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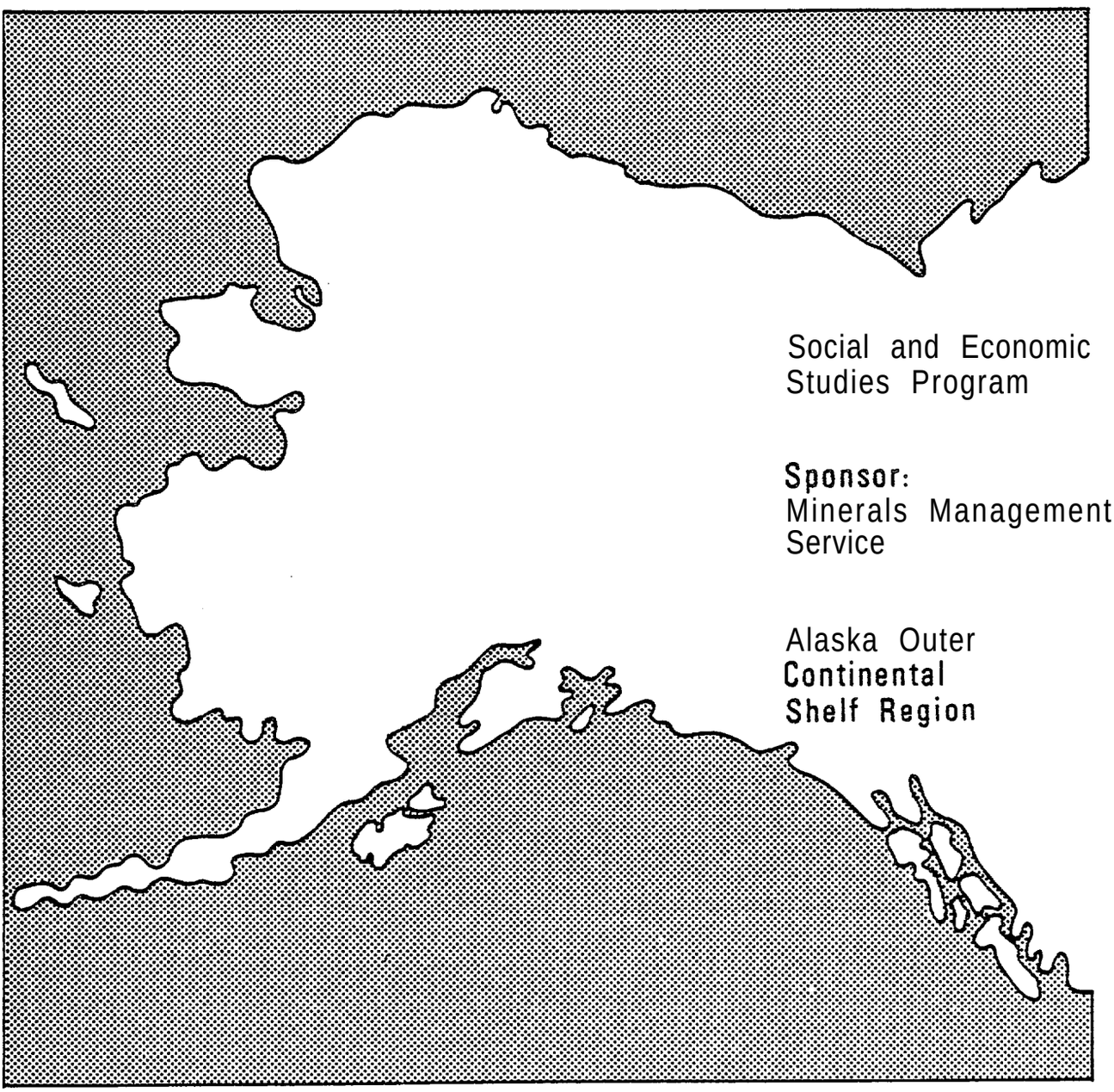

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Sociocultural / Socioeconomic Organization of Bristol Bay: Regional and Subregional Analyses

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ALASKA OCS SOCIOECONOMIC STUDIES PROGRAM

SOCIOCULTURAL/SOCIOECONOMIC ORGANIZATION OF BRISTOL BAY:

REGIONAL AND SUBREGIONAL ANALYSES

PREPARED FOR

MINERALS MANAGEMENT SERVICE
ALASKA OUTER CONTINENTAL SHELF REGION
LEASING AND ENVIRONMENT OFFICE

PREPARED BY

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NOTICE

Alaska OCS Socioeconomic Studies Program

Sociocultural/Socioeconomic Organization of Bristol Bay: Regional and Subregional Analyses

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Abstract

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

The population of the region reflects a common pattern in rural Native regions of Alaska. Males represent 53% of the population, while the age distribution of the region is roughly hi-modal with more than half the population under the age of 24. The ethnic distribution of the regions's population has remained relatively constant (76.3% Native in 1970 versus 75.6% in 1980). Most Bristol Bay villages experienced stable or declining population between 1960 and 1980. Population change was found to be tied more to patterns of immigration and intra-regional movement than to patterns of natal ity and mortality. The bulk of the increase in non-Native population was centered in Dillingham.

The Bristol Bay economy is based primarily on the annual red salmon harvests and, as a result, has been subject to corresponding surges and declines in that resource. The late 1970s and early 1980s, however, have seen several record harvests and, where price per pound was high, in record earning levels. Earnings in other sectors of the economy have been relatively stable with two except ions; first, in the recreation industry where gradually increasing incomes have been the rule and, second, in civilian government activity which has grown from 7% of total income in 1970 to 15% in 1980.

Non-residents are seen to derive approximately 57% of the total earnings generated by the Bristol Bay fishery. This income leakage is compounded by the fact that fuel, major commercial products, and a major portion of locally consumed food are purchased from outside the region. The pro-cessing sector of the economy has diversified in response to increased competition from smaller processors and fish buyers. Most canneries now commit a portion of their fish to fresh, fresh frozen and special-pack products. The growth of the market for fresh salmon is seen to support the continued viability of the fishery and the higher levels of income attained in the last few years. The potent ial effects of longer-term price contracts between the processors and fishermen will also contri-bute toward higher earnings and investment security for the fishermen and processors alike. The role of foreign capital investment in the fishery, in response to greater exclusionary efforts on the part of the U.S. in its domestic fisheries, is seen as a significant and growing concern of both fishermen and remaining domestically-controlled pr-

cessors. Though the traditional economic and political power of the onshore Processors 'has suffered decline, they nevertheless remain the dominant" force in the commerical f ishery. The long-term ability of the Japanese to unify and control these processors has created justified concern among Bristol Bay fishermen.

Limited Entry has had several major effects on the Bristol Bay economy. This policy identified specific individuals who would be allocated permits to fish the resource according to participation patterns prevailing in 1973. These transferable permits have increased in value from $1,500 in 1975 to over $100,000 in 1983. The resulting economic changes have included dramatically increased competition among both fishermen and processors, increased fisherman independence from canneries, increased capital investment in new technology, and changes in the spatial distribution of local fishermen from one based on traditional sociocultural patterns toward one based on maximization of income. Limited entry has encouraged residential stability but has also led to increasing social differentiation based on income, residence patterns, and inheritance of permits.

It was determined that between 50-75% of total income earned in Bristol Bay was tied to non-resident workers and fishermen who participate only in the annual. salmon (and herring) fishery of early summer. We have estimated that non-resident spending accounts for approximately 10% of total expenditures in the region. Real income in constant 1980 dollars increased only 17% between 1970 and 1980, from $125.9 to $146.7 million. Real income earned by non-residents fell in absolute terms and as a proration of total income (from 74% to 53%) during the same period. Real local spending in Bristol Bay increased from $11.1 to $34.5 million. Most of this increase is attributed to expanded resident participation in the local cash economy. The Bristol Bay economic multiplier is believed to be between 1.1 and 1.2. Most of the direct and induced effects of economic expansion over the past decade were concentrated in Dillingham. The Bristol Bay labor force grew signif icantly in the past decade, suggesting a general trend toward increased part icipation in the cash economy. In spite of this growth, laker force participant ion rates (LFPR) across subregions do not exhibit consistent increasing patterns; two subregions registered declines.

Three economic forecast parameters are employed in our analysis; economic multiplier, labor force part icipat ion rate, and migration rates. Given the dominance of outside fishermen in harvesting the salmon resources of the region, it is clear that consideration of an aggregate economic multiplier would result in a negative number since more than 60% of the gross revenue from the fishery is distributed to outside residents who make virtually no local purchases. However, even after excluding these outside residents from the amputation, the economic multiplier resulting from resident fishery earnings has traditionally been, and continues to be, extremely low. The bulk of all first tier expenditures go to purchase products from outside the region. Moreover, the service sector of the economy, though it has grown significantly since 1970, remains small while local production of consumption items has not increased significantly. Thus, second tier expenditures have remained relatively low. However, while the multiplier remains low in the region it has nevertheless increased significantly since 1970. Our

examination of labor force participation rates indicates an increase in employed residents since 1970. This overall increase, however, reflects clear gains for males and females in Dillingham and Togiak, gains for females in King Salmon, declines for males in King Salmon and relatively unreliable indicators for the remaining communities.

The pattern of zero annual cash savings for the Native population of Bristol Bay remains dominant. About 75% of total household cash income is earned over the fishing season and is usually spent well in advance of the following season. The incentive to spend surplus cash is derived from enduring cultural values which have only recently come under direct pressure from federal taxing policies, long-term debt service on newly purchased vessels, housing payments resulting from purchase of HUD-financed homes, and from changes in consumption patterns. Capital formation, resulting from investment in new vessels, homes, bulk purchases, and ownership of entry permits, however, represents a significant departure from traditional patterns, and is expected to result in an increased skew in the distribution of wealth and its logical social and cultural consequences. There was found to be a direct relationship between saving and investment in the village economy. Most investment was self-generated from personal saving and was geared toward commercial fishing vessel upgrade. Public and private sources of commercial financing, including banks and state loans, tend to perpetuate the pattern of self-generated investment from village household saving.

The region consists of five primary subregions. The two primary economic centers are seen as Naknek and Dillingham where the bulk of the processors are located. While the Naknek processors generate the bulk of the fishery income, Dillingham is clearly the dominant regional service center as Naknek's role virtually ends with the fishing season. Togiak is seen as an incipient service center for both a growing salmon and herring fishery though recent population growth in this community is seen to derive from social and economic forces pushing residents out of other communities, primarily from the lower Kuskokwim, rather than from the draw of Togiak as a particularly attractive residence.

The pre-existing sociocultural framework of Bristol Bay is seen to reflect millenia of cultural adaptation to a cyclical resource utilization pattern The core traditional values that have been largely retained in the modern context, and which have oriented recent adaptation, include (1) a very close interdependence of individuals within the community, maintained by ties of kinship and reciprocity, and (2) by the interdependence of man and nature, maintainedby seasonal patterns of resource availability.

While increasing social differentiation has not yet led to the emergence of a stratified society, certain points of stress have emerged. These points are indicated by increasing problems with alcohol abuse, disruption of families and crime, and revolve around differences in commercial and subsistence productivity, political conflict and greater emphasis on ethnic identity, and challenges to the self-image of local residents. Nevertheless, residents are seen to have been relatively successful in selecting adaptive strategies and in the overall "management" of change.

CHAPTER 1

INTRODUCTION

1.1 Objective of the Study

The following report provides a baseline description and analysis of the socioeconomic and sociocultural systems of the North Aleutian lease sale area in Alaska. Most of this area is located in the Bristol Bay and lower Kuskokwim regions and includes twenty-four communities. The communities of the Alaska Peninsula southwest of the Bristol Bay Borough, and most of the Kuskokwim region, have been excluded from this analysis.

The aim of this study was to develop an understanding of current conditions and trends in the socioeconomic structure and organization of the Bristol Bay region, and thus, to serve as a springboard for future forecasts and analyses of the impact of oil and gas activity in the region and subregions of the North Aleutian Basin lease sale area (sale 92). Most of our analysis, therefore, concerns Bristol Bay's two major socioeconomic systems: the cash-based system, represented primarily by the commercial fishing industry, and the indigenous, subsistence-oriented system, represented primarily by hunting and fishing activities and kin-based patterns of resource distribution. The analysis also focuses on the major structural axes upon which these two systems turn, including subsistence production and distribution, commercial harvesting, processing, other cash-producing activities, public assistance, and local government participation in revenue-sharing and capital project development. The effects of regulatory processes such as the Limited Entry Act of 1973, the Alaska Native Claims Settlement Act (ANCSA) of 1971, and the Alaska National Interest Lands Conservation Act (ANILCA) of 1980 will also be explored.

Although the report concentrates on economic activities, other aspects of the socioeconomic and sociocultural systems, such as patterns of

social organization, political activity, and value systems, are also discussed to determine how they affect and are affected by these economic activities. For the purposes of this study, sociocultural systems were viewed as the context within which socioeconomic systems operated and were not considered uniform throughout the region.

The report is intended to serve as the basis for the development of a forecast methodology which can be applied throughout the region in assessing potential aspects of OCS-related or any other form of economic development. An outline of this methodology is provided in Technical Memorandum 92-2.

1.2 Study Methodology

1.2.1 Organization of the Study

This study was conducted by a research team under the direction of Dr. John Petterson, the principal investigator, and included anthropologists (Dr. Bruce Harris, Dr. Steve Langdon, Dr. Lawrence Palinkas, Ms. Kathleen Barlow, and Mr. Michael Downs) economists (Dr. Lee Huskey and Mr. Will Nebesky), and a commercial fisheries analyst (Mr. Jeffrey Tobolski). Mr. Nebesky and Mr. Tobolski were responsible for the collection and analysis of data pertaining to the cash economy and commercial activities in the study area. Dr. Patterson, Dr. Harris, and Dr. Langdon were principally involved in the collection and analysis of data pertaining to subsistence activities, political structure, and sociocultural organization. Dr. Huskey and Dr. Palinkas were responsible for the development of the forecast methodology. Dr. Palinkas also assisted in the analysis of sociocultural data. Ms. Barlow collected and analyzed data pertaining to the educational systems in the study area.

1.2.2 Data Collection

Data utilized in this study were obtained through two different sources.

In the first phase of research, existing data sources, including published reports, census information, ethnographic studies, and unpublished data from the Alaska Department of Fish and Game, were reviewed and analyzed to determine issues and topics requiring further data collection. This material was compiled and formed the groundwork for Technical Memorandum 92-1: Methods, Standards and Assumptions: Fieldwork Plan. On the basis of this effort a list of data needs was constructed. This list was then used as the basis for data collection efforts in the field.

In the second phase, project researchers travelled throughout the region collecting data on the prescribed topics. Dr. Petterson was responsible for the communities of the Naknek-Kvichak and Iliamna Lake subregions, and for brief data collection periods in the communities of Togiak, Twin Hills and Platinum. Dr. Harris visited the communities of Koliganek, Manokotak, New Stuyahok, Ekwok, Portage Creek, and Clark's Point. Dr. Langdon visited the communities of Togiak and Twin Hills, and Mr. Nebesky collected data from Dillingham.

In addition to the efforts of-the study team, data from the communities of Goodnews Bay, Quinhagak, Togiak, and New Stuyahok were provided by members of a research team from the Subsistence Division of the Alaska State Department of Fish and Game. These data were collected from a separate study of subsistence strategies and domestic modes of production in these communities.

Participant observation and informal interviews were the chief methods by which data were collected; the use of survey techniques was both discouraged and inappropriate. Given the number of communities, it was not possible for any one investigator to remain for long periods of time in any single community. Data were collected in two ways. A broad sample of community residents were approached for general information on subsistence activities, involvement in the commercial fishery, perceptions of community life, economic development, and value systems. More specific information regarding social networks, migration patterns, economic decision making and political activities was obtained from a

smaller number of key informants. Information collected from fieldwork was then organized and integrated with the analysis of existing data to produce the report.

1.2.3. Data Analysis

Analysis of the socioeconomic and sociocultural systems of the Bristol Bay region is based on a "top-down" or "nested" approach and is made on three distinct levels: regional, subregional, and community. The first two levels, however, are given the greatest emphasis in this report. As reflected in previous OCS Social and Economic Studies Program studies, regional-level analysis and projections tend to be limited naturally by their inclusion of diverse subregions, community clusters, and idiosyncratic communities. Analysis at the regional level must, perforce, be quite generalized and is of limited use in making accurate forecasts. In subregional or village-cluster analysis, on the other hand, data can be tied more specifically to the set of communities involved and the analysis used to make more accurate forecasts. Finally, a community-by-community analysis is directly tied to the data, varies dramatically from one community to the next, is highly defendable, is invariably the most accurate, and also the least elegant.

In the following report the three levels are integrated for a complete view of Bristol Bay socioeconomic and sociocultural systems. The analysis of regional structure and process will be a point of comparison for analyses at the other levels. Where subregional, village cluster, or community sectors or activities are significantly different from the corresponding sectors or activities at the regional level, detailed analyses have been made. At the community level our analysis is designed to reveal the ways in which a particular community differs from others in its cluster or subregion. We have not intended to make a comprehensive ethnographic study of each community but rather to highlight the distinctive features of local structure, and the ways in which local level systems differ significantly from the subregional and regional systems.

Another essential feature of the analytical approach used in this study is the integration of economic, social, political, and cultural components of the sociocultural and socioeconomic systems of the study area using a systems framework. The key to this framework is the elaboration of the value systems extant in the area. Cultural values form the matrix from which economic decisions and behavior emanate, different cultural values creating different socioeconomic structures. Even in a subregion which is tightly interconnected by kinship or economic structure, the attitudes of the inhabitants toward general or specific changes brought about by outside influence may preclude major local participation in the intrusive commercial economy. Also, value conflicts may inhibit economic development. Traditional, frontier, and modern value systems each affect the structure and organization of economic activity differently (Petterson et al. 1983). These value systems vary by subregion and, to some degree, even by individual community. Where possible, a value structure for the region as a whole and for the major subregions will be identified. Individual community variations are noted only where markedly different from other communities in a subregion.

1.3 Overview of the Report

The report attempts to paint as comprehensive a picture as possible of the sociocultural and socioeconomic systems in the study region and is organized according to three major themes. The first concerns the importance of non-economic facets of the social systems in understanding economic activities. These facets are part of the existing ideological systems which include values, world views, and definitions of self and social identity. In turn, these ideological systems are influenced by social relations, political conflicts, education, and religion. Ethnicity is one of the keys to social identity and influences the decision-making process vis-a-vis economic activities. Health and social well-being are also important barometers of the sociocultural and socioeconomic systems which both register and influence economic activity.

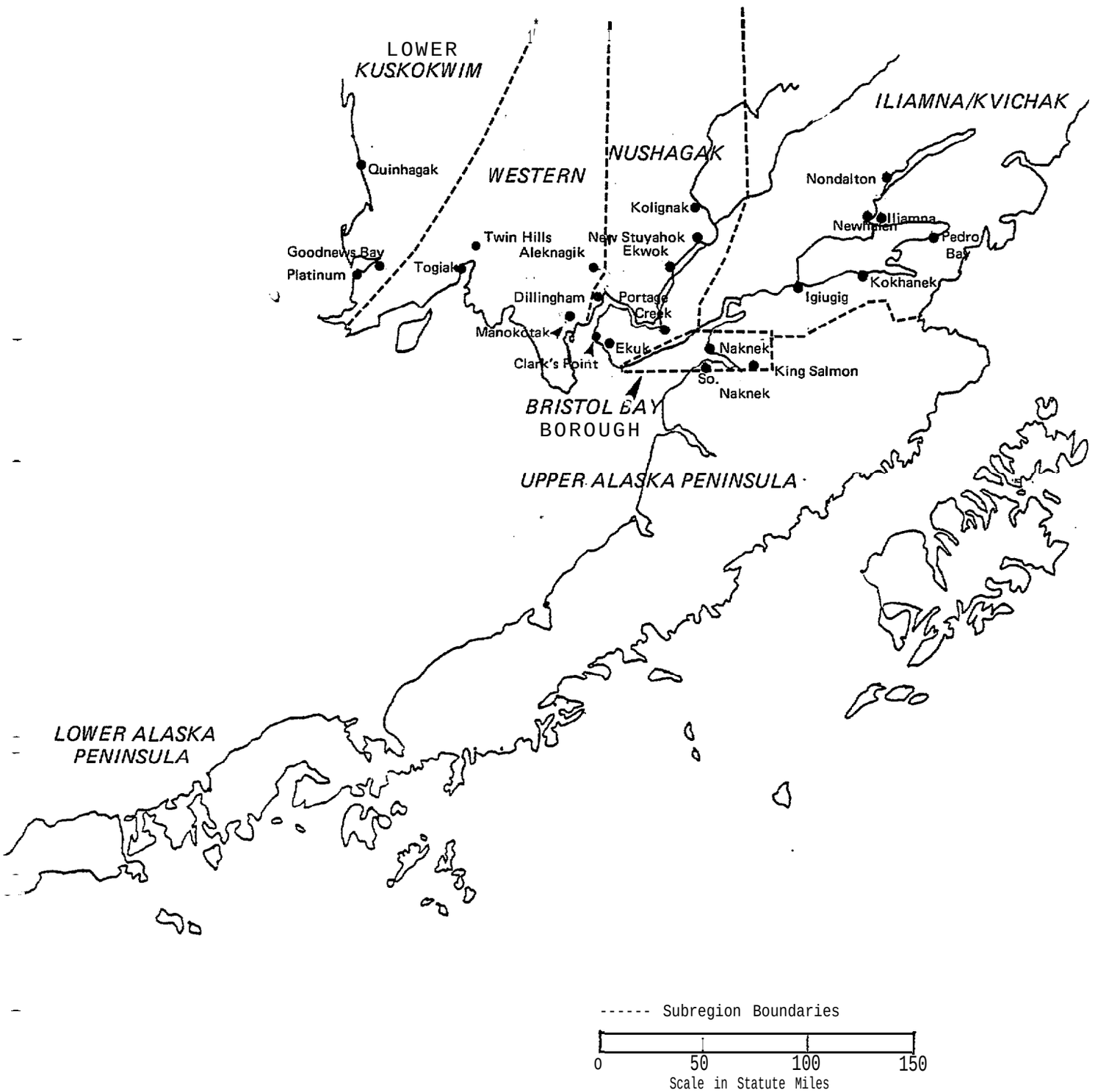
The second theme is the interaction between the indigenous and intrusive socioeconomic/sociocultural systems. Formal economic models often are employed to forecast development and social change in rural Alaska, but they often lead to an inadequate understanding of the interaction between the intrusive and indigenous systems. In this report, interaction is viewed from the perspective of the management of social change. The process of social change is not seen as random and haphazard but as a process by which local residents satisfy certain material, social, cultural, and psychological needs. This process is also affected to a large extent by environmental factors. Although certain aspects of bicultural interaction appear throughout the region and can therefore be used in the development of a forecast methodology for all of Bristol Bay, important subregional differences limit the usefulness of regional-level forecasts. Subregional differences in the management of change will be detailed throughout the report.

Also to be identified in this report are those areas of social and cultural life in which the management of change is impossible, incomplete, or otherwise unsuccessful. These points of stress between the dominant systems may be social, psychological, or economic and on the one hand may be viewed as a negative consequence of previous or current change, or as providing the impetus for further change (such as government-supported services) on the other.

The third major theme embraces important subregional variations in the management of change. These variations are the result of different cultural traditions, patterns of subsistence activity, and degrees of exposure to the intrusive cash-based economic system. In many important respects these subregions must be viewed as separate sociocultural and socioeconomic systems in a forecast model which describes projected trends of change.

The study area is divided into five major subregions and the City of Dillingham. These subregions are defined on the basis of certain geographic, economic, cultural, and political characteristics. The approximate geographic boundaries are indicated on the map in Figure 1-1.

Figure 1.1 Bristol Bay Study Area



Dillingham is the largest community in the Bristol Bay area and serves as the major service center for the region. In this capacity it has important links with all the major subregions, with the exception of the lower-Kuskokwim communities which are tied to Bethel. The community also includes the largest populations of Aleuts and non-Natives in the region.

The Bristol Bay Borough, including the communities of Naknek, South Naknek, and King Salmon, is oneof five major subregions in the study area. It is located on the eastern end of Bristol Bay and is bounded by the Kvichak River to the north and the Naknek River to the south. Naknek and South Naknek are oriented towards the commercial salmon fishery while King Salmon is primarily a government-military enclave. South Naknek is an Aleut village, King Salmon is almost exclusively non-Native, and Naknek represents a combination of the two ethnic groups. This subregion is distinguished by the productivity of its salmon fishery, relative economic prosperity of its residents, and large percentage of non-Native residents.

The Kvichak-Iliamna subregion is located in a riverine/lacustrine environment and is defined as the area lying within the drainages of the Kvichak and Newhalen rivers. It includes the communities of Nondalton, Newhalen, Iliamna, Levelock, Pedro Bay, Igiugig, and Kokhanok. Historically, this subregion has been a meeting place for the three Native cultures of southwestern Alaska: the Yup'ik, Athapaskan, and Aleut. In recent years non-Natives have also comprised a significant part of the subregion's population. Iliamna is the service center of the subregion. The subregion is characterized by participation in the commercial salmon fishing industry and an emerging recreation industry.

The Nushagak subregion is located in a riverine/lacustrine environment and is defined as the area lying within the drainage of the Nushagak river and its tributaries. It includes the communities of Ekuk, Koliganek, Ekwok, Clark's Point, Portage Creek, and New Stuyahok. Dillingham is also located within the geographical boundaries of this subregion and, together with Clark's Point, is viewed as a separate

subregion in certain respects. These communities are inhabited predominately by Yup'ik Natives who are primarily employed in the commercial salmon fishery.

The Togiak subregion is located in a coastal environment on the northwestern edge of Bristol Bay and is defined as the area between the Nushagak Peninsula and Wood River to the east and Cape Newenham to the west. The subregion includes the communities of Aleknagik and Manokotak in the east and Togiak and Twin Hills in the west. Togiak is the largest of the four communities and in some respects assumes the role of a service center. The majority of local residents are Yup'ik who are primarily involved in commercial salmon and herring fisheries.

The final subregion is actually located in a coastal environment by Kuskokwim Bay and is defined by Cape Newenham to the south and the Kuskokwim river to the north. It includes the communities of Quinhagak, Goodnews Bay, and Platinum. Quinhagak is the largest of the three communities and serves as a service center in some respects. This subregion is also a part of the Yukon-Kuskokwim Delta region with Bethel, rather than Dillingham, serving as the primary regional service center. However, the communities in this subregi on arelinked to the rest of Bristol Bay through social networks, transportation links, and economic activities. The large majority of its residents are Yup'ik who participate in the Bristol Bay and Kuskokwim Bay commercial salmon and herring fisheries.

1.4 Outline of the Report

The report commences in Chapter Two with an overview of the regional environment, examining the types of resources available as well as their patterns of availability.

In Chapter Three the demographic structure of the study area is investigated. This investigation focuses on the existing composition of the population in the Bristol Bay region as well as factors such as

morbidity and mortality and migration which affect the rate of population growth in the area.

An overview of the regional cash-based economic system is contained in Chapter Four. This discussion begins with a summary of income and employment patterns at the regional, subregional, and local levels. A detailed examination of the commercial fishing industry, the government and support sectors, and the emerging recreation industry in the study area is also provided.

The discussion of the structure and organization of the commercial fishery is divided into two major parts dealing with the processing sector and the harvesting sectors of the salmon and herring fisheries. A brief history of each fishery is included, together with a discussion of the structure of the production and distribution sectors, the role of the industry in the Bristol Bay economy, and the sociocultural context.

The section on the government sector includes an examination of political organizations and activities at the regional, subregional, and community levels that affect economic activity. Investment activities of Native corporations and government spending and revenues are analyzed. Discussion extends to the impact of government services in the areas of education and health care, and the resources and limitations to economic activity afforded by existing community facilities.

Chapter Five is a detailed investigation of the three control parameters used in econometric forecast models: the economic multiplier, labor force participation, and economic migration. These parameters are examined in light of the constraints associated with the existing regional and subregional economic structures and the sociocultural systems which influence economic activity. Changes in the resident/non-resident structure of income and spending are investigatedto derive an estimate of the economic multiplier. The importance of the seasonal nature of the economy and subregional variations are considered in the analysis of labor force participation. Differences between permanent and itinerant

migration, and the relationship between permanent migration and several key economic indicators, are also analyzed.

Chapter Six provides an analysis of resident income and expenditure patterns in the study area. Particular attention is paid to changing patterns of aggregate income, income sources, income range and distribution, and leakage of income to sources outside the region. Expenditures relating to energy, household requirements, leisure activities, and subsistence costs will also be explored.

Chapter Seven is concerned with a description and analysis of subregional and local socioeconomic systems. This discussion provides an outline of subregional and local variations in economic structure and activities, including involvement in the commercial fishery, wage-earning opportunities, and subsistence activities.

Chapter Eight contains a description and analysis of the sociocultural systems of the study area. The pre-existing sociocultural system of the region and important subregional variations are described in the first section, including a discussion of subsistence activities, kinship relations, and values. The second section examines the value system associated with the intrusive sociocultural system as represented by religious functionaries, settlers, entrepreneurs and teachers.

The third section of Chapter Eight examines the management of change in the study area, delineating features of the pre-existing system which have accommodated selected aspects of the intrusive system. Points of stress where integration is incomplete or unsuccessful are also discussed. Patterns of social relations, subsistence activities, political behavior, and self and social identity are examined from the perspective of both systems. The value hierarchies which underlie these systems are detailed, and related to both economic and non-economic patterns of behavior.

CHAPTER 2

GEOGRAPHY AND RESOURCES OF THE BRISTOL BAY REGION

2.1 Introduction

In this chapter we discuss the geography and resources of Bristol Bay. Geography will consist of a description of the physical subdivisions of the region. The resource discussion will deal with resource availability and exploitation at the regional and subregional levels. This will include potential energy resources, mineral resources, and floral and faunal resources, with the latter divided into marine, freshwater, terrestrial and avian. The discussion will also cover the cycle of resource availability. We will note the seasonal round of resource abundance and scarcity, and the ways these resources are exploited by the inhabitants.

2.2 Geography

The Bristol Bay region of Alaska is located in the southwestern part of the state. Its eastern boundary is the Alaska Mountain Range, which separates it by only a few air miles from Cook Inlet and Anchorage. To the south the region stretches about half the length of the Alaska Peninsula, although in this report we are concerned only with the area as far south as South Naknek and the Bristol Bay Borough. To the west the region is bounded by Bristol Bay, an eastward extension of the Bering Sea. To the north it is bounded by the Kuskokwim Mountains which separate the headwaters of the Nushagak River and the Tikchik Lakes, a part of the region, from the Kuskokwim River. In this study, however, the boundary will extend to the Kuskokwim River itself.

Within the region there are several subregions defined by topography and

geography. In general the region can be divided into two different kinds of environment, coastal and riverine/lacustrine. 'There are four major coastal concentrations in the study area. To the northwest is the Kuskokwim subregion. To the immediate south, at the mouth of the Togiak River where it empties into Bristol Bay is the Togiak subregion. Near the center of the Bristol Bay coast along Nushagak Bay is the Dillingham-Nushagak subregion. A few miles southeastof Dillingham, close to where the Naknek River flows into Kvichak Bay, an arm of Bristol Bay proper, is the Naknek/King Salmon subregion. The major river and lake concentrations are in two areas. First is the Nushagak River drainage in the center of the region, which includes an area from the Tikchik Lakes and upper Mulchatna River to the north, to the mouth of the river at Dillingham to the south. The Nushagak drainage is the largest in the region, with a total of 14,000 square miles. The Mulchatna drainage, an extension of the Nushagak, extends over 4,300 square miles. The second major concentration is a combination of lake and river systems. This consists of the Kvichak River, Lake Iliamna, Lake Clark and several smaller rivers, which are all part of the Kvichak drainage. The total drainage area of the Kvichak River is 8,000 square miles.

Other rivers in the region include the Naknek, Newhalen, Egegik, Nuyakuk, Wood, Igushik, Snake, and Alagnak. The lakes of the region are mostly long and narrow and of glacial origin. The largest of these is Iliamna Lake. With a surface area of about 1,000 square miles it is also the largest lake in Alaska and one of the ten largest in the United States. Other major lakes include Lake Clark, connected to Iliamna by the Newhalen River, and a series of very deep and narrow lakes called the Tikchik and Wood River Lakes, which are the source of the Nuyakuk, Wood, and several smaller rivers.

The climate of the region is strongly influenced by the Bering Sea. The sea acts as a moderating influence and temperatures are not as extreme as in other parts of Alaska. However, when air-flows come from the north, temperatures can drop considerably. Such air-flows originate in the western interior of the state and not over the ocean, thereby reducing the moderating influence of the water. At such times temperatures

can drop to fifty below or colder. However, as a rule, temperatures are less extreme and the general cloudiness usually prevents extremely cold temperatures. The region normally experiences moderate winters and cool summers. Temperatures range from a summer average of between 50 and 60 degrees Fahrenheit to a winter average of between O and 20 degrees Fahrenheit.

Precipitation is heaviest during the summer and fall. Surprisingly little snowfall occurs, and winter is the period of least precipitation. Two air-flows affect the region. The first originates in the Bering Sea and the North Pacific. Moving along the northern side of the Alaska Peninsula and into Bristol Bay, it brings with it numerous storms. The second emanates from the north and northwest. The former brings large amounts of precipitation, while the latter brings less precipitation but much colder temperatures.

Summer is also characterized by frequent heavy fog throughout the region, although somewhat less in the Iliamna Lake subregion as a result of its distance from, the sea. The ocean rarely freezes completely, although from December through March broken ice is frequent offshore, and consolidated ice occurs close to shore in some sheltered locations. The unusually large tides, which reachup to30 feet at times, help to prevent the sea ice from consolidating. Rivers freeze for most of the winter. There is a great range between the longest and the shortest days of the year. An average for the region is a longest day of approximately 18 1/2 hours and a shortest day of 6 1/4 hours.

2.3 Resource Availability

Our discussion of the resources of the Bristol Bay region will be in two parts. Part one deals with mineral and power resources. Part two looks at floral and faunal resources, and includes an explanation of the cycle of resource availability, covering seasonal patterns of resource use and the cycle of abundance and scarcity.

2.3.1 Energy and Mineral Resources of the Bristol Bay Region

The mineral resources of the Bristol Bay region are not yet well cata-logued. Preliminary investigations indicate a probability of significant mineral resources in several areas, particularly around the volcanoes on the Alaska Peninsula. These volcanic deposits are likely to contain such minerals as molybdenum and copper and may include some gold, silver, lead, or zinc (BBCMP 1983:A7-1). The mountainous terrain surrounding Iliamna Lake contains known deposits of several precious metals, although a full inventory does not exist. According to the Bristol Bay Cooperative Management Plan (BBCMP) report, the Goodnews Bay area has several known deposits of gold, platinum and chromium, and at least one platinum mine is currently operating close to the village of Platinum. A final area with precious metal potential is the mountainous terrain surrounding the Tikchik Lakes.

Important potential energy resources include oil, gas, coal, and hydro-electric, geothermal, wind, solar, and tidal power. In this section we discuss only the potential energy resources of the region. For a more extensive discussion of actual energy sources utilized see the section on Community Infrastructure in chapter 6.

The potential source of energy which has received the most attention is hydroelectric power. This is a result of the existence of a number of large river and lake systems in the area which possess considerable hydroelectric potential. The most promising site is the Tazimina Lake area, located between Iliamna Lake and Lake Clark. Other sites with potential are near Kukaklek Lake on the Newhalen River, Kontrashibuna on the Tanalian River, and Chikuminuk Lake. Recently the Newhalen and Chikuminuk River sites have emerged as perhaps the most likely areas for hydroelectric development.

Geothermal energy also has considerable potential in the Bristol Bay region. The region is on the northern side of an area of intense volcanic and thermal activity, a part of the so-called “ring of fire”

stretching around the Pacific Ocean basin. The United States Geological Survey has identified a number of Prospective Geothermal Resource Areas (PGRAs) within the region. These PGRAs include Katmai, Peulik, Mother Goose Lake, Aniakchak, Black Peak, Veniaminof, and Staniukovich.

There are at least three known sites with potentially commercially valuable coal deposits in the region. These are the Chignik Coal Field, the Herendeen Bay Coal Field, and the Unga Island Coal Field (BB Inventory). According to the BBCMP report, the Chignik field and the Herendeen field may each contain 300 million tons of high volatile bituminous coal. In the recent past none of these sites has been heavily mined because the cost of extraction and marketing has been prohibitive.

Bristol Bay contains some of the western hemisphere's largest potential oil and gas reserves,and there are a number of areas with great potential for development. These include the North Aleutian Shelf, the St. George Basin, and parts of Bristol Bay itself, including onshore areas, particularly in the Nushagak subregion. There is currently a good deal of leasing activity and exploratory drilling in Bristol Bay. In general the areas most distant from Bristol Bay perse, such as the St. George Basin and North Aleutian Shelf; are the most promising, while those closest to the region are less so. The Nushagak District may ultimately prove more favorable for natural gas than for oil.

There are two major onshore areas with oil and gas potential. First is the Bristol Bay Tertiary Province which runs from the Nushagak Peninsula south and east to the Kvichak River drainage, and from there southwest to Port Moller. The second is actually outside the study area for this project. Known as the Alaska Peninsula Mesozoic Province it stretches from the Kamishak Bay area southwest to the Aleutian Islands (BBCMP 1983:A7-3).

Oil and gas exploration has a long history in the region, even though no operation has ever succeeded in extracting commercially significant amounts of either resource. However, in 1976, the Alaska Department of Natural Resources conducted an assessment of all state-held land with

the potential for oil or gas development. As part of this assessment every area with potential deposits was ranked on a scale from 1 to 406. According to this ranking, the most promising area in the Bristol Bay Region for oil and gas is on the north side of the Alaska Peninsula with the highest ranking 17, putting some sections of the region in the top 5% of all sites in Alaska. The same report concluded that the Bristol Bay region is likely to have an unusally large reserve of gas compared to oil, and estimated that for every well showing oil, two gas shows could be expected.

Wind energy is potentially one of the cheapest and most useful sources of energy available in the Bristol Bay region. A number of areas in the region would be suitable for wind power generation. Particularly promising are the areas around Port Heiden, King Salmon, Iliamna, and Cape Newenham. Dillingham also appears to have considerable potential, but a full analysis of the year-round potential of the site has not yet been made.

Tides are extremely high in the region, rangingas high as 30' in some areas, making tidal energy a potentially important resource. The areas of greatest potential are the Nushagak and the Naknek/Kvichak River mouths. According to the National Oceanic and Atmosphere Administration (NOAA), mean tidal range for the Naknek River entrance is 18.5 feet, while at Snag Point on Nushagak Bay it is 15.9 feet. Tidal currents in the region often reach five knots.

2.3.2 Biotic Resources

The biotic resources of Bristol Bay can be divided into marine, freshwater, terrestrial (both fauna and flora), and avian resources. Sea mammals, fish, and shellfish are Bristol Bay's main marine resources. A major fish resource is pollock, large concentrations of which are found along the north coast of the Alaska Peninsula and in the outer bay area. Pollock is harvested by several foreign nations, including Japan and the Soviet Union. Another important groundfish is cod. The two varieties

that exist in the bay, Pacific cod and Blackcod (or sablefish), are found fairly far offshore. Cod is heavily exploited by the Japanese and Russians. Blackcod are most common atdepths overa thousand feeton the continental slope in the eastern Bering Sea.

Herring is also common in the bay, mostly occurring in the area between Kulukak Point and Togiak and along the coast of Hagemeister Island. These stocks are the largest in the state. In the study area there are two other fishing grounds for herring, at Security Cove and Goodnews Bay, although they are less productive than the Togiak fishery. Herring stocks have supported a growing herring and sac roe fishery over the last several years which is attracting increasing numbers of American fishermen to the region. Herring roe, particularly herring roe on kelp, has also become commercially important in the last several years (both herring and herring roe on kelp fisheries are discussed in the section on commercial fishing). Herring migrate a considerable distance offshore during the winter months, then return to shallower inshore waters to spawn during the early summer months when the fishery is pursued.

Pacific perch are also common in the bay, andare generally taken at depths of60 to 200 feet over submarine canyons or rocky parts of the ocean bed. A number of flatfish are also abundant in the region, including large quantities of yellowfin, flathead, arrowtooth (turbot) and rock sole. Yellowfin sole stocks have been depressed since overfishing in the 1960s, but rock sole have remained at considerably higher levels. Most flatfish inhabit the waters above the continental shelf.

Halibut are present throughout the bay. They are also migratory, moving into the shallow inshore waters in the spring and out to deeper water to spawn in the fall. However, although the bay supports a large population of halibut, they are not as a rule exploited commercially, because the International Pacific Halibut Commission (IPHC) has declared most of the Bristol Bay area a halibut nursery. This means that most of the area east of a line from Cape Sarichef to Cape Newenham is closed to commercial fishing.

Salmon is commercially the most important fish in Bristol Bay. Five of the six known species of Pacific salmon spawn here with the exception of the Oncorhynchus maru, which spawns in Japan and Asia. Chinook (king), salmon, is the first species to spawn and run in the late spring and early summer. King salmon spawn in streams throughout the region including (from southwest to east and northwest,) Izembek Lagoon, Nelson Lagoon, Bear River, Port Heiden, Naknek River, Nushagak River, and Togiak River. Red, (sockeye,) salmon spawn next. The major spawning areas for sockeye are Nelson Lagoon, Bear River, Egegik, Naknek, the Kvichak River, and the Wood/Nushagak River system. Pink salmon also spawn in the bay in great numbers every other (even numbered) year. The major systems in which pinks spawn are the Bechevin Bay system, the Kvichak/Naknek system, the Nushagak/Nuyakuk system and the Togiak system. Chum salmon also breed here, with the strongest runs in the Nushagak, Kvichak and Togiak River systems. Finally, coho (silver) salmon also run strongly in the region. The major coho spawning grounds are in Nelson Lagoon, Port Heiden, the Nushagak, and Togiak.

Freshwater and nearshore fish are also abundant in the study area. Dolly Varden and Arctic Char, two distinct species of char, are distributed throughout the streams and lakes of the region. These fish are found in both freshwater and coastal marine water. Char is most plentiful in the Togiak River subregion, although large populations are also found in the Nushagak and Ugashik systems. Rainbow trout are present throughout the region, and this population is not believed to be anadromous. Steelhead, the anadromous variety of rainbow trout, is not generally present in the region although occasional catches have been made.

Arctic grayling are found in lakes and rivers throughout the Bristol Bay region. They are less numerous in the eastern than in the northern and southern areas. Northern pike is also present, preferring lake environments and generally avoiding swiftly flowing waters. Whitefish are also distributed widely throughout the region-in both lakes and rivers.

There are a number of varieties of marine mammals present in the Bristol Bay region. Historically, perhaps the most important mammal has been the otter. At one time thought to be extinct, the otter is currently making a successful comeback. It is now estimated that the sea otter population numbers over 15,000. They are found primarily on the southern side of the Alaska Peninsula, and on the northern side of the peninsula as far northeast as Port Heiden. The land otter is also found in this region, and its habitat often overlaps with the sea otter's. The Steller Sea Lion is also present in great numbers, with the highest estimate putting the number at over 50,000. They occur in greatest concentrations on rocky coasts, and for this reason are most plentiful between the Nushagak Peninsula and Cape Newenham and Kuskokwim Bay in the northwest, and along the northern side of the Alaska Peninsula as far northeast as Port Moller.

Four other kinds of seal frequent the region, including harbor, ringed, bearded and ribbon seal. Spotted seal are also found, primarily in the area to the north of Cape Constantine. Harbor seals are present throughout the region. They are less well adapted to land than otters and sea lions and need a smoother surface on which to "haul out." They are therefore generally found on beaches or sand bars all along the coast more often than on rocks, and are generally concentrated on the edge of the ice where they have equal access to water, ice or land. Several varieties of seal have been observed following salmon into the rivers during salmon spawning season. In fact, there is a permanent population of harbor seals living in Iliamna Lake, one of the few known freshwater seal populations in the world. Fur seals migrate through the region but rarely stay in bay for any significant period of time. Walrus are concentrated in a state game refuge on Round Island and throughout the Walrus Islands. Round Island is the site of the largest walrus hauling out grounds in the world, and it is estimated that as many as 13,000 to 19,000 bulls can be found there.

There are several varietiesof porpoise and whale in the bay. Harbor and Dan's porpoise are found throughout, particularly along the shoreline. Beluga whales are also common in the area, and are hunted by some

of the coastal people, particularly in the northern subregions. an estimated 15,000 belugas inhabit the shallow waters of Bristol Bay and Kuskokwim Bay year round, and they have also been observed to pursue and feed on spawning salmon up rivers. Killer whales are present in large numbers. Among the baleen whales several varieties frequent the bays. The bowhead whale is hunted by some Eskimo groups, more frequently in the arctic regions than in Bristol Bay **per se.** Approximately 16,000 gray whales migrate to the area each summer and are concentrated in the northern Bering Sea in relatively shallow waters. At one time the grays were nearly hunted to extinction after discovery of their calving grounds in Baja California, but they have made a comeback in the last three decades. The Minke Whale, a smaller baleen than the gray or sperm, is also frequently seen in the region, though generally only at the western edge of the bay and in Kuskokwim Bay.

Terrestrial fauna are quite numerous and varied in the Bristol Bay region. The bear family is represented by the grizzly (known in region as the brown bear) and black bears. Brown bears tend to congregate along the sea shore and along streams during the summer when the salmon are running. Black bears may be found in the same environments, but in general they prefer a more heavily forested habitat further inland than the brown bear. The abundance of salmon probably accounts for the unusually large size of the brown bears in the area. There are a number of smaller mammals, many of which are important commercially for their fur. The mink is common and prefers a habitat along the banks of streams or lakes. The wolverine is also widely scattered throughout the region, both in coastal and inland areas. Wolves are found, often close to herds of caribou, one of their primary sources of food. Red fox share much the same habitat as wolves, but are found with greater frequency in coastal regions. The Arctic fox has also become widespread in the recent past and spends even more time along the shore than does the red fox. Both are coastal scavengers. The only major cat species is the lynx. They prefer forested areas and are therefore present along rivers and in the forested uplands. Beavers are numerous along most of the watercourses in the region and have been important commercially in the past, although today they are much less so. Nonetheless, they

remain the most important of the furbearers, and are also an important source of food. Among the smaller mammals present in the region are the muskrat, several varieties of voles, ground squirrels, and porcupine.

The deer family is also represented by several major species in Bristol Bay. The largest of the group is the moose which can be found from Nelson Lagoon east and north throughout the region. Moose generally prefer alder or willow cover along watercourses. It is estimated that there are approximately 2,500 moose in the region. Caribou are also present in fairly large numbers, notably, the Mulchatna herd which numbers from 20,000 to 25,000 and is a major source of game. The herd appears to have grown considerably in the past two decades. The Alaska Peninsula also supports caribou, with two herds located there which, together, may match the Mulchatna total. Reindeer have also been present as a domesticated animal, although they are currently limited to a herd on Hagemeister Island.

The area is less rich in terrestrial flora than fauna, but there are several varieties which are important as local resources. Spruce and birch provide wood for a number of uses from housing to skiffs, although the latter are much more frequently manufactured outside of Bristol Bay. The most important class of flora is berries. During the late summer the women and families of the villages harvesta wide variety for use during the winter, and they are the single most important source of vitamin C. Berries include cranberries, (both low and highbush), blueberries, salmonberries, huckleberries, blackberries, anda numberof other varieties, most of which are picked by the inhabitants. Several kinds of wild vegetable, such as wild celery and wild rhubarb, are also harvested for subsistence purposes. Several kinds of small trees are used for building purposes and for heating steam baths, including birch, spruce, willow, and alder.

The vegetation of the Bristol Bay region has recently been the subject of major investigation. This project, known as the Bristol Bay Cooperative Lana Cover Mapping Project, made use of a LANDSAT satellite to map the ground coverin the region. This mapping divided the region into

fifteen types of ground cover. The kinds of cover which predominated included the following:

Table 2-1
Ground Cover in the Bristol Bay Region

Cover Type	Acreage	% of Total
1. Deep Clear Water	10,791,122	22.7%
2. Open Low Shrub Grass - Tundra	6,988,489	14.7%
3. Open Low Shrub Heath - Tundra	4,933,180	10.4%
4. Closed Shrub/Grass	4,648,406	9.8%
5. Miscellaneous Deciduous	3,763,393	7.9%
6. Lichen Shrub Tundra	3,281,287	6.9%
7. Barren	3,029,525	6.4%
8. Wet Bog/Wet Meadow	2,023,776	4.2%
9. Mixed Forest	1,800,262	3.8%
10. Shallow Sedimented Water	1,573,989	3.3%
11. Lichen	1,242,771	2.6%
12. Snow/Ice/Light Barren	1,182,620	2.5%
13. Mountain Shadow	993,481	2.1%
14. Conifer Forest	848,850	1.8%
15. Marsh/Very Wet Bog	503,475	1.1%

This assessment included analysis of water surface area as well as land cover. By far the most common ground cover was open low shrub heath or grass tundra, which accounted for over 25% of the total area, including water, and for over a third of the total land area. Most of the miscellaneous deciduous and conifer cover is found near waterways such as rivers or lakes. Lichen and snow/ice occur on the slopes of the Ahklun Mountains to the west and the Nushagak Hills in the north central por-

tion of the region, as well as in the mountainous areas surrounding Iliamna Lake.

This concludes the discussion of resources available in the Bristol Bay region. We will now consider the ways and sequences in which these resources are utilized by the inhabitants of the region. This pattern of utilization has been altered somewhat over the last century, and in order to gain an idea of the nature of these alterations we will first present an outline of "traditional" utilization patterns, followed by a discussion of current patterns.

2.3.3 Historical Patterns of Resource Utilization

In the nineteenth century the residents of the Bristol Bay region were much more heavily dependent to a subsistence system than today, despite the fact that they are still relatively heavily involved in such activity. Cash was less available in the nineteenth century so that goods were purchased from outside with less frequently. Moreover fewer items were available from outside. Transportation took longer and costs were much higher than they are today. Tne number of trading posts at which one could obtain outside articles were also more limited.

Traditional patterns of resource utilization have nonetheless survived in large measure. These people have entered the cash economy via the same resources. These resources are seasonal, and are available in sequence, but each for only a partof the year. The salmon spawn at a particular time each year and must be caught at that time, whether for subsistence or for cash. Berries ripen at the same time each year, animals are most profitably trapped when their fur is thickest and will afford the most warmth for personal use or will bring the highest price for commercial purposes. Thus, while there have been some changes in the yearly cycle, these have been in the context of a constant cycle of resource availability. The following description of traditional patterns of resource utilization is based on field discussions with older informants, on J. VanStone's descriptions in **Eskimos of the Nushagak**

River, (1967), and on the "Subsistence Study of Four Communities" by the Subsistence Division of the Alaska Department of Fish and Game (1983).

The mainstay of the Native economy was, and still is, salmon. The annual salmon runs were the focus of the year, both economically and socially. In late spring or early summer most of the villages began to prepare to move to the fish camps for the summer where they would exploit the massive salmon runs which occurred from June through September. Each village had a traditional location where they fished, and virtually the entire village moved to those locations in preparation for the start of the fishing season. Generally these locations were at the mouths of the rivers on which the village was located. It was a time for renewing social relations with people from other villages as well as a time for subsistence activities.

The fishing season may once have been shorter than it is today, primarily because the subsistence needs of the villagers could be met more rapidly than current commercial needs. However, even today many families spend well undera month in the commercial fishery. In the villages, once salmon had been caught and dried, smoked, or salted for the winter, the men turned to late summer activities. Generally by the end of August they were involved in hunting caribou, and soon afterward began trapping beaver. The latter was a cash activity as well as a subsistence activity as the furs could be sold to buyers later in the winter. These hunting and trapping activities were generally pursued from camps in the interior which consisted of a number of men, most often related, who shared camp responsibilities. Thus, during the late summer and early fall, men and women resided in separate locations as a result of a sexual division of labor.

By the middle of fall, at about the time of the first snowfall, most of the men in trapping or hunting camps returned to the village. While they were away, women had been occupied preparing the fish and picking berries to put up for the winter. In terms of resource utilization this was the period of least activity. Once the lakes and rivers began to freeze, whitefish and grayling would be fished through the ice, and some

trapping would continue throughout the winter. However, the winter was generally spent in the village or in other villages at dances, festivals, and in social visiting.

Resource utilization began to accelerate once again with the advent of spri ng. In late winter many of the villages broke up again as the families and kin groups movedto trapping camps along streams in the interior. Once again trapping was a major activity, as was the hunting of caribou. At this time there was a signifi cant distinction between the riverine and coastal settlements in terms of subsistence activity. While the riverine groups moved to the interior and exploited fur bearers and caribou, the coastal groups concentrated more heavily on smelt and sea mammals. Seal hunting in particular was a popular activity. The taking of seal by the coastal people, and of fur bearers and caribou by the riverine people, formed the basis for extensive inter-village exchange networks later in the summer. By late spring preparations would be made for a return to the fishing grounds. So the cycle came full circle.

2.3.4 Current Pattern of Resource Utilization

As we noted above, there have been some changes in the pattern of resource utilization. These changes have occurred for several reasons, all of which ultimately revolve around the intrusion of outside economic and social forces. One cause of changed utilization patterns is involvement in the cash economy, particularly in commercial fishing. The lucrative returns from the commercial fishery have resulted in more time devoted to the fishery than was historically the case. The availability of cash has also meant that there is (objectively) less need for subsistence activities, although it is dangerous to conclude that there is a direct relationship between cash availability and (subsistence) utilization of resources. (This is discussed at length in the social and cultural sections of this report). A third factor is state and federal regulations limiting the time and areas for certain activities, such as moose or caribou hunting. The availability of new technologies which

allow for more rapid and efficient exploitation of resources has also altered exploitation patterns. These technological innovations include snowmobiles, which allow for much more rapid and wide-ranging hunting and trapping activities, airplanes, which extend the range of possible activity even further, and modern weapons, which result more kills per attempt. (For general consideration of modern subsistence utilization see Federal-State Land Use Planning Commission 1974; Kruse 1979; Lonner 1980; Tuck 1973; and Patterson 1974.)

Other factors have also worked change utilization patterns. The distribution of land settlements of various kinds, (including ANCSA, ANILCA), state land withdrawals, and other changes in land ownership and jurisdiction have affected areas available for exploitation. (See Wolfe 1979; Alaska State Legislature 1978, 1981; ADF & G 1978; and U.S. Department of the Interior 1977.) The increases recreational hunting and fishing have also affected utilization patterns. Finally, the influx of outsiders, who come either for recreation or for permanent residence, has forced some changes in use patterns.

Despite these forces which have caused changes in certain elements of the yearly round of activities, the basic structure of this cycle has remained relatively constant. The fishery remains the dominant activity around which the year is ordered. The timing of this activity is very close to what it was traditionally because the salmon return at the same time each year regardless of the kind of fishing activity which takes place. In the following paragraphs we shall discuss the patterns of resource utilization currently existing in the subregions of Bristol Bay.

The patterns of resource use among the Natives of Bristol Bay vary between subregions. These variations are indicated by Table 2-2, which lists the range of resources taken in each subregion, and by Table 2-3, which details the number of resources harvested in one year, 1973, in each community. The most basic distinction is between those subregions, such as Togiak and Kuskokwim, oriented towards a maritime environment and those such as the Nushagak River, oriented toward a terrestrial-

riverine environment. The Naknek-Kvichak area is somewhat intermediate, with access to both maritime and terrestrial resources, as is the Iliamna Lake subregion, since seal are taken from the lake itself. In the following discussion it should be noted that the Naknek-Kvichak subregion participates in subsistence activities less than the other subregions and is more heavily involved in the commercial fishery than any other subregion. Although perhaps arbitrary, the best starting point for the yearly round of activity is Spring, a period during which activity quickens considerably from the relative inactivity of the Winter months.

TABLE 2-2 PARTIAL LIST OF SUBSISTENCE RESOURCES USED IN THE BRISTOL BAY STUDY AREA

	Subregions					
	IV	III	11		I	
	Upper Ak. Peninsula	Iliamna Lake	Nushagak River	Nushagak Bay	Togiak	Kuskokwim Bay
Noose	x	X	x	x	x	o
Caribou	X	x	x	x	x	0
Brown bear		0	o	0	o	?
Black bear	?	x	x	0	0	?
Porcupine	X	x	X	x	x	?
Arctic hare	x	X	x	x	x	x
Snowshoe hare	x	x	x	X	X	x
Ground squirrel		X	x	x	x	x
Marmot					X	?
Beaver	x	x	X	x	x	x
Red fox	x	x	X	x	X	x
Arctic fox					o	x
Wolverine	x	X	X	X	x	x
Wolf	x	X	X	X	X	X
River otter	x	x	X	x	X	x
Mink	X	x	x	X	X	x
Marten		X	x	x	x	?
Muskrat		0	o	0	o	?
Lynx		x	x	0		?
Harbor (spotted) seal	x	x	o	x	x	x
Ringed seal	?			x	X	x
Bearded seal				?	x	X
Sea lion				o	X	?
Walrus				x	x	x
Belunka		0		x	x	X
Whale (grey or other washed up on shore)				?	x	?
Porpoise (? species)					o	o
Swans[a]	X	x	X	x	?	?
Geese[a]	X	x	x	x	X	x
Ducks	x	x	x	x	x	x
Cranes	x		x	X	x	?
Ptarmigan	x	x	X	x	x	x
Spruce grouse	X	x	x	x	X	?
Bird eggs[c]	x		x	X	x	x
Clams[d]	x			X	X	?
Crabs[e]					x	?
Octopus					x	?
Mussels, limpets					o	
Sea urchins						
Shrimp						
King salmon	x	x	x	X	x	x
Red salmon	x	x	X	X	X	0
Silver salmon	x	X	X	x	x	X
Chum salmon	X	x	X	x	X	X
Pink salmon	X		x	X	x	0

Table 2-2 (Cent)

	Subregions					
	IV	III	II		I	
	Upper Ak. Peninsula	Illamna Lake	Nushagak River	Nushagak Bay	Toglak	Kuskokwim Bay
Dolly Varden/Char	x	x	x	x	x	x
Rainbow/Steelhead	x	x	x	x	x	x
Lake trout	x	x	x	x	x	?
Gray 1 i ng	x	x	x	x	x	x
Whitef ish	x	x	x	x	x	x
Pike	x	x	x	x	x	?
Burbot	x	x	x	x	?	?
Smelt	x	x	x	x	x	?
Halibut, sole, flounder	x			0	x	?
Herring (and their eggs)	x			x	x	x
Cod					x	?
Capelin					0	?
Salmonberries (Rubus chamaemorus)	x	x	x	X	" X	
Blueberries (Vaccinium uliginosum)	x	x	x	x	x	x
Huckleberries (V. ovalifolium)	x	x	x	x	x	?
Crowberries (Empetrum nigrum)	x	x	x	x	x	x
Cranberries (V. vitis-idaea)	x	x	x	x	x	x
Strawberries (Fragaria chiloensis)						
Basketgrass (Elymus)	?			x	x	x
Firewood (spruce, birch, willow, poplar, alder, etc.)	x	x	x	x	x	x
Vegetables (wild celery, onions, potatoes, spinach, etc.)	x	x	x	x	x	X
Herbs	x	X	X	X	X	X

X = commonly used
0 = occasionally used
? . uncertain
blank = use not documented

[a]Geese used include Canada, Brant, Emperor, White-front and Snow.
[b]Ducks used include Mallards, Pintails, Gadwall, Green-winged Teal, Shovelers, Wigeon, Scaup, Goldeneye, Bufflehead, Oldsquaw, Eiders and Scoters.
[c]Eggs of seabirds, gulls, terns and waterfowl.
[d]Clams used include cockles, softshell, butter, razor, bidarkis and emmas.
[e]Crabs used include king, tanner, dungeness and horse.

SOURCE: Alaska Department of Fish and Game

Table 2-3

NUMBER OF SUBSISTANCE RESOURCES HARVESTED

Community	SALMON % Successful Harvesting	SALMON # Taken	% Successful Harvest Freshwater Fish	# Whitefish	# Pike	# Char/Dolly V.	# Grayling	# Rainbow	# Lake Trout	# Smelt	% Harvesting Berries	# Herring	% Harvesting Clams
New Stuyahok	81	5089	84	1245	2318	317	3710	550	428	40	92	0	0
Koliganek	80	5600	60	1145	645	110	1210	131	28	0	60	0	0
Ekwok	59	5325	76	2595	539	22	735	108	0	1000	82	0	0
Aleknagik	94	1198	69	438	242	215	85	40	216	90	94	300	19
Dillingham	75	3039	62	195	187	454	392	157	62	7620	62	900	22
Manokotak	95	3009	89	773	843	521	513	148	215	6840	84	1010	42
Clarks Point	73	780	36	52	80	36	0	0	0	6030	73	850	9
Levelock	88	6524	88	1144	252	41	133	361	0	4082	69	0	0
Igiugig	66	2700	83	1110	320	205	692	836	0	0	50	0	0
Newhalen	54	4300	64	21	160	780	405	1060	185	0	82	500	0
Iliamna	89	665	67	28	16	341	102	34	4	0	89	0	0
Kokhanok	89	13000	100	1101	83	623	85	440	117	0	89	0	0
Pedro Bay	75	3340	88	0	2	524	0	41	475	0	75	0	0
Nondalton	81	16940	81	1446	253	56	1604	242	657	0	54	0	0
King Salmon	80	309	87	0	42	183	324	286	2	4080	20	0	20
Naknek	70	2305	54	85	50	175	229	370	20	8066	11	0	18
S. Naknek	76	1540	35	135	16	50	184	23	0	1260	0	0	24
Egegik	70	1005	45	127	151	105	99	47	10	2517	70	500	60
Pilot Point	90	1150	40	0	55	15	42	22	10	1050	90	0	50
Ugashik	40	95	60	0	40	55	6	10	33	1712	80	0	40
Port Heiden	40	220	20	0	0	20	0	0	20	240	60	20	80

Table 2-3

Community	[# Individuals Sampled] (# Households Sampled)	% of Household sampled	MOOSE: % of Sample successful	MOOSE: # Harvested	CARIBOU: % Successful	CARIBOU: # Harvested	# Brown Bear Harvested	# Black Bear Harvested	% Success Harvest of Marine Mammals	# Seals Harvested	# Sea Lions	# Walrus	Belukha	% Successfully Harvested Waterfowl	# Ducks	# Geese	# Swans	# Ptarmigan & Grouse	BEAVER: % Successfully Harvested	BEAVER: # Taken	# Fox	# Rabbit	# Porcupine
N. Stu	[163](26)	84	69	57	54	138	0	0	0	0	0	0	0	81	479	208	0	339	69	245	86	59	152
Kol.	[85](15)	75	60	23	60	81	3	1	0	0	0	0	0	80	325	75	0	284	53	131	34	13	56
Ekwok	[83](17)	81	53	15	35	49	0	0	0	0	0	0	0	59	135	** 73	0	153	65	116	27	22	23
Alek.	[80](16)	76	44	7	12	6	0	0	19	5	1	0	0	50	99	34	0	193	31	62	36	3	10
Dill.	[137](32)	14	34	11	34	36	2	0	3	3	0	0	0	41	286	106	2	457	9	21	37	122	18
Mano.	[112](19)	51	42	17	26	20	1	0	58	13	1	2	4	79	443	234	6	1085	37	74	299	37	4
C.Point	[60](11)	78	27	5	54	32	0	0	64	54	2	1	1	64	259	59	1	525	18	7	51	23	25
Lev.	[74](16)	94	62	19	69	34	0	0	31	2	0	0	4	81	250	126	1	472	25	40	197	52	48
Iglu.	[29](6)	75	33	3	83	48	3	0	17	1	0	0	0	83	81	2	0	120	50	21	64	33	10
Newhal.	[50](11)	69	70	9	*	23	1	0	18	2	0	0	0	64	105	11	0	640	27	27	88	78	100
Iliamna	[33](9)	53	22	2	33	8	1	2	0	0	0	0	0	33	41	0	0	165	0	0	8	36	2
Kok.	[56](9)	69	67	10	11	8	8	2	33	4	0	0	0	78	162	35	9	708	11	15	82	140	325
P. Bay	[52](8)	80	50	6	0	0	5	0	0	0	0	0	0	75	160	0	0	470	12	6	38	150	27
Nondal.	[136](26)	90	54	25	62	97	1	8	0	0	0	0	0	31	104	47	0	678	35	114	189	215	95
K. S.	[64](15)	*	53	9	67	59	0	0	0	0	0	0	0	87	148	70	0	204	0	0	28	11	0
Naknek	[213](56)	92	28	23	45	74	0	0	2	1	0	0	0	48	559	157	0	959	2	2	26	74	11
S. Nak.	[87](17)	68	29	7	59	58	0	0	0	0	0	0	0	35	153	88	1	533	6	20	7	0	50
Egegik	[82](20)	83	5	1	65	57	0	0	5	1	0	0	0	55	250	144	0	314	10	45	97	16	0
P.Point	[40](10)	77	0	0	70	39	0	0	10	2	0	0	0	80	108	137	0	265	0	0	50	0	0
Ugashik	[11](5)	50	40	4	60	41	0	0	20	4	0	0	0	80	54	63	0	212	60	19	44	8	6
P.Heiden	[42](10)	77	10	1	30	22	0	0	0	0	0	0	0	40	16	38	0	86	0	0	20	2	0

Source: ADF&G

2.3.4.1 Spring

Spring in all subregions of Bristol Bay is a period of intense activity. It is a time when stocks of subsistence items depleted during the winter are replenished and is equally a period of preparation for the intense fishing activity of late spring and early summer. In the Kuskokwim subregion spring finds the people fishing for freshwater fish such as grayling, rainbow trout, Dolly Varden, and whitefish. Most of these are taken with nets in the rivers of the subregion, following breakup. Along the shore of the Bering Sea, clams, herring roe on kelp, and crabs are taken. Many families in the subregion establish spring camps from which seal, brown bear, and a number of smaller terrestrial mammals are hunted. Sea lion and walrus are also taken when they are encountered. In general, spring is the period during which marine mammals are most heavily hunted. During much of April and May the fishermen of the subregion are engaged in preparation for the fishing season, which must be completed by the first part of May if they intend to take part in the herring fishery. The herring fishery itself is pursued during May and June, prior to the salmon fishery. Ducks and geese are also taken as they migrate through the area.

To the south of the Kuskokwim subregion is the Togiak subregion which shares many features of resource utilization with the former. One distinction between the Togiak subregion and most others in Bristol Bay is that most of the yearly activities are pursued from areas in close proximity to the villages. Rarely are long-term camps established either for fishing or hunting. Spring in the Togiak subregion also is a period of intense exploitation of marine resources, including sea lion and walrus as well as seal, in particular, spotted seal. As in the Kuskokwim this is often accompanied by the collection of herring roe on kelp, and herring. The Togiak subregion is the location of the largest and most productive herring fishery in the region, and many villagers pursue it in May and June. Waterfowl are especially important subsistence items in this subregion. Even Brown bears are also hunted by a number of men each year. In addition, egg gathering is a popular subsistence activity during the spring. Finally, a number of smaller

terrestrial mammals are exploited, including squirrel, porcupine, and beaver.

Spring on the Nushagak River is somewhat different from the two subregions discussed so far since the orientation is towards the interior and the river rather than the coast. Subsistence activity is considerably less intense than along the coast, primarily because of the lack of marine mammals which account for much of the spring coastal activity. On the Nushagak the major spring activities are fishing for freshwater fish, such as whitefish, pike and trout, and, in some instances, hunting for brown bear. Most energy during this period is devoted to preparation for the subsistence and commercial fishing seasons.

In the Iliamna Lake subregion spring was traditionally a period when people moved to spring camp to hunt and fish. However, in the last several decades this pattern has been altered somewhat, although some still establish such camps. During spring the people of this subregion fish for char, lake trout, pike, and several other freshwater fish. They also hunt porcupine and brown bear. Ducks and geese are also popular subsistence items. Much of the fish, in particular pike, is split and dried for use during the upcoming commercial fishing season.

Spring in the Naknek-Kvichak subregion is in many ways intermediate to the pattern of the Nushagak and that of the more northern subregions. During spring, people of this subregion are engaged in the huntingof both terrestrial and marine mammals. Brown bear is hunted, as are several smaller terrestrial mammals such as porcupine and rabbit. Spring is also a time when seal is hunted offshore, although not to the extent as in the northern subregions. Freshwater fish are also a focus of subsistence activity at this time. However, the most intense activity of spring in this subregion is preparation for the commercial salmon fishing season. These are the most lucrative fishing grounds in all Bristol Bay, itself the most lucrative salmon fishing area in the world. The people in this subregion earn more from the salmon fishery than do inhabitants of any of the other subregions in the state, and the intensity with which they pursue it restricts their subsistence activity in

the spring considerably.

2.3.4.2 Summer

As summer approaches all subregions prepare for the onset of the salmon runs which are exploited both for subsistence and for profit. There are two overall distinctions between the subregions, the first in the timing of the runs. The time during which the salmon are exploited depends on when they arrive in each subregion, and in general they arrive in the southern subregions first and work their way up the coast to Togiak and the Kuskokwim last. In each subregion it is the arrival of the king salmon run which marks the beginning of the fishing season. The second distinction concerns whether the exploitation of salmon entails a move of some distance from the village to a fish camp. We will note these distinctions in the discussion of each subregion.

In the Naknek-Kvichak subregion by far the most important activity of summer is the exploitation of the fishery. Because it is the most valuable subregion in the entire region in terms of salmon, fishing activity takes priority over all other activities. When the king salmon arrive there is a short period during which many fish are taken for subsistence, but with the arrival of the red salmon runs most energy is devoted to the commercial fishery. As a rule the red runs are the major ones exploited by this subregion since they are so productive, and it is unnecessary to continue fishing commercially once they are exhausted. Both commercial and subsistence fisheries occur simultaneously to a large extent. However, after commercial fishing is completed the subsistence fishery continues through the runs of chum, pinks and silvers. The people of this subregion are also somewhat intermediate with respect to the establishment of fish camps. Most do remove to a fish camp, but generally it is within a relatively short distance from the village itself. Some establish fish camps across Kvichak Bay while others establish camp to the north of Naknek towards the mouth of the Kvichak. However, these camps are generally close enough to the village to allow for periodic return when necessary.

On the Nushagak the arrival of the kings spurs a short subsistence period, after which most people leave the villages and go to the fish camps on Nushagak Bay. This is a major exodus which leaves the villages literally empty. Inhabitants of whole villages gather at traditional locations at Lewis Point, Etolin Point, and other locations on the bay where they remain throughout the commercial season. The subsistence and commercial fisheries occur at the same time in this subregion, generally with the women engaged in the subsistence fishery with set nets while the men are in the commercial fishery with their drift gill net boats. Red salmon is the preferred species for both commercial and subsistence purposes, and forms the largest portion of the winter diet for the Nushagak subregion. Once the commercial season is over the villagers return upriver, usually during the first part of August. At the village a subsistence fishery continues through early September exploiting chum, which is generally prepared for dog food through the winter, as well as silvers, pinks, and spawned out reds.

In the Iliamna Lake subregion the first part of June finds the families, which have been in spring camps fishing for freshwater fish and hunting waterfowl and other game, preparing to move to the fish camps for fishing season. As on the Nushagak, this entails a move of considerable distance. Those who have commercial permits move to Bristol Bay where they participate in the Naknek-Kvichak fishery. Those without permits generally remain closer to the villages and pursue a subsistence fishery. The sockeye run peaks later in the Iliamna Lake subregion than in the Bay itself, with the result that those who fish sockeye commercially are often able to return to the villages to take them for subsistence purposes. This fishing is often done close to the village but may be pursued from fish camps on one of the rivers in the region or on Lake Clark or Iliamna Lake.

In the Togiak subregion the major salmon runs arrive after they have passed through the Kvichak and Nushagak fisheries. Kings run until the first part of July and are taken primarily for subsistence. The major commercial runs are red salmon. In distinction to the subregions to the south, the commercial fishery in the Togiak subregion is generally

pursued in proximity to the villages, eliminating the need for a removed fish camp. Red salmon are the dominant fish taken for subsistence purposes as well.

The last subregion to participate in the commercial fishery is the Kuskokwim subregion. This subregion is not actually part of the Bristol Bay fishery, and the vitality of the commercial fishery in the Kuskokwim is considerably less than that of Bristol Bay. Nonetheless, both commercial and subsistence fishing occurs throughout the region. In general those villages upriver tend to come down to the Bay, while those near the Bay remain in proximity to the village during the commercial fishing season. In this subregion there is an apparent preference for silver salmon as a subsistence species rather than red salmon, the species of choice further south. Silvers continue to be taken for subsistence purposes after the conclusion of the commercial fishing season.

These patterns of exploitation of the commercial fishery show a number of changes from the traditional subsistence patterns. In keeping with tradition, each village has an established position on the shore which it occupies each summer. This may be virtually in the village itself, as is frequently the case in the northern subregions, or at a great distance from the village, as with the Nushagak or Iliamna Lake fishermen. Although shore position was traditionally determined according to rights of usufruct, these camps have now been given legal status according to the laws of the intrusive system. When limited entry was implemented those who gained setnet permits applied for the right to use particular stretches of shore which they had traditionally utilized. Thus, setnet sites are now legally registered, and these form the bases for the fish camps. Unlike traditional patterns, the men generally leave the setnet sites and fish in the Bay with their drift gillnet permits. Thus, the sexual division of labor is more absolute than traditionally, although when the fishery is closed for certain periods or when there is a lull between runs the men may return to the fish camp and join their families.

Commercial fishing occurs on a much larger scale than did traditional subsistence fishing. Nonetheless, the equipment and technologies available mean that in approximately the same period of time traditionally devoted to the subsistence fishery, both commercial and subsistence activities can now be pursued. Generally the women begin subsistence fishing before the men have completed their participation in the commercial fishery, so that by the time the latter have completed their fishing the women are well on the way to having met the subsistence needs for the coming winter. The major deviation here from the traditional pattern again revolves around the more distinct division of labor. Women handle every aspect of the early subsistence fishery, from netting to picking to preparing the fish for drying, whereas traditionally the men would set the nets and pick the fish, leaving the preparation and drying to the women. In the Kuskokwim subregion this pattern is slightly different. This is because the subsistence and commercial seasons are less overlapping. Therefore, the traditional divisionof labor is maintained for the subsistence season, while the new division of labor is utilized during the commercial season.

2.3.4.3 Fall

Fall is a period during which the entire region is occupied with hunting and the gathering of berries. In the Naknek-Kvichak subregion this is a time of considerable mobility in the search for subsistence items. Moose and caribou are both hunted at this time. There is a local caribou herd which ranges between the area just to the south of the subregion to Port Heiden on the Alaska Peninsula which is exploited by local residents, as well as by many people from other subregions in Bristol Bay. Moose also occur sporadically in the subregion, and some go as far as Iliamna Lake or the Nushagak to hunt moose. During this period berry picking is a favorite activity, and the women of the subregion may travel as far as the Togiak subregion to harvest them. Subsistence fishing continues in the fall, both for spawned out reds and for freshwater varieties such as whitefish, lake trout, blackfish and grayling. Finally, waterfowl are also taken on their southward

migration through the subregion.

On the Nushagak people travel long distances to harvest berries, usually in connection with visting friends and relatives. Women often go as far as the Kuskokwim subregion to pick salmonberries, a local favorite. The Iliamna subregion is also popular for blackberries, also found locally and on the Mulchatna River. Subsistence fishing also continues, both for salmon and for freshwater varieties. Spawned out red salmon are taken at this time for preparation for winter stores. Whitefish and pike are taken with set nets and rainbow trout, lake trout and grayling are generally taken with pole and line. Residents also take extensive trips to the Tikchik Lakes region to fish for the larger humpback whitefish with gill nets. Once the ice freezes fishing continues with hook and line through the ice for burbot, grayling and pike.

Fall is a period of productive hunting. The most prized game during this period is moose and caribou. Moose are actually much more prevalent in the subregion now than they were previously and appear to have moved into the areain large numbers since the 1930s. Most hunt moose along the Mulchatna River, generally as a cooperative enterprise involving a number of men. Caribou is also hunted during this time, and is the focus of the most intense activity of the season. Caribou hunting groups generally number between ten and twenty men who usually use snowmachines to increase their range and effectiveness. Caribou forms a major part of the winter diet for the people of the Nushagak.

Among the villages of the Iliamna Lake subregion fall proceeds in a fashion roughly similar to the Nushagak sequence. With the completion of the fishing season people become increasingly desirous of harvesting sources of red meat. Caribou are hunted from the first part of August, when the season officially opens. Moose is also a favorite game animal during this period. A number of hunting lodges in the subregion have made meat available for villagers from kills by hunters interested only in trophies. Trips to hunt moose can be especially long, with some traveling over a hundred miles to productive hunting grounds. This is also a period of berry gathering and continued fishing for freshwater

fish such as pike, whitefish, grayling and Dolly Varden.

In the Togiak subregion fall is a period of hunting and gathering as well, but this entails moving much greater distances than in the Nushagak subregion since the major game animals are not present in the subregion. Many hunting parties go upriver to hunt caribou and brown bear. Caribou are generally taken outside the subregion, around the Nushagak and Mulchatna Rivers. This is the opportunity for renewal of exchange networks as people from the Togiak subregion bring gifts of sea mammal products to the Nushagak River villages in return for hunting caribou in the vicinity. Villagers also travel by airplane to the Alaska Peninsula to hunt caribou. Beaver and land otter are also taken, generally closer to the village. Ducks and geese are also taken, but the main flyway for the southerly migration does not pass directly through the Togiak subregion so it is usually necessary to go either inland or to the Kuskokwim subregion. A subsistence fishery also continues during this period, concentrated primarily on spawned out red salmon and char. Numerous berries are harvested in the immediate area. Togiak grass is also valued throughout the region for its suitability for weaving baskets.

In the Kuskokwim subregion fall proceeds similarly to the pattern in the Togiak subregion. This is a period of hunting trips and berry gathering. Groups ofup to ten hunters go upriver in search of moose, brown bear and smaller game, such as beaver. The subregion is probably the greatest user of brown bear in the Bristol Bay region, and this is the preferred time of harvest since the bears are feeding on berries for much of the time. This is also the time for the second waterfowl hunting season as the flocks begin their southward migration. Whitefish are also taken during this time. A few hunters attempt to harvest some seal during this period as they pass through the subregion on their way south. Finally, this is a period of intense berry gathering.

2.3.4.4 **Winter**

With the onset of winter a lull in activity occurs in all subregions as the ice begins to freeze and before it is suitable for winter travel. Winter itself is generally a period of trapping, renewed hunting for some game and the beginning of hunting for other varieties, depending on what is available in the general vicinity. Winter actually allows greater mobility than any other season since it is possible, with a snowmachine, to travel virtually anywhere if there is snow or ice. This increases the range available for hunting.

In the Naknek-Kvichak subregion winter is a period of continued hunting and the onset of trapping activity. Both caribou and moose continue to be the focus of hunting activity, and especially the former forms a major part of the winter subsistence diet of people of this subregion. Trapping begins once the snows have fallen and the ice has set in, and species trapped include beaver, fox, wolverine, and otter. Some, such as porcupine and hare, are taken for food, while others, such as land otter and beaver are taken primarily for commercial purposes. The later part of winter is a time when people in this subregion begin againto exploit the sea mammals, in particular seal, in the subregion.

On the Nushagak winter sees, after a brief respite, a continuation of the caribou and moose seasons. Generally these game are hunted during August and September, a break occurs during October and November, and hunting resumes from Decemberto March. Winter is also the trapping season. Numerous animals are trapped, including porcupine, beaver, hare, and others. Other furbearers are taken for their pelts, including land otter, fox, and occasionally lynx and wolverine. The Nushagak is probably the subregion with the most intense beaver and land otter harvesting, and traditionally this has been a major source of income. Today, however, the decline in prices paid for pelts has greatly reduced the importance of commercial trapping.

In the Iliamna Lake subregion winter is also a time of hunting and trapping. Animals trapped include beaver, fox, marten, and lynx.

Fishing continues through the ice, especially for grayling, lake trout, whitefish, and Dolly Varden. As do most of the people of the region, villagers from the Iliamna Lake area range widely in search of caribou. The most productive hunting grounds are again around the Mulchatna and Nushagak Rivers, although occasionally caribou will come down to Lake Clark itself.

In the Togiak and Kuskokwim subregions winter activities vary somewhat from those pursued in the more southerly subregions. Both of these subregions take part in the winter caribou and moose hunting seasons to the extent possible. However, they are removed some distance from the main hunting grounds and utilization of the resource entails lengthy trips to the Nushagak and Mulchatna Rivers or, periodically, to the northern Alaska Peninsula. Both subregions also trap during the winter, for such animals as beaver, by far the most lucrative, fox, land otter, hare, mink, and occasional lynx.

The major distinction between these two more northerly and maritime subregions and those to the south revolves around exploitation of sea mammals. Seal are generally hunted as the sea ice forms. Seal, walrus and sea lion are all taken during the winter in the region, and into the Spring. These items form the basis for large scale exchanges with interior groups, such as those along the Nushagak, for the land mammals (especially caribou and moose) and freshwater fish unavailable in the immediate vicinity.

2.3.5 Changes in the Patterns of Resource Utilization

Throughout the region there have been some basic changes in some winter activities. Two changes have occurred in the pattern of moose hunting in recent years. First, moose are now more plentiful in the region than they have been historically, particularly in the Nushagak River drainage area. Therefore there is a greater dependence on this animal than has traditionally been the case. Second, the introduction of the freezer has altered the pattern of hunting. Traditionally, and historically

until the late 1960s, moose was hunted several times a year since it was difficult to preserve a large amount of meat for an appreciable time. Today, however, it is possible for one family to subsist for an entire winter on a single moose since it can be frozen and preserved effectively. As we will see when we discuss social patterns, the introduction of the freezer has altered sharing patterns within the community since it is not necessary to consume all the meat rapidly. The freezer has had some similar effects on the distribution of caribou.

The pattern of trapping has also been altered. First, the lucrative nature of the commercial fishery has meant that trapping need no longer be relied on heavily for cash. Historically trapping has often been the dominant means of acquiring cash, but this is no longer the case. Second, the prices now available for furs have been wildly variable, and for the last several years have been especially low, greatly reducing the return on the time and money invested.

The most basic change in the pattern of trapping, however, is social. The reduction in overall trapping activity, in concert with the utilization of snowmobiles and other modern technologies, has made the lengthy separation of men from the village in winter hunting and trapping camps nearly obsolete. Whereas traditionally the men remove to an interior location for much of the fall trapping and hunting season, this is no longer necessary. It is now possible, with a snowmobile, to set and check an extensive trap line removed considerably from the village, in a single day. This increased mobility has meant a reduction in the number of long term fall and winter camps on the part of the men. To an extent the yearly pattern of sexual division of labor in resource exploitation has been reversed. Traditionally in the summer men and women were together at one site in the fish camps and in the fall they were separated with the men in trapping/hunting camps for weeks at a time and women in the village site. Today during the fishing season men and women are separated, with men pursuing the drift fishery and women working the set net fishery alone. However, they are now more often together in the fall since the new technologies and reduced reliance on furbearers for income means the men can stay in the village and still

pursue those trapping and hunting activities which are necessary.

A final result of this is that contemporary villages are more settled, permanent sites than historically. This is a result of several factors. First, schools have been established and from fall through spring children must be kept at a centrally located site so they can attend classes. Second, such technology as snowmobiles and modern weapons have reduced time expendedon hunting and trapping. Third, the passage of ANCSA and the selection by each village of lands for conveyance has tied villages to a particular stretch of land. (For an extended case study of the implications of ANCSA on subsistence land use see Burns 1977.)

Serious concerns about the futureof subsistence hunting and fishing rights in and around these more permanent villages have been expressed by village residents. (We discuss these at some length below; for a broader perspective on Alaskan Native views see Alaska Native Foundation, 1975.) There are, as well, many specific concerns over continued access to Federal Lands by Natives for subsistence utilization. Each particular change in federal policy concerning National Interest lands or changes in Refuge or Park land designation has led to collection of data too voluminous to be treated in detail here. While only key findings have been integrated into this report, the reader is referred to Alaska Planning Group 1974; Anderson et al. 1976, 1977; Behnke 1977, 1978, 1979, 1982; Bishop 1978; Eisler 1978; Kelso 1976; Nowak n.d.; Udall 1977; and Worl 1977 for specific issue studies of relevance to the study region.

CHAPTER 3

THE POPULATION OF BRISTOL BAY

3.1 Introduction

The demographic structure of the study area plays a significant role in the socioeconomic and sociocultural systems of the region in several different respects. Population structure, particularly age and sex distributions, affects the rate of natural growth in a specific community, subregion, or region. Population growth due to natural increase and migration is a key variable in determining the rate of economic growth and pro

Changes in the composition of the population, such as the ethnic ratio, will influence the character of the value hierarchy which organizes social, cultural, and economic activities throughout the region. Finally, growth rates also provide an index of health and well-being in the region, and can influence the demands for public services such as education and health care.

This chapter will examine the demographic structure of the Bristol Bay population and identify key elements of population growth.

3.2 Historical Growth Trends

Bristol Bay population growth over the past century can be condensed into four eras with relatively uniform characteristics (see Table 3-l). The first era, beginning in the mid-1700s and ending at about the turn of the 20th century, encompasses the early period of white contact with Bristol Bay's indigenous population. Fueled mainly by natural increase but dampened by poor immunity to new forms of disease, long-term population levels remained relatively stable during this period. The seconders stretches from the early 1900s to 1939 and encompasses the decline of and recovery from the influenza epidemic, which devastated

Native populations throughout Alaska. Not until after 1939 did the population recover to levels comparable to those recorded prior to the turn of the century (Oswalt 1967, Swanton 1952).

The third era of population expansion extends from 1939 to 1960. It reflects the combined effects of war-time evacuation programs, which resulted in partial relocation of Aleuts to Bristol Bay, and the creation of post-war military installations in Bristol Bay. Rapid introduction of active-duty military personnel plus their dependents probably accounts for the bulk of population increase from 1950 to 1950.

The fourth era, stretching from 1960 to the present, reflects the advances in health care delivery, expanded government programs, and a growing commercial economy. Overall the population growth in the second decade of this twenty-year period was 50 percent faster than that recorded from 1960 to 1970 (1.4% per year). This accelerated pattern reflects the combined effects of unprecedented fisheries expansion and heavy state government spending in the latter 1970s.

Table 3-2 presents a more detailed view of changing civilian population for the period 1960 to 1980. The table shows population by village for the six subregions that comprise the study area. In addition to village population, the figures in Table 3-2 depict remote population situated in the outskirts, fully removed from settled places. The U.S. Census figures indicate that in 1980, 177 persons were remotely situated outside of settled places across the Dillingham and Bristol Bay Borough census divisions. At 3% of total census division population, the economic effect of remote population is probably negligible. Only population in the proximity of a village or regional service center was taken into account in this analysis.

TABLE 3-1

POPULATION TRENDS OF THE BRISTOL BAY REGION

	Military	Bristol Bay Borough	Bristol Bay Division	Total Region
				2,400
1880[1]				2,679
1900				3,400
1909				2,271
1920				2,015
1929				2,198
1939				1,992
1950	100			2,756
1960	539			4,024
1970	400	1,147	3,485	4,632
1971	420	1,027	3,200	4,227
1972	400	1,121	3,572	4,693
1973	440	1,199	3,659	4,858
1974	529	1,239	3,875	5,114
1975	456	1,914	3,847	5,761
1975	452	1,252	3,500	4,752
1977	459	1,102	3,521	4,623
1978	310	1,400	3,900	5,300
1979	369	1,233	3,971	5,204
1980	375	1,094	4,616	5,710

[1]1880 Census reported 2,331 persons in this area. Oswalt considers this to be a gross over-count, however, and suggests 1,000 as being closer to the actual population (Oswalt, op. cit.), p. 9. Other references consulted support this view.

SOURCE: J. W. Swanton, The Indian Tribes of North America (1952); W. H. Oswalt, Alaska Eskimos (1967); U.S. Bureau of the Census, 1S80-1980.

Alaska Department of Labor, 1971-1979.

TABLE 3-2
HISTORICAL POPULATION GROWTH BY VILLAGE
1960-1980

Sub Region	Community	Civilian Population 96		980	Average Annual Growth Rate (Percent) 1960-1980	70-1980
1 Lower Kuskokwim						
	Quinhagak	228	340	412	3.0	1.9
	Platinum	43	55	55	1.2	0
	Goodnews Bay	154	218	168	0.4	2.6
	sun	425	613	635	2.0	0.4
2 Western						
	Twim Hills	NA	67	70	NA	0.4
	Manokotak	149	214	294	3.5	3.2
	Togiak	220	383	470	3.9	2.1
	Aleknagik	231	128	154	-2.1	1.9
	sun	600	792	988	2.5	2.2
3 Dillingham						
	Dillingham	424	914	1563	6.7	5.5
4 Nushagak						
	Ekuk	40	51	7	-9.1	-22.0
	Koliganek	100	142	117	0.8	-2.0
	Ekwok	106	103	77	-1.6	-3.0
	Clarks Point	138	95	79	-2.8	-1.9
	Portage Creek	0	0	48	NA	NA
	New Stuyahok	145	216	331	4.2	4.4
	Sum	529	607	659	1.1	0.8
5 Iliamna/Kvichak						
	Newhalen	63	88	87	1.6	-0.1
	Iliamna	47	58	94	3.5	5.0
	Nondal ton	205	184	173	-0.9	-0.6
	Pedro Bay	53	65	33	-2.4	-7.0
	Igiugig	0	35	33	NA	-0.6
	Levelock	88	74	79	-0.5	0.7
	Kakhonak		88	83	1.9	-0.6
	sum	&-	592	582	0.6	-0.2
6 Bristol Say Borough						
	South Naknek	142	154	145	0.1	-0.6
	Naknek	249	178	318	1.2	6.0
	King Salmon	227	202	170	-1.5	-1.7
	Sum	618	534	633	0.1	1.7
All Villages						
	sun	3109	4052	5060	2.5	2.2
Remote Population		NA	NA	177	NA	NA
Military Population		539	400	375	-1.8	-0.6
Census Division (Civilian)						
	Dilling am Iv.	NA	1147	1094	HA	0.5
	Bristol Bay Bor.	NA	3485	4616	NA	2.9
	Census Div. Total	3485	4632	5710	2.5	2.1

SOURCE : US. Bureau of the Census 1960, 1970, 1380.

Dillingham's population increased more rapidly than any other village or subregion in the study area over both the 20-year and latter 10-year intervals. However, much of the early-period increase occurred in 1963 when Dillingham incorporated over a 22-square-mile area and absorbed the population of Kanakanak, Nelsonville, and Wood River village. According to the Alaska State Housing Authority (1972), Dillingham's 1960 population would have been about 800 persons if the same area as1970 and 1980 had been used. Expanded government, transportation, and fish processing activity were the main forces contributing to Dillingham population growth during the 1970s.

In addition to Dillingham only two of the subregions in Bristol Bay experienced any significant population growth in the 1960-1980 period. The Western subregion registered the highest population gains over both 10- and 20-year intervals, in spite of Aleknagik's sharp decline between 1960 and 1970. Both Manokotak and Togiak experienced steady population growth of 3.5% and 3.9% over the 20-year interval. Manokotak is believed to have absorbed a significant portion of Togiak's out-migration, depicted in Table 3-3*. Natural population increase in Togiak counteracted significant out-migration from that village between 1970 and 1980.

Quinhagak, New Stuyahok, and Iliamna were the only other villages that exhibited strong population growth from 1960 to 1980. Like Togiak, Quinhagak was the only Lower Kuskokwim village in which natural increase offset net out-migration. Naknek experienced strong population growth in the 1970s, but this resulted more from in-migration than natural increase (Table 3-3).

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*Ekuk was not enumerated separately in the U.S. Census summary data used to generate the tables in Appendixes A through F. Further, because of its small size, Ekuk was largely ignored in much of the subsequent analysis. It, nevertheless, remains important as a Nushagak Bay processing center and fish camp site.

TABLE .3-3
PATTERNS OF RIGRATION AND NATURAL INCREASE

Sub Region	Community	Population 1970	Population 1980	Natural Increase fran 1970 to 1980	Net Migration from 1970 to 1980
1 Lower Kuskokwim					
	Quinhagak	340	412	91	-19
	Platinum	55	55	6	-6
	Goodnews Bay	218	168	9	-s9
2 *stern					
	Twin Hills	67	70	7	-4
	Manokotak	214	294	45	35
	Togiak	383	470	128	-46
	Aleknagik	128	154	24	2
3 Dillingham					
	Di 11 ingham	914	1563	197	452
4 Nushagak					
	Ekuk	51	7	NA	NA
	Kol i ganek	142	117	NA	NA
	Ekwok	103	77	15	-41
	Clarks Point	95	79	10	-26
	Portage Creek	0	48	NA	NA
	New Stuyahok	216	331	68	47
5 Iliamna/Kvichak					
	Newhalen	88	87	16	-17
	Iliamna	58	94	27	9
	Nondalton	184	173	41	-s2
	Pedro Bay	65	33	13	-45
	Iguigig	35	33	3	-6
	Levelock	74	79	17	-1:
	Kakhonak	88	83	21	-26
6 Bristol Bay Borough					
	South Naknek	154	145	14	-23
	Naknek	118	318	52	88
	King Salmon	202	170	NA	NA
All Villages		4052	5060	804[a]	251[a]

[a]Excludes Ekuk, Portage Creek, Koliganek, and King Salmon.

SOURCE: U.S. Bureau of the Census 1970, 1980.

Out of 24 communities shown in Table 3-2, nine exhibited absolute population decline over the 20-year historical period. Ekuk's year-round population registered the steepest decline and currently consists of a processor watchman and his immediate family.

Except for the Bristol Bay Borough all remaining subregions exhibited a pattern of weakened population growth in the 1970s. Iliamna/Kvichak was the only subregion to experience population decline from 1970 to 1980, mainly as a result of net out-migration in every village except Iliamna (Table 3-3).

These population patterns reveal the significance of migration as a determinant of population change. Most Bristol Bay villages experienced stable or declining population between 1960 and 1980. Exceptions include Quinhagak, Manokotak, Togiak, New Stuyahok, Iliamna, Naknek, and, of course, Dillingham. Further, 14 of the 24 villages shown in Table 3-3 registered net out-migration between 1970 and 1980. This suggests that out-migration exerted downward pressure on population in many villages. In some cases, net out-migration may reflect intraregional population shifts motivated by kinship ties in neighboring villages. Labor market incentives also may help explain village population decline.

Villages with strong population growth fall mainly into the RSC (Regional Service Center) or SRC (Subregional Center) categories, the focal points of Bristol Bay government and commerce. Exceptions to this rule are Manokotak and New Stuyahok, which do not fit the RSC or SRC classification. Whether or not they qualify as RSCs, all of these villages exhibited strong patterns of natural increase as well as substantial gains from migration, reflecting population spillover from neighboring villages and from outside the Bristol Bay region. A more detailed discussion of economic determinants of migration is contained in Chapter 5.

3.3 Population Structure

Table 3-2 provides a breakdown of the population of Bristol Bay in 1980 for the entire region as well as the individual subregions. Dillingham had the largest population, followed by the Bristol Bay Borough and the Western subregions. The Iliamna subregion had the smallest population in 1980. Dillingham, Togiak, Quinhagak and Naknek were the largest communities.

3.3.1 Age and Sex Distribution

The population structure of the region and subregions can be further examined in terms of age and sex distribution, ethnicity, and household size and composition.

Table 3-4 provides a distribution of the regional and subregional populations by age and sex. The sex ratio is relatively constant throughout the region with males representing approximately 53% of the population and females representing 47% percent. This ratio also appears to be relatively uniform within each of the age categories for each subregion. In the Nushagak subregion, however, males over the age of 65 are over-represented by a ratio of almost 3 to 1 and males 4 years of age or younger are underrepresented by a factor of almost 2 to 1. Bristol Bay Borough's population has a much higher proportion of males (65%), particularly in the 18-64 age group. However, when military personnel from King Salmon are excluded from consideration, the sex ratio of the subregion approximates the mean for the other subregions. With the exception of Bristol Bay Borough, the largest age groups in all subregions are the 10 to 17 year olds and the 35 to 64year olds. Because of the unequal size of the age ranges for each group, comparisons among groups are quite limited. However, even a cursory glance suggestsa bimodal distribution in the mean age of the population throughout the region. In the Bristol Bay Borough, the large percentage of 18 to65 year olds is again explained by the military population of King Salmon.

Table 3-4

Population by Age and Sex - Bristol Bay Region

	0-4	5-9	10-17	18-24	25-34	35-64	65+	Total	%
LowerKuskokwim									
male	34	37	68	49	50	87	17	342	53.9
female	33	30	61	42	41	73	13	293	46.1
total	67	67	129	91	91	160	30	635	
Western									
male	45	43	115	80	85	123	21	512	51.8
female	47	52	114	72	67	109	15	476	48.2
total	92	95	229	152	152	232	36	988	
Dillingham									
male	73	83	136	106	167	211	30	806	51.6
female	79	67	133	109	150	198	21	757	48.4
total	152	150	269	215	317	409	51	1,563	
Nushagak									
male	34	23	82	56	57	69	26	347	53.2
female	27	32	66	49	58	64	9	305	46.8
total	61	55	148	105	115	133	35	652	
11 i arena									
male	38	25	66	48	42	80	14	313	53.8
female	21	24	61	44	40	70	9	269	46.2
total	59	49	127	92	82	150	23	582	
Bristol Bay Borough									
male*	33	27	56	183	215	187	13	714	65.3
male **								244	52.7
female*	24	31	69	70	70	104	12	380	34.7
female**								219	47.3
total	57	58	123	253	285	291	25	1,094	
Bristol Bay Region									
male*	257	238	523	522	616	757	121	3,034	55.0
male**									52.5
female	231	236	504	386	426	618	79	2,480	45.0
female**									47.5
total	488	474	1,027	908	1,042	1,375	200	5,514	

* Includes military population.

** Civilian population only.

Source: U.S. Census Data 1980.

3.3.2 Ethnicity

The ethnic group status, dichotomized into Native and non-Native categories, of Bristol Bay residents is presented in Table 3-5. As can be seen from this table, 3 out of every 4 residents of the study area are Alaskan Natives, the majority of whom are descendants of Yup'ik-speaking Eskimos. In the Lower Kuskokwim, Western, and Nushagak subregions, Natives represent over 90% of the population. Natives also comprise the overwhelming majority of the population in the villages of the Iliamna/Kvichak subregion with the exception of Iliamna, where the majority of residents (60%) are non-Native. Non-Natives are also strongly represented in Dillingham and in the Bristol Bay Borough, although only in King Salmon do they represent a majority of the local population.

The overall proportion of Native population declined slightly over the ten-year period from 1970 to 1980. Thirteen villages experienced stable or increasing Native population as a proportion of the total. They are Quinhagak, Aleknagik, Clark's Point, Ekwok, Koliganek, Newhalen, Iliamna, Pedro Bay, Kokhanok, Levelock, Naknek, King Salmon, and South Naknek. Dillingham exhibited the largest decline in the proportion of Native inhabitants between 1970 and 1980. The Lower Kuskokwim and Western subregions also experienced modest reductions in the proportion of Native inhabitants. Net in-migration of non-Natives probably accounts for the bulk of ethnicity change in Dillingham, while a pattern of Native out-migration and non-Native immigration underlie changing ethnicity in the Lower Kuskokwim and Western subregions.

A stable or increasing proportion of Native inhabitants were recorded in the remaining three subregions. The dramatic change in Naknek's ethnicity appears to be related to the expanding economic opportunities in retail sales and service industries associated with the growth of the commercial fishing industry during the late 1970s.

Table 3-5

CHANGES IN ETHNICITY FROM 1970 TO 1980

Sub Region	Community	Percent Native-1970	Percent Native-1980
1 Lower Kuskokwim			
	Quinhagak	97.6	97.6
	Platinum	87.3	80.0
	Goodnews Bay	96.3	95.8
	sum	96.2	95.6
2 Western			
	Twin Hills	98.5	97.1
	Manokotak	95.8	93.2
	Togiak	98.4	94.3
	Aleknagik	75.8	89.6
	Sum	94.1	93.2
3 Dillingham			
	Dillingham	63.7	57.5
4 Nushagak			
	Ekuk	74.5	NA
	Koliganek	94.4	95.7
	Ekwok	91.3	93.5
	Clarks Point	69.5	88.6
	Portage Creek	NA	91.7
	New Stuyahok	~ -	94.0
	sum	89.0	92.4
5 Iliamna/Kvichak			
	Newhalen	94.3	94.3
	Iliamna	39.7	40.4
	Nondalton	98.9	93.6
	Pedro Bay	78.5	93.9
	Iguigig	94.4	90.9
	Levelock	81.1	87.3
	Kakhonak	76.1	96.4
	sum	84.3	84.5
6 Bristol Bay Borough			
	South Naknek	55.2	85.5
	Naknek	21.3	51.6
	King Salmon	5.9	5.9
	sum	25.3	47.1
All Villages		76.3	75.6

The first percentage figure under Bristol Bay Region for each sex represents total population, including military, while the second percentage figure represents civilian population only.

To summarize, most villages in the study area experienced stable or declining population from 1960 to 1980. Migration was a major reason for population decline in some villages and for expansion in others. Ignoring Dillingham, Bristol Bay's most important regional service center, the Western subregion experienced the largest population gains. Net immigration tended to concentrate in Dillingham and several other secondary RSCs. A dramatic decline in average household size was observed over the 20-year period, which may be accounted for by changing age-sex distribution, non-Native immigration, rising real income, and government housing programs.

3.3-3 Household Size and Composition

In 1980, the average household size for the Bristol Bay Region was 3.81 residents. As indicated by Table 3-6 household size tended to be significantly greater in the Lower Kuskokwim, Western, and Nushagak subregions. The smallest average household size is found in the Bristol Bay Borough subregion. Small households of 1 to 4 persons appear to be the most common household type throughout the region with the exception of the Lower Kuskokwim subregion where 5 to 8 person households are the most common type. The large majority of households (75% or more) throughout the region are owner occupied, with the exception of Dillingham and the Bristol Bay Borough.

The relationship between population growth and household growth is a function of changes in the number of persons per household (average household size). As shown in Table 3-5, average household size declined dramatically between 1970 and 1980, with an average rate of decline equal to 2.3% per year for all 24 communities. There are several reasons for this decline: First, populati on expansion was due partly to

Table 3-6

POPULATIONAND HOUSEHOLDS

Sub Region	Community	1970 Population	1970 Households	1980 Population	1980 Households	Rate of Decline in Average Household Size (%/Year)
1 Lower Kuskokwim						
	Quinhagak	340	65	412	82	0.4%
	Platinum	55	13	55	14	0.1
	Goodnews Bay	218	36	168	42	4.2
	Sum	613	114	635	138	
Average Household Size			5.33		4.60	1.6%
2 Western						
	Twin Hills	67	13	70	17	2.3%
	Manokotak	214	37	294	57	1.2
	Togiak	383	66	470	101	2.2
	Aleknagik	128	22	154	38	3.7
	Sum	792	138	988	213	
Average Household Size			5.74		4.64	2.2%
3 Dillingham						
	Dillingham	914	238	1563	467	1.4%
Average Household Size			3.84		3.35	1.4%
4 Nushagak						
	Ekuk	51	8	7	1	-0.9%
	Koliganek	142	19	117	24	4.4
	Ekwok	103	24	77	20	1.1
	Clarks Point	95	16	79	22	5.2
	Portage Creek	0	NA	48	13	NA
	New Stuyahok	216	32	331	65	2.9
	Sum	607	99	659	145	
Average Household Size			6.13		4.55	3.0%
5 Iliamna/Kvichak						
	Newhalen	88	14	87	18	2.7%
	Iliamna	58	15	94	22	-0.1
	Nondalton	184	29	173	42	4.4
	Pedro Bay	65	17	33	11	2.5
	Iguigig	35	8	33	9	2.1
	Levelock	74	14	79	21	3.5
	Kakhonak	88	19	83	20	1.1
	Sum	592	116	582	143	
Average Household Size			5.10		4.07	2.3%
6 Bristol Bay Borough						
	South Naknek	154	34	145	43	3.0%
	Naknek	178	45	318	103	2.5
	King Salmon	202	62	170	75	3.7
	Sum	534	141	633	221	
Average Household Size			3.79		2.86	2.8%
All Villages		4052	846	5060	1327	
Average Household Size			4.79		3.8?	2.3%

non-Native immigration, which placed downward pressure on average household size. Second, the improving fishing economy increased household income, which enabled families to split into smaller units. Third, government homes have contributed to smaller family units by creating net additions to village housing. Fourth, recent trends in the age distribution of population have produced a growing segment of young adults, which traditionally have smaller families than populations with an advanced age distribution.

3.4 Population Change

3.4.1 Rates of Birth and Death

Among the factors affecting the demographic structure of the local population in the Bristol Bay Region are the birth and death rates. These rates, in turn, are a reflection of the level of health and well-being of local residents and are key indicators of the stresses imposed on the socioeconomic and sociocultural systems in the Bristol Bay region by exogenous forces of change. Health care and social services are the primary responsibility of the public sector in Bristol Bay but may be influenced by other components of regional, subregional and community socioeconomic systems, including political, social and economic factors which may contribute to high levels of stress, increasing the risk for illness and social disorganization.

This section will limit its examination to birth and mortality rates in Bristol Bay. The health care system and the effect of socioeconomic change on health and well-being will be discussed in later sections.

3.4.1.1 Natality

Natality in the Bristol Bay region can be assessed according to birth rate and general fertility ratio. The birth rate in Bristol Bay in 1975 was 20.6 per 1,000, compared with a statewide rate of 18.5 and an overall United States rate of 14.9. The general fertility ratio (GFR) in

Bristol Bay is also higher than the nationwide ratio. In 1975, the GFR (calculatedly dividing the number of live births by the number of women of childbearing age) was 120.3 for the Bristol Bay Region (Bristol Bay Regional Specific Health Plan 1979:32). The GFR among Natives in the region was 130.9 dnd the GFR among non-Natives was 88.4. This compares with an overall U.S. rate of 65.8. The GFR, however, appears to be on the decline for Natives while displaying a slight increase for non-Natives. In 1970 the GFR was 139.5 for Natives and 84.2 for non-Natives. (Nathan and Associates 1975: IA2,17).

3.4.1.2 Mortal i ty

Mortality among Bristol Bay residents can be described by age-adjusted and crude death rates (CDR). The Bristol Bay Regional Specific Health Plan (1979) indicates that for the period 1970-1975, the CDR for Bristol Bay was 6.4 deaths per annum 1,000 population, while the CDR for the U.S. was 8.9 per 1,000. Kelso (1977), indicates that in 1974, the CDR in Bristol Bay was 5.14 per 1,000 population, compared with a statewide rate of 4.16. However, these comparisons alone are insufficient to indicate the relative mortality risk for Bristol Bay residents. For instance, Nathan and Associates (1975) note that the Native death rate in Bristol Bay in 1974 was 11.05 per 1,000 compared with a non-Native death rate in the region of 3.22. The Native death rate is considerably higher than the statewide Native rate of 7.36 per 1,000, and represents a significant increase from a death rate of 6.3 per 1,000 Bristol Bay Natives in 1968. Conversely, the non-Native rate is lower than the statewide non-Native rate of 3.51. These figures reveal that the health risks for the Natives of Bristol Bay are on the rise and greater than for other Alaskan Natives.

Age-specific death rates provide a more detailed expression of the mortality risk for Bristol Bay residents. Table 3-7 provides the age specific mortality ratios for Bristol Bay for 1970-1975, using the U.S. as the standard population:

Table 3-7

Age-Specific Standardized Mortality Ratios*, Bristol Bay, 1970-1975

Age	U.S. (per 1,000)	Bristol Bay Expected Deaths (per year)	Bristol Bay Observed Deaths (per year)	SMR %
<1	16.4	2.0	2.6	130
	.7	.3	1.2	400
5-14	.4	.6	.7	117
15-24	1.2	.9	4.7	522
25-34	1.4	.8	2.8	350
35-44	2.7	1.1	3.0	273
45-54	6.5	2.1	3.5	167
55-64	15.0	3.3	3.8	115
65-74	31.9	3.1	8.0	258
75+	90.8	2.9	0	0

Source: Bristol Bay Regional Specific Health Plan, 1979.

* Standardized mortality ratio is defined as the number of deaths, either total or cause-specific, in a given group, expressed as a percentage of the number of deaths that would have been expected in that group if the age and sex specific rates in the general population were applicable.

This table shows that age-specific rates are higher for Bristol Bay residents than for the general U.S. population in all age categories in which deaths were reported, especially among 1 to 4 year-olds and 15 to 24 year-olds.

Cause-specific death rates for Bristol Bay indicate that accidents are the primary cause of death and that the accidental death rate is more than three times greater than the rate for the entire country. Deaths attributed to "violent" causes such as accidents, suicides, homicides,

and alcoholism account for the largest percentage of deaths in Bristol Bay, followed by deaths due to chronic illness and old age and deaths due to "preventable" (i.e., infectious and parasitic diseases) causes. Between 1968 and 1972, 48.7 percent of all deaths among Natives and42 percent among non-Natives in Bristol Bay were attributed to violent causes. This compares with a statewide average of 37 percent for Natives and 29.2 percent for non-Natives. Similarly, 15 percent of all Native and 8 percent of all non-Native deaths in Bristol Bay were attributed to ''preventable" causes, while the statewide averages were 11.7 percent and 7.2 percent respectively. Bristol Bay Native and non-Native percentages are only lower than statewide averages only in the category of deaths due to chronic illness and old age (Nathan and Associates 1975 IA2:20). The rates for these cause-specific categories are contained in Table 3-8.

3-8
Cause-Specific Death Rates* for Bristol Bay, Alaska, and U.S.

Cause of Death	Bristol Bay Rate 1970-75	Alaska Rate 1975	U.S. Rate 1975
Preventable			
Tuberculosis	4.2	1.5	1.6
Other Infections	6.3	2.7	4.8
Inflammatory Diseases of CNS	4.2	1.5	N/A
Gastritis and Enteritis	6.3	.7	.9
Influenza & Pneumonia	38.0	11.6	26.1
Other Respiratory	25.3	10.9	12.0
Maternal			.2
Congenital Abnormalities	21.1	5.4	6.2
Diseases of Early Infancy	14.8	12.6	12.5
Ill Defined	48.6	12.6	14.9
Chronic and Old Age			
Heart Diseases & Hypertension	73.9	64.7	351.7
Malignant Neoplasms	54.9	52.9	171.7
Diabetes	0.0	3.5	16.5
Vascular Lesions and CNS	27.4	18.3	91.1
General Arteriosclerosis	4.2	3.5	13.6
Chronic Nephritis	6.3	.5	3.0
Cirrhosis of the Liver	10.6	12.1	14.8
Other Degenerative	19.0	7.9	11.3
Vi 01 ent			
Accidents	179.6	103.5	48.4
Suicides	6.3	18.3	12.7
Homicides	21.1	6.4	10.0
Alcoholism	21.1	11.4	2.3
All Other	46.5	13.6	62.8

* per 100,000 population

Source: Bristol Bay Regional Specific Health Plan, 1979.

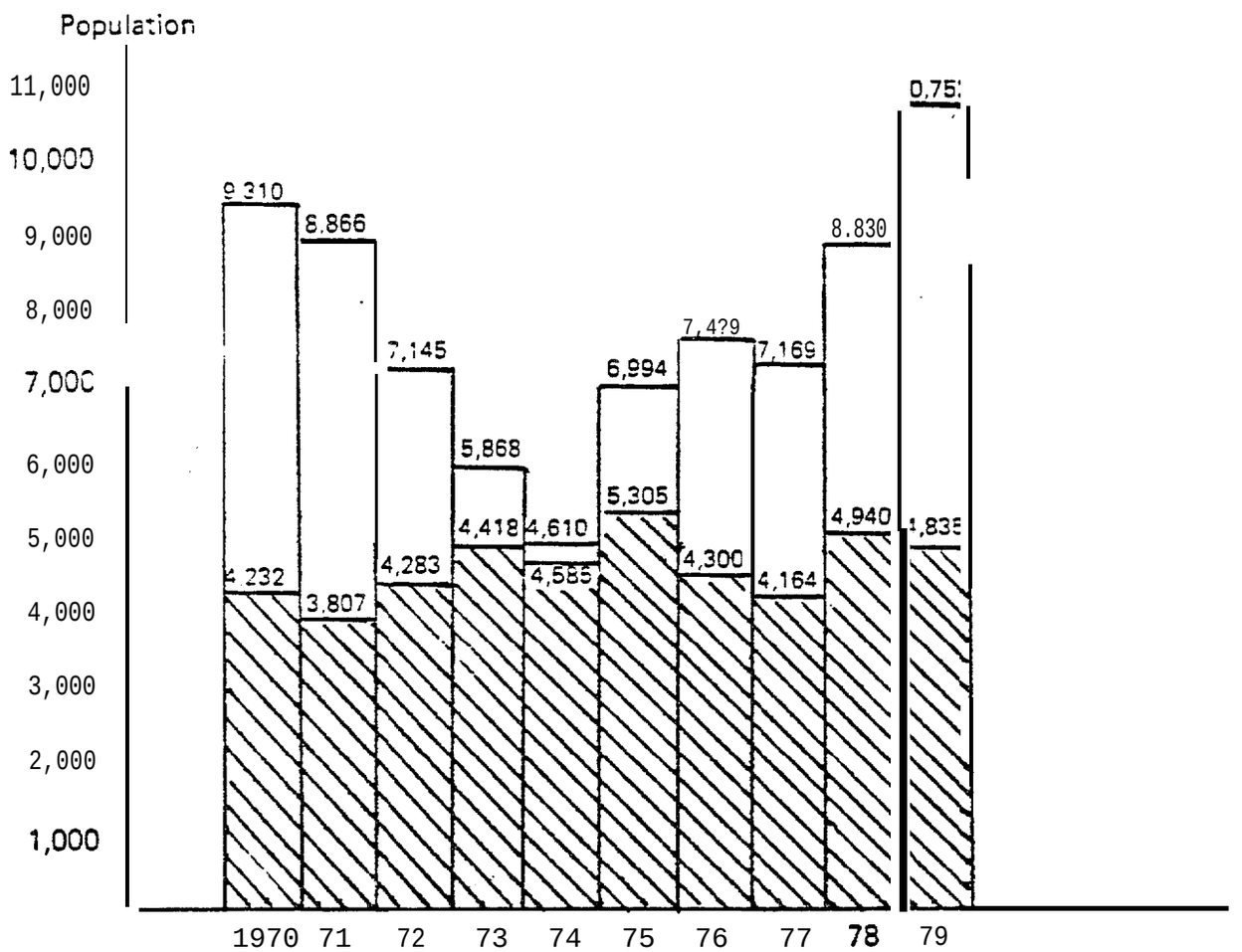
3.4.2 Migration

The second major factor influencing population growth is migration. Population migration may be broadly classified as permanent and itinerant. Both forms of migration can occur at the village, regional, and state levels, and both forms are prevalent in Bristol Bay. Both resident and nonresident itinerant population movement is closely related to changing economic conditions in Bristol Bay. Similarly, non-economic factors such as education, kinship relations, population age structure, and television are also important determinants of permanent migration. Patterns of permanent population movement are not well understood and are subject to considerable debate. Migration patterns are difficult to track, particularly when data do not reveal gross in- and out-migration patterns or the destination of out-migrants. Furthermore, both types of migration represent a critically important link between population and economic conditions. It represents a labor supply relief valve and, as such, an important tie between communities and markets of all types in and outside of Alaska.

3.4.2.1 Itinerant Migration

For the most part, Bristol Bay itinerant migration at the state and regional levels is caused by economic factors. Non-resident fishermen migrate to participate in the seasonal fishery, and nonresident seasonal workers assume the bulk of Bristol Bay processing jobs. The extent of itinerant migration is reflected mainly by seasonal employment shifts since nonworking dependents usually do not participate in this seasonal activity. To illustrate the extent of the seasonal population component, July employment figures from the Alaska Department of Labor (ADOL) were compared with ADOL annual civilian population figures for both Bristol Bay census divisions in Figure 3-1. Two conditions are evident from this Figure. First, employment is closely related to economic conditions in the fishery and reaches levels that occasionally exceed twice that of the resident population. Second, resident and itinerant population, as reflected in the difference between total employment and

Figure 3- I Bristol Bay Seasonal Employment and Annual Civilian Population 1970-1979



Sources: (1) Alaska Department of Labor, Current Population Estimates by Census Division.
(2) Ibid., Alaska Labor Force Estimates by area, 1970-79.

resident population, appear to move inversely to one another.

Itinerant migration at the village level consists mainly of seasonal migration by villagers to fish camp sites in the Nushagak and Kvichak Bays. Large groups of villagers -- men and women, young and old -- migrate downriver to fish with drift gillnet and set gillnet gear and to visit with friends and relatives from neighboring villages. Three or four weeks later when the commercial fishery is closed, villagers migrate back up river and begin subsistence fishing at their home village sites (although some practice subsistence fishing at the fish camp as well as commercial fishing). Table 3-9 provides a glimpse of itinerant resident migration from the U.S. Census. Except for Dillingham, all respondents from other villages indicated they worked at locations different from their place of residence.

3.4.2.2 Permanent Migration

Permanent migration (from here on referred to as either net in- or out-migration) is one of two basic components of total population change shown in Table 3-9. The other component is natural population increase (i.e., births minus deaths). A comparison of net migration and natural increase for the study area communities is shown in Table 3-10. It is clear that, while all villages experienced varying levels of positive natural increase, net out-migration was responsible for population decline in half the villages shown between 1970 and 1980. Only three of the eleven villages that recorded net out-migration (Twin Hills, Togiak, and Levelock) had sufficient natural population increase to offset migration-induced population decline.

According to Lane et al. (1982), several economic factors help explain patterns of migration in rural Alaska. Local employment opportunities and public service availability rank among the highest. In general, increasing dependence on wage employment and on modern conveniences result in higher rates of out-migration, especially in small villages that are relatively isolated from job opportunities and public services.

TABLE 3-9
PLACE OF WORK IN 1980

SUB REGION	COMMUNITY	WORKED INSTATE				WORKED OUT OF STATE
		IN PLACE OF RESIDENCE	OUT OF PIACE OF RESIDENCE	NO PORTED	UNIDENTIFIED PLACE	
1 LOWER KUSKOKWIM						
	QUINHAGAK	0	0	0	44	0
	PLATINUM	0	0	0	14	0
	GOODNEWS	0	0	0	20	0
	SUM	0	0	0	78	0
WESTERN						
	TWIN HILLS	0	0	0	5	0
	MANOKOTAK	0	0	0	48	0
	TOGIAK	0	0	0	57	0
	ALEKNAGIK	0	0	0	41	0
	SUM	0	0	0	151	0
3 DILLINGHAM						
	DILL INGHAM	541	21	80	0	5
4 NUSHAGAK						
	KO. IGANEK	0	0	0	48	0
	EKWOK	0	0	0	33	0
	CLARKS POINT	0	0	0	15	0
	PORTAGE CREEK	0	0	0	7	0
	NEW STUYAHOK	0	0	0	54	0
	SUM	0	0	0	157	0
5 ILIAMNA/KVICHAK						
	NEWHALEN	0	0	0	21	0
	ILIAMNA	0	0	0	15	0
	NONDALTON	0	0	0	35	0
	PEDRO BAY	0	0	0	0	0
	IGIUGIG	0	0	0	0	0
	LEVELOCK	0	0	0	29	0
	KAKHONAK	0	0	0	5	0
	SUM	0	0	0	105	0
6 BRISTOL BAY BOROUGH						
	OUTH NAKNEK	0	0	0	34	0
	NAKNEK	0	0	0	120	0
	KING SALMON	0	0	0	426	4
	SUM	0	0	0	580	4
ALL VILLAGES						
	SUM	541	21	80	1071	9
REMOTE POPULATION						
	DILLINGHAM DIV.	0	0	0	16	0
	BRISTOL BAY BOR.	0	0	0	27	0
	SUM	0	0	0	43	0
CENSUS DIVISION TOTAL						
	DILLINGHAM DIV.	541	21	80	628	80
	BRISTOL BAY BOR.	0	0	0	607	0
	SUM	541	21	80	1235	80

SOURCE: U.S. Bureau of the Census, Special Tabulations, STF5, 1980.

TABLE 3-10
PATTERNS OF WGRATION AN
NATURAL INCREASE

SUB REGION	COMMUNITY	TOTAL CIVILIAN POPULATION 1970	TOTAL CIVILIAN POPULATION 1980	NATURAL INCREASE FROM 1970 TO 1980	NET MIGRATION FROM 1970 TO ?980
1 LOWER KUSKOKWIM					
	QUINHAGAK	340	412	91	-19
	PLATINUM	57	55	6	-8
	GOODNEWS BAY	218	168	9	-60
	SUM	615	635	9	-60
2 WESTERN					
	TWIN HILLS	67	70	7	-4
	MANOKOTAK	214	294	45	35
	TOGIAK	383	470	128	-46
	ALEKNAGIK	128	154	24	2
	SUM	792	988	204	-13
3 DILLINGHAM					
	DILLINGHAM	914	1563	197	452
4 NUSHAGAK					
	KOLIGANEK	142	117	NA	NA
	EKWOK	103	77	15	-41
	CLARKS POINT	95	79	10	-26
	PORTAGE CREEK	0	48	NA	NA
	NEW STUYAHOK	216	331	68	41
	SUM	556	652	NA	NA
5 ILIAMNA/KVICHAK					
	NEWHALEN	88	81	16	-17
	ILIAMNA	58	94	27	9
	NONDALTON	184	173	41	-52
	PEDRO BAY	65	33	13	-45
	IGIUGIG	35	33	3	-6
	LEVELOCK	74	79	17	-12
	KAKHONAK	88	83	21	-26
	SUM	592	582	138	-149
6 BRISTOL BAY BOROUGH					
	SOUTH NAKNEK	154	145	14	-23
	NAKNEK	118	318	52	88
	KING SALMON	202	170	NA	NA
	SUM	534	633	NA	NA
ALL VILLAGES					
	SUM	4003	5053	804	108
REMOTE POPULATION					
	DILLINGHAM DIV.	NA	83	MA	NA
	BRISTOL BAY BOR.	NA	86	NA	NA
	SUM	NA	169	NA	NA
CENSUS DIVISION TOTAL					
	DILLINGHAM DIV.	3827	4616	NA	NA
	BRISTOL BAY BOR.	1147	719	NA	NA
	SUM	4974	5335	NA	NA

SOURCES: Lane, Nebesky, and Hull, 1982.

U.S. Bureau of the Census, 1970, 1980.

An excerpt from Volume II of Lane, et al. (1982), is contained in Table 3-11 which shows patterns of population change between 1970 and 1980 for 20 Bristol Bay communities. The communities are organized first according to whether they experienced net out- or in-migration and, second, by place size in 1980. The results indicate a clear direct relationship between small village size and net out-migration. Nine out of ten villages with 1980 population below 100 (excluding Portage Creek) experienced net out-migration. Similarly three out of four villages with 1980 population ranging from 101 to 250 also registered net out-migration. The relationship between village size and migration is reversed for villages with 1980 population in excess of about 300 persons. Net in-migration is associated with larger villages. Dillingham, the largest Bristol Bay community, experienced the highest rate of net in-migration. (In fact, Dillingham's rate of net in-migration exceeded that of other statewide regional service centers, including Bethel, Kotzebue, Barrow, and Nome).

These findings confirm that small villages gave rise to greater net out-migration from 1970 to 1980. Whether or not economic factors underlie this pattern is less clear. The relationship between net migration and other basic economic indicators is depicted by subregion in Table 3-12. Although the evidence is not conclusive, an apparent link between employment patterns and net migration emerges. For example, employment growth and net migration rates to to behave inversely. Dillingham, with strong, positive net in-migration ranked first in subregional employment growth. Employment tended to grow less rapidly for subregions with increasing net out-migration. (Though not in a major way, the Lower Kuskokwim and Bristol Bay Borough subregions depart from this pattern.) With the exception of subregion 5 (Iliamna/Kvichak), where data on unemployment were not available, the three subregions with net out-migration between 1970 and 1980 (Lower Kuskokwim, Western, and Nushagak) also exhibited unemployment growth. The only subregion with net in-migration (Dillingham) registered a decline in the rate of unemployment from 1970 to 1980.

Table 3-11

DETAILED POPULATION CHARACTERISTICS BY NET MIGRATION AND PLACE SIZE

Place Size	Place Names	1970 Pop.	Births	Deaths	1970 % Female	1970 % Native	1970 % 15-35 Years	1980 Pop.	1980 % Female	1980 % Native	1980 % 15-35 Years	Net Migration Rate	Net Migration
Out-Migration													
LT 100													
	Platinum	57	11	5	52.7	07.3	10.9	55	41.8	00.0	30.9	-14.0	-8
	Clarks Point	95	20	10	50.5	69.5	29.5	79	41.0	00.6	50.6	-27.4	-26
	Ekwok	103	27	12	47.6	91.3	15.5	77	42.9	93.5	37.7	-39.8	-41
	Igiugig	36	6	3	44.4	94.4	13.9	33	54.5	90.9	36.4	-16.7	-6
	Kakonak	88	24	3	51.1	76.1	9.1	83	-	-		-29.5	-26
	Levelock	74	25	8	45.9	81.1	16.2	79	38.0	87.3	41.8	-16.2	-12
	Newhalen	88	18	2	38.6	94.3	18.2	87	37.9	94.3	41.4	-19.3	-17
	Pedro Bay	65	15	2	46.2	78.5	21.5	33	42.4	93.9	33.3	-69.2	-45
	Twin Hills	67	9	2	47.8	98.5	14.9	70	50.0	97.1	45.7	-6.0	-4
101-250													
	Goodnews Bay	218	30	21	40.9	96.3	17.0	168	44.0	95.8	46.4	-27.1	-60
	Nondalton	184	47	6	50.0	90.9	14.7	1/3	46.(I	93.6	42.2	-28.3	-52
	South Naknek	154	26	12	45.5	55.2	9.7	145	50.3	85.5	40.7	-14.9	-23
251-500													
	Quinhagak	340	110	19	47.1	97.6	20.3	412	47.6	97.6	34.2	-5.6	-19
	Togiak	383	NA	NA	46.7	98.2	NA	470	48.7	94.3	NA	-12.0	-46
	Naknek	318	70	18	48.9	21.3	15.7	318	45.9	51.6	42.1	-16.4	-52
In-Migration													
LT 100													
	Illamna	58	35	8	41.4	39.7	6.9	94	51.1	40.4	35.1	15.5	9
101-250													
	Aleknagik	128	41	17	44.5	75.8	24.2	154	44.2	89.6	36.4	1.6	2
251-500													
	Manokotak	214	56	11	50.0	95.8	12.1	294	49.0	93.2	38.8	16.4	35
	New Stuyahok	216	79	11	45.4	96.3	19.0	331	40.6	94.0	41.1	21.8	47
1001-2508													
	Dillingham	914	293	96	49.1	63.7	15.1	1563	48.4	57.5	41.4	49.5	452

Study area villages not shown include Kolliganek, Portage Creek, and King Salmon.

SOURCE: Lane, Nebesky and Hull 1982

TABLE 3-12
COMPARISON OF MIGRATION AND BASIC ECONOMIC INDICATORS
BY SUBREGION

SUBREGION	MIGRATION RATE[a]	REAL PER CAPITA INCOME			LABOR FORCE PARTICIPATION RATE			EMPLOYMENT			UNEMPLOYMENT		
		1970	1980	Annual Growth Rate	1970	1980	Annual Growth Rate	1970	1980	Annual Growth Rate	1970	1980	Annual Growth
	(Percent)	(1980 Dollars)		(Percent)		(Percent)				(Percent)			
1 Lower Kuskokwim	-14.0%	$2262	$5302	8.9%	11.1%	24.5%	8.2%	NA	81	NA	11.0%	24.8%	11.6%
2 Western	-1.6	1719	6177	13.6	21.0	51.5	9.4	80	162	7.3%	5.9	51.5	24.2
3 Dillingham	49.5	5005	13156	10.1	61.9	66.0	0.6	269	656	9.3	11.5	5.7	-7.3
4 Nushagak	-4.8[b]	3294	4989	4.2	31.1	39.0	2.3	84	157	6.5	15.2	16.4	0.8
5 Iliamna/Kvichak	-24.8	3146	6204	7.0	38.5	24.6	-4.6	84	108	2.5	NA	NA	NA
6 Bristol Bay Bor.	-15.9[c]	$5360	$15794	11.4	63.5	62.9	-0.1	135	255	6.6	16.7	13.6	-2.1
ALL VILLAGES	5.0[b, c]	$3141	$7277	8.8%	34.4%	39.1%	1.3%	684	1419	7.6%	12.8%	17.7%	5.2%

[a]Migration Rate = $\frac{\text{Difference Between 1980 and 1971 Population - Natural Increase}}{\text{1970 Population}}$

[b]Excludes Koliganek and Portage Creek.

[c]Excludes King Salmon.

SOURCE: U.S. Bureau of the Census, 1970, 1980.

However, further evidence confirming the strength of the link between economic factors and migration cannot be found in Table 3-12. For example, the Lower Kuskokwim and Bristol Bay Borough subregions registered comparable real per capita income gains to Dillingham, while concurrently exhibiting among the highest rates of net out-migration. The relationship between changing rates of labor force participation and net migration are also difficult to discern. Relatively strong gains in labor force participation rates among the Lower Kuskokwim, Western, and Nushagak subregions were paired with moderate to high net out-migration rates. Yet, subregions with low or negative growth in labor force participation experienced widely varying patterns of net migration.

The lack of firm evidence tying economic conditions to migration patterns suggests that, in addition to social and cultural considerations referred to earlier, a transition in settlement patterns may be underway in Bristol Bay. Recent field investigations made it clear that the incidence of return to home villages by members after lengthy periods of absence may no longer be an exception to the rule. Although not conclusive, the U.S. Census data on resident location five years prior to each census year indicate that a higher proportion of Bristol Bay residents lived in the same county (but a different house) between 1975 and 1980 than between 1965 and 1970 for the Dillingham, Nushagak, and Bristol Bay Borough subregions (Table 3-13).

Finally, we must consider the relationship between permanent migration and resource abundance. Historically, local avail ability of fish and game was a primary factor in village location decisions. Technological innovation has dramatically improved access to the back country and increased the range of hunting and fishing territory available to many villages. Larger subsistence territories would tend to offset pressure toward out-migration, discussed above in the context of isolated villages.

TABLE 3-13
RESIDENT LOCATION[a]

Subregion	Proportion 1970 Population 5 Years and Older That Lived in the Same County But Not the Same House in 1965 (Percent)	Proportion of 1980 Population 5 Years and Older That Lived in the Same County But Not the Same House in 1975 (Percent)
1 Lower Kuskokwim	NA	53.0
2 Western	16.0	9.4
3 Dillingham	26.7	34.3
4 Nushagak	16.8	17.3
5 Iliamna/Kvichak	NA	16.4
6 Bristol Bay Borough	6.3	38.7
All Villages	5.9	26.5

SOURCE: U.S. Bureau of the Census, 1970, 1980.

To summarize, both itinerant and permanent migration were present in the past decade of population change in Bristol Bay. Itinerant migration of residents and nonresidents is closely tied to the commercial fishery. Permanent migration is more difficult to explain from the standpoint of economic factors. A strong, direct relationship between village size and net migration is evident, with smaller villages tending to lose population through net out-migration and larger villages with population greater than 300 experiencing net in-migration from 1970 to 1980.

Dillingham, the only subregion to register a decline in the unemployment rate from 1970 to 1980, was also the only subregion to record net in-migration. However, its status as a regional service center suggests that factors other than rising employment opportunities help to explain Dillingham's positive migration rates.

CHAPTER 4

OVERVIEW OF THE ECONOMY

4.1 Introduction

As will become evident throughout this report, it is extremely difficult to disentangle the influences that the cash-based and subsistence-based socioeconomic/sociocultural systems have upon one another. The description and analysis of either of these systems demands an understanding of the other.

The objective of this chapter is to describe and analyze the major components of the cash-based economic system of the study area. This description and analysis is intended to be sufficiently broad in scope to provide an adequate understanding of structures and processes which apply throughout the study region, yet also detailed enough to indicate subregional variations. A description and analysis of the subsistence-based economic system will follow in subsequent chapters.

Our examination will begin with a summary description and analysis of income and employment patterns for the entire region. The chapter will then focus on the major sectors of cash-based economic activity, including the commercial fishery, the government, the support sector, and the recreation industry. Each of these sectors will be examined from the perspectives of their structure, operations, and trends of change. It is in the examination of these sectors that subregional variations will become particularly salient. A discussion of household savings, capital formation, and economic forecast parameters is provided in subsequent chapters.

4.2 Inco

The distribution of total personal income across major industry classifications from 1970 to 1980 is presented in Figure 4-1. The levels shown here are expressed in real, inflation-adjusted 1980 dollars and reflect total income of residents and nonresidents alike. The levels of income shown for each major industry classification are cumulative. The highest level represents income of the total economy. Income from commercial fishing and processing is depicted in the area between the highest and second highest curves, and so on.

The commercial fishing sector includes income from fish harvesting and processing, based on calculations by Rogers (1982). The support sector covers distributive industries including transportation, communication, and utilities; wholesale and retail trade; finance, insurance, and real estate; and service industries. The support sector also includes construction income, fueled mainly by government activity, plus mining income, which is negligible throughout the historical period. Government income covers federal, state, and local branches including the military. Transfers include payments from various federal and state income assistance programs (e.g., Aid to Families with Dependent Children, Aidto the Blind, Aidto the Disabled, Old Age Assistance, and BIA General Assistance).

Several characteristics of Bristol Bay's economy are evident from Figure 4-1:

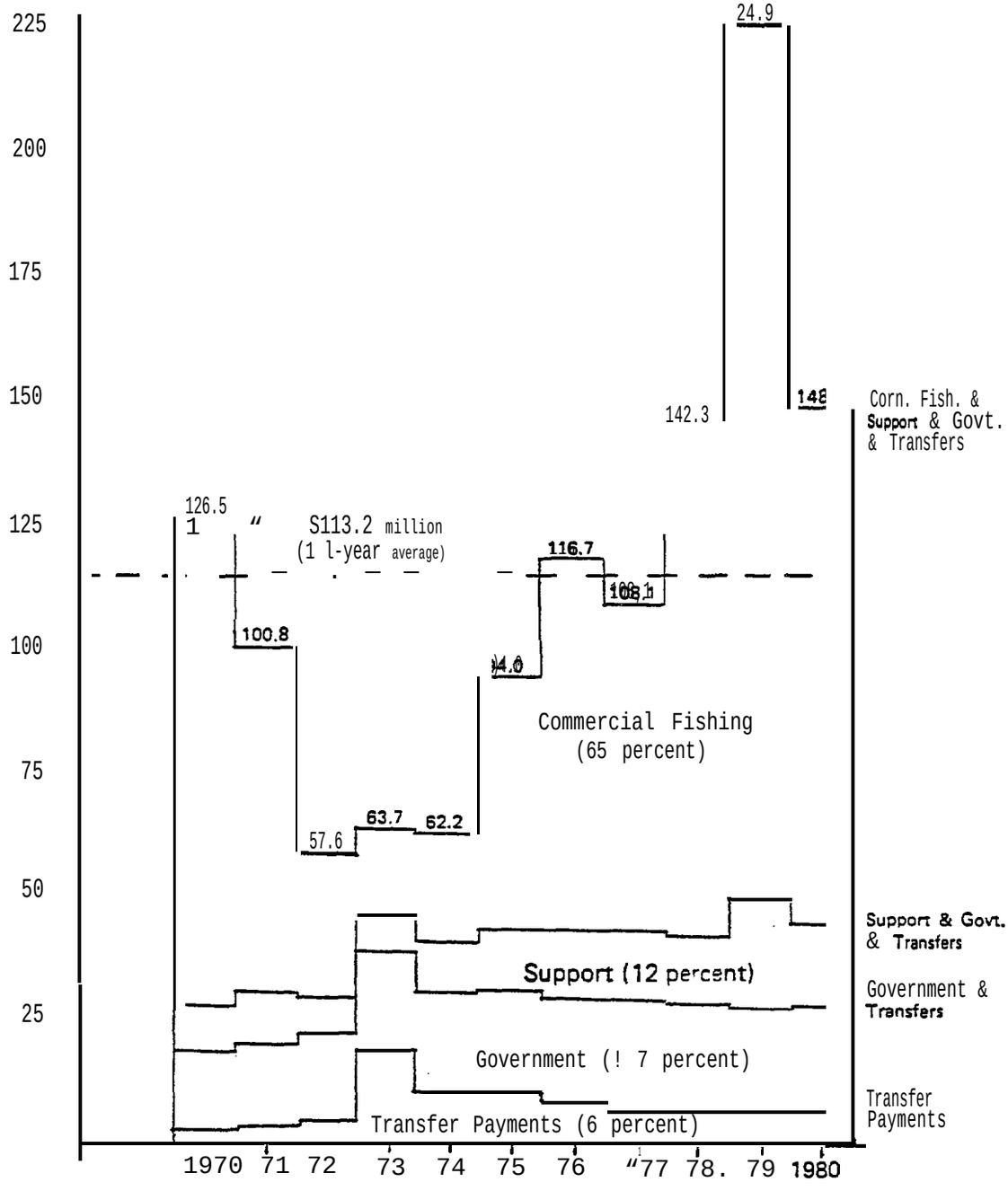
1. Although a definite pattern of real growth is evident, Bristol Bay's economy is subject to significant variability, due mainly to changing conditions in the fishing sector. Not until 1978 did the economy recover the level of real income recorded in 1970. Fishing earnings continued to rise sharply in the late 1970s. Gross income of resident and nonresident fishermen increased to an unprecedented $176 million (in 1980 dollars) in 1979, from $101 million in 1978, in itself an exceptional season. This dramatic but temporary surge

elevated the Bristol Bay Borough to the highest ranking per capita income position among all U.S. counties, according to 1980 Census results (based on 1979 income). The earnings through the early 1970s reflect a combination of poor salmon runs and low prices.

2. Compared with commercial fishing, income earned in other sectors was relatively stable. A temporary increase in transfer payments occurred in 1973, probably in response to the dramatic fishery decline of the early 1970s. After 1973, government income and transfer payments fell gradually in real terms. The support sector was the only nonfishing sector of the economy to increase somewhat steadily after 1973. This may partly reflect Bristol Bay's growing recreation industry, discussed in greater detail below. It may also reflect an incipient decline in the traditional service/indenture relationship between canneries and local fishermen (see Chapter 9).

3. Government income and transfers tend to move inversely with other sectors of the economy. When the private (fishing and support) economy is strong, as in the early and late 1970s, government payrolls and transfer payments comprised less than one-fifth of total personal income. Conversely, government income, as a proportion of total personal income, increased to 59% in 1973, the year of deepest economic decline. This countervailing tendency suggests that government plays a stabilizing role in what is otherwise a predomintaly seasonal, resource-based economy.

Figure 4- 1 Real Total Personal income in Bristol Bay
(millions of 1980 dollars)



Note: Figures include non-resident and absentee income. Also, these figures ignore income from interest, dividends, rant. and contributions for social insurance. As a result. they differ slightly from income estimates used elsewhere in this report. Difference is negligible.

Source: George Rogers, 1982; Bureau of Economic Analysis, Personal Income by Major Sources, 197 S1960.

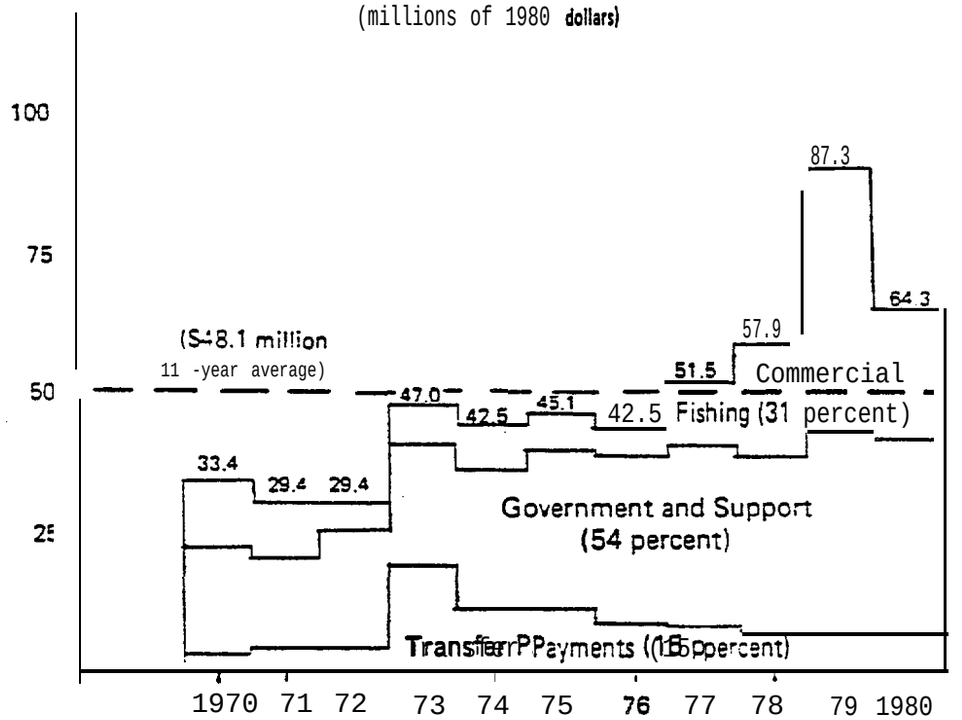
The income patterns exhibited in Figure 4-1 reflect Bristol Bay's total economy, including nonresident workers. How would real income compare if nonresident earnings were excluded? Bristol Bay resident income by sector is depicted in Figure 4-2, using the same scale as Figure 4-1. The resident income levels in Figure 4-2 are based on resident-adjustment calculations by Rogers (1982) for the commercial fishery and by the Bureau of Economic Analysis (BEA) for the support and government sectors. A more detailed discussion of these adjustments can be found in Chapter 5. Comparing Figures 4-1 and 4-2 suggests several patterns:

1. More than half (57% of total personal income earned over the n-year period is tied to nonresidents of the Bristol Bay region.

2. Income leakage of nonresidents is concentrated in the commercial fishing sector. As a result, the relative size of each sector changes significantly. As a proportion of resident-adjusted personal income, the commercial fishing sector falls to 31% down from 65% of total resident and nonresident personal income. Collectively, government and support industries nearly doubled to 54% of resident-adjusted income, compared to 29% of the total economy. After deducting nonresident earnings, the role of transfer payments also increases notably from 6-15%.

3. In addition to a wholly different structure, the resident economy of Bristol Bay exhibited a more uniform pattern of real expansion over the n-year period, 1970 to 1980. Thus, nonresidents tended toward greater participation when the fishing was good, and vice versa. For example, in 1973, resident income comprised 74% of total resident and nonresident income. In contrast to this, resident income was only 39% of total income in 1979. It appears that residents of Bristol Bay are not only exposed to the ebbs and tides of changing biological and market conditions, but they must also contend with a highly responsive and mobile nonresident contingent.

Figure 4-2 Resident-Adjusted Real Personal Income in Bristol Bay, 1970-1980
(millions of 1980 dollars)



Source: George Rogers, 1982: of Economic Analysis, Personal Income by Major Sources, 19701980.

Table 4-1 presents real (inflation adjusted) per capita personal income for Bristol Bay residents from 1970 to 1980. The table shows that in spite of a more stable resident economy, wide swings in real per capita personal income occurred. In 1979 real per capita personal income increased nearly two-fold over levels recorded in 1972. The temporary rise to $9,778 in 1973 probably reflects the contribution of transfer payments.

4.3 Employment

Bristol Bay employment over the period 1969-1980 is shown in Table 4-2. The employment estimates are divided into the same economic classifications used in the above income tables, with mining and construction included under support employment. Table 4-2 depicts average annual employment and employment for the month of July when the fishing economy is at its peak. The estimates include both resident and nonresident workers and, thus, correspond to total personal income estimates in Figure 4-2.

The figures in Table 4-2 underscore the seasonal nature of Bristol Bay's economy. State and local government and finance, insurance, and real estate employment are the only classifications to exhibit reverse patterns from the traditional July employment peak. In general, total employment in July is between two and three times larger than corresponding average annual levels. As expected, the most significant seasonal peaks were recorded in commercial fishing and processing. The ratio of employment in the month of July to annual average employment is lowest in the depressed years, 1972 to 1974, a pattern commensurate with lower levels of participation among nonresident fishermen.

The distribution of total employment across major industrial classifications is summarized in Figure 4-3. It is evident from this figure that shifting patterns have occurred in each industry group over the past decade. As a proportion of total employment, commercial fishing fell sharply from 59.2% in 1970 to 24.9% in 1974, before rising steadily

thereafter. The relationship between government and commercial fishing employment is consistent with observed patterns of income; the sectors move inversely to one another. While fishing, as a proportion of total employment, declined in the early 1970s, the share of government employment increased sharply from 32% to 53%, only to reverse this pattern over the second half of the decade when fishing increased.

Support employment, as a proportion of total employment, increased steadily over the n-year period. In spite of the pattern reversal observed in commercial fishing and government, the steady increase in support employment may reflect an underlying shift in economic structure. Indeed, at an average rate of 18.2% per year, support sector employment grew over three times faster than employment in all other sectors.

TABLE 4-1
BRISTOL BAY REAL PER CAPITA PERSONAL INCOME
1970-1980

	BRISTOL RAY REGION		
	Resident Real Personal Income (Millions of 1980 dollars)	Resident Population	Real Per Capita Personal Income Bristol Bay
1970	$37.6	4,632	$8,117
1971	32.5	4,227	7,689
1972	29.8	4,693	6,350
1973	47.5	4,858	9,778
1974	43.5	5,114	8,506
1975	4'3.7	5,761	$ 7,933
1976	43.7	4,752	9,196
1977	52.7	4,623	11,400
1978	59.4	5,300	11,208
1979	88.7	5,204	17,045
1980	$65.7	5,710	$11,506
10-Year Average	$49.7	4,989	$ 9,953

SOURCE : BEA, Personal Income by Major Sources, 1970-1980. George Rogers, Preliminary Assessment Pertaining to the Bristol Bay Salmon Fisheries Economic Development, 1982.

TABLE " 4-2.
TOTAL ESTIMATED WAGE ANO SALARY AND COMMERCIAL FISHING EMPLOYMENT[a]
BY MAJOR INDUSTRIAL CLASSIFICATION FOR THE BRISTOL BAY REGION
1969-1980

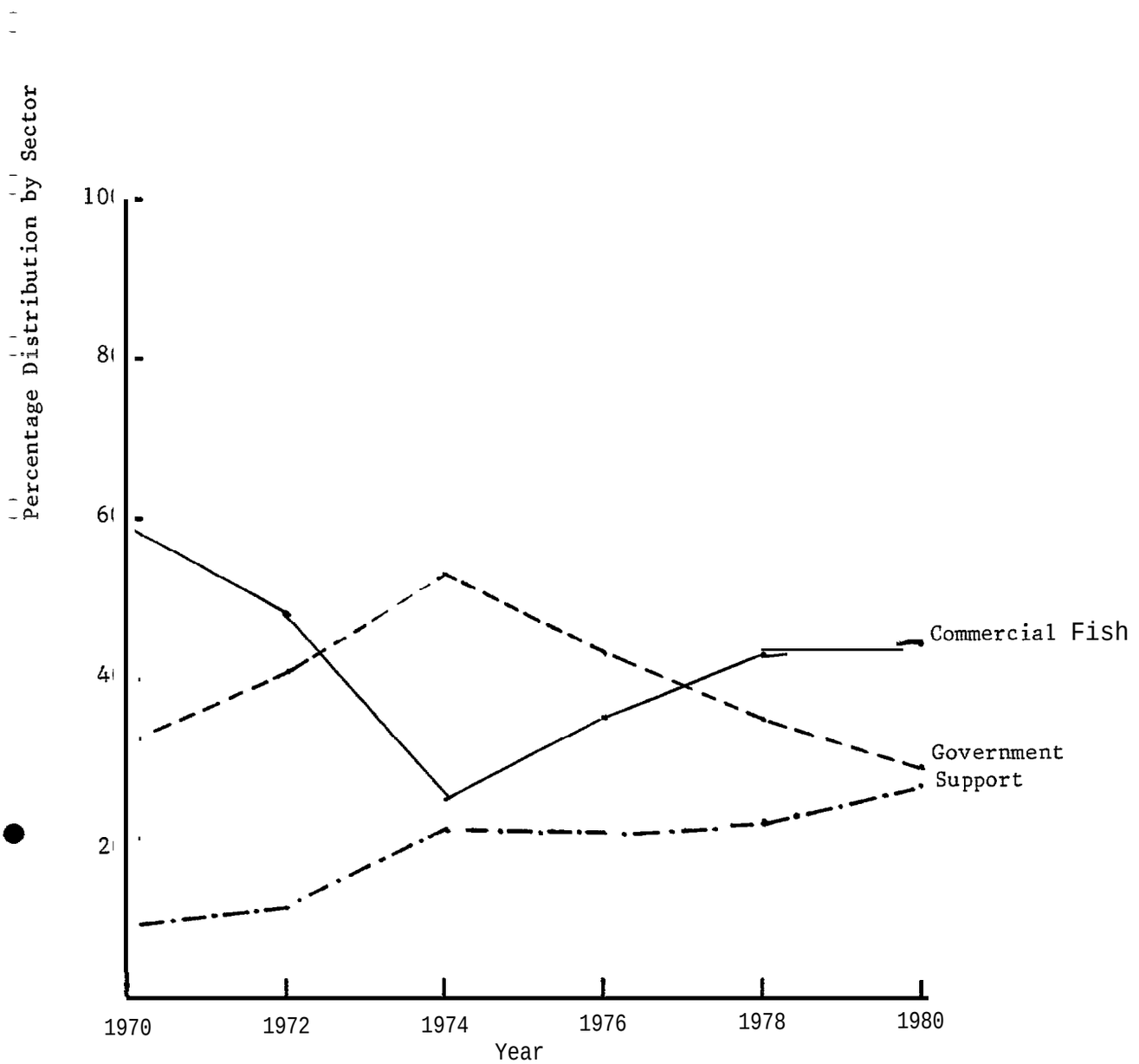
Industry	Annual Average 1969	70	71	72	73	74	75	76	77	78	79	80
Total Employment	2103	2392	2351	2188	2299	2076	2384	2685	2616	2792	'3469	4024
Commercial Fishing												
Fish Harvest	571	735	688	650	506	281	419	635	729	990	1220	1165
Mfg. (primarily fish processing)[b]	515	680	642	402	446	235	288	306	264	204	330	624
Subtotal	1086	1415	1330	1052	%2	516	707	941	993	1194	1550	1789
Government												
Federal-Military	470	400	420	400	440	529	456	452	459	310	369	37s
Federal-Civilian	146	160	120	171	190	192	194	196	194	96	191	184
State & Local	190	210	264	317	368	395	473	507	437	578	636	605
Subtotal	806	770	804	888	998	1116	1123	1155	1090	984	1196	11[illegible]
Support												
Transportation, Communications, Public Utilities	117	110	110	104	170	172	192	213	215	234	182	227
Trade	42	50	46	59	59	74	103	92	80	100	71	197
Finance, Knsurante, Real Estate[b]	20	20	27	2S	28	28	28	39	43	33	32	[illegible]
Services	25	20	33	45	55	142	187	201	170	235	393	551
Mining	0	0	0	1	0	1	3	1	0	0	0	0
Construction	2	2	2	13	36	26	41	42	25	12	45	58
Subtotal	206	202	218	247	248	443	554	588	533	614	723	1071
Miscellaneous & Unclassified	5	5	0	1	1	1	0	1	0	0	0	0

Industry	Month of July 1969	70	71	12			75	16	77	78	79	80
Total Employment	7403	8823	8391	6724	5187	4397	6606	7053	6699	8258	10079	12124
Commercial Fishing												
Fish Harvest	4121	4383	4277	3789	2863	1921	3496	3837	4111	5150	5742	6357
Mfg. (primarily fish processing)[b]	2141	3320	3102	1835	1446	729	1342	1406	1 05.?	1471	2611	2324
Subtotal	6262	7703	7379	S624	3949	2650	4838	5243	5163	6621	2560	8681
Governmen t												
Federal-Military	470	400	420	400	440	529	456	452	459	310	369	375
Federal-Civilian	169	250	137	165	200	207	206	211	209	205	196	1s[illegible]
State & Local	211	200	207	243	264	S22	448	483	258	390	351	310
Subtotal	8s0	850	764	808	904	1258	1110	1146	926	905	916	883
Support												
Transportation, Communications, Public Utilities	?59	140	134	130	147	169	217	234	209	249	227	24[illegible]
Trade	52	30	41	53	62	89	149	110	84	98	69	2[illegible]
Finance, Insurante, Real Estate[b]	40	40	35	21	35	30	30	36	50	31	25	37
Services	31	60	38	59	66	134	172	216	197	334	438	1959
Mining	0	0	0	2	0	2	10	0	0	0	0	0
Construction	0	0	0	15	24	59	80	68	70	20	51	90
Subtotal	282	270	248	280	334	483	658	664	610	730	810	2560
Miscellaneous & Unclassified	9	0	0	.12	3	6	0	0	0	0	0	0

FIGURE 4-3

DISTRIBUTION OF BRISTOL BAY EMPLOYMENT

1970-1980



Although the evidence from conventional income and employment data does not explain this trend, field investigations conducted in the fall of 1983 support the contention that a shift toward provision of services by the private sector rather than the canneries, and a booming recreation industry, may underlie Bristol Bay's marked support sector expansion.

Concerning changing economic conditions, commercial fishing continues to dominate Bristol Bay's economy in terms of employment and earnings. Government activity was relatively stable in the latter 1970s when fishing expansion accelerated. Income and employment figures indicate a pattern of steady support sector growth, suggesting a dramatic expansion of recreational activity, and a shift away from cannery provision of services to local fishermen.

Nonresident participation, particularly in commercial fishing, is significant and accentuates the seasonal nature of Bristol Bay's economy. As a proportion of total income, commercial fishing commands a significantly smaller share after deducting nonresident income from all sectors of the economy. Reports by Alaska Consultants, 1981, University of Alaska, ISER, 1981, and Kresge et al., 1974 provide additional statistical examinations of economic change in the 1970s. Bennett et al. 1979 may be consulted for analysis of ties between economic and non-Native cultural change, primarily in the northern Gulf of Alaska region.

4.4 The Commercial Fishery

4.4.1 Introduction

The Bristol Bay fishery is composed of several river, lake, and bay systems, each supporting a distinct stock of salmon, as well as a growing herring fishery and a potentially valuable groundfishery. Both the salmon and herring fisheries are composed of a processing and a harvesting sector. This section will also be concerned with the fishermen from the communities of Platinum, Goodnews Bay, and Quinhagek. Technically these communities are closer to the Kuskokwim fishery than the Bristol Bay fishery. However, a number of them participate in both fisheries or

in the Bristol Bay fishery exclusively. A number of fishermen from these communities also participate in the herring fishery both in the Kuskokwim and in Bristol Bay. In this section we shall discuss the salmon fishery and, subsequently, the herring fishery. Both fisheries will be examined in terms of their history, structure, operations, and trends of change.

4.4.2 The Salmon Fishery

The commercial salmon fishery is unquestionably the mainstay of the Bristol Bay economy, both in the number of people involved and amount of income and revenue generated. The overall fishery is divided into a number of smaller management units which often function as independent fisheries, although in fact any fisherman with a Bristol Bay limited entry permit may fish in any Bristol Bay salmon fishery.

The individual salmon subfisheries are managed independently and have their own escapement goals and their own permitted harvestable catch (i.e., all those fish above the specified escapement goal). To ensure that fish from one system are not overharvested the Alaska Department of Fish and Game (ADF&G) has created fishing zones just beyond the mouths of Bristol Bay's major rivers including the Ugashik, Egegik, Naknek, Kvichak, Nushagak/Wood, and Togiak rivers. Fish may be caught only during authorized periods; no fishing is allowed beyond the specified zones. This is because prior to running upstream, salmon from all the different river systems normally "mill" in deeper water in the middle of the bay. If fish were taken from this mixed stock it would be impossible for the ADF&G to regulate the fishery effectively and guarantee adequate escapement of fish up each of the river systems.

There are five distinct species of salmon which "run" in the Bristol Bay region (for a more detailed explanation of the different kinds of salmon and their run patterns see Chapter Two). The first to run every year is the king salmon (Oncorhynchus tshawytscha). Kings are the largest of the salmon family. However, they appear in relatively small numbers and consequently fewer than half the Bristol Bay fishermen choose to fish

for king salmon commercially. The second run, the red or sockeye (O. nerka) run, is commercially the most important. Reds range from four to eleven pounds, averaging about seven pounds, but they are by far the most abundant species and are considered the most suitable for processing. The red salmon run usually peaks on July 4th and nearly 80 percent of the yearly harvest of all species of salmon occurs within a ten-day to two-week period around this date. The other three species, chum or dog (O. keta), pinks or humpies (O. gorbuscha), and silvers or coho (O. kisutch) are generally fished only as a "scratch" fishery to make up for cash needs unmet by the red run.

The pattern of resource availability and the regulation of the various fisheries by federal and state authorities has given the Bristol Bay salmon fishing industry a fairly stable framework. However, even in the context of long-term stability, the last several decades have seen some important structural changes which will continue to affect the way in which the fisheries are worked and who works them. The fishery has tended towards greater diversification in terms of the processor, the methods of processing, the fishermen themselves, and the support services available to the fishermen. In the following sections we shall discuss the history and development of the Bristol Bay salmon fishery, its current structure, some changes in the traditional processing and fishing sectors, and of the more profound forces which precipitate future change.

4.4.2.1 History of the Fishery

The history and development of the Bristol Bay salmon fishery can be divided chronologically into anumber of periods. These are the pre-contact period, the Russian period, the beginnings of the commercial fishery in the late 19th century, the period of Native exclusion from the fishery, World War II and the entrance of Natives into the fishery, the mechanization of the fleet in the 1950s, fisherman independence and the creation of fishermen's associations, the introduction of limited entry in 1973, the growth of independent processors and transshipping operations and, finally, the growing role of sophisticated technology in

the fishery.

The Native population of Bristol Bay has exploited the seasonal salmon runs for millenia. Salmon was the staple food source for as long as the region has been inhabited. Salmon caught in the summer were dried, smoked, or otherwise preserved and used to sustain the community throughout the winter months. Supplemented with game and berries and other wild vegetation, the fish satisfied all the nutritional needs of the indigenous population. So abundant was this resource and so readily available that the villagers had much free time for pursuits other than food gathering, and their elaborate ritual and ceremonial life owes much to the ease with which their physical needs could be met.

The Russians entered the Bristol Bay region in the eighteenth century, but there was little commercial exploitation of the fishery during that period (from approximately 1820 to 1867). Salmon were caught and preserved for use by local traders and missionaries as early as 1785; a small amount of salted salmon was exported to Russia during the first half of the nineteenth century, but never on a large scale.

It was the arrival of the Scandinavian and southern European fishermen from the west coast of the United States in the last quarter of the nineteenth century which marked the true beginning of the commercial fishery. The fishermen, predominantly Finns, Norwegians, Swedes, Portuguese, Italians and Yugoslavians, exploited the massive salmon runs during the 1870s. At about this time a new technology was developed which insured a fruitful future for the Alaskan salmon fisheries in general and the Bristol Bay fisheries in particular.

The canning process was invented in California; the first cannery opened in that state in 1864. By 1878 a canning operation was established in southeastern Alaska and in 1884 the Arctic Packing Company opened the first cannery in Bristol Bay. In that first year an experimental pack of 400 cases was produced in Bristol Bay, but by the following year this had risen to 14,000 and the rush to the Bristol Bay fisheries was on. By 1897 Bristol Bay alone boasted seven canneries which between them

produced a pack of 254,312 cases (Moser 1902:51-52). If we assume that each case contained an average of twelve sockeye, the harvest that year was about three million red salmon. (For additional reports on this era see, for example, Moser 1899; Tanner 1891.)

From the early days of the canning industry -- which marked the advent of the commercial fishery -- to the beginning of World War II, the structure of the Bristol Bay fishery remained essentially unaltered. All aspects of the fishery were dominated by outsiders; the Native population was excluded from any large-scale participation. The Bristol Bay region was the most remote of the major salmon fisheries of Alaska, and even the most accessible (the southeast) was considered to be remote. This meant all materials necessary to produce the yearly pack had to be imported each fishing season from the "lower forty-eight." (Cf. Bower 1938; Gregory and Barnes 1939.)

The two main groups of personnel needed by the industry were the processing workers and the fishermen. In the early years cannery workers were predominantly Chinese and Japanese but later they included a number of Filipinos and Mexicans. The cannery provided workers with housing, food, and all material and equipment required for survival throughout the fishing season. The fishermen were mostly Americans of Scandinavian and southern European descent; they also depended on the cannery for housing and food, as well as for the boats which were stored at the cannery over the winter and prepared for use each spring.

Because workers were so dependent, the cannery owners controlled the entire fishing industry and contracted directly with processing workers and fishermen. In the industry's infancy, the cannery owners' authority was essentially informal. However, during the 1880s the canneries institutionalized their control by forming the monopolistic Alaska Packers Association (APA). The APA was officially incorporated in 1893 and included most processors in Alaska, controlling over 90 percent of all canneries in Alaska within a year of its incorporation. The organization decided which canneries would operate and for how long, which should be closed to keep prices at an acceptably high level, when equip-

ment should be shifted from one cannery to another for greater efficiency, and so on. All members were issued stock in the corporation and all shared in the profits according to the amount of stock held.

The power of the APA waxed and waned over the years but the exclusive structure of Alaska's commercial fishing industry was maintained until very recently, and is only now, as the discussion below will reveal, beginning to break down. For example, in 1939 nine companies accounted for 58 percent of the total American production of salmon, and as late as 1959 the six largest packers accounted for 53 percent of the total output for Alaska. During the same year just five companies in Bristol Bay accounted for over 70 percent of all regional production (Cooley 1963:28-29; for an extended analysis of the fishery of this era see Hawkins and Daugherty 1958).

The control of the fishery by outsiders was paralleled by the lack of involvement of the indigenous population. The canneries were generally located near the mouths of the region's major rivers, precisely where the indigenous population had traditionally established summer fish camps (VanStone, 1967). Natives were therefore readily available for work and early reports indicate that they were frequent "hangers-on" at the canneries. However, despite some early attempts to employ local workers, few Natives were hired, apparently because of cultural and social differences. From the outsiders' perspective the Yup'ik appeared lazy and unambitious, whereas the Yup'ik must have regarded the outsiders as almost manic in their need to work beyond the point where physical needs were met and in their obsessive pursuit of profit. Native participation never rose above minimal levels in either the processing or harvesting sector of the fishery until the advent of World War II.

In the period prior to World War II most of the Native population of Bristol Bay maintained a traditional lifestyle dependent on the region's natural resources. During the same period, from 1880 to the early 1940s, the commercial fishery was organized around the major canning facilities at Naknek, Kvichak, Nushagak, and Egegik. Gradually, Natives

were hired to work in the canneries or as winter watchmen, but only in token numbers. The employment of locals as fishermen increased even more slowly. Efforts by the government to promote the employment of locals went unheeded, although canners claimed that they wanted to hire more Natives but that they were unreliable. Established fishermen, of course, were reluctant to 'give their jobs to the locals' and even established different rates of pay for fish caught by white fishermen and those harvested by Natives.

Although in general most Natives were not involved in the fishery in the inter-war period, levels of involvement varied from region to region . There was some variation by subregion in the timing of the entry of local workers into the fishery. Natives living in the Egegik and Naknek subregions were apparently the first to enter the fisheries in large numbers, and this was well before World War II. One explanation for this is that both these subregions were heavily hit by the influenza epidemic of 1918-19. This led to the consolidation of villages along both the Egegik and Kvichak at sites near the mouths of the rivers where canneries had been established. This contrasts with the reaction of the Native population on the Nushagak River and around Iliamna Lake. These groups, rather than relocating near the canneries chose to relocate to other traditional village sites. As a result the latter groups did not come into proximity with the canneries to the extent that the Kvichak and Egegik River groups did.

However, World War 11 forced canneries throughout the region to look for alternative fishermen as large numbers of the outside fishermen were conscripted. Native fishermen were then allowed, indeed encouraged, to participate in the fishery as the canneries suffered shortages of men, and by the close of the war many local fishermen had established a foothold with the canneries. Natives were also hired to replace processing workers. Gradually the number of Native fishermen involved in the commercial fishery grew until the advent of entry limitation in 1973 when their numbers were fixed by a permit system.

The years after World War I also saw changes in the technology employed

by fishermen. In the 1920s mechanized boats were introduced on the Bay. According to VanStone (1967:64-65), power boats were first used in the fishery in 1922. That same year purse seiners were introduced. Together these two innovations proved so efficient at harvesting the salmon runs that they raised fears among federal officials who presided over the fishery that future productivity would be threatened by such large harvests. Probably more importantly, as VanStone notes (1967:64-65),

> . ..cannery operators realized that their tight control over the fishery would be weakened if seiners and power boats, worked by independent operators, were allowed to come into Bristol Bay.

As aresult of the pressures brought to bear by cannery owners and the federal government, power boats and purse seines were outlawed from the fishery. The sailboat became the only kind of fishing vessel allowed on the bay. Most were twenty-five to twenty-eight foot double-enders with a center board and a sprit sail. At first sailboats were far less efficient than the power boats, but by the 1940s the canneries, seeking to increase the catch without losing control of their fishermen, began to use powerboats to tow long strings of sailboats out to the fisheries and, after they had filled their holds, back to the canneries. Ultimately, as VanStone observed, "...in this way the sailboats could be moved rapidly when necessary and they soon became almost as efficient as the power boats (1967:65)." As a result, in 1951 the ban on power boats was lifted by the Fish and Wildlife Service.

The motorized vessels rapidly proved their suitability and canneries began converting the existing fleet. However, the expense of conversion was considerable, and the canneries decided that each vessel should be "owned" by individual fishermen. Thus, under the control of the canneries, the vessels were outfitted with motors and gradually sold to the fleet's better fishermen. By the early 1960s all the cannery vessels had been converted to power and virtually all were owned by the fishermen themselves. Local residents only participated marginally in this ownership scheme. However, when the canneries began to assist

company fishermen in purchasing their own new shallow draft motorized boats, built specifically for conditions in Bristol Bay, the older converted wooden vessels were in turn sold to other fishermen, many of them local. Until the late 1970s the outsider-owned and Native-owned vessels could be distinguished by length (32 foot, and under 28 feet, respectively) and by construction. The difference between the outsider and local fisherman is also reflected in harvest levels, earnings, and status. (Cf. Bristol Bay Area Development Corporation 1975; Langdon 1981.)

In response to the cannery owners' APA, Bristol Bay fishermen al so organized, although somewhat less successfully. Organizations have existed to represent outside fishermen in Bristol Bay since the early 1900s. These rather loosely organized and ineffectual organizations eventually evolved into today's Alaskan Independent Fishermen's Marketing Association (AIFMA) and the Western Alaska Cooperative Marketing Association (WACMA). The AIFMA, the older of the two organizations, represents primarily onshore cannery fishermen from outside the region in negotiations with the processors over fish prices, limitation agreements, and special handling arrangements. WACMA, a younger organization formed primarily by resident fishermen, is the weaker of the two organizations and is concerned with representing local interests in negotiations with specific processors over fish prices. Membership in both organizations has clearly suffered from the diversification of the fishery because the greater number of options available to fishermen has given them more power to negotiate with buyers to obtain favorable early agreements on individualized prices for their catches, without the help of a union. Direct demands by processors that fishermen quit the union if they wish to sell fish to certain canneries has also thinned the ranks of these two organizations. It is difficult to foresee a reversal of this trend and an increased rate of defection appears likely.

4.4.2.2 Seasonal Fishery Pattern

The overall "run patterns" for salmon differ substantially from subregion to subregion within Bristol Bay. King salmon are particularly

numerous in the Nushagak, Naknek and Togiak river systems. According to the Arctic Environmental Information and Data Center (AEIDC 1974:422), over 75 percent of all kings taken in Bristol Bay each year are taken in the Nushagak River drainage area. Red salmon are most abundant in the Bear River and Nelson Lagoon subregions in the north peninsula and in the Wood, Kvichak/Naknek and Egegik river systems. Sockeye do not spawn in appreciable numbers on the Nushagak, as the Wood provides much more ready access to a deepwater lake, a precondition for reds to spawn on any river. It is estimated by AEIDC (1974:442) that over 70 percent of all Bristol Bay sockeye spawn in the Kvichak/Naknek river system. Along the north peninsula the most important spawning area for silvers, the third commercially important species of salmon, is the Nelson Lagoon subregion. Further east and north are the largest silver runs in the Bristol Bay region, and they are particularly heavy in the Nushagak River system with large numbers also present in the Togiak river system. The Nushagak river alone generally accounts for over 60 percent of all silvers harvested in the region (AEIDC 1974:426). Chum are relatively scarce in the north peninsula subregion, and are by far most prevalent in the Nushagak, Kvichak and Togiak systems. Again, the Nushagak is the major spawning and harvesting area, with approximately fifty percent of the total catch in recent years (AEIDC 1974:430). Finally, pink salmon run in years alternate to the years of heavy silver runs, that is in even numbered years. In the north peninsula the heaviest runs are in the Bechevin Bay subregion, while in the area to the north and east the Nushagak provides the most important pink salmon spawning grounds. It is estimated (AEIDC 1974:435) that over 90 percent of all pinks harvested in even numbered years in the area from Naknek to Togiak are taken from the Nushagak.

4.4.2.3 Species Composition

The species composition of the Bristol Bay commercial salmon fishery (see Table 4-3) reflects the dominance of red (sockeye) salmon although all five Pacific salmon species indigenous to North America are found in the region. Red salmon account more than eighty percent of the total harvest in more than half the years. Peak years of total harvest often

see reds accounting for more than 90% of the catch. Averaging normally between 5 and 7 pounds per fish, red salmon are also the primary contributor to the fishery on poundage basis. The second most abundant species is the chum or dog salmon which average between6 and 7.5 pounds per fish. Pink salmon are available in substantial commercial quantities only in even years. They average 3-4 pounds per fish. King salmon are the least numerous but the largest of the species averaging about 20 pounds per fish. Coho salmon, averaging between 6-8 pounds per fish, arrive later in the season and are the preferred species for smoking.

4.4.2.4 District Patterns

The salmon runs occur in different subregions in predictable order from one year to the next. The Ugashik runs begin in late June, the Kvichak and Naknek runs in early July, followed by the Nushagak/Wood River runs, the Togiak runs and, finally, the Egegik runs. The early historical pattern of fishing activity focused only on the Nushagak/Wood and Kvichak/ Naknek runs to the virtual exclusion of the other river systems. Gradually canneries were established in additional locations to take advantage spawning systems in the Egegik, Ugashik and Togiak river drainages. Fishing patterns have basically remained the same over the years. Most fishermen can legitimately claim to be "Nushagak" or "Kvichak fishermen" and many are unfamiliar with fishing grounds other than their own. Like their fathers before them they have fished for the same cannery for several decades. Logistical requirements also support the traditional fishing patterns. For example, canneries will only send their tenders a certain distance to obtain fish because the costs of support facilities, fuel, and maintenance increase dramatically when operating at a distance.

4.4.2.5 Processor Diversification

The recent changes in the industry have forced Bristol Bay's major onshore processors to make readjustments. The distribution of economic and political power among the different processors and between the fishermen and the processors has shifted considerably over just the last

couple of years. Since passage of the Limited Entry Act in 1973, and especially since the record runs and prices of the late seventies, the rate of change and diversification if the Bristol Bay fishery has accelerated. Diversification is reflected in a wide range of products, the emergence of different kinds of processors, and more options for the fishermen.

TABLE 4-3

1982 - BRISTOL BAY SALMON PRODUCTION AND DISPOSITION
(EXCLUDES UGASHIK DISTRICT)

Species	Canned[1]	Frozen[2]	Cured[3]	Fresh[4,8] Export	Brine[5,8] Export
Sockeye	14,195,348	52,493,376	2,626,490	19,229,362	n.a.
King	117,477	3,025,762	55,801	1,942,539	n.a.
Chum	1,230,066	2,183,075	277,013	1,027,817	n.a.
Pinks[6]	2,205,270	2,346,188	12,780	166,570	n.a
Coho	554,546	2,704,824	1,466	1,204,077	n.a.
TOTALS	17,195,757 (lbs)	67,753,225 (lbs)	2,973,550 (lbs)	23,570,365 (lbs)	3,179,735 (lbs)

GRAND TOTAL = 109,670,000

1. In pounds, estimated by multiplying the number of cases by the number of fish per case by the average round weight per fish.

2. In pounds, includes only fish processed in Bristol Bay.

3. In pounds, includes only fish processed in Bristol Bay.

4. In pounds, includes all fresh fish moved by air transport out of Bristol Bay regardless of final processed product form.

5. In pounds includes all fish exported from Bristol Bay in brine or chilled sea water by sea-going tenders for eventual processing.

6. Pinks are available in appreciable numbers only in even-numbered years.

7. Roe not included.

8. "Export" in this case means shipment of fish out of Bristol Bayto another location, usually Alaska and seldom outside the U.S. as would be the case for exports classified in trade.

Source: ADF&G

One major product change lies in the increase in the number of processing methods and ways of delivering salmon to the world market. The proportion of salmon which left Bristol Bay in cans declined from 63 percent of the total harvest in 1978 to 17 percent of the total harvest in 1982. This reflects a radical change in the nature of the commercial economy of Bristol Bay. Table 4-4 provides an overview of the changing composition of the commercial fisheries economy in Bristol Bay and shows how demand for canned and frozen salmon have reversed themselves since 1978.

Table 4-4

Percent of Annual Total by Year: Bristol Bay

Type Production	1978	1979	1980	1981	1982
Canned	63	36	34	38	17
Frozen/Cured	12	32	27	36	60
Fresh Export	9	18	18	13	20
Brine Export	16	14	21	13	3

(ADF&G, Preliminary Review of the Bristol Bay Salmon Fishery 1982

Production and distribution of salmon has changed from 63 percent canned and 12 percent frozen in 1978 to 17 percent canned and 60 percent frozen in 1982. Preliminary analysis indicates that the 1983 harvest will see a return, in part, of the processors to the use of canning as a processing method, but the long-term trend is still toward increased fresh and fresh-frozen processing.

The botulism scare of 1981 accelerated the shift away from canned salmen. Table 4-5 illustrates the radical drop in the amount of canned fish as opposed to fresh and frozen fish reaching the market.

Table 4-5

Relative Proportions of Canned and Fresh/Frozen Salmon Marketed 1973-1982

Year	Canned	Frozen and Fresh
1973	61.9	38.1
1974	69.0	31.0
1975	70.8	29.2
1976	78.2	21.8
1977	71.3	28.7
1978	66.9	33.1
1979	60.0	40.0
1980	60.6	39*4
1981	53.0	47.0
1982	28.3	71.7

Source: ADF & G

The increase in the total fresh and frozen product reaching the consumer is even more dramatic. Total fresh and frozen production in 1978 was 121 million pounds, in 1979 it was 149 million pounds, in 1980, 195 million pounds, in 1981, 283 million pounds, and in 1982, 428 million pounds. Given the size of the 1983 pack, markets other than the traditional ones had to be developed. The existence of these new markets will have a major bearing on the future course of the Bristol Bay economy.

Associated with this change in processing strategy has been the emergence of the role of offshore processors and small onshore special packers and transshippers in Bristol Bay. Beginning very early in the 1900s, smaller independent onshore operations were established in Bristol Bay, but because of the substantial "up-front" capital outlay required to run these high risk enterprises, they invariably went bankrupt. Opportunistic entrepreneurs, tempted by the promise of high

returns, persisted in their efforts to set up such operations, but the independent onshore owner never really contributed more than a small percentage of the total earnings of the fishery.

This situation began to change in the 1970s when the number of offshore and small onshore "initial processing" units, and onshore and offshore transshipping operations began to increase in Bristol Bay. From about 1977 on, the salmon runs began to increase in size and a structural gap emerged as a result of both abundance of product and new technologies.

With the new markets-later reinforcedby the botulism scare, and new technology--quick or flash freezing--the transshipping of the product to other secondary processing sites or to a wider range of markets became both feasible and profitable. Small operators could purchase fresh, high quality salmon at reasonable prices, ice them down or freeze them, and still make a handsome profitby shipping them to remote fresh and fresh-frozen markets in the United States, Europe, and Japan. A number of these operations still go bankrupt each year because the margin for error is small, but nonetheless, their numbers are increasing. Moreover, the number of enterprises seeking permits to set up shore-based operations is increasing dramatically which is an important measure of their commitment and economic feasibility. The number of freezing and export operations licensed to do business in Bristol Bay has grown from 77 in 1978 to 139 in 1982 and is still growing.

Table 4-6 gives an idea of the growth in processors producing fresh frozen fish, and fish in brine for export between 1978 and 1982. During this period, the largest proportion of processors have been located in the Naknek-Kvichak subregion, followed by the Nushagak, Egegik, and Togiak subregions. Although the Togiak subregion has the fewestprocessors, the number of processors has remained relatively stable over the period in contrast to the other subregions.

Table 4-6

FREEZING AND EXPORT OPERATIONS IN BRISTOL BAY

Year	Freezing	Export Fresh	Export Brine	District (see legend)
1978	12	7	5	N-K
	9	3	6	E
	8	8	7	N
	5	4	3	T
Total	34	22	21	
1979	29	23	7	N-K
	12	8	2	E
	14	9	5	N
	5	2	0	T
Total	60	42	14	
1980	27	16	6	N-K
	9	4	3	E
	18	5	4	N
	5	4	1 .	T
Total	59	29	14	
1981	37	20	12	N-K
	15	8	5	E
	19	15	7	N
	7	4	0	T
Total	78	47	26	
1982	25	21	2	N-K
	21	9	2	E
	28	15	4	N
	7	5	0	T
Total	81	50	8	

1. Number of operators with either a physical plant or facility in a district or those operators who tender and/or buy fish for use in other districts away from the processing facility.

LEGEND :
N-K = Naknek- Kvichak
E = Egegik
N = Nushagek
T = Togiak

Source: ADF&G

It is clear from this table that there was a leap in 1981 in the number of processors freezing and exporting fresh product and that this production of fresh product has stayed at high levels in the 1982 season. This dramatic surge introduction ledto increased sales of fresh and fresh-frozen salmon and because entrepreneurs were forced to reject the canned market for that year, they were forced to develop many new markets for the unexpectedly heavy salmon run. These new markets, particularly the smaller specialized markets, could continue to prove lucrative additions to traditional Bristol Bay distributional system. More directly, they provide the basis for the market on which the smaller operators depend.

Thus, while the major processors have been forced to produce more frozen fish over the last four years, the bulk of the increase in frozen product has come from the small-scale, low capitalization operations only recently established in Bristol Bay. The growth of these smaller operations has had marked effects on the region's economy by dramatically increasing competition to buy fish which has resulted in the concomitantly higher prices commanded by the fisherman. The growth of the small plant has also meant an increase in open markets for product, so virtually every fisherman in the region can be confident he will be able to sell his catch. This is a significant change from the situation that existed just two or three years ago in which some fishermen elected not to fish simply because they felt there was no demand for their catch. Fiercer competition has al so caused a precipitous increase in the use of tenders and other means of off shore delivery, to reduce the "down time" unavoidable when delivering to shore-based canneries, thereby insuring higher average annual catches. The large number of cash buyers enables fishermen to deliver virtually anywhere in the Bay and to seek out the best fishing areas with less concern for the location of their delivery points, although contracts with particular cash buyers will often require movement from one district to another.

There is, however, a strict limit on the ability of current world markets to absorb increases in quantities of fish caught in the recent boom years in the Bristol Bay fishery. The ability of the market to expand

depends to a large extent on how much of the increase in fresh and fresh-frozen products has been distributed in new markets. It appears that this proportion is high which means that current levels of production can be maintained. It will also signify continued high earnings for the fishermen and an accelerated growth of secondary industries related to the fishery. On the other hand, Bristol Bay processors often claim that world markets have been saturated by the record 1983 harvest.

These changes in the structure of the fishing industry have weakened the hold of the larger processors on the industry as a whole. Historically, the major canneries have dominated the Bristol Bay fishery and they are still the single most important element of the Bristol Bay economy, but their control has been noticeably eroded over the last decade, particularly over the last five years. This erosion has resulted from a combination of a high settlement price in 1979, disastrous losses caused by the 1981 botulism scare, and a dramatic surge of small-scale cash buyers and transshippers competing for the fisherman's catch. The increasing power of Japanese investors has also weakened the solidarity of the processors and lowered their profits.

The on shore canneries are also subject to economic forces which do not affect the small-scale operators. These include long-term capital investment in equipment, high maintenance and start-up costs, a substantial fixed tax liability for both land and equipment, and capital and interest costs resulting from the delay in sale and distribution of their product. The viability of on shore canning operations which fail to diversify is doubtful in light of current market and harvesting trends. Their primacy is nonetheless assured for the near future because fishermen still have misgivings about the long-term presence of the cash buyers in the Bay, and because historically both local and outside fishermen have been dependent on the facilities and advantages provided by the canneries.

The major canneries have tried hard to maintain control over their fishermen. Since off shore processors and transshippers normally pay fishermen slightly more, sometimes much more, for their catch than the

on shore processors, the latter have had to adjust relations with their fishermen accordingly. The once autocratic major processors now cater to many of their fishermen's more minor needs. Processors have made a number of concessions and are now more willing to allow fishermen to sell their over-limit fish to cash buyers. Prior to 1982 fishermen were threatened with loss of their jobs for selling fish to anyone other than their cannery. Fishermen were expected to give away their excess catch, so that other cannery fishermen could meet limits, and then dump the remainder. Now the canneries not only encourage the sale of excess fish to other processors, in some cases they have even lowered the cost of supplies, housing, boat maintenance, and gear in order to hold their fishermen.

The largest concession of all has come in the form of long-term contracts, an unprecedented shiftin policy. In 1983 the processors and fishermen agreed to a three-year contract guaranteeing approximately $.58 per pound in addition to a "bonus" payment based on the canneries' returns on the sale of the product. At the time of writing it is unknown whether such a bonus will be paid, and if so, how much. The fishermen are waiting expectantly toseeif the processors liveup to their end of the deal.

The last significant change concerns the injection of foreign capital into the commercial fishery. In the last decade Japanese investors have stepped up their level of capital involvement in the Bristol Bay processing sector, and today many of the region's major processors are under the partial or total control of foreign capital. Strategies and techniques designed to increase efficiency and to reduce down time have already been introduced by the Japanese in many of the canneries. Japan will continue to be a major market for several products, in particular roe and fresh salmon, which will encourage the strengthening of business ties with that country. As Japanese ownership in the industry becomes more widespread the country can be expected to increase its salmon imports. This circular relationship will result in increased involvement of the Japanese in the industry.

In conclusion, all the new trends discussed above will continue. The role of small, independent processing operations, and local buyers and transshippers will form an increasingly large part of the economic base of the fishing industry. The major fixed on shore processing plants will be forced to diversify their operations, resulting in a gradual decline in the importance of canned salmon. The larger salmon runs, the limited number of individuals permitted to fish, and the keener competition for salmon by a wider range of buyers will all lead to more lucrative harvests and higher earnings for the fisherman.

4.4.2.6 Harvesting Sector

The harvesting sector of the Bristol Bay fishery provides the majority of the employment and earnings of residents of Bristol Bay. In this section, socioeconomic characteristics of this sector will be examined at the regional level. Important subregional variations will also be noted.

4.4.2.6.1 Commercial Salmon Harvests

Table 4-7 summarizes the annual commercial catch of salmon in the Bristol Bay area by species for the period 1962-1982.

In the first half of the period, catch levels followed a sharply cyclical pattern in which a peak in the fishery occurred every 5 years (1965, 1970). Since 1970 that pattern has disappeared. During the period 1971-1975 the lowest recorded levels of commercial harvest were experienced and the 1976 peak was drastically diminished. Since 1978, harvest levels have shown little of the variation seen in previous cycles and production has been sustained at the highest levels in history. Department of Fish and Game personnel attribute this development to a combination of restrictive management which has produced excellent escapements for the propagation of salmon and mild environmental conditions (air and sea temperatures) which contribute to the survival and return of greater numbers of salmon. Despite the recent increases, average harvest levels over the the period 1960-1969 and 1970-1979 show little difference. The

Table 4-7

TOTAL BRISTOL BAY AREA

SALMON CATCH BY SPECIES

1962 - 1982

Year	Sockeye	King	Chum	Pink	Coho	Total
1962	4,718,016	84,047	677,545	913,934	39,284	6,432,826
1963	2,871,136	62,269	370,097	461	41,262	3,345,225
1964	5,596,120	139,536	802,508	1,549,569	36,563	8,124,296
1965	24,255,239	112,967	360,544	700	8,083	24,737,533
1966	9,314,240	77,472	343,212	2,492,851	33,942	12,261,7?7
1967	4,330,730	117,193	476,357	1,114	53,796	49979,790
1968	2,792,849	103,723	363,791	1,935,836	93,374	5,289,573
1969	6,621,698	124,908	332,989	1,870	81,376	7,162,841
1970	20,720,766	140,511	717,846	456,.911	14,490	22,050,524
1971	9,583,987	123,015	676,906	212	12,709	10,396,829
1972	2,416,233	69,546	656,609	127,023	13,957	3,283,368
1973	761,322	44,044	684,498	387	57,042	1,547,293
1974	1,362,479	45,662	286,354	939,978	43,745	2,678,220
1975	4,S98,814	29,992	325,417	422	46,281	5,300,926
1976	5,619,292	95,968	1,329,052	1,036,543	26,646	8,107,501
1977	4,877,880	130,526	1,598,164	4,517	107,215	6,718,302
1978	9,929,139	191,539	1,158,090	5,152,700	94,271	16,524,739
1979	21,428,606	212,873	906,797	3,849	294,399	22,846,524
1980	23,761,746	95,528	1,301,026	2,563,468	348,484	28,070,252
1981	25,713,212	239,065	1,475,307	7,528	313,167	27,748,279
1982	15,145,505	264,619	942,156	1,437,463	663,145	18,452,968

1960-1969 annual average harvest was 10,772,000 fish compared with an annual average harvest of 10,750,000 fish for the 1970-1979 period. However, this must be seen in the light of the disastrous period from 1970 to 1975, followed by the boom years of the late 1970s and early 1980s.

The Bristol Bay salmon catch is distributed unequal ly across the sub-regions. Table 4-8 shows the total commercial catch by district from 1962 to 1982. This table shows the dominance of the Naknek-Kvichak and Nushagak districts in the overall fishery. In general the former is the most productive district in the region, although the Nushagak has often contributed more in a single year. The table also clearly illustrates the higher than average levels of catch over the last five years.

Table 4-9 presents total catch across each subregion as a percentage of the total Bristol Bay catch. This gives even more dramatic evidence of the dominance of the Naknek-Kvichak and Nushagak fisheries in the over-all Bristol Bay fishery. Between the two districts almost 80% of the total catch is accounted for.

Table 4-8

TOTAL BRISTOL BAY AREA COMMERCIAL CATCH

BY DISTRICT

1962 - 1982

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1962	2,501,722	667,856	272,682	2,722,524	268,042	6,432,826
1963	1,069,902	713,655	205,024	1,085,758	270,886	3,345,225
1964	2,462,507	1,132,430	611,548	3,517,089	400,722	8,124,296
1965	19,198,357	3,194,005	945,416	1,059,613	340.142	24,737,533
1966	5,606,584	2,137,148	477,018	3,736,382	334,585	12,261,717
1967	2,391,732	1,085,310	181,331	1,124,019	196,798	4,797,190
1968	1,492,532	697,937	108,005	2,760,285	230,814	5,289,573
1969	4,716,845	905,511	183,240	1,106,307	250,938	7,162,841
1970	17,971,475	1,458,196	192,703	2,132,636	295,514	22,050,524
1971	6,019,188	1,336,865	969,822	1,707,656	363,298	10,396,829
1972	1,277,840	884,350	27,295	809,125	284,758	3,283,368
1973	293,174	284,547	12,612	667,664	325,296	1,547,293
1974	1,089,440	182,969	10,080	1,126,747	268,984	2,678,220
1975	2,166,169	969,315	20,900	827,715	316,827	5,300,926
1976	3,134,716	1,384,323	188,862	2,873,538	526,062	8,107,501
1977	2,514,717	1,870,067	103,144	1,659,379	570,995	6,718,302
1978	6,051,842	1,268,586	17,933	8,300,533	885,845	16,524,739
1979	15,211,128	2,316,037	430,755	4,056,340	832,264	22,846,524
1980	15,628,654	2,732,245	946,588	7,594,946	1,167,819	23,070,252
1981	11,306,039	4,604,860	2,012,637	8,906,901	917,842	27,748,279
1982	5,329,661	2,575,117	1,269,668	8,329,076	949,446	18,452,968
Average						
20-Yr.	6,296,625	1,584,874	445,729	3,167,585	486,492	11,981,305
63-72	6,220,696	1,354,541	390,140	1,900,887	296,846	10,163,110
73-82	6,372,554	1,815,207	501,318	4,434,284	676,138	13,799,500

Table 4-9

Proportional Contribution of Each Subregion to Total Bristol Bay Salmon Harvest

Naknek-Kvichak	46.2%
Nushagak	32.1%
Egegik	13.1%
Togiak	4.9%
Ugashik	3.6%

Whether these recent higher levels of harvest can or will be sustained is obviously uncertain. Environmental variables and escapement levels will play an important role in determining the outcome.

Another factor in the increased commercial harvest is the decline of the offshore interception of Bristol Bay salmon by the Japanese longline fleet. During the 1960s and the first half of the 1970s, the Japanese harvest averaged about 30% of total Bristol Bay salmon harvests reaching levels in excess of 50% in several years (1968, 1973, 1974) (Rogers 1982: 19). Since 1975, however, Japanese interceptions have ranged between 10-20% thus resulting in greater numbers of salmon for inshore harvests.

4.4.2.6.2 **Earnings**

Along with the increases in number of fish landed has come an increase in earnings by the fishermen. This has resulted from two general trends. First, the number of fish caught has increased steadily over the last decade. Since there are only so many permits, this generally

means more fish per fisherman. Second, the price paid for the fish has increased steadily as well. The result is clear in Tables 4-10 and4-11. Table 4-10 shows mean earnings by gear type, by village, and by subregion. There has been a uniform increase in earnings across all subregions since 1975. 1979 was a particularly lucrative year with high prices and an unexpectedly large run, and earnings have dropped somewhat since that peak year. Nonetheless, the overall trend is clearly toward greater earnings.

Figure 4-4 provides a comparison of the mean earnings from drift gillnet salmon fishing by subregion from 1975 to 1982. This figure indicates that the range of income levels is relatively small during the first three years (1975-77). During the peak harvest years of 1979 and 1981, the range appears to be at its greatest. When the subregions are ranked by mean income, no one subregion retains the same rank from year to year across the eight-year period. Nevertheless, Dillingham retains the highest mean income level for the last three years of the study period (1980-82), indicating that its fishermen have been more successful in recent years than the fishermen in other subregions. The income level of the Bristol Bay Borough fishermen, which was highest for the region in 1979, appears to be slipping somewhat, while the income levels of Togiak fishermen are increasing. With the exception of 1979, the mean income level of fishermen in the Iliamna-Kvichak subregion have been the lowest of all the subregions.

Several different factors contribute to these subregional differences. Two of these factors, availability of the resource and location of processors, have already been dicussed. As was noted above, the Nushagak and the Naknek-Kvichak Districts dominate the Bristol Bay salmon fishery with respect to both the number of fish caught and the nubmer of processors located in the district. In the past, fishermen have preferred to fish in areas where they were bound by territorial and kin ties. Togiak fishermen, for example, have traditionally fished close to home, enabling them to return home on weekends in order to observe the Moravian religious practice of not working on the Sabbath. Hence, productivity has been influenced by cultural preferences and location of fish

and processors. There are, however, two additional factors which have resulted in subregional differences in mean income and which are acting as major forces of change in the harvesting sector. These two factors are the limited entry program and the technological characteristics of the fleet.

The distinctions between set and drift gillnet earnings is also clear. Once again, the greater returns are from the Naknek-Kvichak and Nushagak subregions, with the Togiak fishery lagging far behind. This information is presented in terms of total value per village and subregion in Table 4-11. Table 4-13 shows the proportional contribution of each subregion to the total regional earnings from the salmon fishery.

Earnings vary not only across subregions, but also according to whether or not one is a resident of Bristol Bay, greater Alaska, or from outside Alaska. Again, the central conclusion is that those from outside, as a result of superior gear and vessels, earn considerably more per capita than do Bristol Bay residents. Table 4-13 presents earnings by place of residence.

4.4.2.6.3 Gear Types and Units of Gear

Only two types of gear can be used to fish commercially for salmon in Bristol Bay. They are drift gillnets and set gillnets. The difference between the two is that a drift gill net is released from a boat and hauled back aboard the boat after the ''drift" with whatever fish have been caught (gilled). Set gillnets use the same principle of entrapping the fish, that is by catching them behind their gills, but are stationary. They are typically attached to stakes which are placed within the intertidal range allowing the nets to be picked of fish at low tide. One must have a vessel to drift gillnet and one must have a site (shore location) to set gillnet. There are significant differences in the social characteristics of those who utilize each of these gear types, in the earnings obtained from each of the gear types, and the areas in which each of these gear types is important.

The number of limited entry permits by community and subregion is provided in Table 4-14. Locally-owned drift-gillnet permits are concentratedin the Togiakand Nushagak subregions and in Dillingham, while the majority of set-net permits are held by residents of Dillingham and Bristol Bay Borough. During the period from 1979 to 1983, most communities have seen an increase in the number of drift gill net and set gillnet permits. Noticeable declines in the number of drift gillnet permits, however, can be observed in Twin Hills, Ekwok, Portage Creek, Newhalen, and Kokhanok. While this may contribute to the decline in overall earnings from drift gillnet fishing, as indicated in Table 4-11, it is difficult to determine what proportion of the decline in overall earnings may be attributed to the decline in permits.

Table 4-15 displays the number of drift and set gillnet units which have registered to fish in Bristol Bay from 1963-1982 by residency. Residence in this table refers to Alaskan residence. The peaks of effort realized in 1973 and 1975 clearly reflect the anticipatory impacts of fishermen attempting to qualify for limited entry. The drop from 1975 to 1976 is a result of the Commercial Fisheries Entry Commission adjudicating many interim permits and denying applicants permanent permit status.

Table 4-

YEAR/MEAN SALMON EARNINGS

975 - 1982

Subregion/ Village	975 Drift	975 Set	1976 Drift	1976 Set	1977 Drift	1977 Set	1978 Drift	1978 Set
Western								
Togiak	7,866 (72)	2,240 (24)	7,883 (79)	6,237 (23)	22,413 (62)	6,363 (35)	30,897 (99)	3,735 (36)
Twin Hills	4,431 (6)		5,479 (4)		19,116 (7)		34,271 (4)	
Manokotak	6,296 (34)	2,237 (24)	5,623 (37)	1,573 (27)	15,513 (38)	1,338 (26)	31,625 (36)	4,220 (45)
Aleknagik	5,653 (29)	2,152 (13)	6,883 (33)	2,827 (12)	17,362 (32)	1,795 (14)	37,791 (36)	9,443 (16)
Subreg. To al	(41)	(61)	(48)	(62)	(160)	(75)	(175)	(97)
Dillingham	4,219 (06)	2,095 (70)	14,751 (18)	5,419 (86)	14.301 (22)	3,574 (69)	36,844 (163)	0,962 (90)
Nushagak								
Ekuk		1,422 (5)		4,783 (5)		4,736 (7)		18,773 (7)
Clarks Pt.	5,273 (3)	1,599 (9)	17,024 (17)	4,537 (9)	17,757 (16)	3,815 (7)	37,662 (14)	10,952 (9)
Ekwok	4,933 (9)		14,599 (17)		12,885 (12)		26,727 (11)	
Koliganek	5,688 (3)		20,478 (12)		15,102 (13)		30,935 (13)	
New Stuyahok	4,391 (6)		15,831 (23)		14,001 (25)		30,966 (31)	
Portage Crk.	5,837 (9)	1,602 (4)	20,554 (7)		24,250 (4)		54,073 (4)	
Subreg. Total	(60)	(8)	(70)	(4)	(70)	(4)	(73)	(16)
I. Lake								
Iliamna	8,543 (10)	2,459 7)	8,06 (13)	2,163 (3)	1,947 (1)	4,259 (7)	21,323 (23)	1,183 (17)
Igiugig	6,867 (4)		9,50 (4)		0,155 (6)		28,813 (5)	
Kokhanok	5,701 (9)		7,59 (9)		6,301 (8)	4,997 (4)	16,001 (7)	5,153 (9)
Levelock	7,172 (13)		1,01 (13)	3,729 (4)	0.540 (12)	3,930 (6)	22,092 (12)	3,460 (8)
Newhalen	0,043 (4)		2,73 (4)	4,303 (4)				
Nondalton	8,686 . 4)		8,82 (6)		203 (5)			
Pedro Bay			3,47 (4)			4,437 (4)		23,394 (4)
Subreg. Total	(44)	(7)	(53)	(21)	(42)	(21)	(54)	(41)
Bristol Bay Borough								
King Salmon	8,350 (4)	3,551 (13)	5,556 (4)	4,016 (13)	13,709 (10)	8,216 (10)	21,182 (12)	10,422 (15)
Naknek	7,194 (38)	2,927 (47)	0,725 (45)	3,263 (56)	13,893 (46)	6,891 (60)	23,467 (48)	7,926 (73)
South Naknek	7,657 (13)	2,476 (29)	5,458 (11)	3,558 (31)	21,876 (10)	4,665 (31)	29,206 (12)	5,290 (37)
Subreg. Total	. 55)	(89)	(60)	(00)	(66)	(101)	(72)	(125)
Egegik	7,611 (28)	2, 76 (9)	3, 72 (21)	5,181 (17)	18,800 (29)	8,966 (17)	14,526 (30)	4,377 (2)
Total	(4 5)	(2 5)	449)	(283)	(460)	(280)	(537)	(369)

Table 4-10 (cont.)

Subregion/ Village	1979 Drift	1979 Set	1981 Drift	1981 Set	1981 Drift	1981 Set.	1982 Drift	1982 Set
Western								
Togiak	37,969 (101)	15,553 (48)	24,068 (95)	11,392 (97)	27,879 (92)	15,509 (45)	30,694 (87)	12,911 (47)
Twin Hills	35,873 (5)		18,584 (5)		20,244 (6)		27,432 (6)	
Manokotak	42,922 (39)	7,944 (50)	29,712 (47)	4,723 (50)	48,488 (48)	13,197 (49)	25,634 (46)	7,206 (49)
Aleknagik	50,790 (37)	10,568 (11)	30,186 (34)	9,601 (14)	56,083 (35)	18,215 (12)	36,399 (30)	7,416 (12)
Subreg. Total	(182)	(114)	(181)	(111)	(181)	(106)	(169)	(108)
Dillingham	51,767 (178)	19,580 (96)	35,806 (181)	12,164 (95)	65,301 (195)	28,373 (109)	39,302 (191)	10,219 (96)
Nushagak								
Ekuk		13,568 (11)		16,930 (14)		27,400 (4)		13,927 (8)
Clarks Pt.	45,682 (15)	11,222 (10)	41,648 (13)	11,775 (11)	72,269 (16)	30,824 (10)	28,926 (13)	7,412 (9)
Ekwok	30,017 (12)		20,895 (9)		32,636 (9)		26,790 (9)	
Koliganek	35,380 (14)	12,012 (4)	27,572 (18)		51,772 (16)	23,711 (4)	18,659 (18)	8,828 (4)
New Stuyahok	37,757 (31)		26,159 (32)		43,128 (39)		17,437 (33)	
Portage Crk	41,667 (8)		32,073 (7)		61,150 (5)		24,148 (6)	
Subreg. Total	(80)	(25)	(79)	(15)	(80)	(18)	(79)	(21)
I. Lake								
Iliamna	68,205 (21)	28,913 (19)	31,594 (21)	13,785 (16)	39,142 (22)	16,860 (17)	19,820 (20)	4,855 (14)
Igiugig	70,860 (7)		31,550 (6)		36,125 (7)		18,550 (7)	
Kokhanok	44,277 (9)	25,467 (6)	19,692 (9)	11,395 (4)	21,825 (7)	19,379 (6)		6,940 (5)'
Levelock	54,664 (11)	7,942 (6)	23,633 (12)	4,334 (5)	33,762 (11)	9,704 (6)	14,817 (11)	1,362 (6)
Newhalen								
Nondalton	36,167 (6)	12,903 (13)	24,452 (12)	8,835 (14)	37,998 (11)	19,626 (11)	34,479 (10)	3,413 (13)
Pedro Bay				19,204 (4)				15,756 (4)
Subreg. Total	(54)	(44)	(60)	(43)	(58)	(40)	(48)	(42)
Bristol Bay Borough								
King Salmon	72,977 (11)	40,090 (19)	31,159 (10)	21,457 (21)	27,355 (8)	16,021 (25)	34,564 (10)	11,132 (20)
Naknek	59,435 (55)	28,654 (79)	29,159 (59)	12,742 (84)	39,741 (54)	17,352 (85)	26,053 (81)	11,275 (84)
South Naknek	83,125 (14)	14,000 (38)	32,543 (16)	7,462 (40)	43,540 (23)	14,050 (43)	25,242 (24)	9,156 (33)
Subreg. Total	(80)	(136)	(85)	(145)	(85)	(153)	(95)	(137)
Egegik	45,530 (26)	20,369 (18)	40,479 (27)	16,612 (18)	59,632 (28)	23,500 (30)	31,123 (26)	18,752 (25)
Total	(574)	(915)	(586)	(409)	(599)	(421)	(582)	(404)

Table 4-11

TOTAL VALUE OF VILLAGE, SUBREGION, REGION OF BRISTOL BAY COMMERCIAL SALMON CATCH, 1975 - 1982

Comm	1975 Drift Value	1975 Set Value	1975 Total Value	1976 Drift Value	1976 Set Value	1976 Total Value	1977 Drift Value	1977 Set Value	1977 Total Value	1978 Drift Value	1978 Set Value	1978 Total Value
Western												
To	556,352	53,760	620,112	1,363,342	143,951	1,966,793	1,860,279	222,705	2,082,984	3,058,803	494,460	3,557,763
TH	26,616		26,616	61,916		61,916	133,812		133,812	137,084		137,084
Ma	214,064	53,688	267,752	587,051	42,471	620,522	589 ,494	34,788	624,282	1,138,500	189,900	1,328,400
Al.	163,937	27,976	191,913	557,139	33,924	591,063	555,584	25,130	580,714	1,360,476	151,088	1,511,564
ST	970,969	135,424	1,106,393	2,520,448	219,846	2,140,294	3,139,169	282,623	3,421,792	5,694,863	835,448	6,530,311
Di	447,214	146,650	593,864	1,740,618	388,634	2,129,252	1,744,722	296,606	1,991,328	6,005,572	986,580	6,999,452
Nushagak												
CP	68,549	14,391	82,940	289,408	40,833	330,241	284,112	26,705	310,817	527,268	98,568	625,836
Ek	44,397		44,397	160,589		160 ,589	154,620		154,620	293,997		293,997
Ko	73,944		73,949	245,736		245,736	196,326		196,326	402,155		402, 1 55
NS	70,256		70,256	364,113		364,111	350,025		350.025	959.946		959.946
Pc	52,533		52,533	143,878		143,878	97,000		97; 000	216,292		216,292
ST	309,679	21,502	331,180	1,203,714	64,748	1,268,472	1,082,083	59,857	1,141,940	2,399,158	229,979	2,629,537
Il. Lakes												
Ig	27,468		27,468	38,008		38,008	60,930		50,930	144,065		144,065
11	85,430	17,213	102,643	104,819	28,119	132,938	131,417	29,813	161 ,230	490,429	190,111	680,540
Ko	51 ,309		51,309	68,328		68,328	50,408	19,988	70,396	112,007	20,612	132,619
Le	93,236		93,236	143,156	14,916	158,072	126,480	23,580	150,060	265,104	.27,680	292,789
NH	40,172		40,172	50,952	17,212	68,164						
ND	34',744		34,744	52,944		52,944	41,315		41,315	130,654	24,208	159,862
PB				53,900		53,900		17,748	17,748		93,576	93,576
ST	332,359	17,213	349,572	512,107	60,247	572,354	410,550	91,129	501,679	1,142,259	356,187	1,498,246
Bristol Bay Borough												
KS	33,400	46,163	79,563	62,264	52,208	114,472	137,709	82,160	219,869	254,184	156,330	410,514
NN	273,372	137,569	410,941	482,625	182,728	665,353	639,078	413,460	1,052,508	1,126,416	578,598	1,705,104
SN	99,541	71,804	171,345	170,038	110,298	280,336	218,760	144,615	363,375	350,472	195,730	546,202
ST	406,313	255,536	661,849	714,927	345,234	1,060,161	995,547	690,235	1,695,782	1,731,072	930,658	1,661,720
Total	2,466,533	576,325	3,402,858	6,691,824	1,078,709	7,770,575	7,371,452	1,320,450	8,691,909	16,773,424	2,228,852	20,312,276

Table 4-11 (cont.)

Comm	Drift Value	1979 Set Value	Total Value	Drift Value	1980 Set Value	Total Value	Drift Value	1981 Set Value	Total Value	Drift Value	1982 Set Value	Total Value
Western												
To	3,784,369	746,544	4,530,913	2,286,860	535,424	2,821,884	2,564,818	697,905	3,262,773	2,670,378	606,817	3,279,195
TH	179,365		179,365	92,920		92,920	121,464		121,464	164,592		164,592
Ma	1,673,958	397,200	2,071,158	1,396,464	236,150	1,632,614	2,327,424	640,653	2,974,077	1,179,164	353,084	1,532,258
Al	1,878,230	169,088	2,048,318	1,026,324	134,414	1,160,738	1,962,905	218,580	2,181,485	1,091,970	88,992	1,180,962
ST	5,637,692	1,312,832	6,950,524	4,802,168	905,988	5,708,156	6,976,661	1,563,138	8,539,799	5,106,104	1,048,903	6,155,007
Di	9,214,526	1,879,680	11,044,206	6,480,886	1,155,580	7,636,466	12,733,695	2,950,792	15,684,487	7,506,682	981,024	8,487,706
Nushagak												
CP	685,230	112,220	797,450	541,424	129,525	670,949	1,156,304	308,290	1,464,544	376,038	66,708	492,746
Ek	360,204		360,204	188,055		188,055	293,724		293,724	241,110		241,110
Ko	495,320	48,048	543,368	496,296		496,296	828,352	94,844	923,196	335,862	35,312	371,174
NS	1,170,467		1,170,467	837,088		837,088	1,466,352		1,466,352	575,421		575,421
PC	333,336		333,336	224,511		224,511	305,750		305,750	144,888		144,888
ST	3,044,557	309,516	3,354,073	2,287,379	197,245	2,484,614	4.,050,482	512,684	4,563,166	1,673,319	213,436	1,886,755
I. Lakes												
Ig	496,020		496,020	189,300		189,300	252,875		252,875	129$850		129,850
11	1,432,305	549,347	1,981,652	663,474	236,560	900,034	861,124	286,620	1,147,744	396,400	67,970	464,370
Ko	398,133	152,802	550,935	177,228	45,480	222,808	152,775	116,274	269,049		34? 700	34?700
Le	60? ,304	47,652	648,956	283,596	21,670	305,266	371 ,382	58,224	429,606	162,987	8,172	171,159
NH												
ND	217,002	180,739	397,741	293,424	123,690	417,114	412,478	215,886	628,364	344,790	44,369	389,159
PB					76,816	76,816 .					63,024	63,024
ST	3,144,764	930,540	4,075,304	1,607,022	504,316	2,111,338	2,050,634	677,004	2,727,638	1,039 027	218,235	1,252,262
Bristol Bay Borough												
KS	802,747	761,710	1,564,457	311,590	450,597	762,187	450,597	415,525	866,122	345,640	222,640	568,280
NN	3,268,925	2,263,666	5,532,591	1,720,381	1,070,328	2,790,709	2,146,014	1,474,920	3,620,934	1,589,233	947,100	2,536,333
SN	1,163,750	532,000	1,695,750	520,688	298,480	819,168	1,001,420	604,150	1,605,570	605,808	302,148	907,956
ST	5,235,422	3,557,376	8,792,798	2,552,659	1,819,405	4,372,064	3,598,031	2,494,595	6,092,626	2,540,681	1,471,888	4,012,569
Total												
	26,276,961	7,989,944	34,266,905	17,730,109	4,582,534	22,312,643	29,409,503	8,198,213	37,607,716	17,860,813	3,933,486	21,794,299

Figure 4-4

MEAN INCOME LEVELS, DRIFT GILLNET SALMON FISHING, BY SUBREGION AND YEAR, 1975-1982 ,

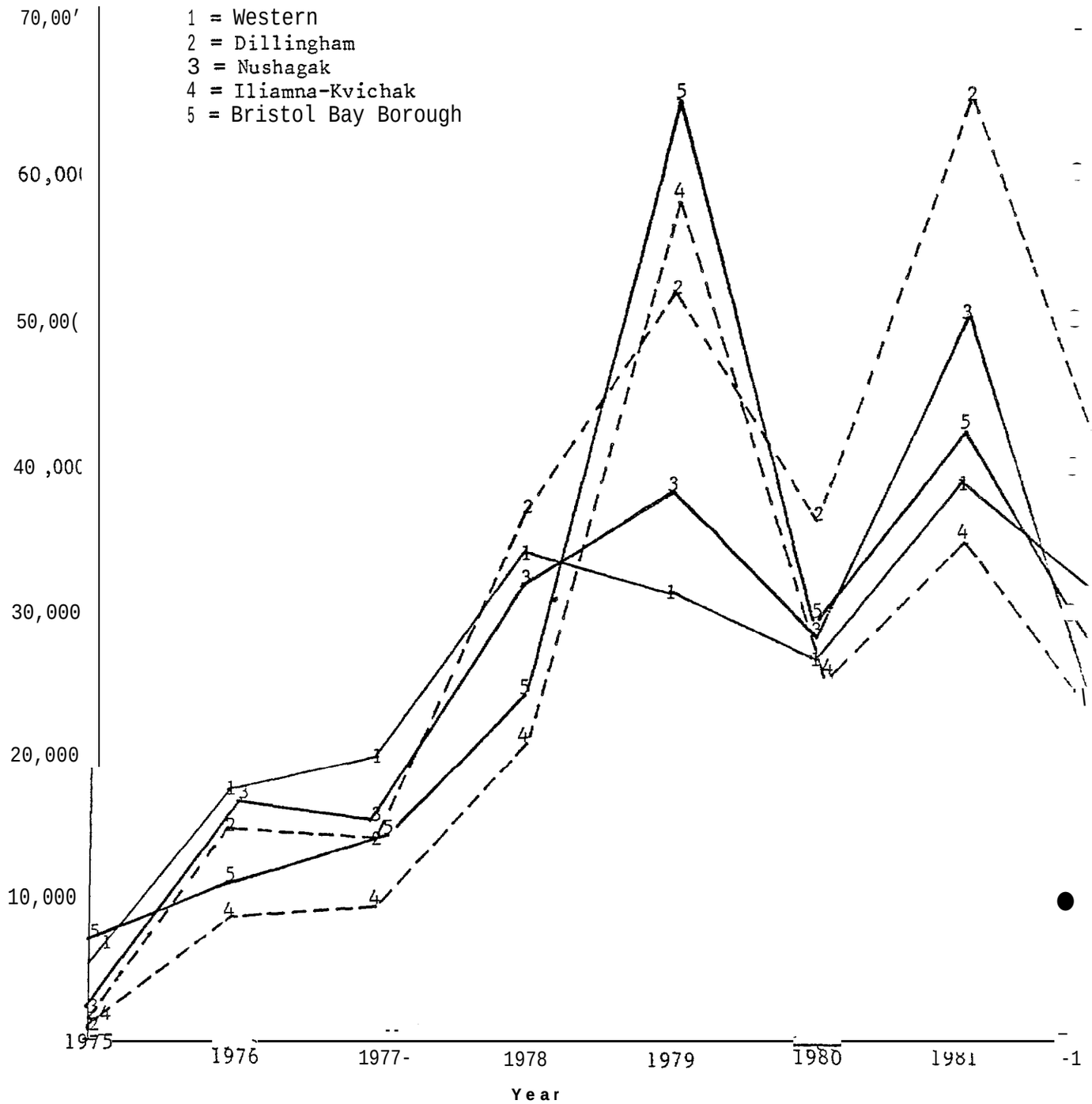


Table 4-12

STUDY AREA AND SUBREGIONAL SHARE OF SALMON EARNINGS

1975 - 1982

Year	Study Areal	Subregion I Western		II Dillingham		III Nushagak		IV Lakes2,3		V Borough	
		TC	SA	TC	SA	TC	SA	TC	SA	TC	SA
1975	25.3%	9.2%	36.4%	4.9%	19.5%	2.7%	10.9%	2.9%	11.5%	5.5%	21.7%
1976	35.4%	12.5	35.5	9.79	27.6	5.8	16.4	2.6	7.4	4.8	13.7
1977	33 .2%	13.1	39.4	7.6	23.	4.4	13.2	1.8	5.6	6.2	18.8
1978	38.9$	12.5	32.3	13.4	34.6	5.	13.1	2.7	6.9	5.1	13.2
1979	24. 8%	5.	20.3	8.	32.4	2.4	9.8	2.9	11.9	6.3	25.7
1980	26. 5%	6.8	25.6	9.1	34.2	2.9	11.2	2.4	9.1	5.2	19.6
1981	28. 4%	6.4	22.7	11.8	41.7	3.4	12.1	2.1	7.2	4.6	16.2
1982	26.8$	7.6	28.2	10.4	39.1	2.3	8.7	1.5	5.5	4.9	18.5

1. Including Pedro Bay in several years.

2. Excluding Pedro Bay

3. Kokhanok drift not included in 1982 figures (even with 150,000 leak - 1.6% 6.2%)

'Table 4-13

AVERAGE GROSS EARNINGS OF DIFFERENT POPULATIONS
OF BRISTOL BAY DRIFT GILLNET FISHERMEN, 1975 - 1982

Year	Western Alaskan Fishermen [1]	Other Alaskan and Non-Alaskan Fishermen [2]	All Fishermen [3]
1975	$6,386	$9,980	$8,368
1976	15,635	13,793	14,621
1977	17,103	18,489	17,844
1978	33,478	26,785	29,781
1979	47,951	78,642	65,222
1980	31,718	41,059	37,054
1981	51,505	78,498	62,100
1982	32,124	42,956	38,700

1. Estimate based on earnings data from all drift gillnet fishermen in 20 Bristol Bay communities. This sample consisted of 406 cases in 1975 and grew to 582 in 1982. Figures from this sample were extrapolated to 130 additional Bristol Bay drift gillnet permits held by residents of other western Alaskan communities.

2. Estimate derived by subtracting the earnings of western Alaskan residents from total earnings of the fishery and dividing the remainder by the number of other Alaskan and non-Alaskan fishermen combined.

3. Source: CFEC, 1982

TABLE 4-14
BRISTOL BAY RESIDENT LIMITED ENTRY PERMITS
BY COMMUNITY: 1979 AND 1983

sue REGION	COMMUNITY	1979 DRIFT	1979 SET	1979 TOTAL	1983 DRIFT TOTAL	1983 DRIFT (INT)	1983 SET TOTAL	1983 SET (INT)	1983 TOTAL	1983 TOTAL (INT)
1 LOWER KUSKOKWIM										
	QUINHAGAK									
	PLATINUM		50	90	NA	NA	NA	NA	NA	NA
	GOODNEWS									
	SUM	40	50	90	NA	NA	NA	NA	NA	NA
2 WESTERN										
	TWIN HILLS	14	(0)	14	6	(0)	0	(0)	6	(0)
	MANOKOTAK	37	27	64	43	(0)	52	(3)	95	(3)
	TOGIAK	70	23	93	84	(16)	51	(6)	13s	(22)
	ALEKNAGIK	30	19	49	31	(4)	13	(0)	44	(4)
	SUM	151	69	220	164	(20)	116	(9)	280	(29)
3 DILLINGHAM										
	DILLINGHAM	136	93	229	179	(20)	109	(2)	288	(30)
4 NUSHAGAK										
	KOLIGANEK	15	3	18	27	(0)	7	(1)	34	(1)
	EKWOK	16	0	?6	8	(0)	0	(0)	8	(0)
	CLARKS POINT	10	9	19	13	(2)	10	(0)	23	(2)
	PORTAGE CREEK	10	2	12	5	(1)	6	(0)	11	(1)
	NEW STUYAHOK	30	4	34	31	(6)	1	(0)	32	(6)
	SUM	81	18	99	84	(9)	24	(1)	108	(10)
5 ILIAMNA/KVICHAK .										
	NEWHALEN	6	3	9	1	(0)		(0)	1	(0)
	XL IAMNA	12	21	33	16	(0)	16	(1)	32	(1)
	NONDALTON	12	13	25	14	(3)	14	(1)	28	(4)
	PEDRO BAY	2	2	4	4	(0)	4	(0)	8	(0)
	IGIUGIG	6	0	6	6	(0)	1	(0)	7	(0)
	LEVELOCK	11	8	19	14	(1)	8	(0)	22	(1)
	KAKHONAK	12	3	15	3	(0)	0	(0)	3	(0)
	SUM	61	50	111	58	(4)	43	(2)	101	(6)
6 BRISTOL BAY BOROUGH										
	SOUTH NAKNEK	15	34	49	21	(s)	32	(4)	53	(9)
	NAKNEK	47	66	113	53	(1)	85	(7)	138	(8)
	KING SALMON	3	4	7	24	(1)	37	(2)	61	(3)
	SUM	65	104	169	98	(7)	154	(13)	252	(20)
ALL VILLAGES										
	SUM[a]	534	384	918	NA	M	NA	NA	NA	NA

SOURCE: Langdon, Steve. Special Tabulations for the Commercial Fisheries Entry Commission

Table 4-15

SALMON FISHING ENTRY PERMIT REGISTRATION
BY GEAR TYPE AND RESIDENCY
BRISTOL BAY
[1]
1962 - 1982

	Drift Net[2]			Set Net[2]			
Year	Resident	Non-Resident	Total	Resident	Non-Resident	Total	Total
1963	914	545	1,459	773	116	889	2,348
64	947	689	1,636	793	137	930	2,566
65	916	677	1,593	868	125	993	2,586
66	1,019	846	1,865	826	139	965	2,830
67	965	734	1,699	686	144	830	2,529
1968	973	711	1,684	722	117	839	2,523
69	1,110	818	1,928	804	166	970	2,898
70	1,057	824	1,881	747	143	890	2,771
71	1,034	831	1,865	710	136	846	2,711
72	993	771	1,764	722	132	854	2,618
1973[3]	2,041	1,162	3,203	902	108	1,010	4,213
744	643 (634)	238 (238)	872	475 (475)	55 (55)	530	1,402
75	1,216 (450)	843 (194)	2,059	751 (159)	169 (45)	920	2,979
76	987 (69)	734 (30)	1,721	624 (5)	139 (0)	763	2,484
77	999 (52)	729 (13)	1,728	683 (15)	156 (1)	839	2,567
1978	1,039 ('66)	737 (11)	1,776	748 (16)	161 (3)	909	2,685
79	1,046 (73)	754 (10)	1,800	763 (19)	170 (5)	933	2,733
80	1,060 (92)	767 (18)	1,827	760 (29)	187 (5)	947	2,774
81	1,055 (89)	771 (18)	1,826	754 (37)	202 (5)	956	2,782
82	1,047 (85)	775 (15)	1,822	735 (36)	212 (5)	947	2,769
Total							
20 yr	21,052	14,956	36,008	14,846	2,914	?7,760	53,768
63-72	9,928	7,446	17,374	7,651	1,355	9,006	26,830
73-82	11,124	7,510	18,634	7,195	1,559	8,754	27,388
Average							
20 Yr	1,053	748	1,800	742	146	888	2,688
63-72	993	745	1,737	765	136	901	2,638
73-82	1,112	751	1,863	720	156	875	2,739

1. Total permit registration; not all permittee's actually fished.
2. Allowable gear per license/permit is 150 fathoms for drift and 50 fathoms for set with the following exceptions: 1968 and 1975- 75 F. drift and 25 F. set; 1969 - 125 F. drift; 1973 -- 25 F. drift and 12-1/2 set.
3. Sliding gear scale in effect.
4. Limited Entry went into effect. Figures in parentheses are interim-use permits, and are included in totals.

Table 4-16 breaks residency down even further, distinguishing among Alaska Rural Local, Alaska Urban Local, Alaska Rural Non-Local, Alaska Urban Non-Local, and Non-Resident. This shows a clear trend through the mid 1970s of loss of permits on the part of local residents. However, beginning in the late 1970s locals began again to increase their share of permits. This reflects a self-conscious effort on the part of villages to both prevent further loss of permits and to regain permits which had previously been alienated.

Table 4-17 examines the age and sex distribution of Bristol Bay permit holders. This clarifies the preponderance of males in the drift gillnet fishery and the domination of women in the set gillnet fishery.

Interim permits have proliferated in the last several years. Interim permits represent application by individuals who feel, for one reason or another, that they deserve a permit and were denied due process originally. To the extent that Natives apply for them, it represents increasing sophistication and understanding of the bureaucratic processes involved in gaining entrance to the fishery. It also represents increased political awareness and a self-conscious effort on the part of villages and villagers to redress what they see as wrongs committed in the original allocation.

The combined total of Bristol Bay permits in interim status in 1983 was 95 (about 67% of all interim permit), of which 68 were drift and 27 were set. Those 95 permits represented a little over 9% of all permits held in the study area. This is almost double the 5% rate for the total fishery indicating that Bristol Bay residents are substantially over-represented in the interim use permit holder class. Within the Bristol Bay study, the subregions where most of the interim permits are held are the Western (25), Dillingham (30), and Bristol Bay Borough (20), where combined nearly 80% of the study area interim permits are found. In the Western subregion, interim permits comprise the highest percentage representing 10.6% of all the permits in the subregion.

Table 4-16

OWNERSHIP OF BRISTOL BAY PERMITS BY RESIDENCE CATEGORY[1]

DRIFT

	ARL	%	AUL	%	ARN	%	AUN	%	N	%	TOTAL
Initial Issue[2]	639	37.1	0	0	130	'7.6	220	12.8	734	42.5	4'720
1979	539	34.7	0	0	123	7.2	241	14	760	44s2	1720
1981	594	34.5	0	0	111	6.4	256	14.9	759	44.1	1720
Change	-4.5	(-7%)	o	0	-19(-14.6%)		+38(+16.6%)		+28	(+3.8%)	

SET

Initial Issue[2]	573	62.6	0	0	30	3.3	163	17.8	150	16.9	916[3]
1979	527	5795	0	0	36	3.9	193	21.1	160	17.5	916
1981	493	53.9	O	0	38	4.1	179	19.6	205	22.4	915
Change	-80	(-14%)	O	0	+8	(+2.7%)	+16	(+9.8%)	+55	(+36.7%)	

1. ARN = Alaska Rural Local
   AUL = Alaska Urban Local
   ARN = Alaska Rural Non-local
   AUN = Alaska Urban Non-local
   N = Non-resident

2. All permits issued to this fishery from 1975 to 1981.

3. One permit revoked.

Table 4-17

AGE AND SEX OF BRISTOL BAY PERMIT HOLDERS

SEX

Year	Drift			Set		
	Male	Female	Total	Male	Female	Total
1975	1393	23	1416	382	334	716
1976	1572	49	1621	371	388	759
1977	1598	59	1657	410	409	819
1978	1631	69	1700	439	450	889
1979	1659	58	1717	437	475	912

Source: Langdon, 1980

Age (Mean Age)

Year	Drift	Set
1975	45.56	35* 99
1976	44.52	35.49
1977	43.59	34.78
1978	43.07	33.91
1979	43.24	34.22
1980	42.96	34.78
1981	42.80	34.78

Source: CFEC, 1983

Table 4-18

SALMON FISHING INTERIM- AND PERMANENT ENTRY
PERMITS ACTUALLY FISHED, BY GEAR TYPE

BRISTOL BAY
1975 - 1982

Year	Number Permits Issued[1] Interim-Use	Permanent	Total	Number Permits Fished Number	Percent
DRIFT-GILL-NET					
1975	644	1,416	2,060	1,195	58%
76	99	1,624	1,720	1,288	75%
77	65	1,663	1,728	1,287	74%
78	78	1,700	1,778	1,490	84%
79	83	1,717	1,800	1,610	89%
1980	110	1,717	1,827	1,670	91 %
812	107	1,720	1,827	1,667	91%
822	100	1,722	1,822	1,791	98%
Average	161	1,660	1,820	1,500	82%
SET GILL NET					
1975	205	716	921	409	44%
76	5	759	764	471	62%
77	16	824	840	478	57%
78	19	891	910	610	67%
79	24	911	935	718	77%
1980	34	914	948	754	80%
812	42	915	957	74-4	78%
922	41	906	947	859	91%
Average	48	855	903	630	70%
TOTAL DRIFT/ SET GILL NET					
1975	849	2,132	2,981	1,604	54%
76	104	2,380	2,484	1,759	71%
77	81	2,487	2,568	1,765	69%
78	97	2,591	2,688	2,100	78%
79	107	2,628	2,735	2,328	85%
1980	144	2,631	2,775	2,424	87%
812	149	2,635	2,784	2,411	87%
822	141	2,628	2,769	2,650	96%
Average	209	2,514	2,723	2,130	78%

1. Number of permanent permits include unrenewed permits.
2. Preliminary

Since 1976 the basic proportion of Alaskan and non-Alaskan fishermen registering in the Bristol Bay drift gillnet fishery has remained steady at about 57.5%. In the set gillnet fishery, however, non-Alaskan registration has increased as the Alaskan portion of the fishery has dropped from82% in 1976, to77% in 1982. Despite an absolute increase from a combined total of 1610 Alaskan resident drift and set units of gear in 1976 to 1782 in 1982, the relative proportion of Alaskan residents in the fishery tenon-Alaskan residents has fallen from 64.8% in 1976 to 64.4% in 1982.

The reason for the absolute increase in the number of units of drift and set gear participating in the Bristol Bay fishery is revealed in Table 4-18. As is clearly evident, the rate of use of permanent permits has increased steadily since 1975. The percentage of drift permits being actively fished has increased from 58% in 1975 to 98% in 1982 while set gillnet usage has risen from 44% in 1975 to 91% in 1982. Increases in permit use will probably continue in both gear types until total permit usage is realized.

4.4.2.6.4 Technological Characteristics

Fishing methods and delivery systems have also evolved rapidly over the last four years. While maximum vessel length is limited to32 feet, vessel width and depth are not regulated. New vessels are being built that are 16 and 18 feet wide with holds twice the size -- and which contain twice the payload -- of the older vessels. However, there are some important variations by subregion with respect to vessels and equipment. There are three basic commercial fishing orientations, from simple to complex, arranged geographically from northwest to southeast. This is especial ly true of vessel type. While mostof those who fish the Kvichak/Naknek, Nushagak and northern peninsula subregions utilize 32 foot boats, this is not the case in the Togiak or Kuskokwim fisheries. The Togiak River delta contains many more mudflats and the water is more shallow than in the other river deltas in the region. For this reason a unique vessel, known as the Togiak skiff, has become the vessel preferred in this subregion. The Togiak skiff is both shorter,

averaging around twenty-four to twenty-six feet in length, and of shallower draft than the 32 footers which are widely used in the other' subregions of Bristol Bay. The shallow draft allows maneuverability in areas which would be impossible for the larger vessels.

Togiak fishermen have to offload their fish more frequently than other fishermen in the region since their vessels have a smaller capacity, but most feel this is an advantage since they are able to deliver the fish in a fresher state. In addition, the lower total weight means that fewer fish are compacted under the weight of other fish than would be the case in a larger vessel. So far, most Togiak fishermen have continued to use the Togiak skiff, although the first few years of the 1980s have seen some successful Togiak fishermen purchase the larger 32 footers which they use to fish in alternative fisheries such as Nushagak or Kvichak/Naknek. Finally, in the Kuskokwim subregion, which includes Quinhagak, Platinum, and Goodnews Bay, the majority of the fishermen utilize aluminum skiffs which vary in length from about eighteen to twenty-four feet. Table 4-19 provides apicture of the distinctions across. subregions from the perspective of vessel length. Data from the Kuskokwim subregion indicate that vessels shorter and smaller than those in the rest of the study area. It is clear that the western subregion has generally shorter vessels than the rest of the region. It is also clear that the Naknek-Kvichak, followed by the Dillingham and Nushagak subregions, has the longest vessels, nearly all of which are atthe32 foot limit.

Vessel length may also be a factor in accounting for subregional differences in mean income. In 1979 the mean gross earnings of drift gillnet fishermen in selected study communities appeared to be correlated with mean vessel length, as indicated by Table 4-19. However, the drift gillnet income statistics reported in Appendix G provide no clear-cut trend across time. Dillingham and Aleknagik report the highest mean earnings during the 1979 to 1982 period. The ranking of Manokotak slowly falls during the period, while the relative earnings of Togiak drift gillnet fishermen increases. These trends appear to be due to a variety of factors, including the upgrading of technology which is

evident in Togiak. Naknek, however, which had one of the highest mean vessel lengths in 1979, has a smaller income than communities with smaller mean vessel lengths. The relationship between vessel length and income, therefore, is not a straightforward one.

Vessel length is only one characteristic which is important in determining harvesting efficiency. Table 4-20 provides an overview of several different characteristics, including length, breadth, tonnage, age, horsepower, kind of engine, and material of construction. Even though the fishery is limited to 32 foot vessels, this table clarifies the ways in which greater efficiency has been achieved while maintaining vessel length. By increasing the breadth and total tonnage of the vessel, greater capacity is achieved. At the same time increases in horsepower and a greater percentage of diesel engines has increased range and speed. This has also been aided by the conversion from wooden hulls to fibreglas and aluminum hulls. It is, however, unquestionably the case that more outside than Native fishermen have been able to upgrade or purchase new boats. Nonetheless, Native vessels are being gradually improved as well.

A more recent innovation is to use aircraft to assist in locating fish. Aircraft spotting began in 1982 and is used to locate those fishermen who are successfully catching fish. The pilots then relay this information to a consortium of six to ten vessels which then move to the new location. Depending on the experience and talentof the pilots, air spotting can result in increases of 50 to 100 percent in harvest levels. Approximately half a dozen such consortiums were in operation in 1983 and more are certain to appear in the future.

Table 4-19

VESSEL LENGTH OF BRISTOL BAY RESIDENT FISHERMAN
BY SUBREGION, 1980

Subregion Community	No.	Vessel (Length Ft.) 12-15	16-18	19-21	22-25	26-28	29-32	Average
Western								
Aleknagik	13	1	0	0	2	0	10	29.9
Manokotak	9	0	0	0	4	1	4	27.0
Togiak	25	0	3	0	9	13	0	26.9
Sub Total	47	1	3	0	15	14	14	27.75
Dining.	52	0	1	0	5	3	43	31.00
Nushagak								
Koliganek	6	0	0	0	0	0	6	31.0
New Stuy.	13	0	0	0	3	1	9	30.8
Sub Total	19	0	0	0	3	1	15	30.86
I. Lakes								
Newhalen/ I liamna	15	0	2	2	3	1	7	27.8
Bristol Bay Borough								
Naknek	16	0	0	0	1	3	12	31.8
Study Area	149	1	6	2	27	22	91	29.7

Source: Langdon, 1981

Table 4-20

VESSEL CHARACTISTICS IN THE BRISTOL BAY
DRIFT GILLNET FISHERY, 1969 - 1980

Year	Ave. Leng.	Ave. Breadth	Gross Tons	Net Tons	Age	Horse Power	% Diesel Power	Hwl Type % wood	% Glass	% Alum
1969	29.3	10.59	7.84	4.88	10.12	149.3	.191	.927	.059	.011
1970	29.0	10.64	8.01	4.94	10.4.2	150.4	.203	.898	.085	.012
1971	29.0	10.63	7.92	4.89	10.98	148.5	.194	.882	.085	.031
1972	29.1	10.68	7.96	4.90	11.89	151.9	.210	.872	.096	.030
1973	28.9	10.69	8.00	4.86	12.29	152.1	.208	.846	.110	.039
1974	28.3	10.88	7.81	4.81	11.29	150.1	.240	.828	.141	.029
1975	29.I	10.72	7.96	4.98	14.06	154.9	.212	.859	.107	.031
1976	29.2	10074	8.05	4.95	14.53	155.6	.205	.848	.103	.047
1577	29.1	10.72	7.94	4.95	15.02	155.6	.206	.829	.120	.049
1978	28.6	10.90	7.97	5.22	17.50	160.1	.212	.738	.177	.082
1979	28.6	11.12	8.84	5.80	12.30	175.1	.279	.633	.250	.116
1980	29.1	11.21	9.96	6.98	10013	200.4	.381	.492	.357	.151

Source: CFEC, 1983

Offloading and transportation systems are also using more aircraft. In 1980 only one transshipping operation used helicopters but in 1983 there were five such operations with up to a total of ten helicopters delivering fish from tenders to waiting vans and quick-freezing facilities along the bank of the Naknek river. The fish were then taken immediately to aircraft at King Salmon and transshipped to Anchorage, Seattle, and Southeast Alaska for secondary processing and direct marketing. These operations are highly efficient.

The above mentioned changes mean that the lean harvest years, which can return at any time, will be economically less severe for the Bristol Bay fisherman than in the past. This is because of the increased flexibility of cash buyers and independent processors to meet fluctuating fish prices. The smaller operators cannot afford to cease production and must have fish to process so they will be willing to increase the price they pay for fish to the competitive limit in order to obtain product. Therefore, even during lean salmon runs the short-term economic consequences will be less disastrous to the fishermen.

On the other hand, any long-term reduction in the harvest level would put many of these low capitalization operations out of business because they would have to pay top prices for several years in a row and any significant change in the market, or inaccurate market predictions, might mean bankruptcy. The larger shore-based processors, on the other hand, have fixed markets and decades of experience in estimating the margin of profit needed at each incremental increase in the cost of the product. They are extremely conservative and cautious in price negotiations and, because they deal more heavily in a canned product, have greater flexibility in the location, price setting, and timing of their sale. The vested interests and high long-term capital investmentof larger canneries will insure their continued operation at least through 1990. This is not to say that major processors will not suffer as a result of current trends and each year we can expect several major processors to succumb to take-over bids, outright buy-outs, and more subtle capital controls by Japanese and other investors.

4.4.2.6.5 Forces of Change

Today the fishing sector of the Bristol Bay fishery is composed of approximately 1,800 drift gill net permit holders and about 950 set gillnet permit holders, a number more or less fixed by the State of Alaska's Limited Entry Act of 1973. The reader is referred to Morehouse (1980), for a comparison of the history and objectives of this legislation with that of Canada's entry limitation program, or to Petterson (1982), for a detailed discussion of the impact of the program on the Native Americans of Bristol Bay.

For the purpose of our discussion it is sufficient to say that entry limitation has had profound political and economic ramifications for the fishery. By restricting the number of fishermen in the Bay, the Limited Entry Act established a group of individuals who literally own the resource in perpetuity. This group, and the associations which represented them, quickly increased their power base, and during the middle and late 1970s were able to secure dramatic increases in the price of fish per pound. In 1979, when one of the largest recorded salmon runs in history occurred, processors paid fisherman an all time high price of between $.80 and $1.20 per pound. This forced many of the smaller processing plants into bankruptcy and resulted in severe losses for the remaining minor operations and for many major processors. The early 1980s brought a dramatic increase in the aggregate holdings of the Japanese as domestic firms were forced to seek new financing in order to survive. Prices have fallen significantly since 1979, but the unexpectedly large runs in ensuing years have nevertheless resulted in unusually high incomes for fishermen.

The increased competition and higher prices paid by the small-scale operators have also fueled the shift toward fisherman independence from the canneries. Many local fishermen and some of the traditional Scandinavian, and southern European fishermen are becoming increasingly aware of the advantages of independence and the disadvantages of continuing their relationships with the major processors. The convenience of

having a room in a bunkhouse and of mess-hall privileges and storage facilities is no longer regarded as adequate incentive to promise all one's catch to a cannery, especially when most of the season is spent out on the Bay, and canneries may pay as much as 50 percent less than independent buyers. Furthermore, the latter pay cash on delivery rather than at the end of the season or later in the year.

The major onshore canneries have traditionally negotiated fish prices with the fishermen's unions, but because selling fish to the canneries is becoming a less attractive option for fishermen the power of the two principal unions has diminished. Disaffection with both WACMA and AIFMA has increased as have defections. Why go out on strike during the peak of the run and ultimately settle for $.60 a pound when one can fish the entire season for a cash buyer who pays $.70 to $.80 a pound?

The limited entry system also has led to increased competition and diversification in other aspects of the fishing industry. Although the number of permits has been limited, this does not constitute a ceiling on effort since each of those individual units can increase their capacity to catch fish through technological upgrading and the addition of crewmen. Department of Fish and Game records indicate that the percentage of drift permits participating in the fishery has risen from 74% in 1977 to 98% in 1982. Furthermore, as new entrants come into the fishery through permit purchases, they are faced with significantly higher overhead expenses than fishermen who were granted a permit in the form of the costs of the permit. They therefore must be highly competitive to insure that their permit payments are met.

Increasing competition between bigger and better equipped vessels is a fact of the limited entry system driven by the entry of individuals into the fishery through permit purchases, through competition to make boat payments on larger boats, and through desire to enhance personal earnings.

Processors are interested in obtaining as much product as they can since most are caught in a volume squeeze: as the margin between the price to

the fishermen and the wholesale price dwindles, either through processors competing for limited markets or attempting to create new markets through lower prices, processors' strategy must become like that of large grocery stores - obtain profit through volume. So processors, too, are interested in fishermen who can deliver large volumes of fish. Such fishermen are given preferential treatment and guaranteed unlimited markets, while less productive fishermen might be put on limits or be denied markets altogether. Fishermen are thus prodded into greater competition in order to insure a market for their product.

Increased competition among fishermen has spatial ramifications for the conduct of the fishery. Resident drift gill net fishermen experience increasing competitive pressure in their local and traditional fisheries. This can be seen in the changing distribution of the fleet over the management area in recent years. The Bristol Bay management area constitutes a potentially single drift fishery in which all units of gear can fish anywhere in the Bay. Nonetheless, fishermen from different locations have tended in the pastto fish in certain districts. For Bristol Bay Native fishermen, the districts in which they fished were generally linked to their home villages and traditional resource use areas. As such, they are forms of territoriality. This has been the case, to a greateror lesser extent, from Port Heiden to Togiak. In general, the pattern is strongest in the Togiak and Nushagak districts than in the Ugashik, Egegik, and Naknek-Kvichak districts.

In analyzing the movement of British Columbian fishermen between different districts and fishing grounds during the course of the season, Hilborn and Davis (1980) hypothesized that fishermen were income maximizers. As a result, their patterns of movement would reflect the abundance of fish in districts at different times of the season. In a truly integrated fishery in which there were no local ties, and no technological, informational, or skill differences, earnings differentials among fishermen would disappear because movement between areas would continue until earnings were equal throughout the fishery. Where fish runs were large many fishermen would divide earnings, and where runs were small fewer fishermen would divide earnings, thus equalizing earn-

ings among fishermen. Tests of these hypotheses in the British Columbian fishery supported the basic thesis with the notable exception of Native American fishermen in certain areas who persisted in fishing local fisheries when other segments of the fleet were attaining significantly higher earnings in other locations.

A similar situation appears to reemerging in Bristol Bay. There has been an increase in the movement of fishermen between districts in the past several years. The flow of that movement is linked to both technology and social factors. Over the years the Naknek-Kvichak, Egegik, and Ugashik districts have shown greater intermingling of fleets than other districts. There is greater movementof local fishermen among the three eastern districts than one finds in the western districts. Fishermen from Dillingham, Aleknagik, and the Nuahsagak villages have generally preferred to fish in the Nushagak district, only rarely moving east or west unti 1 the last few years. Likewise, very few Togiak fishermen leave the Togiak district fish in other districts. In 1982, 91% of 44 Togiak resident drift gill net fishermen spent their entire fishing season in the Togiak district.

The impetus behind the recent trend toward greater movement of fishermen between districts appears to be the non-Bristol Bay resident fleet operating primarily out of Naknek and traditionally concentrating its efforts in the Naknek-Kvichak district. In recent years more fishermen from this district have fished the king run in the Nushagak district in June before transferringto the Nakek-Kvichak district for the area's largest red run. They then return to the Nushagak after the Naknek-Kvichak peak to continue to catch reds in the Nushagak which experiences its peak somewhat later than Naknek-Kvichak.

Nushagak fishermen have responded to the recent influx in two ways. In the last two years an increasing percentage of Nushagak River fishermen have begun fishing the Naknek-Kvichak district. A second response has been to transfer into the Togiak district earlier than usual. From the late 1970s through 1981, the average number of drift gillnet boats operating in the Togiak district was between 100 and 110, of which 80 to

85 were Togiak residents. In 1982 that number jumped to 150 as more boats came over from the Nushagak; fishermen estimate that the number may have gone as high as 250 in 1983. Thus, traditional territorial patterns are apparently breaking down. For Bristol Bay resident fishermen this is an uncomfortable period when they are wracked by the conflict between principles of appropriate fishing by which they have been raised and fished most of their lives, and the realities of survival in the fishery which demands making enough to cover the boat payment, pay some bills, and put food on the table for the winter.

But why this pattern of vessel movement? In the previous section, technological variations within the drift gillnet fleet were noted. The non-local Naknek-Kvichak fleet operating out of Naknek has the highest percentage of large capacity, large horsepower, heavily equipped 32-foot vessels in the fleet. The major reason for this is the tremendous earnings of 1979, highest of all in the Naknek-Kvichak district. In 1979, following the huge run and high prices, many fishermen built new boats. This was particularly because the fleet in general was in serious need of upgrading after nearly a decade of poor runs and low earings. Additionally, fishermen needed tax shelters to protect their bonanza earnings. Larger horsepower and larger capacity vessels also promised greater harvests and personal earnings. Although vessel upgrading also occurred elsewhere in the Bay, the quantitative leap taken by Naknek-Kvichak based vessels began competing intensively with each other in the Naknek-Kvichak district. As competition increased, some fishermen apparently decided to take their chances in the less technologically advanced and less competitive Nushagak fishery. This increased competition in the Nushagak district, much to the consternation of resident fishermen who had fished in the Nushagak district their entire lives. As competition rose in the Nushagak district, fishermen from there began to move into the Togiak district, which, as noted above, was operating at a significantly different technological level. In each case, fishermen under intensifying competition in their own districts have sought relief by moving to districts where vessels were in general not as technologically advanced and where they stood a better competitive opportunity to increase earnings.

Varying technological levels and earnings across segments of the fleet also affect the process of entry and exit through permit purchases. Entry to the fishery is made more expensive. Permit prices appear to be linked to the earnings potential of the Naknek-Kvichak district and reflect expectations of fishermen purchasing permits to achieve this level of earnings in order to pay for the permit. Prices, therefore, are at levels above what Bristol Bay resident fishermen are able to earn if they pursue the traditional pattern of fishing. Those Bristol Bay Natives who do choose to purchase permits will likely have to display a different orientation to production and kinsmen than is presently practiced by the majority of Bristol Bay Native fishermen.

Exit from the fishery is also affected by the difference between typical Bristol Bay Native fishermen's earnings and the market price of permits. As discussed in greater detail in Langdon (1980), it is an economically rational decision for a fisherman with below median earnings to sell his permit at a market price which reflects a higher rate of earnings. He makes money on it. This is at least one reason for the continuing decline of Bristol Bay resident permit holders.'

Perhaps more important is the cultural dilemma posed by the potential sale of the permit. Langdon (1980) and the Commercial Fisheries Entry Commission (1983) have documented that transfers among Bristol Bay resident fishermen tend to be familial transactions in the majority of cases while non-resident transactions tend to be sales. Further, there is a much higher percentage of transfers to kinsmen among Bristol Bay resident fishermen than among non-resident fishermen. Both of these facts are evidence of the domestic mode of production in operation. Parents are faced with the dilemma of investing in the children, as the traditional cultural pattern prescribes, by passing the permit on to them, or investing in stored value (money) for their declining years by selling the permit at market value. To most Bristol Bay residents the idea of children paying parents for permits seems incomprehensible. Rather, the expectation is that children who receive permits have a greater responsibility to care for their parents than do those whodo

not receive the permit. However, the principle of intergenerational support seems to have declined. Younger people appear less ready to support parents in their declining years, even through earnings on the permits transferred to them. This may be abetted by the perception by the youth that government programs can adequately support the elders, or the younger generation may simply be indulging their own desires to maximize personal earnings. Parents are confused about whether to sell the permit or give it to the children. Many are fearful that offspring may sell the permit and squander the money obtained. Even if parents decide to pass the permit on, the dilemma is to whom. One young man reported that his father offered him, rather than his older brother, his permit because he (the younger brother) had always helped the parents out more with labor, money, and subsistence products. This may also lead to the loss of permits as the traditional cultural pattern of investing in kinsmen (children particularly) comes under stress.

These developments all threaten the viability of the domestic mode of production. The domestic mode of production practiced by Bristol Bay Native fishermen has been expressed in kinsmen working together and sharing the proceeds fairly equally. In the past, partnerships between men with boats and men with gear were common, and were expressions of equality. This pattern was damaged by limited entry through assignment of the permit to one person, establishing a dominant-subordinate relationship in place of the former relationship of equality. Bristol Bay Native fishermen have persisted in the domestic mode of production by paying relatively generous crewshares to their kinsmen. In the Togiak district, a payment of 33% of the gross earnings to the crewmen is standard practice. On Nushagak district 32 footers, 25% has been standard for kinsmen.

This pattern and rate is much higher than found among non-resident fishermen who have far fewer kinsmen as crewman, and pay rates of 5 to 15%. Prior to the 1983 season, labor brokers contacted many Bristol Bay fishermen, both Native and non-local, indicating that they could supply crewmen willing to work for 5%. This is becoming a serious temptation for many Bristol Bay Native fishermen. The wife of one fisherman

reported that her husband had finally gotten fed up with his cousin who he had been paying 25% fora number of seasons for what he thought was too little productivity and decided to hire an experienced outside crewman who would work for 10%.

Many Bristol Bay fishermen face a similar dilemma. Because of the cultural value of equality among kinsmen, many are ashamed to ask kin who have been working for a third or a quarter share over the years to take lower shares. Those who want crewmen to work for less often do not even give kinsmen a chance to refuse the lower rate because of the hostility, shame, and social pressure that are sure to follow. They simply go out and hire an outsider. In villages where the age cohort of young males and females between 15 and25 is the largest and who are without permits of their own, the decline of positions as crewmen and the decline of earnings from those positions are serious problems.

The socioeconomic and sociocultural dilemmas posed by the changing dynamics of the commercial salmon fishery in Bristol Bay are many and stressful. One likely result is the emergence and survival of the aggressive, entrepreneurial fisherman who abandons the domestic mode of production, who abandons production for use, and who becomes a maximizer of personal wealth. These types will enter the herring fisheries and seek to diversify into other fisheries as well. This is the individualist strategy. Further, to the extent that these individuals appear in villages, they will be pushed out into the regional centers as local social pressures on them will become intense because they have violate cultural norms. They will thus tend over time to be concentrated in Dillingham, Naknek, and perhaps Anchorage as well.

Another strategy which appears to be operating in Manokotak and Port Heiden is to adapt the domestic mode of production to the condition of increasing competition by leaving accustomed territorial fishing grounds and going to the Naknek-Kvichak district together. A group of brothers and friends, when fishing together, can reduce the risks associated with fishing in unknown waters and perhaps carve out a fishing area. To a certain degree this strategy can address the problem of declining earn-

ings due to competition, and allow for higher crewshares. But it cannot solve the dilemma of limited numbers of permits.

In the village of Port Heiden a further strategy is apparent. Here the village leader coordinates kinsmen to travel and fish together in other districts. In addition, this leader has been able to identify permits and use local earnings and state loan programs to bring permits into the community for the younger people. The adaptation of the domestic mode of production is to make all kinsmen permit holders and then hire outsiders as crewmen (and as laborers in his local enterprise) and pay them the going rate of low percentages among non-local fishermen.

It is likely that these strategies may appear more frequently and that more strategies will be developed to cope with the forces of change in the commercial salmon fishery. All of these strategies require adjustment or abandonment of certain principles of the traditional cultural orientation to the commercial fisheries.

4.4.2.7 Diversification in Support Services

The services and materials provided by the large canning plants are of considerable importance, particularly to the established, multiple-fishery fishermen from Washington, Oregon and California. We noted the variety of these services above. In addition to equipment, facilities, and room and board the canneries also provide long term vessel loans, advances to see fishermen through the winter and grubstakes for gearup activities.

It is clear, however, that at some stage the financial disparity between selling fish to the large processors, with all their services and conveniences, and selling to the new, higher-paying processors will become so great that more fishermen will inevitably leave the established canneries. If additional lodging was available and Naknek and Dillingham could provide much needed small boat harbors, if improved repair, fueling, and maintenance facilities were available and the

fishermen could be convinced that the now ubiquitous outside buyers were here to stay, the role of the major canneries would surely enter a rapid decline. For now, the industry is in a period of transition with many cannery fishermen waiting to see which way the wind will blow before deciding which strategy to adopt.

Many low risk types of support facility have already appeared. Boat storage, for instance, has become a major source of revenue in Naknek, King Salmon, and Dillingham. Four years ago only one or two such facilities existed, but there arenow halfa dozen in the Naknek/King Salmon area alone. This type of enterprise requires only a small parcel of land with access to the river and a crane capable of moving the vessels from the river to storage. Storage rentals run from about $750 per year to around $3,000 per year. Marine engine repair services, fiberglas repair, radio and electronics services, fuel suppliers, and welding services have also appeared.

Even when all necessary services can be provided outside the canneries there will still be a corps of established outside fishermen who will remain committed to their old canneries, committed by tradition, habit, and temperament to the existing pattern. They are accustomed to fishing other species throughout the year off the coast of Washington, California, and Oregon, and then coming to Bristol Bay just prior to the opening of the season to find their vessel almost ready to launch, equipped with all necessary gear, and with room and board already arranged. These fishermen are used to boarding with their friends, Italians with Italians, Yugoslavians with Yugoslavians, Scandinavians with Scandinavians, all in separate bunkhouses. The additional profit to be made from "going independent" has to be substantial to entice these fishermen away from their customary routine. A large number of local fishermen will also remain with the canneries. Traditional patterns, a low incentive to take major risks, and financial ties to their canneries all serve to extend the lives of the working relationships.

4.4.3

The herring fisheries in the Bristol Bay and Kuskokwim regions are much more recent developments than the salmon fisheries, particularly from the perspective of United States involvement. There are three major herring fisheries in the region under discussion. First and largest is the Togiak fishery. The other two fisheries, Goodnews Bay and Security Cove, are often treated as a single fishery since Security Cove completely encloses Goodnews Bay.

There are actually two separate herring fisheries in each subregion, one for herring itself and another for herring-roe-on-kel p. Herring are migratory fish with a lifespan of over five years. Spawning occurs in bays along the shoreline from late April to early June. Eggs released by females are fertilized by milt discharges from the males, and these fertilized eggs attach themselves to any readily available surface. The fact that the fish prefer to hide in kelp and that there are large beds of kelp in their spawning grounds means that most of the fertilized eggs adhere to seaweed. This is the basis of the herring-roe-on-kelp fishery.

Herring develop through a larval stage into the juvenile stage in under three months. By early autumn juveniles migrate offshore where they remain for several years before returning to spawn. Most herring do not spawn until they are at least three to five years old. Adult herring remain in the off shore waters throughout the summer, then move out to deeper water with the beginning of autumn. These adult herring form vast schools which actually migrate out of Bristol Bay and winter in the Bering Sea to the north and west of the Pribilof Islands. These schools remain relatively inactive until late March when they begin the return journey to the spawning grounds.

4.4.3.1 History of the Fishery

The herring fishery of Bristol Bay has a relatively shallow history in terms of American participation. Until recently the major exploiters of

herring have been the Japanese and the soviets who intercepted the schools as they migrated to and from the coastal spawning grounds.

Soviet and Japanese interest in Alaskan herring became intense in the late 1960s. The two countries had severely depleted the herring stocks off the coast of Siberia which had been the mainstay of their fisheries for several decades. By 1968 the two countries agreed to halt fishing in the Siberian fishery and turned their efforts on a large scale to western Alaska. In the previous year, 1967, the combined catch of the two nations in western Alaska was 132 million pounds. By 1970 landings reached an all time peak of 319 million pounds. However, this precipitated the same problems of over-exploitation which had plagued the Siberian fishery, and catches dropped rapidly to50 million pounds in 1976. That same year the United States imposed a 200- mile limit which greatly reduced foreign participation.

United States participation in the fishery began in the late 1970s. However, Alaskan herring fisheries have been the focus of American interest since the early part of this century. As early as 1909 American fishermen were exploiting the herring stocks of Norton Sound. In contrast to the massive high seas fishery pursued by the Japanese and Soviets, American activity has always involved much smaller vessels and nearshore waters. By 1929 they had extended their activities to the region of Unalaska Island, and for the next decade flourishing herring fisheries existed in both Norton Sound and Unalaska. With World War II American exploitation of these herring stocks ceased, and despite sporadic efforts following the war the collapse of the world herring market prevented a resurgence of the industry. United States participation did not pick up again until the 1960s.

During the early 1960s the Norton Sound herring fishery was again exploited, though only modestly. Finally, in 1967 the Bristol Bay fishery became the focus of interest. That year 122 metric tons of herring were harvested from the Togiak fishery. The next year the Togiak herring-roe-on-kelp fishery was exploited by American fishermen for the first time. The Togiak herring fishery waxed and waned, and

never exceeded the 122 metric tons of 1967 until 1977 when a quantum leap occurred. In that year six floating processors came to Togiak to explore the value of pursuing the herring fishery before the salmon season began, and they brought with them a small fleet of purse seiners. Output jumped to 2,534.9 metric tons, and the modern phase of the fishery was fully underway. Within three years production jumped to 17,774 metric tons in a fishery conducted by 140 seiners and 363 gillnetters. In the time since then output has fluctuated, and in 1982 total output reached 19,556 metric tons.

Several factors encouraged the entry of Americans into the herring fishery. One factor was the enactment of the 200-mile limit which prevented foreign fishermen from exploiting the stocks of herring as they had in the past. At the same time, in the late 1970s, Japan suffered depleted domestic herring stocks and was interested in developing new supplies which the western Alaska herring grounds could readily provide. Japanese investment in American, and particularly Alaskan, fisheries was increasing dramatically as the yen had gained considerably at the expense of the dollar. By the time this process was reversed substantial Japanese investment had already occurred, and the infrastructure for the development of a herring fishery was basically intact. Finally, the herring fishery occurs just prior to the salmon fishery but does not overlap with the latter. This made it economical for processors to devote time to the herring fishery and develop it to supplement the salmon fishery.

During the period from 1967 to 1976 the Togiak herring-roe-on-kelp fishery continued to be sporadic, butin 1976 output tripled from the previous year to 134.1 metric tons and has remained at comparable levels ever since, reaching 171.9 metric tons in 1981, although dropping to 106.5 metric tons in 1982. The Security Cove/Goodnews Bay herring fishery developed later than the Togiak fishery and has remained consistently less productive. The first year for which a significant commercial catch was reported was 1978 when 259 metric tons were landed. By 1982 this had risen to 1,178 m.t. As yet the herring-roe-on-kelp fishery in the Security Cove/Goodnews Bay subregion has remained

essentially unexploited. Table 4-21 gives a picture of the development of the Bristol Bay and Security Cove-Goodnews Bay herring and herring-roe-on-kelp fisheries.

4.4.3.2

The Western Alaska herring fisheries are exploited with two principal types of boat and gear, and these types generally distinguish local and outside fishermen. By far the most efficient means of landing herring is the purse seine, and the fishery has been increasingly exploited by non-Bristol Bay Alaskans and non-Alaskans with large seiners. The purse seiners are highly efficient. Most use "spotter" planes to locate spawning herring and are able to net hundreds of thousands of pounds in a single set. The herring are then pumped directly from the nets.

The local fleet, on the other hand, is dominated by gillnetters designed originally for the salmon fishery. These are much less efficient than the purse seiners. They are able to take only relatively small volumes of fish since the nets are considerably smaller and the fish must be shaken from the net. Such gear is also less useful on the high seas and, as a result, the fishermen must generally wait until the fish have come relatively near shore.

With the differences in capacity and efficiency it is understandable that the processors favor dealing with the purse seiners. It is doubtful that they would remain in the area if their only source of supply was gillnetters. Local leaders have been very concerned about the domination of the fishery by outsiders and have been successful in having the purse seine fleet restricted to the Togiak fishery which is, nonetheless, the most lucrative in Western Alaska. Table 4-22 shows the growth in participation of purse seiners at the expense of gillnetters and reflects the increasing concentration of that fleet on the Togiak fishery following on the closing of the other district to seiners in 1979.

Table 4-21

HERRING AND HERRING SPAWN ON KELP HARVEST IN METRIC TONS BY U.S. COMMERCIAL FISHERMEN IN THE EASTERN BERING SEA, ALASKA

1966 - 1982

Year	Herring *		Herring Spawn on Kelp
	Bristol Bay	Security Cove/ Goodness Bay	Bristol Bay
1966			
1967	12200		
1968	82.4		24.8
1969	42.8		4.6
1970	25.0		17.6
1971			23.5
1972	73.7		29.1
1973	46.3		5.3
1974	111.7		57.0
1975	50.4		50.4
1976			134.1
1977	2,534.9		125.1
1978	7,030.4	259.0	149.6
1979	10,115.3	466.0	188.0
1980	17,774.0 **	1,039.0	86.0
1981	11,37.4.3	1,660.2	171.9
1982	19,556.0	1.178.0	106.5

* Prior to 1964 majority of herring catch was taken in summer and fall for food market; since 1964 majority of herring catch was taken in spring primarily for marketing of roe.

** There was an additional estimated 5,200 m.t. of wastage.

Sources ADF & G

Table 4-22

Number of Fishermen by Gear Type Participating in Eastern Bering Sea Pacific Herring Fisheries, 1978-1982

Year	District	Purse Seiners	Gillnetters
1978	Togiak	25	40
	Security Cove	0	0
	Goodnews Bay	0	0
1979	Togiak	175	350
	Security Cove	*	61
	Goodnews Bay	*	41
1980	Togi ak	140	363
	Security Cove	*	175
	Goodnews Bay	*	165
1981	Togiak	83	106
	Security Cove	*	113
	Goodnews Bay	*	175
1982	Togiak	135	200
	Security Cove	*	107
	Goodnews Bay	*	84

* = purse seine gear prohibited Source: ADF&G

This table illustrates several points. First, the growth of the fishery in general since 1978 has been dramatic. Second, the collapse of the market in 1980 was reflected in a greatly reduced effort in 1981 which is only now being increased. Commercial harvesting in all districts has been governed by Emergency Orders of the Alaska Department of Fish and Game since the 1981 season in order to eliminate waste, achieve harvest

objectives, and ultimately cause optimum yields. Third, the elimination of purse seiners from the two northern districts has led to increased efforts on the part of local fishermen using gillnetters. From 1980 a large influx of local fishermen was evident, and there appears to be a growing gillnet fishery which has a significant future potential in the area.

Most of the participants in the herring fisheries are from the Togiak or Lower Kuskokwim subregions. However, a number of fishermen from Dillingham have begun to participate in recent years. Nonetheless, the vast majority of participants are from the western and northwestern subregions. Table 4-23 divides participants by subregion. Unfortunately we have no data on the participation levels of Lower Kuskokwim residents. However, as we have noted, the communities of Goodnews Bay, Platinum, and Quinhagak are attempting to increase their participation.

Table 4-23

ROE ON KELP (RK) AND SAC ROE (SR) GILLNET HERRING - PARTICIPANTS BY BRISTOL BAY COMMUNITY: 1975 - 1982

Subregion/ Community	75 RK	75 SR	76 RK	76 SR	77 RK	77 SR	78 RK	78 SR	79 RK	79 SR	80 RK	80 SR	81 RK	81 SR	82 RK	82 SR
Western																
Manokotak	2	0	5	0	7	0	18	4	16	6	9	0	9	10	15	15
Togiak	14		17	0	25	0	21	8	27	18	43	1	40	17	53	19
Twin Hills	0	0	0	0				0	2	0	0	0	0	0	0	1
Nushagak Bay																
Aleknagik	2	?	2		1	0	10	0	6	2	4	0	5	5	4	8
Clarks Pt.	0	0		0	0	0	1	1	0	0	0	0	0	4	0	2
Dillingham	0	0	2	0	2	0	36	18	17	37	5	37	7	45	12	40
Ekuk	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Nushagak River																
Ekwok	0	0	0	0	0	0	2	1	0	1	0	0	0	1	0	1
Koliganek	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
New Stuy.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
Port.Creek	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Iliamna Lake																
Iguigig	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I liamna	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Kokhanok	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Levelock	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0
Newhalen	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nondalton	0	0	0	0	0	0	0	0	0	0	.0	0	0	0	0	0
Pedro Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Bristol Bay Borough																
King Salmon	0	0	1	0	0	0	13	4	5	18	0	0	0	5	3	6
Naknek	1	0	10	0	4	0	31	10	9	40	0	0	0	10	6	21
S. Naknek	0	0	0	0	0	0	0	1	0	6	0	0	0	5	0	8
Total	19	1	37	0	40	0	940	47	82	129	52	45	6?	104	93	124

4.4.3.3 Processing Sector

The processing sector of the herring fishery consists mainly of floaters which come north from the main Bristol Bay salmon grounds to pursue the herring fishery before the salmon season. The number of such processors and buyers has increased dramatically since 1977 when, as we noted above, only six processors arrived in Togiak. The explosion in prices which occurred over the next two years led to a large increase in processing activity, as shown in Table 4-24, which lists the number of buyers participating by district.

Table 4-24

Number of Buyers Participating in Eastern Bering Sea Pacific Herring Fishries, 1978-82

Year	District	Number of Buyers
1977	Togiak	6
	Security Cove	0
	Goodnews Bay	0
1978	Togiak	16
	Security Cove	3
	Goodnews Bay	0
1979	Togiak	33
	Security Cove	2
	Goodnews Bay	1
1980	Togiak	27
	Security Cove	8
	Goodnews Bay	4
1981	Togiak	28
	Security Cove	7
	Goodnews Bay	5
1982	Togiak	33
	Security Cove	3
	Goodnews Bay	3

Source: ADF&G

4.4.3.4 Markets

The great influx of American fishermen into the herring fisheries in the late 1970s was spurred by a dramatic increase in prices paid in Japanese markets. Between 1977 and 1980 prices rose more than fourfold, then dropped precipitously to former levels. The drop in prices was attributed largely to a boycott by Japanese consumers who believed that Japanese buyers had conspired to inflate prices artificially. Japan still remains the dominant market for herring. However, several studies are now underway to determine the feasibility of developing new markets for the product. This would reduce the dependence of the industry on a single market and thereby reduce the likelihood of wild price fluctuations from year to year.

4.4.3.5 Prospects

The herring fishery has become an established element of the Bristol Bay and Kuskokwim commercial fisheries picture during the last decade. Although it has suffered from inefficient and overexploitative practices, its availability appears to be proceeding apace. With the introduction of Emergency Orders in 1981 much wastage has been eliminated. For example, in the Togiak District, wastage in 1980, prior to the Emergency Orders, was estimated at 5,200 metric tons of a total harvest in excess of 17,000 metric tons. By 1982 wastage had been dramatically reduced to only 343 metric tons of a total harvest of over 19,000 metric ton, two thousand metric tons greater than 1980 (ADF&G, Pacific Herring Stocks and Fisheries, 1982:5)

The ADF&G has taken an active role through the use of Emergency Orders in discouraging the taking of younger fish and encouraging the harvest of older fish. This is possible because the earlier runs are typically of older fish while the younger populations do not run until the older run is substantially over. It appears that the stocks of herring are being rapidly replenished and that expanded harvests will be possible in the near future. Ina reportto the North Pacific Fishery Management Council on Bering Sea Herring Research the North Pacific Fishing Vessel

Owners' Association indicates that stocks have made a significant comeback during the past several seasons. Nevertheless, it appears that, at least for the next season or two, Emergency Orders will remain in effect, although they may be applied less restrictively as more is learned about the probable resurgence of the herring population.

4.5 The Government Sector

4.5.1 Introduction

As noted at the beginning of this chapter, the government sector plays an important role in the cash-based economy of the Bristol Bay region both in terms of income and employment. In several different respect, this sector also exerts a major influence on the direction of future socioeconomic development in the region. It is responsible for the development of community facilities and services and can implement policies regarding land use, all of which can affect future economic development and population growth.

This section begins with an examination of the organization of the various political structures which have jurisdiction within the study area. We focus specifically on regional, subregional, and local levels of political organization. From there we examine the educational and health care services offered within the region and discuss the existing state of local, subregional, and regional utilities and public facilities. Next, we examine the role of government spending in the region's cash-based economy and conclude with a discussion of current political issues and trends of change.

4.5.2 Political Organization

In general in Bristol Bay there are three different types of political structures existing on six different levels. This arrangement is represented graphically by Table 4-25.

TABLE 4-25

Chart of Bristol Bay Political Organization

	Formal Governmental	Native Corporate	Quasi-Political
Level I: Internt'l	U.N.: Various Bodies		I. P.H.C. Internt'l Fisheries
Level II: National	Federal Government		NPFMC
	Bristol Bay Cooperative Management Plan		
Level III: State	State of Alaska		UFA CZM
	Bristol Bay Cooperative Management Plan		
Level IV: Regional		B.B.N.C. B.B.N.A.	BBAHC CRSAs
Level V: Sub-Regional	Bristol Bay Borough	Kvichak Fnd'n Choggiung Alaska Penin. Corporation	
Level VI: Village/ Local	1st Class City 2nd Class City	Village ANCSA Corporations	Traditional Village Councils

The three kinds of political organizations in Bristol Bay are formal governmental bodies, Native corporate political organizations, and quasi-political organizations, both Native and non-Native. The formal political bodies include federal, state, and municipal governmental agencies. The Native corporate political organizations are essentially those which have emerged after the passage of the Alaska Native Claims Settlement Act of 1971. The quasi-political organizations includes great variety of bodies concerned with issues such as fishery management, labor relations, and coastal zone management.

These three kinds of political organization also operate on several different geographic levels. At the most encompassing level (denoted as Level I here) is the international environment. At the international level is the United Nations and several of its agencies which are instrumental particularly in formulating international conventions concerning ocean resources and the sea. This level also includes international fishery commissions, such as the International Pacific Halibut Commission (IPHC), and includes as well those treaties and conventions, both bi- and multilateral, entered into by the United States which affect the region (most notably, of course, involving fisheries and law of the sea).

Level II is that of the national government. Here are included the agencies, activities, laws, and enforcement procedures of the federal government. Most important in the Bristol Bay context are the Department of the Interior, the Department of Commerce, the Bureau of Indian Affairs, the Department of Housing and Urban Development, social welfare activities of several branches of the federal government, and activities of the several the armed services, in particular the Air Force. National quasi-political organizations also exercise influence on Bristol Bay, notably fisheries commissions such as the Northern Pacific Fisheries Commission and the Pacific Fisheries Commission.

Level III is the government of the State of Alaska. This includes those departments, commissions, and boards which have been most active in the region or which promise to be active in the future. Also in Level III

are several different areas of state government, such as the International Fisheries and External Affairs Department, the Alaska Coastal Policy Commission, the Rural Affairs Commission, the Alaska Commercial Fisheries Entry Commission, the Division of Energy and Power Development, the Alaska Housing Finance Corporation, the Alaska Power Authority, the Alaska State Housing Authority, and the Alaska Department of Community and Regional Affairs. There are also several quasi-political bodies which operate at the state level, including the United Fishermen of Alaska and the Coastal Zone Management Commission.

Finally, there is a rather unique entity operating from the state level in Bristol Bay, the Bristol Bay Cooperative Management Plan Study Group. This organization exists at both the federal and state levels, cross-cuts formal, Native, and quasi-political groups and has representation from each levelon its governing board.

Close attention will be paid to the Bristol Bay Cooperative Mangement Plan as a political phenomenon since it shows who are the important participants in establishing the political and economic framework for the future of Bristol Bay as well as the relative roles of Bristol Bay residents and institutions in that process.

Level IV is the Bristol Bay region of Alaska. There is no formal governmental body at the regional level; this role is filled by the regional Bristol Bay Native Corporation (BBNC). The BBNC is the corporation-for-profi t for the Bristol Bay region proper, and the Bristol Bay Native Association (BBNA) is the non-profit corporation which serves as the major conduit for federal and state social welfare and educational programs. There are also a number of quasi-political organizations which operate at the regional level, including the Bristol Bay Area Health Corporation, three Rural Education Attendance Areas (REAAs), two Coastal Resource Service Areas, and fisheries-related groups such as the Western Alaska Cooperative Marketing Association (WACMA) and the Alaskan Independent Fishermen's Marketing Association (AIFMA). Calista and Nunam Kitlutsisti and the Association of Village Council Presidents (AVCP) are the corresponding profit and non-profit

corporations for the lower portion of the Kuskokwim region covered by this study.

Level V is that of the sub-regions of Bristol Bay. This level comprises units of various sizes, ranging from the relatively compact Bristol Bay Borough to the extensive Alaska Peninsula Corporation. The Borough is the major formal subregional political structure and consists of the three communities of Naknek, South Naknek, and King Salmon. The major subregional political organizations oriented toward Natives result from mergers among individual village corporations. These are the Kvichak Foundation, consisting of the corporations of Levelock and Iliamna; the Alaska Peninsula Corporation, consisting of five communities including, in the area under consideration, the corporations of Newhalen, South Naknek, and Kokhanok; and Choggiung, Ltd., originally the village corporation of Dillingham, but now including the corporations of Ekuk and Portage Creek, and with partial responsibility for the communities of Aleknagik and Clark's Point.

Level VI is the level of the individual village or Community. At this level there is a certain conglomeration of Native and formal governmental organizations. Among the formal organizations are those cities which have incorporated as first class (Dillingham) or second class cities (eleven other communities) in the portion of the Bristol Bay region under study. Native political organizations at this level are represented primarily by the village corporations mandated by ANCSA, of which there are twenty-three in the study area, one for every village except King Salmon which was not recognized as an ANCSA village under the original legislation. Mergers, which have occurred increasingly since the late 1970s, have reduced the number of village corporations. Quasi-political organizations at the village level include the traditional village councils, which in many cases have acted as formally constituted local governmental bodies, and in others have assumed much more informal roles. In some villages, the traditional council has been superseded by an ANCSA corporation or by a municipal government formed upon incorporation.

4.5.2.1 National Level

The impact of the federal government has been pervasive in Alaska and the Bristol Bay region during the last several decades. Indeed, prior to statehood the federal government was the only formal governmental entity operating in the region. In this section we shall note both the current and the past activity of the federal government in the Bristol Bay region.

Several major pieces of legislation and the agencies which administer federal programs have had a major impact on the Bristol Bay region. The Native Allotment Act of 1906 allowed Native Alaskans to claim up to 160 acres of land if they were over twenty-one years old and had used the land for over five years. Originally title took the form of a "certificate of allotment" from the Department of the Interior, but the amended Act of 1956 allowed for the sale of the land at which time it became subject to fee simple ownership taxes. Few claims were submitted under the Act until two years before the passage of ANCSA. At that time it became clear that one of the provisions of ANCSA would repeal the conditions of the Native Allotment Act, and a number of regional, state, and national organizations encouraged Natives to apply for land under the 1906 Act before ANCSA was passed. This resulted in 8,500 applications statewide and 1,618 in the Bristol Bay region alone, representing an amazing 36% of all Natives in the region. The bulk of these claims are still outstanding despite a provision added to the Alaska National Interest Lands Conservation Act (ANILCA) in 1980 to the effect that all claims pending as of December 18, 1971 (the date of passage of ANCSA) would automatically be approved by June 1, 1981 unless there were extenuating circumstances, primarily caused by claim conflicts.

The Native Townsite Act of 1926 provided for the patenting of townsites if a majority of the population petitioned the Department of the Interior. Unlike the Native Allotment Act, this resulted in fee simple ownership of the land by Natives. Twenty-three communities in Bristol Bay petitioned for townsite status, but five petitions were held improper because they were received after provisional land claims had

been made under the provisions of ANCSA. Of the remaining 18 most are still in the process of being completed, although several have now gone through the entire process and title turned over to Native landowners.

Another piece of federal legislation which has had profound effects in the region is the Coastal Zone Management Actof 1972. This Act was passed to manage the development and resource utilization of the coastal areas of Alaska. Its primary purpose was the preservation and judicious development of coastal resources. The Act, along with the Alaska Coastal Management Act of 1977, mandated the establishment of Coastal Resource Service Areas throughout coastal Alaska. A coastal management plan will be developed for each CRSA by an elected board. Once a plan is developed and is approved by the state and the Department of the Interior, any future federal, state or private use of the coastal area must be "consistent" with the local plan. There are two CRSAs in Bristol Bay, one for the Bristol Bay Borough andone for the rest of the region. This has been and will continue to be a highly politicized issue in Bristol Bay.

TheAlaska Native Claims Settlement Act has probably been the single most influential piece of federal legislation in terms of its impact on the Bristol Bay region and on rural Alaska generally. ANCSA has radically reoriented the land ownership patterns of the region and has provided for eventual entry of Native-owned lands into the private sector by establishing 1991 as the date when shares in the corporations will become alienable. Much of the political activity in the region involves the establishment of the village and regional profit corporations as viable business entities in orderto discourage the sale of shares when that becomes possible in 1991.

The final land actof importance to the region is the Alaska National Interest Lands Conservation Act of 1980 (AN ILCA). ANILCA withdrew l arge amounts of additional land under several classifications, including National Wildlife Refuges, National Parks, National Forests, and Wild and Scenic Rivers Systems. In the Bristol Bay region, which prior to the Act had only the Katmai National Park and Preserve classified as a

federal preserve, this resulted in the withdrawal of an additional 5.3 million acres. ANILCA established the Togiak National Wildlife Refuge, the Lake Clark National Park and Preserve, the Alaska Peninsula National Wildlife Refuge, the Becharof National Wildlife Refuge, the Aniakchak National Monument and Preserve, and additional land in the Katmai National Park and Refuge.

These laws have resulted in the strong presence of several federal agencies in Bristol Bay, most notably the Departments of Commerce and the Interior. The Department of Commerce has a major role in the Coastal Zone Management program and is actively involved in the process by which local coastal management plans are approved. The Departmentof the Interior is heavily involved in the area through programs as the Minerals Management Service (successor to the BLM), the Fish and Wildlife Service, and in its capacity as a major force in the conveyance of lands through the BIA under ANCSA.

There are also several federal social programs which are politically important to the region. They include programs such as CETA, HUD housing projects, AFDC, and welfare and unemployment programs. Most of these programs, as we shall see below, are administered through the regional non-profit corporation, the Bristol Bay Native Association.

4.5.2.2 State Level

The majority of the Bristol Bay region, with the exception of the Bristol Bay Borough, falls within the unorganized borough of the State of Alaska. As such, its governing body is the Alaska state legislature. Thus, decisions affecting resource use and transportation that are of a regional nature and fall within the state's jurisdiction are made by a a legislature with only one member out of 40 elected by the residents of the Bristol Bay region.

The residents of the Bristol Bay region have direct input into the legislature of the State of Alaska through a Representative and a Senator whom they elect. The reapportionment of1982 created a house

district consisting of Bristol Bay, the Alaska Peninsula, and the Aleutian and Pribilof Islands areas. This house district is in turn combined with the Kodiak house district to form the relevant Senate district.

The Alaska Department of Community and Regional Affairs has had considerable influence in the region. The Department works closely with regional and local political and economic groups. It provides aid and assistance to community and regional level governmental bodies; gives financial, advisory, and management assistance; and administers state programs including Rural Development Grants, Municipal Services Revenue Sharing, senior citizen tax exemptions, and Municipal Organizational Grants. The Department also gives advice and holds seminars on municipal organization, community management and finance, and community planning. The Local Government Assistance Division administers the Community Legal Assistance Grant Program and the State Aid to Local Governments Program. This Division is also responsible for the Rural Development Assistance Program designed to broaden and diversify the economic base of rural Alaska through funding of basic community facilities and promoting effective management of assistance grants. The Community Planning Division's major responsibilities include coastal management planning, OCS planning, housing development, and resource development planning. The Municipal Lands Trust Program gives the division responsibility for management of land to be conveyed to the state in trust under section 14(c) of ANCSA for approximately 100 unincorporated rural settlements. The Community Employment and Training Assistance Division administers CETA Titles II, IV, VI and the Governor's Grant. The Division also administers the community Services Program funded by the federal Community Services Administration (CSA) and the State of Alaska, which provides planning, management, and technical assistance to communities, and local, and regional organizations to aid low income Alaskans.

In addition to land, water is a critically important resource in the Bristol Bay region largely due to its importance in sustaining the abundant salmon runs so vital to the livelihood of the region's residents. Water resources and their management are primarily the responsi-

bility of the State of Alaska, including those waters that fall within the boundaries of federal or private holdings. There are, however, provisions for Federal Water Reserves to be established so that federal agencies can meet their legislative mandates to maintain habitats crucial to the survival of fish and wildlife resources. Rivers and lakes and their use are therefore formally regulated by the State, primarily through the Department of Environmental Conservation.

The Department of Environmental Conservation (DEC) oversees water quality control, water supply, air quality control, solid waste management, tanker and oil terminal facilities, oil spill prevention, pesticides, hazardous substance control, land damage, and land and subsurface pollution prevention. The Department manages water and sewer construction and Village Safe Water Facility construction programs. DEC also reviews all major development activities to minimize or eliminate environmental damage.

The most important resource to Bristol Bay residents, and the nonresidents who come to Bristol Bay for commercial or recreational pursuits is the region's fish and wildlife. These species, whether they liveon federal, state, or private land or waters, are managedby the State of Alaska and deemed by the state Constitution to be the "common property" of the citizens of Alaska. The two policymaking boards concerned with fish and wildlife resources are the Board of Fish and the Board of Game. Appointees are sworn to carry out the Constitution of the state and to regulate legislation pertinent to the utilization of the State's fish and game. A resident of Dillingham has sat on the Board of Fish for the last five years.

Within Bristol Bay there are five Fish and Game Advisory Committees which make recommendations to the Boards of Fish and Game. The five committees are the Togiak Advisory Committee, the Nushagak Advisory Committee, the Naknek-Kvichak Advisory Committee, the Lake Iliamna Advisory Committee, and the Lower Bristol Bay Advisory Committee (which represents Egegik, Pilot Point, Port Heiden, and Ugashik). The committees are composed of residents from the villages they represent, the

only exception being Manokotak and Togiak which have representatives on both the Togiak and Nushagak Advisory Committees. Based on activity over the past year, the Nushagak Advisory Committee is the most active, sometimes meeting as often as twice a month; the Togiak Advisory Committee has been the least active.

Mediating between the local advisory committees and the statewide board is the Southwest Regional Council, composed of the chairmen of 15 local advisory committees from Kodiak, the Aleutian Islands, the Alaska Peninsula, and Bristol Bay. This body presents the opinions of local residents to the statewide Board of Fisheries.

The second largest controller of land in the Bristol Bay area is the State of Alaska. State lands are also divided under a number of jurisdictions, most, however, are under the Department of Natural Resources. The State Park system (in the form of the Wood-Tikchik State Park) is the trustee of some of the State lands, but the majority are under the management of the Division of Lands. The Division of Lands has the legally-mandated task of classifying lands under their jurisdiction according to their "best and highest use." They are also mandated to turn over a portion of public lands to private ownership hands through a variety of "disposal" programs. Although public review and commentary on both of these processes are provided for, the ultimate determination on a land classification or land disposal rests with the State of Alaska and not the Bay.

Other State agencies which have jurisdiction in the Bristol Bay Region include the Department of Fish and Game, the Department of Natural Resources, the Department of Transportation and Public Facilities, the Coastal Management Program, the Department of Health and Social Services, and the Department of Commerce and Economic Development.

4.5.2.3 Regional Level

4.5.2.3.1 The Bristol Bay Cooperative Management Plan

The Alaska National Interest Lands Conservation Act (ANILCA) of 1980, Section 1203, mandated the development of a cooperative management plan by relevant federal agencies and the State of Al aska. The plan was to be coordinated by the Alaska Land Use Council, a joint federal-state body that coordinates state and federal land use policies. The Bristol Bay Study Group (BBSG) was formed by the Alaska Land Use Council and consisted of the Alaska Department of Natural Resources, Alaska Department of Fish and Game, U.S. Fish and Wildlife Service, Bureau of Land Management, Bristol Bay Borough, Aleutians East Coastal Resource Service Area, Bristol Bay Coastal Resource Service Area, and Native Interests (the Alaska Federation of Natives obtained an appointment to the BBSG from the Bristol Bay Native Corporation). The study group was directed to prepare a comprehensive Cooperative Management Plan to conserve the fish, wildlife, and other significant natural and cultural resources in the region, and to provide for the rational, orderly, and environmentally sound development of economic resources. The plan, which is currently in agency review after incorporating extensive public comment from July through October, 1983, must now be reviewed and approved by the Alaska Land Use Council, followed by the Secretary of the Interior and the Governor of Alaska before it can be implemented.

The process of plan development began with an inventory of the resources of the Bristol Bay region, a resource needs assessment of the communities in the region, and a survey of current reource utilization patterns. This was drawn up by dividing the region into 38 units and obtaining relevant data from state and federal agencies on each. Goals for the use and conservation of the region's resources were then developed and guidelines for the primary, secondary, and tertiary uses of the units established.

The draft plan developed during the latter part of 1982 and 1983 consisted of a preferred plan and five alternatives. Each alternative plan included consideration of major resource and land uses under the following headings: Fish and Wildlife, Oil and Gas, Minerals, Recreation, Transportation, Alternative Energy, Settlement, Agriculture, and Forestry.

In addition, the draft plan also makes recommendations for exchange of lands among state, local, and federal entities to facilitate the goals of the plan and to identify lands for state selection under the Alaska Statehood Act.

The primary purpose of the plan is protection of the fish and wildlife resources of the study area. This is accomplished by denying mineral development on virtually all anadromous (salmon, or spawning) fish streams in the area. This is a highly desirable restriction as far as Bristol Bay residents are concerned. Although heavily criticized by the mining industry in the draft comments, the provisions protecting Bristol Bay's streams have generally remained in the revised version of the plan.

Despite its emphasis on fish and wildlife protection, the draft plan proposes oil and gas exploration in areas where drilling is most likely to be successful, particularly along the north side of the Alaska Peninsula from north of Egegik south to Cape Seniavin. The plan also concentrates mineral exploration and development in small areas along the Pacific Shore northeast of Sand Point, and in the far western areas surrounding the Kuskokwim Bay communities of Goodnews Bay and Quinhagak. Transportation proposals generally reflect local wishes, as no major transportation systems are proposed to link communities to each other or the region with the urban areas of south central Alaska. Corridors for access and transportation of oil, gas, and minerals are generally confined to routes with the least likelihood of disrupting fish and wildlife resources.

By far the most controversial aspect of the Bristol Bay Cooperative Management Plan in the eyes of Bristol Bay residents, is its allowance for up to 14,000 acres of land disposal, primarily by the State, for new settlement. Nearly unanimous and heated opposition to proposals for state land sales in the region was voiced by Bristol Bay residents from the beginning of initial data collection through to the public comment on the draft plan. They continue to oppose what they consider to be excessive quantities of land disposal in the proposed plan. Bristol Bay residents prefer alternative plan 2 which reduces the amount of land to 2,250 acres, all of which is in the Dillingham area. When considered against the possibility of 37,000 acres of land being sold off by the state over the next 10 years as proposed in one of the alternative plans, the 14,000 acres that would be sold under what is considered to be the most likely of the alternatives to be' adopted, appears to be a substantial victory, though still far above local desires. Bristol Bay residents also appear to have influenced the location of the land sales, keeping most of them in the vicinity of Dillingham·and obtaining a provision to keep land sales out of the highly valued caribou country in the upper Mulchatna River area.

The study group which was responsible for putting together the Bristol Bay Cooperative Management Plan was composed of 7 people, 3 of whom were residents of Bristol Bay. Of those three, one was appointed by the Bristol Bay Native Corporation, and the other two were representatives of the Coastal Resource Service Areas. The plan, it must be concluded, does represent many of the priorities of Bristol Bay resident board members who articulated the desires of their constituents. Nevertheless, there is strong resentment over the land settlement provisions of the plan, and a general feeling that the planning process was forced on the region and that it certainly was not a product of local resident wishes. Clearly, Bristol Bay residents have feelings of powerlessness and, as in the past, have been placed in a reactive position: responding to initiatives from Juneau and Washington to do something, but what that something should be remains obscure. Perhaps more than any other group, the villages of the lower Kuskokwim Bay (Quinhagak, Platinum, Goodnews Bay) resented the planning process because they do not consider themselves to

be part of Bristol Bay, and are administratively linked for almost all other purposes to the Calista/Bethel/Kuskokwi m region; moreover, they had no voice or say in the election of the study group members.

4.5.2.3.2 The Bristol Bay Native Corporation

The Bristol Bay Native Corporation (BBNC) was formed following the passage of ANCSA and was an outgrowth of two earlier regional associations, the Bristol Bay Native Association (BBNA) and the Bristol Bay Development Corporation (BBDC). The BBNA was originally formed in 1966 as an informal organization devoted primarily to attempting to settle land ownership and use issues. Formally incorporated in 1973, the BBNA was devoted exclusively to serving the Native population. The BBDC was also influential in the formation of the BBNC. The BBDC was established in 1969, primarily to claim available federal, state, and other funds for social services, including educational and economic programs. The formation of the BBDC was encouraged by the Office of Economic Development which wanted a regional organization to administer diverse programs.

With the passage of ANCSA, profit and non-profit activities were separated by law, which meant that one corporation had to be organized as non-profit to administer social programs, while another corporation had to be profit oriented with the intent of maximizing returns on investment for Native shareholders. (For a general discussion of organizational probelems associated with ANCSA, cf. Arnold 1978; Castile 1974; Lazarus n.d.; or Timme 1979.) ANCSA prohibited the profit- oriented corporation from being involved in the provision or administration of educational, health, social service, or welfare programs, or political activities. BBNC was incorporated as the profit corporation, with responsibility for handling land conveyances, financial settlements, etc. BBNC also has title to all subsurface rights in those areas in which surface rights are held by village corporations. As a regional corporation, BBNC is the third largest landholder in the region after the federal and state governments. BBNA is a non-profit corporation and has taken primary responsibility for the procurement and administration

of those programs prohibited to the profit corporation.

The BBNC is designed to generate a profit for its shareholders. As of 1980 there were 5,298 Yup'ik, Aleut, and Athabaskan shareholders in the BBNC. Although most of the shareholders reside in the region, over 35% live elsewhere in Alaska or the United States. Like all Alaskan regional corporations, the BBNC faces the challenge of 1991. In December of that year, twenty years after the passage of ANCSA, shares held in the regional corporation become fee simple, allowing the shareholder to sell his or her shares without the permission of the corporation or "tribal organization." Therefore, if the corporation has not proved to be profitable, by not offering a satisfactory return to its shareholders, the sale of a significant number of shares could lead to a loss of Native control of the corporation and, ipso facto, of the land.

BBNC is governed by a Board of Directors composed of twelve shareholders --eleven men and one woman. Only one of the twelve directors currently sitting on the Board of Directors is presently a resident of one of the Bristol Bay villages. The remaining directors reside either in Dillingham, Naknek, or outside the Bristol Bay region.

The economic performance of the Bristol Bay Native Corporation has been good, if not exemplary, since its formation. When compared to the other ANCSA-created regional corporations, BBNC has finished in the top five in earnings over the years since incorporation. It has made a profit in seven of the ten years it has existed.

BBNC has shown a profit during the two most recent years for which data are available. In 1982 the corporation reported operating profits of $2,349,687 and total net profit of $3,478,007. BBNC's major source of revenue is the Westward Hilton Hotel located in Anchorage. In addition BBNC currently owns Pacific Food Products, which produces the Sunny Jim product line and Tyrrell's pet foods. The corporation has a number of oil-, gas-, and mineral-oriented ventures within and outside the region. Joint ventures in petroleum support services are operated with the Northwest Alaska Native Association (NANA) on the North Slope. Invest-

ments in mineral exploration in southeast Alaska have been undertaken with NORANDA, which has contracted with Amoco Production Company and Resource Associates of Alaska to explore for oil, gas, and hardrock minerals. Finally, BBNC was a founder and is a major stockholder in United Bancorporation (United Bank of Alaska).

Because of its size and wealth BBNC is a powerful force in the Bristol Bay region. It played an important role in the Bristol Bay Cooperative Management Plan being designated by Alaska Federation of Natives (AFN) to appoint the "Native Interest" representative to the study group. In examining the overall role of BBNC toward its shareholders, the corporation has been successful in turning a profit.

As the regional profit corporation for the Bristol Bay area, the BBNC has the rights to subsurface resources of lands claimed under the provisions of ANCSA. A distribution of these land resources by government and corporate authority is provided in Table 4-26. This means that the BBNC has been, and will continue to be, the major organization in the region which oil and gas developers must deal with in order to proceed with for onshore development. This responsibility for subsurface rights has in many ways defined the activities of the BBNC, its relationship to other organizations in the region, and to its own shareholders.

The quest for subsurface rights was a major factor in determining the relationship between the BBNC and local village corporations for most of the 1970s. From the passage ofANCSA to the last third of the decade the BBNC was heavily involved in local corporate organization and activities. The BBNC took the lead in helping local corporations to organize properly and to make claims for land to be conveyed under ANCSA. This was a pragmatic business decision in that BBNC, as the regional corporation, could not claim subsurface rights until the local corporations had claimed their surface rights. By law, the land to which the regional corporation has subsurface rights is determined by the local corporations' land claims in the region. However, once BBNC had aided the local corporations in organizing and selecting lands they began to withdraw from extensive interaction with the villages themselves.

Land Status in the Bristol Bay Region[1]
Table 4-26

Patented Lands			
Private			
Trade & Manuf. sites	559		
Headquarter sites	223		
Homesites	1,092		
Homesteads	3,752		
Mineral	264		
	566		
Townsite settlement	365		
	6,821		
Townsite Trustee[2]			
ANCSA Village Corporations		24,395	
State		4,018,068	
Total Patented		4,054,092	4,054,092
Native Allotments [Certified - 59 ea)			3,983
State Tentatively Approved			2,408,937
ANCSA Village Corp. Interim Conveyance (IC)			2,463,784
National Parks, Monuments, Refuges, and Preserves[3]			8,097,136
Pending			
Private			2,578
Townsites			1,643
Native Allotments (Active)[4]			129,924
ANCSA Village Corporations[5]			9,798,555
			477,323
Public Domain			650,000
TOTAL			28,087,955
Land acres in region (excludes 1 and which drains southward into the Western Gulf of Alaska)[6]			26,021,012

1 This table represents only lands within the Bristol Bay Regional Corp. (BBNC) boundaries.

2 Does not coincide with data obtained from the Townsite Trustee. This figure is approximately twice as high.

3 See Table 110.

4 Withdrawals shown on ELM's record often overlap, and therefore this figure represents duplication and is too high.

5 Estimate.

6 Kresge et al. 1974: Table 8-4.

Sources: U.S. Department of the Interior, BLM, Alaska Automated Lands Record System, March 12, 1981 and Easement Progress Report, January 5, 1981; P.L. 96-487; U.S. Fish and Wildlife Service; National Park Service.

(Source: MMS Draft Final Technical Report, North Aleutian Shelf Basin Sociocultural Systems Analysis, p224, May 1983.)

This withdrawal from the local corporations was made evident with the move of the BBNC's headquarters from Dillingham to Anchorage in the late 1970's. Prior to this the corporation had been a major local employer with the headquarters located in the region it represented. By moving to Anchorage the corporation was able to come into closer communication with the business and financial communities with which, as a major corporation, it must interact extensively. Additionally, major BBNC real estate and business holdings are also located in Anchorage, notably the Anchorage Westward Hilton and the United Bank of Alaska; having the headquarters there makes management of those interests easier and more efficient. With the move to Anchorage, however, the impression of an even more removed entity which lacked extensive interaction with the local residents was solidified.

As a profit making corporation BBNC has found itself at times inevitably in conflict with the interests of its shareholders. Two examples will illustrate this, with the difficulties in both cases arising from the fact that most shareholders in BBNC are either subsistence or commercial fishermen or, as is usually the case, both.

First, as a profit making corporation BBNC is not opposed to regional development, such as oil and gas development, and in fact supports such development, if properly managed, as a means of generating a profit. Its control over extensive subsurface resources impels it into the areas of oil, gas, and mineral development. However, it is clear that corporation shareholders are extremely concerned about the effects of such development on renewable resources, especially salmon. The BBNC has therefore at times found itself opposed to its own shareholders, even though the corporate leadership has been extremely careful to insure that such development occurs with as little chance of harm to the marine resources as possible. This conflict of interest will continue in the forseeable future.

A second example also revolves around the seafood industry. In the mid-seventies the BBNC purchased Peter Pan Seafoods, a major processor of seafood in the Bristol Bay region. This purchase was a calculated

business move intended to make a profit for the shareholders of the corporation. Yet this was a difficult position for the corporation since many of the fishermen who were shareholders in the BBNC also fished for Peter Pan during the fishing season. Thus BBNC found itself in the dual role of advocate for its shareholders and employer of its shareholders, which inevitably caused some ill feelings on the part of residents of the region. Nonetheless, the BBNC appears to have managed the episode quite well from a business perspective, and ultimately this redounds to the benefit of its shareholders. The company was purchased for9 million dollars and was sold, in 1979, for 20 million dollars, and the sale was made at a time when the seafood industry was entering a period of decreased earnings and increased labor problems. This simultaneously insured a profit for the BBNC, removed them from the risk of loss during the ensuing years (in fact the corporation which purchased Peter Pan has been unable to realize a profit since the purchase), and, perhaps most importantly, prevented a direct confrontation with its own shareholders during labor negotiations between the canneries and the fishermen. (These conflicts were particularly bitter during the strike which crippled the industry during the 1980 season.) All in all the Peter Pan purchase and sale should probably be seen as an excellent demonstration of business acumen under difficult circumstances.

The gradual withdrawal of the BBNC from extensive interaction with local level corporations can ultimately be seen as a pragmatic business decision. Similarly, the slow retreat from involvement in local businesses which conflict with the interests of the shareholders of the corporation can be viewed as a sound decision from the perspective of a Euro-American worldview. Though many in the region criticize the BBNC for some of these actions, it is difficult to see how the corporation could have acted differently, given the avowed intent of the corporation to operate at a profit in the interest of those same shareholders.

4.5.2.3.3 Bristol Bay Native Association

The Bristol Bay Native Association is the organization which most closely resembles a political body for the Bristol Bay region. It has functioned in that capacity since the mid-1960s. Its official designation is as the non-profit regional organization, the primary responsibilities of which are to administer and develop the social and educational programs required by the residents of the Bristol Bay region. Its bylaws call fora governing body composed of elected representatives from every community in the region (including the five Chignik communities) as well as several at-large elected members. However, the majority of the actions of the BBNA are typically made by a seven-member Executive Committee. These include administration of the Johnson-O'Malley program, an educational enrichment program; administration of the Coastal Zone Management Program; administration of CETA (the federal Comprehensive Employment and Training Act) funds which provide training and job opportunities for Natives; administration of several social programs of the Bureau of Indian Affairs; the provision of local government training programs with both federal and state funds; administration of the Economic Development Administration (EDA) community planning program funded by the federal government; and publication of a monthly newspaper, the Chinook Cryer.

The BBNA is officially recognized by the Bureau of Indian Affairs (131A) as the designated contractor for Alaskan Native federal services in the Bristol Bay area. In that capacity the Association provides a wide range of BIA-funded services to Bristol Bay Natives; it oversees educational loan and scholarship funds, job training funds, and formerly dispensed general assistance funds prior to the termination of that program in 1982. The BBNA is also the designated Alaskan Native organization handling adoptions and child disposition under the Indian Child Welfare Act and providing early childhood education and nutritional programs with BIA funds. It also coordinates the Village Public Safety Officer program and provides assistance to village governments.

The BBNA is also the recipient of awards from' the State government for the delivery of services in the Bristol Bay area such as energy assistance and "weatherization" programs. It has also received fishery development funds in the past from the Department of Community and Regional Affairs.

must dispense to all qualifying persons, not simply Alaskan Natives, as is the case with BIA funds. This dual function as both Native and general service organization places the BBNA in an ambiguous position in serving both Native and non-Native constituents, as this dual role creates confusion about which programs are for which constituents. It can also produce tension as non-Natives complain about BIA provisions for Alaskan Natives that are not available to non-Alaskan Natives.

The most important role that the Bristol Bay Native Association plays, however, is as advocate for economic advancement for Bristol Bay residents. The BBNA has consistently worked over the last half decade to expand opportunities for local residents in the fishery. They have coordinated testimony before the Board of Fisheries on crucial questions such as retaining the 32-foot limit on vessel length and on greater access to the emerging herring fishery for local gillnet fishermen and women. They have lobbied for improvements in the infrastructure of the fishing industry in the Bay. They are looked to by state legislators for assistance in identifying major issues and improvements needed in the Bristol Bay area. Thus, the BBNA plays an important intermediary role in bringing issues and actions before both state and federal institutions.

The BBNA also administers the Senior Citizens Program funded by the State of Alaska, and is responsible for the federal ly-funded Village Government Management Program. This program was initiated in 1980 and is designed to aid and advise communities in applying for and utilizing state and federal revenue sharing funds; P.L. 93-638 (Indian Self-determination and Education Assistance Act) funds; and funds available for municipal improvements under the provisions of House Bill 60. Until

1980, state revenue sharing funds were available only to incorporated communities, but as of that year they became available to traditional councils as well. Therefore, the BBNA works closely with both city councils and traditional councils in administering these funds.

'The BBNA has been very active in recent years in helping traditional local councils to organize formally, that is, draft and adopt a constitution and bylaws in order to qualify for P.L. 93-638 funds. The local nature of these programs, has meant that the BBNA has emerged as the major organization to bridge the gap createdby the withdrawal of the BBNC from large scale interaction with local corporations.

Public Law 93-638 deserves special mention when discussing the political structure of the Bristol Bay region. Also known as the Indian Self-Determination and Education Assistance Act of 1975, this law initiated some fundamental changes in the Bristol Bay region and encouraged some trends which had already begun at the time of its passage. The Act was designed to decentralize control of the BIA over funds used by Native Americans. To do so it expanded the concept of "Indian tribe" and "tribal organization" to allow additional organizations to qualify as local and regional administrators of federal, particularly BIA, funds. Essentially P.L. 93-638 redefined tribal organizations as those Native organizations recognized under ANCSA. The specific wording defines an "Indian tribe" as "...any Alaska Native village or regional or village corporation as defined in or established pursuant to the Alaska Native Claims Settlement Act." The actual contracting organization is the "tribal organization" which is defined as the governing organization of the "Indian tribe." This meant that each ANCSA village was recognized as a separate "Indian tribe," with each village corporation becoming the corresponding tribal organization. At the same time, the non-profit regional corporation (the BBNA) was recognized as a tribal organization for the entire region which, at that level, constituted an "Indian tribe" as wel l. (We wi ll return to a discussion of the local effects of P.L. 93-638 under Village-Level Organizations below.)

4.5.2.3.4 Bristol Bay Housing Authority and Bristol Bay Area Health Corporation

Until 1980 the Bristol Bay Housing Authority (BBHA) and the Bristol Bay Area Health Corporation (BBAHC) were auxillary bodies of the Bristol Bay Native Association. They are now, however, independent agencies with separate duties. Both are primarily non-profit service corporations. The Bristol Bay Housing Authority conducts federal Department of Housing and Urban Development programs in the area. The Bristol Bay Area Health Corporation is the subcontractor with the United States Public Health Service providing federal health care programs to Alaskan Natives in the Bristol Bay area. The Corporation operates the hospital at Kanakanak and employs the village health aides. A detailed discussion of health care services provided by the BBAHC is provided below.

4.5.2.4 Subregional Level Political Organizations in Bristol Bay .

4.5.2.4.1 Coastal Resource Service *Areas*

The Alaska Coastal Management Act of 1977 mandated local communities to organize Coastal Resource Service Areas to set guidelines on the use of coastal areas within their jurisdictions. Although the act provides broad leeway to Coastal Resource Service Areas in establishing guidelines, all plans require State Coastal Zone Management Board approval and, in some cases, may also require legislative approval. The limitations of this legislation are demonstrated by the State Coastal Zone Management Board's rejection of the North Slope Borough Coastal Zone Management Plan which contained a number of prohibitions and restrictions to limit or exclude oil exploration and production in areas deemed important for local subsistence and highly sensitive to environmental disruption.

In Bristol Bay there are three Coastal Service Resource Areas; two fall within the boundaries of this report's study area. One of these the Bristol Bay Borough Coastal Management Planning District, borders on the

Bristol Bay Borough, and has already completed its Coastal Zone Management Plan. The other is the Bristol Bay Coastal Resource Service Area which includes all of Bristol Bay outside of the Borough from Port Heiden to Togiak. This area includes the north Pacific Coast along the central portion of the Alaska Peninsula, and the communities of Chignik, Chignik Lake, Chignik Lagoon, Ivanof Bay, and Perryville. Its constituencies include the residents of Dillingham and all the communities within the Southwest Region and Lake and Peninsula Rural Education Attendance Area. The Bristol Bay Coastal Resource Service Area board is composed of seven members elected from different geographic areas. The six areas are Togiak-Twin Hills with 1 member; Dillingham, 2 members; Nushagak Bay, 1 member; Nushagak River, 1 member; Kvichak River, 1 member; and Alaska Peninsula, 1 member. Persons interested in serving on the BBCRSA board are required to submit a petition and are then subject to a vote. Concerns about state and federal oil and gas leasing are likely to be expressed through the Bristol Bay Coastal Resource Service Area.

4.5.2.4.2 Rural Education Attendance Areas

As part of the settlement of the Molly Hootch case challenging the state's provision of equal educational opportunity to village students, the state of Alaska created Rural Education Attendance Areas (REAA) to govern the schools in the unorganized areas of Alaska. In the study area there are three REAA's - the Southwest Region School District covering the western part of the region from Levelock to Togiak, the Lake and Peninsula School District which stretches down the eastern side of Bristol Bay from Port Alsworth to the Chignik communities, and the Lower Kuskokweim REAA covering the communities of Quinhagak, Goodnews Bay, and Platinum. The Southwest Region School District has headquarters in Dillingham, the Lake and Peninsula School District is based in the Bristol Bay Borough, and the Lower Kuskokwim headquarters are in Quinhagak.

These educational bodies have State delegated power to set school policies subject only to guidelines established by the State Board of Educa-

tion (i.e., teacher certification and high school graduation standards) and the state legislature. Their funds, however, unlike the vast majority of school districts in the United States, are not derived from local taxes but instead are appropriated from the state's general fund. In addition to establishing the basic educational philosophies and programs for the schools of the region, the REAA boards wield substantial power through the allocation of funds and jobs within the region. In most villages the school is the largest source of wage employment for local residents (in the form of secretarial, cook, aide, and janitorial positions) and the second largest source of cash next to commercial fishing. Consequently, the REAA board exercises considerable power.

Below the boards are the Local Advisory Committees which are elected in each community. These committees typically make recommendations to the regional board on teacher and personnel hiring and firing which, in most cases, are followed by the regional board. The Southwest Region board members are elected at-large from two districts. Togiak, Twin Hills, Aleknagik, and Manokotak communities comprise one district which has two "seats and Clark's Point, Portage Creek, Levelock, Ekwok, Koliganek, and New Stuyahok comprise the other district which has three seats. The Lake and Peninsula School District is divided into three districts. One district consists of Port Alsworth, Nondalton, Iliamna, Newhalen, Pedro Bay, Kakhonak, and Igiugig; the second district consists of Egegik, Pilot Point, Ugashik, and Port Heiden; and the third district consists of the five Chignik communities. The Lower Kuskokwim REAA consists of a single district.

4.5.2.4.3 Subregional Corporations and the Bristol Bay Borough

As we noted above there have been several forces which have led to the development of a relatively unique form of Native corporate organization, the subregional corporation. Two factors in particular account for this development: first, the gradual withdrawal of BBNC from involvement in the affairs of local corporations following the resolution of preliminary land selections; and second, from the other end of the continuum, the local corporations' failure to successfully pursue

profit-oriented business ventures. We have already discussed the first trend. In this section we will note the subregional corporations which have emerged in the last decade, then detail their lack of success in profit-oriented businesses.

There have been two major foci of subregional corporate activity in the Bristol Bay region. The first has centered on Dillingham and the Nushagak River drainage, the location of Choggiung, Ltd., which was originally the village corporation of Dillingham. However, in the late 1970's the village corporations of Ekuk and Portage Creek merged with Choggiung. The village corporations of Ekuk and Portage Creek thus ceased to exist, and their affairs are now handled through the offices of Choggiung. Ekuk residents formed a group called the Ekuk Association which consists of the former directors of the Ekuk Corporation who serve as advisors to Choggiung in matters concerning land use, disposals, claims, etc., in the immediate Ekuk area. In addition to all absorbing the activities of these two former village corporations, Choggiung also acts as land manager for two other village corporations, Aleknagik and Clark's Point. Thus, Choggiung takes responsibility for all or part of the management of a total of five village corporations, three of which have completely merged and two of which are associated in matters of land use and management. The second area of merger activity in the Bristol Bay region is somewhat larger than Choggiung. This is the district of the Alaska Peninsula Corporation stretching from Iliamna Lake to the southwestern Alaska Peninsula. This corporation was founded in 1978 when the South Naknek village corporation approached the Port Heiden village corporation suggesting a cooperative effort to build a large fishing vessel. Since that time the Alaska Peninsula Corporation has added Kokhanok and Ugashik in 1980, and Newhalen in 1981. This corporation, has five members, of which all five have dissolved the original village corporation; all their assets, rights, and responsibilities are now vested in the Alaska Peninsula Corporation.

The advantages of these subregional corporations have become very clear in the last few years, and we expect this trend toward merger among village corporations to continue. The most important advantage is that

the village corporation, like BBNC but unlike BBNA, is organized with profit as its central motive. These corporations intend to make a profit before 1991 when their lands and shares become both taxable and alienable, and loss of both land and corporation is very possible. However, the small scale of most villages and the acute lack of both resources and manpower means that it is much more difficult for village corporations to generate a profit than it is for the regional corporation. Many of the villages have difficulty finding even enough people to fill managerial and executive positions in the corporation, simply to insure that the vital day to day procedures are completed. This is especially true in villages where most of the population takes time off during the season to fish commercially, leaving literally no one in the village who is both competent and willing to maintain the corporation's business.

Shortage of capital is also a problem, with small villages unable to raise enough capital to make wise business investments. With the merger of several corporations, however, many of these drawbacks are overcome and risk is minimized. The pool from which manpower can be selected is greatly enlarged so the likelihood of finding both a qualified and willing staff is correspondingly increased. The available capital is likewise increased, allowing substantial investments with the promise of substantial return. However, perhaps the most efficient aspect of these subregional corporations is the combination of overhead and operating expenses. "By merging, Alaska Peninsula Corporation got rid of four village corporation audits, four tax statements, and four overhead expenses. It al so enabled us to pool our assets in order to make more realistic investments" (quoted in Payne and Braund 1983.)

For the reasons noted above we expect this trend toward subregional corporations to continue. There is no other organization, in the absence of extensive local activity by the BBNC, which can effectively generate aprofit at the local or subregional level, and profit, as we noted, becomes increasingly important as 1991 approaches. It has been suggested by some that eventually Bristol Bay will be the location of only three profit-seeking Native corporations: the regional corporation

(BBNC); and two subregional corporations, Choggiung and Alaska Peninsula. Though this exact situation may never comne to pass, increasing numbers of mergers are bound to occur.

4.5.2.4.4 Bristol Bay Borough

There is one other subregional organization of importance, the Bristol Bay Borough. Bristol Bay Borough was founded in 1962 and it is the first and still the smallest of all Alaskan boroughs. The Borough was organized to allow its three communities, Naknek, South Naknek, and King Salmon, to realize revenues from local commercial activity, particularly the raw fish tax. An allied goal was to gain control of the local educational system which was achieved through the establishment of a separate Borough school district.

The Bristol Bay Borough was formed under the 1961 Borough Act. This act gave the Borough several mandatory and several voluntary powers. The Act states that the Borough must assume responsi blity for education, taxation, planning and zoning for the Borough area. The Bristol Bay Borough may also assume several other powers, and in the areas of fire and police services, telephones, solid waste disposal, libraries, and cemeteries.

The Borough is distinct from the subregional corporations in several ways. First, itis not an explicitly Native organi zation, andas such it is the only subregional organization which represents all residents, Native and non-Native, living within its jurisdiction. Second, it cuts across the jurisdictions of Native corporations, including within its bounds the community of South Naknek, a member of the Alaska Peninsula Corporation, as well as Naknek which has a local Native corporation. The Borough also includes the most anomalous community in the region, King Salmon. King Salmon was not recognized as a Native village under the provisions of ANCSA and therefore is the only community in the region which lacks a local Native corporation and is not a member of a subregional corporation. Nor does King Salmon have a traditional village council. The sole political structure for the community is the

Bristol Bay Borough government, an unusual situation for this region in which nearly every other community has at least two overlapping political organizations (see Price (1975) or Harrison (1972) for a discussion of the emergence of subregional political organization).

The major strength of the Borough is twofold. First, itoperates ata profit, primarily as a result of the three percent raw fish tax. Second, the school system is generally recognized as a positive program of the Borough and the three communities would, according to local residents, be reluctant to withdraw from the Borough if it meant losing access to the school system.

4.5.2.5 Local Level Organizations

In the area under consideration there are five kinds of local level organizations; first, the traditional village councils, both formally and informally organized; second, the ANCSA village corporations; third, incorporated first and second class cities with city councils; fourth, are Appropriate Village Entities (AVES); and fifth, villages which lack a purely local corporation, but are part of a subregional corporation as noted above. One of the potential difficulties at the local level is the existence of more than one of these political forms simultaneously in the community. Table 4-27 summarizes the situation in each of the villages of the study area.

Table 4-27
Village Level Political Structure **of Bristol** Bay **Communities**

Community	Traditional ViUage Council	ANCSA Village Corporation	City Council
Dillingham	Yes	**Choggiung**	First Class (1963)
Aleknagik	Yes	Aleknagik Natives*	Second Class (1973)
Clark's Point	Yes	Saguyak	Second Class (1971)
Ekwok	Yes	Ekwok Natives	Second Class (1974)
Manokotak	Yes	Manokotak Natives	Second Class (1970)
New Stuyahok	Yes	New Stuyahok Natives	Second Class (1972)
Newhalen	No	**Alaska Peninsula**	Second Class (1971)
Nondalton	No	Nondalton Natives	Second Class (1971)
Togiak	Yes	Togiak Natives	Second Class (1969)
Ekuk	No	**Choggiung**	Unincorporated
Igiugig	Yes	Igiugig	Unincorporated
Iliamna	Yes	Iliamna Natives	Unincorporated

King Salmon	No	No	Borough
Naknek	Yes	Paug-vik	Borough
South Naknek	Yes	**Alaska Peninsula**	Borough
Kokhanok	Yes	**Alaska Peninsula**	Unincorporated I
Koliganek	Yes	Koliganek	Unincorporated
Levelock	Yes	Levelock	Unincorporated I
Pedro Bay	Yes	Pedro Bay	Unincorporated
Portage Creek	Yes	**Choggiung**	Unincorporated
Twin Hills	Yes	Twin Hills	Unincorporated
Quinhagak	Yes	Qanirtuug	Second Class (1975)
Platinum	Yes	Arvig	Second Class (1975)
Goodnews Bay	Yes	Kiutsarak	Second Class (1970)

Note: Bold = Membership in a sub-regional corporation

* = Land management issues assumed by Choggiung, Ltd.

There are several interesting points which should be noted concerning local political activity. These include: the pattern of incorporation, the possibility of exclusion of non-Natives from local representation,

and the major political concerns of most communities in the region.

An interesting and revealing aspect of the political development of the region concerns the pattern of incorporation which has characterized the area in the last two decades. As canbe seen from the above table, no community incorporated after 1974, that is, soon after the passage of ANCSA and just prior to the passage of the Indian Self-Determination Act of 1975 (P.L. 93-638). This pattern appears to be connected to enactment of these two laws, for several reasons.

First, following ANCSA, village corporations were established, giving the Native population increased control of the communities in the region. This might be expected to discourage incorporation, in that both governments and private concerns now had a formal structure to work through when dealing with community-wide issues, especially those concerning land and physical resources, and social services. However, it was precisely at this time that the State of Alaska was most vigorously encouraging incorporation, in order to establish a constituted local body through which state and federal programs could be administered, and which could take local responsibility for many state-provided services. The biggest deterrent to this rush to incorporate appears to be P.L. 93-638. The Act established new definitions of both "Indian tribe" and "tribal organization" for the purposes of administering several federal and state programs, particularly Johnson-O'Malley and other Bureau of Indian Affairs funds. As a result it became possible for unincorporated communities to qualify for several programs which, previously, would have necessitated community incorporation for eligibility. The formal organization of a tribal council could now serve as well as an incorporated body. Those communities which had not yet incorporated therefore became much less eager to do so, as the benefits now seemed readily available without incorporation (see Kleinfeld (1973a) and McBeath (1980) for discussions of the problems and prospects of Native self government).

The second aspect of the legislation which may have discouraged some villages from incorporating after the passage of P.L. 93-638 concerned

the possible loss of political power. Not only did the Act designate organized traditional village councils as official administrative organs for the community, it also redefined the membership of such organizations, restricting them to Natives. Thus, by federal law organized traditional village councils could have only Native membership, and could represent only a Native constituency, if they were to be eligible for various programs and services. Prior to this there was no explicit ethnic requirement for membership on such councils and it was not infrequent to have non-Native members, particularly in those communities with a substantial non-Native minority. However, once the Act became law, non-Natives were excluded both from membership on the councils and from representation by them. This insured that the Native population could retain local control, indeed exclusive control, as long as the traditional village council was the major local political organ. This is the primary reason why most of these villages have avoided incorporation. Incorporation is often seen as a means of consolidating non-Native political power, which threatens, in the long run, to deny political power to the Native population.

This strategy for maintaining the Native population's political power is understandable, but it has the unfortunate side effect of denying local representation to non-Natives. This is currently an issue in the region and will continue to be until the question is resolved. Nonetheless, this should not be construed to mean that incorporation must inevitably lead to the political disenfranchisement of the Native population at the local level. In several of the incorporated municipalities a means of maintaining political power has been established by replicating membership on the traditional council and the city council. For example, in Aleknagik, Manokotak, New Stuyahok, and Togiak, among others, the city council and the traditional village council are identical in membership and in most cases both bodies are elected simultaneously. Thus, since the vast majority of the population in all these communities is Native, effective political control of both municipal and traditional village political bodies remains in Native hands.

Despite these allowances, throughout the 1970's communities still had to

incorporate in order to qualify for state revenue-sharing funds, a major source of local income. However, even this incentive for incorporation has now been removed. In 1981 state law was amended allowing any village with a permanent population of over 25, which is recognized under ANCSA to be eligible for revenue-sharing funds. This has even further retarded the desire for incorporation. Beyond this, most of the villages in the region are simply pragmatically unsuited for incorporation. Even in the early 1970's, when the state was actively encouraging incorporation, and when most of the incorporations took place, few communities in Bristol Bay were genuinely equipped to act as independent municipalities. Almost all lacked manpower, adequately trained personnel, and a local tax base sufficient to support and administer an incorporated community.

A recently emerging local government designation is the appropriate village entity (AVE) which was established by the state as the institution to make decisions about municipal townsite lands. ANCSA required village corporations to deed back townsite lands to their local government. Communities which were not incorporated under state law acquired AVEs to make determinations about municipal lands held in trust. In most unincorporated, predominantly Native communities, village councils either petitioned to be or were declared to be the AVE (cf. M. Wailer, n.d., for a discussion of a similar process). However, if there was significant local opposition to having the Native government declared the AVE, then the state would require that an "alternative entity" be created. This has apparently occurred in only two communities, Egegik and Iliamna, in the last three years. The emergence of AVEs is an indication of the increasing non-Native population in these communities and the dissatisfaction of non-Native residents with the Native governing institutions, largely because non-Natives are not represented.

This confusing collection of local political structures has resulted in very uneven distribution of federal, state and private funds throughout the region. However, two factors can reduce or increase the confusion: the kinds of local organizations present, and the particular personnel administering those organizations. As we have noted, each local struc-

ture is eligible to administer and receive certain kinds of funds. Traditional councils, as a result of P.L. 93-638, generally act as administrators of social service programs for Natives, often through the BBNA (for example, Johnson-O'Malley (JOM) and health programs). Additionally, HUD block grants for Alaska Natives, BIA Self-Determination money (for administration of the council itself), and other BIA funding is administered via traditional councils. "Second Class" cities generally receive federal and state revenue-sharing funds (these, however, are now available to unincorporated communities as well). Also, village electrical facility grants, and certain other federal, state, and private grants and funding, as well as property and sales taxes, if they choose to institute them, are administered by second class cities. It is clear that most of the advantages which once accrued to the incorporated community are generally available and no longer strong incentives for incorporation. ANCSA village corporations are eligible to select land to convey to the Native members of their communities; to receive ANCSA monies for redistribution to shareholders or for investment; and to decide land use issues in the communities.

There are also potential land use conflicts, especially in those villages in which the village corporation has a large proportion of nonresident shareholders. Several villages have a large percentage of shareholders in the local corporation who do not reside in the community. This could lead to land use decisions, such as leasing land to a major developer, which are attractive from the perspective of profit to those outside the village, but which are disagreeable to those living in the village. This appears to be a greater possibility in Dillingham, Bristol Bay Borough and the Iliamna-Kvichak subregions which have much higher percentages of nonresident shareholders than clothe Western and Nushagak subregions.

There is also the problem of ethnic relations, particularly in unincorporated communities in which the traditional council is the major recognized local structure. Iliamna may be the most extreme example. The population of Iliamna is approximately 60% non-Native, yet the community is unincorporated. This means that the traditional council has been

recognized for most purposes by both the federal and state governments as the constituted local authority. However, federal law requires that, as a "tribal organization," the council consist only of Natives and represent only a Native constituency. Thus, by federal law 60% of the population of Iliamna has no representation at the local level.

The presence of these multiple local political structures presents, as we noted above, varied opportunities for acquiring an array of funding and revenue. Ultimately, however, the success of a community (or, in the case of subregional corporations, several communities) in gaining these funds depends more on personnel than on local organizational forms. A particularly adept administrator has proven to be far more crucial than any other factor in the communities' success in gaining their "fair share" of available federal, state, and private funds. Levelock presents an excellent example of this phenomenon. Levelock qualified for and received several times more money during 1981 and 1982 than communities up to twice its size. Table 4-28 compares funding for Levelock (population 80), another community approximately the same size (Kokhanok, population 83), and a community twice its size (Nondalton, population 170).

Table 4-28

Comparison of **Revenue Received by** Selected Bristol Bay **Communities**

Community:	Levelock	Kokhanok	Nondalton
Population	80	83	170
Funding Source			
State Revenue Sharing	$38,000		$31,717
Federal Revenue Sharing	$4,526		
State of Alaska Grants			
A. D.C. R.A.	$450,000		
	$55,000		
	$65,000		
Municipal Aid	$80,000		
Unspecified		$62,000	$76,000
HUD Community Development Block Grant	$47,000		
B.I.A. Grants			
J.O'M.	$6,000		
Office Management	$8,492		
Total	$754,018	$62,000	$107,717

Source: AEIDC Community Profiles

Both Levelock and Kokhanok are unincorporated communities and while Nondalton is incorporated, but all three have active traditional village councils. It would superficially appear that Nondalton would have an advantage over both the other two communities in terms of access to revenue and funding sources, as a result of its incorporation as a second class city. It would also appear that Levelock and Kokhanok would be approximately equally qualified for gaining funds, as both are unincorporated and both have a traditional council and a local corporation. However, not only was Levelock able, from 1981 to 1982, to gain over ten ti thefunds as Kokhanok, a community with the same structural status as Levelock; it was also able to gain *over seven* times as much revenue as Nondalton, a community which is both incorporated and twice the size of Levelock. This aptitude for gaining funds can be traced directly to the expertise of one or two people who directed the village's efforts to gain appropriate funds.
extremely important in a region in which qualified individuals are in short supply and potential sources of revenue are varied. In such a context community training and experience are vital.

4.5.3 Education

4.5.3.1 Introduction

There has been formal education in Bristol Bay since the Russian Orthodox mission established the first school at Nushugak Bay in the 1880s (Van Stone, 1967). However, until recently, the level of education among the local population has been inferior to the rest of Alaska and the U.S. In 1970, 23% of the Native population had received no formal education, and only 6.6% had finished from one to three years of high school (Nathan 2(c), 1975). In the past decade, federal and state legislation have made large amounts of money available for improving the quality, availability, and relevance of education in rural areas, local people have had a much greater voice in decision making and planning. While it is still too early to evaluate the precise effects of new programs and facilities, without a doubt the picture of education

in Bristol Bay has changed dramatically.

Today there are 19 elementary schools for24 communities in the study region, ranging in size from 400 students and 40 full-time teachers at Dillingham to 9 students and 1 full-time teacher at Twin Hills. In the Bristol Bay Borough, children from South Naknek and King Salmon commute by plane and bus to school in Naknek. Ekuk is a summer fishing camp, and when children are living there as permanent residents they attend school at Clarks Point. Children from Iliamna go to school in Newhalen and the two communities also share facilities for recreational activities and community meetings.

Pre-school programs have been added to the curricula of Bristol Bay schools in recent years, and parents have reacted very favorably. Johnson O'Malley funds support pre-school classes at Levelock, New Stuyahok, Aleknagik, and Manokotak. Togiak, Pedro Bay, and Naknek also have pre-schools.

As a result of the Molly Hootch Consent Decree, high school education is much more widely available in Bristol Bay schools than a decade ago, and there are now accredited high schools at Dillingham, Togiak, Manokotak, Goodnews Bay, Quinhagak, and New Stuyahok. Naknek, Platinum, Levelock, New Stuyahok, Ekwok, Aleknagik, and Clarks Point offer high school programs aspart ofa single, combined kindergarten through twelfth grade school. Two villages, Twin Hill sand Portage Creek, must still send their students to other communities for their high school education. Iliamna and Manokotak have programs for high school equivalence degrees (GED). Ten communities have built either entirely new facilities or added gymnasiums, wood and mechanics workshops, cafeterias, etc., to existing buildings in the last five years.

Table 4-29 summarizes programs and facilities in each community, with the exception of Koliganek, Goodnews Bay, and Platinum.

Table 4-29

Educational Facilities and Personnel

	Elementary Students	High School Students	Combined Elem/HS	Teachers*	Staff	Rooms
Aleknagik-N	12	--	no	1	1	1
Aleknagik-S	16	--	K-10	2	1	2
Clark's Point		10	K-12	2	3	2
Dillingham	217	181		40	15	21
Ekuk**	1			0	0	0
Ekwok		24	K-12	3	4	3
Goodnew's Bay	35	30		6	N/A	N/A
Igiugig		14	K-12	2	3	2
11 i arena						
Kakhonak		35	K-12	4	9	4
King Salmon						
Koliganek		N/A				
Levelock		27	K-12	2	3	2
Manokotak		113	K-12	13		
Naknek	239	104		18	12	20
Newhalen		84	K-12	7	9	3+
New Stuyahok		90	K-12	11		14
Nondalton		47	K-12	5	8	6
Pedro Bay		10	K-12	1	4	
Platinum		15		N/A	N/A	N/A
Portage Creek			K-12	3		2
Quinhagak		75		13		
South Naknek						
Togiak		148	K-12	16	7	10
Twin Hills	9		K-6	1	1	

*Only full-time certified teachers are counted; aides and part-time teachers in special subjects have been included under staff.

**Ekuk is a summer fishing village with only one student who is a permanent resident. He attends school at Clark's Point, two miles away.

Table 4-30 shows participation in pre-school, bilingual, and adult education programs according to community.

Table 4-30

Education Programs

	Pre-school	Bilingual	Adult Educ./Community
Aleknagik	JOM*	yes	Bristol Bay Rural Educ. Ctr.
Clark's Point	x	yes	Bristol Bay Rural Educ. Ctr.
Dillingham	no	yes	Bristol Bay Rural Educ. Ctr. Community Education Program Johnson-O'Malley funded Indian Close-Up Program
Ekuk	no	no	no
Ekwok	no	yes	Bristol Bay Rural Educ. Ctr.
Igiugig	x	no	Southeast Regional Resource Ctr. Alaska Foundation for the Arts
Iliamna	no	no	Graduation Equivalency Degree
King Salmon	no	no	Chapman College AFB recreation facilities
Kokhanok	x	no	Native Olympics Southeast Regional Res. Ctr. Alaska Foundation for the Arts
Levelock	JOM	yes	Bristol Bay Rural Educ. Ctr. Title I aide
Manokotak	JOM	yes	G.E.D. Bristol Bay Rural Educ. Ctr.
Naknek	yes		
Newhalen	no	yes	Native Olympics Alaska Foundation for the Arts Southeast Regional Res. Ctr.
New Stuyahok	JOM	yes	Bristol Bay Rural Educ. Ctr.
Pedro Bay	yes	no	Alaska Foundation for the Arts
Portage Creek	no	yes	Bristol Bay Rural Educ. Ctr.
South Naknek	yes	no	
Togiak	JOM	yes	Bristol Bay Rural Educ. Ctr.
Twin Hills	?	yes	Bristol Bay Rural Educ. Ctr.

*JOM - Johnson-O'Malley funded pre-school program

The Rural Education Center of the University of Alaska provides extra-curricular education for communities of the Dillingham/ Nushugak area. In 1982-83 over twenty different classes were offered in Dillingham itself and nearly thirty were designed for outlying communities; instructors travelled to the villages once a month to meet with students. Village residents with no formal teaching credentials are sometimes hired to teach courses. Classes offered by the Center reflect social change and new education needs, and have included grant writing, basic plumbing, snow-go repair, child nutrition and health, marine and automotive engine trouble-shooting, crisis intervention volunteer training, and introduction to college English (DOWL, 1982).

There has been a move toward contracting educational services through the Native corporations. The Southeast Regional Resource Center provides specialized personnel to the villages of Igiugig, Pedro Bay, Newhalen, and Nondalton, including a school psychologist, a guidance counselor, and a speech and language therapist.

Federal funding. sources specifically for the education of Native Alaskans are being tapped by Bristol Bay schools. In addition to Johnson-O'Malley (JOM) funds, which offer $238,000 for some 500 students, in 1974 Bristol Bay received 6.6% of the available funds from the Indian Education Act ($218,956). Impact Aid funds amounted to $146,863 in 1974.

4.5.3.2 Lake and Peninsula REAA

There are fourteen village schools in the Lake and Peninsula district, with student enrollments ranging from 2 to 70. The district office has recently been moved from Naknek to King Salmon. Administrative services to the village schools are provided as needed on visits by the district superintendent, assistant superintendent, director of federal projects, administrative assistant, facilities coordinator, and director of maintenance. Iliamna is the location of an additional administrative office which provides support staff to schools in Igiugig, Pedro Bay, Nondalton, and Newhalen. The support staff arethe areapri ncipal, art tea-

cher, music teacher, district librarian, special education instructor, and reading consultant. These "floating teachers" make regular trips to every school in the district (REAA Oversight Committee, 1982). Since 1977 the number of Lake and Peninsula high schools has jumped from 3 to 12; the smallest has only 2 students, and the largest, 70.

Educators note with enthusiasm the increasing number of places available and students enrolled in local secondary schools. Out-migration due to families and students leaving the villages for higher education has been a cause of community instability for many years. In spite of a national and statewide trend toward higher education for all, in Bristol Bay students have been slow to pursue the opportunity offered them. Because high school-aged individuals earn as much as $70,000 in one fishing season it is more difficult to maintain traditional economic arguments in favor of finishing high school (Petterson 1982).

High rates of teacher turnover has been a problem in the district and there are several reasons for this. High salaries and relatively more difficult living have attracted younger teachers who have had very little previous teaching experience, and often no previous experience in cross-cultural teaching. Lack of suitabl ehousing has been a primary complaint of incoming teachers. Many have left after their first year. In addition, many teachers claim that the rapid increase in salaries with time in grade has been an incentive for the district to hire new teachers and allow more senior personnel to leave. However, this has changed very rapidly over the last four or five years and teacher turnover rates have declined dramatically and promise to decline further (Petterson 1982).

The rapid expansion of programs and teaching staff has caused housing problems for teachers in some villages. Newly hired teachers are responsible for finding their own quarters. Moreover, in some villages no utilities are available. The district compensates in part for these difficulties, subsidizing housing by one-half of the rent up to per month. The district also offers $150 per month toward heat and utilities upon receipt of bills presented at the end of the school year

(General Information About District, Lake and Peninsula, 1982).

According to the General Information sheet prepared by the district office, approximately 95% of the students are Native Alaskans, including substantial numbers of individuals from all three major groups: Aleuts, Eskimos, and Indians. Most of them speak English at home and some are bilingual so it is unusual for students to have language problems in school (General Information About District, 1983). Several bilingual programs have been introduced in the area with varying degrees of success.

As a result of the rapid increase in school facilities, the district has been faced with higher energy bills and some more maintenance problems. Older school facilities are not heat efficient and should be remodeled or renovated to improve heat conservation.

4.5.3.3 Bristol Bay Borough

For many years the Bristol Bay Borough has provided education for the communities of Naknek, South Naknek, and King Salmon. South Naknek has a small elementary school. Children from King Salmon are bused to Naknek for elementary and secondary education.

The original Naknek school was built in 1952; elementary and high school buildings and administrative offices are part of a single complex. The present school facility was built in 1969. In 1981 six classrooms were added to the elementary school; there are plans afoot to remodel the high school and add a swimming pool. Combined, the elementary and high schools have twenty classrooms, a library, gymnasium, cafeteria, kitchen and auditorium (Naknek Village Profile, 1982).

In 1982 the staff consisted of 6 full-time and 2 part-time elementary teachers and 11 full-time high school teachers. There were 121 students from pre-school through Grade 6, and 105 students in Grades 7-12. Nineteen high school students flew in daily from South Naknek, and over 100 students traveled by bus from King Salmon.

4.5.3.4 Southwest REAA

The Southwest Region district office is located in Dillingham, although Dillingham has its own city wide school system. There are over500 students unevenly distributed among Aleknagik North Shore School, Aleknagik School, Clark's Point School, Koliganek School, Levelock School, Manokotak School, New Stuyahok School, Ahgsenahale School (Portage Creek), Togiak School, Twin Hills School and William "Sonny" Nelson School (Ekwok) (REAA Oversight Committee, 1982).

There are 7 locally elected members on the school board. Each village has a Community School Committee (CSC) which evaluates educational needs in the village and makes recommendations to the school administration and board. The CSCS also have final say on school calendars, hiring and firing of classified staff, etc. A high rateof teacher turnover has been a problem in this region. In 1978 the district hired 25 new teachers,3 of whom left the following year. In 1979 the ratio was 14 new to 31 returning teachers; and in 1980, 19 new to 29 returning. (REAA Oversight Committee, 1982b, p. 23). The district attributes this rapid turnover to the housing situation and to the fact that teachers are only given 2- or 3-year contracts, and as a result most teachers make plans to return to more urban areas after their contracts expire. Continuity in planning educational programs is thus disrupted, but even more detrimental is the obstacle that rapid turnover presents to establishing strong rapport and communication networks between school faculty, community, and students.

There is a shortage of rental housing in the the Southwest region and almost no land available for purchase. The district provides teachers' housing on a reduced cost basis, and pays an energy allowance for teachers who rent their own accommodations. Because many of the village schools have only a few students spread across a wide age range, teachers are often required to provide instruction at many grade levels at once. It has been difficult to find teachers who are certifiedto teach all grades, buton the other hand, it is unfeasible to hire many

teachers to cover all standards when the school has an enrollment of 20 students or less.

New facilities in many Southwest region villages have been built over the past 5 to 6 years. Levelock added two new classrooms in 1978, and a gymnasium and vocational education facility in 1982. The William Sonny Nelson School in Ekwok was built in 1979 and has three classrooms, a gymnasium, a kitchen, and an office. A new classroom building at Aleknagik, completed in 1983 serves both the North and South shore areas. The Clark's Point school was renovated and upgraded in 1981 when two classrooms were added. In 1978 Manokotak acquired a new gymnasium, library, vocational education center, home economics room, and music room, in addition to high school classrooms. In 1981 a new elementary school was built in Dillingham. The high school, built in 1960, was remodeled to include more classrooms, a gym, foyer, and concessions stand in 1978, and a new second floor of 9 classrooms, a laboratory, and space for the public radio station were added in 1981 (Village Profiles, 1982) .

These additional facilities have substantially raised the energy and maintenance costs for the district, Where there are old facilities built in the BIA and territorial days, maintenance and energy costs are also high, and the district is interested in reducing energy costs in schools which are heated with electricity, fuel oil, and propane (REAA Oversight Committee, 1982).

Local schools are the major source of employment in many of the villages, affording adults the opportunity to acquire work experience and some degree of social mobility through learning new skills and getting salary benefits. The University of Alaska X-CED program provides field-based teacher training in many of the villages, and school jobs are often accompanied by training programs. As far as possible the district tries to hire both classified and certified staff from the district Oversight Committee, 1982

The school is often the focus of a community's social life, and its

facilities are used for many activities, such as meetings and entertainment, in addition to those on the regular school curriculum. In some villages, schools are the source of electricity. The district administration believes that schools play an important role in village life by serving as a center for outside activities, thus involving the whole community and helping to create a more open, healthy educational environment (REAA Oversight Committee, 1982, p. 89f.).

4.5.3.5 Dillingham City School District

The Dillingham City School District offers a wide range of programs for students and the community. There is a full K-12 program for approximately 400 students. The present education facilities in Dillingham consist of a new elementary school, built in 1981, and the high school, which was extended in 1978 and 1981. The elementary school has 11 regular classrooms and 1 special education classroom, a Title I education room, multipurpose/gymnasium with stage, a kitchen, library, staff lounge, storage area, clinic, reception area, and offices. The high school has 10 classrooms, in addition to laboratories and workshops, a multipurpose room, gymnasium with locker rooms, nurse's office, library, administrative offices, and space for the public radio station.

Elementary school personnel consist of 10 teachers, including reading and physical education specialists, a reading and music specialist, 3 special education teachers, a librarian, 4 aides, and a secretary. The high school has 25 teachers, 2 counselors, an athletic director, and administrative staff.

School programs include bilingual and bicultural programs, and community education programs. Some of the classes offered in addition to regular academic programs include art, carving, skin sewing, woodshop, mechanics, auto repair, metal shop, music, business education, and radio broadcasting.

In anticipation of future growth, the present school site is already considered inadequate. It is not possible to expand the existing site

activity facilities. The center of population is moving away from the vicinity of present school site, a trend which residential land use planning indicates will continue. The City of Dillingham Comprehensive Plan Update, Phase 2 (Nov. 1982) recommends that a future school and recreational site be planned in the northwest corner of the city. The site is large enough, but not currently accessible by road (1982).

4.5.3.6 Lower Kuskokwim

The Lower Kuskokwim REAA includes the villages of Quinhagak, Goodnews Bay, and Platinum, which, with approximately 2,000 students, is the largest REAA in Alaska. It serves an area predominantly inhabited by Yup'ik Eskimos, and which still has a large proportion of the existing BIA schools. Local hiring is atop priority for the Board of Education district. With this goal in mind the Board and its management team have entered into an agreement with Kuskokwim Community College, the Cross-Cultural Education Program (X-CED) at the University of Alaska, and Alaska Pacific University to provide bilingual education teacher training.

Utilities constitute a major expense for the district, and whenever possible, the district tries to use local water and power sources rather than becoming the local provider of these expensive services.

4.5.4 Health Care

4.5.4.1 Administration

Responsibility for health care in the Bristol Bay study area is assumed by four major organizations: the federal government under the auspices of the Alaska Area Native Health Service (AANHS) of the Indian Health Service (IHS), the state government under the auspices of the Department of Health and Social Services (DHSS), the Yukon-Kuskokwim Delta Health Corporation (for the community of Quinhagak), and the Bristol Bay Area Health Corporation (BBAHC).

The Alaska Area Native Health Service administers and operates IHS programs in Alaska. Two components of the AANHS are of particular relevance to Bristol Bay Natives: the Anchorage Service Unit, responsible for the health care needs of residents living in the Iliamna subregion, and the Bristol Bay Area Service Unit (BBASU), responsible for the health care needs throughout the rest of the Bristol Bay region. Residents of Quinhagak are served by the Yukon-Kuskokwim Delta Service Unit (YKDSU).

The State of Alaska is responsible for the administration of certain aspects of health care provision which affect Bristol Bay residents. First, it is responsible for services providedby the Departmentof Health and Social Services which serves all Alaskans, and second, it provides direct support through grants and contracts with regional health organizations and local governments. These services are available to Natives and non-Natives alike (Alaska House Finance Committee 1982:63-64) .

The state DHSS administers five different programs:

* mental health programs, including the Alaska Psychiatric Institute, several mental health clinics, and the DHSS Division of Mental Health and Development Disabilities which provides grants for the operation of 21 community mental health centers (Alaska House Finance Committee 1982:64), one of which is located in Dillingham.

* alcoholism programs funded by the State Office of Alcoholism. The majority of these programs provide information and referral, outpatient care, outreach, and aftercare and followup.

* Public Health Nursing services-the DHSS division of Public Health maintains a health center in Dillingham. Itinerant PHN's travel to villages and small communities in rural areas working with and supporting the Community Health Aides.

* Emergency Medical Services (EMS)-the state has budgeted $3 million for

emergency medical services which is administered through three regional EMS organizations. Each organization administers grants, and subcontracts to a variety of organizations in the health care system.

* Village Safe Water (VSW)-the VSW program provides safe water and solid waste and waste disposal systems for villages in remote areas of Alaska, The VSW program operates in conjunction with the IHS Office of Environmental Health, village residents, and regional health organizations to design, construct, and operate facilities that meet the needs of individual villages.

In fiscal year (FY) 1982 the state of Alaska allocated $90,000 for mental health programs, $200,000 for the BBAHC Alcoholism program, and $6,000 to the EMS program in Bristol Bay." These three programs are administered by the BBAHC.

In 1975 the Indian Self-Determination and Education Assistance Act, which mandated the IHS to assist tribal groups in transferring management of services provided to them by the federal government. Management of services is gradually being assumed by the BBAHC. The BBAHC was organized in 1973 and is the primary advocate for the people of Bristol Bay in the health care area. The BBAHC's central office is located in Dillingham. The BBAHC Board of Directors is made up of one Native representative from each of the 32 villages in Bristol Bay. The Board identifies health care needs from information provided by the village representatives, and then works with staff in the various programs to plan, implement, and evaluate health programs to meet local health care needs. (BBAHC Annual Report 1979:4).

The BBAHC operates through funds obtained from the Alaska Area Native Health Service and the State Department of Health and Social Services. While the majority of its funding is from the AANHS, the services provided by the BBAHC are not restrictedto Bristol Bay Natives. The BBAHC administers the Kanakanak/Bristol Bay Area Hospital in Dillingham/Kanakanak and the Bay and Peninsula Clinic in King Salmon. The BBAHC also administers several programs, including the Community

Health Aide program, the Emergency Medical Services (EMS) program, the Community Injury Control program, a Health Education program, and Human Services programs in mental health and alcoholism and drug abuse.

The community of Quinhagak lies within the jurisdiction of the Yukon-Kuskokwim Health Corporation (YKHC). The YKHCoperates a hospital in Bethel which provides the same level of service as the Kanakanak/Bristol Bay Area Hospital in Dillingham.

There are no subregional levels of health care administration in Bristol Bay. The only subregional health program, the Bay and Peninsula Clinic in King Salmon, is administered by the BBAHC. The Iliamna subregion also falls into a jurisdictional sphere of the AANHS which is separate from the rest of the region.

Local health care has a three-tiered administration. Village clinics in Bristol Bay are owned by the village, operated by the BBAHC, and funded by the AANHS. Local clinics are usually leased to the AANHS by the city or village councils and staffed by Community Health Aides. The clinic in Naknek is owned by the BBAHC. In the few communities which have no clinics, such as Ekuk and Platinum, responsibility for health care is occasionally assumed by one of the canneries operating in the area. This usually involves the maintenance of a first aid station and hiring of a nurse during the fishing season.

4.5.4.2

With each sphere and level of authority for the administration of the health care system in Alaska, there is also a range of services provided by each of the agencies involved. Extra-regional services involving Bristol Bay residents are provided by the Alaska Area Native Health Service and the Alaska State Department of Health and Social Services. There are two types of care provided by the AANHS health care system. Contract health care is used in areas where direct care (IHS-operated services) is not available or when medical needs of patients are greater than AANHS can provide. Direct care is provided on three levels:

* Primary care incl udes all routine diagnosis and treatment of minor injuries or illnesses, in addition to basic health maintenance activities such as routine physical exams and eye examinations. Primary care is provided in all IHS hospitals and clinics by the full range of medical professionals.

* Secondary care includes specialist outpatient care, hospital admissions for common illnesses, minor surgical procedures, maternity care, and other more complicated medical needs.

* Tertiary care includes all major illnesses or injuries where inpatient services under the direction of a specialist are requested. Complex diagnostic procedures and major surgery are Included in this category.

Of the three levels of direct care only the Alaska Native Medical Center provides all three to Bristol Bay residents. The Bristol Bay Area hospital in Kanakanak and the Yukon-Kuskokwim Delta hospital in Bethel provide primary and secondary care, while village and subregional clinics provide primary care only.

The Alaska Native Medical Center is the chief medical facility of the AANHS. In addition to providing care for Bristol Bay residents in the Iliamna subregion it provides long-term care and specialized services to Alaska Natives throughout the state. Specialized treatment programs are available in internal medicine, psychiatry, surgery, orthopedics, and obstetrics and gynecology. The Center maintains a staff of 52 physicians, 3 mid-level practitioners, 8 dentists, 18 dental technicians, and 212 nurses. The average stay in the 170-bed facility is 10.5 days.

The Yukon-Kuskokwim Delta Area Hospital is located in Bethel and is used by the residents of Quinhagak. The existing hospital facility was constructed in 1979 and can provide surgical services. It is staffed by 14 physicians, 4 dentists, and 21 registered nurses and serves over 14,000 Natives in 49 villages (Alaska House Finance Committee 1982:49).

The Bristol Bay Area Hospital is located in Kanakanak, 6.2 miles outside of Dillingham. It was constructed in 1941, renovated in 1973, and is accredited by the Joint Commission on Accreditation of Hospitals. The facility is equipped to provide medical, nursing, laboratory, X-ray, and pharmacy services. In October, 1980 the 54 person staff consisted of 3 physicians, 11 nurses, two dentists, one pharmacist, and one social worker. In 1982, however, one physician had been dropped from the staff due to budget cuts and the total staff had declined to 48 (Alaska House Finance Committee 1982:101).

The hospital's average daily patient load has declined over the years because of shorter hospital stays and increased outpatient treatment. The current daily patient load rate in fiscal year (FY) 1980 was 5.3 persons staying an average of 3.5 days. Outpatient visits have steadily increased in recent years, with the 11,358 visits for FY 1980 representing a 17.1% increase over the visits in FY 1978. About 40% of all patients come from communities in the region other than Dillingham (Payne & Braund 1983:351).

In addition to direct medical services the Kanakanak/Bristol Bay Area Service Unit provides other types of health care. Dental care is provided by two dentists and two dental assistants. A staff social worker helps hospital patients and outpatients seek social services from the appropriate state or federal program and counsels alcoholics and referred clients with other mental health problems. A staff pharmacist prepares and dispenses prescription and non-prescription drugs to patients and outpatients and coordinates the medications sentto and dispensed by community health aides.

The Kanakanak/Bristol Bay Area Service Unit also provides environmental health services, including education and promotion of sanitary sewage and waste disposal practices, safe water and food handling procedures, and accident prevention. The Service Unit sanitaria and environmental health technician provide technical assistance to villages in maintaining safe waste disposal, water, and sewer systems. They also coordinate

Public Health Service construction projects in the villages (Bristol Bay Regional Specific Health Plan 1979:51).

Four Public Health Nurses funded through the Alaska State Department of Health and Social Services also work in the Bristol Bay area. Two of these nurses staff the State Public Health Clinic in Dillingham, the third works in Naknek, and the fourth in Anchorage. These nurses provide a wide range of services, emphasizing preventive health care, to Dillingham and to the smaller communities in the region (Payne & Braund 1983:352). The level of service provided by a Public Health Nurse in Bristol Bay communities varies with the skill of the community health aide in each community.

All other health care services in the region are provided by the BBAHC via the Community Health Aides Program and Bay and Peninsula clinic (BBAHC Annual Report 1979:3). The BBAHC also provides services through the programs it administers. The Health Education Program serves four areas: Bristol Bay schools, Kanakanak Hospital, the Bristol Bay communities and villages. It also administers other BBAHC programs, including the development of newsletter articles and Yup'ik/English radio announcements, ordering films, and so on.

The Emergency Medical Services Program, also managed by the BBAHC, trains local residents as Emergency Medical Technicians, providing them with first aid skills. This program also offers other types of courses in first aid and coordinates a volunteer rescue squad in Dillingham, and participates in planning for a statewide EMS program.

The goal of the Community Injury Control Program is safety education and accident prevention. Villages are visited by CICP staff members who conduct educational presentations and work with village councils to locate and clear up potential safety hazards. The program has also sponsored a swimming program for local residents in several communities and aided in the development of an Injury Treatment Report for use by Community Health Aides.

The BBAHC Human Services Department is based in Dillingham and offers programs in drug abuse prevention, alcohol counseling, and mental health services. The present staff includes a clinical psychologist who serves as program director and provides a wide range of counseling and referral services. There is also an alcoholism counselor, based in Dillingham, who provides outreach and referral services to Bristol Bay residents.

The BBAHC program in Alternative Activities to Drug Abuse is based in Dillingham and is not designed for outreach to the villages. Its purpose is to teach young people the hazards of using drugs, and it sponsors a "Youth Activities Club," primarily a recreational program designed to reduce drug usage through participation in organized social activities.

The BBAHC has a grant from the state for $190,000 forFY83 to provide services for alcoholics to 22 villages and the City of Dillingham in the form of outpatient counseling, followup, outreach, aftercare, ASAp and justice system services, referral, alcohol information, school information, education, and prevention (Office of Alcoholism & Drug Abuse Annual Report 1982).

Federal Programs and Alaska Natives III:A Survey of Natives Views lists data by region on the percentage of families surveyed who report using different health care services provided by, for example, traveling nurses, community health aides, village clinics, traveling doctors or dentists, or hospitals and private care. The extent to which health and social service programs are utilized by Bristol Bay Natives is indicated in Table 4-31. Overall, use of medical facilities and personnel by Bristol Bay Natives appears to be higher than or comparable to Alaskan Natives in general, with the exception of village clinics. Use of social services by Bristol Bay Natives is on a par with, or lower than, other areas of the state. Unfortunately there is no data on non-Native use of these services for Bristol Bay.

Table 4-31

Percentage of Families Reporting Program Use Health and Social Service Programs, Bristol Bay and Alaska

Program	Bristol Bay	Alaska
Traveling Nurse	52.0	36*9
Community Health Aide	52.0	46.0
Village Clinic	22.0	38.5
Traveling Doctor	55.9	43.0
Traveling Dentist	66.9	45.1
Alaska Native Medical Center	40.9	42.5
Kanakanak Hospital	54.3	28.8
Private Health Care	25.2	15.4
BIA Social Worker	13.4	11.5
Social Service Aide	3.1	7.5
PHS Social Worker	6.3	7.7

Source: Nathan and Associates (1975 :III).

In the 1975 survey over 89.7% of Bristol Bay Natives reported satisfaction with village medical services; 85.7% expressed satisfaction with hospitals and private care; and 86.4% were satisfied with existing social services (Nathan and Associates 1975 IIIB1:20).

The BBAHC hopes to establish subregional clinics in each of the five major subregions, although to date, only one has been established, (the Bay and Peninsula Clinic in King Salmon), in March of 1978 (BBAHC Annual Report 1979:8). The clinic is equipped to provide basic laboratory services and an X-ray unit will be installed in the future. It is staffed by two nurse practitioners who deliver primary and emergency medical care. Nurse practitioners are licensed by the State Nursing Board and are responsible for in-house training of community health aides in the subregion as well as basic primary care. Services offered include treatment for illness and injury, family planning, prenatal

care, and patient education. The clinic has also conducted an extensive immunization program.

Primary health care services in the small communities of Bristol Bay are provided, for the most part, by Community Health Aides (CHAS) working in village-owned clinics. These communities are also visited periodically by itinerant health care personnel. Table 4-32 indicates the type of direct health care resources available to the Bristol Bay villages in the study area. The chart lists whether the village has a clinic, and indicates the number of CHAs, the number of IHS visits, and state PHN visits per year, ownership and source of funding for the clinic, and whether or not state mental health and alcoholism services are provided.

Table 4-32
Community and Village Direct Health Care Resources FY 82
Bristol Bay Area Health Corporation

Community/Village population (1980)		Clinic	Number CHA's	Visits per year IHS	PHN	Ownership	Funding	State MH/Alcohol Services
Aleknagik	227	x	1	1	1	village	IHS/BBAHC	BBAHC
Clark's Point	70	x	1	0	2	village	IHS/BBAHC	BBAHC
Ekuk	3							
Ekwok	96	X	1	1	2	village	IHS/BBAHC	BBAHC
GoodnewsBay	168		1	0	2	space in	school	BBAHC
Igiugig	53	x	1	0	1	village	IHS/BBAHC	BBAHC
Iliamna	112	x	1	0	1	village	IHS/BBAHC	BBAHC
Kakhonak	88	x	1	0	1	village	IHS/BBAHC	BBAHC
King Salmon	350		Subregional Clinic					
Koliganek	140	x	1	1	1	village	IHS/BBAHC	BBAHC
Levelock	95	x	1	1	2	village	IHS/BBAHC	BBAHC
Manokotak	300	x	1	1	2	village	IHS/BBAHC	BBAHC
Naknek	350		Subregional Clinic					
Newhalen	114							BBAHC
New Stuyahok	307	x	1	1	2	village	IHS/BBAHC	BBAHC
Nondalton	300	x	1	1	2	village	IHS/BBAHC	BBAHC
Pedro Bay	65	x	1	1	0	village	IHS/BBAHC	BBAHC
Platinum	55							
Portage Creek	66	x	1	1	2	village	IHS/BBAHC	BBAHC
Quinhagek	451	x	2	3	4	village	IHS	YKDHC
South Naknek	153	x	1	1	2	village	IHS/BBAHC	BBAHC
Togiak	455	x	1	1	2	village	IHS/BBAHC	BBAHC
Twin Hills	67	x	1	1	2	village	IHS/BBAHC	BBAHC

Source: Alaska House Finance Committee Health Care Project, 1982.

Community Health Aides (CHAS) provide the only health care available in most villages. This includes direct medical care for illness, hospital referrals when necessary, and preventive health programs.

The duties of the CHA are as follows:

* direct patient care--patient interview and examination, initial diagnosis, treatment of uncomplicated illnesses, patient referral to hospital or health center, assistance to itinerant health professionals, and monitoring chronic illnesses.

* health surveillance and preventive services--routine physical exams, individual health resources, and medication ordering for chronic illness.

* administration and support activities--keeping daily medical logs and medical records, and drug management.

CHAS usually practice without direct medical supervision but maintain communication with hospital-based physicians by radio, satellite telephone, or conventional telephone. However, weather conditions, power failures, and equipment breakdown frequently compel CHAS to manage patients without medical backup (Wil 1s and Mal hotra 1981 :17).

In addition to the CHAS, some of the Bristol Bay communities have Community Health Representatives who work with the clinical psychologist of the BBAHC to give mental health counseling and to help reduce drug and alcohol abuse problems. Their purpose is to refer local residents to clinical psychologists for counseling. Community Health Representatives are employed in Newhalen, New Stuyahok, Nondalton, Togiak, Levelock, Manokotak, and Platinum (BBAHC Annual Report, 1979:14).

While Community Health Aides and Community Health Representatives are residents of the communities they serve, health care at the local level is also provided by itinerant personnel who periodically visit each community. The two physicians from the Kanakanak Hospital and a

physician from the Alaska Native Medical Center visit from seven to ten villages each at. least once a year and usually twice. The physicians work with the health aides and Public Health Nurses to provide periodic screening, chronic disease monitoring and followup, as well as episodic acute medical care when emergencies arise. Each community is also visited at least once a year by a Public Health Service Nurse. Both of the dentists from the Kanakanak/Bristol Bay Area Service Unit, and one from the Anchorage Service Unit, visit the villages at least once a year. The services provided by these AANHS dentists are supplemented by dentists under contract to treat residents of Togiak, Twin Hills, Naknek, and King Salmon. Itinerant physicians and dentists from the Yukon-Kuskokwim Delta Service Unit in Bethel also visit the community of Quinhagak on a regular basis.

Village Alcoholism programs in the study area exist in Togiak, Manokotak, Quinhagak, Koliganek, New Stuyahok, Levelock, King Salmon, Nondalton, and Newhalen (Office of Alcoholism and Drug Abuse Annual Report 1983). A total of 26 clients were served by alcohol and drug programs in Dillingham from October 1, 1982 to February 28, 1983 {Office of Alcoholism and Drug Abuse Annual Report, March 1983).

In addition to the services provided by federal, state, and BBAHC personnel, health care is available from a general practitioner who operates a small private clinic in Dillingham on a part-time basis and an itinerant optometrist who periodically visits Dillingham, Naknek, and King Salmon. Some of the canneries which operate in the Bristol Bay region during the summer months will occasionally hire a nurse to provide emergency and first aid care for their employees, and King Salmon A.F.B. runs an infirmary staffed by two medics for military personnel as well as members of the general community.

4.5.5 Community Facilities and Public Utilities

4.5.5.1 Introduction

Some of the key components of the socioeconomic system of the Bristol Bay region are the facilities and services relating to housing, energy, sanitation, and other public utilities. These facilities and services are grouped together under the heading of "community facilities."

Community facilities are important to the overall description and analysis of the socioeconomic system of the Bristol Bay region in four respects. First, they provide the foundation for economic activities and patterns of social interaction, and are the concern of different political groups and government agencies. Second, community facilities play a large role in determining the character of future population growth and economic expansion in the region. These facilities can either encourage or constrain such growth and expansion. Third, many of these facilities require a certain level of cash-income in order to be used by local residents. By placing a constant financial obligation on the users of these facilities, local residents are drawn into participation in the intrusive cash-oriented commercial economy. Fourth, these facilities themselves are a source of cash-income since they require a certain number of full-time or part-time employees for construction, installation, and maintenance. Because many of these facilities and services require constant attention throughout the year, they can restrict participation in subsistence activities.

4.5.5.2 Housing

An outline of existing housing resources in the study area is provided in Table 4-33. Housing throughout the Bristol Bay region is either of wood frame or log construction. Most were constructed by the owners although in the past twelve years houses have been constructed with funds from the Alaska State Housing Authority, the U.S. Departmentof Housing and Urban Development, or the Bureau of Indian Affairs. The

Table 4-33
Housing Resources in Bristol Bay Communities, 1982

Community	Single Family Dwellings	Cannery Bunkhouses	HUD Homes	Apartment Units	Motels/ Lodges
Aleknagik	11	x	9		
Clark's Point	32	x	15		
Dillingham	345	x	70	98	2
Ekuk	5	x	o		
Ekwok	25		0		1
Goodnews Bay	69		20	2	
Igiugig	13		4		
Iliamna	29		0	x	8
Kakhonak	27		12		
King Salmon	161		0	x	1
Koliganek	40		0		
Levelock	23		15		
Manokotak	61		19		
Naknek	164	x	15		2
Newhalen	28		15		
New Stuyahok	54		17		
Nondalton	42		11	4	1
Quinhagak	95		55		
Pedro Bay	23		0		
Platinum	14		0		
portage Creek	17		0		
South Naknek	52		15		
Togiak	116	x	30		
Twin Hills	20		0		

condition of housing varies widely by community. In some communities, such as Manokotak, Ekwok, and Iliamna, housing is generally regarded as being in very good condition. In other communities, such as Newhalen, Ekuk and even Dillingham, a large percentage of available housing is substandard, poorly insulated, and in need of extensive repairs. The high cost of construction and building materials has exacerbated this situation.

Attempts have been made to compensate for this dearth of adequate housing through the construction of homes financed by state or federal programs. Most HUD housing in the region has been constructed within the past few years. Not all residents are eligible for such housing as certain income requirements must be met. The maximum income allowable for a family to reeligible for such housing is $28,000 per year, but applicants must also have enough cash income to pay the administrative costs of $92 to $125 per month. In some communities, HUD housing has been built in subdivisions separate from older parts of the community while in others such housing is constructed apart from one another and blends in with the older buildings. Generally, the HUD homes are considered to be of good quality and are highly valued. In some communities such as Naknek, however, the HUD houses are of poor quality.

Other forms of housing include cannery bunkhouses, trailers, apartments, and motels. The only apartments in the Bristol Bay region are in Dillingham, Iliamna, and Nondalton. Motels and lodges exist in Dillingham, King Salmon, Naknek, Nondalton, and Iliamna.

In many communities there is a critical shortage of housing during the fishing season, and in Dillingham and Naknek, for example, many of the visiting fishermen and cannery workers must camp wherever they can. In Dillingham, transients camp in a "tent city" composed of tents located near the boat harbor on property owned by Peter Pan Seafoods, the U.S. Army Corps of Engineers, and the City. These individuals usually arrive without having first confirmed that a job exists for them and they stay in makeshift "tents" until they can land a job. In Naknek, land has been set aside for temporary camps for transient fishery workers, and

city officials in Dillingham are contemplating a similar move. In other communities, houses are vacated during the summer while residents move elsewhere to work in the fishery. In Newhalen, for instance, an estimated 80 percent of existing houses are vacant when residents leave to fish throughout the region during the summer months (Environmental Services 1982).

Despite the relatively high proportion of residents in the region who live below the poverty level or who receive various forms of federal and state assistance, the proportion of residents receiving housing assistance has been smaller than in other regions of the state. In 1975, for instance, Nathan and Associates found that only 7.9% of Bristol Bay Natives surveyed received any housing assistance through BIA programs, compared with 9.9% of Natives statewide. Only 6.3% of Bristol Bay Natives surveyed received assistance from the Alaska State Housing Authority compared with 10.1% of Natives statewide. Only 1.6% received FHA assistance and less than one percent were eligible for VA assistante. This compares with statewide participation in these programs of 3.7% by Alaska Natives for FHA, and 3.5% for VA.

4.5.5.3 Energy

The energy system of Bristol Bay is fragmented, dependent upon imported energy sources, expensive, and inadequate to meet the demands of potential growth. The potential in the region for hydroelectric systems and alternative energy sources has yet to be developed on a large scale.

The major forms of energy used in the region are diesel fuel, gasoline, aviation gas, jet fuel, andpropane. The consumption of jet fuel, propane, and diesel fuel comprises 48 percent of the total energy used in the region. Home heating and industrial uses consume 32 percent of the useful energy utilized in Bristol Bay. Transportation and electricity account for the remaining energy uses (Golia 1980:7).

Virtually all communities in Bristol Bay rely upon diesel generators to supply the bulk of their electricity and heating needs. This is a dis-

advantage in two respects. First, diesel fuel must be imported from outside the region. Because of the lack of reliable, cheap modes of transportation as well as the ever-constant possibility of oil shortages even in Alaska, residents are dependent upon energy supplies from outside the state. Second, imported diesel fuel and gasoline is much more costly than centrally distributed systems, hence raising the cost of living in rural areas. Rising diesel fuel prices inflate the monthly bills that consumers receive from their local electrical and oil distributers, and home heating costs and utility bills are expected to continue their current rate of increase (Golia 1980:6). For many rural residents already living below the poverty line, these high energy bills mean they must miss out on other basic amenities.

There are several factors contributing to the high cost of diesel fuel throughout the region. One is the difficulty of transporting and storing fuel in large quantities. Each year the smaller communities must purchase fuel in bulk (usually 55-gallon drums) so their supply will last through the winter. Should supplies run out before the end of winter and it become necessary to transport additional supplies, the cost can be staggering.

Another factor contributing to the high cost of energy is the inefficiency of existing power generation and distribution systems. Fifty-two percent of the useful energy produced is lost as waste heat (through smoke stacks, exhaust pipes, etc.). Diesel electric generation, for example, loses 70% of its heat energy through the stack as radiated heat (Golia 1980:7). The high cost of electricity and heating is regarded by Bristol Bay residents as one of their major problems, and regional utility companies frequently bear the brunt of complaints. In a seminar sponsored by the Alaska Power Authority in 1980, village representatives expressed the need for some type of state or federal assistance to enable local villagers to cope with increasing electrical and home heating costs (Golia 1980:10).

In addition to the high cost of energy in the region, Bristol Bay's existing energy system is not expected to meet future demands. The 1980

Reconnaissance Study by Rutherford Associates indicates that if present trends in population and economic growth continue, the total electrical energy demand of the region will increase by about 4.5% annually. A study conducted by the Institute of Social and Economic Research (Goldsmith et al., 1982), concluded that the rate of growth in demand for electrical energy throughout the region would range between 3.9% and 4.8% annually for the next twenty years, depending on the price and availability of electricity. This demand will not be met by continuing to rely on diesel fuel for electrical power generation.

However, anticipated energy needs could be met through development of indigenous sources of energy and a decreasing reliance upon diesel fuel. There are several forms of energy and electric power which could be developed throughout the region. The hydroelectric power potential of the region is estimated to be over two million megawatt hours per year. The geothermal energy potential of the region is estimated to be 3.5 million megawatt hours per year. The coal resources of the region could provide about 50,000 megawatt hours peryear for the next one hundred years (Gel ia 1980:7).

Several sites were examined by Rutherford Associates (1979) for the possible development of hydroelectric power and the Tazimina Lake, Lake Elva, and Grant Lake sites were judged to be most feasible in terms of cost, capacity, environmental impact, and land status. The potential Lake Tazimina hydroelectric site is located in the Lake Iliamna region of Bristol Bay, approximately fourteen miles from the communities of Nondalton and Iliamna. The Lake Elva and Grant Lake sites are located forty-five and fifty-five miles north of Dillingham respectively. All three sites have the potential for providing over five times the current energy needs of the region, yet proposed transmission lines would only be economical for serving fifteen communities or approximately 65% of the region (Rutherford Associates 1979:XS23). The energy from the Lake Elva and Grant Lake projects could be absorbed immediately by an interconnected Dillingham/ Naknek/King Salmon system but would only provide for short-term energy needs. The Lake Tazimina project would be considerably larger and less costly on a per unit basis but could not

deliver energy at competitive cost until the late 1980s or early 1990s. The project would involve two phases, the first being the construction of two dams, one of which would produce 78,000 megawatt hours per year, and the other, an additional 34,252 megawatt hours per year (Golia 1980:13). Taking into account inflation and contingency costs, the cost for this phase is estimated at $77.7 million. The second phase would call for the addition of extra turbine units and another transmission line, costing an estimated additional $99.6 million. The development of the site would require the installation of 165 miles of transmission lines and would provide electricity for:

Dillingham	Koliganek
Aleknagik	Levelock
Manokotak	Igiugig
Clark's Point	Naknek
Ekuk	South Naknek
Portage Creek	King Salmon
Ekwok	New Stuyahok

An important advantage which favors these potential hydroelectric sites is the attractiveness of a utility inter-tie between Naknek/King Salmon and Dillingham. The Nushagak Electric Cooperative and the Naknek Electric Association would be linked by transmission lines allowing them to share any electrical power generated in the region. An inter-tie would improve the reliability of service to the Dillingham-Naknek areas (Golia 1980:8).

Golia (1980:12) concludes that "without question, hydro-power could lessen the dependency that the region has on diesel generation for electricity, including the use of stove oil for home heating." However, several obstacles are in the way of this development, the most crucial being the risk that these projects could disrupt the annual migratory patterns of salmon upon which the region depends for its economic livelihood. It is estimated that the Nushagak and the Naknek/Kvichak River drainages provide waterways for approximately 60 million adult salmon,

including young salmon fry, migrating out to the high seas (Golia 1980:12). Another obstacle is that a number of potential hydroelectric power sites fall within special state and federal management areas.

In addition to hydroelectric power, Bristol Bay has often been cited as a suitable area for the development of wind power generators.

> Certain areas of the Bristol Bay region have a long history of windmill use. In the early years of the commercial salmon fishery, wind power was used to 'pump' water from water sources to processing facilities. In several cases, windmills were used by private individuals to acquire water from wells. Wind generators were also used by local villagers to charge 12 volt batteries, used as a source of electricity for radio communications and home lighting in the villages during the early years (Golia 1980:21).

Wind generators are already operating in the communities of Naknek, Newhalen, Iliamna, Pedro Bay, and King Salmon.

Other potential sources of energy have been proposed for the Bristol Bay region. To the north, where forests grow, wood has long been used as a source of fuel for the home. The escalation of diesel fuel costs has made wood an important alternative for home heating. Wood gasification has also been proposed for the region, but no feasibility studies have been conducted. Other sources of energy include peat, available in great quantities throughout the region, and bio-mass conversion, but their feasibility has yet to be determined. The feasibility of mining peat in the Bristol Bay region is currently under study by the Bristol Bay Native Corporation and Choggiung Limited. An experimental mining operation, the Belt Creek Peat Project, is underway in the Dillingham area, funded by a $165,000 state grant. This energy source is believed to hold significant potential for the future since it has been estimated that "enough peat lies beneath the flats north of Dillingham to supply the city's electrical needs for some 50 years," according to a consultant's estimate published in the Bristol Bay Times.

Geothermal energy utilization is also considered to have great potential throughout the region. However, there are several problems with the development of these resources. Most if these resources are on the Alaska Peninsula, which is one of the least populated subregions in the area. Therefore, energy demand in the immediate vicinity of the resource is not particularly high. In addition, the estimated costs for research and development of these sites are high. Rutherford and Associates (1980) estimates that the cost of development of a 25 Mega-Watt plant would be in the 50 to 80 million dollar range. Recent withdrawals of federal land in the region also is believed to result in difficulties in both development and transmission.

There are four subregional electrical cooperatives in the Bristol Bay area. The Alaska Village Electric Cooperative (AVEC), a statewide rural electrification cooperative, provides service to the communities of Togiak, Goodnews Bay, Quinhagak, and New Stuyahok. A $5 membership fee is charged for the initial hook-up, and rates for a residential unit in 1983 were 37.2 cents/kwh plus a 10.94 cent/kwh fuel surcharge. A state subsidy, however, provides a reduction of 23.69 cents/kwh for the first 600 kilowatt hours each month.

The Nushagak Electrical Cooperative provides electrical power to the communities of Dillingham and Aleknagik. All electricity is generated at a power plant located in Dillingham which operates five diesel generators with acombined generating capaci tyof 3,850 kW. Cost to residential consumers in 1981 was $ 0.20 per kW hour. Power is distributed by overhead cabl esexcept for one short segment of buried cable along the west side of the airport. Single-phase sections were being upgraded to triple-phase in 1981 and 1982, and sectionalizes were also being installed to better balance the load and prevent serious voltage drops in some parts of the system (DOWL 1982).

The Naknek Electrical Association (NEA) provides power to the communities of Naknek, King Salmon, and South Naknek. There were 174 consumers in Naknek, 95 in King Salmon, and67 in South Naknek in 1982 (Environ-

mental Services 1982). Most of the canneries in Naknek and the air force base in King Salmon are tied into the system but use their own generators once they begin processing. The NEA has ten generators with the following kilowatt ratings: three 350 kW, three 440 kW, two 1,150 kW, and one 1,000 kW generator. Residents and single customers receive single-phase service. Three-phase service is provided for commercial customers. In June 1982 overhead transmission lines distributed power to the community at a base rate of $ 0.30 per kW hour plus a fuel surcharge. The original service line carries 7,200 volts to Naknek and South Naknek. Another line carries 14,400 volts to King Salmon (Environmental Services 1982).

The Iliamna-Newhalen Electrical Co-op was formed in 1977 to provide power to the communities of Iliamna, Newhalen, and Nondalton. Funding for this project was received in 1982, and three 330 kW generators were placed in Newhalen, chosen for its proximity to the Newhalen River and for convenience for fuel shipment. Poweris distributed to all three communities by means of overhead lines.

Local energy systems are outlined in Table 4-34 below. In several communities, energy is obtained from generators which supply local schools for the nine-month school year. During the summer months, small village-owned and individual generators provide enough power to meet local demand. In larger communities, village-owned and operated generators provide electricity. Other energy sources include canneries and state and federal facilities in the region.

Even with thehigh cost and inefficiency of diesel generators, in the short-term this form of energy production will continue to be relied upon in most of the rural communities in the region. In the communities of Clark's Point and Levelock, local residents rely upon individual private diesel generators to supply their energy needs rather than upon community-owned generators as is the case elsewhere. This adds to the high fuel consumption costs for the villagers in these two communities. In other communities supply of energy is constrained by the lack of adequate storage tanks. In communities such as Togiak, Iliamna, and

Table 4-34

Electrical Power and Fuel Storage Facilities

in Bristol Bay Communities, 1982

Community	Community-wide Electrical System	Power Generation Capacity	Wind Generators	Fuel Storage Capacity (gal)
Aleknagik	x	3,850(a)		
Clark's Point				65,000
Dillingham	x	3,850(a)		2,500,000
Ekuk				
Ekwok	x	190		29,000
Goodnews Bay	x	370		60,000
Igiugig				50,000
Iliamna	x	990(b)	x	56,000
Kakhonak				30,000
King Salmon	x	6,170(c)	x	na
Koliganek	*	180		na
Levelock	*	250	**	73,000
Manokotak	x	610		60,000
Naknek	x	6,170(c)	x	898,500
Newhalen	x	990(b)	x	350,000
New Stuyahok	x	300		58,000
Nondalton	x	990(b)		4,000
Quinhagak	x	410		212,000
Pedro Bay			x	na
Platinum	x	160		180,000
Portage Creek	*			21,000
South Naknek	x	6,170(c)		0
Togiak	x	770		114,470
Twin Hills	*	112		22,000

* In these villages, power is provided to many homes from the school generator at least nine months of the year.

** A 33 kW wind farm has been proposed as part of a village electric cooperative. The current status of this proposal is unknown.

(a) = Shared through the Nushagak Electrical Cooperative
(b) = Shared through the Iliamna-Newhalen Electrical Cooperative
(c) = Shared through the Naknek Electrical Association

Nondalton the lack of sufficient tanks results in fuel shortages during the winter and the occasional emergency shipment of fuel by air which is considerably more expensive than fuel transport by barge or skiff.

In addition to the major hydropower projects proposed for the Bristol Bay region, seven sites in the region have been identified as having the potential for small-scale hydroelectric power development. These include sites near the study communities of Togiak, New Stuyahok, Iliamna, Nondalton, and Newhalen. The site near Togiak is estimated to have the potential of producing 30kW of power, or 14% of the total 1978 power demand of the community, and would cost between $1 million and $1.3 million. The project near New Stuyahok has the potential of producing 55 kW of power or 51% of the total 1978 power demand and would cost between $1.7 and $2.1 million dollars. "Unfortunately, the project is considered by the Alaska Power Administration to be unfeasible because of such factors as winter-time stream flow observations and head height and pipe length" (Golia 1980:20).

4.5.5.4 Water and Sanitation

An adequate supply of potable water and proper disposal of wastes are two major concerns throughout the Bristol Bay region. As Table 4-35 indicates, only ten of the study communities have community-wide water supply and distribution systems, and only eight communities have community-wide sewage disposal systems. Naknek has a water supply and sewage system which provides service to only a part of the community and complete systems are under development. Because of inadequate maintenance and environmental conditions, the water and sewage systems of Goodnews Bay cannot presently be used. Elsewhere water is collected and sewage disposed of on an individual basis.

Table 4-35

Water and Sanitation Facilities in Bristol Bay Communities, 1982

Community	Water	Community	Solid Wastes		Sewage
	Public System	Source	Maintained Dump Site	Collection	Public System
Aleknagik		x	x		
Clark's Point		x	x		
Dillingham		x	x		x
Ekuk		x	x		
Ekwok		x			
Goodnews Bay		x	x		x
Igiugig		x			
Iliamna			x		
Kakhonak		x	x		
King Salmon		x	x		
Koliganek	x				x
Levelock		x	x		
Manokotak	x	x	x		x
Naknek	*	x	x		*
Newhalen		x			
New Stuyahok	x	x	x		x
Nondalton	x		x		x
Quinhagak	x	x			
Pedro Bay		x			
Platinum	x	x			
Portage Creek		x			
South Naknek		x	x		
Togiak	x	x	x		x
Twin Hills	x	x	x		x

* Complete water and sewage systems in Naknek are under construction.

In communities where water and sewage systems are the responsibility of the city government a flat fee is charged to customers. In Togiak, households are charged $38 per month for these services, while in New Stuyahok a fee of $5 per month is charged for the sewage system and $15 per month for the water.

Water in most communities is obtained from community wells, individual wells, and surface lakes and streams. This water is usually untreated and varies in quality. Occasionally a well will run dry or become contaminated and new wells must be dug. Most of the existing water supply systems were installed by the U.S. Public Health Service in the 1970s. These systems usually consist of a community well, a pumphouse with small diesel generator, and six inch mains. In some communities such as Quinhagak, a "washeteria" serves as a central distribution point and water distribution is not metered. In many cases, the water is treated before distribution, although in a few communities such as New Stuyahok the water is considered tobe of such good quality that it is left untreated.

The provision of adequate water supplies in communities throughout the region has always been a top priority because of the potential for contamination and disease. In the past, outbreaks of infectious and parasitic diseases have been linked to contaminated water. Moreover, the potential for population increase and commercial economic growth carries with it the threat of water shortages, In Dillingham, for example, a severe shortage of water occurred in the summer of 1983, due in part to the dilapidated main water tank and in part to the expansion of two local fish processing facilities. In the 1980 reporton "The Villages of Bristol Bay and their Development Priorities" the communities of Aleknagik, Clark's Point, Ekuk, Ekwok, Igiugig, Kakhonak, Levelock, Naknek, and Portage Creek each indicated that improvements in existing water supplies or the developmentof new water systems were high development priorities (Beck 1980).

Most of the communities in Bristol Bay continue to rely on privies, cesspools, and "honeybuckets" for sewage disposal. Dillingham, King

Salmon, and Naknek have limited systems which do not serve all of the community. In Dillingham the existing sewage system serves only the older sections of the city, while in communities such as Clark's Point, Naknek, and Togiak a limited system serves recently constructed HUD subdivisions. Usually there will be one or two septic tanks in each community which handle sewage disposal for the local school and individual residents. In a few communities septic tanks have been inefficient because of poor soil conditions. Existing sewage systems rely upon 4- to 8-inch lines for collection and septic tanks or aerated lagoons for treatment. In some communities the sewage is collected but not treated; in others such as Quinhagak local environmental conditions prevent the construction of cost-effective systems. In the 1980 report on "The Villages of Bristol Bay and their Development Priorities" the communities of Aleknagik, Clark's Point, Ekwok, Igiugig, Kakhonak, Levelock, Naknek, Portage Creek, and Twin Hills identified improvements in existing sewage systems or the development of new systems as high development priorities (Beck 1980).

The Naknek Public Utilities District No. 1 was formed in 1950 to remedy local sanitation problems. With the aid of a state grant of $4 million, a community sanitary system is scheduled for construction this year. This system, which will service all of Naknek, will include a collection 1 ine and a primary treatment lagoon (Environmental Services 1982). The sewage system in New Stuyahok is slated for substantial improvements in 1984.

Solid waste is generally disposed of using open dumpsites and sanitary landfills. Control led sites existin sixteen communities, while the others either have uncontrolled dumpsites or have no sites at all. Even among those communities with controlled sites most are unfenced so that trash may fly about, thus adding to the litter problem, and animals may root among the garbage and spread disease (Bristol Bay Regional Specific Health Plan 1979:25). Usually responsibility for solid waste disposal is assumed on an individual basis, although in seven of the communities a collection service assumes this duty. Four communities--Aleknagik, Kakhonak, Nondalton, and Togiak--identified improvements of existing

dumpsites or developmentof new landfills as high priorities in the 1980 report on "The Villages of Bristol Bay and their Development Priorities" (Beck 1980).

4.5.6 Government Spending

Unprecedented gains in the fishing sector were not solely responsible for the substantial economic growth in the latter 1970s. Government expansion, stimulated principally by state oil and gas revenue increases, left most of Alaska's rural communities untouched, including Bristol Bay.

According to combined data from Rogers (1982) and BEA, personal income from civilian government activity, including transfer payments, grew from $4.6 million in 1970, representing 7% of resident personal income, to $22.2 million in 1980, representing 15% of resident personal income (see Figure 4-2). Over the same period, as a proportion of total employment, civil ian government employment increased from 49 to 56% according to the U.S. Census.

Collectively, federal, state, and local government programs for spending and employment have accelerated more rapidly than most private segments of Bristol Bay's economy. Compared with strong growth in Bristol Bay private sector employment, which averaged 5.4% per year from 1970 to 1980, government employment grew at8.4% per year over the same period.

State and local government programs represent the bulk of public sector expansion since 1970. For example, personal income from state government commanded an increasing share of total personal income from government activity, rising from 59% in 1970 to 73% in 1980. The changing role of state government is clearly illustrated in patterns of legislative capital appropriations. In 1973 the Alaska Legislature appropriated a total of $300,000 for transportation projects in five Bristol Bay communities. As shown in Table 4-36, legislative capital appropriations to study-area communities ranged from $1 million to over $14 million between 1978 and 1984, averaging about $.5 million per year for

TABLE 4-36 SUMMARY OF CAPITAL APPROPRIATIONS
1978 TO 1984
(Thousands of Current Dollars)

SUB REGION	COMMUNITY	1978	1980	1981	1982	1983	1984	TOTAL ALL YEARS
1 LOWER KUSKOKWIM								
	QUINHAGAK	NA	0	150	0	NA	55	NA
	PLATINUM	NA	41	426	125	NA	240	NA
	GOODNEWS	NA		295	250	NA	0	NA
	SUM	NA	1;:	871	375	NA	295	NA
	MEAN	NA	38.7	290.3	125	NA	98.3	NA
2 MESTERN								
	TOGIAK	0	262.5	3800	674.2	320	89	5145.7
	TWIN HILLS	266	250	75	0	0	0	591
	MANOKOTAK	0	0	345	0	153	40	538
	ALEKNAGIK	0	257	2057	3193	750	476	6733
	SUM	266	769. S	6277	3867.2	1223	605	13007.7
	MEAN	66.5	192.4	1569.2	966.8	305.8	151.3	3251.9
DILLINGHAM								
	DI LLINGHAM	98	7829.6	2305	2649	2332	2963	18176.6
4 NUSHAGAK								
	CLARKS POINT	0	0	75	0	0	0	75
	EKUK	0	0	0	0	250	0	250
	PORTAGE CREEK	0	0	325	0	0	0	325
	EKWOK	0	0	420	250	31	73	774
	NEW STUYAHOK	0	0	625	265	0	370	1260
	KOLIGANEK	18	12.5	0	250	453	0	733.5
	DILL SUBAREA	0	0	0	0	0	0	0
	SUM	18	12.5	1445	765	734	443	3417.5
	MEAN	2.6	1.8	206.4	109,3	104.9	63.3	488.2
5 ILIAMNA/KVICHAK								
	NONDALTON	0	75	262	250	0		1087
	NEWHALEN	0	290	710	283	140	1;:	259:
	IL IAMNA	0	25	155	50	200	170	600
	PEDRO BAY	0	75	1090	0	580	500	2245
	KAKHONAK	200	0	912	0	0	0	1112
	IGIUGIG	0	0	0	0	286	1043	1329
	LEVELOCK	0	0	0	0		2130	2130
		200	465	3129	583	120:	5513	11096
	MEAN	28.6	66.4	447	83.3	172.3	787,6	1585.1
6 BRISTOL BAY BOROUGH								
	NAKNEK	90	210	730	3850	0	1420	6300
	KING SALMOM	0	39.5	0	825	70	425	1359 .5
	SOUTH NAKNEK	0	0	0	0	0	87	87
	BBB SUBAREA	0	0	0	0		0	
	BB BOROUGH	0	600	500		12:	300	152:
	SUM	90	849.5	1230	467;	195	2232	9271 .5
	MEAN	18	169.9	246	935	39	446.4	1854 .3
ALL VILLAGES								
	sun	NA	10042.1	15257	12914	NA	12051	NA
	MEAN	NA	418.4	635.7	538.1	NA	502.1	NA

SOURCE: Alaska State Legislature, free Conference Committee, Operating and Capital Budget by Election District, 1978, 1980, 1981, 1982, 1983, and 1984.

each community.

These appropriations are made for projects in education, health, community facilities, transportation, and public utilities. They represent spending over and above state agency planned budgets for capital improvement projects (CIP). For example, tracing Department of Transportation and Public Facilities (DOTPF) spending from February 1981 to May 1983, and being careful not to duplicate allocations shown in Table 4-36, indicated that DOTPF authorized an additional $36.8 million in capital projects, of which $29.9 million was spent. Presumably other state agencies administered in-house CIP programs as well. Evidence from statewide CIP spending patterns indicates that about 40% of appropriations like those in Table 4-36 are spent in the year authorized, and 30% in the next year, with the remainder distributed over the following year or two.

Another important source of state government activity is revenue sharing. There were two revenue-sharing programs in 1980 and 1981, one administered by Department of Community and Regional Affairs (DCRA) and the other by the Departmentof Revenue (DOR). In 1982 a third program was introduced by the Department of Administration (DOA). Revenue-sharing programs generally provide funding for locally controlled projects involving public protection, planning, transportation, health, and miscellaneous facility construction. Total state revenue-sharing disbursements steadily increased from $.7 million in 1980 to $6.2 million in 1982 for all 21 study-area communities combined. Although modest in scale when compared with yearly capital appropriations from the State Legislature, revenue-sharing expenditures probably have higher retention in Bristol Bay's local economy.

State public assistance payments probably amount to about 25% of 1980 total transfer payments in Bristol Bay. Table 4-37 presents the distribution of State public assistance payments across the study area for 1981 and 1982. Transfer payments are important because they represent direct cash injections into the economy, which probably trigger higher secondary expansion per dollar than other forms of government spending.

Federal government programs also represent a sizable element in Bristol Bay's public sector. The Public Health Service (PHS), Bureau of Indian Affairs (BIA), Economic Development Administration (EDA), and Housing and Urban Development (HUD) agencies account for the bulk of federal government activity in Bristol Bay. As shown in Table 4-38 HUD played a significant part in overall housing stock expansion. Between 1970 and 1983, 303 units were installed and occupied with additional units planned for later years. By 1980, HUD housing accounted for over 12% of total owner-occupied housing units in the 24-village study area.

An unknown, but possibly significant, proportion of capital project spending may have accrued to non-local engineers, planners, consultants, and construction crews based outside of the study area. Finally, even transfer-payment cash injections are subject to the same patterns of resident spending outside of the local economy.

TABLE 4-37 STATE PUBLIC ASSISTANCE PAYMENTS
(Thousands of Current Dollars)

SUB REGION	COMMUNITY		1981	1982
1 LOWER KUSKOKWIM				
	QUINHAGAK		111.8	181.3
	PLATINUM		5.1	5.3
	GOODNEWS		43.8	46.2
		SUM	160.7	232.8
		MEAN	53.6	77.6
2 WESTERN				
	TOGIAK		53.3	70.0
	TWIN HILLS		6.2	4.1
	MANOKOTAK		30.4	15.7
	ALEKNAGIK		17.3	13.9
		SUM	107.2	103.7
		MEAN	26.8	25.9
3 DILLINGHAM				
	DILLINGHAM		104.1	163.4
4 NUSHAGAK				
	CT-ARKS POINT		2.8	0
	EKUK		0	0
	PORTAGE CREEK		0	0
	EKWOK		24.9	30.3
	NEW STUYAHOK		76.2	85.2
	KOLIGANEK		84.9	29.8
	DILL SUBAREA		0	0
		SUM	188.8	145.3
		MEAN	26.1	20.8
5 ILIAMNA/KVICHAK				
	NONDALTON		66.2	53.9
	NEWHALEN		3.8	3.6
	ILIAMNA		0	14.1
	PEDRO BAY		0	0
	KAKHONAK		26.6	34.1
	IGIUGIG		16.7	10.5
	LEVELOCK		2.1	2.7
		SUM	115.4	118.9
		MEAN	16.5	17.0
6 BRISTOL BAY BOROUGH				
	NAKNEK		17.9	13.3
	KING SALMON		4.2	2.7
	NAKNEK		0	0.
	BBB SUEAREA		0	0.
	BB BOROUGH		0	0.
		SUM	22.1	16
		MEAN	4.4	3.2
ALL VILLAGES				
		SUM	698.3	780.1
		MEAN	29.1	32.5

Alaska State Legislature Operating Budget. Income transfer data reflect State Public Assistance payments only. They do not include Longevity Bonuses or Senior Citizen Homeowner Taxes.

TABLE 4-38 NUMBER OF HUD HOUSING BUILT

SUB REGION	COMMUNITY	DATE OF FULL AVAILABILITY PRE 1970	1970-1975	980	98	982	1983	ALL YEARS
1 LOWER KUSKOKWIM								
	QUINHAGAK	0	0		0	0	0	55
	PLATINUM	0	0	0	0	0	0	0
	GOODNEWS	0	20	0	0	0	0	20
	SUM	0	20	55	0	0	0	75
2 WESTERN								
	TOGIAK	0	0	30	0	0	0	30
	TWIN HILLS	0	0	0	0	0	0	0
	MANOKOTAK	19	0	0	0	0	0	19
	ALEKNAGIK	0	0	0	0	0	9	9
	SUM	19	0	30	0	0	9	58
DILLINGHAM								
	DILLINGHAM	0	0	50	0	20	0	70
4 NUSHAGAK								
	CLARKS POINT	0	0	0	15	0	0	15
	EKUK	0	0	0	0	0	0	0
	PORTAGE CREEK	0	0	0	0	0	0	0
	EKWOK	0	0	0	0	0	0	0
	NEW STUYAHOK	0	17	0	0	0	0	17
	KOLIGANEK	0	0	0	0	0	0	0
	SUM	0	17	0	15	0	0	32
LAKE/KVICHAK								
	NONDALTON	0	0	0	0	0	11	11
	NEWHALEN	0	0	0	0	0	15	15
	ILIAMNA	0	0	0	0	0	0	0
	PEDRO BAY	0	0	0	0	0	0	0
	KAKHONAK	0	0	0	0	0	12	12
	IGIUGIG	0	0	0	0	0	4	4
	LEVELOCK	0	0	0	0	0	15	15
	SUM	0	0	0	0	0	57	57
6 BRISTOL BAY BOROUGH								
	NAKNEK	0	0	15	0	0	0	15
	KING SALMON	0	0	0	0	0	0	0
	SOUTH NAKNEK	0	0	15	0	0	0	15
	SUM	0	0	30	0	0	0	30
ALL VILLAGES								
	SUM	19	37	165	15	20	66	322

SOURCE: U.S. Department of Housing and Urban Development, Special Tabulations.

4.6 Support Sector

As noted at the beginning of this chapter, the support sector of the cash-based economy is closely related to the government sector. construction, housing, and public utilities which rely upon government sources for support and which are contingent upon government policies, are also viewed as part of the support sector. In this section, we discuss two major components of the support sector not already addressed in our analysis of the government sector: transportation and communications.

4.6.1 Transportation

Numerous forms of air, sea, and land transport are used throughout the Bristol Bay region. In traveling between Bristol Bay and other parts of the state, air transport is the primary mode and sea transport the secondary mode. In traveling throughout the region, the primary modes are air and water transport. Among the villages in the area there are less than sixty miles of connecting roads and most of these are poorly maintained. Air transport is the primary means of passenger traffic throughout the region; fuel and other supplies are principally transported by boat. In traveling among villages in the same subregion, air, sea, and land transport are all used. During the winter, snowmobiles are an important means of travel between villages. At the local level the primary means of transport are boats, three-wheelers, passenger automobiles and trucks, and snowmobiles during the winter.

Several different social and environmental factors limit the transportation networks throughout the region. Although the need for efficient transportation within the region and between Bristol Bay and the outside world is widely recognized by local residents, many fear that improved transportation will lead to rapid population growth throughout the region. Little interest has been expressed, for example, in linking the region by road with the rest of the state. Climatic conditions and difficult terrain also discourage road construction and maintenance.

Water transport is hampered by the lack of docking facilities in many communities. Moreover, air transport is limited by the lack of airfields of sufficient length and having modern facilities and navigational aids. In fact, only one airfield intheregi on is capable of handling jet transport. Further, all these forms of transportation are greatly affected by the weather conditions. Each of these limitations adds to the cost of transportation throughout the region and serves as a constraint on potential population growth and economic development. They also impose certain structural parameters on patterns of social organization.

4.6.1.1 Air Transport

Considering the location of villages scattered widely over the region, airplane travel is the most practical form of transportation and the most useful in case of emergency. The communi ties of the Bristol Bay region are linked with the outside world primarily by regularly scheduled flights as well as by chartered flights. Dillingham, King Salmon, and Iliamna are all served by regular air service from Anchorage. Wien Air Alaska provides regularly scheduled service to Bristol Bay from Anchorage.

Several different commercial airlines provide service throughout Bristol Bay and most are based in subregional centers. Dillingham, King Salmon, and Iliamna serve as subregional air transportation hubs, and each is the home base for two or more carriers. Mail coming to these centers from Anchorage is distributed to the surrounding villages. These locations also serve as centers of air passenger traffic in the region because all the major air taxi services are based there. Peninsula Airways is based in King Salmon, and Grietchen's Air Taxi and King Flying Service are based in Naknek. All three provide service to communities throughout the Naknek/King Salmon and Iliamna subregions. Dillingham Air Services, Yute Air Alaska, Southwest Airlines and Armstrong Air Service are all based in Dillingham and provide service to the Nushagak and Togiak subregions. Iliamna Air Service and Talarik Creek Air Taxi operate out of Iliamna and provide service to communities

in the Iliamna subregion.

Table 4-39 provides information on the airfields in the Bristol Bay region and the air carriers providing service to them. Each community is serviced by at least one regularly scheduled airline. As can be seen from twistable, however, most of the airfields are smal 1 with gravel surfaces. Many of these fields become muddy in the winter and spring, anda few, such as the fields in Manokotak, Twin Hills, and Pedro Bay, are subject to hazardous cross winds and wind sheer. Only the airports at Dillingham, King Salmon, Iliamna, and Naknek have lighted runways and any form of navigational equipment, and the only paved runways are in King Salmon and Naknek. The airports in King Salmon, which also serve as the King Salmon Air Force Base, are the major transportation hubs for air traffic in and out of the region. These airports are the only ones in the region capable of handling jet aircraft. A new field in Togiak, however, capable of accommodating larger and/or jet commercial aircraft, is currently under construction.

Most of the airports in the region were constructed and are owned by the state, with the exception of the airfield at Ekuk which is privately owned. The State Department of Transportation assumes responsibility for them and typically contracts with a member of each community to maintain the airfield with a grader. This individual also maintains local roads with the same equipment. In many communities the State Department of Transportation has allocated funds for runway extension, surface improvements, or construction of entirely new fields to avoid hazardous wind conditions.

Air

	Number of Airstrips	Length of longest strip (feet)	Surface	Service: Scheduled Carriers	Service: Charter Carriers
Aleknagik	2	2,000	G	Y	Y,S,A
Clark's Point	1	2,738	G		Y,S,A
Dillingham	1	6,404	G/P	W,Se Y,S,A	Y,S,A,
Ekuk	1	1,200	D/G		Y,S,A
Ekwok	1	2,200	G		Y,S,A
Goodnews Bay	2	2,900	G	Y,W,Se	Y,S,A
Igiugig	1	2,700	G		P,I,T,Ki
Iliamna	2	4,800	G	W	I,T,Ki
Kakhonak	1	1,600	G	I	P,I,T,Ki
King Salmon	2	8,515		W,P,Ki,Se	P,Ki,
Koliganek	1			Y	Y,S,A
Levelock	2	2,100	G		Y, S,A,Ki
Manokotak	1	2,600	D/G	Y	Y,S,A
Naknek	1	1,700	D/G	Ko,P,Ki,G	P, Ki,G
Newhalen	(see Iliamna)				
New Stuyahok	1	2,160	D/G	Y	Y,S,A
Nondalton	1	2,250	G	I	P,I,T
Quinhagak	1	2,800	G	Y,W,Se	Y,S,A
Pedro Bay	1	1,800	D	I	P,I,T
Platinum	2	4,000	G	N/A	N/A
Portage Creek	1	1,900	S		Y,S,A
South Naknek	2	3,000	D/G		P,Ki ,G
Togiak	2	2,600*	G	Y	Y,S,A
Twin Hills	1	2,000	G	Y	Y,S,A

Legend: Airfield surface - D=dirt, G=gravel, P=paved, S=sand
Air Carriers A=Armstrong Air Service, G=Grietchen Air Taxi, I=Iliamna Air Service, Ki=King Flying Air Service, P=Peninsula Airways, S=Southwest Airlines, Se=Seair, T=Taralik Creek Air Taxi, Y=Yute Air Alaska, W=Wien Air Alaska

* The runway of the new airfield under construction in Togiak is estimated to be 4,800 feet long.

Water transport between Bristol Bay and the rest of Alaska and the United States is provided by a few shipping companies which transport supplies and freight into the region and processed seafood products out of the region. The most common forms of water transport in Bristol Bay are the skiff, the fishing boat, and the barge.

Water transportation is possible only during the 5 to 6 ice-free months of the year. Commercial fishing, fish processing, and construction industries ship a large amount of freight, and residents generally arrange for personal freight to be shipped in conjunction with these larger shipments. Due to the high cost and limited selection of goods throughout the region, supplies are usually ordered by individuals and delivered by ship in bulk (DOWL 1982).

Dillingham is the regional center for water transport in Bristol Bay. A few larger vessels belonging to shipping lines such as Foss Alaska, PAL, and Northland Services regularly visit Dillingham three or four times each year." Smaller barge companies such as Smith's and Moody's Lighter. age Companies transport fuel and supplies to many of the smaller villages.

Dillingham has a municipal dock which is the only public dock available to independent fishermen, off-shore processors, and fish buyers in the area. Numerous services and amenities are available at the dock including showers, loading and offloading of fishing boat and processor supplies, and reloading of all lighterage boats. City personnel are responsible for supervision of all cargo equipment. A new $732,000 dock staging area was completed in Dillingham in November 1981.

There is a small boat harbor in Dillingham which is inadequate for the existing fishing fleet of approximately four hundred boats. The average number of vessels using the harbor daily during the period of May through August in 1980 and 1981 was 150 and 190, respectively. The remaining boats were forced to anchor up the Wood River, at Aleknagik,

in the Clark's Point area, or elsewhere. The U.S. Army Corps of Engineers completed an expansion study in January 1983 which is currently being reviewed by the State.

There are three subregional centers for water transport in Bristol Bay, Togiak, Dillingham, and Naknek. Fuel and other supplies are transported by barge from these centers to nearby communities. Smith and Sorenson Lighterage companies provide service to communities along the Nushagak River, and Moody's Barge Company provides service from Naknek to communities in the Bristol Bay Borough and Iliamna subregions.

Skiffs and 32-foot fishing vessels are used for travel between villages and hunting and fishing camps, and are used to haul supplies. In communities close to Dillingham, supplies are often transported by skiff. Skiffs, however, are of little use during the winter months when lakes and streams are frozen over.

Skiffs and fishing vessels are the primary mode of water transport in local areas. Docking facilities, nonetheless, are few and far between. Usually supplies must be lightered to a community from larger barges by skiffs and other small vessels. Those communities with canneries have commercial wharfs and docks, but they are usually not available to the public. A few communities such as Aleknagik and Levelock are in the process of constructing small docks for local use, and the Bristol Bay Borough is also in the process of completing its own dock facility east of Naknek.

4.6.1.3 Ground Transport

There are no roads linking the Bristol Bay region with other parts of the state and, as noted above, residents throughout the region appear to prefer the status quo. An overland crossing between Iliamna Bay on Cook Inlet and Anchorage Bay on Iliamna Lake is used to transport boats and goods to Iliamna Lake and Bristol Bay villages during the sumer months.

As mentioned above, ground transportation throughout the Bristol Bay region is limited by the lack of adequate roads. There are only sixty miles of roadway throughout the region, and most of that is either dirt or gravel. It is not possible to use road surfaces to travel throughout the region, so road transportation is limited to travel within communities or in a few instances, between communities.

Only a few roads exist which link villages within the region into clusters. The communities of Dillingham and Aleknagik are connected by the 22 mile "Lake Road" which is the longest in the Bristol Bay region. Naknek and King Salmon are linked by a 15.5-mile road, and Iliamna and Newhalen are linked by a 9-mile road. Other communities in the region are merely linked together by trails.

Most communities have dirt or gravel roads within village or city limits, but these are usually poorly maintained and become very muddy in the spring. Only a few miles of roadway in the entire region are paved, and these are usually maintained by the State Department of Transportation near subregional airports. Dillingham has about four miles of paved road in town, completed in 1982.

The most common forms of transportation within villages are three-wheelers, snowmobiles in the winter, and passenger vehicles, usually pick-up trucks.

4.6.2 Communications

The communications systems serving the Bristol Bay region are similar to those found throughout Alaska. Satellite telephone links provide the primary means of communication both within and outside of the region while radios, satellite television, mail service, and newspapers vary widely from community to community.

The primary mode of communications throughout the region is the telephone. ALASCOM, Inc. provides long-distance satellite telephone service to all the study communities in the Bristol Bay region. Some communities have ALASCOM earth stations while others have radio links to the earth stations in King Salmon, Togiak, Dillingham, and Iliamna. The ALASCOM system is the only region-wide telephone system. When it was first established in the 1960s, there were frequent complaints regarding the qualityof service. Since that time, however, many of the ''bugs" have been worked out and service is generally regarded as adequate.

There are four subregional telephone systems providing service to the study communities in the Bristol Bay and lower Kuskokwim regions. The largest is the Nushagak Telephone Cooperative which provides local exchange service to the communities of Dillingham and Aleknagik. As of November 1981 the system consisted of 946 stations, including 390 residential and 202 business main stations, and 56 residential and 298 business extensions in Dillingham, and 35 residential stations in Aleknagik.

Eighteen lines for long distance communications via satellite are provided by ALASCOM. Major improvements were made to the system in 1977. Reliability is considered excellent and the telephone system currently provides for all of Dillingham's local and long distance needs. In 1982, monthly telephone fees were $16 for residences and $24 for businesses. The Nushagak Telephone Cooperative also provides service to Aleknagik.

Another subregional telephone network joins the communities of Iliamna and Newhalen. The Interior Telephone Company provides service to these communities with a total of 125 hook-ups and the capacity for a total of 400 hook-ups. Long distance calls are still provided by ALASCOM through a satellite earth station in Iliamna.

The Bristol Bay Telephone Cooperative (BBTC) provides local telephone service to Naknek, South Naknek, and King Salmon. There are 200 units in Naknek, 200 in King Salmon, and 40 in South Naknek. The system of underground cables has the capacity to expand to over 10,000 hookups. Long distance service is provided by ALASCOM through an earth station located in King Salmon.

United Utilities provides telephone service to the communities of Quinhagak, Goodnews Bay, and Togiak. In 1983 there were 73 households with telephones in Togiak, 53 households in Quinhagak, and 22 households in Goodnews Bay. One or two part-time employees in each of these communities handle minor repairs and service requests while major repairs, installations, and equipment maintenance are performed by employees stationed in Bethel. Initial hook-up charges in 1983 were $71.50; the basic monthly service charge is $17.75.

Most of the small communities throughout the region have only one telephone which is linked by radio to an ALASCOM earth station. The telephone is usually kept in the village corporation office, community hall, clinic, or cooperative store, although in some cases it is located in a private residence. These locations are not always open 24 hours a day, however, and the person with a key to the building is not always available; hence, access can be limited. At least one village had its phone service discontinued for failure to pay its bill and at least four others have been faced with such drastic action when payment was late (Bristol Bay Regional Specific Health Plan 1979:25). In those communities without telephone systems, the citizens band radio is the most common means of communicating with other local residents.

4.6.2.2. Mail

All but one of the study communities has an established U.S. Post Office. Mail is delivered to each community by regularly scheduled air transport. As noted above, mail is delivered by air from Anchorage to Dillingham, Bethel, King Salmon, and Iliamna and from there is flown to the smaller villages. Mail flights range from weekly to daily, depend-

i ng upon the community. Because the mail depends on the flying weather, it is subject to considerable delays during winter. Some villages may not receive mail for several weeks because of bad flying weather (Bristol Bay Regional Specific Health Plan 1979:25).

4.6.2.3 Television

All the study communities in the Bristol Bay region with the exception of Ekwok receive the State satellite demonstration project television programs. At least one station, the state educational station, is available and usually a community receives two different stations through ALASCOM earth stations. Most homes have television sets although many communities only recently began to receive satellite and other television channels. Home video recorders are also a popular form of television entertainment throughout the region.

Many communities receive additional television channels by means of a local satellite dish. Some communities receive broadcasts from the armed forces station in King Salmon. Television in Manokotak is received by a satellite dish owned by the village corporation, and the village is served by cable hook-ups providing four channels. Television service cost $20 a month in 1982. The corporation's TV dish, installed in 1981, has access to an additional twenty-two channels (DOWL 1982). Cable television is also available in Igiugig.

4.6.2.4 Radio

Radio Station KDLG in Dillingham broadcasts throughout the Bristol Bay region. The station is on the air eighteen hours a day during winter and twenty-four hours a day during the summer. Station KYUK in Bethel provides service to communities in the Yukon-Kuskokwim region. Both stations offer a variety of music, education, and news programs, and also has a "community bulletin board" which broadcasts messages for individuals and organizations in the area. Messages for each village are also broadcast at regularly scheduled times. The Armed Forces Radio Network is broadcast from a station in King Salmon. Depending on their

locations, some Bristol Bay communities are also within range of radio broadcasts from Homer and Anchorage.

Communicant! on among households within a community frequently occurs by means of C.B. radios, sideband radios, and VHF radios. Usually most households will own at least one C.B. radio while single sideband radios are usually used at the local school or health clinic.

4.6.2.5 Newspapers

The Bristol Bay Times, published one or twice monthly in Dillingham, and the Tundra Times, published weekly in Anchorage, are the only newspapers received by most residents of Bristol Bay communities. Those living in Dillingham, Naknek, King Salmon, South Naknek, and Iliamna also have access to the Anchorage daily newspapers one to four days after publication. Besides the above-mentioned newspapers, students of the Togiak High School publish a small hi-weekly newspaper, the Togiak Times.

4.7 Recreation

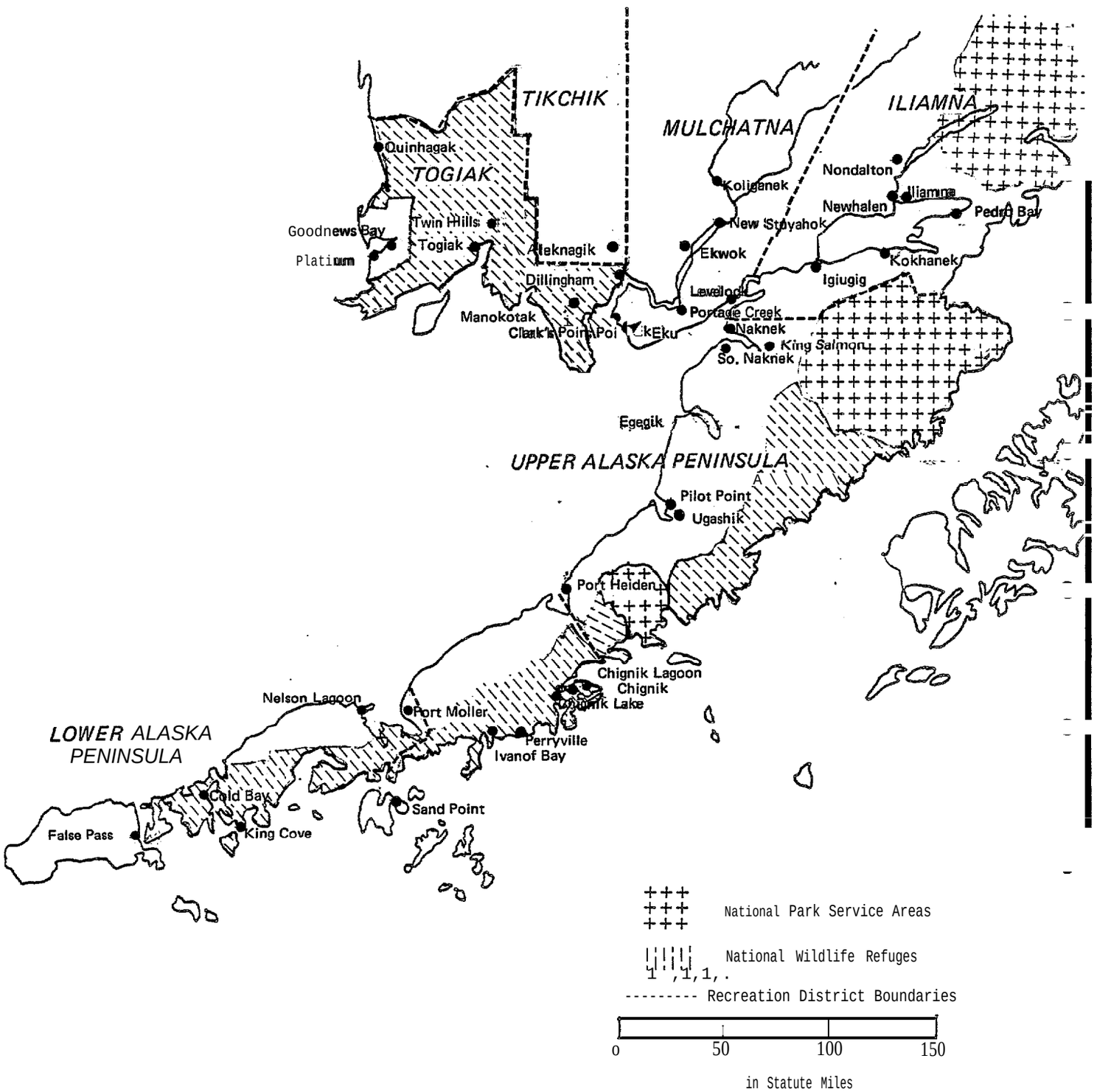
The final sector of cash-based economic activity to be examined is Bristol Bay's thriving recreation industry. This industry depends on a 40,000-square-mile expanse of wilderness that retains much of its natural abundance of flora and fauna. The Bristol Bay region encompasses four national wildlife refuges, dozens of world-class sport fishing lakes and rivers, and hundreds of miles of unspoiled coastline. It is no surprise that Bristol Bay ranks among the finest fishing and hunting territories in the world. Indeed, next to commercial fishing and government activity, recreation is probably the most important catalyst for change in the past ten years of economic growth in Bristol Bay.

We divided Bristol Bay into five major recreation districts as shown in Figure 4-5. Although most of the Alaska Peninsula is excluded from the boundaries of this study area, Naknek and King Salmon are principal staging areas for recreational activities in the northern half of the

Peninsula (from here on designated Upper Peninsula). Thus, characteristics of Upper Peninsula recreation are included in this discussion.

After a brief review of the study area's five recreation districts we shall examine several direct indicators of industry size including clientele, income, and employment. We shall also briefly examine the recreation industry's resident structure and its indirect effects on income for Alaska's airline industry and service sector, above all, hotels and retail trade.

Figure 4-5 Bristol Bay Recreation Districts



4.7.1 Recreation Districts

4.7.1.1 Togiak District

The Togiak district encompasses the Togiak National Wildlife Refuge (Togiak NWR), which stretches south from Quinhagak to Cape Newenham and east to the western edge of the Tikchik district. Known primarily for sport fishing, this district includes numerous tributaries of three major rivers, the Kenektok, Goodnews, and Togiak rivers; River rafting, bear, moose, and waterfowl hunting; and wildlife photography are popular secondary forms of recreation in the Togiak district. According to unpublished U. S. Fish and Wildlife Service (USFWS) estimates, 22 commercial guides including 8 with exclusive bear hunting rights used the refuge in 1982, serving over 1,500 customers fishermen). An additional 325 nonguided users (mostly Alaskan) visited the refuge in 1982. Round Island, located within the boundaries of the NWR, also attracted as many as 500 recreation visitor days last year. Although the Togiak NWR captures a large share of Bristol Bay's recreation clientele, to date, there are remote, permanent-facility wilderness lodges operating commercially in the refuge. Access to the Togiak NWR is primarily through Dillingham. Bethel is also sometimes used used as a base. Fishing and hunting parties typically take float trips down the rivers or set up tent base camps. Direct float plane access from lodges outside of the refuge and from Dillingham is also becoming increasingly popular.

4.7.1.2 Tikchik District

The Tikchik district includes two interconnected lake systems that drain separately into Nushagak Bay. The Tikchik lake system, situated in the district's northern reaches, is comprised of three interconnected lakes that empty into the Nuyakuk River, which connects with the Nushagak River just upstream of Koliganek village. The Wood River Lake system to the south includes five interconnected lakes that drain into the Wood River at the village of Aleknagik just north of Dillingham. As in the Togiak district, sport fishing is the primary form of recreation, al-

though sport hunting is also important. The lakes provide a unique wilderness setting for five of Bristol Bay's most prestigious commercial fishing lodges. These lodges offer complete services including guided boat and air access to prime fishing locations throughout the lake systems as well as to other choice areas of Bristol Bay. Averaging $2,500 per customer per week these lodges provide an exclusive form of recreation that is geared to executive and international patrons. The typical lodge sleeps 8 to 14 persons. Facilities usually include a main lodge building for kitchen and dining, numerous outbuildings, several powered boats, and at least one 4-6 seater place float plane. The lodges usually operate duringa 16-week season from mid-May to mid-September, and together, they employ about as many cooks, helpers, guides, and pilots, as customers served at any one time.

All of the Tikchik district lodges have been operating since the early 1970s, which gives them senior status among the 50 to 60 commercial lodges that currently operate throughout Bristol Bay. Each lodge probably enjoyed a total of 100 to 150 customers in the brisk 16-week 1983 season,

Guided and nonguided float fishing trips are also popular in the Tikchik district. Accordi ng to Tom Tucker, a seasoned pilot with 12 years of flying experience in western Bristol Bay, 120 non-guided parties floated sections of the Tikchik-Wood River Lakes system in 1983, roughly four times the number of similar non-guided groups each year during the late 1970s.

4.7.1.3 Mulchatna District

This district boasts some of the more remote and prized hunting areas of Bristol Bay. Sandwiched between the Tikchik and Iliamna districts, the Mulchatna district extends northward to the upper reaches of the Nushagak and Mulchatna Rivers. As a location for one of three predominant Bristol Bay caribou herds, this district represents an important hunting area for villagers of the Nushagak and Kvichak drainages, and it is becoming an increasingly important hunting area for

outsiders as well. River rafting and float fishing on the Mulchatna is also popular.

There are few improved lodge facilities in this district. Most tourists and sportsmen stay in itinerant tent camps, which sometimes function as semi-permanent seasonal base camps for hunting and fishing parties.

Access to the upper Nushagak and Mulchatna rivers and their many tributaries begins primarily at Iliamna, where Bristol Bay's highest concentration of lodges, guides, and outfitters are situated. Our investigations suggest that at least four guides operate regularly in this district out of the Iliamna area. It is probable that in recent years overcrowding near the Iliamna area has forced many lodges to offer daily fly-out fishing trips to selected locations throughout eastern and central regions of Bristol Bay. The Upper Mulchatna is also accessible to air taxis out of Anchorage.

4.7.1.4 Iliamna District

This district is undoubtedly the focal point of Bristol Bay's recreation industry. Its geographic boundary extends from the Lake Clark National Preserve southward to Lake Nonvianuk, flanking the Kvichak River to the west and Cook Inlet to the east. Five major lakes (Lake Clark, Six Mile, Iliamna, Kakhonak, and Nonvianuk) and five key rivers (Newhalen, Kvichak, Alagnak, Copper, and Battle) are the primary recreation areas in the Iliamna district. Sport fishing is probably the principal form of recreation in terms of visitor days. At least seven major fixed-base fishing lodges encircle the shores of Lake Clark and Six Mile Lake. Another dozen lodges are situated on the shores of Iliamna Lake, mainly in the villages of Iliamna and Igiugig.

Field data collected in October 1983 indicate that another 8 to 10 lodges are distributed across several drainages south of Iliamna Lake. These lodges are geared primarily toward fishing and are similar to lodges in the Tikchik district. Most lodges have capacity for 8 to 14 persons, fly-out services to remote areas, and operate on a 16 week

basis. They are generally booked solid, often a year in advance.

In addition to lodges, at least four guide services operate regularly in this district. The actual number of fishing guides and outfitters, including those based in Anchorage, probably far exceed this estimate. Excluding the Katmai National Park area we conservatively estimate that fully one-third of guided fishing activity in Bristol Bay is conducted in the Iliamna district.

4.7.1.5 Upper Peninsula District

This district includes the Bristol Bay borough and extends southwest across the Alaska Peninsula to Port Heiden. It encompasses the northern portion of the Alaska Peninsula Wildlife Refuge and Katmai National Park and Preserve. The combination of unusually varied geography and the existence of Katmai Park help explain why this area, more than any other recreation district of Bristol Bay, attracts a wide spectrum of recreation enthusiasts, despite offering fewer facilities and recreation services than can be found in the Iliamna District. It is also an important subsistence habitat for communities of the Alaska Peninsula.

Katmai National Park and Preserve, among Alaska's most prestigious recreation sites, is one of three National Park Service (NPS) areas within the Bristol Bay region In 1980, 2,259 persons visited Katmai, staying an average of 3 days each. This compares to 1,414 in 1970 and suggests a 4.8% annual average rate of increase over the period 1970 to 1980. Brooks Camp, with a capacity of 45 persons, is Bristol Bay's largest wilderness lodge. Situated on Naknek Lake about 30 miles from King Salmon, Brooks Camp captured 40% of all visitors to Katmai in 1980. Another 40% stayed at the park's campground. The remaining 20% were backcountry hikers.

Access to this district usually originates at Naknek or King Salmon. Bristol Bay's largest air carrier operates daily scheduled air service from King Salmon to Brooks Camp during the open season.

The northern portion of the Alaska Peninsula National Wildlife Refuge borders Katmai's southern boundary and stretches south and east across the eastern flanks of the Alaska Peninsula. With about twice the land area as Katmai, the entire Alaska Peninsula NWR logged 2,165 visits in 1981, roughly the same number of visits recorded at Katmai.

Remoteness discourages most kinds of recreational activity in the Alaska Peninsula NWR, except hunting and sport fishing. The Alaska Peninsula offers prime hunting for brown bear, moose, and caribou as well as for waterfowl and other small game. According to U.S. Fish and Wildlife Service (FWS) memoranda, approximately30 guides operate inthe NWR, serving 3 to 6 hunters each per season. The U.S. FWS estimated that about 40,000 angler days were recorded in the Alaska Peninsula NWR in 1981, up from about 1,400 in 1978.

Less prominent forms of recreation in the Alaska Peninsula include river rafting, hiking, camping, wildlife photography, and trapping. The U.S. FWS expects lodges and guide services to diversify into areas other than traditional hunting and fishing. At present the Northern Peninsula encompasses 10 lodges geared mainly toward sport fishing. Three are located in the Alaska Peninsula NWR. Five guided hunting and fishing camps also operate in this district.

4.7.2 Recreation Income, Employment, and Clientele

Broadly speaking, Bristol Bay's recreation industry consists of three main components: lodges, guides, and air taxi operators. Overlap is common, for example, most lodges employ guides who are also pilots. In general the lodges are permanent, facilities with most modern conveniences. Guided river trips for fishing, photography, and hunting rely on tent camps and occasionally operate from unimproved base camps. An increasing number of independent, non-guided groups also enjoy wilderness adventures in Bristol Bay. Local air taxi operators feel the economic impact of these groups more than any one. In an attempt to broaden the base of potential customers, many lodges offer semi-float trip excursions which stress outdoor wilderness experiences away from

the lodge. Most lodges offer fly-out service to choice, isolated fishing locations throughout Bristol Bay.

Perhaps the most significant local economic effectof the recreation lodges is on the local air taxi operator. During the 1983 season one Dillingham operator earned about $100,000 in lodge-related receipts from a single aircraft. As a whole, Bristol Bay air taxi operators earned about 8% of total direct recreation earnings in 1983.

Bristol Bay has 12 air taxi operators in Dillingham, Iliamna, Naknek, and King Salmon, with fleet sizes ranging from 3 to 20 aircraft- Most air taxis draw business from lodges and guides. One Naknek operator indicated that 85% of their customers were recreation-related, up from 60% five years ago.

Recreation has been a recognized element of Bristol Bay's economy for over 50 years. During the 1930s the recreation industry was composed of two wilderness lodge facilities, one in the Tikchik-Wood River system and one at Naknek Lake (now Brooks Camp). Today the number of recreation lodges is pegged from between 50 and 60, suggesting a strong 6% average annual of growth over the past 50 years. However, industry growth has been neither smooth nor constant. Recreation facilities have multiplied and income has increased at haphazard rates, in part paralleling cycles of economic expansion in Alaska and in the nation as a whole.

In spite of sharp growth over the past 5 to 10 years, the recreation industry has probably retained much of its original business character of absentee ownership, nonresident employment, and an extremely well-to-do clientele. Many of Bristol Bay's hunting and fishing guides reside in Anchorage and other regions of the state. Furthermore, field investigations indicate that many nonguide lodge employees (i.e., cooks, helpers, and managers) were out-of-state college students or other workers imported for seasonal work.

4.7.2.1 Lodges

Most of the 50 to 60 lodges that operated in the 1983 season were geared toward fishing. lodges were located in the Iliamna district, which includes Lake Clark, Kakhonak, Nonvianuk, and several smaller lakes north of the Naknek River. We counted 10 lodges in the Upper Alaska Peninsula and five in the Tikchik-Wood River Lake system.

These wilderness lodges vary in size and in services and recreation packages offered. Most lodges offer weekly packages with daily fly-out fishing, and some are expanding services to include remote, float fishing river excursions. Excluding Brooks Camp, the following characteristics are typical of the average lodge:

- Season duration: 16 weeks
- Capacity: 8 to 14 persons
- Occupancy rate: 80% to 100%
- Number employed: equal to capacity
- Client cost: $1,500 to $3,500 per person per week

Together these characteristics suggest that in the 1983 season, Bristol Bay lodges served about 6,400 clients (assuming 80% occupancy), employed 462 persons, and earned between $14 and $20 million in direct gross receipts (including $.5 million in direct air taxi receipts). Field investigations indicate that lodge business activity varies widely from season to season. Business failure, bankruptcy, and abrupt ownership turnover were common features of this industry, in spite ofa general pattern of industry expansion. Ignoring occasional cyclical swings, lodge business activity has probably experienced a steady increase over the past decade.

We estimate that two-thirds of lodge patrons were foreign; the remainder were domestic, mostly non-Alaskans. At least 90% of lodge employees resided outside Bristol Bay. Of these, about half resided out of state. The local economic impact of lodge activity is relatively minor for

several reasons. First, although some lodges purchase fuel supplies from local literage companies, most obtain seasonal supplies directly from Anchorage and Seattle. Second, except during periods of bad weather, lodge patrons do not usually have to stay overnight at regional service centers while en route to or returning from their destination. Third, about 90% of the lodges have absentee owners.

4.7.2.2

The 1982 State Guide Register recorded 189 commercial hunting and fishing guides in Bristol Bay management units 9 and 17. About 50 registered fishing guides are tied directly to the lodges. Another 25 operated fly-out float fishing trips on key rivers throughout Bristol Bay. Float fishing trips usually last 10 days and involve parties of 4 to 8 persons. We estimate costs to average about $1,400 per person, per trip. Collectively, 1983 guided float fishing excursions produced between $1.5 and $2.0 million in guide receipts, plus an additional $.5 million in direct air taxi receipts.

Table 4-40 shows an estimate of the number of big game and waterfowl permit holders in the 19
gross receipts, by species, earned by guides. If we assume that each caribou and moose permit represents one animal taken, then recreation harvests of caribou would account for about 10% of total Bristol Bay region recreation-pi us-subsistence harvests in 1982, according to estimates in Nebesky and Langdon (1982). The data in Table 4-40 indicate that Bristol Bay hunting guides commanded gross receipts of over $2.5 million.

Together, fishing and hunting guides earned about $5 million in direct guiding receipts in the 1981-1982 season. The state guide register indicates that only 5% of all Bristol Bay fishing and hunting guides actually reside in the region; the remaining 95% reside elsewhere in Alaska. Moreover, many of these individuals maintained residences out of the state. Thus, only a small proportion of total guide earnings were probably retained in the local economy.

TABLE 4-40
BRISTOL RAY GUIDED HUNTING ACTIVITY
IN THE 1981-1982 SEASON

Species	Nonresident Permits Total	Percent Guided (%)	Number Guided	Earnings Average ($)	Seasonal Guide Inane ($)
Caribou					
Unit	268	90%	241	$3,000	$723,600
Unit 17	30	90	27	3,000	81,000
Total	298	90	268	3,000	804,600
Moose					
Unit 9	103	95	99	3,500	342,475
Unit 17	24	95	23	3,500	79,80)
Total	127	95	122	3,500	422,275
Brown Bear					
Unit 9	159	100	159	6,000	954,003
Unit 17	6	100	6	6,000	36,000
Total	165	100	165	6,000	990,000
Waterfowl					
Units 9 and 17	150 (hunters)	100	150	2,000	300,00)
All Species	740	95%	705	$ 3,570	$2,516,875

NOTES: Management Unit 9 extends from Quinhagak east to the Upper Muldiatna area. Management Unit 17 extends from Lake Iliamna south across the Alaska Peninsula to Unimak Island.

SOURCE : Dennis Harms, Bristol Bay Guide.

4.7.2.3 Non-guided Activity

Non-guided, independent hiking and fishing trips are becoming increasingly popular in Bristol Bay. Katmai is well established as a popular area for private backcountry excursions. Private float fishing trips have more than tripled in the Tikchik-Wood River district over the past five years.

Groups averaging 3 to 4 persons are typically flown from the nearest RSC to remote areas for 1- to 2-week wilderness trips on lakes and rivers. We estimate that between 750 and l,OOOpersons (mostly Al askans) take non-guided float fishing trips each year in Bristol Bay. Because of its popularity, the Tikchik-Wood River Lake system probably captures 50% of the non-guided recreation business. The local economic effect of non-guided activity is concentrated exclusively on air taxi operators and amounts to about $.3 to $.5 million in gross receipts each year.

Table 4-41 summarizes the annual direct and indirect income and employment effects of total recreation demand for the period between 1981 and 1983. Clientele totalling 11,460 annually would produce direct receipts to lodges, guides, and air taxis of $21.4 million and generate 642 seasonal jobs. Another $2.3 million in indirect receipts would accrue to airlines shuttling patrons between Anchorage, Dillingham, King Salmon, and Illiamna (excluding national airline receipts for out-of-state travelers). We also estimate that at least $1 million in additional indirect earnings would accrue to hotels, restaurants, and retail stores in Anchorage.

TABLE 4-41
BRISTOL BAY REGION RECREATION CUSTOMERS,
INCOME, AND EMPLOYMENT
1983

	Direct					Indirect		
	Operator			Air Taxi		Airline		Support Sec
	No. of Customers	Income ($ Millions)	No. of Jobs	Income ($ Millions)	No. of Jobs	Customers	Income ($ Millions)	Income ($ Million
Lodges								
General	6,400	$15.5	400	$ 0.5	3			
Katmai	1,800	0.2	90	0.5	3			
Subtotal	8,200	$15.7	490	$ 1.0	6	8,200	$ 1.6	NA
Guides								
Fishing	1,320	$1.8	40	$0.3	2			
Hunting	740	$2.2	100		2			
Subtotal	2,060	$ 4.0	140	$ 0.3	2	2,060	$ 0.4	NA
Nonguided								
General	750	NA	NA	$ 0.3	2			
Katmai	450	NA	NA	0.1	1			
Subtotal	1,200	NA	NA	$ 0.4	3	1,200	$ 0.3	NA
TOTAL	11,460	$19.7	630	$ 1.7	11	11,460	$2.3	$1.0

SOURCE: See text.

As a whole, we conservatively estimate that Bristol Bay's recreation industry produces about $25 million in total direct and indirect receipts. About $2 million is tied to nonresident wages. Of the remaining $23 million, $6.7 million was earned by residents of Bristol Bay (virtually all by non-Natives), while $16.3 million accrued to other Alaskans and out-of-state residents. It must be recognized, however, that the vast majority of total gross revenues derived from this industry in Bristol Bay is expended on the purchase of non-local supplies, equipment, and fuel and is not retained within the region,

Table 4-42 compares the size and resident structure of the Bristol Bay recreation industry with the regional fishing industry. Recreation earnings were about one-fifth the size of those of Bristol Bay's commercial salmon fishery in 1979, the most successful fishing season in Bristol Bay history (in terms of total ex-vessel earnings). The share of total earnings retained in the local economy is about the same in each industry, 27%. The distribution pattern of earnings derived from the two industries, however, varies significantly. While non-Alaskan fishermen captured 50% of total earnings in 1979, non-Alaskan recreation industry interests (i.e., absentee owners) captured about 8% of total industry recipts. Unlike Bristol Bay's fishing earnings, 65% of recreation earnings accrue to Alaska residents living outside of Bristol Bay.

TABLE 4-42
COMPARISON OF BRISTOL BAY RECREATION AND
FISHING EARNINGS

	Recreation[a] (1983)		Fishing[b] (1980)	
	Gross Receipts ($ Millions)	Percent of Total (%)	Expense Value to Fishermen ($ Millions)	Percent of Total (%)
Bristol Bay Residents	$ 6.7	27%	$37.8	27%
Other Alaska Residents	16.3	65	32.0	23
Other Non-Alaskan Residents	2.0	8	69.8	50
Total Earnings	$25.0	100%	$139.6	100%

[a]Based on resident distribution of lodges and guides from 1982 State Guide Registry and from unpublished U.S. Fish and Wildlife Service memorandum.

[b]Based on George Rogers, Preliminary Assessment Pertaining to *Bristol Bay* Salmon Fisheries Economic Development, March 1982.

CHAPTER 5

FORECAST PARAMETERS

5.1 Introduction

Economic forecast models such as the Rural Alaska Model (RAM) are based on certain economic and demographic indices which serve as forecast parameters. The three most important of these parameters are the economic multiplier, labor force participation rate, and economic migration rate. This chapter will review each parameter in lite of the existing economic organization and trends of socioeconomic change in the Bristol Bay study area. The usefulness of these parameters in forecasting economic change in the region will be discussed, and measures which may be applied in a forecast model will be presented.

5.2 Economic Multiplier

The multiplier is one of the most fundamental and accepted concepts of contemporary economic theory. In general, the multiplier refers to the change in income or employment in the economy as a whole, divided by the change in income or employment in the sector where economic expansion originated. A variety of multiplier definitions exist that distinguish between income versus employment and the duration of induced economic expansion. The multiplier operates on the same principal as money supply expansion brought about by lending a portion of total bank reserves. Essentially, when people spend a portion of their income for consumption they create additional income in the consumption goods industries that results in new rounds of spending and saving for others. Because people save a portion of their income, the amount spent at each round in the spending process gets smaller and gradually becomes insignificant. Economic expansion that results from this multiplier process is the sum of additional increments from successive rounds of spending. The multiplier effect itself is derived by dividing this sum by the original amount spent in the first round. It could also be analyzed in

terms of employment rather than income.

The multiplier provides a useful tool for determining induced economic expansion that originates in one sector of the economy and spreads to another. It has a variety of practical forecasting applications that usually involve the relationship between income and employment. Ultimately, income expansion leads to higher demand for goods and services and produces new employment. ISER's Rural Alaska Model (RAM), which is designed for projecting economic conditions in rural Alaska communities, presently contains four parameters that depict multiplier relationships between employment and income in various sectors of theeconomy (see Table 5-l).

TABLE 5-1
MULTIPLIER ASSUMPTIONS IN THE RURAL ALASKA MODEL[a]

Multiplier	Formula
1. Endogenous Support Employment	$\frac{\text{Endogenous Support Employment}}{\text{Income}}$
2. Government-Sponsored Support Employment	$\frac{\text{Government Sponsored Support Employment}}{\text{Population} \times \text{State Per Capital Expenditures}}$
3. Enclave-Generated Support Employment	$\frac{\text{Enclave Generated Support Employment}}{\text{Enclave Employment}}$
4. Endogenous Government Employment	$\frac{\text{Endogenous Government Employment}}{\text{Population} \times \text{State Per Capita Operating Expenditure}}$

[a]These parameters are pegged at their 1980 values. RAM Model forecasts are based on the assumption that multiplier relationships remain constant. (For more information, see Knapp, 1983).

5.2.1 Income and Spending

Because a significant portion of people who earn income in Bristol Bay reside outside the region and do not fully participate in the local economy by spending there, and because a substantial part of Bristol Bay residents' spending is directed outside of the region, several adjustments to conventional estimates of total Bristol Bay personal income must be introduced. This will produce a more reliable income base from which to analyze the multiplier effect of income expansion.

5.2.1.1 Resident and Nonresident Earnings

A comprehensive income data series that captures income from all sectors of the economy, let alone one that breaks out resident and nonresident earnings, does not exist for regions of Alaska. To determine the structure of total Bristol Bay residents' income we combined income estimates from two sources. In a recent economic analysis of Bristol Bay salmon fishery, Rogers (1982) estimates total Bristol Bay salmon fisheries income by residence for the period 1970 to 1979. Rogers' (1982) estimates include payments to fishermen and manufacturing wages paid for fish processing. They are based, in part, on fish ticket data and represent the most advanced and reliable fishing income series available for the Bristol Bay region.

The Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce calculates total labor and proprietor income on a place-of-work basis and then adjusts for resident status. The BEA income estimates, like those produced by the Alaska Department of Labor (ADOL), are based largely on wage and salary disbursements for industries covered by unemployment insurance. The BEA estimates of income for industries not covered by unemployment insurance, such as fishing and agriculture, are subject to serious errors and omissions at the regional level. To correct these problems and avoid double counting, we substituted Rogers' (1982) estimates of fishing income directly for BEA estimates of income in manufacturing and in agriculture, forestry, and fishing. This hybrid series is shown in Table 5-2 for 1970, 1975, and 1980. It is also the

source of income data used in Figures 4-2 and 4-3. The resident adjustment shown in Table 5-2 reflects wages received by out-of-state workers in the Dillingham Census Division and Bristol Bay Borough. These figures indicate that between one-half and three-fourths of total income earned in Bristol Bay was tied to nonresident laborers and fishermen who in-migrated for seasonal employment. Had we ignored this adjustment, our measure of income would include a component that is not spent in Bristol Bay and, therefore, does not directly contribute to secondary expansion of the economy.

5.2.1.2 Resident and Nonresident Spending

Equally important to the economic multiplier is the question, "What proportion of resident and nonresident income was actually spent in Bristol Bay?" It's well known that throughout Alaska's bush, residents often purchase goods and services in places other than their home communities. Accordingly, Bristol Bay resident income that is spent in

Table 5-2
PERSONAL INCONE FOR DILLINGHAM CENSUS DIVISION
AND BRISTOL BAY BOROUGH, 1970, 1975, 1980
(Millions of Current Dollars)

	1970	1975	1980
Total Fishing Industry Payments	$50.1	$35.2	$105.2
Total Nonfishing Labor and Proprietor Income by Place of Work	9.8	21.9	36.8
Less Personal Contributions for Social Insurance by Place of Work	0.6	1.3	3.0
Net Fishing Labor and Proprietor Income by Place of Work	59.3	55.8	139.0
Plus Resident Adjustment	-45.3	-33.5	-78.2
Net Labor and Proprietor Income Place of Residence	14.0	22.3	60.8
Plus Dividend, Interest, and Rents	0.4	1.0	2.1
Plus Transfer Payments	1.5	7.2	6.6
Personal Income by Place of Residence	$ 15.9	$ 30.5	$ 69.5
Per Capita Personal Income (Dollars)	$3,433	$5,294	$12,172
Real Per Capita Personal Income (1980 Dollars)	$7,062	$7,767	$12,172

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, Special Tabulations, Personal Income by Major Source, April 1982.

George Rogers, Preliminary Assessment Pertaining to the Bay Salmon Fisheries Economic Development, 1982.

NOTE : Fishing industry payments and fishing component of resident adjustment calculated on the basis of Rogers (1982) estimates. All other income data from BEA tabulations.

Anchorage or Seattle will not have a direct multiplier effect in Bristol Bay. Similarly, income spent in Dillingham, Bristol Bay's principal regional service center (RSC), will not produce secondary economic expansion in the neighboring village, where the income originated.

Evidence that directly illustrates resident spending patterns within and outside of Bristol Bay cannotbe found in the BEA, the U.S. Census, the Alaska Department of Labor (DOL) statistics, or in other studies of income in Bristol Bay. To estimate resident spending patterns, we apply a two-stage procedure that involves (1) estimating gross product in several Bristol Bay support services industries as a proxy for total resident and nonresident local expenditures, and (2) estimating the proportion of total spending by local residents of Bristol Bay from data on the monthly distribution of gross receipts in retail trade.

Gross product is the total market value of all goods and services produced for a given period. We estimated gross product in five distributive and service industries plus the construction sector to represent that segment of the economy believed to capture the bulk of personal consumption spending and, thus, the bulk of secondary economic expansion. The gross product estimates are based on the relationship between industry-specific wages and salary earnings and gross product at the state level. This relationship is reflected in the adjustment factors shown in Tables 5-3 and 5-4, for 1970 and 1980, respectively.

Gross product estimates in Tables 5-3 and 5-4 are shown by industry for both census divisions. The gross product sum across all six industries is expressed as Total Expenditures, and reflects total spending by residents and nonresidents alike. Tables 5-3 and 5-4 also compare total expenditures with residents' personal income. Comparing results for 1970 and 1980 indicates two important changes. First, the ratio of total expenditures to residents' personal income increased from 30 % in 1970 to49% in 1980. This strong pattern suggests that Bristol Bay's cash economy grew dramatically between 1970 and 1980. Asa result of this change, it is probable that the multiplier has also changed.

Second, despite strong growth in both census divisions the bulk of the relative increase in local spending occurred in the Dillingham Census Division. The data strongly suggests that Bristol Bay's center of trade and commerce shifted from the Naknek/King Salmon area to Dillingham between 1970 and 1980. The significance of this shift and its importance to the multiplier is discussed below under the subheading "Regional Service Center."

To complete the analysis of resident spending patterns, we need only determine what proportion of total expenditures originated from Bristol Bay resident population. To address this question, we obtained data on the distribution of 1982 store receipts for Paul's Tackle Shop, Inc., a large multiproduct retail store in Dillingham.

Seasonal business patterns for Paul's Tackle are shown in Figure 5-1. As a proportion of annual receipts, monthly sales range from a low of6% to a high of 15%. Basedon discussions with several Dillingham store managers and others knowledgeable about business patterns in Bristol Bay, we arbitrarily established a 9% cutoff threshold for resident

Table 5-3
GROSS PRODUCT ESTIMATES FOR SELECTED
BRISTOL BAY INDUSTRIES, 1970
($ Thousands)

	DILLINGHAM DIVISION			BRISTOL BAY BOROUGH			TOTAL		
	W & S	Factor	Gross Product	W & S	Factor	Gross Product	W & S	Factor	Gross Prod
Construction	$255		$362	$272	1.42	$386	$527	1.42	$748
Transportation, Communication, & Utilities	390	1.93	753	501	1.93	%?	891	1.93	1,720
Wholesale Trade	50	1.71	86	50	1.71	86	100	1.71	172
Retail Trade	454	1.80	817	454	1.80	817	908	1.80	1,634
Finance, Insurance, & Real Estate	50	4.62	231	53	4.62	245	103	4.62	476
Services	177	1.57	278	232	1.57	364	409	1.57	642
TOTAL EXPENDITURES			2,527			2,865			5,392
RESIDENT PERSONAL INCOME			$10,200			$5,700			$15,900
RATIOOF TOTAL EXPENDITURES TO RESIDENT PERSONAL INCOME			25%			50%			34%

NOTE : Adjustment factor derived from relationship between Gross State Product and statewide wages and salaries. Gross State Product estimates from ISER, Special Tabulations; State W & S data from Alaska Department of Labor, Statistical Quarterly publications.

SOURCE : W & S data for Bristol Bay Area from BEA, Personal Income by Major Source, 1969-1980.

Table 5-4

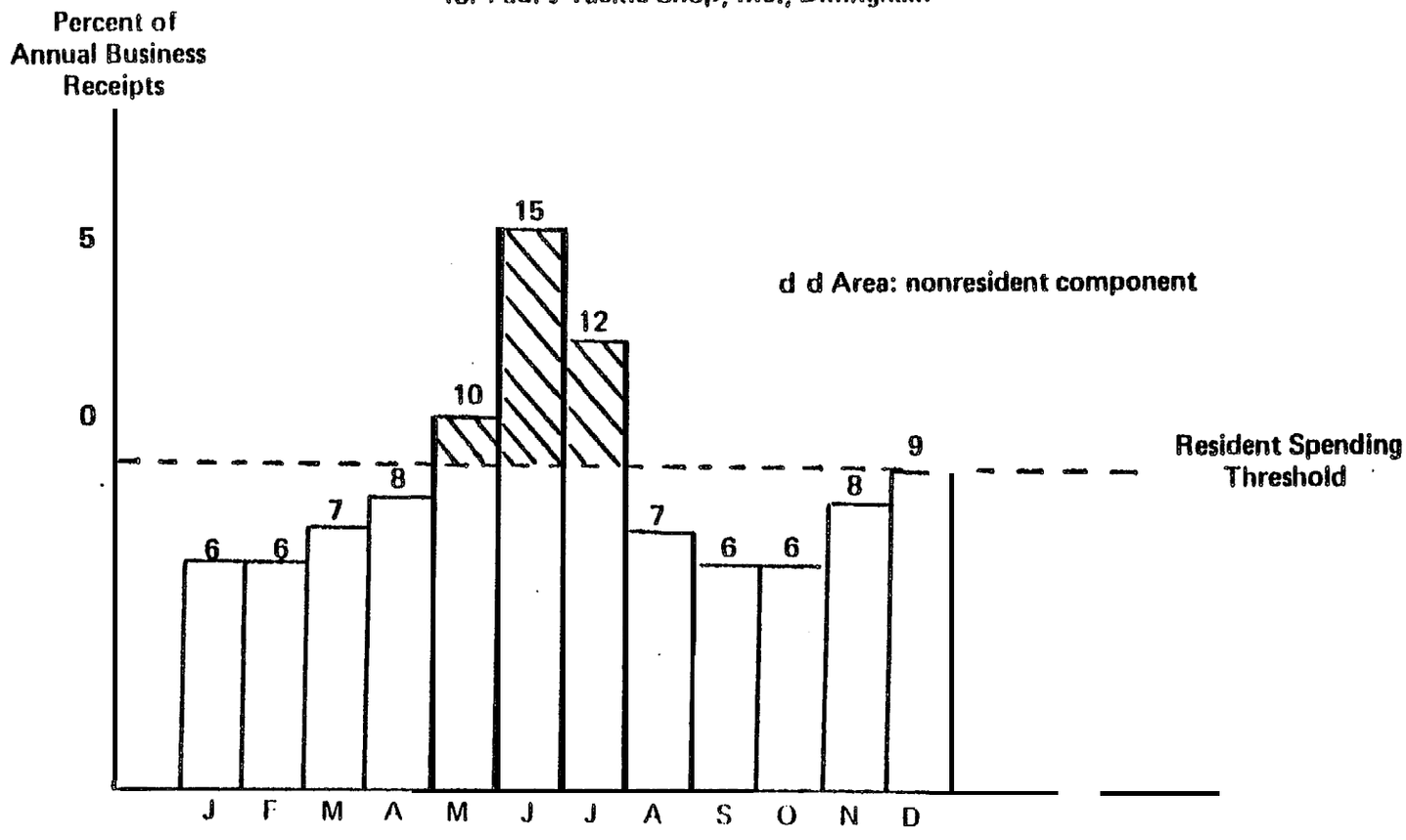
GROSS PRODUCT ESTIMATES FOR SELECTED BRISTOL BAY INDUSTRIES, 1980
($ Thousands)

	DILLINGHAM DIVISION			GRIST(X BAY BOROUGH			TOTAL		
	W & S	Factor	Gross Product	W & S	Factor	Gross Product	W & S	Factor	Gross Product
construction	$1,622	1,56	$2,530	$276	1.56	$431	$1,898	1.56	$2,%1
Transportation, Communication, & Utilities	3,817	1.98	1,5s8	1,214	1.98	2,404	5,031	1.98	9,%2
Wholesale Trade	84	1,82	153	50	1.82	91	134	1.82	244
Retail Trade	1,684	1.55	2,610	1,178	1.55	1,826	2,862	1.55	4,436
Finance, Insurance, & Real Estate	1,688	4.74	8,001	339	4.74	1,607	2,027	4.74	9,608
Services	4,152	1.57	6,519	472	1.57	741	4,624	1.57	7,260
TOTAL EXPENDITURES			27,371			7,100			34,471
RESIDENT PERSONAL INCOME			$s0,300			$19,200			$69,500
RATIOOF TOTAL EXPENDITURES TO RESIDENT PERSONAL INCOME			54%			371			502

SOURCE: W & S data for Bristol Bay Area from BEA, Personal Income by Major Source, 1969-1960.

NOTE : Adjustment factor derived from relationship between Gross State Product and statewide wages and salary data. Gross State Product estimates from ISER, Special Tabulations; State W & S data from Alaska Department of Labor, Statistical Quarterly publications.

Figure 5–1 Distribution of Annual Receipts
for Paul's Tackle Shop, Inc., Dillingham



So Bob Loveall, Paul's ackle Shop, Inc., personal conversation, Oct. 26, 1983.

spending. Thus, for any month, resident disbursements account for up to 9% of annual receipts. We assume that monthly receipts that exceed this threshold origin
this esti
industries implies that, in general, nonresident spending accounts for about 10

Whether spending origin
import
different. The implications for secondary economic expansion have several possibilities. On the one hand, the resident status of spending should not influence induced effects that filter through the economy. A dollar spent is just that, independent of whether a resident or nonresident spent it. On the other hand, itis probable that the mix of goods and services demanded by nonresidents is different from that of residents. If nonresidents concentrated expenditures in a particular sector of the economy, such as retail trade, then the resulting multiplier would take on characteristics belonging to that sector. One store manager directly involved in planning for seasonal demand indicated that nonresident spending patterns are highly variable. Many seasonal fishermen try to bring their own supplies in order to minimize short-term dependence on relatively high-priced goods and services. However, crew and boat operating needs cannot be fully anticipated. Nevertheless, this tendency would confirm the plausibility of seemingly low 10% nonresident spending assumption.

Table 5-5 summarizes findings concerning resident patterns of Bristol Bay income and spending over the period 1970 to 1980. The key findings are:

a. Real income in constant 1980 dollars increased only 17% from $125.9 to $147.7 million.

b. Real income earned by nonresidents fell in absolute terms ($93.2 to $78.2 million) and as a proportion of total income (from 74 to 53%).

c. Real local spending in Bristol Bay increased twofold from $11.1 to $34.5 million. Most of this increase can be attributed to expanded resident participation in the local economy.

d. Total income leakage (earned in Bristol Bay but spent elsewhere) measured in constant 1980 dollars declined slightly from $114.8 to $113.2 million. Residents continued to spend over half of their earned income outside of Bristol Bay. Thus, nearly half of the gain in resident participation, as measured in increased real earnings, was spent outside of the local economy.

e. Nonresident participation in Bristol Bay's economy dropped between 1970 and 1980. The associated decline in income leakage was offset by prevailing patterns of resident spending outside of the local economy.

A matter of greater importance to the multiplier than the origins of spending (i.e., resident versus nonresident) is the question of how much spending is retained in the Bristol Bay economy to trigger secondary expansion. To illustrate, we examine the relationship between nongovernment-support/services employment, total local expenditures, and total personal income.

After correcting for inflation by adjusting all income and spending figures to constant 1980 dollars, the relationship between total personal income and nongovernment, support/services employment is depicted in Table 5-6. This figure is derived by subtracting the Census count of total civilian government employment from the sum of transportation, communications, public utilities, wholesale trade, retail trade, finance, insurance, real estate, and all services.

Table 5-5
PERSONAL INCOME, SPENDING, AND INCOME LEAKAGE
IN THE BRISTOL BAY REGION
(Millions of Dollars)

	1980			1980	
	Current 1980 Dollars	Constant 1980001 lars	Percent[a]	Constant 1980001 lars	Percent
Total Income	$61.2	$125.9	100%	$147.7	100%
Nonresident	45.3	93.2	74	78.2	53
Resident	15.9	32.7	26	69.5	47
Spending in Bristol Bay	5.1	11.1	9	34.5	23
Nonresident	0.5	1.1	(lo)	3.4	(lo)
Resident	4.9	10.0	(90)	31.1	(90)
Spending Outside of Bristol Bay	55.8	114.8	91	113.2	77
Nonresident	44.8	92.2	(80)	74.8	(66)
Resident	11.0	22.6	(20)	38.4	(34)

[a]Parentheses indicate percent of subgroup, not of total income.

SOURCE : See *text.*

In 1970, a new support/services job was created for each $441,700 increment in personal income (using 1980 constant dollars). In 1980, the ratio of total personal income to support/services employment decreased to one job per $305,800 increment in income.

A wholly different picture of induced employment expansion is painted when local support/services expenditures are substituted for personal income. Using inflation-adjusted 1980 dollars, the ratio of total spending to total support/services employment jumps from $38,900 per job in 1970 to $71,100 per job in 1980. Two immediate conclusions are evident. First, after substituting local spending for total personal income, the ratio of spending to employment is significantly lower. This suggests a higher employment multiplier.

Second, the relationship between spending and employment changed markedly from 1970 to 1980. Roughly twice the 1970 level of spending must be made to produce a job in 1980. This suggests the possibility of structural change in the Bristol Bay economy. The unprecedented recovery precipitated by fishing expansion in the late 1970s, coupled with corresponding gains in trade and commerce, stimulated investment in support/services industries that probably was not fully absorbed. As a result, the multiplier effect was not fully transmitted through the economy. The figures shown in Table 5-5 reflect only first-round expansion. Employment gains may not have stabilized at. a new, higher equilibrium compatible with recent levels of trade and commerce, reflected in the 1980 Census income and expenditure data. Pending no other major disruptions to the economy, it is possible that employment will expand further and that the ratio of local spending to support sector jobs will decline toa level approaching the 1970 ratio of local expenditure to support services employment, shown in the bottom row of Table 5-6.

Using the ratio of support employment to total personal income runs the risk of falsely tying employment expansions to income earned but none spent in the local economy. Forecasts based on this relationship suggest the multiplier effect in that much greater income would be required to generate another job and tend to understate the multiplier effect in

the support sector. A more reliable method of gauging future secondary economic expansion would be to tie local support expenditures to support employment.

One factor that complicates matters is the degree to which support sector capacity is geared toward peak season levels of activity. Under such conditions the support sector may not be able to adjust easily to higher seasonal peaks because of uncertain expectations that future earnings would justify more investment in facilities and equipment. Despite clear evidence that support sector expansion has occurred in response to the recent fishery recovery, resistance to new investment would suggest that, until the economy stabilizes, employment levels may lag behind actual first-round expansion of commerce and trade. This would also help explain the dramatic increase in the expenditures-to-employment ratio shown in the bottom row of Table 5-6.

Table 5-6

RATIO OF TOTAL PERSONAL INCOME VERSUS LOCAL EXPENDITURE TO SUPPORT/SERVICE EMPLOYMENT IN 1970 AND 1980
(1980 Constant Dollars)

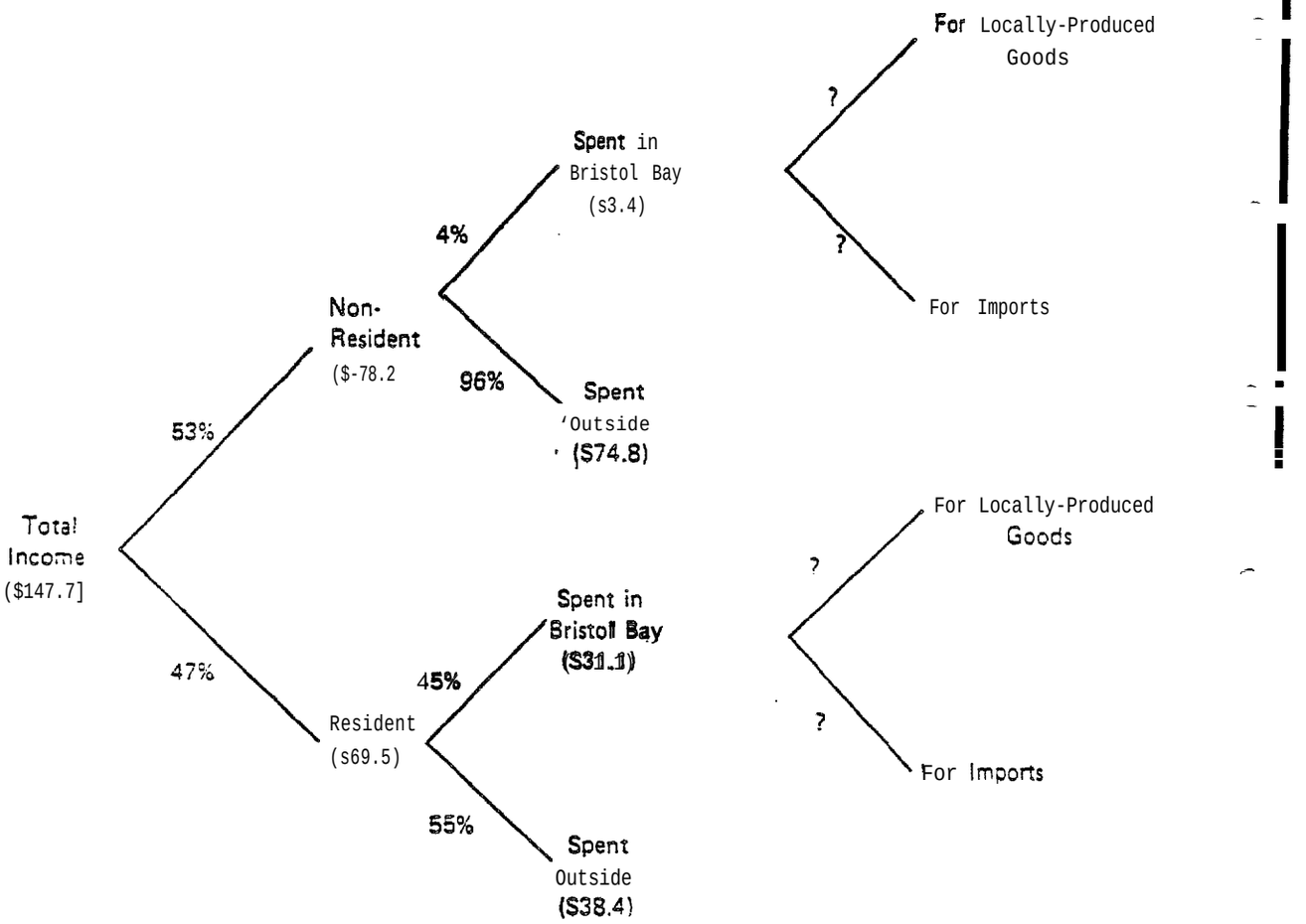
Ratio	1970	1980
Total Personal Income E Support/Services Employment	$441,700	$305,800
Total Expenditures E Support/Services Employment	$38,900	$71,100

SOURCE : Employment figure: U.S. Census, 1970 and 1980.

Income and expenditures: Table 111.5.

Figure 5-2 Resident Patterns of Income and Spending in Bristol Bay—1980

(millions of 1980 dollars)



Source: Table III.5

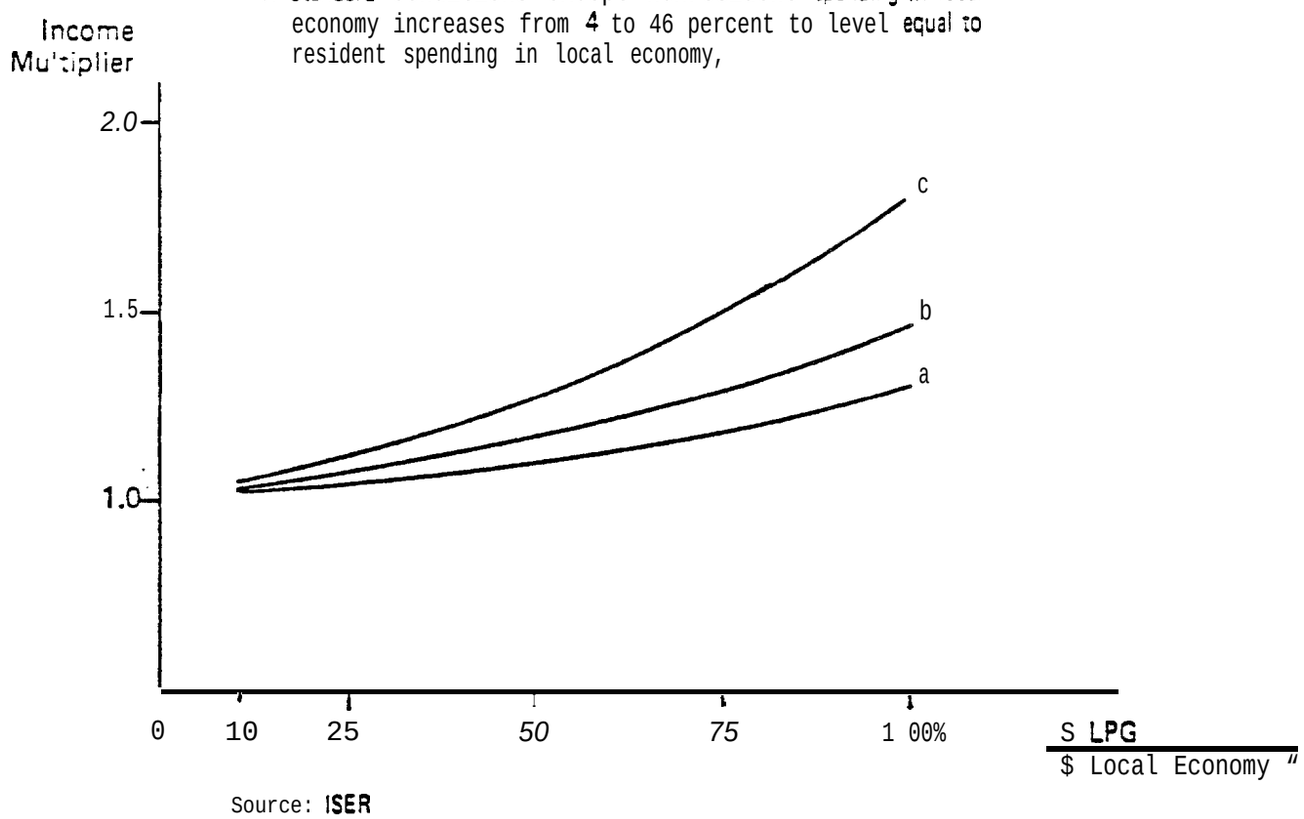
Figure 5-3. Relationship Between Income Multiplier and Proportion of Local Spending for Locally Produced Goods (LPGs)

Curve:

a: Standard conditions of resident income and local spending patterns (as shown in Figure 1[1.2).

b: Standard conditions except resident share of total income increases from 47 to 67 percent; nonresident share declines from 53 to 33 percent

c: Standard conditions except nonresident spending in local economy increases from 4 to 46 percent to level equal to resident spending in local economy,



Source: ISER

In the preceding section we observed a pattern of increased resident participation in the local economy. Because of this the proportion of total personal income spent in the local economy also increased. Less clear is whether the pattern of increased local spending implies a higher economic multiplier. For the multiplier to increase, local spending by residents and nonresidents must be concentrated on locally-produced goods (LPGs); those that produce the greatest value added (i.e., the market price of a good, less the cost of outside labor and materials used to fabricate that good). Local spending for imported goods would produce negligible multiplier effects, since only the value added in distribution would be retained in the local economy.

The tree diagram in Figure 5-2 depicts the relationship between the resident and nonresident shares of total income, the proportion of resident and nonresident income spent in the local economy, and the proportion of local spending directed to goods and services produced in the local economy (LPGs).

Although data on LPG spending is not available, we examine several hypothetical cases of LPG spending and assert implications for the economic multiplier. To do so requires that we assume Bristol Bay consumer patterns are relatively invariant with respect to different levels of income. Under this condition, the ratio of dollars spent on LPGs to total income provides a crude measure of the overall marginal propensity to consume (i.e., the fraction of an extra--marginal--dollar of income spent for consumption). This, however, is an average propensity to consume locally produced goods and overstates the income spent in the area. The curves in Figure 5-3 depict the relationship between the income multiplier and the proportion of local spending directed to LPGs. The horizontal axis of Figure 5-3 corresponds to the last group of tree diagram branches in Figure 5-2; the proportion on local spending on LPGs, ranging from zero to 100% of total resident and nonresident spending in Bristol Bay. Each curve was derived by substituting values for the final set of tree diagram branches (Figure 5-2), calculating the proportion of income spent on LPGs (i.e., the marginal propensity to consume--(MPC)), and applying the formula:

$$\text{Multiplier} = \frac{1}{1 - \text{MPC}}$$

The lower curve (a) was calculated on the basis of estimates of resident and nonresident income shares and local spending shown in Figure 5-3. The middle (b) and higher (c) curves depict varying conditions in the inner branches of the tree diagram. For example, if we assume that the resident share of total income increases from 47% to 67% and that corresponding nonresident shares decline, then the multiplier will vary according to curve(b). If, on the other hand, the proportion of nonresident income spent in Bristol Bay was pegged at the same proportion as resident spending (i.e., 45% instead of 4%), then the multiplier will vary according to curve (c).

This analysis suggests that Bristol Bay's multiplier is very small, having a probable range of 1.1 to 1.2. Furthermore, the multiplier does not vary significantly with changes in the proportions of resident and nonresident earnings, the degree of local spending, or the amount of local spending on locally produced goods. This, in turn, suggests that in spite of Bristol Bay's immense fishery resource and record levels of per capita income and its pattern of increasing resident participation, the economy remains underdeveloped.

5.2.2 Regional Service Center

For the most part, local trade in the village is confined to household-to-household transactions and purchases from a limited selection of grocery and hardware items available in the village store. All the villages had stores, many of which were small back-room sections to private dwellings. Togiak had three household store operations plus a main cooperative store. Larger villages, such as Iliamna, Naknek, and King Salmon, exhibited more diversified private sector activity. How-

ever, for the most part, Bristol Bay residents traveled to Dillingham and Anchorage for periodic shopping. In fact, there were no other communities in the study area that approached the regional service center (RSC) role played by Dillingham.

As Bristol Bay's primary RSC, Dillingham is the center of gravity for industry, commerce, and government throughout Bristol Bay. The relationship of Dillinghhm to Bristol Bay is analogous to that of Anchorage to the rest of the state. Both represent important transshipment points with relatively efficient access to a network of villages (Dillingham) and cities (Anchorage). Both are characterized by economies of scale (i.e., savings in money outlays due to efficiencies inherent in larger scale operations). Both represent a hub for state and federal government. And, as shown in Table 5-7, both exhibited similar patterns of growth relative to their respective regions of influence. Just as growth anywhere in the state is likely to have an impact on the Anchorage economy, growth in the Bristol Bay region will spill over into Dillingham proper. It is probable that, as an RSC, Dillingham captures a disproportionate amount of area-wide resident and nonresident spending.

As mentioned above, Dillingham also appears to have displaced Naknek and King Salmon as the prevailing RSCs for Bristol Bay in 1970. The figures in Table 5-3 and 5-4 indicate that, after adjusting for inflation, local expenditures in the Bristol Bay Borough increased from $5.9 to $7.1 million, a respectable average annual growth rate of 1.9% from 1970 and 1980. In comparison, real expenditure growth in the Dillingham Census Division increased nearly fivefold from $5.2 to $27.4 million over the same period. This reflects an average annual growth rate of 18.1%, nearly ten times faster than growth in the Bristol Bay Borough.

Table 5-7
REGIONAL SERVICE CENTER ATTRIBUTES:
DILLINGHAM AND ANCHORAGE

INDICATOR	DILLINGHAM AS A PROPORTION OF THE 21-COMMUNITY STUDY AREA (Percent)		ANCHORAGE AS A PROPORTION OF STATE (Percent)	
	1970	1980	1910	1980
Civilian Population	24	34	42	44
Civilian Employment	42	50	45	46
Personal Income	35	51	49	48

SOURCE : Bureau Economic Analysis, Personal Income by Source, 1982.
Alaska Department of Labor, Statistical Quarterly, 1970, 1980.

With the exception of Togiak, which appears to be increasingly involved in transportation and commerce in Western Bristol Bay; Iliamna, which is centered in the heart of Bristol Bay's rapidly growing recreation industry; and Naknek/King Salmon, which continues to feel the effect of fishing and of military presence, it is probable that Dillingham experienced the bulk of secondary expansion driven by area-wide growth in fishing, government, and recreation.

This pattern maybe viewedas beneficial both from the standpointof Dillingham business interests and of tradition in village lifestyle. As the primary outlet for an expanding regional economy, the Dillingham RSC will effectively shelter nearby villages from the possibly disruptive effects of an active cash economy.

5.2.3 Summary

To summarize, multiplier effects refer to induced economic expansion that originates in one sector of the economy and spreads to others. We estimated the overall Bristol Bay economic multiplier to be between 1.1

and 1.2. Several factors underlie its modest scale. They are:

1. Nonresident participation is significant in Bristol Bay.

2. Spending in the local economy is a small share of total spending by residents and nonresidents.

3. Spending that does occur locally is primarily for imported goods rather than locally-produced goods.

Regional growth patterns suggest that the direct and induced effects of economic expansion over the past decade were concentrated in Dillingham, Bristol Bay's most important regional service center.

5.3 Labor Force Participation

Labor force refers to employed persons plus those actively seeking work. Employment is usually confined to wage-and-salary (W&S) workers and self-employed workers who earn cash income. Unpaid workers in farm and family businesses are also sometimes included.

The labor force participation rate (LFPR) is measured asthe ratioof labor force (employment plus unemployment) to total population:

$$\text{LFPR} = \frac{\text{Labor Force}}{\text{Population}} = \frac{\text{Employment + Unemployment}}{\text{Employment + Unemployment + Persons Not in the Labor Force}}$$

More elaborate measures of the LFPR include only persons greater than age sixteen in estimates of labor force and population. Labor force participation rates are important in projecting labor supply. Most economic forecasting models with labor-market components incorporate LFPRs. Some models, such as ISER's Rural Alaska Model (RAM), group LFPRs by sex and ethnicity.

5.3.1 Historic Patterns

Table 5-8 compares historic patterns of labor force participation for the combined Dillingham and Bristol Bay Borough Census Divisions, which comprise the Bristol Bay study region, and for the State of Alaska. Al so shown are the components usedto calculate LFPRs in Bristol Bay. Note that the simpler measure using total population is used. This would tend to understate LFPRs. However, this measure is applied consistently and, therefore, presents no immediate problem from the standpoint of year-to-year comparisons.

As shown in Table 5-8, Bristol Bay labor force participation is highly variable and does not exhibit a clear pattern over the 20-year historic interval. However, an inverse relationship between labor force participation and the unemployment rate (unemployment divided by the labor force) is evident. Unemployment is highest when labor force participation is low and vice versa.

In contrast, statewide labor force participation clearly exhibits increasing pattern with minor exceptions in 1970 and in 1974. Furthermore, the statewide rate of unemployment does not appear to move inversely with changes in the statewide LFPR.

For a variety of reasons, caution must be used in the interpretation of employment and its derivatives. The employment estimate used to derive LFPRs in Table 5-8 is essentially a job count. Here equal weight is given to every job, regardless of whether it is part-time, full-time, or overtime work. Furthermore, persons having more than one job or who changed jobs are double counted.

In contrast, the LFPRs shown in Table 5-9 are basedon the U.S. Census count of the number of persons employed during a selected week of the year. Because the choice of week was not necessarily the same for all households, the Census risks double counting a single job that was held by two different people at different times--a common pattern in village

Table 5-8

LABOR FORCE CHARACTERISTICS
BRISTOL BAY AND ALASKA 1961-1980

	BRISTOL BAY					ALASKA	
	Labor Force	Labor Force Participation Rate (%)	No. Employed	No. Unemployed	Unemployment Rate (%)	Labor Force Participation Rate (%)	Unemployment Rate (%)
1961	1,294	32.8	1,192	102	7.9	37.0	9.9
1962	1,076	26.5	%4	112	10.4	36.5	9.4
1%3	1,138	27.1	989	149	13.1	37.2	9.3
1%4	1,073	28.1	942	131	12.2	38.0	9.4
1%5	1,388	34.6	1,242	146	10.5	38.7	8.6
1966	1,282	31.1	1,133	149	11.6	38.9	9.0
1967	1,089	24.8	971	118	10.8	39.5	8.7
1968	1,194	26.6	1,048	146	12.2	39.7	9.1
1969	1,355	29.6	1,185	170	12.5	41.2	8.7
1970	1,468	34.7	1,291	177	12.1	39	9.0
1971	1,483	39.0	1,280	203	13.7	41.2	10.4
1972	1,384	32.2	1,228	156	11.3	44.6	10.5
1973	1,547	35.0	1,399	148	9.6	42.8	10.8
1974	1,601	34.9	1,494	107	6.7	39.4	7.9
1975	2,005	37.8	1,897	108	5.4	43.6	6.9
1976	2,096	48.?	1,943	153	7.3	43.5	8.3
1977	1,928	46.3	1,778	150	7.8	44.8	9.2
1978	1,661	33.3	1,497	164	9.9	47.6	11.0
1979	1,838	38.0	1,679	159	8.7	48.0	9.4
1980	1,824	34.2	1,673	151	8.3	49.6	9.6

SOURCES : Alaska Department of Labor, Labor Force Estimates, various issues, 1%1-1977.
Alaska Department of Labor, special tabulations of labor force, 1978-1980.
Alaska Department of Labor, Alaska Population overview, 1979.
Alaska Department of Labor, special tabulation of population for Alaska, 1970-1980.
Alaska Department of Labor, Current Population Estimates, 1%0-1970.

employment. On the other hand, the Census did not count two different jobs that were held by the same person, which would tend to offset the double counting bias mentioned above. Census did not distinguish between full- or part-time work (as is the case for ADOL figures).

Employment estimated on the basis of jobs (ADOL) could produce significantly different results compared with employment estimated from a count of persons (Census). The Census count of employment for both 1970 and 1980 (785 and 1590, respectively) was consistently lower than ADOL's estimate for the same years (1291 and 1673, respectively).

The combined census division estimates for total LFPR, shown at the bottom of Table 5-9, are higher than the corresponding estimates shown in Table 5-8 for both 1970 and 1980. Aside from methodology differences that would undoubtedly influence comparability, the Census only includes persons aged sixteen years and older. The figures in Table 5-8 reflect a labor force based on total population.

Despite significant variability from community to community, the figures in Table 5-9 suggest a relatively strong overall shift toward increased labor force participation. This shift is most visible in the Western subregion, for which every community registered strong LFPR gains. The Nushagak subregion also exhibited moderate increases in spite of Koliganek's LFPR decline from 1970 to 1980. Missing data for the village of Quinhagak in 1970 produced LFPR estimates that understate true levels for the Lower Kuskokwim subregion in 1970. Nevertheless, a moderate increase in overall LFPR probably occurred in the Lower Kuskokwim subregion, mainly in response to sharp gains registered in Goodnews Bay. Many communities did not experience increased labor force participation, and for those that did, the gains were not substantial. Moderate gains in Dillingham's LFPR reflect this community's increasingly established position as Bristol Bay's regional service center. Relatively stable patterns of LFPR growth were observed in the Iliamna Lake and Bristol Bay Borough subregion. Subregion 5 (Iliamna/Kvichak) experienced significant decline that was probably linked to the dramatic downward shift in Level ock's LFPR (from 60.9 in 1970 to 37.7 in 1980).

Table 5-9

LABOR FORCE PARTICIPATION RATES
1970 AND 1980 (per'cant]

SUB REGION	COMMUNITY	1970 TOTAL	1970 MALE	1970 FEMALE	1980 TOTAL	1980 MALE	1980 FEMALE
1 LOWI KUSKOKWIM							
	QUINHAGAK	0	0	0	17	15.9	18.3
	PLATINUM	40.0	47.1	30.8	39.0	60.9	11.1
	GOODNEWS	16.2	26.0	6.7	31.1	44	18.5
	MEAN"	18.7	24.4	12.5	29.1	40.3	16
2 WESTERN							
	ALEKNAGIK	7.9	17.1	0.	55.9	44.9	68.2
	TWIN HILLS	13.2	0.	31.3	34.0		23.5
	TOGIAK	23.1	30.2	17.0	62.1	67.1	57.0
	MANOKOTAK	29.8	20.0	38.9	36.1	35.4	36.9
	MEAN	21.0	21.8	20.4	51.5	53.4	49.7
3 DILLINGHAM							
	DILLINGHAM	61.9	71.6	53.4	66.0	77.4	54.7
4 NUSHAGAK							
	EKWOK	29.7	57.6	0.	60.0	61.3	58.3
	CLARKS POINT	27.8	35.7	16.7	35.7	33.3	38.1
	KOLIGANEK	45.7	52.0	38.1	40.7	43.8	37.0
	NEW STUYAHOK	31.0	34.3	26.8	35.1	34.2	36.0
	PORTAGE CREEK	NA	NA	NA	29.0	15.4	38.9
	MEAN	31.1	41.8	18.9	39.0	39.1	38.8
5 ILIAMNA/NVIICHAK							
	NEWHALEN	44.4	51.7	31.3	36.2	48.5	20.0
	PEDRO BAY	" 60.0	100.0	30.0	NA	NA	NA
	NONDALTON	13.8	16.7	10.7	29.3	26.1	32.8
	ILIAMNA	63.3	100.0	31.3	52.5	84.0	0.
	IGIUGIG	29.6	40.0	0.	NA	NA	NA
	KAKHONAK	NA	NA	NA	16.7	27.8	0.
	LEVELOCK	60.9	64.3	55.6	37.7	29.3	47.2
	MEAN	38.9	53.2	22.7	24.6	30.8	14.3
6 BRISTOL BAY BOROUGH							
	SOUTH NAKNEK	67.1	75.5	55.6	53.2	65.2	41.7
	NAKNEK	69.7	73.9	63.3	62.8	66.1	58.9
	KING SALMON	55.3	100.0	19.2	69.5	80.5	51.9
	MEAN	63.5	82.5	41.5	62.9	70.8	53.1
ALL VILLAGES		34.4	44.1	24.2	39.1	44.1	32.6
REMOTE POPULATION							
	DILLINGHAM DIV.	13.3	21.8	0.	47.6	38.1	57.1
	BRISTOL BAY BOR.	53,4	83.8	10.4	39.7	31.3	46.3
	MEAN	35.3	56.1	6.0	40.9	%4.0	46.8
CENSUS DIVISION TOTAL							
	DILLINGHAM DIV.	34.1	39.2	28.5	51.5	55.3	47.4
	BRISTOL BAY BOR.	60.4	82.9	32.5	59.8	66.4	52.0
	MEAN	38.2	46.2	29.1	52,9	57.0	48.3

SOURCE: U.S. Bureau of the Census, Special Tabulations, CNT5, 1970; STF3, 1980.

A variety of factors could influence changing patterns of labor force partici pati on. Anything that would alter levels of population, employment, and unemployment would in turn affect the LFPR. Even at the subregional level where sampling error problems can be safely ignored, a consistent relationship between labor force participation and basic eonomic indicators does not emerge (see Table 5-10). There are several reasons for this.

First, expanding employment may not result in an increased LFPR since employment is found in both the numerator and demoninator of the expression for LFPR.

Second, many conditions may change simultaneously and thereby confound the effect of any single factor. For example, rapid in-migration, like that which occured in Dillingham and in the Western subregion, would also call forth worker dependents, increasing that segment of population not in the labor force. This would tend to drive LFPRs downward, although employment expansion could be rapid enough to counteract this downward effect. Thus, despite strong migration and overall population growth, employment gains were apparently large enough to produce rising labor force participation in both Dillingham and the Western subregion.

The evidence is less clear in other cases. For example, subregion 5 experienced a significant decline in labor force participation despite moderate gains in employment (2.5% average annual growth from 1970 to 1980), substantial out-migration, and absolute population decline.

Third, the problem of sampling error, significant at the village level of analysis, could produce unreliable results. The villages in the Iliamna-Kvichak subregion were particularity hard hit by undersampling in the 1980 Census. Large sample errors in any single community could sway results in a direction that misrepresents conditions in the subregion as a whole. However, as shown in Table A-1 of Appendix A, sampling error difficulties are less serious at the subregional level of analysis.

Fourth, although provisions are built into the Census survey questionnaire to minimize misrepresenting employment and labor force status, the format of the census questions on employment throws additional doubt on the validity of Census survey results. The Census questionnaire asks if the respondent worked any time during the previous (non-standard) week and what their chief job activity was during that week. If the respondent was not working that week and was not temporarily absent or layed off, then the respondent was asked when he or she last worked, even if it was only for a few days. A Bristol Bay fisherman who did temporary construction work during the selected week may not be correctly classified in terms of duration of work and occupation. This problem was magnified under conditions in which a census interviewer unfamiliar with seasonal patterns in Bristol Bay was unable to clarify employment survey questions for the respondent.

So far we have observed that subregional patterns of labor force participation exhibited in the U.S. Census data are highly variable and difficult to explain on the basis of changes in conventional measures of population, employment, and unemployment. Commune ties with similar patterns of population, migration, and employment growth (subregions 4 and 6) exhibit dramatically different patterns in LFPR from 1970 and 1980. Conversely, communities with comparable patterns of LFPR (subregions 1 and 3) exhibit markedly different patterns of migration, employment, and population growth.

Table 5-10

CHANGE IN THE COMPONENTS OF LABOR FORCE
PARTICIPATION RAZES, 1970 TO 1980

Subregion	Direction of Change in LFPR 1970 to 1980	Avg Annual Growth From 1970 to 1980 (Percent) Population	Employment	Unemployment	Migratic Rate (%)
1 Lower Kuskokwim	+	0.3%	3.1%	11.6%	-14 .0%
2 Western	+	2.2	7.3	24.2	-1.6
3 Dillingham	+	5.5	9.3	-7.3	49.5
4 Nushagak	+	1.6	6.5	0.8	-4.8
5 Iliamna/Kvichak	-	-0.2	2.5	NA	-24.8
6 Bristol Bay Bor.	-	1.7	6.6	2.1	-15.9
ALL VILLAGES "	+	2.2	7.6	11.8	5.0

[a]Migration rate = $\frac{\text{Difference Between 1980 and 1970 Population - Natural Increase}}{\text{1970 Population}}$

SOURCE : Lane, Nebesky, and Hull, 1982.

U.S. Bureau of the Census, Special Tabulations, 1970 and 1980.

These findings suggest that factors other than those reflected in annual economic indicators underlie community or subregional variation in labor force participation from 1970 to 1980.

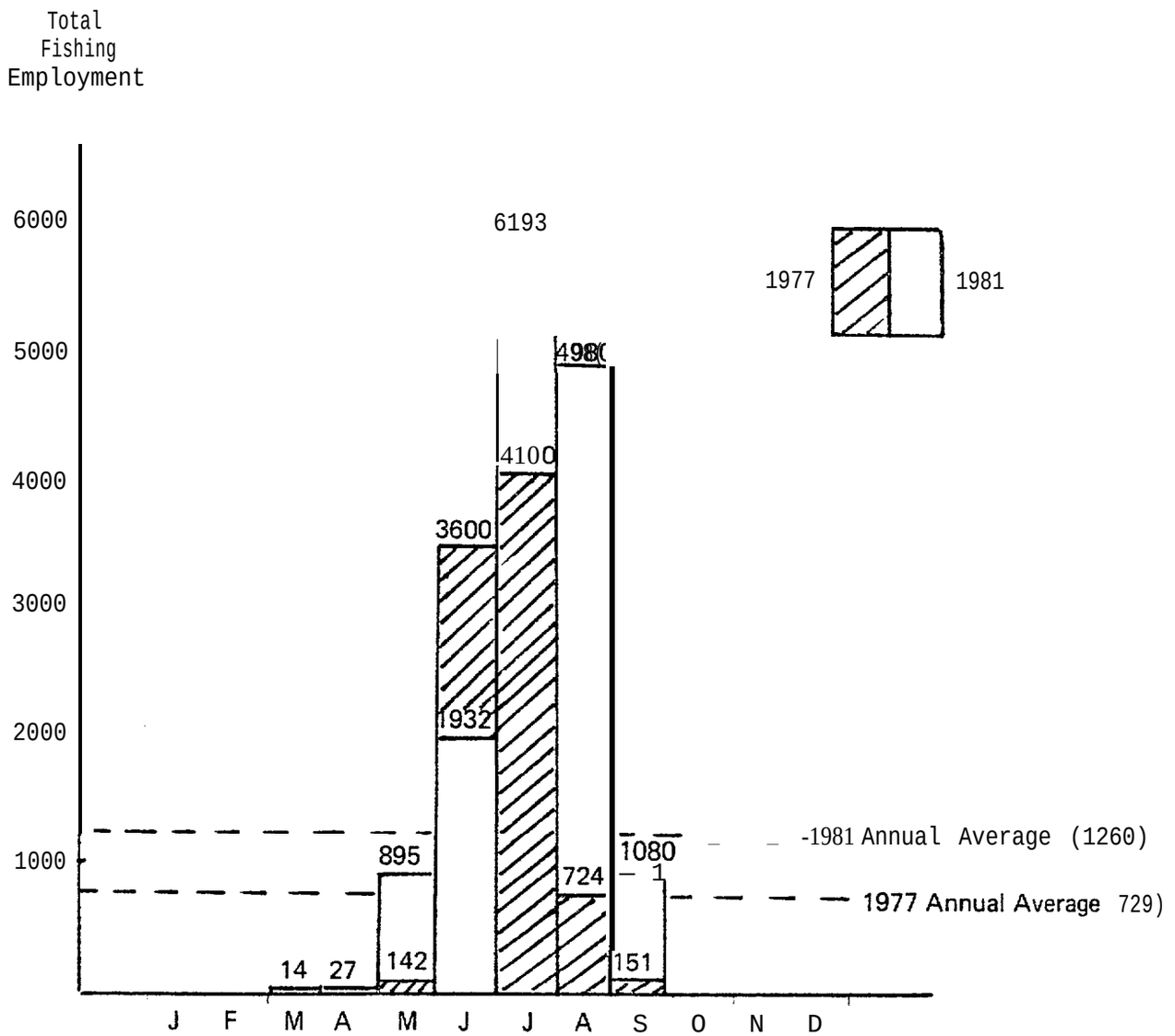
5.3.2 Seasonal Patterns

It would be difficult to overstate the importance of seasonal patterns in the Bristol Bay economy. Seasonal peaks and troughs closely associated with fishing provide the principal economic stimulus to the remaining industries in Bristol Bay.

Figure 5-4 illustrates seasonal shifts in fish harvesting employment using monthly estimates from ADOL. Note the relationship between annual average and monthly employment. Similar seasonal patterns are evident in other industries, as shown in Figure 5-5 (electric utility) and Figure 5-1 above (retail trade). On the one hand, it is possible that, despite seasonal employment peaks, the Bristol Bay resident labor force remains relatively constant over the year. People simply shift between employment and unemployment from season to season. If so, then LFPRs are reasonable measures of potential labor supply. On the other hand, it is probable that labor force participation among Bristol Bay residents changes seasonally in patterns similar to monthly employment. People enter and exit from the labor force on a seasonal basis. As a result they do not consider themselves unemployed in the conventional sense. Field investigations conductedin Bristol Bay tend to confirm the interpretation that labor force participation is conditional. Commercial and subsistence fishing during summer and hunting in fall usually take precedence over wage labor and other kinds of income-earning employment opportunities that occur at the same time. A combination of weather and resource-harvest patterns leave time for a brief construction season in the fall, sandwiched tightly between the fishing and hunting seasons, that is usually spent making private housing-stock

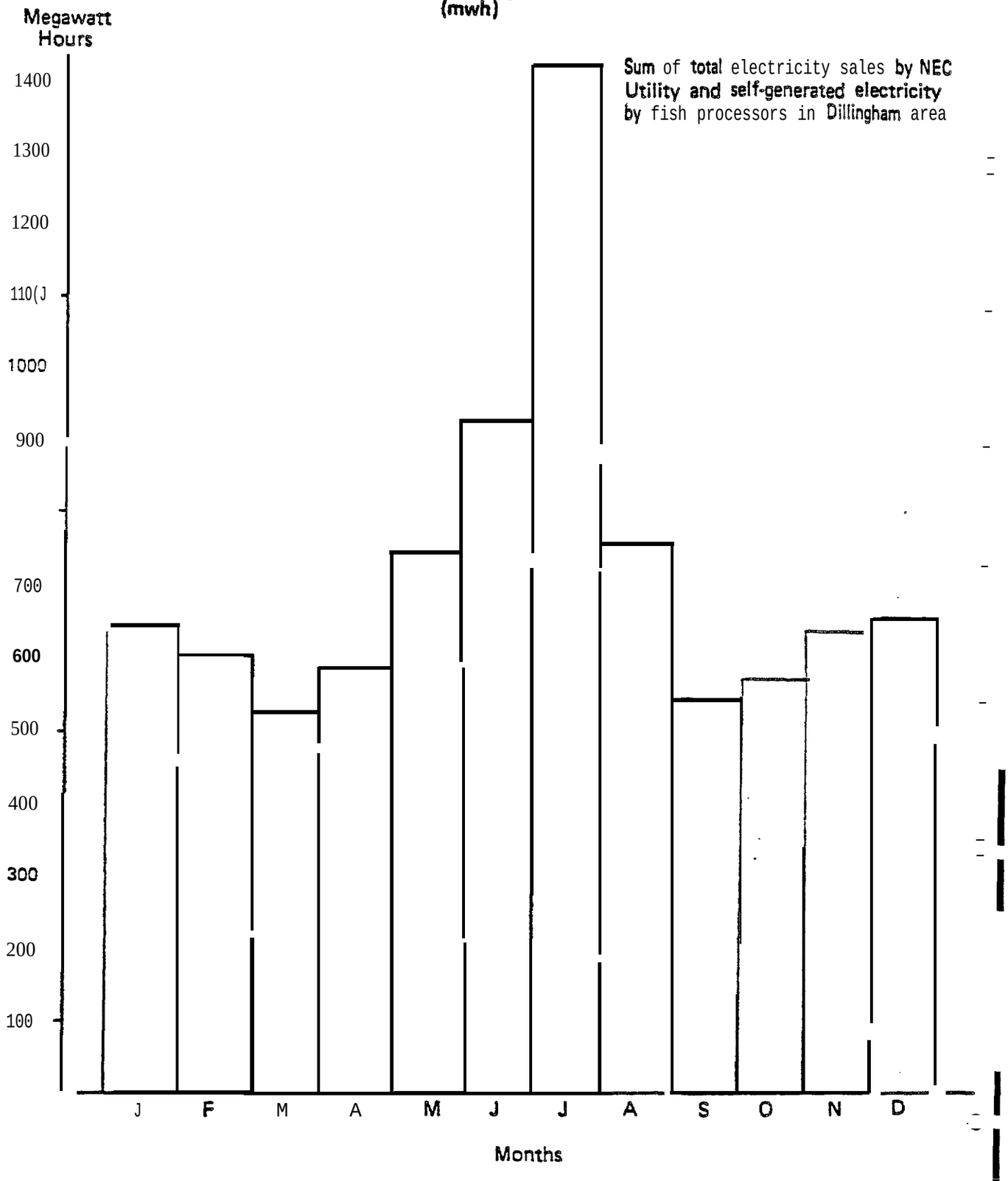
Figure 5-4

Bristol Bay Total Fishing Employment
1977,1981



Source: Alaska Department of Labor, Special Tabulations, 1983.

Figure 5-5 Total Utility and Non-Utility Electricity Consumption in the Dillingham District in 1980 (mwh)



additions. Whether permanent or temporary, jobs that become available during the fishing and hunting seasons are likely to be ignored by resident villagers. This is not to say that labor force participation is low during these periods. Bristol Bay residents of all ages probably exhibit 100 percent labor force participation during the peak periods of the commercial salmon run.

At other times of the year labor force participation will decline, due partly because of the scarcity of job opportunities and partly, because the need for cash is satisfied for the time being.

In general, labor force participation is high for a six-month period from mid-May to mid-November. At other times of the year, labor force participation probably declines until early spring when cash requirements begin to increase.

Indirect evidence of the effect of seasonality on labor force participation is illustrated in Table 5-11. The figures in Table 5-11 reflect an alternative labor force measure derived by summing the number of responses to census questions on the number of hours worked per week. The count of respondents (not hours) that indicated hours worked per week exceeds the conventional labor force estimate that includes both employed and unemployed persons.

One would conclude from this comparison that Bristol Bay residents choose to work and not to work at varying times over the course of the year.

Higher LFPR in the summer season is geared predominantly toward the fishing sector of the economy. Thus, in spite of increased labor force participation, labor supply that is willing to participate indiscriminatly in all wage labor markets would not readily emerge. To a certain degree, this consideration also would apply to the nonresident labor force that migrates seasonally to participate in fish harvesting, processing, and related industries.

Table 5-11
LABOR FORCE ESTIMATES FOR 1980
BASED ON CENSUS COUNT OF RESPONDENTS
FOR **USUAL HOURS WORKED**

Subregion	(1) Conventional Labor Force	(2) Sum of Usual Hours Worked Respondents	(1) ÷ (2) (Percent)
1 Lower Kuskokwim	96	244	39%
2 Western	334	412	81%
3 Dillingham	696	895	78%
4 Nushagak	189	277	68%
5 Iliamna/Kvichak	115	227	51%
6 Bristol Bay Borough[a]	197	288	68%
ALL VILLAGES	1,293	1,931	67%
REMOTE POPULATION			
Dillingham Division	20	33	61%
Bristol Bay Borough	29	57	51%
Total Remote	49	90	54%
CENSUS DIVISION			
Dillingham Division	1,576	2,207	71%
Bristol Bay Borough	324	798	41%
Census Division Total	1,900	3,005	63%

SOURCE : U.S. Bureau of the Census, Special Tabulations, 1980.

NOTE : [a]Excludes King Salmon

5.3.3 Interpretation of Labor Force Participation Rates

Labor force participation in the study area mustbe examined in terms of the opportunity to engage in subsistence activity and the availability of transfer incomes which together give local residents the option of simply withdrawing from the labor force. In their report on the neighboring Nunam Kitlutsisti region, Huskey, Nebesky, and Kerr (1981:14) expected 1 abor force participation to grow as a result of three trends: increasing socialization and acculturation of Euro-American ideals through schooling; more and better job opportunities; and the wider range of goods available for purchase from village stores and earier access to goods in urban centers due to improved transportation. Supporting this trend toward growth of the labor force will be greater dependence on money incomes to pay for increasing energy costs and for modern technology used in subsistence activities.

An important distinction has been made between potential, desired, and actual labor force participation. Actual labor force participation refers to the share of the population presently working or actively seeking work. In rural Alaska, actual and desired labor force participation may differ because of the "discouraged worker" effect and the preference for seasonal employment. Desired labor force participation is usually less than the potential participation because of the employee's freedom to choose leisure over income. Theoretically, given a wage rate, the employee will work so long as the cash income provides him with more benefits than if he were to spend these wage-earning hours on other activities. The employee's trade-off between purchasing goods on the one hand, and engaging in subsistence activities or having more leisure time on the other, determines how much wage labor he will offer (Huskey 1982:44-46).

The amount of time a person wishes to spend in the labor force also depends upon his priorities, the wages offered, and the price of goods. The desired labor force participation will be a function of the total level of population which determines number of labor suppliers. It also

depends on the age-sex structure of the population since both priorities and potential income change according to sex and over the course of a person's life (Huskey 1982:46). Desired labor force participation is expected to parallel increases in wages, employment opportunities, subsistence costs (both time and money), and opportunities for spending money. The change in the tastes and priorities of local residents should also promote increasing labor force participation (Huskey 1982:40).

A wage increase simultaneously increases the consumer's income and the price of leisure (lost wages). Higher incomes increase the wage-earner's ability to pay for leisure and reduces the amount of time he works while the higher cost of leisure reduces leisure time and increases work. The net effect of an increase in wages will depend on which effect dominates (Huskey 1982:60).

Given the current low levels of income in rural Alaska, formal econometric models often assume that increase in market work depends on the income elasticity of leisure which is determined by tastes. The assumptions regarding decisions as to whether to participate in the commercial economy or to engage in subsistence activities is based on the belief that the consumer always acts to maximize the fruits of his labor and decides which activity to pursue on the basis of their marginal products. Huskey (1982:63), notes thata rational consumer will work at home or engage in subsistence activities only for as long as he gets more goods for each hour of labor at home than he could by working in the market. When the marginal product of home-work or subsistence activities falls below the wage rate, the consumer will shift to market work. This decision-making process is believed to occur in a milieu in which subsistence activities are assumed to decline in productivity as population grows and competition for existing subsistence resources increases and the price of equipment goods used in subsistence activities rises. When the cost of subsistence activities increases, the resulting decline in real income is assumed to promote a drop in leisure and a rise in market work (Huskey 1982:68).

However, to reach this conclusion, the difference in preference between subsistence and market goods must be "incorporated into the production relations by making the goods produced effective units--subsistence goods equal the number of market goods which the consumer would require in exchange for one unit of subsistence goods" (Huskey 1982:66-68). As this study has demonstrated, this conversion cannot be easily performed because subsistence activities and goods have more than economic significance and cannot readily be translated into ''units of consumption." Changing tastes are evaluated only along one dimension in these models, a dimension which attempts to place conceptually different units into the same equation. Finally, as opportunities for employment expand and the range of goods and services available increases and their prices fall, marginal utility of income is expected to increase (Huskey 1982:70). This, however, assumes that there isan initial preference for these goods and services, whether or not they are available and/or expensive.

5*3.4 Summary

The Bristol Bay labor force grew significantly over the period 1970 to 1980, suggesting a general trend toward increased participation in the cash economy. In spite of this growth, LFPRs across subregions do not exhibit consistent increasing patterns; two subregions registered LFPR decline. Itis difficul t to isol ate the causes of changing LFPR patterns across subregions from 1970 to 1980. Labor force participation rates derived from U.S. Census data may not be reliable. They are based on conventional labor force measures and do not adequately account for significant seasonal labor force variation resulting traditional resource harvest patterns.

CHAPTER 6

HOUSEHOLD SAVINGS AND CAPITAL FORMATION

6.1 Introduction

Balanced economic growth depends, in part, on the correct combination of saving and consumption. Consumption expenditures stimulate business investment. Yet, too much consumption may draw on funds that would otherwise be available for investment. This could produce both rising interest rates and rising prices. If, for example, an economy approached 100 percent consumption, then economic growth would ultimately come to a standstill as banks and lending institutions would be unable to procure sufficient reserves for further capital formation at a price businesses could afford. On the other hand, excess saving would depress consumption expenditures and, in turn, business incentive to invest. Economic growth, as measured in capital accumulation and the real (inflation-adjusted) value of goods and services, would decline.

Growth also depends on the form of saving and how saving is allocated to investment, In the modern western economy, personal saving is not directly related to business investment. The banking system plays a vital intermediary role in allocating funds originally set aside for personal saving toward investments ranked by competing rates of return. Although influenced by market conditions and government macro policies, household saving decisions are made quite independently of business investment decisions. In the Bristol Bay village economy, a more direct relationship exists between personal saving and business investment.

In this chapter, we examine the relationship of personal saving among village households and investment patterns in the economy as a whole. We are interested in the form of household saving and the implications for growth and diversification of the regional economy.

6.2 Zero Cash Savings

The conventional interpretation of household saving is viewed as abstention from present consumption in order to increase future consumption opportunities. Saving is measured as the difference between disposable personal income and consumption expenditures. At the national level, personal saving as a proportion of disposable income varied from 5.9 to 8.6 percent between 1974 and 1981 (see Table 6-l).

Although comparable data does not exist for Bristol Bay, anecdotal data on spending patterns from key informants suggests that, for the most part, village households spend all of their cash income. Indeed, even in favorable fishing years such as 1979, it was not uncommon for many successful fishing households to run out of cash several months in advance of the next fishing season. Executives from Dillingham's only commercial bank confirm this pattern. The bankers indicated that many households retain positive savings accounts averaging $5,000 when the

TABLE 6-1
PERSONAL SAVING AS A PERCENT OF
DISPOSABLE INCOME - U.S.

YEAR	U.S. PERSONAL SAVINGS - DISPOSABLE INCOME
1960	5.6
1965	7.1
1970	8.0
1974	8.5
1975	8.6
1976	6.9
1977	5.9
1978	6.1
1979	5.9
1980	5.8
1981	6.4

SOURCE : Statistical Abstract of the United States, ed. 103, 1932-83, p. 424, Table 701.

fishing season ends. By late winter, those accounts are typically depleted. While households in Bristol Bay's chief regional service centers (i.e., Dillingham and Naknek) are believed to exhibit saving patterns comparable to other more developed commercial economies, the pattern of zero cash saving is prevalent among the outlying villages.

An obvious explanation for zero cash saving is that even households in the higher income brackets cannot keep up with the high cost of living that characterizes Alaska's bush. Alternatively, although more elaborate, well-stocked village stores are starting to appear in larger villages (i.e., Togiak, Manokotak, and New Stuyahok), most villages have limited consumer opportunities. Cash that cannot be spent in the village has less value, which produces an incentive for the villager to spend cash that would otherwise remain idle.

That most income is earned over a relatively short period each year may indirectly explain zero cash saving. The graph in Figure 6-1 compares the concentrated "windfall" nature of seasonal fisheries earnings to other forms of income for the typical Nushagak River village. Commercial fishery net earnings not only exceed other income sources; they are concentrated in a short three-to-six-week period each summer. Figure 6-1 was constructed mainly from anecdotal data on the sources, uses, timing of income, and the incidence of fishing and nonfishing jobs in the village. However, several conventional data series confirm the size distribution of Bristol Bay fishing income relative to all other sources. (See, for example, Bureau of Economic Analysis personal income data.)

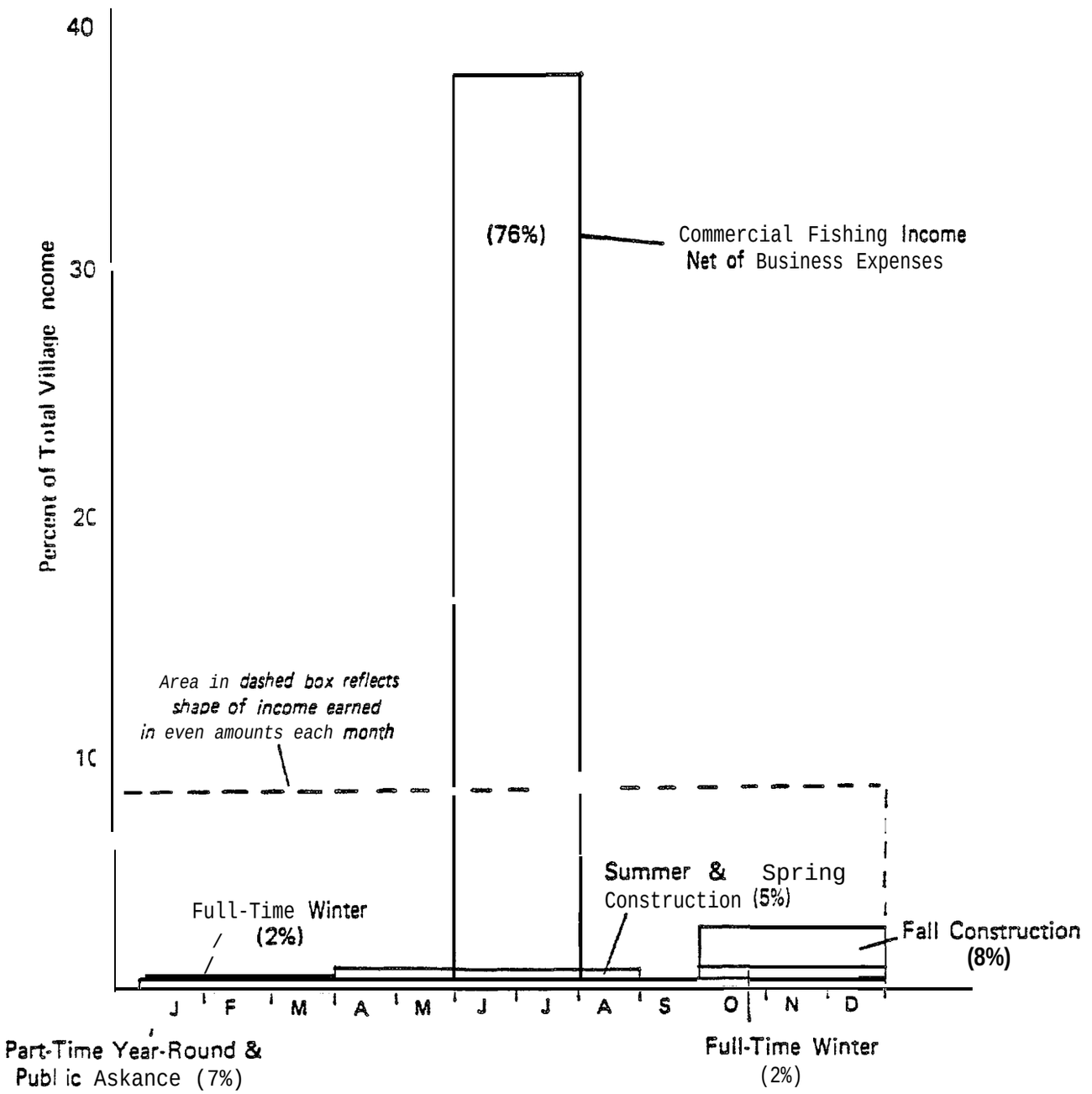
The size and concentrated nature of fishing income may help to explain the spontaneous and often careless spending patterns that prevail during and immediately after the fishing season. Furthermore, households usually allocate large amounts of income to one-time, lump-sum disbursements for the annual boat payment, the winter supply of heating fuel, gasoline, food, clothing, materials for building, and for durable items. According to Goldsmith et al. (1981), the typical household spent between $1,700 and $4,900 for heating fuel and electricity in 1980,

representing between 10 and 31 percent of average household income. Langdon (1981) pegged the median 1980 fishing boat payment at $7,500.

The Bristol Bay economy is characterized by villages isolated from markets, a seasonal fishing industry, and large once-a-year bulk purchases of basic consumer goods. This condition parallels the concentrated nature of earnings and availability of goods and probably accentuates the pattern of excessive spending and cash alienation.

Together, limited market opportunities, reduced winter access, and seasonal income may underscore the difficulty of managing funds over a medium-term planning horizon. Under these conditions, it is hardly surprising that households deplete cash reserves by late winter and that local commercial banks will not permit checking services to villagers. As Bristol Bay's commercial economy expands, it is increasingly evident that principals of financial management and budgeting are neither understood nor practiced by the majority of villagers.

Figure 6-1 Income Patterns for Typical Nushagak River Village
1983



6.3 Less Conventional Forms of Household Saving

Based on observations of zero cash saving, the occasional visitorto Bristol Bay might conclude that, as a whole, saving plays a minor role in that economy. However, if we broaden the earlier definition of personal saving--abstention from present consumption to increase future consumption opportunities--to include noncash elements, then a different interpretation of saving patterns emerges for Bristol Bay.

6.3.1 Bulk Purchases

A one-time bulk purchase that reduces costs from what it otherwise would have been under conditions of repeated, smaller purchases represents an important form of intangible saving in an economy characterized by high-cost, limited seasonal access to markets. For example, to match $100 in bulk-purchase savings, a household in the 33 percent tax bracket would have to earn an additional $150. Furthermore, a bulk purchase that ties up $1,000 but saves $100 implies a 15 percent tax-free return on investment from the standpoint of the $150 opportunity-cost savings. The $1,000 in tied-up funds reflects abstention from other competing forms of present consumption and increases future consumption opportunities. It, therefore, satisfies the basic saving criteria.

Taking into account the cost of occasional transportation to Dillingham to purchase items that could have been bought once in bulk and shipped upriver on the household fishing boat's last run suggests that bulk purchases in Bristol Bay probably produce saving well in excess of 10 or 15 percent of funds dedicated to bulk purchases.

Four literage companies haul fuel, supplies, and durable goods to outlying Bristol Bay villages. Each company makes about ten barge trips upriver per season and transports a total of about one million gallons of fuel oil for residential and small commercial space-heating. In 1981, the average village household consumed about 1,000 gallons of fuel oil per year, with annual costs ranging from $1,300 to $1,600, including a shipping surcharge of about 25 cents per gallon (Goldsmith et al.,

1981). Conservatively pegging the cost of spot transport at four times literage rates and assuming that the average village household ties up $1,600 in up-front fuel purchases each fall season suggests that this household realizes a 56 cent tax-free return on each dollar spent. Summed over about 500 outlying village households, this implies intangible yearly bulk-purchase saving of about $450,000 for fuel oil alone.

6.3.2 Residential Housing Stock

Village housing in Bristol Bay is composed primarily of owner-built dwellings and a sizable portion of government homes. Most nongovernment village housing is owned outright and constructed from unfinanced materials. Cash additions are another common feature of Bristol Bay's residential housing stock. Growing families typically build single-room additions as they can afford. Older homes can be identified by the number of single room additions that have been built. Although data on cash additions is not available for outlying villages, an unpublished random household survey conducted for ISER by Dillingham high school students indicates that in 1981, 45 percent of residential housing in Dillingham and Aleknagik had single- or multi-room additions.

The figures in Table 6-2 summarize U.S. census data on housing unit ownership patterns for the study area. For all 23 villages combined, the proportion of total occupied housing units owned from 1970 to 1980. A different ownership pattern emerges if Dillingham is excluded from the count. The proportion of total occupied housing units owned increased slightly from 68 to 71 percent over the same period. This suggests that village housing ownership patterns have remained fairly constant at rates higher than those exhibited in Dillingham.

Table 6-2

PROPORTION OF TOTAL OCCUPIED HOUSING UNITS OWNED IN 1970 AND 1980

(Percent)

23 Study Area

	Including Dillingham	Excluding Dillingham
1970	65 percent	68 percent
1980	64 percent	71 percent

SOURCE: U.S. Bureau of the Census, Special Tabulations, CNT1: 1970, STF1: 1980. (See Appendix B, Table B.4a and B.4b.)

Census data on the value distribution of owner-occupied housing suggests that nominal housing values appreciated sharply from 1970 to 1980. In 1970, respondents from all 23 villages indicated housing value of less than $50,000. By 1980, two-thirds of total respondents indicated housing values in excess of $50,000. The median value of 1980 village housing was $38,322 across all 23 communities. Excluding Dillingham housing units, the median value of outlying village housing falls to $28,900 in 1980.

U.S. Department of Housing and Urban Development (HUD) homes are also an important factor in village housing. By 1980, HUD homes comprised about 12 percent of residential housing in the study area (see Table A-n in Appendix A). Most villages now have HUD homes. Some villages (i.e.,

Dillingham and New Stuyahok) are scheduled to receive additional units from more recent HUD programs.

The Mutual Help Housing Program financed by HUD represents the third in a two-decade series of Federal low-income housing programs designed to gradually permit the occupant to build equity and assume ownership. The two-part monthly payment includes a mandatory service charge of almost $95 plus a conditional equity account charge for households able to afford to build equity. Out of fifty HUD homes in Dillingham, four families presently contribute to the equity account. A smaller proportion of families in HUD units in outlying villages are contributing to housing equity. For the most part, the HUD program has had a negligible effect on ownership patterns. HUD's most significant impact may be the destabilizing effect of tying households that earn income seasonably into regular monthly housing payments.

Except for government housing subsidies, new housing units and housing additions are usually paid for with cash. Standard home-mortgage financing is all but absent in the outlying villages. According to Dillingham bankers, it is difficult to receive BIA approval to use Native land allotments as collateral for home mortgages. This institutional consideration is one of several barriers to standard housing finance in outlying villages. The difficulty in managing a monthly housing budget with seasonal cash earnings reflects a more fundamental constraint.

6.4 Savings and Capital Formation

Cash invested in fishing and hunting gear represents another form of household saving. In addition to improving labor productivity and increasing household net worth (i.e., total assets minus total liabilities) commercial fishing investments satisfy the basic saving criteria. The following discussion centers on two elements of capital Formation in the Bristol Bay commercial salmon fishery: limited entry permits and fishing vessel upgrade.

6.4.1 Limited Entry Program

Because of its effect on household net worth, the Limited Entry Program's influence on household saving cannot be ignored. Starting in 1975, participation in Alaska's commercial salmon fisheries was fixed according to the number of limited entry permits authorized by the Alaska Limited Entry Commission (ADFG). Permit value varies with the ebbs and tides of salmon runs, market prices, and expectations. The price of a limited entry permit is thought to reflect the expected value of the future stream of excess profits in the restricted access fishery (i.e., total revenues minus total costs, including a normal return on investment for gear and equipment).

Bristol Bay drift gill net permit prices increased from $1,166 in 1975 to nearly $70,000 in 1979. Set gill net permit prices also appreciated, as shown in Table 6-3. As expected, growth in the number of drift and set gill net permits fished was commensurate with permit price appreciation over the same period. As shown in Table 4-14 residents of the study area owned 828 drift- and set-gill net permits in 1979. This implies a total value of $41 million, or about $34,000 in additional average household net worth for 1,188 census households--a reflection of long-run excess profitability in Bristol Bay's commercial fishery. By 1983, the number of permits increased to 1,051 for the same villages.

According to Langdon (1983), the bulk of this increase reflects a combination of several factors: (1) ADFG permanent-status authorization given to interim-use permits, (2) interfamily transfers, and (3) in-migration of persons who either held permits or purchased them after becoming Bristol Bay residents. Except for Port Moller (which is outside of the study area), there is no evidence of permit purchases from outside holders by Bristol Bay residents since 1975.

TABLE . . 6 - 3

NUMBER AND PRICE OF BRISTOL BAY LIMITED ENTRY PERMITS

YEAR	NUMBER OF PERMITS ISSUED			NUMBER OF PERMITS FISHED		PRICE
	INTERIM USE	PERMANENT	TOTAL	NUMBER	PERCENT	$
DRIFT GILL NET						
1975	644	1,416	2,060	1,195	58	$ 1,166
1976	99	1,621	1,720	1,288	75	2,536
1977	65	1,663	1,728	1,287	74	6,180
1978	78	1,700	1,778	1,490	84	21,638
1979	83	1,717	1,800	1,610	89	69,667
1980	110	1,717	1,827	1,670	91	NA
1981	107	1,720	1,827	1,667	91	NA
1982	100	1,722	1,822	1,791	98	NA
AVERAGE	161	1,660	1,820	1,500	82	$22,797
SET GILL NET						
1975	205	716	921	409	44	NA
1976	5	759	764	471	62	$2,755
1977	16	824	840	478	57	2,694
1978	19	891	910	610	67	8,507
1979	24	911	935	718	77	19,445
1980	34	914	948	754	80	NA
1981	42	915	957	744	78	NA
1982	41	906	947	859	91	NA
AVERAGE	48	855	903	630	70	$9,546

SOURCE: Alaska Department of Fish and Game, 1982, Appendix Table 1, Langdon, 1980, p. 65.

6.4.2 Vessel Ownership Patterns

The primary method for improving fishing productivity is to upgrade fishing vessels. Basic characteristics of Bristol Bay's total drift gill-net fleet (including nonresidents of Bristol Bay) are shown in Table 6-4 from 1969 to 1980. While average length has remained fairly constant at about 29 feet, average horsepower increased sharply, and average vessel age dropped rapidly after 1977. Other characteristics not shown in Table 6-4, including the number of vessels with diesel engines and fiberglass hulls, also registered significant gains after 1977 (see Terry et al. 1982}. Except for vessel length, the data suggest a clear pattern of vessel upgrade in the late 1970s. Less clear is whether these improvements are evenly distributed across residents and nonresidents of Bristol Bay.

According to the results of a 1980 survey of Bristol Bay Native fishermen, Langdon (1980) reported that although "the majority" of drift gill-net fishermen operated vessels in the 32-foot class in 1980, over40 percent operated smaller skiffs powered by outboard motors. Langdon (1980) notes further that drift gil 1 netting in open skiffs stil 1 predominates in the western communities of Togiak and Manokotak. Indeed, none of the 25 survey respondents from Togiak operated a 32-foot vessel in 1980. Recent field investigations indicate that only a few Togiak residents have upgraded to the 32-foot class since 1980.

Table 6-5 shows units of gear fished, by residence of operator, and suggests that resident drift gill-net fleet participation has increased since 1974, but at a slower rate than nonresident Bristol Bay vessels. As a result, the share of total vessels owned by residents fell from 60 percent in 1974 to 36 percent in 1980. The resident share of total set gill net gear declined from 75 to 58 percent over the same period.

In summary, although a clear pattern of vessel upgrade is evident, there does not appear to be exclusive focus on 32-foot, limit-class vessel purchases. The evidence does not reveal resident versus nonresident patterns of vessel improvement.

TABLE 6-4
FLEET SIZE AND PERMITS FISHED IN BRISTOL BAY SALMON DRIFT GILL NET FISHERY

YEAR	VESSEL CHARACTERISTICS[a] NUMBER OF VESSELS	AVERAGE LENGTH	AVERAGE HORSEPOWER	AVERAGE AGE (years)	TOTAL DRIFT GILL[b] NET PERMITS FISHED	RATIO OF FLEET SIZE TO PERMITS
1969	1,216	29.3	149.3	10.1	NA	NA
1970	1,298	29.0	150.4	10.4	NA	NA
1971	1,383	29.0	148.5	11.0	NA	NA
1972	1,357	29.1	151.9	11.7	MA	NA
1973	1,136	28.9	152.1	12.3	NA	NA
1974	626	28.3	150.1	11.3	NA	NA
1975	1,203	29.1	154.9	14.1	1,195	1.01
1976	1,299	29.2	155.6	14.5	1,288	1.01
1977	1,281	29.1	155.6	15.0	1,287	1.00
1978	1,578	28.6	160.1	13.5	1,490	1.06
1979	1,821	28.6	175.7	12.3	1,610	1.13
1980	1,882	29.1	200.4	10.1	1,670	1.13
1981	NA	NA	NA	NA	1,667	NA
1982	NA	NA	NA	NA	1,791	NA

SOURCES : [a]Terry et al., 1982.

[b]Nelson, Alaska Department of Fish and Game, 1981.

TABLE 4-5
WITS OF GEAR FISHED IN BRISTOL BAY
BY RESIDENCE OF OPERATOR, 1%9 -1980

YEAR	BRISTOL BAY	OTHER ALASKA RURAL	OTHER ALASKA ANCHORAGE	OTHER ALASKA TOTAL	NON-RESIDENT	TOTAL
DRIFT GILL NET						
UNITS OF GEAR FISHED:						
1%9	569	224	97	321	914	1,804
1970	533	2s1	17s	426	667	1,626
1971	574	230	153	383	816	1,773
1972	554	195	?20	315	611	1,480
1973	1,052	256	151	*401*	740	2,199
1974	388	67	37	*104*	148	640
1975	491	163	88	251	501	1,243
1976	506	159	101	260	557	1,323
1977	484	74	167	242	560	1,287
1970	56a	89	230	319	691	1,578
1979	656	101	270	371	794	1,821
1980	658	107	274	381	788	1,827
SET GILL NET						
UNITS OF GEAR FISHED:						
1%9	33s	48	52	100	81	516
1970	354	60	65	125	62	54 1
1971	328	34	42	76	6 7	471
1972	348	21	50	71	59	478
1973	384	16	42	58	36	476
1974	177	15	21	35	23	235
1975	262	29	43	72	37	371
1976	315	42	46	88	57	460
1977	279	15	99	114	85	478
1978	NA	NA	MA	NA	NA	NA
1979	NA	NA	NA	NA	NA	NA
1980	549	26	156	182	217	948

SOURCES : 1969-76 units fished from Rogers.

1977-1980 estimates based on resident distribution of permits held from Steve Langdon, 1980, and on proportion of total permits fished from Alaska Department of Fish and Game, 1982.

6.4.3 Changing Debt Structure

In addition to traditional cannery lending practices, there are two primary sources of debt capital available to Bristol Bay fishermen. The first, operated by the Alaska Department of Commerce and Economic Development (DECD), is the Commercial Fishing Loan Program. This program is geared primarily toward fishing vessels, although processor loans and entry permit loans also receive a small portion of DECD loanable funds.

The number and value of commercial fishing loans from DECD are shown for the period 1974 to1984, in Table 6-6. These data indicate that loans to Bristol Bay fishermen for fishing vessels increased sharply prior to the peak fishing seasons of 1979 and 1980, before declining in later years.

The decline in loans administered after 1980 may reflect a combination of reduced fishery potential and of rising involvement in lending by the Alaska Commercial Fish and Agriculture Bank (CFAB). CFAB began operations in 1980 and represents the second primary source of debt capital to commercial fishing interests. Like DECD, CFAB procures loans for vessels, entry permits and gear, and fish processor facilities. At the time of this writing, CFAB data on loan involvement in Bristol Bay were not available. However, it is probable that CFAB has processed about 50 loans for commercial fishing vessels over the period 1980 to 1983. This would tendto offset the decline in number of state loans after 1980, shown in Table 6-6.

Data from Table 6-6 suggest further that availability and use of state financing for fishing vessel s may signal an important departure from traditional cannery financing. Although cannery loan data are not available, recent field investigations tend to confirm that resident fishermen are moving away from cannery indenture toward independent status, a pattern that would preclude continued cannery participation in commercial fishing-vessel financing.

According to Jerry Liboff, a commercial fisherman and tax consultant for

several Bristol Bay villages, prior to 1978 nearly all village fishermen received cannery loans to finance their boats. Today, only 10 percent of village fishermen receive cannery financing. Liboff suggests that several factors account for this change:

1. Rising interest rates in the late 1970s discouraged cannery lending.

2. Rising fish prices encouraged fishermen to shift from canneries to higher-priced independent buyers.

3. Increased government involvement in low-interest commercial fishing loans presented fishermen with an attractive alternative for financial support.

To summarize, coincident with a decline in traditional cannery financing

TABLE 6-6
ALASKA DEPARTMENT OF COMMERCE AND ECONOMIC DEVELOPMENT
LOANS IN BRISTOL BAY[a]

YEAR	COMMERCIAL FISH[a] NUMBER	VALUE
1974/1975	2	65.0
1976	0	0
1977	2	35.9
1978	10	294.1
1979	41	1,630.9
1980	83	4,002.5
1981	12	627.3
1982	20	1,313.1
1983	7	2,554.7
1984	0	0
ALL YEARS COMBINED	177	9,669.2

[a]Loan count and value in 1983 and 1984 are for district 26.

was the emergence of state and private capital to finance vessel improvements. The data in Table 6-6 suggest that Bristol Bay resident fishermen have actively participated in lending programs for vessel upgrading. However, Bristol Bay fishermen who now rely on commercial finance no longer enjoy the often negotiable terms of traditional cannery fishing boat loans, typically a proportion of seasonal gross receipts. In unfavorable fishing years, the negotiable terms of cannery financing were an important safety valve for many Bristol Bay fishing households.

In contrast to this, fishermen are becoming increasingly tied to strict yearly loan payments under conventional financing arrangements. More important, the limited entry permit is typically used as collateral for state and private lending. This, more than any other consideration, represents a significant change in the structure of Bristol Bay's household debt. It signals a potentially unstable precedent given the strict terms of conventional finance, the uncertainty of future salmon markets and run size, and the overriding importance of the entry permit as the key to the Bristol Bay fisherman's livelihood.

6.4.4 Native Corporation Investment

The Bristol Bay Native Corporation (BBNC) and its 29 village-corporation affiliates constitute another source of business investment and personal wealth for the region. Cash compensation and land entitlement was awarded on the basis of Native enrollment among villages in the regional corporation boundaries. By the end of 1978, the BBNC received about $22.8 million in cash and 2.9 million acres of subsurface estate in conjunction with ANCSA. Bristol Bay village corporations received surface title to the same 2.9 million acres plus an initial endowmentof cash equal to about $250,000 per village.

Over the past decade the BBNC participated in many business investments that directly affected the Bristol Bay region. For example, until recently the BBNC owned and operated a large shore-based fish processing plant in Dillingham. In spite of capital of this plant

in 1981 created controversy over the issue of appropriate forms of investment among BBNC shareholders. In the mid-1970s, the BBNC participated in a joint venture with several neighboring regional corporations to form a statewide bank. Like other regional Native corporations, BBNC probably retains a portfolio of securities investments for which dividend payments are distributed directly to shareholders.

Village corporation investments generally affect villagers more directly than those of the regional corporation. For example, village corporations from New Stuyahok and Togiak operate village stores in their communities. Ekwok Native Limited, Inc., owns and operates two of Bristol Bay's only locally controlled recreation lodges. Nondalton's village corporation recently negotiated the purchase of a doll factory that is to be relocated in Nondalton. Production is scheduled to begin in March 1984. Manokotak Native Limited, Inc., invested part of its wealth in an electric utility and several bulk-fuel storage tanks. Koliganek's village corporation placed its cash in securities investments that pay dividends directly to shareholders. Several other village corporations elected to merge with Choggiung Limited, Inc., of Dillingham, Bristol Bay's largest village corporation. Among others, Choggiung's assets include a hotel, an office building, a lumber yard, real estate subdivisions, and a sand and gravel excavation company.

ANCSA provisions do not permit village corporation shareholders to sell surface estate until after 1991. Nevertheless, some village corporations estimate implicit net worth from land assets at nearly $1 million per Native shareholder. Until these assets become marketable, their effect on household net worth is negligible. Nevertheless, as 1991 draws closer, patterns of household spending and investment may increase with rising expectations for new wealth. The commercial economy will undoubtedly expand. However, the degree of expansion will depend upon statewide economic conditions as well as conditions in Bristol Bay's salmon fishery, recreation industry, and support industries during the late 1980s.

Over the past decade, jobs for planning and administration probably

employed hundreds of persons and payed out millions of dollars in salaries each year. Because the BBNC is headquartered in Anchorage, its effect on Bristol Bay resident employment is unclear. Each village corporation probably employs one or two persons year round. The direct and indirect economic effect from regional and village corporation investments is probably just beginning to take hold. In general, village corporation investment strategies are geared toward fishing and related support industries. However; recent exceptions to this pattern (e.g., Ekwok and Nondalton) suggests widening trend toward economic diversification.

6.5 Summary

To summarize, despite significant economic growth over the past decade, zero cash saving is still a predominant factor in Bristol Bay's outlying villages. About three-fourths of total household cash income is earned over a short but intense fishing season, and it is usually spent well in advance of next season's salmon runs. In this regard, cash appears to be used in patterns similar to the yearly cycles of resource harvest.

Yet, household saving does occur in less obvious, noncash forms. One-time bulk purchases represent a method of implicit household saving, one that is tied to seasonal availability of cash and limited access to markets.

For the most part, there is a direct relationship between saving and investment in the village economy. Most investment was self-generated from personal saving and was geared toward commercial fishing vessel upgrade.

Evidence of banking system participation is beginning to appear in connection with consumer loans for sno-gos, three-wheelers, and other moderate-size durable "goods. For example, Dillingham's only commercial bank is presently processing seven consumer loans for sno-go purchases by Togiak residents.

Banking system involvement in commercial financing was geared mainly toward commercial fishing vessel loans and tends to perpetuate a pattern of limited economic diversification. There are several factors that underlie the narrow scope of bank finance:

Local sources of capital are not abundant.

2. Loan management expertise is geared mainly toward commercial fishing boats.

3. Specialized loans are more expensive.

State loans represent another major source of capital for commercial-fishing vessel upgrades. The availability and use of state and, to some extent, private bank loans to finance vessel improvements is a significant departure from traditional cannery financial assistance to fishermen.

Public and private sources of commercial financing, triggered in part by rising net worth from limited entry permits, tend to perpetuate the pattern of self-generated investment from village household saving.

CHAPTER 7

SUBREGIONAL AND VILLAGE LEVEL ECONOMIC STRUCTURE AND ACTIVITY

7.1 Introduction

In this chapter we will discuss the subregional - and village-level economic structure of Bristol Bay. Several sources, in addition to primary sources have been used in the preparation of this section. These include the Arctic Environmental and Information Data Center Village Profiles prepared for the Alaska Department of Community and Regional Affairs (referred to throughoutas the ADC&RA Reports), the Alaska Department of Fish and Game, the Alaska Department of Labor, Gasbarro (1975), Langdon (1980 and 1981), and Payne and Braund (1983), as well as several other sources which will be noted where appropriate.

7.2 The Bristol Bay Borough

The Bristol Bay Borough consists of Naknek, South Naknek and King Sal men. The communities of Naknek and South Naknek interact with each other more than either does with King Salmon. King Salmon is essentially a governmental enclave with a very small indigenous population, as opposedto the other two communities which each have a Native majority population. We will discuss the economic structure and activities in each of the three communities separately, after which we will note the major economic and subsistence-related concerns of residents in the Borough.

7.2.1 Naknek

Naknek is a major subregional center and the political seat of the Bristol Bay Borough. It is also the site of offices of the Bristol Bay Borough School District (the Lake and Peninsula School District office

was recently [1983] moved to King Salmon). The population of Naknek is 318 of which 50.6% identify themselves as Native, including 6 Indians, 25 Eskimos, and 130 Al cuts. (Throughout this section we wil 1 refer to the Native population of various communities. It should be noted that we are discussing people who **identify themselves as Native and are making** no **judgement** as to actual **racial composition of the population.)**

Naknek's economy, though more diversified than most villages in the region, is nonetheless dependent upon commercial salmon fishing and processing. The community is one of the two centers of the Bristol Bay red salmon fishery and serves as the departure point for several thousand people at the beginning of the season. The residents of Naknek are themselves heavily involved in the fishery, holding 53 drift **gillnet** and 85 set **gillnet** permits, meaning 43.4% of the community members hold limited entry permits. The bulk of the local fishermen are members of the Alaska Independent Fishermen's Marketing Association, and as such have placed representatives on the organization's board. (Board membership is determined by the number of drift gillnet fishermen working for the canneries. This is true for **all** the communities in the Borough.) The fishery, and therefore thecommunity's economy, depends heavily on the salmon runs, particularly the red runs. In the **last** several years the red runs have revived dramatically, although the runs to the **Kvichak** drainage have not been as large as expected.

Other than fishing, fish processing is the major industry in Naknek. There are nine salmon processors on the Naknek side of the river, and these range from relatively small specialty operations to two **large** processors employing several hundred people (over 400 in season). However, as is the pattern for mostof the Bay, the canneries import almost all their labor from the lower forty-eight or from other parts of Alaska, and provide little employment for local residents.

Naknek has a fairly diversified economy relative to other communities in the region. The Borough government employed eleven people year-round and seven people part time during 1982. The school districts employ between forty and fifty people in the community, including at least 35

by the Bristol Bay Borough School District and approximately ten by the Lake and Peninsula School District. Employment is also available in two general stores, two restaurants, three bars and in such areas as boat storage and repair operations, a service station, library, lumberyard, four air taxi services, fuel distributors, and two hotels. There are several other primarily service jobs as well.

Subsistence hunting and fishing is common in Naknek, particularly among the long-term resident and Native population. Salmon are the most popular subsistence catch, but several other species are utilized as well, including porcupine, rabbit, moose, caribou, ptarmigan, geese, ducks, freshwater fish, etc. (for a more detailed treatment of Naknek subsistence patterns see Morris 1982). Residents of Naknek range over a fairly wide territory in search of subsistence game, often going as far south as Egegik to hunt caribou and northeastto Iliamna Lake to hunt and fish. Trapping is also pursued off-season, particularly for fox, beaver, land otter, and lynx. Sealing is pursued by some in the winter and spring.

7.2.2 South Naknek

South Naknek is located approximately a mile down the river from Naknek on the opposite bank. The population in 1980 was 145, of which 85.5% identified themselves as Native, including 2 Indians, 7 Eskimos, and 115 Aleuts.

The major economic activity of the community is centered on the salmon fishery. The village had 21 drift gillnet and 32 set gillnet permits in 1983, held by 36.5% of the population. Crews are selected partly on the basis of kin relations, but often friendship is also a basis of selection. The drift gillnet fishery is dominated by men, while the set gillnet fishery is comprised of about half male and half female participants. Male participation in the set gillnet fishery is a fairly recent development in a predominantly female occupation (most of these men are non-Native). Most South Naknek fishermen belong to the Alaska Independent Fishermen's Marketing Association.

The processing sector is represented in South Naknek by five processors on the south shore of the Naknek River, of which only two or three have operated in recent years. The canneries generally employ between 400 and 500 people during the fishing season (this figure includes both fishermen and processing workers). These positions, however, have little impact on local employment levels as nearly all workers are brought in from other locations each year. The major impact for locals is during the start-up and shutdown periods when the processor hires several local people to perform specific tasks. Nonetheless, the local economy does realize a good return from the processor workers, particularly the bars, restaurant and retail outlets. Resident cannery workers, tendermen, beachmen, and culinary workers are represented by the International Longshore Workers Union.

Other jobs available in the community include one community health representative, one alcoholism counselor, one postal employee, positions in two small stores, five cannery watchmen, one road maintenance position, and in the school, one certified teacher, one cook, one aide, and one janitor.

Subsistence hunting and fishing is an important part of the yearly round of South Naknek life, particularly for the Native population. About 75% of Naknek residents depend on subsistence hunting or fishing to some extent (ADCRA). The most important subsistence game is salmon, followed by freshwater fish, porcupine, rabbit, moose, caribou, ptarmigan, ducks and geese. Additionally, some people trap fox, beaver, wolverine, and otter during the winter.

7.2.3 King Salmon

King Salmon is located approximately fourteen miles upriver from Naknek. The population of the community in 1980 was 545, of which only 5.9% were Native, including 3 Indians, 2 Eskimos, and 27 Aleuts. (In most communities in the region the Native population is virtually the entire long-term resident population of the community. King Salmon's Native population, however, like it's non-Native population is primarily composed of

individuals with relatively short terms of residence in the community.)

King Salmon is the most atypical community in the region and is dominated by Euro-Americans, particularly military personnel from the Air Force base. Activity focusses on the airport, the most advanced in the region and the center of the regional transportation network. As a result, government employment (military in particular) and transportation/communications-related employment are the major contributors to the local economy.

Employment is dominated by the Air Force which has 341 personnel stationed in King Salmon. The Air Force base is self-contained and individuals serve tours of duty lasting one year. Little interaction occurs between base personnel and the restof the Borough except that about 100 base personnel work in the canneries during the fishing season. The Federal Aviation Administration, with 33 employers, is also a major source of jobs, primarily in the area of airport operation and support. Additional federal employers include the Fish and Wildlife Service, which administers units of several National Wildlife Refuges; the National Park Service, which employs approximately five year-round and twenty summer employees to oversee the Katmai National Monument and other National Park Service units in the region; and the Postal Service. The state is another employee in the community, particularly in airport related activities. The Department of T'ransportation and Public Facilities is concerned with airport maintenance and security. The Alaska Department of Fish and Game also has offices in the community, as does the Department of Public Safety.

The private sector of the King Salmon economy is also heavily supported by the community's position as a regional air traffic center. Peninsula Airlines has a large office which employs about 25 people, King Flying Service employs two people, Wein Air Alaska bases 13 people in the community, and Kodiak Western Airlines has eight employees.

There are also some positions available in the hotel and restaurant sector, such as the Fireside Inn which, depending on the season, employs

between 12 and 16 people and the King Ko Inn which employs five or six people in winter and as many as twenty or more during the summer. Additional sources of employment include a car rental business, three small fishing lodges, the King Salmon Commercial Company, a construction company, and other small enterprises.

Commercial fishing involves arelatively low proportionof the total population of King Salmon and is far less important here than in any other village in the Bristol Bay region. Twenty-Four individuals in the community hold drift gillnet permits, and 37 individuals hold set gillnet permits, for a total of 11.2% of the population. Though there are fishing dependent villages in the region with lower percentages of the population holding permits, the population of King Salmon is virtually without economic dependency on the fishery. Subsistence hunting and fishing are also of relatively little importance in the community, largely as a result of a small Native population and lack of traditions associated with such activities. However, some people do preserve salmon for the winter and a few trap fox, beaver, lynx, wolverine, and wolf.

7.2.4 Concerns of Borough Residents

Following are the major concerns expressed by Borough residents regarding economic issues and subsistence activities. Except where indicated these concerns are generally shared by all Borough residents. It should be remembered that subsistence and commercial fishing activities are of much greater concern in South Naknek and Naknek than in King Salmon.

7.2.4.1 Economic Concerns

Salmon Limited Entry permit regulation is a major concern of local residents who believe it has eliminated many people from the fishery who should rightfully have been able to secure a permit. Residents also dislike the fact that a number of outsiders were able to obtain permits when many of their own people who traditionally utilized the fishery

were, often inadvertently, eliminated. Finally, there is widespread fear that the next generation will find very few permits available and that it will be impossible for the children of the present generation to enter the fishery.

A second concern is over impending Outer Continental Shelf (OCS) development. Local residents fear that off-shore drilling will damage the salmon runs which are the lifeblood of the region. Although there is a good deal of resistance to off-shore drilling there appears to be much less resistance to on-shore drilling which is perceived as presenting less of a threat to the environment.

Growth and development in the region are, in general, another concern of residents. There are fears of increased urbanization in the region and a diminished quality of life. There are also fears that the existing infrastructure will be unable to absorb rapid growth. Finally, the Native population fears being submerged in another social and cultural system and the consequent loss of their traditional culture.

One other major issue in South Naknek is the construction of abridge which would span the Naknek River between Naknek and South Naknek. This would provide easy access to retail and service outlets in Naknek, would allow the children to drive rather than fly to school, and would, residents believe, give South Naknek a more direct voice in Borough affairs. There is concern expressed by some residents of South Naknek that were the bridge to be built, their community would in effectbe swallowed by Naknek, and thereby lose those features which make it a distinct (and attractive to these individuals) environment. There is little chance that this bridge will be built, in that two studies conducted in recent years have shown construction to be prohibitively expensive.

7.2.4.2 **Subsistence**

Subsistence activities vary widely among the three communities which make up the Bristol Bay Borough. Local discussions indicate that the least involved in such activities are the residents of King Salmon, with Naknek residents moderately involved, and South Naknek inhabitants heavily involved. Subsistence game forms perhaps 5
residents' diet, and perhaps 75% of their meat intake, with fluctuations according to the price of outside goods. Subsistence hunting provides perhaps 25% of Naknek residents' nutritional needs and a slightly higher percentage of their meat intake. A large number of game animals are taken each year by King Salmon residents on subsistence permits. King Salmon is also the recognized center for outside recreational hunters discussed earlier in the economic section.

The major subsistence areas lie in the vicinity of the villages. The area from south of South Naknek to the Smelt Creek Ridge is generally used for hunting, although for other wildlife such as caribou, ducks and geese, the residents often go to **Egegik** and beyond on the Peninsula. **Kvichak** Bay is extensively utilized, both for marine and land resources. Parts of **Katmai** National Monument were once heavily usedextensively but are now restricted as part of the expanded Monument established under the Alaska National Interest Lands Conservation Act **(ANILCA).** Moose are hunted in the river drainages and caribou are also hunted just south of the communities.

Salmon, caribou and moose are the major species taken; beaver, rabbi ts and porcupine are the species most consistently taken while other species such as squirrel, lynx, whitefish, lake trout, **blackfish,** and **grayling** are taken less frequently. In addition, numerous kinds of berries and edible wild vegetation are gathered.

7.2.4.3 **Subsistence Concerns and Issues**

The major concern regarding subsistence is the problem of continued use of traditional areas and resources. Both the legal use of particular

areas and the continued viability of the resources are at issue.

For example, the residents of the subregion have traditionally used a small lake, Seagull Lake, for the collection of seagull eggs and other subsistence items. Several years ago a dispute arose over use of the lake. Paugvik, the Naknek village corporation, took a cannery to court claiming that the cannery was using water from the lake without authorization and that this threatened the seagull population among other subsistence resources. Ultimately this question was settled in favor of the processor, upsetting a number of local residents.

Overregulation is also a subregional issue. The people, particularly the Natives, are not accustomed to getting licenses or permits for practicing traditional activities such as subsistence hunting and fishing. This is not yet a major issue but has caused a number of misunderstandings and minor conflicts.

Sport hunting and fishing are also controversial issues in the subregion. Sport .hunters and fishermen, the vast majority of whom come from outisde of the region, have become much more numerous in the last decade, largely as a result of the expansion of facilities around Iliamna Lake and most notably in the village of Iliamna itself. It is feared that such hunters, especially the so-called ''head hunters" who take only the head for a trophy and leave the carcass, threaten the continued abundance of subsistence resources. This remains an unresolved conflict of interests in the subregion.

Land withdrawals and possible land disposals are also important issues. Land withdrawals occurred on a large scale with the passage of ANILCA. ANILCA withdrew an additional 5.3 million acres in Bristol Bay alone, much of which had traditionally been utilized for subsistence purposes. Many people are still uncertain about the extent to which they can continue to use those areas, Land disposals are the result of a policy of the State of Alaska to make more land available for residents. It the possibility of non-Natives moving into the region and it is particularly feared by the Natives as a threat to their social and

cultural integrity.

7.3 The Kuskokwim Subregion

The Kuskokwim subregion consists of the communities of Platinum, Goodnews Bay and Quinhagak. All three communities are located between the Kuskokwim river to the north and Cape Newenham to the south. These communities are tied together socially and culturally. All share in the Kuskokwim fishery, which is much less lucrative than the Bristol Bay fishery, although some do hold Bristol Bay permits. The villages are nonetheless tied into the Bristol Bay region, economically and socially, particularly through the Togiak subregion.

7.3.1 Quinhagak

Quinhagak is located near the mouth of the Kanektok river between the Kuskokwim and Cape Newenham. The population in 1980 was 412; 97.6% were Native. It was estimated in 1981 that the population had grown to 448 (U.S. Bureau of the Census).

The cash economy of Quinhagak is relatively undeveloped in comparison the villages of the Bristol Bay region. This is because relatively few of the villagers participate in the commercial fishery. Some participate in the Togiak or Goodnews Bay/Security Cove herring fishery, but again the numbers are few. The major local employment opportunities are in the school (twelve full-time teachers usually hired from outside the area, and several maintenance personnel), in two stores run in the village, two health aides, two utility plant operators, an airport manager, and intermittent construction and local development employment. Some villagers work in Bristol Bay canneries during the fishing season, and some work the Pribilof seal herds.

Subsistence activity is very important in Quinhagak. The majority of literally depend on such activities for survival. Quinhagak is a coastal community, and as such depends heavily on sea mammals, in particular seal, sea lion and walrus along with beluga whale. A number

of animals are trapped, and Quinhagak residents often travel as far as the Mulchatna to hunt caribou and moose. The village is involved in extensive exchange networks, both with communities to the north and with those of the Bristol Bay region.

7.3.2 Platinum

Platinum is located over a hundred miles south of Bethel on the southwest edge of Goodnews Bay. The population in 1980 was 55, and it was estimated to be 58 in 1981. 80% of the 1980 population was Native.

The economy of Platinum is relatively undeveloped. However, a major local employer, the Goodnews Mining Company which operates a platinum mine has recently reopened and this may mean additional local employment. Other than the mine, the only local employment is two teaching jobs, an airport manager position (all state jobs), a postmaster and health aide (federal) and city jobs including a mayor, city clerk, chief of police, fire chief and treasurer. There is a single store run by the Platinum Commercial Company which employs several people.

Platinum residents participate at low levels in the commercial fishing industry. There are few locally held permits for the Bristol Bay fishery, although some residents do work in canneries in the Bristol Bay region during the season. A few residents also participate in the Goodnews Bay-Security Cove herring fishery, particularly since 1981 when those two herring fisheries were closed to purse seiners which are primarily owned by outsiders. Only drift gillnetters are now allowed to use those fisheries and this has spurred local interest in the fishery.

The low level of development of the cash economy in Platinum has meant that the subsistence sector is very important. Platinum subsistence activities are oriented toward the sea, and the community depends heavily on the harvest of seal, sea lion, walrus and whale. Hunting also is done for moose and, by traveling to the interior, caribou. Many smaller animals are also taken both for food and for their furs. Berries are an important subsistence item in the late summer and fall.

Platinum residents participate in a regional exchange network which allows them to get goods from the interior in return for coastal subsistence goods. Seal, seal oil and herring are traded to communities such as Manokotak and the Nushagak river villages for caribou and various kinds of freshwater fish. Exchange also occurs to the north with the villages of the Kuskokwim.

7.3.3 Goodnews Bay

Goodnews Bay is located at the mouth of the Goodnews river on the northeast side of Goodnews Bay. It is only twelve miles from Platinum. The population of the village in 1980 was 168; 95.8% were Native.

The economy of Goodnews Bay is based on commercial fishing and some local positions. The villagers hold some Kuskokwim limited entry salmon permits and a few for the Bristol Bay fishery. In recent years the villagers have taken an increased interest in the herring fishery which is located adjacent to the village, especially since purse seiners were prohibited in 1981. However, most of the village is unable to participate in the commercial fishery due to a history of low incomes resulting from low value fish harvests. Without the capital to move into higher value fisheries, the average annual income is perhaps the lowest in study area. There being few local employment opportunities, some villagers work in the canneries in Bristol Bay during the salmon season.

The other major employer, when in operation, is the Goodnews Platinum mine located near the village of Plantinum about twelve miles away. As noted above, this mine reopened in late 1981 and may provide additional employment for locals.

The villagers depend heavily on subsistence for survival as the opportunities for earning cash are few. Particularly important are marine resources, including marine mammals such as seal, sea lion, walrus and whale; shellfish; and herring and herring roe-on-kelp. These resources also form the basis for an exchange network with interior

communities from which game such as caribou, porcupine and rabbit are available. Salmon are, of course, a very important subsistence resource as are wild fowl including ptarmigan, and several kinds of berries.

7.3.4 Economic Concerns of the Subregion

The overriding economic concern of all three villages in this subregion is the lack of opportunity to participate in the cash economy. Local employment opportunities are sparse, and this subregion does not share the economic advantages of the communities in the Bristol Bay region proper.

Commercial fishing is not as widespread nor as lucrative in this subregion as in the others discussed in this report. This is for two reasons. First, there are fewer limited entry permits per capita in these communities than in most Bristol Bay communities. Second, most of those who do have permits have them for entry to the Kuskokwim fishery and not Bristol Bay. The Kuwkokwim fishery is far less productive than Bristol Bay, and this is reflected in the relative values of the permits, approximately $10,000 for the former and as much as $100,000 for the latter.

Local residents are very much in favor of the continuing development of the herring fisheries in the subregion. Increasing numbers of villagers, particularly from Goodnews Bay and Platinum, are earning income from the herring fishery, and this seems certain to increase in the future. Residents are concerned that there be no change in the regulations which have eliminated purse seiners from participation in the Goodnews Bay and Security Cove herring fisheries. This allows locals, with their less efficient gillnetters, to compete favorably.

Finally, there is a good deal of interest in the current attempt to reopen the platinum mine. This has historically been a source of local jobs and may be in the future if the current venture is successful.

From a negative perspective the people of the subregion are concerned about OCS development, even though it may not occur in their subregion. The concern is that any oil spill or similar accident which occurred in the Bristol Bay region would negatively affect the migration of salmon to the Kuskokwim subregion.

7.4 The Togiak Subregion

The Togiak subregion consists of the communities of Togiak, Twin Hills, Manokotak and Aleknagik. These communities are connected by both economic activity and social and cultural history. There has been, from prehistoric times, a general movement of people from the northwest, the Kuskokwim and Norton Sound regions, to the Togiak area and beyond. This has tied the area from Togiak to Aleknagik into a social network.

7.4.1 Twin Hills

The population of Twin Hills in 1980 was 70, of which 96% were Native (67 Eskimos). The community is located across the mouth of the Togiak River from Togiak. The major economic activity of the residents of Twin Hills is the commercial fishery, particularly the salmon fishery but to a lesser extent the herring fishery. There were 6 drift gillnet and no set gill net permits in Togiak in 1983 meaning that 8.6% of the residents held a limited entry permit.

The Twin Hills residents participate most heavily in the Togiak fishery which is unique in terms of boat design. Most boats are flat-bottomed skiffs known as Togiak Skiffs which are generally 26 to 28 feet long rather than the 32 foot boats common throughout the rest of the Bay. This is a result of the unique characteristics of Togiak Bay which has especially shallow water and numerous mudflats and mud beaches. The Togiak fishery is not as lucrative as those located to the south and the returns are correspondingly smaller for fishermen in this subregion. In 1980 the average income from salmon fishing was around $10,000. Some of these fishermen, those with larger vessels, go through a cycle which begins with the herring fishery at Togiak and continues with king and

red salmon runs to the south, after which they travel back to Togiak to exploit the later red runs.

The processing sector is represented by three major canneries in the vicinity of Twin Hills. Most fishermen sell to the Togiak Fisheries cannery located near Twin hills. Two other major canners, Kachemak Seafoods, on the opposite shore of Togiak Bay in Togiak, and the Togiak Eskimo Seafoods cannery in Togiak (owned by Togiak Natives, Inc.), buy from Twin Hills fishermen. The first two of these canneries employ almost all outsiders, while the Togiak Eskimo plant employs a number of locals.

In addition to the salmon fishery a large herring fishery has developed in the region of Twin Hills since the late 1970s. As we noted in the regional discussion most of this harvest has thus far been taken by outside fishermen with large purse seiners, while most of the locals who participate have used much less efficient drift gillnets. The fishery concentrates on herring roe which is very popular in Japan. The overall world decline in herring stocks has made it particularly inviting to develop the Togiak/Kulukak Bay herring fishery. As a part of "this fishery a herring roe-on-kelp fishery has emerged as well. The development of these fisheries has posed several problems which are addressed in the section below on community concerns.

There are very few employment positions in Twin Hills outside of the fishery. Those few include one full time and four part time positions at the school, one position at the post office, and three at the Bristol !3ay Area Health Corporation. The State of Alaska also employs two to ten people depending on the season.

Subsistence activities are very important in Twin Hills even relative to most other Bristol Bay communities. Residents range over a wide area in search of subsistence game. The coastal area is particularly important, yielding seal, walrus, whale, and sea lion among the large mammals, salmon, which is extremely important, herring and herring roe-on-kelp, and several other varieties of marine life. Residents also hunt for

ducks, geese and ptarmigan and gather seagull and murre eggs. Residents frequently fly to other areas to hunt caribou and moose.

Exchange patterns are highly developed in Twin Hills and in the surrounding area. Subsistence items, above all the larger animals, are routinely shared throughout the village, particularly with kin and the old or infirm. There is also a subregional exchange network of considerable scope which includes Togiak, Twin Hills, Manokotak, and Aleknagik. Especially important for Manokotak and Aleknagik is the seal oil from Togiak and Twin Hills. Likewise, Togiakand Twin Hi 11s also exchange whitefish for Manokotak blackfish. Twin Hills residents also travel frequently to Manokotak to harvest various sorts of berries. Women in the community weave grass baskets, and the grass for the baskets is itself a subsistence item which is exchanged widely throughout most of the Bristol Bay region.

7.4.2 Togiak

The population of Togiak in 1980 was 470, making it the second largest community in the entire region after Dillingham. It is 93.6% Native, including 2 Indians, 440 Eskimos, and 1 Aleut. It is located on the north shore of Togiak Bay near the mouth of the Togiak River.

The Togiak population depends almost exclusively on the commercial fishery for cash income. There are 84 drift gillnet and 51 set gillnets held by villagers, meaning that some 28.7% of the community members hold permits. Average earnings are somewhat lower in Togiak than in communities to the south which are located on larger fishing grounds. In 1980 average earnings from adrift gillnet permit were $12,176 and overall village average earnings for salmon were $11,455. As in Twin Hills, fishermen use flat bottomed skiffs measuring between twenty four and twenty eight feet, shorter than the vessels used in the rest of the bay. The fishermen in this region believe that these boats, since they hold less than the larger vessels and the catch is less densely packed, and since they must be unloaded more frequently, aid in delivering a higher value product to the cannery. Mostof the fishermen in Togiak

are members of the Western Alaska Cooperative Marketing Association.

The economic return from this fishery, while not high in absolute terms, represents a high return on investment given the relative low cost of purchasing and outfitting these small skiffs versus the 32' drift gill net vessels.

Togiak fishermen deliver fish to several processors located in the area. These are the same three we noted above in discussing Twin Hills. However, the Togiak fishermen deliver more frequently to Kachemak which is located on the edge of the village. Togiak Natives, Inc. constructed the Togiak Eskimo Seafoods cannery in Togiak, though this cannery has not yet been involved to full production capacity.

Togiak is also part of the commercial herring fishery which is developing in the Togiak and Goodnews-Security Cove areas. However, as in the case of Twin Hills, most Togiak fishermen are at a disadvantage in that they must operate in the fishery with drift gillnets which are much less efficient than the purse seiners used by the larger outside fishing vessels. The fishery has also caused some problems which we will note below under "community concerns."

Togiak is a large community and has begun to emerge as a subregional center. As a result there are a fair number of non-fishery positions available *in* the community. These positions are filled by four police officers, one maintenance worker, two post office employees, three health aides, several village council members who receive a minimal salary, jobs in several stores, and a number of school positions including three bilingual teachers, two bilingual aides, two cooks, two janitors and one librarian. Altogether the city employs sixteen people, the state three people, and Southwest Regional School District another 23 employees.

As in most of this subregion, the residents of Togiak are heavily involved in and dependent on subsistence activities. This is especially true as the incomes in this subregion from commercial fishing are not as high

as they are further south. Residents range widely in search of subsistence game. Locally, salmon and large marine mammals such as walrus, sea lion, whale, and seal are most important. Herring and herring roe-on-kelp are also harvested, and residents often fly to Egegik or even further in search of caribou. Moose and bear are hunted close to the community.

Exchange patterns are well developed in Togiak, and most large animals are shared throughout the community. A fairly strong subregional exchange network among Aleknagik, Manokotak, Togiak, and Twin Hills also exi st. This has been discussed above and will not be repeated here. Togiak also participates in a regional exchange network, especially for seal oil and the basket grass which local women use to generate a small income. This grass is valued throughout the region and is exchanged as far south as Naknek and Egegik for other subsistence items. Women also go to Aleknagik or Manokotak to pick several varieties of berries.

7.4.3 Manokotak

The population of Manokotak in 1980 was 294 of whom 92.5% were Native, including 272 Eskimos and 1 Aleut. The community is located on the Igushik River between Togiak and Dillingham.

As in the rest of the region the major commerical activity in Manokotak is commercial salmon fishing. In 1983 there were 43 drift gillnet and 52 set gillnet permit holders in the community, or 32.3% of the population.

Incomes in Manokotak from the salmon fishery are intermediate to those to the north (Togiak and Twin Hills) and the more lucrative grounds to the south. In 1980 average drift gillnet earnings were $23,750, while set gill net gross income averaged $3,857; the overall village average per limited entry permit was $14,467. Most fishing is done toward the mouth of the Igushik River where a summer fish camp is established each season. Some fishermen also fish with drift gillnets in Nushagak Bay. Most fishermen fish for the Columbia Ward Fisheries cannery located at

Ekuk. Most boats are 32 footers although there are many which are older, smaller, and often wooden, rather than fiberglass or metal.

Manokotak residents also participate in the Togiak/Kulukak Bay herring and herring roe-on-kelp fisheries. In 1981 ten vessels from Manokotak participated in this fishery and more plan to do so in the future.

Alternative cash economy employment in Manokotak is sparse. Some villagers work for the Columbia Ward Fisheries cannery in Ekuk. Other positions in the village include several in the school (ten certified teachers, two principal positions, two cooks, two janitors, and several Indian Education Act and Johnson-O'Malley positions), four village public safety officers, two health aides and one alternate, one village airport maintenance person (DOT), a CETA refuse collector, and several employees in the village stores. The largest employer is Southwest Regional School District which has 25 local employees.

Subsistence activities are an important aspect of life in Manokotak. Though the community is inland it is oriented toward the marine environment and depends to a great extent on marine subsistence resources. Salmon is probably the most important resource, but residents also harvest large sea mammals whenever possible. Caribou are hunted in several areas on the Alaska Peninsula, ducks and geese are hunted in the Osmiak River area to the west of the community and residents go as far as Levelock to harvest berries.

Manokotak residents exchange a good deal of the subsistence items they procure among relatives and friends. The old and infirm are invariably provided for. The community also has a close relationship with Togiak and Twin Hills and often exchanges whitefish for blackfish. The community also depends heavily on Togiak and Twin Hills for seal oil and the women of the community get grass for baskets from those two communities as well. Some of these goods are also sent on to Aleknagik in exchange for items that community often gets from Nushagak River communities.

7.4.4 Aleknagik

The population of Aleknagik in 1980 was 154, of which 89.6% were Native including 2 Indians and 136 Eskimos. The community is located approximately twenty five miles from Dillingham up the Wood River on Lake Aleknagik. The community is nearly at the confluence of the Lake and the River.

The economy of Aleknagik is almost completely dominated by commercial fishing. The residents fish the Nushagak Bay/River and Wood River areas. Set net sites are established at Ekuk and Igushik during the season. In 1983 there were 31 individuals who owned drift gillnet permits, and 18 who owned set net permits, for a total of 28.6% of the population holding permits. Earnings are fairly high in the community, with the average gross income in 1980 from a drift gill net permit coming to $28,636 (information on set net and overall averages is unavailable).

Some Aleknagik residents also take part in the Togiak herring fishery, but so far this is relatively small seal e. Other areas of the economy offering jobs in the community are very limited and include Southwest Region Schools with seven positions, the city with two full time and two half time positions, theBri stol Bay Area Health Corporation withone full time and one part time worker, and two Village Public Safety Officers.

Aleknagik residents are heavily involved in subsistence activities. The entire population depends on such subsistence activities for at least part of its nutritional needs. (For a baseline utilization comparison, see Nicholson 1976.) Most popular species include salmon, grayling, pike, Dolly Varden, and rainbow trout among fish species and moose, caribou and bear among terrestrial species. A wide range of berries and vegetation are also utilized.

7.4.5 Economic Concerns of the Togiak Subregion

The residents of Aleknagik, Manokotak, Twin Hills, and Togiak share many concerns based upon changes in the last two decades. These concerns can be divided into those related to the cash economy and those concerning subsistence activities, although, as we will see, the two are often inextricably bound.

One of the major concerns shared by all four communities is limited entry regulation of the salmon fishery. Most feel that there are a number of local residents who deserve permits but were unable to get them for several reasons. Many did not understand the bureaucratic procedures which had to be completed, many did not keep accurate records of past participation, and many simply did not understand the necessity of applying for a permit. Residents also feel that outsiders gained a disproportionate share of the permits, especially the drift gillnet permits which are by far the most valuable. (This point was discussed at length under the regional economic discussion.) A final complaint about limited entry concerns the dwindling likelihood of the current residents' children entering the fishery. With the population growing in these communities, a limited number of permits may prevent the community's children from ever entering the fishery.

A second concern regarding the fishery is whether to waive the 32 foot vessel length limit. This has been a topic of some discussion over the last several years. Togiak residents are uniformly opposed to the limitation while Manakotak residents are more evenly divided. This is a result of differences in current resource use patterns and to an attempt by Togiak fishermen to somehow contain the rapid growth of outside fishermen utilizing the local resource. Many believe that extending the legal vessel length would put the local fishermen at more of a disadvantage compared to better equipped outside fishermen. Outside fishermen have more capital and would find it easier to enlarge their vessels and thereby gain a greater proportion of the total catch. Some Manakotak residents view the increased vessel length as a means of reaping greater returns from a fishery that allows deeper draft fishing vessels.

A third fishery issue concerns the herring fishery. From the perspective of local residents there are several problems with this fishery. First, the local fishermen cannot afford the purse seiners which outside fishermen utilize and which are far more productive than the gillnetters used by locals. Second, there are, according to residents, several negative environmental conse

fishery. Residents complain that these vessels discharge their garbage and decayed fish into the bay and that the debris pollutes the beaches; that the airplanes used as spotters scare away some of the large sea mammals; that the herring roe-on-kelp fishery is depleting the kelp beds (traditionally a major local subsistence resource.) Finally, there is a fear that if the herring stocks are depleted loss of this vital link in the food chain may have disastrous consequences in all subsistence and commercial areas.

Along with limited entry probably the most controversial issue of the last decade has been the likelihood of oil development in the area and the fears that OCS leasing and development have raised. The primary concern is that the most important commercial and subsistence resource in the region, salmon, a renewable resource, will be endangered by attempts to extract gas and oil, non-renewable resources. Opposition is generally confined to off-shore drilling and very little concern is expressed concerning on-shore development.

Finally, there is some interest in reviving a traditional occupation with an eye toward its cash potential. Reindeer herding, which was attempted in both the Togiak and Manokotak areas until the earlier part of this century, is still seen by some local residents as a viable occupation. There is a herd of reindeer on Hagemeister Island which locals contend could serve as the nucleus of new herds.

Subsistence activities are also amajorarea of concern for the residents of this subregion. Subsistence is unusually important here. We have reported some major criticisms of recent development in the region concerning the potentially deleterious effects of such development on subsistence. Particularly important is the growth of the herring fish-

ery which residents perceive as potentially affecting a wide range of subsistence activities in a generally negative fashion. Residents also voice the opinion that stocks of such subsistence staples as moose, otter, mink, fox, and caribou have declined noticeably in the last decade. Some blame thison increased sport hunting activities in the region. Finally there is some concern among the older residents that the young are coming to prefer Euro-American foods to traditional staples and that this will eventually lead to a loss of subsistence skills.

7.5 Dillingham

The population of Dillingham in 1980 was 1,563 making it by far the largest community in the Bristol Bay region. It is a major regional center, particularly for services and government activity. The population is 57% Native, including 26 Indians, 443 Eskimos and 442 Aleuts.

As with the rest of the region, the major economic activity in. Dillingham is commercial fishing, most notably red salmon. However, Dillingham's size and its status as a regional center provide it with the most diversified economic structure of any Bristol Bay community. As a result, Dillingham has a more stable year-round economic structure than any other study community with the exception of King Salmon.

Commercial fishing and processing are the largest sectors of the Dillingham economy, accounting for about 275 jobs. In 1983 Dillingham residents held 201 drift gill net permits and 109 set gill net permits, meaning that 19.8% of all residents held a permit. This low percentage reflects Dillingham's greater economic diversity compared to the other villages in the region, which depend almost exclusively on fishing for their livelihood. Dillingham is located in an area of the Bristol Bay fishery which is more lucrative than most. The 1980 average gross earnings for a drift permit were $32,023 and the overall average income for all permits was a very high $26,948.

A few of the residents of Dillingham also participate in the Togiak/Kulukak Bay herring fishery, although as yet this is a small percentage of the total fleet. Other major employers include the government with 180 jobs (local government accounted for 120, state for 44, and federal for 16), manufacturing with 155 jobs, and the service sector with 144, including the Kanakanak Hospital, the Bristol Bay Area Health Corporation, and the Bristol Bay Native Association. Dillingham also has two hotels, one large and one small. Retail trade employment accounts for 101 jobs, with transportation, communications, and public utilities accounting for another 96.

These figures undervalue the contribution of fishing positions because they are based on yearly averages. During the fishing season as many as 400 fishermen are in Dillingham, and an even greater number of workers are employed in the processing plants. Even taking a yearly average, if we consider the number of positions in trade, transportation, communications, etc., which are fishery related, we find that 40% of all positions in the community are in directly connected with the commercial fishing industry.

Although subsistence is an important aspect of Dillingham life, itis not as important as in most other communities in the region, in terms of percentage of dietary reliance. (This is not, however, to discount the personal and social values associated with participation in subsistence pursuits.) This is a result of the community's large number of short-term residents and its accessible and efficient outside communciations and transportation systems. It also reflects the fact that only 57% of the populace is Native, though it is the case that many non-Natives actively utilize local subsistence resources.

Salmon is the most important subsistence catch and beaver trapping is widespread, much of it in preparation for the annual Beaver Roundup in early March. Trapping of lynx, mink, fox, and land otter also occurs and the furs are often sold at the Beaver Roundup. It is estimated that about half of Dillingham's population depends to some extent on subsistence activities. Other species frequently utilized are Dolly

Varden, grayling, 'pike, rainbow trout, moose, bear, caribou (usually on the Peninsula), ptarmigan, and numerous types of berries and vegetation. Residents use Okstukuk Lake, the Kvichak River as far as Igiugig, and the Lake Iliamna vicinity extensively.

Exchange occurs frequently in Dillingham, though the size of the community precludes community-wide sharing. Residents also join in some regional exchange networks, though not to the extent of most villages in the region. Many people originally from other villages in the region who reside in Dillingham return to their home villages seasonally and pursue subsistence activities there.

7.5.1 Major Economic Issues in Dillingham

The most important economic concerns in Dillingham are salmon limited entry permit regulation, the 32 foot vessel limit, available markets, and OCS development.

Limited entry is seen by most of the resident population unfair. Most feel that many residents who deserved permits did not receive them, and that many outsiders who did receive them did not deserve them. Many people blame this unfair distribution on the State of Alaska which encouraged residents to take alternative temporary positions such as pipeline work or forestry work instead of fishing the Bay during the permit qualifying period. People also complain that the extensive bureaucratic details required for application and proof of past participation simply overwhelmed or discouraged a great many people who were actually qualified to receive a permit. Finally, this community is increasing in population due to natural increase and return migration. These factors have led most people to doubt that the next generation will be able to take part in the commercial fishery due to the scarcity of permits.

Another issue connected with the fishery is the recent move toward rescinding the 32 foot limit on salmon boats fishing the Bay. Most residents are against this change since they see outside fishermen as

being able to refit their boats before local fishermen, thus gaining an even greater advantage.

The second major community-wide concern is potential OCS development. Off-shore development is viewed with great suspicion by the residents of the community who fear that it will adversely affect the salmon stocks, particularly in the event of a major oil spill. Most think that salmon, as a renewable resource and, hence, potentially perpetual source of food and income, should not be jeopardized merely to gain access to a non-renewable resource which will be exhausted within a few years.

A third major shared economic concern is the increasing influx of recreational fishermen and recreational hunters. This issue, however, evokes more mixed reactions than the aforementioned issues. Residents realize that tourism is good for the economy, but they are less than pleasedby the kind of person who is attracted to the area and the effects of large scale tourist activities on the environment. Sport hunters are viewed negatively, particularly "head hunters," those who come only for the trophy and leave the carcass behind. Residents believe "head hunting" is a threat to the continued viability of a number of extremely important subsistence species. Sport fisherman are seen as competing for the land, in the form of fishing lodges, and they are also viewed by some as depeting fresh-water fish stocks.

Finally, some of the residents of Dillingham are interested in the development of the Togiak herring fishery. However, they do not currently see themselves as major participants because conversion to purse seiners, something most locals consider necessary, is prohibitively expensive.

Dillingham is interested in constructing an improved boat harbor because the present harbor is overcrowded and drains at low tide, leaving vessels stranded on the mud flats. An Army Corps of
conducted in 1982 recommended Dillingham for such improvements. The community would also like their docking facilities upgraded. Finally, many local roads are in need of major maintenance or repair,

particularly the road to the airport. Another suggestion, that a road be constructed connecting Dillingham to Anchorage, has received a more mixed reaction, with many residents fearing that the economic advantages would be outweighed by the social and cultural disadvantages of large numbers of "city people" having access to the community and region.

7.5.2 Major Subsistence Concerns in Dillingham

Most of Dillingham's subsistence concerns are related to possible major development in the area and its potential impact on subsistence resources and activities.

The greatest fears concern the possibility of oil development, and in particular the effects of an oil spill from offshore OCS development. The BBNA, with headquarters in Dillingham, officially opposes any development, including leasing, until written guarantees have been received concerning the liability of the oil companies for any damage to the salmon and other commercial fishing stocks. The Association has formed the Bristol Bay/Outer Continental Shelf Advisory Committee to ensure that this occurs before development is approved. Onshore development is not nearly as controversial and would probably notbe strongly opposed. However, during the period of fieldwork the BBNA went on record as supporting the establishment of development-free zones within five miles of the banks of all major rivers in the region.

A second concern is sport hunting and other recreational activities. We have discussed this concern above and will not reiterate it here.

7.6 Iliamna Lake Subregion

This subregion includes the villages of Iliamna, Newhalen, Nondalton, Pedro Bay, Kakhanok, Igiugig, and Levelock. All are located on the Lake Clark, Newhalen river, Lake Iliamna, Kvichak river drainage system. This is the largest and most important red salmon spawning habitat in the world and the biggest contributor to the Bristol Bay salmon stock. These communities are tied together by common participation in the

commercial fi shery. They are also tied together socially and culturally, having Bristol Bay's major concentration of Athapaskan Indians, specifically the Dens'ina branch of the Athapaskan family. The villages around Iliamna Lake also interact as a result of a growing tourist industry centered on the lakeshore area.

Iliamna

The population of Iliamna in 1980 was 94 of which only 40.4% were Native including 19 Indians (Dens'ins), 7 Eskimos and 12 Aleuts. The community is located on the northeastern shore of Iliamna Lake, a few miles to the northeast of Newhalen and the mouth of the Newhalen River.

Iliamna is economically more diversified than most of the communities in the Bristol Bay region. In addition to commercial fishing the last decade has seen the emergence of a major tourist and hunting lodge industry in the community. Iliamna has also emerged somewhat as a subregional center, and as a result has a number of jobs in government and transportation sectors. It has one of the larger and more accessible airports in the subregion.

Commercial fishing is an important element of Iliamna's economic structure. Based on CFEC data there are 19 drift gillnet permits and 16 set gill net permits held by community members, meaning that 37.2% of the community members are permit holders. Most of the residents move toward the mouth of the Kvichak during fishing season where they establish set gill net sites or fish the Bay and mouth of the river with the drift gillnets.

Iliamna has also become the stopping off point for the many recreational, sport hunting, and fishing activities in the immediate vicinity. At last report there were at least eight lodges operating in or immediately adjacent to the community. These lodges, however, do not provide a major source of employment for the community as most of the employees are hired from outside. Nonetheless, the guests and workers contribute substantially to commercial enterprise in Iliamna's economy.

As a subregional center Iliamna has employment opportunities in the FAA, with four workers, the Lake and Peninsula School District offices which employ up to ten people, the Iliamna-Newhalen Electrical Cooperative which employs three, and a number of air taxi and transportation related services. There are also several other businesses including aircraft maintenance, the telephone company, and Iliamna Fuel.

Iliamna residents depend to varying degrees on subsistence resources. Most of the Natives are involved in such activities, and there are signs that the non-Native population is becoming increasingly involved in subsistence. Salmon are the most important subsistence fish, but several varieties of freshwater fish are also caught. Porcupine, rabbit, ducks, and geese are taken; moose, caribou, and bear are also utilized. The Iliamna area is also rich in berries and other vegetation harvested for subsistence purposes. Residents hunt and trap along both the north and south shores of theeast endof the lake andto the north and west as far as Keefer Creek.

7.6.2 Newhalen

The community of Newhalen is located just a few miles to the southwest of Iliamna at the mouth of the Newhalen River where it empties into Iliamna Lake. The population of the village in 1980 was 87; 94.3% were Native, including 1 Indian, 13 Eskimos and 68 Aleuts.

Many individuals from this community fish the commercial salmon runs of Bristol Bay and while only a few hold permits the bulk of population participates as crewmen or partners in the fishery. The public sector also offers some employment opportunities in Newhalen. The city has six employees while the school employs up to twenty people, including eleven teachers. A few residents have also found work at one of the lodges in Iliamna.

The residents of Newhalen are heavily involved in subsistence activities, and particularly exploit the area around the village and up the Newhalen River to Lake Clark. Salmon is the major species harvested for

subsistence purposes, but several varieties of freshwater fish (including world record class rainbow trout) are also caught. Game hunted includes rabbit, porcupine, caribou, moose, bear, ptarmigan, ducks, and geese. In summer and fall great variety of berries and wild vegetables are harvested.

A subsistence exchange network extends throughout most of the Iliamna Lake subregion, and Newhalen regularly exchanges items with Nondalton, Pedro Bay, Iliamna and, to a lesser extent, Kakhonak.

7.6.3 Nondalton

Nondalton is located upriver along the Newhalen river from the village of Newhalen near where the river originates in Lake Clark. The population of the community in 1980 was 170 of which 93.1% were Native (161 Indians).

Commercial fishing is the major economic activity of the community of Nondalton. There were 14 drift gillnet permit holders in the community in 1983, and 14 set gill net permits holders, who together comprise 16.5% of the population. Most of those who fish move to Bristol Bay during the season and return at the end of July. Most fishermen keep their boats at canneries in Naknek during the off season.

There are few other substantial employment opportunities in the community. The city employs two or three people, a health aide is provided by the Bristol Bay Area Health Corporation, a store has three employees and the school employs five teachers and eight other workers. Nondalton is one of the most economically depressed communities in the entire region. There are relatively few limited entry permits, and almost no other employment opportunities for those who are unable to fish. This is a particularly difficult situation for residents in light of the very high cost of living, the result of the cost of importing fuel and supplies into a relatively remote area.

The fact that there are few cash economy positions in Nondalton has

meant that the people remain heavily dependent on subsistence resources. Residents literally depend on subsistence activities to survive. Salmon are the most important and consistent source of food, supplemented by several varieties of freshwater fish; moose, caribou, bear, porcupine, and rabbit are utilized. Nondalton residents range widely in the pursuit of subsistence resources. Salmon and freshwater fish are harvested in the Newhalen river, Sixmile lake, and along the shore of Lake Clark. Major hunting and trapping areas lie north and east of the village and along the east side of Lake Clark.

Nondalton residents exchange and give away subsistence items frequently, within the village and with other villages in the subregion, particularly Newhalen, Pedro Bay, and Iliamna.

7.6.4 Pedro Bay

Pedro Bay is located on the north shore of Pile Bay, an inlet on the very eastern edge of Iliamna Lake. Its population in 1980 was 33; 93.9% were Native including 28 Indians, 2 Eskimo and 1 Aleut.

Commercial fishing is virtually the only economic activity in Pedro Bay. In 1983 there were4 drift gill netholdersand4 setnet holders in the community, who together made up 24.2% of the population. The fishery cannot support the majority of the employable populace, and the community is economically depressed as a result. There is a community health aide, a village public safety officer, a school teacher, custodian, cook and teacher's aide, and a post office employee.

The lack of cash economy opportunities in the village means that an unusual degree of importance is still placed on subsistence activities. Virtually all residents depend heavily on subsistence activities for food. As usual salmon is the most important species, but the residents also take several kinds of freshwater fish from the lake, and hunt or trap both large and small animals such as moose, caribou, porcupine and rabbi t. The community is also involved in a fairly extensive exchange system which stretches around Iliamna Lake and up the Newhalen River.

7.6.5 Kokhanok

Kokhanok is located in the middle of the southern shore of Iliamna Lake at the entrance to an inlet known as Kokhanok Bay. The population of the community in 1980 was 83; 96.4% were Native, including 9 Indians, 8 Eskimos and 63 Aleuts.

In 1983 there were 3 drift gillnet permit holders in the community and no set gill net permit holders, totalling only 3.6% of the population.

Currently the largest employer in the community is the school where 8 residents are working. The school has also brought in 4 teachers and 5 teacher aides from outside. There are few other jobs in the community. There is a village maintenance worker, a garbage collector, a health aide, and a post office employee as well as two small stores.

As in several other communities in this subregion the lack of cash economy positions has meant that virtually all residents depend heavily on subsistence resources for survival. Salmon are by far the most important of the subsistence species but other fish, particularly freshwater, are also taken. Additionally the taking of moose, caribou, rabbit, and porcupine occurs extensively along the south shore of Iliamna Lake. Several varieties of fowl are also hunted including duck and geese, and a great variety of berries and wild vegetables are harvested in the spring and fall.

7.6.6 Igiugig

Igiugig is located on the extreme western end of Iliamna Lake at the point where the Kvichak River originates. The population of the community in 1980 was 33.

The economic structure of the community depends largely on commercial salmon fishing. There were 6 resident holders of drift gillnet permits in 1983 and 1 set gillnet permit holder, together totalling 21.2% of the population. Those who have permits go to Bristol Bay each fishing

season.

Other cash economy employment opportunities in town are limited. The village council has six people on its payroll, including a land planner, secretary, community hall supervisor, and a person who runs the village store. The Bristol Bay Native Association has made funds available for the hiring of a village administrator and a bulk fuel storage attendant. A number of people, usually around 6 or 8, also trap beaver, fox, mink, otter, and wolverine in the winter for cash.

Subsistence is very important in Igiugig, particularly during those years when the red salmon runs have been smaller than expected. Much of the shoreline of Iliamna Lake is used as a subsistence range. Salmon is the most important resource but the residents also hunt moose, caribou, bear, porcupine, and rabbit. Freshwater fish are taken frequently, and several varieties of berries and wild vegetable are harvested.

The community has an exchange network which extends along both the north and south shores of Iliamna lake, and exchange within the community is very common, particularly when larger animals are taken.

7.6.7 Levelock

The community of Levelock is located about a quarter of the way from the mouth of the Kvichak River to Lake Iliamna. The population of the village in 1980 was 80; 87.3% were Native including 1 Indian, 19 Eskimos and 49 Aleuts.

Commercial fishing is the dominant economic activity in Levelock. Residents hold 14 drift gillnet permits and 8 set gillnet permits, meaning that 27.5% of the population is composed of permit holders. Almost the entire village moves to fish camps along the shore of Kvichak Bay during the fishing season.

Levelock has several other cash economy positions available in the community besides commercial fishing. The largest employer is the

village council with six full-time employees and twelve part-time; the village corporation employs two full-time and ten part-time workers; the Southwest Region School District has 3 full time teachers and four part time aides; and the Bristol Bay Area Health Corporation employs 2 full-time workers and one part-time worker.

Levelock is heavily dependenton subsistence resources for food. The range covered in search of such items is extensive, including an area stretching from Kvichak Bay to both shores of Iliamna Lake. Red salmon is the most important subsistence species, but other kinds of salmon are also taken as well as several varieties of freshwater fish. Moose and caribou are hunted, and a number of kinds of berries and wild vegetables are harvested.

7.6.8 Subregional Economic Concerns and Issues

This subregion is particularly affected by six major economic issues. First, the effects of Alaska's Limited Entry Actof 1973; second, the growth in tourism and sport hunting; third, development of hydroelectric generating plants in the subregion; fourth, the State of Alaska land disposal program and the ANILCA land withdrawals; fifth the generally depressed economic condition of the subregion, and sixth, the potential effects of OCS development.

A major economic issue for this subregion concerns Limited Entry. The Iliamna Lake subregion has suffered perhaps more under the system of entry limitation than any other area in the region (Petterson 1982). Over the years many of the permits held by residents in these communities have been sold, and now the subregion has many fewer limited entry permits per capita than the regionwide average. Residents believe they are being pushed out of the fishery and they fear that their children will never be able to participate in the fishery.

Residents of the subregion have divided opinions regarding the growth of tourism and sport hunting and fishing. On one hand, the economically depressed conditions of the subregion are somewhat alleviated by tourist

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revenues. On the other hand, the residents view these outsiders as threatening the stocks of resources which are essential to local subsistence activities. Moreover, the fact that the region is economically depressed increases the value of these local resources. The area around Iliamna has become a tourist mecca, and the attitudes of residents seem to be about equally split concerning whether such developments should be encouraged or discouraged.

Another economic concern of residents is the likelihood of the development of a major hydroelectric facility in the area. Several sites have been discussed for such a development, including the Newhalen River, the Tazimina Lakes region, Lake Elva, and others. Residents differ on this issue also. On one hand, hydroelectric power would provide plentiful and, according to the power authority, cheap electric energy in place of the expensive fuel oil which must be brought up the Kvichak and across the lake at considerable expense. On the other hand, there are fears that such facilities might disrupt the salmon, caribou, and moose populations and thereby threaten subsistence resources. The Alaska Power Authority is continuing to evaluate potential sites in the subregion.

Land disposals and withdrawals are another cause of concern. Residents have seen extensive land withdrawal following the passage of ANILCA, and they are uncertain of the extent to which such withdrawals will restrict their use of those areas for subsistence purposes. At the same time, residents are aware that the State of Alaska has embarked on an ambitious land disposal program and they are dismayed that this might result in land very near their villages being developed by outsiders. The people in this subregion value their isolation and would be likely to regard any major influx of outsiders as negative and threatening.

The most crucial economic problem faced by residents of the Iliamna subregion is the depressed economic conditions which prevail. This is largely a result of the distance of the communities from the main salmon fishing grounds, the relatively small proportion of the population which held or retained limited entry permits, and the resulting low levels of

income realized from the commercial fishery. At the same time there are few other local employment opportunities. Even the rapid expansion of tourist facilities and traffic has not benefited the resident population because the lodges and associated businesses bring in the vast majority of their employees from outside. This employment practice has caused considerable resentment among the residents in this subregion, and has probably bolstered a more negative perception of increasing tourism than would have occurred had the lodges hired local help extensively. Additionally, the residents see major businesses starting which depend on local traditional subsistence resources for their success, but which do not contribute in turn to the economic well-being of the local populace.

OCS development is viewed with considerable suspicion in the Iliamna Lake subregion as in all subregions of Bristol Bay, and residents express great concern about the effects of a major oil spill on the salmon stock. In general, people are opposed to off-shore development and somewhat more evenly divided over on-shore development.

7.6.9 Su Issues and Concerns

The concerns of the residents of this subregion regarding subsistence are closely related to their general economic concerns, however, there is a more pervasive fear of losing traditional values, including relationships with each other and with the environment that are the basis of their Native culture.

outside influences on the availability and range of subsistence resources. The development of hydroelectric power is feared because possible negative effects on the spawning salmon stocks could result. The development of tourism and sport hunting and fishing is questioned because the depletion of both land and water subsistence resources is possible. Any development planning for the region must carefully be consider the overriding importance of subsistence activities in this subregion.

7.7 Nushagak River Subregion

There are six communities in the Nushagak River subregion, Ekuk, Clarkis Point, New Stuyahok, Ekwok, Portage Creek, and Koliganek. The four are linked by geography, economy and similar subsistence relations.

7.7.1 Ekuk

Ekuk was at one time a self-sufficient settlement, but in recent years the year round populaton has dwindled to as little as three people. The official population of Ekuk in 1980 was 7 people. However, this figure is deceptive since this community is the site of the largest concentration of fish camps during the fishing season in the entire Bristol Bay region. As fish camps are set up and the cannery begins to operate the population explodes to over 800 people.

The commercial fishing industry is literally the only cash-based economic activity in Ekuk, the major local employer being Columbia Ward Fisheries cannery which has one full-time employee and approximately 200 seasonal employees. In season the beach around Ekuk is the location of a huge number of fish camps and there are ninety set gillnet sites situated along the beach between Ekuk and Etolin Point. There are also 72 set gillnet sites across the Bay at Igushik (occupied primari ly by Manokotak residents.) Hunting and trapping are also pursued further inland.

Because there is no other economic activity in Ekuk, the permanent population is too small to qualify for revenue sharing or other social and economic programs. There is no school, no local health care, no utilities, stores or services. The community continues to survive primarily on the strength of the seasonal fishing activity.

7.7.2 Clark's Point

The population of Clark's Point in 1980 was 79; 88.6% were Native, including 2 Indians, 50 Eskimos and 18 Aleuts. The community is located

across Nushagak Bay from Dillingham just north of Ekuk.

Like other communities in the subregion, the major economic activity in Clark's Point is the commercial salmon fishery. There are 13 drift gillnet and 10 set gillnet permit holders residing in the community, together composing 29.1% of the population. Boat crews are usually made up of kin or friends and most vessels are 32 foot Bristol Bay boats. Most fishermen fished for the APA cannery until it closed two years ago. Now the main processor is Columbia Ward Fisheries at Ekuk, several miles down the coast. However, there is an APA floater in the general vicinity which ties Up at Clark's Point dock to receive deliveries. This has caused some problems, noted below. Average earnings per permit are currently unavailable.

Clark's Point is a crossroads of the Nushagak Bay fisheries. The waters just offshore are generally filled with floating processors, scows, and other vessels involved in either the processing or transportation of sal mon. During the 1981 fishing season some 21 floaters and30 scows were anchored offshore at Clark's Point. The beaches around the community are major fish camp areas and many set net sites are nearby. Most of the fishermen in the community are members of AIFMA and in 1981 three residents of Clark's Point were representatives in the Association.

There is some non-fisheries economic activity in the community as well. The Southwest Region School district employs 6 people, and the Bristol Bay Area Health Corporation has two employees.

The people of Clark's Point interact extensively with several different subregions of Bristol Bay in subsistence activities. Basket grass comes from Togiak, Goodnews Bay, Quinhagak and Platinum; Pilot point and Ugashik areas are hunted for moose and caribou; and residents fly to Iliamna, Aleknagik and the Platinum area for berries. Duck and geese are hunted both in the immediate area and south and west of Pilot Point. Lake Aleknagik and the Kokwok river are fished for trout and spawned out salmon.

Subsistence items are shared throughout the village, and particularly with the elderly or those unable to hunt. Some intervillage exchange occurs with smelt traded for whitefish from Ekwok, New Stuyahok, and Bethel, and moose traded for lingcod from Manokotak.

Clark's Point also faces a major economic issue not generally shared by the rest of the subregion. As we noted the shore based cannery has closed, but the APA cannery still maintains a processing ship ("floater") near the community. Clark's Point fishermen complain, however, that the APA cannery cannot take all their fish, but that if they sell to other canneries in the area, like Columbia Ward Fisheries only a few miles away in Ekuk, the APA will subsequently refuse to buy from them. This, it is felt, restricts Clark' s Point fishermen from realizing a fair return from the fishery. Fieldwork revealed that this is less of an issue in 1983 than previously. The increasing independence of the fishermen and the increased competition among buyers, discussed at length in Chapter 7, has led to greater flexibility and tolerance on the part of the processors.

7.7.3 New Stuyahok

New Stuyahok is located approximately half-way between the mouth of the Nushagak river and Nuyakuk Lake. In 1980 the population of New Stuyahok was 325; over 95% were Natives. It is the largest community in the subregion.

The major commercial activity is fishing, although a number of people also trap commercially. There are 32 drift gillnet permit holders residing in the community, and 1 set gill net permit holder, together making up approximately 10% of the population. Those who fish go to the Nushagak river mouth and Nushagak Bay during the fishing season where temporary fish camps are established.

Regarding commercial trapping, also a common source of income in New Stuyahok, approximately 30 people are involved in trapping lynx, otter, beaver, fox, mink, muskrat, wolverine, and marten. Many of these furs

are sold at the Beaver Roundup held annually each March in Dillingham.

Subsistence activity plays an important role in New Stuyahok life. Salmon are the most important species taken for subsistence and supply a good deal of the residents' year round diet. Caribou are also very important, and this subregion has the most accessible caribou herd in the region located on the Mulchatna river. Moose, rabbit, and porcupine are also taken for food along with ptarmigan, ducks and geese from the Nushagak river. A great variety of berries and wild vegetables are also harvested.

Exchange is frequent within the village and with other villages. The community's extensive exchange network includes trading caribou or fish for lingcod with communities as far north as the Kuskokwim; trading with Togiak and the surrounding region for walrus, seal, and herring roe-on-kelp also takes place Caribou is the most valued resource from this subregion, and forms the basis of its exchange relations with the rest of the region.

7.7.4 Ekwok

Ekwok is located on the Nushagak river a few miles to the south of New Stuyahok. The population of the community was 79 in 1980; almost all were Natives.

The commercial fishery is the major support of the cash economy in Ekwok. In 1983 there were8 drift gillnet and no set gillnet permit holders in the community, for a total of 10.1% of the population holding permits. However, by and large the residents of Ekwok are not interested in participating in the cash economy. This is one of the more traditional villages in the Bristol Bay region, and the people are very heavily involved in subsistence activities. Of all the communities on the River, fewer people leave Ekwok during the summer for fish camps on the Bay.

Some residents trap various kinds of furbearers for a small cash income,

usually realized at the Dillingham Beaver Roundup in March. Other cash economy positions in the community include 8 people employed by the Southwest School District, 1 city employee, 1 Bristol Bay Area Health Corporation employee and 1 state-funded part-time airport maintenance man. There is also one Village Public Safety Officer and a single store run on an intermittent basis by a local resident.

Several varieties of freshwater fish are also taken for subsistence purposes. Caribou is a very important resource and many are taken each year, along with a number of moose. Ducks and geese are also important subsistence items. Numerous kinds of berries and edible wild vegetation are also harvested.

7.7.5 Portage Creek

Portage Creek is located approximately half-way between Dillingham and Ekwok on the Nushagak river. The population of the community in 1980 was 50; almost all of whom are Natives.

Commercial fishing is the most important aspect of the community's economy. 22% of the community's residents hold limited entry permits, being divided between 5 drift gillnet holders, and 6 set gillnet holders. Those who fish commercially move to fish camps at the startof the season, usually at Ekuk or Lewis Point.

Subsistence is an important element of life in Portage Creek and most residents depend on it to some extent for food. Salmon is the most important of all subsistence items, but other fish, such as pike, whitefish, and rainbow trout are also taken. Terrestrial resources include moose, caribou, ducks, geese and smaller mammals. Marine mammals, such as seal, are also caught and a wide variety of berries and edible vegetation are harvested.

7.7.6 Koliganek

Koliganek is the most remote community in the Nushagak river subregion,

located some three quarters of the way up the Nushagak river toward Nuyakuk Lake. The population of the community in 1980 was 116; 96% of whom were Native.

Koliganek is physically distant from the Bristol Bay commercial salmon fishery, butis nevertheless dependenton the commercial fishery for most of its cash income. In 1983 there were a total of 17 drift gillnet and 7 set gillnet permits held by residents of the village, or 20.7% of the population in aggregate. Most of the village takes part in the Bristol Bay commercial salmon fishery and move to temporary fish camps in the Nushagak Bay region.

Other employment available in Koliganek is essenti ally in the public sector or Native Corporation, both of which employ several people. The school is the largest employer, and there are generally a number of temporary or relatively short term jobs available when community improvement are occurring. There are two stores in the community, one a coop and one privately owned, each of which employs several people.

Koliganek is *very* much involved in subsistence activities. The removed location has allowed the residents to maintain a more traditional lifestyle than has been possible in more accessible communities. Salmon is by far the most important subsistence game, but other varieties of fish, particularly freshwater, are also taken. Moose, caribou and smaller terrestrial mammals are also important sources of food. Numerous types of berries and edible wild vegetation are also harvested.

Koliganek residents share any large subsistence kill among most of the populace. There is a strong exchange network with other villages, particularly those located along the Nushagak. In addition, Koliganek residents trade with downriver and Togiak subregio communities for marine resources, such as seal, walrus, and seal oil.

7.7.7 Economic Concerns of the Nushagak River Subregion

The economic concerns of the residents of this subregion are in some ways similar to and in other ways distinct from the concerns of the rest of the region. OCS development and limited entry are two major issues, however, which have caused concern in the community. Some of the issues, however, which are more explicitly local, revolve around land disposal sand withdrawals, and the possibility of the developmentof hydroelectric power.

Residents are wary of OCS development. The major fear, as throughout the region, is the effect such development may have on the salmon resource. Limited Entry is also a concern, and many feel, asdo those in the rest of the region, that the allocation of such permits has been inequitable.

Land disposals are an important issue in light of at least two disposals being contemplated by the state in the vicinity. Residents are worried that this will mean an influx of outsiders who will jeopardize both the traditional lifestyle and subsistence resources. There has been considerable resistance to State of Alaska land disposals in the area. The residents were also concerned over the land withdrawals, particularly in the Wood/Tikchik area, which occurred under ANILCA. Once again, the major concern is the effect withdrawals will have on subsistence activities.

A final major concern is the possibility of the development of hydroelectric facilties in the subregion and the effect of such facilities on subsistence resources, particularly salmon. Several sites have been examined in the Wood/Tikchik area as potential hydroelectric sites.

CHAPTER 8

THE PRE-EXISTING SOCIOCULTURAL FRAMEWORK OF BRISTOL BAY

8.1 Introduction

In this chapter we first examine the traditional sociocultural framework of the Native peoples of the Bristol Bay Region. We then discuss the forms of social and cultural adaptation which have emerged as a product of the interaction of intrusive sociocultural forces with this pre-existing system of values.

8.2 The Pre-existing Sociocultural Framework of Bristol Bay

The traditional sociocultural framework constitutes the underlying system of values prior to large-scale contact with outside values and beliefs. At the time of contact the Natives of the Bristol Bay region were divisible into six separate groups, one Athapaskan, four Central Yup'ik, and one Aleut, distinguished primarily by linguistic and cultural differences and differences in resources exploited and the yearly pattern of subsistence resulting from that exploitation. To the south the Aglegmiut Yup'ik occupied the subregion from Port Moller, up the northern side of the Alaska Peninsula as far as the western two thirds of Lake Iliamna, along the banks of the Kvichak and north and west along the coast to Cape Constantine (VanStone 1967; Dummond 1975; McCartney 1974; Hammerich 1958). This group had accessto both large sea and terrestrial game, and to salmon and freshwater fish. The Kiatagmiut Yup'ik occupied the territory around the Nushagak River and west to the Tikchik and Wood River Lakes. Their adaptation was oriented toward riverine and terrestrial environments; they depended more heavily on land mammals, especially caribou, than did the other Yup'ik groups. A third Yup'ik group was the Togiagamiut who occupied the area from Cape Constantine north and west to the Kanektok River where a common boundary existed with the fourth Yup'ik group, the Kuskowagamiut who occupied coastal and riverine territory to the north. Both these groups were

oriented toward a maritime environment and depended heavily on the harvest of large sea mammals. The Dens'ins, a western Athapaskan Indian group, occupied the eastern periphery (Lake Clark and eastern Iliamna Lake) and were adapted to lacustrine and terrestrial environments; they also took salmon. Finally, some Aleuts were present along the Alaska Peninsula and into the Nushagak area.

At the time of contact and, presumably, for long before, extensive trade and exchange relations existed among these subgroups, based on the irregular distribution of resources across the region (cf. Ackerman 1974). The Aglegmiut took salmon, freshwater fish, seal, walrus and sea lion as well as caribou. The Dena'ina had access to forbearers, caribou, smaller land mammals, salmon and freshwater fish, as well as seal from Iliamna Lake, one of the few freshwater populations in the world. The Kiatagmiut took caribou, salmon and freshwater fish. The Togiagamiut and the Kuskowagamiut hunted large sea mammals, including several varieties of seal, walrus, sea lion, and occasional whale, particularly beluga, as well as taking herring, freshwater fish, salmon, and caribou.

The result was that the exact pattern of social and cultural life which developed around these resources varied across subregions, but shared a basic structure throughout the region. Settlement patterns were keyed to seasonal availability of resources. Villages, or subgroups such as extended families or agnatic groups, organized to exploit the valued species most available during any one season. The residence pattern was essentially cyclic migration, following a seasonally determined pattern. Exchange relations based on these resource distinctions gave the entire region access to most of the resources available in the region. These exchange relations were complemented by intermarriage patterns and, by extension, kinship relations. The entire region was integrated in terms of exchange and kinship relations (cf. Dummond 1965, 1969, 1982, 1974a, 1977; Kowts 1963; Laughlin 1963, 1980).

From a religious perspective the region was animistic, with special

concern for the major species on which the people depended for survival. Though the species varied from subregion to subregion, the essential ethic was similar. Man was part of a complex cosmos in which all species, animal and human, living and dead, depended on one another for survival. All had responsibilities in maintaining the orderly sequence of existence and, having filled those responsibilities, each species had corresponding rights to use those things necessary for survival. Ritual and ceremonial life revolved around insuring the survival of those species necessary for existence. Among the Kuskowagamiut, Togiagamiut, and Aglegmiut the major ceremonies revolved around the seal and other sea mammals. Among the Dens'ina the salmon was a focus, as was the moose, particularly in funerary rituals. Among the Kiatagmiut the salmon and the caribou were important.

Traditional Bristol Bay culture revolved around a small number of core values which arose from this relationship to the environment. Primary was the interdependence of all individuals in an integrated community, reciprocity and group co-responsibility which spring from that interdependence, and the belief that the individual is also closely integrated with, and responsible for and to, the natural and spiritual environments.

Interdependence and the belief in the interconnectedness of all elements of the social, natural, and spiritual worlds was also reflected in the egalitarianism, hospitality, and maintenance of tradition which were core values of Bristol Bay Native culture. These values have evolved, as we will see, from the traditional pattern of interaction between the people and their environment. This pattern supported, and was supported by, a cosmology based on cyclicity and responsibility for maintaining that cyclicity.

8.3 The Traditional Value System of the Bristol Bay Natives

8.3.1 Introduction

In Chapter Two we described the environment in which the Natives of

Bristol Bay developed their distinctive culture. Here we will determine the ways in which the environment has helped to mold the system of core values. Two problems arise, the first theoretical and the second methodological. First, what is the relationship between environment and culture? We view the environment as having crucial but not determinative importance. Second, there is a dearth of information about Bristol Bay before the days of Euro-American influence. We shall, therefore, rely heavily on information concerning other Eskimo, Athapaskan, and Aleut groups, as well as on information concerning the region itself. Though details of social and cultural life among these groups differ, we have selected examples which give a sound understanding of the basic cultural system of the region and of the values constituting that system.

8.3.2 Interdependence and Reciprocity

8.3.2.1 Overview

The environment to which the Bristol Bay Natives adapted involved a clearly defined cycle of resource availability which they exploited with a technology based on man and animal power. In the yearly cycle, discussed above in detail, a sequence of distinct activities succeed one another over The most basic distinction is between a season of intense resource exploitation and mobility (summer), and a season of sedentarism, feasting, and communal activity (winter), Within these two patterns are several intra-seasonal variations. In the June and July the dominant activities revolved around exploitation of the massive annual salmon runs. Toward the endof summer and into fall the main activities were berry harvesting for the women and hunting and trapping for the men. In the winter caribou hunting was also sometimes pursued but through the bulk of the winter there was relatively little subsistence activity; the group survived on the stores gathered during summer and fall for winter use and was involved in extensive social interaction within their own community and with other villages in the region. An exception to this is in the Togiak and Kuskokwim subregions where sealing often began during late January and continued until breakup made

it hazardous. With late winter and early spring came a new round of hunting and trapping. During this season the interior riverine groups concentrated on hunting and trapping terrestrial species, while the coastal groups again harvest sea mammals, in particular seal, walrus and, occasionally whale.

This pattern of resource exploitation and the climatic sequence associated with it, has had deep social and cultural effects. It encouraged an emphasis on interdependence and its frequent correlate, reciprocity. In all the yearly activities cooperative action was virtually a necessity. In fishing for salmon several people were required to handle the traps or nets. In hunting and trapping joint efforts resulted in more efficient exploitation. Interdependence was important to insure continued survival of all members of the village through the difficult winter months. This was particularly true of the sharing of food. It made sense to exchange portions of big game animals with others in the village. If a caribou was killed by one family group and shared with others it was understood that those who received would in turn be expected to share a future kill with those who had provided for them. A pattern was established in which family groups made kills and shared them with others in a circular fashion. Even the bestof hunters or fishermen were not successful all the time. Kin networks increased the number of interl inked producers, making access to game more dependable.

Though interdependence was at the heart of the Bristol Bay social and cultural system, it was expressed differently at different times of the year in response to various kinds of activities. Mauss has discussed this seasonal variation which he characterizes as “seasonal morphology.”

> Although the settlement is always the fundamental unit of Eskimo society, it still takes on quite different forms according to the seasons. In summer, the members of a settlement live in tents and these tents are dispersed; in winter, they live in houses grouped close to one another (1979:36).

This "twofold morphology," as Mauss refers to it, leads in both summer and winter to a reinforcement of the *sense* of interdependence. However, it does so at different levels and in different ways in each season. In summer interdependence is established between members of the work or kin group, a smaller unit than that which gathers together in the qasgig (or qasig or kashim) in the winter. In the summer interdependence is often evident only within the family or lineage, while in winter the entire village or settlement forms a cohesive group.

8.3.2.2 The Interdependence of Sumner

subsistence goods to last the group the winter. Time is limited; cooperation among family members is crucial if the needs of the coming season are to be met. The interdependence of the Eskimo family is expressed in vivid terms by Mauss:

> The rules for the summer family are relatively patriarchal. The predominant role is held by the father as provider, and by male children of hunting age. They are more than just heads of the family; they constitute its very foundation. Their disappearance would necessarily result in the complete disappearance of the family; the young children, if they were not adopted within another tent, would be put to death. The mother's role, it must be added, is no less important. Were she to disappear, the family would also be entirely destroyed. These two persons are so indispensable that, even when the children are somewhat older, if a husband loses awifeor a wife her husband, he or she will try to remarry as quickly as possible (1979:63).

The insistence on the nuclear family as the operative unit in the summer overstates the case for the Eskimo of the Bristol Bay Region. Although the family is the basic social unit during the summer for most circum-

polar groups, the unusual abundance of salmon during the summer in Bristol Bay and surrounding regions allows for larger social aggregations. In the Bristol Bay or Kuskokwim regions it is not unusual for the summer group to, at least temporarily, consist of extended families or even most of the village. Mauss recognizes this variation when he says:

> It is also reported that, in certain villages of the Kuskokwim, the winter houses are occupied during the summer; but it seems clear that they are occupied only temporarily, when the group had gone to the sea to take part in exchanges, and then returned to disperse upstream to fish for salmon and later out onto the tundra to hunt reindeer (sic) and migrating birds. Elsewhere, especially in villages on maritime rivers, it happens that before abandoning the winter houses, the village sets up its tents or its winter houses in a regular order not far away. But there is a specific reason for this particular situation . . . (I)n both summer and winter, the group maintains virtually the same subsistence pattern based on a diet of fish (1979:51).

As a result, the Natives of Bristol Bay underwent less extreme fluctuations in social structure between the summer and winter than many other Eskimo groups. Nonetheless, seasonal distinctions significant, as were distinctions within the seasons themselves. Summer settlements were more concentrated when the salmon were being harvested but dispersed during hunting and trapping periods, for example. These trapping and hunting groups were characteristically kin-based and expressed the solidarity of a particular kinship group.

The question as to whether the Yup'ik were traditionally patrilineal, matrilineal or bilineal has been controversial. The truth appears to be some combination of the three. Eskimo kinship was flexible, designed to allow efficient exploitation of a changing series of resources throughout the year. Some activities, such as hunting and trapping, tended tobe pursued by agnatic kin groups. Other activities, such as

salmon fishing, exhibited a matrilineal influence. Still others, such as the gathering of the group in the winter, seem to have been bilateral.

Much of the problem of kinship classification results from an overemphasis on the nuclear family as a separate and definable entity. Although the nuclear family was occasionally a distinct group, seasonal and resource variation resulted in a social structure in flux and allowed for latitude in the service of group survival. As VanStone notes, "a bilateral form of social organization has greater survival value in the subarctic because it makes possible a larger number and variety of kinship affiliations in a difficult environment where assistance from kinsmen is essential for survival (1974:53)." Bilateral ity allows the uti lization ofmatrikin, patrikin or both as called for by the situation, While at times appearing as a patrilineal or matrilineal system, this structure takes advantage of both in addition to bilineality. As Fienup-Riordan notes:

> The system of the Qaluyaarmiut, rather than manifesting the linkage of individual and conceptually isolatable nuclear families, is a prime example of what Levi-Strauss labeled social concern, or the denial of the family's right to exist in isolation or permanent y (1983:160).

The Dens'ina were similar, and this may have resulted from Eskimo influences. The social structuresof most North American Athapaskan groups were basedon matrilineal sibs, but, as VanStone notes, "Among other eastern Athapaskans, however, both maternal and paternal lines were relevant for purposes of tracing descent and this bilateral (as opposed to unilateral) reckoning was also characteristic of two groups in western Alaska, the Ingalik and the Koyukon (1974:52)."

Townsend (1970) argues that the Dens'ina of the Iliamna Lake subregion *were* initially matrilineal and matrilocal but that inheritance has shifted gradually to patrilineal. Residence, on the other hand, has shifted from matrilocal to patrilocal and finally to neolocal. The

situation among the Aleut is less clear. Although most contemporary scholars assert that Aleut social structure was based on matrilineal descent, this is not conclusive. Veniaminov asserted that succession passed from father to son (II:167-168). However, Lantis feels this observation was colored by the descent system of the Russians. Gross and Khera, however, question Lantis' conclusions with three observations. They point out that residence generally is patrilocal following the birth of the first child; that the male child, and not the nephew, succeeds to the office of chief when succession does occur; and that the offspring of a male and a slave was free, unlike in most matrilineal societies. Among both the Dens'ina and the Aleuts, the central feature was, as among the Yup'ik, the flexibility afforded by a shifting social structure.

Though the social groups of Bristol Bay Natives were flexible and they often maintained larger groupings in the summer than most Eskimo peoples, it was still of great importance to belong to a family group. The individual unable to place himself in a family simply could not survive. This partly explains the high adoption rates which characterize all Bristol Bay Native groups. Adoption had three interrelated functions. First, the individual who was orphaned was at a tremendous disadvantage. As Mauss noted above, the family could not survive in the absence of either mother or father, much less in the absence of both. The orphan to be either adopted or abandoned. There were evidently cases of both, though the former seems to have been more frequent. Thus, the first function of adoption was survival of the orphan.

The second function of adoption was the survival of the older generation. The pattern of seasonal variation in social structure among Bristol Bay Natives meant that for much of the summer the family was largely thrown back on its own resources in order to survive. Thus, when the parents grew old they needed some younger male or female to provide and care for them. This reciprocal need of the orphan for parents and, later, of the parents for someone to care for them in their

old age encouraged high adoption rates in which a younger individual was incorporated into a family or lineage through a process of putative kinship. As Mauss notes:

> The Eskimo are one of the peoples who have made the most use of [adoption], but it would be neither possible nor useful , if the winter group retained its unity throughout the year. On the one hand, orphan children as members of a large egalitarian family are supposed to be raised by the entire community; whereas, on the contrary, accounts and folk tales throughout the Eskimo area are unanimous in their description of the sad situation of the orphan. On the other hand, for the same reason, if the nuclear family did not periodically replace the large family, there would be no cause for married couples without children to be concerned about their future material and spiritual welfare. They would feel no need to adopt some young relative or stranger to care for them when they were old and, later, for their spirits (1979:74).

Orphans were not the only, or even the most frequently, adopted children. It was a general practice which illustrated the importance of reciprocity as an aspect of interdependence. Adoption was a widely practiced mechanism of "social security" redistribution, and it was commonplace for couples to adopt the children of relatives who had more than an average number of children. This removeda burden from those with too many mouths to feed and a future means of support was guaranteed those with no children. This was explicit recognition of the need for couples to have offspring to insure their physical and spiritual well being.

Fienup-Riordan notes adoption also served as a means to further integrate the entire village.

> Adoption, on the other hand, creates a more binding tie

> between the adoptive parents and the adopted child **kitugte-** "to repair, mend, fix or arrange" **plus +'(g)aq passive participle,** hence, lit. arranged, mended, fixed"). Yet the fact that the relationship between an adopted child and its natal parents and sibling is maintained despite the adoption lays emphasis on the inalienable character of the relationship through the stomach. . ..Adoption is most often movement of a child between households related in the ascending generation through a parallel sibling relationship (most often between sisters) where the child moved into the family of his classificatory siblings... . One-tenth of the current population on Nelson Island has been adopted out of their family of generation and 62 percent of these by **matrilaterals (1983:165).**

Adoption is an example, within and between families, of a more general value to which we shall return frequently. The pattern of giving to insure that one **will** receive at another point in the cycle is a consistent **leit-motif of Yup'ik culture.**

Interdependence was not only a family matter, it extended beyond the family at all times, even during the summer. Although spring and fall hunting and trapping were generally pursued by restricted kin groups, the fruits of their labors were frequently shared with the entire village. There were often elaborate ceremonies to distribute the meat from a large game animal or from the first kill of a certain species each year. In the Bristol Bay region the major animal s **celebrated i** n this manner were moose, caribou, salmon, seal, and walrus. In the same way the summer fish camps were generally organized according to complementary principles. Fishing sites were allocated by familial and close kinship relations. Each extended family gathered at a particular spot where they had traditionally pursued subsistence fishing. However, kin groups from the same village were usually adjacent to each other, so that the fish camp provided a concrete expression of the village social structure and of the kinship relations within those villages.

8.3.2.3 The Interdependence of Winter

Summer was a time of relative social dispersement, a time of work, gathering of resources, and preparation for the winter. Even under these conditions, interdependence was a lesson of daily life. However, if summer can be seen, admittedly somewhat simplistically, as an essentially pragmatic and instrumental period, winter was a time of intense moral and religious communitas. During the long arctic and subarctic winters there was little instrumental activity, but the most extreme examples of social interdependence occurred then. The village became a unified entity as members of the communi ty came together to engage in pursuits designed to make the long, harsh winter bearable, indeed enjoyable.

During the winter the young were educated, stories passed from generation to generation, religious ceremonies enacted, and community solidarity consistently reinforced. Family boundaries were blurred and the community became literally corporate and reaffirmed its integrity. Mauss notes this secular-dispersed/sacred-uni fied dichotomy between summer and winter:

> The religion of the Eskimo has the same rhythm as their social organization. There is, as it were, a summer religion and a winter religion; or rather, there is no religion during the summer . . ..By contrast, the winter settlement lives in a state of continuous religious exaltation. This is the time when myths and legends are transmitted from generation to generation . . ..Not only is this religious life intense, it also has a very special character which contrasts with life during the summer: it is pre-eminently collective. By this, we do not simply mean that festivities are celebrated in common, but that the feeling which the community has of itself and its unity suffuses all its actions. Festivities are not only collective in the sense that very many individ-

uals assemble to take part; they are the object and the expression of the group.

> This derives from the fact that they take place in the **kashim....Whatever its other features maybe, itis always essentially a public place that manifests the unity of the group.** This unity is indeed so strong that, inside the **kashim, the individuality of families and of particular** houses disappears; they **all** merge in the totality of the society. In fact, in the **kashim, individuals are not grouped by families** or by houses but according to certain barely differentiated social functions which they perform **(1950:57-58).**

The melding of family units during the winter represented the largest long-term groupingof the entire year. The whole village ate, **slept,** celebrated, and worked together during this period. Children became a collective responsibility and at **an** early age learned to see themselves as a part of a much larger group than merely the family. Collectivism became **a necessary** and expected partof social life, extending to **all** activities, and especially to food distribution.

> Collective rights over food, instead of being limited to the family as in the summer, extend to the entire house. Game is divided equally among all members. The exclusive economy of the nuclear family totally disappears. The family may not put aside for its own use food from its own hunting or from the share of meat it receives. External stocks such as the frozen provisions that are brought from distant catches are joint property. Provisions that were gathered earlier and are brought in later are shared to meet common needs **(Mauss 1979:72).**

8.3.2.4 Inter-Village Interdependence

Interdependence extended beyond the village limits. Traditional exchange relationships were established with other villages, most commonly between coastal and interior groups. Coastal groups had access to resources, notably sea mammals, unavailable to interior groups. By the same token, the caribou, moose and furbearing animals to which interior groups had easy access were less available to coastal groups. This respective scarcity and abundance was remedied by extensive exchange relations between the two ecological zones. Seal and seal oil from Togiak and the Goodnews Bay area *were* exchanged for caribou, moose, and whitefish from the Nushagak River groups. Togiak grass, used to construct baskets, was exchanged throughout the region for resources unavailable in the Togiak subregion. Moose from the Dens'ina and Nushagak River groups was exchanged for herring and herring roe-on-kelp from the coast. The Nushagak River groups also exchanged for seal, but the Dens'ina were able to harvest seal from Iliamna Lake and therefore were self-sufficient in this regard. Other exchange patterns were established as well, which had the cumulative effect of weaving the entire region together in a web of interdependence.

During the summer inter-village relations took on an essentially instrumental character with families and individuals exchanging goods with established trading partners. In winter, village interdependence was expressed through essentially religious mechanisms. Perhaps most important was the traditional Messenger Feast. This was a winter feast in which villages alternated in hosting *one* another. One village would announce a Messenger Feast to which another village was invited. There was often competition among villages to have the first feast, and the village was able to prepare a good inaugural feast gained pretige (Fienup-Riordan, 1983:308). The feast lasted several days and involved several types of reciprocity of both practical and symbolic importance. It was the responsibility of the host village to provide food, drink, and lodging to the guest village, and in return the guest village was expected to bring all manner of gifts for its hosts. Often the host village specified the gifts and quantities they expected to receive when

issuing the invitation. Naturally, the guest village was expected to reciprocate, usually sometime during the same winter.

The Messenger Feast tied communities into formal exchange relationships. Pragmatically the Messenger Feast was a contrivance to redistribute goods in short supply in one village but plentiful in another. Villages might establish such feast relationships with several other villages.

The Messenger Feast was also symbolically and religiously important. By recycling resources and establishing reciprocal relationships among villages, the interdependence of the cosmos was symbolically reinforced. This was also done through the activities of the feast itself. Oneof the major forms of religious expression during the festivals was dancing. The Messenger Feast was accompanied by literally day after day of dancing which, generally to the accompaniment of drumming, was the most popular recreational and religious activity. The order in which individuals and couples danced was an expression of ritual and kinship links. Dancing also often provided the opportunity for rituals such role reversal in which men took on women's clothes and behaviors and vice versa. More than anything else, however, dancing was a celebration of the unity of the group and an expression of social unity and cultural cohesion.

Throughout the twentieth century winter festivals have continued to be a major feature of village life in the Bristol Bay Region. For example, most of the villages on the Nushagak River host such festivals once a year which are attended by most of the members of other river and coastal villages, thus maintaining the reciprocity of the traditional feast. Although the strict ritual structure of the Messenger Feast is rarely replicated today, the festivals nonetheless have the undeniable effect of continuing to tie together the region in a network of social relationships.

8.3.2.5 Interdependence of the Social, Spiritual and Natural Worlds

Interdependence was also extended beyond the human community. At this point it becomes clear that it is the underpinning for the entire Native ethic and view of the structure and operation of the cosmos.

This extension of interdependence was in two directions. First, the Native concept of the world included not only the living, but the dead as well. The relationship between the living and dead was regarded as one of interdependence, and tied the spirit and material world together in a single system. Second, humans were tied to the natural world, particularly to those species considered crucial for survival. this way the dead and the natural world were integrated in a system of mutual obligation, respect and, ultimately, responsibility. Cosmos (literally, "order") was defined as a cyclical series of mutual obligations and rights to be repeated for eternity. What is held is not to be hoarded, but should be given out to insure its future return.

8.3.2.5.1 The Living and the Dead

The relationship of the livingto the dead was apart of this cycl ical cosmology. The cycle tied alternate generations to one another and was particularly evident in the naming of children. When a Yup'ik child was born he was given several names, including the name of a recently deceased relative, usually of grandparental generation.
instances the child might be given the name of an elderly, but still living member of the grandparent's generation.) However, once given this name, its use was prohibited out of respect for the dead. As Fienup-Riordan notes for the Yup'ik of Nelson Island:

> The result of this view is that the newborn succeeds to a name, which is symbolic of a position which must always be filled. Out of respect for the namesake, however, the name is then never usedin direct address or indirect reference. Rather the form of address is a kinship term, which term depends on the relative age of

> the speaker and the person addressed, as well as their relationship to the deceased... [I]f a person has the Eskimo name of the dead kinsmen of another, then both the namesake and kinsmen of the deceased reciprocally refer to and address each other with kin terminology appropriate to the dead kinsmen. For example, two infant children are jokingly referred to as husband and wife because of the relationship attending their names. (1983:153).

This naming system symbolized the primacy of the group over the individual. Taking the name of a deceased relative emphasized the continuity and integration of the group and reinforced the sense of being enmeshed in an ongoing and recursive society. However, the substitution of a kinship term in everyday conversation for the prohibited proper name. This even extended to inter-village relations, and two Eskimos, meeting for the first time, immediately set about comparing lineages until they discovered an acceptable kin relation which would allow them to interact. The use of a kin name rather than the proper name meant the individual was constantly reminded of the overriding importance of the group. That is, the individual would be related to one person as, structurally, a cousin, to another as a nephew, another as a brother, and so on. Each person with whom the individual interacted might therefore use a different term of address, emphasizing group while the proper name, which would always be the same and therefore emphasize the centrality of the individual, was never used. Much the same basic approach was utilized by the Dens'ina (VanStone, 1974).

Thus the inventory of names did notconsist ofan unlimited numberof options; rather, each village had two finite sets of possible names. First was a limited set of proper names which were continually "recycled" each generation to establish a tangible and circular link among the past, present and future. A second, also finite, set of kinship names were used for daily intercourse and centered on the structure of the group rather than the individual. Both sets of names revolved around the idea of a closed, cyclical system reflecting the

general Native cosmology. Fienup-Riordan notes the consequences of this system of naming among the Nelson Islanders:

> What becomes apparent in our consideration of Qual uyaarmiut naming and the subsequent termi nol ogi cal skewing, is not simply the existence of a relationship between the living and the dead, but a cycling between them, and a consequent collapse of the system into two generations, with alternate generations equated (1983 :156)... [Procreation is not the addition of new persons to the inventory of the universe, but rather the substitution of one for the other (1983:153).

8.3.2.5.2 The World of Men and the Natural World

Interdependence encompassed the natural environment as well. The Natives were concerned that the natural environment continue to yield resources, particularly animal resources. The rituals embodying this concern took, as with the process of naming, a cyclical form fundamentally influenced by the round of resource availability. Every time something was removed from the system something was returned to ensure future availability. This attitude toward the natural world was widespread among the Dens'ina as well as the Yup'ik. VanStone notes that the most consistent theme among northern Athapaskan groups was "the significant reciprocal relationship that existed between men and the animals on which they *were* dependent for their Livelihood....the spirits of animals had to be placated if men were to continue their exploitative relationship to the natural environment" (1974:59). The Aleuts were equally concerned to treat the important animals species with respect to insure their return.

Fienup-Riordan relates a story told her by Nelson Island Yup'ik about sealing which shows awareness of this interdependence and the respect for the natural environment which it engendered. By way of introduction, the Yup'ik believe that the spiritor soul of the seal resides in its bladder, and care is taken to return the bladder to the sea so the seal

might return again next year. This is done each year in the Bladder Festival. The following excerpt is from a story about a young man given to the seals for a year to learn to become a great hunter. During his apprenticeshiphe is taken under the tutelage ofa seal elder who gives him some final advice as he prepares for return tothe worldof humans.

> While the boy was in the **qasiq** some of the smaller seals used to leave. They were warned by their elders not to fall asleep. ..For if they were killed whilethey were sleeping, they would die forever and never return. For while they slept their life was diffused all over their body. If they were concentrating, however, their **life** would go to their bladders, and even though their flesh was cut, they would never die. For the hunters **would** care for the bladders and return them to the **sea...When** spring came the old bearded seal who was his host told the boy that they would go out, but that the boy must fight to keep awake. So they left the **qasiq** together. And the boy had to fight hardto stay **awake...They** came to the village where the **big** seal's hunter lived. The big seal said that he always returned to this man because he took care of him, of his skin, his blubber and his **bones...As** they went, the big seal told the boy what he should do when he returned to the village. He should always think of the seals when he was shoveling, thinking **that he** was **making a** way for them. If he did not help with the shoveling, thinking of the seals as he did so, he would not succeed as a hunter...These are the things a great hunter must do (Fienup-Riordan, 1983:177-180) .

This excerpt highlights several points. Interdependence is clearly expressed between the natural and social worlds, as is the reciprocity between hunter and hunted, who enter into a voluntary relationship which insures the regeneration and survival of both. Even the structure of

seal society, with the exalted position of the elders and the utilization of the qasiq, echoes the structure of humans. Finally, the cyclicity of all aspects of activity, including life and death themselves, is explicitly recognized. Again, one must yield something, even if it is life, in order to receive it again, through rebirth, in the future.

Among the non-coastal groups there was, of course, no Bladder Festival. However, an equivalent sense of interdependence and responsibility was expressed in the ceremony of the First Salmon. The details of this ceremony varied among different Eskimo and Aleut groups, and there exist no detailed accounts of its practice among Bristol Bay Natives. Amoss (1983) has described the ceremony for the Indians of Northwestern America. The ceremony proceeded as follows. When the first king salmon arrived heralding the spring runs, a large specimen was selected for a ceremonial feast. The salmon was carried like a babe in arms from the stream to the communal house, its arrival hailed by a child sent running on ahead. There the fish was rubbed with red ochre and slowly and carefully cleaned leaving the backbone intact. It was then roasted on a spit and consumed in a strict order determined by kinship and age. After the fish was eaten its remains, including the still intact backbone, were careful ly gathered and returned to the river. VanStone reports a similar ceremony among the western Athapaskan groups, of which the Dens'ina were one. "The fish were laid on fresh grass in frontof the houses, and the people, after taking sweat baths and making other preparations, put on their best clothes to clean and cook them. Cleaning was accomplished without breaking the backbones, and the entrails were thrown back into the water (1974:69)." As with the bladders of the seals, it was believed that returning the fish's remains to the river insured the return of more salmon the following year.

We noted that most of the winter was spent engaged in communal feasting and ceremonies. However, ceremonies of the type described above occurred not just in winter but throughout the year to mark the advent of the availability of each major resource. The first salmon, the first seal, the first caribou were all celebrated as they were caught in

communal , deeply religious ceremonies believed to insure the reappearance of the resource in the coming year. These practices were also pursued among the Dens'ina. As VanStone notes in his discussion of the ceremony of the first salmon, "Ceremonies of a similar propitiatory nature were held at the time of killing the year's first big game (1974 :69)." As among the Yup'ik, many of these ceremonies revolved around the communal house, the **qasiq** among the Yup'ik and the **kashim** among the Dens'ina.

8.3.3 Other Traditional Values

We have described the pervasive role of interdependence in traditional Yup'ik, Dens'ina and Aleut life. This was expressed at different social levels at different times of the year, but the individual was consistently and forcefully reminded of his inability to survive alone, of the importance of the group, and the necessity of giving in order to receive. This was true at family, village, and regional levels, as well as with the spiritual and material worlds. These beliefs reveal a humble view of humans as only one among many species in the cosmos. This vital emphasis on interdependence was complemented by several other important core values, all of which were related to the group and group integration. Among the most important of these values were egalitarianism, hospitality, the importance of tradition, and, finally, a cyclical and regenerative view of time and space.

8.3.3.1 Egalitarianism

Egalitarianism emerges from the seasonal cycle of resource exploitation and the interdependence of the group at all levels. The fact that resources were predominantly gathered during one part of the year and thereafter had to suffice through the winter made egalitarianism unavoidable. The inherent equality in food distribution has been illustrated in several contexts above and it would be unconscionable for an individual to hoard goods when someone else in the village was in

need. The coming together of the village in the qasgig or kashim during the winter insured that the members of the village would remain at least roughly equal. All were located in the same communal sleeping quarters, all ate the same food; what was available for one was available for all. The mobility of the Eskimo also prevented the accumulation of large amounts of non-moveable wealth. Elaborate distribution mechanisms, such as intervillage exchange, seal parties, and other customs insured that goods and wealth would be redistributed within and among villages.

The "potlatch-like" institution that Mauss observed among the Alaskan Eskimos was one means of achieving prestige, although leadership was not well developed in the Bristol Bay region. The potlatch was never as important in this region as it was to the Dens'ina and other Athapaskan Indians in the interior and in southeastern Alaska. Concepts of class and privilege were also more developed among the Dens'ina and Aleuts than among the Yup'ik. Osgood (1937) and Townsend (1970) report that during the mid-nineteenth century the Tanaina (of which the Dens'ina are a western portion) had classes and a concept of wealth related to prestige. However, the Dens'ina were less elaborated in these respects than any of the other Athapaskan groups to the east and southeast.

Among the Aleuts the concept of chieftainship was fairly well developed, although inheritance of the position was problematic. The chiefs were selected primarily on achieved grounds, hunting and fishing skill as well as valor and wisdom in general. A child of a chief who did not exhibit these characteristics could not expect to succeed his father easily. The Aleuts also expressed social status through the display of wealth, particularly slaves and trade goods. According to Veniaminov a three class system operated among the Aleut including an upper class, the slaveholders, a commoner class, free persons, and a slave class. Again, however, the Aleuts in the Bristol Bay region appear to have been less rigidly stratified than their relatives to the west. At any rate, for all groups concern was taken to insure that everyone got at least roughly equal shares of major subsistence items.

The potlatch was only one of several redistributive mechanisms which

achieved the dual purpose of bringing honor and respect to the individual sponsoring it while assuring that the entire community would receive the goods necessary for survival. Many of the ceremonies revolving around the major game animals which we discussed above had this second function of promoting such redistribution. One such mechanism was the seal ceremony of the **Aglegmiut, Togiagamiut,** and **Kuskowagamiut.**

At the seal party a redistribution occurs which insures the even allotment of goods throughout the community. As each hunter kills his first seal of the year his spouse is required **to hol** daparty at which she redistributes most of the meat, **in** addition to other kinds of goods. The seal party is an excellent example of the principle of egalitarianism in practice because the goods distributed not only leave the family which captured the seal, but the extended **family as** well. The only persons eligible to receive presents are those not considered to be "relatives," insuring the widest possible social distribution. **Fienup-Riordan** discusses the pattern among the **Yup'ik** of Nelson Island:

> On the morning after the seal has been brought home, or, if the seal was caught early in the day, later in the afternoon, a youngster of the host family is sent to invite all of the married women of the village to the home of the successful hunter. No "relatives" are included, and by this is meant the hostess' sisters, aunts, sisters-in-law, and female parallel cousins (classificatory siblings) **(1983:191).**

8.3.3.2 **Hospitality**

Egalitarianism is closely connected with hospitality, another *core* value among Bristol Bay Natives. Hospitality is obviously an adaptation to an objectively harsh environment in which lack of shelter or food means certain death. The dangers of being stranded or lost in the arctic winter demand agreement that the individual in need must be cared for. Hospitality, however, despite its obvious expediency in a pitiless

physical environment, means more to the Native Alaskan than merely physical security. Hospitality has a spiritual dimension as well, and is, as are all the core values of the culture, a reflection of the Native perception of the nature of the cosmos and of man's place in that cosmos.

The centrality of hospitality illustrates that the end of activityis not accumulation of goods but rather insurance that those goods will continue to circulate from men to men, from the living to the dead, and from the natural world to the human world. From this perspective, hospitality is a central expression of cosmology.

> All Yup'ik systems of reciprocity between humans (from the exchange of food between two closely allied households, to the exchange of gifts between the men and women of an entire community, and finally to the hosting of one community by another) are ultimately tied to the system of mutual hospitality embodied in the relationship between men and the natural world. What comes freely must be given freely in order to ensure that it will return (1983:346, emphasis added).

Hospitality was also important among the Dens'ina. As Townsend (1970) notes, the rich had to support the ir poorer relatives in order to maintain their prestige. This could be accomplished through informal exchanges or through potlatches. Since the potlatch is no longer used as a means of distribution, hospitality is now largely expressed informally.

8.3.3.3 The Value of Tradition

The view of the cosmos implied in the values discussed above leads to an emphasis on tradition. It is the guarantee of order. The idea of going "beyond" tradition, of "progressing" to more "modern" practices appears absurd from within such a cosmology. To change the ways in which things

are done is not to advance, but to risk chaos. Cosmos, order, depends above all on the maintenance of the correct relationship among the constituents of the universe, including man, the natural world, and the spiritual world. Any change in the actions, ceremonies, or rituals which insure that cosmos threatens to lead to chaos.

The importance of tradition as a guide to the ways in which order can be preserved and insured also has social consequences. It results in a predictably high value on the knowledge of the elders and on successfully repeating the practices, ceremonies, and activities in which they have engaged. Since the world as it is presently constituted fills all human needs, the acts in which the elders have engaged for all their lives are clearly efficacious in insuring the continuation of the structure of the universe. There is no desire to go beyond the knowledge of the elders, because that knowledge is in perfect tune with the yearly round of existence. Rather the children and adolescents spend much of the year listening to the elders pass on knowledge crucial to the continued survival of the group, indeed of the world itself.

8.4 Conclusion: The Basis of Cosmology

The examples discussed above clarify the traditional world view of the Bristol Bay Natives. Events, even time itself, do not proceed in linear fashion; the object of existence is not continual change and "progress: with its implication of unilinear movement toward a new and different future. The object is to confirm and preserve the cyclical, timeless nature of the cosmos. Proper behavior, which includes respect and generosity, insures that this cycle will continue unbroken. The present is not seen as an intermediate step toward an infinite future but as a channel through which the past and future are joined and looped back on one another. Children and elders, the living and the dead, humans and the animal world are all players in this infinitely recurring rhythm.

Yup'ik, Dens'ina and Aleut values revolved around this fundamental belief in the interdependence of all levels of the natural and spiritual worlds. This pattern led to the ethic of giving to insure that one

would receive. As Fienup-Riordan noted "what comes freely must be given freely in order to ensure that it will return." The practice of hospitality and egalitarianism emerged naturally from this perspective. Goods were shared among the living and between the living and the dead. The fact that the individual distributed goods to the rest of the village insured that he in his turn would receive goods from others. When one family showed hospitality to another it knew that it would likewise receive hospitality.

It is in the ceremonies and rituals of a people that concepts of the structure and operation of the universe become most clear, The cyclical view of the operation of the cosmos, and the importance of reciprocity (and associated concepts of hospitality and egalitarianism) in maintaining that operation give us a clue to the reason for the structure of most Bristol Bay Native ceremonies. The importance of maintaining the ongoing cyclicity of the universe means that those people and events which were structurally at the points of transition from one phase of a cycle to another were given particular importance. It is at these "points of linkage" that the cycle is in greatest danger of being "broken," and extreme care must be taken to move successfully from one phase of the cycle to the next, as illustrated by the elaborate ceremonies which herald the beginning of the sealing season or the arrival of the first salmon. Tradition is the guide to the correct behavior in such ritual situations, and therefore is the guide to preservation of the structure of the cosmos.

At the heart of this view of the world lay the perception of the cosmos as stable communitas. Man was only one kind of being in an extensive spiritual and natural community. Each group in this cosmological community - - man, salmon, seal, spirit - - bore responsibilities to one another. By fulfilling these responsibilities each group maintained the good will of the others who would insure the survival of all by providing a continued abundance of resources. When all groups executed their responsibilities and rights in proper measure, the cycle was insured and cosmos, order, was maintained.

We shall see below that this world view has important implications for the ways in which Bristol Bay Natives have dealt with the values and materials of the intrusive social and cultural systems of the outside. It is especially important in understanding the approach they have adopted to cash and the cash economy. Accumulation for the sake of accumulation has no meaning in a system in which the structure and resources of the moment will not pass away forever, but will return again in an inevitable circular fashion next year or next generation. There is no sense in which, for example, "opportunity knocks only once" in such a system, and there is therefore no corresponding urgency to "capitalize" on a situation which, it is feared, will never recur. In a capitalist system future returns are seen as the fruit of progressive accumulation of goods and capital; among the Natives future return is guaranteed only by distributing or "letting go of" goods.

8.5 The Management of Change: Nodes of Accommodation and Points of Stress

This section examines the interaction of the two cultural systems discussed in the previous two sections. The discussion concerns the management of change by Bristol Bay Natives. It includes two general divisions, modesof accommodation, areas in which the management of change has been successful, and points of stress, areas in which such management has been less successful. We do not believe the effects of cultural interaction can be characterized along a single dimension or as a single type, adaptive or maladaptive. There are certain points at which the interaction between the two systems is particularly intense. At these points the two cultural orientations are articulated by local residents to meet certain social and psychological needs. A salient aspect of this articulation is the process of adjustment through which the two orientations are able to coexist in certain spheresof social and cultural life.

Though stress inevitably accompanies social and cultural change, the process itself is not necessarily stressful. The preexistent social and

cultural system is predisposed to "manage" many changes effectively. The first section of this chapter will focus on the ways the indigenous population has reformul ated elementsof the intrusive system to make them consonant with their own cultural orientation. This reformulation is one side of the Bristol Bay Native experience with Euro-American culture.

Following the discussion of modes of accommodation we will look at the other side of interaction -- areas where points of stress have emerged. Although the Bristol Bay Natives have, overall, been successful in managing the changes thrust upon them, there are also areas in which change has been destructive to their culture. These are two perspectives on the same phenomena, and neither is to be taken as completely accurate without being balanced by the other. (For general considerations of contemporary cultural change in this area and in Alaska in general the reader is referred to Alonzo 1977; Bloom 1972; Chance 1960, 1965, Davis 1976, 1978; Pel to 1978.)

8.5.1 Modes of Accommodation

In this section we will explore three areas where the elements of the cash economy have actually maintained and supported traditional economic, social, and cultural structures in the Bristol Bay region. First, we shall consider sources of village integrity, in particular the elements of the intrusive economic system which have encouraged the **persistence of village residence,** a crucial precondition for the persistence of social and cultural systems. Secondly, we shall address forces which have encouraged a **persistence of social order,** especially those elements of the intrusive system which, sometimes surprisingly, have helped maintain the economic, social, and political power of the village elders and the domestic mode of production. Finally, the implications of both the persistence of village residence and of village social order for the **persistence of the local cultural** system will be discussed.

The most distinctive aspectof the process of culture contact in the Bristol Bay region, particularly in the villages, has been the extent to

which the middle and senior generations have been able to maintain their positions of power. This is the most important factor behind the persistence of social order in Native life and together with other elements has (1) encouraged the youth to remain in the village; (2) minimized the perceived importance of education outside the community; and (3) reduced the attractiveness of outside wage-labor positions. The breach between the generations often seen in such situations has failed to develop. This means the local social and cultural system is able to maintain much of its pre-contact vitality. Its continued vitality means it continues to serve as a support system minimizing the disruptive effects of social change.

At the heart of these developments is the kind of economic activity in which the people of the region have become involved. If, as Shea says, "To attempt to change the way of work is...to attempt to change the way of life," (1969:322) we will also find that to attempt to maintain the way of work is to attempt to maintain the way of life. What may appear to be solely "economic" activity to outsiders is also a social and cultural activity to the Natives which makes its characterization as solely economic untenable.

8.5.1.1 Factors Encouraging Residential Stability

In both fieldwork and data collection phases of the research it was clear that the Bristol Bay region, and in particular the villages, is not experiencing the massive outmigration often characteristic of small scale societies in contact with outside culture and society. In the Nushagak River villages the perception of residents is that increasingly the younger generation is remaining in the village, and that those who left in the past are returning to take up permanent residence in their birthplace. In Togiak the youth state explicitly that they do not want to leave the village. Those who leave to attend school outside plan to return to the village and apply their skills there. The general goal is to retain or retake control of local affairs, and those youth who go outside for higher education do so in order to obtain skills to assume positions in the village as teachers, city officials, and so on. There

is a general feeling throughout the region that skills should be acquired which will be useful in addressing the problems of the village in its continuing interaction with the state, nation, and other outside forces. In many ways the nature of the forces intruding on the region have abetted this tendency toward residential stability.

The salmon fishery is the major economic activity in the region. The introduction of the limited entry permit is a fascinating development in the "modernization" of the seafood industry. A permit is worth a great deal of money -- often over $100,000 for a drift gill net permit -- and is unquestionably the key to the door of the Bristol Bay cash economy. However, there are several unique aspects to both the permit and the commercial fishery to which it allows entrance, which are different from, for example, large scale wage-labor involvement in the cash economy.

First, the permit allows entry to a fishery which has historically been exploited by the Native population of the region. The main entrance into the modern cash economy is through an avenue already familiar to Natives. Salmon are still valued by Natives as a vital resource; there is no need to become involved in a totally alien means of production. Elements of the commercial exploitation of salmon have reinforced traditional patterns of residence.

Salmon are unlike other primary resources such as coal, oil, or timber. Salmon are migratory and it is only when they return yearly to spawn that they can be caught in significant numbers. The fishing season spans such a brief period that it is much less disruptive of traditional lifestyle than permanent year-round industries like those based on oil or minerals, found in other parts of Alaska. A system of permanent wage labor is disruptive. It introduces a totally novel structure of work to a Native people accustomed to subsistence activities. Long-term wage labor positions involve working established shifts over a lengthy period of time, usually by leaving the village for another location for much of the year. This leads to a reduction in village residence and in social interaction with other villagers, with destructive social results.

In Bristol Bay time spent in the commercial fishery incomparable to that traditionally spent in subsistence fishing. As a result, commercial salmon fishing "fits in" very closely with traditional residential patterns. Fish camps are nota resultof the commercial fishery, but of the fishery, period. These camps have always been utilized during the summer salmon runs by certain villages. As traditionally, once the fishing season is over the villagers return to more permanent village sites. They are not forced to become involved in a year-round process of earning income. Moreover, earnings from the relatively brief period of intense commercial activity are quite substantial and generally meet the cash needs of the villagers for the entire year.

Other elements of the cash economy in the Bristol Bay region have also helped maintain traditional residence patterns. The Alaska Native Claims Settlement Act ties villagers to land close to their village, as this land is most often selected for conveyance. Native allotments work in much the same way by giving the local population a concrete investment in the subregion in which they reside.

Finally, fur-trapping is another traditional activity which has been part of the commercial economy. Like fishing, this is a seasonal activity occurring in the fall and winter, but with the aid of modern technology it is even more easily pursued from the village site itself than traditionally. With a snowmobile a trapper can cover more ground in a day, checking and setting lines, than in several days or a week on foot or by dogsled.

These economic forces have tended to reinforce village residence, and have slowed the exodus from the villages. ANCSA and Native allotments have stabilized residential patterns in the village. Other factors encourage villagers to remain, including the low cost of village living compared to urban living, and the availability of game and other subsistence resources. House payments are generally low or non-existent, and the only major expenses are the yearly boat payment and

the yearly supply of fuel oil which, in times of need, can be minimized by using wood for fuel.

8.5.1.2 Factors Encouraging the Persistence of Social Order

The structure of commercial fishing also reinforces traditional social relationships. Every fishing season, many Native villages move en masse to fish camps located at the mouths of the rivers of the region. Each village has traditional sites, and longstanding social relationships, between families from the same village and from different villages, dictate who will fish where and also social activity at the fish camps. Commercial fishing does not pull the social group apart, it allows for the continued integration of the family into a larger network which, in many cases, extends to a number of villages.

The scale of commercial fishing also supports traditional structures. The technological sophistication of commercial fishing allows the gathering of much larger quantities of fish in the same time as was traditionally devoted to fishing. This means there is an opportunity to gather a surplus of subsistence resources at the same time that commercial quantities are caught. This is important because it means a larger supply of the resource can be shared throughout the community, thereby supporting more traditional values of distribution and property relations.

However, the most important way in which the commercial fishery maintains social order concerns those who control the generation of income. The fishery is regulated by the limited entry permit, and those Natives who received permits were those who had used the fishery in the late sixties and early seventies. This means that power over the permits is generally vested in middle-aged and older people. By and large, it is the males of the middle and senior generations who hold drift gill net permits, easily the most valuable permits, and it is women of the same generations who hold the set net permits. Thus, control over the greatest source of income is not in the hands of the younger generation as is often the case during the process of culture contact. This has several

effects, all of which reinforce social cohesion.

First, the sheer scale of income available with a limited entry permit means it is not necessary for villagers, in particular the youth, to migrate to an urban center in order to participate in the cash economy. They are able to crew for a parent or relative, or run a set net without leaving the subregion. Indeed, with in only a few weeks per year one can earn more than from a full year's wage labor outside the village.

The attractiveness of the commercial fishery for Natives, even those without permits, is enhanced by another aspect of social structure which has persisted to the present, the domestic mode of production. The domestic mode of production is one oriented toward production for use rather than for profit or accumulation. Within certain bounds, the traditional Native mode of production fits Sahlins' definition of the domestic mode of production, and certain elements of the contemporary adaptation to the commercial fishery have helped maintain this mode.

The crew among Bristol Bay Natives tends to be kin-based, and their earnings are higher than the crews of outsiders. In the Togiak district, a payment of 33% of the gross earnings to the crewmen is standard practice. On Nushagak district 32-footers, 25% has been standard for kinsmen. Outsiders, by contrast, pay their crews 10%.

Second, when limited entry permits are transferred among kinsmen, as usual among Natives, the transfers tend to be gift transactions, while non-resident transactions are generally sales. There is a much higher percentage of transfers to kinsmen among Bristol Bay resident fishermen than among non-resident fishermen. Both these facts are evidence of the domestic mode of production in operation.

Under these circumstances, itis simply not an attractive prospectto work for a full year outside the village for what can be earned in the village, or at least among villagers in the fish camps, in a few weeks during the summer. Thus, the earnings from the fishery discourage migration from the village to seek wage labor positions.

Second, the social order is not threatened by educational opportunities outside the village. The younger generation has, by and large, foregone education beyond the high school level (education is available in most villages of the region through the twelfth grade). Fieldwork revealed that many villages in the region have never produced a college graduate. Unlike the typical case of culture contact, education confers little or no economic advantage over those who remain in the village since large incomes can be earned with minimal interaction with the outside. Thus, a major mechanism by which a younger generation typically gains an advantage over an older generation is minimized, and another incentive for migration is reduced.

The result of these factors is a persistence of thepower of the older generations. This was not universally true, but was obviously the case in many of the villages we visited. Limited entry permits are a finite resource limited to the number originally issued, and are generally unavailable on the open market except atexorbi tant prices. They are very valuable, both as equity and as a means of income generation. Thus, the limited entry system ties the younger generation even more firmly to the middle and older generations. The son who expects to inherit his father's permit must take care to remain in his father's good graces, and, consequently, the respect and deference traditionally shown the older generation is a continuing feature of most Native villages today. The continued residence of the younger generation in the village, and the deference which they wisely show their elders, result in a maintenance of the most important. features of social order. This need not be a conscious process and, like most deeply held cultural orientations, is probably not. Nonetheless, the practical effects of this "empowerment" of the middle and older generations is a continuation of many traditional patterns. Even in those villages in which there is a strong movement for the enfranchisement of the younger generation, it is the older and middle generations which must support such steps if they are to be successful.

Other elements of the cash economy also contribute in some ways to the

maintenance of social order. In 1971 ANCSA placed land and political power in the form of voting shares in the local corporation into the hands of all villagers. The middle and older generations form the majority of these voting shareholders, and since there are no more shares to be had, the ultimate acquisition of these shares by the younger generation is again dependent on the good will of their parents. The same is true of land distributed under the Native Allotments Act, with the average landholder being even older than the ANCSA shareholder.

Most villages in the region have small stores in which basic supplies and foodstuffs are sold. These stores operate on an unusual credit system which is more closely related to traditional distribution modes than to Western capitalist modes. In most of the villages of the region goods purchased on credit are not subject to interest and payment is handled relatively informally. In the lower Kuskokwim and Togiak sub-regions it is usual to charge no interest not only on credit purchases, but as well on loans of any kind.

The focal place of the commercial fishery in terms of cash generation, the position of the middle and older generations in that fishery, and the ANCSA and Native Allotment holdings, together insure that the older generation will not be "put out to pasture" or forgotten in the village while the younger generation leaves to pursue opportunities in the outside world. These circumstances also confer political power, since the wishes of the most economically advantaged group must be respected in the political arena. The focus of local political power is the village corporation, which is heavily influenced in most villages by the middle and senior generations. In most of the villages of the region we visited, it would be virtually impossible for the younger members of the corporations to realize any political or economic objective which offended the elders. The elders are generally either in direct control of the board of directors of the corporation or were consistently consulted by that board whenever major decisions are made. A leader in one village, a man in his mid-thirties, said that whenever he had an idea he wished to present to the board of a regional organization of which he was a member he first visited the homes of the most influential

elders and solicited their opinions. He explained that it was difficult to get all of the elders together at once, but believed that their goodwill was so important to the success of any initiative that he went to the trouble of visiting each elder individually.

8.5.1.3 Factors Encouraging the Persistence of the Cultural System

Continued residence in the village and persistence of the social order combine to encourage a continuation of cultural beliefs and values. If people remain in the village they can pursue traditional activities more frequently than if they relocated outside the village. The relationships between the generations also preserve traditional cultural beliefs and values.

The sequence of resources which must be exploited in very different ways during the yearly cycle, which has not been essentially changed by the commercial economy, is a fundamental force for the persistence of a cultural system. The year, and time itself are not seen as sequential and divided into uniform segments as in Western cultures. The standardization of time and the work week, with its eight hour day and five days on, two off week would literally be impossible. Western concepts of success, progress, and advancement, associated with a linear conception of time, are alien to the cyclical conception of time held by the Natives. The wise Native studies and understands this cyclicity and acts in accord with it as to take maximum advantage of the cycle without threatening future abundance; nature thereby becomes a force to be worked with rather than against.

Connected with this approach to time is the idea of production for use rather than for accumulation. This was traditionally an important characteristic of Native social and economic activity. Once enough was produced for personal needs or those of the domestic group there was no particular incentive for further production. An important dimension of production for use is that there is little or no liquidity associated with any resource. The Native did have ways of storing value, but such value was stored in the form of kinsmen and through rituals to insure

the abundance of natural resources rather than in things or money.

Stored value in Native culture is deposited in one's kinsmen through giving and caring. These are people who can be called on in times of shortage and scarcity. Most importantly, investment in one's children can be seen as the stored value to be called upon in old age when one can no longer produce his own. By developing respect in and providing for one's children one can store the value to support oneself later in life.

By storing value in kinsmen, one is investing in their productive capabilities. But their capabilities, and one's own capabilities are only as productive as the natural resources which can be called upon. So the second form of stored value is in natural resources. Certain aspects of Native ritual are linked to storing value in natural resources by giving to them directly. We have already discussed the seal ceremony and the ceremony of the first salmon, both of which are examples of the ways in which the Yup'ik "store value."

Cash, in this system has in many ways been integrated as another resource available for exploitation at particular times of the year. Its long-term accumulation has not yet taken priority and has not overtaken other resources in importance. Subsistence activities have, in fact, increased in importance as they have become measures of ethnic and personal identity. Subsistence activities are jealously guarded by the Natives of the region, and cash has not replaced subsistence. Rather it has allowed for the extension of such activities through the utilization of snowmobiles, modern weapons, and airplanes. Cash is utilized only once or twice a year on a large scale, notably at the end of the fishing season when the boat payment is due and soon thereafter when the winter's supply of fuel oil must repurchased. However, itis considered no great hardship if little cash is available for the remainder of the year.

Some changes which have occurred in both educational philosophy and practice since statehood have also acted to preserve the cultural

system. The shift from an assimilationist to a multicultural or pluralist philosophy has led to several practical changes. Bilingual and bicultural education has become common throughout the region. Native languages are taught in virtually every school in the region. Language has been maintainedto varying extents throughout the region. In the Togiak and lower Kuskokwim subregions Yup'ik is still widely spoken as a language of daily interaction. Togiak and Manokotak have been especially successful in retaining the traditional tongue. Nushagak River villages have retained language less successfully, and most the younger generations speak little ifany Yup'ik. The same is generally trueof the Naknek/Kvichak subregion. The Iliamna subregion has also lost most of the traditional language. However, all areas now have bilingual programs which insure at least minimal retention of language.

Because the Natives' cultural view of the world has been maintained elements of the outside system have tended to be integrated into the preexisting culture, rather than dominating it. Rather than succumb to the values and beliefs of the outside culture, these people have managed in many instances to absorb elements of that culture, most particularly of the cash economy, into a different social and cultural system which has been able to survive that contact.

8.5.2 Areas of Stress

Natives have been more or less successful in managing the forces of change with which they have been confronted, but the process has not been an entirely smooth one. Unsatisfactory or unsuccessful efforts to adjust to change generate stress, and these areas of stress will be the focus of the following section.

We have noted the two ideological orientations dominant in Bristol Bay. While these orientations are associated with certain economic activities, their existence does not depend exclusively on economic considerations of production and distribution. Rather, these two orientations are utilized by local residents to meet certain social and psychological needs. Certain arenas are particularly important because they are areas

in which the two orientations coexist and in which adjustment must take place. These points of stress are partly structural and partly created by the unequal distribution of the traditional and modern resources necessary to cope with sociocultural change. The central areas in which stress has occurred are social organization, individual and social identity, and the educational system.

8.5.2.1 Indices of Stress in Bristol Bay

During the process of change in Bristol Bay, social organization and individual and social identity have been affected in different ways. There are several indicates of high levels of social and psychological stress among Bristol Bay residents involved in sociocultural change.

Bristol Bay Natives, are far higher than for the population of the United States. As noted earlier, Bristol Bay residents are at particularly high risk for accidental injuries and deaths, suicides, homicides, and alcohol-related illnesses.

As is the case throughout Alaska, major health and social problems in the Bristol Bay region are relatedto alcohol abuse and alcoholism in one form or another. According to the district court magistrate in Dillingham almost all of the criminal cases before him are alcohol-related. In a recent survey of high school students in Dillingham 62% of the respondents indicated that they used alcohol "at least some of the time."

The high incidence of drinking throughout the region may be attributed to cultural as well as environmental factors. In both the Native and non-Native cultures drinking plays an important role in social interaction and validation of social status. As Foulks observes (1980:158)

> . ..for today's Eskimo, alcohol often is a vehicle for achieving sociability and congeniality. On the surface it provides a mechanism for the hospitality and cooperative sharing so

typical of traditional Eskimo interaction.

In the Native culture alcohol is viewed as an opportunity for social interaction in which the tops of bottles are thrown away, indicating the interaction will not cease until the alcohol is consumed. Among Natives, most drinking is of the type known as binge drinking. Among non-Natives, alcohol is consumed in great quantities because of the ethic of excessive consumption.

Above and beyond using alcohol as a social prop or status symbol, alcohol is also seen as a critical response to existing socioenvironmental stressors. Payne and Braund (1983:353) attribute the problem to the lack of adequate housing but there are several other factors which contribute stress throughout the region. These include increasing social differentiation among residents in small communities on the basis of socioeconomic status, the discrepancy between value expectations and value capabilities resulting from the existing educational system, and increasing social and political factionalism. The problem has become intensified among Alaskan Natives in Bristol Bay with the abandonment of or departure from traditional means of dealing with environmental stress. Foulks (1980:160) noted that "alcohol has replaced the dissociative state during the recent decades of rapid social change as the medium by which one can escape psychological pain and obtain momentary relief through 'timeout'."

Whatever the nature of the stress, the consequences of alcohol abuse in Bristol Bay are severe. Violent deaths due to alcohol (aside from alcohol-related accidents, suicides and homicides) occurred at a rate of 21.1 per 100,000 people between 1970 and 1975 for Bristol Bay for Native and non-Native residents, while the statewide rate for such deaths in 1975 was 11.4 and the U.S. rate in the same year was 2.3 per 100,000 (Bristol Bay Area Heal th Corporation 1979:37).

Homicide represents another index of psychosocial disorder in the communities of Bristol Bay. Between 1970 and 1975, the homicide rate in the region was 21.1 per 100,000 population, compared with a statewide

rate of 6.4 per 100,000 and a nationwide rate of 10.0 per 100,000 in 1975. The suicide rate among Bristol Bay residents between 1975 and 1978 was 29.3 per 100,000 (Travis 1980:5). While less than the statewide rate of 45 per 100,000, it remains approximately two and one-half times greater than the national average. In the past year alone five suicides have occurred in Togiak, a community of less than 500.

The predominance of stress-related disorders which threaten the health and well-being of Bristol Bay residents is also indicated by morbidity rates. In 1977, an estimated 5% of the Alaskan Native population of the Bristol Bay region was treated in facilities of the Alaska Area Native Health Service for mental illness and drug and alcohol abuse (Kraus and Buffler 1978:80). Hospital discharge rates and physicians' visits indicated that accidents, poisonings and violence comprise the major health problems among all Bristol Bay residents. These problems appear to be greater in the larger communi ties of Dillingham and Naknek. In many of the smaller communities, alcohol prohibition ordinances have helped to reduce the incidence of alcohol abuse and alcohol-related morbidity. However, fieldwork showed that in Togiak, which has such an ordinance, the perception of local residents is that alcohol remains a serious problem.

The problem of drug abuse among the residents of Bristol Bay is relatively minor and is limited to marijuana and cocaine. A recent survey of high school students in Dillingham, however, indicated that 50% of the respondents were presently using or had used marijuana and that 12% had tried cocaine. Drug use usually increases during the summer when it is introduced by outside fishermen or by local fishermen returning from other parts of Alaska.

The problem of mental illness is not limited to Alaskan Natives in the region. According to Payne and Braund (1983:354), "inonerecenty ear five people suffered severe psychotic episodes and had to be airlifted to the Alaska Psychiatric Institute in Anchorage. All of these patients were white, and the episodes occurred during the fishing season on boats." Mental health problems, however, appear to be most frequent

both prior to the fishing season and during the winter months.

In addition to the health problems which afflict the residents of Bristol Bay, stress is also indicated by a high level of social problems. Child abuse and neglect is believed to be widespread throughout the region, particularly in the larger towns. Much of this appears to be alcohol-related. According to Payne and Braund (1983:357), "among the Native population, most problems associated with children are classified as neglect, with very little abuse. Among the white population, however, abuse is cited as the more common problem."

8.5.2.2 Social Relations

8.5.2.2.1 Formation of' Social Classes

Social relations is one of the "arenas" of social life in Bristol Bay in which the commercial, outside value system and the subsistence-based, indigenous system have largely been integrated by local residents into a workable arrangement. One of the aspects of social relations where these two orientations have had significant contributions, is in the formation of social classes.

There are three major socioeconomic groups in the Bristol Bay region today: commercial fishing boat captains and their families; local residents who serve as crew; and "disenfranchised" residents. The boat captains possess a drift gillnet permit and fishing vessels of various types and sizes. Many of them also have part-time or full-time state- or federally-funded jobs. A small percentage of these boat captains are referred to as "highliners" and are distinguished by their success in the commercial fishery, with incomes averaging over $100,000 per year and the latest in vessels, gear, navigation aids, and other equipment. Many local residents serve as crew or fish using set gillnets. Many also have full or part-time wage-earning positions funded by the city or village corporation. The disenfranchised residents are those who do not possess limited entry permits, who have few or marginal kin relations, are unemployed or ill and unable to participate in either commercial or

subsistence activities. The major source for income among this group is from government assistance and transfer payments.

Several contributing factors have caused the emergence of social class distinctions in Bristol but perhaps the most important has been the unequal access to the salmon fishery resulting from the Limited Entry Act of 19 The Act was designed to restrict access to the fishery in order to protect the salmon from being overfished and to promote the interests of local fishermen in the face of increasing competition from outside fishing enterprises. However, as Petterson (1982, 1983) observes, the qualification system was ill-suited to the fishing practices and cultural traditionsof Native Alaskan fishermen. Many Native Alaskan fishermen were unable to qualify for a limited entry permit because they did not fish or could not prove their participation in the fishery during the critical qualifying years; because they could not understand the complex bureaucratic system required for qualification; or because of reluctance to be involved in a bureaucratic system governed by outsiders, a system they did not necessarily expect to last. The successful harvests in the years after implementation of the legislation succeeded in inflating the value of the permits -- a drift gillnet permit could fetch $80,000 or more -- which proved a financial boon for those with permits but also permanently excluded from the fishery the locals who were initially unable to qualify. In contrast to the highliners many of those without permits remain below the poverty level, and the permit system has resulted in big differentials in the incomes of local residents.

The effect of Limited Entry on income stratification may be examined by analyzing the patterns of income distribution among residents involved in the commercial fishery. Appendix G contains a list of tables which detail the patterns of income distribution among fishermen in a number of the study communities holding drift gill net permits from 1976 to 1982. These patterns are described by the range, mean and median earnings, standard deviation, skewness (direction of distribution), and kurtosis (a measure of “flatness” or “peakedness” of a distribution.

The findings Indicate that the range of earnings has increased in all communities, and is wider in financially successful years than in less lucrative years. The tendency is not towards a linear increase in the range because the two high income years (1979,1981) were bracketed by two low income years (1980, 1982). In addition, the ratio of standard deviation to the mean has not increased uniformly over the seven-year period, and, in fact, has declined in a number of communities. This would appear to show that although the absolute difference in income is greater now due to the expansion of the commercial fishery, the relative differentiation among the fishermen was no greater in 1982 than it was in 1976. Evidence for positive skewing of income is also somewhat indeterminate. Although there is evidence of a small group of fishermen with higher earnings overtaking fellow villagers, this trend does not occur in all communities and in fact, a reverse trend is observed for the seven-year period. With respect to the kurtosis measure, the communities are not generally characterized as moving from an initial concentration of incomes to a more dispersed distribution. In fact, the available evidence for many communities is that there is an increasing concentration of incomes, indicating a trend toward parity.

In examining these patterns, several limitations to the data must be kept in mind. First, data from the lower Kuskokwim communities and some of the Iliamna Lake communities were unavailable; hence, the regional analysis is incomplete. Second, the data is limited to earnings acquired from drift gill net fishing. A complete representation of stratification based on income would require data on per capita income of all residents from all sources. Drift gill net earnings only represent the patterns among the upper classes (relatively speaking) in each community. Third, certain factors act to minimize the social stratification resulting from Limited Entry. One is the greater success of outside fishermen which makes the differences among Bristol Bay resident fishermen appear insignificant in comparison. The other factor is the alienation of permits outside the community by less successful fishermen, thus minimizing the differences among fishermen who retain their permits.

Nevertheless, three relatively distinct patterns of income distribution become evident in the analysis of these data. The pattern of income distribution among the small communities fluctuates during the study period, but nonetheless the evidence for significant income stratification appears minimal. More significant evidence for such stratification occurs at the subregional center level. Communities such as Togiak and Naknek exhibit clear patterns towards increasing differentiation. This is particularly evident in the declining proportion of fishermen in the upper one-third income bracket. The subregional centers also tend to be more positively skewed than the villages. Finally, Dillingham displays a pattern which fails to adhere completely to the trends in either the villages or the subregional centers. The increases in range and standard deviation of mean income appear to be greater than the increases in most other communities in the study area; yet the skewness and kurtosis measures fail to indicate any clear pattern of income differentiation.

Although there is some evidence of increasing stratification following Limited Entry, the overwhelming factor at work in altering income distributions appears to be the run size and price per pound. Runs have been extremely large from the late seventies to the present, and they have occurredin the context of unusually high prices per pound. The extended kin group may be viewed as a source of financial as well as subsistence resources; hence the larger the kin group, the greater the total cash income with which to buy new fishing vessels and the latest gear. On the other hand, more family members also means more mouths to feed.

To a smaller degree, education and the enactment of legislation such as the Alaska Native Claims Settlement Act of 1971 have also encouraged the formation of social classes in Bristol Bay. With the passage of ANCSA, the regional Bristol Bay Native Corporation and many individual village corporations were established to protect the financial interests of Native Alaskan shareholders. With the increasing bureaucratization of local and regional government made necessary by the availability of federal and state revenue-sharing and funding programs, younger Native

Alaskan residents with high school educations assumed positions of importance in local communities, occasionally replacing the traditional village elders. This replacement is particularly noticeable when these younger, educated Natives now represent the community to the rapidly encroaching outside world and are able to affect the inflow of goods and services to the community. While the distinction between educated and uneducated is not a major one and occurs mostly between the generations it nonetheless plays a *role* in social class formation. Political power has now become more than a matter of generational status or skill in hunting and fishing. Education and familiarity with bureaucratic procedures are now important factors in signifying the status of local residents. Moreover, access to the educational opportunities, mandated by the Molly Hootch Consent Decree, has prompted the construction of modern schools in rural communities, resulting in greater exposure of younger residents to the commercial ideological orientation.

Finally, the public assistance system also contributes to social differentiation. For example, welfare actually acts to permanently disenfranchise people who need access to it for survival. Recipients are forced to divest themselves of skiffs, snowmobiles, and the like which are necessary to engage in subsistence activities. The result is that they are permanently excluded from acquiring these items, at least as long as they need the welfare payments. Thus, they are forced into a state of chronic dependency (Subsistence Report, 1983).

8.5.2.2.2 Indices of Socioeconomic Status

As noted above, Limited Entry legislation has been a major factor contributing to the emergence of social classes in Bristol Bay. Principal indices of socioeconomic status among Bristol Bay residents are related to limited entry permits in three specific ways: 1) whether or not a family member possesses a limited entry permit, 2) whether the permit is a drift or a set net permit, and 3) how many permits are held by members of one family.

The first criterion, possession of a limited entry permit, has already

been discussed. Since residents throughout the region depend on the salmon fishery for income, possession of a permit means the difference between the large incomes earned by boat captains and the small incomes of crew members, earned through variable (10 to 33%) shares of vessel catches, and set gillnet fishermen.

Whether the permit is a drift gillnet or set gillnet permit affects potential income because the former method of fishing is much more lucrative. As indicated in Chapter 4, depending on the type of fishing season, a drift gillnetter can earn between three and four times more than a set netter (see Table 4-19).

Finally, the number of permits per family obviously can increase the family income. Drift gillnet permits are usually owned by the men of a family while set net permits are the property of women. The more permits in the family, the greater the potential income.

Our research indicates that income stratification appears to be greatest in the Naknek-Kvichak and Iliamna Lake subregions. This is a pattern which has been emerging *over* the last decade and more. United States Census data indicate, for example, that *in* certain regions the range of incomes has increased greatly between 1970 and 1980, and that some are being left behind at poverty or near poverty levels while others are steadily increasing income. In Togiak in 1970 fifty-four out of sixty two families earned under $10,000, and of these 29 earned less than $5,000. By 1980 thirty four families were earning over $15,000 while 21 were still earning less than $5,000. In Manokotak all families reporting, 31 of 31, earned less than $10,000 in 1970, but by 1980 there were 12 families earning over $50,000 and 18 earning more than $15,000 while there were still 14 families earning less than $10,000. The same general process has occurred in the villages of the Bristol Bay Borough during the period from 1970 to 1980. Some other subregions, however, have experienced less stratification as a result of changing income levels. The Nushagak River villages appear to have experienced little increase in income stratification over the period from 1970 to 1980. Koliganek, for example, actually appears to be less stratified now than

it was in 1970. In 1970 nine families earned less than $10,CIOO while eight earned between $15,000 and $24,999. In 1980 only seven families earned less than $10,000 while all the rest, fifteen families, earned between $10,000 and $24,999 (see Appendix C for a complete listing of income range for each community). The high end of the income scale has remained the same while a number of families have moved from the lower end to the middle range of income. The same general pattern has been replicated in Ekwok. In those subregions and villages in which there is increasing stratification the ability of local residents to participate in the commercial fishery is differentially affected because those with smaller incomes are unable to invest in modern technology and new vessels.

Technological factors also serve as markers of status in that they directly affect the level of earnings possible for the fisherman. Average breadth, gross and net tons, horsepower, percent diesel powered and vessel hull materials are all important technological factors correlated with greater earnings. We have found that the most revealing figures in terms of increased catching, and therefore earning, power are the net tons and horsepower figures. The net ton figure provides an indication of the quantity of fish a vessel can hold and deliver. This is significant because in recent years fishermen have had the amount of time they can fish eroded by the amount of time they had to wait in line to deliver fish. If one can make only a limited number of deliveries in a *given* periodof time, the larger the deliveries the better from the standpoint of earnings. Greater net tonnage means that larger quantities can be delivered. The importance of the horsepower figures is that increased horsepower represents greater speed for greater mobility, fishing time and safety. Again the effect of more speed is to allow for more actual time fishing.

There is a good deal of variation in both net tonnage and horsepower among the subregions. The Naknek-Kvichak subregion tops the list in terms of both variables, and is also the area with the highest average earnings. In the middle range is the Nushagak subregion, which is also in the middle in terms of total earnings. Finally, at the low end for

both these technological variables and total earnings are the Togiak and Iliamna Lake subregions.

In the commercial value system an important marker of socioeconomic status is the level of conspicuous consumption exhibited by a particular individual or group of individuals. In Bristol Bay, however, conspicuous consumption is limited by virtue of lack of access to consumer luxuries "as well as by lack of a desire to display them in public. Most luxury items, including new clothes, home entertainment systems, and transport vehicles, are purchased outside the community. The items which are most valued, including three-wheelers and video casettes, are usually available to most residents of small communities. Winter vacations "outside" (i.e., to Hawaii, California, or Seattle) are dependent on income and are therefore important symbols of socioeconomic status. However, because these vacations are taken outside the community, they are not "public" and residents can engage in this form of conspicuous consumption among outsiders without violating traditional norms. Conspicuous consumption o
highliners to maintain the myth of egalitarianism within the community while adhering to the value system of the commerical ideological orientation outside the community.

Residence is also becoming a marker of socioeconomic status. Prosperous community members only reside in the village for partof the year and move to other parts of Alaska, usually in Anchorage, or one of the "lower 48" states for the winter. This may be motivated by the desire to provide children with improved educational opportunities, to seek alternate forms of employment in the fishing off-season, or merely to relax and enjoy more comfortable climes. Of the subregions, our data indicate that the Naknek-Kvichak and, to a lesser extent, the Nushagak subregions are the areas in which this practice is most common. Whatever the motives seasonal residence is practiced byonlya small minority of Bristol Bay residents, and most, lacking the substantial incomes derived from participation in the commercial fishery usually reside in the village or its environs for the entire year.

Quality of housing also defines socioeconomic status. There are normally four types of housing available in Bristol Bay communities. At the lowest level are the substandard, overcrowded wooden shacks and log cabins. Next come the older wood-frame houses which are inhabited by most residents throughout the region and usually accommodate more than one nuclear family. Another step up the housing hierarchy we find the prefabricated housing units financed by the Department of Housing and Urban Development and constructed by the Bristol Bay Housing Authority. Known as HUD housing, these units are supposedly available to residents with incomes below a certain level. With a few exceptions such homes are generally well-built and include modern sewerage and water systems. In large communities, such as Dillingham or Anchorage HUD housing units would be equated with "Natives" and lower class status, but in most Bristol Bay communities they represent an improvement over traditional housing and are very desirable. In fact, while in most communities it is the older residents with small incomes who move into HUD housing, in Bristol Bay families of boat captains were sometimes able to qualify for residence on the basis of low income records from poor fishing in past years or because they were '''unemployed" during most of the year. Hence, residence in HUD housing became associated with upper or middle class status.

At the top of the market are houses of modern design which residents have built or build themselves. There are relatively few units of this type; their owners are generally boat captains, cannery supervisors, or government personnel, and they are almost invariably situated in the larger towns such as Dillingham or Naknek. Government housing is only available in the community of King Salmon on any appreciable scale and is therefore irrelevant to our discussion here.

8.5.2.2.3 Class and Kinship

The commercial economy has affected the organization of social relations in four important ways. First, it has had a noticeable impact on patterns of subsistence activity and subsistence exchange. It would appear that the more money an individual earns from commercial fishing,

the more time and greater number of resources he has for subsistence activities. In many communities we studied, it was common for those owning aircraft or those able to charter aircraft to fly to the Alaska Peninsula or to New Stuyahok to hunt for caribou. Boat captains are able to afford new rifles, modern means of transport, cabins for hunting camps, and freezers, all of which contribute to more productive hunting. This conforms to a pattern observed in other parts of Alaska (Nowak 1975; Kruse, Kleinfeld and Travis 1982). As Lonner (1980:11) notes:

> Increased income appears to lead to more efficient, reliable, useful, and less-demanding subsistence technology. Improved technology provides wider ranging transportation to offset both resource scarcity in the immediate area and reduced time availability to engage in subsistence activities.

Though true in general, the last part of Lonner's statement shouldbe modified for the special conditions of Bristol Bay. Reduced time availability for subsistence activities may be a consequence of wage-labor, but is not a result of involvement in the higher echelons of the commercial fishery. Boat captains are able to devote more time to subsistence activities than members of the other social classes. His substantially higher income frees the boat captain from having to seek other forms of wage labor during the fishing off-season. These other forms of wage labor include CETA jobs, positions funded by local and regional Native Corporations, and construction work. Without having to work in these positions the permit holders are able to spend more of their leisure time in pursuit of subsistence resources. (We wish to make it clear, however, that this pattern cannot be equated with the recreational activities of outside fishermen, hunters, and sportsmen.)

Given the emergence of a difference in subsistence activities, it could be argued that socioeconomic status has some effect on traditional patterns of exchange, but to what extent is subject to debate. There is evidence to suggest that there is no substantial change in the distribution and exchange of subsistence resources. Boat captains who are able to fly to other parts of the region to hunt for caribou or

moose and who make bigger and more frequent kills than less affluent residents, distribute all but a small portion of the meat to villagers who need it. Subsistence items continue to be exchanged between coastal and riverine communities, and even though some of these items may be of little economic value and relatively small in quantity, exchanges are nonetheless regarded as critical to the maintenance of long-established social networks throughout the region. Kinship and gift giving remain important features of the status system in Bristol Bay and political power is not necessarily equivalent to economic power (Gross 1983:5). Thus, the networks of exchange between and within class groups remain essentially as they were in the past.

It is important to remember that, in Native culture, the exchange of food is the most basic means of establishing relationships. We have seen above the importance of food distribution in many spheres of Native life. Food is used as a medium for the cementing of a great variety of ties among people. The Subsistence Study (1983) noted the importance of food in this respect. This is the reason patterns of food distribution are important indicators of the nature of social relationships and can be markers of the emergence of social stratification.

In analyzing the significance of food distribution patterns a distinction should be made between the networks of distribution themselves and the patterns of exchange within those networks. The Subsistence Study fails to find evidence of stratification in food distribution patterns precisely because this distinction is ignored. While the networks have remained constant, the patterns of exchange have themselves altered. Under the traditional ideological orientation, subsistence exchanges were characterized by generalized reciprocity which maintained the equality of community members. Under the commercial ideological orientation, exchange may be characterized as unbalanced reciprocity which promotes the emergence of a social hierarchy among local residents. Because participation in the commercial fishery has provided some, but not all, local residents with the technology to increase their subsistence production a new pattern of generalized distribution has emerged. This pattern typically involves

resources which are harvested in far greater quantities than can be reasonably consumed by the producers or their immediate exchange network. On one occasion, for example, meat from a hunting trip to the Alaska Peninsula by boat captains in a Nushagak area community was distributed by leaving the dressed meat to hang outside and then inviting the entire community to help itself. Thus, exchange occurred in a generalized manner whereby those in need were given the choice of whether or not to take the meat. In a society where exchange is critical for establishing and maintaining social relations, accepting the meat and being unable to reciprocate implied an acceptance of the status of the more successful hunters. Because the boat captains are able to provide a greater share of the community's subsistence resources, those lower down the socioeconomic scale will not be able to reciprocate enough to preserve an egalitarian relationship.

A distinction has emerged between newer, generalized forms of exchange which promote the concept of social hierarchy, and specific forms of exchange which promote egalitarianism and balanced reciprocity. Although traditional exchanges between kin members and between communities remains the dominant form of exchange in Bristol Bay, the growth of generalized exchange is bound to have a negative impacton some residents, those least able to reciprocate. These individuals have low status under the commercial ideological orientation and are indirectly losing status under the traditional subsistence orientation as well. Fienup-Riordan (1983) notes that among Alaskan Natives on Nelson Island, egalitarianism and cooperation between subsistence hunters are threatened by wage labor which upsets traditional patterns of exchange. While the givers are validating their status in the traditional system, the receivers are losing their's. This cannot yet be seen as a serious problem in Bristol Bay, but the elements promoting the erosion of old patterns are present, creating a structural point of stress.

There are also several factors resisting this stress. The Subsistence Study {1983) discusses four factors which are primary levelling mechanisms which operate to spread differential wealth across all social

segments. First is the absence of a pervasive principle of private property that assumes exclusive ownership and right to alienate property from the group. This acts to reduce levels of capital and material accumulation at the same time it acts to reduce the sale of property, and thereby reduces status distinctions. Second is the principle that giving is more prestigious in Yup'ik culture than receiving, which acts to encourage redistributive mechanisms. It should be recalled that traditional Yup'ik culture is founded on the principle of giving in order to insure that one will receive in the future. Third is the general prevalence of bilateral inheritance rules. This means that wealth is more evenly distributed throughout the kinship network than would otherwise be the case. Finally, the emphasis in Yup'ik culture is on moveable material goods rather than fixed goods. Moveable goods are generally of less capital value than immovable property and therefore provide less opportunity for the establishment of status distinctions based on possessions. Mobile goods are also seasonally and geographically variable, making them less subject to exclusive ownership through property relations.

Of these the continued importance of kinship links among Bristol Bay residents is particularly important. In many ways, the commercial ideology has been adjusted to fit in with the traditional ideology. For example, increases in income, extracurricular activities in local schools, and improvements in transportation throughout the region have favored the extension of kinship links to other communities. Kinship ties also cut across the boundaries established by income and other indices of socioeconomic status. Related families may belong to different status groups but the continued importance of generosity and exchange insures that everyone has access to wealth and material goods. These kin networks also provide access to modern technology for subsistence purposes for those who might not be able to afford such devices on their own. This serves to minimize the inequality in productive capacity between the 'owners' of modern technology and those who cannot afford such items.

However, as we have emphasized throughout this report, the situation is

not as simple and direct as such a view might suggest. There are both areas of successful management of change and areas in which such management has been less successful and has resulted in stress. Several qualifications must be made to the straightforward scenario presented in the Subsistence Report. First, though distribution networks are still strong among Natives, these networks have undergone change. These networks are now redistributive rather than reciprocal, that is, they flow more frequently in one direction than in the other. The simple fact is that those who have become more wealthy are more frequently able to redistribute resources to the less wealthy than vice versa. Thus, parity is never achieved even though distribution continues.

Second, the ext.ended kin system maybe undergoing some change andour data indicate that fewer and fewer kin members serve as crew on locally owned fishing vessels. This is a process which is most advanced in the Naknek-Kvichak subregion, but there are signs that it is occurring in the Nushagak subregion as well. The wife of one fisherman on the Nushagak reported that her husband had finally gotten fed up with his cousin who he had been paying 25% for a number of seasons for what he thought was too little productivity and decided to hire an experienced outside crewman who would work for 10%. In the Togiak subregion, on the other hand, and in the Nushagak subregion to a certain extent social patterns have acted to retard the development of a full class structure. Both regions have restricted inheritance rules, fairly strict rules of mate selection, fairly well-defined rules of post-marital residence, and internal limitations on access to technology and resources according to a specific class of kinsmen. All these factors discourage the emergence of full class distinctions.

Family structure also appears to be changing as a result of the greater acceptance of the commercial ideology. The trend toward smaller households is one of the more obvious consequences of the increasing acceptance of this orientation. Between 1970 and 1980 the average size of a Bristol Bay household declined from 4.62 members to 3.75 members, a rate of decline of 2.1 percent per year (Nebesky, Langdon, Hull 1983:III-18). There are several reasons for this decline. First,

population expansion was due partly to the non-Native immigration which placed downward pressure on household size. fishing economy has increased household income, enabling families to split into smaller units. Third, government homes have further contributed to smaller family units by creating net additions to family housing. Fourth, secular trends in the distribution of population by age have produced a growing segment of young adults, which traditionally have smaller families than populations with a more advanced age distribution (Nebesky, Langdon and Hull 1983:III-18).

The modern commercial ideological orientation also promises to affect traditional patterns of inheritance. The kinship system is traditionally bilateral, but with the introduction of limited entry, inheritance is taking the form of patrilineal descent. As we noted above, because sons have limited opportunities to acquire a permit on their own, they must rely on the inheritance of permits from their fathers if they are to participate as boat captains in the commercial fishery.

Finally, a sexual division of labor is beginning to emerge which is at variance with the traditional division of labor in Yup'ik society. In all subregions the general equation of set net permits with females and drift net permits with males means that women now engage in all steps of the fishing process. Formerly men had set the nets and picked the fish while women cleaned and dried them. Now women also set and pick the fish from set nets while men do the same from drift nets. Subregional variations on these adaptations have also emerged. In the Nushagak subregion, for example, fish and game regulations mandate that commercial and subsistence seasons coincide, with the result that the same person cannot engage in both activities simultaneously. In the Togiak/-Kuskokwim subregion several factors are at work in this regard. First, fish and game regulations dictate that in that subregion the subsistence and commercial seasons do not overlap. Therefore a division of labor has occurred in which males pursue the drift net commercial fishery while females pursue the set net commercial fishery and both sexes are able to cooperate in the pursuit of the subsistence fishery.

8.5.2.2.4 Social Conflict

Our examination of social relations among Bristol Bay residents reveals a process of integration of the subsistence and commercial lifestyles. At the same time this process has its divisive side which serves to antagonize certain points of stress and threaten the health and well being of those unable to successfully "manage" the articulation of two different ideological orientations. Amongst the several forms of conflict between different segments of the local population is the distinction of community residents on the basis of special "interests." One of the interests which has the potential for increased social conflict is the utilization of subsistence resources.

As has been noted, there appears to bea U-curve relationship between income and subsistence activities such that the very rich and the very poor are most involved in these activities, but for different reasons. As the supply of resources becomes threatened by the demands of increased population pressures, competition may occur between the two socioeconomic groups. Because of the technological and political advantages of the well-to-do residents, the less able residents may become further disenfranchised in both a social and cultural sense.

Political conflict also threatens to divide communities. Political conflict usually occurs over the question of community development. Pro- and anti-development groups are often distinguished by generation, income, education, and access to political resources. The boat captains are able to defend their interests successfully in a political arena such as a village council meeting, by the very fact of their economic and political success, and thus represent a challenge to the egalitarian ethic of the traditional orientation. Although political decisions in most of the communities we studied are made with a minimum of community conflict, and elders often have been able to maintain their traditional authority over local matters, the emergence of differing interests, values, and world views creates the potential for conflict and hence represents a structural point of stress. Those villagers unable to

represent their interests effectively in the political arena are most vulnerable to the consequences of this stress.

Finally, social conflict within families is beginning to emerge as a serious problem. This conflict occurs between the generations and is particularly visible in the form of child abuse and neglect. Two specific factors promote this conflict. The first is generational differences in levels of education. As younger residents have greater access to modern educational program's, parents become increasingly concerned about the acquisition of values and forms of behavior which are sometimes at odds with traditional values. In some communities, parents order children not to speak of school while at home because the values taught in the schools are perceived as a threat to the traditional orientation. The teaching of traditional Yup'ik language and culture in schools and the involvement of community advisory committees in many village schools help to minimize stress between the community and the school system. Nevertheless, signs of stress between the school system and the community in some villages were evident during the period of fieldwork.

The limited entry system also threatens to increase conflict within the family. Because the virtually the only way to obtain a permit nowadays is to inherit one, the chance of conflict in a family having more than one son is increased because sons must compete for their father's favor. This represents a change from the traditional pattern of sibling cooperation.

In both types of family conflict, a stress point emerges. Certain family members will be placed in a disadvantageous position by the interaction of two different ideological orientations. Those unable to manage change resulting from this interaction will be particularly susceptible to the symptoms of stress.

Whether conflict occurs in a subsistence, political, or family arena, it is expected to generate stress for the entire community in general and for certain community members in particular. By upsetting the

traditional pattern of social relations and behavior, conflict causes insecurity and uncertainty, which in turn increases the level of anxiety and stress. Traditional expectations are no longer guaranteed and decisionmaking becomes increasingly difficult as options are either eliminated or greatly increased. addition, when the social group divides into smaller segments the number of resources available to any one member of the community is reduced accordingly. The fewer the resources, the less the ability to manage change and the greater the stress.

8.5.2.3 Education and Sociocultural Change

Education is one of the major arenas for the management of social change. Given the variety of experience, ethnic backgrounds, and adaptability which characterize the residents of Bristol Bay, it is not surprising that there are differences of opinion about the role of education.

The principal purpose of Western European and American institutionalized education (in other words, schooling) is to prepare individuals for life as adults in society. The missionaries and government officials who introduced schooling to the Native peoples of Alaska in the 1880's attempted to prepare upcoming generations of adults for life in a Christian, capitalist society. At the end of a century which has seen mission, federal and state-controlled education in Alaska, the goal of schooling is now to prepare individuals to become adults capable of living in a rapidly changing society.

In Alaska thetrend isnow toward local control of education which is regarded as the best way to ensure that children's educational experiences are appropriate to their anticipated adult lifestyle. It is not enough only to be informed about the Native culture and way of life or about the Western materialist culture; it is vital to understand both of these cultures in order to successfully negotiate the middle ground between them. The educational stakes are high, because the judicious use of Bristol Bay's rich fishing and oil resources, and the survival

of a lifestyle well-adapted to the extreme environmental conditions of Alaska will depend upon what is taught in the schools.

The task of maintaining local control over local resources present a real challenge to Bristol Bay residents. Many of the resources which have recently been legally recognized as the property of Natives Alaskans will eventually, at their discretion, become available for sale to outside interests (e.g., ANCSA 1991 land availability). Until then Native corporations, both profit and non-profit, are somewhat emmune to outside pressures to sell their land, and fishing rights to powerful economic interests. The challenge facing those who run the corporations is to become effective business managers in their own right in a very short time. There is a great need for qualified local people with the skills to administer business matters and resources in the best interests of the local people. This task requires not only effective business management skill, but the foresight and ingenuity to alleviate social problems which pressure individuals and families into exchanging long-term benefits for short-term relief. Wolfe et al (1983) describe the circumstances in which owners of fishing net permits decide to sell their long-term asset in order to qualify for government health benefits which they need immediately but cannot receive because of the assessed value of the permits. Such dilemmas can be solved partly by education about how to manage personal and family resources, and how to negotiate bureaucracies like the health care system, etc., which is indispensable if local people are to maintain control of their lifestyles and resources. This challenge to the self-determination of Native peoples of the Bristol Bay region is a challenge for education as well.

8.5.2.3.1 Economics of the Educational System

The educational system represents an enormous investment by the outside sociocultural system in the Bristol Bay region. In rural areas of Alaska educational programs are funded approximately 90% by the state, while municipal areas receive about 65% state funds augmented by local and federal monies. This difference is due to the sufficient tax base of rural areas. However, the state is obligated to provide equal

educational opportunities for all children and thus subsidizes rural education to a greater degree. This funding priority represents an important precept of American society that education is a means of improving an individuals' life and achieving upward mobility in society. It has been demonstrated, in fact, that education is less and less a means to upward mobility, and that family economic status is a better indicator of the economic status of members of the next generation. Nevertheless, American society believes every child deserves a school education, and this belief is put into practice in Bristol Bay through a major commitment of funds and other resources.

Within the Bristol Bay region the determination to provide education of a certain type for all children is visible in the recent expansion of programs and facilities. A great deal of money was made available by the Hootch Consent Decree to construct new school facilities. Other funds for pre-school, bilingual, and bicultural programs, educationally disadvantaged, and special education created a sudden explosion of programs and education-related employment over the past five to ten years. New school facilities are not especially well designed for sub-arctic weather conditions and are expensive to heat and maintain. The rapid expansion of programs and facilities is now slowing because of a decrease in state oil revenues, increased enrollments, and the transfer of seventeen Bureau of Indian Affairs (BIA) schools to the state (Bristol Bay Times, 11/15/82). These decreases mean that districts are contemplating program and staff reductions at a time when the educational needs are great and the new facilities may not continue to be usable if the costs of maintaining and operating them continue to rise.

In many Bristol Bay villages the school is the main employer; school districts pay local people to maintain the school facilities, work as aides in classrooms, and run the school lunch programs, etc. As Wolfe et al (1983) point out, these few jobs are often the only source of cash for an extended family which relies on this income to supplement their subsistence efforts in order to pay for electricity and heating, telephone service, and transportation to nearby towns for medical

treatment. The loss of even a few jobs in such communities has a major impact on many more people than the individual employee and his or her immediate family. Furthermore, these jobs are the main source of employment for women, including single parents and heads of households.

8.5.2.3.2 Regional Diversity

Schools in the Bristol Bay region must meet the diverse needs of communities which vary in economic status from subsistence-oriented to support-sector urban; in language use from Yup'ik, Dens'ina or Aleut to English; and in religious affiliation and calendar of activities from Russian Orthodox to Moravian to Seventh Day Adventist. In some villages the teachers are the only outsiders; in others they are part of a community of outsiders. These complex differences are often handled within a single school district. The Bristol Bay Borough School District, for example, operates city schools but is also the coordinator for the Lake and Peninsula REAA in certain capacities, which serves small remote villages (Froehlich, 1983).

School districts are responsible for arranging adequate and appropriate curricula, staff, and housing for local administrators, non-certificated personnel, and teachers. The districts' decisions have important consequences for small communities of only a few hundred people. In this capacity, school districts are important arbiters of social change but often at one remove because administrators work out of offices located outside and often far away from the community.

Travel among villages is difficult at times and also very expensive. As a result the administrators sometimes only visit the schools every few years. The type of reception that outsiders get from the villages varies from interest and cooperation to blatant hostility. ("I don't know why, the assistant superintendent walked into the village last July and got shot at, over his head
have decision-making authority for hiring teachers, and deciding curriculum since the Community School Committees are only allowed to make recommendations. The actual administration of schools in rural

areas is handicapped by being somewhat removed from the communities, from personal interaction with residents, and from direct observation and participation in local issues which pertain to education. Because administrators are unable to oversee the village schools directly, the selection and maintenance of the teaching staff is, of course, an important consideration.

8.5.2.3.3 Teaching Staff

Throughout rural areas of Alaska there has been and continues tobe a high rate of teacher attrition. Of the school districts in the Bristol Bay region, the Lower Kuskokwim REAA has a slightly higher than average rate of turnover and has more younger teachers than other rural or municipal districts in the state. There are data available on the turnover rate in the Lake and Peninsula district (Froehlich, 1983), although they are currently offering higher starting salaries than many other REAA districts in an attempt to attract qualified teachers (Thompson, 1983). The Southwest REAA claims a somewhat lower rate than average, partly because the headquarters for a rural teacher training program is located in Dillingham amd native teachers tend to stay longer in the same teaching assignment (Barnhardt, 1977). Dillingham School District has a 20% annual replacement of teaching staff, and Bristol Bay Borough 26% (Froehlich, 1983). Statistical analyses of teacher turnover, teachers' ages, background and experience show that most teachers in rural areas stay for two to four years and perform best during the second year (Orvik, 1970; Froehlich, 1983).

The Alaska State Department of Education has been concerned with reducing teacher turnover for several reasons. First of all, rapid turnover is very costly because it requires more recruitment and interviewing, increased costs for teachers of moving new teachers into a remote area, and out again, and time consuming orientation for new teachers. High turnover also puts excessive demands on the remaining teachers, and forces the districts to recruit from a larger pool of applicants with lower qualifications.

Perhaps more important, the official policy of the educational programs is to support the basic sense of worth and dignity of local peoples. A high rate of teachers leaving the community after brief periods of residence is a strong message of rejection from the members of the outside culture. When teachers are only in the community for one or two years, students are unlikely to form lasting teacher-pupil of attachments which promote trust in the stability of the educational system and the motivation to succeed within that system. (Orvik, 1970)

The annual turnover rate has declined from 50% in 1953-58 to 30-35% in the period 1958-60, to the present rates mentioned above. The rateof turnover has been reduced partly because of efforts to orient outside teachers to the culture and lifestyle of rural areas before they go to their teaching assignments, and to help them keep in touch with each other while they are adjusting to their new situations. This orientation program was first initiated in Bristol Bay Southwest REAA in 1977. (Grubis, 1982)

Some of the most difficult adjustments new teachers have to make are to unfamiliar cultural values, lifestyles, and modes of expression, As part of their research into the causes of teacher attrition Dittman Analysts asked teachers what they thought would be most useful in helping new appointees to adjust to rural teaching assignments. An overwhelming majority of them said they would like more information about all aspects of the local culture. (Dittman Research, 1980)

8.5.2.3.4 Alaska Native Teachers

An obvious solution to these problems, andone which complements the current goal of local control over education, is to train local native teachers. If it is difficult for people from the lower forty-eight states to adjust to teaching conditions in rural Alaskan villages, it is also likely to be difficult for children and young adults raised in rural Alaska to make the transition to Western higher education institutions in Anchorage and other urban communities. Educators concerned about the rate at which rural native students left boarding

high schools and university to return home began to consider the possibilities of training teachers from the villages. The X-CED program developed by the Center for Northern Educational Research at the University of Alaska is now training teachers in several Bristol Bay villages. Togiak has approximately eight women teachers currently in training (Wolfe et al, 1983).

Native Alaska teachers claim the obvious advantages of already having a role in the community, understanding the local culture, speaking the language, and knowing how to cope in the environment. Naturally, they can communicate more easily with students and parents, and participate in village life. These advantages lead to longer periods of service in the same community, and stability in the educational system. The result is that school personnel are able to work effectively with the community to develop an appropriate educational program.

There are also some drawbacks to employing Native teachers, both from the teachers' point of view and from the administrators; these problems seem to derive mostly from the teacher's *role* as "middleman" who is caught between the demands of contradictory social roles. Teachers are, on the one hand, members of families and the community who participate in and embrace local cultural values, and, on the other representatives of Euro-American culture who have a responsibility to teach local children how to cope in a society rapidly moving in the direction of materialism, commercial exploitation, and individualism (Barnhardt, 1977). For one or two individuals within acommunityto forgea path through the two intertwining cultures is difficult if not impossible.

Administrators who originally saw the employment of Native teachers as a means of improving communication between school and community, and creating a more stable learning and teaching environment, have adopted. a policy of rotating teachers through the villages. Some teachers have become embroiled in local politics to an extent that administrators in some districts try to buffer themselves and the teachers from local political pressures by moving teachers every five years before they have time to become too heavily involved (Thompson, 1980; Flisock, 1983).

Rotation is self-defeating in the light of the original goals of training more local teachers. The problems which have produced this policy of rotation are irrefutable evidence of the compromising intermediary role played by Native teachers in Euro-American educational institutions. If the teachers show too much preference for either the indigenous *or* the outside culture, pressure is exerted by the community members or the school officials to reexert influence over the teachers' activities.

For the present, all teachers will have to continue to move back and forth across cultural boundaries. Teachers from outside will find it difficult to adjust to an unfamiliar lifestyle and often puzzling cultural differences. The new teacher who eventually discovers that her/his students are not just sullen and stubborn, but acutely embarrassed to be singled out for praise in a way that is completely contrary to the egalitarianism of their home environment, is learning the norms of Eskimo or Athapascan culture (Tafoya, 1980). Native teachers will continue to encounter parents who expect them to behave more like Euro-Americans or, alternatively, more like Natives.

8.5.2.3.5 Children Between Cultures

The introduction of Native residents to outside culture is often in the form of schools where children spend time learning literacy and mathematics skills. The presence of schools is generally interpreted as a condemnation of local culture and how the members of that culture raise their children. In some parts of the world colonized by Europeans, local people, seeing the wealth and power of colonials, have been eager to emulate their way of life; in others they have conformed as little as possible. Whatever the degreeof adaptation to European influence, colonized peoples have historically experienced a profound rejection of their way of life through institutionalized education, even though it may help them cope with the changes thrust upon them.

The most effective way of creating lasting cultural change is through education which changes the experience and values of a society's

children. In Alaska this process began in the mid to late nineteenth century with Russian and later American mission schools. One hundred years later, we are observing the impact of these developments. Traditionally children were educated within the family by observing and participating in the day to day activities. Instruction came from familiar people, usually parents or older siblings, with whom children had affectionate ties. Children were not separated from the activities of their family, or instructed by strangers, or confined to a specific place for a predetermined period of time in order to learn. This stuctured approach to education was introduced by the schools. Today formal education continues to strike a dissonant role in the local lifestyle, and has created some interesting contradictions.

Residents of Lower Kuskokwim villages revealed the extent of which schools imposed upon their on customary activities when they evaluated the Indian Education Act activities of the past year. Many of them expressed enthusiasm for the teaching of traditional subsistence and survival skills in school time. But the reasons for this enthusiasm are interesting.

Parents and students overwhelmingly expressed the necessity for classes on traditional culture in order to preserve old ways and to learn important skills for which there is insufficient time outside school. (Chilkat Institute, 1983) For example, a fish fence made by students as part of a class served an entire community for the winter. The fence had to be built over the weekend to avoid missing school. What the children need to know, and what the school teaches, are now beginning to coincide as bicultural programs are introduced in school, but development of traditional skills was still not seen as a valid use of school time. It is ironic that the much of what is taught in these programs would have been learned as a matter of course if the children had not had to attend school for so many hours a day, away from the activities of daily village life. The parents requested that traditional activities in a school context be organized as instructional units. The instructors and parents also noted that the time constraints of the school day made it difficult to teach subjects requiring several

hours of instruction (Ibid., p. 34, 46). The parents apparently wanted the classes on traditional culture presented in such a way that they would be on a par with academic subjects. However, realistically school is not the most appropriate context in which to teach many of the cultural skills and traditions.

Village children attending school live with one foot in their traditional culture and the other in the Euro-American culture. Some parents find the world of formal education so disruptive and insidious that they forbid their children to speak about school in the home. The child then must try to compromise and ends up straddling the fence dividing two societies which would prefer not to acknowledge one another's existence.

This problem maybe even more acute for children and youths who have been sent away to school. The acute loneliness and homesickness experienced by many native children attending boarding schools and boarding home programs, have been wel 1 described (Kl ei nfeld, 1973). The dramatic increase in locally available secondary education which resulted from the Hootch Consent Decree is an effort to solve this problem. However, some members of the generation who were sent away to school believe that it is even more stressful forchildren to bridge the gap between home and school on a daily basis--at least the boaders only had to make the transition at long intervals, unfortunately, when they returned to the village at the end of their education some of the boarders felt they had no clear role in the community. It remains to be seen whether the present generation will be better equipped and reconcile the two cultures and develop satisfying adult roles.

Some parents and community members have perceived new problems. When adolescents who attended boarding shcool return to the village for their high school education they often have too little todo in the village. They are getting an education that is not only oriented towards future life, but also toward participation in the cash economy and wider society. In addition, they are also often under pressure from the family to remain in the village with family, Parents' ambivalence about

school places children in a difficult position. If they do well in school, they may leave the village more or less permanently; if they do not, they may have difficulty finding a suitable role and occupation in the village, because they may not have the requisite subsistence skills for fitting into in the mixed economy of the community (Kleinfeld and Berry, 1978). There are few opportunities for wage employment in most villages, though there are possibilities in commercial fishing if the parents or other close relatives have permits. There is a conflict between the expectations encouraged by Western schooling and the desire to remain near family and in a familiar setting. The dearth of job opportunities available in small rural communities further complicates the situation.

Young adults in the village compete for social and political recognition and influence in the community, but those who attended school are at a disadvantage because they spent so much time at their books and comparatively little developing the skills and understandings of the traditional society (Petterson, 1983).

8.5.2.3.6 The Need to Know About the Outside World

Kleinfeld and Berry (1978) point out that even if people intend to remain in the village throughout their lifetime, the pace and magnitude of social change is such that villagers cannot afford to remain ignorant about the outside world. In order to face the changes witha sense of confidence and self-worth, the Native youth must come into contact with outsiders and understand the differences and similarities between his culture and theirs. Without such a basis he will find it difficult to find a satisfying adult role in his home communities or elsewhere and to protect his own best interests.

Several programs have been organized with the aim of broadening students' educational experience. Some programs involve sending students away to gain experience in different communities in Alaska and in urban settings. Others involve more extensive travel and visits to other states, and foreign countries like Japan. One such project was

the Dillingham Foreign Study Program which was later judged to be quite successful in attaining its goal of improving students' self-confidence and increasing college enrollment by providing a special support group. Another opportunity available to high school students inthe Lake and Peninsula REAA is the legislative internship program which allows them to observe and participate in governmental process in the Alaska State Legislature.

Programs which concentrate on work experience and vocational training provide students with opportunities to sample various jobs thus enabling them to make more informed career and lifestyle choice when the time comes.

Finally, television is an important source of information and potential curriculum development, but, unfortunately,it is very expensive to exploit. There are numerous videotape programs available on the environment, and the ecology of the Arctic and other parts of Alaska which would be useful teaching materials both for their informational content and for the perspective they provide on how Alaska and Alaskans are viewed by outsiders. It is essential for native Alaskans to gain this prospective if they are to engage in social, political, and economic interaction with outsiders representing diverse interests. There is great potential for such interaction in the form of the many committees created by new legislation concerning land and mineral rights, educational obligations of the government bodies, etc., but,unfortunately, this potential is rarely realized because too few people understand the complex corporate and legal structures.

8.5.2.4 Identity

8.5.2.4.1 Self Identity

The effects of the articulation of the subsistence and commercial ideological orientations also are apparent in the expression of self and social identity among Bristol Bay residents. In the traditional

cultural system identity was affirmed in part through skill in hunting and fishing. Such skills retain their importance in the commercial fishery which allows the top-notch highliners to "capitalize" on their skills for the purpose of economic profit. Other investigators (Rainey 1941; Lantis 1958; Chance 1960) have suggested that the ability to maintain self-respect is vital if Eskimos are to adjust to their rapidly changing world. Boat captains are able to maintain self-respect under either ideological orientation, but the disenfranchised lose self--respect under the commercial orientation because they lack the income and other indices of socioeconomic status. Their alternative is to validate their sense of self through increased participation in subsistence activities. However, as described above, the standards of success in hunting and fishing have been altered by the increased use of modern technology. Hence, no matter how much time and energy is spent in traditional hunting and fishing for subsistence purposes, disenfranchised individuals will always appear less successful in these activities in comparison to the boat captains.

The self-identity of all Bristol Bay residents also is potentially affected by a decreasing sense of self-reliance that comes with participation in the commercial economy. This participation can result in dependence on cash income, external markets for salmon, availability of goods and services to meet acquired tastes and needs, and so on. This is in marked contrast to the perceptions of self-reliance promoted by participation in subsistence activities. Unless one is able to validate a sense of self-reliance in one or the other of the ideological orientations, a point of stress may emerge which poses a threat to health and well-being.

8.5.2.4.2 Social Identity

Social identity is also undergoing a process of change and adjustment in Bristol Bay. With the trend toward smaller households, and the increasing availability of migration for younger residents out of the region to seek educational and employment opportunities, kinship as a

basis of social identity is undergoing a transformation. As noted above, while certain aspects of the commercial economy are being modified in accordance with the traditional ideological orientation, the position of the extended kinship group as the foundation for social identity is being challenged by the emergence of new social categories. One of these new categories is the neighborhood. Whereas residence in a community was once considered equivalent to membership in an extended kin group, (i.e., everyone was related one way or another), communities are now dividing into smaller segments. This division is being facilitated by differences in income and the allocation of HUD housing. Many communities are dividing into two major parts, that is, residents who live in the community throughout the year, and residents who live elsewhere, usually in Anchorage or in Seattle, during the winter, returning only to participate in the commercial fishery each spring and summer. The construction of HUD housing in small villages has in some cases resulted in the emergence of the concept of neighborhood as a subdivision of the village. Thus, while reducing overcrowding in existing, substandard housing, it also has an impact on the importance of certain social relations, and, thus, local definitions of social groups.

Ethnicity has also become an important element of social identity. Belonging to an ethnic group has assumed greater importance with the establishment of ANCSA, increased migration of non-Natives into the area, and protection of regional/local interests. The importance of ethnicity is also associated with competition in the commercial economy and the protection of subsistence resources. With the passage of the Alaska Native Claims Settlement Act in 1971, the two ideological orientations were integrated by recognizing traditional Native claims to land in the region and creating the potential for participation in the commercial economy that comes with land ownership. With the imminent expansion of OCS-related and other forms of economic development throughout the region, Native-owned property has become a valuable commercial resource. The right to such ownership depends on claims to ethnic identity, however.

Limited Entry has also increased the importance of ethnic identity.

Designed to promote the interests of local, predominately Native, commercial fishermen, the Act in fact gave greater advantages to non-Native, outside fishermen. Because of their familiarity with bureaucratic procedures and greater resources to endure years of poor fishing, outside fishermen were able to acquire a disproportionate share of limited entry permits, and have been more productive with those permitsby virtue of having larger vessels and better equipment than Native Bristol Bay fishermen. Outsider fishermen are thus perceived as a threat to the interests of Native resident commercial fishermen in Bristol Bay.

Ethnic identity has also assumed importance in competition for subsistence resources in the area with the expansion of sports hunting and fishing and other recreational industries throughout the region. Natives and non-Natives are seen as competing *over* the same set of resources which Natives utilize for subsistence purposes and non-Natives utilize for commercial and recreational purposes.

As these three examples indicate, with the expansion of the arena of social relations and greater involvement in the commercial economy, ethnic group membership may eventually replace the village as the focus for identity. In this light, the existing attitudes of Bristol Bay Natives towards non-Natives can be seen as a reflection of the necessity to form social and cultural boundaries to aid in defining the ethnic group. This task is made especially important by the fact that Natives often have as much as 75 percent non-Native blood and prior to passage of ANCSA often denied their ethnic identity. The current concern over continuation of subsistence pursuits is an example of the attempt to articulate this ethnic identity. By subsistence hunting and fishing, one is able to validate to oneself and others that he/she is an Alaskan Native. Simultaneously, these individuals also distinguish themselves from others (non-Natives) who do not engage in subsistence activities.

Finally, socioeconomic status is beginning to acquire importance as a basis for social identity. Currently, identification with others of the same socioeconomic status is not as important as identification as a

member of a particular kin group. Socioeconomic status, however, may serve to reduce the scope of kin identification to that of the nuclear family and extended kin groups may become differentiated by virtue of their possession of limited entry permits, their success in the commercial fishery, and their household income.

8.5.3 Two Perspectives on Change

In this chapter we have examined the interaction of two kinds of ideological orientation, that based on a traditional subsistence lifestyle and that based on an intrusive commercial style. We have described how participation in the commercial economy is based on "economic" considerations in the Western sense of the term. The motives which guide participation in the subsistence economy, however, are considerably different. Analyses of subsistence activities, in Bristol Bay as well as other parts of Alaska, have been based largely on the economic significance of such activities. Emphasis has been placed, therefore, on the quantification of resources harvested and utilized by local residents, assuming that any decline in the number of animals or fish harvested will indicate a decline in the importance of subsistence activities. However, what is Important to local residents is not how much is harvested, but that these resources remain available to them for harvesting. Subsistence activity mustbe regarded as tied closely to the larger framework of values and self-images that perpetuate it. Therefore the real difference between commercial and subsistence activities is qualitative rather than quantitative. To label both of these sets of activities as "economic" is misleading.

The fact that these two sets of activities involve different ideological orientations and do not simply represent different forms of economy does not mean that they remain separate. Bristol Bay residents actively work to integrate elements of the two socioeconomic systems in order to meet certain social and psychological needs. The modifications in the traditional patterns of exchange, utilizing resources gained from participation in the commercial economy and the adjustment of commercial values to accommodate subsistence pursuits are evidence of this process

of adjustment.

Particularly in the villages, there is a good deal of capability to manage the process of change. Two points about the indices of stress which we have been discussing should be made explicit. First, most of these indices are highest in the larger population centers, in particular Dillingham and Naknek. Thus, the villages are less disrupted than are those larger communities. Second, the larger population centers literally "draw off" many of those who are experiencing stress in the villages, leaving the villages in a more stable condition. Both the management of change and the emergence of stress and potential points of stress must be taken into account to gain a balanced view of the effects of cross-cultural contact on the Yup'ik of Bristol Bay.

APPENDIX A

SAMPLING ERROR

Most of the data shown in the appendix is based on a sample count of less than 100 percent of total housing units, persons within housing units, and persons in group quarters for each community. Sampling reduces the precision of the estimates of demographic and economic conditions found in the U.S. Census data. The sampling errors shown for 1980 in Table A-1 are measures of variability around the true population values inherent in estimates derived from samples. In general, the sampling error can be interpreted as follows: the true value will be within plus-or-minus X% of the observed values 95% of the time, where X is the sampling error.

For example, as shown in Table D-4b, there is a 95% chance that the true rate of unemployment among all working-age men in Manokotak is between 78.55 (70 + 8.55) and 61.45 (70- 8.55) percent.

Iliamna, Pedro Bay, Kakhonak, and Twin Hills rank highest in sampling error variability. Dillingham and Bristol Bay Borough villages enjoy relatively low sampling errors. Sampling error estimates at the subregion level were lower than for individual villages. This is because population size is a key determinant of the sampling error. Thus, places with comparable sample proportions (e.g., New Stuyahok and Pedro Bay) exhibited markedly different sampling errors (8.44 versus 26.27).

APPENDIX A

LIST OF TABLES

SAMPLING ERROR

Table

TABLE A-1 SAMPLING ERROR IN 1980

SUB REGION	COMMUNITY	(1) SAMPLE SIZE	(2) TOTAL ESTIMATED POPULATION	(3) SAMPLE PROPORTION (1) - (2) (%)	SAMPLING ERROR
1 LOWER KUSKOKWIM					
	QUINHAGAK	162	412	39	6.01
	PLATINUM	29	55	53	12.63
	GOODNEWS	73	168	43	8.65
		264	635	42	4.61
2 WESTERN					
	TWIN HILLS	17	70	24	20.83
	MANOKOTAK	91	294	31	8.55
	TOGIAK	128	470	27	7.40
	ALEKNAGIK	64	154	42	9.40
		300	988	30	4.72
3 DILLINGHAM					
	DILLINGHAM	486	1563	31	3.69
4 NUSHAGAK					
	KOLIGANEK	46	117	39	11.30
	EKWOK	37	77	48	11.69
	CLARKS POINT	28	79	35	14.98
	PORTAGE CREEK	29	48	60	11.57
	NEW STUYAHOK	96	331	29	8.44
		236	652	36	5.10
5 ILIAMNA/KVICHAK					
	NEWHALEN	36	87	41	12.58
	ILIAMNA	8	94	9	33.32
	NONDALTON	36	173	21	14.58
	PEDRO BAY	10	33	30	26.27
	IGUIGIG	16	33	48	17.86
	LEVELOCK	30	79	38	14.18
	KAKHONAK	14	83	17	24.03
		150	582	26	6.9
6 BRISTOL BAY BOROUGH					
	SOUTH NAKNEK	63	145	43	9.32
	NAKNEK	163	318	51	5.37
	KING SALMON	123	545	23	7.78
		349	1008	12	4.24
ALL VILLAGES		1785	5428	33	1.90
REMOTE POPULATION					
	DILLINGHAM DIV.	35	83	42	12.67
	BRISTOL BAY BOR.	37	86	43	12.23
		72	169	43	8.78
CENSUS DIVISION TOTAL					
	DILLINGHAM DIV.	1467	4616	32	2.11
	BRISTOL BAY BOR.	386	1094	35	4.02
		1853	5710	33	1.87

SOURCE: U.S. Bureau of the Census, Special Tabulations, STF3, 1980.

APPENDIX B

DEMOGRAPHIC

Housing Unit, Household, and Family

Housing units, households, and families represent three basic classifications of persons used by the U.S. Census. Although many tables in this appendix will draw from the universe of total persons, several of the tables listed in the following sections are geared toward the universe of households, families, and housing units. The conceptual overlap implied by these classifications tends to cause confusion. To minimize possible confusion, some key shared and unshared features of these terms are described below. More detailed definition of terms can be found in most census publications (see, for example, U.S. Department of Commerce, Bureau of the Census, Census of Population and Housing 1980: Summary Tape File 3, Technical Documentation, 1982).

Housing Unit

Housing units are physical dwellings (i.e., a house, apartment, mobile home, or trailer). They may be occupied or vacant. The occupants may be single family, one person living alone, two or more families living together, or any other group of related or unrelated persons, except for persons in group quarters (i.e., inmates of institutions, rooming houses, nursing homes, communes, dormitories, etc.). Together, occupied housing units and group quarters exhaust the broad dwelling classifications in which persons can be designated.

Household

A household is both a physical dwelling and a social relationship. There are family and nonfamily households. Family households include the following persons: one householder and one or more related individuals. The 1980 concept of householder is comparable to the 1970 concept of household head. Both refer to the persons (or one of the persons) in whose name the dwelling is owned or rented. In nonfamily households, any unrelated individual, at least 15 years or older, could be designated as householder (only one per nonfamily household). In addition to the householder, nonfamily households may include unrelated individuals that live in the same dwelling.

In complete-count tabulations (i.e., 100% samples), the following relationship between households and housing units exist:

The number of households	=	The number of family & nonfamily householders	=	The number of occupied housing units

Family

Families are yet another kind of social relationship closely tied to households. A family consists of two or more persons who live together as one household and are related by birth, marriage, or adoption. Families, therefore, include a householder. A household can contain only one family. A married couple with or without children or a single parent living in a housing unit and related to the householder (i.e., a young married couple sharing the home of the husband's parents) is classified as a subfamily. Subfamilies are counted as the householder's family, not as a separate family.

Some households composed of unrelated individuals do not contain families (i.e., nonfamily households). Thus, the number of families cannot exceed the number of households.

Again, the relationship between housing units, households, and families must be carefully understood before attempting to interpret the tables contained in the appendices.

APPENDIX B

LIST OF TABLES

DEMOGRAPHIC

TABLE B-1 HOUSEHOLD TYPE BY PERSONS IN HOUSEHOLD[a]
YEAR 1980

SUB REGION	COMMUNITY	NUMBER OF PERSONS IN FAMILY HOUSEHOLD 1-4	5-8	9+	NUMBER OF PERSONS NONFAMILY HO 1-4	5-9
1 LOWER KUSKOKWIM						
	QUINHAGAK	25.2	52.0	1.0	4.0	0
	PLATINUM	4.0	5.0	1.0	4.0	0
	GOODNEWS	14.0	13.0	3.0	12.0	0
	SUM	43.0	70.0	5.0	20.0	0
2 WESTERN						
	TWIN HILLS	8.0	5	1.0	3.0	0
	MANOKOTAK	19.0	28	5.0	5.0	0
	TOGIAK	39.0	36	11.0	15.0	0
	ALEKNAGIK	22.0	11	1.0	4.0	0
	SUM	88.0	80	18.0	27.0	0
3 DILLINGHAM						
	DILLINGHAM	228.0	102.0	9.0	127.0	1.0
4 NUSHAGAK						
	KOLIGANEK	8.0	12.0	2.0	2.0	0
	EKWOK	2.0	6.0	0	2.0	0
	CLARKS POINT	9.0	7.0	1.0	5.0	0
	PORTAGE CREEK	7.0	4.0	0	2.0	0
	NEW STUYAHOK	25.0	26.0	9.0	5.0	0
	SUM	61.0	55.0	2.0	16.0	0
5 ILIAMNA/KVICHAK						
	NEWHALEN	4.0	12.0	0	2.0	0
	ILIAMNA	10.0	9.0	1.0	2.0	0
	NONDALTON	20.0	9.0	4.0	9.0	0
	PEDRO BAY	8.0	1.0	0	2.0	0
	IGIUGIG	1.0	5.0	0	3.0	0
	LEVELOCK	12.0	3.0	2.0	4.0	0
	KAKHONAK	8.0	9.0	0	3.0	0
	SUM	63.0	48.0	7.0	25.0	0
6 BRISTOL BAY BOROUGH						
	SOUTH NAKNEK	22.0	8.0	4.0	10.0	2 0
	NAKNEK	62.0	17.0	4.0	23.0	0
	KING SALMON[b]	0	0	0	0	0
	SUM	84.0	25.0	0	33.0	2 0
ALL VILLAGES						
	SUM	567.0	380.0	53.0	248.0	3.0
	MEAN	26.200	15.500	2.400	11.400	0.150
REMOTE POPULATION						
	DILLINGHAM DIV.	0	0	0	0	0
	BRISTOL BAY BOR.	0	0	0	0	0
	SUM	0	0	0	0	0
CENSUS DIVISION TOTAL						
	DILLINGHAM DIV.	570.0	337.0	51.0	248.0	8.0
	BRISTOL BAY BOR.	130.0	46.0	2.0	66.0	2.0
	SUM	700.0	383.0	53.0	314.0	10.0
	MEAN	175.000	95.750	13.250	78.500	2.500

SOURCE: U.S. Bureau of the Census, Special Tabulations STF2B, 1980.

NOTES: [a]Universe equals to total households.

[b]Suppression because King Salmon has few fami y households

TAME B-2a HOUSING UNIT STATUS IN 1970

SUB REGION	COMMUNITY	OCCUPIED OWNER	OCCUPIED RENTER	VACANT YR RND	VACANT SEASONAL	TOTAL OCCUPIED AND VACANT
1 LOWER KUSKOKWIM						
	QUINHAGAK	0	0	0	0	0
	PLATINUM	9	4	5	0	18
	GOODNEWS	32	4	5	0	41
	SUM	41	8	10	0	59
2 WESTERN						
	TWIN HILLS	12	1	2	0	15
	MANOKOTAK	35	2	0	0	37
	TOGIAK	61	5	1	0	67
	ALEKNAGIK	18	4	8	0	30
	SUM	126	12	11	0	149
3 DILLINGHAM						
	DILLINGHAM	135	103	28	1	267
4 NUSHAGAK						
	KOLIGANEK	16	3	1	0	20
	EKWOK	5	19	2	0	26
	CLARKS POINT	13	3	10	6	32
	PORTAGE CREEK	0	0	0	0	0
	NEW STUYAHOK	27	5	0	0	32
	SUN	61	30	13	6	110
5 ILIAMNA/KVICHAK						
	NEWHALEN	12	2	0	0	14
	ILIAMNA	6	9	2	7	24
	NONDALTON	29	0	15	7	51
	PEDRO BAY	13	4	3	2	22
	IGIUGIG	7	1	1	3	12
	LEVELOCK	10	4	3	0	17
	KAKHONAK	0	0	0	0	0
	SUM	77	20	24	19	140
6 BRISTOL BAY BOROUGH						
	OUTH NAKNEK	23	11	2	0	36
	NAKNEK	20	25	3	0	48
	KING SALMON	4	58	8	0	70
	SUM	47	94	13	0	154
ALL VILLAGES						
	Sun	487	267	99	26	879
REMOTE POPULATION						
	DILLINGHAM DIV.	0	0	0	0	0
	BRISTOL BAY BOR.	0	0	0	0	0
	SUM	0	0	0	0	0
CENSUS DIVISION TOTAL						
	DILLINGHAM DIV :	587	209	138	107	1041
	BRISTOL BAY BOR.	81	111	19	3	214
	SUM	668	320	157	110	1255

SOURCE : U.S. Bureau of the Census, Special Tabulations, CNT1, 1970.

TABLE HOUSING UNIT STATUS IN 1980

SUB REGION	COMMUNITY	OCCUPIED		VACANT		TOTAL OCCUPIED AND VACANT
		OWNER	RENTER	YR RND	SEASONAL	
1 LOWER KUSKOKWIM						
	QUINHAGAK	78	4	0	0	82
	PLATINUM	10	4	0	0	14
	GOODNEWS	37	6	4	0	46
	SUM	125	13	4	0	142
2 WESTERN						
	TWIN HILLS	16	1	1	0	19
	MANOKOTAK	47	10	0	0	67
	TOGIAK	64	37	13	9	160
	ALEKNAGIK	30	8	25	3	74
	SUM	157	56	39	12	320
3 DILLINGHAM						
	DILLINGHAM	237	230	96	4	797
4 NUSHAGAK						
	KOLIGANEK	22	2	0	0	26
	EKWOK	19	1	0	0	21
	CLARKS POINT	14	8	0	0	30
	PORTAGE CREEK	10	3	3	0	19
	NEW STUYAHOK	53	12	0	0	77
	SUM	118	26	3	0	173
5 ILIAMNA/KVICHAK						
	NEWHALEN	16	2	0	0	20
	ILIAMNA	11	11	0	0	33
	NONDALTON	30	12	4	2	60
	PEDRO BAY	11	0	1	0	12
	IGIUGIG	8	1	3	3	16
	LEVELOCK	14	7	5	2	35
	KAKHONAK	19	1	4	0	25
	SUM	109	34	17	7	167
6 BRISTOL BAY BOROUGH						
	SOUTH NAKNEK	27	16	8	0	67
	NAKNEK	54	49	8	1	161
	KING SALMON	16	59	27	13	174
	SUM	97	124	43	14	402
ALL VILLAGES						
	SUM	843	483	202	37	1565
REMOTE POPULATION						
	DILLINGHAM DIV.	18	13	19	6	69
	BRISTOL BAY BOR.	22	3	5	1	34
	SUM	40	16	24	7	103
CENSUS DIVISION TOTAL						
	DILLINGHAM DIV.	119	426	196	42	1878
	BRISTOL BAY BOR.	788	127	48	15	436
	SUM	907	553	244	57	2314

SOURCE: U.S. Bureau of the Census, Spatial Tabulations, STF1, 19$0.

APPENDIX C

INCOME

Personal income from the Census is counted on a usual-place-of-residence basis. That is, the U.S. Census ignores income from nonresident sources. In contrast to this, the Bureau of Economic Analysis (BEA) estimates income on a place-of-work basis and requires a resident adjustment to place it on an equal footing with the census. Nevertheless, discrepancies persist between Census and BEA estimates of personal income, after accounting for differences in resident status.

As shown below, the resident income discrepancy is greater in 1980 than in 1970:

RESIDENT INCOME
(Thousands of Current Dollars)

	1970		1980	
	BEA	U.S.CENSUS	BEA	U.S. CENSUS
Dillingham Div.	$ 7,167	$6,566	$31,335	$40,248
Bristol Bay Bor.	4,242	3,827	11,175	17,449
Total	11,591	$10,393	$42,510	$57,697

Part of the difference in 1980 is caused by a shift in Census division boundaries. The 1980 Dillingham division boundary shifted to include six Alaska Peninsula villages not included in 1970. "They are Port Heiden, Chignik, Chignik Lake, Chignik Lagoon, Perryville, and Ivanof Bay. In 1980, these six villages accounted for about 12% of total population and 14% of total personal income under the new Dillingham division boundaries. The BEA figures for 1980 do not reflect this boundary change; they are based on 1970 Census division boundaries.

Also, Census income estimates for 1980 are actually based on earnings in 1979, a year of unprecedented fishery gains. The BEA estimates are tied to 1980.

Additional discrepancies probably arise out of different methods of treating income from fishing. Both series suffer from errors and omissions in counting fishing industry income and employment and tend to understate fishing earnings, although BEA omissions appear to be greater.

The matrix in Figure C-1 depicts the sources and composition of census income. Two basic sources of income are shown: earned and unearned, each of which contains several subclassifications. Earned income refers to income from sources tied to labor force participation (including crafts and trapping). In some cases it is not clear how the census classified certain kinds of income. Nonfarm, self-employed income probably accounts for the skipper's income from fishing, but possibly not income to crew members. Wages and salary income probably captures crew shares as well as wages to processing workers. In general, self-

employment income refers to net income after subtracting business expenses from gross business receipts. The major user-classifications of income are depicted by the rows in Figure C-1. These correspond with the census classifications of persons discussed earlier under Demography. Aggregate household income is equal to the sum of family income and income of unrelated persons. The size distribution, mean, and median of household and family income is also available in certain cases.

The tables that follow are designed to present as complete a picture as possible of income patterns and characteristics available from the Census at the village level. Unfortunately, missing data, suppression, and sampling error problems result in serious limits to comparability between 1970 and 1980.

APPENDIX C

LIST OF FIGURE AND TABLES

INCOME

Figure C-1 Source and Composition of Census Income

	Earned			Unearned				Total	Distribution
	Wages & Salaries	Non-Farm Self-Employment	Farm Self-Employment	Interest Dividend Rent	Social Security	Public Assistance	Other		
Family									
Unrelated Person									
Household									
Total								Aggregate, per capita	Mean, Median

TABLE C-1 PER CAPITA & TOTAL INCOME 1970 AND 1980
(IN 1980 DOLLARS)

SUB REGION	COMMUNITY	TOTAL INCOME ADJUSTED	TOTAL INCOME 98	POPULATION 1970	POPULATION 1980	PER CAPITA INCOME ADJUSTED	PER CAPITA INCOME
1 LOWER KUSKOKWIM							
	QUINHAGAK	0	1261285	0	412	0	3061
	PLATINUM	229998	428285	55	55	4182	7787
	GOODNEWS	569754	849680	218	168	2604	5058
	Sun	797751	2539250	273	635	6786	15906
	MEAN	265917	846417	91	212	2262	5302
2 WESTERN							
	TWIN HILLS	110714	241030	67	70	1652	3443
	MANOKOTAK	347902	1823035	214	294	1626	6201
	TOGIAK	707230	2344445	383	470	1847	4988
	ALEKNAGIK	195227	1694635	128	154	1525	11004
	Sun	1361073	6103145	792	988	6650	25636
	MEAN	340268	1525786	198	247	1662	6409
3 DILLINGHAM							
	DILLINGHAM	4574833	20563570	914	1563	5005	13156
4 NUSHAGAK							
	KOLIGANEK	403456	423385	142	117	2841	3619
	EKWOK	381294	456710	103	77	3702	5931
	CLARKS POINT	800805	226215	95	79	8430	2853
	PORTAGE CREEK	0	208855		48	0	4351
	NEW STUYAHOK	245856	1937445	2?:	331	1138	5853
	SUM	1831410	3252610	556	652	16111	22618
	MEAN	366282	650522	111	130	3222	4524
5 ILIAMNA/KVICHAK							
	NEWHALEN	315693	608730	88	%7	3587	6997
	ILIAMNA	346129	137s50	58	94	5968	1463
	NONDALTON	489742	1075485	184	173	2662	6217
	PEDRO BAY	272747	0	65	33	4196	0
	IGIUGIG	127656	512375	36	33	3546	15527
	LEVELOCK	152675	945525	74	79	2063	11969
	KAKHONAK	0	104270	0	83	0	1256
	SUM	1704601	3383935	505	582	22022	43428
	MEAN	243520	483419	72	83	3146	6204
6 BRISTOL BAY BOROUGH							
	OUTH NAKNEK	551305	1807745	154	145	3580	12467
	NAKNEK	981750	6310345	178	318	5515	19844
	KING SALMON	1329061	7802195	202	545	6580	14316
	SUH	2862114	15920285	534	1008	15675	46627
	MEAN	954038	5306761	178	336	5225	15542
ALL VILLAGES							
	SUH	13131823	51762795	3574	5428	72249	167372
	HEAN	570949	2250556	155	236	3141	7277
REHOTE POPULATION							
	DILLINGHAM DIV.	N/A	572775	N/A	83	N / A	6901
	BRISTOL BAY BOR.	N/A	1528390	N/A	86	N/A	17772
	SUM	N/A	2101165	N/A	169	N/A	24673
	MEAN	N/A	1050582	N/A	84	N/A	12336
CENSUS DIVISION TOTAL							
	DILLINGHHAM DIV.	12935276	40247925	3827	4616	3380	8719
	BRISTOL BAY BOR.	7539092	17448675	1147	1094	6573	15949
	SUH	20474368	57696600	4974	5710	9953	24669
	MEAN	10237184	28848300	2487	2855	4976	12334

SOURCE: U.S. Bureau of Census, Special Tabulations, CNT5, 1970; STF3, 1980.

N/A - Not available.

Adjusted = converted to 1980 dollars.

TABLE C-2 AVERAGE 1980 HOUSEHOLD INCOME BY INCOME TYPE

SUB REGION	COMMUNITY	EARNED INCOME W&S	NON FARM SELF	FARM SELF	INT DIV RENT	SOC SEC	PUB ASSIST	OTHER
1 LOWER KUSKOKWIM								
	QUINHAGAK	7467	8060	0	2968	2351	4053	1826
	PLATINUM	14922	8217	0	111	85	7790	711
	GOODNEWS	15128	7133	0	16045	3172	1823	3682
	SUM	37517	23410	0	19124	5608	13666	6219
	MEAN	12506	7803	0	6375	1869	4555	2073
2 WESTERN								
	TWIN HILLS	8082	18005	0	0	0	0	0
	MANOKOTAK	29945	12466	0	484	3174	245	4408
	TOGIAK	12259	12938	0	302	3139	1569	631
	ALEKNAGIK	34471	18747	0	0	0	345	7255
	SUM	84757	62156	0	786	6313	2159	12294
	MEAN	21189	15539	0	196	1578	540	3073
3 DILLINGHAM								
	DILLINGHAM	30429	26477		6538	2246	3302	2193
4 NUSHAGAK								
	KOLIGANEK	728%	10059	0	5005	0	3638	1505
	EKWOK	9276	14713	0	0	1955	1655	1610
	CLARKS POINT	19633	0	0	31760	0	0	1125
	PORTAGE CREEK	-16882	0	0	0	2405	8533	0
	NEW STUYAHOK	19518	11630	0	186	1641	782	3176
	SUM	72592	36402	0	36951	6001	14608	7416
	MEAN	14518	7280	0	7390	1200	2922	1483
5 ILIAMNA/KVICHAK								
	NEWHALEN	23743	-505	0	725	0	3405	2367
	IL IAMNA	2605	6255	0	0	0	0	965
	NONDALTON	17943	15010	0	135	0	3619	0
	PEDRO BAY	0	0	0	0	0	0	0
	IGIUGIG	36737	5205	0		0	0	39658
	LEVELOCK	34654	26710	0	11!	1847	2205	0
	KAKHONAK	11585	0	0	0	0	0	0
	SUM	127267	52675	0	972	1847	9229	42990
	MEAN	18181	7525	0	139	263	1318	6141
6 BRISTOL BAY BOROUGH								
	SOUTH NAKNEK	32772	21852	2405	1304	3720	1541	1348
	NAKNEK	44264	44??2	0	6491	2805	2636	2223
	KING SALMON	24239	35603	0	4125	2390	8215	4508
	SUM	101275	101667	2405	11926	8915	12452	8079
	MEAN	33758	33889	802	3975	2972	4151	2693
ALL VILLAGES								
	SUM	453837	302787	6410	76297	30930	55416	79191
	MEAN	19732	13165	279	3317	1345	2409	3443
REMOTE POPULATION								
	DILLINGHAM DIV.	20128	53941	0	150	0	0,	546
	BRISTOL BAY BOR.	63066	17205	0	655	700	0	1205
	SUM	83194	71146	0	805	700	0	1751
	MEAN	41597	35573	0	402	350	0	875
CENSUS DIVISION TOTAL								
	ILLINGHAM DIV.	22918	19237	4005	5651	24$0	2443	2874
	BRISTOL BAY BOR.	37461	38671	2405	4318	2740	3050	2281
	S UM	60379	57908	6410	9969	5220	5493	5155
	MEAN	30190	28954	3205	4984	2610	2746	2577

SOURCE: U.S. Bureau of the Census, Special Tabulations, STF3, 1980.

TABLE C-3a DISTRIBUTION OF 1970 FAMILY INCOME
TOTAL

SUB REGION	COMMUNITY	LT 5000	5000 9999	10000 14999	15000 24999	25000 49999	50000 +	TOTAL INCOME
1 LOWER KUSKOKWIM								
	QUINHAGAK	0	0	0	0	0	0	0
	PLATINUM	1	4	0	4	0	0	9965
	GOODNEWS	34	20	0	6	0	0	28760
	SUM	35	24	0	10	0	0	38725
2 WESTERN								
	TWIN HILLS	6	10	0	0	0	0	56200
	MANOKOTAK	15	16	0	0	0	0	159050
	TOGIAK	29	25	0	8	0	0	359000
	ALEKNAGIK	10	12	0	0	0	0	99100
	SUM	60	63	0	8	0	0	673350
3 DILLINGHAM								
	DILLINGHAM	25	56	69	34	0	0	1977700
4 NUSHAGAK								
	KOLIGANEK	4	5	0	8	0	0	
	EKWOK	15	4	0	5	0	0	
	CLARKS POINT	0	5	5	5	5	0	378750
	PORTAGE CREEK	0	0	0	0	0	0	
	NEW STUYAHOK	30	5	0	0	0	0	11680:
	SUM	49	19	5	18	5	0	893900
5 ILIAMNA/KVICHAK								
	NEWHALEN	0	5	0	5	0	0	160250
	IL IAMNA	0	0	14	0	0	0	175700
	NONDALTON	25	16	0	5	0	0	248600
	PEDRO BAY	10	5	0	0	0	0	56250
	IGIUGIG	4	0	4	0	0	0	64800
	LEVELOCK	0	10	0	0	0	0	77500
	KAKHONAK	0	0	0	0	0	0	0
	SUM	39	36	18	10	0	0	783100
6 BRISTOL BAY BOROUGH								
	SOUTH NAKNEK	5	5	5	0	0	0	107250
	NAKNEK	5	6	13	4	5	0	449450
	KING SALMON	10	0	27	15	0	0	629400
	SUM	20	11	45	19	5	0	1186100
ALL VILLAGES								
	SUM	228	209	137	99	10	0	5901400
REMOTE POPULATION								
	DILLINGHAM DIV.	19	19	5	0	0	0	208990
	BRISTOL BAY BOR.	14	10	18	7	0	0	458850
	SUM	33	29	23	7	0	0	667840
CENSUS DIVISION TOTAL								
	DILLINGHAM DIV.	242	240	109	81	11	0	5594030
	BRISTOL BAY BOR.	34	21	63	26	5	0	1644950
	SUM	276	261	172	107	16	0	7238980

SOURCE : U.S. Bureau of the Census, Special Tabulations, CNT5, 1970.

TABLE C-3b DISTRIBUTION OF 1980 FAMILY INCOME
TOTAL

SUB REGION	COMMUNITY	LT 5000	5000 9999	10000 14999	15000 24999	25000 49999	50000 +	TOTAL INCOME
1 LOWER KUSKOKWIM								
	QUINHAGAK	16	29	28	12	5	0	1108715
	PLATINUM	0	0	2	7	0	0	170885
	GOODNEWS	1	6	11	5	0	3	630520
	SUM	17	35	41	24	5	3	1910120
2 WESTERN								
	TWIN HILLS	5	0	0	4	0	0	169000
	MANOKOTAK	5	9	0	3	3	12	1778620
	TOGIAK	21	27	8	34	0	0	1510080
	ALEKNAGIK	3	2	4	7	0	18	1694635
	SUM	34	38	12	48	3	30	5152335
3 DILLINGHAM								
	DILLINGHAM	70	14	25	36	30	101	2056352O
4 NUSHAGAK								
	KOLIGANEK	7	0	12	13	0	0	382355
	EKWOK	5	6	2	2	0	0	263685
	CLARKS POINT	10	0	0	6	2	0	226215
	PORTAGE CREEK	0	3	0	3	0	0	194425
	NEW STUYAHOK	9	15	0	16	0	5	1350220
	SUM	31	24	14	40	2	5	2416900
5 ILIAMNA/KVICHAK								
	NEWHALEN	5	0	6	2	0	5	579570
	ILIAMNA	0	14	0	0	0	0	137550
	NONDALTON	10	4	0	8	3	0	649265
	PEDRO BAY	0	0	0	0	0	0	NA
	IGIUGIG	0	0	0	0	2	2	358825
	LEVELOCK	3	6	4	0	0	6	943490
	KAKHONAK	6	0	9	0	0	0	104270
	SUM	24	24	19	10	5	13	277.2970
6 BRISTOL BAY BOROUGH								
	SOUTH NAKNEK	0	0	0	6	9	8	1627500
	NAKNEK	0	2	4	11	8	36	5140700
	KING SALMOM	0	0	0	8	12	2	1276315
	SUM	0	2	4	25	29	46	8044585
ALL VILLAGES								
	SUM	176	137	115	183	74	198	20296910
REMOTE POPULATION								
	DILLINGHAM DIV.	3	1	2	2	0	5	430645
	BRISTOL BAY BOR.	0	2	4	0	2	12	1528390
	SUM	3	3	6	2	2	17	1959035
CENSUS DIVISION TOTAL								
	ILLINGHAM DIV.	196	128	93	165	44	186	NA
	BRISTOL BAY BOR.	0	4	8	25	31	58	9572975
	SUM	196	132	101	190	75	244	9572975

SOURCE: U.S. Bureau of the Census, Special Tabulations, STF3, 1980.

TABLE C-4 RACE BY POVERTY STATUS IN 1980

SUB REGION	COMMUNITY	TOTAL		NATIVE		NON-NATIVE	
		INCOME ABOVE POV LEVEL	INCOME BELOW POV LEVEL	INCOME ABOVE POV LEVEL	INCOME BELOW POV LEVEL	INCOME ABOVE POV LEVEL	INCOME BELOW POV LEVEL
1 LOWER KUSKOKWIM							
	QUINHAGAK	243	170	0	0	243	170
	PLATINUM	57	0	0	0	57	0
	GOODNEWS	110	58	0	0	110	58
	SUM	410	228	0	0	410	228
WESTERN							
	TWIN HILLS	26	48	0	0	26	48
	MANOKOTAK	230	71	0	0	230	71
	TOGIAK	359	128	334	119	25	9
	ALEKNAGIK	163	10	0	0	163	10
	SUM	778	257	334	119	444	138
DILLINGHAM							
	DILLINGHAM	1247	299	627	250	520	49
4 NUSHAGAK							
	KOLIGANEK	131	28	0	0	131	28
	EKWOK	55	33	47	29	8	4
	CLARKS POINT	31	37	0	0	31	37
	PORTAGE CREEK	52	10	0	0	52	10
	NEW STUYAHOK	254	91	0	0	254	91
	SUM	523	199	47	29	476	170
5 ILIAMNA/KVICHAK							
	NEWHALEN	77	19	0	0	77	19
	ILIAMNA	94	11	0	0	94	11
	NONDALTON	134	36	0	0	134	36
	PEDRO BAY	0	0	0	0	0	0
	IGIUGIG	0	0	0	0	0	0
	LEVELOCK	81	31	0	0	81	31
	KA KHONAK	33	17	0	0	33	17
	SUM	419	114	0	0	419	114
6 BRISTOL BAY BOROUGH							
	SOUTH NAKNEK	134	10	103	6		4
	NAKNEK	305	10	145	10	12:	0
	KING SALMON	187	9	36	3	151	6
	SUM	626	29	284	19	342	10
ALL VILLAGES							
	SUM	4003	1126	1292	417	2711	709
REMOTE POPULATION							
	DILLINGHAM DIV.	55	13	0	0	55	13
	BRISTOL BAY BOR.	92	2	49	2	43	0
	sum	147	15	49	2	98	13
CENSUS DIVISION TOTAL							
	DILLINGHAM DIV.	"35s5	1044	2564	945	991	99
	BRISTOL BAY BOR.	718	31	333	21	385	10
	SUM	4213	1075	2097	956	1376	109

SOURCE: U.S. Bureau of the Census, Special Tabulations, STF3, 1980.

TABLE C-5 POVERTY STATUS IN 1980

SUB REGION	COMMUNITY	PERSONS WITH INCOME AS A PERCENT OF POVERTY LEVEL[a] BELOW 75%	75 - 124%	125 - 199%	200% AND ABOVE
1 LOWER KUSKOKWIM					
	QUINHAGAK	88	111	127	87
	PLATINUM	0	28	0	29
	GOODNEWS	17	50	37	64
	SLIM	105	189	164	180
2 WESTERN					
	TWIN HILLS	48	0	0	26
	MANOKOTAK	55	16	0	230
	TOGIAK	124	63	142	158
	ALEKNAGIK	10	0	13	150
	SUM	237	79	155	564
3 DILLINGHAM					
	DILLINGHAM	263	43	103	1137
4 NUSHAGAK					
	KOLIGANEK	28	64	52	15
	EKWOK	6	33	7	42
	CLARKS POINT	37	0	0	31
	PORTAGE CREEK	3	10	0	49
	NEW STUYAHOK	56	41	148	100
	SUM	130	148	207	237
5 ILIAMNA/KVICHAK					
	NEWHALEN	19	2	21	54
	ILIAMNA	11	94	0	0
	NONDALTON	13	28	66	63
	PEDRO BAY	0	0	0	0
	IGIUGIG	0	0	0	0
	LEVELOCK	27	4	4	77
	KAKHONAK	17	22	0	11
	SUM	87	150	91	205
6 BRISTOL BAY BOROUGH					
	SOUTH NAKNEK	2	8	6	128
	NAKNEK	10	6	23	276
	KING SALMON	3	6	3	184
	SUM	15	20	32	588
ALL VILLAGES					
	SUM	837	629	752	2911
REMOTE POPULATION					
	DILLINGHAM DIV.	13	4	1	50
	BRISTOL BAY BOR.	2	8	12	72
	SUM	15	12	13	122
CENSUS DIVISION TOTAL					
	DILLINGHAM DIV.	867	467	643	2622
	BRISTOL BAY BOR.	17	28	44	660
	SUM	884	495	687	3282

SOURCE : U.S. Bureau of the Census, Special Tabulations, STF3, 1980.

NOTE : [a]Summing figures in yields larger numbers than total population, as shown in Table B.1. A clear explanation for this is not available. It is possible that because this data is derived from a sample (as compared to a total population survey in Table 8.1), the sampling error is compounding the effect of weighting to levels comparable with total population.

APPENDIX D

EMPLOYMENT AND LABOR FORCE

Two methods are commonly used to estimate employment: one is a count of persons with jobs; the other is a job count. The U.S. Census count of employment is essentially a count of persons employed during a selected week of the year. In contrast to this, the BEA and Alaska Department of Labor (ADOL) estimates are based on the number of jobs that were filled during the pay period containing the twelfth day of each month.

Each method has its shortcomings and produces results that are not directly comparable with other estimates. Because the choice of work week is not necessarily the same for all households surveyed by census interviewers, the census may double count a single job that was held by two different people at different times--a common pattern in village employment.

More importantly, the Census estimates do not account for differences between part-time, full-time, and overtime jobs. All jobs are given equal weight regardless of their duration and intensity. This problem also occurs in the BEA and ADOL employment estimates. The census questionnaire may not be designed to handle seasonal employment reliably. The respondent was asked if he or she worked any time during the "previous week." The choice of week was not standardized and may also differ from interviewer to interviewer. If not working that week and not temporarily absent or on layoff, then the respondent was asked when they last worked, even if for a few days. For example, a Bristol Bay fisherman who worked temporary construction during a selected week may not be correctly classified in terms of duration and occupation.

This may partially explain why the census appears to understate fishing employment in nearly all Bristol Bay villages. Census interviewers conducted visits in April when the previous fishing season was long past, yet weeks in advance of preparation for upcoming harvest activity. The moderate level of part-time and seasonal work available in the off-season would tend to further accentuate this problem.

The problem of undercounting fishingemployment maybe aggravated by sampling, which, as explained in Appendix A, can produce unreliable population estimates in small places.

Several census classifications of employment are depicted in this appendix: industry, occupation, and class of worker.

The industry classification refers to the "kind of business or industrial activity." In comparison, the occupation classification refers to the "kind of work the person was doing at his job or business." The industry categories correspond to the Standard Industrial Classification System (U.S. Department of Commerce, Office of Management and Budget). They are broad and "may include occupations other than those concentrated in that industry." Furthermore, the same occupation may cut across several industries.

The class of worker refers to the "type of ownership of the employing organ ization." Four main classifications are used: private wage and salary, government, self-employed, and unpaid family workers. Although class of worker status is determined independently of industry and occupation, the same total job count by place is used for each classification.

The labor force equals the number of persons employed and those unemployed but actively looking for work. Persons younger than age 16, older than age 65, and those not working or actively seeking work are counted as "not in the labor force." Labor force participation rates are equal to the ratio of those in the labor force to the sum of those in the labor force plus those not in the labor force.

APPENDIX D

LIST OF TABLES

EMPLOYMENT AND LABOR

TAM D-1a EMPLOYMENT BY OCCUPATION IN 1970

SUB REGION	COMMUNITY	MGMT PROFESSNL TECHNICAL	SALES	ADMIN CLERK	SER-VICE	FARM FOREST FISH	PRODUCTN CRAFT REPAIR	OPERTN FABRICTN LABOR	TOTAL
1 LOWER KUSKOKWIM									
	QUINHAGAK	0	0	0	0	0	0	0	0
	PLATINUM	0	0	4	0	0	0	4	8
	GOODNEWS	0	0	5	0	0	12	7	24
	SUM	0	0	9	0	0	12	11	32
2 WESTERN									
	TWIN HILLS	0	0	0	5	0	0	0	5
	MANOKOTAK	7	0	0	0	14	0	10	31
	TOGIAK	28	0	0	5	0	5	0	38
	ALEKNAGIK "	6	0	0	0	0	0	0	6
	SUM	41	0	0	10	14	5	10	80
3 DILLINGHAM									
	DILLINGHAM	110	11	52	44	0	26	26	269
NUSHAGAK									
	KOLIGANEK	8	0	4	9	0	0	0	21
	EKWOK	0	0	5	4	0	0	0	9
	CLARKS POINT	15	0	0	0	0	0	0	15
	PORTAGE CREEK[a]	0	0	0	0	0	0	0	0
	NEW STUYAHOK	5	5	0	21	0	0	8	39
	SUM	28	5	9	34	0	0	8	84
5 ILIAMNA/KVICHAK									
	NEWHALEN	0	0	0	10	0	0	5	15
	ILIAMNA	15	0	0	0	0	0	0	15
	NONDALTON	0	0	0	16	0	0	0	16
	PEDRO BAY	6	0	0	0	0	5	5	16
	IGIUGIG	0	0	0	8	0	0	0	8
	LEVELOCK	0	0	0	0	0	5	9	14
	KAKHONAK[a]	0	0	0	0	0	0	0	0
	SUM	21	0	0	34	0	10	19	84
6 BRISTOL BAY BOROUGH									
	SOUTH NAKNEK	20	0	0	5	0	5	0	30
	NAKNEK	24	0	0	24	0	5	0	53
	KING SALMON	43	0	5	0	0	4	0	52
	SUM	87	0	5	29	0	14	0	135
ALL VILLAGES									
	SUM	287	16	75	151	14	67	74	684
REMOTE POPULATION									
	DILLINGHAM DIV.	15	0	0	6	0	0	0	21
	BRISTOL BAY BOR.	11	0	0	9	0	6	4	30
	SUM	26	0	0	15	0	6	4	51
CENSUS DIVISION TOTAL									
	DILLINGHAM DIV.	237	20	61	168	18	46	73	623
	BRISTOL BAY BOR.	98	0	5	38	0	20	4	165
	SUM	335	20	66	206	18	66	77	788

SOURCE: U.S. Bureau of the Census, Special Tabulations, CNT5, 1970.

NOTE : [a]Suppression

TABLE D-1b EMPLOYMENT BY OCCUPATION IN 1980

SUB REGION	COMMUNITY	MGMT PROFESSNL TECHNICAL	SALES	ADMIN CLERK	SER-VICE	FARM FOREST FISH	PRODUCTN CRAFT REPAIR	OPERTN FABRICTN LABOR	TOTAL
1 LOWER KUSKOKWIM									
	QU INHAGAK	18	"2	1	14	0	3	6	44
	PLATINUM	5	3	0	4	0	0	2	14
	GOODNEWS	3	5	5	5	0	2	3	23
	SUM	26	10	6	23	0	5	11	81
2 WESTERN									
	TWIN HILLS	2	0	0	0	3	0	0	5
	MANOKOTAK	9	0	0	15	22	2	0	48
	TOGIAK	29	0	3	21	2	0	5	60
	ALEKNAGIK	17	0	8	10	7	0	7	49
	SUM	57	0	11	46	34	2	12	162
3 DILLINGHAM									
	DILLINGHAM	261	39	101	67	25	52	111	656
4 NUSHAGAK									
	KOLIGANEK	19	4	0	6	14	0	5	48
	EKWOK	14	0	3	7	9	0	0	33
	CLARKS POINT	8	0	0	3	3	0	1	15
	PORTAGE CREEK	0	0	0	7	0	0	0	7
	NEW STUYAHOK	29	0	16	5	1	0	3	54
	SUM	70	4	19	28	21		9	157
5 ILIAMNA/KVICHAK									
	NEWHALEN	9	0	5	5	0	2	0	21
	IL IAMNA	14	0	0	0	0	0	0	14
	NONDALTON	24	0	0	7	0	0	8	39
	PEDRO SAY	0	0	0	0	0	0	0	0
	IGIUGIG	0	0	0	0	0	0	0	0
	LEVELOCK	16	0	0	12	0	0	1	29
	KAKHONAK	5	0	0	0	0	0	0	5
	SUM	68	0	5	24	0		9	108
6 BRISTOL BAY BOROUGH									
	SOUTH NAKNEK	6	0	7	9	7	9	0	38
	NAKNEK	36	10	23	25	12	18	7	131
	KING SALRON	44	5	5	11	0	17	4	86
	SUM	86	15	35	45	19	44	11	255
ALL VILLAGES									
	SUM	568	68	177	233	105	105	163	1419
REMOTE POPULATION									
	DILLINGHAM DIV.	4	0	12	1	0	0	0	17
	BRISTOL BAY BOR.	8	0	7	10	0	0	2	27
	SUM	12	0	19	11	0	0	2	44
CENSUS DIVISION TOTAL									
	ILLINGHAM Div.	555	49	171	204	111	63	155	1308
	BRISTOL BAY BOR.	94	15	42	55	19	44	13	282
	SUM	649	64	213	259	130	107	168	1590

SOURCE : U.S. Bureau of the Census, Special Tabulations, STF3, 1980.

TABLE D-2a INDUSTRY EMPLOYMENT IN 1970

SUB REGION	COMMUNITY	AGRI FORE ST MI NE FISH	CONSTR	MANUFACTURING DUR	MANUFACTURING NONDUR	TRANSP	COMM PUBLIC UTILITY	TRADE	PUBLIC ADMI N	FIRE BUSINSS REPAIR	PROFES	EDUCAT	OTHER	TOTAL
1 LOWER KUSKOKWIM														
	UTHHAGAK	NA	0	0	0	0	0	0	0	0	0	0	0	0
	PLATI NUM	NA	0	0	0	0	0	0	4	0	0	0	4	8
	GOODNEWS	NA	0	0	19	0	0	0	5	0	0	0	0	24
	SUM		0	0	19	0	0	0	9	0	0	0	4	32
2 WESTERN														
	TWIN HILLS	NA	0	0	0	0	0	0	0	0	5	0	0	5
	MANOKOTAK	NA	0	0	0	0	0	10	7	0	0	0	14	31
	TOGIAK	NA	0	0	0	0	5	6	5	0	6	16	0	38
	ALEKNAGIK	NA	0	0	0	0	0	0	0	0	6	0	0	6
	SUM		0	0	0	0	5	16	12	0	17	16	14	80
3 DILLI NGHAM														
	DILLI NGHAM	NA	10	0	0	43	13	41	27	0	61	48	26	269
4 NUSHAGAK														
	KOLTGANEK	NA	0	0	0	4	0	0	0	0	4	13	0	21
	EKWOK	NA	0	0	0	0	0	5	0	0	4	0	0	9
	CLARKS POINT	NA	0	0	0	0	0	5	0	0	0	10	0	15
	PORTAGE CREEK	NA	0	0	0	0	0	0	0	0	0	0	0	0
	NEW STUYAHOK	NA	0	0	8	0	0	5	10	0	5	11	0	39
	SUM		0	0	8	4	0	15	10	0	13	34	0	84
5 ILIAMNA/KVICHAK														
	NEWHALEN	NA	0	0	0	0	0	0	5	0	0	5	5	15
	ILIAMNA	NA	0	0	0	6	0	0	4	0	0	5	0	15
	NONDALTON	NA	0	0	5	0	0	0	0	5	0	0	6	16
	PEDRO BAY	NA	0	5	10	0	0	0	0	0	0	6	0	21
	IGIUGIG	NA	0	0	0	0	0	0	0	0	4	4	0	8
	LEVELOCK	NA	0	14	14	0	0	0	0	0	0	0	0	28
	KAKHONAK	NA	0	0	0	0	0	0	0	0	0	0	0	0
	SUM		0	19	29	6	0	0	9	5	4	20	11	103
6 BRISTOL BAY BOROUGH														
	SOUTH NAKNEK	NA	0	0	0	5	0	5	0	0	0	20	0	30
	NAKNEK	NA	0	0	0	0	0	14	15	0	0	19	5	53
	KING SALMON	NA	0	0	0	0	0	0	47	0	5	0	0	52
	SUM		0	0	0	5	0	19	62	0	5	39	5	135
ALL VILLAGES														
	SUM		10	19	56	58	18	91	129	5	100	157	60	703

Table D-2a Industry Employment In 1970
(Continued)

SUB REGION	COMMUNITY	AGRI FOREST MINE FISH	CONSTR	MANUFACTURING DUR	MANUFACTURING NONDUR	TRANSP	COMM PUBLIC UTILITY	TRADE	PUN. ADMIN	FIRE BUSINSS REPAIR	PROFES	EDUCAT	OTHER	TOTAL
REMOTE POPULATION														
	DILLINGHAM DIV.	NA	9	0	0	0	0	6	6	0	0	0	0	21
	BRISTOL BAY BOR.	NA	0	0	0	0	6	0	4	0	0	11	9	30
	SUM		9	0	0	0	6	6	10	0	0	11	9	51
CENSUS DIVISION TOTAL														
	DILLINGHAM DIV.	NA	13	19	37	58	27	87	80	11		143	55	642
	BRISTOL BAY BOR.	NA	0	0	0	5	6	19	66	0		50	14	165
	SUM		13	19	37	63	33	106	146	11	11?	193	69	807

SOURCE : U.S. Bureau of the Census, Special Tabulations, CNT5, 1970.

NOTE: NA = Not Available

TABLE D-2b 1NDUSTR% EMPLOYMENTIN 1980

SU REGION	COMMUNITY	AGRI FOREST MINE FISH	CONSTR	MANUFACTNG DUR	MANUFACTNG NONDUR	T RANSP	C OMM PUBLIC UTILITY	TRADE	PUBLIC ADMIN	FIRE BUSINSS REPAIR	PROFES	EDUCAT	TOTAL
1 LOWER KUSKOKWIM													
	QUTNHAGAK	0	8	0	4	0	0	6	8	0	6	12	44
	PLATINUM	0	0	0	0	0	0	3	6	0	2	3	14
	GOODNEWS	0	2	0	3	2	2	5	0	0	0	9	23
	SUM	0	10	0	7	2	2	14	14	0	8	24	81
2 WESTERN													
	TWIN HILLS	3	0	0	0	0	0	0	0	0	0	2	5
	MANOKOTAK	4	4	0	17	0	4	0	4	0	3	12	48
	TOGIAK	2	3	0	0	3	4	0	10	2	6	30	60
	ALEKNAGIK	7	1	0	0	10	2	0	11	0	5	13	49
	SUM	16	8	0	17	13	10	0	25	2	14	57	162
3 DILLINGHAM													
	DILLI NGHAM	30	44	7	8	56	26	79	97	51	121	137	656
4 NUSHAGAK													
	KOL IGANEK	14	5	0	0	3	0	1	3	0	0	22	48
	EKWOK	9	0	0	0	3	0	2	5	0	0	14	33
	CLARKS POINT	0	0	0	4	0	0	0	0	0	3	8	15
	PORTAGE CREEK	0	0	0	0	0	0	0	0	0	5	2	7
	NEW STUYAHOK	1	7	0	3	2	0	0	0	3	5	33	54
	SUM	24	12	0	7	8	0	3	8	3	13	79	157
5 ILIAMNA/KVICHAK													
	NEWHALEN	0	0	0	0	0	2	0	0	0	0	19	21
	ILIAMNA	0	0	0	0	0	0	0	0	0	14	0	14
	NONDALTON	0	8	0	0	0	0	0	2	0	4	25	39
	PEDRO BAY	0	0	0	0	0	0	0	0	0	0	0	0
	IGIUGIG	0	0	0	0	0	0	0	0	0	0	0	0
	LEVELOCK	0	0	0	0	7	0	0	0	0	4	18	29
	KAKHONAK	0	0	0	0	0	0	0	0	0	0	5	5
	SUM	0	8	0	0	7	2	0	2	0	22	67	108
6 BRISTOL BAY BOROUGH													
	UTH NAKNEK	18	2	0	0	0	0	2	4	2	4	6	38
	NAKNEK	14	1	0	9	13	12	23	15	2	9	33	131
	KING SALMON	3	0	0	0	10	3	10	53	0	2	5	86
	SUM	35	3	0	9	23	15	35	72	4	15	44	255
ALL VILLAGES													
	SUM	105	85	7	48	109	53	131	218	60	193	408	1419

Table D-2b Industry Employment in 1980
(Continued)

SUB REGION	COMMUNITY	AGRI FOREST MINE FISH	CONSTR	MANUFACTNG OUR	MANUFACTNG NONDUR	TRANSP	COMM PUBLIC UTILITY	TRADE	PUBLIC ADMIN	FIRE BUSINSS REPAIR	PROFES	EDUCAT	TOTAL
REMOTE POPULATION													
	DILLINGHAM DIV.	1	0	0	0	0	0	2	0	0	10	4	17
	BRISTOL BAY BOR.	0	0	0	2	4	0	4	10	0	5	2	27
	SUM	1	0	0	2	4	0	6	10	0	15	6	44
CENSUS DIVISION TOTAL													
	DILLINGHAM DIV.	96	81	7	71	92	41	93	149	56	192	43U	1308
	BRISTOL BAY BOR.	35	3	0	11	27	15	39	82	4	20	46	282
	SUM	131	84	7	82	119	56	132	231	60	212	476	1590

SOURCE: U.S. Bureau of the Census, Special Tabulations, STF3, 1980.

TABLE B-3 CLASS OF WORKER IN 1980

SUB REGION	COMMUNITY	PRIVATE WAGE AND SALARY	GOVERNMENT				SELF EMPLOY	UNPAID FAMILY	TOTAL EMPLOY
			FEDERAL	STATE	LOCAL	TOTAL GOV'T			
1 LOWER KUSKOKWIM									
	QUINHAGAK	18	9	0	17	26	0	0	44
	PLATINUM	3	4	5	0	9	2	0	14
	GOODNEWS	8	6	4	5	15	0	0	23
	SUM	29	19	9	22	50	2	0	81
2 WESTERN									
	TWIN HILLS	0	0	2	0	2	3	0	5
	MANOKOTAK	32	2	3	11	16	0	0	48
	TOGIAK	23	4	20	11	35	2	0	60
	ALEKNAGIK	12	12	18	7	37	0	0	49
	SUM	67	18	43	29	90	5	0	162
3 DILLINGHAM									
	DILLINGHAM	272	113	114	117	344	40	0	656
4 NUSHAGAK									
	KOLIGANEK	1	3	21	9	33	14	0	48
	EKWOK	0	7	11	4	22	11	0	33
	CLARKS POINT	4	0	6	5	11	0	0	15
	PORTAGE CREEK	0	6	0	1	7	0	0	7
	NEW STUYAHOK	13	0	37	4	41	0	0	54
	SUM	18	16	75	23	114	25	0	157
5 ILIAMNA/KVICHAK									
	NEWHALEN	0	2	19	0	21	0	0	21
	ILIAMNA	14	0	0	0	0	0	0	14
	NONDALTON	0	2	33	0	35	4	0	39
	PEDRO BAY	0	0	0	0	0	0	0	0
	IGIUGIG	0	0	0	0	0	0	0	0
	LEVEL(XX	2	7	12	6	25	0	2	29
	KAKHONAK	0	0	0	5	5	0	0	5
	SUM	16	11	64	11	86	4	2	108
6 BRISTOL BAY BOROUGH									
	SOUTH NAKNEK	22	4	5	7	16	0	0	38
	NAKNEK	59	13	19	27	59	13	0	131
	KING SALMON	23	45	16	0	61	2	0	86
	SUM	104	62	40	34	136	15	0	255
ALL. VILLAGES									
	SUM	506	239	345	236	820	91	2	1419
REMOTE POPULATION									
	DILLINGHAM DIV.	11	2	4	0	6	0	0	17
	BRISTOL BAY BOR.	10	15	0	0	15	2	0	27
	SUM	21	17	4	0	21	2	0	44
CENSUS DIVISION TOTAL									
	DILLINGHAM DIV.	467	170	370	196	736	103	2	1308
	BRISTOL BAY BOR.	114	77	40	34	151	17	0	282
	SUM	581	247	410	230	887	120	2	1590

SOURCE: U.S. Bureau of the Census, Special Tabulations, STF3, 1980.

APPENDIX E

LIST OF TABLES

EDUCATION

TABLE E-1 YEARS OF SCHOOL COMPLETED IN 1980
TOTAL POPULATION

SUB REGION	COMMUNITY	PERSONS 25 AND OLDER				
		ELEMENTRY	HIGH SCHOOL		COLLEGE	
			1-3 YRS	4YRS	1-3 YRS	4 YRS
1 LOWER KUSKOKWIM						
	QUINHAGAK	132	18	39	2	8
	PLATINUM	19	5	3	0	6
	GOODNEWS	55	0	13	4	4
	SUM	206	23	55	6	18
	MEAN	68.7	7.7	18.3	2	6
WESTERN						
	TWIN HILLS	17	0	7	2	0
	MANOKOTAK	82	3	17	3	1
	TOGIAK	125	11	41	18	20
	ALEKNAGIK	38	6	11	21	8
	SUM	262	20	76	44	29
	MEAN	65.5	5	19	11	7.3
3 DILLINGHAM						
	DILLINGHAM	154	32	266	140	185
4 NUSHAGAK						
	KOLIGANEK	46	0	12	0	8
	EKWOK	16	8	3	2	4
	CLARKS POINT	17	0	13	2	3
	PORTAGE CREEK	14	6	4	0	0
	NEW STUYAHOK	71	2	40	3	23
	SUM	164	16	72	7	38
	MEAN	32.8	3.2	14.4	1.4	7.6
5 ILIAMNA/KVICHAK						
	NEWHALEN	9	2	17	0	10
	IL IAMNA	0	0	25	15	0
	NONDALTON	45	0	24	0	11
	PEDRO BAY	0	0	0	0	0
	IGIUGIG	0	0	0	0	0
	LEVELOCK	29	3	18	3	3
	KAKHONAK	0	6	12	0	5
	sun	83	11	96	18	29
	MEAN	11.9	1.6	13.7	2.6	4.1
6 BRISTOL BAY BOROUGH						
	OUTH NAKNEK	17	6	31	3	8
	NAKNEK	17	26	61	25	30
	KING SALMON	11	21	154	93	45
	SUM	45	53	246	121	83
	MEAN	15	17.7	82	40.3	27.7
ALL VILLAGES						
	SUM	914	155	811	336	382
	MEAN	39.7	6.7	35.3	14.6	16.6
REMOTE POPULATION						
	DILLINGHAM DIV.	3	4	11	2	5
	BRISTOL BAY BOR.	11	0	15	11	16
	SUM	14	4	26	13	21
	MEAN	7	2	13	6.5	10.5
CENSUS DIVISION TOTAL						
	DILLINGHAM DIV.	802	127	615	240	345
	BRISTOL BAY BOR.	56	53	261	132	99
	SUM	858	180	876	372	444
	MEAN	429	90	438	186	222

SOURCE : U.S. Bureau of the Census, Special Tabulations, STF3, 1980.

APPENDIX F

LIST OF TABLES

CONSUMER PATTERNS

TABLE F-1a VALUE DISTRIBUTION OF OWNER-OCCUPIED[a] HOUSING IN 1970

SUB REGION	COMMUNITY	MEDIAN VALUE	LESS THAN $49999	$50000+	$100000 AND ABOVE
1 LOWER KUSKOKWIM					
	QUINHAGAK	NA	0	0	NA
	PLATINUM	NA	1	0	NA
	GOODNEWS	NA	46	0	NA
	SUM	NA	47	0	NA
2 WESTERN					
	TWIN HILLS	NA	1	0	NA
	MANOKOTAK	NA	44	0	NA
	TOGIAK	NA	50	0	NA
	ALEKNAGIK	NA	1	0	NA
	SUM	NA[b]	96	0	MA
3 DILLINGHAM					
	DILLINGHAM	NA	81	0	MA
4 NUSHAGAK					
	KOLIGANEK	NA	1	0	NA
	EKWOK	NA	1	0	NA
	CLARKS POINT	NA	1	0	MA
	PORTAGE CREEK	NA	0	0	NA
	NEW STUYAHOK	NA	1	0	NA
	SUM	NA	4	0	NA
5 ILIAMNA/KVICHAK					
	NEWHALEN	NA	1	0	NA
	ILIAMNA	NA	1	0	NA
	NONDALTON	NA	41	0	NA
	PEDRO BAY	NA	1	0	NA
	IGIUGIG	NA	1	0	NA
	LEVELOCK	NA	1	0	NA
	KAKHONAK	NA	0	0	NA
	SUM	NA	46	0	NA
6 BRISTOL BAY BOROUGH					
	SOUTH NAKNEK	NA	25	0	NA
	NAKNEK	NA	1	0	NA
	KING SALMON	NA	1	0	NA
	SUM	NA	27	0	NA
ALL VILLAGES					
	SUM	NA	301	0	NA
REMOTE POPULATION					
	DILLINGHAM DIV.	NA	13	0	NA
	BRISTOL BAY BOR.	NA	3	0	NA
	SUM	NA	16	0	NA
CENSUS DIVISION TOTAL					
	DILLINGHAM DIV.	NA	518	0	NA
	BRISTOL BAY BOR.	NA	62	0	NA
	SUM	NA	580	0	NA

SOURCE: U.S. Bureau of the Census, Special Tabulations, CNT5, 1970.

NOTES: [a]Universe equals owner-occupied and vacant housing units but excludes renter-occupied housing units.

[b]NA = Not Available.

TABLE F-1b VALUE DISTRIBUTION OF OWNER-OCCUPIED[a] HOUSING IN 1980

SUB REGION	COMMUNITY	MEDIAN VALUE	LESS THAN $49999	$50000+	$100000 AND ABOVE
1 LOWER KUSKOKWIM					
	QUINHAGAK	84800	44	94	301
	PLATINUM	9900	14	56	2
	GOODNEWS	9900	20	169	9
	SUM	NA	78	319	312
2 WESTERN					
	TWIN HILLS	20800	5	70	0
	MANOKOTAK	18200	48	301	24
	TOGIAK	48300	57	409	50
	ALEKNAGIK	27500	41	131	64
	SUM	28700	151	911	138
3 DILLINGHAM					
	DILLINGHAM	59900	1284	474	692
4 NUSHAGAK					
	KOLIGANEK	15700	48	160	36
	EKWOK	18900	33	102	13
	CLARKS POINT	17500	15	54	13
	PORTAGE CREEK	12500	7	55	13
	NEW STUYAHOK	57000	54	255	78
	SUM	24320	157	626	153
5 ILIAMNA/KVICHAK					
	NEWHALEN	27000	21	81	6
	ILIAMNA	57500	15	87	13
	NONDALTON	15800	35	172	25
	PEORO BAY	50000	0	0	0
	IGIUGIG	85000	0	0	0
	LEVELOCK	45000	29	83	47
	KAKHONAK	77000	5	22	23
	SUM	51043	105	445	114
6 BRISTOL BAY BOROUGH					
	SOUTH NAKNEK	15000	34	74	49
	NAKNEK	43200	120	256	138
	KING SALMON	65000	426	514	166
	SUM	41067	580	844	353
ALL VILLAGES					
	SUM	38322	2355	3619	1762
REMOTE POPULATION					
	DILLINGHAM DIV.	27500	16	42	24
	BRISTOL BAY BOR.	65000	27	75	40
	SUM	92500	43	117	64
CENSUS DIVISION TOTAL					
	DILLINGHAM DIV.	29100	1912	2991	1382
	BRISTOL BAY BOR.	41400	607	919	393
	SUM	70500	2519	3910	1775

SOURCE: U.S. Bureau of the Census, Special Tabulations, STF1, 1980.

NOTE: [a]Universe equals owner-occupied and vacant housing units but excludes renter-occupied housing units.

APPENDIX G

LIST OF TABLES

DRIFT GILLNET INCOME STATISTICS

ALEKNAGIK

DRIFT GILLNET INCOME

Year	Range	Highest	Lowest	Mean	Median	Std. Dev.	Kurtosis	Skewness
1982	85,573	86,642	1,069	36,399	36,202	21,849	0.164	0.583
1981	96,330	96,598	268	56,083	61,727	30,721	-1.122	-0.448
1980	53,900	54,140	240	30,186	32,616	15,601	-0.1388	-0.331
1979	103,791	110,123	6,332	50,790	46,650	30,439	-0.895	0.346
1978	91,037	92,586	1,549	37,791	29,351	23,342	-0.936	0.276
1977	32,624	32,794	170	17,362	15,781	11,265	-1.530	-0.126
1976	30,216	33,662	3,446	16,883	15,076	9,553	-1.367	0.297

INCOME BY RANGE

Year	Total Permits	Lower One-Third	Percent of Total	Middle One-Third	Percent of Total	Upper One-Third	Percent Of Total
1982	30	11.5*	38.3	14*5	48.3	4	13.3
1981	35	9	25.7	10.5	30.0	15.5	44.3
1980	34	9	26.5	12	35.3	13	38.2
1979	37	17	46.0	13	35.1	7	18.9
1978	36	18	50.0	12.5	34.7	5.5	15.3
1977	32	12	37.5	7	21.9	13	40.6
1976	33	15	45.5	8	24.2	10	30.3

* individual's earnings fell on range division cut-offs they were split between for statistical purposes.

Table G-2

CLARKS POINT

DRIFT GILLNET INCOME

Year	Range	Highest	Lowest	Mean	Median	Std. Dev.	Kurtosis	Skewness
1982	47,559	56,576	9,017	28,926	26,260	14.,147	0.255	0.792-
1981	**120,778**	120,985	207	72,269	65,513	38,612	-0 . 492	0.568
1980	**29,138**	54,390	25,252	41,648	**40,599**	8,892	-0.385	-00402
1979	**32,695**	96, 742	14,047	45,682	51,527	24,311	-0.396	0.23i4-
1978	**90,222**	91 ,551	1,329	37,662	29,530	27,426	-0.542	0.313
1 977	34,548	40,133	5,585	17,758	12,100	11,076	-00574	0.745
1976	31,157	34,832	3,675	17,024	15,982	9,843	-0075	0.421-

INCOME BY RANGE

Year	Total Permits	Lower One-Third	Percent of Total	Middle One-Third	Percent of Total	Upper One-Third	Percent Of Total
1 982	13	4	30.8	6.5*	50.0	2.5	19.2
1981	16	3	18.7	5	31.3	8	50.0
1 980	13	2	15.4	6	46.1	5	38.5
1979	15	6	40.0	8	53.3	1	6.7
1978	14	7	50.0	5	35.7	2	14.3
1977	16	9	56.2	4	25.0	3	18.8
1976	17	7	41.2	5	29.4	5	29.4

* Where individual's earnings fell on range division cut-offs they were split between ranges for statistical purposes.

Table G-3

DILLINGHAM

DRIFT GILLNET INCOME

Year	Range	Highest	Lowest	Mean	Median	Std. Dev.	Kurtosis	Skewness
1982	134,836	134,956	120	39,302	31,647	30,319	0.905	1.199
1981	149,515	149,922	407	65,301	67,519	34,335	-0.367	0.031
1980	79,174	79,440	266	35,806	37,526	18,419	-0.476	-0.105
1979	145,234	145,528	294	57,167	52,863	30,996	-0.033	0.428
1978	117,237	117,349	112	36,844	34,635	25,041	0.552	0.818
1977	46,367	46,422	55	94,301	13,823	10,409	-0.412	0.534
1976	48,854	48,933	79	14,751	12,695	10,734	-0.284	0. 584

INCOME BY RANGE

Year	Total Permits	Lower One-Third	Percent of Total	Middle One-Third	Percent of Total	Upper One-Third	Percent Of Total
I 982	191	132.5[4]	69.4	39.5	20.7	19	9.9
1981	195	62.5	32.0	104.5	53.6	29	14.4
1980	181	49.5	27.4	100.5	55.5	31	17.1
1979	178	83.5	46.9	79.5	44.7	15	8.4
1'378	163	99.5	61.0	53.5	32.8	10	6.2
1977	122	71	58.2	41	33.6	10	8.2
1976	118	71	60.2	38.5	32.6	8.5	7.2

•*Where* individuals earnings fell *on* range division cut-offs they *were* split between ranges for statistical purposes.

Table G-4

EKWOK

DRIFT GILLNET INCOME

Year	Range	Highest	Lowest	Mean	Median	Std. Dev.	Kurtosis	Skewness
1982	45,086	52,635	7,549	26,790	26,132	14,713	-0.268	0.271
1981	67,669	74,731	7,062	32,636	18,883	27,640	-1.396	0.792
1980	45,512	45,682	170	20,895	13,297	17,198	-1.546	0.328
1979	59,907	64,564	4,647	30,017	29,009	22,435	-1.371	0.372
1978	50,509	60,185	9,676	26,727	17,292	18,159	-0.926	0.759
1977	30,929	32,281	1,352	12,885	9,945	10,425	-0.182	0.912
1976	27,828	31,179	3,361	14,599	13,662	9,121	0.050	0.880

INCOME BY RANGE

Year	Total Permits	Lower One-Third	Percent of Total	Middle One-Third	Percent of Total	Upper One-Third	Percent Of Total
1982	9	4	44.5	3	33.3	2	22.2
1981	9	6	66.7	0	0.0	3	33.3
1980	9	5	55.6	1	11.1	3	33.3
1979	12	5	41.7	3	25.0	4	33.3
1978	11	6	54.5	3	27.3	2	18.2
1977	12	7	58.3	3	25.0	2	16.7
1976	11	" 4.5*	40.9	4.5	40.9	2	18.2

* Where individual's earnings fell on range division cut-off they were split between ranges for statistical purposes.

Table G-5

KING SALMON

DRIFT GILLNET INCOME

Year	Range	Highest	Lowest	Mean	Median	Std. Dev.	Kurtosis	Skewness
1982	76,794	82,650	5,856	34,564	34,972	24,484	0.226	0.824
1981	34,089	38,572	4,483	27,355	27,637	11,270	1.555	-1.304
1980	47,722	54,793	7,071	31,159	28,805	15,767	-1.059	0.053
1979	69,288	101,143	31,855	72,977	68,593	21,479	-0.454	-0.343
1978	32,647	34,864	2,217	21,182	21,650	9,738	-0.212	-0.556
1977	46,348	46,447	99	13,709	7,285	14,553	1.797	1.353
1976	30,328	31,400	1,072	15,566	14,897	12,450	1.348	0.317

INCOME BY RANGE

Year	Total Permits	Lower One-Third	Percent of Total	Middle One-Third	Percent of Total	Upper One-Third	Percent Of Total
1982	10	4	40.0	4	40.0	2	20.0
1981	8	1	12.5	2	25.0	5	62.5
1980	10	3	30.0	4	40.0	3	30.0
1979	11	1	9.0	5	45.5	5	45.5
1978	12	2	16.6	5	41.7	5	41.7
1977	10	7	70.0	2	20.0	1	10.0
1976	4	1	25.0	2	50.0	1	25.0

Table G-6

KOKNANOK

DRIFT GILLNET INCOME

Year	Range	Highest	Lowest	Mean	Median	Std. Dev.	Kurtosis	Skewness
1982	MISSING CASES							
1981	37,701	41,114	3,413	21,825	22,413	12,435	0.006	-0.017
1980	409644	44,515	3,871	19,692	18,994	12,230	1.153	0.814
1979	54,445	74,442	19,997	44,237	38,788	19,365	-1 .280	0.473
1978	12,974	22,621	9,647	16,001	15,441	4,218	0.224	0.227
19'77	6,435	10,537	4,102	6,301	5,643	2,272	0.264	1.003
1976	9,662	13,545	3,883	7,592	7,816	2,292	0. 940	0.673

INCOME BY RANGE

Year	Total Permits	Lower One-Third	Percent of Total	Middle One-Third	Percent of Total	Upper One-Third	Percent Of Total
1982	NO DATA						
1 981	7	2	28.6	3	42.8	2	28.6
1980	9	4	44.4	4	44.4	1	11.2
1979	9	4	44.4	2	22.2	3	33.3
1978	7	2	28.6	3	42.9	2	28.5
197'7	8	4	50.0	2	25.0	2	25.0
1976	9	4	44.4	4	44.4	1	11.2

Table G-7

KOLIGANEK

DRIFT GILLNET INCOME

Year	Range	Highest	Lowest	Mean	Median	Std. Dev.	Kurtosis	Skewness
1	30,209	34,758	4,549	18,659	19,700	9,020	-1.009	-0.191
1	70,387	84,592	14,205	51,772	50,830	18,430	-0.030	-0.440
1980	49,454	49,816	362	27,572	29,707	14,050	0.015	-0.726
1979	56,209	66,552	10,343	35,380	36,522	17,596	-1.049	-0.046
1978	49,048	52,166	3,118	30,935	31,425	15,214	-0.740	-0.314
1977	23,920	25,335	1,415	15,102	15,166	6,583	0.095	-0.4.19
197	1S,699	29,784	11,085	20,478	20,468	5,600	-0.565	-0.297

INCOME BY RANGE

Year	Total Permits	Lower One-Third	Percent of Total	Middle one-Third	Percent of Total	Upper One-Third	Percent Of Total
1982	18	6	33.3	6	33*3	6	33.3
1981	16	3.5	21.9	5.5*	34.4	7	43.7
1980	18	4	22.2	7	39.9	7	39.9
1979	14	5	35.7	6	42.9	3	21.4
1978	13	3	23.1	4	30.8	6	46.1
1977	13	2	15.4	6	46.1	5	38.5
1976	12	3	25.0	5	41.7	4	33.3

* *Where* individual's earnings fell on range division cut-offs they were split between ranges for statistical purposes.

Table G-8

MANOKOTAK

DRIFT GILLNET INCOME

Year	Range	Highest	Lowest	Mean	Median	Std. Dev.	Kurtosis	Skewness
1982	61,211	63,076	1,865	25,634	26,572	14,756	-0.656	0.236
1981	102,393	104,724	2,331	48,488	39,160	30,130	-1.273	0.139
1980	59,448	60,144	696	29,712	31,275	17,219	-1.366	-0.020
1979	116,276	120,253	3,977	42,922	32,481	27,995	-0.170	0.762
1978	115,241	1	1,362	31,625	22,045	27,263	1.886	1.419
1977	42,019	43,507	1,488	15,513	10,366	12,673	-0.455	0.912
1976	34,852	36,544	1,692	15,623	14,330	10,649	-0.988	0.549

INCOME BY RANGE

Year	Total Permits	Lower One-Third	Percent of Total	Middle One-Third	Percent of Total	Upper One-Third	Percent of Total
1982	46	20.5*	44.6	8.5	40.2	7	15.2
1981	48	22	45.8	11	22.9	15	31.3
1980	47	19	40.4	10.5	22.3	17.5	37.3
1979	39	23.5	60.3	11.5	29.5	4	10.2
1978	36	25.5	70.8	8.5	23.6	2	5.6
1977	38	25	65.8	5	13.1	8	21.1
1976	37	28	48.6	10	27.0	9	24.3

* Where individual's earnings fell on range division cut-offs they were split between ranges for statistical purposes.

Table G-9

NAKNEK

DRIFT GILLNET INCOME

Year	Range	Highest	Lowest	Mean	Median	Std. Dev.	Kurtosis	Skewness
1982	110,823	111,303	408	26,053	19,244	22,128	3.533	1.689
1981	101,622	102,540	981	39,741	41,109	21,529	1.040	0.412
1980	63,643	63,783	140	29,159	28,156	16,277	-0.574	0.242
1979	150,638	151,418	780	59,435	57,116	37,926	-0.423	0.333
1978	62,935	63,088	153	23,467	24,714	16,220	-0.109	0.576
1977	27,444	27,619	175	13,893	13,809	8,133	-1.015	-0.064
1976	21,181	21,362	181	10,725	10,887	6,229	-1.111	-0.082

INCOME BY RANGE

Year	Total Permits	Lower One-Third	Percent of Total	Middle One-Third	Percent of Total	Upper One-Third	Percent Of Total
1982	61	46	75.4	13	21.3	2	3.3
1981	54	20. 5*	38.0	29.5	54.6	4	7.4
1980	59	21.5	36.4	23.5	39.9	14	23.7
1979	55	20	36.4	27	49.1	8	14.5
1978	48	22	45.8	19.5	40.6	6.5	13.6
1977	46	16	34.8	16	34.8	14	30.4
1976	45	. 16	33.3	14.5	32.2	15.5	34.5

* individual's earnings fell on range division cut-offs they were split between ranges for statistical purposes.

Table G-10

PORTAGE CREEK

DRIFT GILLNET INCOME

Year	Range	Highest	Lowest	Mean	Median	Std. Dev.	Kurtosis	Skewness
1982	30,079	37,765	7,686	24,148	20,422	11,660	-0.856	0.082
1981	40,502	74,632	34,130	61,150	68,483	16,048	2.795	-1.654
1980	39,669	46,520	6,851	32,073	40,510	14,967	-0.725	-0.805
1979	60,384	71,442	11,058	419667	37,146	23,008	-1.490	-0.186
1978	35,248	79,104	43,856	54,073	46,665	16,741	3.879	1.961
1977	17,895	30,787	12,892	24,250	23,651	8,291	0.321	-1.161
1976	18,455	28,799	10,344	20,554	22,010	7,270	-10430	-0.332

INCOME BY RANGE

Year	Total Permits	Lower One-Third	Percent of Total	Middle One-Third	Percent of Total	Upper One-Third	Percent Of Total
1982		1	16.7	3	50.0	2	33.3
1981	5	1	20.0	1	20.0	3	
1980	7	1	14.3	2	28.6	4	57.1
1979	8	3	37.5	2	25.0	3	37.5
1978	4	3	75.0	0	0.0	1	25.0
1977	4	1	25.0	1	25.0	2	50.0
1976	7	" 2	28.6	2	28.6	3	42.8

Ta G-n

SOUTH-NAKNEK

DRIFT GILLNET INCOME

Year	Range	Highest	Lowest	Mean	Median	Std. Dev.	Kurtosis	Skewness
1982	89,522	93,445	3,923	2,542	13,469	26,002	1.589	1.609
1981	139,409	145,282	5,873	43,540	43,873	29,448	5.706	1.818
1980	79,972	88,394	8,422	32,543	26,541	20,757	2.161	1.285
1979	136,003	152,631	16,628	83,125	78,246	36,445	0.138	0.365
1978	55,568	57,205	1,637	29,206	25,547	18,161	-1.193	0.105
1977	60,629	65,080	4,451	21,876	16,467	16,898	5,339	2.074
1976	29,698	31,133	1,435	15,458	14,621	9,750	-1.222	0.085

INCOME BY RANGE

year	Total Permits	Lower One-Third	Percent of Total	Middle One-Third	Percent of Total	Upper One-Third	Percent Of Total
1982	24	19	79.2	2	8.3	3	12.5
1981	23	16.5*	71.7	5*5	23.9	1	4.4
4980	16	10	62.5	5	31.2	1	6.3
1979	14	5	35.7	5	35*7	4	28.6
1978	12	5	41●7	3	25.0	4	33.3
1977	10	6	6000	3	30.0	1	10.0
1976		4	36.4	3	27.2	4	36.4

* Where individuals earnings fell on range division cut-off they were split between ranges for statistical purposes.

Table G-12

TOGIAK

DRIFT GILLNET INCOME

Year	Range	Highest	Lowest	Mean	Median	Std. Dev.	Kurtosis	Skewness
1982	77,326	77,710	384	30,394	29,366	14,228	0.513	0.341
1981	96,742	103,407	6,665	27,879	27,731	13,596	9.768	1.959
1980	52,242	52,489	247	24,068	23,994	9,889	0.602	0.345
1979	108,033	109,075	1,042	37,469	33,909	19,838	2.423	1.287
1978	71,311	72,291	980	30,897	30,093	14,373	0.543	0.308
1977	45,890	50,283	4,793	22,413	20,997	10,276	0.085	0.523
1976	34,031	34,258	227	17,883	17,882	7,528	-0.340	-0.239

INCOME BY RANGE

Year	Total Permits	Lower One-Third	Percent of Total	Middle One-Third	Percent of Total	Upper One-Third	Percent Of Total
1982	87	34	39.1	48	55.2	5	5.7
1981	92	82. 5*	89.7	8.5	9.2	1	1.1
1980	95	24	25.3	59	62.1	12	12.6
1979	101	61.5	60.9	33.5	33.2	6	5.9
1978	99	32.5	32.8	56	56.6	10.5	10.6
1977	83	35	42.2	37.5	45.2	10.5	12.6
1976	74	13	17.6	39.5	53.4	21.5	29.0

* Where individual's earnings fell on range division cut-offs they were split between ranges for statistical purposes.

Table G-13

TWIN HILLS

DRIFT GILLNET INCOME

Year	Range		Lowest	Mean	Median	Std. Dev.	Kurtosis	Skewness
1982	51,474	52,836	1,362	27,433	26,316	17,212	0.826	-0.083
1981	30,213	31,130	971	20,244	22,792	10,456	2.804	-1.508
1980	6,401	21	15,030	18,584	17,987	26,792	-1.548	-0.179
1979	55,270	70,717	15,447	35,873	32,042	20,660	3.326	1.576
1978	36,805	52,129	15,324	34,271	34,518	15,809	-1.053	-0.167
1977	35,668	36,019	351	19,116	18,177	11,049	1.218	-0.207
1976	6,949	18,738	11,789	15,479	12,984	3,663	-5.549	-0.072

INCOME BY RANGE

Year	Total Permits	Lower One-Third	Percent of Total	Middle One-Third	Percent of Total	Upper One-Third	Percent Of Total
1982	6	1.5*			50.0	1.5	25.0
1981	6	1	16.7	1	16.7	4	66.6
1980	5	1	20.0	2	40.0	2	40.0
1979	5	4	80.0	0	0.0	1	20.0
1978	4	1	25.0	1	25.0	2	50.0
1977	7	1	14.3	4	5	2	28.6
1976	4	2	50.0	0	0.0	2	50.0

* Where individual's earnings fell on range division cut-off they were split between ranges for statistical purposes.

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