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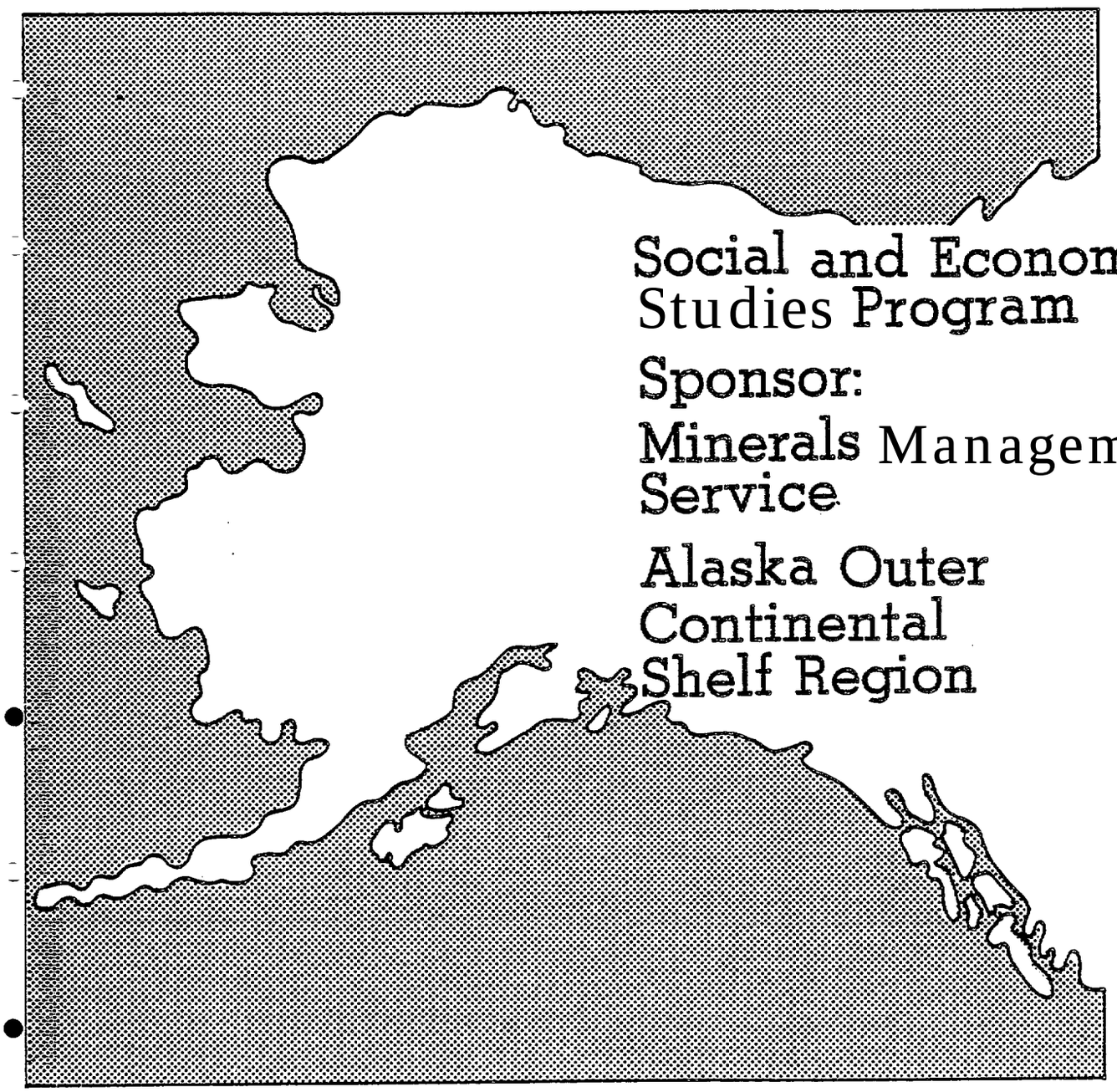

Social and Economic
Studies Program

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Alaska Outer
Continental
Shelf Region

• Social Indicators for OCS Impact Monitoring

Volume 1 of 3

The United States Department of the Interior was designated by the Outer Continental Shelf (OCS) Lands Act of 1953 to carry out the majority of the Act's provisions for administering the mineral leasing and development of offshore areas of the United States under federal jurisdiction. Within the Department, the Minerals Management Service (MMS) has the responsibility to meet requirements of the National Environmental Policy Act of 1969 (NEPA) as well as other legislation and regulations dealing with the effects of offshore development. In Alaska, unique cultural differences and climatic conditions create a need for developing additional socioeconomic and environmental information to improve OCS decisionmaking at all governmental levels. In fulfillment of its federal responsibilities and with an awareness of these additional information needs, several investigative programs have been initiated, one of which is the Alaska OCS Social and Economic Studies Program (SESP).

The Alaska OCS Social and Economic Studies Program is a multi-year research effort which attempts to predict and evaluate the effects of Alaska OCS petroleum development upon the physical, social, and economic environments within the state. The overall methodology is divided into three broad research components. The first component identifies an alternative set of assumptions regarding the location, the nature, and the timing of future petroleum events and related activities. In this component, the program takes into account the particular needs of the petroleum industry and projects the human, technological, economic, and environmental offshore and onshore development requirements of the regional petroleum industry.

The second component focuses on data gathering that identifies those quantifiable and qualifiable facts by which OCS-induced changes can be assessed. The critical community and regional components are identified and evaluated. Current endogenous and exogenous sources of change and functional organization among different sectors of community and regional life are analyzed. Susceptible community relationships, values, activities, and processes also are included.

The third research component focuses on an evaluation of the changes that could occur due to the potential oil and gas development. Impact evaluation concentrates on an analysis of the impacts at the statewide, regional, and local level.

In general, program products are sequentially arranged in accordance with MMS's proposed OCS lease sale schedule, so that information is timely to decisionmaking. Reports are available through the National Technical Information Service, and the MMS has a limited number of copies available through the Leasing & Environment Office. Inquiries for information should be directed to: Social and Economic Studies Program Coordinator, Minerals Management Service, Leasing & Environment Office, Alaska OCS Region, P.O. Box 1159, Anchorage, Alaska 99510.

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SOCIAL INDICATORS FOR OCS IMPACT MONITORING

Prepared for

Minerals Management Service
Alaska Outer Continental Shelf Region

Prepared by

Louis Berger & Associates, Inc.
Anchorage, Alaska

VOLUME I

May 1983

NOTICE

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Alaska OCS Social and Economic Studies Program

Social Indicators for OCS Impact Monitoring

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SOCIAL INDICATORS FOR OCS IMPACT MONITORING

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ABSTRACT

ABSTRACT

The final report of the OCS Social Indicators research project reports the findings of sociocultural research conducted in the Northwest Alaska Native Association (NANA) and Aleutian-Pribilof Islands regions. The objective of this research was to conduct primary ethnographic and secondary quantitative data research in two dissimilar Alaskan regions that are represented by very different corpora of baseline data, both in quality and quantity, to ascertain how and in what ways a 'systematic monitoring of community well-being and stress can be conducted.

The focus of the research was broad and generalized. The research team sought to determine the general types of changes and measurements of these changes that occur along a number of socioeconomic dimensions, consequent to broadly defined social and economic adjustments and variations. Our emphasis was on the definition of social indicators that, based upon the empirical data we collected, could be used to index the varieties of social change and re-adjustment that are typical of both study regions. In short, we were concerned with the discovery and documentation of social variables that, as indicators, represent a broad range of social facts, and that might be used as scientific tools evaluate ongoing change in these and other regions, that can be traced to development impacts.

The study team conducted research and analysis on primary ethnographic data as well as secondary aggregate quantitative data. The contextual background for the research and analysis was established through a review of available existing data and literature in which generalizations concerning sociocultural trends in the study regions were developed; the result of this review is Volume III of this report: "Baseline Ethnographic Description of NANA and Aleutian-Pribilof Regions".

The villages selected for primary field research study were Kotzebue, Selawik, Noatak and Kiana in the NANA region, and Unalaska, King Cove, Nikolski and St. George in the Aleutian-Pribilof region. Long time series of aggregate secondary data were also collected at both the regional and village levels; these time series are indexed and described in Volume II, Appendix D, "The Present State of Well Being in "Two Selected Regions of Alaska". The primary field research was conducted for

a period of two weeks in each village. This research was guided by data collection protocols corresponding to key domestic and institutional topics.

The aggregate and primary field data were collected independently and one goal was the comparison of these independent data sets to determine if aggregate time series were sensitive to impacts we could document in the field, such that selected time series might be used as monitoring indicators. Several series of data manipulations were performed on both primary field and aggregate data, creating multiple ordinal and bivariate matrices of comparisons after the data were sorted, coded and ranked. Finally, a smallest space analysis was conducted to identify the most conspicuous clusters of variables, and distinguish the variables that best serve as indicators of the larger clusters of variables. Concluding hypotheses were prepared that seek to account for these clustering patterns, contingent on further tests of the hypotheses at other points in time.

None of the indicators identified in this analysis are linked statistically to all variables, but rather tend to be tightly linked to variables in the clusters in which they reside*. The variables corresponding to non-governmental source of income, domestic functions and child-rearing, and household dynamics seem to indicate many other variables relating to income, subsistence and family organization (nine variables in all). In a second cluster, seven variables are indicated by our variables of earned governmental-source income, and village size; these seven variables relate primarily to attitudes and expectations concerning political, social, and economic issues, and economic dependency. A third cluster of variables (related to income pooling and distribution, service use, economic strategies and attitudes) is best represented, or indicated by our household income variable, and a variable characterizing income source, predictability, and stability. A fourth cluster consisting of many critical variables concerning subsistence and wage practices, Westernization, and traditional patterns is strongly indicated by the variables of household size, resource

*Nonetheless, there are many dimensions along which one or several variables may indicate other variables in other clusters.

pooling and sharing, and subsistence expenses. A fifth cluster of institutional variables related to institutional structure and organization in the study communities is indicated by the variables of Native institutional representation, sodality memberships, and perceptions of institutional control.

Judging by joint analyses of primary and aggregate data, the aggregate time series that are the most sensitive indicators of institutional and domestic changes are internal growth, school enrollments, government and private sector employment, and welfare payments; social welfare caseloads may represent another indicator.

The powerful aggregate and primary field data indicators are seen to be complementary because 'they overlap functionally in indicating numerous types of dependencies and the ramifications of these dependencies. Although the time series data may have less utility as indicators for a number of reasons, research showed that selected powerful events can be detected by the t ime series data record; specifically, the research showed that the Alaska Native Claims Settlement Act and recent 200 m ile territorial limit legislation had measurable impacts evident in many time series. These findings are summarized in the concluding hypotheses along with a proposed methodology for testing the hypotheses at two additional points in time.

A research validation and monitoring methodology is proposed, based on the assumption that the social dynamics of Alaskan villages can be captured by a few key indicators and that impacts on social well-being from OCS as well as other development can be observed by measuring these indicators over time. This methodology requires that the indicator system be measured at two additional points in time in a wide variety of villages, including a sample of villages where OCS development is unlikely and villages outside the two study regions. By analyzing the relationships among measurements in three time periods, the indicator system can be refined until it is optimally unbiased and reliable. Observation of villages unlikely to be affected by OCS activities and those outside the NANA and Aleutian Pribilof regions will ensure cross sectional control. A first round protocol is proposed to operationalize a set of preliminary indicators which can be utilized by MMS until the validation has been completed.

CHAPTER I

INTRODUCTION

I. Introduction

This project was conceived by the Alaska OCS Office of the Minerals Management Service (MMS), Department of the Interior, in order to provide the MMS with a more thorough understanding of the present state of community well-being within a pair of geographic study regions, the Northwest Alaska Native Association region (NANA) and the Aleutian-Pribilof Islands region, with special attention devoted to the areas of social, economic and cultural change that may result from OCS development. The ultimate goal beyond the descriptive and analytic tasks necessary for achieving these broad ends was the creation of tangible scientific tools useful for gauging and monitoring these changes. The specific objectives for the study include:

- the development of a broad cultural context and setting in narrative form within which the study could be situated, planned and carried out.

- the identification and analysis of quantitative data depicting the present status of well-being in the study areas.

- the collection and analysis of supplementary and corroborative primary qualitative data that would assist in the interpretation of existing data.

- the identification of formal and informal, domestic and institutional structures and practices within selected communities that may act to guide, mediate, filter, transform, ameliorate, avert, or otherwise respond to changes and the stresses that may accompany changes.

- the development of methodologies, hypotheses, ideas, or models which may be used by MMS in monitoring changes that may accompany OCS development, based on the research findings that accumulate from the above objectives.

Louis Berger and Associates was the contractor responsible for managing the project; the technical team consisted of Dr. Robert Weisz (Principal Investigator), Drs. Joseph Jorgensen and Charles Cortese (Senior Advisors), Dr. Richard McCleary

(Quantitative Sociologist), Steven McNabb (Chief Field Anthropologist), Paul Wasserman (Aggregate Data Specialist), Paula Rasmus, Bert Griest, Roland Booth, and Lorraine Topping (Field Researchers), and Darcy Lockhart (Data Coder). Peter Cook of Louis Berger & Associates was Project Manager.

The final document consists of three volumes: Volume I, "Social Indicators for OCS Impact Monitoring", represents the text and major narrative detailing all project activities and findings. This Volume in turn consists of six Chapters including this introduction.

Chapter II (Theory and Background) reviews background issues and data and charts out some of the key conceptual elements that structured the research, all of which provides a context for our work, both in terms of concrete analytic and procedural issues as well as general placement of our work within the tradition of indicators research in general. This Chapter first discusses prior social indicator research; then it details a selection of social and institutional trends in Alaska as a whole and in the study regions in particular, and finally integrates the generalizations and data peculiarities gleaned from this overview within a perspective of indicators research. It also outlines a framework for conducting indicator investigations in rural Alaska which is sensitive to rural Alaskan conditions, and designed to embrace both accessible data and empirical social phenomena.

Chapter III, Methods and Approach, consists of two sections. The first provides a general overview of methodological issues and techniques and the second is devoted to specific procedures employed in the study.

Chapter IV, Community Conditions in the NANA and Aleutian-Pribilof Regions is devoted to a mid-range discussion of initial and provisional, suggestive findings that guided the later stages of analysis. As such, Chapter IV represents a refinement of crude early assumptions and hunches, and in turn a precursor of final analyses and the concluding hypotheses. The reader should bear in mind that this coverage illustrates interim "working hypotheses" that are consonant with analysis and data at the study mid-point, but that were cumulatively refined as the study progressed. This coverage is subdivided into a display of regional-level data, community-level data, and a final section which discusses the possible meanings of these interim analyses

and findings as they may relate to formal or informal, domestic and institutional mechanisms of adjustment and accommodation to change.

Chapter V, Conclusions, reduces and synthesizes the many diverse results and addresses these results in three sections presenting aggregate data analyses, primary data analysis, and finally an integration of both analysis that reveals the most promising potential indicators and exposes their associations and joint meanings. The final Chapter (Validation and Monitoring System) takes these results one step further and presents an operational definition of the hypothesized indicators, the validation requirements for this set of indicators, and the procedures recommended for actively employing such indicators in a monitoring scheme (once such a system is validated).

The remaining two Volumes are supporting documents. Volume II, Technical Appendices, includes those Appendices that flesh out the procedures, rationale, measurement criteria, and other technical details that are useful for some audiences in their review of this study, but not for all. These Appendices include the field research protocols, variable definitions, a guide to analytic matrices constructed in order to compare and contrast variables in a number of different ways, and an aggregate data inventory which lists all the data sets collected and analyzed as part of the study. Additional Appendices are discussed but not included in this Volume. These are the primary data coding sheets and the aggregate forecasts, and are available for public review through the Alaska OCS office.

Volume III, Baseline Ethnographic Description of NANA and Aleutian-Pribilof Regions, establishes a cultural context within which the research could be couched, and because it is a cohesive document it can stand alone as a descriptive ethnographic sketch, or can be used as a supporting document juxtaposed against the other project findings. This Volume discusses the historical and contemporary sociocultural practices and organizations in the study areas, institutional and domestic trends, social, political and economic patterns, and worldview elements that are crucial to the overall sociocultural context of adaptation and change in the study regions. Some key trends that initially seemed critical in the determination of current as well as future changes are identified here.

We would be failing our larger mission if we did not express our sincere gratitude and thanks to the persons and organizations that actively and eagerly supported our research, provided direct assistance, and in many cases suffered many hours of questioning on our part, and necessary and rudimentary tutoring on their own, but for our benefit. In particular, NANA Corporation, Maniilaq Association, the NANA Region Spirit Committee, Aleutian-Pribilof Islands Association, and City Councils, IRA's and Corporations in each study village in a very real way made this study productive and possible. The cooperation of PHS, the Alaska Departments of Labor, Public Safety, Health and Social Services, and other governmental agencies was also critical to the success of this study, and is much appreciated.

CHAPTER II

THEORY AND BACKGROUND

II. Theory and Background

A. Introduction

Chapter II is divided into three parts: social indicator research, social and institutional trends in Alaska and a framework for the analysis of community well-being in Alaska. Section B reviews social indicators research in general as well as in the context of Alaska and describes the differences between social indicators for rural-Alaska and those relevant for the larger society. Section C illustrates the social and institutional trends, first in Alaska then in the study areas, and displays the data concerning sociocultural change, economics, health and social welfare trends appropriate to this study and the NANA and Aleutian-Pribilof regions. The final section sets forth the methodology developed by the study team to measure the structural relations and significant meanings of rural Alaskan villages and to evaluate conflicts and contradictions in meanings, behavior and organization.

B. Social Indicator Research

1) A General Review

In The Wealth of Nations, Adam Smith proposed a simple relationship between individual and corporate well-being: As the corporation (or nation) flourishes, so does the individual. Modern economic theory follows Smith's dictum for the most part. Economists today speak of wealthy and poor nations, for example, implying that the citizens of wealthy nations are better off than the citizens of poor nations; and economists tell us that the United States is wealthier today than at any time in its history, implying that we are better off now than our parents were in their time.

There are obvious limits to this logic. Contrasts and comparisons of this sort have nevertheless become a fundamental goal for modern economic analysis. When the government proposes new economic programs, tax reductions or increases, tariffs, and so forth, the success or failure of the program is measured in terms of its impact on the national income or Gross National Product (GNP) which, in simple terms, is defined as the total

value of goods and services generated by the economy. Real growth in GNP is a desired end of any government program because, presumably, as national income increases, so do the incomes of the individuals, families, and households who constitute the nation.

The concept of GNP became a de facto social indicator central to government planning as early as the eighteenth century, although reliable measures of GNP did not become available until the early twentieth century. Much of the basic research in this area is due to Havelmo, a Swede, and to Kuznets, an American.

The use of GNP as the primary measure of societal well-being assumes that any increase in GNP is necessarily an improvement over the status quo. As the country flourishes, that is, so do its citizens. This point is debatable, of course, and we will have more to say about this assumption shortly. Second, we must assume that GNP estimates are roughly comparable longitudinally and cross-sectionally. On this point, Kuznets himself stated that: "The difficulties in measuring economic growth... lie precisely in this point: modern economic growth implies major structural changes and correspondingly large modifications in social and institutional conditions... Yet for the purposes of measurement, the change component of the structure must be reduced to a common denominator" such as GNP which masks these changes. (1959:15)

The dilemma Kuznets speaks of here is easily illustrated. In 1932, Herbert Hoover ran for re-election promising "a chicken in every pot and a car in every garage". This description of economic prosperity was apt and meaningful in 1932; twenty years later, however, the standards of economic prosperity had changed radically. The prosperous American family of 1952 would own a small black and white televisions for example, as well as a number of household appliances that had not been invented in 1932; and fifty years later, the standards of prosperity had changed again. In 1982, even the poorest American family might own a large color television. The poor of 1982 in this sense are economically better off than the wealthy of 1932.

Changes in the quality and types of goods and services available to the consumer over time make it difficult, though not impossible, to compare GNPs from different eras. In the same

sense, structural differences between nations make cross-sectional GNP comparisons difficult. Is the average Japanese family better off economically than the average American family? Yes and no. The average middle class American family home, for example, would be beyond the economic reach of many wealthy Japanese families. The average middle class Japanese family, on the other hand, would routinely have many goods and services that the average American family could not afford. These cross-sectional differences cannot be interpreted literally, of course. In the United States, housing is an important component of the economy because, due to culture and tradition, housing is important to American families. The Japanese could easily afford American-style housing but, due to culture and tradition, the Japanese choose to concentrate their economic potential on other goods and services.

Economists solve this dilemma by taking cultural differences or "tastes" as a given. GNPs are then translated into dollars (or some other currency convertible to dollars) and this universal unit of economic output makes it possible to compare GNPs longitudinally or cross-sectionally. Using the dollar as a basic unit of economic output, economists argue that the average American family is better off today than in 1932; and that the average American family is better off than the average Japanese or Canadian family. The average American family has a higher dollar-income today than in 1932; and the average American family has a higher dollar-income than the average Japanese or Canadian family.

For a long period of time, economic well-being was the sole indicator of what we call the "quality of life". Government policy during the last century, in fact, was aimed almost exclusively at the goal of eliminating poverty, often at the expense of other social goals. The rationale for this narrow view was the universally held belief that poverty caused all social ills, especially crime and mental illness. The relationship between economic well-being and personal happiness has more recently fallen into question. Deterioration of the environment (air and water quality) and mounting social problems (war, crime, and so forth) raise the possibility that, although individuals, families, and households are better off economically today than ever before, the real quality of life has not increased or, perhaps, has actually decreased since the end of World War II. Furthermore, although the average American family

has a higher dollar-income than the average Japanese or Canadian family, the average Japanese or Canadian family may nevertheless be happier than the average American family.

The social indicators movement grew from the post-war recognition that the quality of life had noneconomic dimensions and, hence, that an increase in GNP could not guarantee an increase in the quality of life. For our purposes, we define a social indicator as any datum (archival record, questionnaire response, observation, and so forth) that measures the basic quality of life in a population. A social indicator implicitly excludes GNP, median family income, or any other parochial economic datum. And in all cases, a social indicator will reflect some objective national goal or priority. The elimination of crime is a national goal, for example, so the Uniform Crime Reports (Federal Bureau of Investigation, 1982) and the household victimization surveys (Department of Justice, 1975) are important social indicators; similarly, a cleaner, safer environment is a national goal, so measures of ambient air and water quality are important social indicators. None of these indicators are positively correlated with GNP, of course, and environmental indicators may actually be negatively correlated with GNP. More important, however, along with GNP, these social indicators give 'government planners a composite picture of the quality of life.

The first noneconomic indicators of national well-being were collected in the mid-1930's. Public opinion researchers at that time began to ask samples of the American public questions about personal happiness and the quality of life (Gallup, 1972). Although these data were not collected primarily for use as social indicators, they mark the start of social indicator research as we understand it today: A recognition that personal happiness has social and psychological dimensions that are not wholly dependent on economic well-being. In addition to this privately sponsored research, the Roosevelt administration implemented a rudimentary program of social reporting, resulting in the publication of Recent Social Trends in the United States (President's Research Committee on Social Trends, 1933).

The first real step toward developing a comprehensive system of consistent, meaningful social indicators was taken by psychologists. In 1957, the Institute for Social Research at the University of Michigan conducted a survey of the American

population to ascertain the quality of individual life experiences (Gur in, Veroff and Fe Id, 1960). Supported by the National Commission on Mental Illness and Health, the survey was aimed at measuring:

> "the mental health of the nation. ..the level at which people are living with themselves ---their fears and anxieties, their strengths and resources, the problems they face and the ways they cope with them".

Psychologists had previously devoted much effort to measuring these variables at the individual level in both clinical and laboratory-experi menta 1 milieus but the Gurin-Veroff-Feld research was the first attempt at measuring these variables across the entire adult population.

In 1961, the National Opinion Research Center at the University of Chicago replicated the Gurin-Veroff-Feld mental health questionnaire. The published reports of this replication (Brad burn and Caplovitz, 1965; Brad burn, 1969) permitted a longitudinal comparison of mental health for the American public. At approximately the same time, Cantril (1965) administered a mental health questionnaire to sample populations in 13 nations. By 1970, these psychological indicators were routinely used to make cross-sectional and longitudinal contrasts, that is, to determine whether the mental health of the American people was improving or deteriorating over time; and whether the American people were better or worse off than the citizens of other nations with respect to mental health.

Formulating a meaningful social indicator is not a straightforward task, of course, even at the level of the individual. If we ask a stranger "are you happy", the answer will usually be uninterpretable because some people always answer affirmatively, some negatively; some people will lie and some will misunderstand the question; and some people who answer negatively may have every right, by objective criteria, to be happy. This is the essential problem with psychological data as social indicators. They are subjective data and, although they may have relative interpretations --- in cross-sectional and longitudinal contrasts, for example --- there is no simple operational bridge between these data and the quality of life. Cantril's cross-national research in particular was criticized

for ethnocentrism, that is, for ignoring culturally defined differences in mental health.

In the 1970's, social, indicator research moved away from traditional (but subjective) psychological measures towards more objective or, at least, objectifiable measures. A Presidential task force had earlier identified a set of Goals for Americans (President's Commission on National Goals, 1960) which, for the most part, set the agenda for social indicators research in 1960's and 1970's. The impetus for social indicator research during this later period was not wholly governmental, however. The Russell Sage Foundation, for example, sponsored several influential research projects (Sheldon and Moore, 1969; Campbell, Converse and Rodgers, 1976). The most notable product of this research effort was a broad consensus among social scientists and government planners on a list of social indicator dimensions. Terlecky (1975) cites 18 such dimensions including health; public safety; basic education; higher education; income level; earning ability; income adequacy; income continuity; economic equality; racial equality; sexual equality; housing and neighborhoods; pollution control; outdoor recreation; preservation; discretionary or leisure time; science; and the arts.

It is important at this point to note a practical difference between a system of social indicators and GNP. While both purport to measure the well-being of a society, a social indicators system has no universal unit of well-being. From a macroeconomic perspective, two $10,000 cars are equivalent to one $20,000 car. A family who owns two Chevrolets, in other words, is no better or worse off than a family who owns one Cadillac. Since a social indicator system has no universal metric of well-being, however - no dollar - there is no simple method of comparing two distinct indicators. Suppose, for example, that society could either cure cancer or reduce highway fatalities by twenty percent but not both. We might be able to rationally choose between these two national priorities because they share a metric: human lives saved. But if the third option were a ten percent reduction in crime or a fifteen percent increase in ambient air quality, no simple, rational choice would be possible. When regional differences are considered, choices and trade-offs of this sort are even more problematic. Californians might think that improving ambient air quality is a more

important goal than reducing crime while residents of New York City might feel exactly the opposite.

Beginning in the early 1970's, however, social indicators research started moving toward the goal of a social accounting system (see, e.g., Juster and Land, 1981). In 1969, the federal government published its first annual social report (Department of Health, Education and Welfare, 1969). This first report was speculative and largely experimental. Subsequent reports have become more regular and systematic, however, giving an interesting if not useful picture of the progress made towards national goals.

In the context of a social accounting system, social indicators research has achieved a status parallel to that of macroeconomic research in an economic accounting system. The federal executive and legislative branches, that is, receive annual reports on the state of the national economy; and since the middle 1970's, both branches have received annual reports on the quality of life, defined in terms of social indicators and national goals. In both cases, the reports serve a planning and monitoring function.

Our present research, albeit experimental, is oriented toward planning and monitoring the impact of oil and gas development on the quality of life in Alaskan villages. It is not clear, of course, how one might measure the quality of life in an Alaskan village. Our research consciously follows the social indicators tradition, however, which implies a discrete set of values and assumptions. We assume, for example, that the quality of life in Alaskan villages can be measured both cross-sectionally and longitudinally; we can compare the quality of life across a sample of several villages, that is, and we can monitor changes in the quality of life for a single village over time. Social indicators for Alaskan villages, in this sense, will be similar to social indicators for the larger society. But the similarity ends there because we cannot assume that the status quo, or standards of personal happiness, for an Alaskan villager will be the same as the status quo for individuals and households in the larger society.

To illustrate this point, we need only consider the issue of public health. As a region of the United States, Alaska has many goals and priorities which are not shared with other regions.

Alaskans place a high priority on preservation of wilderness areas and economic development, for example. But regional differences on the issue of public health are virtually nonexistent. Public health is an indisputable national goal which is as important in Alaska as it is in any of the other 49 states. The indicators of public health, moreover -- infant mortality, physicians per capita, visits to clinics, and so forth -- are universally accepted as unambiguous measures of the quality of life.

This standard indicator is not applicable to Alaskan villages, however. Our research shows a very interesting health practice pattern: The use of Native healers, as opposed to exclusive reliance on Western medical facilities, varies by area. Drawing from cross-tabulations of field data representing a first phase of our analysis, we find that the two study regions are quite different in terms of health care patterns.

Use of Native Healers

	Used Native Healers	
Region	YES	NO
NANA	100%	0%
Aleutian-Pribilof	0%	100%

That is, 100 percent of the NANA region sample uses Native healers, while 100 percent of the Aleutian-Pribilof sample does not. Thus the use or disuse of Native healers is not an unambiguous indicator of health status, health priorities, or health service utilization, not to mention well-being as it might be defined in association with health phenomena. Judging by these initial data, health-related indicators in rural Alaska may vary in their meaning and sensitivity cross-sectionally (that is, across and between areas).

Our research in Alaskan villages also shows another interesting "public health" phenomenon: The use of Native healers varies with household income. Using $20,000 per year as the cut-off between "high" and "low" incomes, the relationship between household income and use of Native healers is given by the following table:

Household Income in Relation to Native Healers

Income	Used Native Healers	
	YES	NO
Low	20%	80%
High	68%	32%

Only one of five households with annual incomes under $20,000 utilizes native healers, versus two of every three households with annual incomes over $20,000. As household income increases, so does the use of Native healers. More to the point, in Alaskan villages, as household income increases, the use of modern medical facilities, especially public health clinics may decrease.

We must bear in mind, of course, that all of the Native healer users are in the NANA region, while all of the non-users are not; this breakdown is, if anything, a secondary overlay that in itself masks the regional cross-sectional variation but nonetheless shows what may be a significant cross-sectional variation based on income.

Some measures of public health (infant mortality, disease, etc.) may indeed have the same meaning for the quality of Alaskan village life as for the quality of life in the larger society. But other measures of public health (visits to clinics) have very different, idiosyncratic meanings. In almost every other region of the United States, people rely on folk medicine or nonmedical treatments because adequate public health clinics are not available.

The first task of any social indicator research project is to identify a set of goals or priorities which the social indicator system must reflect. In the broader national context, these goals and priorites were determined by the political process. As noted earlier, of course, the relative importance of any particular national goal may vary by region of the country. Regional differences are relatively small, however, because, with only minor exceptions, all regions of the United States share a

language, culture, and history. But as the unit of reference or level of aggregation grows smaller -- region, state, city, neighborhood, and so forth -- differences grow larger. When we consider the task of measuring the quality of life in an Alaskan village, differences in language, culture, and history cannot be "assumed away" as one might do with regional differences. We cannot simply "modify" the standard set of national goals and priorities so as to reflect the unknown but salient differences. We must instead begin our research by developing a set of goals and priorities that have real meaning and consequences for the daily routines of Alaskan village life. Rather than basing our social indicator system on the set of goals and priorities which have traditionally informed the social indicators research, we have instead relied on field research in Alaskan villages to develop a meaningful set of goals and priorities.

Having identified a consistent set of' goals and priorities, our research task reduces to a straightforward -- though not at all simple -- exercise in social logic. First, the set of goals and priorities identified from field research must be defined in an operational sense. This often amounts to specifying each abstract goal or priority as a protocol response. Second, the set of operational ized goals and priorities must be reduced to a smaller set of dimensions.

The statistical procedures required for this task will also be discussed in some detail at a later point. For the time being, however, we may describe these two tasks in very general, functional terms. First, to be useful for cross-sectional and longitudinal monitoring, any system of social indicators must be replicable. Operational ization of the system ensures this. Second, the operational ized system must be reduced to a manageable form. It is relatively easy to compile a list of all possible operational izations. But it is relatively difficult in practice to use a large, exhaustive set of operational izations. This second task is undoubtedly the most important result of our research. If the system cannot be reduced to a-parsimonious set of dimensions, it will be relatively useless as a planning and monitoring instrument.

2) Indicator Research in Alaska

By and large the portrait of indicator research precedents in Alaska is quite similar to that evident throughout the United States, except that few indicator studies or programs have been conducted, and those that have been are quite recent. One programmatic and research constraint that is perhaps more conspicuous in Alaska than elsewhere is the general paucity of adequate data. The chief similarity between the Alaskan case and the wider U.S. case is that, in general, (1) there have been very few controlled, experimental, empirical studies of social change and underlying social and community elements which indicators should sensitively measure, and which go beyond simple *a priori* and *ad hoc* assumptions about these changes and elements. relative to the larger number of studies and programs that as a-whole (2) simply describe socioeconomic data and changes to these data through time, and which hinge on presumed self-evident assumptions and connections between variables, for which no validation is attempted or even provisionally or heuristically hypothesized. This section will briefly describe and compare two sets of indicator precedents, the first represented by two empirical studies and the second by two applied indicator programs designed for planning purposes.

In 1979 the Institute for Social and Economic Research published a predictive indicators study sponsored by the Outer Continental Shelf Office, BLM. The goal of the research was to establish a means for anticipating the socioeconomic effects of energy developments in Alaska. Quoting from the study,

> "The primary problem addressed by the research is that the same general type of energy development is likely to result in different changes among individuals and communities. (The research) . ..attempts to explain these differences. Our explanation is based on the idea that observable community and individual characteristics somehow influence the effects of outside forces of change". (ISER 1979:I-1)

Thus the study explicitly recognizes that there are many avenues for change to penetrate communities and domestic groups, and that these changes can be mediated in many ways; furthermore, similar changes may lead to different ends. The study therefore

implicitly recognizes that change and response to change is structural in form; that is, changes are not "received" by social entities in a vacuum, but are absorbed, restructured and transformed in a manner partly determined by the nature of the social entity in question and the forms of social and institutional organization that typify it.

This study is far superior to most indicator precedents in Alaska, in that the ISER methodology (1) is explicit; (2) employs a comparative approach (which compares Fairbanks and Valdez as surrogates for communities that are likely to be affected by energy developments) in which the deficits of the research sites are clearly illustrated; (3) attempts to embrace a pre - and post-intervention design, whereby two points in time are compared in order to ascertain if the given variables vary through time in the predicted fashion; and (4) recognizes changes to both communities and individuals within those communities. The study identified a number of variables that might prove useful as indicators, some of which varied across communities, some of which varied not across communities but from energy project to energy project, individual-level variables that varied between communities and stratified or differentiated populations within communities, and perceptual variables that seemed to be associated with local attitudes about changes in the community. Many other findings were developed, and these illustrate only types of findings rather than tangible and particularistic conclusions.

However, the study results explicitly note that these variables and the methodology that embraces them do not represent a predictive capability. Furthermore, although the general approach recognizes the structural nature of change and response to change, in many cases the findings skirt a true structural explanation. For instance, of four key community-level variables identified as significant characteristics in the study (i.e., uncertainty, information accuracy and credibility, resources, and procedures), only the latter two can clearly be construed as structural elements; the former variables, uncertainty and information accuracy and credibility, cannot be operational ized in a structural fashion as they stand. Information transfer as a general phenomenon is just that, a phenomenon; as such it begs the structural definition until it is couched within an organizational matrix that fixes it and defines its place within a patterned and ordered set of institutional and domestic

variables. Even the final variable, procedures employed in response, is quite a complex variable.

Dixon's (1978) exemplary study of the consequences of the pipeline boom on Fairbanks, on the other hand, took great pains to address hidden and self-evident assumptions about available data and their meaning head-on, and to tease out the ramifications of aggregate data and community or institutional changes for individuals, and vice versa. Furthermore her study not only claimed explicitly to recognize the structural dimensions of change, the methodology and findings achieved this end. She explains that:

> "...impacts are not simply a function of population increases, but rather result from the structure of in-migration and the structure of the community... a community is not merely a passive recipient of change; it has the power to affect the shape of change" (Dixon 1978:119).

Employing a cultural ecology model, she used the concept of carrying capacity to illustrate how excessive demands on services and the physical infrastructure of Fairbanks selected for certain kinds of individual response on the part of the poorer residents, and other kinds of response on the part of the rich; thus a diverse variety of particularistic responses occurred within a general context of change. As services are swamped, utilities overburdened, and the availability of goods hampered, innovative responses occur that depart from those predicted by "standard" models based on statistically normal populations; and, in turn, as these services and the infrastructure change to accommodate these pressures, the larger community and its many integrated structures achieve a new equilibrium, a larger "carrying capacity", and in fact a new structural integration that makes today's Fairbanks qualitatively different from yesterday's; thus even assumptions firmly based on empirical reality before the boom cannot hold today. Just as the meaning of unemployment in the U.S. has changed, due to structural transformation of the larger economy (cf. section 11.B), so has Fairbanks as it is constituted by a set of social organizations (cf. Dixon 1978:268-281).

The numerous data, case histories, and anecdotes Dixon brings to bear on the issue of change in Fairbanks clearly illustrate these points and challenge the traditional assumptions about linear and standardized forecasts of social change. For instance, pre-boom forecasts envisaged squatter communities and incredible burdens on housing. Although available housing was not able to absorb the in-migrants, no squatter communities emerged. Fairbanks acted as a "sponge", absorbing newcomers in part because of the structure of the arriving population and their attitudes about housing. In 1975 the vacancy rate was 0.6 percent in Fairbanks; yet more in-migrants were appearing every day. But although the number of residential water hook-ups increased by only 1 percent between 1974 and 1975, water consumption increased by 25 percent; similar findings are evident for electrical hook-ups and consumption. It is probable that in-migrants were absorbed by existing households.

Dixon's study, however, was not an attempt to define social indicators, but was rather an attempt to describe a social impact case and assess its magnitude and broad ramifications. However, one by-product of her work is the use of data as indicators in the Fairbanks area.

In the mid-1970's, the Fairbanks Pipeline Impact Information Center began a series of irregular published reviews of impact-related data and analyses that quickly become a monthly report. These reports, geared toward specific impact topics, tended not to follow a standardized format and reported on sets of data that might differ from month to month, depending on the issues and topics at hand. This series was expanded and, became a quarterly document, taking on at this time more of a socioeconomic and specifically economic focus. However, by the close of the pipeline boom in the late 1970's the focus shifted again, away from specific pipeline impacts and more toward a general socioeconomic accounting and monitoring scheme; the title changed as well, now to the Community Information Center and its publication, the Community Information Quarterly. In the 1980's a more critical perspective on reported socioeconomic data has been injected. This very brief history charts in the most general way the changing aims as well as credibility of the social monitoring format used by this arm of the North Star Borough.

The Fairbanks North Star Borough publishes a collection of socioeconomic data at quarterly intervals; these data, assembled by the Community Information Center, are intended to provide a review of socioeconomic indicators, presumably for planners and businesses, although the meaning of these indicators, the reality of what they are intended to actually indicate, is unclear. In 1979, for instance, this review displayed 75 types of data classified into five main categories: economic trends, employment, housing and energy trends, cost trends, and social trends.

These data have a surface validity that is no stronger than what can be assessed by "eye-balling" the data. The meaning of these data is unclear, and in point of fact controversial in many cases. Their use in planning, not to mention scientific studies, is problematic. Although many data sets used by Dixon in her earlier work are included, their use in this review is cloudy. We must bear in mind one of her most important points, that is, that the meaning of these data can change through time and is thus always problematic; this point in not addressed or broached in any way in these quarterly reviews.

Although this quarterly review does use some data sets explored by Dixon (for instance, Tok Alcan highway crossings, air traveler residences and Fairbanks deplanements as rough indices of immigration) that have been empirically and critically assessed locally for their sensitivity, other similar planning documents fall short of this measure. The Kenai Peninsula Borough publishes a document entitled Situation and Prospects annually. Quoting from the document, this report is intended to:

> ". ..provide data measuring economic and social changes to community residents, officials and businessmen, and ...(analyze) changes as they may result from oil and gas activities and other individual developments influencing growth...(and) is tailored to address the needs of investors. ..and government agencies looking further into the Borough's future" (Kenai Peninsula Borough 1982).

In past years this review has reported quarterly data, although now the document is prepared annually. As in the Fairbanks case, the content of this series has shifted through the years as

regional issues and priorities and population and economic structure have changed. Currently this annual review collects and displays data in eleven categories: population, housing, utilities and related services, public safety and health, education, employment, inflation, business activity, assessed values and revenues, resources, and a final catch-all category that includes among other items flood data and traffic information. Although the organization of the review departs from that employed by the Fairbanks North Star Borough and more categories of data are detailed (87 data sets), the purpose and, in fact, most of the information is quite similar. However, in the Kenai case, a claim is made for much greater utility and validity. In reality, though, all the same criticisms can be leveled at this annual review; these data are not indicators, their meaning is problematic, they may change in meaning through time: this is a descriptive review that displays data, not indicators of objective conditions.

The purpose of this section has not been to criticize planning documents or particular studies, but rather to forcefully show how weak most indicator precedents are in Alaska. We will be seriously mislead if we allow ourselves to construe some of these documents especially the agency planning reviews, as real "indicator" documents. Alaska is not alone in lacking a well defined concept of what indicators are and what they can be used for, as well as their constraints and the conditions under which they are useful. It is against this backdrop that the Social Indicators study described in this report should be assessed.

C. Social and Institutional Trends in Alaska

1) Introduction

This section illustrates and discusses social and institutional trends in Alaska, with a specific focus on the two study areas, the NANA region and the Aleutian-Pribilof Islands. The general objective of this section is to provide a bridge between the discussion of background issues and theory pertinent to social indicator research on the one hand, and the framework for the analysis of community well-being employed in this study on the other. A more specific objective is the display of numerous data concerning sociocultural change, economics, health, and social welfare trends relevant to this study and the study regions. These data will provide a broad descriptive base that will promote a common understanding of local conditions on the part of the reading audience, so as to ensure an informed understanding of these conditions at the outset and alert the audience to those characteristics of the study regions that deserve attention in any study of well-being in rural Alaska.

This section is divided into three parts. The first subsection will discuss general sociocultural trends in each area, including subsistence and economic change, social organization, demography, and historical changes to populations, institutions and communities. The second subsection will address mental health, mortality, and morbidity. This discussion will cover both general statewide rural characteristics as well as localized conditions in the study regions. The third subsection will focus on economic and social welfare indicators in the study regions.

2) Generalized Sociocultural Trends

Postwar society in general, and Alaskan village life in particular, has been characterized by rapid change. The sources of change are not always obvious and, in some cases, the ultimate consequences of change are unpredictable. In every case, we must nevertheless interpret social well-being in the context of change and this presents real problems.

To illustrate this problem, consider how the nature of unemployment has changed over time. In the early 1950's, unemployment rates averaged four to five percent of the workforce. In the late 1970's, on the other hand, unemployment rates averaged seven to eight percent of the workforce. One might easily conclude that the quality of life, or social well-being, has deteriorated substantially since the 1950's. But this conclusion is not wholly valid. The interpretational problem here is a result of the changing nature of unemployment from 1950 to 1970. In 1950, for example, slightly less than thirty percent of the eligible females participated in the workforce while in 1970, slightly more than fifty percent of the eligible females participated in the workforce. Female workforce participation is only one dimension of the change, of course. Government programs such as AFDC (instituted in the 1950's) and foodstamps (instituted in the 1960's) must also be considered. Overall, however, the social meaning of unemployment has changed so dramatically in the last thirty years that we may not interpret it literally as an indicator of social well-being.

Assuming that past economic trends continue into the future, this will also be true of unemployment in Alaskan villages during the 1980's. In Chapter V.A., we present four-year forecasts of selected social and economic series and, in the Aleutian-Pribilof region, these forecasts portend significant change in the economy. Four-year changes for six employment sectors are:

Manufacturing	+48.4%
Federal Government	+ .4%
Service	+11.2%
Trade	- 8.1%
State/Local/Government	+19.5%
Construction	-58.8%

The most striking changes are in construction and manufacturing employment and in unemployment. The former is expected to decline while the latter is expected to increase. At the risk of oversimplification, we may say that we expect the Aleutian-Pribilof economy to become less seasonal; more stable; more bureaucratized or formalized; and more industrialized. And the social meaning of unemployment is expected to change accordingly. As village social routines change in response to changes in the regional employment economy, we expect villagers

to become more susceptible to the social ills of unemployment. Unemployment will become a more important, more sensitive indicator of social well-being.

The employment economy of the NANA region, in contrast, consists of only four sectors. If no significant mineral development occurs in the region, four-year changes for these sectors are expected to be:

Transportation	-22.2%
Federal Government	+20.0%
Trade	-19.1%
State/Local Government	+43.2%

The largest employment sector in the NANA region is government. In the near future, we expect the dominance of government employment to increase and, as a result, we expect the NANA economy to be nearly immune to unemployment.

The point we are trying to make here is now obvious. First, unemployment-- or any statistic for that matter--has no absolute value as a social indicator. Its social meaning in the NANA villages is quite different from its social meaning in the Aleutian-Pribilof villages. Second, and more important, its social meaning will change over time. In the Aleutian-Pribilof villages where unemployment is already an "important" social indicator, it will grow more important. And in the NANA villages where it is now a relatively "unimportant" social indicator, it will become even less important.

To some extent, the forecasts we present in Chapter V.A. give a consistent picture of the future. But in other cases, the picture is obscured. This is particularly true when we consider village-specific change. In the NANA region, for example, Kotzebue and Selawik have radically different demographic futures. Four-year forecast changes in net growth statistic (births minus deaths) for the NANA villages are:

Kiana	.0%	No change
Kotzebue	-44.2%	
Noatak	+ 8.0%	
Selawik	+98.5%	

Kiana and Noatak are expected to be demographically stable in the near future but Kotzebue and Selawik are expected to change dramatically.

Demographic statistics constitute a class of social indicators per se, of course, but demographics also underlie a broader set of phenomena, including crime, employment, public health, and mental health. Much of the gross increase in crime for the U.S. since 1950, for example, can be attributed to the post-war "baby boom". We expect to find analogous phenomena in any village that experiences dramatic demographic shifts in the near future. The problem raised by anomalies of this sort should be obvious. Any change in a social indicator should imply some change in the quality of village life or community well-being. In the face of demographic shifts, however, this simple interpretation must be questioned.

We will describe pertinent changes in Chapter V and, in the context of this change, interpret our social indicators. Additionally, however, we describe a broader set of social and institutional trends. For this purpose, trends are best viewed in terms of a locus. Some trends are realized at the village level, for example. One village will change but all other villages will remain unchanged. Other trends are realized at the region-level. All the villages in one region may change, that is, while the villages in another region remain unchanged. Finally, some changes are realized statewide.

A. NANA

'1) Subsistence and the Local Economy in the NANA Region

The traditional cycle of subsistence activities was and remains closely calibrated to the migratory habits of game animals and fish, as well as precipitation, ice conditions, and the physical topology of the land. The closely attuned relations between these elements have been noted on numerous occasions in the literature, but. can hardly be overstated. High levels of precipitation delay or even prevent fish harvests; ice movements are frequently the deciding factor in successful sea mammal harvests; the north-south versus east-west configurations of rivers create completely different ecological zones, each with their own types of resources available on different but normally

predictable schedules; the generally northeast to southwest migration routes of caribou cause different calendars of availability depending on location (thus caribou are available near Buckland in late fall, winter and very early spring, whereas they are available twice, in spring and fall, on the Kobuk); the migratory habits of fish like the sheefish cause them to be accessible twice on the lower Kobuk, but only once in the upriver area near Kobuk village. These natural principles and the many other factors that surround them form the basic hunting and fishing lore of the NANA region Inupiat and underpin their larger economic strategies, now as in the past.

The transition to today's economy and a complex mixture of local resource extraction and wage and cash practices has been much the same for all the Inupiat in the region, even given the real exceptions or localized variations we can identify. Although it would be incorrect to say that some subsistence practices have been discarded, it is a fact that the intrinsic weighting or loading individual practices now have is different, and thus the likelihood that they will be pursued is different. "Subsistence" takes cash, and it is an expensive proposition. The Inupiat, like anyone else, take numerous factors into account in making decisions about sustenance and the domestic economy. Traditional activities like ptarmigan hunting, rabbit and muskrat hunting, fish trapping and the like are on the wane, or have been absent in some areas for many years. Caribou hunting and fish gill- and seine-netting, however, are very conspicuous in all villages. Today over 60% of the Inupiat protein intake and most of their caloric needs are accommodated through subsistence; in many villages all of the fresh vegetable produce is gathered, for some families (cf. NANA Regional Strategy 1979).

Subsistence practices and wage-cash incomes are tightly integrated in a single economy here; it is in fact misleading to use separate terms to describe the whole. Although many activities are disappearing, like trapping and small game hunting, they frequently re-emerge anew in times of economic uncertainty. During 1980 when CETA and other cutbacks threatened the economic stability of most villages, there was a resurgence of subsistence activities that had been practiced only marginally for many years. Young men were out hunting muskrats for clothing in large numbers; new trap lines were established, and to cut down on gas prices new dog teams came into being. In some villages the number of Inupiat mushers has doubled in two years

(McNabb, personal observation). Even given the "snow machine revolution" the numbers of dogs and available sleds has not decreased in the area in the last 15 years (cf. Foote 1965, Moore 1980). They remain an available resource, one that people, at least some people, are willing to use again.

Subsistence planning remains a strategic process, one that people in the region consciously reflect upon, especially with regard to cash needs. It is not uncommon at all for families to mull over their needs for a new boat or a new net for subsistence, or a new rifle or ammunition for hunting, and then try to determine how to collect the needed cash. Often an adult son or daughter will be subtly assigned to take a job; they will then work just long enough to purchase the items needed. On the other hand people will often evaluate the pros and cons of certain kinds of employment, knowing that they require a job but knowing also that they must integrate their work schedule with hunting and fishing. Each is constantly evaluated in terms of the other; opportunity costs and real rewards are always two-sided. Subsistence is a volatile issue today, both locally and Statewide. Frequently uninformed observers are mystified by the actual practices they see, since it becomes clear very quickly that people do not simply hunt and fish, or alternatively work. One would be hardpressed to find some ideal, truly "traditional" family and village, where all hunted and fished exclusively; nor could one find many families or villages where everyone worked for wages. The blends are complementary and complex. This trend of complementary blending of economic practices has roots deep in the past.

It is important to note that the structure of the economy encourages local Inupiat to be suspicious of the cash elements of their economy, and in the long run encourages as well more optimism about the advantages of maintaining a subsistence local resource regime. About 88% of the region's economy is based on government funds, in the form of wages, direct and indirect transfer and other payments, and State and Federal grants and contracts. Two-thirds of the regional income is based in Kotzebue and the remainder in the outlying villages, while Kotzebue represents half the population (Derbyshire and Associates, 1981). Government payments fuel the economy in a very real way, and the air charter services, taxis, Dairy Queen and other businesses are totally dependent on a continuing flow

of government money into the region. This is felt acutely by the Inupiat, although it is hardly understood and is a constant source of mystery and confusion. Cutbacks come and go, and reliance on wages would be, in the minds of most, a foolish decision. Jobs are capricious and unpredictable, as the recent CETA cutbacks brought home to the people. Nonetheless, cash is a necessity, even in order to hunt and fish. The ambivalence and anxiety people feel about money is pronounced; but now, as probably in the past people see there is no way to escape their dependency on this fickle resource.

2) Polity and Social Organization

Although Inupiaq social structures have undergone tremendous alteration in the last 100 years, the kinship-based relations and obligations, the village-specific identity, and mutual aid and assistance networks remain relatively strong. Leadership and social organization processes are a different situation. Although the role of strong families remains central to current politics and in all local institutions, the traditional style of leadership is eroding rapidly. New institutions are taking the place of traditional dispute resolution mechanisms, organizing principles, child-rearing techniques, spiritual practices, and health care. In many cases these institutions are simply an overlay, a thin veneer over Eskimo ways of doing things that are still quite strong; children, for instance, still learn primarily by precept and respond weakly at best to the hierarchical bureaucratic education as it is practiced.

Although Inupiaq leadership is achieved in large part by personal charisma, as it was in the past, today's requirements for leadership include facility in English and Western economic and other bureaucratic systems. Successful leadership today calls for acculturated Natives who are willing to be assertive, bold and competitive; a strong family helps in recruitment for support, but it is hardly necessary in the long run. Today's successful leaders may share many attitudes and goals in common with their neighbors, but many leaders are drawn from families with roots in the early commercial merchant families, who were in the vanguard of first sustained contact in the region.

Today polity and social organizational processes tend to centralize powers and institutional authority at regional hubs (Kotzebue in this case), and thence outward with stronger rather

than diminished links to outside bureaucracies, whereas in the past these powers and responsibilities were vested in the individual family and secondarily in the community (historically a fluid entity at best). This process of institutionalization is common to most colonial settings around the world, and is notable in the NANA region.

Institutionalization has accelerated, and it is more immediate and visible, but there has been a major change in the last two decades: The level of Native participation in these organizations has increased, and a variety of new Native organizations have formed. A year after the Northwest Alaska Native Association formed to engage in land claims activities, the K.D.C. (Kikiktagruk Development Corporation) organized in 1967 under grants through the U.S. Office of Economic Opportunity. In 1971 the NANA Regional . Corporation was formed and aligned itself with the Northwest Alaska Native Association; village corporations were also organized, and all save the Kotzebue Corporation (K.I.C.) merged with NANA in 1975. In 1972 the Northwest Alaska Native Association was separated from NANA Regional Corporation and renamed Manilliq Association, becoming the non-profit organization to develop social programs. The Kotzebue Area Health Corporation incorporated in 1973, and then merged with Manilliq Association in 1975. The manpower and training branch of Manilliq Association had by 1980 separated from the parent corporation, forming Mauneluk Manpower.

Under the terms of the Indian Reorganization Act of 1934, individual villages have formed IRA Councils (Tribal Governments). With the exception of Noatak, all villages are incorporated as second-class cities. In Kotzebue, which for many years was dominated by whites on the City Council (Smith 1966), Native participation in city government has increased. The establishment of a Rural Education Attendance Area in the region in 1976 boosted the level of Native participation in official organizations and in Board or advisory capacities. These multiple overlays and checkerboards of authorities and organizations have led to much confusion in the region, as is natural. The unique Alaskan dual form of government, with city councils on one side (recognized by the State but ignored by the Federal Government) and IRA Councils on the other (recognized by the Federal Government but ignored by the State), lead to complex planning and administrative problems for villagers. Participation or lack of participation in these institutions is

frequently a political statement in itself. Noatak chose not to incorporate as a city precisely to avoid some of these problems, but most notably to continue an exclusive IRA form of government organization which, as opposed to city government, could allow them to control the entry of outsiders into their village (McNabb, personal observation).

3) Demographic Shifts and Mobility

The history of the region has frequently been seen as one of constant catastrophe and abrupt change, especially since prolonged contact with Western society began. Unfortunately we have little solid evi dence about the lives of people in the region before the turn of the century. Some experts and researchers have attempted to reconstruct elements of social life prior to this time, however. Ray (1967, 1975) and Burch (1980) both agree that there were in fact a number of distinct societies in Northwest Alaska before the turn of the century. Ray chose the term “tribes”, while Burch preferred the term “societies”. In any event, both were trying to emphasize that there were a number of politically and socially distinct groupings in the area, each with its own dialect, its own territorial boundaries, its own routine of subsistence and ecological adaptations, its own limited kinship network. Each was largely autonomous and separate. Their separate subregions were presumably jealously guarded, and trespass by outsiders even from adjoining subregions was cause for serious repercussions in many instances.

There was a series of large-scale population movements in the region and from the region near the turn of the century. Their causes are due in part to historical crises, but to other factors as well. The decline in the caribou herd late in the 19th century, epidemics that were especially severe on the Arctic coast at the same time, and the economic opportunities provided by the presence of Western whalers in the Barrow to Herschel Island area, all served to draw people from the interior Northwest region to the north. By 1885 the original population of the Arctic coast had been halved due to disease, and this situation created a population vacuum that migrants from the upper Noatak and Kobuk Rivers started to fill; in addition, close to 170 whalers wintered over between Barrow and Herschel Island from 1889 to 1914 (Foote 1964). There were far more caribou in this area, and moreover the whalers who wintered over

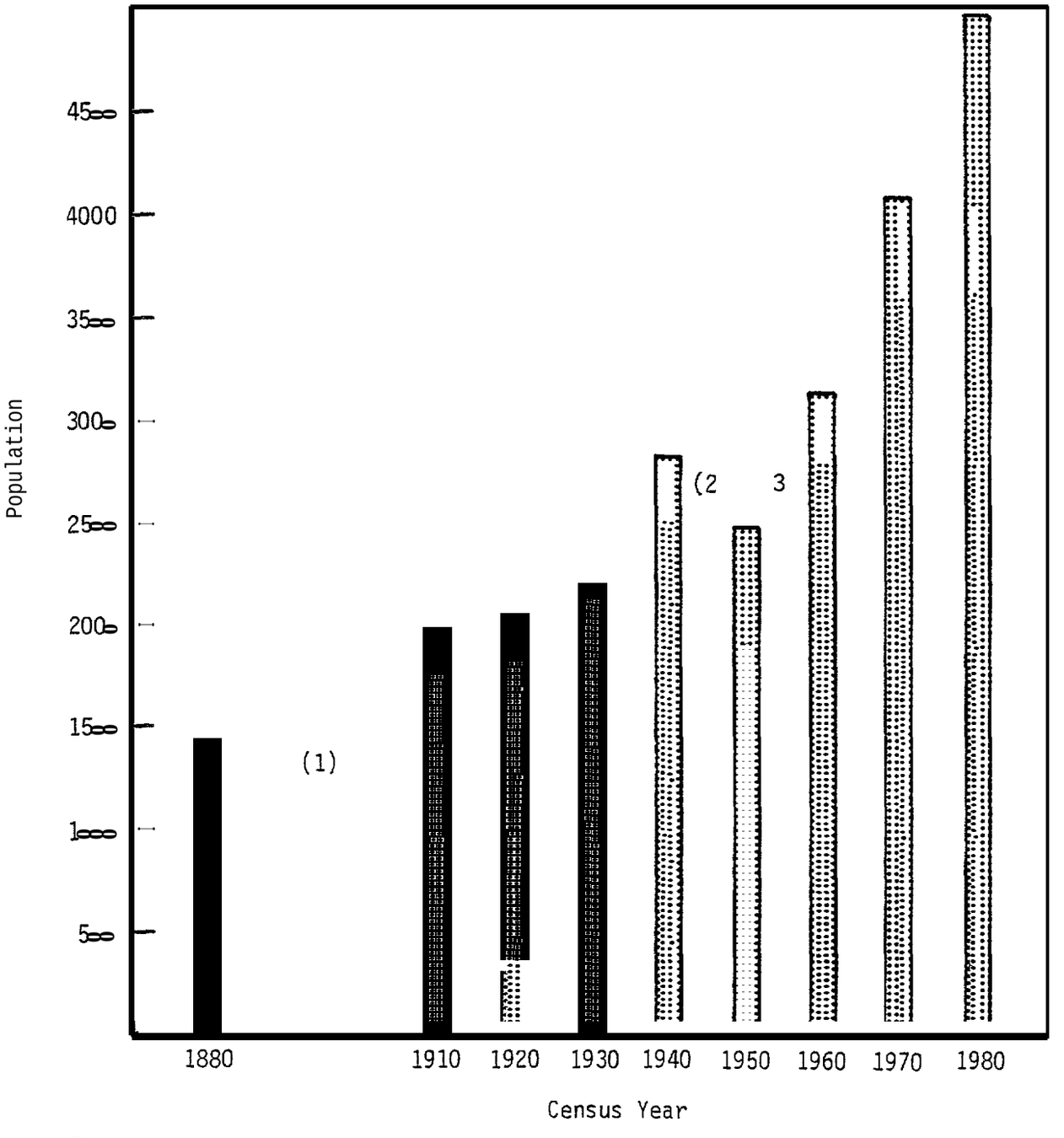
needed fresh meat which they would pay for in goods. The Arctic coastal area and the adjacent interior hinterlands become attractive sites for settlement by migrants from the south.

By the time the bottom dropped out of the whaling trade during the first decade of the 20th century, the Eskimos were left with a stronger dependence on imports and a depleted resource base. After 1906, however, the fox pelt market became more lucrative while the whaling trade dropped off. The MacKenzie delta, was also a population void and at the same time an area incredibly rich in fox and other resources. A movement into Canada began. Judging by current population figures for the MacKenzie delta and average birth rates, it is possible that over 200 Kobuk and Noatak Eskimos relocated to Canada during this period. This number represents in excess of 15% of the NANA region population at that time, and probably represents "one-third of the Kobuk and Noatak population during the same periods. Stefansson (1913:71) noted that the majority of the Eskimos at Cape Smythe during this time were from the upper Colville, Noatak and Kobuk Rivers. Gubser (1965) described a similar migration for many of the interior Nunamiut of the Brooks Range and inland valleys. The point to be made from these movements is that, although disaster and hardship were powerful factors unchanging the lives of Inupiat here, the picture one is left with is one of mobility, pragmatic thinking, and flexible economic adaptation on the part of these people. It would be too pessimistic to look at history as a story of people always fleeing from calamities they have no control over. The history seems to be a chronicle of widespread, conscious adjustment and accommodation to rapid change.

Intra-regional population and demographic changes are summarized below. Figure 1 outlines the entire NANA region population for the last 1(90 years. Because census figures are nearly useless for 1890 and 1900, those decades are deleted entirely. The population as it was enumerated increased by 48% between 1880 and 1910, or just less than 15% per decade. (1) refers to this block of time. (2) indicates the first major documented drop in population. Occurring during the war, this drop is associated with outmigration (largely by Whites, most probably, from the Seward Peninsula mining districts) and the first effects of TB in the region. (3) marks the beginning of a recovery in population and rapid growth in the post-war period.

FIGURE 1

NANA REGION POPULATION



Source: U.S. Census

While looking at the entire NANA region population, we should add that until the 1920's this does not really represent a village-based population at all. In 1910, well over half of the NANA population did not live in enumerated villages but instead in seasonal camps. By 1920 the proportion had dropped to one quarter, and by 1930 to one fifth. In 1950 only 4% of the population did not live in form-al villages. The aggregation of the population in villages and away from traditional camps is a very recent phenomenon, one that has occurred within living memory (McNabb 1982).

4) Centralization and Institutionalization

There has been a virtual explosion of organization in the NANA region during the last twenty years. The visible, immediate presence of large institutions and bureaucracies has never been greater. This fact leaves the impression that the scope and direction of social and political change has fundamentally shifted in the recent decades, and that this change has speeded up. Although in many ways this is true, this impression is strengthened by the fact that outside interests and institutions are now much less remote than they once were. From the days of the first whalers and missionaries the effects of distant political, social and economic concerns began to play a prominent role in the lives of the people in the region. Today these distant concerns are not so distant, and their presence is readily apparent in the office buildings, staffs, official representatives, Boards, hearings, plans and agenda that have blossomed in the region.

Today there is a staggering variety of organizations and representative bodies in the area that have an Inupiaq membership. They include:

- Planning and advisory Task Forces in the areas of Health Education and Social Services; Lands; and Facilities.

- Regional school board.

- Fish and Game Advisory Boards.

- Boards overseeing the operating of electrical utilities and telecommunications.

- Governor's Advisory Boards.

  Boards and Committees setting policy decisions in the areas of health, alcoholism and substance abuse, and other social welfare areas.

Still, this represents only a portion of the involvement, specifically that tied to established functions of the State, Federal and other authorities. The organizations that local Inupiat have formed or participated in directed at specific Native issues include:

- The Inupiaq Language Commission
- The NANA Museum
- Reindeer Herders Association
- Bering Sea Fisherman's Association
- The Inupiaq Spirit Committee
- Elder's Committees
- The Alaska Native Federation
- The Alaska Federation of Natives

With a bit of poetic license, it is fair to say that the underlying weave of the entire texture of change in the region as summarized in population movements, sociopolitical change and the rest, represents the ongoing processes of centralization of authority and economic structures in hub communities and more so, outside the region; and institutionalization of all aspects of Inupiaq life in forms alien to tradition and embodied in specialists and bureaucracies operating along principles that are seldom sensitive or responsive to the people they control. A harsh assertion but entirely true.

By far the greatest number of these organizations with Eskimo membership do not represent new waves of change, new issues, or new directions. For the most part the vastly increased Inupiaq representation is a claim to local control, equal rights, and enfranchisement with regard to old issues that previously had been handled by non-Natives. True, the kind of representation and many of the issues are fundamentally different. Chiefly, though, the new members are filling roles or kinds of roles that before were filled by whites in more or less

remote locations. Now, as then, decisions are being made about educational policy, development options, economic plans, and regulations that represent pieces of a larger Western system. Memberships have changed considerably along with certain policies and programs, but the underlying system is largely intact.

This has been a source of great frustration in the region, both for the leaders who have been working to engineer significant changes and for the residents they represent who want to see this change. Positions of leadership and representation seem too often to confer only responsibilities and obligations, while real power is vested far away as before. The limitations and constraints on these positions are best known by the people who fill them, but unfortunately most Inupiat residents in the region have only the most general understanding of what these organizations entail and what their operations require. The majority of the people in the region, although deeply affected by these institutions, play no direct part in them. This situation is exaggerated due to the extensive over-lapping of this administrative core's responsibilities in this program and that; the local population's perceptions of the boundaries between these policies, programs, plans and so on, are also blurred. Naturally they have a hard time interpreting the roles of these institutions in the NANA region.

B. Aleutian-Pribilof Region

1) Subsistence and the Local Economy

The marine waters adjacent to the Peninsula mainland and islands have provided and continue to provide the bulk of the locally extracted subsistence resources for the Aleuts. Although marine-oriented cultures abound in Alaska, one would be hard pressed to identify any that exceed the order of dependence and adaptation to the ocean that the Aleuts demonstrate. Although a large sea-mammal hunting orientation has been evident in the history of the Aleut people (notable in an elaborate bowhead whale hunting method utilizing charms, secret men's societies and aconite poison), this hunting complex is diminished or absent today in most Aleut communities. Sea lions are still sought but are rare, and require special hunting skills to procure. When they are obtained through hunting or by washing up on the shore after a storm, it is considered a fortunate but somewhat

exceptional event.

Sea mammals (primarily seals) fish, fowl, reef foods (crustaceans and small fish found in intertidal pools) and caribou (chiefly on the Alaska Peninsula) represent the key subsistence species for the Aleuts. Vegetable products such as berries and select greens (wild celery, for instance) are important additions to the larder, but in most cases in the modern era these products are much overshadowed by the protein resources.

Fish weirs and dams were used well into the 20th century, and normally represented a community resource extraction technology that all-shared freely (Jochelson 1933/1966:52). Both species and volume changes are apparent in the last century. For Nikolski, a fairly remote community and one that would feel the effect of the commercial fishing industry less than its neighbors to the east, recent OCS research shows a preponderance of pink, and secondarily silver salmon harvested in mid- to late-summer. Families with substantial needs might put up 200 to 300 salmon for the year (Reed 1981). But in 1910 Jochelson noted that Nikolski families would procure 50 to 100 salmon per day at the community fish weir, and that the salmon were primarily reds. It is unclear how many days of intensive utilization were involved (although the estimate was developed on the basis of July usage specifically) in this example, and certainly the weir offers a superior form of extraction compared even to modern nets; these shifts over the past 70 years are suggestive of impacts of commercial fisheries on red salmon accessibility, but too few data are available to assess this hypothesis.

Reed (1981) notes that fish harvested in significant numbers, by seining and the like, are still shared freely with all who desire them. Seining in fact is a community enterprise in which all, women and children included, participate. This is a clear continuation of community practices, noted by Jochelson in 1910 in connection with the Nikolski weir and by others (cf. Lantis 1970) in many areas. The means of production were typically community property at least so far as large volume harvests are concerned (large boats, weirs, dams), not unnatural to communities that traditionally represented a single large family.

Spring (April and May) is typically the season of sea lion hunting, a practice that has diminished in the last centuries. These animals were traditionally hunted through a cautious combination of stealth and skill in sheltered bays during their migration, but would be hunted in open water as well. Harpoons, and darts propelled by throwing boards were used in sea mammal hunting. Seals were available for most of the year, although judging by today's dietary preferences sea lion flesh is preferred to seal (Reed 1981).

Bird species appear to be utilized in smaller quantities today compared to past usages. At the time of Russian contact and long after, dozens of varieties of birds were important ingredients in the Aleut subsistence scheme. The flesh, skins and eggs played a central role in the Aleut food economy (cf. Jochelson 1933/1966--Hrdlicka 1945; Lantis 1970; Veniaminov 1840). As in many parts of Alaska, during the hard early months of spring, or if stranded far from other resources birds represented on many occasions the only reprieve from starvation. The reef foods (octopus, sea urchin, mussels, pogie cod, pinto abalone, etc.) also provided emergency rations fairly consistently throughout the year. Recent research indicates that birds are used far less frequently today even for a break from a monotonous diet, although birds are hunted and eggs collected in spring and sometimes fall (some migratory waterfowl follow an east-west route and are thus accessible twice a year) (Reed 1981).

The only caribou in the area are found on the Alaska Peninsula, and although these animals might be hunted during any permitted season they are normally procured in the fall when the animals are prime. Reindeer have been introduced on Atka, and today a herd of about 3,500 animals grazes freely on the island. These animals are frequently hunted by Atkans, since they are not commercially herded anymore. These are the only representatives of the deer family west of the False Pass area.

There are very few data in the literature that would permit any accurate descriptions of current subsistence harvest volumes, or changes in underlying economic strategies tied to local resource extraction. Recent OCS work (Reed 1981) indicates that one half of the local protein intake comes from subsistence products at King Cove; other sources (AEIDC 1978) indicate that subsistence is of minimal importance in King Cove. Thus where

even minimal comparisons across sources are possible, noncorroborat ion or in fact conflict is often apparent. Recent. research conducted in 1981 and 1982 has however begun to flesh out the social, economic and cultural patterns of resource use in this study area. Smythe's (1982) Occasional Paper produced for the Alaska OCS Office profiles subsistence routines in key resource categories (by type, use, extraction techniques, and extraction periods and places), employment and population characteristics, and cultural values associated with resource use, in the Pribilofs. Based primarily on brief ethnographic fieldwork at one point in time-and directed discussions with selected, key subsistence users, this short description provides a generalized inventory of resources, methods, uses, times, and places that typify a subsistence cycle in the Pribilofs. It does not set out to describe the operational strategies that encompass these data, and is less an analysis of what people actually do than a descriptive body of information on the range of options, availability, and resources.

Veltre and Veltre (1981, 1982) have also recently produced two community subsistence studies for the Alaska Department of Fish and Game, Subsistence Division. These studies present parallel descriptions of the ethnographic backgrounds, settings, and resource utilization routines for Unalaska and the Pribilofs. As in the former case, these reports concentrate on inventorying a broad range of tangible resource data, such as utilized species, periods and places of availability, frequencies of harvests, natural constraints, and so on. These studies were based on limited fieldwork employing participant-observation and key informant interview methods. These studies too provide a general typification of community subsistence pursuits and a baseline inventory of techniques, uses, species, times and places for the two study sites at one point in time. The historical and natural setting reviews in these two documents are comprehensive yet succinct. Neither set of studies (Smythe, Veltre and Veltre) described here details harvest volumes, empirical analyses of change through time, or the integration of subsistence and other community organizations or activities save in a general sense.

The most pronounced shifts in the local economies and use of marine resources occurred with the coming of the Russians soon after Bering sighted the Aleutians in 1741, and have continued to this day. Soon after the Russians invaded the islands the tremendous open-water navigation and hunting skills of the Aleuts

were put to work in the exploitation of marine fur resources. First sea otter and then seal pelts were the goals of the new enslaved-barter system imposed by the Russians, and the lives and society of the Aleuts were changed forever. With their families held as hostages, Aleut hunters were sent out to procure the pelts the European markets desired; in return the Aleuts were given trade goods to replace those they no longer had the time to produce, credit at company stores, taxes, and debts if their returns in pelts did not balance with their family's expenses.

The point here is that regardless of the calamities and misfortune that followed on the heels of the Russian entry into Alaska, a continuity or persistence in history is noteworthy: the nearly exclusive marine orientation. First it is food for local consumption, then sea otter and seal; still later it will become salmon, halibut, crab and shrimp. The magnitude of the enforced hunting effort under Russian rule that propelled nearly all Aleuts into a cash-credit Western economy within two or three generations at the most, is staggering. Even as early as the 1780's about forty years after Russian contact, fleets of hundreds of two-man bidarkas were cruising the islands and inter-island waterways in search of furbearers. (Lantis 1970: 279).

Until the end of the 19th century most of the Aleuts' cash income still came from the sea otter trade; but once the sea otter became scarce their economic base became extremely fragile. It is at this point that a new economic phase begins and a new stage of village differentiation emerges. At this time the cod fisheries began to develop in the (eastern) Aleutians, and soon after the salmon industry took hold. By World War I canneries and other local operations were viable concerns (Jones 1976:23-24). But only some villages could participate in these new developments. Most of the western villages were too remote, had too little fresh water for cannery operation, did not have deep enough water for port facilities, or simply did not enjoy good access to the fish. These factors and capricious changes in the markets prevented any stable planning or policies, much less family level stability. Unalaska, for instance, did not enjoy any real benefits of the early cod and salmon fisheries; but suddenly in the 1920's and 1930's, the local herring brought recognition, outside interests and some local opportunity to Unalaska. But by World War II, the herring industry was dead and never revived. The boom-and-bust cycle has always been very pronounced in the Aleutians.

The post-war years were grim economically, but slowly the king crab fishery began to grow. The salmon industry matched its growth, but largely in the east. In the late 1950's the industries began to expand, and commercial survival appeared to depend on diversification at plant sites, combining salmon processing and canning with crab operations. This is one more chapter in the centralization of resources and economic opportunities in the Aleutians; villages fortunate enough to be selected for the massive combined operations tend to be those with the strongest economic base today. By the mid-1960's the industries had expanded to the point that halibut, shrimp, crab and salmon operations were among the largest in the world, and they continue to grow.

Wherever there is a fishery operation in the Aleutians, it is consistently the primary source of employment for the local people (cf. AEIDC 1978). It is even difficult to say if the fisheries industries, or subsistence, is ultimately more important to the day to day livelihood of the people. These industries in many cases (but not all) provide jobs for whoever wishes to work; although the wages are low, the work unskilled in most cases, and the activity backbreaking all too often, these jobs are a crucial adjunct, even a central element, of the Aleutian adaptation. A strong maritime tradition persists, even if the changes that have created the picture we see today were far from voluntary.

2) Polity and Social Organization

One of the problems we face in assessing traditional political and social forms in the Aleutians stems from the fact that the vast majority of observations of Aleut life come from one locale: Unalaska Island. Although on the surface this should not present insurmountable difficulties for generalization, recent archaeological and ethnohistorical work urges caution in this regard. It seems that there was in past times a continuum of material, and probably intangible culture from the Nushagak-Naknek region all the way through the Aleutians. Each island filled an interstitial niche, and was much like its neighbors but much unlike the "foreigners" at one end or the other of the continuum (cf. Dumond 1974). Past documents, such as those relevant to the Russian period show

uncertainty and confusion about the ethnic status of certain Natives, specifically the Aglegmiut of central Bristol Bay, the Peninsula Eskimos on their south border, and the Aleuts proper. This boundary zone has been inhabited by many ethnic groups over the years, and it is probable that the ebb and flow of peoples through the area has made the identification of clearly discrete cultures difficult.

Fairly rigid boundaries between families, communities and islands were recognized by the Aleuts, and both affinities and obligations pertaining to social relations were neatly fitted to these boundaries. The apparent contradiction between egalitarianism and cooperation on the one hand, and out-group antagonisms and internal stratification on the other, is resolved through an understanding of how these boundaries and social responsibilities articulate. Prior to Russian contact individual villages usually comprised one or two large extended families residing in individual dwellings fissioned off from the larger groups or more commonly one or two large semisubterranean structures that housed several couples and children along with unattached elders and young adults. It was at this level, the community (or rather extended kin group), that egalitarian relations and open cooperation were most conspicuous. Although individuals might retain use rights to the possessions they produced or normally used, access was open to all, and the larger tools and means of production (such as the large sea going craft, or baidars) were community property. This is entirely reasonable given the kin structure of the community (cf. Lantis 1970:191).

The next level of organization was the regional domain which normally consisted of the island. Each island had numerous villages and perhaps dozens of recognized encampments that belonged to individual villages (cf. Lantis 1970:176-178). The encampments were used seasonally, and formed a network of satellite villages clustered around the home community; these would often be coves, hillsides or watersheds that were used regularly by members of the extended village families for food gathering. Although all villages on an island would be connected by bonds of kinship, trespass on territories belonging to another village (including satellite camps, even if they were unoccupied) was an offense that might even be construed as invasion. Visitors from other island communities, lost travelers and others were expected to approach the main village openly and directly and reside there for the duration of their stay.

Leadership and political authority at the village and domain levels represents a recapitulation of the same practices and principles operant at the family level. Although available evidence suggests that chieftainship within the village or larger domain was not hereditary in principle, it usually was in fact. Leaders were chosen by virtue of their skills and influence, but influence was clearly the single most important quality; those with the largest families were normally chiefs and the chieftainship in most cases passed to male relatives matrilineally. Strictly speaking the chief had little authority, especially to coerce or order villagers to perform involuntary tasks or provide services for himself. The chief was an organizer in events or affairs that touched on the common good, but hunted and tended for his own family without assistance 'from others. His power came with his prestige and kinship ties, Community decisions were made with the assistance of the elders, and the elders and chief reached decisions through consensus and mutual ratification. Just as all in the community received equal shares of subsistence products, so did the chief in quantities equal to the others (although he might receive choice portions), Chiefs of the domain were chosen from all island villages, but it is unclear if this office was hereditary. These chiefs were in a position to accumulate significant wealth, for these chiefs received a portion of subsistence goods, driftwood and the like from each of the villages in the domain. Thus although their shares were equal, they received shares from many more sources than did the local chiefs. They too had no coercive authority and led, with the assistance of all domain elders and chiefs, in affairs that affected the entire domain. There is no evidence of political office beyond the boundaries of the domain.

Today some of the traditional organizational forms persist among the Aleuts, but in large part they eroded or began to erode during the Russian period. Although the Russians did not meddle in all aspects of Aleut social life and left relative autonomy in some spheres, they quickly tried to subvert the office of the village and regional chiefs by supplanting them with a three tiered chieftainship designed to mediate the Russians' demands for regulation and control. Orthodox Church representatives proselytized the Aleuts, offering Russianization and three year's relief from tax tribute for conversion to the faith, and attacked the Aleut social order in areas of supernatural belief, healing hygiene and the domestic family. The pelt trade

commercialized Aleut life and disintegrated the networks of intra - and inter-village ties, breaking up families and aggregating village populations at centralized locations for ease of administration. By the close of the Russian period the die had been cast, and although the actors changed after the American purchase of Alaska most of these trends persisted.

Today Aleut villages are highly variable with respect to the types of traditional orientations that they display. Although the Russian Orthodox tradition is one of the stronger heritages that they still retain (and even though it is an imported overlay) some villages have discarded it along with much else. Other villages maintain, though, a very strong Orthodox tradition. Some villages retain the "banya" steam baths (another import), while others do not. The village chieftainship is viable still (remaining hereditary) in some villages, but not in others.

3) Demographic Shifts and Mobility

The movement of the Aleut population through time is tightly associated with the trends of centralization and institutionalization n that began with the Russian entry and accelerated quickly after that time. During the first fifty years of Russian contact, three inter-related processes backed up by Russian commercial agenda exerted tremendous effects on the Aleut population, effects that are conspicuous today. They are (1) the massive regrouping and centralization of regional populations at central administration sites; (2) the mobilization of Aleut hunters in the fur trade, which dispersed these men over immense distances; and (3) wholesale murder of thousands of Aleuts. Thus Russian contact brought both centrifugal and centripetal trends in population movements, as well as new population control and mortality mechanisms. After fifty years of contact, the Aleut population had fallen from an estimate of 12,000 to 15,000 to about 2,000 (cf. Stein 1977; Federova 1973; Jones 1970, 1973, 1976; Lantis 1970).

Early in the Russian period the Aleuts were forcibly removed from many villages and aggregated at central locations. The patterns of relocation followed natural geographical considerations as the main rationale, and subsequent to these moves later patterns of relocation, distribution of employment

opportunities, commercialization, and regional migration have followed much the same patterns. Many contact villages on Unalaska Island, which numbered about 12, were abandoned and the population was moved to Unalaska. The Unalaska villages of Chernovsky, Kashega and Biorka have been residential villages in the last century, but the early effort was to congregate the population at Unalaska or nearby. Because these complexes are so visible even today, the village complexes of existant, recent and marginal settlements will simply be enumerated as follows:

Unalaska Complex:	Unalaska
	Biorka
	Kashega
	Chernovsky
Unimak Complex:	False Pass
	Ikatan
	Company Harbor
	Pauloff Harbor
South Peninsula Complex:	Morzhovoi
	Thin Point
	Cold Bay
	King Cove
	Belkovski
North Peninsula Complex:	Nelson Lagoon
	Port Moller
	Herendeen Bay
Shumagin Complex:	Korovin
	Sand Point
	Coal Harbor
	Private Cove
	Unga
	Squaw Harbor
	Semenovsky

The settlements of Attu, Nikol ski, Akutan, and Atka, and those on the Alaska Peninsula northeast. of Port Moller from earlier times do not appear to have been integrated into such complexes. The

links or affinities established by these complexes are still operant today, as people from one village in a complex are more apt to relocate to, marry into, or seek jobs within another community in the complex (cf. AEIDC 1978).

The Aleuts show a history of extreme mobility in the current century. Figure 2 shows the aggregate Aleutian population for the last century. Although these figures are undoubtedly inaccurate due primarily to Aleut mobility (as well as miscounting), they are especially useful to compare to individual village populations during the same period. Although military population fluctuations in the Aleutian make generalizations about the Native population difficult, the census counts give us at least a baseline for intra-regional comparison.

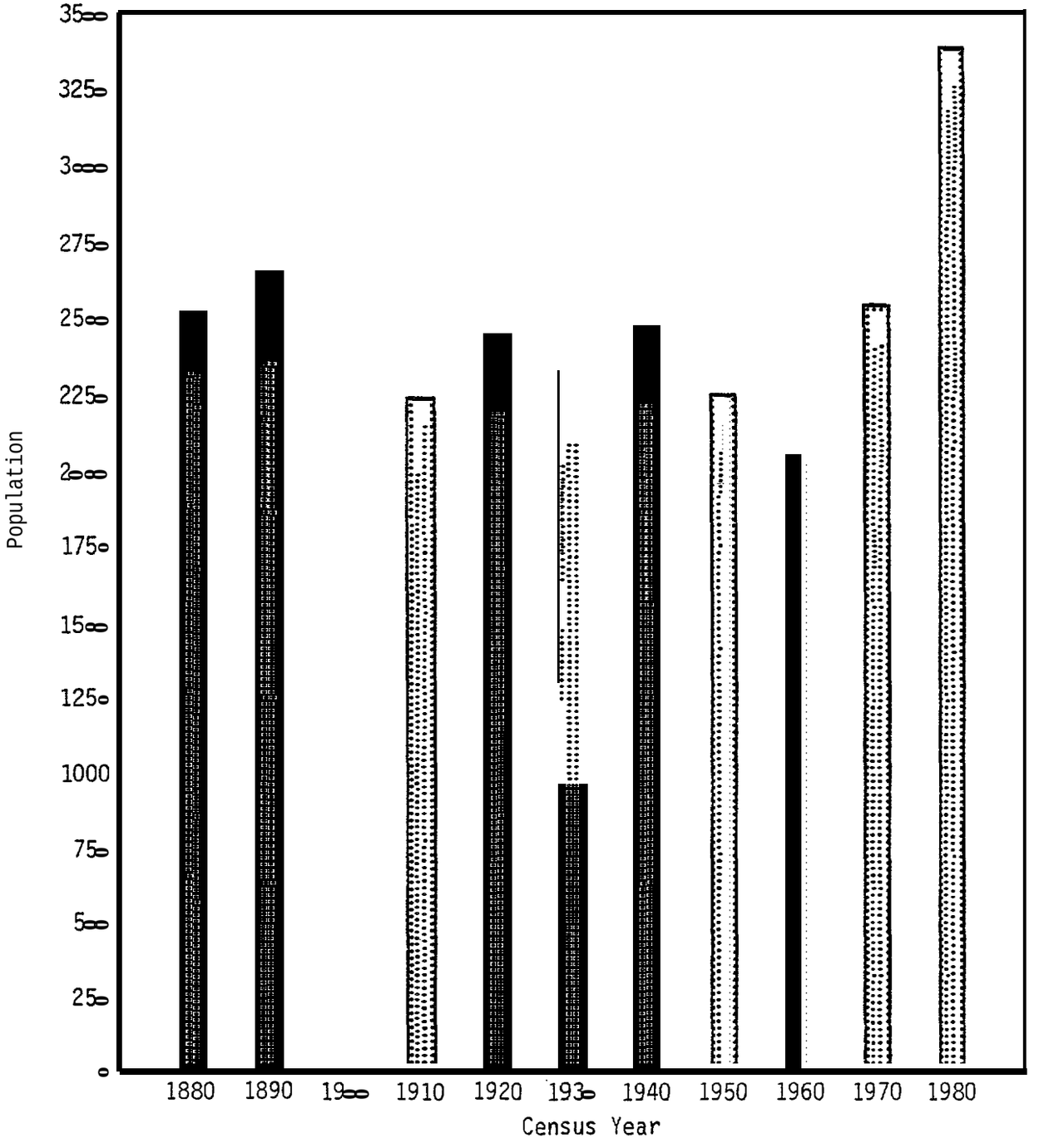
Permanent or temporary outmigration is typical in the area, and although the former may be slacking off the latter is not. People still speak of going outside to work for some years and then returning to the village in middle age (or earlier) to "retire" (cf. Reed 1981). Recent analyses comparing Aleutian population structure at the turn of the century with 1970 clearly show that not only are more children being born, but young adults in the vigorous rearing years are absent, probably temporarily in many cases. Although the author submits that outmigration of a permanent variety combined with lower infant mortality rates explain the pattern we see now, it is entirely possible that the adults absent are in transit for extended periods and may return; the local perceptions in the villages tend to support this suggestion. Figure 3 compares four villages at two points in time and illustrates the effects of out-migration in the 20-40 year age range.

4) Centralization and Institutionalization

The Russian period characterizes in clear detail the joint processes of centralization and institutionalization that have been the dominant themes of Aleut culture during the last 200 years. From the beginning, Aleuts were forcibly relocated in alien settings, and thrown abruptly into a cash-barter system that drew them into institutional relationships with Western economics and politics. Some small relief from onerous tax tribute was afforded those who converted to Orthodox religion, but this again drew the Aleuts into new and different

FIGURE 2

STUDY AREA POPULATION
ALEUTIANS-PRIBILOFS-PENINSULA

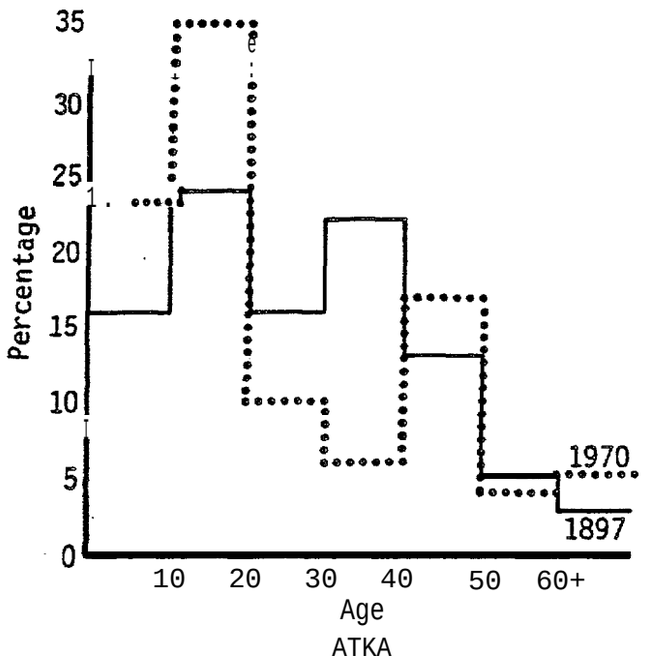


Note:Military Base Population Excluded.

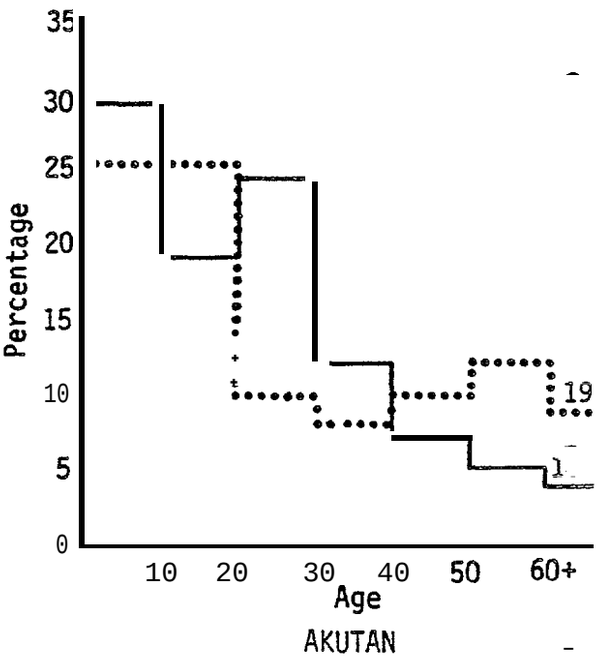
Source: U.S. Census

FIGURE 3

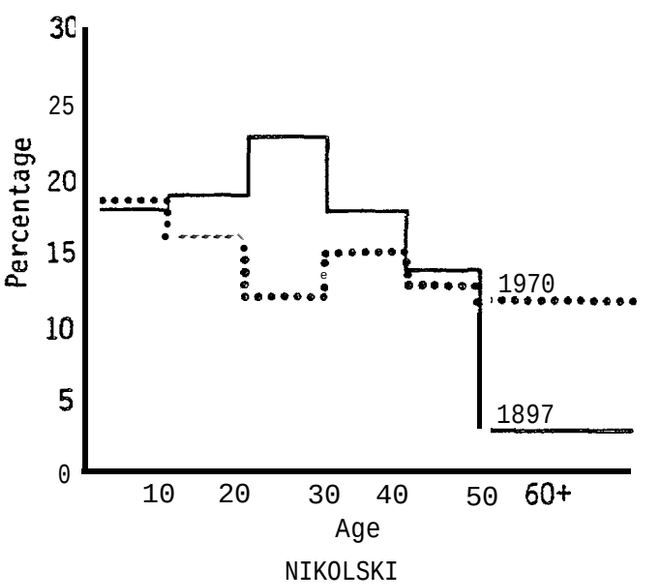
PERCENTAGE DISTRIBUTION OF POPULATION BY AGE
IN FOUR ALEUT VILLAGES, 1897 and 1970



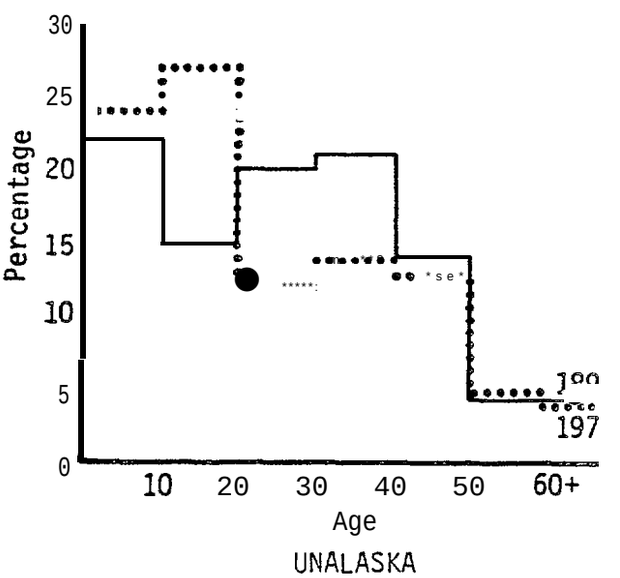
ATKA



AKUTAN



NIKOLSKI



UNALASKA

Source: Jones, D. 1973. Patterns of Village Growth and Decline in the Aleutians. ISER Occasional Paper No. 1. University of Alaska, Fairbanks.

institutional relations, and for those who followed these beliefs and doctrines in an active manner it introduced another element of centralization: those inspired and motivated Aleuts who wanted to assimilate or at least gain access to better jobs had to attend Church school in order to learn trades and become literate. Their dependence on the facilities and services in the centralized communities grew.

Even while literally enslaved by the Russians and transported immense distances on hunting expeditions, the dependence on the Russian institutions grew. Everywhere, they were met with hostility by neighboring tribes, since they were by outward appearance agents of the feared Russians. The Russians were their only source of protection in many parts of the State, a fact full of irony.

After the close of the Russian period the Aleut dependence on outside economies seems to have increased. The American trading posts stocked far more goods than did the Russian ones, and the Aleuts latched onto these new material goods rapidly. The debt and dependency that ensued locked them still tighter into the pelt trade, a dependency that would soon prove fruitless and exasperating. By the turn of the 19th century the pelt trade was in ruins, but the Aleuts managed to quickly adapt to a different marine pursuit: commercial fishing. Sources and sites of opportunity shifted rapidly, some villages gaining a strategic edge over others while some were isolated out of the mainstream. Nonetheless all villages transferred their dependency to this new market, and the key question seemed to be, was the industry local (and thus accessible without relocation) or was it remote (necessitating at least seasonal moves from the home community)?

These trends are strong even in 1981, and the concentration of resources at communities such as Cold Bay, Dutch Harbor/Unalaska, King Cove, St. Paul and others provides some sense of security for the Aleuts, but one that has never been consistent in the past. A recent survey in the area asked "who controls your village?"; an extremely common answer was "The companies" (cf. McNabb, M. 1981). There is no real hub community in the Aleutians. Corporate headquarters are in Anchorage, and although this fact may seem only natural on the surface due to conditions and distances in the Aleutians, it remains a commentary on the centers of power and authority in the Aleutians; the center is outside. The newest layers of

institutionalization have come during the American period. The regulated fur seal harvest in the Pribilofs, the commercialization and militarization of the Islands, new layers of government (the Indian Reorganization Act of 1934, city council forms of government), the recent categorical and block grant funding schemes, and most recently the Alaska Native Lands Claims Settlement Act and the Native Corporations; all have served to maintain and create an enormous variety of organizations., agencies, and institutions that serve the region but that are essentially foreign to it. In this respect the Aleutian case is similar to most other rural examples in Alaska.

3) Mental Health, Mortality, and Morbidity Trends

A. General Conditions

Trends through time show that the scope of alcoholism and alcohol-related problems among Natives in Alaska is expanding, and that overall rates are accelerating. Table 1 summarizes the number of alcohol and drug abuse admissions at IHS facilities, the percent of total admissions that this number represents, and the admission rate for alcohol and drug abuse problems for a seven year period. Although the figures fluctuate slightly, the overall trend is clear. In 1971 3.1 percent of all admissions were for alcohol and drug related problems; by 1977, the figure was 4.6 percent. The admission rate goes from 6.6 per thousand to 8.4 per thousand (note that it peaks in 1974, drops a bit, and then resumes the climb up again). A 6.6 per thousand rate means "that over half of one percent of the entire Native population is admitted to IHS facilities for alcohol or drug abuse problems during the year.

Table 2 details alcohol and drug abuse diagnoses, rather than admissions. The trend is also clear in these figures. In 1971, 3.7 percent of all diagnoses were for alcohol and drug related problems, and 1.19 percent of the population of Natives suffered some consequences of alcohol and drug abuse. By 1977, 5.4 percent of all diagnoses related to alcohol or drug abuse, and 1.48 percent of the population suffered some ill effects. Although both indicators (percent of all diagnoses and morbidity rate) peaked in 1974 and dropped afterwards, note that the trend seems still to be present.

Although it is clear that in a general sense, or in terms of nationwide trends, there are strong associations between alcoholism, mental health, accidents, and overall mortality, the exact association is unclear. Furthermore the strength of the association probably varies from group to group depending on age, geographical setting, socioeconomic status and so on. The bulk of professional opinion supports the idea that the association is very strong, but there are few sources of data that could really help us attach numbers and a degree of certainty to the connection between alcohol abuse and a variety of mortality and morbidity conditions. Some work conducted by the University of Washington, University of Texas and. the Alaska Area Native Health

TABLE 1

TOTAL NUMBER OF ADMISSIONS TO INDIAN HEALTH SERVICE
GENERAL MEDICAL AND SURGICAL HOSPITALS AND ADMISSION RATES
PER 1000 POPULATION FOR ADMISSION DIAGNOSIS OF ALCOHOL AND DRUG ABUSE,
ALASKA AREA NATIVE HEALTH SERVICE, BY FISCAL YEAR
(1971-1977)

Fiscal Year	Number of Alcohol and Drug Abuse Admissions	% of Total Admissions	Admission Rate/ 1000 Population
1971	334	3.1	6.6
1972	384	3.4	7.5
1973	377	3.5	7.2
1974	476	4.5	9.0
1975	428	4.4	7.9
1976	433	4.5	7.9
1977	468	4.6	8.4

Source: Kraus, R. and P. Buffler. 1979. Sociocultural Stress and the American Native in Alaska; An Analysis of Changing Patterns of Psychiatric Illness and Alcohol Abuse Among Alaska Natives. Alaska Federation of Natives. Anchorage.

TABLE 2

TOTAL NUMBER OF DIAGNOSES RELATED TO DRUG AND ALCOHOL ABUSE AMONG ALL ADMISSIONS TO INDIAN HEALTH SERVICE GENERAL MEDICAL-AND SURGICAL HOSPITALS AND MORBIDITY RATES PER 1000 POPULATION, ALASKA AREA NATIVE HEALTH SERVICE, FISCAL YEAR (1971-1977)

Fiscal Year	# Diagnoses Related Drug & Alcohol Abuse	% of Total Diagnoses	Morbidity Rate 1000 Population
1971	602	3.7	11.9
1972	658	3.7	12.8
1973	711	4.6	13.6
1974	871	5.6	16.4
1975	796	5.5	14.8
1976	818	5.2	14.9
1977	823	5.4	14.8

Source: Klaus, R. and P. Buffler. 1979. Sociocultural Stress and the American Native in Alaska: An Analysis of Changing Patterns of Psychiatric Illness and Alcohol Abuse Among Alaska Natives. Anchorage. Alaska Federation of Natives.

Service in Alaska suggests, however, that these associations are indeed identifiable and strong. Although this work has not yet been completed, preliminary results show a very strong correlation between rates of outpatient visits for mental conditions other than alcoholism, and outpatient rates for accidents (Kraus, Buffler and Richards n.d.). All of the regions of Native enrollment were compared in terms of these rates, and a high correlation was found; some regions (Aleut, Bristol Bay, Doyon, NANA and Arctic Slope) show some departure from this trend, however. The same study compared the regions in terms of rates of outpatient visits for accidents, and outpatient visits for alcoholism. High correlations were also documented for these rates, although again some corporation areas (Ahtna, Koniag, Aleut, NANA and Doyon) showed some discrepancies. These correlations are positive, and indicate that as the number or rates of visits for one problem increase, the rates for the other problems they are compared to increase too. The NANA region seems to depart somewhat from the general trend by reason of the high frequency of accidents in the region compared to the others. This study also compared the rates of alcohol deaths and accidental deaths for the corporation areas. Alcohol death for their purposes included overdose, aspiration of stomach contents, cirrhosis, alcoholic liver, withdrawal seizures with alcohol, exposure with alcohol, and pneumonia with alcohol. The Native regions were ranked for each cause of death; the rates ranged from over 75/100,000 to less than 25/100,000 for alcohol death. Cook Inlet ranked first, followed in turn by Koniag, Doyon, Sealaska, Chugach, Ahtna, Bering Straits, Arctic Slope, NANA, Calista, Bristol Bay and finally Aleut. The rates for accidental death ranged from a high of over 300/100,000 to about 110/100,000; the ranking reveals Ahtna in first place followed by Bering Straits, Koniag, Doyon, Bristol Bay, NANA, Cook Inlet, Calista, Aleut, Arctic Slope, Sealaska, and finally Chugach.

Tables 3 and 4 summarize the homicide rates for Native Alaskans as a whole (Table 3) and for Alaska Northern Eskimos/Inupiaq specifically (Table 4). All figure references to "Northern Eskimos" signify Alaskan Inupiat; although the term Northern Eskimo is somewhat dated it is common in relevant literature and is an acceptable optional term for Inupiat. The time period runs from 1952 to 1976, and the rates for both males and females are broken down. Although there are some dips in the rates as we move forward in time, the general trend is easy to see. Rates for both men and women increase, and the rates for

TABLE 3

FIVE YEAR AVERAGE ANNUAL AGE-ADJUSTED HOMICIDE RATES PER 100,000 POPULATION FOR TOTAL ALASKAN NATIVES BY SEX (1952-1976)

Year	Sex	
	Male	Female
1952	13.2	7.5
1953	12.4	10.9
1954	11.8	12.5
1955	16.6	12.2
1956	20.9	13.1
1957	21.9	10.8
1958	20.6	8.5
1959	16.7	10.4
1960	12.9	13.4
1961	12.5	12.1
1962	13.3	15.7
1963	18.0	20.4
1964	26.4	21.1
1965	32.4	19.6
1966	26.?	25.0
1967	39.9	28.1
1968	47.3	24.2
1969	45.0	22.1
1970	47.7	23.2
1971	42.6	21.7
1972	44.3	20.8
1973	37.2	23.2
1974	41.4	22.7
1975	42.1	20.7
1976	52.8	19.8

Source: Kraus. R., P. Buffler and W. Richards Unpublished Data. Anchorage. Alaska Area Native Health Services.

TABLE 4

FIVE YEAR AVERAGE ANNUAL AGE-ADJUSTED HOMICIDE RATES PER 100,000 POPULATION FOR ALASKAN NORTHERN ESKIMOS BY SEX (1952-1976)

Year	Sex	
	Male	Female
1952	18.0	5.9
1953	16.6	5.9
1954	10.7	5.9
1955	10.7	11.2
1956	10.4	11.2
1957	10.4	5.3
1958	5.2	5.3
1959	5.2	5.3
1960	5.2	0.0
1961	8.9	0.0
1962	13.2	5.3
1963	13.2	11.1
1964	23.0	30.4
1965	34.6	38.4
1966	30.6	49.4
1967	30.8	65.4
1968	50.7	59.6
1969	56.1	45.4
1970	53.6	42.4
1971	48.6	40.7
1972	55.5	23.7
1973	47.1	36.7
1974	69.2	35.9
1975	70.6	30.9
1976	97.4	29.4

Source: Kraus, R., P. Buffler and W. Richards Unpublished Data. Anchorage. Alaska Area Native Health Service.

Inupiat are higher than the Native Alaskans average. In fact, looking only at 1976 we see that the rates for Inupiat are more than 50 percent higher than Native Alaskan in general, and the rates for Inupiaq men are more than three times that of Inupiaq women. Interestingly, the rate of Inupiaq women was twice that of Inupiaq men in 1967; from a peak in 1967, the rates for Inupiaq women dropped off to a low in 1972, rose a bit, and then continued a general decline.

Tables 5 and 6 show the number of homicides by place and season for both Alaskan Natives (Table 5) and Inupiat (Table 6). Homicides, another indicator often associated with well-being, occur largely in villages during the spring for Alaskan Natives in general (for the years 1975-78). Summer is the season represented by the fewest Native homicides. However, when we examine the data concerning the Inupiat, it is apparent that the majority of homicides occur in the winter in cities and Native towns (like Barrow, Nome and Kotzebue). Spring is clearly the season marked by the fewest homicides (5 for this time period, as opposed to 7 in summer, 6 in fall and 9 in winter).

Tables 7 and 8 summarize the number of suicides by season and place for Alaskan Natives (Table 7) and Inupiat (Table 8). Similar differences appear when we compare the tabulations. Winter (for the time period 1975-78) is most heavily represented for Alaskan Natives, but only by a slight edge. Suicides for Natives in general occur largely in villages, secondly in cities, and in distant third place, Native towns. For the Inupiat, however, summer is again most heavily represented as a season in which suicides occur; most often they occur in villages, but cities and Native towns together are the next most frequent place of suicides.

Table 9 provides a running tally of the suicide rates for the Inupiat, both men and women, from 1952 through 1976. The suicide rate for women was zero for the first four years covered by the Table, but women had caught up with men in 1959; after that point the rates diverge and show little similarity in dips and fluctuations. The general pattern, though, is an increase for both men and women. Interestingly, the men show a rather distinct drop in rates just when the women are catching up with them. The rates for both men and women seem, to accelerate starting in about 1970. For the five year period 1970-75, the rates for men increase by 300 percent while the rates for women

TABLE 5

NUMBER OF HOMICIDES AMONG THE TOTAL ALASKAN NATIVE POPULATION BY PLACE OF EVENT AND SEASON (1975-1978)

Place of Event	Season				
	Spring	Summer	Fall	Winter	Total
City	5	8	4	7	24
Non-Native Town			2		2
Native Town	4	2	8	2	16
Village	11	6	4	5	26
Other Rural				3	3
Alaska, Unspec.				1	1
TOTAL	20	16	18	18	72

Source: Kraus, R., P. Buffler and W. Richards. Unpublished data. Anchorage. Alaska Area Native Health Service.

TABLE 6

NUMBER OF HOMICIDES AMONG THE ALASKAN NORTHERN ESKIMO POPULATION BY PLACE OF EVENT AND SEASON (1975-1978)

Place of Event	Season				
	Spring	Summer	Fall	Winter	Total
City	1	3	1	5	10
Non-Native Town		-	1		1
Native Town	3	2	4	1	10
Village	1	2		3	6
Other Rural Alaska, Unspec.	—	—	—		—
TOTAL	5	7	6	9	27

Source: Kraus, R., P. Buffler and W. Richards. Unpublished data. Anchorage. Alaska Area Native Health Service.

TABLE 7

NUMBER OF COMPLETED SUICIDES AMONG THE
TOTAL ALASKAN NATIVE POPULATION
BY PLACE OF EVENT AND SEASON
(1975-1978)

Place of Event	Season				
	Spring	Summer	Fall	Winter	Total
city	4	10	a	4	26
Non-Native Town			3		3
Native Town	5	6	2	3	16
Village	17	10	10	18	55
Other Rural			2	1	3
Alaska, Unspec.	—	—	—	1	1
TOTAL	26	26	25	27	104

Source: Kraus, R., P. Buffler and W. Richards. Unpublished data. Anchorage. Alaska-Area Native Health Service.

TABLE 8

NUMBER OF COMPLETED SUICIDES AMONG THE
ALASKAN NORTHERN ESKIMO
BY PLACE OF EVENT AND SEASON
(1975-1978)

Place of Event	Season				Total
	Spring	Summer	Fall	Winter	
City	2	5	5	2	14
Non-Native Town					
Native Town	4	6	2	2	14
Village	4	3	4	7	18
Other Rural Alaska, Unspec.	—		—	—	
TOTAL	10	14	11	11	46

Source: Kraus, R., P. Buffler and W. Richards. Unpublished data. Anchorage. Alaska Area Native Health Service.

TABLE 9

FIVE YEAR AVERAGE ANNUAL AGE-ADJUSTED
SUICIDE MORTALITY RATES PER 100,000 POPULATION
FOR ALASKAN NORTHERN ESKIMOS BY SEX

(.1952-1976)

	Sex	
Year	Male	Female
1952	21.8	0.0
1953	26.8	0.0
1954	35.2	0.0
1955	38.5	0.0
1956	35.2	4.3
1957	30.4	4.3
1958	25.4	4.3
1959	17.0	17.7
1960	17.7	17.7
1961	19.1	13.4
1962	23.3	13.4
1963	32.1	17.2
1964	41.5	13.7
1965	35.9	19.0
1966	45.0	31.7
1967	40.8	31.7
1968	51.8	33.8
1969	57.7	34.6
1970	56.5	34.2
1971	83.1	40.2
1972	107.3	59.5
1973	126.6	66.6
1974	151.2	64.8
1975	181.8	79.6
1976	166.5	63.6

Source; Kraus, R., P, Buffler and W. Richards. Unpublished data. Anchorage, Alaska Area Native Health Service.

nearly double.

For the most part the discussion has centered on Alaskan Natives as a whole, although a few regional differences have been identified. The question now is, how are the regions different, and in particular what is the status of the study region in the larger picture? Table 10 outlines the numbers, both male and female, of Natives and overall percentage of the regional population in treatment for mental illness and alcohol or drug abuse at Native Health Service facilities with the tabulations broken down by region. The percentages of the regional populations treated in these facilities range from a low of 1.6 percent for Ahtna to a high of 12.5 percent for Doyon. NANA ranks second overall with a percentage of 11.3 percent of the NANA region population receiving NHS mental illness and alcohol or drug abuse treatment in 1977; Aleut ranks sixth. It is interesting to note that Bering Straits, with ethnic and traditional affiliations with both the NANA and Arctic Slope regions shows a percentage of only 2.3 percent.

Table 11 summarizes the numbers of Natives treated in community mental health centers for mental illness and alcohol and drug abuse for the same year by region. In this case the percentage of overall population receiving treatment ranges from a low of 0.5 percent (Cal ista) to 3.4 percent (Koniag). NANA is again in second ranked position with a percentage of 2.5 percent. No Aleut figure is available, since there is no local CMCH. Although these figures help to provide a profile of conditions in the regions, we must remember that figures like this can reveal many other things and obscure objective conditions at times; differences between regions may not relate primarily to alcoholism and mental illness, but perhaps to differences in community acceptance of the services, differences in program referral patterns, or differences in help-seeking patterns. That is, a low percentage in one case may not mean that the conditions themselves are rare, but instead that people rarely seek treatment. These factors are unknowns at present. It is striking, though, that in many cases there are far more women (see Table 13) in treatment than men, even though statistics previously discussed indicate that patterns of alcohol-related mortality and morbidity are more severe for males. Studies in many places of the world, however, suggest that women are more likely to seek treatment for any number of problems than are men; thus, these figures should not necessarily be interpreted to mean

TABLE 10

NUMBER OF ALASKA NATIVES TREATED IN FACILITIES OF THE ALASKA AREA NATIVE HEALTH SERVICE FOR MENTAL ILLNESS AND DRUG AND ALCOHOL ABUSE, BY NATIVE CORPORATION OF RESIDENCE (1977*)

	Estimated Native Population of Area	Number of Patients			Number of Population Receiving Treatment
		Male	Female	Total	
Ahtna, Inc.	1,032	T -	4	17	1.6
Arctic Slope Regional Corp.	3,641	224.	185	409	11.2
Aleut Corp.	2,1515	66	75	141	6.5
Bering Straits Native Corp.	5,152	72	50	122	2.3
Bristol Bay Native Corp.	3,934	10?	96	198	5.0
Calista Corp.	13,842	274	444	718	5.2
Chugach Natives Inc.	1,3.35	15	10	25	1.8
Cook Inlet Region, Inc.	8,793	447	501	948	10.7
Doyon, Ltd.	7,127	424	471	895	12.5
Koniag, Inc.	1,783	28	23	51	2.8
Nana Regional Corp.	4,097	217	248	465	11.3
Sealaska Corp.	10,597	398	518	916	8.6
Unspecified		180	201	381	
Total	63,489	2,460	2,826	5,286	8.3

*1977 figures are tentative.

Source; Kraus, R. and P. Buffler. 1979.. Sociocultural Stress and the American Native in Alaska. An Analysis of Changing Patterns of Psychiatric Illness and Alcohol Abuse Among Alaska Natives. Anchorage. Alaska Federation of Natives.

TABLE 11

NUMBER OF ALASKA NATIVES TREATED IN ALASKAN COMMUNITY MENTAL HEALTH CENTERS (CMCH) FOR MENTAL ILLNESS AND DRUG AND ALCOHOL ABUSE, BY NATIVE CORPORATION OF RESIDENCE
(1977*)

	Estimated Native Population of Area	No.. Patients Treated in CMCH ' S	% of Population Treated
Ahtna, Inc.	1,032	**	
Arctic Slope Regional Corp.	3,641	36	0.9
Aleut Corp.	'2,156	**	
Bering Straits Native Corp.	5,152	95	1.8
Bristol Bay Native Corp.	3,934	**	
Calista Corp.	13 ,842	82	0.5
Chugach Natives, Inc.	1,335	24	1,7
Cook Inlet Region, Inc.	8,793	94	1.0
Doyon, Ltd.	7,127	149	2.0
Koniag, Inc.	1,783	62	3.4
Nana Regional Corp.	4,097	106	2.5 "
Sealaska Corp.	10,597	126	1.1
Total	63,439	774	1.2

*1977 figures are tentative.
**No Community Mental Health Center in region.

Source: Kraus, R., and P. Buffler. 1979. Sociocultural Stress and the American Native in Alaska: An Analysis of Psychiatric Illness and Alcohol Abuse Among Alaska Natives. Anchorage. Alaska Federation of Natives.

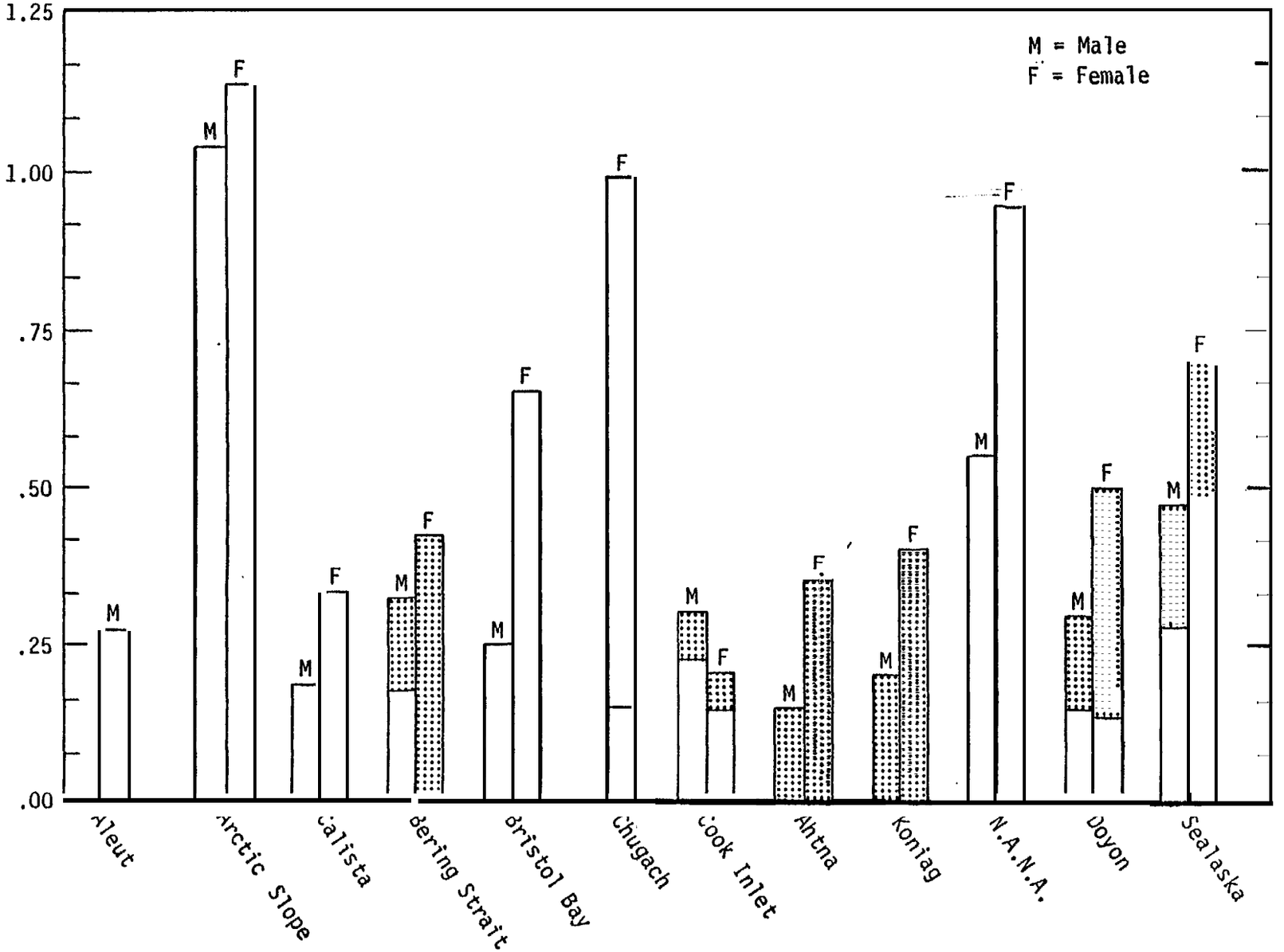
that women more frequently have alcohol-related problems in some regions.

Mental illness, alcohol and drug abuse categories were combined in most of the figures above, and by separating them we can get a better picture of regional conditions. Table 12 shows the rate of inpatient discharges for mental other than alcohol for 1978 and thus provides tabulations that are adjusted for population size. The NANA region shows rates of discharge ranked third compared to the other regions behind Arctic Slope in the first rank and Chugach in second; the Aleut -region is ranked last, behind Cook Inlet and Calista. The dark portions represent contract services while the light portions of the vertical bars represent direct (PHS) services.

Another way to look at alcohol-related conditions in the regions would be to examine the differences between first visits for a problem and revisits for the same problem. This would provide a sense of the ongoing recurrence of problems or repetitive incidence as well as duration of treatment. Table 13 outlines the rates of outpatient first visits (the bar on the left) and revisits (the bar on the right) for alcohol abuse by corporation of residence. The dark portion again is contract services, the light portion direct. Although the rate of first visits for Arctic Slope is much lower than that for NANA and Cook Inlet, the rate of repeat visits for the same problem brings the results up above them. Thus, Arctic Slope's repeat rate is much higher than NANA's and Aleuts. Since the first visit bar for the NANA region is lower than the revisit bar, it is apparent that the NANA region (for 1978) had more first visits that were not repeated. The Aleut revisit rate, on the other hand, is about 50 percent greater than the first visit rate, The revisit rate is an important statistic to scrutinize since it is a rough clue as to the persistence of a problem after treatment (although aftercare patterns also play a role here).

Table 14 shows the rates of 1978 outpatient first visits and revisits for mental problems other than alcohol abuse by region. The NANA first visit rate ranks first in Alaska tied with Arctic Slope, followed by Aleut in second place, although the NANA rate of revisits is in third place behind Arctic Slope and Aleut.

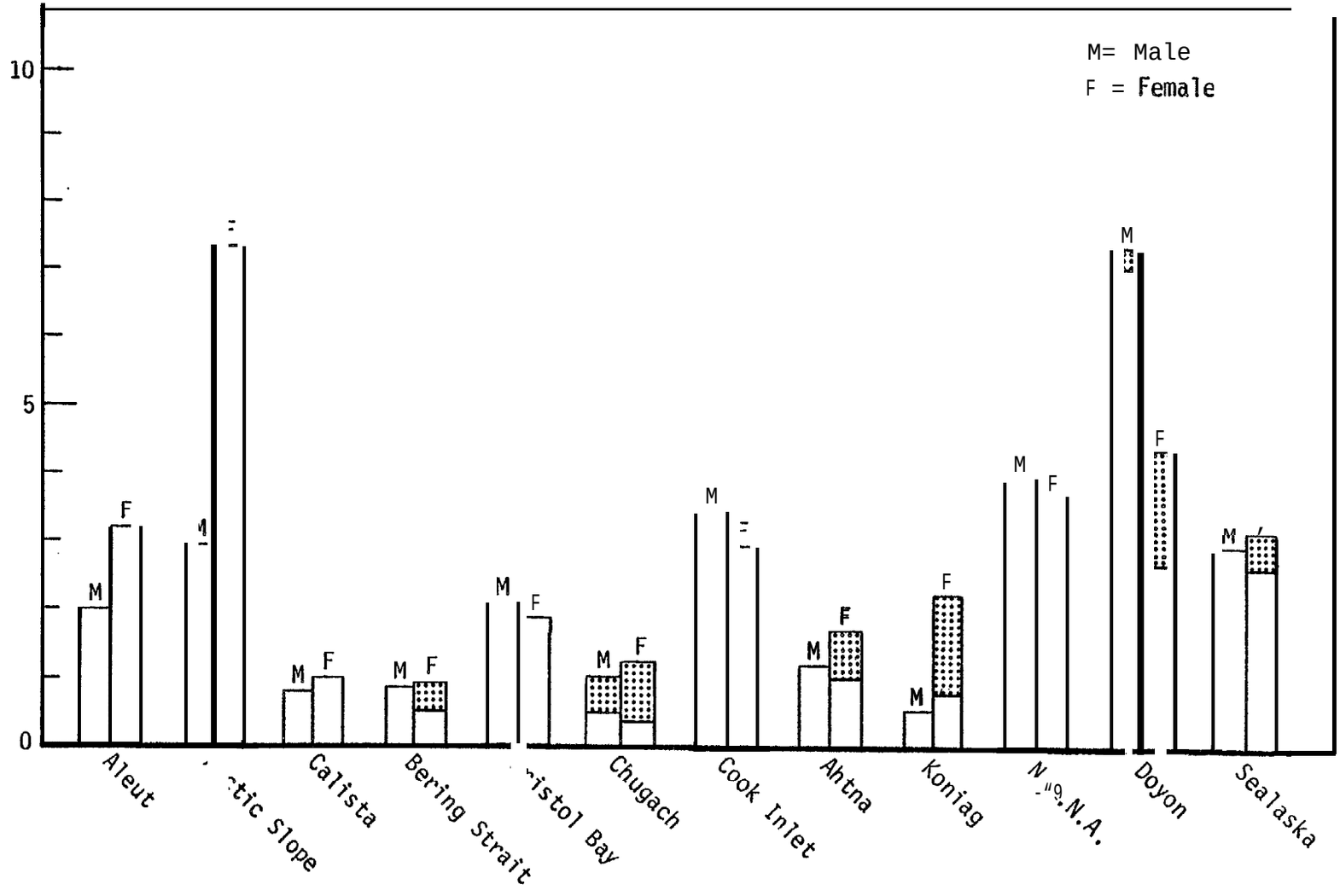
RATE OF FY1978 INPATIENT DISCHARGES FOR MENTAL OTHER THAN ALCOHOL ABUSE BY SEX AND CORPORATION OF RESIDENCE



Source: Kraus, R., P. Buffler and W. Richards. Unpublished data. Anchorage. Alaska Area Native Health Service.

TABLE 13

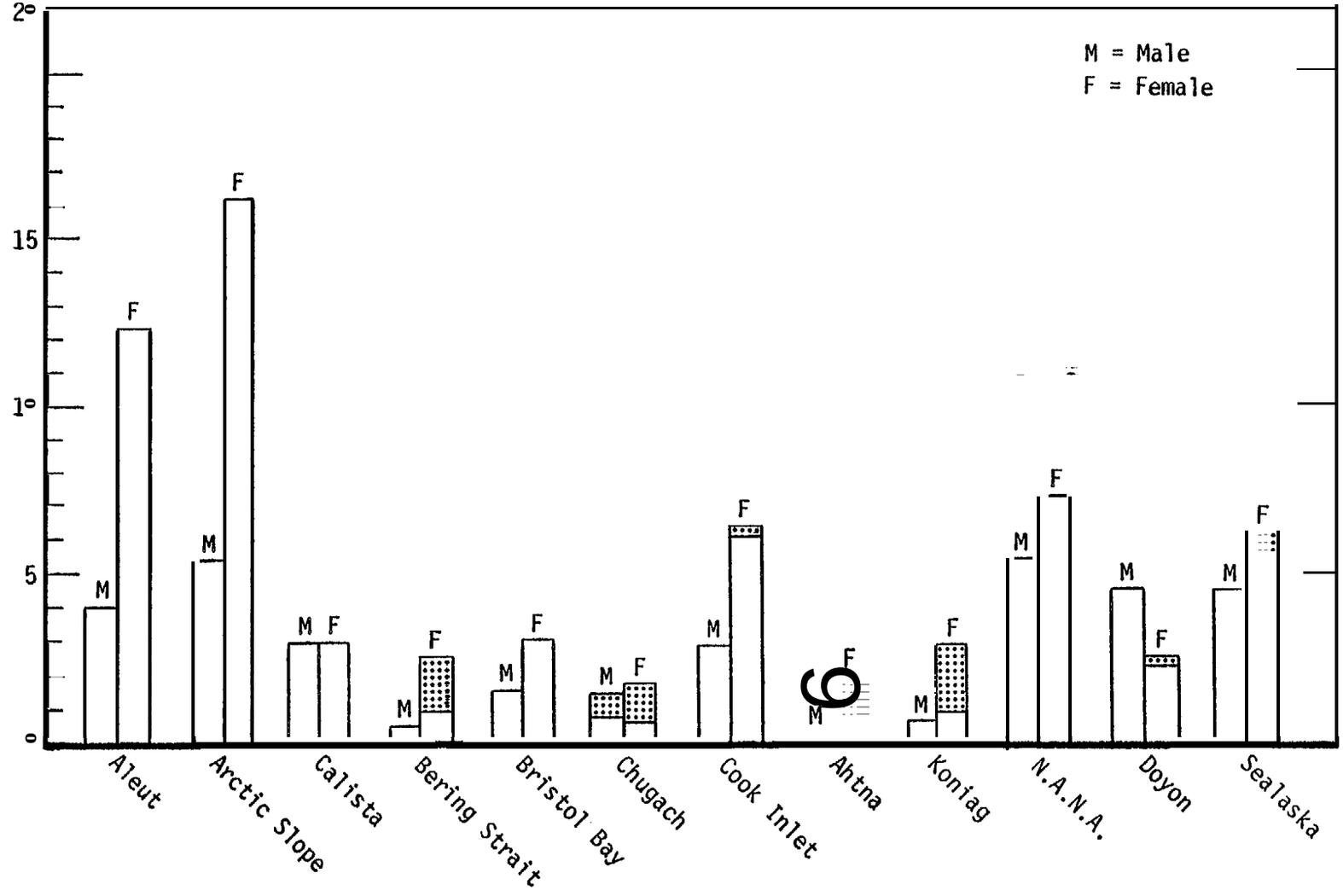
RATE OF FY1978 OUTPATIENT FIRST VISITS AND REVISITS FOR ALCOHOL ABUSE BY SEX AND CORPORATION OF RESIDENCE



Source: Kraus, R., P. Buffler and W. Richards. Unpublished data. Anchorage. Alaska Area Native Health Service.

TABLE 4

RATE OF FY 1978 OUTPATIENT FIRST VISITS AND REVISITS FOR MENTAL OTHER IAN ALCOHOL BY CORPORATION OF RESIDENCE



Source: Kraus, R., P. Buffler and W. Richards. Unpublished data. Anchorage. Alaska Area Native Health Service.

B. Specific Regional Characteristics

1) NANA Region

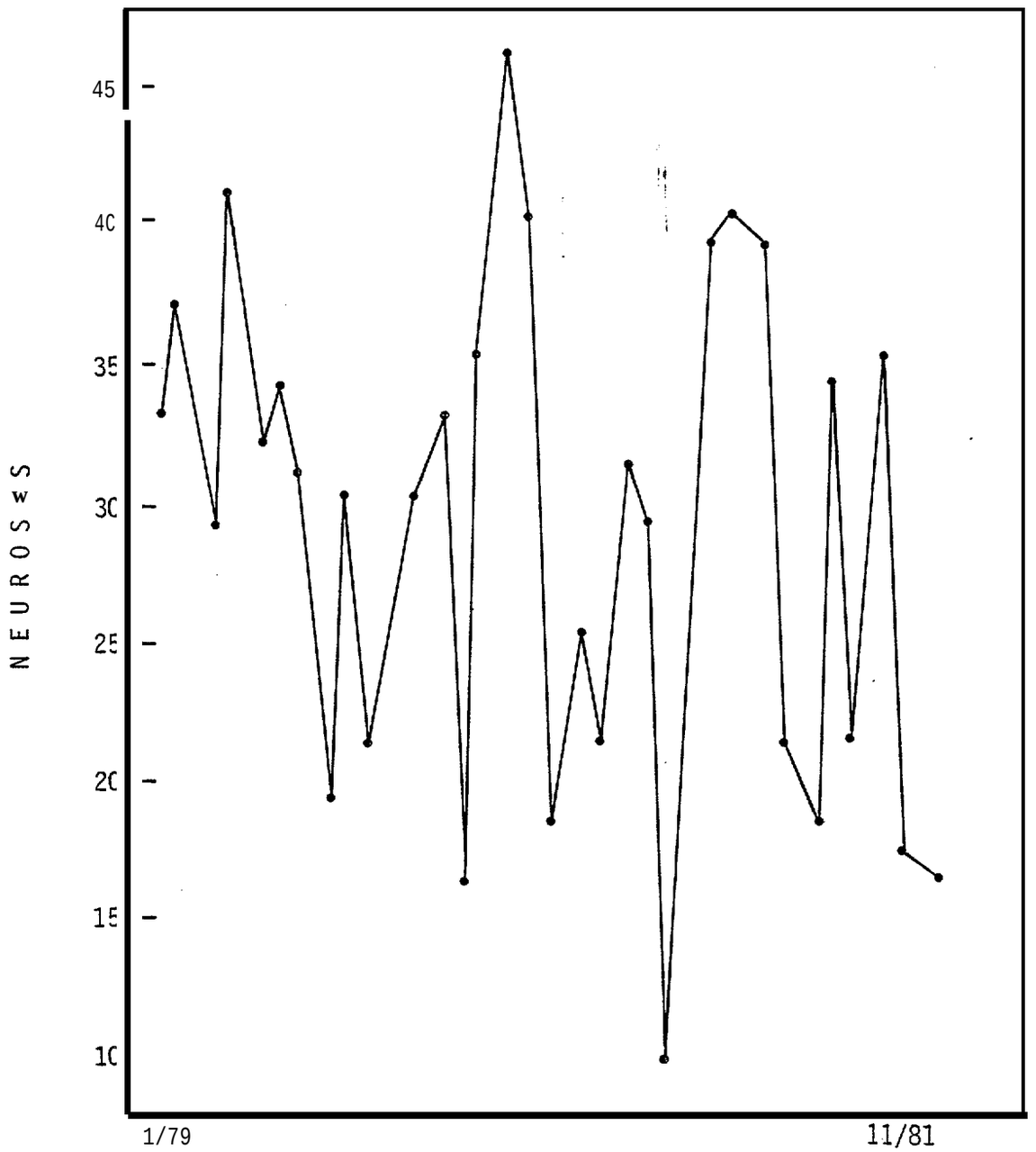
This subsection will describe and illustrate some specific mental health, mortality and morbidity characteristics of the NANA region as these characteristics are revealed in social indicators often used to assess community well-being. The data described here were selected from a very large corpus of data in Appendix D of Volume 2; readers who may wish to review a much larger selection of data are urged to consult this Appendix. As will be immediately apparent, many of the data series available for analysis are very short in terms of time depth, and the population size in any category (for instance, the population represented by any single illness category) is normally quite small. Nonetheless, these data represent the finest scale of analysis available to us. The data discussed here are intended to portray a sample profile of well-being conditions rather than an exhaustive inventory.

In the general discussion of mental health and morbidity trends in rural Alaska (Section 3A), the observation was made that many morbidity and mortality events are seasonal, specifically accidents, suicides, and homicides. Although the available particularistic data for the NANA region are too scarce to allow generalizations along these lines, Figure 4 provides evidence that bears scrutiny. This Figure displays a time series representing total visits for neuroses over a 34 month period, January 1979 through October 1981, the longest and best period for which evidence of this sort is available at a monthly interval level.

Figure 5 provides a graphic illustration of suicides in the NANA region over a twelve year period. Here again the data show a capricious trend, if in fact a trend can be ascertained at all. Although the number of suicides seems to be increasing with time, over the 1968-1979 period, the idiosyncrasies and dips in the data distribution do not allow a well-founded and judicious conclusion regarding the direction and potential future states of these data. Nonetheless, the number of suicides in the latter half of this period exceeds those of the former half by 300 percent.

FIGURE 4

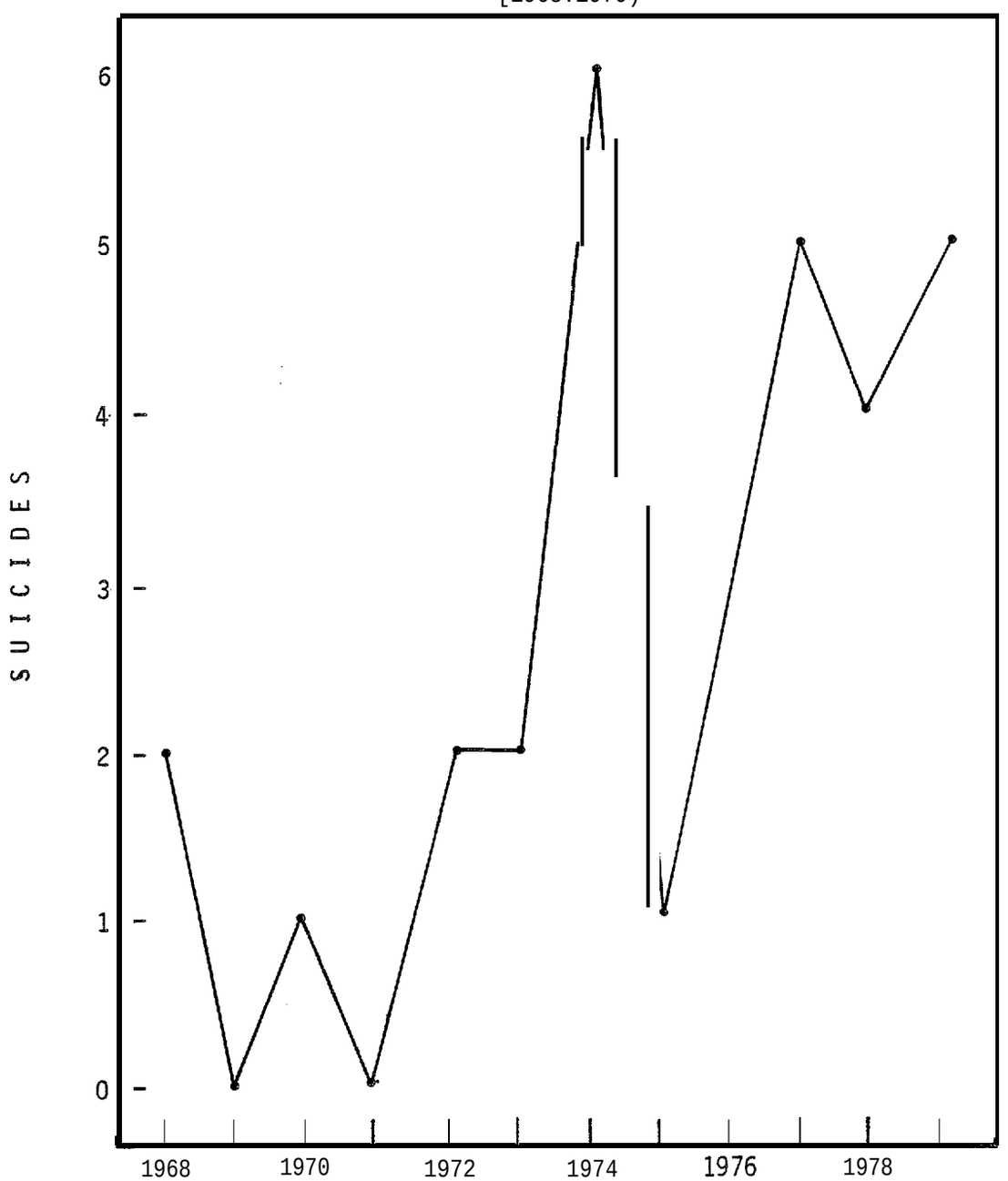
NANA REGION, TOTAL VISITS FOR NEUROSES
JANUARY 1979 - NOVEMBER 1981



Source: Alaska Area Native Health Service, Public Health Service. 1981. Program Formulation Branch computer printouts. Anchorage.

FIGURE 5

NANA REGION, NUMBER OF DEATHS BY SUICIDE
[1968.1979)



Source: Kraus, R. and P. Buffler. 1979. Adapted from Socio-cultural Stress and the American Native in Alaska: An Analysis of Changing Patterns of 'psychiatric Illness and Alcohol Abuse Among Alaska Natives. Anchorage. Alaska Federation of Natives.

Figure 6 shows the number of NANA region accidental deaths over the same period. Here again we see a substantial increase (about 50%) in the latter half of the recording period. Nonetheless, the data trends are erratic, and population growth has been substantial during this period, thus the real meaning of this increase remains to be interpreted appropriately.

Figure 7 displays the number of homicides in the NANA region over the same twelve year period. There are zero cells (i.e., a zero incidence of the event) for many years. But these data seem to show that the incidence of homicide is decreasing (although these are not population adjusted figures, the fact, that we know that population has increased during this period allows this generalization).

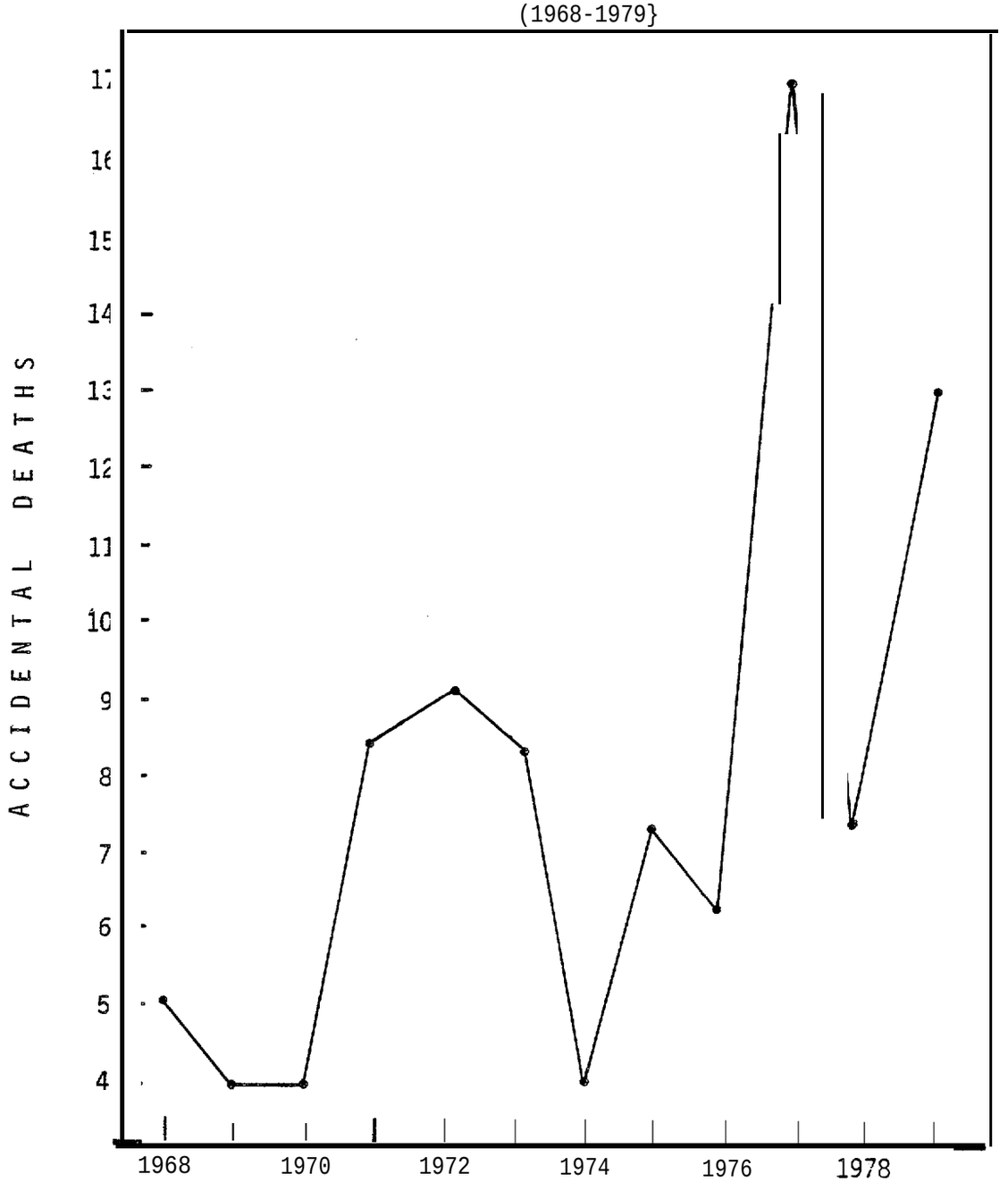
2) Aleutian-Pribilof Islands

This subsection will report on selected mental health, morbidity and mortality indicators in the Aleutian region in a manner similar to that employed in the subsection on the NANA region. Many of the particularistic data that can be reported at the monthly level in the NANA region cannot be reported and displayed here in a complementary fashion, because the overall numbers of these events, specifically homicides, suicides, neuroses and the like, occur so sporadically and infrequently that their incidence does not lend itself to analysis. In recent years, for instance, there have been so few Aleut homicide cases that a graphic portrayal of them would be irrelevant. That is, the number of "zero case" months is so great that any table or graph would be meaningless. As such no monthly data will be reported here for the Aleutians at all; rather, annual data will be used.

Table 15 displays the total number of deaths in the Aleutian villages in the study region over a six year period. Although the time depth is extremely limited and the overall village size and age composition is not taken into account here, one sees that the total number of deaths shows a conspicuous peak in 1980; here the villages of St. George and King Cove are primarily responsible for this observation. Nonetheless, Nikol ski has an age composition that is the "oldest" in the region, yet there are no deaths recorded for this village. It is possible that Nikol ski deaths were recorded as Anchorage deaths (since the

FIGURE 6

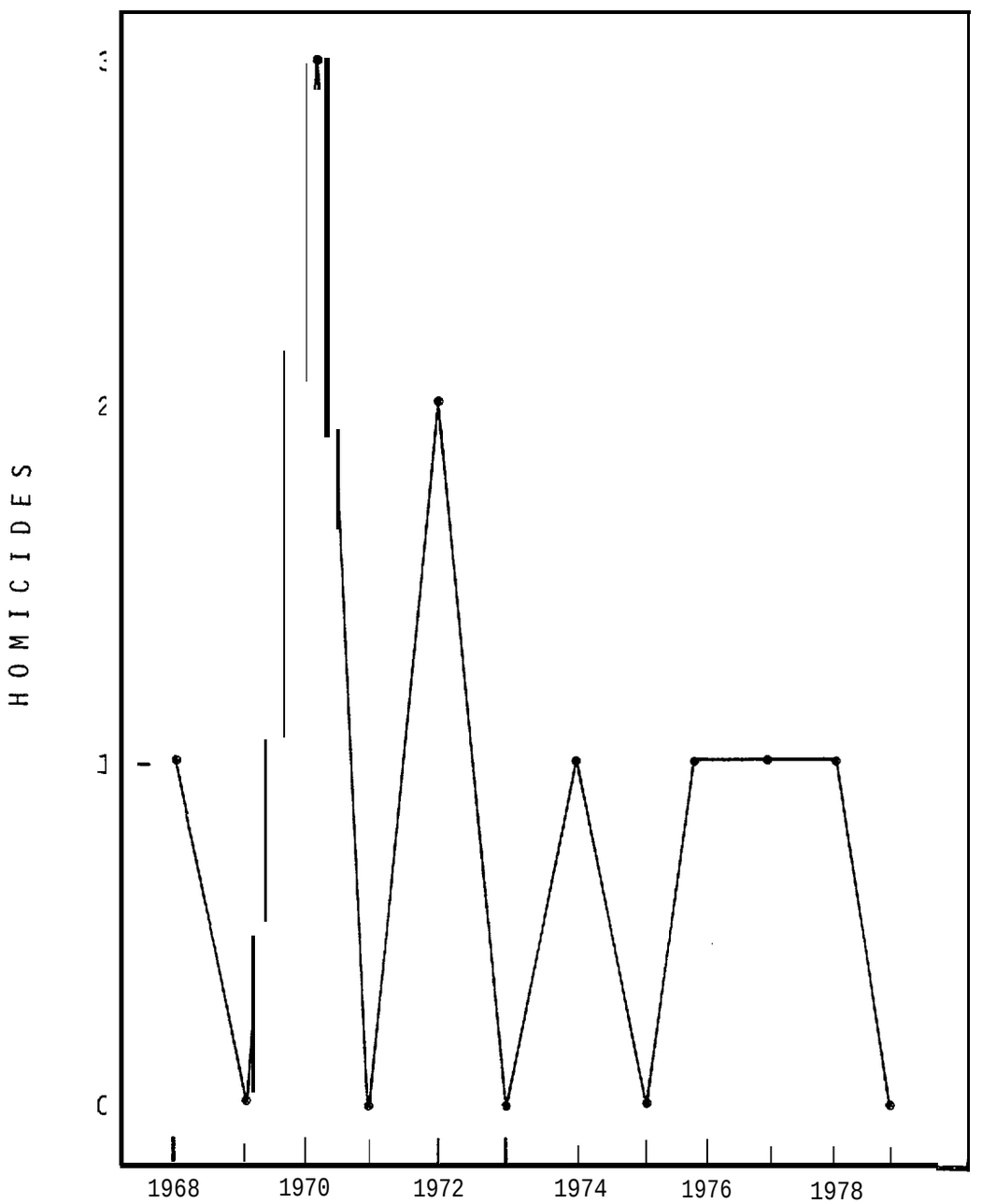
NANA REGION, TOTAL NUMBER OF ACCIDENTAL DEATHS
(1968-1979}



Source: Kraus, R. and P. Buffler. 1979. Adapted from Socio-cultural Stress and the American Native in Alaska: An Analysis of Changing Patterns of Psychiatric Illness and Alcohol Abuse Among Alaska Natives. Anchorage.. Alaska Federation of Natives.

FIGURE 7

NANA REGION, TOTAL NUMBER OF HOMICIDES
(1968-1979)



Source: Kraus, R. and P. Buffler. 1979. Sociocultural Stress and the American Native in Alaska: An Analysis of Changing Patterns of Psychiatric Illness and Alcohol Abuse Among Alaska Natives. Anchorage. Alaska Federation of Natives.

TABLE 15

TOTAL DEATHS

YEAR	KING COVE	NIKOLSKI	ST. GEORGE	UNALASKA	TOTAL
1975	1	0	0	2	3
1976	1	0	3	5	9
1977	2	0	1	?	3
1978	3	0	1	4	8
1979	1	0	2	5	8
1980	5	0	8	2	15

Source: McNabb, S. and P. Wasserman. 1982. APIA Behavioral Health Assessment. Anchorage. APIA, Inc.

TABLE 16

CAUSE OF DEATH
(regional)

	1977	1978	1979	1980
Preventable	4	5	3	n/a
Chronic/Old Age	12	6	11	n/a
Accidents	3	6	4	16
Suicides	0	0	0	3
Homicides	1	0	1	0
Alcoholism	0	0	1	1
Other	0	0	1	n/a
TOTAL	19	17	21	20

Source: McNabb, S. and P. Wasserman. 1982. APIA Behavioral Health Assessment. Anchorage. APIA, Inc.

elderly Nikolskiites may have been in the Anchorage IHS hospital at the time of death), but this speculation cannot be firmly supported.

Table 16 shows total deaths by cause over a four year period. No clear trends are apparent, but it is clear that alcoholism, homicide and suicide deaths occurred only in the 1979-1980 period. Perhaps a trend is apparent here, but it is too early to know for certain. Many Aleuts, however, suggest that these trends are new and are accelerating (McNabb, 1981, personal observation).

Table 17 provides a comprehensive summary of Aleutian patients in nine categories over three years, by village. Although in many cases the total number of patients declines with time, in many cases the number increases, or shows a peak in 1980. Some local respondents have suggested that the peak in 1980, especially for Sand Point, King Cove, False Pass and Akutan, is caused by an increased incidence of physician visits rather than an increased incidence of problems in question (McNabb, 1981, personal communication). Such an increase in physician visits would potentially result in a higher diagnosis rate regardless of the actual rate of the problem. This assertion is unsupported at the present, however, although it is a feasible explanation of the incidence we see in the data.

Table 18 displays a summary of inpatient discharges, days in treatment, and average length of stay for Aleut patients by admission diagnosis and sex, for a sample of seven Aleut villages including the four in our study area. These data reflect only 1981, so no trends can be revealed using these data. However, the discrepancies between female and male data are noteworthy; in many cases and in some villages, the females are much more conspicuous as patients, while in others, the males are more conspicuous. Here, as elsewhere (see Section 3A on the general trends of mental health, mortality and morbidity), we see evidence of a possible distinction between male and female morbidity patterns as well as help-seeking behaviors.

Table 19 shows that certain villages, such as Sand Point, King Cove, St. Paul and Unalaska account for an incredible number of medical interventions: over 4,000 in a year for King Cove and St. Paul, over 3,000 for Sand Point, and nearly 8,000 for Unalaska. Clearly, medical emergencies and general medical

TABLE 17

PCIS SUMMARIES (APIA)
(Number of Patients)

LOCATION	A	B	C	D	E	F	G	H	I
Akutan									
1979			2	22	1	1	8	2	4
1980			2	26	3	3	16	1	
1981		2	6	12	3	1	21		
Belkovski									
1979		2	7	1	1	1	7	3	4
1980		1	9	4	3	1	9	4	2
1981		2	9	2	5	2	6		2
Cold Bay									
1979		2		2			1	1	
1980				3	2		8	2	
1981				1	3		13	3	
False Pass									
1979		2	1	15	6	1	18	1	1
1980		1	7	25	7	2	15	6	1
1981			6	13	5	1	16	4	
King Cove									
1979		2	3	32	17	12	51	8	6
1980		8	5	48	25	20	83	3	2
1981	1	13	3	47	13	12	58	7	2
Nikolski									
1979		3	3	23	7	1	6	3	
1980		2	3	33	3		13	2	
1981				18			10	3	
Port Heiden									
1979		1	7	17	14	2	16	4	2
1980		4	16	18	12	5	16	10	
1981	1		7	19	15		22	3	
Sand Point									
1979		7	7	59	19	9	40	19	8
1980	1	18	23	103	25	22	91	18	5
1981		6	7	48	8	14	36	12	2
St. George									
1979	4	33	17	86	43	3	109	15	23
1980	2	35	8	57	26	8	109	10	1
1981	1	11	4	26	20	3	39	1	2
St. Paul									
1979	15	46	39	404	90	11	214	60	54
1980	9	36	32	354	89	20	253	23	4
1981	16	36	43	260	62	11	196	38	6
Unalaska									
1979		1	3	5	1		5	2	1
1980		2	1	2	1	5	9	6	
1981			3	2	4	1	23	4	

A= psychoses
B= neuroses
C= substance abuse
D= circulatory
E= digestive
F= pregnancy complications
G= vague symptoms
H= accidents
I= non-accidental violence

Source: McNabb, S. and P. Wasserman. 1982. APIA Behavioral "Health Assessment. Anchorage. APIA, Inc.

TABLE 18

SUMMARY - INPATIENT HOSPITAL VISITS FOR SELECTED COMMUNITIES
(1981)

	Akutan		King Cove		Nikolski		St. George		St. Paul		Sand Point		Unalaska*		TOTAL
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
A. Dis.									1						1
Days									64						64
ALOS									64						64
B. Dis.	1		1	5					3	1			2		13
Days	2		1	58					25	33			2		121
ALOS	2		1	11.6					8.3	33			1		9.5
C. Dis.				1					2		3	2			8
Days				3					43		45	39			130
ALOS				3					21.5		15	19.5			14.8
D. Dis.			1	1				2	1	3	1	1	1	1	12
Days			8	1				16	14	61	3	8	4	22	137
ALOS			8	1				8	14	20.3	3	8	4	22	9.8
E. Dis.		3		13				2		10		20		8	56
Days.		10		51				7		38		63		36	205
ALOS		3.3		3.9				3.5		3.8		3.2		4.5	3.7
F. Dis.			3	3				2	3	2		1	1		15
Days			13	15				27	13	5		2	2		87
ALOS			4.3	5.0				13.5	4.3	2.5		2	2		5.8
G. Dis.		1	1	1	1	1			5	5	2	1	6	6	30
Days		4	13	8	1	11			43	103	15	22	7	52	359
ALOS		4	13	8	1	11			8.6	20.6	7.5	22	6.5	8.7	11.0

*Unalaska figures include Dutch Harbor

A= mental disorders
B= nervous system diseases
C = circulatory
D = digestive
E = pregnancy
F = vague symptoms
G = injuries and poisonings

Source: McNabb, S. and P. Wasserman. 1982. APIA Behavioral Health Assessment. Anchorage. APIA, Inc.

TABLE 19

PHS AND VILLAGE-BASED OUTPATIENT CARE BY VISITS

		PHS Programs*	CHA On-Site*	Other On-Site	Total Visits
AKUTAN	1979		332		inc.
	1980		332		inc.
	1981	156	364		520
KING COVE	1979			2190	inc.
	1980			2234	inc.
	1981	866		3369	4235
NIKOLSKI	1979		297		inc.
	1980		360		inc.
	1981	132	420		451
ST. GEORGE	1979				inc.
	1980				inc.
	1981	1424			1424
ST. PAUL	1979				inc.
	1980				inc.
	1981	4536			4536
SAND POINT	1979		1694		inc.
	1980		2134		inc.
	1981	627	2408		3035
UNALASKA/ DUTCH HARBOR	1979				inc.
	1980			4180	inc.
	1981	250		7655	7905

*PHS and CHA programs by fiscal year, others are calendar years.

SOURCE : PHS figures - Ambulatory Patient Care On-Request Report No. 2, ANMC.
CHA figures - CHA-PCIS reports, APIA, Anchorage.
King Cove figures - King Cove Clinic, King Cove.
Unalaska figures - Iliuliuk Family and Health Services, Unalaska.

McNabb, S. and P. Wasserman. 1982. APIA Behavioral Health Assessment. Anchorage. APIA, Inc.

problems are at a critical level in the Aleutians. It is likely that many of these relate directly to the hazards associated with fisheries employment.

Tables 20 and 21 detail the medical evacuations from the Aleutians for five years. Although the records are far from complete, it is apparent that serious medical emergencies requiring evacuation from the Aleutians are on the rise. General Aleutian area transfers have more than doubled during t-his period, and Unalaska transfers alone have about quadrupled.

Although many of the general data reporting regional trends seem to indicate lesser levels of social stress and social pathology as revealed in mortality and morbidity statistics in the Aleutians in contrast with the NANA region (see Section 3, General Mental Health, Mortality and Morbidity Indicators), these more specific data seem to reflect serious and accelerating health problems in the Aleutians. This observation may reflect only more recent data (as these specific data relate to very recent conditions, whereas those reported previously are obsolete by comparison), but it nonetheless draws our attention to the plight of the Aleutian region and encourages our scrutiny of the adequacy and accuracy of both the newer and older data.

4) Economic and Social Welfare Trends

A. NANA Region

This section describes a variety of economic and social welfare trends in the study regions. A review f these data achieves two purposes on the one hand, they will fulfill a descriptive function insofar as they consist of representative data sets that tell a story about a region; on the other hand, these data will help reveal the inherent flaws and obstacles to interpretation that make the search for reliable and accurate social indicators for rural Alaska a difficult one.

Table 22 illustrates school enrollment totals by year for each of the NANA study sites, over a thirteen year period. One sees immediately that (1) enrollment trends can be erratic, and (2) enrollment overall seems to be declining. This latter observation does not fit well with population data reported in the section entitled Generalized Sociocultural Trends, where we

TABLE 20

EMERGENCY MEDICAL EVACUATIONS

	1977	1978	1979	1980	1981
Aleutian Transfers	58	63	90	101	136[a] (91)[b]
Unalaska Transfers	18	*	*	*	(53)[c] 57[d] (102)[e] 82[f]
Unalaska Ambulance Calls	*	*	*	*	187

a= pro rated 12 months
b= actual number, April-November
c= actual number, medical evacuations, 11 months
d= pro rated 12 months, medical evacuations
e= actual number, 15 months (September 1980 - November 1981) Clinic Log
f= pro rated for 12 months (note figures overlap into 1980)

*unreported.

Source: Illiuliuk Clinic, 1982; McNabb, S. and P. Wasserman. 1982. APIA Behavioral Health Assessment. Anchorage. APIA, Inc.

TABLE 21

PERCENT CHANGE, ALEUTIAN MEDICAL TRANSFERS

	1977	1978	1979	1980	1981
Change	*	+9%	+43%	+12%	+35%

Source: McNabb, S. and P. Wasserman. 1982. APIA Behavioral Health Assessment. Anchorage. APIA, Inc.

TABLE 22

SCHOOL ENROLLMENTS - NANA REGION
1969/70 - 1981/82
(Selected Villages)

Year	Selawik	Noatak	Kotzebue	Kiana	Total
69-70	129	90	664	82	836
70-71	135	63	674	76	948
71-72	138	63	674	69	944
72-73	169	88	609	79	945
73-74	167	74	675	93	1009
74-75	201	84	670	103	1058
75-76	197	111	693	147	1148
76-77	199	95	629	126	1049
77-78	196	117	620	109	1042
78-79	186	96	647	119	1048
79-80	156	94	636	111	997
80-81	154	95	589	134	972
81-82	153	113	589	116	971

Source: Alaska Department of Education. 1982. Unpublished data. Juneau.

find substantial population growth in most villages. There are several possible explanations. First, it seems that contraception was quickly and eagerly adopted in the region in the mid-60's, which resulted in a decline in birth rates (which would naturally affect later school enrollments); however, in the mid-70's when many of the dangers of contraceptive drugs and devices were being revealed in the national press, it seems that these devices and drug's were abandoned in large numbers, resulting, we might speculate, in an increase in birth rates. It is important to note that there is no categorical proof for this assertion regarding contraceptives; however, some data, both primary and aggregate, support this contention (cf. McNabb 1981, 198"2). Be that as it may, these events could possibly have spurred an erratic down-and-up birth rate, and consequently shifts in enrollments later. As well, it is important to point out that (1) students relocate frequently, and adolescent Inupiat are quite transient, spending one year in this school, and another elsewhere; (2) up until the late 1970's, many students from smaller villages (like Noatak) boarded with families in other villages for the school year, and were enrolled away from home. Since this time there has been a slow but predictable return of students to their home village schools. This may account in part for the decline or leveling off in enrollments since the mid-1970's in Kiana, Kotzebue, and Selawik, all of which boarded many students from other villages.

Table 23 details OASDI (Old Age Survivors and Disability Insurance) beneficiaries, payments, and average payments per beneficiary over an eleven year period. In part, the total beneficiaries column illustrates the problems inherent in data representing small populations; because the elderly population is so small, we are apt to find few steady trends. The beneficiary totals grow by as much as 20 percent one year (1971-1972), decline by as much as 20 percent in a year (1973-1974), or show very slow growth of less than 1 percent (1979-1980). The payments, however, seem to keep pace with inflation and show a moderate and steady growth.

Figure 8 shows a 55 month series of social service case loads in Kotzebue. One is immediately struck by the wild fluctuations in the data; nonetheless there are two clear peaks and a substantial decline mid-way through the series. A simple least squares trend line will account for over 50 percent of the variance in this distribution of data, that is, there is a

TABLE 23

OASDI PAYMENTS AND BENEFICIARIES
NANA REGION

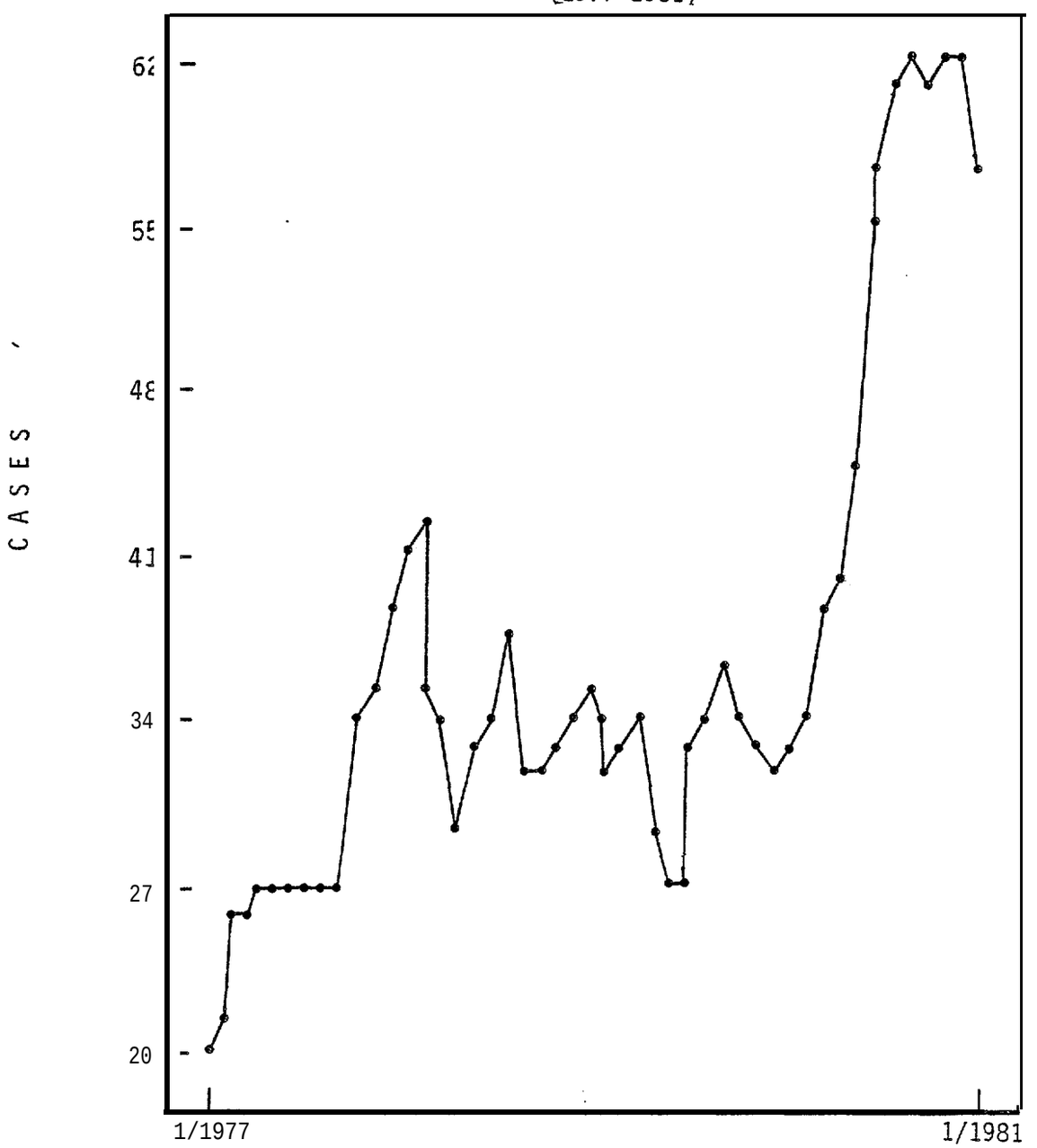
Year	Total Beneficiaries	Monthly Payments	Average Payment/Me.
1970	358	$23,000	$ 64.25
1971	365	27,000	73.97
1972	436	37,000	84.86
1973	440	39,000	88.64
1974	330	29,000	87.88
1975	358	35,006	97.78
1976	368	39,218	106.57
1977	366	44,281	120.99
1978	385	52,230	135.66
1979	399	61,989	155.36
1980	402	72,479	180.30

Both payments and number of beneficiaries are those of an average "representative" month.

Source: Alaska Department of Health and Social Services (DHSS), OASDI. 1981. Unpublished data. Juneau.

FIGURE 8

KOTZEBUE CASE LOADS BY MONTH
(1977-1981)



Note: Least squares trend line accounts for 53.52% variance.

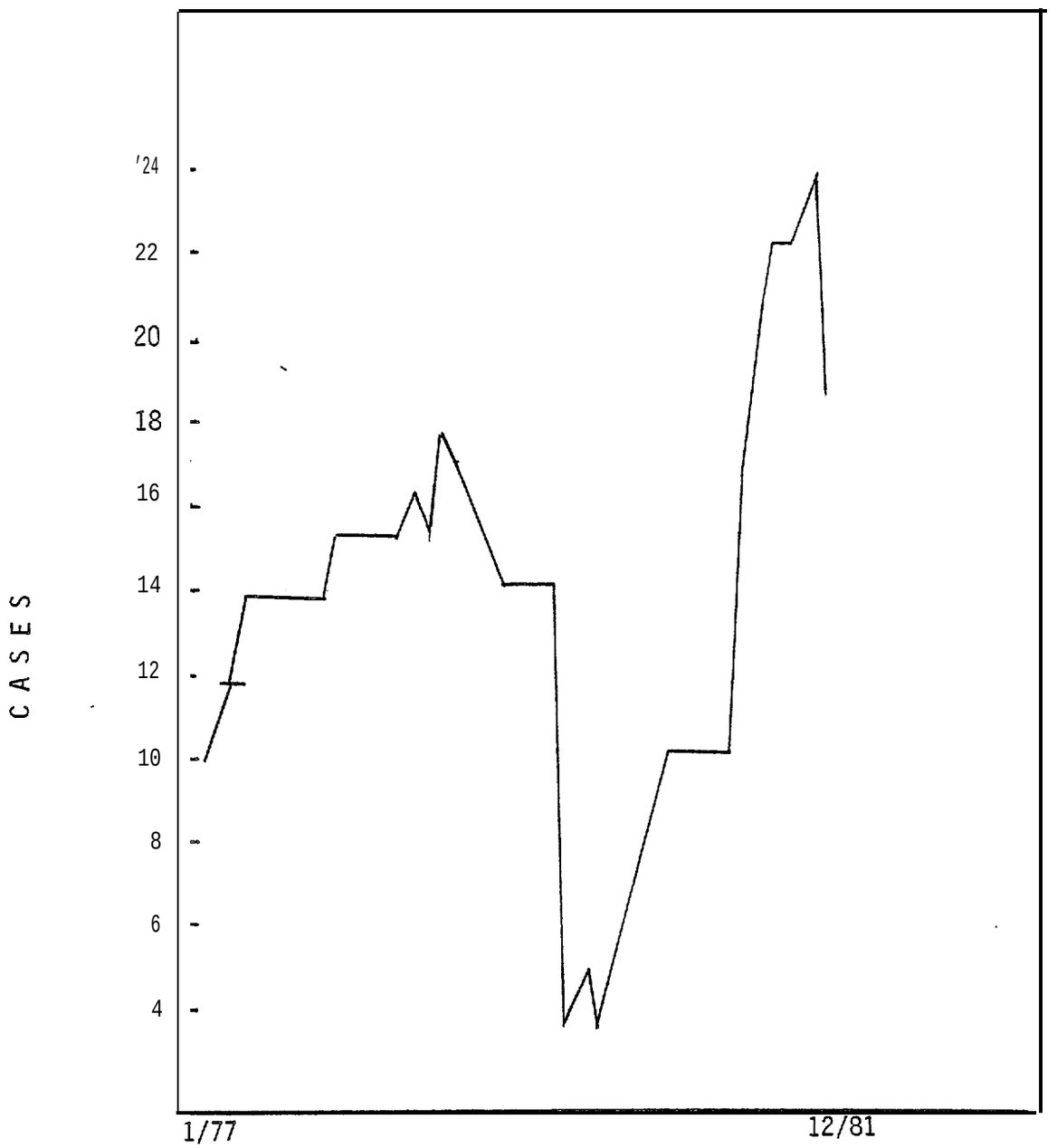
Source: Alaska Department of Health and Social Services, DYFS. 1981. Unpublished data. Juneau.

statistical trend embedded in the data that encompasses most of the data displayed. However, let us move just 60 miles away to Selawik, for a look at equivalent data for basically the same period (53 months) in Figure 9. Although we identify two substantial peaks and another decline mid-way through the series, in a statistical sense these data are worthless; a simple least squares trend line accounts for less than half of one percent of the data. This comparison represents one of the many paradoxes that are apt to be found in Alaskan data; many apparent, superficial associations between data can be found, but they are too weak to rely upon. There may in fact be a very good, joint explanation for the seeming association between the Selawik and Kotzebue data, possibly relating to administrative artifacts in data recording that imprint all data with a general pattern; however, we would be foolish to use social service case loads at the local level, at least for Selawik, since such an indicator may be quite unreliable. This is not to say that all indicators should trend linearly; on the contrary, they should be sensitive to erratic fluctuations. But this comparison throws enough doubt on the real meaning of service case loads that we should be hesitant about using them as indicators.

Figure 10 displays non-accidental violence hospital visits recorded at the PHS facility in Kotzebue. Here we find a clear example of recording errors. The conspicuous peak during the first eight months of the recording period (1979-1981) is not a peak in incidence, but rather a technical error embedded in the recording system. During the first year of PCIS operation, the automated system used to record and retrieve health data for IHS, population and rate figures were exaggerated; the NANA region population, for instance, was listed as over 9,000 while half that figure is more accurate. As such, doubt is cast on the entire system insofar as it may be used as a source of social indicators. But perhaps if we discard the first year and compare these data to another set they should bear some similarity to, a possible connection may be identified. Figure 11 details all crime totals over about two years in Kotzebue. Although this is pure speculation, one would expect at least some association between crime data and non-accidental violence (i.e., assaults, etc.) data, the latter of which is reported in the previous Figure. However, scrutiny of these data fails to unearth any conspicuous association; in addition, the N (population size) is quite small for both, and encourages great caution in extrapolation from these data sets.

FIGURE 9

SELAWIK CASE LOADS
(1977-1981)



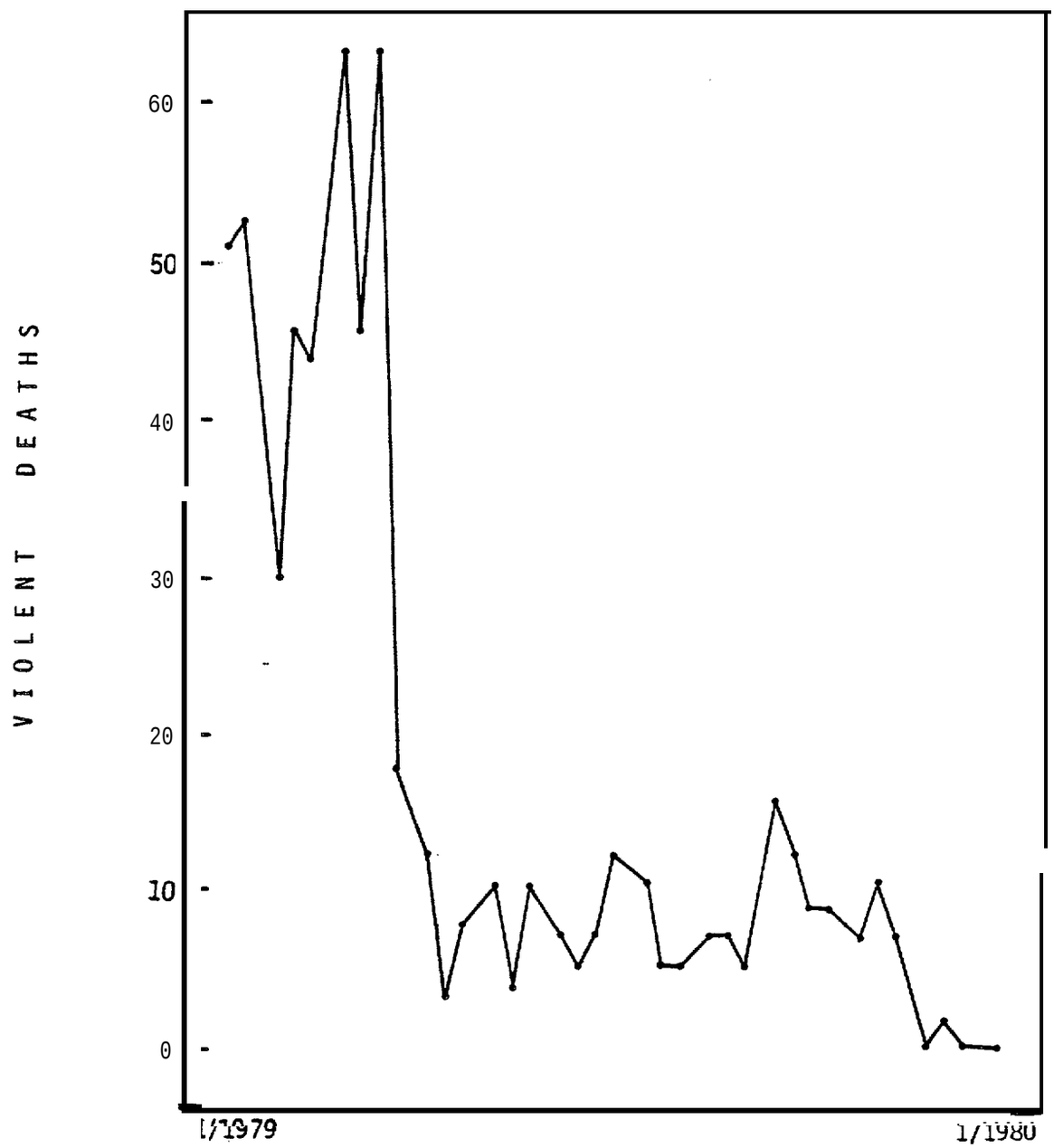
Note: Least square trend line accounts for 0.39% variance.

Source: Department of Human Social Services, DYFS. 1982. Unpublished data. Juneau.

FIGURE 10

VIOLENT (NONACCIDENTAL DEATHS-KOTZEBUE)

(1979-1980)



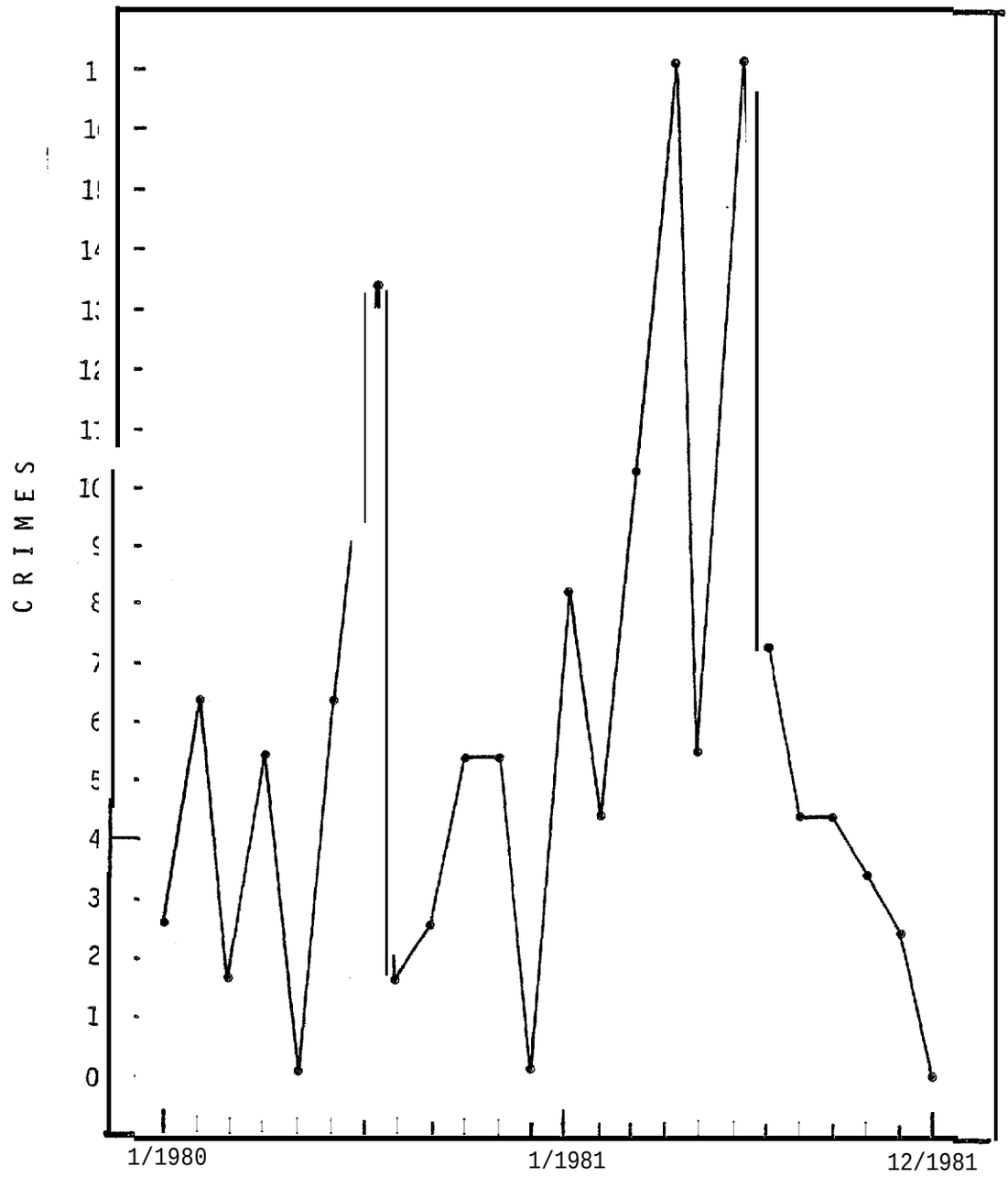
Note: Least square trend line accounts for 52.38% variance.

Source: Alaska Area Native Health Service. 1981. (Patient Care Information System). Anchorage.

FIGURE 11

KOTZEBUE CRIME INCIDENCE BY MONTH

(1980-1981)



Note: Least squares trend accounts for 1.3% variance.

Source: Alaska Department of Public Safety and Kotzebue Police Department. 1982.

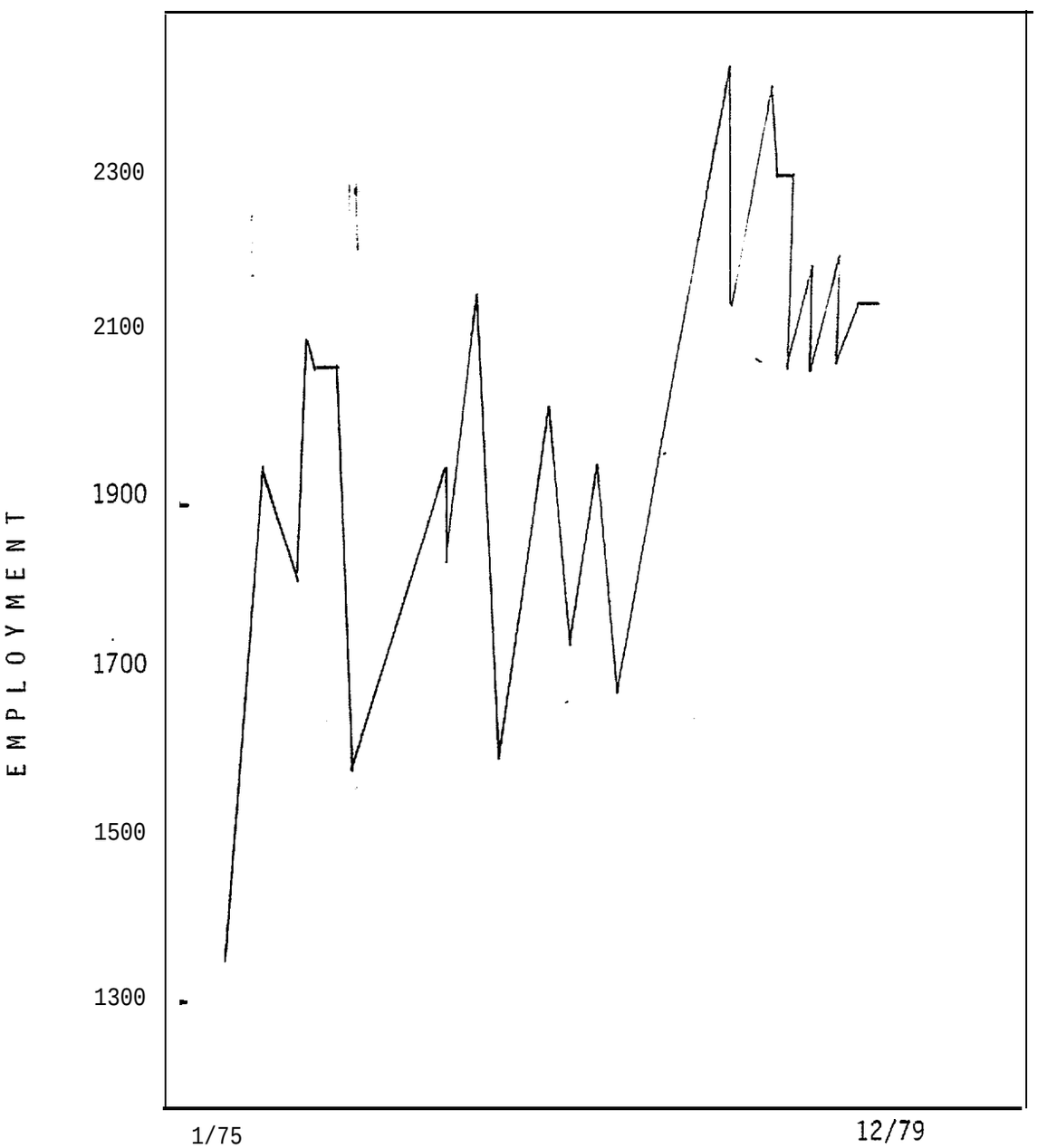
Figures 12 and 13 display Kobuk division (N ANA) employment. and unemployment respectively, by month over a five year period. The seasonal nature of employment in the region is clearly demonstrated by the employment data set. Note too that the unemployment data series closely follows the employment set, peak by peak and decline by decline. This may promote the counter-intuitive conclusion that increases in employment in the area signify more unemployment; actually there is a grain of truth to this observation. Although cyclic immigration and other factors can account for the patterns shown here, it is most probable that the seasonal movement of people out of the work force (in the late fall) accounts for this positive association between employment and unemployment. That is, there are more jobs in the summer, but also more people looking for work (and thus listed in unemployment statistics); in the winter there are fewer jobs, and fewer people actively seeking work. Although a cogent explanation can be developed to account for these similarities, the data remain difficult to use as potential indicators since we cannot be sure what higher or lower levels of employment, or unemployment, entail in the larger picture.

Figure 14 represents the fishing record of a sample of seven families at one of the study sites in 1976. The purpose of this figure is to draw attention to the sort of impact that we should ideally be able to detect using social indicators; after briefly introducing this figure, we ‘can then review other sources of data in order to determine if and how such indicators may work. This Figure displays the volume of fish harvested by day throughout the summer of 1976. The capital letters refer to other community events that may or may not have affected the harvest. Disregard all but G and H, late in August. G and H represent periods of local bickering and frustration over the very bad fish harvest, and the exit of many community members to Kotzebue, Fairbanks and Anchorage to search for jobs as an economic stopgap. Thus, this poor harvest and the problems that ensued can be seen as an impact, no different in its results than man-made or -caused impacts. The question now is, how can such an impact be detected?

Figure 15 displays mean quarterly wages in Kiana for the 3rd quarter for ten years. The 3rd quarter is shown since the proposed impact occurred in the summer. 1976 does in fact represent a decline in wages that departs from the overall trend. This comparison is by no means intended to assert that the poor

FIGURE 12

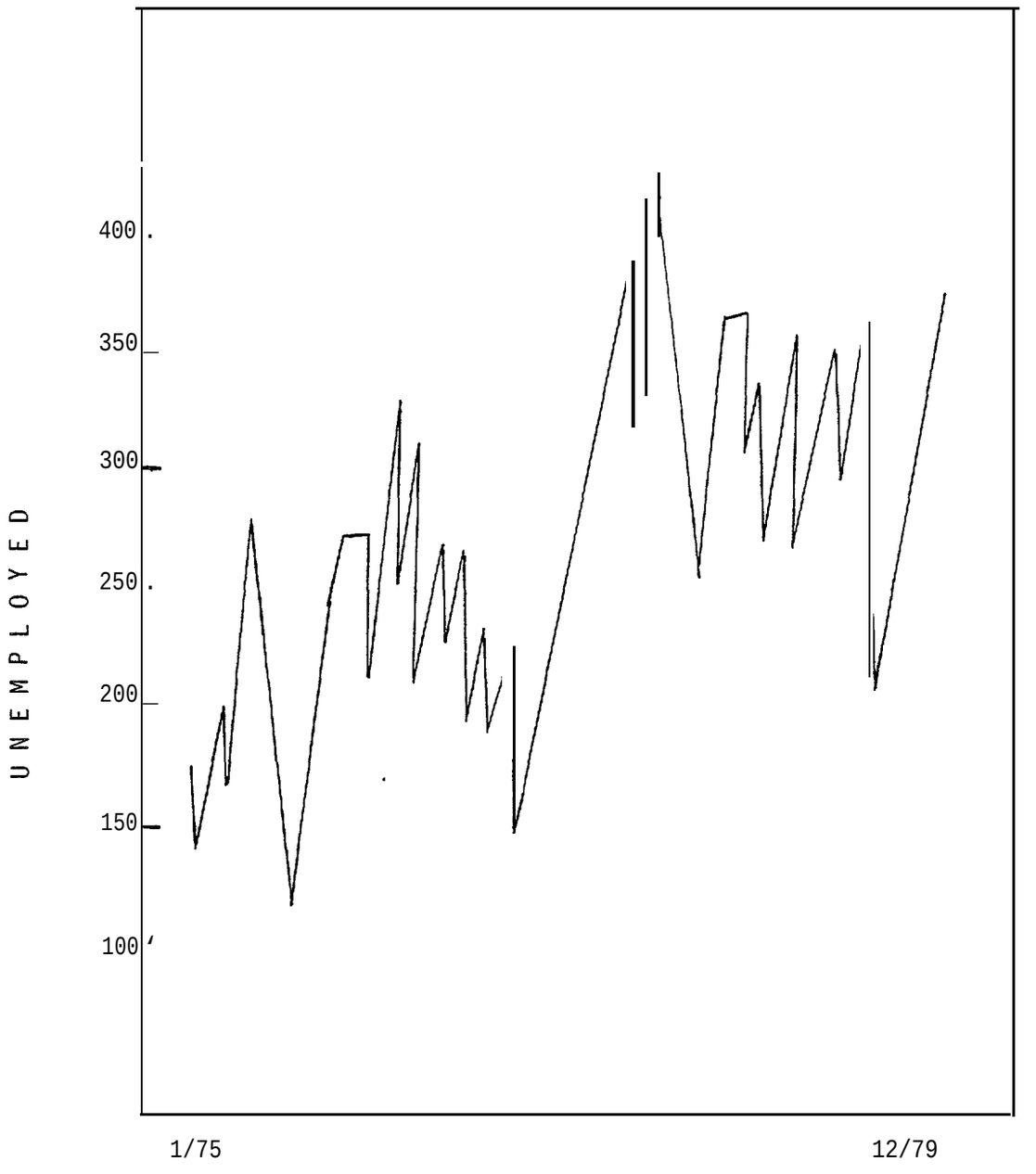
KOBUK EMPLOYMENT
(1975-1979)



Source: Alaska Department of Labor. 1975-1980. Quarterly Reports. Juneau.

FIGURE 13

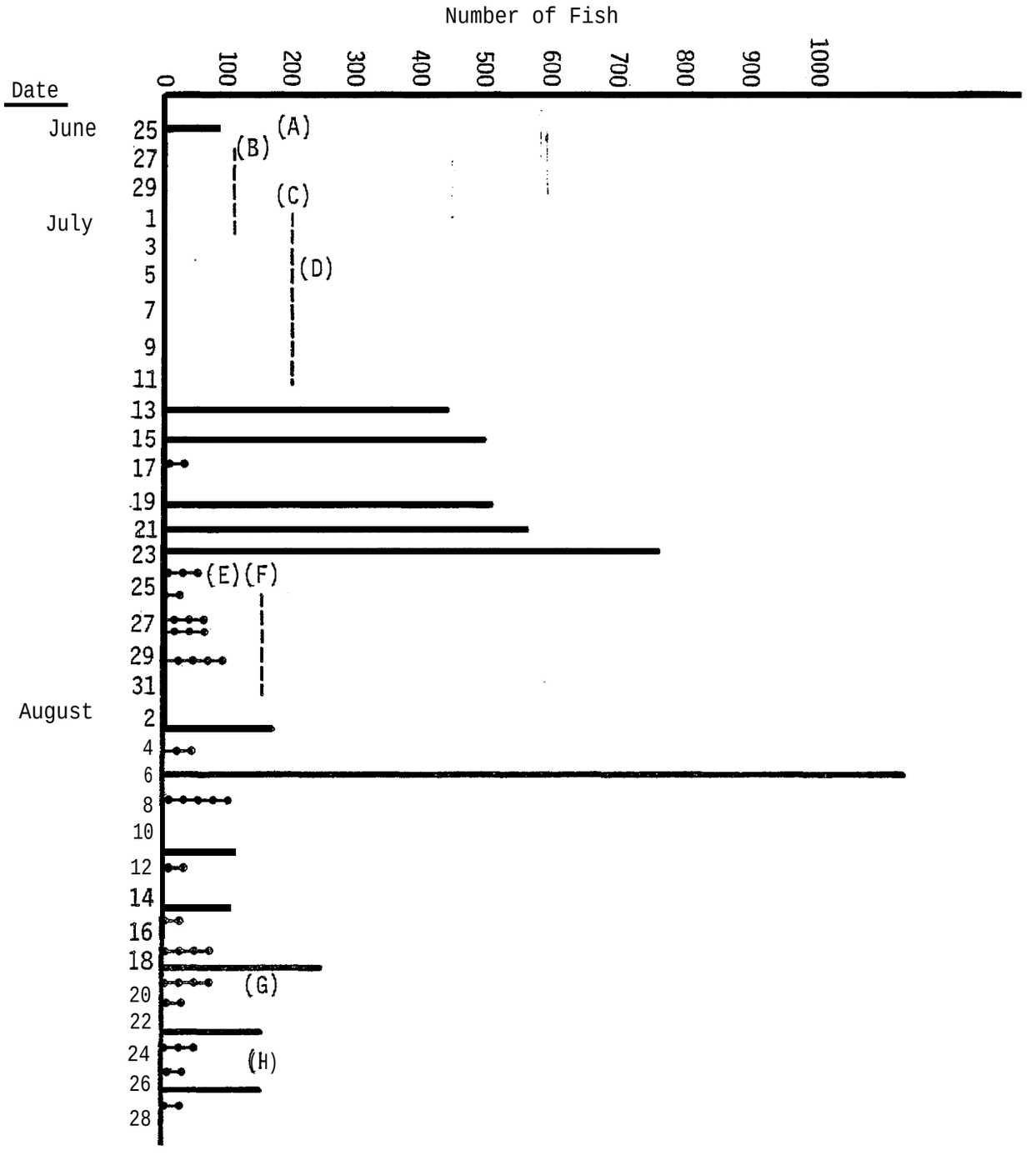
KOBUK UNEMPLOYMENT
(1975-1979)



Source: Alaska Department of Labor. 1975-1980. Quarterly Reports. Juneau.

FIGURE 14.

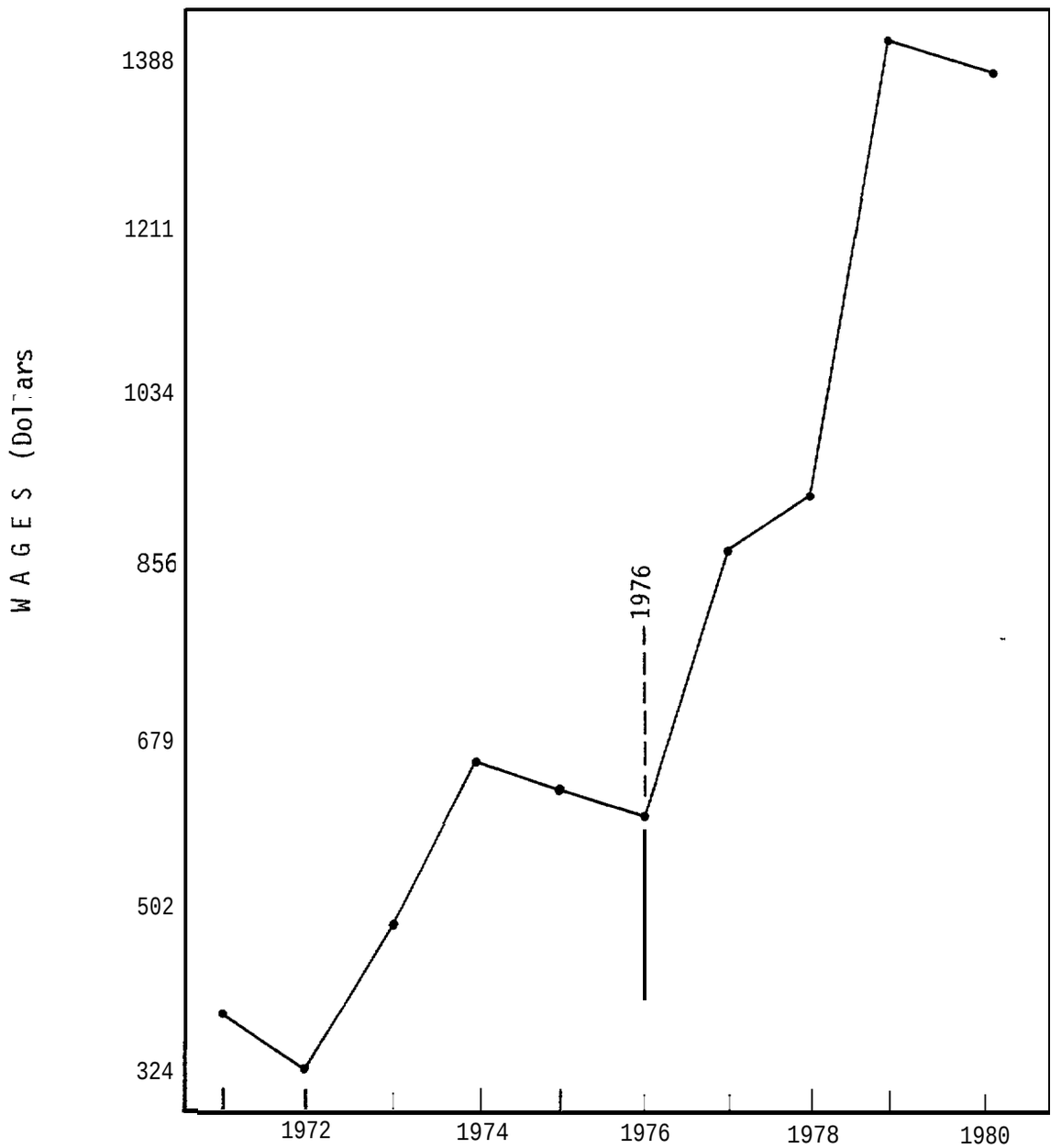
KIANA 1976 FISHING RECORD
(Summer seine and set nets)



Source: McNabb. s. 1981. Personal files.

FIGURE 15

MEAN QUARTERLY WAGES, KIANA, THIRD QUARTER
(1971-1980)



Note: Least squares line accounts for 86.85% variance.

Source: Alaska Department of Labor. 1971 - 1981. Quarterly Reports Juneau.

fishing season resulted from lower wages, or in itself caused these lower average wages. It is possible, however, that the impact achieved its significance (which resulted in local tension and temporary outmigration) because of a juxtaposition of several interrelated conditions. That is, perhaps the poor fishing season would not have exerted such significant effects if other conditions had been more positive. Although this comparison does by no means prove this connection, it is suggestive.

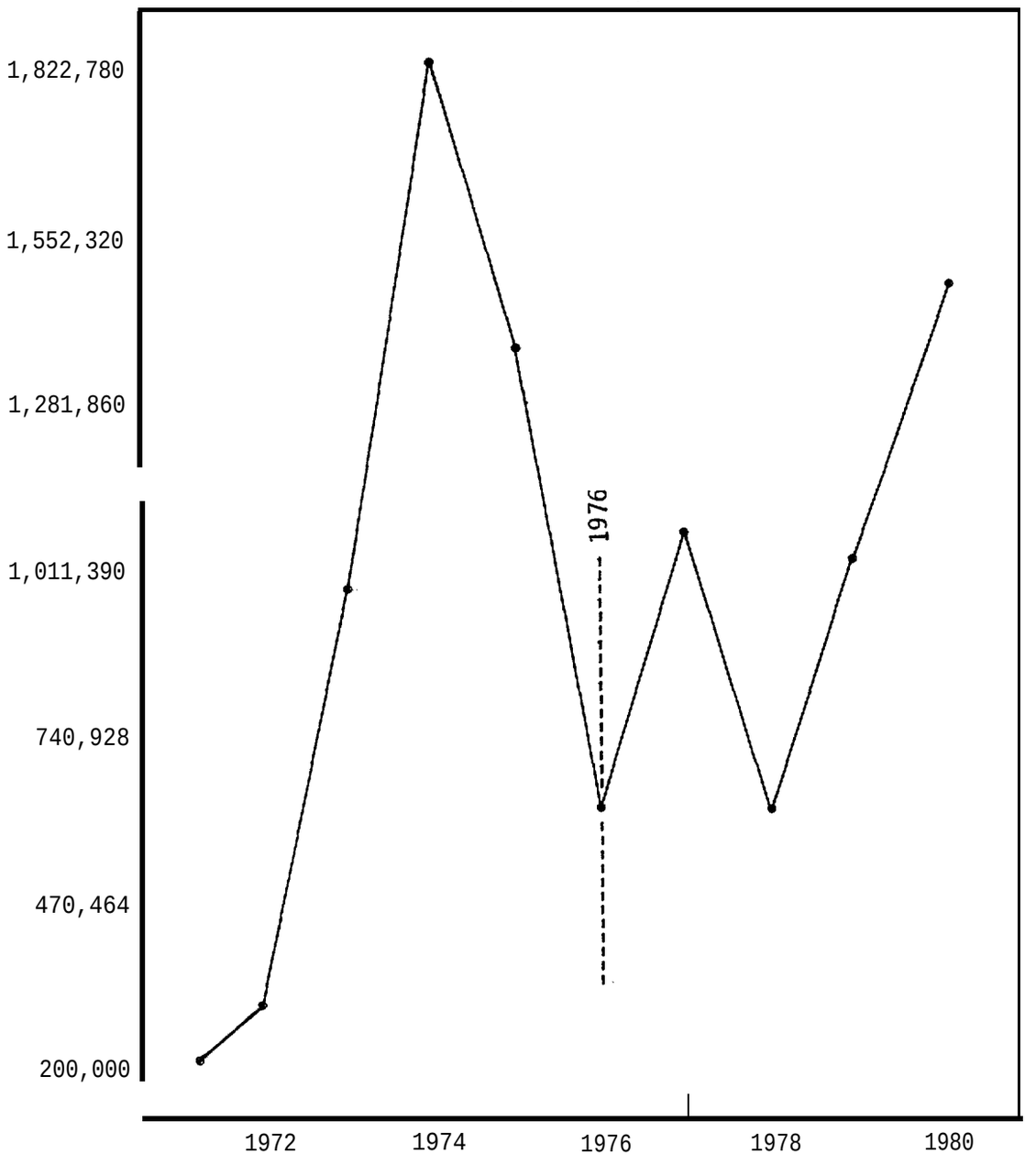
Figure 16 shows the total dollar value of commercial salmon for the same ten year period, for the entire Kotzebue Sound fishery in which many Kiana residents participate. Here too, 1976 represents a substantial slump in the value of the commercial catch. Figure 17 shows the total subsistence salmon estimate for Kiana over the same ten year period. Although 1977 reveals a lower estimate, 1976 clearly stands out as a poor year; this Figure partially corroborates the primary data collected in Kiana. Figure 18 shows the mean subsistence catch adjusted for population.

Figure 19 displays total employment in Kiana for September (the month following the proposed impact) for the 1971-1980 period. Here again, 1976 is conspicuous, representing a decline from 1975 and a departure from the upward and linear trend. However, similar data at the regional level fail to support the consensus of the local, village level data. Figure 20, for instance, reports 3rd quarter State and local payrolls for the same ten year period; in this case 1976 does not stand out at all. Figure 21 shows the 3rd quarter Federal payroll over ten years; 1976 in this case represents a peak year. Federal, State, and local payrolls were reported here since they together account for about 88 percent of the regional cash economy (Derbyshire and Associates, 1981; 1982).

This discussion is not intended to identify any social indicators of well-being, but rather to illustrate some of the difficulties entailed in interpreting aggregate data trends as well as in associating various types of aggregate trends in a joint and integrated explanation of impacts. There may in fact be no valid and defensible relation between the data discussed above; the apparent connections may be spurious or superficial. Nonetheless, these data are suggestive of a sensitivity to detection of impacts. This association must be determined empirically, however, on a village by village basis; as has

FIGURE 1"6

TOTAL DOLLAR VALUE, COMMERCIAL CHUM SALMON CATCH
NANA/KOBUK AREA
(1971-1980)

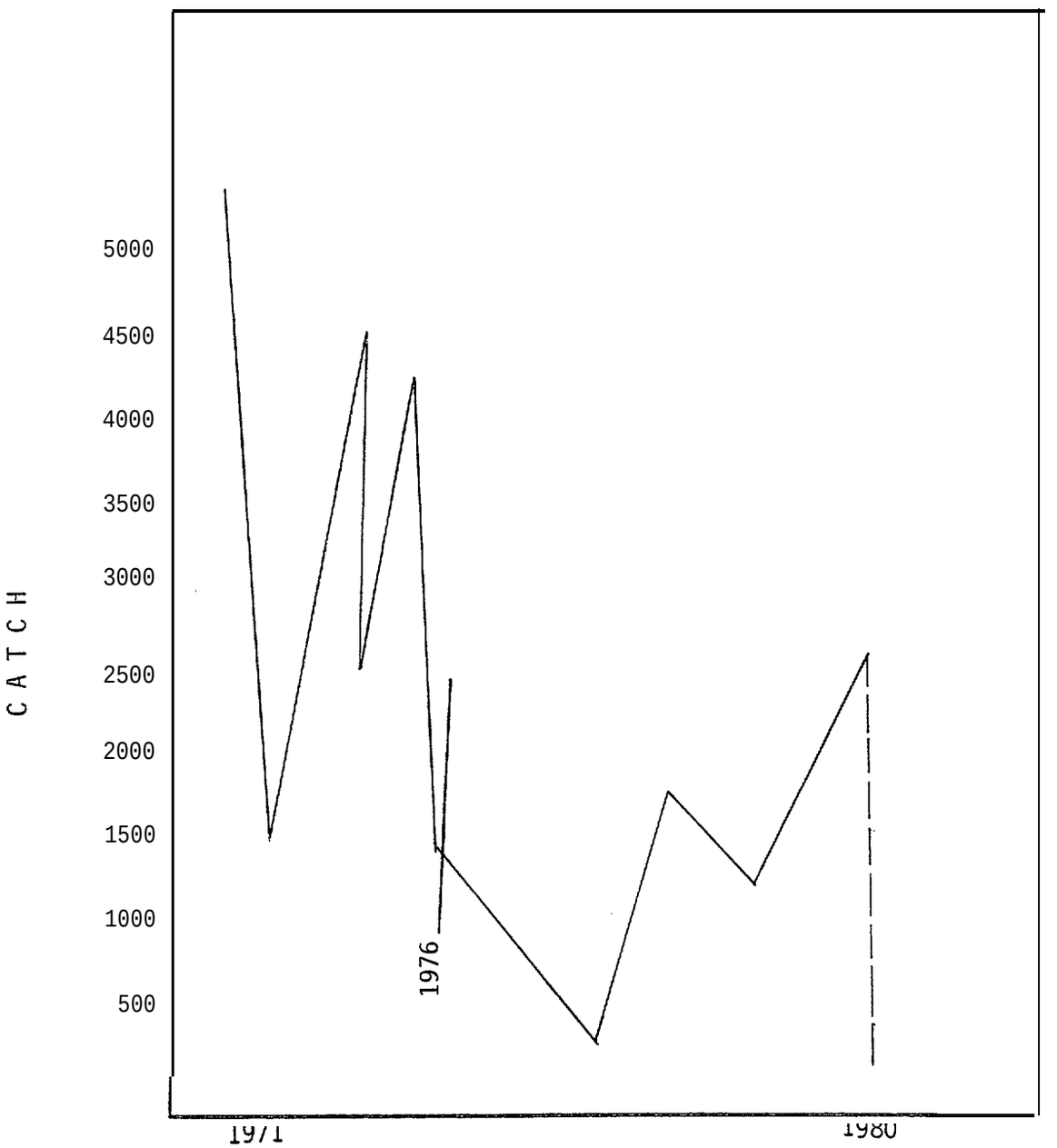


Source: Alaska Department of Fish and Game. 1981. Limited Entry Commission. Juneau.

Note: Least square trend line accounts for 15.86% variance.

FIGURE 17

KIANA TOTAL SUBSISTENCE CHUM CATCH
(1971-1980)

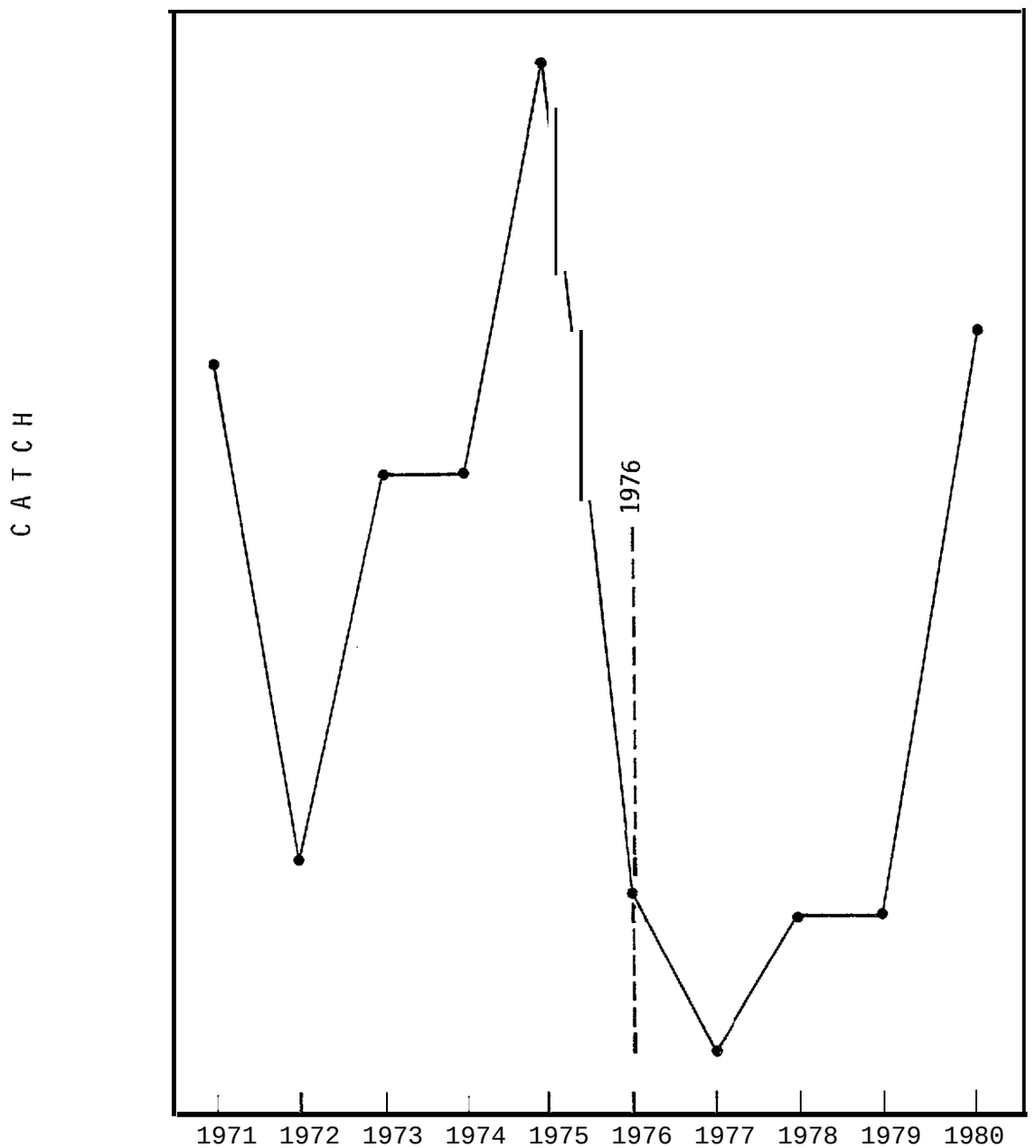


Note: Least square trends line accounts for 32.4% variance.

Source: Alaska Department of Fish and Game. 1981. Juneau.

FIGURE 18

KIANA MEAN SUBSISTENCE CHUM CATCH
(1971-1980)



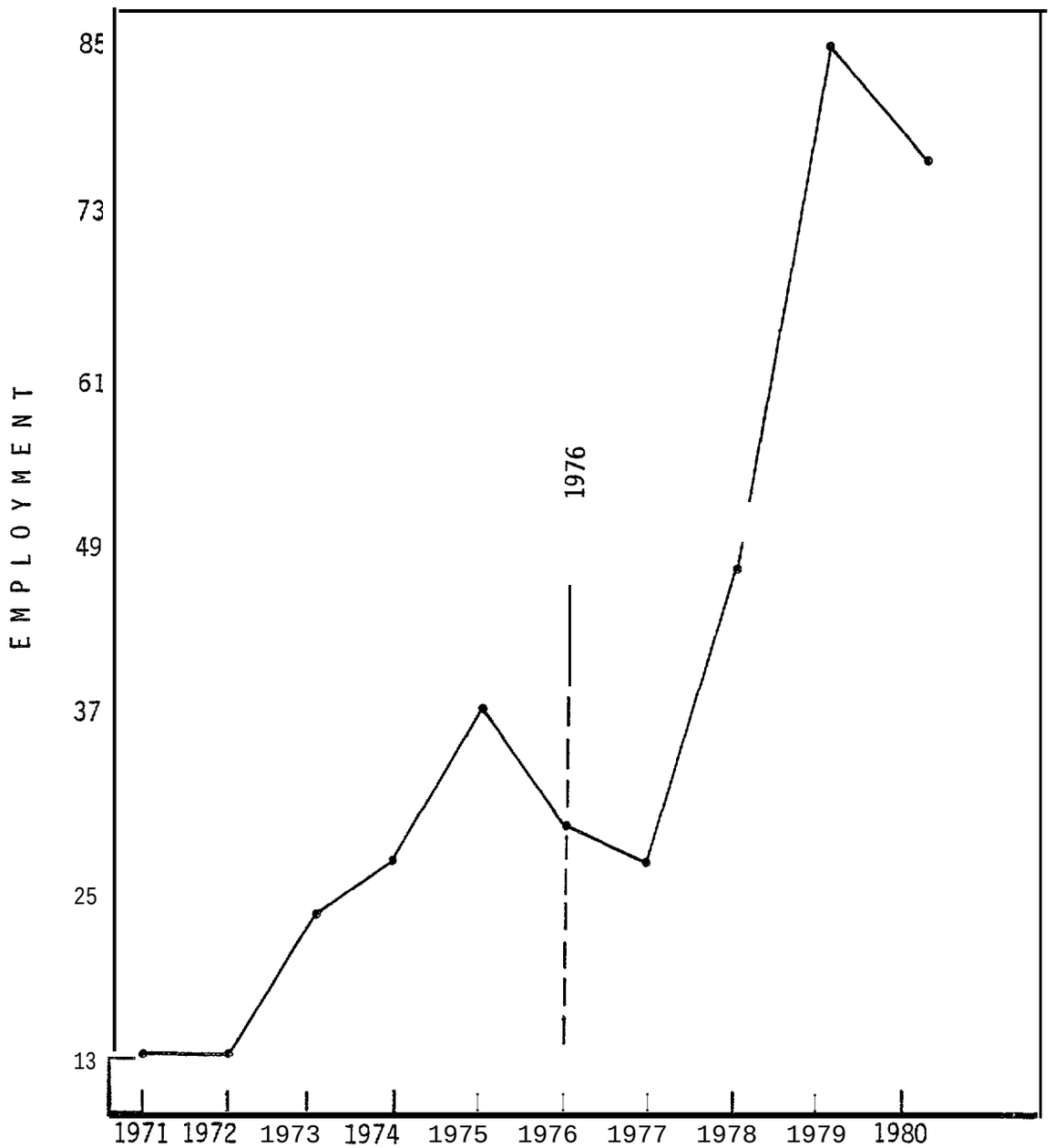
Note: Least squares trend line accounts for 7,4% variance.

Source: Alaska Department of Fish and Game. 1981. Juneau.

FIGURE 19

KIANA SEPTEMBER EMPLOYMENT

(1971-1980)

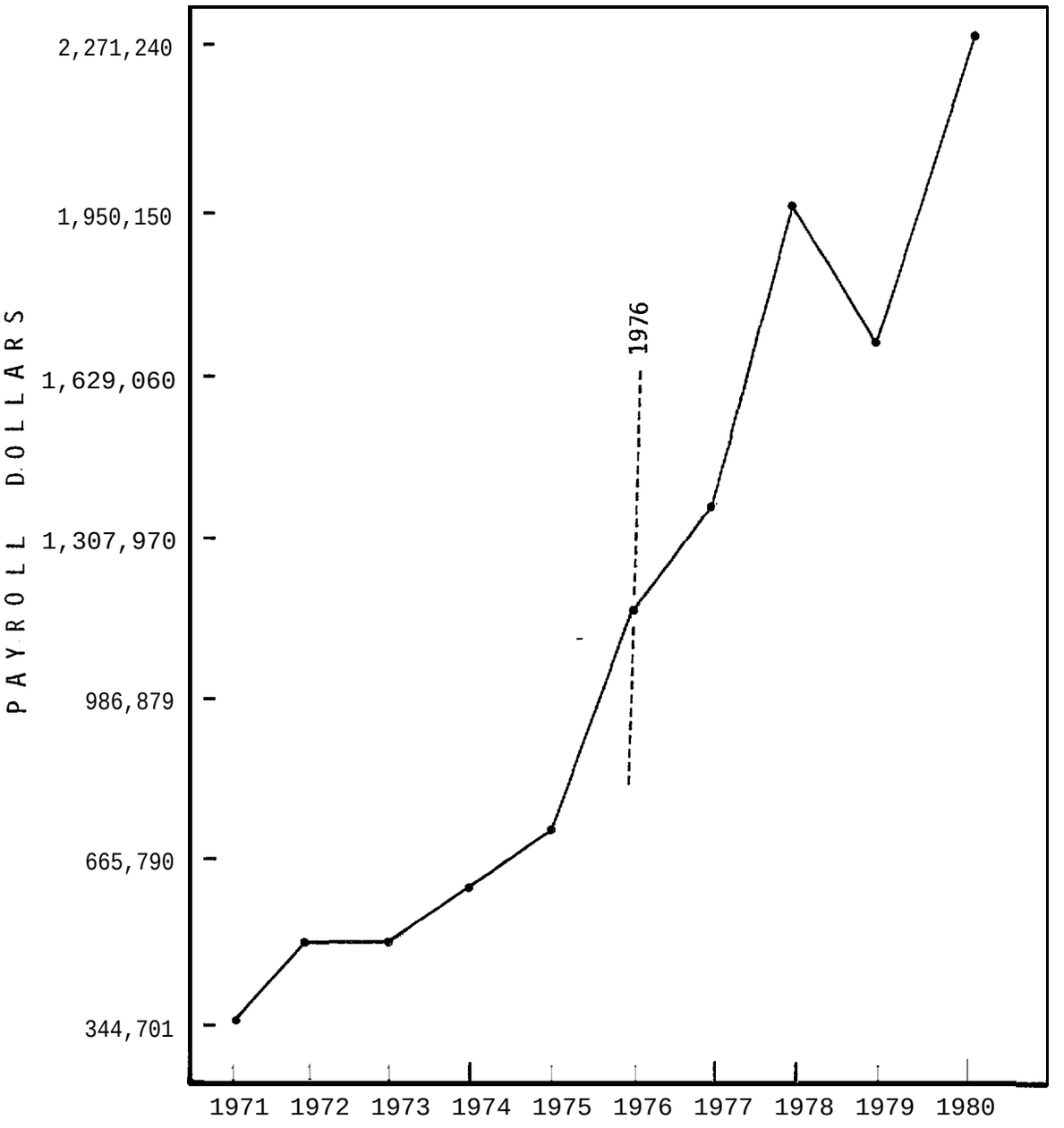


NOTE: Least squares trend line accounts for 76.3% variance.

Source: Alaska Department of Labor, 1971-1981. Quarterly Reports. Juneau.

FIGURE 20

KOBUK REGION STATE AND LOCAL GOVERNMENT THIRD QUARTER PAYROLL
(1971-1980)

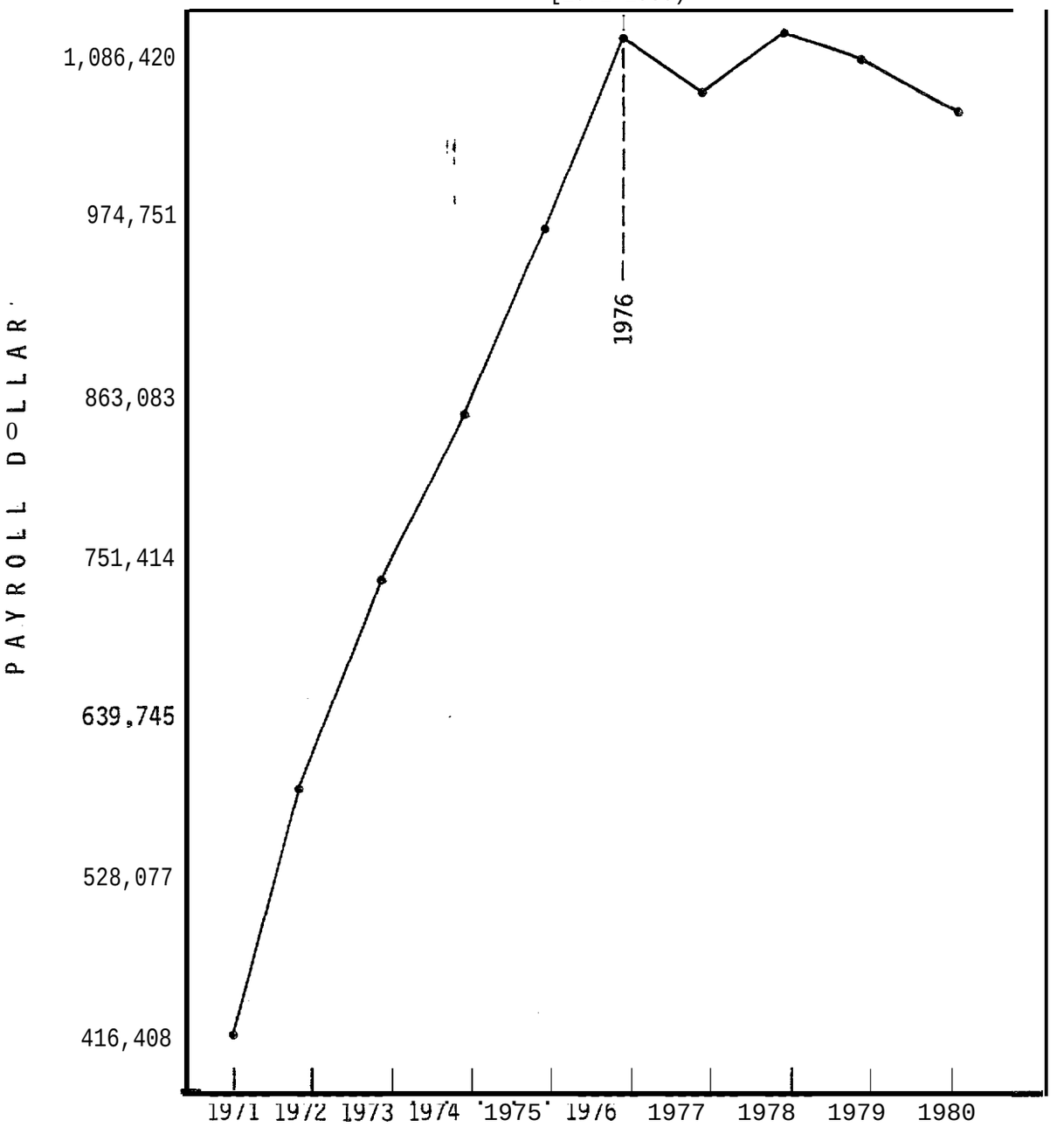


NOTE: Least squares trend line accounts for 91.05% variance.

Source: Alaska Department of Labor. .1971-1981. Quarterly Reports. Juneau.

FIGURE 21

KOBUK REGION FREDERAL GOVERNMENT THIRD QUARTER PARYROLL
[1971-1980)



NOTE: Least squares trend line accounts for 78.62% variance.

Source: Alaska Department of Labor. 1971-1981. Quarterly Reports. Juneau.

already been made clear, villages often show quite erratic data trends, and the nature of the economy and institutional structure of the region is capricious in itself. Figures 22 and 23, respectively, display CETA cutbacks over four fiscal quarters in Kotzebue and other regional villages in 1980. Some villages, like Deering, Buckland and Shungnak, display gradual and moderate cutbacks; others, like Kotzebue, Noatak and Noorvik, show massive and abrupt terminations. It is apparent that some villages will experience an impact in one way, while others may experience it in a completely different manner. This observation should be borne in mind when attempting to interpret any regional or local data and assign meanings to them as indicators.

B. Aleutian-Pribilof Islands

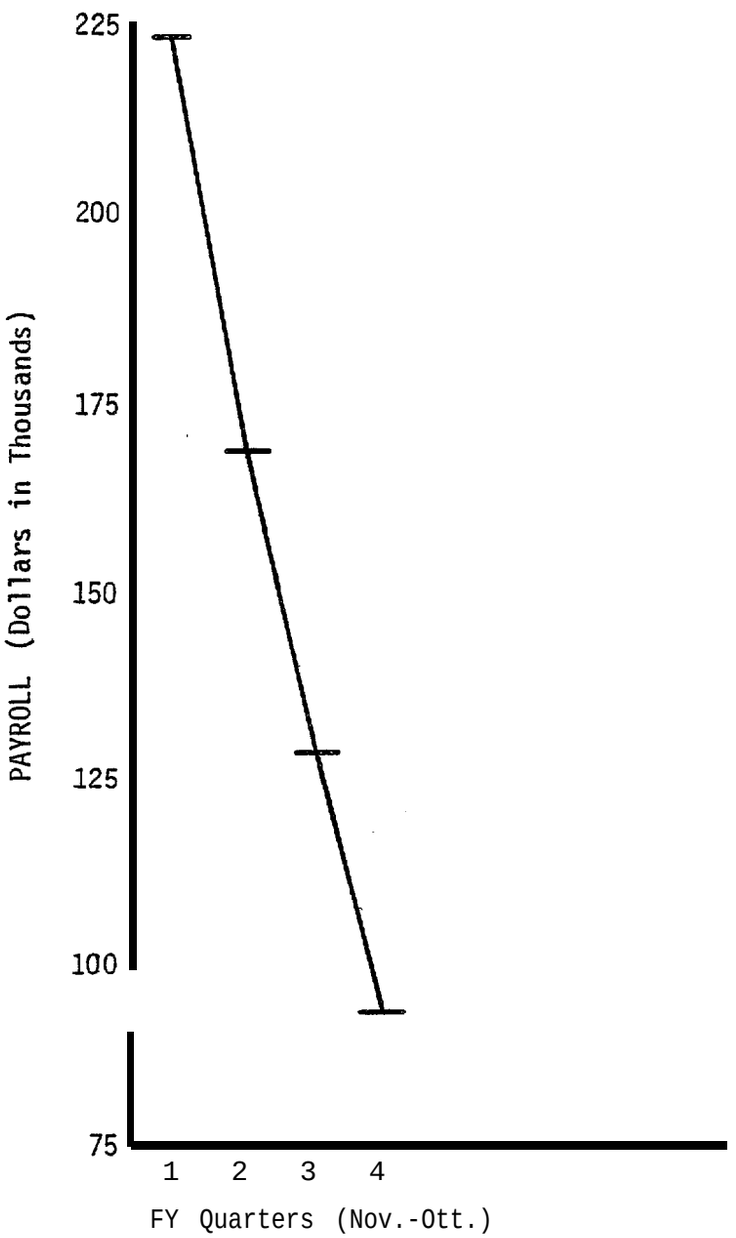
In comparison with the NANA data, the Aleutian-Pribilof data series shows far less variation through time. A review of the population data also reveals little change or growth through time; a review of other, but not all, data sets for the Aleutian-Pribilof region leaves one with a fairly static picture of trends.

Figure 24 displays employment in the Aleutians by month over a seven year period, for a total of 84 observations. The same sort of cyclic seasonality of employment that is so dramatic in the NANA region is apparent here too. This data set is a clear exception to the general observation made above.

Certain more specific and particularistic data series for employment provide a varied picture of employment trends in the Aleutians. Figure 25 shows the 3rd quarter payrolls in the manufacturing sector (a substantial industry here, which includes commercial fish processing) over a six year period. These data exhibit steady growth. However, Figure 26, representing 3rd quarter payrolls in construction over the same period, shows a quite erratic picture of change through time. In contrast to both of the above, Figure 27 illustrates 3rd quarter payrolls in transportation, utilities and communications for the same period; here we see a steady drop and a slow recovery, rather than oscillation (construction) or a linear growth trend (manufacturing). The 3rd quarter payrolls are shown here because they represent substantial summer employment.

FIGURE 22

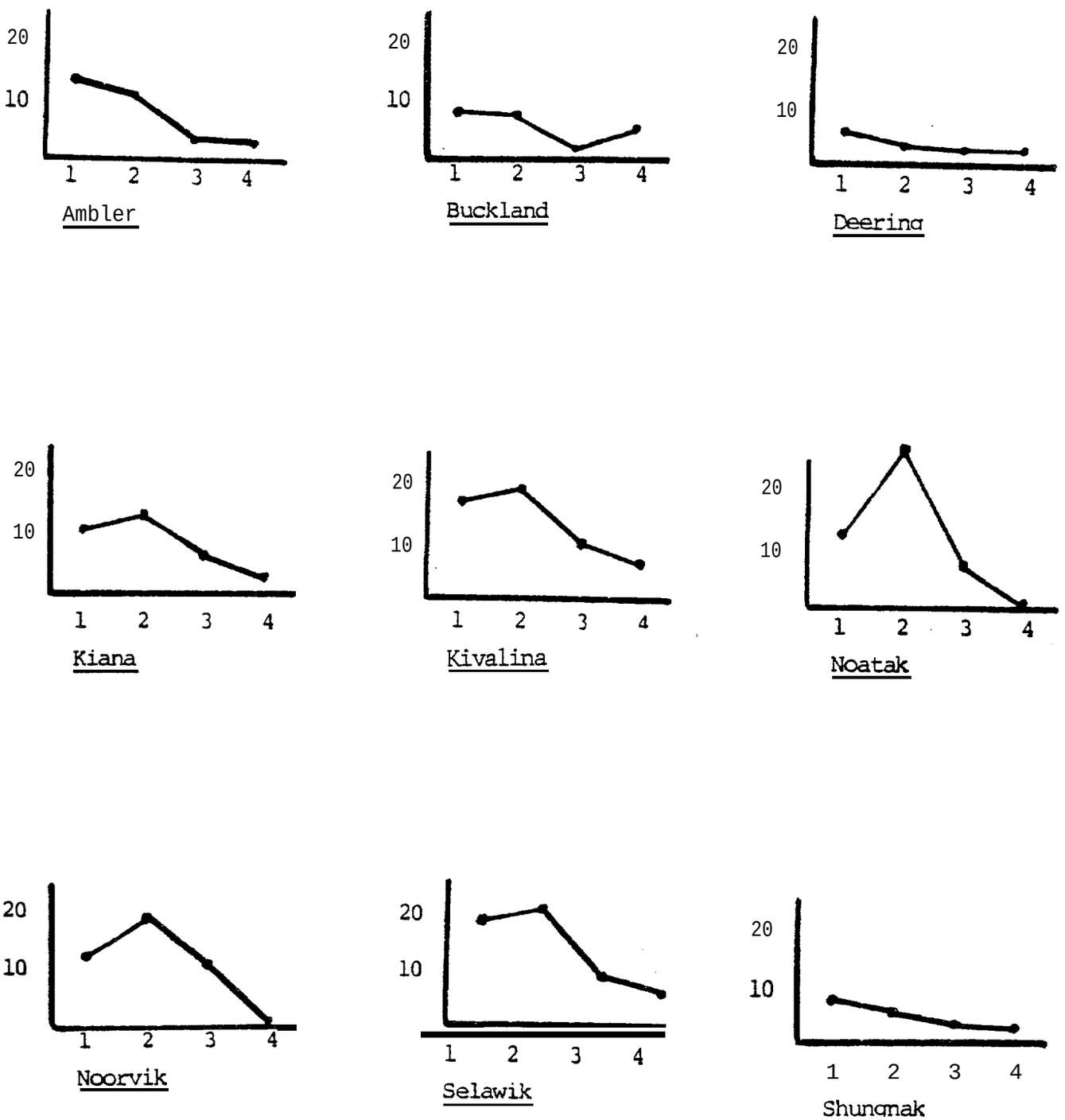
1980 KOTZEBUE CETA MANPOWER WAGE PAYMENTS



Source: McNabb, S. 1981. Human Resources in the NANA Region. Chapter 5 in NANA CSRA CZM Draft Plan. Derbyshire & Associates. Anchorage.

FIGURE 23

1980 VILLAGE CETA MANPOWER WAGE PAYMENTS

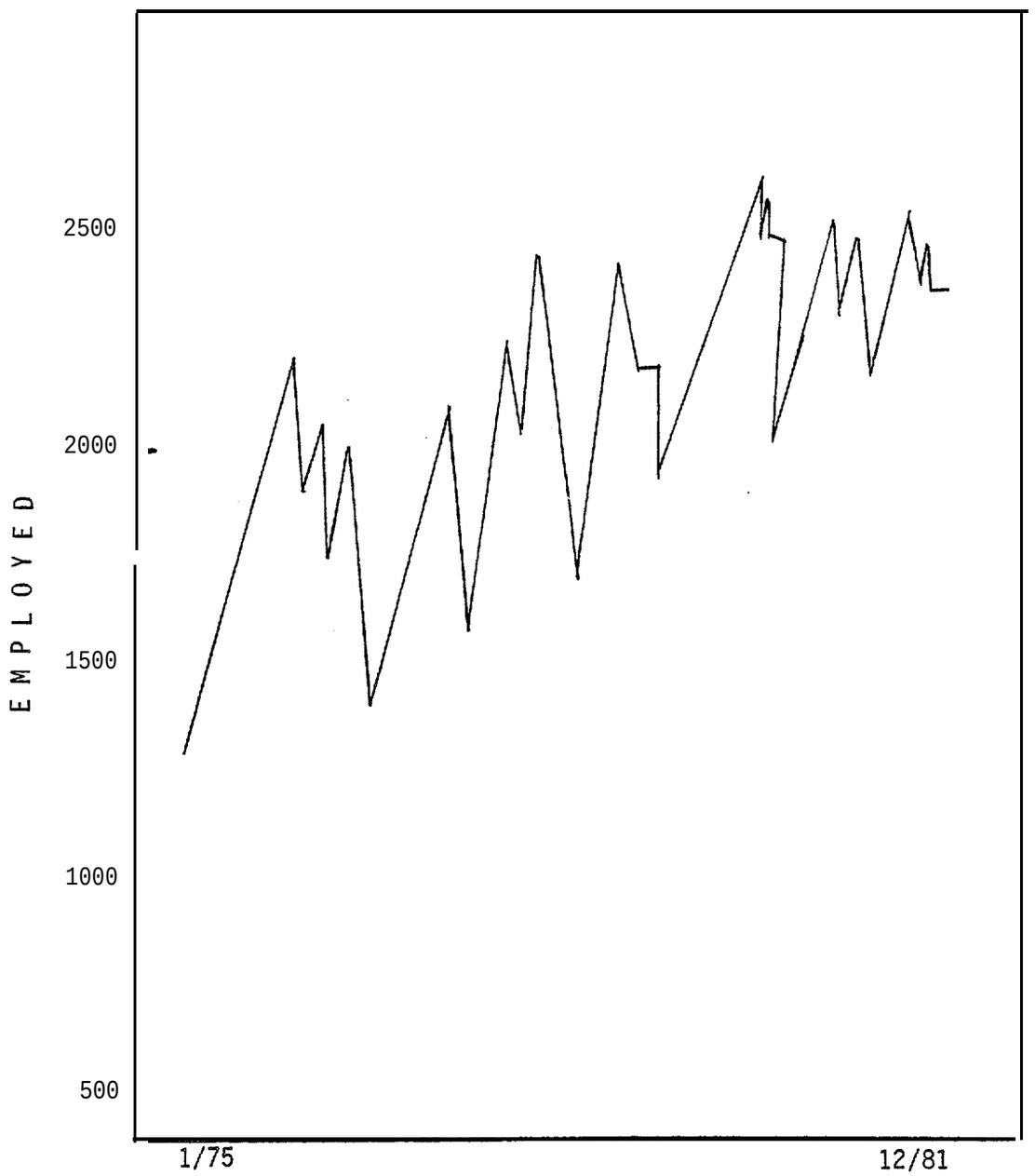


Note: Federal FY quarters listed horizontally; dollar amounts in thousands on the vertical scale.

Source: McNabb, S. 1981. Human Resources in the NANA Region. Chapter 5 in NANA CSRA CZM Draft Plan. Derbyshire and Associates. Anchorage.

FIGURE 24

ALEUTIAN EMPLOYMENT
(1975-1981)



Source: Alaska Department of Labor. 1975-1982. Quarterly Reports. Juneau.

FIGURE 25

3rd Quarter Aleutian payroll, Manufacturing, 1975-1980

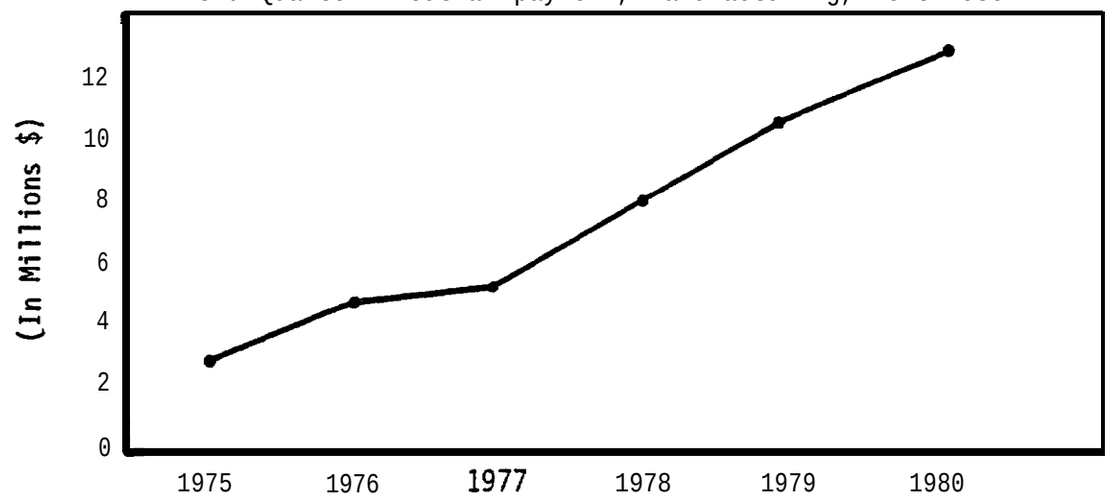


FIGURE 26

3rd Quarter Aleutian Payroll, Construction, 1975-1980

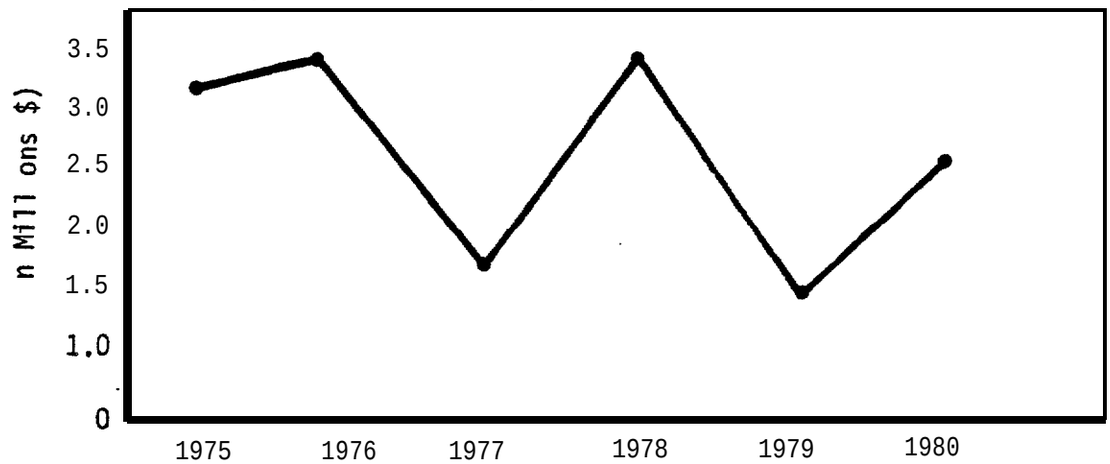
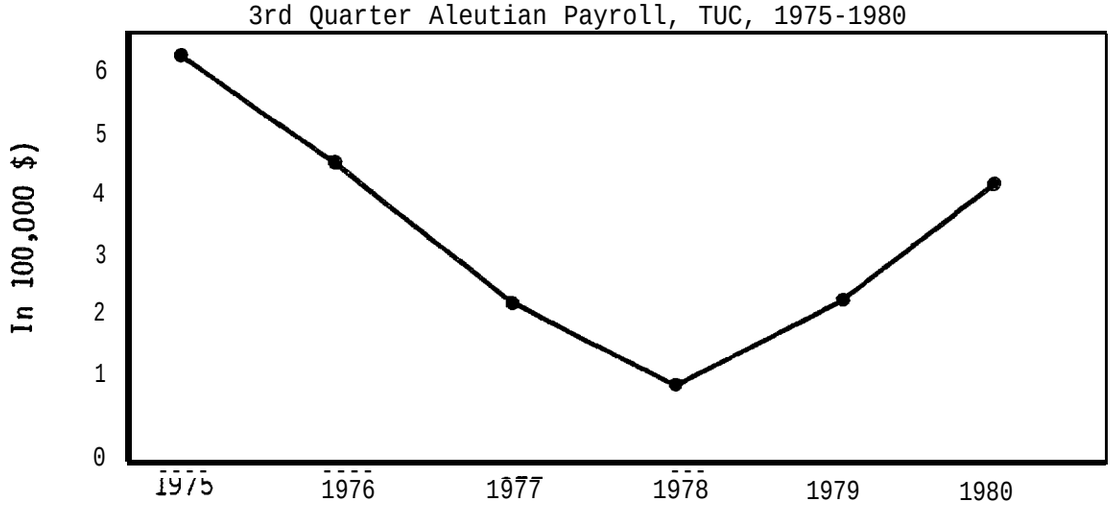


FIGURE 27

3rd Quarter Aleutian Payroll, TUC, 1975-1980



Source: Alaska Department of Labor. 1975-1980. Quarterly Reports. Juneau.
McNabb, S'. and P. Wasserman. 1982. APIA Behavioral Health Assessment. Anchorage. APIA, Inc. ,

Another economic perspective can be achieved by reviewing number of employees, again in the lucrative and significant summer months. Figure 28 displays numbers of employees in the State and local government category in July, over an eight year period. This trend is fairly flat and unremarkable, in contrast to that evident in most other rural areas in which State and local government employment has skyrocketed during the last eight years. In contrast to this Figure, Figure 29, July employees in services, demonstrates a conspicuous spike in 1975 that departs from the otherwise fairly flat distribution of data.

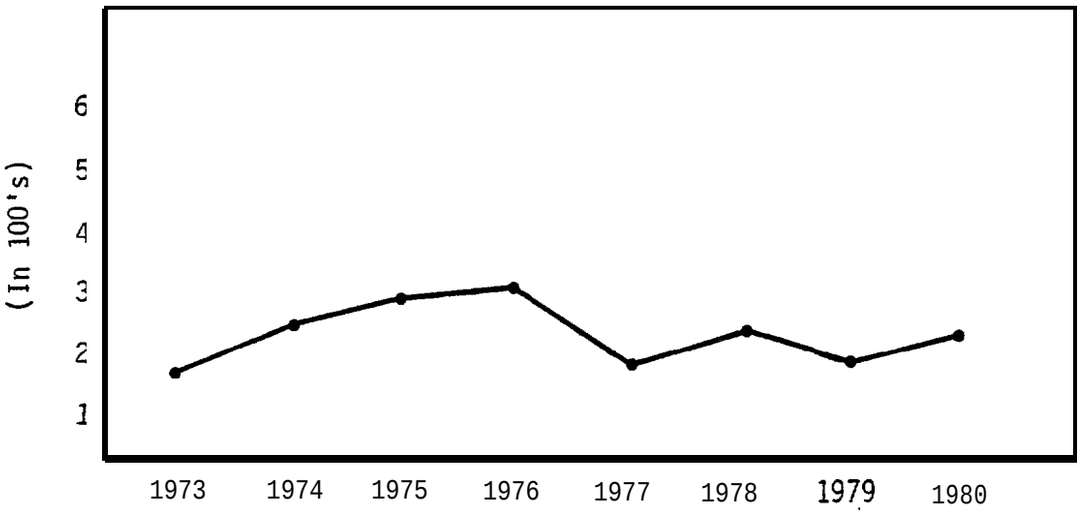
Table 24 displays AFDC payments and recipients regionally for six years. Note that although there was a substantial increase in the number of recipients between 1975 and 1976, the numbers otherwise are relatively static. Table 25 details OASDI beneficiaries and payments for the same period. Here too there is relatively little change in the number of beneficiaries, although 1980 seems to represent a clear decline. As in the NANA case, the payments show steady growth, keeping pace with inflation.

Table 26 provides birth data for each of the study sites and Dutch Harbor. The small population sizes are evident in the capricious birth totals; were the populations larger and age structure of the communities statistically normal, we might predict a more orderly and consistent record of births. Table 27 exhibits total school enrollments for the four study sites. As is obvious from these data, Nikolski is a very small community with a pronounced elderly subpopulation; due to the small school enrollment, the villagers are now considering whether or not to send their last remaining young people to another community for schooling (OCS-SI Nikolski field notes). Unalaska and King Cove are more alike in many demographic characteristics as compared to Nikolski and St. George, as birth and enrollment records show. However, it seems that King Cove is by far the more robust and self-sufficient community, a conclusion reached by Jones in her community comparison study in the Aleutians (Jones 1976).

Although the birth records provide a slim clue about this characteristic, other data are highly supportive of this conclusion. Table 28, for instance, displays social service case loads in each of the study sites. King Cove had no cases for most years, while Unalaska represents about 80% of the total for all four villages. Table 29 shows the average monthly case load

FIGURE 28

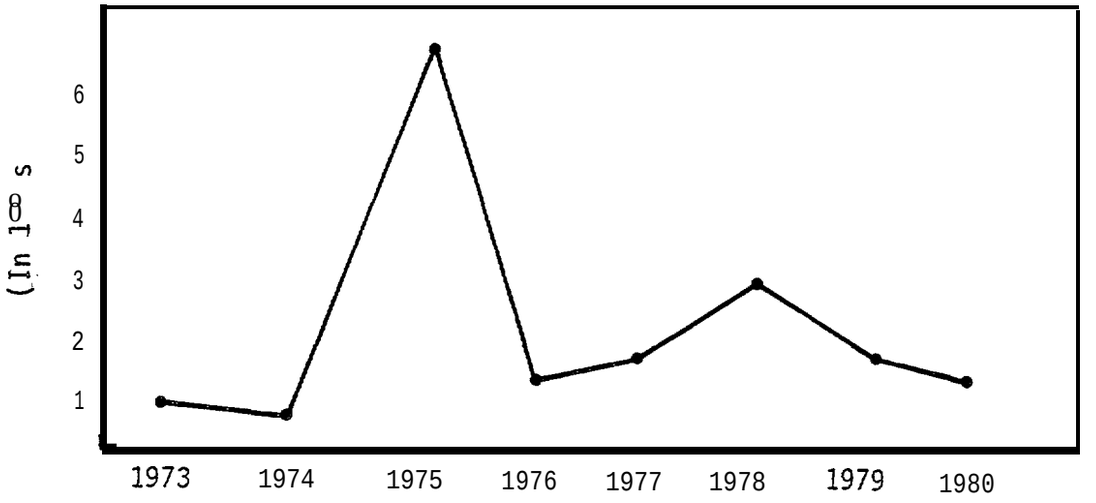
NUMBER OF JULY EMPLOYEES, STATE/LOCAL GOVERNMENT, 1973-1980



Source: McNabb, S. and P. Wasserman. APIA Behavioral Health Assessment. Anchorage. APIA, Inc.

FIGURE 29

NUMBER OF JULY EMPLOYEES, SERVICES



Source: McNabb, S. and P. Wasserman. APIA Behavioral Health Assessment. Anchorage. APIA, Inc.

TABLE 24

ALEUTIAN REGION
AFDC PAYMENTS AND RECIPIENTS

Year	Recipients Per Month	Amount of Assistance/Month
1975	56	$ 5,684
1976	9 0	9,229
1977	108	11,588
1978	114	12,273
1979	*	*
1980	109	14,085

*Not available.

Source: McNabb, S. and P. Wasserman. 1982. Behavioral Health Assessment. Anchorage. APIA, Inc.

TABLE 25

ALEUTIAN REGION
OASDI BENEFICIARIES AND PAYMENTS

Year	Recipients Per Month	Amount of Assistance/Month
1975	181	$ 23,576
1976	187	26,452
1977	182	30,831
1978	177	33,647
1979	185	38,985
1980	161	40,661

Source McNabb, S. and P. Wasserman. 1982. APIA Behavioral Health Assessment. Anchorage. APIA, Inc.

TABLE 26

NUMBER OF BIRTHS BY VILLAGE
(1970-1980)

Year	Dutch Harbor	King Cove	Nikolski	St. George	Unalaska	Total
1970	2	10	0	2	7	21
1971	0	3	2	4	9	18
1972	1	17	1	4	11	34
1973	0	5	1	3	4	13
1974	1	8	0	4	1	14
1975	2	6	0	4	5	17
1976	4	10	0	1	2	17
1977	0	9	1	3	5	18
1978	5	3	0	3	6	17
1979	0	11	0	4	4	19
1980	0	17	0	6	10	33

Source: McNabb, S. and P. Wasserman. 1982. APIA Behavioral Health Assessment. Anchorage. APIA, Inc.

TABLE 27

TOTAL SCHOOL ENROLLMENTS BY VILLAGE
(1976/77 - 1981/82)

Year	King Cove	Nikolski	St. George	Unalaska	Total
1976-77	126	11	35	123	295
1977-78	121	15	36	133	305
1978-79	126	15	30	140	311
1979-80	122	12	30	160	324
1980-81	119	11	33	197	360
1981-82	137	8	28	196	369

Source: McNabb, S. and P. Wasserman. 1982. APIA Behavioral Health Assessment. Anchorage. APIA, Inc.

TABLE 28

SOCIAL SERVICE CASES BY VILLAGE
(MONTHLY TOTALS FOR YEAR)

YEAR	KING COVE	NIKOLSKI	ST. GEORGE	UNALASKA	TOTAL
1978	0	0	28	224	252
1979	0	8	36	280	324
1980	2	10	36	304	352
1981	0	0	59	311	370

Source: McNabb, S. and P. Wasserman. 198'2. APIA Behavioral Health Assessment. Anchorage. APIA, Inc.

TABLE 29

SOCIAL SERVICE CASES
(monthly averages)

YEAR	KING COVE	NIKOLSKI	ST. GEORGE	UNALASKA	TOTAL
1978	0	0	2.33	18.66	21.00
1979	0	0.66	3.00	23.33	27.00
1980	0.8	0.83	3.00	25.33	29.33
1981	0	0	4.92	25.92	30.83

Source: McNabb, S. and P. Wasserman. 1982. APIA Behavioral Health Assessment. Anchorage. APIA, Inc.

in each of the villages, and here too we find confirmation of the observations made above. King Cove averaged less than one case per month during 1980, and otherwise had no cases at all. Unalaska on the other hand displays steady growth in the average monthly case load, reaching a high of about 26 cases in 1981. St. George shows a rather abrupt increase in 1981 in both Figures, but otherwise is relatively low and steady. Nikolski exhibits what may be an idiosyncratic jump from zero after 1979, and then a return to zero in 1981.

Thus these trends provide a portrait of economic and welfare conditions that are remarkably consistent with those broader conditions, both historically and contemporary, that typify the Aleutian-Pribilof region (cf. Chapter II.B.2 and Volume 3). That is, change has been often abrupt and erratic in both cause and effect; highly localized in many cases; and, nonetheless, we see that highly static conditions ar-e juxtaposed against rapid and dynamic change in terms of location, time, and theme.

D. A Framework for the Analysis of Community Hell-Being in Alaska

Basic to the definition of community in social inquiry from the turn of the century (e.g., Weber 1904-5, Durkheim 1913) is that co-residing people assign symbols, i.e., significant meanings, to the spaces in which they procure their livelihoods and which they are willing to defend, the places in which they have their homes, the people with whom and the contexts in which they regularly interact, and the organizations or structures through which regular relations occur. The shared meanings, then, accompany place, space, and social actions.

Modern village Alaska comprises small communities, more than 200 in number and with few larger than 300 persons, in which practically every resident knows every other resident and in which most interactions are face-to-face. Events for entire communities, from Fourth of July celebrations to, perhaps, whaling festivals are sponsored annually. And although state services are available to supplement, if not to perform the domestic functions formerly performed by families and wider networks of kinspeople and friends, all of the services that are potentially available are not used in each village. Moreover, because several federal acts following the Alaska Native Claims Settlement Act have mad-e it possible for villages, through IRA governments to administer their own services by contracting to do so with the Bureau of Indian Affairs and the Indian Health Service, the impersonal, professional relations that normally accompany the growth of state services in village and city affairs can assume less impersonal and less professional (patron-client) forms in village Alaska. The smallest villages may not receive many services at all.

The residents of Alaskan villages, whether located in the arctic or sub-arctic, and whether located on the coast or in the interior, have sustained themselves in large part as did their forebearers, from naturally-occurring and renewable resources. Concepts of ownership and stewardship of resources, the organization of labor, exchange, distribution, and consumption, we presume, have acquired significant meanings over time, influencing how people use, share and think about their resources. Family organizations and responsibilities and obligations among networks of kinspeople and friends, responsibilities of elders and to children, and sentiments toward

persons Standing in various kinship and friendship relations to one another, also have persisted.

Recognizing that some villages have grown larger and others smaller in the past 40 years, but especially since the enactment of ANCSA in 1971; that public sector employment has increased dramatically in village Alaska; that modern, relatively inexpensive technology in the forms of snowmobiles, all-terrain cycles, and outboard motor boats have greatly altered some subsistence practices and organizations of extractive labor; and that corporations, state and federal governments have influenced village affairs in many complex ways, a methodology has been developed to allow us to measure many of the structural relations and the significant meanings of which village Alaskan communities are composed, and also to evaluate conflicts and contradictions in meanings, behavior, and organization.

As is consonant with the tradition of social indicators research, we have sought non-economic measures of community well-being. But because community well-being in village Alaska has had subsistence resources at its base for several mill enia, the interplay of subsistence economy with recent political and economic forces causes economic topics to assume considerable importance in our analysis. Village Alaska refers to villages spread over a vast territory and in which, exclusive of south-eastern Al aska., two Eskimo languages, Aleut, and several Athapaskan languages are spoken. These villages are unique in the United States because of the extent of their reliances for subsistence on the naturally-occurring resources of the spaces that they occupy, so the research was designed to measure the nature of the subsistence economy in relation to the public sector and market economy, family-household organizations, village institutions, and the ideas and sentiments that accompany these phenomena. Measures of these many phenomena, we presumed, would allow us to determine similarities and differences within villages as well as between and among villages. Hence, the goals and priorities of the research to measure the quality of life in village Alaska is specific to the eight villages in our sample, the two regions they represent, the two native languages that are spoken (Aleut in one, Inupik in the other) the two traditions from which the residents of the two regions stem, and the responses through the recent political and economic events.

The research on which this study is based includes classical anthropological observations of village life and focused discussions about community affairs and the meanings which people attached to those affairs. It also includes as is consonant with social indicators research, the collection and analysis of archival data in the form of time series, and analysis of events that may have affected those time series. So archival data on population, morbidity, mortality, births, transfer payments, health, crime, transportation, business activities and the like are studied in the course of this research. The goal is to fit the field observations to the time series observations and to derive a set of variables that will indicate community well-being. This goal can only be paretically met in this study, as will be seen in the following chapters.

CHAPTER III

METHODS AND APPROACH

III. Methods and Approach

Coastal Alaskan villages north of Cook Inlet, inhabited principally by Eskimos and Aleuts whose precursors began adapting to sub-arctic and arctic environments at least 5,000 years ago, are not readily nor easily generalizable by standard social indicator methodologies and data bases. Harsh environments, extractive subsistence economies, and the persistence of kinship networks and community solidarity, even in the context of dramatic political and technological changes prompted the research team to fashion a methodology that would collect and analyze many kinds of data from many sources and from several points in time for eight villages. Those data were to be drawn from archives (aggregate time series), field investigation (individual-level and institutional-level data) and observations. The multifaceted research was necessary if the team was to accomplish its research mission of defining communities, analyzing community well-being, and providing indicators of community well-being.

Our multifaceted methodology fits within the genre of methods referred to as "triangulation".

A. Methodological Issues - The General Approach

1) Triangulation

Triangulation as a general method of social inquiry refers to the use of several methodologies, several research designs, and several data sets to study a single problem. The triangulation principle is a common response to broad problems of validity. For our purposes, validity is synonymous with the truth-value or logical consistency of a research finding. Although a particular research finding may be valid, or true, or logically consistent, it is always possible that the finding is an artifact of methodology, of design, or of the data set. Two researchers who use different methodologies, designs, or data sets are likely to arrive at quite different answers to the same question. By using several methodologies, designs, and data sets, however, we arrive at answers that are relatively more valid, or true, or logically consistent.

The three research methodologies used here are socioeconomic observation, that is, the collection and analysis of archival data; protocol observation, that is, the collection of focused responses; and anthropological observation, that is, the collection of structured and unstructured observations. Each of these methodologies has strengths and weaknesses. Relying on the principle of triangulation, however, we used the strengths of one methodology to control the weaknesses of another.

A. Archival Data

Village- and regional-level socioeconomic time series data were collected and analyzed. These data have two unique strengths. First, they are longitudinal and, thus, support strong inferences about change over time. Second, they are easily analyzed. They also have a number of serious weaknesses. For example, archival data often have weak construct validity. In many cases, we are interested in village- or even family-level phenomena but only regional-level time series are available. And of course, many of the most interesting phenomena are not recorded for government archives. Although archival data have many advantages, they have serious disadvantages for our purposes.

B. Focused Responses

In addition to simple, structured and unstructured observations, field workers collected focused responses to several protocols (or sets of questions akin to an interview schedule, but not administered as a scheduled interview or questionnaire). The strengths of these data are best illustrated by comparing them to the structured observations. First, unlike structured observations, focused responses allow formal, repeatable contrasts between families, villages, and regions. This permits some generalization and, thus, supports statements about similarities and differences across the sample. Second, unlike structured observations, focused responses can be formally analyzed--although not always easily. Analysis supports statements about relationships among variables across the sample. Focused responses also have several weaknesses.

Like structured observations, focused responses as collected and analyzed here are synchronous measurements; they are inadequate for inferences about change. In addition, focused responses as used here have weak construct validity due to the forced nature of the classification of the response. That is, whereas the response may have been open-ended, the analyst had to classify that response as one attribute of a variable. In other words, in order to analyze responses to focused questions it is necessary to limit the responses to a number of classes or categories within a variable, hence producing a limited repertoire of answers. This "multiple choice" format often trivializes the operational link between a phenomenon and its measure.

c. Structured Observations

Field workers living in each of the eight communities observed and recorded the daily routines of village life. Some of those observations were structured (field workers looked for certain things and asked open-ended questions about those observations). Other observations were unstructured and unanticipated, amounting to discoveries. The two-- structured and unstructured observations--informed by open-ended questioning, stimulated discoveries as well as puzzlements. The puzzles prompted more inquiry. Texts were collected for analysis, and we were able to explore more deeply the responses obtained from focused discussions.

This methodology is the most crudely empirical of the three and that is its strength. Structured observations give us the richest possible understanding of village life and, quite often, we discover phenomena from these data that could be discovered in no other way, and when these discoveries are made in the field they open up both new and related areas of inquiry. The weaknesses of this method are just as obvious, however. First, the data are synchronous-- observations recorded at one point in time-- and hence, inadequate for inferring change. Second, the data are prone to reactive arrangements, i.e., they are subjective. We can never be certain that what we saw and interpreted was what happened and what prompted the happening, or what the field worker heard is what the villager said, or that the villager understood what the field worker requested, or, more generally, that a villager has not "lied" to the field worker for some reason. Third, structured observations are not easily

analyzed. Indeed, they can only be analyzed in contexts of many observations and discussions.

2) Principles of Triangulation

Given these strengths and weaknesses, the principle of triangulation can be illustrated by example. Structured and unstructured observations appear in our research as narrative and as anecdote. During the research process, however, structured observations serve to generate working hypotheses. Although these hypotheses can be tested inductively by other structured observations, they cannot be tested deductively; nor can they be analyzed to show similarities and differences among the villages. This is often a serious shortcoming of studies based only on structured observations. These "case" studies seldom support generalization beyond the immediate and specific case. When combined with an analysis of focused responses, however, the rich basis of understanding derived from structured observations takes on another dimension.

An analysis of focused responses permits tests of deductive hypotheses. When the findings are reconciled with the findings of case studies, we have greater confidence in our conclusions. Because focused responses can be analyzed statistically, moreover, we can make statements about all of the villages or all families in a given village. And hypotheses about relationships among variables can be tested. In this way, the strengths of our focused response data--their quantifiable, objective nature--compensate for the weaknesses of our structured data.

Both structured observations and focused responses as collected here at one point in time, are synchronous data, of course. Neither will support inferences about change and this is a serious disadvantage. Alaskan village life and culture have changed radically in the last ten years and, in the next ten years, we expect even more change. The validity question raised by this state of flux is simple: Are our findings time-bound? Are phenomena that we have discovered today likely to be operating unchanged in the future? Here our archival data come into use. Although these data are limited, their analysis provides a valuable picture of the change expected in our eight villages. And in this change context, we are able to subject our

structured observations and focused responses to yet another validity check.

A. External Validity

On this point, however, we must also address the broad issue of external validity. For our purposes, external validity refers to the general inability of our findings. Put simply again, if our findings are true in eight Alaskan villages today, will they also be true in other Alaskan villages in the future? Our research guarantees nothing here, although we feel confident that at least some of our findings are spurious in this sense. There is only one sure method for strengthening the external validity of our findings: replication. Temporal replication among the eight villages, of course, transforms synchronous data to diachronic and overcomes some of the problems of casual inference.

B. Focused Response Data

1) Scale Assumptions for Synchronic Data

The synchronic data collected from structured and unstructured observations require analysis from less formal methods, such as the thematic analysis of texts (unstructured responses) and contextual analysis of observations. The synchronic data collected from focused protocols administered among individuals for individual-level and village-level responses, and the diachronic data collected from archives, require analyses through formal methods based on either empirical or theoretical sampling distributions. Where formal, statistical analyses are appropriate, we have selected bivariate and multivariate statistics whose scale assumptions fitted the data.

Responses to the protocols, or focused discussions, were organized into variables, or classes of data for analysis. For example, we sought to determine household composition and dynamics. So field researchers were instructed to ask each native respondent how many persons resided in that person's household and whether there were rules about when and what persons could move in or out of that household. The responses that were received were checked in the field by observations made

by the field worker as to who resided in the household. These questions and observations were further supplemented by other questions about kinship, adoptive, and non-kinship relations among members of a household, and by questions about the duration of residency for members. Consistency, or contradictions, between household composition and dynamics as reported by the respondent could be noted and further questions could be asked, if necessary, to resolve problems and allow the field worker to understand the household. The information thus collected, through structured response and observation, could be used in several ways.

One way in which the information has been used is to classify each respondent's household in the qualitative variable "Household Dynamics/Composition-Movement" (V33). The variable, by definition, is "qualitative" rather than "quantitative", because it comprises attributes that vary in kind rather than degree. Each household in the study has been classified as either fluid (open options, no set expectations) or non-fluid (structured, explicit expectations, rule ordered). The classification allows us to compare household dynamics within and among villages, and to determine the relations between household dynamics and dozens of other variables, i.e., we are allowed to evaluate multivariate relations.

Qualitative variables satisfy different scale assumptions from quantitative variables. Furthermore, there are different kinds of qualitative variables, nominal and ordinal, and those, too, satisfy different scale assumptions. In nominal variables a quality (attribute) is present or absent. For example, services of native healers are used (present) or are not used (absent). In ordinal variables qualities increase or decrease with respect to an underlying property. For example, we might conceptualize the use of the services of native healers on a scale from not used to used very frequently. In the absence of direct counts of times used per year (or some other unit of time), and depending on questioning about frequencies of illness and the kinds of solutions sought for these illnesses, a respondent might be classified by the researcher as not using, seldom using, frequently using, or very frequently using the services of native healers.

In constructing an ordinal variable on the use of native healers, we conceptualize that native healers are present or absent, and if present, whether they are not used at all or whether they are used seldom, frequently, or very frequently. There is no assumption that each scale attribute is equidistant from, or a multiple of the attributes above and below it on the scale. Nor is there an assumption of infinite divisibility of the property in question, or of normality to the distribution. The scale is much weaker, assuming only that each higher attribute represents more of the variable property than the preceding attribute on the scale, so that the attributes of an ordinal variable are ranked from lowest to highest (or vice versa). Order, then, is preserved, but amount is only greater or lesser.

Quantitative variables employed in the study also are of two kinds, interval and count. The scale assumption of each is that the variable increases or decreases in comparable measurement units. For interval variables, such as income, the units of measure are "infinitely" fractionable into equal parts. For count variables, such as household size, the units of measure are finitely limited to, say, units representing whole numbers or counts.

2) Fitting Statistics to the Synchronic Variables

a. Bivariate

In analyzing the synchronic data derived from the individual-level and village-level protocols we seek to preserve the maximum amount of information contained in those data. In order to preserve the greatest amount of information, in every instance in which qualitative variables can be ordered on the basis of underlying, ordinal principals, they are so ordered. Moreover, all nominal qualitative variables are also ordered so as to test for directional relations.

The following analysis does not use the Chi Squared statistic because it makes very constraining assumptions about the statistical properties of the data set. The statistics that have been selected allow the most flexibility in terms of basic assumptions about the structure of the data. The bulk of the analysis is based on the proportional reduction of error values obtained for bivariate ordinal tables with Goodman and

Kruskal's Gamma (γ). This statistic allows us to determine whether paired relations of two ordinal variables increase in the same direction with few reversals (high positive proportional reduction of error), increase in opposite direction with few reversals (high negative proportional reduction of errors) or fall somewhere in between. The greater the number of reversals of paired relations, the lower toward zero the proportional reduction of error value, and the less either variable in the pair "explains" the other. Gamma is useful because it not only provides a measure of how much error is reduced in X if we know the distribution of Y, and vice versa, but it also provides information about the direction (positive or negative) of the relation.

Gamma, however, masks crucial curvilinear relations, that is, relations between pairs of variables that, perhaps, increase for part of the range and decrease for another part of that range. In this study curvilinear relations often obtained among some crucial quantitative variables, especially income and household size, and important ordinal variables, such as the economic distribution strategies of pooling and sharing, and predictability/stabi lity of income. In these instances it is necessary to employ Pearson's correlation ratio, or Eta-squared (η^2,) to demonstrate the shapes of the relations between each pair of variables and the percentage of each variable that is "explained" by the other. The curvilinear measures are very important to the narrative, allowing us to account for the persistence of some very basic features of Eskimo and Aleut social, economic, and ideological organizations.

It is also part of our strategy to isolate and control variables in such a fashion that the relations between specific attributes can be assessed, such as (a) household income less than $20,000 and (b) unstable and unpredictable income. In order to evaluate the relations between and among specific attributes, the ordinal and quantitative variables are dichotomized and ordered in two different configurations, Kendall's Tau values for pairs of ordered qualitative variables are obtained, and the results are checked against our expectations (hypotheses). The two matrices of Tau values provide further information to refine and support the narrative.

b. Multi variate Analyses: In Pursuit of Social Indicators

The Gamma, Tau, and Eta relations between the pairs of variables help to provide understanding, but because we seek to analyze community well-being, and to specify a few variables that will account for, i.e., indicate, many interrelated variables, it is necessary to go beyond bivariate analysis and determine the connections among a large corpus of individual level variables, as a set of related phenomena. We wish to do the same for a matrix of the most interesting village-level variables.

To accomplish this we select a multi variate, multidimensional scaling (MDS) algorithm developed by Louis Guttman, James Lingoes, and Edward Roskam that allows us to find the spatial structure among the variables while making very weak assumptions about the Gamma and the Tau scores being evaluated. In brief, the non-metric MDS analysis employed here converts the Gamma and the Tau scores to distances, rank-orders the distances, breaks ties among ranks, and maps the ranks in a Euclidian space on the basis of their proximities to all ranks in the set. The result of the analyses here are represented in three dimensional graphics where each variable is represented as a point in the data space. The most closely related variables are located in near proximity in the space, and the closeness among them is often because the many variables share common connections to one or more "central" variables, even if every pair in the set is not closely related. Centrality is measured by an index. The MDS analysis allows us to interpret those variables that form clusters, and further allows us, while selecting variables that are most central to clusters, to hypothesize about the value of these variables as "indicators" of the matrix of relations in question.

Archival data were analyzed by means of "time series analysis". This analytic method is ideally suited to these data for two reasons. First, unlike econometric or structural equation analyses, time series analysis is relatively assumptionless. Data need not be continuous nor normally distributed or specified in a given format. Second, time series analysis provides reliable minimum mean-square error forecasts. These forecasts have proved extremely useful in defining the context of change for our social indicators.

The essential idea of time series analysis is that a phenomenon is driven by "noise''--or more formally, by stochastic error. If the phenomenon is then measured at regular time intervals (every month, every quarter, every year, etc.), we derive a longitudinal measure composed of "noise" and certain deterministic structures (trend, seasonality, etc.) that characterize the phenomenon. In theory then, time series analysis gives us a surprisingly clear picture of the change patterns in these data. In practice, of course, the analysis is not nearly so unambiguous.

The field work observations and open-ended discussion allow us to interpret the multivariate relations and time series analysis results, even as these two statistical analyses help us to understand the field work observations and open-ended discussions. A narrative is developed as ideas are stimulated through discoveries from the different modes of data analysis.

B. Research Design

1) Data Collection Methods

A.. Objectives

The background and theoretical issues that underlie and inform our research have been discussed extensively and in many different ways; in terms of general social science theory, social indicators research per se, and the highly localized trends of social and institutional change in the study areas. The ways in which these issues inform our methodology, and the tangible data and analysis forms that are so dictated are discussed in Section III.A., immediately preceding this one. The concrete data collection and sorting procedures, consonant with the larger methodological scheme and procedurally prior to actual analysis, are described in this section.

Before describing these methods, however, it is useful to briefly touch on what our earlier data and literature reviews and personal knowledge of the study areas suggested were significant elements of the social order and trends. These trends have been thoroughly discussed elsewhere (cf. TM-1, Section II.B. of this document), and are included here so as to refresh the reader about the key concerns that guided the development of our

methodology, which in turn established concrete guidelines for the collection of data.

Two main trends present in both study areas that were central to our thinking about the scope and focus for field research are (1) institutional izat ion and (2) the growth of dependencies. In both areas, the massive erosion of indigenous institutions and social processes has been matched by an even more massive importation of outside institutional structures that displace localized ones and create bureaucratic necessities in the place of domestic and informal mechanisms. In addition, the attitudes, worldview and communal agreements upon which these new institutional patterns hinge are alien to those operant in the given communities. This trend is associated with the complementary trend of growing dependency. As indigenous processes and life strategies are displaced, they are replaced by ambivalence about new ways of thinking, managing one's life, and coping with the day to day exigencies of domestic and communal change. These patterns and all they entail are central in our design of the research methodology and basic research questions.

We identified many issues that must be explored in our field research. These include:

Institutionalization, and the ramifications for domestic and community life today.

Dependencies, and how these dependencies are linked to on-going institutional processes.

Linkages between institutions such as helping service and other agencies, and domestic groups.

Domestic group experiences in connection with these various institutions.

General changes as evidenced in real data and field observations on the part of both local domestic groups, as well as representatives of identified institutions.

Influences exerted by bureaucratic institutions on domestic practices, stra tegies, and attitudes.

The roles of institutions as experienced and identified by domestic group representatives.

- The perceptions of client groups on the part of institutional agency representatives.

The historic and current responses of both domestic and non-domestic institutions to changes in community life, and the ways in which these responses are locally assessed.

The senses of control over destiny experienced by local representatives of both domestic and non-domestic institutions.

Because these central and critical issues are very broad, complex and interrelated in ways that are important but unspecifiable prior to analysis, our data needs are in turn broad and complex. Because relatively few comparative or longitudinal data are available at large (in literature, for instance) to explicate these relationships for us, our data requirements are made doubly demanding. These and other concerns (cf. Section II.A, II.C, and 111.5.1) have prompted us to collect and analyze many data sets of three main types and develop an analytic apparatus that will make explicit provision for village and regional comparisons, will address both diachronic and synchronic conditions, will allow these data sets 'to complement and inform one another, employ the strengths of one data type to balance the weaknesses of others, and in the end allow the strongest possible and best supported and defensible conclusions.

B. Data Types

There are three main categories from which we collected and analyzed data. These are (1) archival data, (2) focused responses, and (3) structured observation. The archival data are secondary aggregate data obtained primarily from government agencies (State and Federal); some archival information was retrieved at the field sites (for instance, City and IRA records). Focused response and structured observational data are primary data types collected by the field researchers.

c. Archival Data

1) Collection Procedures

Archival data collection is technically simple, but in practice may be a burdensome and drawn-out process. The process is largely mechanical, but problems of availability, access and periodic changes in agency recording practices can create collection obstacles that even persistence and intimate knowledge of data sources cannot circumvent. This is true to some extent nearly everywhere, but these problems are pronounced in Alaska.

Archival data sources used in the research fall into two categories: primary records and secondary literature. The primary records used are of two types as well: in-house files, and computerized data. Some governmental agencies publish periodic reports (monthly, quarterly, or annually) that provide numeric tallies of data useful for our research, and aggregate data can be collected directly from such reports; Alaska State DOL employment and payroll data are examples of secondary literature sources. In addition, some long time series or portions of long time series can be collected directly from published documents that are themselves secondary and tertiary longitudinal collections of time series (rather than monthly, quarterly or annual data sets that would be used collectively to build up a time series); some school enrollment data were collected using such sources. For the primary data, special requests had to be made to relevant governmental agencies in order to secure the time series information needed. In some cases, the monthly, quarterly or annual data were retrieved by agency personnel from in-house files (e.g., DHSS, DYFS); in other cases the data were sorted out and retrieved from computer files (e.g., IHS PCIS). The aggregate archival data we collected are described fully in Volume II, Appendix D.

Some archival data were collected or at least consulted by field researchers in their efforts to support primary observations or focused responses. For instance, study area site primary data concerning institutional relations were supplemented and complemented by reviews of Board meeting minutes, letters to Boards and committees filed by those Boards and committees, and recorded public testimony. This is an example of the opera tionalization of “triangulation” at the level of actual data collection. “

2) Data Characteristics

Although data from dozens of data categories were collected, we discovered very few time series that were not substantially flawed due to agency record keeping inadequacies, short-time depth, or other similar problems. As such, only very few kinds of forecasts could be made although hundreds of individual time series were originally collected. Most of these time series could not pass the minimal statistical tests required for inclusion as forecast data.

Among the many problems evident in these data that warrant discussion here, we found that most could be categorized as: (1) incomplete (due to missing data or erratic data recording, or systematic bias, as in the case of commercial fishing earnings going unrecorded in standard industrial income records), (2) shortness (many organizations have been keeping systematic data collected only in the last few years), or (3) rare events (low frequencies of certain data observations make analysis impossible, as in the case of recorded suicides at the village level). Table 31 below charts major data types against data irregularities for reader review of typical obstacles that bias or limit Alaskan data.

3) Analysis: Archival Data

Our experience with archival data in other areas of the U.S. convinces us that Alaskan data are unique. With respect to data collection, for example, we found many regional-level time series. Village-1evel series, on the other hand, were often too difficult or too expensive to collect. Furthermore, while there are many village-level series from 1980 to present, earlier time frames were seldom available. This change in data availability from 1970's to the 1980's is due largely to the advent of computers. Future research will undoubtedly have access to a wider range of data for that reason alone. This present research, however, admits to some gaps in data. Sufficient, reliable criminal justice series were unavailable at the village level, for example, and our measure of several other social, political, and economic phenomena are scarce at the village level. Nevertheless, we have managed to collect a surprisingly large number of time series and the analysis of these data give us some insight into the well-being of our eight villages.

TABLE 31

TYPICAL AGGREGATE DATA BIAS

	Missing Data	Systematic Bias	Shortness	Rare Event	Comments
population data; births, deaths, population. (Vital statistics, Census, DHSS, Revenue Sharing)		X			Revenue sharing often systematically high; crude fertility ratio rates biased due to population movement
School enrollments (DOE, BIA)	X	X			Early REAA figures often lost; small village figures aggregated often
Criminal justice (local PD, CJPA, DPS)			X	X	Some crimes are rare.
social services (DHSS, SS)			X	X	Some data difficult to retrieve for long series; some case loads very small.
Employment; firms, wages, employment/ unemployment. (DOL)		X			Unemployment systematically biased; commercia 1 fishing self-employment is not covered.
Renewable resource utilization; fisheries, subsistence estimates. (DFG, Limited Entry)	X	X	X		Permit holder residence and sale site do not correlate; subsistence estimates spotty.
Health (IHS PCIS, DHSS)			X	X	PCIS very recent (1979); many rare events (i.e. suicides, cancer) with small population N.
Retail prices (local commercial organizations)	X		X		Local records incomplete or staff unwilling to retrieve long time series

Alaskan time series are also unique in a statistical sense. Some of these statistical problems were expected but others were not. In many cases, we developed new methods and models to accommodate statistical anomalies but in other cases, we were less successful at analyzing these data. Taken separately, none of these statistical problems present an insurmountable obstacle to analysis. Together, however, these problems made our analysis a challenging task. The statistical problems unique to Alaska time series include:

Seasonality. It was not surprising that our data were strongly seasonal. Preliminary attempts at deseasonalization suggest that standard methods (e.g., U.S. Commerce and Labor Departments' X-n procedure) are inappropriate for Alaskan-type seasonality. In all cases, however, we were able to deseasonalize our data by means of the autoregressive integrated moving "average (ARIMA) methods of Box and Jenkins (1976: Chapter 9: see also, McCleary and Hay 1980: Chapter 2).

Nonstationarity. Alaskan time series exhibit strong patterns of growth and decay (trend) which, in statistical terms, imply nonstationarity. To be sure, data from other parts of the U.S. are also nonstationary but not to the degree of these data. Due presumably to spectacular economic growth during the last two decades, Alaskan data exhibit spectacular trends. In every case, we were able to accommodate trends with appropriate degrees and types of differencing and transformation.

Outliers. In addition to secular trend, Alaskan time series typically include "outliers", observations hundreds of times larger or smaller than the average. Technically speaking, outliers are a type of nonstationary stochastic behavior. Unlike secular trend, however, differencing and/or transformation will not control for the presence of outliers in a short time series. The outliers in Alaska time series are presumably due to one-time, short-run phenomena. In employment and wage series, for example, idiosyncratic construction projects (e.g., building a new school) will result in outliers. The only successful method of statistically controlling outliers is to account for their presence with instrumental variables. We used this method and found it adequate in all cases. If outliers are not statistically controlled, of course, forecasts and impact assessments will be biased.

Missing Data. Many Alaskan time series include missing data. Our investigation suggests that villages and regions simply did not report data on a systematic basis during the 1960's and 1970's. There are a number of widely used and accepted methods to control for missing observations in time series but none of these methods proved wholly adequate in light of Alaskan-type seasonality and trend. Where one or two consecutive observations were missing, we were able to make the appropriate adjustment. Where several observations or even several years were missing, however, we were unable to fully analyze the time series.,

The utility of time series analysis for our archival data is two-fold. First, we used time series models to forecast future values of each series. Second, for selected series, we used time series models to assess the impacts of known interventions. While the analytic method of time series analysis is itself relatively assumptionless, each of these uses requires weak assumptions.

Most forecasting assumes that the past stochastic behavior of a time series process will continue into the future. In some respects, this is a reasonable assumption. To the extent that time series seasonality is due to recurring weather cycles, for example, we may assume time invariance: Alaskan weather is predictable in the largest sense. But other stochastic behaviors, especially trend, are not so easily categorized. To the extent that secular trend is due to the regular, predictable accretion ("growth") of a process, we may assume time invariance. Where trend is due to some intervention, however, this assumption is less plausible.

Impact assessment relates directly to this point. In impact assessment, we assume that a model "adequately" represents the underlying stochastic process of a time series. We then test the empirical plausibility of this assumption by comparing the model's structure before and after an intervention. If the model structure changes significantly before and after the intervention, we attribute the structural change to the intervention.

While there are many theoretically interesting interventions in our eight villages, we ordinarily could not find time series

for assessing these interventions. Regional-level time series, in contrast, were relatively available. Two regional-level interventions that were expected to impact a number series were the Alaskan Native Claims Settlement Act and extension of the territorial limits to 200 miles.

For the most part, we used impact assessment models as a check on the validity of our forecasting models. These are reported in Chapter V.

D. Focused Responses

Although the issues and trends discussed earlier often refer to institutions, we emphasize that the categories of data collected and analyzed should address not only institutions and agencies in general, but also what institutions mean to people, and how changes to formal institutions may influence individuals and vice versa. Study team members engaged in a review of available data and generalizations that had already been achieved in order to determine how best to describe and analyze the relations between formal institutions and persons in communities.

We determined that a series of field research protocols geared toward specific and different, yet integrated goals, must be prepared. In this connection, study team members developed a series of protocols directed at the collection of field data in all major institutions, as well as at the collection of data in interstitial or medial categories that were tied to two or more institutions, or two or more basic research questions. Field research protocols are displayed in Volume 2, Appendix A. The criteria and rationale behind them, are discussed below.

Worldview Protocol: This protocol was developed with the aim of collecting cohesive data concerning culture change, attitudes about appropriate personality and social development, and the roles of the individual and society as a whole in achieving these appropriate goals.

Economic Protocol: This protocol addresses the institutional relations between various economic organizations, the funds they administer, and the authority and forms of control exerted by them. The composition of these organizations and their general activities are investigated very closely within these protocols. This is because economic institutional linkages between local organizations and domestic groups have been identified as being critical to the basic and provisional concepts of well-being and stress that we are operating with.

Political Protocol: This protocol treats the issues relating to authority and control within each community, and the connections between these issues and larger polity issues attached to State, Federal, and other entities. Here the emphasis within the fieldwork procedure relates to the disputes and their methods of resolution, the political participation, and control and local authority problems that are fundamental to research of this sort.

Education Protocol: This protocol is addressed to the determination of the educational, and by extension, socialization dissonances that may typify a community, as well as the general range of attitudes and ideas surrounding education and career development that may be important in the designation of community topologies couched in terms of acculturation and, on the converse, conservatism in local motivations and educational ideals. Here we are concerned with how local people not only appreciate and perceive, but also use local educational institutions for their own means.

Helping Services Protocol: This protocol is aimed at guiding the collection of data on the use, and perceptions surrounding that use, of social services in the site communities. Perceptions of the goals of services, the reason for them, and their place in the larger texture of community life are explored here.

Modalities Protocol: This protocol is designed to guide the collection of data on the many clubs, associations, and other formal and informal groups that are central to the organization of a community. Here the religious, social, and political organizations peripheral or otherwise distinct from those designated in other protocols are addressed. These associations are important because they usually provide channels for interaction, as well as constructive and focused group activity, that is often missed in the exploration of other sorts of social

entities. They are central to the processes which typify a community, and therefore take an important place in the sort of analysis required here.

Religion Protocol: This protocol is designed to guide the collection of data concerning the religious movements in any study area, the sentiments that hinge upon them, the current religious participation patterns, and the roles of both officially recognized and lay participants in religious exercises. Special attention is paid to new movements or variants of current religous movements, and to the complementary roles of various kinds of leaders, in other social, economic, or political spheres.

Family and Kinship Protocol: This is perhaps the key research protocol in this study. It is certainly the most lengthy in terms of required depth and content. This protocol is designed to guide the collection of domestic data in many domains, all of which are critical to the overall research effort aimed at determining the ways in which institutions interact with and on behalf of domestic groups, and the ways in which these interactions shape and direct responses to on-going change.

Data collection categories enclosed with this protocol structure and designate specified information in the following ways:

- sources of income
- amount of income
- stability of income
- predictability of income
- strategy for income allocations (including skills, goods, subsistence items, etc).
- expenses entailed in subsistence activities
- development expectations
- economic interests in general
- subsistence products and procedures
- residence patterns of household members
- household composition
- household dynamics (movements in and out of household, and expectations associated with same)
- conflict resolution
- sodality memberships
- family rituals

helping service use
educational expectations
kinship and extended kinship/peer relations
sibling relations, and changes therein
social pathologies
religion
health
household facilities
political affiliations and representation
inter-ethnic attitudes

E. Fieldwork Procedures

Two weeks were devoted to field investigations in each of the eight field sites: Unalaska, St. George, King Cove, Nikolski, Kotzebue, Selawik, Kiana, and Noatak. Field procedures varied depending on the field location, but general ground rules were observed in all sites.

The protocols guided all investigations and provided coherence and consistency in the results, but specific methods in the field varied. For instance, public meetings were held in Kiana, Unalaska and Nikolski, during which the substance of the protocols was discussed with a significant share of the resident population. The thrust of the research was discussed, and the majority of the protocol topic areas explored on a provisional basis. Additional investigations in these communities were largely concerned with adding data and observations to data that had been collected at least marginally at the first meetings. In other communities, the data collection procedures were much more open-ended and flexible. In most communities, no public meetings were held, and all investigations were conducted at an informal level.

In most cases, preliminary investigations centered on institutional processes that could be researched in local agency offices with regional, State, or Federal officials. The domestic/family protocols were almost always researched afterwards. This situation obtained for both pragmatic and other reasons. The family protocols were the most difficult to employ, and so they were more often investigated after other data had been collected and some measure of local rapport achieved.

The field sites varied in terms of the accessibility of data, the rapport with the field population, the sequencing of data collection that was reasonable and demanded given field constraints, and the willingness of local residents to expend considerable amounts of time with field researchers. Field researcher contacts in Unalaska, Nikolski, Selawik, Kiana, Kotzebue and Noatak were extremely productive. On the other hand, contacts in St. George and King Cove were poor by comparison. This variation resulted from the type and style of contact that these villages had recently experienced in connection with social science studies. Both King Cove and St. George residents were extremely wary of studies of this type, and we can categorically attribute this response to the fears and anxieties they volunteered regarding the possible results of social science studies. Nonetheless we managed to collect useful data from these communities, even though they were clearly inadequate compared to that collected for other communities.

Network sampling methods were employed to collect primary domestic data. At the close of the first directed family protocol discussion, the family representative(s) identified two other families with which joint activities (hunting, fishing, other forms of economic cooperation, visiting, sodality participation, etc.) were conducted. As before, at the close of the discussions, two other families were identified for each of the new domestic discussants. This method allowed researchers to identify a pool of discussants that was linked by the common bonds of mutual activities and affiliation in any of a number of areas. The sample was not random, but rather systematically representative of real cohesive networks typical of the community in question. The first initial family was selected fortuitously, on the basis of prior contacts with the researcher (i.e., friendship, past work experience, etc), or as a result of the family's voluntary invitation of assistance. Thus, although the initial selection may not have been representative in a technical sense, the sample as a whole was nonetheless a cohesive social unit.

The manner in which these protocols were administered can best be illustrated as follows. During discussion sessions, for instance with a family, key data topics would be approached by any means that, in the professional judgment of the researcher, were appropriate given the topic, setting, and other background and contextual factors. For instance, the family-kinship economic

topic concerning amount of family income could be broached by direct reference to income; by oblique reference to recent trips (that may be job-related); by indirect reference to taxes or store commodity prices (which could provide the disposition and context for discussion of wages and income); by reference to absent family members (who may be working elsewhere); or by many other means. Such an approach also provides channels for information concerning many other topics. The oblique income probe concerning trips from home, for instance, can provide subsistence hunting and fishing information just as the reference to absent family members provides family composition and movement data, all of which are required for other protocol topics. This short example shows that the protocol data collection procedure is structured redundant, and self-confirmatory.

Structured observations and, rarely, archival data serve to assist field researchers in supporting their findings from the focused responses, as well as to aid them in pursuing new or altered approaches to focused response data collection. For instance, a careful visual review of home furnishings may, for an alert observer, identify traditional items that in form or style depart from local habit; this observation can prompt questions about their origin, which in turn would provide data for the protocol topics concerning sharing and distribution of goods and services; an observation of a brand-new river boat and outbound motor could prompt questions about wages and expenses; observations of diplomas or certificates of merit on the wall may prompt references to achievement and education; etc.

The field protocols were administered to institutional and domestic group representatives on a flexible schedule. These protocols might be completed in two hours at a sitting, or might be extended over a two week period, a few minutes at a time. Absolute flexibility was a key in carrying out this research. In some cases the protocols might be addressed in group meetings of institutional representatives and completed fairly quickly; in other cases, these protocols required cautious and moderated approaches that might take many days with the individual or group.

Our goal was to collect a sample of five sets of directed, focused responses for each individual-level protocol (i. e., domestic, worldview and client) for each village; each village represents one institutional case or unit, hence our

institutional sample goal was eight, one for each village. Thus, the "cases" representing the other protocols are domestic groups and individuals within the village. However, our primary concern was to secure at least a sample of eight institutional cases (that is, to achieve coverage for each village) and five domestic cases per village for a total of 40 domestic cases, the remaining protocol samples were considered important but less so than the above. At the close of the field research we had secured a sample of eight institutional cases, 41 domestic cases, 17 worldview cases, and 16 client cases; this represents a sample of eight village cases and 74 individual or domestic cases.

All field observations and results of discussions with key informants were recorded daily in field notebooks in narrative form and, where appropriate, numerical tabulations. Although many of the protocol topics required data that can be recorded in a very straight-forward and concise form (such as the economic topics in the institutional and family-kinship protocols where numeric tallies are appropriate), the recording requirements for the field investigations varied widely depending on the specific topic. Many of the topics could only be addressed by a combination of interrelated and indirect verbal probes and behavioral observations coupled with direct verbal inquiries. For instance, topics concerning broad and often abstract expectations, tacit cultural knowledge and local, situated categories of practices and habits, and so on required voluminous and detailed data in many categories.

Given that community life, and culture in the wider perspective, must be viewed and analyzed as integrated wholes, it is misleading to speak of even the "straightforward" categories of data (such as income sources and amounts, income allocations, etc) as discrete units apart from others. Our understanding of these more explicit topics required knowledge from many other domains. A numerical entry in a budget or income category is meaningless in this kind of research unless we can contextualized such data. We sought to understand, for instance, not only what these seemingly discrete data are, but also the historical and culturally grounded practices and beliefs that create and give meaning to certain kinds of economic activities, the attitudes that motivate one sort of use of money rather than another, the place of such discrete data in the larger and much more complex domestic and community living arrangements, and much, much more.

The resulting data form a narrative text that has been partially pre- sorted, in large part because the protocols employed in the study created a structure within which to sort and categorize the data. The protocols and the logic that underlies them provided the initial organizing framework for data review and analysis.

F. Sorting and Review Data Procedures: Coding and Rating of the Primary Field Data

Data review began once the field work in site villages had been terminated. This review began with a simple but thorough re-reading of all field notes in order to prepare the reviewer for categorizing and coding requirements suggested by the data themselves. Discussions were conducted with the other field researchers in order to answer any and all last minute questions about the data. Once this had been accomplished, a thorough sorting of the data proceeded, whereby the reviewer identified the apparent (1) clusters of data or certain kinds of responses that may or may not be associated with legitimate uniformities or trends, and (2) ranges of variability and "natural" breaks along any identified dimensions or scalar sequences.

The results of this review informed the process whereby a list of key variables and their multiple values were developed. Once a provisional inventory of these variables and the alternative forms the variables may take was complete, a coding manual was prepared (see Appendix B in Volume 2). The coding manual was designed to provide operational guidance in scoring the various protocol data along many different dimensions so as to allow for computer processing of these data.

The scoring procedures and structuring of the data sets are described in more detail in subsection III.B.2, Data Variables. Here we will discuss some properties of the data that dictate their feasibility in the analysis carried out, as well as details concerning the variables used in the analysis.

There are four key categories of data.

(1) Worldview data
(2) Institutional data
(3) Family-kinship data
(4) Social service client data (collected as part of the Helping Service Institutional protocol).

These data can further be placed into three blocks of data that will allow analysis. First, the institutional data represent the community setting and the sociocultural structures of broad scale and scope that affect everyone's life. For this reason, institutional data generalizations will be seen as common denominators of community life in general. They will be used to characterize each community, based on the similar as well as unique properties that typify the given community. As such, we are left with three major blocks of data: worldview data (representing those specific respondents, and as situated through the use of institutional variables), family-kinship data (representing another set of key informants, and again situated and typified through institutional data), and service client data (treated in the same way).

G. Structured Observation

1) Procedure

Structured observations were collected-and detailed in field researcher daily journals, but were not subjected to analysis per se as were the focused responses and archival data. Structured responses were, however, critical to the assessment of primary data. Although focused responses, for instance, provide tangible and concrete data relevant to the data topics contained in the protocols, interpretation of focused responses often requires structured observations that complement the original focused responses. Focused responses, although focused as the term implies, can be ambiguous when they pertain to complex cultural elements (for instance, worldview, attitudes, and expectations). In these cases, supplementary data collected in a different mode are quite useful.

Protocols contained very general guidelines for the collection of structured observations, but the field researchers were expected to use their participant observation skills to search for and obtain supplementary observational data relevant to any and all primary data topics. Trained field researchers learn, among many other things, the value of complementary observational data that assist in refining and adjusting field data records during their training and subsequent experience. The process of seeking and securing focused response data and

structured observational data together becomes quite routine to the point where a trained researcher is literally always seeking observational data to parallel other findings.

The difficulty inherent to demonstrating and explaining how to collect structured observations for such purposes lies in the fact that they cannot be specified in advance; you do not know what to look for until you have already witnessed or studied phenomena that require complementary observational data. Although we can specify the topic, one cannot always specify in advance what will count as evidence for or against some element of that topic, until that element itself is known or presumed.

For this reason, we will chart some of the observational data we actually collected with other primary data for which we collected supplementary observations, or which were collected as a response to primary observations that alerted us to their importance. This exercise will demonstrate how and in what connections these data were obtained.

Observation	Other Primary Data
A baby's crib, known to the field researcher to belong to a particular child, is seen in the home of the child's grandmother instead of mother.	The observation triggered questions concerning possible changes in (temporary) family composition; it was learned that the mother and child moved in with parents due to high energy costs (the mother temporarily vacated her own home).
Avoidance behavior and attention relative to a hi-ethnic couple (eskimo woman and anglo boyfriend) was gauged by observing and noting (1) length of face to face contact by observers of couple, (2) contact avoidance.	Observational data concerning ethnic attitudes was required to complement focused responses that suggested that attitudes about mixed couples were neutral rather than distinctly negative or positive.
Frozen bowhead maktak is observed in a freezer.	Questions of origin, distribution, and partnerships regarding the maktak are generated, since this is not a local resource.

A young mother "grounded" her daughter, putting her on restriction for disciplinary infraction.

This observation generates questi concerning domestic functions and family roles, role change, and fami responsibility.

These cases exemplify the use of observational data in triggering or supporting other findings. They, in conjunction with all other data sources, are critical to the development of empirical variables and subsequent rating of variation along these variables (see Section 111.8.3).

2) Data Variables

The variables which we defined, investigated and compared were developed through a variety of means. Briefly, these variables hinge on and are informed by formal logic, sociological and ethnological theory, and empirical facts. The ways in which these variables were identified and operational ized, ranked and sorted in analysis, their relations to the formal, theoretical and empirical spheres, and how these variables interpenetrate all these dimensions, are discussed in this section. The reader is urged to refer to Appendix B in Volume 2 while reading this section; the Appendix, which is a variable inventory and variable coding manual at one and the same time, is a valuable guide to the variables which will assist in understanding this section.

a. Genesis of the Variables

The methodology employed in this study demanded that we refrain from predetermining the explicit variables and their operational values prior to field data collection, and instead define more general data themes and topics for which to collect information; only after the data were collected were we in a position to define the ranges of variation along which a variable could be defined and its values bracketed and specified. Although many classic research traditions call for an explicit and formal predefinition of variables prior to any data collection, it is our judgment that we cannot pretend to know so much about the distributions and qualities of the data that these predeterminations can be made in good faith before we even reach

the field site. Instead, our methods seek to specify general topics of data collection (specified in the protocols) that are justified on the basis of our previous knowledge of the areas and general social science findings, for which data can be collected, and thereafter scored and ranked using variable definitions that are inherently empirical in nature but nonetheless informed by and grounded in prior general knowledge and tenets of social science. These issues are discussed in other sections (cf. for instance Section III.A.).

The point of this discussion is, that (1) the variables were emergent and embedded in the protocols, even though they were not predetermined there, and (2) the variables and their values were defined through the empirical review of actual data, however this review was guided and shaped by formal and theoretical concerns relevant to the objectives of the study.

Such an approach provides the most flexibility for treating research and analysis as an exploratory and discovery procedure. As noted above, we thought it unwise to pretend to know too much about the data before" actually collecting them; thus the procedures we employed for analyzing the variables and recombining and reconfiguring them in multiple ways provided us with both safeguards and great latitude in analysis: our first operational definitions of variables and their values were based on preliminary reviews of the empirical facts: how the data were distributed, the ranges of variations and clusters, and so on. But as our understanding of the empirical facts grew through analysis of the data, we were also in a position to reconfigure these variables in ways that were more refined and designed to reveal yet more about the behavior of our data. For this reason, too, we were hesitant about subscribing to monolithic and pre facto definitions of variables that ultimately may serve little purpose in our analysis.

The explicit definition of the variables, the specification of their values, and distinctions between these variables and their values were achieved through the review of the ethnographic field notes, focused responses, structured observations, relevant aggregate data, and secondary literature; however, the focused response data are most central to this determination by and large. The key elements that guided the review of data in the creation of these variables and their values were distinctiveness, variation, and significance. Obviously, our

preliminary review could not categorically ascertain what was significant, what was distinctive, what variations were most cogent and revealing, and so on; however, the preliminary review could at least identify the provisional sets of variables and ranges of variation that seemed to make sense at that point in time. This was the role of the review and definition of variables.

In short, the problem is one of identifying the differences that "make "a difference", and are thus not spurious, insignificant, or that fail to distinguish between discrete data elements between which our definitions and values should distinguish. We cannot be sure that our definitions do this before analysis, of course; but, as noted above, our analysis plan is designed explicitly to allow recombination of variables so as to allow ongoing and refined analysis and redefinition. A handful of simple examples will illustrate how these definitions were accomplished and the criteria and standards upon which they depend; subsection (3) of this section describes how the latter recombination and consequent resorting and collapse of variables is achieved, for what reasons, and to what end.

Variable 5, EICOMP (Economic Institution Composition), has four possible attributes or values: 1 (Federal majority), 2 (State majority), 3 (both), or 4 (not ascertained). This variable represents an entire community, and is arrived at through the review of field notes that, among other things, inventory all institutions in each site community (cf. instructions in the protocols). Value 4 is a dummy value that will allow us to use data from this village as a whole even if the fieldworker failed to obtain the institutional inventory; thus the first three values are key, substantive values for analysis. The question is, why did we decide on these three?

This variable seeks to distinguish between three possible village cases; those in which there are more Federally chartered economic institutions, that in which there are more State chartered organizations, and those in which there is a tie. Background secondary literature on rural Alaska and Alaska Natives has drawn attention to the shifting role of the Federal government on numerous occasions; the dual government nature of rural Alaska, with IRA's existing alongside City governments, draws attention to this mix; aggregate data for the past twenty or more years showing a growing but nonetheless shifting mix of

Federal versus State and local government expenditures also alerts us to the possible distinctiveness of any special preponderance of reliance on one versus the other; and, finally, field observations and focused responses from different villages suggested that, possibly, there were other salient social and institutional characteristics that might tend to co-occur with one (Federal majority), the other (State majority), or neither overall (both). Thus, this variable was operational ized as it now appears, with four values.

Variable 26, HAREX (Subsistence Harvesting Expense), is not an institutional but rather a domestic-variable; it is intended to define and measure the proportions of gross income invested by families in subsistence harvest expenses and capital goods, ranging from O to 9% (value 1), 10 to 19% (value 2), and 20% or more (value 3). As above, the dummy value 4 (not ascertained) is included too. This variable and its values are closely tied to empirical observation as well as formal, theoretical, and other issues, including secondary literature and prior understanding. For instance, too few respondents invested more than about 22%, thus we saw little reason to provide a finer breakdown of values; the three described seemed to do justice to the range of variation evident in the data.

It seemed important to include such a variable, since past research has shown that families must have the wherewithal to hunt and fish in order to do so, thus the cash linkage to traditional activities needed to be addressed in some way. The breakdowns as reported also seemed, through provisional review, to distinguish between different types of families with different income strategies and sources; thus we found the operational ization of the variable suitable on that count as well .

These general concerns, illustrated above, guided the opera tionalization of variables, the specification of their values, and the final ranking and scoring of the actual empirical data (whereby the “cases”, domestic groups and communities sampled with the protocols, received scores, that is values, for each of the identified and relevant variables, i.e., domestic variables for the domestic groups, institutional variables for the communities).

b. The Variables

A total of 57 variables were defined; 51 were developed as a consequence of the first data review (described above), and six additional variables were created from the data after the first sets of analyses were completed (see subsection (3) of this section). Of the six additional variables, one was created directly as a recombination and redefinition of a previous variable (e.g., variable 52, VSIZE ("Village Size"), regroups variable 3, VILLNO ("Village Number") on population size parameters rather than on the basis of an arbitrary code designation); the five other variables, dealing with income (unearned and earned, and source) and subsistence resource habits, were developed because the initial set of variables did not adequately reveal economic distinctions among families that the first order of analysis showed was critical (cf. Appendix B Volume 2).

There were at first 17 institutional variables, 22 domestic variables, four worldview variables, and four client variables; thesecond round of variable development and definition added one institutional variable ("Village Size" and five domestic variables (as above).

Some variables are technical labels that assist only in sorting and merging data sets by computer; others, although based on specific field data, are clear at the outset and will not be discussed here. For instance, in the family-kinship subsection of the manual there are variables pertaining to divorce and use of Native healers; each has two possible values, meaning we are interested in whether or not the event has taken place. Other variables here are more complex, and their understanding is assisted by some attention to the rationale for inclusion and the reasoning that applies to the choice of variable values. A selection of these variables is displayed below in tabular form.

Variable	Attribute Notation
EICOMP and EIPART (Economic Institution Composition, and Economic Institution Participation)	Field observations and data review suggested that the values (attributes) of these variables made important distinctions in the institutional processes in communities.
EICOORD (Economic Institution Cooperation and Coordination	Data suggested that communities varied strongly along two dimensions: cooperation and coordination. Cooperation in operational terms for us signifies real and objective mutual assistance networks that are actually used; coordination signifies technical, formalized links such as contractual relations. Villages may evidence one or the other, both, or neither, hence the creation of a four cell matrix.
POLDIS and POLDCAUS (Political Disputes and Cause of Political Disputes)	Field data suggested not only that local residents can readily rank local institutions, but that these value categories are salient discriminators.
EDAD and EDDIS (Educational Adequacy and Educational Disjunction)	These value categories are scored on the basis of major respondent attitudes and the judgment of the researcher.
SERPER (Service Perceptions of Clients)	These values represent category labels that subsume the actual responses of key informants.
HINC and HSIZE (Household Income and Household Size)	Field data suggested that these category breaks were probably discriminate in many ways.
INSTAB and INSTRAT (Income Stability and Predictability, and Income and Labor Strategies)	Both were based on field data which suggest that these are discriminant category values. Income can vary along two major dimensions: stability and predictability. For INSTAB, value 1 can

	be, e.g., unskilled construction labor. Value 2 example: commercial fishing and trapping. Value 3 example: CETA jobs and certain welfare payments. Value 4 example: wage job or pension. Income strategies tended to be organized in three ways: goods and skills were pooled and not distributed outside the household or pooled and distributed, either locally in restricted networks, or locally and outside the village.
HAREX and SUBS (Subsistence Harvest Expenses, and Subsistence Harvests)	These values seem to make valid distinctions, judging by the data.
CONFL (Household Conflict Resolution)	Conflict resolution patterns seemed to follow the given value categories; 3 and 4 are rare, but were observed.
POLISSUE (Political Issues Identified)	Perceptions of current issues followed three main patterns: identified issues were either chiefly service related, political (relating to power and authority), or issues were misidentified. The first two were sometimes blended.
CHREA (Reason for Change)	In worldview discussion, respondents tended to provide explanations for cultural change in these categories.
PCLIE (Perceptions of the Problems of Program Clients)	This variable and its values mirror the institutional variable SERPER, such that comparisons between the two can be made.

c. Scoring and Ranking Process, and Recombination

Once the variable definitions and their values were operationalized, we scored each set of data (i.e. one individual level, that is, one family; and one institutional-level set, that is, one community) along the guidelines established by the coding manual (cf. Appendix B in Volume 2). This scoring procedure is quite straightforward; data from the protocol focused discussions are compared to the variable list, and appropriate values entered for each domestic protocol and institutional protocol as these values are demanded by the data for each topic area; that is, with reference to Variable 5, EICOMP, depending on the documented institutional composition of the community, an appropriate value was entered (i.e., 1 for a Federal majority, and so on). Likewise, for Variable 23, HSIZE ("House Size"), the appropriate value was entered depending on the empirical data for that data set; 1 for a household size of 1-3, 2 for a household size of 4-6, and so on.

However, we found in some cases that the variables as they were presently defined did not distinguish adequately between the data distributions we wished to analyze. By this, we mean that the configuration of some variables left something to be desired; they, in some cases, seemed to gloss over distinctions that we felt may be important; they, in other cases, combined sets of variable values that might be better separated in order to make sense of the data. In short, after the first set of analyses, we found that we must reconfigure and recombine several variables in order to make the greatest sense of them, and then re-submit them to analysis in order to determine how best to interpret the results. This process is described below:

(1) variables with more than two substantive values might be collapsed so as to yield two values in order to analyze the possible bivariate characteristics of the data; for instance, variable 10, POLDCAUS ("Cause of Political Disputes"), contains five substantive values, which can be collapsed to two, in this case "money" (l), "personalities" (3), and "money and personalities" (5), against the rest.

(2) variable values would be reordered in order to measure what may be a scalar distribution; for instance, variable 11, EDAD ("Adequacy of Education"), can be reordered so as to place

former value 3 ("sometimes") between 1 and 2 ("no" and "yes", respectively).

(3) alternative reconfiguration that accomplished either (1) or (2) above in more than one way were developed; for instance, variable 22, HINC ("Household Income") was collapsed so as to yield a bivariate comparison of 0-20,000 income (value 1) against the rest, and 0-30,000 income (values 1 and 2) against the rest.

Reconfiguration, because it is really more central to a discussion of methodology and analysis, is described in detail in sections 111.A., 111.B.1, and 111.B.4.

3) Formal Methods of Analysis

a. Primary Field Research Data

After defining the variables and rating each respondent's answers and each village on the codes, two PRE (proportional reduction of error) statistics and one correlation ratio were employed to measure the relations between pairs of variables. The results were analyzed and the variables were subsequently reanalyzed in several ways in four different matrices. In three of those matrices, one ordinal and two dichotomous, the same 28 variables were employed, but the attribute sets comprising most of those variables were rearranged for different analytic purposes. The description of the procedures used by the research team follows.

b. Bivariate Analysis

One of the measures employed in the bivariate analysis was developed by Goodman and Kruskal (1954) as a "regression free" measure of relationship between ordinal variables. The 56 variables used in the bivariate tests are ordinal, i.e., the attribute categories are ranked to mean that 1 is less than 2, 2 is less than 3, and so forth. On the other hand, ordinal ranks do not assume that the distance between each pair of ranks is equal. Thus, in one analysis of 28 ordinal variables we have chosen Goodman and Kruskal's Gamma to measure whether the order of ranks in one variable predicts the order of ranks in the

other, and vice versa. Gamma = Ns - Nr divided by Ns + Nr where Ns = the number of pairs of cases having the same order on both variables, and Nr = the number of pairs of cases having reverse orders on both variables.

Gamma, which varies between -1.00 and +1.00, tells us that there is no relation between pairs of ordered ranks at zero, that the pairs of ranks change in the same order at +1.00, and that they change in the reverse order at -1.00. Thus, in measuring the relation between "Household Income" (V22) and "Income and Labor Strategies" (V25) we are concerned with measuring the relations among the ordered categories.

Income and Labor Strategies (V25)

Household Income (V22)	Pooling & Accumulation w/in household	Local Pooling & Distribution w/in & Beyond Household	Local & Regional Pooling and Distribution
	%	%	%
0-22K	27	11	3
20-30K	11	11	14
30+K	0	15	8

Gamma = .49

The Gamma is calculated using focused discussion data from the individuals interviewed in each of eight villages. Here we see that whereas the majority of persons that possessed the lowest incomes pooled their income and their labor principally for use within their own households, the wide majority of all natives pooled and shared income with people within and outside their own households. Sharing and pooling is the predominant strategy and it seems evident that people who possessed more are able to share more, and do so. No simple, positive relation was obtained because 62 percent of the households representing all income categories shared resources, income, labor, and skills

beyond the household.

Although we do not provide matrices of Pearson's eta-square (η^2) scores, interval scales underlie most of the income variables, while some other variables, such as household size, are count scales. Pearson's eta-square, or the correlation ratio as it is sometimes called, is sensitive to curvilinearity and employed to measure the amount of variation in one variable that is explained by the variable with which it is being correlated. When correlating x and y, for instance, η^2_{xy} yields the amount of variation in x that is "explained" by y, whereas η^2_{yx} yields the amount of variation in y that is "explained" by x. Thus, two one-way measures of the relation between x and y are required to determine whether the relation is linear or curvilinear. If y "explains" more of x than x explains of y, or vice versa, the relation is curvilinear (does not follow the hypothetical regression line). Eta-square can be used to measure the relations between interval scale variables, between interval scale and ordinal scale variables, or between interval scale and nominal scale variables. Inasmuch as curvilinearity was anticipated in many bivariate relations, eta-square was calculated so as to be able to account for curvilinearity.

For example, the following tables demonstrate curvilinearity in the relations between income (V22, an interval scale variable) and household size (V23, an interval (count) scale variable); and income (V22) and income stability and predictability (V24, an ordered nominal scale variable).

TABLE 32

HOUSEHOLD SIZE (V23)

Household Income $ (V22)	1-3 %	4-6 %	7-10 %	11+ %
0-20K	19	16	3	3
20-30K	3	19	11	5
30+K	3	11	5	3

------- η^2_{xy} = .39 _____ η^2_{yx} = .38

The eta-squares for the preceding table show that 39 percent of the variation in household income "explains", that is, accounts for or is accompanied by, variation in household size; whereas 38 percent, of the variation in household size is accompanied by variation in household income. Income increases, then flattens with the increase in household size, whereas household size increases, then decreases as income increases. The relations are not linear.

TABLE 33

INCOME STABILITY AND PREDICTABILITY (V24)

Household Income (V22)	Unstable Unpredictable	Unstable Predictable	Stable Unpredictable	Stable Predictable
$	%	%	%	%
0-20K	14	8	0	16
20-30K	5	19	5	8
30+K	0	22	0	3

$\eta^2_{xy} = .10$ ------- $\eta^2_{yx} = .55$

In the preceding income accounts for very little (10 percent) of the variation in income stability and predictability, yet income predictability accounts for 55 percent of the variation in income amount. The way in which this table is to be interpreted is that low incomes are both unstable-unpredictable, and stable-predictable, whereas high incomes are seasonal, hence unstable but predictable. The households with the greatest incomes should be those that are most dependent on seasonal work or productive activities pinned to one or two seasons per year, such as summer salmon fishing.

The effects of the unstable-predictable, i.e., season-dependent income, are also observable in variation in household size (V23). In the following table we see that V24 accounts for 41 percent "of the. variation in household size.

TABLE 34

INCOME STABILITY AND PREDICTABILITY (V24)

Household Size (V23)	Unstable Unpredictable	Unstable Predictable	Stable Unpredictable	Stable Predictable
	%	%	%	%
1-3	5	5	0	13
4-6	11	16	5	13
7-10	0	16	0	5
11+	3	8	0	0

$\eta^2 xy = .28$ ------ $\eta^2 yx = .41$

Although we seek to retain as much information as possible in the ordinal data set (which includes several interval scale variables), we also collapse the entire ordinal data set into two differently structured dichotomous data sets*, referred to as Dichotomous I and Dichotomous 11. In these two data sets the attributes within each variable are collapsed so as to form dichotomies, or variables comprising two attributes each. Every variable is an ordered scale with two and only two scale items. In Dichotomous I, for instance, the household income variable (V22) is collapsed into two attributes (1) Income 0-30K, and (2) Income 30K+; the household size variable (V23) is collapsed into (1) 4-6, and (2) all other sizes; the income predictability and stability variable (V24) is collapsed into (1) unstable-predictable, and (2) all others, and so forth. Dichotomous I was

*See Appendix C for the combination of attributes for each data set. The recombination are made from the variable codes in Appendix B. The four lists represent the variables used in computing PRE" statistics for each of the four matrices.

created because in the course of analysis it appeared that the income break at $30K was important in many relations, and that those many relations could be determined by combining attributes of other variables in specific, ordered dichotomies.

In order to check the effects of the combination in Dichotomous I, many variables were recombined into still different dichotomous arrangements, and the relations among those variables are provided in the matrix for Dichotomous II; for example, V22= (1) O-20K, (2) 20+K; V23=(1) 1-3 and 11+ (smallest and largest.), (2) 4-6, 7-10 (medium size); and V24=(1) unstable predictable and stable predictable, (2) unstable unpredictable and stable unpredictable (predictable as opposed to unpredictable). In this set, among other things, we measure the relations among low income, smallest and largest households, and predictability of income. Thus, Dichotomous II allows for tests of the relations that were observed at the lowest and highest points in the ordinal-interval tables presented above (those curvilinear relations that obtained among household income, household size, and household income and labor strategies). Dichotomous I allows us to test the relations at the high points of the income and the unstable-predictable scales.

Kendall's Tau C for ordered nominal scales is employed. Tau C varies between -1.00 and 1.00 as does Gamma, but whereas Gamma behaves erratically in 2 x N tables, Tau C for grouped data does not. Tc = S divided by $1/2\ N^2((m-1)/m)$.

Comparative examples of the relations between the same two variables as they appear in three data sets, Ordinal, Dichotomous I and Dichotomous II, will be instructive. In the following three tables household income (V22) is correlated with development expectations (V27). In the ordinal data set the relation between income and the expectations that benefits from industrial developments, particularly outer continental shelf oil-related developments, is positive, but low (γ =.24)

TABLE 35

DEVELOPMENT EXPECTATIONS (V27)

Household Income (V22)	Chiefly Local Benefits and Control %	Balanced Local & External Benefits and Control %	Chiefly Extern Benefits and - Control %
0-20K	6	27	9
20-30K	9	9	18
30+K	0	9	15

$\gamma = .24$

Dichotomous I yields a relation similar to the ordinal PRE, whereas Dichotomous II demonstrates that it was the belief of respondents from the households with the lowest incomes that most benefits would either accrue and be controlled locally or would be balanced with externally located firms at a considerably higher rate than either of the other two classifications.

TABLE 36

DICHOTOMOUS I

Household Income	Development Local Blend %	Expectations External %	Ratios
0-30K	50	26	(2:1)
30+K	9	15	(1:1.7)

Tau = .24

DICHOTOMOUS II

Household Income	Development Local Expectations		
	Blend %	External %	Ratios
0-20K	32	9	(3.3:1)
20+K	27	32	(1:1.2)

Tau = .34

In the preceding example, Dichotomous II allows the research team to explore the hypothesis that the lower the income, the higher the expectations, and the scantier the knowledge and information about the nature of industrial developments. It is evident from each of the three partitionings of the variables, however, that the higher the income the more likely it is that respondents expect external control for industrial developments and also expect benefits from those developments to accrue externally, yet the majority of respondents (59%) believe that control and benefits will at least be balanced. All available information about industrial developments in rural areas contradicts the majority perception, as do the public presentations of representatives of oil companies to Native groups.

c. Multivariate, Multidimensional Analysis

James Lingoes and Edward Roskam (1973), following Louis Guttman (1968), developed an MDS (multidimensional scale analysis) technique based on Euclidian geometry for ordering a matrix of distance scores. As used here, the technique, referred to as MINISSA (a variant of Guttman-Lingoes SSA or smallest space analysis), converts proportional reduction of error statistics (PREs) to distance measures or measures of proximity. The higher the distance score, the more dissimilar the two variables and the more likely that the two parts of the relation will occupy locations in a hyperspace that are distant from one another. The higher the positive PRE value, the lower the distance score, and the more likely that the two parts of the relation, say SERTEN (the tenure of services staff) and SERCON (the control of

services) will occupy locations in a hyperspace that are close to one another.

d. Description of MINISSA Version of Smallest Space Analysis

The multivariate analysis technique that we employ takes as given a set of n objects: $O_1, O_2, \ldots, O_n$, for which there is a defined distance function, d_{ij}, on the $n(n-1)/2$ pairs of points in a metric or non-metric space, find that set of coordinate X_{ia} ($i=1, 2, \ldots n$; $a = 1, 2, \ldots m$) such that if:

$$\delta_{ij} = \sum_{a=1}^{m} (Xia - X_{ja})^2$$

then $\delta_{ij} \leq \delta_{kl}$ whenever $d_{ij} \leq d_{kl}$ for m, a minimum number of Euclidian dimensions. The function to be minimized is,

$$\phi = \sum_{i=1}^{n-1} \sum_{j=i+1}^{n} (\delta_{ij} \delta^*_{ij})^2,$$

where, the δ^*'s are the δ's permuted to maintain the ranks of the d's. ϕ is represented as the coefficient of alienation, (K).

The complexity of the relations among features of modern native societies in the NANA and Aleutian-Pribilof regions are simplified and rendered intelligible in the smallest space analysis figures in Chapter V.

The location of items (variables (V)) in the three dimensional spaces* provides the reader with a graphic, visual

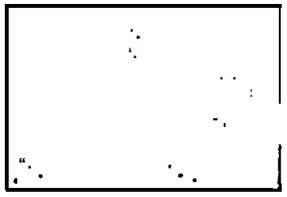
*In order to interpret the multivariate analysis of the primary field data obtained from residents of four NANA and four Aleutian-Pribilof villages it will be helpful to refer to the variable code definitions in Appendix B, to the specific ordering of each variable class for each matrix in Appendix C, and to the discussions of the non parametric proportional reduction of error statistics and to MINISSA in Chapter II.

picture of the proximity of closely related and distantly related variables. By and large, items that are located on opposite sides (front and back, left or right side of the box) are negatively related, or distant from one another, while they are positively or closely related to variables whose base locations and heights are adjacent to their own.

The figures can best be understood by inspecting the variables that cluster together in two dimensions, and then by looking at the height differences among the variables in each cluster. A smallest space analysis that is represented in three dimensions may well take on the appearance of a contour map replete with several distinct mountain chains and valleys. It is relatively simple to observe that mountains and valleys can occur in several different places on the map, much as littoral and coastal ranges are separated from interior valleys and mountain ranges.

The first two dimensions [front to back, and side to side) often explain more variation than subsequent dimensions. Ideally, we would like to reduce all matrices to a single dimension in which no scale errors occurred and in which if we knew the order of one variable we could predict the order of the others. These data are far too complex for so simple and neat a scheme. The data analyzed below require solutions in greater dimensional ity. Three dimensions have been selected because a very large percentage of the error can be explained with three dimensional solutions, and because three dimensional graphics are rather easy to comprehend. They are easier to comprehend. than a matrix of zero order correlations, allow for the analysis of large numbers of variables, provide much more information about relations of each variable to every other variable in a large set than do other multivariate techniques, such as path analysis and partial correlation analysis, and make very weak assumptions of the data.

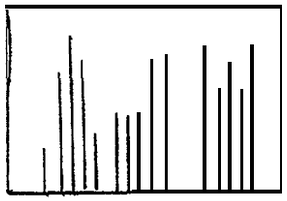
To interpret the distributions, first the clusters can be located in two dimensions, and the most closely related variables can be analyzed. It is helpful to refer to the matrix of Gamma or Tau scores from which they were derived so as to



II (II will appear front to back in a three dimensional box)

I

determine the PRE relation for each pair (zero order relation). Second, height may be observed to further determine variation within each cluster.

III 

The height dimension is important also because it shows relations that are less close (more distant) than those in the first two dimensions, yet whose structure, like those of the first two dimensions, is most likely based on an underlying principle.

MINISSA converts all distance scores to ranks so that the lower the distance score, the higher the rank. Prior to employing MINISSA, we obtained a PRE score (Tau C or Gamma) for every pair of variables. We used the matrices of PRE scores as inputs to MINISSA. MINISSA controls for ties between and among ranks, and in our case, places each variable in a three dimensional space. The location of each variable is determined on the basis of its ranked relations with all other variables, not just the variables with which it is most highly ranked, because the variable (SERCON) with which SERTEN, say, is most similar might be more similar to several variables than it is to SERTEN. If a researcher possesses unlimited funds, MINISSA can locate SERTEN in the hyperspace on the basis of the relations among all pairs of variables in the variable sample. So MINISSA is multi variate and multidimensional (it will locate the variables in as many as ten dimensions). The more complex the relations among variables the higher the dimensionality required to map the distance relations among them, and the-larger the

sample, the more computer time required to obtain a solution. Computer time costs money, so it is a limiting factor in research.

As mentioned above, we employed MINISSA on four different matrices (see Appendix C) of variables derived from the 57 variables listed in Appendix B. One matrix of 17 variables dealt solely with "institutional" topics. In this "institutional" matrix the eight study villages are the cases so that entire villages receive a rating on each of 17 institutional variables. The other three matrices represent three ways -- one ordinal and two nominal -- to analyze the relations among a set of 28 variables whose cases are individuals, or persons, from each community. Upon review of the initial bivariate tables, the team concluded that the individual level variables should be recombined in different ways for different purposes. Of the three matrices that we created, one was ordinal so that the attributes of every variable fitted scale assumptions in which each succeeding attribute was greater along some dimension than the attribute that it succeeded in the scale. The other two matrices comprised ordered dichotomous variables so that each variable class possessed only two attributes, that is, each was a dichotomy.

In order to obtain MINISSA solutions for the smaller matrix (17 variables), the relations among 136 ranks (17 x 16 divided by 2) had to be determined by finding the shortest distances in a Euclidean space. The solution for the larger matrices (28 variables) required finding the shortest distances among 378 ranks (28 x 27 divided by 2). Fixed solutions were obtained, meaning that each variable was located in the hyperspace on the relations among all the ranks in the matrix. The power of the solution was determined by the Coefficient of Alienation K, a matrix coefficient that determines the percentage of variation that is unexplained. At ten dimensions only about two percent of the variation, on average, was left unexplained in the several matrices that were analyzed. We choose here to use the three dimensional solutions because (1) they can be presented graphically, and (2) they averaged about eighteen percent unexplained variation in three dimensions. The K values are not so high as to warrant seeking higher dimensional ity, even though at ten dimensions we account for practically all variations among as many as 378 ranks. A K value of .15 is considered a sufficiently good solution not to require higher dimensional ity.

2) Summary of Research Design

We seek of course, a simple, compact measure of the quality of life, but for empirical and logical reasons we fall short of our goal. Our field observations are synchronous, hence inadequate for inferring change, and the time series data at the village level that are available to us are not collected on enough topics in sufficient depths to allow us to create a simple, temporal indicator of well-being.

We are, on the other hand, by analyzing networks of individuals within villages, able to determine similarities and differences within villages, between and among villages, and between regions, isolating, we hypothesize, significant meanings and competing meanings (disagreements) in village Alaska. Moreover, by analyzing the principal institutions in each village --economic, political, social, service, and religious -- we are able to create a typology of villages. Our research will allow us, then, to generate an empirical typology of villages and regions, which demonstrates the relations between diachronic and synchronic data, some of which are quantitative and some of which are qualitative. We seek no single indicator of quality of life in village Alaska: We seek village topologies, and the attributes of these topologies that will be sensitive indicators of the quality of village Alaska and responsive to change in village life.

The attributes that we determine through the triangulation of our field and archival investigations must be retested two or more times in order to know whether our generalizations are warranted. If villages differ because of the relationships that we hypothesize as a result of this research, we should be able to account for changes in indicators values founds in these retests and thus account for changes in community well-being.

CHAPTER IV

COMMUNITY CONDITIONS IN THE NANA AND ALEUTIAN-PRIBILOF REGIONS

IV. Community Conditions in the NANA and the Aleutian-Pribilof Regions

A. Introduction

This chapter is devoted to a discussion of regional, village and domestic well-being in the study areas to the extent that this well-being and adjustment can be suggestively and hypothetically determined on the basis of interim findings. This chapter is intended to represent a "middle level" analysis of research findings prior to final analyses. As such it will be largely descriptive, rather than interpretive and conclusive. It does not preempt the conclusions in any respect, and in fact may detail initial expectations concerning the data that were not born out by the later analysis. This chapter is designed to display a large sample of our interim data, explain how these initial sets of evidence spurred later and revised analyses, and present some of the study team's hypotheses about these data as they relate to community well-being, adaptation, institutional change, and domestic reponses to these changes and directions and trends in adaptation at the institutional and community level.

This chapter is divided into four parts: introduction, a discussion of regional evidence, a discussion of village-level evidence and a discussion of hypotheses about both sets of evidence as they relate to community well-being. As the reader will note mid-way through the subsection on village level evidence, most initial findings point toward the recognition of particular variables as discriminators of well-being, rather than toward more monolithic conclusions regarding entire regions or villages. In fact we find that generalizations about regions or villages as wholes are much less illuminating than the evidence about particular variables. As such, the proper logical and scientific course would be to direct our attention to variables, some of which are represented in certain villages in one way and in other villages in another fashion, ways and fashions that may change through time. This is because for the most part the important variation we identified occurred most often between domestic groups and institutions, rather than between whole villages or regions. This is as it should be, and is entirely predictable and natural. Nonetheless, generalizations about villages, regions and sets of institutions are possible and meaningful , for after all, these entities are composed of the domestic groups we studied. For this reason they are also apt to

change through time. Initial hypotheses about these entities and their contribution to well-being are explored in the final subsection.

1) Institutional Evidence

Our comparison of the first and second cross-tabulations confirmed many of the variable associations that the study team had anticipated after reviewing the initial data. The second series of cross-tabulations was in fact an attempt to confirm the strong associations and clusters we already suspected, while at the same time extricating the key variable values or ordinal dimensions that accounted for the most conspicuous patterns of covariation and clustering.

It is most useful to begin this section with a comparative review of a sample of both the initial and later series of data analyses. This approach is most productive because it will (1) graphically display the reasons for re-ordering and collapsing variable values in the later examinations, (2) illustrate the logical path the team devised for examining the variables, and (3) identify many of the research findings as they are emergent in, or corroborated through, ongoing and cumulative analysis.

Some of the early results were striking at the outset, even prior to subsequent analysis. Nonetheless, the subsequent analyses tended overall to shore up and confirm patterns that were at least provisionally evident in the earliest data. Tables 37 and 38 describe regional breakdowns along two institutional dimensions; Table 37 indicates the overall proportions of institutional dispute by type, sorted by region (REGNO X POLDIS; cf. Appendix 2); Table 38 describes the characteristic types of institutional links sorted in the same fashion (REGNO X EICOORD). The statistics are not convincing for any sort of conclusion, but it is important to point out that given the very small N size we are working with we cannot rely solely on statistical proof in developing hypotheses concerning the dynamic between any two variables. In both Tables there is an intuitive association, however, that is worth pursuing. The two regions may evidence, it appears, different sorts of institutional relations; the NANA region shows no evidence of dispute within high ranked institutions, while the Aleutian region does (Table 37); the Aleutian region may demonstrate less cooperation and coordination

TABLE 37

REGION X LOCUS OF POLITICAL DISPUTES

Region	Institutions		
	Low Rank	High Rank	Approx. Equal
ALEUTIAN-PRIBILOF	0	28.6%	14.3%
NANA	14.3%	0	42. 9%

$X^2 = 3.94$ 2df p=0.14
Gamma = -0.333

TABLE 38

REGION X INSTITUTONAL COOPERATION COORDINATION

Region	"Low Cooperation Low Coordination	Low Cooperation High Coordination	High Cooperation High Coordination
ALEUTIAN-PRIBILOF	25%	12.5%	12.5%
NANA	0	12.5%	37,5%

$X^2 = 3$ 2df p=0.22
Gamma = 0.833

between institutions, while the NANA region is overbalanced at the other end of the scale (Table 38). These potential patterns do not urge us toward conclusions, though, but rather toward new analysis. Table 37, it is clear, should be re-ordered to insert the third dispute value between the first two, thereby creating an ordinal dimension (i.e., low rank, approximately equal, high rank); Table 38 could be collapsed in order to either isolate or merge the zero cell (NANA X low coop/low coord). Such modifications and subsequent analyses are first steps in both the definition of key variables, and the determination of useless ones.

Table 39 is a 2X2 table illustrating the regional split in terms of Native participation in institutional leadership positions (REGNO X EI PART). Although the statistics, again, are not convincing, the clear split between the regional distributions lead us to question both the regional as well as institutional variables. Tables 40 and 41 display stronger and very conspicuous patterns that we discovered again and again in the research; that is, the apparent association between Native political and institutional participation, other broad and varied social commitments and village dynamics, and local perceptions about control and power. Table 40 charts local proportion of Native leadership against local perceptions of political-institutional control (EIPART X SERCON); Table 41 displays the results of comparing Native leadership with the local density of club, sodality, and association membership (E IPART X SODOV).

The five Tables above were developed during the initial analysis, and these, among many others, caused us to couch new questions for further analysis about the possible regional differences that might be identified along any number of dimensions, as well as the apparent connection between tight, overlapping multiple community affiliations, leadership, and senses of control and power within the community. They also showed us where our variable ordering and organizing procedures were weak or otherwise insufficient, and provided clues for collapsing and re-ordering variable values for optimal results.

2) Domestic Evidence

As was the case for institutional variables, our first order analysis of domestic data employed variables that often contained

TABLE 39

REGION X NATIVE INSTITUTIONAL LEADERSHIP

(100% Native leadership in institutions, or less than 100%)

Region	All Native	Not all Native
ALEUTIAN-PRIBILOF	12.5%	37.5%
NANA	37. 5%	12.5%

$X^2 = 2.5$ 1df p= 0.1
Gamma = -0.8

TABLE 40

NATIVE INSTITUTIONAL LEADERSHIP X PERCEPTION OF CONTROL

	Perception	
Leadership	Local	External
100% Native	57. 1%	0
not 100% Native	0	42. 9%

Gamma = 1.000
Kendall's Tau B = 1.000
P = 0.0000

TABLE 41

NATIVE INSTITUTIONAL LEADERSHIP X SODALITY MEMBERSHIP OVERLAP

	Overlap	
Leadership	Usually	Seldom
100% Native	42. 9%	0
Not 100% Native	14.3%	42. 9%

Gamma = 1.000
Kendall's Tau B = 0.75

many values: three, four, five or more. Such variable organizations are quite useful in initial exploratory investigations, but once an association or pattern of covariation is suspected it is critical for the analytic approach to focus on the possible variable values or clusters of values that account for the suspected pattern; re-ordering and variable collapse is a straightforward method for beginning this step-wise and cumulative assessment of the variables.

For instance, Table 42 displays the results of comparing household income with income and labor strategies within the household (HINC X IN STRAT). The Table clearly shows that low income levels are associated with internal accumulation of goods and skills and labor, while higher income levels become more and more associated with higher levels of distribution outside the household (based on our network samples]. This pattern, drawn from the initial analysis, is not striking by itself, and may even seem simplistic or trivial; it only stands to reason, one might surmise, that household economic status is tied closely to other sorts of economic practices. The value of this comparison does not accrue from its discrete or independent value, however; this comparison, and many others similiar to it by topic, assist us in defining (1) the wider range of economic trends and practices that are interrelated, and (2) the key variable values within the variables that discriminate between many diverse sorts of practices and economic factors. This point is raised here in order to encourage the reader not to assess apparently self--evident associations on their own merit, but rather as parts of a larger and densely connected cluster of relations that, as a whole, explain far more than its constituents in isolation.

Table 42, although evidencing strong associations between values along each dimension, probably overdifferenti ates; that is, too many distinctions are being made within each variable. Overdifferenti ation can hide crucial distinctions along both dimensions, income on the one hand and income-labor strategies on the other. Although this table makes it clear that an association exists between these two variables our analysis has not yet identified the critical breaks along both dimensions that capture the inherent patterning of these data. A brief review of this table reveals that incomes below $20,000 and above $30,000 are associated with very different income-labor strategies; the former is associated, it seems, with a greater reliance on accumulation rather than distribution while the latter shows the

TABLE 42

INCOME X INCOME AND LABOR STRATEGIES

Income $	Strategies: Local Pooling Accumulation	Local Pooling Distribution	Local/Regional Pooling & Distribution
0-20,000	27%	10.8%	2.7%
20,001 - 30,000	10.8%	10.8%	13.5%
30,001 - 40,000	0	5.4%	2.7%
40,001 - 60,000	0	10.8%	0
60,000 +	0	0	5.4%

$X^2 = 21.8$ 8df $p = 0.005$
Gamma = 0.62
Kendall's Tau b = 0.45 p = 0.001

reverse. Similarly, the "accumulation" value in the income-labor strategy variable is associated primarily with lower incomes, while the remaining two values are more diversely associated. This finding encourages a re-analysis of these variables through a re-grouping of the variable values; this re-analysis is discussed in the following subsections.

Table 43 exhibits a similar and complementary series of breaks; this table shows the distribution of types of income stability and predictability against income levels (HINC X INSTAB). The statistical measures are weaker, but nonetheless the breaks between certain income levels (at the 20,000 and 30,000 brackets) seem to parallel breaks in income strategies; also, the pattern of the "predictable" income patterns, and especially the "unstable predictable" category, seem to be associated intuitively with key income levels. This table requires collapsing in order to make sense of these possible associations.

3) Re-ordering and Collapsing Results

In the secondary analysis, three variants of this table were developed; one that inserted a break at the 20,000 income level and collapsed the predictable and unpredictable income types, one that inserted a break at the 30,000 income level and compared the unstable predictable category against the other types, and one that followed an ordinal scale organization that incorporated both income level breaks but left the income types intact. These are displayed respectively as Table 44, Table 45, and Table 46.

Although there is considerable variation in the strength of the statistical measures in the three tables, it is apparent that these new tables assist us considerably in identifying the potential discriminant values contained in these variables vis-a-vis one another. Table 45 presents what is probably the most significant set of associations. These series of analyses lead one to suggest that, at least as far as this comparison is concerned, the income type designated "unstable predictable" probably has some explanatory importance in terms of economic adjustment and well-being, as does the apparently critical income break at $30,000. Again, these comparisons must not stand alone; further analysis must always provide the basis for confirmation .

TABLE 43

INCOME X INCOME STABILITY-PREDICTABILITY

Income $	Income Stability and Predictability: Unstable/ Unpredictable	Unstable/ Predictable	Stable/ Unpredictable	Stable/ Predictable
0-20,000	13.5%	8.1%	0	16.2%
20,001 - 30,000	5.4%	18.9%	5.4%	8.1%
30,001- 40,000	0	5.4%	0	2.7%
40,001- 60,000	0	10.8%	0	0
60,000 +	0	5.4%	0	0

$X^2 = 15.95$ 12df p= 0.194
Gamma = -0.05
Kendall's Tau B = -0.035 p = 0.40

TABLE 44

INCOME X INCOME STABILITY-PREDICTABILITY

Income	Predictable	Unpredictable
0-20,000	24.3%	13.5%
20,000 +	51.4%	10.8%

X^2=0.75 1df p=o.39
Gamma = -0.43
Kendall's Tau B = -0.21 p= 0.11

TABLE 45

INCOME X INCOME STABILITY-PREDICTABILITY

Income	Unstable/Predictable	Other
0-30,000	27%	48. 6%
30,001 +	21.6%	2.7%

X^2= 5.73 1df p= 0.017
Gamma = -0.87
Kendall's Tau B = -0.46 p = 0.003

TABLE 46

INCOME X INCOME STABILITY-PREDICTABILITY

Income	Unstable Unpredictable	Unstable Predictable	Stable Unpredictable	Stable Predictable
0-20,000	13.5%	8.1%	0	16.2%
20,001/ 30,000	5.4%	18.9%	5.4%	8.1%
30,001 +	0	21.6%	0	2 .7%

X^2= 14.67 6df p = 0.02
Gamma = -0.03
Kendall's Tau B = -0.02 p= 0.44

of suspected variable patterns as well as for the designation of key indicators.

An association between income and social habits and perceptions paralleling those noted above is displayed in Table 47. Here we are comparing income level with expectations of benefits and control relating to economic development activities (e. g., perceived as likely to be local, external, or both; HINC X DEVEX). This table was drawn from the first analyses, and shows weak but suggestive associations between income and attitudes; judging by income levels per se, it seems that there may be expectations of external control associated in a positive manner with income. However, this table does not allow a clear determination of the likelihood of such an association. In this case, the income categories needed to be collapsed, and the expectation categories needed to be re-ordered (placing the third "blend" value between values one and two); in the secondary analysis these alterations were made, and the expectations categories collapsed as well. The results, using the already conspicuous $20,000 and $30,000 breaks, are displayed in Tables 48 and 49. Although the statistics are not convincing on the surface, the reversals in distributions are quite obvious and it is possible that Table 48 points to potential attitudinal discriminators based on income; it is interesting to point out here that the salient break in income in this case is at $20,000 whereas earlier the $30,000 break seemed more critical.

The rationale for collapsing variable values is also evident in the treatment of Table 50 from the first analysis, and the subsequent analyses shown in Tables 51 and 52. Table 50 shows the weak association between household dynamics (defined for our purposes by household fluidity and internal expectations regarding movement within and between households) and sodality memberships (HYDN X SODMEM). Table 51 merges the "l" and "O" sodality values, and in doing so isolates the bottom left zero cell; Table 52 merges the "l" and "2+" values, and merges the zero cell with another. These re-analyses suggest that perhaps fluidity of household dynamics is associated with household affiliative tendencies (although the statistics alone should not be taken as strong evidence of this suspicion).

A series of interrelated comparisons are displayed below in Tables 53 through 56. All are taken from the secondary analyses, and are intended to show not only the nature of the dichotomous

TABLE 47

INCOME X EXPECTATIONS OF BENEFITS/CONTROL
OF DEVELOPMENT

	Expectations		
Income	Local Benefits	External	Blend
0-20,000	5.9%	8.8%	26.5%
20,001-30,000	8.8%	17.6%	8.8%
30,001-40,000	0	5.9%	2.9%
40,001-60,000	0	5.9%	2.9%
60,001 -I-	0	2.9%	2.9%

$X^2 = 7.04$ 8df p= 0.53
Gamma = -0.21
Kendall's Tau B = -0.144 p= 0.18

TABLE 48

INCOME X EXPECTATIONS OF BENEFITS/CONTROL
OF DEVELOPMENT

Income	Local or Blend	External
0-30,000	50%	26.5%
30,001 +	8.8%	14.7%

$X^2 = 0.98$ 1df p= 0.32
Gamma = 0.52
Kendall's Tau B = 0.24 p=0.08

TABLE 49

INCOME X EXPECTATIONS OF BENEFITS/CONTROL
OF DEVELOPMENT

Income	Local or Blend	External
0-20,000	32.4%	8.8%
20,001 +	26.5	32.4%

X^2= 2,57 1df p= 0.1
Gamma = 0.64
Kendall's Tau B = 0.34 p ▫0.027

TABLE 50

HOUSEHOLD DYNAMICS X HOUSEHOLD SODALITY MEMBERSHIP

	Number of Memberships		
Dynamics	Two +	One	Zero
Fluid Household	22. 6%	12.9%	32.3%
Non-fluid Household	0	12.9%	19.4%

X^2 = 4.69 2df p = 0.10
Gamma = 0.4
Kendall's Tau B = 0.22 p =0.1

TABLE 51

HOUSEHOLD DYNAMICS X HOUSEHOLD SODALITY MEMBERSHIP

Dynamics	Two +	One or Less
Fluid	22a 6%	45.2%
Non-fluid	0	32.3%

X^2 = 4.3 1df p = 0.11
Gamma = 1.000

TABLE 52

HOUSEHOLD DYNAMICS X HOUSEHOLD SODALITY MEMBERSHIP

Dynamics	One +	Zero
Fluid	35.5%	32. 3%
Non-fluid	12.9%	19.4%

X^2= 0.42 1df p = 0.52
Gamma = 0 . 2 5
Kendall's Tau B = 0.12 p = 0.26

bivariate comparisons developed in the secondary analysis phase, but also the long and densely reticulated chains of association uncovered during the analysis that clearly demonstrate the often exhaustive interconnectedness and integration of the variables we investigated. The partial chain of associations described here is illustrative of the numerous clusters of variables we have identified, and that provide the basis for later generalization not only about clusters but about the potential key indicators that emerge from this analysis and the smallest space analysis as well .

Table 53 described the association between income and income and labor strategies in the households sampled" through our network approach (HINC X INSTRAT); both variables are collapsed (in INSTRAT, "local pooling and accumulation" alone was treated as one value, while both "distribution" values were merged). The trend evident here, of positive relations between income and distribution, is conspicuous. Moving on to Table 54, we compare income and labor strategies with expenses entailed in subsistence harvests (percentage of total income; IN ST RAT X HAREX). A parallel reversal and' significant positive relation is apparent in this comparison; higher income is associated with more distribution of goods, services, and income; likewise, distribution of these goods and services is positively associated with higher subsistence expenses.

Table 55 displays the results of a comparison of subsistence expenses with the number of species harvested and consumed in key subsistence resource categories (HAREX X SUBS). Here again, it is evident that an association between economic variables and species utilization emerges; higher shares of income expended on subsistence pursuits are associated with wider and more varied utilization of resources. Table 56 provides another perspective on these patterns, and shows how these densely associated economic-subsistence variables bleed over into broader cultural domains related to less tangible interpersonal dynamics. Table 56 compares subsistence resource utilization and modes of conflict resolution (SUBS X CONFL). Although the statistics are weaker in comparison with the other Tables noted above, the economi c-susbsistence patterns that have already begun to crystallize now appear to align themselves with a much broader variety of sociocultural practices. Income levels are associated with distribution habits; distribution habits are tied to subsistence practices; subsistence practices are tied to

TABLE 53

INCOME X INCOME AND LABOR STRATEGIES

	Strategies	
Income $	Local Pooling/Accumulation	Pooling and Distribution
0-20,000	27%	13.5%
20,001 +	10. 8%	48.6%

$X^2 = 6.97$ 1df p= 0.008
Gamma = 0.8

TABLE 54

INCOME AND LABOR STRATEGIES X SUBSISTENCE EXPENSES
(% of Income)

	Expenses	
Strategies	0 - 9 %	10% +
Local Pooling and Accumulation	35. 5%	3.2%
Local and Regional Pooling and Distribution	19.4%	41. 9%

$X^2 = 8.43$ 1df p = 0.0037
Gamma = 0.92

TABLE 55

SUBSISTENCE EXPENSES X SPECIES CONSUMED IN EACH SUBSISTENCE CATEGORY

	Species/Category	
Expenses	One or More	Less
0-9% Income	26. 7%	30%
10% or More	40. 0%	3.3%

X^2 = 4.9 1df p =0.027
Gamma = -0.86

TABLE 56

SPECIES USED IN EACH SUBSISTENCE CATEGORY X CONFLICT RESOLUTION

	Resolution Mode	
Species/Category	Passive Internal	Non-Passive
One or More	48. 3%	13.8%
Less	13.8%	24.1%

X^2 = 3.4 1df p = 0.06
Gamma = 0.72

resource consumption; and, resource consumption is associated with interpersonal variables.

This cluster is only a part of the wider "families" of variable associations uncovered during the analysis, associations that serve to illustrate what is meant in a real empirical sense by concepts and constructs like "traditional pursuits" and "cultural conservatism"; here we see traditional and culturally grounded Native habits like "passive internal" conflict resolution falling together analytically with diverse subsistence pursuits, large subsistence expenses, and high income. Once such chains of association are documented and assessed as a whole, the self-evident veneer of some of the individual associations is stripped away and a more complex whole begins to emerge. These complex and reticulated associations are by no means self-evident.

B. Regional Level Social Conditions

This subsection will display and discuss briefly a sample of the initial regional findings relating to well-being in the study areas. The data to be discussed are exemplary and illustrative, in that they are by no means exhaustive but rather representative of the major types of initial findings we discovered after early data analysis and prior to the more detailed and sophisticated smallest-space analysis. They are not conclusive, but suggestive. The discussion of the import and portent of these provisional findings will be limited, since the findings are in fact provisional, and all findings must remain contingent on the later and final analyses.

A more thorough, but interim, discussion of the meaning of these findings concerning well-being will be addressed in the last subsection of this chapter, which covers the hypotheses concerning domestic and institutional mechanisms in the study regions that act to mediate and guide community responses to a changing world, hypotheses that were developed prior to the final analyses. These hypotheses underlie and come logically prior to the later hypotheses concerning well-being that conclude this study.

1) Regional Analyses

Although most of the tangible and salient findings of the primary data analysis point toward findings that are best represented and discussed at the level of variables per se, rather than communities or regions, some initial findings do illustrate differences between both communities and regions.

Some very suggestive evidence points to empirical distinctions that can be made between the two study regions, NANA and Aleutian-Pribilofs. For instance, Table 57 displays the results of a comparison between regions as they are represented by data concerning local, domestic economic strategies. In this case, we see that the Income and Labor Strategies variable (V25) has values that are differently distributed on the basis of region; the first value represents localized pooling and distribution of resources and skills within the immediate household; the second value represents pooling and distribution beyond the household (i.e., within the village, and throughout the region). The cross-tabulation shows that the NANA region can be better represented by broader sharing practices, while the Aleutian-Pribilof region is better represented, or typified, by more restricted sharing; however, the statistical measures relating to these distributions are not very powerful. Nonetheless they are suggestive.

Table 57 displays another contrast between the regions; here we see the regions broken out by the level of investment in subsistence expenses. The first value is a low investment (0-9% of gross family income), while the second is higher (10% or more). Here we find that the NANA region can be typified by high subsistence investments, while the Aleutian region is typified by lower investments, based on our sample.

A dichotomy between economic, specifically subsistence, practices is further supported by the Table 59; here we compare regions against actual harvests of subsistence resources. The first value in variable 29 (Subsistence Harvests) represents at least one species in each class (five total; sea mammals, land mammals, fish, fowl, and vegetables) harvested, while the second represents less than one total in each, or up to four categories in all. The NANA region shows a much more diverse harvest.

TABLE 57

NANA AND ALEUTIAN LOCAL DOMESTIC ECONOMIC STRATEGIES

	Local Pooling and Accumulation	Local and Regional Pooling and Distribution
NANA	15.4	38.5
ALEUTIAN-PRIBILOF	25.6	20.5

Kendall's Tau B = 0.27348

Gamma = 0.50000

Eta = 0.22537

TABLE 58

NANA AND ALEUTIAN INVESTMENT IN SUBSISTENCE EXPENSES

	Low 0-9%	Medium 10 or more
NANA	21.9	40.6
ALEUT	34.4	3.1

Kendall's Tau B = -0.55301

Gamma = -0.90667

Eta = 0.55301

TABLE 59

NANA AND ALEUTIAN SUBSISTENCE HARVESTS

	Use 2 or More Species	Less than 1
NANA	45.9	8.1
ALEUT	13.5	32.4

Kendall's Tau B = 0.56424

Gamma = 0.86301

Eta = 0.56424

Looking to other sociocultural measures of community functioning and cohesion, we can compare the regions on the basis of the typical sodality memberships that occur. Multiple memberships can often be an index to the formality or informality attaching to these affiliations, the degree to which many organizations serve joint but multiple purposes, and the general level of institutionalization inherent in an organization or a community as a whole. Thus, many overlaps can indicate a more informal and "grassroots" oriented approach, a much more traditional approach, to institutional problem solving and organizational dynamics. Table 60 illustrates the breakdown by region against sodality memberships in each household. The first value along the sodality dimension represents one or two memberships per household; the second value represents less than one overall (throughout the sample). Many more sodality memberships are apparent in the NANA region. A similar breakout, but one that does not illustrate a dichotomous break, is displayed in Table 61, where we see that the regions are different when comparing 2 memberships per family, against 1 or less.

TabI-e 62 displays a breakdown of region against the variable Income Stability and Predictability. The first value of the variable represents unstable but predictable Income: income that is based on seasonal wages, but. which nonetheless represents a very predictable income from year to year (i.e., income from trapping or commercial fishing on the part of hunters or fishers who are highly competent and can thus predict good incomes from year to year). Here we see that again the NANA and Aleutian regions diverge; many more incomes in the NANA region are unstable but predictable, while this sort of income is less typical in the Aleutians, as evidenced in our sample.

As the earlier discussion revealed, income and labor strategies differ, it seems, by region. Another table reveals another facet to this observation. The previous Tables have been dichotomous, showing a 2X2 breakdown by region and variable. In Table 63 we see an ordinal table displaying three values of the income and labor strategies variable broken down by region; here again we see that, even by using a finer gradation of values along key variables, a basic distinction may be evident by region. The NANA region residents are more apt, according to our sample, to distribute and share their resources widely. Similar findings are evident in Table 64 (detailing subsistence

TABLE 60

NANA ANO ALEUTIAN SODALITY MEMBERSHIP BY HOUSEHOLD

	1 or 2 Memberships	Less Than 1 Membership
NANA	29.7	18.9
ALEUT	18.9	32.4

Kendall's Tau B = 0.24269

Gamma = 0.45856

Eta = 0.24269

TABLE 61

NANA AND ALEUTIAN SODALITY MEMBERSHIP BY HOUSEHOLD

	2 or More Memberships	1 or Less Membership
NANA	16.2	32.4
ALEUT	2.7	48.6

Kendall's Tau B = 0.35822

Gamma = 0.80000

Eta = 0.35822

TABLE 62

NANAAND ALEUTIAN INCOME STABILITY AND PREDICTABILITY

	Unstable/ Predictable	Other
NANA	35.9	17.9
ALEUT	10.3	35.9

Kendall's Tau B = 0.44444

Gamma = 0.75000

Eta = 0.44444

TABLE 63

NANA AND ALEUTIAN POOLING, ACCUMULATION AND DISTRIBUTION

	Local Pooling and Accumulation	Local Pooling and Distribution	Local & Regional Pooling & Distribution
NANA	15.4	17.9	20.5
ALEUTIANS	25.6	17.9	2.6

Kendall's Tau B = 0.34944

Gamma = 0.57854

Eta = 0.40034

TABLE 64

NANA AND ALEUTIAN SUBSISTENCE INVESTMENTS

	Low 0-9%	Medi urn 10-19%	High 20 or More
NANA	21.9	34.4	6.3
ALEUTIANS	34.4	3.1	0.0

Kendall's Tau B = 0.53619

Gamma = 0.90789

Eta = 0.55444

TABLE 65

NANA AND ALEUTIAN SUBSISTENCE HARVEST DIVERSITY

	Use of 2 or More Species	One Species	Less Than 1
NANA	27.0	18.9	8.1
ALEUTIANS	2.7	10.8	32.4

Kendall's Tau B = -0.56692

Gamma = -0.83459

Eta = 0.60240

investments), and Table 65 (detailing typical diversity of subsistence harvest by region).

In Table 66 we find more evidence, although it is not statistically conclusive, of an ordinal-level support for the evidence we reviewed earlier concerning regional differences based on sodality membership. In this table the sodality variable values represent 2 or more memberships, 1 membership, and less than one membership per family. The NANA region shows a greater representation in the higher sodality memberships categories.

Finally, a very discrete and disparate breakdown that distinguishes between regions can be illustrated by Table 67. Here we see that none of the Aleutian respondents used Native healers, while all of the NANA region domestic respondents did. This example shows that some very real and solid differences can be evidenced but these differences may explain little. That is, the variable relating to the use of Native healers may on the surface seem to discriminate, and in fact it does, but the regional variable does as well. That is to say, we already know that the regions are discriminated on the basis of this variable but, then, why not simply discriminate on the basis of region? In this sense, the Native healer variable tells us little except that the regions are different in this one respect, but further comparisons using this variable are equivalent to comparison by region alone.

C. Community Level Social Conditions

This subsection will detail data that illustrate village-level differences in well-being, and the variables related to this well-being. The discussion will also include coverage of differences that are revealed at the level of variables themselves, variables that may cross-cut villages and that thus may or may not distinguish between villages or regions. In particular, the latter discussion will cover distinctions that are based on formal and empirical dimensions that may be shared by some villages, or regions, and that may change through time. The possible meaning of these distinctions will be explicated in part in the last subsection of this chapter, which deals with hypotheses concerning well-being that may relate to domestic or institutional mechanisms that can be identified as crucial

TABLE 66

NANA AND ALEUTIAN SODALITY MEMBERSHIP BY HOUSEHOLD

	2 or More Memberships	1 Membership	No Memberships
NANA	16.2	13.5	18.9
ALEUTIANS	2.7	16.2	32.4

Kendall's Tau B = -0.30115

Gamma = -0.51351

Eta = 0.36594

TABLE 67

NANA AND ALEUTIAN USE OF NATIVE HEALERS

	Did not Use Native Healers	Use of Native Healers
NANA	0.0	51.6
ALEUTIANS	48.4	0.0

Kendall's Tau B = 1.00000

Gamma = 1.00000

Eta = 1.00000

mechanisms for the purpose of this study; to wit, mechanisms that assist in the accommodation and adaptation of populations, communities, and individuals to rapid change.

Table 68 describes village-level differences in income distribution, according to our sample. A quick visual review of this Table shows that certain villages display a higher typical family income than others. In this case, we find that Unalaska, King Cove, Kotzebue and Kiana seem to rank above the other villages in income level. Although village size may seem to be an important discriminator here, the fact that Selawik is larger than Kiana leads such a logical train of thought away from such a simplistic determination. However, Selawik, although larger than Kiana, is widely considered in local lay opinion to be a less progressive or cosmopolitan village. In this case, then, perhaps an alternative variable may be a better discriminator; it is unclear, however, what this variable may be or how it can be operationalized.

Table 69 displays a breakdown of income type against village; here we see that all the NANA region villages, and Unalaska and King Cove display a conspicuous pattern toward an unstable and predictable income and source. Although the statistical measures are far from supportive, they are suggestive; the NANA region villages as well as Unalaska and King Cove seem to display a pattern of seasonal dependence with overall predictability.

Table 70 provides us with a different picture, one that departs somewhat from that portrayed by the previous tables. It displays villages against types of income and labor strategies; local pooling and accumulation (within the household), pooling and distribution (within the household and village), and local and regional pooling and accumulation (within the household and village, and throughout the region). Here we see that Unalaska households typically distribute locally and only in a limited fashion beyond the household; King Cove families distribute more widely; St. George families distribute widely also, in comparison with both the former; Nikolski families distribute less, but with a larger variation; Kotzebue families distribute far more widely; Kiana families distribute widely, but not as widely and as frequently as Kotzebue families; Noatak families distribute less widely, perhaps just less than the Nikolski families; and Selawik families distribute widely and with great

TABLE 68

NANA AND ALEUT AN VILLAGE INCOME DISTRIBUT ON

Income $	Unalaska	King Cove	St. George	Nikolski	Kotzebue	Kiana	Noatak	Selawik
0-20,000	5.3	2.6	2.6	13.2	2.6	⊙°	7.9	5.3
20,000 - 30,000	5.3	0.0	5.3	0.0	5.3	7.9	7.9	5.3
30,000- 40,000	0.°	2.6	⊙°	0.0	2.6	2.6	0.0	⊙°
40,000- 60,000	2.6	5.3	0.°	0.0	0.0	2.6	0.°	0.°
60,000 +	0.0	0.0	0.⊙	0.0	5.3	0.0	0.⊙	0.⊙

Kenda' l s Tau B = -0.07697
Gamma = -0.09577

TABLE 69

NANA AND ALEUTIAN VILLAGE INCOME STABILITY AND PREDICTABILITY

	Unalaska	King Cove	St. George	Nikolski	Kotzebue	Kiana	Noatak	Selawik
Unstable/ Unpredictable	5.1	0.0	0.0	5.1	0.0	0.0	5.1	2.6
Unstable/ Predictable	2.6	7.7	0.0	0.0	2.8	7.7	7.7	7.7
Stable/ Unpredictable	2.6	0.0	2.6	0.0	0.0	0.0	0.0	0.0
Stable/ Predictable	2.6	5.1	5.1	7.7	2.6	5.1	0.0	2.6

Kendall s Tau B = 151 0
Gamma = -0.19205
Era = 0.46993

TABLE 70

NANA AND ALEUTIAN VILLAGE INCOME AND LABOR STRATEGIES

	Unalaska	King Cove	St. George	Nikolski	Kotzebue	Kiana	Noatak	Selawik
Local Pooling & Accumulation	7.7	5.1	2.6	10.3	0.0	0.0	10.3	5.1
Local Pooling	5.1	7.7	5.1	0.0	5.1	7.7	2.6	2.6
Local and Regional Pooling	0.0	0.0	0.0′	2.6	10.3	5.1	0.0	5.1

TABLE 71

NANA AND ALEUTIAN VILLAGE ATTITUDES ABOUT ECONOMIC DEVELOPMENT CONFLICTS

	Unalaska	King Cove	St. George	Nikolski	Kotzebue	Kiana	Noatak	Selawik
No Conflict	3.0	3.0	9.1	9.1	6.1	3.0	9.1	9.1
Native vs. Non Native	9.1	6.1	0.0	3.0	6.1	12.1	6.1	3.0
Between Natives	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0

Kendall's Tau B = -0.01085
Gamma = - 0.01550
Eta = 0.42795

variation.

Moving on to data concerning the political and attitudinal dimensions of village differences, we see in Table 71 that three villages seem to depart from the others in terms of the local sentiments concerning conflicts between persons relating to economic development. Variable 28 refers to the perceived conflict between Natives and Natives, and Natives and non-Natives as this conflict relates to development; variable 3 lists the villages in the study areas. This table illustrates the fact that Unalaska, King Cove and Kiana show a high proportion of responses indicating that local residents feel that development conflicts are between Natives and non-Natives; other villages showed a high incidence of such a response as well, but the former are conspicuous in this respect.

Very interesting results are displayed in Table 72; here we see a comparison of villages against numbers of species harvested through subsistence endeavors. This table shows that the NANA region villages very often use, on a village-level basis, two or more species per subsistence category (land mammal, fish, fowl, vegetable), whereas the Aleutian-Pribilof villages use less.

Another village level comparison that suggests regional or size-determinate relations is displayed in Table 73: the comparison between villages and the nature of religious institutional participation therein. The values along the religious participation dimension refer to: (1) participation in two or more church activities, (2) participation in only one church activity, and (3) nonparticipation in church activities. These data show clearly that the least levels of church activity are to be found in regional centers, Unalaska and Kotzebue. The data are not definitive, but are highly suggestive.

1) General Findings for Regions and Villages

As has been noted several times previously, most of the more provocative interim findings relate to variables that cross-cut and intersect regions and villages, rather than relate to villages and regions as wholes. The interim findings, which come logically prior to the final analyses and should be reviewed and interpreted as such, represent data distributions that illustrate differences both within villages and regions, and cannot

TABLE 72 .

NANA AND ALEUTIAN VILLAGE SUBSISTENCE HARVESTS

	Unalaska	King Cove	St. George	Nikolski	Kotzebue	Kiana	Noatak	Selawik
Use 2 + Species	0.0	0.0	2.7	0.0	10.8	8.1	5.4	2.7
One Speces Each	2.7	2.7	0.0	5.4	2.7	2.7	10.8	2.7
Less than One in Each	10.8	8.1	5.4	8.1	2.7	2.7	0.0	2.7

Kendall's Tau B = -0.39993
Gamma = -0.50611
Eta = 0.62906

TABLE 73

NANA AND ALEUTIAN VILLAGE RELIGIOUS PARTICIPATION

	Unalaska	King Cove	St. George	Nikolski	Kotzebue	Kiana	Noatak	Selawik
Active in Church (2 or more)	2.6	5.1	5.1	7.7	0.0	5.1	12.8	5.1
Active in Church (only 1)	5.1	5.1	2.6	2.6	2.6	2.6	0.0	5.1
Not Active	5.1	2.6	0.0	2.6	12.8	5.1	2.6	0.0

themselves represent "monolithic entities like villages or regions. In point of fact, these findings point toward differences between the functions and actions of domestic networks, organizational entities that are established in villages and regions, but nonetheless flow beyond villages and represent in the largest perspective collections of persons, sentiments, and sociocultural linkages that cannot be centered in geographical spaces, like villages or regions. Well-being, in other words, is best represented by the opportunities, actions, and events that center on domestic networks. These networks may, by their frequency or density, represent villages or entire regions; nonetheless, it is more appropriate to think of networks as organizational entities that occur in villages, or regions, but that cross-cut and merge in many and diverse ways.

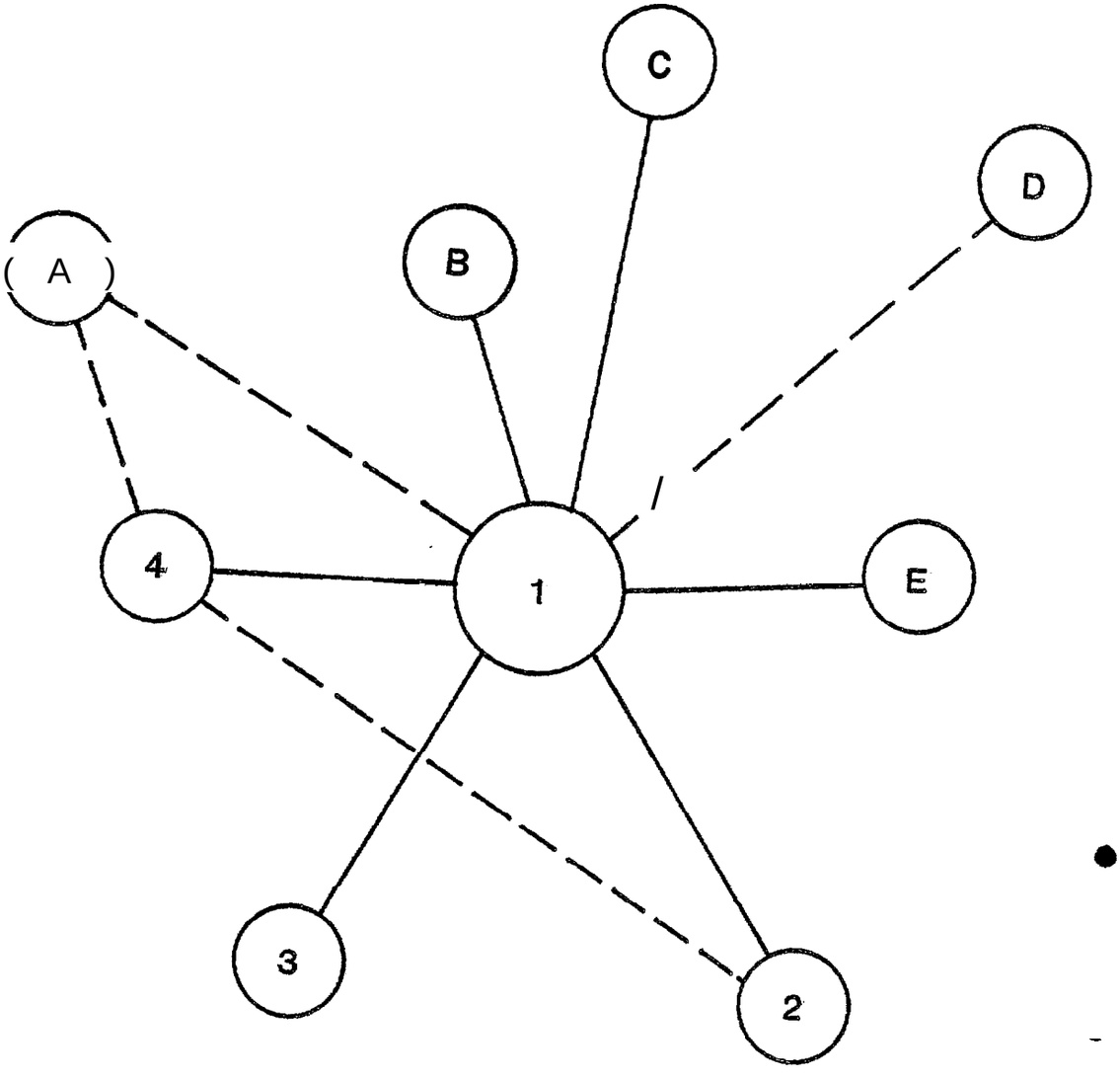
Domestic networks organize persons, distribute goods, develop and direct sentiments and attitudes, and are of longer duration than the individual; thus, they represent corporate organizations. Many of the findings discussed initially describe the ways in which domestic groups extract and distribute goods, share members, work together, and respond to the outside world; these activities do not occur in a vacuum, they occur within and between networks. It is therefore proper at this point to describe a typical network in order to illustrate how networks work, how they are organized, and how they contribute to and in fact promote well-being in study communities.

Figure 30 displays in graphic form a sample network from our study in a particular village. Domestic groups are represented by circles and interactions between them are designated by lines; the dotted lines represent infrequent interactions, while the solid lines represent common, even daily interactions. We see that group 1 is central to this network; in network analysis terms, group 1 is an "anchor". Many more lines of interaction attach to this group than others, such as groups 2, 3 and 4.* Domestic group 1 is a key economic leader group in this community; the head of household in this group earns over $50,000 per year, and in addition is a superb and well respected

*The numbered groups are those with whom directed, structured protocol discussions were held; the letters represent groups with whom we were familiarized during these discussions but with whom we did not employ the domestic protocols.

FIGURE 30

NETWORK DIAGRAM



subsistence hunter and fisher, and commercial fisherman. He and his family respond to many, many requests for assistance and support. In fact, this family gives over 50% of their subsistence goods to other families, primarily elders, during the year (i.e., families B and C, secondarily A and D).

The head of household is a key community member, serving on a number of significant community Boards and committees, and assists many families (which cannot be diagramed here for lack of space) with advice, resources, and other help. His brother is the head of household in group 2, another group that is central to this network. His group provides assistance to many households; the head of household holds a significant position in the regional Native corporation. Family E represents a group somewhat isolated from the rest, and perhaps by design. This group is headed by a very significant leader in the regional corporation; he is a political leader, while not an economic resource as are families 1 and 2. Nonetheless, it is apparent that he has access to., and is accessed through, many other members of the network. Thus, he may not interact directly with many others, but he receives information and tangible and intangible resources through many channels. Groups 3 and 4 are relatively poor, and are younger compared to families 1 and 2. Their role in the network is chiefly as recipients of goods and services, although they provide many informal services, primarily to families 1 and 2. They are beneficiaries, but pay their debts through service to their benefactors. They call upon family 1, and secondarily 2, to provide information and resources, but respond with the services and resources they are able to provide. Families A, B, C and D are poor, and are recipients of the largesse of others. They provide little if anything in return. Nonetheless they are intact and solid members of this network, a network that illustrates how privileges, goods, and other resources are distributed and shared typically within a rural traditional community.

Sharing of goods, accumulation and distribution, household fluidity and the rest, detailed within our research, do not occur in a vacuum. They occur, and in fact are organized and guided, through family networks of a type described here. These networks give shape to, provide a context for, and generally organize the movement of persons and goods within a community and beyond, and the sentiments that underlie this movement.

Table 74 illustrates how household size is associated with household fluidity, that is, the typical movement of persons between and within households. Here we see that smaller households typically evidence less fluidity. This may be a result of a generally lower age of residents in smaller households, and thus a greater degree of acculturation (and thus a lesser probability of following traditional patterns of great fluidity), or on the other hand a greater probability of older ages being represented in the smaller households, and thus a lesser ability to support more household members moving in and out; other hypotheses could be entertained here as well.

Table 75 shows the distribution of income and labor strategy practices against income types; here we see that unstable but predictable incomes are associated more often with wider resource distribution practices; the stable but predictable incomes also show a high sharing level, but not to the degree that is evidenced in the unstable but predictable incomes.

Sharing practices are also discriminated by income. Table 76 shows that those domestic groups having an income above $20,000 pool and distribute their goods and income throughout the community and region far more often than do the lower income families. Table 77 shows that these higher income families are also more apt to harvest 1 or more species per subsistence category (land mammal, sea mammal, fish, fowl, and vegetable), than their cohorts in the lower income category. Subsistence investments are also associated with other factors: Table 78 shows that predictable income families more often invest more in subsistence expenses than do the unpredictable income families, regardless of whether or not the income is stable. Table 79 shows that subsistence investments are also associated with income; here we see that local pooling and accumulation within the household is associated with lower (0-9% gross income) subsistence investments, while higher investments are associated with broader distributions, throughout the village and in fact throughout the region. The relation between subsistence investments and subsistence harvests is further illustrated by Table 80; here we see that large investments (10% or more of gross income) are associated with the harvest of at least 1 species in each category (land mammals, sea mammals, fish, fowl, and vegetables), whereas lower investments are associated more often with less diverse harvesters.

TABLE 74

HOUSEHOLD SIZE VS. HOUSEHOLD FLUIDITY

Household Size	Fluid Household	Non-fluid Household
1-3	6.1	12.1
4-6	33.3	18.2
7-10	18.2	0.0
11+	12.1	0.0

Kendall's Tau B = -0.48445
Gamma = - 0.84615
Eta = 0.47667

TABLE 75

INCOME AND LABOR STRATEGY PRACTICES

	Local Pooling & Accumulation	Local Pooling	Local & Regional Pooling
Unstable/ Unpredictable	15.8	2.6	0.0
Unstable/ Predictable	5.3	23.7	15.8
Stable/ Unpredictable	0.0	5.3	0.0
Stable/ Predictable	18.4	5.3	7.9

Kendall's Tau B = 0.07579
Gamma = 0.10588
Eta = 0.10784

TABLE 76

INCOME SHARING PRACTICES

Income $	Local Pooling/Accumulation	Local Pooling,
0-20,000	27.0	13.5
20,000 - 30,000	10.8	48.6

Kendall's Tau B = 0.49083
Gamma = 0.80000
Eta = 0.49083

TABLE 77

SUBSISTENCE HARVESTING

Income $	1 or More Species	Less than 1
0-20,000	16.2	21.6
20,000 - 30,000	43.2	18.9

Kendall's Tau B = -0.26382
Gamma = -0.50588
Eta = 0.26382

TABLE 78

SUBSISTENCE INVESTMENTS

. . .	Low 0-9%	Medium 10% +
Stable/Predictable	32.3	45.2
Unstable/Unpredictable	22.6	0.0

Kendall's Tau B = -0.49010
Gamma = -1.00000
Eta = 0.49010

TABLE 79

INCOME" AND LABOR STRATEGIES

	Low 0-9%	Medium 10% +
Local Pooling & Accumulation	35.5	3.2
Local Pooling	19.4	41.9

Kendall's Tau B = 0.58812
Gamma = 0.91946
Eta = 0.58812

TABLE 80

SUBSISTENCE INVESTMENTS VS.
SUBSISTENCE HARVESTS

Percentage of Income	One to Two Species	One Species in Each Category
Low 0-9%	26.7	30.0
Medium 10 -19%	40.0	3.3

Kendall's Tau B = -0.47565
Gamma = -0.86207
Eta = 0.47565

TABLE 81

RESIDENT VS. NON-RESIDENT RELIGIOUS PRACTICES

	Active in 1 or More Churches	Active in 1 or less Chuches
Born in Region	37.8	27.0
Other	5.4	29.7

Kendall's Tau B = 0.41386

Even residence and institutional activity are associated if we look at variables rather than regions or villages. Table 81 shows that original residence (born in the same subregion or village, versus born in the same region or outside the region) is associated with religious participation. Here we see that those domestic groups represented by head of household birth in the subregion or village, are more apt to participate in more church activities (2 or more, versus 1 or less). Looking at more intangible variables, such as worldview and child-rearing practices, we find that child-rearing practices and the incidence of broken unions (divorce, etc.) are also associated. Table 82 shows that traditional child-rearing practices within the family, as opposed to mixed or Western practices, are associated with fewer broken unions within the family. Looking further, we see that even age of household head and religious institutional activity are associated. Table 83 displays the distribution of data along two dimensions: age (25-40 against all others), by religious participation (one or more church activities, against less than one). Here we see that younger households (but not the youngest) are less apt to be involved in church activities, a finding that is entirely predictable were this to be a standard sample population from the lower 48. However, it is not. As such, we see what may be local evidence of population and generational changes that are current throughout the United States, if not the Western world.

D. Hypotheses Concerning Well-Being and Institutional Coping Mechanisms

Even though institutionalization has been proceeding at breakneck speed through all of rural Alaska and specifically in the study regions, this process, it can be argued, has not yet assembled and placed adequate service-oriented formal institutions in sufficient number for these organizations and their functions to radically transform the social structures that are. traditional and still in place. Although numerous and often dangerous new dependencies have altered domestic and institutional life forever in these areas, traditional social practices often have remained functional, efficient, useful and utilized, exemplary habits that are associated with very strong sentiments and expectations. Although sociocultural change in the face of the massive and persistent momentum of Westernization

TABLE 82

TRADITIONAL CHILD-REARING PRACTICES

Method	Broken Unions	No Broken Unions
Traditional Child-Rearing	45.8	0.0
Western Child-Rearing	29.2	25.0

Kendall's Tau b = 0.53109
Gamma = 1.0000
Eta = 0.53108

TABLE 83

RELIGIOUS PARTICIPATION

	Active in 1 or 2 Churches	Not Active
Under 25	20.0	22.9
25-40	45.7	11.4

Kendall's Tau B = -0.34752
Gamma = -0.64103
Eta = 0.34752

characterizes the study area, there are many forms and styles of organization and behavior in the study areas that are hardly typified by debilitating inroads by Western models. There are simply too few tangible Western organizations and facilities providing services that are actually used in a purposeful manner that may take the place of traditional practices. Looking only at the Aleutian-Pribilof area as an example, Tables 84 and 85 list regional health resources and criminal justice resources respectively. A brief review shows that the region is relatively poor in these resources. This is not to say that the impact of those available services is negligible by any means. The fact, however, is that there is not a Western institutional option in place competing with every traditional institution or practice; there is plenty of room today for traditional modes of behavior and institutional coping to remain dominant and entirely functional; tomorrow is another story, and one that is unpredictable for now.

The data we have are highly suggestive of many, many hypotheses concerning response to change, institutional mechanisms for promoting community well-being, domestic processes and forms of organization that maintain local adjustment to change, economic practices that bond networks and encourage flexibility and positive adjustment for many persons, and much more. The discussion below touches only on the broader and more inclusive categories of potential hypotheses; "families'* of hypotheses, perhaps.

The data clearly indicate that economic status and well-being is associated with a broad range of other economic and non-economic factors that represent on the one hand conservatism and tradition, and on the other acculturation and Westernization. We found that higher levels of income are associated with larger subsistence harvests, investments, and a more diverse range of subsistence pursuits. Thus the poor, who are able to afford only modest subsistence investments and may have the least job training and skills, are not necessarily those who would rely on traditional sustenance practices; this is because they cannot afford to. Those who earn high salaries, and may in fact have the greatest education and formal job skills attained through training programs either in or outside the state, are more apt to enjoy the subsistence foods that their grandparents did and eschew store-brought commodities; this is because they can afford to. In addition, those with higher salaries are more likely to

TABLE 84

HEALTH RESOURCES

	Health Services	Alcohol P rog ram	Juvenile Program	Mental Health Center	Family Violence Program	Volunteer Fire Department
Adak	no	no	no	no	no	no
Akutan	yes	no	no	no	no	yes
Atka	yes	no	no	no	no	yes
Belkofski	no	no	no	no	no	yes
Cold Bay	yes	no	no	no	no	yes
False Pass	yes	no	no	no	no	no
King Cove	yes	no	no	no	no	yes
Nikolski	yes	no	no	no	no	no
St. George	yes	no	no	no	no	yes
St. Paul	yes	yes	yes	no	no	yes
Sand Point	yes	no	no	no	no	yes
Unalaska/Dutch Harbor	yes	no	yes	yes	no	yes

Source: Department of Health and Social Services, Division of Public Health, Nursing Section, and the Division of Law, Criminal Justic Planning Agency. 1982. Juneau.

TABLE 85

CRIMINAL JUSTICE RESOURCES

	COURTS	STATE TROOPER	LOCAL LAW ENFORCEMENT OFFICERS	CELLS	DISTRICT ATTORNEY	PUBLIC DEFENDER	PROBATION OFFICER	PARALEGAL
Adak	no	no	no	0	no	no	no	no
Akutan	no	no	no	0	no	I-10	no	no
Atka	no	VPSO	no	0	no	no	no	no
Belkofski	no	no	i-10	0	no	no	no	no
Cold Bay	yes	no	no	1	no	no	no	no
False Pass	no	no	no	0	no	no	no	no
King Cove	no	no	1	0	no	no	no	no
Nikolski	no	no	no	0	no	no	no	no
St. George	no	VPSO	no	1	no	no	no	no
St. Paul	yes	yes	1	2	no	no	no	no
Sand Point	yes	yes	1	2	no	no	no	no
Unalaska/Dutch Harbor	yes	no	9	3	no	no	no	no

Source: Department of Health and Social Services, Division of Public Health, Nursing Section, and the Division of Law, Criminal Justice Planning Agency. 1982. Juneau.

eschew formalized social services (e. g., the poor and young primarily use these services, while those with higher incomes, and who are generally older, more often avoid these services; again, because they can afford to); these groups are also more likely to display a sceptical attitude about the possible benefits of economic development in the area. The poorer groups seem more often to evidence a naive optimism concerning who is likely to benefit from development, and why.

Thus, we are left with a picture that suggests that the nature of a "progressive" family entails: skepticism about development, but a probable history of more acculturative experiences; higher incomes and more formal training and skills; higher levels of subsistence investments; a preference for Native, informal domestic-level services and mutual support, for instance Native healers, over institutional services; and frequently a more conspicuous use of traditional, preceptual child-rearing techniques and disciplinary practices. Thus, the progressive family is a balanced blend of old and new, while the family that might be stereotyped as more traditional, for instance, those who show little evidence of acculturative experiences and formalized training, may actually display the more pronounced dependencies on institutional, Western services, income (transfer payments, for instance), and sustenance (store-bought foods).

In the institutional realm, we see that local perceptions of well-being, for instance attitudes suggesting that local institutions are locally controlled and administered in a manner responsive to local needs, are associated quite clearly with the nature of Native leadership (i.e., is local leadership all Native?) and the feuding and factionalism that may occur within communities and between organizations (i.e., does feuding occur in the highest ranked organizations, and what is the focus of the feuding?). We see that positive institutional attitudes co-occur with higher levels of Native leadership, institutional squabbling only in the lesser ranked organizations, and feuding that revolves around personalities more often than issue-specific politics. In addition, we find that higher levels of membership overlap within and between organizations (whereby individuals are members of many groups, and groups are thus typified locally by members who serve in other capacities and enjoy different roles in many other community groups) are associated with less political and institutional turmoil, better institutional

relations, more coordination and Cooperation organizationally within a community, and more of a sense of local control.

Related to the above are the data concerning institutions and services, which can be generalized and hypothetically organized as follows: villages in which organizations are thought to be locally controlled and administered in a manner consistent with local desires and responsive to them, are also villages in which, more often, both service providers and service recipients will share a perception of the objective of the service. There is more unanimity of perception 'and attitude. In short, villages that display community attitudes reflecting a belief that local organizations are locally controlled, are more apt to also display consensus and shared, mutual opinion in other areas. Both service providers and clients have a single and shared perception of what the function of that service is in the first place; whereas, villages without this perception are more apt to show contradictions and disjunctures between provider and client attitudes.

In addition, these joint perceptions and attitudes relating to service functions and local control also co-occur with other institutional patterns, such as high levels of Native leadership, and sodality membership overlaps. Thus, there are bundles of sociocultural practices and patterns that seem to co-occur together on a fairly consistent basis; these bundles represent clear distinctions between villages, and village-level as well as regional institutions.

Some hypothetical and provisional conclusions can be drawn concerning institutional support mechanisms. It is apparent, we suggest, that the formalized institutional supports available in the study areas are: inadequate as a whole, and few and far between; eschewed by those who can afford to be choosy; utilized therefore primarily by poorer residents; misunderstood frequently by both staff and clients in villages most unstable in terms of local leadership and perceptions; function for reasons at odds with their Western definition, as for example when programs are designed for the sake of the jobs they provide rather than for the services they render; and are typified more often by organizational rivalries and bickering precisely in those villages that can least afford these feuds that disrupt services and organizational operations.

Looking back to the description of a network in the previous subsection, and generalizing from the data about balanced and progressive families and healthy institutions above, it seems that the real and most powerful, durable forms of institutional support are organized through and directed by informal, traditional institutions within the village. These mutual support services move through networks, and seem to provide much more support, and certainly more support with healthy, positive connotations and attached sentiments, than do transfer payments and institutionalized, formal services. They certainly reach more people, for in fact everyone seems to be engaged in some way as either a provider or recipient of shared foodstuffs, skills, and other resources. We hypothesize that the network is in fact the crucial locus of institutional support in the study regions, and is, by corollary, the nexus of the sentiments, ideas, and actions that bond persons to groups and provide for them. Although formal institutional mechanisms are growing in numbers and frequency of use, we suggest that they are far from eclipsing these more covert but very profound informal supports. These informal supports behave in much the way they must have even hundreds of years ago; they are durable and persistent today, and as long as they remain functional and efficient they would seem to be the main buttress of mutual aid in the area.

CHAPTER V

FINDINGS AND CONCLUSIONS

V. Findings and Conclusions

A. Introduction

Chapter V reports the results of our social indicator research. Essential to the interpretation of our indicators is the understanding of the issue of long-term structural change. Our social indicator system reflects the current status quo, that is, the idiosyncratic definitions of well-being at the time we conducted research. If the most recent Alaskan history is typical, we cannot assume that the current status quo will remain unchanged. We are concerned primarily with structural change, of course, and specifically, with the effects of structural change on the interpretation of our indicators. Moreover, as we will soon demonstrate, some structural changes will be relatively important in this context while others will be relatively unimportant. Incremental (gradual, evolutionary, etc.) changes are less important for the stated purpose of interpreting our social indicators.

B. Aggregate Data Analysis Results

To assess structural change in the NANA and Aleutian-Pribilof regions (and in the eight villages), we collected a broad sample of aggregate time series. These time series are per se social indicators in the sense that they measure the social, political, or economic well-being of individuals and households in the eight villages. The definition of well-being implied by these time series is an "official" or governmental definition and, thus, uninterpretable in terms of village-level social indicators. These time series nevertheless permit us to assess long-range change in the villages.

The procedure followed in this assessment was simply to forecast each time series five years into the future. To assure comparability, the same forecasting methodology, ARIMA modeling, was used for all series. (Mini mum-mean-square-erro r forecasts for over one hundred time series are given in Appendix I, Volume 2).

In many cases, the forecasts showed nothing of consequence; changes were incremental in many cases, for example, or in other

cases, were uniform across villages and regions. Similarly, no single forecast proved crucial or even surprising. Sets of forecasts displayed an interesting pattern of change, however. For the purposes of exposition, we have divided the sets into three main categories: demographics (including population growth and school enrollment), economics (including employment and wages), and public aid (including recipients and payments).

1) Growth Patterns in the Eight Villages

Population growth in an open system can be described as the sum of internal growth (births minus deaths) and external growth (in-migration minus out-migration). Internal growth is often a demographically trivial component of overall population change. Small communities would ordinarily not change rapidly due to internal growth alone. Rapid changes in population are due instead to in- and out-migration, or external growth. Internal growth is an important sociological indicator, however, because it measures a population's ability to "reproduce" itself. When internal growth is a relatively large proportion of overall growth the population remains culturally, politically, and socially homogeneous. When internal growth is a relatively small proportion of overall growth, in contrast, the population becomes culturally, politically and socially heterogeneous. One expects great social strain as a result of such change.

Internal growth for the four NANA region villages was positive throughout the 1970-80 decade but four-year forecasts reveal a surprising pattern of change in this indicator.

	1970/80 Average Annual Growth	1984 Forecast
Kiana	7.7	7.7
Kotzebue	44.5	24.8
Noatak	11.3	12.2
Selawik	10.9	21.8

Analogous internal growth statistics for the four Aleutian-Pribilof region villages are:

	1970/80 Average Annual Growth	1984 Forecast
King Cove	7.0	7.2
Nikolski	.4	.4
St. George	1.6	1.8
Unalaska	3.0	3.0

Projections must be interpreted in context of the total expected growth and we have no indicator of this. Nevertheless, internal growth for the four Aleutian-Pribilof region villages is relatively small compared to the four NANA region villages. Furthermore, there is no expected change in this indicator during the next four years.

In the NANA region, on the other hand, internal change is relatively large. Internal growth rates in Kiana and Noatak are expected to remain nearly constant throughout the next four years but internal growth in Selawik and Kotzebue is expected to change. In Selawik, the rate of internal growth is expected to increase substantially throughout this period while in Kotzebue, it is expected to decrease substantially. In this sense, Kotzebue stands out from the other villages. Since its internal growth rate is expected to slow down gradually over the next four years, population growth must come largely from in-migration. One would expect Kotzebue to experience substantial community trauma, certainly manifested in political flux, but probably also in terms of increased crime, drug and alcohol use, and related problems during the next four years.

2) School Enrollments in the Eight Villages

School enrollments are related to internal growth as social indicators. First, a local school system is often the most salient socialization mechanism of a community; the community will maintain its social character as a result of having a vigorous local school system. Second, however, from the opposite perspective, the local school system is often the single most expensive local institution: if enrollments grow too large, as a result of in-migration, for example, the resulting tax burden may bankrupt the community. Assuming that no major economic

disruptions occur within the two regions, four year changes in school enrollments for the eight villages (in progressive order from largest negative to largest positive) are:

St. George	- 27.4	percent
Nikolski	4.2	percent
Noatak	.4	percent
Kotzebue	+ 3.0	percent
Selawik	+ 4.2	percent
Kiana	+ 9.8	percent
Unalaska	+ 14.6	percent
King Cove	+ 14.8	percent

Enrollments in St. George are expected to drop substantially over the next four years. Given the already low level of this indicator, and given that the community must have a school, it would appear that St. George will have a growing problem in this area. Enrollments in five of the communities, on the other hand, are likely to remain constant over the next four years while in Unalaska and King Cove, enrollments are expected to grow substantially. 'In these latter two communities, we would expect a need for expanded funding of the school systems. This need in turn may portend increasing political turmoil as this issue becomes more salient.

3) Regional Economics

Many of our social indicators are regional level time series. In some cases, regional level indicators would have little information to give about social well-being in the villages. In the case of economic series, however, this is not always true. While it is conceivable that the Aleutian-Pribilof and NANA regions could flourish even while some villages withered (and there is some evidence to suggest that this has happened in the Aleutian-Pribilof region: see the next section), economists would ordinarily expect a positive relationship: economic growth in the region will "trickle down" to the villages.

Economists conventionally view employment in terms of "sectors". For the Aleutian-Pribilof region, employment consists of six significant sectors and four-year change in employment by these sectors is:

Manufacturing Employment	+ 48.4 percent
Federal Government Employment	+ .4 percent
Service Employment	+ 11.2 percent
Wholesale/Retail Trade Employment	8.1 percent
State/Local Government Employment	+ 19.5 percent
Contract Construction Employment	- 58.8 percent

These forecasts provide an interesting picture of change. some employment sectors are expected to grow while others are expected to decline: Federal government employment is expected to remain nearly constant in the next four years.

As percentages of the sector-employment in 1980 and 1984, the six sectors are:

	1980	1984
Manufacturing Employment	61.5%	67.8%
Federal Government Employment	18.8%	15.4%
Service Employment	3.8%	2.9%
Wholesale/Retail Trade Employment	3.2%	2.3%
State/Local Government Employment	11".2%	9.6%
Contract Construction Employment	1.5%	1.9%
Total Employment	100.0%	100.0%

So the relative sizes of these six sectors are not expected to change in the next four years. Manufacturing employment (canneries) dominated the Aleutian -Pribilof economy in 1980 and it will continue to do so into the near future; its dominance in fact will increase.

For the NANA region, employment consists of four significant sectors and four-year change by these sectors is:

Trans./Com./Utilities Employment	- 2.2 percent
Federal Government Employment	+20.0 percent
Wholesale/Retail Trade Employment	-19.1 percent
State/Local Government Employment	+43.2 percent

The NANA regional economy is starkly different from the Aleutian-Pribilof regional economy. There is no significant manufacturing sector in NANA, for example, although this may change in 1984. With this caveat, government sector employment--Federal, state, and local--is expected to grow while the remaining two sectors are expected to decline.

As percentages of the total in 1980 and 1984, these four sectors are:

	1980	1984
Transp./Comm./Utilities Employment	7.3%	9.1%
Federal Government Employment	16.8%	15.2%
Wholesale/Retail Trade Employment	11.8%	7.8%
State/Local Government Employment	64.1%	67.9%
Total Employment	100.0%	100.0%

So again, the relative sizes of these sectors are not expected to change in the next four years.

Our analysis of the Aleutian-Pribilof and N"ANA regional economies points out the very real difference between these two regions. In NANA, government is the largest single employer and, other things equal, will continue in this role for several years. At the village level, of course, employment plays a relatively small role in the mundane lives of NANA natives. Subsistence harvesting is still significant to the native lifestyle. But it is also important to remember that government employment plays a significant role in the status system of the NANA villages. Expansion of the government employment sector during the next four years ensures a continuation of the cultural, political, and social status quo of NANA. And of course, if the manufacturing sector becomes a more important part of the NANA economy, the status quo is likely to be threatened.

In the Aleutian-Pribilof region, on the other hand, we see a more "modern", industrialized and diversified economy. Here formal employment plays a relatively large role in the lifestyle and, or course, this implies that Aleutian-Pribilof villages are more sensitive to the sorts of problems (unemployment, e.g.) that one associates with "modern", industrialized societies.

We must question the validity of the employment data underlying these analyses. There is reason to believe that these data are fraught with error, and perhaps, that they have no grounded meaning. Nevertheless, it would appear that regional economic series are not the best possible aggregate social indicators for Aleutian-Pribilof villages. Instead, more direct measures of economically caused strain should be sought. For the NANA region, on the other hand, formal employment itself plays only a small role in the social well-being of villages, so again, we suspect that regional level economic series would not be the best possible aggregate social indicators.

A. Employment and Wages in Nikolski and Unalaska

Although regional sector employment data are considered unreliable and, for other reasons, are unsuitable as social indicators, village level employment statistics are presumably more reliable. These series are also more important as social indicators, at least for Aleutian-Pribilof villages. Forecastable time series of these indicators are available only for Nikolski and Unalaska, however. Four-year changes in total employment and wages for these two villages are projected to be:

	Employment	Wages
Nikolski	-26.6%	+ 26.1%
Unalaska	-31.4%	+303.4%

In both villages, total employment is expected to drop over the next four years. The reader should bear in mind that covered employment for which statistics are available exclude commercial fishing outside of processing, listed in the manufacturing category; as such these figures represent forecasts of employment apart from commercial fishing; for Unalaska, a site that may experience fisheries growth, this means that other employment is expected to diminish. This change is expected to produce severe social displacement, of course. It is interesting that, even though total employment will decrease, total wages are expected to increase. This is a result of inflation. Historically, wage inflation in Unalaska has outpaced wage inflation in Nikolski and this is likely to continue for the next several years.

These village level employment statistics are most interesting when interpreted in the context of the analogous regional level statistics. Here we see that the village level economy is expected to behave exactly the opposite of the regional level economy. This underscores the fragile validity of the regional level data but also illustrates that a phenomenon operating at the regional level need not necessarily operate identically at the village level.

4) Welfare Payments

Our most complete set of village level indicators are the time series on welfare payments (AFDC and- APA). Given the nature of employment in the NANA region, welfare payments are probably a significant factor in the village level economies: and given the incipient "industrial" nature of the Aleutian-Pribilof regional economy, welfare payments may prove to be an important social indicator for these villages as well.

For the NANA region villages, four-year growth in AFDC and APA payments are:

	AFDC	APA
Kiana	+ 45.2%	+ 41.0%
Kotzebue	+ 58.0%	+ 57.6%
Noatak	+ 31.7%	+ 75.7%
Selawik	+ 30.9%	+ 53.7%

Substantial growth is anticipated in all four communities, with the greatest growth expected in Kotzebue. The growth in number of recipients is not insubstantial but, strictly in dollar terms, the annual level of payments for these villages in 1986 is expected to exceed $1.16 million.

For the Aleutian-Pribilof villages, growth in welfare payments is expected to be mixed and modest, at least compared to the NANA region villages.

	AFDC	APA
King Cove	+55.4%	- 96.5%
Nikolski	Unavailable	+ 27.8%
St. George	-76.9%	Unavailable
Unalaska	- 1.6%	+ 88.4%

Several villages are actually expected to decline in terms of this indicator. The gross percentage changes in the Aleutian-Pribilof villages should not be misinterpreted. These changes are due largely to the relatively low level of welfare payments in these villages. The level of welfare payments in 1986 for these four villages in fact is not expected to exceed ten thousand dollars.

The stark difference between the NANA and Aleutian-Pribilof regions on these indicators hints at their value as social indicators. In the NANA region, welfare payments are a significant proportion of the village economies, so any unexpected change in these indicators--increases or decreases--will impact the village economies. In the Aleutian-Pribilof region, in contrast, welfare payments have been historically trivial, due presumably to the nature of the regional economy. As noted, however, the incipient "industrial" nature of the regional economy makes these villages particularly sensitive to the social trauma associated with unemployment. Given the very low level of welfare payments in these villages, sudden increases in unemployment should be easily detected as increases in welfare payments. In either case, we suspect that these time series may be excellent social indicators.

5) Social Welfare Cases

A set of indicators related to welfare payments are social welfare caseloads as reported by the Alaska Division of Youth and Family Services, DHSS. For the NANA region villages, four-year growth in these indicators is:

Kiana	+ 44.4 percent
Kotzebue	+ 45.1 percent
Noatak	+ 8.5 percent
Selawik	+ 15.1 percent

And for the Aleutian-Pribilof region villages,

King Cove	Unavailable
Nikolski	Unavailable
St. George	+ 45.4 percent
Unalaska	+ 52.3 percent

The caseload statistics for King Cove and Nikolski are "unavailable" because these indicators are nearly zero for these two villages. No growth is expected in the near future. Otherwise, it appears that Kiana, Kotzebue, St. George, and Unalaska are expected to show substantial growth in social welfare caseloads while the remaining four villages are expected to show little or no growth.

It is not clear how these growth patterns can be interpreted nor how this statistic can be used immediately as a social indicator. Caseloads may be determined to a large extent by policies of the local DYFS office, for example, by reporting practices of the state DYFS office, or by local customs. Nevertheless, it would seem that any sudden changes in this indicator would signal a sudden change in patterns of community "helping". We suspect that this statistic may be a useful social indicator in this limited sense but we would have to have more experience with its behavior over time in order to form a sure judgment.

6) Conclusion: An Aggregate Model

On the basis of this forecasting experience, we can draw several conclusions about future changes in our eight Alaskan villages. Overall, the two regions are remarkably similar in the most general sense. The implication of this finding is that a large number of our social indicators will have literally the same meaning in both regions. There is one important difference, however, relating to regional economies, and one of the eight villages, Kotzebue, represents a special case.

First, in terms of, demographics, we foresee only slight differences in the future of the NANA and Aleutian-Pribilof regions. Classifying the villages by "growth", "no change" and "decline", for example:

Region	Growth	No Change	Decline
NANA	Selawik	Kiana Noatak	Kotzebue
Aleutian- Pribilof		King Cove Nikolski St. George Unalaska	

Six of the eight villages are not expected to change their historical internal growth profiles in the near future; all four of the Aleutian-Pribilof villages fall into this category. Of the four NANA region villages, Selawik and Kotzebue are expected to change in significantly different ways. The internal growth rate of Selawik is expected to increase while the internal growth rate of Kotzebue is expected to decline. When we understand the meaning of internal growth, it appears that, barring any substantial immigration, the social, political, and economic fabric of Selawik will grow stronger and more idiosyncratic. Other things being equal, Kotzebue is the most fragile of these eight cases. Given a decline in its internal growth rate in the near future, the status quo culture could become a minority culture. The social indicators for Kotzebue, in other words, will be more sensitive to external impacts while for Selawik, the

indicators will be less sensitive. We should point out that in-migration to Kotzebue, a potentially de-stabilizing trend, need not consist primarily of non-Natives in order to exert significant impacts. Although substantial non-Native in-migration may occur, it is apparent already that NANA region shareholders residing outside the region, as well as in-migrants from NANA region villages may represent a substantial share of any in-migrant population. Thus, a declining rate of natural increase does not necessarily imply a diminishing "native" population in ethnic terms, but only the potential for a diminished "Kotzebue Native" population. Other villages in the region have long contributed substantially to Kotzebue's population.

When we consider structural change in regional economies, we see significant differences between the two regions. The Aleutian-Pribilof region again shows much long-range stability. Its regional economy in 1980 was dominated by the manufacturing sector and this domination is expected to continue throughout the decade. Similarly, in the NANA region, the 1980 economy was dominated by government employment and we see no evidence of change during the 1980 decade. The economies of the NANA and Aleutian-Pribilof regions are quite different, of course. The Aleutian-Pribilof economy is more dependent on the whims of the market while the NANA economy is more dependent on the whims of Federal, state, and local governments. Nevertheless, both regional economies are" expected to change little in the near future.

Finally, when we consider dependence on welfare programs, the two regions show similar patterns of change.

Region	Growth	No Change	Decline
NANA	Kiana Kotzebue Selawik	Noatak	
Aleutian-Pribilof	St. George Unalaska	King Cove Nikolski	

None of the eight villages are expected to depend less on government welfare in the near future. Kiaria, Kotzebue, and Selawik in the NANA region and St. George and Unalaska in the Aleutian-Pribilof region are expected to grow more dependent in the near future. Noatak, King Cove, and Nikolski are all expected to show no change.

Major differences between the two regions in this respect center on the qualitative aspects of village life. In both regions, the household economies depend heavily on the public sector. Any external intervention that affects the public sector is likely to have major impacts in both regions. The market economy of NANA region is also heavily dependent on the public sector but the market economy of the Aleutian-Pribilof region, in contrast, is heavily dependent on the private sector. We would thus expect any interventions in the private sector (economic recession, for example) to have a strong impact on Aleutian-Pribilof villages but not on the NANA villages, at least to the same extent.

C. Primary Data Analysis Results

1) Introduction

To examine the detailed effects of social, political and economic well-being in the eight villages selected for research, we carried out both focused interviews and structured observations. The structured observations provided an overview of the village content and led to the formulation of hypotheses about potential social indicators. The focused interviews provided the data to operationalize these indicators.

Social indicators, as the term implies, are constructs that are supposed to represent, or indicate something. Unlike direct counts of a person's age, or the number of residents in a household, an indicator is a construct, measured with bivariate and multivariate statistics in this research, which is intended to account for something or something which are not directly measured. For example, the sharing of resources, including income, and the pooling of labor within households and among a wider network of kin and friends may be used to indicate necessity in a malfunctioning economy. Of course, depending on the sample and the technical construct, the variable may be measured and used to indicate the persistence and the proper and expected functioning of the production and distribution sectors for a native economic organization. Because indicators indicate, disputes arise over the adequacy of enumeration measures and whether the measure that is employed is a valid indicator of the theoretical construct we wish to measure.

At the outset, the research team made certain assumptions about the kinds of subsistence, economic, family-household, political, and religious information that, when measured with

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See Chapter III for a definition of ordinal scale. In brief, ordinal scale means that a class of mutually exclusive and mutually inclusive phenomena, such as "marriage stability", can be measured for any sample in which marriages occur, and that the categories (i.e., attributes or variates) of the variable are ordered from low to high, or high to low, or increasing to decreasing, or decreasing to increasing with respect to the degree to which they possess a certain characteristic, yet one cannot measure exactly how much of the characteristic is possessed.

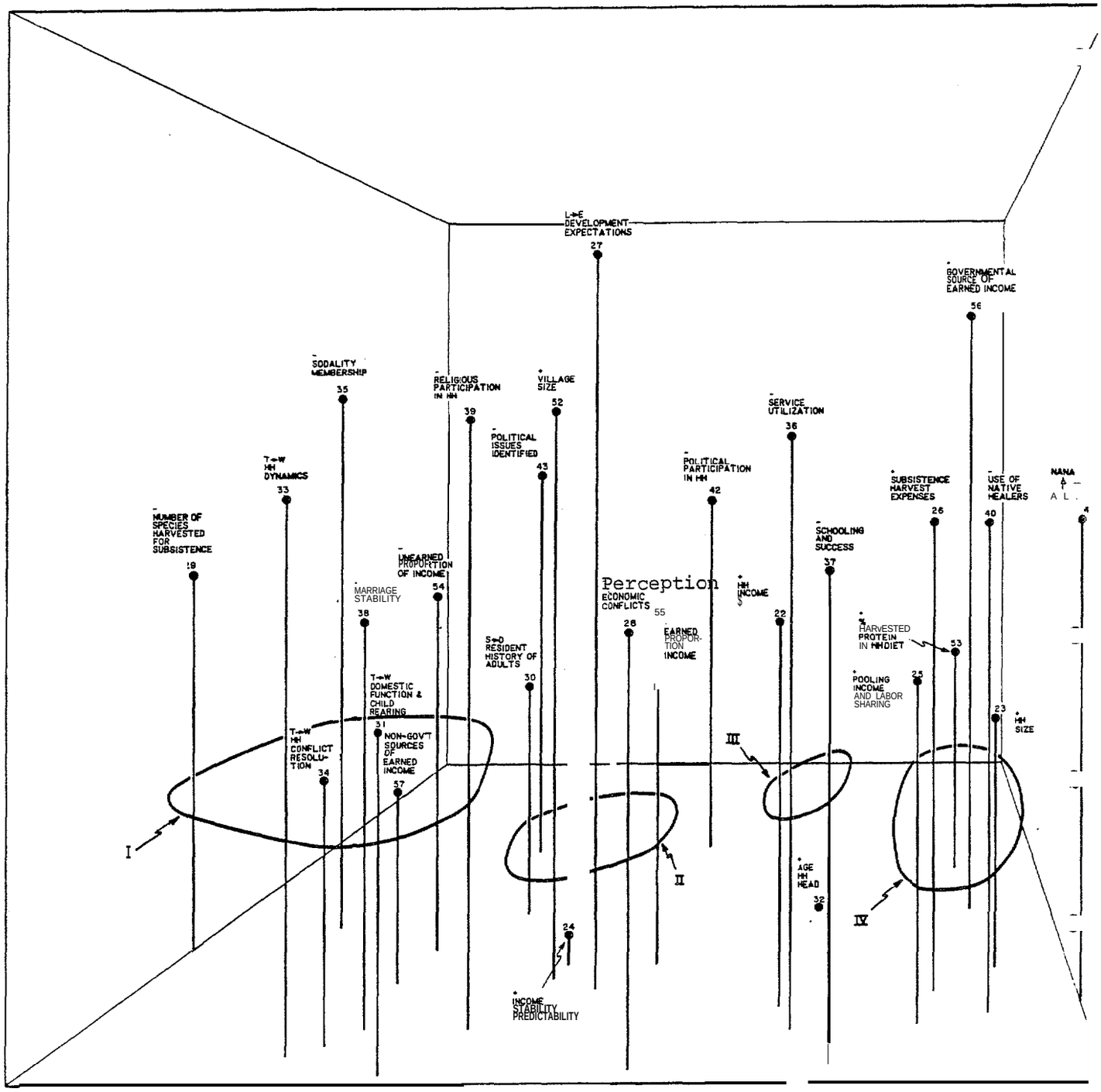
multi variate methods, would indicate the nexus of native society and culture and allow us, by exercising comparisons and controls on synch ronic data (timeless state data), to form concluding hypotheses about the well being of native communities and the ways in which native communities will respond to changes in the future. It was our intention from the beginning to determine by formal means those central items in groups of related variables (determined statistically) which could serve as social indicators in future studies. Yet to know whether the variables that we have defined and measured are valid* indicators of the social and cultural phenomena that we have measured synchronically, all of the variables analyzed in this study, with the exception of those that proved to be constant hence non-distinguishing, must be restudied twice. Tests at three points in time (To, T_1, T_2) are required to determine the validity and reliability of our selected indicators of change, i.e., whether these variables interact as we hypothesize that they do, or do not so interact, or do so, but for different reasons than we have hypothesized.

In the succeeding analysis, four three-dimensional figures are presented, Figures 31-34. The matrices of proportional reduction of error statistics on which these three-dimensional, multi variate, non-metric solutions are based are also given, along with the ordinal solution among data acquired through interviews of household respondents in eight villages (Figure 31), and the ordinal solution among data representing institutional variables for villages and regions (Figure 34). The variables represented in Figures 32 and 33 have been dichotomized (each variable was altered so as to comprise two attributes) in order to provide explicit tests that could not be made on the ordinal variables as originally coded and rated. The matrices for Figures 32 and 33 are located in Appendix C inasmuch as these figures are two different versions of Figure 31. These figures and their associated matrices show clusters of variables which lead to the selection of potential indicators as described below.

*valid in the sense that the relations between those variables and other variables with which they are associated are statistically real, i.e., when the indicator varies, the variables with which it is associated vary, and determinate i.e., no other source of influence accounts for the relations among those variables.

FIGURE 31

Relations in three dimensions among 28 ordinal variables measuring subsistence, economy, households, religion, and formal institutions in the NANA and Aleutian-Pribilof regions, Alaska. 1981-2. Minissa* applied to Gammas (8). Co-efficient of Alienation = .20. (25 iterations).



LEGEND

+ Increase of variable property from low to high.

- Decrease of variable property from high to low.

T→W= Change of variable property from tradi-tional to Western.

L→E= Change of variable property from local to external

S→D= Same village or subregion to different region

2) Cluster I: Traditional Subsistence, Household and Social Organization. Some Modifications to the Western Industrial Model

In brief, the Western industrial model presumes that individuals will strive to achieve; economize their resources so as to maximize the benefits for themselves and their families; delay gratification so as to invest in the future; form into ever smaller family-household units (currently the trend is toward conjugal pairs, single persons living alone, and same sex pairs); and perform few domestic functions in the household as formally organized institutions assume many of those functions (education, health, financial assistance, counseling, and conflict resolution). The model favors personal solvency and narrow responsibilities over wider obligations and communitarian practices. Mobility, too, that is, relocating self and family for economic reasons is expected in the Western industrial model.

In Cluster I many of the variables are scaled from traditional practices to Western practices. Western is measured by seeking formal resolution to conflicts within the household through the intervention of service institutions, including police; child-rearing practices which are verbal, directive, and employ punishments; the use of Western gender distinctions in and out of the household; the maintenance of structured nuclear family households in which there is little change of personnel, and whose members are expected to comply with behavioral rules; and increasing marriage stability in which divorces and separations are infrequent (a feature of the Western Industrial model during the early stages of its development).

Nine variables are located in the left front quadrant of the box ((a) V31, 34, 54; (b) V38, 54; and (c) V29, 33, 35, 39). Whereas the nine form a closely related cluster, height separates the nine, into three internal sets (a, b, and c) and serves as well to show relations to other variables at similar height dimensions to their own throughout the space. That is to say, roughly, that the first two dimensions organize most similar variables into proximate locations, while height shows mediating connections, as well as further internal differences within the cluster. Although synchronic, we interpret Cluster I to

represent a major set of variables depicting a partial ordering* that has been occurring since implementation of the Alaska Native Claims Settlement Act, if not before.

Cluster I comprises four central variables, household dynamics, household conflict, marriage stability, and household domestic functions and child rearing; and five variables somewhat more distant, income, subsistence harvests (number of species harvested of fish, birds, wild plants, land and sea mammals), sodality memberships, and religious participation within the household. The relations among these variables should be understood as follows: some native households have adopted many features of family economics and social structure that are consonant with Western Industrial society, while many other households-- the majority--have not. Nevertheless, the majority of households have not been affected by the emergence of native corporations within their regions, increased bureaucratization and administration, increased travel, and the local activities of externally-based and controlled corporations. Yet none of the households fully fit the Western Industrial model. To unravel the structured relations within communities among economics, politics, household organizations, and the socio-economic organizations of wider networks of kinspeople and friends will require analysis of all four clusters.

A constellation of Westernized practices occurs in a context where the unearned proportion of the household income (welfare, transfer payments, etc.) is low or absent, where earned income predominantly derives from non-governmental sources (a crucial indicator when region is controlled), and where the number of five categories of naturally-occurring fauna and floral species harvested annually for subsistence is few (less than one species each of land mammals, sea mammals, fish, birds, and wild plants). Members of these westernized households tend neither to be active in modalities (clubs, associations and the like) nor in church or extra-curricular religious activities.

*By partial ordering we infer change from timeless state data in which all things equal and given an indefinite amount of time, we infer that all respondents would change toward the top rank of each variable.

Because the variables are ordinal, they also measure the converse of earned income and Westernization, lumping together traditional households in which conflict resolutions are passive (for example, people might characteristically walk away from conflicts and neither discuss those conflicts or their source); children are indulged and gender distinctions in domestic functions are maintained; marriage partner changes are not uncommon; household compositions change as aged parents, affines, adoptees, distant relatives, even friends (fictive kin) move in and out of fluid households; the number of types of five categories of species harvested for subsistence is two or more for each of the categories (fewer types of species are available on the smaller islands in the Aleutians and Pribilofs); governmental sources of income (public sector jobs) provide the majority of earned income; the unearned proportion of all income is high, and so are sodality memberships and church extra-curricular religious participation within the household.

Regional differences are important in the analysis, as can be inferred from V40 but also from the location of the Aleutian-Pribilof/NANA variable (V_4) on the far right side of the figure beyond Cluster IV. NANA, the second category in the ordinal variable, correlates with the increasing values (higher orders) of the variables in Cluster IV. The Aleutian-Pribilof region correlates with the lower orders and, by interpolation, with the variables in Cluster I (the dichotomous analyses below confirm these relations). The Aleutian-Pribilof region correlates with increasing non-governmental sources of earned income (V57) in Cluster I, while NANA correlates with decreasing sources of non-governmental income. Conversly, NANA correlates with increasing governmental sources of earned income (V56) in Cluster IV, whereas Aleutian/Pribilof does not. Sources of earned income are important: that Aleutian-Pribilof experiences with increased personal financial success through the development of fishing and fish processing since the federal government began enforcing a 200 mile territorial control over waters adjacent to United States land, are different from the NANA region experiences with earned income, which predominantly stems from employment in the public sector, or from government-derived funds which have been available since ANSCA.

Although traditional households occur throughout both regions, the northwestern Alaska Inupiat and the Aleuts of the

Aleutian -Pribilof Islands do not share identical histories or identical traditions. An interesting facet of both traditional and Westernized respondents in the Al eutian-Pribilof region (as inferred from V57 in Cluster I) is that they perceive the benefits from future economic developments and the likelihood of future economic conflicts in the same way: benefits, they aver either will accrue locally or will be shared with outside agencies and firms; control will be exercised locally, or shared with outside firms; and economic conflicts are not foreseen. In the NANA region, on the other hand, the residents of the smaller villages express opinions and perceptions about future economic conflicts and economic benefits and controls that are similar to those expressed by Aleutian-Pribilof residents. The residents of larger villages in the NANA region, especially those whose earned income derives from governmental (public) sources (V56), perceive that the benefits of economic developments will accrue outside the local area, that control will be maintained outside the local arena, and that economic conflicts are between natives and non-natives. Residents of the smaller NANA and Aleutian-Pribilof villages are uninformed and have similar experiences and expectations, whereas those of the larger NANA and Aleutian-Pribilof villages have had different experiences with economic developments, and their opinions reflect their experiences.

Several other variables located across Figure 31 allow us to understand the similarities among residents in the two study regions. Refering as well to the original Gamma scores in Table 86, we seek the underlying principle that links some of these variables from different clusters. Religious participation in the household (V39, Cluster 1), for example, decreases in 56 percent of the cases in which adults in the household have been born and reared in the regions or subregions that are different from the region in which they currently reside (V30, Cluster II), 55 percent of the cases in which publicly available federal or state supported services, such as welfare, financial planning, and family counseling are either seldom used or not used (V36, Cluster III), 52 percent of the cases in which residence is in a large rather than a small village (V52, Cluster II), and 45 percent of the cases in which the amount of household income to harvest naturally-occurring subsistence resources increases (V26, Cluster IV).

The underlying construct we perceive is that some NANA and Aleutian/Pribilof residents in large villages to which they have

TABLE 86

ORDINAL VARIBLE LIST; GAMMAS FOR 28 VARIABLES

ORIGINAL COEFFICIENTS

COLUMM - V	V4	V22	V23	24	25	26	27	28	29	30	31	?42	33	34	35	36	37	38	3 s	40	42	43	52	53	54	55	56	57
RoW -4	4.0																											
ROW -22	0.28	0.0																										
RoW -23	0.42	0.46	0.0																									
ROW . 24	-0.31	-0.03	-0. 25	0.0																								
ROW - 25	0.38	0.43	0.49	0.11	0.0																							
ROW = 28	0.41	0.40	0.47	0.0 s	0.49	0.0																						
ROW -27	-0.43	0.41	-0.08	0.35	0.21	0.33	0.0																					
ROW - 26	0.23	0.93	0.16	0.28	0.32	0.08	0.30	(4 . 0																				
Row -29	-0.83	-0.48	-0.84	0.04	-0.46	-9.	78	0.22	-3	43	0.0																	
Row - 30	-0.48	0.11	0.09	0.18	0.03	0.41	-	0.04	0.17	0.17	0 . 0	.																
ROW = 31	-0.24	0.25	-0. 20	0.02	- 0 . 3 1	' - 0 . 8 ?		-0.18	0.53	' 0.13	0.19	0.0																
ROW - 32	' 0 . 0 8		-0.09	0.28	0.19	0.05	0.06	-0.09	0.19	- 0 .	19	-0.09	-0.29	0.0														
ROW •33	-0.48	O.II'	O. Ss	0.30	-0.23	0.12	0.26	0.94	0.4?		-0.21	0.71	-0.39	0.0														
Row - 34	-0.36	0.27	0 . 0	-0.10	-0.1 2	-0.05	' 0 . 0 S		0.36	0.39	0.35	0.93	0.23	0.93	0.0													
ROW - 35	'0.	51	-0; 33	-0.44	0.12	-0. 37	-0.92	0.16	0.08	0.36	0.22	0.01	-0.4?	0.40	-0.23	0.0												
ROW - 36	. 1.00	0.69	*0.40	6*1	I 0.41	0.47	0.69	0.?4	-0.11	●	o*	0.74	-0.15	0.43	. 9.44	-0.94	0.0											
Row - 37	·0.37	0.47	0 . 1 0	-0 . 1 0	0.47	0.63	0.38	8 . 4 4	-0.41	0.06	0.01	0.01	0.06	0.15	4 . 1 1	0.62	0.0											
RoW •38	- 0 . 4 4		0 . 3 4	- O n	0.08	0.14	-0.06	0.12	1.00	0.86	0.32	0.03	-0.32	0.71	0.31	0.30	0.41	0.09	0.0										
ROW - 39	0.13	0.02	-0.09	0.04	0. 26	0 . 4 S		0.34	0.12	0.13	0. 34	0.33	-0.37	0. 71	0.43	0.39	0 . 8 9	0.31	0. 76	0.0								
ROW = 40	1.00	0.63	0.72	-0.13	0.79	1 . 0 0		-0.03	0.28	-0. 76	-0.36	-0.23	-0.16	-0.16	-0. 86	-0.47	1.00	0.78	-0.33	0.50	0.0							
RoW -42	-0.09	'O.	06	-0.	24	-0.04	-0.16	0.27	0 . 0 4	-0.33	-0.01	0.06	0.22	0.06	0.08	-0.28	0.0	0.03	-0.	32	0.19	0.07	o. 0	0.0				
ROW = 43	-0. 43	-0.13	"-Ott	-0. 29	-0.45	-0.45	0.13	-0.11	0.36	0. 29	-0. 53	+0.04	-0.14	. 0.29	0.38	-0.48	-0.	79	-0. 24	● el,	-0.62	0.37	0.0					
ROW - 52	- 0 . 1 0	0.41	-0.11	-0. 12	0.30	9.49	0.70	0.33	0.21	0 . 3 4	-0.30	-0.37	0. 72	0.20	0.17	0.36	0.37	0.43	0.33	0.31	0.38	0.43	0.0					
Row - 53	0 . 1 S		0.35	0.	23	-0.01	0.09	0.11	-0.32	-0.06	-0.69	-0.01	-0.26	0.46	-0.43	-0.49	-0.28	0.09	-0.02	-0.56	-0.43	0.19	0.40	-0. 11	-0. 50	0.0		
Row -54	'0.16	".0.43	-0.04	0.20	0. 20	-0.44	0.37	-3.03	0.16	0.48	0.22	-0.48	0.11	0.	S1''	6.44	-0.13	0.03	0.47	0.28	-0. 24	-0.0?	0.23	0.,	s	-0.07	0.0	
ROW - 55	0.34	0.14	0.21	0.09	' 0.43	0.27	-0.14	0.22	-0.48	0.30	0.70	-0.48	-0.23	-0.09	0.39	0.16	0.44	1.00	0.23	0.44	0.18	0.26	0.34	0.19	too	0.0		
Row - 56	0.13	0.04	0.08	-0.34	0.08	0.06	0.07	0.03	-0.41	-0.23	-0.26	-0.42	-0.07	- 0 . 4 4	-0.11	0.80	-0.14	-0.23	-0.18	0.43	'0.02	0.23	-0.28	0.1?	-0.23	0.05	0 . 0	
ROW - 57	-0.39	0.33	0.10	0.01	0.27	0.06	● kJ$	-0. 22	3.30	0.40	0.43	0.09	0. 58	0.46	0.0	'-1.00	0.36	0.71	0.29	' 0 . 0 4	0.06	0.03	0 . 4 S	-0.38	0.76	1.00	-1. 00	0.0

Source: Consultant's calculations based on primary data collection.

TABLE 87

GUTTMAN-LINGOES' SMALLEST SPACE COORDINATES FOR M = 3 (SEMI-STRONG MONOTONICITY), DERIVED FROM GAMMAS FOR 28 ORDINAL VARIABLES.

Variables	Dimension 1	2	3	
4	100.000	-50.389	0.567	94.939
22	37.074	-54.712	-21.386	36.500
23	84.932	-30.843	-46.959	85.321
24	-11.151	-26.234	-94.294	84.253
25	66.021	-63.467	-29.522	67.257
26	68.628	-45.315	3.921	64.446
27	- 3.456	-34 . 130	57.700	71.104
28	13.745	-96 . 631	-17.346	61.275
29	-100.000	-17.250	-11.656	108.667
30	-27.270	2.815	-42 . 662	59.841
31	-33.640	-100.000	-36.401	79.560
32	43.029	9.337	-100.000	104.787
33	-54.181	-83.833	9.739	80.902
34	-47.100	-79.036	-46.918	77.265
35	-71.188	- 1.517	31.571	96.203
36	39.558	-69.634	19.733	56.919
37	46.231	-89.000	- 4.811	66.472
38	-41.191	-66.638	-13.167	57.200
39	-23.541	-68.635	23.160	57.349
40	82.416	-58.474	2.335	80.073
42	10.062	46.136	1.778	83.349
43	-41.349	51.442	12.441	102.954
52	-16.844	-34.357	29.531	48.447
53	78.308	32.374	-30.962	100.336
54	-44.262	-16.315	-18.499	55.240
55	9.521	-26.839	-23.999	14.774
56	78.858	7.154	51.231	105.287
57	-45.935	-40.786	-57.942	69.907

Note: Guttman-Lingoes coefficient of alienation = 0.20628 in 25 iterations. Kruskal's Stress = .018727.

Source: Consultant's calculations based on primary data collection.

migrated, most probably possess saleable skills, are employed, reject some western practices and modify others. For example, they require few public services, perhaps even eschew such services, are not active participants in organized religion, and are active in extractive subsistence economies. This set of relations concurs with our expectations that subsistence economy is very important, and that mobile native households have not adopted western practices in toto. Indeed, the relations between V39 and V26, 30, 36, 52 help to understand the relations in Cluster I, while not contradicting them. Religious participation in the household is better accounted for by its relations to Cluster I variables, than to variables outside the cluster. Religious participation decreases in 75 percent of the cases in which family nuclearization and stability increases, 76 percent of the cases in which marriages are stable, and 53 percent of the cases in which non-governmental sources of income increase as proportions of total household income.

Yet, when we assess all three dimensions we understand the relations among mobility, employment or income not dominated by governmental sources, residence in large villages, marriage stability, stable nuclear family households, modest religious participation, and persistence at subsistence resource harvesting. The third dimension, therefore, demonstrates many strong relations among variables that are not located in close proximity in the clusters, while at the same time showing relations through height, that differentiate among variables in the same cluster.

3) Cluster II: Ideological Structure and Dependency: The Mitigating Effects of Experience on Perceptions of the Western Industrial Model of Economic and Social Change

Seven variables located in the center of the box form Cluster II (a) V24, (b) V30, 28, 55, and (c) 43, 52,27), indicating perceptions and knowledge borne of experience of native persons about contemporary economic and political issues. These perceptions and experiences, we aver, portend increasing dependence on earned income (V55) (which is perfectly correlated with increasing governmental sources of earned income) (V56); increasing stability and predictability of income for persons in one way or another dependent on regular salaries ultimately derived from government (public) funds (V24); residence in large

villages that are becoming administrative and social service centers (V52); and immigrants to large villages who are reared in different sub-regions or regions than the one in which they currently reside (V30). In this context, the growth of government has stimulated migration, and increased the proportion of earned to unearned income, but such growth has also created dependencies on publicly-derived funds--the public sector. These factors entail expectations among persons in large villages and those who earn the largest proportion of their income, that economic conflicts are principally between natives and non-natives (V28), and that the control of, and financial benefits from present or future economic developments within the region or village will be vested in and accrue exclusively to companies located outside the region, providing a mix of benefits to local residents and externally-based firms (V27)*. Inasmuch as expectations for development and perceptions of economic conflicts fit the empirical model of translational corporate growth, particularly economic growth related to energy developments, it appears contradictory that correct identification of political issues (V43) decreases with village size and with other variables in the cluster. The probable explanation of this phenomenon is that a large village of 2,000, comprising immigrants as well as long term residents, is less a community, i.e., the residents share less basic information about their community, fewer values, feel less attached to it, and are less animated by the panoply of political issues that are raised by interest groups, elected and appointed officials in the village, than is true for the smaller villages.

On the other hand, the many variables in Cluster II are ordinal and should be interpreted to mean that residents of small villages subsist on less stable and less predictable income (transfer payments, remittances, subsistence resource extracting, and the like), or unstable and predictable income (seasonal); receive a small proportion of earned income; were born and reared in the village or sub-region in which they currently reside; correctly identify several political issues; do not perceive economic conflicts either between natives, or between natives and non-natives; and expect that any and all economic

*We call attention to Cluster 1. in which several of these variables correlate negatively with perceptions of economic conflicts (V28) and development expectations (V27).

developments will be controlled locally, where benefits will also accrue, or will be shared with absentee owners. In short, these variables measure the growth of dependency on public funds and the concomitant growth, through experience, of knowledge about the locus of economic power, the value of schooling in achieving success*, and the nature of economic conflicts. The traditional features of native households and the perception and opinion of members of such households appear to be pinned to dependence on traditional resources and as such, with a few important exceptions, link small villages among the NANA and Aleutian-Pribilof regions.

4) Cluster III: Increased Income and Increased Skepticism

Cluster III is a tight distribution of three variables (Ys among the three average 66 percent reduction of error) household income (V22), public services utilized by households, such as family planning, counseling, financial assistance and so forth (V36), and opinions about the relation between schooling and success as an adult (V37). Age of household head (V32) does not scale and is valueless as an ordinal variable. It is evident that as income increases the use of public services decreases as does the opinion that schooling correlates with success. Therefore, the most financially successful natives, regardless of the sources of their income, are skeptical of the value of education, but that is not to say they eschew education. Field research revealed people to be extremely concerned about schools, school board actions, and curriculum. All things being equal, that is to say, if nothing intervenes to change the proportions of government funded employment (sources of earned income) to non-government, it is likely that household income will indicate the uses of public services and a rather crucial ideological variable, opinions about schooling and success. Indeed, opinions about the poor fit between schooling and success seem to be in

*It is relevant to point out that in 64 percent of the cases people who perceive economic conflicts between natives and non-natives also perceive either no association, or an occasional association between formal schooling and success (V37). V37 is located in Cluster III.

large part a corollary of high income, whether or not it derives from government (V56) or non-government (V57) sources. In order to interpret the meaning of this cluster we must analyze some relations among the clusters and, in particular, income and the sources from which it derives. The central importance of household income and its value as an indicator will be discussed following the assessment of Cluster IV.

5) Cluster IV: The Tie that Binds. The Persistence of Traditional Subsistence Practices and the Organization of Economic Labor and Distribution

The six variables located in the far right center of the box, in metaphorical terms, are the cement that holds together the structure. That is, although residents of big villages gain less of their diets from naturally-occurring resources, are more apt to be gainfully employed or self-employed, and are more apt than residents of small villages, especially NANA villages, to maintain nuclear households and observe many Western customs, four variables in the cluster--practices of' income pooling, labor sharing, and resource giving within and beyond households (V25), amounts expended on extracting naturally-occurring and renewable resources for subsistence (V26), the percentage of harvested protein in the diet (V53), and household size (V23)--bind the Westernized, economically solvent households together with the more traditional households, including the less solvent, welfare and transfer payment-dependent versions.

As income increases, especially governmentally derived income, household sizes first accelerate to about 6 persons, then decelerate in relation to income, households spend more to extract subsistence resources, harvested protein comprises more of the household members' diets, and more types of species are harvested* (gammas for V29, changing signs to positive, are .69 (V53), .78 (V26), and .46 (V25)).

*Controls for the availability of species must be exercised in subsequent diachronic tests so that the Aleutians and Pribilofs are not rendered incomparable, speciously so, to the NANA region.

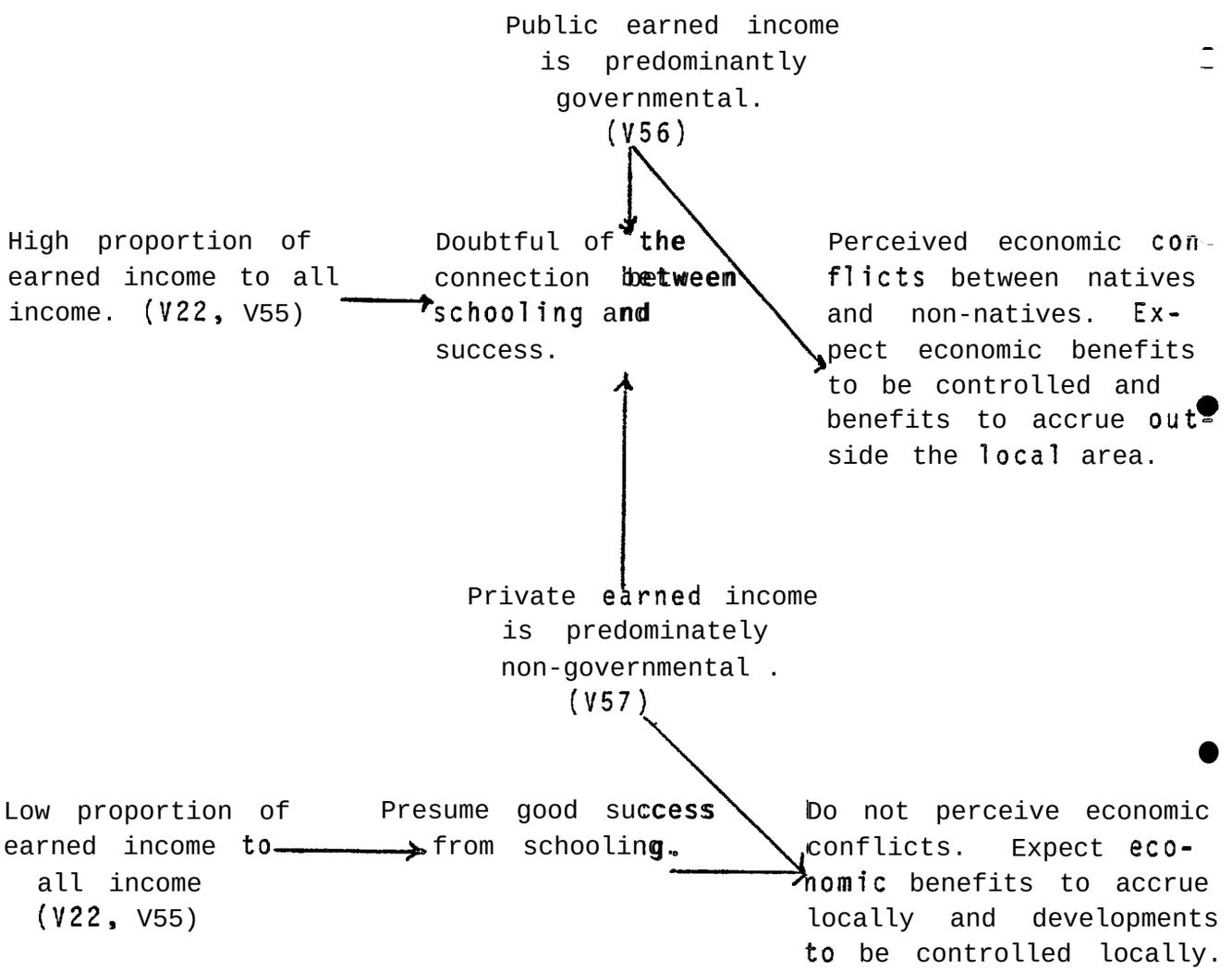
Household size, in conjunction with income, is important. The smallest and largest households possess the least income, per capita and absolutely, earned and unearned. They also have the least to give to others, but through kinship and community friendship networks receive goods, food, income, and labor from others such that those with the most share with those that have less. In the largest households (30 percent larger than 7, 11 percent larger than 11) not only is there considerable pooling of income, sharing of resources and skills, but all but 5 percent of these households participate in wider sharing networks. We did not measure the prestige that accrues from giving, but field research indicates that high prestige is accorded to generalized givers (people who give much more than they receive), that mental and written records of gifts, labor, and resources are not kept, and that neither repayment nor reciprocity is expected from recipients. Furthermore, no stigma is attached to the generalized recipient, or persons and households that receive more than they can give. The aged, in fact, are the first served, and often they receive so much beyond their needs that they redistribute some of the items that are given to them.

Use of native healers (V40) is exclusively a trait of NANA region residents. NANA region residents, including those in large villages, correlate more highly with the Cluster IV variables than do residents of large villages in the Aleutian-Pribilof region.

6) Relations Among the Four Clusters: Public and Private Sector Economies and the Importance of Household Income

It is evident that there are differences between communities, especially in how individuals perceive education, economic development, and the like, depending on whether they reside in small villages or large villages, and whether they are dependent on public or private sector sources of income. When we assess household income we see that relations between household income and expectations for success from schooling do not hold for the relations between household income and expectations for economic development, and for household income and perceptions of economic conflicts. On those topics there is a clear break between Cluster I and Clusters II and III. For instance, when we use a gross measure, such as the proportion of earned income to

all income, regardless of its source--public or private--we see that as the proportion of earned income increases (V55), development is expected to be controlled by and to be beneficial to externally-based organizations (V27). In these cases, economic conflicts are thought to be between natives and non-natives (V28). Yet when we control for the source of income, as non-governmental (private) sources of earned income increase (V57), expectations are that developments will benefit local populations (V27), and economic conflicts are seldom perceived (V28). The distinction is important because it yields three way contrasts, to wit:



Dependency on governmental (public) funding for earned income may or may not be perceived by respondents so dependent, yet differences in opinions and expectations for economic development and economic conflicts clearly discriminate between persons whose earned income derives from either governmental or non-governmental sources. Let us turn our attention to the role of household income in the organization and persistence of the Eskimo and Aleut domestic economy--labor, distribution, and consumption.

Household Income as an Indicator of Native Extraction, Distribution, and Consumption

Household income (V22) occupies a prominent position in Cluster III. Service utilization (V36) increases as income decreases, and vice versa, and the opinion that there is a good fit between acquiring a school education and future success (V37) also increases as household income decreases, and vice versa. But household income is also related in interesting ways to at least 11 other variables in the 28 variable matrix, although only five of those variables yield gamma scores higher than .60 when correlated with household income. Because household income accounts for so much variation in so many variables, including three key variables in Cluster IV (V23, 25, 26), and because a couple of variables account for so much variation in household income (particularly V24 on income stability and predictability and V25 on income pooling, resource gifting and using, and labor sharing), we provide some of the tables that are of unusual concern here. It is apparent that income is distributed curvilinearly with many of these variables, and that curvilinearity is important in our assessment of household income as a social indicator of Alaskan native society.

In Table 88 we see that the ordinal relations between household income and household size (V23) is relatively high (γ =.46) but that the greatest number of frequents fall in the second column and the second row. The relation is curvilinear, with both household income and household size accelerating, then flattening. Thus household size increases as income increases to about $30,000 annually, but proportionally more higher incomes tend to be gained by households of 6 persons or less.

TABLE 88

HOUSEHOLD SIZE (V23)

Household Income (V22) $	1-3 %	4-6 %	7-10 %	11+ %
0-22K	19	16	3	3
20-30K	3	19	11	5
30+K	3		5	3

γ = .46
$\eta^2 yx$ = .38
$\eta^2 xy$ = .39

Some understanding of income is gained by correlating amounts of income with stability and predictability as in Table 89. Here we see that the model type of income is seasonal (unstable, yet predictable), yet seasonal income is disproportionately represented in the above $30K category. These high income levels reflect the large incomes that are earned from salmon fishing and processing, seal harvesting sales and subsidies, and some other intensive seasonal activities. The relations are curvilinear, yielding a weak gamma of -.03. But when combinations of stability and predictability vary, income varies 55 percent of the time ($\eta^2 yx$ = .55). Whereas incomes do not explain stability or predictability, highest incomes stem from seasonal harvesting and from the selling of some of the kinds of renewable resources on which native Alaskans have subsisted for millenia.

TABLE 89

INCOME STABILITY AND PREDICTABILITY (V24)

Household Income (V22) $	Unstable Unpredictable %	Unstable Predictable %	Stable Unpredictable %	Stable Predictable %
0-20K	14	8	0	16
20-30K	5	19	5	8
30+K	0	22	0	3

γ =
$\eta^2 yx$
$\eta^2 xy$

In the following tables (90, 91) we see two important relations with household income that are contradictory to the model of culture change that is usually associated with the diffusion of a western industrial economy. In the first (table A3) we learn that the more people earn, the more widely they distribute their income and share their services, resources, and labor beyond their own households. Those who possess the least income have the least to give and are least able to travel, being closer to the edge of subsistence. Two-thirds of those households tend to share and pool resources and labor within their households, yet the other third is linked in wider networks of sharing and pooling. Rather, then, than dissociating from and withholding help from others, and rather than saving so as to reap future profits to be used by and for themselves, Alaskan natives at all income levels are drawn into sharing and helping networks. Those at the botton of the earning pyramid receive much more than they can give. Although curvilinear, each variable predicts the other very well.

TABLE 90

POOLING INCOME AND LABOR SHARING (V25)

Household Income $	Local Household Pooling & Accumulating %	Local Pooling & Distribution Beyond Household %	Local & Regional Pooling & Distribution %
0-20K	27	11	3
20-30K	11	11	14
30+K	0	if - - - - - - - - - a	

$\eta^2_{yx} = .62$
$\eta^2_{xy} = .55$
$\eta^2_{xy} = .51$

The second contradiction to western industrial expectations is that the higher the income the greater the expenditure in the harvesting of subsistence resources (Table 91). So rather than

invest in non-subsistence pursuits in order to liberate - themselves from subsistence tasks, natives invest so as to be successful at subsistence pursuits and the corollary, sharing their proceeds, equipment, and skills with others (Table 92).

TABLE 91

SUBSISTENCE HARVESTING EXPENSES (V26)

Household Income Income $	Low o-9% Income	Medium 10-19% Income	High 20+% Income
0-20K	26	10	0
20-30K	26	13	3
30+K	3	16	3

γ =.60
η^2_{yx} = .43
η^2_{xy} = .45

TABLE 92

SUBSISTENCE HARVESTING EXPENSES (V26)

Pooling Income & Labor Strategies (V25)	Low %	Medium %	High %
Local Household Pooling & Accumulate	36	3	0
Local Pooling and Distribution, Household and Beyond	13	13	7
Local and Regional Pooling & Distribution	7	23	0

γ = .69
η^2_{yx} = .60
η^2_{xy} = .56

These native practices, traditional we aver, cut across all income levels and are principal indicators of the persistence of traditional society, particularly kinship, friendship and community obligations to help, to share, and to gain livelihoods from the. natural resources. The more people invest in subsistence harvest and the wider they share the proceeds, the greater -the number of kinds of species that they harvest (changing the signs of β s, V29 x V28 = .78, V29 x V25 = .46).

Certain native opinions and expectations mentioned earlier that also run counter to the ideology of western industrial capitalism, but not to its practice, also serve to indicate significant features of NANA and Aleutian-Pribilof understanding of economic development and the roles of Alaskan natives within such development. A constellation of factors encompassing traditional practices of sharing, harvesting subsistence resources, and investing to do both, is related to opinions and expectations about economic development (V27, V28). For both, as income increases people are more apt to expect that local economic development will benefit and be controlled by companies located outside the local area (Table 93) and also more apt to perceive economic conflicts between natives and non-natives (Table 94). These attitudes and opinions indicate valid experiences as well as preferences to maintain traditional practices even as income, especially income derived from governmental sources, increases. In the short run, both market opportunities and government-funded jobs are recent. In the long run, natives have cooperated in extracting and sharing naturally-occurring resources for mill enia. Market opportunities and government employment come and go, but adaptations to the natural environments of the Arctic and sub-arctic endure.

It is important to note that the highest incomes, in general, are earned by residents of the largest villages, Kotzebue (2,000) and Unalaska (1,300). The former, a NANA village, is dependent on public sector funds, the latter, an Aleutian-Pribilof village, on private sector funds. The next largest villages in our sample from each region, Selawik and King Cove, are similar in economic structures to the largest villages in their regions. Thus, size, we will see is important, but the nature of the source of earned income is even more important.

TABLE 93

EXPECTATIONS FOR DEVELOPMENT (V27)

Household Income $	Local Control & Benefits	Mixed Control & Benefits	External Control & Benefits
0 -20K	6	27	9
20-30K	9	9	18
30+K	0	9	15

γ = .41
η^2_{yx} = .34
η^2_{xy} = .31

TABLE 94

PERCEIVED ECONOMIC CONFLICTS (V28)

Household Income (V22) $	No Conflict	Natives vs. Non-Natives
0-20K	9	3
20-30K	6	7
30+K	2	4

γ = .53
η^2_{yx} = .33
η^2_{xy} = .34

7) Ordinal Dichotomous Relations Among Individual Level Data

The following three dimensional Figures (32 and 33) are supplementary to the preceding analysis and serve to confirm the results obtained there. As such, the figures will be accompanied by very little narrative. The strategy of the analysis is to reclassify the 28 most discriminating ordinal variables (those that provided strongest connections to, or distances among other variables) into dichotomous variables. A dichotomous variable comprises two attributes. In this fashion we can determine the specific relations of a single attribute of subsistence harvesting activities, say, to specific attributes of subsistence harvesting expenditures, such as those that amount to 9 percent or less of a household's total annual income. It would be possible, of course, to recombine each ordinal variable as that every attribute in each variable was paired against all other attributes in that variable. Were we to do so, and consequently analyze the relations of every attribute with every other attribute we would generate about 6,200 PRE values. We elected not to do so if the first two dichotomous analyses supported the generalizations from the ordinal analysis. They do, so we merely point out the highligh s. The tables for Figures 32 and 33 are located in Appendix C following the lists that define the way in which the attributes of the ordinal variables were reorganized or combined to yield dichotomies.

Figures 32 and 33 analyze the "traditional" attributes of most household organizations (child rearing, conflict resolution, openness of structure), subsistence (many species harvested), economic expectation (development benefits, if controlled by locals, no conflicts) and schooling expectation (good fit with success). NANA was selected as the key to testing the fit among these variables. We were not sure whether our concept of traditional was an artifact of the NANA region, or whether traditional, as we hypothesized, fitted with low incomes in both the NANA and Aleutian-Pribilof regions. In Figure 32 we divide household income at $30,000 annually, and we test household size at the model category 4b. We also selected some attributes that we presumed to be predominantly restricted to NANA (e.g., sodality memberships) and some that we presumed to be predominantly restricted to the Al eutian-Pribilof region. In Figure 33 we dichotomized income at the lowest household income level ($20,000K), and selected several attributes that, based on

FIGURE 32

Dichotomous I. High Income. Relations in three dimensions among 28 ordered dichotomous variables measuring subsistence economy, household, religion, and formal institutions in the NANA and Aleutian-Pribilof regions, Alaska. 1981-2. Minissa solution applied to Kendall's Tau. Guttman-Lingoes Coefficient of Alienation K=.19. (25 iterations).

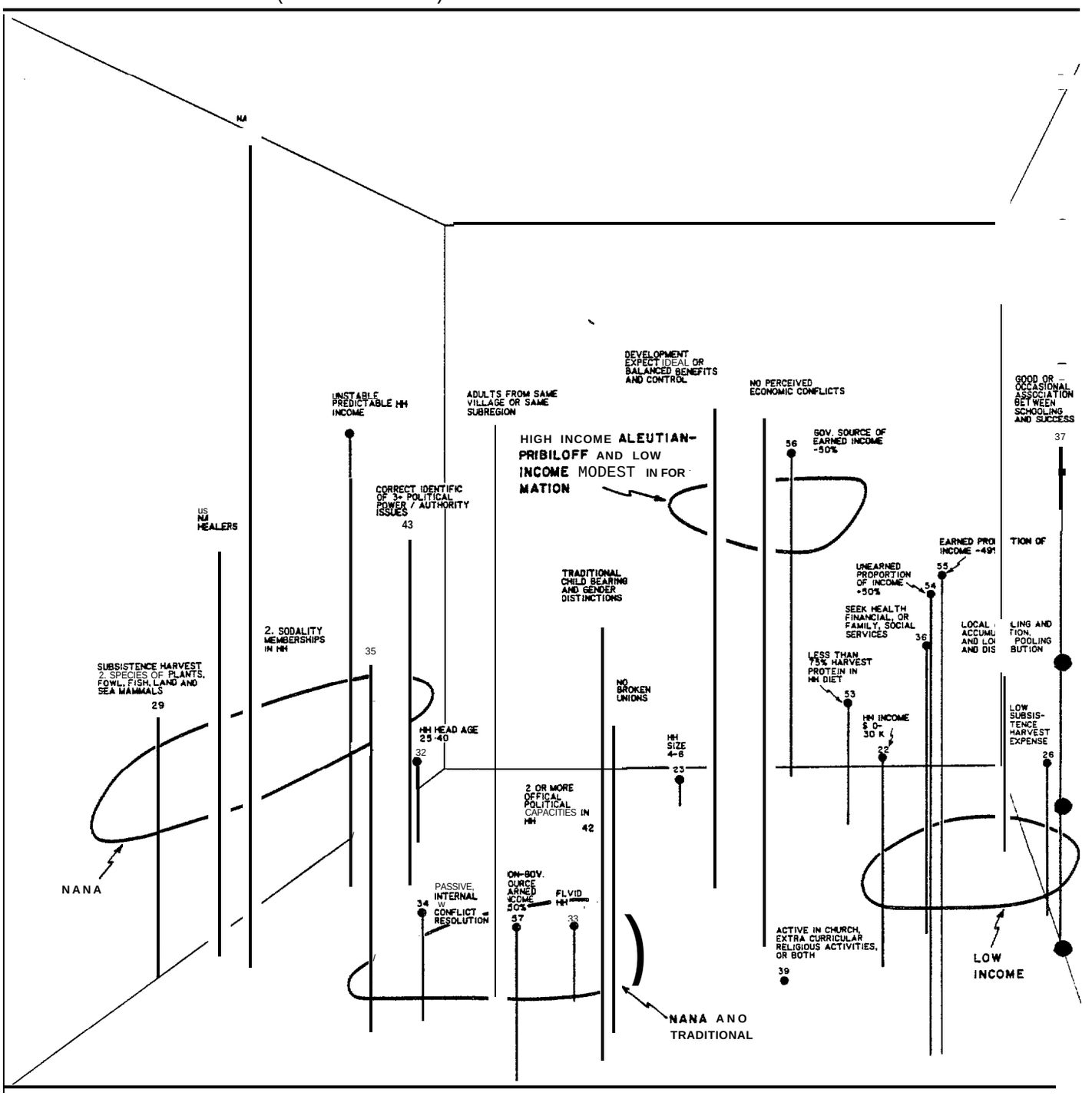
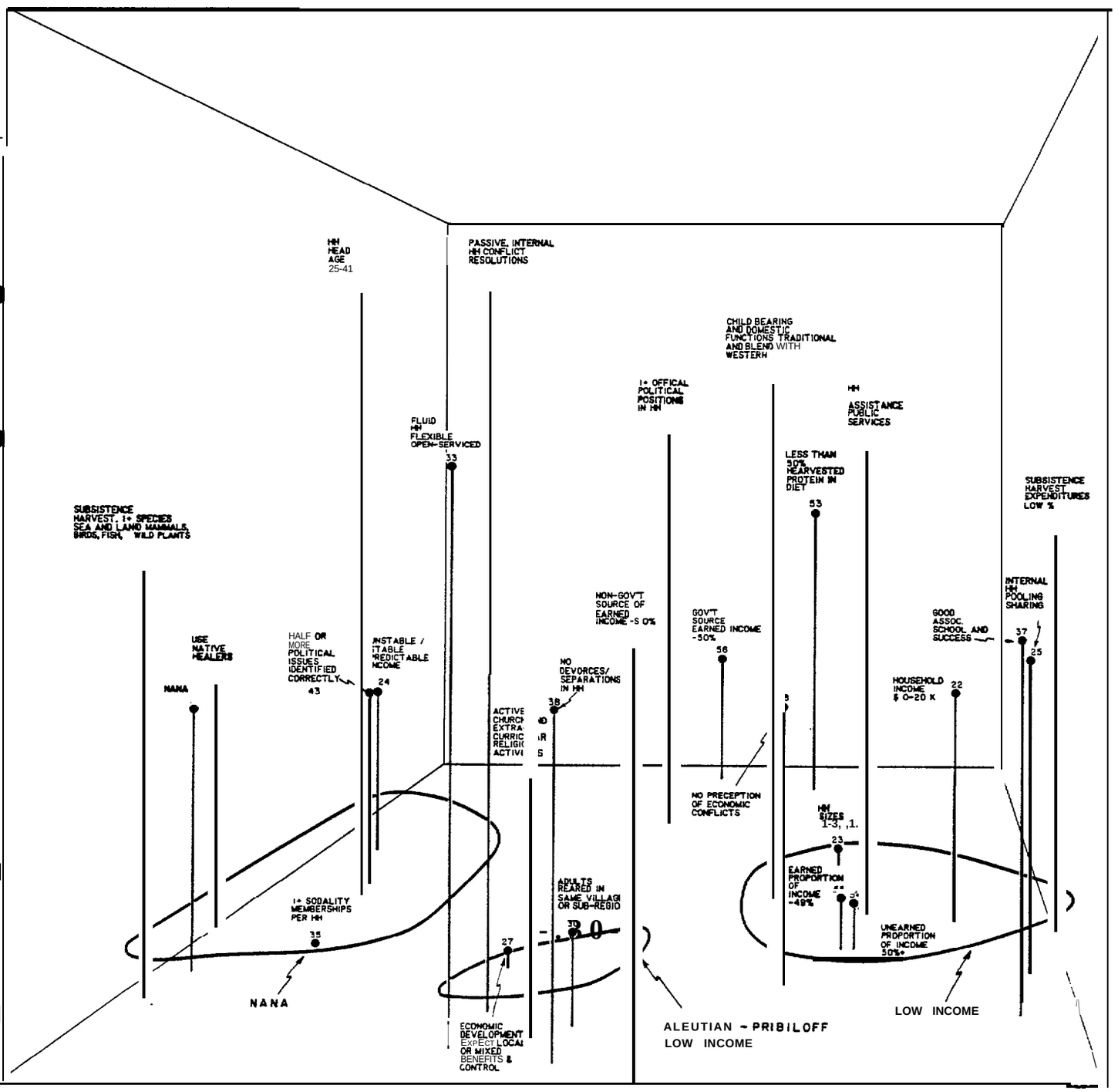


FIGURE 33

Dichotomous II - Low Income. Relations in three dimensions among 28 ordered dichotomous variables measuring subsistence economy, household, religion, and formal institutions in the NANA and Aleutian-Pribilof regions, Alaska. 1981-2. Minissa solution applied to Kendall's Tau. Guttman-Lingoes Coefficient of Alienation. K=.18. (25 iterations) .



our analyses of the bivariate ordinal tables, we thought correlated with that level.

The two analyses yield remarkably similar results, controlling for income (the higher Aleutian-Pribilof incomes appear as distant points for the low income and NANA sets). The left portions of both figures cluster the characteristically NANA traits of native healers, manifold types of species harvested, high subsistence harvest expense (the negative relation appears on the far right side), multiple sodality membership, and politically informed residents; connections are evident to traditional and low income households in NANA and the Aleutian-Pribilof in the front center of both figures; and the far right sections of both figures join together low income households in terms of size, sources of income, sharing patterns, subsistence expenses, and the like. These people are optimistic about schooling; unaware of economic conflicts; have little to share, but share what they have; invest little into subsistence harvest, and seek assistance from public services.

8) Village Institutions: Ordinal Relations Among Village Level Data

The individual level data obtained through interviews of household members have allowed us to interpret variation within and between regions, large and small villages, and households of different income levels. Here we turn our attention to village level data. That is to say, key informants in political, economic, social and health service, and religious institutions in each of the eight villages were interviewed, as were samples of persons who used, or could use, available social and health services.

Striking differences obtain between the NANA and Aleutian-Pribilof regions on the basis of the formal, organized institutions that operate in their respective villages, and the manner in which residents (users and non-users) as well as employees of those institutions perceive the institutions. A few tables from the 272 from which the multivariate solution is derived will be instructive. Inasmuch as each village is tallied by a single frequent, the subsequent tables are based on the sample of eight villages. so N=8. The comparisons, then, are of village topologies. We have expressed frequencies as percents.

Raw counts, or even shadings of the cells from light to dark could serve equally well to express the frequencies. Figure 34 and Tables 95 and 96 provide a three dimensional solution for the institutional level variables (one instance per village), the MINISSA coordinates, and the matrix of Tau scores on which the three dimensional solution is based.

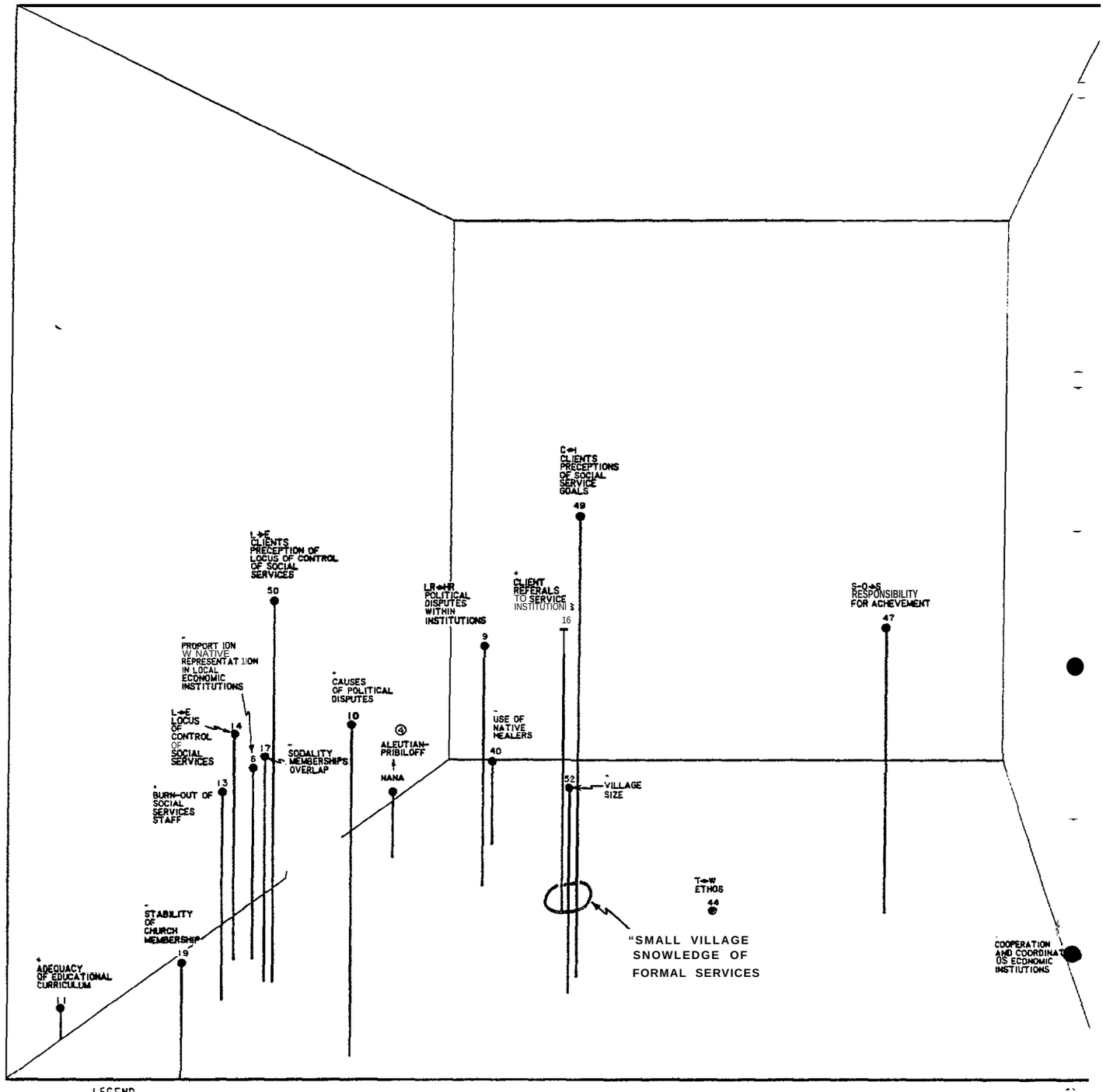
NANA and Aleutian-Pribilof Differences

In the NANA region the economic institutions within t-he villages (village corporation offices, fuel depots, etc.) are principally staffed by natives (V6), whereas natives occupy 3/4 fewer positions in the Al eutian-Pribilofs (Table 97). The several institutions in NANA villages (IRA, Native corporation, city councils, and the like) are everywhere classified as being highly coordinated and in 3/4ths of the cases, also being highly cooperative (V7), while the institutions in Al eutian-Pribilof villages are characterized as exhibiting low cooperation in most instances and high coordination in only half the cases (Table 98). Political disputes within institutions in NANA villages most frequently occur in those ranked lower or within those of both lower and higher rank (V9), yet in the Al eutian-Pribilofs political disputes within institutions most frequently occur among those that are high ranking (Table 99).

Institutional ranking was accomplished primarily by local representatives in the community in question, and does not refer to exogenous criteria developed by researchers except in very few cases. As part of the research, informants were asked to rank local and regional institutions in terms of their importance to the community. Researchers did not define this importance or set standards by which this importance would be judged. Regardless of the logic by which this determination is made, we were interested in the ranking that local residents would create. The rankings established by local informants were almost without exception consistent; no contradictions were identified, although hesitation regarding apparent "ties" for second, third, or another position between one or more institutions was sometimes evident. In the case of ties, further research would be conducted in order to determine if a wider set of informants might be able to agree on an ordering. Only in cases of consistent ties did researchers intervene in the data record and "break" the tie. The criteria used to break these ties were (1)

FIGURE 34

Village level relations among village institutions in Nana and the Aleutian Pribilof Regions relations in three dimensions among 17 Ordinal variables measuring aspects of formal economic, political, social and religious institutions. Data obtained from key institutional informants in four Nana and four Aleutian-Pribilof villages. Relations measured by Kendall 's Tau. Relations ordered by Minissa (Lingoes and Roskam), a multivariant, multidimensional algorithm for finding the smallest distances among points in a Euclidian space.



LEGEND

\+ = Increasing ordinal measure from low to high.

. Decreasing ordinal measure from high to low.

C-1 = Correct to Incorrect.

LR ⇒ HR = Lower ranked to higher ranked."

L ⇒ E = Local to external.

T ⇒ W = Traditional to Western

S-O-S = Self and other-self.

TABLE 95

INSTITUTIONAL VARIABLES LIST: GUTTMAN-LINGOES' SMALLEST SPACE COORDINATES FOR M = 3 (SEMI-STRONG MONTONICITY) DERIVED FROM TAU-BETAS FOR 17 VARIABLES

VARIABLE	DIMENSIONS 1	2	3	
4	-77.821	40.283	-81.500	34.343
6	-82.532	-24.748	-57.464	44,884
7	100.000	-79.672	-87.996	151.242
9	-45.516	20.128	-35.645	52.240
10	-40.642	-88.934	-34.102	63.453
11	100.000	-76.280	-95.055	88.753
13	-77.005	-51.452	-36.901	48.116
14	-87.360	-22.439	-49.206	49.887
16	-20.516	2.895	-28.459	43.638
17	-74.897	-39.230	-50.216	38.543
19	-69.955	-100.000	-79.457	82.602
40	-54.464	48.914	-77.618	82 .%03
44	17.871	6.628	-100.000	80.836
47	59.670	4.156	-26.016	106.520
49	- 9.660	-42.409	5.021	66.261
50	-72.498	-33.022	-15.445	52.043
52	-10.668	-44.095	-54.882	31.523

Note: Guttman-Lingoes' coefficient of alienation = 0.12208 in 25 iterations. Kruskal 's stress = 0.09761.

Source: Consultant's calculations based on primary data collection.

TABLE 96

TAU-BETAS FOR 17 INSTITUTIONAL VARIABLES

4	6	7	9	10	11	13	14	16	17	19	40	44	47	49	50	52
0*0																
0.51	0.0															
-0.59	-0.92	0.0														
0.68	0.61	'0.59	0.0													
-0.11	0.48	-0.22	0.17	0.0												
0.20	0.62	-0.56	-0.02	0.29	0.0											
0.07	0.84	-0.68	0.56	0.43	0.50	0.0										
0.40	1*00	-0.93	0.55	0.36	0.59	0.84	0.0									
0.20	0.51	-0.51	1.00	0.51	-0.48	0.51	0.51	0.0								
0.38	0.97	-0.70	0.61	0.56	0.51	1.00	0.85	0.51	0.0							
-0.08	0.44	-0.32	-0.17	0.59	0.83	0.54	0.36	-0.48	0.62	0.0						
1.00	0.43	-0.57	0.66	-0.32	0.08	-0.07	0.37	0.20	0.21	-0.41	0.0					
'0.06	0.09	-0.08	0.29	0.08	-0.33	0.12	0.12	0.46	0.08	-0.33	0.20	0.0				
-0.20	-0.33	0.33	0.14	-0.33	-0.59	-0.29	-0.29	0.29	-0.33	-0.59	0.20	0.16	0.0			
-0.12	0.29	-0.24	0.24	0.36	-0.02	0.29	0.29	0.35	0.29	0.20	0.20	0.20	0.20	0.0		
0.20	0.82	-0.82	0.43	0.82	0.37	0.92	0.82	9.43	0.82	0.37	0.20	0.20	0.20	0.27	0.0	
0.05	0.47	-0.27	0.55	0.30	-0.02	0.63	0.39	1.00	0.71	0.44	-0.16	0.20	0.20	0.20	0.20	0.0

TABLE 97

NATIVE PARTICIPATION IN
VILLAGE ECONOMIC INSTITUTIONS (V6)

	Exclusively Native	Non-Exclusively Native
NANA	38%	12%
ALEUTIAN-PRIBILOF	12%	38%

$\gamma = .87$

TABLE 98

COOPERATION AND COORDINATION AMONG
VILLAGE ECONOMIC INSTITUTIONS (V7)

	Low Cooperation Low Coordination	Low Cooperation High Coordination	High Cooperation High Coordination
NANA	0	12.5%	37.5%
ALEUTIAN-PRIBILOF	25	12.5%	12.5%

$\gamma = .83$

TABLE 99

LOCUS OF POLITICAL DISPUTES WITHIN NATIVE INSTITUTIONS (V9)

Region	Lower Rank	Low & High Rank	Higher Rank
NANA	14%	43%	0
ALEUTIAN-PRIBILOF	0	14%	29%

γ = 1.00

TABLE 100

CAUSES OF POLITICAL DISPUTES WITHIN AND BETWEEN VILLAGE INSTITUTIONS (V10)

Region	Money	Money & Procedural Administrative, Political or Other Factors	Money & Personality or Factional Dispute
NANA	0	17%	33%
ALEUTIAN-PRIBILOF	17	17%	17%

γ = .67

dollar volume of contractual and other agreements representative of institution, (2) longevity of the institution, and (3) local official representation within the institution. Researcher decisions were only required in two cases (two villages, one "tie" among many institutions each), thus our intervention is considered negligible. For present research purposes, in which we are concerned not with absolute ranks but rather with relative order, the consequences are even more negligible.

The causes of political disputes within villages and village institutions (V10) are traceable to money in all villages, but in the NANA villages personalities and disputatious domestic factions are embedded in the money issues, while in the Aleutian-Pribilofs, money alone is the issue some of the time, whereas political factors other than personalities and domestic factions also contribute to disputes (Table 100).

The differences between NANA and Aleutian-Pribilof villages make it appear that high cooperation and high coordination among institutions is more apt to be achieved when natives dominate the positions in those institutions. In such cases, political disputes are more often caused by the personalities of the participants or the domestic factions to which they belong--as one would expect in a more traditional, long lived, informal, perhaps kinship-based community than by procedural, administrative, or political disputes generated within formal, bureaucratic agencies and offices staffed by professional, non-native employees. And finally, when native representatives dominate, cooperation and coordination are higher, and when disputes arise, they occur more often among lower ranking than higher ranking institutions.

Five further tables will help us to interpret the multivariate analysis while specifying the principal indicators within it. In Table 101 we see that whenever natives exclusively staff and manage village institutions (V6), village residents perceive those institutions, regardless of their functions or position in a regional, state, or federal hierarchy, to be controlled locally (or within) the region, but never so otherwise (V14). In Table 102, we see that when most sodality memberships (clubs, associations, voluntary organizations) among the institutional leaders within villages overlap (V17), natives, predominantly or exclusively, direct and staff native institutions, but such is not the case for villages in which

TABLE 101

NATIVE PARTICIPATION IN VILLAGE INSTITUTIONS
vs. VILLAGE PERCEPTION OF INSTITUTIONAL CONTROL

Native Participation in Village Institutions (V6)	Village Residents' Perceptions of the Locus of Control Over Institutions (V14)	
	Local or Regional	External (Beyond the Region
Exclusively Native	57%	0
Not Exclusively Native	0	43%

γ = 1.00

TABLE 102

NATIVE PARTICIPATION IN VILLAGE INSTITUTIONS VS.
SODALITY MEMBERSHIP OVERLAP AMONG INSTITUTIONAL
AND VILLAGE LEADERS

Native Participation in Village Institutions (V6)	Sodality Membership Overlap Among Institutional & Village Leaders (V17	
	Most Sodality Memberships Overlaps	Sodality Membersh Seldom Overlaps-
Exclusively Native	43%	0
Not Exclusively Native	14%	43%

γ = 1.00

institutional representatives do not participate in overlapping modalities. And in Table 103 we see that social service employees (health, financial, counseling, family planning, and the like) do not experience "burn out" and turn over, that is grow weary, feel beleaguered, and leave their jobs, in villages in which disputes occur within low ranked institutions. These relations occur exclusively within NANA, where native employees and leaders dominate, and where controls are exercised locally or regionally, but they do not occur within many other villages. They also occur in all villages where disputes occur exclusively within high ranked institutions (the Al eutian-Pribilofs) (V13). In Table 104 there is an invariant connection between exclusive native participation in institutional leadership (V6) and high cooperation and high coordination among village institutions (V7). Table 105 shows the importance of community, if not personal and factional jockeying for advantages in, perhaps, a personalized rather than a formal and bureaucratized system. Here, we see that the causes of political disputes in villages in which sodality memberships among institutional leaders overlap (V17) are invariably financial issues coupled either with personality or domestic-factional issues (V10).

The inferences to draw from communities in which natives staff and direct the formally organized institutions, and in which leaders belong to many of the same modalities, thus meeting, working with, and knowing one another in many different contexts and for several different purposes, follow. (1) The residents of those communities will perceive institutions as being "their" institutions (locally controlled by people with whom they have regular contacts, either directly or through networks of sodality, kinship, or other associations). (2) Staff persons will experience less burn out and there will be less turn over in staff members. (3) Disputes within institutions are more apt to occur in the lowest ranking ones. (4) Those disputes, always about money, are more apt to be embedded in, if not confused with, personal and factional issues--differences that persist in face-to-face communities when a long term and active member of that community is perceived to help relatives with jobs and other favors, say, rather than non-relatives. In the professionalized, non-native, bureaucratized institutions the financial issues are entailed by procedural, administrative, and avowedly-political disputes rather than personal disputes.

TABLE 103

LOCUS OF POLITICAL DISPUTES WITHIN INSTITUTIONS
VS. TENURE OF SERVICES STAFF

Locus of Political Disputes Within Institutions	Tenure of Services Staff (V13)	
	Turn-Over/Burn-Out Seldom Identified as Problem	Turn-Over/Burn-Out Seen as Epidemic Problem with Staff
Low Ranked	20%	0
Equal Low and High Ranked	40%	20%
High Ranked	0	20%

$\gamma = 1.00$

TABLE 104

NATIVE PARTICIPATION IN VILLAGE INSTITUTIONS VS.
COOPERATION AND COORDINATION AMONG VILLAGE ECONOMIC INSTITUTIONS

Native Participation in Village Institutions (V6)	Cooperation and Coordination Among Village Economic Institutions (V7)		
	Low Cooperation Low Coordination	Low Cooperation High Coordination	High Cooperation High Coordination
Exclusively Native	0	0	53%
Not Exclusively Native	15%	32%	0

$\gamma = 1.00$

TABLE 105

SODALITY MEMBERSHIP OVERLAP AMONG INSTITUTIONAL AND VILLAGE LEADERS VS. CAUSES OF POLITICAL DISPUTES WITHIN AND BETWEEN VILLAGE INSTITUTIONS

Sodality Membership Overlap Among Institutional and Village Leaders (V17)	Causes of Political Disputes Within and Between Village Institutions		
	Money	Money & Procedural, Administrative, Bureaucratic or Political Factors	Money & Personality or Domestic Factional Factors
Most Sodality Membership Overlap	0	0	54%
Sodality Membership Seldom Overlap	9	37%	0

$\gamma = 1.00$

Figure 34 and Tables 95 and 96 provide a multidimensional solution to the relations among the 17 institutional variables. Because the Aleutian-Pribilof region is the higher step in the two part variable classifying regions (V4: (1) = NANA, (2) = Aleutian-Pribilof), the ordinal variables are correlated and then converted to distances in relation to whether they systematically increase or decrease in relation to the increase in the regional variable. If one looks at the following Figure the base of the stems of each variable point, rather than the peak, can interpret the NANA relations. For example, Aleutian-Pribilof villages or villagers do not use native healers (V40), whereas NANA villagers do; are apt to have disputes within highranking institutions, whereas NANA villages are not (V9); experience social staff turn over and burn out, whereas NANA experiences these problems less so (V13); thinks the education curriculum is essentially adequate, yet NANA key personnel . are less inclined to that opinion, and so forth.

Some items do not fall within the cluster as neatly as they would if the attributes within them were inverted so as to yield strong positive relations with the regional variable (V4). Causes of political disputes (V IO), and cooperation and coordination of economic institutions (V7), if inverted to yield decreasing ordinal relations, would be placed in the tight cluster that is composed of V6, 13, 14, 17 and 50.

Other variables, such as village size, are interesting because of the particular information that they provide. For instance, as village size decreases, client referals to service institutions increase (rather than clients refering themselves), and client perceptions of social service goals are often wrong. So residents of small villages are often uninformed, as is exemplified by their opinions about the relations between schooling and success, economic conflicts, the locus of benefits and control of economic development projects, by their knowledge about alien, formal, service institutions. The ethos measure (V44) produced many low Tau values, suggesting the persistence of traditional world views among most native key informants in most villages, regardless of size or who directs and works in the key institutions. The traditional ethos may be the ideological counterpart of the sharing, gifting, pooling practice within and among villages.

9) Concluding Hypotheses

The following hypotheses are drawn from our individual-level and institutional-level analyses (Figures 31, 34), and will be integrated with the results of our socioeconomic archival analysis below. From Cluster I in Figure 31 we hypothesize that non-governmental sources of earned income (V57), domestic functions and child-rearing practices (V31), and household dynamics (V33) are sensitive to many of the most basic features of native society, including subsistence practices and family-household organization, and will indicate that entire set of relations so that if the directions of frequencies in any of these variables change, changes will be reflected in the other variables in the set. Because the critical distinctions are between traditional and Western family-household practices, and between earned income in a market economy and catholic subsistence activities, these variables seem to indicate some of the institutional effects most frequently attributed to the replacement of traditional, undeveloped economies by market economies, and the replacement of traditional family-household organizations by nuclear families, conjugal pairs, and single persons living alone, and the replacement of the functions of families, family networks, and traditional leadership by formal external institutions perhaps presaging large changes to the current practices and shared meanings of native communities.

The evidence does not support the concluding hypothesis that native societies in the NANA and Aleutian-Pribilof regions are changing (stochastically) in their many institutional and individual relations toward the Western industrial model. Indeed, many features suggest that Native culture, particularly in the organization of labor, the organization of economic distribution, and the organizations of households and wider networks of kinspeople and friends, run counter to the expectations of the model that expects persons to economize so as to maximize benefits, alter their relations with kinspeople and friends, commoditize labor, withhold resources, invest in one's own family, save and delay gratification, engage in and use the services of formal organizations rather than informal institutions, value formal educations as the requisite for economic and personal success, and believe that hard work will yield personal benefits to be accumulated.

From Cluster II, Figure 31, it is plausible, and we hypothesize, that village size (V52), and the proportion of total earned income that is derived from government (public) sources (a new variable must be derived from V55 and V56 to measure this information) will indicate Cluster II, hence indicate the growth or decline of government-related dependencies and perceptions, expectations, and knowledge about political and economic affairs.

From our analysis of Cluster 111 it is evident that household income is an important variable, accounting for much of the variation in household size, pooling and sharing of income, skills and labor, amounts spent on subsistence harvesting tasks, opinions about the relations between schooling and success, and the utilization of services made available by formally organized institutions. In turn, many of these variables account for much of the variation in income. Moreover, it is our impression that if the measure of income stability and predictability (V29), is redefined so as to distinguish stable predictable earned income (say government-funded employment) from unstable predictable earned income (seasonal fishing income, say) and used in conjunction with household income (V22), it will serve as an important indicator of community well-being and culture change.

From Cluster IV, Figure 31, we hypothesize that household size (V23), labor, resource, and income pooling and sharing (V25), and investment of total income into subsistence harvesting activities (V26) are crucial indicators of the nature of native communities in the NANA and Aleutian-Pribilof regions of Alaska. Decreases in household sizes, pooling and sharing practices, and investment in subsistence harvest pursuits will, in conjunction with other indicators mentioned above and to be refined below, reflect very substantial ideological, cultural, economic, and social changes in those communities and, depending on the income base and the locus of power, may be the harbinger of social movements, political or religious in nature.

From our analysis of Figure 34, four variables appear to be very sensitive to stresses within the formal institutional structure of native villages in the NANA and Aleutian-Pribilof regions: (1) the proportion of native representatives in local institutions (V6), (2) the sodality memberships of village leaders and institutional employees (V17), and (3) the locus of control of social services and institutions (V14), and (4)

village size (V54). We hypothesize that changes in these features in a village will be reflected in turn over of social staff, perceptions of the locus of control and of the nature of social services that are available, the causes of political disputes, the nature of disputes within institutions, and the levels of coordination and cooperation that will obtain among institutions within a village.

Changes away from native control are very evident in local perceptions of services, power, and control and will, perhaps, in conjunction with other factors, particularly those of increasing economic dependency, political subjugation, and less reliance of naturally-occurring, renewable resources, portend many stressful consequences for villages.

In summary there are 16 variables which appear to be potential indicators of community well-being from our research. These are:

V22	Household Income
V54	Percentage of Total Income Earned
V55	Percentage of Total Income Unearned
V56	Proportion of Total Earned Income that is Derived from Government (Public) Sources
V57	Proportion of Total Earned Income that is Derived from Non-Government (Private) Sources
V24a	Stability of Earned Income
V24b	Stability of Unearned Income
V25	Income Pooling, Labor, and Resource Sharing
V26	Investment of Percentage of Total Income in Subsistence Harvest Expenses
V23	Household Size
V31	Domestic Functions and Child Rearing Practices
V33	Household Dynamics
V52	Village Size
V14	Residents Perceptions of the Locus of Control over Institutions

on the individual level, and

V6	Native Participation in Formal Village Institutions
V17	Sodality Memberships Overlap Among Institutional and Village Leaders

on the institutional level.

These variables must be recognized as only concluding hypotheses of a synchronous research effort, and must therefore be validated and revised, if necessary, following further research efforts at two other time periods.

VI. IMPLICATIONS OF RESEARCH FOR THE REGIONS

VI. IMPLICATIONS OF RESEARCH RESULTS FOR THE REGIONS

Our investigations among archival data and data culled from primary research have yielded several measures that indicate how contemporary Alaska village communities are organized, whether cooperation and coordination are evident within communities, the attitudes and opinions (shared meanings) people harbor about community institutions, their uses of space and place, their internal growth, their economic dependencies, their family-household organizations, their expectations for economic development, their subsistence economies, their sharing practices, and so on.

The synchronic data have facilitated the generation of individual-level, village-level, and regional-level topologies, empirical generalizations about "what is". The diachronic (temporal) data collected from various archives have yielded to time series analyses. Some of these time series have been used to retrodict explanations, whereas forecasts from time series, and subsequent empirical tests of those forecasts, will provide reasonable tests of the postdictive values of the retrodictions.

The empirical topologies, too, can be used as the basis for predictions, but they have no retrodictive value. For example, to determine whether the variables specified in the previous section indicate more complex village relations that vary in a predictable fashion when the indicators vary will require observations at two or more points in time. Subsequent observations, of course, will convert synchronous observations to diachronic observations and allow explicit comparisons with temporal archival data and with external events that may influence either or both.

Good social indicators must be forecastable. Our time series are, but our individual-level, village-level and regional-level generalizations are not forecastable, and will not be forecastable until several temporal observations have been made. The "forecasts" that follow are "concluding hypotheses" which derive their empirical support from the statistical and multivariate analysis of data drawn from" primary observations. Thus, we use conclusions drawn from the analysis of comparative synchronic data to hypothesize the future. We have only baseline observations, no retrodictions to guide us. Let us join our

archival and field observation indicators into unified hypotheses.

A. Indicating Well-Being in Village Alaska

We conclude from our time series analyses that the NANA and Aleutian/Pribilof regions are very similar demographically; that, although the market economies of the two regions are very different, we expect no real change in regional economies; and that the household economies, especially their general reliance on government transfers, including welfare, are very similar among the eight sample villages in the two regions.

1) Changes in the NANA Region

We forecast demographic changes in the two NANA region villages, Kotzebue and Selawik. Kotzebue is the more fragile of the two villages because it is declining. Growth by natural increase has stopped and now reversed. Immigrants are projected to replace some of the dwindling natural population in this administrative town dominated by public sector economies. Because non-natives, and non-Kotzebue village residents and NANA shareholders from outside the region represent a large inmigrant population and if nothing intervenes to alter the trend, recent in-migrants will soon comprise a majority while long-term resident natives will comprise a minority in Kotzebue. This pattern has some historical depth; the "old" Kotzebue population is comprised of some original Kotzebue families as well as original Noatak, Deering and other village migrants who have slowly merged; these families are now in turn becoming overshadowed by recent in-migrants from the villages as well as by returning NANA shareholders who have resided outside the region for some years. Thus, there are two major factors that must be taken into account when assessing the meaning of diminished natural increase rates: the proportion of non-Native in-migrants (who may represent a threat to ethnic stability) and the ex-resident shareholder and village in-migrants. The quality of life in Kotzebue will probably change, noticeably so, inasmuch as employed non-natives will be drawn to Kotzebue because of employment, and will soon out number employed and unemployed natives portending internal impacts. The non-Natives will require services, if not voices in village affairs.

Problems among natives stemming from dislocations also will require services. Hence, at a time when income may be dwindling for some natives, local revenues must increase, or federal or state transfers to Kotzebue must increase.

The hypothesis that quality of life in Kotzebue may decline is predicted from the social displacements that normally occur when populations decline and when one ethnic population is dominated, in numbers at least, by another. The expectation is supported by the village level institutional indicators that suggest if the proportion of natives employed in village institutions is small, if village leaders and institutional employees do not belong to a common and limited set of modalities, and if the perception of control of village level services and institutions is outside the village that, consequently, staff turnover is high, services are misunderstood, client dissatisfaction is high, cooperation and coordination among organizations is low, and political disputes are common and not necessarily economically motivated. Moreover, on educational and development issues discrepancies occur between attitudes of residents born and reared in the villages in which they reside as adult, and in-migrants to those same villages.

The time series analyses also support the forecast that the public sector dependency of the market economy in the NANA region will increase especially in the larger villages such as Kotzebue. When coupled with individual-level data we hypothesize that persons who earn the largest parts of their income will perceive conflicts as principally between natives and non-natives, and that the control of, and financial benefits from economic development within the region will accrue to companies located outside the region, though some benefits will occur locally as well. Those local benefits may accrue disproportionately to non-Natives.

The decline forecasted for Kotzebue, then, most likely will be accompanied by increased discrepancies between the in-migrants, who will likely be employed, and many of the long-term native residents. Because long-term residents, in small villages and large, cull most of their annual diets from naturally-occurring species, in their native areas, the economic dislocations of some natives projected for Kotzebue may restrict the harvests available to the least solvent residents of the

village, while solvent non-natives, for recreation and for subsistence, will likely compete for some of the resources available in the Kotzebue area. Those families with larger incomes, following past practices, should continue to invest larger portions of their incomes into subsistence activities, and continue to share the proceeds from those activities among many kinspeople and friends, especially the needy. Inasmuch as the subsistence economy continues to be the bedrock of native livelihoods and entailed in their local and intervillage distribution and consumption patterns, changes to the subsistence economy that are precipitated by population decreases among, and social dislocations to natives, and increases by non-native, in-migrants could have a marked negative effect on community well-being. Attitudes about newcomers, non-natives, traditional spaces and places and state and federal regulations of fish and wildlife may be affected.

Two other factors could exercise significant effects on Kotzebue. The local commercial salmon fishing has grown considerably since the federal enactment of a 200 mile territorial limit. Local fishermen have gained incomes that they soon could lose either if the limit were removed, or if the Alaska Commercial Fisheries Entry Commission (ACFEC) increased the number of commercial entry fishing permits, and/or if the Alaska Department of Fish and Game (ADF&G) increased the allowable size and harvesting efficiency of fishing boats and equipment.

Turning our attention to Selawik, we forecast that its population will grow, but it will not experience the same problems as Kotzebue. That is because growth will be through natural increase and natives will continue to be in a considerable majority, controlling village decisions and staffing the institutions that operate within the village. School enrollments, the need for services, and the need for infrastructure will increase. Public sector dependency in the market economy, too, will increase.

The unanswered question for Selawik is the consequence to the harvest of naturally-occurring resources as the village population grows. Some families, in quest of naturally-occurring, harvestable resources, may have to invest larger proportions of their incomes than heretofore in subsistence technology, including fuel and machine maintenance, in order to

exact resources at places that are located long distances from the village.

A crucial feature of the NANA region is its dependence on government-derived income, or income from the public sector. Such funds can be reduced or terminated by legislative action at the state and federal levels, portending serious problems if some villages continue to grow while others wither, if subsistence resources are strained near the larger villages, and if residents become ever more dependent on petroleum burning vehicles to harvest naturally-occurring species.

(2) Changes in the Aleutian-Pribilof Region

Village populations in the Aleutian/Pribilof Region are not expected to grow. But -''manufacturing" (the collective term for commercial fishing, seal harvesting, and fish processing), which dominates the market section of the region is expected to decline in Unalaska and Nikolski, while increasing in the region. It is likely, therefore, that high rates of unemployment will occur in Nikolski and Unalaska, precipitating social dislocations and the need for increased social service deliveries and increasing welfare case loads. In-migration, too, is possible although not forecasted. But in-migration may be stimulated by the increasing availability of services. Crime, alcohol abuse, and drug abuse will probably increase, and reliable, village-level data will be required to monitor these consequences from high unemployment, especially if it is accompanied by in-migration.

The institutions that deliver services to residents in the Aleutian/Pribilof Region tend to be staffed by non-natives. Expansion of those institutions and the introduction of new institutions to deliver services in Unalaska and Nikolski will probably be accomplished by non-natives. The pattern of coordination and cooperation among those institutions most likely will not increase, staff burn-out rates will be high, natives will be apt to misperceive the proper functions of those institutions, the locus of control of such institutions will be perceived by natives as outside the village, and political disputes among service institutions and between decision making bodies (political institutions) and service institutions will increase.

High unemployment will strain unemployed households if they are to continue to invest in equipment, petroleum, and repairs for subsistence harvests. Many families will either become more dependent on kinspeople and friends for naturally-occurring foods, or they will become more dependent on welfare commodities.

Whereas the market economies of the Aleutian/Pribilof region villages are more dependent on income earned from "manufacturing[i]" than are NANA villages, they are also more sensitive to market conditions and high rates of unemployment than are NANA villages. A surfeit of salmon, or a human death caused by botulism or salmonella from processed fish can depress prices or sales world-wide. Moreover, the Aleutian/Pribilof fishing industry has benefitted from the 200 mile limit that has had the effects of decreasing foreign competition while increasing local fish availability. The Aleutian/Pribilof region, which has benefitted more from the 200 mile limit than has the NANA region, would suffer more as well if it were retracted.

Finally, the Pribilof Islands benefit from federal subsidization and oversight of the annual fur seal harvest. This aspect of the market economy is, in actuality, a federal transfer payment, the source of income is public and dependent on legislative appropriation. It can be withdrawn.

3) Household Incomes

Family households in both the NANA and Aleutian/Pribilof regions are heavily dependent on public funds (federal and state transfer of all kinds) and the subsistence harvest of naturally-occurring species. In part, the former are used to make the latter possible. Several reductions in federal and state remittances of all kinds -- to persons and to institutions -- in the absence of the successful development of a self-sustaining and expanding market economy in these subarctic and arctic regions, would cause severe social dislocations and migrations. Large cities, such as Anchorage, might expand to accommodate some families, and some might relocate in smaller villages and attempt to resume lifestyles more fully dependent on naturally-occurring resources.

4) ANCSA

The Alaska Native Claims Settlement Act has exercised profound effects on both NANA and Aleutian /Pribilof regions. Villages have incorporated as have regions, while federal and state monies have flowed through the corporations and the offices and agencies that they have established. Natives, however, had their claims to land, wildlife, and fish extinguished, except for the land conveyed to them by title. The profit corporations -- village and regional --are scheduled to go public in 1991. The consequences of public sales are not forecastable at this point, but our field research on the topic leads to the inescapable conclusion that natives are extremely apprehensive, even frightened, by the possibility that ownership of their corporations will transfer to non-native persons and corporations.

B. The Congruence Between Indicators of Mell-Being from Archival and Primary Data

The obvious congruence between the socioeconomic archival indicators and the primary indicators is not a fortuity. We suggest that several social indicators from among the many individual-level variables will suffice to measure individual-level conditions: (V22) total household income, (V23) household size, (V24, V24b) stability and predictability of income

(modifications explained below)*, (V25) labor and resource sharing, income pooling and resource giving, (V26) subsistence harvest expenses, (V29) number of species harvested for subsistence (adjusting to account for fewer species available in the Aleutian-Pribilof region), (V33) household dynamics, (V52) village size, the percentage of total income unearned (V54)*, total income earned (V55)*, and the sources of earned income (V56, V57)*.

The community level institutional indicators are (V6) the proportion of native representatives serving in village institutions, (V17) the sodality memberships of village leaders and institutional employees, and (V14) the perceived locus of control of village level services and institutions.

The many indicators, as explained above, reflect dependencies on and independence from public funds; cooperation and coordination of village institutions; sources of conflict within and between institutions; native attitudes about economic

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*The following variables are redefined here for future investigation.

V24a Stability of Earned Income. (1) Irregular (piece work, short duration contract, catch-as-catch-can" labor, etc.). (2) Seasonal receipts (e.g., summer fishing, fish processing, etc. from labor or entrepreneurship). (3) Monthly salary, or profits (drawn) from self employment, entrepreneurship.

V24b Stability of Unearned Income. (1) Irregular (gifts, unemployment compensation of short duration, etc.). (2) Monthly welfare or other transfer payments. (3) Regular shareholders receipts, lease or royalty income, etc., and welfare and transfer payments.

V54 Percentage of Total Income Unearned. (1) 0-24, (2) 25-49, (3) 50-74, and (4) 75+.

V55 Percentage of Total Income Earned. (1) 0-24, (2) 25-49, (3) 50-74, (4) 75+.

V56 Governmental (Public) Source of Total Earned Income by Proportion. (1) 0-24, (2) 25-40, (3) 50-74, (4) 75+.

V57 Non-governmental (Private) Source of Total Earned Income by Proportion. (1) 0-24, (2) 25-49, (3) 50-74, (4) 75+, life, such as opinions about economic development and conflicts.

development in relation to the sources and amounts of their income; child rearing practices, gender distinctions, household size, sharing and pooling practices, investment in subsistence harvests, and percentage of harvested proteins in household diets in relation to finances and to each other.

The dependence on government funds in the market economy of the NANA region correlates with several factors that stand in striking contrast to the Aleutian-Pribilof area in which public funds are much less important. An increase or decrease in dependency on government funds in either area will probably affect many features of native child rearing practices, household dynamics, and so forth as discussed above.

More important, perhaps, are the several indicators that measure subsistence practices. Should investment in subsistence harvests decline, the numbers and kinds of species harvested will decline, and there will be less pooling and sharing of income and resources. The naturally-occurring, renewable, extractable resources are keys to the maintenance of traditional ties to the land and sea that lead to the maintenance of ties among kinspeople and friends within and beyond the community. Whereas the 200 mile territorial limit and ANCSA have proved to be significant recent events in the NANA and Aleutian-Pribilof societies, any event or protracted series of events that will disrupt subsistence resource harvest or cause people to invest less or procure fewer resources will have far reaching effects in NANA and Aleutian-Pribilof society, pushing them either toward welfare dependencies or public sector (earned) dependencies; social movements (political, religious, or both) are plausible community responses to these trends and as such deserve careful monitoring as well.

The Western Industrial model does not adequately account for either the socioeconomic conditions in modern village Alaska, nor the probable stochastic change. If naturally-occurring species are so disrupted that they cannot sustain native subsistence and commercial pursuits, it is plausible to predict a greater dependence on public funds; increased sharing of skills, resources, and cash; out-migration; and, perhaps, the occurrence and diffusion of social movements.

CHAPTER VII

A VALIDATION AND MONITORING METHODOLOGY

VII. A MONITORING METHODOLOGY

The conclusions outlined in the preceding chapter- suggest that the social dynamics of Alaskan villages can be captured by a few key indicators. Reading these key indicators over time, the impact of OCS development on the social well-being of villages can be monitored. In this chapter, we propose a methodology for using these indicators for that purpose. Our proposal assumes that these indicators are valid, however, and this assumption is not yet warranted. In what follows, we outline the validity issues which apply to our research. We then suggest a method for validating our research and, finally, we demonstrate how the research/validation procedures lead to a routine impact monitoring methodology.

The proposed monitoring methodology requires a multidimensional indicator system. One could alternatively monitor social well-being in terms of a single valid indicator. While a unidimensional methodology would be less costly, however, it would have several fatal shortcomings. For example, it would generate a high level of false positive and false negative readings --Type I and Type II errors. Second, a unidimensional methodology would detect only the grossest indicator-specific impacts. Furthermore, it would not detect marginal or incipient impacts or impacts that are not indicator-specific; and it would detect gross indicator-specific impacts only long after the fact. The unidimensional methodology, in other words, would lack the sensitivity or statistical power required for routine monitoring.

Since the proposed monitoring methodology relies on a highly correlated system of social indicators, no single indicator is crucial. OCS development is unlikely to affect one indicator without also affecting all other indicators. As a practical consequence, the systematic nature of these indicators ensures that they will be optimally sensitive to slight changes in the villages. While one might expect any single indicator to change slightly over time due only to stochastic error, that is, one would not expect stochastic error to result in a consistent pattern of change across a set of indicators. When the indicator system shifts from one year to the next then, the implied change in village-level social well-being can be confidently attributed to OCS activity.

Sensitivity -- or statistical power -- is an important property of any social indicator system. But in addition to sensitivity, an adequate social indicator system must be general across section and across time. The greatest shortcoming of any unidimensional methodology is generality. While there may be many "good" indicators, no single indicator of social well-being can be general to all Alaskan villages at all times. A two-indicator system in this sense will be more general than any one-indicator system, a three-indicator system will be more general than any two-indicator system, and so forth. As correlated indicators are added to the system, however, the incremental improvement diminishes geometrically. An n-dimensional indicator system is more general than an m-dimensional system then, but the difference may be too small to warrant the added cost of collecting the nth indicator.

The multidimensional system proposed here is optimally efficient in the sense that it uses relatively few variables to define a sensitive, general indicator system. But the system is optimally efficient only within the limits of scientific inference and these limits are determined by the design of our research. The system's statistical power, or sensitivity, and its putative generality derive from the highly correlated structure of its elements. Our statistical analysis assumes that this structure is a stationary, time-invariant property of the universe of Alaskan villages. If this assumption is unwarranted, however, the multidimensional indicator system derived from our research will not necessarily be sensitive or general. Instead, it will be an artifact of our research design.

There are three salient "flaws" in our research design. First, because social indicator research is inherently casual, it necessarily requires longitudinal data: our design used synchronic data. Second, to support cross-sectional inferences, social indicator research requires a set of universal observations; our design used a purposive cross-section of eight villages. Third, since there are no predesignated goals or priorities 'from which to select indicators, the research design required an exhaustive set of variables; but our research was necessarily limited to a small set of on-site and archival variables that were readily available.

To accommodate these "flaws", our research design assumed that each of the eight villages had been observed under a

condition of "system stability" (Heise, 1975: 56). Given this assumption, synchronic and longitudinal data will lead to the same conclusions. Our research design further assumed that our sample of eight villages was representative of the universe; the villages were not drawn as an "equal probability random sample," of course, but we assumed nevertheless that the sample was not abnormal in any substantive respect. And finally, our research design assumed that social well-being could be inferred perfectly from our on-site structured observations.

None of these assumptions is empirically warranted. With respect to stationarity, for example, we suspect that two of our eight villages (Kotzebue and Selawik) "experienced recent demographic shifts inconsistent with the "system stability" assumption. With respect to cross-sectional representativeness, we know that these eight villages are atypical in some respects. And with respect to data availability, we suspect that two missing variables, in- and out-migrations, are theoretically important.

When one or more analytic-assumptions are not empirically warranted, analytic inferences are subject to threats to validity. The pertinent types of validity in this-case are statistical conclusion, external, and construct validities (Cook and Campbell, 1979: Chapter 2). Specific definitions of these three types of validity are beyond the scope of this chapter. In practical terms, however, uncontrolled threats to either of the three validity-types may lead to erroneous conclusions. Conclusions drawn from our research are not automatically erroneous, of course, but the possibility exists nonetheless.

Adopting a "probabilistic" notion of validity (Campbell and Stanley, 1966), we must state each threat to validity as a null hypothesis and, then, in future research, rule each hypothesis out or, where the null hypothesis cannot be rejected, modify the multidimensional indicator system. In short, to guarantee the validity of our findings, our research must be validated.

A. The Limits of Inference

Validation and monitoring share a number of tasks. In this section, we will outline the research required for validation and then, in subsequent sections, we will demonstrate how this

research coincides with the routine task of monitoring. Before we can develop the research/methodology task, however, we must explicate the three threats to validity which limit our inferences. Put simply, the validation procedure must account for the longitudinal, cross-sectional, and statistical controls which our research design lacked.

By "longitudinal control", we mean that each element of our indicator system is temporally stochastic. Social well-being varies over time, that is, rising and falling due to nothing other than stochastic error. In the context of routine monitoring, we expect the indicator system to respond to OCS development. At the onset of OCS development, that is, we expect the indicator system to change in some measurable way. But since the indicator system varies stochastically over time, it would change with or without the OCS intervention. Clearly, we cannot attribute any change in the indicator system to an OCS intervention unless we can control for this longitudinal stochastic error.

A minimally adequate validation procedure for this threat to validity requires that the indicator system be measured at three points in time. To illustrate the logic of this control, let M(t) be the social indicator system (a multidimensional vector) in the tth year. Then if OCS development begins in the tth year, a routine monitoring system could be represented by the equation:

$$(1) \quad W(t) = W^* + r \times OCS$$

where W* is a baseline (mean) measure of social well-being and r is an estimated coefficient. Since the level of OCS development varies from village to village, r is interpreted substantively as the effect of OCS development on social well-being.

Now if r is zero, the monitoring system implies that OCS development had no impact on social well-being in the villages. And if r is nonzero, the monitoring system implies that OCS development did indeed have some impact (positive or negative) on social well-being in the villages. In practice, of course, r will never be exactly zero but, instead, will be some nonzero number. And because W(t) is measured in arbitrary units, there is no absolute substantive criterion for assessing the size of the impact. Was the impact large *or* small, that is, and was it larger in some types of villages than in others?

A more important question, of course, is whether r is statistically different from zero. The most logical procedure for answering this question is to test the value of r for statistical significance. Unfortunately, tests of statistical significance assume "system stability" and, as noted, this assumption is not wholly warranted.

A related problem concerns the so-called "regression artifact". To demonstrate the implications of this problem, denote the social indicator system in the preceding year by W(t-1). Since OCS development does not begin until the tth year, the routine monitoring system is represented by the equation:

$$(2)\quad W(t-1) = W^*$$

Then subtracting equation (2) from equation (l),

$$W(t) - W(t-1) = W^* - W^* = r \times OCS$$
$$w(t) - ((t-1) = r \times OCS$$

This first-order difference equation (see Kessler and Greenberg, 1981: Chapter 2) eliminates the baseline (mean) measure of social well-being from consideration. The change, or difference, from one year to the next is attributed to OCS development. But if W(t) and W(t-1) are correlated, this inference is invalid. In fact, because the social indicator system is statistically powerful and generalizable, its year-to-year readings are guaranteed to be highly correlated. Given this, we can use the value of W(t-1) as an independent variable of the monitoring system.

$$(3)\quad W(t) = W^* + b \times W(t-1) + r \times OCS$$

where b is an estimated (standardized) coefficient. Comparing equations (1) and (3), the "regression artifact" fallacy is apparent. The coefficient b will be an index number ranging from zero to unity, interpreted as the correlation between year-to-year readings of the indicator system. Because b is a positive number, equation (1) will always overestimate the impact of OCS development on W(t). The biased estimate of r (of OCS impact, that is) is a result of the inherently high correlation between W(t) and W(t-1). Equation (3) uses W(t-1) as a longitudinal control for regression to the mean and, thus, generates

relatively unbiased estimates of OCS development. An adequate monitoring system requires absolutely unbiased estimates of OCS development, of course, but this requires another validation procedure. We will address this point shortly.

In practice, the coefficient b must be a large positive number. When b is large and positive -- say 0.8 or higher -- the social indicator system is statistically reliable. Although statistical reliability is related to the properties of sensitivity and generalizability, it cannot be built into the system a priori. It can be optimized as part of the validation procedure, however. To accomplish this optimization, a slightly inefficient version of W(t) -- one that includes an excessive number or indicator elements -- must be read in two successive years. Redundant indicator elements can then be deleted from W(t) until the value of b is at its optimum.

While equation (3) will generate better estimates of OCS impacts than equation (l), its estimates are not guaranteed to be unbiased. To demonstrate this fact, we need only expand equation (3) to include a reading of the indicator system for the year prior to OCS development.

$$(4)\quad w(t) = W^* + b \times W(t-1) + c \times W(t-2) + \text{OCS}$$

Again, year-to-year readings of the indicator system are highly correlated by definition; we have selected the indicator elements so as to optimize statistical reliability. But it is now clear that W(t) and W(t-2) are correlated and, to the extent that is true, equation (3) will produce biased estimates of OCS impacts because it does not control for second-order "regression artifacts".

The validation procedure could continue indefinitely, controlling for third-, fourth- and nth-order "regression artifacts". In practice, however, the validation procedure is aimed at developing a system where the coefficient c is zero, that is, where second-order "regression artifacts" do not exist. To accomplish this, a slightly inefficient version of W(t) must be read in three successive years. If the first and third readings are correlated when first-order correlations are controlled, redundant indicator elements can be deleted until the coefficient c is zero. The refined version of the indicator system is then guaranteed to produce absolutely unbiased

estimates of OCS impacts on social well-being in the villages.

With respect to longitudinal control, validation of the indicator system -requires. readings (or replications) of several key indicator elements at three points in time. By examining the relationships among the three readings, the indicator system can be refined until it is optimally reliable and unbiased. The research tasks required for validation, of course, are identical to the tasks required of routine monitoring.

Readings at three points in time are also necessary to achieve a level of statistical control. By "statistical control", we mean that our indicator system does not include many theoretically important variables. It is well known that any monitoring system which omits variables in this way will produce biased estimates of OCS impacts (see, e.g., Johnston, 1972: Chapter 5.8). Refinement of the indicator system on the basis of observations at three points in time eliminates this bias. If we represent all theoretically important (but omitted) variables as Z, then the static monitoring system at two successive readings may. be written as:

$$W(t-1) = W^* + Z$$
$$w(t) = W^* + Z + r \times OCS$$

Both readings are based on equation (1) and, hence, both will give biased estimates of OCS impacts. If I/(t-l) is introduced as an independent variable, however, then:

$$W(t) = W^* + b \times W(t-1) + r \times OCS \text{ or}$$
$$= W^* + b \times (W^* + Z) + r \times OCS$$

Introducing W(t-1) into the monitoring system thus controls not only for "regression artifacts", but also, for the effects of all theoretically important (but omitted) variables. Refinement of the indicator system to optimize statistical reliability is a crucial aspect of validation because reliability is largely a function of omitted variables.

To achieve longitudinal and statistical control, the indicator system must be read and refined at three points in time. This validation procedure will not adequately control the germane threats to construct validity, however. To control threats to this type of validity, the indicator system must be

replicated in other villages.

By "cross-sectional control", we mean that the relationships among indicator elements are not fully specified. To illustrate this point, we need only consider the importance of "region" -- NANA vs. Aleutian-Pribilof -- in our indicator system. This variable appears to explain several important indicator phenomena and, in that sense, it can be used as a plausible element of the indicator system. But what does "region" mean? The NANA and Aleutian-Pribilof "regions" are different in terms of climates, economies, histories, cultures, languages, and so forth. In our statistical analyses, "region" undoubtedly serves as a proxy for one or more of these more fundamentally meaningful variables. But because the NANA and Aleutian-Pribilof regions are different in so many respects, our statistical analyses cannot distinguish the relative importance of these underlying variables.

For the limited purpose of monitoring OCS impacts in these eight villages, there is no practical need to know the meaning of this variable. If the indicator system is used to monitor OCS impacts outside these two regions, however, the explanatory power of this variable will diminish substantially.

Although the principle of cross-sectional control is most dramatically illustrated by "region", it applies (though less dramatically) to every variable of the proposed indicator system. The only adequate procedure for building cross-sectional control into the indicator system is to replicate the indicator research across the broadest possible sample of Alaskan villages -- including villages that are unlikely to experience OCS development.

This last point is crucial not only to the construct and external validity of the indicator system but, also, to the internal validity of the monitoring methodology. According to Campbell and Stanley (1966: 5), threats to internal validity are

". ..variables which, if not controlled in the experimental design, might produce effects confounded with the effect of the experimental stimulus".

The most important and plausible threat to the internal validity of the monitoring methodology, in our opinion, is history which Campbell and Stanley define as

". ..specific events occurring between the first and second measurement *in* addition to the experimental variable".

Using the standard notation of Campbell and Stanley, we can diagram the monitoring methodology as:

O1 O2 O3 x O4 O5

where each "O" is a reading or observation of the indicator system and where the "X" is OCS development. The diagram suggests that three readings of the indicator system are required before the impact of OCS development can be measured; to validate the indicator system, in other words. The fourth and fifth readings are conducted as part of the routine monitoring methodology. To determine whether OCS development has had any impact on social well-being in the village, we measure the difference between the third and fourth readings. Specifically,

OCS Impact = 04 - 05

Now history as a threat to internal validity refers to the very plausible hypothesis that—some event other than OCS development occurred in the time between the fourth and fifth readings. If some coincident event did occur, the impact of the coincident event would be mistakenly attributed to OCS development. The monitoring methodology would be hopelessly confounded.

The pragmatic question, of course, concerns the likelihood of such a threat to internal validity. In fact, OCS development is quite often accompanied by other interventions which may impact the social dynamics of all villages -- including those where there has been OCS activity. Examples of these coincident events are court decisions, broader federal policy changes, and State of Alaska policy changes which may often "cause or be caused by" OCS activity.

To control the confounding effects of these extraneous coincident events, the monitoring methodology must read the indicator system in a sample of villages where OCS development is

unlikely. With this "no-treatment control group" feature incorporated, the monitoring methodology could be diagramed as:

01	02	03	x	04	05
R1	R2	R3		R4	R5

where each "R" is a reading of the indicator system from a village where OCS development is unlikely. With this design, the effect of any extraneous coincident event is measured as:

Confound = R4 - R3

and the impact of OCS development, controlling for any threat to internal validity, is measured as:

OCS Impact = 04 - 03 -. Confound

Control of this sort is not essential to validation of the indicator system, of course, but it is absolutely essential to the subsequent monitoring methodology. To validate the indicator system, however, the range of villages from which data are drawn must be greatly expanded. To control for cross-sectional issues of validity, the indicator system must tap the full range of political, economic, and cultural diversity.

B. The Validation Procedure

Based on the limits of inference outlined in the preceding section, an adequate procedure for validating the social indicator system would require three separate readings of a slightly inefficient indicator system *on an* expanded sample of N villages. We can diagram this validation procedure as:

1st	village:	01	02	03
2nd	village:	01	02	03
"	"	"	"	
"	"	"	"	
"	"	"	"	
Nth	village:	01	02	03

Validation of the indicator system per se does not require a "no-treatment control group", so these N villages would presumably be drawn from the universe of all villages where future OCS

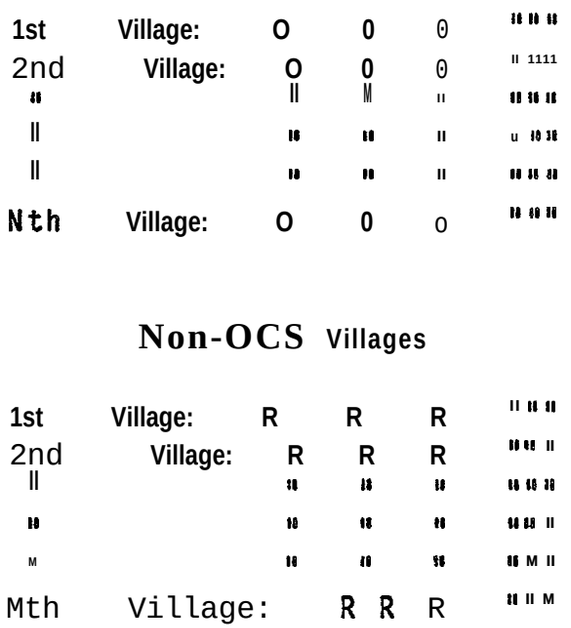
development was likely. The size of N would depend on the diversity of indicator-specific variables in the universe but, as a general rule, the sample would include at least two villages from every distinct, identifiable OCS "region". On the basis of these three readings in N villages, the indicator system would be refined to optimize its sensitivity, general inability, and reliability.

The procedures used to validate and refine the indicator system are nearly identical to the procedures which define the monitoring methodology; that is, the indicator system is read longitudinally across all villages where future OCS development is likely. Since the monitoring methodology must control threats to internal validity, it must include a set of villages where future OCS development is unlikely. Internal validity not withstanding, the validation procedure and the monitoring methodology are distinguished by an important practical consideration. Since the monitoring methodology is to be used regularly and routinely, it must be efficient and inexpensive. This practical consideration means that the monitoring methodology must employ a sophisticated sampling design within each village, across the universe of villages, and across time. And finally, since the monitoring methodology must be implemented in the near future, the research required for validation of the indicator system must be concluded as soon as possible.

Given these practical constraints, we propose to validate the indicator system as if the routine monitoring methodology had already been implemented. The validation procedure will use the same purposive sampling strategy as the monitoring methodology and, moreover, will include a small number of villages where future OCS development is unlikely. For all practical purposes then, the validation research tasks will be indistinguishable from the monitoring tasks with only two exceptions: First, inferences about OCS impacts drawn from the validation research must be interpreted cautiously. Second, the indicator system will be refined during the validation research and, thus, a finalized system will not be available until the validation tasks are completed.

In the next section, we will propose a first-round protocol which operationalizes a few key indicator elements to be used as the preliminary indicator system. Given this preliminary system, the validation research (as well as the routine monitoring

methodology) could be diagramed as:



for the universe of M+N Alaskan villages. The sense of this diagram is that the indicator system will be read in each and every village at regular time intervals (annually, e.g.). A monitoring methodology based on this research design would be astronomically expensive and, furthermore, assuming that there were enough money and trained field workers to execute the design, it would be obtrusive (generating threats to external validity) and cumbersome.

A more practical methodology must employ a sampling strategy where data collected from only a few villages are used to support inferences about social well-being in the universe of villages. We must emphasize, of course, that inferences drawn from a sample are necessarily weaker than inferences drawn from the universe. But practical considerations dictate the use of sampling and, given an adequate sampling strategy, sample inferences will support reasonably powerful estimates of OCS development impacts on the social well-being of the villages.

For our purposes, the sampling strategy must account for variance within each village, for variance between villages, and

for variance across time. At the lowest level, within each village, that is, field workers will use protocols to collect data corresponding to elements of the indicator system. Since the indicator system functions at the level of the network --- not at the level of the individual --- these data are not sampled in the strictest sense. Trained fieldworkers can collect data from several networks of a village. The amount of in-field time required for collection of these data will vary by village size, of course.

Data must be collected at regular intervals -- annual, biennial, quarterly, etc. --- but a village will not ordinarily be monitored in two successive intervals. Rather, for any given wave, data are collected from a small sample of villages selected on the basis of three purposive criteria. These criteria are region, size, and OCS activity. Over a period of time then, the monitoring methodology could be diagramed as:

OCS Villages

1st Village: o o o
2nd Village: o o o
Nth Village: X O o o

Non-OCS Villages

1st Village: R R
2nd Village: R
Mth Village: R R

This sampling strategy results *in* variation of the "separate sample pretest-posttest design". This design enjoys wide use in industrial engineering contexts and, according to Campbell and Stanley (1966: 56), it is a powerful design-; controlling all threats to internal validity.

Indicator readings for any village are separated by (apparently) random intervals. But in fact, the time between readings is determined by need and convenience. Note that each non-OCS "control" village is read less frequently than each OCS village. This facet of the sampling strategy minimizes scarce resources. The non-OCS readings are used only to control threats to internal validity, so they are less substantively important than the OCS village readings. 'Note also that, following the onset of OCS activity, the Nth OCS village is observed *in* three successive waves. Villages will not ordinarily be sampled in successive waves, of course, except in those cases where successive sampling is dictated by convenience or need.

Although this design appears to leave gaping holes in the longitudinal record of each village, the purposive sampling strategy by which villages are selected for observation in any given wave generates a consistent longitudinal record for categories of villages. In every wave, at least one large and one small village from every distinct, identifiable "region" will be selected for the sample. Collapsing the indicator system readings by these two criteria, the research design is diagramed as:

1st Region, Large	Village:	O	0	0	0	0	0	" " "
1st Region, Small	Village:	O	0	0	0	0	0	" " II
2nd Region, Large	Village:	O	0	0	0	0	0	" " "
II		"	"	"	"	"	"	" " "
"		"	"	"	"	"	"	" " "
"		"	"	"	"	"	"	" " "
Kth Region, Large	Village:	O	0	0	0	0	0	" " "

With indicator system readings arrayed in this "nested" design, the monitoring methodology is complete.

C. Proposed Data Collection and Analysis for the Validation/ Monitoring System

The synchronic and archival data analyzed in Chapter. V suggest that community well-being in village Alaska is intimately connected with village sizes, the subsistence economies and distribution (sharing) practices of individuals and households and, on the institutional level, with the focus of power and the affective relations among village leaders and institutional employees. The research, however, which compared four Aleutian-Pribilof and four NANA villages, also demonstrated several distinct differences between the two regions. We call these differences "regional factors", a general term for environmental, economic historical, cultural, and, perhaps, linguistic differences.

Because differences obtain between NANA and Aleutian-Pribilof villages, differences may also obtain between villages from these and other native regions in Alaska. Thus, future observations must be conducted among villages in other regions, as well as NANA and the Al eutian-Pribilofs. And because the effects of OCS activities must be distinguished from the effects of other factors, villages that are unlikely to be affected by OCS activities must also be observed. '

1) Longitudinal Sampling - The Cross-Sectional Sample

Inasmuch as several factors that we will call, collectively, diffusion, render Alaskan villages inter-dependent, there is sufficient reason to sample villages in such a way that interdependence is controlled. Diffusion, as used here, refers to contacts between or among villages. It comprises intervillage, intraregional, and interregional activities of persons and institutions including migrations; economic and political activities; intermarriages; intervillage attendance at ceremonial affairs; education of many students from different villages at the same school and their subsequent return to native villages; wide distribution of, and attention to, broadcast and print media; and still other factors, but especially common heritages. Common heritages, including native languages, usually are composed of some shared meanings (sentiments and ideas) pertaining to acts, such as those entailed in economic distribution, and to culturally-defined objects, such as rivers,

or wildlife, or women's boats. Common heritages "move" with persons, and households, or even entire villages, as they migrate, or expand through natural increase.

Because Alaskan villages are interdependent, random sampling cannot make them independent. In order to disentangle interdependencies so as to measure the effects of OCS activities, we recommend creating a purposive sample, optimally from five regions and minimally from three regions, such that criteria for native language (an indicator of cultural inheritance), village size, and OCS activity are employed in the selection. The criteria for native languages should distinguish Yupik (Siberian and Mainland), Inupik, and Aleut; criteria for village sizes should distinguish villages with 400 persons or below from those of 600 or above; and criteria for OCS activities should distinguish villages near which OCS activities will most likely occur from villages near which, in all likelihood, OCS activities will not occur.

Table 106 is a typology from which a purposive sample of village can be selected for validation and subsequent monitoring. Five regions are listed and are considered optimal. No fewer than three regions should be studied, and no fewer. than three villages per region likely to be affected by OCS activities should be selected during each validation or monitoring year. One village in each of the four (or two) regions in which OCS activities are likely to occur, should be selected because it is unlikely that they will be directly affected by OCS activities; and two villages from one region which is very unlikely, as a region, to be affected by OCS oil and gas activities, should be selected for each validation and monitoring period. Furthermore, two or three sets of villages should be selected from each region so as to allow for observations of alternating sets of villages in "waves". Whereas data must be collected at regular intervals, no set of villages will be monitored in two successive intervals. Our method instructs that each set is monitored at each third interval (if three sets are selected), or every other interval (if two sets are selected).

If only three regions are studied, we suggest that the Aleutian-Pribilof, Bering Strait, and NANA regions are selected. Synchronic and archival data bases have been developed for the first and the last, while the Bering Strait region is likely to be influenced by Norton Sound and Navarin Basin OCS activities

TABLE 106

PURPOSIVE SAMPLING TYPOLOGY BY REGION*

	Likely to Sustain OCS Activities				Unlikely to Sustain OCS Activities
	Region				
	Bristol Bay	Bering Strait	North Slope	Aleutian-Pribilof	NANA
Language --	Mainland Yupi k	Siberian Yupik Mainland Yupik Inupik	Iñupiaq	Aleut	Iñupiaq
Village Size 400 ‘r or less	x	x	x		
Village Size 600 or More	x	x	x		
Village Near Which Direct OCS Activity Unlikely	x	‘x	x		

*Two or three sets of villages should be selected from each region. Each set should be monitored on alternating (two sets) or every third (three sets) investigation periods.

and comprises villages whose languages are Inupik (e. g., Golov in), Siberian Yupik (e. g., Gambel l), Mainland Yupik (e. g., St. Michael s), or some combination of those languages (e.g., Unalakleet (2), Nome (3)).

2) Network Sampling the Villages

Villages comprise many interdependent persons, households, and institutions. Some significant meanings and information are often shared throughout entire villages. We recommend that these interdependencies are accounted for in the sampling design. Network sampling will accomplish this end by selecting as few as four networks of five person each in each village, as well as sampling one persons from each of at least five major types of formal institutions in the village, to wit: governmental, helping service, educational, religious, market economic.

Two ego-centered friendship networks, one kinship network, and one voluntary association (soda lity) network will be sufficient.

Ego-centered and kinship networks can be selected at random from a list of village households. For either type network, a name is selected and the person is then interviewed. At the conclusion of the interview, the interviewee is asked to name two other persons in the village who are friends, or with whom various activities and information are shared. These persons are then interviewed and each is asked to name another person with whom they share various information and activities (friends), and they too are interviewed. Each ego-centered network, started at random, should be penetrated until five members are interviewed.

A kinship-centered network also should be penetrated to five members. In a kinship network, beginning with a random selection, at the conclusion of the first interview the respondent names a kinsperson in the village with whom he or she regularly engages in some activity, such as subsistence pursuits, or religious activities. That second person is then interviewed, and at the conclusion of the interview is asked to name a kinsperson in a third household with whom he or she regularly interacts. This procedure, too, is followed until five persons are interviewed.

A voluntary association (sodality) network should be sampled much as the kinship network. A member from a voluntary organization, such as a search and rescue club, or a church auxiliary, should be interviewed. At the conclusion that person names an associate in the organization to be interviewed, and this continues until five persons are interviewed.

A person should be interviewed only once. If a persons is named in more than one network, that person's name *(or* those persons' names) is listed in the interviewers notes. The number of times a person is named is often an indication of their centrality to village affairs (they are "nodes" that operate in several networks).

When the four networks and five institutions are interviewed -- the former with protocols for individual-level data and the latter with protocols for village-level data -- those persons should be requested to serve as respondent during each appropriate monitoring period for the village in which they reside.

3) Data to be Collected

A. Primary Observations

The authors have pointed out the advisability of collecting data on all 57 individual-level and village-level variables at two successive study periods. In brief, two restudies must be conducted so as to validate the original results, i.e., determine whether the relations are real (not fortuitous or a statistical artifact) and determinate (other sources are not influencing the relations).

Several of the 57 variables have been modified from the original versions (see especially V24a, b, 54-57, Chapter V.C.). The new versions of these variables should be measured in subsequent studies.

In the event that MMS assumes that the 16 social indicators that have been determined *in* Chapter V are sensitive to the system of 57 variables, as specified, a much faster and less expensive validation procedure can be implemented. In this event, during the next, i.e., the second, field research period,

field investigators will be able to collect all of the data that are required in less than one hour per interview, or perhaps 25 interview hours per village (5 to 7 days per village should suffice to obtain the 25 interviews).

During the third (validation] and subsequent (monitoring) periods, the research can be conducted by mail. That is, during the second research period respondents in each network should be paid for their time, and they should be asked to participate in subsequent studies simply by filling out answers to 13 scheduled questions on the identical topics about which they have just then provided information. They should be reimbursed for their time.

The short listing of primary observation variables, by code titles, follow.

Individual Level:

V22	Household Income
V54	Percentage of Total Income Earned
V55	Percentage of Total Income Unearned
V56	Proportion of Total Earned Income that is Derived from Government (Public) Sources
V57	Proportion of Total Earned Income that is Derived from Non--Government (Private) Sources
V24a	Stability of Earned Income
V24b	Stability of Unearned Income
V25	Income. Pooling, Labor, and Resource Sharing
V26	Investment of Percentage of Total Income in Subsistence Harvest Expenses
V23	Household Size
V31	Domestic Functions and Child Rearing Practices
V33	Household Dynamics
V52	Village Size
V14	Residents Perceptions of the Locus of Control over Institutions

Institutional Level:

V6	Native Participation in Formal Village Institutions
V17	Sodality Memberships Overlap Among Institutional and Village Leaders

B. Archival Data:

The following archival data is suggested for collection for the sample villages:

1. Village-Level :

Internal Growth Rates
External Growth Rates (In- and Out-Migration)
School Enrollments
Employment and Wages
Welfare Payments (AFDC and APA)
Social Welfare Caseloads

2. Regional-Level :

Employment by Sector

4) Statistical Analysis

Subsequent (succeeding interval) observations of primary social phenomena transform synchronic data to diachromic data and yield them amenable to the statistical analyses described in the first part of this Chapter. Ideally, the original 57 variables would be analyzed using the multivariate techniques described above, and then these would be reduced to the most parsimonious data set that explains changes in village well-being over time. The third observations would only have to analyze an estimated 16-27 variables in a further refinement of the best indicators. Finally, the continuing monitoring system would use only the most valid and reliable indicators.

D. Summary of the Proposed Validation/Monitoring Process

As described above we recommend a validation and monitoring process which combines cross-section and time series data collection in a sample of villages from 3-5 regions in Alaska. The first two periods of analysis would focus on validation of the indicators selected in the present study, through replication of the types of analysis presented in this report. The number of variables sampled can be reduced substantially at each stage of this validation.

The subsequent on-going monitoring will use the same samples as the previous validation surveys, but would focus on the best indicators found during validation which provide the most parsimonious data set. We suggest using the same respondents year after year and pooling them by telephone or mail, with payment for their time.

The following outline presents the sequence of events required to conduct the monitoring procedure:

1. Sample Selection

a. Optimally from five regions, minimally from three regions.
b. Employ criteria for native language to select the regions.
c* Employ criteria for village size and OCS activity to select three villages per region. (See pages 294, 295).

2. Network Sampling Within Villages

a. In each village, select at least four networks of five persons each - two ego-centered friendship networks, one kinship network, and one voluntary association network (sodality). Use protocols for individual-level data to interview at least five members from each network.

b. In each village, select at least five formal institution: governmental, helping service, educational, religious, market economic. Use protocols for village-level data to interview at least one person from each of the five institutions, (See pages 296, 297).

3. Data Collection

a. Collect data on all 57 individual-level and village-level variables in the first replication periods plus archival data. A reduced number of variables may be analyzed in the second replication period. (Validation).

b. If 16 indicators are determined to be the minimum needed for impact analysis as suggested by our results, collect data on these primary observation variables, and archival data for the remaining sample periods. (Listed on pages 298-299) . (Monitoring).

BIBLIOGRAPHY

A. TECHNICAL BIBLIOGRAPHY

Box, G.E.P. and G.M. Jenkins. 1976. Time series analysis: forecasting and control, Second Ed. San Francisco: Holden-Day.

Box, G.E.P. and G.C. Tiao. 1975. Intervention analysis with applications to economic and environmental problems. Journal of the American Statistical Association, 70, 70-92.

Box, G.E.P. and G.C. Tiao. 1965. A change in level of nonstationary time series. Biometrika, 52, 181-192.

Bradburn, N.M. 1965. The structure of psychological well being. Chicago: Aldine.

Bradburn, N.M. and D. Caplovitz. 1969. Reports on Happiness. Chicago: Addine.

Campbell, Donald T. and Julian C. Stanley. 1966. Experimental and Quasi-Experimental Designs for Research. Chicago: Rand-McNally.

Cantril, H. The pattern of human concerns. New Brunswik, NJ: Rugers University Press.

Community Information Center. 1979. Community information quarterly 11(2). Fairbanks North Star Borough. June.

Cook, Thomas D. and Donald T. Campbell. 1979. Quasi-experimentation: design and analysis issueus for field settings. Chicago: Rand-McNally.

Dhrymes, P.J. 1974. Econometrics: statistical foundations and applications. New York: Springer -Verlag.

Dixon, M. 1978. What ever happened to Fairbanks? Social Impact Assessment Series. Boulder, CO. Westview Press.

Durkheim, Emily. 1913. The elementary forms of religious experience. (Reprinted in 1961, Gleni se: The Free Press).

Federal Bureau of Investigation. Uniform crime reports of the United States. Washington, D.C.: GPO, Annual, 1933-1982.

Gallup, G.H. 1972. The gallup poll: public opinion, 1935-1971. New York: Random House.

Granger, C.W.I. and P. Newbold. 1977. Forecasting economic time series. New York: Academic Press.

Gurin, G., J. Veroff and S. Feld. 1960. Americans view their mental health. New York: Basic Books.

Guttman, Louis. 1968. A general nonmetric technique for finding the smallest coordinate space for a configuration of points. Psychometrika 33: 469-506.

Heise, David R. 1975. Causal analysis. New York: Wiley.

Institute for Social and Economic Research. 1979. Developing predictive indicators of community and population change. Technical Report Number 26. Alaska OCS Office, Bureau of Land Management.

Johnston, J. 1972. Econometric methods, second edition. New York: McGraw-Hill.

Juster, F. T. and K.C. Land. 1981. Social accounting systems: essays on the state of the art. New York: Academic Press.

Kenai Peninsula Borough. 1982. Situation and prospects. Resource Development Office. April.

Kessler, Ronald C. and David F. Greenberg. 1981. Linear panel analysis: models of quantitative change. New York: Academic Press.

Kuznets, S. 1959. Six essays in economic growth. New York: MacMillan.

Lingoes, James C. The Guttman-Lingoes nonmetric program series. Ann Arbor: Mathesis Press.

McCleary, R., R.A. Hay, E.E. Meidinger, and D. McDowell. 1980. Applied time series analysis for the social scienes. Beverly Hills: Sage.

Malinvaud, E. 1970. Statistical Methods for Econometrics. Amsterdam: North Holland.

Pack, D.J. 1978. A computer program for the analysis of time series models using the Box-Jenkins philosphy. Hatboro, PA: Automatic Forecasting Service.

President's Commision on National Goals. 1960. Goals for americans. New York: Prentice-Hall.

President's Research Commission on Social Trends. 1933. Recent social trends in the United States. New York: McGraw-Hill.

SAS Institute. 1981. SAS econometric time series package. Chapel Hill, NC: SAS, Inc.

Sheldon, E. and W. E. Moore. 1968. Indicators of social change: concepts and measurements. New York: Russell Sage Foundation.

Terleckyj, N. E. 1975. Improvements in the quality of life: estimates of possibilities in the United States, 1974-1983. Washington, D.C.: National Planning Association.

Theil, H. 1971. Principles in econometrics. New York: John Wiley and Sons.

U*S. Department of Justice. National crime panel surveys. Washington, D.C.: GPO, 1974-1982.

U*S. Department of Health, Education, and Welfare. Toward a social report. Washington, D.C.: GPO, 1969.

Weber, Max. 1904-05. The protestant ethic and the spirit of capitalism. (Reprinted in 1958. New York Scribners).

B. NANA REGION

Alaska Department of Labor, Administrative Services. 1981. Area nonagricultural employment and payroll industry series. Kobuk Division, four quarters 1979 and first two quarters 1980. Report for in-house files. 12 pp.

Alaska Planning Council. 1940. Preliminary economic survey of the Seward Peninsula area. Juneau. 99 pp.

Alaska State Housing Authority. 1971. Kotzebue, Alaska comprehensive development plan. Anchorage. Report for the City of Kotzebue. 117 pp.

Anderson, D.D. 1970. Akmak: an early archaeological assemblage from Onion Portage, Northwest Alaska. Antarctica. 16 pp.

Anderson, D.D. et al. 1977. Kuuvangmiut: traditional subsistence living in the latter twentieth century. U.S. Park Service, Fairbanks, AK. 744 pp.

Andrews, C.L. 1939. The Eskimo and his reindeer in Alaska. Caxton Printers, Caldwell, ID. 253 pp.

Bogoras, V. G. 1909. The chukchee. Memoirs of the American Museum of Natural History, NY. 1 pp.

Briggs, J. 19170. Never in anger. Harvard University Press, Cambridge, MA. 379 pp.

Brody, H. 1975. The people's land. Penguin Books, Middlesex, England. 250 pp.

Burch, E.S. 1975. Eskimo kinsmen. Changing family relationships in Northwest Alaska. American Ethnological Society Monograph No. 59. West Publishing Co., St. Paul.

Burch, E.S. 1972. Eskimos of the Kotzebue region. ethnology and culture history. Unpublished. Chapter prepared for publication in the Handbook of North American Indians. vol. 5, Arctic. 58 pp.

Chance, N.A. (No Date) The Eskimo of North Alaska. HoIt, Rinehart and Winston, NY. 107 pp.

Craig, R. 1976. Deering and Oorvik histories. Personal communication. Personal interview with Rachel Craig, NANA Corporation, Kotzebue, AK 1. p.

Derbyshire and Associates. 1982. NANA Coastal Resource Service Area Plan, Phase 1. NANA CRSA/Mauneluk Association.

Davis, N. (No date) Chukchi Sea Sociocultural Systems Analysis. Minerals Management System. Alaska OCS Region (in progress).

Foote, D. C. 1977. A human geographic study. Pages 1041-1109 in N.J. Will imovsky and J. N. Wolfe, eds. Environment of the Cape Thompson Region, AK. U.S. Atomic Energy Commission. Report PNE-481.

Foote, D. C. 1964. American whalemen in Northwestern Arctic Alaska. Arctic Anthropology. 2(2): 16-20.

Gaffney, M. 1981. Alaska native rural development. Paper prepared for the Center for Cross-Cultural Studies, Education and Rural Development CECD Conference, Paris, France. (Forthcoming). 59 pp.

Giddings, J. L. 1961. Kobuk River people. Studies of Northern Peoples. Department of Anthropology and Geography, University of Alaska. No. 1. 166 pp.

Gubser, N. J. 1965. The Nunamiut Eskimos: hunters of caribou. Yale University Press, New Haven. 384 pp.

Herman, P. 1981 CETA cutbacks and the effects on planning. Personal communication. Telephone conversation, Kotzebue, AK 2 pp.

Hippier, A. 1969. Barrow and Kotzebue: an exploratory comparison of acculturation and education in two large Northwestern Alaska villages. Training Center for Community Programs. University of Minnesota, Minneapolis. 74 pp.

Hobart, C. W. 1980. Impacts of rotation employment on Canadian Inuit. Unpublished. Paper for presentation at the 31st Alaska Science Conference, Anchoroage. Alaska Division, American Association for the Advancement of Science. 22 pp.

Indian Health Service, Public Health Service. 1981. Alaska area patient care information system, Kotzebue service unit population summary P-DMG-005. Computer printout, Anchorage.

Institute of Cultural Affairs. 1980. Selawik, Alaska agriculture and village development project planning conference summary statement. Report for Rural Ventures, Inc. and the city of Selawik. 44 pp.

Jenness, D. 1964. Eskimo administration: 11. Canada. Arctic Institute of North America, Montreal. Technical Report No. 14.

Karmun, Alfred and Mamie. 1981. Regional history and reindeer herding. Personal interview with A & M Karmun, Deering residents. 14 pp.

Kelsey, R. 1917. Friends and the indians. Associated Committee of Friends of Indian Affairs, Philadelphia. 267 pp.

Larsen, H. and F. G. Rainey. 1948. Inpiutak and the arctic whale hunting culture. Anthropological Papers of the American Museum of Natural History. 42 pp.

Lomen, C. J. 1954. Fifty years in Alaska. McKay Company, New York 302 pp.

MacDonald, S. 1981. Ward distributions and health trends. Personal interview with S. MacDonald, Service Unit Director, Kotzebue ANHS hospital, Kotzebue, AK 6 pp.

Mauneluk Association. 1979. Comprehensive health plan. Kotzebue, Alaska 406 pp.

Mauneluk Association. 1974. The NANA region: its resources and development potenti al. EDA and Bureau of Indian Affairs. Juneau. 289 pp.

Mauneluk Association and Northrim Associates. 1979. Regional strategy survey. Report for in-house files, Kotzebue, AK. 119 PP.

Mauneluk Manpower. 1981. CETA wage disbursements in the NANA region. Correspondence and personal interviews with F. Jones, T. Jorgenson, H. Cross and' S. Gaston. Mauneluk Manpo-wer administrative staff, Kotzebue, AK. 26 pp.

McNabb, S. 1979. Planning for learning in Northwest Alaska. Mauneluk Association and Chukchi Community College. 93 pp.

McNabb, S. 1980. Alcohol in Northwest Alaska. Report for Mauneluk Association, Kotzebue, AK. 221 pp.

McNabb, S. 1981. Human resources in the NANA region. Chapter 5 in NANA CSRA CZM Draft Plan. Derbyshire and Associates, Anchorage. 113 pp.

McNabb, S. 1982. Human Resources in the NANA region. Derbyshire and Associates. NANA CRSA Plan, Phase 1. Anchorage.

Moore, G. 1980. Report on the special caribou season for Buckland, Alaska. Subsistence Sec., Alaska Department of Fish and dGame, Kotzebue. 22 pp.

Moore, G. 1980. Subsistence fish catch, Noorvik and Kiana. Correpsondence with Greg Moore, Subsistence Sec. Mauneluk Association, Kotzebue, AK. May 28, 1981. 19 pp.

NUNA 1981. Inupiaq spirit. Transcript of speech delivered by Winy Hensley. 2(2):2-5.

Mauneluk Association and Alaska Public Forum, NANA Regional Strategy. 1979 Report. Anchorage and Kotzebue. 13 pp.

Northwest Arctic School District. 1981. Student enrollment and achievement data. Personal interviews and correspondence with G. White (superintendent), M. Zelonkey (Superintendent's administrative assistant), J. Woodward (NWASD program support center). 48 pp.

Olson, D. 1969. Alaska reindeer herdsmen. Institute of Social, Economic and Government Research, University of Alaska, Fairbanks. Report No. 22. 156 pp.

Oswalt, W. 1967. Alaskan Eskimos. Chandler Publishing Company. Scranton, PA. 297 pp.

Pelto, P. J. and L. Muller-Wille. 1972. Snowmobiles: technological revolution in the arctic. pages 166-199 in H. R. Bernard and P. J. Pelto. Technology and culture change. Macmillan, NY.

Policy Analysts Ltd. 1980. Bering-Norton petroleum development scenarios: local socioeconomic systems analysis. Alaska Outer Continental Shelf Office. Bureau of Land Management, Anchorage. Alaska OCS Socioeconomic Studies Program Technical Report 53. 592 pp.

Ray, D. J. 1967. Land tenure and policy of the Bering Strait Eskimos. Journal of the West. 6:371-394.

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

Saario, D. J., and B. Kessel. 1966. Human ecological investigations at Kivalina. Pages 969-1041 in J.J. Wilimovsky and J.N. Wolfe, eds. Environment of the Cape Thompson Region, AK. U.S. Atomic Energy Commission. Report PNE-481.

Sampson, C., and P. Harvey. 1978. Tales of Noorvik: a history. Social Studies Lab, Noorvik School class of 1977-78, AK. 64 pp.

Savoie, D. 1970. The Amerindians of the Canadian Northwest in the 19th century, as seen by E. Petitot. Northern Science Research Group, Department of Indian Affairs and Northern Development, Ottawa, Canada. 228 pp.

Scanlon, S. 1981. NANA shareholder distribution. Personal communication. Telephone conversation with Sarah ScanIon. NANA Regional Corporation, Fairbanks, AK. 2 pp.

Smith, D. G. 1975. Natives and outsiders: pluralism in the MacKenzie River delta, Northwest Territories. Northern Research Division, Department of Indian Affairs and Northern Development, Ottawa, Canada.

Smith, V. L. 1977. Eskimo tourism: micro-models and marginal men. pages 51-71 in V. L. Smith. Hosts and guests: the anthropology of tourism. University of Pennsylvania Press, PA. 252 pp.

Smith, V. L. 1968. In-migration and factionalism: an Eskimo example. Unpublished. Paper for presentation at the Annual Conference of the American Anthropological Association, Seattle. 15 pp.

Smith, V. L. (No date). Intercontinental aboriginal trade in the Bering Straits area. Unpublished. 8 pp.

Smith, V. 1966. Kotzebue: a modern Alaskan Eskimo community. Ph.D. thesis. University of Utah. 160 pp.

Spencer, R. A. 1959. The North Alaskan Eskimo. U.S. GPO. Bureau of American Thnology, Bulletin 171. 490 pp.

Stefansson, V. 1913. My life with the Eskimo. 1962 Edition. Collier, NY. 447 pp.

Stern, R. O., et al. 1980. Eskimos, reindeer and land. Agricultural Experiment Station. University of Alaska, Fairbanks. Bulletin 59. 205 pp.

Tundra Times. 1981. NANA region works to revitalize Inupiat spirit. 18(22):1-16.

U.S. Department of the Interior, Alaska Planning Group. 1974. Final environmental statement: Proposed Chukchi Imuruk National Reserve. 763 pp.

Us. Department of the Interior, Alaska Planning Group. 1974. Final environmental statement: Proposed Kobuk Valley National Monument. 626 pp.

U.S. Department of the Interior, Alaska Planning Group. 1974. Final environmental statement; Proposed Selawik 'National Wildlife Refuge. 632 pp.

Uhl, W. R., and C. K. Uhl. 1977. Tagiumsinaaqmiit: ocean beach dwellers of the Cape Krusenstern area: subsistence patterns. Anthropology and Historic Preservation Cooperative Park Studies Unit, University of Alaska, Fairbanks. Occasional Paper 14. 127 pp.

Wells, J. K. 1974. Ipani Eskimos: a cycle of life in nature. Alaska Methodist University Press, Anchorage, Alaska. 110 pp.

Wells, P. W. 1977. Northern population workshop 1. Proceedings of the Actes due Premier Colloque sur les Populations Nordiques. Arctic Institute of North America, North Hatley, Quebec, Canada 219 pp.

White, G. 1981. Educational trends in the NANA region. Personal interview with G. White, Superintendent of Schools, NWASD. 5 pp.

Wilimovsky, N. J., and J. N. Wolfe, eds. 1966. Environment of the Cape Thompson region Alaska. U.S. Atomic Energy Commission. Report PNE-481.

Wolforth, J. 1971. The evolution and economy of the Delta community. Northern Science Research Group, Department of Indian Affairs and Northern Development, Ottawa, Canada.

c. ALEUTIAN-PRIBILOF REGION

Alaska, Special Commissioner. 1975. Economic and social conditions on the Pribilof Islands. Secretary of State's office. 73 pp.

Aleut reference group alienation, mobility and acculturation. 1964. American Anthropologist. vol. 55, No. 2.

Aleutian-Pribilof Islands region community profiles. 1969. University of Alaska, Anchorage.

Aleutian-Pribilof Islands Association, Health Department. 1979. Tribal Specific Health Plan.

Al eutian-Pribilof Islands Association. 1977. Looking Forward. Proceedings from the 1st Island Conference.

APIA. 1979. Aang angagin sang angaginas. 3(4):1-20.

APIA. 1978. Aang angagin sang angaginas. 2(3):1-12 and 2(3):1-8.

Bank, T. 1971. People of the Bering Sea. Readings in Anthropology, No. 31. Educational Publishing Company, Inc. NY.

Bensin, M. 1968. Russian Orthodox Church in Alaska 1974-1967. Russian Orthodox Catholic Church of North America, Diocese of Alaska, Sitka.

Berreman, G. D. 1955. Inquiry into community integration in an Aleutian village. American Anthropologist. Vol. 57, No. 1.

Berreman, G. D. 1970. A study of social and economic problems in Unalaska, an Aleut village. Dissertation, University of California. University Microfilms, Inc., Ann Arbor, MI.

Black, T. 1977. Ivan Pankov, an architect of Aleut literacy. Arctic Anthropology. Vol. 14, No. 1.

Bomhoff Associates. 1977. City of Sand Point Comprehensive Plan.

Collins, H. B., et al. 1945. The Aleutian Islands: their people and natural history. Smithsonian Institution War Background Studies 21. 129 pp.

Dauenhauer, R. 1978. The spiritual epiphany of the Aleut. Center for Equality of Opportunity in Schooling, Alaska Native Foundation, Anchorage, AK.

Dumond, D. E., et al. 1976. Archaeology and prehistory on the Alaska Peninsula. Anthropological Papers of the University of Alaska. 18(1):17-29.

Dumond, D. E. 1974. Prehistoric ethnic boundaries on the Alaska Peninsula. Anthropological Papers of the University of Alaska. 16(1):1-7.

Fedorova, S. G. 1973. The population of Russian America 1799-1867. ISEGR Research Note. University of Alaska, Fairbanks. 6 PP.

Foote, D. C., V. Fischer and G. Rogers. 1968. St.. Paul Community Study. Institute of Social and Economic Research. Report No. 18, University of Alaska, Fairbanks.

Hrdlicka, A. 1945. The Aleutians and Commander Islands and their inhabitants. Wistar Institute of Anatomy and Biology, PA.

Institute of Social, Economic and Government Research. 1970. Changes in population structure in the Aleutian Islands. Research note A-2, University of Alaska, Fairbanks.

Institute of Social, Economic and Government Research. 1973. Patterns of village growth and decline in the Aleutians. Occasional Paper No. 11, University of Alaska, Fairbanks.

Jochelson, W. 1968. History, ethnology and anthropology of the Aleut. Oosterhour, N. B., Netherlands.

Jones, D. 1980. A centuray of servitude: Pribilof Aleuts under U.S. rule. University Press of America, Inc., MD.

Jones, D. 1973. Patterns of village growth and decline in the Aleutians. ISEGR Occasional Paper No. 1. University of Alaska, Fairbanks, 39 pp.

Kresge, D.T., et al. 1974. Bristol Bay: a socioeconomic study. ISEGR Report No. 41. University of Alaska, Fairbanks.

Lantis, M. 1970. Ethnohistory in Southwestern Alaska and the Southern Yukon. University Press of Kentucky, Lexington.

Laughlin, S., et al. 1975. Anangula blade site excavations 1972 and 1973. Anthropological Papers of the Unversity of Alaska. 17(2):39-49.

Laughlin, W. 1980. Aleuts, survivors of the Bering land bridge.

Marsh, G. H. 1954. Eskimo-Aleut religion. Anthropological Papers of the University of Alaska. Vol. 3., No. 1.

McNabb, M. 1981. Cultural values and orientation. Addendum to Ocs St. George Basin Sociocultural Baseline. Bureau of Land Management, Alaska Outer Continental Shelf Office. 50 pp.

McNabb, S. and P. Wasserman. 1982. APIA behavioral health assessment. A-PIA, Inc. 113 pp.

Milan, L. C. 1974. Ethnoh istory of disease and medical care among the Aleut. Anthropological Papers, University of Alaska. 16(2):1-14.

Ransom, T. 1946. Aleut natural food economy. American Anthropologist. 48:608-623.

Reed, C. 1981. Subsistence. Addendum to OCS St. George Basin Sociocultural Baseline. Bureau of Land Managment, Alaska Outer Continental Shelf Office.

Sekora, P. 1973. Aleutian Islands' wilderness study report. Draft reprint. 409 pp.

Smith, S. 1980. Russian Orthodoxy in Alaska. Alaska Historical Commission.

Stein, G. 1977. Cultural resources of the Aleutian region. Occasional Papers No. 6. University of Alaska, Fairbanks.

U*S. Department of Interior. 1973. Proposed Alaska Coastal National Wildlife Refuge.

Us. Fish and Wildlife Service. 1973. Aleutian Islands Wilderness Study.

VanStone, J. 1967. Eskimos of the Nushagak River. University of Washington Press, Seattle. 192 pp.

Veniaminov, 1. 1840. Notes on the islands of the Unalaska district. St. Petersburg University Microfilms, Inc., Ann Arbor, MI.

D. ALASKA STATEWIDE BIBLIOGRAPHY

Alaska Area Native Health Service, Public Health Service. 1981. Program formulation branch computer printouts. Anchorage. 32 pp.

Alaska Department of Labor, Administrative Services Division. 1981. Alaska's 1980 population, a preliminary look. 44 pp.

Alaskan Eskimo Ceremonialism. 1947. American Ethnographical Society, Monographs, Margaret Lantis. No. 11. J. J. Augustin, NY.

Graburn, N. H. and S. Strong. 1973. Circumpolar peoples: an anthropological perspective. Goodyear Regional Anthropological Series. Goodyear Publishing Company, Inc., Pacific Palisades, CA.

Indian Health Service, Health Statistics Sec. 1970. Statistical summary. Anchorage. 6 pp.

Kraus, R., P. Buffler and W. Richards. (No date - in progress). Sociocultural stress and the Alaskan native. Alaska Area Indian Health Service. Anchorage.

Kraus, R., P. Buffler. 1979. Sociocultural stress and the american native in Alaska: an analysis of changing patterns of psychiatric illness and alcohol abuse among Alaskan natives. Alaska Federation of Natives. Anchorage.

Pelto, P. J. 1973. The snowmobile revolution: technology and culture change in the Arctic. Cummings, Menlo Park.

Rogers, G. W. 1971. Alaska native population trends and vital statistics 1950-1985. Institute for Social, Economic and Government Research, Fairbanks. ISEGR Research Note. 19 pp.

Rollins, A. M. 1978. Census Alaska: numbers of inhabitants, 1792-1970. University of Alaska, Anchorage Library. 140 pp.

Seiver, D. A., and S. R. Fison. 1975. Alaskan population growth and movements 1960-1973. Institute for Social, Economic and Government Research, Fairbanks. 20 pp.

Sullivan, J., and W. Rose. 1970. Alaska school enrollments. Institute for Social, Economic and Government Research, Fairbanks, AK. 531 pp.

Us. Department of Housing and Urban Development. 1981. Population and housing figures for the Alaska district office. Juneau and Anchorage. 5 pp.

Us. Department of Interior, Census Office. 1902. Twelfth census of the United States: Population.

U*S. Department of Interior. 1974. Federal programs and Alaska native. 2(c). TASK I-an analysis of Alaska natives' well-being. -

Us. Department of Interior. 1974. Federal programs and Alaska natives. 2(c). TASK III-a survey of native's views.

U.S. Federal Field Committee for Development Planning in Alaska. 1971. Alaska community inventory. 231 pp.