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**A DESCRIPTION OF THE SOCIOECONOMICS  
OF THE NORTH SLOPE BOROUGH**

Alaska OCS Socioeconomic Studies Program

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OF THE NORTH SLOPE BOROUGH

Prepared for

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## ABSTRACT

This report describes current and projected economic and social conditions on the North Slope, establishes an analytical framework for assessing changes in these conditions due to OCS development, and describes research methods specifically developed to examine the issues of future North Slope Borough revenues and expenditures and Inupiat perceptions of the potential effects of petroleum development.

The primary source of social and economic change on the North Slope between 1973 and 1983 has been the North Slope Borough. We expect this situation to continue as long as the borough continues to receive substantial property taxes from the petroleum industry and significant environmental effects can be avoided. Following our examination of the factors affecting borough revenues, we conclude that OCS development will not substantially increase borough revenues. Other factors, however, can be expected to cause the borough to begin to curtail its construction program and thereby reduce local employment opportunities.

Our review of Inupiat employment patterns and projected borough employment opportunities suggests that reduced Inupiat employment, rather than increased Inupiat involvement in petroleum activities, may best characterize the coming decade unless there are specific efforts to reduce constraints to Inupiat employment associated with petroleum development. These constraints include job rotation schedules, work crew composition, hiring location, and training opportunities.



To date, conflicts between onshore petroleum development and Inupiat land use and land-use values appear to have been isolated. The major potential conflict associated with onshore petroleum development is posed by the regulatory restriction of subsistence activities in development areas. Oil spills related to offshore development could reduce the subsistence resources available to Inupiat, as could noise. Rudimentary available data on oil spill risks, biological responses to environmental disturbances, and Inupiat hunting and fishing patterns suggest that development activities in coastal areas near Inupiat settlements and/or areas with significant concentrations of wildlife could adversely affect the North Slope subsistence economy.

We analyzed ten years of Inupiat testimony on proposed developments and conclude that Inupiat fears that offshore development will inevitably harm subsistence resources are both intense and widespread and themselves constitute an impact of development. The report describes Inupiat perceptions through direct quotations and specific references to past Inupiat experiences with their environment or development activities. Inupiat institutions have actively attempted to place controls on development activities. Barring unforeseen successes, however, we do not expect that North Slope institutions will be particularly effective in influencing offshore activities, an outcome which may generate significant social stress on the North Slope.

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## CHAPTER ONE

### INTRODUCTION AND SUMMARY OF RESULTS

The federal government expects to open the remainder of the Beaufort Sea for oil exploration in 1984. Under the current five-year outercontinental leasing plan, the government will issue a draft environmental impact statement (EIS) on the proposed action, Lease Sale 87, sometime in 1983. This report will be used by the Minerals Management Service of the Department of the Interior in its preparation of the environmental impact statement.

The Minerals Management Service (MMS) contracted the Institute of Social and Economic Research (ISER) to design and perform the research necessary to describe current social and economic conditions on the North Slope, to identify likely changes in these conditions, and to develop a framework for assessing the social and economic impacts of Lease Sale 87. This report does not contain a comprehensive description of social and economic conditions on the North Slope. Given the wealth of information readily available from other recent reports, we chose to focus our attention on several potential social and economic impacts which warrant additional research and which can be feasibly investigated within the constraints of our contract. Throughout the report, we attempt to summarize relevant previous research. For a comprehensive review of North Slope social and economic conditions, however, we suggest the

reader review the following reports: Worl, Worl, and Lonner (1981); Kruse (1982); Kleinfeld (1981); and McBeath (1981).

### Report Organization

With the exception of Chapters One and Three, each chapter of the report corresponds to a separate research objective. In Chapter Two, we describe our approach to the development of a forecast methodology. To acquaint the reader with the cumulative scale of development activities, Chapter Three contains an overview of state and federal leasing areas on the North Slope and projected estimates of oil reserves. Chapter Four traces the relationship between oil development and North Slope Borough (NSB) revenues and expenditures.

Chapter Five establishes estimates of the North Slope workforce likely to be employed by the North Slope Borough and the petroleum industry. Chapters Six and Seven primarily focus on the potential relationships between oil development and Inupiat subsistence activities. In Chapter Six, we identify the types of land-use conflicts that may result from development. Chapter Seven and its associated appendix contain the results of the largest component of our research effort: the documentation of Inupiat perceptions of the threats posed by oil development on the North Slope.

Over the past several years, North Slope researchers have repeatedly turned their attention to the relationships between local institutions and oil development (McBeath and Morehouse, 1981; Worl,

Worl, and Lonner, 1981). The ability of local institutions to influence development has emerged as a key factor in the projection of development impacts. In Chapter Eight, we extend the discussion of local institutional activity to cover recent changes which may significantly alter the scale and form of development impacts. Finally in Chapter Nine, we present updated information on the economic well-being of North Slope residents and discuss the implications of development on Inupiat social well-being and culture.

### Summary of Results

#### FORECASTING METHODOLOGY

Our first step in generating a forecasting methodology was to identify what we expect could be the most important social and economic changes that can be logically related to petroleum development on the North Slope. We based our assessment on a review of recent research literature, our own past work on the North Slope, and on field visits to Barrow, Kaktovik, and Nuiqsut. We then constructed an overall analytical framework centered on a diagram illustrating the major potential causal factors and resulting social and economic changes that could occur on the North Slope. The following appear to be significant potential social or economic changes that could be influenced by continued petroleum development activity:

- decrease in the net supply of subsistence resources available to Inupiat hunters

- increased social stress due to perceived threats to subsistence resources
- enhancement of expected North Slope Borough financial situation in the next decade
- increased industry employment
- change in ability of local institutions to influence development activities
- long-term changes in Inupiat cultural values

We next considered the feasibility of designing and implementing data collection efforts which would permit us to assess the likelihood and characteristics of each type of change. Factors affecting the feasibility of one or more data collection efforts included uncertainties as to the magnitude, location, likelihood, and consequences of industry activities; restrictions on systematic data collection; unacceptable impacts of the research itself; and insufficient time to collect information. Based upon these considerations, we chose to focus our data collection efforts primarily on two research topics: North Slope Borough revenues, expenditures, and employment and Inupiat perceptions of potential threats to subsistence resources posed by petroleum development. In addition, we devoted part of our research effort to analyses of the factors which may affect the net supply of subsistence resources and Inupiat participation in employment opportunities. Finally, we reviewed recent trends concerning local institutional attempts to influence development and concerning changes in Inupiat social and economic well-being.

## NORTH SLOPE BOROUGH REVENUES, EXPENDITURES, AND EMPLOYMENT

By now, the average Alaskan firmly connects oil development with state wealth and believes that what is true for the state is particularly true for the North Slope Borough. It stands to reason, then, that further oil development in the north will continue to fuel the North Slope economy. Our analysis shows that OCS development will not, in fact, substantially increase North Slope Borough revenues.

The primary source of North Slope Borough revenues is property taxes. Property taxes are not presently constrained by borough property values, but rather by state-imposed limitations on borough property tax operating revenues. We project that the borough's property tax base will continue to be at least as high as current levels and possibly much higher for at least two decades. As a result, property values will not be the limiting factor for borough operating revenues during this period. Instead, the primary factor affecting borough operating revenues will continue to be revenue limits determined in the statewide political arena.

North Slope Borough capital expenditures, the driving force behind local employment, will have to decline in the 1980s. While the NSB is not presently limited in the extent to which it can raise money for capital expenditures, it cannot exceed state-imposed limits on the taxes that can be levied to fund operating expenditures. Borough operating expenditures are skyrocketing as CIP projects are

completed. The NSB simply cannot afford to operate a much larger set of facilities. In addition, the size of the NSB's debt (over one billion dollars) may result in future state restrictions on the NSB's borrowing.

#### INUPIAT EMPLOYMENT

Local job opportunities with the North Slope Borough or those supported indirectly by borough spending currently employ most of the available Inupiat labor force. However, these employment opportunities are likely to decline as borough capital expenditures decline.

While the number of jobs created by a given amount of operating funds may exceed that generated by an equal capital expenditure, the higher rate of capital spending during the CIP is certainly generating more employment than will the much lower rate of NSB operations spending in the future. We expect that borough employment will decline from current levels, with or without OCS development.

Thus, the oil industry is likely to become more important as a potential source of employment for Inupiat. Our 1977 survey results indicated that only a small proportion of the Inupiat labor force had worked directly for industry prior to the survey. Although similar current data are not available, a variety of evidence suggests that Inupiat oil industry employment continues to be very



low. Both industry and various Native-owned corporations have attempted to increase Inupiat participation in oil development activities with little results. Inupiat workers view the jobs they are offered as menial; industry supervisors express frustration that their efforts to hire Natives fail due to a lack of job commitment on the part of the Natives themselves. Meanwhile, many village residents recall past industry promises of jobs and perceive the promises to be empty.

The size of the communication gap between industry and village residents is both awesome and bewildering. Beneath the mutual misperceptions of industry and the Inupiat, however, are several real constraints on Inupiat participation in oil development activities. As we mentioned, most Inupiat are not looking for industry jobs; they can work for the same or higher wages on better jobs at home. Another constraint involves the general lack of formal training and certification of skills. Inupiat men often learn to operate equipment on local jobs without joining a union. Those that do belong to a union complain that the location of the hiring hall in Fairbanks makes it extremely difficult to obtain a job. It is important to remember that perhaps half the jobs at Prudhoe Bay are not with the producers but rather with contractors and subcontractors. Hiring practices and job conditions can vary widely. Still another constraint involves the willingness of Inupiat to commit themselves to work a steady shift even if it conflicts with hunting opportunities or village activities. The NSB

permits Inupiat men to follow an intermittent work pattern which industry views as unacceptable.

OCS development, in general, and the incremental development effect of Lease Sale 87, in particular, will add relatively few jobs to the North Slope, and most of those that are added will require labor with special skills not present in the Inupiat labor force. The negative attitudes toward OCS development shared by most Inupiat may also limit their interest in OCS employment. Inupiat employment with industry may increase at the same time that OCS development occurs, but the increase will most likely be related to a decline in village employment opportunities.

#### LAND USE CONFLICTS

A comparison of the area subject to potential oil development activity on the North Slope and the area used by Inupiat for subsistence activities suggests a substantial potential for land-use conflicts on the North Slope. We identified six types of potential land-use conflicts: physical barriers to land use, regulatory barriers, habitat destruction, direct mortality of fish and wildlife, dislocation of fish and wildlife, and increased competition for resources. All of these involve Inupiat subsistence activities.

It appears that onshore development inevitably creates land-use conflicts as a result of physical and regulatory barriers to Inupiat

land use. To date, the cumulative impact of onshore development on Inupiat land use has reached significant proportions for Nuiqsut residents. Most North Slope villages could face similar problems if onshore development activities substantially expand.

Offshore development poses a potentially much greater, but highly uncertain, land-use conflict with Inupiat subsistence activities. Oil spills as well as visual and sound disturbances may reduce the supply of subsistence resources with profound effects on Inupiat economic and social well-being. Development risk analyses and the level of biological knowledge still appear to be inadequate to the task of projecting the likelihood of major changes in subsistence resource availability. It is, therefore, only possible to draw the crudest relationships between offshore development and Inupiat land use. If we use any of a variety of measures of development activity (e.g., areal extent, estimated production, distance to nearest village, water depth), Lease Sale 87 represents a large increase in the relative risk of land-use conflicts.

#### PERCEIVED THREATS OF OIL DEVELOPMENT

The Inupiat do not appear to share the uncertainty scientists attach to the risks that offshore oil development will harm subsistence resources; they believe it is inevitable. Inupiat concern over the dangers of offshore development represents a current impact of OCS development. As development proceeds, these concerns will increase to the detriment of Inupiat social well-being. We, therefore,

decided that one of the central research objectives of this study should be the documentation of Inupiat perceptions of the threats of oil development. Our primary sources of information were dozens of public hearings on North Slope oil development proposals conducted over the past eleven years.

The Inupiat fear that the ice, winds, and currents of the Beaufort Sea will combine to overpower offshore facilities. They assume that resulting oil spills will inevitably contaminate or kill marine wildlife. They also believe that industrial noise will drive away their subsistence resources. Judging from the depth of feeling pervading the Inupiat testimony, the loss of subsistence foods would have devastating effects on Inupiat health and culture.

Due to the uncertainties surrounding the environmental risks of oil development and the actual physionomic, social, and cultural effects of a loss of subsistence resources, it makes little sense to speculate about long-term impacts. At the same time, we should recognize that Inupiat fears are already affecting Inupiat social well-being. We documented Inupiat perceptions of the threats posed by oil development so that the reader can gauge the magnitude of this current impact.

#### ABILITY OF LOCAL INSTITUTIONS TO INFLUENCE OIL DEVELOPMENT

Inupiat concerns about development are likely to vary with their perceptions of the ability of local institutions to influence

development activities. Vigorous local intervention has been a trademark of the North Slope Inupiat. The Inupiat fought hard and effectively to push their land claims and to establish the North Slope Borough. They have aggressively developed new tools in attempts to achieve their objectives. The Inupiat have zoned, lobbied, litigated, reviewed, monitored, and manipulated public opinion in order to reduce environmental risks and increase local economic benefits. Both researchers and the Inupiat themselves have viewed the North Slope Borough as an effective protector of Inupiat subsistence and cultural values.

The perception of institutional effectiveness, however, has largely been based on NSB actions taken to influence onshore development. When local attention shifted offshore, the ability of local institutions to influence industry activities rapidly deteriorated. The NSB has thus far failed to extend its jurisdiction through the Coastal Zone Management Act. It lost its major law suit contesting offshore leasing beyond the barrier islands. Other North Slope institutions have tried to assume the role of protector of Inupiat culture previously held exclusively by the NSB. The Kaktovik village council opposed all offshore development in both state and federal courts. The Inupiat Community of the Arctic Slope (ICAS) initiated a federal suit as well; both institutions lost.

The Inupiat may well find new ways to reassert some influence over oil development activities. The NSB is continuing to litigate, to

seek public support through the Arctic Policy Review, to develop a Coastal Management Plan, and to develop alliances with other northern peoples and outside interest groups. Barring unforeseen successes, however, we believe that North Slope institutions will not be particularly effective in influencing offshore development activities. As a result, we expect Inupiat concerns about offshore development to continue unabated and, therefore, to generate considerable social stress.

#### INUPIAT SOCIAL AND ECONOMIC WELL-BEING

Our 1977 survey of the Inupiat population showed the Inupiat to be rapidly improving their economic well-being. Limited, but more current, information suggests that the trend has continued. Between 1977 and 1979 the median Inupiat family income more than doubled in nominal terms. Even in constant dollars, Inupiat incomes probably increased by an average of over 50 percent in three years. The NSB capital improvements program has delivered new housing, school facilities, roads, power generation systems, water supplies, health clinics, fire stations, and a host of other public services to every North Slope community. Most Inupiat now enjoy residential telephone service and television. While a poor spring whaling season in 1982 has temporarily reduced the subsistence harvest, the crises posed by past caribou regulations and threatened bans on subsistence whaling are over. In sum, Inupiat economic well-being has probably never been higher.

The Inupiat are still not rich by urban Alaskan standards, nor do most have such conveniences as flush toilets or a piped water supply. Furthermore, their economic well-being is largely dependent on the temporary employment demands generated by the borough CIP. Already, the loss of employment due to the completion of village projects has made it difficult for some families to pay for their new homes and higher utility bills. We expect the gap between expenses and income to grow during the 1980s as capital expenditures under the CIP decline.

As we mentioned earlier, OCS development will have little effect on Inupiat economic well-being; that is, unless development interrupts the supply of subsistence resources. However, local employment and household incomes will probably decline during the OCS development period for other reasons. Inupiat social well-being will doubtless decline if jobs disappear and incomes drop. Fears about the effects of OCS development on subsistence resources will further reduce Inupiat social well-being. If the NSB secures additional revenues, if the Inupiat find effective means to influence development, or if the Inupiat participate heavily in industry employment opportunities, then Inupiat social well-being may not significantly decline in the 1980s. In our view, however, each of these events is unlikely, and we would expect the Inupiat to face a much worse situation in the late 1980s than they do today.

## CHAPTER TWO

### FORECAST METHODOLOGY

To date, the socioeconomic studies program has published sixteen technical reports on the Beaufort Sea region. With the exception of the reports based on the MAP or SCIMP models, the methods used to analyze and project change vary widely. This lack of consistency is largely warranted. The authors of each report selected somewhat different topics for study. Topics treated adequately in a previous study could be ignored if further distinctions between the impacts of successive developments were impossible. Changing conditions caused previously unstudied areas to assume greater importance. Forecasting methods also differed in response to changes in the form of data available, particularly in view of the constraints placed on primary data collection.

While we think it would be a mistake to impose a consistent set of forecasting objectives and methods on future SESP socioeconomic studies, we recognize the value of developing a reference of methods that have been successfully used to analyze and forecast closely related sets of impacts. Since each study does not address all potential impacts (nor should it), we believe such a methodological reference is best developed over time.

In this chapter, we describe our procedure for identifying potentially significant impacts. These impacts may well differ from



those we would identify for another development proposal, a different region, or even for another time. We then show how we determined the feasibility of addressing each study topic. Finally, we discuss the methods that we would consider appropriate for topics not studied under this contract and describe the methods we actually used to address the subject areas included in our study.

#### Potentially Significant Impacts

Two sets of circumstances on the North Slope cause its mix of potentially significant impacts of oil development to differ from that observed in the Lower 48 or even elsewhere in Alaska. First, energy development on the North Slope does not result in rapid population increases in existing communities, attendant increases in service demands, and lags in the availability of public revenues necessary to meet such demands. While this has been the usual experience of western U.S. boomtowns, the dual factors of remoteness and regional taxing powers cause a completely different outcome. With no village located near Prudhoe Bay and no permanent roads connecting the development site with any Inupiat settlement, industry developed a virtually independent infrastructure from that supporting the North Slope traditional villages. Population increases directly induced by development thus occurred in enclaves, not in communities. Service demands in North Slope villages rapidly increased due to rising expectations, not rising populations. The formation of the North Slope Borough coincident with the multibillion dollar capital investments of the oil industry

permitted the Inupiat to pay for these new services through a regional property tax. While there was some lag in revenue-generating ability due to court challenges, the North Slope Borough was ultimately successful in mounting a capital improvements program now worth over one billion dollars. The important point, however, is that the western boom-town model of impacts does not apply to the North Slope.

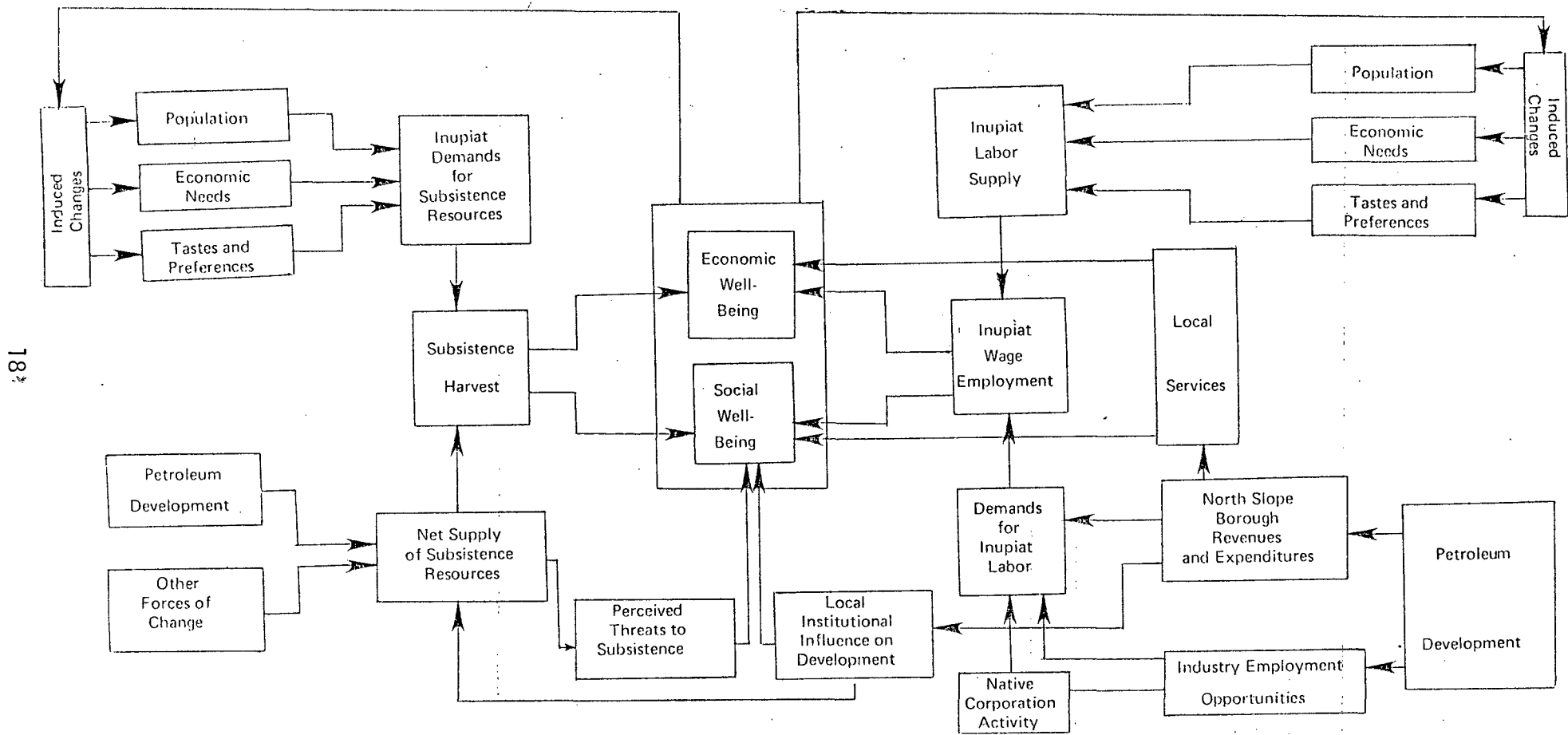
The second major set of circumstances differentiating the North Slope and other rural Alaskan regions from regions outside of Alaska experiencing energy impacts is the widespread use of and value attached to the wildlife resources of the region. Well over 90 percent of the Inupiat residents of the North Slope regularly consume wild foods (Kruse, 1982). As the traditional economic base of the region, these wild foods and the attendant harvesting activities are the object of the most important social and cultural values, values which have persisted in spite of a decline in the economic importance of wild foods.<sup>1</sup> Potential impacts involving subsistence resources are, therefore, clearly key topics to be addressed in North Slope impact studies.

Our forecasting methodology is based on an analytical framework that is illustrated in Figure 1. Starting in the lower left corner of Figure 1, we see that both petroleum development and other forces for change--the International Whaling Commission, for example--may

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<sup>1</sup>We should note, however, the wild foods continue to support a significant proportion of the Inupiat mixed economy (Kruse, 1982).

FIGURE 1. DYNAMICS OF SOCIAL AND ECONOMIC CHANGE ON ALASKA'S NORTH SLOPE



affect the net supply of subsistence resources available to Inupiat hunters. We discuss the potential means by which petroleum development could affect the net supply of subsistence resources in Chapter Six.

The potential relationship between OCS development and the net supply of subsistence resources may or may not prove to be significant. However, in designing our research, we observed that Inupiat perceptions of threats to subsistence are a current reality that may already be generating social stress. Therefore, we decided to document Inupiat perceptions so that policy makers are aware of the scope and intensity of Inupiat concerns. The results of this effort are contained in Chapter Seven.

The top left corner of Figure 1 illustrates our conception of the demand side of subsistence resource consumption. The size of the population consuming subsistence resources, both on a regional and on a community basis, will affect total demand, as will the level of economic need and a host of personal, social, and cultural factors that collectively determine tastes and preferences. We discuss the potential effects of population changes on Inupiat demands for subsistence resources in Chapter Six. The relationships between economic needs and tastes and preferences and Inupiat resource demands are discussed in Kruse (1982). Kruse found that despite rapid increases in Inupiat real incomes, subsistence resources still reflect a substantial economic value to the Inupiat. Kruse also

found that personal, social, and cultural factors appear to account for a significant amount of resource demands. Therefore, we expect that changes in Inupiat demand over at least the next decade will primarily be a function of intraregional population shifts.

Turning now to the lower right corner of Figure 1, we show the second major link between petroleum development and social and economic change on the North Slope. We discuss the relationship between development and North Slope Borough revenues and expenditures in Chapter Four. Chapter Five contains our analysis of the relationships among borough expenditures, development activity, industry employment opportunities, and demands for Inupiat labor.

According to our conceptual framework, the supply of Inupiat labor is affected by the same types of factors affecting Inupiat demands for subsistence resources: population, economic needs, and tastes and preferences. We did not investigate these relationships in the current project because they are treated in depth in Kleinfeld (1981). Kleinfeld observed that the supply of Inupiat labor is rapidly growing due to two major factors: the aging and entry into the labor force of a large number of Inupiat born in the 1950s and 1960s and the entry of a large number of women into the labor force for the first time. Kleinfeld found that, in contrast to Inupiat women, Inupiat men do not appear to be participating in the wage economy in greater proportions now than they did before the petroleum industry and the North Slope Borough became active on the

North Slope in the 1970s. At least for men, it appears that changes in the pattern of Inupiat wage employment will primarily result from changes in the character of demand for Inupiat labor. Thus, we believe our analysis of potential labor demands in Chapter Five is of primary significance to the projection of employment impacts.

The development and funding of the North Slope Borough not only increased local employment opportunities but also substantially expanded and improved the quality of local services. Chapter Nine contains an overview of changes in local services. We chose not to conduct an in-depth analysis of local services in this study because changes in local services are the result of local decisions and not petroleum development. In addition to borough affects on employment and local services, however, are its potential influences on development activities and the effects of these influence attempts on Inupiat social well-being. Since our initial investigations suggested that Inupiat perceptions of development threats on subsistence resources are potentially already affecting Inupiat social well-being, we chose to focus part of our research effort on the degree to which local institutional influence on development may affect Inupiat perceptions. The results of our analysis are contained in Chapter Eight.

As shown in the center of Figure 1, subsistence harvest, Inupiat wage employment, local services, perceived threats to subsistence, and local institutional influence on development are the major

factors we believe affect Inupiat economic and social well-being. Chapter Nine contains a discussion of these interrelationships.

Before describing our forecast methodology for each major element of our current research program, we should note that we intend Figure 1 to describe a dynamic social system in which changes in Inupiat social and economic well-being are expected to induce population shifts, alterations in economic needs, and changes in Inupiat tastes and preferences. These relationships are depicted as feedback loops in Figure 1.

#### North Slope Borough Revenues and Expenditures

The North Slope Borough has played a very important role for Inupiat over the past ten years, providing both employment and a variety of new services and facilities. The extent of the borough's role was made possible by the enormous property tax base arising from development of the oil resources at or near Prudhoe Bay. The most significant effects of oil development on the North Slope to date have arisen from the expenditure of the revenues arising from this tax base. Thus, it is important to assess the possible effects of OCS development upon North Slope Borough revenues, and the resulting indirect effects upon North Slope Borough expenditures.

In order to examine these questions, we have developed a model of the population and economy of the North Slope Borough. We refer to this model as the "North Slope Model." We describe the model in

detail in Appendix A and present a set of "base case" projections for the model in Appendix C.

Mathematical models have both disadvantages and advantages. The disadvantages result from the fact that models tend to be intimidating, causing some people to reject their results as too complicated to understand, and others to blindly accept their results because they convey an illusion of accuracy. In the case of our North Slope Model, we believe that these disadvantages are outweighed by two advantages. First, the model requires us to state the exact reasoning we have used in arriving at our conclusions. Our assumptions are explicit rather than implicit. Secondly, the model is flexible; if someone disagrees with a particular assumption which we have used—even a crucial assumption—we can change the assumption and calculate new results without abandoning the entire projection methodology.

Many people expect models to make complicated problems simple. They cannot do this. They can only make the methods used to solve the problems more explicit. We feel that modeling has an important role in SESP research tasks such as the projection of revenues, population, or employment. However, models impose a responsibility upon both the researcher and the user of the research. The researcher must document his assumptions clearly and completely so that his methodology is indeed explicit. The user must study the



assumptions and understand what the reader has done in order to have a basis for either accepting or rejecting the results.

### Inupiat Employment

Our projections of declining future North Slope Borough expenditures suggest that borough-supported employment opportunities for Inupiat will decline in the future. As a result, the oil industry may become a more important source of employment for Inupiat. However, there are a number of uncertainties about the extent to which Inupiat may obtain oil industry employment. We use our North Slope model to develop a range of projections for future Inupiat employment, taking account of these uncertainties.

To date, direct Inupiat participation in oil development activities has been limited. This is disappointing both for Inupiat and for the oil industry since Inupiat perceive few direct benefits from oil development, and this perception contributes to Inupiat political resistance to oil development.

Future SESP research might reduce some of these uncertainties. One important area for research is oil industry labor requirements--not just how people are hired but how long individual jobs last, what skills or special training is required, and how existing employment practices work. The current manpower model used by the OCS office in developing sale employment assumptions provides relatively little guidance with respect to these questions. In addition, research

might examine measures specifically designed to increase local hire and how effective they have been.

Low current levels of Inupiat employment in the oil industry suggest that the limiting factor upon Inupiat employment is not the size of the industry or the total number of jobs. Thus, OCS development which would tend simply to expand rather than to change the industry is likely to have relatively little impact upon Inupiat employment.

#### Land Use Conflicts

Six types of potential land-use conflicts appear to exist: physical barriers to Inupiat land use, regulatory barriers to Inupiat land use, habitat destruction, direct mortality of fish and wildlife, dislocation of fish and wildlife, and competition for wildlife resources. In each case, impact forecasts must be based upon information concerning the location of industry activities capable of causing the impact and upon information concerning Inupiat land use.

Inupiat land use outside of the North Slope communities primarily consists of hunting and fishing activities. The geographic location of each hunting and fishing activity varies according to the current and future distribution of the specific wildlife resources being sought. Land-use patterns also vary according to individual and family knowledge of areas within their community's hunting range and their past association with these areas. Land-use patterns differ

according to seasonal changes in resource availability and in mode of travel. Activity commitments within the village such as wage employment can restrict the time available for hunting and fishing and, hence, the distance one can travel to hunt or fish. On the other hand, increased income can be used to purchase the equipment and fuel necessary to reach more distant hunting and fishing destinations. Even information for a single year of land use would dramatically improve our ability to assess the likelihood and intensity of land-use conflicts. An analysis of the association between individual differences in land-use patterns and the degree of past association with the area, income, and employment characteristics and other variables could reveal relationships which could be expected to shift land-use patterns in the future. If the survey were periodically repeated, hypothesized trends could be tested and projections of future land use under changing conditions could be improved.

Our task, then, is to develop a method which will document Inupiat land use in a manner that will permit us to assess the potential impacts of development. The first requirement is that the information be location-specific. If it is not, we cannot distinguish between the impacts of one development from another. The second requirement is that the method produce measures of intensity of use. Clearly the impact of disrupting one individual's subsistence activities is less than that resulting from the disruption of a prime hunting area for an entire community. Third,

the method must be sensitive to differences in the land-use patterns associated with each species being harvested.

The final methodological requirement in documenting Inupiat land use is that it must take into account two dimensions of intensity of land use: frequency of use and productivity of use for each geographic unit. The reason for this final complication is that some areas which are infrequently used are particularly productive and can provide a disproportionately large share of the total resource harvest. They are infrequently used usually because they are distant from the community. At the same time, other areas that are more accessible but less productive are critical for meeting subsistence requirements when a lack of time or money precludes visits to more productive areas.

Can information on both the frequency of land use and the productivity of land use be collected by researchers under contract to the SESP program? No. Due to the variability in land-use behavior among individual Inupiat and over time, such information is best collected through repeated surveys not currently permitted by MMS. Furthermore, Inupiat residents are unlikely to divulge their land-use behavior to OCS contractors because they distrust the motivations of anyone associated with offshore petroleum development.

In order to address land-use conflicts, then, we must depend on secondary information. The Subsistence Division of the Alaska

Department of Fish and Game has begun to collect information on both dimensions of Inupiat land use. To date, the Division has published land-use maps which depict the extent but not the intensity of land use. They have not performed the analysis necessary to report intensities of use, nor have they obtained community approval to release such information. Therefore, we are unable to implement what we believe is the only method capable of addressing the need to forecast the potential impacts of specific development proposals. We recommend that MMS ask the Subsistence Division to provide land-use information as they produce it.

Inupiat land use is difficult to document but currently exists. Industry land use, in contrast, is largely unpredictable since the location of most land uses capable of producing conflicts cannot be determined prior to exploration. The best available measure of the potential locations of industry activity is the leasing area itself. Even this information can be highly misleading, however, when specific tracts are not delineated as in the case of Lease Sale 87.

The task of forecasting land-use conflicts is further complicated by the fact that the likelihood that a given land use will result in a land-use conflict is not known. While we are not responsible for producing predictions of biological impacts, we must use such predictions to forecast subsequent human impacts. We reviewed the Diapir Field EIS and the Beaufort Sea Synthesis Report for Lease

Sale 71. We also discussed the contents of both reports with physical scientists who reviewed the reports. We concluded that there currently is insufficient information to estimate the probabilities of industry-induced land-use impacts.

#### CONCLUSIONS REGARDING METHODS OF FORECASTING LAND-USE CONFLICTS

The preceding discussion paints a bleak but, we believe, realistic picture of the present feasibility of forecasting the probable increase in land-use conflicts associated with leasing additional tracts in the Beaufort Sea. We did decide that it would be instructive to map the cumulative current and potential areas for oil exploration and to describe the generalized pattern of Inupiat subsistence activity. The map and accompanying text appears in Chapter Six. While this information cannot be used to identify the potential impacts of a single lease sale, it does establish the physical overlap between virtually all areas used by Inupiat living in Barrow, Nuiqsut, and Kaktovik and the combined current and potential petroleum lease sale areas. In addition, we document Inupiat reports of land-use conflicts in Chapter Seven.

#### Perceived Threats to Subsistence and Cultural Values

While the actual threats to subsistence resources have yet to be sufficiently defined to serve as a basis for impact forecasts, Inupiat perceptions of threats are a reality that can be measured. We believe such perceptions are an important area of impact in themselves because they appear to be associated with significant social stress.

## PUBLIC HEARING TESTIMONY

The measurement of perceived threats can itself easily be a source of social stress. Residents have already faced numerous development proposals and have voiced their concerns repeatedly in public hearings and law suits. We discussed this issue with North Slope leaders during the research design phase of our study and concluded that an extensive data collection effort would be unacceptable to community residents. However, we also found that the long history of public testimony offers a rich source of information. We therefore designed our study around the public record and augmented this record with key informant interviews.

Public testimony is a difficult source of data to use because it is not organized by subject and because it is voluminous. To circumvent these problems, we devised a coding scheme whereby each mention of a type of impact constitutes a separate entry in a data file. One person's testimony can therefore generate dozens of separate entries. In this way, we can determine the frequency with which each specific impact is mentioned.

We also designed the coding scheme to serve as an analytical data base and as an index to the testimony. We wanted to be able to match the testimony of individuals over time and to compare testimony concerning different development proposals. Since the entire data base is a part of the public record, we coded the name of the person testifying along with the date of the testimony and

the hearing title or other reference as to the reason the testimony was given. Other potentially significant characteristics included in the coding scheme were:

- Location where the testimony was given
- Village of residence
- Organizational affiliation (up to three organizations)
- Sex
- Age
- Geographic reference (especially onshore/offshore)

We also attempted to categorize the testimony according to whether it primarily reflected an individual's point of view or experience, a group point of view or experience, generally accepted Inupiat knowledge, or scientific knowledge.

To meet its indexing objective, each subject entry included the page number of the original testimony, a keyword reference to specific animals, a flag for references to specific geographic locations, a flag if the testimony included detailed personal experiences, and a flag if recommendations were given.

Each original entry consists of a five-by-eight-inch card that includes a written paraphrase or quote from the testimony. We also entered the numerically coded data and the name of the person testifying on the University of Alaska computer. We created an SPSS



system file using the raw data and an appropriate set of variable and value labels. It is thus possible to perform cross-tabulations on the data and to use the computer file as a reference to either the cards or the original testimony.

The public hearing testimony proved to be a valuable source of Inupiat perceptions. However, it is important to recognize the limitations inherent in the use of public hearing testimony. First, those testifying may not present a representative view of resident perceptions. The majority of the Inupiat adult population in the three villages in which hearings were conducted never testified. Second, much of the testimony given at small village hearings is spontaneous, and some of it was apparently influenced by previous testimony. Therefore, some subjects may receive disproportionate attention by chance rather than because they are relatively more important. Public hearings are also political events; at times, speakers appeared to place more emphasis on pleasing other residents or intimidating the hearing officers than they did on expressing new perspectives or facts.

Speakers attempting to follow a chain of causality also may have stopped testifying before they have reached what logically could be a final impact. For example, we observed little testimony concerning the social and cultural impacts associated with the loss of subsistence resources. It may be that residents do not perceive that such impacts will occur. Alternatively, they may have felt

that they had spoken long enough before they reached the point that they would logically raise social and cultural issues. A third possibility is that they may not wish to publicly discuss or perhaps even privately recognize outcomes that would strike at the core of their existence. Finally, residents may not perceive some incremental but significant changes in their lives.

The North Slope case is particularly suited for an analysis of the public hearing record for two reasons. First, some ten years of relevant testimony exists. This method could not be applied in areas which have not repeatedly faced similar development proposals. Second, there was widespread public participation in the villages of Barrow, Nuiqsut, and Kaktovik. Over 150 individuals or almost 20 percent of the Inupiat adult population testified at least once. This reflects an unusually high rate of public participation when compared with most public hearings. Furthermore, those testifying generally did not represent special interests, but rather spoke for themselves or on behalf of local or regional governments or tribal organizations. While it is important to keep in mind that the Inupiat perceptions reported in Chapter Seven are not based on a scientific sampling of the Inupiat population, these perceptions do reflect the views of concerned individuals who chose to participate in a legally mandated form of public involvement. Just as we currently accept election results that are based upon the participation of a minority of eligible voters, so, too, can we argue that public hearing testimony can be interpreted as a valid

representation of public perceptions in its own right, particularly when it is based on relatively widespread public participation.

We also pointed out that the dynamics of the public hearings themselves may influence the content of individual testimony. In our judgment, these influences may produce minor distortions in the content of the public record but are unlikely to seriously misrepresent public perceptions. Our judgment is based on the fact that the record we analyzed included legal affidavits and formal resolutions which were not subject to spontaneous revisions in content, yet reflected the same perceptions as those contained in the public hearing record. In addition, we questioned our key informants about their testimony and probed to see if their testimony was incomplete. According to our key informants, the public record accurately reflects their views.

We could not resolve the question of why there was little testimony concerning social and cultural impacts on the basis of our key informant interviews. This fact, coupled with the expectation that the dynamics of the public hearings colored the content of the public record to some degree, prompted us to focus on the presentation of Inupiat perceptions within each subject area rather than to embark on an in-depth analysis of the relative frequency that subjects came up in the testimony. Used in this way, we believe the North Slope public record constitutes a valuable source of information on Inupiat perceptions.

## KEY INFORMANT INTERVIEWS

The next step in our forecasting method was to identify key informants to verify our interpretation of the testimony, to fill in gaps in the testimony, and to extend the testimony to include the area proposed for Lease Sale 87. We selected key informants on the basis of the scope and frequency of their previous testimony, assuming that these factors suggested both knowledge and concern. We interviewed 19 key informants in August 1982 in the villages of Nuiqsut, Kaktovik, and Barrow. To produce a record comparable to that already coded, we recorded each interview on tape, arranged for translations where necessary, and transcribed the tapes.

We had hoped that the key informant interviews would produce documentation of Inupiat perceptions that would be of higher quality than that in the public hearing record. We reasoned that an extended interview would allow the individual more time to organize and voice their views. Instead, we found that, much like a legal deposition, the written transcription often appears disjointed and fragmentary, reflecting the conversational nature of the interview. In order to provide future researchers with a useful record of our field interviews, we edited the transcripts to produce more concise, grammatically correct documents that capture the meaning of the original interviews. These transcripts are contained in Appendix G, a separate document.

The key informant interviews successfully met the verification objective. Informants usually briefly reiterated their testimony when we described our interpretation of their public statements. It was difficult, however, to get the informants to expand on their previous testimony. We were particularly unsuccessful in getting informants to distinguish between the perceived threats posed by successive offshore development proposals such as Lease Sales 71 and 87. To some extent, deficiencies in the interview process may account for this result. However, we believe the more important reason is that many Inupiat residents perceive that any offshore development can result in regionwide threats to subsistence resources and cultural values. They expect that the combination of currents and migratory movements of subsistence resources will ensure contact between spilled oil and each resource.

One of the deficiencies of past SESP reports based on key informant interviews is that it is impossible to validate the interpretations of the researchers. Private field notes contain the only record of the content of the interviews. We chose to record our interviews on tape so that other researchers could review our interpretations and use transcripts of the interviews as raw data in their own studies. We encountered two significant problems with this approach. First, taped interviews consisting of relatively short questions and answers are much more difficult to reliably transcribe than interviews in which the informant talks at length. The frequency of incomplete sentences and garbled conversation is much higher.

Second, some respondents provided substantially more information when the interview was not being taped. Thus, there is a tradeoff between the amount of information produced for use in this study and the amount available for future studies.

On balance, we recommend continued use of tape recording for subject matter that is not controversial. We suggest researchers not follow our approach of holding a single, hour-long interview session; rather, we think an initial on-taped session is required to establish rapport and to verify past testimony. Subsequent interview sessions should then be arranged to address single topics. Some of these sessions would be taped. To increase the probability that the topics are completely covered and that the informants' views are correctly interpreted, we strongly recommend the use of a two-person interview team. We found the approach to be clearly superior to that employing a single interviewer.

#### Influence of Local Institutions on Development Activities

The North Slope case is a good example of why it is difficult to project patterns of institutional behavior and outcomes of institutional actions. It is even difficult to project which institutions will attempt to influence development activities. Yet, as we observed in Inupiat testimony, a sense of local control is a critical ingredient in the determination of the intensity of fears about potential development impacts.

Given the inevitable uncertainties associated with forecasting the influence of local institutions on development activities, it makes little sense to adopt a complex research method to approach the problem. We began by identifying the local institutions which have attempted to influence development in the past or which potentially are in a position to do so in the future. We then identified the strategies used by these institutions to exert some influence over development activities and reviewed the outcomes of past influence attempts. Based on this assessment, we projected future institutional behavior and projected the likelihood of success in influencing development activities.

In the case of the North Slope, the number of institutions attempting to influence development and the number of intervention strategies employed is relatively large. We can, therefore, be more confident in our projections than we could in a region where many strategies are as yet untested. It may be the case that one or more potential local institutions do not even exist in a study region. For example, many regions are not organized as boroughs and no other region in Alaska contains a formally recognized regional tribal institution formed under the Indian Reorganization Act. In these cases, one would have to first assess the likelihood of new institutions developing in response to anticipated development.

### Social and Economic Well-Being

The mere measurement of the economic well-being of rural Alaskans is a formidable task. The methods employed will inevitably be largely determined by the data available. In most cases, current, reliable data differentiating Native and non-Native income, employment, housing quality, subsistence resource use, and other critical contributors to economic well-being simply do not exist. At the moment, it is possible to use data from the 1980 federal census to estimate family and household income by race. Rapid economic fluctuations, however, will quickly render even this source obsolete.

On the North Slope, we are fortunate to have a wealth of relevant, although somewhat dated, information from a survey of the Inupiat population funded by the National Science Foundation. The North Slope Survey should serve as a prototype for a program of periodic surveys in each region facing offshore development. We are well aware of the current ban on survey research within the SESP program. We also recognize that it is impossible to seriously describe, analyze, and project changes in economic and social well-being without reliable information developed through survey research. If the SESP program cannot be modified to provide for the collection of household information on income, employment, cost of living, housing quality, and subsistence activity, we think future Requests for Proposals (RFPs) should omit requirements to produce baseline descriptions and impact projections which must be based on such information. Otherwise, the SESP program will simply foster



the application of inappropriate research techniques or encourage the use of bastardized survey research techniques which produce unreliable data at no savings in response burden--the underlying reason for banning surveys in the first place.

### Inupiat Culture

In order to address the issue of whether OCS development will change Inupiat culture, researchers inevitably must develop operational measures which describe the culture and are sensitive to cultural change. Clearly, part of Inupiat culture is the means by which life is sustained. Thus, prevalent economic relationships must be a central component of any analysis of Inupiat culture. Relatively common and enduring social relationships are relevant to an analysis of Inupiat culture as well. Traditional Inupiat production activities probably are responsible for several forms of social relationship which ethnographers and the Inupiat themselves associate with the Inupiat cultural identity. These relationships include the sharing of subsistence products among other households and various cooperative activities. Obviously, the language used to pursue the particular production activities and attendant social relationships that traditionally existed on the North Slope is another core element of Inupiat culture, as are the beliefs about man-environment relationships and the ceremonies and celebrations which affirm those beliefs.

Each of the above elements of Inupiat culture are, of course, subject to change. We are interested in the emergence and societal recognition of qualitatively new forms of behavior. Most likely, however, such new forms of behavior will not emerge simultaneously throughout the population; rather, a growing proportion of the population will adopt the new form of behavior. Until a large segment of the population has made this change and the change is sustained over two or more generations, it is impossible to conclude that the shift indeed qualifies as a cultural change.

Here we confront the basic dilemma with regard to projecting the cultural impact of OCS development. If we wait until new behaviors become normative to recognize them as cultural changes, we will certainly have to wait a long time, perhaps several generations, in order to draw our conclusions. Alternatively, if we monitor and analyze shifts in the proportion of the population exhibiting a behavior of interest (e.g., sharing), we may be misled by temporary fluctuations in behavior. Furthermore, we would have to systematically measure changes in the incidence of behaviors using either survey research or participant observation techniques, or both. The former, as we pointed out, is not permitted, and the latter is not feasible within the time limits placed on the research. Key informants cannot be used because they will tend to refer to normative behaviors, and we are interested in long-term trends away from current norms.

The only alternative we can suggest is to track changes in the basic environmental characteristics thought to be associated with cultural attributes and to project what cultural changes might arise from these new conditions. For example, reduced subsistence harvests may discourage Inupiat from sharing. New housing may permit nuclear families to live separately with the result that there are fewer extended family relationships. These relationships amount to no more than untested hypotheses, and they are by no means a certainty. Worl and Lonner, for example, maintain that sharing has continued despite harvest restrictions and that extended family relationships continue to be maintained among households who now live as nuclear families (1981:26,190). We cannot confirm their conclusions without data that currently cannot be collected.

Again, we must return to the issue of acceptable and feasible forms of data collection. If the SESP program must project the cultural impacts of OCS development, we recommend that a small number of operational measures be developed and that appropriate forms of data collection be instituted.

## CHAPTER THREE

### NORTH SLOPE OIL DEVELOPMENT OVERVIEW

In this chapter, we provide a brief overview of oil development activities on the North Slope and estimates of oil reserves. Our purpose is to provide an introduction to this subject for readers unfamiliar with North Slope oil development. We have based our discussion on the U.S. Geological Survey's Arctic Summary Report (USGS Open File Report 81-621, October 1981), the May 1982 Update to this report (USGS Open File Report 82-19), the Minerals' Management Service's Arctic Summary Report (January 1983), and the National Petroleum Council's U.S. Arctic Oil and Gas (December 1981). We recommend these studies to those interested in a detailed review of North Slope oil development.

#### Oil Development Activities

In describing oil development activities, it is convenient to divide the North Slope into the following different areas:

- State-owned lands and offshore lease areas

- Federal-owned lands

- National Petroleum Reserve Alaska (NPRA)

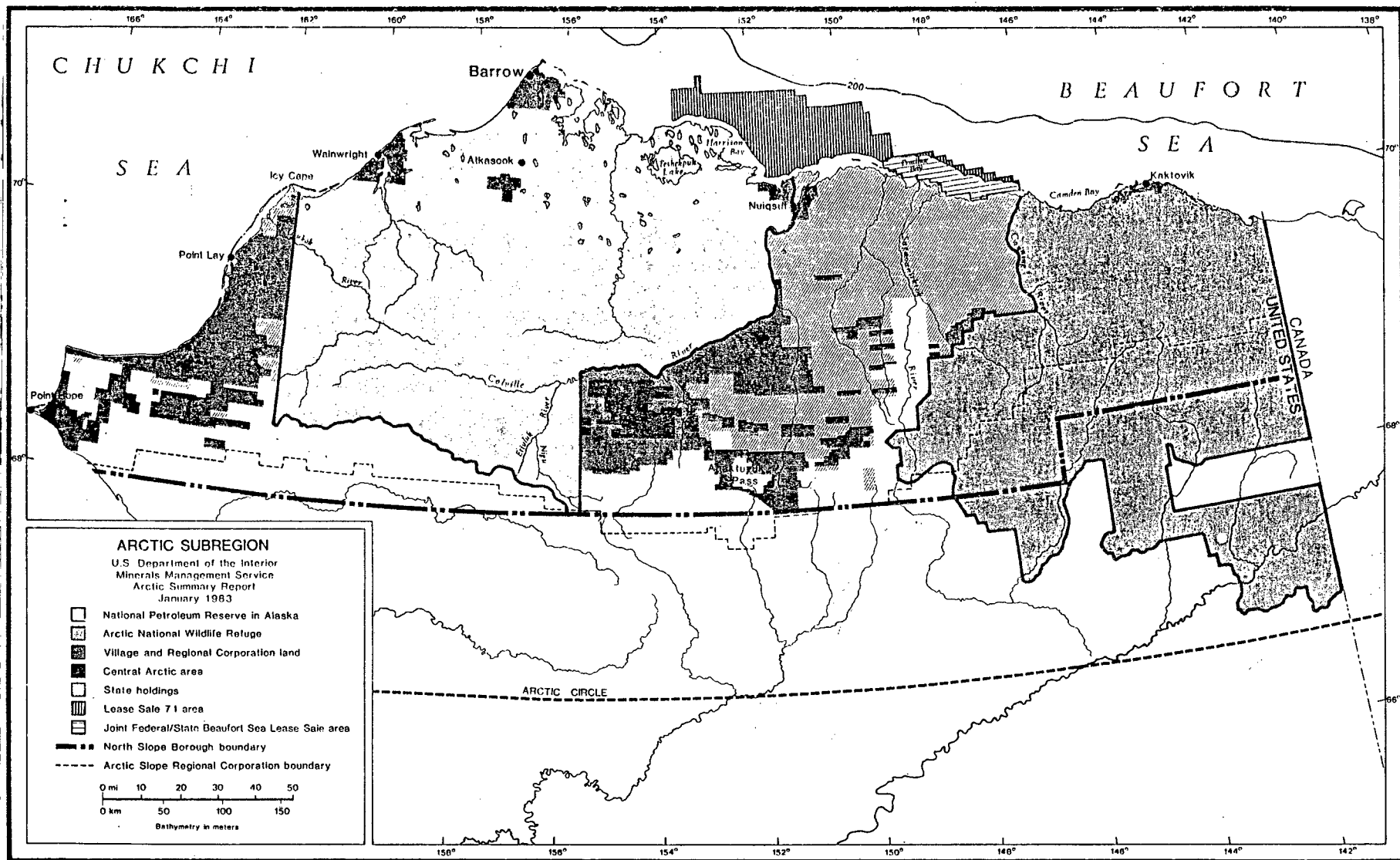
- Arctic National Wildlife Range (ANWR)

- Native lands

- Federal offshore lease areas

These areas are shown in Figure 2 below.

FIGURE 2. NORTH SLOPE LAND OWNERSHIP AND LEASE SALE AREAS



SOURCE: Joanne Barnes Jackson and Frederick N. Kurz, *Arctic Summary Report*. Prepared for Minerals Management Service (1983), p. 5. Map prepared by Rogers, Golden, and Halpern.

State lands are mostly in an area located along the coast that is about 100 miles long and 50 miles wide and centered at Prudhoe Bay. Additional state lands are located to the south of Prudhoe Bay and to the west of the pipeline corridor. The state also has jurisdiction over submerged lands in a three-mile-wide strip along the coast. The state and federal governments have disputed the definition of this limit. Federal lands include the Arctic National Wildlife Range (ANWR), located to the east of these state lands, and the National Petroleum Reserve in Alaska (NPRA), located to the west. Native lands are located immediately around North Slope villages and in larger areas to the west and south of the NPRA. Federal offshore lease areas are beyond the three-mile limit.

Below we review past, current, and planned development activities for each of these areas.

#### STATE-OWNED LANDS

The State of Alaska selected 1.6 million acres in the Prudhoe Bay vicinity in 1964 as part of its land entitlement under the 1958 Statehood Act. The state conducted a number of lease sales beginning in 1964. In January 1968, a major discovery was announced at Prudhoe Bay. The main formation, known as the Sadlerochit reservoir, contains an estimated 9.6 billion barrels of recoverable oil and 20 trillion cubic feet of salable natural gas. Delineation and production drilling were carried out between 1968 and 1977, when production of oil began with the completion of the Trans-Alaska

Pipeline. In 1982, production was approximately 1.5 million barrels per day. ARCO operates the eastern side of the Prudhoe Bay field while Sohio operates the western side. Facilities in place include production structures, base camps, gravel roads, two gravel docks, two airstrips, a power station, and a small field refinery. Eventually, a total of 900 development wells, including water and gas injection wells, will be drilled. Work has begun on the water-flooding project to enhance recovery from the field.

The Kuparuk field is located approximately 20 miles to the west of Prudhoe Bay. Although smaller than the Sadlerochit reservoir, it is still one of the largest oil fields in the United States, with total recoverable resources of 1.2-1.5 billion barrels. ARCO began production from Kuparuk in 1981, and production was approximately 90 thousand barrels per day in 1982. When fully developed, Kuparuk will have up to 800 producing and water-injection wells.

In 1979, the state and federal governments conducted a joint lease sale (Sale BF) in shallow waters to the north and east of Prudhoe Bay, primarily inside the barrier islands. Several fields have been discovered within the lease area and are being considered for development. Much of the Sale BF drilling has taken place on natural islands. In addition, as of May 1982, ten gravel islands and two ice islands had been constructed. A development plan has been proposed for the Sag River/Duck Island unit which would involve

construction of several gravel islands, a causeway, and an underwater pipeline with production beginning as early as 1988.

Table 1 provides summary information about oil fields on state-owned lands.

TABLE 1. OIL FIELDS ON STATE-OWNED LANDS

<u>Unit</u>	<u>Location</u>	<u>Volume</u>	<u>Development</u>
Prudhoe Bay	Prudhoe Bay	Recoverable reserves 9.6 billion barrels oil; 20 trillion barrels gas	Production began 1979, current production 1.5 million barrels per day
Kuparuk	25 miles west of Prudhoe Bay	Recoverable reserves 1.5 billion barrels oil	Production began 1981, current production 90 thousand barrels per day
Sag River/ Duck Island	10 miles east of Prudhoe Bay	Recoverable reserves 300-500 million barrels of oil	Development plan proposed with production beginning 1988. Could produce 100,000 barrels per day by 1990
Gwydyr Bay	15 miles west of Prudhoe Bay	-	Development being considered
Milne Point	25 miles northwest of Prudhoe Bay	-	Development being considered
Flaxman Is.- Pt. Thompson	60 miles east of Prudhoe Bay	-	Development being considered



#### NATIONAL PETROLEUM RESERVE IN ALASKA

Oil seeps were discovered in 1904 on what is now the National Petroleum Reserve in Alaska. This area was designated Naval Petroleum Reserve Number 4 (NPR-4) by executive order in 1923. The U.S. Navy conducted an extensive mapping and exploratory drilling program on NPR-4 from 1944 until 1953. During 1949 and 1950, the Navy drilled several wells near Barrow in order to develop natural gas supplies for its Barrow station. These were the first development wells on the North Slope. In 1976, jurisdiction of NPR-4 was transferred from the Navy to the Department of the Interior, and it was redesignated the National Petroleum Reserve in Alaska.

Legislation passed by the U.S. Congress in 1980 called for competitive leasing for oil and gas exploration and development within NPRA. Lease sales were held in 1981 and 1982, with oil companies' accepted bids totaling \$67 million. A third sale is scheduled for July 1983. Due to its remoteness, only very large discoveries could be economically developed in most of the NPRA.

#### ARCTIC NATIONAL WILDLIFE RANGE

Under a provision of the Alaska National Interest Lands Conservation Act of 1980 (ANILCA), the U.S. Fish and Wildlife Service is conducting a baseline study of the coastal plain in ANWR in order to establish guidelines for oil and gas exploration. ANWR is believed to have considerable oil and gas potential along the coast, both on-

and offshore. Limited seismic exploration work will be allowed in 1983, but there are as yet no provisions for follow-up drilling or leasing.

#### NATIVE LANDS

The Arctic Slope Regional Corporation has title to 4.3 million acres in the North Slope Borough. The corporation has entered into agreements with a number of oil companies to permit exploratory work on ASRC lands with options to acquire oil and gas leases. Several wells have been drilled southeast and west of NPRA, but all have been reported as dry holes. Recently, ASRC has obtained lands near Cape Halkett and has negotiated a trade of title to lands located in the Brooks Range for title to lands with high petroleum potential currently located in the Arctic Wildlife refuge.

#### FEDERAL OFFSHORE LEASE AREAS

Following the 1979 joint federal-state lease sale (Sale BF), the first federal OCS lease sale in the Beaufort Sea was Sale 71 which took place in October 1982. The U.S. Geological Survey's mean resource estimates for this sale were 2.38 billion barrels of oil and 1.70 trillion cubic feet of gas, with a 99 percent chance that commercial quantities would be found. These very favorable prospects were reflected in the bidding for the sale, with accepted bids totaling over \$2 billion. The tracts receiving the highest bids were located north of Harrison Bay, to the northwest of Prudhoe Bay.

Additional federal OCS lease sales planned in waters off the North Slope are shown in Table 2. Sale 87, which is the focus of this report, is scheduled for June of 1984.

TABLE 2. SCHEDULED FEDERAL OCS LEASE SALES  
IN THE BEAUFORT AND CHUKCHI SEAS

<u>Sale Number</u>	<u>Sale Date</u>	<u>Location</u>
71 (Diapir Field)	October 1982	Beaufort Sea, north and west of Sale BF
87 (Diapir Field)	June 1984	Beaufort Sea, north and west of Sale 71
85 (Barrow Arch)	February 1985	Chukchi Sea, west of Barrow
97 (Diapir Field)	June 1986	Beaufort Sea
109 (Barrow Arch)	February 1987	Chukchi Sea, west of Barrow

#### Estimates of Oil Reserves

There is great uncertainty about how much oil and gas might actually be discovered on the North Slope, when and where it might be discovered, and the extent to which it might be economically recoverable. Most estimates of undiscovered resources are based on analyses of geologic structures. Whether these structures actually hold oil and gas can be determined only by drilling. Before drilling actually takes place, reserve estimates remain highly uncertain.

Table 3 shows the National Petroleum Council's mean estimates of North Slope oil and gas resources. Economically recoverable undiscovered resources are estimated to total 16.3 billion barrels, with 6.5 billion barrels onshore (compared to 10.2 billion barrels already discovered onshore), and 9.8 billion barrels offshore. Table 4 shows U.S. Geological Survey mean estimates of North Slope oil and gas reserves. These U.S.G.S. total estimates of undiscovered recoverable resources are slightly lower than the National Petroleum Council's estimates, but are roughly similar in magnitude.

#### Future North Slope Oil Development Activity

Many factors other than future resource discoveries will influence oil development activity on the North Slope. These include world energy prices (which determine in large part whether discovered resources are economically recoverable); oil company operating strategies; local, state, and federal policies and regulations affecting onshore and offshore leasing, exploration, and development; and court decisions on lawsuits concerning these policies. All of these factors will influence the timing and character of future oil development on the North Slope, and the kinds of socioeconomic impacts oil development will have upon the Inupiat. The uncertainty introduced by all of these factors with respect to the overall pattern of future oil development magnifies the uncertainty associated with the specific impacts of any given lease sale, such as OCS Lease Sale 87.

TABLE 3. NATIONAL PETROLEUM COUNCIL MEAN ESTIMATES  
OF NORTH SLOPE OIL AND GAS RESOURCES

	<u>Total(a)</u>	<u>Oil(b)</u>	<u>Gas(a)</u>
<u>Discovered Resources (onshore)</u>	16.5	10.2	6.3
<u>Undiscovered Resources</u>			
Onshore	12.8	6.5	6.3
Offshore	<u>21.8</u>	<u>12.9</u>	<u>8.9</u>
Total	34.6	19.4	15.2
<u>Economically Recoverable Undiscovered Resources (c)</u>			
Onshore	6.5	6.5	-
Offshore	<u>9.8</u>	<u>9.8</u>	-
Total	16.3	16.3	
<u>Total: Discovered and Economically Recoverable Undiscovered Resources</u>			
Onshore	23.0	16.7	6.3
Offshore	<u>9.8</u>	<u>9.8</u>	-
Total	32.8	26.5	6.3

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(a) Billion barrels of oil equivalent.

(b) Billion barrels.

(c) Providing a 10 percent rate of return.

SOURCE: National Petroleum Council, 1981. U.S. Arctic Oil and Gas  
(Washington, D.C., National Petroleum Council, December),  
pp. 13, 18, 19, 89.

TABLE 4. U.S. GEOLOGICAL SURVEY MEAN ESTIMATES OF NORTH SLOPE OIL AND GAS RESERVES

	<u>Total(a)</u>	<u>Oil(b)</u>	<u>Gas(a,c)</u>
<u>Discovered Resources (onshore)</u>	13.5	8.3	5.2
<u>Undiscovered Recoverable Resources</u>			
Arctic Coastal Plain	7.6	4.4	3.2
Northern Foothills	3.5	1.4	2.1
Southern Foothills and Brooks Range	0.6	0.2	0.4
Onshore Total	11.7	6.0	5.7
Beaufort Sea (d)	13.2	7.0	6.2
Chukchi Sea (d)	2.5	1.4	1.1
Offshore Total	15.7	8.4	7.3
Total	27.4	14.4	13.0

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(a) Billion barrels of oil equivalent.

(b) Billion barrels.

(c) Gas Volumes converted to billions of barrels of oil equivalent at 1 trillion cubic feet = .178 billion barrels of oil equivalent.

(d) Water depths 0 - 200 meters.

SOURCE: U.S. Geological Survey, Arctic Summary Report, U.S.G.S. Open File Report 81-621, page 22.

One rough indication of the possible scale of future oil development activities is provided by projections of future North Slope crude oil production done by Arlon Tussing in 1980 (Tussing, 1981). Tussing reviewed numerous oil production forecasts published by a variety of groups and assessed the factors listed above in developing assumptions about the probabilities of different levels of future oil production from different fields. Based on these assumptions, he used a "Monte Carlo" technique to develop the North Slope oil production projections shown in Table 5. These are the only production projections we have found which attempt to assess systematically the likelihood of production from different fields in arriving at overall production figures.

Under Tussing's mean projection, North Slope oil production would rise from 1.5 million barrels per day in 1982 to about 1.9 million barrels per day in 1987 and would subsequently decline. Under the low projection, no substantial increase in production would occur. Under the high projection, production would rise steadily to over 4 million barrels per day in 1998. Thus, Tussing's projections suggest that, while total North Slope oil production could rise by a factor of almost three, it is most likely that it will not increase by more than about 25 percent. Long-run employment increases in the oil industry might also fall within this range although short-run (several-year) construction employment in the development of new fields might be much higher.

TABLE 5. ALASKA NORTH SLOPE CRUDE OIL PRODUCTION PROJECTIONS  
1980 - 2000

(1,000 Barrels Per Day)

<u>Confidence Level</u>	<u>Low (95 percent)</u>	<u>Most Likely (50 percent)</u>	<u>High (5 percent)</u>
1981	1,484	1,500	1,560
1982	1,484	1,539	1,597
1983	1,452	1,558	1,643
1984	1,452	1,690	1,815
1985	1,500	1,771	1,950
1986	1,530	1,808	2,133
1987	1,585	1,906	2,332
1988	1,410	1,745	2,440
1989	1,092	1,465	2,798
1990	910	1,377	2,898
1991	759	1,295	3,270
1992	750	1,289	3,566
1993	720	1,279	3,541
1994	648	1,185	3,451
1995	584	1,112	3,429
1996	569	1,094	3,820
1997	521	1,013	4,055
1998	476	935	4,220
1999	433	867	4,040
2000	394	791	3,844

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SOURCE: Arlon Tussing, The Outlook for Alaska North Slope Crude Oil Production: 1981-2000, ISER Research Summary No. 8, January 1981, page 4.





CHAPTER FOUR  
NORTH SLOPE BOROUGH REVENUES AND EXPENDITURES

Introduction

To date, the most significant effects of oil development on the North Slope have resulted from property taxes levied on the oil industry by the North Slope Borough. The borough has used this huge source of revenues to embark on an ambitious Capital Improvement Program (CIP). Construction and operation of CIP facilities have provided a wide variety of employment opportunities to borough residents, not only in Barrow but also in the smaller villages.

To what extent will development of federal leases on the outer continental shelf further add to North Slope property tax revenues and the borough's ability to employ local residents? In this chapter, we show that the effects of federal outer continental shelf development on borough revenues and expenditures are likely to be much smaller than they have been for past onshore development. One reason for this is that development of federal leases on the outer continental shelf would produce smaller increases in the property tax base of the North Slope Borough than those associated with onshore oil development. The most important reason, however, is that North Slope Borough's property taxes for operating revenues are presently constrained by a state limitation on per capita revenues rather than by the size of the property tax base.

While there is no legal limit on the amount of property taxes the borough can collect to pay for capital projects (both principal and interest), the scale of the borough's capital construction program will ultimately be limited by the amount of money available to operate and maintain borough facilities. Thus, even if the North Slope property tax base were to dramatically increase, we expect that the borough's combined operating and capital expenditures in real dollars will have to be less in five to ten years than they are today. This will be the case unless the state's legal constraint on North Slope Borough operating revenues is significantly reduced, which seems unlikely given the projected decline in state revenues.

We begin this chapter with a description of current North Slope Borough revenues and expenditures. Then we discuss future borough revenues and expenditures and how these might be affected by federal OCS development.

In order to study the effects of different factors affecting borough revenues and employment, we developed a model of the population and economy of the North Slope Borough. We describe the model, which we refer to as the "North Slope Model," in Appendix A. In Appendix B, we summarize the assumptions which we made in preparing a set of "base case" projections of the model. We present tables of the base case projections in Appendix C.

Our model projections are subject to the following three main sources of uncertainty: future North Slope oil discoveries and developments; state government policies and court decisions affecting the borough's tax revenues; and the borough's spending policies. Despite our uncertainties in these areas, however, the model gives us an indication of reasonable ranges for future borough revenues and expenditures and how they might be affected by future federal OCS development.

### Current North Slope Borough Revenues and Expenditures

#### NORTH SLOPE BOROUGH REVENUE SOURCES

The North Slope Borough receives revenue from four principal sources: property taxes, intergovernmental (state and federal) transfers, charges for services and utilities, and interest earnings. Below, we discuss each of these sources of revenue.

Property tax revenues are divided between those used to pay for principal and interest on bonds and those used to pay for borough operating expenditures. There is no restriction on the rate at which the borough may tax property to raise funds for paying principal or interest on bonds. In contrast, the rate at which the borough may tax property to raise revenue for operating purposes is restricted by state law.

State law restricts property taxes collected for operating revenues in two ways. First, and most significantly, the amount of property tax which may be collected per borough resident for operating purposes is limited to the greater of two numbers:

- \$1,500 or
- 6.75 percent of the average per capita assessed value of property in Alaska.<sup>2</sup>

The second formula has been used in recent years since it allows the borough to collect more taxes. In fiscal years 1981, 1982, and 1983, the per capita revenue limit for the borough, as determined by this formula, was \$3,614, \$3,915, and \$4,761, respectively (based on North Slope Borough Budget Document, FY 1982-83, p. 21). A second restriction imposed by state law is that the annual property tax rate for operating revenues may not exceed 30 mills (three percent of assessed value). However, this law is not presently restricting borough revenues since the mill rate for operating revenues is far below this limit. (The fiscal year 1982 mill rate for operating revenue taxes was 5.47 mills.)

More generally, the limit on borough property taxes for operating revenues may be expressed as the smaller of the values given by two alternative formulas:

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<sup>2</sup>Legally, one arrives at this figure by limiting property tax collections to three percent of a maximum assessed value arrived at by multiplying 225 percent of the average per capita assessed value of property in Alaska by the number of residents of the borough.

- $\frac{\text{Borough Population}}{\text{State Population}} \times \text{Total Assessed Value of Property Statewide} \times .0675$
- $\text{Total Assessed Value of Property Within the Borough} \times .03$

These formulas follow directly from the operating revenue limit rules discussed above. At present, the first formula is that which is limiting revenues.

There are several important aspects of this formula to keep in mind when considering future borough revenues and the effects of OCS development upon borough revenues. First, the limit is proportional to the borough population. Thus, the legal definition of the borough's population--in particular, the extent to which oil field workers who reside in other areas of the state are included in the legal population--is a key factor affecting borough revenues. Second, it is statewide property values, rather than property values within the borough, which currently limit borough revenues. At present, the effect on borough revenues is the same whether an increase in property values occurs within the borough or elsewhere in the state.<sup>3</sup>

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<sup>3</sup>The only difference is the effect on the mill rate paid for property taxes within the borough. To the extent that property values rise within the borough, the mill rate is lower. However, the total amount which may be collected by the borough remains the same. See Alaska Statute 29.53.045, quoted in Alaska Department of Community and Regional Affairs, Alaska Taxable 1981, Vol. XXI (January 1982), Appendix G., p. 121.

In addition to property tax revenues, the borough receives revenues from the state and federal governments under a number of programs. Most of these funds are specifically earmarked for certain purposes. The greatest share is for education. Two years after the borough spends funds for school capital outlays or school debt service, the state reimburses the borough for 50 percent of these expenditures (75 percent for vocational facilities). The state also supports a significant proportion of school operating expenses.<sup>4</sup> The borough collects some revenues from charges for services and utilities. Most services and utilities are run at a deficit.

The borough also levies a three percent sales tax which is restricted to the first \$1,000 of each sale. Another important source of revenue is interest earnings on investments of the borough. The use of interest earnings on some funds is restricted to capital projects and debt repayments.

#### CURRENT NORTH SLOPE BOROUGH REVENUES

Table 6 summarizes the fiscal year 1983 North Slope Borough general fund revenue estimates. Total projected revenues are \$185 million, of which property taxes account for \$134 million, or 72 percent. Much of this money must be used to pay for previous borough

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<sup>4</sup>The state provides a relatively lower share of operating expenses for education than in many other areas due to higher operating costs in the North Slope Borough. In addition, the North Slope Borough has not received direct school construction appropriations from the state (Robert Dupere, personal communication, February 22, 1983).

TABLE 6. NORTH SLOPE BOROUGH FISCAL YEAR 1982-1983  
GENERAL FUND REVENUE ESTIMATES<sup>a</sup>

	<u>Thousands of Dollars</u>	<u>Percent</u>
Property Taxes: Total	134,205	72
For Operations	33,796	18
For Debt Service	100,370	54
Sales Taxes	4,228	2
Interest Income	15,000	8
Restricted to Debt Service <sup>b</sup>	11,218	6
Other	3,782	2
Intergov't Revenues: Total	28,014	15
Debt Service for		
School Facilities	8,959	5
Education Operating Expenses	13,903	8
Health and Social Services	2,475	1
Other	2,677	1
Charges for Services <sup>c</sup>	3,903	2
<b>TOTAL</b>	<b>185,350</b>	<b>100</b>
Restricted to Debt Service	120,347	65
Other Funds	64,803	35

<sup>a</sup>Totals may not add exactly due to rounding.

<sup>b</sup>Assumes that the share of interest income restricted to debt service is the same as for property taxes.

<sup>c</sup>Excludes Service Area Number 10 (Prudhoe Bay industrial area).

SOURCE: North Slope Borough, Budget Document, FY 1982-1983, pp. 10, 21-33.



expenditures. Over \$100 million of these property taxes must go toward debt service. The borough must apply another \$9 million of intergovernmental revenues to debt service on school facilities. Some interest income is likewise restricted to debt service. We could not determine the exact share of interest income that must be applied to debt service. If we assume that this share is the same as for property taxes, then the projected revenues that are restricted to debt service total \$121 million, or 65 percent of total revenues. Thus, projected revenues other than those for debt service total \$65 million. Of these revenues, property taxes account for 52 percent.

Table 7 presents a similar breakdown of borough revenues for the past five fiscal years. Over this period, total borough revenues more than tripled. However, almost all of the increase in revenues had to be applied to debt service. While revenues for debt service increased by a factor of more than ten between FY 1979-1980 and FY 1982-1983, there was almost no change in other revenues.

TABLE 7. SUMMARY OF NORTH SLOPE BOROUGH GENERAL FUND REVENUES (MILLIONS OF DOLLARS)<sup>a</sup>

	<u>Actual FY 78/79</u>	<u>Actual FY 79/80</u>	<u>Actual FY 80/81</u>	<u>Revised Budget FY 81/82</u>	<u>Budget FY 82/83</u>
Property Taxes	35.1	52.4	59.1	110.3	134.2
For Debt Service	9.0	26.2	32.8	74.2	100.4
For Operations	26.1	26.3	26.2	36.1	33.8
Sales Taxes	1.9	2.1	3.7	3.3	4.2
Interest and Rental Earnings	6.5	7.4	24.0	8.9	15.0
Restricted to Debt Service	1.6	3.7	13.3	6.0	11.2
Other	4.8	3.7	10.7	2.9	3.8
Intergovernment Revenue	12.3	16.2	26.2	27.0	28.0
For School Construction and Debt Service	-	2.4	7.0	8.0	9.0
Other	-	13.8	19.2	19.0	19.0
Charges for Services	0.9	1.6	1.0	2.8	3.4
Miscellaneous	0.5	-	-	-	-
<b>TOTAL</b>	<b>57.2</b>	<b>94.3</b>	<b>113.9</b>	<b>152.3</b>	<b>185.4</b>
Funds Restricted to Debt Service	10.6	32.3	53.1	88.2	120.6
Other Funds	46.6	62.0	60.8	64.1	64.8

- Not available.

<sup>a</sup>Totals may not add exactly due to rounding.

SOURCE: North Slope Borough, Budget Document, FY 1982-83, p. 10.

Table 8 provides selected comparisons of 1981 property values, taxes, and debt for the North Slope Borough, the Municipality of Anchorage, and the Fairbanks North Star Borough. This table provides some perspective on the magnitude of North Slope Borough property values, revenues, and debt. The full property value of the North Slope Borough in 1981 was almost as high as that in Anchorage and more than double the full value of all property in Fairbanks. Oil and gas property accounted for 93 percent of the total North Slope property value, compared with 7 percent for Anchorage and 20 percent for Fairbanks. The per capita valuation of the North Slope Borough was more than 18 times that of either Anchorage or Fairbanks. However, North Slope Borough property owners were taxed at a rate more than twice that at which Anchorage property owners were taxed and more than three times that at which Fairbanks property owners were taxed. Per capita debt for the North Slope Borough was more than 30 times as high as for either Anchorage or Fairbanks in 1981, reflecting the tremendous scale of the borough CIP. In fact, by 1983 the borough's total bonded indebtedness was approximately equal to that of the State of Alaska--one billion dollars (Brenneman, 1983).

#### BOND REVENUES

The primary funding source for the North Slope Borough's long-range CIP has been general obligation bonds. As of June 30, 1981, the borough had raised \$489,300,000 from bond sales. An additional \$21,728,000 had been approved but had yet to be issued. In the fall

TABLE 8. PROPERTY VALUE, PROPERTY TAXES, AND DEBT:  
 SELECTED COMPARISONS OF NORTH SLOPE BOROUGH,  
 MUNICIPALITY OF ANCHORAGE, AND FAIRBANKS  
 NORTH STAR BOROUGH, 1981

	<u>North Slope Borough</u>	<u>Municipality of Anchorage</u>	<u>Fairbanks North Star Borough</u>
Population	7,098	180,740	51,659
Full Value Determination (millions of dollars)	6,705	8,003	2,607
Total Property Taxes (millions of dollars)	110.3	59.5	12.8
General Obligation Bonded Debt (Millions of Dollars)	454	266	98
Per Capita Valuation	944,596	44,280	50,463
Per Capita Debt	63,990	1,473	1,894
Debt Percentage of Valuation	6.77	3.33	3.75
Property Taxes as % of Full Value	1.65	0.74	0.49
Oil and Gas Property Taxes as Percent of Total	92.6	6.8	26.1

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SOURCE: Alaska Department of Community and Regional Affairs, Alaska  
 Taxable 1981, January 1982, pp. 33, 61.

of 1981, North Slope voters approved \$392,058,000 in additional bond issues, and they approved an additional \$199,969,000 in bond issues in the fall of 1982 (North Slope Borough, 1982, Official Statement, pp. 21, 27).

There is no debt limit imposed upon the borough by statute or by the state constitution. The general obligation bonds are authorized by vote of the borough assembly and ratified by a simple majority of voters. The full faith and credit of the borough is pledged to guarantee payment of the bonds.

#### NORTH SLOPE BOROUGH EXPENDITURES

North Slope Borough expenditures fall into three general categories: operating expenditures, debt service, and capital expenditures. The borough finances its operating expenditures and debt service primarily with property tax revenues. It finances virtually all of its capital expenditures with general obligation bonds. Table 9 summarizes borough expenditures for fiscal years 1979-1983. Expenditures in all three categories rose dramatically over this period. Table 10 summarizes North Slope Borough operating expenditures. Education consumes the largest share of the operating budget, followed by general government and community services. The share of education expenditures in the total operating budget declined from 44 percent in 1978-1979 to 33 percent in 1982-1983.

TABLE 9. NORTH SLOPE BOROUGH EXPENDITURES  
(thousands of dollars)

<u>Fiscal Year</u>	<u>Operating Expenditures</u>	<u>Debt Service</u>	<u>Capital Expenditures</u>
1979 <sup>a</sup>	28,962	10,865	69,143
1980 <sup>a</sup>	39,360	29,152	90,524
1981 <sup>a</sup>	48,362	32,820	128,921
1982 <sup>b</sup>	62,611	74,150	NA
1983 <sup>b</sup>	69,327	100,370	NA

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NA - Not available

<sup>a</sup>Actual expenditures

<sup>b</sup>Budgeted expenditures

SOURCE: North Slope Borough, Official Statement Relating to the Original Issuance of \$80,000,000 General Obligation Bonds, Series P: Part II: Information Statement (March 31, 1982), p. 39.

TABLE 10. NORTH SLOPE BOROUGH OPERATING EXPENDITURES  
(thousands of dollars)

<u>Activity</u>	<u>1978-79<sup>a</sup></u>	<u>1979-80<sup>a</sup></u>	<u>1980-81<sup>a</sup></u>	<u>1981-82<sup>b</sup></u>	<u>1982-83<sup>b</sup></u>
General Government	6,038	7,651	10,900	13,550	17,639
Community Issues	5,862	8,372	7,302	13,574	13,894
Roads	NA	NA	2,783	NA	NA
Health/Social Svcs.	1,687	2,100	3,414	5,144	5,602
Miscellaneous	500	NA	34	NA	NA
Housing	537	1,016	2,320	3,830	4,093
Public Safety	1,702	3,180	3,011	5,486	5,359
Education	<u>12,636</u>	<u>17,041</u>	<u>18,598</u>	<u>21,027</u>	<u>23,010</u>
TOTAL	28,962	39,360	48,362	62,611	69,327

NA - Not available.

<sup>a</sup>Actual expenditures.

<sup>b</sup>Budgeted expenditures.

SOURCE: North Slope Borough, Official Statement Relating to the Original Issuance of \$80,000,000 General Obligation Bonds, Series P: Part II: Information Statement (March 31, 1982), p. 39.

Debt service on the general obligation bonds used to finance the Capital Improvement Program increased by a factor of nine over the five-year period. Beginning in fiscal year 1982, debt service expenditures exceeded operating expenditures. Over the three-year period 1978/79-1980/81, capital expenditures nearly doubled. By 1980-81, capital expenditures exceeded operating expenditures by over 250 percent. Although capital expenditure data for the most recent two years are not available, as of June 30, 1981, the borough had authorized the expenditure of an additional \$546 million in capital improvements over a six-year period, or an average of \$90 million/year. Thus, it is likely that capital expenditures will continue to exceed operating expenditures for several more years.

Table 11 summarizes capital expenditures by activity for the years 1978/79-1980/81. Community services (roads, utilities, and transportation facilities), educational facilities, and housing accounted for the largest shares of capital expenditures in these years. Table 12 provides a breakdown of CIP project authorization and expenditures as of June 30, 1981.



TABLE 11. NORTH SLOPE BOROUGH CAPITAL EXPENDITURES  
(thousands of dollars)

<u>Category</u>	<u>1978-79</u>	<u>1979-80</u>	<u>1980-81</u>
General Government	321	495	269
Community Services	10,128	22,027	55,525
Roads	3,916	6,608	9,433
Health/Social Services	37	1,722	644
Miscellaneous	13,181	-	10,339
Housing	19,352	33,281	23,989
Public Safety	253	1,990	3,627
Education	<u>21,955</u>	<u>24,401</u>	<u>25,095</u>
Total	69,143	90,524	128,921

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SOURCE: North Slope Borough, Official Statement Relating to the Original Issuance of \$80,000,000 General Obligation Bonds, Series P: Part II: Information Statement (March 31, 1982), p. 39.

TABLE 12. CAPITAL IMPROVEMENTS PROGRAM STATUS  
AS OF JUNE 30, 1981

(dollars)

	<u>Authorized</u>	<u>Expended</u>
School facilities	\$169,074,000	\$82,662,933
Roads	69,667,000	17,973,309
Public housing	145,875,000	39,729,287
Water facilities	73,049,000	26,953,895
Sewage treatment	82,534,000	27,263,016
Airports	17,394,000	5,578,957
Urban renewal and development	3,800,000	2,870,923
Light, power, and heating facility	57,726,000	18,964,597
Public safety facilities	29,931,000	4,506,864
Sanitary facilities	83,697,000	35,570,802
Industrial parks	48,043,000	175,000
Communications	3,168,000	2,323,838
General capital projects	3,234,000	904,236
Health facilities	19,980,000	2,402,301
Library facilities	2,800,000	46,197
Administration facilities	3,850,000	180,384
Totals	\$813,822,000	\$268,106,539

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SOURCE: North Slope Borough, Official Statement Relating to the Original Issuance of \$80,000,000 General Obligation Bonds, Series P: Part II: Information Statement (March 31, 1982), p. 27.

## NORTH SLOPE BOROUGH OIL FIELD FACILITIES

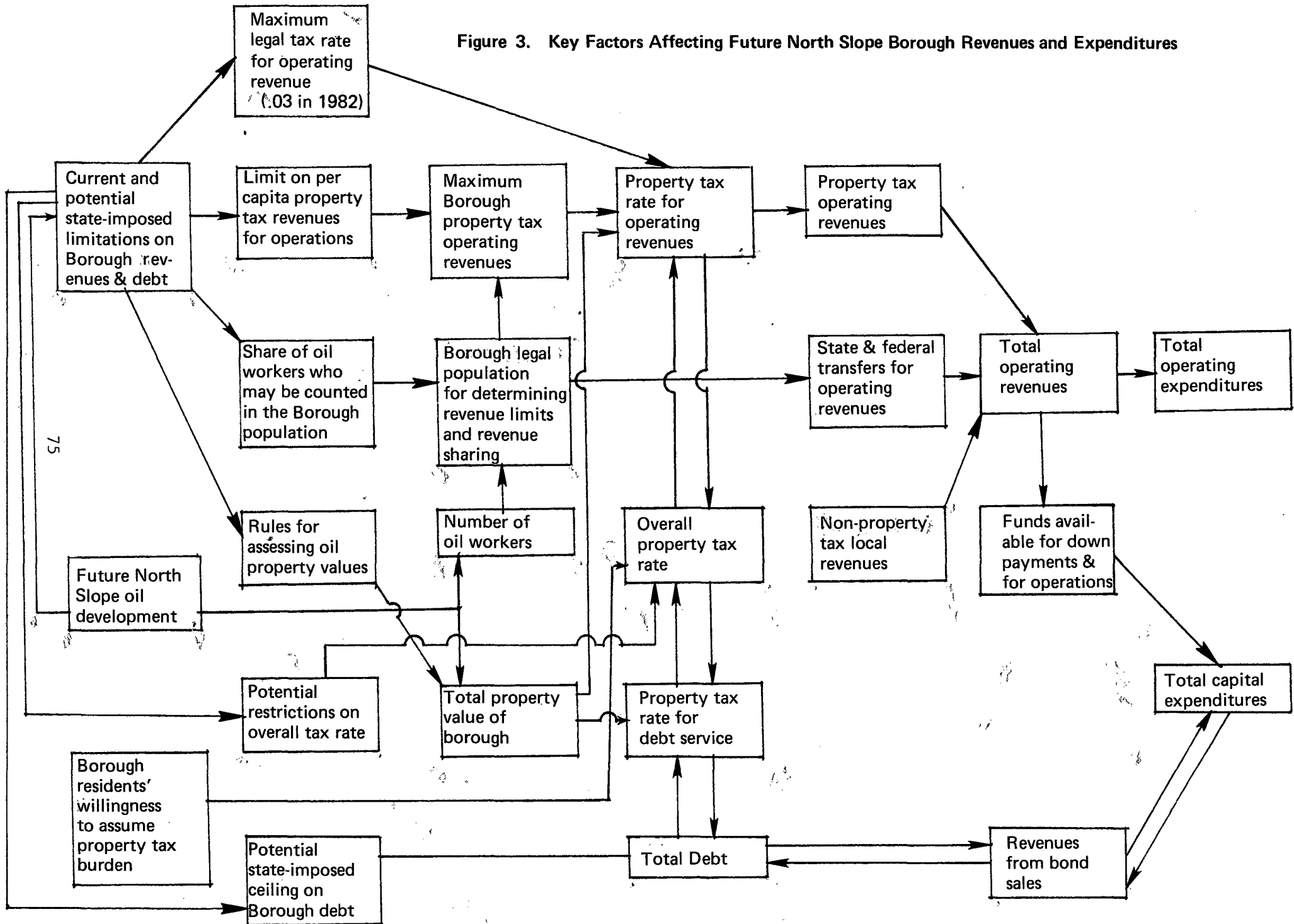
In addition to its activities in North Slope villages, the North Slope Borough operates a comprehensive sanitary facility at Prudhoe Bay that provides water, sewage treatment, solid waste incineration, and landfill to the industrial area. The borough also operates an environmental protection office at Prudhoe Bay and provides police service and search and rescue services. The borough is also planning to construct an industrial center at Kuparuk, west of the Prudhoe Bay field. The bonds used to finance both of these facilities are expected to be self-liquidating, and operating revenues should approximately cover operating costs. Since the costs and revenues of these projects approximately balance each other and these projects differ in this respect from most other borough activities, we will not include them in this discussion of borough revenues and expenditures.

### Future North Slope Borough Revenues and Expenditures

Figure 3 summarizes key factors affecting future North Slope Borough revenues and expenditures. There are three primary factors potentially limiting future borough revenues and expenditures:

- Current and potential state-imposed limits on borough revenues and debt
- Future North Slope oil development (through its effects on borough property values and population)
- Borough residents' willingness to assume property tax burdens

Figure 3. Key Factors Affecting Future North Slope Borough Revenues and Expenditures



In this section, we show that it is the first of these factors--state-imposed limits on borough revenues and debt--which is likely to be the primary factor limiting North Slope Borough revenues and expenditures over the next twenty years. Due to the huge property tax base of the borough from present and projected future oil development, neither the borough property value nor the property tax burden upon borough residents is likely to constrain borough revenues.

We begin by examining the kinds of limits to borough revenues which the state has imposed or might impose. We project a range of future revenues which the borough might receive under different limitations. Next, we project a range for future borough property values. We then project a range for future property tax rates, given our projected ranges for revenues and property values. Our projected tax rates are low enough for us to conclude that property values are unlikely to constrain borough revenues over the next two decades.

#### STATE-IMPOSED LIMITATIONS TO NORTH SLOPE BOROUGH REVENUES

The reasons for state-imposed limitations on North Slope Borough revenues are to be found in the direct tradeoff between revenues received by the North Slope Borough and revenues received by the State of Alaska and by other municipalities throughout the state. Oil developments on the North Slope represent an enormous property

tax base. However, there are economic and political limits to the total property taxes which can be raised from this tax base. To the extent that these limits are not reached by the North Slope Borough, property taxes can be collected on North Slope oil properties by the state and indirectly by other municipalities through state revenue-sharing programs. Limitations on borough revenues may be understood as attempts by residents of other areas of the state to limit the share of the total North Slope property "tax pie" which is taken by the North Slope Borough in order to obtain more for themselves.

At present, the division of the property tax pie works as follows. The State of Alaska taxes oil and gas property at a rate of 20 mills (2 percent). Property taxes collected by municipalities (such as the North Slope Borough) are subtracted from this tax obligation. Thus, up to a tax rate of 20 mills, any increase in borough oil and gas property tax revenues (which account for almost all borough property tax revenues) results in a decrease in state revenues. Above a tax rate of 20 mills, further increases in borough property tax revenues would no longer directly translate into lowered state revenues. However, they might have other indirect statewide effects such as potentially discouraging future North Slope oil development.

In 1981, the assessed value of oil and gas property within the North Slope Borough was approximately \$6.3 billion (see Table 8). At a tax rate of 20 mills, this would permit a total property tax pie of \$126 million. Total borough property taxes in 1981 were

\$110 million. Thus, the borough received 87 percent of the property tax pie in that year. Since the borough was taxing at a rate of less than 20 mills, there was a direct tradeoff between state and borough revenues.

The most important state limitation upon borough revenues at present is the restriction upon borough property taxes for operating revenues, as discussed above. This restriction may be most simply expressed as follows:

$$\begin{array}{l} \text{maximum per capita} \\ \text{property tax} \\ \text{operating revenues} \end{array} = .0675 \times \begin{array}{l} \text{per capita assessed} \\ \text{value of property} \\ \text{in Alaska} \end{array}$$

As we noted above, this formula is not tied to borough property values, except indirectly in that these values constitute a significant share of the total property value of the state. The formula is tied to the population of the borough. Thus, the procedure for determining the population of the borough--in particular the number of oil workers who may be counted in the borough's population--has become a subject of political dispute (see Table 13).

The current formula restricting operating revenues is not necessarily a good indicator of future state limitations on borough revenues. Ever since the incorporation of the borough, the struggle over the oil property tax pie has continued in the political and

TABLE 13. LEGAL AND POLITICAL BATTLES OVER NORTH SLOPE  
BOROUGH REVENUES: A BRIEF SUMMARY

July 1972	Borough formally incorporated
1973	Special legislative session establishes per capita limit on municipalities' ability to tax as well as ceiling on property tax rate
1973-1974	Oil company suit attempts to exclude Prudhoe Bay area from North Slope Borough
1976	Legislature increases municipalities' per capita property tax revenue limit from \$1,000 to \$1,500
1976	Oil company suit argues borough cannot tax property above limit for debt service; borough bonding delayed
1978	State Supreme Court rules borough not limited in debt service bonding
1982	Bill which would increase the share of oil workers included in borough population, thereby increasing borough property tax revenues, fails to pass legislature
November 1983	Outgoing Hammond administration signs emergency regulation to raise borough's legal population
May 1983	Legislation introduced in Alaska legislature to limit bond debt of local governments
August 1983	Alaska Commissioner of Community and Regional Affairs certifies borough population at 5,118 for revenue sharing purposes and 10,427 for tax-ceiling purposes, thus lowering borough revenue sharing receipts but raising property tax revenues



judicial arena, both over new legislation restricting revenues and in the proper interpretation of existing legislation. Nor are property taxes for operating revenues the only area in which efforts have been made to limit borough revenues; efforts have also been made to restrict sales taxes, state revenue sharing receipts, and property taxes for debt service. Table 13 provides a brief summary of past and current attempts to limit borough revenues.

Given the history of attempts to limit North Slope Borough revenues, it appears likely that the state will continue to limit borough revenues in the future and that new kinds of limitations may appear. Below, we briefly summarize six different kinds of limitations which might be introduced and their possible effects. Figure 3 also traces through these effects.

1. A tax rate ceiling on the property tax rate for operating revenues. Such a ceiling is already in effect. As we discussed above, state law prohibits the borough from taxing property for operating revenue at a rate of more than 30 mills (3 percent). However, this law is not currently restricting borough revenues since the limit on total property tax operating revenues is more restrictive.
2. A limit on per capita property tax revenues for operations. This is the limit currently restricting borough per capita operating revenues to 6.75 percent of the per capita value of property statewide. In FY 1983, it restricted borough property tax operating revenues to \$4,761 per capita. The formula could be changed in the future, conceivably to a lower share of per capita statewide property value as a maximum for per capita revenues or to an altogether different basis for the limit than the per capita statewide property value.

3. Limits on the number of oil workers who may be included in the borough population in determining revenue-sharing allocations and revenues permitted under the per capita operating revenue limit. The number of oil workers who may be included in the borough's legal population has been the subject of both legislative battles and court cases. Since both revenue-sharing allocations and property tax revenue limits are determined on the basis of population, the legal definition of the borough's population directly affects the revenues of not only the borough but also other municipalities. Therefore, it is likely to remain a subject of contention.
4. Rules for Assessing Oil Property Values. The procedure used to assess oil property--in particular depreciation formulas--can greatly affect its value. The borough is likely to attempt to change these procedures in order to increase the assessed value of oil property in the future, especially after new investment has peaked and property values begin to decline. In this area, state and borough interests may be similar.
5. Potential restrictions on overall tax rate. At present, the state does not restrict the borough property tax rate for debt service revenues (or the overall property tax rate). However, such limits could be imposed in the future. Such restrictions could limit future borough borrowing for capital projects, thus restricting capital expenditures. Alternatively, given debt service requirements, they could limit operating revenues.
6. Potential state-imposed restrictions on borough debt. Such restrictions have been proposed but do not currently exist. They could limit future borough capital expenditures with significant implications for borough employment.

#### PROJECTIONS OF FUTURE BOROUGH PROPERTY TAX REVENUES

Given the kinds of revenue restrictions which the state has imposed on the borough in the past and which it might impose in the future, what is a reasonable range for future borough revenues, assuming state restrictions are the primary limiting factor? We believe that

there are three main factors to consider in projecting future state limitations on borough revenues. First, current state limitations were imposed at a time of high and rising state revenues. In the future, state petroleum revenues are likely to decline, with per capita petroleum revenues declining even faster as the state population rises. Property taxes are likely to become a larger share of the declining state oil revenue pie. As a result, political competition for limited revenues between municipalities is likely to become more intense, particularly for oil and gas property tax revenues. It is likely that other regions of the state, in attempting to keep an equal share of that pie, will continue to try to limit the share of oil industry property taxes going to the North Slope Borough.<sup>5</sup> They are likely to be increasingly successful since the political power of urban areas of the state is likely to increase as relatively more population growth takes place there. Thus, current revenue limitations rules are not fixed for the indefinite future. If anything, they are likely to become less favorable to the borough. More generally, we believe that it is unlikely that the share of the total municipal revenue pie received

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<sup>5</sup>A reviewer has offered the following comment on the discussion in this paragraph: "You are editorializing the motives of those who would change the rules of the game for local greed, envy, and indeed racial prejudice. Before the Eskimo area had an industry, there was no equalizing the pie of the richer urban Alaska. The name of the game was that those that had a tax base did not share, and those with the most population got additional state aid and capital projects. The state majority is trying to do with the North Slope Borough what the eastern states are trying to do with the western states--steal their tax and resource revenues. If they have the political power, they will do so" (Robert Dupere, personal communication, February 22, 1983).

by the North Slope Borough will increase in the future; it is possible that it will decline.

Secondly, we suggest that state-imposed limits on North Slope Borough property tax revenues for operations should be considered in terms of per capita property tax revenues, with the population base being resident population. Much of the debate over North Slope Borough revenues is likely to be carried out indirectly over issues such as who should be included in the population when calculating revenue limits. However, the underlying issue will remain: how much money is the borough receiving compared to other municipalities in terms of the number of people who actually live there?

Thirdly, we feel that North Slope Borough borrowing and expenditures for the Capital Improvements Program are likely to be cut back sharply due to increased uneasiness among private lenders as well as legislators about the size of the borough's debt and the costs of operating CIP facilities.

Given these considerations, we have developed low, medium, and high cases for maximum North Slope Borough property tax revenues which might be permitted under state limitations to borough revenues and debt. These projections are shown in Table 14.

TABLE 14. LOW, MEDIUM, AND HIGH CASES FOR NORTH SLOPE BOROUGH  
PROPERTY TAX REVENUES PERMITTED UNDER  
STATE-IMPOSED LIMITATIONS

(millions of 1982 dollars)

Year(a)	Operating Revenues			Debt Service Revenues			Total Revenues		
	Low Case	Medium Case	High Case	Low Case	Medium Case	High Case	Low Case	Medium Case	High Case
1982(b)	35	35	35	87	87	87	122	122	122
1983	36	37	38	124	132	134	160	169	172
1984	36	38	40	137	150	154	173	188	194
1985	36	39	43	159	180	186	195	219	229
1986	35	39	44	173	203	213	208	242	257
1987	35	40	46	176	216	231	211	256	277
1988	34	41	49	166	217	237	200	258	286
1989	34	42	52	159	220	245	193	262	297
1990	34	43	54	124	193	223	158	236	277
1991	34	44	57	93	164	199	127	208	260
1992	33	45	60	62	133	170	95	178	234
1993	33	46	64	41	110	151	74	156	219
1994	33	47	67	31	96	139	64	143	210
1995	33	48	70	22	82	127	55	130	202
1996	32	49	71	18	74	120	50	123	199
1997	32	50	78	15	67	113	47	117	196
1998	32	51	82	14	61	108	46	112	195
1999	32	53	88	13	56	104	45	109	197
2000	32	54	92	13	52	99	45	106	197
2001	31	55	96	12	48	95	43	108	197
2002	31	56	101	12	44	90	43	100	197
2003	31	57	106	12	41	86	43	98	198
2004	31	59	113	12	38	83	43	97	203
2005	30	60	118	12	35	79	42	95	205
2006	30	61	124	11	33	76	41	94	208
2007	30	62	130	11	31	72	41	93	210
2008	30	64	138	11	29	69	41	93	231
2009	29	64	144	11	27	67	40	92	211
2010	28	65	149	11	25	64	39	90	213

(a) Projections are for calendar years. Historic data which are basis for projections were obtained by averaging fiscal year data.

(b) The 1982 values were obtained by averaging data for FY 1982 and FY 1983.

Assumptions

Low Case: Limit on per capita operating revenues declines at 3 percent per year after 1982; CIP expenditures decline at 30 percent per year after 1980.

Medium Case: Limit on per capita operating revenues remains constant; CIP expenditures decline at 10 percent per year after 1980.

High Case: Limit on per capita operating revenues increases at 3 percent per year after 1982; CIP expenditures decline at 5 percent per year after 1980.

In all cases, population projections for calculations of operating revenues are those of the base case (see Appendix C, Table C.1)

Source: 1982 values are averages of data for FY 1982 and FY 1983 reported in Table 7. Debt service revenue projections were calculated by the North Slope Model (variable RVPYDB, DSETS NSLP.2, NS.BC.MD, NSLP.3).

In the medium case, we assume that the limit on per capita operating revenues remains the same as in 1982. We develop our operating revenue projections by multiplying this limit by resident population, as projected in our North Slope Model "base case." Our medium case projections for property taxes permitted for operating revenues rises from \$36 million in 1982 to \$65 million in 2010. This growth is entirely due to increases in population.

In the low and high cases, we assume that the limit on per capita operating revenues decreases or increases by 3 percent per year, respectively. In these cases, property taxes permitted for operating revenues fall to as little as \$28 million or rise to as high as \$149 million by 2010.

Property tax revenues for debt service are more difficult to project. We based our projections on debt service requirements for past and future borrowing, given a standard debt repayment schedule and assuming three different levels of future CIP expenditures. In all cases, we assumed that future CIP expenditures would decline from current levels, due to future state restrictions on borough debt as well as increased costs of borrowing and the costs of maintaining CIP facilities. For the low, medium, and high cases, we assumed that CIP expenditures would decline at rates of 30 percent, 10 percent, and 5 percent from their 1980 levels. Obviously, none of these cases is likely to describe exactly the pattern of CIP

expenditures over time, but we believe that on average, CIP expenditures are likely to fall within this range.

Given the very large debt repayment requirements for past borough borrowing, in all of our cases, we project that borough property tax revenues for debt service will continue to rise for a number of years before eventually declining. In the medium case, they reach a peak of \$220 million in 1989 and then decline steadily to \$25 million by 2010. In the low case, they peak at \$176 million in 1987 and decline to \$11 million by 2010. In the high case, they peak at \$245 million in 1989 and decline to \$64 million by 2010.

By adding our projections for operating revenues and debt service revenues, we obtain low, medium, and high projections of the maximum North Slope Borough property tax revenues which might be permitted under state limitations to borough operating revenues and debt. In the medium case, total borough property taxes rise from \$164 million in 1982 to a high of \$262 million in 1989 and then decline steadily to \$90 million by 2010. In the low case, total revenues peak at \$211 million in 1987 and decline to \$39 million in 2010. In the high case, total revenues peak at \$297 million in 1989 and decline to \$213 million in 2010.

This range of projections serves as a bound for the level of revenues which the state might permit the borough to raise from property taxes. Below, we will examine the extent to which the

property values of the borough might constitute a constraint to revenues within this range.

PROJECTIONS OF FUTURE NORTH SLOPE  
BOROUGH PROPERTY VALUES

Table 15 shows the property tax base of the North Slope Borough from 1973 to 1982. Assessed property values increased by a factor of more than 40 over this period. In 1982, the borough's property tax base was over \$8 billion. Oil and gas property accounted for over 90 percent of this value.

TABLE 15. THE NORTH SLOPE BOROUGH PROPERTY TAX BASE  
(millions of dollars)

Year	Oil and Gas Property	Other Property	Total
1973	-	-	203
1974	-	-	256
1975	-	-	561
1976	-	-	1,794
1977	-	-	3,570
1978	-	-	4,716
1979	4,818	214	5,032
1980	5,451	367	5,818
1981	6,298	407	6,705
1982	7,722	547	8,269

- Not Available

SOURCE: Alaska Department of Community and Regional Affairs,  
Alaska Taxable, 1977-1982.



How are borough property values likely to change in the future? Adding to property values will be the construction of new facilities. Even without any new oil discoveries, a great deal of additional investments will take place on the North Slope, including additional production wells and enhanced recovery projects. The value of facilities delivered in the 1983 sealift alone totaled over \$2 billion. Additional discoveries may result in further development, which would further add to the North Slope Borough tax base. In the distant future, development of the North Slope's extensive coal resources might also add to property values. Offsetting increases in value due to new facilities, however, will be the depreciation of existing facilities.

Oil and gas properties are assessed by the state, which uses different procedures for valuing exploration facilities, production facilities, and pipelines. Production facilities and pipelines account for all but a small share of North Slope oil and gas property values. Production facilities are valued at replacement cost, with straight-line depreciation over the field life. Pipelines are valued using a complicated formula based on the present discounted value of expected future pipeline earnings. A rough approximation of future pipeline values may be gained from straight-line depreciation of construction cost over the expected life of the pipeline. However, new discoveries of oil, by expanding the expected life of a pipeline, may cause its assessed value to increase.

In order to examine the future property tax base of the North Slope Borough, we projected the future property value under several conservative assumptions about new oil discoveries. In Table 16, we provide four different projections of North Slope property values. All of the values are in 1982 dollars. We discuss our calculation of these projections in detail in Appendix D. In general, our projections are conservative and are most likely to underestimate future property values. For example, we did not include the costs of secondary recovery expenditures in our assumptions. For federal OCS developments, we only calculated the value of onshore facilities. We assumed no new trans-Alaska oil or gas pipelines will be constructed. We depreciated the current value of the Trans-Alaska Pipeline Service (TAPS) pipeline, approximately \$2 billion, over a 30-year period, without taking into account any increase in value which might result from an extension of the life of the pipeline through new discoveries. In addition, we assumed that the real value of non-oil and gas property remains constant at \$450 million.

For our first projection, we assumed that there is no additional oil development on the North Slope beyond that which is currently scheduled. In this case, real property values reach a maximum of \$16 billion, or twice their current level, in 1987 and begin to decline gradually thereafter as the increase in value from construction of new facilities begins to be offset by the depreciation of existing facilities. However, property values do

TABLE 16. PROJECTIONS OF NORTH SLOPE BOROUGH PROPERTY  
VALUES UNDER ALTERNATIVE ASSUMPTIONS ABOUT  
NEW OIL RESOURCE DEVELOPMENT

(millions of 1982 dollars)

Volume and Location of New Resources Discovered

<u>Year</u>	<u>No New Discoveries</u>	<u>4 Bbb1 Federal OCS</u>	<u>4 Bbb1 NPRA</u>	<u>4 Bbb1 State Offshore</u>
1982	8177	8177	8177	8177
1983	10320	10320	10320	10320
1984	12195	12195	12195	12195
1985	13814	13814	13814	13814
1986	15192	15192	15192	15192
1987	16342	16342	16342	16342
1988	15930	15930	15930	36570
1989	15480	15480	15480	35432
1990	14992	14992	14992	34256
1991	14190	16770	33721	32766
1992	13388	15882	32267	31276
1993	12586	14994	30814	29786
1994	11783	14105	29361	28295
1995	10981	13217	27908	26805
1996	10179	12329	26455	25315
1997	9377	11441	25001	23825
1998	8575	10553	23548	22335
1999	7773	9665	22095	20845
2000	6971	8777	20642	19355
2001	6169	7889	19189	17865
2002	5367	7001	17736	16375
2003	4564	6112	16283	14884
2004	3762	5224	14830	13394
2005	2960	4336	13377	11904
2006	2158	3448	11924	10414
2007	1356	2560	10471	8924
2008	1175	2293	9638	8055
2009	994	2026	8806	7186
2010	813	1759	7974	6317

SOURCE: See text.

not decline to their present value until 1998. Subsequently, they continue to decline rapidly, due to the assumed rapid depreciation of property values in the mostly depleted oil fields.

For the remaining three cases, we assume that an additional four billion barrels of oil are discovered and developed on the North Slope. We believe that this is a conservative estimate. The National Petroleum Council's mean estimate of North Slope onshore and offshore economically recoverable oil was 16.3 billion barrels (National Petroleum Council, 1981, p. C-23).

The differences in property values in the three cases arise from differences in our assumptions about the location of the discoveries, resulting in different estimates of the value of new onshore facilities constructed. We projected future property values, given development of an additional four billion barrels for three different locations: the National Petroleum Reserve Alaska (NPRA), offshore state leases, and offshore federal leases from Lease Sale 71.

Discovery and development of an additional four billion barrels of oil on federal offshore (OCS) leases has relatively little effect upon borough property values since most development is offshore. At their peak in 1991, values are about \$16.8 billion, or about \$2.6 billion higher than in the case in which there are no new discoveries. The main effect of new oil development is to delay by

about two years the decline in property values. Borough property values fall below their 1982 level after 2000.

Discovery and development of an additional four billion barrels on the NPRA or on state offshore leases would have a much more significant effect upon property values. At their peak, property values would considerably exceed \$32 million--more than four times current levels--and they would not fall below current levels before 2007. These very high property values are due to the extremely high cost of offshore development, in the case of offshore state leases development, and somewhat lower development costs combined with high pipeline costs, in the case of NPRA development.

Table 16 suggests that property values would jump abruptly in 1991 in the NPRA case and in 1998 in the state offshore case. This is because we did not assume any increase in property values until a field was actually brought on line, and we assumed that all development would be completed at once. In fact, the increase in property values, although steep, would be more gradual.

In our subsequent discussion, we will use the "no-new discoveries" case as a "low case" projection of borough property values. We use the "4 BBBL OCS case" as a "medium case," and we use the "4 BBBL NPRA case" as a "high case."

We emphasize again that these projections are only rough approximations based on a great many assumptions. However, they do illustrate the fact that the North Slope Borough's property tax base will be very large for at least 15 years, even if no new oil discoveries are made, and that new oil developments--especially onshore developments--would add significantly to this already large tax base. The conservative assumptions used in developing the property value projections tend to reinforce this conclusion.

#### PROJECTED NORTH SLOPE BOROUGH PROPERTY TAX RATES

In this section, we discuss current and potential limits to North Slope Borough property tax rates and compare these limits to projections of tax rates based on our revenue and property value projections. There are several current or potential limits to borough property tax rates:

1. The legal limit on the tax rate for operating revenues. This limit is currently set at 30 mills (3 percent).
2. A potential limit on the total property tax rate for operating and debt service revenues. Although such a limit does not currently exist, it might conceivably be imposed. For example, it is highly unlikely that the state would ever permit the borough to tax property at a rate exceeding 50 mills (5 percent).
3. The willingness of local taxpayers to accept a property tax burden. In most municipalities, property taxes are limited not by legal limits upon operating revenues, but rather by the willingness of the residents to tax themselves. Until recently, this has probably not been a significant factor in determining borough revenues since borough residents own only a small share of the borough property tax base. However, in 1982, the borough announced a two-month extension of the borough property tax payment deadline

to give residents having difficulty paying their taxes extra time to make these payments. This suggests that the borough property tax rate has already reached a burdensome level for local residents. As Table 17 shows, the total borough mill rate rose sharply in fiscal year 1982, reflecting the rapid growth in the collection of revenues for payment of debt service. The effective tax rate for fiscal year 1982 was 16.70 mills--over twice the average rate for Anchorage. Thus, even though residents pay only a small proportion of the total property taxes collected, the borough's revenue requirements are so high that taxes are beginning to be a burden for local residents. A reasonable upper limit on the tax rate acceptable to borough residents might be 30 mills, or 3 percent.

TABLE 17. NORTH SLOPE BOROUGH EFFECTIVE TAX RATES

<u>Fiscal Year</u>	<u>Mill Rate</u>
1976	12.3
1977	10.3
1978	7.52
1979	7.28
1980	10.35
1981	10.33
1982	16.70
1983	16.42

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SOURCE: North Slope Borough, Official Statement Relating to the Original Issuance of \$80,000,000 General Obligation Bonds, Series P: Part II: Information Statement (March 31, 1982), page 14.

Of the three limits to property tax rates discussed above, the most significant may not be a state-imposed limit, but rather borough residents' willingness to accept a high tax burden. In general, it appears that the upper limit on the borough's overall tax rate in the future will be somewhere between 20 mills and 40 mills.

How does this range compare with the tax rates that would prevail, given our projected revenues permitted under state limitations and our projected borough property values? In Table 18, we have projected tax rates for three different cases. For the medium case, we assume our medium case revenue projections and our medium case property values. For the low case, we assume our low case revenues and our high case property values. For the high case, we assume our high case revenues and our low case property values.

In the medium case, our projected total tax rate on property in the North Slope Borough rises slightly, to just below 17 mills in 1989. This is because borough property tax revenues are increasing faster than the borough property value, due to high debt service payments. By 1993, tax rates decline to about 10 mills, as debt service payments decline. After 2000, tax rates rise steadily, climbing above 20 mills by 2005 and above 30 mills by 2007. This rapid increase in tax rates at the end of the projection period is due to the assumed rapid decline in property values due to depreciation and is probably unrealistically steep.



TABLE 18. PROJECTED NORTH SLOPE BOROUGH PROPERTY TAX RATES:  
LOW, MEDIUM, AND HIGH CASES

Year	Rate for Operating Revenues			Rate for Debt Service Revenues			Total Rate		
	Low Case	Medium Case	High Case	Low Case	Medium Case	High Case	Low Case	Medium Case	High Case
1982	.0043	.0043	.0043	.0106	.0106	.0106	.0149	.0149	.0149
1983	.0035	.0036	.0037	.0120	.0128	.0130	.0155	.0163	.0167
1984	.0030	.0031	.0033	.0112	.0123	.0126	.0142	.0154	.0159
1985	.0026	.0028	.0031	.0115	.0130	.0135	.0141	.0158	.0166
1986	.0023	.0026	.0029	.0114	.0133	.0140	.0137	.0159	.0169
1987	.0021	.0025	.0028	.0108	.0132	.0141	.0129	.0157	.0170
1988	.0021	.0026	.0031	.0104	.0136	.0145	.0122	.0162	.0175
1989	.0022	.0027	.0034	.0103	.0142	.0158	.0125	.0169	.0192
1990	.0023	.0029	.0036	.0083	.0129	.0149	.0105	.0158	.0185
1991	.0010	.0026	.0040	.0028	.0098	.0140	.0038	.0124	.0180
1992	.0010	.0028	.0045	.0019	.0083	.0127	.0029	.0112	.0172
1993	.0011	.0031	.0051	.0013	.0073	.0120	.0024	.0104	.0171
1994	.0011	.0033	.0057	.0011	.0068	.0118	.0022	.0102	.0175
1995	.0012	.0036	.0064	.0008	.0063	.0116	.0020	.0099	.0180
1996	.0012	.0040	.0070	.0007	.0060	.0118	.0019	.0100	.0188
1997	.0013	.0044	.0083	.0006	.0059	.0121	.0019	.0102	.0204
1998	.0014	.0049	.0096	.0006	.0058	.0126	.0020	.0107	.0222
1999	.0014	.0054	.0113	.0006	.0058	.0134	.0020	.0113	.0247
2000	.0016	.0061	.0132	.0006	.0059	.0142	.0022	.0120	.0274
2001	.1106	.0070	.0156	.0006	.0061	.0154	.0022	.0130	.0310
2002	.0017	.0080	.0188	.0007	.0063	.0168	.0024	.0143	.0356
2003	.0019	.0094	.0232	.0007	.0067	.0188	.0026	.0161	.0420
2004	.0021	.0112	.0300	.0008	.0073	.0221	.0029	.0185	.0521
2005	.0022	.0138	.0399	.0009	.0081	.0267	.0031	.0219	.0666
2006	.0025	.0177	.0575	.0009	.0095	.0352	.0034	.0273	.0927
2007	.0029	.0244	.0959	.0011	.0120	.0531	.0040	.0364	.1490
2008	.0031	.0278	.1174	.0011	.0125	.0587	.0042	.0404	.1761
2009	.0033	.0321	.1449	.0012	.0133	.0677	.0045	.0454	.2123
2010	.0035	.0370	.1833	.0014	.0145	.0787	.0049	.0512	.2620

Assumptions

Low Case: High property value projections, low revenue projections

Medium Case: Medium property value projections, medium revenue projections

High Case: Low property value projections, high revenue projections

Tax rates calculated based on property value projections from Table 16 and revenue projections from Table 14.

In the low case, tax rates decline steadily, with an abrupt drop in 1991 due to the assumed jump in property values. Subsequently, tax rates remain below 5 mills. In the high case, tax rates increase gradually to 20 mills in 1997, 30 mills in 2001, and very high rates by the end of the period due to the sharp drop-off in property values. Again, the very steep increase in rates at the end of the period is probably unrealistic due to our conservative property value assumptions.

In all of these cases, including the high case where high revenue requirements are combined with low property values, the tax rate does not rise above 20 mills before 1997. Thus, we believe it is reasonable to conclude that property values are highly unlikely to be a constraint on North Slope Borough revenues for at least the next fifteen years. Only under the extreme assumptions of our high case are property values likely to become a constraint to borough revenues in the subsequent years. In our medium case, property tax rates would not become unreasonably high before 2005.

In summary, it appears likely that borough property values will not be the limiting factor upon borough revenues over the next two decades, but rather state-imposed limits on borough revenues. Only in the distant future, when the enormous property values from current oil developments have largely depreciated, are increases in borough property values likely to again have a significant effect upon borough revenues.

In projecting future borough revenues and expenditures, the kinds of limitations imposed by the state are the key factor. The borough's revenues will depend primarily upon its success in the political and legal arena. Our "medium" projections in Table 14 represent a case in which the borough neither gains nor loses ground in this arena while the low and high cases provide a wide range for the level of revenues and expenditures which may actually occur.

#### Effects of OCS Development upon North Slope Borough Revenues

Our preceding discussion of North Slope Borough revenues suggested that future borough revenues are likely to be limited primarily by politically determined limits rather than by the size of the borough's tax base. This suggests that expansion of the borough tax base as a result of OCS development would not have a significant effect upon North Slope Borough revenues. This conclusion is reinforced by the fact that a large share of the total value of OCS facilities would be located offshore and would not be taxable by the borough.

The greatest contribution of OCS development to property values would occur in the 1990s, at a time when property values from developments which are already in place or planned would be at their highest. By the time these values had depreciated significantly, the value of OCS-related onshore developments would have also begun to depreciate. In general, the sooner OCS development takes place,

the smaller the relative effect it will have upon North Slope Borough property values. In effect, the borough's benefits from high oil and gas property values are reduced if these high values all occur at once. The borough could reap much higher property tax benefits if oil development were spaced over a longer period.

There are several ways in which OCS development might have indirect effects upon borough revenues. However, these effects are likely to be fairly small.

One such indirect effect might result from expansion of the state's total tax base, which is the basis for the current rule limiting operating revenues. Assuming 1981 population figures, the increase in revenues would be given by the following formula:

$$\begin{aligned}
 \text{Increase in Borough Revenues} &= .0675 \times \frac{\text{Borough Population}}{\text{State Population}} \times \text{Taxable Value of OCS Developments} \\
 &= .0675 \times \frac{7,098}{422,187} \times \text{Taxable Value of OCS Developments} \\
 &= .00113 \times \text{Taxable Value of OCS Developments}
 \end{aligned}$$

Thus, for every \$1 billion increase in borough property values, borough operating revenues would increase by about \$1 million. Using very approximate cost figures, development of a one billion barrel OCS oil field might add approximately \$1.7 billion to the tax base of the North Slope Borough, with this value declining over time due to depreciation. This would result in an increase of approximately \$2 million in borough revenues.

Another possible source of borough revenues from OCS development is future federal OCS revenue sharing. Legislation has been proposed which would provide a share of federal OCS revenues to the State of Alaska and to local communities. However, it is unlikely that this OCS revenue sharing would contribute more than \$5 million to borough revenues. We discuss proposed OCS revenue sharing legislation in Appendix H.

#### Future North Slope Borough Expenditures

We may divide future borough expenditures into three categories: operating expenditures, capital expenditures, and debt service expenditures. In this section, we will discuss the first two of these categories since these directly affect North Slope Borough employment--the subject of our next chapter. It appears likely that operating expenditures will increase gradually over time. However, capital expenditures are likely to decline significantly.

Future borough operating expenditures will be constrained by operating revenues. These include both property tax revenues and other revenues, primarily from state revenue sharing. Assuming constant per capita nonproperty tax revenues and adding these to our low, medium, and high case projections of property tax revenues, we obtain the low, medium, and high projections of total operating expenditures, shown in Table 19. In our medium case, operating expenditures increase from \$55 million in 1982 to \$99 million in 2010. In our low case, total operating expenditures increase only slightly, to \$62 million in 2010. In our high case, total operating expenditures increase very rapidly, to \$183 million in 2010.

There are two important potential constraints to future capital expenditures by the borough. One potential constraint is a state-imposed limit on future borough borrowing or indebtedness. There is currently no limit on borough indebtedness, but one has been proposed (Brenneman, 1983). The attractiveness of borough bonds to investors is also affected by the size of the borough's total debt, and this factor may also serve to slow future borough borrowing.

A second constraint is imposed by the level of funds available to operate new facilities. The borough has not systematically studied the future operating costs associated with the numerous CIP projects already under construction or planned, but it is apparent that these will be considerable.

TABLE 19. PROJECTED NORTH SLOPE BOROUGH EXPENDITURES;  
LOW, MEDIUM, AND HIGH CASES  
(millions of 1982 dollars)

Year	Operating Expenditures			Capital Expenditures			Total Expenditures		
	Low Case	Medium Case	High Case	Low Case	Medium Case	High Case	Low Case	Medium Case	High Case
1982	55	55	55	54	89	99	109	144	154
1983	55	56	58	38	80	94	93	136	152
1984	56	58	60	26	72	89	82	130	149
1985	56	59	63	18	65	85	74	124	148
1986	56	60	65	13	58	81	69	118	146
1987	56	62	67	9	52	77	65	114	144
1988	56	63	71	6	47	73	62	110	144
1989	56	64	74	4	43	69	60	107	143
1990	57	66	77	3	38	66	59	104	143
1991	57	67	80	2	34	62	59	101	142
1992	57	69	84	2	31	59	59	100	143
1993	57	70	88	1	28	56	58	98	144
1994	58	72	92	1	25	54	59	97	146
1995	58	73	95	1	23	51	59	96	146
1996	58	75	97	0	20	48	58	95	145
1997	58	77	104	0	18	46	58	95	150
1998	59	78	109	0	16	44	59	94	153
1999	60	80	116	0	15	41	60	95	157
2000	60	82	120	0	13	39	60	95	159
2001	60	84	125	0	12	37	60	96	162
2002	60	85	130	0	11	35	60	96	165
2003	61	87	136	0	10	34	61	97	170
2004	62	87	144	0	9	32	62	98	176
2005	61	91	149	0	8	30	61	99	179
2006	62	93	156	0	7	29	62	100	185
2007	63	95	163	0	6	27	63	101	190
2008	63	97	171	0	6	26	63	103	197
2009	63	99	178	0	5	25	63	104	203
2010	62	99	183	0	5	24	62	104	207

Assumptions

Operating revenue assumptions are the sum of base case nonproperty tax operating revenue projections and the property tax operating revenue projections given in Table 14. Construction expenditures for the low, medium, and high cases assume rates of decrease in construction spending of 30 percent, 10 percent, and 5 percent, respectively, from a 1980 level of \$110 million.

Our North Slope model base case projections in Table 20 provide an illustration of the potential shortfall in borough operating revenues compared to costs, under fairly conservative assumptions about future borough construction expenditures. We assumed that 1980 operating revenues were just adequate to cover operating costs and that operating costs for new capital projects are 10 percent of the costs of construction. Because our projections of operating revenues increase much more slowly than do operating costs, a revenue shortfall arises which increases to over \$50 million by 1993. These are funds which would be needed to adequately operate all facilities, but which are not expended due to lack of revenues.

The borough could conceivably continue to build facilities even if it did not have the funds to operate them. However, it is likely that the constraint imposed by limited operating revenues will serve to limit construction expenditures to some extent.

In sum, we believe that borough CIP expenditures are likely to decline considerably from their current levels. In Table 19, we present low, medium, and high projections of borough construction expenditures which assume annual rates of decline of 30 percent, 10 percent, and 5 percent, respectively, from their 1980 levels. These assumptions will not necessarily reflect borough construction expenditure patterns well in the immediate future; for example, expenditures could conceivably rise for several years. However, we feel that they provide a reasonable range for longer-run projections



TABLE 20. NORTH SLOPE MODEL PROJECTIONS FOR BOROUGH OPERATING REVENUES, OPERATING COSTS, AND REVENUE SHORTFALLS

Year	Borough Operating Revenues	Borough Operating Costs	Revenue Surplus or Shortfall
1980	43861	43861	0
1981	50031	49073	958
1982	54922	56507	-1584
1983	56211	65940	-9729
1984	57522	74430	-16908
1985	58854	82071	-23217
1986	60206	88948	-28742
1987	61578	95137	-33559
1988	62971	100707	-37737
1989	64386	105720	-41335
1990	65824	110232	-44409
1991	67287	114293	-47006
1992	68776	117948	-49172
1993	70293	121237	-50944
1994	71839	124197	-52358
1995	73416	126861	-53445
1996	75025	129259	-54234
1997	76667	131417	-54749
1998	78345	133359	-55014
1999	80058	135107	-55048
2000	81809	136680	-54870
2001	83599	138096	-54497
2002	85428	139370	-53942
2003	87298	140516	-53218
2004	89210	141549	-52338
2005	91165	142477	-51312
2006	93164	143313	-50149
2007	95208	144066	-48857
2008	97299	144743	-47444
2009	94791	145352	-50561
2010	87112	145900	-58788

SOURCE: North Slope Model Simulation NSLP.1--8/16/83

VARIABLES: RVOPTO, CSOP, AND DFOPPT

of construction expenditures. (The projections formed the basis for our debt service revenue projections in Table 14).

Adding together our projections of operating expenditures and construction expenditures, we have the range of projections for total borough expenditures shown in Table 19. In the medium case, borough expenditures would initially decline from about \$140 million in 1982 to \$95 million in 1996, due to a sharp decline in construction expenditures. Subsequently, expenditures would gradually rise, to about \$104 million in 2010, due to increases in operating expenditures. In our low case, expenditures would be about half this high while in our high case, expenditures would be about twice as high.

The most significant point to be gained from these projections is that future total North Slope Borough expenditures are likely to decline considerably from present levels--perhaps by about one-third--due to reductions in capital expenditures. Even in a high expenditure case, borough expenditures would not be likely to be much higher than current levels for the next twenty years. As we discuss in the next chapter, the decline in borough expenditures is likely to reduce North Slope Borough employment opportunities for Inupiat.

EFFECTS OF OCS DEVELOPMENT UPON  
NORTH SLOPE BOROUGH EXPENDITURES

Since borough expenditures are directly and indirectly constrained by borough revenues, the impacts of OCS development upon borough expenditures will reflect the impacts of OCS upon borough revenues. Since effects upon revenues are likely to be small, as discussed in the above section, effects upon expenditures are also likely to be small.

## CHAPTER FIVE

### INUPIAT EMPLOYMENT

A primary goal of the North Slope Borough has been to increase employment opportunities for Inupiat. The borough has been very successful in this respect. It has hired large numbers of Inupiat both for work in borough operations and on construction projects. A very large share of Inupiat employment--perhaps as high as 80 percent--results either directly or indirectly from North Slope Borough expenditures.

North Slope oil development has been indirectly responsible for most of this employment by providing a tax base for the North Slope Borough. However, the oil industry has provided very little direct employment to Natives.

In this chapter, we show that non-oil-related employment opportunities for Inupiat are likely to decline significantly with the decline in borough construction expenditures which we have projected. It is uncertain whether Inupiat gains in oil-industry employment will offset these declines in borough-supported employment. This will depend upon the extent to which Inupiat are willing to take oil industry jobs as well as the extent to which the oil industry is able to offer jobs to Inupiat.

It is unlikely that OCS development will have significant effects upon Inupiat employment. As we discussed in Chapter Four, additional OCS development is unlikely to significantly affect borough revenues and expenditures and would, therefore, not affect borough-supported non-oil employment. Although OCS development would increase the total number of North Slope oil jobs, this would probably not affect Inupiat oil employment, which is likely to continue to be constrained by other factors.

We begin this chapter with a discussion of employment data for the North Slope, generally, and the difficulty of obtaining data for Inupiat employment, in particular. Next, we present an estimate of Inupiat employment in 1980. Next, we discuss future non-oil-industry employment of Inupiat--in particular, North Slope Borough-supported employment. We then discuss oil industry employment of Inupiat. Finally, we conclude with a discussion of the effects of future OCS development upon Inupiat employment.

### North Slope Employment Data

#### DEFINING EMPLOYMENT

A first problem in measuring Inupiat employment is in defining employment. Depending upon the purpose of the analysis, one may wish a definition of employment to be for a point in time or to be averaged over a period of time such as a year, to count full-time and part-time jobs equally or to average part-time jobs into a

full-time equivalent figure, and to count all individuals who have worked during a given period or to include only average employment (if there has been turnover of employees). Available data for the North Slope vary considerably in the concept of employment which has been measured, and it is frequently not clear which concept has been used.

In this chapter, we use the concept of annual average full-time equivalent employment to describe Inupiat employment. This refers to the total number of man-hours of employment worked in a given year. We believe this concept of employment to be the single most useful concept for describing employment, although other concepts may be more useful for some purposes.

#### EMPLOYMENT DATA

A second problem in describing Inupiat employment on the North Slope is the lack of data. To begin with, no single data source is available which provides an estimate of annual average full-time equivalent employment while also allowing us to distinguish between resident and nonresident employment. The Alaska Department of Labor has published monthly data for wage and salary employment in the borough through 1980 (Appendix Tables E.1 and E.2). These data permit an estimate of annual overall full-time equivalent employment. However, these data do not distinguish between employment at oil-related sites and employment in other parts of the

borough. As a result, they cannot be used to estimate resident employment.

In contrast, the 1980 census provides data on employment for each village (Appendix Tables E.7 through E.9). However, these data are for a given point in time and may not accurately reflect annual average full-time equivalent employment. The date for which census employment data were collected is not clear and may not have been consistent (it is likely to have been during the summer or spring of 1980). In addition, enumeration problems may have introduced biases into the census employment estimates.<sup>6</sup>

Alaska Consultants, Inc., has recently surveyed employment and prepared estimates of annual average full-time equivalent employment for Atkasook, Kaktovik, Point Hope, and Point Lay in the preparation of planning documents for the North Slope Borough (Appendix Tables E.19 through E.22). However, they have not yet published employment data for the remaining villages which account for most of the population of the borough. When these data are available, they should prove very useful for describing resident employment in the North Slope Borough. However, these data do not distinguish between Inupiat and non-Inupiat employment.

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<sup>6</sup>For a discussion of potential problems with 1980 census data, see John A. Kruse and Robert Travis, A Technical Review of the 1980 U.S. Census in Alaska: Interviews with Census Workers. (Anchorage, Institute of Social and Economic Research, October 1981.)

A variety of data are available from miscellaneous other sources which contribute to the picture of employment in the borough. Most of these data were collected for a single point in time, and they may not be an accurate description of annual average employment. Most do not distinguish between Inupiat and non-Inupiat employment, and some data are only for particular industries or sectors.

We have collected data on employment in the North Slope Borough from as many different sources as we could find. We include these data in the tables in Appendix E. They may serve as a useful source for those wishing to learn more about Inupiat employment than we provide in the subsequent discussion in this chapter.

#### Inupiat Employment in 1980

In Table 21, we present estimates of full-time equivalent employment on the North Slope in 1980. We developed these estimates in the preparation of another report, using data from several sources and making a number of assumptions. We discuss the development of these assumptions in detail elsewhere (Knapp and Nebesky, Impacts of the Barrow Arch Lease Sale, 1983). Because so little evidence is available from which to develop employment assumptions, our figures may differ considerably from actual employment in 1980. Nevertheless, they provide an indication of the approximate scale of employment in various categories for Inupiat, non-Inupiat village residents, and nonresident workers.



TABLE 21. ESTIMATED FULL-TIME EQUIVALENT EMPLOYMENT  
IN THE NORTH SLOPE BOROUGH, 1980  
BY RACE, RESIDENCY STATUS, AND  
EMPLOYMENT CATEGORY

Categories	Total Employment	Inupiat	Non-Inupiat Resident	Total Resident	Non- Resident
1. State & Federal Government	294	64	39	103	191
1. Borough Operating	792	517	275	792	0
3. Borough CIP	321	321	0	321	0
4. Borough-funded Private CIP	348	0	0	0	348
5. Support	458	299	159	458	0
6. Oil Industry	3,902	10	0	10	3,892
<b>TOTAL</b>	<b>6,115</b>	<b>1,211</b>	<b>473</b>	<b>1,684</b>	<b>4,431</b>
<u>Subtotals</u>					
Total Borough (2+3)	1,113	838	275	1,113	0
Total CIP (3+4)	669	321	0	321	348
Total Gov't (1+2+3)	1,407	902	314	1,216	191
Total Gov't Funded (1+2+3+4)	1,755	902	314	1,216	539
Total Private Funded (5+6)	4,360	309	159	468	3,892
Total Private (4+5+6)	4,708	309	159	468	4,240

SOURCE: Gunnar Knapp and Will Nebesky, Impact Analysis of the Barrow Arch Lease Offering (Anchorage, Minerals Management Service Alaska OCS Office, forthcoming 1983).

Of total employment of approximately 6,100 on the North Slope in 1980, three-quarters of all jobs were held by nonresident workers, mostly in the oil industry. About 1,700 jobs were held by village residents, of which non-Native residents accounted for about 500 jobs. Total Inupiat employment was about 1,200, of which over 800 jobs were borough employment. In addition, many of the approximately 300 support jobs held by Inupiat probably resulted directly from North Slope Borough spending. Assuming half of these jobs were borough-supported, approximately 950 jobs, or about 80 percent of Inupiat employment, was supported by North Slope Borough spending.

#### NORTH SLOPE BOROUGH EMPLOYMENT OF INUPIAT

It is difficult to obtain a clear picture of North Slope Borough employment of Inupiat. Table 22 provides a rough picture of borough employment based on several different sources. Total borough employment is at least 1,000 and may be as high as 1,300. These figures may still underestimate direct employment resulting from borough expenditures since they do not include workers on CIP projects who are not borough employees. (These workers are included in Table 21 as support employment.)

The employment figures shown in Table 22 do not correspond to the number of Inupiat employed by the borough. A substantial portion of borough operating employment and CIP employment consists of

TABLE 22. RECENT NORTH SLOPE BOROUGH EMPLOYMENT ESTIMATES

<u>Year</u>	<u>Total Local Government Employment</u>	<u>Budgeted Employment Excluding Education</u>	<u>Employment in Education</u>	<u>CIP Employment</u>
1976	573 <sup>a</sup>			
1977	766 <sup>a</sup>			
1978	932 <sup>a</sup>			
1979	1,186 <sup>a</sup>			
1980	1,081 <sup>a</sup> 1,235 <sup>d</sup>	419 <sup>b</sup> 456 <sup>d</sup>	423 <sup>d</sup>	356 <sup>d</sup>
1981	-	489 <sup>b</sup>		
1982	982 <sup>e</sup>	629 <sup>b</sup>	382 <sup>c</sup>	

<sup>a</sup>North Slope Borough, Official Statement, Part II (1982), page 50, based upon Alaska Department of Labor Statistics (see Table E.2).

<sup>b</sup>North Slope Borough Budget Document, FY 1982-83. Figures are for following fiscal year (see Table E.13).

<sup>c</sup>North Slope Borough School District, memo to main herdman with employment figures prepared for 1982 audit. Thirty-three part-time employees were counted as one-half job each or 27 employees. Figure also included 191 classified employees and 164 certified employees.

<sup>d</sup>Gerald McBeath, North Slope Borough Government and Policy Making (1981), page 20. July 1980 employment, based on paycheck register (see Table E.10).

<sup>e</sup>Total Borough Employment, October 13, 1982. Personal communication with Borough personnel office.

Non-Native imported labor. According to a 1981 North Slope Borough proposal for a regional training facility for Inupiat,

The Capital Improvement Program (CIP) created and continues to create hundreds of jobs in government administration and construction projects. . . . A large proportion of the payroll for these projects continues to be paid to import labor and not to the local labor force . . . Presently, the majority of CIP employees are import labor primarily because residents lack skill. (North Slope Borough, Annual Overall Economic Development Program Report [1981], p. 21)

Table 23 presents data which suggest that only about half of employment in CIP construction consists of local labor. Still, the overall Inupiat work force on the CIP program suggested by this table is over 700. This figure is larger than the Inupiat CIP employment figure of 321 given in Table 21. However, it is unlikely that the number of workers counted referred to full-time equivalent employment. In addition, some of the CIP work force counted in Table 23 may fall in the "support employment" category in Table 21.

TABLE 23. CIP PROGRAM WORK FORCE PROFILE SUMMARY  
FOR 1981

<u>Location</u>	<u>No. of Workers</u>	<u>Local</u>	<u>Imported</u>
Anaktuvuk Pass	97	40%	60%
Atqasuk	43	15%	85%
Barrow	686	70%	30%
Kaktovik	65	30%	70%
Nuiqsut	84	40%	60%
Point Hope	189	50%	50%
Point Lay	31	15%	85%
Dead Horse	N/A	0	100%
Wainwright	163	50%	50%
TOTAL <sup>a</sup>	1,358	55%	45%

<sup>a</sup>The original source did not provide totals. We calculated the total and percentage breakdowns on the basis of information provided to individual locations.

SOURCE: Work Force courtesy of Alaska Consultants, Inc. Study prepared by CSM, Inc., 1981. Reproduced from North Slope Borough, Annual Overall Economic Development Program Report (1981), p. 21.

Borough employment has been very well-paying, providing an important source of cash income to Inupiat. Borough hiring policy has been flexible, permitting employees to take time off when they wish to, and allowing employees to be rehired after quitting or being fired. Turnover in borough employment has been very high. The borough has accepted the high costs of liberal wages and hiring practices in order to channel employment and income to Inupiat.<sup>7</sup>

Employment opportunities have been plentiful at times in most villages. However, steady year-round employment is not available in all villages. In some villages there is concern about the adequacy of present future employment opportunities.

#### Future North Slope Borough Inupiat Employment

The same factors that are likely to constrain North Slope Borough expenditures in the future are also likely to constrain North Slope Borough employment. One principal constraint is the legal limit upon borough operating revenues. Operating revenues constrain operating expenditures, which in turn constrain operating employment.

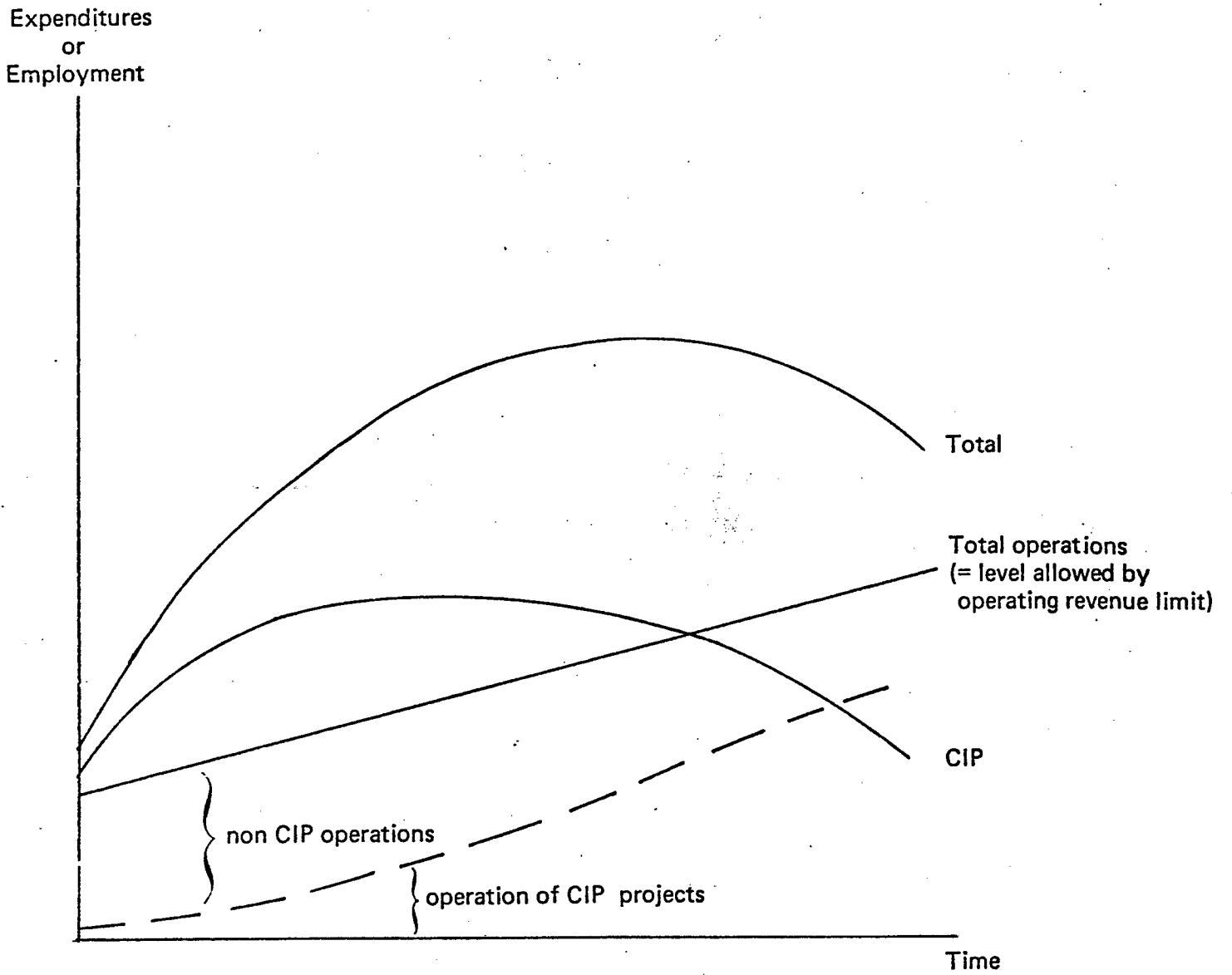
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<sup>7</sup>According to Robert Dupere, bond counsel to the borough, "The Borough in the Capital Improvements Program is required by state law to pay the posted labor rate schedules provided by the Department of Labor (the borough's pay scales for operating employment are those of the state). The cost differential outlined in the state scales indicated the Borough area salaries" (Robert Dupere, personal communication, February 22, 1983).

Operating revenue constraints also restrain the total size of the CIP program, due to the operating costs of CIP facilities. The borough has funded CIP program employment primarily with bond revenues. However, with its operating revenues constrained, the borough cannot continue to build capital projects at past rates. In addition, future capital expenditures may be limited by restrictions on the borough's debt. Thus, the borough will have to fund future employment increasingly with tax revenues. Increases in tax revenue-funded operating employment will probably not be able to offset decreases in bond-revenue funded construction employment.

Figure 4 illustrates these trends in North Slope Borough expenditures and employment. As CIP expenditures continue over time, the borough completes more and more projects and faces higher operating expenditures and employment. These facilities require a greater share of the total operating budget, eventually forcing a cutback in CIP expenditures and employment. The increase in operating expenditures and employment does not offset the decline in CIP expenditures and employment so total expenditures and employment decline. In general, governments cannot sustain employment over long periods of time at the levels provided by periods of above-average construction activity.

Figure 4 Trends in North Slope Borough Expenditures and Employment





In less abstract terms, the borough has kept a large work force employed building projects such as schools, firehouses, and utilities. Once the projects are complete, however, they require many fewer employees for maintenance and operations.

A number of other factors will also affect the ability of the borough to offer employment to Inupiat. One of these is the extent to which the share of Inupiat in total borough employment can be increased. This will depend partly upon the extent to which the skills and work preferences of Inupiat match the job requirements for operating employment, compared to those for CIP employment. We cannot determine from available data whether operating employment will hire a greater or lower share of Inupiat. However, those Inupiat losing CIP jobs will require different skills for most operating jobs. Job training programs may help with this transition.

The borough may also be able to expand operations in the provision of services to the oil industry, such as the Prudhoe Bay Service Area and the planned Kuparuk facility. These facilities do not represent an additional drain on operating revenues since they can pay for themselves through user fees. However, they provide an additional opportunity for the borough to hire Inupiat under flexible working conditions. Since the borough enjoys a monopoly in the provision of public services, it can charge fees sufficient to cover extra operating costs generated by these policies.

Another factor affecting future borough employment will be the share of labor in total expenditures. Table 24 shows that the share of labor costs in total budgeted operating expenditures rose to about 61 percent in FY 1983, from 54 percent in FY 1980. The share of fuel costs also rose, and the share of other costs fell by about 10 percent. However, the extent to which the share of labor costs can continue to rise is limited. Fuel costs are likely to increase disproportionately as more CIP projects are completed. The Department of the Interior is planning to relinquish responsibility for operating in Barrow gas fields for which it has been providing substantial subsidies. This is likely to cause energy costs in Barrow to increase (Mills, 1983).

#### PROJECTIONS OF INUPIAT NON-OIL EMPLOYMENT

In order to establish a range for future Inupiat employment, we used our North Slope Model to project Inupiat employment under several different sets of assumptions about North Slope Borough expenditures and Inupiat ability to obtain oil industry jobs. Our "low," "medium," and "high" employment projections reflect the low, medium, and high North Slope Borough expenditure projections shown in Table 19. In addition, we prepared "extra-low" employment projections which assumed that very few of those Inupiat not able to find other employment would be willing to take oil industry jobs.

TABLE 24. NORTH SLOPE BOROUGH OPERATIONS EXPENDITURES,  
BY EXPENDITURE CATEGORY (a)

(Dollars)

	<u>1979/80</u>	<u>1980/81</u>	<u>1981/82</u>	<u>1982/83</u>
Total Expenditure (Excl. service area #10)	25,378,838	32,967,818	50,437,200	58,348,400
Total Labor Costs	13,676,295	19,133,888	30,046,400	35,533,500
Total Fuel Costs	1,310,352	1,693,360	3,372,200	4,428,100
Total Other Costs	10,392,191	12,140,570	17,018,600	18,386,800
Share of Labor Costs	53.9	58.0	59.6	60.9
Share of Fuel Costs	5.2	5.1	6.7	7.6
Share of Other Costs	40.9	36.9	33.7	31.5

---

(a) Includes only budgeted sums. Does not include education.

SOURCE: North Slope Borough Budget Document, Ordinance 82-3, FY  
1982-83.

Our projections of Inupiat non-oil industry employment are shown in Table 25. They are based on 1980 starting values and thus the projections vary slightly for the years 1981-1983 and do not exactly correspond to actual values for those years.

Our medium case projections are those of the base case given in Appendix C. Non-oil industry Inupiat employment in this case declines gradually through 1990, due to a reduction in North Slope Borough expenditures. Thereafter, it rises gradually, due to increased operations expenditures. (The slight decline in employment in the last three projection years is due to a reduction in operating revenues due to the 30-mill tax limit.)

In the low case, Inupiat non-oil employment falls more sharply, to a level about 250 jobs lower than in the medium case. Employment is still lower in the extra-low case since Inupiat income is lower, resulting in lower support employment.

In the high case, employment does not fall, but rather rises gradually to 1,500 by 1990 and 1,750 by 2000. In this case, the decline in borough construction employment is offset by increasing borough operating employment.

In sum, future Inupiat non-oil employment opportunities will depend heavily on borough expenditures--which are, in turn, dependent on borough revenues. It appears most likely that non-oil employment

TABLE 25. PROJECTIONS OF INUPIAT NON-OIL INDUSTRY EMPLOYMENT:  
EXTRA-LOW, LOW, MEDIUM, AND HIGH CASES

Year	Extra Low Case	Low Case	Medium Case	High Case
1981	1,131	1,135	1,239	1,239
1982	1,084	1,092	1,259	1,273
1983	1,013	1,025	1,235	1,303
1984	965	980	1,216	1,331
1985	935	952	1,201	1,357
1986	916	934	1,190	1,381
1987	904	925	1,182	1,405
1988	899	920	1,176	1,429
1989	897	920	1,174	1,452
1990	899	922	1,174	1,476
1991	902	926	1,176	1,500
1992	906	931	1,181	1,525
1993	912	938	1,187	1,550
1994	918	945	1,196	1,577
1995	925	952	1,206	1,604
1996	932	960	1,217	1,633
1997	940	968	1,230	1,662
1998	947	977	1,245	1,692
1999	955	986	1,261	1,724
2000	964	995	1,278	1,757
2001	972	1,005	1,297	1,790
2002	981	1,014	1,316	1,825
2003	990	1,024	1,337	1,861
2004	999	1,034	1,359	1,898
2005	1,008	1,045	1,382	1,936
2006	1,017	1,055	1,406	1,975
2007	1,027	1,066	1,431	2,015
2008	1,023	1,061	1,457	2,057
2009	957	993	1,423	2,099
2010	885	926	1,321	2,143

ASSUMPTIONS:

Extra Low Case: Low North Slope Borough expenditures. Low willingness to take oil industry jobs

Low Case: Low North Slope Borough expenditures. High willingness to take oil industry jobs.

Medium Case: Medium North Slope Borough expenditures.

High Case: High North Slope Borough expenditures.

SOURCE: North Slope Model projections. See discussion in text. (Variable EMNANOAI, DSETS NSLP.6, NSLP.4, NS.BC.MD, USLP.5.)

will decline slightly over the next ten years, before gradually beginning to rise again. However, depending primarily upon state revenue limitations imposed on the borough, the decline in employment could be much sharper, or it could be avoided entirely.

#### Inupiat Employment in the Oil Industry

Currently, relatively few Inupiat are employed by the oil industry. This pattern of low industrial employment participation is similar to that for natives in other areas of Alaska and Canada, and more generally for local populations during the development of modern industries in underdeveloped regions or countries.

There is a large communications gap between industry and village residents on the causes of low Inupiat employment in the oil industry. Many village residents view the jobs available to them as menial and perceive industry's past promises of jobs to be empty. Meanwhile industry representatives claim that their sincere efforts to hire Inupiat are frustrated due to a lack of commitment on the part of the Natives themselves.

Beneath these perceptions of industry and village residents are real constraints to Inupiat employment. Oil industry firms are constrained with respect to the conditions of employment that they can offer to Inupiat. Similarly, Inupiat are constrained in the kinds of employment they will accept with industry. In general, we find that the conditions under which industry is willing to offer

CHAPTER SIX  
RESOURCE USE AND VALUE CONFLICTS

Potential impacts between OCS development and the Inupiat primarily involve the wildlife resources harvested by the Inupiat and the specific sites and more general geographic areas associated with their present or past subsistence activities. This chapter examines these potential impacts to the extent it is possible to do so with available data. We describe our preferred approach to examining this issue in Chapter Two. In the following section, we present an overview of Inupiat resource use. The second section of this chapter describes the culture values attached to resource use areas. In the final section of the chapter, we examine the resource use and value conflicts potentially associated with OCS development.

Hunting and Fishing Patterns of Coastal Villages

The distribution of wildlife on the North Slope and in the coastal waters of the Beaufort Sea has been summarized in the Diapir Field Final Environmental Impact Statement (Bureau of Land Management, 1982: 54-71). Our purpose here is to provide a brief overview of the distribution of marine wildlife that constitute major subsistence resources for the Inupiat.

Starting usually in April, bowhead whales begin to pass by Point Hope, following nearshore leads. The migration route nears shore again at Icy Cape, Point Franklin to the east of Wainwright, and at

Point Barrow. At these exposed locations, strong winds and currents can quickly create leads (Nelson, 1981: 11). The timing of the bowhead migration past Pt. Barrow varies from year to year and may occur as early as mid-April and as late as early June. East of Pt. Barrow, the spring migration route is located further offshore, outside of the range of Inupiat hunters.

The fall bowhead migration begins in August or September in open water near the coast from Demarcation Point on the East and continues past Kaktovik and Nuiqsut, moving further offshore. The route again nears the coast east of Point Barrow before remaining offshore across the Chukchi Sea. Hunters from Kaktovik, Nuiqsut, and Barrow travel in motorized boats, often in rough weather, to intercept bowhead as they migrate to the west.

Beluga whales often migrate with the bowheads but also remain in nearshore waters and are available during the summer months. Wainwright residents hunt beluga from leads in the spring and later in the open water. During open water conditions, both Point Lay and Wainwright hunters try to drive beluga into shallow areas such as lagoons or river mouths where they can be more easily killed. Kaktovik residents hunt beluga in the fall as they migrate with the bowhead.

Walrus also migrate in the spring, but they rarely travel east of Barrow and are closely associated with the pack ice. Barrow and



Wainwright hunters reported that they hunted walrus from May through September in the 12-month period prior to the ISER North Slope Survey (unpublished data).

Ringed seals are hunted year-round in either ice or open water conditions while bearded seal are primarily harvested in the summer months. Inupiat often set up camps along the coast to fish and to hunt bearded seal. Spotted seals are less common but may be found in bays and inlets except in the winter months. Geese commonly arrive in the Barrow area by mid-May and nest on deltas or near lagoons or rivers. The prime hunting period for waterfowl is in the spring prior to nesting, but they are also hunted in September as they migrate south.

Coastal ocean fishing is limited to the short summer months when nets can be set out from shore. In Kaktovik, residents fish in the ocean for Arctic Char, Arctic Cisco, Least Cisco, Arctic Flounder, Tom Cod, and smelt. They have also been known to harvest pink salmon, although this is rare (Jacobsen and Wentworth, 1982: 62-64).

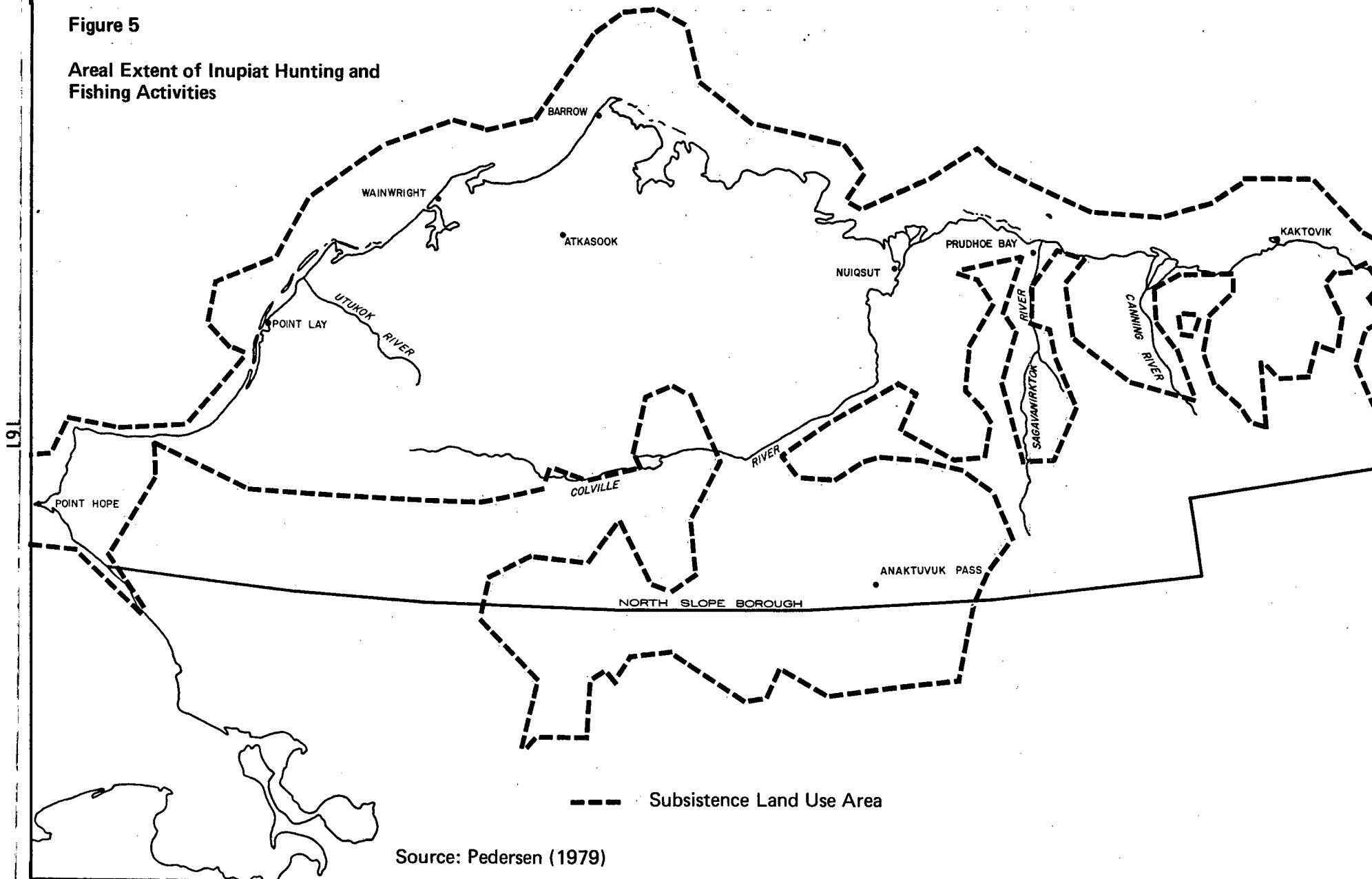
There are hundreds of inland fishing sites along the North Slope river systems. They are used primarily in the fall and winter. It is not uncommon for people from Barrow to travel south of Atkasuk for fishing on the Isuktuk and the Meade Rivers, or to travel 40 to 50 miles up the Ikpikpuk River. Wainwright residents commonly travel 50 or more miles upriver or almost twice that distance to

fishing sites on the upper reaches of the Utuqqaq River (Nelson, 1981: 18-19). Nuiqsut residents often travel up Fish Creek and the Colville in the summer, and Kaktovik residents frequently travel to camps on the Hulahulah. These fish stocks depend upon salt and freshwater habitats in their yearly cycle; thus, the area of ecological concern is much broader than the specific fishing locations of Inupiat residents.

Figure 5, primarily derived from Pederson (1979) and compared with Jacobsen and Wentworth (1982), Brown (1979), Sonnenfeld (1957), and Nelson (1981), provides a rough indication of the areal extent of Inupiat hunting and fishing activities. The only conclusion which can be drawn from this illustration is that all of the coast and much of the interior of the North Slope is presently used by Inupiat for some form of subsistence activity. The boundary itself has little or no meaning. Work to date on subsistence land-use patterns represents a significant step, but the material published to date is not a sufficient base for impact assessment. The boundary shown in Figure 5 reflects an aggregate of the most distant subsistence sites ever visited by 80 people living in permanent villages. The boundary pattern would doubtless be larger if all Inupiat were interviewed or if data were collected in the future. At the same time, the illustration contains no information about the intensity of use nor about the varying hunting and fishing harvest levels commonly associated with different areas. Furthermore, subsistence activities vary by season, yearly weather conditions, resource

Figure 5

Areal Extent of Inupiat Hunting and Fishing Activities



Source: Pedersen (1979)

population levels, hunting success, economic need, cash resources, competing time demands, and, of course, presence of the species. The actual amount of activity in any given area is in no way indicated by Figure 5. We refer the reader to our discussion of the problem of estimating current Inupiat land use in Chapter Two.

The most recent published quantitative data on the extent of Inupiat dependence on subsistence resources is contained in Kruse et al. (1980). A more recent study sponsored by the Department of Interior Bureau of Indian Affairs will be published in 1983. As of this writing, however, we must rely on data collected in 1977. The 1977 survey focused on participation in and time spent on subsistence activities rather than on harvest amounts. The latter type of data, while most directly relevant to many objectives of the survey, could not be collected due to local sensitivities about potential uses of the data. Table 33 contains summary data concerning subsistence activity by village.

The North Slope survey sample was designed to produce reliable estimates for the entire region. Village estimates should be used with caution since sampling errors at a 95-percent level of confidence range from  $\pm 10$  percent in Barrow to  $\pm 20$  percent in Kaktovik and Nuiqsut. The data do document, however, widespread subsistence activity and a major dependence on subsistence resources for food in 1977. In Chapter Nine, we present data showing a substantial increase in Inupiat family incomes between

TABLE 33. SUMMARY INDICATORS OF NORTH SLOPE INUPIAT  
SUBSISTENCE ACTIVITY

(percentages of all Inupiat 18 and over)

	Barrow	Anaktuvuk Pass	Kaktovik	Nuiqsut	Wainwright	Pt. Hope	All Villages
1. Percentage participating in at least one subsis- tence activity during year	73	64	45	80	57	84	70
2. Percentage of households obtaining half or more of food from subsistence activities	41	57	46	70	42	46	45
3. Percentages of Inupiat hunting key subsistence resources							
Caribou <sup>a</sup>	44	71	57	80	47	42	48
Bowhead	30	-	18	20	38	63	34 <sup>a</sup>
Fish	34	57	41	65	31	38	37
Waterfowl <sup>b</sup>	31	4	41	45	36	34	33
Seals	31	-	23	15	27	50	29 <sup>c</sup>
Walrus	14	-	-	5	25	32	18 <sup>d</sup>
Moose or Sheep	2	21	27	15	-	7	15 <sup>e</sup>
(Respondents)	(101)	(28)	(22)	(20)	(61)	(56)	(287)

<sup>a</sup>Based on hunting activity before 1976 restrictions on harvest.

<sup>b</sup>Including egg gathering.

<sup>c</sup>Anaktuvuk excluded in calculation of regional percentage.

<sup>d</sup>Anaktuvuk and Kaktovik excluded in calculation of regional percentages.

<sup>e</sup>Barrow and Wainwright excluded in calculation of regional percentages.

SOURCE: ISER North Slope Survey, 1977.

1977 and 1979. While long-term increases in cash income may result in decreased subsistence harvests, we observed no inverse relationship between household income and subsistence activity among the Inupiat respondents to our 1977 survey (Kruse, 1982). On the contrary, one of the major uses of increased incomes was to purchase the equipment and supplies necessary for various hunting and fishing activities. We would, therefore, estimate that aggregate levels of subsistence activity in 1983 are roughly comparable to those observed in 1977, when differences in the availability of specific resources are considered. Poor hunting conditions and harvest quotas have reduced the whale harvest while a substantial increase in the size of the Western Arctic caribou herd and associated relaxation of harvest regulations has probably increased the caribou harvest over 1977 levels. Note, however, that the participation rate for caribou hunting shown in Table 33 applies to the period before harvest restrictions were imposed.

The information on participation rates contained in Table 33 does not indicate the relative contribution of individual subsistence resources to the Inupiat diet because participation in one activity (e.g. bowhead whaling) may produce much more meat than participation in another (e.g. caribou hunting or fishing). We do know that annual harvests of bowhead or caribou can vary from a minor amount to an amount large enough to constitute the major source of meat in the Inupiat diet. Neither the bowhead nor the caribou are completely dependable sources of meat. Natural variations in

weather and ice conditions can preclude successful bowhead harvests, and the Western Arctic caribou herd has experienced precipitous population declines. Therefore, we would expect that the particular mix of subsistence resources consumed is likely to vary over time.

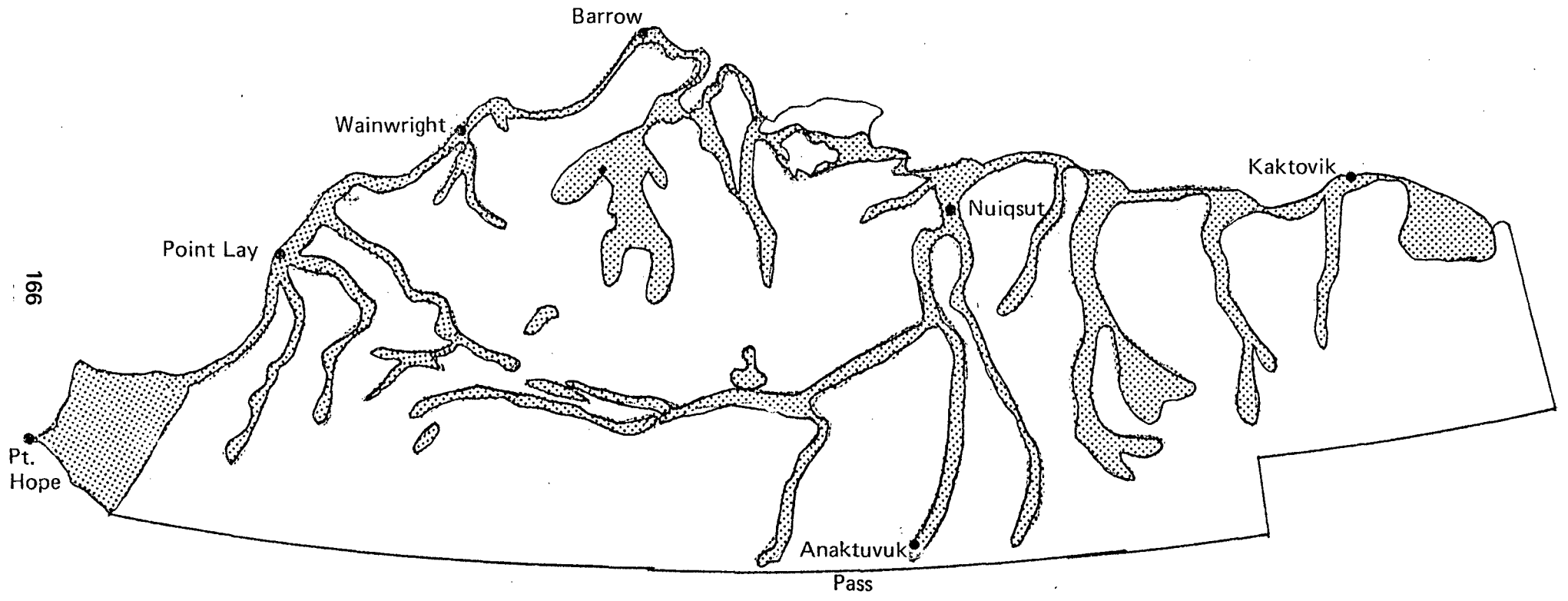
#### Cultural Significance of Lands

The contemporary hunting and fishing patterns briefly described above are rooted in cultural traditions. Past associations with hunting and fishing areas contribute to their present value among the Inupiat. In this section, we describe some of the more significant historical associations discussed extensively in Worl (1978).

Before European contact in the mid-nineteenth century, the coastal Inupiat were dispersed along the Chukchi and Beaufort Sea coastlines, with major settlements along the coast from Point Hope to Point Barrow and trading centers usually at river mouths and at Barter Island. Inland-oriented Inupiat came to these trading sites to trade caribou skins and furs for sea mammal skins and other products. Large amounts of shorefast ice in the Beaufort resulted in relatively lower winter marine mammal populations, and some suggest that, as a result, the population east of Point Barrow was more dispersed than the population along the Chukchi (Worl, 1978). Figure 6 illustrates the areas of cultural significance identified in the North Slope Borough Comprehensive Plan (North Slope Borough, 1982b). Further research is likely to identify additional areas.

Figure 6

Areas of High Cultural Value



Source: North Slope Borough Comprehensive Plan prepared by Wickersham and Flavin, 1983.



The establishment of commercial whaling bases, trading stations, and missionary outposts directly and indirectly (through added hunting pressure on the caribou) led to increased concentration of the coastal Inupiat although the Inupiat continued to travel to take advantage of seasonal hunting and fishing opportunities. After 1850 and until the caribou population increased in this century, the Inupiat depended heavily upon sea mammals and fishing. Spring whaling and walrus hunting were particularly important, but population levels of both species were drastically reduced by commercial whalers (Burch, 1975 27-28).

With the decline in commercial whaling at the turn of the century, the Inupiat took advantage of high fur prices and dispersed along the coast in association with trading posts which were seasonally supplied by trading schooners from the west coast of the United States and from Barrow. The coastal trading stations served as focal points for families who extended out along the coast and inland to trap (Arundale and Schneider, 1983 135-155). Klerekoper, a Presbyterian missionary assigned to Barrow between 1936 and 1945, documented this settlement pattern (Klerekoper, 1977). Many Inupiat adults now in their 50s and 60s grew up during this period and have strong attachments to the coastal areas they once inhabited. The pattern of families scattered out along the coast and inland rivers continued until just after World War II, when the Navy began an extensive oil exploration program. The construction of DEW Line sites occurred soon thereafter. These programs provided wage labor

opportunities for many people and, along with village schools, drew families primarily to Barrow during the 1940s and, to a lesser extent, to Wainwright (Milan, 1964: 24) and Kaktovik (Jacobsen and Wentworth, 1982: 5). Thus, some of today's adults in their late 30s and 40s were born out on the land and later moved with their families into town so that their parents could work and so that they could go to school. Others were born in Barrow, where medical facilities were available. This generation learned about the hunting areas from their parents; few, however, had the chance for the intensive out-on-the-land experiences of their parents.

The growth of Barrow resulted in further urban amenities but also caused some Inupiat to wish for more remote settlement opportunities. Passage of the Alaska Native Claims Settlement Act provided a political incentive to reestablish a permanent Inupiat presence in traditionally occupied areas of the North Slope and an economic means to do so. The Inupiat settling at Point Lay, Nuiqsut, and Atkasuk not only sought to escape the urban problems of Barrow and to take advantage of good hunting and fishing sites but also hoped that they could develop small communities which could support airstrips, schools, frame houses, utilities, and an employment base. Recent in-migration to Nuiqsut and Atkasuk has been large enough to cause housing shortages.

The actual choice of settlement locations was largely dependent on past historical associations with the area and on desirable physical

site characteristics. Nuiqsut is located near the traditional trading site of Niglik (Stefansson, 1914: 5) and, according to Samuel Kunakuana, was selected in part because it was dry (ISER, Kunakuana interview, 8/9/82). During our interviews, we also learned that some families moving to Nuiqsut hoped that they could blend employment at Prudhoe Bay with a traditional lifestyle in a small settlement (ISER, Kunakuana interview, 8/9/82, and Hopson interview, 8/9/82).

Pt. Lay or Kali is a traditional site with a long history of use. The location gained additional significance in 1930 when a school and store were established at the site. When Barrow employment opportunities increased in the 1940s, Pt. Lay's population decreased until there was hardly anyone at the site. Following the passage of ANCSA, the village was resettled by many of the same people who had left in the 1940s and 50s. A prime motivation for returning was the generally large caribou population in that area. On February 14, 1971, there were enough families to resume classes in the old school building. Since then, a new school has been built, along with housing and a store.

The Atqasuk area was also extensively used by families, many of whom have resettled there in the post-1971 period. The present village of Atqasuk is surrounded by historic and recent sites of cultural significance. Old Atqasuk is located two miles to the north of the present village at a good fishing site on the Meade River. To the

south, on the river about one mile, is Tyalook, a traditional fishing site and the location of a commercial coal mine which serviced Barrow during the 1940s. Former residents of the Meade River traveled there seasonally from Barrow during the late 1940s, 50s, and 60s, until resettlement became feasible in 1971. Today, there are major building projects at the village and some housing shortages.

Wainwright, Barter Island, and Barrow were continuously occupied throughout the historic period. Archeological sites and the observations of explorers point to their antiquity. Since 1940, all three villages have experienced increases in wage labor opportunities. Barrow has been the commercial center of the North Slope since a shore-based whaling station and trading post were established there before the turn of the century. Employment opportunities drew Inupiat from smaller villages. Today, the Native population of Barrow consists of some families who have lived there all of their lives and others who came for employment and stayed.

#### Conflicts with Resource Uses and Values

As we have described above, the primary Inupiat use of resources in the marine and terrestrial environment outside of North Slope communities is subsistence wildlife harvesting. The primary Inupiat resource values are associated with both present and past subsistence activity. Therefore, potential resource use and resource value conflicts caused by petroleum development are likely

to involve either the disruption of Inupiat subsistence activities, subsistence resources, or the disturbance of areas and sites associated with past subsistence activity and which are, therefore, of cultural significance.

The 1983 Beaufort Sea OCS Synthesis meeting session on subsistence identified five categories of potential impacts. These were:

1. Direct mortality of fish and wildlife.
2. Habitat destruction.
3. Dislocation of fish and wildlife.
4. Physical disruption of access to fish and wildlife.
5. Regulatory restriction of access to fish and wildlife.

To these five categories we would add a sixth, indirect potential impact.

6. Increased competition for fish and wildlife.

In the remainder of this chapter, we discuss the potential conflicts with Inupiat resource uses and values in the context of each of the six impact categories.

#### DIRECT MORTALITY OF FISH AND WILDLIFE

The likelihood, magnitude, timing, and location of oil spills is extremely difficult to predict in the frontier area of the Beaufort Sea. An offshore spill could reach virtually any part of the

Beaufort Sea coastline under some conceivable set of ice conditions, winds, and currents. The following conclusions were drawn at the 1983 Beaufort Sea Synthesis Meeting (Burns, 1983):

If oil were spilled in the lead systems during the spring migration of eiders, direct mortality could result. Similarly, significant numbers of oldsquaws could be killed by oil in lagoons during summer . . . An oil spill which results in the presence of oil in waters of the nearshore system would result in mortality of egg and larval stages of fishes. No direct mortality of whales, caribou, arctic foxes, or seals beyond the age of weaning was anticipated. Nursing ringed seals in the immediate vicinity of a spill would be subjected to ingestion of oil and fouling of their fur. Some pups would probably die as a result. Oiling of polar bears would probably result in the death of those animals ingesting it in the course of grooming their fur. The baleen of bowhead would become fouled if feeding activity occurred where oil was present. The effects of ingested oil or reduced feeding efficiency of bowheads are unknown but presumed to be debilitating and perhaps fatal.

As we pointed out earlier, information on intensity of use and on relative hunting and fishing success is currently lacking. Although significant exceptions doubtless exist, the intensity of Inupiat subsistence activity generally decreases with distance from the home village. While virtually the entire coast is used, at least occasionally, for some form of subsistence activity, leasing activity near Inupiat villages is expected to pose potentially greater resource-use conflicts than leasing activity in other areas. Lease sales in the vicinity of Barrow and Kaktovik, including high-use areas such as Peard Bay, Elson Lagoon, Camden Bay, and the coast east of Kaktovik to Humphrey Point are relatively more likely to result in resource-use conflicts. The same would be true for further lease sale activity near Nuiqsut.

## HABITAT DESTRUCTION

According to the 1983 Beaufort Sea Synthesis meeting (Burns, 1983):

The presence of oil in salt marshes would probably disrupt feeding activity of geese, particularly snow geese. The Teshekpuk Lake area was recognized as being of importance and would be adversely impacted by transportation corridors and activities such as gravel mining. The nesting activity of oldsquaws occurs over a wide area and would therefore not be significantly impacted. There would be very little impact on nesting habitat of eider ducks. The habitat of whitefish could be impacted by gravel mining operations or by the removal of significant amounts of water from overwintering areas. Roads, pipelines, oil collecting facilities, and other structures ancillary to OCS development may affect the movement patterns and distribution of caribou. No destruction of marine mammal habitat, on a significant scale, was anticipated by participants of the plenary session. However, it was thought that use of nearshore feeding areas by bowhead whales may be altered in years of extensive ice cover during summer months.

Potential OCS impacts related to habitat destruction appear to primarily involve onshore support facilities and activities such as roads, pipelines, and gravel removal. Inupiat subsistence activities that could be adversely affected include waterfowl hunting in the Teshukpuk Lake area and fishing along Fish Creek and in the Colville River delta.

## DISLOCATION OF FISH AND WILDLIFE

The conclusions of the 1983 Beaufort Sea Synthesis meeting (Burns, 1983) were:

Noise was thought to present little if any problem to birds. The response of birds to oil slicks in the marine environment may be avoidance. Causeways may result in the dislocation of fishes which move close to shore. The

possibility of lowered recruitment was raised. Beluga and bowhead whales may be displaced from nearshore areas by noise. Belugas seem more susceptible to such disturbance than bowheads. Responses of bowheads to noise are apparently highly variable. Comparative data from whales in nearshore versus more distant waters is not available. In the eastern [Canadian] Beaufort Sea, bowhead whales were reported to not be significantly displaced by noise.

Based on the above summary, the most significant potential dislocation of wildlife from the perspective of Inupiat resource use would be the avoidance of noise in nearshore hunting areas by bowhead and beluga whales. In the spring, these sensitive areas would include the area to the west of Point Barrow, the area between Icy Cape and Point Franklin, and the area from Cape Thompson to Cape Lisburne. In the fall, sensitive areas would include the area from Demarcation Point to west of Arey Island and the area from Dease Inlet to west of Point Barrow.

#### PHYSICAL DISRUPTION OF ACCESS TO FISH AND WILDLIFE

Beaufort Sea Synthesis meeting participants concluded that, "OCS development would probably not have any impacts on the access to fish and wildlife of primary and secondary importance to subsistence harvesters" (Burns, 1983). If offshore petroleum finds were needed to make onshore developments economically attractive, however, then OCS development could indirectly result in an extension of drilling sites and connecting pipelines in onshore areas used by the Inupiat. These onshore facilities could conceivably disturb sites or hunting areas of cultural value or make it more difficult to



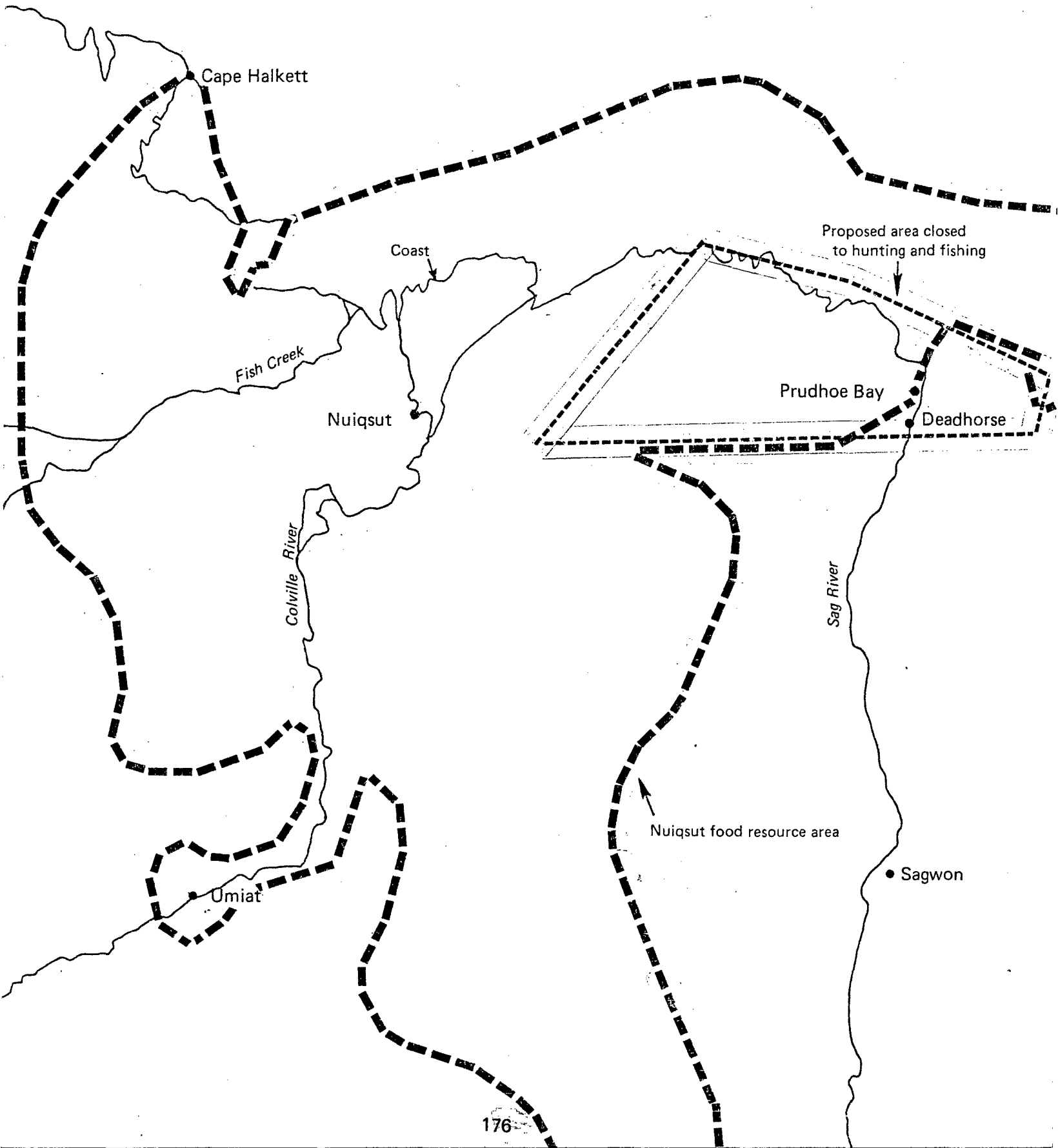
reach subsistence hunting and fishing areas. We found only two brief references to past difficulties in accessing hunting areas in the Prudhoe Bay area, and they are discussed in Chapter Seven. Barrow and Nuiqsut residents have reported some destruction of cultural resources or loss of access. The potential resource use and resource value conflicts posed by physical disruptions are probably avoidable or relatively minor in comparison to the potential effect of regulatory restrictions.

#### REGULATORY RESTRICTIONS OR ACCESS TO FISH AND WILDLIFE

As in the case of physical disruptions, access to fish and wildlife, OCS development is unlikely to directly result in regulatory restrictions. Possible exceptions might involve hunting restriction in the vicinity of onshore petroleum pipelines and processing facilities associated with offshore activity. Should onshore development be dependent on offshore finds, however, the cumulative impact of regulatory restrictions of access could be severe. The Prudhoe Bay area is currently close to the taking of big game (Alaska Department of Fish and Game Regulations, 5AAC 81.260). In 1981, ARCO, Alaska, Inc., and the SOHIO Alaska Petroleum Company requested the Alaska Board of Game to close the Prudhoe Bay area to all hunting and trapping (Norgaard and Nelson, 1981). In the same request, ARCO and SOHIO asked the Board of Game to enlarge the closed area (see Figure 7). Also shown on Figure 7 are the habitats of the major food sources of Nuiqsut residents (Brown, 1979: 29). If comparable onshore developments were to occur in NPR-A as an

Figure 7

Nuiqsut Subsistence Resource Area  
and Proposed Area to be Closed to Hunting



indirect result of OCS development, industry might request additional closures. The likelihood that such closures would produce conflicts with Inupiat resource use is high. Figure 8 compares the total area for which there is documented subsistence activity with the areas which may be subject to petroleum exploration and development according to current state and federal plans.

#### INCREASED COMPETITION FOR FISH AND WILDLIFE

##### Competition for Resources

Industry does not permit its enclave workers to hunt or fish on the North Slope. The major potential sources of competition for resources are the following:

- Non-Inupiat who come to North Slope villages to work on Borough or Native corporation projects.
- Non-Inupiat who use the North Slope haul road (Patten Highway) to access North Slope hunting areas.
- Inupiat who move from Barrow to smaller villages to escape the increasingly urban character of Barrow.

While Inupiat institutions, and not industry itself, have chosen to use nonlocal labor in order to complete village projects quickly, the fact remains that the presence of a substantial non-Inupiat population will continue as long as North Slope institutions can capture petroleum dollars. No one has reliably documented the extent of non-Inupiat hunting and fishing activity. Only 39 non-Inupiat fell into our 1977 random sample. Approximately half of

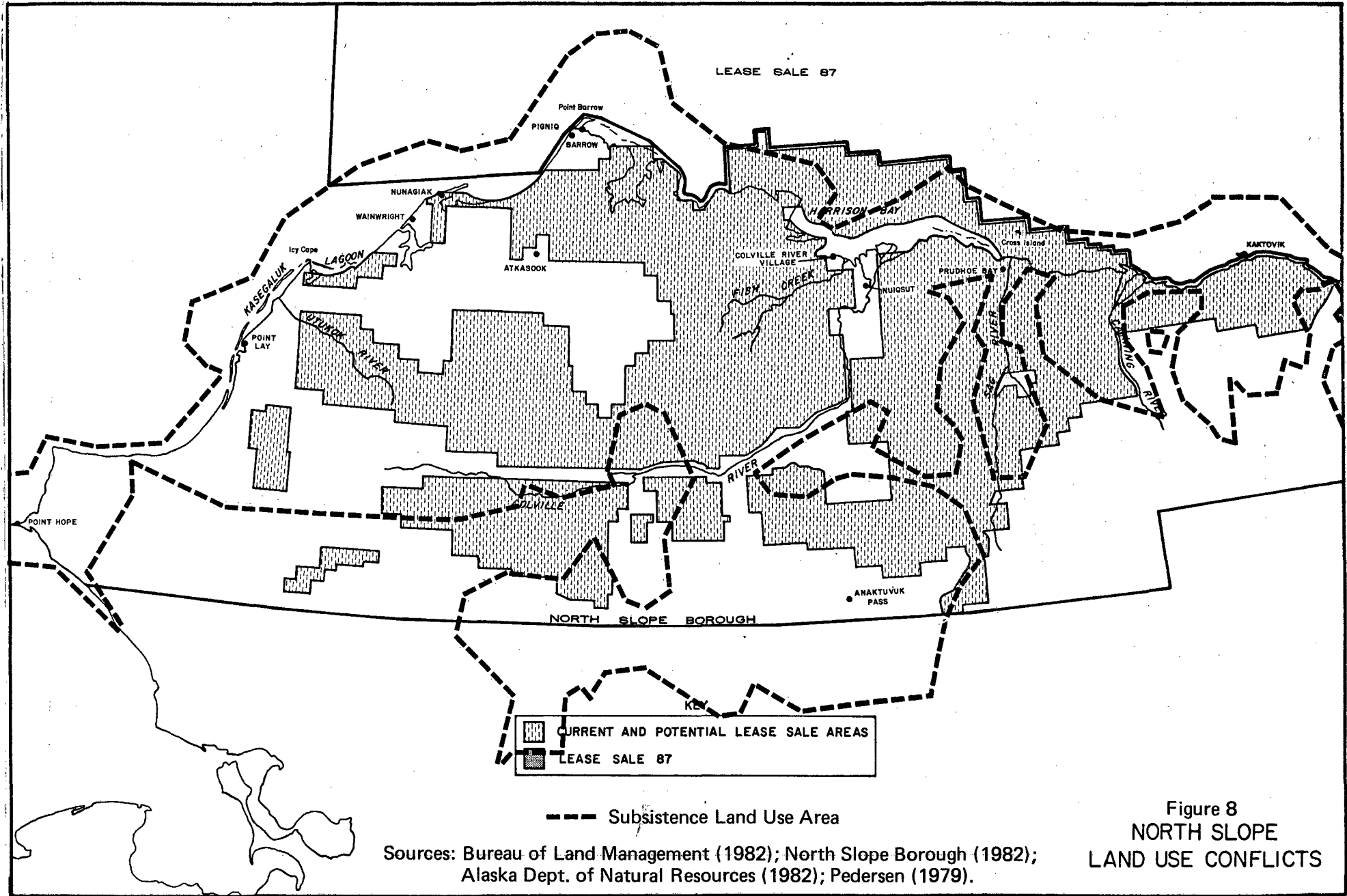


Figure 8  
NORTH SLOPE  
LAND USE CONFLICTS

this small group reported that they had hunted or fished on the North Slope in the previous twelve months.

The link between OCS development and non-Inupiat competition for resources is through the additional tax revenues collected and spent which attract non-Inupiat to live in North Slope villages. We have already shown in Chapter Four that OCS development is not likely to add significantly to the borough's revenue stream; therefore, we would not expect non-Inupiat competition for resources to increase significantly.

To date, the state has not opened the portion of the North Slope haul road that is within the North Slope Borough to public use. The major proponent of continued closure was the North Slope Borough, and industry refrained from entering the public debate. An added factor, however, is the interest of trucking firms to restrict use to industrial traffic in order to reduce risks of accidents and to minimize financial liabilities. The intensity of their concern is likely to vary with the level of development activity. We would, therefore, not expect OCS development to increase nonlocal hunting and fishing over the short term. In the long term, should a dropoff in development activities occur, however, the workers familiar with the area may return as sports hunters, thereby increasing competition for resources.

Finally, the Inupiat themselves can compete for limited resources. Already, Inupiat families have decided to move from Barrow to one of the smaller villages to escape what is perceived as an unpleasant, unsafe urban environment. Movement to the smaller villages has been facilitated by the at-least-temporary existence of local jobs. These families contribute to the aggregate demand for the limited resources located near the small communities in which they now live. The extent to which petroleum development is likely to maintain or increase the rate of in-migration to the smaller villages and subsequently increase local resource pressures will depend on industry's choice of staging locations and upon the degree of involvement of village corporations in petroleum-related activities. It appears likely that Kaktovik will continue to be used as a staging area for exploration activities. Nuiqsut's proximity to the Kuparuk field and the possible construction of a year-round road to the village may also lead to further growth in the village population.

CHAPTER SEVEN  
PERCEIVED THREATS OF OIL DEVELOPMENT

Introduction

The purpose of this chapter is to describe the threats which Inupiat perceive as likely results of oil development on the North Slope. It is not an attempt to delineate the full range of actual impacts likely to occur from the proposed Lease Sale 87 or, in fact, any other specific lease sale; rather it presents the Inupiat perspective. The Inupiat view of offshore development impacts is an important reality in its own right, for Inupiat fears can generate considerable social stress even before development takes place.

We appreciate the fact that it is difficult to know how much weight one should attach to Inupiat perceptions of threats to subsistence and cultural values when these perceptions are not compared with the opinions of scientists or industry or with the reports of disinterested observers. If we could establish the match between real and perceived threats, then the task of weighting Inupiat perceptions would appear much easier. However, there are several reasons why we decided that an attempt to compare real versus perceived impacts would prove counterproductive.

First, most Inupiat perceptions concern the physical and biological threats posed by ice, currents, oil, sediments, noise,

potential physical barriers, and visual activity. Whether or not these perceptions are based on real or imagined threats is best addressed by physical and biological scientists. The relationships involved in these potential threats are complex and still not well understood. We believe it is beyond our expertise to attempt to interpret Inupiat perceptions in the context of statements emanating from OCSEAP studies but think that it would be useful to have OCSEAP scientists review and comment upon the Inupiat perceptions documented in this chapter.

Many Inupiat perceptions are based on past Inupiat observations of ice movements, altered wildlife behavior, industrial accidents, and other phenomena related to potential impacts. In part, Inupiat perceptions are also based on national media reports on industrial accidents outside of Alaska. We suspect that in virtually all of the cases involving local historical events such as ice movements, storm surges, and the like that the only observers were Inupiat. Inupiat observers, like all other observers, may not perceive or recall events accurately. This does not mean, however, that we should ignore their observations, particularly when we consider the long-standing value of accurate observations to Inupiat survival. Rather, Inupiat reports should serve to alert western scientists to physical and biological circumstances that have yet to be observed during the relatively short period of western presence in the Arctic.



We believe the chances of locating reliable reports of or witnesses to past Arctic industrial accidents such as the Navy fuel spill in the 1940s are remote. While documentation for recent industrial accidents such as the DOME/Can Mar gas blowout would be easier to find, the task of corroborating Inupiat perceptions could prove to be enormous.

While the magnitude of the documentation effort described above would be large, there is a more important reason why we did not attempt to temper our presentation of Inupiat perceptions with factual information. Our purpose in attempting to document Inupiat perceptions was not to contribute to the debate on potential physical or biological impacts but rather to assemble, organize, and present a body of information that accurately describes Inupiat perceptions. The perceptions themselves are the "reality" we wish to reliably document. It is an important reality because it is the context in which Inupiat will respond to development proposals. To the extent that Inupiat perceptions include expectations of major environmental disturbances that will affect their way of life, we would expect such proposals to generate social stress. Therefore, a documentation of Inupiat perceptions improves our ability to project social impacts.

If we were to intersperse information other than that generated by our review of Inupiat perceptions throughout our presentation, the reader would be likely to attach more weight to some perceptions and

less to others. Readers would thus miss the point of the chapter since inaccurate perceptions carry just as much weight in Inupiat responses to development proposals as accurate perceptions. Of course, Inupiat perceptions may change as Inupiat observe actual development activities. We observed such a change in the case of onshore development activities. It is, therefore, important to continue to monitor Inupiat perceptions as offshore development progresses.

Inupiat perceptions of the threats of offshore development may appear relatively narrow. Most focus on subsistence issues. There is good reason for this, however, given the importance of subsistence in both the historical and contemporary culture of the Inupiat. On the North Slope today, there is extensive, if not increasing, participation in subsistence activities. In part, current interest in subsistence activities may be a cultural reaffirmation. The availability of cash to finance subsistence activities may also enhance subsistence participation. In addition, however, subsistence activities continue to support the Inupiat economically, and they may become more important in the future. Many Inupiat believe that oil development on the North Slope is temporary and that they will have to return to a reliance on subsistence once oil resources are depleted. There is also a belief in the focality of subsistence as both an indicator and long-term goal of cultural well-being; to remain Inupiat, subsistence must remain an option. This belief has a religious quality which, if not

held, would preclude them from being Inupiat. Subsistence is central to the Inupiat culture; it not only provides physical sustenance and identity but embodies the values of sharing, the extended family, and traditional knowledge, which are manifest in hunting, fishing, gathering, and trapping.

I'd like to see all my kids grow up to be culturally tied to our native culture instead of completely giving in to the cash economy. The reason why I say that is that our cultural history is mostly based on subsistence values, such as learning and being able to hunt and fish and speak Inupiat, understand and speaking it (M. Ahmakak, personal interview).

Because of the importance of subsistence, anything which threatens the environment and the subsistence species dependent on that environment is seen as a potential danger to the Inupiat. The majority of impacts anticipated from oil development are of this type. The Inupiat key in on the relationships between environment and subsistence resources and food. The format of this chapter follows this causal chain. We describe the perceived effects of the Arctic sea and ice environment on oil development, the potential direct damage to subsistence species from oil, and the disruption of the migratory patterns of species. We also examine the perceived loss of access to hunting areas and loss of cultural landmarks used in subsistence as they, in turn, affect the potential loss of traditional Native foods and associated cultural values. Externally introduced changes which affect the Inupiat culture directly instead of through the subsistence chain (e.g., alcoholism or population

increase) are often not recognized or are not perceived as important as those stemming from the relationship between subsistence and Inupiat culture.

Before we detail Inupiat perceptions of the threats of oil development, we briefly describe the methods we used to document Inupiat perceptions. We also discuss two underlying influences on Inupiat perceptions: their historical experience with oil development and their basic beliefs about the Arctic environment.

#### Methods

We used two methods to obtain data on perceived impacts. The first was a content analysis of public testimony given at development hearings on the North Slope from 1971 through 1982 and other public records produced in the same period. A complete listing of these sources appears in Table 34. They range in time from the original trans-Alaska pipeline hearings in 1971 to those conducted in Barrow, Nuiqsut, and Kaktovik on the OCS Diapir Lease Sale 71 Draft Environmental Impact Statement. They also include written comments submitted from the North Slope on impact statements, affidavits filed for various legal cases on development projects, and other forms of the public record. We analyzed the transcript from each meeting on a topic-by-topic basis and separately coded each impact issue cited in the testimony along with the characteristics of the presenter, locality of the testimony, issue(s) of concern, locality of concern, species involved (if any), the form of testimony, and

TABLE 34. LISTING OF NORTH SLOPE PUBLIC HEARINGS  
AND SOURCES OF PUBLIC TESTIMONY

01. Lease Sale 71 Hearings on Draft EIS 1982
02. Beaufort Lease Sale Hearings on Draft EIS 1979
03. Waterflood Hearings on Draft EIS 1979
04. Alaska National Wildlife Range Hearing on Oil  
Exploration 1981
05. Trans-Alaska Pipeline Hearings on Draft EIS 1971
  
06. Pt. Thompson Hearings 1978
07. BLM Haul Road Corridor Hearings 1978
08. Hearing on Bowhead Whaling 1977
09. Subsistence Hearing 1977
10. Land-Use Planning Commission Hearings
  
11. National Petroleum Reserve-Alaska Hearings-105(c) 1978
12. North Slope Borough Comprehensive Plan Meetings
13. Lease Sale 71 Public Written Comments
14. Beaufort Sea Public Written Comments
15. Waterflood Project Written Comments
  
16. NPR-4 Written Comments
17. 1978 Elders' Conference
18. NSB (white hardback) Traditional Land-Use Inventory
19. Thomas P. Brower, Sr., Affidavits, October 10, 1978;  
November 6, 1978
20. Horace Ahsogak Affidavit, October 31, 1978
  
21. Thomas Napageak Affidavit, October 31, 1978
22. State Lease Sales 34 and 36
23. Ralph Ahkivgak Affidavit, October 31, 1978
24. Archie Brower Affidavit, December 14, 1978
25. Herman Rexford Affidavit, October 18, 1978
  
26. Alfred Hopson, Sr., Affidavit, September 21, 1977
27. Seasonal Drilling Hearing 1982
28. NPRA - Land Plan Questionnaire 1978
29. NPRA - Public Contact Record 1978
30. NPRA - Environment Assessment 1981
  
31. NPRA - Barrow Public Hearing, July 20, 1981
32. NPRA - ICAS 105(c) Vol. 1(b)
33. Beaufort Island Lease Sale, May 1975
34. CZM Hearings 1980

opinion on the project. We extracted a total of 923 separate "pieces," or issues, of information from the various meetings and affidavits.

This record represents testimony from fifteen different local organizational units and 158 different North Slope residents, almost 20 percent of the adult population living in the three villages in which hearings have been held. Many of these people testified on several occasions. The largest proportion of the testimony is from Barrow residents (54 percent), and an additional 40 percent is evenly divided among residents of Kaktovik (22 percent) and Nuiqsut (18 percent). Although men gave the majority of testimony, women provided 18 percent of the testimony. With relatively few exceptions, the testimony is from Inupiat, most of whom are middle-aged or elders and constitute the social, political, and opinion leaders of the North Slope. Although two-thirds of the testifiers spoke for themselves, 11 percent of the testimony came from known members of village councils, and 9 percent came from representatives of the North Slope Borough. Smaller numbers of testifiers also stated that they were affiliated with organizations such as ASNA, village corporations, ICAS, AEWG, and ASRC. In sum, the testimony appears to reflect a cross-section of Native opinion from the North Slope, weighted toward communities of greatest prospective oil impact and the traditional and organizational leadership of the region.

The second method involved field work and key informant interviews. We conducted interviews in Kaktovik, Nuiqsut, and Barrow in August 1982 with representatives of North Slope institutions and with informants selected on the basis of their presentation of testimony in the public meetings. The purpose of these interviews was to validate and to expand upon the personal testimony cited in the public record. In all, we conducted and taped nineteen interviews: nine from Nuiqsut, six from Kaktovik, and four from Barrow. In addition, we conducted but did not tape approximately thirty other, generally shorter, interviews with similar informants.

#### Inupiat Experience with Oil Development

Our review of the public hearing transcripts from the North Slope produced the primary conclusion that there is almost universal Inupiat opposition to OCS oil and gas development. It was also apparent that this opposition is not simply the product of prejudice or environmentalist "propaganda" but has its foundations in a body of knowledge which the Inupiat have developed over the past several decades, largely as a result of direct personal contact with petroleum exploration and development activities. It is this body of knowledge, developed from within the Inupiat sociocultural system, that has molded and will continue to shape the Inupiat's perceptions of oil and gas development.

Inupiat concepts of oil exploration and development have been derived from several sources, the first of which was during the

1940s when the U.S. Navy searched for oil in what is now called the National Petroleum Reserve, Alaska (NPRRA). This period of contact was followed by the development of the Barrow gas field; the exploration and development of Prudhoe Bay and Kuparuk; and finally current exploration activities in NPRRA, in the Arctic Wildlife Reserve, and on the Outer Continental Shelf. Many of the Inupiat men now in or approaching their 60s worked for or had direct contact with the Navy's drilling operations during the 1940s. This period of initial and, in many ways, intensive exposure generated many strong impressions about oil and gas development which have persisted to the present time. Because some of these personal experiences have been told and retold in public, the events of this development period have become general knowledge to the Inupiat population. This oral history includes accounts of accidents, environmental changes, poor interethnic relations, oil-related deaths, and disruptions of animal populations. Not all of these perceptions are negative since benefits such as low-cost fuel and expanded opportunities for wage employment are also recognized as being related to oil and gas development.

Accounts of accidents, including fires, explosions, blow outs, and oil spills, are recalled by older North Slope Inupiat. Samuel Kunanknana of Nuiqsut worked for the Navy on an oilrig near Barrow in the late 1940s and recalls witnessing several large fires and explosions, including one in 1948 where "The fire was so large that



it could be heard from the village of Barrow" (Samuel Kunanknana, personal interview).

His predominant concern was the effect of the noise on wildlife. Specific experiences become generalized and take on increasing significance as they are repeated at further hearings, for example the Diapir OCS hearings:

There will be a blow out. There have been blow outs (I. Kayatak, personal interview).

Perhaps one of the most frequently recounted and best-known oil-related accident is the one told by Thomas Brower. This "Navy oil spill story" has recurred in the records of numerous public testimonies and illustrates several opinions held by the Inupiat. According to Brower's affidavit and testimony, the Navy was in the process of moving a convoy of ships east across the coast of the North Slope. Despite his warnings and advice, the Navy took the ships into shallow water and grounded one of the tankers. In an effort to lighten and, thereby, free the ship, the Navy then pumped fuel oil over the side. In a field interview with Thomas Brower, he pointed out that the fuel could have been pumped into another ship. Brower testified that the spill killed waterfowl and seals and that whales changed their migrations to avoid the spill area.

Another example of disruption to the environment which is repeatedly mentioned by the Inupiat is from equipment and materials abandoned during the early exploration of the National Petroleum Reserve.

Mark Ahmakak stated at the Point Thomson hearings in 1978 that he saw oil spills, dynamite sticks, blasting caps, and wiring still out on the tundra (Mark Ahmakak, personal interview). Charlie Edwardson, Sr., described a similar event: "When [the] Navy was blasting, I saw a seal blown clear out of the water" (Charlie Edwardson, Sr., personal interview).

The Inupiat also recount beneficial and positive experiences associated with the early phase of Navy oil and gas exploration. These almost exclusively refer to the advantages of wage employment and cheap energy. Many of the Inupiat worked for the Navy as "equipment operators," a type of work the Inupiat hold in high esteem. There is little mention of employment in the more menial positions of general labor or maintenance. It is not clear if the latter type of employment did not occur to any significant degree or whether the lack of mention is due to Inupiat not holding these low-prestige jobs for long periods of time or selectively choosing not to recall them.

While involvement in wage employment during this period limited the amount of time Inupiat employees were able to participate in subsistence, it did not completely exclude hunting and fishing, and they do not think of the period as one which conflicted with their traditional way of life. The Navy apparently did not formally restrict subsistence activities near oil development equipment on installations. One informant told of being fired for shooting a

caribou while working on a drilling rig, but he was soon rehired and informed that he could hunt as long as it was not during working hours. In general, a functional and satisfactory work relationship appeared to exist with industry from the Inupiat perspective. Some complaints of prejudice and discrimination did occur, but these seem to have been effectively addressed in most part:

"The Navy called Natives not able-bodied. Natives worked a few days and were thrown out of their jobs. Finally, their [the Natives'] complaints were recognized" (Arnold Brower, Sr., 787).\*

More recently, the Inupiat recalled experiences associated with the exploration of Prudhoe Bay, NPRA, and the Alaska Native Wildlife Refuge, both as employees and, more frequently, as observers of oil development activity. In an affidavit given in 1978, Ralph Ahkivgak stated that when working at Prudhoe Bay, he saw a blow out which continued to spill oil for almost four days. Indicative of the manner in which these experiences can be applied to offshore development, he stated, "At least an oil spill can be cleaned up on land. Spills and pollution from offshore drilling would just go right into the water and be swept away by the current or go into or under the ice and get trapped and carried away when the wind or current moves the ice sheet" (2). There are also concerns that the new phase of exploration and development has brought new pollutants potentially damaging to subsistence species. Thomas Napageak stated that he had worked as a roustabout in the south Barrow Gas field and had helped mix the drilling muds. He saw the chemicals being added

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\*See Appendix A, entry "787," for a more complete reference.

and was concerned about the possible effects of them on the environment (58).

The Inupiat also describe and associate strange and new animal behavior with the presence of oil, perhaps due to the spread of rabies: "Caribou have gone crazy from pollution at Prudhoe Bay" (326). Thomas Napageak stated that he has seen concentrations of arctic white fox around the new drilling rigs along the Beaufort Sea that result in the spread of rabies (287). He had also been told in 1977 to look out for a rabid caribou in the Prudhoe Bay area: "In all my years in the Arctic, I had never heard of a rabid caribou. In my opinion, offshore operations could well result in more and more rabid white foxes and perhaps even rabid polar bears" (Thomas Napageak, 288).

In spite of its geographic isolation, the size and intensity of the Prudhoe Bay development is much greater than the earlier Navy experience. Inupiat concern about the sight, sound, and presence of outsiders and equipment is also more intense. Noah Itta (568) stated that in 1978 he saw heavy equipment on the site at Prudhoe Bay where his grandfather was buried. Dan Okomsilak (586) testified that he had witnessed drilling activities on Flaxman Island not far from where his grandmother's grave is located.

The Inupiat not only face seemingly uncontrollable alteration to their land, but they also report that they have been denied access

to it. Testimony from past development experiences recalls being deprived access to homesites and personal possessions: the "oil companies wouldn't let me take anything from my father's house at Prudhoe. Finally [I] did get them back from the university" (S. Kunuknana, 571). Various examples are also cited of loss of access to traditional hunting and fishing sites in the Prudhoe Bay area as a result of oil development activity (199, 541).

Unlike the earlier Navy oil experience, the Inupiat appear to perceive fewer personal positive effects from Prudhoe Bay; the assumed benefits of employment and cheap oil and gas have not materialized, and the testimony indicates a growing feeling of mistrust. While the Inupiat were not supportive of development, they did perceive that industry was obligated to provide them with these benefits if development were to occur:

"If gas is found near Atkasook, we want to know if the village will get any. Nowadays, the people can't survive off the tundra like they used to" (W. Akpik, Sr., 850).

"We've tried to pursue employment potential, and oil companies promise jobs; we fill out applications, and nothing happens" (A. Linn, Jr., 870).

"If the state-federal sale becomes a reality, can't a stipulation be that we get to use the gas that's made already at Prudhoe?" (Z. Kittredge, 865).

"Union people at Harrison Bay all promised local hire but then said that they contracted out the job and said they had no control over hiring" (T. Napageak, 872).

"In December 1968, a group of Eskimos from Barrow landed at Prudhoe Bay and at that time ASNA made a list of 235 men at Barrow who could qualify for the type of work then being done at Prudhoe Bay. Demand was made upon the oil

companies for job opportunities. The answer the oil companies gave is that the subcontractors had charge of the jobs and therefore the oil companies had no jurisdiction to insist upon jobs for Eskimos. The type of work then being done was truck driving and rough carpentry and heavy equipment driving. The Eskimos had previously been trained during the construction and operation of the DEW Line" (ASNA, 853).

"The Union Oil Company promised that the local people would get jobs on Ice Island near the mouth of the Colville River. Local people objected to the project but it got a permit. No one from village in fact got any jobs" (T. Napageak, 871).

For those Inupiat who did get jobs with the oil companies in Prudhoe Bay, most found it to be an unsatisfactory experience:

"It's really hard to work over there [Prudhoe Bay] as a minority because of lack of communication with the employer and also with rules that have never been given to you. Even though I was a certified welder, when I went down to work at the oil companies, they let me work as a welder's helper" (Eli Nukapigak, personal interview).

In addition to feeling that the oil industry is not fulfilling obligations to North Slope residents, the Inupiat also believe that industry has had great influence over government and sufficient power to achieve its own needs.

"ASNA is trying to sponsor borough government but we believe the state would not permit it to be organized--the oil industry would exert enough pressure on the state to 'frustrate the idea'" (ASNA, 768).

"We are going to get run over on both land and sea by the oil industry, whether we like it or not. Not a very pleasant future, in many people's opinion" (Z. Kittredge, 819).

Inupiat knowledge of offshore oil development is derived primarily from secondary sources. However, there are some individuals on the North Slope who have seen OCS operations in the Canadian Arctic or have worked on offshore facilities in Cook Inlet or other locations. The secondary sources of information include OCS informational meetings ("scopings"), the mass media, and listening to testimony that is given at public hearings on the North Slope. Examples of these include the testimony given by Eben Hopsen (477): "I think what happened in Canada last summer [1979] is a very good example of how dangerous offshore drilling is." The following testimony of Horace Ahsogeak at the Diapir Lease Sale hearings demonstrates this efficiency of the mass media in informing the Inupiat of oil accidents in other parts of the world:

"He -- he watch movie on -- in Mexico -- that were washed ashore and saw some ducks that were slaughtered by oil spill, killed by oil. A few years ago, he also watched when there was an oil spill, the whales were -- had to go through that -- that area, and they didn't go through because of the oil spill. Well, its a hundred mile long, thirty mile wide, three hundred feet deep, having (ph) cross there, couldn't make it, because the whale that died. It cost (ph) forty whale, maybe more -- more that whale, you know. A lot of whale. No more whale to hunt under the ground (ph). Mexico -- in Mexico -- man coming to here -- to here (indiscernible) from Mexico. He talk about, they had lots of whale on the beach all day long. That's what he say. (speaks Inupiat) He wants to get this across to young people, what he saw on the TV movie, because it is what the young people should see, what was -- what happened over there. And they could order the film, because he wants them to remember what he saw in that movie. And if they want to see it, they can order -- if they can order the movie, the film. He said if there should be an oil spill, the same thing will happen like it did in Mexico. But he said if there's an oil spill, it will go clear up to Canada. He has a picture of an oil rig that has five foundations, or whatever, on it in Norwegian -- Nor -- Norway, maybe, that this. Norway. That just slopped over, fell down. And killed over one hundred

people. He wants these -- he wants to get across to the young people what he saw. And he hasn't much to say, but the people here has said most of what can be said (H. Ahsogeak, 106).

At the same hearing, testimony was also given based on the draft environmental impact statement itself, another source of information for development of Inupiat perceptions:

"And in your environmental impact statement here, it says that there will be a blow out" (I. Kayutak, 260).

Because no full offshore oil development has occurred up to the present in northern Alaska, the Inupiat are largely dependent upon secondary information from other areas for the formation of their current opinions. These are combined with the actual experiences they have had or heard about onshore oil developments on the North Slope, and they are juxtaposed against their own use and knowledge of the Arctic environment and the subsistence species upon which their culture is based. This combination of prior experience and information with their own knowledge and use of the same environment forms the basis of Inupiat perspectives toward offshore oil development and the threats they perceive it will bring to their own culture and lifestyle.

#### Basic Inupiat Beliefs

The ocean is central to the Inupiat environment. It is more than a mere extension of land, although the ice which covers it for the majority of the year, in fact, makes it this. The coastal Inupiat



have historically used and depended upon the ocean for their subsistence and travel. It has traditionally provided the Inupiat with their major source of food--the bowhead whale, seal, walrus, and fish--and it constitutes an integral part of their culture, beliefs, and life.

Threats to the ocean and their continued relation to the ocean consequently strike at the core of the Inupiat:

"Being an Eskimo and having lived around the ocean, I am really concerned . . . because I have used the ocean for food. When we had nothing to eat we went to the ocean for food because the ocean has a lot of animals . . . . The land, as you can see, is big, and if you cannot find anything inside the land, then you can go and drill towards the ocean . . . . I am really concerned about the ocean. That is where we get our food from. I am not really concerned about the land" (E. Dukapigak, 28).

"You just don't get enough nourishment from them (ptarmigan and caribou), but unless you have some oil, like from seal, ugruk, and walrus and whale, you just die out . . . . People die off without any help from the blubber you get from the sea animals, and that's why our sea is that important to us" (T. Hobson, personal interview).

"I think that if they drill on land, it is better. You see, I have survived by hunting from the ocean. During the winter, the summer or anytime, I survive by hunting. The ice, its current is powerful and the formation of its ridges are powerful and I know this fact. I feel better about their drilling on land" (Samuel Kunaknana, personal interview).

"I will talk about what I have seen on the tracks on your map and what I have heard about selling and not selling. The ocean is not a land, and before I have heard that the ocean is not for ownership . . . . Even though I am a woman, I have hunted when I was small. Even up to now I have still hunted . . . . The ocean that you have on your lease sale, she is very against [it]. She does not want it to be on sale. She does not have it on her mind" (R. Sielak, 920).

In addition to constituting a source of food and nourishment, Inupiat appear to hold several specific perceptions of the sea and ice which affect their attitudes toward offshore oil development. Included among these are the following:

1. The ocean is part of an entire ecological system which includes the Inupiat through their hunting and use of sea mammals and fish. The Inupiat understand and appreciate the complex interrelationships of this system: the reliance of the small marine organisms on fresh water and nutrients from rivers that flow into the Arctic; the migratory and feeding habits of the larger marine species and their dependence upon the planktons and lower biological species. The Inupiat, therefore, are sensitive to the various ways in which this system could be disrupted by occurrences resulting from development, be it a threat to the food chain from river pollution or a direct threat to a species such as the bowhead. Through their years of habitation and use, the Inupiat also see their part in this environment as one of integration, belonging, and consistency, subject to disruption from outsiders:

"Since they, the oil company people, found out that I grew up there and lived there (Beechey Point), they asked me why I would live in such a wilderness area where there is nothing. So I tell them because I am an Eskimo, and my parents took me there and I grew up in it. It is my land, and I love it. . . . We still travel through that land, living off of it, and I still don't want that land abused" (L. Ahvakana, 110).

2. Because of their continuous use of the sea and ice, the Inupiat developed a deep respect for the ocean and consider it both forceful and dangerous. Virtually all Inupiat have experienced the personal tragedies of losing family or friends on the ice. Personal experiences with boats that are crushed or hunting parties cut off from home are common. Danger is continually present: "When the violent ice override begins, nothing in its way will stand its force" (F. Hopson, 39). "When the ice is coming in with 100 million tons of force, coming right at you along with the current and the wind, nothing can stop that. Nothing can stop that kind of force" (W. Matumeak, personal interview). In the minds of the Inupiat, there exists no greater force or strength than that which is held by the ocean.
  
3. The sea, and particularly the ice, is not subject to control by man. Through the application of traditional knowledge, it can be lived with and used; man can exist with and on the ice only by knowing his limits and respecting the sea ice environment. To the Inupiat, man does not have the capability to control it. In fact, man can only survive if he realizes that the sea and ice control him. "There is no way you can predict what the ice is going to do" (C Hopson, 37). "No one can stop the ice if the wind is strong enough" (H. Ahsogeak, 4).
  
4. The Inupiat generally believe that knowledge is gained through experience. Because of their history and extensive experience

with sea ice, they therefore believe that they personally have more information and know more about ice than others without this experience. "Natives are known as experts in sea ice" (J. Nukapigak, 67). This belief holds two important corollaries. The first is that those members of the Inupiat community with the greatest wealth of experience will be the most knowledgeable and trusted for information about sea and ice. These knowledgeable individuals are the elders, those who can speak of personal experiences gained throughout their lifetime, and who, because of their proven ability to survive the dangers of the ice, are by definition repositories of the most important information. It is, consequently, the elders who should be looked to for information on when and where the buildup of ice occurs in greatest proportions, what the strength of the ocean is, and when the dangers are the greatest.

"In many instances, our respected elders shared with us their vast experience and observations, just as many times the scientific community and oil industry officials refused to accept their expertise--an expertise gained not only from a lifetime of experience and interaction with the Arctic environment but also from an inbred closeness with the forces of nature that dates back not hundreds of years, but thousands of years. True, many of the Inupiat experts may not be able to explain precise mathematical formulas or equations on why nature acts in a certain way, but when our Inupiat experts talk, we listen. When it comes to deciding between the credibility of a learned scientist that's based on his information on data gathered mostly in the last fifteen to twenty-five years or that of a learned Arctic Inupiat expert who bases his judgment not only upon his lifetime of experience but upon the countless lifetimes of experience of his ancestors, I will choose the Inupiat expert over the scientific expert every time. When an Inupiat expert says something will happen, it's just a matter of time until it comes to pass." (Brian MacLean, 52, 15-16).

The second corollary is that newcomers who lack this experience, be they whites, scientists, or oil industry representatives, will not understand the strengths of the ocean currents and ice. The Inupiat believe that it would take years of study and research for these individuals to accumulate the necessary experience for holding valid knowledge and understanding and that the decisions they make without this are bound to have disastrous effects. Nelson Ahvakana (personal interview) defines this as a distinction between traditional knowledge and factual knowledge. The former, most respected by the Inupiat, is relatively constant, is passed on by the tribal entity (elders), defines appropriate use and valuation, and can be applied to contemporary problems and current situations. Factual knowledge, on the other hand, is something that one could learn and which is always changing.

No single Inupiat is seen to possess a complete knowledge of the sea and ice; traditional knowledge is collectively held and appears to transcend the individual. It is beyond the learning capacity of any single person during his lifetime. This knowledge has been developed over countless generations of Inupiat adapting to the sea ice environment. The elders, because of their personal experience, have the greatest access to this body of cultural knowledge and the greatest understanding of it. In the Inupiat view, newcomers and scientists who attempt to short-circuit this source of knowledge or who exclusively depend upon incomplete factual knowledge without

reliance on traditional knowledge will inevitably confront eventual disaster.

These beliefs in the force of the sea, its uncontrollability, and the validity of information based on accumulated experiential knowledge are continuously reinforced by the Inupiat's current experiences. Boats are lost and hunting parties are threatened by icebergs moving through the ice (178); currents are experienced which lead whalers to believe that a dead and drowned whale is actually alive and dragging the boat (N. Solomon and H. Aishana, personal interviews). The advice of elders is sought, and their predictions on the nature of the ocean are perceived to be correct.

Inupiat experiences, presented in narrative accounts in both the public testimony and field research, are used to assess the potential dangers of industrial and oil development. Instances are mentioned of sea ice totally covering a 20-foot-high by 200-yard-long barrier island (15), of ice coming over 30-40-foot cliffs near Kaktovik (79), of the destruction of sod houses (34), steel buildings (31), and a storage shed at Bullen Point 30 feet above waterline and 100 yards from the shore (H. Aishana, personal interview, 20). Inupiat attest to being witness to 30-foot waves (36, 37), the devastating effects of ice when wind and current are operating together (24, 62, 83, 84), and currents that carry icebergs at the speed of a tug, leaving a wake behind it (H. Aishana, personal interview). These experiences support Inupiat

original beliefs on the nature of the sea and ice. These dangers are further validated by information received on the damage to oil facilities in other northern environments. It is with this informational perspective that the Inupiat of the North Slope perceive specific threats and dangers to oil development facilities on the outer continental shelf.

#### Effects of Sea and Ice on Offshore Oil Facilities

A considerable proportion of the testimony given in public hearings on the North Slope, constituting approximately 9 percent of all testimony, focuses on the potential damage to oil facilities by sea and ice and the resulting impacts. The Inupiat repeatedly point to two major threats. The first is the potential damage to artificial structures--notably drilling rigs, platforms, and gravel islands. On the basis of their experience with ice, currents, and pressure ridges, the Inupiat anticipate that sooner or later these structures will be overridden by sea ice. "The wind and ice could slice through it [the gravel island] like a knife through butter" (T. Brower, 18). Similar examples of testimonial statements include the following:

- Icebergs and currents will push out manmade islands (13).
- The icepack grinding against drilling rigs or platforms will destroy them (30, 50).
- In winter, high tides caused by winds can break up the ice and cause it to come up on the beaches and islands in deeper water. In fall, wind can push young ice on islands in shallow water. "No one can stop the ice if the wind is strong enough" (H. Ahsogeak, 98).

- Fall storms, when accompanied by heavy winds and tides, can sweep ice or waves over the natural islands, which are bigger than the artificial islands (2, 18, 62).
- During spring breakup, ice pressure ridges up to 30 feet high can occur, driving "huge" blocks of ice on the islands that could push equipment and drilling wastes into the water (72).
- Strong onshore currents will push ice onshore and build it up to 20 feet high; events such as these occurred twenty or more years ago and are conditions not witnessed in the very short duration of research by oil companies (11, 67).
- "Current, wind, and the waves are not going to allow [manmade ice islands] to remain the same" (K. Toovak, 83).

The fact that various gravel islands now being tested have yet to be overridden provides inadequate proof to the Inupiat. They maintain that the islands have been sited in sheltered areas inside the barrier islands or have not been in place long enough to be subject to the severe ice conditions that will inevitably occur (W. Matumeak, personal interview). In the public testimony, damage to these facilities is always assumed to cause oil spills and subsequent damage to subsistence species: "I don't think that we will ever see our animals again" (H. Akootchook, 13, p 6). Similar dangers from ice are also cited in the testimony, though with less frequency, in regard to offshore pipelines (73, 286) and tanker traffic (153). In a personal interview, Thomas Brower of Barrow mentioned the perceived threat of oil spills from tankers caught in the ice as a major factor for Inupiat advocacy for the trans-Alaska pipeline, instead of transporting the oil by tanker from the North Slope through the Arctic Ocean (Manhattan Project).



The second major perceived threat concerns oil spills themselves, regardless of whether their origin be blowouts, tanker and pipeline spills, or ice damage to drilling rigs and wells. The Inupiat believe that oil would be swept out under the ice and that cleanup would be impossible, particularly in the fall and spring when the ice movement is greatest or where pressure areas or ridges are involved (W. Matumeak, personal interviews, 7, 55, 76). A common assumption is that oil spill technology and equipment is inadequate for cleanup in all but minor spills occurring under optimal conditions (1, 77, 80).

The two perceived threats of ice destruction of ocean oil facilities and the incapability of oil cleanup from spills are viewed uniformly across the North Slope. Testimony on these subjects appears in roughly equivalent proportions in all three coastal villages although it is less frequent in the interior villages of Atkasook and Anaktuvik. Although the Inupiat perceive the danger of ice throughout the Beaufort, there are some important offshore distinctions:

1. The Inupiat think that the greatest dangers from ice offshore exist beyond the barrier islands, where the ocean currents are often stated as stronger, the water deeper, and wind and wave action frequently more intense (12, 52, 82). They see the greatest potential for damage to drilling rigs and islands to be in this area, particularly where winter and spring tides break

up the pack ice causing the ice to come onto the islands without grounded ice to hold down movement (47).

2. Although the vast majority of Inupiat oppose all offshore drilling<sup>8</sup>, most Inupiat appear to consider the ocean area inside the barrier islands to be safer from ice destruction than the area outside the islands (H. Aishana and W. Matumeak, personal interviews). The Inupiat frequently testify, however, about specific near-shore areas where they have observed dangerous currents, areas which would be particularly susceptible at spring breakup and fall periods when the ice is moving and storms most likely to occur (2, 4, 11a, 20, 28, 44, 49, 58, 79, 80). The Inupiat believe there is a lack of understanding of ice movement in the land fast-ice zone (7, 40, 54, 67).
3. Several Inupiat have pointed to particular dangers in near-shore areas in the vicinity of the river mouths. They think gravel islands in these areas are particularly vulnerable during spring to flooding and ice buildup (H. Rexford, personal interview, 4, 71).

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<sup>8</sup>In testimony specific to offshore developments and impacts, 73 percent of the testimony given opposed lease sales: less than 1 percent were in favor; 2 percent were mixed; and 2 percent stated they did not know. In the remaining 23 percent of the testimony, no opinion was specifically stated although dangers from drilling and ice were cited in addition to opinions on more specific issues such as seasonal drilling restrictions.

4. The Inupiat mentioned some general areas and some specific sites as being particularly hazardous; for example, they see Reindeer Island as hazardous because of its low height and exposure (58). However, the Inupiat identified no areas in either their testimony or during our field research where they felt that offshore drilling would be totally safe. They made numerous references to specific locations and events where they observed conditions that would have been potentially destructive to offshore oil facilities. However, the Inupiat appear to cite these cases only as examples of what could or can happen, not as a comprehensive list of problem areas. "All the areas have dangers" (W. Matumeak, personal interview).

In summary, the Inupiat are critical of both the technology and knowledge of the oil industry and their potential to withstand dangers presented by the Arctic ice. They perceive that oil facilities will inevitably be damaged by ice, that oil spills will ensue, and that cleanup operations will not be effective. Inupiat testimony does include mention of factors which they believe could mitigate the danger of offshore development. These include limiting the drilling season during freeze and breakup periods and extending the time duration of leases in order to reduce pressures on drilling. The Inupiat almost universally approve of restricting oil development to onshore sites until industry develops the technology to guarantee safety offshore.

The Inupiat believe it is particularly important for industry to incorporate Natives, especially Native elders with their extensive body of experience, in the study of sea ice in areas where drilling is anticipated. Even if this were done, however, the Inupiat appear skeptical that offshore development can occur safely. While the Inupiat truly believe that the oil industry could learn more from listening and gaining access to the knowledge which elders hold, it is doubtful whether they perceive that the elders could learn more from scientific study of the ice. Their knowledge of the ice is already held; while never complete, it has been gained through years of successful adaptation to the sea ice environment. Involvement with research and the western learning process implies a lack of validity for their traditional perspective, an incompleteness, and an incorrectness to their form of knowledge. It is doubtful that "scientific proof" based on research of a few years duration would mitigate their conviction of the ice's eventual destructive capacity. It would also be difficult to avoid a conclusion and perception that the oil industry was teaching them, rather than they the oil industry.

#### Overview of Perceived Threats to Inupiat Subsistence and Culture

In their testimony about the impacts of oil development on the North Slope, relatively few Natives isolate direct social or cultural impacts. Rarely, for example, do Inupiat restrict their testimony to a discussion of change in a village or an alteration in traditional values and customs. Even when they do discuss such

subjects of cultural change, they rarely talk about the specific impact (the dependent variable) without referring also to subsistence. The following quote from the Diapir Field hearings in Barrow is typical of this approach:

"The negative impacts this lease sale will have are numerous. There is the threat of the influx of outsiders who, when able to outvote the Inupiat people, will dominate our home-ruled government. In a speech by our late Abraham Lincoln on May 19, 1856, he stated: "The ballot is stronger than the bullet." And that is one of my concerns, is that the opening of this field will bring outsiders in and we no longer will be the dominant society in the North Slope Borough. There is the threat of genocide, alcoholism increase, alcohol- and drug-related deaths. A major concern is the threat to the feeding grounds of our marine mammals, the migratory grounds of the whales" (D. Rexford, Diapir, Barrow, 31-32).

What is important from the quotation is not just the mention of the whale. The centrality of whaling to the Inupiat culture has already been described fully by R. Worl (1978). What is important is how the quote demonstrates the Inupiat unwillingness to separate specific cultural impacts from the total ecological environment in which Inupiat culture exists.

The Inupiat hold a holistic view of their environment. This system is based on a complex series of interrelationships between the marine and terrestrial environments, subsistence species, and man. Core to the culture is the ethos of hunting and fishing; this is the mechanism through which the Inupiat have related to their environment and on which they have depended throughout history for

sustenance and life. Through subsistence, the attainment, distribution, and consumption of "Native foods" and religious beliefs and values such as those concerning cooperation and sharing have evolved. To the Inupiat, whether or not Native food is available is closely related to their quality of life, their spiritual well-being, and their physical health. Not obtaining or not having Native food derived from subsistence is an indicator that something major is wrong with their social and environmental system.

Few Inupiat cultural values, therefore, can be treated in isolation; they are relevant only in their original context and as an end product of subsistence activity. When the Inupiat talk of the impact of oil development, therefore, they start by talking about the potential effects on the foundation of their culture, namely their environment. Then they trace the relationships between environmental disturbances, subsistence activity, and Inupiat society and culture. Since the Inupiat believe that ultimately they will have to return to a subsistence livelihood when the era of oil development is over, any prolonged or permanent disruption of this flow is particularly threatening. For example, they strongly believe that Inupiat youth must learn, on a continuous basis, about their subsistence livelihood. If the youth work for an industry which does not allow them opportunity to pursue subsistence knowledge, the results would be disastrous not only in terms of their immediate quest for food but also in their accumulated knowledge of the activity for future periods of need.

Since the Inupiat system originates in the hunting and gathering of wildlife, it is threats to the well-being and continued use of these resources that are of paramount importance. Consequently, any direct damage to these species or the disruption of their migratory patterns are the immediate threats which Inupiat fear most. Assuming that subsistence species do remain available, the Inupiat see as a secondary threat actions which disrupt Native access to subsistence resources. In the remainder of Chapter Seven, we detail Inupiat perceptions in each of the subject areas shown in Table 35. Figure 9 summarizes the relationships between these subject areas. We begin with the subject which comprises over one-third of all Inupiat testimony--perceptions of the direct threats posed by oil development to subsistence resources.

#### Direct Damage to Subsistence Species

Because the basis of the Inupiat system is the physical environment and subsistence species, the single most-feared impact of oil development is physical damage to these species. As seen in Table 35, 34 percent of the entire testimony given on the North Slope focused around issues and developments which might potentially damage or kill these species. Repeatedly, Inupiat refer to the full range of species and potential environmental threats, including the loss of waterfowl and whales due to oil spills (99, 101, 125, 197), fish from stream and ocean pollution (87, 214), caribou from the ingestion of chemicals or ensnarment in abandoned debris (92), seals and fish from seismic testing (208, 269, 373), and polar bear

Figure 9. INUPIAT CULTURAL-SUBSISTENCE SYSTEM

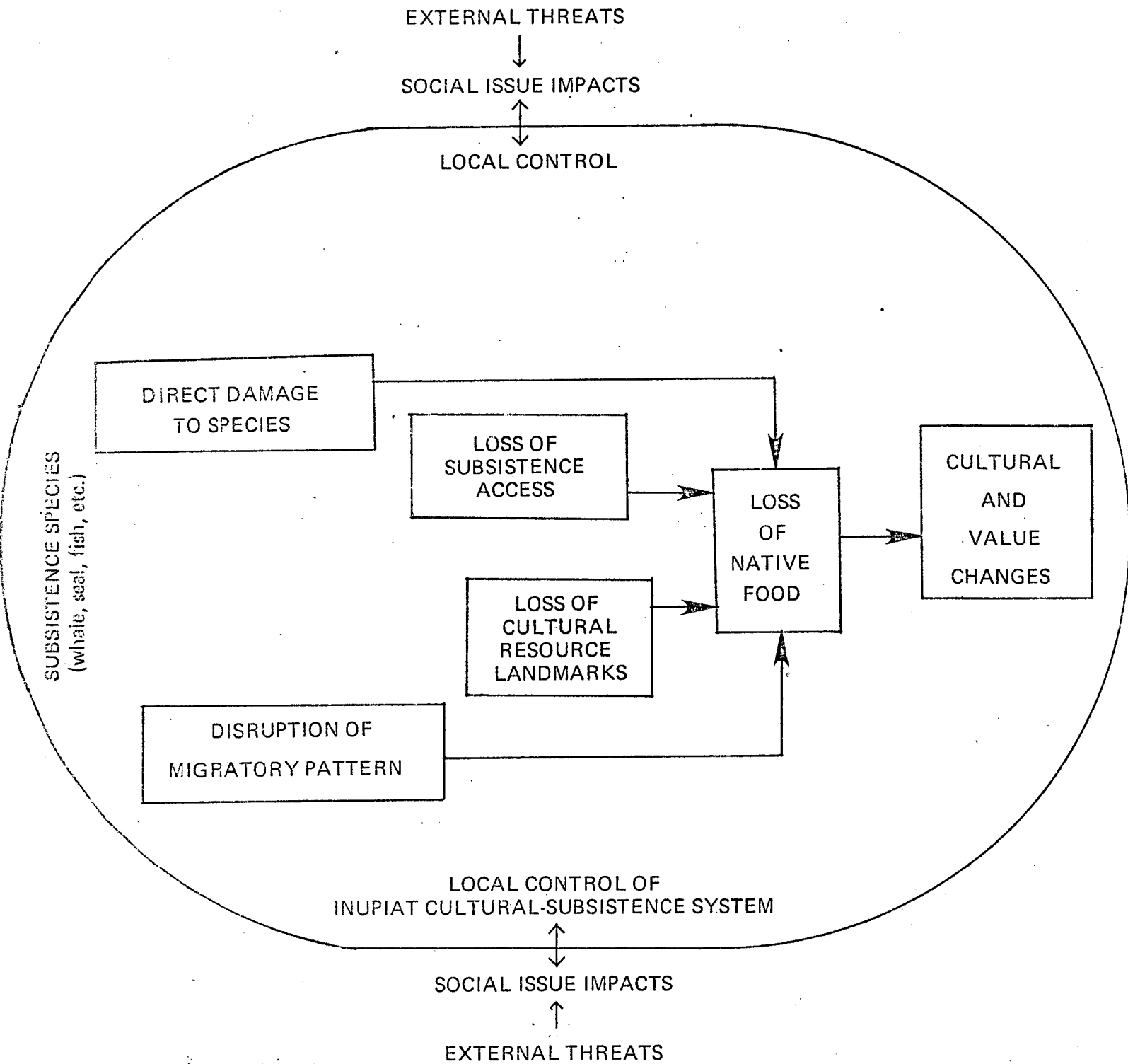




TABLE 35. SUMMARY OF SUBJECTS MENTIONED IN INUPIAT NORTH SLOPE  
PUBLIC TESTIMONY, BY COMMUNITY AND TYPE OF DEVELOPMENT

(by percent of subjects mentioned)

Subject	All Testimony				Testimony on Offshore Development
	Barrow	Nuiqsut	Kaktovik	Entire North Slope	Entire North Slope
1. Sea or Ice Hazards to Development	9	10	11	9	16
2. Damage to Subsistence Species	33	30	39	34	37
3. Disruption of Subsistence Migration	14	18	14	15	19
4. Loss of Access to Subsistence	2	1	1	2	0
5. Loss of Cultural Resource Landmarks	4	6	2	4	3
6. Loss of Native Subsistence Foods	10	12	22	13	11
7. Cultural and Value Changes	5	7	3	5	4
8. Loss of Local Control	14	4	3	9	6
9. Social Issue Impacts	5	8	2	5	2
10. No Subject Mentioned, Opinion Only	<u>4</u>	<u>4</u>	<u>3</u>	<u>3</u>	<u>2</u>
Total	100	100	100	100	100
Number of Mentions	461	155	189	923	522

from consumption of contaminated fish (168, 314). Our key informants reiterated threats of these types in virtually all of the field interviews, in addition to voicing a more general fear of a decline in all subsistence species as a result of development.

Almost half of the Inupiat testimony on threats to subsistence resources addressed the single issue of the effects of oil spills. Inupiat testifiers had read in environmental impact statements that oil spills will probably occur. This confirmed their own perceptions of the inevitable damage and oil spills that sea ice will cause to oil rig platforms and gravel islands. In some cases, the Inupiat refer to threats that are specific to particular animals such as the threat of oil to the baleen plates of whales or to waterfowl sites (98). In other cases, Inupiat testimony more generally raises the threat of oil spills to subsistence resources (113).

Inupiat projections on the effects of oil spills vary from comments such as "the impact of oil spills would create unrest among the Inupiat, the land, the sea, and the wildlife" (Kagak, 250) to "if an accident occurs, it will destroy the whales and the seals" (Akootchook, 125). Virtually unanimous consent exists that the current level of technology, combined with the difficulties of the sea ice environment, make adequate cleanup of anything but minor oil spills impossible (131, 196, 365). The direct perceived result will be damage to virtually all species: the bowhead whale, seals, polar

bear, migratory waterfowl, and fish. Among these, the Inupiat expect that the bowhead whale is most threatened by oil spills (34 percent), a natural phenomena given its importance in the Inupiat subsistence and cultural system. Following the bowhead in frequency are general references to all marine species (16 percent), fish (13 percent), seal (12 percent), waterfowl (13 percent), marine and inland species in general (5 percent), walrus (4 percent), and polar bear (3 percent). In addition to directly harming these species, testimony also cited potential damage to plankton and food chains, thereby affecting the major species (133, 164, 349). These fears of species destruction stem both from basic beliefs and from the limited experiences which the Inupiat have had with oil spills. Thomas Brower, for example, cited the death of seals and ducks following the dumping of 25,000 barrels of fuel oil from the grounded tanker near Barrow in 1944 during Pet IV (155).

Although the Inupiat feel that the danger and potential for oil spills is greatest outside the barrier islands, they believe the resulting damage to subsistence species from spills will be greatest between the coast and the islands. The Inupiat cite numerous accounts of the bowhead feeding in shallow waters, particularly in the river delta regions (119, 155, 290, 359). Fish, duck, geese, and seals also congregate in the nearshore areas. The Inupiat also voice fears that onshore spills in the immediate vicinity of rivers will harm fish in the rivers and eventually flow into the Arctic Ocean, affecting other wildlife as well (182, 269, 282).

In addition to oil spills, the Inupiat think that other features of oil development are potentially damaging to subsistence species. On the basis of their experience with Pet IV, where caribou carcasses were occasionally found entangled in abandoned seismic wires and various animals were poisoned from abandoned chemicals, they expressed concern about debris left in exploration and drilling (92, 326) and cited drilling muds and settling ponds as potential hazards for waterfowl (179, 204). Blasting and seismic soundings were credited with the killing of fish and seals (208, 269). The Inupiat also testified that gravel removal for causeway and island construction could cause "huge damage" to fisheries and fish habitat (134, 174) and saw the pumping and heating of seawater as disruptive of the local ecology with potential effects on food chains and fish populations (93, 243). They perceive that the use of water from rivers and lakes for drilling, pollution of rivers, vehicle crossings of shallow rivers, and the pollution of nearshore waters from drilling rigs and islands will threaten fish and fish habitat (100, 162, 269, 282, 306, 373). Finally, they attribute the outbreak of rabies among foxes to concentration of fox around the drilling rigs at Prudhoe (295); the Inupiat worry that strange behavior among animals and reports of rabid caribou may be caused by oil development (28, 71). To the Inupiat, all these oil-related occurrences are a serious threat to the subsistence species on which they depend.

### Migratory Disruptions of Subsistence Species

Although oil spills and related events constitute the single most-direct threat to subsistence species in the eyes of the Inupiat, they also expect industrial activities to disrupt the migration of subsistence resources. Considering all the testimony given at hearings on the North Slope, 15 percent of the concerns focused on the potentially disruptive effects which the sights and sounds of development may have on the traditional migratory patterns of marine and inland species.

Knowledge of and reliance upon the migratory patterns of fish and animal species are central to the Inupiat culture; they determined the Inupiat's own original pattern of nomadic settlement along the north coast, a seasonal pattern which many inhabitants still remember. Animal migrations were also important in the location of permanent village sites and determine the annual round of hunting and subsistence activities. Disruption of these routes would affect Inupiat ability to participate in subsistence as greatly as death or elimination of the species. The Inupiat are also well aware of how susceptible the movement of most species and their access to them are to disruption caused by human activity, a knowledge born from their hunting experience. Horace Ahsogeak (411) establishes this tie between the hunting experience and industry when describing his earlier nomadic lifestyle and frequent need to keep away from other families so that they would not scare away the game when it was scarce: "I still remember this lesson that game can be scared away

by too much noise and activity." "The elders know the animals are bothered by any noise. Even the boats in the water disrupt them" (S. Kanaknana, 485). Instead of humans temporarily disrupting the successful completion of a hunt, however, the Inupiat see oil development as posing more permanent threats to animal migration and accessibility.

Although the Inupiat perceive most elements of industrial development to be disruptive, they most frequently referred to noise originating from drilling and island construction. Natives know that the noise from their outboard motors will scare whales at a distance of several miles, and they have experienced the sound of drilling at many times that range. Archie Brower of Kaktovik described instances of having heard the Exxon exploratory well at Flaxman Island from a distance of 15 miles on a calm day, and noise from development of Pt. Thompson from distances that were even greater (441). The Inupiat fear that noise that will scare the bowhead whales further out to sea where they will not be accessible to Native whalers. They cite examples of whales being sighted and caught in the vicinity of Flaxman and Cross Islands previous to the onset of oil exploration activity but not currently (497). They expect disasters such as oil spills and blowouts to have even stronger effects, citing cases where whales avoided areas polluted by oil in the past. Archie Brower cites an example of a gas blowout at the DOME/Can Mar well in the summer of 1978 which resulted in no whales being sighted in that area during that year (444). The

Inupiat think whales are sensitive to seismic activity and that the whales will alter their migration routes to avoid areas occupied by seismic boats (537, 420). A total listing of disruptive activities involving noise and sight disturbances as well as physical barriers to subsistence species include the following:

- Seismic and exploration activity will disrupt primarily bowhead migrations and also potential fish routes (E. Nukapigak and H. Aishana, personal interviews, 420, 447, 477, 497). Nearshore areas are particularly feared, where the bowhead come in to feed and where they are the most accessible to Native hunters. Inupiat mention witnessing fish kills from seismic work, both offshore and in rivers and lakes (414, 480). Fears are also expressed for the disruption of waterfowl and seals by seismic testing (463, 500).
- The noise from platform and island construction and drilling will drive the bowhead further offshore (402, 430, 446, 455, 460, 507, 533). The Inupiat fear that noise from this source may disrupt wild fowl migration and nesting (465, 474) and also drive away seals and fish (P. Tikluk, personal interview). They believe island construction, for example near Flaxman, will alter currents and create open water leads in the ice, thereby affecting the seal (586). They also anticipate that foxes and polar bear will be disrupted by noise (444, 445).
- The Inupiat perceive that causeway construction between the mainland and islands along the coast will disrupt fish migrations over long stretches of coastline (461). They think barge and boat traffic are potentially hazardous to fish migrations (429) and that either noise or spills from oil tankers will disrupt the whales (T. Brower, W. Matumeak, personal interviews).
- Onshore noise from electric and turbine generation will alter wild fowl migration and nesting patterns (469, 532).
- Marine species, particularly the whale, are especially sensitive to the smell of oil and will stay away from areas of pollution and even past oil spills (499).

- The aforementioned impact of oil spills could temporarily disrupt food chains and migratory routes of waterfowl and sea mammals.
- Onshore pipeline landings and routes could be disruptive to coastal caribou migrations. Many believe that the trans-Alaska pipeline has had a disruptive effect of restricting caribou migration (30, 304, 357, 413, 462).
- The Inupiat perceive that airplane traffic and noise will disrupt caribou migrations, splitting up the herds and causing mothers to leave calves. They particularly criticize low-flying aircraft used for the counting of caribou for generally harassing the herds (H. Aishana, personal interview, 416, 479, 530).
- Finally, they think Hercules landings on lakes and vehicle/cat train crossings of rivers will potentially damage freshwater fish populations and fish movements (467).

Minor regional variations do exist in regard to these particular threats. Areas that are more densely developed would presumably be more susceptible to species disruption from industrial sight and sound sources. These threats are mentioned more frequently by residents of Nuiqsut, the village closest to the Prudhoe Bay and Kuparuk oil fields. Although offshore species are perceived as threatened more frequently than those onshore, a higher proportion of Kaktovik residents mention onshore disruptions, a fact associated with their usage of the Arctic Wildlife Refuge. Finally, the Inupiat testifiers mention nearshore disruptions more frequently than those outside the barrier islands. In part, this may be due to the concentration of industry activity in the nearshore area; it is also the densest area for subsistence species and that most accessible to Natives for hunting and fishing.



### Access to Hunting Areas

A third mechanism through which The Inupiat expect Native participation in subsistence to be threatened is through loss of access to traditional subsistence areas. Due to the relative isolation of oil development activities from centers of Native population, this threat is only infrequently cited in the public testimony. For example, less than 2 percent of the items mentioned in the testimony concerned the loss of access or related activities such as competition from whites for subsistence. The subject came up more frequently in the field interviews, however, particularly in Nuiqsut which is closest to the oil facilities. As competition for land use increases on the North Slope and industrial activities occur closer to settlement areas like Nuiqsut, the Inupiat anticipate that access will become a significant problem.

The Inupiat point to three ways in which they may lose their access to subsistence resources. First, and probably most important, is through the enactment of regulations limiting hunting use in traditional areas. They fear that offshore drilling would result in the enactment of new government regulations restricting subsistence use (540). They also worry that industry will prohibit hunting in the vicinity of oil and pipeline facilities (547, 548). This is felt most strongly in Nuiqsut where traditional hunting and fishing areas have been lost due to restrictions that preclude hunting within five-to-ten miles of oil lease and facility locations (E. Nukapigak and J. Nukapigak, personal interviews).

A second, more general area of concern is the reduction in access to subsistence species through increased competition from whites and outsiders. The Inupiat anticipate increased pressure on fishing and hunting resources if the haul road is opened, and they have expressed similar concerns over the recreational development of NPR-A lands (542, 545, 549). Regulations restricting hunting by oil workers on the North Slope have minimized this threat at the present time, but Inupiat remain concerned that increased pressures on hunting and fishing by outsiders will result from further oil development (543, 549). Some Nuiqsut residents, for example, opposed the construction of a road from Prudhoe Bay and Kuparuk to Nuiqsut because they expected the road would open this area to hunting use by outsiders (S. Taalak, personal interview).

A final factor threatening access is the imposition of physically obstructive facilities in areas traditionally or currently used for hunting. Inupiat cited several experiences with oil company exploratory teams going over or otherwise molesting trap lines, forcing Inupiat trappers to relocate their trap lines to other areas (551). Similarly, Natives with allotments in the Prudhoe Bay area found that pipelines and oil facilities effectively cut them off from hunting areas because of difficulties in snow machine travel (541, 551). They visualize the same results with offshore facilities, where oil rigs and equipment may serve as obstacles to subsistence activities:

"In the event that in the future that I might want to go whaling out there again, I do not want the drillers to be in my way. There is no way to be near the drillers when you want to go out hunting, and if they start drilling out there, all you can do is look at the animals instead of hunting them. Having lots of sons to be whalers, and wanting to start a whaling crew again, I have a lot of sons, that I want them to be whalers, I do not want anything to get in the way" (E. Dukakpigak, 28, p. 31).

#### Cultural Resource Landmarks

Although few Inupiat mention threats to cultural resource landmarks such as grave sites, old buildings, and historic sites, about 4 percent of the total testimony is of this type. The direct perceived threat involves either the actual destruction of these sites by oil development construction and activity or the loss of access to such sites. These concerns come up relatively more frequently among Barrow and Nuiqsut residents.

The relevancy of cultural landmarks to Inupiat families and villages appears to be twofold. They are valid historic and family sites in their own right, be it for personal reasons or for purposes of cultural identity and preservation. "His relatives that are buried there (the Kupig River) are his main concern too" (J. Turkle, 589,), and "Inupiat ties to land and marine resources and sacred places . . . would suffer an undetermined but important loss if these sites were oiled" (North Slope Borough, Harold Curran, 580,). It also appears, however, that these sites may have more than a purely historic role by linking present-day Inupiat to current use of their subsistence resources. Typical of the testimony on

perceived landmark destruction is the following quote of Ruth Nukapigak from Nuiqsut:

"As you know, Powtou will be a drilling place, but you should also know that there are graves down there. It's also a hunting area and animals have lived there. And the people that are drilling have ruined the place already where they have hunted animals before" (R. Nukapigak, (551, p. 14).

What appears relevant is that the historic place is more than a grave; it is an actual historic marker for contemporary subsistence use. The site is still used; the hunting is good there; and the grave marks this locality for the subsistence user. The identification markers permit the Inupiat to step back into history and perform the identical subsistence activities pursued by their forebearers, while at the same time providing for their current subsistence needs. In other words, the cultural landmarks direct the present-day Inupiat to where their families have traditionally found the hunting to be good, where the caribou migrate, or where the whales may be spotted or fish found. It places the Inupiat subsistence hunter in a unique and timeless relation to their cultural heritage. Destruction or obstruction of these cultural markers would not only destroy these ties to the past but would also significantly disrupt their ability to locate and use subsistence species. This may be one reason why ICAS would advocate for cultural resources being protected through the National Historic Preservation Act of 1966 "provided that continued surface use by Inupiat is insured" (ICAS, 564, p. 15). On Cross Island, Nannie Woods (590, p. 29) has an old house where her husband is buried and

where the family goes for fishing in summer and winter. On Flaxman Island, Josephine Itta (567) notes not only the location of her grandparents' graves but also that she learned to trap foxes and hunt seal there. Her mother's mother is buried at Brown Low Point, where they have fished and used Leffingwell's historic house as a storehouse. Loss of these sites through development activity not only cut Inupiat off from their cultural heritage but may also deprive them of access to important current subsistence areas.<sup>9</sup>

#### Loss of Native Food

Losing access to hunting or damage to the subsistence species themselves will necessarily result in loss of traditional native food. This threat, mentioned in 13 percent of the testimony, is potentially the most damaging to the Inupiat. Consumption of native food bonds the Inupiat to their environment. Without this, there is no life, and the continuity and wholeness of their system is broken: "If they cause one to quit taking this seal oil, my body is going to be sapped of its strength" (P. Akootchook, 610, p. 14). "If they

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<sup>9</sup>A related hypothesis, for which specific data is unfortunately lacking, is the differential social definition which Inupiat may place on litter and debris. Articles which the Inupiat abandon such as snow machines, whale bones, or hunting equipment are all ones to which they can relate in a culturally consistent manner--products of the Inupiat occupation and utilization of their environment. They will be viewed as positive landmarks of traditionally acceptable use and identity. On the other hand, land debris left by industry and outsiders who are using that same environment in a different and contradictory way will be viewed as destructive and desecratory. This might explain why Inupiat can view their own debris and landmarks positively while strongly objecting to that left by industry as visual intrusions (e.g. cat tracks or drilling materials) (H. Aishana, personal interview).

stop us, I'm going to take my boat and go whale hunting. I have to have it for food; it is part of my body" (E. Brower, 628, p. 17). "Even though I have a white man for a father, my stomach is an Inupiaq stomach. Without [whale and seal] oil, without fermented Inupiaq meat, I couldn't live--ever" (T. Brower, Sr., 626, p. 7).

Most families on the North Slope consume native food on a regular basis. Even when it is not hunted personally, it is still normally available through family, sharing, or trade. Although lack of harvesting of a particular species may result in its temporarily not being available in the community, other secondary species can normally be substituted as food sources. The Inupiat also regularly rely on white, store-bought food, particularly in Barrow. As a major food source, however, the Inupiat definitely prefer native food.

The Inupiat present four major, although overlapping, reasons for the importance they attach to native food. The first is simply a taste preference for this food as compared to white food. Inupiat think that eating meat without whale or seal oil is not appetizing. White food does not "satisfy one"; and "those elders would become sick if they were forced to quit eating something which they had eaten ever since they were very little" (A. Solomon, 704, p. 1). In the eyes of the Inupiat, native food is simply better and vastly preferred. Since they normally share native food, this preference

has obvious social implications. One example of this is illustrated in the following quote from a white family in Kaktovik:

"One statement that was in the study (Beaufort Lease Sale DEIS) was that the people of the area do not need subsistence food, but can be replaced with commercial lines of food. Well from the mouth of babes, so to speak, I have two children that were raised here in Kaktovik, 15 and 16 years old, and recently both of them related to me that their friends didn't like to come to our house around dinner time because they were afraid they were going to have to eat dinner with us, and I assure you the cooking is very good at our house; so I can only surmise they don't like the type of food, which is for the most part commercial products. And I probably wouldn't eat it either if I could get out and get my own. I don't know if that says anything or not" (Walt Audi, 623, p. 25).

Another example of the way in which the pleasure of native food bonds one to both other social generations and the environment is from Barrow:

Well, for the well-being of my own people, I hope the hunting like they have here exists forever till the earth gave way, because we love it. And I hope they don't destroy too much of the little bit of greens that I introduce to my children and a lot of the neighborhood kids, too. Some of them--they have no idea what they were and they said to me, "What are you eating?" And I would tell them, "Didn't they tell you what these were?" Then they start looking forward to walks with me in the summertime. And, when I was a girl, we used to walk down the beach and we caught those little fishes; we called them crees. And, my grandmother would make me a net like, you know, then I would scoop down and get them and they're very easy to cook. They swim by together, you know, and you just watch out for them and then you have to walk very slowly and just get as many as you can. It's a lot of fun. And those little ones, I want them to see--my children to see them too. To hunt them along with me, and their children. It's nice to see something like that when you take a walk and you get all excited because there's food there at your feet. If you were born and raised here in Barrow, you'd get excited, too. Because to outsiders, it means nothing. To us, it's just precious (D. Maupin, personal interview).

The second reason given for the preference of native food is that it is more nutritious and needed for staying healthy. Some of the testimony presented provides scientific documentation for the superior nutritional value of native food (706). More commonly, the Inupiat state their belief that one gets sick without native food; that "the nutrients derived from our game are essential for us to maintain good health in this climate" (L. Ahvakana, 599, p. 10); "you cannot live on store-bought food, period. You can live on it maybe just one day . . . But with native food, it doesn't have any chemicals, so we thrive on that. It makes strong bones and well-being of the children when you feed them native foods and for the elderly, too" (Maupin, 666). Frequently, the Inupiat base their belief upon personal experiences with getting sick when not eating native food, causing heartburn, for example. "When I started eating white man's food, that is when I started getting fat" (W. Aiken, 600, p. 6). "That the first day I came back (from school), I saw my father and he told me I looked pale and skinny. He told me I was going to have to go out hunting and get fat, so we went out fishing at his camp (M. Ahmakak, personal interview).

Of greater relevance is the particular belief that native foods are superior to white in providing endurance against both cold and hunger. Eating white man's food without oil does not last: "Which one of you have brought beef meet and eat it frozen while camping and hunting? I've tried it. It's no good" (E. Brower, 628, p. 17). The Inupiat believe that frozen fat from seal or whale and raw or dried meat are particularly adaptive to hunting. It can be carried



easily, helps withstand hunger, and has reported beneficial qualities in regard to the Arctic environment; it provides energy and warmth, limits frostbite, and makes the skin more resistant to frozen ice and snow (T. Brower, personal interview). There is a symbiotic relationship between the environment and native food and the derivatives of furs and skins used in clothing and equipment: native food is both needed for and obtained from participating successfully in subsistence, and without this food, both the cultural tradition and hunting capability are threatened. "That's why it's so special. We prepare it that way to fit our way of life, lifestyle. We can't do that with store-bought stuff" (T. Hopson, personal interview).

Finally, the Inupiat consider native foods to be essential for self-reliance. On a practical level, the high cost of store-bought food, large families, and the disruption and uncertainty of supply in the villages make total dependence on white food beyond the means of most Natives:

"My subsistence hunting and trapping is now more important than ever for the health and well-being of my family since it is impossible for our village store to get enough food to feed the village at prices that we could possibly afford" (T. Napageak, 674, p. 2).

On a more general level, the ability to have and consume native food is a statement of reaffirmation in cultural identity and well-being. The loss of subsistence food, possibly more than any other single factor, threatens the concept of being Inupiat. Among the more

affluent Western societies, the availability of food is not questioned, but among the Inupiat, periods of scarce food supplies are too recent to be forgotten. Abundance of native food from subsistence species meant that times were good, that a reciprocal, beneficial relationship existed with the environment and species, and that the culture was consequently well. Conversely, "western" or "white man's" food may be culturally and historically associated with times of hunger and hardship. During these times of potential starvation, the Inupiat had to depend on the outside trader for scarce and unaffordable goods of questionable quality that in all probability inadequately met the need caused by the lack of subsistence resources. To not have native food and thereby to be malnourished and dependent on an external source for this has always been considered a threat to Inupiat well-being. Primarily, it has been an indication that all is not well with their culture and environment. In contrast, "You eat your fullest when you eat native foods because you know it's good for you. It gives you a well-being (D. Maupin, personal interview).

#### Cultural and Value Changes

If culture is thought of in terms of shared language, customs, traditions, and institutions, relatively few statements in the public testimony address direct threats to Inupiat culture.<sup>10</sup> Only

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<sup>10</sup>In this context, culture is narrowly defined to include those social beliefs and behaviors emanating, but separate, from the physical/subsistence environment. In this context, culture is restricted to consideration of family and social institutions, language, religious beliefs and ceremonies, community roles, and

about 5 percent of the testimony addresses threats of a specific cultural nature such as the loss of sharing among families or throughout the community as a result of potential declines in subsistence. Moreover, there is little difference between communities. The highest frequency, for example, was in Nuiqsut where residents mentioned cultural threats in 7 percent of the testimony; the lowest was in Kaktovik with residents mentioning cultural threats in 3 percent of their testimony.

The threats to culture expressed in the testimony are of two types. The first is highly general and associates a decline and demise of the total concept "culture" with a disruption in hunting. "If oil destroys our ability to get food . . . as we have in our culture for thousands of years, our culture will be destroyed" (T. Brower, Sr., 723, p. 5). "Without the bowhead, the Inupiat loses a major part of his identity. And without his identity, he starts to die" (Patkotak, 752, p. 33). In essence, any threat to the subsistence species and environment on which the Inupiat is dependent threatens their culture and way of life. One explanation for the paucity of Inupiat testimony on the projected impacts and threat to culture is that they assume that such a basic causal relationship does not need

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social interaction and beliefs governing the distribution of resources. Beliefs concerning that component of culture which relates to the natural environment and subsistence activities have been discussed previously. Similarly, threats to control and autonomy of the entire cultural system and threats to specific social behavioral patterns (i.e., social problems) are discussed as social impacts in subsequent sections.

to be stated. Instead of focusing upon the culture, Inupiat place their attention on the focal point of impact: threats to the natural environment and subsistence species from which all Inupiat life emanates, even in those cases where Inupiat refer to threats to general cultural values. The source of threat is disruption of Inupiat ties to subsistence:

"It (oil development) will have a tremendous impact on this village. The impact would be on the values of subsistence hunting and fishing. There would be a lot o job opportunities, and people are going to have to be careful of how they train their kids on cultural interest and values. I have seen some of the elders now . . . not the elders, but some of these men that are older than me, get jobs and stay with the jobs, and they let their children go without teaching them how to hunt and fish, or teach them how to speak their own Eskimo language and read Eskimo." (M. Ahmakak, personal interview).

The second type of cultural impact is more specific. Certain cultural and behavioral patterns particular to the Inupiat are specified as subject to threat. The most frequently mentioned of these, in addition to the ability of the male Inupiat to hunt, is the custom of sharing what is hunted with other members of the community:

"And I cannot fulfill the role of an Inupiat hunter that I have been taught to do . . . that I must always share what I hunt with poor people who cannot hunt. Already the hunting is getting so difficult that it is hard for me to continue the sharing I want and need to do to be a true Inupiat hunter" (H. Ahsogek, 711, p. 3).

The concept of sharing is widespread in Inupiat culture. It not only guarantees a safety net for those unable to hunt successfully but also provides an important linkage tying together Inupiat from different families and communities, including urban areas:

"Even when I don't come to Barrow, I would hear that Barrow people had caught a whale and, yes, I will again eat oil. And I won't pay for it; my relatives will send me some" (E. Kakinya, 734, p. 4).

"Anyone here in Barrow with a relative inland, such as Anaktuvuk or Fairbanks, will send them some (whale) without selling it so that they can have a taste of something, knowing that they relish, love, and miss it" (Nageak, 740, p. 1).

"Some of it (caribou and seal), you give it, of course. I know, because we still get a lot. . . . we don't get hardly ugruk or any ducks here, but I get enough from my relatives and friends in Barrow. They sent something. And if Kaktovik gets a whale, maybe clear down to Point Hope, they'd catch that. They share it" (T. Hobson, personal interview).

A decline in subsistence might weaken the ties that unite the broader Inupiat community.

Other specific components of Inupiat culture cited in the testimony are similarly linked to potential threats in subsistence. Inupiat mentioned threats to the traditional role of the female in the preparation of native food and hunting gear (D. Maupin, personal interview). They also perceive threats to the family, a basic institution in Inupiat society: "the cumulative effects of continuing depletion of subsistence resources . . . can be expected to add to already high levels of family stress" (North Slope Borough, 747, p. 16). Inupiat expect a similar impact on religious beliefs and ceremonies: "Offshore drilling activities threaten to befoul and destroy the physical environment and animal life which are central to Inupiat religious beliefs" (Barrow Village Corporation, 717, p. 112). Although they rarely mention the loss of

language, central to culture, as a specified outcome or impact of oil development, Inupiat frequently point to the failure to use Inupiaq in public hearings as a major issue of local control (762, 830). Finally, the Inupiat perceive that the role of the elders in Inupiat culture, the respect given them on the basis of their accumulated experiential knowledge, and potential for their continuing role in the teachings of the young and the traditional subsistence lifestyles are also threatened (52, 838).

#### Local Control

In the foregoing sections, we have described the primary perceived threats to the Inupiat way of life. They focus on the dangers of sea and ice development and fears of destructive oil impact on the physical and biological environment. Because subsistence forms the basis of Inupiat culture, Inupiat continually couch their testimony in terms of the potential harm to subsistence species, continued hunting access, and in terms of their continued consumption of native foods.

The Inupiat expect their institutions to protect this cultural system. As might be expected, very little of the public testimony concerns Inupiat institutions since the purpose of the hearings was to solicit public opinion on the lease sales themselves and other development projects. However, a considerable proportion of the testimony--9 percent overall--does focus on issues of local

control.<sup>11</sup> The testimony is directed at external government and industry activities which conflict with local policies, thereby threatening in a broad sense the entirety of the Inupiat cultural subsistence system. Since Barrow is where most of the Inupiat institutions are based and since Barrow, as the largest community of the North Slope, is where the greatest external influence is exerted, it is not surprising that the frequency of mention of local control in the testimony is highest here: 14 percent as compared to 4 percent and 3 percent in Nuiqsut and Kaktovik, respectively. This pattern also suggests that local control issues may increase in importance in the future as the influence of industry and development increases in the smaller and more isolated villages.

The two most frequent and general issues of local control are use of the Inupiat language and lack of consideration of Inupiat public involvement in decision making (762, 830, 760, 761). The former is a criticism leveled at hearing officers where Inupiat translators were not available and where the hearings were conducted in English. Insistence on use of their own language is not only a reaffirmation of Inupiat culture but also a validation of the knowledge which comes from the testimony of elders, who are largely monolingual. In essence, this states the symbolic position that the

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<sup>11</sup>The vast majority of this was from Barrow where 13 percent of the testimony addresses local control issues. In Nuiqsut and Kaktovik, this constitutes only 4 percent and 3 percent of the testimony presented.

hearings themselves, unless conducted in Inupiat, are foreign to a total appreciation and understanding of the Inupiat perspective.

The second local control issue focuses on the repetition of testimony: Inupiat say, and the testimony clearly shows, that much of the same testimony is continually repeated at hearing after hearing. This reflects an Inupiat belief that government neither listens to nor acts upon the information which they provide at hearings. The intensity of Inupiat feeling varies from one that is relatively mild, "that he would appreciate that you go ahead and utilize some of what he has said" (D. Leavitt, 737, p. 25), to one evidencing much greater exasperation and a sense of powerlessness:

We will keep talking and talking no matter how hard it is for us to keep telling you because the ocean is very dangerous, and you will lose people out there" (G. Akootcook, 14, p. 8)

"I don't have a written statement, but I have--I can memorize what I have said before time after time--during the hearings. Like I said before, it's getting to be like a broken record to me. I can memorize it altogether what I have said, and I have never changed it and will never change it, what I have been saying" (Annie Brower, 791, p. 147).

On a more specific issue basis, Inupiat testimony addresses the ways in which industry and government activities have bypassed local policies developed by the Inupiat to protect and enhance their own interests, thereby "destroying the local planning process" (H. Bartel, 775, p. 22). The Inupiat object to state and federal commitments to offshore leasing while litigation to halt the leasing is still pending (767, 776, 823). They also referred to the



establishment of bowhead quotas and seasonal game limit restrictions despite local views as a violation of Inupiat control over their own affairs (777, 782, 796, 815). Similarly, the Inupiat raised issues relating to the recognition of tribal sovereignty (787, 788), and the implementation of projects that violate the intentions of the pending Coastal Zone Management Plan (775, 780, 825, 831):

"Therefore, the North Slope Borough will no longer cooperate with the Beaufort Sea sale preparations other than through the procedures of the Coastal Zone Management Program. We will oppose, all the way to the Supreme Court, any attempt to lease before our Arctic Coastal Zone Management regime is in place. For where trust is lacking, due process must be carefully observed" (E. Hopson, 779, p. 12).

The Inupiat also mentioned specific industry practices which violate or threaten native individual property allotments (762, 784, 786), and the perceived general practice of not coordinating with or informing the community when development projects such as seismic testing or drilling actually begin (760, 785, 834). They believe that local North Slope institutions such as the Borough should have some regulatory responsibilities (772).

In the current field interviews, however, the dominant theme expressed was one of resignation to the inevitability of oil development in spite of opposition to it. In many cases, the Inupiat see industry as being more careful or cautious in their developments, partially in response to public hearings, borough regulations, and public criticisms (W. Matumeak, W. Aikens, personal interviews). They view their ability to significantly affect the

process of development through hearings or regulatory policies, however, as limited. The knowledge that development will continue with its subsequent threats to the environment are a source of significant stress to the Inupiat:

"And that's what hurt most is you try, but nothing. That's why these things and everything else are getting so that we just get mad. You just don't get anywhere. You just. Even though you say 'No,' they're there. . . . We don't like it to happen because we don't know what the outcome will be. We're not sure if this drilling and all that sort of thing would be safe. Just a gamble on anything like that; it's too much, and it's scary for us to think about it" (T. Hobson, personal interview).

#### Social Issues

A relatively small amount of public testimony (5 percent) is presented on traditional issues of social impact such as employment, social problems, cost of living, and improvements in community services. This is surprising since these types of impacts have been given such high public notoriety in other areas of the country where similar energy development projects have been experienced.

In regard to social problem concerns, for example, less than one percent of all testimony addresses areas such as alcoholism, stress, family breakup, drug addiction, and generational conflict (860, 881, 890). Indicative of the importance placed on these by Natives is that whites gave almost half of the testimony from the North Slope on this issue, many of them speaking from their institutional positions with social welfare-type agencies.

From the field research, it appears that the Inupiat are not unaware of these potential impact problems. In fact, a fairly high level of concern exists about both their present occurrence and possible future increase. However, to a large extent, they are seen as direct implants originating from outside the traditional Inupiat system:

"The mental health of the Inupiat is also closely bound to the whole issue of subsistence activity . . . When the white man first came to this country, we shared with him our food, our clothing, and our knowledge of the land. He shared with us his diseases and his alcohol, and practically annihilated the Inupiat" (E. Potkotak, 879).

As such, the Inupiat connect drugs and alcohol with the outsiders as a source and cause, and they are considered to be the suppliers impinging externally upon the local community. In contrast, they do not appear to view alcoholism and stress as an internal Inupiat reaction to rapid change, a potential outcome of changing social conditions resulting from a decline in or threats to traditional and subsistence social patterns. The fact that they strongly advocate in their testimony the validity and continuing need for subsistence activities and direct their comments to areas in which their primary system is threatened may direct attention away from consideration of these social problem concerns.

A similar pattern appears to exist regarding other social impacts. Only one mention is made in the testimony of improved services to communities as a direct result of oil development (850), and local response to development opportunities in business investments (847)

and taxation policies (848) also receive minimal consideration. In the field interviews, however, informants give stronger credit to beneficial changes in the villages, particularly in housing and transportation facilities, although they associate these changes with the North Slope Borough and not with direct products of oil-generated revenues. Informants associated with both regional and village Native corporations also expressed strong interest in investing in regional development.

"I know for a fact that the oil won't stop for anything, even though I shout my head off to try to stop them. I think the only thing people can do is try to make the best of everything, especially the corporation, of our village. I recognize the potentials of profit-making corporation like this" (H. Aishana, personal interview).

On the other hand, the Inupiat assessed other potential changes from oil impact negatively in their testimony. Almost one percent of the testimony cited increased prices and costs as being experienced or anticipated from oil development (845, 854, 863, 868); roads (853, 862, 875) as well as increases in village population (857).

A final prospective social impact concerned local employment, accounting for 2 percent of the testimony. As would be expected, the majority of testimony focused on expanded employment opportunities for Natives (849, 850, 855, 877) and included criticisms of the fact that Natives have not been able to obtain more of the jobs that have been created (878, 885, 886). The important fact, however, appears to be the relatively low concern given to employment in the testimony. This appears attributable to

two common factors. The first is that considerable local employment has been generated by the Borough Capital Improvements Program and that these more flexible local jobs are preferred by Natives because of proximity to their homes and opportunity for continuing subsistence. The second reason for not raising employment as a significant impact issue may lie in the Inupiat definition of employment itself, and the general compatibility of employment with subsistence. In terms of the Inupiat system, industry employment does not threaten subsistence lifestyles because it is assumed that the jobs will only be taken if they provide opportunities or release time for maintaining hunting and fishing activities. Several Inupiat who have worked for industry said that they continued their subsistence activities. In fact, the increasing cost of being able to participate actively in subsistence makes cash employment complementary and necessary for continuation in the subsistence system.

"We were brought up in this cash economy business so we have to depend on the cash economy business. Some of our elders there had never seen money way back then, but us, we grew up with money. My mother was born here [Nuiqsut]. My parents used to live here, and they were instructed to take my brother to Barrow for education, which was a mandate reason. So, therefore, they moved us to Barrow. After the Native Land Claim Settlement Act, we had an opportunity to get together and come back here. So that's why we are here--we want to go back to our subsistence way of life. In order to do that, we have to spend cash, employment" (M. Ahmakak, 844, pp. 24-25).

"You know, you have to have work. You are not going to live by hunting alone today" (I. Akootchook, personal interview).

Natives may, therefore, look positively on flexible industrial jobs as one of the major benefits that can be derived from external development. Field work in Nuiqsut revealed that employment with the oil companies generally was desired and that the lack of hiring of Natives was not understandable, given the current higher levels of education and the earlier experiences which many parents had had working as equipment operators in oil industry jobs in PET-4 during the 1940s and 1950s. Criticism of employment practices may reflect what many consider to be unfulfilled expectations of being given jobs promised by industry, a potential result of communication gaps between industry and Natives on how to actually get these jobs. Those who actually had worked for oil companies cited additional problems such as industry's inability to communicate with or instruct Natives, a lack of training, and harassment from and fees required by labor unions (E. Nukapigak and H. Aishana, personal interviews). In spite of the general desirability of these jobs, however, an underlying assumption is that they will not conflict with a subsistence-based lifestyle:

"In this situation now, I've been able to work, combining both, not at a very fast speed, but working at the time when the job is available. I work so I can pay off all my bills, but when the work slacks off, then I go out hunting. Gather up all necessary fish and meat and store it and freeze it" (M. Ahmakak, personal interview).

"I wouldn't sell my subsistence for a job--no way!" (H. Aishana, personal interview).

### Conclusions

We have attempted to describe the major and most frequently mentioned threats posed by development to the Inupiat subsistence system. Subsistence issues dominate the public testimonial record, completely documenting the importance and integration of subsistence to the present Inupiat culture. The most commonly perceived specific threats are those associated with oil spills, degradation of the environment, and damage or disruption to subsistence species. Underlying these perceptions, however, is a conflict between basic Inupiat and Western beliefs. The Inupiat view of these differences is summarized in Table 36. The differences include interpretations of what contributes the most to the quality of life (resource development and cash or subsistence), what constitutes knowledge (scientific or traditional), whether the environment can or should be controlled, and whether or not cultural change is inevitable and beneficial.

TABLE 36. INUPIAT AND NON-INUPIAT PERCEPTIONS  
OF BASIC CULTURAL BELIEFS

<u>Inupiat Perception of Outsider Basic Beliefs</u>	<u>Inupiat Basic Beliefs</u>
1. Resource development will permanently improve Inupiat quality of life; cash economy is an alternative and will eventually replace subsistence.	1. Inupiat quality of life depends on continued availability of subsistence resources, both because it is central to Inupiat identity and because resource development is transitory; cash is compatible with subsistence.
2. The Arctic environment, including the sea, can be controlled.	2. The Arctic sea environment cannot be controlled but must be lived with; development will inevitably damage subsistence resources.
3. Inupiat do not understand scientific information and are consequently unjustifiably concerned about potential environmental damage.	3. Scientific information is less reliable than long term Inupiat traditional and experiential knowledge; it is not necessary to understand scientific information to form a valid opinion.
4. Social and cultural change is largely beneficial and inevitable and a product of autonomous cultural change.	4. Social and cultural change is not necessarily beneficial and is a product of external forces and intrusion by industry.



To the extent that these perceived differences in Inupiat and non-Inupiat beliefs are accurate, they inevitably will result in conflict. Such appears to be the case on the North Slope, particularly with regard to OCS development. We assume that conflicting beliefs will continue to give rise to problems of miscommunication and misinterpretation around many development issues. Several examples of Inupiat perceptions include the following:

- Oil will bring inflation and higher prices for goods and services in North Slope villages. Very few perceive the opposite effect, often viewed by whites, that improved access and transportation to villages will reduce costs and result in lower prices.
- The lack of reasonably priced oil and gas in many of the villages is unjustified and results from oil industry policies designed to maintain profits and sales without consideration of Inupiat needs.
- Non-Natives think that increased population is necessarily beneficial to villages, in contrast to the Inupiat view that population poses a competitive threat for their subsistence-resource base.
- Non-Natives assume that cash jobs can and should replace the Inupiat dependence on subsistence, whereas from the Inupiat perspective, cash employment complements and makes possible a continued reliance upon subsistence.
- Both government and industry believe that the dissemination of information to the public constitutes the basic purpose of most hearings and meetings, in contrast to the Inupiat view that the primary purpose is to have input to policy and, thereby, to change the direction of decisions. One empirical referant to this would be the August 1982 seismic hearings in Barrow; whereas the BLM/OCS purpose was to describe the seismic operations and monitoring programs, the expectations of the Inupiat were to cancel seismic work so that the bowhead migration would not be disrupted.
- Industry assumes that if they simply make a trip to a village to distribute work application forms, their

promise of employment is fulfilled; whereas the Inupiat expect industry to come to the village and actually hire workers.

- Similarly, industry assumes that good workers will stay on the job even if it interferes with subsistence activities; whereas Inupiat see their primary responsibility is to directly provide food through their subsistence activities. Wage work is largely a means to enhance subsistence opportunities.

Regardless of the future and directions which development takes on the North Slope, it would seem imperative for industry and government to be aware of these sources of conflict and misinterpretation. Only then can strategies and mechanisms be implemented for mitigating their occurrence. This will require listening to and understanding the Inupiat and the perspectives from which they speak.

The Inupiat will continue to attempt to maintain their culture in the context of a subsistence system. Perceived threats to this system are bound to be stressful. While the current situation persists, therefore, we anticipate continuing or increasing levels of anxiety and stress among the Inupiat, potentially reflected both within the individual Native and within the Inupiat institutions which attempt to protect Inupiat culture. To the extent that local institutions are able to restrict and control development to minimize impacts on subsistence, individual stress may be reduced, particularly if local institutions also continue to provide employment opportunities. To the extent that they are not successful, the Inupiat may lose confidence in their institutions

and experience higher levels of stress. Alternatively, the Inupiat may reduce their anxiety by attaching less importance on subsistence. This alternative would imply a process of assimilation towards the Western belief system.

It is important to keep in mind that Inupiat perceptions of threats to subsistence resources and the potential loss of confidence in Inupiat institutions are not the only sources of social stress on the North Slope. Rapid change induced by the North Slope Borough itself probably accounts for significant social stress. It is also important not to lose sight of the social and economic benefits enjoyed by Inupiat as a result of petroleum development. Our purpose here, however, is not to assess the relative importance of various contributors to social stress nor to weigh measures of societal stress against measures of societal health. Rather, we have attempted to describe one significant cause of social stress: Inupiat perceptions of threats to subsistence.

At the present time, the Inupiat culture is validated by strong, persistent beliefs concerning subsistence roles and activities. These form the basis for the continuation of their culture:

"And it would be that we should continue to live our lifestyle just the way it is. He will continue to live his life under the traditional style as it is today. And he says that he will be the first person to be in jail or to be in prison if he should break the law. On the month of May, he has prepared all his weapons, his boat, and he is going out into the ocean. And that he would appreciate that you go ahead and utilize some of what he has said and he would really appreciate it" (D. Leavitt, 737, p.25).

"Our way of life is more precious than all the money in the world. I would rather go back to those old days and travel by dog team than those who want this section of the world in a few hours. The last frontier is being decided upon by people who have never lived here. We want a voice; we want to be heard. The way of life that we have is on the edge of nowhere, and I plead for this cause. And I am telling you the truth, and that's why I plead with proof. The dangers of what an ice can do, no man has ever been able to contain the ice in our area. Several people can testify to that. What will happen to the culture of the Inupiat which is now on the verge of being destroyed. Is there any other culture that is still living off the land anywhere in the world? Are they still using the simple hunting ways that they hunt with? We are trying to keep our way of life, but they have locked so high that no Inupiat can get over without the help of their brothers and sisters without the help of our government. I plead for the cause of the last frontier, if it is in your hearts to help us. To help keep our culture, please help us (M. Aiken, 713).

## CHAPTER EIGHT

### ABILITY OF LOCAL INSTITUTIONS TO ADDRESS INUPIAT CONCERNS

#### Introduction

Chapter Seven documented the strong Inupiat concerns about the effects of offshore development on Inupiat subsistence resources. In this chapter, we turn to an analysis of the effectiveness of North Slope institutions in addressing the concerns of Inupiat residents. Several SESP reports and related research monographs have described efforts of the North Slope Borough to control perceived external threats (Worl, 1978; Morehouse and Leask, 1978; McBeath and Morehouse, 1980; McBeath, 1981; Worl, Worl, and Lonner, 1981). We intend to pick up that discussion and extend it to other North Slope institutions which have also attempted to influence these external threats. Our objective is to determine whether Inupiat institutions are likely to effectively influence offshore development, thereby reducing the evidently significant social stress associated with the perceived threats of OCS development.

Last year, Worl, Worl, and Lonner (1981:18) reported:

"Opposition to accelerated development significantly deteriorated as those institutions, village corporations, the North Slope Borough, and the city of Barrow initiated or expanded economic relations with industry, began working with some industry representatives, and turned attention to other tasks less public yet equally demanding of institutional attention. Thus, public institutional expression of conservative Inupiat values, particularly evident under Eben Hopson's North Slope Borough administration, appears to have lessened."

Yet Eugene Brower, mayor of the North Slope Borough, recently announced that "as national attention is focused upon the second lease sale in the Beaufort Sea (Lease Sale 71), I feel obliged to point out the borough's continuing opposition to deep-water offshore operations" (Brower, 1982). We believe the discrepancy between the statements of Worl and Lonner on the one hand and Brower on the other is largely superficial.

Borough-initiated opposition to OCS development has, in fact, diminished since it lost the suit challenging the 1979 Joint Federal-State Lease Sale. We believe the reduction in active opposition is more a function of the reduced options available to the North Slope Borough than it is to a change in basic philosophy. At the same time, Brower's statement contains an important implicit distinction: deep-water offshore operations versus shallow water offshore operations. It is a distinction perhaps based on perceptions of relative risk or upon a compromise with development interests.

We conclude from much of the Inupiat testimony we reviewed, however, that Inupiat residents (not necessarily their leaders) generally oppose nearshore as well as deep-water drilling. If we are interested in whether Inupiat institutions are likely to effectively influence external threats and thereby reduce social stress, we must analyze the actions of other Inupiat institutions as well as the North Slope Borough, for they, too, incorporate the Inupiat goal of

the protection of subsistence resources. This chapter examines the organizational goals, structures and strategies of North Slope local and regional institutions which have affected or could affect offshore development activities.

Like other North Slope researchers, we found that the Inupiat are adept at using western institutional forms to advance their interests in protecting subsistence resources and cultural values. The opportunities to intervene, however, are becoming more scarce as legal and regulatory options are foreclosed or cannot be used in offshore situations. This trend has reduced the potential for effective confrontation and increased the need for strategies based on negotiation and compromise. Inupiat attitudes toward onshore developments appear to have become more favorable since the early seventies (see Chapter Seven), thus making approaches based on compromise more viable.

In the case of offshore development, however, there is little evidence of a comparable shift in attitudes. The result has been a broadening of institutional involvement in efforts to influence development. In our discussion below, we document the involvement of village councils and of the Inupiat Community of the Arctic Slope. Despite these new efforts, however, we conclude that North Slope residents are unlikely to think that their institutions can effectively address the perceived threats of offshore development. It appears, therefore, that the social stress attending these

perceived threats is likely to increase as further offshore developments take place.

#### Institutional Development on the North Slope

Regional political development of the Inupiat did not take place, formally, until the 1960s. Up to that time, regional political relations were based upon kinship, marriage, economic and ceremonial exchanges, and other customary practices. Village-level legal institutions had developed much earlier, in the 1900s, under the influence of school teachers and missionaries, and later under the charter of the Indian Reorganization Act that was extended to Alaska in 1936.

There have been numerous studies and articles on the North Slope political and governmental institutions at the regional and community levels (Worl, 1978; Morehouse and Leask, 1978; McBeath and Morehouse, 1980; Worl, Worl, and Lonner, 1981; and McBeath, 1981). Although these studies have different objectives and foci, they all indicate that Inupiat regional unification developed out of a response to external threats to Inupiat land/resource use and their control.

The unification of the Inupiat by institutions with a legal charter began in 1966 with the formation of Arctic Slope Native Association (ASNA). It was established as a non-profit corporation. Regional political development came about largely as a reaction to a number



of external threats to Inupiat land and hunting rights. Perceived threats included a fear of contamination from the Atomic Energy Commission's Project Chariot; enforcement of the migratory bird treaties, thereby precluding spring waterfowl hunting; state land selections; and the state's sale of oil leases at Prudhoe Bay (Worl, 1978: 54; McBeath and Morehouse, 1980: 40-47). The majority of regional institutions were formed after 1970. ASNA was the parent organization of Inupiat Community of the Arctic Slope (ICAS), Arctic Slope Regional Corporation (ASRC), and the North Slope Borough (NSB). Each of these organizations taps a different set of political resources and serves as a vehicle to meet a different mix of the shared Inupiat goals of environmental and cultural protection, economic development, and local control. The NSB provided a legal structure for capturing petro dollars, asserting local control over land use, and providing education and other key public services long thought by the Inupiat to be inadequate. The ICAS, in contrast, reasserted the continuing federal trust responsibility for the Inupiat and established a conduit for federal program funds to a locally controlled tribal institution. Finally, ASRC was clearly established as a profit-making institution able to realize the benefits of the Alaska Native Claims Settlement Act.

The regional institutions act as a point of contact for the Western world of government, business, services, and the like while providing a channel by which Inupiat express their concerns and secure a competitive position vis a vis other interest groups.

Critically, the legal-institutional framework that the Inupiat adapted to their social system provides them with a legal identity at the state and federal level. In summary, the Inupiat have adopted new forms of political organization, but these forms have been modified to adjust, internally to promote Inupiat cultural values and economic development, and externally to meet the requirement of protection from and articulation with the outside world.

Observers of the North Slope political situation are often puzzled by apparent inconsistencies in personal actions and goals. It is important to recognize that most Inupiat indeed hold multiple goals which can conflict with one another. The Inupiat perceive conflicts that are the result of Inupiat, and not external, decisions to be a pragmatic necessity. They recognize that they are not fully in control of events on the North Slope and that many actions that they take will not achieve their intended objective. From this perspective, it makes sense for Inupiat leaders to attempt to further all Inupiat goals and not to restrict their actions to the goal of the protection of subsistence resources and cultural values. Thus, for example, Kaktovik whaling captains may support ASRC activities at Cape Halkett that are tied to OCS development.

Were all Inupiat goals addressed by the same institution and the same individuals, the probability of paralyzing personal or organizational conflict would be extremely high. Instead, Inupiat

leaders have recognized the varying opportunities presented by each institution to address their goals and have taken advantage of these institutional strengths, thereby minimizing conflict within an institution. Furthermore, the Inupiat have shown themselves to be particularly adept at differentiating their role in one organization from that in another. In this way, it is possible to minimize personal conflicts yet pursue goals which are potentially incompatible. There will be a tendency to reduce internal conflict among leaders and institutions as long as there is a strong perception of an externally produced threat to Inupiat culture and self-determination. The key point is that the Inupiat are opportunistic and attempt to match Inupiat goals with organizational strengths. No single institution pursues all Inupiat goals with equal vigor, nor does any institution totally ignore the goal of protecting subsistence resources and cultural values. We now turn to the specific Inupiat institutions which are involved in the protection of subsistence resources and cultural values.

#### The North Slope Borough

The principal motivation for the formation of the borough was, in the words of the then ASNA president, to acquire the "maximum amount of self-determination for the people" (McBeath and Morehouse, 1980: 87). More specifically, Inupiat saw the NSB as a vehicle for obtaining the money and legal powers necessary to improve the quality of local education, housing, utilities, and medical care; to increase local employment opportunities; and to protect the

environment and subsistence resources of the North Slope. The NSB has used a variety of strategies to address the latter goal. It has:

- Inventoried sites of cultural importance and traditional use areas as a basis for establishing cultural preservation areas.
- Required developers to obtain permits to explore for and develop onshore petroleum resources and have monitored industry compliance with local, state, and federal regulations.
- Used planning and zoning powers to restrict land use.
- Established a committee of Alaskan scientists to review environmental impact statements and other major proposal documents.
- Participated in federal and state agency planning efforts to ensure that Inupiat interests are represented.
- Lobbied for favorable legislation and executive decisions in state and federal government.
- Challenged federal and state actions in the courts.
- Developed alliances with other groups sharing one or more interests either generally or on an issue-by-issue basis.

The above strategies have resulted in some changes in onshore development plans and changes in such government policies as those applying to the use of the North Slope Haul Road. In the case of offshore development, however, the NSB is constrained by overlapping jurisdictions or, beyond the three-mile limit, by a total lack of jurisdiction. In 1979, the Borough attempted to use the federal and state coastal zone planning acts as vehicles to assert its jurisdiction out to the three-mile limit. In the 1979 coastal zone plan, the Borough prohibited all oil and gas activities in the area of the Beaufort Sea between the twelve-meter isobath and the

three-mile limit. Between the eight- and twelve-meter isobaths, the Borough called for at least a five-year delay in development activities. If implemented, these policies would have precluded most offshore development between the barrier islands and the three-mile limit.

In January 1980, Jacob Adams, acting in the capacity of president of the North Slope Borough Assembly, publically withdrew the plan from consideration by the Alaska Coastal Policy Council. The Borough plan faced certain rejection by the Council, in part because of the outright ban on development outside the barrier islands and in part because of the stringent restrictions placed on development within the barrier islands (North Slope Borough Coastal Management Plan, May 1982 draft). In addition, the plan only covered the mid-Beaufort region and was not based upon a comprehensive Borough plan.

The Borough turned its efforts toward developing a comprehensive plan. In its first attempt, the Borough tried to limit development activities seaward of the barrier islands to resource exploration and experimental structures (North Slope Borough, 1982a). Again, the Borough encountered strong objections, and a new Borough administration decided to take another approach which was later approved by the Borough Assembly and implemented through ordinances that became effective in January 1983.

The current comprehensive plan reflects both a consistency of local intent and a recognition that the Borough cannot unilaterally assert its will over industry, state, and federal actions but rather must ground its policies where possible in federal and state law and frame them in terms that are more likely to withstand the scrutiny of the courts. The plan abandons the previous approach of areawide land-use restrictions in favor of performance standards that are tied to specific planning objectives and environmental assessments. Most of the standards are framed in terms of an explicit intent (e.g. "development which restricts subsistence user access to a subsistence resource is prohibited . . .") coupled with language that tolerates exceptions (i.e. ". . . unless no feasible and prudent alternative is available") (North Slope Borough, 1982b:31).

Whether the use of non-exclusionary language will result in practice in less restrictive land-use controls remains to be seen. The burden is on the developer to demonstrate a lack of alternatives if a waiver of the standard is desired. At the same time, such language creates an environment conducive to negotiation.

The 1979 Borough coastal zone management ordinance established a three-person board appointed by the mayor. The board was charged with the responsibility of evaluating the adequacy of development plans within the coastal zone (North Slope Borough, 1979). The language of the new comprehensive plan represents a significant shift toward a compromise strategy:

Independent third-party verification by a Borough-approved agent is required for a developer's environmental assessment and design and engineering criteria for offshore development outside the landfast ice zone (North Slope Borough, 1982b:274).

The Borough plan calls for a coordinated effort by local, state, and federal entities to define the location and extent of geophysical hazard areas and appropriate mitigation technologies (North Slope Borough, 1982b:276). Again, this approach departs from the 1979 coastal zone management plan in which the Borough defined the geophysical hazard zone and required industry to use the most advanced and effective technology currently feasible to use in the industry.

On the several issues, however, the Borough has attempted to maintain an uncompromising stance. The comprehensive plan prohibits the following:

1. Depletion of subsistence resources below the needs of local residents
2. Preclusion of subsistence-user access to subsistence resources
3. Drilling or other high-impact activities in whale migration routes during the spring and fall migration seasons
4. Deposition of toxic or untreated solid waste
5. Disturbance of cultural or historic sites

While these prohibitions only apply within the three-mile limit, OCS activities could be affected through restrictions on onshore facilities, marine pipelines, and supply links. Except for areas offshore Point Barrow and near Kaktovik and Point Hope, however, spring and fall bowhead migration routes are located outside the three-mile limit. By definition, of course, actual federal OCS drilling activities will occur outside the three-mile limit.

The North Slope Borough is currently nearing the public hearing phase for its new Coastal Management Program (CMP). The Borough hopes to obtain approval from the Alaska Coastal Policy Council early in 1984. The primary value of the CMP beyond the Borough's comprehensive plan is stated in the draft CMP:

The Alaska Coastal Management Program allows coastal districts to significantly influence decisions made by other levels of government through the development of a set of enforceable rules. These rules are the basis upon which all consistency recommendations or determinations will be made. Clearly stated policies that use enforceable terms such as "shall" and "must" and are comprehensive and specific become enforceable rules (North Slope Borough, 1983).

Adoption of the CMP would establish the Borough's right to serve as a watchdog for violations of federal and state laws and regulations, and it would provide a firm legal basis for local intervention offshore within the three-mile limit. The CMP would also strengthen the Borough's position regarding development restrictions in areas designated to merit special attention under the Alaska Coastal Management Act. In the current draft of the CMP, only two areas are



suggested for special attention consisting in part of a prohibition of development: Cape Thompson, south of Point Hope, and the Kaseguluk Lagoon and barrier island system starting south of Point Lay and extending north of Icy Cape. No such areas have been identified in the coastal zone abutting the Beaufort Sea Planning Area.

While adoption of a coastal management plan would strengthen the Borough's legal standing to directly influence development activities in the coastal zone, it would not extend the Borough's jurisdiction beyond that claimed in the comprehensive plan. And while the CMP would establish the Borough's right to monitor industry compliance with state and federal standards as well as local standards, it would not transfer state or federal enforcement powers to the Borough. If the Borough observes a violation of federal or state standards, it can only report them to the appropriate authorities. Thus, the practical effect is to increase state and federal accountability, not to increase Borough enforcement powers.

Two other limitations of the CMP are (1) that it cannot be applied to federally controlled coastal lands, including those in the National Petroleum Reserve-Alaska and the Arctic National Wildlife Range, and (2) that developers do not have to comply with a given policy in the CMP if state or federal representatives determine that the policy is not relevant to the development or that the developer

has properly evaluated and eliminated all feasible and prudent alternative means of complying with the policy. Thus, much of the Borough's potential influence over development activities in the coastal zone depends on voluntary compliance by federal land managers and state and federal willingness to exert their own enforcement powers. Finally, it is important to keep in mind that neither the comprehensive plan nor the coastal management plan directly applies to the outer continental shelf.

The NSB has also attempted to use the courts to alter the course of offshore development. The borough challenged the Joint State/Federal Lease Sale under the National Environmental Policy Act, the Endangered Species Act, federal trust responsibilities, and under the state requirements for a "best interest determination." Consistent with current policy but against the interests of several North Slope village councils, the NSB limited its suit to the leasing area outside the barrier islands. The NSB ultimately lost the major part of both the state and federal suits, thus constraining further litigation options as a means of protecting subsistence resources and cultural values which might be affected by offshore development. The borough currently is suing over the recent relaxation of drilling restrictions in the Beaufort Sea.

Aside from the probability of enacting a weakened coastal zone management plan and winning one or more narrow victories in the courts, the NSB options to protect offshore subsistence resources

and cultural values will be limited. The borough may pursue political alliances with federal and state government agencies whose mandates most closely correspond to borough resource protection objectives (e.g., NMFS, USFWS). However, these agencies must conform to the policies of the larger administrative departments in which they are located. At the moment, at least, the executive orientation of both the state and the federal government is toward further offshore development. It, therefore, appears unlikely that such alliances would prove effective.

The NSB may also attempt to generate international support through the Inuit Circumpolar Conference (ICC), or if it can, by connecting the bowhead whale issue with offshore development. The borough may try to interest national environmental groups to support its position as well. The ICC has thus far not emerged as a strong source of international pressure, nor are there any indications that the International Whaling Commission will extend its interest to offshore development. Finally, national environmental groups are likely to focus on issues closer to home, given current national policies. In sum, the NSB's prospects for generating political support do not appear bright. In any case, such political support would probably be a weaker form of influence than the largely eliminated alternatives of direct influence through planning powers and through the courts.

The North Slope Borough, while established under state law, is currently a Native regional government. This is the practical result of the fact that the vast majority of voting residents of the North Slope are Inupiat. Worl et al. (1981) observed that a continuation of growth in the village non-Inupiat population could result in a non-Inupiat voting majority in a few years. Given our projections of declining capital expenditures, the driving force behind the increase in the non-Inupiat village population, we do not think it likely that the village non-Inupiat population will maintain its current level, much less continue its recent growth trend. At the same time, another source of non-Inupiat voters may materialize on the North Slope. In fact, these potential voters are already spending much of their time working in the Prudhoe Bay area.

The major producers have shown no interest in fostering the establishment of a residential community near their facilities. About half the Prudhoe Bay workforce, however, consists of persons employed by dozens of different specialty and support-sector firms. Work schedules and living conditions vary widely among these firms, and some individuals who work at Prudhoe Bay believe that the North Slope Borough should provide public services and represent local interests. Acting on this belief, they are attempting to get 500 people to transfer their voting registration to the North Slope (Anchorage Daily News, 1983). If a substantial number of Prudhoe Bay workers were to register to vote within the Borough, the North Slope Borough could cease to be under Inupiat control. More likely,

however, would be an effort by the Borough to cater to the concerns of Prudhoe Bay workers before a pattern of heavy non-Inupiat voter participation could develop.

#### Village Councils

Although all of the North Slope villages are incorporated as Alaskan cities, the role of local governments has been limited because they transferred most of their powers to the NSB. They do receive some state revenue sharing monies and continue to act as a traditional council to debate and resolve local problems such as alcohol abuse. Initially, the North Slope villages deferred to the NSB in dealing with external development interests except in cases where the village was directly approached by industry (e.g., arctic gas involvement with Kaktovik). Concern over the NSB approach to offshore development, however, prompted the Kaktovik city council to file its own federal suit over all offshore development activity. This step represented a significant but short-lived change in the North Slope political situation, for Kaktovik lost its suit in the federal court of appeals. Currently, the North Slope Borough provides legal counsel and representation to all North Slope communities.

#### Inupiat Community of the Arctic Slope (ICAS)

The ICAS has recently become active in the areas of subsistence resource and cultural value protection. ICAS is a federally recognized regional tribal organization which provides quite a

different umbrella of protection than the borough or city governments formed under state statutes. Unlike ASRC formed under ANCSA, ICAS is a permanent Inupiat-controlled institution to which the federal government has an ongoing trust responsibility. Until passage of the Indian Self-Determination and Education Assistance Act of 1975, the ICAS remained an organization largely existing on paper, perhaps as an insurance policy against the day when ASRC shareholders could sell their stock to non-Inupiat. After 1975, however, the ICAS could take advantage of new federal funds for Native education, social services, and economic development programs. These services are currently contracted through the NSB. More important for our purposes, however, is the fact that federal support has also enabled the ICAS to actively promote the protection of Inupiat subsistence resources and cultural values.

The ICAS strategy has been to assert Inupiat sovereignty, not only over all lands on the North Slope but also over the Beaufort Sea. It recently asked the U.S. District Court in Alaska for a legal determination of Inupiat rights beyond the three-mile limit. If the ICAS had won its major arguments (it did not, as the suit was dismissed), the entire political situation on the North Slope would have been upset, for the NSB would have become an illegal incursion of a state institution on federal land. The ICAS would also have had some form of jurisdiction over offshore activities. While the suit was dismissed and the leadership of the ICAS changed, there are some aspects to the case that demonstrate the Inupiat strategy. The

NSB mayor, Eugene Brower, submitted an affidavit in support of the ICAS suit, and ASRC provided financial backing. The implication is that Inupiat control is clearly more important than the particular institution which exerts that control. The case also indicates that the Inupiat are actively seeking ways to assert local control but are nearing the end of the universe of available options.

#### Alaska Eskimo Whaling Commission (AEWC)

The creation of the AEWC by the NSB, ASRC, and Barrow Whaling Captains Association in 1977 was in response to the moratorium on hunting bowhead whales proposed by the International Whaling Commission (IWC). The AEWC is a unique and significant institution; it directly represents Native whaling communities nationally and internationally without state overview concerning whaling issues. In effect, it has assumed the function of whaling management for the Inupiat. Its board includes a representative from each whaling village in Alaska, and the regional IRA (ICAS) has delegated its authority concerning whaling issues to AEWC. Although it receives its administrative support from the NSB and ASRC, it is not a commission of the borough. Support for its programs have come from the NSB, the state, and other private sources. In sum, the AEWC has the specialized function or task of protecting Inupiat whaling practices from total external control and regulation. Externally, its institutional form is western; internally, its recruitment, composition, and structure is traditional Inupiat, i.e., composed of Umialik (Whaling Captains).

To date, the AEWC has focused its attention on the policies of the International Whaling Commission (IWC). Should this issue be resolved, the AEWC represents another Native institution which could attempt to influence offshore industry activity. The AEWC does not, however, have any legal jurisdiction. Its main strength would be the unification of Inupiat interests throughout northern and western Alaska.

#### Arctic Slope Regional Corporation (ASRC)

The ASNA leadership voiced the view at the formation of ASRC that its major task was to promote Inupiat health, welfare, and economic and social well-being by promoting and participating in economic development (Worl, 1978: 76). The basic objective of ASRC, according to its charter, is "to manage and invest its entitlement under the ANCSA . . . and all other corporate assets on a profit-making basis for the benefit of its stockholders" (Worl, 1978: 78). Although its charter is a for-profit corporation externally, ASRC has not pursued its institutional mandate without regard for Inupiat interests in the protection of subsistence resources. It is necessary to realize that the Inupiat are not opposed to energy-related development but rather are opposed to development that takes place irrespective of Inupiat concerns, objections, and fears. Development by Inupiat corporations at least provides the perception of control and responsiveness as well as continuity to Inupiat life. ASRC is a conduit into private industry, as NSB is to the state and ICAS is to the federal



systems. Its power or influence with industry has not been clearly tested as has that of NSB in regard to the state.

There are four major ways by which ASRC attempts to achieve its objectives for its shareholders and the Inupiat:

- Investment and development
- Land leasing to oil companies
- Affiliations with other North Slope institutions
- Joint ventures with oil companies and others

ASRC has directed much effort toward economic development of the North Slope. Through its own operations and that of its wholly owned subsidiaries, ASRC has engaged in construction, general contracting, transportation, technical services, oil-related construction and maintenance, catering, communications, engineering, and heavy equipment operations, among others (Worl, 1981: 67). Aside from its revenues, including \$29 million by 1979 from rentals of leasing part of its subsurface estate to oil companies, ASRC employed 150 workers in Barrow and over 800 through its "partnerships and subsidiaries" (McBeath, 1981: 33). As McBeath (Ibid.) observed, ASRC "has increased greatly the capital supply and investment opportunities for Natives." Through the return on its investments and projects, it has been able to extend lines of credit to village corporations and provide some monetary support to ICAS in its litigation with the U.S. government.

ASRC's ability to generate working capital from its land holdings is limited, however, by the negotiated terms of Section 7(i) of the Alaska Native Claims Settlement Act (ANCSA). As of June 1982, ASRC had leased about 4.3 million acres of its land to several oil companies for exploration (ASRC, 1982), and industry had spent over 400 million dollars on exploration activities. Section 7(i) of ANCSA requires each of the twelve regional corporations to share 70 percent of revenues (adjusted for costs) derived from timber or subsurface resources. ASRC has maintained that lease payments for exploratory rights do not constitute Section 7(i) revenues and are, therefore, not subject to distribution to the other corporations. Five other corporations disagreed with ASRC's interpretation and filed suit. On June 29, 1982, the regional corporations agreed on the definition of Section 7(i) revenues and on the accounting procedures by which they are calculated (Section 7(i), Settlement Agreement, 1982).

Although the agreement is a compromise, ASRC largely lost its argument that the proceeds of lease sales for petroleum exploration are not Section 7(i) revenues. Under the terms of the agreement, ASRC owes a total of \$7,250,000 to the other eleven regional corporations for the period ending June 30, 1981, and an additional \$2,392,413 for the twelve-month period ending June 30, 1982. The latter figure represents 36 percent of the fiscal 1982 gross revenues ASRC received from land leases and other natural resource-related revenues.

ASRC affiliation with the NSB has been mutually advantageous and reflects ASRC's general support for protecting Inupiat interests. We were told by an ASRC administrator that politically the NSB provides much of the direction and restrictions in regard to development. The borough has urged a cautious development strategy with particular attention given to environmental concerns and gains for Inupiat. To these urgings, ASRC has responded by cooperating with NSB. In turn, NSB has been extremely supportive of ASRC by contracting it or its subsidiaries for numerous CIP projects, CZM planning, North Slope oil operations, and other services. ASRC has promoted Inupiat interests by providing direct support for Alaska Eskimo Whaling Commission, ICAS trespass claims, formation of the Inupiat University of the Arctic, Inuit Circumpolar Conference, and internationally the Committee for Original Peoples Entitlement (COPE) of Inuvik which would enable it to pursue the Canadian western Arctic Inupiat land claims settlement (Worl, 1978:93).

Joint ventures with oil companies would appear to be financially rewarding, but, at the same time, it provides one of the few remaining avenues for Inupiat influence and involvement in oil-related development. However, there is little available information that indicates ASRC has utilized its business ties with industry to change policies of most concern to the Inupiat. While industry no doubt finds it attractive to work with Native-owned companies where possible, ASRC certainly has no monopoly over the services its subsidiaries provide to industry. It, therefore, may

have little leverage. In addition, ASRC is itself part of the oil industry in that there are now no alternative means to develop basic industry activity on the North Slope. While ASRC tacitly supports the NSB policy of supporting environmentally responsible offshore activity inside the barrier islands and opposing deepwater activity, it appears to view the NSB as the appropriate vehicle for promoting this policy and has refrained from active, direct intervention.

### Conclusions

North Slope institutions have brought an impressive amount of effort to bear on the objective of influencing offshore development. Doubtless, additional attempts will be made. In our view, however, it is unlikely that any institution will be particularly successful. Already many village residents we interviewed evidenced an attitude of resignation to the prospect of offshore oil development.

It may also become necessary for the NSB to shift its priorities to maintain its strong base of local support. The NSB has received widespread political support for its past ability to improve local living conditions, create jobs, and protect onshore subsistence resources and cultural values. We have already seen that offshore development will not result in an economic boom comparable to that indirectly produced by onshore development. As the NSB turns from an active capital construction program to an operations program, the quality of services will plateau and local employment opportunities will drop. If we are correct in projecting little opportunity for

the NSB to intervene in offshore development to protect subsistence resources, a third basis for political support may be in jeopardy. Should this occur, the NSB will have to find another vehicle for pleasing its constituents or face a potential loss in regional influence. The borough-sponsored Kuparuk service center may be a viable alternative. This would require a refocusing of public attention on the employment opportunities associated directly with industry.

What if the borough can find no way to retain its strong public support? One possibility is that the regional political integration enjoyed by Inupiat for ten years will disintegrate. Village residents already have begun grumbling about the mismatch between the cost of operating facilities built by the NSB and their ability to pay. Will these criticisms evolve into an outright rejection of NSB involvement in village affairs?

While we think that the borough will have increasing difficulties in meeting public expectations, there are several reasons why we think that the borough will remain a politically viable regional institution. First, the strongest forces uniting the Inupiat are perceived external threats that are likely to continue. As long as state, federal, and outside private interests pursue policies which conflict with Inupiat self-interests, local institutions are likely to continue to receive local support even if they are generally ineffective, unless, of course, continued support of less-effective

local institutions means withholding support from a more effective local institution. Since all North Slope institutions receive their financial support from outside the North Slope, however, they generally do not compete for scarce local resources.

The North Slope Borough should also retain local support because it is likely to remain an Inupiat-controlled institution. The North Slope non-Inupiat population living in enclaves will probably continue to vote in the political jurisdictions in which their families reside and in which they own property. The village non-Inupiat population will not continue to grow once CIP program activities decline. In fact, their number will probably fall.

Finally, the borough, like other North Slope institutions, provides a base for politically strong Inupiat individuals and families. These Inupiat are unlikely to abandon the NSB unless they locate another power base. In our view, there are few opportunities for the development of additional North Slope institutions.

Even if the borough remains an important North Slope institution, the fact remains that if it cannot influence OCS development, Inupiat anxieties about development impacts are likely to increase.

We now turn to an examination of the implications of this stress on Inupiat social well-being.

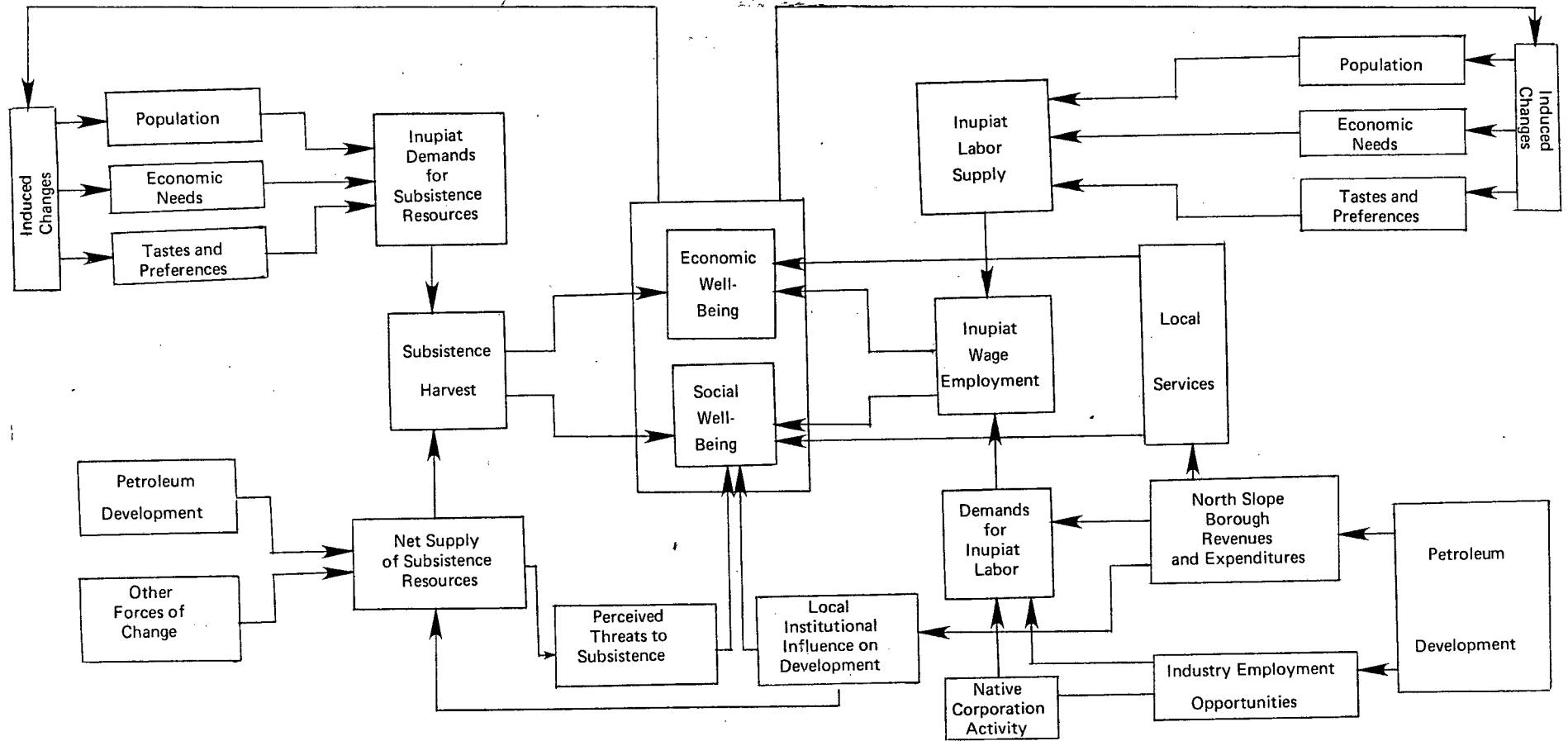
CHAPTER NINE  
INUPIAT SOCIAL AND ECONOMIC WELL-BEING

Economic Well-Being

According to the analytical framework we presented in Chapter Two and summarized in Figure 1 (repeated here as Figure 10), Inupiat economic well-being is principally a function of land-use conflicts; North Slope Borough (NSB) revenues, expenditures, and employment; local participation in development employment; and local investment activity. Land-use conflicts can reduce Inupiat hunting and fishing activity and thereby decrease the availability of subsistence products. NSB activity can create employment opportunities which raise earned income and can improve the quality and quantity of household and community goods and services. Local participation in development employment can also increase incomes. Native corporation activities can raise Inupiat incomes through preferential hiring and, eventually, through corporate profits.

We extensively discussed the driving forces behind Inupiat economic well-being in the MAP publications emerging from research conducted in 1977. We believe our observations and conclusions generally apply to the current situation, and we refer the reader to our previous publications for detailed analysis of the North Slope economy. Since 1977, the NSB continued to pursue an intense capital improvements program (see our discussion in Chapter Four). Native corporation activity has expanded since we conducted our 1977

FIGURE 10. DYNAMICS OF SOCIAL AND ECONOMIC CHANGE ON ALASKA'S NORTH SLOPE





research and now doubtless contributes significantly to Inupiat incomes. Quantitative estimates of the extent that Native Corporation activities are contributing to Inupiat economic well-being cannot be developed without conducting another survey of the general population or analyzing confidential corporation records. We also have no quantitative estimates of Inupiat employment with the oil industry. Based on our key informant interviews, however, there is no reason to expect that Inupiat participation has increased beyond the minimal levels we observed in 1977. More attractive NSB and Native Corporation employment opportunities in North Slope communities remain the basic source of Inupiat employment.

1980 Census data provide an indication of the cumulative effects of NSB and Native Corporation activities since 1977. Table 37 compares Inupiat family incomes for 1977 and 1979. Even when one assumes an 18 percent increase in the cost of living (based on changes in the Anchorage CPI), the median family income of Inupiat households increased by 56 percent, from \$17,347 to \$27,127, in three years.

TABLE 37. CHANGES IN INUPIAT FAMILY INCOME

(Percent)

	<u>1977</u> <sup>1</sup>	<u>1979</u> <sup>2</sup>
Under \$5,000	1	9
5,000 - 7,499	10	3
7,500 - 9,999	7	5
10,000 - 14,999	13	9
15,000 - 19,999	9	5
20,000 - 24,999	18	10
25,000 - 34,999	13	19
35,000 - 49,999	13	20
50,000 or more	<u>6</u>	<u>20</u>
	100	100
Median Family Income:	\$17,347	\$32,035
Adjusted Median Family Income (1977 dollars):	\$17,347	\$27,129

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Sources: <sup>1</sup>ISER 1977 North Slope Survey

<sup>2</sup>U.S. Bureau of the Census, Summary Tape File 3

Largely due to the NSB Capital Improvements Program (CIP), the Census Bureau estimates that 382 houses were constructed on the North Slope since 1974. This represents almost 40 percent of the total North Slope housing stock. The availability of new housing and a declining birth rate resulted in a decline in average household size from 5.7 in 1970 to 4.3 in 1980. Clearly the quality of housing has substantially improved.

The NSB CIP has significantly improved the quality of community living conditions in many other areas as well. New facilities built in virtually all North Slope communities include:

- schools
- electric generation and distribution systems
- water supply and sewage disposal systems
- roads
- storage and warehousing
- public safety buildings, including fire stations
- health clinics
- fuel storage
- airport runways or terminals
- community centers
- community vehicles
- libraries or museums (Barrow and Point Hope)

Without additional survey data, we cannot estimate what, if any, changes have occurred in the amount or quality of the subsistence harvest which still heavily contributes to Inupiat economic well-being. The poor 1982 spring whaling season has doubtless reduced the aggregate subsistence harvest last year, but there is no evidence to suggest that this is more than a single-year phenomenon. Based on our previous North Slope research, we project no decline in Inupiat subsistence activity and would expect that harvest levels will primarily be determined by the supply of subsistence resources.

### Social Well-Being

No current data exists to confirm that recent improvements in Inupiat income, housing, and community facilities have contributed to the Inupiat sense of social well-being. The Inupiat did recognize similar improvements as contributing to their quality of life in our 1977 survey, and there is no reason to expect that this obvious relationship has changed. At the same time, however, our 1977 survey respondents perceived that significant negative changes have attended the positive ones.

One change apparently detracting from the Inupiat sense of social well-being has been the increase in the number of non-Natives present in North Slope villages. Worl and Lonner (1981) discuss this problem extensively. 1980 Census figures deceptively indicate that the proportion of non-Natives present in North Slope villages has only increased from 18 percent in 1970 to 24 percent in 1980. These figures do not include the large (but variable and unknown) number of transient non-Natives who primarily live in construction camps in or near Inupiat villages. The number of non-Natives in North Slope communities is primarily a function of CIP activity. As this activity declines in the future (see Chapter Four), the non-Inupiat presence in Inupiat communities should decline. Attending this decline, however, is likely to be a reduction in local employment and incomes. Therefore, we would not expect an increase in Inupiat social well-being to follow a reduction in the number of non-Inupiat present in North Slope communities.

In addition to the influences of economic well-being and the presence of non-Natives, Inupiat social well-being also is likely to be affected by fears that offshore development activity will damage, destroy, or dislocate subsistence resources. Our only measure of this relationship is the level of emotional intensity observed in Inupiat testimony (see Chapter Seven). Inupiat testimony clearly indicates that the continued availability of subsistence resources is of paramount importance to Inupiat social well-being. Yet we cannot assume that fears of future disruptions to subsistence activity carry as much weight in determining current levels of social well-being as would actual disruptions to subsistence activity should they occur. In our view, the relative importance of Inupiat economic well-being and Inupiat fears is impossible to assess in the absence of an actual situation demanding a tradeoff in values. Obviously, no one would wish for such a situation ever to occur.

In cases of uncertainty, we believe it is best to err on the side of overestimating impacts. Therefore, we would assume that Inupiat fears concerning the effects of offshore development activity are the most important determinants of current Inupiat social well-being. Under this assumption, we expect Inupiat social well-being to decline with additional anticipated offshore development, particularly if North Slope institutions are, as expected, ineffective in influencing development activities. Furthermore, we expect that Inupiat social well-being will

dramatically decline when the pace of NSB CIP construction activities slows in the 1980s.

### Inupiat Culture

The traditional attributes of Inupiat culture have been described by Sonnenfeld (1957), Van Stone (1962), Gubser (1965), Spencer (1969), Nelson (1969), Worl (1978), and others. These accounts include as major elements of Inupiat culture the extended family as a key social and economic unit, cooperative activity in the provision of material goods, sharing and exchange of goods, and a system of beliefs attributing a spiritual dimension to man-environment relationships. Of course, the language of the Inupiat is considered a central part of Inupiat culture.

Beginning in the mid-nineteenth century, the Inupiat faced a succession of outside forces of change, including commercial whaling, missionaries, traders, oil exploration activities, defense installations, and government social programs. The effects of these forces have been analyzed by Sonnenfeld (1957) and Brower et al. (1942) and summarized by Worl (1978) and Kruse et al. (1982). While the material environment of the Inupiat changed rapidly as they applied new technology to traditional subsistence activities, worked for wages, lived in frame houses, attended schools conducted in English, abandoned ceremonial houses, and attended Protestant churches, many attributes of Inupiat culture persisted. Thus, at the time of the discovery of oil at Prudhoe Bay, Inupiat continued

to maintain social and economic ties with an extended family, cooperatively hunted for whale, shared the proceeds of hunting activities, spoke Inupiaq, and incorporated spiritual beliefs with community celebrations. While the culture of the Inupiat has never been static, the major changes encountered over the past 150 years have clearly not fostered a wholesale abandonment of traditional Inupiat culture. In fact, those researching the effects of major forces for change prior to recent energy developments on the North Slope remarked on the ability of the Inupiat to adapt to changing circumstances while maintaining significant elements of traditional culture (Van Stone, 1962; Sonnenfeld, 1957; Chance, 1966).

Now the perennial question of whether a major force of change is affecting Inupiat culture can once again be framed with respect to North Slope energy development and the concurrent activities of such institutions as the North Slope Borough and the Arctic Slope Regional Corporation. The following are representative of observations made by those who have recently addressed this question:

1. A number of recent studies initiated by social scientists under sponsorship of several different agencies such as U.S. Department of Interior (1979), the North Slope Borough (Brown, 1979; Peterson, 1979), and the University of Alaska's Arctic Environmental Information and Data Center (Worl, 1979) and Institute of Social and Economic Research (Kruse, Kleinfeld, and Travis, 1979) attest to the persistence of various elements of Inupiat culture (Worl, Worl, and Lonner, 1981:26).
2. The many outward changes, however, have not brought substantial changes in sociocultural values (Jacoson and Wentworth, 1982:22).

3. Research and analysis initiated for this project indicates that the Kaktovik Inupiat have maintained the social cohesiveness which characterized the community during the period described by Chance [late 1950s to early 1960s] (Worl and McMillan, 1982:25).
4. In spite of the political and economic forces impacting Kaktovik and the resulting sociocultural changes in the last ten years, the Inupiat culture and social organization reflect a remarkable resiliency and tenacity (Worl and McMillan, 1982:92).
5. Partnerships among the Yupik and Inupiat were quite common and continue to persist in essentially the traditional form (Langdon and Worl, 1981:79).
6. Contrary to prevalent assumptions which hold that nuclear family residency patterns would weaken extended family bonds, indications are that nuclear families living in single-family dwellings continue to interact as members of extended families particularly evident through their cooperative subsistence activities; kinship ties and the cultural values of sharing and cooperation continue to integrate the nuclear family with the extended family (Worl, Worl, and Lonner, 1981:190).

It seems, then, that researchers have not observed qualitative changes in Inupiat culture since the discovery of oil at Prudhoe Bay. At the same time, researchers are aware of the lack of definitive research results:

Undoubtedly, extensive fieldwork would reveal further changes in the social and cultural spheres which are not apparent from the recent literature . . . It was not possible for the authors to immediately conclude from the significant events of the past three years that clear sociocultural changes had occurred (Worl, Worl, and Lonner, 1981:1, 51).

The literature indicates that the values which promote ceremonial feasting and distribution of resource goods have persisted in all Alaska groups, but precise descriptions of surviving ceremonies and accountings for the amount of subsistence resources involved have not been done for the contemporary period (Langdon and Worl, 1981:i).



We considered the above findings during the design of the current research project and concluded in the fieldwork plan approved by MMS that reliable indicators of cultural change would require quantitative measures which could not be obtained under the methodological limitations placed on the project.

We observed few references to changes in Inupiat cultural attributes in the record of public testimony, although there were several references to the young not becoming proficient in traditional skills and in Inupiaq. As we pointed out in Chapter Seven, the omission of specific cultural references is not indicative of a lack of concern; rather, Inupiat still associate the survival of their culture with the continued integrity of their natural environment and, therefore, focus their testimony on perceived environmental threats. Even when pressed to talk about changes in sharing, cooperative activity, and other attributes of Inupiat culture, however, our informants were reticent. They appeared to hold to the general belief that Inupiat culture is threatened by offshore development but were not prepared to more specifically state that environmental disruptions could force an end to sharing or cooperative activity. Instead, they suggested that the objects shared or the activities involving cooperative behavior might change so that the cultural attribute would persist. We have no evidence as to whether or not such substitutions in fact would occur.

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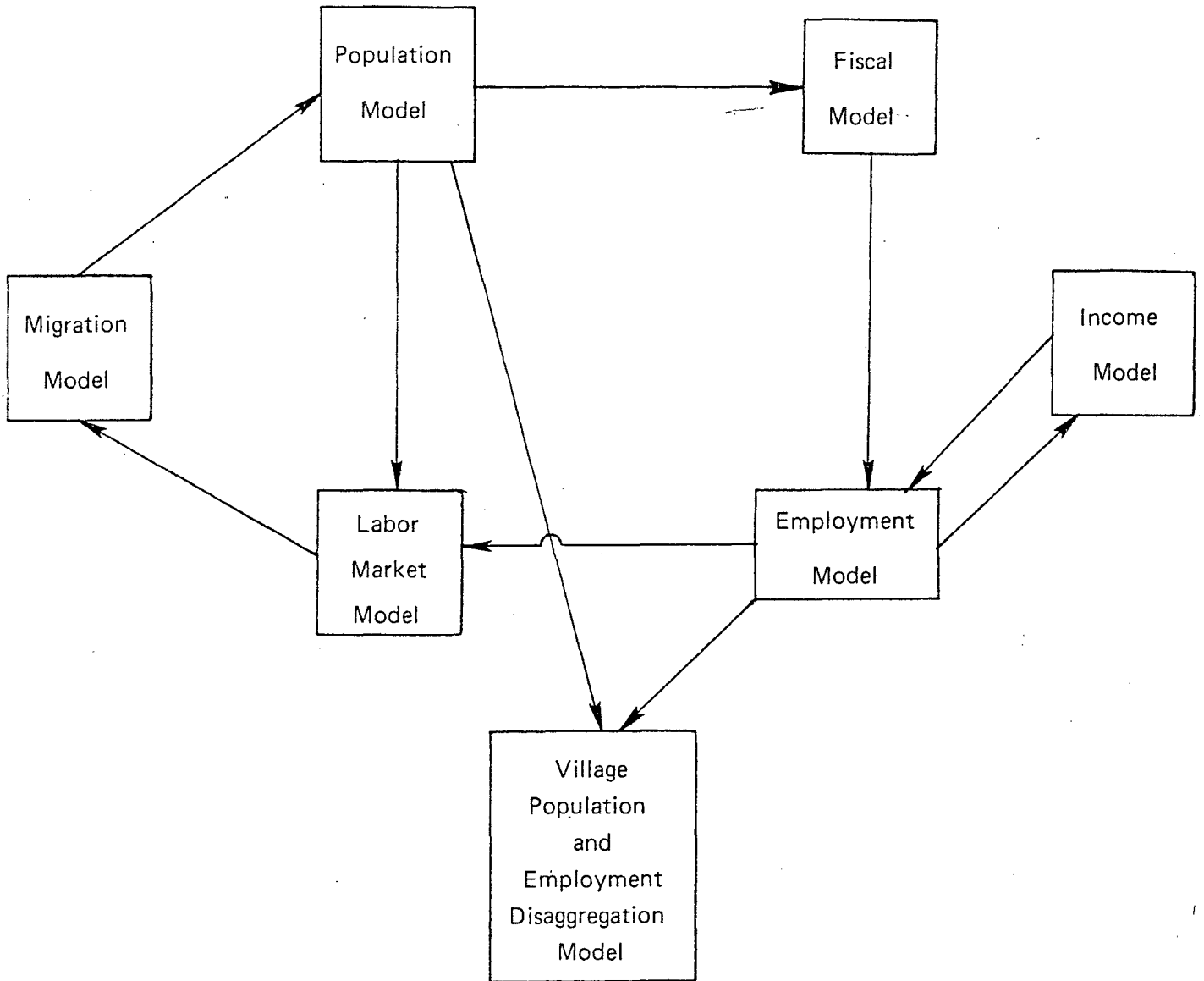
## APPENDIX A: THE NORTH SLOPE MODEL

In this appendix we describe a model of the population and economy of the North Slope Borough. We refer to this model as the "North Slope Model." The model is a computer model which projects population, employment, revenues, expenditures, and a variety of other variables based on a number of assumptions. Our principal purpose in developing the model was to be able to examine the effects of different assumptions about factors such as state spending limits or Inupiat labor force participation on Inupiat employment, income and population.

We describe the model using several figures which diagram the interrelationships between different variables. At the end of this appendix, we provide a complete listing of the equations of the model which should be examined by anyone wishing to trace through exactly how the model calculates different variables.

Figure A-1 shows the overall structure of the model. There are seven submodels: the population model, the fiscal model, the income model, the employment model, the labor market model, the migration model, and the village population and employment disaggregation model. With the exception of the village population and employment disaggregation model, all of the other models feed into each other. Below, we describe each of the submodels.

Figure A-1  
The North Slope Model



### The Fiscal Model

Figure A-2 illustrates the fiscal model, which calculates North Slope Borough revenues, debt repayment costs, and tax rates based on assumptions about state spending limits, population, property values, and CIP construction spending. Per capita tax limits determine operating revenues from property taxes and other sources. All operating revenues are spent as operating expenditures. Local government construction spending determines new borough debt repayment costs, which are added to existing debt repayment requirements to determine total debt repayment. These funds are raised through property taxes. Together, property taxes for operations and property taxes for debt repayment determine total property taxes, which are combined with assumptions about total property value to calculate tax rates. The fiscal model also calculates an estimate of total borough operating costs by adding a fraction of the cost of new construction each year to operating costs of current facilities.

### The Employment Model

Figure A-3 depicts the employment model. There are seven categories of employment. Borough operations employment is proportional to Borough operations spending. Similarly, borough CIP employment (assumed to be Inupiat) and other CIP employment (assumed to be non-resident non-Native workers) are proportional to borough CIP



Figure A-2

The North Slope Fiscal Model

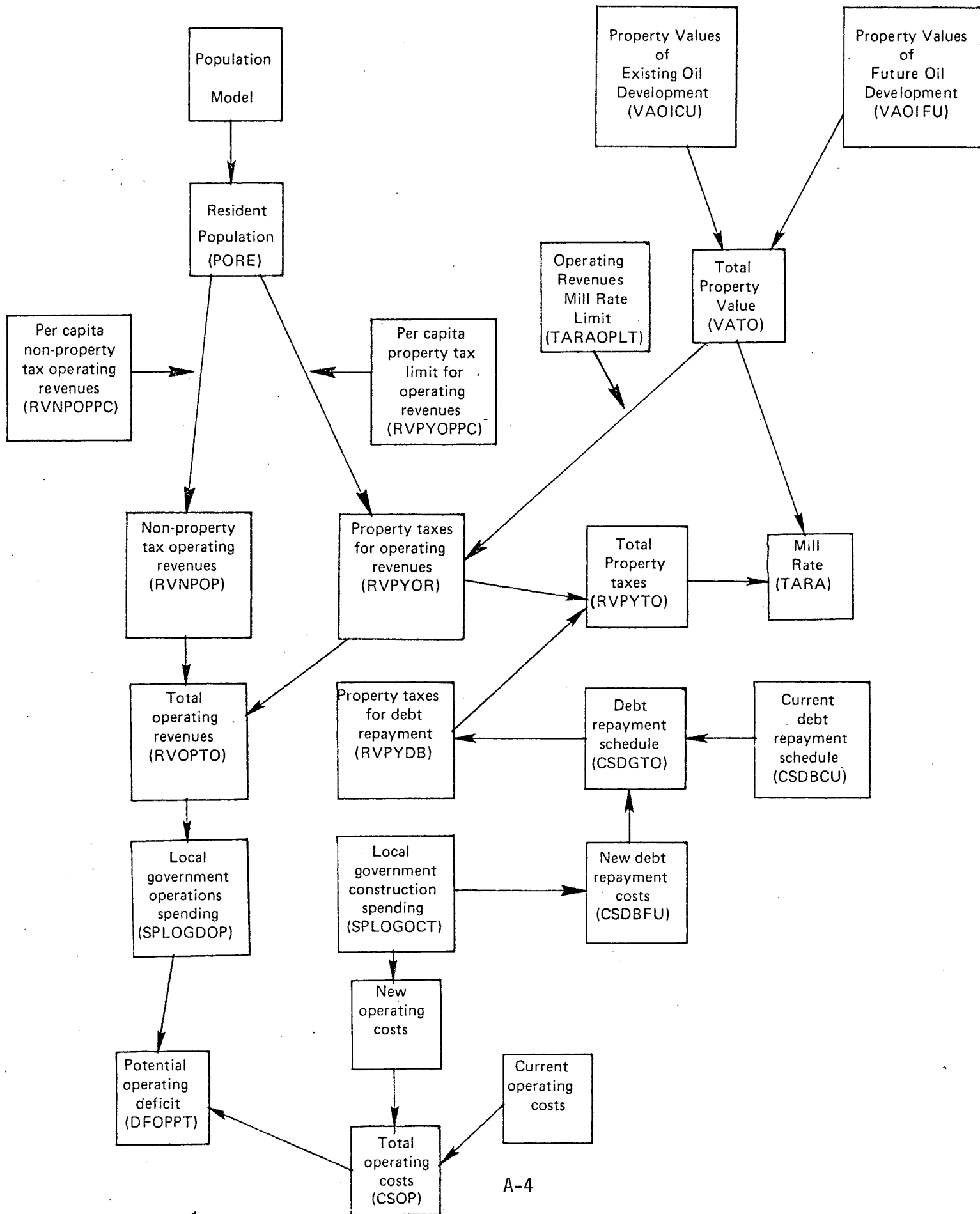
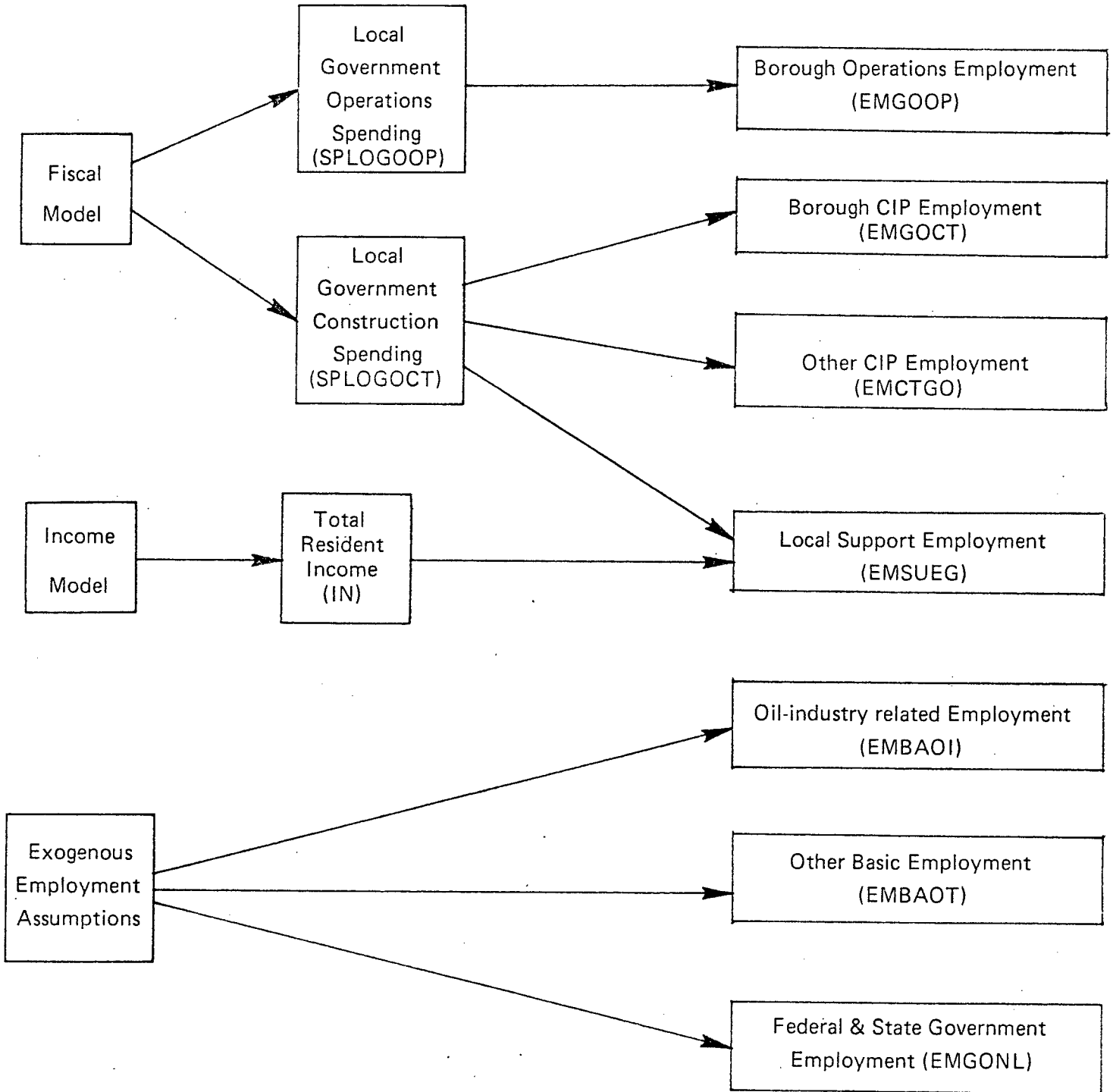


Figure A-3

The North Slope Employment Model



spending. Local support employment is partly a function of resident income and partly a function of borough CIP spending. The remaining three categories of employment--oil industry-related employment, other basic employment, and federal and state government employment--are assumed exogenously.

#### The Income Model

Figure A-4 depicts the income model. Wage income is calculated by multiplying resident employment by a single wage rate. Non-wage income is calculated by multiplying resident population by assumed per capita non-wage income levels which differ by race. The total income figures calculated then become an input into the employment model, where they partially determine the level of support employment.

#### The Labor Market Model

Figure A-5 depicts the labor market model. A total Inupiat labor force is calculated by multiplying the adult Inupiat population by a labor force participation rate. These workers are then allocated to jobs in different industries in a series of steps. First, employment of each type is divided between those jobs which are available to Inupiat and those jobs which are not. Inupiat workers are allocated first to non-oil jobs. Subsequently, if not enough non-oil jobs are available to employ all workers, a share of the

Figure A-4

The North Slope Income Model

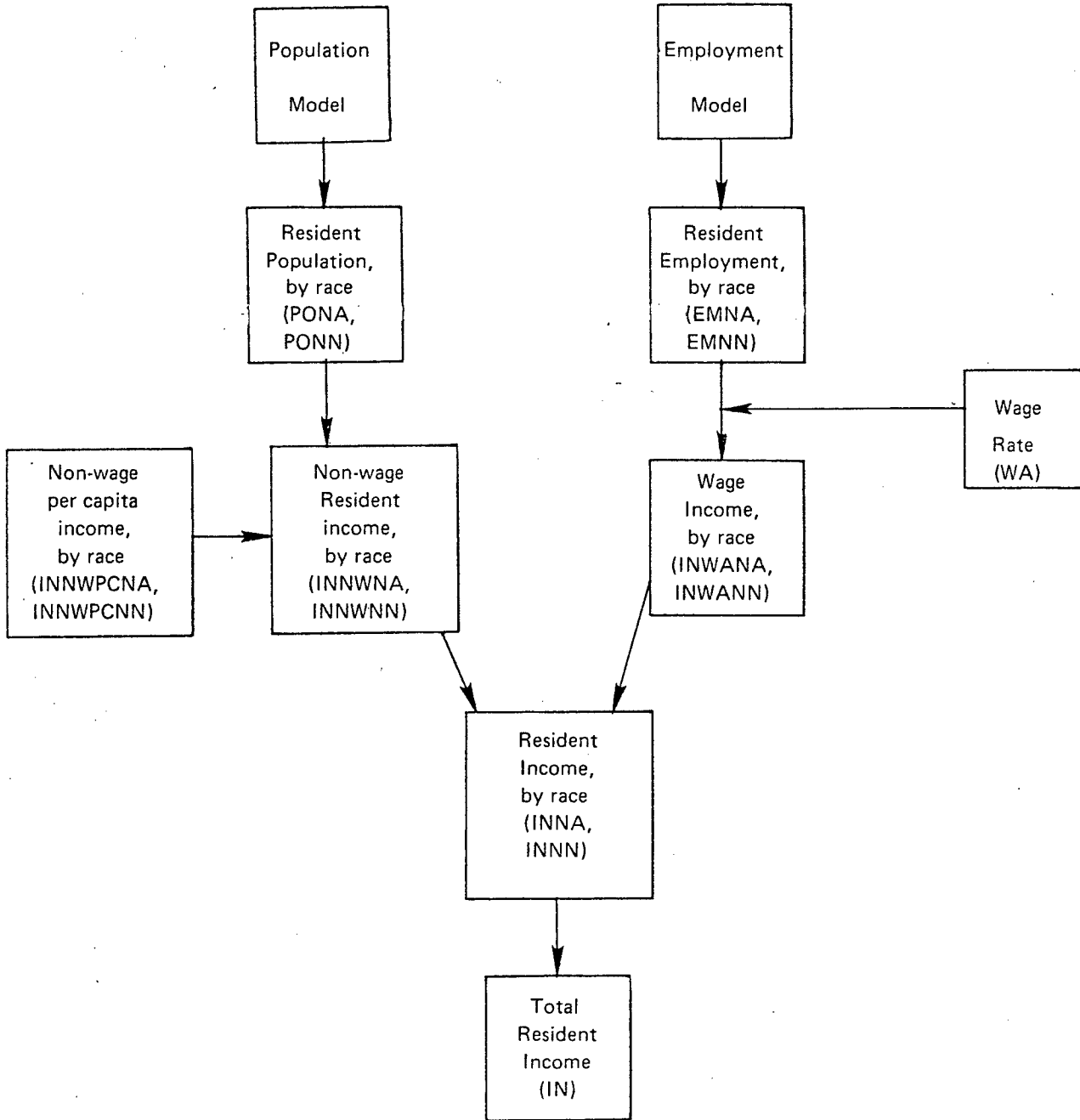
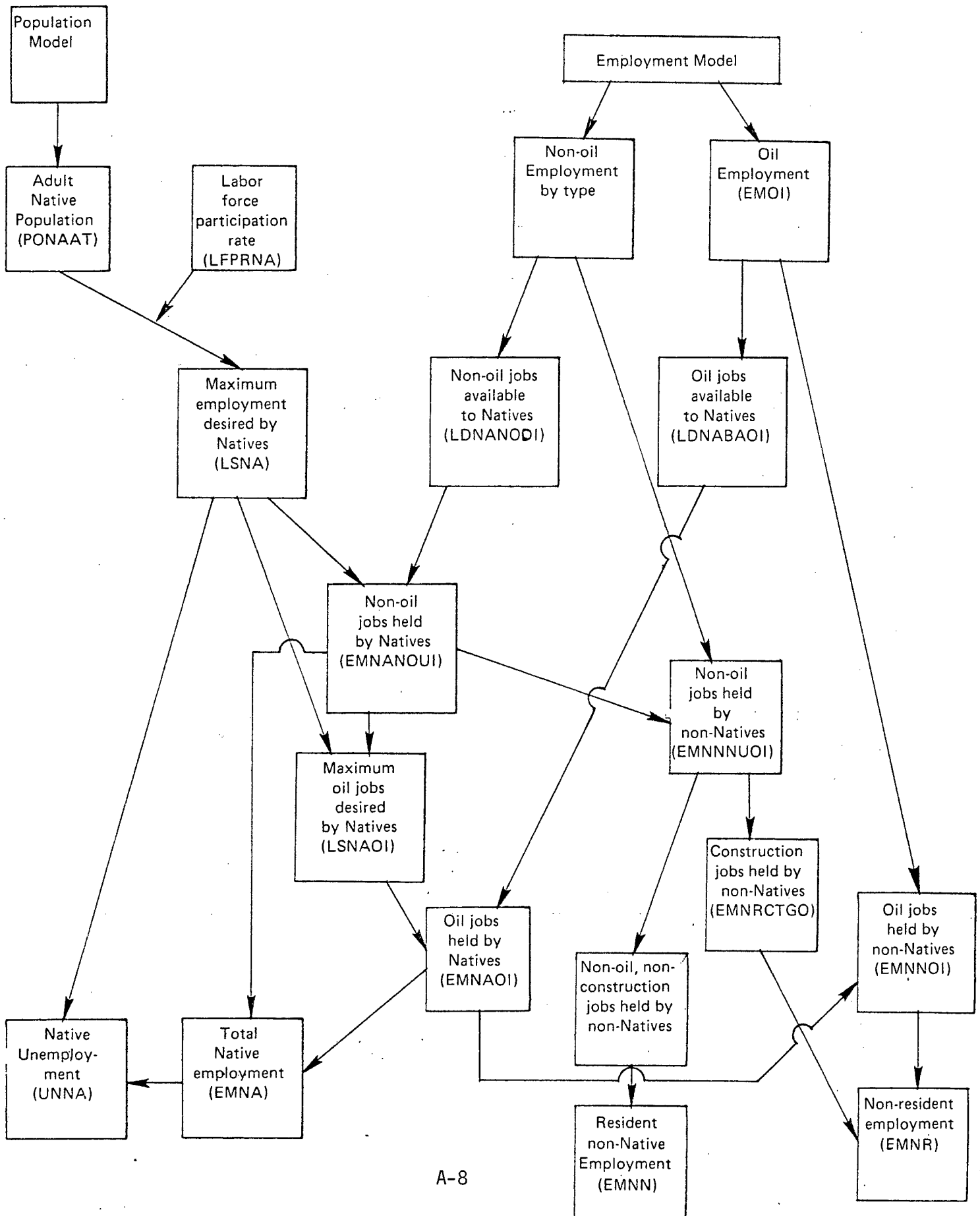


Figure A-5

North Slope Labor Market Model



remaining workers are assumed to seek work in the oil industry. Of jobs not taken by Inupiat, jobs in borough operations, the federal and state governments, and the support sector are assumed to be taken by non-natives who become residents of the borough. Other jobs are taken by non-residents, who live in work camps rather than in North Slope Borough villages. In particular, this is the case for oil industry workers and non-native CIP construction workers.

#### The Population and Migration Models

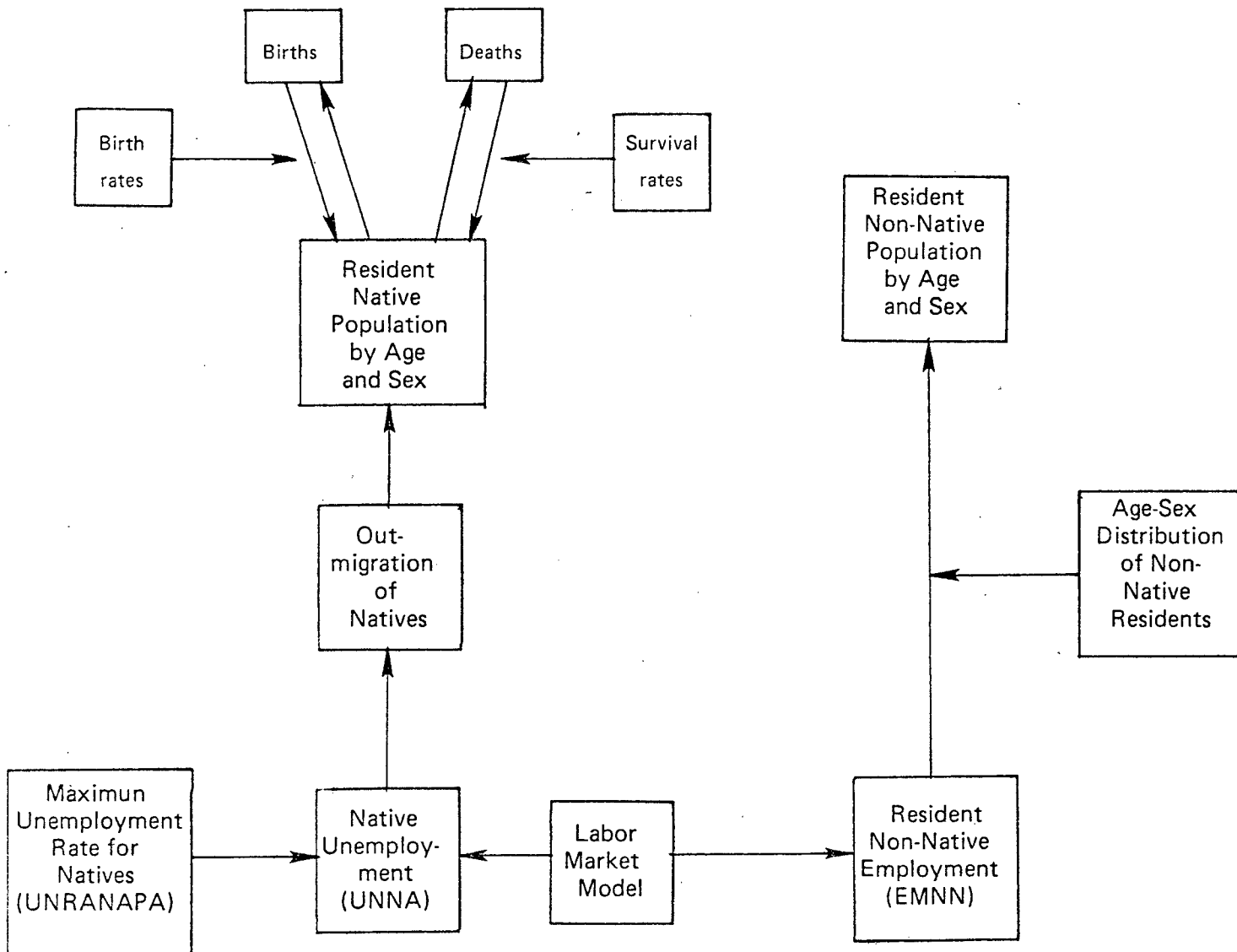
Figure A-6 depicts the population and migration models. Inupiat population is calculated by assuming birth and death rates for each of twelve age and sex cohorts. If the unemployment rate rises above an assumed level, some Inupiat are assumed to move out of the borough. Non-native population is calculated as a function of non-native employment, with a constant assumed age-sex distribution.

#### The Village Population and Employment Disaggregation Model

The model calculates projections of population and employment for each of the eight villages of the North Slope Borough by disaggregating total population and employment into assumed shares for each village.

Figure A-6

The North Slope Population and Migration Models



### North Slope Model Variable Definitions

All North Slope model variable names are constructed out of combinations of two-letter groups. Table A-1 lists these two-letter groups, along with their definitions, in alphabetical order.

For example, the variable INNOWAPC may be divided into IN-NO-WA-PC. By referring to Table A-1, we can determine that this means "income"- "non"- "wage"- "per capita," or per capita nonwage income. Similarly, SPLOGOCT can be divided into SP-LO-GO-CT, which means "spending"- "local"- "government"- "construction," or local government construction expenditures.



TABLE A-1. NORTH SLOPE (RURAL ALASKA MODEL) NOTATION CODE

An	age group n
AT	adult
AV	average
BA	basic
BE	before adjustment for migration or training
BT	births
CH	change in
Cn	coefficient in equation used to define a variable
CR	crude
CS	costs
CT	construction
CU	current
DB	debt
DE	dependent
DF	deficit
DT	deaths
EG	endogenous
EM	employment
FE	female
Fn	female, age group n
FR	fertility rate
FU	future
GE	geriatric or senior
GO	government

GR growth  
IC increase  
IN income  
KD preschool age children or "kids"  
LA labor  
LF labor force  
LI limit  
LO local  
LR long run  
LS labor supply  
MA male  
MG endogenous migration  
MI migration  
Mn male, age group n  
NA native  
NE net  
NL nonlocal  
NN Non-Native  
NO non-  
NP nonproperty tax  
NR nonresident  
NW nonwage  
OI oil industry  
OP operations  
OT other  
PA parameter used in defining a variable

PC per capita  
PE peak  
PN percent  
PO population  
PR participation rate  
PT potential  
Pt property taxes  
RA rate  
RE resident  
RT ratio  
RV revenues  
SA share of jobs accessible  
SF cohort shift  
SH share  
SL school aged  
SP spending  
SS sponsored  
SU support  
SV survival  
TA taxes  
TF transfer  
TL tax limit  
TO total  
UN unemployment  
VA property value  
WA wage

### North Slope Model Equations

Below we provide a complete listing of the equations in the North Slope model. The model is programmed in TROLL on the MIT computer. In order to run the model, we access the MIT computer using a telenet telephone connection. TROLL is a powerful modeling language which was developed especially for modeling simultaneous systems of equations such as those in the North Slope Model.

MODEL: NSLP1

NSLP1 IS A SPECIAL VERSION OF THE RURAL ALASKA MODEL (RAM) FOR PROJECTING ECONOMIC CONDITIONS IN THE NORTH SLOPE REGION. IT WAS DEVELOPED AT THE INSTITUTE OF SOCIAL AND ECONOMIC RESEARCH UNDER CONTRACT WITH THE MINERALS MANAGEMENT SERVICED OFFICE OF THE BUREAU OF LAND MANAGEMENT. DATE COMPLETE: 5 AUGUST 1983.

## SYMBOL DECLARATIONS

### ENDOGENOUS:

CSOP EMCTGO EMGOCT EMGOOP EMNA EMNN EMNR EMSUEG IN INNWNA INNWN  
INWANA INWANN LSNA OUMGSHNA PO PONAFA1 PONAFA2 PONAFA3 PONAFA4 PONAFA5  
PONAFA6 PONAM1 PONAM2 PONAM3 PONAM4 PONAM5 PONAM6 PONNF1 PONNF2  
PONNF3 PONNF4 PONNF5 PONNF6 PONNM1 PONNM2 PONNM3 PONNM4 PONNM5  
PONNM6 PONRAV PONRPE PONRTO RVNPOP RVPYOP SPLOGOOP

### DEFINITION:

BEPONAF1 BEPONAF2 BEPONAF3 BEPONAF4 BEPONAF5 BEPONAF6 BEPONAM1  
BEPONAM2 BEPONAM3 BEPONAM4 BEPONAM5 BEPONAM6 BTNA CHPO CSDBFU CSDBTO  
DFOPPT DTNA EMANPA EMATKA EMBARR EMCT EMKAKT EMNABAOT EMNACTGO  
EMNAGOCT EMNAGONL EMNAGOOP EMNANOOI EMNAOI EMNASUEG EMNBAOT EMNNGONL  
EMNNGOOP EMNNSUEG EMNOOI EMNRBAOI EMNRCTGO EMNRGOCT EMNROI EMNUIQ  
EMPOHO EMPOLA EMRE EMTO EMWAIN INNA INNN INPC INPCNA INPCNN  
LDNABAOI LDNABAOT LDNACTGO LDNAGCT LDNAGONL LDNAGOOP LDNANOOI  
LDNASUEG LSNAOI NTICNA NTICNARA OUMGLANA OUMGNA PNPOA1 PNPOA2 PNPOA3  
PNPOA4 PNPOA5 PNPOA6 PNPOF1 PNPOF2 PNPOF3 PNPOF4 PNPOF5 PNPOF6  
PNPOM1 PNPOM2 PNPOM3 PNPOM4 PNPOM5 PNPOM6 PNPONAA1 PNPONAA2 PNPONAA3  
PNPONAA4 PNPONAA5 PNPONAA6 PNPONAF1 PNPONAF2 PNPONAF3 PNPONAF4  
PNPONAF5 PNPONAF6 PNPONAM1 PNPONAM2 PNPONAM3 PNPONAM4 PNPONAM5  
PNPONAM6 PNPONNA1 PNPONNA2 PNPONNA3 PNPONNA4 PNPONNA5 PNPONNA6  
PNPONNF1 PNPONNF2 PNPONNF3 PNPONNF4 PNPONNF5 PNPONNF6 PNPONNM1  
PNPONNM2 PNPONNM3 PNPONNM4 PNPONNM5 PNPONNM6 POANPA POAT POATKA POA1  
POA2 POA3 POA4 POA5 POA6 POBARR POFE POF1 POF2 POF3 POF4 POF5  
POF6 POG E POKAKT POKD POMA POM1 POM2 POM3 POM4 POM5 POM6 PONA  
PONAAT PONA1 PONA2 PONA3 PONA4 PONA5 PONA6 PONAFA PONAFAE PONAFAE  
PONAKD PONAMA PONASL PONN PONNA1 PONNA2 PONNA3 PONNA4 PONNA5 PONNA6  
PONNFE PONNMA PONUIQ POPOHO POPOLA PORE POSL POTO POWAIN RVOPTO  
RVPYDB RVPYTO RVTO SPTO TARA TARADB TARAOP UNNA UNRANA VATO

### EXOGENOUS:

CSDBCU EMBAOI EMBAOT EMGONL EMNAOIEX EMNRGONL LFPRNA RVNPOPPC  
RVPYOPPC  
SANABAOI SANABAOT SANACTGO SANAGOCT SANAGONL SANAGOOP SANASUEG  
SPLOGOCT VAOICU VAOIFU

COEFFICIENT:

CSDBFUC0 CSDBFUC1 CSDBFUC2 CSDBFUC3 CSDBFUC4 CSDBFUC5 CSDBFUC6  
CSDBFUC7 CSDBFUC8 CSDBFUC9 CSOPC0 CSOPC1 CSOPC2 CSOPC3 EMANPAC1  
EMATKAC1 EMBARRC1 EMCTGOC1 EMGOCTC1 EMGOOPC1 EMKAKTC1 EMNUIQC1  
EMPOHOC1 EMPOLAC1 EMSUEGC1 EMSUEGC2 EMWAINC1 POANPAC1 POATKAC1  
POBARRC1 POKAKTC1 PONRAVC1 PONRPEC1 PONUIQC1 POPOHOC1 POPOLAC1  
POWAINC1

PARAMETER:

EMSUEGPA FRNA03 FRNA04 FRNA05 IFSVNAFE IFSVNAMA INNWPCNA INNWPCNN  
LSNAOIPA PONNF1PA PONNF2PA PONNF3PA PONNF4PA PONNF5PA PONNF6PA  
PONNM1PA PONNM2PA PONNM3PA PONNM4PA PONNM5PA PONNM6PA SFPA01 SFPA02  
SFPA03 SFPA04 SFPA05 SFPA06 SVRANAF1 SVRANAF2 SVRANAF3 SVRANAF4  
SVRANAF5 SVRANAF6 SVRANAM1 SVRANAM2 SVRANAM3 SVRANAM4 SVRANAM5  
SVRANAM6 SXDVNA TARAOLPI UNRANAPA WA

EQUATIONS

POPULATION BY AGE, SEX, AND RACE

NON NATIVE RESIDENT POPULATION

- 1:       PONNM1 = PONNM1PA\*EMNN
- 2:       PONNF1 = PONNF1PA\*EMNN
- 3:       PONNM2 = PONNM2PA\*EMNN
- 4:       PONNF2 = PONNF2PA\*EMNN
- 5:       PONNM3 = PONNM3PA\*EMNN
- 6:       PONNF3 = PONNF3PA\*EMNN
- 7:       PONNM4 = PONNM4PA\*EMNN
- 8:       PONNF4 = PONNF4PA\*EMNN
- 9:       PONNM5 = PONNM5PA\*EMNN
- 10:      PONNF5 = PONNF5PA\*EMNN
- 11:      PONNM6 = PONNM6PA\*EMNN
- 12:      PONNF6 = PONNF6PA\*EMNN
- 13:      PONN == PONNM6+PONNF6+PONNM5+PONNF5+PONNM4+PONNF4+PONNM3+PONNF3+  
          PONNM2+PONNF2+PONNM1+PONNF1

NATIVE POPULATION BEFORE MIGRATION

- 14: BEPONAM2 == SFPA02\*SVRANAM2\*PONAM2(-1)+(1-SFPA01)\*PONAM1(-1)\*SVRANAM1
- 15: BEPONAF2 == SFPA02\*SVRANAF2\*PONAF2(-1)+(1-SFPA01)\*PONAF1(-1)\*SVRANAF1
- 16: BEPONAM3 == SFPA03\*SVRANAM3\*PONAM3(-1)+(1-SFPA02)\*PONAM2(-1)\*SVRANAM2
- 17: BEPONAF3 == SFPA03\*SVRANAF3\*PONAF3(-1)+(1-SFPA02)\*PONAF2(-1)\*SVRANAF2
- 18: BEPONAM4 == SFPA04\*SVRANAM4\*PONAM4(-1)+(1-SFPA03)\*PONAM3(-1)\*SVRANAM3
- 19: BEPONAF4 == SFPA04\*SVRANAF4\*PONAF4(-1)+(1-SFPA03)\*PONAF3(-1)\*SVRANAF3
- 20: BEPONAM5 == SFPA05\*SVRANAM5\*PONAM5(-1)+(1-SFPA04)\*PONAM4(-1)\*SVRANAM4
- 21: BEPONAF5 == SFPA05\*SVRANAF5\*PONAF5(-1)+(1-SFPA04)\*PONAF4(-1)\*SVRANAF4
- 22: BEPONAM6 == SFPA06\*SVRANAM6\*PONAM6(-1)+(1-SFPA05)\*PONAM5(-1)\*SVRANAM5
- 23: BEPONAF6 == SFPA06\*SVRANAF6\*PONAF6(-1)+(1-SFPA05)\*PONAF5(-1)\*SVRANAF5
- 24: BTNA == BEPONAF3\*FRNA03+BEPONAF4\*FRNA04+BEPONAF5\*FRNA05
- 25: BEPONAM1 == SFPA01\*SVRANAM1\*PONAM1(-1)+SXDVNA\*BTNA\*IFSVNAMA
- 26: BEPONAF1 == SFPA01\*SVRANAF1\*PONAF1(-1)+(1-SXDVNA)\*BTNA\*IFSVNAFE

NATIVE POPULATION AFTER MIGRATION

- 27: PONAM1 = BEPONAM1\*(1-OUMGSHNA)
- 28: PONAF1 = BEPONAF1\*(1-OUMGSHNA)
- 29: PONAM2 = BEPONAM2\*(1-OUMGSHNA)

30:        PONA F2 = BEPONA F2\*(1-OUMGSHNA)  
 31:        PONA M3 = BEPONA M3\*(1-OUMGSHNA)  
 32:        PONA F3 = BEPONA F3\*(1-OUMGSHNA)  
 33:        PONA M4 = BEPONA M4\*(1-OUMGSHNA)  
 34:        PONA F4 = BEPONA F4\*(1-OUMGSHNA)  
 35:        PONA M5 = BEPONA M5\*(1-OUMGSHNA)  
 36:        PONA F5 = BEPONA F5\*(1-OUMGSHNA)  
 37:        PONA M6 = BEPONA M6\*(1-OUMGSHNA)  
 38:        PONA F6 = BEPONA F6\*(1-OUMGSHNA)  
 39:        DTNA == BEPONA M6(-1)\*(1-SVRANAM6)+BEPONA F6(-1)\*(1-SVRANAF6)+  
           BEPONA M5(-1)\*(1-SVRANAM5)+BEPONA F5(-1)\*(1-SVRANAF5)+BEPONA M4(-1)\*  
           (1-SVRANAM4)+BEPONA F4(-1)\*(1-SVRANAF4)+BEPONA M3(-1)\*(1-SVRANAM3)+  
           BEPONA F3(-1)\*(1-SVRANAF3)+BEPONA M2(-1)\*(1-SVRANAM2)+BEPONA F2(-1)\*  
           (1-SVRANAF2)+BEPONA M1(-1)\*(1-SVRANAM1)+BEPONA F1(-1)\*(1-SVRANAF1)  
 40:        PONA == PONA M6+PONA F6+PONA M5+PONA F5+PONA M4+PONA F4+PONA M3+PONA F3+  
           PONA M2+PONA F2+PONA M1+PONA F1  
 41:        NTICNA == BTNA-DTNA  
 42:        NTICNARA == NTICNA/PONA(-1)  
 43:        OUMGNA == OUMGSHNA\*PONA

MALE POPULATION BY AGE COHORT

44:        POM1 == PONNM1+PONA M1  
 45:        POM2 == PONNM2+PONA M2  
 46:        POM3 == PONNM3+PONA M3  
 47:        POM4 == PONNM4+PONA M4  
 48:        POM5 == PONNM5+PONA M5  
 49:        POM6 == PONNM6+PONA M6



FEMALE POPULATION BY AGE COHORT

50: POF1 == PONNF1+PONAF1  
51: POF2 == PONNF2+PONAF2  
52: POF3 == PONNF3+PONAF3  
53: POF4 == PONNF4+PONAF4  
54: POF5 == PONNF5+PONAF5  
55: POF6 == PONNF6+PONAF6

TOTAL POPULATION AND CHANGE IN POPULATION

56: PO = POM1+POM2+POM3+POM4+POM5+POM6+POF1+POF2+POF3+POF4+POF5+POF6  
57: CHPO == PO-PO(-1)

DEFINITION OF AGE GROUPS FOR TOTAL POPULATION

58: POKD == POM1+POF1  
59: POSL == POM2+POF2+0.8\*(POM3+POF3)  
60: POAT == 0.2\*(POM3+POF3)+POM4+POF4+POM5+POF5  
61: POGE == POM6+POF6

NATIVE POPULATION BY AGE COHORT

62: PONAA1 == PONAM1+PONAF1  
63: PONAA2 == PONAM2+PONAF2  
64: PONAA3 == PONAM3+PONAF3  
65: PONAA4 == PONAM4+PONAF4

66: PONAA5 == PONAM5+PONAF5

67: PONAA6 == PONAM6+PONAF6

DEFINITION OF AGE GROUPS FOR NATIVE POPULATION

68: PONAKD == PONAM1+PONAF1

69: PONASL == PONAM2+PONAF2+0.8\*(PONAM3+PONAF3)

70: PONAAT == 0.2\*(PONAM3+PONAF3)+PONAM4+PONAF4+PONAM5+PONAF5

71: PONAGE == PONAM6+PONAF6

NON NATIVE POPULATION BY AGE COHORT

72: PONNA1 == PONNM1+PONNF1

73: PONNA2 == PONNM2+PONNF2

74: PONNA3 == PONNM3+PONNF3

75: PONNA4 == PONNM4+PONNF4

76: PONNA5 == PONNM5+PONNF5

77: PONNA6 == PONNM6+PONNF6

TOTAL POPULATION BY AGE COHORT

78: POA1 == POM1+POF1

79: POA2 == POM2+POF2

80: POA3 == POM3+POF3

81: POA4 == POM4+POF4

82: POA5 == POM5+POF5

83: POA6 == POM6+POF6

POPULATION BY RACE AND SEX COHORTS

84: PONAMA == PONAM1+PONAM2+PONAM3+PONAM4+PONAM5+PONAM6  
85: PONAFA == PONAFA1+PONAFA2+PONAFA3+PONAFA4+PONAFA5+PONAFA6  
86: PONNMA == PONNM1+PONNM2+PONNM3+PONNM4+PONNM5+PONNM6  
87: PONNFE == PONNF1+PONNF2+PONNF3+PONNF4+PONNF5+PONNF6  
88: POMA == PONAMA+PONNMA  
89: POFE == PONAFA+PONNFE

SPECIAL POPULATION CATEGORIES AS A PERCENT OF TOTAL POPULATION

90: PNPOA1 == 100\*POA1/PO  
91: PNPOA2 == 100\*POA2/PO  
92: PNPOA3 == 100\*POA3/PO  
93: PNPOA4 == 100\*POA4/PO  
94: PNPOA5 == 100\*POA5/PO  
95: PNPOA6 == 100\*POA6/PO  
96: PNPONAA1 == 100\*PONAA1/PONA  
97: PNPONAA2 == 100\*PONAA2/PONA  
98: PNPONAA3 == 100\*PONAA3/PONA  
99: PNPONAA4 == 100\*PONAA4/PONA  
100: PNPONAA5 == 100\*PONAA5/PONA  
101: PNPONAA6 == 100\*PONAA6/PONA  
102: PNPONNA1 == 100\*PONNA1/PONN  
103: PNPONNA2 == 100\*PONNA2/PONN  
104: PNPONNA3 == 100\*PONNA3/PONN

105: PNPONNA4 == 100\*PONNA4/PONN  
106: PNPONNA5 == 100\*PONNA5/PONN  
107: PNPONNA6 == 100\*PONNA6/PONN  
108: PNPOM1 == 100\*POM1/POMA  
109: PNPOM2 == 100\*POM2/POMA  
110: PNPOM3 == 100\*POM3/POMA  
111: PNPOM4 == 100\*POM4/POMA  
112: PNPOM5 == 100\*POM5/POMA  
113: PNPOM6 == 100\*POM6/POMA  
114: PNPOF1 == 100\*POF1/POFE  
115: PNPOF2 == 100\*POF2/POFE  
116: PNPOF3 == 100\*POF3/POFE  
117: PNPOF4 == 100\*POF4/POFE  
118: PNPOF5 == 100\*POF5/POFE  
119: PNPOF6 == 100\*POF6/POFE  
120: PNPONAM1 == 100\*PONAM1/PONAMA  
121: PNPONAM2 == 100\*PONAM2/PONAMA  
122: PNPONAM3 == 100\*PONAM3/PONAMA  
123: PNPONAM4 == 100\*PONAM4/PONAMA  
124: PNPONAM5 == 100\*PONAM5/PONAMA  
125: PNPONAM6 == 100\*PONAM6/PONAMA  
126: PNPONAF1 == 100\*PONAF1/PONAFE  
127: PNPONAF2 == 100\*PONAF2/PONAFE  
128: PNPONAF3 == 100\*PONAF3/PONAFE  
129: PNPONAF4 == 100\*PONAF4/PONAFE

130: PNPONAF5 == 100\*PONAF5/PONAFE  
 131: PNPONAF6 == 100\*PONAF6/PONAFE  
 132: PNPONNM1 == 100\*PONNM1/PONNMA  
 133: PNPONNM2 == 100\*PONNM2/PONNMA  
 134: PNPONNM3 == 100\*PONNM3/PONNMA  
 135: PNPONNM4 == 100\*PONNM4/PONNMA  
 136: PNPONNM5 == 100\*PONNM5/PONNMA  
 137: PNPONNM6 == 100\*PONNM6/PONNMA  
 138: PNPONNF1 == 100\*PONNF1/PONNFE  
 139: PNPONNF2 == 100\*PONNF2/PONNFE  
 140: PNPONNF3 == 100\*PONNF3/PONNFE  
 141: PNPONNF4 == 100\*PONNF4/PONNFE  
 142: PNPONNF5 == 100\*PONNF5/PONNFE  
 143: PNPONNF6 == 100\*PONNF6/PONNFE

RESIDENT AND NON RESIDENT POPULATION

144: PONRTO = EMNR  
 145: PONRAV = PONRAVC1\*PONRTO  
 146: PONRPE = PONRPEC1\*PONRTO  
 147: PORE == PONA+PONN  
 148: POTO == PORE+PONRAV

EMPLOYMENT BY SECTOR

149: EMSUEG = EMSUEGC1\*IN\*EMSUEGPA+EMSUEGC2\*SPLOGOCT\*(1-EMSUEGPA)  
 150: EMGOCT = EMGOCTC1\*SPLOGOCT

151: EMCTGO = EMCTGOC1\*SPLOGOCT  
152: EMGOOP = EMGOOPC1\*SPLOGOOP  
153: EMTO == EMGOOP+EMGOCT+EMCTGO+EMSUEG+EMBAOI+EMBAOT+EMGONL  
154: EMNOOI == EMGOOP+EMGOCT+EMCTGO+EMSUEG+EMBAOT+EMGONL  
155: EMCT == EMGOCT+EMCTGO

TOTAL AND PER CAPITA INCOME

156: INNWNA = INNWPCNA\*PONA  
157: INNWNN = INNWPCNN\*PONN  
158: INWANA = EMNA\*WA  
159: INWANN = EMNN\*WA  
160: INNA == INNWNA+INWANA  
161: INNN == INNWNN+INWANN  
162: IN = INNA+INNN  
163: INPC == IN/PO  
164: INPCNA == INNA/PONA  
165: INPCNN == INNN/PONN

LABOR MARKET

166: LSNA = PONAAT\*LFPRNA  
167: LDNAGOOP == SANAGOOP\*EMGOOP  
168: LDNAGOCT == SANAGOCT\*EMGOCT  
169: LDNACTGO == SANACTGO\*EMCTGO  
170: LDNASUEG == SANASUEG\*EMSUEG

171: LDNABAOI == SANABAOI\*EMBAOI  
172: LDNABAOT == SANABAOT\*EMBAOT  
173: LDNAGONL == SANAGONL\*(EMGONL-EMNRGONL)  
174: LDNANOOI == LDNAGOOP+LDNAGOCT+LDNACTGO+LDNASUEG+LDNABAOT+LDNAGONL  
175: EMNANOOI == IF LDNANOOI GT (LSNA-EMNAOIEX) THEN (LSNA-EMNAOIEX)  
ELSE LDNANOOI  
176: LSNAOI == IF LDNANOOI GT (LSNA- EMNAOIEX) THEN EMNAOIEX ELSE  
(LSNA- EMNAOIEX-LDNANOOI)\*LSNAOIPA+EMNAOIEX  
177: EMNAOI == IF LDNABAOI GT LSNAOI THEN LSNAOI ELSE LDNABAOI  
178: EMNA = EMNANOOI+EMNAOI  
179: UNNA == IF EMNA GE LSNA THEN 0 ELSE LSNA+EMNA  
180: UNRANA == UNNA/LSNA  
181: EMNAGOOP == LDNAGOOP/LDNANOOI\*EMNANOOI  
182: EMNAGOCT == LDNAGOCT/LDNANOOI\*EMNANOOI  
183: EMNACTGO == LDNACTGO/LDNANOOI\*EMNANOOI  
184: EMNASUEG == LDNASUEG/LDNANOOI\*EMNANOOI  
185: EMNABAOT == LDNABAOT/LDNANOOI\*EMNANOOI  
186: EMNAGONL == LDNAGONL/LDNANOOI\*EMNANOOI  
187: EMNNGONL == EMGONL-EMNAGONL-EMNRGONL  
188: EMNNGOOP == EMGOOP-EMNAGOOP  
189: EMNNSUEG == EMSUEG-EMNASUEG  
190: EMN NBAOT == EMBAOT-EMNABAOT  
191: EMNRGOCT == EMGOCT-EMNAGOCT  
192: EMNRCTGO == EMCTGO-EMNACTGO  
193: EMNRBAOI == EMBAOI-EMNAOI  
194: EMNROI == EMNRBAOI

195: EMNR = EMNRGONL+EMNRBAOI+EMNRGOCT+EMNRCTGO  
 196: EMNN = EMNNGONL+EMNNSUEG+EMNNBAOT+EMNNGOOP  
 197: EMRE == EMNA+EMNN  
 198: OUMGLANA == IF UNRANA GT UNRANAPA THEN (UNRANA-UNRANAPA)\*LSNA  
 ELSE 0  
 199: OUMGSHNA = OUMGLANA/PONAAT

FISCAL MODEL

200: RVNPOP = PORE\*RVNPOPPC  
 201: VATO == VAOICU+VAOIFU  
 202: RVPYOP = IF PORE\*RVPYOPPC/VATO LT TARAOPLI THEN PORE\*RVPYOPPC  
 ELSE TARAOPLI\*VATO  
 203: RVOPTO == RVNPOP+RVPYOP  
 204: SPLOGOOP = RVOPTO  
 205: CSOP = CSOP(-1)+CSOPCO\*SPLOGOCT+CSOPC1\*SPLOGOCT(-1)+CSOPC2\*  
 SPLOGOCT(-2)+CSOPC3\*SPLOGOCT(-3)  
 206: DFOPPT == RVOPTO-CSOP  
 207: CSDBFU == CSDBFUC0\*SPLOGOCT+CSDBFUC1\*SPLOGOCT(-1)+CSDBFUC2\*  
 SPLOGOCT(-2)+CSDBFUC3\*SPLOGOCT(-3)+CSDBFUC4\*SPLOGOCT(-4)+CSDBFUC5\*  
 SPLOGOCT(-5)+CSDBFUC6\*SPLOGOCT(-6)+CSDBFUC7\*SPLOGOCT(-7)+CSDBFUC8\*  
 SPLOGOCT(-8)+CSDBFUC9\*SPLOGOCT(-9)  
 208: CSDBTO == CSDBCU+CSDBFU  
 209: RVPYDB == CSDBTO  
 210: RVPYTO == RVPYOP+RVPYDB  
 211: RVTO == RVOPTO+RVPYDB  
 212: SPTO == SPLOGOOP+SPLOGOCT+CSDBTO  
 213: TARAOP == RVPYOP/VATO  
 214: TARADB == RVPYDB/VATO  
 215: TARA == RVPYTO/VATO



VILLAGE ALLOCATION EQUATIONS

216: POANPA == POANPAC1\*PORE  
217: POATKA == POATKAC1\*PORE  
218: POBARR == POBARRC1\*PORE  
219: POKAKT == POKAKTC1\*PORE  
220: PONUIQ == PONUIQC1\*PORE  
221: POPOHO == POPOHOC1\*PORE  
222: POPOLA == POPOLAC1\*PORE  
223: POWAIN == POWAINC1\*PORE  
224: EMANPA == EMANPAC1\*EMRE  
225: EMATKA == EMATKAC1\*EMRE  
226: EMBARR == EMBARRC1\*EMRE  
227: EMKAKT == EMKAKTC1\*EMRE  
228: EMNUIQ == EMNUIQC1\*EMRE  
229: EMPOHO == EMPOHOC1\*EMRE  
230: EMPOLA == EMPOLAC1\*EMRE  
231: EMWAIN == EMWAINC1\*EMRE

APPENDIX B  
ASSUMPTIONS USED FOR NORTH SLOPE

APPENDIX B  
ASSUMPTIONS FOR MODEL PROJECTIONS

Table B-1 provides a summary of the assumptions we have used for our base case projections.

TABLE B-1.  
KEY ASSUMPTIONS USED FOR NORTH SLOPE  
MODEL BASE CASE PROJECTIONS

<u>Category</u>	<u>Assumption</u>
<u>POPULATION MODEL</u>	
● Native birth rates and survival rates	Based on 1980 census data for non-Anchorage Alaska Natives
● Maximum unemployment rate for Natives before out-migration begins	50 percent
● Age-sex distribution of Non-Native residents	1980 age-sex distribution
<u>EMPLOYMENT MODEL</u>	
● Federal and state gov't employment	Remains at 1980 level of 294
● Other basic employment	Assumed to be 0
● Oil industry-related employment	Grows from 3900 in 1980 to peak of 12,700 in 1992, and declines to 9700 in 2010; based on MAP model assumptions
● Support employment	$3.375 \times (\text{income in \$million}) + 2.085 \times (\text{CIP spending in \$million})$
● Borough CIP employment (Native)	$2.93 \times (\text{Borough CIP spending in \$million})$
● Other CIP employment (Non-Native)	$3.17 \times (\text{Borough CIP spending in \$million})$
● Borough operating employment	$18.06 \times (\text{Borough operations spending in \$million})$
<u>INCOME MODEL</u>	
● Per capita transfer income	\$1,450 for Natives; 0 for Non-Natives
● Wage rate (all jobs)	\$37,500 per year

Category

Assumption

LABOR MARKET MODEL

- Labor force participation rate 72.6% for adult Natives; 100% for adult Non-Natives. Only 25% of Natives unable to find other work are assumed to be willing to take oil industry jobs
- Share of jobs available to Natives, by type of employment 65% of jobs in Borough operations, local support employment, and state and federal gov't employment available to Natives; 5% of oil industry jobs available to Natives

FISCAL MODEL

- Per capita nonproperty tax operating revenues \$4610
- Per capita property tax limit for operating revenues \$8790 after 1982
- Property value Rises from \$5.3 billion in 1980 to \$16.8 billion in 1991; then falls to \$1.8 billion by 2010
- Local government construction spending Declines at 10% per year, from \$109 million in 1980 to \$38 million in 1990, \$13 million in 2000, and \$4 million in 2010

VILLAGE POPULATION AND EMPLOYMENT

- Shares of total Borough population and employment remain at 1980 levels.

APPENDIX C

NORTH SLOPE MODEL BASE CASE PROJECTIONS

## APPENDIX C

### NORTH SLOPE MODEL BASE CASE PROJECTIONS.

In this appendix, we present tables of the North Slope Model base case projections. The tables are organized as follows:

#### Table Variables

C-1	Total Population, Resident Population, and Average Nonresident Population
C-2	Resident Population: Total, Native, and Non-Native
C-3	Native Population: Preschool, School Age, Adult and Aged
C-4	Native Population: Male, Female, Natural Increase, Rate of Natural Increase, Outmigration
C-5	Nonresident Population: Average, Peak, and Total
C-6	Employment: Total, Native, Non-Native Resident, and Nonresident
C-7	Employment, by Type, for All Races
C-8	Native Employment, by Type
C-9	Non-Native Resident Employment, by Type
C-10	Nonresident Employment, by Type
C-11	North Slope Borough Tax Revenues: Total, Nonproperty Tax, Property Tax for Operations, and Property Tax for Debt Service
C-12	North Slope Borough Expenditures: Total, Operations, Construction, Debt Service
C-13	Total Property Value, Total Property Taxes, Property Tax Rate, Property Tax Rate for Operating Revenues, and Property Tax Rate for Debt Service Revenues
C-14	Income: Resident, Native, and Non-Native Resident; Per Capita Income; Resident, Native, and Non-Native
C-15	Adult Native Population, Native Labor Supply, Native Employment, Native Unemployment, and Native Unemployment Rate
C-16	North Slope Borough Operating Revenues, Operating Costs, and Operating Surplus or Deficit
C-17	Village Resident Population Projections: Anaktuvuk Pass, Atkasook, Barrow, Kaktovik
C-18	Village Resident Population Projections: Nuiqsut, Point Hope, Point Lay, Wainwright
C-19	Village Resident Employment Projections: Anaktuvuk Pass, Atkasook, Barrow, Kaktovik
C-20	Village Resident Employment Projections: Nuiqsut, Point Hope, Point Lay, Wainwright





TABLE C-1:  
NORTH SLOPE MODEL PROJECTIONS

	TOTAL POPULATION	RESIDENT POPULATION	AVERAGE NON- RESIDENT POPULATION <sup>a</sup>
1980	6781	3827	2954
1981	7676	3971	3706
1982	8453	4099	4354
1983	9443	4195	5248
1984	9022	4293	4729
1985	9962	4392	5570
1986	10342	4493	5849
1987	10873	4595	6277
1988	11220	4699	6521
1989	11630	4805	6825
1990	13356	4912	8444
1991	11951	5021	6930
1992	13738	5133	8606
1993	12089	5246	6844
1994	12856	5361	7495
1995	12188	5479	6709
1996	12252	5599	6653
1997	12502	5721	6781
1998	12356	5847	6510
1999	12404	5975	6430
2000	12531	6105	6426
2001	12679	6239	6441
2002	12820	6375	6444
2003	13069	6515	6555
2004	13224	6657	6566
2005	13429	6803	6626
2006	13635	6953	6683
2007	13750	7105	6645
2008	13903	7261	6642
2009	13856	7378	6478
2010	13923	7449	6473

<sup>a</sup>Average nonresident population is defined as the year-round average of the number of nonresident persons present.

SOURCE: NORTH SLOPE MODEL SIMULATION NSLP.1--8/16/83  
VARIABLES: POTO, PO, AND PONRAV

TABLE C-2  
NORTH SLOPE MODEL PROJECTIONS

	RESIDENT POPULATION	RESIDENT NATIVE POPULATION	RESIDENT NON-NATIVE POPULATION
1980	3827	3208	617
1981	3971	3301	669
1982	4099	3395	704
1983	4195	3489	705
1984	4293	3584	709
1985	4392	3679	713
1986	4493	3775	718
1987	4595	3871	724
1988	4699	3968	732
1989	4805	4065	740
1990	4912	4164	748
1991	5021	4263	758
1992	5133	4364	768
1993	5246	4467	779
1994	5361	4570	791
1995	5479	4676	803
1996	5599	4783	816
1997	5721	4892	829
1998	5847	5003	843
1999	5975	5116	858
2000	6105	5232	873
2001	6239	5350	889
2002	6375	5470	905
2003	6515	5592	922
2004	6657	5718	940
2005	6803	5846	958
2006	6953	5976	976
2007	7105	6110	995
2008	7261	6246	1015
2009	7378	6386	992
2010	7449	6528	921

SOURCE: NORTH SLOPE MODEL SIMULATION NSLP.1--8/16/83  
VARIABLES: PO, PONA, AND PONN

TABLE C-3  
NORTH SLOPE MODEL PROJECTIONS

	NATIVE POPULATION	PRE-SCHOOL NATIVE POPULATION	SCHOOL-AGE NATIVE POPULATION	ADULT NATIVE POPULATION	AGED NATIVE POPULATION
1980	3208	362	1040	1669	137
1981	3301	405	1022	1721	154
1982	3395	441	1017	1767	170
1983	3489	471	1022	1809	187
1984	3584	496	1036	1847	204
1985	3679	518	1056	1883	222
1986	3775	537	1081	1916	239
1987	3871	554	1110	1949	257
1988	3968	569	1142	1981	275
1989	4065	583	1175	2014	293
1990	4164	597	1210	2046	311
1991	4263	610	1245	2080	329
1992	4364	622	1281	2114	348
1993	4467	635	1317	2149	366
1994	4570	647	1354	2186	384
1995	4676	660	1390	2223	402
1996	4783	673	1427	2262	421
1997	4892	687	1463	2303	439
1998	5003	701	1500	2345	457
1999	5116	715	1537	2388	476
2000	5232	730	1575	2433	494
2001	5350	745	1612	2480	513
2002	5470	761	1650	2528	531
2003	5592	777	1688	2577	550
2004	5718	794	1727	2628	568
2005	5846	811	1767	2681	587
2006	5976	829	1807	2734	606
2007	6110	847	1848	2790	625
2008	6246	866	1890	2847	644
2009	6386	885	1932	2905	663
2010	6528	905	1975	2965	683

SOURCE: NORTH SLOPE MODEL SIMULATION NSLP.1--8/16/83  
VARIABLES: PONA, PONAkd, PONAsl, PONAAT, AND PONAge

TABLE C-4  
NORTH SLOPE MODEL PROJECTIONS

	NATIVE POPULATION	NATIVE MALE POPULATION	NATIVE FEMALE POPULATION	NATIVE NATURAL INCREASE	NATIVE RATE OF NATURAL INCREASE	NATIVE OUT- MIGRATION
1980	3208	1685	1523	-	-	-
1981	3301	1726	1576	92	0.029	0
1982	3395	1767	1628	94	0.028	0
1983	3489	1809	1681	94	0.028	0
1984	3584	1851	1734	95	0.027	-0
1985	3679	1892	1787	95	0.027	-0
1986	3775	1934	1841	96	0.026	0
1987	3871	1976	1895	96	0.025	0
1988	3968	2018	1949	97	0.025	-0
1989	4065	2061	2004	98	0.025	-0
1990	4164	2104	2060	99	0.024	-0
1991	4263	2147	2117	100	0.024	0
1992	4364	2191	2174	101	0.024	-0
1993	4467	2235	2232	102	0.023	-0
1994	4570	2280	2290	104	0.023	-0
1995	4676	2326	2350	105	0.023	-0
1996	4783	2372	2411	107	0.023	0
1997	4892	2420	2472	109	0.023	0
1998	5003	2468	2535	111	0.023	-0
1999	5116	2517	2599	113	0.023	0
2000	5232	2567	2664	115	0.023	-0
2001	5350	2619	2731	118	0.023	0
2002	5470	2671	2799	120	0.022	0
2003	5592	2725	2868	123	0.022	0
2004	5718	2780	2938	125	0.022	-0
2005	5846	2836	3010	128	0.022	0
2006	5976	2893	3083	131	0.022	0
2007	6110	2952	3158	134	0.022	-0
2008	6246	3012	3234	136	0.022	0
2009	6386	3074	3312	139	0.022	0
2010	6528	3137	3391	142	0.022	0

SOURCE: NORTH SLOPE MODEL SIMULATION NSLP.1--8/16/83  
VARIABLES: PONA, PONAMA, PONAFA, NTICNA, NTICNARA, AND OUMGNA

TABLE C-5  
NORTH SLOPE MODEL PROJECTIONS

	AVERAGE NON- RESIDENT POPULATION	PEAK NON- RESIDENT POPULATION	TOTAL NON- RESIDENT POPULATION
1980	2954	4431	4431
1981	3706	5564	5564
1982	4354	6538	6538
1983	5248	7880	7880
1984	4729	7101	7101
1985	5570	8364	8364
1986	5849	8782	8782
1987	6277	9425	9425
1988	6521	9791	9791
1989	6825	10248	10248
1990	8444	12679	12679
1991	6930	10405	10405
1992	8606	12921	12921
1993	6844	10276	10276
1994	7495	11253	11253
1995	6709	10074	10074
1996	6653	9990	9990
1997	6781	10181	10181
1998	6510	9774	9774
1999	6430	9654	9654
2000	6426	9649	9649
2001	6441	9671	9671
2002	6444	9676	9676
2003	6555	9842	9842
2004	6566	9859	9859
2005	6626	9948	9948
2006	6683	10034	10034
2007	6645	9977	9977
2008	6642	9973	9973
2009	6478	9727	9727
2010	6473	9719	9719

SOURCE: NORTH SLOPE MODEL SIMULATION NSLP.1--8/16/83

VARIABLES: PONRAV, PONRPE, AND PONRTO

DEFINITIONS:

AVERAGE NON-RESIDENT POPULATION=YEAR-ROUND AVERAGE OF THE NUMBER OF  
NON-RESIDENT PERSONS PRESENT.

PEAK NON-RESIDENT POPULATION=PEAK NUMBER OF NON-RESIDENT PERSONS  
PRESENT AT ANY GIVEN TIME.

TOTAL NON-RESIDENT POPULATION=NON-RESIDENT EMPLOYMENT.

TABLE C-6  
NORTH SLOPE MODEL PROJECTIONS

	TOTAL EMPLOYMENT	TOTAL NATIVE EMPLOYMENT	TOTAL NON-NATIVE RESIDENT EMPLOYMENT	TOTAL NON- RESIDENT EMPLOYMENT
1980	6115	1211	473	4431
1981	7325	1249	512	5564
1982	8348	1272	538	6538
1983	9681	1262	539	7880
1984	8897	1255	541	7101
1985	10158	1250	545	8364
1986	10578	1248	549	8782
1987	11227	1248	553	9425
1988	11599	1249	559	9791
1989	12067	1253	565	10248
1990	14510	1259	572	12679
1991	12252	1267	579	10405
1992	14785	1277	587	12921
1993	12159	1288	595	10276
1994	13158	1301	604	11253
1995	12003	1315	614	10074
1996	11944	1331	623	9990
1997	12163	1348	634	10181
1998	11786	1367	644	9774
1999	11697	1387	656	9654
2000	11724	1408	667	9649
2001	11780	1430	679	9671
2002	11822	1454	692	9676
2003	12025	1478	705	9842
2004	12081	1504	718	9859
2005	12211	1531	732	9948
2006	12338	1558	746	10034
2007	12325	1587	760	9977
2008	12366	1617	775	9973
2009	12087	1602	758	9727
2010	11960	1536	704	9719

SOURCE: NORTH SLOPE MODEL SIMULATION NSLP.1--8/16/83  
VARIABLES: EMTO, EMNA, EMNN, AND EMNR

TABLE C-7  
NORTH SLOPE MODEL PROJECTIONS

EMPLOYMENT: ALL RACES

	TOTAL EMPLOY- MENT	FEDERAL AND STATE GOVERN- MENT EMPLOY- MENT	BOROUGH OPER- ATING EMPLOY- MENT	BOROUGH CIP EMPLOY- MENT	OTHER CIP EMPLOY- MENT	LOCAL SUPPORT EMPLOY- MENT	OIL INDUSTRY EMPLOY- MENT	NON-OIL BASIC EMPLOY- MENT
1980	6115	294	792	321	348	458	3902	0
1981	7325	294	904	289	313	445	5080	0
1982	8348	294	992	260	282	431	6089	0
1983	9681	294	1015	234	254	412	7472	0
1984	8897	294	1039	211	228	395	6730	0
1985	10158	294	1063	190	205	380	8026	0
1986	10578	294	1087	171	185	367	8474	0
1987	11227	294	1112	154	166	356	9144	0
1988	11599	294	1137	138	150	347	9533	0
1989	12067	294	1163	125	135	339	10012	0
1990	14510	294	1189	112	121	332	12462	0
1991	12252	294	1215	101	109	326	10206	0
1992	14785	294	1242	91	98	322	12738	0
1993	12159	294	1269	82	88	318	10107	0
1994	13158	294	1297	74	80	316	11098	0
1995	12003	294	1326	66	72	314	9931	0
1996	11944	294	1355	60	64	313	9858	0
1997	12163	294	1385	54	58	313	10060	0
1998	11786	294	1415	48	52	313	9663	0
1999	11697	294	1446	43	47	314	9552	0
2000	11724	294	1477	39	42	316	9555	0
2001	11780	294	1510	35	38	318	9585	0
2002	11822	294	1543	32	34	321	9598	0
2003	12025	294	1577	28	31	324	9771	0
2004	12081	294	1611	26	28	327	9795	0
2005	12211	294	1646	23	25	331	9891	0
2006	12338	294	1683	21	22	336	9983	0
2007	12325	294	1719	19	20	340	9932	0
2008	12366	294	1757	17	18	345	9934	0
2009	12087	294	1712	15	16	341	9709	0
2010	11960	294	1573	14	15	325	9739	0

SOURCE: NORTH SLOPE MODEL SIMULATION NSLP.1--8/16/83  
VARIABLES: EMTO, EMGNL, EMGOOP, EMGOCT, EMCTGO, EMSUEG,  
EMBAOI, AND EMBAOT

TABLE C-8  
NORTH SLOPE MODEL PROJECTIONS

EMPLOYMENT: NATIVES

	TOTAL EMPLOY- MENT	FEDERAL AND STATE GOVERN- MENT EMPLOY- MENT	BOROUGH OPER- ATING EMPLOY- MENT	BOROUGH CIP EMPLOY- MENT	OTHER CIP EMPLOY- MENT	LOCAL SUPPORT EMPLOY- MENT	OIL INDUSTRY EMPLOY- MENT	NON-OIL BASIC EMPLOY- MENT
1980	1211	64	517	321	0	299	10	0
1981	1249	73	587	289	0	289	10	0
1982	1272	73	645	260	0	280	14	0
1983	1262	73	660	234	0	268	27	0
1984	1255	73	675	211	0	257	39	0
1985	1250	73	691	190	0	247	49	0
1986	1248	73	707	171	0	239	58	0
1987	1248	73	723	154	0	232	66	0
1988	1249	73	739	138	0	225	73	0
1989	1253	73	756	125	0	220	80	0
1990	1259	73	773	112	0	216	85	0
1991	1267	73	790	101	0	212	91	0
1992	1277	73	807	91	0	209	96	0
1993	1288	73	825	82	0	207	101	0
1994	1301	73	843	74	0	205	105	0
1995	1315	73	862	66	0	204	110	0
1996	1331	73	881	60	0	204	114	0
1997	1348	73	900	54	0	203	118	0
1998	1367	73	920	48	0	204	122	0
1999	1387	73	940	43	0	204	126	0
2000	1408	73	960	39	0	205	130	0
2001	1430	73	981	35	0	207	133	0
2002	1454	73	1003	32	0	209	137	0
2003	1478	73	1025	28	0	211	141	0
2004	1504	73	1047	26	0	213	145	0
2005	1531	73	1070	23	0	215	148	0
2006	1558	73	1094	21	0	218	152	0
2007	1587	73	1118	19	0	221	156	0
2008	1617	73	1142	17	0	224	160	0
2009	1602	73	1113	15	0	221	179	0
2010	1536	73	1023	14	0	211	215	0

SOURCE: NORTH SLOPE MODEL SIMULATION NSLP.1--8/16/83  
VARIABLES: EMNA, EMNAGONL, EMNAGOOP, EMNAGOCT, EMNACTGO,  
EMNASUEG, EMNAOI, AND EMNABAOT



TABLE C-9  
NORTH SLOPE MODEL PROJECTIONS

EMPLOYMENT: NON-NATIVE RESIDENTS

	TOTAL NON-NATIVE EMPLOYMENT	FEDERAL AND STATE GOVERNMENT EMPLOYMENT	BOROUGH OPERATING EMPLOYMENT	LOCAL SUPPORT EMPLOYMENT	NON-OIL BASIC EMPLOYMENT
1980	473	39	275	159	0
1981	512	40	316	156	0
1982	538	40	347	151	0
1983	539	40	355	144	0
1984	541	40	364	138	0
1985	545	40	372	133	0
1986	549	40	381	129	0
1987	553	40	389	125	0
1988	559	40	398	121	0
1989	565	40	407	119	0
1990	572	40	416	116	0
1991	579	40	425	114	0
1992	587	40	435	113	0
1993	595	40	444	111	0
1994	604	40	454	111	0
1995	614	40	464	110	0
1996	623	40	474	110	0
1997	634	40	485	110	0
1998	644	40	495	110	0
1999	656	40	506	110	0
2000	667	40	517	111	0
2001	679	40	528	111	0
2002	692	40	540	112	0
2003	705	40	552	113	0
2004	718	40	564	115	0
2005	732	40	576	116	0
2006	746	40	589	117	0
2007	760	40	602	119	0
2008	775	40	615	121	0
2009	758	40	599	119	0
2010	704	40	551	114	0

SOURCE: NORTH SLOPE MODEL SIMULATION NSLP.1--8/16/83  
VARIABLES: EMNN, EMNNGONL, EMNNGOOP, EMNNSUEG, AND EMNNBAOT

TABLE C-10  
NORTH SLOPE MODEL PROJECTIONS

EMPLOYMENT: NON-RESIDENTS

	TOTAL NON- RESIDENT EMPLOYMENT	FEDERAL AND AND STATE GOVERNMENT EMPLOYMENT	BOROUGH CIP EMPLOYMENT	OTHER CIP EMPLOYMENT	OIL INDUSTRY EMPLOYMENT
1980	4431	191	0	348	3892
1981	5564	181	0	313	5070
1982	6538	181	0	282	6075
1983	7880	181	0	254	7445
1984	7101	181	0	228	6691
1985	8364	181	0	205	7977
1986	8782	181	0	185	8416
1987	9425	181	0	166	9078
1988	9791	181	0	150	9460
1989	10248	181	0	135	9932
1990	12679	181	0	121	12377
1991	10405	181	0	109	10115
1992	12921	181	0	98	12642
1993	10276	181	0	88	10006
1994	11253	181	0	80	10993
1995	10074	181	0	72	9821
1996	9990	181	0	64	9744
1997	10181	181	0	58	9942
1998	9774	181	0	52	9541
1999	9654	181	0	47	9426
2000	9649	181	0	42	9425
2001	9671	181	0	38	9452
2002	9676	181	0	34	9461
2003	9842	181	0	31	9630
2004	9859	181	0	28	9650
2005	9948	181	0	25	9743
2006	10034	181	0	22	9831
2007	9977	181	0	20	9776
2008	9973	181	0	18	9774
2009	9727	181	0	16	9530
2010	9719	181	0	15	9524

SOURCE: NORTH SLOPE MODEL SIMULATION NSLP.1--8/16/83  
VARIABLES: EMNR, EMNRGONL, EMNRGOCT, EMNRCTGO, AND EMNRGAOT

TABLE C-11  
NORTH SLOPE MODEL PROJECTIONS

	TOTAL BOROUGH TAX REVENUES (000)	NON- PROPERTY TAX REVENUES (000)	PROPERTY TAX REVENUES FOR OPERATIONS (000)	PROPERTY TAX REVENUES FOR DEBT SERVICE (000)
1981	129230	18305	31726	79199
1982	182394	18895	36027	127472
1983	187761	19338	36873	131549
1984	207351	19789	37733	149828
1985	238490	20248	38606	179636
1986	262758	20713	39493	202552
1987	277760	21185	40393	216183
1988	280233	21664	41307	217262
1989	284133	22151	42235	219747
1990	259002	22645	43178	193178
1991	231574	23149	44138	164287
1992	201368	23661	45115	132593
1993	180181	24183	46110	109889
1994	167999	24715	47124	96160
1995	156065	25257	48158	82649
1996	149436	25811	49214	74411
1997	143597	26376	50292	66930
1998	139712	26953	51392	61367
1999	136419	27542	52516	56360
2000	133663	28145	53665	51854
2001	131398	28761	54838	47799
2002	129577	29390	56038	44149
2003	128162	30033	57265	40864
2004	127118	30691	58519	37908
2005	126412	31364	59802	35247
2006	126016	32051	61113	32852
2007	125905	32755	62454	30697
2008	126056	33474	63825	28757
2009	121802	34011	60780	27011
2010	112552	34342	52770	25440

SOURCE: NORTH SLOPE MODEL SIMULATION NSLP.1--8/16/83  
VARIABLES: RVTO, RVNPOP, RVPYOP, AND RVPYDB

TABLE C-12  
NORTH SLOPE MODEL PROJECTIONS

	TOTAL BOROUGH EXPENDI- TURES (000)	OPERATIONS EXPENDI- TURES (000)	CON- STRUCTION EXPENDI- TURES (000)	DEBT SERVICE EXPENDI- TURES (000)
1980	184570	43861	109723	30986
1981	227981	50031	98751	79199
1982	271269	54922	88876	127472
1983	267749	56211	79988	131549
1984	279340	57522	71989	149828
1985	303280	58854	64790	179636
1986	321069	60206	58311	202552
1987	330240	61578	52480	216183
1988	327465	62971	47232	217262
1989	326642	64386	42509	219747
1990	297260	65824	38258	193178
1991	266006	67287	34432	164287
1992	232357	68776	30989	132593
1993	208071	70293	27890	109889
1994	193100	71839	25101	96160
1995	178655	73416	22591	82649
1996	169767	75025	20332	74411
1997	161896	76667	18299	66930
1998	156180	78345	16469	61367
1999	151240	80058	14822	56360
2000	147003	81809	13340	51854
2001	143403	83599	12006	47799
2002	140382	85428	10805	44149
2003	137887	87298	9725	40864
2004	135870	89210	8752	37908
2005	134289	91165	7877	35247
2006	133106	93164	7089	32852
2007	132285	95208	6380	30697
2008	131798	97299	5742	28757
2009	126970	94791	5168	27011
2010	117204	87112	4651	25440

SOURCE: NORTH SLOPE MODEL SIMULATION NSLP.1--8/16/83  
VARIABLES: SPTO, SPLOGOOP, SPLOGOCT, AND CSDBTO

TABLE C-13  
NORTH SLOPE MODEL PROJECTIONS

	TOTAL PROPERTY VALUE (000)	TOTAL PROPERTY TAXES (000)	TAX RATE	TAX RATE FOR OPERATING REVENUES	TAX RATE FOR DEBT SERVICE REVENUES
1980	5387000	55700	0.0103	0.0049	0.0054
1981	6782000	110925	0.0164	0.0047	0.0117
1982	8177000	163499	0.0200	0.0044	0.0156
1983	10320000	168422	0.0163	0.0036	0.0127
1984	12195000	187561	0.0154	0.0031	0.0123
1985	13814000	218242	0.0158	0.0028	0.0130
1986	15192000	242045	0.0159	0.0026	0.0133
1987	16342000	256576	0.0157	0.0025	0.0132
1988	15930000	258569	0.0162	0.0026	0.0136
1989	15480000	261982	0.0169	0.0027	0.0142
1990	14992000	236357	0.0158	0.0029	0.0129
1991	16770000	208425	0.0124	0.0026	0.0098
1992	15882000	177708	0.0112	0.0028	0.0083
1993	14994000	155999	0.0104	0.0031	0.0073
1994	14105000	143284	0.0102	0.0033	0.0068
1995	13217000	130807	0.0099	0.0036	0.0063
1996	12329000	123625	0.0100	0.0040	0.0060
1997	11441000	117221	0.0102	0.0044	0.0059
1998	10553000	112759	0.0107	0.0049	0.0058
1999	9665000	108876	0.0113	0.0054	0.0058
2000	8777000	105519	0.0120	0.0061	0.0059
2001	7889000	102637	0.0130	0.0070	0.0061
2002	7001000	100187	0.0143	0.0080	0.0063
2003	6112000	98129	0.0161	0.0094	0.0067
2004	5224000	96427	0.0185	0.0112	0.0073
2005	4336000	95048	0.0219	0.0138	0.0081
2006	3448000	93965	0.0273	0.0177	0.0095
2007	2560000	93151	0.0364	0.0244	0.0120
2008	2293000	92582	0.0404	0.0278	0.0125
2009	2026000	87791	0.0433	0.0300	0.0133
2010	1759000	78210	0.0445	0.0300	0.0145

SOURCE: NORTH SLOPE MODEL SIMULATION NSLP.1--8/16/83  
VARIABLES: VATO, RVPYTO, TARA, TARAOP, AND TARADB

TABLE C-14  
NORTH SLOPE MODEL PROJECTIONS

	TOTAL RESIDENT INCOME (000)	TOTAL NATIVE INCOME (000)	TOTAL NON-NATIVE RESIDENT INCOME (000)	PER CAPITA RESIDENT INCOME (000)	PER CAPITA NATIVE INCOME (000)	PER CAPITA NON-NATIVE RESIDENT INCOME (000)
1980	67802	50064	17738	17.717	15.606	28.749
1981	70818	51636	19182	17.835	15.641	28.652
1982	72792	52633	20158	17.760	15.503	28.652
1983	72610	52397	20213	17.309	15.016	28.652
1984	72562	52260	20302	16.904	14.581	28.652
1985	72642	52217	20425	16.539	14.192	28.652
1986	72840	52264	20576	16.212	13.845	28.652
1987	73151	52396	20756	15.919	13.536	28.652
1988	73570	52609	20961	15.655	13.259	28.652
1989	74090	52900	21190	15.420	13.012	28.652
1990	74707	53265	21442	15.208	12.792	28.652
1991	75418	53702	21716	15.019	12.596	28.652
1992	76217	54207	22010	14.850	12.420	28.652
1993	77100	54777	22324	14.698	12.264	28.652
1994	78066	55409	22657	14.562	12.124	28.652
1995	79110	56102	23008	14.439	11.998	28.652
1996	80229	56852	23377	14.329	11.886	28.652
1997	81420	57657	23764	14.231	11.786	28.652
1998	82682	58515	24167	14.142	11.696	28.652
1999	84011	59424	24587	14.062	11.614	28.652
2000	85406	60383	25023	13.989	11.541	28.652
2001	86866	61390	25476	13.924	11.476	28.652
2002	88388	62444	25944	13.864	11.416	28.652
2003	89970	63543	26428	13.810	11.362	28.652
2004	91613	64686	26927	13.761	11.313	28.652
2005	93315	65873	27442	13.716	11.269	28.652
2006	95076	67103	27972	13.675	11.228	28.652
2007	96893	68376	28518	13.637	11.191	28.652
2008	98769	69690	29079	13.602	11.157	28.652
2009	97753	69330	28424	13.250	10.857	28.652
2010	93484	67084	26400	12.549	10.276	28.652

SOURCE: NORTH SLOPE MODEL SIMULATION NSLP.1--8/16/83  
VARIABLES: IN, INNA, INNN, INPC, INPCNA, AND INPCNN

TABLE C-15  
NORTH SLOPE MODEL PROJECTIONS

	ADULT NATIVE POPULATION	NATIVE LABOR SUPPLY	NATIVE EMPLOYMENT	NATIVE UNEMPLOY- MENT
1980	1669	1211	1211	0
1981	1721	1249	1249	0
1982	1767	1283	1272	11
1983	1809	1313	1262	51
1984	1847	1341	1255	86
1985	1883	1367	1250	117
1986	1916	1391	1248	144
1987	1949	1415	1248	168
1988	1981	1439	1249	189
1989	2014	1462	1253	209
1990	2046	1486	1259	226
1991	2080	1510	1267	243
1992	2114	1535	1277	258
1993	2149	1560	1288	272
1994	2186	1587	1301	286
1995	2223	1614	1315	299
1996	2262	1643	1331	311
1997	2303	1672	1348	324
1998	2345	1702	1367	336
1999	2388	1734	1387	347
2000	2433	1767	1408	359
2001	2480	1800	1430	370
2002	2528	1835	1454	382
2003	2577	1871	1478	393
2004	2628	1908	1504	404
2005	2681	1946	1531	415
2006	2734	1985	1558	427
2007	2790	2025	1587	438
2008	2847	2067	1617	450
2009	2905	2109	1602	507
2010	2965	2153	1536	616

SOURCE: NORTH SLOPE MODEL SIMULATION NSLP.1--8/16/83  
VARIABLES: PONAAT, LSNA, EMNA, UNNA, AND UNRANA

TABLE C-16  
NORTH SLOPE MODEL PROJECTIONS

	BOROUGH OPERATING REVENUES (000)	BOROUGH OPERATING COSTS (000)	OPERATING SURPLUS OR DEFICIT (000)
1980	43861	43861	0
1981	50031	49073	958
1982	54922	56507	-1584
1983	56211	65940	-9729
1984	57522	74430	-16908
1985	58854	82071	-23217
1986	60206	88948	-28742
1987	61578	95137	-33559
1988	62971	100707	-37737
1989	64386	105720	-41335
1990	65824	110232	-44409
1991	67287	114293	-47006
1992	68776	117948	-49172
1993	70293	121237	-50944
1994	71839	124197	-52358
1995	73416	126861	-53445
1996	75025	129259	-54234
1997	76667	131417	-54749
1998	78345	133359	-55014
1999	80058	135107	-55048
2000	81809	136680	-54870
2001	83599	138096	-54497
2002	85428	139370	-53942
2003	87298	140516	-53218
2004	89210	141549	-52338
2005	91165	142477	-51312
2006	93164	143313	-50149
2007	95208	144066	-48857
2008	97299	144743	-47444
2009	94791	145352	-50561
2010	87112	145900	-58788

SOURCE: NORTH SLOPE MODEL SIMULATION NSLP.1--8/16/83  
VARIABLES: RVOPTO, CSOP, AND DFOPTT



TABLE C-17  
 NORTH SLOPE MODEL PROJECTIONS:  
 RESIDENT POPULATION

	ANUKTUVUK PASS	ATKASOOK	BARROW	KAKTOVIK
1980	203	107	2207	165
1981	210	111	2291	171
1982	217	115	2365	176
1983	222	117	2420	180
1984	228	120	2477	185
1985	233	123	2534	189
1986	238	126	2592	193
1987	244	129	2652	198
1988	249	132	2711	202
1989	255	135	2772	207
1990	260	138	2834	211
1991	266	141	2897	216
1992	272	144	2961	221
1993	278	147	3027	226
1994	284	150	3093	231
1995	290	153	3161	236
1996	297	157	3231	241
1997	303	160	3301	246
1998	310	164	3374	251
1999	317	167	3447	257
2000	324	171	3523	263
2001	331	175	3600	268
2002	338	179	3679	274
2003	345	182	3759	280
2004	353	186	3841	286
2005	361	190	3926	293
2006	368	195	4012	299
2007	377	199	4100	306
2008	385	203	4190	312
2009	391	207	4257	317
2010	395	209	4298	320

SOURCE: NORTH SLOPE MODEL SIMULATION NSLP.1--8/16/83  
 VARIABLES: POANPA, POATKA, POBARR, AND POKAKT

TABLE C-18  
 NORTH SLOPE MODEL PROJECTIONS:  
 RESIDENT POPULATION

	NUIQSUT	POINT HOPE	POINT LAY	WAINWRIGHT
1980	208	464	68	405
1981	214	480	71	421
1982	221	496	74	434
1983	227	508	76	445
1984	232	519	77	455
1985	237	531	79	466
1986	243	544	81	476
1987	248	556	83	487
1988	254	569	85	498
1989	259	581	86	509
1990	265	594	88	521
1991	271	608	90	532
1992	277	621	92	544
1993	283	635	94	556
1994	289	649	96	568
1995	296	663	99	581
1996	302	677	101	593
1997	309	692	103	606
1998	316	707	105	620
1999	323	723	108	633
2000	330	739	110	647
2001	337	755	112	661
2002	344	771	115	676
2003	352	788	117	691
2004	360	806	120	706
2005	367	823	122	721
2006	375	841	125	737
2007	384	860	128	753
2008	392	879	131	770
2009	398	893	133	782
2010	402	901	134	790

SOURCE: NORTH SLOPE MODEL SIMULATION NSLP.1--8/16/83  
 VARIABLES: PONUIQ, POPOHO, POPOLA, AND POWAIN

TABLE C-19  
 NORTH SLOPE MODEL PROJECTIONS:  
 RESIDENT EMPLOYMENT

	ANUKTUVUK PASS	ATKASOOK	BARROW	KAKTOVIK
1980	49	37	1092	93
1981	51	39	1139	97
1982	52	40	1171	100
1983	52	40	1165	99
1984	52	40	1162	99
1985	52	39	1161	99
1986	52	40	1162	99
1987	52	40	1165	99
1988	52	40	1170	99
1989	53	40	1177	100
1990	53	40	1185	101
1991	54	41	1195	102
1992	54	41	1206	103
1993	55	41	1218	104
1994	55	42	1233	105
1995	56	42	1248	106
1996	57	43	1265	107
1997	57	44	1282	109
1998	58	44	1301	111
1999	59	45	1321	112
2000	60	46	1343	114
2001	61	46	1365	116
2002	62	47	1388	118
2003	63	48	1412	120
2004	64	49	1438	122
2005	66	50	1464	124
2006	67	51	1491	127
2007	68	52	1519	129
2008	69	53	1548	132
2009	68	52	1527	130
2010	65	49	1450	123

SOURCE: NORTH SLOPE MODEL SIMULATION NSLP.1--8/16/83  
 VARIABLES: EMANPA, EMATKA, EMBARR, AND EMKAKT

TABLE C-20  
 NORTH SLOPE MODEL PROJECTIONS:  
 RESIDENT EMPLOYMENT

	NUIQSUT	POINT HOPE	POINT LAY	WAINWRIGHT
1980	71	172	17	151
1981	74	180	18	160
1982	76	185	18	165
1983	76	184	18	164
1984	75	183	18	163
1985	75	183	18	163
1986	75	183	18	163
1987	76	184	18	164
1988	76	184	18	165
1989	76	185	18	165
1990	77	187	18	167
1991	78	188	18	168
1992	78	190	19	170
1993	79	192	19	171
1994	80	194	19	173
1995	81	197	19	176
1996	82	199	20	178
1997	83	202	20	180
1998	84	205	20	183
1999	86	208	20	186
2000	87	212	21	189
2001	89	215	21	192
2002	90	219	21	195
2003	92	223	22	199
2004	93	227	22	202
2005	95	231	23	206
2006	97	235	23	210
2007	99	239	23	214
2008	100	244	24	218
2009	99	241	24	215
2010	94	229	22	204

SOURCE: NORTH SLOPE MODEL SIMULATION NSLP.1--8/16/83  
 VARIABLES: EMNUIQ, EMPOHO, EMPOLA, AND EMWAIN

APPENDIX D

NORTH SLOPE BOROUGH PROPERTY VALUE PROJECTIONS

## APPENDIX D

### NORTH SLOPE BOROUGH PROPERTY VALUE PROJECTIONS

In this appendix, we discuss the methodology we used to project North Slope Borough property values for Chapter IV. Most of the assumptions we used were based on information from two sources: National Petroleum Council, U.S. Arctic Oil and Gas (December 1981), abbreviated "NPC," and North Slope Borough, Official Statement Relating to the Series "P" Bond Sale (1982), abbreviated "NSB." The years in our projection tables refer to calendar years.

#### New Resource Discoveries and Development Costs

In order to calculate the costs of development of new discoveries of oil and gas resources on the North Slope, we first assumed a total volume of future discoveries. Next we allocated these discoveries among eight different locations. Next we made assumptions as to when the discoveries would occur, the time required for development, the costs of development, and the production period for each field. These assumptions are shown in Table D.1. For each location, we assumed a length of pipeline to be constructed. We assumed that pipeline development costs are given by the following formula (based roughly on the discussion of pipeline costs in NPC, page 73):

Cost per Mile in Millions of Dollars	= 14 - 2	Volume of Oil Discovered in Bbb1
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We did not calculate costs for possible construction of additional oil or gas pipeline south from the North Slope. Thus, we assumed that new discoveries would be shipped through TAPS. We also did not calculate costs for secondary recovery efforts following initial development of new fields. We assumed that all fields have a production (and depreciation) period of 30 years.

TABLE D.1. ASSUMPTIONS USED IN CALCULATING  
RESOURCE DISCOVERIES AND DEVELOPMENT COSTS

<u>Location</u>	<u>Year of Discovery</u>	<u>Pipeline Miles</u>	<u>Taxable Development Cost per Bbbl (millions of \$)</u>	<u>Development Period (years)</u>
Onshore State	1982	50	3,000	10
Offshore State	1979	50	4,500	10
NPRA	1982	257	3,000	10
Arctic National Wildlife Range	1986	154	3,000	10
Other Federal Onshore Lands	1985	200	3,000	10
Native Lands	1980	200	3,000	10
Offshore Federal Leases (except OCS Lease Sale 87)	1982	50	300	10
OCS Lease Sale 87	1985	100	300	10

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Notes: We based our pipeline miles assumption for NPRA and the Arctic National Wildlife Range on the discussion in NPC, pages E-10 and E-12. We assumed a standard development cost of \$3,000 million per Bbbl, based on the discussion in NPC, pages E-3 and E-4. However, we assumed a cost 50 percent higher for offshore development of state leases. For offshore federal development, we assumed an onshore (hence, subject to property tax) development cost of \$300 million per Bbbl.



### Assessed Property Values

In order to project North Slope taxable property values, we assumed straight line depreciation of the total cost of development of undiscovered resources, beginning the year in which the developments are completed over a 30-year field life. We assumed straight line depreciation of the current value of existing oil and gas properties and planned Prudhoe Bay spending over a 25-year period to 2007. We assumed straight line depreciation till 2012 of currently planned expenditures at Kuparuk. We assumed that the real property value of non-oil and gas properties would remain constant, at \$450 million (NSB, P.13).

Table D.2 shows our value and depreciation period assumptions for past and future expenditures.

TABLE D.2. VALUE AND DEPRECIATION ASSUMPTIONS  
FOR EXISTING AND PLANNED NORTH SLOPE  
OIL FACILITIES

<u>Project</u>	<u>Value (millions of 1982 \$)</u>	<u>Year of Expenditure</u>	<u>Depreciation Period</u>
Existing North Slope Facilities	7,723	1982	25
1982-1986 Prudhoe Bay Development	2,100 1,953 1,817 1,690 1,572	1982 1983 1984 1985 1986	25 24 23 22 21
1983-1990 Kuparuk Development	500 465 433 402 374 348 324 301	1983 1984 1985 1986 1987 1988 1989 1990	29 28 27 26 25 24 23 22

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NOTES: Value of Existing Facilities based on NSB, page 13. 1982-1986 Prudhoe Bay development spending based on assumption that oil companies will spend \$10.5 billion in "dollars of the day" over a 5-year period (Oil and Gas Journal, July 12, 1982, page 78). 1983-1990 Kuparuk development spending based on assumption that oil companies will spend \$4 billion over an 8-year period (Oil and Gas Journal, July 12, 1982, page 80).

APPENDIX E  
NORTH SLOPE EMPLOYMENT DATA

TABLE E.1. NONAGRICULTURAL EMPLOYMENT, BARROW NORTH SLOPE CENSUS DIVISION, 1980

	January	February	March	April	May	June	July	August	September	October	November	December	Average
Mining	2556	2546	2609	2697	2707	2686	2397	2348	2406	3340	3349	3508	2762
Construction	368	466	665	693	582	474	322	524	672	1173	1262	1261	705
Manufacturing	0	0	0	0	0	0	0	0	0	0	0	0	0
Transportation, Commu- nication & Utilities	346	350	349	377	372	393	427	431	413	525	533	552	422
Wholesale Trade	*	*	*	0	0	0	0	0	0	0	0	0	0
Retail Trade	343	322	296	255	258	306	355	390	491	306	318	316	330
Finance, Insurance, & Real Estate	*	*	*	82	80	87	*	*	*	*	*	*	83(a)
Services	334	334	349	374	382	394	447	482	436	447	441	457	406
Federal Government	251	242	254	259	260	237	237	238	232	267	259	253	249
State and Local Government	1011	1126	1146	1147	1172	1164	1043	1094	1235	1270	1260	1228	1158
Miscellaneous	0	0	0	0	0	0	*	*	*	*	*	*	*
TOTAL	5291	5478	5756	5884	5813	5741	5294	5586	5946	7419	7521	7672	6115(b)

\* Data suppressed to avoid disclosure.

(a) Three-Month Average

(b) Sum of annual averages for industries.

SOURCE: Alaska Department of Labor, Statistical Quarterly, first quarter 1980-fourth quarter 1980.

TABLE E.2. LABOR FORCE ESTIMATES, ANNUAL AVERAGE  
NORTH SLOPE BOROUGH 1974-1981

	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980*</u>	<u>1981</u>
Total Civilian Labor Force	1,507	1,798	1,913	1,849	2,207	2,281	2,306	2,543
Total Unemployment	91	103	157	153	155	142	144	178
Percent of Labor Force	6.0%	6.0%	8.2%	8.3%	7.0%	6.2%	6.2%	7.0%
Total Employment	1,416	1,605	1,756	1,696	2,052	2,139	2,162	2,365
Total Agriculture and Wage and Salary Employment	1,450	1,997	6,932	5,674	6,038	5,548	5,644*	NA
Mining	290	261	1,271	1,961	2,420	2,568	2,550	
Contract Construction	119	380	3,738	1,472	1,283	415	530	
Transportation, Communications, and Utilities	145	185	316	380	341	353	384	
Trade (Wholesale and Retail)	***	129	***	***	173	268	335	
Finance, Insurance, and Real Estate	***	56	***	***	136	122	83**	
Service	96	196	445	551	419	324	392	
Government	641	790	892	1,078	1,266	1,498	1,372	
Federal	283	265	239	240	257	248	246	
State	86	93	79	71	77	64	45	
Local	272	432	573	766	932	1,186	1,081	

\*Nine-Month Average

\*\*Three-Month Average for Second Quarter

\*\*\*Omitted to comply with Alaska Department of Labor disclosure regulations.

NA Not Available

Sources: Alaska Labor Force Estimates by Industry and Area; Alaska Department of Labor, Employment Security Division. Unpublished figures same source.

North Slope Borough, "official statement relating to the original issuance of \$80,000,000 General Obligation Bonds, Series P," Part II, Information Statement (1982), p. 50.

TABLE E.3. PERSONS AT OIL-RELATED WORKSITES IN THE  
NORTH SLOPE BOROUGH BY STATE OF USUAL RESIDENCE  
JANUARY AND FEBRUARY OF 1982

<u>State</u>	<u>Number Naming State as Usual Residence</u>	<u>State</u>	<u>Number Naming State as Usual Residence</u>
Alabama	20	Montana	84
Alaska*	4,874	Nebraska	6
Arizona	25	Nevada	23
Arkansas	10	New Hampshire	4
California	204	New Jersey	6
Colorado	52	New Mexico	22
Connecticut	2	New York	3
Delaware	0	North Carolina	6
District of Columbia	0	North Dakota	18
Florida	16	Ohio	4
Georgia	1	Oklahoma	54
Hawaii	9	Oregon	73
Idaho	47	Pennsylvania	15
Illinois	10	Rhode Island	0
Indiana	1	South Carolina	7
Iowa	4	South Dakota	7
Kansas	3	Tennessee	7
Kentucky	9	Texas	185
Louisiana	44	Utah	22
Maine	2	Vermont	2
Maryland	9	Virginia	0
Massachusetts	2	Washington	264
Michigan	20	West Virginia	1
Minnesota	23	Wisconsin	13
Mississippi	18	Wyoming	31
Missouri	9	Foreign Country	35
		TOTAL	6,306

\*Includes persons claiming no usual place of residence.

SOURCE: Dave Swanson, "Special Census Results for Oil-Related Work-  
sites in the North Slope Borough," in Alaska Department of  
Labor, Alaska Economic Trends (March 1983), p. 2.

TABLE E.4. PERSONS AT OIL-RELATED WORKSITES IN THE  
NORTH SLOPE BOROUGH NAMING ALASKA AS THEIR  
USUAL PLACE OF RESIDENCE BY 1980 CENSUS AREA  
JANUARY AND FEBRUARY OF 1982

<u>1980 Census Area</u>	<u>No. of Persons Naming Area as their Usual Place of Residence</u>	<u>Percent</u>
Aleutian Islands	0	0.0
Anchorage, Municipality of	2,496	51.2
Bethel	10	0.2
Bristol Bay Borough	0	0.0
Dillingham	2	0.0
Fairbanks-North Star Borough	1,094	22.4
Haines Borough	10	0.2
Juneau, City and Borough of	44	0.9
Kenai Peninsula Borough	437	9.0
Ketchikan Gateway Borough	3	0.1
Kobuk	28	0.6
Kodiak Island Borough	6	0.1
Matanuska-Susitna Borough	413	8.5
Nome	9	0.2
North Slope Borough*	178	3.7
Prince of Wales-Outer Ketchikan	0	0.0
Sitka, City and Borough of	7	0.1
Skagway-Yakutat-Angoon	3	0.1
Southeast Fairbanks	37	0.8
Valdez-Cordova	31	0.6
Wade Hampton	1	0.0
Wrangell-Petersburg	6	0.1
Yukon-Koyukuk	59	1.2
TOTAL	4,874	100.0

\*Includes persons claiming no usual place of residence.

SOURCE: Dave Swanson, "Special Census Results for Oil-Related Worksites in the North Slope Borough," in Alaska Department of Labor, Alaska Economic Trends (March 1983), p. 3.

TABLE E.5. PERSONS AT OIL-RELATED WORKSITES  
IN THE NORTH SLOPE BOROUGH BY SEX  
JANUARY AND FEBRUARY OF 1982

<u>Sex</u>	<u>Number</u>	<u>Percent</u>
Male	5,711	90.6
Female	595	9.4
TOTAL	6,306	100.0

SOURCE: Dave Swanson, "Special Census Results for Oil-Related Worksites in the North Slope Borough," in Alaska Department of Labor, Alaska Economic Trends (March 1983), p. 3.

TABLE E.6. NUMBER OF PERSONS AT OIL-RELATED WORKSITES IN THE  
NORTH SLOPE BOROUGH BY REGION OF USUAL PLACE  
OF RESIDENCE AND TYPE OF CAMP  
JANUARY AND FEBRUARY OF 1982

<u>Type of Camp</u>	<u>Number Naming Alaska as Usual Place of Residence*</u>	<u>Number Naming Usual Place of Residence Outside Alaska</u>	<u>Total</u>
Operations	876	87	963
Trades, Construction	1,352	532	1,884
Oil Rig	1,140	291	1,431
Seismic	135	84	219
Tech. Services & Fabrication	59	47	106
Government	34	1	35
Ground Transportation	219	65	284
Air Transportation	49	11	60
Supply, Services, and Repair	297	107	404
General	713	207	920
Total	4,874	1,432	6,306

\*Includes persons claiming no usual place of residence.

SOURCE: Dave Swanson, "Special Census Results for Oil-Related Worksites in the North Slope Borough," in Alaska Department of Labor, Alaska Economic Trends (March 1983), p. 4.



TABLE E.7. CLASS OF WORKERS BY PLACE  
NORTH SLOPE BOROUGH, 1980

Place	Class of Workers					Total*
	Private	Federal Government	State Government	Local Government	Self Government	
Anaktuvuk	15	3	0	27	0	45
Atkasook	20	0	6	8	0	34
Barrow	421	56	46	453	18	994
Kaktovik	47	5	10	23	0	85
Nuiqsut	27	0	9	26	3	65
Point Hope	27	2	37	90	2	158
Point Lay	4	0	6	6	0	16
Wainwright	73	2	21	29	1	139
Subtotal	634	68	148	662	24	1,536
Cape Lisburne	0	0	0	0	0	0
Deadhorse	42	0	0	4	0	46
Prudhoe Bay	30	0	0	0	0	30
Remainder of Prudhoe	88	1	0	0	0	89
Remainder of Barrow	0	0	0	0	0	0
Subtotal	160	1	0	4	0	165
Total	794	69	148	666	24	1,701

\* Excludes unpaid workers

SOURCE: 1980 Census Data, Census Tape STF3A, Table 67; printout on file at the Institute of Social and Economic Research.

TABLE E.8. 1980 CENSUS DATA FOR OCCUPATIONS OF EMPLOYED WORKERS  
16 YEARS AND OLDER, BY OCCUPATION AND PLACE, NORTH SLOPE BOROUGH VILLAGES

<u>Industry</u>	<u>Anak- tuvuk</u>	<u>Atka- sook</u>	<u>Barrow</u>	<u>Kakto- vik</u>	<u>Nuiqsut</u>	<u>Point Hope</u>	<u>Point Lay</u>	<u>Wain- wright</u>	<u>Total-8 Villages</u>
Executives, Administrators and Managers (3-37)	3	4	112	7	4	10	2	8	150
Professional Specialists (43-199)	3	2	108	8	20	35	2	12	190
Technicians (203-235)	0	0	41	0	0	6	0	0	47
Sales Occupations (243-285)	11	2	27	3	5	2	2	10	62
Administrative Support Occupations including clerical (303-389)	0	4	165	9	3	10	0	24	215
Private Household Occupations (403-407)	0	0	19	0	0	2	0	0	21
Protective Service Occupations (413-427)	12	0	27	0	4	15	2	3	63
Service Occupations (433-469)	11	4	124	15	11	27	6	22	220
Farming, Forestry, and Fishing (473-499)	0	0	9	0	0	2	0	0	11
Precision Production, Craft, and Repair Occupations (503-699)	3	6	232	26	11	24	2	38	342
Machine Operators, Assemblers, and Inspectors (703-799)	0	0	15	0	0	4	0	0	19
Transportation and Material Moving Occupa- tions (803-859)	2	6	32	7	3	7	0	4	61
Handlers, Equipment Cleaners, Helpers, and Laborers (863-889)	0	6	88	10	4	14	0	20	142
Total	45	34	999	85	65	158	16	141	1,543

\*Occupation numbers in parentheses are Census Occupational Classification Codes.

SOURCE: 1980 Census Data, Census Tape STF3A, Table 66; printouts on file at the Institute of Social and Economic Research.

TABLE E.9. 1980 CENSUS DATA FOR OCCUPATIONS OF EMPLOYED WORKERS  
16 YEARS AND OLDER, BY INDUSTRY AND PLACE, NORTH SLOPE BOROUGH VILLAGES

<u>Industry</u>	<u>Anak- tuvuk</u>	<u>Atka- sook</u>	<u>Barrow</u>	<u>Kakto- vik</u>	<u>Nuigsut</u>	<u>Point Hope</u>	<u>Point Lay</u>	<u>Wain- wright</u>	<u>Total-8 Villages</u>
Agriculture, Forestry, Fishing and Mining	0	2	16	7	0	5	0	4	34
Construction	0	5	238	20	11	29	2	43	348
Manufacturing: Nondurable Goods	6	0	4	0	2	0	0	0	12
Manufacturing: Durable Goods	0	0	5	0	2	0	0	2	9
Transportation	3	11	40	4	3	2	2	7	72
Communication and Public Utilities	0	2	69	4	3	10	0	7	95
Wholesale Trade	3	0	3	0	3	0	0	13	22
Retail Trade	8	0	62	0	0	4	2	10	86
Finance, Insurance, and Real Estate	0	4	39	3	2	10	0	4	62
Business and Repair Services	3	0	22	0	3	2	0	0	30
Personal Entertainment and Recreation Services	3	0	53	6	0	2	0	3	67
Professional Health Services	4	0	43	5	3	5	0	3	63
Professional Education Services	6	8	179	16	26	69	8	37	349
Other Professional Services	0	0	26	2	0	6	0	2	36
Public Administration	9	2	200	18	7	14	2	6	258
<b>Total</b>	<b>45</b>	<b>34</b>	<b>999</b>	<b>85</b>	<b>65</b>	<b>158</b>	<b>16</b>	<b>141</b>	<b>1,543</b>

SOURCE: 1980 Census Tape STF3A, Table 65; printouts on file at the Institute of Social and Economic Research.

TABLE E.10. BOROUGH EMPLOYMENT, JULY 1980

<u>NORTH SLOPE BOROUGH GOVERNMENT</u> <u>(Department/Unit)</u>	<u>Number of</u> <u>Employees</u>
Public Safety	51
Barrow Office of Environmental Health* (reimbursable [fed.] construction labor)	6
Public Works	42
Utilities	41
Transit	6
Service Area No. 10	59
Barrow Roads	36
Barrow Sanitation	22
Coordinators, Management & Operations	11
Assembly & Utility Board (excluded from total)	(5)
Mayor's Office	20
Administration/Finance	40
Planning	15
Assessing-Physical Plant	16
Nuiqsut*	12
Anaktuvuk Pass*	44
Wainwright School*	45
Wainwright EDA*	16
Atkasook*	37
Environmental Protection	5
Kaktovik*	22
Health Agency	72
Housing	21
Barrow Housing*	119
Barrow Sewage Treatment Plant*	55
Point Lay*	<u>5</u>
Total	823

\*CIP employees, totaling 356 in this pay period.

SOURCE: Paycheck register, pay period ending July 12, 1980.

TABLE E.10 (continued)

<u>NORTH SLOPE BOROUGH SCHOOL DISTRICT</u>		<u>Number of Employees</u>
Certified		149
Administration	22	
Instruction	111	
Support	16	
Classified		204
CETA (summer only)		<u>70</u>
Total		423

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SORUCE: Business Office, NSB School District, and interview with school superintendent. (May 1980 payroll checked against current payroll.)

SOURCE: Gerald A. McBeth, North Slope Borough Government and Policy Making, Man-in-the-Arctic Program Monograph No. 3 (Anchorage, Institute of Social and Economic Research, March 1981), p. 70.

TABLE E.11. RECENT NORTH SLOPE BOROUGH EMPLOYMENT ESTIMATES

<u>Year</u>	<u>Total Local Government Employment</u>	<u>Budgeted Employment Excluding Education</u>	<u>Employment in Education</u>	<u>CIP Employment</u>
1976	573 <sup>a</sup>			
1977	766 <sup>a</sup>			
1978	932 <sup>a</sup>			
1979	1,186 <sup>a</sup>			
1980	1,081 <sup>a</sup> 1,235 <sup>d</sup>	419 <sup>b</sup> 456 <sup>d</sup>	423 <sup>d</sup>	356 <sup>d</sup>
1981	-	489 <sup>b</sup>		
1982	982 <sup>e</sup>	629 <sup>b</sup>	382 <sup>c</sup>	

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<sup>a</sup>North Slope Borough, Official Statement, Part II (1982), page 50, based upon Alaska Department of Labor Statistics (see Table E.2).

<sup>b</sup>North Slope Borough Budget Document, FY 1982-83. Figures are for following fiscal year (see Table E.13).

<sup>c</sup>North Slope Borough School District, memo to main herdman with employment figures prepared for 1982 audit. Thirty-three part-time employees were counted as one-half job each or 27 employees. Figure also included 191 classified employees and 164 certified employees.

<sup>d</sup>Gerald McBeath, North Slope Borough Government and Policy Making (1981), page 20. July 1980 employment, based on paycheck register (see Table E.10).

<sup>e</sup>Total Borough Employment, October 13, 1982. Personal communication with Borough personnel office.

TABLE E.12. CIP PROGRAM WORK FORCE PROFILE SUMMARY  
FOR 1981

<u>Location</u>	<u>No. of Workers</u>	<u>Local</u>	<u>Imported</u>
Anaktuvuk Pass	97	40%	60%
Atqasuk	43	15%	85%
Barrow	686	70%	30%
Kaktovik	65%	30%	70%
Nuiqsut	84	40%	60%
Point Hope	189	50%	50%
Point Lay	31	15%	85%
Dead Horse	N/A	0	100%
Wainwright	163	50%	50%
TOTAL <sup>a</sup>	1,358	55%	45%

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<sup>a</sup>The original source did not provide totals. We calculated the total and percentage breakdowns on the basis of information provided to individual locations.

SOURCE: Work Force courtesy of Alaska Consultants, Inc. Study prepared by CSM, Inc., 1981. Reproduced from North Slope Borough, Annual Overall Economic Development Program Report (1981), p. 21.

TABLE E.13. NORTH SLOPE BOROUGH  
TOTAL BUDGETED EMPLOYMENT, FY 1981-FY 1983

<u>Activity</u>	<u>1980/81</u>	<u>1981/82</u>	<u>1982/83</u>	<u>Change 1980/81 to 1982/83</u>
Service Area #10-Utility	20	52	132	112
Public Safety: Police	35	36	45	10
Public Safety: Fire Protection	-	3	3	3
Public Safety: Search & Rescue	3	4	5	2
Public Works	55	63	68	13
Utilities	78	97	96	18
Assembly	-	-	2	2
Borough Clerk	2	2	2	-
Elections	-	-	1	1
Budgetary Reserve				
Mayer's Appropriation	72	75	98	16
Environmental Protection	4	4	8	4
Health & Social Services	120	120	123	3
Housing Agency	<u>30</u>	<u>33</u>	<u>46</u>	<u>16</u>
Total, NSB Budget	419	489	629	210
<hr/>				
Total Excluding Service Area #10	399	437	497	98

- Figure either 0 or not given.

SOURCE: North Slope Borough, Budget Document, Ordinance 82-3,  
Fiscal Year 1982-83.



TABLE E-14.  
NORTH SLOPE REGION GOVERNMENT EMPLOYMENT GROWTH

<u>Year</u>	<u>G O V E R N M E N T</u>			
	<u>Federal</u>	<u>State</u>	<u>Local</u>	<u>Total</u>
1970	128		37	165
1971	168		114	282
1972	173	142	19	334
1973	171	118	106	395
1974	283	86	272	641
1975	265	93	432	790
1976	239	79	573	892
1977	240	71	766	1078
1978	256	77	1140	1473
1979	248	67	1183	1498
1980	249	45*	1081*	1375*

\*Nine-month averages.

SOURCE: Alaska Department of Labor employment estimates, 1970-1979, reprinted from Will Nebesky and Lee Huskey, Alaska OCS Socioeconomic Studies Program State and Regional Economic and Demographic Systems, Beaufort Sea (71) Impact Analysis, Alaska OCS Socioeconomic Studies Program Technical Report No. 62 (Anchorage, Bureau of Land Management Alaska OCS Office, August 1981).

1980 from Tables E-1 and E-2.

TABLE E-15.  
NORTH SLOPE REGION EMPLOYMENT GROWTH  
(Annual Average Employment)

<u>Year</u>	<u>Total Employment</u>	<u>Prudhoe Bay</u>	<u>Net</u>
1970	--	--	977 <sup>1</sup>
1975 <sup>2</sup>	6172	3820	2352
1976	6932	4444	2488
1977	5674	2723	2951
1978	6059	2493	3566
1979	5549	2282	3267

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<sup>1</sup>Prior to North Slope Borough formation, employment district did not include Prudhoe Bay.

<sup>2</sup>1975-1979 employment estimates from Alaska Department of Labor communications.

SOURCE: Reprinted from Will Nebesky and Lee Huskey, Alaska OCS Socioeconomic Studies Program State and Regional Economic and Demographic Systems, Beaufort Sea (71) Impact Analysis, Alaska OCS Socioeconomic Studies Program Technical Report No. 62 (Anchorage, Bureau of Land Management Alaska OCS Office, August 1981).

TABLE E-16.  
NORTH SLOPE REGION STRUCTURE OF EMPLOYMENT  
(Percent of Total)

<u>Industry</u>	<u>1970</u>	<u>1 9 7 9</u>	
		<u>Total</u>	<u>Net of Prudhoe</u>
Mining	28.6	46.3	21.6
Construction	17.7	7.5	9.7
Transportation	8.8	6.4	8.5
Trade and Finance	13.4	7.0	11.5
Service	14.5	5.8	3.4
Government	16.9	27.0	45.7
Per capita support sector employment	.088	.082	.113

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SOURCE: Alaska Department of Labor communications, cited in Will Nebesky and Lee Huskey, Alaska OCS Socioeconomic Studies Program State and Regional Economic and Demographic Systems, Beaufort Sea (71) Impact Analysis, Alaska OCS Socioeconomic Studies Program Technical Report No. 62 (Anchorage, Bureau of Land Management Alaska OCS Office, August 1981), p. 63.

TABLE E-17.  
 NORTH SLOPE REGION SEASONALITY INDEX\*  
 (Percent of Annual Average Employment)

<u>Quarter</u>	<u>1970</u>	<u>1973</u>	<u>1 9 7 9</u>	
			<u>Total</u>	<u>Prudhoe Bay</u>
1	1.22	1.06	1.08	.95
2	1.04	.99	1.02	.95
3	.99	1.02	.92	1.19
4	.75	.93	.98	.91

\*Seasonality index for each quarter equals the average quarterly employment divided by the annual average.

SOURCE: Derived from Alaska Department of Labor employment estimates, reprinted from Will Nebesky and Lee Huskey, Alaska OCS Socioeconomic Studies Program State and Regional Economic and Demographic Systems, Beaufort Sea (71) Impact Analysis, Alaska OCS Socioeconomic Studies Program Technical Report No. 62 (Anchorage, Bureau of Land Management Alaska OCS Office, August 1981).

TABLE E-18.  
ESTIMATION OF VILLAGE PRIVATE SECTOR EMPLOYMENT, 1980

<u>Industry</u>	<u>Dept. Labor Annual Avg. Employment for Entire North Slope (Table E-1)</u>	<u>1980 Census Employment Figures for 8 Villages (Table E-9)</u>	<u>Difference: Assumed to be Oil Industry Employment Located Outside of Villages</u>
Agriculture, Forestry Fishing and Mining	2762	34	2728
Construction	705	348	357
Manufacturing	0	21	-21
Transportation, Communications and Utilities	422	167	255
Wholesale Trade	0	22	-22
Retail Trade	330	86 <sup>a</sup>	244
Finance, Insurance, and Real Estate	83	62	21
Services	406	66 <sup>b</sup>	340
TOTAL	4708	806	3902

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<sup>a</sup>Three-month average.

<sup>b</sup>Excludes professional health services and professional education services, which we assume to be government employment.

TABLE E-19.  
 AVERAGE ANNUAL FULL-TIME EMPLOYMENT<sup>a</sup>  
 KAKTOVIK  
 1982

<u>Industry Classification</u>	<u>Number</u>	<u>Percent of Total</u>
Agriculture, Forestry, and Fishing	0.0	--
Mining	7.0	10.4
Contract Construction	6.5	9.7
Manufacturing	0.0	--
Transportation, Communications, and Public Utilities	6.0	9.0
Trade	3.5	5.2
Finance, Insurance, and Real Estate	3.0	4.5
Services	3.5	5.2
Government	37.5	56.0
Federal	(3.0)	(4.5)
State	(0.0)	(—)
Local	(34.5)	(51.5)
<u>TOTAL</u>	<u>67.0</u>	<u>100.0</u>

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<sup>a</sup>Includes three local residents employed at Barter Island DEW Line Station, but excludes balance of Station personnel housed on-base. Also includes three jobs held by Kaktovik residents at Prudhoe Bay and four job equivalents held by oil and gas-related crews temporarily based in Kaktovik during part of 1982.

SOURCE: Special census conducted by Alaska Consultants, Inc. Printed as Table 2 in Alaska Consultants, Inc., Background for Planning: City of Kaktovik, prepared for the North Slope Borough (June 1983), p. 11.

TABLE E-20.  
 AVERAGE ANNUAL FULL-TIME EMPLOYMENT  
 POINT LAY  
 1982

<u>Industry Classification</u>	<u>Percent</u> <u>Number</u>	<u>of Total</u>
Agriculture, Forestry, and Fishing	0.0	0.0
Mining	0.0	0.0
Contract Construction	39.5	56.8
Manufacturing	0.0	0.0
Transportation, Communications, and Public Utilities	0.0	0.0
Trade	3.0	4.3
Finance, Insurance, and Real Estate	0.0	0.0
Services	3.0	4.3
Government	24.0	34.5
Federal	(0.5)	(0.7)
State	(0.0)	(0.0)
Local	(23.5)	(33.8)
<u>TOTAL</u>	<u>69.5</u>	<u>100.0</u>

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SOURCE: Special census conducted by Alaska Consultants, Inc.  
 Printed as Table 2 in Alaska Consultants, Inc., Background  
 for Planning: City of Point Lay, prepared for the North  
 Slope Borough (June 1983), p. 12.

TABLE E-21.  
 AVERAGE ANNUAL FULL-TIME EMPLOYMENT<sup>a</sup>  
 POINT HOPE  
 1982

<u>Industry Classification</u>	Percent <u>Number</u>	<u>of Total</u>
Agriculture, Forestry, and Fishing	0.0	--
Mining	3.0	2.7
Contract Construction	38.0	33.8
Manufacturing	0.0	--
Transportation, Communications, and Public Utilities	0.0	--
Trade	9.0	8.0
Finance, Insurance, and Real Estate	7.0	6.2
Services	5.5	4.9
Government	50.0	44.4
Federal	(1.0)	(0.9)
State	(0.0)	(--)
Local	(49.0)	(43.5)
<u>TOTAL</u>	<u>112.5</u>	<u>100.0</u>

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<sup>a</sup>Includes three local residents employed in construction activities at Prudhoe Bay.

SOURCE: Special census conducted by Alaska Consultants, Inc. Printed as Table 2 in Alaska Consultants, Inc., Background for Planning: City of Point Hope, prepared for the North Slope Borough (June 1983), p. 12.



TABLE E-22.  
 AVERAGE ANNUAL FULL-TIME EMPLOYMENT<sup>a</sup>  
 ATQUASUK  
 1982

<u>Industry Classification</u>	<u>Percent</u> <u>Number</u>	<u>of Total</u>
Agriculture, Forestry, and Fishing	0.0	0.0
Mining	0.0	0.0
Contract Construction	33.5	47.5
Manufacturing	0.0	0.0
Transportation, Communications, and Public Utilities	1.0	1.4
Trade	2.0	2.8
Finance, Insurance, and Real Estate	2.0	2.8
Services	4.0	5.8
Government	28.0	39.7
Federal	(0.5)	(0.7)
State	(0.0)	(0.0)
Local	(27.5)	(39.0)
<u>TOTAL</u>	<u>70.5</u>	<u>100.0</u>

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SOURCE: Special census conducted by Alaska Consultants, Inc.  
 Printed as Table 2 in Alaska Consultants, Inc., Background  
 for Planning: City of Atquasuk, prepared for the North  
 Slope Borough (June 1983), p. 11.

TABLE E-23.  
MILITARY PERSONNEL IN BARROW-NORTH SLOPE  
CENSUS DIVISION

	<u>Active Duty</u>	<u>Military Reserves</u>	<u>Total</u>
1975	101	48	149
1976	97	48	145
1977	46	47	93
1978	28	47	75
1979	26	49	75
1980	26	47	73

SOURCE: U.S. Bureau of Economic Analysis, "County Estimates of Active Duty Personnel and Personnel in Military Reserves," Computer Printouts, dated February 8, 1982. On file at Institute of Social and Economic Research, Anchorage.

APPENDIX F

LIST OF PERSONS FORMALLY INTERVIEWED

Ahmakak, Mark  
Ahvakana, Nelson  
Aiken, Wesley  
Aishana, Herman  
Akootchook, Isaak  
Ericklook, Joe  
Hopson, Terza  
Kagelak, Clay, Sr.,  
Kunaknana, Samuel and Sarah  
Matumeak, Warren  
Maupin, Dorcus  
Ningeok, Jonas  
Nukapigak, Joe  
Nukapigak, Edward  
Nukapigak, Eli  
Rexford, Herman  
Soloman, Nolan  
Taalak, Sam  
Tikluk, Philip

APPENDIX G  
TESTIMONY REFERENCES

APPENDIX G. TESTIMONY REFERENCES

SEQNUM	NAME	SOURCE	YEAR	CARD
1.	Sea, Ice Hazards:			
1	AEWC	POINT THOMSON	78	3117
2	AHKIVGAK, RALPH	RALPH AHKIVGAK	78	3195
3	AHNGASUK, ROSS	SEASONAL DRILLI	82	5313
4	AHSOGEAK, HORAC	HRACE AHSOGEAK	78	3163
5	AHSOGEAK, HORAC	HRACE AHSOGEAK	78	3165
6	AIKEN, JOHNNY	DIAPIR FIELD	82	5061
7	AILERS, LOREN	DIAPIR FIELD	82	1009
8	AISHANNA, HERMA	POINT THOMSON	78	3320
9	AKOOTCHOOK, GEO	STATE LEASES 34	81	5156
10	AKOOTCHOOK, PER	STATE LEASES 34	81	5151
11	AKDOTCHOOK, ISA	STATE LEASES 34	81	5167
11a	Akootchook, Isa	Diapir Field	82	1032
12	AKOOTCHOOK, ISA	STATE LEASES 34	81	5180
13	AKOOTCHOOK, HAR	DIAPIR FIELD	82	1003
14	AKOOTCHOOK, GEO	DIAPIR FIELD	82	1006
15	ALLEN NEIL	BEAUFORT JOINT	79	5224
16	BARROW VILLAGE	SEASONAL DRILLI	82	5252
17	BODFISH, WALDO	ELDERS CONF 78	78	5369
18	BROWER, THOMAS	THOMAS BROWER A	78	3150
19	BROWER, THOMAS	THOMAS BROWER A	78	3149
20	BROWER, ARCHIE	ARCHIE BROWER A	78	3203
21	BROWER, ARCHIE	ARCHIE BROWER A	78	3202
22	BROWER, ANNIE	SEASONAL DRILLI	82	5303
23	BROWER, ANNIE	SEASONAL DRILLI	82	5304
24	BROWER, THOMAS	SEASONAL DRILLI	82	5287
25	BROWER, ARNOLD	DIAPIR FIELD	82	5057
26	BROWER, ARNOLD	SEASONAL DRILLI	82	5301
27	BROWER, ARNOLD	SEASONAL DRILLI	82	5300
28	DUKAKFIGAK, EDW	DIAPIR FIELD	82	1054
29	EDWARDSON, GEOR	BEAUFORT JOINT	79	2105
30	EDWARDSON, GEOR	DIAPIR FIELD	82	5101
31	EDWARDSON, CHAR	DIAPIR FIELD	82	5044
32	EDWARDSON, GEOR	DIAPIR FIELD	82	5103
33	ENGEL, MAGO	DIAPIR FIELD	75	5078
34	ERIKLOOK, BESSI	BEAUFORT JOINT	79	5202
35	FRANKSON, ERNIE	ELDERS CONF 78	78	5368
36	HOBSON, CHARLIE	BEAUFORT JOINT	82	5123
37	HOBSON, CHARLIE	DIAPIR FIELD	82	5122
38	HOPSON, EBEN	CZM HEARINGS	80	5362
39	HOPSON, FLOSSIE	CZM HEARINGS	80	5348
40	JEFFERY, MICHAEL	DIAPIR FIELD	82	5112
41	JEFFREY, MICHAEL	BEAUFORT JOINT	79	2126
42	JEFFREY, MICHAEL	DIAPIR FIELD	82	1043
43	JEFFREY, MICHAEL	DIAPIR FIELD	82	1042
44	KAIGELAK, CLAY	TAPS	79	5229
45	KAKTOVIK CITY C	DIAPIR FIELD	82	1013

SEQNUM	NAME	SOURCE	YEAR	CARD
46	KUNAKANNA, SAMU	BEAUFORT JOINT	79	5217
47	KUNAKNANA, SAMU	POINT THOMSON	78	3113
48	KUNAKNANA, SARA	POINT THOMSON	78	3106
49	KUNAKNANA, SARA	POINT THOMSON	78	3110
50	KUNAKNANA, SARA	BEAUFORT JOINT	79	5201
51	LINN, ALFRED JR	BEAUFORT JOINT	79	3047
52	MACLEAN, BRIAN	BEAUFORT JOINT	79	2009
53	MATUMEAK, WARRE	STATE LEASES 34	81	5139
54	MATUMEAK, WARRE	DIAPIR FIELD	82	5079
55	MATUMEAK, WARRE	SEASONAL DRILLI	82	5309
56	MAUPIN, DORCAS	DIAPIR FIELD	82	5105
57	NAGEAK, VINCENT	ELDERS CONF 78	78	5370
58	NAPAGEAK, THOMA	THOMAS NAPAGEAK	78	3190
59	NAPAGEAK, THOMA	THOMAS NAPAGEAK	78	3180
60	NAPAGEAK, THOMA	POINT THOMSON	78	3091
61	NASHANIK, HENRY	ELDERS CONF 78	78	5368
62	NASHOALOOK, BIL	CZM HEARINGS	80	5363
63	NEAKOK, RAYMOND	SEASONAL DRILLI	82	5294
64	NSB	SEASONAL DRILLI	82	5242
65	NSB	WATERFLOOD	82	5374
66	NSBCEPO	DIAPIR FIELD	82	5039
67	NUKAPIGAK, ELI	DIAPIR FIELD	82	1068
68	NUNGASAK, BEN	DIAPIR FIELD	82	5060
69	NUSUNGINYA, THO	DIAPIR FIELD	82	5064
70	PEETOOK, KERSMA	DIAPIR FIELD	82	5056
71	REXFORD, HERMAN	HERMAN REXFORD	78	3216
72	REXFORD, HERMAN	HERMAN REXFORD	78	3218
73	REXFORD, HERMAN	POINT THOMSON	78	3321
74	REXFORD, HERMAN	BEAUFORT JOINT	79	3016
75	REXFORD, HERMAN	BEAUFORT JOINT	79	3056
76	REXFORD, HERMAN	DIAPIR FIELD	82	1020
77	SIMS, MARX	DIAPIR FIELD	82	1027
78	SOLOMAN, NOLAN	BEAUFORT JOINT	79	3055
79	TIKLUK, PHILLIP	BEAUFORT JOINT	79	3051
80	TOOKLEY, JOE	DIAPIR FIELD	82	1045
81	TOOKLEY, JOE	DIAPIR FIELD	82	1048
82	TOOVAK, KENNETH	DIAPIR FIELD	82	5066
83	TOOVAK, KENNETH	SEASONAL DRILLI	82	5310
84	TURKLE, JOASH	DIAPIR FIELD	82	5120

2. Damage to Species:

85	AEWC	POINT THOMSON	78	3118
86	AHKIVGAK, OTIS	ELDERS CONF 78	78	5372

SEQNUM	NAME	SOURCE	YEAR	CARD
87	AHKIVGAK, RALPH	RALPH AHKIVGAK	78	3196
88	AHKIVGAK, RALPH	RALPH AHKIVGAK	78	3198
89	AHKIVGAK, RALPH	RALPH AHKIVGAK	78	3193
90	AHKIVGAK, RALPH	NSB WHITE BOOK	80	4001
91	AHKIVGAK, RALPH	NSB WHITE BOOK	80	4002
92	AHMAKAK, MARK	POINT THOMSON	78	3095
93	AHMAQBAK, GEORG	WATERFLOOD	80	1095
94	AHMAQBAK, GEORG	WATERFLOOD	80	1094
95	AHMAQBAK, GEORG	WATERFLOOD	80	1093
96	AHMAQBAK, GEORG	WATERFLOOD	80	1091
97	AHMOQBAK, GEORG	BEAUFORT JOINT	79	2125
98	AHSGEAK, HORAC	HRACE AHSGEAK	78	3164
99	AHSGEAK, HORAC	HRACE AHSGEAK	78	3158
100	AHSGEAK, HORAC	HRACE AHSGEAK	78	3159
101	AHSGEAK, HORAC	HRACE AHSGEAK	78	3160
102	AHSGEAK, HORAC	HRACE AHSGEAK	78	3166
103	AHSGEAK, HORAC	HRACE AHSGEAK	78	3157
104	AHSGEAK, HORAC	HRACE AHSGEAK	78	3156
105	AHSGEAK, HORAC	HRACE AHSGEAK	78	3167
106	AHSGEAK, HORAC	DIAPIR FIELD	82	5077
107	AHSGEAK, HORAC	DIAPIR FIELD	82	5076
108	AHTUANGARUAK, J	DIAPIR FIELD	82	1055
109	AHVAKANA, LUCY	POINT THOMSON	78	3139
110	AHVAKANA, LUCY	POINT THOMSON	78	3137
111	AHVAKANA, LLOYD	CZM HEARINGS	80	5335
112	AHVAKANA, LLOYD	CZM HEARINGS	80	5336
113	AILERS, LOREN	DIAPIR FIELD	82	1010
114	AISHANNA, HERMA	ANWR OIL EXPL	81	3076
115	AISHANNA, HERMA	ANWR OIL EXPL	81	3079
116	AISHANNA, HERMA	DIAPIR FIELD	82	1036
117	AISHANNA, HERMA	DIAPIR FIELD	82	1035
118	AKOOTCHOOK, ISA	POINT THOMSON	78	3318
119	AKOOTCHOOK, ISA	BEAUFORT JOINT	79	3020
120	AKOOTCHOOK, ISA	BEAUFORT JOINT	79	3005
121	AKOOTCHOOK, GEO	BEAUFORT JOINT	79	3062
122	AKOOTCHOOK, GEO	STATE LEASES 34	81	5155
123	AKOOTCHOOK, ISA	ANWR OIL EXPL	81	3070
124	AKOOTCHOOK, ISA	ANWR OIL EXPL	81	3085
125	AKOOTCHOOK, ISA	STATE LEASES 34	81	5145
126	AKOOTCHOOK, ISA	STATE LEASES 34	81	5144
127	AKOOTCHOOK, PER	STATE LEASES 34	81	5149
128	AKOOTCHOOK, PER	STATE LEASES 34	81	5150
129	AKOOTCHOOK, GEO	DIAPIR FIELD	82	1008
130	AKOOTCHOOK, HAR	DIAPIR FIELD	82	1004
131	ALASKA LEGAL SE	SEASONAL DRILLI	82	5268
132	ALLEN NEIL	BEAUFORT JOINT	79	5223
133	ARMSTRONG, JOHN	BEAUFORT JOINT	79	3041
134	ASNA	TAPS	71	3304

SEQNUM	NAME	SOURCE	YEAR	CARD
135	ASNA	TAPS	71	3302
136	ASNA	TAPS	71	3306
137	ASNA	TAPS	71	3305
138	ASNA	TAPS	71	3313
139	ATKASOOK	NPRA PUBLIC CON	78	3359
140	ATKASOOK	NPRA PUBLIC CON	78	3358
141	ATKASOOK COUNCI	NPRA QUESTIONNA	78	3350
142	ATUANANUAG, WIL	BEAUFORT JOINT	79	5194
143	AUDI, WALT	DIAPIR FIELD	82	1025
144	AUDI, WALT	DIAPIR FIELD	82	1024
145	BARROW VILLAGE	STATE LEASES 34	81	5180
146	BARROW VILLAGE	SEASONAL DRILLI	82	5249
147	BARROW VILLAGE	DIAPIR FIELD	82	5099
148	BARROW VILLAGE	DIAPIR FIELD	82	5098
149	BARROW VILLAGE	DIAPIR FIELD	82	5097
150	BENTON, DAVID	BEAUFORT JOINT	79	2123
151	BENTON, DAVID	BEAUFORT JOINT	79	2124
152	BODENHORN, BARR	DIAPIR FIELD	82	5083
153	BROWER, THOMAS	BEAUFORT ISLAND	75	3422
154	BROWER, THOMAS	BEAUFORT ISLAND	75	3423
155	BROWER, THOMAS	THOMAS BROWER A	78	3148
156	BROWER, THOMAS	THOMAS BROWER A	78	3145
157	BROWER, THOMAS	THOMAS BROWER A	78	3143
158	BROWER, THOMAS	THOMAS BROWER A	78	3147
159	BROWER, THOMAS	POINT THOMSON	78	3120
160	BROWER, THOMAS	POINT THOMSON	78	3121
161	BROWER, THOMAS	POINT THOMSON	78	3122
162	BROWER, THOMAS	THOMAS BROWER A	78	3146
163	BROWER, ARCHIE	POINT THOMSON	78	3322
164	BROWER, ARCHIE	ARCHIE BROWER A	78	3210
165	BROWER, ARCHIE	ARCHIE BROWER A	78	3209
166	BROWER, THOMAS	THOMAS BROWER A	78	3152
167	BROWER, ARCHIE	BEAUFORT JOINT	79	3034
168	BROWER, ARCHIE	BEAUFORT JOINT	79	3034
169	BROWER, ARCHIE	BEAUFORT JOINT	79	3033
170	BROWER, ARCHIE	BEAUFORT JOINT	79	3032
171	BROWER, ARNOLD	BEAUFORT JOINT	79	2131
172	BROWER, ANNIE	BEAUFORT JOINT	79	2139
173	BROWER, RONALD	CZM HEARINGS	80	5366
174	BROWER, ARNOLD	WATERFLOOD	80	1099
175	BROWER, ARNOLD	WATERFLOOD	80	1103
176	BROWER, ARNOLD	WATERFLOOD	80	1100
177	BROWER, ARNOLD	WATERFLOOD	80	1101
178	BROWER, ARNOLD	WATERFLOOD	80	1102
179	BROWER, ARNOLD	NPRA BRW HEARIN	81	3388
180	BROWER, ARNOLD	STATE LEASES 34	81	5175
181	BROWER, ARNOLD	STATE LEASES 34	81	5174
182	BROWER, ARNOLD	NPRA BRW HEARIN	81	3387



SEQNUM	NAME	SOURCE	YEAR	CARD
183	BROWER, ARCHIE	STATE LEASES 34	81	5159
184	BROWER, ARCHIE	STATE LEASES 34	81	5160
185	BROWER, ARCHIE	STATE LEASES 34	81	5161
186	BROWER, ARCHIE	STATE LEASES 34	81	5162
187	BROWER, THOMAS	SEASONAL DRILLI	82	5284
188	BROWER, ANNIE	SEASONAL DRILLI	82	5302
189	BROWER, THOMAS	SEASONAL DRILLI	82	5285
190	BROWER, THOMAS	SEASONAL DRILLI	82	5286
191	BROWER, ANNIE	SEASONAL DRILLI	82	5305
192	BROWER, ARNOLD	SEASONAL DRILLI	82	5296
193	BROWER, RON	SEASONAL DRILLI	82	5318
194	BROWER, RONALD	SEASONAL DRILLI	82	5291
195	BROWER, ARNOLD	SEASONAL DRILLI	82	5298
196	BROWER, ARNOLD	DIAPIR FIELD	82	5058
197	BROWER, RONALD	SEASONAL DRILLI	82	5292
198	BROWER, ARNOLD	SEASONAL DRILLI	82	5299
199	BROWER, JOHN	NPRA BRW HEARIN	87	3390
200	BROWN, WILLIAM	BEAUFORT JOINT	79	2137
201	COOPER, ELLEN	ANWR OIL EXPL	81	3082
202	DUKAKPIGAK, EDW	DIAPIR FIELD	82	1085
203	DUKAKPIGAK, EDW	DIAPIR FIELD	82	1053
204	EDWARDS, MIKE	BEAUFORT JOINT	79	3059
205	EDWARDSSEN, ROBE	POINT THOMSON	78	3128
206	EDWARDSSEN, ROBE	POINT THOMSON	78	3129
207	EDWARDSSEN, ROBE	POINT THOMSON	78	3127
208	EDWARDSSEN, CHAR	NPRA BRW HEARIN	81	3373
209	EDWARDSSEN, CHAR	NPRA BRW HEARIN	81	3397
210	EDWARDSON, GEOR	BEAUFORT JOINT	79	2104
211	EDWARDSON, GEOR	BEAUFORT JOINT	79	2103
212	EDWARDSON, GEOR	BEAUFORT JOINT	79	2106
213	EDWARDSON, GEOR	DIAPIR FIELD	82	5102
214	EDWARDSON, CHAR	DIAPIR FIELD	82	5042
215	EDWARDSON, CHAR	DIAPIR FIELD	82	5043
216	ELAVGAK, JOE	NPRA BRW HEARIN	81	3399
217	ERICKLOG, JOE	DIAPIR FIELD	82	1065
218	FRANKSON, ERNIE	NPRA PUBLIC CON	78	3357
219	FRANKSON, ERNES	NPRA PUBLIC CON	78	1132
220	HANK, MAE RINA	BEAUFORT JOINT	79	2112
221	HANK, MAE RINA	BEAUFORT JOINT	79	2116
222	HANK, MAE RINA	BEAUFORT JOINT	79	2118
223	HANK, MAE RINA	BEAUFORT JOINT	79	2119
224	HANK, MAE RINA	BEAUFORT JOINT	79	2115
225	HANK, MAE RINA	BEAUFORT JOINT	79	2120
226	HOPSON, EBEN	ADFG SUBSISTENC	77	1118
227	HOPSON, EBEN	ADFG SUBSISTENC	77	1119
228	HOPSON, EBEN	BEAUFORT JOINT	77	101
229	HOPSON, FLOSSIE	POINT THOMSON	78	3135
230	HOPSON, EBEN	POINT THOMSON	78	3086

SEGNUM	NAME	SOURCE	YEAR	CARD
231	HOPSON, FLOSSIE	BEAUFORT JOINT	79	3065
232	HOPSON, EBEN	BEAUFORT JOINT	79	2003
233	HOPSON, EBEN	BEAUFORT JOINT	79	2005
234	HUGO, PATRICK	NPRA PUBLIC CON	78	3354
235	ICAS	NPRA ICAS POSIT	79	3411
236	ICAS	NPRA ICAS POSIT	79	3404
237	INTERPRETOR	BEAUFORT JOINT	79	3022
238	INUIT CIRCUMPOL	SEASONAL DRILLI	82	5290
239	INUIT CIRCUMPOL	SEASONAL DRILLI	82	5289
240	IPALOOK, FLORA	BEAUFORT JOINT	79	5236
241	ITTA, IRENE	NPRA BRW HEARIN	81	3393
242	JEFFERY, MIKE	BEAUFORT JOINT	79	3064
243	JEFFERY, MICHAEL	WATERFLOOD	80	1106
244	JEFFERY, MICHAEL	NPRA BRW HEARIN	81	3391
245	JEFFERY, MICHAEL	DIAPIR FIELD	82	5109
246	JEFFREY, MICHAEL	POINT THOMSON	78	3132
247	JEFFREY, MICHAEL	POINT THOMSON	78	3131
248	JEFFREY, MICHAEL	POINT THOMSON	78	3130
249	JEFFREY, MICHAEL	BEAUFORT JOINT	79	2127
250	KAGAK, JACOB	DIAPIR FIELD	82	1117
251	KAIGELAK, ROSA	BEAUFORT JOINT	79	5210
252	KAKTOVIK SCHOOL	BEAUFORT JOINT	79	3017
253	KAKTOVIK CITY C	DIAPIR FIELD	82	1012
254	KAKTOVIK CITY C	DIAPIR FIELD	82	1015
255	KANAKNANA, SAMM	DIAPIR FIELD	82	1056
256	KANAKNANA, SAMM	DIAPIR FIELD	82	1057
257	KAWALSKY, MAGGI	BEAUFORT JOINT	79	5226
258	KAWALSKY, MAGGI	BEAUFORT JOINT	79	5227
259	KAWALSKY, MAGGI	BEAUFORT JOINT	79	5228
260	KAYATAK, ISAAC	DIAPIR FIELD	82	5068
261	KAYATAK, ISAAC	DIAPIR FIELD	82	5069
262	KITTREDGE, ZINN	POINT THOMSON	78	3324
263	KITTREDGE, ZINN	BEAUFORT JOINT	79	3063
264	KITTREDGE, ZINN	ANWR OIL EXPL	81	3080
265	KUNAKNANA, SAMU	POINT THOMSON	78	3094
266	KUNAKNANA, SARA	POINT THOMSON	78	3107
267	KUNAKNANA, SARA	NSB WHITE BOOK	79	4006
268	KUNUK, NUVUK	BEAUFORT JOINT	79	2114
269	LEAVITH, ALFRED	NPRA BRW HEARIN	81	3381
270	LEAVITH, ALFRED	NPRA BRW HEARIN	81	3379
271	LEAVITT, DANIEL	ADFG SUBSISTENC	77	1125
272	LEAVITT, DANIEL	ADFG SUBSISTENC	77	1126
273	LEAVITT, DANIEL	DIAPIR FIELD	82	5074
274	LEAVITT, DANIEL	DIAPIR FIELD	82	5075
275	LONG, FRANK	POINT THOMSON	78	3111
276	MACLEAN, BRIAN	BEAUFORT JOINT	79	2001
277	MACLEAN, BRIAN	BEAUFORT JOINT	79	2010
278	MACLEAN, BRIAN	BEAUFORT JOINT	79	2004

SEQNUM	NAME	SOURCE	YEAR	CARD
279	MACLEAN, BRIAN	BEAUFORT JOINT	79	2007
280	MACLEAN, BRIAN	BEAUFORT JOINT	79	2009
281	MACLEAN, BRIAN	BEAUFORT JOINT	79	2005
282	MATUMEAK, WARRE	NPRA BRW HEARIN	81	3395
283	MATUMEAK, WARRE	DIAPIR FIELD	82	5080
284	MAUPIN, JEFFERY	DIAPIR FIELD	82	5124
285	MORRY, RILEY T.	NPRA QUESTIONNA	78	3352
286	NAKAFIGAK, EDWA	POINT THOMSON	78	3089
287	NAPAGEAK, THOMA	POINT THOMSON	78	3115
288	NAPAGEAK, THOMA	POINT THOMSON	78	3087
289	NAPAGEAK, THOMA	THOMAS NAPAGEAK	78	3182
290	NAPAGEAK, THOMA	THOMAS NAPAGEAK	78	3189
291	NAPAGEAK, THOMA	THOMAS NAPAGEAK	78	3187
292	NAPAGEAK, THOMA	THOMAS NAPAGEAK	78	3186
293	NAPAGEAK, THOMA	THOMAS NAPAGEAK	78	3177
294	NAPAGEAK, THOMA	THOMAS NAPAGEAK	78	3176
295	NAPAGEAK, THOMA	THOMAS NAPAGEAK	78	3175
296	NAPAGEAK, THOMA	THOMAS NAPAGEAK	78	3174
297	NAPAGIAK, THOMA	DIAPIR FIELD	82	1064
298	NASHOALOOK, EDI	BEAUFORT JOINT	79	2132
299	NEAKOK, ALICE	CZM HEARINGS	80	5365
300	NEAKOK, RAYMOND	SEASONAL DRILLI	82	5295
301	NEAKOK, RAYMOND	SEASONAL DRILLI	82	5296
302	NINEOK, JONAS	BEAUFORT JOINT	79	3009
303	NINEOK, JONAS	BEAUFORT JOINT	79	3010
304	NINGEOK, JONAS	DIAPIR FIELD	82	1039
305	NINGEOK, JONAS	DIAPIR FIELD	82	1037
306	NORTH SLOPE BOR	NPRA ENVIRON AS	81	3366
307	NORTH SLOPE BOR	NPRA ENVIRON AS	81	3363
308	NORTH SLOPE BOR	NPRA ENVIRON AS	81	3368
309	NORTH SLOPE BOR	NPRA ENVIRON AS	81	3364
310	NORTH SLOPE BOR	NPRA BRW HEARIN	81	3400
311	NSB	WATERFLOOD	82	5373
312	NSB	WATERFLOOD	82	5378
313	NSB	SEASONAL DRILLI	82	5267
314	NSB	SEASONAL DRILLI	82	5239
315	NSB	SEASONAL DRILLI	82	5238
316	NSB	ARCHIE BROWER A	82	5275
317	NSB	ARCHIE BROWER A	82	5277
318	NSB	SEASONAL DRILLI	82	5240
319	NSB	SEASONAL DRILLI	82	5279
320	NSB	SEASONAL DRILLI	82	5288
321	NSB	ARCHIE BROWER A	82	5274
322	NSBCEFO	LUPC	82	5037
323	NSBCEFO	DIAPIR FIELD	82	5040
324	NUIQSUT VILLAGE	BEAUFORT ISLAND	75	3420
325	NUIQSUT VILLAGE	BEAUFORT ISLAND	75	3421
326	NUKAFIGAK, RUTH	POINT THOMSON	78	3100

SEQNUM	NAME	SOURCE	YEAR	CARD
327	NUKAPIGAK, RUTH	POINT THOMSON	78	3103
328	NUKAPIGAK, RUTH	BEAUFORT JOINT	79	5222
329	NUKAPIGAK, RUTH	BEAUFORT JOINT	79	5221
330	NUKAPIGAK, RUTH	BEAUFORT JOINT	79	5230
331	NUKAPIGAK, RUTH	DIAPIR FIELD	82	1061
332	NUKAPIGAK, ELI	DIAPIR FIELD	82	1067
333	NUKAPIGAK, JOE	DIAPIR FIELD	82	1069
334	NUKAPIGAK, RUTH	DIAPIR FIELD	82	1062
335	NUKAPIGAK, JOE	DIAPIR FIELD	82	1073
336	NUKAPIGAK, JOE	DIAPIR FIELD	82	1072
337	NUSUNGINYA, THO	DIAPIR FIELD	82	5065
338	OENGA, ANDREW	NSB WHITE BOOK	80	4007
339	OHMAKAK, MARK	CZM HEARINGS	80	5322
340	OKOMAILAK, DAN	POINT THOMSON	78	3123
341	OLEMANN, IDA	DIAPIR FIELD	82	5091
342	OLEMANN, IDA	DIAPIR FIELD	82	5092
343	OLEMANN, IDA	DIAPIR FIELD	82	5090
344	DOMITTUK, OTHNI	WATERFLOOD	80	1089
345	OPIE, MARGARET	NPRA BRW HEARIN	81	3374
346	PEETOOK, KERSMA	DIAPIR FIELD	82	5053
347	PEETOOK, KERSMA	DIAPIR FIELD	82	5054
348	PEETOOK, KERSMA	DIAPIR FIELD	82	5055
349	PEPTOOK, ROSSMA	CZM HEARINGS	80	5347
350	RANKIN, GORDEN	BEAUFORT JOINT	79	3050
351	REXFORD, HERMAN	HERMAN REXFORD	78	3217
352	REXFORD, HERMAN	HERMAN REXFORD	78	3223
353	REXFORD, HERMAN	HERMAN REXFORD	78	3220
354	REXFORD, HERMAN	HERMAN REXFORD	78	3219
355	REXFORD, HERMAN	HERMAN REXFORD	78	3214
356	REXFORD, FENTON	POINT THOMSON	78	3317
357	REXFORD, HERMAN	HERMAN REXFORD	78	3221
358	REXFORD, HERMAN	HERMAN REXFORD	78	3222
359	REXFORD, HERMAN	BEAUFORT JOINT	79	3021
360	REXFORD, HERMAN	DIAPIR FIELD	82	1021
361	REXFORD, HERMAN	DIAPIR FIELD	82	1016
362	RIGGS, PETER	BEAUFORT JOINT	79	2102
363	SIMS, MARX	POINT THOMSON	78	3319
364	SIMS, MARX	POINT THOMSON	78	3325
365	SIMS, MARX	BEAUFORT JOINT	79	3044
366	SIMS, MARX	ANWR OIL EXPL	81	3077
367	SIMS, MARX	ANWR OIL EXPL	81	3074
368	SIMS, MARX	ANWR OIL EXPL	81	3068
369	SOLOMAN, MORGAN	POINT THOMSON	78	3092
370	SOLOMAN, NOLAN	BEAUFORT JOINT	79	3024
371	SOLOMAN, NOLAN	BEAUFORT JOINT	79	3023
372	SOLOMAN, NOLAN	BEAUFORT JOINT	79	3026
373	SOLOMAN, NOLAN	ANWR OIL EXPL	81	3078
374	SOLOMAN, NOLAN	ANWR OIL EXPL	81	3072

SEQNUM	NAME	SOURCE	YEAR	CARD
375	SOLOMON, MORGAN	NPRA PUBLIC CON	78	1136
376	SOLOMON, MORGAN	WATERFLOOD	80	1114
377	TAGAROOK, SIMON	ANWR OIL EXPL	81	3075
378	TAGAROOK, SIMON	ANWR OIL EXPL	81	3081
379	THOMAS, WILLIAM	ADFG SUBSISTENC	77	1123
380	THOMAS, WILLIAM	ADFG SUBSISTENC	77	1122
381	TIKLUK, PHILLIP	BEAUFORT JOINT	79	3054
382	TIKLUK, PHILLIP	BEAUFORT JOINT	79	3053
383	TIKLUK, PHILLIP	BEAUFORT JOINT	79	3052
384	TILDEN, ROBERT	BEAUFORT JOINT	79	2122
385	TOOKLEY, JOE	DIAPIR FIELD	82	1046
386	TOOKLEY, JOE	DIAPIR FIELD	82	1047
387	TOOVAK, KENNETH	DIAPIR FIELD	82	5067
388	TURKLE, JOASH	DIAPIR FIELD	82	5121
389	UKPEAGVIK CORP.	NPRA ENVIRON AS	81	3362
390	UPICKSOUN, JOSE	BEAUFORT ISLAND	75	3417
391	UPICKSOUN, JOSE	BEAUFORT ISLAND	75	3419
392	UPICKSOUN, JOSE	BEAUFORT ISLAND	75	3415
393	UPICKSOUN, JOSE	BEAUFORT ISLAND	75	3416
394	VONSEGAZER, LIS	BEAUFORT JOINT	79	2135
395	WAINWRIGHT COUN	NPRA ENVIRON AS	81	3370
396	WELLER, SUZANNE	BEAUFORT JOINT	79	1
397	WOODS, NANNY	POINT THOMSON	78	3105
398	WORL, BOB	BEAUFORT JOINT	79	2111
399	WORL, BOB	BEAUFORT JOINT	79	2109

### 3. Migratory Disruption:

400	AEWC	STATE LEASES 34	81	5184
401	AEWC	STATE LEASES 34	81	5183
402	AHKIVGAK, RALPH	RALPH AHKIVGAK	78	3197
403	AHKAGGAK, GEORG	WATERFLOOD	80	1098
404	AHKUKANA, MARJO	BEAUFORT JOINT	79	5235
405	AHKUKANA, MARJO	BEAUFORT JOINT	79	5234
406	AHNGASUK, ROSS	DIAPIR FIELD	82	5063
407	AHNGASUK, ROSS	SEASONAL DRILLI	82	5314
408	AHNGASUK, ROSS	SEASONAL DRILLI	82	5315
409	AHNGASUK, ROSS	SEASONAL DRILLI	82	5316
410	AHNGASUK, ROSS	SEASONAL DRILLI	82	5317
411	AHSGGEAK, HORAC	HRACE AHSOGEAK	78	3155
412	AHSGGEAK, HORAC	HRACE AHSOGEAK	78	3153
413	AHVAKANA, LUQY	CZM HEARINGS	80	5342
414	AHVAKANA, NELSO	ANWR OIL EXPL	81	3084
415	AIKEN, JOHNNY	DIAPIR FIELD	82	5062

SEQNUM	NAME	SOURCE	YEAR	CARD
416	AISHANNA, HERMA	ANWR OIL EXPL	81	3083
417	AKOOTCHOOK, ISA	STATE LEASES 34	81	5168
418	AKOOTCHOOK, ISA	STATE LEASES 34	81	5142
419	AKOOTCHOOK, ISA	STATE LEASES 34	81	5141
420	AKOOTCHOOK, ISA	STATE LEASES 34	81	5143
421	AKPIK, WALTER S	NPRA BRW HEARIN	81	3375
422	ALASKA LEGAL SE	SEASONAL DRILLI	82	5270
423	ASNA	TAPS	71	3308
424	ATQASUK VILLAGE	SEASONAL DRILLI	82	5258
425	ATQASUK VILLAGE	SEASONAL DRILLI	82	5259
426	AVEOGANNA, JIM	SEASONAL DRILLI	82	5262
427	AVEOGANNA, JIM	SEASONAL DRILLI	82	5263
428	AVEOGANNA, JIM	SEASONAL DRILLI	82	5260
429	AVEOGANNA, JIM	SEASONAL DRILLI	82	5261
430	BARROW VILLAGE	SEASONAL DRILLI	82	5250
431	BARROW VILLAGE	SEASONAL DRILLI	82	5251
432	BARROW VILLAGE	SEASONAL DRILLI	82	5243
433	BARROW VILLAGE	SEASONAL DRILLI	82	5244
434	BARROW VILLAGE	SEASONAL DRILLI	82	5245
435	BARROW VILLAGE	SEASONAL DRILLI	82	5246
436	BARROW VILLAGE	SEASONAL DRILLI	82	5247
437	BARROW VILLAGE	SEASONAL DRILLI	82	5243
438	BARROW VILLAGE	SEASONAL DRILLI	82	5244
439	BARROW VILLAGE	SEASONAL DRILLI	82	5245
440	BODENHORN, BARR	DIAPIR FIELD	82	5084
441	BROWER, ARCHIE	ARCHIE BROWER A	78	3205
442	BROWER, ARCHIE	ARCHIE BROWER A	78	3204
443	BROWER, ARCHIE	ARCHIE BROWER A	78	3208
444	BROWER, ARCHIE	ARCHIE BROWER A	78	3207
445	BROWER, ARCHIE	ARCHIE BROWER A	78	3206
446	BROWER, THOMAS	THOMAS BROWER A	78	3144
447	BROWER, ARNOLD	BEAUFORT JOINT	79	2129
448	BROWER, ARNOLD	BEAUFORT JOINT	79	2128
449	BROWER, EUGENE	CZM HEARINGS	80	5344
450	BROWER, EUGENE	CZM HEARINGS	80	5343
451	BROWER, EUGENE	CZM HEARINGS	80	5345
452	BROWER, THOMAS	NSB WHITE BOOK	80	4005
453	BROWER, EUGENE	STATE LEASES 34	81	5132
454	BROWER, EUGENE	STATE LEASES 34	81	5133
455	BROWER, EUGENE	DIAPIR FIELD	82	5072
456	BROWER, ANNIE	SEASONAL DRILLI	82	5306
457	BROWER, ANNIE	SEASONAL DRILLI	82	5306
458	BROWER, ANNIE	SEASONAL DRILLI	82	5307
459	BROWER, ANNIE	DIAPIR FIELD	82	5115
460	BROWER, ARCHIE	DIAPIR FIELD	82	1002
461	BROWER, ARCHIE	DIAPIR FIELD	82	1001
462	BROWN, SHARON	CZM HEARINGS	80	5360
463	BROWN, SHARON	CZM HEARINGS	80	5359

SEGNUM	NAME	SOURCE	YEAR	CARD
464	DROMENBERG, RAY	SEASONAL DRILLI	82	5272
465	EDWARDS, MIKE	BEAUFORT JOINT	79	3058
466	EDWARDS, MIKE	BEAUFORT JOINT	79	3018
467	EDWARDSSEN, CHAR	NPRA BRW HEARIN	81	3396
468	EDWARDSON, GEOR	BEAUFORT JOINT	79	2107
469	ERIKLOOK, BESSI	BEAUFORT JOINT	79	5207
470	ERIKLOOK, BESSI	BEAUFORT JOINT	79	5204
471	ERIKLOOK, BESSI	BEAUFORT JOINT	79	5205
472	ERIKLOOK, BESSI	BEAUFORT JOINT	79	5203
473	ERIKLOOK, BESSI	BEAUFORT JOINT	79	5206
474	FRANKSON, ERNIE	CZM HEARINGS	80	5364
475	HOPSON, TRISA	BEAUFORT JOINT	79	5214
476	HOPSON, TRISA	BEAUFORT JOINT	79	5215
477	HOPSON, EBEN	CZM HEARINGS	80	5361
478	HOPSON, FLOSSIE	CZM HEARINGS	80	5349
479	HUGO, PATRICK	NPRA PUBLIC CON	78	3355
480	ITTA, NOAH	NPRA BRW HEARIN	81	3371
481	JEFFERY, MICHAEL	NPRA BRW HEARIN	81	3392
482	KASAK, HARRIET	BEAUFORT JOINT	79	5216
483	KILLBEAR, JAMES	BEAUFORT JOINT	79	3040
484	KIOUS, CAROL	SEASONAL DRILLI	82	5321
485	KUNAKNANA, SAMU	POINT THOMSON	78	3114
486	KUNAKNANA, SARA	BEAUFORT JOINT	79	5196
487	KUNAKNANA, SARA	BEAUFORT JOINT	79	5197
488	KUNAKNANA, SARA	BEAUFORT JOINT	79	5198
489	KUNAKNANA, SARA	BEAUFORT JOINT	79	5199
490	KUNAKNANA, SARA	BEAUFORT JOINT	79	5200
491	KUNAKNANA, SAMU	NSB WHITE BOOK	80	4006
492	LEAVITT PONLEE	DIAPIR FIELD	82	5126
493	LEAVITT, CORA	NPRA BRW HEARIN	81	3385
494	LEAVITT, CORA	NPRA BRW HEARIN	81	3384
495	MATUKEAK, WARRE	SEASONAL DRILLI	82	5308
496	NAGEAK, VINCENT	ELDERS CONF 78	78	5371
497	NAPAGEAK, THOMA	POINT THOMSON	78	3098
498	NAPAGEAK, THOMA	THOMAS NAPAGEAK	78	3181
499	NAPAGEAK, THOMA	THOMAS NAPAGEAK	78	3183
500	NAPAGEAK, THOMA	THOMAS NAPAGEAK	78	3178
501	NAPAGEAK, THOMA	THOMAS NAPAGEAK	78	3185
502	NAPAGEAK, THOMA	THOMAS NAPAGEAK	78	3184
503	NAPAGEAK, THOMA	BEAUFORT JOINT	79	5189
504	NINGEOK, JONAS	DIAPIR FIELD	82	1038
505	NORTH SLOPE BOR	NPRA ENVIRON AS	81	3365
506	NSB	STATE LEASES 34	81	5177
507	NSB	SEASONAL DRILLI	82	5241
508	NSB	SEASONAL DRILLI	82	5278
509	NSB	SEASONAL DRILLI	82	5266
510	NSB	HERMAN REXFORD	82	5319
511	NSB	WATERFLOOD	82	5379

SEQNUM	NAME	SOURCE	YEAR	CARD
512	NSBCEPO	DIAPIR FIELD	82	5038
513	NUIQSUT VILLAGE	SEASONAL DRILLI	82	5254
514	NUNGASAK, BEN	DIAPIR FIELD	82	5059
515	NUNSUNGINYA, PE	SEASONAL DRILLI	82	5271
516	OKANAH, NELSON	STATE LEASES 34	81	5166
517	OLEMANN, NATE	STATE LEASES 34	81	5137
518	OMUTUK, OHNEIL	STATE LEASES 34	81	5170
519	OYAGOK, IRENE	BEAUFORT JOINT	79	5237
520	PT. HOPE VILLAG	SEASONAL DRILLI	82	5257
521	PT. LAY VILLAGE	SEASONAL DRILLI	82	5253
522	REXFORD, HERMAN	HERMAN REXFORD	78	3215
523	REXFORD, HERMAN	BEAUFORT JOINT	79	3014
524	REXFORD, HERMAN	BEAUFORT JOINT	79	3013
525	REXFORD, HERMAN	BEAUFORT JOINT	79	3012
526	REXFORD, HERMAN	BEAUFORT JOINT	79	3011
527	REXFORD, DELBER	DIAPIR FIELD	82	5050
528	REXFORD, DELBER	DIAPIR FIELD	82	5051
529	SIMS, MARX	ANWR OIL EXPL	81	3069
530	SOLOMAN, NOLAN	BEAUFORT JOINT	79	3025
531	SOLOMON, ALICE	STATE LEASES 34	81	5128
532	TOOVAK, KENNETH	SEASONAL DRILLI	82	5311
533	TRASKY, LANCE	POINT THOMSON	78	3323
534	TUKLE, JORSH	BEAUFORT JOINT	79	2134
535	TURKLE, JOASH	DIAPIR FIELD	82	5118
536	WAINWRIGHT VILL	SEASONAL DRILLI	82	5255
537	WAINWRIGHT VILL	SEASONAL DRILLI	82	5256
538	WOODS, NANNY	BEAUFORT JOINT	79	5219
539	WOODS, NANNY	BEAUFORT JOINT	79	5220

#### 4. Access to Hunting:

540	AHKIVGAK, RALPH	RALPH AHKIVGAK	78	3200
541	AHVAKANA, LUCY	POINT THOMSON	78	3138
542	AKOOTCHOOK, ISA	ANWR OIL EXPL	81	3071
543	ASNA	TAPS	71	3312
544	ASNA	TAPS	71	3314
545	ICAS	NPRA ICAS POSIT	79	3412
546	ICAS	NPRA ICAS POSIT	79	3402
547	ITTA, IRENE	NPRA BRW HEARIN	81	3394
548	NAPAGEAK, THOMA	THOMAS NAPAGEAK	78	3188
549	NORTH SLOPE BOR	NPRA PUBLIC COM	78	1131
550	NORTH SLOPE BOR	NPRA PUBLIC COM	78	1130
551	NUKAPIGAK, RUTH	POINT THOMSON	78	3101
552	REXFORD, HERMAN	BEAUFORT JOINT	79	3015



SEQNUM	NAME	SOURCE	YEAR	CARD
5. Cultural Landmarks:				
553	ADAMS, JAKE	NPRA BRW HEARIN	81	3378
554	AHVAKANA, NELSO	STATE LEASES 34	81	5146
555	AKOOTCHOOK, JAN	BEAUFORT JOINT	79	3066
556	AKOOTCHOOK, PER	STATE LEASES 34	81	5148
557	BARROW VILLAGE	DIAPIR FIELD	82	5095
558	BARTEL, HERB	POINT THOMSON	78	3133
559	BROWER, ARCHIE	CZM HEARINGS	80	5339
560	BROWER, RONALD	DIAPIR FIELD	82	5106
561	BROWER, EUGENE	DIAPIR FIELD	82	5070
562	CARNAHAN, JOHN	CZM HEARINGS	80	5357
563	ERIKLOOK, BESSI	BEAUFORT JOINT	79	5208
564	ICAS	NPRA ICAS POSIT	79	3406
565	ICAS	DIAPIR FIELD	82	5089
566	ITTA, JOSEPHINE	POINT THOMSON	78	3125
567	ITTA, JOSEPHINE	POINT THOMSON	78	3126
568	ITTA, NOAH	NPRA BRW HEARIN	81	3372
569	KAGAK, JACOB	DIAPIR FIELD	82	1116
570	KAIGELAK, CLAY	POINT THOMSON	78	3090
571	KUNAKNANA, SARA	POINT THOMSON	78	3109
572	KUNAKNANA, SARA	BEAUFORT JOINT	79	5195
573	KUNAKNANA, SARA	DIAPIR FIELD	82	1086
574	LEAVITH, ALFRED	NPRA BRW HEARIN	81	3380
575	KATUMEAK, WARRE	CZM HEARINGS	80	5332
576	NAPAGEAK, THOMA	BEAUFORT JOINT	79	5186
577	NEAKOK, MARTHA	CZM HEARINGS	80	5338
578	NINGEAK, JONAS	STATE LEASES 34	81	5153
579	NORTH SLOPE BOR	NPRA ENVIRON AS	81	3368
580	NSB	ARCHIE BROWER A	82	5280
581	NSBCEPO	DIAPIR FIELD	82	5041
582	NUKAPIGAK, RUTH	DIAPIR FIELD	82	1059
583	NUSUNGINYA, PER	WATERFLOOD	82	5376
584	OHRAKAK, MARK	CZM HEARINGS	80	5323
585	OKANAH, NELSON	STATE LEASES 34	81	5164
586	OKONAILAK, DAN	POINT THOMSON	78	3124
587	REXFORD, HERMAN	HERMAN REXFORD	78	3213
588	SOLOMON, ALICE	STATE LEASES 34	81	5127
589	TURKLE, JOASH	DIAPIR FIELD	82	5119
590	WOODS, NANNY	DIAPIR FIELD	82	1082

SEQNUM

## 6. Subsistence Diet:

SEQNUM	NAME	SOURCE	YEAR	CARD
591	AGIAK, MARILYN	BEAUFORT JOINT	79	3061
592	AHSGEAK, HORAC	HRACE AHSGEAK	78	3170
593	AHSGEAK, HORAC	HRACE AHSGEAK	78	3169
594	AHSGEAK, HORAC	HRACE AHSGEAK	78	3168
595	AHSGEAK, HORAC	HRACE AHSGEAK	78	3171
596	AHTUAGRAK, BERN	BEAUFORT JOINT	79	5232
597	AHTUAGRAK, BERN	BEAUFORT JOINT	79	5233
598	AHTUAGRAK, BERN	BEAUFORT JOINT	79	5231
599	AHVAKANA, LLOYD	CZM HEARINGS	80	5337
600	AIKEN, WESLEY	BOWHEAD HEARING	77	5015
601	AIKEN, WESLEY	BOWHEAD HEARING	77	5017
602	AIKEN, WESLEY	BOWHEAD HEARING	77	5016
603	AKIVGAK, OTIS	BOWHEAD HEARING	77	5012
604	AKIVGAK, OTIS	BOWHEAD HEARING	77	5013
605	AKOOTCHOOK, ISA	BEAUFORT JOINT	79	3002
606	AKOOTCHOOK, ISA	BEAUFORT JOINT	79	3004
607	AKOOTCHOOK, ISA	BEAUFORT JOINT	79	3003
608	AKOOTCHOOK, GEO	STATE LEASES 34	81	5158
609	AKOOTCHOOK, GEO	STATE LEASES 34	81	5157
610	AKOOTCHOOK, PER	STATE LEASES 34	81	5152
611	AKOOTCHOOK, ISA	DIAPIR FIELD	82	1032
612	AKOOTCHOOK, ISA	DIAPIR FIELD	82	1034
613	AKOOTCHOOK, GEO	DIAPIR FIELD	82	1007
614	AKOOTCHOOK, HAR	DIAPIR FIELD	82	1005
615	AKSGEAK, HORAC	NSB WHITE BOOK	80	4004
616	ALLEN NEIL	BEAUFORT JOINT	79	5225
617	ARMSTRONG, JOHN	BEAUFORT JOINT	79	3042
618	ASNA	TAPS	71	3303
619	ASNA	TAPS	71	3307
620	ATUANANUAG, WIL	BEAUFORT JOINT	79	5193
621	ATUANANUAG, WIL	BEAUFORT JOINT	79	5191
622	ATUANANUAG, WIL	BEAUFORT JOINT	79	5192
623	AUDI, WALT	BEAUFORT JOINT	79	3035
624	BODENHORN, BARB	DIAPIR FIELD	82	5081
625	BODENHORN, BARB	DIAPIR FIELD	82	5087
626	BROWER, THOMAS	BOWHEAD HEARING	77	5018
627	BROWER, THOMAS	BOWHEAD HEARING	77	5019
628	BROWER, EUGENE	BOWHEAD HEARING	77	5033
629	BROWER, ARNOLD	BOWHEAD HEARING	77	5036
630	BROWER, ARNOLD	BOWHEAD HEARING	77	5027
631	BROWER, EUGENE	BOWHEAD HEARING	77	5034
632	BROWER, ARNOLD	BOWHEAD HEARING	77	5035
633	BROWER, THOMAS	POINT THOMSON	78	3119

SEQNUM	NAME	SOURCE	YEAR	CARD
634	BROWER, ARCHIE	BEAUFORT JOINT	79	3031
635	BROWER, ARCHIE	BEAUFORT JOINT	79	3030
636	BROWER, ARCHIE	BEAUFORT JOINT	79	3027
637	BROWER, ARCHIE	BEAUFORT JOINT	79	3029
638	BROWER, ARCHIE	BEAUFORT JOINT	79	3028
639	BROWER, ANNIE	BEAUFORT JOINT	79	2140
640	BROWER, EUGENE	STATE LEASES 34	81	5131
641	BROWER, ANNIE	DIAPIR FIELD	82	5116
642	BROWN, SHARON	CZM HEARINGS	80	5358
643	DUKAKFIGAK, EDW	DIAPIR FIELD	82	1051
644	DUKAKFIGAK, EDW	DIAPIR FIELD	82	1050
645	DUKAKFIGAK, EDW	DIAPIR FIELD	82	1052
646	EDWARDS, MIKE	BEAUFORT JOINT	79	3019
647	ICAS	NPRA ICAS POSIT	79	3408
648	ICAS	STATE LEASES 34	81	5171
649	JEFFERY, MICHAEL	DIAPIR FIELD	82	5111
650	JEFFREY, MICHAEL	DIAPIR FIELD	82	1044
651	KAIGELAK, ROSA	BEAUFORT JOINT	79	5209
652	KAKINYA, ELIJAH	BOWHEAD HEARING	77	5009
653	KAKINYA, ELIJAH	BOWHEAD HEARING	77	5010
654	KAKTOVIK CITY C	DIAPIR FIELD	82	1014
655	KILLBEAR, JAMES	BEAUFORT JOINT	79	3039
656	KILLBEAR, JAMES	BEAUFORT JOINT	79	3038
657	KILLBEAR, JAMES	BEAUFORT JOINT	79	3036
658	KILLBEAR, JAMES	BEAUFORT JOINT	79	3037
659	KUMIKUK, MARC	WATERFLOOD	80	1109
660	KUNAKANNA, SAMU	BEAUFORT JOINT	79	5218
661	KUNAKNANA, SARA	DIAPIR FIELD	82	1078
662	LEAVITT, DANIEL	TAPS	77	5023
663	LINN, ALFRED JR	BEAUFORT JOINT	79	3048
664	LINN, ALFRED JR	BEAUFORT JOINT	79	3049
665	LONG, FRANK	POINT THOMSON	78	3112
666	KAUPIN, DORCAS	DIAPIR FIELD	82	5104
667	NAGEAK, VINCENT	BOWHEAD HEARING	77	5001
668	NAGEAK, VINCENT	BOWHEAD HEARING	77	5002
669	NAGEAK, VINCENT	BOWHEAD HEARING	77	5005
670	NAGEAK, VINCENT	BOWHEAD HEARING	77	5004
671	NAGEAK, VINCENT	BOWHEAD HEARING	77	5008
672	NAGEAK, VINCENT	BOWHEAD HEARING	77	5003
673	NAPAGEAK, NATHA	BOWHEAD HEARING	77	5030
674	NAPAGEAK, THOMA	THOMAS NAPAGEAK	78	3173
675	NAPAGEAK, THOMA	BEAUFORT JOINT	79	5187
676	NASHOALOOK, EDI	BEAUFORT JOINT	79	2133
677	NASHOALOOK, EDI	CZM HEARINGS	80	5341
678	NINEOK, JONAS	BEAUFORT JOINT	79	3007
679	NINEOK, JONAS	BEAUFORT JOINT	79	3008
680	NINEOK, JONAS	BEAUFORT JOINT	79	3006
681	NINGEOK, JONAS	DIAPIR FIELD	82	1040

SEQNUM	NAME	SOURCE	YEAR	CARD
682	NSB	SEASONAL DRILLI	82	5282
683	NSB	SEASONAL DRILLI	82	5283
684	NUSUNGINGYA, EM	STATE LEASES 34	81	5135
685	OKAKOK, BERT	BOWHEAD HEARING	77	5026
686	OKAKOK, BERT	BOWHEAD HEARING	77	5025
687	OKANAH, NELSON	STATE LEASES 34	81	5165
688	OOMITTUK, OTHNI	CZM HEARINGS	80	5331
689	OOMITTUK, OTHNI	CZM HEARINGS	80	5330
690	OOMITTUK, OTHNI	CZM HEARINGS	80	5329
691	PATKOTAK, ELISE	CZM HEARINGS	80	5351
692	PATKOTAK, ELISE	CZM HEARINGS	80	5350
693	REXFORD, ISABEL	BOWHEAD HEARING	77	5029
694	REXFORD, HERMAN	HERMAN REXFORD	78	3224
695	REXFORD, HERMAN	BEAUFORT JOINT	79	3057
696	REXFORD, HERMAN	DIAPIR FIELD	82	1018
697	REXFORD, HERMAN	DIAPIR FIELD	82	1017
698	REXFORD, HERMAN	DIAPIR FIELD	82	1019
699	RIGGS, PETER	BEAUFORT JOINT	79	2100
700	SIMS, MARX	BEAUFORT JOINT	79	3045
701	SIMS, MARX	DIAPIR FIELD	82	1028
702	SIMS, MARX	DIAPIR FIELD	82	1029
703	SIMS, MARX	DIAPIR FIELD	82	1030
704	SOLOMON, ALICE	STATE LEASES 34	81	5130
705	SOPALU, EDNA	DIAPIR FIELD	82	1022
706	WENTWORTH, CYNT	BEAUFORT JOINT	79	3043
707	WORL, BOB	BEAUFORT JOINT	79	2110

## 7. Cultural Values:

708	AHKIVGAK, RALPH	NSR WHITE BOOK	80	4003
709	AHMAKAK, MARK	POINT THOMSON	78	3096
710	AHMAKAK, MARK	DIAPIR FIELD	82	1077
711	AHSGEAK, HORAC	HRACE AHSOGEAK	78	3161
712	AHSGEAK, HORAC	HRACE AHSOGEAK	78	3154
713	AIKEN, MARTHA	POINT THOMSON	78	3140
714	AKIVGAK, OTIS	BOWHEAD HEARING	77	5014
715	AKOOTCHOOK, ISA	DIAPIR FIELD	82	1031
716	ASNA	TAPS	71	3310
717	BARROW VILLAGE	DIAPIR FIELD	82	5096
718	BROWER, EUGENE	BOWHEAD HEARING	77	5032
719	BROWER, ARNOLD	BOWHEAD HEARING	77	5028
720	BROWER, THOMAS	BOWHEAD HEARING	77	5022
721	BROWER, THOMAS	BOWHEAD HEARING	77	5020
722	BROWER, THOMAS	BOWHEAD HEARING	77	5021

SEQNUM	NAME	SOURCE	YEAR	CARD
723	BROWER, THOMAS	THOMAS BROWER A	78	3151
724	BROWER, RONALD	CZM HEARINGS	80	5347
725	BROWER, RONALD	SEASONAL DRILLI	82	5293
726	DROMENBERG, RAY	SEASONAL DRILLI	82	5273
727	DUKAKPIGAK, EDW	DIAPIR FIELD	82	1084
728	EDWARDS, MIKE	BEAUFORT JOINT	79	3060
729	HANK, MAE KINA	BEAUFORT JOINT	79	2121
730	HOPSON, TRISA	BEAUFORT JOINT	79	5213
731	ICAS	NPRA ICAS POSIT	79	3401
732	ICAS	NPRA ICAS POSIT	79	3407
733	ICAS	STATE LEASES 34	81	5172
734	KAKINYA, ELIJAH	BOWHEAD HEARING	77	5011
735	KUMIKUK, MARC	WATERFLOOD	80	1110
736	KUNAKNANA, SARA	DIAPIR FIELD	82	1079
737	LEAVITT, DANIEL	ADFG SUBSISTENC	77	1127
738	MACLEAN, BRIAN	BEAUFORT JOINT	79	2002
739	MORRY, RILEY T.	NPRA QUESTIONNA	78	3357
740	NAGEAK, VINCENT	BOWHEAD HEARING	77	5006
741	NAGEAK, VINCENT	BOWHEAD HEARING	77	5007
742	NAPAGEAK, THOMA	THOMAS NAPAGEAK	78	3191
743	NAPAGEAK, THOMA	BEAUFORT JOINT	79	5188
744	NASHOALOOK, EDI	CZM HEARINGS	80	5340
745	NEAKOK, RAYMOND	BOWHEAD HEARING	77	5031
746	NINGEOK, JONAS	DIAPIR FIELD	82	1041
747	NSB	SEASONAL DRILLI	82	5281
748	NUKAPIGAK, RUTH	DIAPIR FIELD	82	1058
749	NUNSONGINYA, PE	SEASONAL DRILLI	82	5312
750	NUSUNGINYA, PER	WATERFLOOD	82	5377
751	OKAKOK, BERT	BOWHEAD HEARING	77	5024
752	PATKOTAK, ELISE	CZM HEARINGS	80	5353
753	PATKOTAK, ELISE	CZM HEARINGS	80	5355
754	SIMS, MARX	BEAUFORT JOINT	79	3046
755	SIMS, MARX	DIAPIR FIELD	82	1026
756	SOLOMON, MORGAN	CZM HEARINGS	80	5325
757	TOOKLEY, JOE	DIAPIR FIELD	82	1049

8. Local Control:

758	ADAMS, JAKE	NPRA BRW HEARIN	81	3383
759	AEWC	STATE LEASES 34	81	5185
760	AHKIVGAK, RALPH	RALPH AHKIVGAK	78	3194
761	AHMAKAK, MARK	DIAPIR FIELD	82	1075
762	AHMAOGAK, GEORG	WATERFLOOD	80	1092
763	AHMAOGAK, GEORG	WATERFLOOD	80	1090

SEQNUM	NAME	SOURCE	YEAR	CARD
764	AHVAKANA, LLOYD	NPRA PUBLIC CON	78	1134
765	AHVAKANA, NELSO	STATE LEASES 34	81	5147
766	AKOOTCHOOK, GEO	STATE LEASES 34	81	5154
767	ALASKA LEGAL SE	SEASONAL DRILLI	82	5269
768	ASNA	TAPS	71	3300
769	ASNA	TAPS	71	3301
770	ASNA	TAPS	71	3309
771	ASNA	TAPS	71	3315
772	ATKASOOK COUNCI	NPRA QUESTIONNA	78	3351
773	BARROW VILLAGE	STATE LEASES 34	81	5181
774	BARROW VILLAGE	DIAPIR FIELD	82	5094
775	BARTEL, HERB	POINT THOMSON	78	3134
776	BODENHORN, BARB	DIAPIR FIELD	82	5082
777	BROWER, ARNOLD	NPRA PUBLIC CON	78	1135
778	BROWER, ANNIE	BEAUFORT JOINT	79	2138
779	BROWER, ARNOLD	BEAUFORT JOINT	79	2130
780	BROWER, ARNOLD	CZM HEARINGS	80	5328
781	BROWER, ARNOLD	CZM HEARINGS	80	5237
782	BROWER, EUGENE	CZM HEARINGS	80	5346
783	BROWER, ARNOLD	CZM HEARINGS	80	5326
784	BROWER, ARNOLD	WATERFLOOD	80	1104
785	BROWER, ARCHIE	STATE LEASES 34	81	5169
786	BROWER, ARNOLD	STATE LEASES 34	81	5176
787	BROWER, ARNOLD	NPRA BRW HEARIN	81	3382
788	BROWER, RONALD	NPRA BRW HEARIN	81	3386
789	BROWER, ARNOLD	NPRA BRW HEARIN	81	3398
790	BROWER, ARNOLD	DIAPIR FIELD	82	5125
791	BROWER, ANNIE	DIAPIR FIELD	82	5113
792	EDWARDSSEN, CHAR	NPRA PUBLIC CON	78	3356
793	FRANKSON, ERNES	NPRA PUBLIC CON	78	1133
794	HOPSON, EBEN	BEAUFORT ISLAND	75	3413
795	HOPSON, EBEN	BEAUFORT JOINT	77	101
796	HOPSON, EBEN	ADFG SUBSISTENC	77	1121
797	HOPSON, EBEN	ADFG SUBSISTENC	77	1120
798	HOPSON, FLOSSIE	POINT THOMSON	78	3136
799	HOPSON, EBEN	BEAUFORT JOINT	79	2012
800	HOPSON, EBEN	BEAUFORT JOINT	79	2013
801	HOPSON, EBEN	BEAUFORT JOINT	79	2014
802	HOPSON, EBEN	BEAUFORT JOINT	79	2015
803	HOPSON, EBEN	BEAUFORT JOINT	79	2010
804	HOPSON, EBEN	BEAUFORT JOINT	79	2011
805	HOPSON, EBEN	BEAUFORT JOINT	79	2006
806	HOPSON, EBEN	BEAUFORT JOINT	79	2007
807	HOPSON, EBEN	BEAUFORT JOINT	79	2009
808	HOPSON, EBEN	BEAUFORT JOINT	79	2008
809	HOPSON, EBEN	BEAUFORT JOINT	79	2004
810	ICAS	NPRA ICAS POSIT	79	3403
811	ICAS	NPRA ICAS POSIT	79	3405

SERNUM	NAME	SOURCE	YEAR	CARD
812	ICAS	STATE LEASES 34	81	5173
813	JEFFERY, MICHAEL	WATERFLOOD	80	1105
814	JEFFERY, MICHAEL	DIAPIR FIELD	82	5108
815	JEFFREY, MICHAEL	ADFG SUBSISTENC	77	1129
816	JEFFREY, MICHAEL	ADFG SUBSISTENC	77	1128
817	JEFFREY, MICHAEL	NPRA ENVIRON AS	81	1137
818	KAYATAK, ISAAC	DIAPIR FIELD	82	5070
819	KITTREDGE, ZINN	DIAPIR FIELD	82	1023
820	KUMIKUK, MARC	WATERFLOOD	80	1108
821	LEAVITT, DANIEL	ADFG SUBSISTENC	77	1124
822	NAGEAK, RAYMOND	WATERFLOOD	80	1112
823	NAPAGIAK, THOMA	DIAPIR FIELD	82	1063
824	NSB	STATE LEASES 34	81	5179
825	NSB COUNCIL	CZM HEARINGS	80	5356
826	NUKAPIGAK, ELI	DIAPIR FIELD	82	1066
827	NUSUNGINGYA, EM	STATE LEASES 34	81	5134
828	OHMAKAK, MARK	CZM HEARINGS	80	5324
829	OKANAH, NELSON	STATE LEASES 34	81	5163
830	OLEMANN, NATE	WATERFLOOD	80	1087
831	OLEMANN, NATE	WATERFLOOD	80	1088
832	OLEMANN, NATE	STATE LEASES 34	81	5136
833	OLEMANN, IDA	DIAPIR FIELD	82	5093
834	REXFORD, HERMAN	BEAUFORT JOINT	79	3067
835	REXFORD, DELBER	DIAPIR FIELD	82	5048
836	SIMS, MARX	ANWR OIL EXPL	81	3073
837	SOLOMON, MORGAN	WATERFLOOD	80	1115
838	SOLOMON, ALICE	STATE LEASES 34	81	5129
839	TURKLE, JOASH	DIAPIR FIELD	82	5117
840	UKPEAGVIK CORP.	NPRA ENVIRON AS	81	3360
841	UKPEAGVIK CORP.	NPRA ENVIRON AS	81	3361
842	WAINWRIGHT COUN	NPRA ENVIRON AS	81	3369

## 9. Social Issues:

843	AHKIVGAK, RALPH	RALPH AHKIVGAK	78	3199
844	AHMAKAK, MARK	DIAPIR FIELD	82	1076
845	AHMAOGAK, GEORG	WATERFLOOD	80	1097
846	AHMAOGAK, GEORG	WATERFLOOD	80	1096
847	AHVAKANA, LLOYD	CZM HEARINGS	80	5333
848	AHVAKANA, LLOYD	CZM HEARINGS	80	5334
849	AKOOTCHOOK, ISA	DIAPIR FIELD	82	1033
850	AKPIK, WALTER S	NPRA BRW HEARIN	81	3377
851	AKPIK, WALTER S	NPRA BRW HEARIN	81	3376
852	ASNA	TAPS	71	3311

SEQNUM	NAME	SOURCE	YEAR	CARD
853	ASNA	TAPS	71	3316
854	AVEGGANNA, JIM	SEASONAL DRILLI	82	5264
855	BARROW VILLAGE	SEASONAL DRILLI	82	5248
856	BARROW VILLAGE	DIAPIR FIELD	82	5100
857	BODENHORN, BARB	DIAPIR FIELD	82	5086
858	BODENHORN, BARR	DIAPIR FIELD	82	5085
859	BROWER, ARNOLD	NPRA BRW HEARIN	81	3389
860	BROWER, ANNIE	DIAPIR FIELD	82	5111
861	DUKAKPIGAK, EDW	DIAPIR FIELD	82	1085
862	ICAS	NPRA ICAS POSIT	79	3410
863	ITTA, NOAH	DIAPIR FIELD	82	5045
864	JEFFERY, MICHAEL	DIAPIR FIELD	82	5110
865	KITTREDGE, ZINN	POINT THOMSON	78	3326
866	KITTREDGE, ZINN	POINT THOMSON	78	3328
867	KUNAKNANA, SARA	POINT THOMSON	78	3108
868	KUNAKNANA, SARA	BEAUFORT JOINT	79	5211
869	LEAVITT, DANIEL	DIAPIR FIELD	82	5073
870	LIHN, ALFRED JR	POINT THOMSON	78	3327
871	NAPAGEAK, THOMA	THOMAS NAPAGEAK	78	3179
872	NAPAGEAK, THOMA	POINT THOMSON	78	3097
873	NAPAGEAK, THOMA	POINT THOMSON	78	3088
874	NAPAGEAK, THOMA	BEAUFORT JOINT	79	5190
875	NSB	WATERFLOOD	82	5375
876	NUKAPIGAK, RUTH	DIAPIR FIELD	82	1060
877	NUKAPIGAK, JOE	DIAPIR FIELD	82	1071
878	NUKAPIGAK, JOE	DIAPIR FIELD	82	1070
879	PATKOTAK, ELISE	CZM HEARINGS	80	5354
880	PATKOTAK, ELISE	CZM HEARINGS	80	5352
881	REXFORD, DELBER	DIAPIR FIELD	82	5052
882	REXFORD, DELBER	DIAPIR FIELD	82	5049
883	REXFORD, DELBER	DIAPIR FIELD	82	5047
884	REXFORD, DELBER	LUPC	82	5046
885	RIGGS, PETER	BEAUFORT JOINT	79	2101
886	SOLOMAN, MORGAN	POINT THOMSON	78	3093
887	SOLOMON, MORGAN	BEAUFORT JOINT	79	2136
888	SOLOMON, MORGAN	WATERFLOOD	80	1113
889	WOODS, ALICE	POINT THOMSON	78	3099
890	WORL, BOB	BEAUFORT JOINT	79	2113
891	WORL, BOB	BEAUFORT JOINT	79	2108
892	WORL, BOB	BEAUFORT JOINT	79	2112
893	AERC	STATE LEASES 34	81	5182



SERNUM	NAME	SOURCE	YEAR	CARD
10. No Subject:				
894	AHKIVGAK, RALPH	RALPH AHKIVGAK	78	3192
895	AHKIVIANA, LOUI	DIAPIR FIELD	82	1083
896	AHSGEAK, HORAC	HRACE AHSOGEAK	78	3162
897	AHVAKANA, LLOYD	WATERFLOOD	80	1111
898	BROWER, THOMAS	THOMAS BROWER A	78	3141
899	BROWER, THOMAS	THOMAS BROWER A	78	3142
900	BROWER, ARCHIE	ARCHIE BROWER A	78	3201
901	EDWARDSON, MARY	SEASONAL DRILLI	82	5320
902	ERICKLOG, BESSI	DIAPIR FIELD	82	1080
903	HOPSON, EBEN	BEAUFORT ISLAND	75	3414
904	HOPSON, EBEN	BEAUFORT JOINT	79	2001
905	HOPSON, EBEN	BEAUFORT JOINT	79	2002
906	ICAS	NPRA ICAS POSIT	79	3409
907	JEFFREY, MICHAEL	ADFG SUBSISTENC	77	1129
908	KAKTOVIK CITY C	BEAUFORT JOINT	79	3001
909	KAKTOVIK CITY C	DIAPIR FIELD	82	1011
910	MACLEAN, BRIAN	BEAUFORT JOINT	79	2011
911	MACLEAN, BRIAN	BEAUFORT JOINT	79	2003
912	MACLEAN, BRIAN	BEAUFORT JOINT	79	2006
913	NAPAGEAK, THOMA	THOMAS NAPAGEAK	78	3172
914	NORTH SLOPE BOR	NPRA ENVIRON AS	81	3367
915	NSB	STATE LEASES 34	81	5178
916	NUIQSUT VILLAGE	SEASONAL DRILLI	82	5265
917	OLEMANN, NATE	STATE LEASES 34	81	5138
918	REXFORD, HERMAN	HERMAN REXFORD	78	3212
919	REXFORD, HERMAN	HERMAN REXFORD	78	3211
920	SIELAK, RUTH	DIAPIR FIELD	82	1074
921	SREALITH, ISA	DIAPIR FIELD	82	1081
922	UKAPIGAK, RUTH	BEAUFORT ISLAND	80	47
923	UPICKSON, JOSE	BEAUFORT ISLAND	75	3418

APPENDIX H  
PROPOSED OCS REVENUE SHARING LEGISLATION

## APPENDIX H

### PROPOSED OCS REVENUE SHARING LEGISLATION

Legislation which would provide block grants to state and local governments from a small share of federal OCS revenues has been seriously considered by the 97th and 98th Congress. The House of Representatives passed such a bill in September 1982; however, a Senate version did not reach the floor during that year.<sup>1</sup> A bill identical to that which passed the House was reintroduced in 1983, has been amended, received a favorable committee recommendation, and awaits floor action. A new Senate version was introduced by Senators Stevens and Murkowski in March of 1983. This Senate bill has progressed through the committee process and likewise awaits floor action.<sup>2</sup>

Even though both bills have received strong "do pass" committee recommendations, it is not certain that Congress will enact this or compromise legislation. The possibility of a presidential veto also exists due to opposition by the Office of Management and Budget (OMB). OMB objects to the earmarking of revenues. Further, due to the concerns regarding deficit spending, OMB is reluctant to see

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<sup>1</sup>H.R. 5543 passed the House by a vote of 260-134, September 29, 1982.

<sup>2</sup>The current versions are H.R. 5--Ocean and Coastal Resources Management and Development Block Grant Act, and S. 800--Ocean and Coastal Development Impact Assistance Block Grant Act.

funding from this source devoted to programs for which the Administration is recommending budget cuts (e.g., Coastal Management, Sea Grant, Coastal Energy Impact Program). Despite these contingencies, it is certainly possible that this or similar legislation will become law.

The rationale for OCS revenue sharing is that OCS mineral development represents the exception to the Federal policy of sharing receipts from resource development on federal lands with the affected states.<sup>3</sup> According to the General Accounting Office, ". . . in OCS development, where the states and communities are not able to tax the actual energy facility (or resource) but are limited to taxing onshore support facilities," the revenues generated will not, in many cases, compensate for impact costs.<sup>4</sup> The OCS revenue sharing bills were designed to overcome the impact funding problem and to make the revenue treatment more consistent with other types of federal resource development.

The argument in opposition to OCS revenue sharing, as presented by representatives of the Reagan Administration, is that OCS activity

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<sup>3</sup>Federal onshore impact funding has come through three mechanisms: (1) shared federal leasing receipts (the source being proposed for the OCS); (2) federal payments in lieu of taxes; and (3) state taxes on the assets of the lessee, including extracted minerals (this source is precluded in the OCS Lands Act, as quoted above).

<sup>4</sup>General Accounting Office. "Mitigating Socioeconomic Impacts of Energy Development," Report EMD-82-13 (March 1982), as quoted in House Report 98-206 (May 1983).

takes place at least three miles outside of state boundaries and thus has minimal environmental impacts; that population impacts are relatively minor (except in Alaska); and that the program is administered for the benefit of the nation, not just the coastal states. The primary impacts of OCS development are related to onshore facilities which are taxable by state and local governments. Peter Tweedt of the National Oceanic and Atmospheric Administration, U.S. Department of Commerce, in testimony to Congress, recommended that instead of the revenue sharing, "state governments should take the lead and work with local governments and regional organizations to better understand impact assistance needs, remove unnecessary legislative and regulatory barriers to revenue generation, encourage industry to share in the cost of mitigating impacts on a site-specific basis, and recognize energy impact assistance needs in establishing state financial priorities."<sup>5</sup>

Table H.1 presents Federal OCS revenues in recent years and estimates of revenues through 1988. As shown in Table 1, federal revenues from OCS leasing are expected to average in excess of \$10 billion annually during the next five years. Congressional revenue sharing proposals would allocate an average of \$290 million (H.R. 5) and \$485 million (S. 800) per year or between 2.68 percent and 4.48 percent of the federal revenues collected between 1984 and 1988. The allocation of the shared revenue is shown in Table H.2.

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<sup>5</sup>Testimony to Subcommittee on Oceanography, March 10, 1981, as reprinted in House of Representatives Report 98-206 on H.R. 5.

TABLE H.1. OCS FEDERAL REVENUES<sup>1</sup>  
(billions of dollars)

Years <sup>2</sup>	Actual	Estimates	
		Congressional Budget Office <sup>3</sup>	Office of Management and Budget <sup>4</sup>
1979	6.62		
1980	6.36		
1981	10.14		
1982	6.25		
1983		10.1	10.5
1984		8.8	10.0
1985		9.2	9.5
1986		13.4	10.4
1987		11.5	10.7
1988		11.2	11.2

<sup>1</sup>From House Report 98-206 (May 1982), pp. 60 and 62.

<sup>2</sup>Figures for 1979 and 1980 are tabulated on calendar years; 1981 forward is on a fiscal-year basis.

<sup>3</sup>CBO baseline projection, January 1983.

<sup>4</sup>Federal Office of Management and Budget, April 1983.

TABLE H.2. ESTIMATED SHARED REVENUES--OCS DEVELOPMENT  
(by fiscal year, millions of dollars)

	1984	1985	1986	1987	1988
<hr/>					
Estimated Total Outlays <sup>1</sup>					
H.R. 5	300	255	295	300	300
S. 800	440	420	470	525	570
<hr/>					
Block Grants to States <sup>1</sup>					
H.R. 5 (approx. 85%)	255	217	231	255	255
S. 800 (approx. 88.5%)	390	370	415	465	505
<hr/>					
Minimum Amount of Pass- Through to Local Governments					
H.R. 5 (35% of state grant)	105	89	103	105	105
S. 800 (30% of state grant)	117	111	124	140	152
<hr/>					
Sea Grant College Program					
H.R. 5 (10-20%, shown at 15%, of total)	45	38	44	45	45
S. 800 (min. of 10% total)	44	42	47	52	57
<hr/>					
National Coastal Resources Research and Development Institute (Oregon)					
S. 800 only (1.5% of total)	6	6	7	8	9

<sup>1</sup>CBO, cost estimates as contained in House Report 98-206 and Senate Report 98-112.

The distribution of the funds among eligible coastal states is based upon formulas which include factors such as amount of OCS leasing and development, planned leases, coastal energy facilities, shoreline mileage, coastal population, amount of bonus revenues, amount of oil and gas produced. Preference is given to states with federally approved coastal management programs. Minimum grants are provided for by both proposals, and S. 800 provides for a maximum state grant of 15 percent of the total fund per fiscal year.

An estimate of Alaska's share under H.R. 5, assuming a total outlay of \$300 million, yields a block grant amount of slightly over \$37 million. The minimum local pass-through of 35 percent would be about \$13 million. Under S. 800, assuming a total fund of \$400 million, Alaska would be eligible for a state grant of about \$23 million, with a minimum local pass-through of \$7 million (30 percent). The state block grants can be used for a variety of purposes, including those defined by the Coastal Zone Management Act (CZMA) and the Coastal Energy Impact Program (CEIP). Other eligible uses include enhancement and management of living and natural resources, including preservation of national coastal habitat, and under S. 800, for construction of capital infrastructure for the full and sustained use of coastal resources.

Local governments are to be consulted regarding the local allocation of funds, but state governments are allowed to establish the allocation schemes. Under H.R. 5, local governments are defined



under 304(11) of the CZMA while under S. 800, this definition is expanded to include unincorporated areas, including Alaska Native villages (to be selected by the Governor) when no local government, as defined in CZMA, exists.

Under provisions of the CEIP (Section 308) of the CZMA, one of several categories for which these funds may be used is the planning and provision of public facilities required as the result of new energy facilities. These facilities might include roads, parking, fire and police, water supply, schools, hospitals, etc. in or near the coastal zone.