

North Slope Borough Comprehensive Plan

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Draft
North Slope Borough Comprehensive Plan

Table of Contents

CHAPTER 1. BOUNDARIES AND LAND STATUS

1.1	Introduction	1
1.2	Land Use	2
1.3	Land Status	2
1.4	Land Management Programs	3
1.4.1	Federal management	3
1.4.2	State Management	6
1.4.3	Arctic Slope Regional Corporation Management	7
1.4.4	North Slope Borough Management	7
1.5	References	8

CHAPTER 2. PHYSICAL ENVIRONMENT

2.1	Introduction	9
2.2	Water Resources	10
2.2.1	Surface Water	11
2.2.2	Distribution of Runoff	12
2.2.3	Water Quality	12
2.2.4	Sediment	13
2.2.5	Groundwater and Permafrost	14
2.2.6	Domestic Consumption	15
2.2.7	Industrial Areas (Prudhoe Bay)	16
2.2.8	Water Related Development Issues	16
2.3	Air Quality	16
2.3.1	Nitrogen Oxides	17
2.3.2	Sulphur Dioxide	17
2.3.3	Ozone	17
2.3.4	Carbon Monoxide	18
2.3.5	Hydrocarbons	18
2.3.6	Total Suspended Particulates	18
2.4	Noise Analysis	19
2.5	Other Pollutants	19
2.6	Beach Erosion	20
2.7	Offshore Environmental Hazards	20
2.7.1	Sea Ice Impacts	21
2.7.2	Wave Erosion	21
2.8	Onshore Environmental Hazards	22
2.8.1	Flooding	22

2.8.2	Permafrost	22
2.8.3	High Winds	22
2.8.4	Subsea Permafrost	22
2.8.5	Seismic Activity	22
2.8.6	Soil Erosion	23
2.8.7	Topographic Hazards	23
2.9	References	24

CHAPTER 3. SUBSISTENCE AND BIOLOGICAL RESOURCES

3.1	Introduction	31
3.2	Subsistence	31
3.2.1	Impacting Factors	33
3.3	Subsistence Resources	33
3.3.1	Large Terrestrial Mammals	33
3.3.2	Small Furbearing Mammals	34
3.3.3	Marine Mammals	34
3.3.4	Birds	35
3.3.5	Bird Eggs – Mannich	35
3.3.6	Invertebrates	36
3.3.7	Fish	36
3.3.8	Berries	37
3.3.9	Greens and Roots	37
3.3.10	Forest Vegetation	37
3.4	Distribution and Special Habitat	38
3.4.1	Large Terrestrial Mammals	38
3.4.2	Furbearers	41
3.4.3	Marine Mammals	42
3.4.4	Freshwater Fisheries	45
3.4.5	Birds	47
3.4.6	Threatened and Endangered Plants	50
3.5	References	51

CHAPTER 4. INUPIAT HISTORY AND CULTURE

4.1	Introduction	63
4.2	Pre-Contact and History	63
4.3	Cultural and Archaeological Resources	70
4.4	Threats to Cultural Resources	72
4.5	The Commission on Inupiat History, Language and Culture	74
4.6	References	76

CHAPTER 5. SOCIAL AND ECONOMIC FACTORS

5.1	Introduction	87
5.2	Employment/Income	88
5.2.1	Expansion of the Labor Force	90
5.2.2	Inupiat/Non-Inupiat Employment	90
5.3	Cost of Living	91
5.4	Housing	92
5.5	Economic Development	93
5.6	Communications	94
5.7	Tourism	97

5.7.1	Packaged Tours	97
5.7.2	Outdoor tourist activities	98
5.7.3	Sport Hunting and Fishing	100
5.7.4	Winter Activities	101
5.7.5	Other Activities	102
5.7.6	Haul Road Corridor	102

5.8	Health	101
5.8.1	Recent Improvements in Native Health	103
5.8.2	Control of Infectious Disease	103
5.8.3	Sexually Transmitted Diseases	104
5.8.4	Adolescent Pregnancy	104
5.8.5	Alcoholism and Alcohol-Related Injuries	105
5.8.6	Causes of Death in the Borough	105
5.8.7	Infant Mortality	106
5.8.8	Causes of Hospitalization	106
5.8.9	Outpatient Treatment	105
5.8.10	Other Health Concerns	105
5.9	Recreation	106
5.10	References	107

CHAPTER 6. TRANSPORTATION

6.1	Introduction	111
6.2	Air Transportation	111
6.3	Land Transportation	112
6.3.1	Community Transportation	112
6.3.2	Prudhoe Bay/Deadhorse	113
6.3.3	Haul Road	114
6.3.4	Traditional and Off-Road Routes	115
6.3.5	Gates of the Arctic	115
6.3.6	Oil Pipelines	116
6.3.7	Constraints of Seasonal Land and Snow Availability	116
6.4	Water Transportation	116
6.4.1	Ice Breaking Tankers	117
6.4.2	Petroleum Development	117
6.5	References	119

CHAPTER 7. OIL, GAS AND MINERAL DEVELOPMENT

7.1	Introduction	121
7.2	Petroleum Development	122
7.2.1	History of Petroleum Development	122
7.2.2	Exploration	123
7.2.3	Production	125
7.2.4	Infrastructure And Logistics	126
7.2.5	Environmental Impacts	126
7.2.6	Construction	138
7.2.7	Off-Road Travel And Marine Transportation	140
7.2.8	Oil Drilling	141
7.2.9	Rehabilitation And Cleanup	141
7.2.10	North Slope Oil Production	132
7.2.11	Federal Leasing Programs	135

7.2.12	State Leasing Program	137
7.3	Natural Gas	149
7.4	Coal	137
7.5	Sand and Gravel	152
7.6	Other Minerals	154
7.7	Facility Siting	140
7.8	References	141

CHAPTER 8. GOVERNMENT

8.1	Introduction	159
8.2	Finances 160	
8.2.1	Revenue	160
8.2.2	Revenue Forecasts	161
8.2.3	Operating Budget	162
8.2.4	Capital Improvements Program	163
8.3	Borough Government Services	167
8.3.1	Department of Administration and Finance	168
8.3.2	CIPM Department	168
8.3.3	Department of Planning and Community Services	168
8.3.4	Department of Municipal Services	169
8.3.5	Department of Industrial Development	170
8.3.6	Departments of Public Safety, Fire and Search & Rescue	171
8.3.7	Department of Health and Social Services	171
8.4	Education	172
8.4.1	North Slope Borough School District	172
8.4.2	Arctic Sivunmum Iisagvik College	174
8.5	Barrow Water and Sewer	174
8.6	Municipal Recreation Powers	156
8.7	Hospital 175	
8.8	Housing 176	
8.9	Governmental Cooperation — Private Development	176
8.10	Intergovernmental Coordination	176
8.11	References	176

CHAPTER 9. COMMUNITIES

9.1	Anaktuvuk Pass	179
9.1.1	History	179
9.1.2	Subsistence	180
9.1.3	Social Characteristics	181
9.1.4	Existing Public Facilities	181
9.1.5	Capital Improvement Projects in Progress	182
9.1.6	Future Capital Improvement Projects	182
9.2	Atqasuk	182
9.2.1	History	182

9.2.2	Subsistence	184
9.2.3	Social Characteristics	185
9.2.4	Existing North Slope Borough Public Facilities	186
9.2.5	Capital Improvement Projects in Progress	186
9.2.6	Future Capital Improvement Projects	187
9.3	Barrow	187
9.3.1	History	187
9.3.2	Subsistence	189
9.3.3	Social Characteristics	192
9.3.4	Existing North Slope Borough Public Facilities	193
9.3.5	Ongoing Capital Improvement Projects	194
9.3.6	Future Capital Improvement Projects	194

9.3	Kaktovik	195
9.3.1	History	195
9.3.2	Subsistence	196
9.3.3	Social Characteristics	199
9.3.4	Existing North Slope Borough Public Facilities	199
9.3.5	Capital Improvement Projects in Progress	200
9.3.6	Future Capital Improvement Projects	200
9.4	Nuiqsut	200
9.4.1	History	200
9.4.2	Subsistence	201
9.4.3	Social Characteristics	203
9.4.4	Existing North Slope Borough Public Facilities	204
9.4.5	Capital Improvement Projects in Progress	204
9.4.6	Future Capital Improvement Projects	204
9.5	Point Hope	205
9.5.1	History	205
9.5.2	Subsistence	207
9.5.3	Social Characteristics	210
9.5.4	Existing North Slope Borough Public Facilities	211
9.5.5	Capital Improvement Projects in Progress	211
9.5.6	Future Capital Improvement Projects	212
9.6	Pt. Lay	212
9.6.1	History	212
9.6.2	Subsistence	214
9.6.3	Social Characteristics	216
9.6.4	Existing North Slope Borough Public Facilities	217
9.6.5	Capital Improvement Projects in Progress	217
9.6.6	Future Capital Improvement Projects	218
9.7	Wainwright	218
9.7.1	History	218
9.7.2	Subsistence	221
9.7.3	Social Characteristics	223
9.7.4	Existing North Slope Borough Public Facilities	223
9.7.5	Capital Improvement Projects in Progress	224
9.7.6	Future Capital Improvement Projects	224

INTRODUCTION

TO THE

1993 COMPREHENSIVE PLAN

"I want you to stop offshore oil exploration which keeps us from taking bowhead whales. We want to be able to develop oil onshore and on our own lands in ANWR."

Jacob Adams, NSB Assembly Member

"That is exactly the opposite of current federal policy."

Bruce Babbitt, Secretary of the Interior. August 1993.

The Borough has had a Comprehensive Plan and Land Management Regulations since late 1982. The three volumes which comprise the 1993 Comprehensive Plan build upon that work and provide updated data and policy.

The purpose of a comprehensive plan to provide for the orderly development of the Borough and to promote the health, safety and welfare of its residents. This Comprehensive Plan, as the 1982 Comprehensive Plan, accomplishes that by identifying and discussing the impacts of development, both good and bad. Its aim is to gain for the Borough and its residents as many of the good impacts as possible and avoid or eliminate as many of the bad impacts as possible.

What a "good" impact is and what a "bad" impact is varies from community to community all across the world. Within each community what is good and what is bad will vary from one area to the next and with the passage of time.

This plan is written for the North Slope Borough, a community in which the Inupiat people and the Inupiaq character of life predominate. Consequently this plan is absolutely unique. While attempts have been made to reflect and accommodate state and

national interests, the plan has been designed for the values and circumstances of the people of the North Slope Borough.

A Comprehensive Plan is the basic governmental instrument for land use planning and regulation, and the development activities of local, state and federal agencies, through text, data, and maps. The Comprehensive Plan provides for the conservation and preservation of the Inupiaq character of life and also for the systematic and orderly development of the communities and the various natural resources of the Borough.

The Comprehensive Plan is designed to provide for orderly development, lessen street congestion, promote fire safety and public order, protect the public health and general welfare, prevent overcrowding, stimulate systematic development of transportation, water, sewer, school, park and other public facilities, and encourage efficiency in the use of energy and the substitution of energy from renewable resources for energy from fossil fuels.

HISTORY OF PLANNING IN THE BOROUGH

In 1978 the Borough prepared a Coastal Zone Management Program for the Prudhoe Bay area. This Management Program formed the basis for the subsequent Mid-Beaufort Sea Coastal Management Program and Zoning Ordinance.

Due to federal, state, and industry opposition, the Mid-Beaufort CMP and Ordinance were withdrawn from Coastal Policy Council consideration, and on December 4, 1979, and Interim Zoning Ordinance was adopted. The Interim Zoning Ordinance provided the Borough with an interim mechanism for exercising control over petroleum development activities in the Mid-Beaufort Coastal Area.

In 1982 the Borough adopted a Comprehensive Plan and associated Land Management Regulations. The Land Management Regulations provided for land use regulation in Borough communities, a permitting process designed to maximize the benefits and reduce or eliminate the negative impacts of resource development activity, and resource development districts which, when proposed by the oil industry and approved by the Borough, allow for a one-time comprehensive review of the social and environmental impacts of development of major oil fields and associated facilities.

The Land Management Regulations were amended in 1990 to provide for a more detailed zoning system for the City of Barrow and a different permitted process for resource development activities.

Although the oil industry was initially skeptical and threatened to sue the Borough over adoption of the Land Management Regulations, the process has worked smoothly over the years and the Borough permitting office has received high marks from the oil

industry for efficiency by which permits are issued and the clarity of lease stipulations.

In 1985 the Borough and state adopted a Coastal Management Program for the Borough which established an elaborate process of consistency determinations by state and federal agencies for development activities on the North Slope. The Borough through its Wildlife Management Department and other agencies, participates actively in state and federal decisions pursuant to the Coastal Management Program.

The most important plan element from the viewpoint of many Borough residents is not regulation of oil development activity but the Borough's annual Capital Improvements Program. This program has provided and continues to provide school, fire, police, roads, maintenance, water and sewer and other facilities for each community in the Borough, and has been a significant continuing source of employment at high wages for residents of the Borough.

FORMAT AND COMPONENTS

The Comprehensive Plan is a decision making tool for the Borough. It contains the policy basis for land use and capital improvements decisions as well as data and maps which help developers design their projects, and planners, public officials, and the public review the projects.

The 1982 Comprehensive Plan was an attempt to catalog all government and academic information which had been developed about the Borough and its residents up to that time. Since then there has been an explosion of information and data. More is being produced every year. It would be impossible to compile this data into one or two bookcases full of volumes, and it would become obsolescent almost as soon as the task was completed.

For this rewrite of the Comprehensive Plan the Borough has chosen a three volume format:

1. Volume 1 consists of goals, objectives, development policies and Borough programs, and a discussion of each.
2. Volume 2 contains a synopsis or overview of current information on the Borough, together with bibliography and resource data to assist the person needing more detailed information.
3. Volume 3 contains plan maps and prepared from the most current information available to the Borough Planning Department's Geographic Information System.

Other documents adopted by the Borough are incorporated into the Comprehensive Plan by reference. They include:

- * The Borough Coastal Management Program.
- * The 1993 and subsequent year's Capital Improvements Programs.
- * The 1993 Transportation Plan.
- * The Master Plans for Resources Development Districts when adopted by the Planning Commission and Assembly.
- * The Borough's Automated Geographic Information System, which is constantly updated.

The information in all three volumes is current as of the date of adoption of the plan. It may change significantly, however, based on studies in progress and new developments in the Borough.

RELATIONSHIP OF THE COMPREHENSIVE PLAN TO THE BOROUGH'S LAND MANAGEMENT REGULATIONS.

The Land Management Regulations are based directly upon the Comprehensive Plan and are designed and intended to implement the Comprehensive Plan.

The Development Policies of the Comprehensive Plan become the basis for issuance or denial of permits, and stipulations contained in Borough permits. Thus, policies which have been altered or added as a result of the 1993 planning process will form the basis for amendments to the Land Management Regulations. Industry and Borough personnel alike believe that the development permit process is working well.

Provisions in the existing regulations call for community review of projects within the Village Area of Influence. However, this process sometimes does not work as well as it should. Community residents have been surprised by new projects taking place within their areas of influence, and this plan includes upgraded administrative procedures to improve the community input into Borough land management permits.

RELATIONSHIP OF THE COMPREHENSIVE PLAN TO THE BOROUGH CAPITAL IMPROVEMENTS PROGRAM AND TRANSPORTATION PLAN

The Borough government and the school district are the largest developers and

employers in the communities of the North Slope Borough. The Borough Capital Improvements Program, including the Capital Improvements Policies adopted in 1985, are intended to implement the Comprehensive Plan and the goals of the residents of the Borough. Increased emphasis will be placed on the location and siting of major Borough facilities in the communities as a result of this plan with the goal of creating a "core area" or downtown in each community in the Borough.

The Transportation Plan deals not only with transportation improvements, but new roads and subdivisions in each community to accommodate anticipated growth. Thus, the Transportation Plan contains the growth plan for each community in the Borough.

COMMUNITY VIEW

The overriding issue shaping and forming the view of North Slope Borough residents is the continuing need to preserve and strengthen the opportunity of the residents to continue in subsistence living and the Inupiaq character of life in the face of petroleum development within the Borough.

In the 1982 planning effort, the oil industry was viewed as generally incompatible with this goal. Eleven years of experience have shown that, in general, development of onshore petroleum resources can be accomplished without significant impact on subsistence resources and the Inupiaq character of life. Revenues from this development are used to development the capital projects in the community such as schools, health clinics, fire stations, and the like, provide a large number of Borough and school district jobs, and make contributions to the Borough Permanent Fund.

These oil revenues will not last forever, although the oil industry has been able to develop North Slope fields beyond the expectation of a decade ago. It is the goal of the North Slope Borough to use these revenues to develop permanent public facilities which will last many years into the future and to build a Borough Permanent Fund which will be sufficient to endow the operation and maintenance of these facilities and the continued operations of Borough government and the school district, which provide the bulk of jobs on the North Slope, indefinitely.

The Borough supports oil exploration on the Coastal Plain of the Arctic National Wildlife Refuge for this reason.

The Borough does not support large scale exploration and development of offshore resources. Seismic exploration and drilling activity has been shown to divert the migration of the bowhead whale to areas so far off shore that whaling is rendered much for difficult and dangerous, if not outright impossible, for local residents.

Unlike onshore development, offshore development provides no tax revenues to the Borough. The Borough has never considered tax revenues to be an offset for damages to subsistence resources or the Inupiaq character of life. Both the preservation and enhancement of subsistence resources and the Inupiaq character of life, and tax revenues from the oil industry, are necessary and desirable to the residents of the Borough. It is the expectation of the Borough that both of these can take place side by side without major conflict. However, if there is a conflict between subsistence activities and oil development, as there appears to be with large-scale offshore exploration and development, then the Borough's position is and always has been that the preservation of subsistence resources and activities must prevail over the development of petroleum resources for short term economic gain.

CHAPTER 1.

BOUNDARIES AND LAND STATUS

1.1 Introduction

The North Slope Borough covers approximately 79,000 square miles in northern Alaska — about 56 million acres. The boundaries are roughly the same as those of the Arctic Slope Regional Corporation (ASRC). More than half the land within the Borough is owned by the federal government, including the National Petroleum Reserve–Alaska (NPR–A), a portion of Gates of the Arctic National Park and Preserve, a portion of Noatak National Preserve, and the Arctic National Wildlife Refuge (ANWR).

Land ownership within the Borough is set forth on Map *. This is the most current illustration of existing land ownership patterns based on existing and published information.

Land use patterns relating to subsistence activities for each community in the North Slope Borough are illustrated in Map *.

Each village also has an Area of Influence, shown on Map *. Any land use activity within a Village Area of Influence can impact the character of life for the Inupiat of that region. Consequently, the Borough's efforts to protect the Inupiat character of life must be specifically

directed toward land use activities within these Village Areas of Influence.

1.2 Land Use

The North Slope Borough's jurisdictional boundaries encompass approximately 79,000 square miles of Arctic terrain which has been the homeland of the Inupiat for thousands of years.

Throughout this time, the Inupiat have sustained themselves by harvesting the wild resources of the land and sea. This intimate relationship to the land has exerted a powerful shaping effect on Inupiat culture which has, by necessity, adapted itself to the encompassing environments and its imperatives. Thus, Inupiat culture is in large measure a manifestation, in human terms, of the land and sea which has sustained it for millennia.

For further information about subsistence activities and historic land use, see Chapters 3 and 4.

Prior to state oil and gas lease sales of the mid 1960's and the subsequent discovery of the Prudhoe Bay oil fields, the North Slope was for all practical purposes the last remaining great wilderness frontier in America. Subsistence hunting, fishing and foraging was a matter of survival to the Inupiat. Oil and gas exploration and production activities rapidly changed the status quo on the North Slope and ultimately, the patterns of land use through the placement of differing values on Arctic land and water resources. Today, subsistence resources and uses of the land must coexist with hydrocarbon exploration and production operations in the Arctic.

1.3 Land Status

One aspect of comprehensive planning is the examination of major land and resource ownership patterns and management responsibilities within or adjacent to the Borough. The importance of such a land status determination allows for a clear understanding of ownership and management responsibilities.

The predominant land owner within the North Slope Borough is the federal government. Of the approximately 50 million acres in the region north of 68° N latitude, more than one half is contained in NPR-A and ANWR. Portions of the Noatak National Preserve and the Gates of the Arctic National Park and Preserve are also found within the North Slope Borough. The state of

Alaska owns approximately 3.5 million acres of North Slope lands between the Colville and the Canning Rivers, an area called CAMA (Central Arctic Management Area). An additional 3.5 million acres are owned by the eight village corporations and the Arctic Slope Regional Corporation (ASRC).

The North Slope Borough was incorporated in 1972 and received the right to select up to one percent of the vacant general grant lands conferred under the Alaska Statehood Act. In 1978 the state legislature changed the land entitlement calculations. Borough/State litigation ensued over those land entitlements which, ultimately, the Borough lost causing a delay in the transfer of any state land to the Borough. In 1989 the state legislature re-instated the Borough's right to 89,500 acres of state land on the North Slope, although the state has yet to convey any lands applied for by the Borough.

Map * illustrates present land status. Federal holdings, state patented and selected lands, and village and regional corporation patented and selected lands are portrayed on the map.

The 1971 Alaska Native Claims Settlement Act (ANCSA) was designed to provide a fair and just settlement of all aboriginal land, use, and occupancy claims by Natives and Native groups in Alaska. The act designates that only surface estate rights can be conveyed to Native village corporations and that subsurface estate rights are to be conveyed to regional corporations. The exception to this is on federal government holdings where the subsurface estate is reserved for the United States. As a result, ASRC has received no entitlement or selection privileges for the subsurface estates within the NPR-A or ANWR despite conveyance of surface estates to the village corporations. ANCSA allows ASRC to make selections of the subsurface estate outside of the NPR-A and ANWR "in lieu" of lands not available to them within federal holdings.

1.4 Land Management Programs

Different land management programs at the federal, state, Borough and regional corporation level impact the management of lands within the North Slope Borough.

1.4.1 Federal management

At the federal level, the Department of the Interior, through its Bureau of Land Management (BLM) manages the exploration and development of oil and gas resources in NPR-A. The BLM also oversees the oil, gas and mineral resources of other federal land in

the CAMA lands which lie between NPR–A and ANWR. Most BLM land on the North Slope (outside of NPR–A) lies within three blocks: along the Haul Road corridor, along the eastern boundary of NPR–A and along the western boundary of NPR–A.

Federal submerged lands lying beyond the three–mile state limit are managed by the Minerals Management Service of the Department of Interior.

Land within ANWR is managed by the Department of Interior through its Fish and Wildlife Service (US FWS). A large portion of ANWR is already classified as a wilderness area; a smaller portion — called the 1002 study area — awaits congressional action to determine whether it will receive wilderness classification. (See Chapter 8 for more information on ANWR status.) USFWS also manages two smaller refuge areas on the North Slope — both areas are located on the west end of the North Slope, near Point Hope, and are part of the Alaska Maritime National Wildlife Refuge.

The Gates of the Arctic National Park and Preserve and the Noatak National Preserve both partially lie in the southern portion of the North Slope Borough. They are managed by the National Park Service of the Department of the Interior.

1.4.1.1. Federal Leasing Process. BLM–managed public lands are available for oil and gas leasing only after they have been evaluated through BLM’s multiple–use planning process. In areas where development of oil and gas resources would conflict with the protection or management of other resources or public lands uses, mitigating measures are identified and may appear on leases as either stipulations to uses or as restrictions on surface occupancy.

The leasing process consists of 12 decision–making steps prior to lease sale. These steps are summarized below:

1. **Resource Reports Requested:** Resource reports for a specific lease area are requested from federal and state agencies, up to three years prior to scheduled sale date.
2. **Scoping:** Scoping meetings provide an opportunity for the staff to meet representatives from concerned federal and state agencies, oil industry, environmental groups, and the public to identify actual issues and alternatives to proposed action.

3. Call for Information: Informational responses are requested from oil industry, government agencies, private citizen, and environmental groups concerning which blocks should be included in the lease sale.
4. Secretary of Interior Decision: The Secretary makes area selections based on information received from resource reports, scoping meetings, and calls for information.
5. Draft Environmental Impact Statement (EIS): Preparation of an EIS is required in accordance with Section 102(2)(d) of the National Environmental Policy Act of 1969.
6. Public Hearings: Public hearings are held after release of draft EIS.
7. Comments to Draft EIS: Comments from private citizens, state and federal agencies, communities, oil industry, and special interest groups are incorporated into final EIS.
8. Final Environmental Impact Statement: FEIS is prepared and distributed to interested parties.
9. Proposed Notice of Sale: Notice of Sale is sent to the governor of the state.
10. Consistency Determination: A statement of consistency with the District Coastal Plan is submitted.
11. Comments to Proposed Notice: Governor's comments to proposed notice of sale and Consistency Determination are received and reviewed.
12. Secretary of Interior Decision: Secretary makes final decision on whether to hold a sale, and if so, issues final notice of sale.

BLM issues two types of oil and gas leases for oil and gas exploration and development on lands owned or controlled by the federal government — competitive and noncompetitive. Competitive leases are issued for a five-year period and noncompetitive leases are issued for a ten-year period, and both types continue for as long thereafter as oil or gas are produced in paying quantities.

Oral auctions of oil and gas leases are conducted by BLM state offices at least quarterly when parcels are available. Noncompetitive leases may be issued only for parcels that have been offered competitively and failed to receive a bid. Rental rates for both competitive and noncompetitive leases are \$1.50 per acre (or fraction thereof) in the first five years, and \$2.00 per acre each year thereafter. Royalty on production is 12.5 percent for both competitive and noncompetitive

leases.

Oil and gas leases expire at the end of their term — the fifth year in the case of a competitive lease, or the tenth year of a noncompetitive lease — unless a well producing paying quantities of oil or gas has been developed.

1.4.2 State Management

The Department of Natural Resources has the primary responsibility for management of state subsurface oil, gas and mineral resources. The Commissioner of Natural Resources is required to submit to the Alaska Legislature each year a five year schedule for the leasing of state land for oil and gas exploration. One of the major purposes of the five-year petroleum leasing schedule is to provide a plan to facilitate the orderly assessment and development of Alaska petroleum resources.

The State of Alaska's strategy with regard to leasing is summarized as follows:

- **Schedule:** To adhere to an oil and gas leasing schedule, as required by state statute, that is predictable and that can be counted on by industry, the public and government in their planning on behalf of the citizens of Alaska and the rest of the United States.

- **Coordination:** To coordinate leasing with nearby owners of subsurface rights, particularly the federal government, so that: (1) statewide oil, gas and coal leasing activities are cohesive regardless of land ownership; (2) geologic and environmental data may be shared if possible; (3) drainage of commonly owned petroleum reservoirs may be equitable; and (4) oil, gas, coal and other mineral exploration and development may continue while ownership disputes are being resolved.

- **Fiscal Planning:** To collect resource information adequate to estimate a fair return to the state when developing leasing procedures and terms of sales and for long-term fiscal planning.

- **Revenues:** To obtain the maximum economic return to the state and its citizens from the sale of state-owned oil and gas resources by using a variety of bidding methods and by encouraging competition.

- **Phasing:** To lease first in the most prospective areas and near areas in which development has been or is taking place so that potential additional development may take advantage of existing facilities wherever possible.

- **Access:** To maintain access to promising oil, gas and coal areas by reserving

access corridors and by avoiding commitments to incompatible surface uses in key transportation corridors.

- **Regulatory Simplification:** To avoid hindering development or placing an undue burden on industry, by simplifying necessary regulations so they are fair and effective.
- **Public Participation:** To work with local citizens, local governments, special interest groups, and other government agencies when approving permits.
- **Employment:** To encourage the petroleum industry to provide local training programs and to hire local people for available jobs.
- **Protection:** To protect the integrity of affected cultures, the environment, and fish and wildlife resources through plans of operations, lease and permit stipulations, and comprehensive monitoring operations.

1.4.3 Arctic Slope Regional Corporation Management

ASRC has taken an aggressive posture with regard to oil and gas exploration on corporation land on the North Slope. Several wells have been drilled southeast and west of NPR-A, all of which were reported as dry holes. ASRC plans to continue oil and gas exploration.

1.4.4 North Slope Borough Management

The North Slope Borough is still awaiting conveyance of some 89,500 acres of state land on the North Slope to which it is entitled under state law. When that land is conveyed, the Borough will adopt policies and plans for the best use of the land, including consideration of oil, gas and mineral leasing.

1.5 References

Alaska Department of Natural Resources, Division of Oil and Gas, 1993, "Five-Year Oil and Gas Leasing Program".

U.S. Department of the Interior, Bureau of Land Management, "The Federal Onshore Oil and Gas Leasing System".

U.S. Department of the Interior, Fish and Wildlife Service, "National Wildlife Refuges of Alaska".

CHAPTER 2.

PHYSICAL ENVIRONMENT

2.1 Introduction

Alaska's North Slope includes 79,000 square miles of mostly open country. There are three general types of terrain in the area. The mountains in the northern Brooks Range extend along the southern edge of the area from the U.S.–Canada border west to the Chukchi Sea. Rolling foothills extend as far as 100 miles north from the edge of the mountains and are bordered by the coastal plain. The North Slope is characterized by open tundra of various types, with dense stands of willow and alder occurring in narrow strips along rivers.

Water, air and land resources are all important to North Slope Borough residents. The quality and availability of water on the North Slope is critical to Borough residents both from the standpoint of human consumption, and as an integral part of subsistence resource habitat. The continuing development of dependable community water systems and the protection of water quality throughout the Borough are of prime importance. Equally important is the maintenance of air quality standards in areas surrounding resource development. Clean air is essential to the well-being of residents, subsistence resources and habitat. The onshore and offshore hazards associated with extreme conditions present a formidable challenge to human activities and operations. At the same time, the onshore and offshore environment hosts subsistence resources that are essential to the Iñupiat culture and economy.

2.2 Water Resources

The availability and distribution of water in the Arctic Region is governed by the same principles as in other parts of Alaska. Man's use of water in the Arctic is the same as elsewhere; water is needed for community and industrial development, for transportation and recreation, and for subsistence. However, the presence of water, especially ground water, is profoundly altered by the severe climate and permafrost. Therefore, the limitations placed on the hydrologic cycle by the Arctic environment must be understood before water supplies are developed.

Water is a conspicuous part of the Arctic landscape and contributes to the unique topographic features of this region. During summer, most of the flat coastal plain is covered with surface water (streams, meandering rivers, lakes, and marshes). This water is readily available for plants and animals. In winter the land, lakes and rivers freeze, and water is only available as ice and snow.

Permafrost prevents water from entering the ground and from being stored as ground water. Maintained by subfreezing temperatures, frozen ground forms an impermeable layer which restricts recharge, discharge and the movement of ground water. The ground acts as a confining layer and limits the volume of unconsolidated deposits and bedrock in which liquid water may be stored.

The area covered by water during summer months on the coastal plain suggests that a plentiful supply should be available. However, the availability of water is limited by freezing conditions which prevail for eight to nine months of the year as well as the relatively small amount of precipitation. Water availability begins to rise in June to a peak availability in late August, falling off dramatically from September through the next May.

Water supply is determined and controlled by such hydrologic factors as annual precipitation, surface storage and runoff, evaporation and transpiration. Surface hydrology is dominated by spring breakup and snow melt runoff.

Surface storage plays a principal part in the hydrologic cycle. Numerous lakes and virtually continuous permafrost greatly increase active storage. Ice areas near springs (aufeis) and river ice

cover also provide surface storage in the mountains and foothills.

Average annual precipitation in coastal and foothill areas ranges from less than five inches to seven inches, while central valleys of the Brooks Range receive about ten inches.

Precipitation occurs as snow, which goes directly to temporary surface storage, and rain which is distributed to surface (lake) storage, soil retention and surface runoff. From 1931 to 1971 at Barrow, approximately one-half of the precipitation fell as rain during June, July and August. At Umiat, most of the precipitation for 1945 through 1951 fell as snow.

Water quality is extremely important in developing community water supplies. Surface water and ground water contain mineral ions in solution as a balanced system of cations (positive ions) and anions (negative ions). The nature of these ions is determined by the mineral content and structure of geologic deposits scoured by flowing waters. Because health hazards are directly related to the chemical concentration of certain ions, the U.S. Public Health Service established water quality standards for various uses in 1962. In 1967 they were adopted by the State of Alaska, Department of Health and Welfare. The standards are now enforced by the Alaska Department of Environmental Conservation.

2.2.1 Surface Water

Although 40 percent of the Arctic region faces the Chukchi Sea, about 80 percent of the land area drains into the Beaufort Sea since those rivers that flow from the extensive middle section of the Brooks Range are all tributaries of the Colville River. The Colville River is the master drainage system of the region, draining about 24,000 square miles of the Arctic region. About 26 percent is in the Brooks Range, 64 percent in the Arctic foothills, and 10 percent on the Arctic coastal plain. The river flows 428 miles to its termination in a 200-square mile delta fronting on the Beaufort Sea. The entire river lies in the zone of continuous permafrost and is frozen seven or eight months a year.

West of the Colville system the principal rivers are the Kukpowruk, Kokolik, Utukok, Kuk, Meade, and Ikpikpuk. Only those from the Utukok west have headwaters in the mountains. East of the Colville the streams flow almost directly north in narrow valleys with few tributaries and small runoff due to very low precipitation. The principal rivers are

the Kuparuk, Sagavanirktok, and Canning.

Freshwater lakes in the Arctic region fall into two main categories, thaw lakes and glacial lakes. Thaw lakes, common features of the Arctic coastal plain, cover 50 to 75 percent of the total plain area and also occur in the foothills. Teshekpuk Lake, the largest, is over 25 miles in diameter. Thaw lakes on the coastal plain commonly are oriented with their long axes aligned 10 to 15 degrees west of north.

Glacial lakes are widely scattered among the mountains and foothills. Their generally slender basins were excavated by glaciers formerly occupying the valleys. The water is usually very clear and deep. The principal glacial lakes in the region are Chandler Lake at the head of the Chandler River, and the Neruokpuk Lakes (Lake Peters and Lake Schrader), headwaters for the Sadlerochit River.

Lakes less than six to eight feet deep usually freeze to the bottom in winter. This limits their use as water supplies to summer only. Larger lakes may remain unfrozen near the bottom, but this water will generally contain most of the concentrated impurities from the frozen upper layers and may be unsuitable for human consumption.

2.2.2 Distribution of Runoff

Mean annual runoff in the Arctic region is lowest near the coast and increases somewhat in the foothills and mountains to the south. Drainage from the Colville River accounts for almost half the runoff from the region each year. Mean annual peak runoff occurs from late May to early June during and after breakup. The region has a mean annual low monthly runoff of zero. Even in areas where fluid water exists in river channels below ice, stream flow is so slow that it cannot be measured during the late winter months.

2.2.3 Water Quality

Water from surface sources in the Arctic region is generally of acceptable chemical quality. The concentration of total dissolved solids in streams typically increases from its headwaters to its mouth. Along the coast, seawater often infiltrates

upstream for several miles from the mouths of major rivers, increasing the sodium chloride (salt) content. Total dissolved solids in streams range from 30 to 1,077 mg/l, but generally are less than 120 mg/l. Total dissolved solids vary seasonally from a low concentration during peak flow to an increasingly high concentration as winter progresses. During fall and winter, seawater penetrates at least 30 miles up the Colville River Delta channels under the ice.

In general, lake water has lower concentrations of dissolved solids than stream water, which would ordinarily make it more attractive for human use. However, lake water is frequently characterized by objectionable color, odor and the presence of iron. Near the coast of the Arctic Ocean where most of the lake waters have been sampled, water is high in sodium chloride (salt). Based on the little data at hand, the mineral content of surface water is within the limits set by the U.S. Public Health Service for drinking water standards.

2.2.4 Sediment

Most stream sediment in the Brooks Range results from complex mechanical processes. Primarily, these include expansion and contraction of rocks due to temperature changes, freezing and expansion of water in rock crevices, erosion of fine-grained and poorly cemented deposits such as shales, and abrasion of rocks against one another in debris slides and soil movement. Several small glaciers supply additional sediment.

At lower elevations, much of the stream sediment comes from streambed, bank and gully erosion of unconsolidated deposits, chiefly sand, silt and clay. Mudflows may also contribute to the sediment load. Tundra vegetation and permafrost in these areas inhibit erosion, except near streambeds where relatively warm water thaws the banks and removes material from beneath the vegetative cover.

Stream sediment particles range in size from predominantly large boulders and cobbles in the eastern Brooks Range, to silt and clay in the Arctic coastal plain. Coastal plain streams with headwaters in the mountains east of the Colville River contain coarser sediment than streams west of the river. Streams to the west are likely to carry a relatively high percentage of organic materials. Sediment concentrations and discharges peak during

June when more than 50 percent of the annual sediment discharge usually occurs. Almost all sediment is carried between May and October.

Data from the Colville River indicate that from the beginning of snow melt to the end of post breakup flooding, approximately 75 percent of the annual suspended load passes through the delta. As much as 500,000 tons of sediment were carried down the river in one 24-hour period in 1962. Maximum, instantaneous suspended concentrations as high as 1,650 mg/l have been measured for a short period. The annual sediment yield of the Colville River is 6.4 million tons (a ton of sediment is roughly equal to a cubic yard of material) or 300 tons per square mile of drainage area, about the same as the Yukon River.

Measurements on a small glacial drainage, Chamberlain Creek in the eastern Brooks Range, have shown suspended sediment concentrations as high as 3,000 mg/l and sediment yield as great as 1,000 tons per square mile of drainage area. These figures are quite high because they were taken at the point below Chamberlain Glacier where sediment discharge is probably greatest.

2.2.5 Groundwater and Permafrost

Permafrost markedly affects the distribution of groundwater in the Arctic. It underlies virtually all land and prevents subsurface drainage, creating an artificially high water table on top of the frozen material. Wetlands occur where the water table intersects the land surface. This type of groundwater is generally very high in organic content and exists only seasonally. It is not suitable for community water supplies.

Water is potentially available throughout the year from unfrozen alluvium (sand or mud deposits) near large, perennial rivers and beneath larger lakes that do not freeze to the bottom in winter. The warming effect of surface water bodies creates a thaw bowl in the deposits around the water body. The thawed zones may be hundreds of feet deep and may extend into the terraces on either side of the water body. Generally, the storage potential in such alluvial aquifers is greater under perennially flowing rivers, which can continually recharge them, than it is under lakes.

Sub permafrost water, possibly a year-round source, would be difficult to reach

since it is at depths of several hundred to over a thousand feet. Unfrozen, alluvial aquifers are difficult to locate, unfrozen bedrock is generally of low yield, and water is high in dissolved solids. Keeping wells through permafrost free of ice would be a year-round problem. On the Arctic coastal plain, most sub permafrost water is extremely brackish, and salinity of 2,000 parts per million (ppm) are common. Coastal communities like Barrow often find groundwater salinities considerably higher where ocean water intrudes under the permafrost.

In the foothills, brackish water still occurs under permafrost, and the only reliable source of year-round groundwater there and in the Brooks Range are springs. These are associated with faults in limestone. The springs are perennial and form large icings (aufeis) that occupy segments of several major valleys of the Brooks Range east of 149 degrees longitude.

The largest known springs in the eastern Brooks Range are the Shublik Springs which have a perennial flow of about 1,000 gallons per minute (gpm) and the Sadlerochit Springs with an estimated discharge of about 500 gpm. Both springs are located along faults in limestone as are the Ivishak, Echooka and Canning River Springs. Although located at the toe of an alluvial fan, Tulugak Springs in Anaktuvuk Pass may originate in limestone exposed in the valley wall to the east or at its contact with other rocks. The spring at Cape Lisburne reportedly flows throughout the year from limestone.

Numerous springs are also reported to flow from alluvial deposits along major stream courses. These springs cause large river icings; areas upstream from the icings are considered to be relatively favorable sites for near-surface groundwater prospecting.

2.2.6 Domestic Consumption

Water demand for other than industrial use is generated by the communities of the North Slope Borough, NARL and DEW Line sites. Domestic use in the Borough ranges between two and 10 gallons per day per person, depending on the data source. At Dew Line stations, where central water systems and distribution lines are available, 30–60 gallons per day per person has been the average consumption rate, with reduced overall use as staffing requirements have declined in recent years.

In summer, water for village consumption is typically pumped or hauled from nearby lakes, lagoons or rivers (.5 to 1.5 miles away) and stored in tanks. During the winter, water is drawn from large reservoirs filled during the summer.

None of the villages outside of Barrow currently has a central distribution system. Barrow's pressurized and filtered circulation system has been in operation since 1983. Water (or ice) is either delivered by truck or is carried by individual residents. Generally, public buildings, most notably the schools, pipe water directly from water tanks.

A preliminary engineering report developed for the Borough by Shiltec, Northern & Environmental Engineering, on water and sewer projects for seven villages outside of Barrow, has identified water needs and system requirements through the year 2010. Cost projections for piped water distribution systems in each of the villages totals \$340,000,000. Construction will take from two to five years in each village. Water usage is expected to reach an average of 45 gallon per person per day by 2010.

Anaktuvuk Pass is an exception to usual village water supply systems. It has a groundwater well from which water is pumped to a storage tank. Point Hope, another exception, uses shallow wells for a summer water source.

2.2.7 Industrial Areas (Prudhoe Bay)

Both ARCO and BP have developed their own water systems. ARCO pumps water directly from the Sagavanirktok River to its operations center during the summer, filling a water reservoir. BP obtains most of its water from the Kuparuk River and Big Lake. Reservoirs have been constructed at each, and these are filled every summer. Service companies based in this area obtain water from Colleen Lake, where water is pumped into tank trucks and then delivered to individual companies.

2.2.8 Water Related Development Issues

Issues raised in conjunction with obtaining fresh water for both human consumption and industrial use lie in the possible disruption of lake and river fish overwintering habitats

caused by pumping water from beneath the ice and by disturbing covering snow layers. Removing the snow to get at the water decreases lake and river insulation and heat retention. This, in turn, causes even thicker ice to form, reducing the amount of water and oxygen remaining in limited fish overwintering areas and, thus, decreasing their biological carrying capacities to the point that the concentrated populations of a lake or river may die off.

2.3 Air Quality

Air quality standards in the Borough fall under the jurisdiction of the Alaska Department of Environmental Conservation as per Alaska State Statutes, Title 46. Past air quality and meteorological studies at Prudhoe Bay provide some information on changes that could occur with development in other parts of the Borough. Continuously monitored pollutants included:

- Nitrogen oxides (NO, NO₂ and NO_x);
- Sulphur dioxide (SO₂);
- Ozone (O₃);
- Carbon monoxide (CO);
- Total hydrocarbons (THC);
- Methane (CH₄); and
- Total suspended particulates (TSP).

2.3.1 Nitrogen Oxides

The most significant man-made sources of nitrogen oxides (NO_x) are combustion processes. At temperatures of combustion, nitrogen in the air or in the fuel combines with oxygen to form nitric oxide (NO) and less frequently nitrogen dioxide (NO₂). NO reacts further in the atmosphere to form NO₂. NO_x emissions contribute to the formation of ozone by a complex set of photochemical reactions and eventually will form nitrate complexes which can contribute to acid rain.

In past studies, NO₂ levels at Prudhoe Bay were consistently low. Hourly maximums were mostly attributed to nearby construction or production activity.

Increases in nitrogen oxides are observed with decreasing ambient temperatures and strong temperature inversions during the winter months.

2.3.2 Sulphur Dioxide

The major source of sulphur dioxide (SO₂) emissions is the combustion of sulfur rich fuels, i.e., coal. Conversion of SO₂ levels at Prudhoe Bay were insignificant, primarily because there are no major natural or man-made sulfur-emitting sources in the area.

2.3.3 Ozone

Secondary formation of ozone is a result of a complex set of photochemical reactions involving hydrocarbons, nitrogen oxides and sunlight. There is no evidence to support the occurrence of ozone formation at Prudhoe Bay. Peak ozone (O₃) levels observed in past studies are probably related to atmospheric mixing that allows the intrusion of O₃ from the tropospheric to the surface layer. This mixing occurs with the passage of a warm air front and warming due to sinking air. Such events are usually accompanied by increased surface temperatures and wind speeds and a shift in wind direction.

2.3.4 Carbon Monoxide

Carbon monoxide (CO) is produced by incomplete fuel combustion and is almost entirely a man-made pollutant. Automobiles are the major contributors of CO. CO levels are consistently low in Prudhoe Bay study; peak one-hour levels are monitored in conjunction with vehicular activity near the site.

2.3.5 Hydrocarbons

Primary sources of hydrocarbons are automobiles. In the Prudhoe Bay area evaporation from oil spills may also be important. Both total hydrocarbons (THC) and methane (CH₄) were measured at Prudhoe Bay in past studies. Non-methane HC's (NMHC) are specified by the EPA as a criteria pollutant because they react to form ozone, and are equal to THC-CH₄. The observed level of CH₄ agreed closely with global background levels, but the standard for NMHC was sometimes exceeded. Vehicles near the

sample site account for these increases in reactive hydrocarbon levels.

2.3.6 Total Suspended Particulates

Total Suspended Particulates (TSP) levels appear to depend on wind speed and direction. Violations of the primary air quality standard occur with high winds. TSP is influenced by precipitation, ground cover, soil moisture and vehicular activity. Low TSP levels correspond to periods of moist soil conditions (after precipitation) and the period of snow and ice cover.

Additional air quality data include visibility records for Cape Lisburne, Barrow, Urmiat, and Kaktovik which indicate that reduced visibility due to smoke and haze are very infrequent for all of these locations. The main cause of vision obstruction in the summer is fog and in the winter blowing snow.

Because it is heavier than gaseous pollutants and not as easily dispersed, fugitive dust stirred up by vehicles may pose a problem to adjacent vegetation. In Prudhoe Bay there have been noticeable changes in roadside vegetation over the last 20 years. Many mosses, lichens and herbaceous plants that are especially sensitive to dust have disappeared from the roadside. Dusted areas extend several hundred meters from the roadway. In addition to suppressing vegetation, dust accelerates the snowmelt process by about two to three weeks within 100-300 feet of the road.

2.4 Noise Analysis

A variety of noises are associated with any resource development that occurs in the Borough and offshore. The intensive level of support required to establish and maintain remote facilities result in an area of noise influence that extends beyond the space required for roads, drill pads, pipelines and ports. Increases in the noise level are caused primarily by a variety of machines and equipment associated with development, including aircraft, drilling rigs and pipelines. Improved facilities and terminal sites create increased noise levels. Offshore, seismic testing and facility operations generate increased noise.

The response of fish, wildlife and marine mammals to these increased noise levels vary with

the time of the year and the species involved. Occasionally, when birds or mammals are continuously disturbed by noise, they may temporarily abandon or discontinue their use of the affected habitats. Migration patterns may be altered because of noise disruption. The overall effect on population levels may be severe if habitats utilized for critical life functions are rendered unusable by noise levels associated with intense activity. These critical periods include activities such as breeding, nesting, pupping, staging, wintering, denning and calving.

The Borough will continue to support studies that will provide additional information on disturbance and avoidance behavior, particularly for marine mammals.

2.5 Other Pollutants

The leading environmental concern in Borough communities is the handling of large quantities of waste oil. The primary source of the oil is from village power generating plants, but other sources include heavy and light duty vehicles. An aggressive plan to design and build collection facilities and secure storage tanks has been initiated by the Borough. Plans also call for the purchase of waste oil burners that can be used to heat public facilities.

The Borough is also working with communities to identify and properly handle other waste and toxic or hazardous materials. Some of those materials include glycol, solvents, paints, thinners and used batteries.

Community volunteers have been trained to respond to emergencies such as fuel spills. Each community has been equipped with an emergency response vehicle.

2.6 Beach Erosion

Extensive coastal erosion at the communities of Barrow and Wainwright provides ample evidence that protection of shorelines is in the best long-term interest of coastal communities. In a report by the engineering firm, LCMF Limited, the experiences of Wainwright and Barrow cites erosion in these communities as having “been caused and/or greatly accelerated by man’s removal of beach materials for construction projects.” Three major storms, in 1954, 1963 and 1986, also caused substantial damage to the coastal beaches.

Active considerations of erosion control in these communities includes:

- Beach armor in various configurations;
- Sheet piling seawalls;
- Utilidor section seawalls; and
- Beach nourishment by dredging or conventional material placement.

Passive or non-active considerations include insuring capital investments against flood damage and a “do nothing” concept.

Beach nourishment by dredging is recommended as an active alternative to other considerations in the report. The project would cost an estimated \$17 to \$20 million over an eight year period. The estimates are based on the placement of 960,000 cubic yards of material between the two communities; 360,000 cubic yards at Wainwright and 600,000 cubic yards at Barrow.

2.7 Offshore Environmental Hazards

The coastal and upland regions of the North Slope Borough are subject to environmental hazards that are distinctly different and in many cases more severe than are commonly encountered in other parts of Alaska. These hazards interfere with all categories of human activities and operations, and must be properly taken into account, both when new uses of the land are proposed and when they are implemented.

Most hazards are ultimately the result of the cold weather which prevails during most of the year because of the high latitude. Snow is present for most of the year, and when driven by winds over the relatively flat terrain of the coastal plain and in offshore areas, visibility near ground level is seriously impaired. In summer, fog is often found in coastal regions, reducing visibility. Extremely cold winter temperatures and windy conditions pose a hazard to human activities.

2.7.1 Sea Ice Impacts

Sea ice may interfere with offshore operations in several ways:

- Moving ice may exert lateral and vertical forces on offshore structures and

tificial islands. Methods for determining such forces should be available during the structure design process, and such forces should be taken into account.

- Both moving sea ice and ridged sea ice can interfere with winter transport by vehicles traveling over the ice.
- Inadvertent spills of oil or other contaminants may be taken up into the ice by the freezing process, and subsequently transported to remote locations by ice movements.
- Ice interferes with summer operation of ship and barge traffic needed for re-supply and geophysical reconnaissance. Furthermore, drilling operations in the summer from drillships, jack-ups or semi-submersibles would be impeded to some extent by ice movements against the vessels.
- The beaches of artificial islands, and the edges of artificial drilling structures, would be subjected to possible ice ride-up, over-ride and ice pileup, which should be predictably controlled if ice movements are expected.
- Pipelines buried in the sea floor may be damaged or broken if severely gouged by ice ridge keels or ice islands.

2.7.2 Wave Erosion

Wave erosion of offshore structures, i.e., gravel islands and causeways, is a serious consideration in offshore development, because unprotected gravel slopes will erode rapidly during the open water season. Impacts of significant erosion could include a changed sediment distribution in the surrounding gravel supplies to replace eroded material, and increased sedimentation in surrounding areas. Proper precautions should be taken to minimize wave erosion of these structures. This approach is prudent from both an environmental and engineering standpoint.

2.8 Onshore Environmental Hazards

2.8.1 Flooding

The flooding hazard is greatest near the mouths of the rivers where river discharge may back up against and flow across the seasonal shore-fast ice. River discharge is highly seasonal, with a large percentage of the flow occurring within a 10-day period after break-up. In addition to hazards normally associated with flooding, hazards are created by

floating ice and scour activity at drainage holes.

2.8.2 Permafrost

The entire North Slope is underlain by continuous permafrost which may extend to depths greater than 1,650 ft. Development in areas of permafrost presents unique construction and operational problems. These problems are understood in part and mitigating measures to counter any detrimental effects of these activities have been and are being developed. Experience in Arctic construction has yielded methods of placing structures in permafrost without significantly disturbing the thermal balance. Though variations exist, designs typically either insulate the permafrost or separate it from the damaging heat sources.

2.8.3 High Winds

Consequences of high wind speed include ice movement in winter, waves in summer and reduced visibility because of blowing snow.

2.8.4 Subsea Permafrost

A consequence of the thaw of ice-bonded permafrost is the possibility of sea floor subsidence. In locations where the subsea sediment is still ice-bonded, any foundation preparation activity or heat transmitted from hot oil pipelines to the sea floor could cause thaw and subsidence, eventually challenging the stability of the foundation.

2.8.5 Seismic Activity

The existence of clearly active faults in the Kaktovik region, and the likely location of oil reservoirs adjacent to these faults, demands consideration of whether there is sufficient fault movement near the surface to shear off any wells which may be drilled through a surface fault zone. This area should be constructed to withstand ground shaking associated with a shallow (depth less than 12.5 miles) source with a magnitude of at least 6.0 on the Richter scale.

2.8.6 Soil Erosion

Development in storm surge areas or near rivers and streams should address the potential for bank erosion. Development on spits should address their transient nature. Removing sand from barrier islands could upset natural currents and other erosion patterns.

2.8.7 Topographic Hazards

Development near cliffs and steep slopes should account for rock falls inevitably associated with steep terrain. Solifluction (mass slope movement) must be considered in design, so as not to unnecessarily aggravate the condition, i.e. making cuts perpendicular to the direction of flow.

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CHAPTER 3. SUBSISTENCE AND BIOLOGICAL RESOURCES

3.1 Introduction

The subsistence use of fish, wildlife and plant resources in the North Slope Borough provides direct cultural, nutritional and economic benefits to its residents. In recognition of these values, it is the primary intent of the Borough to protect subsistence resources through appropriate management and regulation. This protection is intended to supplement and enhance the subsistence preference awarded under federal law. Conflicts arising between traditional and non-traditional uses of subsistence resources shall be resolved in favor of traditional subsistence uses.

3.2 Subsistence

Subsistence foods constitute a significant portion of the diet of the I_upiat, especially in the smaller villages where imported foods are not so readily available. I_upiat foods are richer in protein and provide a more readily usable form of energy compared to imported foods, which are

high in carbohydrates. The traditional diet of *nigipiaq* (I_upiat food) is not only a nutritional necessity, but is essential to the I_upiat character of life.

Subsistence harvesting patterns are seasonal in nature, responding to biological cycles, proximity of resources, environmental conditions and ease of travel. These patterns have a long historical basis, and have been modified with the establishment of permanent settlements. Each of the communities rely on specific subsistence resources to varying degrees, depending upon their abundance, seasonal distribution and proximity to the village. (See Chapter 9 for a discussion of subsistence patterns in each community.)

Examples of important subsistence wildlife resources are *agviq* (bowhead whale), *sisuaq* (beluga whale), *ugruk* (bearded seal), *natchiq* (ringed seal), *aiviq* (walrus), waterfowl, bird eggs, *tuttu* (caribou), *imnaiq* (sheep), *tuttuvak* (moose), *nanuq* (polar bear), *iqalugruaq* (chum salmon), *amaqtuq* (humpback salmon), *sulukpaugaq* (grayling), *qaaktaq* (Arctic cisco), *aanaakxiq* (broad whitefish) *pikutuuq* (humpback whitefish), *igalussaq* (least cisco), and *anaakliq* (round whitefish).

Vegetation is also important as a subsistence resource. Greens and roots such as *qaugangq* (grass roots) and *nakaat* (swamp grass) are important for nutrition. Forest vegetation such as *nunaniak* (alder bark), *urgiliq* (birch tree) and *uqpiq* (willow brush) provide subsistence materials. These represent only major examples of available subsistence resources.

Subsistence foods are extensively shared, particularly with the elderly. Sharing of subsistence foods goes beyond the family and village. There is an extensive network of exchange that occurs between residents and their relatives in larger communities such as Anchorage and Fairbanks. The shares of whale that each crew receives after whaling are involved in a secondary redistribution among relatives and other villages. Food exchanges strengthen family and regional ties.

Other subsistence foods are exchanged between villages, with each area noted for its special resources. Point Hope and Barrow are the major suppliers of *agvig* (bowhead whale) with Point Lay contributing *sisuaq* (beluga whale), Kaktovik is recognized for its *imnaiq* (sheep) and Wainwright its *ixhuagniq* (smelt), Nuisut is noted for its whitefish and pelts, while Atqasuk contributes fish and *tuttu* (caribou). The Brooks Range village Anaktuvuk Pass trades its *tuttu* (caribou) and pelts for sea mammals which are not available locally.

3.2.1 Impacting Factors

Activities with potential direct negative impacts on the biological/subsistence resources are development and extraction of natural resources; and increased tourism, especially sport hunting/fishing.

The pressure of continuing oil development may result in activities that present a potential negative impact on subsistence resources. Research shows that environmental and habitat impacts may accompany resource development.

The Borough can reduce negative impacts on subsistence resources by:

- Using its land management and enforcement powers to implement its policies;
- Further study of subsistence species;
- Monitoring development and the effectiveness of mitigation measures; and
- Monitoring land status and ownership changes (a more detailed discussion of land status is contained in Chapter I).

3.3 Subsistence Resources

3.3.1 Large Terrestrial Mammals

<u>Iupiat</u>	<u>English</u>	<u>Scientific</u>
Iggari	Black Bear	Urus americanus
Aktaq	Grizzly Bear	Ursis arctos
Tuttu	Caribou	Rangifer tarandus
Tuttuvak	Moose	Alces alces
Imnaiq	Dall Sheep	Ovis Dalli

3.3.2 Small Furbearing Mammals

<u>I upiat</u>	<u>English</u>	<u>Scientific</u>
	Beaver	
Tigiganniaq	Arctic Fox	<i>Alopex lagopus</i>
Kayuqtuq	Red Fox	<i>Vulpes fulva</i>
	Blue Fox	
	Silver Fox	
	Cross Fox	
	Coyote	
Ukalliq	Hare, snowshoe	<i>Lepus americana</i>
Niutuuuyiq	Lynx	<i>Lynx canadensis</i>
Siksriqpak	Marmot, hoary	<i>Marmots caligata</i>
	Marten	
Itigiaqpak	Mink	<i>Mustela vison</i>
	Muskrat	
	Otter, land	<i>Lutra canadensis</i>
Qinagluk	Porcupine	<i>Erethizon dorsatum</i>
Silsrik	Squirrel, arctic ground	<i>Citellus parryi</i>
Itigiaq	Weasel	<i>Mustela erminea</i>
Amaguq	Wolf	<i>Canis lupus</i>
Qavvik	Wolverine	<i>Gulo luscus</i>

3.3.3 Marine Mammals

<u>I upiat</u>	<u>English</u>	<u>Scientific</u>
Nanuq	Bear, polar	<i>Ursus maritimus</i>
Ugruk	Bearded Seal	<i>Erignathus barbatus</i>
Qasigiaq	Harbor or spotted seal	<i>Phoca vitulina</i>
Qaigulik	Ribbon seal	<i>Phoca fasciata</i>
Natchiq	Ringed seal	<i>Phoca hispida</i>

Aiviq	Walrus	Odebenus rosmarus
Sisuaq	Beluga whale	Delphinapterus leucas
Agviq	Bowhead whale	Balaena mysticetus
Agvigluaq	Grey whale	Eschrichtius gibbosus
	Killer whale	Orcinus orca

3.3.4 Birds

<u>I upiat</u>	<u>English</u>	<u>Scientific</u>
Niglingaq	Brant, lesser	Branta nigricans
Tatirgaq	Crane, sandhill	
Amauligruaq	Common eider	Somateria mollissima
Qinalik	Kine Eider	Somateria fisheri
Qavaasuk	Spectacled Eider	Lampronetta fisheri
Igniqauqtuq	Stellar's Eider	Polysticta stelleri
Nigliq	Canada Goose	Branta canadensis
Kanuq	Lesser Snow Goose	Chen caerulescens
Niglivik	White-Fronted Goose	Anser albifrons
Malgi	Arctic Loon	Gavia arctica
Taasinig	Common Loon	Gavia immer
Qakaruq	Red-throated Loon	Gavia stellata
	Mallard	
Aqpak	Common Murre	Uria aalge
Aqpak	Thickbilled Murre	Uria lomvia
Aaqhaaliq	Oldsquaw	Clangula hyemalis
Ukpik	Owl, snowy	Nyctea scandiaca
Ukpik	Pintail	Anas acuta
Niksaaktunic	Rock, Ptarmigan	Lagopus mutus
Aqargiq	Willow, Ptarmigan	Lagopus lagopus
	Swan, Whistling	Olor columbian us

3.3.5 Bird Eggs – Mannich

<u>I upiat</u>	<u>English</u>	<u>Scientific</u>
	Arctic Tern	
	Black Guillemots	
	Brant	
	Crowbill	
	Eider	
	Geese	
	Murre	
	Oldsquaw	
	Ptarmigan	
	Sea Gull	

3.3.6 Invertebrates

<u>I upiat</u>	<u>English</u>	<u>Scientific</u>
Kiirauraq	Clams	Macoma calcerea
Puyyugiaq	King Crab	Paralithodes platypus
Putyuum	Tanner Crab	Chionoecetes opilio
Igligaq	Shrimp	Panadaliidae sp. and Cragonidae sp.

3.3.7 Fish

<u>I upiat</u>	<u>English</u>	<u>Scientific</u>
Iluuqiniq	Blackfish	Dallia pectoralis
Panmagriq	Capelin	Mallotus villosus
Iqalukpik	Char, arctic	Salvelinus alpinus
Uugaq	Arctic Cod	Boreogadus saida
Tittaaliq	Ling Cod	Lota lota
Naataagnaq	Flounder, arctic	Liopsetta glacialis
Sulukpaugaq	Grayling	Thymallos arcticus
Siilik	Pike, northern	Esox Lucius

Iqalugruaq	Chum salmon	Oncorhynchus keta
Amaqtuq	Humpback salmon	Oncorhynchus gorbuscha
Kanayuuq	Sculpin	Cottus cognatus
Iluhagniq	Smelt, rainbow	Osmerus mordax
Qaviqsuaq	Sucker	Catostomus catastomus
Iqalukpik	Trout, lake	Salvelinus namaycush
Qaaktaq	Arctic cisco	Coregonus autumnalis
Aanaakliq	Broad whitefish	Coregonus nasus
Piuktuuq	Humpback	Coregonus pidschian
Igalussaq	Least cisco	Coregonus sardinella
Anaakliq	Round whitefish	Prosopium cylindraceum

3.3.8 Berries

<u>I upiat</u>	<u>English</u>	<u>Scientific</u>
Asiaq	Blueberry	Vaccinium uliginosum
Aqpik	Cloudberry	Rabus chamaemorus
Kikminaq	Cranberry	Vacconium vitis-idaea
Paungaq	Crowberry	Empetrum nigrum

3.3.9 Greens and Roots

<u>I upiat</u>	<u>English</u>	<u>Scientific</u>
Qauganq	Grass Roots	Not identified
Tilaakik	Hudson's Bay tea	Ledum decum
Not Identified	Sourdock	Rumex archius
Nakaat	Swamp grass	Not identified
Ikunsuq	Wild celery	Angelica lucida
Quagaq	Wild chives	Allium schoenoprasum
Masu	Wild potato	Hedysarum alpinum
Qunulliq	Wild rhubarb	Oxyric digyna
Quagaq	Wild spinach	Rumex arcticus

Akutuq

Willow leaves

Salix sp.

3.3.10 Forest Vegetation

Nunaniak

Alder bark

Urgiiliq

Birch Tree

Uqpik

Brush, willow

Qiruk

Driftwood

Ivruq

Sod

Napaaqtuq

Spruce tree

3.4 Distribution and Special Habitat

3.4.1 Large Terrestrial Mammals

3.4.1.1 *Tuttu* (Caribou). Patterns of caribou habitat use shift from season to season and vary from year to year. The large carnivores of the Arctic depend upon caribou through both predation and scavenging. Similarly, man in prehistoric, historic and present times has depended upon caribou for meat and other products. As a migratory animal, caribou link the tundra ecosystem with other ecosystems, specifically the taiga, forest-tundra, and alpine areas south of the Brooks Range crest. The well-being of caribou depends on freedom of movement to areas of favorable snow conditions, food and insect relief.

Movements, calving areas and population estimates of caribou herds are difficult to determine because of their dynamic nature. Earlier studies of caribou discussed several of the past variations. Similar observations in recent years have received more attention because of the concern for caribou resources in relation to resource development within the North Slope Borough. Map * indicates the range of terrestrial mammals in the Borough.

Four distinct concentrations of caribou are found within the Borough. The Western Arctic Herd (approximately 415,000 animals) ranges over approximately 140,000 square miles in much of northwestern Alaska and provides critical food, hides, sinew and other resources for most residents of the western section of the Borough. This herd calves near the upper Utukok and Colville Rivers. Most of the herd winters south of the Brooks Range, occasionally on the Lisburne Peninsula. Some of the herd winters on the North Slope just south of Barrow.

The Teshekpuk Lake herd (20,000 animals) generally calves northeast and southwest of Teshekpuk Lake and winters in the same general area. Because of its remote location, the Teshekpuk Lake herd is not as heavily hunted as those with closer proximity to Borough communities. It is estimated that from 800 to almost 1,200 caribou are harvested from this herd each year.

The Central Arctic Herd (approximately 20,000 animals) occupies the area between the Kleroshilik and Kuparuk Rivers. Its calving ground is in the general area north of Franklin Bluffs between the Colville and Canning Rivers. Summer range includes much of the area between the Kuparuk and Sagavanirktok Rivers on the coastal plain. Winter range is in the northern foothills of the Brooks Range.

The Porcupine Herd (approximately 200,000 animals) is of importance to the people of Kaktovik as well as Canadian villages to the east and Athabaskan villages to the south. This herd calves on the Arctic Coastal Plain in northeastern Alaska, summers across the North Slope, and winters mainly south of the Brooks Range between Arctic Village and northwestern Canada. The population of this herd has increased in recent years and supports a harvest of 4,000 to 5,000 animals each year.

The Western Arctic, Teshekpuk Lake, Central Arctic, and Porcupine caribou herds range throughout the Borough. The areas used by the herds vary from year to year, but they are relatively faithful to calving grounds. The number of caribou in all four herds is high relative to historical levels and, at least in the two largest herds, is continuing to increase.

3.4.1.2 *Tuttuvak* (Moose). Temporary cessation of moose hunting in northern Alaska and increasing moose populations during the 1920's prompted movement of these animals into northern areas. Moose have become well established on the North Slope since the 1950's and are common in riparian habitat along most rivers and creeks.

Moose numbers have generally been stable in recent years, although the Canning River population has declined significantly since 1985. Population surveys indicate there are about 1,600 moose in Unit 26A, primarily in the Colville River drainage; 1,000 to 1,200 moose in Unit 26B, and 700–800 in Unit 26C.

In most areas, bull to cow ratios are high. Calf and yearling survival are moderate in most years, but severe winters periodically reduce survival rates dramatically. The reported harvest of moose in Unit 26A has averaged 59 per year, with unreported harvested estimated at 15%. In recent years, the number of moose harvested in Units 26B and 26C has ranged from 26 to 54 with most of the harvest occurring in Unit 26B.

3.4.1.3 Imnaiq (Sheep). The northern Brooks Range supports a large population of Dall sheep, with the highest densities occurring in central and eastern parts of the mountains. The total number of sheep in the Brooks Range is estimated at about 30,000, with about 80% of the population occurring on the North Slope of the Brooks Range. The harvest is primarily comprised of rams with 7/8-curl or larger horns. Either-sex harvests are allowed for qualifying resident hunters in limited parts of the western, central, and eastern mountains, including Gates of the Arctic National Park.

The harvest of rams has generally increased in recent years as the number of hunters has increased, with about 200 rams taken each year. The vast majority are taken in Units 26B and 26C, where sheep are most numerous. It appears that sheep populations have declined in certain areas during the past two or three years. Although severe winters and late springs resulting in poor lamb survival and high adult mortality appear to be factors, the causes of these declines are not entirely known.

3.4.1.4 Muskoxen. Muskoxen were re-introduced to the Arctic National Wildlife Refuge in 1969 and 1970 after being absent for about 100 years. Their numbers have increased in ANWR and appear to have stabilized at about 400 animals. An additional 250 muskoxen live west of ANWR. This segment of the herd resulted from dispersing animals and has grown noticeably in recent years. Up to 11 muskoxen are harvested each year in a Tier II permit hunt. Although a few muskoxen are known to have been killed by wolves and bears, the population seems to be prospering and is presently not regulated by predation.

3.4.1.5 Aktaq (Grizzly Bears). Grizzly bears are widely distributed across the North Slope. Studies in the eastern Brooks Range, the western foothills, and near Prudhoe Bay indicate that population density ranges from about one bear per 15 to 30 square miles in the south, to one bear per 100 square miles in the northern parts of the North Slope. Bear numbers have increased somewhat in recent years. The total population is estimated to range from 1,410 to 1,780. The annual harvest ranges from 40 to 50 bears and is generally well within the level that is regarded as sustainable by the bear population. The number of bears taken in Unit 26B is, however, thought to be higher than desired.

3.4.2 Furbearers

Hoary marmots and arctic ground squirrels were most important animals for parka materials during the 19th century. They were replaced in the early 20th century by (arctic, red, blue, silver and Cross) foxes as preferred fur resources due to world markets. The foothills habitats and gravel substrates in the Cape Thompson region supported good ground squirrel populations, and marmots were trapped in areas north of the Ipewik River.

Arctic fox dens occur at an average density of one per 15 square miles in those areas of the Arctic Coastal Plain suited to their denning characteristics. Den occupancy ranges from 70 to 85% during years of maximum population to five to 20% during population lows due to synchrony with lemming abundance, the natural major food of arctic foxes during the summer.

3.4.2.1 Qavvik (Wolverine). Limited studies of wolverines in the NPR-A suggests that a population density of 1 adult per 58 square miles may be applied to the upper Utukok and Kokolik River drainages. Harvest records are inappropriate estimates of the importance of wolverines and most other furbearers within the Borough because the hides are utilized locally.

3.4.2.2. Amaguq (Wolves). Wolves are common, especially in the mountains and foothill areas of the Borough. Wolf numbers in this vast area have fluctuated widely since the turn of the century. In the early 1900s, caribou and moose were scarce and wolves were less abundant than they are today. Caribou and

moose became more abundant after about 1930, and by the 1940s wolves were quite abundant.

Wolves are now fairly abundant, especially in the mountains and foothills of the eastern and central areas of the Borough. They are scarce on the coastal plain, however, because of the seasonal availability of caribou and because of their vulnerability to hunters in this open country. Population density varies from about one wolf per 50 square miles in the central Brooks Range to one wolf per 100–300 square miles on the coastal plain.

During the late 1980s, the total number of wolves on the North Slope was estimated at about 400. However, more recent surveys suggest this is an underestimate and that the current population is from 500 to 700 wolves. The actual annual harvest appears to range from 80 to over 100 wolves. The harvest of wolves is greatest in the central part of the North Slope where residents of Anaktuvuk Pass and Nuiqsut hunt and trap wolves throughout the winter. The pelts of nearly all wolves harvested in the Borough are used locally for parka ruffs or in handicrafts.

3.4.3 Marine Mammals

3.4.3.1 *Agviq* (Bowhead Whales). Bowheads approach the Point Hope region from the last of March through June and follow the shore lead in the sea ice northwest to Cape Lisburne and then northeast toward Barrow. They continue to follow the nearshore lead past Barrow, arriving during the period between mid-April and early June, and continue east-northeast to summering areas near Banks Island, in Amundsen Gulf, and north of the MacKenzie River delta. In mid-September through mid-October, they return westward along northern Canada and the North Slope to the vicinities of Kaktovik and Barrow, arriving by late October. They continue westward to near Wrangell Island, then south along the Siberian coast to wintering grounds in the Bering Sea, arriving as early as September and as late as December. Feeding and concentration areas used during the fall migration period have been identified in nearshore habitats of Icy Reef.

Because of its nutritional and cultural importance as a subsistence resource,

the protection and enhancement of the bowhead whale is a major priority of the Borough. As a subsistence species, the general concerns and policies relating to all subsistence species apply to it. As an endangered species, the need for complete and accurate research information and precise and effective management practices on a continuing basis are critical.

Bowhead whale harvests by Borough residents currently are regulated by the International Whaling Commission (IWC) which has determined an annual quota of strikes and landed whales that the whaling communities cannot exceed. The Alaska Eskimo Whaling Commission (AEWC), an association of nine officially recognized Alaska whaling communities (plus Little Diomedede, which was accepted into the AWEC in 1988 but has not yet been recognized by the IWC as a whaling community), divides the quota of strikes among the nine communities each year.

All practical steps have been taken to reduce bowhead mortality rates to preserve the population. Although unpopular, quotas balance the risk to the bowheads with the cultural subsistence needs of whaling communities. Conservation is needed because of unknown factors in the biology of the species, such as productivity, age at sexual maturity, gestation period, lactation period, reproductive behavior, seasonal distribution of calving and natural mortality factors.

The Borough will continue to participate in research on the bowhead whale. These continuing studies will provide data on population size, migration patterns, morphology, effects of industrial noise and the potential impacts of an oil spill on the species.

3.4.3.2 *Aguighluaq* (Gray Whales). This endangered species is taken only occasionally at Barrow, and although plentiful, are seldom used for subsistence. Most of the mammals summer in the Bering and Chukchi Seas, occasionally penetrating to the eastern Beaufort Sea.

3.4.3.3 *Sisuaq* (Beluga). Beluga whales are hunted at most coastal Borough villages, sometimes as an adjunct to bowhead hunting. They are actively hunted in

Kaseqaluk Lagoon, which is an important summer and calving habitat for these mammals. Hunters at Point Hope account for up to 50 belugas during years of poor hunting for bowheads, but most contemporary harvest has decreased from former levels. Habitat in the area between Cape Sabine and the northeastern terminus of Kaseqaluk Lagoon is considered to be especially critical for summer use and calving. Special attention should be given to the areas near Kaseqaluk Lagoon, Kukpowruk Pass, Akunik Pass, Utukok Pass, Akoliakatat Pass, and Ice Cape where the belugas frequently concentrate. This source of *maktaa*q is an important supplement to the bowhead *muktuk* that forms the cultural base for the *Taremiut*, or coastal I_{upiat}.

3.4.3.4. *Aiviq* (Walrus). These large mammals are taken for meat, hides and ivory during July and August in Barrow and Wainwright and during June and July in Point Hope.

3.4.3.5 Seals, *Ugruk* (bearded), *Qasigiaq* (spotted) and *Natchiq* (ringed). These seals are an important subsistence resource for the coastal I_{upiat}. Ringed seals are associated with the shorefast ice and occur in highest population densities during winter and early spring months, at the time which few other marine mammals are available. Densities in the Barrow region and eastward are probably lower than in areas to the southwest toward Point Lay and Point Hope. All shorefast/landfast ice is important pupping and denning habitat for ringed seals.

Bearded seals are the largest of the three species but are generally associated with the edge of the pack ice. They are a preferred food resource and skins are still utilized for making mukluks, umiak covers and ropes. They are hunted wherever and whenever they occur and whenever accessible.

Spotted seals are similar to bearded seals in habitat requirements. This seal inhabits the Bering and Chukchi Seas and a small number have been annually harvested by I_{upiat} subsistence hunters in recent years.

3.4.3.6 *Nanuq* (Polar bear). These inhabitants of the arctic ice pack occupy

an important place in I_upiat culture. Hunting polar bears is a means of achieving status as well as meat and skins.

Population estimates of polar bears are complicated by the mobility of marked animals. Recent estimates place the total Alaska population at 3,000 to 5,000 bears, with a northern population in the Beaufort Sea and a western population in the Chukchi Sea.

The most complete study of polar bear denning in northern Alaska indicated that dens were more scattered than in core denning areas of other countries, probably due to topographic differences that affect snow drifting patterns and thus provide fewer denning sites in Alaskan areas. Denning sites are noted on Cross Island. The coastal area of the NPR–A was designated as having particular value for wildlife resources, including polar bears. In the Prudhoe Bay area, Pingok and Cottle Islands are considered important denning areas.

3.4.4 Freshwater Fisheries

A total of 19 species of fish have been reported from rivers and streams on the North Slope. Twelve species have been reported from all of the Alaskan mid–Beaufort region. Ten of these species are in both environments, thus indicating a complete list of 21 fish species that are of varying importance to the Borough residents. Fish resources are shown on Map *.

The Colville River sustains major populations of *iqalussaq* and *qaaktaq* (least and arctic cisco). Overwintering habitat is a major limiting factor and is considered critical to the survival of both freshwater and anadromous fish. That part of the Colville River between the mouth of the Itkillik and the confluence with the Killik River contains much of the best overwintering fish habitat.

Surveys of fish populations within the Borough have not been conducted in comprehensive terms, however, the studies associated with the proposed natural gas pipeline provide important information concerning critical fish habitats that deserve attention. Overwintering habitats are often associated with spring fed areas of several rivers and should be considered as sensitive during all seasons of the year.

In the eastern portion of the Borough, certain streams have been designated as having special values. The Sagavanirktok River supports large populations of arctic char and grayling, plus 11 other species of fish. The delta is an overwintering site for *igalukpik* (char) and *sulukpaugaq* (grayling), especially near Deadhorse and as far south as 15 miles from that location. The Shaviovik River is used for spawning and rearing grayling and char.

An important overwintering area is located 15 miles upstream from the mouth of that river. The Kavik River contains spawning, rearing, and overwintering habitats of importance to char and grayling, particularly in spring fed areas near the headwaters. Sadlerochit Springs is one of the larger perennial springs on the North Slope and is considered important for rearing juvenile char.

The region between Old Woman and Katak Creeks on the Hula Hula River is a major spawning and overwintering area for arctic char; a smaller overwintering area is located about 19 miles inland from the river mouth. This drainage is heavily used by the residents of Kaktovik. Spawning and overwintering areas for char also occur near the headwaters of the Aichilik River and the Egaksrak River. The Ekaluakat River, tributary to the Egaksrak, supports a large population of char that overwinter and spawn in an area a few miles above their confluence.

The Korgakut River is probably one of the most important arctic char streams of the eastern section of the North Slope, with major spawning and overwintering areas occupying a 20-mile section of the river beginning about 13 miles from its mouth and a spring fed area about five miles downstream from that major area.

The Canning River is another very important fish stream of the eastern section. Considerable areas of river icings (aufeis) indicate appreciable groundwater activity in the upper and middle reaches. These spring fed areas serve as spawning and overwintering areas for arctic char. The middle portion of the river is heavily used by char, grayling and round *anaaktiq* (whitefish). Shublik Spring, about one-half mile below the confluence of Marsh Fork River and the Canning, is an important overwintering area for char.

Within the NPRA freshwater systems, the least cisco and arctic grayling are the predominant fish species. The cisco is especially abundant in coastal plain lakes, the grayling is most abundant in mountain rivers and lakes, and the two species are nearly equal in abundance in coastal plain rivers. More important subsistence fishes such as the arctic cisco and broad whitefish depend upon the lower reaches or deep pools of major water courses for overwintering.

The Colville River drainage and the deepwater lakes and a few tundra streams to the south and east of Teshekpuk Lake represent valuable habitats for spawning, feeding, overwintering and migration by several fish species especially whitefish.

In addition to the Colville River, the Meade, Kuk, Chipp and Ikpikpuk drainages may contain important fishery resources. The lakes and streams in the northern portions of the Meade River drainage appear from initial surveys to have important whitefish population potential. Fishery resources of freshwater systems in the western part of the Borough are more limited than in the central North Slope Borough. Grayling, arctic char, *amaquq* (pink salmon) and *igalugruaq* (chum salmon) assume more importance in the west because of their relative abundance compared to whitefish. The Utukok and Kokolik Rivers contain most freshwater species commonly found on the Arctic Slope, but their value to the freshwater fishery of the area is largely unknown.

Uugaq (Arctic cod) and *kanayuuq* (fourhorn sculpin) are the most common marine fish of the Beaufort Sea and its associated estuarine systems. The cod is the most important species because of abundance and its role as an important food item for ringed seals, beluga whales, other fish and Iupiat subsistence fishermen. They are especially abundant in the nearshore (less than 8 feet deep) waters and provide a ready source of fish to coastal villages. Key species in marine environments, in addition to the cod and the fourhorn sculpin, are the anadromous *uugaq* (arctic char), *qaaktaq* (arctic cisco), *igalussa* (least cisco), *aqanaaktiq* (broad whitefish) and *piquktuuq* (humpback whitefish). In addition to the importance of nearshore habitat for feeding activities of anadromous fish, it is also a major migration pathway for the fish stocks that originate in the Colville and MacKenzie Rivers and move at least as far west as Barrow. Estuarine environments are highly productive because of available nutrients and biological cycling through efficient food webs. As a result, habitats such as Simpson Lagoon and nearby coastal waters provide special habitat for many species of fish that use such areas for spawning, feeding, migration and overwintering.

3.4.5 Birds

3.4.5.1 Waterfowl. The aquatic environments of the Borough are heavily used by significant portions of the entire North American populations of several waterbird species. About 15 species of waterfowl occur here with populations of 200,000 to 400,000. Large numbers of eiders make both westerly and easterly migrations along the Beaufort Sea coastline with up to 75,000 birds (mostly male

eiders) passing Barrow in a single day during the westerly summer molt migration movement. The spring migration mainly comprises arctic tern, loons, *niglingaq* (brant), *malgigtaasiniq* and *niglivik* (Jaegers), *kurugaq* (pintails), *aaghaaliq* (old squaw), *amauligruaq*, *quinalik*, *qavaasuk* and *igniqauqtuq* (eiders) and glaucous gulls usually proceeding eastward on a broad front along the coastal lagoon areas.

Barrier islands, such as the Jones Islands, Return Islands, Howe Island, Duck Island, Cross Island, Thetis Island, and several others in the area between Cape Lisburne and Demarcation Point, provide unique nesting habitat for seabirds, such as common eiders, old squaws, black guillemots, arctic terns, and glaucous gulls (see Map * for information on Borough bird resources). About 1,900 seabird nests were found during a 1976 survey of these islands. Common eiders occupied more than half (53%) of the nests, glaucous gulls occupied 25%, and six other seabird species nested in lesser numbers. The attraction of barrier islands for petroleum resource development activities accentuates the need to evaluate the priorities assigned to the various resources of the area.

A major consideration in the use of barrier islands by seabirds is proximity to river mouths where the shorefast ice melts in early spring and isolates the barrier islands from the mainland. Examples are the numerous colonies located between the mouths of the Colville and Canning Rivers. This situation provides security for nests from depredations of arctic foxes and leads to formation of breeding colonies. Such colonies represent important sources of bird eggs for limited numbers of I_upiat families.

Barrier Islands are considered to be special habitat for black guillemots and *kanuq* (snow geese). Howe Island and Duck Island has the only snow goose population within the State of Alaska. Seahorse, Deadman and Cooper Islands support substantial numbers of black guillemots and should be considered for special protection. In addition, the barrier islands have value as resting and staging habitats for summer and fall migrants and their structure is vital to maintaining the productive lagoon habitat for marine invertebrates.

The Colville River Delta and Fish Creek areas are important nesting, feeding, and rearing areas for black brant, white-fronted geese, ducks, loons and whistling swans. A 770-square-mile area near Teshekpuk Lake has been identified as special habitat for several thousand molting black brant, Canadian geese and white-fronted geese. Management strategies to protect the area emphasize the avoidance of disturbances during the month of July and the maintenance of lake levels that are vital to the continued vegetative growth that molting geese require for energy demands during that critical period. An important fall feeding area for snow geese is reported to be located southeast of Kaktovik, probably representing the westward part of the main pre-migration staging area for the western Canadian populations of snow geese that breed on Banks Island and in the Anderson River Delta.

Several nearshore areas of the Beaufort Sea, particularly in Simpson Lagoon, near Flaxman Island, at Camden Bay, in Jago Lagoon and Beaufort Lagoon serve as molting areas for large flocks of male oldsquaws during July. Female oldsquaws concentrate on larger inland lakes of the coastal plain to rear their broods and complete their annual molt of flight feathers. Several other types of waterfowl also use the large inland lakes, particularly those with dense stands of emergent grass (*arctophila fulva*) that provide an important food base. *Krugaq* (pintail ducks) are one of the most important populations found on the North Slope.

3.4.5.2 Shorebirds. The North Slope is recognized as an important summering area for vast shorebird populations. About 15 such species regularly breed in coastal environments, 10 species breed in foothills habitat areas, and eight shorebird species are usually associated with alpine habitats. Several years of comparative studies of nesting birds in the arctic coastal plain tundra environments found 96 to 320 nests per square mile of such representative shorebirds as American golden plovers, pectoral sandpipers, semipalmated sandpipers, dunlins and buff-breasted sandpipers. Greatest nesting density occurred in the wet coastal tundra of the Prudhoe Bay area. Lower densities were found at inland coastal tundra habitats near Franklin Bluffs and in the Colville Delta.

Data from the vicinities of Barrow and Atqasuk indicate shorebird population densities of 260 to 650 birds per square mile at Barrow during the height of the breeding season. This density declines in upland areas and rises in wetter areas to more than 1,000 per square mile as the birds rear their young and prepare for migration. Overall density at Atqasuk is considerably less than at Barrow, except during the breeding season.

Post-breeding movements of shorebirds indicate a massive buildup of birds along a narrow belt adjacent to and including nearshore habitats of the Arctic Ocean during the period of mid-July to early August.

3.4.5.3 Other Birds. A total of 97 bird species are estimated for the entire North Slope region, of which 12 are prominent in the three tundra habitats (coastal, foothill and alpine). In addition to the waterfowl and shorebirds discussed previously, some 14 species are expected to nest in coastal environments, 25 more will utilize foothill habitats, and 32 upland species will be found regularly in alpine zones.

Aerial surveys of the NPR-A during 1977 and 1978 estimated that birds other than waterfowl and shorebirds totaled two to 3 million in the northern part of the Reserve and three to 5 million in the southern portion. About 97% of the passerine, or perching birds, were Lapland longspurs.

Raptors, particularly the peregrine falcon and gyrfalcon, have high visibility because of their position at the top of the food chain and their precarious position from the standpoint of future population predictions. The peregrine falcon is currently listed as endangered and deserving of special consideration. Accordingly, a large section of the bluffs and rock outcrops bordering the central and lower portion of the Colville River has been designated for protection of more than 50 arctic peregrine falcon habitats. Results from the NPR-A studies and recent compilations provide the latest data on sensitive habitats for this species.

3.4.6 Threatened and Endangered Plants

Several plants that occur in the Borough are considered to be so restricted in nature as to be threatened with extinction. The Nature Conservancy is undertaking an ambitious cataloguing effort for indigenous plants throughout Alaska. The U.S. Fish & Wildlife Service and Bureau of Land Management also have staff who work with plant species.

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CHAPTER 4.

INUPIAT HISTORY AND CULTURE

4.1 Introduction

The subsistence lifeway and its associated social and cultural framework have been the heart of Inupiat culture for over 2000 years. This lifeway is the basis of the cultural identity of North Slope residents. This chapter examines the history and cultural resources of the North Slope Borough as a background to economic events in the last two decades. With the discovery of oil in Prudhoe Bay, passage of the Alaska Native Land Claims Settlement Act, construction of the Trans-Alaska Pipeline, improved communications and transportation and a vast capital improvements program implemented by the North Slope Borough, the communities of the North Slope have experienced a physical, psychological and economic transition unequalled in modern times.

4.2 Pre-Contact and History

Despite its relatively severe environment, the North Slope area has long been attractive for

human habitation, resulting in an extended archaeological record. The continuance of a culturally distinct population into historic and modern times prompted early ethnographic interest, accompanied by archaeological investigations. Archaeological sites have been recorded by individual researchers, by state and federally-sponsored agencies, and by the North Slope Borough. These archaeological sites document human activities over an exceptional period of time.

Discoveries in 1992 at the Mesa Site, 150 miles north of the Arctic Circle, have been dated at 11,700 years old. This is the oldest well-documented human habitation of North America. Scientists theorize that the Mesa Site was a lookout point for hunters who may have been in search of game that is now extinct, such as bison or even mammoth. Since there is no evidence of later cultures using the site, archaeologists have named this culture the Mesa Culture. The style of weapons found suggest the Mesa Site was used by a Paleoindian culture, of which no convincing evidence has been found elsewhere in Alaska prior to this discovery. Much remains to be learned about this discovery and about the people who hunted in this area thousands of years ago.

In approximately 5,000 B.C., peoples known archaeologically as the Denbigh Flint Complex inhabited the beaches of northwestern Alaska. Their technology included the microblade technique for producing long sharp slender slivers of stone, which indicates a cultural origin in Asia.

The Denbigh culture has been viewed as the beginning of the Arctic Small Tool Tradition, a pattern of occupation which lasted for several thousand years. Following several hundred years of gradual cultural dormancy, during which at least one completely alien Asiatic group known as the Old Whaling Culture briefly inhabited the Alaskan coast, the Arctic Small Tool Tradition was rejuvenated in the form of the Choris Culture. Changes in tool styles mark the evolution of the several succeeding cultural groups, the Choris, Norton, and Ipiutak Peoples. All shared in a basic lifeway which emphasized coastal settlement and subsistence and included pottery, and all are considered participants in the broad Arctic Small Tool Tradition. Sites relating to the tradition are dated as late as A.D. 500-700 in the Point Hope area and elsewhere.

At about A.D. 500 a technological shift from chipped stone tools to ground slate tools was made by the Old Bering Sea Culture, who developed a more efficient coastal economy through the use of such items as skin floats for tiring harpooned sea mammals, and toggle harpoons. Whaling

became a dominant force in the succeeding Birnirk and Thule Cultures — the ancestors of the Inupiat. The archaeological record also indicates some seasonal emphasis on inland resources, particularly caribou, suggesting a regular pattern of inland and coastal exploitation. This lifestyle continued relatively unchanged until approximately 1875, when the local economies were significantly altered by a combination of several interrelated factors, including European contact and the introduction of metal tools, traps, and guns to support and intensify fur trade; a reduction in human population due to disease, famine, and warfare; and a reduction in the numbers of whales.

Following the initial voyages of Vitus Bering in 1728 and 1741, Russian adventurers and fur traders explored the Aleutian Islands, Kodiak Island, and southeastern Alaska, leading to the establishment of several settlements by 1800. In 1778, Capt. James Cook voyaged as far north as Icy Cape. Russian penetration north into the area is not documented until M. N. Vasilev's 1820 expedition, which turned back at a point 35 miles north of Icy Cape. Several parties independently charted the northern coastline in the following years through the efforts of Beechey and Franklin in 1826, Simpson in 1837, and Kashevarov in 1838. Between 1847 and 1853 several voyages were conducted along the Arctic coast, including those by Franklin, Pullen, and Maguire.

The overall impact of these intrusions on the Inupiat inhabitants were slight and the Inupiat continued to carry on their Asian trade across the Bering Strait while Russian trading posts were operating from Norton Sound southward. The expeditions did provide a wealth of geographic and economic information which stimulated future contact in the form of commercial whaling vessels. As commercial whaling stocks declined in the southern Pacific, whalers expanded northward to take advantage of the known resources in the Bering Sea.

Commercial whaling in the Arctic grew rapidly from 1850, beginning with the discovery of bowhead migration routes and development of more efficient whaling techniques. The bowhead was originally sought for its oil, but the development of the petroleum industry in the 1860's reduced that demand. To compensate for falling prices, more whales were harvested and walrus began to be hunted as another source of oil (and ivory). Probably the most important of all developments during this time was the establishment of shore-based whaling stations beginning with the Pacific Steam Whaling Company in 1884. Additional stations quickly sprang up at various sites along the Arctic coast including a large one at Jabbertown near Point Hope in 1887. These stations engaged in baleen trade with the Inupiat. Commercial crews adopted Inupiat techniques

and Inupiat crews were hired by the stations.

The operation of the shore stations were very effective in increasing the catch of bowheads, until shortly after the turn of the century. The end of commercial whaling came as new materials replaced the need for the expensive baleen and with declining whale population. By 1914, the stations had nearly all switched their emphasis from baleen to furs or had ceased operation.

The severe decline of the bowhead was only one of several significant impacts of commercial whaling. The crews of the over-wintering ships and shore stations required large amounts of caribou. The reduction of the Western caribou herd in the latter part of the last century is attributed by some historians to extreme hunting pressure and a natural decline that began some years before. This decrease may have resulted in the death of a substantial number of inland Inupiat (Nunamiut) whose primary resource was caribou. As the caribou herds declined in the central Brooks Range, the Nunamiut then came to the coast where they hunted caribou for the whalers and engaged in fur trapping.

Mass death also resulted from foreign diseases when the Nunamiut came in contact with whalers during their annual trading fairs to the coast. The coastal Inupiat (Taremiut) were devastated by measles and influenza. Prolonged contact with wintering crews also resulted in the spread of venereal disease. It was not until the 1920's, when the Presbyterian mission doctors and hospital introduced Western medical care to the region, that the Inupiat population was able to begin recovery from the devastation of these introduced diseases.

Toward the end of the commercial whaling era, the fur trapping industry began to develop in the Arctic. In the early part of this century fur prices, especially white fox, began to rise and trapping replaced contract hunting as a source of employment for obtaining necessary trade items. At first, trapping was accomplished out of the villages. Eventually lines were extended inland and seaward. Population shifts occurred as families settled in uninhabited areas. The area east of Barrow towards Herschel Island was populated by two or three families in 1900, but by 1914 trapping camps were established at intervals all the way from Barrow to Harrison Bay. Smaller coastal settlements with trading posts to serve the trappers replaced the larger whaling settlements.

Although trapping took more time away from subsistence activities than did commercial

whaling, it also forced a wider hunting area to be used by the trapper and opened up an alternative resource at a critical time. However, traditional social relations were affected by trapping. Trapping required time away from the village and family, and was an individual enterprise, which contrasted with the usual cooperative hunting pattern.

Along with the growth of the fur industry, missionaries began to influence Inupiat culture. Dr. Sheldon Jackson, later a missionary and general agent of the Presbyterian Church for education in Alaska, was urged by a commander of one of the revenue cutters who patrolled Alaskan waters to provide for the “desperate condition of the Eskimos”. In response, the Federal Council of Churches assigned most of the Arctic region to the Presbyterians in the 1890’s, except Point Hope which was assigned to the Episcopalians.

The first Presbyterian missionary and teacher, L.M. Stevenson, was sent to Barrow in 1890. The first mission house (manse) was built in 1894 and the Presbyterian Church in Barrow was formally organized by Reverend H.R. Marsh in 1899. The missionaries disrupted traditional cultural practices and beliefs including housing, social interactions, settlement and subsistence patterns through practices such as prohibiting hunting on Sundays. However, the Presbyterian Church became an important part of the culture of the villages. In 1934, Percy Ipalook was the first of several Inupiat to be ordained into the Presbyterian ministry. Many more Inupiat were church deacons and active participants in church activities. Reverend Roy Ahmaogak, who was ordained in 1946, translated the New Testament into the Inupiat language in the mid-1960’s. Prior to that time, Inupiaq has not been a formal written language. In 1970, Reverend Samuel Simmons became the first Inupiat minister to serve as pastor of the Barrow congregation.

The first school was constructed in 1894 in Barrow, when the U.S. Government took over education from the church. In the 1930’s, the Bureau of Indian Affairs (BIA) assumed responsibility for Native education. Over the years there were many Inupiat who became teachers and worked at the school. In 1975, the BIA turned over the responsibility for education to the North Slope Borough.

The introduction of missions and schools affected the traditional Inupiat settlement patterns more than the previous economic phases. In their desire to educate their children and be near the missions and employment, the Inupiat had to spend long periods of time in a central location.

These locations, along the coast, became focal points for the I_upiat settlements. As changing economic conditions warranted, the schools and trading posts opened, closed or moved along with the villages.

Sheldon Jackson, through various government agencies, attempted to introduce reindeer herding in Alaska in the 1890's as a replacement for serious resource shortages (caribou and whale) and to provide a new economic base. Initially, reindeer were individually owned, but the property marks soon were difficult to distinguish and a new system of joint ownership was introduced with shares in a company representing the reindeer. In 1933, open herding was introduced and close supervision of the reindeer decreased. Herds developed throughout the Arctic coast at Point Hope, Point Lay-Icy Cape, Wainwright and Barrow, and by the late 1920's at Cape Halkett, Colville River mouth, Beechey Point, Barter Island and later at Collinson Point.

At the turn of the century, herds at Wainwright numbered about 2,300; in 1918 they had grown to 22,000 in Wainwright and 40,000 in Barrow. In 1940, Barrow's herd was down to 5,000 and by the late 1940's to early 1950's, no herds remained in the Arctic. A combination of events, including mismanagement, predation and social tradition led to the decline.

After a bleak period in the 1930's, the economic picture improved during World War II. Native craft sales increased due to the influx of military personnel. Exploration programs and the Naval Petroleum Reserve #4 (now NPR-A) began and in 1946, I_upiat were hired as laborers with a flexible schedule that allowed for subsistence hunting.

Other construction projects during the 1940's, such as the Naval Arctic Research Laboratory (NARL) near Barrow in 1947 and the Distant Early Warning (DEW) line defense sites in the early 1950's, provided other seasonal employment for the I_upiat . Another period of depression followed the military construction programs in which traditional I_upiat socioeconomic system reemerged as the primary economic system.

The contemporary period of political and economic development began in the 1960's with the regional organization of I_upiat political groups in response to rapid change that threatened Native land rights through land transfers, biological resource limitations, and natural resource leasing. Events such as plans for a nuclear created harbor near Point Hope in 1958 (Project

Chariot), Barrow's concerns over eider duck hunting restrictions, the I_upiat Paitot (People's Heritage) conference in Barrow in 1961, and formation of the Tundra Times in 1962, culminated ten years later with the passage of the Alaska Native Claims Settlement Act (ANCSA) of 1971.

The North Slope Native Association (later named Arctic Slope Native Association) developed as a result of the original I_upiat conference with the aim of resolving I_upiat land claims. Within a few years Native groups had filed claims to 172 million acres, about one-fourth of which the state had also selected. In 1966 Secretary of the Interior Udall put a moratorium on all land transfers to the state in response to these suits brought by ASNA until the Native claims were settled. The passage of the Alaska Native Claims Settlement Act was accomplished through association with the state-wide Native organization, Alaska Federation of Natives (comprised of Native groups throughout the state) and with the support of the oil companies who realized the claims had to be settled before their work, and that of the state's selection and lease programs, could proceed.

ASNA was parent to the I_upiat Community of the Arctic Slope (ICAS) and the North Slope Borough. The ICAS developed in 1971 through the Indian Reorganization Act of 1934 to form a federally recognized tribal governing body to manage political and business affairs of the I_upiat. However, Congress proposed the regional corporation concept and ASNA's focus then became securing the land and cash settlements required to compensate the I_upiat for the loss of their original lands. When it became apparent that the proposed settlements would leave ASNA without valuable resources such as Prudhoe Bay, ASNA began to explore another option — creation of a Borough under Alaska state law. This form of government would give the I_upiat powers of taxation to provide revenues, responsibility for education within the Borough, and zoning powers to protect subsistence and cultural resources.

The Presbyterian Church had been an important facet of North Slope Borough life since the 1890's. Through many contacts within the national church hierarchy, the Presbyterians of ASNA obtained funding to aid in development of the Borough. Despite strong opposition from special interest groups, the Borough was approved by the State's Local Boundary Commission in March 1972.

The Arctic Slope Regional Corporation began in 1972 as a profit-making corporation

mandated under ANCSA to manage its 5.6 million acres and \$36 million for benefit of the approximately 3,900 Iupiat shareholders. While ASRC's boundaries are essentially the same as the Borough's, land entitlement was limited to areas outside of conveyed lands or withdrawals such as the NPR-A and the Arctic National Wildlife Refuge (ANWR).

Village corporations were also created through ANCSA, allowing villages to select their village surface entitlements from federal withdrawals. This provision also allowed for the re-establishment of Nuiqsut and Atkasuk, traditional villages that had not been populated in recent years due to emigration to larger villages.

International challenges were met through the organization of the Inuit Circumpolar Conference (ICC) in 1977, where delegates from Canada, Greenland and Alaska met with the idea to develop an international policy on Arctic conservation and environmental protection, especially of offshore resources. The ICC now includes Inuits from Russia. Also in 1977, the International Whaling Commission voted to cancel the right of Native people to take bowhead whales. Whaling captains from nine communities created the Alaska Eskimo Whaling Commission to respond to the ban, and eventually a limited quota was agreed upon. In later years, the quota has steadily been increased with cooperative agreements with the federal government.

The Alaska National Interest Lands Conservation Act was passed in December of 1980 after several years of congressional debate. In the act were items of critical importance to North Slope Iupiat, including the creation of Gates of the Arctic National Park and Preserve, and additions to ANWR. Other sections of the act allow Arctic Slope Regional Corporation to exchange lands within the region, grant future pipeline rights-of-way across certain public lands and allow future subsurface title to village corporation lands within NPR-A and ANWR.

A Coastal Zone Management Plan for the North Slope Borough was begun in the late 1970's and finally adopted in 1988. In 1982 the Borough adopted a Comprehensive Plan. The Comprehensive Plan and Land Management Regulations adopted in the last twenty years are the primary North Slope Borough regulatory tools, which ensure the Borough's rights to control development in coastal areas to protect marine life critical to the subsistence lifestyle of the Iupiat as well as to protect subsistence and cultural resources on land. Most development requires a permit granted on the basis of Comprehensive Plan policies which discourage or prohibit negative impacts

of development and encourage positive impacts, such as local employment.

In the 1980's the Borough initiated a major capital improvements program. Millions of dollars were spent on projects to improve housing, schools, sewer and water facilities, roads, airfields and health facilities. These projects were designed to improve living conditions for Borough residents, and to provide training and employment for the shorter term construction projects as well as for the longer term in operation and maintenance of public facilities in the Borough. Ordinance 93-10 contains major funding to bring piped water and sewer systems to all North Slope Borough communities before the end of the decade.

4.3 Cultural and Archaeological Resources

The values and cultural identity of the North Slope Iupiat are reflected in their past, their traditions, and their dependence on the natural resources of coastal lands and waters. The Iupiat has developed an efficient lifestyle for living in Arctic regions that involves a direct interaction between themselves and their environment. Their adaptive harvest of the land and sea resources upon which they depend has allowed them to survive through changing environmental and resource conditions.

The legal basis for governmental concern with cultural resources resides in a body of laws and regulations formulated over a number of years. The Antiquities Act of 1906 requires protection of "object of antiquity" on Federal lands. This philosophy was expanded in 1935 by the Historic Sites Act, which authorized the Secretary of the Interior to take a leadership role in the protection of cultural resources.

The 1935 act was augmented in 1949 by a supplemental act which created the National Trust for Historic Preservation. More specific federal responsibilities for cultural resources were outlined in the Federal-Aid Highway Acts of 1956 and 1958, and Reservoir Salvage Act of 1960. The latter statute was amended by the Preservation of Historical and Archaeological Data Act of 1974, authorizing funding for archaeological mitigation due to any federally-supported construction project.

The National Historic Preservation Act of 1966 expanded the National Register of Historic

Places to include those of local, state, and regional significance and involved state and regional governments in the planning/preservation process, and established the Advisory Council on Historic Preservation to monitor the activities of all federal agencies affecting cultural resources.

The concern for cultural resources expressed by the 1966 act was amplified and included in the National Environmental Policy Act of 1969, resulting in the consideration of cultural resources along with natural resources in environmental impact statements. In 1971 Executive Order 11593 was issued to integrate the many cultural resources laws and regulations into a uniform policy, and went on to charge all land-controlling federal agencies to inventory all cultural resources in their domain to determine their eligibility for the National Register of Historic Places. This sequence of legislation has provided a firm legal basis for considering cultural resources in making overall management decisions.

Cultural resources have been defined through legal precedent and consideration of legislative intent to include traditional features and localities which display physical evidence of cultural activity, such as structures or artifacts. A more abstract concept which includes less tangible resources has come into use more recently, clarified by operational regulations and Public Law 95-341 of 1978. Thus, for example, a natural feature such as a hill or mountain can be considered a cultural resource because of its religious significance or its function as a landmark, despite the absence of any physical or cultural alteration of the natural feature.

In the North Slope Borough, where maintaining subsistence opportunities is a priority of the local residents, use areas represent the locations of natural resources together with the sites resulting from their exploitation. Many activities such as berry picking or hunting leave little or no physical evidence in the form of an obvious archaeological site, and the local residents consider the locality to be simply a use area. This broad concept tends to blur the distinction between a cultural resource and a natural resource, emphasizing the fact that land use areas are an interdependent composite of the two and are equally necessary to the maintenance of a traditional subsistence lifestyle.

All cultural sites together reflect a continuous pattern of land use in the region, so it is difficult to assign sites to certain time periods. Many individual sites were continuously occupied, and span a great length of time. The accuracy of the information for individual sites varies considerably depending on its original source. The perimeter of a traditional land use area may vary

according to individuals' experiences and perceptions, changes in resource distribution, or other factors. Finally, inventory of archaeological and traditional land use sites has been conducted sporadically over the recent decades, with varying emphasis and methods and intensities. It is likely that other significant sites within the Borough are yet to be discovered or identified.

4.4 Threats to Cultural Resources

The cultural resources of the North Slope Borough are threatened by both natural and manmade processes and activities. Cultural sites can be damaged or destroyed by erosion. Commercial development can be equally destructive to cultural resources. However, destruction of archaeological sites for the sole purpose of acquiring salable artifacts is responsible for much of the rapid deterioration of major cultural sites in the North Slope Borough.

In the Arctic environment of the North Slope Borough, there are many environmental factors which cause erosion. Very low year-round temperatures contribute to environmental characteristics such as permafrost, frost mounds, pingos and ice-wedge polygons which contribute to bluff erosion along rivers. The force of water is a factor for the short period of time that it is unfrozen; meltwater flowing downstream thaws snowdrifts and permafrost along riverbanks which undercuts the river bluff. This leads to collapse of large blocks of earth, especially along ice wedges. Moving water also loosens and transports earth. In wider rivers such as the Colville, wind can cause waves which erode the bluffs. Along the coastline, tide and wind generated waves impact the shoreline. Sea ice is driven against the beach, eroding and gouging the bank.

Manmade processes can hasten erosion. The "greenhouse effect" has been blamed for sea level increases which lead to further coastal erosion. Mining of sand and gravel from beaches removes material which protects the shoreline.

Frequently the best sites to build on are areas where erosion is most likely to occur, such as bluffs overlooking the river, coastal areas which are close enough to the ocean to provide access to marine animals, junctions of river channels, and the heads of large islands. Although natural erosion processes often reveal these sites for the first time, erosion has also claimed many significant archaeological sites in many areas. Once these sites are lost, the I_upiat lose important links to their past.

Commercial development and other construction poses a danger to valuable cultural sites. The Borough has in place policies which provide protection for such sites should they be discovered during construction. These policies respect the importance of these valuable cultural resources while acknowledging that development is inevitable and necessary in many areas.

The key to minimizing damage to cultural resources by commercial development and construction is forewarning and early input into the planning process. A field survey of potential construction areas first identifies cultural sites which may be impacted. If avoidance and preservation of the site is possible through careful planning and design changes in the project facility, then it is often a preferred solution due to several factors, not the least of which is lower cost. Otherwise some form of intensive data study, such as archaeological excavation or surface collection may be necessary. Periodic monitoring of cultural sites during construction, together with a program to inform workers of the laws and penalties of tampering with cultural sites, may be an aid in avoiding the adverse affects of surface collecting and digging by construction personnel.

One of the most serious threats to cultural sites is "pothunting", or deliberate scavenging of sites for artifacts. Old ivory in the form of large structural house supports, and smaller carved artwork and tools, is ransacked from archaeological sites for ready resale on a semi-clandestine market. In the sense that it constitutes a significant (though difficult to document) portion of the local economy, "pothunting" is a commercial enterprise. This activity is prohibited by the Antiquities Act of 1906 (and subsequent legislation) on federal land, by the Architectural Resource Protection Act on State land, and by Borough policies on Borough land. It is difficult to assess the extent of "pothunting" on privately owned land, and no legal mechanisms currently exist to protect cultural resources on private land.

The problem of unauthorized digging in ruins to obtain artifacts for sale cannot be resolved easily, yet it may be the most serious threat to the cultural resources of the North Slope Borough. The first step should be a commitment on the part of federal and state agencies to enforce the federal and state antiquities statutes. Detailed research into the role that artifact sales have in the local economy is necessary to assess the monetary and sociological magnitude of the problem.

To protect significant archaeological sites from erosion, development and deliberate looting,

sites must first be located and identified, then characterized as to their current condition and the threat of impending damage by various processes.

The North Slope Borough Traditional Land Use Inventory (TLUI) has been the vehicle to gather information from many different sources to document traditional subsistence areas and other culturally significant sites in the North Slope Borough. The Commission on I_upiat History, Language and Culture (IHLC) and Geographic Information Systems (GIS) Divisions of the North Slope Borough Planning Department have been tasked with integrating federal, state, Borough and other research into the GIS database. The database will be valuable in planning and managing North Slope Borough resources.

Map E of this plan shows, in general, historic and cultural resources of the North Slope Borough. Although much information has been collected and catalogued, more detailed maps and information will be available from the IHLC once the TLUI is completed.

4.5 The Commission on I_upiat History, Language and Culture

The Commission on I_upiat History, Language and Culture (IHLC) was founded by the North Slope Borough Municipal Code in 1975 as the Inupiat History and Culture Commission. A separate Language Commission formed in the 1970's was merged with the History and Culture Commission to form the IHLC. NSB Code lists the duties of the Commission as follows,

- A. Develop a common writing system for the I_upiat language;
- B. Develop a complete historical record of the land, people and villages of the North Slope;
- C. Translate into the I_upiat language all important documents within the North Slope Borough government;
- D. Assist in the development of facilities that will make records and collections available to the citizens of the North Slope Borough;
- E. Assist in the development of facilities and coordination of production of publication of work in the form of books, dictionaries, exhibits, films, video and audio tapes, and other media utilizing the I_upiat language, culture and history of the Inupiaq of the North Slope;
- F. Evaluate on-going programs and current developments as to their cultural and

linguistic context and impact;

G. Evaluate the existing historical, cultural and linguistic knowledge of the region, and on the basis of such evaluation identify areas and priorities for future studies and programs;

H. Cooperate with federal, state and local government, agencies, organizations in programs relating to history, language and culture;

I. Undertake at its discretion and subject to the approval of the assembly, a research and exchange program including other I_upiat –speaking people at an International level;

J. Present to the mayor, assembly and school board funding and recommendations in areas of the Commission’s concerns;

K. Seek funding for studies and programs according to priorities established by the Commission; and

L. Review all research planned or under progress relating to or bearing upon the history, language and culture of the North Slope Region. This review shall apply to research sponsored both from within and outside the North Slope region.

The IHLC is central to North Slope Borough planning and activities when they concern history, language and culture. The IHLC can provide guidance for any projects which may impact these areas.

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CHAPTER 5.

SOCIAL AND ECONOMIC FACTORS

5.1 Introduction

During recent years, the communities of the North Slope Borough have experienced physical, cultural, and economic changes unequalled in modern times. These changes have been driven by several major developments:

- The discovery of oil at Prudhoe Bay;
- The Alaska Native Claims Settlement Act;
- The Trans-Alaska Pipeline;
- Improved telephone, television, and other communications systems;
- Improved air travel service; and
- Vast capital improvements programs developed by the North Slope Borough, the petroleum industry, and state and federal agencies.

These changes have resulted in economic and social changes on the North Slope. Since the

Borough's incorporation, employment opportunities for the I_upiat have increased. However, housing shortage continues to be a Borough concern.

Through the village clinics and new technology, health of area residents has significantly improved. Childhood diseases and communicable diseases have decreased. The village clinics serve as the front line defense for I_upiat health. The Borough continues its efforts to reduce and prevent other ailments through preventative programs and early detection.

With the introduction of a cash economy and due to the harsh Arctic environment, residents have an increased demand for community centers and recreation facilities. Tourism is increasing in the Borough, including packaged tours to Barrow and outdoor activities on federal lands. While tourism aids the local economy, it also conflicts with local subsistence use of the land.

5.2 Employment/Income

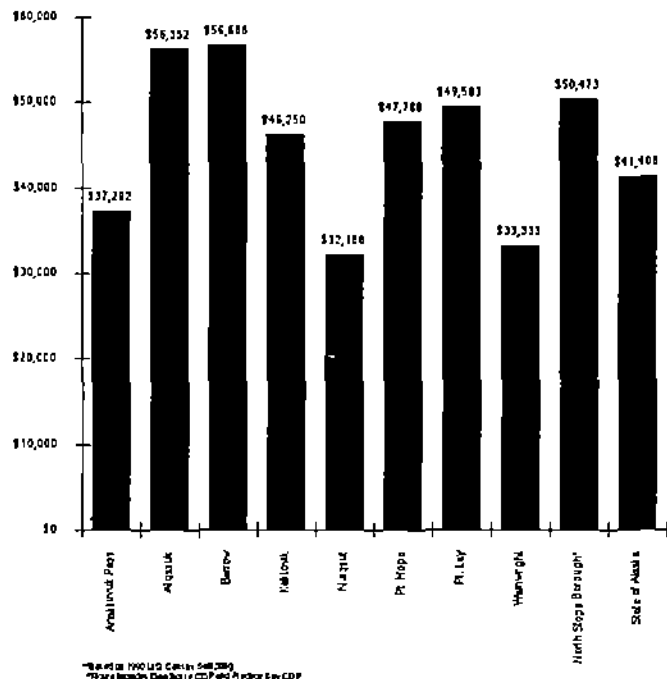
During the 1970's job opportunities increased substantially because of the rapid growth driven by Prudhoe Bay and Trans-Alaska Pipeline development, the passage of the Alaska Native Claims Settlement Act and formation of the North Slope Borough. Although employment declined with the completion of the Trans-Alaska Pipeline, the Borough increased employment through its Capital Improvements Program (CIP). Today, the Borough, combined with the school district, employs over 60 percent of the labor force.

The Borough has scheduled CIP projects, a source of village employment, through 1998. The Borough is currently funding a Permanent Fund to provide for capital and operating revenue, and fund employment positions with the Borough.

Including part-time and temporary work, the total employment in the villages increased from 1,677 in 1980 to 3,264 in 1992. This 94 percent increase in twelve years represents an average 5 percent increase per year, a rate considerably faster than an already strong rate of regional population growth. The North Slope Borough government, the Arctic Slope Regional Corporation and ANCSA village corporations and their affiliates accounted for much of the employment growth over the past twelve years.

In 1990, the median household income in the North Slope Borough communities ranged from a high of \$56,352 in Barrow to a low of \$32,188 in Nuiqsut (Table 5A). The borough-wide median household income in the traditional communities was \$50,473. In contrast, the median household income in the Deadhorse CDP was \$102,264. Household income is defined as all forms of yearly earned and unearned income from all household members. This includes Alaska Permanent Fund dividends, ASRC and ANCSA Village Corporation dividends.

Household Median Income**
Comparison by Communities



Economic prosperity is not equally shared by all households within the North Slope Borough. Of the 660 non-Iupiat households on the North Slope, 34 percent earned less than the Borough-wide median household income of \$50,473. In comparison, 58 percent of the 1,028 Iupiat households earned less than the Borough-wide median household income. According to the 1990 U.S. Census, 44 percent of the non-Iupiat households and 19 percent of the Iupiat households made \$75,000 or more a year. Furthermore, all of the 101 families on the North Slope living at or below the poverty threshold are Iupiat families.

A comparison of resident and non-resident wage-and-salary earnings in the North Slope Borough from 1980 through 1986 shows a dramatic disparity between income earned by residents compared to non-residents employed in petroleum related industries. The total earnings of all workers in the North Slope Borough in 1980 totaled \$315,093,000 compared to \$64,782,000 for Borough residents. In 1986, the difference was \$428,463,000 for all workers and \$87,178,000 for North Slope Borough residents.

From 1980 through 1986, approximately 20 percent of the total earnings of all workers in

the North Slope was earned by North Slope Borough residents. These figures illustrate the disparity between employees of the Prudhoe Bay oil and gas operations and the North Slope Borough regional economy. The consequences are significant for the Borough economy because virtually all of the income earned within the North Slope Borough by non-resident employees is spent outside of the regional economy.

5.2.1 Expansion of the Labor Force

The labor force in the Borough is projected to increase over the next decade. The labor force includes all persons from age 16 to 65 who are able and willing to work. Until the end of the century, the number of young persons entering the labor force will more than offset retirees and other labor force departures. Every person retiring from the labor force by the turn of the century will be replaced by four or five new entrants from the resident population base. This calculation does not include individuals who may migrate to the North Slope seeking employment.

5.2.2 I_upiat/Non-I_upiat Employment

For every 100 I_upiat residents employed on the North Slope, there are also 70 non-I_upiat who are employed. Non-I_upiats, however, comprise only 39 percent of the population. This indicates that the unemployment rate is higher among I_upiats.

There are several differences in employment patterns between I_upiat and non-I_upiat residents. The majority of non-I_upiat residents are employed in Barrow. Approximately 41 percent of the employed I_upiat on the North Slope are employed directly by the North Slope Borough, 13 percent by the North Slope Borough School District and 22 percent by the ANCSA village corporations. In contrast, approximately 36 percent of the non-I_upiat residents are employed by the North Slope Borough, 25 percent by the School District and 9 percent by the ANCSA Corporations.

5.3 Cost of Living

Those who perceive the North Slope Borough and its residents as being "oil rich" do not consider that the cost of living in the North Slope Borough is among the highest in the nation. This

is reflected by the fact that most Federal Government workers receive a 25 percent tax free Cost of Living Adjustment for working on the North Slope. The cost of living in the Borough is between 40 to 80 percent higher than living in Anchorage.

A 1985 study for the State of Alaska concluded that the overall cost of living was 45 percent higher in the North Slope Borough than in Anchorage. The analysis covered seven major expenditure categories including housing, food, transportation, recreation and entertainment, medical, and miscellaneous goods and services.

The study concluded that North Slope Borough communities experience the highest living costs of any region in Alaska. To place the Borough cost of living in a national context, a 1987 index of Anchorage living costs was 32 percent higher than a comparable index averaged over 260 cities in the "lower-48". This implies that the cost of living is between 75 and 90 percent higher than that of living costs averaged over various regions of the United States.

For 1985, housing, food and transportation accounted for 80 percent of North Slope Borough resident expenditures. Food prices were estimated to cost Borough residents over 60 percent more than in Anchorage for a comparable market basket of items.

The high costs of living in the Borough is not a surprise. North Slope communities are the most remotely situated and isolated in all Alaska. The communities enjoy no low cost links to the outside world. Air transportation and summer barge service represent the only transportation options for bringing goods to residents. There are no roads connecting the communities to each other or connecting to the outside world. Therefore, high transportation costs are an important determinant of high living costs in the Borough. Few goods and services available to North Slope residents escape a substantial transportation premium.

5.4 Housing

The North Slope Borough, through its Capital Improvements Program, is actively pursuing efforts to elevate the standard and quality of housing throughout the Borough. Overcrowding and homes in disrepair are concerns.

In 1985, over 18% of the 1,225 households in the Borough had three or more generations living in one household. This percentage was the highest of any Native area in Alaska. More than one-third of the residents were living in housing units in which there was 200 square feet or less of room per person. The average square footage of living space per person was 281. In contrast, an Anchorage resident had an average of 600 square feet per household resident.

While the housing situation has significantly improved since the 1970's, there is still a housing shortage in the Borough. In 1992, more than 250 families were on the waiting list in Barrow for Borough rental units. Point Hope and Wainwright are also suffering from a housing shortage.

In order to address the housing shortage, the North Slope Borough Housing Task Force was created to develop a comprehensive housing plan to increase housing for rental and ownership. The North Slope Borough Assembly has adopted several new programs.

The newest programs help families purchase a home. The North Slope Borough Home-ownership Assistance Loan Program will assist residents in obtaining financing for the construction or purchase of a home. Through this program, individuals who pre-qualify for financing from a bank can obtain low interest loans for up to half the down payment and closing costs up to \$12,500, with payments stretched over a five year period.

A Low Income Home-ownership Program will provide for the construction of five homes in each village, with low interest loans utilized to finance the purchase. Income limits for this program have not been set, but total household income must be at least \$22,000.

Another new program is the 45-Home Project. Under this program, the Tagiugmiullu

Nunamiullu Housing Authority (TNHA) received a zero percent interest loan of \$7,800,000 from the Alaska Housing Finance Corporation to finance home ownership for low income families. The TNHA will loan money to the purchaser under special financing terms. The Borough will build five homes in each of the villages and ten in Barrow. The actual cost of a 3-bedroom home in the Borough ranges from \$145,000 to \$165,000, depending on the community.

There are three other types of local governmental subsidized housing in the Borough:

- Borough owned rental units
- Mutual Help Home Ownership units; and
- Low rent rental units

There are approximately 226 Borough owned rental units within Barrow and 48 units in the other communities. The number of Borough owned rental units in the villages vary as units are completed or sold through the Mutual Help Home Ownership program. Village rents for Borough owned units range from \$557 for a studio apartment to \$947 for a 4 bedroom unit.

The Mutual Help Home Ownership program in the Borough subsidizes single family home ownership. Single family residences are built by the Borough through the Capital Improvements Program and sold to the Arctic Slope Regional Corporation (ASRC) Housing Authority, which in turn sells the residences through HUD to a predesignated buyer. Eligible buyers are selected by village resolutions based on family needs for such housing. Monthly mortgage payments are based on the income of the buyer, taking into consideration energy allowances for electricity and heating which can result in substantial monthly utility bills.

The low rent units are owned and operated by TNHA. There are approximately 71 low rent units within the Borough. Rental rates are established by ASRC Housing Authority and are based on the income of tenants, taking into consideration energy allowances for electricity and heating.

5.5 Economic Development

There have been significant developments in the Borough economy in the past 20 years. With increased development, the trade and services sector is increasing. In Barrow, there are three

hotels, several restaurants, a dry cleaner and a bank. Barrow residents may shop at a large grocery/merchandise store or at several convenience stores. Major repair services include marine engine, boat, auto and aircraft.

The trade and services sector is less developed in the villages. Still, all of the villages have a local store and four of the villages have limited lodging.

To foster local economic development, the Arctic Development Council (ADC), a non-profit economic development agency, was formed in the Borough. The ADC is a member of the Alaska Regional Development Organization (ARDOR) which is designed to promote economic development at community and regional levels. ARDORs encourage a healthier economic climate that will increase the number of jobs, strengthen existing business, encourage economic diversification, and attract new businesses to the region.

The mission of the ADC is to build sustainable local and regional economies by cultivating people-centered economic development, encouraging citizen leadership, and promoting healthy human and natural environments. Services of the ADC include:

- assisting development of business concepts and proposals;
- referring individual proposals to supporting organizations;
- promoting partnerships between private and public sectors;
- providing technical assistance, including formulation of business plans; and
- funding source research.

In 1993, the ADC second annual conference focused on four different topics: privatization, tourism development, small business development, and regional strategy for development.

5.6 Communications

Development of modern communications systems on the North Slope has paralleled the growth of government services in the Borough. Due to the immense size of the Borough and the remoteness of the villages, modern region-wide telecommunications systems are vital for the health and safety of residents and for government and business activities. Today, telephone, radio and television service, along with other state-of-the-art communications technology, is available in all

the communities of the North Slope Borough.

Telephone service in the villages is provided by the Arctic Slope Telephone Association Cooperative (ASTAC), a locally owned cooperative. Prior to ASTAC, the only communications system consisted of high frequency radio and telephone service. By 1982, telephone service was available in all the villages.

All telephone service within the Borough, except for Deadhorse which operates from microwave facilities, is delivered through satellite links. A village-to-village telephone call has an electronic journey of over 90,000 miles traveling through a "double-hop" pathway. The telephone signal travels from the sending point to the Aurora II satellite. From the satellite, the signal is sent to a switching center in Alaska and then bounced back to the satellite. The satellite sends the signal down to the destination point.

More than half of the homes in the Borough have telephones, according to the 1990 U.S. Census sampling. Only 51.2 percent of Pt. Lay homes had telephones, while Barrow had the highest percentage of homes with 88.5 percent.

Barrow telephone service is provided by GTE, which opened its first office in Barrow in 1967. Today, GTE serves approximately 1,900 customers. Local service charges have not increased since GTE opened in 1967. In 1996 the company plans to upgrade its digital switching equipment, which will allow access to custom calling features such as call waiting and conference calling.

The primary provider of long distance telecommunications in the North Slope Borough is Alascom, Inc., based in Anchorage. Once a subsidiary of RCA, since 1979 Alascom has been a subsidiary of Pacific Telecom Inc. based in Vancouver, Washington.

Alascom constructed and maintains small satellite earth stations in the villages of Anaktuvuk Pass, Umiat, Kaktovik, Nuiqsut, Atkasuk, Pt. Hope, Pt. Lay and Wainwright. The company has major earth stations in Barrow and Prudhoe Bay, as well as communications facilities at Air Force radar sites at Barter Island, Oliktok, Pt. Lay and Cape Lisburne. Alascom also built and operates the microwave telecommunications system for the trans-Alaska oil pipeline from Prudhoe Bay to Valdez. Alascom provides a range of telecommunications services through its statewide

facilities, including intrastate and interstate service via the company's Aurora II satellite. GCI now provides long distance service in the Borough as well.

In addition to modern-day digital telephone service, the communities of the North Slope Borough have access to other telecommunications technology. Through the distance delivery system, a fully interactive video conferencing system, a teacher in Barrow may simultaneously teach the same class in the seven villages. The system is voice activated, picturing the speaker on the video and providing audio. At times, over 75 students throughout the Borough may be enrolled in a distance delivery class.

Telecommunications technology is also used in the health field. Physicians at the Barrow hospital assist health aides in the village clinics through the Telehealth Network. Through a desktop video telephone system, doctors can exchange graphics and video images with the village health clinics and assist in long-distance diagnosis of injuries or illnesses.

Because of the distance and remoteness of the villages on the North Slope, the Borough has constructed teleconference facilities in all of the communities. Up to 28 phone connections may be handled in one teleconference call, allowing residents in all the communities to participate in various meetings. The teleconference facilities are also available for use by other government and social groups. With the passage of the \$1,455,000 bond proposal in 1993, new teleconference facilities will be constructed in Pt. Hope, Pt. Lay, Wainwright and Nuiqsut in the next two years.

Radio news and entertainment is provided by KBRW radio, a public radio station broadcasting from Barrow. Established in 1975, KBRW, operating with 10,000 watts of power, broadcasts in all the Borough communities. The station is a member of the Alaska Public Radio Network.

KBRW is a vital part of the Borough communication system. The station is an emergency weather broadcast station and is authorized to transmit person to person messages. At times, this is the only means to contact residents who are away from the village, such as during subsistence hunting periods.

The radio station is also a source of entertainment for residents, especially during the long,

dark winter months. At times, 95 percent of area residents are tuned into KBRW. Local programming is extensive, offering several talk shows including Public Affairs, Public Safety, Barrow Town Hall, and the Mayor's Talk Show. Other programming includes To Your Health, I_upiat Word of the Day, and I_upiat translation.

Some of the homes in the communities have television. In Barrow, residents have access to cable television through Barrow Cable Television. Through a satellite system, Barrow Cable serves 965 subscribers. The company is expanding and plans to offer pay-per-view soon. RATNET (Rural Alaska Television NETwork), a state-funded television network, provides programming and network feeds via satellite.

Limited local television programming and video production is provided by CATV. This station is funded through the North Slope Borough Mayor's Office, Public Information Division. Presently, CATV does limited local programming, but the station is scheduled for renovations and evening programming in 1994. Most work done in the studio is video production primarily for the Borough, including videos for training, workshops, public relations and documentaries. The station also produces video news releases including segments for Heartbeat of Alaska, and works with major U.S. and foreign networks to provide footage of activities in the Borough.

5.7 Tourism

Tourism activities continue to grow in some areas of the Borough, especially in Barrow and in Prudhoe Bay. The North Slope Borough is encouraging and assisting local communities in developing tourism under the control of local residents. Currently tourism in the Borough is low. However, severe conflicts arise when tourism, such as sport hunting and flightseeing, disrupt traditional lifestyles, interfere with subsistence use, or reduce local harvests. Subsistence use of fish and wildlife resources should receive priority in cases where conflicts occur with recreational tourism uses.

If access to the Borough continues to be limited to air travel, outdoor activity visits are expected to remain low at least until the turn of the century. Increased visitor demand will depend on the availability (and improvement) of airstrips, and facilities for public use, preservation of the Borough's present natural condition, and encouragement of outdoor activity. Demand for visitor

use is not expected to exceed the resource potential by the year 2,000 (except possibly for sport hunting due to the relatively low productivity of most game species).

Presently, tourism in the Borough consists of packaged tours to Barrow and Prudhoe Bay and visitors engaging in outdoor activities including sport hunting, backpacking, and river floating.

5.7.1 Packaged Tours

Packaged and organized tours in the Borough occur almost exclusively within the Barrow and Prudhoe Bay areas due to the absence of public accommodations and tourist services elsewhere in the Borough. Aircraft provide the only practical access, and very few tourists travel beyond the immediate vicinity .

Most tourists visiting Barrow are with organized tours. The tours, which begin in May and end in September, start in and return to either Anchorage or Fairbanks, and spend one day (and sometimes one night) in Barrow. A combined tour where part of the second day is spent at Prudhoe Bay is also available. Tourist attractions in Barrow include opportunities to observe Native culture, purchase local art works, visit a Distant Early Warning site, and view the Arctic Ocean and ice pack. The cost of these tours in 1993 from Anchorage was about \$489 for the combined one day tour and overnight in Barrow, and \$315 for the one day Prudhoe Bay tour.

During the 1992 tourist season, about 3,000 to 4,000 tourists visited Barrow on organized tours. The total number of tourists visiting the Borough in the future will most likely increase. The amount of increased tourism in Barrow, however, depends on the development of additional visitor-oriented recreational facilities, such as a cultural center, guided trips to historic sites and other points of interest, scenic overflights and guided dog sled or snow machine trips. The Borough is developing a cultural center to display the history and tradition of the I_upiat.

Presently, tourism in the villages is minimal. The Borough is exploring the feasibility of tourism in the villages. To minimize interference with residents' lifestyles, the villages want to promote "eco-tourism" in which visitors view the village on a unobtrusive guided tour and experience I_upiat culture.

5.7.2 Outdoor Tourist Activities

The Borough contains many physical and biological resources capable of supporting high quality visitor use. However, tourism presents potential conflict because of competition for subsistence resources and disruption of village lifestyles. Current outdoor visitor use in the area is relatively minor, largely because of inaccessibility, lack of knowledge about the area, and inadequate facilities. Still, the Borough offers expansive, unaltered natural settings, relatively treeless terrain, opportunities for wildlife viewing and successful sport hunting and fishing. Most outdoor activity tourism is limited to back country trips to the National Petroleum Reserve–Alaska (NPR–A) and the Arctic National Wildlife Refuge (ANWR).

5.7.2.1 Arctic National Wildlife Refuge. The 19.3 million-acre Arctic National Wildlife Refuge (ANWR) is managed by the Fish and Wildlife Service primarily “to conserve fish and wildlife populations in their natural diversity and to provide the opportunity for continued subsistence uses by local residents”. Located within ANWR boundaries is the approximately eight million acre Arctic Wildlife Refuge Wilderness managed under the Wilderness Act, and three wild rivers (the Wind, Ivishak, and Sheenjek) managed under the Wild and Scenic Rivers Act. Key recreational areas are located mainly in the mountains and foothills, including the major North Slope river valleys (primarily the upper Hula Hula, Okpikak, and Kongakut rivers), the upper Sheenjek river, and the Peters-Schrader Lakes.

In 1991, approximately 1,600 people visited ANWR, including backpackers, river floaters, sport hunters and subsistence users. Visitor use of ANWR has increased over the past decade, but has declined slightly in the early 1990's. A significant amount of use in the late 1990's is attributed to the heightened public awareness of possible oil and gas development in ANWR.

Many visitors to ANWR seek a unique wildlife and wilderness experience, drawn by the dramatic scenery and remoteness of the Brooks Range and the rivers. In the late 1980's, the most popular summer activity was river floating, followed by backpacking and camping. In 1989, 21 guides ran a total of 48 float or river-based backpacking trips in ANWR. The most popular fall activity was hunting.

The increased commercial and non commercial use of ANWR has led to concerns about the impacts of increasing visitor use within river corridors. Commercial visitor use increased 500 percent from 1985 to 1989, while private visitor use increased proportionately. Much of the increase was by river float groups. Visitors have commented and ANWR staff have observed that the increasing use is adversely affecting wilderness resource values. In response, the Fish and Wildlife Service is currently developing a river management plan for ANWR.

The Fish and Wildlife Service estimates that the visitor use of ANWR will increase five to eight percent annually during the next five to ten years. This estimate is based, in part, on the assumption that the Haul Road is opened to the public, providing hikers with a relatively easy and inexpensive access to the west side of ANWR. Current access to ANWR is generally via commercial aircraft to Deadhorse and charter flights from this point.

5.7.2.2 National Petroleum Reserve in Alaska (NPR-A). Current use of NPR-A is low, with only 200 to 250 people visiting the 23 million acre Reserve each year. Although no formal recreation plan exists, NPR-A is managed for non-intensive, dispersed activities, taking into account the biological and physical limitations of the Arctic and concerns of the local people. Most visitors engage in sport hunting in NPR-A. Key areas for recreation opportunities within NPR-A include the DeLong Mountains, southern foothills area, portions of the Chukchi Sea coastline (the area between Wainwright and Icy Cape) and the area immediately around Barrow. The major rivers in the area are the Nigu-Etiviluk, Colville, and the Utukok. These rivers are wild rivers under the Wild and Scenic Rivers Act. The Bureau of Land Management (BLM) does not expect recreational use of NPR-A to increase in the next decade due to limited accessibility. Currently, access to the remote reserve is by charter plan out of Bettles.

5.7.2.3 Gates of the Arctic National Park and Preserve. The Gates of the Arctic is a national park located in the south central area of the Borough. In 1992, approximately 2,100 people visited the park. The main activity in the park is river floating and backpacking. Presently, most park visitors enter the park through Bettles. Several guides operate out of Bettles, offering guided float trips down the rivers. Only a limited number of visitors enter the park from the North Slope Borough through Anaktuvuk Pass.

5.7.3 Sport Hunting and Fishing

Big game animals are hunted for sport in the Borough. Compared to other areas in the state, sport harvest is very low. Few trophy animals are found, and game populations are abundant only in scattered locations. Caribou and Dall sheep are the most sought after

big game in the Borough, followed by moose and brown bear. A few ptarmigan are harvested by visitors in association with big game hunting. Waterfowl hunting is almost exclusively a local activity because the birds are not concentrated enough to attract more distant hunters. The King Eider is the most sought after bird.

Sport hunters account for the majority of people visiting the Borough, excluding tour groups. Approximately 650 sport hunters traveled to the Borough during the 1991–92 season, according to the Alaska Department of Fish & Game, Division of Wildlife Conservation. Sport hunting has increased in the Borough, a trend that is expected to continue as the availability of game and hunter success in other areas of the state decreases. Increased sport hunting pressures will accompany any increase in bag limits, improvements in access and facilities, introduction of new game species and alteration of the protective status of other species. Since many populations are being harvested at or near optimum levels, additional hunting pressures (particularly on moose and caribou) would lead to conflicts between subsistence and sport hunters.

Conflicts with sport hunters arise from competition for available resources used for subsistence by Borough residents, the dispersment of animals out of traditional subsistence areas because of increased hunting pressure, the decline in successful subsistence harvests brought on by increased sport harvests, and the disturbance or destruction of subsistence resource habitat.

The overall, long-term potential for sport harvest of fish is low, compared with superior opportunities closer to population centers elsewhere in the state. Reduced feeding opportunities and the Arctic environment impede individual growth. Limited overwintering habitat, spawning habitat and other ecological constraints limit reproduction and survival. Consequently, increased sport fishing pressure could lead to overfishing.

5.7.4 Winter Activities

Limited winter tourism occurs in the Borough in the vicinity of the villages along major river drainages in parts of the mountains and coastline, and on well-established tracks. Winter tourism consists of snowmobiling, and to a lesser extent, dog sledding and cross country skiing. The best conditions are found where there is gentle terrain and deep,

wind-packed snow. The most favorable months for winter tourism activities are mid-March to early May, when temperatures are usually higher and periods of daylight are longer. Obstacles to winter use by visitors are high winds that restrict visibility and create severe wind chill factors, low temperatures, and the vast expanse of the coastal plain which increases chances of getting lost.

Based on existing information, very few visitors engage in winter activities. An increasing interest in experiencing many of the Arctic winter features, such as the northern lights and Kivgiq, a winter festival, will most likely result in future increased use.

5.7.5 Other Activities

Other outdoor activities engaged in by visitors to the Borough include sightseeing, photography, and nature study. Most of these activities are related to the opportunity to observe wildlife in its natural habitat, explore unusual geologic landforms, and visit paleontological, archaeological and cultural sites. Limitations on these activities are aircraft cost, accessibility to sites or localities of interest, and weather conditions such as coastal fog.

5.7.6 Haul Road Corridor

Currently, the only road which provides access to the North Slope Borough from interior Alaska is the Dalton Highway or "Haul Road". The Haul Road is a gravel roadway which parallels the Trans-Alaska Pipeline from Fairbanks to Prudhoc Bay. Although built by Alyeska Pipeline Service Company for construction and service of the pipeline, the State Department of Transportation and Public Facilities assumed responsibility for operation and maintenance of the roadway in 1978. The BLM retained responsibility of management of the public land along the road corridor; however, the State of Alaska recently selected sections of this land. The corridor ranges from 12 to 24 miles wide; its length through the Borough is about 170 miles.

Until 1981, the road had been limited to industrial use only. During the summer of that year, the road was opened for general public use north of the Yukon River as far as Dietrich Camp, about 25 miles south of the Borough boundary. In the early 1990's,

Governor Walter Hickel opened the entire road to the public. The BLM drafted a management plan including campsites, lookouts and services along the corridor. Concerned about potential damage to fish and wildlife and the effect on subsistence activities, the Borough opposed opening the road north to Prudhoe Bay without certain controls. The Borough brought suit challenging the road opening. Presently, Haul Road litigation is still pending.

Opening the Haul Road north of the Yukon to public use would significantly increase visitors in the Borough. It is estimated that in the early 1990's, over 1,500 hunters ignored the posted closure of the Haul Road and traveled the road to hunt in the Borough. Without appropriate safeguards, the increase of visitors via the Haul Road, especially sport hunters, could seriously affect subsistence hunting and gathering practices and traditional Iupiat lifestyle.

5.8 Health

Over the past twenty years, the Borough and other governmental agencies have made significant strides in improving the health of area residents. The establishment of health clinics in all the villages and improvements in the hospital in Barrow have been the impetus in improving the health of North Slope residents. The improvements to these health facilities are described in chapter 8. The health clinics provide basic health care to villagers, including vaccinations, medical care for illness, eye care, and dental examinations.

5.8.1 Recent Improvements in Native Health

Advances in the health sciences and the development of a health care system have improved the health status of Alaska Natives, according to the Alaska Area Native Health Service. The statistics of the Alaska Native Health Service include Eskimos, Aleuts, Athabascans and American Indians as "Natives". A significant technological advance was the development of chemotherapeutic agents, especially isoniazid, shortly after World War II. Isoniazid helped control the devastating effects of tuberculosis. Tuberculosis has declined as a leading cause of Native mortality as accidental deaths have risen. (See Table 5G)

5.8.2 Control of Infectious Disease

The most important control of infectious disease is the provision of safe water and adequate sewage disposal. In Alaska Native villages, where these services have been provided, the incidence of infectious enteric diseases of infancy, the most sensitive indicator of infectious disease, has decreased dramatically over the past 15 years. Currently, the Borough villages operate a honey bucket sewer system, but construction of piped water and sewer systems in the villages is scheduled to be completed by 1998. This project will reduce residents' exposure to infectious diseases.

In the area of childhood diseases, public nurses throughout Alaska have maintained high rates of infant/child vaccination, resulting in a virtual extinction of vaccine-preventable childhood illnesses. However, the Native infant population has extraordinary rates of invasive disease due to *Hemophilus influenzae*, type B (HiB) and *Streptococcus pneumoniae*. Usually, this disease occurs in the first year of life. Available vaccines for HiB are effective only after 18 months of age, when 95 percent of HiB disease has already occurred. The development of a vaccine effective in Alaska Native infants is at least three to five years away.

A model immunization program has succeeded at controlling endemic hepatitis B (HBV). About 51,000 Alaska Natives received screening for HBV and over 40,000 received at least two doses of HBV vaccine. As a result, the incidence of HBV infection in Alaska has declined.

5.8.3 Sexually Transmitted Diseases

Control of sexually transmitted disease (STD) has been a major problem in Alaska. During the last 15 years, the rate of STD's in Alaska was the highest in the nation. The rate of gonorrhea among Alaska Natives has declined during the past decade but is still significantly higher than the Alaska rate and the U.S. rate. Health officials estimate that this rate will continue to decrease with effective programs, including detecting and treating existing infections, identifying and examining sex partners, and advocating educational programs.

With the Acquired Immune Deficiency Syndrome (AIDS) epidemic, health workers have intensified efforts to impart widespread knowledge about reducing the risk of STD and AIDS. It is believed that a major risk factor in STD is substance abuse. At this time, there is only one reported case of Human Immunodeficiency Virus (HIV) infection in the Borough.

5.8.4 Adolescent Pregnancy

Adolescent pregnancy among Alaska Natives is a primary concern. For ages 15–17, the fertility rate for Alaska Natives is more than twice the U.S. rate. The fertility rate for Alaska Natives ages 15–17 was 71.7 births per 1,000 women while the national rate was 30.6.

Some of the underlying causes for teen pregnancy include sexual abuse, low self-esteem and limited life options. According to the Alaskan Adolescent Health Survey (1990), 25 percent of the female respondents had experienced sexual abuse and 23 percent had suffered physical abuse. The Borough has established many programs to address these problems as well as the underlying concerns of education and employment.

5.8.5 Alcoholism and Alcohol-Related Injuries

Alcoholism, while not a leading cause of death, is still a serious health problem in the North Slope Borough. State-wide, the U.S. Public Health Service estimates that 75 percent of all unintentional injury deaths among Natives are alcohol-related. Likewise, alcohol is involved in 80 percent of the suicides and 90 percent of the homicides among Natives.

Currently, the Borough is studying the extent of alcoholism and its resulting health effects on residents. Many health care organizations are taking a new approach to the problem. Instead of treating the behavior of alcoholism, these groups are focusing on the root cause of the behavior. The Substance Abuse Treatment Services of the NSB Department of Health and Social Services recently began publishing a newsletter focusing on substance abuse. *Aullaqusaatqigvik, A place of new beginnings* contains articles written about local residents and their battles and recoveries from substance abuse. Alcoholics

Anonymous, a 12–step support group, meets in Barrow, Anaktuvuk Pass and Point Hope. Narcotics Anonymous meets weekly in Barrow. The sale of alcoholic beverages is prohibited by law in the Borough.

5.8.6 Causes of Death in the Borough

In 1988, the leading causes of Iupiat mortality in the Borough were malignant neoplasms (cancer) and accidents. Within the Barrow Service Unit, which includes the North Slope Borough except for Point Hope and Anaktuvuk Pass, eight residents died from malignant neoplasms (including four deaths caused by lung cancer), and eight residents died from accidents.

In Alaska, accidental deaths among Natives have been declining, but are still well above the national rate. The Community Injury Prevention Program (CIPP) in Alaska is aggressively combating this killer of Alaska Natives. The death rate from unintentional injuries has dropped more than 39 percent in the last eleven years.

Heart disease was the third leading cause of death. The rate of Native mortality for heart disease has increased moderately. However, heart disease and hypertension is lower among Alaska Natives than in the nation. Many studies have focused on the role of diet in preventing heart disease among Alaska’s Native people. The traditional Native subsistence diet includes salmon, seal, walrus and whale. These foods are rich in omega–3 fatty acids.

The fourth leading causes of death in the Borough were alcohol–related deaths, cerebrovascular disease, pulmonary disease and suicide. Each of these contributed to one death in the Borough. Alcohol related deaths includes alcoholic psychoses, alcohol dependence syndrome, nondependent alcohol abuse and alcoholic cirrhosis. State–wide, the fourth leading cause of Native mortality is suicide. However, the Alaska Federation of Natives reports that most Native suicides share the common denominator of alcohol abuse. More than three–fourths of the autopsy reports on Native suicides record measurable blood alcohol levels at the time of death.

5.8.7 Infant Mortality

Infant mortality for the Barrow Service area was 30.1 deaths per 1,000 live births for 1987 as compare to 45.2 in 1979. However, the Barrow rate was still higher than the U.S. rate of 10.1 deaths per 1,000 live births.

While the infant mortality rate among Native Alaskans is higher than the U.S. rate, the overall infant mortality rate is decreasing. Until the late 1960's, infant death rates among Native Alaskans were among the highest in the world. Meningitis, measles, pneumonia and tuberculosis swept through Alaska's rural villages in waves, with babies and elders suffering the most.

Infant deaths have decreased as health aides began to work in the villages and scientists developed new vaccines and medical technology. Airplanes make daily flights between villages and regional hospitals allowing for better medical care for the villagers.

5.8.8 Causes of Hospitalization

The leading causes of hospital admissions have remained the same for 1988 through 1990. Deliveries of babies, accidents and injuries, and pregnancy complications ranked as the top three causes of hospitalization. Other causes of hospitalization included pneumonia, undiagnosed symptoms, infected skin and abrasions, and heart disease.

Approximately 20 children were hospitalized in 1990 for pneumonia. Other causes for pediatric admissions included accidents and injuries, undiagnosed symptoms, and viral infections.

5.8.9 Outpatient Treatment

Most outpatient services for adults in 1990 consisted of medical and follow-up visits. The second leading cause for outpatient visits were upper respiratory problems, followed by otitis media. Otitis media was the leading cause for pediatric outpatient treatment in 1990, followed by upper respiratory problems. Otitis media, inflammation of the middle ear, is a serious complication of viral diseases of the respiratory tract such as the common cold, flu and streptococcal diseases. Chronic or recurrent otitis media can result in significant hearing loss, impeding a child's ability to learn to speak and perform well in

school. If not treated promptly, the infection can enter and inflame the brain tissue causing abscesses, meningitis and/or mastoiditis.

5.8.10 Other Health Concerns

The Borough continues to deal with health problems unique to the area. The Health Department participated in the review of Project Chariot and requested an independent assessment of health risks associated with the Cape Thompson nuclear waste site. Another Borough issue is the effect of iodine given to residents in four North Slope communities by federal researchers in the 1960's.

The Borough will continue its goal to improve the health of its residents. For the villages, primary care is provided by a community health aide in the village clinic. The village clinic is the front line defense for illness and injury and an important aspect of preventative medicine. The Department of Health and Human Services is currently developing a community-based strategic health program called Health Plan 2000. Through its programs, the Borough will continue to provide quality health care for its residents.

5.9 Recreation

Local uses of resources, such as hunting and camping, are not considered recreational activities. Traditionally, the local use of resources in the Borough by the I_upiat have been deeply entrenched in a predominantly subsistence lifestyle. Many of the residents believe recreational use of land to be an alien concept. They view hunting, fishing, and camping as an integral part of their subsistence lifestyle, not leisure activities as they may be considered by non-residents.

Recreation opportunities in the Borough varies between Barrow and the villages. In Barrow, residents enjoy a recreation center, which includes a new gymnasium, two racquetball courts, a weight room and saunas. Events held at the center include sports tournaments, I_upiat dances and various celebrations. Other community activities include movies, dog team races, snow machine races, and Nalukataq, the celebration of a whale harvest. The North Slope Borough is also considering the development of a shopping mall that would include a movie theater and a bowling alley.

In the villages, recreational activities are limited. Due to the harsh Arctic environment, outdoor activities are severely limited during winter months. During the school year, residents may use the school gym and pool facilities in the evening. The school building is closed during the summer because school district funding does not provide for keeping the school facilities open to the public. There is a great demand in the villages for community centers as a place for recreation.

The problem surrounding construction of village community centers is that the villages have recreation powers, but do not have a source of funding. On the other hand, the Borough has the funding for community centers, but does not have recreation powers. The Borough is currently reviewing the situation. Possibly, the Borough may assume recreational powers to solve the dilemma.

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CHAPTER 6. TRANSPORTATION

6.1 Introduction

For the isolated communities in the Borough, transportation in its many forms serves as a vital link between the people and their culture, between villages in this far-flung area, and between its residents and economic activity. Families and friends can follow the well-traveled route of an historic trail to a traditional Iupiat celebration. At the same time another Borough resident can be boarding a jet airliner for a business trip to Anchorage or points south. Regardless of its form, transportation can serve both the traditional and contemporary needs of the Borough.

6.2 Air Transportation

Air transportation is the most important link between communities in the Borough and with the rest of Alaska and beyond. All of the villages have landing strips and are served on a daily basis by small aircraft, weather permitting. Barrow has daily jet service from Alaska Airlines and MarkAir with the frequency of flights adjusted for seasonal demand. Service is also available

between Barrow and Prudhoe Bay.

The Borough owns the landing strips at Atkasuk, Nuiqsut, and Anaktuvuk Pass. All are improved gravel runways of approximately 4,500 feet in length. The State of Alaska owns the facilities at Barrow, Deadhorse and Pt. Hope. Both the Barrow and Deadhorse runways are 6,500 feet in length and paved. Pt. Hope has a 4,000 foot paved runway. The Air Force owns the gravel runways at Pt. Lay, Wainwright and Kaktovik. The Pt. Lay runway is just 3,519 feet in length. Both of the other Air Force runways are approximately 4,800 feet in length. ARCO Alaska, Inc. owns the 6,500 foot runway at Prudhoe Bay.

Aircraft serving Barrow and the villages carry cargo and mail on a regular basis. Northern Air Cargo flies regular cargo runs to Barrow.

6.3 Land Transportation

6.3.1 Community Transportation

Every community in the Borough has an internal gravel or dirt road system that links it with an airport or marine lightering area or both. Village residents use motor bikes, bicycles, all-terrain vehicles, cars or trucks in summer and snowmobiles in winter. Freight haulers and mining exploration crews rely on tracked vehicles and Rolligons. No public roads connect the Borough's communities to one another. Winter trails, including historic overland routes, as well as those established during oil exploration or postwar (DEW Line) construction are still used.

Barrow has the most extensive gravel road system (about 38 miles of road), linking the community to NARL, Emaiksoun Lake (the village's principal water source), the gas field, scientific sites and Nuvuk. Road conditions vary according to season, frequency of use and maintenance. Approximately 1,400 motor vehicles are registered in Barrow. Fewer than 400 motor vehicles are registered in the seven villages in the rest of the Borough, where roads total less than 50 miles.

The communities of the North Slope Borough have requested a variety of projects. Many of the projects are directly related to village transportation. These include:

- Upgrading existing roads;
- Construction of roads which have been platted but not yet constructed;
- New roads;
- New subdivisions;
- Re-platting existing subdivisions to provide larger lots;
- New boat launches;
- New breakwaters/docks;
- Bridges; and
- ATV trails.

The total cost of all projects requested for each community are given below.

Estimated Total Project Costs

Anaktuvuk Pass	\$ 12,290,000
Atqasuk	3,370,000
Barrow	51,030,000
Kaktovik	7,220,000
Nuiqsut	7,650,000
Point Hope	35,435,000
Point Lay	2,965,000
Wainwright	2,176,000
Total	\$ 122,136,000

6.3.2 Prudhoe Bay/Deadhorse

Prudhoe Bay/Deadhorse has a well-developed, high-quality gravel road system which links the airport, the Prudhoe Bay facility and various drill pads, storage and dump sites. The road system is connected to the Alaska highway system by the North Slope Haul Road.

Petroleum exploration and development activities around Prudhoe Bay require

extensive logistical support, travel over off-road routes and creation of new routes. Most surface operations are limited to winter, when the ground is frozen and can support the equipment and there is enough snow cover to protect the surface and its vegetation layer. Permits to travel over designated off-road routes are required by the federal and state governments. Winter operation is generally restricted to the November 1 – April 15 period. In other times, ground conditions are monitored and operations are considered on a case-by-case basis. Summer operation is confined to tundra and upland areas, using vehicles that minimize surface and soil disturbance. Rolligons are currently the only wheeled vehicles permitted on the tundra in the summer.

Ice or compacted snow roads are constructed and maintained for large volumes of traffic or continuous use. These are suitable for heavy-duty highway vehicles. At present, ice and snow roads are used on the North Slope for moving large quantities of gravel to well sites for drilling pads, for gravel-road construction, for hauling water required for well-drilling and for moving drill rigs. BP Exploration (Alaska) Inc. was experimenting in 1993 with a new portable drill-pad technology that seeks to maintain a frozen surface for two years.

6.3.3 Haul Road

Construction began on the North Slope Haul Road on April 29, 1974, and was completed in 154 days. The road was designed and built by oil companies as a service road for construction and maintenance of the Trans Alaska Pipeline. It covers a route between the Yukon River and Prudhoe Bay.

In 1978, the Haul Road was turned over to the State of Alaska and the first 56 miles were opened to the public. In 1982, after much debate in the state legislature, year-round public access was extended another 155 miles, to Disaster Creek. This is a point 206 miles from Prudhoe Bay, and nearly 100 miles north of the Arctic Circle, making it the northernmost public road in the United States.

Beyond Disaster Creek (near Dietrich), travelers must apply for permits to continue on the road. These permits, granted by the Alaska Department of Transportation, are given only for the following uses:

- Commercial and industrial uses related to the oil, gas or mineral industries;
- Official government business;
- University of Alaska–affiliated research;
- Mass transit; and
- Access by residents to their property.

A checkpoint where permits **must** be shown operates 24–hours a day.

The State of Alaska has tried to open the entire Haul Road. The Borough strongly opposes opening any more of the road to the public. Opening the road to public access will bring about increased sport hunting, fishing and tourism. These activities will adversely affect the subsistence hunting and culture of Borough residents.

On July 1, 1991, the Borough filed a lawsuit that sought to prevent the state from opening the Haul Road. The Borough's position was upheld by the Superior Court where first a preliminary and then permanent injunctions were issued, blocking opening of the road. The case has moved to the Alaska Supreme Court.

An ice road/Rolligon route running near the coast connects Kaktovik and Barrow. The more than 350-mile route passes through Deadhorse and Nuiqsut. From Barrow, the ice road runs south for some 75 miles to Atqasuk. A winter route also connects Anaktuvuk Pass with the Haul Road, more than 75 miles to the east.

6.3.4 Traditional and Off-Road Routes

A number of traditional routes are still in use today for inter-village surface travel, much of which is by snowmachine. Dog teams have been replaced by snowmachines. Travel is possible throughout much of the area for eight months of the year or longer, generally October through May.

6.3.5 Gates of the Arctic

More all-terrain vehicles routes will become available in Gates of the Arctic National Park and Preserve if Congress approves a proposed agreement between the National Park Service, the city of Anaktuvuk Pass, the Arctic Slope Regional Corporation and Nunamiut Corporation. The proposal, presented to Congress in late 1992, would remove wilderness status from 27,762 acres in the park, and allow access to the 30,642 acre Akmagolik and Contact Creek areas by conveying them to the corporations. The proposal would also allow all-terrain vehicle access for subsistence to 126,632 acres of park land; 80,401 acres next to linear ATV easements held by Native landowners and an additional 46,231 acres removed from wilderness status.

In exchange, the legislation provides for village residents and corporations to limit ATV use for subsistence on 126,632 acres of park land. Development would also be limited on 116,940 acres of Native land within park boundaries, and public access across 148,484 acres of Native corporation land around Anaktuvuk Pass and Chandler Lake would be improved. An additional 17,985 acres of park land would be classified as wilderness and 38,840 acres of Native land would be conveyed to federal ownership.

6.3.6 Oil Pipelines

The 800-mile Trans-Alaska Pipeline System (TAPS) carries crude oil south from Prudhoe Bay to Valdez. Oil flows from wells at the Prudhoe Bay field via a gathering system to Pump Station 1, where TAPS starts. The 48-inch pipeline is elevated for half of its route. In addition to the pipeline, principal components include pump stations, which push the oil along its course to the Valdez marine terminal.

The TAPS pipeline is a common carrier and therefore, comes under the jurisdiction of several federal and state agencies, including the U. S. Department of Transportation and the Federal Energy Regulatory Commission.

6.3.7 Constraints of Seasonal Land and Snow Availability

The beginning and end of the winter travel season is governed by two factors; ice cover on water bodies and sufficient snow cover to prevent damage to tracked and runner-equipped machines. In a typical year, ice cover will form on major water bodies in November. By mid-December both lake and river ice covers are normally thick enough for safe snowmachine travel. Breakup generally occurs in May. Adequate snow cover for winter trail construction can normally be expected by November and will last until mid-May, giving a five month period for winter trail use.

6.4 Water Transportation

Summer sea-lifts bring general cargo and fuel to the coastal communities and Prudhoe Bay. During the month of August, a general cargo barge from Seattle makes stops at Pt. Hope, Pt. Lay,

Wainwright, Barrow and Kaktovik. Full cargo containers are dropped at each community along the route and materials and equipment are ferried between communities. On the return route, the empty containers are picked up for the trip to Seattle. A fuel barge makes calls to the same communities during this time.

A sea-lift has served Prudhoe Bay, located near the mouth of the Sagavanirktok River in the Beaufort Sea, every year but one since 1969. Cargo is lightered from an anchorage almost two miles offshore. Over the years, everything from general cargo to construction materials, drilling rigs and housing modules have reached the Prudhoe Bay oilfield by barge.

Small motorboats abound on fresh and salt waters, providing an avenue of summer travel and a way to carry on subsistence activities.

Rapid growth in recreational use of the Arctic National Wildlife Refuge has prompted the U.S. Fish and Wildlife Service to consider limiting rafting and other use of rivers in the refuge. Commercial recreation in the refuge increased 500 percent from 1985 to 1989, with a proportional increase in private recreation. Most of the users are float groups, especially on North Slope rivers. After a slight dip in 1990, recreation in 1991 and 1992 increased to 1989 levels. Within the refuge, the Porcupine River was the most heavily used river as of 1988.

6.4.1 Ice Breaking Tankers

The State of Alaska, private shipping companies and the Northern Forum, a multigovernment panel with representatives from all the Arctic nations, are promoting extending the Arctic Ocean Northern Sea Route used traditionally by Russians to include the Beaufort and Bering Seas and North Pacific Ocean. The State of Alaska and private companies have already set up experiments shipping cod from Unalaska to Norway by way of the Bering Strait and European Arctic. Year-round operations of the Northern Sea Route would require ice breakers to clear paths for the cargo ships. Ice breakers have also been considered for transporting oil from the Canadian Beaufort Sea, using a western route through the Beaufort and Bering Seas. However, oil industry interest in exploring and developing the Canadian Beaufort has dwindled in the past four years.

6.4.2 Petroleum Development

Resource exploration, extraction and export will require new air, marine and land transportation facilities. New fields along the perimeter of the Prudhoe Bay and Kuparuk Rive fields are expected to come on-line in coming years, with production piped through

existing facilities. Larger prospective fields in the Colville Delta, the Beaufort Sea, the Brooks Range foothills and the National Petroleum Reserve would require pipelines and service roads to connect any production facilities with the Trans Alaska Pipeline System (TAPS). See Chapter 7 for a detailed discussion of petroleum development.

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CHAPTER 7. OIL, GAS AND MINERAL DEVELOPMENT

7.1 Introduction

The mainland and offshore lands of the North Slope Borough contain substantial petroleum, natural gas and coal resources. Resource exploration has been ongoing since the 1940's, with sizable development and production activities ongoing since 1974. Activity is likely to continue over the next two decades. Resource development takes place on federal, state, and regional corporation lands. The vast majority of the energy resources produced in the Borough are transported out of the Borough and, with the exception of natural gas in Barrow, finished petroleum products are shipped in at great cost.

With the exception of a small surface coal mine near Atkasuk and intermittent activity at the Deadfall Syncline near Point Lay, extraction of mineral resources other than gravel has not progressed beyond feasibility studies. Potential resource areas have been delineated through

exploration, and as land status issues are being settled, deposits with higher economic potential may undergo feasibility studies in preparation for eventual development and permit application stages.

Gravel is treated as a mineral resource because of the high demand for gravel as a construction material for transportation facilities (roads, airfields, facility construction and offshore structures). Extraction of gravel presents potential engineering and environmental problems; distribution and ownership of the resource affects cost.

7.2 Petroleum Development

7.2.1 History of Petroleum Development

Alaska's North Slope area oil and gas operations actively began in 1944 when the U.S. Navy began a ten-year drilling program in the 23-million acre Naval Petroleum Reserve No. 4, resulting in nine oil and gas discoveries — often near sites of observed oil seeps. In 1977 the reserve was redesignated the National Petroleum Reserve-Alaska (NPR-A). Exploration in the NPR-A has continued at varying levels since the 1940's.

While the BLM rates the entire NPR-A area as having high potential for oil and gas, the largest discovery (estimated 70- to 120-million barrels) has been identified near Umiat. Other potential fields are located at Cape Simpson and the Fish Creek area. Gas is produced at sites known as East Barrow and South Barrow (both of which also have unproduced oil), and Walakpa. Untapped reserves exist at Square Lake, Meade and Wolf Creek. Many oil and gas discoveries have not been developed because they were not considered commercially viable. No NPR-A oil fields are currently in production.

As NPR-A was being explored in the 40's, 50's and 60's, federal land east of NPR-A and south of the present Prudhoe Bay oil field was explored by private oil companies. In 1964 the state of Alaska began leasing areas on the arctic coastal plain within the three mile limit of the Beaufort Sea, between NPR-A in the west and the Arctic National Wildlife Range (ANWR) to the east. In 1968 the mammoth Prudhoe Bay oil field was discovered with an originally estimated 9.6 billion barrels of recoverable oil and 26 trillion cubic feet of recoverable gas. By 1977 the 800-mile trans Alaska oil pipeline was operational, carrying

Prudhoe Bay crude oil to awaiting tankers at Valdez.

Exploration activities, following a ten-year federal land hiatus in the 1970's, have continued through the 1980's and into the 1990's. While exploration continues, most North Slope land has already been offered for oil and gas lease; it is projected that nearly all state-owned land between NPR-A and ANWR will have been offered by 1997, according to the state's five-year leasing plan. An exception is some offshore land; the ownership of these small barrier islands remains in question pending the outcome of state/federal litigation. Some Native-owned land has also yet to be offered for lease.

The Arctic Slope Regional Corporation (ASRC) has been actively leasing its lands to oil companies in the central and western areas of the Borough. However, commercial quantities of hydrocarbons have not yet been found.

Oil production now occurs in six major North Slope fields in the Prudhoe Bay region: Prudhoe Bay (by far the largest field), Kuparuk, Milne Point, Endicott, Point McIntyre and Lisburne. BP Exploration's offshore Niakuk field is expected to begin producing by early 1994. Other commercial discoveries in the area are undergoing further development and will probably be brought on-line in the not too distant future. These include the West Sak field west of Prudhoe Bay. Other discoveries including the Point Thompson, Kuvlum, Badami and Colville River finds may also hold commercial potential. Most of the newer fields entering production are significantly smaller than the original Prudhoe Bay discovery. But the huge Prudhoe Bay field makes the development of the nearby smaller fields economically viable.

7.2.2 Exploration

Locating and confirming potential petroleum hydrocarbon deposits takes place in two stages. During the initial stage, a geophysical survey is conducted to analyze the geological substructure of potential lease areas. This can be done using various methods including seismic surveys. The prime objective of a geophysical survey is to identify and locate favorable reservoir rocks and structures in which oil and gas could have accumulated. Four types of studies are used in determining appropriate locations for geophysical surveys. These studies include:

- Consideration of the potential onshore extensions of producing formations;
- Consideration of the potential offshore extension of producing onshore formations;
- Comparison of lithology of non-producing nearshore formations with comparable formations elsewhere in the world that are hydrocarbon bearing; and
- Gravity and magnetism measurements by aircraft and ships which may provide a general picture of the structural configuration and the type and depths of sedimentary rocks that underlie the land surface and sea floor.

These geophysical surveys normally can be carried out with little or no physical contact with the land or sea surfaces and therefore represent a minimal threat to subsistence environments.

In areas where positive indications of potential exist, further studies are required. Positive signs of hydrocarbon potential usually require geological exploration of the substructure and may involve drilling of a stratigraphic test well (onshore or offshore), side scan sonar equipment, dart sampling techniques, and offshore shallow core drilling.

Once a lease sale has been held, the second and more intensive phase of exploration begins. If an exploration well indicates the presence of a petroleum bearing strata, additional wells are drilled to determine the boundaries of the reservoir. This can be accomplished to a certain extent through directional drilling from a single drill site, through sharing information with other area or unit operators, or by drilling additional wells at new drill sites established nearby. These wells are called confirmation or delineation wells. This latter group of exploration activities requires specific contact with the surface and subsurface elements and therefore represents an area of concern for potential conflict with subsistence resources.

Depending on the party that issues the lease, and whether the lease is located onshore or offshore, exploration activities are subject to seasonal and operational restrictions. Onshore exploration activities are often limited to winter months, when frozen ground minimizes the impacts of surface disturbance. Until a field is determined to be

economically developable, use of existing support facilities (airfields, roads, docks, and drill pads) or construction of temporary snow/ice roads and pads are preferred by regulating agencies. Offshore exploration operations take place on platform rigs, barrier islands or on artificial gravel or ice islands placed on the sea floor. A ruling by the Alaska Department of Natural Resources has restricted offshore drilling in state waters to 6-1/2 winter months of the year. Prudhoe Bay has traditionally been the center for support of offshore operations, which consist of air transport and ice/snow roads to drill sites.

7.2.3 Production

The time between field discovery and significant production normally averages between four and nine years, depending on environmental problems, government policies, and economics. Development of an economic field involves drilling production and secondary recovery wells (injection wells), and constructing access roads, airstrips, gathering and transmission pipelines and pads. Depending on field size, field development requires between 64 (300-million-barrel field) and 475 (five-billion-barrel field) production and injection wells. Development activities take place on a year around basis once transportation and other support facilities have been installed. Directional drilling is utilized to minimize the need for new roads and drill pads, save time, reduce costs, and reduce environmental problems. During pipeline construction, a gravel road is usually constructed first and utilized as the construction pad for gathering and transmission pipelines.

In some ways, development of an offshore field is similar to onshore operations, primarily in sequence and length of time. Because of cost and environmental considerations, more emphasis is placed on directional drilling. Offshore gathering and transmission pipelines are buried in the ocean floor to a depth below the zone of ice gouging, six feet or more.

Once the major production facilities are in place, peak production could be expected in two to five years and remain at that level for three to eight years and then decline 10 to 12 percent per year. The productive life of an oil field is usually 20 to 30 years. The production rate varies with the size of the field. After a certain amount of oil is pumped from a field, a

secondary recovery method such as water flooding or gas injection may be necessary to increase the amount of oil recovered. In addition to a means of moving the oil to market (by pipeline from the North Slope), additional infrastructure is associated with production and support activities. These may include power generation, separation, gas conditioning and compressing systems, injection facilities, pump station, and a camp complex for field operations.

7.2.4 Infrastructure And Logistics

Current petroleum-related infrastructure on the North Slope is primarily associated with development of the Prudhoe Bay and associated fields, although support bases for exploration activities do exist in the NPR-A at Barrow and Camp Lonely. The Prudhoe Bay fields infrastructure consist of residential and lodging facilities, power generation plants, staging areas, warehouse buildings, drilling rigs, separation facilities, infield petroleum transport facilities, crude oil processing equipment and gathering systems, and injection equipment. They also include communications systems (microwave, telephone and base-to-mobile equipment network), airstrips, roads, docks, and the trans-Alaska Pipeline System.

Most of the heavy equipment used for exploration development and production is brought to the North Slope by barge during the few ice-free weeks in late summer. Ship transport is precluded by the absence of adequate port facilities and the shallow offshore water. Other equipment, supplies, and fuel are transported year-round by truck via the Haul Road, while food and personnel are flown in.

Ground transportation for geophysical operations and for moving equipment and supplies to drill sites during winter (when most ground transportation takes place) is done on snow, ice, or all-season gravel roads; or off road by low-ground-pressure vehicles such as tundra-tired vehicles, rolligons and sleds.

7.2.5 Environmental Impacts

Alaska's North Slope is considered a delicate and valuable ecosystem providing habitat for a variety of wildlife. More than 100 species of birds depend on the North Slope's wetlands for nesting, feeding and rearing their young. Lakes and streams support several species of fish. The North Slope is home to brown bears, polar bears, musk oxen, wolves, wolverines, arctic foxes and two large caribou herds which migrate across its vast expanse. Offshore, the sea is rich in wildlife including 21 species of marine mammals, most of which are migratory. They inhabit the Beaufort and Chukchi seas for critical periods in their life cycles. An example is the bowhead whale population which migrates along the long

coast in spring and fall. Tables 7A through 7D, on the following pages, detail environmental impacts.

Table 7A

from "Environmental Quality Impacts from NPR—A Petroleum Development and Production"

Water Quality

Action	Impacts	Magnitude	Term	Location
Construction activities (stream crossings, dredging, roads and airfields, drill pads, causeways, camps, ditches, gravel extraction).	• Surface disturbance, alteration of soil thermal regime, alteration of drainage pattern.	**	*/***	*/**
	• Increased turbidity.	**	*	**
	• Thermokarst, icings, ponding, flood hazard.	*/**	**	*/**
Sewage effluent	• Increase in organic nutrients; alteration of aquatic habitat.	**	**	**
Solid waste disposal	• Leaching of organics and metals into active layer; degradation of surface water.	**	**	**/**
Thermal effluent	• Heat transfer; possible reduction in ice thickness.	**	*	**
Saltwater transport – spills	• Increased salt concentration in fresh water and active layer.	*	**	**/**
	• Destruction of salt-intolerant flora; fish kills.	**	*	*
Oil spills (crude, fuel, lubricant)	• Toxic effects on biota	***	**	*
	• Interference with reaeration and photosynthesis	**	**	*
Drilling mud – escape from pit.	• Toxic effect on biota	**	*	*
Drilling	• Depletion of water resources; impaired water quality.	*/**	*	*

Snow and ice roads	• Depletion of water resources; altered drainage patterns.	*	*	*
Hydrostatic testing of pipelines, storage tanks.	• Depletion of water resource	*	*	*
Water flooding (fresh water)	• Depletion of water resource	***	**	**/**
Domestic water use	• Depletion of water resource	**	**	**/**
Operation of pipelines	• Thermokarst, frost heaves • Ponding, change in vegetative patterns.	**	**	*
		*	**/**	*

Air Quality

Action	Impacts	Magnitude	Term	Location
Construction activities (drilling, blasting, road pads, airfields, pipelines, camps).	• Dust	**	*	*
	• Combustion emissions	**	*	*
	• Decreased albedo and increased snowmelt.	*	*	*
	• Ice fog	**	*	**
Fixed plant operation (gas blowdown, power plants, gas flaring).	• Combustion emissions	**	**	*/**
	• Decreased visibility	*	**	*
	• Ice fog	**	**	*
	• Impaired human health	*	**	*
Accidents (spills, blowouts, fires, explosions).	• Hydrocarbon vapors (spills)	*	*	*
	• Combustion emissions	**	**	*/**
Burning mudpits	• Combustion emissions	**	*	*/**
Waste incineration	• Combustion emissions	**	**	*/**
Fuel, crude oil and gas (storage, handling, transfer).	• Hydrocarbon vapors— potential fire or explosion and hazard to human health.	*	*	*
Pipeline operation	• Change in micro climate – heat or cold transfer.	*	**	*
	• Altered soil temperature regime.	*	**	*
	• Green trails.	**/**	**/**	*
Traffic – air and ground	• Dust and combustion emissions	*/**	**	*

Noise Levels

Action	Impacts	Magnitude	Term	Location
Fixed plant operation	• Noise and vibration	*/**	*	**
Accidents (blowouts and explosions).	• Noise and shock	*	*	*

Construction activities	<ul style="list-style-type: none"> • Effects on humans – hearing loss, reflex changes, disturbed sense of balance, pain, fatigue, circulatory disorders, annoyance, decreased job performance. • Effects on wildlife – similar to human effects, altered behavior and stress. 	*/*	*/*	*
Traffic – air and ground	• Noise and vibration	*/*	**	**

Key:

Magnitude	* = minor	** = moderate	*** = major
Term	* = short	** = intermediate	*** = long
Location	* = onsite	** = local	*** = regional

Table 7B

from “Fish and Wildlife Impacts from Petroleum Development and Production”

Source	Impacts	Magnitude	Term	Location
Construction (material borrowing, foundations, facilities, pipelines, waste disposal, water supply, traffic, human presence, failure).	• Loss/damage of aquatic, terrestrial, riparian, and coastal habitat.	**/**	*/**	*/**
	• Mortality of fish populations	**	*	*/**
	• Mortality of wildlife populations	**	*	*/**
	• Blocks to fish passage	***	*/**	**/**
	• Blocks to wildlife passage	***	*/**	**/**
	• Fish entrapment	*	*/**	*
	• Wildlife attraction or feeding	**	*/**	*
	• Wildlife harassment	**/**	*/**	**
	• Increased fish and wildlife harvest	**/**	*/**	**
	Operation and maintenance (facilities, oil and gas wells, pipelines, waste disposal, water supply, traffic, human presence).	• Loss/damage to habitats	**/**	**/**
• Mortality of fish populations		**	**	*/**
• Mortality of wildlife populations		**	**	*/**
• Blocks to fish passage		***	**/**	**/**
• Blocks to wildlife passage		***	**/**	**/**
• Wildlife attraction or feeding		**	**	*
• Wildlife harassment		**/**	**	**
• Increased fish and wildlife harvest		**	**	**
Rehabilitation (removal of facilities, revegetation).	• Unknown – impacts depend on whether populations can recover following construction and operations impacts.	Unknown	Unknown	Unknown
Key:				
Magnitude	* = minor	** = moderate	*** = major	
Term	* = short	** = intermediate	*** = long	
Location	* = onsite	** = local	*** = regional	

Table 7C

from "Impacts on Archeological and Historical Resources by Petroleum
Development and Production"

Source	Impacts	Magnitude	Term	Location
Excavation borrow pits, quarries, trenches, pits, blasting).	• Obliteration of part of all of sites	***	***	*
		***	***	*/**
	• Buried site exposure	*/***	*/***	*
	• Changes in artifact preservation	***	***	*
	• Destruction of artifacts			
Drilling	• Changes in artifact preservation	*/***	*/***	*/**
	• Destruction of artifacts	*/***	***	*
Construction:				
Snow and ice roads	• Changes in artifact preservation	*/***	*/***	*
	• Alterations in erosion pattern	*/***	*/***	*/**
Sand and gravel roads, work pads.	• Site burial	*/***	***	*
	• Changes in artifact preservation	*/***	*/***	*
Pipeline	• Changes in artifact preservation	*/***	**/***	*/**
Human activity	• Changes in artifact preservation	*/***	*/***	*
	• Increased discovery and looting of sites	**/***	***	*
	• Increased discovery and scientific consideration of sites	*/***	***	*
Waste disposal	• Chemical contamination of artifacts	*/***	***	*
	• Changes in artifact preservation	*/***	*/***	*
	• Strata disruption	**/***	***	*/**
Accidents (mechanical, chemical spills, fire).	• Strata disruption	**/***	***	*/**
	• Changes in artifact preservation	*/***	***	*
	• Buried site exposure	***	***	*
Emergency clean-up procedures	• Strata disruption	**/***	***	*/**
	• Changes in artifact preservation	**/***	*/***	*
	• Contamination of artifacts	**/***	***	*
	• Obliteration of part or all of site	***	***	*
	• Buried site exposure	***	***	*/**
	• Exposed site burial	**/***	***	*

Abandonment (stabilization, revegetation, contouring).	• Strata disturbance	**/**	***	*
	• Site burial	**/**	***	*
	• Buried site exposure	***	***	*
	• Artifact preservation changes	**/**	**/**	*
	• Obliteration of part or all of site(s)	***	***	*

Key:

Magnitude	* = minor	** = moderate	*** = major
Term	* = short	** = intermediate	*** = long
Location	* = onsite	** = local	*** = regional

Table 7D

from "Socioeconomic Impacts from Petroleum Development and Production"

Factors	Primary Impacts	Secondary Impacts	Magnitude	Term
Population	• Increase in number of people in area	• Stress on infrastructure	***	*
		• Stress subsistence resources	***	***
		• Increase racial tension	**	*
		• Increase cost of living	**	*
	• Shift cultural composition of region to non-Native.		Unknown	***
	• Shift Sex ration of population to predominately male.	• Worsen race relations	**	*
	• Loss of regional isolation.	• Make maintenance to traditional culture difficult.	***	***
Villages	• Increase demands on infrastructure	• Stress existing infrastructure	***	***
		• Improve infrastructure	***	***
		• Increase demands on transportation facilities.	**	*
	• Increase demands for housing.		***	*
Subsistence	• Stimulate nontraditional use of wildlife.	• Compete with subsistence use of wildlife.	**	*
		• Make subsistence hunting more difficult.	***	***
		• Decrease subsistence resources	***	***
		• Increase air traffic.	• Harass wildlife,	***

		especially subsistence species.		
		• Harass Native hunters	***	***
	• Pipeline and roadway barriers.	• Decrease numbers of subsistence animals.	***	***
		• Increase access to traditional subsistence lands.	***	***
		• Increase difficulty of locating subsistence animals.	***	***
Economics	• Increase number of jobs in region.	• Decrease unemployment.	**	*
		• Increase need for areas resident job training.	**	*
		• Increase cost of living.	**	*
		• Increase employment opportunities for women, young and old.	**	*
		• Stimulate Native population stability.	**	***
		• Stimulate competition between job time and subsistence time.	**	***
		• Stimulate competition among workers for existing jobs.	**	*
	• Increase opportunities for small businesses.	• Decrease unemployment.	***	*
		• Increase opportunity for resident investment.	**	***
		• Increase regional economic stability.	**	***
	• Increase tax revenues.	• More money available to borough and villages.	***	*
		• More jobs available to resident.	**	*
	• Increase tourism	• Increase job opportunities	**	***
		• Tourist activities compete with subsistence.	***	***
North Slope	• Increase funds available	• Increase investment	**	*

Borough and Arctic Slope Regional Corporation.		opportunities. • Increase job opportunities for residents	**	*
	• Increase in demand for employees	• Increase competition for workers • Increase operating costs • Increase area inflation	* ** **	* * *
	• Increase number of responsibilities assumed.	• Stimulate growth in local government	Unknown	***
	• Increase investment opportunities	• Increase financial stability of ASRC. • Increase local investment opportunities • Increase competition between new and previous investments.	** ** *	* * *
Government and local politics.	• Increase demands on local government.	• Increase need for governmental employees • Increase costs of local government.	* **	* *
	• Increase need for local control and participation.	_____	***	***
Lifestyle	• Increase pressure for resident to accept change.	• Increase difficulty of maintaining traditional culture. • Decrease opportunities to pursue traditional activities. • Stress traditional kinship patterns.	*** *** ***	*** *** ***
Social problems	• Increase racial tension	• Stress social structure	**	*
	• Increase alcohol/drug abuse.	• Increase area health problems • Intensify area crime problems	*** ***	*** ***

Key:

Magnitude	* = minor	** = moderate	*** = major
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Term	* = short	** = intermediate	*** = long
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Oil or gas development on the North Slope inevitably impacts the natural environment. Concerns include air pollution from production and pipeline facilities; habitat destruction from the construction of roads, airstrips, and production and pipeline facilities; and negative wildlife/wilderness impact from the increased presence and activities of man and his equipment. Offshore development also carries additional risks associated with the effects of chronic pollution from oil spills and drilling wastes, and disturbance from drill rigs, supply vessels, aircraft, industrial noise, and other activities. Also of concern are the effects on marine life caused by the construction of long gravel causeways built to reach offshore facilities.

The bowhead whale plays an important role in the subsistence lifestyle of many North Slope residents. For this and other reasons, the well-being of the 7,800 members of the western arctic bowhead stock is very important. In April and May spring migration brings them from wintering grounds in the Bering Sea. They follow open ice leads along the Chukchi Sea coast from Kotzebue to Barrow, then turn east to follow leads along the Beaufort Sea coast toward summer grounds in the Canadian Beaufort Sea. During late August and September they turn around, heading west through the fall to eventually disperse back into the Bering Sea and for some, back to Russian waters. Whalers are concerned that expanding offshore exploration and production activities will interfere with the customary migration routes and patterns of the whales upon which several North Slope communities depend. Arco Alaska's discovery of the offshore Kuvlum oil field about 60 miles east of Prudhoe Bay has brought the issue to a head.

In August 1993, North Slope whalers along with the North Slope Borough, village corporations in Barrow, Kaktovik and Nuiqsut, and other plaintiffs, filed a lawsuit against the government for allowing oil exploration in the path of migrating bowhead whales in the Beaufort Sea. The plaintiffs seek to stop ARCO's testing activities at the Kuvlum site until villages meet their whaling quotas and the whales have had a chance to complete their regular migration. The National Fisheries Marine Service had given ARCO permission to conduct work at their Kuvlum site provided they conduct a comprehensive whale migration monitoring program during the fall of 1993.

As the *Anchorage Daily News* wrote, "The suit is the latest episode in a long-

running clash. At issue is control of the seas at a critical time when subsistence hunters chase whales as one of the state's largest oil companies chases new reserves.”

Others have expressed concern that in the event of an offshore spill, oil would likely concentrate in the restricted lead systems where whales often travel.

There has been much debate concerning the possibility and likelihood of major oil spills from exploration and production rigs operating offshore in the Beaufort and Chukchi Seas where weather, and especially sea ice, add to the inherent risks. Federal Minerals Management Service reports conclude that, cumulatively, the probability of one or more major spills in the Beaufort and Chukchi seas from outer continental shelf development would be 100 percent over time.

Industry's primary response to a major oil spill in the offshore arctic calls for burning spilled oil. Test-burning spilled crude oil under controlled conditions has proven inconclusive at best. Alternate spill response technology, including the use of skimmers, would likely be impossible or inadequate in solid or broken ice conditions.

Onshore, other issues continue to receive attention including the impact oil field exploration and development has on wildlife — especially the migrating caribou herds. A state of Alaska 1.05 million acre lease sale in the fall of 1993 (Lease Sale 57 — North Slope Foothills) focuses the debate on how herds might respond to east/west oil pipelines if development and production should occur within the lease area just north of Anaktuvuk Pass. Area hunters are concerned that gathering pipelines and transmission pipelines connecting fields with the trans Alaska pipeline might divert herds away from entering area valleys as they migrate south through the Brooks Range. The North Slope Borough, although aware of local concerns, has not opposed Lease Sale 57.

Much has been learned about how wildlife interacts with the trans Alaska pipeline during the years since its construction. Among other things, researchers have found that caribou will cross under elevated sections of the pipe, but don't like to use specially constructed ramps over the pipe because they can't comfortably see what awaits them on the other side.

Another environmental impact is noise. Noise associated with resource development both onshore and offshore has the potential to disturb wildlife and sea mammals, impacting their cultural, nutritional and economic value to Borough residents. Careful consideration should be given to the effects of noise on the subsistence resources. The Borough's management and regulatory policies regarding noise will be directed towards protecting the subsistence resource.

The reaction of caribou to a variety of noises has been investigated in conjunction with development at Prudhoe Bay. The most thoroughly investigated disturbance is that caused by low-flying aircraft. Both fixed wing aircraft and helicopter disturbances were observed over herds of varying size, at different altitudes, times of the year and under varying weather conditions. The greatest reaction was consistently exhibited during the post calving season. In declining order of reaction, the other seasonal responses were winter, spring migration, calving, fall migration and summer dispersal.

Although it is well known that whales, particularly the beluga, are sensitive to noise disturbance, relatively little quantitative information is available on the auditory sensitivity of whales. Two types of extraneous sounds may affect whale behavior, impulse and chronic background noise. Impulse noise often elicits a startle reflex. The characteristics of this reflex vary with the species, age, sex, physiological and psychological status.

The effects of low level chronic noise on whales is thought to occur mainly through interference with the acoustical sensor-receptor system. Sounds similar in decibel range, but at a higher noise level to that emitted by gray whales, may mask the whale's sounds.

Unlike low level noise, high level noise may cause injury to whales. At sound levels exceeding 137 decibels, impacts may be inflicted on whales due to high pressure. During seismic testing near Prudhoe Bay, an underwater explosion was measured at 148 decibels. An underwater disturbance of this magnitude creates peak pressure of 365 pounds per square inch. Based on a formula for underwater attenuation rate, any whale within 200 yards would probable have sustained an injury or been killed.

The same sounds which influence whale behavior may also affect seal behavior. Both ringed seals and bearded seals vocalize at a noise level similar to that of whales, but at a higher frequency. As with whales, impulse and chronic background noise can potentially alter behavior. The startle response in these animals usually results in a dispersal from rookeries, often taking the form of a mass movement to the water. This action may result in the disruption of mother–pup pair bonds and the accidental injury or death of pups. Subsequent recolonization of the rookery may then be associated with territorial aggression and injury. Repeated disturbance may cause the abandonment of a traditional breeding area.

It must be noted that increased environmental awareness as well as lessons learned in North Slope oil and gas development have, in some cases, lead to safer practices and more sound environmental policies. Newer fields have incorporated measures that have reduced some of the impact of oil development. Many legitimate concerns remain, however. Future development must always be weighed against potential and real environmental impact.

Impacts to wildlife habitat are associated with:

- Any activity that removes, scars, or covers the surface vegetation which, in turn, leads to increased erosion, permafrost degradation or drainage changes;
- Oil well blowouts, spills, leakage, or release of other toxic materials capable of killing or damaging vegetation;
- Any activity that will increase the frequency or intensity of tundra fires, such as a burning oil or gas well blowout;
- Degradation of the quality of land surface or water bodies by the disposal of solid or liquid wastes;
- The creation of physical barriers, such as roads, pipelines, or other facilities that separate large tracts of previously continuous wildlife habitat and may lead to differential use of habitats by wildlife; and
- Any activity such as gravel or sand borrowing or water withdrawal, that will result in the lowering of habitat quality for aquatic invertebrates and, indirectly, for waterfowl and shorebirds.

In general, damage to wildlife habitat can be reduced by:

- Constructing compact facilities utilizing directional drilling and multipurpose work areas to eliminate a proliferation of connecting roads and pipelines;
- Developing oil fields sequentially in relatively small parcels so that the first small parcel is developed, its oil produced and area rehabilitated before another small parcel is developed;
- Scheduling construction and production activities for non-peak wildlife habitat use periods;
- Utilizing prior planning based on specific research to eliminate or minimize vegetation scarring, oil spills, fires, pollution, or habitat fragmentation by pipelines and roads; and,
- Limiting alterations to waterfowl habitats.

In general, damage to aquatic habitat can be reduced by:

- Limiting all activities within or adjacent to waterways;
- Breaching causeways to allow the flow of water and the movement of aquatic wildlife;
- Placing all storage areas for oil, fuel, or toxic materials away from waterways and locating wells away from watercourses;
- Limiting the amount of water use and using several withdrawal sites, especially in winter;
- Treating all sewage according to applicable standards prior to discharge, and prohibiting discharge of solid waste to waterways on top of ice; and
- Scheduling construction near waterways to avoid migratory fish runs.

7.2.6 Construction

Large scale construction in the Arctic requires importing equipment and workers. At peak periods of construction activity, encamped workers and support operations can introduce many disruptions to fish and wildlife and their habitat.

General measures to mitigate impacts associated with construction include:

impacts;

- Confine or limit facilities to the smallest area possible to reduce overall impacts;
- Provide for fish and wildlife movement around construction facilities and locate facilities away from traditional migration routes, calving or nesting areas;
- Conduct specific research on animal disturbance as part of the design stage of any oil and gas development plan for the North Slope;
- Design and enforce regulations that prevent workers from harassing wildlife; and
- Control litter and trash and ensure the proper disposal of construction materials.

Arctic construction requires large amounts of sand and gravel to insulate foundations and prevent permafrost thaw. Borrow sites for this material should be carefully selected to avoid serious erosion or wildlife habitat disturbance. There may be some shoreline areas of active deposition where borrowing may take place without serious disturbance to wildlife habitat, but most areas would be sensitive. To mitigate the impacts of borrowing, work should be done in strict adherence with guidelines for site selection, mining and rehabilitation including:

- Avoid material borrowing in or near endangered species habitat, active stream channels and fish wintering sites or spawning sites;
 - Minimize erosion and siltation by using control structures such as settling basins;
 - If possible, leave buffer strips at least 500 feet wide between mining sites and active streams;
 - Locate access trails or other structures in the flood plain in such a way as to minimize damage and to provide for fish passage;
 - Prohibit fueling facilities in flood plains; and
 - After mining, reshape borrow areas to fit existing topography and drainage and restore natural condition by cleanup and revegetation as needed.

Water demands during both the construction phase and operation of any oil or gas

facility will be large, particularly in winter. The magnitude of water withdrawal impacts will depend on the season, type of source, location of the source in relation to fish and wildlife use, and the amount of water required.

The effects of obtaining water supplies during construction can be mitigated by:

- Avoiding any water body that is a significant aquatic habitat or that requires a permanent road;
- Spreading summer and winter withdrawals among several sources to lessen overall impacts;
- Providing erosion control devices at all withdrawal points; and
- Controlling use of large, deep lakes as water sources.

Mitigation of the impacts of permanent water supply withdrawal for an oil and gas development complex involve:

- Establishing an artificial reservoir system, which will disrupt some present fish and wildlife habitat but will ensure a winter water supply; and
- Maximizing water recycling to minimize withdrawal.

7.2.7 Off-Road Travel And Marine Transportation

Geophysical operations require off-road travel. These operations should be restricted to winter because mobile seismic crews often move via tracked or tractor-type vehicles that pull sleds. These “trains” are capable of causing surface damage unless a sufficient layer of snow is present to protect the surface and its vegetation. Even with mitigation measures strictly enforced, overland travel of this type may cause compaction and possible marring of the surface which can result in abnormal patterns of vegetative growth, ponding water, and minor erosion in summer months.

The impacts of off-road seismic work can be mitigated to some extent by:

- Combining all seismic work so the same surface area does not receive repeated surveys;

- Traveling only where and when sufficient snow cover has accumulated to protect the surface (normally between October 15 and November 1) and ceasing when snowmelt begins (early May);
- Properly disposing of all waste materials;
- Prohibiting blading of the ground surface; and
- Avoiding steep slopes and snow-free areas.

Extensive use of marine transportation is possible if development occurs near the coast. Assuming marine transportation methods would be similar to those used at Prudhoe Bay or at coastal villages and government Distant Early Warning Line (DEW Line) sites, a summer barge transport mode would be used in future exploration and development. Summer barge traffic causes few impacts, barring accidents such as oil spills, that would likely destroy marine life. But barge traffic would require construction of wharves or causeways for direct freight handling or establishment of lightering beaches where the freight comes ashore. Establishment of these lightering points, even on gravel beaches, subjects the beaches to heavy-equipment movement leading to erosion problems and will disrupt the traditional waterfowl and marine life use during the summer. This activity may also damage the winter habitat of polar bear and arctic fox.

Mitigation of the construction impacts of wharves and causeways and establishment of lightering beaches includes:

- Investigation of marine processes at prospective sites for wharves, causeways, or beach lightering points to allow for optimal selection; and
- Investigation of each possible site to ensure that the chosen site has the least impact on waterfowl, polar bear or arctic fox.

7.2.8 Oil Drilling

Oil drilling presents some potential impacts on fish and wildlife and their habitats. Mitigation of drilling impacts could include:

- Maximizing use of directional drilling;
- Sequencing development over a widespread field so a small parcel is

utilized;

- Shielding drilling rigs within partitions to lessen visual and noise impacts;
- Maximizing the effectiveness of blowout preventers and the containment of drilling wastes; and
- Regulating flight operations, especially helicopter, to and from drilling sites, along specific flight paths and schedules according to season.

7.2.9 Rehabilitation And Cleanup

The rehabilitation and cleanup of any area disturbed by construction or operation activities should be a part of the overall plan for oil and gas development. The objective of any rehabilitation program should be to promote soil stability and encourage the re-establishment of natural plant communities. The main problem in any reseeded program is application of seed before snowmelt occurs. The dry summer season and coarse-textured berm materials are not conducive to plant establishment. Other factors that limit native plant establishment and growth are warm surface soils and high soil-water evaporation rates over any buried oil line, or cold surfaces and possibly shallow active layers over a buried, refrigerated gas line. Herbivore grazing coupled with moose and caribou trampling make it difficult to maintain a plant cover if the species grown are selectively grazed. Gravel berms, however, can be best left unseeded.

During the design stage of any proposed project, specific studies should be performed in areas of proposed development to test the applicability of revegetation studies done in the Alaskan and Canadian arctic for past petroleum developments.

Measures for rehabilitation and cleanup include:

- Avoiding disturbance of any organic layer over permafrost beyond actual construction areas to limit the area where rehabilitation will be needed;
- Applying dust control measures during all activities to avoid damage to vegetation outside work areas;
- Planning the layout of material borrow sites to limit the area and degree of vegetation damage and soil erosion that might occur;
- Stockpiling vegetative organic mats stripped from work areas for reuse in

restoration;

- Disposing of surplus excavated material in a manner that prevents further vegetation damage or soil erosion;
- During any phase of development, restricting all mobile ground equipment to prepared foundations; and
- Studying the use of fertilizers in conjunction with any reseeded research.

Additional cleanup procedures should include:

- Removal of all solid waste from work areas; and
- Restabilization and recontouring of slopes.

The impacts of abandoning oil and gas developments on the North Slope are not predictable. However, it can be generally assumed that if development impacts have not been severe enough to prevent fish and wildlife resource recovery, complete abandonment of all facilities with some type of restoration may allow reasonable recovery of the present biotic resources.

If oil and gas developments are abandoned, it is likely that a system of roads would be left behind in areas that have been traditionally roadless. Unless properly managed or made unusable, these roads may allow or even encourage access and use by non-resident visitors, hunters and other recreational users. Questions about the eventual disposal of the Prudhoe Bay development also include the possibility that the former oil field housing and facilities might be taken over by other interests to accommodate tourists, other new businesses, or even residential housing.

7.2.10 North Slope Oil Production

North Slope oil production peaked in 1988 at 2.0 million barrels per day. Since then production has declined (despite the use of the latest production-boosting technology) to 1.8 million barrels per day in 1992, and down to 1.6 million barrels per day in 1993. Combined production from all current and planned Prudhoe Bay area fields will decline to an estimated 1.0 million barrels per day in 2000, and to 137,000 barrels per day in 2015, according to state estimates. It should be noted that such projections are revised annually

and are based on a number of factors including current economic forecasts, known reserves and projected technology. Over the years, projections for recoverable reserves as well as production trends have consistently expanded, even though the daily flow rate through the trans Alaska pipeline has continued to decline, paralleling early projections. (See Tables 7E, Historic North Slope Oil Production; 7F, North Slope Oil Production Forecast; 7G, Trans Alaska Pipeline Annual Through-Put; and 7H, Trans Alaska Pipeline Average Daily Through-Put)

By the beginning of 1977, the year the trans Alaska oil pipeline entered service, the state estimated that approximately 9.6 billion barrels of recoverable oil reserves existed at Prudhoe Bay. Sixteen years later in 1993, some 9.3 billion barrels have flowed through the pipeline (nearly equal to the entire original estimate), while current state estimates still place recoverable Prudhoe Bay reserves at an additional 4 billion barrels. This translates to almost a 50 percent growth in recoverable reserve estimates for the Prudhoe Bay field. Estimates for remaining reserves at all North Slope fields total about 6.7 billion barrels. (See Table 7I, Estimated Remaining Reserves)

Table 7E
 Historic North Slope Oil Production
 millions of barrels per year
 (figures have been rounded)

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
North Slope		.060	.314	.323	.130	.127	.529	.722	.993	113.2	397.7
Endicott											
Kuparuk River											
Lisburne											
Milne Point											
Prudhoe Bay		.060	.314	.323	.130	.127	.529	.722	.993	113.2	397.7
Sag Delta											
Schrader Bluff											
West Sak											
	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
North Slope	468.4	555.6	556.7	592.0	601.1	608.8	650.4	665.3	715.8	743.5	687.4
Endicott									8.8	37.9	36.6
Kuparuk River			1.1	32.4	39.9	46.2	79.7	95.0	103.7	111.1	109.8

Lisburne			.002	.2	.09	.29	1.1	3.6	16.6	15.8	14.2
Milne Point							.70	4.7	.04		3.7
Prudhoe Bay	468.4	555.6	555.6	559.4	561.1	562.3	568.6	561.8	586.7	578.7	522.9
Sag Delta											.354
Schrader Bluff											
West Sak					.006	.124	.326	.300			

1990 1991 1992 * cumulative *

North Slope	654.3	664.9	642.5	9,267.5
Endicott	37.0	40.2	41.4	198.4
Kuparuk River	107.2	113.5	117.3	947.0
Lisburne	15.7	14.7	14.3	95.3
Milne Point	6.6	6.7	5.9	27.9
Prudhoe Bay	486.2	486.7	461.4	7,991.0
Sag Delta	1.6	2.4	1.0	5.2
Schrader Bluff	.004	.756	1.2	1.8
West Sak				.755

* estimated

Table 7F
North Slope Oil Production Forecast
Average Number of Barrels Per Day For Each Year And
Total Number of Barrels During 23 Year Span ¹ (in thousands of barrels)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
North Slope	1,665	1,596	1,620	1,501	1,386	1,259	1,133	998	876	766
Endicott ²	110	94	83	72	63	55	47	40	34	29
Kuparuk River	310	310	310	295	280	265	250	220	190	170
Lisburne	40	34	27	22	17	14	11	10	9	8
Milne Point ³	17	16	16	17	18	19	20	20	18	16
Prudhoe Bay	1,166	1,078	1,078	987	893	800	708	621	540	467
West Sak						6	12	12	25	25
Point McIntyre	20	60	90	90	90	75	60	50	40	35
Niakuk/Alapah			10	10	15	15	15	15	12	10
Prudhoe Bay other	2	4	6	8	10	10	10	10	8	6
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
North Slope	697	609	527	460	381	335	288	252	220	196
Endicott ²	24	21	18	16						
Kuparuk River	150	125	105	90	75	65	55	45	35	30
Lisburne	8	8	8	8	8	8	8	8	8	8
Milne Point ³	14	13	12	10	8	6				

Prudhoe Bay	405	353	308	270	238	211	187	167	151	136
West Sak	50	50	42	35	30	26	22	18	14	12
Point McIntyre	32	30	28	26	22	19	16	14	12	10
Niakuk/Alapah	9	7	6	5						
Prudhoe Bay other	5	2								

	2013	2014	2015	Total
North Slope	174	155	137	6,289,315
Endicott ²				257,690
Kuparuk River	25	20	15	1,253,775
Lisburne	7	6	5	105,850
Milne Point ³				87,600
Prudhoe Bay	124	114	105	4,054,055
West Sak	10	8	6	147,095
Point McIntyre	8	7	6	306,600
Niakuk/Alapah				47,085
Prudhoe Bay other				29,565

¹ Includes oil, condensate and natural gas liquids

² Includes Sag Delta North

³ Includes Schrader Bluff

Table 7G
Trans Alaska Oil Pipeline Annual Through-Put at Pump Station #1
(in millions of barrels)

1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
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112.315	397.149	467.939	554.934	556.067	591.142	600.859	608.836	649.887	665.435	716.662
1988	1989	1990	1991	1992*	Cumulative*					
743.302	688.062	654.551	665.175	640.729	9,313.044					

* estimated

Table 7H
Trans Alaska Oil Pipeline Average Daily Through-Put at Pump Station #1
(in millions of barrels, figures have been rounded)

1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
.610*	1.09	1.28	1.52	1.52	1.62	1.65	1.66	1.78	1.82	1.96
1988	1989	1990	1991	1992	1993					
2.03	1.88	1.79	1.82	1.75	1.61*					

*estimated

Table 7I
Estimated North Slope Remaining Oil Reserves
(in millions of barrels)

Developed

Endicott	258
Kuparuk	1,254
Lisburne	106
Milne Point	88

Prudhoe Bay	4,054
Prudhoe Bay other	30
Undeveloped	
Beaufort Sea	180
Pt. Thompson/Flaxman Island	200
West Sak	147
Niakuk/Alapah	47
Point McIntyre	307
TOTAL	6,671

A big question affecting North Slope oil and gas exploration and development for the next decade focuses on the debate to open ANWR to such activities. ANWR covers approximately 18 million acres in the northeast corner of Alaska and is part of nationwide system of wildlife refuges administered by the U.S. Fish and Wildlife Service. With regard to geologic oil characteristics, ANWR has many similarities to the NPR-A, but in a much smaller area. Some studies conclude that ANWR has the same high potential for oil and gas as NPR-A and the same high risk owing to uncertainties in field formation, development costs, harsh operating environment and market forces. The extra dimension of debate centers on environmental issues — particularly the impact that oil and gas development would have on the pivotal Arctic coastal plain and the 180,000-member Porcupine caribou herd that uses the area as a birthing ground.

The 1.5 million acre Arctic coastal plain — the only part of ANWR currently deemed prospective for petroleum — continues to undergo scrutiny. The Alaska National Interest Lands Conservation Act (ANILCA) mandates evaluation of the plain (termed the 1002 area) for its oil and gas potential while commercial exploration and development is on

hold pending possible wilderness classification for the area by the U.S. Congress. This is a politically-charged issue. The Secretary of the Interior, Bruce Babbitt, has said that idea of drilling in the wildlife refuge is dead for five to ten years.

If the 1002 area of ANWR holds viable oil and gas reserves and is developed, numerous permanent facilities would be built including a main camp, production facilities, an airstrip, roads, and possibly a marine facility. The most probable method of transporting the oil is by an east-west elevated pipeline to the trans Alaska pipeline pump station 1, there joining the 48-inch pipeline to Valdez.

The exact timing and location of any future petroleum activities will be influenced by several factors: lease sales, new petroleum discoveries, economic, and legal and regulatory concerns. Because of the oil and gas supply, the support infrastructure and a means of transporting oil (through the trans-Alaska pipeline), Prudhoe Bay will remain the center of petroleum related activity on the North Slope for the foreseeable future.

Exploration activities usually begin one to two years after the award of a lease, depending on the ability to mobilize equipment, and may last up to five years. Most leases require that exploration activity take place within a certain time after the award.

Development of areas more remote from Prudhoe Bay such as NPR-A, ANWR, and Chukchi Sea lease sale area are subject to increased support and transportation costs over the distance from Prudhoe Bay and the Haul Road corridor. The decision to develop new fields may hinge on either finding a large field or connecting enough small fields to make feasible a new pipeline to connect with the trans-Alaska pipeline. The trans-Alaska pipeline itself should be able to accommodate the production from new fields as the flow from the original Prudhoe Bay fields continues to decline. The condition of the pipeline will require ongoing monitoring and maintenance as it ages and approaches its original projected operating life span of 30 years.

7.2.11 Federal Leasing Programs

The federal government has jurisdiction for oil and gas leasing on federal lands within NPR-A, the Central Arctic Management Area (CAMA), ANWR and offshore areas

beyond three-miles from shore. In the first two programs (NPR-A and CAMA), BLM has jurisdiction for developing and managing the lease program. The federal Department of the Interior's U.S. Fish and Wildlife Service, manager of ANWR, also oversees resource assessment and planning for any future leasing in the wildlife refuge. For offshore leasing the Interior Department's Minerals Management Service has jurisdiction. In all cases, the Minerals Management Service manages surface activities in the immediate vicinity of approved activity sites, such as exploratory wells.

The NPR-A leasing program developed in the early 1980's identified 21.6 million acres as available for oil and gas leasing, subject to stipulations. Certain portions of the NPR-A were excluded from leasing due to environmental concerns about the possible impact of development upon the western arctic caribou herd calving area, Utukok uplands and the highest density black brant (geese) molting area — areas totaling about 1.45 million acres.

The federal subsurface rights of village lands at Barrow, Atkasuk, Nuiqsut and Wainwright are not offered for lease until ASRC has exhausted subsurface selection rights under ANILCA.

Lease sales across NPR-A were projected by BLM to be held each year through 1987, but the Arctic District Office of BLM reports there was little interest in those lease offerings, with few leases remaining active today. No new lease offerings are planned at this time.

Since 1979, 1,009 offshore federal leases have been sold in the Beaufort and Chukchi seas. As of August 1993, 358 leases remain active. Active lease status does not, however, necessarily suggest that exploration or development on that lease is ongoing at the present time or that production will necessarily occur from sites within that lease.

Current planning for the future leasing of federal lands beyond the state's three-mile offshore limit is directed by a five-year planning document prepared by Interior Department under President George Bush in 1992. This five-year program considers making available for leasing areas off the North Slope in the Beaufort Sea in 1995, in the Chukchi Sea in

1996, and in the Hope Basin near Point Hope in 1997. The long processes of area evaluation and decision making is underway for the Beaufort and Chukchi lease programs, with a similar process for the Hope Basin program scheduled to begin in mid-1994. According to the offshore planning document, consideration will be given to establishing a nearshore "coastal buffer" for migratory whales in the lease sale evaluation process.

7.2.12 State Leasing Program

Much of the North Slope sub-surface resources located between the NPR-A and ANWR as well as offshore lands within a three-mile limit fall under the jurisdiction of the Alaska Department of Natural Resources' Division of Oil and Gas. Since 1959 the state has conducted 70 oil or gas lease sales, at least 28 of those have been for areas on or offshore the North Slope.

The current state leasing plan covers the period 1993 through 1997. In it are 11 proposed or completed lease sales for areas on or offshore the North Slope; three areas were designated for sale in 1993, one for 1994, three in 1995, one in 1996 and three more in 1997. A map and table showing these planned sales is at the end of this Chapter.

7.3 Natural Gas

North Slope gas production began in 1946 from the South Barrow field in NPR-A which has continued to supply gas for local use in Barrow. Some 47 years after production began at South Barrow, the field is nearing the end of its life span with an estimated 88 percent of its resources depleted. A nearby field, East Barrow, came on-line in 1981 and is estimated to be about 54 percent depleted. Walakpa, a new field south of Barrow, is now on-line and also supplying Barrow with natural gas.

The other gas-producing region of the North Slope is at Prudhoe Bay, 200 miles distant. During the approximately 16 years of oil production at Prudhoe Bay, large amounts of natural gas have been re-injected into the reservoir with only small amounts tapped for local use in the Prudhoe Bay area. Since 1977 net gas production has grown in all but two years to 252 billion cubic feet in 1992. Production is expected to continue to grow for the next several years, whether or not a natural gas pipeline paralleling the oil pipeline is built (see Potential Trends elsewhere in this

chapter). By the end of 1992, North Slope fields had produced some 1.9 trillion cubic feet. North Slope proven natural gas reserves total 37 trillion cubic feet. Some estimates also project potential undiscovered reserves totaling an additional 100 trillion cubic feet of natural gas.

Natural gas production is expected to continue to grow for the next several years, whether or not a long-discussed natural gas pipeline is built paralleling the oil pipeline from Prudhoe Bay. By the end of 1992, North Slope fields had produced some 1.9 trillion cubic feet, the vast majority of which is re-injected into the Prudhoe Bay fields aiding oil production as well preserving the gas. North Slope proven natural gas reserves total 37 trillion cubic feet. Some estimates also project potential undiscovered reserves totaling an additional 100 trillion cubic feet of natural gas.

The idea of building a pipeline to carry North Slope gas south from the Prudhoe Bay area has been discussed since the construction of the trans-Alaska oil pipeline in the 1970's. Several factors have delayed the project. While the Prudhoe Bay area gas is owned by the same companies that own the oil rights, independent companies have for years been competing with each other for the rights and business opportunity to build a gas pipeline. Several plans have been promoted, but the most likely plan today is offered by Yukon Pacific Corporation of Anchorage, a company 87 percent owned by international transportation conglomerate CSX Corporation of Richmond, Virginia. CSX also owns Sea-Land Service Inc. which transports much of Alaska's freight on its container ships.

The Yukon Pacific plan envisions building a gas conditioning plant on the North Slope and a 42-inch-diameter, chilled and buried pipeline paralleling the existing oil pipeline running 800 miles from Prudhoe Bay to Valdez. Three compressor stations would be built enroute to move the vaporous gas south. The gas pipeline would terminate three miles west of the existing oil terminal. At the gas terminal, the natural gas would be converted from a vapor to a liquid natural gas (LNG) by chilling it to 259 degrees below zero and storing it for transport aboard specially-insulated LNG tankers for delivery to Asian markets. Asia is considered the primary market for North Slope gas.

Yukon Pacific says it has secured or satisfied all of the major necessary legal approval and requirements to export Alaska North Slope natural gas to Asia. A final environmental impact statements has been completed; authority to sell the gas in Asia has been secured; and federal and state right-of-way agreements and leases for the pipeline corridor and LNG plant site are in hand.

Although no dates have been set, the company says construction will begin once long-term sales and purchase contracts are negotiated with the owners of the natural gas and with Asian LNG customers, primarily electric and gas utilities. Officials at Yukon Pacific admit that these large scale agreements take time — sellers and buyers alike are looking for huge, stable, long-term agreements that will assure supply and demand for periods of up to 20 or 30 years. Yukon Pacific points out that LNG demand in Asia will begin exceeding existing supply by the turn of the century requiring the development of a huge new supply like the North Slope. A strong point is the North Slope's proven gas reserves and established gas handling facilities already in place in support of the oil field development. With the proven reserves on the North Slope, Yukon Pacific says there is enough gas to supply the proposed pipeline for nearly 50 years.

7.4 Coal

Coal resources on the North Slope are enormous — the NPR-A alone is estimated to contain at least 2.7 trillion tons. The entire region may contain some 4 trillion tons — at least 40 percent of the total coal resource potential of the entire United States.

At present there is no commercial coal production within the Borough, although an old, small surface mine operated by the Borough near Atqasuk provides the local community with some 100 to 200 tons per year for some home heating. A larger operation at the Deadfall Syncline on ASRC land 40 miles south of Point Lay has seen varying amounts of activity within the last few years. Sporadic work continues at this surface mine, located within the large Western Arctic Coal Reserve area west of NPR-A, to prove its economic feasibility. Test shipments have been made to prospective Pacific Rim customers for analysis while small amounts of coal have been delivered to the nearby villages of Point Hope, Point Lay and Wainwright for local consumption.

Impediments to commercial coal development include a long-standing ban on commercial mineral development within NPR-A where the majority of large-scale reserves are thought to lie. Other obstacles include transportation constraints, distance to tidewater ports, environmental concerns, and the availability of more easily developed competing fields in Alaska. Because there are other coal deposits in Alaska that are close to tidewater, can be mined year around, and face less environmental constraints, it is unlikely that commercial coal deposits will be developed in the

Arctic in the foreseeable future. Small-scale coal mining for village power generation is more promising. The most likely areas for potential mine mouth generation development are in the Point Hope, Kukpowruk River and Wainwright areas.

Development of coal resources at village sites must address potential environmental constraints presented by removal of frozen overburden, overburden disposal, ash disposal, and site reclamation. Earlier mining operations along the Meade River were periodically flooded. Preparation of detailed mining and reclamation plans are recommended to minimize impacts. Depending on the location of mine and power generation facilities, access roads and transmission lines may be required.

7.5 Sand and Gravel

Large quantities of sand and gravel have been and continue to be mined from several streambed and upland sites on the North Slope, with considerable amounts mined from sites near or adjacent to the Prudhoe Bay oil field development. To a lesser extent, gravel has also been extracted from coastal and dredged offshore sources. Gravel also continues to be extracted from several locations along the Haul Road for road maintenance and construction.

The demand for gravel is tied to resource development, construction projects and Capital Improvement Projects in each community; demand is also likely to continue as oil field development continues. The state estimates that the development of a moderate-sized oil field requires some 3 million cubic yards of gravel for roads, drilling pads, building sites, etc.

Assessment of gravel availability and development of mining plans have been done for individual development projects. Area-wide studies of potential gravel resources have been limited; gravel extraction is generally an issue of more local than regional concern.

The removal of gravel from its various sources is subject to environmental and engineering constraints. Use of offshore and coastal sources must consider impacts on biological and cultural resources, coastal erosion and deposition patterns, and thermal erosion. Gravel removal in stream beds and flood plains can affect fish and wildlife resources, bank erosion, and normal and flood event discharges. Use of upland sites must address thermal erosion, surface runoff and habitat loss

impacts.

Prior to extraction of gravel resources for resource development and facility construction, detailed analyses should be completed to identify; 1) the amount of gravel available; 2) potential impacts of development; and 3) a mining plan that identifies mining areas, techniques, and a reclamation program.

7.6 Other Minerals

There is no current large-scale exploration, development or mineral production on the North Slope.

Resources within NPR-A are known or thought to include a variety of minerals including phosphate rock, metalliferous oil shale, zinc, lead, silver, barite, chromite, platinum group elements, copper and fluorite. The geology of the area also appears conducive to the presence of a variety of resources including uranium, base and precious metals, and non-metallic materials.

The Red Dog lead, zinc and silver mine, which began production in 1990, is south and west of NPR-A and south of the North Slope Borough. It is considered a world-class mine. Mineralization similar to that found at the Red Dog mine has been recognized elsewhere in northwest Alaska; the geologic formation that hosts the Red Dog deposit trends north and east from the mine's location, largely through the southern portion of the NPR-A and continuing far to the east in a somewhat ill-defined regional belt. The study and development of these resources within the NPR-A by private industry has been prohibited by federal authority since the creation of the Naval Petroleum Reserve, apparently to protect and ensure the promotion of oil and gas development in the area. The U.S. Bureau of Mines, however, is completing a three-year assessment of mineral resources covering much of the North Slope, including the NPR-A lands.

As with petroleum, development of mineral resources are subject to economic, market, environmental and regulatory constraints. For mineral deposits located great distances from tidewater or existing transportation corridors, the size and quality of a given deposit must increase in order to make economic development feasible. As long as there are other dependable mineral deposits that are less costly to develop to meet mineral demands, it is unlikely that Arctic deposits

will be developed in the near future.

7.7 Facility Siting

The siting of energy and mineral facilities is influenced by the location of the resource, economics, social and environmental concerns, physical conditions, available technology, and legal and regulatory constraints, not necessarily in that order. Some of these characteristics can be addressed through mitigation measures or restrictions on activities; others, such as the location of the resource or areas where development is prohibited by law, are inflexible.

While some siting decisions will continue to be addressed on a site by site basis, a Master Plan approach to siting energy and mineral facilities is helpful in minimizing uncertainty and conflict. This process should include:

1. Identification of potential resource development areas and associated facility requirements.
2. Location of sites that meet facility requirement criteria.
3. Identification of areas that are sensitive to development for environmental, physical, and socio/cultural reasons.
4. Separation of areas where development cannot take place (high sensitivity to development or protected by law) from areas where development could be permitted with proper restrictions and mitigation measures.
5. Identification and ranking of preferred sites.
6. Development of stipulations or performance criteria for areas where development can occur.

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CHAPTER 8. GOVERNMENT

8.1 Introduction

The North Slope Borough is the largest local government in the United States. Its land base covers approximately 88,000 square miles, and encompasses eight I_upiat communities, the Prudhoe Bay oil complex, and other major potential energy sources. The Borough has a mayor, elected to a three year term, and a seven-member assembly. There is also a seven-member elected school board. The Borough is a home rule borough and has all legislative powers not prohibited by State law or its charter, including powers of taxation, education, planning and zoning.

When incorporated in 1972, the Borough employed 19 workers. In 1992, it employed approximately 2,197, or more than 65 percent of the resident civilian labor force, making the Borough the largest employer of I_upiat residents. These workers were employed in general government, health, public works jobs, and capital improvement projects. Roughly 15 to 20 percent were employed by the school district.

The Capital Improvements Program (CIP), initiated in 1975, is the largest undertaking by the Borough government to date. It was designed to raise the standard of public facilities available to I_upiat residents to the level enjoyed by urban Alaskans and provide employment for the I_upiat population. It was originally planned to last six years during which time 80 different projects would be developed to provide the I_upiat communities with a basic social and economic infrastructure. Recent re-evaluation and planning has resulted in a six-year CIP plan that reviews the Borough's needs through 1998. The most recent revisions to the plan include 115 capital projects totaling \$507,806,000.

Since its incorporation in 1972, Borough government has expanded to meet the needs of local residents. Today, Borough government is comprised of many departments providing a wide variety of services and serving many different functions. These services include budgeting and revenues analysis, community planning, health services, public safety, education, housing, and utility services.

8.2 Finances

8.2.1 Revenue

Borough revenues have dramatically increased since the Borough's incorporation in 1972, from about \$528,000 in 1973 to projected revenues of over \$306,000,000 in fiscal year 1993. In the last ten years, revenues have increased from over \$227,000,000 to over \$306,000,000 in 1993.

Property taxes are by far the most significant source of these revenues. About 74 percent of Borough revenues comes from real property taxes. The majority of real property taxes comes from the owner companies at Prudhoe Bay, Kuparuk and other oil fields in the Borough. In 1992, ARCO was the largest taxpayer, paying \$125,000,000, followed by BP Exploration and Alyeska Pipeline Service Co. paying \$68,000,000 and \$23,800,000, respectively.

Under State law, the tax rate of municipalities and the state on oil and gas properties is limited in two ways. First, a ceiling of 20 mills is set on all state and local government taxes on real property. This 20-mill ceiling is referred to as the "Operating Tax Cap" and

limits the amount of millage that can be levied to support local operating budgets.

Second, the local government share of this property tax is determined by the size of the municipal population (\$1,500 per capita) or by a complex formula based on average statewide per capita assessed property evaluation. Both factors limit the Borough's ability to use revenues from property taxes on Prudhoe Bay to fund the CIP out of the operating budget.

Millage limitations, however, are not placed upon local governments for debt service. State statutes provide that local governments can levy unlimited millage to cover annual debt service requirements.

The unlimited debt service millage has two effects. First, since there is no tax cap on debt service, the Borough is encouraged to issue bonds to generate revenue above the Operating Tax Cap. Second, the Borough may use the interest revenue from the bond sales to support operating needs. The assessed valuation of Prudhoe Bay (approximately \$12 billion) provides the collateral for the Borough's municipal bonds which finance the CIP.

Approximately nine percent of Borough revenues for 1993 were derived from federal and state intergovernmental transfers (in a ratio of 1:3 federal/state). State transfers are primarily for the purpose of education under the State's foundation grant program. Miscellaneous revenues amounted to about 13 percent of 1993 revenues. Charges for services accounted for just over 2 percent.

Sales taxes account for the smallest part of Borough revenues, approximately two percent in 1993. Sales taxes paid by Prudhoe Bay owner companies were a larger part of Borough revenues during construction of the Prudhoe Bay complex in 1974 and 1975.

8.2.2 Revenue Forecasts

For several years now, all forecasts for the Borough's future financial outlook have carried one main theme: in the last half of this decade, Borough revenues will fall as taxable property values decline. This reflects the depletion of the major oil field reserves on the North Slope. Although the critical time frame may be deferred if major new fields are

brought on line, the phenomenon itself is inevitable under the current economic system.

The most recent forecast for oil production, the basis of property values and the tax base for the Borough, is estimated at 654,000,000 barrels for 1993 declining to 457,000,000 barrels at the turn of the century. The long range estimates indicate that only 180 million barrels will be produced in 2010. This forecast is based upon the State's mid-price scenario which assumes that the global economy begins to pick up in 1993 and 1994 which means that oil consumption grows in response to both relatively low oil prices and increased demand for oil. Oil prices begin to slowly drift upward as OPEC capacity expansion is required to meet growing demand.

The Alaska Department of Revenue, Oil and Gas Audit Division, and the Borough have projected the assessed values for property in the Borough. The most recent Borough figures project that property valuations will decline from \$12 billion in 1993 to \$8.8 billion in 2004. The State projections for the same period are higher for 1993 but decline at a faster rate with property valuations at \$8.4 billion in 2004.

The decline in oil production results in a chain reaction of events that translates into overall reduced revenues. Initially, the decline in oil production affects property values. As property values are reduced, so are property taxes. Less tax revenue produces proportionately less interest revenue; funds available to invest are more quickly expended to meet current operational and capital needs. At the same time, grants from the State will be dramatically reduced because of the squeeze on their budgets due to reduced tax and royalty revenues derived from oil production.

The need to balance current and future resource requirements is largely dependent upon the Borough's commitment to save current revenues for future use. In 1984, the Assembly established the North Slope Borough Permanent Fund, recognizing that current savings are important to prepare for declining property tax revenues that will cause serious pressures on the Borough's capital and operating levels in the future. The fund is designed to generate sufficient interest income to sustain a reasonable level of basic services for residents when the oil field tax base declines. The goal is to increase the principal amount of the Fund to at least \$500,000,000 by the year 2000.

8.2.3 Operating Budget

Dramatic growth in the Borough operating budget occurred between 1973 and 1992. Expenditures grew from about \$788,000 in 1973 to over \$300,000,000 in 1993. In the last ten years, expenditures have almost doubled. While expenditures grew from \$788,000 to over \$300,000,000 between 1973 and 1993, the population only increased from about 3,200 to 5,979.

Debt service, amounting to \$162,305,965 for 1993, was the largest Borough expenditure comprising 53 percent of the budget. Approximately 20 percent of the budget was spent on public services, and 14 percent for education.

General government expenditures accounted for about 8 percent, followed by public safety at 4 percent. The smallest Borough outlay was 1 percent for the Assembly.

8.2.4 Capital Improvements Program

Much of the credit for the progress and development in the formative years of the North Slope Borough goes to the late Eben Hopson, a widely respected I_lupiat elder, visionary and statesman. As the first Mayor of the Borough, he defined the Borough's primary goals as providing residents with the same basic services enjoyed by other Americans. The Borough sought to achieve this goal through Capital Improvement Program (CIP).

This goal has been difficult to attain, especially since there were no regional services before the Borough's incorporation. When the Borough was organized in 1972, it assumed the mandatory area-wide powers of assessment, taxation, planning, zoning and education. It also assumed responsibility for an additional wide array of services including sewer, water, light, power and heating systems, housing, health facilities, communications, urban development, transportation infrastructure, and police and fire protection.

Prior to 1972, virtually none of these services were available on the North Slope. Conditions were similar to those in a third world country. Unemployment was rampant.

Families lived in homes built from whatever scrap wood they could find or housing material they could afford to buy. There were only three elementary schools, none of which met minimum State of Alaska fire and health standards. The police force consisted of one Alaska State Trooper stationed in Barrow. The only fire protection was one volunteer organization in Barrow. Barrow was the only village with a central electrical generation plant capable of serving an entire community.

There were no sanitation services, no running water, no phones, no public libraries, no community centers and no recreation facilities in any of the communities. The only transportation facilities serving the communities, other than Barrow, were unimproved airstrips. Planning services were not available, nor were there any land use regulations to preserve the physical and cultural environment.

In the 20 years since its incorporation, the North Slope Borough has addressed these overwhelming public needs. Incorporation of the Borough provided North Slope residents with a means to levy property taxes on oil and gas facilities in Prudhoe Bay. Incorporation of the North Slope Borough in 1972 ushered in a new era of economic and physical development. This allowed the Inupiat self-determination where formerly decisions of remote state and federal bureaucracies reigned.

Monies derived from the tax base were funneled into each of the eight communities. Every village was provided with a school, health clinic and fire station. Roads and new housing were built. Municipal services organized by the Borough included health care, locally controlled education, the creation of a college tailored to the needs of the local residents, public safety, fire fighting, search and rescue, seniors programs, day care, and a substance abuse treatment facility. In addition, the Borough built basic public facilities present in the rest of the United States. These facilities included sewage treatment and solid waste disposal facilities, airport facilities, communication systems, community centers, public safety facilities, public housing, administrative facilities, and water, heat, and electrical power systems.

With these changes, increased employment opportunities naturally followed. The majority of employment opportunities in each of the communities is provided either directly

or indirectly through the North Slope Borough or is Borough related. To maintain its wide range of services and to staff its facilities, the Borough employs more than 40 percent of all working residents. When the North Slope Borough School District is included in the employment figures, Borough employees account for 60 percent of the region's resident employed work force.

The largest Borough outlay is for the CIP. In 1992, the Borough issued \$192,000,000 in general obligation bonds for a wide variety of capital projects which employed 210 residents. The Borough had a total of over \$714,000,000 in gross bonded debt in 1992. The greatest investments are in schools, housing, and water and sewer facilities followed by roads, sanitary facilities, and utilities.

The most recent 6-Year CIP covers 1992 through 1998 and contains projects with a total value of \$559,198,000. The Borough's 1993 capital budget appropriates \$480,317,000 for projects from 1993 to 1996. Of this amount, \$464,217,000 will be funded by bonds and the remaining will be funded out of the general fund or state and federal grants.

In August 1993, residents overwhelmingly approved the issuance of \$464,217,000 in general obligation bonds for twelve different CIP proposals. The proposals cover a wide range of projects.

The most significant propositions on the ballot were G and H. Passing with approximately 85 percent voter approval, these propositions provided for piped water and sewer for the villages.

During the early 1980's, the Borough developed a water and sewer utilidor system in Barrow, plus water and sewage treatment systems. In the mid-1980's, the system was reconstructed as a direct-bury system. The growth of Barrow requires the extension of water and sewer lines and the construction of a new sewage treatment plant.

Meanwhile, the other villages in the Borough have struggled with trucked water and waste-water systems. The systems have many detriments including expensive operation and maintenance, inadequate fire flows, and inadequate pressure for in-home plumbing

fixtures.

Village residents do not have running water for sinks, showers, flush toilets, or washing machines. Currently, the only option for many village residents is to use a honey bucket system to transport wastes out of the home. This exposes families to hepatitis and other debilitating diseases. Incidence of hepatitis from honey bucket handling is a health crisis in rural Alaska.

In 1992, the Borough contracted with Shiltec, Ltd. to design water and systems for the villages. The Borough chose direct-bury distribution systems and sewage treatment plants that would maximize use of local labor and local contractors. With the passage of the water and sewer bond proposals, the Borough is committed to spend over \$300,000,000 to construct full service water and sewer systems and provide loans to homeowners for plumbing fixtures and appliances.

Proposition A, passing by 84 percent, provided for the issuance of \$7,795,000 in general obligation bonds for the improvements related to light, power and heating systems and facilities in the villages. The most significant project is the expansion of the Pt. Hope power plant, scheduled for 1994.

Proposition B, passing by 64 percent, provides for \$13,456,000 for public safety facilities. This includes the construction of free-standing Public Safety Headquarters buildings in Anaktuvuk Pass, Kaktovik, Pt. Hope, Pt. Lay and Wainwright. Proposal B also provides for emergency clothing and equipment for volunteer fire departments, search and rescue equipment for all villages, and purchase of a new medivac aircraft.

The Borough Department of Administration and Finance will install a new mainframe computer system with the approval of proposition C, which provides for \$944,000 in general obligation bonds. This proposition also provides for the replacement of computers in all the villages.

The voters approved by 86 percent the issuance of \$3,558,000 in bonds for the renovation of the Children's Receiving Home to house an emergency foster home/family

home for up to five children (Proposition D). A therapeutic day care program for special needs children from six to eight weeks old will also be included in the renovations.

Passing with 73 percent voter approval were \$8,140,000 in general obligation bonds for general capital projects. These projects include area-wide upgrades on facility heating, ventilation, plumbing, mechanical and electrical systems; complete replacement of all overhead doors on North Slope Borough and NSB School District buildings; purchase of ten vehicles per year for various Borough departments; and remodeling of the existing Shipping and Receiving space.

Proposition F, passing by 72 percent, specifies \$1,455,000 for construction and improvement of communication facilities. This will cover construction of free-standing buildings that will house meeting rooms, rest rooms and teleconference facilities in Pt. Lay, Pt. Hope, Wainwright and Nuiqsut. Additionally, the bonds provide for installation of a repeater dish on the KBRW tower, replacement of TV studio equipment and a new computer for GIS information.

Public housing is covered in Proposition I. Meeting 80 percent voter approval, this proposition states that \$21,254,000 in bonds will provide for construction of 33 new housing units per year for three years (1994-1996), upgrading funds to complete the Housing Department Warehouse in Wainwright, village maintenance replacements, moving 11 Borough-owned housing units in Atqasuk, and construction of two new teacher housing units in Pt. Hope.

School projects, passing by 80 percent, are covered in Proposition J. At a cost of \$17,482,000, this proposal provides for a variety of projects including:

- upgrading the distance delivery equipment and capabilities;
- upgrading fire protection systems and equipment;
- window replacement;
- phone system replacement;
- purchase of equipment for librarians, classrooms, kitchens and vocational education;

- construction of a swimming pool, storage room and vocational education shop extension in Atqasuk;
- miscellaneous mechanical, electrical and functional renovations at Kaktovik School;
- completion of a variety of interior renovations at Nuiqsut School;
- an addition to the Pt. Lay School to include pool upgrades, miscellaneous storage areas and two classrooms; and
- purchase of capital equipment and nine vehicles.

Passing by 83 percent, Proposition K provides for \$16,879,000 in general obligation bonds for repair and construction of public roads, streets, water course and flood control facilities.

Proposition L provides for \$7,850,000 for construction and improvement of sanitary facilities.

8.3 Borough Government Services

Over the past twenty years, North Slope Borough government services have expanded to meet the growing demands of the communities and the needs of the residents. The Borough functions not only as a service provider, but also as the major employer in the Borough. The principal Borough departments include Administration and Finance, CIPM, Planning and Community Services, Municipal Services, Industrial Development, Public Safety, Health and Social Services, and Housing.

8.3.1 Department of Administration and Finance

The Borough Department of Administration and Finance is responsible for protecting the financial integrity of the Borough through the enforcement of its fiscal policies and procedures. This role has two functions:

- representing the Borough in its dealings with outside financial institutions;
- acting as a service organization by providing financial and budgetary guidance and administrative support to Borough departments.

and

The department is responsible for assessing real property in the Borough, collecting taxes, preparing bond sale documents, and preparing internal and external financial reports. Other responsibilities include performing tax audits on Borough taxpayers.

8.3.2 CIPM Department

All capital improvement projects are managed by the CIPM department. With a staff of about 50 including engineers and architects, the CIPM department manages project funds and scope of work. Department responsibility includes contracting for the design and construction of CIPs. This department is funded out of the project funds and not out of the operating budget.

8.3.3 Department of Planning and Community Services

The Department of Planning and Community Services is responsible for the coordination of land use and impacts associated with the social, economic and cultural concerns of the North Slope communities. The department divisions address long and short term planning through CIP coordination, Zoning and Planning Commissions, Permitting, Geographic Information Systems (GIS), Teleconferencing, Iupiat History Language and Culture (IHLC), Economic Research and Development and Museum operations.

8.3.4 Department of Municipal Services

The Department of Municipal Services (DMS) is the largest of the Borough departments (excluding the school district), with an operating budget of \$26,092,247 for fiscal year 1993. DMS, employing over 300 residents, serves the North Slope communities in many ways. DMS services include the following:

- producing and distributing electricity and water to the villages;
- providing timely and efficient waste collection;
- managing a fixed route transit system in all communities;
- managing Borough assets to optimize services and employment for all

residents; and

- providing opportunity for self-determination in the villages by offering training and support.

DMS is divided into four divisions, Central Office, Village Services, Heavy Operations Maintenance and Equipment (HOME) and Transit.

The Central Office offers technical support for accounting, administrative, budgeting, and management for all DMS divisions.

The Village Services Division is a major employer in the villages. The Village Services Division incorporates all levels of services for the seven outlying villages and stations support personnel in Barrow. This division is responsible for equipment maintenance, waste collection and disposal, water production testing and delivery, and maintaining all roads and drainage.

The HOME Division is responsible for the heavy equipment and light duty vehicle operation and maintenance, maintenance and improvements of roads, waste collection and disposal, and operation of the Barrow landfill.

Fixed route transit services are provided to all North Slope communities by the Transit Division. This division offers a timely, efficient and economical transit operation to all residents.

DMS is responsible for producing and distributing electricity to the villages. In 1991, the average electricity cost for individual village households in 1991 ranged from a high of \$2,561 in Atqasuk to \$423 in Barrow.

8.3.5 Department of Industrial Development

Current investments of the North Slope Borough are protected by the Department of Industrial Development. This department protects current investments through prudent management and sound fiscal policies, providing a long term source of revenue for the Borough and maintaining a spirit of partnership with the oil industry at Prudhoe Bay.

Industrial Development uses enterprise funds to operate Borough businesses including the Barrow gas fields and service to Prudhoe Bay (Service Area 10) and the Kuparuk Industrial Center (KIC). Department responsibilities include exploration and development of the Barrow gas fields and the sale of natural gas to Barrow Utilities and Electric Cooperative, Inc. (BUECI). Additionally, Industrial Development is responsible for solid waste management, sewage processing and water sales to Prudhoe Bay and KIC. With a staff of ten, this department contracts with other companies to perform its services.

8.3.6 Departments of Public Safety, Fire and Search & Rescue

The North Slope Borough Department of Public Safety is responsible for police operations in the Borough. The Department selects candidates from a nationwide pool and is among the most experienced and most well trained of any police department in the State or country. The Department has 46 sworn officers, including at least two in each of the villages. In addition, the Department employs 41 personnel to provide support in Barrow, the seven villages, and Prudhoe Bay.

The Department operates a contract jail for the State of Alaska in Barrow. All salaries and costs associated with the operation of the jail facility are provided by contract with the State. In addition, the Department operates temporary holding cells in each of the seven villages and Prudhoe Bay. The Department has currently received voter approval for bond funding for the construction of new village Public Safety offices in Nuiqsut and Atqasuk. In August 1993 voters approved the issuance of \$13,456,000 in general obligation bonds which will provide for construction of new Public Safety headquarters in five of the villages.

The Borough Fire Department, created in 1982, is responsible for fire protection in all communities. There are two fire stations in Barrow and a fire station in each of the other seven villages. The Barrow fire station is fully staffed, and the village stations are staffed by a full-time fire chief. Borough-wide, 270 volunteers support the fire department. In 1990, the Fire Department responded to 46 fire calls in Barrow, and 20 fire calls in the other villages.

The Fire Department is also responsible for emergency medical service. In Barrow, the Fire Department responded to 378 emergency ambulance calls in 1990. For the same year, the other villages responded to 146 calls.

All search and rescue calls are handled by the North Slope Borough Department of Search and Rescue. Over half of department calls are for medivac services to transport patients from the villages to the hospital in Barrow or transport Barrow patients to Anchorage. The department, which has 15 full time personnel, also has two airplanes and three helicopters for rescue operations to locate lost or missing persons. Additionally, the department supplies boats, ATVs and other support supplies to volunteer rescue operations in the villages.

8.3.7 Department of Health and Social Services

The North Slope Borough's Health and Social Services Department maintains a range of social services to meet the mental, emotional and social well-being of residents. With an operating budget of over \$20,000,000 in fiscal year 1993, this department employs over 300 people. The Department of Health and Social Services operates health clinics in all of the Borough villages to provide residents with quality medical, dental and vision care. The Borough employs a traditional medical practitioner who travels to each village. Additionally, each health clinic is staffed by a community health aide and is open during regular business hours for clinic activities. A health aide or alternate is available on a 24-hour basis for emergencies.

As the first-line primary care provider, the clinics treat a wide variety of illnesses and injury, from terminal illness to the common cold. One clinic provided chemotherapy treatment for sick villager. On average, the clinics receive 21,000 patient visits a year.

Most of the clinics were operating by 1984. Today, the clinics have three examining rooms, a dental/eye examination room, a garage for transporting patients to and from an ambulance, and itinerant quarters for traveling medical practitioners and aides.

Some of the programs or services provided by the Borough's Health and Social Services are listed below:

- Arctic Women in Crisis Shelter;
- Barrow Alcohol Program;
- Children's Receiving Home;
- Community Health Aide Program;
- Community Mental Health Center;
- Dental Care Program;
- Emergency Medical Service;
- Eye Care Clinic;
- Health Education;
- Interpreter/social Service Aide;
- Parent Infant Program;
- Health Nursery;
- Public Health Officer;
- Senior Citizen Program;
- Veterinary Services;
- Women-Infant-Children; and
- Youth Alternatives.

8.4 Education

8.4.1 North Slope Borough School District

The North Slope Borough School District boundary lines are the same as the North Slope Borough. The district's goal is to provide students with the education necessary to excel in college, or vocational training or work, blended with the traditional Inupiat lifestyle.

The Borough spends more than \$17,000 per student per year for educational programs and services. In 1993, school district enrollment for all grades (early childhood education and kindergarten through grade 12) was placed at 1,816 students. Of these students, 1,002 attend school in Barrow. The 5-year forecast projects enrollment to increase to 2,216 students district wide by 1997.

As part of the Borough's commitment to its children, the Borough, through the CIP, has constructed new schools and teacher housing in the communities. Borough-wide, the district has 145 classrooms. The Borough also supplies 117 housing units for professional staff.

There is a school in every village with classes from Early Childhood Education (for children ages 3 and 4) through 12th grade. All schools have multi-purpose gym facilities, wood/metal shops, computer labs and community education programs. Many of the schools also have swimming pools. Construction is scheduled for 1994 and 1995 to add pool additions to three of the village schools.

Barrow, the largest of the villages, has three schools: the Fred Ipalook Elementary School, the Eben Hopson, Sr. Middle School and the Barrow High School. The opening of the Ipalook Elementary School in 1992 and opening of the middle school in 1993 alleviated the school overcrowding situation in Barrow. The three schools combined represent 293,732 square feet, of which 76,674 square feet is classroom space.

In the villages, one school serves the needs of the community. Due to the remoteness of the village schools, the district has implemented an innovative education tool. Through the distance delivery system, teachers in Barrow also instruct students in the villages through an interactive video conferencing system. The fully interactive audio and video system is voice activated, picturing the speaking person on the video. Classes taught on the distance delivery system in 1993 include Algebra I, Consumer Math and Alaska Studies. In the past, up to 75 students have been enrolled in a distance delivery class.

In the next decade, the focus of the district is on maintenance and improvements to existing buildings, and school and teacher housing additions to accommodate growth in the villages. Other areas of review are new technology to improve education in isolated sites and development of new administrative office space.

8.4.2 Arctic Sivunmum Ilisagvik College

The Arctic Sivunmum Ilisagvik College, located in Barrow, offers post-secondary courses to about 550 Borough residents. Through teleconference technology, the college offers classes in all of the villages. The college, affiliated with the University of Alaska-Fairbanks, provides courses designed to give residents the information, knowledge and skills required to function effectively in academic, vocational, and personal situations.

The college's curriculum, designed to meet the requirements for an associate degree, includes core classes in Iupiat, English, natural sciences, social sciences, speech, humanities, library science, fine arts, and mathematics. The college is currently expanding the vocational program to include diesel maintenance and building trades.

8.5 Barrow Water and Sewer

Water, sewer and electricity in Barrow are provided by the Barrow Utilities and Electric Cooperative, Inc. (BUECI), a locally owned cooperative. BUECI services about 1,400 households in Barrow through a direct-bury and utilidor system. The utilidor, built by the Borough, is operated by BUECI.

BUECI purchases natural gas from the Borough Industrial Development Department. Natural gas is provided to Barrow residents for heating, and BUECI distributes natural gas to Barrow residents for heating and utilizes natural gas to generate electricity for Barrow residents.

In 1992, BUECI residential rates for electric was a flat rate of \$0.0675 per kilowatt hours (KWH) with a \$9.00 minimum bill. The average annual usage for Barrow households in 1991 was 6,254 KWH, resulting in an average household expense of \$423.

For natural gas, the BUECI 1992 rate was \$0.2231 per CCF for the first 100 CCF, \$0.2008 per CCF for the next 100 CCF, and \$0.1841 per CCF for additional gas. In 1991, the average Barrow household used approximately 331 CCF of gas in March and only 77 CCF in July. In cost terms, this translated to \$66.51 in March and \$17.18 in July.

8.6 Municipal Recreation Powers

Under the current governmental structure, all communities, except for Point Lay, are incorporated as second class cities. The communities, however, transferred all municipal powers, excluding recreation powers, to the Borough. This current allocation of powers between the Borough and communities has caused a void in the development of recreational facilities for residents.

Under the current scheme, the villages have recreation powers but do not have any taxation powers to fund recreational pursuits. On the other hand, the Borough has taxation powers but does not have recreation power.

There is a great need for a variety of recreational-type facilities in the villages. Day care is a high demand, followed by new community centers, senior centers, senior programs, and cultural centers. During the school year, school facilities including the gym and pool are open for recreational use. During the summer, however, the school buildings are closed.

The Borough is reviewing this situation. Possible solutions under consideration are having the Borough assume recreation powers or find a source of funding for the communities to exercise recreation powers.

8.7 Hospital

For more extensive medical needs, the health clinics are assisted by doctors at the U.S. Public Health Serve Hospital (PHS) in Barrow. The PHS, a 14-bed hospital, is a general, medical/surgical/emergency facility staffed by 6 doctors, 2 pharmacists, 1 laboratory technician, 1 medical technician, 1 radiology technician, 20 registered nurses, and about 70 support personnel. Staff are on call at the hospital 24 hours per day if necessary for emergency services. A social worker is available at the hospital to help with individual and family problems.

The physicians at PHS assist the village health clinics through advanced technology. PHS doctors can exchange graphics and video images with village health clinics and assist in long-distance diagnosis of injuries or illness through the Telehealth Network. Telehealth uses desktop

video telephones to link the seven village clinics with the hospital.

8.8 Housing

Housing needs are handled by the Housing Department. The mission of the Housing Department is to maintain and support decent, safe and sanitary housing for Borough residents. The department is also committed to the development of opportunities for home-ownership for residents of all income ranges.

In addition to placing residents in Borough-owned rental units and assisting home-buyer, the department is responsible for maintenance of all Borough buildings. See Chapter 5 for a description of Borough housing programs.

8.9 Governmental Cooperation — Private Development

North Slope residents have derived significant direct and indirect benefits from resource extraction. These benefits include jobs, personal income, and capital improvements that bring better housing, schools, health facilities, transportation and communications, safe solid and liquid waste systems, safe drinking water, public safety, and many other improvements. With wise investment of resource extraction revenues, Borough improvements will benefit residents for generations.

The Borough seeks to coordinate and cooperate with industry to meet state and national energy needs while insuring the protection of subsistence and I_{upiat} values unique and vital to local residents of the Borough.

The Borough will also foster and coordinate with new industries that do not diminish subsistence needs or disrupt the I_{upiat} culture. The Borough recognizes the need to develop a stable economy with full and culturally flexible employment for its residents and a stable tax base for their government.

8.10 Intergovernmental Coordination

The North Slope Borough views village participation in all governmental activities directly affecting the lands and waters of the Village's Area of Influence (see Map *) as vital to the health and prosperity of the region. Development, both governmental and private, may tremendously

impact a village. To ensure that this impact is beneficial, the village must be informed and allowed to participate at all stages of development from planning to production. Cooperation and coordination with the village generates efficiency and cost savings as well as good will and good government. The Borough wishes to actively participate in planning, policy development and regulatory activities within its jurisdiction as well as foster the participation of local villages that are impacted by Borough decisions.

The Borough looks favorably upon opportunities to participate in and coordinate activities and developments with other governmental entities including the Unorganized Borough.

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CHAPTER 9. COMMUNITIES

9.1 Anaktuvuk Pass

9.1.1 History

Anaktuvuk Pass is one of four passes (the Howard, the Survey, the Dietrich, and the Anaktuvuk) through the Brooks Range. The pass is two miles wide and is characterized by tundra vegetation of grass, bush willow, and small ponds. This pass has been used by migrating caribou herds and by humans for thousands of years.

Anaktuvuk Pass is located in the pass of that name in the Brooks Range, at an altitude of 2,200 feet. It is between the headwaters of the John and Anaktuvuk Rivers.

The cultural and ecological designation for the I_upiat of this region is Nunamiut, or inland I_upiat. The Nunamiut were semi-nomadic people who depended solely on caribou for survival.

The Nunamiut were once numerous but they decreased primarily through migration to coastal regions. Their population was about 3,000 in 1895, 900 in 1948, and approximately 100 in 1970. They were nomadic with a biologically determined territory derived from the methods of subsistence of each group. They traveled a route between four

trading centers — Cape Prince of Wales, Kotzebue, Nirlik and Barter Island. There were historic gatherings at different times of the year at these four centers for trade.

The Nunamiut traded furs, kettles, knives, tobacco, beads, tin, arrows, etc., for whale and seal oil, whalebone, walrus tusk, sealskin, etc. Trading disappeared with the advent of commercial whaling in 1848. Since the Nunamiut were no longer able to obtain trade goods, they migrated to Barrow, Wainwright, Point Lay, Point Hope, Noatak, or Kivalina. Another reason for the migration of the inland Nunamiut was better trapping along the coast. In 1938, however, as trapping declined along the coast, three families moved back to the Brooks Range. They were later joined by others, and again became semi-nomadic.

In 1947, there were people at Chandler Lake and on the Killik River. In 1949, these people made an alliance, moved, and founded Anaktuvuk. A Post Office was established in 1951.

9.1.2 Subsistence

Caribou remains the prime subsistence species. Other food sources are Dall sheep, squirrel, ptarmigan, salmon, grayling, trout, and whitefish. Trade for marine mammal food with coastal Inupiat is also important. An occasional bear is killed, often for fur. Berries are the most important vegetable contribution to the diet and are made into pemmican. Other plant matter is eaten indirectly in the form of the pouch contents of caribou. The people use plant matter for other purposes, such as home and sled construction and fuel.

Trapping is a prime source of cash income. Silver, white, and blue fox, wolverine, wolf, bear, and weasel are available. Furbearer materials are also used for making arts and craft products.

9.1.2.1 Spring. The spring begins in late March with very windy weather and heavy snowfall. Spring migration of caribou to the north slope begins, with some fish and ptarmigan also available. By the end of March or early April, the pelts of many fur bearing animals are no longer desirable. This time is marked by intensive caribou hunting, skinning, transporting, and caching of meat and fat. Some ptarmigan hunting is done. Caribou

migration continues and about the middle of April grizzlies, marmots, and ground squirrels come out of hibernation. By the end of April and into May, large birds migrate. Intensive caribou hunting continues during this time along with hunting and trapping of marmot and ground squirrels.

In May, the wind may still be cold but by the end of the month breakup occurs. Caribou are still drifting north. Large birds are migrating and marmot and ground squirrel are also available.

9.1.2.2 Summer. Summers are warm, although occasional snowfall is possible. Some hunting for waterfowl and wolf pups takes place, as well as fishing for whitefish and trout during June and July. Otherwise, it is time for seasonal cash employment opportunities.

In August, subsistence activities pick up with hunting for summer caribou skins and ground squirrels. Berry and root collecting also take place as well as some fishing.

9.1.2.3 Fall. In late August and September, intensive preparation for winter begins as light snowfalls increase and freeze-up occurs. Caribou is heavily hunted along with sheep, moose and marmot. In October, few fish are available and ground squirrels hibernate. Ptarmigan are sought as their southward movement commences.

9.1.2.4 Winter. Light snow and increasing cold arrive in November as caribou scatter into small groups in the timber. Mountain sheep are sometimes available, and serious trapping begins. Ptarmigan also are sought. In December and January, trapping continues and some ptarmigan are available. Caribou are scattered and not very fat. In December round whitefish begin to leave several lakes. In January and February, there is some fishing and taking of ptarmigan which have begun their northward movement.

9.1.3 Social Characteristics

At the end of December, all households attempt to come together for communal eating, singing and dancing at Christmas and New Year's.

9.1.4 Existing Public Facilities

Over the past two decades, the Borough has instituted many capital improvement projects in Anaktuvuk Pass. Education facilities consist of new school facilities (including new classrooms, a school shop, a gymnasium and pool), a washeteria, a generator building, teacher housing, and a house for the principal. Other significant improvements include an airport terminal, a USDW building, a fire station, a public safety building, the Simon Paneok Museum and a health center. New housing construction by the Borough includes a four-plex and tri-plex. The existing Borough facilities were valued at over \$21,000,000 in 1991.

9.1.5 Capital Improvement Projects in Progress

The most significant ongoing project is the Anaktuvuk Pass generator move. This project, estimate to cost over \$6 million dollars, consists of significant modifications to increase efficiency. The modifications will provide a safer working environment for the operators and mechanics, and handle projected village growth for the next 20 years. The airport is also undergoing improvements including upgrades to the runway, roads, and safety features. Other current projects include Phase I of the Contact Creek Water Flood Control, school water improvements, purchase of a water delivery vehicle, the Tank Farm project, purchase of a power line utility vehicle, safety and efficiency upgrades to the Public Safety facility, expansion of the landfill and construction of an artifacts repository.

9.1.6 Future Capital Improvement Projects

Consistent with the Borough's goal to provide residents with basic services enjoyed by other Americans, construction of a piped water and sewer system will begin in 1994. This project, scheduled for completion in 1995, will greatly improve the life, health and safety of Anaktuvuk Pass residents. Other projects scheduled for the next six years are road construction and a new free-standing prototype Public Safety building, a prototype Search and Rescue building, and a day care center.

Anaktuvuk Pass has a sufficient gravel supply for the next several years, according to current estimates. Approximately 35,000 cubic yards (CY) of crushed aggregate gravel is

stockpiled. The gravel estimates do not take into account additional gravel needs for the construction of the piped water and sewer systems in the village.

9.2 Atqasuk

9.2.1 History

Atqasuk is located about 60 miles southwest of Barrow on the Meade River within the National Petroleum Reserve–Alaska (NPR–A). The village, now consisting of about 200 people, was resettled in 1977 mainly with people from Barrow who had once lived in the area. Strong family ties are retained today between Barrow and Atqasuk; this includes not only joint participation in hunting and receipt of sea mammal resources, but also involves common subsistence use areas especially along the upper half of the Meade River.

Since Atqasuk is an inland community, terrestrial resources are of major interest to subsistence hunters. Traditionally sea mammals were hunted, and may be again in the future depending upon circumstances, but they are not conveniently located near the village.

Pre historically, groups of people inhabited inland and coastal area moving according to the seasons within their territory of familiar sites known to produce the needed resources. Numerous archaeological sites along the Meade River attest to the long history of occupation; oral histories and explorers accounts confirm the seasonal patterns of resource exploitation and interregional trade.

Some of the earliest insights into the Meade River people comes from Ray, who traveling there in 1883, learned the region previously had a permanent population in the early 1800's who had nearly all died off during a time of starvation and severe cold. Afterwards, the area was frequented by people from Barrow. The lifeways and land use patterns of earlier groups can be drawn from these records and habitation sites.

Certain spots on the Meade River such as Payugvik were occupied before the turn of the last century by small groups on a semi-permanent basis who built numerous sod houses and fished in the winter. In the spring groups moved to the coast for whaling. Goose hunting was an important subsistence activity after whaling, and many sites such as Pulayatchiaq

provided geese plus many varieties of fish in the summer and fall. Summer was a time for traveling and trading. Some families would go up the Meade River from the coast after whaling when the rivers were free of ice and stop at especially productive spots along the way. Other groups, like the Ikpikpagmiut, would leave inland regions and go to coastal sites like Barrow to trade. In the fall, people would move to productive fishing sites where caribou could also be taken.

Prospects of wages and trade during the commercial whaling era and the decline of caribou herds drew inland groups to larger coastal settlements, at least seasonally. Trapping and reindeer herding after 1900 resulted in a dispersal to inland regions again. Rich coastal sites sometimes provided grazing for the herds when they were brought there in the summer.

A coal mine operated at Tikigluk near Atqasuk from the 1940's to 1960's. The mine, which supplied coal to Barrow, employed Meade and Ikpikpuk river residents; the village post office, Meade River, was in service for most of the 1950's. Gradually the services, schools and wage opportunities offered at larger places such as Barrow drew Atqasuk people away, although the area continued to be seasonally inhabited by families who would return to familiar spots to hunt, trap, and fish.

9.2.2 Subsistence

Caribou, waterfowl and fish are Atqasuk's primary resources. Caribou make up more than half the village's subsistence needs and supply important secondary products from the hides. There has also been a shift to more intensive usage of fish and waterfowl resources. Atqasuk relies on relatives in Barrow for their supply of whale and other sea mammals. Barrow has had to utilize more terrestrial resources with the advent of whale quotas, and there are common subsistence use areas with Atqasuk villagers especially along the Meade River drainage.

As an inland community, Atqasuk has less diversity of resources than those on the coast. Terrestrial resources are of greatest importance to the villagers, yet the shallow waters around the village during the summer limits access to distant areas. All terrain vehicles may be used to access summer fish sites to compensate for this and the limitations on caribou.

9.2.2.1 Spring. No whaling is done at Atqasuk because of its location, but villagers have close ties with Barrow and receive shares of whale. Some people will go to Barrow to join whaling crews, thereby ensuring shares after a successful hunt.

Trapping continues until April 15 and hunting of furbearers continues until the snow is gone. Caribou are hunted and are critical in replenishing depleted food supplies (depending upon the hunting restrictions). Geese are found along interior bodies of water and on the tundra after the snow melts. They are hunted intensely with productive results at such places as Uatuq on the Meade River. Ground squirrels are trapped or shot as they come out of hibernation. Brown bear and moose are taken if they are encountered. Ptarmigan are harvested all year, but are most productive when they flock together in the spring.

9.2.2.2 Summer. Normally, summer is a time for wide ranging activities, but due to the limitations of land travel at Atqasuk and especially shallow water, activities are concentrated near the village. Fishing is the primary activity. Gill nets are set as soon as the ice leaves the river in late May/early June. Grayling, whitefish, char and pink salmon are taken. Any long water trips, such as to Barrow or the Meade Delta or Inaru River, must be taken by early July before the water drops. Walrus and seals are not hunted at this time by the villagers, but a hunter may join in a hunt if he is in Barrow.

Emphasis on fishing intensifies in August when the fish begin to migrate. Fish and caribou camps are set up along the Meade, lower Nigsaqtugvik, lower Isuqtug Rivers and near the village. Berries are gathered in late summer also.

9.2.2.3 Winter. Trapping is actively pursued in the winter, although it is not as intense as it was in the earlier part of the century. Lines are centered near the village with some trappers moving into traditional areas farther away. Furbearers are hunted, especially in late winter when caribou are also taken.

The darkest and coldest part of the winter limits travel, although caribou hunting and river ice fishing (for grayling, whitefish, and cod) are important activities often pursued in conjunction with trapping furbearers. Like other villages, December is a time for

community celebration and sharing of subsistence foods.

By late winter/early spring, there is increased fishing on the Meade River. Some residents may travel to the coast for sea mammal hunting; and some residents join in spring whaling in Barrow.

9.2.3 Social Characteristics

Former Atqasuk residents and others were given the opportunity to reestablish the village after settlement of Alaska Native Land Claims. Families who had once lived at Tikigluk and old Atqasuk, and others who desired to settle for social and cultural reasons, were assisted in their move by the Arctic Slope Regional Corporation. The new village had few job opportunities and subsistence activities were an important and necessary element of the economy. Villagers combine wage employment with subsistence activities as is done in other North Slope communities.

Atqasuk has a village council but is not formally incorporated. The North Slope Borough provides the necessary public services. The Atqasuk Corporation, created as a result of ANCSA was allotted surface rights to 69,120 acres within the NPR-A. The corporation provides some jobs through its organization and the sale of village fuel oil. Other jobs are available through the school and construction and maintenance of the Borough's capital improvement projects.

Atqasuk has established itself, both physically with the development of necessary buildings and public services, and culturally. Old inland subsistence areas are being used again and new ones are sought. Atqasuk hunters occasionally participate in sea mammal hunting with relatives in Barrow, and sometimes Wainwright.

Sharing of subsistence foods is an important feature of social life in Atqasuk as in other North Slope villages. With its close ties to Barrow, there is much trading of resources between the two villages. Atqasuk celebrates the usual holidays with traditional and non-traditional events, including communal feasts at which time subsistence foods are served. During these times there is a lot of traveling and visiting between the villages.

9.2.4 Existing North Slope Borough Public Facilities

Today, Atqasuk children attend a school in the new Meade River School, valued at over \$10,000,000 in 1991. Other improvements in the village include a health clinic, public safety building, a fire station, a USDW building, a water utility tank, a heavy equipment shop, a generator and telephone and TV service.

9.2.5 Capital Improvement Projects in Progress

An ongoing project in Atqasuk is the feasibility of using coal as an alternative source of heating. The severe Arctic climate, high fuel costs and poorly constructed and insulated homes combine to make energy costs among the highest in the nation. Currently, fuel is transported to Barrow from Seattle and then transported to Atqasuk by over-land transport. The Atqasuk Coal Mine project consists of transferring the coal storage area to a convenient location and mining approximately 275 tons of coal in 1993.

Other ongoing projects include construction of a new prototype Public Safety Office and construction of a new water tank.

9.2.6 Future Capital Improvement Projects

Several major projects are slated for Atqasuk including construction of a piped water and sewage system beginning in 1996, a house move and a pool addition to the school. The house move, a priority for the village for a number of years, consists of moving 11 units of Borough-owned housing to new lots. Original construction of the homes placed them too close together, posing a life and safety threat. The school will also receive interior renovations to upgrade the school to safety codes and protect the structure. Due to village growth, 4,846 linear feet of community roads will be constructed for a proposed new subdivision. A new Search and Rescue office and a day care center will also be built in the village.

Most recent reports estimate that Atqasuk has an adequate stockpile of gravel through 1996. The village has a gravel stockpile of about 120,000 CY with an estimated

demand of 20,000 CY over the next three years.

9.3 Barrow

9.3.1 History

Barrow, located near a point of land (Point Barrow) separating the Chukchi and Beaufort Seas, is the largest of the North Slope Iupiat villages; it also contains a significant white population. The coast and inland regions have been occupied for thousands of years. The archaeological site of Walakpa, south of Barrow on the coast, with an early occupation dating about 3,400 years ago, records a series of occupations by various northern groups culminating in that of the Thule, ancestors of modern Iupiat. Other nearby coastal and inland sites are of similar antiquity. The resource base of earlier inhabitants has changed several times over the years due to climatic conditions causing major resource declines or population shifts. The earliest record for the Barrow area shows that seals, caribou, and whales each played a major role in the economy at different times. Between 500 to 1,000 years ago, the records show a lifestyle centered around the bowhead whale similar to that described by early northern explorers in the mid 1800's.

The Point Barrow area was one of the last places to be reached by early explorers. Mid-1800 accounts provide the earliest documentation of traditional Ualigpaamiut (people of the Barrow area), who were little affected by the explorers except for increased access to foreign trade items, until the arrival of commercial whalers.

During the first International Polar Year in 1881, a meteorological station was established at Barrow.

In 1883 the Pacific Steam Whaling Company established the first Arctic shore station. Charles Brower, the historic Barrow trader and ancestor of many present day residents came to the station two years later in 1886. He started his own post in 1896, the Cape Smythe Whaling and Trading Company, for whalers at this time drew Iupiat from inland regions and from places as far away as Kotzebue.

The decline in the whale, walrus and caribou populations at the end of the century

combined with the heterogeneous population base causing a shift in subsistence use areas. Inland groups came to the coast and joined the variety of Iupiat whalers who had settled there. A school, opening in 1890, and a church, a few years later, were additional incentives to Barrow settlers. A post office opened in 1901. Trappers and reindeer herders spread to eastern and inland areas, and as a result the Barrow area resources were utilized to a greater extent than they were before the population influx.

Disease and famine continued to intermittently plague Barrow for decades; 126 people died of measles in 1902 and many more died in the flu of 1918 including some of the most experienced reindeer herders. During one bleak period, 1936–1938, after the decline of fur trapping, Subsistence were at a low and some people starved. Those who remained dispersed at inland camps during the depression had to develop a greater self sufficiency than those who stayed in Barrow.

Additional economic opportunities were slow to develop. Barrow's first attempt at establishing a Native store began in 1917. However, it lasted only as long as the supplies did. In 1930 another store was started with the administrative aid of local teachers.

During World War II the picture began to change. A coal mine on the Meade River at Tikigluk began operating in 1943 when the purchase of a caterpillar tractor solved the mine's transportation problems. Coal was hauled to Barrow to supply commercial buildings. The mine continued operating until the 1960's. Other events at that time included the formation of the Alaska Territorial Guard, oil explorations in the 9 million acre Naval Petroleum Reserve #4, and construction of the Naval Arctic Research Laboratory. Iupiat were hired for work in the NPR #4 in 1946, and the city of Barrow benefited as well. Through the efforts of the local contractor, new sanitation and medical programs were initiated, and housing was improved.

After oil exploration activities ended in 1953, 18 families left Barrow to find work in larger cities, but the desire to pursue subsistence activities drew most of them back in a short time. In the interests of filling an economic gap, trapping pursuits increased to a greater extent than they had in the previous 10 years. Many people were kept busy during these years supplying craft items and skin clothing to the transient non-Native population.

Construction on the DEW line stations began in the 1950's which provided additional seasonal work and later permanent maintenance jobs for a few Barrow people. In 1954, Barrow's tourist industry began through the efforts of the Native store and Wien Airlines. Tourism and the associated craft trade continues to be part of Barrow's economic base to this day. Plans for expansion of this industry include a museum and access to local historical and cultural sites. Barrow has experienced significant population growth in the past 20 years since its development as the communication and political center for northern Alaska. The North Slope Borough and Arctic Slope Regional Corporation are headquartered here and provide a wide range of jobs.

9.3.2 Subsistence

Barrow's yearly cycle of subsistence activities is similar to that of traditional times due to the seasonal nature of the resources, however, a shift in emphasis has occurred for several reasons. Seasonal restrictions and quotas imposed on bowhead whales severely limit their take and cause heavier exploitation of other resources such as waterfowl, walrus, and beluga whale. Full-time employment has affected mid-winter hunters when weather and light conditions are poor. Now, subsistence activities are carried out after working hours and during vacations/weekends. The take of walrus and seals for dog food has been reduced with the decrease in dog teams, but their importance in the human diet has increased with the whale restrictions. Snow machines allow easier access to land-based resources. This, coupled with the whale and caribou limits, has caused a greater usage of waterfowl and freshwater fish. Boats are still used, as in the past, for travel in the open season and in ocean leads. Outboard motors and all-terrain-vehicles enable hunters to travel much farther in a day than in the past. Aircraft are used by some to access fish camps or special hunting areas far from the village. Planes are also used in the exchange of subsistence foods between the villages.

Barrow hunters use the sea-ice/ocean environment at all times of the year, ranging from Peard Bay to Pitt Point for marine mammals, waterfowl, and fox. Spring whaling is done from camps on the ice shelf near the village. The coastal zone is used for a variety of purposes including the taking of ducks, seals, walrus, fish (spring/summer), and in the fall, whaling (especially at Pigniq). The coast is also used for collecting eggs, driftwood, and

occasionally plants and invertebrates. Inland areas are used for caribou, fish and the harvesting of furbearers.

9.3.1.1 Spring. Bowhead whaling heads the list of springtime subsistence activities. Barrow's excellent position allows access to bowhead from April to June in offshore leads from locations like historic Nuvuk. Quotas have reduced the time spent hunting bowhead whales by up to one month in some cases.

Other subsistence activities increase with the daylight hours and the appearance of migratory animals. Ducks, some walrus and bearded seals may be available offshore, west and north of Point Barrow in April. Trapping closes at this time, but furbearer hunting continues at places such as Qaviarat on the Meade River. Geese can be taken there and Kalayauk, which is also noted for its geese and ducks. Caribou may be hunted but usually whaling takes precedence, unless the quota is met early. Then, all of the above resources are pursued. Ptarmigan are available all year, but are taken in greater numbers in the spring when they form flocks.

By June, when whaling is over, seal and duck hunting camps are set up along the coast, southwest to Peard Bay. One popular camp is at the historic site of Pigniq, north of town. Inland snowmachine travel along these bodies of water are increased in search of geese.

9.3.1.2 Summer. In late spring/early summer, eggs of coastal and inland birds are collected, but not as intensely as in traditional times. When the rivers are free of ice, nets are set at fish camps for whitefish, char, and salmon. By early July, when the shore ice retreats, boat travel becomes more frequent with trips taken to Wainwright, Nuiqsut, Beechey Point and inland fish camps. Ringed sealing decreases as the ice leaves, but bearded and harbor seals become more numerous. Bearded seal hunting requires a communal effort and hunts are conducted west of Barrow or from Pigniq. Walrus are also hunted cooperatively after the shore ice breaks up. Coastal fishing with nets for salmon and char occurs at traditional sites along Elson Lagoon and west of the Point where net tending may be combined with duck and sea mammal hunting. Whitefish and grayling are taken with gill nets in mid-to-late summer when they move from lakes to major rivers. Payugvik, on the Meade

River, is a traditional site used for over 100 years as a summer and winter fishing spot, and is a noted stopping over place for people traveling the trail between Barrow and Atqasuk. Berries and plants are collected at this time in conjunction with other activities on the coast and at inland lakes and rivers. The major fish effort for the Barrow area takes place at inland sites. Sealing and walrus hunting decreases in late summer.

In late summer when the hunting effort begins, caribou skins are in prime condition. A few grizzly bears are taken if the occasion presents itself, usually while conducting other subsistence activities along rivers. Duck hunting continues into September as the southward migration begins, especially at Pigniq, where some fishing is also done.

9.3.1.3 Fall. Fall activities are characterized by intensive caribou hunting, fishing and whaling. Barrow has a fall whaling season in September and October, which is conducted in open water, generally along the barrier island east of the village. Fall whaling is generally not as productive as that in the spring because of weather conditions.

Caribou are still numerous near Barrow in September. Inland fishing is best in the fall and that activity increases especially at such historic places as Iviksuk on the Inaru River and Nauyalik on the Meade River, where a landing strip provides easy access for the villagers. Fishing is often combined with caribou hunting and berry picking, and later with furbearer hunting. Permanent (cabins) and temporary camps are set up at favorite spots for extended periods of time, from which all these activities are conducted. Food storage is another function of these camps, as ice cellars store excess food which can be transported to the village later. However, they are not as commonly used today as in the past. The camps are like small "tent cities," and are heavily used on weekends. Distant camps as far away as Teshekpuk Lake are used by Barrow residents, either because their past history includes personal familiarity or because nearer camps may be overcrowded.

Pigniq and other coastal areas continue to produce ducks while they are available. A few seals and walrus may also be found. As ice forms on inland waters, fishing continues for whitefish, grayling, and burbot with nets and by jigging. Ringed seals appear once again on the coast. Moose have recently extended their range northward and are available in the Colville drainage, but the number taken by Barrow residents is small. Some hunters,

however, will charter aircraft for fall hunts to Umiat.

9.3.1.4 Winter. Subsistence activities progressively decrease during the coldest and darkest months of winter. Sealing is, however, good on the west side of Barrow and polar bears are harvested if they are encountered close to the coast. Inland travel is generally curtailed and river and lake fishing cease by mid-winter.

Trapping is a minor activity compared to earlier in the century, but hunting of furbearers is more common due to the versatility of the snowmachine. Traplines are set on the nearshore pack ice off Barrow and inland for about one hour. They are extended much farther in all directions when the weather warms in March. The historic site of Pulayaaq on the Meade River is used for trapping in late winter and for waterfowl hunting in the spring, as well as summer fishing and hunting. Nearby Pulayatchiaq is also a current and historical area for trapping and spring waterfowl hunting. Some traplines extend for a hundred miles with many loops, and follow the rivers, ridges or other easily traveled features. Furbearer hunting by snowmachine is also done when people are caribou hunting or trapping. Foxes are trapped or shot incidental to other hunting trips. The local demand for wolf and wolverine far exceeds the supply.

Mid-winter is a time for socializing and celebrations at which subsistence foods, particularly whale, play an important role. As winter progresses, and the daylight hours lengthen, subsistence activities and travel increases. Traplines are extended and caribou hunting is important, because food supplies are generally low. Sealing and polar bear hunting continues off the Point, along the coast in each direction. In late winter, preparations begin for spring whaling.

9.3.3 Social Characteristics

The Borough and ASRC provide a significant portion of the jobs available in Barrow. The Borough has a home rule charter (since 1973) and with it comes responsibilities for providing education, zoning, planning, transportation, communications, taxation and other public services in an area larger than California. Private business are few due to the lack of available land and buildings, and to high freight costs. Employee turnover is great with many people seeking higher paid Borough and ASRC jobs. State and federal

government positions also account for many of the local jobs, with the public health hospital providing several dozen.

Although Barrow is a town with more wage opportunities, services, and urban pressures than the other villages, subsistence activities are still a major force in the community. Individuals combine work with subsistence as in other villages the whole community is involved with spring whaling activities. As in Point Hope and Wainwright, there are many pre-season preparations that must be attended to from covering the skin boats, to cutting ice trails, to preparing the equipment and supplies. Upwards of 36 crews averaging 10 members each participate in whaling and dozens of other people are needed for associated support tasks. Community involvement continues for the duration of the normal 6–8 week season with butchering and distributing the whale, and in the Nalukataq celebration.

Aside from the whaling festival, Barrow participates in the other usual holidays as well. The 4th of July, Thanksgiving and Christmas are all special occasions at which traditional and non-traditional games, dances, and songs are performed. Christmas is especially important because the traditional celebration of the Messenger Feast is incorporated with the week long activities. At all celebrations subsistence foods are an important element of the communal feasts and boxes of food are distributed to all the families of the community at Thanksgiving and Christmas.

9.3.4 Existing North Slope Borough Public Facilities

As the center of Borough administration and the largest of the North Slope villages, Barrow has received the most extensive improvements of the villages. The largest single improvement is in the Barrow schools. Following a fire in 1988, the elementary school was partially destroyed. Several new buildings temporarily housed the elementary school until the Borough completed the \$61,000,000 Ipalook Elementary School in 1993. The Borough also constructed new facilities for the high school.

Existing health facilities in Barrow include a convalescent hospital, a children's receiving home, a prematernal home, a health administration building, the Griest Family services, a health center and a science building.

The city is also serviced by a fire station and a public safety office. The school district administration building along with the Borough administrative offices are located in Barrow. The largest apartment complex in the Borough is a 32–unit complex located in Barrow. All of the North Slope public facilities, including numerous facilities not listed above, were valued at over \$209,000,000 in 1991.

9.3.5 Ongoing Capital Improvement Projects

Numerous projects are presently under–way in Barrow. The water and sewer system are being extended and upgraded to add 150 to 200 residential connections in the community, as well as utilidor hookups to Borough housing 12–plexes and 21 single units. Gas and electrical utility lines will be installed in the Browerville subdivision located along Cakeater Road. The Borough is also constructing an alternate pipeline from the south gas field to avoid dependence and catastrophic consequences of relying on one pipeline.

Older residents will also benefit from the ongoing projects. Currently, the senior center is undergoing renovations that will allow for services for six elderly people in the region.

The Borough is constructing a new transit garage and purchasing six buses, two with lifts and two with elderly and handicap accessible features.

Other ongoing health and safety projects include an addition to the fire station, upgrades to the public safety facility, expansion of the Griest Center, and upgrades to community roads. The Borough is also replacing the outdated, 10–year–old mainframe computer system to improve the general financial management.

9.3.6 Future Capital Improvement Projects

Future projects include extension of the water and sewer system (phase II and III) to accommodate growth of the city. Many upgrades are scheduled for Borough buildings including the following:

- the Borough Central Office;
- the equipment shops;
- the incinerator building;
- the south pad warehouse rebuild;
- the shipping and receiving terminal; and
- Barrow and Browerville roads.

The Borough has appropriated over \$4,600,000 for gravel acquisition through 1996 for scheduled road work and annual repairs.

For the children in the community, the Borough has scheduled renovations to the Children's Receiving Home to provide for an emergency foster home and a therapeutic day care program for infants. The Children and Youth Facility will receive a \$3,000,000 addition to provide space for outpatient diagnosis and treatment, juvenile detention, staff training, parenting and educational classes and office space.

Several new buildings will be constructed in the next six years. The Barrow cultural center, which will house a museum, a library, a performing arts area and studios for arts and crafts, will be constructed. Other new buildings will include a new North Slope Borough School District administrative facility, a new Health Department administrative facility and a new ASIC building.

Barrow is one of the few North Slope communities that has an unlimited gravel source. The city owns a gravel pit, and UIC has access to a high quality gravel source. According to 1991 estimates, Barrow requires about 400,000 CY of gravel through 1996.

9.3 Kaktovik

9.3.1 History

The coastal and inland area in the vicinity of Barter Island, where the present day village of Kaktovik is situated, was seasonally inhabited by aboriginal groups. The coast, with its barrier islands and lagoons, was a prime area for spring waterfowl and seals, and summer fishing. Caribou could be taken at various spots all year and several large semi-

permanent prehistoric villages such as Naalagiagnio (Arey Island) and Nuvuaq (Point Collinson) attest to the former population.

The Colville delta site of Nigliq was a trading point for Asian articles coming through the Kotzebue–Noatak–Kobuk area, while Barter Island was a trading center for English goods among Barrow and MacKenzie Eskimos, and Athapaskan Indians. Point Barrow Iupiat traveling eastward after the Nigliq fair would stop at Barter Island to trade surplus Russian and inland Eskimo items for English articles that came from Hudson's Bay Company at the MacKenzie post.

During the era of commercial whaling, the Native trading system was disrupted due to trading ships, and later shore-based whaling/trading stations. Barter Island was one of the important stopping places for the whalers. After whaling declined, fur trapping became a very important economic activity in the area. Trading posts sprang up all along the coast. Tom Gordon's was established on Barter Island in 1923 and marked the beginning of the permanent Kaktovik settlement. Gordon, along with two or three other families, formed the core of the present day Kaktovik population. Reindeer herds were kept in the Barter Island and adjacent areas in the 1920's and 30's. Gradually, the trading posts closed as fur prices fell. By 1943 the last post at Brownlow Point closed and many people began to move to Herschel Island in Canada, where they traded at Aklavik.

After World War II employment opportunities began to draw people back to the Barter Island area. There was oil exploration work in the Naval Petroleum Reserve #4, the Coast and Geodetic Survey hired Iupiat during mapping of the coast, and a DEWline station was built on Barter Island in the early 1950's. When a school was built there about the same time, some Herschel Island families returned. The ones remaining formed the kin related basis for present day inter-regional communication.

In 1960 the 9 million acre Arctic National Wildlife Refuge (ANWR) was created, the significance of which, for Kaktovik people, did not become apparent until the land claims settlement of 1971 when the village began selecting its lands. The village corporation was allowed to select 92,160 acres, both within and outside of ANWR.

9.3.2 Subsistence

Kaktovik subsistence patterns are determined not only by the seasonal availability of the resources but by the village's geographical position and periodic access limitations. The Beaufort Sea coast has shorefast ice for at least 10 months of the year due to the currents. Marine mammals are not as numerous in winter as in the Chukchi Sea, nor are they present as long in the summer. Some species such as walrus are rare even then. The village does not have direct access to a navigable river because the waters are too shallow for boating, therefore summer activities are coastal oriented.

Oral traditions recall whaling in the last century, and commercial whalers used the area, but fall whaling was not re-established until two crews could be organized. Despite the less abundant sea mammal resources, Kaktovik has good winter access to Dall sheep in the Brooks Range. The Porcupine caribou herd, upon which the village depends, lacks hunting restrictions; thus these two resources make up for the less numerous sea mammals.

Kaktovik's primary Subsistence are caribou, sheep, bowhead whale, fish and waterfowl; with seal, polar bear and furbearers also being important elements. The subsistence areas include a summer coastal zone extending from Foggy Island to Demarcation Bay. Inland areas such as the Hula Hula River and the Brooks Range are used when snowcover permits access by snowmachine.

9.3.2.1 Spring. The long daylight hours of April and May, plus sufficient snow cover, are good for snowmachine trips. Fishing at Hula Hula and other rivers continues until early April. Sheep might be taken until May. Furbearer hunting continues until then also. Ground squirrels and marmots are hunted from early April when they come out of their holes. Ptarmigan, although hunted all year, are most easily taken when they congregate in large flocks in the spring. Upon returning from the mountains, the first migratory waterfowl are taken along the coast in late spring/early summer, especially at traditional sites like Nuvuaq where seals, caribou, fox and fish can be taken in various seasons.

9.3.2.2 Summer. Waterfowl arrive as soon as there is open water. Tent camps are set up in the Camden Bay area. As the season progresses and snowmachine travel diminishes, hunting is done closer to the village on the mainland or the historic area of Arey

Island. Eggs are gathered on several of the barrier islands. Seals may also be taken particularly for the oil and hides, but are hunted less than they were when they were needed for dog food. Towards the end of June, subsistence activities come to a standstill because there is no snow for snowmachine travel and the frozen waters prohibit boat travel. Later, summer use areas are confined mainly to coastal and river delta regions due to shallow water. Griffin Point is a primary summer subsistence area with caribou, seals, and fish being taken by people who may stay there for up to two months.

In early July, boat travel is possible and nets are set in Kaktovik Lagoon and other sites from Camden Bay to Jago Spit for arctic char, which are taken until August. Cisco and pink salmon are caught in the nets later in the summer. Occasionally beluga whales are taken. Caribou season opens in July and they are taken along the coast and the lower seven miles of the Canning River where boating is possible. Grayling and whitefish are taken in the Canning delta, which is one of the most important fishing areas for Kaktovik. A particularly good caribou hunting area is at Konganevik Point.

9.3.2.3 Fall. In late August whaling begins. Crews may travel 50 miles out to sea in the beginning of the season, but later the whales migrate closer to shore and can be taken nearer the village. Whaling may continue for several weeks and butchering and transporting the whale can take another week. After whaling and freeze up, inland travel is possible and trips are made along the Hula Hula River and into the mountains. Various camps along the Hula Hula are good spots for ice fishing for grayling, Dolly Varden/char, and provide a base of operations for caribou and sheep hunting in late October/early November.

Kongakut River fishing sites produce Dolly Varden/char. Grayling fishing is done in nearly all the major rivers and especially along the Canning where whitefish and ling cod are also taken. Fishing is also done along the Kuparuk.

9.3.2.4 Winter. Little sheep or caribou hunting is done in December due to the lack of daylight. Trapping however does continue, with wolves and wolverines taken from camps in the mountains. Foxes are trapped along the coast. Polar bears are hunted near the village. At holiday time, everyone returns to the village for celebrations and games, but by late January hunters begin returning to the mountains. Trips become more frequent in

March with the increasing daylight. Winter fishing at the Hula Hula camps is best from late February to April. Some caribou remain on the coast and are taken in late winter and moose may be taken if they are needed. Some sheep hunting may be done in late winter. Lake trout are taken at places in the mountains, and ling cod can be obtained along inland portions of rivers.

9.3.3 Social Characteristics

Economic opportunities for Kaktovik's residents are limited even with the jobs that are available through the North Slope Borough and ANCSA related village corporation. The school provides some jobs as in other North Slope communities. Kaktovik has the highest family income of North Slope villages outside of Barrow, but subsistence activities continue to be an important and necessary part of the economy.

Historically, Kaktovik people have--been working for wages since the turn of the century through trapping and herding pursuits, but these activities did not require a year round settled life as is necessary now. Despite the changes that settled life and wages have made on the villagers, they still desire to pursue cultural traditions through subsistence activities; and money from jobs has helped in the re--establishment of an important community based activity -- whaling. Fall bowhead whaling is becoming an increasingly important subsistence practice. Two crews were formed in 1964 with the help of Barrow whalers and from 1976 onwards, five or more crews were in operation, taking up to five whales per season. Butchering takes place close enough to the village that the community can participate, which it does to the exclusion of nearly all other activities including jobs. A tent camp is set up at the site and cooked maktak is served. The whale, including the baleen is divided equally among the households, with the captain's share reserved for holiday feasts. Before whaling was re--established, Kaktovik was supplied with whale meat and maktak by relatives in other villages.

The traditional winter celebration, with feasting, games and dances, is now incorporated into the Christmas holidays with the Presbyterian church playing an active role. Subsistence foods, and especially bowhead whale, are served; traditional games, songs and dances are performed; and, as in the past, new clothes and parkas are made for the occasion.

9.3.4 Existing North Slope Borough Public Facilities

As in other communities, the bulk of improvements in Kaktovik are related to education. Existing public facilities in Kaktovik include an upgraded school, including a

gym and library addition. Kaktovik also has four teacher housing buildings. Other public facilities include a fire station, a health department, a public safety building, a USDW building, a generator, warm storage, a tank farm, and television and telephone service.

9.3.5 Capital Improvement Projects in Progress

Current capital improvement projects include construction of a road to the landfill, purchase of a water delivery vehicle, upgrading a water tank, renovating the Kaktovik power plant, and construction of a snow fence to deter drifting snow. The public safety facility, which serves as operational headquarters and as a temporary holding facility, is being renovated to meet safety and operational standards. The school is being upgraded to add furniture and equipment for classrooms and the gym.

9.3.6 Future Capital Improvement Projects

The Borough has appropriated over \$29,000,000 for a water and sewage treatment for the village. The project is scheduled to begin in 1996. Other future improvements include interior renovations to the school, a new prototype public safety office, a new day care facility, construction of 300 linear feet of new roads and construction of racks to store electric poles.

Kaktovik has an inadequate stockpile of gravel to last through 1996. The current village site is located on soils, unlike the original village site which was on a spit with a well drained gravel base. Today, the DEW Line Strip occupies the old village area. According to 1991 reports, Kaktovik required 50,000 CY yards of gravel through 1996. Currently, the village only has a gravel stockpile of 20,000 CY.

9.4 Nuiqsut

9.4.1 History

The village of Nuiqsut, situated within NPR-A on the west side of the Colville River delta, was re-established in 1973. Some of the settlers were returning to familiar territory they had inhabited three decades earlier. The Colville is a major travel route to the interior where

good fishing and caribou hunting exists. Traditionally the Kukpikmiut, people of the lower Colville, used the region in their seasonal round of subsistence activities for varying lengths of time depending upon the seasonality and availability of the resources. According to some sources, they may have been an extension of inland Inupiat groups.

Oral histories connected with many of the sites reflect this seasonal usage by inland peoples, and ancestors of many Anaktuvuk Pass residents once lived at places such as Kayuktisikuk. The lower Colville is probably most noted for the summer trading fairs held at Niqlik, on the west bank of the delta. Historic accounts and oral histories recall the importance of the site as the meeting place for coastal and inland groups where dancing, games and trading (some articles coming from Asia) were conducted.

Resources used by the Kukpikmiut underwent serious changes in the latter part of the 1800's due to a natural decline of the caribou coupled with overkill of the caribou and bowhead whales by commercial whalers as in the rest of the Arctic. Inland regions became depopulated as people were drawn to coastal schools, missions and employment, but after the end of whaling, trapping and herding brought them back again.

The Kukpikmiut kept reindeer herds at places such as Tiragroak (on the Colville River above the Itkillik) and Nanuk (east bank of Nechelik Channel of the Colville) where a corral from the 1930's-40's is still visible.

Another shift away from the area occurred after trapping declined during the depression. The original Nuiqsut settlement, on an island in the eastern Colville delta, was abandoned because of flooding and erosion. A second Nuiqsut was situated on another nearby island and was inhabited until compulsory education and other services drew people to larger towns such as Barrow in the 1940's.

A few families continued to live in the lower Colville, and many more seasonally returned to their traditional subsistence sites, but the oil exploration and post war construction employment drew most of the remaining people away by the 1950's. When ANCSA allowed the opportunity to resettle the traditional area, 27 families chose to return and were supported by the Arctic Slope Regional Corporation.

9.4.2 Subsistence

Nuiqsut's subsistence complex is based primarily on land resources, including caribou, moose, furbearers and freshwater fish. Sea mammals, waterfowl, and polar bear are also important resources.

The subsistence economy of the village is still developing as hunters continue to explore the best ways of harvesting the region's resources. The caribou and fish-based economy requires the least amount of cash outlay. Nuiqsut hunters constantly modify their subsistence strategies to respond to changes in the resource base, just as traditional hunters exhibited flexibility in their resource procurement. Yet, these changes are tempered by today's social and economic constraints of village responsibilities.

The general area of subsistence activities extends from the village east to the Sagavanirktok River, south to the middle Colville, west to Teshekpuk Lake, and along the coast to Pitt Point and the mouth of the Canning River. Hunters also join Barrow people for sea mammal hunting and occasionally go to Kaktovik and Wainwright.

9.4.2.1 Spring Whaling. Spring whaling on the coast draws some men to Barrow where they participate as crew members or whaling captains. No spring whaling is done near Nuiqsut. Furbearer hunting in the foothills and on the plain becomes an important activity as the daylight and weather improve and continue until the snow is gone in May. Seals are taken on the sea ice in April/May. Grayling, cod, and lake trout are taken with hook and line during the warmer weather. Long snowmachine trips may be taken to Barrow or Kaktovik or even farther to visit friends and relatives before the snow melts. Some caribou may be taken during these trips.

9.4.2.2 Summer. Whitefish are taken in nets in the Colville River when the water clears after breakup in June. As the season progresses, fishing is conducted farther up river and on Fish Creek. Waterfowl appear and are taken periodically until their fall migration. In late summer, char and salmon begin running up the river and are followed by spotted seals. Some coastal fishing is done for whitefish and cisco. Children set traps for ground squirrels and fish for grayling with nets and rod/reel. Caribou hunting becomes the primary activity in

late summer.

9.4.2.3 Fall. Caribou hunting, fishing and whaling are the most important subsistence activities in the fall. The caribou migrate south from their respective calving grounds, however some always remain in the area throughout the winter near Fish Creek. Moose have recently moved into the region and are becoming an important resource.

Fishing for cisco and whitefish is done with nets in the rivers before freeze-up and continues to be a significant activity after freeze-up at fish camps on the Colville and Fish Creek. Grayling and ling cod are taken through the ice in late fall. Berries are picked in conjunction with fishing and hunting trips, and sometimes driftwood and coal are collected.

Whaling begins in mid-September along the coast as far east as the Canning River. Seals, ducks, caribou and sometimes polar bear are taken while whaling. Other seal hunting is done near the Colville delta.

9.4.2.4 Winter. Activities slow down during the coldest and darkest part of winter. Trapping is done for foxes, while wolves and wolverines are more often hunted than trapped. Caribou and moose have traditionally been taken during winter, but snow conditions at Umiat where the moose congregate, make snowmachine travel difficult. Seals are hunted on sea ice when open leads occur. As weather and light improves, trapping and caribou hunting activities increase and fishing is done for cod, grayling and lake trout.

9.4.3 Social Characteristics

Nuiqsut is now a 2nd class city with a mayor and council, and a population of about 400. It has a mixed subsistence and wage economy. Subsistence activities are of primary importance to the villagers but wage opportunities are available through the North Slope Borough, school, store, post office, health clinic and Native village corporation positions, trapping, seasonal construction, and in the Prudhoe Bay oil field. A small commercial fishery operates at the mouth of the delta and employs several part-time people. The village provides recreational services. Other services, including fire protection, are assumed by the borough.

Although the village is new, there are two churches, each providing facilities for social events and public meetings, and programs for children and adults. Bingo is the most popular recreational activity, as in other North Slope communities, and is held many times a week by different organizations. Other recreational activities are limited to the school.

Christmas and the Fourth of July are important holidays with traditional activities (games and dances) being combined with non-traditional events. Sharing is an important aspect of Nuiqsut social behavior; equipment and subsistence foods are shared, with holidays being especially important occasions to serve and share traditional foods. Other cultural values persist among Nuiqsut villagers and played a key role in their decision to leave the urban comforts and pressures of Barrow to resettle their traditional region.

9.4.4 Existing North Slope Borough Public Facilities

Nuiqsut has many of the basic public facilities found in the other North Slope Borough villages. The village has a school, a fire station, a health center, a USDW building, and a tank farm. Other public facilities include a telephone and television building, a generator, and a warm storage building. These facilities were valued at \$24,825,000 in 1991.

9.4.5 Capital Improvement Projects in Progress

There are many capital improvement projects in progress in 1993. The Trapper School is currently receiving a \$3,300,000 addition. Another important project is the dredging of the Nechelik channel between Nuiqsut and the Colville River. The dredging will allow a small boat to navigate the channel. Under present conditions, Nuiqsut residents are unable to access the Colville River via Nechelik channel for fall subsistence activities.

In the area of safety, a 4,290 square foot public safety office is under construction and the village will receive an ambulance. The \$85,000 vehicle is a four wheel drive, modular-type ambulance, equipped for basic life support. Also, the Borough is installing sprinklers in homes for the safety of residents.

Other projects in progress include:

- road upgrades;
- water supply and equipment upgrades;
- extension of utility lines and service hook-ups; and
- purchase of a sewage support vehicle.

9.4.6 Future Capital Improvement Projects

Several projects are scheduled for Nuiqsut through 1998. The most significant projects are the piped water system and new water treatment/storage facility, and the piped sewage system and new sewage treatment plant. These two projects will cost over \$38,000,000 and employ residents from 1996 through 1998.

The school will receive a \$4,000,000 addition, four units for teacher housing, and renovations to the gym, corridors, and vocational education facilities. In 1994, 3,986 linear feet of roads will be constructed for a proposed subdivision and a teleconference center will be constructed to enable village residents to more effectively participate in Borough and business meetings. A prototype Search and Rescue office and a day care center are also scheduled for construction.

Nuiqsut was one of the North Slope communities to benefit from a dredging project in 1992. Presently, the village has about 100,000 CY of gravel stockpiled. Estimates indicated the village will require 120,000 CY of gravel through 1996. The most recent estimates do not consider the additional gravel needs for construction of a piped water and sewer system.

9.5 Point Hope

9.5.1 History

The northwest Alaskan Village of Point Hope is located near the tip of a gravel spit projecting into the Chukchi Sea. Originally called Tikiraq, Point Hope was named by Captain Beechey in 1926. The name also refers to a larger area of the peninsula lying between the Lisburne and Kemegrak Hills.

The region has a long history of continual occupation spanning at least 2,000 years. The Norton or Near Ipuitak culture was clearly present about 500 BC, with the unique Ipuitak culture becoming evident by 300 AD. The direct predecessor of the present day Iupiat of Point Hope, the western Thule culture, appeared about 1,300 AD, and engaged in intensive sea mammal and whale hunting with the use of floats in open water.

The lifestyle of the Point Hope people has been and is currently strongly adapted towards utilizing sea mammals that abound in the rich marine environment, and also towards land animals. A wide coastal area from Kivalina to Point Lay and inland along the Kukpuk, and most of the Kukpowruk river drainages was controlled and used by earlier Tikirarmiut (people of Point Hope). Today the hunting territory generally comprises the area between Cape Thompson and Cape Lisburne.

Point Hope was severely affected by commercial whaling in the late 1800's. Jabbertown, established in 1887, was the first shore-based station in the area and additional stations soon tripled the number of whaling crews. Part of the disruption plaguing the village during the era of shore-based whaling was the practice of hiring Native crew members from other areas. At first the Point Hope people refused to help the whalers, but the prime whaling locale, along with increased numbers of stations, drew Eskimos from the Seward Peninsula, Kobuk and Noatak river areas. These people, whose areas were suffering from the decline of the caribou, were eager to become involved in the whaling/trading experience. They constituted the first large Native group of outsiders to enter the Point Hope territory. Their presence constituted a social disruption by their intrusion into the area where normally people came only by invitation or for war. Many of them settled in Kivalina and traveled to Point Hope each spring to work. The presence of these outsiders, coupled with an increasing decline in the caribou, and the general desire to find a better life elsewhere, prompted emigration towards the north, and by 1910 the Tikiarmiut were spread along the coast to Canada.

The chaos that continued in the wake of the shore stations prompted the Commander of the Revenue Cutter Thetis to request that a Christian mission be established at Point Hope. In 1890 the St. Thomas Episcopal mission and school was founded.

Point Hope's first reindeer herd arrived in 1908. The range extended from Cape Thompson to Cape Beaufort. Difficulties soon arose over the limited range and over identification of herds owned by Kivalina people who were living in Point Hope. The joint ownership herd that was formed in 1926 overcame the problems for a few years and the animals increased, as elsewhere in the Arctic. But by the late 1940's the last of them disappeared.

While the shore station at Jabbertown was still in operation, the government opened a school there in 1904; but soon the station closed and the school was moved to Tikirag about 1920. The mission school had continued to operate throughout this time but closed after nearly 30 years in 1924. The government assumed responsibility for the education at Point Hope and in 1931 the Bureau of Indian Affairs began its administration of the school. This continued until 1969 when it was transferred to the State Operated School System.

The Episcopal mission was instrumental in setting up the first village store in 1920. Six years later it was reorganized with the reindeer operations and was served by a Board of Directors elected from the stockholders, with mission supervision. In a few years the herding and trading functions were separated. The store continued to function until 1945 when, due to internal problems, the store was taken over by the village who then arranged for affiliation with the government sponsored Alaska Native Industries Cooperative Association. The store helped stabilize the village trading situation and together with the Alaskan Native Arts and Crafts office, stimulated sales of Native products.

Attempts to market local products of seal and whale oil for candle making (in 1950) and the practice of selling coal to nearby villages (in the 1940's) did not prove profitable and have been discontinued.

In 1940 the territorial guard was established in Point Hope, being replaced by the National Guard in 1948. The guard is a focal point for village activities in its own right, and also acts as a center for communities activities such as dances and covering of whale boats.

The Episcopal mission was also instrumental in organizing a village council in 1920

to control local affairs. In 1940 under the Indian Reorganization Act of 1934, the council became chartered as a corporation of the U.S. which recognized tribal governments. The council had no power to enforce its rulings, but it effectively controlled many aspects of village life due to the prestige of council members and pressure of public opinion. Since these were the same means used for social control in traditional times, the decision-making processes of the council are grounded in traditional law ways and values.

In 1972 Point Hope incorporated as a 2nd class city and operates with a mayor and seven member council. The city provides recreational facilities and services to the community. Fire protection is provided by the Borough.

9.5.2 Subsistence

The strategic location of Point Hope has allowed for a long and dependable history oriented toward marine mammal utilization. For at least 2,000 years, the area has supported a significant arctic population because of the availability of these marine species and the ability of the inhabitants to secure them. Both terrestrial and marine resources are harvested from the sea, ice and land environments, providing an adequate food supply. This intimate association with the environment is strongly influenced by the Iupiat 's language, art, survival skills, and social and ceremonial practices.

Certain species, such as seals and caribou, are present near Point Hope much of the year, while some smaller mammals and ptarmigan are available all year. Other resources such as bowhead whales can be obtained only for short periods annually. Changing environmental conditions and resource fluctuations require knowledge of how to utilize all wildlife in an extensive area.

Seals have historically proven to be the mainstay of coastal Iupiat along with caribou, but the latter have undergone population fluctuations causing human hardship. Of all the available resources, the bowhead whale is the most significant to the Iupiat , not only for the huge amount of desirable food it provides, but because so many of the social, cultural and ceremonial practices revolve around it.

Climatic conditions can from year to year alter ice conditions, resulting in a reduced

whale harvest. When catches of other marine mammals are reduced, the I_upiat have resorted to heavier exploitation of terrestrial resources such as small mammals, waterfowl and fish. A flexible strategy for resource procurement has been developed by the I_upiat to account for these fluctuations.

9.5.2.1 Spring. Spring is an important period in the Point Hope subsistence cycle because of animal migration patterns. The most significant resource is the bowhead whale. The whole community is involved with whaling from the time the offshore leads form in the ice south of the point in late March or early April until June. Extensive pre-season and post-season activities indicate the significance of whaling to I_upiat culture and contribute to its continuity. Seals, occasional walrus, beluga whales, and polar bears are taken if the bowhead whales are not running, but the main sealing season begins along the south shores of the peninsula after whaling has ended. Seals and walrus follow the receding ice pack, and are not commonly available at Point Hope in the summer. Walrus are also hunted in south shore leads and by boat as the old ice breaks up. Early migratory birds passing through the area are harvested. The area of subsistence activities includes extensive sea ice usage along the north coast and around the point towards Cape Thompson. Inland areas along the Kukpuk and Ipewik rivers are also utilized.

9.5.2.2 Summer. By late June, the ice is usually gone from around Point Hope allowing boat travel. Subsistence activities are diversified and include wide areas of usage. Favorite bird nesting sites at Cape Thompson and Cape Lisburne are visited by boat to collect eggs and birds. Frequent use has resulted in the naming of specific ledges and trails on the cliffs. Ocean fishing for char and salmon is conducted with beach seines and nets along the north and south shores, and lagoons produce whitefish. Most of the fish are consumed immediately with little left for drying or freezing. Fresh meat during the summer is supplied by caribou, which are found in several places inland along the coast, the Kukpuk River area, or towards the Pitmega River. Salmon and grayling are caught at the mouth of the Kukpuk River and at other fishing areas along the river. Berries and edible plants are collected and, if not used immediately, are stored in oil or frozen. Some bearded and harbor sealing may occur in late spring/early summer. The second run of beluga whales occurs in July and some may be taken with nets from the beach. Seasonal activities encompass extensive areas along the north and south coasts and the Kukpuk River.

9.5.2.3 Fall. Subsistence activities in the fall are conducted from about mid-September to early November and are characterized by intensive fishing along the Kukpuk River. About three-fourths of the total fish harvest is obtained in the fall. Fishing is combined with caribou and moose hunting up to the mouth of the Ipewik River. With the advent of the snowmachine, a wage earner may participate in both fishing and caribou hunting. Gill nets and hook and line are used for fishing before freeze-up and afterwards through holes in the ice. Grayling, char, whitefish, and Dolly Varden are taken. Cod are utilized in the fall when storms throw them up on the beaches. Caribou are hunted along the Kukpuk River and at coastal and inland areas around Cape Thompson. Migratory waterfowl are again harvested on their return migration. Seals begin to reappear as the sea ice forms and some are hunted by boat while people are out driftwood collecting. More intense sealing is done as the ice thickens. Trapping season opens in early November. The area of greatest fall subsistence usage extends from the south shore inland to an area beyond the Kukpuk River and part of the north coast. The area towards Cape Lisburne is not as heavily used. There is no fall whaling at Point Hope.

9.5.2.4 Winter. Inland travel becomes easier during winter, which lasts from November to March/April. Longer trips are taken to Cape Lisburne and Kivalina in conjunction with caribou and furbearer hunting. Sealing and caribou hunting supply most of the subsistence foods during winter, with sea ice fishing for cod contributing to the diet in January. Cod fishing is done with hook and line through the ice. Trapping sites are set up all along the coast north and south of the village, especially around sea mammal carcasses that attract arctic fox and wolverines. Sealing sites along the south coast are used most frequently, but north coast sites are used if ice and wind conditions permit. Polar bears, who feed upon seals, are more abundant in late winter. Formerly, they were hunted by air by sport hunters, but this is now prohibited by law. I_upiat hunters harvest up to 10 bear a year from locations north and south of the village, approximately five to seven miles offshore. The winter area of subsistence usage is more extensive than in any other season, ranging from Cape Lisburne to the ice pack well beyond Cape Thompson to inland regions encompassing nearly all the Kukpuk and Ipewik Rivers.

9.5.3 Social Characteristics

Point Hope is a traditional village with a long history of marine mammal exploitation. The very fact that Point Hope has existed uninterrupted for thousands of years has left the community with a sense of cooperative cohesiveness not found in other villages. The approximately 800 residents combine a predominantly subsistence lifestyle with wage employment, as in other areas. By using modern equipment and services, employed persons continue their subsistence activities, and surveys show they supply a more diverse variety of subsistence foods to their households in comparison to unemployed hunters.

The extended family still comprises the basic unit for acquisition and sharing of Subsistence and from which the whaling crews are drawn. The whole community also functions as part of the socioeconomic unit for this most important activity. For two months each spring Point Hope collectively devotes its energy towards whaling which serves to integrate the community socially and provides a focus for transmitting cultural tradition to younger members. The captains of Point Hope are organized between two of the remaining qalgi (traditional ceremonial halls), through which relationships between crews are formalized. The Qagmaqtuug and Ugasiksikaaq qalgi serve as governing bodies for the whaling fleet. Meetings are held before each season to review old regulations, adopt new ones and distribute captains' identifying marks. The organizations also serve in a judicial capacity for grievances.

Point Hope has a complex system of portioning and distributing the whale. Certain parts are given to the captain who in turn will distribute them in accordance with custom at ceremonies during the year. The crew members get specific sections in relation to the order they arrived to aid in the capture. Butchering patterns allow for eight crews at Point Hope with certain sections designated for more crews should there be any. A captain catching his first whale must divide the whale in a slightly different pattern.

Point Hope is unique among North Slope villages in that it holds a pre-whaling celebration in addition to the past season Nalukataq festival. Other holidays such as 4th of July, Thanksgiving and Christmas are also special events in Point Hope. The traditional Messenger Feast celebration, Qakummisaaliq is now conducted by each qalgi on alternate nights during the Christmas–New Years holidays. Subsistence foods are an important part

of any celebration and are served at all the feasts. Aside from seasonal wage employment in larger towns such as Anchorage or Fairbanks, jobs have become available in the village through the North Slope Borough and Arctic Slope Regional Corporation. The Borough provides employment within its organization and through its capital improvement programs such as construction of schools, housing, public safety and health facilities. More permanent jobs are available to maintain and operate these facilities.

9.5.4 Existing North Slope Borough Public Facilities

Point Hope has many public facilities. The village is centered around the Tikigaq School complex that is comprised of a K–12 school, a gym, a pool, an industrial education building, four portable classrooms and a bus garage. Unlike some of the other villages, Point Hope has a day care and a senior center for its residents. Other important facilities are the health clinic, fire station, public safety office, airport terminal, city hall, U.S.D.W. building, tank farm, generator building, water treatment building, and sewage pumping building. The phone and television building houses CATV. There is also a four plex for teacher housing.

9.5.5 Capital Improvement Projects in Progress

Several CIPs are in progress in Point Hope. Due to student population growth, the school is undergoing a \$3,498,000 expansion that will add a multipurpose room, renovate laundry and gym storage, and add two to three elementary classrooms. Other ongoing projects include renovation of the utilidor and water system, phase II of the water project, the tank farm upgrade, a landfill relocation study, and the power plant upgrade. The Point Hope Utility Vehicle project provides for the purchase and delivery of a mid-size power line utility truck that will be equipped with a hydraulic bucket lift. The senior center, the gathering place of the elders in the village, is being expanding to provide additional office and meeting space and modification of the existing structure and building systems. Additionally, the health clinic is being expanded by 4,400 square feet to meet community needs.

9.5.6 Future Capital Improvement Projects

Future CIPs are scheduled through 1996 and will employ residents through 1998. The major projects will be the construction of a piped water and sewer systems and treatment facilities. The \$33,768,000 projects, scheduled to begin in 1995, will improve the quality of life of Point Hope residents. Other future CIPs include:

- construction of a teleconference center;
- construction of a public safety office building;
- renovation of the power plant (phase II);
- construction of two teacher housing units; and
- construction of 800 linear feet of new roads.

Pt. Hope is located on a rocky spit. This rock is crushed to make gravel. Current reports estimate the village has 20,000 CY of gravel stockpiled. Construction of a piped water and sewer system will require reconstruction of roadways and necessitate additional gravel sources.

9.6 Pt. Lay

9.6.1 History

The recent resettlement of Point Lay is part of a continuing series of historic and archaeological events documenting the long-term occupation of the area by Native peoples. Many of the current residents are descended from Utukok and Kupowruk river groups (Utukamiut and Kukparungmiut) and those geographic areas form a large part of the present day subsistence use territory.

Prehistoric archaeological sites along the Utukok River, which some researchers place at more than 7,000 years old, demonstrate the antiquity of aboriginal habitation along this major travel route to the interior. The Utukamiut Eskimos lived in the upper reaches of the river, and while primarily caribou hunters, some would come to the coast to trade and participate in sea mammal hunting. Travel down the river occurred in the spring during high water and the sea ice break up. The spring movement involved 50 to 75 boats and several hundred people.

The degree of coastal resource utilization appears to have shifted over time to the point where the people had a dual orientation to coast and land. Utukamiut could opt to winter at their permanent houses at Icy Cape where they also had ice cellars, or they would remain inland. They participated in spring bowhead whaling at Icy Cape, summer walrus hunting, and sealing in Kasegaluk Lagoon. The trading fairs at the mouth of the Utukok River drew them there in the summer and to Icy Cape for winter messenger feasts.

By the early part of this century the Utukamiut centered their lives more on the coast than the interior. Trading ships would stop off Icy Cape in the late 1800's to trade with the Natives (called the Kayaakserevigmiuts), who had a small settlement there with one community house (qalgi).

After the turn of the century a store was opened and was restocked by trading schooners. At least one other store was opened in the 1920's and a school was built in 1900. A reindeer herd was also kept in the Icy Cape/Point Lay area. All of these attractions plus the long-term cultural associations must have had an effect on the settlement patterns of the nearby Inupiat groups, centralizing them on the coast for longer and longer periods of time. Trapping, however, kept at least part of the family members away during the winter.

Today's elders of Point Lay, and others who have moved to Wainwright, recall being raised in the 1920's at historic places such as Neokok, Kuuchiak, and Cully. They were called Kalimiut and lived at various small camps before gradually consolidating at Point Lay about the time the Icy Cape school was moved there (by skin boat and launch) in 1930. The village and school settled on an offshore barrier island next to the old historic site of Cully. With a store and school to draw people, Point Lay's population grew to 117 in 1940. The reindeer herd was declining, however, as was the case in other northern areas, and by 1949 no deer were kept at Point Lay.

The post war construction boom touched Point Lay in several ways. It provided jobs in the early 1950's through the Coast and Geodetic Survey, and later with the DEW line sites at Point Lay, Icy Cape, and Cape Beaufort. But construction at the former two sites also disturbed graves and archaeological sites. After the short period of economic activity the villagers began to leave Point Lay and the U.S. census that listed a population of 75 in 1950

did not list Point Lay at all for 30 years. In 1970, there was a movement back to the old village on the barrier island. The Arctic Slope Regional Corporation aided the villagers in their return. Old houses were reinhabited and the old school reopened in early 1971. Not all the people chose to return. Some live in Wainwright today, and close family ties bind the two groups to each other and to common subsistence territories.

9.6.2 Subsistence

Caribou, fish, and beluga whale comprise the most significant Subsistence of Point Lay residents. Seals and walrus are not as intensively used as in the past due to the reduction in dog teams and the present adequate supply of caribou. Sea mammal exploitation may increase with fluctuations in the caribou numbers and regulatory restrictions that decrease the supply.

Point Lay's subsistence usage areas comprise a coastal region from Icy Cape to Cape Beaufort, and inland along the Kukpowruk River and into the DeLong Mountains. Some villagers are descended from the Utukok River people and hunters still use this familiar territory for hunting.

Many Point Lay people have lived in Wainwright and still retain close family ties there. Thus, it is not surprising there are several overlapping areas of subsistence usage with Wainwright hunters such as in the Beaufort and Raven basins up the Kukpowruk River where each group goes for furbearers. Icy Cape is another area that each village uses for hunting waterfowl. Wainwright hunters occasionally come for caribou to the western Brooks Range in the southeast corner of the National Petroleum Reserve, which is also used by Point Lay people. In March and April, both villages may hunt for wolf and wolverine in the Amatusuk Hills.

9.6.2.1 Spring. Migratory waterfowl and eggs are taken in May and June at coastal sites and along inland rivers. Specific areas, such as the islands in Kasegaluk Lagoon north of the village and along the barrier islands, yield large quantities of eggs, all of which are used by the villagers. Ground squirrels are taken near the village. Hoary marmots are hunted in the Amatusuk Hills where other furbearers might also be found. April is a good time for sealing which is done when the animals come out and lay on top of the ice. Seals are found

all along the coast with the Kasegaluk Lagoon. Snowmachines are used to hunt caribou as they move toward the coast for the summer, or in the Amatusuk and Kiklupiklak Hills.

9.6.2.2 Summer. Summer is a busy time for Point Lay subsistence activities. Boats are used for coastal and river work, as tundra travel is very limited. Caribou are taken along the coast and around Icy Cape. Waterfowl and egg harvests continue in early summer. Open lead sealing is done in early June with many taken later during the annual walrus hunt at Icy Cape.

Gill nets are set up in coastal places such as river mouths (except Kokolik), at ocean passes, the Kasegaluk Lagoon and at the popular Kitkik Point. The season lasts from early July to late September. The nets are moved about 15 miles up the Kukpowruk River in September for grayling. A variety of salmon, whitefish, flounder, smelt, herring, bullhead and an occasional char are taken. Almost all the village is engaged in fishing during the summer.

As the sea ice retreats in June, the walrus migrate north past Point Lay and the villagers conduct their annual hunt. Walrus are found with ice flows from Omalik Lagoon north to Icy Cape, where most of the most recent hunts have been conducted. Communal beluga whale hunts are conducted in the lagoons and shallow bays in early July. The west side of Icy Cape and the passes north of the village are favorite spots. Like the walrus hunt, all available hunters participate. Boats are used to herd whales into shallow water where they can easily be retrieved after being killed. Occasionally, belugas can be taken in August, too.

Berries and other edible plants are collected along the coast, inland along rivers and near the historic site of Cully. As fall approaches preparations are made for ice fishing. Snowmachines are taken by boat up the Kupowruk River and left to be used after freeze-up.

9.6.2.3 Fall. The fall migration of waterfowl attracts some hunters to the productive spots near Icy Cape. Caribou hunting is actively pursued from late August to October at inland locations in an attempt to fill the ice cellars for winter.

Whole families engage in fall grayling fishing up the Kukpowruk River, even after the school year has begun. Nets are used until freeze-up and then hook and line are used through the ice. Net fishing under the ice is not practiced. Traditional ice fishing sites are still used by the villagers today. One especially popular site is 15 miles up the river, called Neokok's or #1 camp. Berry picking is combined with fishing trips and coal is sometimes brought back to the village after freeze-up by snowmachine from the mine on the Kukpowruk, or by boat before. Moose are newcomers to the area and are taken when the occasional opportunity presents itself. Spotted seals are hunted in early fall when they are fat and do not sink.

9.6.2.4 Winter. Some ice fishing continues in early winter and occasional caribou hunting trips are taken. Trapping is done all winter, primarily at coastal areas, but storms may prevent the checking of traps at regular intervals. Wolf, wolverine, and caribou hunting may be combined in areas towards the mountains. Coastal traps are often set next to washed up marine mammal carcasses which attract fox and wolverine. Polar bears are also taken at trapping sites where they are attracted because of the bait or foxes. Otherwise, polar bears are not as actively hunted as in former years. Some sealing is attempted. In late winter, some people travel to other villages to participate in the bowhead whaling activities.

9.6.3 Social Characteristics

Point Lay is unincorporated with a local village council. The approximately 140 residents live in a new location today, having moved to a new site near the DEW line station south of the Kokolik River's mouth in the early 1980's. The North Slope Borough provides public services such as education, electrical power, and police and fire protection. In summer the villagers continue to return to the old site on the barrier island even though it is threatened by erosion, unprotected from storms, and has no fresh water. Traditional ice cellars are still maintained at the old site. The villagers rely heavily on subsistence to meet their needs. They also engage in seasonal employment when it is available to buy equipment to support subsistence practices.

The various capital improvement projects conducted by the North Slope Borough have recently provided temporary employment, but few jobs are available locally outside of the health aide, teachers' aides, shopkeepers and public facilities maintenance. Native crafts

bring in some cash. The closely related families of Point Lay continue traditional social and cultural practices. The commercial beluga and walrus hunters provide the focus for community involvement and cooperation. Fall fishing is an especially important activity bringing whole families together for up to several weeks. Communication with friends and relatives in other villages is an important part of continuing cultural traditions. Residents may travel to Point Hope to participate in the spring whaling festival or go in the fall to the slush ice celebration—both events being tied to the sharing of Subsistence. Close ties are also retained with Wainwright and Barrow people. Sharing is an integral part of the social pattern in the village as well. Subsistence foods are shared among families which is a significant means of expressing social cohesion. The community celebrates 4th of July and Christmas with special programs of traditional dances, traditional and nontraditional games and feasts.

9.6.4 Existing North Slope Borough Public Facilities

Several public facilities exist in Point Lay. The small village has a school, a school play structure for the children, a health center, a fire station, a public safety office, a U.S.D.W. building and a community center. A construction camp is also located within the village. On the south end of the village, there is a telephone building, a vehicle maintenance/warm storage building, a water treatment facility, and a generator plant. The facilities have a 1991 valuation of \$17,799,700.

9.6.5 Capital Improvement Projects in Progress

Most of the CIPs in progress relate to the mining and use of coal near Point Lay. The Western Arctic Coal Demonstration Project (phase III) provides for the installation of seven additional coal burning units and mining of approximately 900 tons of coal for use in Point Hope, Point Lay, and Wainwright. This project also provides for the purchase of a Nodwell tracked vehicle to transport equipment and coal. The purpose of the Western Arctic Coal Demonstration Project is to demonstrate the use of coal as an alternate heating and energy source and advance the commercial development of coal. Another grant provides for funds to transport the coal by barge to other North Slope coastal villages.

Another coal project involves a feasibility study of developing the Deadfall Syncline

coal prospect of the Western Arctic Coal fields for mining. The study is aimed at reducing the level of dependence of diesel fuel in rural Alaska and increase the potential for development of Western Arctic coal. Coal is also viewed as a potential for economic development in Northern Alaska.

The school is currently undergoing a \$3,498,000 addition to expand the gym and add 6,660 square feet of classroom space. Other projects include construction of a one-million gallon water tank, construction of new electrical power line for a new subdivision, purchase of a utility vehicle, and design and construction of a snow fence system.

9.6.6 Future Capital Improvement Projects

Many future capital improvement projects are scheduled for Point Lay. In 1995, construction of the piped water and sewer systems will begin. Coal mining and development continues to be a theme with the Arctic Coal Underground Mining project. This project will initiate construction of a portal and decline for an underground test mine in the region west of the Kuchiak Block. Employees will also receive mine health and safety training.

In 1994, the Cully School will receive a 3,500 addition to house a swimming pool and two classrooms. Additional projects include a public safety building, a search and rescue office, a teleconference center, and a day care center.

According to 1991 estimates, Pr. Lay has an adequate supply of gravel through 1996. Approximately 100,000 CY of gravel is stockpiled. Future use is estimated at about 53,000 CY.

9.7 Wainwright

9.7.1 History

The village of Wainwright, situated on the Chukchi Sea and near the mouth of the Kuk River, is within the National Petroleum Preserve—Alaska. The population consists of many descendants of the Utukok and Kuk river peoples (Utukokmiut and Kukmiut).

Prehistorically the Utukok was a natural pathway to the interior and sites of at least 7,000 years of age document that antiquity. Continuous occupation since then of coastal and inland areas are recorded in other archaeological sites.

Utukokmiut traditionally had a dual orientation towards sea and land resources. More recently they shifted emphasis towards coastal exploitation, while still retaining extensive use of inland areas. The Kukmiut were more coastal adapted, but used the Kuk River drainage for fishing and caribou hunting. Coastal sites such as Nunagiak at Point Belcher have a recorded history for about 800 years.

Captain Beechey visited the Wainwright area in 1826. Another explorer, the Russian Kashevarov, met I_upiat at the mouth of the Utukok River and at Atanik (an old settlement near Wainwright) in the summer of 1838.

As in other Arctic coastal areas, Wainwright experienced the affects of shore-based commercial whaling stations and the decline of important Subsistence. Families subsequently dispersed to inland regions during the era of trapping, but gradually people were drawn to Wainwright as a permanent year-round settlement after a school and reindeer herd were established there in 1904 near Ahaliraq (Old Wainwright).

Many Utukokmiut settled at Icy Cape, their traditional summer locations, when a school opened there in 1900, and then resettled in Point Lay and Wainwright in the 1930's when it closed. The Presbyterians established a church in Wainwright in 1923.

After the decline of fur trapping and herding in the 1930's and 40's, the I_upiat shifted to more traditional activities but from a permanent village base where services and some employment was available. Wainwright men participated in the post World War II construction boom and NPR #4 oil explorations along with other North Slope residents. Wainwright has a balanced orientation towards marine and land resources due to its slightly less favorable bowhead whaling location and its easy access to the Kuk River.

Knowledge of a wide base of traditional subsistence areas is shared among the Kukmiut and Utukokmiut descendants in the village. Old sites such as Icy Cape or on the

Utukok River are still used since the advent of snowmachines and outboard motors permit even wage earners rapid access to those areas. Interest in pursuing the activities has not decreased over time; free time may be intensively devoted to selected subsistence activities and once a subsistence area is reached it is used in much the same way as in traditional times, except for modern equipment.

The family unit still comprises the basis of the hunting group and distribution network. Subsistence activities are carried out by related people or with hunting partners. Fishing has become an increasingly important activity over the past 20 years due to a general revitalization movement and ease of travel provided by snowmachines and outboard motors. Some fall camps resemble small villages such as Uyagaagruk on the Avalliq River where people have built cabins and combine several months of fishing with caribou and waterfowl hunting and berry picking. Smelt fishing has become a major subsistence activity again and the usual mid-winter season is being extended from fall to spring. Wainwright is noted for its smelt which are caught in the lagoon at the mouth of the Kuk River, and are traded to other North Slope villages such as Barrow who lack that resource.

Furbearer hunting is another subsistence activity that is often conducted by husband and wife teams, with late winter trips being taken by small groups of couples. Early summer coastal camps are another example of subsistence activities conducted by the family unit. The camps are away from the distractions of the village and provide another important context for transmitting culturally relevant information to younger people.

This historical and better suited whaling location of Icy Cape is being used for whaling again when marginal conditions at Wainwright warrant it. Point Lay people have been invited to help with Icy Cape whaling and they in turn receive a share. There was a time during the mid-1960's when Wainwright's whaling activities declined and there were several years of poor catches. But now whaling has reemerged as the village's most important cultural and economic activity. Bowhead whaling is not just an isolated spring event. It is integrated throughout the year into many aspects of Wainwright's social life. The Nulukataq celebration, held after spring whaling, (as in Barrow and Point Hope) reinforces mutual cooperation of all the villagers. Throughout the year at the Slush Ice festival (fall), Thanksgiving, and Christmas, the umialit (whale boat captains) distribute whale products

which continue to emphasize this cooperation and the valued personality trait of sharing. Other subsistence foods are distributed to each family and to relatives and friends in other villages during the holidays, with waterfowl and polar bear being other prized foods to serve at these times.

As a result of the Alaska Native Claims Settlement Act of 1971, the village corporation of Olgoonik was formed and was allotted surface rights to 115,200 acres, all of which lie within NPR-A. The corporation provides employment within its organization and through the operation of a store and the sale of fuel. Wainwright became a second class city in 1972 and operates with a mayor and seven-member council. Some jobs are available through the recreational services it provides to the community along with other employment available through the North Slope Borough which provides nearly all of the other public services including fire protection and education. The stores, school, clinic, various local and regional government positions and a few private businesses provide the basis for most village employment. The Borough's Capital Improvement Project program provides seasonal work across the slope and some men find short-term positions in larger towns. Trapping and craft work also brings in some money. The National Guard is active in Wainwright and contributes to the economy. The armory is also a center for community activities.

9.7.2 Subsistence

Wainwright is situated close to several different environments, each of which provide seasonally diverse wildlife resources. In the extensive lagoon system created by offshore barrier islands are waterfowl, seals and other marine mammals. Bowheads, belugas, walrus, and seals are taken from the ocean/sea ice environments. The Kuk River is an avenue to the interior where fish and other predators who are attracted to them are taken. The Kuk also forms a large estuary which provides habitat for fish, especially smelt. Terrestrial resources such as caribou, furbearers, plant/berries, bear and ptarmigan are available.

Subsistence activities are concentrated along coastal areas from Point Franklin to Icy Cape and inland along the Kuk and Utukok River drainages. The sea and sea/ice environments are used for many miles out from shore. Avid hunters may extend their

operations to Meade and Colville Rivers or along the coast to Point Lay and Peard Bay.

9.7.2.1 Spring. Whaling is the most important subsistence activity in the spring. Bowheads migrate north beginning in April and are taken in open leads in the offshore ice as they pass close to shore at points of land jutting into the ocean, such as Point Belcher or Icy Cape. Wainwright people travel up the coast as far as Peard Bay to hunt bowheads in the spring.

Schools of beluga whales arrive about the same time as bowheads. They are hunted from the ice along leads or driven into inlets in the summer and killed. Walrus, harbor and bearded seals may also be taken, but are more commonly hunted in summer. Ringed seals, however, are taken during the spring hunt. Migratory waterfowl are taken along the coast and along rivers beginning in May. Squirrels and marmots are sometimes pursued in conjunction with furbearer hunting trips to the mountains.

9.7.2.2 Summer. Activities are focused on the coast and along rivers as tundra travel becomes more difficult in summer. Families occupy traditional camping sites along the coast for sealing, waterfowl hunting and other activities up to mid-summer when fishing becomes more intense.

Waterfowl are taken in early summer until they nest and some egg collecting is done by families along the Kasegaluk Lagoon or Sea Horse Islands. Bearded seals are hunted in early summer southwest of the village, while spotted seals, which migrate south in the fall, are best taken in late summer when they will float after being shot. Walrus are prevalent in July and August and are taken on drifting ice floes in front of Wainwright, and along the coast to Peard Bay.

Caribou come to the coast during summer and are taken along the coast from Icy Cape to Peard Bay from late August onward. Berries are collected in late summer near the village and along the Kuk.

Fishing is a major subsistence activity for Wainwrighters nearly all year. In mid-summer nets are set up in front of the village for salmon, trout, and whitefish. Fishing

moves to streams and rivers as the migratory fish work their way up.

9.7.2.3 Fall. Fall activities are focused on fishing and caribou hunting. There is no fall whaling in Wainwright. Caribou skins are best at this time and the animals are hunted on the coast from Icy Cape to Peard Bay and along major rivers. Migrating waterfowl are also hunted at spots such as Icy Cape and Point Belcher. Although caribou is not a coastal resource, access to it is tied to waterways as the animals travel along the drainages and beaches. Waterways are used for locating and transporting caribou.

Fishing is conducted at camps for up to two months along the Kuk, Ivisaruk and Avalik Rivers, often in conjunction with hunting and berry picking trips.

After freezeup, travel is easier and additional fishing trips are made to Utukok River camps. Sometimes people use charter airplanes to reach these camps. Sites on the Kuk River are reached after freezeup with snowmachines, as overland travel is possible from Wainwright in a few hours.

When shorefast ice forms in the late fall, polar bears are taken when they come to the coast to feed on sea mammal carcasses. The meat is popular for winter holiday feasts.

Coal is collected in late summer and fall along the Kuk River and coastal beaches after heavy storms.

9.7.2.4 Winter. Furbearers are taken during the Winter, especially in late season when there is increased daylight and better weather. Fox are taken along major rivers and at coast sites. Wolf and wolverine are trapped or shot on the coast or at inland locations. Ringed seals are taken throughout the winter along leads in the ice, and some caribou and polar bear may occasionally be taken.

Wainwright is noted throughout the North Slope for its smelt, and much fishing is done in January through March in the Kuk Lagoon. With the increased popularity of smelt, fishing has been extended from October to May.

Traditional subsistence cycles are reflected in the geographic areas by the Utukokmiut and Kukmiut, and in seasonality of the resources. The same areas and species are used today by Wainwrighters (and some people from Point Lay), who have a combined knowledge of the territory based upon historic information learned from their elders.

9.7.3 Social Characteristics

Wainwrighters continue to conduct their traditional songs, dances, games, and feasts but they are combined now with modern holidays.

9.7.4 Existing North Slope Borough Public Facilities

Wainwright has many North Slope Borough public facilities. The Alak School complex, located on Main Street, serves students from pre-school through grade 12. The village also has a fire station, a public safety office, a health center, and a senior citizens center. Communication facilities include a TV and a telephone building. Other public facilities include teacher housing, two four-plex units, the old school, a generator building, a tank farm, and a sewer and water treatment facility. These facilities were valued at \$39,360,400 in 1991.

9.7.5 Capital Improvement Projects in Progress

Several projects in progress involve the purchase of vehicles. Under a state grant, Wainwright will receive a van for transporting senior citizens. A trash collection vehicle and a power line utility truck will also be purchased. Other projects in progress include construction of a housing warehouse, construction of arctic entries to 4-plex units, and water treatment pipe repairs.

9.7.6 Future Capital Improvement Projects

In 1994, construction will begin on the new water and sewer systems for Wainwright. The \$45,000,000 project will improve the life, health and safety of residents by providing piped water and sewer systems including treatment facilities. Also scheduled for 1994 is construction of a free standing prototype public safety office. Other projects include:

- development of a day care center;
- construction of a search and rescue office;
- construction of a teleconference center;
- soil testing and surveying for the water and sewer project;
- completion of the housing warehouse;
- construction of 600 linear feet of new roads; and
- construction of utility pole racks.

Traditionally, gravel was taken from the shores of Wainwright Inlet, south of town. However, additional gravel was obtained from dredging projects. Wainwright has about 25,000 to 35,000 CY of gravel stockpiled with a need for 55,000 CY through 1996. Additional gravel is available, but it must be hauled across the lagoon during the winter months.

1.0 BOUNDARIES AND LAND STATUS

ISSUE: THE PATCH QUILT OF JURISDICTIONAL AND OWNERSHIP BOUNDARIES AND THE COMPETING POLICIES AND PRIORITIES OF FEDERAL, STATE, LOCAL AND PRIVATE LAND MANAGEMENT ENTITIES.

Neither government jurisdictional boundaries, nor private property boundaries, are traditional concepts in the Inupiaq character of life. Where necessary they must give way to the goal of preservation of subsistence resources, subsistence activities, and the Inupiaq character of life.

The North Slope Borough Comprehensive Plan is a cooperative expression of land and water resources utilization focused toward maintenance of the Inupiat culture through preserving and enhancing wildlife and wildlife habitat basic to the subsistence lifestyle. The Borough also recognizes the existence of competing uses and the necessity of accommodation of mutual cooperation now and in the future.

The North Slope Borough views participation in all governmental activities directly affecting its lands, air and waters as a significant means of attaining its goals. The Borough wishes to actively participate in planning, policy development and regulatory activities within its jurisdiction.

Further, the Borough looks favorably upon opportunities, allowable under law, to participate in an coordinate activities and developments with other governmental entities.

ISSUE: DEVELOPMENT OUTSIDE THE BOROUGH WHICH ADVERSELY IMPACTS BOROUGH RESIDENTS.

Neither the concept of land ownership nor the concept of government jurisdiction are traditional concepts in the Inupiaq culture. The seaward jurisdiction of the North Slope Borough extends only three miles from the shore. Yet for thousands of years the Inupiat people have hunted whales, seals, walrus and other marine mammals, and fished, far beyond this three mile limit.

It is likely that significant oil and gas resources exist beyond the three mile limit, in exclusive federal jurisdiction, and the federal government has conducted lease sales in this area. Oil and gas exploration and development in this area have been shown to alter the migration routes of the Agviq and other species of marine mammals, pushing them far offshore. This in turn means that residents of the Borough must travel farther, as much as thirty miles offshore, in order to hunt, often in difficult and dangerous weather and sea conditions. This seriously affects the health and safety of Borough residents, and reduces the chances of a successful hunt. It requires considerably more risk, skill, time and resources to haul whales back to shore, during which time the meat can spoil. The Borough is opposed to offshore resource development which adversely impacts the migration of whales and the habitat of other marine mammals.

For this reason the Borough has joined with whaling captains from all the affected communities and the Alaska Eskimo Whaling Commission in suing the federal government and the developer to obtain restrictions on exploration and drilling which respect the migration patterns of the bowhead whale and enable hunters to continue in their traditional activities.

GOAL: PRESERVATION OF OPPORTUNITIES FOR SUBSISTENCE HARVEST, TRADITIONAL ACTIVITIES AND THE INUPIAQ CHARACTER OF LIFE REGARDLESS OF OWNERSHIP AND JURISDICTIONAL BOUNDARIES.

OBJECTIVES

- OBJECTIVE 1:** To protect the Inupiaq character of life.
- OBJECTIVE 2:** To insure maximum control by Inupiat over their own destiny
- OBJECTIVE 3:** To encourage a close working relationship between *the Borough and its residents, and state and federal agencies and developers, to ensure that development does not affect the subsistence resources and activities of Borough residents.*

In the 1982 plan this objective read as follows: To encourage close working relationship between development entities and Borough and community governments where mutually beneficial development site locations and protection of subsistence and cultural resources.

OBJECTIVE 4: *To maximize the Borough's entitlement to land selections.*

DEVELOPMENT POLICY

POLICY 1.1 CONFLICT WITH SUBSISTENCE RESOURCES AND SUBSISTENCE HARVEST. *Development which materially adversely affects subsistence resources or the subsistence harvest activities of borough residents is prohibited.*

BOROUGH PROGRAMS

PROGRAM 1.2 DEVELOPMENT OUTSIDE THE BOROUGH'S JURISDICTION. *The Borough will work with state and federal agencies and the oil industry to develop lease stipulations and monitoring programs to minimize or eliminate conflicts between resource development activities outside the Borough's jurisdiction, and subsistence harvest activities.*

PROGRAM 1.3 LAND SELECTIONS. *The Borough will support the passage of legislation to increase the Borough's entitlement to land selections from the current one percent of its land area up to ten percent of its land area.*

Under current state law, new boroughs are entitled to select up to ten percent of their land area for Borough purposes. But the North Slope Borough has been entitled to select only one percent. Legislation introduced in the 1992 session of the legislature would bring the North Slope Borough into parity with other local governments in the state.

PROGRAM 1.4 LOCAL CONSULTATION ON LAND SELECTIONS. *The Borough will consult with and consider the wishes of the residents of each community in the Borough before making any future land selections. Priorities for selections will be land near North Slope Borough communities, Prudhoe Bay, the Haul Road, and sensitive habitat of subsistence resources.*

PROGRAM 1.5 DEVELOPMENT OF A LAND SELECTION AND LAND MANAGEMENT POLICY. *The Borough will develop a comprehensive policy for the selection, management and disposition of lands to which it*

receives title, including the establishment of goals for selection and management implementation procedures for selections, implementation procedures for disposals.

PROGRAM 1.6 OFFSHORE ACTIVITIES. *The North Slope Borough will use all means at its disposal, including but not limited to increased participation in agency decision making, continued research and development of data, and litigation, to ensure that marine mammal populations and migration routes are not adversely affected by offshore exploration and development and that Borough residents will continue to have access to marine mammals for subsistence hunting purposes.*

As noted above, the Borough has filed suit to prevent offshore development which is likely to adversely affect the migration patterns of the bowhead whale and continued access by Borough residents to the whales. Similar concerns exist with respect to development and exploration activity on barrier islands.

PROGRAM 1.7 ACCESS TO SUBSISTENCE RESOURCES . *The Borough will use every means at its disposal to ensure that Borough residents have unrestrained access to subsistence resources.*

Although such access was guaranteed to rural Alaskans in the Alaskan National Interest Lands Conservation Act of 1980, recent steps by officials of the Gates of the Arctic National Park to restrain access over traditional routes by residents of Anaktuvuk Pass. The Borough will use all means at its disposal to ensure that traditional access routes are not impeded by the regulations of other governmental bodies.

2.0 PHYSICAL ENVIRONMENT

**ISSUE: NATURAL RESOURCE DEVELOPMENT AND
EXTRACTION ACTIVITIES**

**GOAL: PROTECTION OF THE NATURAL ENVIRONMENT, AND
ITS CAPACITY TO CONTINUE TO SUPPORT
SUBSISTENCE ACTIVITIES, FROM DEGRADATION BY
DEVELOPMENT ACTIVITIES.**

Poorly planned and executed resource development threatens the biological ecosystems which support subsistence and the Inupiat culture. Harmful impacts include the disruption of energy flow through the food chain, alteration of habitats, and changes in species composition. Arctic ecosystems have fewer species and shortened food chains, and are exists few replacement species.

ISSUE: A SAFE, HEALTHY AND PLEASANT LIVING ENVIRONMENT

**GOAL: SECURE DISPOSAL OF GARBAGE, TRASH AND
LITTER**

**GOAL: DESTRUCTION OR REMOVAL OF HAZARDOUS AND
TOXIC SUBSTANCES**

OBJECTIVES

- OBJECTIVE 1: To continue to provide environmental guidance and direction for present and potential resource development activities and related facilities.
- OBJECTIVE 2: To maintain *and enforce* environmental standards for air, water, vibration, glare, *hazardous and toxic substances*, and noise, based on the preservation of human health and habitat for subsistence species.
- OBJECTIVE 3: To minimize loss of life or property due to oil spills, pollution or natural hazards or phenomena.
- OBJECTIVE 4: To protect and preserve natural and ecological values.
- OBJECTIVE 5: *To ensure that litter, trash, garbage, and hazardous and toxic substances are properly disposed of.*
- OBJECTIVE 6: *To ensure that construction materials are secured and construction projects cleaned up.*
- OBJECTIVE 7: *To locate, design and construct landfills, freshwater lakes, sewage lagoons and other sensitive facilities to minimize the possibility of air and water pollution.*

DEVELOPMENT POLICIES

POLICY 2.1: ENVIRONMENTAL DEGRADATION

2.1.1 Development which substantially pollutes the natural environment (including water, air, noise and vibration) is prohibited unless no feasible and prudent alternative is available.

2.1.2 Development which will likely result in depleting a subsistence resource, as set forth in Chapter 3, or the subsistence needs of local residents of the Borough, is prohibited.

POLICY 2.2: SITE CLEAN-UP

2.2.1 *Development is required to cleanup all trash and excess building materials prior to the termination of construction. The outdoor storage of construction materials for longer than one construction season is prohibited unless there is no prudent and feasible alternative.*

POLICY 2.3: COMMERCIAL AND INDUSTRIAL DEVELOPMENT

2.3.1 The joint siting and use of facilities, and the concentration of development, as a method of minimizing negative impacts on the environment, is strongly encouraged.

2.3.2 Siting, design and construction, and maintenance of transportation and utility facilities (including ice roads) are required to minimize alteration of shorelines, water courses, wetlands, and tidal marshes and significant disturbance to special habitat; and to avoid critical fish migration periods.

2.3.3 Development on the shoreline that does not require a shoreline location, *and* landfills, fuel or toxic material storage areas and dumps, on or near a shoreline, are prohibited unless no feasible and prudent alternative is available.

2.3.4 The erosion protection standards of the U.S. Army Corps of Engineers and the Permanent International Association of Navigation Congresses' (PIANC) International Commission for the study of Waves Annex to bulletin No. 25 (vol. III/1976), apply to all commercial and industrial development.

POLICY 2.4: RESIDENTIAL DEVELOPMENT

2.4.1 New subdivisions or other residential development near the shoreline or in a Special Habitat Area are required to provide adequate water and sewer service to prevent damage to the environmental and habitat of subsistence species.

2.4.2 Residential development associated with industrial and resource extraction development must be removed when the industrial or extractive use is completed unless, pursuant to Plan policies, removal is more harmful than non-removal.

2.4.3 Residential development associated with industrial and resource extraction which is designated and maintained for employees to be shuttled into the work area for work periods then outside to their permanent residence is encouraged.

Avoiding an irreparable conflict between the uses of land and waters for development purposes, and their use for the production of wildlife resources, requires great care in planning and management programming.

The events of the last 25 years at Prudhoe Bay have provided invaluable experiences for local communities, the North Slope Borough, and the State of Alaska, in

the transportation of a traditional subsistence fishing and hunting area into major experiment in resource development and coastal management. With the real possibilities of additional discoveries and development of *petroleum reserves* looming here and elsewhere on the North Slope coastline, the opportunity is present for utilizing these experiences and circumstances to further develop the Borough's program for land and water management.

The Borough seeks to manage its resource development in a manner that maximizes its benefits, while minimizing the negatives. The policies developed for protection of the physical environment are designed to minimize the negative impacts to air [Sections *] and water quality from development. These policies take into account potential environmental degradation from developmental damage from erosion, Ice, and permafrost.

Development activities should not degrade the quality of the natural environment, including water quality and air quality, nor contribute to deleterious effects on local or adjacent environments and habitats.

Water dependent and water related activities or uses for which there is no feasible inland alternatives will receive precedence in coastal areas providing they give priority and protection to subsistence activities and culture.

Multiple use of the shoreline will be encouraged where such uses and activities do not interfere with or inhibit existing uses or activities. Uses or activities which may interfere with or impact subsistence needs shall be sited in geographically separate locations.

POLICY 2.5: GEOPHYSICAL HAZARDS

2.5.1 Development in flood plains and other geologic hazard areas identified in Maps *, and Section * of this Plan is prohibited unless no feasible or prudent alternative is available.

2.5.2 Development in floodplains, shoreline areas, and offshore is required to be sited, designed and constructed to minimize loss of life or property due to oceanic storms, sea waves, ice gouging and override and shore erosion.

2.5.3 Development is required to maintain the natural permafrost insulation quality of existing soil and vegetation to the extent feasible and prudent.

2.5.4 The use of test structures in sea ice hazard areas is encouraged.

2.5.5 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. [See Map *].

2.5.6 Development in permafrost areas is required to maintain or enhance the natural insulation quality of existing soil and vegetation.

Unique south to north river flows create annual events of flooding requiring that necessary development on the flood plains be subject to proper siting, design and construction measures to minimize the potential flooding hazard. In order to promote the public health, safety and general welfare of the Borough and to protect the environment, the loss of life and property, the disruption of commerce and governmental services and the impairment of the tax base, facilities shall be protected against flood damages in location, design, construction and operation.

The North Slope Borough supports safe and sensible utilization of potentially hazardous coastal lands that are subject to periodic oceanic storms and sea wave actions. Borough, state and federal standards for protective siting and construction will be acknowledged by all developments. [See Section *].

Due to the extraordinary offshore sea ice conditions in the North Slope Borough, it is absolutely essential that design and engineering criteria are demonstrably sufficient to withstand environmental hazards.

Permafrost occurs throughout the North Slope Borough creating implications for resource exploration and development activities and for facility siting and general community development. The widespread occurrence of permafrost requires special engineering considerations and it is the policy of the North Slope Borough to require proper enhancements of the natural insulation cover to prevent thawing of frozen sediments and related erosion results. [See Section *].

Existing structures in Barrow and Wainwright are being threatened by beach erosion along the shoreline. The Borough has approved extensive capital projects which, when constructed, may significantly alter the subsurface ecosystem directly offshore, wave and ice patterns, and migration patterns of sea mammals and fish, with the possibility of only a temporary intermission in beach erosion and the threat to structures. Future Borough development must be located, sited and designed so as to minimize the threat from beach erosion.

POLICY 2.6: RESOURCE EXTRACTION

2.6.1 Resource extraction development for administration, operations,

residential and other uses not absolutely required in the field are required to be located in a designated service base which is sited, designed, constructed and maintained to be as compact as possible; and to share facilities to the maximum extent as possible.

2.6.2 Development with water or airborne emissions is required to comply with all state Department of Environmental Conservation requirements.

2.6.3 Mining and mineral processing in the coastal area is required to be designed and conducted to minimize impacts on subsistence species habitat, land and water resources, and general environmental conditions.

2.6.4 Development of no more than the minimum number of borrow pits to serve all development in an area is encouraged.

2.6.5 Mining during portions of the year when there would likely be substantial harm to the environment, such as the excessive silting of rivers and streams, is prohibited.

2.6.6 Mining on beaches or offshore is prohibited unless no feasible and prudent alternatives exist for extraction of the resource, and in those circumstances substantial alteration of shoreline dynamics is prohibited.

POLICY 2.7: TRANSPORTATION FACILITIES

2.7.1 Development incorporating utilities and multimodal transportation facilities in a single corridor are encouraged.

2.7.2 Siting, design, construction and maintenance of transportation and utility facilities (including ice roads) are required to minimize alteration of shorelines, water courses, wetlands, tidal marshes and significant disturbance to special habitat; and to avoid critical fish migration periods.

POLICY 2.8: UTILITY FACILITIES

2.8.1 Industrial and commercial development is required to be served by solid waste disposal facilities which meet state and federal regulations.

2.8.2 Toxic materials and untreated solid waste disposal on the barrier islands, sea ice, artificial islands or at sea; in rivers or lakes which support subsistence species; and Special Habitat Areas; is prohibited.

2.8.3 Development not on a sewer system is required to impound and process effluent to state and federal quality standards.

2.8.4 Siting, design, construction and maintenance of transportation and utility facilities (including ice roads) are required to minimize alteration of shorelines, water courses, wetlands, and tidal marshes and significant disturbance to special habitat; and to avoid critical fish migration periods.

Policies for facility development require that facilities be designed, constructed and sited to avoid environmental degradation. Siting policies require avoidance of sensitive environments and physical hazards. Design and construction policies require facilities that do not degrade the environment and are capable of withstanding contact with severe physical hazards such as ice and wave action. [See Section *].

BOROUGH PROGRAMS

PROGRAM 2.9: GEOPHYSICAL HAZARD AREAS

2.9.1 The Borough shall coordinate with the state and federal government and private industry to develop information defining the location and extent of geophysical hazards, and mitigation technology including proper siting, design construction, operation and maintenance measures.

2.9.2 Development in geophysical hazard areas shall be approved only on a site specific basis.

2.9.3 The degree of BOrOUGH evaluation and monitoring of offshore development shall increase as development moves from the safe landfast ice areas [See Map * - Zone AO areas inside moderate and severe ridging zones] into less stable landfast ice areas [See Plan Map * - areas of moderate ridging] and the shear zone [See Map *].

2.9.4 Each new development in offshore sea ice zones shall be considered a valuable research tool to assess future offshore development. The Borough seeks the cooperation of offshore development. The Borough seeks the critical design, construction, and operational data in order to meet the challenge of expanding offshore operations. Future permitting practices will be based to a large measure upon such cooperation.

PROGRAM 2.10: INDUSTRIAL AND COMMERCIAL DEVELOPMENT

It is the policy of the Borough that new areas should be opened to petroleum exploration and development only by phases, and on a scale

which allows effective management of lease stipulations, enforcement of local, state, and federal regulations, creation of efficient service bases, maximization of shared facilities, and master planning of resource development and related activities.

PROGRAM 2.11: RESOURCE EXTRACTION

2.11.1 The Borough acknowledges the desirability of cooperative agreements with state and federal agencies in the process of determining site suitability for energy facilities as outlined in 6 AAC 80.070 and related standards.

2.11.2 Developers of resource extraction uses will be required to discuss their plans with Borough officials prior to making application for a Development Permit or Resource Development rezoning.

PROGRAM 2.12: MINING

The Borough shall identify preferred locations for extracting gravel associated with resource development.

PROGRAM 2.13: UTILITIES

Underground installation of utilities in *communities* and service bases, to the extent feasible, is encouraged.

PROGRAM 2.14. TRASH AND LITTER.

The Borough will encourage the cleanup of trash and litter through the following programs among others:

- *Posters, brochures and other educational means.*
- *Early spring trash cleanup program in each community.*
- *Encouragement by the community coordinator to participate in the Borough's program of cleanup of residences and private property.*
- *Coordination with tourism development opportunities.*
- *Encourage of trash and garbage cleanup at camps and remote sites.*
- *Rigorous enforcement of policies requiring removal of building materials.*

■ *The removal of junk vehicles.*

■ *Securing and controlled burning at landfills to prevent blown debris and deliberate removal of materials and other programs.*

PROGRAM 2.15 LANDFILL.

The Borough will locate, design and maintain community landfills so they are secure, so as to minimize blowing trash and to minimize the possibility of air pollution from burning in and near communities. The Borough will investigate the possibility of incinerating trash in the communities to provide co-generation of electricity.

PROGRAM 2.16 HAZARDOUS/TOXIC SUBSTANCES

The Borough will take the lead in ensuring the cleanup of hazardous and toxic materials at Umiat, Project Chariot and other possible locations of hazardous and toxic substances within the Borough by responsible agencies.

PROGRAM 2.17 FENCING

The Borough will provide secure fencing of freshwater lakes to prevent pollution, and fencing of sewage lagoons to prevent accidental contact by animals and humans.

PROGRAM 2.18 MICROWAVES

The Borough will investigate the possibility of hazards to humans from microwaves and other electronic hazards associated with dewline stations.

PROGRAM 2.19 RECYCLING

The Borough will encourage the recycling of waste materials and containers, such as oil drums, within each community.

3.0 SUBSISTENCE AND BIOLOGICAL RESOURCES

ISSUE: POTENTIAL IMPACTS ON BIOLOGICAL RESOURCES FROM DEVELOPMENT ACTIVITIES

Because of their dependence upon subsistence resources, North Slope residents are concerned with development impacts such as:

The disturbance of terrestrial and marine mammals and their habitat.

- * The disturbance of fish and marine mammal migration patterns.
- * Impacts on caribou migration, habitat, and calving grounds.
- * Potential disturbance and resulting reduction in bird populations, particularly sea birds and marine waterfowl.
- * Exploration effects on animals and sea life (e.g. explosives used during seismic testing).
- * Disruption of subsistence activities.
- * Competition for subsistence resources.

GOAL: PROTECTION AND ENHANCEMENT OF SUBSISTENCE RESOURCES.

GOAL: MAINTENANCE AND ENHANCEMENT OF ACCESS TO SUBSISTENCE RESOURCES.

The objectives and policies of this chapter focus on two overall goals concerning subsistence and biological resources. First, the plan recognizes that the subsistence resources in the Borough should be protected and enhanced. Second, the plan includes objectives and policies directed at maintaining and enhancing access to subsistence resources.

OBJECTIVES

- OBJECTIVE 1: To manage biotic resources on a total ecosystem basis regardless of jurisdiction or land status.
- OBJECTIVE 2: To protect and enhance special habitat of important subsistence resources.
- OBJECTIVE 3: To promote the optimum sustainable yield of subsistence resources through sound planning, management and regulatory programs.
- OBJECTIVE 4: To minimize or eliminate land, water, air and ice uses that negatively impact subsistence resources.
- OBJECTIVE 5: To designate and conserve special habitat areas of important animal subsistence species.
- OBJECTIVE 6: To conserve the habitat and food supply of subsistence species.
- OBJECTIVE 7: To protect water quality and fish spawning areas.
- OBJECTIVE 8: To give subsistence use first consideration in evaluating development.
- OBJECTIVE 9: To discourage or eliminate commercial, sport and non-local use of subsistence resources.
- OBJECTIVE 10: To monitor expected impacts from proposed land use and transportation developments in sensitive subsistence resources areas.
- OBJECTIVE 11: To closely monitor and manage any development (including transportation) in special habitat areas.

- OBJECTIVE 12:** To increase knowledge of subsistence species to protect and enhance populations and habitat.
- OBJECTIVE 13:** To maintain access to and use of subsistence resources by local residents.
- OBJECTIVE 14:** To provide for subsistence use and access in development plans.
- OBJECTIVE 15:** To afford subsistence use priority over commercial, sport or recreational use.

DEVELOPMENT POLICIES

POLICY 3.1: SUBSISTENCE RESOURCES

3.1.1 Development which will likely result in depleting a subsistence resource below the subsistence needs of local residents of the Borough is prohibited.

3.1.2 Development that will likely result in significantly decreased productivity of subsistence resources or their ecosystems is prohibited unless no feasible and prudent alternative is available.

3.3.3 Subsistence Access. Development which restricts subsistence user access to a subsistence resource is prohibited unless no feasible and prudent alternative is available.

3.1.4 Development which precludes subsistence user access to a subsistence resource is prohibited.

From the outset of petroleum exploration and development on the North Slope, the Inupiat residents have expressed concern for the biologic implications of using land for development purposes versus its use for the production of wildlife resources. For centuries, these North Slope lands and waters have provided prime fish and wildlife habitat and provided the basis for the subsistence economy and culture of the Inupiat people who inhabit this vast coastal region. Major subsistence species and their habitats are set forth in this chapter. Special Habitat Areas are designated on Maps G,H, I and J. Important Subsistence Use Areas are found on Map K.

Research and experience show that adverse impacts to the biological components of these habitats can result from direct contact with resource development. Such impacts

could range from the disruption of energy flow through the food chain, alteration of habitats, and changes in species composition. Arctic ecosystems have fewer species and shorter food chains, so adverse impacts of whatever character do not find new replacement species to take over. Maps G,H,I and J highlight those areas of special concern where subsistence species habitat or subsistence activities may conflict with development plans.

The community view of North Slope residents includes certain specific concerns reflective of their collective perception of biologic disturbances. These are as follows:

- * The disturbance of marine mammals and their habitat.
- * The disturbance of fish migration patterns along the coastline.
- * Impacts on caribou migration and habitat.
- * Potential disturbance and resulting reduction in avian populations, particularly sea birds and marine waterfowl.

- * Exploration effects on animals and sealife (e.g. explosives used during seismic test).

- * The potential presence of health hazards due to oil spills or pollution.

By definition a "potential impact" is a condition capable of development into actuality. The accumulative experience of centuries provide Borough residents with intuitive knowledge of life in the arctic and the biological peculiarities of fish and wildlife survivability.

Avoiding an irreparable conflict between the uses of land and waters for development purposes and their use for the production of wildlife resources requires great care in planning and management programming.

The events of the last 25 years at Prudhoe Bay have provided invaluable experiences for local communities, North Slope Borough, and the State of Alaska, in the transformation of a traditional subsistence fishing and hunting area into a major experiment in resource development and coastal management. With the real possibilities of additional discoveries and development of hydrocarbons looming here, elsewhere on the North Slope coastline and offshore, the opportunity is present for utilizing these experiences and circumstances to further develop the Borough's program for coastal management.

These policies are designed to minimize negative development impacts on subsistence resources and activities. The Borough's policy is to manage resource development in a manner that maximizes its benefits, while minimizing the negatives,

and to organize the physical, and economic conditions on logical, analytical, and objective terms.

POLICY 3.2: CRITICAL HABITAT FOR SUBSISTENCE SPECIES

3.2.1 Development within Special Habitat Areas of this Plan is prohibited unless no feasible and prudent alternative is available.

3.2.2 Resource extraction uses within a Special Habitat Area are prohibited unless no feasible and prudent alternative is available.

3.2.3 Vehicles, vessels, and aircraft usage in Special Habitat Areas is required to be confined to corridors designated in their permit.

The Special Habitats Areas are described in Section * and set out on Maps G, H, I and J. These Special Habitat policies are designed to protect sensitive and irreplaceable habitat from the impacts set forth in Chapter 7.

POLICY 3.3: MARINE OR COASTAL DEVELOPMENT

3.3.1 Drilling and other high-impact activities are prohibited within the area of bowhead whale migration routes during the migration season.

3.3.2 Development in Sensitive Areas such as estuaries, tideflats, beaches, rivers, streams and lakes, and high energy ice impacted shorelines are prohibited unless no feasible and prudent alternative is available.

See Maps * for Sensitive Areas; the policy will be applied on an actual occurrence basis, regardless of designation on the maps.

3.3.3 Development that does not meet the standards of the Borough's Coastal Management Program, for management of Sensitive Areas such as estuaries, wetlands, tideflats, beaches, rivers, streams and lakes, permafrost landscape, and high energy ice impacted shorelines is prohibited.

3.3.4 Facility siting, drilling or other high-impact activities are prohibited at barrier islands intensively used by whales, seals, walrus and other species as feeding and resting areas unless no feasible and prudent alternative is available.

Marine and offshore areas are a very significant portion of the hunting and fishing habitat utilized as a food supply base for the Inupiat people. These areas must receive the respect and protection required for perpetuation of the habitat for future generations.

In coastal areas, habitat protection will be accomplished in accordance with the standards of the Alaska Coastal Management Program for management of sensitive areas such as estuaries, wetlands, tideflats, beaches, rivers, streams and lakes, permafrost landscape, and high energy ice impacted shorelines.

The marine and coastal policies address the need to protect these aspects of marine wildlife or fish habitat or behavior such as migration routes, which are most vulnerable.

POLICY 3.4 : INDUSTRIAL AND COMMERCIAL DEVELOPMENT

3.4.1 Siting, design, construction and maintenance of transportation and utility facilities (including ice roads) are required to minimize alteration of shorelines, water courses, wetlands, and tidal marshes and significant disturbance to special habitat; and to avoid critical fish migration periods.

3.4.2 Development on the shoreline that does not require a shoreline location, landfills, fuel or toxic material storage areas and dumps on or near shoreline are prohibited unless no feasible and prudent alternative is available.

3.4.3 Industrial and commercial development is required to be located, designed, and maintained in a manner that prevents significant adverse impacts upon subsistence resources and their habitat, including water circulation and drainage patterns, and coastal processes, unless no feasible and prudent alternative is available.

POLICY 3.5: RESOURCE EXTRACTION

3.5.1 Resource extraction development is required to be located, designed, and maintained in a manner that prevents significant adverse impacts upon subsistence resources and their habitat, including water circulation and drainage patterns, and coastal processes unless no feasible and prudent alternative is available.

3.5.2 The joint siting and use of facilities, and concentration of development, as methods of minimizing negative impacts on the

environment, is strongly encouraged.

3.5.3 Offshore exploration, development and production drilling outside the landfast ice area [Map *, and Section *] is required to be sited on the barrier islands or artificial islands. A variance from this policy to allow offshore platforms will be granted only if the requirements of Sections * and * are met and, in addition, the developer demonstrates the actual capability of the structure to withstand all natural forces, specifically including ice.

3.5.4 Offshore exploration, development and production drilling outside the landfast ice area [Map *, and Section *] is required to be sited on the barrier islands or artificial islands. A variance from this policy to allow offshore platforms will be granted only if the requirements of Sections * and * are met and, in addition, the developer demonstrates the actual capability of the structure to withstand all natural forces, specifically including ice.

POLICY 3.6 : TRANSPORTATION AND TRANSPORTATION FACILITIES

3.6.1 Airports and helicopter pads are required to be sited, designed, constructed and operated to minimize their impact upon significant wildfowl migration routes, breeding grounds and nesting areas.

3.6.2 Siting, design, construction and maintenance of transportation and utility facilities (including ice roads) are required to minimize alteration of shorelines, water courses, wetlands, and tidal marshes and significant disturbance to special habitat; and to avoid critical fish migration periods.

3.6.3 Public highway development, except for community roads, and streets and highways indicated in the Capital improvements Program, is prohibited.

3.6.4 When linear structures such as roads and pipelines are located in areas used as corridors by migratory species of wildlife, a means of crossing shall be included for those migratory species. Pipelines shall be designed, using the best available information, to minimize disruptions of migratory patterns and other major movements of wildlife. Above ground pipelines shall be elevated a minimum of five (5) feet; except at those points where the pipeline intersects a road, pad or caribou ramp.

3.6.5 Transportation development, including pipelines, which

significantly obstructs wildlife migration is prohibited unless no feasible and prudent alternative is available.

3.6.6 Transportation to accommodate petroleum transportation via marine tankers is prohibited unless no feasible and prudent alternative is available.

3.6.7 Duplicative transportation corridors from mine sites to tide water are prohibited unless no feasible and prudent alternative is available.

3.6.8 Marine tankers to be utilized in offshore areas are required to be specially designed to withstand environmental hazards specifically including sea ice.

3.6.9 The closure and/or destruction of roads in industrial and resource development areas after the resource has been extracted is strongly encouraged to prevent public access and/or land disposals.

POLICY 3.7: UTILITY FACILITIES

3.7.1 Deposition of toxic materials and untreated solid waste on the barrier islands, sea ice artificial islands, at sea, in any wetlands, rivers or lakes which support or are capable of supporting significant populations of fish and wildlife is prohibited.

3.7.2 Siting, design, construction, and maintenance of transportation and utility facilities (including ice roads) are required to minimize alteration of shorelines, water courses, wetlands, and tidal marshes and disturbance to habitat; and to avoid critical fish migration periods.

3.7.3 Utility siting and design which precludes subsistence user access to a subsistence resource is prohibited.

3.7.4 Development which restricts subsistence user access to a subsistence resource is prohibited unless no feasible and prudent alternative is available.

Policies 3.4 (Industrial and Commercial), 3.5 (Resource Extraction), 3.6 (Transportation and Transportation Facilities), and 3.7 (Utility Facilities) all seek to minimize the negative impacts on subsistence resources. Of particular concern are development or activities which degrade fish or wildlife habitat or create physical barriers that restrict animal or fish movement. These policies bar major habitat

degradation or disruption of animal movement.

POIICY 3.8: RESIDENTIAL DEVELOPMENT

3.8.1 Development in a community is required to be consistent with the relevant community Comprehensive Development Plan, when adopted.

3.8.2 New subdivisions or other residential development near the shoreline or in Special Habitat Areas are required to provide adequate water and sewer service to prevent damage to the environment and habitat of subsistence species.

3.8.3 Residential development associated with industrial and resource extraction development shall be removed when the industrial or extractive use is completed unless, pursuant to Plan policies, removal is more harmful than non-removal.

3.8.4 Residential development associated with industrial and resource extraction which is designed and maintained for employees to be shuttled into the area for work periods then outside to their permanent residence is encouraged.

No permanent industrial residential settlement or new town should be located in the Borough. The practice of maintaining camps for employees who are shuttled into the area for work periods, then outside to their permanent residence is viewed by the Borough as the best means of limiting the impact of people upon the environment. Permanent residential development would increase the consumption of wildlife habitat, pollution and competition for limited subsistence resources. The major private and public facilities created by this activity should be confined to the service base areas.

POLICY 3.9 : RECREATION AREAS AND TOURISM

3.9.1 Development associated with *commercial* recreational uses of land and wildlife habitat, such as commercial hunting and fishing camps and lodges, is *prohibited unless the permit is specifically approved by the City Councils of all affected communities.*

See Map C for Village Areas of Influence.

3.9.2 Development of tourist facilities outside of a *community* and Prudhoe Bay is prohibited.

Unrestricted increases in recreation and tourism could directly decrease subsistence harvests by Borough residents through diminishing subsistence species populations and interference with subsistence activities.

The recreation and tourism policies establish subsistence as a first priority and discourage any growth in recreational or tourism activities which would undermine subsistence.

The policies discouraging increased recreation and tourism are instituted to protect the Inupiat from disruption of their nutritionally and culturally vital subsistence pursuits. Increases in recreational use of wildlife fosters competition for subsistence resources. Increased tourism could disrupt subsistence activities if extended into user areas.

BOROUGH PROGRAMS

3.10: REGULATION AND MANAGEMENT

It is the policy of the North Slope Borough to:

3.10.1 Ensure a safe environment for the optimum propagation of fish and wildlife for subsistence uses.

3.10.2 Enforce sound management of all fish and wildlife resources and the environment upon which the fish and wildlife depend.

3.10.3 Use Borough regulatory powers to enter into joint management agreements, and to generally promote the protection of fish and wildlife habitat regardless of jurisdiction.

3.10.4 Require lease sale documentation of noise levels, erosion, silting, gravel extraction, water usage, ice effects and impact and waste disposal for development and development related activities.

3.10.5 Control harmful effects of activities and development upon subsistence resources through planning regulations, stipulations and agreements.

3.10.6 Intensify management, enforcement and habitat improvement programs during periods of habitat disruption and fish and wildlife consumption.

3.10.7 Promote withdrawal of Special Habitat Areas from all resource

extraction and non-essential entry and appropriation.

3.10.8 Effectively monitor development activities throughout the Borough to ensure minimum impact on subsistence resources.

3.10.9 Enhance subsistence species populations and habitat wherever feasible.

3.10.10 Promote the protection of subsistence resources and habitat regardless of jurisdiction.

3.11.11 Enter into governmental agreements to ensure access by Borough subsistence users to subsistence resources.

3.10.12 Use the Borough Public Safety Officer to enforce existing state and federal laws prohibiting harassment of game and other game management laws and regulations

3.10.13 Conduct an education program on subsistence species characteristics and protection.

This plan applies to all lands in the Borough wholly or partially subject to its police powers. It applies to lands subject to the jurisdiction of other governmental entities to the extent that the control and supervision of such lands by such entities fail to carry out and implement the goals, standards and policies of this Plan and implementing ordinances.

The Borough recognizes that there are, within its borders, lands, areas, and activities which may come under some degree of regulation or jurisdiction of other governmental entities. The Borough finds that its jurisdiction and police powers to protect those aspects of the health, safety and welfare of its people which are not fully protected by other entities have not been preempted, and that the Borough retains jurisdiction in such areas.

The Borough further finds that the perceptions of benefits and of detriments, of what constitutes a balancing of the needs of the people of the Borough and of state, federal and industrial interests, and of the relative importance of Borough resources such as petroleum and subsistence, vary substantially in Houston, Washington, Juneau, and in the Borough. The Borough further finds that, in view of numerous past state, federal and industry plans and proposals, a continued effort on the part of the Borough to adequately protect the health, safety and welfare of its residents is unlikely to extensively duplicate those protections offered by other levels of government.

The Borough can support its goals and objectives by using its legislative and regulatory powers to implement this plan.

Ordinances and regulations should avoid simply duplicating the permit and review requirements of existing state and federal agencies. Borough ordinances should be designed to make the most of local knowledge and experience as well as accomplishing uniquely local objectives. Where existing permit and review systems are not adequately designed to protect the values identified by this plan, Borough regulations should fill the gap. It should be recognized that the purpose and objectives of other agency regulatory programs often do not satisfy the needs this plan for meaningful implementing mechanisms. While numerous agencies may review the same land use proposal, agency missions or responsibilities will vary significantly. The Borough itself should take the lead to protect the values of its residents, particularly where other agencies have failed to do so.

Another important element of the police power is a continuing and expanded monitoring procedure. This involves monitoring development activities on a daily basis. As development expands out of the generally centralized development zone in and around Prudhoe, monitoring needs will expand to maintain existing levels of protection. This would also involve a regular evaluation to determine the effects over time of various type of extraction related development on specific biological and environmental resources. As an example, monitoring can involve evaluations of possible changes in the size or health of caribou herds, or sea mammals, or fish, their behavioral patterns or migration routes either regionally or locally in and around extraction development areas. The results of the studies should be fed back into the Borough's planning and decision-making process, possible altering standards and permit requirements.

The Borough will encourage relevant federal agencies to fund monitoring within federal lands.

PROGRAM 3.11: LETTERS OF AGREEMENT

It is the policy of the North Slope Borough to oppose the issuance of Letters of Agreement from the National Marine Fisheries Service in instances where such Letters of Agreement will enable the disturbance of subsistence species or restrict access to those species by Borough residents.

PROGRAM 3.12: RESEARCH AND ADVOCACY

The Borough will increase research and advocacy activities which are directed towards permitting activities of state and federal agencies, with a

view toward minimizing disturbance of subsistence species or access by residents to subsistence species in research development activities under their jurisdiction.

PROGRAM 3.13: SPORT HUNTING AND GUIDING

The Borough will increase educational programs, work more closely with the Guide Licensing Board and the Alaska Board of Game, and increase enforcement of state laws by Borough public safety officials to minimize violations of state law by sport hunters and guides and flightseeing operators. Particular attention will be given to harassment of wildlife by flightseeing operations and deflections of animals from their migration routes by sport hunters and guides.

At present flightseeing operations in the Arctic National Wildlife Refuge have harassed caribou herds while local residents have been attempting to hunt them. Anaktuvuk Pass, Nuiqsut and Kaktovik report similar problems. Sport hunters and guided hunters on sport duration trips shoot the lead caribou as they start up a valley thus scaring off the caribou for local subsistence hunters.

PROGRAM 3.14: SUBSISTENCE ZONING

The Borough will monitor the outcome of pending litigation regarding the "subsistence zone" district of the Northwest Arctic Borough. If this district is approved by the courts, the Borough will give immediate consideration to adopting a comparable zone category within the Borough.

The Northwest Arctic Borough has a zone district which prohibits all activity other than subsistence hunting, specifically including sport hunting and guided hunting. The Borough intends to adopt such a zone district if the courts deem it to be legal.

PROGRAM 3.15: SALMON FISHERY

The Borough will work for the establishment of many salmon hatcheries to enhance the subsistence salmon fishery.

Please see Program 5.15 for a discussion of development of a commercial fishery in the Borough.

There is a need to constantly monitor the land status and land ownership changes within the Borough's boundaries, so that at all times an up-to-date comprehensive overview is available to guide policy making and planning.

One way to increase the Borough's influence on decisions made by various federal and state agencies, especially regarding dispositions affecting federal land, *is* to make further use of the referral process whereby state and federal agencies elicit the Borough's comments on any plans directly or indirectly affecting the lives and values of the residents of the Borough.

This Plan and any implementing ordinances are legislatively enacted expressions of local policies, concerns, and needs, and should, in all areas in which Borough jurisdiction and police powers are limited or restricted by law, be taken fully into consideration and implemented to the fullest extent of the law by those governmental entities having jurisdiction.

3.16: RESEARCH

It is the policy of the North Slope Borough to:

3.16.1 Use local research councils, comprised of knowledgeable subsistence users, to aid in data gathering on subsistence resources and usage.

3.16.2 Identify areas of particular importance to the subsistence economy, such as those of high yield of one or several resources over short or long periods of time.

3.16.3 Research important subsistence resource species abundance, distribution and habitat in order to establish management guidelines for optimum resource yield.

3.16.4 Develop a *computerized* geographic information system concerning the North Slope environment, history and culture.

Many years of development have produced a geographic information system which contains vital data on traditionally land use inventories, subsistence use patterns, land status zoning and other information. The maps, which comprise volume 3 of this plan, are constantly be revised and undated.

The Borough should be knowledgeable in all aspects of petroleum and mineral extraction operations and related activities to increase local influence on operations and to secure an increased level of local and individual economic benefit.

The Borough must also compile as much data on subsistence resources and activities as possible. The best source of information is from the subsistence users in each Village. Pederson in "Regional Subsistence Land User North Slope Borough, Alaska" recommends the establishment of local research councils of subsistence users.

4.0 HUMAN RESOURCES

ISSUE: IMPACTS ON CULTURAL AND HISTORIC RESOURCES FROM DEVELOPMENT ACTIVITIES

GOAL: PRESERVATION OF THE INUPIAT CULTURE

The Comprehensive Plan has utilized the knowledge and values of Inupiat peoples in both technical and policy aspects of program development. It is clear that the introduction of *resource* development into the North Slope has raised significant social cultural and historic issues. Local concerns in the cultural realm include:

- Preservation of the traditional Inupiat character of life and culture.
- Disruption to lifestyle and culture.
- Concern with the impact of offshore oil development.
- *Petroleum* development that produces population increase with related social problems (e.g. service base development).
- Rising cost of living impacts at the local community level (e.g. high cost of energy).
- Disturbance of cultural *benefits* (e.g. the value of subsistence products for the family).

The objectives and policies of this chapter center around the overall goal of preserving the Inupiat culture. This involves protecting cultural, religious, and historical activities or areas, and maximizing control by Borough residents over their own destinies and their environment.

OBJECTIVES

- OBJECTIVE 1:** To protect cultural, religious, and historical activities and areas.
- OBJECTIVE 2:** To ensure maximum control by the residents of the North Slope Borough over their own destinies.
- OBJECTIVE 3:** To maximize local control of decisions which affect the coastal resources of the North Slope Borough.
- OBJECTIVE 4:** To provide for a geographic information system to coordinate with state and federal agencies in tracking all resource development permit applications.

DEVELOPMENT POLICIES

POLICY 4-1: LISTED CULTURAL AND HISTORICAL SITES

Development which significantly disturbs cultural or historic sites listed on the National Register of Historic Places or eligible for inclusion in the National Register is prohibited. Development which significantly interferes with traditional activities at cultural or historic sites identified in this Plan is prohibited. Significant interference with traditional activities includes: significant visual, noise and other pollution, prolonged increases in activity, driving off subsistence species, or significant surface disturbance.

POLICY 4-2: NEWLY DISCOVERED SITES

Surface disturbance of newly discovered historic sites is prohibited prior to archeological investigation.

Recently discovered geological sites include the following:

** A site at Point Hope on Community Corporation land which had been vandalized and subject to uncontrolled exploration.*

** The ancient site at Barrow, commonly referred to as the Arctic Pizza Site, is located on a Municipal Reserve. This site is on the National Register of Historic Places. Uncontrolled exploration and recovery of artifacts is prohibited, but continues in unregulated fashion. In addition, the area is used by people on foot, bicycle, snowmachine and three wheeler, further*

degrading the site.

** A site discovered at Nuvuk, partially on an allotment, is also being degraded.*

POLICY 4-3: GROWTH

Development which significantly violates guidelines on the rate or amount of growth adopted by a *community* and adopted as a part of its Comprehensive Development Plan is prohibited unless no feasible and prudent alternative is available. Development which grossly violates such guidelines is prohibited.

BOROUGH PROGRAMS

It is the policy of the North Slope Borough:

PROGRAM 4.4 VILLAGE GROWTH POLICY

To allow each village to adopt its own policy in regard to population growth.

PROGRAM 4.5 CONTROLLED GROWTH

To use the development permit process to control village growth which violates local policy.

PROGRAM 4.6: GEOGRAPHIC INFORMATION SYSTEM

To develop *and use a computerized* geographic information system for the North Slope environment, history, culture, land status and other factors.

PROGRAM 4.7: COMMUNITY DECISION MAKING

To notify each *community* of proposed development in its Village Area of Influence and afford it the opportunity to participate in the decision.

PROGRAM 4.8: CULTURAL/HISTORIC SITES

To place as many cultural and historic sites as possible on the National Register of Historic Places.

PROGRAM 4.9: CULTURAL INVESTIGATIONS

To require the developer to conduct an investigation of potential cultural and historical or archeological sites or features as part of the development permit or rezoning application.

Disruptions of subsistence activities due to development could influence the viability and social stability of the Inupiat culture, since it is through subsistence that so many culturally important activities take place. Therefore, the policies adopted for subsistence in Chapter 3 are equally applicable to this Chapter 4.

Resource development projects have the potential to harm cultural and historical resource sites, which are susceptible to damage from construction activities and looting by both Borough residents and non-resident work crews. These policies are intended to minimize negative impacts, and to encourage archaeological investigation of sites discovered in the development process.

It is Borough policy to afford each village the maximum control possible over its own social, cultural and governmental destiny.

The Borough has a vital interest in preserving from destruction or detrimental impact those sites or areas of: historic, architectural, archeological, and general cultural significance identified in the Human Resources Site Inventory. Many of the sites shown could meet National Register criteria. However, many sites require interpretation in far greater detail to guarantee that historic preservation and environmental requirements are completely met. Especially important to the coastal Inupiat and the North Slope Borough are the barrier islands from Thetis Island to Icy Reef. If there is to be compatible development offshore, these sites must be held inviolate. Therefore, identification, study and interpretation of these sites in detail must be carried out prior to lease sales so that conflicts will be avoided.

The Borough believes that prehistoric and archeological sites are important assets to local and state government. Both levels should institute conscientious programs to identify and preserve all significant sites not currently protected by other state and federal programs.

PROGRAM RECREATION

It is the policy of the North Slope Borough to increase recreation opportunities for Borough residents.

At the present time the cities, and not the Borough, have recreation powers including, but not limited to, cultural centers, daycare facilities, community centers, senior center and the like. The cities do not have the financial resources to provide adequate facilities and programs for their residents. The Borough does have the financial ability to provide these programs and services. It is the Borough's intention to either provide financial assistance to the cities to adequately provide for the recreation and

cultural needs of their residents, through a shared powers agreement, or to assume these governmental functions for the cities. If the latter takes place, the Borough intends to employ existing city facilities and personnel to the maximum extent possible. The Borough considers that improved recreational facilities will lead to improved mental and physical health of the residents of the Borough.

5.0 SOCIAL AND ECONOMIC FACTORS

The social and economic factors impacting the North Slope Borough cover a multitude of areas. The objectives and policies *of this chapter* are directed toward several key areas.

In the areas of employment and economy, the policies are designed to attain full employment of all Borough residents; to develop new industries based on the Inupiat culture; and to diversify economic opportunities within the villages.

With respect to energy, policies are designed to encourage upgrading the energy efficiency of buildings within the Borough; to consider various forms of alternative energy sources; to develop a long-range energy supplies; and to reduce local reliance on fuel oil.

With respect to housing, the intention is to produce decent, affordable housing, with a full range of utilities, including piped water and sewer, available to all Borough residents.

With respect to health, the goal is the improvement of all areas of public and personal health, both physical and mental.

And with respect to recreation, the Borough intends to find ways to improve opportunities, either by assuming recreation powers or by helping the cities with funding.

ISSUE: IMPROVED ECONOMIC WELL-BEING.

GOAL: FULL EMPLOYMENT

OBJECTIVE 1: To reduce actual unemployment in the Borough to as low a rate as possible, consistent with flexible working arrangements and leave

policies to provide time for seasonal subsistence activities.

OBJECTIVE 2: To provide the North Slope community with options for living including traditional subsistence pursuits, and part or full time employment or combination thereof.

OBJECTIVE 3: To *continue to improve* skill training for *residents* oriented toward existing and developing employment opportunities.

These first three goals remain unchanged from the 1982 plan, but their focus has shifted dramatically. In 1982 unemployment and underemployment was epidemic in North Slope Borough communities. At the time the solution was seen as jobs in the oil field for people willing to take such work. The Inupiat industry development was thought to involve the production and marketing of Inupiat art, and community economic development consisted primarily of retail and service sector jobs in the communities. The evolution of the North Slope Borough economy has produced quite a different result.

Today the Borough and the School District provide more than half of all employment opportunities in the Borough and in each community as well. Community and regional corporations have formed joint ventures to work on construction projects, primarily North Slope Borough capital improvements projects, and these provide both high paying construction jobs and profits for shareholders.

North Slope Borough communities are considerably more prosperous than they were eleven years ago. This prosperity depends, however, on the continued ability of the Borough to finance capital improvements programs, the operating budget and the School District budget.

The Prudhoe Bay oil field has been in a slow decline since 1988, and the introduction of new fields, although delaying the overall decline of North Slope oil production, have not replaced the loss of production from Prudhoe Bay. This slow decline is expected to continue for the indefinite future, although Borough and state oil production projections continuously show longer field life due to the discovery of new reserves and the development of new technology enabling greater recovery from existing fields. At this point, the Borough anticipates at least another twenty years of oil production on the North slope, but at constantly dwindling rates.

DEVELOPMENT POLICIES

POLICY 5.1: FULL EMPLOYMENT

5.1.1 Development which employs local Borough residents in construction and Development activities or its work force is encouraged.

5.1.2 Development which utilizes flexible employment procedures to allow subsistence pursuits by local Borough resident employees is strongly encouraged.

5.1.3 Development which incorporates job training programs for local Borough residents is encouraged.

BOROUGH PROGRAMS

PROGRAM 5.2 JOB AND SKILL TRAINING

The North Slope Borough *will continue to support the Arctic Siuunnuu Iligsaviq College to promote and provide local skill center training for Borough residents.*

PROGRAM 5.3: EMPLOYMENT

To the maximum extent possible all local residents who desire it should have the opportunity for work in their local communities.

For the next five to six years, almost all Borough residents who desire work will be able to find work within the Borough on Capital Improvements Projects such as the community water and sewer program. Further large scale construction of Capital Improvements Projects will depend on the future availability of tax revenues which can be devoted to this purpose.

PROGRAM 5.4: HIRING OFFICE

The Borough will establish a casual hiring office in each community.

For many residents of the Borough, subsistence activities take priority over regular employment. These people do not desire full-time year round jobs, and will often leave work to engage in subsistence activities. Likewise, there are many jobs of short duration in the communities of the Borough which do not require full-time permanent workers. The Borough will establish a program for casual labor in each community. workers and employers utilizing this office would commit only to a few hours or a few days of work. This will enable casual workers to obtain more work than presently possible.

The private sector can also use this hiring office. Point Lay residents have asked to be considered for jobs at the Deadfall Syncline Coal Mine, and residents of several communities have asked to be considered for work on archeological digs in the Borough.

Full employment remains a priority goal for the North Slope Borough. The Borough realizes that unemployment *and* social stress stem from not fully utilizing all the

resources at hand, in particular human resources.

Local hire and stable employment involves a balance between permanent employment and flexible subsistence-oriented working schedules, but it must address the competition involving an important labor force. It requires residents possessing the necessary education and talents to actively participate in the job market. Local job-oriented education and training are an essential tool the North Slope people must implement in order to continue in their pursuit for economic and social stability. *ASIC* provides the vehicle necessary to adequately educate and train residents for permanent employment. The need to cultivate and upgrade the skill and talents of the residents is intense. The social and economic costs of import labor *are* serious liability. Cultivating local manpower is the most cost-efficient, self-sufficient approach to economic stability.

GOAL: INUPIAT INDUSTRY DEVELOPMENT

- OBJECTIVE 4:** To develop and market new industries using natural products, and to improve selling conditions for these new industries by providing better outlets for *Inupiat* manufactured items.
- OBJECTIVE 5:** To encourage and strengthen the manufacturing and marketing of *Inupiat* crafts supportive of the tourist industry.
- OBJECTIVE 6:** To promote the Inupiat culture and Inupiaq way of life through legitimate commercial outlets for arts and skills.
- OBJECTIVE 7:** To protect the Inupiat culture and Inupiaq way of life from competing on potentially harmful economic development.

DEVELOPMENT POLICIES

5.3: INUPIAT INDUSTRIES

5.3.1 Development which relates to or encourages Inupiat arts and crafts is encouraged.

It is *desirable* to increase production and marketing of local arts and crafts products for two reasons: some traditional craft skills and dying; and these products could provide a source of income to local people in light of rising prices for necessities of life and fewer other job opportunities in the area. Identified problems in this enterprise are as follows: Typically *Inupiat* handicrafts are very inconsistent since most craftsmen sell for cash as soon as they finish creating an item. There is no standard criteria for pricing of arts and

crafts items. Distinctions are difficult to draw between high value "true" art and lesser value "souvenir" art.

GOAL: COMMUNITY ECONOMIC DEVELOPMENT

- OBJECTIVE 8:** To emphasize basic community development as a necessary first step in the economic development of the Borough, as well as the regional and village corporations.
- OBJECTIVE 9:** To ensure maximum opportunity for the residents of the Borough to achieve their goals in their own communities.
- OBJECTIVE 10:** To *continue to* provide residents with greater business opportunities both through village and regional corporation enterprises.
- OBJECTIVE 11:** To preserve and enhance the culture, values, and traditional lifestyle of the resident population, while encouraging improved economic well-being.
- OBJECTIVE 12:** To maximize local linkages among federal, state and local and private interests so as to keep monies earned and generated in the Borough within the local economy.
- OBJECTIVE 13:** To develop a stable economy not subject to major fluctuations of employment and investment.
- OBJECTIVE 14:** *To develop community based tourism facilities, activities and business in communities where tourism is desired.*

DEVELOPMENT POLICIES

POLICY 5.4: LOCAL ECONOMIC DEVELOPMENT

- 5.4.1 Development which provides local employment in the villages is strongly encouraged.
- 5.4.2 Resource development which utilizes local private business or village or regional corporations in its operation is strongly encouraged.
- 5.4.3 Development which utilizes flexible employment procedures to

allow subsistence pursuits by local Borough resident employees is strongly encouraged.

POLICY 5.5: TOURISM

5.5.1 The development of tourist businesses by local Borough residents is encouraged.

5.5.2 Tourism development which respects and reinforces the Inupiaq character of life and subsistence hunting values is encouraged; tourism development which adversely impacts access to or the taking of subsistence resources by local residents is prohibited.

POLICY 5.6: SPORT HUNTING

The development of tourist businesses which involve small planes or commercial or sport hunting by other than Borough is prohibited unless there is no feasible and prudent alternative.

Opinion expressed during the formation of the 1982 plan was generally opposed to tourism, and this was reflected in the policies of the 1982 plan. This is not the case today in the Borough.

The communities of Kaktovik, Nuiqsut and Anaktuvuk Pass all expressed strong opposition to flightseeing, fly-in hunters, and guided hunting trips, because they disrupt subsistence resources. These involve hunters and guides based outside the Borough who use Borough resources and, as a consequence, adversely impact Borough residents. The Borough continues to be strongly opposed to these operations and will use every legal means to regulate or prevent them.

However, opinion has changed with respect to low-impact backcountry trips and development of tourism within the communities of the North Slope. A economic development Conference in the summer of 1993 focusing on tourist development indicated general support in all Borough communities for this kind of tourism. The potential for low-impact and community based tourism varies widely from one area of the Borough to the next, and from one community to the next.

Community based tourism already exists in Barrow and Prudhoe Bay with multiple jet flights every day. Opportunities for tourists are somewhat limited once they arrive, however, and the Borough encourages private businesses, the airlines, and the hotels to develop coordinated visitor services and tours in Barrow. The Borough intends to build a Inupiat Center in Barrow to assist in this effort.

In the others communities, basic tourist facilities and activities are generally lacking. In some instances community airports must be improved, lodging and dining facilities must be

developed, and activities and access to them must be created in order to attract and maintain a viable tourist industry. The Borough will participate with the development of public facilities, such as airports and basic access roads, to help in this effort.

Backcountry travel, such as float trips, mountain climbing, backpacking, etc., is expected to increase. Presently, few Borough residents benefit from this activity. The Borough believes that local residents can be used as guides and outfitters on these trips, and that Borough-based transportation companies can be utilized to supply and transport backcountry adventurers.

BOROUGH PROGRAMS

PROGRAM 5.7: LOCAL HIRE

It is the policy of the North Slope Borough to hire local residents on Borough projects within a *community* or Village Area of Influence.

The goal of community development reflects the fact that community development in the *communities* and the region is necessary as a first step in the economic development of the Borough. The best place to foster or control development is at the *community* where positive effects will be felt. *Local* residents are in the best position to weigh and balance the benefits and detriments of proposed development through assessment of subsistence and cultural impacts. Flexible employment which affords opportunities for subsistence pursuits are most easily accommodated at the village level. As CIP employment opportunities end, employment in the *public* sector become increasingly important.

PROGRAM 5.8: COMMERCIAL FISHERY

The Borough will consider the development of a commercial fishery.

Other Borough policies have called for the establishment of mini salmon hatcheries in the Borough to increase the possibility of the subsistence harvest of salmon and char. With the development of boat harbors the Borough may be able to support a small commercial fishery. Residents of Barrow and communities in the Western Arctic have expressed an interest in a commercial fishery.

PROGRAM 5.9: TEMPORARY WORKERS

The Borough will establish programs to minimize or eliminate social problems resulting from temporary workers in the Borough.

The Borough will work with private contractors to produce educational materials such as posters, pamphlets and videotapes for temporary Borough workers to discourage behavior which

will lead to social problems and to maintain cordial relations between temporary workers and local residents. The Borough will carefully monitor contractor performance of local hire policies and utilization of the borough's education program.

The Borough anticipates that local residents may leave permanent Borough or school district jobs to take work with contractors on the expanded Borough Capital Improvements Program. If non-residents replace residents in these Borough and school district jobs the jobs will be unavailable to residents when the construction work is over. Unless corrected, then, the Capital Improvements Program could have the unintended side effect of moving non-residents into Borough jobs and leaving residents unemployed at the end of the construction period. To avoid this problem, the Borough proposes to contract with a labor contractor to perform the jobs of Borough employees who quit to go to work on the Capital Improvements Program. When the Capital Improvements Program is over, the labor contractor can be released to enable the Borough resident to reapply for the permanent Borough job.

GOAL: LONG RANGE ECONOMIC INDEPENDENCE

OBJECTIVE 15: *To continue to construct public facilities which maximize long term Value and minimize operations and maintenance costs.*

OBJECTIVE 16: *To continue to employ as many residents as possible in Borough and school district jobs.*

OBJECTIVE 17: *To maximize local hire and use of local contractors and Borough capital improvements program jobs.*

OBJECTIVE 18: *To implement policies and programs which will enable Borough residents to work in permanent Borough jobs when capital improvement program jobs wind down.*

OBJECTIVE 19: *To continue to fund the Borough Permanent Fund with the aim that, at the end of oil production, the Borough permanent fund would be able to permanently endow the Boroughs operation budget indefinitely.*

OBJECTIVE 20: *To support the Arctic Development Council and its programs.*

The goal of long range economic independence is new in this plan. It is a recognition of the dependence, by the Borough as well as its residents, on a cash based economy as a supplement to the traditional subsistence based economy. There is no question that this infusion of capital has provided high incomes, a better education, greater personal safety and public health, better housing, and other advantages which would not have been possible without it.

PROGRAM 5.10: LONG TERM BOROUGH EMPLOYMENT BASE

To make sufficient contributions to the North Slope Borough Permanent Fund each year to enable the Borough to fund its annual operating budget each year from the earnings of the permanent fund.

For the present and the foreseeable future most employment opportunities for local Borough residents will be jobs offered by the North Slope Borough, the North Slope Borough School District and regional and community corporations performing construction work for the North Slope Borough Capital Improvements Program. As the Borough's property tax revenues from the oil industry decline as expected over the next twenty years, the Borough's revenues will also decline. The Borough established its permanent fund in 1984 to provide a permanent source of income to fund necessary Borough activities after the termination of oil production. In order for the Borough to continue to provide basic services to Borough residents, and jobs for Borough employees, by the time of cessation of oil activities on the North slope, the borough Permanent Fund must be large enough to pay all the Costs of Borough services from its earnings.

The Borough enjoys good relations with the oil industry at the present time, although conflicts can occur, such as the 1993 lawsuit over bowhead whale migration patterns as altered by the Kuvlum well. While asserting its interest wherever necessary, it is the Borough's intention to continue to maintain close, open, cooperative relations with the oil industry.

ISSUE: LOCAL ENERGY DEVELOPMENT AND CONSERVATION

Energy conservation is a primary concern to the North Slope Borough, *because of the exceptionally high rate of energy consumption in arctic conditions and the extremely high cost of energy outside Barrow.*

The Borough must concern itself not only with the escalating heating costs to its residents, but also the extraordinary budget it must carry to maintain public buildings throughout the Slope.

To realize the immediacy of this dilemma, several other factors must also be considered. In the Arctic, heating degree days average 19,569. Heating consumes 70% of an Arctic community's allotted energy. Transportation averages 7% and lighting, industrial use, etc. consume 23%. Although the Borough is constantly upgrading the housing situation throughout the Slope, many residents still reside in poorly constructed homes with minimum insulation. Therefore, those who can least afford the escalated costs are struck hardest. Heat is not a luxury in the Arctic, but a basic need.

The Borough must encourage the most efficient use of existing energy supplies while developing expanded and alternative energy supplies.

GOAL: INCREASED ENERGY CONSERVATION

GOAL: INCREASED ENERGY SUPPLY

GOAL: INCREASED SELF SUFFICIENCY

OBJECTIVE 21: To implement energy conservation standards and practices to be applied to development.

OBJECTIVE 22: To *continue to* reduce energy consumption by inspecting and retrofitting existing structures.

OBJECTIVE 23: To instruct residents in conservation techniques and use of alternative energy sources.

OBJECTIVE 24: To develop a Borough long-range energy policy.

OBJECTIVE 25: To *continue to* improve fuel distribution.

OBJECTIVE 26: To *continue to* develop locally available energy resources.

OBJECTIVE 27: To *continue to provide local employment and income for the resident population through local energy development.*

OBJECTIVE 28: To reduce village dependence on fuel oils.

A large savings in fuel cost could result if local coal were used, in addition to providing job opportunities at the local level. Coal is the major fossil fuel which will be locally available in the long term. Thus, planning for the development of this resource should be instituted in the near future to ensure that the coal can replace oil when it becomes too expensive. If the Borough is to achieve energy independence in the long term, it must use the coal reserves and develop non-renewables as supplements (wind or solar).

Wind energy is the primary renewable energy source in the North Slope Borough. Although this resource can only be considered as a supplementary energy source, it can make significant contributions to the Borough's energy mix, if wind generators are properly installed. Since the kWh generated by wind will replace an equal quantity of fossil fuel energy, the use of wind energy should be considered as a means to reduce the existing dependence on oil. When and if appropriate energy storage is developed, the Borough could consider wind as a primary energy source. Additional demonstrations of the technology is required before large-scale Borough installations are contemplated.

A project to evaluate vertical-axis wind turbines should be initiated. Funding for such a project could be based on a cooperative agreement between the Borough, a selected manufacturer and possibly another government agency. This type of effort is required to identify and correct design, maintenance and operating problems for using wind turbines in the Arctic before a large capital outlay is made.

Atqasuk is initiating another fuel alternative project by utilizing coal reserves near the village. The surface mining project, directed by the North Slope Borough *Industrial Development* Department, will extract and stockpile coal reserves for residents. During the first phase coal will be limited to private use such as home heating.

DEVELOPMENT POLICIES

POLICY 5.11: ENERGY CONSERVATION

5.11.1 Development which provides or materially contributes to lower cost fuel or power to adjacent villages is strongly encouraged.

5.11.2 Development which utilizes locally obtained energy (such as

locally produced coal and natural gas) or renewable sources of energy, is encouraged.

5.12: REDUCED ENERGY COSTS

Development which provides or materially contributes to lower cost fuel or power to adjacent villages is strongly encouraged.

BOROUGH PROGRAMS

PROGRAM 5.13: ENERGY CONSERVATION

5.13.1 Life cycle energy costs for all proposed new Borough facilities will be calculated.

5.13.2 Federal and state agency assistance will be sought for Borough energy planning and management efforts with a full range of grants and technical assistance.

5.13.3 With State and Federal support, programs should be expanded to include those for retrofitting existing structures, conducting energy audits and implementing conservation and weatherization programs.

5.13.4 The Borough shall provide direct financial assistance to the elderly and handicapped who are unable to provide for the rising cost of energy.

5.13.5 The Borough, including the School District and ASIC, shall provide training and education in energy conservation on existing facilities and on the utilization of new energy resources and related technology.

5.13.6 Energy conservation should apply to all areas of energy use - residential, commercial, public, industrial and transportation. The Borough will set a strong example in areas and projects under its control.

5.13.7 The *Borough* strongly supports efforts to obtain outside grants for the planning and implementation of alternate energy systems and increased energy conservation.

5.13.8 The Borough urges the School Board and School District to develop courses to teach the young people the techniques of energy conservation and alternate energy conservation and alternate energy as developed and used by their ancestors.

5.13.9 The Borough shall provide aid in the form of consultation service and financing to enable homeowners to take energy conservation measures on their homes and apartments.

5.13.10 The Borough shall encourage the participation by all government, institutional, and commercial entities in all viable energy conservation and local resource utilization programs and projects to promote self-reliance and the optimum use of all North Slope energy resources.

5.13.11 The Borough should continue installing heat recovery systems where fossil fuels are now used to fuel electrical power generating systems.

5.13.12 *The Borough should continue its program of residential energy conservation loans.*

PROGRAM 5.14 ENERGY PLANNING

It is the policy of the North Slope Borough to develop and implement a Borough Energy Plan. This plan will include conservation goals, alternative energy system priorities and a strategy for dealing with emergency energy shortages.

Local control of energy is accomplished through development of alternative energy sources and the efficient use of existing resources. Access to adjacent energy development should provide for the energy needs of villages who are impacted in a variety of ways by such development. The provision of low cost energy for these villages could balance out some of the negative disruptions of village life due to the presence of the oil and gas industry.

5.15 LOCAL ENERGY RESOURCES

5.15.1 Alternative energy is established as a priority for NSB economic development, including CIP needs.

5.15.2 *Continued development of the pilot coal project at Atqasuk to extract local coal deposits is encouraged. Continued development of the pilot coal project at the Deadfall Syncline is encouraged, with increased communication and coordination with the village of Pt. Lay and use of workers from Pt. Lay.*

5.15.3 The Borough stimulate through its energy program and projects industries that are job-intensive and mechanisms that promote energy self-sufficiency.

5.15.4 Due to the transportation cost of imported energy supplies the Borough encourages local production and/or gathering of domestic goods.

5.15.5 Field reconnaissance studies be initiated to identify and establish coal resources that could be used in other villages and begin planning for their use.

5.15.6 Coal be further developed as the primary fossil fuel for Borough use *through* coal gassification or liquefaction. *The Borough will analyze the possibility of using wind generators and trash incinerators to generate power in the villages.*

PROGRAM 5.16 GAS LINE EXTENSION

The Borough will analyze the possibility of extending transmission lines from the Walakpa gas field to Atqasuk and Wainwright.

ISSUE: HEALTH

GOAL: IMPROVED PHYSICAL AND MENTAL HEALTH OF BOROUGH RESIDENTS.

- OBJECTIVE 29:** To develop a Borough-wide Comprehensive Health Plan.
- OBJECTIVE 30:** To reduce the incidence of alcohol abuse and attendant health problems as measured by alcohol-related accidents, alcohol-related arrests and alcohol-related social service contracts.
- OBJECTIVE 31:** To reduce the prevalence of alcoholism as measured by deaths due to alcoholism and cirrhosis of the liver, per capita consumption and alcohol-related social service contacts.
- OBJECTIVE 32:** To reduce incidence of diseases caused by Group A streptococci and complications and associated diseases, *and* rheumatic fever.
- OBJECTIVE 33:** To reduce the incidence of communicable diseases to zero. Also, to eliminate new cases of diseases which are vaccine preventable (poliomyelitis, tetanus, typhoid fever).
- OBJECTIVE 34:** To reduce the incidence of *sexually transmitted* diseases, *and to prevent AIDS.*
- OBJECTIVE 35:** To reduce the incidence of viral hepatitis.
- OBJECTIVE 36:** To reduce the incidence of new or reactivated tuberculosis.

- OBJECTIVE 37:** To reduce the incidence of new cases of chronic otitis media and its complications, and to reduce hearing loss due to noise.
- OBJECTIVE 38:** To reduce the percentage of uncorrected eye problems, such as refractive error, eye injury and eye disease.
- OBJECTIVE 39:** To reduce the incidence of preventable developmental disabilities (mental retardation due to rubella, fetal alcohol syndrome and Down's syndrome).
- OBJECTIVE 40:** To raise the level of functioning of all developmentally disabled persons to their innate potential.
- OBJECTIVE 41:** To reduce the cardiovascular death rate.
- OBJECTIVE 42:** To reduce the death rate due to chronic obstructive pulmonary disease.
- OBJECTIVE 43:** To reduce the prevalence of the psychologically and socially dysfunctional due to mental illness.
- OBJECTIVE 44:** To reduce the total number of decayed and missing teeth due to dental disease.
- OBJECTIVE 45:** *To reduce smoking and smoking-related diseases.*

These objectives are largely unchanged from the 1982 plan, except for smoking, and the North Slope Borough Health Department has made remarkable progress in achieving them. Notable among the Borough achievements has been the development of comprehensive health clinics, staffed by trained community health aides, in each community. These clinics have made tremendous progress in all areas of public health in the last few years, and further progress is expected.

ISSUE: RECREATION

GOAL: A FULL RANGE OF RECREATION FACILITIES AND ACTIVITIES IN EACH COMMUNITY.

- OBJECTIVE 1:** To determine the best means of using Borough resources to provide recreation facilities and programs in each

community.

- OBJECTIVE 2: To develop daycare centers in each community.
- OBJECTIVE 3: To develop a community center, including facilities for youth, families and seniors in each community.
- OBJECTIVE 4: To develop an Inupiat Cultural Center in Barrow.
- OBJECTIVE 5: To adequately fund operation of athletic and recreational facilities in the schools during the summer months.
- OBJECTIVE 6: To develop playground facilities in each community.
- OBJECTIVE 7: To develop a recreation pad, including sports fields, in each community.

DEVELOPMENT POLICIES

POLICY 5.17 PRIVATE RECREATION FACILITIES

Private recreation facilities, such as movie theaters, bowling facilities and the like are encouraged.

BOROUGH PROGRAMS

PROGRAM 5.18: RECREATION

5.18.1 It is the policy of the North Slope Borough to increase recreation opportunities for Borough residents.

At the present time the cities, and not the Borough, have recreation powers including, but not limited to, cultural centers, daycare facilities, community centers, senior center and the like. The cities do not have the financial resources to provide adequate facilities and programs for their residents. The Borough does have the financial ability to provide these programs and services. It is the Borough's intention to either provide financial assistance to the cities to adequately provide for the recreation and cultural needs of their residents, through a shared powers agreement, or to assume these governmental functions for the cities. If the latter takes place, the Borough intends to employ existing city facilities and personnel to the maximum extent possible. The

Borough considers that improved recreational facilities will lead to improved mental and physical health of the residents of the Borough.

5.18.2 The Borough supports keeping the school gymnasiums and pools open during the summer for recreation purposes.

PROGRAM 5.19: RECREATION POWERS

The Borough will analyze the possibility of either assuming recreation powers from the cities or sharing those powers in a way that Borough resources can be used to develop and operate daycare centers, community centers, senior centers, cultural centers, and similar facilities in each community.

PROGRAM 5.20: CULTURAL CENTER

The Borough supports the development of a Inupiat Cultural Center in Barrow.

PROGRAM 5.21: BOAT HARBORS

The Borough will analyze the possibility of either assuming city powers with respect to boat harbors and boat launch areas, sharing those powers, in order to participate in the cost of developing and operating and maintaining boat harbors.

GOAL: DECENT AFFORDABLE HOUSING

PROGRAM 5.22: HOUSING

It is the policy of the Borough that every resident of the Borough is entitled to decent affordable housing.

Several communities have indicate that if there were more housing, residents who had moved away would be willing to move back. Population and job opportunities are expanding at a rate of 5 percent or more in the communities of the North Slope Borough. The community corporations and city governments need to engage in a lot development and disposal programs since the community corporations can only dispose of lots to shareholders and there are and will continue to be non-corporation shareholders in all communities who will need housing. The Borough supports the efforts of the City of Barrow to move its airport to enable development outside of the present city limits.

6.0 TRANSPORTATION

ISSUE: TRANSPORTATION DEVELOPMENT

GOAL: PRESERVATION OF SUBSISTENCE RESOURCES AND THE INUPIAT CULTURE.

GOAL: ACCESS TO SUBSISTENCE RESOURCES BY BOROUGH RESIDENTS.

GOAL: *IMPROVED ACCESS TO MARKET GOODS BY BOROUGH RESIDENTS*

The negative impacts of transportation development can include:

- Degradation of fish and wildlife habitat.
- Barriers to fish and wildlife movement.
- Pollution.
- Increased competition for subsistence resources by sport or commercial users.
- Disruption of subsistence activities.

Along with this Comprehensive Plan the Borough will adopt, for the first time, a six year transportation plan which will address, not only the transportation needs of each community, but improved access to and between the communities of the North Slope Borough. For the first time, the Borough proposes to undertake development of a system of seasonal Rolligan routes and ice roads to connect Borough communities with each other and with the Deadhorse Airport. Also for the first time roads will be developed to improve access between communities and traditional hunting camps and boat launch

areas.

Proper planning should ensure that transportation development results in lower costs for goods and services with a minimum disruption of subsistence resources and activities.

OBJECTIVES

OBJECTIVE 1: *To keep two airlines coming to Barrow and to Prudhoe Bay.*

Competition keeps service up and freight and passenger costs down.

OBJECTIVE 2: *To improve seasonal access between communities and the Haul Road.*

OBJECTIVE 3: *To reduce or eliminate non-resident hunter access to the Borough over the Haul Road.*

OBJECTIVE 4: *To improve community road systems.*

OBJECTIVE 5: *To improve resident access to subsistence resources.*

OBJECTIVE 6: *To improve air access to all communities.*

OBJECTIVE 7: *To improve boat storage and launching, and construct harbors where appropriate, for Borough communities.*

OBJECTIVE 8: *To minimize or eliminate disturbance of subsistence species and migration routes in the construction and operation of pipelines and roads associated with oil or gas development.*

DEVELOPMENT POLICIES

Policy 6.1: CONSOLIDATION OF FACILITIES

Unless no feasible and prudent alternative is available transportation facilities for resource development and extraction are required to be consolidated to the maximum extent possible.

Policy 6.2: AIRPORTS AND HELICOPTER PADS

Airports and helicopter pads are required to be sited, designed,

constructed and operated to minimize their impact upon significant wildfowl migration routes, breeding grounds and nesting areas.

Policy 6.3: HAUL ROAD CORRIDOR

6.3.1 Any development located outside the Prudhoe Bay Base Area, Pump Station 3, or the Chandalar Base Area; and tourist and recreational facilities located anywhere within the Haul Road Corridor are prohibited.

6.3.2 The Haul Road Comprehensive Plan policies are incorporated herein by reference.

Policy 6.4: DISTURBANCE OF HABITAT

Disturbance of subsistence resource habitat, or migration routes during migration periods, by transportation modes or development is prohibited unless no feasible and prudent alternative is available.

Policy 6.5: TRANSPORTATION SITING

Siting, design, construction, and maintenance of transportation and utility facilities (including ice roads) are required to minimize alteration of shorelines, water courses, wetlands, and tidal marshes and significant disturbance to special habitat; and to avoid critical fish migration periods.

6.6: JOINT USE

Development incorporating utilities and multimodal transportation facilities in a single corridor, or joint use of transportation facilities, is strongly encouraged.

Chapters 2 and 3 of this Plan detail the importance of fish and wildlife resources, and the habitat upon which they depend, for the protection of subsistence resources. These subsistence resources are nutritionally and culturally vital to the Inupiat.

The policies in this section ensure that transportation development minimizes the potential negative impacts described in the data sections of this chapter upon subsistence resources and Inupiat access to these resources.

BOROUGH PROGRAMS

PROGRAM 6.7: MINIMIZE CORRIDORS

It is the policy of the North Slope Borough to minimize the number of transportation corridors through cooperative long-term planning efforts with private industry and other governmental agencies.

PROGRAM 6.8: SEASONAL ROADS

Each year the Borough will develop Rolligon routes between Deadhorse and Barrow, with a spur to Nuiqsut; Deadhorse to Nuiqsut (continuation of existing program), Barrow to the Wokakpa gas field and on to Atqasuk; Barrow to Wainwright; and Anaktuvuk Pass to the Haul Road.

PROGRAM 6.9: HAUL ROAD

To fully utilize the Haul Road for freight for use by the Borough, the communities, and the residents of the Borough.

With the exception of the Nuiqsut to Deadhorse route, this represents a significant expansion of surface transportation within the Borough. Ice roads are preferable to gravel roads because they minimize disturbance of the natural environmental and subsistence resources, and are not available for use by summer visitors. The Borough does not anticipate maintaining or patrolling these routes and residents will use them at their own risk. The primary purpose for these routes is to reduce the cost and increase the availability of goods in North Slope Borough communities during the winter months.

PROGRAM 6.10: BARROW AIRPORT

The Borough supports efforts by the City of Barrow to move its airport to a new location approximately six miles inland from the city.

This will enable the natural expansion of the city to the south, which is currently blocked by the existing airport. Enable development of expanded passenger and freight handling facilities and warehouses, and enable all-weather flights throughout the year. Currently, many landings during the summer are precluded by fog at the present city airport.

PROGRAM 6.11: PUBLIC USE OF THE HAUL ROAD

The Borough will resist by all legal means, including litigation, the opening of the portion of the Haul Road in the Borough to the general public.

The Haul Road was originally designed and constructed for freight access to the Prudhoe Bay oil field only. The Borough's policy of opening the Haul Road for freight use by the Borough and its residents is consistent with the original purpose. Opening the Haul Road for general visitor traffic, however, is not consistent with this purpose. General visitor traffic is inconsistent with the Borough's goal of maximizing use of and access to subsistence resources by residents of the Borough. The Borough is concerned that it would become responsible for increased maintenance and safety patrols on its portion of the Haul Road. Of greatest concern to the Borough is the BLM

plan for numerous pullouts, campgrounds and general tourist and motor services throughout the length of the Haul Road. This violated the Borough Zoning Ordinance and consistent Borough policy, which prohibits such development. The development of the Rolligon routes set forth in Program 6.8 above may slightly increase winter traffic on the Haul Road by local Borough residents. This is not of concern to the Borough.

PROGRAM 6.12: KAKTOVIK AIRPORT

The Borough supports state or Borough aquisition of the Kaktovik Airport from the United States Air Force.

PROGRAM 6.13: ROAD DUST

The Borough will undertake efforts to reduce road dust on community road systems.

Road dust is an issue in almost every community in the Borough. The Borough's programs may include some or all of the following: increased use of water trucks, seal coating, and pavement of selected streets in the communities.

PROGRAM 6.14: BOAT HARBORS

The Borough supports development of boat harbors at Barrow, Kaktovik, Wainwright and Point Hope.

These communities have requested boat harbors to accommodate a range from a low of thirty to a high of over 200. Boat Harbors are seen as desirable as a safety factor for Borough residents who use boats and their subsistence activities. The Borough currently does not have the power to construct boat harbors, and will either seek this power from the voters or will explore means of sharing these powers with the cities in order to assume development, operations and maintenance costs for these boat harbors.

PROGRAM 6.15

The Borough will explore alternative means of transportation of coal at Cape Beaufort.

The Deadfall Syncline Coal Mine, about five miles inland from Cape Beaufort, is unable to market its coal because of a lack of transportation facilities. Development of a coal dock at Cape Beaufort could conflict with Beluga habitat and migration routes, which could create a adverse impact for the hunters of Point Lay. The Borough will not enter into development of coal loading facilities at or near Cape Beaufort without careful analysis of the impact on Belugas and other marine mammals, and close consultation with the residents of Point Lay.

7.0 PETROLEUM AND MINERAL DEVELOPMENT

ISSUE: ONSHORE AND OFFSHORE RESOURCE DEVELOPMENT

**GOAL: PRESERVATION ON SUBSISTENCE RESOURCES BY
BOROUGH RESIDENTS.**

**GOAL: CONTINUED ACCESS TO SUBSISTENCE RESOURCES BY
BOROUGH RESIDENTS.**

**GOAL: FULL EMPLOYMENT FOR BOROUGH RESIDENTS WHICH
PROVIDES FLEXIBILITY FOR TRADITIONAL INUPIAT
CULTURE AND SUBSISTENCE ACTIVITIES.**

**GOAL: PROTECTION AND ENHANCEMENT OF THE
BOROUGH'S TAX BASE**

The prospect of further resource exploration and development both on and offshore in the North Slope Borough means that the technical aspects of this effort will continue to constitute an issue of significance to the Inupiat people.

The North Slope Borough contains coastal communities with both a seaward and landward orientation. This emanates from the subsistence activities that divide the attention of the community on the basis of concern for potential impacts on the character of life and well-being resulting from the natural resource development and extraction activities.

As further knowledge of resource extraction potentials emerge (e.g. oil, coal, minerals) subsistence will be balanced against the opportunities afforded for rising levels of living for the people. This equation, and the extractive industry sector, is basic to the continued improvement of living conditions in this harsh environment.

The purpose of this Plan is to minimize the negative impacts of resource development upon subsistence resources and the Inupiat culture while maximizing the economic benefits of such development.

Borough policies encourage industrial and commercial development that does not substantially reduce subsistence resources or disrupt the Inupiaq character of life. The Borough will work with industrial and commercial interests who will cooperatively coordinate with the Borough to achieve beneficial development that achieves these goals.

The Borough has acknowledged the importance of cooperation and local participation in the planning process, having made a commitment to meet this need by providing local communities an opportunity to participate in the identification of issues, goals and objectives appropriate to their respective areas. The comprehensive plan is a cooperative public expression of desired areas and characteristics for land and water resource utilization embellished with broad public statements of goals and policies, including agreed upon recommendations for implementation.

OBJECTIVES

- OBJECTIVE 1:** To improve employment opportunities for Borough residents in the resource extraction industry.
- OBJECTIVE 2:** To support and encourage resource development which does not significantly adversely impact the natural environment subsistence activities, or Inupiat culture.
- OBJECTIVE 3:** To improve employment opportunities for Borough residents in local private enterprises and village and regional corporations.
- OBJECTIVE 4:** *To collect the maximum tax revenue from oil and gas facilities consistent with the other goals and objectives of this Plan.*

POLICIES

DEVELOPMENT POLICIES

POLICY 7.1: LOCAL EMPLOYMENT

7.1.1 Development which employs Borough residents in construction and development activities, or in its work force, is strongly encouraged.

7.1.2 Resource development which will not significantly employ local Borough residents, unless residents of the *Borough* express no interest in the work, is prohibited unless no feasible and prudent alternative is available.

POLICY 7.3: LOCAL BUSINESS

7.3.1 Resource development which utilizes local private business or village or regional corporations in its operation is encouraged.

7.3.2 Resource development which uses suppliers or subcontractors from outside the Borough for work which can be accomplished competitively by local private businesses or regional or village corporations is prohibited unless no feasible and prudent alternative is available.

POLICY 7.4: FLEXIBLE EMPLOYMENT SCHEDULES

Development which utilizes flexible employment procedures to allow subsistence pursuits by local Borough resident employees is strongly encouraged.

BOROUGH PROGRAMS

It is the policy of the North Slope Borough:

PROGRAM 7.5: JOB TRAINING.

To provide training for residents of the Borough *through ASIC* oriented toward resource development employment opportunities.

PROGRAM 7.6: JOB OPPORTUNITIES FOR RESIDENTS.

7.6.1 To encourage close working relationships between industry and

government opportunities for local Borough residents.

7.6.2 To require resource exploration and development proposals to include detailed work plan identifying operating schedules for field operations at the time of permit application.

Except for public employment (principally Borough; See Section * of this Plan) and employment by village and regional corporations, the resource extraction industry offers the greatest opportunity for employment of local Borough residents.

Where resource development does not conflict with subsistence or Inupiat culture it is encouraged. The Borough will promote resource development that provides flexible employment for local Borough residents without degrading subsistence resources or the Inupiat culture.

The Borough recognized its responsibility to provide training for its young people so that they can take advantage of resource extraction related employment if they so choose.

PROGRAM 7.7: RESOURCE DEVELOPMENT MASTER PLANS

To design special policies, streamline permitting procedures, consolidate permits and provide financial incentives for resource development which is cooperatively planned with the Borough through the Resource Development District Master Planning Process.

The land area of the Borough outside the communities and the Haul Road corridor is zoned C-Conservation. Virtually all development in this district requires a permit, and resource exploration and development activities are extensively reviewed before the permit is used. This permitting program is appropriate for both the industry and the Borough for review and approval of isolated activities. However, when a field has been delineated and proved up, it is more efficient for the operator of the field to master plan development of the field rather than to develop it in piecemeal fashion. Likewise, it is important for the Borough to be able to assess and evaluate the cumulative impact of individual projects in the development of the field. For these reasons, the Borough included an RD-Resource Development District in its Land Management Regulations. When the developer applies for RD zoning for an entire oil field, the Borough can assess the cumulative impact of development of the field on the environment and subsistence resources. It can propose changes and impose uniform stipulations which will minimize or eliminate the negative impacts of development. The advantage for the field operator is that it does not need to apply for permits for individual activities which are developed pursuant to the master plan, thus saving time and expense and most importantly providing assurance that development will not be delayed or impeded by the Borough.

Thus, coordinated planning and rezoning to the RD District are in the interest of both the industry and the Borough and its residents.

The Borough enjoys good relations with the oil industry at the present time, although conflicts can occur, such as the 1993 lawsuit over bowhead whale migration patterns altered by the Kurlum well. While asserting its interests wherever necessary, it is the Borough's intention to continue to maintain close, open, cooperative relations with the oil industry.

Borough policies encourage industrial and commercial development that does not substantially reduce subsistence resources or disrupt the Inupiaq character of life. The Borough will work with industrial and commercial interests who will cooperatively coordinate with the Borough to achieve beneficial development that achieves these goals.

The Borough has acknowledged the importance of cooperation and local participation in the planning process, having made a commitment to meet this need by providing local communities an opportunity to participate in the identification of issues, goals and objectives appropriate to their respective areas. The comprehensive plan is a cooperative public expression of desired areas and characteristics for land and water resource utilization embellished with broad public statements of goals and policies, including agreed upon recommendations for implementation.

8.0 GOVERNMENT

ISSUE : ADEQUATE PUBLIC SERVICES AND FACILITIES

GOAL: PROVISION OF PUBLIC SERVICES AND FACILITIES TO RESIDENTS OF THE BOROUGH AT THE SAME LEVEL AS OTHER COMMUNITIES IN THE UNITED STATES

GOAL: SUFFICIENT CONTRIBUTIONS TO THE NORTH SLOPE BOROUGH PERMANENT FUND TO ENABLE THE INTEREST FROM THE PERMANENT FUND TO FULLY FUND THE OPERATIONAL COSTS OF BOROUGH GOVERNMENT AT SUCH TIME AS TAX REVENUES FROM THE OIL INDUSTRY CEASE.

GOAL: TO ADEQUATELY FUND THE OPERATION AND MAINTENANCE NEEDS OF THE NORTH SLOPE BOROUGH.

GOAL: TO MAXIMIZE EMPLOYMENT AND ADVANCEMENT POSSIBILITIES FOR LOCAL RESIDENTS IN BOROUGH JOBS.

OBJECTIVES

- OBJECTIVE 1:** To maximize local linkages among federal, state, local and private economic interests so as to keep monies earned and generated in the Borough withing the local economy, *to the extent possible.*
- OBJECTIVE 2:** To expand on the Inupiaq traditions, and to encourage government and private *developers* to think first of local needs, local employees, and local contractors.
- OBJECTIVE 3:** To develop a stable economy which produces predictable, stable and sufficient tax revenues to meet Borough service and facilities needs as identified in the Capital Improvements Program.
- OBJECTIVE 4:** To improve the quality of life of Borough residents.
- OBJECTIVE 5:** To undertake capital improvement projects on a coordinated basis to promote efficiency, reduce disruption and best utilize the local labor force.
- OBJECTIVE 6:** To develop comprehensive plans for all Borough communities.
- OBJECTIVE 7:** To emphasize well-planned, well-designed facilities of high quality to reduce operating and maintenance expenses in future years while being efficient and aesthetically pleasing.
- OBJECTIVE 8:** *To approve the financial management and operational capability of the communities to deliver services for which they have jurisdiction.*

DEVELOPMENT POLICIES

POLICY 8.1 PUBLIC FISCAL BALANCE

Development which results in an excess of tax revenues over demand for expenditures is strongly encouraged.

BOROUGH PROGRAMS

It is the policy of the North Slope Borough to:

PROGRAM 8.2 RESOURCE DEVELOPMENT MASTER PLANS

8.2.1 Master plan resource development districts through cooperation and coordination with industry.

8.2.2 To minimize the developer's costs of regulation through process efficiency and communication with industry as part of the planning process.

8.2.3 To provide consolidated service based facilities for industry within resource development areas.

8.2.4 To encourage new industrial or commercial development that provides local employment and revenues consistent with subsistence activities and Inupiat culture.

Borough policies encourage industrial and commercial development that does not substantially reduce subsistence resources or disrupt the Inupiat character of life. The Borough will work with industrial and commercial interests who will cooperatively coordinate with the Borough to achieve beneficial development that achieves these goals.

The land area of the Borough outside the communities and the Haul Road corridors is zoned C-Conservation. Virtually all development in this district requires a permit, and resource exploration and development activities are extensively reviewed before the permit is issued. This permitting program is appropriate for both the industry and the Borough for review and approval of isolated activities. However, when a field has been delineated and proved up, it is more efficient for the operator of the field to master plan development of the field rather than to develop it in piecemeal fashion. Likewise, it is important for the Borough to be able to assess and evaluate the cumulative impact of individual projects in the development of the field.

For these reasons, the Borough included an RD-Resource Development District in its Land Management Regulations. When the developer applies for RD Zoning for an entire oil field, the Borough can assess the cumulative impact of development of the field on the environment and subsistence resources. It can propose changes and impose uniform stipulations which will minimize or eliminate the negative impacts of development. The advantage for the field operator is that it does not need to apply for permits for individual activities which are developed pursuant to the master plan, thus saving time and expense and most importantly providing assurance that development will not be delayed or impeded by the Borough. Thus, coordinated planning and rezonings to the RD District are in the interest of both the industry and the Borough and its residents.

PROGRAM 8.3 CAPITAL IMPROVEMENTS

8.3.1 The following are the Borough's goals for its Capital Improvements Program:

- A. *The North Slope Borough will give help, safety and welfare a greater emphasis.*
- B. *The North Slope Borough will be fiscally responsible in its program expenditures.*
- C. *The North Slope Borough will evaluate life cycle costs as a prerequisite to construction.*
- D. *The North Slope Borough will support community self-determination.*
- E. *The North Slope Borough will promote long-range planning efforts.*

These goals were adopted by the Borough in 1986.

8.3.2 Each community in the Borough shall be well informed regarding the specific capital improvement projects, the expenditures for these projects and the local labor force needed during the construction.

8.3.3 The location *and design* of all facilities shall be in conformance with the community comprehensive development plan, *developed and adopted as soon as possible after adoption of this plan.*

8.3.4 Advance land acquisition for capital improvement facilities, where required, shall be undertaken as soon as possible after adoption of the community comprehensive development plan.

8.3.5 Uniform specifications in regard to basic materials, hardware and equipment shall be considered to reduce supply, warehousing and maintenance costs.

8.3.6 *The Borough will consider energy costs, operation and maintenance costs, jobs and job scheduling, new housing requirements, travel requirements and environmental concerns when siting and designing new capital improvements.*

8.3.7 *The Borough will require a project analysis report for all major capital improvements.*

8.3.8 *The Borough will develop major facilities in Barrow, such as the new Administration Building, the new ASIC Building, the Cultural Center and Health Department Administration Building pursuant to the Master Plan for Downtown Barrow and a Master Space Needs Plan for the Borough.*

8.3.9 To the extent possible, the Borough will develop standardized or prototype facilities for the communities to equalize service delivery to all residents of the Borough and to reduce construction and maintenance costs.

8.3.10 The Borough will develop piped water and sewer systems available to the residences of all Borough residents by 1998.

Prior to formation of the North Slope Borough in 1972, the Inupiat residents of the Borough suffered from a virtual total lack of public services and facilities, including education and health, compared to other Americans. The formation of the Borough has enabled twenty years of development of a modern infrastructure in Barrow and each of the communities. More needs to be done, notably the community piped water and sewer program to commence in 1994. It is the goal of the Borough to complete the community water and sewer project, and to continue to develop public services and facilities to enable the residents of the Borough to enjoy the same quality of life as residents of other parts of the country.

PROGRAM 8.4 CULTURAL AND RECREATIONAL FACILITIES

The Borough will investigate means of undertaking or financing cultural and recreational powers currently exercised by the cities, to improve delivery of these services to the residents of the Borough.

It is the intention of the residents of the Borough an Inupiat Cultural Center in Barrow and daycare facilities, and new community center, including a senior center in each community in the Borough. This may involve an election to have to Borough assume recreational and cultural powers from the cities, or it may involve finding ways to share with the communities in cost of those services and facilities.

PROGRAM 8.5 HOUSING

It is the policy of the Borough to construct new housing and to privatize the existing housing market through the surplus of Borough-owned houses will continue.

PROGRAM 8.6 ATV AND SNOWMACHINE SAFETY

The Borough will develop and enforce safety regulations for operation of ATV's and snowmachines should be developed and enforced in each community.

PROGRAM 8.7 TECHNICAL ASSISTANCE

It is the policy of the North Slope Borough to provide technical and other assistance to enable the communities of the Borough to obtain grants and to improve their ability to deliver municipal services within their area of responsibility. This policy includes assisting the communities in developing additional revenue sources.

PROGRAM 8.8 COMPREHENSIVE PLANS

It is a high priority of the Borough to assist each community in developing, adopting and implementing a comprehensive plan.

The Borough has acknowledged the importance of cooperation and local participation in the planning process having made a commitment to meet this need by providing local communities an opportunity to participate in the identification of issues, goals and objectives appropriate to their respective areas. The comprehensive plan is a cooperative public expression of desired areas and characteristics for land and water resource utilization embellished with broad public statements of goals and policies, including agreed upon recommendations for implementation. The public participation process provided a cooperative context for programmed decisions, both public and private, that will assist the Borough community in achieving increased benefits when acting for the future.

Development, both governmental and private may tremendously impact a village. In order to ensure that this impact is beneficial the village must be informed and allowed to participate at all stages of development from planning to production. Cooperation and coordination with the village generates efficiency and cost savings as well as goodwill and good government.

PROGRAM 8.9 LOCAL HIRE

It is the policy of the North Slope Borough, consistent with sound financial planning:

8.9.1 To maximize employment of local residents in CIP projects.

8.9.2 To maximize the use of contractors owned by the residents of the North Slope Borough in CIP projects.

8.9.3 To keep the communities informed of the progress of all the CIP projects and;

8.9.4 To give the communities a greater role in scheduling projects to maximize work flow and minimize period of unemployment in the communities.

The Borough will improve enforcement of its local hire policies through both direct action and coordination with local contractors to minimize the use of outside laborers when local qualified laborers are not employed.

PROGRAM 8.10 BOROUGH PERMANENT FUND

To make sufficient contributions to the North Slope Borough Permanent Fund each year to enable the Borough to fund its annual operating budget each year from the earnings of the permanent fund.

For the present and the foreseeable future most employment opportunities for local Borough residents will be jobs offered by the North Slope Borough, the North Slope Borough School District and regional and community corporations performing construction work for the North Slope Borough Capital Improvements Program. As the Borough's property tax revenues from the oil industry decline as expected over the next twenty years, the Borough's revenues will also decline.

The Borough established its permanent fund in 1984 to provide a permanent source of income to fund necessary Borough activities after the termination of oil production. In order for the Borough to continue to provide basis services to Borough residents, and jobs for Borough employees, by the time of cessation of oil activities on the North Slope, the Borough Permanent Fund must be large enough to pay all the costs of Borough services from its earnings.

9.0 COMMUNITIES

GOAL: AN OPTIMUM QUALITY OF LIFE AND THE OPPORTUNITY FOR SELF-DETERMINATION IN EACH COMMUNITY IN THE NORTH SLOPE BOROUGH.

OBJECTIVES

- OBJECTIVE 1:** TO MAXIMIZE COMMUNITY PARTICIPATION IN THE PLANNING AND PERMITTING PROCESSES.
- OBJECTIVE 2:** TO MAXIMIZE COMMUNITY PARTICIPATION IN THE BOROUGH CAPITAL IMPROVEMENTS PROGRAM PLANNING PROCESS.
- OBJECTIVE 3:** TO MAXIMIZE EMPLOYMENT OPPORTUNITIES IN THE COMMUNITIES.
- OBJECTIVE 4:** TO MAXIMIZE COMMUNITY DEVELOPMENT PURSUANT TO A COMPREHENSIVE PLAN ADOPTED BY BOTH THE CITY COUNCIL AND THE BOROUGH.
- OBJECTIVE 5:** TO MAXIMIZE OPPORTUNITIES FOR SUBSISTENCE ACTIVITIES AND THE INUPIAQ CHARACTER OF LIFE IN EACH COMMUNITY.
- OBJECTIVE 6:** TO MAXIMIZE COMMUNITY CONTROL OVER DEVELOPMENT ACTIVITY IN ITS VILLAGE AREA OF INFLUENCE.

BOROUGH PROGRAMS

PROGRAM 9.1: COMMUNITY PARTICIPATION IN PERMITTING

The Borough shall notify each community of any development proposal within the community or Village Area of Influence and shall afford the residents an opportunity to participate in the permit decision.

PROGRAM 9.2: VILLAGE INFLUENCE

In determining whether a proposed development in a community or Village Area of Influence complies with the various policies, the Borough will solicit and consider the opinions of residents of the community on all matters in which they have a special knowledge or experience.

PROGRAM 9.3: LOCAL RESOURCE COUNCILS

The North Slope Borough shall establish local resource councils, comprised of knowledgeable subsistence users, to aid in data gathering and development decisions.

PROGRAM 9.4 COMMUNITY COMPREHENSIVE PLANS

Community comprehensive plans will include, but not be limited to, a land use element which identifies a core area for each community in which major capital improvements and non-residential buildings will be located, new growth areas, and development standards, including lot sizes for each community.

The following Borough programs are drawn from discussions with community leaders in each of the eight communities during the summer of 1993. They are not presented as a exhaustive list of all public issues in these communities, some of which are discussed in other chapters of this plan. This list does not deal with the transportation improvements and new subdivisions contained in the Borough's Six Year Transportation Plan.

PROGRAM 9.5 PHASING

Phasing of Public Improvements. The Borough will develop all roads, water and sewer systems and other public facilities in Addition No. 5 before developing Addition No. 6.

PROGRAM 9.6 ADDITION NO. 6 DEVELOPMENT

The Borough will develop a permitting process for improvements on lots in Addition No. 6 to ensure that such improvements will not require any public services or facilities prior to the time that the Borough phases them in.

PROGRAM 9.7 BARROW SPACE NEEDS PAR

The Borough will conduct, as part of its Barrow Space Needs Project Analysis Report, a planning program for the core area of Barrow, to include circulation, parking and traffic improvements and increased space for commercial and recreational development.

PROGRAM 9.8 NEW BARROW AIRPORT

The Borough will support the City of Barrow in its efforts to develop a new airport south of town and, eventually, to expand the city to the south.

PROGRAM 9.9 VANDALISM

The Borough supports community efforts aimed at securing existing cultural and archaeological sites from vandalism and degradation from overuse.

CITY OF ANAKTUVUK PASS

Jobs. Anaktuvuk Pass did not have many jobs in the summer of 1993.

Subsistence and Oil Development. They are very concerned about Lease Sale 57 and conflicts with the North Slope Borough land selection with subsistence activities. If oil development happens at all, they want ice pads and roads, not permanent roads, and they want exempt areas where caribou migrate. They want numerous areas where the caribou can pass under the pipes. Generally speaking, the residents of Anaktuvuk Pass believe that they can work with the oil industry better than with the Department of Natural Resources in dealing with their concerns.

Housing. Anaktuvuk Pass has few lots left for development and needs a major subdivision north of town and would like a new road to their hunting camp at Kanumavik.

Tourism. Tourism has a significant potential with Anaktuvuk Pass. The Nunamiut Corporation is considering construction of a lodge. Tourists now come only for a few hours and leave. Few people enter the Gates of the Arctic National Park. The community believes that there is a significant possibility for spring skiing and snowboarding. Guiding of eco-tourism and visits

to Gates of the Arctic as a base facility for float trips and for locally guided hunting trips in the fall. The community is completely opposed to fly-in hunters and guided hunters who camp at the mouth of the canyons and the valleys of the Brooks Range and shoot the lead caribou as they start up these valleys thus turning the remaining caribou back and making them unavailable for local residents. The community is generally concerned about permit enforcement and enforcement of existing laws against harassment of game and similar sporthunting violations which hurt subsistence activities in the community. The community is opposed to the Bureau of Land Management Recreation Plan for the Haul Road corridor and does not want development of gas stations, lodges, or rest stops along the Haul Road.

Roads. Residents of Anaktuvuk Pass would like to consider a seasonal ice road from the community over to the Haul Road to lower the cost of freight and fuel in the winter.

Planning. The community wants North Slope Borough permits for residential activities administered by the city to include setbacks and other standards for residential development.

Jobs. Generally, there are insufficient jobs in Anaktuvuk this summer and SKW Eskimos is hiring people from outside of town to work in the community.

Recreation. Anaktuvuk Pass, like other communities, wants access to the swimming pool and school gymnasium in the summer.

Ten-Year Forecast. Ten years from now "everything will be double." The community will need recreational facilities, especially during the summer. A rec center, a gymnasium or open school for the summer. They need recreation for youth and a senior home. The landfill will need to be moved and enlarged. There will be a water and sewer program coming in the summer of 1994. Tourism will be established for spring skiing, summer visitors and fall hunting. This community, like others, has raised the possibility of the Borough undertaking recreational and cultural powers so that it can build daycare center, senior center, recreational facilities and so forth. Also, this community, like others, asked how the sites for CIP projects were selected and asked to participate in the site selection process for CIP projects.

CITY OF ATQUSUK

CIP Projects. Atqusuk has several projects which have not been completed, including fencing in the sewage lagoon, dikes at the landfill, and a fence at the freshwater lake. The tank farm is too close to the freshwater lake and the vehicle storage area north of town is directly next to the freshwater lake. Raw sewage is carried to the landfill in fifty-five gallon drums and dumped. It is probably seeping in to the river. The landfill needs to be completely fenced to keep people and animals out. The community needs a new boat launch area. The community would like more housing and believes that if there were more housing available, people who had moved away would

move back. The community needs a daycare, senior center, community center, city offices, a larger post office and a cultural center. They need a new airport building and they will need additions to the school and to the generator plant.

Transportation. The community needs a new road to the Burnell Coal Mine and subdivision lots developed in that area. The problem is that there is no gravel for the road. There is a general problem in Atqasuk regarding the lack of gravel; basically, roads and pads are made out of dirt rather than gravel and this is a continuing problem in town. There is a great deal of dust that blows up from the road. The roads have to be watered more than most.

Planning. The community wants to take on its own zoning power or have better communication on permitting decisions with the Borough.

Jobs. There were enough jobs in the summer of 1993 but they were quickly running out.

Tourism. The community is opposed to fly-in hunting and guided hunting of all types. The community would like a small hotel or bed and breakfast and a restaurant, and would be amenable to tourism development which is based in the community.

Oil development. Generally, the community supports the North Slope Borough taxing and regulatory activities with regard to the oil industry although they do not care much about jobs in Prudhoe Bay. They need more revenue.

Ten-Year Forecast. Ten years out the community would like to see more steady year-round jobs, a land settlement between the city and the village corporation, more playground areas and recreation facilities, a resolution to the conflict between Borough powers and city powers, and more funding for the city to perform its own functions.

The city would like to be on gas, either in its own gas field or connected to the Walapka gas field.

All the communities want better revenue resources or the North Slope Borough should take on cultural and recreational powers.

CITY OF BARROW

Transportation. Roads throughout the community generally require surfacing or watering to keep the dust down during the summer. The city supports a road to the gas field and on to Atqasuk, and also development of an ice road to Nuiqsut.

The city is strongly in favor of developing a boat harbor for about 200 boats with a saddle

hoist, up to six launches, fuel pumps and a tank farm. There should be a large parking and storage area and eventually and closed and locked storage area.

Generally, the community needs ATV corridors and a boat access along the north side of the airport from MarkAir west to the shore about thirty feet wide. The city is concerned about snowmachines and ATV's on the street. City ordinance requires an age limit and helmets on city streets only but not offroad. Subsistence issues include the following.

The city supports development of a winter ice road to Prudhoe Bay to reduce freight prices during the winter.

Subsistence. Offshore drilling forces to crews to go twenty to thirty miles offshore and tow their whales for up to twenty-two hours to get them back during rain, snow and big seas. The caribou population is adequate, and may be overpopulated because caribou are lean this year.

The fish population will be healthy as long as they are maintained for subsistence activities and not for commercial activities. Salmon is a new species and is getting very popular. Char is no longer available close in.

Boat harbors will increase fishing and make commercial fishing viable. It will also increase the opportunities for shellfish and crab. The boat harbor and the new beach erosion project may affect the shellfish.

The Borough needs permission to dredge and fill in the tidelands pursuant to the beach erosion project since the city owns the tidelands and city can stop the project.

Housing. The city just sold ten lots at an auction for \$16,000 to \$25,000 each. There were up to twenty applications for each lot. That was two months ago and the houses are already being built. The public will be buying 14-C lots if roads were available. People would be building in Add 5 and Add 6. When Add 3 and 4 get utilities they will boom. The city is issuing about 150 housing permits per year. The city is entitled to 1,280 acres which it intends to select south of the airport to use for urban development. UIC will be expanded toward NARL. There needs to be a Land Management Agreement between the Borough, the City and UIC. The city also plans to develop a commercial area along the road to the freshwater lake.

Cultural Resources. The City of Barrow has an ordinance which makes it illegal to collect artifacts. The tract 27 site is nominated inclusion on the Historic Register but it is city property and the city can control it. It needs to be fenced and controlled. There is an abundance of jobs this summer.

Recreation. The City of Barrow needs more winter indoor recreation for adults such as bowling, gathering for games, cards and so forth. They need more space for leisure activity -- theaters, cards, and passive recreation.

Tourism. The city's main priority is the development of an Inupiaq Cultural Center in Barrow. The city needs to continue to support two airlines to keep freight prices down and to keep passengers coming to Barrow. With development of the boat harbor, there will be charter trips up to Point Barrow and the Will Rogers Monument.

Ten-year Forecast. In ten years Barrow will still be expanding. There will be both in and out migration from the villages, temporary residents will become permanent residents and there will be new family generation. Barrow is the hub of the North Slope and the center of government, commercial and health and social services for the North Slope.

Health services could be improved and will expand into a full scale hospital with doctors coming in to visit patient rather than sending patients out to Fairbanks or Anchorage.

The city needs to get title to its 1,280 to expand housing opportunities.

A primary goal in the next ten years is moving the airport to a location six miles south of town so that the existing airport will no longer block city expansion. The airport should be built for international flights and significantly larger passenger and freight handling. It should accommodate equipment to enable fog landing and by being located six miles away it will be on higher ground and away from the coast which will reduce the amount of fog.

The city expressed a very strong interest in developing a new comprehensive plan to accommodate this as well as the planned significant expansion of Borough facilities in this city, including a new Borough Administration Building, a new School District Administration Building, a new ASIC Building, the Cultural Center and a new Health Department Administration Building.

CITY OF KAKTOVIK

Subsistence. A major issue in Kaktovik is want restriction on the dates of seismic and drilling activity to comport with the whale migration. The first whales usually come in mid-August but sometimes as early as July. They need a cessation of activities during September, because if the lead whales are scared they can turn all of the whales away. Kaktovik needs new land for a subdivision.

Subsistence, flightseeing and tourist planes are running caribou off. The flightseeing operators get permits from the U.S. Fish and Wildlife Service. They do their best to get close to the caribou and then get them moving. The problem here is enforcement of existing rules against harassment of game. These flightseers are operating out of Deadhorse. There are lots of tourists and scientists who are watching the caribou, taking pictures and counting the herds. The

community wants these people to get permits from the North Slope Borough. Normally, the residents of Kaktovik would be out hunting in mid-July. Several people have been hunting when a plane goes by and spooks the caribou. Most caribou are healthy, and shift the calving area every year.

Housing. They want a minimum of one acre lots and they need about fifty lots, twenty five from the city and twenty five from the village corporation. The subdivision should be south of town on the road to the landfill. Water and sewer are coming to Kaktovik in 1995.

The job situation is good. In the summer of 1993 the school remodel had just ended, and the insulation and weatherization program was going forward. Kaktovik's main employment issue is year-round employment.

Tourism. The community of Kaktovik is not particularly interested in ANWR visitors because only a few people in the community will profit from tourism. ANWR visitors are no longer a big item in town, it was bigger a couple of years ago and is now down about 75 percent. People live in Kaktovik to have an isolated life and are not particular interested in tourists.

CIP Projects. Kaktovik needs docks and a launch area for thirty to forty boats. They need roads to traditional hunting areas and a butchering platform and ramp for whales. Kaktovik contributes funds to the school district to keep the school open over the summer. The community needs a senior center and a daycare center but does not have the money to build or maintain these facilities. The state has funded a visitor's center and museum but this has not been built.

Oil development. Kaktovik generally supports oil development in ANWR but if there is development the local people want a say in its direction and the ability to monitor it but do not want the responsibility of issuing and establishing permits. They want to be advisors not regulators. The North Slope Borough should be the regulator. Local people could be hired as monitors and advisors on the development.

Jobs. Kaktovik people would like to schedule CIPM work so that there is a steady flow of it and to keep it coming.

Ten-Year Forecast. Ten years out the community is looking forward to the new community water and sewer system and improved medical and health care with a doctor in the community. They want to be able to drive to Deadhorse over a seasonal ice road and get cheaper freight rates. They want all blacktop roads within ten years. Within the next ten years the airport should be transferred from the U.S. Air Force to local control and it should be completely rebuilt. The most important issue for the people in Kaktovik is that their rights will be nailed down so that they do not have to fight for their rights and they can hunt and fish at will in ANWR without fear of interference by the federal government. In ten years there should be more than NSB maintenance jobs and recreation. Their biggest fear in ten years is that ANWR will be totally

locked up by the federal government.

CITY OF NUIQSUT

Oil development. Nuiqsut supports oil and gas development onshore and opposes offshore oil and gas development. Prudhoe Bay is a safe environment. Development on the barrier islands interferes with the seal hunt and there is danger from ice. Development offshore such as Kuulum adversely impacts subsistence bowhead hunts.

Tourism. Nuiqsut is opposed to all guided hunting. In Nuiqsut moose is the issue. The guided hunter fly in, shoot the moose, and take moose from the local population. Float trips on Colville River are okay and the community is friendly to people who pull out in Nuiqsut from their float trips.

Subsistence. All of their hunting takes place on the west side of the Colville River and all their camps are south of the Colville Delta. They do hunt at the mouth of Colville and they are worried about expansion of the Kuparuk uplands field into that area. Nuiqsut is interested in completing its traditional land use inventory and documenting hunting areas for seal and whale harvest now so that information can be used in permitting for oil and gas development offshore on the barrier islands. Whales used to be taken as close as five miles out, now they are more than thirty miles offshore.

The main issue is that it is harder to get whales and seals when you have to go thirty miles out to avoid the offshore drilling rigs. It can take two days to drag a whale back to shore. It seems to be easier to get caribou but they seem to be farther away. Wolves and wolverines are also farther away and caribou sometimes get blocked by the pipeline because they cannot go under the pipeline when the snow is deep, as is generally believed in the North Slope Borough Wildlife Department.

Residential Development and CIP Projects. Nuiqsut will need 100 lots developed to the southwest and north in the next few years. All of these lots will need new roads. There is to be a new road south of town to the boat launch area on the Colville River. The community is generally concerned about security of the freshwater lake, making sure that trash and gray water do not inadvertently seep into that area. They recommend a development setback from the freshwater lake of 500 feet. There is fencing needed for the landfill to keep trash from blowing away. Nuiqsut needs a boat launch and storage facilities for about thirty or forty boats on the main channel of the Colville River.

Transportation. On balance Nuiqsut favors the ice road to Prudhoe Bay and Deadhorse because it enables much cheaper fuel. They support development of seasonal ice roads to Barrow and Atkasuk but non-public roads.

Social Issues. *The Colville dredge operators have caused some social problems. Last year they uncovered mammoth tusks and took these away without reporting them to IHLC. These were sold by the dredge operators. In general, there needs to be more sensitivity between outside workers on the dredge with respect to liquor and contacts with community residents.*

They are concerned about the social impact of the water and sewer program, the increased purchasing power of the workers, the alcohol, drugs, the new people in town creating social tensions, people leaving permanent Borough jobs to work on the water and sewer project, and sexually transmitted diseases.

Recreation. *Recreation facilities are needed for the youth. These facilities seem to be trashed. They need improvements to the ball field and a kindergarten through sixth grade playground. They want the school open in the summer for basketball. There has been some vandalism of boats and construction materials. Kids swim in the river, not in the pool and three children have drowned. The community, like all communities on the North Slope, needs a daycare center. There are too many hassles with the school district to use the school for community events.*

Employment. *The community needs employment for youth in the summer. They would like some jobs in the oil field. No oil company has ever sought employees from Nuiqsut and they feel that there is a great deal of racism in the oil patch.*

Ten Year Forecast. *Nuiqsut is and will continue to be a very traditional community and change will be coming slowly. The main issue of the next ten years is to keep the good features that Nuiqsut has. It is a very clean and tidy community with straight roads. It look good and it is well organized. They want to keep planning ahead. They want to maintain the pride in their community and maintain the reasons why people move to Nuiqsut for the traditional lifestyle. They want to delay "Barrowization."*

CITY OF POINT HOPE

Point Hope would like many hatcheries in and around the community to improve the salmon harvest.

Employment. *There are not enough jobs and SKW has brought in lots of outsiders to work on the major school expansion project.*

Housing and CIP Projects. *There is a long list of people who need housing and the community needs new subdivision and new roads for them. The community desires a new road up the Kukpuk River to access the main winter and summer subsistence area. The community is opposed to outside hunters, sport hunters, and guided hunters. A major problem in Point Hope is conflicts with Native allotments in and near the townsite, and the inability to get title to Native*

allotments. Trespass access to Native allotments is also an issue. The landfill needs to be relocated away from the airport.

Planning. Point Hope, like other communities, has asked for more control over the planning and siting of CIP facilities in the community. They have asked for the Borough to put Native allotment on the GIS system.

Subsistence. Whitefish are starting to come back into the Kukpuk River. There are no more parka squirrels, residents must go further inland. Ten years ago the caribou came into town. They do not do so now.

The bowhead harvest is about normal. Birds are about normal.

The community is satisfied that the solution to Project Chariot has taken their recommendations into consideration.

This community, like others, never know when people are coming in study wildlife or archeological digs. They would like to know when that is going to happen and they would like to participate in it.

The community needs a youth recreation center. This community, like others, has nothing for children in the summer. The school facilities are closed.

A new subdivision will be needed in about ten years and the community needs a plan because Native allotments block community growth in most directions.

Tourism. The community desires tourism associated with existing tourism in Kotzebue and Nome. They are attempting to raise \$500,000 for a hotel and museum. At this point, the old town site is unsecured and is open for souvenir picking. The community would like to package and sell traditional foods, perform dances and Nalaqataq ceremonies for visitors, give boat rides around the area.

Ten-Year Forecast. Ten years out the community would like an Inupiaq channel on their cable TV to include job announcement in the Borough and a mini-campus of AISC. The community will have recreational facilities for children, teens, elders and the general community. It should have a Borough Administration Building and a new airport capable of handling jet airplanes. It should have a fulltime doctor. Hunting guides should be replaced by locals, and a road to Kukpuk and Kivalina. Point Hope requested that the North Slope Borough Assembly be elected by districts so the communities can get an Assembly member.

VILLAGE OF POINT LAY

Coal Mine. There are significant concerns at Point Lay regarding the Deadfall Syncline Coal Mine. There is no communication between the operator and the community. They just go in and work and leave. The community is not advised of permitted activities and also has no opportunity for local employment at the mine. They are concerned that the mine operator will soon ask for a coal loading facility in the vicinity of Cape Beaufort and this will adversely impact beluga habitat and beluga migration routes. Point Lay is heavily dependent on belugas and Kasegaluk Lagoon and any coal moving facility at Cape Beaufort is likely to adversely impact the beluga populations.

Jobs. In the summer of 1993 there were plenty of jobs in Point Lay.

Residential Development. They will need a new subdivision soon. The best location for this is directly south of town on land belonging to the dewline site. If this land is not available the next best location would be directly east of town. The community needs thirty to fifty new lots and there is a general housing shortage which is made worse in the summer.

Planning. Point Lay is generally concerned about communication of planning and permitting decisions. They would like greater input into planning decisions that affect the community and the coal mine.

Contamination. Point Lay residents are concerned about radiation and microwave contamination from the dewline site and have requested that the Borough conduct a study of possible health affect of this. Former residents of Point Lay are moving back from Anchorage, Kotzebue and Barrow.

Ten-Year Forecast. Ten year out Point Lay does not want to become like Anchorage. It is a traditional community. They want a community center, better recreation for seniors as well as others, fulltime year-round jobs, and a stable subsistence lifestyle focusing on the beluga whale.

CITY OF WAINWRIGHT

In General. Wainwright needs a new trash truck, it already has a Borough appropriation but it is not sufficient. The new piped water and sewer project will begin in Wainwright in 1994. There are a lot people temporarily unemployed in Wainwright, with the weatherization program the only work at present.

Generally speaking, the city does not have the expertise or the finances to fulfill its responsibilities. The high school seems to be filling up. There is a problem with the washeteria in that it is a two story building and the washers and dryers are on the top floor so that the people who have problems negotiating the stairs have problems at the washeteria.

Recreation. The community needs outdoor recreation facilities. The school is normally used for family recreation but it is closed during the summer and the city is interested in discussing the possibility of the Borough taking over recreation powers because the Borough has the money to pay for it. The city needs a new baseball field, perhaps tennis courts and an upgrade to the basketball park and a new recreation pad. The city needs technical assistance in grant writing and carrying out the duties that it has.

The city needs a new city hall. The senior center needs equipment and code upgrades and the city needs money to operate the senior center. The communities needs about 100 new lots. They should be located south of town. They should be larger than the present city lots and they need it fairly soon. Roads are dusty in the summer and either need an asphalt coat or increased watering. Birds are picking up trash at the dump and dropping it in the freshwater lake, contaminating the freshwater lake.

CIP Projects. The projects are on paper but they are constantly being put off and the community wants more input in the processing of CIP projects and the scheduling of them so that there is a steady flow of work. The city wants more residential sprinkler systems.

Subsistence Issues. Twenty year ago there were fish nets on the beach at Wainwright, but then pinesol raw sewage have driven the fish away from the channel. The sewage lagoon drains in and overflows into the ocean and contaminates it. Caribou are sick or starving and they are not in good shape. Caribou and waterfowl seem to taste very strong at this point.

The community of Wainwright is concerned about OCS Lease Sales and the Kuwolum project because the bowhead whales which are affected by Kuwolum are the same whales that migrate past the community of Wainwright. Wainwright wants to participate in those decision. There is a general issue regarding University archeological camps and construction sites which are not cleaned up after the project is over and the community has requested that the Borough require bonds for these temporary camps.

With cultural and archeological sites, wave action may be chewing up the sites on the beach.

Archeologists should hire local people because they know the country and it will help put money in the local area. The CIPM Department must require local hire and it must enforce it. In ten years Wainwright sees itself as culturally established with the full range of public facilities and recreation facilities in place. Health, education and safety issues will always be top priorities with Wainwright. Transportation will be improved.

10.0 LAND USE

The land use chapter incorporate policies from the following North Slope Borough documents:

- The Comprehensive Plan.
- The Haul Road Area Comprehensive Plan.
- The Coastal Management Program.
- The Subdivision Ordinance.
- Each Annual Capital Improvements Program.
- Village Comprehensive Development Plans, when adopted by the Borough.
- Resource Development (RD) District Master Plans, when adopted.
- The Land Management Regulations.

LAND USE ZONE DISTRICTS

The Land Use Plan consists of four broadly defined zone districts in which Plan policies are to be administered. These zone districts are set out on Map ___ and are described as follows:

Village (V) Districts. These districts govern the municipal limits of each incorporated Village, and the sites and immediate environs of Pt. Lay. Village Districts are established to encourage development which:

- (a) Reinforces traditional values and lifestyles.
- (b) Is in accord with the Capital Improvements Program and Comprehensive Development Plan for the Village.
- (c) Is in accord with the desires of the residents of the Village.

Barrow (B) District. The Barrow District encompasses the city limits of the City of

Barrow *and includes several specific and multiple use zones.* The intent of the Barrow District is to accommodate a full range of urban development which:

- (a) Does not materially adversely impact existing and future subsistence activities by residents of the City.
- (b) Recognizes and reinforces, through special policies *and districts*, various existing neighborhoods in the City.
- (c) Is in accord with the Capital Improvements Program and *the Comprehensive Development Plan for the City.*
- (d) Is in accord with the desires of the residents of the City.

Conservation (C) District. The Conservation District encompasses the entire area of the Borough, except the Villages, the City of Barrow, the transportation corridor and areas specifically zoned for Resource Development. The district is intended to preserve the natural ecosystem for all of the various species upon which residents depend for subsistence. The Conservation District can accommodate resource exploration and development on a limited scale, on a case by case basis, but major resource development projects will find it advantageous to apply for rezoning to a Resource Development District.

Resource Development (RD) District. The Resource Development District is a zone designed *and adopted* on a master plan basis to accommodate large scale resource extraction, and related activities which:

- (a) Do not permanently and seriously impair the capacity of the surrounding ecosystem to support the species upon which Borough residents depend for the major portion of their subsistence.
- (b) Is planned, phased and developed as a unit, or series of interrelated units, (the Master Plan) with provisions made for all necessary public and private facilities.
- (c) Meet the various special policies set forth for all Resource Development Districts, as well as those imposed on each individual Resource Development District at the time of designation.

Transportation Corridor (TC) District. *The Transportation Corridor District governs the area of the Haul Road (Dalton Highway) and is generally designed to prohibit development of visitor and tourist related facilities, so as to discourage visitors in that area.*

Overlaying the zone districts set out in the preceding section are special land use areas in which specific policies apply. The following Special Land Use Areas are established:

SPECIAL HABITAT AREAS

A Special Habitat Area is either a geographical area which supports essential life functions of significant fish or wildlife species including breeding, nesting, pupping, calving, spawning, rearing, feeding and hauling out areas.

Provides unique population elements including very high concentrations or isolated occurrence.

Provides habitat essential to the maintenance of endanger species.

Supports seasonal concentrations of a significant fish or wildlife species (including water), spring, summer or fall concentrations.

Supports highly productive fish or wildlife populations elements necessary for special uses including migration corridors and feeding areas.

Provides supporting habitat essential to the maintenance of special habitat (i.e. stream banks).

These areas are identified on Maps G, H, I and J.

Caribou. This area includes the western Arctic Caribou Herd's core calving grounds set out on Plan Map J and includes the area located on the upper reaches of the Utokok River and the western portion of the Porcupine Herd's calving area between the Canadian border and the Niguanak River.

Muskoxen. This area is set out on Plan Map J and includes upland habitat used by the muskoxen south of Kaktovik, southeast of the Canning River Delta, and on the Lisburne Peninsula east of Point Hope.

Polar Bear. This area is set out on Map J and includes polar bear documented den locations and those areas used by females and cubs recently out of maternity dens.

Bowhead Whale. This special habitat area, subject to a special policy, includes the spring and fall migration routes and possible fall feeding areas of the Bowhead Whale as set out on Plan Map G. These areas include possible bowhead whale fall feeding areas, one off the mouth of the Kongakut River near Demarcation Point and one off Dease Inlet east of Point Barrow.

Beluga Whale. This area is subject to special policy and includes the critical feeding and calving locations for the Beluga whale as set out on Plan Map G which focuses mainly on Kadegaluk lagoon and south along the Chukchi Sea coast to Cape Sabine. It also includes the intensive calving and feeding areas and intensive feeding and resting areas at Barrier Island passes as set out on Map G.

Ringed Seal. This area includes the spotted seal summer/fall high use area set out on Plan Map G and the estuarine feeding areas and haul out locations located on Map G.

Coastal and Marine Fisheries. This area includes identified valuable whitefish habitats (particularly in and around Teshekpuk Lake and the many lakes and streams in the general area between Atqasuk and Nuiqsut). [Map H]. It also contains the nearshore feeding habitat and migration pathways for marine and anadromous fish [Plan Map H].

Riverine Fisheries Habitat Area. Most rivers and adjacent areas hold importance as habitats for a number of fish species. As a consequence, most river corridors are important subsistence areas and often contain active fish camps. Along the course of most rivers, there are certain parts that have particular significance as fish habitats or that are particularly sensitive to disturbance. They include identified overwintering and spawning areas as set out on Plan Map H and are included in this habitat district.

Peregrine Falcon. This area includes the documented nesting habitat for Peregrine Falcons which are set out on Map I.

Waterfowl. The identified primary goose, duck and swan nesting and molting areas as delineated on Plan map I are included in the waterfowl Special Habitat Area. Also included are the Black Brant fall migration staging area on Map I and the waterfowl and shorebird important use and high quality nesting areas, whistling swan high density nesting habitat and common eider nesting colonies on Map I .

Seabirds. The Seabird Special Habitat Area consists of documented major and minor seabird colonies which are located on Map I.

SUBSISTENCE USE AREAS

These areas include the regions utilized by local residents of the North Slope Borough for subsistence activities. These activities and their locations are detailed in Chapters 3 and 9. The Plan establishes the areas, and sets forth special policies. The location of the subsistence use area for each village is set out on Map K .

GEOPHYSICAL HAZARD AREAS

These areas are established to protect life and property, as well as the environment, from damage resulting from inadequately planned, designed, or construction development within hazardous geophysical areas such as seismic, permafrost or sea ice zones.

Sea Ice Hazard Area. Due to extraordinary offshore sea ice conditions in the North Slope Borough, it is absolutely essential that design and engineering criteria are demonstrably sufficient to withstand environmental hazards. The Sea Ice Hazard Areas are those sea ice areas of instability with moderate to severe massive ridging. The Sea Ice Hazard Area includes zones ____ as set out in Section * of this Plan and the moderate and severe ridging zones on *Map **.

Flood Hazard Areas. *Map ** illustrates areas of potential flood hazards, but is not considered exhaustive.

Shorelines. Shorelines are subject to storm surges, erosion, wasting and high winds.

Seismic Hazard Areas. A seismic hazard area is illustrated in *Map **.

HISTORIC AND CULTURAL AREAS

The purpose of the Special Historic and Cultural Areas is to preserve and protect areas, sites, or structures of subsistence, cultural, historic, archaeological, or architectural significance to residents of the Borough from incompatible development or land uses. The importance and sensitivity of such sites are discussed in Chapter 4.

VILLAGE AREAS OF INFLUENCE

Pursuant to the 1982 Plan there were established Village Areas of Influence for each village in the North Slope Borough. These areas include the regions of cultural and subsistence activities described in Chapters 3 and 9. The Areas of Influence also include the area outside the municipal limits which are used in common by some or all villagers for transportation, public facilities or other purpose.

Village Areas of Influence are set out on *Map C* .

Under this Plan and the associated Land Management Regulations, the residents of each village within a Village Area of Influence are involved in all development decisions affecting their Area of Influence. The knowledge and experience of residents of the Area of Influence will be considered seriously in development related decisions. If a public hearing is necessary for a development proposal in a Village Area of Influence, it will be held in the village.

LAND MANAGEMENT REGULATIONS

The Land Use Plan is implemented by the Land Management Regulations which have been developed with the Plan, and by the Subdivision Regulations and other Borough Ordinances. These laws are all incorporated by reference.

DEVELOPMENT POLICIES

POLICY 10.1 SPECIAL HABITAT AREAS

The following policies apply in the Special Habitat Areas:

10.1 Development within Special Habitat Areas is prohibited unless no feasible and prudent alternative is available.

10.2 Resource extraction uses within a Special Habitat Area are prohibited unless no feasible and prudent alternative is available.

10.3 Vehicles, vessels, and aircraft usage in Special Habitat Areas is required to be confined to corridors designated in their permit.

10.4 Siting, design, construction and maintenance of transportation and utility facilities (including ice roads) are required to minimize alteration of shorelines, water courses, wetlands, and tidal marshes and significant disturbance to special habitat; and to avoid critical fish migration periods.

10.5 Airport and helicopter pads are required to be sited, designed, constructed and operated to minimize their impact upon significant wildfowl migration routes, breeding grounds and nesting areas.

10.6 Siting, design, construction and maintenance of transportation and utility facilities (including ice roads) are required to minimize alteration of shorelines, water courses, wetlands, and tidal marshes and significant disturbance to special habitat; and to avoid critical fish migration periods.

10.7 Transportation development which significantly obstructs wildlife migration is prohibited.

10.8 Toxic materials and untreated solid waste disposal on the barrier

islands, sea ice, artificial islands, at sea, in any wetlands, rivers or lakes which support or are capable or supporting significant populations of fish and wildlife is prohibited.

10.9 Siting, design, construction, and maintenance of transportation and utility facilities (including ice roads) are required to minimize alteration of shorelines, water courses, wetlands, and tidal marshes and significant disturbance to special habitat; and to avoid critical fish migration periods.

10.10 Siting, design, construction, and maintenance of transportation and utility facilities (including ice roads) are required to minimize alteration of shorelines, water courses, wetlands, and tidal marshes and significant disturbance to special habitat; and to avoid critical fish migration periods.

10.11 Siting, design, construction, and maintenance of transportation and utility facilities (including ice roads) are required to minimize alteration of shorelines, water courses, wetlands, and tidal marshes and significant disturbance to special habitat; and to avoid critical fish migration periods.

10.12 Disturbance of subsistence resource habitat, or migration routes during migration periods, by transportation modes or development is prohibited unless no feasible and prudent alternative is available.

10.13 Siting, design, construction, and maintenance of transportation and utility facilities (including ice roads) are required to minimize alteration of shorelines, water courses, wetlands, and tidal marshes and significant disturbance to special habitat; and to avoid critical fish migration periods.

POLICY 10.2 SUBSISTENCE SPECIAL USE AREAS

The following policies apply in the Subsistence Use Special Areas:

10.14 Development which will likely result in depleting a subsistence resource, as below the subsistence needs of local residents of the Borough is prohibited.

10.15 Development that will likely result in significantly decreased productivity of subsistence resources or their ecosystems is prohibited unless no feasible and prudent alternative is available.

10.16 Development which restricts subsistence user access to a subsistence resource is strongly prohibited unless no feasible and prudent alternative is available.

10.17 Development which precludes subsistence user access to a subsistence resource is prohibited.

10.18 Utility siting and design which precludes subsistence user access to a subsistence resource is prohibited.

POLICY 10.3 GEOPHYSICAL HAZARD AREAS

The following policies apply to Geophysical Hazard Areas:

10.19 Development in flood plains and other Geologic Hazard Areas is prohibited unless no feasible and prudent alternative is available.

10.20 Development in floodplains, shoreline areas, and offshore is required to be sited, designed and constructed to minimize loss of life or property due to erosion.

10.21 Development in permafrost areas is required to maintain or enhance the natural insulation quality of existing soil and vegetation.

10.22 Drilling in active seismic faults is prohibited.

10.23 Offshore exploration, development and production drilling outside the landfast ice area is required to be sited on a barrier island or artificial island. A variance from this policy to allow offshore platforms will be granted only if the requirements of Section * et seq. are met and, in addition, the developer demonstrates the actual capability of the structure to withstand all natural forces, specifically including ice.

10.24 The use of test structures in sea ice hazard areas is encouraged.

10.25 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. [See Map *].

POLICY 10.4 HISTORICAL AND CULTURAL AREAS

The following policies apply to the Historical and Cultural Areas:

10.26 Development which significantly disturbs cultural or historic sites listed on the National Register of Historic Places or eligible for inclusion

in the National Register is prohibited.

10.27 Development which significantly interferes with traditional activities at cultural or historic sites identified in this Plan is prohibited. Significant interference with traditional activities at cultural or historic sites identified in this Plan is prohibited. Significant interference with traditional activities includes: significant visual, noise and other pollution; prolonged increases in activity; driving off subsistence species; or significant surface disturbance.

10.28 Surface disturbance of newly discovered historic sites is prohibited prior to archaeological investigation.

10.29 Development which significantly violates guidelines on the rate or amount of growth adopted by a Village for a Village (V) District and adopted as a part of its Comprehensive Development Plan or to submission of the application therefore is discouraged. Development which grossly violates such guidelines is prohibited unless these are no feasible and prudent alternatives available.

BOROUGH PROGRAMS

10.30 Drainage Plans. The Borough shall require drainage plans in all new subdivisions. The Borough shall conduct a study of drainage problems and solutions in Browerville and other areas on an as-needed basis. The Borough shall amend the Land Management Regulations to distinguish between structures used for subsistence activities and structures used for residential purposes and to delineate the requirements for each.

10.31 Temporary Structures. The Borough will amend the Land Management Regulations to require a check-off by the permitting office for temporary structures.

NORTH SLOPE BOROUGH COMPREHENSIVE PLAN UPDATE

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Prepared by: Department of Planning and Community Services
Division of Economic Development and Planning

TABLE OF CONTENTS

Land Use And Natural Resources	2
Public Facilities/Services And Transportation	12
Economic Development	22
Shelter	31
Haul Road Corridor	34
Implementation	42

LAND USE AND NATURAL RESOURCES

OVERVIEW

Land use refers to the how and where land will be identified to accommodate the physical growth of our communities in a rational and sequential fashion. Once the overall land requirements are assessed, the issue of how the land will be managed arises. How this management or accommodation process works is through the application of land use controls (such as zoning and subdivision regulations) as they are deemed necessary and may be strengthened or relaxed by village residents.

Currently there are borough-wide land use plan and zoning categories. The zoning categories or "Districts" are:

- Barrow Mixed Uses
- Barrow Suburban Residential
- Barrow Industrial and Storage
- Barrow Reserve
- Village
- Conservation
- Resource Development
- Transportation Corridor

Zoning administration is managed by the Department of Planning and Community Services with the North Slope Borough Planning Commission or Barrow Zoning Commission making decisions or recommendations to the Assembly when ordinance changes to NSB Title19 or rezoning are being considered. Currently only Barrow has its own zoning commission. This commission is composed of five members, three appointed by the Barrow city council and two appointed by the borough mayor.

Who should be in control of the land use management process? Who decides what is desirable, compatible, and appropriate? The answer to this is that it should be as close to those who are directly affected as possible. There also needs to be the assumption of technical, administrative, legal, and financial responsibility for whoever shoulders this duty. Ultimately the decision of who manages the process is a combination of local interest, capability, and legal requirements.

Natural resources are inextricably related to how land is used, specifically in regard to subsistence resources and natural or geologic hazards. The manner in which land uses impact natural resources is an integral component for how they are evaluated. Likewise the presence of geologic hazards is a consideration in the decision of where growth takes place.

GOAL 1:

EMPOWER LOCAL JURISDICTIONS IN THE CONTROL OF THEIR LAND USES AND NATURAL RESOURCES.

OBJECTIVES:

1. To maximize and strengthen local control of decisions which affect the resources of the local area.
 2. To afford each village the maximum control possible over its own social, cultural, and governmental destiny.
-

POLICIES:

1. Development which significantly violates guidelines on the rate or amount of growth adopted by a village as a part of its Comprehensive Development Plan is prohibited unless no feasible and prudent alternative is available and measures to mitigate against identified negative growth impacts are taken.
2. To use the Development Permit process to control village growth so that it is consistent with local policy as identified in the village comprehensive plan when developed and approved.
3. Allow each village its own policy regarding land being made available for development. Such policy formulated as a component of the village comprehensive plan and implemented through Policies 1 & 2.

Policies 1-3 Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

4. To notify each village of proposed development in its Area of Influence and afford it the opportunity to participate in the decision making process.
5. Establish a comprehensive planning process within each village.

Policies 4-5 Implemented by NSB Department of Planning and Community Services.

GOAL 2:

PRESERVATION OF LANDS AND NATURAL RESOURCES THAT SUPPORT THE INUPIAT CULTURE.

OBJECTIVES:

1. To protect cultural, religious, and historical activities and areas.
-

POLICIES:

1. Development which significantly disturbs cultural or historic sites listed on the National Register of Historic Places or eligible for inclusion in the National Register is prohibited.

Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

Note: The term "Significantly" requires an objective definition defined in each village Comprehensive Plan.

2. Development which significantly* interferes with traditional activities at cultural or historic sites identified in this Plan or the village comprehensive plan, when adopted, is prohibited.

*[Significant interference with traditional activities includes significant visual, noise and other pollution; prolonged increases in activity; driving off subsistence species; or significant surface disturbance.]

3. Surface disturbance of newly discovered historic sites prior to archaeological investigation is prohibited.
4. Place as many cultural and historic sites as possible on the National Register of Historic Places.

Policies 2-4 Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.
created, (In the affected village) through the permitting process.

5. Develop a review process for all sites proposed for inclusion in the National Historic Register. The process must address the overall impact on the NSB.

Implemented by NSB Department of Planning and Community Service, IHLC Division.

6. Require non-residential developers to hire an independent third party to perform an Environmental Site Audit (ESA) as part of the development permit or rezoning application. The ESA will include an investigation for hazardous materials liabilities, significant archaeological or cultural resources, and critical habitats.
7. Review the new Indian Burial Site Protection Act of 1990 and incorporate those parts that are relevant and pertain to the preservation of burial sites in the borough.

Policies 6-7 Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

GOAL 3:

PROTECTION OF THE NATURAL ENVIRONMENT AND ITS CAPACITY TO CONTINUE TO SUPPORT SUBSISTENCE ACTIVITIES AND GENERAL HUMAN WELFARE.

OBJECTIVES:

1. To continue to provide environmental guidance and direction for present and potential resource development activities and related facilities.
 2. To maintain the health of human and wildlife populations and the environment through enforcement of high standards for air, land, water quality. Reduce to the greatest extent possible pollution, noise, vibration, aesthetic degradation, solid & liquid toxic wastes and other forms of environmental contamination.
-

POLICIES:

1. Development which substantially pollutes the natural environment (including water, air, soil, noise, and vibration) is prohibited.

After a determination is made by, The Division of Occupational Safety and Environmental Administration of the Department of Planning and Community Services. Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

2. Development which will likely result in depleting a subsistence resource below the documented base line subsistence needs of residents of the borough or which renders it inaccessible through a physical barrier or deflection is prohibited.

Determination made by Wildlife Management. Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

3. Concentrating the siting and use of commercial and industrial facilities as a method of minimizing negative impacts on the environment is strongly encouraged.

Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

4. Consideration must be given when siting, designing, constructing, and maintaining transportation and utility facilities (including ice roads). Facility construction and maintenance must be done in such a manner so as to minimize the alteration of shorelines, water courses, wetlands, tidal marshes and significant disturbance to special habitat (including seasonally critical wildlife migratory, breeding, molting, and feeding habitat) and to avoid critical fish migration periods, to protect fish overwintering areas and to prevent drawing-down critical winter freshwater habitats.

Implemented by Wildlife Management, Department of Municipal Services, Planning and Community Services, and CIPM.

5. Development that does not require a shoreline location along with landfills, fuel or toxic material storage areas, and dumps are prohibited on or near shoreline areas unless no feasible and prudent alternative is available.
6. The erosion protection standards of the U.S. Army Corps of Engineers and the Permanent International Association of Navigation Congresses' (PIANC) International Commission for the study of Waves Annex to bulletin No. 25 (vol. III/1976), apply to all commercial and industrial development.
7. New subdivisions and other residential development near the shoreline or in a special habitat area are required to provide adequate water and sewer service to prevent damage to the environment.

Policies 5-7 Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

8. Residential, commercial, and industrial development associated with industrial and resource extraction development must be removed when the industrial or extractive use is completed. The NSB at its sole discretion may not require removal of facilities and structures erected as support

facilities if the borough determines it is in the best interest of the borough to leave the facilities in place after the purpose for which they were intended no longer exists.

Determination made by Wildlife Management and Planning and Community Services. Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

9. Residential development associated with industrial and resource extraction which is designed and maintained for employees to be shuttled into the work area for work periods then outside to their permanent residence is encouraged.
10. Water dependent and water related activities *and* uses for which there are no feasible inland alternatives will receive precedence in coastal areas over non-water dependent activities and uses. In consideration of any development or activity priority and protection to subsistence activities and culture is always given .

Policies 9-10 Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

11. Mining and mineral processing in the coastal area is required to be designed and conducted to minimize impacts on subsistence species habitat, land and water resources, and general environmental conditions.

Determination made by Wildlife Management and Planning and Community Services. Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

12. Consolidation of gravel extraction operations among multiple developments is encouraged.

Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

13. Mining during periods of the year when there would likely be substantial harm to the environment, such as the excessive silting of rivers and streams, is prohibited, unless approved mitigating measures are employed.
14. Mining on beaches or offshore is prohibited unless no feasible and prudent alternatives exist for extraction of the resource, and in those circumstances substantial alteration of shoreline dynamics is prohibited.

Policies 13-14 Determination made by Wildlife Management and Planning and Community Services. Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

15. The deposition of toxic materials and untreated solid waste disposal on land, the barrier islands, sea ice, artificial islands or at sea; in rivers or lakes which support subsistence species, and special habitat areas is prohibited.
16. Development when not on a sewer system is required to impound and process effluent to state and federal quality standards.

Policies 15-16 Determination made by Planning and Community Services (OSEA). Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

17. Manage biotic resources on a total ecosystem basis regardless of jurisdiction or land status.

18. Protect and enhance special habitat of-subsistence resources.

19. Promote the optimum sustainable yield of subsistence resources through sound planning, management, and regulatory programs.

20. Control land, water, air, and ice uses that negatively impact subsistence resources.

21. Conserve sensitive denning, calving,-feeding, molting, brooding, and other critical subsistence resources.

Policies 17-21 Determination made by Wildlife Management. Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

22. Subsistence use and resources are provided first consideration in evaluating land use development.

Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

23. Discourage commercial, sport, and non-local use of local subsistence resources.

Determination made by Wildlife Management and Planning and Community Services. Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

24. Require the prospective developer to quantify and or monitor expected impacts from on-going and potential development in sensitive subsistence resource areas.

Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

25. Increase the collection, use, and respect of local knowledge of subsistence resources and the environment by all resource users and managers.

Implemented by Wildlife Management and IHLC Division.

26. Exploratory drilling, seismic activities, and other high-impact operations are prohibited within the area of bowhead whale migration routes during the migration period unless approved by the affected village's whaling organization.

27. Development that does not meet the standards of the Alaska Coastal Management Program for management of Sensitive Areas such as estuaries, wetlands, tide flats, beaches, rivers, streams and lakes, permafrost landscape, and high energy ice impacted shorelines is prohibited.

28. Facility siting, drilling, or other high-impact activities are prohibited in lagoon passes on and between Barrier Islands and other areas intensively used by Beluga whales as feeding and resting areas unless no feasible and prudent alternative is available.
29. Resource extraction, industrial, and commercial development is required to be located, designed, and maintained in a manner that prevents significant adverse impacts upon subsistence resources and their habitat, including water circulation, drainage patterns, and coastal processes unless mitigating measures are identified and adopted by the developer and approved by the appropriate jurisdiction.
30. Offshore exploration, development, and production drilling outside the land fast ice area plan is required to be sited on the barrier islands or artificial islands. A variance from this policy to allow offshore platforms may be granted by the borough if the developer demonstrates and establishes the comparable safety of such a structure, and complies with all Federal and State Laws.
31. When linear structures such as roads, transportation corridors, and pipelines are located in areas used as corridors by migratory species of wildlife, a means of crossing shall be included for those migratory species. Pipelines shall be designed, using the best available information, to minimize disruptions of migratory patterns and other major movements of wildlife. Above ground pipelines shall be elevated a minimum of five (5) feet, except at those points where the pipeline intersects a road or to provide a caribou ramp.
32. Transportation development, including pipelines, which significantly obstructs wildlife migration is prohibited unless no feasible and prudent alternative is available and Federal and State approvals are secured.
33. Duplicative transportation corridors from mine sites to tide water or railroads are prohibited unless no feasible and prudent alternative is available.

Policies 26-33 Determination made by Wildlife Management and Planning and Community Services. Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

34. The North Slope Borough shall maintain local resource councils, comprised of knowledgeable subsistence users, to aid in data gathering and development decisions.

Implemented by Wildlife Management.

35. To implement the requirements of the 1996 Solid Waste Management Plan including siting new facilities upon approval of the NSB Planning Commission and the Village Comprehensive Plan Committees or City Councils.

Implemented by The NSB Planning Commission, OSEA, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process. (OSEA).

36. Each village shall incorporate into its Comprehensive Plan explicit policies that will prevent the contamination of drinking water including watershed protection.

Implemented by Planning and Community Services.

GOAL 4:

PROTECTION OF LIFE AND PROPERTY FROM INJURY CAUSED BY NATURAL HAZARDS AND PHENOMENA.

OBJECTIVE:

1. To minimize loss of life or property due to oil spills, pollution, natural hazards or phenomena.
 2. To minimize health and environmental risks from uncontrolled development.
-

POLICIES:

1. Development in flood plains, erosion endangered shorelines, and other geologic hazard areas is prohibited unless no feasible or prudent alternative is available.
2. Development in flood plains, shoreline areas, and offshore is required to be sited, designed, and constructed to minimize loss of life or property due to flooding, oceanic storms, sea waves, ice gouging and override, and shore erosion.

Policies 1-2 Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

3. Independent third party verification by a borough approved agent is required for a developer's environmental assessment, design, and engineering criteria for offshore development outside the land fast ice zone.

Implemented by Wildlife Management.

4. Development in permafrost areas must maintain or enhance the natural insulation quality of existing soil and vegetation.

Determination made by Wildlife Management and Planning and Community Services. Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

5. The borough shall coordinate with the state and federal government and private industry to develop information defining the location and extent of geophysical hazards and mitigation technology including proper siting, design construction, operation, and maintenance measures.

Implemented by Wildlife Management and Planning and Community Services.

6. Development in geophysical hazard areas shall be approved only on a site specific basis.

Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

7. The degree of borough and village evaluation and monitoring of offshore development shall increase as development moves from the safe land fast ice areas into less stable land fast ice areas and the shear zone.

Determination made by Wildlife Management and Planning and Community Services. Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

The street plan for each village should provide for adequate emergency access and building separation to slow the spread of fire.

Implemented by NSB Planning Commission, Barrow Zoning Commission, or village zoning commissions when created, (In the affected village) through the permitting process.

GOAL 5:

UTILIZE BOROUGH LANDS IN THE BEST INTEREST OF BOROUGH RESIDENTS

OBJECTIVE:

1. Obtain and manage the borough's full entitlement of lands under the state municipal entitlement program

POLICIES:

1. Select and obtain an adequate amount of state lands to help diversify the Borough economy, provide control over services for industrial and transportation purposes, generate revenue and fund the Borough land management program.
2. Emphasize land selections which meet village goals and priorities.
3. Maximize the long-term benefits of entitlement plans to Borough residents by emphasizing leasing, rather than selling, as a means of conveyance. When land is sold a substantial amount of the proceeds, as determined by the assembly policy, shall be deposit in the Borough permanent fund.
4. Actively assert and obtain lease royalty and other payments made on state lands selected by the Borough from the date of selection.
5. Prepare an asset management plan to guide the use, management and development of the Borough's real property assets.

OBJECTIVE:

2. Obtain lands to facilitate construction of Borough capital improvement projects and to support Borough operations and programs.

POLICIES:

1. Acquire lands in a timely manner to ensure cost-efficient construction.

2. Locate lands in accordance with village comprehensive plans.
3. Emphasize land acquisition which will minimize negative impacts on the environment and local historic and cultural resources.

PUBLIC FACILITIES/SERVICES and TRANSPORTATION

OVERVIEW

Public facilities/services and transportation include a broad array of items from public health to washeterias to public safety. Each of these activities includes both a facility and the actual service that is performed.

For each public facilities/service there needs to be established minimum "Levels Of Service" (LOS) for each type of public facility by village differentiated between that which is a borough, city, state, or federal responsibility. Once a LOS is established unmet needs, both current and forecasted, can be appraised. With this information, a program for improvements over a 5 or 10 year period can be devised.

The actual types of facilities and services covered are generally related to borough powers, which include:

- education
- sewage and sewage treatment facilities
- watercourse and flood control facilities
- health services and facilities
- telephone systems
- light, power, and heat
- water
- transportation systems
- streets and sidewalks
- airport and aviation facilities
- libraries
- garbage and solid waste collection and disposal services and facilities

While these facilities and services are within borough powers, meeting the designated LOS may be addressed through privatization as appropriate.

OVERALL GOAL

ENHANCE THE QUALITY OF LIFE IN THE NORTH SLOPE BOROUGH THROUGH THE PROVISION OF APPROPRIATE AND EFFICIENT PUBLIC SERVICES AND FACILITIES.

OBJECTIVES:

1. Establish and maintain a minimum "Level of Service" (LOS) in relation to public facilities and services for all North Slope Borough communities.
2. Maintain an objective, rational, and equitable selection process for capital improvement projects.
3. Ensure that public investments are utilized to their maximum and most efficient potential.

POLICIES:

1. Identify village defined norms for public services and facilities.

Implemented by NSB Department of Planning and Community Services in cooperation with the specific service providing department.

2. Schedule public improvements in order to reach identified norms and to meet future demands.

Implemented by NSB Planning Commission, The CIP Policy Review Committee, the NSB Administration and Assembly

3. Include village participation in the decision making for funding capital improvements.

Implemented by NSB Planning Commission and the Department of Planning and Community Services.

4. Prepare a Level of Service (LOS) analysis by village with a commensurate implementation program covering a 6 or more year period (with updates every two years or as appropriate) including project funding and scheduling for submittal to the NSB Planning Commission with prior approval from the village Comprehensive Plan Committee or City Council.

Implemented by each responsible NSB department in conjunction with the Department of Planning and Community Services.

5. Owners of structures adjacent to a utilidor or other public water and sewer service will be strongly encouraged to connect.

Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

6. The owners of those structures who are able to connect but do not will be charged for services up to market cost for the provision of water and wastewater removal.

Implemented by DMS or the utility provider.

7. The North Slope Borough will evaluate life cycle costs as a prerequisite to construction.

Implemented by Planning and Community Services and CIPM.

8. Every new project will be required to project future operating costs and to identify the proposed revenue source for funding the operating costs. Where most other factors are equal, lower operating cost projects will be given priority.

Implemented by Planning and Community Services, Administration and Finance, and CIPM.

9. All federally mandated requirements for public services and facilities will be evaluated for optional and minimum compliance standards to determine appropriate implementation levels.

Implemented by Planning and Community Services, and the department directly concerned.

OBJECTIVES & POLICIES BY SPECIFIC TOPICS

A. ENERGY

GOAL:

TO IMPROVE THE STANDARD OF LIVING ON THE NORTH SLOPE BY EFFECTIVELY MANAGING PRESENT AND FUTURE ENERGY PROGRAMS.

OBJECTIVE:

1. Increase efficiency, conservation, and economy in energy consumption

POLICIES:

1. Establish and implement energy conservation measures through efficiency standards and practices to be applied to future developments.

Implemented by Energy Management and CIPM (Through the PAR Process).

2. Reduce energy consumption by inspecting and retrofitting existing structures.

Implemented by Energy Management and Housing and Property Management.

3. Instruct residents in energy conservation techniques and use of alternative energy sources.

Implemented by Energy Management.

4. New capital projects should include an estimate of life cycle energy costs not only in straight line projections, but also on the basis of recommended energy conservation management practices.

Implemented by Energy Management, CIPM (PAR Process), and Planning and Community Services.

5. A review of alternative energy sources and measures should be compiled for each village.

Implemented by Energy Management.

OBJECTIVE:

2. Improve sources of energy supply to borough villages.
-

POLICIES:

1. Improve fuel distribution by upgrading, constructing, and maintaining modern and safe bulk fuel facilities and by increasing the efficiency of village fuel businesses.
-

Implemented by Energy Management.

OBJECTIVE:

3. Development and efficient use of local energy resources.
-

POLICIES:

1. Develop available local energy resources (such as coal and gas) to reduce village dependence on fuel oils when economically feasible.

Implemented by Energy Management.

2. Development which provides or materially contributes to lower cost fuel or distribution of power to adjacent villages is strongly encouraged.

Implemented by NSB Planning Commission in conjunction with Energy Management.

3. Development which utilizes locally obtained energy (such as locally produced coal and natural gas) or renewable sources of energy is encouraged.

Implemented by NSB Planning Commission in conjunction with Energy Management.

4. Federal and state agency assistance will be sought for borough energy planning and management efforts by pursuing a full range of grants and technical assistance.

Implemented by Department of Energy Management in conjunction with the Grants Division.

5. With state and federal support, programs should be expanded to include those for retrofitting existing structures, conducting energy audits, and implementing conservation and weatherization programs.

Implemented by Department of Energy Management in conjunction with Housing and CIPM, (Through the PAR Process).

6. Provide training and education in energy conservation on existing facilities and on the utilization of new energy resources and related technology.

Implemented by Energy Management, North Slope Borough School District, and Ilisagvik College.

7. The Assembly strongly supports staff efforts to obtain outside grants for the planning and implementation of alternate energy systems and increased energy conservation measures and practices.

Implemented by Energy Management and The Grants Division.

8. The borough strongly urges the NSB School Board and School District to develop courses to teach young people the techniques of energy conservation and alternate energy as developed and used by their ancestors.

Implemented by Energy Management, North Slope Borough School District, and Ilisagvik College.

9. The borough shall provide aid in the form of consultation services and information on financing alternatives to enable homeowners to make energy conservation improvements on their homes and apartments.

Implemented by Energy Management in coordination with Housing and CIPM.

10. The borough shall continue installing waste heat recovery systems, when possible and economically viable.

Implemented by Energy Management, Housing, and Municipal Services, Planning and Community Services.

11. Develop and implement a borough Energy Plan. This long range plan will include fuel use and energy conservation goals, alternative energy system priorities, possible funding sources, and a strategy for dealing with emergency energy shortages .

Implemented by Energy Management in consultation with the Department of Planning and Community Services and NSB Planning Commission.

12. Specific alternate energy projects should be undertaken as soon as possible to provide a realistic, practical demonstration and test of such alternatives.

Implemented by Energy Management.

13. Field reconnaissance studies should be initiated to identify and establish coal resources that could be used in other villages and begin planning for their use.

Implemented by Energy Management.

B. TRANSPORTATION

OBJECTIVES:

1. Provide North Slope Borough residents with safe and reliable transportation services (Also see Land Use and Natural Resources).
 2. Ensure that transportation facilities do not materially impact subsistence resources.
-

POLICIES:

1. Consolidation of Facilities: Unless no feasible and prudent alternative is available, transportation facilities for resource development and extraction are required to be consolidated to the maximum extent possible.
2. Joint Use: Development incorporating utilities and multimodal transportation facilities in a single corridor, or joint use of transportation facilities, is strongly encouraged.
3. Minimize Corridors: It is the policy of the North Slope Borough to minimize the number of transportation corridors through cooperative long-term planning efforts with private industry and other governmental entities.
4. State Regulations: The North Slope Borough acknowledges and encourages transportation development consistent with the Comprehensive Plan and the Coastal Management Plan.
5. Airports and helicopter pads are required to be sited at least 10,000 feet away from solid waste sites (Pursuant to FAA Regulations) designed, constructed, and operated in ways to minimize their impact upon significant wildfowl migration routes, breeding grounds, and nesting areas.
6. Public highway development, except for village roads, streets, and highways indicated in the Capital Improvements Program, is prohibited unless no feasible and prudent alternative is available.
7. A street plan, including provisions for adequate drainage and snow removal, shall be developed for each village.
8. A provision for system wide drainage consideration will be included when new roads are planned.

Policies 1-8 Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

9. When new roads are planned, the cost of extending water and sewer services shall be included as a component and funding requests will be made incorporating this cost. Development permits will not be issued unless planned and funded accordingly.

Implemented by Department of Planning and Community Services, DMS, CIPM (Through the PAR Process) Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

C. HUMAN RESOURCES AND EDUCATION

GOAL 1:

STUDENTS WILL HAVE THE OPPORTUNITY TO KNOW THE ENVIRONMENT AND WAY OF LIFE OF THE INUPIAT, INCLUDING LANGUAGE, HISTORY, CULTURE, TRADITIONS, AND SUBSISTENCE WAY OF LIFE.

OBJECTIVE:

Perpetuate and strengthen Inupiat culture, language, values, and traditions.

POLICIES:

1. Design activities and curriculum to improve understanding and knowledge of Inupiat history, language, culture, and traditions.
2. Seek ways to develop activities and curriculum to use Inupiat knowledge as the basis of further learning.

Policies 1-2 Implemented by Ilisagvik College and North Slope Borough School District.

GOAL 2:

STUDENTS WILL LEARN AND UNDERSTAND VOCATIONAL, ACADEMIC, AND TECHNICAL SKILLS WHICH EMPHASIZE CRITICAL THINKING SKILLS, PROBLEM SOLVING SKILLS, AND OTHER SKILLS AS IDENTIFIED BY THE NORTH SLOPE SCHOOL DISTRICT BOARD, THE NORTH SLOPE BOROUGH HIGHER EDUCATION BOARD, AND THE NORTH SLOPE BOROUGH APPRENTICESHIP COMMITTEE. STUDENTS WILL DEVELOP THE NECESSARY SKILLS TO FUNCTION WELL IN A CULTURE WHICH DRAWS UPON KNOWLEDGE AND SKILLS OF BOTH THE INUPIAT AND WESTERN CULTURES.

OBJECTIVE:

Provide relevant learning experiences to students in a school-to-work approach.

POLICIES:

1. Improve student access to a comprehensive curriculum and high quality instruction.

2. Ensure relevancy of curriculum through open communication between the educational entities, private industry, and the community.
3. Continuously review the effectiveness of instructional practices and research alternatives for improvements.
4. Use technology as a means of delivery for greater student accessibility, a method for more effective instruction, and as the tools reflective of the workplace needs.

Policies 1-4 Implemented by Ilisagvik College and North Slope Borough School District.

GOAL 3:

STUDENTS WILL DEVELOP A POSITIVE ATTITUDE TOWARD LEARNING, SCHOOL, AND SELF.

OBJECTIVE:

The educational entities will provide academic environments conducive to student learning.

POLICY:

1. Seek input from students, staff, and the community on ways to strengthen the learning environment through curriculum development, instructional practices, and/or services.

Implemented by Ilisagvik College and North Slope Borough School District.

GOAL 4:

STUDENTS WILL LEARN THE VALUE OF BECOMING ABIDING CITIZENS, THEREFORE CREATING A MORE HARMONIOUS COMMUNITY, AND WILL ULTIMATELY BECOME CONTRIBUTING MEMBERS OF THEIR COMMUNITY.

OBJECTIVE:

Provide lifelong learning experiences.

POLICY:

1. Design curriculum and activities to address the individual's role in society.
2. Ensure that instructional content and practices align with community and industry needs.

Policies 1-2 Implemented by Ilisagvik College and North Slope Borough School District.

GOAL 5:

THE BOROUGH SHALL BE INTEGRATED THROUGH AN INFORMATION NETWORK DESIGNED TO ALLOW FOR INFORMATION DISSEMINATION AND THE ENHANCEMENT OF LEARNING.

OBJECTIVE:

Create and maintain a borough electronic information network accessible to government, educational facilities, and for public interest.

POLICY:

1. Maximize use of the borough's information system developed for the NSB, NSBSD, and Ilisagvik College when appropriate.
2. Develop borough-wide systems for data base storage designed to increase the efficient use of, and access to, government data.
3. Utilize the borough-wide information system to support village training requirements as appropriate.

ALL of the policies above implemented by Department of Administration and Finance, Network Support Services, NSB School District, and Ilisagvik College.

D. PUBLIC SAFETY SERVICES

GOAL:

PROTECT THE LIFE, SAFETY, AND PROPERTY OF BOROUGH RESIDENTS AND VISITORS.

OBJECTIVE:

Provide well equipped and trained firefighters, police officers, and search and rescue providers in each village with a central dispatch system capable of responding to all emergencies.

POLICY:

1. Maintain equipment and facilities in good operating condition.
2. Provide regular, on-going training so that service providers are ready and capable of handling fires, disturbances, rescue operations, and related medical emergencies.
3. Upgrade equipment and facilities; increase personnel training as the population and complexity of structures and population increase in each village.
4. Maintain and expand the residential sprinkler program as an effective and cost efficient means of protecting structures from fires.
5. Provide public safety services within the borough through a central dispatch centrally operated on a 24 hour basis.
6. Provide community education and training programs aimed increasing public safety.
7. Provide search and rescue and air ambulance service and basic medical evacuation (Medivac) services through-out the borough with at least one (1) fixed-wing and one (1) rotor-wing aircraft.

8. Maintain close working relationships among Search and Rescue, the Fire Departments, and Police Department to improve emergency response.

All policies above implemented by NSB Police Department, Fire Department, and Search and Rescue as appropriate.

E. HEALTH

OBJECTIVE:

Provide health services and support which:

- Assist the residents of the North Slope Borough in preventing illness
 - Maintain personal health
 - Restore health
-

POLICY:

1. Plan for the provision of services and facilities which provide for:
 - A holistic approach to treating and supporting a person, a family and the community in dealing with health issues.
 - The inter-relatedness of the various programs of the Department of Health
 - That this intra-relatedness be established in the day-to-day operational systems and in facility design

Implemented by Health Department.

1. Maximize operating effectiveness of health care delivery systems while minimizing operating cost and provide a flexible program to respond to unusual situations and advances in technology.

Implemented by Health Department.

ECONOMIC DEVELOPMENT

OVERVIEW

The Economic Development element is intended to identify where the public sector can positively influence private sector economic growth and individual subsistence. True economic growth comes as a result of private sector expansion as goods and services are sold to borough residents (non-basic sales) and when goods and services are sold to those outside the borough (basic sales). In addition, "government transfers" in the form of grants, taxes, and other financial contributions coming from outside the borough are "basic" in their impact on the economy.

The ultimate aim of economic development is the creation of meaningful employment opportunities, creation of higher incomes, stability, and generally improving the life styles of borough residents.

THE NON-BASIC FACTORS

Non-basic activities help stimulate the local economy by keeping money in circulation. As we purchase goods and services from outside the area, money "leaks" from the economy. Most purchases made, even from local stores, will contain a leakage as the item purchased was likely manufactured elsewhere and so money went out of the local economy. Even locally made handicrafts may have a foreign component from beads or thread to tanning supplies. But the fact is, that since few finished products are made locally, most expenditures contain a large leakage component.

When money stays in the economy, it continues to circulate and has a "multiplier effect" creating more income and jobs. Therefore, developing these non-basic activities is a typical objective of an economic plan. The emphasis for buying local products and patronizing local stores results in greater local employment and income. Such growth comes as a result of expanding the local retail sector and both small and large businesses of all kinds.

PRIVATIZATION

A way for local non-basic activities to enhance economic benefits is through providing goods and services more efficiently than those coming from outside the borough. This move toward efficiency is also one of the driving forces behind privatizing what is now done by the government. When current

governmental functions can be done better and at a lower cost by the private sector, then transfer of the function should be encouraged. Such an approach is used in many jurisdictions around the world and is increasing in popularity. First, it cost services at their economic price and lessens "distortions". Smaller governmental outlays mean that funds will be freed up for other essential tasks.

THE BASIC FACTORS

To obtain the money to circulate within our economy we need to export some good or service or receive government transfers. In the North Slope Borough the greatest source of money is from revenues received, indirectly, from the oil being exported from Prudhoe Bay. The borough levies taxes on facilities used in the production of the oil. It is estimated that direct and indirect employment as a result of this revenue source accounts for 90% or more of all those employed on the North Slope including both government and private sector workers. Tourism also brings in some money from outside the borough, but the level of such spending is very small compared to oil related money.

Healthy local economies have more than one major source of money flowing into the economy. When there is only one or two sources, the economy is considered "unstable". A major oil industry downturn would result in devastating economic consequences for those living on the North Slope. Currently there are no other business activities equivalent in size to pick up the slack should a downturn occur. This situation is by definition unstable.

In unstable economies standard economic strategy is to broaden the economic base of the economy, expand on what it is that is exported (including tourism), and look at other economic opportunities.

SUBSISTENCE RESOURCES

Traditional economic development plans do not generally look with great interest at the non-cash (such as subsistence) side of the economy. But, on the North Slope subsistence activities are not only an important cultural activity, they are also translate into an economic resource for many. Maintaining and protecting subsistence resources must be a principal part of the economic development plan.

BOROUGH SPENDING

Across the borough the principal source of transfers to the villages are passed on as borough government expenditures/ transfers. As such, these expenditures are critical in determining the relative economic health of all villages. Even subsistence activities depend upon the cash economy in order to purchase items like gasoline for snow machines. Where the money is spent and how it is spent must be examined in relation to maximizing the economic benefits that can be achieved through greater employment and income, and in an equitable fashion among villages.

SUMMARY

An economic development plan from the public sector perspective is intended to support the private sector by assisting in activities which increase employment opportunities, raise incomes, provide a stable economy, and generally increase the standard of living.

These aims are met through creating a more efficient economy, expanding exports, protecting key subsistence resources, and monitoring the nature of public expenditures.

GOAL 1:

FULL EMPLOYMENT OF ALL BOROUGH RESIDENTS.

OBJECTIVES:

1. To reduce actual unemployment in the borough to as low a rate as possible.
2. Employment opportunities should be consistent with flexible working arrangements and leave policies to provide time for seasonal subsistence activities.
3. To provide the North Slope community with options for living including the practice of traditional subsistence pursuits, part or full time employment, or combinations thereof.
4. To develop skill center training for young adults within the borough oriented toward existing and developing employment opportunities .
5. Increase local purchases of goods and services as opposed to off-slope transactions.

POLICES:

1. Development which employs borough residents in construction and development activities or its work force is encouraged.

Implementation NSB Assembly, maintain a policy of local bidders preference for local contractors using local hires on borough funded projects.

2. Encourage development activities which will utilize local suppliers or subcontractors within the borough.

Implementation NSB Assembly, require a local resources plan for bidders on borough sponsored projects seeking bidder's preference.

3. Development which incorporates job training programs for borough residents that leads to professional and leadership roles is encouraged.

Implementation NSB Assembly, require contractor's to provided for the employment of apprentices in borough sponsored projects.

4. Require resource exploration and development proposals to provide the borough with a detailed work plan identifying operating levels, local support employment requirements, and time schedules for field operations at the time of permit application.

Implemented by Planning and Community Services.

5. Resource development which uses suppliers or subcontractors from outside the borough for work which can be accomplished competitively by local private businesses or regional or village corporations is prohibited unless no feasible and prudent alternative is available.

Implementation responsibility not designated as means to encourage such activity in the private sector not clear.

GOAL 2:

CREATE A STABLE AND DIVERSIFIED ECONOMIC BASE.

OBJECTIVES:

1. To improve employment opportunities for borough residents in the resource extraction industry.
 2. To improve employment opportunities for borough residents in local private enterprises and village and regional corporations.
 3. To develop a stable economy not subject to major fluctuations in employment.
 4. To provide market information and access to financial resources to assist borough entrepreneurs.
-

POLICIES:

1. Development utilizing borough funds is mandated to maximize employment of borough residents in construction and development activities.

Implemented by CIPM.

2. To provide skill center training for residents of the borough oriented toward all reasonable and potential employment pursuits including resource development, telecommunications and computers, and other employment opportunities offered within the borough.

Implemented by NSB School District and Iisagvik College.

3. To encourage close working relationships between industry and government for mutually beneficial resource development employment opportunities for borough residents.

Implementation responsibility not designated as means to encourage such activity in the private sector not clear.

4. To design special policies, streamline permitting procedures, consolidate permits, and provide financial incentives for resource development which is cooperatively planned with the borough.

Implemented by Planning and Community Services

5. To develop and implement an aggressive borough-wide five year strategic plan that addresses economic development while protecting the Inupiat culture. The plan to be updated annually.

Implemented by Planning and Community Services.

GOAL 3:

MAINTENANCE AND ENHANCEMENT OF SUBSISTENCE RESOURCES INCLUDING THEIR ACCESSIBILITY BY NORTH SLOPE RESIDENTS. (Also see Land Use and Natural Resources)

OBJECTIVES:

1. To maintain access to and use of subsistence resources by residents.

2. To provide for subsistence use and access in development plans.
3. To afford subsistence use as a priority over commercial, sport, or recreational use.

POLICIES:

1. Identify areas of particular importance to the subsistence economy, such as those of high yield of one or several resources over short or long periods of time.

Implemented by Wildlife Management.

2. Research important subsistence resource species abundance, distribution, and habitat in order to establish management guidelines for optimum resource yield.

Implemented by Wildlife Management.

3. Development which precludes subsistence user access to a subsistence resource is prohibited.

Implemented by Wildlife Management and Planning and Community Services.

4. Use borough regulatory powers to enter into joint management agreements and to generally promote the protection of fish and wildlife habitat regardless of jurisdiction.

Implemented by Wildlife Management and Planning and Community Services.

5. Intensify management, enforcement, and habitat improvement programs during periods of habitat disruption and fish and wildlife harvesting.

Implemented by Wildlife Management.

6. Promote withdrawal of Special Habitat Areas from all resource extraction and non-essential entry and appropriation.

Implemented by Wildlife Management and Planning and Community Services.

7. Effectively monitor development activities throughout the borough to ensure minimum negative impact on subsistence resources.

Implemented by Wildlife Management and Planning and Community Services.

8. Promote the protection of subsistence resources and habitat regardless of jurisdiction.

Implemented by Wildlife Management.

9. The borough should encourage relevant federal agencies to fund monitoring activities within federal lands.

Implemented by Wildlife Management.

10. Development associated with purely recreational uses of land and wildlife habitat, such as commercial hunting and fishing camps or lodges, and recreational second home subdivisions will generally not be allowed. When these uses are allowed, strict standards and guidelines will apply.

Implemented by Wildlife Management and Planning and Community Services.

GOAL 4:

DEVELOP INDUSTRIES BASED ON THE INUPIAT CULTURE AND LOCAL RESOURCES.

OBJECTIVES:

1. To develop and market new industries using natural products and to improve selling conditions for these new industries by providing better outlets for Native manufactured items.
 2. To encourage and strengthen the manufacturing and marketing of Native crafts targeting the tourist industry.
 3. To promote the Inupiat culture and Inupiat way of life through legitimate commercial outlets for arts and skills.
 4. To protect the Inupiat culture and Inupiat way of life from competing on potentially harmful economic development.
-

POLICIES:

1. It is the policy of the North Slope Borough to promote and provide local skill center training for borough residents.

Implementation responsibility not designated.

2. Development which relates to or encourages Inupiat arts and crafts is encouraged.

Implementation responsibility not designated.

GOAL 5:

INCREASED ECONOMIC OPPORTUNITIES IN VILLAGES.

OBJECTIVES:

1. To emphasize basic community development as a necessary first step in the economic development of the borough as well as the regional and village corporations.
2. To ensure maximum opportunity for the residents of the borough villages to achieve their economic goals in their own communities.

3. To provide residents with greater business opportunities both through village and regional corporation enterprises.
 4. To support village self determination through economic development among village corporations, village consortium companies, and the North Slope Borough.
-

POLICIES:

1. Development which provides local employment in the villages is strongly encouraged.

Implementation responsibility not designated as means to act not clear.

2. Resource development which utilizes local private business or village or regional corporations in its operation is strongly encouraged.

Implementation responsibility not designated as means to act not clear.

3. It is the policy of the North Slope Borough to hire residents on borough projects within a village or Village Area of Influence.

Implemented by CIPM.

4. No permanent industrial residential settlement or new town should be located in the borough.

Implemented by Planning and Community Services.

5. Industrial and commercial development is required to be served by solid waste disposal facilities which meet state and federal regulations.

Implemented by Planning and Community Services.

GOAL 6:

BOROUGH GOVERNMENT ACTIONS SHOULD LEAD TO THE ENHANCEMENT OF THE ECONOMY.

OBJECTIVES:

1. A synergistic relationship between public and private interests should be fostered.
 2. Utilize capital improvement expenditures and other public outlays as a means of sustaining village economies.
 3. To protect and enhance the borough tax base.
 4. To develop a stable economy which produces predictable, stable, and sufficient tax revenues to meet borough service and facilities needs as identified in the Capital Improvements Program.
 5. To undertake capital improvement projects on a coordinated basis to promote efficiency, reduce disruption, and best utilize the local labor force.
-

POLICIES:

1. To maximize local linkages among federal, state, local and private economic interests so as to, as much as possible, keep moneys earned and generated in the borough within the local economy.

Implementation responsibility not designated as means to act not clear

2. To balance positive and negative impacts of all development and preservation programs, as perceived by the local population, while considering state and national concerns and interests.

Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

3. Master plan resource development areas through cooperation and coordination with industry.

Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

4. To require the consolidation of service based facilities for industry within resource development areas.

Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

5. To encourage new industrial or commercial development that provides local employment and revenues consistent with subsistence and Inupiat culture.

Implementation Arctic Development Council

6. To minimize the developer's costs of regulation through process efficiency and communication with industry as part of the planning process.

Implemented by The NSB Planning Commission, Barrow Zoning Commission, or village zoning commission when created, (In the affected village) through the permitting process.

7. That each Community in the borough be well informed regarding the specific capital improvement projects, the expenditures for these projects, and the local labor force needed during construction.

Implemented by Planning and Community Services and contractors securing bidder's preference for borough sponsored projects.

8. That uniform specifications in regard to basic materials, hardware, and equipment be considered to reduce warehousing and maintenance costs.

Implemented by CIPM and respective participating NSB department.

9. Capital Improvement Project contracts will be written which maximize local hire.

Implemented by NSB Assembly Policy and CIPM.

10. A working group will be formed with members consisting of CIPM, Planning and Community Services, Mayor's Office, village representative, to establish CIP project scheduling in an attempt to spread the timing of projects out.

Implemented by CIPM and Planning and Community Services.

11. Public services shall be privatized when it is economically feasible, more efficient, and provides equal or better service to the community.

Implementation Department providing the service under consideration.

12. Develop an ongoing process for privatizing suitable borough programs, thereby stimulating economic development in the private sector, and down-sizing government by moving service responsibilities from the public to the private sector.

Implementation responsibility not designated.

13. Maximize use of the borough's information system and borough-wide network to support economic development when it is appropriate to do so.

Implemented by Administration and Finance and Network Support Services.

14. Develop and manage programs which channel previous public sector maintenance and construction activities to the private sector.

Implemented by Housing and Property Management, DMS, and affected departments.

SHELTER¹

OVERVIEW

Shelter is a generic term for housing. There are several issues to be identified regarding a role the borough should play in relation to housing. These issues include the various aspects which define the dimensions of housing and then what action the borough should undertake in regard to them.

Items which define the housing situation include:

- affordability or cost
- quality
- size related to crowding
- quantity or availability
- type



Each of these factors should be defined based upon local norms. What, for instance, is affordable housing on the North Slope? In the lower 48 the general rule is that if your gross housing expenses are 30% or less for renters and 40% or less for owners relative to household income, then it is affordable. Higher percentage ratios are not affordable. This standard may or not be applicable to the North Slope.

Similar standards are applied to issues regarding quality of structure and when a house is considered crowded.

So, in the event that housing is not affordable, or is below quality standards, or is too crowded, what should the borough do about it, if anything at all?

Most jurisdictions address housing issues utilizing a range of direct government action and indirect intervention through incentives for private sector investments that result in corrective measures. Direct government actions typically mobilize the resources of federal and state programs and complement these with local funds. This can range from building and operating low cost housing to providing rent or mortgage payment assistance. Private sector incentives include tax benefits, ample

¹ This Chapter was previously titled "Housing". The name was changed to distinguish this topic from the Department of Housing and Property Management. As a general rule, the Comprehensive Plan does not speak directly to specific borough departments.

properly zoned land, relaxing of some development regulations, developing market research for investors, providing easier access to financing, and other assistance and information programs.

Ultimately, the appropriate response will depend upon the extent of the problem and how the community wishes to prioritize use of capital and operating revenues.

GOAL:

SUPPORT AFFORDABLE, UNCROWDED, DECENT, SAFE, AND SANITARY HOUSING FOR ALL RESIDENTS OF THE COMMUNITIES OF THE NORTH SLOPE BOROUGH.

OBJECTIVE 1:

Provide opportunities to meet permanent and temporary housing needs.

POLICIES:

1. Develop, implement, and operate programs designed to assist low and moderate income families to own their own homes.

Implemented by Housing and Property Management and TNHA.

2. Develop, implement, and operate an alternative program option for rental housing.

Implemented by Housing and Property Management.

3. Develop and provide technical assistance to maximize existing funding resources available around the state for home construction and improvement.

Implemented by Housing and Property Management.

4. Develop and implement a NSB Low Rent program.

Implemented by Housing and Property Management.

5. Develop and implement a Fair Market Rent Schedule for borough operated housing to encourage residents of moderate and high income currently residing in borough rental housing to build their own homes.

Implemented by Housing and Property Management.

6. Encourage home ownership through divesting of borough owned housing units to individuals.

Implemented by Housing and Property Management.

7. Obtain funding to increase residential housing stock in all communities.

Implemented by Housing and Property Management, TNHA, and local Tribes.

8. Develop and maintain data on current and forecasted housing demand and local norms for affordability, quality, and crowding.

Implemented by Planning and Community Services and Housing and Property Management.

OBJECTIVE 2:

Maximize opportunities for development of quality affordable homes by the private sector for purchase or lease by private individuals.

POLICIES:

1. Provide adequate land areas zoned or otherwise designated for housing development.

Implemented by Planning and Community Services.

2. Review and modify development and permitting requirements to ensure that they do not unreasonably increase housing costs.

Implemented by Planning and Community Services and Housing and Property Management.

3. Ensure that home construction conforms with all applicable quality and safety standards.

Implementing body not identified.

4. Operate programs which support small businesses and private contractors who are engaged in activities resulting in the provision of housing.

Implemented by, Unidentified

HAUL ROAD CORRIDOR

VIEW

The Haul Road (also known as the Dalton Highway) is open to the general public. Although the borough had opposed the opening of the road, we are now obliged to plan for public use of the road in a responsible fashion. Directing responsible node development through land use zoning and other regulations will protect the borough's interests.

It is in the interest of the North Slope Borough to develop a specific management plan that will ensure low environmental impact development and to allow North Slope residents the greatest opportunities to benefit economically.

The previous planning document was titled North Slope Borough Comprehensive Policy Plan Haul Road Area, and was incorporated into the 1983 North Slope Borough Comprehensive Plan by reference. This document serves as the main source for the policies presented in this draft.

GOAL 1:

MAXIMIZE THE BENEFITS FROM THE OPENING OF THE DALTON HIGHWAY FOR NORTH SLOPE RESIDENTS WHILE MINIMIZING THE ENVIRONMENTAL AND SOCIAL IMPACTS.

OBJECTIVE 1:

Restrict growth along the road to specific development nodes and ensure adequate public safety, wildlife management, and subsistence resource protection commensurate with development throughout the corridor.

POLICIES:

1. Make land available through borough permits both temporary and long-term borough, state, and federal leases for use by governmental units and commercial operators. Commercial nodes to be located in places such as Chandalar and one at mid-point such as Happy Valley or Franklin Bluffs. Deadhorse should be used to serve the northern end of the Haul Road beyond the service range of the mid-point node.

Implemented by Planning and Community Services.

2. Permit the clustering of research facilities in a central facility in the already disturbed area at Toolik Lake.

Implemented by Planning and Community Services.

3. In the event of gas line construction, use of existing pump stations and pad will be required and a cluster based development program will be followed.

Implemented by Planning and Community Services.

4. Emphasize use of existing airports and airstrips at Prudhoe Bay, and to a much less extent Chandalar, for air support necessary for industrial use of the Haul Road. Any expansion or reactivation of airstrips in other areas, including Galbraith Lake and Happy Valley, must be done on the basis of plans and permits reviewed and approved by the borough and villages such as Anaktuvuk Pass.

Implemented by Planning and Community Services.

5. Coordinate the provision of tour bus stops and facilities with Policy 1. Encourage the tour bus operators to make their buses as self-contained as possible, including toilet facilities, emergency medical equipment and adequate emergency parts and tools, as well as communications equipment, to reduce the need for special roadside facilities and services.

Implementing Planning and Community Services.

6. Make land available for commercial development related to road use within the North Slope Borough, with controlled commercial development at identified developed nodes to serve the safe travel needs of truckers, tour bus riders, and independent travelers. The basic nodes are Chandalar, Deadhorse, and one mid-point node such as Happy Valley. Commercial development within the Haul Road Corridor should involve ASRC and/or village corporations or other North Slope resident businesses or persons.

Implemented by Planning and Community Services.

7. Make all future development decisions regarding Chandalar Camp and all NSB recognized development nodes on the basis of a detailed site plan developed and approved by the North Slope Borough Planning Commission, the state, and BLM as appropriate. This plan should cover access points to the Haul Road, internal circulation, lot or lease area size, grade street width, visual features, and other relevant physical and environmental factors.

Implemented by Planning and Community Services.

8. Reserve a single transportation corridor from the Haul Road to lands with significant oil, gas, or mineral potential, including lands held by the Arctic Slope Regional Corporation. Consider a winter use only policy on this connecting corridor road. Ensure borough review and approval of final rights-of-way and access routes from the Haul Road. All existing 2477 rights-of-way which connect with the Haul Road Corridor should be jointly reviewed by BLM, the state, and the borough. Those rights-of-way not clearly necessary for industrial use, including the Hickel Highway, should be terminated.

Implemented by Planning and Community Services.

9. Prepare follow-up off-road vehicle and communication plans for the corridor in close coordination with borough departments such as Wildlife Management, and the Police/Public Safety Department and with villages such as Anaktuvuk Pass. Provide for final borough Planning Commission review and approval of these and other activity plans for the corridor.

Implemented by Planning and Community Services.

10. Require a minimum level of public services (provided by private or state agencies) necessary to support increased development at nodes and the resultant growth in road traffic and other activities along the corridor, before additional commercial development is allowed. Services required include public sanitation including RV dump stations, litter and other solid waste disposal, public safety, emergency medical response capability, and wildlife management.

Implemented by Planning and Community Services and Wildlife Management.

OBJECTIVE 2:

Provide a rational framework for mineral extraction.

POLICIES:

1. Use of the Haul Road to support hard mineral exploration and extraction which should generally be considered as serious industrial uses. The existing inner corridor should be maintained as is and kept closed to exploration. Native allotments should be fully protected against unauthorized access and development.

Implementing Planning and Community Services.

2. The state DOT, in cooperation with BLM, should closely monitor the number of people and vehicles using the road for mineral exploration. Periodic reports should be made to the borough Wildlife Management and the Police/Public Safety Departments on these type of users, at least on a semi-annual basis. The borough should advocate stronger federal and state controls on prospectors who use the road if monitoring shows serious and frequent abuses, or if periodic reports to the borough are not provided.

Implementing body not indicated.

3. Gravel use for maintenance of the Haul Road, operation and maintenance of TAPS, and construction of the Alaska natural gas pipeline has first priority. Essential governmental and commercial uses should also be allowed gravel use but only if it is impossible to use existing pads and developed areas. The gravel should be mined first from existing pits, set back at least 300 feet from river and stream channels; second from known but unopened pits; and last, the lowest priority from newly located and developed pits. In addition, gravel sites must not negatively impact fish overwintering areas.

Implementing Planning and Community Services.

4. BLM and the State of Alaska DNR should complete an inventory of sand and gravel potential for the portion of the Haul Road Corridor within the borough as soon as possible and use this information to further develop appropriate policies and priorities in cooperation with the borough and the state.

Implementing body not indicated.

OBJECTIVE 3:

Ensure watershed protection.

POLICIES:

1. BLM, in coordination with the state and local governments, should take the overall responsibility for designing and implementing, as soon as possible, a water quality monitoring program and water quantity program to provide baseline data for resource management decisions. Monitoring stations in the North Slope Borough should be located in accordance with borough plans and staffed as much as possible with local residents.

Implemented by Wildlife Management and Planning and Community Services.

2. Monitor water quality at or near surface disturbance sites before, during, and after disturbing activities. Such monitoring shall be immediately followed by appropriate action. Federal and state officials, along with oil and gas companies, should bear the expense and major responsibility for such restoration and monitoring, but should also involve local people and share the results of such monitoring on a periodic basis with the North Slope Borough and other local governments.

Implemented by Wildlife Management and OSEA.

3. BLM, in coordination with the Soil Conservation Service and the state and local governments, should establish and maintain snow course areas for gathering data on annual runoff and usability of snow.

Implemented by Wildlife Management and Planning and Community Services.

4. Protect stream banks and lake shores by providing a minimum 300-foot buffer strip of undisturbed vegetation to mitigate adverse impacts.

Implemented by Planning and Community Services.

5. Designate all public lands within the Haul Road Corridor as restricted to use by Off Road Vehicles (ORV's) until an ORV plan is developed by BLM and reviewed and approved by the state and adjacent local governments. The interim limits on ORV use are:
 - A BLM permit would be required for use of ORV's, during summer, freeze-up, and breakup. ORV's with wheels and/or tread which will damage the tundra should be prohibited.
 - A BLM permit would be required for all ORV's except snow machines weighing less than 800 pounds during winter. Snow machines used for traditional subsistence activity by North Slope Borough residents of the traditional villages would be exempt from such regulations.

Implemented by Planning and Community Services.

6. Restrict development of land within standard project flood limits unless major overriding environmental benefits from such development can be demonstrated, such as infill of essential

development at or adjacent to a pump station, thus preventing sprawl and new development on a new gravel pad.

Implemented by Planning and Community Services.

OBJECTIVE 4:

Protect wildlife and subsistence resources.

POLICIES:

1. BLM and the U.S. Fish and Wildlife Service should work cooperatively with the state, the North Slope Borough, and other local governments to develop a management plan for wildlife and their habitat in the Haul Road area. Caribou should be a priority concern.

Implemented by Wildlife Management.

2. The US Fish and Wildlife Service and the State of Alaska, in cooperation with the North Slope Borough and other local governments, should protect wildlife and their habitat from aircraft, vehicle, and ORV harassment by enforcement of existing laws, a public relations program, and permit stipulations.

Implemented by Wildlife Management and Planning and Community Services.

3. Withdraw from all mineral and non-essential entry and appropriation the eleven identified Dall sheep lambing areas, including Atigun Canyon and thirteen mineral licks.

Implementing body not identified.

4. Consider the following areas for designation as Areas of Critical Environmental Concern and make every attempt to manage them as such during the formal designation process.
 - The Galbraith Lake- Toolik Lake- Atigun Canyon area
 - The area in the North Slope Borough along the Sagavanirktok River, especially in the Sagwon Bluffs, Happy Valley, and Franklin Bluffs area
 - The Joe Creek-Chandalar Shelf area

Implemented by Wildlife Management and Planning and Community Services.

5. Consider caribou and other wildlife south of the borough toward Dietrich, Wiseman, and beyond as part of wildlife plans for the borough where relevant.

Implemented by Wildlife Management and Planning and Community Services.

6. Protect from all further development all raptor nesting areas, specific nest sites including Sagwon, and other identified peregrine falcon habitat areas.

Implemented by Wildlife Management and Planning and Community Services.

OBJECTIVE 5:

Protect fish and other aquatic resources.

POLICIES:

1. Maintain a three-foot minimum water depth (or other minimum as required) in streams or lakes where water is withdrawn for use during winter, and develop and enforce stipulations in permits for actions which might adversely affect fish habitat on a site by site basis. Also, minimize snow removal from the sites of winter rate withdrawals and temporary airstrips.

Implemented by Wildlife Management and Planning and Community Services.

2. Restrict man-made in-stream disturbances such as culverts and gravel removal in areas used for fish spawning or migration. BLM shall provide NSB Planning with a list of active and inactive gravel sites as soon as possible.

Implemented by Wildlife Management and Planning and Community Services.

3. Prohibit any development of parking areas and facilities at streams and lakes in the borough portion of the Haul Road corridor which have sport fishing potential, including Galbraith Lake and Toolik Lake. Sport fishing should be restricted within the NSB boundary when in competition with subsistence fishing as determined by state or borough studies.

Implemented by Wildlife Management and Planning and Community Services.

OBJECTIVE 6:

Protection of historic and cultural resources.

POLICIES:

1. BLM and other federal and state agencies should continue protection of all sites, structures, locations, and traditional trails listed in BLM and other inventories, including the traditional land use sites and archeological sites identified by the North Slope Borough in order to protect their historical and cultural values. Federal and state agencies should provide immediate assistance to the borough with National Register nominations.

Implemented by Planning and Community Services.

2. Leave archeological sites within the Utility Corridor unexcavated, unless local people and qualified archeologists jointly agree that such excavation would provide especially useful and unique information and aid in achieving major local goals with regard to cultural and historic protection.

Implemented by Planning and Community Services.

3. BLM, working jointly with other state, federal, and local interests including the North Slope Borough should develop a cultural resource management plan for the Mosquito Lake, Gallagher Flint Station, and other sites of high historic and cultural value which lie close to the Haul Road and which are especially susceptible to destruction and vandalism.

Implemented by Planning and Community Services.

4. BLM should program adequate funds immediately to conduct a Class I and Class II inventory of those areas in the Utility Corridor that were not inventoried by Alyeska archeologists and which are not scheduled to be inventoried by Northwest Gas archeologists.

Implemented by Planning and Community Services.

5. Adequate federal and state funding should be obtained to use contract services, if necessary, to complete the inventories noted in 4 above, and to prepare the nomination forms for National Register nominations.

Implemented by Grants Division.

6. As soon as possible, the National Park Service should complete a study of the Haul Road Corridor, especially the segment within the North Slope Borough, for possible designation as a cultural park, with management responsibilities shared with the North Slope Borough.

Implemented by Planning and Community Services.

OBJECTIVE 7:

Protection of visual resources.

POLICIES:

1. Manage those lands which can be seen from the Haul Road in the general vicinity of Cathedral Mountain north through the Toolik Lake area as a scenic corridor so that this highly scenic area, with high subsistence and cultural importance, will be protected under federal mandate. Any changes in the landform, water, or vegetation, except essential gravel removal on land, should not create evident visual change.

Implemented by Planning and Community Services.

2. Plan and manage all new activities in the Haul Road Corridor from south of Pump Station #3 to north of Franklin Bluffs so that such activities will not dominate the view or appear as unnatural objects. Manage both federal and state lands in the area in conformance with the BLM Visual Resource Management Class III designation.

Implemented by Planning and Community Services.

3. Rehabilitate visual disturbances in all appropriate areas of the Haul Road Corridor within the borough as soon as possible. BLM and the State of Alaska shall bear the responsibility of funding such rehabilitation, either through action against those who created the visual disturbances or through their own revenues.

Implementing body not indicated.

4. Prior to construction of the proposed gas line, an analysis of the visual impacts shall be made by state and federal agencies in cooperation with the borough and other local governments

Implemented by Planning and Community Services.

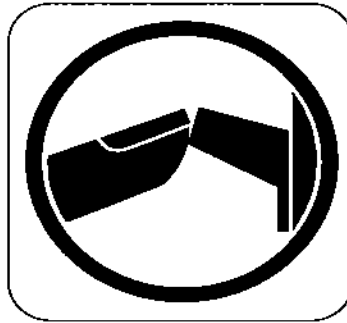
5. Analyze oil spill contingency plans to assure that clean up activities will not degrade visual resources.

Implemented by Planning and Community Services.

IMPLEMENTATION

OVERVIEW

Implementation is a key element in any plan and one that is often lacking. In the implementation section are the mechanisms, or proposed mechanisms, that should be in place in order for the plan to be acted upon. These mechanisms can be in the form of ordinances with rules and regulations; they can be administrative or procedural changes; or identifying where cooperative undertakings are required. Funding where financial support is necessary for policies to be acted upon need also be addressed.



As a matter of principle, a plan element should not be proposed without the corresponding mechanism, intent, and ability to implement that plan element.

GOAL 1:

INSTITUTE ENFORCEMENT AND ADMINISTRATIVE MECHANISMS THAT LEAD TO PLAN REALIZATION.

OBJECTIVES:

1. To ensure maximum control by North Slope residents over their own destiny.
 2. To encourage close working relationships between development entities and borough and village governments for mutually beneficial development site location and protection of subsistence and cultural resources.
 3. To maximize village participation in the planning and permitting review processes.
 4. To provide the rationale for funding CIP and borough departmental budgets.
-

POLICIES:

1. The borough Planning Commission shall with the assistance of the Department of Planning and Community Services update the borough and Village Comprehensive Plans every two years.

Implemented by Planning and Community Services.

2. Where appropriate specific ordinances with regulatory and enforcement measures including adequate funding will be provided to ensure implementation.

Implemented by respective department with policy implementation responsibility as a component of their Strategic Plan.

3. For those actions outside of borough responsibility and control, cooperative intergovernmental agreements and public-private partnerships will be pursued in order to meet plan goals and objectives.

Implemented by respective department with policy implementation responsibility.

4. Planning capability will be extended to or established for each village.

Implemented by Planning and Community Services.

5. The borough shall notify each village of any development proposal within the village or village Area of Influence and shall afford the residents of the village an opportunity to participate in the permit decision.

Implemented by Planning and Community Services.

6. The development permitting process will be modified so that when development of a significant nature is proposed in a village Area of Influence the respective city council will be allowed the opportunity to sign-off indicating their objection or non-objection prior to finalizing the application process.

Implemented by Planning and Community Services.

7. In determining whether a proposed development in a village or village Area of Influence complies with the various policies, the borough will solicit and consider the opinions of residents of the village on all matters in which they have special knowledge or experience.

Implemented by Planning and Community Services.

8. Establish or modify zoning, subdivision regulations, and other land use regulatory mechanisms that are appropriate and consistent with the Comprehensive Plan for the borough and each village when adopted.

Implemented by Planning and Community Services.

9. Utilize the goals, objectives, and policies in the borough and village Comprehensive Plans as one source for evaluating and approving CIP and other funding requests including borough departmental budgets.

Implemented by Mayor's Office, and Administration and Finance.

10. The North Slope Borough will adhere to the desires of each village regarding industrial development infrastructure, project design, and priorities. Each village will determine its own priority on traditional versus modern needs.

Implemented by Planning and Community Services.

11. The North Slope Borough will support village self-determination.

Implementing NSB Assembly and Planning Commission

12. Target CIP budget amounts will be developed annually for each village in line with the village Comprehensive Plan when adopted. Local residents will have a major role in determining projects under these budget guidelines.

Implemented by Planning and Community Services and Administration and Finance.

13. The NSB Planning Commission will serve as major facilitator and advocate for village priorities.

Implemented by NSB Planning Commission and Planning and Community Services.

14. The North Slope Borough will promote and provide sufficient funding to maintain long range planning efforts.

Implemented by Planning and Community Services, Mayor's Office, Budget Committee, and NSB Assembly.

15. Long-term fiscal economic, energy, social, cultural, and community planning will be reflected in short and long-term CIP project decisions.

Implemented by Planning and Community Services and Administration and Finance.

16. A combined CIP project listing, from village and relevant departmental requests, will be presented to the village city council for a final combined CIP priority listing, village by village, to be forwarded to the NSB Planning Commission.

Implemented by Planning and Community Services.

17. To ensure consistency, all departmental planning efforts dealing with land use or public facilities, must be approved by the North Slope Borough Planning Commission.

Implemented by NSB Planning Commission and Planning and Community Services.

Departmental and village CIP requests shall be consistent with the Comprehensive Plan for the borough and the Comprehensive Plan for each village when adopted, unless the project is for an unforeseen event or emergency.

Implemented by Planning and Community Services.

Borough departments will develop mission and goal statements as part of their Strategic Plan and budget proposal consistent and supportive of the goals, objectives, and policies presented in the Comprehensive Plan. Implemented by all departments and monitored by Administration and Finance and Mayor's office.

18. Borough departments will conduct annual self evaluations on their responsiveness in implementing the policies as assigned in the Comprehensive Plan. A consistent format for evaluation to be drafted by the Department of Planning and Community Services.

City of Nuiqsut & Planning Department Meeting
May 24, 2001

The lists below are the following concerns that Eli Nukapigak, Mayor and Rosemary Ahtuanguaruak; Vice Mayor of Nuiqsut has brought to our attention regarding the rapid growth and development in their community.

1. The North Slope Borough has worked towards the community's needs but instability in the departments have kept them from meeting them.
2. Local control of personnel hiring in Nuiqsut and not in Barrow to allow flexibility to make jobs more desirable.
3. Look into other companies for the sale of diesel; diesel is being sold a lot more to companies then to community members. Kuukpik is selling the North Slope Borough's diesel to other companies, which then causes shortage of diesel to the community. Recommends that Kuukpik stops selling the NSB Diesel residents suffer when there is shortages need separate stock or supply area to meet this.
4. Address dust control problems in the community.
 - a) Vice Mayor has inquired about a method that Canada is using for dust control.
5. Do an inventory of gravel stockpile; checking of the quality and quantity of the stockpile. Changes have occurred what is there now to previous.
 - a) Stockpile is low, per councilman
 - b) Poor quality of gravel stockpile
6. Community is being overwhelmed by too many activities all at once; needs to plan in stages and development is now having effects to subsistence harvester.

7. Community's public meetings are being postponed or cancel due to no space available in the hotel, which then causes needs not being met.
8. Recommend that part of permitting fee go into the affected community for monitoring of the project local inspector or observers.
9. Would like project information and calendar/time frame of the monitoring activities, such as the bird watchers, caribou studies, and fish studies.
10. Getting copies of the permits to the impacted communities in a timely manner for commenting.
11. Stipulation of permits needs updating and improving, and random checks to ensure that stipulation are being met discuss repercussions.
12. Improve communication with all leadership and entities.
13. The Planning Commissioner's concern from their village needs to be back on the agenda of their monthly meetings.
14. Coordination of all leaderships/entities resolution database. This is to ensure that there isn't any duplication of same goals or not following through by the Borough and other entities.
15. Disaster Plan Coordinator needs to educate village supervisors, such as DMS, Health Clinic, Housing, and Village Coordinator plan yearly quarterly and monthly village response.
16. Recommends that Disaster Plan Coordinator frequently contact NSB departments for intervention.
17. Discussion makers for Community are being override by State, Federal, and Borough.

18. Need assistance to document through oral history elders land use versus youth usage. Greatest impact is loosing of the traditional land usage areas and no hint of restoration.
19. Risk for traveling to new harvest areas is high and no compensation to displace hunter's increased cost in fuel; wear and tear of equipment; and physical expenditures on the hunters.
20. Public Facility's high turnouts takes trained individuals and replaces with untrained individual's absorption of local resources loss of community involvement.
21. High concern with private contractors taking local jobs away from the villagers still little intervention to village to get applications.
22. NSB Public Facilities, the washerteria, maintenance is privatized and for many weeks only three washers working out of eight are working.
23. The NSB Airport Terminal needs to be put in use.
24. The CIPM Housing should be planned for more efficient use. If organized by village coordinator the usage could be expanded.
25. All departments should coordinate with village coordinator for village visits posting plan of interaction.
26. Health Clinic – There hasn't been village discussion regarding changes to village delivery, but plans are being discuss for future budget cuts.
27. Fire Department – Village training for group is limited to only one and benefit would occur if they rotated training sites allow more chance for village participations.
28. NSBSD – The School Board needs to communicate with the villages regarding continuation of contract for staffing. At

least allow input from village leaders that has to deal with the decisions.

29. The building usage is limited due to control from outside of the village residents. For instance the Plant Manager didn't want the summer recreation to occur discussed problems of the clean up.
30. Our students are expected to pass these tests, but we have no control over who teaches our students or if they continue.
31. Developing activities/studies should be incorporated in the curriculum. Utilize necessary current events community.
32. The School Advisory Council (SAC) meetings are not advertised and nor local input was encouraged lunchtime meetings.
33. Encourage contract length to at least two to five years for teachers and/or Administrator. After year probation successful encourage investment to community some teachers like to stay but district retakes them to their advantage at village expense.
34. Wildlife Department – Needs to inter-act with community regarding subsistence. Many projects high conflicts. Aircraft usage for monitoring causing conflict to subsistence discussed at development meetings repeated.
35. Needs to follow up on Umiat contamination research community respects NSB leadership.
36. Needs to be involved in the developing subsistence consumption survey.
37. Planning Department – The traditional subsistence use areas needs to be incorporated into the stipulation permit.
38. The community needs to be involved in the NPR-A planning stages and pipeline routes and heights

39. Need a local representative to act as an advocate for the community to oil companies for conflict resolution. (Like Waska Williams position).
40. Funds need to be allocated for equipment for monitoring activities.
41. North Slope Borough request donations of land for grants to build housing from the City.
42. Conflict resolution for problems contractors

NATURAL FEATURES

I. PHYSICAL SETTING

The Village of Nuiqsut overlooks the west channel of the Colville River near the head of its delta, some 25 miles from the Arctic Ocean. The Villagers chose to live where the great river links land and sea because it is a place rich in animals to hunt and fish.¹ Nuiqsut occupies a tundra site along an embankment overlooking the Nechelik (Nigliq) Channel, the westernmost distributary of the Colville River delta.

The National Petroleum Reserve-Alaska boundary is a short distance to the east (although the exact location of the boundary is a matter of dispute), and marks the dividing line between federal State-owned subsurface estates in an oil and gas province of high potential. The village's proximity to the Beaufort Sea, some 30 miles downstream to the north, give Nuiqsut a climate typical of the Arctic coast and similar to that of Deadhorse. *Governments and private interests plan many ventures in the Nuiqsut area. Whether benevolent, exploitative or combinations of the two, these ventures will add to the dynamics of change affecting the cultural landscape valued and used by the Nuiqsut heritage community. It is timely, therefore that a cultural plan be integrated at both planning and political levels to help the Nuiqsut people protect their traditional land-use area and perpetuate their subsistence way of life.²*

From the air the terrain looks flat, but on the ground it is an undulating landscape with many small relief features-banks, bluffs, meadows, and draws.³ It is dotted with innumerable swamps, ponds, and lakes.⁴ There are active dune deposits.⁵ Frost

¹ Nuiqsut Heritage a cultural plan, Feb. 1979. Pg. 2

² Nuiqsut Heritage a cultural plan, Feb. 1979. Pg. 2

³ Nuiqsut Heritage a cultural heritage, Feb. 1979 pg. 12

⁴ Nuiqsut Heritage a cultural heritage, Feb. 1979 pg. 12

⁵ Nuiqsut Heritage a cultural heritage, Feb. 1979 pg. 12

cracks and polygonal ground are common features.⁶ See Page 12 for further description.

Nuiqsut is underlain by continuous permafrost to a depth of at least several hundred feet. This mantle of frozen marine and alluvial clay, silt, sand and gravel is overlain by a thin peaty mat of organic material which serves as an insulating layer. The permafrost at Nuiqsut is rich in silt which is poorly drained and has a high water content. Tundra polygons indicating vertical ice lenses are common in this frozen, saturated material. Summer thaw depths may reach 18 inches where drainage is poor and 3 feet or more in the better drained gravelly sands along the Nechelik Channel. The tundra vegetation consists of various grasses, sedges, lichens, mosses and low growing shrubs, herbaceous plants and some willows along the streams.

Permafrost conditions in areas such as Nuiqsut where soils are poorly drained and saturated do not necessarily prohibit urban development, but they do add to development costs and must be taken into account in the design of structures and other facilities. Disruption of the thin organic insulating layer, changes in surface drainage, and the construction of facilities where a steady new heat source is inadequately insulated from the tundra surface can lead to changes in the temperature equilibrium which may result in structural failure. Thaw slumping and subsidence or flooding are common forms of surface degradation.

*Communities throughout the North Slope have been concerned on lack of adequate drainage within their communities, **the North Slope Borough has funded a drainage study see Bob Harcharek. add***

Drainage within the village is poor. Thaw ponds, puddles, and swampy areas are common during the short summer. The small stream and associated ponds which intersect the townsite tend to divide the village into two distinct sections. In addition, there is a drained thaw basin down the bluff at the southeast side of the village near the old airstrip. The village water supply is drawn from a lake to the south of the

⁶ Nuiqsut Heritage a cultural heritage, Feb. 1979 pg. 12

village during the summer, is treated, and stored for consumption during the remainder of the year.

Improvements in the system for supplying potable water to individual homes, combined with the larger water using capabilities of new buildings, add to local drainage problems. They increase surface drainage through the direct discharge of more graywater from each building .The construction of gravel pads and roadbeds *creates* an inadvertent diking system, which diverts any natural drainage from occurring in the developed area. *Appropriate culverts and other control measures are currently being studied. A Project Analysis Report was funded in N.S.B. Ordinance 96-10.*

*North Slope Borough has funded a Village Sewage/Water project, scheduled to begin in 1997. {The water and sewer system currently proposed for Nuiqsut is a direct bury piped system. This system would make piped water and sewer service available to all structures in the village. The present lake will continue to serve as the water source for the community. A new overland water treatment plant will be refitted with new packaged treatment units and pumping equipment. An additional 2.7 million gallon reservoir will need to be constructed to provide a total storage capacity of approximately 4.2 million gallons.}*⁷

Summer flooding can occur in the low lying area below the bluff to the east of the developed townsite along parts of the Nechelik Channel and also in the stream and pond section which intersects the village along an east-west axis. In addition, erosion can occur throughout the village where vehicle traffic destroys or damages the protective organic surface layer. Such surface degradation is particularly noticeable where there has been heavy vehicle traffic on unprotected residential lots.

The Colville River delta has traditionally been of particular significance to the Ioupiat people. The marine resources of the Beaufort Sea were nearby and the Colville River,

⁷ North Slope Borough Nuiqsut Water and Sewer workbook, 1995.

provided a good route for travel to interior fishing and hunting areas. *One of the many important trading places for loupiat people, west of Wainwright, to the MacKenzie River in Canada, and inland south to the Brooks Range, was the Niglik area. Freida Elavgak, born at Nuvuk, (Barrow) in 1902, describes one of the last trade fairs to be held at Niglik at the mouth of the Colville River. She attended this trade fair when still a young girl.⁸ Before reaching Niglik you can start hearing the Eskimo drums beating and it is such a joy to hear their beat, knowing that you are expected and are welcomed by the people... After the big Eskimo dance they start the trading... After all the trading at Niglik people continue on to Tigvagiak to trade but they do not hold any dancing or anything, they just trade there at Tigvagiak or Saviugvik.⁹ See page 18, for more on trading sites.*

The Colville Delta has long been favored for settlement because it is near the marine resources of the Beaufort sea and gives access to interior hunting, fishing, and trapping locations.¹⁰ These resources include caribou and some moose and polar bear; marine mammals such as bowhead and beluga whales and a variety of seals; many species of waterfowl such as geese, swans, ducks, brants, and loons; and fish such as Arctic char, whitefish, burbot and grayling. Furbearers include fox, wolf, wolverine, ermine and squirrels. The site possesses great scientific value, for here arctic material culture can be traced from prehistoric to historic times, then compared to the current material culture and subsistence activities of Woods Camp.¹¹ The area also serves Nuiqsut people as a hunting and camping locality and as a base for ice fishing and winter trapping.¹² Taken together, these animals were historically and remain today the staple food resources of the Nuiqsut people.¹³

⁸ Nuiqsut Heritage a cultural heritage, Feb. 1979. Pg. 10.

⁹ Nuiqsut Heritage a cultural heritage, Feb. 1979. Pg. 10.

¹⁰ Nuiqsut Heritage a cultural heritage, Feb. 1979. Pg. 12.

¹¹ Nuiqsut Heritage, a cultural plan, Feb. 1979. Pg. 18.

¹² Nuiqsut Heritage, a cultural plan, Feb. 1979. Pg. 18

¹³ Nuiqsut Heritage, a cultural plan, Feb. 1979. Pg. 13

II CLIMATE

The Arctic coastal plain is a cold desert. Nuiqsut's climate is typical of the coastal plain bordering the western portion of the Beaufort Sea. It is characterized by long cold winters made even more uncomfortable by persistent strong winds, and short cool summers. The Arctic Ocean, although frozen for most of the year, has a strong influence on the climate by moderating both the extreme low and high temperatures. *Tides affect fishing in the Nuiqsut area. Even in the winter, Nechelik channel experiences high tides which drives the fish up river..*

Average monthly temperatures are below 0°F from December through March, while the average minimum daily temperature is 0°F or less for about 163 days a year. The coldest temperatures recorded in this area are around -50°F.

The mean annual wind speed at Nuiqsut is estimated to be about 11 miles per hour with the prevailing wind being from the east-northeast. There is not a great amount of variation in wind speed or direction through the year although November winds are judged to be the strongest. Sustained winds of 35 miles per hour are not uncommon in the Nuiqsut area, while sustained winds of 48 miles per hour have been recorded at Deadhorse, with gusts registered at even higher speeds. Using a mean wind speed of 11 miles per hour in March, the average temperature of -14°F for that month would be an equivalent of about -41°F when wind chill factors are taken into account. Under such conditions, exposed flesh can freeze within 30 seconds, making the wearing of adequate protective clothing essential for human survival.

Precipitation in Nuiqsut is light, averaging about 5 or 6 inches per year. Despite the superficial evidence of surface water during the short summers, this area is a frozen desert. The average annual snowfall is estimated to be about 20 inches. During the long winter, snowdrifting caused by persistent strong winds creates problems both from the standpoint of safety and mobility. Because of this drifting, the design of structures, including the placement of exterior doors and the placement of facilities on

lots, are critical mitigating factors. {Some of these problems could be reduced through the use of snowfences. If the snowfences in Wainwright prove to be effective, similar fencing might also be helpful at Nuiqsut.} *Revise and Update.*

All commercial transportation of passengers in and out of Nuiqsut is by air, and in most cases freight also moves in the same manner. (The exception being cargo arriving via winter haul roads.) Observations at Oliktok indicate that flying weather with at least minimum conditions of a 1,000 foot ceiling and a 2 mile visibility occur 77 percent of the time in an average year. Flying weather is normally best in the winter when the Beaufort Sea is frozen. During the summer months, low clouds and fog forming over the open water are moved inland by winds, often blanketing the entire coastal plain up to the foothills of the Brooks Range. Delays in winter flights are usually related to visibility problems arising from fog, drifting snow or the lack of daylight. *Climate conditions which interfere with aviation are important in the lives of village residents.*

Sea ice is a major obstruction to marine navigation in the Beaufort Sea. Shorefast coastal ice persists for more than 8 months per year in this area and the polar pack ice moves offshore erratically during the summer. During that period, the pack ice can be blown close to or against the shore by northerly winds. While the sea ice may not impact Nuiqsut directly because of its inland location, it can influence subsistence hunting *access to their marine resources. This in turn impacts the village of Nuiqsut throughout the year.* The petroleum exploration and development activities in which village residents may have a direct interest *in, are currently proposing to drill offshore, at the proposed North Star site. May move this subject, to more appropriate location.*

TABLE 1

AVERAGE TEMPERATURES, PRECIPITATION AND WINDS a/
POINT LONELY

<u>MONTH</u>	<u>TEMPERATURE</u> (°F)	<u>PRECIPITATION</u> (inches)	<u>SNOWFALL</u> (inches)	<u>WIND</u>	
				Prevailing direction	Mean Speed (m.p.h.)
January	-12.6	0.02	0.3	E	9.1
February	-8.3	*	*	NE	7.8
March	-13.6	0.02	0.02	NE	8.1
April	-4.7	0.19	1.6	NE	7.9
May	27.1	0.11	0.8	E	8.0
June	39.5	0.19	*	E	8.2
July	48.1	1.59	0.1	E	7.8
August	44.2	2.08	0.1	E	8.4
September	35.3	0.52	2.7	E	9.5
October	20.8	0.79	4.1	NE	9.6
November	2.0	0.16	1.2	NE	10.7

December	-10.4	0.16	1.6	NE	8.3
<u>ANNUAL</u>	<u>14.7</u>	<u>5.83</u>	<u>12.7</u>		<u>11.0</u>

- Trace

a/ Data recorded at Point Lonely 1957 to 1961. Comparable data unavailable for Nuiqsut.

Source: University of Alaska, Arctic Environmental Information and Data Center. Anchorage.

Data unavailable for Nuiqsut, Alaska.

NATURAL FEATURES

I. PHYSICAL SETTING

Kaktovik differs in several aspects from other coastal village of the North Slope Borough. Its easterly location on the Beaufort Sea isolates it from the warm currents which move up through the Chukchi Sea, subjecting it solely to the influence of the Arctic Ocean. As a result, Barter Island is free of shorefast ocean ice for less than three months a year.

Barter Island is probably a mainland tundra element which was formed by the sea's thermal erosion of ice-rich soils. The Island is relatively flat, with its highest point being only about 55 feet above sea level. Kaktovik is located on the northeast coast of the Island, facing onto Kaktovik Lagoon. The Lagoon is protected from direct action of the Beaufort Sea by a site of the DEW Line airstrip.

The village of Kaktovik has developed back from the Lagoon, mainly above the 20 foot level, although some development has taken place at lower elevations near the Lagoon. There is some evidence of erosion along the shore of the Lagoon adjacent to the village, suggesting that care should be taken in locating structures below the 20 foot level in the area. The same area may be liable to flooding as a result of storm surge tides with superimposed waves which occasionally occur in late summer and fall.

The surface of Barter Island is characterized by small thaw lakes and ponds, tundra polygons and few incised stream channels. { The only lake of any size is located about 7/10th of a mile from Kaktovik} Maybe closer now. and serves as the water source for both the village and the Barter Island DEW Line Station. This lake is about 9 feet deep and freezes to depth of around 6 feet during the winter. While Kaktovik relies on a stored water supply during the winter months, {the DEW Line Station continues to draw its water needs from this source year-round. } Delete *ADD Report Update status of Dewline Site.*

As elsewhere on the North Slope, Barter Island is within an area of continuous permafrost, with the permafrost probably extending several hundred feet below the surface here. The present Kaktovik townsite is located on silty soils with a high water content. These soils are topped by a thin, peaty tundra mat which supports a variety of tundra vegetation. (The original village location on the gravel spit now occupied by the DEW Line airstrip provided a much more stable surface). During the summer months, the "active" layer (i.e. the depth to which the permafrost thaws) at Kaktovik ranges from about 18 inches in tundra soils to 4 feet in better drained sands and gravels. Where natural drainage is poor or is impeded, this results in the formation of ponds and swampy areas.

In Kaktovik, as in most other Arctic communities, soil conditions place severe limitation on urban development. In itself, permafrost does not necessarily prohibit development but it does add to development costs and its presence must be taken into account in the design of structures and other facilities. {Disturbance of the organic surface layer, changes in surface drainage and the construction of buildings or roads which are inadequately insulated from the ground can lead to major changes in the equilibrium of the soils such as thaw slumping and subsidence and to resulting structural failure.} Delete *ADD rephrase.*

The natural drainage pattern of the immediate Kaktovik village area is northeast into Kaktovik Lagoon. {Ponds, puddles and swampy areas are common throughout the village during the summer months.} Rephrase. The use of gravel to construct roads and pads {has reduced the instability of the permanently frozen underlying surface layers.} Delete {However,} Delete has served to impede natural drainage patterns *{within the community} add.* The direct discharge onto the ground of graywater from housing units and other structures has compounded surface drainage problems in the village, particularly since the addition of new housing and public structures which have larger water using capabilities than traditional village buildings. {and since} delete Water delivery services in the village have been upgraded. {While the installation of culverts can reduce the damming effect caused by the construction of raised gravel roads, extreme care must be taken to avoid surface degradation caused by alteration of natural drainage patterns which can lead to changes in the natural permafrost equilibrium.} Delete. *Communities throughout the North Slope have been concerned on lack of adequate*

drainage within their communities, the North Slope Borough has funded a drainage study see Bob Harcharek.

While Barter Island is an extension of the Arctic coastal plain, {it is still located relatively close to inland foothills and mountains.} Delete (The Arctic Coastal plain becomes much wider westward from Barter Island along the Beaufort Sea coast). {This proximity to foothills and mountains and the limited period annually when sea ice is not shorefast have had a major influence on the subsistence hunting patterns of Kaktovik residents.} Rephrase.

{The winter population of marine mammals in the Beaufort Sea is smaller than that of the Chukchi Sea. On the other hand,} Rephrase The large Porcupine caribou herd's critical spring calving area is in the Arctic National Wildlife Refuge entire coastal plain from Canada to as far west as the Sagavanirktok River. The presence of the Porcupine herd and the nearness of the mountains has resulted in a greater emphasis being placed by Kaktovik residents on the caribou resource and a much greater use of Dall Sheep than in other Alaska coastal loupiat villages. Fishing does take place around Kaktovik when the sea ice move out (Kaktovik means "seining place" in loupiat) and early winter fishing on the Hulahula River is popular, often combined with hunting. Hunting of bowhead whale by the loupiat of this area usually takes place in September, when ice conditions permit.

II. CLIMATE

Kaktovik has a harsh Arctic climate characterized by long cold winters, short cool summers, low precipitation and persistent strong winds. The community's northern latitude is also reflected in continuous darkness for 55 days in mid-winter and continuous light in mid-summer.

The weather at Kaktovik is strongly influenced by the Beaufort Sea, even though that body of water is frozen for more than nine months of the year. The Beaufort Sea's modifying influence results in warmer temperatures during the winter and cooler temperatures during the summer than would otherwise be expected at this latitude.

Sea ice is a dominant feature of the Kaktovik area where the shore is generally free of ice for less than three months each year. During the short summer season, the polar ice pack usually moves offshore to the north but it can remain quite close to or against the coast during periods of strong northerly winds. The formation of river and sea ice normally takes place in late September although this varies from year to year. Break-up usually occurs in July. The combination of a short period of open water and the changing location of the polar ice pack makes shipping to the Barter Island area uncertain, a factor which is reflected in high marine insurance rates.

Winter temperatures are cold and are further depressed by the effects of wind. Temperatures average below 0°F. from December through April. February is the coldest month with an average temperature of only -20.5°F and dropping to an average daily low of -25.8°F. "Felt" temperatures are even lower because of high chill factors induced by almost constant strong winds.

Prevailing winds at Kaktovik are from the East, although this switches to the West from January through April and to East North East in June and July. The mean wind speed at Kaktovik during the coldest winter months averages between 14 and 15 miles per hour. A wind speed of 15 miles per hour would have the effect of reducing Kaktovik's

average -20.5°F February temperature to an equivalent chill temperature of -60.°F. However, steady winds of 38 miles per hour have been reported for every month of the year. At that speed, the equivalent chill temperature on a normal February day in Kaktovik would be in the area of -85°F. Under these conditions, exposed flesh can freeze within 30 seconds, making the wearing of adequate protective clothing essential for human survival.

Precipitation at Kaktovik is low enough to qualify this area as a cold desert. Total annual precipitation averages only 6.41 inches, with close to one-third of it falling in July and August. Snowfall averages 43 inches per year, much higher than the average of 28.1 inches recorded for Barrow. Persistent strong winds during the winter months result in snow drifting which can create problems in town both from the standpoint of safety and convenience. Because of this, the placement of facilities relative to prevailing winter winds and the location of exterior doors of buildings are critical features to be considered in the design of structures. Some of these problems may be overcome through the use of snowfences. (If the fences in Wainwright prove to be effective, similar fences may be helpful in Kaktovik.) *Delete, Add Snow fences have proven to cut maintenance and operation of snow removal, Phase 1 of Kaktovik's snow fence was implemented at 1000 sq. Ft. Of snow fence at a projected cost of \$722,000. Phase 2 Snow fence was prioritized as the number 1 C.I.P. project in Resolution 96-01. The North Slope Borough has budgeted for phase 2 in N.S.B. Ordinance 96-10 at 900,000.*

Because Kaktovik is accessible only by air for virtually all of the year, climate conditions which interfere with aviation are especially important in the lives of this community's residents. Visibility is reduced to one mile or less for natural reasons other than darkness for an average of 118 days per year. Strong winds, blowing snow and darkness often result in poor visibility and disrupt air service at Kaktovik during December and January. Foggy conditions occur on an average of 74 days per year and also serve to disrupt air service, especially during the summer and fall months when there is open water offshore.

TABLE 1

AVERAGE TEMPERATURES, PRECIPITATION AND WINDS a/
KAKTOVIK

<u>MONTH</u>	<u>TEMPERATURE</u> (°F)	<u>PRECIPITATION</u> (inches)	<u>SNOWFALL</u> (inches)	<u>WIND</u>	
				PREVAILING DIRECTION	MEAN SPEED (M.P.H.)
January	-14.1	0.51	5.0	W	14.8
February	-20.5	0.26	2.8	w	14.2
March	-15.4	0.24	2.7	w	13.7
April	-0.7	0.21	2.5	w	11.9
May	20.9	0.33	3.1	E	12.5
June	34.1	0.52	1.7	ENE	11.5
July	39.9	1.02	0.6	ENE	10.6
August	39.1	1.08	1.5	E	11.7
September	31.5	0.78	5.7	E	13.1
October	15.7	0.79	9.4	E	14.6
November	-0.7	0.42	4.9	E	15.0

December	-12.7	0.25	3.1	E	13.9
<u>ANNUAL</u>	<u>13.3</u>	<u>10.30</u>	<u>57.1</u>	<u>E</u>	<u>13.1</u>

a/ Record mean values for period 1948 through 1981 except for wind direction which are based on records through 1963.

Sources: U.S. Department. Of Commerce, National Oceanic and Atmospheric Administration, Environmental Data Service, National Climatic Center.