CODE 11	PERSON CODE 12	PERSON CODE 13	PERSON CODE 14	PERSON CODE 15	PERSON CODE 16
MOOSE HARVESTERS																
210800																
CARIBOU HARVESTERS																
210400																
OTHER BIG GAME HARVESTERS																
210000																

BETWEEN MARCH 1994 AND FEBRUARY 1995, WHO PROCESSED ("CUT") LARGE LAND MAMMALS YOUR HOUSEHOLD USED?
PLEASE LIST THE MOST IMPORTANT PROCESSORS FIRST. (2)

	PERSON CODE 01	PERSON CODE 02	PERSON CODE 03	PERSON CODE 04	PERSON CODE 05	PERSON CODE 06	PERSON CODE 07	PERSON CODE 08	PERSON CODE 09	PERSON CODE 10	PERSON CODE 11	PERSON CODE 12	PERSON CODE 13	PERSON CODE 14	PERSON CODE 15	PERSON CODE 16
MOOSE PROCESSORS																
210800																
CARIBOU PROCESSORS																
210400																
OTHER BIG GAME PROCESSORS																
210000																

BETWEEN MARCH 1994 AND FEBRUARY 1995, WERE ANY OF THE BIG GAME USED BY YOUR HOUSEHOLD GIVEN TO YOU BY SOMEONE
IN ANOTHER HOUSEHOLD OR COMMUNITY? IF YES, WHO GAVE GAME TO YOUR HOUSEHOLD? PLEASE LIST MOST IMPORTANT FIRS YES _____ NO _____ (3)

	PERSON CODE 01	PERSON CODE 02	PERSON CODE 03	PERSON CODE 04	PERSON CODE 05	PERSON CODE 06	PERSON CODE 07	PERSON CODE 08	PERSON CODE 09	PERSON CODE 10	PERSON CODE 11	PERSON CODE 12	PERSON CODE 13	PERSON CODE 14	PERSON CODE 15	PERSON CODE 16
MOOSE PROVIDERS																
210800																
CARIBOU PROVIDERS																
210400																
OTHER BIG GAME PROVIDERS																
210000																

REINDEER

ALTHOUGH REINDEER ARE A DOMESTIC ANIMAL, REINDEER ARE IMPORTANT TO LOCAL ECONOMIES IN SOME COMMUNITIES, ESPECIALLY WHEN CARIBOU ARE NOT AVAILABLE.

BETWEEN MARCH 1994 AND FEBRUARY 1995, DID MEMBERS OF YOUR HOUSEHOLD USE REINDEER ? YES: _____ NO: _____
IF YES, PLEASE COMPLETE THE FOLLOWING TABLE

		AMOUNT USED BY HOUSEHOLD...								
SPECIES	USED? Y/N	USED FROM OWN HERD (#)	BOUGHT FROM HERD (#)	RECEIVED FOR LABOR (#)	RECEIVED AS GIFT (#)	BOUGHT FROM STORE (#)	TOTAL	UNITS	GAVE AWAY Y/N	NOTES:
REINDEER *QUNNIQ*								LBS		
230400								2		
								IND		
								HIND QRTR		
								FRONT QRTR		

NOTE: REINDEER HERDERS SHOULD INCLUDE ONLY REINDEER THAT WERE CONSUMED BY THEIR OWN HOUSEHOLDS
NOTE: EACH HALF OF A CARCASS CUT IN HALF LENGTHWISE SHOULD BE RECORDED AS ONE HINDQUARTER AND ONE FRONT QUARTER.

FURBEARERS AND SMALL LAND MAMMALS

BETWEEN MARCH 1994 AND FEBRUARY 1995, DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE FURBEARERS OR SMALL MAMMAI YES: _____ NO: _____
IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (POUNDS SHOULD INDICATE EDIBLE WEIGHT).

SPECIES	USED? Y/N	TRIED TO HARVEST Y/N	NUMBER HARVESTED FOOD #	NUMBER HARVESTED FUR ONLY #	RECEIVED Y/N	GAVE AWAY Y/N	NUMBER SOLD	AVERAGE PRICE	NOTES
WOLVERINE *QAPVIK, QAPPIK*									
221400									
WOLF *AMAGUQ*									
221300									
RED FOX *KAYUQTUQ*									
220120									
ARCTIC FOX *QUSRHAAQ, PISUKTI*									
220110									
MARTEN *QAPVAITCHIAQ*									
220800									
LYNX *NUUTUUYIQ*									
220600									
BEAVER *PALUQTAQ*									
220200									
MUSKRAT *KIGVALUK*									
221000									
LAND OTTER *PAMIUQTUUQ*									
220500									
MINK *TIGIAQPAK*									
220900									
WEASEL/ERMINE *TIGIAQ*									
221200									

FURBEARERS & SMALL LAND MAMMALS (CONTINUED)

SPECIES	USED? Y/N	TRIED TO HARVEST Y/N	NUMBER HARVESTED FOOD #	NUMBER HARVESTED FUR ONLY #	RECEIVED Y/N	GAVE AWAY Y/N	NUMBER SOLD	AVERAGE PRICE	NOTES
GROUND SQUIRREL *SIKSRIK*									
221520									
MARMOT *SIKSRIKPAK*									
ARCTIC HARE *KALLISUGRUK, UKALLIK*									
220410									
SNOWSHOE HARE *UKALLIURAQ, UKALLIQ*									
220420									
UNKNOWN HARE									
220490									
PORCUPINE *ILUQUTAQ*									
221100									

FURBEARERS & SMALL LAND MAMMALS (CONTINUED)

(1)

BETWEEN MARCH 1994 AND FEBRUARY 1995, WHO HARVESTED ("CAUGHT") THE FURBEARERS AND SMALL MAMMALS YOUR HOUSEHOLD USED?
PLEASE LIST THE MOST IMPORTANT HARVESTERS FIRST.

	PERSON CODE 01	PERSON CODE 02	PERSON CODE 03	PERSON CODE 04	PERSON CODE 05	PERSON CODE 06	PERSON CODE 07	PERSON CODE 08	PERSON CODE 09	PERSON CODE 10	PERSON CODE 11	PERSON CODE 12	PERSON CODE 13	PERSON CODE 14	PERSON CODE 15	PERSON CODE 16
FUR & SMALL MAMMAL HARVESTERS																
220000																

BETWEEN MARCH 1994 AND FEBRUARY 1995, WHO PROCESSED ("CUT") THE FURBEARERS AND SMALL MAMMALS YOUR HOUSEHOLD USED? (2)
PLEASE LIST THE MOST IMPORTANT PROCESSORS FIRST.

	PERSON CODE 01	PERSON CODE 02	PERSON CODE 03	PERSON CODE 04	PERSON CODE 05	PERSON CODE 06	PERSON CODE 07	PERSON CODE 08	PERSON CODE 09	PERSON CODE 10	PERSON CODE 11	PERSON CODE 12	PERSON CODE 13	PERSON CODE 14	PERSON CODE 15	PERSON CODE 16
FUR & SMALL MAMMAL PROCESSORS																
220000																

BETWEEN MARCH 1994 AND FEBRUARY 1995, WERE ANY OF THE FURBEARERS AND SMALL MAMMALS USED BY YOUR HH GIVEN TO YOU BY SOMEONE IN ANOTHER HH OR COMMUN
IF YES, WHO GAVE FISH TO YOUR HOUSEHOLD? PLEASE LIST MOST IMPORTANT PROVIDERS FIRST. YES (1) _____ NO (0) _____ (3)

	PERSON CODE 01	PERSON CODE 02	PERSON CODE 03	PERSON CODE 04	PERSON CODE 05	PERSON CODE 06	PERSON CODE 07	PERSON CODE 08	PERSON CODE 09	PERSON CODE 10	PERSON CODE 11	PERSON CODE 12	PERSON CODE 13	PERSON CODE 14	PERSON CODE 15	PERSON CODE 16
FUR & SMALL MAMMAL PROVIDERS																
220000																

THIS YEAR, DID YOUR HOUSEHOLD HARVEST LESS, MORE, OR ABOUT THE SAME AMOUNT OF FURBEARERS AND SMALL MAMMALS AS IN THE PAST?

NEVER HARVEST _____(0) LESS: (1) SAME: (2) MORE: (3)

IF LESS OR MORE, WHY? _____

65	220000				

DID YOUR HOUSEHOLD GET ENOUGH FURBEARERS AND SMALL MAMMALS FOR SUBSISTENCE THIS YEAR? YES: (1) NO: (0)

IF NO, WHY NOT? _____

66	220000				

BIRDS

BETWEEN MARCH 1994 AND FEBRUARY 1995, DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE BIRDS OR EG YES: _____ NO: _____
IF YES, PLEASE COMPLETE THE FOLLOWING TABLE

KEY NO.	RESOURCE	USED? Y/N	TRIED TO HARVEST Y/N	NUMBER HARVESTED IN... ...WINTER (N D J F) #	...SPRING (M A M) #	...SUMMER (J J) #	...FALL (A S O) #	...UNKNOWN #	TOTAL BIRDS HARVESTED #	TOTAL EGGS TAKEN #	RECEIVED Y/N	GAVE AWAY Y/N
1	WHITEFRONTED GOOSE *KIGIYUK*											
	442040											
2	EMPEROR GOOSE *MITILUGRUAQ, NASAUŁIQ*											
	442020											
	CANADA GEESE *NIGLIQ, LIQLIRAIRUQ*											
	442110											
5	SNOW GEESE *KANUK*											
	442030											
6	BLACK BRANT *LIQLINAURAQ*											
	442130											
	UNKNOWN GEESE											
	442990											
7	NORTHERN PINTAIL *YUGAQ*											
	441090											
8	AMERICAN WIGEON											
	441710											
9	MALLARD *IRAGUSRUGRUK*											
	441080											
10	NORTHERN SHOVELER											
	441140											
	UNKNOWN SCAUP											
	441590											
11	CANVASBACK											
	441150											

BIRDS (CONTINUED)

KEY NO.	RESOURCE	USED? Y/N	TRIED TO HARVEST Y/N	NUMBER HARVESTED IN... ...WINTER (N D J F) #	...SPRING (M A M) #	...SUMMER (J J) #	...FALL (A S O) #	...UNKNOWN #	TOTAL BIRDS HARVESTED #	TOTAL EGGS TAKEN #	RECEIVED Y/N	GAVE AWAY Y/N
14	GREEN-WINGED TEAL											
	441260											
	UNKNOWN MERGANSER											
	441490											
18	HARLEQUIN											
	441030											
19	OLDSQUAW *AHAALIQ*											
	441130											
20	COMMON GOLDENEYE											
	441610											
	UNKNOWN SCOTER *TUNNAQ*											
	441290											
24	COMMON EIDER *AIYURIAGRUK*											
	441240											
25	KING EIDER *QINGUALIK*											
	441230											
26	SPECTACLED EIDER *MITIQ*											
	441220											
27	STELLER'S EIDER											
	441210											
	UNKNOWN EIDER											
	441180											
	UNKNOWN DUCKS											
	441990											

BIRDS (CONTINUED)

KEY NO.	RESOURCE	USED? Y/N	TRIED TO HARVEST Y/N	NUMBER HARVESTED IN... ...WINTER (N D J F) #	...SPRING (M A M) #	...SUMMER (J J) #	...FALL (A S O) #	...UNKNOWN #	TOTAL BIRDS HARVESTED #	TOTAL EGGS TAKEN #	RECEIVED Y/N	GAVE AWAY Y/N
	LOON *QAQSRAUQ*											
	447290											
	UNKNOWN MURRE *ATPA*											
	447690											
	UNKNOWN GULL *NAUYUAQ*											
	447490											
39	AUKLETS *TINGMIURAQ*											
	448390											
40	PUFFINS											
	447390											
	OTHER SEABIRDS											
	446990											
	UNKNOWN SHOREBIRDS											
	445990											
	PTARMIGAN *AQALGIQ*											
	420290											
45	GROUSE *NAPAQTUM AQALGIQ*											
	420100											
46	SNOWY OWL *UKPIK*											
	410100											
47	SANDHILL CRANE *TATIRGAQ*											
	444010											
48	TUNDRA SWAN *QUGRUK*											
	443010											

BIRDS (C0NTINUED)

BETWEEN MARCH 1994 AND FEBRUARY 1995, WHO HARVESTED ("CAUGHT") THE BIRDS YOUR HOUSEHOLD USED? (1)
PLEASE LIST THE MOST IMPORTANT HARVESTERS FIRST.

	PERSON CODE 01	PERSON CODE 02	PERSON CODE 03	PERSON CODE 04	PERSON CODE 05	PERSON CODE 06	PERSON CODE 07	PERSON CODE 08	PERSON CODE 09	PERSON CODE 10	PERSON CODE 11	PERSON CODE 12	PERSON CODE 13	PERSON CODE 14	PERSON CODE 15	PERSON CODE 16
BIRD HARVESTERS																
400000																

BETWEEN MARCH 1994 AND FEBRUARY 1995, WHO PROCESSED ("CUT") THE BIRDS YOUR HOUSEHOLD USED? (2)
PLEASE LIST THE MOST IMPORTANT PROCESSORS FIRST.

	PERSON CODE 01	PERSON CODE 02	PERSON CODE 03	PERSON CODE 04	PERSON CODE 05	PERSON CODE 06	PERSON CODE 07	PERSON CODE 08	PERSON CODE 09	PERSON CODE 10	PERSON CODE 11	PERSON CODE 12	PERSON CODE 13	PERSON CODE 14	PERSON CODE 15	PERSON CODE 16
BIRD PROCESSORS																
400000																

BETWEEN MARCH 1994 AND FEBRUARY 1995, WERE ANY OF THE BIRDS USED BY YOUR HOUSEHOLD GIVEN TO YOU BY SOMEONE IN ANOTHER HOUSEHOLD OR COMMUNITY?
IF YES, WHO GAVE FISH TO YOUR HOUSEHOLD? PLEASE LIST MOST IMPORTANT PROVIDERS FIRST. YES (1) _____ NO (0) _____ (3)

	PERSON CODE 01	PERSON CODE 02	PERSON CODE 03	PERSON CODE 04	PERSON CODE 05	PERSON CODE 06	PERSON CODE 07	PERSON CODE 08	PERSON CODE 09	PERSON CODE 10	PERSON CODE 11	PERSON CODE 12	PERSON CODE 13	PERSON CODE 14	PERSON CODE 15	PERSON CODE 16
BIRD PROVIDERS																
400000																

THIS YEAR, DID YOUR HOUSEHOLD HARVEST LESS, MORE, OR ABOUT THE SAME AMOUNT OF BIRDS AS IN THE PAST?

NEVER HARVEST _____(0) LESS: (1) SAME: (2) MORE: (3)

IF LESS OR MORE, WHY? _____

65	400000				

DID YOUR HOUSEHOLD GET ENOUGH BIRDS FOR SUBSISTENCE THIS YEAR? YES: (1) NO: (0)

IF NO, WHY NOT? _____

66	400000				

WILD PLANTS.

BETWEEN MARCH 1994 AND FEBRUARY 1995, DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE WILD PLANTS? YES:_____ NO:_____
IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (POUNDS SHOULD INDICATE EDIBLE WEIGHT).

SPECIES	USED? Y/N	TRIED TO HARVEST Y/N	AMOUNT HARVESTED #	UNIT	RECEIVED Y/N	GAVE AWAY Y/N	NOTES
BERRIES							
ASIAT							
610000							
PLANTS/GREENS/MUSHROOMS							
NAUSRIAT							
620300							
ROOTS							
MASU							
620700							
FIREWOOD							
640000							

WILD PLANTS (CONTINUED)

BETWEEN MARCH 1994 AND FEBRUARY 1995, WHO HARVESTED ("CAUGHT") THE EDIBLE WILD PLANTS YOUR HOUSEHOLD USED? (1)
PLEASE LIST THE MOST IMPORTANT HARVESTERS FIRST.

	PERSON CODE 01	PERSON CODE 02	PERSON CODE 03	PERSON CODE 04	PERSON CODE 05	PERSON CODE 06	PERSON CODE 07	PERSON CODE 08	PERSON CODE 09	PERSON CODE 10	PERSON CODE 11	PERSON CODE 12	PERSON CODE 13	PERSON CODE 14	PERSON CODE 15	PERSON CODE 16
EDIBLE PLANT HARVESTERS																
600000																

BETWEEN MARCH 1994 AND FEBRUARY 1995, WHO PROCESSED ("CUT") THE EDIBLE WILD PLANTS YOUR HOUSEHOLD USED? (2)
PLEASE LIST THE MOST IMPORTANT PROCESSORS FIRST.

	PERSON CODE 01	PERSON CODE 02	PERSON CODE 03	PERSON CODE 04	PERSON CODE 05	PERSON CODE 06	PERSON CODE 07	PERSON CODE 08	PERSON CODE 09	PERSON CODE 10	PERSON CODE 11	PERSON CODE 12	PERSON CODE 13	PERSON CODE 14	PERSON CODE 15	PERSON CODE 16
EDIBLE PLANT PROCESSORS																
600000																

BETWEEN MARCH 1994 AND FEBRUARY 1995, WERE ANY OF THE EDIBLE WILD PLANTS USED BY YOUR HOUSEHOLD GIVEN TO YOU BY SOMEONE IN ANOTHER HOUSEHOLD OR COM
IF YES, WHO GAVE FISH TO YOUR HOUSEHOLD? PLEASE LIST MOST IMPORTANT PROVIDERS FIRST. YES (1) _____ NO (0) _____ (3)

	PERSON CODE 01	PERSON CODE 02	PERSON CODE 03	PERSON CODE 04	PERSON CODE 05	PERSON CODE 06	PERSON CODE 07	PERSON CODE 08	PERSON CODE 09	PERSON CODE 10	PERSON CODE 11	PERSON CODE 12	PERSON CODE 13	PERSON CODE 14	PERSON CODE 15	PERSON CODE 16
EDIBLE PLANT PROVIDERS																
600000																

THIS YEAR, DID YOUR HOUSEHOLD HARVEST LESS, MORE, OR ABOUT THE SAME AMOUNT OF EDIBLE WILD PLANTS AS IN THE PAST?

NEVER HARVEST _____(0) LESS: (1) SAME: (2) MORE: (3)

IF LESS OR MORE, WHY? _____

65	600000				

DID YOUR HOUSEHOLD GET ENOUGH EDIBLE WILD PLANTS FOR SUBSISTENCE THIS YEAR? YES: (1) NO: (0)

IF NO, WHY NOT? _____

66	600000				

COMMERCIAL FISHING

DID MEMBERS OF YOUR HOUSEHOLD PARTICIPATE IN COMMERCIAL FISHING BETWEEN MARCH 1994 AND FEBRUARY 1995? YES: _____ NO: _____

IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (POUNDS SHOULD INDICATE EDIBLE WEIGHT):

	COMMERCIAL FISHED?		AREAS			NUMBER REMOVED FOR:			ID #'S OF FISHERS	
SPECIES	Y/N	INCIDENTAL	1ST	2ND	PRINCIPAL GEAR TYPE	OWN USE #	GAVE AWAY #	UNITS	PERMIT HOLDER	CREW
CHUM SALMON *QALUGRUAQ*								IND		
110101								1		
PINK SALMON (HUMPIES) *AMAKŁUK*								IND		
110401								1		
SILVER SALMON								IND		
110201								1		
KING SALMON *IQALUSUGRUK*								IND		
110301								1		
SOCKEYE SALMON								IND		
110501								1		
DOLLY VARDEN *IQAŁUKPIK*								GAL		
124121								4		
HERRING *IGAŁUAQPAQ*								GAL		
121501								4		
SHEEFISH *SII*								IND		
120601								1		
HALIBUT								LBS		
121401								2		
KING CRAB *QAQUQ*								IND		
503391								1		

AREAS: AKP, BB, CHG, KOD, CI, PWS, SE, ALU, KUSK, YUK, NOR, KOT

GEAR TYPES: SET GILL, DRIFT GILL, SEINE, LONG LINE, TROLLING, POTS, TRAWLING

COMMUNITIES - GAVE

BETWEEN MARCH 1994 AND FEBRUARY 1995, TO WHICH COMMUNITIES DID YOUR HOUSEHOLD GIVE RESOURCES?
PLEASE LIST MOST IMPORTANT GIFTS FIRST, AND INCLUDE YOUR HOME COMMUNITY WHEN YOU GAVE RESOURCES TO ANOTHER HOUSEHOLD HERE.

	COMM. 1	COMM. 2	COMM. 3	COMM. 4	COMM. 5	COMM. 6	COMM. 7	COMM. 8	COMM. 9	COMM. 10
TROUT *IQALUKPIK, SIGLITAK*										
124200										
SALMON *QALUGRUAQ*										
110000										
SHEEFISH *SII*										
120600										
CARIBOU *TUTTU*										
210400										
MOOSE *TINIIKAQ, TUTUVAK*										
210800										
BD SEAL (OIL/MEAT) *UGRUK*										
300200										
WATERFOWL *TINGMIAT*										
440000										
BOWHEAD WHALE *AGVIQ, AGVAK*										
300120										
BELUKHA WHALE *SISUAQ, SIŁUAQ*										
300110										

BETWEEN MARCH 1994 AND FEBRUARY 1995, WHICH OF THE FOLLOWING CAMPS AND EQUIPMENT DID MEMBERS OF YOUR HOUSEHOLD OWN OR USE FOR SUBSISTENCE?

	DID ANYONE IN YOUR HH USE? Y/N	HOW MANY DID YOUR HH OWN? #	DID ANYONE IN ANOTHER HH USE YOURS? Y/N	DID ANYONE IN YOUR HH USE ANOTHER HHS? Y/N	IF YES, WHOSE CAMP OR EQUIPMENT DID THEY USE?							
					PERSON CODE 01	PERSON CODE 02	PERSON CODE 03	PERSON CODE 04	PERSON CODE 05	PERSON CODE 06	PERSON CODE 07	PERSON CODE 08
FISH CAMP												
1												
OTHER CAMP												
2												
BOAT												
3												
SNOWMACHINE												
4												
DOG TEAM												
5												
ALL TERRAIN VEHICLE												
6												
CAR OR TRUCK												
7												
AIRPLANE*												
8												

* FOR AIRPLANES, DO NOT INCLUDE ROUTINE COMMUNITY TO COMMUNITY TRANSPORTATION. DO INCLUDE AIRPLANE TRIPS TO FISHING OR HUNTING CAMPS

INTERGENERATIONAL TRANSMISSION OF KNOWLEDGE

WE ARE INTERESTED IN HOW PEOPLE LEARN ABOUT SUBSISTENCE.

RESPONDENT ID: _____
(FROM DEMOGRAPHICS PAGE)

HOW OLD WERE YOU WHEN YOU FIRST LEARNED ABOUT...	(AGE)	WHO WAS WITH YOU OR SHOWED YOU? TEACHER 01	TEACHER 02	TEACHER 03	TEACHER 04	TEACHER 05
HUNTING IN THIS AREA? 1						
FISHING IN THIS AREA? 2						
TRAPPING IN THIS AREA? 3						
PICKING IN THIS AREA? 4						
PROCESSING LOCAL FOODS? 5						
CARVING OR SEWING? 6						
TRADITIONAL MEDICINE? 7						

HOW OLD WERE YOU WHEN YOU FIRST SHOWED SOMEONE ABOUT...	(AGE)	WHO WAS WITH YOU OR WATCHED YOU? STUDENT 01	STUDENT 02	STUDENT 03	STUDENT 04	STUDENT 05
HUNTING IN THIS AREA? 1						
FISHING IN THIS AREA? 2						
TRAPPING IN THIS AREA? 3						
PICKING IN THIS AREA? 4						
PROCESSING LOCAL FOODS? 5						
CARVING OR SEWING? 6						
TRADITIONAL MEDICINE? 7						

RELATIONSHIP	CODE	...IN OTHER WORDS
YOUR...		
FATHER	FA	
MOTHER	MO	
BROTHER	BR	
SISTER	SI	
HUSBAND	HU	
WIFE	WI	
SON	SO	
DAUGHTER	DA	
SON'S CHILD	SOSO, SODA	Your Grandchild
DAUGHTER'S CHILD	DASO, DADA	Your Grandchild
YOUR FATHER'S...		
...FATHER	FAFA	Your Grandfather
...MOTHER	FAMO	Your Grandmother
...BROTHER	FABR	Your Uncle
...SISTER	FASI	Your Aunt
...SIBLING'S CHILD	FACO	Your Cousin
YOUR MOTHER'S...		
...FATHER	MOFA	Your Grandfather
...MOTHER	MOMO	Your Grandmother
...BROTHER	MOBR	Your Uncle
...SISTER	MOSI	Your Aunt
...SIBLING'S CHILD	MOCO	Your Cousin
YOUR SPOUSE'S...		
...FATHER	HUFA, WIFA	Your Father-in-Law
...MOTHER	HUMO. WIMO	Your Mother-in-Law
...BROTHER	HUBR, WIBR	Your Brother-in-Law
...SISTER	HUSI, WISI	Your Sister-in-Law
YOUR BROTHER'S OR SISTER'S...		
...SPOUSE	SISP	
...SON	SISO	Your Nephew
...DAUGHTER	SIDA	Your Niece
OTHER...		
FRIEND	FRND	
SELF	SELF	
ELDER	ELDR	
BOAT CAPTAIN	CPTN	Umialik, Boat Owner
SCHOOL TEACHER	TCHR	
STUDENT	STUD	Students in school
OTHER	OTHR	

EMPLOYMENT HISTORY.

PLEASE INDICATE THE FOLLOWING INFORMATION FOR ALL JOBS HELD BY THE EMPLOYED PERMANENT HOUSEHOLD MEMBERS 16 OR OLDER LISTED ON PAGE 1 BETWEEN MARCH 1994 AND FEBRUARY 1995. BE SURE TO INDICATE TRAPPING, IF FURS ARE BARTERED OR SOLD.
FOR THOSE NOT EMPLOYED, PLEASE SPECIFY RETIRED, UNEMPLOYED, DISABLED, STUDENT, OR HOMEMAKER.

ID#	JOB #	JOB TITLE	SOC	EMPLOYER TYPE	SIC	TYPE*	LOCATION	WHICH MONTHS WORKED IN 1994/95	HRS/DAY	DAYS/ WEEK	WORK ** SCHEDULE	PERSONAL GROSS INCOME
								M A M J J A S O N D J F				
								M A M J J A S O N D J F				
								M A M J J A S O N D J F				
								M A M J J A S O N D J F				
								M A M J J A S O N D J F				
								M A M J J A S O N D J F				
								M A M J J A S O N D J F				
								M A M J J A S O N D J F				
								M A M J J A S O N D J F				
								M A M J J A S O N D J F				

*TYPE: **(1)** NATIVE PROFIT or **(2)** NATIVE NON-PROFIT; OTHERWISE LEAVE BLANK.

WORK SCHEDULE = **(1) FULLTIME (35+ HOURS/WK) **(2)** PARTTIME (<35 HOURS/WEEK) **(3)** SHIFT (2 WEEKS ON/2 OFF, 1 WEEK ON/1 OFF, ETC.) **(4)** IRREGULAR, ON CALL, AS REQUIRE

OTHER INCOME AND EXPENSES.

OTHER INCOME SOURCES BETWEEN MARCH 1994 AND FEBRUARY 1995

NOTES:

1	2	3	4	5	6	7	8	9	10
$984	$1,968	$2,952	$3,936	$4,920	$5,903	$6,887	$7,871	$8,855	$9,839

_____ (NUMBER) ALASKA PERMANENT FUND DIVIDEND $ _____ PER YEAR

SOCIAL SECURITY (07) $ _____ PER YEAR

SUPPLEMENTAL SECURITY INCOME (10) $ _____ PER YEAR

NATIVE CORPORATION DIVIDEND (13) $ _____ PER YEAR

AID TO FAMILIES WITH DEPENDENT CHILDREN (02) $ _____ PER YEAR

PENSION AND RETIREMENT (05) $ _____ PER YEAR

WORK COMPENSATION INSURANCE (08) $ _____ PER YEAR

FOOD STAMPS (11) $ _____ PER YEAR

DIVIDENDS AND INTEREST (14) $ _____ PER YEAR

ADULT PUBLIC ASSISTANCE (03) $ _____ PER YEAR

LONGEVITY BONUS ($250 PER MONTH) (06) $ _____ PER YEAR

ENERGY ASSISTANCE (09) $ _____ PER YEAR

UNEMPLOYMENT (12) $ _____ PER YEAR

OTHER _____( ) $ _____ PER YEAR

ABOUT HOW MUCH MONEY DOES YOUR HOUSEHOLD SPEND EACH MONTH TO BUY FOOD?

FOOD EXPENSE $ _____ PER MONTH

DO YOU HAVE ANY OTHER QUESTIONS, COMMENTS, OR CONCERNS?

INTERVIEW SUMMARY:

BE SURE TO FILL IN THE STOP TIME ON THE FIRST PAGE!!!!