North Slope Borough
Comprehensive Plan

Adopted by the
North Slope Borough Assembly
Ordinance 75-6-48
October 11, 2005

Prepared for:
The North Slope Borough

Prepared by:
URS Corporation

October 2005

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North Slope Borough
Comprehensive Plan

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1.0 Mayor's Forward

When the North Slope Borough prepared it's first Comprehensive Plan in 1983, it was an important milestone in taking local control; control over the development of lands and resources in the North Slope Borough, and control in protecting the fish, wildlife, and subsistence activities on which we depend. Approval of the 1983 Comprehensive Plan led to developing the Land Management Regulations and Zoning Districts in Title 19, which, along with our coastal management program, remain the major tools the Borough uses in regulating land use and resource development.

Much has changed in the Borough since 1983. We have seen benefits and impacts from petroleum and mineral development. Communities now have improved water and sewer, schools, health clinics, fire stations, and transportation facilities. Our population has grown along with village infrastructure and services. There are more pressures on subsistence resources and more housing needs. We are graduating more students from high school and college, and need more jobs.

Youth in Point Lay (R. Suydam)

The oil industry has also evolved since 1983. Development has spread from the initial discoveries in Prudhoe Bay east to Badami and west into the National Petroleum Reserve – Alaska (NPRA). With advances in technology, oil fields can be brought online with fewer, smaller, and less expensive facilities. Development has occurred in our offshore areas, and more offshore development is proposed. As development moves into NPRA, other communities will see both the impacts and the opportunities that Nuiqsut has experienced. The cumulative impacts of oil and gas development on our fish and wildlife, subsistence, and communities are just beginning to be understood and addressed.

Over time, the decline of the large oil fields at Prudhoe Bay and Kuparuk and the smaller size of new projects has led to a substantial slump in Borough revenues. We expect that this decline will continue. At the same time, the state's revenue contribution to the Borough and our city governments has also decreased. These revenue cuts have dramatically affected the Borough's and villages' ability to provide jobs and services.

Bowhead whale at the surface (G. Zelinsky)

Some things have not changed. Our Inupiat culture has remained strong. We respect and seek the guidance of our elders, and we value our youth and their suggestions. Subsistence is part of our everyday lives. It remains a foundation of all our villages, whether harvesting bowhead whales in the spring and fall, hunting caribou, eider ducks, white fronted geese, or fishing for broad whitefish. We work together as a community in pursuing subsistence, during celebrations such Kivgiq, and in our daily activities.

When I took office in 1999, we started creating a vision for the future. A smaller Borough is necessary to remain financially sound, and a smaller Borough cannot do everything it has done in the past. Meeting the needs of the future will require personal effort from our people, and rely more on the tradition of volunteering for services such as firefighting, and search and rescue. Stronger partnerships between all of the organizations that share the future on the North Slope will also be required. Some of these partnerships must take place at the village level, where the city and tribal governments and village corporations will have to share resources, funding opportunities, and leadership. On a regional level, non-profit organizations, Arctic Slope Regional Corporation, state and federal governments, the resource development industries, and the conservation groups will need to increase their efforts to help us provide economic opportunities for all, while maintaining our fish and wildlife, our communities, and our cultural heritage.

Assembly President Olemaun and Mayor Ahmaogak in session

Revising the Borough's Comprehensive Plan has been one of my administration's highest priorities, and I am very pleased to achieve this goal. The plan looks into the future of the North Slope, and raises a broad range of issues…much broader than one might expect. The plan provides paths of action for us to attain a sound and healthy future for the residents of the North Slope.

Village involvement has been very important in this process. So has the participation of regional organizations and other stakeholders such as the state and federal government, oil industry, and conservation groups. This Comprehensive Plan gives all of us a starting point for discussion, for partnerships, and most important, for action. I want to thank you all for your effort and participation in developing this plan, and look forward to working together in implementing it.

Quyanaqpak

Mayor George N. Ahmaogak, Sr.

1.1 Acknowledgements

The Comprehensive Plan revision was accomplished by the efforts of dozens of people throughout the North Slope Borough. Borough staff, residents, tribal organizations, Native corporations, state and federal agencies, industry representatives, and non-profit organizations were all essential to the success of the planning process. We would like to acknowledge the contributions of several key individuals and organizations.

Assembly	George Olemaun, President Charlotte Brower Charles F. Hopson Paul Hugo Herman Kignak, Sr. Roy Nageak Rex Rock, Sr.	**Mayor's Office**	George N. Ahmaogak, Sr., Mayor Dennis Packer, Chief Administrative Officer Arnold Brower Virginia Crosby June Elavgak Effie Goodwin Malia Texeira Noe Texeira
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In addition, Brian Rogers of Information Insights facilitated workshops in the early stages of the planning process, Arlene Thomas of ASCG, Inc. assisted with a portion of the public meetings in Borough communities, and Amalie Couvillion of The Nature Conservancy provided invaluable assistance and data for the borough-wide maps.

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North Slope Borough

Comprehensive Plan

Issues, Goals, and Objectives/Policies

Adopted by the
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Ordinance 75-6-48
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Abbreviations

1983	North Slope Borough Comprehensive Plan, adopted by Assembly
1993	Attempted revision of comprehensive plan
1998	Attempted revision of comprehensive plan
2003	Regional Comprehensive Economic Development Plan
2004 S	North Slope Borough Strategic Economic Plan, March 2004
2004 B	Borough staff interviews in April 2004
2004 I	Workshops with internal stakeholders (Borough residents) in Barrow in June 2004
2004 E	Workshops with external stakeholders in Barrow in June 2004 (federal and state government, resource development industry, and conservation organizations)
2004 V	Village meetings conducted July through September 2004
2005 P	Public comment received from villages, Borough Departments, and other stakeholders on the draft Comprehensive Plan
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
ADOT&PF	Alaska Department of Transportation and Public Facilities
AEWC	Alaska Eskimo Whaling Commission
ANCSA	Alaska Native Claims Settlement Act
ANWR	Arctic National Wildlife Refuge
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
DCED	Department of Community and Economic Development
DR&R	Dismantle, Remove and Restore
EPA	US Environmental Protection Agency
FEMA	Federal Emergency Management Agency
GIS	Geographic Information System
HUD	Housing and Urban Development
ICAS	Inupiat Community of the Arctic Slope
KSOP	Kuukpik Subsistence Oversight Panel
MMS	Minerals Management Service
NEPA	National Environmental Policy Act
NPRA	National Petroleum Reserve – Alaska
NPS	National Park Service
NSB	North Slope Borough
NSSI	North Slope Science Initiative
OSHA	Occupational Safety and Health Administration
RAB	Restoration Advisory Board
TNHA	Tagiugmiullu Nunamiullu Housing Authority
TLUI	Traditional Land Use Inventory
USFWS	United States Fish and Wildlife Service

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2.0 Executive Summary

Introduction

The North Slope Borough stretches across the top of Alaska from Point Hope to the Canadian border and from the Brooks Range to the Arctic Ocean. It spans 89,000 square miles of unique tundra and upland landscape, and features one of the most challenging climates on earth. The region is home to a predominantly Inupiat Eskimo population living in eight far-flung communities.

Inupiat culture draws its inspiration from the land and sea. Cultural practices revolve around traditional whaling and other subsistence hunting, fishing, trapping and gathering activities throughout the region. Commercial whaling attracted outside interest in the late 19th century, and the discovery of oil at Prudhoe Bay in 1968 has generated enormous industrial activity in succeeding decades.

This is truly a region with powerful ties to the past and the future, tradition and innovation, the land and the sea.

Our first comprehensive plan, prepared in the early 1980s and adopted by the NSB Assembly in 1983, listed the following in its Preface:

> "This plan is written for the North Slope Borough community – a community in which 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."

Aerial view near Kaktovik

While this remains true today, many things have also changed since then making it important that our Plan be revised to reflect the circumstances of our communities and people. We have seen benefits and impacts from petroleum development. Our population has grown along with village infrastructure. There are more pressures on subsistence resources and more housing needs. We are graduating more students from high school and college, and need more jobs, but there are decreases in revenues and the Borough's ability to provide jobs and services. This revision of the Comprehensive Plan will guide Borough decisions, including those affecting:

- government services,
- public facilities,
- transportation,
- hazards and public safety,
- land use,
- subsistence,
- fish and wildlife management
- social and economic development, and
- petroleum and mineral development.

Landfill cover material in Nuiqsut

Let's take a brief look at some of the changes we have seen since our first Comprehensive Plan was developed.

In 1983 the petroleum industry on the North Slope was in its early stages of development and growth. The Dalton Highway (Haul Road) brought a new means of transportation into the North Slope Borough. The industry brought a new source of funding, enabling new facilities and services to be developed throughout the Borough communities. Development spread from Badami Field east of Prudhoe Bay to the National Petroleum Reserve – Alaska (NPRA). The North Slope became, and remains, the largest petroleum-producing region in Alaska. Now over twenty years later, oil field production is declining, as well as the revenues to the North Slope Borough. We are looking at the potential closure and dismantlement of some of the early oil field facilities. We are also anticipating proposals for industry growth and expansion to new areas, including the NPRA and the Arctic National Wildlife Refuge (ANWR). Borough residents want to maintain opportunities for subsistence activities and continuing traditional uses of the land and water as the petroleum and mineral industry changes.

The population across the North Slope Borough has generally increased over the past twenty years. We have a very young population, with average ages below the state and national averages. The population increase influences the need for housing, healthcare, education, subsistence resources, employment, and public services.

Since the first Comprehensive Plan was developed, the Borough has worked to improve village infrastructure, including roads, telecommunications, and water and sewer capabilities. In some instances, the Borough stepped forward and assumed responsibilities that would not typically be provided by local government, because the services were needed and the Borough was able to accomplish the work. However, with decreased funding levels available today, the Borough is not able to continue to provide the same level of services. Many services that the Borough can

no longer provide are still needed; other entities will have to provide these services. The Borough is turning to logical business partners, such as other government agencies and non-profit organizations to assist the transition of services.

Traditional activities are still the foundation of Borough communities, and some activities, such as community dance groups are increasing in popularity. However, not all the social trends in the villages are positive. While transportation is still costly on the North Slope, air transportation is more available, snowmobile routes connect some villages, and Nuiqsut has seasonal connections to the Dalton Highway via ice roads. This increase in transportation has likely contributed to an increase in the availability of drugs and alcohol to the villages. The high school students in Nuiqsut identified drug and alcohol abuse as one of the most important issues for their community to address. Drug and alcohol abuse is a contributor to domestic violence, unemployment, and poverty levels.

Nuiqsut dancers at Kivgiq in 2005

The North Slope Borough is facing many opportunities and challenges. In 2004 the Borough began the process to update the Comprehensive Plan to document existing issues, identify goals for the future, and outline objectives to achieve these goals. The Borough and its contractors visited the villages to talk about planning issues, and had discussions with representatives of Native corporations, and tribal and city governments. We also met with representatives of state and federal agencies, the petroleum industry, and conservation groups.

What is a Comprehensive Plan?

A comprehensive plan is a long-range vision intended to guide the growth and development of the borough. Borough residents, landowners, business owners, high school students, public officials, and staff have participated in the planning process. The plan portrays what the borough is today, both strengths and weaknesses, and what we want to happen in the future. It forms the basis for land use regulations and future policy decisions.

The Comprehensive Plan works with several other documents, including the Coastal Management Plan, Title 19 Land Management Regulations, and the Comprehensive Transportation Plan. These documents are guided by the approved Comprehensive Plan. The Borough's Coastal Management Plan was structured to support the original Comprehensive Plan. Due to recent legislative changes in the Alaska Coastal Management Program, the Borough's Coastal Management Plan is being revised. The Title 19 Land Management Regulations and Barrow zoning ordinances are also being revised to provide better management to changing land use. The Comprehensive Transportation Plan was adopted in 2005 to provide direction and set priorities to meet the transportation needs of Borough communities. The Transportation Plan is an element of the Comprehensive Plan.

The North Slope Borough Comprehensive Plan can be used in many ways:

- **Assist with revising and implementing Borough land management regulations** – the Planning Department, Planning Commission, and Assembly can use the comprehensive plan in documenting decisions associated with permits, plats, and rezoning.
- **Anticipate potential growth and forecast needs for land use, infrastructure and services, and economic development** – the Borough can use the plan to review development permits, guide use of Borough owned lands, identify capital project needs, and support applications for federal and state grant funds .
- **Provide direction for the future community growth and expansion -** villages can use the plan to guide where and how growth should occur, what improvements are needed in roads, recreation facilities and utilities, and what types of development should be encouraged.
- **Build partnerships and develop strategies to accomplish goals and objectives, and assign responsibility for acting on those strategies** – the plan includes recommendations on how Borough, city, and tribal governments, Native corporations and industry can work together to maintain services and create jobs.

Craft sales in Barrow

- **Present an opportunity for the Borough to assess how it is doing** – Borough decision makers can meet annually to identify strengths and values to preserve and to build upon; identify weaknesses and problems to address, examine current trends affecting the North Slope Borough, and measure progress in implementing the plan.

Through the process of comprehensive planning, we can promote, protect, and prepare. A balance can be struck in conserving, developing, utilizing, and protecting natural resources.

However, in order for the Comprehensive Plan to be a meaningful and effective document, it must be used by the North Slope Borough, the Planning Commission, the Assembly, local residents, and community organizations. Discussions related to growth, redevelopment, capital and social improvements, or budget, need to occur with the Comprehensive Plan in mind. The plan will help decision-makers to focus on the issues that Borough residents have identified and their goals for the future.

We need to keep the Comprehensive Plan current, making updates and amendments as conditions change. Monitoring the effectiveness of our plan implementation and the changing conditions will be important. The planning department is currently responsible for monitoring compliance with many land use permits and for updating the Comprehensive Plan every two years. To assist with the Comprehensive Plan updates, the planning department will coordinate an annual review with all Borough departments to determine the status of the plan's implementation objectives.

Contents of the 2005 Comprehensive Plan Update

The 2005 North Slope Borough Comprehensive Plan Update contains the following elements:

- Mayor's Introduction
- Comprehensive Plan
  - Executive Summary
  - Planning Issues, Goals, and Objectives/Policies
    - Land Ownership and Status
    - Land Use
    - Subsistence
    - Human and Cultural Resources
    - Hazards and Safety
    - Fish, Wildlife, and Vegetation
    - Socioeconomic Factors
    - Youth Involvement
    - Public Services, Facilities, and Government
    - Petroleum and Mineral Development
    - Traditional and Contemporary Local Knowledge
    - Cumulative Effects
    - Haul Road District and Other Industrial Roads
  - Monitoring Plan Implementation
  - Public Participation
- Village Profiles
  - Anaktuvuk Pass
  - Atqasuk
  - Barrow
  - Kaktovik
  - Nuiqsut
  - Point Hope
  - Point Lay
  - Wainwright
- Background Report
  - Physical Environment
  - Biological Environment
  - Human Environment

View of Kaktovik

- Maps
  - Borough-wide maps
  - Village maps

The North Slope Borough has also developed a Transportation Plan, which is an element of the Comprehensive Plan. Additional transportation-related issues, goals, and objectives/policies are identified in the Transportation Plan.

Since the Comprehensive Plan looks to the future, the planning team sought the suggestions of the youth, our future leaders. The team developed a project to engage youth in the planning process. The Youth Involvement Project is included as an appendix and may be used at any time to assist youth in understanding governmental processes, defining current issues, and planning for future outcomes.

Issues, Goals, Objectives/Policies and Implementation

This is the heart of the Comprehensive Plan. Current issues are the foundation of the plan. Goals are identified for each planning issue or group of issues, to identify a future direction for the Borough. The issues and goals were used to develop action-oriented objectives/policies for implementation. The key to a successful comprehensive plan is implementation. Implementation identifies what specifically needs to be done, who is going to do it, and when it should be done. Further consideration of priorities is needed for these objectives.

To implement the Comprehensive Plan, there must be commitment on the part of the Borough and its partners to attain the visions presented in this document. However, the plan is a living document and it is also necessary to acknowledge changing conditions that may require a change in priorities or amendment to the plan direction.

Many of the actions recommended in the Comprehensive Plan are the responsibility of the Borough. However, the North Slope Borough consists of a variety of groups and individuals, including tribal councils, village councils, regional and local Native corporations, the School District, state and federal agencies, and private businesses. Implementation of this plan will require the cooperation and resources of all public, private and citizen groups and individuals, not just the Borough. It will take commitment, dedication of funds, and pride to make this plan happen.

In the past the Borough was able to finance many needed services and facilities. At times it funded projects that were not a borough responsibility under state law, either because they needed to be done or there was no one else to do it. Now, with severly declining fiscal resources, the Borough must make tough and strategic decisions on what it can continue to fund and where cuts will have to be made. When cuts are necessary, alternative sources of funds will be sought, however some of the costs for services and facilities will likely be born by individuals in the future. Some services and facilities may be eliminated or offered at a reduced level.

Activity at Anaktuvuk Pass Airport

Using the Comprehensive Plan

While the Borough population is predominately comprised of Inupiat Eskimos (over 70 percent), the population is becoming increasingly diverse. This Borough-wide plan reflects the issues and goals of the local people. The development of the plan was focused on twelve traditional Inupiat values, which are widely shared principles embraced by many cultures.

The residents of the North Slope Borough are very committed to maintaining their traditional subsistence culture and lifestyle. While complex value systems are difficult to describe, some of these central, traditional Inupiat values were captured at a North Slope Borough Youth and Elders Conference. The values are described and displayed in a set of posters developed by the North Slope Borough School District, in cooperation with the Native Village of Barrow and PetroStar, Incorporated. Schools throughout the Borough display the posters, with text in Inupiaq and English, and photos that illustrate specific values. The following excerpt is the English text from the posters.

COMPASSION – Though the environment is harsh and cold, our ancestors learned to live with warmth, kindness, caring and compassion.

AVOIDANCE OF CONFLICT – The Inupiaq way is to think positive, act positive, speak positive and live positive.

LOVE AND RESPECT FOR OUR ELDERS AND ONE ANOTHER – Our Elders model our traditions and ways of being. They are a light of hope to younger generations. May we treat each other as our Elders have taught us.

COOPERATION – Together we have an awesome power to accomplish anything.

HUMOR – Indeed, laughter is the best medicine!

SHARING – It is amazing how sharing works. Your acts of giving always come back.

FAMILY AND KINSHIP – As Inupiaq people, we believe in knowing who we are and how we are related to one another. Our families bind us together.

Gathering at the first spring bowhead whale in Barrow, 2005

KNOWLEDGE OF LANGUAGE – With our language we have an identity. It helps us to find out who we are in our mind and in our heart.

HUNTING TRADITIONS – Reverence for the land, sea and animals is the foundation of our hunting traditions.

RESPECT FOR NATURE – Our Creator gave us the gift of our surroundings. Those before us placed ultimate importance on respecting this magnificent gift for their future generations.

HUMILITY – Our hearts command we act on goodness. Expect no reward in return. This is part of our cultural fiber.

SPIRITUALITY – We know the power of prayer. We are a spiritual people.

Implementation Examples

The Comprehensive Plan is intended to be a tool for both the Borough and its business partners. There are many ways that the Borough and others can implement the plan. The following list of activities is meant to be used as examples where the plan can be applied or consulted when making decisions. It is intended to be referred to regularly as a guide and reference for project and proposal planning, as well as permitting and decision making stages.

North Slope Borough

- Land use regulation revisions and implementations
- Permitting processes
- Day to day zoning code decisions (conditional uses, rezoning)
- Capital project identification and scheduling
- Operating budget priorities
- Support applications for state and federal grants
- Utility master plans
- Regional transportation plans and improvements

Tribes and Villages

- Capital project identification and scheduling
- Support applications for state and federal grants
- Local transportation planning
- Setting programs and priorities
- Developing village plans and land use regulations

Kali School, Point Lay

North Slope School District

- Capital facility programming
- Facility reuse/evening use
- Education programming

Business Community

- Setting programs and priorities
- Promoting the Borough's potential for commercial, service, and transportation
- Accepting individual responsibilities for social development and the need to self finance some facilities and services based on actual usage
- Design and permitting for resource development projects
- Partnerships in employment, job training, and assistance with facilities and services

Given the changes in Borough finances, and both funding challenges and opportunities facing Borough communities, people are thinking of and acting on different ways to work together to provide employment opportunities, services and facilities within the Borough and its communities.The following tables show examples of implementation suggestions and actions from North Slope Borough villages and the Borough at large. These are meant to be examples that can be shared between communities and partners in implementing the plan.

Examples of Key Suggestions

Community	Key Suggestions from Village Public Meetings
Anaktuvuk Pass	Firefighter training was suggested as a potential to help increase seasonal employment and income
Atqasuk	Closer communication is needed with other communities, especially Wainwright
Barrow	The Northwest Arctic Borough Quad Board is a good example of important groups working together; the North Slope Borough groups should consider similar formal working agreements between potential partners
Kaktovik	Include local residents in apprentice programs for outfitter-guides
Nuiqsut	There is a need to develop training and services for repairs in the village, e.g. mechanical, electrical skills
Point Hope	Consider on-shore conflict avoidance agreements to protect resource development
Point Lay	Utilize waste heat from the power plant and better regulate heat in Borough buildings to save fuel
Wainwright	Develop an arts and crafts cooperative; coordinate with the Alaska Arts Consortium or the Northwest Arctic Borough
Borough-wide Themes	Address the cumulative effects of oil and gas development on subsistence activities through mapping of important village resources or formation of oversight committees.

Examples of Actions being Taken

Community	Example of Recent Implementation Actions
Anaktuvuk Pass	• Anaktuvuk Pass has completed a village transportation plan; projects should have higher rankings for funding by the Denali Commission and Bureau of Indian Affairs (BIA)
Atqasuk	• Atqasuk passed a resolution to adopt the North Slope Borough Transportation Plan as their village transportation plan
Barrow	• Tagiugmiullu Nunamiullu Housing Authority (TNHA) and ConocoPhillips Alaska cooperation on funding an Elders Housing Project
Kaktovik	• Kaktovik operates a cooperative art sales outlet from the city offices
Nuiqsut	• Nuiqsut established a subsistence oversight committee to coordinate with industry on potential development impacts
Point Hope	• Point Hope developed a tri-lateral agreement between the city, tribe, and corporation to work together on an evacuation road, a very high priority for the community
Point Lay	• Point Lay is considering relocating the airport road to improve airport access and to assist with residential lot development
Wainwright	• The Tribal Council developed a partnership with The Nature Conservancy to document and map subsistence use areas
Borough-wide Themes	• Conflict avoidance agreements between BP Exploration – Alaska and the Alaska Eskimo Whaling Commission (AEWC) for offshore areas; subsistence compensation provisions in North Slope Borough development permits for Alpine Project Satellites

Public Participation in Developing the Comprehensive Plan

Public participation occurred throughout the project, with several key points. The project kick-off meeting was held in Barrow in April 2004. On this occasion, the planning team was able to meet with representatives from most of the Borough departments. Staff members identified an initial list of issues and concerns.

In June 2004, the planning team held two workshops in Barrow. The first workshop was with internal stakeholders, or Borough residents. Representatives from all villages except for Point Hope were able to attend and participate in the meeting. The second workshop was with external stakeholders, or representatives from federal and state government, resource development industry, and conservation organizations. Both of these workshops identified a strong framework of planning issues.

Workshop with internal stakeholders

From July through September of 2004, planning team members traveled to each of the Borough communities for public meetings. Additional planning issues were developed from community input.

In October 2004, the planning team sent a newsletter to all post office box-holders in the Borough, as well as the external stakeholders that participated in the June workshops. The newsletter provided an update on the planning process, summarized issue topics, and highlighted innovative actions taken by each community. A comment form was also enclosed in the newsletter.

In October 2004, the planning team also met with representatives from the North Slope Borough School District administration and the principals from each school to encourage youth participation in the comprehensive plan revision process. The planning team provided a curriculum-based project, tied to the State of Alaska education standards, to provide an overview of the planning process, relevant background information, and methods for local youth to identify community issues. The project was completed in one community, Nuiqsut, in December 2004. The outcomes of the Nuiqsut project were reported to the Economic Summit in Barrow in January 2005. A Youth Involvement section was incorporated into the Comprehensive Plan.

The draft Comprehensive Plan was presented to each community in August of 2005. It was also presented to state and federal agencies, the resource development industry, and conservation groups in August 2005. Additional comments were incorporated into the plan.

The North Slope Borough Planning Commission held workshops on the Comprehensive Plan in August and September 2005. In September 2005, the Planning Commission passed Resolution 2005-07, which recommended the plan to the Assembly for adoption. The Assembly held a public hearing and adopted the Comprehensive Plan by Ordinance 75-6-48 on October 11, 2005.

Village Profiles

Aerial view of Atqasuk

A brief profile of each community in the North Slope Borough is provided in the Comprehensive Plan. The physical setting, trends in socioeconomic indicators, and existing village infrastructure are summarized. Information on individual communities can be used in planning for and locating projects in and around specific villages. These profiles, together with the Comprehensive Plan, provide a foundation for developing a comprehensive plan for individual communities in the future.

Background Report

This section of the Comprehensive Plan provides a brief summary of the physical, biological, and human environment across the North Slope Borough. This information should be used in applying the objectives/policies of the Comprehensive Plan, in planning for and locating projects within the North Slope Borough, and in preparing and reviewing permit applications.

Beach in Point Hope

Maps

Maps that relate to the Background Report and the Village Profiles are included in a separate volume. The Borough-wide maps include the general vicinity, land ownership, subsistence, traditional land use, fish and wildlife, and petroleum and minerals. The village maps include critical facilities, land use, and flood hazard data (for communities where information is available).

Reviewing maps in Point Lay

2.1 PLANNING ISSUES FOR COMPREHENSIVE PLAN

Planning issues help us decide what the plan needs to address and what actions are recommended to reach planning goals and objectives. These issues should reflect the concerns and needs of village residents and will be used to develop implementation actions.

The issues in the comprehensive plan come from several sources. We have summarized issues from prior Borough plans, including the 1983 Comprehensive Plan, attempted revisions in 1993 and 1998, the Regional Comprehensive Economic Development Strategy from 2003, meetings with Borough staff, workshops with local groups, and public meetings in Borough villages.

The notes at the end of each issue indicate where they came from, usually either a previous version of the comprehensive plan, a recent planning workshop, or a village meeting. Some of them come from earlier village workshops when the plan was being revised. These notes on sources of issues are explained below:

- 1983 – North Slope Borough Comprehensive Plan, adopted by Assembly
- 1993 – Attempted revision of Comprehensive Plan
- 1998 – Attempted revision of Comprehensive Plan
- 2003 – Regional Comprehensive Economic Development Plan
- 2004 S – North Slope Borough Strategic Economic Plan
- 2004 B – Borough staff interviews in April
- 2004 I – Workshops with internal stakeholders (Borough residents) in Barrow in June
- 2004 E – Workshops with external stakeholders in Barrow in June (federal and state government, resource development industry, and conservation organizations)
- 2004 V – Issues from village meetings conducted July through September
- 2005 P – Issues and comments from public meetings and review of the Draft Comprehensive Plan in August 2005

Where an issue begins with the phrase “some people feel that”, the issue was included because it was echoed by many people in a workshop and/or village meeting, and was a common theme heard in several locations.

2.2 OBJECTIVES, POLICIES AND IMPLEMENTATION

As stated above, the North Slope Borough and its communities are faced with a broad array of issues. The issues reflect the comments identified over the past year in public meetings, workshops, scoping comments, and conversations with the planning team. The objectives and policies identify action items to address the issues and goals. The Borough and its logical business partners are identified as responsible parties for plan implementation. ***This is the core of the Comprehensive Plan: identifying what needs to be done and who is going to do it. The Borough has limitations to its jurisdiction and financial resources, and must rely on partners for assistance in implementing some aspects of the comprehensive plan. The issues, goals, objectives, policies, and assistance from responsible parties are linked together to achieve the visions for the future***.

The implementation of the goals and objectives will occur throughout the life of the plan. Some actions are already underway, and are reinforced by being in the plan. Other actions may not be implemented for a long time due to a lack of funding or other resources. The plan identifies many important issues and will guide the Borough and its business partners for implementation. Not all of the issues are solely the jurisdiction of the Borough, nor should the Borough be expected to take sole responsibility for implementing all the actions. The Borough Comprehensive Plan should be considered a road map for all stakeholders to participate in building a sound and healthy future for the North Slope. The Borough will request cooperation from the business partners listed, but their funding or staffing limitations, or their willingness to cooperate could also postpone the attainment of some goals.

The plan and its components were approved by the North Slope Borough Planning Commission and the Assembly. The update to the Title 19 Land Use Regulations will relate to the issues, goals, objectives, and policies identified in the Comprehensive Plan. As required by North Slope Borough Ordinance, the Comprehensive Plan and its components should be periodically reviewed and updated to assure that the Borough management is responsive to changing conditions and local issues.

This plan has not attempted to set priorities among the issues and action identified, particularly since priorities may change over time. It is strongly recommended that the Borough, through the Departments, Planning Commission, and Assembly review the Plan on an annual basis and set achievable priorities and assignments for implementation. Areas needing update or plan revision can also be identified and revised as a minor amendment, rather than waiting 10 or 20 years to revise the plan. Similarly, the Plan can be reviewed in other regional forums such as Economic Summits and Youth and Elders Conference, where cooperative partners can also identify priorities for action.

2.2.1 *Land Ownership and Status*

The North Slope Borough (NSB) covers 89,000 square miles and has multiple landowners. The federal government owns over half of the land within the Borough, including lands in the National Petroleum Reserve in Alaska (NPRA) and the Arctic National Wildlife Refuge. Other landowners include the State of Alaska, regional and village Native corporations, and private individuals or companies. The Alaska Statehood Act, the Alaska Native Claims Settlement Act (ANCSA), and municipal entitlement allow for selection and conveyance of land by the State, ANCSA regional and village corporations, the Borough, and village municipal governments. Land ownership and status also includes issues concerning the availability of land for selection, and the process of selecting and receiving title to land by Native corporations, the Borough, and village municipal governments.

Issue	Goal	Objective/Policy	Responsible Parties
Complex Land Ownership			
1. Lands and waters in the North Slope Borough are owned by different entities; this ownership pattern makes it difficult to manage land use, enforce regulations, and mitigate impacts (1983, 1993, 2004E).	Promote cooperation between Native, federal, state, local and private entities to facilitate land use management, enforcement of regulations, and mitigation efforts.	Establish local liaisons for each of the federal and state agencies to communicate with communities.	North Slope Borough Mayor's Office to initiate contact with federal and state agencies, requesting assignment of staff
		Hold an annual conference between the Borough, agencies, Alaska Native corporations, other regional groups such as the AEWC, and businesses that own or manage natural resources on the North Slope.	North Slope Borough Mayor's Office to initiate contact with other entities to foster support, cooperation, and co-hosting of event
2. Multiple landowners and interests can make it difficult to develop natural resources (2004B).	Enhance coordination between landowners on activities related to resource development.	Coordinate timing of agency permitting processes, between the Borough, Native corporations, state, and federal government entities.	North Slope Borough Planning Department to initiate contact with federal and state governments, Native corporations
		Coordinate meetings regarding resource development with village residents, agencies, Native corporations, and industry.	North Slope Borough Planning Department; develop permitting requirements for meetings
3. Maintaining opportunities for subsistence harvest, traditional activities, and access across ownership boundaries is difficult due to differing rules and regulations (1983, 1993).	Maintain opportunities for and access to subsistence activities across ownership boundaries.	Identify important subsistence use areas and access routes during planning and National Environmental Policy Act (NEPA) processes, and provide protection and access through permit requirements.	North Slope Borough Planning Department and Wildlife Department – region-wide focus and technical support to Villages; Village and Tribal Councils – local focus
		Develop formal agreements between landowners to provide subsistence access.	North Slope Borough Planning Department, working with public and private landowners
		Identify and dedicate important subsistence access routes prior to resource development.	Village and Tribal Councils and NSB Wildlife Department identify locally important areas; NSB Planning Department compiles information for permitting

Issue	Goal	Objective/Policy	Responsible Parties
Borough Resident Land Rights			
4. Some residents are concerned that Native allotments don't have subsurface rights (2004V). 5. Some local residents feel they have less rights than outside interests to the land within the Borough (2004I).	Increase local voice in decision making to maintain local land rights.	Seek out and include local resident recommendations during general and project specific planning activities.	North Slope Borough Planning Department – permitting division Law Department – Title 19 update Federal and State government
	Acknowledge traditional land use patterns in the North Slope Borough.	Educate local residents about land rights of surface owners	North Slope Borough Law Department; Village and Tribal Councils, Native corporations Federal and State government
6. Congressional designations on federal land (such as wilderness, and wild and scenic rivers) affect use of the land within the North Slope Borough, and many residents do not understand the consequences of these designations (2004E).	Educate North Slope Borough residents about the types of specific Congressional designations in the local areas so that residents understand the implications of these designations.	Federal land managers should work with village residents to accommodate resident use of Congressionally designated federal lands.	North Slope Borough Planning Department to initiate contact with federal agencies; Village and Tribal Councils to coordinate
		Conduct and present [case study] research on areas with Congressional designations and implications to local communities on use of designated lands. [Research could focus on impacts to rural communities, including economic development, changes in the character of communities, and quality of life.]	North Slope Borough Planning Department; coordinate with North Slope Science Initiative, NSB Wildlife Department, and federal land managers
Land Ownership/Status Information			
7. Current information on land ownership status and easement locations is inadequate, making land management and resource development difficult and time consuming for both the North Slope Borough and permit applicants (2004B, 2004E).	Acquire and maintain updated land ownership status and easement location data in the North Slope Borough for permit applicants and administrators.	Work with federal and state land managers to update land ownership status and easement location data in the North Slope Borough geographic information system (GIS).	North Slope Borough Planning Department – permitting division Law Department – Title 19 update
		Develop a Borough-wide program that establishes a process and provides standards for updating future changes in land ownership status and easement location data, where a single office manages all updates.	North Slope Borough Planning Department, working with the Bureau of Land Management (BLM), Alaska Department of Natural Resources (ADNR), and Native corporations
8. Lack of legal surveying and information on property lines makes development projects difficult in villages (2004E).	Provide accurate property data to project proponents and borough administrators.	Establish or update legal property data throughout the Borough, and manage the data in the Borough's geographic information system.	North Slope Borough Law Department, Planning Department, and Assessing Department
		Secure sources of funding and develop a program that establishes a process for updating future changes in legal property data.	North Slope Borough Mayor's Office, Law Department, and Planning Department – GIS division

Issue	Goal	Objective/Policy	Responsible Parties
Land Selection Process			
9. Limited funds and staff, availability of land for selection, and opposition from other parties have slowed municipal selection of State lands by the Borough (2004B). 10. Conveyance of selected lands to the Borough and Native corporations has been very slow and makes it difficult to manage lands. (2004B).	Create a strategy with the respective state and local decision-makers to complete the land selection process for the Borough, Native corporations, and municipalities.	Use 14(c)3 handbook developed by the State of Alaska Department of Community and Economic Development (DCED).	North Slope Borough Planning Department; Village and Tribal Councils
		Bring attention to the status of the land claims process to foster public support for funding to complete the conveyances.	North Slope Borough Planning Department; Village and Tribal Councils, working with BLM and ADNR
		Develop working agreements between entities involved in land conveyances to expedite the processes, including classifying lands as available for Borough selection.	North Slope Borough Planning Department; Village and Tribal Councils, working with BLM and ADNR
Miscellaneous Land Ownership Issues			
11. New home construction and other developments are limited by the lack of roads and utilities to available lots (2004I).	Construct roads and utilities to potential housing lots in villages.	Create a land use, development phasing, and improvement financing plan for the construction of roads and utilities in the Borough communities.	North Slope Borough Mayor's Office, Planning Department, Law Department, city and tribal councils, and Native Corporations
		Develop cooperative agreements between landowners (including Native corporations), the city, Borough, and funding agencies to coordinate construction funding and logistics.	
	Investigate funding opportunities for additional road and utility development in villages. Work with partners to secure appropriate funding for road and utility development.	Pursue funding from Bureau of Indian Affairs, State of Alaska, Denali Commission, Housing and Urban Development (HUD), and federal transportation funds.	North Slope Borough Mayor's Office, Planning Department, Village and Tribal Councils, Native corporations, and private land owners
		Require developers to pay their fair share for extending utilities and building roads.	

2.2.2 *Land Use*

Use of land includes traditional and current activities of Borough residents such as subsistence, as well as resource development on public and private lands. It also addresses how lands within communities should be used to meet the needs of residents and allow for community growth. The Borough has land management regulations (Title 19) that determine how lands are zoned for different uses and how uses should be managed. One of the purposes of the Comprehensive Plan is to guide how land management regulations are used and revised.

Some land use issues relate to transportation. The North Slope Borough has also developed a Transportation Plan, which is an element of the Comprehensive Plan. Additional transportation-related issues, goals, and objectives/policies are identified in the Transportation Plan.

Issue	Goal	Objective/Policy	Responsible Parties
Zoning			
12. Local communities desire greater control over their use of lands and natural resources (1998, 2004B).	Include local participation in land management and resource development decision-making.	Establish agency representation in the communities via local liaisons to federal and state agencies.	City and tribal councils make joint requests to federal and state agencies
		Educate Borough residents about land use regulations and other alternatives for obtaining greater controls of who uses their land. Establish means for communities to assume greater land use control, as well as corresponding fiscal responsibilities.	North Slope Borough Planning Department coordinates information sessions with city and tribal councils, Native Corporations
	Increase communication and cooperation between local residents and land management agencies.	Increase local resident participation in federal and state land advisory boards. Strengthen communication between the communities, their Planning Commissioners and the Borough.	North Slope Borough Mayor's Office, BLM, National Park Service (NPS), United States Fish and Wildlife Service (USFWS), Minerals Management Service (MMS), and other federal and state agencies North Slope Borough Planning Department and community residents

Issue	Goal	Objective/Policy	Responsible Parties
Zoning (continued)			
13. Most Borough communities do not have local zoning and enforcement authorities, which makes it difficult to regulate development (2004I).	Establish zoning and enforcement mechanisms in the villages that desire them.	Educate the villages about what a zoning ordinance is and the implications of establishing these regulations.	North Slope Borough Planning Department and Law Department coordinates information sessions with city and tribal councils and Native corporations
		Determine which communities desire zoning and enforcement mechanisms by conducting a survey in each village.	North Slope Borough Planning Department coordinates with city and tribal councils and Native corporations
		Coordinate with interested villages to help them establish appropriate community-based approval and enforcement mechanisms that would be supported by the Comprehensive Plan.	North Slope Borough Planning Department and Law Department coordinates with city and tribal councils and Native corporations
		Identify funding obligations associated with local zoning and enforcement and develop strategies for addressing needs.	North Slope Borough Planning Department coordinates with city and tribal councils and Native corporations
14. The lack of adequate community planning and zoning in most Borough communities encourages inefficient development and demand for expanded infrastructure.	Avoid inefficient development. Improve community planning to address zoning needs.	Develop community comprehensive plans to address existing and future growth and development needs.	North Slope Borough Planning Department, and City and tribal councils and Native corporations
		Develop land use zones that encourage use of existing facilities and infrastructure in villages that desire zoning.	City and tribal councils, regional and village corporations North Slope Borough Planning Department and Planning Commission
		Emphasize compactness in community development during project planning to minimize operations and maintenance costs of community infrastructure.	North Slope Borough Planning Department, Public Works Department, city and tribal councils, and Native corporations
15. Existing zoning in the Borough is not consistently enforced due to funding and staffing limitations (2004I).	Improve Borough zoning enforcement.	Find additional funding sources for Borough zoning enforcement staff, such as permit and impact mitigation fees.	North Slope Borough Planning Department, Mayor's Office, and Administration and Finance Department
		Make sure that the planning staff, which is in charge of enforcing zoning regulations, is familiar with the regulations.	North Slope Borough Planning Department

Issue	Goal	Objective/Policy	Responsible Parties
Zoning (continued)			
16. Areas rezoned for resource development are generally large, when only specific pads and access routes need the resource development zone classification (2004I).	Limit rezoning areas to reasonably foreseeable development. Encourage joint use of facilities where feasible.	Review and improve the criteria for rezoning areas designated "conservation" to "resource development" in Title 19.	North Slope Borough Planning, Wildlife, and Law Departments, NSB Assembly
		Develop specific criteria that define areas that will be designated "reasonably foreseeable" development.	North Slope Borough Planning, Wildlife, and Law Departments, NSB Assembly
		Work with industry and land management agencies to address the location and reduce the footprint of resource development, and joint use of facilities.	North Slope Borough Planning Department, Wildlife Department, NSB Assembly, BLM, ADNR, MMS, other state and federal agencies, and petroleum industry
17. Conservation or similar zoning is needed to protect traditional camps and cabins (2004V). 18. Resource development displaces subsistence uses and visually impacts communities, traditional camps and cabins (2004V).	Protect traditional camps, cabins, and activities that occur in their vicinity to maintain subsistence way of life. Maintain historic and natural landscapes.	Consider the impacts of resource projects on traditional camps, cabins and the associated subsistence activities; avoid, minimize, and mitigate impacts to camps and cabins and the associated subsistence activities. Consider maintaining important subsistence areas as Conservation District, or rezone as Subsistence, depending on proposed changes to Title 19. Consider the visual impacts of resource projects; avoid, minimize, and mitigate visual impacts to communities, traditional camps and cabins.	North Slope Borough Planning Department, state and federal agencies, Native corporations, and resource development industry

Issue	Goal	Objective/Policy	Responsible Parties
Permitting			
19. Different permitting requirements and regulations of many land managers can make development difficult (2004B). 20. The process for acquiring permits within the North Slope Borough is confusing because it lacks coordination between governmental entities and private landowners; different permits have different requirements that are not clear, and permit processing times vary which can delay projects (2004E). 21. There is insufficient communication and coordination with local villages when state and federal land managing agencies issue permits (2004I). 22. Some residents feel that agencies do not adequately inform local residents before issuing permits to tourists and sport hunters (2004V). 23. Some residents feel that permits for development in villages are issued without the knowledge of local residents (2004V).	Clarify the federal, state, Borough, and Native corporation permitting processes.	Provide education to village residents about the federal, state, Borough, and Native corporation permitting processes.	North Slope Borough Planning Department, federal and state agencies, Native corporations, city and tribal councils
		Develop guidance that explains the permitting process and includes the permitting agency, timelines, and necessary information for obtaining a permit.	North Slope Borough Planning Department and Law Department coordinates with state and federal agencies, including BLM and ADNR, and Native corporations
		Include villages in the notification and decision-making process before permits are issued.	North Slope Borough Planning Department coordinates with city and tribal councils, AEWC, and state and federal agencies
	Simplify the permitting process and improve coordination between land managers.	Review the existing permitting process for areas of improvement and simplification.	North Slope Borough Planning Department and Law Department, coordinating with state and federal agencies, including BLM and ADNR, and Native corporations
	Encourage coordination among government entities that have permits with similar requirements or require different permits for the same activity.	Hold a meeting with local, state and federal entities to discuss similarities between their various required permits. Request annual reports from federal and state agencies for permits issued within the North slope Borough.	North Slope Borough Planning Department and Law Department, coordinating with city and tribal government, the AEWC, and state and federal agencies

Issue	Goal	Objective/Policy	Responsible Parties
Changes to Land Use			
24. The Borough and other management agencies lack scientific data that documents changes in land use (2004E).	Develop a cooperative program to address the consequences of changes in land use, such as changing from conservation to resource development.	Coordinate with industry, management agencies, and the Borough to conduct studies concerning the consequences of changing land uses.	North Slope Borough Mayor's Office, Wildlife Department, and Planning Department initiates contact with federal and state agencies and petroleum industry
		Institute a cooperative program such as the North Slope Science Initiative to identify research needs and monitor baseline conditions and investigate changes in land use.	North Slope Borough Mayor's Office, Wildlife Department, and Planning Department
25. Subsistence users are sensitive to development and have been displaced from traditional use areas (2004I).	Minimize the impacts to subsistence users due to development. Protect areas that are critical to subsistence.	Identify and map subsistence and traditional use areas and other culturally important areas.	North Slope Borough Planning Department, Inupiat History, Language, and Culture Commission, working with city and tribal councils
		Require that federal and state agencies, and industry coordinate with Borough residents early in leasing and project planning to avoid or minimize potential impacts of development.	North Slope Borough Planning Department, Law Department, and Wildlife Department, working with BLM, MMS, and ADNR
		Work with industry, and federal and state agencies to develop appropriate mitigation measures regarding displacement of subsistence resources.	North Slope Borough Planning Department, Law Department, and Wildlife Department, working with BLM, MMS, and ADNR, and the petroleum industry
Miscellaneous Land Use Issues			
26. Communities are expanding outward, creating sprawl, which increases the cost of municipal operations and maintenance (2004B).	Create compact communities to decrease operations and maintenance costs and increase chances for community sustainability.	Review development plans for opportunities to decrease inefficient development.	North Slope Borough Planning Department, Public Works Department, city and tribal councils
		Encourage land uses that maximize the use of existing infrastructure.	
		Require those developing outside of current utility service areas to pay their fair share for extending service.	
27. Commercial development along the Dalton Highway/Haul Road Corridor creates unfunded demands on Borough services (2004 B/I).	Reduce unfunded demands for Borough services within the Haul Road Corridor.	New commercial development on the Haul Road Corridor provides for its own facilities and services prior to or concurrent with development.	North Slope Borough Planning Department working with ADNR, BLM

Issue	Goal	Objective/Policy	Responsible Parties
Miscellaneous Land Use Issues (continued)			
28. There is inadequate land reserved for transportation facilities such as airports (2004E).	Develop and implement a Borough transportation plan that meets existing needs and considers future needs.	Review transportation needs at a village level and a regional level.	North Slope Borough Planning Department coordinates with city and tribal councils
		Work with the Alaska Department of Transportation and Public Facilities (ADOT&PF), communities, and village corporations to identify safe and suitable locations for transportation facilities.	North Slope Borough Planning Department coordinates with the state
		Consider transportation needs in land use zoning and permitting processes.	North Slope Borough Planning Department
		Refer to the North Slope Borough Comprehensive Transportation Plan for project planning direction.	Project proponents, federal and state agencies, and North Slope Borough Planning Department
29. Resource development is very important to the Borough economy; some people feel not enough lands are open for resource exploration (2004V).	Pursue opportunities for resource exploration that avoid adverse effects to Borough residents.	Work with landowners and borough residents to schedule and conduct resource exploration in a manner that avoids or minimizes adverse impacts.	North Slope Borough Planning Department coordinates with city and tribal councils, federal and state agencies, Native corporations, and petroleum industry
	Continue to provide opportunities for public participation in the exploration permitting process.	Incorporate local concerns and suggestions in exploration permit approvals and denials, and document measures that have been successful or unsuccessful.	North Slope Borough Planning Department coordinates with city and tribal councils

2.2.3 *Subsistence*

Subsistence resources and subsistence activities are central to the subsistence lifestyle of residents of the North Slope Borough, and remains a vital and essential foundation of village culture and the economic base. North Slope villages use large areas for subsistence activities; many of the resources used are migratory and/or are only seasonally present in the Borough. As a result, the location of subsistence resources and harvest activities can vary from year to year; management of lands and resource development must be sensitive to protecting subsistence activities throughout the North Slope Borough area.

The health and abundance of subsistence resources, access to resources, and opportunities for traditional sharing is of utmost importance to Borough residents. While resource and economic development provides income that helps support subsistence activities, development can significantly impact subsistence activities by affecting the distribution and populations of fish and wildlife used for subsistence, and by restricting access to and activities within areas traditionally and currently used for subsistence.

Issue	Goal	Objective/Policy	Responsible Parties
Impacts to Subsistence			
30. Residents are concerned that subsistence is adversely affected by pressures from development and outside influences (such as sport hunting) (2004 B/V). 31. Villages are experiencing greater impacts to subsistence due to the combination of changes in natural patterns (such as changes in climate and migrations); displacement of subsistence uses; and increased pressure from development, population growth, and outside uses (2004B, 2004E). 32. Drill pads and pipelines encroach upon subsistence zones (2004I).	Minimize impacts to subsistence from development, sport hunting and other outside influences.	Coordinate with village residents to reduce the footprint of development and encourage common use of facilities.	North Slope Borough Planning Department, resource development industry, and federal and state agencies coordinate with city and tribal councils
		Mitigate impacts to subsistence from development.	North Slope Borough Planning Department and Wildlife Department, resource development industry, and federal and state agencies coordinate with city and tribal councils
		Develop a program to compensate village residents for impacts to subsistence.	North Slope Borough Planning Department, Law Department, Wildlife Department, Administration and Finance Department, resource development industry, and federal and state agencies
		Work with the Alaska Department of Fish and Game, other state agencies, federal land agencies, outfitters/guides and air transporters to reduce effects on Borough residents from outside sport and commercial hunting and fishing activities.	North Slope Borough Mayor's Office and Planning Department, state and federal agencies, city and tribal councils, tourism businesses, and outfitter/guides

Issue	Goal	Objective/Policy	Responsible Parties
Impacts to Subsistence (continued)			
33. Development in waters offshore from the Borough can adversely impact Borough residents and subsistence resources (1983, 1993, 2004B/V).	Minimize impacts to Borough residents from offshore development.	Maintain Good Neighbor Policy and Conflict Avoidance Agreements for activities in marine waters.	Alaska Eskimo Whaling Commission, North Slope Borough Planning, Wildlife, and Law Departments
		Document adverse impacts from offshore activities.	Alaska Eskimo Whaling Commission, North Slope Borough Planning, Wildlife, and Law Departments working with ADNR and MMS
		Actively participate in planning process for proposed offshore development projects with state and federal agencies and the petroleum industry to avoid or minimize impacts.	
		Develop a program to compensate Borough residents for impacts that occur from offshore development.	Alaska Eskimo Whaling Commission, North Slope Borough Planning Department, Law Department, Wildlife Department, and Administration and Finance Department
34. Onshore industrial activities impact Borough residents, but Conflict Avoidance Agreements and Good Neighbor Policies are not presently applied to onshore activities (2004 I/V).	Apply Good Neighbor Policies and Conflict Avoidance Agreements to onshore development activities.	Develop policies and agreements to incorporate Conflict Avoidance and Good Neighbor Policies into onshore resource development activities.	North Slope Borough Mayor's Office, Planning Department, Law Department, Wildlife Department, and city and tribal councils
		Encourage industry to use the Good Neighbor Policies and Conflict Avoidance Agreements for onshore development activities.	North Slope Borough Mayor's Office, Planning Department, Law Department, and Wildlife Department work with petroleum industry on individual permit applications
		Actively participate in planning process for proposed onshore development projects with state and federal agencies and the petroleum industry to avoid or minimize impacts.	North Slope Borough Mayor's Office, Planning Department, Law Department, Wildlife Department, and city and tribal councils, and state and federal agencies
Access			
35. Resource development activities can threaten camps and cabins outside of Native allotments and access to subsistence resources (2004V).	Provide continued access to subsistence resources, including the camps and cabins used for subsistence activities.	Recognize the importance of traditional camps and cabins, and associated subsistence activities, when managing public lands and planning for leasing, exploration, and development of petroleum and mineral resources.	North Slope Borough Mayor's Office, Planning Department, Law Department, and Wildlife Department, working with BLM, NPS, USFWS, and ADNR

Issue	Goal	Objective/Policy	Responsible Parties
36. Transportation and other infrastructure developments can increase access to subsistence resources and increase competition for these resources (1983, 1993, 2004B).	Educate outside users of subsistence resources about how to minimize their impact to these resources.	Develop a brochure for distribution with Borough land use permits and for distribution by air taxi operators.	North Slope Borough Mayor's Office, Planning Department, Law Department, and Wildlife Department
		Work with the Alaska Department of Fish and Game and state and federal land managers to reduce effects on Borough residents from outside sport and commercial hunting and fishing activities.	North Slope Borough Planning Department and Wildlife Department, working with state and federal agencies
	Work with local residents to manage new access to lands that are critical subsistence use areas.	Utilize the Borough permitting process to direct outside visitors to appropriate areas.	North Slope Borough Planning Department and Wildlife Department, working with federal and state agencies
37. Watersheds and wetlands serve as primary access routes to subsistence resources, but these resources are not adequately protected (2004V).	Increase protection of watersheds and wetlands in the North Slope Borough.	Coordinate with resource agencies to identify and map watersheds and wetlands in the North Slope Borough that are important for subsistence.	North Slope Borough Planning Department and Wildlife Department, US Army Corps of Engineers
		Minimize development impacts in these watersheds and wetlands that are identified as important for subsistence.	North Slope Borough Planning Department and Wildlife Department, US Army Corps of Engineers

Issue	Goal	Objective/Policy	Responsible Parties
Resource Development			
38. Subsistence users perceive that increased oil field security has displaced subsistence activities and caused changes in the subsistence experience for these users (2004B, 2004I/E).	Sustain subsistence uses and access to resources while providing for oil field security.	Coordinate with local villages regarding subsistence access in industrial areas, and any changes in security policies.	North Slope Borough Mayor's Office and Wildlife Department to initiate coordination between industry, and city and tribal councils
		Establish local liaisons in affected villages to improve communication between the villages and the oil field staff.	North Slope Borough Mayor's Office and Wildlife Department to initiate coordination between industry, and city and tribal councils
		Document sensitive subsistence use areas to avoid development in critical areas.	North Slope Borough Planning Department and Wildlife Department, working with federal and state agencies
39. Cumulative effects are not always analyzed and mitigated when resource development projects occur in incremental stages (2004B). 40. Smaller resource development projects cannot always support requirements that reduce impacts on subsistence but increase project costs (2004B).	Minimize impacts of resource development on subsistence resources. Understand/mitigate/compensate cumulative effects of incremental development on subsistence.	Develop impact mitigation measures that require relative contributions from proposed development.	North Slope Borough Planning Department and Wildlife Department
		Complete cumulative effects analyses for existing and new projects.	North Slope Borough Planning Department, Wildlife Department, and Law Department develop permit requirements
		Mitigate or compensate for documented cumulative effects.	North Slope Borough Planning Department, Wildlife Department, and Law Department develop permit requirements
		Develop agreements between the borough, federal agencies, state agencies, and industry to cooperatively analyze and mitigate cumulative effects to subsistence from resource development.	North Slope Borough Mayor's Office, Planning Department, Wildlife Department, and Law Department

Issue	Goal	Objective/Policy	Responsible Parties
Coordination			
41. There is minimal coordination between local, state, and federal governments to assess, monitor, and mitigate impacts to subsistence (2004I/E).	Increase coordination between local, state, and federal governments to assess, monitor, and mitigate impacts to subsistence.	Develop a joint federal/state/local/industry program to assess, monitor, and mitigate impacts to subsistence, and meet on an annual basis.	North Slope Borough Mayor's Office, Planning Department, and Wildlife Department to initiate contact with federal and state agencies and petroleum industry
42. The resource industry does not adequately coordinate with local subsistence users prior to development or dismantlement of oil and gas facilities (2004I/E).	Improve coordination with local subsistence users prior to development and dismantlement activities.	Use the Kuukpik Subsistence Oversight Panel (KSOP) as a model for improving coordination and local participation in planning for and monitoring resource exploration and development activities.	North Slope Borough Planning Department, Wildlife Department, and petroleum industry coordinates with local city and tribal councils
		Investigate other models for coordinating subsistence and resource development, including Canadian hunting and trapping associations.	City and tribal councils
Data Needs			
43. There is a lack of current and consistent borough-wide data on subsistence activities and uses (2004 B).	Update subsistence use information for all Borough communities.	Coordinate with communities to update historic subsistence information and to document current subsistence activities and uses Identify distribution, abundance, and habitat characteristics of subsistence use areas	North Slope Borough Planning Department and Wildlife Department coordinates with city and tribal councils, and state and federal agencies
44. The location of subsistence use areas by season is not adequately mapped; subsistence activities occur in different areas based on season, availability of resources, weather conditions, and other factors (2004V).	Understand where subsistence activities occur by species and season.	Coordinate with communities to identify and comprehensively map village subsistence areas by species and season.	North Slope Borough Planning Department and Wildlife Department coordinates with local city and tribal councils
		Work with North Slope Borough communities and cooperative partners to develop comprehensive subsistence maps for all Borough communities.	North Slope Borough Planning Department and Wildlife Department coordinates with local city and tribal councils

Issue	Goal	Objective/Policy	Responsible Parties
Data Needs (continued)			
45. Environmental Impact Statements and other documents on resource development do not include enough subsistence harvest information, such as distance to harvest and effort (2004V). 46. Current planning efforts do not consider subsistence impacts that occur between villages and at borough-wide levels (2004E).	Incorporate comprehensive information about subsistence harvest data into Environmental Impact Statements and other documents, including distance to harvest and effort.	Make every effort to obtain and include comprehensive information about subsistence harvest, such as distance to harvest and effort, when preparing Environmental Impact Statements and other documents.	North Slope Borough Planning Department and Wildlife Department coordinates with local city and tribal councils
		Address subsistence impacts that occur between villages and at Borough-wide levels in current and future planning efforts.	North Slope Borough Planning Department and Wildlife Department coordinates with federal and state agencies and petroleum industry during permitting processes
47. Research that combines traditional and contemporary local knowledge and science is limited and as a result does not sufficiently protect subsistence resources (2004B, 2004I).	Utilize traditional and contemporary local knowledge to help protect subsistence resources. Incorporate traditional and contemporary local knowledge in designing and conducting research.	Conduct interviews with village elders to understand where traditional subsistence activities occurred.	North Slope Borough Planning Department coordinates with local city and tribal councils
		Document and archive the interviews in a manner that is useful and available to the Borough and researchers.	North Slope Borough Planning Department coordinates with local city and tribal councils and the Inupiat History, Language, and Culture Commission

Issue	Goal	Objective/Policy	Responsible Parties
Miscellaneous Subsistence Issues			
48. Existing regulations are not adequately enforced, including local enforcement for proper use of subsistence equipment, and enforcement for sport hunters (2004l).	Improve compliance with state and federal subsistence and sport fish and game regulations.	Educate local residents to improve compliance, incorporating traditional values of hunting traditions, respect for nature, and cooperation.	North Slope Borough Planning Department coordinates with local city and tribal councils
		Seek funding sources for improved enforcement of subsistence and sport hunting.	North Slope Borough Planning Department, Mayor's Office, and Administration and Finance Department work with ADNR and ADF&G and federal agencies
		Work with the Alaska Department of Fish and Game (ADF&G) and state and federal land managers to reduce effects on Borough residents from outside sport and commercial hunting and fishing activities.	North Slope Borough Planning Department and Wildlife Department and city and tribal councils working with ADF&G and federal agencies
	Educate outside users of subsistence resources about how to minimize their impact to these resources.	Develop educational information for distribution with Borough land use permits, federal and state agencies, and for distribution by outfitter/guides and air taxi operators.	North Slope Borough Planning Department, Wildlife Department, and city and tribal councils, Federal and state land owners

2.2.4 *Human and Cultural Resources*

Maintaining traditional values and activities is important to the social, cultural, and economic well-being of Borough residents and all residents of Alaska. The location and protection of culturally significant resources, such as subsistence areas or archeological sites, is also very important.

Issue	Goal	Objective/Policy	Responsible Parties
Resource Development Impacts			
49. Development activities can negatively affect the quality of cultural and traditional resources and activities (1983, 1993, 2004E).	Minimize development impacts on cultural and traditional resources and activities.	Identify important cultural and traditional resources and activities in the vicinity of proposed resource development and incorporate into planning for impact avoidance and mitigation.	North Slope Borough Planning Department – region-wide focus, technical support to villages, and coordinate in permitting process; city and tribal councils – local focus, working with federal and state agencies and petroleum and mineral industry.
50. Resource development activities generate both benefits and impacts to the Inupiat culture and the subsistence lifestyle of Borough residents (2003, 2004I).	Maintain positive working relationship between the borough/villages and the resource development industry. (See also goals for issue #51).	Identify and expand/develop/promote resource development areas of mutual benefit for the borough/villages and the resource development industry and work cooperatively on development.	North Slope Borough Planning Department, city and tribal councils
		Identify and expand/develop/promote impacts of concern and areas for improvement in the working relationship between the Borough/villages and the resource industry.	North Slope Borough Planning Department – region-wide focus, technical support to villages, and coordinate in permitting process; city and tribal councils – local focus
		Develop formal agreements between the Borough and the development industry applicable to onshore activities.	North Slope Borough Mayor's Office, Planning Department and Law Department coordinate with industry
51. Human and cultural impacts from resource development are not always mitigated by the petroleum industry (2004I).	Avoid or minimize human and cultural impacts, and provide mitigation for impacts when they cannot be avoided.	Identify and document important cultural use areas prior to resource development.	City and tribal councils; North Slope Borough Planning Department coordinates information during permitting process
		Identify important human and cultural resources in the vicinity of proposed resource development and incorporate into planning for impact avoidance and mitigation.	City and tribal councils; North Slope Borough Planning Department coordinates information during permitting process
		Include human and cultural protection measures and mitigation criteria in the Borough permit process.	North Slope Borough Planning Department

Issue	Goal	Objective/Policy	Responsible Parties
		Traditional Values	
52. It is a challenge to maintain traditional activities and cultural values between generations as communities change and grow (2003, 2004I/E). 53. Change associated with a transition from a more traditional way of life to a cash-based economy has increased social and health care impacts (2004B). 54. Academic and cultural education does not sufficiently promote understanding of local values and subsistence activities (2004I). 55. Traditional values are sometimes temporarily displaced by change (2004E). 56. There are fewer people who can fluently speak Native languages; there is a danger of losing the Native language in some communities (2004V).	Maintain traditional local values even as communities change and grow. Teach traditional values to new generations. Improve Native language fluency.	Encourage educators to incorporate traditional and cultural values throughout school curricula.	North Slope Borough School District
		Encourage families to teach and model traditional and cultural values at home.	Inupiat History, Language, and Culture Commission
		Highlight local success stories and how traditional and cultural values assisted in their success.	North Slope Borough Mayor's Office, Inupiat History, Language, and Culture Commission
		Recognize and accommodate the importance of traditional and cultural values and activities in local hire programs for resource development.	North Slope Borough Mayor's Office to initiate contact with industry
		Expand the Inupiaq Immersion Program (in progress in Barrow).	North Slope Borough School District
		Develop Native language education programs for adults.	Ilisagvik College, city and tribal councils

Issue	Goal	Objective/Policy	Responsible Parties
Miscellaneous Human and Cultural Issues			
57. State, and federal government entities, and the oil and gas industry do not fully understand the importance of traditional and contemporary local knowledge to Borough residents (2004B, 2004I/E).	Recognize the importance of cultural values and traditional and contemporary local knowledge to Borough residents.	Educate state, federal and local government entities, and the oil and gas industry about the importance of traditional and contemporary local knowledge to Borough residents .	North Slope Borough Planning Department
		Develop a handbook for government entities and oil and gas industry that relays the importance and utilization of traditional and contemporary local knowledge.	North Slope Borough Planning Department, Inupiat History, Language, and Culture Commission
		Seek out and incorporate aspects of traditional and contemporary local knowledge during project design, permitting, and environmental impact assessments.	North Slope Borough Planning Department, Inupiat History, Language, and Culture Commission, city and tribal councils
58. Traditional use and sharing of local resources can conflict with using these resources for economic development and self-sufficiency (2004I).	Create and foster economic development that is compatible with local values.	Each village identifies viable industries compatible with the local culture and climate.	City and tribal councils, and Native corporations
		Expand the North Slope Borough Strategic Economic Plan to include a focus on diversifying the borough economy and fostering new economic development compatible with local values.	North Slope Borough Mayor's Office
		Economic development activities within villages should avoid or minimize uses of areas and resources important to subsistence and traditional activities.	City and tribal councils, and Native corporations

2.2.5 *Hazards and Safety*

Hazards may be naturally occurring or human-caused. Natural hazards include flooding from coastal storms, flooding along rivers and streams, erosion, ice override and permafrost. Climate change and global warming appears to be increasing risks from coastal storms, flooding, erosion, and permafrost melting. These events are endangering public safety and property, and should be carefully considered when siting new village and resource development. Human activity can result in air and water pollution, and also accelerate the rates of hazards such as erosion and permafrost melting through improper design and siting of activities. The Borough is working to minimize human-caused hazards and accommodate natural hazards.

Issue	Goal	Objective/Policy	Responsible Parties
Development in Hazard Areas			
59. Some facilities are located and built in hazard zones (2004B, 2004I). 60. Development plans do not adequately consider flooding, erosion, permafrost, and availability of materials sites (2004E).	Construct facilities and other community developments that are safe from natural or human-caused hazards.	Identify and map hazard zones in each village.	North Slope Borough Public Works Department, Planning Department, and city and tribal councils, and Federal Emergency Management Agency (FEMA)
		Avoid construction of new facilities in known hazard areas; if such construction cannot be avoided, design and locate facilities to minimize risk from hazards.	North Slope Borough Public Works Department, Planning Department, city and tribal councils, Native corporations
		Review existing permitting and zoning requirements for deficiencies regarding construction criteria in hazard zones.	North Slope Borough Planning Department
		Work with federal and state agencies to establish measures to avoid development in hazardous areas and protect existing development that is exposed to hazards.	North Slope Borough Public Works Department coordinates with state and federal agencies, including FEMA

Issue	Goal	Objective/Policy	Responsible Parties
		Natural Hazards	
61. The potential for natural hazard impacts is increasing with global warming and climate change (2004I). 62. Erosion and other natural events (flooding) appear to be increasing in severity and frequency (2004B, 2004I). 63. Changing sea ice conditions cause difficulties during spring and fall whaling (2004B). 64. Ice cellars are damaged or lost due to permafrost melting (2004V). 65. Permafrost melting causes the ground and structures to collapse, but these hazard areas have not been identified in many villages (2004V). 66. Warming trends (changing climatic conditions) affect the development methods and seasons (ice road use) (2004I).	Gain a greater understanding of trends in the natural environment that affect natural hazards.	Work with federal and state agencies to conduct studies to identify trends in climate change.	North Slope Borough Mayor's Office coordinates with state and federal agencies, including FEMA, and scientific and academic institutions
		Conduct interviews among elders to document traditional and contemporary local knowledge of past climate trends.	Inupiat History, Language, and Culture Commission
		Transcribe and catalog existing historic interviews with information about climate trends.	Inupiat History, Language, and Culture Commission
		Share the results of federal, state and local studies and interviews with village residents.	North Slope Borough Mayor's Office
	Promote industry and activities that assist in stabilizing climate conditions.	Research other industries that could be viable on the North Slope and compatible with the local environment and culture. Identify practices that can be used with resource development and villages to reduce fossil fuel use and emissions.	North Slope Borough Mayor's Office and Planning Department and Native Corporations North Slope Borough Departments, communities, and resource development industry

Issue	Goal	Objective/Policy	Responsible Parties
		Human Activities	
67. Environmental quality is impacted through human activities (2004I). 68. Development could threaten water sources (2004I/E).	Understand impacts to the environment from human activities.	Conduct studies to identify environmental impacts from human activities on village and regional level.	North Slope Borough Mayor's Office, Planning Department, Wildlife Department, city and tribal councils, and state and federal agencies
		Share the results of studies with Borough residents, industry, and agencies.	North Slope Borough Mayor's Office
	Minimize impacts to the environment from human activities.	Review and document existing permitting and zoning requirements for deficiencies regarding development criteria.	North Slope Borough Planning Department and Law Department
		Determine "Best Management Practices" for construction to minimize environmental impacts.	North Slope Borough Planning Department and Wildlife Department, working with federal state agencies and petroleum industry
		Work with industry to minimize air emissions and water discharges from resource exploration and production.	North Slope Borough Planning Department and Wildlife Department coordinate with state and federal agencies and petroleum industry
		Work with industry and the federal and state government to comprehensively plan for demobilization, removal, and restoration of oil field facilities.	North Slope Borough Mayor's Office and Planning Department coordinate with state and federal agencies and petroleum industry
69. Improper disposal of garbage, hazardous waste, and toxic substances threatens a safe, healthy, and pleasant living environment (1993, 2004I).	Maintain a safe, healthy, and pleasant living environment.	Identify existing and abandoned sites with garbage, hazardous waste, and toxic substances.	North Slope Borough Public Works Department, ADEC, Environmental Protection Agency (EPA), and FEMA
		Contact Alaska Department of Environmental Conservation (ADEC), EPA, and other appropriate parties to determine quick remediation alternatives, secure funding, and develop action plans to remediate sites.	North Slope Borough Public Works Department and Planning Department, working with state and federal agencies
		Enforce existing laws to prevent future contamination.	North Slope Borough Planning Department, ADEC, EPA, & FEMA
		Educate village residents about proper disposal of garbage, hazardous waste and toxic substances.	North Slope Borough Public Works Department, working with city and tribal councils
		Continue to work with the Restoration Advisory Board (RAB) to clean up old military sites.	North Slope Borough Public Works Department, Department of Defense
		Only permit uses where there are sufficient facilities for proper waste management.	North Slope Borough Planning Department

Issue	Goal	Objective/Policy	Responsible Parties
Human Activities (continued)			
70. Abandoned and derelict structures are safety hazards to residents and firefighters (2004B).	Reduce the number of hazardous structures in the communities.	Demolish and clean up hazardous structures in Borough communities.	North Slope Borough Planning Department and Fire Department to coordinate with property owners
		Adopt ordinances that require property owners to demolish and clean up abandoned and derelict structures.	North Slope Borough Planning Department, Planning Commission, and Assembly
71. There is more than one dwelling unit on some single residential lots, creating unsafe conditions in emergency situations (2004B).	Require effective emergency access to all structures, including residential structures.	Identify emergency access routes to existing structures.	North Slope Borough Fire Department coordinating property owners
		Identify structures that have no emergency access routes and develop access plans or condemn the structures.	North Slope Borough Fire Department coordinating with property owners
		Adopt ordinances that prohibit more than one residential structure on a single residential lot, unless adequate emergency access is provided.	North Slope Borough Planning Department, Planning Commission, and Assembly, and city and tribal councils
72. Some multiple dwelling units in the Borough are not constructed to meet state codes (2004B).	Renovate existing multi-unit housing to meet state safety standards. Construct new multi-unit housing to meet state safety standards.	Educate housing owners regarding state standards and owner liability.	North Slope Borough Fire Department
		Enforce compliance with state standards to save lives.	North Slope Borough Fire Department, state agencies, city and tribal councils
73. New structures are built without consideration of acceptable water flow for fire fighting (2004B).	Provide adequate water flow for firefighting to community facilities and structures.	Review firefighting water demands in proposals for new construction, particularly for large facilities/structures.	North Slope Borough Planning, Fire and Public Works Departments
		Adopt an ordinance that requires fire suppression sprinkler systems in new construction of large facilities/structures.	North Slope Borough Planning Department and Fire Department, Planning Commission and Assembly
		Adopt National Fire Protection Association development codes in Barrow.	North Slope Borough Planning Department and Fire Department, Planning Commission and Assembly

Issue	Goal	Objective/Policy	Responsible Parties
Climate Change			
74. The warming trends could increase arctic shipping and bring a corresponding increase in potential for oil spills, introduction of pests and diseases, and cause displacement of marine mammals (2005P). 75. Warming trends could increase fishing in the Beaufort and Chukchi Seas, bringing a related increase in debris (such as nets) (2005P).	Prevent adverse impacts to the environment and subsistence that may result from increasing marine activities such as shipping.	Monitor increases in marine activity and work to avoid or minimize effects on the marine environment and subsistence activities.	North Slope Borough Mayor's Office, Planning Department, and Wildlife Department coordinate with the North Slope Science Initiative (NSSI)
Miscellaneous Hazard Issues			
76. Limited research exists that explains how pollutants move through air and water due to activities inside and outside the Borough (2004I/E).	Support research on how pollutants move through the air and water due to activities inside and outside the Borough.	Work with the NSSI to initiate studies to identify how pollutants move through the air and water due to activities inside and outside the Borough, and share the findings of the studies with Borough residents, industries, and agencies.	North Slope Borough Mayor's Office, Planning Department, and Wildlife Department coordinate with NSSI

2.2.6 *Fish, Wildlife, and Vegetation*

The North Slope supports many types of fish, wildlife, and vegetation which are important resources for the residents of the Borough, state, nation, and world. Many of these species, such whales, caribou, waterfowl, and fish, are migratory. They are sensitive to disruption of migration patterns and important habitat that can result from physical facilities such as pipelines, roads, and causeways, or from activities such as marine and aviation traffic during migration periods. As resource development activities and facilities expand geographically within the borough, the identification of critical habitat and adverse effects from incremental development become increasingly important.

Issue	Goal	Objective/Policy	Responsible Parties
Research			
77. There is limited research on critical habitat for many plant and animal species throughout the Borough (2004B, 2004I/E).	Identify critical habitats for plant and animal species located throughout the Borough.	Coordinate with Borough biologists, state and federal land managers, North Slope Science Initiative, and local residents to conduct research regarding the location of critical habitat for plant and animal species.	North Slope Borough Wildlife Department to coordinate with NSSI, state and federal agencies, and city and tribal councils
		Utilize traditional and contemporary local knowledge to help identify important habitat for plant and animal species.	North Slope Borough Wildlife Department, city and tribal councils
78. There are not adequate studies to determine the source of changes in habitats and populations of fish and wildlife. (2004I/E).	Understand the source of changes in habitats and populations of fish and wildlife.	Coordinate with North Slope Science Initiative, state and federal agencies, the petroleum industry, and local residents to conduct research on the sources of changes in habitats and populations of fish and wildlife.	North Slope Borough Wildlife Department to coordinate with NSSI, state and federal agencies, the petroleum industry, and city and tribal councils
79. Fish and wildlife research and study plans, including tagging and tracking animals, are not well coordinated with local residents (2004I).	Include local residents when developing study or research plans.	Brief residents on study plans and request local input prior to initiating studies.	Researchers and project proponents, North Slope Borough Wildlife Department and Planning Department, city and tribal councils
		Brief residents on study progress before leaving the community; share research results with the community.	Researchers and project proponents, North Slope Borough Wildlife Department and Planning Department, city and tribal councils
		Encourage joint funding of research, supported by the North Slope Borough, state and federal agencies, and industry.	North Slope Borough Wildlife Department to coordinate with agencies and industry

Issue	Goal	Objective/Policy	Responsible Parties
Resource Development			
80. Development activities can impact fish and wildlife populations, habitat, and their capacity to continue to support subsistence activities (2004B). 81. Local residents are concerned about resource development impacts to fish, wildlife, and vegetation (2004E). 82. Migratory patterns of fish and wildlife, such as caribou and whales, may be affected by development activities (2004B, 2004I).	Minimize resource development impacts to fish, wildlife and vegetation, including barriers to and disturbance of migration. Minimize habitat fragmentation from construction of resource development infrastructure that impacts migratory patterns of fish and wildlife. Maintain fish and wildlife populations to support subsistence activities. Encourage development to use best available technology to reduce adverse impacts of fish and wildlife.	Coordinate with the Borough and local residents when preparing resource development plans to avoid or reduce impacts to fish and wildlife.	North Slope Borough Planning Department, Wildlife Department, city and tribal councils
		Monitor fish and wildlife populations and habitat before, during, and after development activities to document impacts.	North Slope Borough Planning Department, Wildlife Department, city and tribal councils
		Incorporate measures such as buried pipelines, common rights-of-way, and directional drilling to minimize adverse effects on fish and wildlife migration and habitat.	North Slope Borough Planning Department, Law Department, Wildlife Department, Administration and Finance Department, state and federal agencies, city and tribal councils, and resource development industry
83. Damage to important habitat is not always restored (2004I).	Avoid or minimize impacts to fish and wildlife habitat that would require restoration. Restore impacted areas when projects are complete.	Evaluate existing permit requirements for effectiveness and strengthen, if needed.	North Slope Borough Planning Department and Wildlife Department
		Enforce existing permit requirements	North Slope Borough Planning Department and Wildlife Department coordinates with state and federal agencies

Issue	Goal	Objective/Policy	Responsible Parties
Traditional and Contemporary Local Knowledge			
84. Sensitive areas (like Teshekpuk Lake) that support fish and wildlife need to be identified and mapped, based on traditional and contemporary local knowledge, and protected (2004I/V).	Protect sensitive areas that support fish and wildlife.	Identify and map sensitive areas based on traditional and contemporary local knowledge.	North Slope Borough Planning Department and Wildlife Department
		Identify potential threats to sensitive areas.	North Slope Borough Planning Department and Wildlife Department
		Evaluate existing zoning and land use regulations for effectiveness in protecting sensitive areas, including rezoning for subsistence or special habitat and strengthen, if needed.	North Slope Borough Planning Department and Wildlife Department
85. Traditional and contemporary local knowledge and scientific studies are not always incorporated into development plans (2004I/E).	Encourage industry and government entities to incorporate traditional and contemporary local knowledge and scientific studies into development plans.	Establish mechanisms for industry to easily access traditional and contemporary local knowledge and scientific studies relevant to proposed development plans.	North Slope Borough Planning Department and Wildlife Department, working with the petroleum and mining industries
		Identify village residents that can help provide traditional and contemporary local knowledge to industry during development planning.	North Slope Borough Planning Department, Wildlife Department, and city and tribal councils
		Inventory, catalog, and transcribe existing interviews to make traditional and contemporary local knowledge more accessible and useful to the Borough.	North Slope Borough Planning Department, Wildlife Department, and Inupiat History, Language, and Culture Commission

Issue	Goal	Objective/Policy	Responsible Parties
Land Managers			
86. Project developers sometimes do not clearly understand who is using the land and for what subsistence purposes, which makes it difficult to negotiate land restoration (2004I).	Educate project developers about who is using the land and for what purposes.	Evaluate the Traditional Land Use Inventory (TLUI) for accuracy, update if needed, and make available to state and federal agencies and industry in a timely manner.	North Slope Borough Planning Department, Wildlife Department, and Inupiat History, Language, and Culture Commission
		Coordinate with Borough residents to better document current land and subsistence uses and convey this information to project developers.	North Slope Borough Planning Department, Wildlife Department, Inupiat History, Language, and Culture Commission, and city and tribal councils, working with land owners and the petroleum and mining industries
87. Managers from different governmental organizations do not always work well together, which makes it difficult to maintain biodiversity and improve management of fish and wildlife (2004B, 2004I/E).	Increase coordination between land managers to improve fish and wildlife management and maintain the biodiversity of the North Slope.	Organize annual workshops in Barrow for land managers to attend and share information.	North Slope Borough Planning Department and Wildlife Department initiate contact with state and federal agencies
		Identify mutual management goals and potential for inter-agency cooperation.	North Slope Borough Planning Department and Wildlife Department coordinate with state and federal agencies
		Develop formal cooperative agreements between land and resource management entities.	North Slope Borough Mayor's Office, Planning Department, and Wildlife Department coordinate with state and federal agencies
Miscellaneous Fish and Wildlife Issues			
88. Cumulative effects of human and natural activities on fish and wildlife are not well understood (2004B, 2004E).	Increase understanding of the cumulative effects of human and natural activities on fish and wildlife.	Coordinate with industry, and state and federal agencies to conduct studies regarding cumulative effects of human and natural activities on fish and wildlife.	North Slope Borough Mayor's Office, Planning Department, and Wildlife Department coordinate with industry and state and federal agencies
		Conduct baseline studies and monitor fish and wildlife populations and habitat.	North Slope Borough Wildlife Department, state and federal agencies, industry and academic institutions
		Share study results with Borough residents.	North Slope Borough Mayor's Office, and Wildlife Department, state and federal agencies, industry and academic institutions

2.2.7 *Socioeconomic Factors*

Borough residents desire additional opportunities for economic development and economic diversification that are compatible with maintaining subsistence lifestyles. Providing and maintaining employment has faced challenges associated with workforce skills and training, flexibility for family and subsistence needs, and meeting drug and alcohol testing requirements. Education, housing, healthcare, and employment are persistent needs in all Borough communities, and the ability to provide these needs are in transition, requiring partnerships between the Borough, tribal governments, Native corporations, regional non-profit organizations, and industry. The Borough must encourage development that generates revenue to maintain services while avoiding cultural and social impacts.

Issue	Goal	Objective/Policy	Responsible Parties
Employment			
89. Borough residents seek greater employment opportunities, while maintaining traditional values and lifestyles (1983, 2003, 2004B). 90. A small percentage of local residents are presently employed by outside companies (2004I). 91. After 30 years, large numbers of Borough residents have not found direct employment in industry (2004B).	Create more employment opportunities for Borough residents. Create more locally owned businesses. Increase local hire in outside companies, such as the oil and gas industry. Diversify the Borough economy to create additional employment opportunities.	Develop employment-training programs to help Borough residents become more employable.	North Slope Borough Mayor's Office, Native Corporations, and Ilisagvik College, Native corporations and resource development industries
		Decrease drug and alcohol use to help Borough residents become more employable.	North Slope Borough Mayor's Office and Health and Social Services Department, city and tribal councils
		Establish local employment goals for outside companies to hire local employees.	North Slope Borough Mayor's Office
		Encourage flexible work schedules to accommodate subsistence activities while meeting workforce needs.	North Slope Borough Mayor's Office, Native corporations and resource development industries
		Foster the values of cooperation and mutual respect between businesses and employees by identifying mutual goals and diverse needs.	North Slope Borough Mayor's Office, city and tribal councils
		Develop work ethics and an understanding of employer requirements for local residents to create a more stable workforce and to increase the viability of economic development.	North Slope Borough Mayor's Office, city and tribal councils, Native Corporations, and Ilisagvik College
		Provide information on developing business management skills.	North Slope Borough Mayor's Office, city and tribal councils, regional and village Native corporations, and Ilisagvik College

Issue	Goal	Objective/Policy	Responsible Parties
Employment (continued)			
92. Borough residents desire greater opportunities for job skill development and employment training (2005P). 93. Young people are not getting jobs in our communities (2005P).	Develop the local workforce to meet employment demands.	Promote existing job training and development programs.	North Slope Borough Mayor's Office, city and tribal councils, Native corporations, resource development industry, and Ilisagvik College
		Develop internships, apprenticeships, on the job training, and student hire programs.	
		Expand outplacement services at Ilisagvik College.	
		Promote local hire.	
94. There is not enough understanding of local employment availability and training needs between Borough residents, Borough government, village corporations, tribal governments, and resource development industries (2004B).	Increase coordination between Borough residents, Borough government, village corporations, tribal governments and resource development industries to provide local employment training opportunities.	Develop formal cooperative agreements between the Borough, communities, corporations, tribes, and industry to provide local employment training.	North Slope Borough Mayor's Office to initiate contacts
		Identify barriers to increasing local employment and work cooperatively with communities to find solutions.	North Slope Borough Mayor's Office, city and tribal councils
		Provide local employment training in villages to help village residents become more employable.	North Slope Borough Mayor's Office, city and tribal councils, Native Corporations, Ilisagvik College, and the resource development industry.

Issue	Goal	Objective/Policy	Responsible Parties
Village Self-Sufficiency			
95. Borough communities are not economically self-sufficient and do not have an economic base or economic strategies (2003I). 96. The future well-being of NSB residents is uncertain as oil and gas development declines, and residents become increasingly reliant on a cash economy (2004E).	Develop economic strategies for villages so they can achieve greater self-sufficiency. Encourage economic activities that provide a tax base and fiscal resources greater than the cost of providing public services.	Work with cooperative partners to determine specific economic strategies and goals for each village.	North Slope Borough Mayor's Office, city and tribal councils, regional and village Native corporations
		Incorporate economic goals for villages into the North Slope Borough Strategic Economic Plan, local comprehensive plans, or the Borough comprehensive plan.	North Slope Borough Mayor's Office, city and tribal councils, regional and village Native corporations
		Use Borough Permanent Fund earnings for Municipal Revenue Sharing.	North Slope Borough Mayor's Office and Administration and Finance Department
97. Borough communities are not energy self-sufficient (1983, 1993, 1998, 2004V).	Develop energy strategies for the villages to achieve greater self-sufficiency.	Identify energy conservation strategies for public and private structures and vehicles.	North Slope Borough Public Works, and city and tribal councils
		Develop alternative energy sources for Borough communities, such as coal, natural gas and wind power.	North Slope Borough Public Works Department, city and tribal councils, and Native corporations
		Look for ways that oil and gas development can provide natural gas to village communities.	North Slope Borough Mayor's Office, Public Works Department, and city and tribal councils, regional and village Native corporations, and petroleum industry
98. City and tribal governments increasingly rely on federal funds because state funding is declining. (2004E). 99. Revenues are declining, which makes it difficult for the Borough to maintain financial well-being (2004I).	Maintain fiscal integrity for the Borough, city, and tribes.	Explore alternative revenue sources (2003).	North Slope Borough Mayor's Office, Administration and Finance Department, and city and tribal councils
		Work with industry to find incentives for new exploration and development while minimizing adverse effects to the villages.	North Slope Borough Mayor's Office, city and tribal councils, and Native Corporations
		Identify inefficiencies in services or processes and options for increased efficiency including privatization (2003).	North Slope Borough Mayor's Office, Administration and Finance Department, and city and tribal councils
		Decrease the number of services that the Borough provides (2003).	North Slope Borough Mayor's Office
		Develop formal agreements with other entities to consolidate efforts for providing services more efficiently (2003).	North Slope Borough Mayor's Office, Administration and Finance Department, city and tribal councils, and Native Corporations

Issue	Goal	Objective/Policy	Responsible Parties
Housing			
100. With young populations and increasing household sizes, the number of homes and types of housing in villages is inadequate (2004V). 101. There are not enough roads and utilities to allow new housing construction on available land(2004V). 102. Limited funds are available for housing from regional and tribal housing authorities (2004I).	Increase housing opportunities in villages. Secure appropriate funding for road and utility development. Create a land use, development phasing, and improvement financing plan for the construction of roads and utilities in Borough communities.	Explore alternative funding opportunities for regional and tribal housing authorities, elder housing, low-income housing, and new infrastructure needs, such as federal or state grants, and assistance from industry.	North Slope Borough Mayor's Office, TNHA, city and tribal councils, and state and federal agencies (including HUD)
		Develop cooperative agreements between the Borough, cities, tribes, and the corporation to expand roads and utilities to support housing construction.	North Slope Borough Mayor's Office, Public Works Department, city and tribal councils, and regional and village Native corporations
		Document housing needs for each village and incorporate into village comprehensive plans or the Borough Comprehensive Plan.	North Slope Borough Mayor's Office, TNHA, city and tribal councils, and state and federal agencies

Issue	Goal	Objective/Policy	Responsible Parties
Education			
103. The current education system does not adequately focus on developing tomorrow's community leaders and local workforce (2004I).	Provide education that is focused on developing community leaders and prepares students to enter the workforce.	Develop a sense of citizenship and a sense of ownership in the community through student participation in community projects, such as the Comprehensive Plan Youth Involvement Program and Joint Borough Summits.	North Slope Borough Mayor's Office, North Slope Borough School District, Ilisagvik College, city and tribal councils, private sector, and the health industry
		Encourage student programs that foster leadership skills, such as student council and peer-mentoring activities.	North Slope Borough School District, Ilisagvik College, city and tribal councils, private sector, and the health industry
		Work with local businesses and industry to create opportunities for internships and job shadowing (annual event, ongoing possibilities).	North Slope Borough Mayor's Office, North Slope Borough School District, Ilisagvik College, city and tribal councils, petroleum and mining industries, private sector, and the health industry
		Identify local "success stories" (such as the sewer treatment plant worker – someone that goes to work EVERY day) to be role models and guest speakers to address work ethic concepts.	North Slope Borough Mayor's Office, North Slope Borough School District, Ilisagvik College, city and tribal councils, private sector, and the health industry
		Develop a "how to" employment library, focusing on job skills, financial aid, and other topics.	North Slope Borough Mayor's Office, North Slope Borough School District, Ilisagvik College, city and tribal councils, private sector, and the health industry
		Promote existing scholarship opportunities and continue to develop and expand scholarships to meet the needs of students and employers.	North Slope Borough Mayor's Office, Ilisagvik College, Native corporations, resource development industry, private sector, and the health industry
104. There are not enough developmental and education programs provided for very young children (2005P)	Provide developmental and education programs for infants and pre-school children in Borough communities.	Seek grant opportunities and identify regional and state-wide organizations that can provide early childhood education	North Slope Borough School District, regional and village tribal organizations

Issue	Goal	Objective/Policy	Responsible Parties
Education (continued)			
105. Vocational education is not adequately offered in most of our public schools, which limits the availability of technical skills in the communities (2004I).	Increase the ability of local people to provide a range of needed technical skills in the community.	Evaluate the availability and needs of technical services in each community.	North Slope Borough Mayor's Office, North Slope Borough School District, Ilisagvik College, and city and tribal councils
		Develop an apprenticeship program, which would provide training to create new skills in villages, supported by a regional network for technical assistance.	North Slope Borough Mayor's Office, North Slope Borough School District, Ilisagvik College, and city and tribal councils
		Provide additional technical education opportunities for adults, including intensive course and certification programs.	North Slope Borough Mayor's Office, Ilisagvik College, Native corporations, and resource development industry
	Provide vocational education opportunities in public schools (high school) throughout the Borough.	Evaluate the existing vocational education programs in each community and how it addresses the needs.	North Slope Borough Mayor's Office, North Slope Borough School District, Ilisagvik College, and city and tribal councils
		Create a job-shadowing program that matches students with local professionals to share existing traditional and technical knowledge and to model responsible work practices and ethics.	North Slope Borough Mayor's Office, North Slope Borough School District, Ilisagvik College, and city and tribal councils, and resource development industry
106. There is not adequate sex education in the villages (2004I). 107. There is concern among village residents that the number of youth that are having children is increasing (2004I).	Decrease the teen pregnancy rates.	Provide sex education in villages through the public school and health systems.	North Slope Borough Health and Social Services Department, North Slope Borough School District, and city and tribal councils
		Identify and utilize state programs that provide support and resources for sex education, including grants for materials.	North Slope Borough Health and Social Services Department, North Slope Borough School District, and city and tribal councils
		Develop a borough-wide peer-mentoring program using healthcare and education professionals for program support.	North Slope Borough Health and Social Services Department, North Slope Borough School District, and city and tribal councils
		Increase parents' awareness for education opportunities within families.	North Slope Borough Health and Social Services Department, North Slope Borough School District, and city and tribal councils

Issue	Goal	Objective/Policy	Responsible Parties
Health			
108. Borough residents continue to face health concerns that are preventable, as well as high rates of violent and accidental death (1983, 1993, 2004B). 109. Local access to health care is limited; eye care is generally available locally only once per year and dental care twice per year (2004B). 110. There is limited access to veterinary care in the Borough (2004B).	Develop healthy communities that are based in traditional values. Increase access to health care services, including eye care, dental care, and veterinary care. Decrease public health risks throughout the Borough, including diabetes, fetal alcohol spectrum disorder, and rabies.	Re-evaluate existing programs that address health concerns, violence, and accidental death to improve effectiveness	North Slope Borough Health and Social Services Department, the Inupiat Community of the Arctic Slope (ICAS), and city and tribal councils
		Evaluate barriers to effective local health care throughout the Borough.	
		Investigate alternate funding sources and provider options for healthcare.	
		Continue health education, including the benefits of traditional diets and the disadvantages of non-local snack foods.	North Slope Borough Health and Social Services Department, North Slope Borough School District, and city and tribal councils
		Continue education on the effects of alcoholism and drug abuse on individuals, families, and communities.	
		Promote success stories for healthy communities.	
		Share traditional and contemporary local knowledge throughout the community for winter travel safety and survival skills.	
111. The lack of veterinary care increases public health issues, including the incidence of rabies (2004B). 112. There are limited places, such as safe rooms, for village residents to go if they are in a domestic abuse or sexual assault situation (2004V).	Reduce violence within Borough communities.	Identify and utilize community resources for rehabilitation of offenders, as well as outside alternatives.	North Slope Borough Health and Social Services Department and city and tribal councils, with assistance from state and federal agencies
		Provide and maintain shelters to provide protection from domestic violence.	
		Develop/continue a hot-line for domestic violence to support victims.	North Slope Borough Health and Social Services Department

Issue	Goal	Objective/Policy	Responsible Parties
Health (continued)			
113. Village residents lack access to mental health professionals (counselors) (2004V).	Provide Borough residents access to mental health services.	Utilize state mental health programs.	North Slope Borough Health and Social Services Department, ICAS, and city and tribal councils, with assistance from state and federal agencies
		Seek funding to sponsor mental health services, including visiting professionals and full-time staff.	
		Develop/maintain crisis lines for mental health resources and assistance.	
		Evaluate the availability and effectiveness of existing community infrastructure and support networks.	
Facilities			
114. Recreation facilities and activities are not available in all communities to provide youth and young adults with healthy activities (1993, 2004V).	Provide viable year-round recreation options in all communities.	Emphasize traditional activities and values, supported by community elders, such as developing skills for the Eskimo Olympics and traditional crafts.	North Slope Borough Health and Social Services Department and city and tribal councils
		Partner with the cities, village corporations, and schools to support or enhance recreation facilities and opportunities.	North Slope Borough Public Works Department, city and tribal councils, regional and village Native corporations, and North Slope Borough School District
		Identify community priorities for facilities and seek funding for development.	North Slope Borough Public Works Department and city and tribal councils
Other Socioeconomic Issues			
115. Market goods are difficult and expensive to access from the North Slope Borough (2004B).	Reduce cost of market goods to North Slope residents.	Form cooperative buying clubs to decrease costs of market goods.	City and tribal councils, regional and village Native corporations
		Encourage residents to utilize locally produced items, including traditional foods and goods.	
		Re-use existing market goods, via sharing used items between families and developing second-hand stores.	
116. Increasing transportation costs raise the costs of goods and services within the Borough (2005V).	Maintain practices that keep transportation costs reasonable.	Support and maintain bypass mail.	North Slope Borough Mayors office, U.S. Postal Service

Issue	Goal	Objective/Policy	Responsible Parties
Other Socioeconomic Issues			
117. There is not enough research on the positive and negative impacts of the relationship between the Borough and the resource development industry (2004E).	Understand the socioeconomic and cultural complexities of the relationship between the Borough and the resource development industry.	Identify examples of positive past partnerships and ways to promote the partnerships.	North Slope Borough Mayor's Office, city and tribal councils, and regional and village Native corporations
		Work with resource development industry to jointly provide needed local services, such as employment training programs.	
		Identify threats/problems with resource development industry and potential mitigation within the communities.	
118. Resource development changes the character of the landscape and alters the way local people use the land (2004V).	Minimize visual and other impacts on community character.	Locate and design oil and gas facilities to minimize visual and other impacts on community character.	North Slope Borough Planning Department, city and tribal councils, working with the petroleum and mining industry
119. Since the Borough has had difficulty selecting lands from the state, the Borough is not able to generate revenue from those lands (2004I).	Complete selection of Borough lands and obtain selected lands with potential for generating revenue for the Borough.	Work with ADNR to finalize their selections so that municipal and borough selections can proceed and minimize visual and other impacts on community character.	North Slope Borough Mayor's Office, Planning Department, city and tribal councils, and Native Corporations, working with BLM and ADNR
		Identify Borough priorities for land selection.	North Slope Borough Mayor's Office
		Seek funding and support to finalize land selections.	North Slope Borough Mayor's Office, working with BLM and ADNR

2.2.8 *Youth Involvement*

The Comprehensive Plan is expected to be in effect for the next ten to fifteen years. Because this plan will be affecting changes in the Borough as today's high school students become part of the workforce and local leadership, the Borough invited local youth to become involved in the revision process. They identified issues relevant to youth and potential solutions for their communities. The high school students in Nuiqsut participated in the project in December 2004.

Issue	Goal	Objective/Policy	Responsible Parties
		Drug and Alcohol Abuse	
120. Marijuana is widely used in our community (2004N). 121. Drugs affect everybody in town; some elders are robbed for drug money, parents use drugs and do not take care of their children, and teenagers use drugs too (2004N). 122. Alcohol abuse is tearing families apart; parents that drink sometimes abuse their children or end up away from their families in jail (2004N). 123. There are high rates of accidents and domestic violence in our community that are related to drug and alcohol abuse (2004N). 124. Alcoholic parents are a bad influence on their children (2004N). 125. Families spend money on drugs and alcohol instead of paying their bills (2004N).	Decrease or eliminate drug and alcohol abuse in the community. Provide safe homes for elders, children, and parents. Decrease accident rates and incidences of domestic violence. Provide positive role models for children. Develop good family financial management skills.	Continue education on effects of alcohol and drug abuse to individuals, families, and communities.	Local youth, North Slope Borough Mayor's Office, North Slope Borough Health and Social Services Department, North Slope Borough School District, city and tribal councils, state and federal agencies, and other partners.
		Conduct "community readiness surveys" to assess community readiness for change, increase community capacity, and create a climate that makes change possible, related to changing drug and alcohol habits (source: Plested, Barbara A., Ruth W. Edwards, and Pamela Jumper-Thurman. *Community Readiness Handbook for Successful Change*. Tri-Ethnic Center for Prevention Research.)	
		Pursue research grants to implement and evaluate substance abuse prevention programs (source: The Library at Akeela, Inc. www.akeela.org and Alaska Division of Behavioral Health Prevention Section 1-800-478-7677).	
		Promote traditional and contemporary local knowledge and values for healthy families and communities.	
		Implement Assets Programs in the communities, using *Helping Kids Succeed – Alaskan Style* (source: www.alaskaice.org).	
		Increase drug testing for employment and youth sports participation.	
		Increase drug searches at community access points, such as airports and ice roads.	
		Develop community-based crisis centers and safe homes for families coping with drugs and alcohol.	
		Encourage community members who have personally overcome drug and alcohol abuse to become advocates for change.	
		Develop family financial management education programs for local communities.	
		Conduct outreach to other partners in healthcare and social services to consolidate efforts to improve effectiveness and efficiency.	
		Develop youth recreation opportunities.	

Issue	Goal	Objective/Policy	Responsible Parties
Drug and Alcohol Abuse (continued)			
126. There is a lot of peer pressure to use drugs and alcohol (2004N). 127. Kids who use drugs and alcohol miss a lot of school (2004N).	Create peer education and support programs to decrease teen drug and alcohol abuse. Increase school attendance and achievement. Develop healthy environments that are free of drug and alcohol abuse and that incorporate traditional and cultural values. Empower teens to have a positive influence on their community and environment.	Establish a locally based Safe and Drug-Free Schools Program (source: Anchorage School District Safe and Drug-Free Schools Program: 907-742-4162 and Federal Safe and Drug-Free Schools National Training and Technical Assistance Center www.k12.coordinator.org). (Also see objectives for issues #120-125, above.	Local youth, North Slope Borough School District, North Slope Borough Mayor's Office, City and tribal councils
		Develop teen centers and provide alternative healthy activities for teens.	
		Develop a Mayor's Youth Advisory Commission for teens to continue to identify community issues and work toward practical solutions.	
		Acknowledge positive youth accomplishments through Spirit of Youth Campaign or similar programs (source: Teen Action Council www.spiritofyouth.org).	
Tobacco Impacts			
128. Children and babies get sick from second hand smoke (2004N).	Provide a healthy environment for children and babies. Decrease tobacco use in the community.	Provide education on tobacco's effects on individuals, families, and communities.	Local youth, North Slope Borough Mayor's Office, North Slope Borough Health and Social Services Department, city and tribal councils, state and federal agencies, and other partners.
		Provide support programs for people attempting to stop using tobacco products.	
		Conduct "community readiness surveys" to assess community readiness for change, increase community capacity, and create a climate that makes change possible, related to changing tobacco habits (source: Plested, Barbara A., Ruth W. Edwards, and Pamela Jumper-Thurman. *Community Readiness Handbook for Successful Change*. Tri-Ethnic Center for Prevention Research).	
		Pursue research grants to implement and evaluate tobacco use prevention programs (source: The Library at Akeela, Inc. www.akeela.org and Alaska Division of Behavioral Health Prevention Section 1-800-478-7677).	

Issue	Goal	Objective/Policy	Responsible Parties
Laziness			
129. Lazy adults set a poor example for their children; kids do not learn how to be valuable community members (2004N).	Provide positive role models for children. Develop valuable future community members.	Promote traditional and contemporary local knowledge and values for healthy families and communities. Implement Assets Programs in the communities, using *Helping Kids Succeed – Alaskan Style* (source: www.alaskaice.org).	City and tribal councils, North Slope Borough School District
Hatred and Jealousy			
130. There are divisions in our community due to hatred and jealousy (2004N).	Develop healthy communities that are based in traditional values, including the values of conflict avoidance, cooperation, sharing, humility, and love and respect for elders and one another.	Promote traditional and contemporary local knowledge and values for healthy families and communities.	City and tribal councils
Poverty			
131. There are high rates of poverty in our community (2004N). 132. Adult education and employment programs are needed in our community (2004N).	Decrease the poverty rates in our community. Develop adult education opportunities for residents. Create employment opportunities for residents.	Develop employment-training programs to help Borough residents become more employable. Decrease drug and alcohol use to help Borough residents become more employable. Establish local employment goals for outside companies to hire local employees. Create more locally owned businesses. Conduct outreach to other partners in employment and social services to consolidate efforts to improve effectiveness and efficiency.	North Slope Borough Mayor's Office, Health and Social Services Department, city and tribal councils, regional and village Native corporations, Ilisagvik College, North Slope Borough School District, and resource development industry

2.2.9 *Public Services, Facilities, and Government*

Public facilities and government services are dependent upon tax revenues from resource development in the North Slope Borough. Demand for services are remaining the same or increasing, while tax revenues are declining, and the Borough can no longer provide the same level of facilities and services that is has in the past. The cost of providing reliable services and facilities in the North Slope Borough presents challenges, and developing partnerships between the Borough, city and tribal governments, regional non-profit organizations, and Native corporations will become increasingly important in maintaining facilities and services.

Issue	Goal	Objective/Policy	Responsible Parties
Funding and Services			
133. As population and demand for services increase, and Borough revenues decline, some facilities and services may not be maintained (2004B). 134. The Borough stopped funding washeterias in the villages, which makes it difficult for residents who do not have home washing facilities (2004V). 135. Declining resource development revenue has impacted the ability of the Borough to provide public facilities and services used by residents (2004B).	Continue communication with residents about the North Slope Borough economy (via Speaking on the Issues, Borough Summits, etc.). Continue to implement operational efficiencies and cost-saving measures, restructure services and salary rates (2003). Pursue alternative approaches to service delivery, including contracting and new ways of providing services in-house (2003). Limit the initiation of new services; ensure revenue for services can be sustained over time or make trade-offs of existing services (2003). Build partnerships to transfer services and facilities to the appropriate entities. Selectively recover costs by increasing fees or reducing subsidies (2003).	Identify the role of the Borough in providing services and logical business partners to assist in providing services.	North Slope Borough Mayor's Office
		Prioritize funding for Borough services and facilities. Prepare mid- and long-range fiscal forecast of revenues and expenditures. Consider costs and benefits of services when developing the operating budget (2003). Evaluate the ability to operate and maintain new capital projects prior to funding construction (2003). Privatize Borough services when savings can be obtained and the quality of service is not diminished (2003). The Borough will find the most economically feasible way to provide services that cannot pay for themselves. Identify the hidden costs (indirect effects) of facility closings and funding services and facilities that are not the Borough's responsibility (e.g. Washeterias may have been able to be kept open if the Borough was not paying for jails and airports).	North Slope Borough Mayor's Office, Administration and Finance Department, working with city and tribal governments, and Native corporations

Issue	Goal	Objective/Policy	Responsible Parties
Funding and Services (continued)			
(continued from above)	(continued from above)	Identify roles, responsibilities, and resources at the borough and village levels to help with providing services (foster accountability).	North Slope Borough Mayor's Office, Administration and Finance Department, and city and tribal councils
		Build partnerships with village and regional corporations and tribes. Form assessment districts so that communities/neighborhoods can self-finance infrastructure needs. As public facilities or powers are delegated for local control, fiscal responsibilities for operations and maintenance are also delegated.	North Slope Borough Mayor's Office to initiate contacts with city and tribal governments, and Native corporations
		Pursue partnerships and cost sharing strategies with other for-profit and non-profit entities (2003).	North Slope Borough Mayor's Office to initiate contacts with business and non-profit partners
		Prepare or update master plans for key public services including fire, police, search and rescue, recreation and open space, and libraries.	North Slope Borough Mayor's Office, Administration and Finance, Police, Fire, Search and Rescue, and Planning Departments
		Provide information on the washeterias' past operating costs and procedures to communities and village corporations.	North Slope Borough Mayor's Office, Administration and Finance Department
136. The Borough funds facilities and services that are another government's responsibility, including airports, roads, and jails (2004I).	Build partnerships to transfer services and facilities to the appropriate entities.	Identify current facilities and services that need to be transferred to other entities. Privatize, transfer, or phase out Borough provided services that are not a Borough responsibility (2003).	North Slope Borough Mayor's Office, Administration and Finance Department working with city and tribal government and state and federal agencies
		Meet with appropriate agencies to discuss transfer options and the need to work together. Work with the administrations to develop agreements and initiate the transfers.	North Slope Borough Mayor's Office working with state and federal agencies

Issue	Goal	Objective/Policy	Responsible Parties
Public Facilities			
137. There is a perception that public services and facilities are not available to Borough residents at the same level as other communities in Alaska (1993, 2004V).	Encourage the development of services at the highest level possible, contingent upon funding levels.	Identify service needs and prioritize by community.	North Slope Borough Mayor's Office, city and tribal councils
		Clearly communicate what the Borough and other public service providers are capable of offering, and notify residents as changes in service levels are expected (2003).	North Slope Borough Mayor's Office, Public Works Department, Health and Social Services Department, and city and tribal councils
		Seek efficiencies in providing services (2003); get suggestions from operators and community residents.	North Slope Borough Mayor's Office, city and tribal councils
		Analyze other communities in Alaska of similar size for how they provide services to compare costs and means of service delivery.	North Slope Borough Mayor's Office
138. Some public facilities are outdated, not maintained, or not up to code, and funding for renovation is limited (2004I).	Encourage the development of safe facilities that meet building codes. Preserve physical infrastructure; maintain existing facilities and infrastructure in a manner that leads to operating budget savings (2003).	Update master plans for key public facilities and infrastructure, including utilities, solid waste, and roads.	North Slope Borough Public Works Department and city and tribal councils, state and federal agencies, and the Denali Commission
		Identify and prioritize maintenance and renovation needs by community.	
		Estimate costs for maintenance backlog and annual maintenance needs.	
		Design renovations that are durable and easy to maintain locally (sustainable).	
		Combine current facilities to utilize space efficiently and to reduce operating costs.	
		Research grant funding options, including partnerships with tribes and cities (2003).	North Slope Borough Public Works Department, Administration and Finance Department, and city and tribal councils
139. The Ilisagvik College lease will expire soon, which is a key facility for maintaining local access to post-secondary training and education (2005P).	Obtain adequate facilities for post-secondary training and education. Relocate the College campus in Barrow and/or Browerville in a timely manner.	Identify possible campus facility sites in Barrow and/or Browerville for future relocation. Secure lease agreements or purchase of facilities for post-secondary training and education.	North Slope Borough Mayor's Office, Public Works Department, and Ilisagvik College

Issue	Goal	Objective/Policy	Responsible Parties
Public Facilities (continued)			
140. Few places exist for community residents to gather, such as teen or senior centers (2004V).	Encourage the development of safe, healthy community centers, which are supported by the communities.	Identify needs and desired activities.	North Slope Borough Mayor's Office, city and tribal councils
		Identify resources, such as using existing buildings and school facilities during summer months. (Consider multiple purposes for existing structures.)	North Slope Borough Mayor's Office, city and tribal councils, and North Slope Borough School District
		Train community members to operate facilities and run programs.	North Slope Borough Mayor's Office, city and tribal councils
		Actively engage community members in operating facilities and programs. Encourage elders to foster a volunteer/teamwork approach to managing the facility/program for the benefit of the community at large.	North Slope Borough Mayor's Office, city and tribal councils, and Native corporations.
141. Villages do not have adequate telecommunications (2004B/I). 142. Multiple calls are required for village emergencies; existing radio repeaters can take three to four minutes to complete a call (2004B).	Continue to upgrade telecommunication services throughout the Borough.	Increase bandwidth services for village access to regional and global telecommunications networks.	North Slope Borough Public Works Department and Fire Department, city and tribal councils
		Implement Enhanced 911 systems in every Borough community.	
		Provide "real time" radio communication between the Police Department Dispatcher (in Barrow) and emergency responders (in the villages).	
		Investigate funding sources for upgrades, including Homeland Security funding.	
143. There are limited public access trails in villages (2004V).	Develop safe public access in villages. Implement transportation plan recommendations.	Review and update needs identified in the transportation plan, including trails for snowmobiles and ATVs.	North Slope Borough Public Works Department, city and tribal councils
		Research outside funding sources and potential partnerships for implementation (2003).	North Slope Borough Public Works Department, Administration and Finance Department, city and tribal councils, and state and federal agencies

Issue	Goal	Objective/Policy	Responsible Parties
Construction			
144. Plans for capital projects generally focus on existing needs, rather than future needs (2004B). 145. Construction projects are started even though funding for operation and maintenance is uncertain (2004B).	Develop sustainable capital projects that can be locally maintained and will meet future needs.	Consider population and demographic trends in project proposals and planning.	North Slope Borough Mayor's Office, Administration and Finance Department, and Public Works Department
		Continue communication with residents to assist with the transition from the existing economy to a realistic economy of the future (2003).	
		Review capital project proposals for long-term maintenance costs and levels of required maintenance (2003).	
Government Coordination			
146. There is poor communication between some of the Borough departments (2004B).	Improve interdepartmental communication and coordination.	Hold regular meetings for internal Borough coordination.	North Slope Borough Mayor's Office
147. The Borough, tribal, state, and federal agencies do not always communicate and cooperate effectively (2004B/V). 148. Government agencies (state and federal) typically do not have local offices and are not easily accessible to Borough residents (2004B/V). 149. Plan implementation is difficult without formal agreements or partnerships between government entities and industry (2004V).	Develop effective working relationships with other government agencies (between the borough and other governments, as well as with villages). Coordinate and collaborate with other government agencies to meet mutual objectives.	Develop liaison offices, possibly expanding the NSB liaison office, where contact information and current event information is located in a central place.	North Slope Borough Mayor's Office, city and tribal councils
		Initiate contact with all other agencies and organizations to discuss roles and opportunities for partnerships.	North Slope Borough Mayor's Office initiates contact with state and federal agencies and local organizations
		Develop agreements with other agencies and organizations to facilitate future working relationships.	North Slope Borough Mayor's Office initiates contact with state and federal agencies and local organizations
		Encourage agencies to communicate regularly with villages regarding agency programs and activities.	North Slope Borough Mayor's Office, encourage state and federal agencies to initiate contact with city and tribal councils
150. The North Slope Borough does not have a tribal policy of full cooperation and non-interference (2004V).	Develop effective working relationships with local tribes.	Develop a policy for interactions with tribes.	North Slope Borough Mayor's Office and tribal councils

Issue	Goal	Objective/Policy	Responsible Parties
Other Public Governmental Issues (continued)			
151. Governmental, tribal, corporation, and non-profit entities do not actively participate in promoting healthy communities (2004E).	Combine efforts to raise local awareness of traditional values and personal commitment to community, including how each individual benefits the community as a whole. Community representatives actively participate on boards and commissions.	Develop cooperative programs to assist job readiness.	North Slope Borough Mayor's Office, city and tribal councils, regional and village Native corporations
		Develop cooperative programs to reduce drug use, alcohol abuse, and domestic violence.	North Slope Borough Mayor's Office, city and tribal councils, regional and village Native corporations
		Promote healthy choices with a "wisdom of the elders" campaign to advocate traditional values, including healthy families and communities.	North Slope Borough Mayor's Office, city and tribal councils
152. North Slope Borough residents desire maximum local control over decisions that affect them (1998, 2004B).	Provide local residents with an active role in community planning, project planning, and regional planning.	Educate local residents on avenues for affecting decisions.	North Slope Borough Mayor's Office, Planning Department, and city and tribal councils
		Encourage participation from all sectors of the community, including the youth.	North Slope Borough Mayor's Office, Planning Department, and city and tribal councils
153. Lands available for village expansion, including shareholder lots, do not have enough roads and utilities to allow new construction (2004B/V). (Also see issues #11, 100, 101 and 102).	Provide developable lots for village expansion. Secure appropriate funding for road and utility development.	Develop long-term community plans.	North Slope Borough Planning Department assisting city and tribal governments
		Develop cooperative agreements between landowners (including Native corporations), the city, Borough, and funding agencies to coordinate construction funding and logistics.	North Slope Borough Mayor's Office, city and tribal councils, and regional and village Native corporations
		Pursue funding for road and utility development from the Bureau of Indian Affairs, State of Alaska, Denali Commission, and federal sources.	North Slope Borough Mayor's Office, Public Works Department, city and tribal councils, and regional and village Native corporations
154. During the summer months, the village youth lack challenging physical and mental activities (2004I).	Engage village youth in productive activities during the summer months.	Work with the school district to develop practical "external learning experiences" during the summer months.	North Slope Borough Mayor's Office, North Slope Borough School District, regional and village Native corporations
		Participate in culture camps.	North Slope Borough Mayor's Office, city and tribal councils, and regional and village Native Corporations
		Develop youth programs that serve the community and teach job skills.	North Slope Borough Mayor's Office, city and tribal councils, and regional and village Native corporations

2.2.10 *Petroleum and Mineral Development*

Resource development and production has provided financial and employment opportunities for Borough residents, and allowed the North Slope Borough to improve infrastructure, health and social services in it's villages. However, the expansion of oil and gas infrastructure into areas important for subsistence activities and fish and wildlife habitat, and potential cumulative effects, are of concern to Borough residents.

Issue	Goal	Objective/Policy	Responsible Parties
Environmental Impacts			
155. There is concern about future resource development in ecologically sensitive areas (2004E). (Also see Fish and Wildlife issues #80-83.)	Maintain the integrity of ecologically sensitive areas and habitats. Protect Teshekpuk Lake, the Colville River, and other sensitive areas from development impacts.	Work with elders and scientists, state and federal resource managers, and experienced hunters to identify ecologically sensitive areas and reasons for concern.	North Slope Borough Planning Department and Wildlife Department
		Present concerns to industry and other land managing agencies.	North Slope Borough Mayor's Office Planning Department, and Wildlife Department coordinate with industry and state and federal agencies
		Pursue land use regulations and zoning restrictions for ecologically sensitive areas that are documented by elders and scientists.	North Slope Borough Planning Department
156. Oil field infrastructure, including roads, pads, and pipelines cause physical changes in the environment (2004I/E).	Minimize physical changes in the environment from oil field infrastructure.	Work with industry in the permitting process to incorporate mitigation measures that reduce impacts.	North Slope Borough Planning Department with state and federal agencies and the petroleum industry
		Develop incentives for industry to develop alternative designs to minimize development footprint and consolidate facilities.	North Slope Borough Planning Department coordinates with petroleum industry during permitting process
157. The total area of resource development continues to expand incrementally, causing broader impacts to the natural environment (2004 E).	Avoid or minimize impacts to the natural environment from resource development.	Create concentrated developments with small footprints.	North Slope Borough Planning Department, working with resource development industry
		Promote development techniques, such as ice roads, that minimize permanent impacts to the environment.	North Slope Borough Planning Department, working with state and federal agencies and petroleum industry
		Rehabilitate obsolete facility sites.	
158. Borough residents are concerned about the cumulative effects of incremental development of petroleum and mineral facilities (2000V).	Assess and mitigate cumulative effects from multiple resource development projects.	Complete cumulative effects analyses for existing and new projects.	North Slope Borough Mayor's Office and Planning Department
		Identify effects and options for mitigation.	
		Encourage joint use of facilities wherever possible.	

Issue	Goal	Objective/Policy	Responsible Parties
Infrastructure Issues			
159. The oil field infrastructure is aging, increasing potential for failures or spills (2005P).	Maintain safe oil field infrastructure.	Include permit requirements for facility inspections/safety requirements.	North Slope Borough Planning Department; federal and state agencies, including the EPA and Occupational Safety and Health Administration (OSHA)
160. There is a lack of regulations for oil and gas pipelines (2005P).	Develop and implement state regulations for oil and gas pipeline installation, operation, and maintenance.	Develop agreements with the state for minimum criteria and inspections. Bring public attention to the issue to encourage development of state regulations for pipelines.	North Slope Borough Mayor's Office, Planning Department – interface with state agencies and industry
161. As oil fields are depleted and facilities become obsolete, there will be an increased need for the state to guarantee and enforce dismantlement and removal of facilities and restoration of sites (DR&R) (2005P).	DR&R facilities and sites in a timely, safe, and efficient manner.	Prioritize facilities and sites for DR&R. Establish Borough procedures to review DR&R plans and inspect sites. Provide key contacts for state DR&R teams.	North Slope Borough Mayor's Office – interface with state agencies and industry
Other Petroleum Development Issues			
162. Communities are concerned about the potential impacts of demobilizing oil and gas facilities in the future (2000V).	Require industry to rehabilitate oil and gas facility sites as resources are depleted.	Encourage public participation in demobilization planning.	North Slope Borough Mayor's Office and Planning Department
		Enforce existing permit requirements for demobilization.	North Slope Borough Planning Department, state and federal agencies
		Monitor demobilization efforts.	North Slope Borough Planning Department
	Assure adequate funds and resources for demobilization and restoration activities are established.	Work with federal and state agencies to ensure that adequate funds and resources for demobilization and restoration activities are being reserved.	North Slope Borough Mayor's Office and Planning Department, working with state and federal agencies

Issue	Goal	Objective/Policy	Responsible Parties
Other Petroleum Development Issues			
163. The economy of the North Slope Borough is subject to the boom and bust cycles of the resource development industry (2004 E).	Develop a more stable economy for the North Slope, which is supported by diverse businesses.	Identify other industries compatible with the North Slope Borough culture and climate.	North Slope Borough Mayor's Office and Planning Department and regional and village Native Corporations
		Identify barriers to new businesses and potential avenues for overcoming barriers.	
		Acknowledge the historic cycles of the economy and plan for financial downturns.	North Slope Borough Mayor's Office and Administration and Finance Department, and city and tribal councils
		Develop local businesses to serve local needs.	North Slope Borough Mayor's Office, city and tribal councils, and regional and village Native Corporations
164. There are potential economic opportunities in the undeveloped mineral deposits within the Borough (2004 E).	Expand the Borough's economic base. Increase local employment opportunities. Support research and exploration for mineral development potential.	Identify communities that support local mineral development.	North Slope Borough Mayor's Office and city and tribal councils
		Provide incentives for research and exploration for mineral development.	North Slope Borough Mayor's Office, city and tribal councils, and regional and village Native Corporations
		Develop guidelines for resource protection and economic returns to local communities.	North Slope Borough Mayor's Office, Planning Department, and Wildlife Department
165. Some communities close to natural gas resources do not have supply facilities (2004I). 166. It is expensive to develop natural gas facilities for supply and distribution to small communities (2004I).	Develop gas supply facilities in communities with close proximity to natural gas. Obtain grants and other funding sources to develop supply and distribution facilities.	Identify communities for potential gas supply development.	North Slope Borough Mayor's Office, city and tribal councils
		Develop business relationships with funding partners and the resource development industry.	
		Define roles and responsibilities for operations and maintenance.	
		Identify and apply for funding for project development, implementation, and maintenance.	

2.2.11 *Traditional and Contemporary Local Knowledge*

Traditional and contemporary local knowledge of the physical environment has been passed down between generations, and increased through the experience of Borough residents who have spent much of their lives working in and observing the environment. Traditional and contemporary local knowledge means knowledge imparted by elders, hunters, gatherers, whaling captains and others amongst the Inupiat people about the culture and history of the Inupiat people and the natural environment, including, but not limited to, knowledge of subsistence habits, uses, and traditions, wildlife, flora, fauna, land, sea, water, air, and ecosystem conservation. Residents have detailed knowledge of local conditions, including routine and historic events, which can affect the location and design of facilities and utilities. Mayor George Ahmaogak, summarized the issue of applying Traditional Knowledge in a paper delivered at a 1995 oil and gas workshop:

> *"... Industry and government agencies must recognize the value of the Traditional Knowledge of local people. We, the 'local people,' the indigenous people of the U.S. Arctic, want our opinions heard, and we want our Traditional Knowledge to be respected. Since we have lived here for many centuries, our people have learned much about the ice, snow, ocean currents, wildlife behavior, etc. In the past, there have been many instances where representatives of industry and/or government have come to us with the attitude that they 'know everything' and that our Traditional Knowledge is of little significance. Such an attitude is not only insulting, it is also incorrect. Our knowledge about the environment and its wildlife comes from direct observation over many lifetimes."*

Issue	Goal	Objective/Policy	Responsible Parties
Traditional and Contemporary Local Knowledge			
167. Research that combines traditional and contemporary local knowledge and science is limited and as a result does not sufficiently protect subsistence resources (2004B, 2004I).	Utilize traditional and contemporary local knowledge to help protect subsistence resources. Incorporate traditional and contemporary local knowledge in research design.	Conduct interviews with village elders to understand where traditional subsistence activities occurred.	North Slope Borough Planning Department coordinates with local city and tribal councils
		Document and archive the interviews in a manner that is useful and available to the borough and researchers.	North Slope Borough Planning Department coordinates with local city and tribal councils and the Inupiat History, Language, and Culture Commission
168. Traditional and contemporary local knowledge and scientific studies are not always incorporated into development plans (2004I/E).	Encourage industry and government entities to incorporate traditional and contemporary local knowledge and scientific studies into development plans.	Establish mechanisms for industry to easily access traditional and contemporary local knowledge and scientific studies relevant to proposed development plans.	North Slope Borough Planning Department and Wildlife Department
		Identify village residents that can help provide traditional and contemporary local knowledge to industry during development planning.	North Slope Borough Planning Department, Wildlife Department, and city and tribal councils
		Inventory, catalog, and transcribe existing interviews to make traditional and contemporary local knowledge more accessible and useful to the Borough.	North Slope Borough Planning Department, Wildlife Department, and Inupiat History, Language, and Culture Commission
169. State, and federal government entities, and the oil and gas industry do not fully understand the importance of traditional and contemporary local knowledge to Borough residents (2004B, 2004I/E).	Recognize the importance of cultural values and traditional and contemporary local knowledge to Borough residents.	Educate state, federal and local government entities, and the oil and gas industry about the importance of traditional and contemporary local knowledge to Borough residents.	North Slope Borough Planning Department
		Develop a handbook for government entities and oil and gas industry that relays the importance and utilization of traditional and contemporary local knowledge.	North Slope Borough Planning Department, Inupiat History, Language, and Culture Commission
		Seek out and incorporate aspects of traditional and contemporary local knowledge during project design, permitting, and environmental impact assessments.	North Slope Borough Planning Department, Inupiat History, Language, and Culture Commission, city and tribal councils

2.2.12 *Cumulative Effects*

Cumulative effects are defined as "the impact on the environment that results from the incremental or synergistic impact of a particular project when added to other past, present, or reasonably foreseeable future action." Oil and gas development has been incrementally expanding on the North Slope since initial development in Prudhoe Bay in the 1970's. The North Slope Borough and its residents are extremely concerned about the cumulative effects of development and transportation facilities on the fish and wildlife, subsistence activities, and social characteristics of North Slope and its communities. While significant advances have been made in reducing the footprint of oil and gas development and in common use of facilities, understanding the nature of cumulative effects and reducing their impacts remains a concern.

Issue	Goal	Objective/Policy	Responsible Parties
Cumulative Effects Issues			
170. Cumulative effects of human and natural activities on fish and wildlife are not well understood (2004B, 2004E).	Increase understanding of the cumulative effects of human and natural activities on fish and wildlife.	Coordinate with industry, and state and federal agencies to conduct studies regarding cumulative effects of human and natural activities on fish and wildlife.	North Slope Borough Mayor's Office, Planning Department, and Wildlife Department coordinate with industry and state and federal agencies
171. The total area of resource development continues to expand incrementally, causing broader impacts to the natural environment (2004 E).	Avoid or minimize impacts to the natural environment from resource development.	Create concentrated developments with small footprints.	North Slope Borough Planning Department, working with the resource development industry
		Promote development techniques, such as ice roads, that minimize permanent impacts to the environment. Rehabilitate obsolete facility sites.	North Slope Borough Planning Department, working with state and federal agencies and the petroleum industry
172. Borough residents are concerned about the cumulative effects of incremental development of petroleum and mineral facilities (2000V).	Assess and mitigate cumulative effects from multiple resource development projects.	Complete cumulative effects analyses for existing and new projects.	North Slope Borough Mayor's Office and Planning Department
		Identify effects and options for mitigation.	
		Encourage joint use of facilities wherever possible.	

Issue	Goal	Objective/Policy	Responsible Parties
Cumulative Effects Issues (continued)			
173. Cumulative effects are not always analyzed and mitigated when resource development projects occur in incremental stages (2004B). 174. Smaller resource development projects cannot always support requirements that reduce impacts on subsistence but increase project costs (2004B).	Minimize impacts of resource development on subsistence resources. Understand/mitigate/compensate cumulative effects of incremental development on subsistence.	Promote development techniques, such as ice roads, that minimize permanent impacts to the environment.	North Slope Borough Planning Department, working with state and federal agencies and petroleum industry
		Share study results with Borough residents.	North Slope Borough Mayor's Office, and Wildlife Department, , state and federal agencies, industry and academic institutions
		Mitigate or compensate for documented cumulative effects.	North Slope Borough Planning Department, Wildlife Department, and Law Department develop permit requirements
		Develop agreements between the borough, federal agencies, state agencies, and industry to cooperatively analyze and mitigate cumulative effects to subsistence from resource development.	North Slope Borough Mayor's Office, Planning Department, Wildlife Department, and Law Department

2.2.13 *Haul Road District and Other Industrial Roads*

The North Slope Borough Land Management Regulations have a zoning district for the Haul Road (Dalton Highway), and in 1999, the Borough completed a study of the need for adequate facilities and service along the Dalton Highway. Unless properly managed, activities that occur off of the Haul Road can have adverse effects on fish and wildlife, and on subsistence activities by Borough residents. Other industrial roads have been proposed for the North Slope, and management guidance must be developed in order to avoid or minimize adverse impacts.

Issue	Goal	Objective/Policy	Responsible Parties
Haul Road District and Other Industrial Roads			
175. The North Slope Borough provides significant public safety services along the Dalton Highway (2004B).	Encourage increased State of Alaska responsibility for public safety services along the Dalton Highway.	Continue to advise state agencies concerning safety issues and other state obligations on the Dalton Highway/Haul Road.	North Slope Borough Planning, Public Safety and Public Works Departments, and ADOT&PF
176. Commercial development along the Dalton Highway/Haul Road Corridor creates unfunded demands on Borough services (2004 B/I).	Reduce unfunded demands for Borough services within the Haul Road Corridor.	New commercial development on the Haul Road Corridor provides for its own facilities and services prior to or concurrent with development.	North Slope Borough Planning Department working with ADOT&PF, ADNR, and BLM
177. Off-road activities on the Dalton Highway and with other proposed industrial roads can harm fish and wildlife populations and subsistence activities (2004 B).	Provide adequate management and oversight of activities on and adjacent to industrial roads.	Provide funding and staff resources for public safety, and fish and wildlife management along industrial roads. Anticipate and plan for potential impacts to fish and wildlife and subsistence activities when locating and developing management guidelines for industrial roads.	North Slope Borough Public Safety and Wildlife Departments working with state and federal agencies

2.3 MONITORING THE PLAN IMPLEMENTATION

While there are many issues facing the Borough, there are many innovative actions proposed to address these challenges. Each year we plan to review our progress on meeting our goals and proposed implementation actions. In conjunction with the planning department's responsibilities for updating the Comprehensive Plan, the department will coordinate an annual review with all Borough departments to determine the status of the plan's implementation objectives. The goals of the annual review will be to:

- Identify successes
- Identify problems and obstacles
- Review the level of activity and the availability of resources
- Reassess relative priorities
- Maintain and verify departmental accountability
- Generate a set of recommendations to improve the quality and effectiveness of the Comprehensive Plan

A questionnaire will be sent to each department director that has been identified as the responsible agency for the Borough. It will include a list of all objectives/policies that relates to that department. The director shall indicate what action has been carried out, including:

- No activity and reasons for inactivity
- Accomplishments
- Problems or difficulties encountered
- Schedule for future action
- Recommendations for objective/policy changes, including additions and deletions

As illustrated throughout this document, the Comprehensive Plan cannot be implemented by the Borough alone. Partnerships are needed with other government agencies, including city and tribal councils, non-profit organizations, and the business community. We will also seek our business partners' evaluations and recommendations each year. We must work together to achieve stronger communities, vibrant economies, and healthy ecosystems.

Wainwright residents reviewing plan maps

These reports from the Borough departments and our business partners will be presented annually to the Planning Commission and Assembly for their consideration. This information should be a useful tool in developing and approving Capital Improvement Program budgets and priorities, as well as and the annual operating budget.

2.4 PUBLIC INVOLVEMENT SUMMARY

2.4.1 *Introduction*

The North Slope Borough views public participation as a key to successfully revising the Comprehensive Plan. The Borough's goals for the public involvement process were to address the unique aspects of the Borough and to effectively involve all interested stakeholders in the planning process. Stakeholders that were invited to participate in the planning process included:

- Borough communities and residents
- Borough departments, the Planning Commission, and the Assembly
- Borough schools and students
- Native corporations and Tribal organizations
- State and federal agencies
- Resource development industry
- Non-governmental organizations, including conservation organizations

The stakeholders provided guidance to the planning team for plan development; comments and concerns were used to develop issues, goals, and objectives.

2.4.2 *Public Notification*

Several measures were used to notify the public of the comprehensive plan revision process, including:

- Notices and informational flyers displayed throughout the community
- Personal contacts with community representatives
- CB announcements
- Letters of invitation
- Briefing papers
- Newsletter
- Articles in *Speaking on the Issues*
- North Slope Borough website

Prior to each community visit, community representatives were contacted to coordinate the meeting schedule and arrangements. Notices or flyers were provided to each community to advertise the meeting. Letters and briefing packets were sent to each city, tribe, and Native Corporation before the community visits. Immediately prior to each meeting, community announcements were made via local citizen's band radios. The draft plan was presented in each community in August 2005, and was also presented at a workshop with state and federal agencies, the petroleum industry, and conservation groups.

Letters were sent to each community to request their participation in a workshop that was held in Barrow in June 2004. Invitations were also sent to representatives from federal and state government, resource development industry, and conservation organizations.

A newsletter was sent to all post office box-holders in the Borough, as well as the external stakeholders that participated in the June workshops. The newsletter provided an update on the planning process, summarized issue topics, and highlighted innovative actions taken by each community. A comment form was also enclosed in the newsletter.

The North Slope Borough maintained a public website with information regarding the Comprehensive Plan revision process. Draft and final documents were posted to the website for public review.

2.4.3 *Meetings and Workshops*

Meetings were held in each community in the North Slope Borough from July through September 2004. A broad range of issues was identified in each community meeting. The planning team attempted to personally meet with as many community representatives as possible during the community visits. Additional meetings were held in each community in August 2005 to present the draft plan and to incorporate local comments into the final plan.

Community meeting in Point Hope

The planning team was able to meet with the majority of the North Slope Borough departments during the project kick-off meeting in Barrow in April 2004, and with many of the other departments throughout the remainder of the project. The local staff identified issues and concerns for inclusion in the plan.

In June 2004, the planning team held two workshops in Barrow. The first workshop was with internal stakeholders, or Borough residents. Residents of every community, except for Point Hope, participated in the workshop. The second workshop was with the external stakeholders, or representatives from federal and state government, resource development industry, and conservation organizations. Both of these workshops identified a strong framework of planning issues.

The Borough Planning Commission was briefed on progress at their meetings in April, June and 2005.

2.4.4 *Youth Involvement*

In October 2004, the planning team met with representatives from the North Slope Borough School District administration and the principals from each school to encourage youth participation in the comprehensive plan revision process. The planning team provided a curriculum-based project, tied to the State of Alaska education standards, to provide an overview of the planning process, relevant background information, and methods for local youth

to identify community issues. To date, the project was completed in one community, Nuiqsut, in December 2004. The outcomes of the Nuiqsut project were reported to the Economic Summit in Barrow in January 2005. A Youth Involvement section was incorporated into the Comprehensive Plan (Refer to Appendix: Youth Involvement Project).

2.4.5 *Presentation of the Draft Comprehensive Plan*

The planning team returned to each community in August 2005 to present the Draft Comprehensive Plan and obtain feedback. The presentation focused on planning issues, goals, objectives, and implementation responsibilities. In August 2005, a meeting was also held with representatives from state and federal agencies, the resource development industry, and non-profit organizations.

A work session was held with the North Slope Borough Planning Commission in August to review the plan. The Commission is scheduled to consider the plan during the September 2005 meeting. The Planning Commission would adopt the plan before it would be presented for consideration by the Borough Assembly.

2.4.6 *Comments Received on the Draft Comprehensive Plan*

Public comments on the draft plan were due on August 24, 2005. The comment period was extended to September 16, 2005, in response to requests from agencies and members of the public. Comments were received from individuals, villages, North Slope organizations, state and federal agencies, resource development industry and organizations, and conservation groups. North Slope Borough departments also provided additional comments and factual corrections to the draft plan.

Comments were incorporated, and a revised draft plan was posted to the North Slope Borough website on September 22, 2005, one week prior to the September Planning Commission meeting.

2.4.7 *Presentation of the Final Comprehensive Plan*

The planning team presented the final plan to the Borough Assembly on October 11, 2005. The plan was adopted by Ordinance 75-6-48.

Wainwright dancers and drummers at Kivgiq 2005

North Slope Borough
Background Report

Adopted by the
North Slope Borough Assembly
Ordinance 75-6-48
October 11, 2005

Prepared for:
The North Slope Borough

Prepared by:
URS Corporation

October 2005

This project was produced in part with National Petroleum Reserve -- Alaska funds made available through the State of Alaska Department of Commerce, Community and Economic Development

Abbreviations

AAAQS	Alaska Ambient Air Quality Standards
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
AEWC	Alaska Eskimo Whaling Commission
AHFC	Alaska Housing Finance Corporation
ANCSA	Alaska Native Claims Settlement Act
ANILCA	Alaska National Interest Lands Conservation Act
ANMC	Alaska Native Medical Center
ANWR	Arctic National Wildlife Refuge
ASRC	Arctic Slope Regional Corporation
ATV	All terrain vehicle
BLM	Bureau of Land Management
CRSA	Colville River Special Area
DCED	Department of Community and Economic Development
^{o}F	degrees Fahrenheit
DOD	Department of Defense
DDT	dichloro diphenyl trichloroethane
ESA	Endangered Species Act
FWS	U.S. Fish and Wildlife Service
GMUs	game management units
HH	Household
HUD	Housing and Urban Development
ICAS	Inupiat Community of the Arctic Slope
IHS	Indian Health Services
IWC	International Whaling Commission
LMR	Land Management Regulations
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Service
MPH	miles per hour
NAAQS	National Ambient Air Quality Standards
NMFS	National Marine Fisheries Service
NPRA	National Petroleum Reserve – Alaska
NPS	National Park Service
NSB	North Slope Borough
PAHs	polycyclic aromatic hydrocarbons
PBR	potential biological removal
PCBs	polychlorinated biphenyls
POPs	Persistent Organic Pollutants
RAB	Restoration Advisory Board
SSOC	State Species of Concern
TCF	trillion cubic feet
TNHA	Tagiugmiullu Nunamiullu Housing Authority
TLSA	Teshekpuk Lake Special Area
UNEP	United Nations Environmental Programme
URUSA	Utukok River Uplands Special Area
USAED	U.S. Army Engineer District, Alaska
USBLM	U.S. Bureau of Land Management
WCC	Woodward-Clyde Consultants
Y-K	Yukon-Kuskokwim

North Slope Borough
Background Report

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3.0 BACKGROUND REPORT

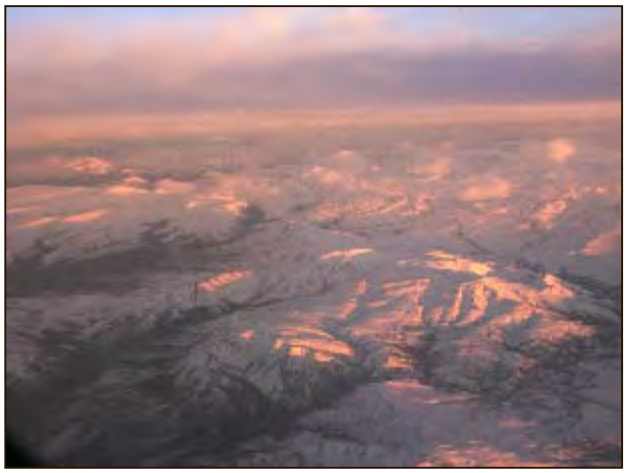
INTRODUCTION

The Background Report of the Comprehensive Plan provides more detailed information on the physical, biological, and human environments of the North Slope. It is intended to present information to assist in implementing the plan and the Title 19 Land Management Regulations that are based on the plan. The Background Report will also be useful to tribal governments, Native corporations, governments, and private industry corporations that plan for, manage, and develop resources and facilities on the North Slope. The Background Report is intended to provide information to assist in planning activities that are compatible with the people and natural environment of the North Slope. Throughout the Background Report, reference will be made to the use of Traditional and Contemporary Local Knowledge and other management practices that should be considered when pursuing activities within the Borough. The report is organized under the topics of physical, biological, and human environment.

3.1 PHYSICAL ENVIRONMENT

3.1.1 *Climate*

The North Slope Borough includes three regions with different climate, drainage, and geology characteristics: the arctic coastal plain, the Brooks Range Foothills and the northern portion of the Brooks Range. A dry, polar climate dominates the arctic coastal plain throughout the year, with short, cool summers and long, cold winters. Temperatures on the arctic coastal plain are typically below freezing from mid-October into May. Temperatures vary across the arctic coastal plain, depending on the proximity to the coast. In general, February is the coldest month with an average temperature of about -21 degrees Fahrenheit (^{o}F). July is typically the warmest month, with an average temperature of 46°F. Maximum temperatures can range from -56 ^{o}F during winter months to as high as 78°F in mid-summer. The nearby Arctic Ocean and abundant sea ice contribute to the cool, frequently foggy, summers (DCED 2004).



Early snow in the Brooks Range

Annual precipitation (both rainfall and snowfall) is low and mostly falls as snow during the winter. Precipitation varies somewhat across the arctic coastal plain. Kaktovik, located on Barter Island in the eastern portion of the Borough, receives approximately 5 inches of precipitation during the summer months and approximately 20 inches of snow during the winter months. Point Hope, located on the western end of the Borough, receives approximately 10 inches of precipitation annually, with snowfall of about 36 inches (DCED 2004).

South of the arctic coastal plain are the Brooks Range Foothills and the Brooks Range. There is a change in the climate conditions as the elevation increases. Air temperatures decrease rapidly with rising elevation (Nowacki, Spencer et al. 2001). Anaktuvuk Pass, located in the north-central portion of the Brooks Range, has more of a continental climate. Due to the higher elevation, summers are cool. The average temperature in January is about -14°F, and the average summer temperature is about 50°F. Extremes have been recorded from -56 to 91°F.

Anaktuvuk Pass receives approximately 11 inches of precipitation in the summer months, and receives an average of 63 inches of snowfall per year (DCED 2004).

Prevailing winds blow cold air off the Arctic Ocean and are strongest during winter, often creating blizzard conditions. The prevailing wind direction is typically northeasterly to easterly, and southerly winds may break this pattern on occasion. The average annual wind speed in the region is approximately 12 miles per hour (MPH).

3.1.1.1 General and unique climate characteristics (seasons, ice characteristics both offshore and soil, atmospheric)

The treeless, wind-swept arctic coastal plain gradually rises from the Beaufort Sea coast southward to the foothills of the Brooks Range. This flat to rolling coastal plain is underlain by unconsolidated soil deposits of marine, fluvial (riverine), glaciofluvial (glacial), and eolian (wind) origin, and has no bedrock near the surface. Due to low temperatures, permafrost is continuous across the region, except under large rivers and thaw lakes. Permafrost and frost processes contribute to a large variety of surface features such as pingos, ice-wedge polygons, and oriented thaw lakes. The presence of permafrost prevents surface drainage so soils typically are saturated and have thick organic horizons. Due to the abundance of thaw lakes (covering up to 50 percent of the surface) and saturated soils, nearly the entire region supports wetland vegetation. Although drainage over most of the area is poor, there are numerous large, braided rivers that originate in the Brooks Range and drain northward to cross the coastal plain (Nowacki, Spencer et al. 2001).

Sea ice typically forms on the Beaufort and Chukchi Sea in November and remains through early June. The formation of first-year sea ice along the coast signals the start of freeze-up. During the first part of freeze-up, nearshore ice is susceptible to movement and deformation by winds and ocean currents. By late winter, the first-year sea ice is about 6 to 7 feet thick. The ice freezes to the seafloor and forms the bottomfast-ice subzone of the landfast-ice zone. The landfast-ice zone may extend from the shore out to depths of 45 to 60 feet (Wickersham & Flavin Planning Consultants 1982; U.S. Department of the Interior 2004).

Nearshore ice in the spring

Rivers and lakes start freezing in September. Some rivers and lakes freeze to the bottom, other maintain flow under the ice or have deep pools, which are critical to both the survival of fish and as a source of water for community and industrial uses (such as ice roads). Along the Beaufort Sea coast, breakup of the rivers and lakes generally begins in late May but may occur as late as mid-June. River ice begins to melt before the sea ice and, during the early stages of breakup, water from rivers may temporarily flood ice that has formed on the deltas.

Storms are a major factor in weather on the North Slope, and a consideration for all types of offshore and onshore human activity. Offshore storms can create hazards for residents pursuing subsistence activities, and create wave and ice conditions that are hazardous to oil exploration and production offshore structures. Storms also contribute to coastal erosion and ice override hazards (see Section 3.1.x). Onshore, storms can bring transportation to a halt, endanger people traveling between communities, and cause snow drifting that buries facilities and roads.

3.1.1.2 Trends and changes (ice characteristics)

Temperatures in Alaska and throughout the arctic appear to have fluctuated over the last few centuries. Changes in sea ice and permafrost are an important indicator of climate change (U.S. Department of the Interior 2004). Observations made over the last 50 years indicate a decline in the arctic sea-ice extent in all seasons, with the most prominent retreat in the summer. The average extent of sea-ice cover in summer has declined by 15 to 20 percent over the past 30 years. This decline is expected to accelerate over the next century with the projected near total loss of summer sea ice. Formation of sea ice is also occurring later in the season, which can increase the hazard of storms and coastal erosion. In addition, sea level is expected to rise on the order of 0.3 to 3 feet over the same time period (Hassol 2004) Observations indicate that permafrost is melting in some locations along the North Slope, resulting in problems for community facilities (see Section 3.1.3).

3.1.2 *Characteristics of North Slope physiographic zones (ocean, nearshore/coastal, riverine, uplands, foothills, mountains)*

Arctic Coastal Plain

The North Slope Borough includes the physiographic regions of the arctic coastal plain, the Brooks Range Foothills and the northern portion of the Brooks Range. The arctic coastal plain is characterized by periglacial features such as thaw lakes, marshes, and polygonal patterned ground. The coastal plain extends southward from the shoreline approximately 30 miles into the coastal lowlands. There is little topographic relief and relatively poor drainage. The polygonal patterned ground forms from ice wedges that freeze within contraction cracks in the soil. Throughout the year, these cracks fill with water and snow, then freeze and expand. Freshwater lakes cover approximately 26 percent of the arctic coastal plain (Nowacki, Spencer et al. 2001).

View of the arctic coastal plain and coastal lowlands

Brooks Range Foothills

The Brooks Range Foothills are characterized by gently rolling hills and broad exposed ridges form the northern flank of the Brooks Range. Narrow alluvial valleys and glacial moraines and outwash are interspersed among long linear ridges, buttes, and mesas comprised of tightly-folded sedimentary rocks. Most of the surface is mantled with colluvial and eolian deposits. A dry polar climate dominates the land, but is somewhat warmer and wetter than the arctic coastal plain. The surface is underlain by thick continuous permafrost and slope-related periglacial features, such as solifluction lobes and stone stripes, are common. Because the permafrost impedes drainage, soils in the active layer are usually saturated and have fairly thick organic horizons. Soils of the lower foothills tend to be calcareous, whereas the upper foothills are frequently acidic. Many braided streams and rivers with highly variable seasonal discharge are present. Lakes are infrequent. Some streams freeze solid to their bottoms, causing large aufeis deposits that last well into summer (Nowacki, Spencer et al. 2001).

Brooks Range

The Brooks Range is an east-west trending range that represents the northern extension of the Rocky Mountains. To the west and east, the topography becomes less rugged. High-energy streams and rivers cut through narrow ravines with steep headwalls etching a deeply-incised, dendritic pattern into the terrain. Few remnant small cirque glaciers exist in the Brooks Range. Valleys and lower mountain slopes on the north side of the range are covered by mixed shrub-sedge tussock tundra with willow thickets along rivers and streams. Alpine tundra and barrens dominate at higher elevations along the entire crest of the range (Nowacki, Spencer et al. 2001).

3.1.3 *General geological characteristics (mineral and oil/gas provinces)*

The geology of the North Slope Borough can be divided into four relatively distinct provinces: the central and eastern Brooks Range, the Delong Mountains in the western Brooks Range, the arctic foothills, and the arctic coastal plain (Wahraftig 1992).

Central/Eastern Brooks Range

The central and eastern Brooks Range encompasses several smaller mountain ranges, including (from west to east) the Endicott, Phillip Smith, Shublik, Franklin, Romanzof, and Davidson Mountains. These mountains were built by upthrusting of Paleozoic- and Mesozoic-aged sedimentary and metamorphic rocks during Mesozoic and Cenozoic time. A large body of granite intrudes the metamorphic rocks of the Romanzof Mountains in the eastern Brooks Range (Selkregg 1975; Moore, Wallace et al. 1994). Significant metalliferous lode deposits related to intrusion of polymetallic veins and skarn deposits have been identified in the Franklin and Romanzof Mountains (Nolkeberg, Bundtzen et al. 1992). This is an area of the North Slope with the high potential for mineral development.

Delong Mountains

The Delong Mountains are characterized by a deformed thrust-faulted belt of late Paleozoic to Mesozoic-aged sedimentary and mafic volcanic rocks (Moore, Wallace et al. 1994). Extensive coal beds occur within these rocks, and oil shale is common along the northern front of the mountains (Selkregg 1975). The Red Dog Mine, a massive sulfide deposit containing copper, zinc, lead, and silver, lies on the south side of the Delong Mountains near the southern boundary of the North Slope Borough (Wickersham & Flavin Planning Consultants 1982). Other significant metalliferous lode deposits have been identified along the Delong Mountains, including podiform chromite, bedded barite, and massive sulfide lead-zinc deposits (Nolkeberg, Bundtzen et al. 1992). This is an area of the North Slope with high potential for mineral development.

Arctic Foothills

The arctic foothills province extends along the north side of the Brooks Range and wraps around the west end of the Delong Mountains near Point Hope. The arctic foothills are composed of primarily Cretaceous-aged sedimentary rocks containing sandstone, conglomerate, siltstone, organic shale, and coal. These rocks comprise a sedimentary basin area known as the Colville foredeep and foreland fold belt, which is characterized by numerous east-west trending folds that trap several known oil and gas fields. It also contains more shallow deposits of frozen natural gas hydrates. These formations also contain extensive coalbeds and potential coalbed methane resources (Merritt and Hawley 1986; Kirschner 1992; Magoon III 1994; Tyler, Scott et al. 2000).

Arctic Coastal Plain

The arctic coastal plain is covered by Quaternary-aged unconsolidated deposits that overlie gently south-dipping Cretaceous- and Tertiary-aged sandstone, conglomerate, shale, and siltstone (Selkregg 1975). Extensive coalfields and potential coalbed methane resources occur beneath the arctic coastal plain in the Cretaceous and Tertiary formations (Merritt and Hawley 1986; Tyler, Scott et al. 2000). Deeper subsurface late Paleozoic and Mesozoic formations, that are buried extensions of Brooks Range rocks, thin out and truncate to the north against a major east-southeast trending structure known as the Barrow Arch. These conditions provide many stratigraphic traps that contain the major oil and gas fields of the Prudhoe Bay region (Selkregg 1975; Kirschner 1992). Approximately 20 oil and gas fields occur in the North Slope coastal region extending from Barrow to the Canadian border (Kirschner 1992; Magoon III 1994). The arctic coastal plain remains an area of high potential for oil and gas development.

3.1.4 *Air and Water Quality*

3.1.4.1 Air Quality

Air quality information in the North Slope Borough is limited to some villages and areas where oil development has occurred. An Ambient Air Quality Monitoring Station, operated at Nuiqsut since 1999, and a comprehensive year-long air quality and meteorological study at Prudhoe Bay, provide the best available estimate of existing conditions and changes that could occur with development. Data collected at the Nuiqsut site are representative of background and regional air quality in the Colville River Delta and the Alpine facility. These data indicate that air quality is in compliance with National Ambient Air Quality Standards (NAAQS) and Alaska Ambient Air Quality Standards (AAAQS) for all pollutants and averaging periods (U.S. Department of the Interior 2004).

Emission sources in North Slope villages consist of diesel-fired generators and home heaters, open burning, small aircraft, and vehicle traffic. Regional sources of emissions consist of oil and gas production facilities such as Kuparuk, Milne Point, Prudhoe Bay, Northstar, Endicott and the Alpine facility.

Arctic haze is a phenomenon that typically affects the North Slope air quality in winter and spring, when visibility can be reduced from more than 50 miles to less than 5 miles. Arctic haze was first reported in the 1950s, well before North Slope developments took place. Scientists believe the haze is the result of long-range transport of pollution from the burning of heavy oils in industrialized Europe (USAED 1999).

Freshwater stream flowing to saltwater

3.1.4.2 Water Quality

Most freshwaters in the North Slope Borough are typically pristine in water quality. Along the coast, seawater often infiltrates upstream for several miles from the mouths of major rivers, increasing the sodium chloride (salt) concentrations. The concentration of total dissolved solids in streams generally increases from their headwaters to the mouth. Total dissolved solids vary seasonally from a low concentration during peak flow to increasingly high concentration as winter progresses. The freeze/thaw

cycle in the arctic plays a controlling role in water quality. In winter, surface waters less than 6 feet deep freeze solid. Major ions and other "impurities" in the ice are typically left in the sediment when breakup occurs, giving these waters a very low dissolved solid concentration (Wickersham & Flavin Planning Consultants 1982; U.S. Department of the Interior 2004). In waters deeper than six feet, ions are forced into the deeper water column with a proportionate increase of concentrations of dissolved solids. As a result, a distinct off-flavor and saline taste affect the potability of water from these shallower "deep-water" lakes and river pools by late winter.

Sources of potential water contamination include human activities associated with oil and gas exploration and production, and with the Borough's villages. Oil and gas activities can contaminate water from sources such as oil and fuel spills, runoff from developed sites, landfills, sewage treatment, and reserve pits associated with drilling. Villages contain similar sources of contamination, including fuel spills, landfills, and sewage disposal. The Borough encourages efforts to reduce potential sources of water contamination, such as the closure and restoration of existing reserve pits and improvements in landfill design and management.

3.1.5 *Hazards*

3.1.5.1 Erosion

Coastal Erosion

Coastal erosion is becoming a major problem in many communities in the North Slope Borough. Erosion is minimal during the winter months when the seas bordering the arctic coast are frozen. The ice acts as a wave dampener, retarding coastal erosion processes during this period. Ice ridges along the coast also serve to protect the coastal beaches and bluffs. However, during summer, erosion of the thawed beaches and the thermal erosion of coastal banks and bluffs proceed at a rate such that coastal retreat is a continuing problem throughout the Arctic. Recession rates as much as 33 feet per year have been reported along the coast of the arctic coastal plain (Selkregg 1975). The retreat is primarily due to thermal erosion and collapse of the coastal banks, as beaches are narrow or absent along much of the coast. Other factors contributing to coastal erosion are storm surges and wave action from major storms, and potentially rising sea levels over the next century (Hassol 2004).

Coastal erosion control project in Barrow

Several communities in the North Slope Borough are experiencing coastal erosion, specifically Barrow, Wainwright, Kaktovik, and Point Hope. Erosion control and protection measures are currently being used in some communities with mixed success. Continued needs for erosion protection and the effectiveness of protection measures should be assessed on a regular basis. Coastal erosion is also a major factor in siting community facilities and housing. During site selection for facilities (including airports, tank farms, and landfills) and housing, short and long-term potential for coastal erosion should be assessed.

River Erosion

Erosion of stream banks results from thermal erosion, bank undercutting, high velocity flooding, and ice scour by broken river ice during spring breakup. As water comes into contact with ice-cemented sediments, heat transfer causes the ice to melt. As streams thaw, the exposed bars, beaches and banks become sources of sand and silt for wind scour. Wind deflation blowouts are common along stream and lake banks (Selkregg 1975). The potential for erosion in communities located on rivers, such as Atqasuk, Nuiqsut, and Anaktuvuk Pass, should be assessed for existing and future facilities.

3.1.5.2 Flooding

Flooding on rivers occurs during spring breakup between May and early July. During spring breakup, ice jams increase the height of floodwater, especially in downstream reaches. When spring flow begins, water flows over the snow and ice in the channels. Flooding can extend for considerable distances beyond channels. Flooding subsides as channel ice is carried downstream and out to sea. The potential for riverine flooding should be assessed when designing and locating new facilities and housing, particularly in Atqasuk and Nuiqsut.

Rarely do flood events occur along the arctic coastal plain that result from precipitation events. Intense, long periods of rainfall can cause general flooding and swollen streams. This is not a normal yearly occurrence because of the low precipitation in the Arctic; however, floods from August rains have been extensive (Selkregg 1975).

During late fall, storm surges often cause significant flooding and damage along coastal areas. In the fall, the sea ice may be far enough offshore that high winds can develop high waves and a storm surge tide that inundate coastal areas. Both Barrow and Kaktovik have experienced flooding during fall storms, and potential for flooding should be a factor when siting new facilities and housing.

3.1.5.3 Permafrost melting

Permafrost consists of frozen soil, frozen rock, or buried ice masses that have remained below a temperature of 32°F for more than two years. Continuous permafrost is present throughout the North Slope Borough, both on land and nearshore. Permafrost melting may occur due to both natural and man-made conditions. Seasonal fluctuations cause material near the ground surface to thaw and refreeze yearly. This active layer ranges from 0.5 to 10 feet thick and extends down to the top of permafrost. Occasionally the entire active layer may not refreeze in winter, potentially causing pressurized porewater to be forced to the surface forming ice sheets known as aufeis. Aufeis often forms in floodplain areas (Wickersham & Flavin Planning Consultants 1982).

Thermokarst ground features can form when ice-rich soil experiences melting due to either natural or man-made causes. These include mounds, sinkholes, tunnels, caverns, ravines, lake basins, circular depressions, and polygonal ground patterns. Natural thaw lakes, a dominant

feature in the arctic coastal plain, form by localized thawing of the upper permafrost by ponded water. Thaw lakes or subsidence may also develop in disturbed areas, such as minor depressions in the tundra caused by vehicle tracks. Thaw lake shorelines tend to migrate in the direction of prevailing winds, as wind increases the undercutting of soil (Wickersham & Flavin Planning Consultants 1982; USAED 1999).

Man-made structures such as roads, buildings, and pipelines can cause permafrost melting. Though all frozen soils are susceptible to thermal degradation, fine-grained ice-rich soils experience the most significant engineering property changes when thawed. Experience in arctic construction has yielded methods of placing structures in permafrost without significantly disturbing the thermal balance. Designs typically either insulate the permafrost or separate it from damaging heat sources. Examples include elevated roads with gravel insulation beneath, pilings that separate structures from the permafrost, and thermal piles that circulate fluids to draw heat from the ground. Frost heave can occur in fine-grained soils in the active layer, or on the edge of thaw bulbs adjacent to lakes, potentially affecting pilings and structures (Wickersham & Flavin Planning Consultants 1982; USAED 1999). Problems associated with the melting of permafrost and settlement under sewer lines has been reported in the community of Point Lay; system repairs have been required frequently over the past several years. Permafrost is a consideration for both the design and location of utilities, facilities and housing.

Climate changes may cause slow long-term permafrost melting due to both natural climate cycle effects and man-made contributions from carbon dioxide emissions. Studies of permafrost temperature profiles suggest that mean annual ground surface temperatures in Alaska have warmed on the order of 3 to 8°F over the last century, and as much as 3 to 4 ^{o}F over the past few decades (Osterkamp 1984; Hassol 2004; U.S. Department of the Interior 2004). In addition, the depth of the active layer is increasing in many areas. Over the next 100 years, permafrost degradation caused by climate change is projected to shift the southern limit of continuous permafrost northward by several hundred miles, potentially reaching the southeast portion of the North Slope Borough (Hassol 2004). Since much of arctic engineering and construction design is based on assuming permafrost will remain frozen if structures are engineered properly, if the permafrost melts due to climate change, design bases are flawed and structures more likely to fail.

Permafrost is also present in offshore areas of the North Slope Borough, having formed when portions of the Chukchi and Beaufort seas were exposed to the arctic climate during periods of lower sea levels. Offshore permafrost occurs in both unbonded and ice-bonded forms. Ice-bonded sediment is held together by interstitial ice similar to onshore permafrost, while unbonded permafrost occurs where temperatures are below 32°F but saline porewater inhibits ice formation. The depth to ice-bonded permafrost generally increases with distance from shore (USAED 1999). Like onshore permafrost, offshore ice-bonded permafrost is susceptible to thaw effects near man-made structures. Subsidence could threaten the stability of buried pipelines or wellbores.

Gas hydrates constitute another subsea permafrost concern. Gas hydrates are solid crystals of gas and ice that occur within and beneath subsea permafrost. Heat from offshore drilling could potentially change hydrates to a gas/water form (Wickersham & Flavin Planning Consultants 1982).

3.1.5.4 Ice override

Ice override occurs when sea ice is shoved onto shorelines and offshore islands by the pressure of moving ice sheets. Ice override is often referred to as ice ride-up and pile-up to describe horizontal and vertical ice movements, respectively. When moving sea ice contacts steep slopes or bluffs, failure tends to occur in a buckling mode, causing pile-up events; whereas ice ride-up tends to occur on more gently sloping beaches. Generally, wind is the main force that causes major ice override events. In the Beaufort Sea, a strong southwest wind combined with a high tide and westward currents create some of the most hazardous ice override conditions (USAED 1999). Capes and headlands are particularly affected by ice override because they are more exposed to shifting ice. Factors that make a coastline more susceptible to ice override include a relatively steep nearshore slope that allows ice to move close to shore before grounding, and an absence of offshore bars and shoals that impede ice movement (Maynard and Partch and Woodward-Clyde Consultants 1984).

Ice override can push aside beach and tundra material, potentially resulting in damage to coastal structures. Ice override events that shoved ice up to 40 feet high and 300 feet inland, crushing houses and boats, have been reported in the Barrow area (Wickersham & Flavin Planning Consultants 1982). Ice override events on barrier islands in the Point Lay area have been documented as moving 98 to 846 feet onshore and were up to 6.6 feet high (Maynard and Partch and Woodward-Clyde Consultants 1984). Moving ice also exerts lateral and vertical forces on offshore drilling structures and artificial islands. Artificial islands are typically engineered to include features such as slopes, benches, and walls that impede, deflect, or accommodate ice override (USAED 1999).

3.1.6 *Physical environment implications for development*

3.1.6.1 Seasonal limitations on development

Tundra Travel

The widespread occurrence of permafrost requires special engineering considerations for the design, construction and maintenance of structures and facilities. Permafrost degradation is primarily related to the insulation qualities of the surface layers and the ice content of the frozen ground beneath. Sensitivity is great along the arctic coastal plain, especially in the northern portion where the surface organic layer is thinnest and soil ice content is highest. Given these conditions, development along the coastal plain is limited to winter months when the ground surface is sufficiently frozen, there is adequate snow cover, and ice roads can be constructed. This prevents damage to the tundra material and subsequently to the underlying permafrost. Conditions and time frames for tundra travel are currently subject to federal, state, and borough regulations. In addition, traditional and contemporary local knowledge of the environment has been passed down from generation to generation and increased through the experience of Borough residents who have spent much of their lives working in and observing the environment. Residents have detailed knowledge of tundra conditions.

Tundra view in the summer months

All project proponents should consult with Borough staff and village residents during the planning and design stages of projects in order to incorporate traditional and contemporary local knowledge in an appropriate manner. The incorporation of traditional and contemporary local knowledge should be an integral component of the project plan; it is not a well-reasoned approach to ignore thousands of years of knowledge until a very late stage of project planning. The Borough particularly emphasizes that project proponents should foster constructive relationships with tribal governments and local governments.

Traditional and contemporary local knowledge has been utilized in the Arctic Gas pipeline project and the Alpine CD4 project to result in safer facility location and designs. There are some projects that the Borough was dissatisfied with how traditional and contemporary local knowledge was used. While there are still improvements to be made in the effective incorporation and utilization of traditional and contemporary local knowledge, efforts such as these will serve as educational tools for future projects.

Offshore Activities

Seasonal limitations also affect offshore vessel traffic and oil and gas operations. Offshore activities typically avoid both break-up and freeze-up conditions when sea ice is thin, broken, and unpredictable. As indicated in Section 3.1.1.1, sea ice typically forms in November and remains until early June. Open water conditions usually exist for 2 to 3 months in the summer (USAED 1999). Once shorefast ice forms and the ice is thick enough to support heavy equipment, ice roads can be constructed for travel in offshore areas.

However, the periods leading to break-up and freeze-up are a great concern for oil and gas exploration activities, due to the inability to contain and recover spilled oil in broken ice. Traditional and contemporary local knowledge on sea ice and severe weather conditions, such as fog, ice, winds, sea state, and currents, indicates that spill response would be severely impeded. Oil skimmers would have great difficulty working efficiently in broken ice and slush ice conditions. There are great dangers for boat travel during periods when unpredictable leads can open and shut quickly. Traditional and contemporary local knowledge is based on extensive experience navigating the Beaufort and Chukchi Seas over thousands of years.

Broken sea ice in early summer

All project proponents should consult with Borough staff and village residents during the planning and design stages of projects in order to incorporate traditional and contemporary local knowledge in an appropriate manner. The incorporation of traditional and contemporary local knowledge should be an integral component of the project plan; it is not a well-reasoned approach to ignore thousands of years of knowledge until a very late stage of project planning. The Borough particularly emphasizes that project proponents should foster constructive relationships with tribal governments and local governments.

3.1.6.2 Hazards

Hazards associated with development that are inherent to the arctic environment include permafrost thawing, channel flooding and erosion during spring breakup, and shoreline impacts. As indicated in Section 3.1.5.3, major engineering problems arise in areas underlain by permafrost containing poorly drained fine-grained sediments. These sediments contain large amounts of ice, and when disturbed, a change in the thermal balance causes the ice to melt. Thawing produces excessive wetting and plasticity, making the sediments unstable resulting in frost heaves, slumping and subsidence of the ground surface. These processes and cycles of freezing and thawing in the active layer can cause extensive damage to building foundations and other facilities, roads and airstrips. Design criteria for pads and structures needs to consider appropriate measures to insulate the soils (gravel pads, foam insulation) and use of thermal piles to avoid introducing heat into the permafrost. Similarly, tundra travel off of ice roads needs to consider adequate snow cover and soil freezing to avoid damaging the vegetation in a manner that will accelerate thawing of permafrost.

Location and design criteria for pads, roads and stream crossings need to consider both the magnitude of design flood events and the height of floodwater during spring breakup. The height of water during a given flood event is a function of the amount of snow and ice in the channel as breakup begins, and the presence of ice jams that may form as the channel ice begins to move downstream. If the height of floodwater is underestimated, pads, roads and other structures may be inundated during breakup. Design criteria for road and pipeline stream crossing also need to account for impacts from ice blocks as they are transported downstream during breakup conditions. Channel ice that is detached from the channel bottom as spring breakup occurs can cause damage to under-designed structures such as bridges, culverts and pipeline supports at stream crossings. Residents of North Slope communities have knowledge of local conditions related to flooding, breakup, and characteristics of specific rivers and streams. Consultation with local residents should occur as part of the siting and design process.

As indicated in Sections 3.1.5.1 and 3.1.5.4, the coastline of the Borough is subject to both ice override and thaw erosion of coastal bluffs. These hazards could conspire to impact as much as a several hundred foot swath of land adjacent to the shoreline. Design criteria for structures within this zone need to account for ice forces and coastal recession, and restrictions on future development within these areas should be considered on a site-specific basis.

3.1.6.3 Spill response

Oil and fuel spills can occur in areas of oil and gas exploration and production, and in villages. Potential impacts to soil and water resources from spills of oil or other contaminants are documented in other planning documents for North Slope projects (e.g., (USAED 1999; U.S. Department of the Interior 2004). Oil spills could occur from a variety of sources such as pipelines, exploration and production pads, roads, airstrips, bridges, or village fuel systems, and could reach tundra, lakes, rivers, or marine water and sediment. Spills released onto tundra can infiltrate snow, vegetation, and soil, or flow downhill until reaching surface water bodies or depressions. The spread of spills onto water surfaces depends on viscosity, temperature, and ice cover.

There are analyses that indicate that spills onto ice would be prevented from spreading rapidly by snow and ice roughness (U.S. Department of the Interior 2004). These sources also indicate that spills onto water between broken ice would not spread as rapidly as on open water and oil leaks under nearshore sea ice would likely not spread until breakup due to slow under ice currents. However, the Borough disagrees with such analyses. Traditional and contemporary local knowledge indicates that the effects of under-ice currents would have a major impact on

the spread of oil in the Beaufort and Chukchi Seas. There are also substantial limitations for boat operations for clean-up efforts during periods when unpredictable leads can open and shut quickly.

To date, there have been no oil spill recovery techniques that have been effectively designed or tested to clean up oil in spring broken ice conditions, fall freeze-up conditions, or under solid ice. In addition, there is a substantial lack of resources and technical capability to stop, recover, and clean up an oil spill in an offshore environment. There is not presently an ice-breaking barge located on the North Slope for oil spill response. Dispersants have not proved to be an effective option when tested in the North Slope Borough. Because of the existing risks of an oil spill from offshore resource development activities, the North Slope Borough has a vested interest in improving offshore oil spill response technology and techniques and encourages industry innovation in developing new spill response techniques to address the climatic conditions of the North Slope Borough.

Responses to spills require different measures depending on the location of the spill and season. Onshore spill containment during frozen ground conditions may include mechanical recovery using heavy equipment, whereas manual or natural degradation methods might be used in summer months to minimize damage to tundra and permafrost. Spill response in offshore areas may employ boats and booms in summer ice-free months; whereas response during broken ice conditions would be very difficult as previously discussed. Offshore spill response during continuous ice conditions may be similar to onshore winter response, making use of heavy equipment transported over ice road (USAED 1999). However, if spills penetrate cracks in ice, there are limited resources and techniques available for handling under-ice spills.

The difficulty in responding to spill events under certain conditions (offshore areas during broken ice, freeze-up or slush ice conditions, and under ice in frozen conditions; and onshore areas during summer months) suggests that development activities, particularly drilling, be seasonally limited to avoid these conditions and afford maximum response capability, unless drilling occurs on an onshore gravel pad. The risk of spills reaching and/or spreading on open waters can be minimized by avoiding the placement of oil development infrastructure in floodplains or near rivers, lakes, and beaches. The Borough has discouraged offshore development because of the current high level of impact risk to the subsistence way of life; there is simply a lack of resources and technical availability to effectively stop, recover, and clean up an oil spill in the offshore environment at any time of year in the North Slope Borough.

3.1.6.4 Persistence of airborne/water/soil contaminants in the arctic environment

Certain contaminants in air, water, and soil are known to persist in the arctic environment more than in temperate regions. A group of chemicals known as persistent organic pollutants (POPs) are carbon-based chemicals that include industrial compounds such as polychlorinated biphenyls (PCBs), pesticides such as DDT, and industrial wastes such as dioxins. These chemicals resist degradation through natural processes and bioaccumulate in living organisms. Long-range transport via the atmosphere is the most likely source of POPs in the arctic. While the use of most of these chemicals has been discontinued In the U.S. for years, they are still widely used in many developing countries. POPs are a concern in arctic Alaska not only because global air and water currents tend to carry them to northern regions, but also because they accumulate in the fat tissues of humans and animals at the top of the food chain, such as those that comprise a critical part of the subsistence diet of Native Alaskans (Chary 2000; Tesar 2000; Tesar 2000b). Current research suggests that POPs may have an effect on the immune systems of children in the arctic as well as other possible health effects (Tesar 2000a).

In 2002, several countries of North America and Europe were party to a global treaty to protect human health and the environment from POPs (United Nations Environmental Programme (UNEP) 2004). It is anticipated that global reduction in the use of POPs will occur as a result of this agreement; however, progress is expected to be slow since much money and time will be needed to replace POPs in developing countries that are highly effective for their intended use, such as pesticides that fight the spread of malaria (Tesar 2000a). POPs are not known to originate in the North Slope Borough, except for minor occurrences in soils at old military installations (Crump 2000). Other than the continued management of old contaminated sites by the military and ADEC, limitations on future development in the Borough would not have an effect on the presence of POPs in the physical or biological environment.

Spills of hydrocarbons or other contaminants that originate in the North Slope Borough from oil and gas operations or other sources are likely to persist in the physical environment in certain forms. Oil spills are subject to degradation and a number of interrelated weathering processes, including spreading, evaporation, dispersion, dissolution, emulsification, microbial degradation, sedimentation, and photo-oxidation. The toxicity of crude oil decreases with time as lighter, more harmful, aromatic hydrocarbons evaporate. Air quality impacts, acute chemical toxicity, and physical effects such as oiling of feathers, are greatest during the first month following a spill. Sublethal effects may be observed in surviving birds, mammals, and fish for years after a spill, as the toxic components of hydrocarbons such as PAHs persist in soils and lake or marine sediments (USAED 1999). Despite the acute short-term effects on tundra, recovery of vegetation has been documented in studies after several decades following oil spills (Athey, Reeder et al. 2001).

3.1.7 *Use of Traditional and Contemporary Local Knowledge*

Traditional and contemporary local knowledge of the physical environment has been passed down from generation to generation and increased through the experience of Borough residents who have spent much of their lives working in and observing the environment. Traditional and contemporary local knowledge means knowledge imparted by elders, hunters, gatherers, whaling captains and others amongst the Inupiat people about the culture and history of the Inupiat people and the natural environment, including, but not limited to, knowledge of subsistence habits, uses, and traditions, wildlife, flora, fauna, land, sea, water, air, and ecosystem conservation.

Residents have detailed knowledge of local conditions, including routine and historic events, which can affect the location and design of facilities and utilities. Traditional and contemporary local knowledge can provide information on local flooding, erosion, ice override, storm, and geological conditions.

Traditional and contemporary local knowledge for the North Slope area is well documented in written record at the University of Alaska – Anchorage, University of Alaska – Fairbanks, Barrow Tuzzy Consortium Library, North Slope Borough Planning Department Inupiat History Language and Culture division, North Slope Borough Planning Department's Geographic Information System, tribal organizations, and the Alaska Eskimo Whaling Commission records, among other locations. In addition, federal agencies such as the National Science Foundation, National Oceanic and Atmospheric Administration, and Minerals Management Service have specific funding and programs to elicit and document traditional and contemporary local knowledge, and have an obligation as tribal trustees to provide this information to the public.

All project proponents, including resource and village development projects, should consult with Borough staff and village residents during the planning and design stages of projects in order to incorporate traditional and contemporary local knowledge in an appropriate manner. The

incorporation of traditional and contemporary local knowledge should be an integral component of the project plan; it is not a well-reasoned approach to ignore thousands of years of knowledge until a very late stage of project planning. The Borough particularly emphasizes that project proponents should foster constructive relationships with tribal governments and local governments.

Traditional and contemporary local knowledge has been utilized in the Arctic Gas pipeline project (from Kaktovik) and the Alpine CD4 project (from Nuiqsut) to result in safer facility location and designs. There are some projects that the Borough was dissatisfied with how traditional and contemporary local knowledge was used. While there are still improvements to be made in the effective incorporation and utilization of traditional and contemporary local knowledge, efforts such as these will serve as educational tools for future projects.

The Alaska Eskimo Whaling Commission (Alaska Eskimo Whaling Commission 2005) provided an example of traditional knowledge being relied upon to inform decisions regarding development.

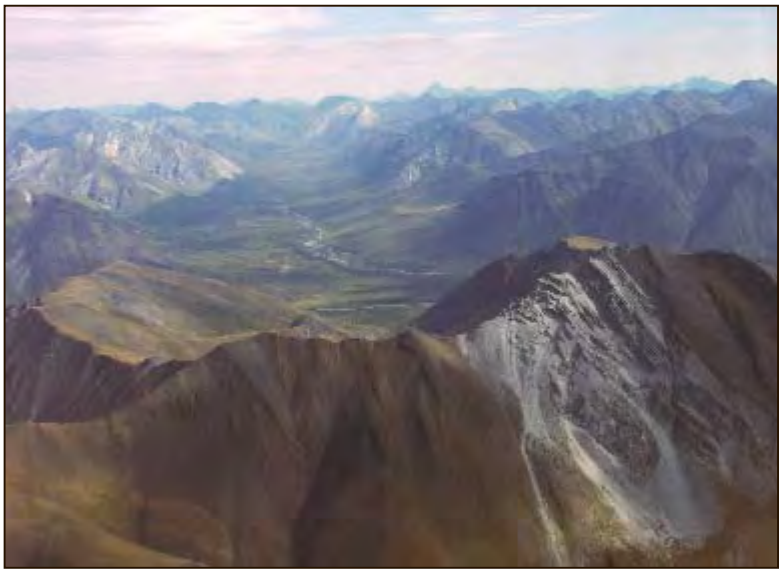
> When Phillips Petroleum proposed building an ice island to drill the McCovey Prospect, the NSB and AEWC, based on Eskimo traditional knowledge of arctic sea ice, informed state officials that the drill site was located in the “shear ice zone” and that attempting to drill this prospect from an ice island would be extremely dangerous. Fortunately, the State was persuaded and did not permit the drilling operation to go forward. Had the operator gone ahead with this project, it could have had serious environmental consequences and could well have endangered the lives of those who worked on the ice island.
>
> A different operator later applied to drill at the same site using a bottom-founded drilling structure. The Borough and the AEWC believed that this structure would be able to withstand the pressures of the shear ice zone, and agreed that the project should go forward.

Traditional whaling boat ready for the spring harvest

3.2 BIOLOGICAL ENVIRONMENT

3.2.1 *Ecosystem/habitat components*

The North Slope Borough lies within the arctic region of Alaska, a planning unit defined by the Joint Federal-State Land Use Planning Commission as an area encompassing the drainage basins of the northward-flowing rivers from the divide of the Brooks Range into the Chukchi and Beaufort seas (Selkregg 1975). The arctic region, and thus the North Slope Borough, can be divided into habitat subregions, or provinces based on physiography that serves to support the biological resources. The Delong Mountains and the central and eastern Brooks Range constitute the southern boundary of the arctic region. The range is a rugged area comprised of high (elevation >2,500 feet), glaciated mountains, nearly barren of trees, extensively underlain by permafrost, and covered at lower elevations by alpine and tussock tundra vegetation. The Arctic Foothills (elevation 800-2,500 feet) abut the range to the north and are a passageway to the sea for numerous rivers, such as the Colville, Kuparuk, Sagavanirktok, and Canning, and consist of rolling tussock uplands and dwarf shrub, herbs, and lichen tundra habitat (United States Geological Survey 1995) *in:* (Alaska Department of Natural Resources 1998). The arctic coastal plain (elevation <800 feet) connects the foothills with the arctic coast and is distinguished by the numerous lakes, thaw ponds, frost cracks, and polygonal ground formations that support extensive wetland habitats (Selkregg 1975). The arctic coast is the terminus for many river deltas emptying to the open sea, and is generally low-lying except for occasional bluffs and sea cliffs (Figure B-1). The key fish, wildlife, marine mammal, and protected species within the area that depend on these habitats for survival are discussed below.



View of the Brooks Range, near Anaktuvuk Pass

3.2.2 *Fish*

Fish species on the North Slope must deal with harsh environmental conditions such as seasonal cycles of freezing and thawing to survive. Winter lasts from between eight and ten months, during which freezing temperatures reduce fish habitat by more than 95 percent (U.S. Department of the Interior 1998). As a result, fish overwintering habitat becomes extremely important for the survival of fish populations, and care must be taken that development activities (such as water withdrawal, gravel mining, and bridges) do not impact these habitats. During the winter food is scarce, so fish are required to feed extensively during summer to accumulate energy reserves for over-wintering. Fish on the North Slope grow more slowly than fish living in warmer regions where food is plentiful year-round (U.S. Department of the Interior 1998). The key fish species known to occur in marine and freshwater regions of the North Slope are listed in Table 3.2-1. Three main categories of fish species are considered in this document: freshwater or resident, migratory, and marine. Many of these species are important for subsistence use.

3.2.2.1 Distribution of fish (location and seasons, migratory pathways)

In the Arctic, fish distribution depends on a number of factors, such as adequate over-wintering areas, appropriate feeding and spawning areas, and access to these areas, generally through interconnected waterways (U.S. Department of the Interior 1998). At the onset of winter, nearshore waters begin to freeze, and resident and migratory fish move upstream, while marine species that have migrated nearshore to feed, move further offshore. During the winter, streams less than six feet deep freeze solid to the bottom, and resident and migratory fish move to over-wintering streams and lakes with depths exceeding seven feet, where there is appropriate habitat and ample oxygen to sustain large numbers of fish (U.S. Department of the Interior 2004).

During the summer (open water period), melting coastal ice paired with river runoff creates relatively warm and brackish (low to moderate salinity) nearshore conditions. This band of brackish water typically extends from 1 to 6 miles offshore, but can extend as a plume to 15 miles offshore in areas of river deltas (U.S. Department of the Interior 1998). Marine invertebrates are present in this nearshore area because of the quantities of detritus transported and discharged into marine waters by the major rivers. The concentration of invertebrates, in turn, creates an influx of feeding migratory fish to the nearshore brackish area, and occasionally resident and marine fish.

Freshwater Fish

Freshwater fish species (also known as resident species) generally remain within freshwater rivers, streams, lakes, and ponds year-round. These fish feed, spawn, rear, and overwinter throughout these watersheds. The abundance of most arctic freshwater fish is limited by the availability of proper wintering habitat (National Research Council 2003). Large drainage systems of the central and eastern Borough such as the Colville, Sagavanirktok, and Canning rivers support diverse populations of freshwater fish species. The key freshwater species include arctic grayling (*Thymallus arcticus)*, round whitefish (*Prosopium cylindraceum*), lake trout (*Salvelinus namaycush)*, Alaska blackfish (*Dallia pectoralis)*, ninespine stickleback (*Pungitius pungitius*), and slimy sculpin *(Cottus cognatus)* (Froese 2004; U.S. Department of the Interior 2004).

The diet of freshwater fish consists of terrestrial and aquatic insects and larvae, zooplankton, snails, clams, fish eggs, and small fish (U.S. Department of the Interior 1998). Lake trout reportedly consume large quantities of slimy sculpin and ninespine stickleback, in addition to least cisco, round whitefish, and grayling (U.S. Department of the Interior 1998). Freshwater fish typically spawn from early spring to early fall in habitat with suitable gravel or rubble. As mentioned previously, winter temperatures drive fish to the deeper areas of lakes, rivers, and streams (U.S. Department of the Interior 1998).

Arctic grayling are one of the most abundant and widespread freshwater species in the Colville River drainage above the confluence of the East and West Delta channels. In addition to the Colville River, arctic grayling typically overwinter in deep areas within large river systems such as the Kuparuk, Sagavanirktok, and Canning rivers. In spring, adults move to tributaries to spawn, and during the summer, they move further downstream, into lakes or the main channel, to feed (National Research Council 2003). The lakes and streams of the Colville River watershed also support populations of ninespine stickleback, slimy sculpins and a small population of blackfish (U.S. Department of the Interior 2004).

The Sagavanirktok River delta provides over-wintering habitat for arctic grayling (Ott 1997; Alaska Department of Natural Resources 1998), while the middle reaches of the Canning River

provide habitat for arctic grayling and round whitefish (Alaska Department of Natural Resources 1998). In addition to the Canning River, the Kavik and Shaviovik rivers provide important spawning and over-wintering habitat for arctic grayling (Alaska Department of Natural Resources 1998).

Smaller river systems, like the Tingmiaksiqvik River, provides habitat for round whitefish and arctic grayling during the summer and winter (U.S. Department of the Interior 2004). Round whitefish are also found in Fish Creek (U.S. Department of the Interior 2004). Lake trout are widely distributed in lakes north and west of Fish Creek. The Utuoko and Kokolik rivers support populations of arctic grayling (Wickersham 1993b).

Migratory Fish

Migratory fish can be divided into two categories, anadromous and amphidromous. Anadromous fish are hatched and reared in freshwater, migrate to and spend a majority of their adult lives at sea, and then return to their natal freshwater rivers and lakes to spawn and die. Amphidromous species migrate often between estuarine nearshore waters and freshwater rivers and streams, usually in search of food, refuge, or spawning habitat. In comparison to anadromous fish species, amphidromous species live longer, grow more slowly, and become sexually mature later in life (U.S. Department of the Interior 1998). Anadromous streams are indicated in Figure B-6.

All migratory species feed primarily on epibenthic mysids and amphipods, as well as copepods, fish, and insect larvae during the summer, and most species cease feeding when they return to freshwater in the fall (U.S. Department of the Interior 1998). For those species that spawn during this time, their spawning habitat likely also serves as their over-wintering habitat, because the requirements are the same.

Anadromous Fish

Key anadromous species found in the North Slope Borough include arctic char (*Salvelinus alpinus)*, Dolly Varden (*S. malma malma*), arctic cisco (*Coregonus autumnalis*), Bering cisco *(Coregonus laurettae*), chum and pink salmon (*Oncorhynchus keta* and *O. gorbuscha* respectively), and rainbow smelt (*Osmerus mordax dentex)*. Depending on the species, juvenile anadromous fish can spend up to four years (e.g., Dolly Varden) maturing and feeding in freshwater before moving to marine waters (Froese 2004). Also depending on species, adults can spend up to five years feeding and growing to maturity (e.g., chum salmon) in nearshore marine waters before returning to natal waters to spawn (Froese 2004). Refer to Figure B-6 for key anadromous streams.

The nearshore brackish waters and lagoon systems (e.g., Nelson and Simpson lagoons) along the Beaufort Sea form a corridor along the coast through which anadromous fish migrate and feed. Adult fish generally leave the freshwater systems and enter the Beaufort Sea during early summer, after the nearshore ice has melted, to feed and accumulate energy reserves for over-wintering, or if sexually mature, for spawning (Alaska Department of Natural Resources 1998). Most anadromous species disperse to nearshore areas parallel to the shore whereas species more tolerant of the cold (e.g., arctic cisco and some arctic char) disperse widely from their stream of origin (U.S. Department of the Interior 1998). Migration back to their natal rivers varies by species, but most anadromous fish return to spawn by mid-September (Alaska Department of Natural Resources 1998). As mentioned for freshwater species above, the Colville, Sagavanirktok, and Canning river drainage systems support a wide variety of populations of migratory fish species.

The Colville River provides habitat (especially over-wintering) for dominant populations of arctic cisco and smaller populations of chum and pink salmon, and Dolly Varden (Alaska Department of Natural Resources 1998). Both pink and chum salmon are taken in the fall subsistence fisheries (U.S. Department of the Interior 2004). Arctic cisco are one of the most abundant and widely distributed whitefish in the coastal waters of the Bering Sea during the summer and the lower Colville River during the fall (U.S. Department of the Interior 2004). Arctic ciscos of the Colville River do not spawn in Alaska, but migrate from their natal Mackenzie River Delta system in Canada and move westward into the Alaska Beaufort Sea during late summer (U.S. Department of the Interior 2004). Their migration is a function of wind-generated coastal currents (National Research Council 2003). There is limited information on Bering cisco, but like arctic ciscos, they are likely distributed in the coastal waters of the Beaufort Sea during the summer and the lower reaches of the Colville River during the winter. They are a relatively important subsistence species in Barrow (U.S. Department of the Interior 2004).

The Sagavanirktok River delta provides over-wintering habitat for Dolly Varden and arctic char (Ott 1997; Alaska Department of Natural Resources 1998).

The spring-fed upper reaches of the Canning River provide spawning and over-wintering habitat for Dolly Varden and arctic char (Alaska Department of Natural Resources 1998). In addition to the Canning River, the Kavik and Shaviovik rivers provide spawning and over-wintering habitat for Dolly Varden and arctic char (Alaska Department of Natural Resources 1998).

River systems other than the Colville, Sagavanirktok, and Canning watersheds, although smaller, provide important habitat for a variety of fish species. The Hula Hula River is a major spawning and over-wintering area for arctic char; a smaller over-wintering area is located about 19 miles inland from the river mouth (Wickersham 1993b). This drainage is heavily used by the residents of Kaktovik (Wickersham 1993b). Spawning and over-wintering areas for arctic char are also found near the headwaters of the Aichilik River and the Egaksrak River, as well as the Ekaluakat River, which is a tributary to the Egaksrak (Wickersham 1993b). One of the larger perennial springs in the North Slope Borough, Sadlerochit Springs, is considered important habitat for rearing juvenile arctic char (Wickersham 1993b). Shublik Spring, located near the confluence of the Marsh Fork and Canning Rivers, provides important over-wintering habitat for arctic char (Wickersham 1993b).

The Korgakut River is possibly one of the most important streams in the eastern North Slope to provide habitat for arctic char. A 20-mile section of this river harbors spawning and over-wintering arctic char (Wickersham 1993b). The Utuoko and Kokolik Rivers support populations of arctic char, pink salmon, and chum salmon (Wickersham 1993b).

Rainbow smelt are unlike other anadromous fish in that they spend their winters and summers in nearshore brackish waters and spawn in the spring. Spawning takes place in the lower reaches of the Colville River (U.S. Department of the Interior 2004).

Amphidromous Fish

Key amphidromous species found in the North Slope Borough include: broad whitefish (*Coregonus nasus),* humpback whitefish (*C. oidschian*), and least cisco (*C. sardinella*) (Froese 2004; U.S. Department of the Interior 2004). Amphidromous fish can spawn either in a marine or freshwater environment, and do not necessarily die afterwards, as with anadromous fish (U.S. Department of the Interior 1998). Most amphidromous species spend more time in brackish, nearshore waters than in marine waters, but some populations (i.e., non-migratory components) of least cisco, and broad and humpback whitefish remain within freshwater river and lakes year-round (U.S. Department of the Interior 1998).

The least cisco is one of the most abundant whitefishes in the nearshore areas of the Beaufort Sea, especially Prudhoe Bay and Sagavanirktok Delta areas (Alaska Department of Natural Resources 1998). The least cisco spawns during late September and October in the Colville, Ikpikpuk, and Prive rivers (U.S. Department of the Interior 2004).

The Colville, Ikpikpuk, and Chipp rivers provide regionally important habitat (especially over-wintering) for dominant populations of broad and humpback whitefish (Alaska Department of Natural Resources 1998; Morris 2003; National Research Council 2003). The broad whitefish are distributed throughout the freshwater systems of the North Slope during summer and fall, and are an important subsistence fishery (U.S. Department of the Interior 2004). The Ublutuoch River, although relatively small, appears to be an important wintering area for broad whitefish as well as important spawning grounds because the gravel substrate remains thawed during the winter (Morris 2003). Broad whitefish have been documented to move during three different periods: during spring, the fish move to small streams/productive riverine habitats; in the summer they move to more productive habitats; and from summer to fall, they move to spawning and wintering areas (Morris 2003). The humpback whitefish summer distribution is likely limited to main river channels and low-salinity coastal areas (U.S. Department of the Interior 2004).

Marine Fish

The marine environment along the North Slope consists of inlets, lagoons, sand bars, and mudflats (U.S. Department of the Interior 1998). Key marine species found along the North Slope include arctic cod (*Boreogadis saida*), fourhorn sculpin (*Triglopsis quadricornis*), and arctic flounder *(Pleuronectes glacialis)* (Froese 2004; U.S. Department of the Interior 2004). Marine fish prefer the colder, more saline waters seaward of the nearshore brackish zone, and spend their entire lives in the marine environment, although some species migrate nearshore during summer to feed. The diet of these marine fish species consists primarily of marine invertebrates such as amphipods, mysids, isopods, and copepods. In addition, flounders prey on bivalve mollusks, while fourhorn sculpins consume juvenile cod. Occasionally, marine and migratory fish species will be in direct competition with one another for food, usually in the nearshore areas.

Arctic cod are very abundant in coastal regions during the summer and winter. In the Beaufort Sea, the fish may also be found in estuarine lagoons and into fresh water river mouths. The movements of arctic cod between nearshore and offshore environments are related to spawning as well as ice distribution (U.S. Department of the Interior 2004).

Fourhorn sculpin and arctic flounder exhibit nearshore habitat preferences similar to arctic cod, as they are found in cold brackish and moderately saline water near the coast. Both species migrate nearshore during summer to feed, and may travel considerable distances up rivers (U.S. Department of the Interior 2004). Fourhorn sculpin travel into the freshwater of coastal rivers, and as far as 85 miles upstream in the Meade River (U.S. Department of the Interior 2004). These fish move onshore-offshore seasonally; they travel to deeper water in the spring, and remain there until summer (U.S. Department of the Interior 2004).

3.2.2.2 Trends and development considerations

Freshwater Fish

Development in the North Slope Borough can affect the dispersal or survival of freshwater fish through the alteration of drainage patterns, in combination with water withdrawals and contamination (National Research Council 2003). Drainage patterns are most altered by the

construction of gravel roads or pads in or through wetlands and drainage areas. During spring breakup, if long roads interrupt the flow of snow melt, the water level can be artificially raised, thereby causing a high-velocity water flow through culverts that can inhibit or delay upstream movement by fish. During summer, the water flow is lower than in spring, and some fish, such as the broad whitefish, must move to deeper waters to overwinter. Impoundments caused by improperly placed culverts or streambed modifications can reduce the water flow so that the shallow area freezes early, or is too shallow for passage, thereby trapping the fish and leading to mortality (National Research Council 2003). The proper placement and use of open bottom culverts as opposed to closed-bottom culverts will help to ensure proper flow and access of fish to other areas of a stream. Some human alterations have been found to enhance or create freshwater fish habitat. Abandoned gravel pits that have filled with water and are linked to an existing water body have been shown to provide additional overwintering habitats for freshwater fish such as arctic grayling (National Research Council 2003).

Water withdrawals for the construction of ice roads can affect water quality, available amount, and alter water flow, thereby disrupting fish habitat. The removal of water in fish-bearing lakes is regulated by the Alaska Department of Natural Resources. The use of screens while pumping water can prevent fish from being deposited on ice roads, thereby leading to mortality. However, not all contractors install screening in their pumps (National Research Council 2003). Any contamination near fish-bearing water bodies can become concentrated when the water volume is reduced or flow altered due to an activity mentioned above, thereby becoming more harmful to the fish.

Seismic activity related to development activities has caused fish harm and mortality due to the sudden and large changes in ambient pressure. The introduction of vibratory or percussion equipment has proven to generate a slower velocity energy below the threshold known to affect fish in streams and lakes, thereby reducing the adverse effect on fish (National Research Council 2003).

Migratory Fish

As mentioned above for freshwater fish, gravel and ice roads, and water withdrawals can alter habitat for migratory fish (anadromous and amphidromous) and prevent movement throughout water bodies. Because migratory fish must be able to reach freshwater spawning grounds from marine waters, any construction in the nearshore waters could disturb the fish or prevent their passage to the freshwater stream (National Research Council 2003).

Any modification of the coastal environment that would prevent or interrupt the movement of migratory fish to spawning or overwintering grounds can lead to reduced recruitment. Structures such as sold-fill causeways have been shown to alter the coastal currents and alter fish movements within the coastal band of warm water. Changes in nearshore circulation can lead to temperature and salinity changes, which can affect sensitive species such as broad whitefish. Filled causeways built perpendicular to the shoreline as opposed to parallel to the shore exert more of an impact on currents and fish. The Borough oversees a causeway-monitoring program, which has shown that the West Dock Causeway has interfered with the eastward movement of juvenile least cisco and humpback whitefish moving from the Colville River to Prudhoe Bay during early summer (National Research Council 2003). This blockage was reduced by a breach retrofit in 1996. For these reasons, development activities should favor the use of breaches or elevated causeways, over solid-fill causeways.

Marine Fish

As mentioned for migratory fish above, the construction of causeways should incorporate design features that ensure the passage of fish and do not restrict coastal currents. Because many marine fish use the coastal area for feeding, any alteration of water chemistry or temperature may interfere with the distribution of prey. If prey becomes scarce, fish must expend more energy than usual to find prey, or compete with other larger fish, their nutritional load may decline, thereby possibly leading to poor health and mortality or reduction in recruitment.

The effects of climate change and increasing temperatures over the past 10-15 years have been more pronounced in the arctic regions than elsewhere in the world (National Research Council 2003). Warming of ocean waters may improve fish stocks of arctic cod, which may lead to increased commercial fishing pressure in the Arctic Ocean and Beaufort Sea (Union of Concerned Scientists 2005).

Table 3.2-1
Key Fish Species Found in the North Slope Borough

Common Name	Scientific Name	Inupiaq Name
Arctic grayling	*Thymallus arcticus*	Sulukpaugaq
Lake trout	*Salvelinus namaycus*	Iqaluaqpak
Alaska blackfish	*Dallia pectorali*	Iluunqiniq
Ninespine stickleback	*Pungitius pungitius*	
Slimy sculpin	*Cottus cognatus*	
Round whitefish	*Prosopium cylindraceum*	Savigunnaq
Arctic cisco	*Coregonus autumnalis*	Qaaktak
Bering cisco	*Coregonus laurettae*	
Rainbow smelt	*Osmerus mordax dentex*	Ilhuagniq
Arctic char	*Salvelinus alpinus*	Iqalukpik
Chum salmon	*Oncorhynchus keta*	Iqalugrauq
Pink salmon	*Oncorhynchus gorbuscha*	Amaqtuuq
Dolly Varden	*Salvelinus malma*	Iqalukpik
Rainbow smelt	*Osmerus mordax*	Ilhuagniq
Least cisco	*Coregonus sardinella*	Igalussaq
Broad whitefish	*Coregonus nasus*	Aanaakliq
Humpback whitefish	*Coregonus oidschian*	Pikuktuuq
Arctic cod	*Boreogadis saida*	Igalugaq
Fourhorn sculpin	*Triglopsis quadricornis*	Kanayuq
Arctic flounder	*Pleuronectes glacialis*	Naataagnaq

Source: (Wickersham & Flavin Planning Consultants 1982; Froese 2004; U.S. Department of the Interior 2004)

3.2.3 *Wildlife (mammals and birds)*

3.2.3.1 Major species

Although there is low biodiversity on the North Slope, the ecological importance of the major species discussed herein can be attributed to their abundance and therefore crucial role in helping maintain the stability of the food web. Many of these major species are important to Borough residents as subsistence resources, and some are protected under federal law. Subsistence is discussed in Section 3.3.3 of this document. Tables 3.2-2 and Table 3.2-3 list the key terrestrial mammal species and the key bird species found in the North Slope Borough, respectively.

Information regarding distribution, population size and trends for terrestrial mammals was obtained from various Alaska Department of Fish and Game (ADF&G) management reports, which are cited by author. These reports describe distribution in terms of game management units (GMUs), four of which lie within the North Slope Borough. GMU 26A encompasses the western North Slope (or arctic slope) of the Brooks Range including the western Brooks Range; GMU 26B includes the central North Slope of the Brooks Range and central Brooks Range; GMU 26C encompasses the eastern North Slope of the Brooks Range and the eastern Brooks Range; and just the northwest portion of GMU 23 lies within the Borough in the far western Brooks Range. Depending on the range of a species, the reference to a GMU may be applicable to only a specific geographic area. For example, GMU 26C refers to just the eastern Brooks Range for Dall sheep, whereas for the musk oxen, GMU 26C refers to the eastern North Slope.

The Secretary of the Interior designated three special management areas in the North Slope Borough in 1977 due to their significant wildlife and bird value. These areas are managed for maximum protection of the wildlife resources during oil and gas development activities. The Utukok River Uplands Special Area (URUSA) spans about 4 million acres and contains critical calving habitat for caribou. The Teshekpuk Lake Special Area (TLSA) includes important nesting, staging, and molting habitat for a large number of ducks, geese, and swans and covers approximately 1.7 million acres. The Colville River Special Area (CRSA) includes the bluff and riparian habitats of the Colville River and has been recognized since the 1950s as one of the most significant regional habitats for raptors in North America (Kessel and Cade, 1956, 1958; Cade, 1960; White and Cade, 1971 (U.S. Department of the Interior 2004).

Table 3.2-2
Key Terrestrial Mammal Species Found in the North Slope Borough

Common Name	Scientific Name	Inupiaq Name
Caribou	*Rangifer tarandus*	Tuttu
Moose	*Alces alces*	Tuttuvak
Dall sheep	*Ovis Dalli*	Imnaiq
Musk ox	*Ovibus moschatus*	Uminmak
Grizzly bear	*Ursus arctos*	Aklaq
Hoary marmot	*Marmots caligata*	Siksrikpak
Wolf	*Canis lupus*	Amaguq
Arctic fox	*Alopex lagopus*	Tigiganniaq
Red fox	*Vulpes fulva*	Kayuqtuq
Wolverine	*Gulo luscus*	Qavvik
Arctic ground squirrel	*Spermophilus parryii*	Siksrik

Source: (Wickersham 1993b; U.S. Department of the Interior 2004) and various ADF&G authors cited above.

3.2.3.2 Distribution of wildlife (location and seasons, migratory pathways)

Caribou

Four distinct herds of barren-ground caribou (*Rangifer tarandus grantii*) have been identified in arctic Alaska based on their fidelity to calving grounds (U.S. Department of the Interior 2004). Moving from west to east these herds include: the Western Arctic Herd, the Teshekpuk Herd, the Central Arctic Herd, and the Porcupine Caribou Herd. In general, caribou prefer treeless tundra and mountains during all seasons, but portions of some herds winter in the boreal forest south of the Brooks Range and outside of the North Slope Borough (Alaska Department of Fish and Game 2004). Refer to Figure B-11 for a generalized illustration of the caribou winter and summer ranges. Figure B-10 illustrates the key calving areas for each of the herds.

The summer diet of caribou includes the willow leaves, sedges, mushrooms, and flowering tundra plants; beginning in September when the ground is snow-covered, caribou consume lichens (reindeer moss), dried sedges, and small shrubs. Newborn calves are subject to predation by wolves, grizzly bears, and golden eagles (Alaska Department of Fish and Game 2004). Adult caribou are prey for sport and subsistence hunters, and are, in most cases, the primary terrestrial mammal species harvested for subsistence in the villages in the Borough (refer to Section 3.3.3 for a discussion on subsistence).

Patterns of caribou habitat use vary seasonally, differ from year to year, and are dependent on weather conditions. Deep snow and cold weather can delay migration to calving grounds, thereby prolonging the calving period and affecting calf survival. Conversely, early snowmelt and subsequent plant growth can facilitate early spring migration and promote both calf and adult survival (Seaton 2003). Insect activity increases during periods of warm temperatures (>55 degrees Fahrenheit) and mild winds (<8 miles per hour) and caribou move to the coast or mountain ridges where lower air temperatures and higher winds reduce the number if insects (Dau 1986; Lenart 2003a). This variable distribution has probably contributed to the significant overlap among the four recognized arctic caribou herds that has occasionally been observed over the years, contributing to a significant gene flow between the herds (North Slope Borough 2004). Despite the shifts in distribution throughout the seasons, there are recognizable patterns in migration for the herds. Refer to Figure B-10 for caribou calving areas and Figure B-11 for summer and winter ranges for all four herds. The primary range and distributions for each of the four caribou herds are described below.

The Western Arctic Herd range covers approximately 140,000 square miles in northwestern Alaska, from approximately the Colville River to the western coast of Alaska, and as far south as Norton Sound. Their range spans five GMUs and associated subunits (21D, 22A-E, 23, 24, and 26A). Fall migration and rut for the Western Arctic Herd begin in mid August and often continue until late November, as caribou move southwest generally toward Kotzebue Sound and Norton Sounds. During most of the period from 1980 to 1995, the Western Arctic Herd wintered in the Nulato Hills as far south as the Unalakleet River drainage. Since the 1996, the herd has progressively shifted its southernmost boundary of wintering grounds northwest to the Seward Peninsula, in addition to becoming more dispersed. Most Western Arctic caribou begin migrating north through Anaktuvuk Pass, Chandler Pass, and Killik Pass and reach their calving grounds at the headwaters of the Utukok, Meade, Ketik, and Colville rivers (in the URUSA) by late May. The summer range for the Western Arctic Herd includes the calving grounds as well

Caribou on the coastal plain

as post-calving grounds in the northern foothills and mountains of the Brooks Range west of the Trans-Alaska Pipeline. Large post-calving aggregations form in parts of the Delong Mountains and its northern foothills west of and including the upper Utukok and Kuguruk drainages. Insect harassment in early July forces nearly the entire herd to seek relief and they rapidly move from the Lisburne Hills/Cape Thompson area eastward toward Howard Pass and Chandler Lake, creating an annual peak concentration of the Western Arctic Herd (Dau 2003b).

The Teshekpuk Herd was described in 1978 as a distinct herd, separate from the Central Arctic Herd or Western Arctic Herd (Davis and Valkenburg 1978 *in* (North Slope Borough 2004). The range of the Teshekpuk Herd centers on Teshekpuk Lake, located on the central arctic coast. The Teshekpuk Herd is found in GMU 26A. Fall migration to the herd's wintering grounds generally begins in mid September. Since the 1990s, wintering grounds of this herd have included the area near Atqasuk and south of Teshekpuk Lake, but some caribou venture on westward to the coastal plain of the Chukchi Sea or head south of the Brooks Range through Anaktuvuk Pass. The Teshekpuk Herd has typically migrated from its wintering grounds back towards Teshekpuk Lake during late April and May, taking the most direct route (North Slope Borough 2004). The Teshekpuk Herd tends to settle to the northeast and east of the lake during calving, but by late July when the insect season peaks, most caribou flee to the coast seeking harassment relief.

The range of the Central Arctic Herd extends from the northern foothills of the Brooks Range to the Beaufort Sea and from the Colville River east to the Canning River. The Central Arctic Herd is generally found in GMUs 26B and 26C. Fall migration for the Central Arctic Herd begins during August, and by September most of the herd is along the northern and southern foothills and mountains of the Brooks Range. Caribou from the Western Arctic Herd occasionally mix with the Central Arctic Herd during fall and winter. It is likely that Central Arctic Herd mixes with the Teshekpuk Herd during late summer, fall, and winter, and that their range may overlap with the winter and summer ranges of the Porcupine Caribou Herd (Lenart 2003a). About half of the Central Arctic Herd (the eastern segment) tend to remain east of the Sagavanirktok River during calving and insect seasons, while the other half (the western segment) range on the west side of the river, including the Prudhoe Bay and Kuparuk oilfields (Lawhead 1988; Cameron, E. Lenart et al. 1995). During insect seasons, animals from both herd segments move to within 20 miles of the Beaufort Sea coast (Lawhead and Curatolo 1984).

The range for the Porcupine Caribou Herd covers 130,000 square miles of remote, roadless wilderness east of the Canning River through the Arctic National Wildlife Refuge (ANWR) and the Yukon and Northwest Territories of Canada. The Porcupine Caribou Herd is found in four GMUs (25A, 25B, 25D, and 26C). During the spring, the Porcupine Herd migrates to the coastal plain of ANWR for calving. In June and early July, the Porcupine caribou generally move from the coastal plain to the foothills of the Brooks Range. During insect season, the herd moves up to the ridge tops of the Brooks Range for insect relief. In the fall, the herd continues its inland migration into the Yukon and Northwest Territories of Canada. The herd generally winters in Canada, although during late August and September of 1999-2000 and 2001-2002, a considerable number of caribou returned to Alaska from Canada and wintered near Arctic Village. During the winters of 2000-2001 and 2002-2003, few Porcupine caribou remained in Alaska.

Moose

Unlike caribou, moose (*Alces alces*) of the arctic are not recognized as distinct herds. Distribution of moose across the North Slope is more restricted than caribou; therefore, moose of the North Slope Borough are only found in portions of GMUs 26A and 23. Moose have been present on the North Slope since the 1920s. These animals are generally restricted to riparian

habitat adjoining rivers and streams, but sometimes move to the foothills of the Brooks Range and along the coastal plain (Carroll 2002; Dau 2002a).

On the North Slope, moose are heavily dependent on willow shrub habitats, especially during fall and winter months. During summer, moose consume vegetation in shallow ponds, forbs, and the leaves of willow. Moose are the prey of wolves and brown bears (Alaska Department of Fish and Game 2004). Moose are generally ranked second behind caribou as the terrestrial wildlife species most harvested for subsistence in the villages in the North Slope Borough. Due, in part, to their distribution along major rivers and accessibility, both resident and nonresident recreational hunters avidly pursue them.

Most moose migrate seasonally to calving, rutting, and wintering areas. During the summer, bull moose are widespread between the northern foothills of the Brooks Range Mountains to the arctic coast, while cows move from the river bottoms but remain within the tributaries and hills near riparian habitat, although some venture onto the coastal plain. During fall and after mating, or rut, moose move back to the riparian corridors or large river systems. The Colville River drainage supports the largest concentrations of moose in the North Slope Borough during winter (U.S. Department of the Interior 2004). When spring arrives, most moose disperse to the foothills of the Brooks Range. In late May and early June, pregnant cows move away from the river bottoms to calve. Moose in the Borough travel anywhere from a few miles up to 60 miles during these seasonal movements (Carroll 2002).

Dall Sheep

Dall sheep (*Ovis Dalli*) are found throughout the mountains of the eastern Brooks Range, are sporadically distributed within the Central Brooks Range, and are indigenous to the Delong Mountains in northwest Alaska (a portion of which lies within the North Slope Borough). Their habitat includes open alpine ridges, meadows, and steep slopes with extremely rugged terrain. Within the Borough, the range of Dall sheep includes portions of GMU 23 and all of GMUs 26A-C (Lenart 2002; Stephenson 2002; Dau 2002b).

Dall sheep diets vary by range. A wide variety of plants are consumed during summer, whereas the winter diet is limited to dry, frozen grass and sedge stems, and occasionally lichen and moss. Both rams and pregnant ewes are attracted to mineral licks during the spring and often travel many miles to eat this soil (Alaska Department of Fish and Game 2004). Dall sheep are harvested for subsistence purposes, but their mountainous habitat makes them less accessible to hunters, so they rank after moose in importance.

Within the Central Brooks Range, Dall sheep are sporadically distributed, and are considered to be one population. The animals have well-developed social systems, in which the ewes and rams each form their own groups, intermingling at mineral licks and during mating season. Dall sheep tend to occur in low densities in the western Brooks Range, and highest densities in the northern drainages of the eastern Brooks Range, where they are distributed throughout the mountains due to suitable habitat and weather conditions that provide favorable winter range. Studies of sheep movements in the eastern Brooks Range have shown that major river drainages inhibit movement, thereby resulting in discrete populations within this area (Alaska Department of Fish and Game 2004). Dall sheep do not travel far during seasonal migrations and are very loyal to their home ranges. However, mineral licks are seasonally very important, and the sheep may travel some distance to reach a lick site. In general, Dall sheep movements are likely related to the availability of food and weather.

Brown Bear

Black bears are not found north of the Brooks Range, and are therefore not present in the North Slope of Alaska (Alaska Department of Fish and Game 2004). Polar bears are discussed in Section 3.2.4 (Marine Mammals).

Within the Borough, brown bears (*Ursus arctos*) are found throughout the eastern and western North Slope of the Brooks Range, including the associated foothills, and occasionally on the coastal plain. Their habitat is diverse, and can vary depending on food availability. The range of brown bears within the North Slope Borough includes portions of GMU 23 and GMU 26A-C (Carroll 2003a; Dau 2003a; Stephenson 2003a).

Brown bears are omnivorous, with diets that commonly consist of berries, grasses, sedges, horsetails, fish, ground squirrels, and roots of many kinds of plants. Occasionally, brown bears prey on newborn moose and caribou calves, and are capable of killing and consuming healthy adults of these species. Bears are attracted to carrion as well as human garbage (Alaska Department of Fish and Game 2004). Brown bears are occasionally harvested for subsistence purposes.

Brown bears are typically solitary animals, and are distributed throughout the North Slope, with the highest densities in the foothills of the Brooks Range and the lowest densities on the coastal plain. Some brown bears have been observed moving from the mountains to the coastal plain in the vicinity of the Porcupine Caribou Herd calving area, as well as near salmon spawning grounds in rivers nearby.

When food is unavailable or scarce during the winter, brown bears hibernate in dens for durations ranging from five to seven months. Preferred denning areas on the coastal plain include low hills, dry lake margins, and stream banks, often approaching 20 miles of the coast (Alaska Department of Natural Resources 1998). Recent ADF&G brown bear research confirms that some of the bears using the oilfields on the North Slope den within a mile of the coast (Alaska Department of Natural Resources 1998). Brown bears remain in hibernation until spring (April or early May), unless disturbed by unseasonably warm weather.

Musk Oxen

Musk oxen *(Ovibus moschatus)* are indigenous to northwest Alaska, but they disappeared around the 19th century. ADF&G reintroduced four populations of musk oxen into Alaska, two of which are located within the North Slope Borough. The Cape Thompson population, reintroduced during 1969 to 1970, inhabits the portion of GMU 23 from the mouth of the Noatak River to Cape Lisburne (Lenart 2003b; Dau 2003c). The population reintroduced at the Kavik River (1970) and at Barter Island (1969) inhabits areas of GMUs 26B and 26C, including a group that resides in the Franklin Bluffs area near the Sagavanirktok River (Dau 2003c).The habitat for musk oxen is varied and their distribution is widespread.

Musk oxen consume a variety of vegetation, including grasses, forbs, sedges, and woody plants. During the summer they are found in riparian areas (Dau 2001). During winter, the animals concentrate their feeding efforts to vegetated bluff areas with shallow snow accumulations (Alaska Department of Fish and Game 2004). Predators of musk oxen include wolves, and in recent years, brown bears. Musk oxen are hunted mainly for trophy, but also for meat. The hair of musk oxen, or “qiviut”, is sought after for weaving into clothing.

Musk oxen are social animals, usually forming large, non-roaming groups of between 6 and 60 animals during the winter season. The animals are poorly adapted to movement in deep snow,

so when snow depth exceeds 10 to 12 inches, the animals seek out exposed ridges and domes with minimal snow cover. Musk oxen survive on body fat during the winter, reducing the need to search for food. During the summer, feeding animals tend to form smaller groups of 5-20 animals that move frequently, generally toward riparian habitats (Lenart 2003b; Dau 2003c).

In spring of 1999, moderately long-range migrations were documented in the central arctic slope area by a group of 50 musk oxen that traveled about 32 miles from the Itlillik Hills to east of the Kuparuk River (Lenart 2003b; Dau 2003c). Since their reintroduction to Alaska in 1969, musk oxen have extended their range along the arctic coastal plain about 500 km (310 miles) eastward into Yukon, Canada (as far as Babbage River) and as far west as Fish Creek.

Furbearers

Key furbearer species in the North Slope Borough include: wolf (*Canis lupus)*, wolverine (*Gulo luscus)*, arctic fox (*Alopex lagopus*), and red fox (*Vulpes fulva*). This group of animals is harvested for subsistence during winter months, mainly for their fur. Information on the abundance and distribution of furbearer species is limited.

Wolves are found throughout GMU 26, in the mountains of the Brooks Range and the tundra of the entire Arctic Slope, and rarely on the coastal plain. Wolf packs can have a large range, dependent on the availability of prey (moose, caribou, and Dall sheep). Wolves are highly social animals that tend to live in packs of 6 or 7 animals that usually remain within an established territory. The territory of an Alaskan wolf pack averages about 600 square miles, ranging from 300 to 1,000 square miles. Wolves that target migratory caribou may, however, temporarily abandon their territory and travel long distances if necessary.

Wolverines are highly dispersed in the Brooks Range and the foothills. The range of wolverines is vast and mainly determined by availability of food, which primarily consists of carrion and small mammals. Wolverines are solitary creatures that travel extensively in search of food. The home ranges of same sex adults are generally separate from one another. The home range size of an adult wolverine is very extensive, with males covering up to 240 square miles, and females frequenting a smaller area, generally between 50 to 100 square miles. The home range of the resident male may overlap the ranges of up to six females (Alaska Department of Fish and Game 2004). The number of wolverines on the coastal plain is lower than in the mountains and foothills of the Brooks Range (Bee and Hall 1956; ExxonMobil 2001).

Both red and arctic foxes are found throughout GMU 26, and in the portions of GMU 23 that are within the North Slope Borough boundary, essentially in the treeless coastal areas of the North Slope (Carroll 2001; Dau 2001a). Foxes prey on small mammals and consume carrion. The arctic fox is the most common furbearer on the arctic coastal plain. Arctic fox distribution and movement is related to the availability of food. When local food is scarce, these foxes may travel long distances (80 to 1,400 miles), whereas when food is locally abundant, arctic foxes may remain near their natal dens year-round, which are more or less permanent (Eberhardt and Hanson 1978). During the summer, breeding arctic fox pairs are territorial and defensive, whereas during late fall and winter, the foxes are less territorially defensive and may interact with other foxes in areas where food is abundant (ExxonMobil 2001). Red foxes prefer extensive lowland marsh and tundra regions, which they share with the arctic fox. Where the ranges of the two species overlap, the red fox is dominant. Both red and arctic foxes may use the same den year after year. Their dens are usually located on the coastal plain, and sites include pingos, small mounds, low hills, essentially areas with thin snow accumulations, sandy soils, and surface stability (ExxonMobil 2001).

Other small mammals such as arctic ground squirrel (*Spermophilus parryii),* ermine (short-tailed weasel), least weasel, snowshoe hare, two species of lemmings, three vole species, and two species of shrews are found in the North Slope Borough area and serve as a source of food for larger mammals and some birds. Arctic ground squirrels are found in highest densities along major river drainages, and are most abundant on the coastal plain.

Birds

Birds found in the North Slope Borough can be grouped into two main categories: waterfowl and other water birds, and terrestrial birds. Waterfowl and other water birds include swans, geese, eiders, ducks, loons, grebes, shorebirds, and seabirds (gulls, jaegers, and terns). Terrestrial birds include passerines (songbirds) ptarmigan, raptors, and ravens. Both Steller's and spectacled eiders are found on the North Slope, are listed as threatened under the ESA, and are therefore discussed separately under Section 3.2.3, Protected Species. Most of these species are migratory and are only present on the North Slope for breeding and nesting between late May to October. During this period, nesting habitats are snow-free, and food and open water are available. Key bird species found in the North Slope Borough are listed in Table 3.2-3. Figure B-7 illustrates habitat use by birds across the North Slope Borough. Figure B-8 indicates critical habitat for spectacled eider, the range for Steller's eider, geese molting concentration areas, habitats for other selected species, and known nesting areas.

Waterfowl and Other Water Birds

Species of waterfowl and other water birds common in the North Slope Borough area include Pacific and red-throated loons; tundra swan; greater white-fronted, Canada, and lesser snow geese; black brant; long-tailed and northern pintail ducks; and king and common eiders. In addition, black guillemot, a species that is on the Proposed Bureau of Land Management (BLM) Sensitive Species List for Alaska, may occur in offshore areas (Johnson and Herter 1989; U.S. Department of the Interior 2004). Waterfowl populations are concentrated on the arctic coastal plain, where the birds nest near aquatic habitats along the coast, ponds, or lakes, where food is nearby.

Nearly all of the waterfowl and other water bird species are migratory and are found in the Borough seasonally, generally from May through October. Soon after spring migration, most of these bird populations disperse to nesting grounds located primarily in coastal areas and near water bodies. River deltas and wetlands are particularly important to waterfowl as nesting and breeding areas. During August to late September (before and during the fall migration) the use of lagoons and other coastal habitats by these birds peaks (Alaska Department of Natural Resources 1998).

Three colonies of snow geese have been identified in Alaska, according to ADF&G: 50 nests in the Ikpikpuk River delta, another 50 nests in Kasegaluk Lagoon at the Kukpowruk River delta adjacent to the Chukchi Sea coast, and one nest on Howe Island (located in the Sagavanirktok River Delta) (Alaska Department of Natural Resources 1998).

Howe Island also supports colonies of nesting black brant (Alaska Department of Natural Resources 1998), but the largest nesting concentration of brant on the ACP is located in the Colville River Delta (Johnson and Herter 1989), with another concentration located in the Sagavanirktok River Delta (U.S. Department of the Interior 2004). The major river deltas and other areas along the coastal plain attract greater-white fronted geese for nesting and rearing (Alaska Department of Natural Resources 1998). Canada geese prefer to nest inland, on bluffs along major rivers (Alaska Department of Natural Resources 1998).

Common eiders concentrate for nesting in the Return Islands, Jones Islands, McLure Islands, Cross Island, and Lion Point (Alaska Department of Natural Resources 1998). Nearshore coastal distribution during nesting surveys indicate that breeding pairs of common eiders are more numerous along the coast between the Colville River Delta and the Canadian border than they are along the coast (U.S. Department of the Interior 2004). A large concentration of king eiders is present to the south and east of Teshekpuk Lake (U.S. Department of the Interior 2004).

Eiders take to the air *(J. London)*

Pacific, red-throated, and yellow-billed loons breed across the arctic coastal plain, concentrating during the spring near the Sagavanirktok, Kuparuk, and Colville river deltas (Alaska Department of Natural Resources 1998). Of these species, the Pacific loon is the most abundant, with large concentrations occurring west of Teshekpuk Lake and in a small area near the Colville River south of Nuiqsut. Red-throated loons are common in the Colville River Delta, and occur in relatively high densities both northeast and southwest of Teshekpuk Lake. Yellow-billed loons are the least abundant of the loon species on the arctic coastal plain, the Colville River Delta and the area between the Chipp and Ikpikpuk rivers supports some of the highest breeding densities in Alaska (Smith, L.C. Byrne et al. 1993). Two loon species, the yellow-billed and red-throated, are on the Proposed BLM Sensitive Species List for Alaska (U.S. Department of the Interior 2004). The yellow-billed loon is being considered for listing under the Endangered Species Act (National Research Council 2003).

The northern pintail is the most abundant duck on the arctic coastal plain, with concentrations near Teshekpuk Lake (U.S. Department of the Interior 2004). The long-tailed duck is the second most abundant duck on the arctic coastal plain, with nesting concentrations scattered along the arctic coastal plain (especially near Flaxman Island) as well as near Teshekpuk Lake (U.S. Department of the Interior 2004). Long-tailed ducks inhabit the lagoon systems of the Beaufort Sea, west of the Canning River, to forage and rest during molt and post molt periods (Flint, Reed et al. 2003).

The TLSA attracts between 18,500 and 68,500 (15 year average was estimated at 37,827) brant and greater white-fronted, Canada, and snow geese during their nesting, staging, and molting for several months each summer. The numbers of brant and geese using this area exceed that of any other known molting area (U.S. Department of the Interior 1998).

The shorebirds that frequent the North Slope Borough area include American golden-plover; dunlin; semipalmated, pectoral, and buff-breasted sandpipers; long-billed dowitcher; red-necked and red phalaropes; Baird's, western, and stilt sandpipers; semipalmated and black-bellied plover; and numerous other species. These birds occupy a range of moist to dry tundra habitat for nesting, rearing young, and feeding. Some shorebirds such as sandpipers and phalaropes prefer to nest near wet meadows. The North Slope contains very productive shorebird habitat (U.S. Department of the Interior 2004). Sandpipers, dowitchers, phalaropes, and dunlins occur in greater densities than other bird groups across the arctic coastal plain (U.S. Department of the Interior 2004). Shorebirds are generally present on the North Slope from May to September, with most species occupying tundra-nesting grounds during early summer, and then moving to coastal habitats, such as Kasegaluk Lagoon, to feed before migrating in September. One shorebird species, the buff-breasted sandpiper, occurs regularly on the North Slope and is on the Proposed BLM Sensitive Species List for Alaska (Alaska Department of Natural Resources 1998).

Seabirds present in the North Slope Borough include glaucous and Sabine's gulls; arctic tern; pomarine, parasitic, and long-tailed jaegers; common and thick-billed murres; horned and tufted puffins; black-legged kittiwakes, and numerous other species. Glaucous gulls are a widespread migrant and breeder on the arctic coastal plain, with areas of high-density nesting located both east and west of Dease Inlet and southeast of Teshekpuk Lake (U.S. Department of the Interior 2004). Sabine's gulls are found on the arctic coastal plain less frequently than glaucous gulls but are common in the area north of Teshekpuk Lake where they nest on the shores or islands of tundra lakes (U.S. Department of the Interior 2004). Arctic terns are common breeders and migrants of the Beaufort Sea area. Nesting occurs mainly near the coast but may also occur inland (U.S. Department of the Interior 2004). Mures and kittiwakes nest in large numbers at Cape Lisburne.

Terrestrial Birds

Songbirds found in the North Slope Borough include Lapland longspur, savannah sparrow, redpoll, snow bunting, yellow wagtail and numerous other species. Most songbirds generally arrive on the North Slope during late May to early June and remain until mid to late August before migrating south to warmer regions (ExxonMobil 2001). The Lapland longspur is the most common songbird on the arctic coastal plain; its preferred nesting areas are moist habitats and wet meadows (ExxonMobil 2001). The snow bunting is also a very common breeder on the arctic coastal plain, with nests commonly found near areas of development (U.S. Department of the Interior 2004). All songbirds are seasonal migrants to the North Slope Borough. Many songbird species nest in the foothills of the Brooks Range.

Raptors common to the North Slope Borough area include arctic peregrine falcon; gyrfalcon; rough-legged hawk; golden eagles; snowy and short-eared owls; and northern harrier. Bald eagles are occasionally observed in the Borough but are not common. Raptors nest primarily along larger river bluffs and cliffs, but some, especially owls, nest on the tundra. Golden eagles are known to nest across the North Slope. The snowy owl and gyrfalcon are known to overwinter on the North Slope (U.S. Department of the Interior 2004). Nesting raptor densities along the Colville River are among the highest in the world (National Research Council 2003).

Other terrestrial bird species that are generally year-round residents in the North Slope Borough include willow and rock ptarmigan, and common ravens. Willow and rock ptarmigan nest in the tundra, while ravens prefer to nest on tall buildings and other anthropogenic structures. There is little information about the distribution of the ptarmigan because these species are not usually recorded during aerial surveys for birds on the arctic coastal plain, but they are generally found across the North Slope (Mallek, R. Platte et al. 2003; U.S. Department of the Interior 2004).

Table 3.2-3
Key Bird Species Found in the North Slope Borough

Common Name	Scientific Name	Inupiaq Name
American golden-plover	*Pluvialis dominicus*	Tullik
Arctic peregrine falcon	*Falco peregrinus*	kirgavik
Arctic tern	*Sterna paradisaea*	Mitqutaillaq
Bald eagle	*Haliaeetus leucocephalus*	Tinmiaqpak
Black brant	*Branta bernicla nigricans*	Niglingauraq
Black guillemot	*Cephus grylle*	Inagiq
Buff-breasted sandpiper	*Tryngites subruficollis*	Satqagiilaq
Canada goose	*Branta canadensis*	Iqsragutilik
Common eider	*Somateria mollissima*	Amauligruaq
Common raven	*Corvus corax*	Tulugaq
Common redpoll	*Carduelis flammea*	Saqsakiq
Dunlin	*Calidris alpina*	Siiyukpaligauraq
Glaucous gull	*Larus glaucescens*	Nauyaq
Golden eagle	*Aquila chrysaetos*	
Greater white–fronted Goose	*Anser albifrons*	Nigliq
Gyrfalcon	*Falco rusticolus*	aatqarruaq
King eider	*Somateria spectabils*	Qinalik
Lapland longspur	*Calcarius lapponicus*	Qupaluk/Putukiiiluk
Lesser snow goose	*Chen caerulescens*	Kanuq
Long-billed dowitcher	*Limnodromus scolopaceus*	Siiyukpalik
Long-tailed duck	*Clangula hyemalis*	Aaqhaaliq
Long-tailed jaeger	*Stercorarius longicaudus*	Isunnaq
Northern harrier	*Circus cyaneus*	Papiktuuq
Northern pintail	*Anas acuta*	Kurugaq
Pacific loon	*Gavina pacifica*	Malgi
Parasitic jaeger	*Stercorarius parasiticus*	Migiaqsaayuk
Pectoral sandpiper	*Calidris melanotos*	Puviaqtuuq
Pomarine jaeger	*Stercorarius pomarinus*	Isunnagluk
Ptarmigan, rock/willow	*Lagopus mutus/ lagopus*	Niksaaktuniq/ Aqargiq
Red phalarope	*Phalaropus fulicaria*	
Red-necked phalarope	*Phalaropus lobatus*	Auksruak
Red-throated loon	*Gavina stellata*	Qaqsraupiagruk
Rough-legged hawk	*Buteo lagopus*	Qilgiq
Sabine's gull	*Xema sabini*	Aqargigiaq
Savannah sparrow	*Passerculus sandwichensis*	Aanaruin suliuqpa
Semipalmated sandpiper	*Calidris pusilla*	Livilivillakpak
Short-eared owl	*Asio flammeus*	Nipailuktaq
Snow bunting	*Plectrophenax nivalis*	Amautligaq
Snowy owl	*Nyctea scandiaca*	Ukpik
Spectacled eider	*Somateria fisheri*	Qavaasuk
Steller's eider	*Polysticta stelleri*	Igniqauqtuk
Tundra swan	*Cygnus columbianus*	Qugruk
Yellow wagtail	*Motacilla flava*	
Yellow-billed loon	*Gavia adamsii gray*	Tuullik

Source: (Wickersham 1993b; Brower and Opie 1996; U.S. Department of the Interior 2004)

3.2.3.3 Trends and development considerations

Caribou

The Western Arctic Herd was comprised of approximately 242,000 animals in 1970, but by 1976 it had declined dramatically to just 75,000 animals. During the period from 1976 to 1990, the herd grew at an approximate annual rate of 13 percent to a minimum population size of 416,000. According to an ADF&G 1999 summer aerial photograph census, the Western Arctic Herd population was estimated to be at least 430,000 animals. This number is lower than the 1996 estimate of 463,000 caribou, suggesting that the herd declined about one or two percent each year from 1996 to 1999, but is still very large. Caribou exposure to the bacterium that causes brucellosis has been low since 1996. The primary impact of this disease is a reduction of reproductive success, although brucellosis is probably not currently affecting the population dynamics of the Western Arctic Herd (Dau 2003b).

Sensitive habitat areas for the Western Arctic Herd include the parts of the Delong Mountains and its northern foothills west of and including the upper Utukok and Kuguruk drainages, as well as the Howard Pass/Chandler Lake area described in Section 3.2.3.2 (Dau 2003b).

A cooperative satellite telemetry project was initiated in 1990 by the North Slope Borough, ADF&G, and BLM to evaluate seasonal ranges, annual movements, and habitat use by the Teshekpuk Herd. Because the Teshekpuk Herd is an important subsistence resource for much of the North Slope Borough, understanding the herd distribution and size can help improve management and the harvest success rate. From 1990 to 2000, studies indicated more variability in the annual movements of the Teshekpuk Herd, as well as a wider distribution area than previously thought (North Slope Borough 2004). For example, although most all calving took place near historic Teshekpuk Herd calving grounds of Teshekpuk Lake, some caribou wintered as far south as the Seward Peninsula, intermingling with the Western Arctic Herd (North Slope Borough 2004). Accessibility of their traditional calving area around Teshekpuk Lake appears to be key to calving success for the Teshekpuk Herd. In 1997 and 2001, a heavy snow and late melt prevented many cows from returning to this area in time to calve, and the result was very poor calf survival (53 percent and 44 percent, respectively). However, in 2002, snowmelt was relatively early, allowing access to the calving area, and resulting in a 74 percent calf survival rate (Carroll 2003c).

The Central Arctic Herd was recognized as a distinct herd in the mid 1970s, and the population was estimated at 5,000 animals in 1975. The herd size increased to approximately 13,000 animals by 1983, and the increase continued to over 23,000 caribou by 1992. In 1995, the herd experienced a decline to about 18,100 animals, but then stabilized until 2000 when it increased again considerably to over 27,000 animals. This recent population increase was due to low adult mortality and high calf survival rates during 1998 to 2000 (Lenart 2003a).

Because both industry and government have an interest in developing potential oil resources in ANWR, the coastal plain on which the Porcupine Caribou Herd calves, US and Canadian state and federal agencies have cooperated to conduct baseline studies of the herd. The US and Canada have formed the International Porcupine Caribou Board (1987) to coordinate management and research of the herd. During the 1960s and 1970s the Porcupine Caribou Herd population was stable at about 100,000 animals. In 1979, the population began to experience an annual increase of approximately 5 percent, and by 1989, had reached 178,000 animals. Around 1992, the Porcupine Caribou Herd population had decreased to 160,000, likely due to lower calf survival rates after harsh winters. This decline continued to a population reduction to approximately 129,000 animals in 1998, and declined again in 2001 to 123,000 caribou in 2001, likely due to increased adult mortality (Lenart 2003a). It is thought that current

levels of reproduction may not be sufficient to reverse the population decline since 1989 (Lenart 2003a).

Although all four herds of caribou have been exposed to oil and gas exploration activity in the past 50 or 60 years, it is only the Central Arctic Herd that has been regularly and directly exposed to the relevant surface development (National Research Council 2003). The lack of a baseline against which to compare changes in the caribou population dynamics makes it difficult to assess the effects of such development (National Research Council 2003). However, studies of the Central Arctic Herd have shown that, in general: 1) development, in combination with insect harassment, can impair caribou movement between coastal and inland habitats; 2) increased development could increase the loss of preferred habitats for browsing and subsequent nutrient status of lactating females; and 3) reproductive success of Central Arctic Herd females congregating near oilfields has been lower than for females outside of oilfield developments (National Research Council 2003).

The primary resource development considerations include protection of important habitat areas and migratory routes, including minimizing fragmentation of habitat through the cumulative effects of resource development. Areas critical for caribou calving and insect relief are examples of important habitat, and they may change from year to year based on snow and other climate conditions. The Borough has recommended minimum pipeline heights and other design measures to reduce potential impacts on caribou migration. Activities associated with resource and village development should accommodate measures to avoid or minimize adverse habitat and migration impacts during project planning, design, construction, and operation. Developers should consult with village residents and Borough staff when siting and designing facilities.

Moose

The North Slope is the northern limit for the Alaskan moose, hence moose occur in low densities (U.S. Department of the Interior 2004). Since about 1940, moose populations in the western North Slope have increased in size. Surveys conducted since 1970 indicate that the population increased steadily from about 1,200 animals in 1970 to about 1,500 in 1991. During 1990-1995, moose populations in the Colville River drainage area suffered sharp declines. Adult mortality and poor recruitment were identified as possible reasons for the decline, possibly caused by adverse weather, increased predation, and deteriorating range (O'Hara, Dau et al. 1998). By 1995, however, the population had declined to about 750 animals. In 1996, the population began to recover (Carroll 2002).

Sensitive habitat areas for moose include riparian areas for feeding and migration and willow shrub areas for winter habitat. Development considerations for moose might include avoidance of such habitat areas. During the winter moose can be more stressed due to the lack of food availability, weather, and predation. They are therefore more susceptible to disturbance in the winter season. Limiting the removal of gravel from floodplains, which border many riparian areas, can help reduce the impacts to moose habitat during development activities.

Dall Sheep

There have been few sheep surveys conducted in the Central Brooks Range, but during the early to mid-1970s the population appeared to be low. During the 1980s and 1990s, surveys indicated that the population had increased, stabilized, and then declined. Heavy snowfalls during the late 1980s and early 1990s caused another decline in population. By 1996, the population appeared to be stabilizing or increasing. From 1996 to 2002, the population appeared to be stable, with minor fluctuations (Lenart 2002).

In the Eastern Brooks Range, sporadic surveys have shown that populations appeared to be high during the 1980s with declines in the late 1980s and early 1990s, likely due to severe weather conditions. In 1985 an estimated 13,000 sheep were in the Eastern Brooks Range. In the Hula Hula River drainage, the populations have declined by 40 percent since the mid 1980s, with similar declines appearing in other areas as well. Sheep populations continue to be small in the Eastern Brooks Range, based on anecdotal reports (Stephenson 2002). Sheep can be found in large concentrations near Galbraith Lake, and Slope Mountain is a known lambing area.

In the Western Brooks Range, Dall sheep are at the northwest margin of their range in Alaska, and the populations appear to be more prone to fluctuations due to adverse weather conditions. Sheep in this area are at a lower density than other areas of the Brooks Range. Beginning in 1990, high natural mortality dramatically diminished the population size, prompting the National Park Service (NPS) to either close or shortened the hunting season in this area. Limited hunting was reestablished in 1998, after some rebound in sheep numbers (Dau 2002b).

Dall sheep are sensitive to disturbance from aircraft noise; therefore altitude restrictions are needed to prevent adverse behavioral changes, especially during lambing. Due to the steep nature of sheep habitat, it is unlikely that increased development on the North Slope will directly affect populations. It is possible, however, that steeper gravelly slopes might be considered for material sites, processing, or mining, and sheep habitat should be identified prior to any such habitat altering activities.

Brown Bear

The brown bear population in the Brooks Range declined during the 1960s due to guided hunting, but has been recovering since the introduction of permit hunt regulations that began in 1997 (Carroll 2003a). Densities of brown bears are generally higher in the foothills of the Brooks Range and lowest on the arctic coastal plain (Stephenson 2003a).

Current estimates of brown bear densities in general habitat zones of the western North Slope (GMU 26A) are as follows (all measured in areas of 1,000 square kilometers, or 386 square miles): 0.5-2 bears on the arctic coastal plain, 10-30 bears in the foothills of the Brooks Range, and 10-20 bears in the mountains of the Brooks Range (Carroll 2003a). However, specifically, the most current density information for the Utukok and Kokolik drainages in GMU 26A shows 29.5 animals per 1,000 square kilometers (or 386 square miles) were recorded in 1992 (Carroll 2003a).

Prior to 1987, the population estimate of brown bears in the western North Slope (GMU 26A) was between 645-780 animals. The most current population information for brown bears from 1988 indicates between 900-1,120 animals in GMU 26A (Carroll 2003a). In the eastern Brooks Range (26B-C), the brown bear population is currently estimated to be 1,800 animals (Stephenson 2003a).

Oil and gas development on the North Slope has changed the distribution of brown bears. The destruction of habitat due to facility development and the availability of anthropogenic food sources (garbage) have served to draw bears nearer to developed areas. Mortality of bears has increased due to road development, which allows hunters accessibility to previously inaccessible areas, and to an increase in human-bear interactions, which can result in the death of the bear (National Research Council 2003). Denning may be disrupted by seismic exploration activities (National Research Council 2003). Development considerations regarding brown bears might include designing facilities to reduce sprawl into nearby habitat areas and proper waste management that discourages scavenging.

Musk Oxen

From 1970 to 2000, the Cape Thompson population increased by approximately 8 percent annually, with the highest density of musk oxen estimated at 0.13 animals per square miles (Dau 2003c).

The musk oxen population in GMUs 26B and C (central and eastern North Slope) increased steadily during the 1970s and 1980s; in Unit 26C expanding eastward into Canada, westward into Unit 26B, and eastward into Unit 26A during the late 1980s and early 1990s. The population appeared to be stable during the mid 1990s with approximately 500-600 animals total in Units 26B and 26C. Surveys in 2001 and 2002 showed combined (GMU 26B and C) population numbers had declined and were 426 and 348 animals, respectively (Lenart 2003b). It is now estimated that between 600-700 musk oxen inhabit the eastern North Slope (Lenart 2003b).

Although there have been no detected effects of seismic exploration on musk oxen (some herds avoid areas of noise, while others do not), the effects are of concern because musk oxen are year round residents of the North Slope (National Research Council 2003). Helicopter and low-flying aircraft noise occasionally cause musk oxen to stampede and abandon their calves (National Research Council 2003). Development considerations might include routing aircraft away from known densities of parturient musk oxen to avoid disturbance.

Furbearers

Population trend and density information for furbearers is limited, with the exception of wolves. ADEC manages wolves separately from other furbearers.

Wolves

Wolves are found throughout the central and eastern arctic slope, but are less abundant in these areas due to lower populations of prey, such as moose (Stephenson 2003b). Estimates in the fall of 1992 indicated that between 150 and 215 wolves in 22-32 packs were present in these areas (Stephenson 2003b). Fall wolf densities in these areas are estimated at 5.7-8.3 wolves per 1,000 square miles (Stephenson 2003b).

Wolf numbers on the western arctic coastal plain and Brooks Range (GMU 26A) have fluctuated since the 1900s due to a number of factors: changes in prey populations (moose and caribou); a 1950s federal wolf control program; and public aerial and snowmobile hunting since the 1960s (Carroll 2003b). Bans on aerial hunting in 1970 and land-and-shoot hunting in 1982 promoted an increase in the wolf population, especially in the mountains and foothills of the Brooks Range (U.S. Department of the Interior 2004).

Results of surveys show that the densities of wolves (wolves per 1,000 square kilometers or 386 square miles) in GMU 26A appeared to increase from approximately 2.6 wolves in 1987 to 4.2 wolves in 1992, dropping slightly to 4.1 wolves in 1992. An incomplete 1998 survey indicated a decline in densities in GMU 26A (Carroll 2003b). Wolf numbers in GMU 26A have likely dropped in recent years due to a reduction in prey; since the moose population in this area declined by 75 percent between 1992 and 1996 (Carroll 2003b).

Wolverine

A fall population of 821 wolverines was estimated for the western North Slope (GMU 26A), based on a density of 0.5 wolverine per 100 square miles (U.S. Department of the Interior 2004). More recent surveys have not been conducted, but informal sightings of wolverines in the

western Brooks Range from 1997 to 2000 suggested that the populations in the more remote areas of GMU 26A were high compared to previous years (Dau 2001a).

Arctic and Red Foxes

No quantitative data are available for arctic or red fox populations, but general observations serve to provide some population information. With the decline of pelt harvesting since 1929, it is likely that arctic fox numbers have increased. Because arctic foxes in the Prudhoe Bay oil field area readily use developed areas for habitat and a source of food (garbage), their densities are greater in the oil fields than in surrounding undeveloped areas, and their populations have grown larger and more stable (National Research Council 2003; U.S. Department of the Interior 2004). The increase in arctic fox populations due to development could affect regional populations of some bird species by way of increasing the extent of predation and the foxes' accessibility to previously inaccessible bird nesting locations such as barrier islands (National Research Council 2003). Development considerations regarding arctic foxes might include proper waste management that discourages scavenging as well as design modifications to discourage animal passage.

Surveys in the western Brooks Range from 1997 to 2000 indicated that the red fox population was high, and that both arctic and red fox populations were unusually high during the winter of 2000-2001 (Dau 2001a). Although no quantitative data is available for GMU 26A foxes, arctic foxes are more abundant along the arctic coastal plain while red foxes prefer the interior regions.

Birds

Waterfowl and Other Water Birds

In 1990, Howe Island was found to support 380 to 450 snow goose nests. In the past, fox predation had decimated the snow goose colony, but because the island is isolated in early spring by discharge from the Sagavanirktok River, foxes have been prevented from reaching the island in most years (Alaska Department of Natural Resources 1998). The population of lesser snow geese on the arctic coastal plain has increased in recent years, and a number of scattered nests or small colonies consisting of less than 13 nests have been reported near the coast from Fish Creek to the Ikpikpuk River Delta (U.S. Department of the Interior 2004). In the western delta of the Ikpikpuk River, a minimum of 1,149 nests was located in 2003, which is 25 percent greater than the count in 2002 (Ritchie, Shook et al. 2004a). A brood rearing survey in 2003 yielded an estimation of over 3,360 snow geese in 48 different groups between Barrow and the Fish Creek delta. As in previous years, the geese were concentrated (87 percent of the total) in the Smith Bay subregion (Ritchie, Shook et al. 2004a).

The population of Canada geese on the arctic coastal plain has varied from as few as 3,000 birds (1989 and 1994) to as many as 47,000 in 1986 and 1999 (U.S. Department of the Interior 2004). The 2002 population estimate was 52 percent lower than the 1985 to 2001 mean population size (U.S. Department of the Interior 2004). Since 1992 it appears that the brant population on the arctic coastal plain is increasing (U.S. Department of the Interior 2004). A brood-rearing survey in 2003 yielded an estimation of 19,800 brant in 118 groups between Barrow and Fish Creek, which is a 67 percent increase from numbers recorded in 2002 (Ritchie, Shook et al. 2004a). The largest nesting populations of brant in development areas are on Howe and Duck Islands, which are both near the Endicott Causeway. Although brant nesting in development areas is relatively uncommon (only 2 percent of the breeding population), nesting success in these areas is low (44-55 percent) compared to nesting success in non-developed areas (around 80 percent) (National Research Council 2003). High predation is the likely cause

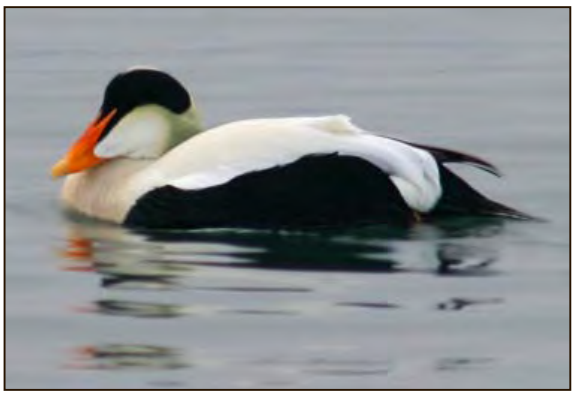
of such low nesting success. Because brant are very sensitive to disturbance by aircraft, especially helicopters during molt (National Research Council 2003), development considerations should include the establishment of flight patterns to avoid molting brant populations, or creation or road links between fields.

Tundra swan densities in the Colville River Delta are three to five times greater than in other areas along the North Slope (Alaska Department of Natural Resources 1998). During aerial surveys in 2003, 86 tundra swan nests (0.06 nests/km2) were observed in the Barrow area, which represents a 38 percent decrease from records in 2002. The highest nesting densities were on the Meade River delta (Ritchie and King 2004b). Predation in existing oil field development areas during the early 1990s did not seem to have influenced nest success (83 percent), which was comparable to success in a non-developed area like the Arctic National Wildlife Refuge (76 percent) (National Research Council 2003). Because swans are sensitive to human disturbance at distances greater than 1600 feet away, nesting success of swans may be more influenced by disturbance than habitat loss. Habitat loss due to development can be offset by the large amount of breeding habitat currently available on the North Slope, the low densities of swans throughout their range, and the natural territorial spacing between nests. Climate change during the past decade has been more pronounced on the North Slope, which has produced longer frost-free periods during the breeding season, thereby beneficially affecting swans through an increase in nesting success (National Research Council 2003).

An increasing trend in the red-throated loon population on the arctic coastal plain was reported from 1986 to 2002 (U.S. Department of the Interior 2004). However, Larned et al. (2003) reported a decreasing trend in the numbers of red-throated loons during 1992 to 2003 (U.S. Department of the Interior 2004). The population of yellow-billed loons has been stable since at least 1986 (U.S. Department of the Interior 2004). During aerial surveys in the Barrow area in 2003, three yellow billed loons were observed (Ritchie, Shook et al. 2004a). There are currently no Pacific loon density or trend estimates for oil fields on the North Slope, but they tend to nest on the shores of impoundments in developed areas (National Research Council 2003).

Pintail numbers fluctuate from year to year, without any reported significant population trends since aerial surveys began in the mid-1980s (U.S. Department of the Interior 2004). Larned et al. (2003) reported an increasing trend in the long-tailed duck population in the arctic coastal plain prior to 2003, but Mallek et al. (2003) reported a declining trend from 1985 to 2002 (U.S. Department of the Interior 2004)

The king eider is the most abundant eider species on the arctic coastal plain (Larned, R. Stehn et al. 2003), followed by the common eider. Data from eider counts as they pass Point Barrow during migration indicates that the king eider population has declined by approximately 56 percent since 1976 (Suydam, D.L. Dickson et al. 2000). However, an increasing population trend for king eiders on the arctic coastal plain from 1993 to 2003 was reported by Larned et al. (2003). Aerial surveys in 2003 in the Barrow region yielded an abundance (0.26 birds/square kilometer) that was 85 percent higher than those recorded in 2002, as well as being higher than all other years of the Barrow study area (0.14-0.25 birds/square kilometer in 1999-2002) (Ritchie, Shook et al. 2004a). There do not appear to be any trends in existing developed areas for king eiders, and they do not appear to avoid anthropogenic structures, however predation in developed areas generally causes lower nesting



Common eider *(J. London)*

success than in non-developed areas of the North Slope. Common eiders nest primarily on barrier islands and use anthropogenic structures as nesting cover, and there are no trends related to oil field development and nesting (National Research Council 2003).

The densities of shorebirds nesting on the arctic coastal plain vary depending on location and habitat. For example, densities of 30 nests per square miles were reported on study plots in drained-lake basin habitat, but only 5 nests per square miles were reported on tussock/ridge tundra on the central NS (U.S. Department of the Interior 2004). Shorebirds appear to prefer wet sedge willow and moist sedge shrub habitats in the Colville River Delta, where the overall shorebird nest density of nearly 35 nests per square miles was observed (U.S. Department of the Interior 2004). Shorebird populations in areas of oil field development appear to be stable, except for the dunlin, which has declined in both development and non-development areas along the North Slope (National Research Council 2003). Near roads and gravel pads, shorebird densities tend to be lower than in more distant areas, although densities are higher on the leeward sides of roads than elsewhere. Increased predation in areas of development likely affects local shorebird populations through the reduction of nesting success (National Research Council 2003).

The population of jaegers (parasitic, long-tailed, and pomarine) along the arctic coastal plain has remained relatively stable from 1992 to 2003 (U.S. Department of the Interior 2004). The glaucous gull population on the arctic coastal plain has remained stable since 1992 (U.S. Department of the Interior 2004). The arctic coastal plain population of Sabine's gulls fluctuated between 5,000 and 8,000 birds between 1992 and 2003, except for a low of 2,800 birds in 1998 (U.S. Department of the Interior 2004). Larned et al. (2003) reported an increasing trend in the arctic tern population of the arctic coastal plain from 1992 to 2003 (U.S. Department of the Interior 2004).

Oil and gas development on the North Slope has affected tundra habitat used by breeding and molting birds through the placement of fill and by thermokarst. Gravel fill and associated dust can cause accelerated or delayed snowmelt, which can affect the quality and availability of underlying vegetation. For waterfowl, a major offshore oil spill would endanger molting flocks in nearshore lagoons. Due to the higher predator densities in development areas, concentrated predation seems to be the primary reason for lower nesting successes in these areas (National Research Council 2003). These affected bird populations may be supplemented by immigration of birds from other areas. Development considerations might include proper waste management (garbage) to reduce the attractiveness of anthropogenic food sources in developed areas to predators/scavengers such as gulls, ravens, foxes, and bears.

Terrestrial Birds

The average nest density for Lapland longspurs on study plots near the Colville River was 8.0 nests per square miles (U.S. Department of the Interior 2004). The savannah sparrow, redpoll, snow bunting, and yellow wagtail appear to be fairly common breeders on the arctic coastal plain (U.S. Department of the Interior 2004).

Willow ptarmigan appear to be much more abundant in the central and west North Slope than rock ptarmigan, with higher nest densities reported for willow ptarmigan than for rock ptarmigan near the Colville River (U.S. Department of the Interior 2004).

In an aerial survey over Barrow in 2003, snowy owl observations had decreased 49 percent from 2002 and the density (0.03 birds/km2) was at the lower end of densities recorded between 1999 and 2002 (0.03-0.11 birds/km2) (Ritchie, Shook et al. 2004a).

Snowy owl chick

The population trend for the common raven has paralleled that of the human development on the North Slope. The lack of appropriate nesting habitat limited the number of ravens prior to development on the North Slope; however, over the past several decades common ravens have become much more abundant on the North Slope (especially the arctic coastal plain) as nesting habitat in the form of buildings, antennas, drill rigs, and other tall structures has become more abundant. Due to the presence of human food sources on the arctic coastal plain, some ravens over-winter near their nesting grounds (U.S. Department of the Interior 2004).

The effects of oil and gas North Slope development on terrestrial birds would be the same as discussed under Waterfowl and Other Water birds above. Development considerations in the foothills of the Brooks Range should account for the possibility that new development could impinge on raptor nesting and hunting success. Human and aircraft activity near nests should be regulated (National Research Council 2003).

Climate change during the past decade may affect the reproduction timing and success of many bird species on the North Slope. The increase in frost-free periods and warmer temperatures may lead to a change in the tundra vegetation abundance and type, thereby altering the availability of some food sources for some birds (National Research Council 2003).

3.2.4 *Marine Mammals*

3.2.4.1 Key species

Marine mammal species that occur regularly in the Beaufort Sea include the ringed seal (*Phoca hispida)*, bearded seal (*Erignathus barbatus)*, spotted seal (*Phoca largha)*, polar bear (*Ursus maritimus)*, Pacific walrus (*Odobenus rosmarus divergens*), and beluga whale (*Delphinapterus leucas)*. Bowhead whales *(Balaena mysticetus)*, also present, are listed as endangered under the Endangered Species Act (ESA), and are discussed in Section 3.2.6 (Protected Species). The Marine Mammal Protection Act of 1972 (MMPA) protects all marine mammals in U.S. waters by directing that they shall “be protected and encouraged to develop to the greatest extent feasible commensurate with sound policies of resource management, and that the primary objective of their management should be to maintain the health and stability of the marine ecosystem” (U.S. Department of the Interior 2004). Key marine mammal species found in the North Slope are listed in Table 3.2-4; a generalized illustration is provided in Figure B-9. Walrus and other species are not indicated on this map.

Some marine mammals, such as the Bowhead whale, bearded seals, ringed seals, Pacific walrus, and polar bears, are important subsistence species for hunters from Barrow, Nuiqsut, and Kaktovik. Subsistence hunters take beluga whales when they are available, particularly in Point Lay and Wainwright (U.S. Department of the Interior 2004). Subsistence is discussed in Section 3.3.3.

3.2.4.2 Distribution (spatial and seasonal, migratory pathways)

Ringed seals, bearded seals, and polar bears are present year-round and move extensively throughout the Beaufort Sea region. Beluga whales are normally present from April to October, and spotted seals are present from July through mid-October (U.S. Department of the Interior 2004). Pacific walrus are generally present in the Alaska portion of the Beaufort Sea during summer months of open water (Alaska Department of Natural Resources 1998)

Ringed Seal

The Bering, Chukchi, and Beaufort seas support the Alaska stock of ringed seals, which are the smallest, yet most abundant, of the arctic ice seals (U.S. Department of the Interior 2004). Ringed seals travel to areas near the coast at the beginning of winter with the formation of shorefast ice, and then return to sea in the spring with breakup or movement of the ice pack (Alaska Department of Fish and Game 2004). Ringed seals have an affinity for ice-covered waters and occupy seasonal and permanent ice. They pup on the ice or in lairs under the snow in late winter/early spring (National Research Council 2003; Angliss 2004). Seals that winter in the Bering Sea likely summer in the northern Chukchi Sea or Arctic Ocean (Alaska Department of Fish and Game 2004)

Bearded Seal

Bearded seals are present throughout the year in the Beaufort Sea, with the abundance of the migratory population centered in the Bering Sea in shallow water (about 650 foot depth) (Angliss 2004; U.S. Department of the Interior 2004). The seasonal migrations of this seal are in response to the movement of sea ice (Alaska Department of Fish and Game 2004). Adults are almost always associated with ice, whereas young seals sometimes remain in ice-free nearshore areas where they frequent bays and estuaries (Alaska Department of Fish and Game 2004).

Spotted Seal

Spotted seals are medium-sized north Pacific seals, the Alaska stock of which occurs from the Bering Sea to the Beaufort Sea in the Arctic Ocean (U.S. Department of the Interior 2004). These seals migrate south from the Chukchi Sea in October through the Bering Strait in November to reach their breeding areas in the Bering Sea. Seals overwinter along the ice edge, move to the southern margin of ice during spring, and then head to coastal habitats for the summer, such as Kasegaluk Lagoon (Angliss 2004). Spotted seals are not common in the Beaufort Sea, but are present during the ice-free summer season (July through mid-October) from Bristol Bay in the southeastern Bering Sea to north of Demarcation Point in the eastern Beaufort Sea (U.S. Department of the Interior 2004). Recently, spotted seals also have used Smith Bay at the mouth of the Piasuk River (U.S. Department of the Interior 2004).

Walrus

Most of the North Pacific walrus population is found west of Barrow, in waters of the Bering and Chukchi seas. However, some individuals move east through the Alaska portion of the Beaufort Sea on their way to Canadian waters. During this time, they are found in relatively shallow waters, either close to ice or land. The diet of walruses consists mainly of bottom dwelling invertebrates such as clams, snails, and crabs (Alaska Department of Natural Resources 1998).

Polar Bear

Polar bears and gulls *(R. Suydam)*

Polar bears are distributed throughout the arctic and are found in the Beaufort Sea year-round, making seasonal offshore migrations as the landfast ice melts every summer (U.S. Department of the Interior 2004). The diet of polar bears consist primarily of ringed and bearded seals, but can include walrus and beluga whale as the opportunity arises (U.S. Department of the Interior 2004). Polar bears often are attracted to the shore to scavenge marine mammal carcasses during the fall open-water period. Recently, large numbers of polar bears have been attracted to areas near the villages of Barrow and Kaktovik, and near the Nuiqsut whaling camps on Cross Island during the fall (U.S. Department of the Interior 2004).

Beluga Whale

The seasonal distribution of beluga whales is affected by ice cover, temperature, access to prey, tidal conditions, and human interactions. During winter, the whales are found in offshore waters and associated with pack ice, whereas they migrate in the spring to molt and calve in warmer near shore waters including estuaries and bays (Angliss 2004). During the summer, beluga whales from two stocks, the Beaufort Sea and the eastern Chukchi Sea, can be found in North Slope waters (U.S. Department of the Interior 2004). The Beaufort Sea stock of beluga whales begin migrating north from wintering areas in the Bering Sea and are usually seen at Point Barrow by mid-April (U.S. Department of the Interior 2004).

Belugas appeared to be common near shorefast ice in the region until ice moves offshore in July (Hazard 1988). There are known concentrations of beluga whales in Kasegaluk Lagoon (Angliss 2004). A few groups (ranging up to 100 belugas) were observed north and east of the Colville River Delta near Jones, Pingok, and Thetis islands during fall migration (U.S. Department of the Interior 2004). More recently, hunters from Nuiqsut reported sightings of belugas swimming in the Nigliq Channel of the Colville River as well as some stranded in shallow water in the Fish Creek Delta (U.S. Department of the Interior 2004). Kasegaluk Lagoon on the Chukchi Sea is an important habitat area for beluga whales.

3.2.4.3 Trends and development considerations

Ringed Seal

Currently, the size of the Alaska ringed seal population is unknown, but estimates indicate between 1 million to 3.5 million animals (U.S. Department of the Interior 2004). The ringed seal Beaufort Sea population appears to range from 40,000 in winter to 80,000 in summer (U.S. Department of the Interior 2004).

Near Prudhoe Bay, densities of ringed seals ranged from 0.15 to 0.28 seals per square miles between 1997 and 2002 (U.S. Department of the Interior 2004), which are lower than densities calculated in the same area during the 1980s (U.S. Department of the Interior 2004).

Aerial surveys conducted during 1999-2000 in the eastern Chukchi Sea indicated that during winter ringed seals were more common in nearshore fast ice and pack ice, with lower densities occurring in offshore pack ice. The coastal waters south of Kivalina and near Kotzebue Sound supported the highest densities of ringed seals. Food availability (a variety of invertebrates and fish, including arctic cod) paired with fast ice distribution may influence densities of ringed seals in the Chukchi Sea (Bengtson 2001; Alaska Department of Fish and Game 2004). Ringed seals return to the open sea during ice breakup in spring (Alaska Department of Fish and Game 2004).

The effects of climate change and increasing temperatures over the past 10 to 15 years have been more pronounced in the arctic regions than elsewhere in the world. Seals that are associated with ice, such as the ringed seal are especially sensitive to changes in weather and sea surface temperatures because such changes directly affect their ice habitat. Any change in ice habitat can shift the population densities and distribution (Angliss 2004).

Commercial fisheries have been responsible for incidental kill of ringed seals, with two mortalities reported from the observer program for the Bering Sea groundfish trawl fishery in 1992.

Because ringed seals are common offshore in waters where oil and gas development have occurred, they are more prone than other seals to effects from contamination from oil spills and disturbance caused by industrial noise from air and water. Noise can cause behavioral reactions and displacement of some species. Displacement of ringed seals can affect subsistence harvest levels, as well as decreasing reproductive success of the species (National Research Council 2003). Development considerations for all ice-associated seals should include noise-reduction measures and oil spill contingency plans.

Bearded Seal

A reliable estimate of the abundance of bearded seals in the Beaufort Sea is currently unavailable (U.S. Department of the Interior 2004). However, it appears that densities in the western Beaufort Sea are highest during the summer and lowest during the winter (U.S. Department of the Interior 2004).

Aerial surveys conducted during 1999-2000 in the eastern Chukchi Sea indicated that densities of bearded seals were generally higher in offshore pack ice, with the exception of high densities of bearded seals observed south of Kivalina. Food availability (wide variety of invertebrates and some fishes) paired with fast ice distribution may influence densities of bearded seals in the Chukchi Sea (Bengtson 2001; Alaska Department of Fish and Game 2004).

Commercial fisheries have been responsible for incidental kill of bearded seals. As reported from the observer program for the Bering Sea groundfish trawl fishery, the bearded seal mortalities include: three in 1991, four in 1994, one in 1998, and two in 1999 (Angliss 2004).

The effects of climate change and increasing temperatures over the past 10 to 15 years are expected to affect ice-associated bearded seals as described for ringed seals above.

Spotted Seal

There is currently no reliable estimate of the numbers of spotted seals in Alaska, however, the population of the Bering Sea was estimated in the early 1970s to be 200,000 to 250,000 during mating season (Angliss 2004).

Commercial fisheries have been responsible for incidental kill of spotted seals. As reported from the observer program for the Bering Sea/Aleutian Islands groundfish fishery, the mortalities include three spotted seals in 1996 (Angliss 2004).

The effects of climate change and increasing temperatures over the past 10 to 15 years are expected to affect ice-associated spotted seals as described for ringed seals above.

Walrus

The population size of the Pacific walrus has been heavily influenced by human exploitation of the animal. The population size was estimated to be between 50,000 and 100,000 animals in the mid 1950s, and probably increased in size during the 1960s and 1970s due to reductions in hunting pressures. Aerial surveys indicated population levels of between approximately 200,000 and 230,000 animals from 1975 to 1990 (Angliss 2004). The current population size is unknown.

Commercial fisheries have been responsible for incidental kill or injury of walruses. As reported from the observer program for the Bering Sea groundfish trawl fishery, there were five walrus mortalities and one injury (alive) during 1996 to 2000 (Angliss 2004).

The effects of climate change and increasing temperatures over the past 10 to 15 years are expected to affect ice-associated Pacific walrus as described for ringed seals above.

Polar Bear

Polar bear density in the region from Point Barrow to Cape Bathurst was estimated to be one bear per 76 to 110 square miles (U.S. Department of the Interior 2004). The two most important natural factors affecting polar bear distribution are sea ice and food availability (U.S. Department of the Interior 2004).

The Beaufort Sea polar bear stock has increased in number during the past 30 years at an estimated annual rate of 2 percent or more (U.S. Department of the Interior 2004). The Beaufort Sea stock now consists of more than 2,000 animals and is believed to be at or near carrying capacity (U.S. Department of the Interior 2004).

Polar bear with seal carcass *(T. Olemaun)*

Polar bear maternal dens are more concentrated along the coastal plain of the eastern North Slope (ANWR) and less common along the western arctic coastal plain (U.S. Department of the Interior 2004). In 2001, of the 35 dens reported on the arctic coastal plain, all were found along bluffs or along river/creek drainages within 15 miles of the coast (U.S. Department of the Interior 2004).

The effects of climate change and increasing temperatures over the past 10 to 15 years have been more pronounced in the arctic regions than elsewhere in the world. For polar bears, the effects can include changes in denning behavior caused by reduced snow cover and earlier spring thaws. The approach of pack ice nearer to the coastline due to earlier melting of shorefast ice provides more access to land for polar bears, which has been causing an increase in aggregations of bears on land. An increase in bears on land may lead to more human-bear interactions and possibly more defense of life or property kills. With polar bears congregating on

shore, it is easier for tourists to view them than if they were on pack ice, and demand for polar bear viewing may increase with continued warming temperatures in the arctic.

Funding for polar bear research had increased since 1994, but there has been little funding provided to USFWS for management, so the research funding has produced little useful application.

Because polar bears are common offshore in waters where oil and gas development have occurred, they are prone to effects from contamination from oil spills and disturbance caused by industrial noise. For a majority of the year, polar bears are not very sensitive to noise or other human disturbances. Pregnant females and those with newborn cubs on land and sea ice, however, are very sensitive to noise and vehicle noise. An event of disturbance of a bear in a maternity den due to seismic noise has been documented. Displacement of polar bears can affect subsistence harvest levels as well as decreasing reproductive success of the species (National Research Council 2003).

In-water structures can be attractive to polar bears because such structures can cause leads in the ice through which the bears hunt seals. Buildings on land can also attract bears due the likely presence of anthropogenic food sources. Development considerations for polar bears might include noise-reduction measures and oil spill contingency plans. Other development considerations regarding polar bears should include siting facilities away from the coast where known dens occur (USFWS requires industry to avoid dens as much as possible) and proper waste management that discourages scavenging to reduce or avoid the instances of human-bear interactions.

Beluga Whale

The Beaufort Sea stock of beluga whales is estimated at more than 39,000 animals, based on data from an aerial survey conducted in 2002 (Angliss and Lodge 2002; Angliss 2004; U.S. Department of the Interior 2004). This stock of belugas is considered to be stable or increasing (Angliss 2004).

Beluga whales (R. Suydam)

The maximum count of belugas of the eastern Chukchi Sea stock during the 1998 survey is considered underestimated at 1,172 animals. However, that number is similar to counts in the same area during summers of 1989-1991 (1,200 animals) and during the summer of 1979 (1,104 to 1,601) (Angliss 2004). This stock does not appear to be declining, based on these data (Angliss 2004).

Because beluga whales are sensitive to human interactions, any increase in activity offshore in the Beaufort Sea might affect the population dynamics of the whales. Development considerations might include restricting the placement of structures and removal of gravel in sensitive habitat areas such as Kasegaluk Lagoon. The nearshore waters of the Chukchi Sea are popular gillnet fishery locations. There have been no reported injuries or mortalities as a result of commercial fishing gear entanglement. However, an increase in commercial fishing pressure for arctic cod due to improved stocks (see Section 3.2.2.2) as a result of climate change would increase the amount of gear used, which may lead to more fishing nets becoming loose and washing up on shore or entangling whales.

Table 3.2-4
Key Marine Mammal Species found in the North Slope Borough

Common Name	Scientific Name	Inupiaq Name
Bowhead whale	*Balaena mysticetus*	Aqviq
Beluga whale	*Delphinapterus leucas*	Sisuaq
Bearded seal	*Erignathus barbatus*	Ugruk
Ringed seal	*Phoca hispida*	Natchiq
Spotted seal	*Phoca largha*	Qasigiaq
Pacific walrus	*Odobenus rosmarus divergens*	Aivaq
Polar bear	*Ursus maritimus*	Nanuq

3.2.5 *Vegetation*

Tundra, which refers to as the rolling, treeless plains of arctic regions, dominates the terrestrial vegetation of the North Slope Borough, and is categorized into three types: alpine, moist, and wet (Selkregg 1975). Alpine tundra vegetation is found in the well-drained mountainous range areas, and consists mainly of low, mat-forming vegetation communities including heather (*Cassiope sp.*), blueberry (*Vaccinium uliginosum*), crowberry (*Empetrum nigrum*), and Labrador tea (*Ledum decumbens*), interspersed with willow (*Salix ssp.*) and dwarf birch (*Betula nana exilis*). Outcrops and talus slopes exposed to harsh environmental conditions support cushion-forming herbaceous vegetation such as moss campion (*Silene acaulis*), mountain avens (*Dryas ssp.*), and purple mountain saxifrage (*Saxifraga oppositifolia*). Lichens (*Cladonia spp.*) and mosses (*Sphagnum ssp.*) are common as well and serve as food for caribou.

Moist tundra vegetation dominates the vegetation community of the foothills region, and consists of tussocks of cottongrass (*Eriophrum vaginatum*), between which mosses, lichens, and herbs such as mountain avens and cloudberry (*Rubus chamaemorus*) thrive. Dwarf scrub (woody vegetation) communities consisting of willow, dwarf birch, Labrador tea, and crowberry are also present. The moist tundra is divided by the numerous river drainages found in the area, the floodplains of which support a different vegetation community consisting of high shrubs. Undisturbed areas of this community support willows, some herbs such as monkshood (*Aconitum delphinifolium)* and lupine *(Lupinus arcticus),* mosses and lichens, and occasionally alders (*Alnus crispa*) and cottonwood trees (*Populus balsamifera balsamifera*). Disturbed areas closest to the streambed are colonized by horsetail (*Equisetum arvense*), dwarf fireweed (*Epliobium latifolium)*, and alpine bluegrass (*Poa alpina*).

The wet soil conditions in the arctic coastal plain support wet tundra herbaceous communities dominated by sedges or grasses (graminoids). Dwarf scrub communities are found where soil conditions are dryer, such as at thaw lake margins, along river bluffs, or other more elevated, well-drained areas (United States Geological Survey 1995).

3.2.6 *Protected Species (T&E, MMPA)*

Protected species are those listed under:

- the Endangered Species Act (ESA), as amended by U.S. Fish and Wildlife Service (FWS) and the U.S. National Marine Fisheries Service (NMFS) October 2002;
- the ADF&G State Species of Concern (SSOC);
- the MMPA;

- and the Proposed Bureau of Land Management (BLM) Sensitive Species List for Alaska[1].

The black guillemot, and yellow-billed and red-throated loons, previously described in Section 3.2.3, are on BLM's Proposed Sensitive Species List for Alaska (U.S. Department of the Interior 2004). The remainder of the protected species is discussed in the following sections.

3.2.6.1 Distribution (spatial and seasonal, migratory pathways)

Bowhead whale

The bowhead whale has been classified as endangered under the ESA since 1973, although no critical habitat has been designated for this species. It has been suggested that that the Bering-Chukchi-Beaufort Seas population of bowhead whales be delisted under the ESA (U.S. Department of the Interior 2004). The bowhead whale is also listed as depleted under the MMPA and is considered an ADF&G SSOC.

The western arctic stock of bowhead whales is the only stock found in U.S. waters (Angliss 2004). Most of this stock migrates annually between the Bering and Beaufort seas (Angliss 2004). In the spring (March through June), they move from their wintering areas in the northern Bering Sea (November to March), through the Chukchi Sea to the Beaufort Sea where they remain from mid-May to September (Angliss 2004). In the fall (September through November) the bowhead whales return to the Bering Sea to winter, following a route that extends from the eastern Beaufort Sea, along the continental shelf across the Chukchi Sea, and south along the coast of the Chukchi Peninsula (U.S. Department of the Interior 2004). For a majority of the year, bowheads are associated with sea ice, except during the summer when they are found in relatively ice-free waters in a broad area from Amundsen Gulf and the Eastern Beaufort Sea to the eastern part of the East Siberian Sea (Angliss 2004; U.S. Department of the Interior 2004). The pathway of spring migration follows fractures in the sea ice along the Alaskan coast, usually in the shear zone between the shorefast and pack ice (Angliss 2004).

Bowhead whales feed on concentrated invertebrates in numerous areas that vary spatially and temporally throughout the fall migration along the coastline of Alaska (U.S. Department of the Interior 2004). Research shows that the extent of ice cover can influence fall migration (Moore 2000). Whales moving through the central Beaufort Sea have been observed migrating closer to shore during light to moderate ice coverage years (median distance offshore 18 to 25 miles), and farther offshore in heavy coverage ice years (median distance offshore 35 to 45 miles) (U.S. Department of the Interior 2004).

Steller's Eider

The Northern American breeding population of Steller's eider was federally listed as a threatened species in 1997 due to a reduction in the number of breeding birds and suspected reduction in the breeding range in Alaska. Critical habitat has been established for Alaska populations of Steller's eider, but there is no designated critical habitat on the North Slope (U.S. Department of the Interior 2004).

[1] BLM Manual Section 6840 defines sensitive species as "...those species that are: (1) under status review by the FWS or NMFS; or (2) whose numbers are declining so rapidly that Federal listing may become necessary; or (3) with typically small and widely dispersed populations; or (4) those inhabiting ecological refugia or other specialized or unique habitat."

Of the three recognized breeding populations of Steller's eiders, one occurs in Alaska and nests primarily on the arctic coastal plain (U.S. Department of the Interior 2004). During seasons other than breeding, Steller's eiders generally are found in shallow marine habitats along the Alaska Peninsula and the eastern Aleutian Islands extending eastward to lower Cook Inlet (U.S. Department of the Interior 2004). Apparently the range for the Steller's eider on the arctic coastal plain formerly extended east from Wainwright into the Canadian Northwest Territories (U.S. Department of the Interior 2004). Steller's eiders have been reported as far east as Prudhoe Bay (1997), but no recent sightings have been reported east of the Sagavanirktok River (U.S. Department of the Interior 2004). No nesting sites have been reported east of Cape Halkett, other than one 2001 record inland near the Colville River (U.S. Department of the Interior 2004). Aerial surveys performed during 1989-2000 indicated that although Steller's eiders occur over a vast area on the arctic coastal plain, the density is much greater near Barrow (USFWS 2002). The apparent importance of Barrow as a breeding area for Steller's eiders prompted the North Slope Borough to sponsor subsequent aerial surveys during 1999-2002. Their surveys confirmed the extensive use of the Barrow area by nesting Steller's eiders (USFWS 2002).

Steller's eider *(R. Suydam)*

Steller's eider nests are located on tundra habitats often associated with tundra ponds or thaw lakes and vegetation both near the coast and at inland locations (U.S. Department of the Interior 2004). Avian predators, including peregrine falcon, gyrfalcon, and snowy owls have been the predominant natural cause for mortality of adult Steller's eiders (U.S. Department of the Interior 2004).

Spectacled Eider

Spectacled eiders were listed as threatened under the ESA in May 1993 due to a 95 percent decline of the Yukon-Kuskokwim (Y-K) Delta breeding population in the previous two decades. Critical habitat has been established for Alaska populations of spectacled eider, but none is located on land on the North Slope. Some critical habitat is located on Ledyard Bay between Point Lay and Cape Lisbourne (U.S. Department of the Interior 2004).

The spectacled eider is a medium-sized sea duck that breeds along coastal areas of western and northern Alaska and eastern Russia, and winters in the Bering Sea (Petersen et al. 2000). Three breeding populations have been described, two of which occur in Alaska: one in the Y-K Delta in western Alaska, and the other on the North Slope of Alaska.

Wintering habitat for the spectacled eider is located in the Bering Sea south of St. Lawrence Island (U.S. Department of the Interior 2004). There is incomplete documentation of the spring migration routes of spectacled eiders, especially on the arctic coastal plain (U.S. Department of the Interior 2004). Most of the available data comes from counts of eiders as they migrate past Point Barrow in late May and early June (U.S. Department of the Interior 2004). Only small numbers of spectacled eiders have been reported offshore during spring migration waterbird counts east of the Colville River at Simpson Lagoon, possibly because most birds migrate overland across the arctic coastal plain following river drainages (U.S. Department of the Interior 2004).

In general, spectacled eiders on the arctic coastal plain prefer to breed near large, shallow thaw lakes with nest sites often located within 3 feet of a lake shore (U.S. Department of the Interior 2004).

3.2.6.2 Trends and Development Concerns

Bowhead Whale

The western arctic stock of bowhead whales is the largest of the five stocks found in the arctic and subarctic (Angliss 2004). In 1848, the stock size was estimated at 10,400 to 23,000 animals, before commercial whaling decreased the stock by 1914 to between 1,000 and 3,000 animals (U.S. Department of the Interior 2004). After commercial whaling ended in 1921, the western arctic stock has been slowly increasing, with population numbers at approximately 9,860 whales (U.S. Department of the Interior 2004). This population increase occurred at an annual rate of 3.3 percent from 1978 to 2001 (U.S. Department of the Interior 2004). Although there are no observer program records of bowhead mortality as a result of commercial fisheries in Alaska, there have been reported cases of whale entanglement in fisher nets and crab gear. Entanglement and scarring attributed to commercial fisheries may include over 20 cases as reported in subsistence harvest reports, and the average rate of entanglement in crab pot gear for 1997-2001 was 0.2 whales (Angliss 2004).

Bowhead whale at the surface (G.Zelinsky)

In terms of effects from development activities, bowhead whales are most sensitive to marine seismic exploration noises. Other activities such as exploratory drilling, ship and aircraft traffic, water discharges, dredging, and production drilling can also cause fall-migrating bowheads to divert around the noise sources. These noises can divert the bowheads sometimes by as much as 12 miles, possibly forcing them seaward, away from hunters, into impassable areas, and into less productive feeding grounds. The morphology of bowheads predisposes them to exceptional harm from contact with spilled oil due to the diversity of tissues that can be affected (National Research Council 2003). For this reason, although a major oil spill in North Slope waters may not be probable, the effects could be grave for bowhead whale populations, and therefore for subsistence communities. Considerations for terrestrial development should include the use of directional drilling to reduce the need for offshore oilrigs as well as conflict avoidance measures, especially during migration.

The effects of climate change and increasing temperatures over the past 10 to 15 years have been more pronounced in the arctic regions than elsewhere in the world. Bowheads are found in association with sea ice, and may be sensitive to alterations in arctic weather, sea surface temperatures, ice extent, or the subsequent effect on prey availability (Angliss 2004). A decrease in ice extent may increase the accessibility of the near shore area for large ships, and may also allow access during periods of time that were previously impassable due to ice cover. An increase in shipping activity can affect bowhead whales, in terms of noise disturbance, ship strikes, and migratory path interference. An increase in commercial fishing and crabbing pressure, possibly associated with improved stocks (see Section 3.2.2.2) as a result of climate change, would increase the amount of gear used, which may lead to more fishing nets

becoming loose and washing up on shore or entangling whales. Marine development considerations in light of climate change should include conflict avoidance measures during the fall migration and subsistence hunting season.

The MMPA requires that a potential biological removal (PBR) level be established for the western arctic bowhead stock to help regulate harvest and manage the stock at a productive level. The PBR of 89 animals is superceded by the authority of the International Whaling Commission (IWC) over subsistence harvest management for this stock. The block quota established by the IWC for the period 2002-2007 is 280 bowhead whale strikes, up to 67 of which can be taken annually (Angliss 2004).

Steller's Eider

Aerial surveys indicate that Steller's eiders are widely distributed across the arctic coastal plain from Point Lay to the Sagavanirktok River with very few sightings east of the Colville River. However, they are present across the arctic coastal plain in low densities (0.001 birds per square miles in 2003) (USFWS 2002; U.S. Department of the Interior 2004). The Barrow area supports the highest concentrations, although breeding does not occur there every year, perhaps due to predator/prey cycles (USFWS 2002; U.S. Department of the Interior 2004). For example, during the 1990s, Steller's eider breeding at Barrow corresponded with a high lemming population.

Aerial breeding pair surveys indicated that the arctic coastal plain Steller's eider population averaged about 1,000 birds between 1986 to 2001, but surveys conducted during months earlier in the year indicated a lower population, averaging approximately 170 birds from 1992 to 2003 (U.S. Department of the Interior 2004). It appears that a reduction in both occurrence and breeding frequency of Steller's eiders had occurred on the arctic coastal plain, with the exception of the Barrow area. This conclusion was based on comparisons of historical and recent data (USFWS 2002; U.S. Department of the Interior 2004).

Although the causes for the decline of the Steller's eider population in Alaska are still unknown, they may include hunting, predation pressure in breeding areas on the North Slope, the ingestion of lead shot, and changes in the marine environment (USFWS 2002; U.S. Department of the Interior 2004).

For both species of eiders (as well as all other ESA-listed species), development considerations must include a Section 7 Consultation with FWS before any activities that may adversely affect habitat can be conducted.

Spectacled Eider

During the 1970s, approximately 50,000 female spectacled eiders nested in the Y-K Delta of western Alaska. Historically, the North Slope population was likely much smaller than Y-K Delta population. In 1958, the spectacled eider was the most abundant eider species migrating along river systems south of Barrow in spring; however there is little information available describing the status of the North Slope spectacled eider population prior to 1992 (U.S. Department of the Interior 2004). In 1992, the FWS began conducting aerial surveys for breeding eiders; the surveys have continued annually through the 2003 breeding season (U.S. Department of the Interior 2004). From 1992 to 2003, the North Slope spectacled eider population ranged from approximately 5,000 to 9,000 birds, remaining relatively stable (U.S. Department of the Interior 2004).

Spectacled eiders arrive on the North Slope to nest in late May or early June. They occur in low densities of approximately 0.1 birds per square mile across the North Slope from Wainwright to the Prudhoe Bay area, with the highest concentrations occurring within approximately 40 miles of the coast between Barrow and Wainwright, and northeast of Teshekpuk Lake (U.S. Department of the Interior 2004). Spectacled eider densities of 0.05 to 0.10 birds per square mile were reported during two years of surveys on the central North Slope. It appears that nesting habitat in the Fish Creek Delta may be attracting more spectacled eiders (greater densities) than other portions of the central North Slope (U.S. Department of the Interior 2004).

Counts of wintering spectacled eiders show foraging populations of between 360,000 to 375,000 birds in the Bering Sea south of St. Lawrence Island (U.S. Department of the Interior 2004). The eiders congregate to forage for invertebrates at depths of 150 to 230 feet in areas of open leads (U.S. Department of the Interior 2004).

For both species of eiders (as well as all other ESA-listed species), development considerations must include a Section 7 Consultation with FWS before any activities that may adversely affect habitat can be conducted.

3.2.6.3 Use of Traditional and Contemporary Local Knowledge

Traditional and contemporary local knowledge of the biological environment has been passed down from generation to generation and increased through the experience of Borough residents who have spent much of their lives working in and observing the environment. Traditional and contemporary local knowledge means knowledge imparted by elders, hunters, gatherers, whaling captains and others amongst the Inupiat people about the culture and history of the Inupiat people and the natural environment, including, but not limited to, knowledge of subsistence habits, uses, and traditions, wildlife, flora, fauna, land, sea, water, air, and ecosystem conservation.

Residents have detailed knowledge of local distribution of fish, wildlife, and their habitat, that can affect the location and design of facilities and utilities. Traditional and contemporary local knowledge can provide information on the location of critical habitat and migration corridors.

Traditional and contemporary local knowledge for the North Slope area is well documented in written record at the University of Alaska – Anchorage, University of Alaska – Fairbanks, Barrow Tuzzy Consortium Library, North Slope Borough Planning Department Inupiat History Language and Culture division, North Slope Borough Planning Department's Geographic Information System, tribal organizations, and the Alaska Eskimo Whaling Commission records, among other locations. In addition, federal agencies such as the National Science Foundation, National Oceanic and Atmospheric Administration, and Minerals Management Service have specific funding and programs to elicit and document traditional and contemporary local knowledge, and have an obligation as tribal trustees to provide this information to the public.

All project proponents, including resource and village development projects, should consult with Borough staff and village residents during the planning and design stages of projects in order to incorporate traditional and contemporary local knowledge in an appropriate manner. The incorporation of traditional and contemporary local knowledge should be an integral component of the project plan; it is not a well-reasoned approach to ignore thousands of years of knowledge until a very late stage of project planning. The Borough particularly emphasizes that project proponents should foster constructive relationships with tribal governments and local governments.

Traditional and contemporary local knowledge has been utilized in the Arctic Gas pipeline project and the Alpine CD4 project to result in safer facility location and designs. There are some projects that the Borough was dissatisfied with how traditional and contemporary local knowledge was used. While there are still improvements to be made in the effective incorporation and utilization of traditional and contemporary local knowledge, efforts such as these will serve as educational tools for future projects.

The Alaska Eskimo Whaling Commission (Alaska Eskimo Whaling Commission 2005) provided several examples of western science confirming traditional knowledge.

1. The Bowhead Quota at the International Whaling Commission

In 1977, the International Whaling Commission, with the cooperation of the U.S. Government, imposed a ban on the Alaskan Eskimo bowhead whale subsistence hunt, based on a National Marine Fisheries Service study concluding that the western arctic bowhead population was in serious decline and that the increasing subsistence hunt was threatening its survival. Inupiat elders and whaling captains informed the U.S. that the bowhead population was healthy and growing and that our hunt was not a threat. As government scientists claimed that the bowhead population was below 1,000, whaling captains and elders reported that the population was in the range of 4,000 to 5,000 (North Slope Borough Department of Wildlife 2005).

The problem that the U.S. scientists were having was that they didn't know enough about bowhead whale behavior to know how to design a census count for the population. The North Slope Borough hired scientists to design and carry-out a bowhead census using techniques taught to them by elder whaling captains. It took several years to complete the first full census. When it was completed, however, the population estimates supported the information given by whaling captains and elders. Subsequent population studies continue to confirm those early reports and to confirm that the population is in fact healthy and growing.

2. Bowhead Whale Reactions to Offshore Industrial Noise

The fall bowhead hunting villages, especially Nuiqsut and Kaktovik, have been experiencing adverse effects from offshore oil and gas activity since the early to mid-1980's. Primarily, these adverse effects have taken the form of changes to bowhead migratory behavior – changes in swimming breathing patterns, offshore deflection – in response to different types of noise. Whaling captains have reported these changes in behavior from the beginning of offshore oil and gas exploration in the Beaufort Sea. Effects have been observed when migrating whales encounter supply and support vessels drilling (especially from drill ships), low flying aircraft, ice breakers, and active seismic vessels.

With the beginnings of seismic exploration during the open water season in the central and eastern Beaufort Sea, the fall captains began to report that as the migrating whales approached the noise source, the whales became skittish, changing their swimming and breathing patterns at distances of up to 30 to 35 miles from the noise source. They reported that the migration then would begin to move offshore, deflecting away from shore as much as 20 to 30 miles. Also, they did not appear to return to their "pre-deflection" path.

Federal agencies and operators refused to acknowledge that migrating bowhead whales reacted to industrial noise. However, a three year study (1996, 1997, 1998) of the effects of the offshore seismic activity on fall migrating bowhead whales ultimately confirmed that the whaling captains were correct regarding the change in behavior and were quite accurate in their estimates of the distances at which whales were reacting.

The study confirmed that migrating bowhead whales deflect around seismic noise at a minimum distance of 20 kilometers (12 miles), with the central part of the migration several more miles out. Changes in the migration were observed at a distance of approximately 35 kilometers (21 miles) east of the noise source and the deflection continued for at least 40-50 kilometers (24-30 miles). The study also demonstrated that the whales change their rate of calling at a distance of at least 45 kilometers (27 miles) away from the seismic source. This study was designed through a stakeholder/peer review process that included whaling captains and NSB and industry scientists.

The lesson of these research projects is that science in the Arctic is best when it is undertaken as a collaborative effort. Our people's traditional knowledge of the Arctic and its living resources can provide important information for researchers trying to design studies or interpret results. This is especially true if the research relates to resources or areas of the Arctic that are important to our survival, such as the behavior of our subsistence resources, weather, and sea ice.

3. Conflict Avoidance Agreements

The AEWC devised Conflict Avoidance Agreements as an aid in mitigating adverse effects on the bowhead hunt from offshore industrial operations. The AEWC uses traditional knowledge to direct timing and seasons of operations to avoid interference with subsistence bowhead hunting.

4. Open Water Season Peer Review Meetings

Each spring, the National Marine Fisheries Service hosts a meeting of NSB, industry and government scientists, whaling captains, and other stakeholders to review monitoring plans, designed and submitted by offshore operators, for activities planned during [the] following fall open water season. The monitoring plans, required under the U.S. Marine Mammals Protection Act, are designed to detect interference with marine mammals caused by the planned operations so that measures can be designed and implement to mitigate potential adverse impacts to fall open water subsistence hunting. Review of the plans at these meetings is a collaborative effort between western science and traditional knowledge. Here, traditional knowledge plays a role in helping operators stay within the federal standard for protection of marine mammal subsistence hunting.

3.3 HUMAN ENVIRONMENT

3.3.1 *Land status, management and use*

3.3.1.1 Ownership status

The ownership of land on the North Slope influences who has access to land and how it is used and managed. However, describing land ownership in the North Slope Borough is difficult, due to a number of factors:

- overlapping ownership interests,
- sometimes vague boundary descriptions
- informal (unrecorded) land transfers in the area, and
- pending land transfers to the state and Alaska Native Corporations, under the Alaska Statehood Act and the Alaska Native Claims Settlement Act (ANCSA).

Surface and subsurface ownership interests in the North Slope Borough are held by the federal government, state government, the Borough, villages, regional and village Native corporations, and private individuals, including Native allotments. As in many areas, surface and subsurface owners may differ, particularly in communities and Native allotments. Figure B-2 illustrates the land ownership status at a gross scale within the North Slope Borough.

Federal Government

The federal government is a predominant landholder within the North Slope Borough, with interests in surface and subsurface estates in the area (Figures B-1 and B-2). Federal agencies responsible for land management include the Bureau of Land Management (BLM), US Fish and Wildlife Service (FWS), National Park Service (NPS), and Department of Defense (DOD).

The National Petroleum Reserve – Alaska (NPRA) contains over 23 million acres and is primarily managed by the BLM for a competitive oil and gas leasing program (U.S. Department of the Interior 2004). Lease sales have been conducted in both the Northeast and Northwest planning areas. The North Slope Borough communities of Atqasuk, Barrow, Nuiqsut, and Barrow physically are located within the NPRA or have corporation lands that are located within NPRA. Residents of other Borough communities use lands within NPRA for subsistence and other traditional uses. In addition to NPRA, the Townsite Trustee in the Bureau of Land Management holds title to restricted lots in several villages, which places the lands in tax exempt status, but also places limitations on transfer of title.

The Arctic National Wildlife Refuge (ANWR) is located on the east side of the Borough and units of the Alaska Maritime National Wildlife Refuge are located along the west coast of the Borough. The refuges are managed by the FWS. The community of Kaktovik is located within the boundaries of ANWR and the community of Point Hope is situated between two units of the Alaska Maritime National Wildlife Refuge. Residents from other Borough communities use lands within both refuges for subsistence and other traditional uses. Primary management activities in the refuges include ecosystem monitoring, research, and invasive species management.

Both the Gates of the Arctic National Park and Preserve and the Noatak National Preserve are also partially located within the North Slope Borough. These two units are located along the southern border of the Borough in the Brooks Range. The community of Anaktuvuk Pass is located within the boundaries of the Gates of the Arctic National Park and Preserve. Residents

of other Borough communities use lands within both parks for subsistence and other traditional uses.

There are numerous DOD sites throughout the Borough. Many of the sites are being closed and facilities dismantled. There are ongoing efforts to eliminate hazards and to clean up contaminated wastes. The military sites were often located in close proximity to communities, or in areas used for subsistence and other traditional uses.

Defense Early Warning (DEW) Line Station near Kaktovik

State Government

The State of Alaska has surface and subsurface interests in approximately 3.5 million acres located within the North Slope Borough. The state maintains ownership of lands extending from the mean low tide line to three miles off-shore. The State of Alaska holds surface and subsurface rights to most of Prudhoe Bay and the surrounding area.

The Alaska Department of Natural Resources (ADNR) is responsible for managing state lands within the Borough. ADNR also manages the oil and gas leasing and exploration program for state lands and waters.

The state has selected lands for ownership throughout the Borough, under the terms of the Alaska Statehood Act. Some of these lands have been conveyed and patented to the state, but final conveyance on many tracts is still pending. The state also owns the James Dalton Highway corridor, as well as several of the airports located throughout the Borough, which are managed by the Alaska Department of Transportation and Public Facilities.

North Slope Borough

The North Slope Borough also owns lands throughout the Borough boundaries, but the lands are primarily located in the vicinity of villages. The Borough holds the title to village lands in Point Lay, as the community remains unincorporated. The Borough is entitled to select land from the State as part of their municipal entitlement. However, the ability to select and obtain lands has been delayed.

The North Slope Borough's municipal land entitlement is 89,850 acres. The NSB originally selected 144,273 acres in 1990. It relinquished 59,842 selected acres, selected an additional 276 acres at Deadhorse, and received title to 364 acres, leaving a balance of 84,619 acres of active selections. Of that 84,000 acres approximately 11,000 acres has been approved for conveyance to the NSB in preliminary decisions. The Borough may select an additional 5,231 acres to fulfill its municipal entitlement. In December 1994, the Borough applied for a 180 acre

land fill site about five miles south of Deadhorse (ADL 415433) and DNR now considers that a municipal selection. However, Borough selection and conveyance have been hampered by the limited amount of land classified as available by ADNR. In addition, opposition to Borough selections by industry support groups has hampered conveyance.

Villages

The villages retain title to municipal lands, generally located in the vicinity of the communities. Villages are entitled to select land from ANCSA village corporations under Section 14 (c) 3 of the act; however, many villages have not completed their selections. As stated above, occasionally the Borough holds title to municipal lands in lieu of the village. Within each village, there are typically lands held by private individuals, including Native allotments, as well as lands held by the local village ANCSA Corporation. In addition, there may be lands held by the regional corporation, or by the Bureau of Land Management Townsite Trustee.

Regional Native Corporation

Arctic Slope Regional Corporation (ASRC) is a regional ANCSA Native corporation that owns interests in surface and subsurface lands throughout the North Slope Borough. The ANCSA did not permit the regional corporation to select lands within the NPRA, however the Alaska National Interest Lands Conservation Act (ANILCA) made a provision for limited selections. A "specific provision allowed ASRC to select the subsurface of village-selected lands if lands within 75 miles of the village lands were made available for commercial development." The ASRC selected the subsurface estate under all lands selected by Nuiqsut and under a portion of the lands conveyed to Wainwright. At Nuiqsut, the ASRC will receive the subsurface rights once the entitlement is completed" (U.S. Department of the Interior 2004). Land selections and conveyances to ASRC have not yet been completed. The corporation is entitled to select 631,282.33 acres (BLM 2005). BLM records further indicate that the corporation has been conveyed more than its entitlement of lands, however the records note that there is an accounting error, which is in the resolution process.

There are other aspects of ANCSA that apply to regional and village corporation lands. Section 14 (c) 3 requires that village corporation allow selection and conveyance of up to 1280 acres of land for public purposes to municipal governments where the corporations are located. Under section 14(h), a regional corporation may select lands of cultural importance. Section 17(b) requires identification and provision of easements to provide public access to public lands.

The Alaska Land Transfer Acceleration Act (2004) "represents and attempt to clear up the conflicting land claims of three distinct parties in Alaska – the State, Alaska Native Corporations, and Native allottees – in time for the fiftieth anniversary of Alaska's statehood in 2009. These claims are grounded in the Alaska Statehood Act, Alaska Native Claims Settlement Act, and the Native Allotment Act of 1906" (Brooks 2005). Many parties are interested in resolving these long-standing land claim issues.

Village Native Corporations

Village ANCSA Native corporations hold title to the surface of lands throughout the North Slope Borough; these lands are primarily located in close proximity to the villages. Land selections and conveyances have not yet been completed in most villages.

Native Allotments and Other Private Landowners

There are also many Native allotments throughout the Borough. The status of these claims varies; 570 allotments have been conveyed and 99 are still pending surveys or processing (Moreno 2005). Activities that may affect Native allotments where title has been transferred or are still being adjudicated require approval from both the allotment owner and the Bureau of Indian Affairs, who acts as trustee for Native allotment owners.

Restricted townsite lots are platted and surveyed lots within villages that have been conveyed in individual Alaska Natives. They are also subject to a trust relationship with the Bureau of Indian Affairs.

Other private individuals also hold title to land within the North Slope Borough, typically located in villages.

Further discussions of historic land ownership issues may be found in earlier North Slope Borough Plans (Wickersham & Flavin Planning Consultants 1982; North Slope Borough 1984). Current status information may be obtained from the Bureau of Indian Affairs and the Bureau of Land Management.

3.3.1.2 Land use

Lands within the North Slope Borough are used for a variety of purposes, including community related activities (residential, commercial and public institutional uses), subsistence, industrial and resource development, transportation, and recreation. Current land use has not been comprehensively mapped, although approximate locations of specific use can be found in various planning documents reports.

The North Slope Borough Comprehensive Plan (Wickersham & Flavin Planning Consultants 1982) broadly defined four land use zoning districts, related to existing and proposed land uses: the Village District, Barrow District, Conservation District, and Resource Development District. A Dalton Highway Transportation Corridor District was defined separately as a Transportation Corridor in a comprehensive plan for the haul road area (North Slope Borough 1980). The Scientific Research District was adopted by ordinance in 2003. Two districts are proposed for addition to the Borough zoning districts, the Special Habitat District and the Subsistence Use District. These land use districts are formally defined in Borough Title 19, Land Management Regulations (LMR). The LMR provides information on uses allowed within each of the zoning districts and permit administrative approvals. Figure B-3 illustrates the North Slope Borough zoning districts.

Village District

Each of the Borough villages, with the exception of Barrow, is zoned as a Village District. The goal of the Village Districts is to maintain traditional values, and lifestyles in the vicinity of the Borough communities. While there is no further zoning to guide development within each village, land uses include residential, public and semi-public, transportation, commercial, and industrial.

Village of Nuiqsut

Barrow Districts

The Barrow District is also intended to maintain subsistence activities for local residents, however it also acknowledges the increasingly urban development demands in the area. The Barrow district includes specific land use zones of industrial, mixed use, suburban, and reserve districts. Barrow Zoning Ordinances are part of the LMR.

Conservation District

The Conservation District encompasses the entire Borough, with the exceptions of the Village Districts, the Barrow District, and areas specifically re-zoned to the Resource Development District. The goal of the Conservation District is to preserve the natural ecosystem, including the subsistence species that local residents depend upon for subsistence. To date, the Borough has rezoned 932,903 acres from Conservation District to Resource Development Districts.

Resource Development District

The Resource Development District is intended to accommodate large-scale resource extraction, balanced with protecting subsistence resources and coordinating with other Borough policies. Rezoning from Conservation to Resource Development requires preparation of a Maser Development Plan, and approval by both the Planning Commission and the Assembly.

Transportation Corridor District

Transportation Corridor Districts are established to provide a strip of land to accommodate linear transportation facilities, such as roads and pipelines. The specific standards for each particular Transportation Corridor District are established pursuant to the Comprehensive Plan and Title 19 policies, but may vary from one transportation corridor to another, depending upon the location, types of transportation facilities involved, and the temporary and permanent development within the district, and other factors.

Dalton Highway Transportation Corridor District

The Haul Road Corridor has evolved from an industrial road with restricted access to a public access road managed by the state and federal government. The Dalton Highway Transportation Corridor District was formed to guide land use and development in the corridor; to coordinate resource development within the district; protect fish, wildlife, water resources, cultural resources, and visual resources within the corridor; and to manage recreation activities and development within the corridor (North Slope Borough 1980).

Scientific Research Zoning District

The Scientific Research District was created by ordinance on July 1, 2003. The intent of this district is exclusively for scientific research and support facilities necessary for that research. The district is intended to conserve areas that have scientific research value or have been used for scientific research for more than twenty years. In 2005, two Scientific Research Districts have been identified, Barrow Scientific Research District and Toolik Field Station Scientific Research District. These areas do not appear on Figure B-3; refer to Official Zoning Maps available from the North Slope Borough, which reflect current ordinances.

Special Habitat Zoning District (Proposed in Title 19 revisions)

The Special Habitat District encompasses areas of the Borough that have a high importance to Borough residents for subsistence resources. These areas are considered inappropriate for development activities. This designation is identified so that the NSB lands may be so designated through a rezoning process in a manner consistent with Title 19, the NSB Coastal Management Plan, and the NSB Comprehensive Plan. There are no Special Habitat Districts identified to date; there are no Special Habitat Districts indicated on Figure B-3. Refer to Official Zoning Maps available from the North Slope Borough, which reflect current ordinances.

Subsistence Use District (Proposed in Title 19 revisions)

The Subsistence Use District encompasses areas of the Borough that have a high importance to Borough residents for subsistence resources. This district is intended to encompass specific areas that are regularly utilized by Borough residents for subsistence purposes. Development activities would be permitted in these areas only if it can be determined that they will not interfere or conflict with subsistence uses and the environment in ways that cannot be mitigated. This designation is identified so that the NSB lands may be so designated through a rezoning process in a manner consistent with Title 19, the NSB Coastal Management Plan, and the NSB Comprehensive Plan. There are no Subsistence Use Districts identified to date; there are no Subsistence Use Districts indicated on Figure B-3. Refer to Official Zoning Maps available from the North Slope Borough, which reflect current ordinances.

Further description of the Borough land use districts may be found in the prior comprehensive plan (Wickersham & Flavin Planning Consultants 1982) and in the Title 19 Land Management Regulations.

Traditional uses and activities

In addition to the land use districts designated in the LMR, a variety of traditional land uses occur throughout the North Slope Borough for subsistence and cultural purposes (Figure B-4). Access to areas for traditional uses, regardless of land ownership, is a concern of village residents. Many documents record traditional land uses and subsistence activities in the Borough (Brown 1979; Wickersham & Flavin Planning Consultants 1982; Wickersham 1993b; Fuller and George 1997; Hepa 1997). Generations of Inupiat people have used the area for thousands of years; use patterns and locations change with the seasons, animal migrations, and weather. With so many complex variables involved in land use, it has been a daunting task to map traditional use areas. Some communities, such as Nuiqsut, have identified important subsistence use areas (Brown 1979; Wickersham & Flavin Planning Consultants 1982; Wickersham 1993b; Fuller and George 1997; Hepa 1997). Important use areas are generally documented on a project-specific basis. Primary concerns include loss of or damage to traditional use areas, and loss of or interference of access to traditional use areas. Activities associated with resource and village development should accommodate

Harvesting ear bones from a young bowhead whale

measures to avoid or minimize adverse impacts during project planning, design, construction, and operation. Developers should consult with village residents and Borough staff when siting and designing facilities.

3.3.1.3 Land management

Mirroring the land ownership patterns, there are land management programs administered by the federal government, state government, borough, corporations, and villages. Management applies to both specific resource development activities and lands in general.

The federal agencies routinely prepare management plans for public lands. The BLM has prepared Integrated Activity Plans for portions of NPRA, and will continue to do so. The FWS has prepared a Comprehensive Conservation Plan (CCPs) for management of ANWR. The NPS has also prepared management plans for both the Gates of the Arctic National Park and Preserve, and Noatak National Preserve. These are public planning processes, with management objectives and guidelines defined for each management unit.

The State of Alaska manages lands through preparation of Area Plans, which classify lands for use and eligibility for selection by the Borough under municipal entitlement. The plan also includes management guidelines for use on state lands. An Area Plan has been prepared for State lands in the western portion of the Borough, west of NPRA.

The North Slope Borough also coordinates other land management programs, including the Coastal Management Program (North Slope Borough 1984) and the land use regulations for the Borough (1990). The Borough primarily remains focused on protecting and managing subsistence resources for Borough residents. However the Coastal Management Program is being revised due to changes in state law. The land use regulations are also being revised, due to changes in demands on local resources.

Oil and gas leasing is administered by multiple entities. The federal government, through the BLM, administers leasing in the NPRA. The Minerals Management Service (MMS) administers resource development activities in the Outer Continental Shelf, and the FWS administers oil and gas exploration within ANWR. The State of Alaska administers oil and gas programs on State lands and waters, and holds lease sales. ASRC pursues oil and gas exploration and development on their lands. In addition, the North Slope Borough remains actively involved in permitting resource development activities within its boundaries through application of both the Comprehensive Plan and LMR.

Several local plans have been produced in the North Slope Borough. The community of Wainwright has a village-level comprehensive plan (Alaska Consultants Incorporated 1978, approximate). The plan has background information, traditional land use patterns, goals for land use and community facilities, and goals for regional and local transportation. While the plan is somewhat dated, it is a good historic reference. The community of Nuiqsut produced a cultural plan, *Nuiqsut Paisanich,* shortly after the community was re-established (Brown 1979). The plan documented the cultural landscape, how the community practices its heritage way of life, issues facing the community, and important subsistence use areas. While this plan is also dated, it is still very important to the community, and should be used as a guide for development in the vicinity of Nuiqsut. The community of Kaktovik produced a guide for people interested in working in the Kaktovik area (Karl E. Francis & Associates 1991, approximate). While this document does not follow the format of a comprehensive plan, it identifies important cultural values and issues in the community. The remaining communities do not have current, approved village-level comprehensive plans. Several communities have expressed interest in updating or

developing village-level comprehensive plans to address current issues facing the communities. In addition, many of the village corporations have plans for their land management programs.

3.3.2 *Socioeconomic Characteristics*

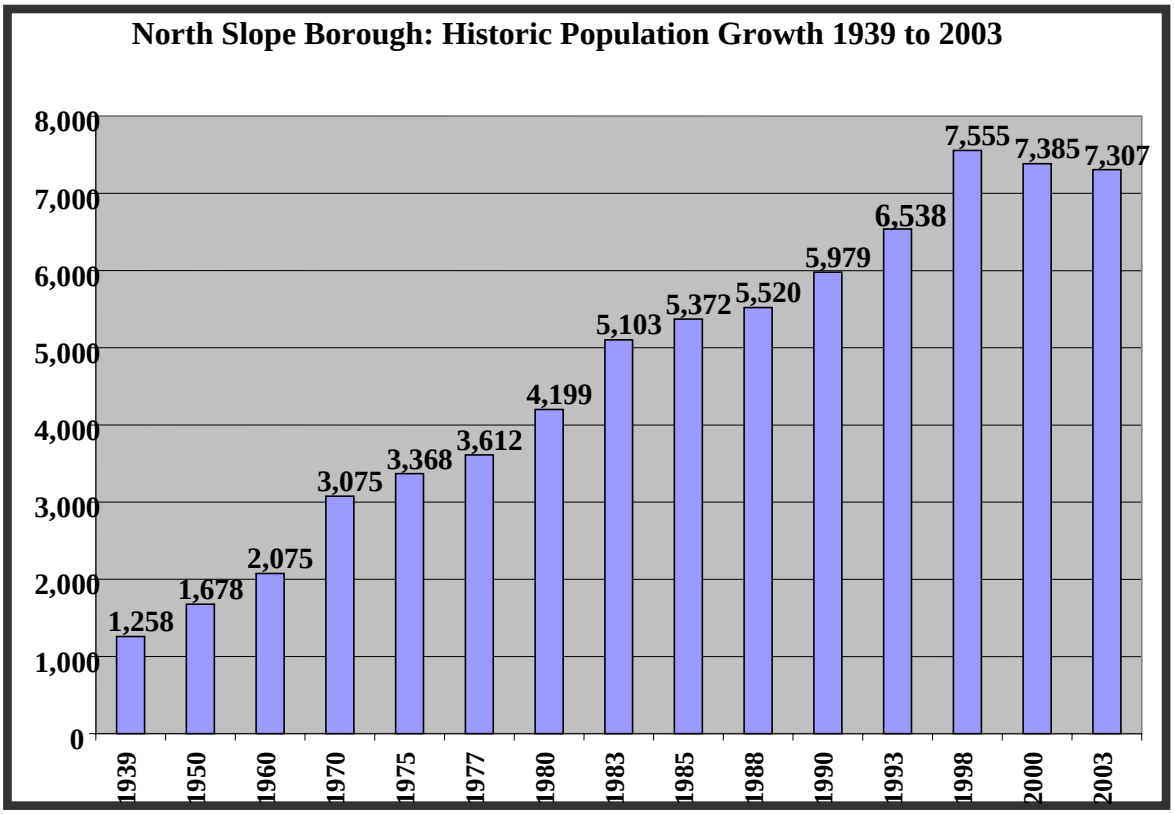
Approximately every five years, the North Slope Borough conducts an independent census, including socioeconomic research. The most recent census was conducted in 2003; the census report contains an overview for the Borough as well as profiles for each of the communities. Topics addressed include: population, employment, income, housing, education, subsistence, Inupiaq language use, and other community indices. (Shepro, Maas et al. 2003). The following section provides an overview of socioeconomic characteristics; for more information please refer to the North Slope Borough Socioeconomic Report (Shepro, Maas et al. 2003).

The oil and gas industry still provides the primary source of revenue for North Slope Borough government services, despite a decline in the industry, and a subsequent decline in revenue levels. Funding from state sources has also declined in recent years, further impacting employment levels and the Borough's ability to provide services. The North Slope Borough and the North Slope Borough School District are large employers in the region; the decline in Borough revenues has affected employment and income throughout the North Slope (Shepro, Maas et al. 2003).

3.3.2.1 Population/demographic characteristics

The North Slope Borough's population increased fairly steadily from 1,258 residents in 1939 to a high of 7,555 residents in 1998. The population then declined by approximately three percent, to 7,307 residents in 2003 (Figure 3-1). During this time, Anaktuvuk Pass, Atqasuk, Kaktovik, and Point Lay gained residents, while Barrow, Nuiqsut, Point Hope, and Wainwright lost residents. Barrow and Wainwright had the largest decreases in population (Shepro, Maas et al. 2003).

Figure 3-1



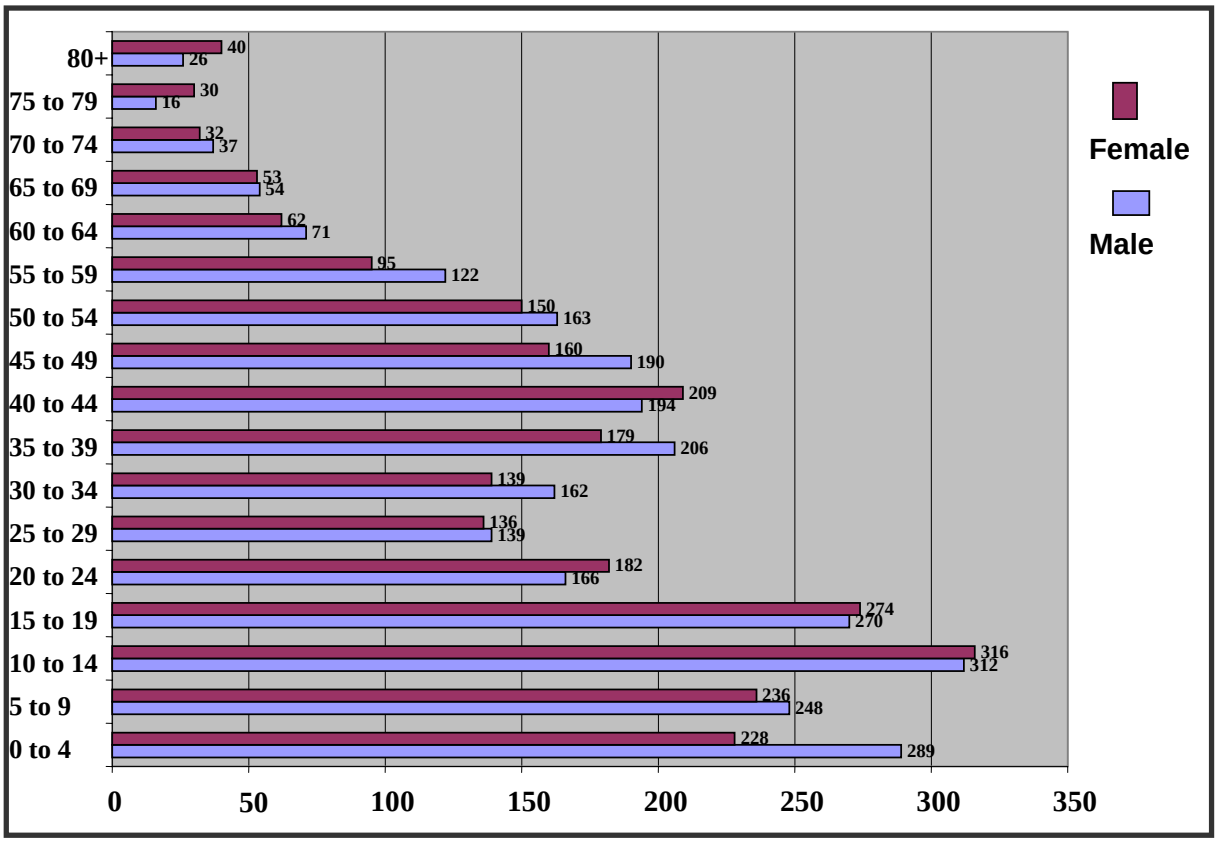
North Slope Borough Population

Source: (Shepro, Maas et al. 2003)

The majority of the population is Inupiat Eskimo (71.7 percent), with the remainder of the population comprised of Caucasians (15.5 percent), Filipinos (7.5 percent), Pacific Islanders (1.9 percent), and small numbers of other ethnic groups (Shepro, Maas et al. 2003).

The Borough has a young population, with average ages and median ages below those of the state or nation. This creates a high ratio of dependents to wage earners, and has implications for future education funding and the need for future housing, other services, and creation of job opportunities. (Shepro, Maas et al. 2003). Figure 3-2 illustrates the Borough's population distribution by age and gender. Table 3.3-1 provides population trend projections for each community in the Borough through 2020.

Figure 3-2
North Slope Borough Population by Age and Gender



Source: (Shepro, Maas et al. 2003)

Table 3.3-1
North Slope Borough Population Projections Through 2020

NORTH SLOPE BOROUGH								
COMMUNITY	1993	1996*	1998	2000**	2003	2010	2015	2020
Anaktuvuk Pass								
High	**270**	**306**	**314**	**282**	**346**	**352**	**361**	**366**
Medium						**335**	**340**	**342**
Low						**322**	**325**	**333**
Atqasuk								
High	**237**	**226**	**224**	**228**	**250**	**290**	**301**	**312**
Medium						**270**	**283**	**274**
Low						**265**	**269**	**266**
Barrow								
High	**3,908**	**4,276**	**4,641**	**4,581**	**4,429**	**4,501**	**4,603**	**4,612**
Medium						**4,488**	**4,462**	**4,465**
Low						**4,279**	**4,198**	**4,102**
Kaktovik								
High	**230**	**223**	**256**	**293**	**286**	**305**	**319**	**327**
Medium						**298**	**302**	**305**
Low						**280**	**289**	**272**
Nuiqsut								
High	**418**	**435**	**420**	**433**	**416**	**435**	**437**	**445**
Medium						**432**	**430**	**436**
Low						**420**	**425**	**427**
Point Hope								
High	**699**	**764**	**805**	**757**	**764**	**810**	**815**	**822**
Medium						**799**	**803**	**807**
Low						**775**	**778**	**775**
Point Lay								
High	**192**	**180**	**246**	**247**	**260**	**288**	**292**	**296**
Medium						**272**	**276**	**278**
Low						**265**	**269**	**262**
Wainwright								
High	**584**	**563**	**649**	**546**	**556**	**575**	**582**	**585**
Medium						**570**	**575**	**572**
Low						**560**	**558**	**553**
NSB Totals								
High	**6,538**	**7,157**	**7,555**	**7,385**	**7,307**	**7,556**	**7,710**	**7,765**
Medium						**7,464**	**7,471**	**7,479**
Low						**7,166**	**7,111**	**6,990**

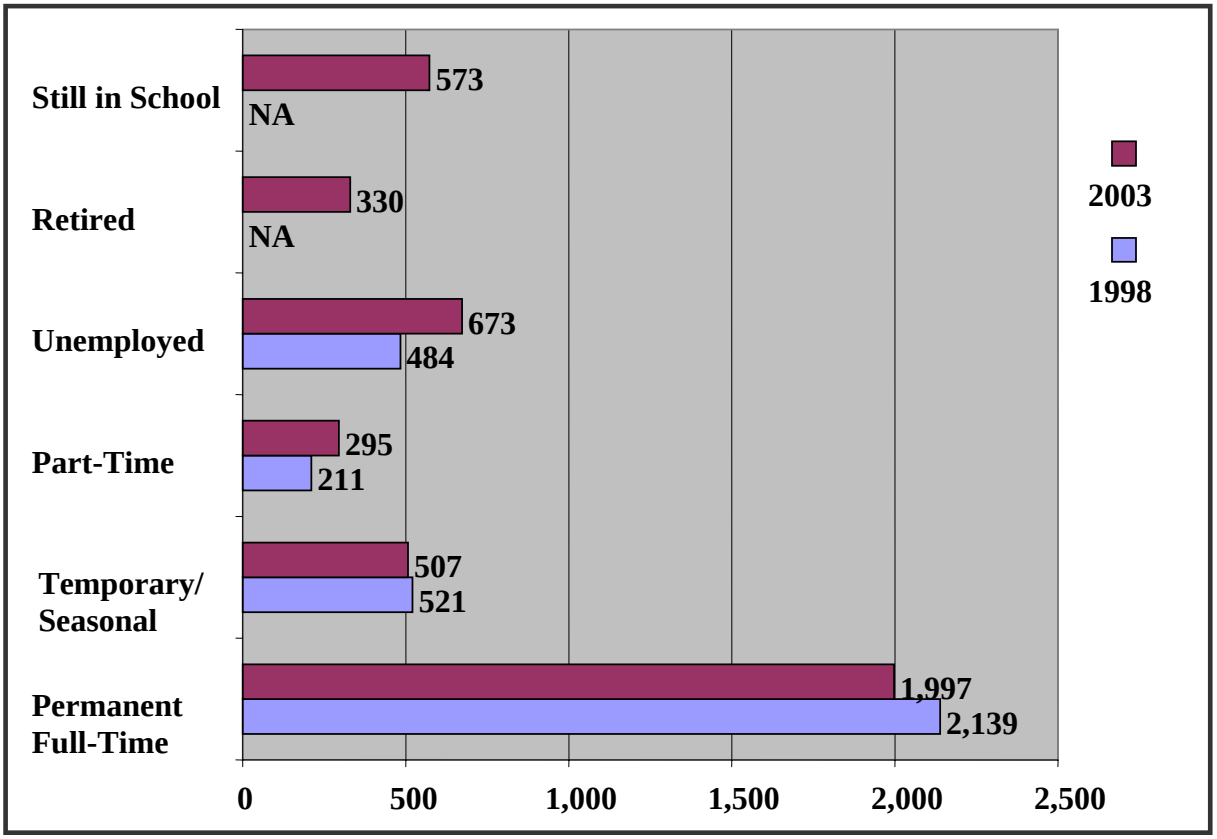
Note: *AK Dept of Labor Research &Analysis (Revised 1/13/99); ** 2000 US Bureau of Census

Source: (Shepro, Maas et al. 2003).

3.3.2.2 Employment and income

The Alaska Department of Labor and Workforce Development estimated that unemployment in the Borough averaged 11.9 percent in 2003, while the North Slope Borough's estimate for unemployment was 22.9 percent for the same period (Figure 3-3). This discrepancy between estimates stems from different definitions of unemployment. The Borough's definition of unemployment includes discouraged workers, or people who are involuntarily unemployed but who are not submitting unemployment reports because they have exhausted their benefits or because they have given up hope of finding local employment. The small communities in the North Slope Borough have limited employment opportunities and high rates of involuntarily unemployed residents (Shepro, Maas et al. 2003).

Figure 3-3
North Slope Borough Employment Status in 1998 and 2003



Source: (Shepro, Maas et al. 2003)

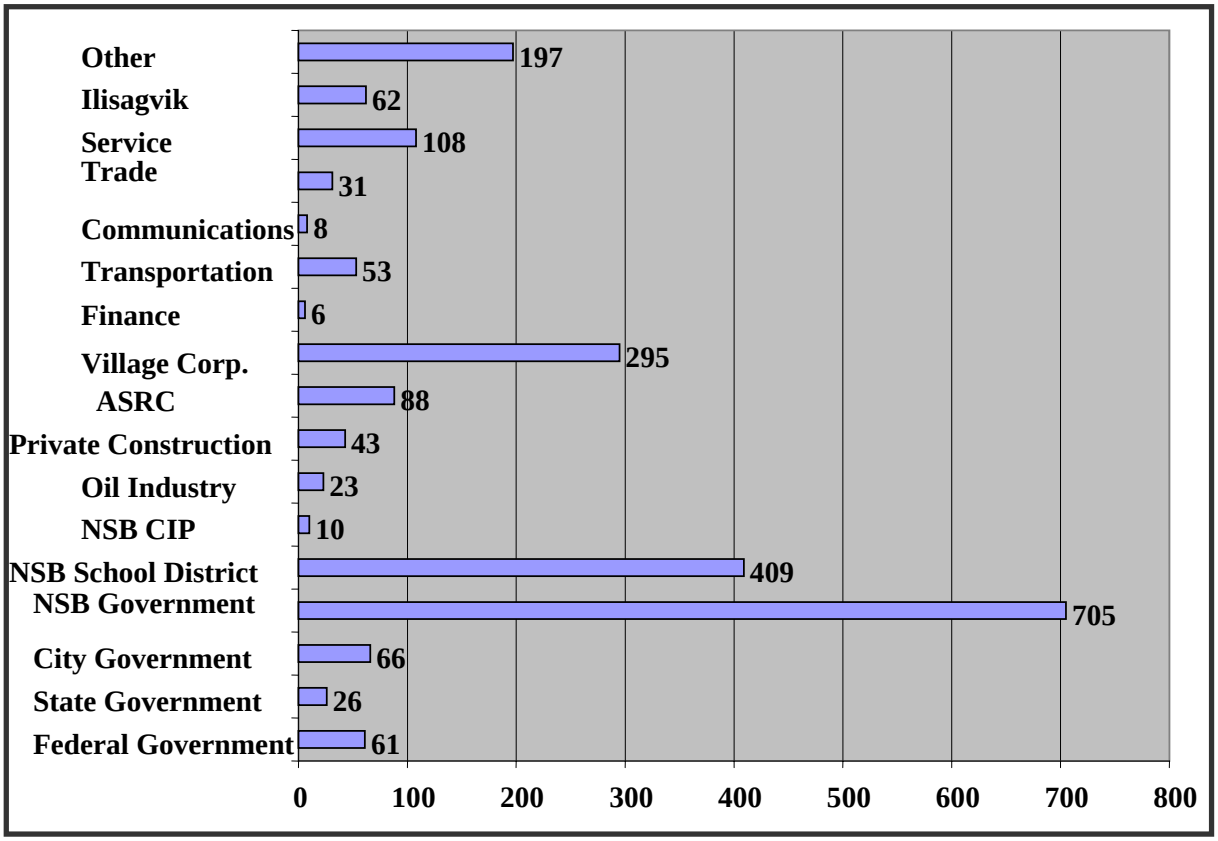
Employment in the North Slope Borough has shifted in recent years. The Borough and the school district have historically been the largest employers of local residents in the region (Figure 3-4). Employment of local residents in the resource development industry has been frustratingly low. While Figure 3-4 displays only 23 employees directly employed by the "oil industry," the number is likely higher if one considers the local employees who work in the resource industry under other employers, such as village corporations. Residents and industry would both like to see increases in the number or Borough residents directly employed by the resource development industry. Some petroleum companies and Native corporations are attempting to improve local hire. However there are a number of barriers to increasing local employment in the resource development industry, which are addressed in the goals and objectives under socioeconomics.

In recent years, the number of permanent full-time jobs has decreased, while the number of part-time jobs and unemployed residents increased. This trend mirrors the Borough's decline in revenues (Shepro, Maas et al. 2003). Interest is high in creating more private sector jobs for local residents.

Regional and village corporations are creating some jobs through subsidiaries and joint ventures, and some companies involved in resource development are attempting to increase local employment through training programs and other opportunities. However, job requirements can create conflicts with subsistence activities. The need to complete education and training and address substance abuse problems are challenges that must be overcome to order to increase local employment. Addressing these challenges will require cooperative

education and training efforts on the part of the Borough, School District, ANCSA corporations, tribal organizations and resource development industry.

Figure 3-4
Employment of North Slope Borough Residents by Employer



Source: (Shepro, Maas et al. 2003)

Household and per capita incomes in the Borough have increased substantially over the past 10 years (Table 3.3-2). However, income disparities remain between Inupiat and non-Inupiat individuals and households. In addition, local incomes still fall below the mean and median household and per capita incomes of the state and the nation (Shepro, Maas et al. 2003). It is important to note that income is not the only measure of economic well-being in Borough communities; subsistence resources provide a substantial amount of food for Borough households. However, cash income remains very important for households, considering the high costs for supplies (including subsistence supplies) and travel.

Table 3.3-2
Average Household and Per Capita Income in the North Slope Borough

North Slope Borough: Average Per Capita and Household Income*		
Household Income	1993	$44,462
	1998	$51,121
	2003	$55,793
Per Capita Income	1993	$12,874
	1998	$13,633
	2003	$24,932

Note : *Results include only those households and individuals responding to the census survey and this question.

Source: (Shepro, Maas et al. 2003)

The poverty level in the communities outside Barrow increased dramatically between 1998 and 2003 (Shepro, Maas et al. 2003). In 1998 there were a total of 76 Poverty Level (as defined by the U.S. Census Bureau) and Very Low Income (defined as 1.25 percent of the Poverty Level) households, comprised of 185 individuals. By 2003 this number had increased to a total of 100 households out of 480 reporting household income and household size, or 436 individuals living at or immediately above the official poverty line (Table 3.3-3).

Table 3.3-3
Poverty Level Households in Communities Outside Barrow

North Slope Borough: Poverty Level Households in Communities Outside Barrow 2003*		
Community	Poverty Level	Total HHs Reporting
Anaktuvuk Pass	29	77
Atqasuk	4	28
Kaktovik	3	41
Nuiqsut	12	65
Point Hope	21	121
Point Lay	12	42
Wainwright	19	106
Total	100	480

Note : *Results include only those households responding to the census survey and the questions of household income and size.

Source: (Shepro, Maas et al. 2003)

3.3.3 *Subsistence*

3.3.3.1 Fish and wildlife resources

Subsistence activities on the North Slope are oriented both to the land and to the sea. Birds, fish, marine mammals, land mammals, and plants are all sources of subsistence food and supplies. Coastal communities are logically more dependent upon marine mammals and coastal resources, while inland communities are more dependent upon caribou and other terrestrial resources. Bowhead whales, beluga whales, several species of seals, and caribou still provide the bulk of subsistence needs for local communities. Other subsistence resources include: waterfowl, ptarmigan, anadromous and freshwater fish, furbearers, large mammals, beluga whale, and vegetation (University of Alaska - Arctic Environmental Information and Data Center 1978; National Research Council 2003). Section 3.2 provides an overview of the biological environment, including species used for subsistence.

3.3.3.2 Cultural importance

The cultural identity of North Slope Borough residents has been rooted in a subsistence lifestyle and its associated social and cultural framework for thousands of years. This fundamental relationship between the people, the land, sea, plants and animals is still prevalent today. Another important factor of cultural identity is the Inupiaq language; Inupiaq and subsistence activities are intimately linked (University of Alaska - Arctic Environmental Information and Data Center 1978; National Research Council 2003).

Shares of muktuk ready for distribution

North Slope Borough residents have developed an efficient lifestyle for living in arctic regions that involves a direct interaction between the people and their environment. Their adaptive harvest of land and sea resources has allowed them to survive changing environmental and resource conditions. Flexibility, in response to change, has been and continues to be the key to local resilience (Maynard and Partch and Woodward-Clyde Consultants 1984).

In addition to social and cultural importance, subsistence resources provide an important source of nutrition on the North Slope. These locally obtained foods generally constitute a large portion of the diet, especially where imported foods are more expensive and less readily available. Subsistence foods are generally high in protein and low in carbohydrates. According to a recent socioeconomic study (Shepro, Maas et al. 2003), nearly all Inupiat households in the Borough utilize subsistence resources for food. This study found that there was an increase in the number of Inupiat households who depend on local subsistence resources for half or more of the food they consume between 1998 and 2003. However the same study noted that the overall consumption of subsistence resources in the Borough declined between the two census years (Table 3.3-4). This discrepancy was attributed to the difference in sample populations; a large number of non-Inupiat teachers were not in residence at the time of the 1998 census, but they were available for the 2003 census.

Native foods are seen to be essential to the Inupiat character of life. “Aside from the basic nutritional value of Native foods, the Inupiat hold the conviction that Native foods maintain their health and strength” (Maynard and Partch and Woodward-Clyde Consultants 1984). Many

aspects of Inupiat life are involved with the harvest, preparation, and distribution of subsistence foods and other resources.

There is an extensive network for sharing subsistence products. Within the village, subsistence resources are shared with elders and family members who may not be able to obtain their own subsistence foods. Subsistence foods are also shared locally during celebrations and holidays. In addition to local sharing and exchange, the custom extends regionally between other North Slope villages, as well as to relatives living in larger communities such as Fairbanks and Anchorage (Maynard and Partch and Woodward-Clyde Consultants 1984). However, recent sharing trends indicate that subsistence foods are now shared more often within local communities and less often with households in other communities (Shepro, Maas et al. 2003).

Table 3.3-4
Household Consumption of Subsistence Resources

	Households 1998	Percentage 1998	Households 2003	Percentage 2003
None	35	3	165	13%
Very little	128	12%	217	17%
Less than half	211	20%	182	14%
Half	216	21%	241	19%
More than half	188	18%	183	14%
Nearly all	134	13%	165	13%
All	126	12%	130	10%
Total	1038	100%	1283	100%

Note: Data indicates households that responded to a question regarding how much of the meat, fish, and birds eaten in the household came from local food sources

Source: (Shepro, Maas et al. 2003);
(North Slope Borough Transportation Plan 2005)

While the subsistence traditions remain steadfast, they have experienced many changes due to the introduction of Western society. The petroleum discoveries on the North Slope have provided an infusion of cash, technology, and capital development projects. Technological and social adaptations have been developed to respond to the natural changes and to those precipitated by the introduction of Western activities during the past 150 years (Maynard and Partch and Woodward-Clyde Consultants 1984). In addition, the number of non-Inupiat households has increased in the communities in recent years (Shepro, Maas et al. 2003). Since non-Inupiat households generally have low levels of reliance on subsistence resources, there are shifts in some community resource utilization data.

Petroleum discoveries and development have evoked major changes to the way of life in the North Slope Borough. In evaluating the cumulative effects of oil and gas activities on the human environment, the National Research Council (National Research Council 2003) found that "many activities associated with petroleum have changed the landscape in ways that have had aesthetic, cultural, and spiritual consequences; those consequences will increase as the use of these facilities and infrastructure declines." Continuing resource development projects have the potential to impact the sociocultural and subsistence patterns of Borough residents (Wickersham & Flavin Planning Consultants 1982; National Research Council 2003). Continuing coordination between Borough residents and developers is needed to minimize sociocultural and environmental impacts. In addition, research is needed to focus on the rising levels of environmental and sociocultural change.

3.3.3.3 Economic importance

This section is excerpted from the North Slope Borough Coastal Management Plan (Maynard and Partch and Woodward-Clyde Consultants 1984):

> The obvious economic aspect of subsistence is that these foods represent income. Several studies have attempted to calculate the dollar value of subsistence foods in terms of replacement market goods. When opportunities for employment tighten, residents can adjust to smaller incomes. The cash economy has not displaced the subsistence economy. Successful hunters redistribute their take to others, particularly to relatives and the elderly, who may not be able to provide for their own needs. Wage earners contribute money to the support of subsistence activities (e.g. equipment and supplies) and help ensure the provision of subsistence foods to the entire community. This combination of subsistence and wage contributions have allowed the Inupiat to weather cycles in employment variability.
>
> The availability of job opportunities on the North Slope has not caused a decrease in the desire to pursue subsistence activities; there is a general preference for spending time in both wage and subsistence activities. Wage earners carry out subsistence activities during non-work time such as vacations, weekends, and after work hours. In other instances it is very common for a family member to work and monetarily sponsor someone else in their subsistence pursuits. A sponsor receives a measure of status and also part of the catch for assisting the hunt.

3.3.3.4 Regional patterns of subsistence activity and seasonal rounds

Subsistence activities occur year-round, with seasonal emphases. Annual use patterns are dependent upon natural cycles, availability of resources, travel conditions, and other environmental factors. Some species may be present year-round, but are only harvested when permitted. Other species are opportunistically harvested or as environmental conditions (such as sea ice) allow. Furbearers are not often harvested during the summer months as the pelts are lighter and the animals are raising their young.

Subsistence harvest activities vary with each community and their surrounding environment. These patterns have a long historical basis, and have been modified with the establishment of permanent settlements and changing conditions (Maynard and Partch and Woodward-Clyde Consultants 1984). The coastal communities generally engage in a fall whaling season and some communities also have a spring whale hunt. Caribou are available year-round near most of the Borough communities. Birds and fish are also available in the Borough throughout most of the year. Refer to the Village Profiles (Section 4.0) for an overview of subsistence activities in each community.

3.3.3.5 Use areas (historic and current), modes and locations of access

The residents of the North Slope Borough travel throughout the area in pursuit of subsistence activities. The use areas for coastal villages extend miles out into the ocean. Inland waters, such as rivers and lakes, are also used for fishing and bird hunting areas. Refer to Figure B-5 for an illustration of the distribution of subsistence uses in the North Slope Borough. Figures 3-5, 3-6, and 3-7 illustrate general areas of subsistence use by the Borough communities. These use areas are intended to be general representations; developers should consult with local communities, tribes, and Borough staff when planning and designing projects and facilities.

Understanding the area of influence of subsistence is critical to understanding the geographic area that must be considered in assessing whether appropriate subsistence protections are in place. Identifying only traditional harvest areas greatly under-represents areas deserving of protection. In addition, one must consider camps, cabins, access routes, butchering sites, and staging areas. Native allotments inherently involve subsistence related activities. Another factor to evaluate is disruptive activities that have the potential to deflect migratory species (e.g. whales, caribou, fish, waterfowl) away from traditional harvest areas and subsistence users. Areas critical to the welfare of the subsistence species, such as concentration areas, calving areas, feeding areas, and molting and brooding areas are particularly vulnerable to disturbance. The area of influence of subsistence uses must be evaluated on a case-by-case basis.

The subsistence hunting areas for land mammals are the most extensive of all subsistence use areas. The area covers nearly the entire North Slope Borough, extending from the Brooks Range to the coastal plains. Modes of travel include a variety of all terrain vehicles, as well as snow machines.

Almost the entire coastline of the Borough is used for marine mammal hunting, extending twenty-five miles or more offshore. A combination of traditional skin boats and motorized boats are used for subsistence activities. Snow machines are also used during the winter months for hunting marine mammals from the sea ice.

Figure 3-5
General Subsistence Use Areas for Wainwright, Anaktuvuk Pass, and Kaktovik

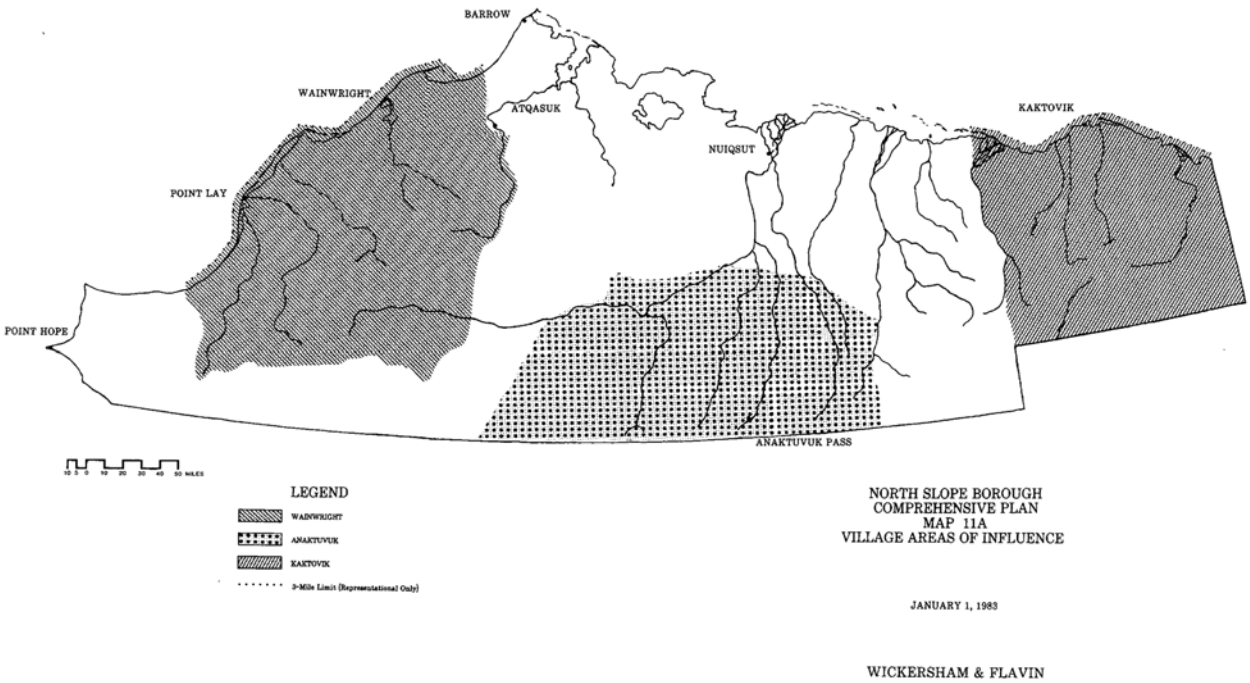


Figure 3-6
General Subsistence Use Areas for Point Lay, Atqasuk, Nuiqsut

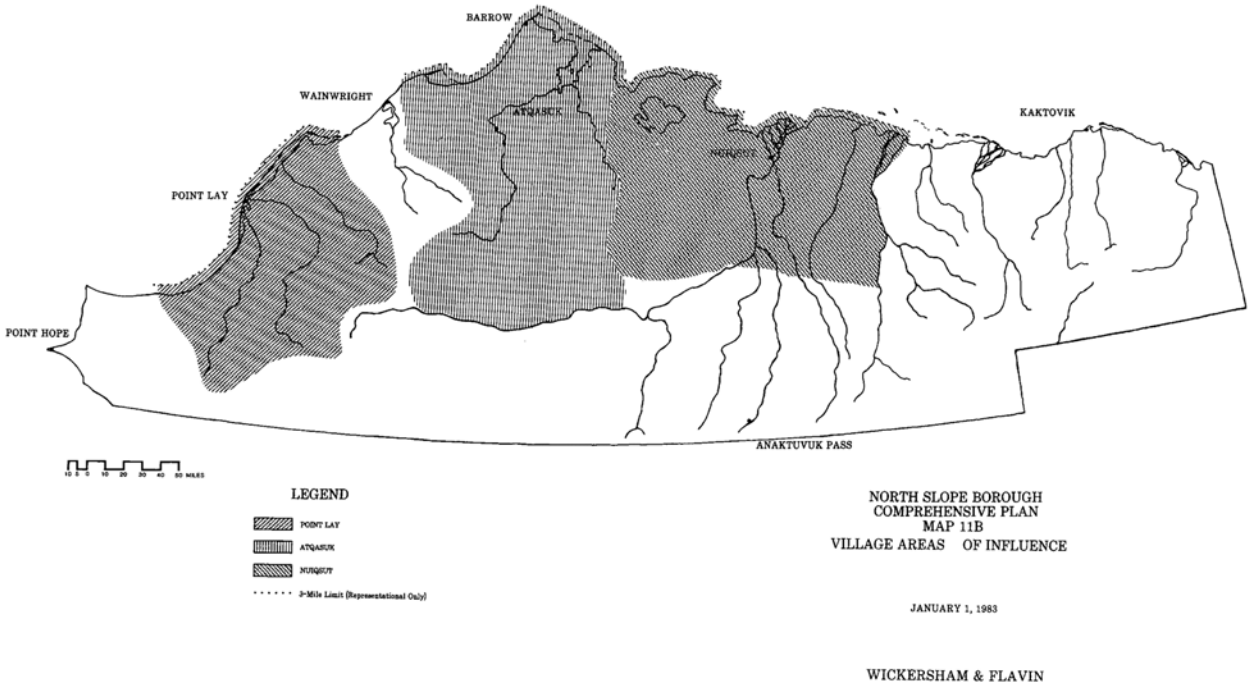
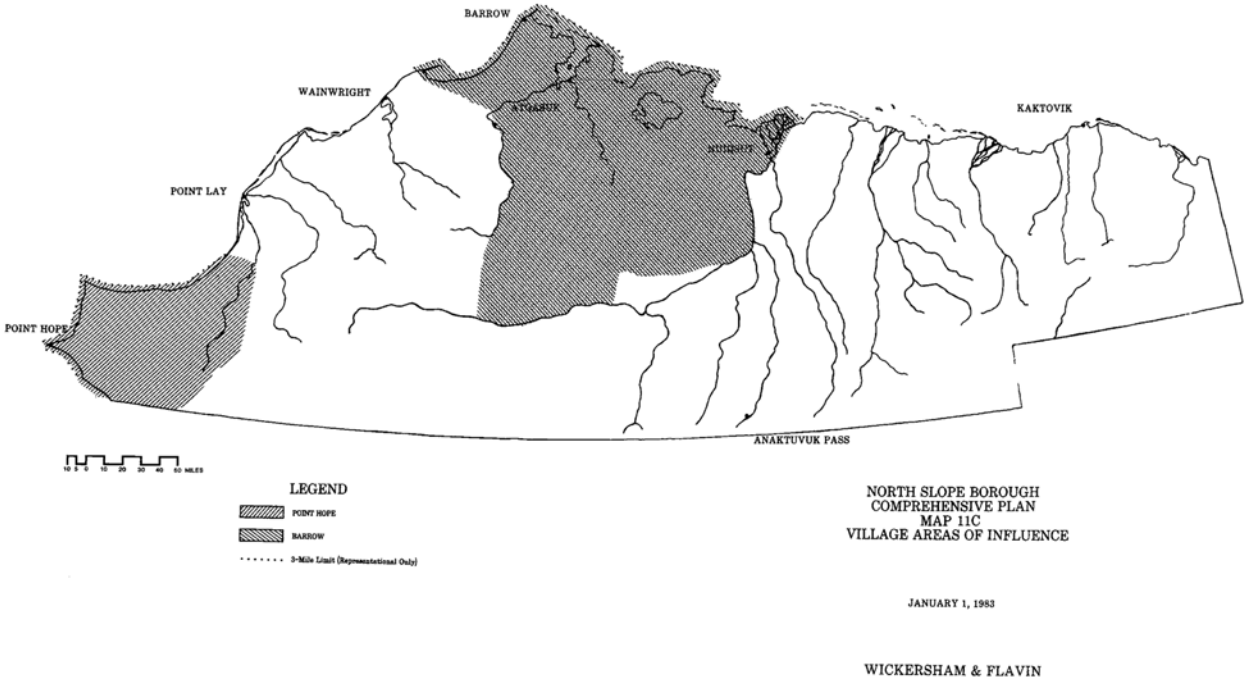


Figure 3-7
General Subsistence Use Areas for Point Hope and Barrow



Birds are primarily hunted in the river deltas and along the coastal plain. Nearly the entire coastline of the Borough is productive habitat for migratory birds and waterfowl. Subsistence fishing also occurs in the coastal waters as well as in rivers and lakes. All-terrain vehicles, snow machines, and boats are used for travel.

Borough residents are concerned about current and cumulative effects of oil and gas development on subsistence resources and activities. Concerns include habitat fragmentation, disruption of migration routes and pathways for fish and wildlife, disturbance and deflection of wildlife from traditional harvest areas, restrictions or exclusions of Borough residents from areas traditionally used for harvest, cumulative contamination, and potential catastrophic events such as oil spills. Activities associated with resource and village development should accommodate measures to avoid or minimize adverse impacts to subsistence resources and activities during project planning, design, construction, and operation. Developers should consult with village residents and Borough staff when siting and designing facilities, or planning for resource exploration and construction activities.

3.3.4 *Cultural Values and Resources*

3.3.4.1 Cultural Values

The people of the North Slope Borough to place great importance in maintaining their culture and lifestyle. The culture has strong ties with the natural environment, including the lands, waters, animals and vegetation. Traditional activities are central to historic and contemporary lifestyles, with subsistence seasons focusing seasonal activities. Family relationships and kinships continue to be strong influences to contemporary life, shaping social interactions, including cooperative activities and sharing.

While complex value systems are difficult to describe, some of these central, traditional Inupiat values have been captured at a North Slope Borough Youth and Elders Conference. The values are described and displayed in a set of posters developed by the North Slope Borough School District, in cooperation with the Native Village of Barrow and PetroStar, Incorporated (North Slope Borough School District 2003). Schools throughout the Borough display the posters, with text in Inupiaq and English, and photos that illustrate the values. The following excerpt is the English text from the posters.

> **COMPASSION –** Though the environment is harsh and cold, our ancestors learned to live with warmth, kindness, caring and compassion.
>
> **AVOIDANCE OF CONFLICT –** The Iñupiaq way is to think positive, act positive, speak positive and live positive.
>
> **LOVE AND RESPECT FOR OUR ELDERS AND ONE ANOTHER –** Our Elders model our traditions and ways of being. They are a light of hope to younger generations. May we treat each other as our Elders have taught us.
>
> **COOPERATION –** Together we have an awesome power to accomplish anything.
>
> **HUMOR –** Indeed, laughter is the best medicine!
>
> **SHARING –** It is amazing how sharing works. Your acts of giving always come back.
>
> **FAMILY AND KINSHIP –** As Iñupiaq people, we believe in knowing who we are and how we are related to one another. Our families bind us together.

KNOWLEDGE OF LANGUAGE – With our language we have an identity. It helps us to find out who we are in our mind and in our heart.

HUNTING TRADITIONS – Reverence for the land, sea and animals is the foundation of our hunting traditions.

RESPECT FOR NATURE – Our Creator gave us the gift of our surroundings. Those before us placed ultimate importance on respecting this magnificent gift for their future generations.

HUMILITY – Our hearts command we act on goodness. Expect no reward in return. This is part of our cultural fiber.

SPIRITUALITY – We know the power of prayer. We are a spiritual people.

Many research projects and development projects have documented cultural values and activities in the North Slope Borough. For more detailed information on Inupiat culture, please refer to original sources (Lantis 1959; Chance 1966; Burch 1975; Spencer 1976; North Slope Borough 1984; Chance 1990; USAED 1999; U.S. Department of the Interior 2004). The Inupiat Heritage and Language Center in Barrow has a wealth of information, some of which still needs to be cataloged, transcribed, and analyzed.

Understanding and accommodating local values and traditional practices is important when developing local hire and training programs, siting and designing facilities, or planning for resource exploration and construction activities. Consultation with the North Slope Borough and potentially affected communities is recommended prior to conducting these activities.

3.3.4.2 Archaeological, Historical, and TLUI resources

The Alaska Department of Natural Resources, Office of History and Archaeology, maintains the Alaska Heritage Resource Survey, with detailed information regarding cultural resources throughout the state, including the North Slope Borough. In addition, the North Slope Borough maintains a geographic database called the Traditional Land Use Inventory. These databases are voluminous, with detailed information on historic and contemporary traditional use areas.

For more detailed information on archaeological, historical, and traditional land uses, these databases should be consulted. Regional prehistoric, historic, and contemporary information may also be found at the Inupiat Heritage and Language Center in Barrow. In addition, planning projects have developed concise summaries of historic and archaeological information in the area, such as the North Slope Borough Coastal Management Plan (North Slope Borough 1984), the Beaufort Sea Oil and Gas Development Project for Northstar (USAED 1999), and the plans for the NPRA (U.S. Department of the Interior 2004).

Borough residents are concerned about current and cumulative effects of oil and gas development on archaeological, historic, and TLUI resources. Industrial development is one of the leading sources of discovery and documentation of new archaeological and cultural sites on the North Slope. Concerns include damage to and degradation of resources, restrictions or exclusion of Borough residents from important cultural resource areas, and damage from potential catastrophic events such as oil spills. Activities associated with resource and village development should accommodate measures to avoid or minimize adverse cultural resource impacts during project planning, design, construction, and operation. Developers should consult with village residents and Borough staff when siting and designing facilities.

3.3.4.3 Use of Traditional and Contemporary Local Knowledge

Traditional and contemporary local knowledge of the physical, biological, and cultural environment has been passed down from generation to generation and increased through the experience of Borough residents who have spent much of their lives working in and observing the environment. Traditional and contemporary local knowledge is highly valued by Borough residents. There are many instances where traditional and contemporary local knowledge has revealed understandings of the environment that western science had not been able to discover. In many other instances traditional and contemporary local knowledge and western science have had similar findings.

Traditional and contemporary local knowledge for the North Slope area is well documented in written record at the University of Alaska – Anchorage, University of Alaska – Fairbanks, Barrow Tuzzy Consortium Library, North Slope Borough Planning Department Inupiat History Language and Culture division, North Slope Borough Planning Department's Geographic Information System, tribal organizations, and the Alaska Eskimo Whaling Commission records, among other locations. In addition, federal agencies such as the National Science Foundation, National Oceanic and Atmospheric Administration, and Minerals Management Service have specific funding and programs to elicit and document traditional and contemporary local knowledge, and have an obligation as tribal trustees to provide this information to the public.

All project proponents, including resource and village development projects, should consult with Borough staff and village residents during the planning and design stages of projects in order to incorporate traditional and contemporary local knowledge in an appropriate manner. The incorporation of traditional and contemporary local knowledge should be an integral component of the project plan; it is not a well-reasoned approach to ignore thousands of years of knowledge until a very late stage of project planning. The Borough particularly emphasizes that project proponents should foster constructive relationships with tribal governments and local governments.

Traditional and contemporary local knowledge has been utilized in the Arctic Gas pipeline project and the Alpine CD4 project to result in safer facility location and designs. There are some projects that the Borough was dissatisfied with how traditional and contemporary local knowledge was used. While there are still improvements to be made in the effective incorporation and utilization of traditional and contemporary local knowledge, efforts such as these will serve as educational tools for future projects.

Whalebone arch and skin boats in Barrow

3.3.5 *Governance and regional/community organizations*

3.3.5.1 Organizations, Jurisdictions and Responsibilities

Borough Government

The North Slope Borough is the largest municipality in the United States, in terms of landmass. It was established as a first class borough in 1972 and a Home Rule Charter was adopted in 1974. The Borough is the regional government for the eight villages within the 89,000 square miles of the Alaskan arctic, north of the Brooks Range. The Borough government consists of an elected mayor, a seven-member assembly, a seven-member school board, and an eight-member planning commission (University of Alaska - Arctic Environmental Information and Data Center 1978; North Slope Borough 2004a).

The powers of the Borough include: taxation, education, planning, platting, and zoning. In addition, the villages have transferred to the Borough many powers typically held by cities, including: area-wide police powers, streets and sidewalks, water, sewers and sewage treatment, garbage and solid waste services and facilities, watercourse and flood control facilities, health services and hospital facilities, telephone systems, utilities (light, power, and heat), transportation systems, housing, management of historic sites and facilities, and libraries. The Borough also presently has responsibility for services typically provided by the state or other entities, such as airport and aviation facilities, and housing and urban development.

Petroleum and natural resource development projects are the greatest source of property tax revenues for the region. With these revenues, the Borough has provided many services to its residents, including improvements in sanitation, water and sewer systems, education, public safety, and cultural services (Shepro, Maas et al. 2003). In addition to providing public services, the Borough strives to protect regional subsistence habitat and the local way of life (Hopson 1978).

While the Borough has provided a high level of service throughout its municipality for over three decades and has been self-sufficient compared to other areas of rural Alaska, the levels of service provided are declining due to decreases in revenues. It is becoming imperative that the Borough reduce costs and eliminate duplication of services that are typically provided by other entities in other areas of the state. The Borough is striving to improve coordination with partner groups within and outside the Borough to maintain services for its residents and maintain fiscal integrity. This includes working together to identify additional sources of funding for services and facilities, and training and maintaining the workforce needed to support them. Potential partners include federal and state entities such as the Denali Commission, the EPA, Alaska Native Tribal Health Consortium, Village Safe Water, the Alaska Department of Transportation and Public Facilities, Alaska State Troopers, ANCSA Native corporations, and regional and village tribal governments.

City Governments

With the exception of Point Lay, all communities in the North Slope Borough are incorporated as second-class municipalities. A mayor and an elected city council typically govern the communities. Some communities are beginning to express interest in resuming some local powers that were transferred to the Borough decades ago, including preparation of village comprehensive plans.

Tribal Governments

All of the North Slope communities have federally recognized tribal governments; each village has an active tribal council. In addition to the local governing bodies, there are two regionally active tribal organizations. The Inupiat Community of the Arctic Slope (ICAS) is a federally recognized tribal organization and provides assistance to villages in areas of realty, transportation, and resource management programs. The Arctic Slope Native Association (ASNA) has been active in the North Slope Borough for many years, but the primary focuses of the organization in recent years are healthcare and social services. In addition, Maniilaq Association (Kotzebue) and Tanana Chiefs Conference (Fairbanks) provide health and social services in some Borough villages.

Alaska Eskimo Whaling Commission

The Alaska Eskimo Whaling Commission (AEWC) is a critical regional entity, with influence on local, regional, national, and international policies that affect bowhead whales and subsistence uses of the whales. The commission functions as a non-profit corporation, with the goal of protecting bowhead whales, their habitat, and Native subsistence uses of bowhead whales. The AEWC is also a strong supporter of bowhead whale research. The commission was initially formed in 1977 to represent ten Eskimo whaling communities before the United States Government and the International Whaling Commission (Alaska Eskimo Whaling Commission 2004).

The AEWC has worked with the oil industry to develop the Good Neighbor Policy and Conflict Avoidance Agreements with regard to oil and gas exploration and development activities in waters offshore the North Slope Borough. These agreements are a model for protection of subsistence resources and cultural values, and are being applied to agreements and permit conditions for resource development activities onshore.

ANCSA Corporations

Arctic Slope Regional Corporation is a private, for-profit corporation that was established through the ANCSA to represent the business interests of the Arctic Slope Inupiat (Arctic Slope Regional Corporation 2004). The corporation has a deep respect for the Inupiat heritage and is committed to preserving the Inupiat culture and traditions. The corporation operations are strongly based in natural resources, holding title to approximately five million acres of land. ASRC represents all eight villages on the North Slope.

The local village corporations include: Atqasuk Inupiat Corporation, Cully Corporation (Point Lay), Kaktovik Inupiat Corporation, Kuukpik Village Corporation (Nuiqsut), Nunamiut Inupiat Corporation (Anaktuvuk Pass), Olgoonik Corporation (Wainwright), Tikigaq Corporation (Point Hope), and Ukpeagvik Inupiat Corporation (Barrow). While the corporations are not governing bodies, they are influential in decisions made by local and regional governments.

3.3.5.2 Fiscal/financial characteristics

Borough revenues have been in decline since the beginning of the 1990s and are projected to continue to decline through 2010. The oil and gas industry provides approximately 97 percent of the Borough's property taxes, which comprises nearly 70 percent of the Borough's budget (Arctic Development Council 2003; Ahmaogak Sr. 2004). However, oil production has declined and tax revenues have correspondingly decreased.

The largest projected decline in non-tax revenues is due to declines in investment income; cash balances, and interest rates (Ahmaogak Sr. 2004). In addition, there has been a precipitous decline in grants and other funding provided by the federal government and the State of Alaska. This combination of revenue declines has seriously impacted the Borough's ability to provide services in recent years.

With all major sources of revenue in decline, Borough services and employment have been dramatically reduced. The Borough is the largest employer in all North Slope communities; thus, these budget cuts have had widespread economic and employment ramifications throughout the region.

The Borough has developed a series of strategic plans to address the revenue and budget declines (Arctic Development Council 2003; Ahmaogak Sr. 2004; North Slope Borough 2004a). Despite the economic hardships, the Borough appears to be maintaining fiscal integrity. Recent bonds proposed for sale continue to receive high ratings by national indices (North Slope Borough 2004).

3.3.6 *Economic Development*

3.3.6.1 Oil, gas, and mineral development

Oil and Gas. Oil and gas development in this region has been a substantial revenue source for the Borough, state, industry, and employees that work in the oilfield. Resource development funding, based from this area, has made the development of infrastructure and facilities possible across the Borough. The oil and gas deposits of the North Slope are among the largest ever found in North America.

While Prudhoe Bay has been the largest producing oil field in the United States, followed closely by the Kuparuk Field, the forecast for production in these fields is for continued decline. New fields have been brought on line recently, including the Northstar and Alpine Fields. The National Petroleum Reserve – Alaska (NPRA) is expected to have between 5.9 to 13.2 billion barrels of oil and between 39.1 and 83.2 trillion cubic feet (TCF) of natural gas (Arctic Development Council 2003). After 15 years of being reserved, the NPRA was re-opened for new development in 1999. Lease sales have continued in the NPRA in 2004 and offshore in 2005, and exploration and development is actively occurring.

While the North Slope Borough has traditionally supported onshore oil exploration and development, the Borough has always required that development plans include prevention measures specifically designed to protect subsistence resources, wildlife, and the arctic environment. The Borough has not supported offshore resource development activities because of the lack of resources and technical capability to stop, recover, and clean up an oil spill in the offshore environment. The risks to the environment, resources, and people in the event of a spill are too great to be tolerated. A major oil spill in the Beaufort Sea would threaten the very existence of the people and culture in the North Slope Borough.

The coastal plain of the Arctic National Wildlife Refuge (ANWR) is also anticipated to have large deposits of recoverable oil and gas. However, only one exploratory well has been drilled in the area, on Native Corporation lands to the southeast of Kaktovik. An act of Congress would be required to open the coastal plan for exploration and leasing.

Coal. Approximately 40 percent of the total coal resources of the United States are located in the western portion of the North Slope Borough. These resources are generally high in BTU value and low in sulfur, making them valuable for number of uses. "The hypothetical resource of

high-rank coal in the western arctic coalfield is 4 trillion tons, of which 150 billion tons is classified as identified resources. During World War II, coal was mined around the Atqasuk area to fuel the community of Barrow. The possible development of coal resources in the region will diversify local economy and improve the standard of living by lowering local energy costs. However, lack of surface transportation and more compatible energy sources like natural gas are the key obstacles to the development of coal on the North Slope" (Arctic Development Council 2003).

Local communities are very interested in alternative fuel sources, particularly with the rising cost of importing diesel. Development of coal and coal gas resources in the area could stimulate the local and regional economies with development of an export market as well as the local home heating market.

Minerals. Hard rock mineral deposits have been identified in the portion of the Borough adjacent to the Red Dog mine, and exploration activities to identify and quantify reserves are ongoing. The likelihood of development depends on the nature of deposits and ability to transport processed ore out of the Borough in an economic manner. Extension of the transportation system that connects the Red Dog mine with the Chukchi Sea may facilitate development.

Sand and Gravel. Sand and gravel, as well as a variety of mineral deposits have been located throughout the North Slope Borough. These resources are a key commodity for both village and oil and gas development activities, given their value in pads for structures and in constructing roads. Access to sand and gravel deposits and lack of existing transport options have been limiting factors for development.

Figure B-12 depicts known petroleum and mineral resources throughout the North Slope Borough.

3.3.6.2 Tourism and commercial recreation

Recreation and commercial tourism have the potential for both economic benefit and cultural threat. Commercial tourism is an important economic activity in Barrow, and is beginning to contribute to the economies of other villages. However, commercial tourism and recreation in areas used by residents for subsistence activities has the potential to create cultural conflict and compete for subsistence resources. The following section is excerpted from the North Slope Regional Comprehensive Economic Development Strategy (Arctic Development Council 2003):

> Tourism is the fastest growing industry in Alaska and the second largest private sector employer in the state. About 1.4 million people travel to Alaska every year, and visitors spend nearly $1 billion in Alaska, or about $770 per visitor. The industry has a 78 percent resident hire rate and employs over 27,000 people. Although this is a huge market, the 1993 North Slope Tourism Potential estimates that only 3 percent of all Alaska tourists visit the Arctic. Barrow, Prudhoe Bay and Kotzebue have been the main destinations. The North Slope Borough's unique arctic location, rich Eskimo indigenous culture, midnight sun, tundra and wildlife offer visitors a lifetime experience. With the right marketing package and consistent management, the North Slope Borough communities should be able to substantially increase tourism activity and revenues.
>
> The region's rich and dynamic Eskimo culture and lifestyle, including whaling, Eskimo dancing, and storytelling offer the culture and historical tourist a unique experience. For the ecotourism and adventure traveler, the North Slope Borough offers great

opportunities for bird watching, wildlife viewing, sport fishing, dog-sledding, fishing, river rafting, canoeing, kayaking and other outdoor activities.

While detailed tourism economic impact data for the North Slope Borough is hard to obtain, the overall number of independent travelers, winter tourists, ecotourism and adventure based travelers is growing in the region. In addition, there are increasing convention bookings in Barrow. The majority of the North Slope communities have been very interested in attracting more visitors and supporting tourism industry growth, although a few communities are divided over what types of tourism and how much should be allowed in their village and the surrounding area. Most communities have seen a developing tourism industry as a way to diversify the local economy, making up for the downsizing of governments. Native corporations are very active in supporting the tourism industry; they are the owners of all the hotels and restaurants in the villages outside Barrow; the Waldo Arms Hotel in Kaktovik being only the exception. The Arctic Slope Regional Corporation owns a hotel, a restaurant and a tour operation in Barrow.

A lack of basic and adequate tourist facilities is a handicap in developing tourism on the North Slope. Most of the hotels in the outlaying villages are very basic; no telephones in the rooms and most of the hotels have common TV rooms, showers and toilets. Almost all the hotels outside of Barrow are closed during the winter low traffic season. Funds are needed for constructing and improving hotels, restaurants and other facilities throughout the region. High transportation and accommodation costs are other obstacles to tourism development. A transportation cost between the villages has been previously noted; average room and board is about $150 per night per person on the North Slope. In addition, some residents are concerned that the promotion of tourism will increase the air traffic and impact subsistence activities.

Given the potential for cultural conflict and competition with subsistence, public and private landowners that permit commercial recreation and tourism on their lands need to coordinate with the Borough and affected communities to avoid, minimize, or mitigate potential adverse impacts.

3.3.6.3 Arts and crafts

Native arts and crafts are produced throughout the North Slope Borough, with specialties varying by location and artisan. Products include whalebone and caribou skin masks, ivory carvings, baleen baskets, ulus, Eskimo dolls, clothing, jewelry, and beadwork. Some villages have local cooperatives to sell their products. A borough-wide cooperative opened in September 2004 at the Inupiat Heritage and Language Center in Barrow (North Slope Borough 2004c; North Slope Borough 2004d). The cooperative assists local artists to make their products available for sale in wider markets. There is potential for expanding the existing cooperative, and establishing community based cooperatives. The Northwest Arctic Borough provides a model for an expanded cooperative system.

Craft sales in Barrow

Income from local arts and crafts is important throughout the North Slope Borough (Table 3.3-5).

Approximately one fifth of households participate in making and selling arts and crafts. Household income varies among the communities. In most communities there are a few households that have markedly higher annual craft incomes than the average income demonstrates (Shepro, Maas et al. 2003).

Table 3.3-5
Arts and Craft Participation in North Slope Borough Communities

Community	Participation in Arts and Craft Production	Average Annual Income
Anaktuvuk Pass	18.5 percent	$2,000 - $3,000
Atqasuk	14.1 percent	$210
Barrow	No information	No information
Kaktovik	18.6	<$500
Nuiqsut	23.2 percent	$480
Point Hope	21.2	$2,373
Point Lay	20 percent	$368
Wainwright	20 percent	$400

Source: (Shepro, Maas et al. 2003)

3.3.6.4 Retail and commercial services

Retail trade and commercial services presently account for a small percentage of the Borough economy (Shepro, Maas et al. 2003). Retail trade accounted for 31 reported jobs in the Borough, or approximately 1.4 percent of employment. Similarly, commercial services accounted for 108 reported jobs or 4.9 percent of employment.

Barrow is the regional center for retail and commercial services, although every village has some degree of local services. Prudhoe Bay is the regional center for retail and commercial services associated with oil and gas development.

3.3.7 *Transportation*

Air travel is the primary means of access to the North Slope Borough and its villages for both passengers and freight. Alaska Air serves Barrow with two flights daily; all other communities are served by regional air carriers.

Deadhorse is the primary transportation hub for the oil fields and the eastern-most communities of the North Slope Borough. The primary public transportation facilities in this area include an airstrip that is owned and maintained by the state, and the northern portion of the Dalton Highway.

Meeting the plane in Point Lay

The Dalton Highway provides year-round access to Deadhorse and Prudhoe Bay. This is the only road access from the Borough to the State of Alaska road system. During the winter months an ice road often reaches from the Prudhoe Bay-Kuparuk road system to the Alpine oilfield and nearby Nuiqsut. There is currently a proposal to construct the Colville River Road,

which would be a gravel road to provide year-round access to the NPRA and a spur road to Nuiqsut (Cashman 2004).

During the ice-free season, which occurs only for a few weeks during mid-summer, barges can access the both the Prudhoe Bay area and coastal communities to deliver fuel, supplies, and heavy equipment.

Within the villages, all terrain vehicles (ATVs) and snow machines are primary modes of mechanized transportation. Cars and trucks are also common in the villages and share the roads with ATVs, snow machines, and pedestrians. A public bus system ceased operation in Barrow in July 2005. A van service for senior citizens also operates in Barrow and in many of the villages.

For a more detailed discussion of transportation, refer to the North Slope Borough Comprehensive Transportation Plan (ASCG Incorporated 2004; ASCG Incorporated 2005)

3.3.8 *Infrastructure and Physical Facilities*

3.3.8.1 Water, Sewer, and Solid waste

Water and sewer utilities are owned by the North Slope Borough. Private utility companies operate and maintain some community systems and the Borough operates and maintains other systems. A Borough-wide piped water and sewer system project that began in 1996 and is completed and operational. On average in 2003, more than 85 percent of the households in each village had running water piped to their homes. More than 50 percent of households in each village also had flush toilets, and the remaining households were dependent on honey buckets. The completion of a second piped water and sewer project that would connect the remaining households relying on water delivery and honey buckets to the piped water and sewer system is dependent on obtaining funding. The Borough also constructed and operated washeterias in many of the villages; however, due to reductions in revenue, some of these washeterias have been transferred to other entities, but most are currently closed. Section 3, Village Profiles, contains specific information related to the water and sewer utilities in each village.

As the Borough continues to face reductions in revenues, operation of water and sewer systems could become problematic. Systems were designed when funding was not a problem and efficiency of operations and maintenance was less of a priority. The Borough will need to work with cooperative partners such as city government, ANCSA corporations, tribal organizations, and state (ADEC) and federal government (ANTHC, EPA, Denali Commission) to maintain the current level of service to village residents.

The North Slope Borough owns and oversees the operation of eight landfills. The locations of individual landfills are discussed for each village in Section 3. All of the landfills or landfill expansions have been constructed since 2000 and have design lives ranging from 10 to 50 years. Refuse is collected by the North Slope Borough.

3.3.8.2 Power

In general, utilities are owned by the North Slope Borough, and private utility companies operate the facilities. Section 3, Village Profiles, contains specific information related to the power utilities in each village.

With the exception of Barrow, diesel oil remains the primary source of heat for village households, regardless of the main heating system in use. Each community has multiple bulk storage, intermediate, and day tanks for fuel storage scattered throughout the village. All fuel storage tanks are connected above ground. Fuel is delivered by barge, and distributed via pipeline and truck, depending on whether the recipient is institutional, commercial or residential.

While communities have back up generators, they remain vulnerable to breakdowns and other problems such as fuel supply, which can be disastrous during winter months. A recent outage in Kaktovik during a winter storm resulted in significant damage and threatened public health and safety. Power generation and distribution is also vulnerable to decreasing Borough revenues. The Borough will need to work with cooperative partners such as city governments, ANCSA corporations, tribal organizations, and state (AEA) and federal government (ANTHC, EPA, Denali Commission) to maintain the current level of service to village residents.

Several communities are interested in developing wind power generation to offset the high cost of fuel. Wind generation was briefly tried in the past, in villages such as Point Lay, and discontinued. However, new technology and the experience gained by regions that have successfully developed wind power generation, such as the Northwest Arctic Borough, suggest that wind power should be seriously explored.

3.3.8.3 Communications

In general, North Slope Borough residents utilize a fully digital local telephone system, local dial-up Internet, a community teleconference center, cable television, public radio broadcast, an interactive video distance education system, wide area data network, and several two-way radio technologies for their telecommunication needs. There is a need for higher bandwidth services for Kaktovik, Nuiqsut, Point Hope, Point Lay, and Wainwright. There is also a need for more immediate emergency dispatch radio connections and improved telecommunications between Barrow and the outlying communities. Section 3, Village Profiles, contains specific information related to the communication infrastructure in each village.

Satellite facilities in Point Hope

The industrial district of Prudhoe Bay and Deadhorse is served by the Arctic Slope Telephone Association Cooperative (ASTAC). The industrial district is spread over a large area, with bases that connect to the public switched network via the ASTAC central office at Deadhorse. Telecommunication links are via a combination of buried wire, microwave, radio, and satellite. Fiber optic cable has recently connected Deadhorse and Valdez, the southern terminus of the Trans-Alaska Pipeline (Arctic Slope Telephone Association Cooperative 2004).

3.3.8.4 Natural Gas

Natural gas has been available to Barrow for a relatively long time, and the majority of Barrow area facilities are heated by natural gas. Additionally, Nuiqsut is currently undergoing an energy conversion from diesel to natural gas; the natural gas system is expected to be operational in 2006. Access to and the availability of natural gas to these communities will need to be maintained. In additional, the availability of natural gas supplies to other villages will be a high priority when planning for additional oil and gas exploration and development.

3.3.8.5 Service Area 10

The North Slope Borough established Service Area 10 in 1975 to provide utilities to industrial customers in the Deadhorse and Prudhoe Bay area, including solid waste collection and disposal, potable water production and distribution, and sanitary waste collection and disposal. The Borough also provides police protection in the area. However, the ordinance that established the district identified that Borough services in this area would be different than services provided in the Borough communities. For example, the Borough has not provided housing, social services, or community facilities in Service Area 10.

3.3.9 *Health, Education, and Social Services*

3.3.9.1 Health care

The following section is excerpted from the North Slope Regional Comprehensive Economic Development Strategy (Arctic Development Council 2003):

> Medical and health services within the North Slope Borough are provided by federal, local, and state government. Indian Health Services (IHS), a federal health program for American Indians and Alaska Natives, provides medical and health services to more than 5,000 tribal members in the region. The North Slope Borough Department of Health and Social Services serves all residents within the boundaries of the North Slope Borough by providing a comprehensive health and social delivery system throughout the region. The State of Alaska also provides some services to residents of the North Slope. One State-funded social worker and one juvenile probation officer live in Barrow and travel to all communities for village services.
>
> Samuel Simmonds Memorial Hospital, funded by the IHS and North Slope Borough, is a 14-bed general medical facility accredited by the Joint commission on Accreditation of Healthcare Organizations. Services provided are outpatient clinic, emergency room, general inpatient services, health screening, prenatal and well-baby care. Personnel from the Alaska Native Medical Center (ANMC) in Anchorage provide specialty clinics. Eye care and dental care are also available in the hospital. Arctic Slope Native Association and Ukpeagvik Inupiat Corporation under contract share hospital programs. In addition to Samuel Simmonds Memorial Hospital, each community has a village based clinic providing some basic service to the village residents. Due to physical isolation, accessing health care in the borough, particularly in the outlaying communities, is extremely difficult. All of the residents who live outside Barrow are without primary health care services and they must travel by plane to access medical care in Barrow. Residents of Point Hope and Anaktuvuk Pass receive some medical care from Kotzebue (Maniilaq Association) and Fairbanks (Tanana Chiefs Conference), respectively. Patients throughout the region are often referred to hospitals and specialized facilities in Anchorage when necessary.
>
> Tele-health is a huge step forward in the North Slope Borough medical and health service. The North Slope Borough Department of Health and Social Services operates the Tele-health Network to provide medical care through telecommunications. Tele-health uses desktop video telephones to link seven outlaying village clinics with the Samuel Simmonds Memorial Hospital, the Alaska Native Medical Center in Anchorage and the Maniilaq Health Center in Kotzebue. This technology provides distant physicians and laboratories the information to determine appropriate treatment and whether or not patients require transport to out-of-town facilities for treatment. It can reduce unnecessary patient travel and disruptions to patient's family and lifestyle.

The North Slope Borough Department of Health and Social Services Agency offers comprehensive health and social services and programs to the borough residents. Some of the services and programs are: Community Health Aides, Emergency Medical Services, Public Health Nursing, Public Assistance, Mental Health, Alcohol and Drug Abuse, Arctic Women in Crisis, Parent-infant Program, Infant Learning Program, Senior citizens Program, Children's Receiving Home, the Women Infant and Children (WIC) Program, Alternate Program for Youth, Environmental Health, and Community Health Education and Medical Development.

While most of the services and programs are outreach to the villages, the need for these services is not being uniformly met throughout the region. Regrettably, children daycare, independent living services for the seniors, facilities and programs for youth are needed in many of the smaller villages.

Point Hope Health Clinic

3.3.9.2 Education

The North Slope Borough School District provides education for pre-school students through grade 12 in all communities. The district administers ten schools; there is one school in each village and three in Barrow. Ilisagvik College offers vocational courses and certificates as well as associate degrees for adults in the region.

The mission statement of the North Slope Borough School District is:

> The North Slope Borough School District is committed to providing opportunities to help all students become productive and contributing citizens. Students will maintain our values of caring, sharing, and giving by understanding our history and traditions.

Some of the objectives adopted by the school board for the 2005 – 2006 school year focused on increasing parental and community involvement in education, improving student attendance, and improving academic achievement. Some of the school board objectives echo other community and regional goals, such as developing technical career programs with agencies and businesses and encouraging the development of local teachers.

The 2003 census conducted in the Borough (Shepro, Maas et al. 2003) indicated that elementary and high school enrollment levels declined, while middle school enrollment

increased slightly. The number of pre-school aged children has increased sharply, particularly in the communities outside Barrow.

The 2003 census reported that 38 percent of individuals in households that responded to the survey were of pre-school age or were still pursuing education through the high school level. Of the remaining respondents, 19 percent did not complete high school; 81 percent graduated from high school, received a GED, or had pursued higher levels of education (Shepro, Maas et al. 2003). By comparison, the 2000 US Census statistics indicate that over 88 percent of Alaskan over the age of 25 have attained high school graduation or equivalent.

The 2003 census also indicated that there was an increase in the number of adults pursuing advanced education or training. While some communities showed an increase in willingness to travel away from their home to pursue additional education or training, other communities were less willing to consider travel for training. Business management, computer programming, teaching, and accounting were the fields that local residents were most interested in for additional education (Shepro, Maas et al. 2003).

Kali School in Point Lay

3.3.9.3 Public Safety (police, fire, search and rescue)

The North Slope Borough provides police services, fire protection and prevention services, as well as search and rescue in all of the local communities.

The Police Department has an office and personnel in each community. The headquarters and dispatch center are located in Barrow, as well as the jail. Police services include responses to requests for assistance, investigation of crimes, patrols, and public education (including school programs) (North Slope Borough 2004a).

Fire stations are also located in each community, with full-time and volunteer staff. Services provided by the Fire Department include fire prevention programs, training for emergency responders and volunteer fire fighters, and extinguishing fires. The department has a key role in emergency response, in conjunction with the Search and Rescue Department (Arctic Development Council 2003; North Slope Borough 2004a).

The Search and Rescue Department also has an office and personnel in each community on the North Slope. The mission of the department is to increase the safety of Borough residents. They provide programs to reduce the number of emergency incidents and guide planning for disaster preparedness. In addition, they respond to search and rescue emergencies. The department maintains equipment for use in search and rescue operations, including aircraft for medevacs and searches. Volunteers are key to many department operations (Arctic Development Council 2003; North Slope Borough 2004a).

3.3.9.4 Housing

Throughout the North Slope Borough, the majority of residents live in single-family homes (Shepro, Maas et al. 2003). Multi-family dwellings (such as duplexes and apartments), trailers, and other structures also exist in the communities. The demand for additional housing is high in most North Slope Borough communities, including housing for seniors and low-income residents.

The demand for housing has increased due to the rising costs of housing and rental properties (Arctic Development Council 2003). Household sizes are increasing in some communities as young families and senior citizens combine households with their extended families. The Tagiugmiullu Nunamiullu Housing Authority (TNHA) is the primary source of low-income housing loans and assistance in the region.

Housing quality remains an issue throughout the Borough. Availability of utilities is increasing, due to completion of capital improvement projects. However, there are still many homes without complete plumbing or kitchen facilities (Shepro, Maas et al. 2003; DCED 2004). Borough residents have become very accustomed to the Borough providing home construction and maintenance. As the Borough has discontinued providing housing services (construction and maintenance) due to budget limitations, there has been confusion over responsibilities for housing. The Borough will encourage TNHA (the regional housing authority) and communities to work with cooperative partners such as city and tribal governments, ANCSA corporations, and the state (AHFC) and federal government (HUD, Denali Commission, BIA) to maintain the current level of service to village residents.

Homes in Wainwright

3.3.9.5 Community Recreation

Most of the Borough communities desire indoor recreation facilities, but they are not generally available. School gymnasiums provide indoor recreation opportunities for basketball, volleyball, and other sports, during the school year. Some communities have indoor swimming pools, generally associated with the school. Barrow has a recreation center, Piuraagvik, as well as a Boys and Girls Club, and facilities in the schools. It is important to note that the Borough does not hold powers for recreation; city governments retained these powers. Thus, the Borough is not pursuing community recreation facilities, but will encourage city and tribal governments and ANCSA corporations to seek grants and alternative funding sources to meet their needs for recreation facilities.

Outdoor recreation opportunities abound throughout the North Slope Borough. Winter activities can include snowmobiling, dog sledding, snowshoeing, and cross country skiing. Summer activities can include wildlife viewing, kayaking and river rafting, hiking, and camping.

Cultural festivals, such as Nalukatak and Kivgiq offer opportunities for Eskimo dancing, storytelling, traditional games, and other language and performance arts. Cultural festivals not only attract residents from across the region, but also residents of neighboring regions and visitors from afar.

3.3.10 *Contamination/hazardous waste*

ADEC has sites listed in their contaminated sites database for all eight North Slope Borough villages. ADEC defines a contaminated site as "a location where hazardous substances, including petroleum products, have been improperly disposed." Understanding of environmental and health impacts has increased and standard disposal practices have improved over the years. However, existing contaminated sites have the potential to threaten public health or the environment and can cause economic hardship to people and communities. There are a variety of efforts underway to clean up many of the sites, as noted on the state website (ADEC 2004).

Many of the contaminated sites in the Borough are related to old military installations. A restoration advisory board (RAB) is formed to work with a particular community during environmental restoration at military installations. Six of the eight Borough communities have a RAB, including: Barrow, Kaktovik, Nuiqsut, Point Hope, Point Lay, and Wainwright.

Section 4, Village Profiles, contains specific information related to the areas of potential contamination in each village. The Contaminated Sites Database (ADEC 2004) contains additional information on sites throughout the North Slope Borough, including many sites outside of village boundaries. Current reports on site cleanup efforts are available on the website.

Barrow sunset

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North Slope Borough
Anaktuvuk Pass Village Profile

Prepared for:
The North Slope Borough

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URS Corporation

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Abbreviations

ADEC ..... Alaska Department of Environmental Conservation
ADOT&PF ..... Alaska Department of Transportation and Public Facilities
ANCSA.....Alaska Native Claims Settlement Act
ASRC .....Arctic Slope Regional Corporation
BIA ..... Bureau of Indian Affairs
CIP .....Capital Improvement Program
gpm .....gallons per minute
kW.....kilowatt
NANA ..... Northwest Alaska Native Association
NSB..... North Slope Borough
PWD..... Public Works Department
SPCC .....Spill Prevention Control and Countermeasure
TNHA ..... Tagiugmiullu Nunamiullu Housing Authority
USDW ..... Unified School District Warehouse

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North Slope Borough
Anaktuvuk Pass Village Profile

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4.1 Anaktuvuk Pass

4.1.1 *Summary*

The residents of Anaktuvuk Pass are known as the descendents of the Nunamiut. The community is the only remaining settlement of the inland northern Inupiat. Anaktuvuk Pass is situated at approximately 2,200 feet in elevation in the Endicott Mountains of the Brooks Range, within the region that has become Gates of the Arctic National Park and Preserve. The community is located about 250 miles southeast of Barrow (Figure B-1).

The Nunamiut people have lived in this region for at least 4,000 years and in the immediate vicinity of Anaktuvuk Pass for over 500 years. Much of the community left the Brooks Range in the 1920s due to a sharp decline in caribou populations and the influx of cultural changes from western settlers. The residents scattered along the Beaufort Sea coast. In the 1930s, some Nunamiuts returned to the mountains, establishing temporary base camps. By 1949, Anaktuvuk Pass had become a permanent camp, and had sporadic service from air taxis. The first post office was established in the community in 1951. By 1959, the village was incorporated as a fourth-class city. In 1971, the community achieved status as a second-class city. Nunamiut Inupiat Corporation is the local village corporation. The Village of Anaktuvuk Pass is a federally recognized tribe, and is governed by the Nagsragmiut Tribal Council.

Anaktuvuk Pass' population has increased from a 1950 census estimate of 66 residents to 346 residents in 2003. The growth pattern has been steady, with some plateaus and minor declines. The community has a young population, with a high ratio of dependents to wage earners. At the same time, the community has high rates of unemployment and underemployment. The community has high levels of subsistence activities and use of subsistence resources.

The Simon Paneak Memorial Museum is located in the community, which features information on the natural and cultural history of the area. The Nunamiut School is operated by the North Slope Borough School District and serves kindergarten through twelfth grade students. The community infrastructure has had several upgrades in recent years. The North Slope Borough began water and sewer installation projects in 1997, which are now complete. An electric utility is functional in the community, as well as telecommunications.

Sources: (University of Alaska - Arctic Environmental Information and Data Center 1978; Wickersham & Flavin Planning Consultants 1982; 1983a; Shepro, Maas et al. 2003; DCED 2004)

Anaktuvuk Pass and the Brooks Range

4.1.2 *Physical Environment*

- Anaktuvuk Pass is located at 2,200 feet elevation in the Endicott Mountains of the central Brooks Range, about 250 miles southeast of Barrow. The community is situated on the divide between the Anaktuvuk and John Rivers (Alaska Consultants Incorporated 1983a).
- The community encompasses approximately 4.8 square miles of land and 0.1 square mile of water in a broad mountain valley (DCED 2004).
- The valley floor is covered with glacial till. Soils are typically sandy, with a seasonal thaw extending three to four feet deep. Permafrost is estimated to be 1,000 feet deep in the area (Alaska Consultants Incorporated 1983a).
- The area is influenced by a continental climate. Summers are cool with average temperatures around 50 degrees Fahrenheit. Winters are cold, with an average temperature in January of –14 degrees Fahrenheit. Precipitation averages 11 inches, with snowfall of 63 inches per year (DCED 2004).
- Physical characteristics of Anaktuvuk Pass are available in more detail in prior planning documents (Wickersham & Flavin Planning Consultants 1982; Alaska Consultants Incorporated 1983a).

Brooks Range, near Anaktuvuk Pass

4.1.2.1. Hazards

- With the community's inland location, potential natural hazards include riverbank erosion, flooding, and subsidence due to permafrost melting. However, existing data are not generally available for the location and extent of hazards; potential hazard conditions should be considered further on a project-specific basis.
- The last recorded flood event was in 1975. The cause of the flood is believed to be snowmelt runoff, however, the height of the flood was not recorded (US Army Corps of Engineers 2000).
- Human-caused environmental hazards include potentially contaminated sites. The Alaska Division of Environmental Conservation (ADEC) has two sites in Anaktuvuk Pass listed in their contaminated sites database (ADEC 2004) (Table 4.1-1). The ADEC approved site closure in 1994 for the power plant site. No action has occurred at the pump house site since 1994.

Table 4.1-1
Anaktuvuk Pass Potentially Contaminated Sites

Site Name	Location	Status	Reckey
Anaktuvuk Pass Power Plant	No Address, Anaktuvuk Pass, AK 99721	Closed	1990310103101
Anaktuvuk Pass Pump House	West of Airstrip, Anaktuvuk Pass, AK 99721	Inactive	1994310106704

Source: (ADEC 2004)

4.1.3 *Human Environment*

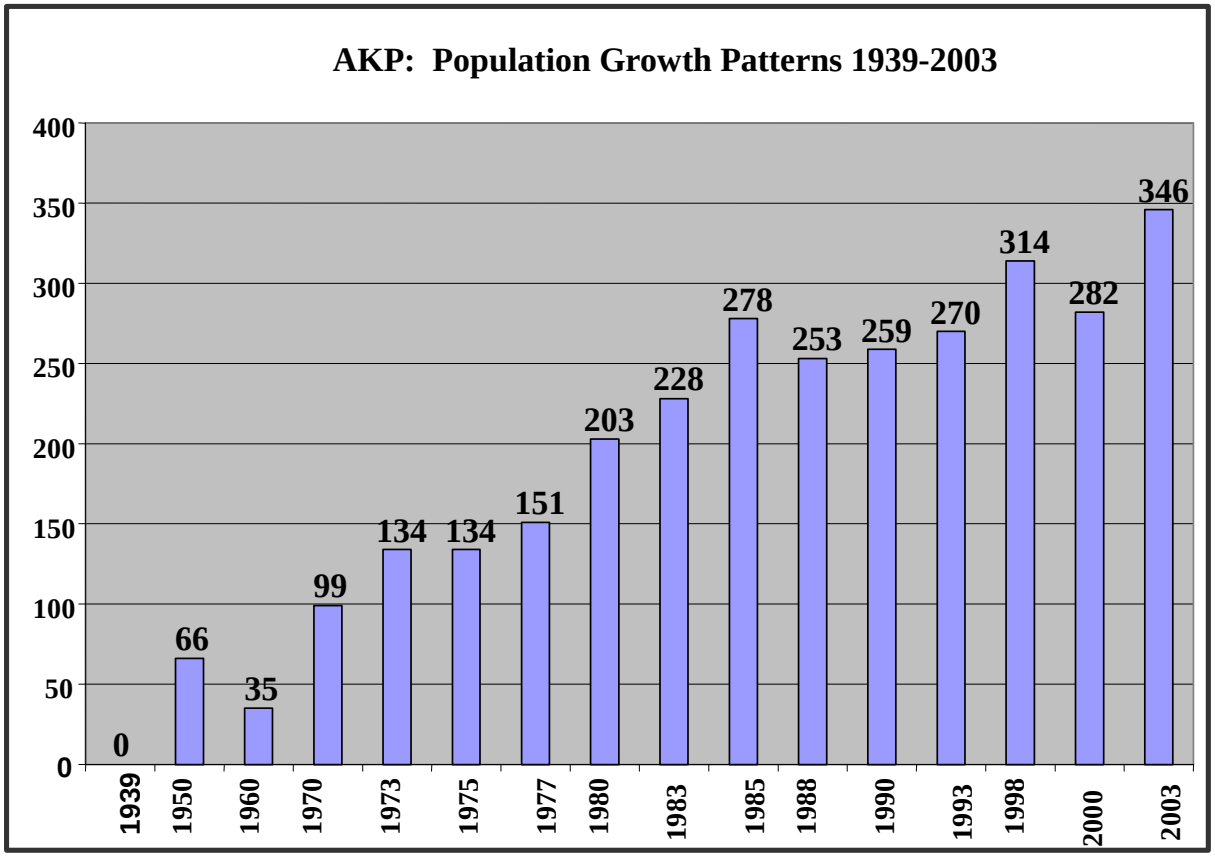
- Anaktuvuk Pass is the only remaining community of the Nunamiut, the inland northern Inupiat.
- The Nunamiut were highly mobile, semi-nomadic hunters of caribou. In the 1920s, they left the Brooks Range and dispersed along the Beaufort Sea coast due a sharp decline in caribou populations and the influx of cultural changes from the western settlers. In the 1930s, some Nunamiuts returned to the mountains, establishing temporary base camps (Alaska Consultants Incorporated 1983a; DCED 2004).
- By 1949, Anaktuvuk Pass had become a permanent camp, and had sporadic service from air taxis. The community's first post office was established in 1951 (Alaska Consultants Incorporated 1983a).
- Anaktuvuk Pass was incorporated as a fourth-class city in 1959, and achieved status as a second-class city in 1971 (Alaska Consultants Incorporated 1983a).
- Nunamiut Inupiat Corporation is the local Alaska Native Claims Settlement Act (ANCSA) village corporation.

Post Office and Borough Liaison Office

4.1.3.1. Population

- The Anaktuvuk Pass population has increased from a 1950 census estimate of 66 residents to 346 residents in 2003 (Shepro, Maas et al. 2003). The growth pattern has been steady, with some plateaus and minor declines (Figure 4.1-1).
- Anaktuvuk Pass has a young population; average ages in Anaktuvuk Pass are less than in the state or nation (Table 4.1-2). There is a high ratio of dependents to wage earners (Shepro, Maas et al. 2003).

Figure 4.1-1
Anaktuvuk Pass Population 1939 – 2003



Source: (Shepro, Maas et al. 2003)

Table 4.1-2
Age Distributions in Anaktuvuk Pass, Alaska, and USA

Criteria	U.S. 2000	Alaska 2000	Anaktuvuk Pass 2003
% 18 yrs. & under	26%	30%	42%
% 18-24 years of age	10%	9%	10%
% 55-64 years of age	9%	7%	5%
% 65 years and older.	12%	6%	6%
% 18-64 years of age	62%	64%	51%

Source: (Shepro, Maas et al. 2003)

4.1.3.2. Economy/Employment

- Economic and employment opportunities are very limited in Anaktuvuk Pass. The North Slope Borough (NSB) and the school district provide most local jobs. City government and the village corporation are also important employers in the community (Shepro, Maas et al. 2003).
- There are high levels of unemployment and underemployment in the community (Table 4.1-3). The community population is increasing, but the number of jobs is not increasing at the same rate (Shepro, Maas et al. 2003).

Caribou skin masks for sale in Anaktuvuk Pass

- The Nunamiut Corporation Store provides local commercial goods, including groceries, general merchandise, propane, diesel fuel, and gasoline.
- There is high community participation in craft sales (Shepro, Maas et al. 2003), including caribou skin masks, jewelry, and clothing items.

Table 4.1-3
Anaktuvuk Pass Employment Status in 1998 and 2003

Employment Status	1998	2003	1998-2003 % Change
Persons in Labor Force*	147	157	+6%
Permanent Full Time	58	59	+2%
Seasonal Employment	21	45	+53%
Part-time Employment	12	19	+37%
Unemployed	11	34	+68%

Note: *Persons with valid data.

Source: (Shepro, Maas et al. 2003)

4.1.3.3. Subsistence

- Important subsistence use areas encompass the area north of Anaktuvuk Pass, including the Chandler and Anaktuvuk River drainages to their confluence with the Colville River. Anaktuvuk Pass residents are dependent on the migration of caribou through the pass because access to resources is very limited in the summer months; residents are unable to boat to resources in the summer and off-road vehicle use is restricted to designated trails in Gates of the Arctic National Park, which surrounds the community.
- There is high use of subsistence resources in the community (Table 4.1-4), with Inupiat households having greater use levels than non-Native households (Shepro, Maas et al. 2003). The subsistence lifestyle remains a primary cultural choice for Native households.
- The North Slope Borough Economic Profile and Census Report found that households with greater unemployment and lower income levels are heavily reliant on subsistence resources (Shepro, Maas et al. 2003). As the economies have declined in the rural communities in recent years, the reliance on subsistence resources has increased.

Drying caribou meat

- Subsistence resources are shared at high levels throughout the community. Subsistence resources are also shared with other Borough communities and with Fairbanks, but at lower levels (Table 4.1-5). A small amount of subsistence resources were shared with other communities (Shepro, Maas et al. 2003).
- About two thirds of the households in Anaktuvuk Pass disclosed their subsistence expenses in the 2003 economic survey (Shepro, Maas et al. 2003). The average expenditure for the 63 households who reported expenditures was $2,868. This includes expenses such as fuel, ammunition, and other supplies needed to participate in subsistence activities.
- Subsistence activities occur year-round, with seasonal emphases (Table 4.1-6). Caribou are the mainstay of subsistence food for the community; they are hunted year round, but in particular from July through September, when the animals are in prime condition. Caribou migrate through the Anaktuvuk Pass area twice a year, in the spring and fall. The spring migration and hunt generally occurs from March through May. Dall sheep, brown bear, and moose are hunted in August, September, and October some distance from the village. Birds and fish are supplementary to terrestrial mammals, but are harvested when available and are more important if caribou numbers are low. Berries are seasonally important; salmonberries and blueberries are frequently plentiful in the area (U.S. Department of the Interior 2004).
- Subsistence Harvests – Terrestrial animals account for 95 percent of the total subsistence harvest for Anaktuvuk Pass (Brower and Opie 1996). Caribou are the main species harvested (approximately 83 percent of total harvest), with moose and sheep harvested in smaller numbers. Sheep and moose are generally harvested within Gates of the Arctic National Park; population numbers are estimated to be relatively low, thus harvests are highly regulated (Brower and Opie 1996; Fuller and George 1997). Fish are a smaller component of the subsistence diet by weight, but are still an important food source. Fish species harvested include grayling, Arctic char, lake trout, and whitefish. Birds harvested during the brief migration include a variety of geese and ducks. Ptarmigan are the most important bird species in the area; they are the only bird species available year-round (Brower and Opie 1996). Vegetation harvested includes berries and Eskimo potatoes (U.S. Department of the Interior 2004).

Fresh aqpik

- A generalized illustration of the distribution of subsistence uses is displayed in Figure B-5. The associated maps of wildlife habitat and distribution (Figures B-6 through B-11) illustrate areas that are important for subsistence resources. All project proponents should consult with the Borough, communities, and tribes regarding current subsistence activities and locations, due to seasonal and annual variations of the resources.

Table 4.1-4
Anaktuvuk Pass Household Use of Subsistence Resources in 1998 and 2003

Amount	Number 1998	Percentage 1998	Number 2003	Percentage 2003
None	1	2%	1	1%
Very little	3	6%	11	13%
Less than half	8	17%	12	15%
Half	13	27%	20	24%
More than half	13	27%	20	24%
Nearly all	4	8%	12	15%
All	6	13%	6	7%
Total	48	100%	82	100%

Source: (Shepro, Maas et al. 2003)

Table 4.1-5
Communities where Subsistence Foods are Shared by Anaktuvuk Pass Residents

Location	1998 Yes (47 respondents)	2003 Yes (72 respondents)
Anaktuvuk Pass	62%	99%
Other NSB community	32%	19%
NANA	0%	4%
Anchorage	0%	4%
Fairbanks	6%	19%
Other areas	0%	6%

Note: NANA – Northwest Alaska Native Association

Source: (Shepro, Maas et al. 2003)

Table 4.1-6
Anaktuvuk Pass Seasonal Subsistence Rounds

	Winter					Spring		Summer			Fall	
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Caribou												
Sheep												
Moose												
Ptarmigan												
Furbearers												
Fish												
Berries												

	No to very low levels of subsistence activities
	Low to medium levels of subsistence activity
	High levels of subsistence activity

Source: (U.S. Department of the Interior 2004)

See (Brower and Opie 1996) for greater detail on subsistence activities in Anaktuvuk Pass.

4.1.3.4. Income

- Household and per capita incomes for Anaktuvuk Pass were estimated by the Borough (Shepro, Maas et al. 2003) to be about one third less than similar estimates from the 2000 U.S. Census.
- Twenty-nine of the 77 households that participated in an economic survey (Shepro, Maas et al. 2003) reported incomes below the poverty level established by the federal government (Table 4.1-7).
- Approximately 20 percent of households receive income from sales of crafts, including caribou skin masks, jewelry, and clothing items (Shepro, Maas et al. 2003).

Table 4.1-7
Anaktuvuk Pass Average Household Income by Ethnicity

Income Reporting	Inupiat	Caucasian	"Other"*
Average Household Income 2003	$31,657	$68,023	$42,728
Proportion of Households Not Reporting Income	20%	15%	0%

Note: * "Other" is composed of 1 Athabascan, 1 Yupik, 2 American Indian, 1 African American and 1 "other" household.

Source: (Shepro, Maas et al. 2003)

4.1.3.5. Housing

- There are 93 reported housing units in Anaktuvuk Pass (Table 4.1-8). The housing units are predominantly detached single-family units (85 percent), although a few duplexes and multi-unit facilities exist (10 percent) (Shepro, Maas et al. 2003).
- Tagiugmiullu Nunamiullu Housing Authority (TNHA) estimated a need for an additional 69 housing units between 1999 and 2009 (David Nairne & Associates 1999a).
- The lack of availability of new residential lots hinders new housing construction (David Nairne & Associates 1999a).

Table 4.1-8
Anaktuvuk Pass Households by Type of Living Structure

Type	Number	Percent
Mobile home/trailer	1	1.1%
One-family house	79	84.9%
Building for two families	1	1.1%
Building for 3 or 4 families	4	4.3%
Building for 5 or more families	5	5.4%
Other	3	3.2%
Total	93	100%

Source: (Shepro, Maas et al. 2003)

4.1.4 *Land Ownership and Land Use*

4.1.4.1. Land Ownership

- Anaktuvuk Pass' boundary description has been vague since incorporation of the community in 1959; no precise delineation of the boundaries has been completed (Alaska Consultants Incorporated 1983a).
- The original townsite survey was patented to the Townsite Trustee in the US Bureau of Land Management. Many residents chose to hold their land in a restricted status, which retains some of the trust relationship between the federal government and Alaska Natives. Restricted status has both benefits and limitations, including exempting the property from taxation and regulatory codes, as well as limiting the owner's ability to sell or transfer the property. There are 46 restricted lots in the community, all south of Contact Creek (Alaska Consultants Incorporated 1983a).
- "In Anaktuvuk Pass, as in other North Slope villages, accurate information regarding the status of title for individual lots is not always available" (Alaska Consultants Incorporated 1983a). This can cause problems in land conveyances.
- There are Native allotment applications within lands selected by the Nunamiut Corporation. However, the closest allotment location is approximately three miles southeast of the community (Alaska Consultants Incorporated 1983a).
- Nunamiut Corporation has the right to select 92,160 acres of land in the Anaktuvuk Pass area; with 82,017 acres patented to the corporation to date. Land selections and conveyances are still incomplete, with 7,032 acres conveyed and 3,111 acres remaining to be selected (BLM 2005). The corporation must convey up to 1,280 acres of land to the City of Anaktuvuk Pass (Alaska Consultants Incorporated 1983a; DCED 2004).

View from the community of Anakatuvuk Pass

- Arctic Slope Regional Corporation (ASRC) owns the subsurface rights to Nunamiut Corporation lands, as well as additional lands in the Anaktuvuk Pass area.
- The federal government owns approximately 11 million acres that surround the community; the National Park Service manages the land in Gates of the Arctic National Park and Preserve.

4.1.4.2. Land Use

- Anaktuvuk Pass is zoned a Village District in the North Slope Borough Comprehensive Plan (Wickersham & Flavin Planning Consultants 1982). Regulations and guidelines for land uses allowed within Village Districts may be found in the Borough Land Management Regulations (1990). Borough zoning districts are displayed in Figure B-3.
- A variety of traditional land uses occur within and adjacent to the community for subsistence and cultural purposes. Important use areas should be identified on a project-specific basis.
- Land uses are divided into four general categories: residential, public and semi-public, commercial, industrial (Figure V-1). These land use classifications are based on observations and community input. There are no legal zoning districts within the community at this time.
- ***Residential*** – The community has both single family and multi-family housing units. The original residential area was to the south of Contact Creek, however additional housing has been constructed north of the creek.
- ***Public and Semi-public*** – Public and semi-public buildings and facilities are located throughout the community, but are predominantly located south of Contact Creek. These buildings and facilities include the church, community hall, fire station, government buildings, health clinic, museum, police station, and school.
- ***Commercial*** – Office buildings, stores, and other businesses are dispersed throughout the community, but are generally located in the central section of town.
- ***Industrial*** – The greatest concentration of industrial land uses occurs on the south and east sides of town. Industrial land uses include the airport, fuel storage tanks, landfill, power plant, telecommunications facilities, and wastewater treatment facilities.

Activities at the airport

4.1.5 *Community Facilities and Utilities*

4.1.5.1. Facilities

Grant Spearman, Curator of the Simon Paneak Memorial Museum

- Community infrastructure and critical facilities are indicated on Figure V-2.
- A health clinic, staffed by community Health Aides, is open each day and is available 24 hours a day for emergencies.
- The fire department is equipped with a pumper apparatus and a pumper/water tender apparatus, capable of pumping 1,250 gallons per minute (gpm) and 750 gpm of water respectively, for a total of 2,000 gpm of water (Steurmer 2005).
- Community facilities include the city hall/recreation building, senior/teen center, police station, fire station equipped with fire engines and an ambulance, and the Simon Paneak Memorial Museum.

4.1.5.2. Water

- A $17 million project to provide piped water and sewer began in 1997. The system is now complet and operational with 2,534,000 gallons of piped water and 74,000 gallons of truck hauled water in 2003 (Grinage 2004).
- In 2003, an estimated 90 percent of households had running water (Shepro, Maas et al. 2003).
- The NSB Public Works Department (PWD) provides the operation and maintenance for both the piped and truck haul system (Grinage 2004).
- Residents are served by one community well. The water is treated with calcium hypochlorite and stored in a 300,000-gallon storage tank prior to distribution by delivery truck (Burton 2004).
- Typical household water holding tank capacity is 250 gallons (Grinage 2004).
- Frequency of household water holding tank delivery is 4–8 days (Grinage 2004).
- There are 17 fire hydrants, and all are operational. Hydrants are spaced greater than 500 feet apart, which exceeds the maximum allowable distance in the International Fire Code (Steurmer 2005).
- The maximum water flow in the community is approximately 1,250 gallons per minute, which would not meet the needs of large fire situations. For example, a fire in a large structure that does not have a sprinkler system, such as a store or equipment shop would require a water flow in excess of 2,000 gallons per minute. In structures that have a sprinkler system, such as the school, the sprinkler system would demand a flow of 1,000 gallons per minute, and the hydrant flow demand would be an additional 1,000 gallons per minute (Steurmer 2005).

4.1.5.3. Sewer

- The sewer system project that began in 1997 is now completed and operational. In 2003, approximately 90 percent of households had flush toilets, and the remaining 10 percent were dependent on honey buckets. The NSB provides limited septic tank pumping and honey bucket service. The completion of a second sewer project will depend on NSB funding. Therefore, the remaining 10 percent relying on honey buckets can be upgraded to the truck haul system as desired but will not be connected into the sewer system until adequate funding is available (Shepro, Maas et al. 2003).
- Information obtained from the Wastewater Discharge Permit dated January 2002 (Grinage 2004) indicates the wastewater treatment plant discharges disinfected domestic wastewater into a drainfield located approximately 1,000 feet southwest of the treatment plant. The utility is required to protect and monitor the groundwater.

4.1.5.4. Solid Waste

- The old landfill located adjacent to the airport was closed in November 2003. It was closed because there were leaching concerns as it was located upstream of the village water source, and when the airport runway expanded, there was no place to expand the landfill.
- Refuse is collected by and disposed of at the NSB operated landfill which is located 2.1 miles northeast of Anaktuvuk Pass. The Class III landfill has a current permit, and typical contributions are unspecified. This landfill was built in 2000 with a 33,400 cubic yard capacity and is anticipated to have a design life of 20 years. The components of the new facility include a landfill equipment storage area, operator's shack, salvage area, burn basket, and honey bucket trench (Demientieff 2004).

4.1.5.5. Power

- Approximately 92 percent of households depend on diesel fuel for heating. Less than five percent depend on electricity alone. There has been a major switch to baseboard/boiler systems between 1998 and 2003. The change has mainly been accompanied by a dramatic drop in the number of households dependent on stand-alone heaters (Shepro, Maas et al. 2003).
- The NSB Power and Light System operates the local electric utility. Electricity is generated using diesel fuel and transmitted to housing via above-ground transmission lines (Grinage 2004).
- The rate schedule for use between 1 and 600 kilowatts (kW) is 15 cents per kW hour; use over 600 kW is 35 cents per kW hour (Grinage 2004).
- The community has a 2,400/4,160 Volt Distribution System with a 3,135 kW generation capacity. The system generated 4,077,000 kW hours in fiscal year 2004 (Grinage 2004).
- Anaktuvuk Pass residents receive a power cost equalization subsidy (Grinage 2004).

4.1.5.6. Fuel Oil/Petroleum Products

- The Nunamiut Corporation is the operations and maintenance contractor for the NSB PWD (Grinage 2004).
- Anaktuvuk Pass has multiple bulk storage, intermediate, and day tanks for fuel storage scattered throughout the village (Table 4.1-9). All fuel storage tanks are connected above ground. Fuel is distributed via pipeline and truck depending on whether the recipient is commercial or residential. All tank information is based on a 2004 assessment that the NSB compiled for updating their Spill Prevention, Control, and Countermeasure (SPCC) plans (Piedlow 2004).

Brooks Range, near Anaktuvuk Pass

Table 4.1-9
Anaktuvuk Pass Fuel Tanks

Tank Location	Tank Description or Number	Year Installed	Type of Fuel	Tank Capacity (gallons)
COMMERCIAL				
Tank Farm & Gas Station	Tank #1(Vertical)	Rebuilt 1995	Diesel	150,000
	Tank #2	1996	Gasoline	30,000
	Tank #3	1996	Gasoline	30,000
	Tank #4 (Dispensing)	1996	Diesel	7,500
	Tank #5 (Dispensing)	1996	Gasoline	7,500
New Generator Building	Tank #1	1994	Diesel	10,000
Old Generator Building	Tank #1	Unknown	Diesel	2,000
	Tank #2	Unknown	Diesel	2,000
	Tank #3	Unknown	Diesel	1,250
Anaktuvuk School	Tank #1	Unknown	Diesel	2,000
	Tank #2	Unknown	Diesel	2,000
Fire Station	Tank #1		Diesel	7,500
	Tank # 2 (Day tank)		Diesel	275
Health Clinic	Tank #1	Unknown	Diesel	6,392
	Tank #2 (Day tank)	Unknown	Diesel	275
New Heavy Equipment Storage	Tank #1	2000	Diesel	500
Old Heavy Equipment Shop	Tank #1	Unknown	Diesel	6,000
Sewage Treatment Bldg	Tank #1	2000	Diesel	1,200
Water Treatment Plant	Tank #1	2000	Diesel	1,200
NSB Public Safety Office	Tank #1	Unknown	Diesel	250
NSB USDW Bldg	Tank #1	Unknown	Diesel	10,000
	Tank #2	Unknown	Diesel	5,000
	Tank #3	Unknown	Diesel	2,000
	Tank #4	Unknown	Gas	2,000
Housing Office/Post Office	Tank #1	Unknown	Diesel	500
Washeteria	Tank #1	1987	Diesel	75
RESIDENTIAL				
Principal's House		Unknown	Diesel	300
NSBSD 5-plex teacher housing		Est. 1995	Diesel	1,128
Transient Housing Duplex	Tank #1	Unknown	Diesel	300
Tri-Plex	Tank #1	Unknown	Diesel	1,000
	Tank #2	Unknown	Diesel	1,000
Old School Residence	Tank #1	Unknown	Diesel	300
Single Family Residence (Blk 9, Lot 13)	Tank #1	1997	Diesel	250
Single Family Residence (Blk 13, Lot 2)	Tank #1	1982	Diesel	250
Single Family Residence (Blk 1A, Lot 16)	Tank #1	1997	Diesel	250
Single Family Residence (Blk 9, Lot 4)	Tank #1	1997	Diesel	250
Single Family Residence (Poker Hill)	Tank #1	1997	Diesel	250
Single Family Residence (Poker Hill)	Tank #1	1999	Diesel	250

Source: (Piedlow 2004)

4.1.6 *Communication Infrastructure*

Anaktuvuk Pass residents utilize a fully digital local telephone system, local dial-up Internet, a community teleconference center, cable television, public radio broadcast, an interactive video distance education system, wide area data network, and several two-way radio technologies for their telecommunication needs. Interconnection with the regional and global network is via satellite (Arctic Slope Telephone Association Cooperative 2004).

4.1.7 *Natural Gas*

No energy conversions from diesel to natural gas are planned at this time. Past gas exploration showed insufficient quantities to make gas a viable option, at current development costs for gas production (Piedlow 2004).

4.1.8 *Community Issues*

Issues, concerns, and comments were gathered during visits to the community in 2004 and 2005 during the Comprehensive Plan revision process. Comments identified at the meetings were grouped by the topics used to organize the Comprehensive Plan. There is a range of concerns identified for the community, and the list should be reviewed and updated annually for planning purposes.

Land Ownership and Status

- Shareholder home-site lots – It is a big, expensive process that requires lots of cooperation to subdivide shareholder lots. There are not currently any shareholder lots in Anaktuvuk Pass.

Land Use

- In 2006, the community will get an Alaska Department of Transportation and Public Facilities (ADOT&PF) project for a landfill road (village sanitation projects are a high priority). Gravel or right-of-way may be acceptable as a 10 percent borough or city match.
- The community has access issues with the Gates of the Arctic National Park; at times, they feel they are visitors in their own homeland.
- Need to upgrade the fence at the landfill; the Borough has money programmed for this.

Subsistence

- Impacts to subsistence need to be considered. We need access to subsistence, but we need to avoid impacts to subsistence from other projects.

Hazards

- The Borough is preparing hazard plans for communities to protect roads from floods and erosion.

Socioeconomic Factors

- Employment/firefighter training – We would like wildland firefighter training in the community; it could be a good source of seasonal income for rural residents.
- A van for seniors is needed. The city should apply to ADOT&PF for a grant.
- Costs in Anaktuvuk Pass are high, especially for fuel. Barges may service the coastal communities, but that is not an option for the inland communities. The community is interested in alternative energy sources, including coal and wind power.
- Additional housing is needed. There are homes that are empty, but they may require renovation to meet safety standards. The community needs to work with TNHA for housing issues, as housing is no longer a Borough responsibility.

Public Services, Facilities, and Government

- Coordination with government agencies – The Borough, state, and other organizations need to represent Anaktuvuk Pass, not just their own interests. Other organizations collect money on the community's behalf, and there is concern that the community does not receive its share of the funds.
  - City priorities should be recognized by the Borough.
  - There is concern that Anaktuvuk Pass is on the tail end of many capital improvement programs, and funds run out before local project are completed.
- Some homes do not have water and sewer service. There is interest in providing service in some way, including enhanced flush/haul programs.
- Recreation/youth facilities – More facilities need to be developed.
  - Outdoor playground equipment for kids is needed; the community has some of the equipment but site preparation is needed.
  - A teen center is needed. There is a vacant building for a teen center, but no funds to operate it.
  - A softball or baseball field is needed for kids and adults; need land, and grants or funding.
  - We need a recreation hall or gym—other than the school—for activities. It could be combined with the teen center.
- The washeteria has been closed, but it is needed.
  - The city leases the building from the Borough.
  - We need to identify potential funding sources and projected operating costs. The village corporation is developing a business plan and is working toward re-opening the facility.
- Transportation – Anaktuvuk Pass and Kaktovik are the only communities in the Borough with transportation plans; the Denali commission should look favorably on funding, as will the Bureau of Indian Affairs (BIA).
  - The road feasibility study by the tribe for the bridge near the clinic will help the community get funding.

- Water and sewer lines need to be connected to the bridge. The project should have a local hire preference. Using 638 BIA funds will make it easier for a local hire preference than with ADOT&PF funds. ADOT can give money to BIA to maximize local control over funds and the project.

4.1.9 *Community Priorities*

The following priorities have been formally identified by the village in previous recommendations, correspondence, the Borough five-year Capital Improvement Program (CIP), or resolutions passed by city councils. Other community needs have been informally identified in the preceding discussion of issues.

- **Need for gravel –** There is a stockpile of gravel at the east side of town that belongs to the North Slope Borough. They have ownership of this gravel. We cannot use this gravel for our driveways or even get gravel for our use.
- **Need for water and sewer extensions and repair –** There are six houses that use honey buckets, and there is no one to repair our flush toilets when they break or are no longer usable as a flush toilet. No one wants to touch them when they break.
- **Need for employment –** The Health Clinic is being remodeled at this time and they have hired two laborers for this project. Can they hire more for the remodel? That is a big project, and it would be helpful to hire more than two at this time due to the high rate of unemployment.

The following projects for Anaktuvuk Pass are on the Borough's CIP list pending funding or project completion:

- Vehicle storage and engine repair area for the school vehicles
- Road projects, including dust control and a two lane bridge
- Water and sewer extensions
- Airport dust control
- Power plant upgrade
- Health clinic upgrade
- Museum addition and renovation

The following projects for Anaktuvuk Pass have been identified as community needs and have been requested from the Borough, but these projects are not Borough responsibilities. The community will have to seek other sources of funding.

- Graveyard upgrade
- Day care facility

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North Slope Borough

Atqasuk Village Profile

Prepared for:
The North Slope Borough

Prepared by:
URS Corporation

October 2005

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Abbreviations

ADEC ..... Alaska Department of Environmental Conservation
ANCSA.....Alaska Native Claims Settlement Act
CIP ..... Capital Improvement Program
DMS ..... Department of Municipal Services (now Public Works Department)
kW ..... kilowatt
NPRA ..... National Petroleum Reserve – Alaska
NSB..... North Slope Borough
PWD..... Public Works Department
SPCC .....Spill Prevention Control and Countermeasure
SKW..... Subsidiary of Arctic Slope Regional Corporation
UIC.....Ukpeagvik Inupiat Corporation
USDW ..... Unified School District Warehouse

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North Slope Borough
Atqasuk Village Profile

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4.2 Atqasuk Village Profile

4.2.1 *Summary*

Atqasuk is located on the Arctic Coastal plain, on the banks of the Meade River, within the region that has become the National Petroleum Reserve – Alaska (NPRA) (Figure B-1). The community is located about 60 miles southwest of Barrow.

The Atqasuk area has been used for generations as base camps for subsistence activities. The village is located near the old Atqasuk village site (pre-1970) and the Tigaluk camp area. There are many historic and contemporary hunting and fishing camps in this area. With the community's inland location, subsistence activities focus on land and river resources. In addition, many residents travel to coastal communities to participate in whaling and hunting for marine mammals.

During World War II (1939-45), bituminous coal was mined in Atqasuk for use in Barrow's government and private facilities. The population of Old Atqasuk declined steadily between 1939 and 1970. The 1970 Census did not record any residents in the community. Atqasuk was re-established by the North Slope Borough (NSB) in 1977. The 1980 Census recorded 107 residents in the community, only three years after people began to return to the area. Atqasuk was incorporated as a second-class city in 1982. Atqasuk Corporation is the local village corporation. The Village of Atqasuk is a federally recognized tribe.

Atqasuk has a young population, with a high ratio of dependents to wage earners. At the same time, the community has high rates of unemployment and underemployment. The community has high levels of subsistence activities and use of subsistence resources.

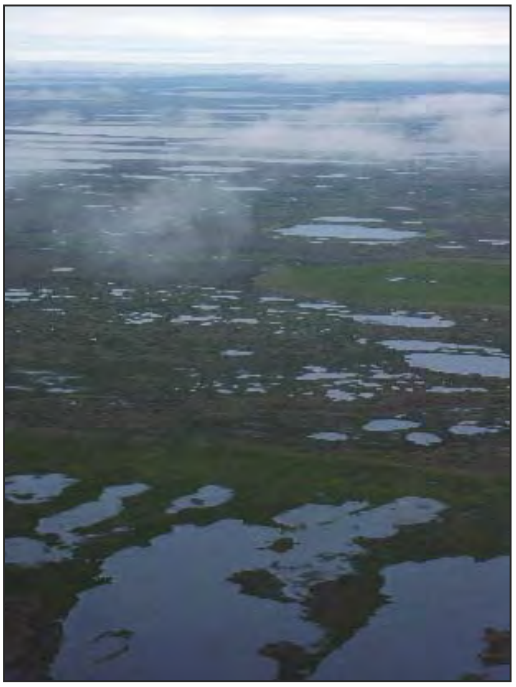
The Meade River School is operated by the North Slope Borough School District and serves kindergarten through twelfth grade students. The community infrastructure has had several upgrades in recent years. Water and sewer projects funded by the North Slope Borough have been completed. An electric utility is functional in the community, as well as telecommunications.

Sources: (University of Alaska - Arctic Environmental Information and Data Center 1978; Wickersham & Flavin Planning Consultants 1982; Alaska Consultants Incorporated 1983b; Shepro, Maas et al. 2003; DCED 2004)

Aerial view of Atqasuk

4.2.2 *Physical Environment*

- Atqasuk is an inland community, located on the Meade River on the Arctic coastal plain, about 60 miles south of Barrow and 58 miles east of Wainwright (Alaska Consultants Incorporated 1983b; DCED 2004).
- The community encompasses 38.9 square miles of land and 3.5 square miles of water (DCED 2004).
- The village is located on a stabilized sand dune flat, which is underlain by permafrost (Alaska Consultants Incorporated 1983b).
- Temperatures in Atqasuk are more extreme than in the coastal settlements. Precipitation is typically light, at 5 inches per year, with snowfall averaging 22 inches (DCED 2004).
- The physical characteristics of Atqasuk are available in more detail in prior planning documents (Wickersham & Flavin Planning Consultants 1982; Alaska Consultants Incorporated 1983b).



Lakes and ponds in the vicinity of Atqasuk

4.2.2.1. Hazards

- With the community's inland location, potential hazards include riverbank erosion, flooding, and subsidence due to permafrost melting. However, existing data are not generally available for the location and extent of hazards; potential hazard conditions should be considered further on a project-specific basis.
- There has been no recorded flooding since the community was re-established in 1977 (US Army Corps of Engineers 2000). However village residents reported in August 2004 that seasonal flooding occurs south of town in the area of the old village site on the east side of the river.
- The Alaska Department of Environmental Conservation (ADEC) (ADEC 2004) has one site in Atqasuk listed in their contaminated sites database. No action has occurred at the tank farm site since 2000 (Table 4.2-1).

Table 4.2-1
Areas of Potential Contamination in Atqasuk

Site Name	Location	Status	Reckey
Atqasuk Tank Farm	No Address, Atqasuk, AK 99791	Inactive	1988310111601

Source (ADEC 2004)

4.2.3 *Human Environment*

- The Atqasuk area has been used for generations as base camps for subsistence activities. The village is located near the old Atqasuk village site (pre-1970) and the Tigaluk camp area (Alaska Consultants Incorporated 1983b).
- During World War II (1939–45), bituminous coal was mined in Atqasuk for use in Barrow's government and private facilities (Alaska Consultants Incorporated 1983b; DCED 2004). There is one woman in Atqasuk who still burns coal for heat.
- A post office was established in the community from 1951 to 1957 under the name of Meade River (DCED 2004).
- The population of Old Atqasuk declined steadily between 1939 and 1970. The 1970 Census did not record any residents in the community. Atqasuk was re-established by the North Slope Borough in 1977. The 1980 Census recorded 107 residents in the community, only three years after people began to return to the area (Alaska Consultants Incorporated 1983b; Shepro, Maas et al. 2003).

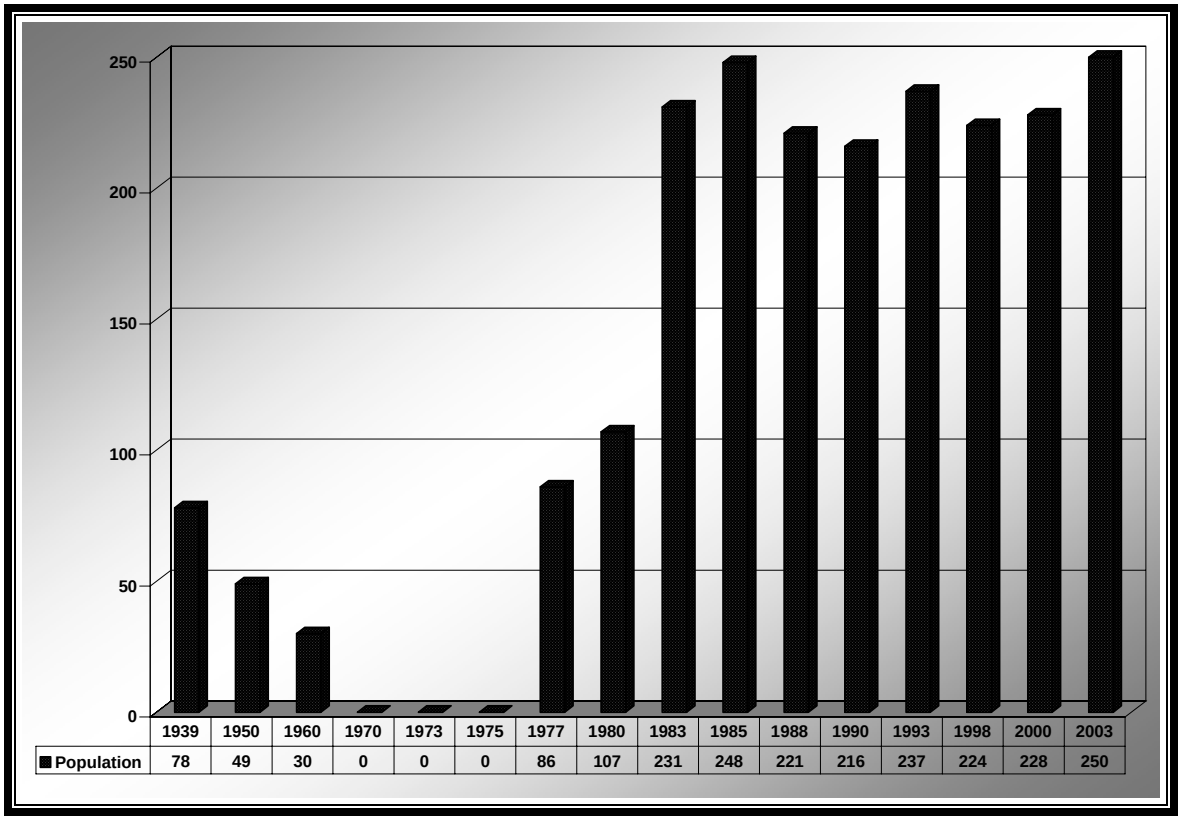
Atqasuk Post Office

- Atqasuk was incorporated as a second-class city in 1982 (Alaska Consultants Incorporated 1983b).
- Atqasuk Corporation is the local Alaska Native Claims Settlement Act (ANCSA) village corporation.

4.2.3.1. Population

- For the past 20 years, the population of Atqasuk has fluctuated with local social and economic circumstances (Shepro, Maas et al. 2003). Refer to Figure 4.2-1.
- Atqasuk has a young population; average ages in Atqasuk are less than in the state or nation (Table 4.2-2). There is a high ratio of dependents to wage earners (Shepro, Maas et al. 2003).

Figure 4.2-1
Atqasuk Population 1939 – 2003



Source: (Shepro, Maas et al. 2003)

Table 4.2-2
Age Distributions in Atqasuk, Alaska, and USA

Criteria	U.S. 2000	Alaska 2000	Atqasuk 2003
Percent 18 and under	26.0%	30.0%	42.9%
Percent 18-24 years of age	10.0%	9.0%	4.7%
Percent 55-64 years of age	9.0%	7.0%	7.6%
Percent 65 and older	12.0%	6.0%	5.9%
Percent 18-64 years of age	62.0%	64.0%	51.2%

Source: (Shepro, Maas et al. 2003)

4.2.3.2. Economy

- The unemployment rate in the community was approximately 15 percent in 2003, which was lower than the Borough unemployment rate of 19 percent, but higher than the unemployment rates for the state (8 percent) or nation (6 percent) in a similar timeframe (Shepro, Maas et al. 2003). The labor force in Atqasuk consisted of approximately 72 individuals in 2003 (Table 4.2-3).
- The Borough education and governmental services have historically provided the majority of employment (about 57 percent), with the Atqasuk Corporation employing approximately 38 percent of the labor force (Table 4.2-4) (Shepro, Maas et al. 2003).
- The Atqasuk Corporation has increased the number of employees from 5 in 1998 to 26 in 2003 (Shepro, Maas et al. 2003).
- The Atqasuk Corporation Store sells local commercial goods, including groceries, general merchandise, propane, diesel fuel, and gasoline.
- Approximately 14 percent of the community households reported income from craft sales in 2003, including masks, toys, and clothing items (Shepro, Maas et al. 2003).

Table 4.2-3
Atqasuk 2003-Labor Force Participation 1998 and 2003

Status	1998	2003
Total Population	224	250
Persons 16-64*	114	140
Persons in Labor Force	64	72
Respondents Reporting Underemployment	6	31
Respondents Working Less Than 10 months	43	45
Average Months Employed	NA	7.7**
Average Months Unemployed	NA	4***

Notes: *Persons with valid data; **Persons with some employment
***Persons seeking work

Source: (Shepro, Maas et al. 2003)

Table 4.2-4
Atqasuk Employees by Ethnicity in 2003

Employer	Inupiat	Caucasian	Other Minority
City Government	1	0	0
NSB Government	19	1	0
NSB School District	8	10	2
Village Corporation/Subsidiary	26	0	1
Trade	1	0	0
Other	3	0	0
Total	58	11	3

Note: *Persons with valid data

Source: (Shepro, Maas et al. 2003)

4.2.3.3. Subsistence

- Approximately 84 percent of Inupiat households were reported to participate in the subsistence economy; subsistence resources provide a substantial amount of local food (Table 4.2-5). Inupiat households have greater levels of subsistence use than non-Native households (Shepro, Maas et al. 2003). The subsistence lifestyle remains a primary cultural choice for Native households.
- "All of the part time workers and 72 percent of temporary seasonal workers said half or more of their food came from hunting and fishing, compared to 38 percent of those who had full-time jobs" (Shepro, Maas et al. 2003). However, the same study noted that 50 percent of Inupiat households with above average incomes derived half or more of their food from subsistence resources. As the economies have declined in the rural communities in recent years, the reliance on subsistence resources has increased.
- There are indications that the tradition of sharing subsistence resources is changing in Atqasuk. Households are giving away less of their subsistence resources. Atqasuk residents who share their subsistence resources typically give them to people in other Arctic Slope communities. Some local residents also share with family and friends in the Northwest Arctic Borough, Fairbanks, and Anchorage (Shepro, Maas et al. 2003).
- The average expenditure for the 29 households who reported subsistence expenditures was $3,307, however the median expenditure was $500. This includes expenses such as fuel, ammunition, and other supplies needed to participate in subsistence activities. There were few families who spent large amounts on subsistence activities and many families who spent little on these activities. The expenditure data supports other evidence that there is a decline in Atqasuk in subsistence harvesting and sharing (Shepro, Maas et al. 2003).
- Subsistence activities occur year-round, with seasonal emphases (Table 4.2-6). Some species, like caribou, are harvested during all months of the year, except April (Hepa 1997). Subsistence resources are particularly abundant from July through September; hunters harvest grizzly bears, moose, squirrels, and migratory birds throughout the summer (U.S. Department of the Interior 2004). Salmonberries and blueberries are generally plentiful in August and September (Hepa 1997).
- Subsistence Harvests – Atqasuk is rich in caribou, fish, and waterfowl, and hunters access areas of the coast for seals and other marine resources. Some Atqasuk hunters are members of Barrow whaling crews and take part in bowhead whaling and festivities in Barrow, returning with shares after a successful harvest. However, the importance of marine mammal harvests to Atqasuk residents may be under-estimated in some studies because harvests are generally attributed to the coastal community of the harvest crew (Hepa 1997). Atqasuk depends on the same resources as Barrow, but in different proportions, and their subsistence use areas overlap. Limited harvest data is available for Atqasuk; the Borough Department of Wildlife Management has only collected harvest data for the harvest year 1994-95 (Hepa 1997; U.S. Department of the Interior 2004).
- A generalized illustration of the distribution of subsistence uses is displayed in Figure B-5. The associated maps of wildlife habitat and distribution (Figures B-6 through B-11) illustrate areas that are important for subsistence resources. All project proponents should consult with the Borough, communities, and tribes regarding current subsistence activities and locations, due to seasonal and annual variations of the resources.

Table 4.2-5
Atqasuk Household Usage of Subsistence Resources in 1998 and 2003

Amount	Number 1998	Percentage 1998	Number 2003	Percentage 2003
None	0	0	9	19%
Very little	6	18%	6	12.5%
Less than half	4	12%	7	15%
Half	6	18%	15	31%
More than half	7	21%	4	8%
Nearly all	10	30%	6	12.5%
All	0	0%	1	2%
Total	33	100%	48	100%

Source: (Shepro, Maas et al. 2003)

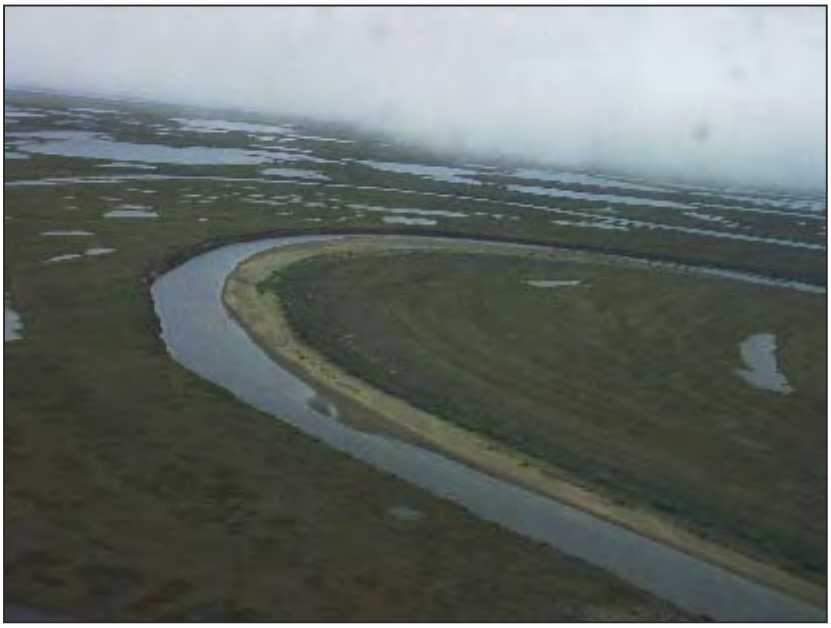
Table 4.2-6
Atqasuk Seasonal Subsistence Rounds

	Winter					Spring		Summer			Fall	
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Fish												
Birds/Eggs												
Berries												
Moose												
Caribou												
Furbearers												

	No to very low levels of subsistence activities
	Low to medium levels of subsistence activity
	High levels of subsistence activity

Source: (U.S. Department of the Interior 2004)

Note: See (Hepa 1997) for more detailed information on Atqasuk subsistence practices.



The Meade River supports many subsistence activities.

4.2.3.4. Income

- The North Slope Borough's census data (Shepro, Maas et al. 2003) identified a per capita income of approximately $29,000, which they contrasted with the federal census data from 2000 of approximately $14,700 per capita. Average and median incomes also varied between the two studies. The median income reported by the Borough study was $56,000, and the figure reported by the federal study was approximately $66,600.
- There were large differences in incomes between ethnic groups; refer to Table 4.2-7 (Shepro, Maas et al. 2003).
- Only one of the 64 households that participated in an economic survey (Shepro, Maas et al. 2003) reported incomes below the poverty level established by the federal government. However, over half of the households did not report their incomes (refer to Table 4.2-8).
- Approximately 14 percent of the Atqasuk households reported income from the sales of crafts, including masks, toys, and clothing items (Shepro, Maas et al. 2003).

Table 4.2-7
Distribution of Inupiat and Non-Inupiat Income in Atqasuk

Total Household Income	Inupiat #	Inupiat %	Non-Inupiat #	Non-Inupiat %
$0-$15,000	25	51.1%	0	0%
$15,001-$29,999	7	14.3%	1	7%
$30,000-$39,999	8	16.4%	1	7%
$40,000-$49,999	6	12.3%	3	21.5%
$50,000-$59,999	2	4.1%	4	28.6%
$60,000-$69,999	1	2.1%	3	21.5%
$70,000-$79,999	0	0%	0	7.5%
$80,000-$89,999	0	0%	1	7%
$90,000-$99,000	0	0%	1	7%
Totals/Percentages	49	100%	14	100%

Note: *Based on Individuals that divulged their income

Source: (Shepro, Maas et al. 2003)

Table 4.2-8
Atqasuk-2003 Household Size and Reported Incomes

Income Level	Number of Persons in Household										
	1	2	3	4	5	6	7	8	9	10	Total
$0-15,000			1								1
$15,001-$30,000		1	1	3							5
$30,001-$40,000		1	2		1	1					5
$40,001-$50,000											0
$50,001-$$60,000		1		3	2						6
$60,001-$70,000	1										1
$70,001-$$80,000					1	2					3
$80,001-$90,000		1					1				2
$90,001-$100,000	2					1					3
Over $100,001		3									2
Households not Reporting Income	10	5	3	4	3	4	4		1	1	35
Total	13	12	7	10	7	8	5	0	1	1	64

Source: (Shepro, Maas et al. 2003)

4.2.3.5. Housing

- Atqasuk has 60 housing units, with 55 occupied, leaving 5 vacant (DCED 2004). The housing units are predominantly detached single-family units, although some multi-unit facilities exist. The North Slope Borough census data (Shepro, Maas et al. 2003) reported only 52 housing units.
- In 2003, 87 percent of households in Atqasuk lived in single-family dwellings, and 13 percent lived in multi-family dwellings (Shepro, Maas et al. 2003). Refer to Table 4.2-9.
- All of the households are reported to have complete kitchens, including running water. However, over 80 percent of the households lacked complete plumbing (DCED 2004).
- The lack of availability of new residential lots hinders new housing construction.

Table 4.2-9
Atqasuk Households by Type of Living Structure

Type	Number	Percent
One-family house	45	86.6%
Building for two families	4	7.7%
Building for 3 or 4 families	3	5.8%
Total	52	100%

Source: (Shepro, Maas et al. 2003)

4.2.4 *Land Ownership and Land Use*

4.2.4.1. Land Ownership

- Atqasuk became a second class city in 1982. The corporate boundaries encompass 43 square miles, and the city boundaries were surveyed at 46.9 acres (Alaska Consultants Incorporated 1983b).
- In Atqasuk, as in other North Slope villages, accurate information regarding the status of title for individual lots is not always available (Alaska Consultants Incorporated 1983b). This can cause problems in land conveyances.
- There are Native allotment applications within Atqasuk's municipal boundaries. They are located both north and southeast of the surveyed city boundaries (Alaska Consultants Incorporated 1983b).
- Atqasuk is located within NPRA, which is federally owned and is managed by the Bureau of Land Management.
- Atqasuk Corporation has the right to select 69,120 acres of land in the Atqasuk area, with 56,744 acres patented to the Corporation to date. Land selections and conveyances are still incomplete, with 12,376 acres still to be selected. There are no interim conveyances pending for Atqasuk (BLM 2005). The Corporation must convey land to the City of Atqasuk for community use and expansion. (Alaska Consultants Incorporated 1983b; DCED 2004). The City initiated legal action against the Corporation in 1997 for failure to complete the conveyances to the City (DCED 2004).

4.2.4.2. Land Use

- Atqasuk is zoned a Village District in the North Slope Borough Comprehensive Plan (Wickersham & Flavin Planning Consultants 1982). Regulations and guidelines for land uses allowed within Village Districts may be found in the Borough Land Management Regulations (1990). Borough zoning districts are displayed in Figure B-3.
- A variety of traditional land uses occur within and adjacent to the community for subsistence and cultural purposes. Important use areas should be identified on a project-specific basis.
- Land uses are divided into four general categories: residential, public and semi-public, commercial, and industrial (Figure V-3). These land use classifications are based on observations and community input. There are no legal zoning districts within the community at this time.
- ***Residential*** – The community has both single-family and multi-family housing units. The original residential area was on the south side of the community, however additional housing has been developed on the north side of the community and along Tikiluk Street, which extends farther south from the community.
- ***Public and Semi-public*** – Public and semi-public buildings and facilities are located throughout the community, but are predominantly located in the center of the community. These buildings and facilities include the church, community hall, fire station, government buildings, health clinic, police station, and school.
- ***Commercial*** – Office buildings, stores, and other businesses are dispersed throughout the community, but are generally located in the central section of town.
- ***Industrial*** – Industrial land uses typically occur on the perimeter of Atqasuk. Industrial land uses include the airport, fuel storage tanks, landfill, power plant, telecommunications facilities, and wastewater treatment facilities.

4.2.5 *Community Facilities and Utilities*

4.2.5.1. Facilities

- A health clinic, staffed by community Health Aides, is open each day and is available 24 hours a day for emergencies.
- The fire department is equipped with a pumper apparatus and a pumper/water tender apparatus, capable of pumping 1,250 gallons per minute (gpm) and 750 gpm of water respectively, for a total of 2,000 gpm of water (Steurmer 2005).
- Community facilities include the community building, police station, and fire station equipped with two fire engines and an ambulance. Community facilities are indicated on Figure V-4.

Atqasuk Fire Station

4.2.5.2. Water

- Construction of a piped water system began in 2001. The system operational with 2,131,000 gallons of piped water and 72,700 gallons of truck hauled water in 2003 (Grinage 2004).
- In 2003, 85 percent of households had running water piped to their house, and 13 percent received their water by truck (Shepro, Maas et al. 2003).
- The NSB Public Works Department (PWD) provides the operations and maintenance for both the water and sewer piped system and operates the water/sewer truck haul system (Grinage 2004).
- Water is collected from a surface water source, Imakruak Lake, and transported to the Water Treatment Facility, treated with membrane filtration, and stored in two large storage tanks. The two storage tanks have capacities of 2.5 and 1.4 million gallons, making a total combined storage capacity of approximately 4 million gallons. Water is pumped from July through September. The utility is operated by the Atqasuk Corporation (Grinage 2004).
- The typical household water holding tank capacity is 250 gallons (Grinage 2004).
- The frequency of household water holding tank delivery is four to eight days (Grinage 2004).
- There are 17 fire hydrants, and all are operational (Burton 2004). However, the fire hydrants are spaced greater than 500 feet apart, which exceeds the maximum allowable distance in the International Fire Code (Steurmer 2005).
- The maximum water flow in the community is approximately 1,250 gallons per minute, which would not meet the needs of large fire situations. For example, a fire in a large structure that does not have a sprinkler system, such as a store or equipment shop would require a water flow in excess of 2,000 gallons per minute. In structures that have a sprinkler system, such as the school, the sprinkler system would demand a flow of 1,000 gallons per minute, and the hydrant flow demand would be an additional 1,000 gallons per minute. (Steurmer 2005)

4.2.5.3. Sewer

- The utility is operated by the NSB PWD. Residents use honey buckets, which are dumped into bunkers, then hauled by truck to the sewage lagoon. The filtered wastewater is discharged into Kigarak Lake by the wastewater treatment plant (wastewater disposal permit, 2002).
- Construction of the sewer system began in 2001; it is presently operational and most households are connected to the piped sewer system. Those who remain on household tanks receive truck hauled water. The NSB provides septic tank pumping and honey bucket service depending on household demand and the number of people.

4.2.5.4. Solid Waste

- Refuse is collected by and disposed of at the NSB operated landfill. The landfill is located 2.5 miles from the airstrip, north of the community. The Class III landfill has a current permit, and typical contributions are unspecified. This landfill was built in 2000 with 1,096 cubic yards per year of expected waste, and is anticipated to have a design

life of 50 years. The components of the new facility include a connex, salvage area, burn cage, and sludge cell (Demientieff 2004).

4.2.5.5. Power

- There was a major switch to a baseboard/boiler system between 1998 and 2003. The change has mainly been accompanied by a dramatic drop in the number of households dependent on stand-alone heaters and forced-air furnace (63 percent baseboard/boiler system, 19 percent forced-air furnace, and 17 percent stand-alone stove) (Shepro, Maas et al. 2003).
- The NSB Power and Light System operates the local electric utility. Electricity is generated using diesel fuel and transmitted to housing via above-ground transmission lines (Grinage 2004).
- The rate schedule for use between one and 600 kilowatts (kW) is 15 cents per kW hour; use over 600 kW is 35 cents per kW hour (Grinage 2004).
- The community has a 2,400/4,160 Volt Distribution System with a 3,345 kW generation capacity. The system generated 3,488,000 kW hours in fiscal year 2004 (Grinage 2004).
- Atqasuk residents receive a power cost equalization subsidy (Grinage 2004).
- The NSB is installing a wind turbine for a feasibility study beginning in 2006 (Peidlow 2005).

4.2.5.6. Fuel Oil Petroleum Products

- The NSB PW provides the operations and maintenance for the bulk tank farm and gas station (Grinage 2004).
- The community has multiple bulk storage, intermediate, and day tanks for fuel storage scattered throughout the village (Table 4.2-10). All fuel storage tanks are connected above ground. Fuel is distributed via pipeline and truck depending on whether the recipient is commercial or residential. All tank information is based on a 2004 assessment that the NSB compiled for updating their Spill Prevention Control and Countermeasure (SPCC) plans (Piedlow 2004).

4.2.6 *Communication Infrastructure*

Atqasuk residents utilize a fully digital local telephone system, local dial-up Internet, a community teleconference center, cable television, public radio broadcast, an interactive video distance education system, a regional wide-area data network, and several two-way radio technologies, such as CB or marine VHF radios. Interconnection with the regional and global networks is via satellite (Arctic Slope Telephone Association Cooperative 2004).

4.2.7 *Natural Gas*

The NSB is planning a feasibility study to determine benefits of converting to natural gas or supplying power from Barrow (Peidlow 2005).

Table 4.2-10
Atqasuk Fuel Tanks

Tank Location	Tank Description or Number	Year Installed	Type of Fuel	Tank Capacity (gallons)
COMMERCIAL				
Tank Farm & Gas Station	ATQ-43 (Vertical)	1996	Diesel	285,000
	ATQ-44 (Vertical)	1996	Diesel	285,000
	ATQ-01	1996	Gasoline	30,000
	ATQ-02	1996	Gasoline	30,000
	ATQ-13 (Dispensing)	1996	Diesel	10,000
	ATQ-12 (Dispensing)	1996	Gasoline	10,000
Power Plant	Tank #1	1986?	Diesel	17,500
	Tank #2	1986?	Diesel	17,500
	Tank #3	1986?	Diesel	17,500
	Tank #4	1986?	Diesel	17,500
	Tank #5	1986?	Diesel	17,500
Generator Building	Tank #1	1987	Diesel	500
	Tank #2	1987	Diesel	250
	Tank #3	1987	Diesel	200
Heavy Equipment Shop	Tank #1	1987	Diesel	10,000
	Tank #2	1987	Diesel	300
New Heavy Equipment Shop	Tank #1	2000	Diesel	1,000
Vacuum Bldg	Tank #1	2000	Diesel	2,000
Health Clinic	Tank #1	1995?	Diesel	7,000
	Tank # 2 (Day Tank)	1995?	Diesel	250
Fire Station	Tank #1	2000	Diesel	7,000
	Tank # 2 (Day Tank)	Unknown	Diesel	275
Warm Storage Bldg (Old PSO)	Tank # 1	Unknown	Diesel	300
Atqasuk Meade River School	Tank #1		Diesel	10,000
	Tank #2 (Day Tank)		Diesel	250
	Tank #3		Diesel	1,000
Storage and Shop Bldg	Tank #1	Unknown	Diesel	300
Public Safety Office	Tank #1	1994	Diesel	6450
	Tank #2 (day tank)	1994	Diesel	100
	Tank #3 (day tank)	1994	Diesel	100
Water Utility Bldg	Tank #1	1987	Diesel	800
Water Treatment Plant	Tank #1	2000	Diesel	2000
Sewage Treatment Bldg	Tank #1	2000	Diesel	2,000
USDW Bldg	Tank #1	1987	Diesel	10,000
	Tank #2 (Day tank)	1987	Diesel	200
RESIDENTIAL				
Trailer w/lean-to (Transient housing)	Tank #1	Unknown	Diesel	250
Single Family Residence (Blk 3, Lot 4A)	Tank #1	Unknown	Diesel	300
5-plex Residential (Teacher housing)	Tank #1	Unknown	Diesel	1100
Single Family Residence (Blk 4, Lot 5A)	Tank #1	Unknown	Diesel	250
Single Family Residence (Blk 3, Lot 3)	Tank #1	1982	Diesel	250
Single Family Residence (Blk 3, Lot 7)	Tank #1	1986	Diesel	250

Table 4.2-10(continued)
Atqasuk Fuel Tanks

Tank Location	Tank Description or Number	Year Installed	Type of Fuel	Tank Capacity (gallons)
Single Family Residence (Lot 2, Blk 14)	Tank #1	2000	Diesel	250
Single Family Residence (Blk 2, Lot 10)	Tank #1	1997	Diesel	250
Single Family Residence (Blk 2, Lot 3)	Tank #1	2000	Diesel	250
Single Family Residence (Blk 2, Lot 10)	Tank #1	2000	Diesel	250

Source: (Piedlow 2004)

4.2.8 *Community Issues*

Issues, concerns, and comments were gathered during visits to the community in 2004 and 2005 during the Comprehensive Plan revision process. Comments identified at the meetings were grouped by the topics used to organize the Comprehensive Plan. There is a range of concerns identified for the community, and the list should be reviewed and updated annually for planning purposes.

Land Ownership and Status

- Village corporation land selections are complete, but have not been conveyed. The process did not include 14(c)(3) selections for the municipality.

Land Use

- The subsistence lifestyle does not have boundaries. Subsistence users wish to preserve opportunities for subsistence activities across ownership boundaries.

Subsistence

- We need to identify subsistence areas by seasons. Subsistence activities occur in different areas, based on seasons, availability of resources, weather conditions, and other factors.
- Protect watersheds and wetlands; these are primary access routes to subsistence resources in the summer time.

Hazards

- The river is eroding the area near the cemetery.

Socioeconomic Factors

- The community needs an economic strategy.
- The senior center could have been a good chance to develop jobs to assist with healthcare and cleaning.
- More housing is needed in the community.

Public Services, Facilities, and Government

- There is a need for additional community facilities. The only existing facilities include the school (not open during the summer) and the community center. Needed facilities include a teen center and day care center.

- Houses that are not connected to water have difficulties because the washeteria is closed.
- Atqasuk is a growing community, and needs to expand the water and sewer systems. We have lots for new development that have power, but not water and sewer.
  - No current problems with the water system were identified. However, the community may wish to consider how the existing water and sewer systems are doing before adding to them. (Currently have a vacuum system.) What systems are working well in other villages? Are there cost advantages?
  - Above-ground sewer lines might be acceptable for consideration in extending water and sewer service to areas of the community that are not currently served.
- Pollution threats to the water source include prevailing winds blowing garbage and waste seepage from material stored near the water source. There is a storage site that might have been used by Borough contractors that needs to be cleaned up. There is also an erosion threat near the outfall of the lake.
- The community needs a new water truck and a new septic haul truck.
- Closer communication is needed with other communities, especially Wainwright.

Petroleum and Mineral Development

- Atqasuk needs to start planning for oil and gas development.
- The community would like a means to clean up natural gas for local use.
- Oil and gas potential of lands selected by the village corporation is unknown
- The US Trust Responsibility Act between the federal and tribal governments should affect the interface with resource development activities.

4.2.9 *Community Priorities*

The following priorities have been formally identified by the village in previous recommendations, correspondence, the Borough five-year Capital Improvement Program (CIP), or resolutions passed by city councils. Other community needs have been informally identified in the preceding discussion of issues.

- **Fuel tank hazards –** The diesel/fuel tanks that were installed in 1979 are holding fuel and have not been repaired. The conditions of the tanks are in a very critical stage, where if they rupture, oil and gas will leak into the drinking water. The land belongs to the Atqasuk Corporation, but they had a verbal agreement between the North Slope Borough and the Atqasuk Corporation to put the tanks where they are now. They are not being used at this time, and the pipes are seeping and will need to be plugged. The tanks were put in when Eugene Brower was Director of Public Works.
- **Need for gravel –** The road to the gravesite needs gravel. There is no gravel source to date, and the only place for gravel would be either Skull Cliffs or four miles out.
- **Need clean-up –** The north area of the village where all the Department of Municipal Services junk, piles of trash, metal, drums, and glass are going into the water. They did some cleaning, but it has not all been done to date.

- **Need clean-up –** On the west side of the village there are old Euclids, old equipment that belongs to Ukpeagvik Inupiat Corporation (UIC)/SKW Corporation. The site needs to be cleaned up.
- **Need clean-up –** There are drums on the NPRA trails that need to be cleaned up. They have been there a while.

The following projects for Atqusuk are on the Borough's CIP list pending funding or project completion:

- Road projects, including dust control and gravel repair on the road to the cemetery
- Removal of Department of Municipal Services (DMS) trash north of village
- Water and sewer extensions
- Power plant upgrade
- Repair, drain, and remove the 1979 fuel tanks
- Remove abandoned UIC/SKW Euclids west of city
- Health clinic upgrade

The following projects have been identified as community needs, and have been requested from the Borough, but these projects are not Borough responsibilities. The community will have to seek other sources of funding.

- Washeteria expansion
- Senior/teen center
- Playground equipment

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North Slope Borough

Barrow Village Profile

Prepared for:
The North Slope Borough

Prepared by:
URS Corporation

October 2005

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Abbreviations

ADEC ..... Alaska Department of Environmental Conservation
AHFC ..... Alaska Housing Finance Corporation
ASNA ..... Arctic Slope Native Association
ASRC ..... Arctic Slope Regional Corporation
BUECI ..... Barrow Utilities and Electric Cooperative, Incorporated
CIP ..... Capital Improvement Program
DEW ..... Distant Early Warning
gpm ..... gallons per minute
ICAS ..... Inupiat Community of the Arctic Slope
NARL ..... Naval Arctic Research Laboratory
NSB ..... North Slope Borough
PWD ..... Public Works Department
SPCC ..... Spill Prevention Control and Countermeasure
TNHA ..... Tagiugmiullu Nunamiullu Housing Authority
TOS ..... Thermal Oxidation System
UIC ..... Ukpeagvik Inupiat Corporation

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North Slope Borough
Barrow Village Profile

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4.3 Barrow Village Profile

4.3.1 *Summary*

Barrow is the largest community in the North Slope Borough and is the hub for regional government, transportation, communications, education, and economic development. The community is located on the northern edge of the Arctic Coastal plain, on the Chukchi Sea Coast (Figure B-1). The area has a long history of habitation, with many historic home sites and traditional camps in the area. Native hunters and travelers have used the area for thousands of years. In the nineteenth century commercial whaling ships, traders, and adventurers began to visit the area.

For over fifty years, military installations, including the Naval Arctic Research Laboratory (NARL) and the Distant Early Warning (DEW) Line Station, influenced the community's history and development. In the 1970s the Borough incorporated, with Barrow as the Borough headquarters. Since the 1970s, the development of the oil and gas industry provided a substantial tax base for the Borough and influenced the area's history and development. The community is located within the region that has become the National Petroleum Reserve – Alaska. There are many historic and contemporary hunting and fishing camps in this area.

Barrow was first incorporated as a fourth-class city in 1959; the city was reclassified in 1972 as a second-class city, and again in 1974 to first-class status. Ukpeagvik Inupiat Corporation is the local village corporation. The Village of Barrow is a federally recognized tribe.

Barrow has a young population, with a high ratio of dependents to wage earners. The community also has high rates of unemployment and underemployment, despite having an employment base that is broader than in other North Slope communities. In recent years, the level of employment in Barrow provided by the North Slope Borough has decreased dramatically, in response to declining revenues from oil field production. The community has high levels of subsistence activities and use of subsistence resources.

As the seat of the North Slope Borough, many regional health and social services are located in Barrow. The community has well developed facilities, including a regional hospital, recreation facilities, and an array of government facilities and services. The Inupiat Heritage Center is also located in Barrow, and is dedicated to protecting Inupiaq culture, history, and language. The North Slope Borough School District operates the Fred Ipalook Elementary School, Eben Hopson Sr. Memorial Middle School, and Barrow High School, serving kindergarten through twelfth grade. Ilisagvik College is also located in Barrow.

Whalebone arch skin boats in Barrow

Barrow's infrastructure is the most extensive of any North Slope community, and includes water, sewer, electric and telecommunication utilities.

Sources: (University of Alaska - Arctic Environmental Information and Data Center 1978; Wickersham & Flavin Planning Consultants 1982; Alaska Consultants Incorporated 1983c; Shepro, Maas et al. 2003; DCED 2004)

4.3.2 *Physical Environment*

- Barrow is located on the Chukchi Sea coast at the northern most tip of Alaska, only a few miles southwest of Point Barrow.
- The community is located on the northern edge of the Arctic coastal plain. The area has little physical relief, varying from sea level to approximately 50 feet in elevation. The area is poorly drained, with a large network of lakes and lagoons. Permafrost underlays the area at depths of approximately 5 to 24 inches, extending to depths of 1,300 feet (Alaska Consultants Incorporated 1983c).
- Barrow encompasses 18.4 sq. miles of land and 2.9 sq. miles of water (DCED 2004).
- Barrow has an arctic climate, with temperatures ranging from –56 to 78 degrees Fahrenheit. The average summer temperature is 40 degrees Fahrenheit. This arctic desert environment has very light annual precipitation (Alaska Consultants Incorporated 1983c).
- The physical characteristics of Barrow are available in more detail in prior planning documents (Wickersham & Flavin Planning Consultants 1982; Alaska Consultants Incorporated 1983c).

4.3.2.1. Hazards

- With the community's coastal location, potential natural hazards include beach erosion, flooding, storm tides, ice override, and subsidence due to permafrost melting. However, existing data are not generally available for the location and extent of hazards; potential hazard conditions should be considered further on a project-specific basis.
- The last recorded flood event was in 1970. The worst flood event was in October 1963, when a storm surge caused a water level rise of approximately 10 feet above normal sea level with a wave height of 16.4 ft (US Army Corps of Engineers 2000). Severe fall storms have been increasing in recent years, becoming more common. The storms result in coastal flooding and erosion in parts of Barrow because the pack ice is decreasing, eliminating the buffer between the severe storms and the shore. The Borough has routinely constructed sand berms along the beach in the fall to protect against flooding and erosion. Flood potential based on wave height is illustrated on Figure V-11.
- Existing structures in Barrow are being threatened by beach erosion from storm tides and ice override. (Wickersham 1993a).

Sand berm in Barrow

- Offloading equipment, fuel, and supplies from barges is becoming a hazardous task as ocean characteristics change.
- Human-caused environmental hazards include potentially contaminated sites. ADEC has the following sixteen sites in Barrow listed in their contaminated sites database (ADEC 2004) (Table 4.3-1).

Table 4.3-1
Potentially Contaminated Sites in Barrow

Site Name	Location	Status	Reckey
Barrow Gas Station Tank Farm	Stevenson & Ahkovak Sts., Barrow, AK 99723	Inactive	1999310126701
Barrow PHS Hospital	No Address, Barrow, AK 99723	Inactive	1991310136401
Barrow UIC Block 19	Hopson Street, Barrow, AK 99723	Inactive	1991310120701
Brower Property	4211 Karluk Street, Barrow, AK 99723	Active	1984310922701
FAA Barrow Vortac Facility	Barrow, Barrow, AK 99723	Active	1992310128201
Frontier Flying Service - Barrow	Barrow Airport, Barrow, AK 99723	Active	1994310900301
NARL - Airstrip Fuel Spill	Near Airstrip, Barrow, AK 99723	Active	198831X129103
NARL - Bulk Fuel Tank Farm	North Salt Lagoon, Barrow, AK 99723	Active	198831X129104
NARL - Elson Lagoon	~7 Miles NE of Barrow, Barrow, AK 99723	Active	198831X929122
NARL - Former Dry Cleaning Facility	NARL Facility, Barrow, AK 99723	Closed	198831X929103
NARL - Middle Salt Lagoon	Middle Salt Lagoon, Barrow, AK 99723	Active	198831X129121
NARL - Naval Arctic Research Lab	5.5 Miles NE of Barrow, Barrow, AK 99723	Active	198831X929101
NARL - Old Waste Disposal Area	0.5 Mile South of NARL, Barrow, AK 99723	Active	198831X929102
NARL - Powerhouse Fuel Spill	5.5 Miles NE of Barrow, Barrow, AK 99723	Active	198831X129102
NARL - Radiation Laboratory	5.5 Miles NE of Barrow, Barrow, AK 99723	Active	198831X929123
Skull Cliff LORAN Dewline / DERP	23 Miles SW of Barrow, Barrow, AK 99723	Active	198531X921301

Source: (ADEC 2004)

4.3.3 *Human Environment*

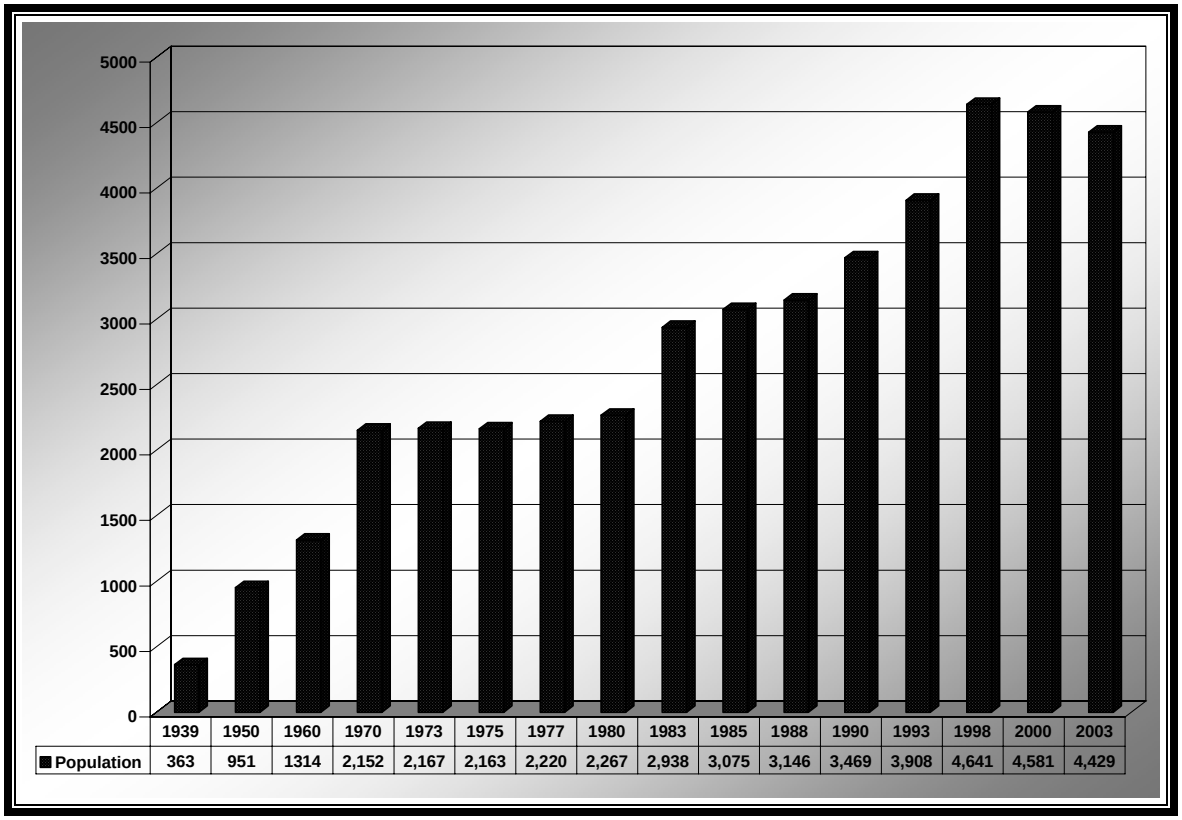
- Barrow was first incorporated as a fourth-class city in 1959; the city was reclassified in 1972 as a second-class city, and again in 1974 to first-class status (Alaska Consultants Incorporated 1983c).
- The community of Barrow extends from the traditional community northeast across Isatkoak and Tasigarook Lagoons to the Browerville area, and farther northeast to the NARL and the DEW Line station (Alaska Consultants Incorporated 1983c).
- For over fifty years, the military installations, including NARL and the DEW Line station, influenced the community's history and development. In the 1970s the Borough incorporated, with Barrow as the Borough headquarters. Since the 1970s, the development of the oil and gas industry provided a substantial tax base for the Borough and also influenced the area's history and development (Alaska Consultants Incorporated 1983c).
- Ukpeagvik Inupiat Corporation is the local Alaska Native Claims Settlement Act (ANCSA) village corporation.

4.3.3.1. Population

- Barrow's population increased from a 1939 census estimate of 363 people to 4,641 in 1998. The 2000 Census estimated that the number of residents declined to 4,581. The North Slope Borough's research indicated that the population had dropped further to 4,429 by 2003 (Shepro, Maas et al. 2003) (Figure 4.3-1). The same study notes that the decline in population could be attributed to reductions in the North Slope Borough's budget and shifts in state and federal funding.
- Barrow has a young population; average ages in Barrow are less than in the state or nation. There is a high ratio of dependents to wage earners (Shepro, Maas et al. 2003). Refer to Table 4.3-2.

Summer sunshine on a Barrow home

Figure 4.3-1
Barrow Population 1939 - 2003



Source: (Shepro, Maas et al. 2003)

Table 4.3-2
Age Distributions in Barrow, Alaska, and the USA

Category	Barrow 2003	Alaska 2000	U.S. 2000
Percentage 18 years & under	37.7%	30.0%	26.0%
Percentage 18-24 years of age	11.0%	9.0%	10.0%
Percentage 55-64 years of age	6.9%	7.0%	9.0%
Percentage 65 years & older	4.5%	6.0%	12.0%
Youth Dependency Ratio	47.6	36.4	32.3
Age Dependency Ratio	6.7	8.2	18.7
Total Dependency Ratio	54.3	44.6	51

Source: (Shepro, Maas et al. 2003)

4.3.3.2. Economy

- Barrow is the economic and administrative center of the North Slope as well as the transportation hub. The economy of the community is heavily dependent upon government services, and has been notably affected by the decrease in the Borough's budget. Nevertheless, Barrow's economy is the most diverse of Borough communities.
- The Borough is the city's primary employer, providing approximately 50 percent of employment in the city. Tribal governments and the private sector, including the Native Village of Barrow, Arctic Slope Regional Corporation (ASRC), Arctic Slope Native

Association (ASNA), Inupiat Community of the Arctic Slope (ICAS), NSB School District and Ukpeagvik Inupiat Corporation (UIC) provide most of the rest of the employment opportunities (Shepro, Maas et al. 2003).

- The unemployment rate in Barrow was approximately 19 percent in 2003 (Table 4.3-3), which was higher than the unemployment rates for the state (8 percent) or nation (6 percent) (Shepro, Maas et al. 2003).
- The North Slope Borough decreased their number of employees from 671 in 1998 to 467 in 2003 (Shepro, Maas et al. 2003).
- Commercial goods and services are available in Barrow from numerous businesses. Sales of arts and crafts and a developing tourism industry also contribute to the local economy (DCED 2004).

Table 4.3-3
Barrow Employment in 1998 and 2003

Employment Status	1998	1998	2003	2003
Permanent Full-time	1,565	71.4%	1461	61.5%
Temporary/Seasonal	287	13.1%	301	12.7%
Part-time	91	4.2%	155	6.6%
Unemployed	251	11.5%	460	19.4%
Totals/Percentages	2,194	100.0%	2,377	100%*

Note: *Total percentage rounded off

Source: (Shepro, Maas et al. 2003)

4.3.3.3. Subsistence

- Barrow has access to marine and terrestrial subsistence resources. In 1992 local residents harvested 61 marine and terrestrial species (Fuller and George 1997).
- "Over 91 percent of the Inupiat households that were interviewed participate in the local subsistence economy, while approximately two-thirds of non-Iñupiat households do not use wild resources obtained from hunting, fishing, or gathering. Iñupiat families depend heavily on subsistence foods (Table 4.3-4). In 2003, 66 percent said that half or more of their diet consisted of local subsistence resources" (Shepro, Maas et al. 2003). The subsistence lifestyle remains a primary cultural choice for Native households.
- The North Slope Borough Economic Profile and Census Report found that the vast majority of unemployed (89 percent) and part-time workers (76 percent) said that half or more of their food came from subsistence hunting and fishing, while fewer full time employees (61 percent) utilized a similar level of subsistence resources (Shepro, Maas et al. 2003). As economies have declined in rural communities in recent years, the reliance on subsistence resources has increased.

Table 4.3-4
Barrow 2003 Percentage of Subsistence from Local Sources by Ethnicity

Ethnicity	None	Very Little	Less than Half	Half	More than Half	Nearly All	All
Inupiat	5%	13%	16%	20%	17%	14%	15%
Caucasian	38%	36%	11%	7%	1%	1%	6%
Other Minorities	43%	23%	12%	8%	7%	4%	2%

Source: (Shepro, Maas et al. 2003)

- There are indications that the use levels of subsistence resources are changing in Barrow. The North Slope Borough census data (Shepro, Maas et al. 2003) indicate that the number of households that reported more than half of their food came from subsistence resources decreased between 1998 and 2003 (from 54 percent to 47 percent), while the proportion of Inupiat households increased.
- The average expenditure for the 492 households who reported subsistence expenditures was $3,787, while the median expenditure was $925. "Fifty-nine percent of the households that were interviewed reported spending less than $2,000 per year on subsistence" (Shepro, Maas et al. 2003). Subsistence expenses include fuel, ammunition, and other supplies needed to participate in subsistence activities.
- Subsistence activities occur year-round, with seasonal emphases (Table 4.3-5). Preparation for bowhead whaling occurs year-round, with spring whaling taking place in April and May, and fall whaling in August through October. Other important subsistence hunts include: caribou, seals, walrus, polar bears, fish, and waterfowl.
- The main focus for Barrow subsistence hunters has been marine mammals, and bowhead whales in particular. Bowhead whale hunting is a pivotal activity for social and community organization; it requires a substantial concentration of effort, time, and money. Other subsistence resources are also vital for subsistence, however they have less influence on the societal structure and function than whaling (Stephen R. Braund and Associates and Institute of Social and Economic Research 1993; Fuller and George 1997).

Spring bowhead harvest activities

- Subsistence harvests – During a three-year study (Stephen R. Braund and Associates and Institute of Social and Economic Research 1993), approximately 55 percent of Barrow's subsistence harvest consisted of marine mammals and land mammals constituted 30 percent. Fewer fish and birds were harvested. A study by the North Slope Borough (Fuller and George 1997) indicated that a harvest of 22 bowhead whales in 1992 accounted for 72.5 percent of the total subsistence harvest for the year. Caribou was ranked second in terms of harvested weight for the year and walrus was ranked third.
- A generalized illustration of the distribution of subsistence uses is displayed in Figure B-5. The associated maps of wildlife habitat and distribution (Figures B-6 through B-11) illustrate areas that are important for subsistence resources. All project proponents should consult with the Borough, communities, and tribes regarding current subsistence activities and locations, due to seasonal and annual variations of resources.

Table 4.3-5
Barrow Seasonal Subsistence Rounds

	Winter					Spring		Summer			Fall	
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Fish												
Birds												
Berries												
Furbearers												
Caribou												
Polar Bears												
Seals												
Walrus												
Bowheads												

	No to very low levels of subsistence activities
	Low to medium levels of subsistence activity
	High levels of subsistence activity

Source: (U.S. Department of the Interior 2004)

Note: See (Fuller and George 1997) for more detailed information on subsistence harvests in Barrow.

4.3.3.4. Income

- The North Slope Borough's 2003 census (Shepro, Maas et al. 2003) did not provide detailed income data for Barrow.
- The United States Census (U.S. Bureau of the Census 2000) reported a per capita income of $22,902 and mean household earnings of $70,660.
- The 2000 Census reported 10.4 percent of Barrow households had an income of less than $15,000. Seventy-three families (7.7 percent) were reported below the federal poverty level, and 6.8 percent of Barrow households received public assistance income (U.S. Bureau of the Census 2000).
- It should be noted that there are typically many discrepancies between Borough and federal socioeconomic data for this area.

4.3.3.5. Housing

- "Sixty-three percent of the households in Barrow live in single-family dwellings. Another 32.4 percent live in multi-family dwellings like apartments or multi-plexes (Shepro, Maas et al. 2003).
- The 2000 Census reported 1620 housing units in Barrow, with 1371 occupied, leaving 249 vacant. However the North Slope Borough statistics indicate a total of 964 living structures (Table 4.3-6) (Shepro, Maas et al. 2003). The housing units are predominantly detached single-family units, although many duplexes, mobile homes and multi-unit facilities exist.
- A Homeless Provider Survey is completed twice annually by Tagiugmiullu Nunamiullu Housing Authority (TNHA) for the Alaska Housing Finance Corporation (AHFC). Approximately 53 people were documented as homeless in Barrow; most were living with relatives or friends.
- Additional housing needs assessments are underway (TNHA).

- The North Slope Borough data (Shepro, Maas et al. 2003) indicate 92 percent of Barrow households have running water, while the remaining 8 percent utilize a water hauling service or other means of water supply.

Table 4.3-6
Barrow - Households by Type of Living Structure

Type	Number	Percent
Mobile home/trailer	28	2.9%
One-family house	608	63.1%
Building for two families	98	10.2%
Building for 3 or 4 families	79	8.2%
Building for 5 or more families	135	14.0%
Other	16	1.7%
Total	964	100%

Source: (Shepro, Maas et al. 2003)

4.3.4 *Land Ownership and Land Use*

4.3.4.1. Land Ownership

- "Barrow's corporate limits take in approximately 21 square miles which include the original 1963 townsite survey, previous and subsequent subdivisions, Townsite Trustee land, lands interim conveyed to the Ukpeagvik Inupiat Corporation (UIC), land withdrawn for the Navy, State airport property, and Native allotment applications" (Alaska Consultants Incorporated 1983c).

Land of the midnight sun
Source: (DCED 2004) (photo #1929, date 1997)

- The original townsite survey was patented to the Townsite Trustee in the Bureau of Land Management in 1965. Many residents chose to hold their land in a restricted status, which retains some of the trust relationship between the federal government and Alaska Natives. Restricted status has both benefits and limitations, including exempting the property from taxation and regulatory codes, as well as limiting the owner's ability to sell or transfer the property. There were just over 200 restricted lots, covering approximately 34 acres in Barrow (Alaska Consultants Incorporated 1983c).

- There are historic land claims issues with the UIC, the old Bureau of Indian Affairs school site, Native allotments, and the disposition of properties utilized by the US Navy (Alaska Consultants Incorporated 1983c).

- Ukpeagvik Inupiat Corporation has the right to select 161,280 acres of federal land in the Barrow area (Alaska Consultants Incorporated 1983c; DCED 2004; BLM 2005). At present, only 4.88 acres are patented to the corporation; interim conveyances are pending for 168,406 acres (BLM 2005). UIC is also entitled to 54,530 acres of land to be reallocated from ASRC; interim conveyances are pending for 51,988 acres. Land

conveyances are still incomplete, but an agreement is in place between the city and the corporation to re-convey 800 acres for community use and expansion (DCED 2004).

- Arctic Slope Regional Corporation owns the subsurface rights to the Ukpeagvik Inupiat Corporation lands, as well as additional lands in the Barrow area.
- The ownership pattern in Barrow is mixed. Public landowners include the federal government, state government, Borough, city, and tribe. Private landowners include ASRC, UIC, other businesses, and private individuals.

4.3.4.2. Land Use

- Barrow is designated as its own zoning district in the North Slope Borough Comprehensive Plan (Wickersham & Flavin Planning Consultants 1982). Regulations and guidelines for land uses allowed within Barrow may be found in the Borough Land Management Regulations (1990), which contains a separate section with Barrow Zoning Regulations. Borough zoning districts are displayed in Figure B-3 and Barrow's zoning districts are displayed in Figures V-5, V-6, and V-7).
- A variety of traditional land uses occur within and adjacent to the community for subsistence and cultural purposes. Important use areas should be identified on a project-specific basis.
- Land uses are divided into four general categories: residential, public and semi-public, commercial, and industrial (Figures V-5, V-6, and V-7). These land use classifications are based on legal zoning districts for the community of Barrow; Barrow is the only community in the Borough to have legal zoning districts within the community.
- ***Residential*** – The community has both single family and multi-family housing units. Residential areas on the north and south sides of Isatkoak Lagoon are interspersed with other land uses, including public and commercial uses.
- ***Public and Semi-public*** – Public and semi-public buildings and facilities are located throughout the community, but are predominantly located on the south side of Isatkoak Lagoon. These buildings and facilities include community recreation facilities, government buildings, hospital, and schools.
- ***Commercial*** – Office buildings, restaurants, stores, and other businesses are dispersed throughout the community, but are also predominantly located on the south side of Isatkoak Lagoon.

AC Store in Barrow; Source: (DCED 2004)

- ***Industrial*** – Industrial land uses typically occur on the perimeter of Barrow. Industrial land uses include the airport, fuel storage tanks, landfill, power plant, telecommunications facilities, and wastewater treatment facilities.

4.3.5 *Community Facilities and Utilities*

4.3.5.1. Facilities

Piuraagvik Swimming Pool; Source: (DCED 2004)

- As the seat of the North Slope Borough (NSB), many regional health and social services are located in Barrow. Some of the public facilities include: a convalescent hospital, a children's receiving home, a pre-maternal home, a health administration building, the Griest Family services, a health center, senior center, and a science building.
- Community facilities include the State Superior Court, youth center, community hall, Ipalook Roller Rink, bingo hall, Inupiat Heritage Center museum and library, Ilisagvik College, and Piuraagvik (Recreation Center).
- There are several research facilities and entities located in Barrow. Ukpeagvik Inupiat Corporation holds title to the former Naval Arctic Research Laboratory, now known as UIC-NARL. The Barrow Global Climate Change Research Facility is currently in its first phase of construction. The facility will support arctic research and education. The structure will include laboratories, offices, and space for lectures. Housing and storage facilities are planned in future construction phases.
- Samuel Simmonds Memorial Hospital is a qualified acute care facility and State-certified medevac service. The NSB Clinic is a qualified emergency care center. NSB Search and Rescue provides critical care air ambulance services. Emergency Services have coastal, helicopter, and seaport access.
- The city is also serviced by two fire stations and a public safety office.
- Infrastructure and critical facilities for Barrow are indicated on Figures V-8, V-9, and V-10.

4.3.5.2. Water

- The Barrow Utilities and Electric Cooperative, Incorporated (BUECI) produces 50 million gallons of water per year (BUCEI 2005).
- Water is derived from a surface water source, a lake enhanced by a dam on the Isatkoak Lagoon. The water is filtered, chlorinated, and stored prior to distribution. Most have piped water, but water hauling is also available through a private carrier (The Water Service). The member owned Barrow Utilities and Electric Cooperative operates the utility (Grinage 2004).
- 92 percent of Barrow residences have water directly connected to their homes. The remaining 8 percent receive water by truck (Shepro, Maas et al. 2003). The typical household water holding tank capacity is 250 gallons. An estimated 90 homes use 30 to 50 gallon barrels (Grinage 2004). The typical frequency of household water holding tank delivery is four to eight days (Grinage 2004).
- Water is treated with micro and nano filtration.

- There are 131 fire hydrants in Barrow. Hydrants are spaced less than 500 feet apart, which satisfies the International Fire Code requirement for structures having a needed fire-flow of less than 1,750 gallons per minute (gpm) of water (Steurmer 2005).
- The maximum water flow in the community is approximately 1,250 gpm community, such as the vicinity of the proposed site for a new hospital, water flow is estimated to be only 1,000 gpm. Water flow demands for a fire in a large structure that does not have a sprinkler system would require a water flow in excess of 2,000 gpm. In a structure that has a sprinkler system, the sprinkler system would demand a flow of 1,000 gpm and the hydrant flow demand would be an additional 1,000 gpm. Due to the low flow rates, an on-site water tank (approximately 200,000 gallons) will need to be constructed at the new hospital site to meet the water flow demands for that single structure during a fire (Steurmer 2005).

4.3.5.3. Sewer

- The NSB Public Works Department (PWD) provides honey bucket and septic tank pumping and hauling service. Information from the wastewater discharge permit indicates that, seasonally, the piped sewage is discharged into the South Salt Lagoon, then into the Middle Lagoon, then into the Arctic Ocean. The Barrow Utilidor System Facility includes the South Salt Lagoon and is used as the primary cell in the wastewater stabilization system. A waste treatment plan is expected to be developed in 2006.
- The community has 190 septic tanks that are routinely pumped, and approximately 90 honey buckets (Grinage 2004).
- BUECI operates the sewage lagoon and piped sewage collection system (Grinage 2004).

4.3.5.4. Solid Waste

- The NSB PWD operates one landfill. It also operates the trash collection via 4 and 6 cubic yard trash bins distributed throughout the community (Grinage 2004).
- The Class II landfill is located on Stephenson Road, 1 mile from the community. The Thermal Oxidation System (TOS) Incinerator is located next to the landfill. Refuse is collected by the NSB. Typical contributions include inert materials, municipal-type, ash, non-regulated asbestos-containing material, sludge, and construction debris. This landfill, scheduled to close in 2006, is being used until the new landfill is completed (Demientieff 2004).
- The new Class II landfill is located approximately 10 miles southeast of the present landfill and TOS facility. Construction of the new landfill is scheduled for completion in 2006. This landfill will have a 1,375,000 cubic yard capacity and is anticipated to have a design life of 50 years (Demientieff 2004).

4.3.5.5. Power

- The utility is operated by the Barrow Utilities and Electric Cooperative, Incorporated (BUECI). Electricity is generated using natural gas turbines and distributed to housing units and businesses via above-ground distribution lines. The power source has a 20,500 kilowatt capacity and approximately 10 cents per kilowatt hour is charged (BUCEI 2005).

- There was a major switch to baseboard/boiler heating systems between 1998 and 2003; the change has mainly been accompanied by a dramatic drop in the number of households dependent on stand-alone heaters and forced-air furnace (63 percent baseboard/boiler system, 19 percent forced-air furnace, and 17 percent stand-alone stove) (Shepro, Maas et al. 2003).
- The community has a 2,400/4,160 Volt Distribution System. The system generated 50,000,000 kWh in fiscal year 2004 (Grinage 2004).
- In 2004, the community experienced 4 partial power outages for a total of 105 minutes and one total outage for 39 minutes. In 2003 the community experienced three partial power outages for a total of 133 minutes and one total outage for 27 minutes (BUCEI 2005).
- Barrow residents do not receive a power cost equalization subsidy (Grinage 2004).

4.3.5.6. Fuel Oil/Petroleum Products

- Eskimo Inc is the owner and operator of a multi-million gallon tank farm and retail gas station that provides retail and commercial petroleum products for Barrow (Peidlow 2005).
- The community has multiple bulk storage, intermediate and day tanks for fuel storage scattered throughout the village (Table 4.3-7). All fuel storage tanks are connected above ground. Fuel is distributed via pipeline and truck depending on whether the recipient is commercial or residential. All tank information is based on a 2004 assessment that the NSB compiled for updating their Spill Prevention Control and Countermeasure (SPCC) plans (Piedlow 2004).

Sunset in Barrow

Table 4.3-7
Barrow Fuel Tanks

Tank Location	Tank Number or Description	Year Installed	Type of Fuel	Tank Capacity (gallons)
COMMERCIAL				
Tank Farm			Diesel	250,000
			Diesel	250,000
			Diesel	250,000
			Diesel	250,000
			Gasoline?	18,000
Barrow High School	Tank # 1	Unknown	Diesel	3,500
Service Garage	Tank # 1	1992	Diesel	500
TSP Building	Tank # 1	1987	Diesel	500
NSB South Gas Field Pad Metering/Regulation Building	Tank # 1	Unknown	Diesel	300
NSB East Gas Field Pad Metering/Regulation Building	Tank # 1	Unknown	Diesel	300
NSB South Gas Field Gas Handling Bldg	Tank # 1	Est. 1985	Diesel	300
Barrow Fire Station	Tank # 1	1979	Diesel	500
NSB Public Safety Bldg			Diesel	500
Therapeutic Day Care Building	Tank # 1	Unknown	Diesel	500
Browerville Fire Station & Office	Tank # 1	1978	Diesel	1,000
Veterinary Clinic	Tank # 1	2000	Diesel	500
NSB Search & Rescue Hangar	Tank # 1	1984	Diesel	2,000
	Tank # 1	1984	Jet B Fuel	2,000
H.O.M.E. Shop	Tank # 1	1983	Diesel	10,000
RESIDENTIAL				
Duplex (Blk 20, Lot 6)	Tank 1	1982	Diesel	300

Note: Most of Barrow area facilities are heated by natural gas

Source: (Piedlow 2004).

4.3.6 *Communication Infrastructure*

Cable television and local dial-up Internet service, public radio on both AM and FM bands, two cellular telephone providers, a local telephone service company, two facilities-based long-distance companies, and several long-distance resellers all combine to make the Barrow community accessible to and from the rest of the world. The Borough's community teleconference network operation center is in Barrow while the NSB public safety divisions (Police, Fire, Wildlife, Search and Rescue) operate an extensive radio-telephone network with links to the other Borough communities. The Borough leases a long-distance network to support distance education and governmental service administration in the villages (Arctic Slope Telephone Association Cooperative 2004).

A Barrow landmark

4.3.7 *Natural Gas*

- Barrow residents rely primarily on natural gas for heating (94 percent in 2003). A small number of people use diesel oil (1.2 percent) or electricity (3.8 percent). Natural gas is also used by the electric utility to generate power (Piedlow 2004).
- The Barrow gas field was transferred from the Department of Interior to the Borough in 1984. The system is currently operated by Ukpik, under contract from the North Slope Borough. There are 42 miles of production lines (Piedlow 2004).

4.3.8 *Community Issues*

Issues, concerns, and comments were gathered during visits to the community in 2004 and 2005 during the Comprehensive Plan revision process. Comments identified at the meeting were grouped by the topics used to organize the Comprehensive Plan. There is a range of concerns identified for the community, and the list should be reviewed and updated annually for planning purposes.

Land Ownership and Status

- Before NPRA moves forward, Native allotments need to be finalized.

Land Use

- The airport is oriented with a crosswind. The gravel excavated for the runway created erosion problems near the gravel source. There needs to be more strength in the land use regulations to require sound development.
- Some new facility locations (e.g. new hospital and science center) will be subject to erosion within the next 50 years.
- Development in wetlands should consider the function and values of wetlands, allowing development in low quality wetlands.

Subsistence

- As populations increase, traditional use of subsistence resources is different/greater than when the Borough was first formed. As the economy declines, the distance to travel for subsistence resources will increase due to increased demand for subsistence resources.
- Areas of subsistence influence are greater than a single point. For example, a cabin supports subsistence uses over a large area.
- It's sometimes necessary to move subsistence cabins, due to erosion or other changing conditions; subsistence areas of influence are not permanently fixed locations.

Hazards

- Development in Barrow is very challenging, and must consider wetlands, eider nesting areas, hazard areas and flood zones.
- Many landfills are over fifty years old and are eroding.

Public Services, Facilities, and Government

- A safe harbor and staging area is needed; offloading equipment, fuel, and supplies from barges is becoming a hazardous task as ocean characteristics change.
- We need to have many entities work together – the Borough, cities, tribes, and corporations.
- It would be nice to have designated trails for snow machines and four-wheelers so people aren't cutting through private property, especially as new construction occurs.
- The State Department of Fish and Game doesn't do enforcement, only biological studies.

4.3.9 *Community Priorities*

The following priorities have been formally identified by the village in previous recommendations, correspondence, the Borough 5-year Community Improvement Program (CIP), or resolutions passed by City Councils. Other community needs have been informally identified in the preceding discussion of issues.

The following projects for Barrow are on the Borough's CIP list pending funding or project completion:

- Hopson Middle School room addition
- Barrow High School corridor expansion
- Floor coverings/upgrades
- Barrow High School additions and renovations, phase II
- Barrow tank farm relocation
- Barrow gas field mapping
- Power plant facilities
- Fuel tank Construction
- Well control systems for Barrow gas fields
- Power line upgrade for Barrow gas fields

The following projects have been identified as community needs and have been requested from the Borough, but these projects are not Borough responsibilities. The community will have to seek other sources of funding.

- Maintenance building for the City of Barrow
- Retractable boat ramps
- Boat harbor jetties
- Indoor ice skating rink/bowling alley
- Cemetery addition
- Heavy equipment operator training program at Ilisagvik College

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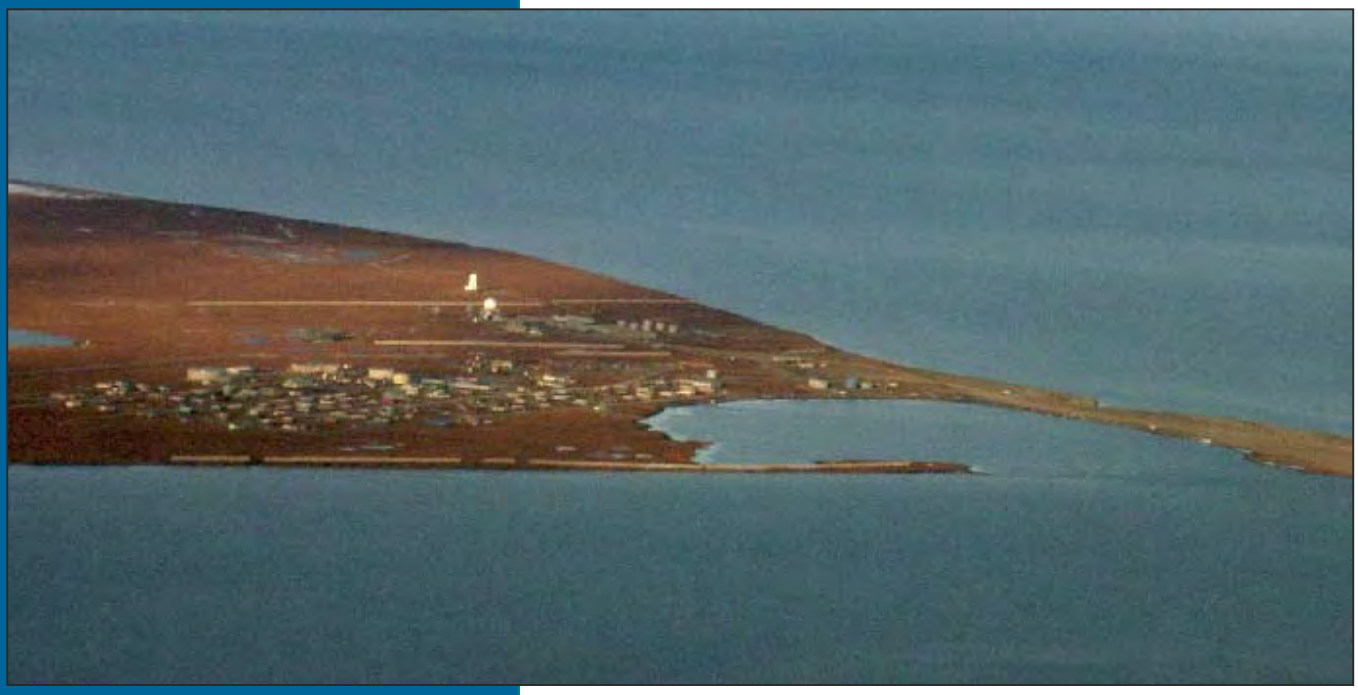
North Slope Borough

Kaktovik Village Profile



Prepared for:
The North Slope Borough

Prepared by:
URS Corporation

October 2005

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Abbreviations

ADEC ..... Alaska Department of Environmental Conservation
ANCSA ..... Alaska Native Claims Settlement Act
ANILCA ..... Alaska National Interest Lands Conservation Act
ANWR ..... Arctic National Wildlife Refuge
ASRC ..... Arctic Slope Regional Corporation
CIP ..... Capital Improvement Program
DCED ..... Department of Commerce, Community, and Economic Development
DEW ..... Distant Early Warning
DMS ..... Department of Municipal Services (now Public Works Department)
kW ..... kilowatt
NPRA ..... National Petroleum Reserve – Alaska
NSB ..... North Slope Borough
PWD ..... Public Works Department
RAB ..... Restoration Advisory Board
SPCC ..... Spill Prevention Control and Countermeasure
TNHA ..... Tagiugmiullu Nunamiullu Housing Authority
USDW ..... Unified School District Warehouse

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North Slope Borough
Kaktovik Village Profile

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4.4 Kaktovik Village Profile

4.4.1 *Summary*

Kaktovik is located on the northern shore of Barter Island, facing Kaktovik Lagoon and the Beaufort Sea. The village is on the northern edge of the region that has become the Arctic National Wildlife Refuge (ANWR), only 90 miles from the Canadian border. It is the eastern-most village in the North Slope Borough (NSB) (Figure B-1).

Barter Island has a long history as an Inupiat meeting and trading place. Its history as a permanent settlement is more recent, when a trading post was established on the island in 1923, due to the abundance of fur resources in the locale. The US Air Force began constructing an airstrip on Barter Island in 1947, and later constructed a Defense Early Warning (DEW) Line Station in the area. The community was moved three times due to military construction and operations.

In recent years, the petroleum and natural gas industry and numerous interest groups have focused attention on Kaktovik and the surrounding area due to the potential for oil and gas development. To date, the refuge (ANWR) remains closed to petroleum exploration and development. Interest in the area remains high, bringing many visitors to the region, including congressional delegations and recreationists.

Kaktovik was incorporated as a fourth-class city in March of 1971, and reclassified as a second-class city in September of the same year. Kaktovik Inupiat Corporation is the local village corporation. The Native Village of Kaktovik is a federally recognized tribe.

Kaktovik's population increased from a 1939 census estimate of 13 people to 286 residents in 2003. The growth pattern has been fairly steady, with some plateaus and minor declines. The community has a young population, with a high ratio of dependents to wage earners. At the same time, the community has high rates of unemployment and underemployment. The community has high levels of subsistence activities and use of subsistence resources.

Kaktovik's infrastructure has had several upgrades in recent years. Water and sewer projects funded by the NSB have been completed. An electric utility is functional in the community, as well as telecommunications. The Harold Kaveolook School is operated by the North Slope Borough School District and serves kindergarten through twelfth grade students.

Sources:(University of Alaska - Arctic Environmental Information and Data Center 1978; Wickersham & Flavin Planning Consultants 1982; Alaska Consultants Incorporated 1983d; Shepro, Maas et al. 2003; DCED 2004)

Coastal view from Kaktovik

4.4.2 *Physical Environment*

- Kaktovik is located on the northern shore of Barter Island, facing Kaktovik Lagoon and the Beaufort Sea. The village is on the northern edge of ANWR, only 90 miles from the Canadian border. It is the eastern-most village in the NSB (Alaska Consultants Incorporated 1983d; DCED 2004).
- The community encompasses approximately 0.8 sq. miles of land and 0.2 sq. miles of water (DCED 2004).
- The community is located on a relatively flat, low-lying area, which is underlain by permafrost. Soil conditions pose challenges and added costs for development (Alaska Consultants Incorporated 1983d).
- The arctic climate is famous for short summers and long winters with blizzard conditions. Temperatures range from -56 to 78 degrees Fahrenheit. Precipitation is typically light, at 5 inches per year, with snowfall averaging 20 inches (DCED 2004).
- The physical characteristics of Kaktovik are available in more detail in prior planning documents (Wickersham & Flavin Planning Consultants 1982; Alaska Consultants Incorporated 1983d).

4.4.2.1. Hazards

- With the community's coastal location, potential natural hazards include beach erosion, flooding, storm tides, ice override, and subsidence due to permafrost melting. However, existing data are not generally available for the location and extent of hazards; potential hazard conditions should be considered further on a project-specific basis.
- The highest flood of memory was a 1964 coastal storm with winds from the west. A high water elevation sign was placed on a utility pole about 18 inches above the ground marking the 1964 flood level.
- There was 4 inches of water measured on the airstrip in August 1972 (US Army Corps of Engineers 2000). The airport still continues to have problems with storm surge and flooding.
- Offloading equipment, fuel, and supplies from barges is becoming a hazardous task as ocean characteristics change.
- Human-caused environmental hazards include potentially contaminated sites. Alaska Department of Environmental Conservation (ADEC) has the following 21 sites in Kaktovik listed in their contaminated sites database (Table 4.4-1) (ADEC 2004).

Eroding bluff

Table 4.4-1
Potentially Contaminated Sites in Kaktovik

Site Name	Location	Status	Reckey
Barter Island - Staging Area	1.5 Miles S. of Kaktovik, Kaktovik, AK 99747	Active	199831X121301
Barter Island DEW - Air Terminal	On the Runway, Kaktovik, AK 99747	Active	200331X121301
Barter Island DEW - Bladder Diesel	IRP site SS20, Kaktovik, AK 99747	Active	198931X102585
Barter Island DEW - Contamin. Ditch	IRP Site SD08, Kaktovik, AK 99747	Active	198931X902579
Barter Island DEW - Garage	East of Powerhouse, Kaktovik, AK 99747	Active	198931X102581
Barter Island DEW - Heated Storage	Barter Island, Kaktovik, AK 99747	Active	198931X102580
Barter Island DEW - JP-4 Spill	adj to city tank farm, Kaktovik, AK 99747	Active	198931X102586
Barter Island DEW - Landfill LF04	Current Landfill, Kaktovik, AK 99747	Active	198931X902577
Barter Island DEW - Old Dump Site	LF019 by snow fence, Kaktovik, AK 99747	Active	198931X102578
Barter Island DEW - Old Landfill	LF001, Kaktovik, AK 99747	Active	198931X102587
Barter Island DEW - POL Catchment	LF003 catchment for, Kaktovik, AK 99747	Active	198931X102576
Barter Island DEW - POL Tanks	SS017 on main part, Kaktovik, AK 99747	Active	198931X102584
Barter Island DEW - Runway Dump	LF012 at the end of the, Kaktovik, AK 99747	Active	198931X102588
Barter Island DEW - Weather Stat	Barter Island, Kaktovik, AK 99747	Active	198931X102582
Barter Island DEW - White Alice	SS016, Kaktovik, AK 99747	Active	198931X902583
Kaktovik Kaveolook School	Barter Island, Kaktovik, AK 99747	Inactive	1993310100401
Kaktovik KIC Pad	North of School, Kaktovik, AK 99747	Inactive	1994310906703
Kaktovik Power Plant Tank Farm	Near Village School, Kaktovik, AK 99747	Inactive	1994310106701
Kaktovik Tank Farm Terminal	North of Town, Kaktovik, AK 99747	Inactive	1994310106702
South Barter Island Barrel Dump	South Barter Island, Kaktovik, AK 99747	Closed	198931X102515
Waldo Arms Fuel	Kaktovik Airport, Kaktovik, AK 99747	Inactive	1991360117201

Source: (ADEC 2004)

4.4.3 *Human Environment*

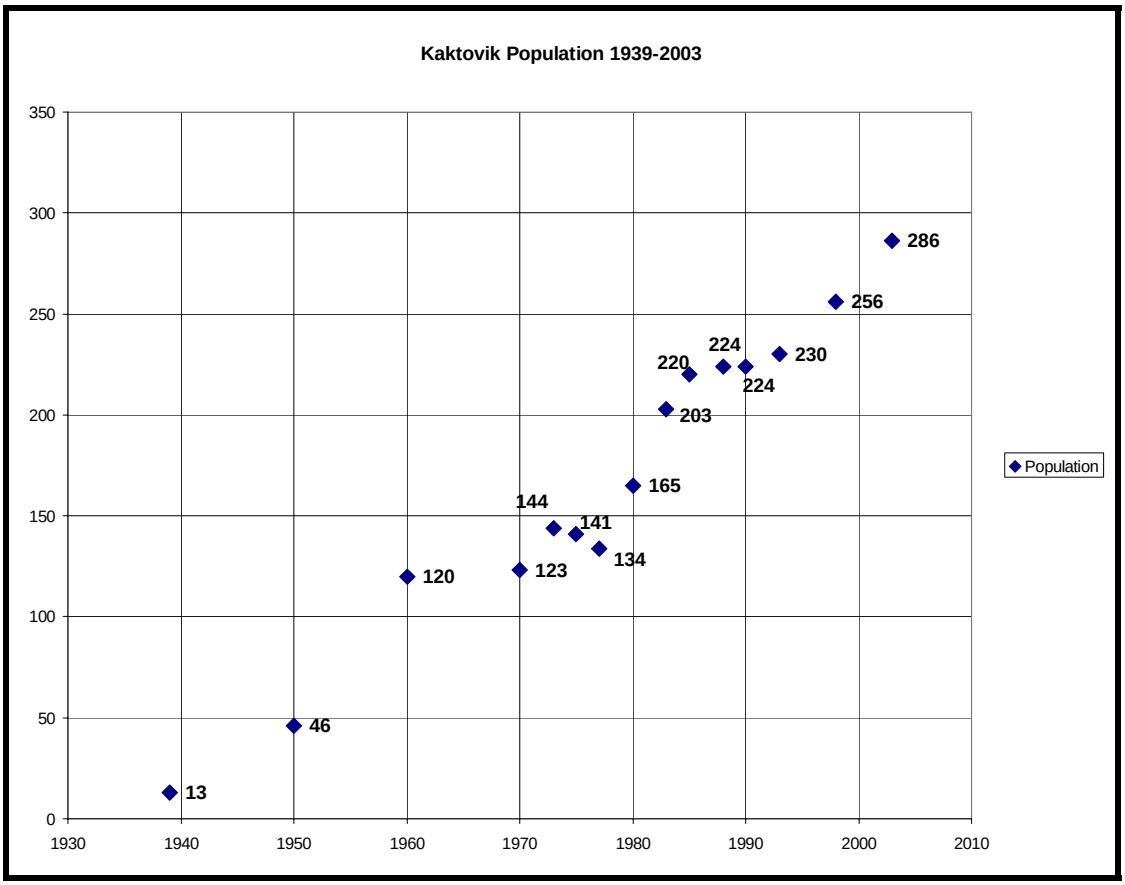
- Kaktovik was incorporated as a fourth-class city in March of 1971, and reclassified as a second-class city in September of the same year (Alaska Consultants Incorporated 1983d).
- Barter Island has a long history as an Inupiat meeting and trading place (Alaska Consultants Incorporated 1983d; DCED 2004). Its history as a permanent settlement is more recent, when a trading post was established on the island in 1923, due to the abundance of fur resources in the locale (Alaska Consultants Incorporated 1983d).
- The US Air Force began constructing an airstrip on Barter Island in 1947, and later constructed a DEW Line Station in the area. The community was moved three times due to military construction and operations (Alaska Consultants Incorporated 1983d).
- Kaktovik Inupiat Corporation is the local Alaskan Native Claims Settlement Act (ANCSA) village corporation.

Defense Early Warning Line Station facilities on Barter Island

4.4.3.1. Population

- Kaktovik's population increased from a 1939 census estimate of 13 people to 286 residents in 2003 (Shepro, Maas et al. 2003). Refer to Figure 4.4-1
- Kaktovik has a young population; average ages in Kaktovik are lower than in the state or nation (Table 4.4-2). There is a high ratio of dependents to wage earners (Shepro, Maas et al. 2003).
- The median age in Kaktovik has declined from the 1998 census estimate of 30 to the 2003 census estimate of 28 (Shepro, Maas et al. 2003). Refer to Table 4.4-3.

Figure 4.4-1
Kaktovik Population 1939 - 2003



Source: (Shepro, Maas et al. 2003)

Table 4.4-2
Age Distributions in Kaktovik, Alaska and the USA

Criteria	Kaktovik 2003	Alaska 2000	U.S. 2000
% 18 yrs. & under	41%	30%	26%
% 18-24 years of age	5%	9%	10%
% 55-64 years of age	10.3%	7%	9%
% 65 years and older.	6.6%	6%	12%
% 18-64 years of age	51.3%	64%	62%

Source: (Shepro, Maas et al. 2003)

Table 4.4-3
Median Age of Population by Gender and Ethnicity

Cohort Group	Median Age 1998	Median Age 2003
All residents - male	30	29.0
All residents - female	30.5	28.0
Inupiat male	-	23.5
Inupiat female	-	27.0
All Residents	30	28.0

Source: (Shepro, Maas et al. 2003)

4.4.3.2. Economy

- The NSB, North Slope Borough School District, and the Kaktovik Inupiat Corporation are the primary employers in the community (Shepro, Maas et al. 2003). Refer to Table 4.4-4.
- There is some disparity in the unemployment trends in Kaktovik between the 1998 and 2003 census (Shepro, Maas et al. 2003). However, the unemployment rate in Kaktovik is estimated at 16 percent, which is higher than the rate for the state (8 percent) or nation (6 percent) in a similar timeframe (Shepro, Maas et al. 2003). Refer to Table 4.4-5.
- The Kaktovik Inupiat Corporation Store provides local commercial goods, including groceries, general merchandise, propane, diesel fuel, and gasoline.
- Craft sales are also part of Kaktovik's economy. Approximately 19 percent of households participated in craft sales in 2003, but the majority of artisans made less than $500 per year (Shepro, Maas et al. 2003).

Table 4.4-4
2003 Individual File – Household Member Employer by Ethnicity and Gender

Employer	Ethnicity - Inupiat & Other			
	Inupiat		"Non-Inupiat"	
	Male	Female	Male	Female
Federal Government	0	0	1	0
State Government	0	0	0	0
City Government	1	1	1	0
NSB Government	16	10	1	0
NSB School District	3	5	6	7
NSB CIP	0	0	0	0
Oil Industry	1	0	0	0
Private Construction firm	5	0	0	0
ASRC or Subsidiary	3	2	0	0
Village Corp./Subsidiary	10	7	0	1
Finance/Insurance	0	0	0	0
Transportation	0	0	0	0
Communications	0	0	0	0
Trade	0	0	0	0
Service	0	0	0	0
Ilisagvik	0	0	0	0
Other	0	1	1	1
Total	39	26	10	9

Source: (Shepro, Maas et al. 2003)

Table 4.4-5
2003 – All Individuals Reporting Labor Status

Employment Status	Number	Percent
Permanent full-time	63	36.8%
Temporary/Seasonal	10	5.8%
Part-Time	9	5.3%
Unemployed	16	9.4%
Retired	12	7.0%
Still in school	61	35.7%

Source: (Shepro, Maas et al. 2003)

4.4.3.3. Subsistence

- The people of Kaktovik have a way of life that is heavily dependent on the subsistence harvest of marine and terrestrial mammals (Brower, Olemaun et al. 2000).
- Approximately 93 percent of the Inupiat households in Kaktovik participate in the local subsistence economy, while approximately 80 percent of other residents use wild resources obtained from hunting, fishing, or gathering. In 2003, 68 percent of all Kaktovik residents reported that half or more of their diet consisted of local subsistence resources (Shepro, Maas et al. 2003). Refer to Table 4.4-6. The subsistence lifestyle remains a primary cultural choice for Native households.
- Between the 1998 and 2003 surveys, there have been some changes in household consumption of subsistence resources (Shepro, Maas et al. 2003). The percentage of households who used very little local foods increased, while the number of households that identified the "more than half" category decreased. The percentage of households that were heavily reliant on subsistence resources (those who consumed all or nearly all of their food from local resources) increased from 35 percent in 1998 to approximately 41 percent in 2003. Refer to Figure 4.4-2.
- The average expenditure for the 49 households who reported subsistence expenditures was $4,788; the community spent approximately 10 percent of its total income on subsistence activities (Shepro, Maas et al. 2003). This includes expenses such as fuel, ammunition, and other supplies needed to participate in subsistence activities.
- Subsistence activities occur year-round, with seasonal emphases. Residents are able to harvest seals and ptarmigan year-round, while whales, geese, and bears are available at certain times of the year. Residents harvest Dall sheep and caribou most of the year. Whaling is usually limited to the fall, as ice conditions are difficult during the spring season (University of Alaska - Arctic Environmental Information and Data Center 1978; Fuller and George 1997; Brower, Olemaun et al. 2000).
- Subsistence Harvests – Data from the Alaska Department of Fish and Game (Alaska Department of Fish and Game 2004b) and the NSB (Fuller and George 1997; Brower, Olemaun et al. 2000) indicate that Kaktovik residents primarily utilize marine mammals, in terms of pounds per person harvested (Table 4.4-7). Land mammals and fish were also important harvests. Many resources, such as birds, eggs, and vegetation, are utilized by the majority of the community, but had lower harvest levels in terms of pounds per person.

Bowhead skull and gulls

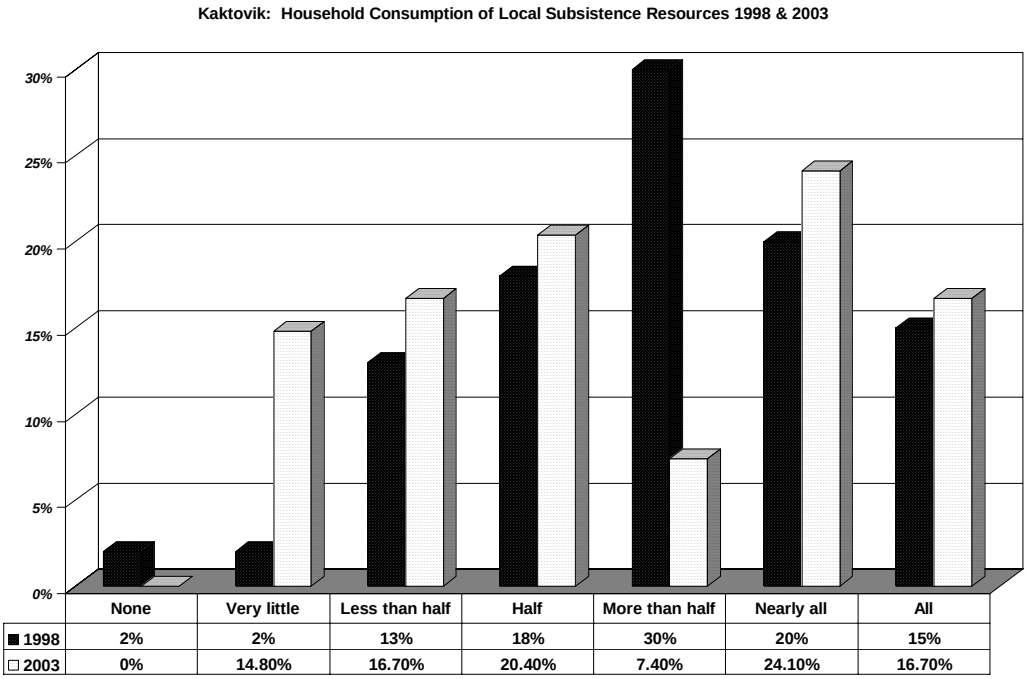
- A generalized illustration of the distribution of subsistence uses is displayed in Figure B-5. The associated maps of wildlife habitat and distribution (Figures B-6 through B-11) illustrate areas that are important for subsistence resources. All project proponents should consult with the Borough, communities, and tribes regarding current subsistence activities and locations, due to seasonal and annual variations of the resources.

Table 4.4-6
Kaktovik's Usage of Local Subsistence Resources in 1998 and 2003

Amount	Number 2003	Percentage 2003	Number 1998	Percentage 1998
None	0	0%	1	2%
Very little	8	15%	1	2%
Less than half	9	17%	8	13%
Half	11	20%	11	18%
More than half	4	7%	18	30%
Nearly all	13	24%	12	20%
All	9	17%	9	15%
Total	54	100%	60	100%

Source: (Shepro, Maas et al. 2003)

Figure 4.4-2
Household Consumption of Local Subsistence Resources



Source: (Shepro, Maas et al. 2003)

Table 4.4-7
Kaktovik Subsistence Harvest Data

Kaktovik Subsistence Harvest (by Weight), ADF&G 1992	
Bowhead Whale	64%
Fish	13%
Caribou	11%
Birds	1%
Other	11%
Kaktovik Mean Per Capita Subsistence Harvest (Lbs per Person), ADF&G 1992	
Salmon	1
Fish	118
Land Mammals	150
Marine Mammals	599
Birds and Eggs	17
Shellfish	0
Plants	1
All Resources	886
Kaktovik Subsistence Harvest Summary, ADF&G 1992	
Estimated Pounds Harvested	170,940.00
Mean Household Pounds Harvested	2713.33
Per Capita Pounds Harvested	885.60

Source: (Alaska Department of Fish and Game 2004b)

Note: See (Fuller and George 1997; Brower, Olemaun et al. 2000) for more detailed information on substance harvest data for Kaktovik.

4.4.3.4. Income

- Income data for Kaktovik is limited; there are high non-response rates for income (Shepro, Maas et al. 2003). However, the 2003 census estimated the average household income at $59,342 and the per capita income at $17,899. The report indicates that the average household income estimate may be slightly high and the per capita income may be slightly low.
- There were differences in incomes between ethnic groups; non-Inupiat households are generally drawn to the community for their skills and education in return for high wages (Shepro, Maas et al. 2003).
- There were 29 out of 77 households that reported incomes below the poverty level (Shepro, Maas et al. 2003).
- Approximately 19 percent of households participated in craft sales in 2003, but the majority of artisans made less than $500 per year (Shepro, Maas et al. 2003).

4.4.3.5. Housing

- In 2004, the Department of Community and Economic Development (DCED) reported 95 housing units in the community, with 89 occupied, leaving 6 vacant. The housing units are predominantly detached single-family units, although a few multi-unit facilities exist. The NSB Census data (Shepro, Maas et al. 2003) reported 59 households and associated housing units (Table 4.4-8).
- Eighty-five percent of the households in Kaktovik live in single-family dwellings. Another 10 percent live in multi-family dwellings like apartments or multi-plexes (Shepro, Maas et al. 2003).

- Over 90 percent of the households have flush toilets (Shepro, Maas et al. 2003).
- Tagiugmiullu Nunamiullu Housing Authority (TNHA) estimated a need for an additional 30 housing units to be constructed in the community between 1999 and 2009 (David Nairne & Associates 1999b).
- The lack of availability of new residential lots hinders new housing construction.

Table 4.4-8
Kaktovik Households by Type of Living Structure

Type	Number	Percent
Mobile home/trailer	1	1.7%
One-family house	57	96.6%
Building for 3 or 4 families	1	1.7%
Total	59	100%

Source: (Shepro, Maas et al. 2003)

View of Kaktovik

4.4.4 *Land Ownership and Use*

4.4.4.1. Land Ownership

- "Kaktovik's corporate limits take in approximately one square mile which includes the original townsite survey done in 1964, the Kaktovik Subdivision which was added officially in 1974, plus an unsubdivided area west and south of the town's developed area which encompasses Fresh Water Lake. Ownership of lands outside the townsite area and its addition is vested in the U.S. Air Force (Barter Island DEW Line Station) and the Kaktovik Inupiat Corporation" (Alaska Consultants Incorporated 1983d).
- The original townsite survey was patented to the Townsite Trustee in the Bureau of Land Management in 1967. Many residents chose to hold their land in a restricted status, which retains some of the trust relationship between the federal government and Alaska Natives. Restricted status has both benefits and limitations, including exempting the property from taxation and regulatory codes, as well as limiting the owner's ability to sell

or transfer the property. There were 26 of these restricted lots, covering approximately 6 acres of land in Kaktovik (Alaska Consultants Incorporated 1983d).

- The Air Force has been a major landowner immediately adjacent to the community. Although the military activities have been reduced in the area, some lands remain in federal ownership (Alaska Consultants Incorporated 1983d).
- Kaktovik Inupiat Corporation owns lands to the south and western portions of the city limits. KIC has the right to select 92,160 acres of federal land in the Kaktovik area. Land status records indicate that 62,193 acres have been patented to the corporation; 22,982 acres have interim conveyances pending (BLM 2005). The corporation and the community developed an agreement for the Alaska National Interest Lands Conservation Act (ANILCA) 14(c)(3) land selections from the corporation to the community. The selections are complete, and map boundaries were submitted to the Bureau of Land Management in August 2004 (DCED 2004).
- Arctic Slope Regional Corporation owns the subsurface rights to the Kaktovik Inupiat Corporation lands.
- In Kaktovik, as in other North Slope villages, accurate information regarding the status of title for individual lots is not always available (Alaska Consultants Incorporated 1983d). This can cause problems in land conveyances.

4.4.4.2. Land Use

- Kaktovik is zoned a Village District in the NSB Comprehensive Plan (Wickersham & Flavin Planning Consultants 1982). Regulations and guidelines for land uses allowed within Village Districts may be found in the Borough Land Management Regulations (1990). Borough zoning districts are displayed in Figure B-3.

Aerial view of Barter Island and Kaktovik

- A variety of traditional land uses occur within and adjacent to the community for subsistence and cultural purposes. Important use areas should be identified on a project-specific basis.
- Land uses are divided into four general categories: residential, public and semi-public, commercial, and industrial (Figure V-12). These land use classifications are based on observations and community input; there are no legal zoning districts within the community at this time.

- ***Residential*** – The community has both single family and multi-family housing units. The residential area is primarily between Barter Avenue and Kaktovik Lagoon, as well as on the south end of the community. The new subdivision to the southeast of town remains largely undeveloped, due to lack of road access.
- ***Public and Semi-public*** – Public and semi-public buildings and facilities are located throughout the community, but are near the community center. These buildings and facilities include the church, community hall, fire station, government buildings, health clinic, police station, and school.
- ***Commercial*** – Office buildings, stores, and other businesses are dispersed throughout the community, but are generally located in the central section of town.
- ***Industrial*** – Industrial land uses typically occur on the perimeter of the community. Industrial land uses include the airport, fuel storage tanks, landfill, power plant, telecommunications facilities, and wastewater treatment facilities.

4.4.5 *Community Facilities and Utilities*

4.4.5.1. Facilities

- A health clinic, staffed by community health aides, is open each day and is available 24 hours a day for emergencies.
- Community facilities include the community hall, senior services, and police station.
- The fire station and its fire engine were destroyed by fire in 2004. Barrow loaned the community a fire engine until their replacement trucks arrive in November 2005. A new fire station should be completed by 2006.
- Critical facilities in Kaktovik are identified on Figures V-13 and V-14.

North Slope Borough Police Station in Kaktovik

4.4.5.2. Water

- Construction of a piped water system in the community began in 2003. It is operational, with commercial facilities on-line. The Borough reported 1,008,000 gallons of piped water service to commercial facilities and 775,900 gallons of water delivered to residential facilities in 2003 (Grinage 2004).
- In 2003, 90 percent of households had running water piped to their house (Shepro, Maas et al. 2003).
- The NSB Public Works Department (PWD) operates both piped and haul water and sewer systems. The typical household water holding tank capacity is 250 gallons and the frequency of household water delivery is 450 to750 gallons per month for homes with holding tanks (Grinage 2004).

- Water is derived from a surface water source, filtered, chlorinated and stored in a water tank prior to distribution. Water is delivered from the central water point via truck to homes with water holding tanks. Almost all homes have running water in the kitchen.
- Water is treated with micro and nano filtration.
- There are 22 fire hydrants. Hydrants are spaced 410 feet apart, which meets the maximum allowable distance in the International Fire Code (Steurmer 2005).
- The maximum water flow in the community is approximately 1,250 gallons per minute, which would not meet the needs of large fire situations. For example, a fire in a large structure that does not have a sprinkler system, such as a store or equipment shop would require a water flow in excess of 2,000 gallons per minute. In structures that have a sprinkler system, such as the school, the sprinkler system would demand a flow of 1,000 gallons per minute and the hydrant flow demand would be an additional 1,000 gallons per minute (Steurmer 2005).

4.4.5.3. Sewer

- Construction of a piped sewer system began Kaktovik in 2003. The system is operational; approximately 90 percent of households have flush toilets, and the remaining 10 percent are dependent on honey buckets (Shepro, Maas et al. 2003). The NSB provides limited septic tank pumping and honey bucket service. Information obtained from the Wastewater Discharge Permit dated January 2002 indicates the wastewater treatment plant discharges disinfected, filtered domestic wastewater into Kaktovik lagoon through a 4-inch diameter outfall line. Additionally, lesser quantities of non-domestic wastewater are disposed of similarly.

4.4.5.4. Solid Waste

- Refuse is collected by and disposed of at the Borough operated landfill. The landfill is located adjacent to the community. The Class III landfill has a current permit, and typical contributions are unspecified. This landfill was built in 2001 and is anticipated to have a design life of 25 years. Approximately 876 cubic yards per year of waste are expected. The components of the new facility include a salvage area, burn basket, sewage lagoon, and empty drum storage area (Demientieff 2004).

4.4.5.5. Power

- Approximately 98 percent of households depend on diesel fuel for heating, while one household relies on wood. There was a major switch to baseboard/boiler heating systems between 1998 and 2003. The change has mainly been accomplished by a dramatic drop in the number of households dependent on stand-alone heaters and forced-air furnace (42.4 percent baseboard/boiler system, 25.4 percent forced-air furnace, 22 percent stand-alone stove, 8.5 percent stand-alone heater, and 1.7 percent portable heater) (Shepro, Maas et al. 2003).
- The NSB Power and Light System operates the local electric utility. Electricity is generated using diesel fuel and transmitted to housing via above-ground transmission lines (Grinage 2004).
- The rate schedule for use between one and 600 kilowatts (kW) is 15 cents per kW hour; use over 600 kW is 35 cents per kW hour (Grinage 2004).

- The community has a 2,400/4,160 Volt Distribution System with a 2,670 kW generation capacity. The system generated 4,179,000 kW hours in fiscal year 2004 (Grinage 2004).
- Kaktovik residents receive a power cost equalization subsidy (Grinage 2004).

4.4.5.6. Fuel Oil/Petroleum Products

- Kaktovik Inupiat Corporation is the operations and maintenance contractor for NSB PWD.
- The community has multiple bulk storage, intermediate and day tanks for fuel storage scattered throughout the village (Table 4.4-9). All fuel storage tanks are connected above ground. Fuel is distributed via pipeline and truck depending on whether the recipient is commercial or residential. All tank information is based on a 2004 assessment that the NSB compiled for updating their Spill Prevention Control and Countermeasure (SPCC) plans (Piedlow 2004).

Qargi Community Center

Table 4.4-9
Kaktovik Fuel Tanks

Tank Location	Tank Description or Number	Year Installed	Type of Fuel	Tank Capacity (gallons)
COMMERCIAL				
Tank Farm & Gas Station	KAK- 1 (or KAK-D) (Vertical)	1988, rebuilt 1996	Diesel	300,000
	KAK- 41 (or KAK-A) (Vertical)	1994	Diesel	250,000
	KAK-42 (or KAK-B) (Vertical)	1994	Diesel	250,000
	KAK-43 (or KAK-C) (Vertical)	1997	Gasoline	150,000
	Dispensing		Diesel	10,000
	Dispensing		Gasoline	10,000
Kaktovik School	Tank # 1 - Gym	1978	Diesel	2,000
	Tank #2 - Library	1978	Diesel	1200
	Tank # 3 - Garage	1981	Diesel	250
Old Generator/ Washeteria Bldg.	Tank # 1	1978	Diesel	250?
Storage Building	Tank # 1	1979	Diesel	600
Public Safety Office Bldg	Tank # 1	1979	Diesel	250
Telephone Bldg	Tank # 1	1983	Diesel	564
Fire Station	Tank #1	1983	Diesel	7,500
Health Clinic	Tank #1	1981	Diesel	9,750
	Tank # 2	1981	Diesel	250
USDW/Vehicle Maintenance Shop	Tank # 1	1987	Diesel	5,000
	Tank # 2	1987	Diesel	5,000
	Tank # 3 (Day tank)	1987	Diesel	250
Heavy Equipment Shop	Tank # 1	1990	Diesel	10,000
New Generator Bldg	Tank #1	2000	Diesel	10,000
	Tank #2	2000	Diesel	200
	Tank # 3 (Day tank)	2000	Diesel	195
RESIDENTIAL				
Teacher Housing #321	Tank # 1	1994	Diesel	250
Teacher Housing #323	Tank # 1	1994	Diesel	250
Teacher Housing #325	Tank # 1	1994	Diesel	250
Teacher Housing #327	Tank # 1	1994	Diesel	250
Single Family Residence (Blk 9, Lot 6)	Tank # 1	1990	Diesel	250
Single Family Residence (Blk 1, Lot 8A)	Tank # 1	1990	Diesel	250
Single Family Residence (Blk 1, Lot 9B)	Tank # 1	Unknown	Diesel	250
Single Family Residence (Blk 1, Lot 9C)	Tank # 1	1990	Diesel	250
Single Family Residence (Blk 1, Lot 9D)	Tank # 1	1990	Diesel	250
Single Family Residence (Blk 1, Lot 9E)	Tank # 1	Unknown	Diesel	250
Single Family Residence (Blk 10, Lot 4)	Tank # 1	1990	Diesel	250
Single Family Residence (Blk 10, Lot 5)	Tank # 1	Unknown	Diesel	250
Duplex - Residence (Blk 10, Lot 6)	Tank # 1	2000	Diesel	250
Single Family Residence (Blk 12, Lot 1)	Tank # 1	1995	Diesel	250
Single Family Residence (Blk 12, Lot 2)	Tank # 1	Unknown	Diesel	250
Single Family Residence (Bldg 12, Lot 3)	Tank # 1	Unknown	Diesel	250
Single Family Residence (Bldg 12, Lot 5)	Tank # 1	Unknown	Diesel	250
Single Family Residence (Bldg 12, Lot 6)	Tank # 1	1995	Diesel	250
Single Family Residence (Blk 13, Lot 5)	Tank # 1	2000	Diesel	250
Single Family Residence (Blk 13, Lot 4)	Tank # 1	2000	Diesel	250
Single Family Residence (Blk 13, Lot 3)	Tank # 1	2000	Diesel	250

Source: (Piedlow 2004)

4.4.6 *Communication Infrastructure*

The telecommunications facilities serving Kaktovik include a fully digital local exchange telephone service, local dial-up Internet, cellular telephone, cable television, public radio broadcast, and the community access public teleconferencing center. In addition, many people have CB or marine VHF radios in their homes. Interconnection with the regional and global telecommunications network is via satellite circuits, which currently present a limitation to the residents needing access to higher bandwidth services. The NSB, in coordination with the NSB School District, leases private circuits and maintains a "long-distance" network in order to provide distance education, tele-health and support for governmental service administration in the community (Arctic Slope Telephone Association Cooperative 2004).

4.4.7 *Natural Gas*

No energy conversions from diesel to natural gas are planned at this time. Past gas exploration showed insufficient quantities to make gas a viable option, at current development costs for gas production (Piedlow 2004).

View of the Brooks Range from the flight to Kaktovik

4.4.8 *Community Issues*

Issues, concerns, and comments were gathered during visits to the community in 2004 and 2005 for the Comprehensive Plan revision process. Comments identified at the meeting were grouped by the topics used to organize Comprehensive Plan. There is a range of concerns identified for the community, and the list should be reviewed and updated annually for planning purposes.

Land Ownership

- There is still conflict over Native allotments. Elders have to show proof for their allotments; the federal government should have to show proof that they own the land.

Land Use

- Residents would like to be notified when a permit is issued – prior to the public hearing.
- Concerns were raised about who is notified when a permit application is made.
- Tourists are using land for recreation without the residents' knowledge. They use Native land but do not pay the entry fee to the tribe. The tribe is unable to keep track of the tourists who enter their land because they do not know when people are going to be in the area.
- The US Fish and Wildlife Service needs to increase communication with the community.
- The community needs its own zoning ordinances.

Fish and Wildlife/Subsistence

- Pipeline infrastructure fragments the habitat that caribou relies on; this is a negative impact to caribou.
- Pipeline infrastructure also affects access to roads.
- Sport hunters and tourism are an issue to the community. Residents have no control over the hunters. We need a policy that regulates hikers, floaters, and hunters that is coordinated with the community. Residents would like to know two to three months ahead of time how many people are going to be recreating (hunting, hiking). The US Fish and Wildlife Service should know what Kaktovik expects from the visitors. There needs to be better coordination with the community, tribe, and Native Corporation.
- In 2003, hunters ruined a resident's subsistence camp and nothing was done about it.
- Local residents could be hired to monitor the area to keep track of summer tourist activities.
- The guide services have apprentice programs, but the local residents are not being asked to participate in the program.
- The US Fish and Wildlife Service should relocate one of their ANWR offices in Kaktovik so better coordination can occur with the village. The residents would better know who is coming in and out of the area.
- ANWR managers visit the community, but the residents feel they are not heard.

- There shouldn't be restrictions on subsistence access. Local residents have to follow Fish and Wildlife Service trails. There are more restrictions on local residents than for tourists and guides.

Hazards

- Permafrost melting has caused the ground to collapse in some areas.
- Need to identify areas where permafrost melting could occur and understand the consequences of this.

Socioeconomic Factors

- Increase local employment opportunities.
- Provide social programs to help residents to pass drug tests – increase local support.
- Provide drug education for youth to keep youth off drugs and increase employment opportunities.
- Focus on job recruiting in the high school to encourage drug-free lifestyles.
- Both sides (applicants and employers) need better follow-up on job applications.
- A mental health professional should be available in every village.
- Elders need improved care – 24 hour assisted living.
- The village needs training for elder care.
- The community needs a center for elders.
- Safe rooms are needed for residents who need to get away from dangerous/violent situations.
- A day care center is needed.
- Another airline is needed to drive down airfare costs.
- Arctic Slope Regional Corporation (ASRC) made the merger possible between Cape Smythe and Frontier. ASRC needs to be a partner in the Comprehensive Plan and assist with local economies.
- Bypass mail is being bumped due to tourists and their luggage.
- A full-size gym is needed for students and residents to release frustrations through exercise – including an indoor track.
- Heartbeat Alaska could potentially provide funding for a youth center.
- The community would prefer to partner with Tanana Chiefs Conference for health care.

Human and Cultural Resources

- Kaktovik does not get National Petroleum Reserve–Alaska (NPRA) impact funds.
- The community needs better discussions with ANWR officers.

- Kaktovik only receives part of the money that goes from the state to Arctic Power. Arctic Power is trying to develop they wildlife refuge and the community would like to receive a greater share of the funds.
- Adults need to teach cultural values in the home.
- Kids need to be paired with elders instead of peers to be taught the traditional ways.
- School should do a better job of incorporating and teaching cultural values.
- Parents need to be more involved with their children to teach them cultural values, engaging them in traditional activities.
- Revenue from Fish and Wildlife permits should be shared with the community in order to provide public facilities.
- The military development in Kaktovik had adverse impacts that should be mitigated.
- The military should mitigate past damage to archaeological sites and help with restoration, repatriation, and/or compensation.
- The military impact is still felt today – they bulldozed archaeological sites and left an old landfill that is hazardous to the community.
- Suggested to meet with the Restoration Advisory Board (RAB) regarding restoration opportunities for the military site.
- Need to establish an arts and crafts cooperative and sell crafts for what they are worth.

Public Services, Facilities, and Government

- How can some of the public services be transferred to the state?
- There is need for a new airport, but there is not agreement on the location.
- The volunteer search and rescue is not well organized. We need a place to meet and more funds/assistance from the state.
- The school has closed after school gym time and the kids are only going to get into more trouble. The loss of the use of school facilities is a big impact to the community.
- The community needs a youth/teen center.
- The community needs another public safety officer.

4.4.9 *Community Priorities*

The following priorities have been formally identified by the village in previous recommendations, correspondence, the Borough 5-year Capital Improvement Program (CIP), or resolutions passed by city councils. Other community needs have been informally identified in the preceding discussion of issues.

- **Dust control –** This is a life, health, and safety issue and is a number one priority for the city.
- **Need for gravel –** The clinic parking lot needs to be expanded. Can the gravel owned by the NSB be used for this purpose?

- **Need structural report –** There was smoke damage to the Heavy Duty Warm Storage, the sprinklers were not working, we will need a structural report on the Department of Municipal Services (DMS) floor.
- **Fire response –** The Fire Department Engine is not working due to the storm; the engine and the tanker both froze. Both vehicles are parked and not working at this time. Parts have been ordered, but they are not here to date.

The following projects for Kaktovik are on the Borough's CIP list pending funding or project completion:

- Classroom and restroom addition for the school
- New subdivision roads
- Airport runway flood improvements
- Tank farm remediation
- Fuel tank construction
- Gravel parking pad for the clinic
- Repair DMS floor, sprinklers, and smoke damage

The following projects have been identified as community needs and have been requested from the Borough, but these projects are not Borough responsibilities. The community will have to seek other sources of funding.

- Community center addition
- Playground and park
- Small boat harbor

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North Slope Borough

Nuiqsut Village Profile

Prepared for:
The North Slope Borough

Prepared by:
URS Corporation

October 2005

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Abbreviations

ADEC ..... Alaska Department of Environmental Conservation
ANCSA.....Alaska Native Claims Settlement Act
ASRC .....Arctic Slope Regional Corporation
BLM..... Bureau of Land Management
CIP .....Capital Improvement Program
EIS .....Environmental Impact Statement
HDPE ..... high-density polyethylene
kW.....kilowatt
NPRA ..... National Petroleum Reserve – Alaska
NSB..... North Slope Borough
PWD..... Public Works Department
SPCC .....Spill Prevention Control and Countermeasure
USDW ..... Unified School District Warehouse
VSM ..... Vertical Support Member

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North Slope Borough
Nuiqsut Village Profile

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4.5 Nuiqsut Village Profile

4.5.1 *Summary*

On April 13, 1973, members of 27 families began a 150-mile journey from Barrow to the Colville River delta, where they would establish a community in the homeland of their ancestors. They lived in tents for 18 months while they selected the village site location, laid out the community, and constructed homes. A festival to celebrate the dedication of the village was held in August 1974. The community was incorporated as a second-class city in 1975. Kuukpik Corporation is the local village corporation. The Native Village of Nuiqsut is a federally recognized tribe.

Soon after settling, the community completed *Nuiqsut Paisanich*, or *Nuiqsut Heritage, a Cultural Plan* (Brown 1979). This plan documented the cultural landscape, how the community practices its heritage way of life, key issues facing the community and important subsistence areas. The plan remains very important to the community, and should be used as a guide for development in the vicinity of Nuiqsut. It is a community priority to update the plan.

Nuiqsut is located approximately 30 miles from the Beaufort Sea on the Nechelik channel of the Colville River delta (Figure B-1). This area has been used for centuries for subsistence activities, including hunting, fishing, gathering, and traditional celebrations. The growth and development of the community has been influenced by oil and gas development. Nuiqsut is located in the northeast section of the region that has become the National Petroleum Reserve – Alaska (NPRA). For about 30 years, oil field installations have been expanding westward from Prudhoe Bay. Oil activity is now occurring on most sides of Nuiqsut: Alpine is only a few miles north of Nuiqsut; Meltwater is not far to the southeast of the village and proposed development is slated for the northwest of Nuiqsut.

Nuiqsut's population increased from 128 residents in the early 1970s to 416 in 2003. The population grew fairly steadily until the early 1990s, when it leveled-out. Nuiqsut has a young population, with a high ratio of dependents to wage earners. At the same time, the community has high rates of unemployment and underemployment. The Kuukpik Corporation is the largest employer in the community. Nuiqsut residents have high levels of subsistence activity and use of subsistence resources.

Nuiqsut's Trapper School is operated by the North Slope Borough School District and serves kindergarten through twelfth grade students. The community infrastructure has had several upgrades in recent years. Water and sewer projects funded by the North Slope Borough (NSB) have been completed. An electric utility is functional in the community, as well as telecommunications. Surface transportation to Nuiqsut is often possible in the winter months, as ice roads associated with the nearby oil field projects are constructed. The ice roads connect to the Dalton Highway.

Sources: (University of Alaska - Arctic Environmental Information and Data Center 1978; Brown 1979; Wickersham & Flavin Planning Consultants 1982; Alaska Consultants Incorporated 1983e; Shepro, Maas et al. 2003; DCED 2004)

Community of Nuiqsut

4.5.2 *Physical Environment*

- Nuiqsut is located approximately 30 miles from the Beaufort Sea on the Nechelik channel of the Colville River delta (Alaska Consultants Incorporated 1983e; DCED 2004).
- The community encompasses approximately nine square miles of land (Alaska Consultants Incorporated 1983e; DCED 2004).
- Nuiqsut is situated on the Arctic coastal plain, which is flat and poorly drained with a network of swamps, ponds, and streams. Soils include frozen marine and alluvial clays, silt, sand, and gravel, with a thin over-layer of peat and organic matter. Permafrost is estimated to be several hundred feet deep in the area (Alaska Consultants Incorporated 1983e).
- Nuiqsut has an arctic climate, with temperatures ranging from –56 to 78 degrees Fahrenheit. The arctic desert has light precipitation averaging 5 inches, with approximately 20 inches of snow (DCED 2004).
- The physical characteristics of Nuiqsut are available in more detail in prior planning documents (Wickersham & Flavin Planning Consultants 1982; Alaska Consultants Incorporated 1983e).

4.5.2.1. Hazards

- With the community's inland location on the coastal plain, potential natural hazards include riverbank erosion, flooding, and subsidence due to permafrost melting. However, existing data are generally not available for the location and extent of these hazards and should be considered further on a project-specific basis.
- There has been no known flooding. The airport has been relocated and is no longer subject to flooding (US Army Corps of Engineers 2000).
- Human-caused environmental hazards include potentially contaminated sites. The Alaska Department of Environmental Conservation (ADEC) (ADEC 2004) has the following two sites in Nuiqsut listed in their contaminated sites database (Table 4.5-1). However, it is worth noting that the Camp Lonely Landfill is not in Nuiqsut, and should perhaps be listed elsewhere in the database.
- There are concerns in the community that the flaring of gas is an economic hazard.

Table 4.5-1
Potentially Contaminated Sites in Nuiqsut

Site Name	Location	Status	Reckey
ARCO Itkillik River Unit #1	7.5 Mi. Up Itkillik River, Nuiqsut, AK 99789	No Further Remedial Action Planned	1994730114001
Camp Lonely Landfill	1 Mile West of Pt. Lonely, Nuiqsut, AK 99789	Active	200436X117001

Source: (ADEC 2004)

4.5.3 *Human Environment*

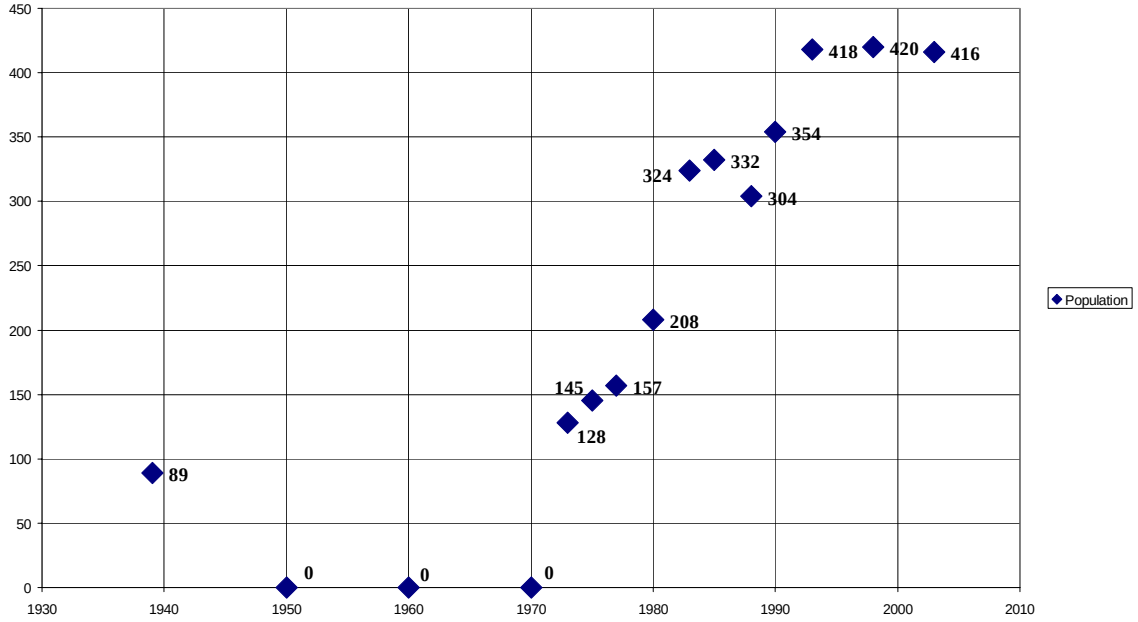
- On April 13, 1973, members of 27 families began a 150-mile journey from Barrow to the Colville River delta, where they would establish a community in the homeland of their ancestors. They lived in tents for 18 months while they selected the village site location, laid out the community, and constructed homes. A festival to celebrate the dedication of the village was held in August 1974 (Brown 1979; Alaska Consultants Incorporated 1983e; DCED 2004).
- Nuiqsut was incorporated as a second-class city in 1975 (Alaska Consultants Incorporated 1983e).
- The growth and development of the community has been influenced by oil and gas development. Nuiqsut is located in the northeast section of the NPRA. For about 30 years, oil field installations have been expanding westward from Prudhoe Bay, reaching closer to Nuiqsut.
- The Alpine Satellite Development Plan will move oil and gas development 30 miles west of Nuiqsut.
- Large areas on three sides of Nuiqsut have been rezoned from a Conservation District to a Resource Development District. The community feels surrounded by development.
- Kuukpik Corporation is the local Alaska Native Claims Settlement Act (ANCSA) village corporation.

4.5.3.1. Population

- Nuiqsut's population increased from 128 residents in the early 1970s to 416 in 2003. The population grew fairly steadily until the early 1990s, when it leveled-out (Shepro, Maas et al. 2003). Refer to Figure 4.5-1.
- Nuiqsut has a young population; average ages in the community are less than in the state or nation. The average age in Nuiqsut is estimated to be 28.9 years. There is a high ratio of dependents to wage earners (Shepro, Maas et al. 2003).
- The median age in the community is still very young, but appears to be increasing (Table 4.5-2). The median age for the state is 32.4 years (Shepro, Maas et al. 2003).

Nuiqsut Trapper School

Figure 4.5-1
Nuiqsut Population 1939 – 2003



Source: (Shepro, Maas et al. 2003)

Table 4.5-2
Median Age of Nuiqsut Population by Gender and Ethnicity

Cohort Groups	Median Age 1998	Median Age 2003
All Male Residents	21	22
All Female Residents	20	25
Inupiat Male	-	18
Inupiat Female	-	24
All Residents	21	24

Source: (Shepro, Maas et al. 2003)

4.5.3.2. Economy

- The Kuukpik Corporation, North Slope Borough, and North Slope Borough School District are the primary employers in the community (Shepro, Maas et al. 2003; DCED 2004). Refer to Table 4.5-3.
- The unemployment rate in Nuiqsut was estimated at 17 percent in the 2003 census, which is higher than the rate for the state (8 percent) or nation (6 percent) in a similar timeframe (Shepro, Maas et al. 2003). Refer to Table 4.5-4. As illustrated in Table 4.5-5, many residents report under-employment and part-time employment.
- The Kuukpik Corporation Store provides local commercial goods, including groceries, general merchandise, propane, diesel fuel, and gasoline.
- Craft sales are also part of Nuiqsut's economy. Approximately 23 percent of households participated in craft sales in 2003 (Shepro, Maas et al. 2003).
- The Kuukpik Corporation owns 46,400 acres of land within NPRA.

Table 4.5-3
Nuiqsut Employers in 2003

Employer	Total
State Government	1
City Government	5
NSB Government	29
NSB School District	27
NSB CIP	2
Oil Industry	3
Private Construction	3
ASRC or Subsidiary	3
Village Corp./Subsidiary	37
Other	11
Total	121

Source: (Shepro, Maas et al. 2003)

Table 4.5-4
Employment Status for Nuiqsut Labor Force - Ages 16–64

Employment Status	Number	Percentage
Permanent full-time	74	37%
Temporary/Seasonal	28	14%
Part-Time	28	14%
Unemployed	33	17%
Retired	4	2%
Still in school	32	16%
Total	199	100%

Source: (Shepro, Maas et al. 2003)

Table 4.5-5
Nuiqsut Labor Force Participation 1998 and 2003

	1998	2003
Total Population	395	383
Persons 16–64*	205	205
Persons in Labor Force*	176	169
Respondents Reporting	47	23
Respondents Reporting	109	54
Ave. Months Employed		6.4**
Ave. Months Unemployed		4.4***

Notes: *Persons with valid data **Persons with some employment.
*** Persons seeking employment.

Source: (Shepro, Maas et al. 2003)

4.5.3.3. Subsistence

- Approximately 81 percent of the households in Nuiqsut participate in the local subsistence economy; the participation rate for Inupiat residents was recorded at approximately 95 percent (Shepro, Maas et al. 2003). Another study of subsistence practices in Nuiqsut (Brower and Opie 1997) indicated that of 259 harvest instances, 226 (87 percent) resulted in sharing with others. Sharing harvest resources is known to be one of the most important traditions in the local subsistence lifestyle. The subsistence lifestyle remains a primary cultural choice for Native households.
- In 2003, approximately 63 percent of local residents said that half or more of their diet consisted of local subsistence resources (Shepro, Maas et al. 2003). Refer to Table 4.5-6.

Table 4.5-6
Nuiqsut's Usage of Local Subsistence Resources in 1998 and 2003

Amount	Number 1998	Percentage 1998	Number 2003	Percentage 2003
None	0	0%	0	0%
Very little	8	13%	14	18%
Less than half	9	14%	16	20%
Half	20	31%	18	23%
More than half	15	23%	14	18%
Nearly all	7	11%	13	17%
All	5	8%	4	5%
Total	64	100%	79	100.0

Source: (Shepro, Maas et al. 2003)

- The majority of unemployed and part-time workers (70 percent) said that half or more of their food came from subsistence hunting and fishing, while less than half of the households (46 percent) with full-time employment utilized a similar level of subsistence resources (Shepro, Maas et al. 2003). As the economies have declined in rural communities in recent years, reliance on subsistence resources has increased.
- There are perceptions that the use levels of subsistence resources are changing in the community. However, the 2003 census (Shepro, Maas et al. 2003) found that "the downturn is perceived as being more dramatic than the actual assessment." This report found that the actual decrease in subsistence use was only four percent among the households with heavy dependence on subsistence resources. The study noted that the estimates of the greatest decrease in subsistence use came from high-income earners, who do not account for the majority of harvests.
- The average expenditure for the 50 households who reported subsistence expenditures was over $6,700. Together, these 50 households spent approximately $335,000 on subsistence in 2003, representing about 20 percent of the gross incomes of these families (Shepro, Maas et al. 2003). This includes expenses such as fuel, ammunition, and other supplies needed to participate in subsistence activities.
- Subsistence activities occur year-round, with seasonal emphases (Brower and Opie 1997) (Table 4.5-7). Preparation for bowhead whaling occurs year-round, but hunting usually occurs in September, during fall migration and whales are closer to land. Fishing occurs throughout the year, with heavier use occurring through the summer months and in October and November. Caribou are hunted year-round, with seasonal fluctuations.

Moose hunting generally takes place in the late summer and early fall. August typically has high hunting activity for caribou and moose because adequate water levels allow for traveling upriver or on the coast by boat, the animals are usually in their best condition, and moose are in legal season for subsistence harvesters (Brower and Opie 1997; U.S. Department of the Interior 2004).

- Subsistence Harvests – Data (Fuller and George 1997; Alaska Department of Fish and Game 2004b) indicates that Nuiqsut residents primarily utilize fish, caribou, and marine mammals, in terms of pounds per person harvested (Table 4.5-8). Many resources, such as birds, eggs, and vegetation, are utilized by the majority of the community, but had lower harvest levels in terms of pounds per person.

Table 4.5-7
Nuiqsut Seasonal Subsistence Rounds

	Winter					Spring		Summer			Fall	
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Fish												
Birds/Eggs												
Berries												
Moose												
Caribou												
Furbearers												
Polar Bears												
Seals												
Bowheads												

	No to very low levels of subsistence activities
	Low to medium levels of subsistence activity
	High levels of subsistence activity

Source: (U.S. Department of the Interior 2004)

Note: See (Brower and Opie 1997) and (Fuller and George 1997) for more detailed information on Nuiqsut subsistence harvest practices.

Table 4.5-8
Nuiqsut Subsistence Harvest Data

Nuiqsut Subsistence Harvest (by Weight), ADF&G 1993	
Bowhead Whale	29%
Fish	34%
Caribou	30%
Birds	2%
Other	5%
Nuiqsut Subsistence Harvest Summary, ADF&G 1993	
Estimated Pounds Harvested	267,818.00
Mean Household Pounds Harvested	2,943.05
Per Capita Pounds Harvested	741.75

Source: (Alaska Department of Fish and Game 2004b)

Note: See (Brower and Opie 1997) and (Fuller and George 1997) for more detailed information on Nuiqsut subsistence harvest practices.

- Locations of Nuiqsut residents' subsistence harvest activities have shifted as petroleum development has grown around the community. Hunters are not using areas to the east of the village in the same manner and extent as in prior years (Fuller and George 1997).
- The local whaling commission has established an annual quota of four whales per year for Nuiqsut. They have five active whaling captains.
- The Kuukpik Subsistence Oversite Panel (KSOP) was established in 1996 and receives $60,000 annually according to the surface use agreement with ConocoPhillips Alaska. It monitors oilfield development and potential subsistence impacts on behalf of the community.
- A generalized illustration of the distribution of subsistence uses is displayed in Figure B-5. The associated maps of wildlife habitat and distribution (Figures B-6 through B-11) illustrate areas that are important for subsistence resources. All project proponents should consult with the Borough, communities, and tribes regarding current subsistence activities and locations, due to seasonal and annual variations of the resources.

Nuiqsut Channel

4.5.3.4. Income

- The 2003 census (Shepro, Maas et al. 2003) had a high non-response rate for income in Nuiqsut. The average income for Inupiat households was estimated to be just under $52,000, while non-Inupiat households had an average income of just under $77,500. The overall average household income for the community was approximately $59,900, and the per capita income was estimated at $13,633. Refer to Table 4.5-9.
- Twelve households in Nuiqsut (18.4 percent) are below the poverty threshold, according to the 2003 census (Shepro, Maas et al. 2003). However, the federal census in 2000 reported much lower poverty levels.
- It should be noted that there are typically many discrepancies between Borough and federal socioeconomic data for this area.
- Approximately 23 percent of Nuiqsut households receive income from craft sales, which averages approximately $480 per year (Shepro, Maas et al. 2003).

Table 4.5-9
Average Household and Per Capita Income for Nuiqsut in 1998 and 2003

	1993	1998	2003
Average Household Income	$39,180	$48,359	$59,907
Per capita Income	$9,637	$13,540	$13,633

Source: (Shepro, Maas et al. 2003)

4.5.3.5. Housing

- The 2003 census (Shepro, Maas et al. 2003) estimated 92 percent of the households in Nuiqsut live in single-family dwellings. The remaining households live in trailers or multi-unit structures. Refer to Table 4.5-10. The community had 126 housing units, with 114 occupied and 12 vacant (City of Nuiqsut 2005).
- Diesel oil is the primary heat source, with forced air and baseboard systems serving almost three quarters of the homes (Shepro, Maas et al. 2003). However, there are plans for the Alpine oil field to provide natural gas to the community starting in early 2006.

Table 4.5-10
Households by Type of Living Structure

Type	Number	Percent
Mobile home/trailer	3	3%
One-family house	92	92%
Building for two families	0	0%
Building for 3 or 4 families	3	3%
Building for 5 or more families	1	1%
Other	1	1%
Total	100	100%

Source: (Shepro, Maas et al. 2003)

4.5.4 *Land Ownership and Land Use*

4.5.4.1. Land Ownership

- The boundary descriptions for the community were filed in 1975 and corrected in l976. The community limits encompass approximately nine square miles (Alaska Consultants Incorporated 1983e; DCED 2004).
- "All lands within Nuiqsut's corporate limits have been selected by the Kuukpik Corporation as part of the acreage to which the corporation is entitled under the terms of the Alaska Native Claims Settlement Act (ANCSA), as amended. Some of these selected lands have been quitclaimed by the Kuukpik Corporation to the City of Nuiqsut which has, in turn, conveyed them to the North Slope Borough" (Alaska Consultants Incorporated 1983e).
- Kuukpik Corporation has the right to select 115,200 acres of federal land in the Nuiqsut area (Alaska Consultants Incorporated 1983c; DCED 2004). Land status records indicate that 69,880 acres have been patented to the corporation; interim conveyances are pending for 35,077 acres (BLM 2005). The corporation is also entitled to 30,933.81 acres of land to be reallocated from Arctic Slope Regional Corporation (ASRC). Land status records indicate that 7,239 acres have been patented to the corporation and 14,068 acres are interim conveyed. Land conveyances from the corporation to the city are reportedly complete for 1,280 acres, but final 14(c)(3) maps have not yet been filed with the Bureau of Land Management (BLM) (DCED 2004).
- Kuukpik Corporation owns 46,400 acres of land within NPRA.
- ASRC owns the subsurface rights to the Kuukpik Corporation lands, as well as additional lands in the Nuiqsut area.

4.5.4.2. Land Use

- Nuiqsut is zoned a Village District in the North Slope Borough Comprehensive Plan (Wickersham & Flavin Planning Consultants 1982). Regulations and guidelines for land uses allowed within Village Districts may be found in the Borough Land Management Regulations (1990). Borough zoning districts are displayed in Figure B-3.
- A variety of traditional land uses occur within and adjacent to the community for subsistence and cultural purposes. Important use areas should be identified on a project-specific basis.
- The North Slope Borough has rezoned lands on three sides of Nuiqsut from Conservation District to Resource Development.
- Land uses are divided into four general categories: residential, public and semi-public, commercial, and industrial (Figure V-15). These land use classifications are based on observations and community input. There are no legal zoning districts within the community at this time.
- ***Residential*** – The community has both single-family and multi-family housing units. Residential areas are grouped in the central portion of the community, with proposed expansion to the north, west, and south.
- ***Public and Semi-public*** – Public and semi-public buildings and facilities are located throughout the community, but are predominantly located in the center of the community. These buildings and facilities include the church, community hall, fire station, government buildings, health clinic, police station, and school.
- ***Commercial*** – Office buildings, stores, and other businesses are dispersed throughout the community, but are generally located in the central section of town.
- ***Industrial*** – Industrial land uses typically occur on the perimeter of Nuiqsut. Industrial land uses include the airport, fuel storage tanks, landfill, power plant, telecommunications facilities, and wastewater treatment facilities.

Nuiqsut power plant

4.5.5 *Community Facilities and Utilities*

4.5.5.1. Facilities

Nuiqsut Health Clinic

- A health clinic, staffed by outside community Health Aides, is open each day and is available 24 hours a day for emergencies.
- Community facilities include the city hall, recreation center, Kisik Community Center, police station, and fire station equipped with fire engines and an ambulance.
- The North Slope Borough School District maintains a school for grades 1-12 and had 116 students in 2005.
- The fire department is equipped with a pumper apparatus and a pumper/water tender apparatus, capable of pumping 1,250 gallons per minute (gpm) and 750 gpm of water respectively, for a total of 2,000 gpm of water (Steurmer 2005).
- Critical facilities for Nuiqsut are illustrated on Figure V-16.

4.5.5.2. Water

- A piped water system was constructed in 2001. The system is operational with 2,900,000 gallons of piped water and 116,000 gallons of truck hauled water in 2003 (Grinage 2004). Water is derived from a surface water source, a nearby lake, and is filtered, chlorinated, and stored prior to distribution.
- In 2003, 88 percent of households had running water piped to their house, and 12 percent depended on a water truck (Shepro, Maas et al. 2003).
- NSB Public Works Department (PWD) provides operations and maintenance for piped water and sewer. NSB PWD also operates a haul system for water and sewer in the community (Grinage 2004).

Water storage tanks in Nuiqsut

- Water is treated by micro and nano filtration.
- There are 31 fire hydrants. Hydrants are spaced greater than 500 feet apart, which exceeds the maximum allowable distance in the International Fire Code (Steurmer 2005).
- The maximum water flow in the community is approximately 1,250 gpm, which would not meet the needs of large fire situations. For example, a fire in a large structure that does not have a sprinkler system, such as a store or equipment shop would require a water flow in excess of 2,000 gpm. In structures that have a sprinkler system, such as the school, the sprinkler system would demand a flow of 1,000 gpm and the hydrant flow demand would be an additional 1,000 gpm (Steurmer 2005).

4.5.5.3. Sewer

- The sewer system project was constructed in 2001. In 2003, approximately 90 percent of households had flush toilets hooked to a sewer line, while those that depended on trucked water had a holding tank (Shepro, Maas et al. 2003). A new sewer lagoon was established in 2004, and the old site has been condemned by ADEC.
- Information obtained from the Wastewater Discharge Permit dated January 2002 indicates the wastewater treatment plant discharges disinfected, filtered domestic wastewater onto the tundra approximately 1,600 feet south of the Nechelik channel through a 4-inch diameter outfall line. Additionally, lesser quantities of industrial and commercial wastewater are disposed of similarly.

4.5.5.4. Solid Waste

- Refuse is collected and disposed of at the NSB operated landfill. The landfill is located adjacent to the community. The Class III landfill has a current permit. This landfill was built in 2000 and is anticipated to have a design life of 50 years. Approximately 964 cubic yards per year of waste is expected. The components of the new facility include a salvage area, burn cage, honey bucket lagoon, and used drum storage area (Demientieff 2004).

Solid waste operations in Nuiqsut

4.5.5.5. Power

- All households depend on diesel oil for heating. Forced air and baseboard systems account for about three fourths of all systems (Shepro, Maas et al. 2003).
- All households are expected to utilize natural gas for heating by early 2006.
- The NSB Power and Light System operates the local electric utility. Electricity is generated using diesel fuel and transmitted to housing via above-ground transmission lines (Grinage 2004).
- The rate schedule for use between one and 600 kilowatts (kW) is 15 cents per kW hour; use over 600 kW is 35 cents per kW hour (Grinage 2004).
- The community has a 2,400/4,160 Volt Distribution System with a 2,720 kW generation capacity. The system generated 5,258,000 kW hours in fiscal year 2004 (Grinage 2004).
- Nuiqsut residents receive a power cost equalization subsidy (Grinage 2004).

4.5.5.6. Fuel Oil/Petroleum Products

- Kuukpik Corporation is the operations and maintenance contractor for NSB PWD.
- The community has multiple bulk storage, intermediate, and day tanks for fuel storage scattered throughout the village (Table 4.5-11). All fuel storage tanks are connected above ground. Fuel is distributed via pipeline and truck depending on whether the recipient is commercial or residential. All tank information is based on a 2004 assessment that the NSB compiled for updating their Spill Prevention Control and Countermeasure (SPCC) plans (Piedlow 2004).

Table 4.5-11
Nuiqsut Fuel Tanks

Tank Location	Tank Description or Number	Year Installed	Type of Fuel	Tank Capacity (gallons)
COMMERCIAL				
Tank Farm & Gas Station	NUI-01	Rebuilt	Diesel	300,000
	NUI-02	Rebuilt	Diesel	100,000
	NUI-27	1996	Gasoline	30,000
	NUI-28	1996	Gasoline	30,000
	Dispensing	2000	Diesel	10,000
	Dispensing	2000	Gasoline	10,000
Reli Office/Airport Terminal	Day tank		Diesel	100
Fire Station	Tank #1		Diesel	7,144
Telephone Building	Tank #1	1983	Diesel	800
Public Safety Office	Tank #1	1998	Diesel	1,000
	Tank #2	1998	Diesel	500
	Tank #3 (Day tank)	1998	Diesel	50
NSB Health Clinic	Tank #1		Diesel	10,000
NSB Warm Storage	Tank #1	Unknown	Diesel	500
Nuiqsut School	Tank #1	Unknown	Diesel	2,000
	Tank #2 (Day tank)	Unknown	Diesel	75
	Tank #3 Voc Ed		Diesel	2400
Old Generator Building	Tank #1	Unknown	Diesel	500
Water Storage Facility/Old Tank Farm	Tank #1 (Vertical)	Unknown	Diesel	40,000
	Tank #2 (Vertical)	Unknown	Diesel	40,000
	Tank #3 (Vertical)	Unknown	Diesel	40,000
	Tank #4 (Vertical)	Unknown	Diesel	40,000
Water Utility/Washeteria Bldg	Tank #1	Unknown	Diesel	2000
Housing Maintenance Bldg	Tank #1	Unknown	Diesel	410
Heavy Equipment/USDW Bldg	Tank #1	1983	Diesel	10,000
	Tank #2	1983	Diesel	10,000
	Tank #3 (Day tank)	1983	Diesel	300
RESIDENTIAL				
5-plex (Blk 3, Lot 16)			Diesel	1400
Single Family Residence /Reli Camp	Tank #1	1980	Diesel	55
Single Family Residence/old PSO Bldg	Tank #1	1980	Diesel	500
Single Family Residence (Blk 3, Lot 3)	Tank #1	1980	Diesel	250
Single Family Residence (Blk 5, Lot 6)	Tank #1	1982	Diesel	250
Single Family Residence (Blk 7, Lot 11)	Tank #1	1997	Diesel	250

Table 4.5-11 (continued)
Nuiqsut Fuel Tanks

Tank Location	Tank Description or Number	Year Installed	Type of Fuel	Tank Capacity (gallons)
Single Family Residence (Blk 7, Lot 12)	Tank #1	1997	Diesel	250
Single Family Residence (Blk 7, Lot 13)	Tank #1	1997	Diesel	250
Single Family Residence (Blk 7. Lot 14)	Tank #1	1996	Diesel	260
Single Family Residence (Teacher's House # 1125)	Tank #1	Unknown	Diesel	260
Single Family Residence (Teacher's House # 1123)	Tank #1	Unknown	Diesel	260
Single Family Residence (New Foam Panel #1)	Tank #1	2000	Diesel	250
Single Family Residence (New Foam Panel #2)	Tank #1	2000	Diesel	250

Source: (Piedlow 2004)

4.5.6 *Communication Infrastructure*

Telecommunications facilities serving Nuiqsut include a fully digital local exchange telephone service, local dial-up Internet, cellular telephone, cable television, public radio broadcast, and the community access public teleconferencing center. Interconnection with the regional and global telecommunications network is via satellite circuits, which currently present a limitation to the residents needing access to higher bandwidth services. The NSB, in coordination with the NSB School District, leases private circuits and maintains a “long-distance” network in order to provide distance education, tele-health and support for governmental service administration in the community (Arctic Slope Telephone Association Cooperative 2004).

4.5.7 *Natural Gas*

There is currently a project underway that will provide Nuiqsut with natural gas. All work is expected to be completed and the system operational in 4–6 months.

The gas line from Alpine to Nuiqsut is complete, and has passed high-pressure hydro-testing. Installation of the gas processing module at Alpine is 95 percent complete and will be ready for operation by the end of the 2005.

The gas processing unit at the Nuiqsut end is for the gas distribution system for the village. The Nuiqsut module is 90 percent complete and distribution systems include a shallow buried high-density polyethylene (HDPE) pipe system that runs throughout the community. This work was completed in the spring of 2005.

There are four major agreements between the Borough, ConocoPhillips Alaska and Kuukpik that are relative to this project. Two of the agreements are between the Borough and ConocoPhillips Alaska regarding the NSB gas line that rides on the ConocoPhillips Alaska oil pipeline: the Vertical Support Member (VSM) License Agreement, and the NSB gas conditioning module that is housed on the Alpine Pad—the Gas Conditioning Facilities Operating Agreement. Both agreements are fully negotiated and are in the signatory process.

The third agreement is between Kuukpik Corporation and the Borough for the delivery of Kuukpik gas to the pipeline—the Gas Supply Contract agreement. The parties are in essential agreement on the primary issues and close to finalizing it.

The fourth agreement is between ConocoPhillips Alaska and the Kuukpik Corporation regarding gas supply.

Gas burning generators are on order for the power plant with the first new generator scheduled for delivery by the end of November, and the second new generator due by March 2006. Once all agreements are finalized and regulatory approvals are in place, the system will be tested for proper operation and reliability by running the new generators.

The NSB has approximately $2,000,000 in grant funds to place gas burning boilers and furnaces in homes and other buildings. Water heaters may also be converted to gas if the project budget is adequate to do so. This work is likely to start in late winter 2005 or early spring 2006, depending on regulatory approval of the operations plan and successful testing of the system.

4.5.8 *Community Issues*

Issues, concerns, and comments were gathered during visits to the community in 2004 and 2005 for the Comprehensive Plan revision process. Comments identified at the meeting were grouped by the topics used to organize the Comprehensive Plan. There is a range of concerns identified for the community, and the list should be reviewed and updated annually for planning purposes.

Nuiqsut Paisanich

- Nuiqsut Paisanich has been adopted by joint resolution of the Nuiqsut City Council, the Native Village of Nuiqsut, and Kuukpik Corporation. The principles established in this plan should guide Nuiqsut development and future planning efforts.
- It is a community priority to update the Nuiqsut Paisanich plan.

Land Ownership and Status

- More lots are needed for home construction.
- There has been a loss of historic rights and land with regard to oil and gas development; traditional local rights were not protected.

Land Use

- Nuiqsut people see urban residents use the haul road freely, why is Nuiqsut being restricted for access through the oil fields to get to the Haul Road?
- Is there some way to get better hunting access off the Haul Road? Hunting permit issues – subsistence vs. sport hunting privileges
- We should conduct and document multi-generation interviews on land use to cover all the user groups.

Fish and Wildlife

- The biological richness of the northeast NRPA is important to Nuiqsut.

Subsistence

- Subsistence areas need to be identified in the plan. Record subsistence data via a calendar (by seasons) and on a map.
- The community does not agree with subsistence information published about the community in some recent Environmental Impact Statements (EIS). Harvest reports in NPRA and Alpine EIS documents have combined information; detail in information has been lost, such as distance to harvest and effort.
- Subsistence use areas have been lost due to conflicting uses. Protect the remaining areas; buffer zones are needed.
- Some people received a form in the late 1970's that protected their rights to subsistence activities; the origin and authority of this form is unclear.
- Nuiqsut residents do not want to be displaced from subsistence resources by sport hunters.
- There was concern about how the Good Neighbor account was set up, and how funds are disbursed.
- A subsistence impact fund for NPRA needs to be developed with BLM.

Hazards

- Water and sewer discharge comes into contact with a trail used for subsistence hunting. A new trail is being established, but residents are concerned about contamination of subsistence resources.

Socioeconomic Factors

- More housing is needed; three generations are sharing some homes.
- Constructing a road to shareholder lots would provide economic development, jobs, and lots for development.
- Charitable contributions go everywhere but Nuiqsut. The response is, "Go ask the Borough; they get the funds (Large industry donations to United Way were used as an example).
- Industry should contribute to local churches, food banks, and other charities to help meet needs in hard times (food and fuel, etc.).
- We need to use corporation lands for industry staging areas (on this side of the Colville River) to generate revenue and increase economic impact locally.
- There is a need to develop training and services for repairs in the village. The Borough has discontinued preventative house maintenance services. We need to be able to hire someone for these jobs.
- We need a mechanic in town; someone needs to be trained to be one; we need to work together.
- We should support small businesses in the community, such as arts and crafts businesses.

- We need training for making business plans and operating businesses. Industry should provide support for this if local hire cannot be increased.
- We should get tourism in the community; we can sell crafts, show Eskimo dancing, and get economic benefits. It is a potential money-maker.
- We have a high cost of living. People look at Nuiqsut as being very rich, but we have some of the highest airfares in the Borough.
- We need training for people other than vocational training, such as computer training. We need to fund local adult education teaching.

Human and Cultural Resources

- We need to strengthen the authority of traditional knowledge; currently, priority is given to western science.
- Local residents should be consulted regarding local uses. This information and traditional knowledge should be incorporated into study plans before they are started.
- It should be mandatory to have traditional knowledge involvement in design of research and monitoring plans, and have the community involved in such plans.
- The school had provided funds to teach traditional skills, but the kids were more interested in basketball. We need to preserve cultural skills, but the programs could be eliminated due to budget cuts.

Public Services, Facilities, and Government

- Approximately 25 percent of Nuiqsut homes are not connected to the water/sewer system.
- We need more Health Aides in the community.
- More funding is needed for elderly housing; it was supposed to start one and a half years ago but we only have about 38 percent of the funding now.
- We need more funding for recreation facilities for youth. There is wintertime congestion on the one gym in Nuiqsut (the school gym). The playground is a dangerous place.
- School activity funding has declined, but activities are still needed.
- The teen center is for teens only. Is it possible to convert it to a Boys and Girls Club to serve more youth, or to get other grants?
- The K3/4 program is at risk to be discontinued, but it is needed.
- Agencies do not listen; they make their own decisions.
    - People tell the federal government to set buffer zones and they do not listen.
    - More state enforcement of hunting activities is needed along the Haul Road.
    - Planning participation is fragmented. Timelines and meetings are spread out so it is hard to keep track of what is happening.
    - Changes in stipulations between the northeast and northwest areas of NPRA leave a lot of room for varied interpretation.

- Oil funding goes to the NSB, and the village needs to ask the Borough for money; we need direct impact funds from industry to the village and corporation.
- We are fighting with the Borough over local control of the gas; the Borough wants revenue and control of the gas.
- Nuiqsut residents feel they should not have to fight with the Borough; sometimes residents feel the Borough's comments are negative.
- We could possibly form a tri-lateral agreement (between the city, tribe, and corporation) for cooperative projects.
- The boat harbor needs improvement; the boat ramp and launching areas need improvement. Other villages have ramps, but not Nuiqsut.
- We need a laundromat because the washeteria is closed. The corporation has asked the Borough for information on the costs on privatization of facilities (washeteria) and the Borough has not provided the information.
- Nuiqsut has a large transient population, which puts demands on public services. How are these demands paid for—bed tax, sales tax, or use tax? What is the source of revenue?

Petroleum and Mineral Development

- We need to document important subsistence use areas so that when oil and gas facilities are demobilized, the restoration returns the areas to their proper use. Adequate funds are needed for clean-up.
- More monitoring is needed for demobilization and restoration efforts. Kuukpik Subsistence Oversight Panel (KSOP) could be used for monitoring efforts.
- There should not be a pipeline toward Fish Creek; it is important for different types of fish in the fall, fall caribou hunting, and spring geese hunting.
- We need better coordination with industry.
  - Industrial development occurred in Prudhoe Bay; industry did not ask local people and did not respect traditional use.
  - When industry pumped water from lakes, sticklebacks were removed and were sprayed into the ice road. They were not even considered a species of fish. We need better studies and more local coordination.
  - We always have to fight with industry for the ice road connection to the village; it helps us to get cheaper gas and supplies. Industry chops up the road at the end of the season.
  - Sometimes industry uses the excuse of avoiding impact to the community (example of not extending roads).
  - Everyone in the village needs access badges through the oil fields.
  - Oil companies behave differently: ConocoPhillips Alaska allows facility access, but BP Exploration (Alaska) does not.
  - Industry restrictions sometimes give the industry personnel more rights than Nuiqsut has (example of restrictions on access during whaling).

- We need to establish a refinery for local use, local fuel production.
- People should be able to come home from Alpine during the workweek.
- National security has become an issue. We need to address security effects to subsistence.
- The cumulative effects of oil and gas development need to be addressed and prioritized.
- NPRA impact funds are administered by the Borough; the community felt that more money should go to Nuiqsut because they are the most impacted.
- The State of Alaska lease sales are causing impacts.
- Nuiqsut has really been impacted by petroleum development; we cannot be quiet any more.

4.5.9 *Community Priorities*

The following priorities have been formally identified by the village in previous recommendations, correspondence, the Borough five-year Capital Improvement Program (CIP), or resolutions passed by city councils. Other community needs have been informally identified in the preceding discussion of issues.

- **Power cost –** Nuiqsut and Atqasuk are the highest paying customers per kW hour since the new facilities have gone up. We need to look into cost equalization for the North Slope communities' utilities.
- **Cultural preservation –** We need to keep our artifacts in the community rather than taking them to the University of Alaska Fairbanks (or elsewhere) for display.
- **Public safety –** A second public safety officer is needed in the community.
- **Social services –** A rehabilitation program, with certified counselors, is needed in the community.

The following projects for Nuiqsut are on the Borough's CIP list pending funding or project completion:

- New subdivision roads
- Road drainage – remediation for ponding water
- Water and sewer system extensions
- Snow removal equipment building and warm storage
- Power plant conversion to natural gas

The following projects have been identified as community needs and have been requested from the Borough, but these projects are not Borough responsibilities. The community will have to seek other sources of funding.

- Boat dock for the Colville River
- Housing renovations for elders and disabled residents

Roadway dust control project

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North Slope Borough

Point Hope Village Profile

Prepared for:
The North Slope Borough

Prepared by:
URS Corporation

October 2005

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Abbreviations

ADEC ..... Alaska Department of Environmental Conservation
AEWC ..... Alaska Eskimo Whaling Commission
ANCSA ..... Alaska Native Claims Settlement Act
CB ..... citizen's band
CIP ..... Capital Improvement Program
ICAS ..... Inupiat Community of the Arctic Slope
kW ..... kilowatt
NSB ..... North Slope Borough
PWD ..... Public Works Department
SPCC ..... Spill Prevention Control and Countermeasure
USDW ..... Unified School District Warehouse
UST ..... underground storage tank

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North Slope Borough
Point Hope Village Profile

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4.6 Point Hope Village Profile

4.6.1 *Summary*

Inupiat people have continually inhabited the Point Hope peninsula perhaps longer than any other location in Alaska. These settlements included Old and New Tigara, Ipiutak, Jabbertown, and the present-day community of Point Hope. Sod house remains, house pits, and other signs of thousands of years of occupancy may be found adjacent to the present-day community. Point Hope is located near the tip of the Lisburne Peninsula, on a large gravel spit that extends approximately 15 miles into the Chukchi Sea (Figure B-1).

The history of Point Hope was strongly influenced by whaling, trading, introduction of alcohol and diseases, reindeer herding, missionaries, and federal agencies. Point Hope was incorporated in 1966 as a fourth-class city and achieved status as a second-class city in 1972. The community moved to its present-day location in 1978 and 1979, due to storm surge and erosion of the prior site on the north side of the spit. Tikigaq Corporation is the local village corporation. The Native Village of Point Hope is a federally recognized tribe.

Point Hope's population gradually increased from 1939 to 1998, when the population peaked at 805 residents. The growth pattern was fairly steady, with some plateaus and minor declines. The community's population declined in 2000, but appears to be gradually increasing again. Point Hope has a young population, with a high ratio of dependents to wage earners. At the same time, the community has high rates of unemployment and underemployment. The community has high levels of subsistence activities and use of subsistence resources.

The community infrastructure has had several upgrades in recent years. Water and sewer projects funded by the North Slope Borough (NSB) have been completed. An electric utility is functional in the community, as well as telecommunications. The North Slope Borough School District operates the Tikigaq School, which serves kindergarten through twelfth grade students. Point Hope also has a community center.

Sources: (University of Alaska - Arctic Environmental Information and Data Center 1978; Wickersham & Flavin Planning Consultants 1982; Alaska Consultants Incorporated 1983f; Shepro, Maas et al. 2003; DCED 2004)

Aerial view of Point Hope

4.6.2 *Physical Environment*

- Point Hope is located near the tip of the Lisburne Peninsula, on a large gravel spit that extends approximately 15 miles into the sea. The spit is reportedly the "westernmost extension of Northwest Alaska into the Chukchi Sea" (Alaska Consultants Incorporated 1983f; DCED 2004).
- The community encompasses 6.3 square miles of land and 0.1 square mile of water (DCED 2004).
- The spit that Point Hope is located on is relatively flat and low-lying. The soils are well drained with a sparse cover of vegetation; soils consist primarily of sand and well-rounded gravel. Permafrost is estimated to be several hundred feet deep in the area (Alaska Consultants Incorporated 1983f).
- The climate is arctic with temperatures ranging from –49 to 79 degrees Fahrenheit. Precipitation averages 10 inches annually, with 36 inches of snow (DCED 2004).
- The physical characteristics of Point Hope are available in more detail in prior planning documents (Wickersham & Flavin Planning Consultants 1982; Alaska Consultants Incorporated 1983f).

Coastline near Point Hope

4.6.2.1. Hazards

- With the community's coastal location, potential natural hazards include beach erosion, flooding, storm tides, ice override, and subsidence due to permafrost melting. However, existing data are not generally available for the location and extent of hazards; potential hazard conditions should be considered further on a project-specific basis.
- There have been no recorded flood events at the present townsite (US Army Corps of Engineers 2000), but beach erosion and flooding due to coastal surge are of great concern to the community. Flood potential, based on wave height, is illustrated in Figure V-19.
- A high priority for the community is to construct an evacuation road so that residents may safely move to higher ground if high waves or other storm events are forecast.
- Offloading equipment, fuel, and supplies from barges is becoming a hazardous task as ocean characteristics change.
- Human-caused environmental hazards include potentially contaminated sites. Alaska Department of Environmental Conservation (ADEC) has the following 17 sites in Point

Hope listed in their contaminated sites database (Table 4.6-1) (ADEC 2004). ADEC also has one site in Point Hope listed in their underground storage tank (UST) database (Table 4.6-2).

- In addition to the potentially contaminated sites in Point Hope, there are known contaminated sites in Cape Thompson (south of the community) and Cape Lisburne (north of Point Hope). Both sites were used by the military; clean-up of contaminated sites in these areas is incomplete to date. The Project Chariot site is six miles southeast of Cape Thompson, which contained radioactive materials from the Atomic Energy Commission operations in the area from 1958 to 1963. Radioactive materials were removed in 1993 and site closure was approved. A report on the Project Chariot clean-up is available online in the ADEC Contaminated Sites Database.

Material storage site

Table 4.6-1
Potentially Contaminated Sites in Point Hope

Site Name	Location	Status	Reckey
AKARNG Point Hope FSA	Unnamed Road, Point Hope, AK 99766	No Further Remedial Action Planned	1998310103001
Cape Lisburne LRRS (LUST)	Cape Lisburne, Point Hope, AK 99766	Active	199131X024801
Cape Lisburne LRRS Dump No. 2	South Side of Upper Camp, Point Hope, AK 99766	Active	199331X119604
Cape Lisburne LRRS Fuel Spill	Cape Lisburne, Point Hope, AK 99766	Active	198331X133707
Cape Lisburne LRRS Landfill	Cape Lisburne, Point Hope, AK 99766	Active	198331X933706
Cape Lisburne LRRS LC Transformer	Cape Lisburne, Point Hope, AK 99766	Active	198331X933705
Cape Lisburne LRRS Runway/Rd Oiling	Gravel Roads & Runway, Point Hope, AK 99766	Active	199331X119601
Cape Lisburne LRRS Spill/Leak No. 1	Lower Camp, Point Hope, AK 99766	Active	199331X119602
Cape Lisburne LRRS Spill/Leak No. 2	Runway, Point Hope, AK 99766	Active	199331X119603
Cape Lisburne LRRS UC Transformer	Cape Lisburne, Point Hope, AK 99766	Active	198331X933704
Cape Lisburne LRRS White Alice Site	Cape Lisburne, Point Hope, AK 99766	Active	198331X933703
Point Hope DMS Bldg. Holding Tank	Point Hope, Point Hope, AK 99766	Inactive	1996310119702
Point Hope Drum Storage Area	South End of Village, Point Hope, AK 99766	Inactive	1992310921303
Point Hope Gasoline Line	Point Hope, Point Hope, AK 99766	Inactive	1992310907701
Tikigaq School Diesel Holding Tank	Point Hope, Point Hope, AK 99766	Inactive	1996310119701
Tuttu Street Trench	Tuttu Street, Point Hope, AK 99766	Inactive	1998310132101
U.S. Postal Service - Point Hope	1234, Point Hope, AK 99766	Inactive	1995310132501

Source: (ADEC 2004)

Table 4.6-2
Point Hope Underground Storage Tank

	Event ID	Reckey	Facility ID	Site Name	Location	Owner
1	27	'199136X024801'	774	Cape Lisburne LRRS	Cape Lisburne; Point Hope, North Slope	611 Ces/cc Elmendorf AFB

Source: (ADEC 2004)

4.6.3 *Human Environment*

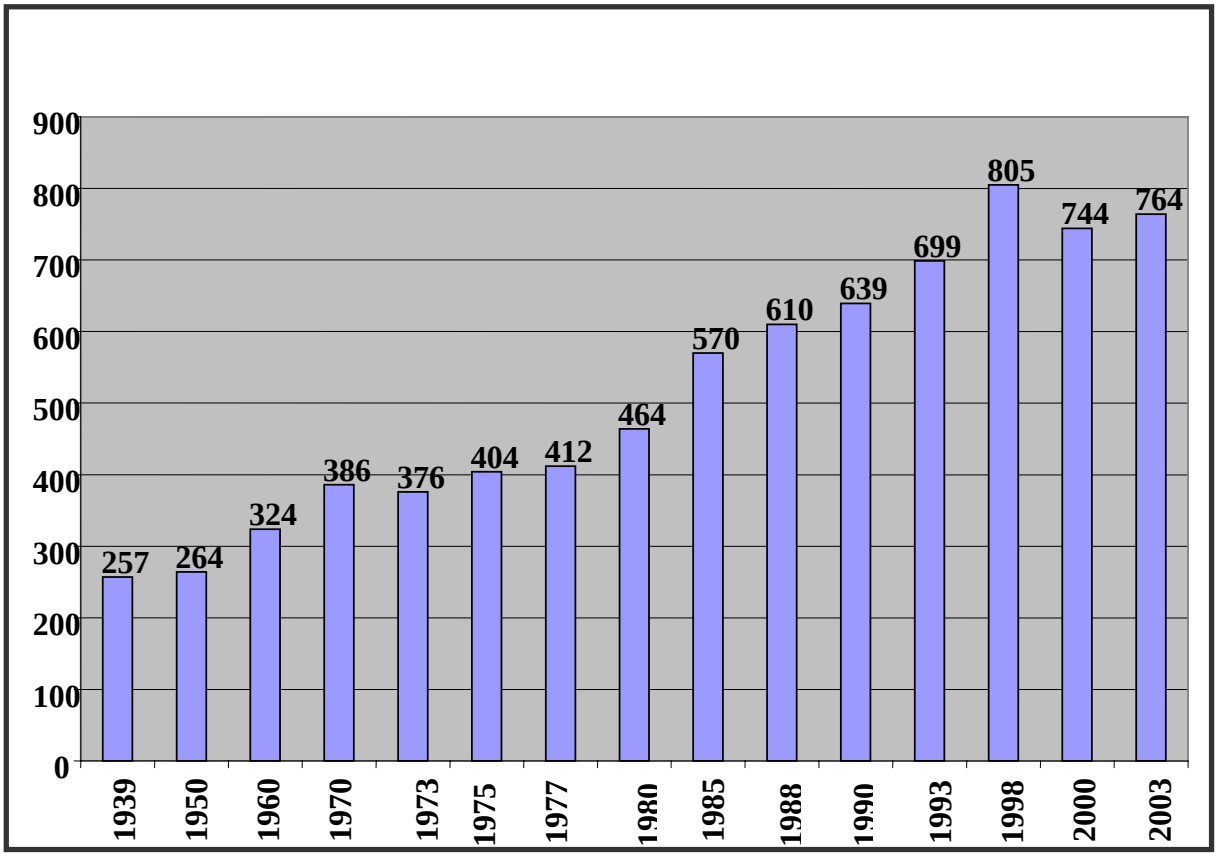
- "Point Hope peninsula is one of the longest continually occupied Inupiat sites in Alaska and consisted of many individual settlements over a period of time, including Old and New Tigara, Ipiutak, Jabbertown, and present Point Hope" (University of Alaska - Arctic Environmental Information and Data Center 1978; DCED 2004).
- The history of Point Hope was strongly influenced by whaling, trading, introduction of alcohol and diseases, reindeer herding, missionaries, and federal agencies (Alaska Consultants Incorporated 1983f).
- Point Hope was incorporated in 1966 as a fourth-class city and achieved status as a second-class city in 1972 (Alaska Consultants Incorporated 1983f).
- The community moved to its present-day location in 1978 and 1979, due to storm surge and erosion of the prior site on the north side of the spit (Alaska Consultants Incorporated 1983f).
- The Native Village of Point Hope is a federally recognized tribe, with large land holdings in the area.
- Tikigaq Corporation is the local Alaska Native Claims Settlement Act (ANCSA) village corporation.

Point Hope Post Office

4.6.3.1. Population

- Point Hope's population gradually increased from 1939 to 1998. Then the population declined in 2000, but appears to be gradually increasing in 2003 (Shepro, Maas et al. 2003). Refer to Figure 4.6-1.
- Point Hope has a young population; average ages in the community are less than in the state or nation (Table 4.6-3). The proportion of the population under the age of 17 is also greater than in the state or nation (Shepro, Maas et al. 2003).
- While the population in Point Hope is over 90 percent Inupiat, the percentage of non-Inupiat residents has increased in recent years to 8.8 percent. The 2003 census found Point Hope to have the greatest number of non-Inupiat residents in the North Slope communities outside of Barrow (Shepro, Maas et al. 2003).

Figure 4.6-1
Point Hope Population from 1939 to 2003



Source: (Shepro, Maas et al. 2003)

Table 4.6-3
Comparison of Age Cohorts in Point Hope, Alaska, and the United States*

Age Groupings	Point Hope	Alaska	U.S.
% 17 Yrs. & Under	43.4%	30.4%	25.7%
% 65 Yrs. & Over	4.9%	5.7%	12.4%

Note: *Results include only those individuals responding to the census survey and the question concerning age.

Source: (Shepro, Maas et al. 2003)

4.6.3.2. Economy

- The North Slope Borough, Tikigaq Corporation, and the North Slope Borough School District are the primary employers in the community (Shepro, Maas et al. 2003; DCED 2004).
- The unemployment rate in Point Hope was estimated at approximately 18 percent in the 2003 census, which is higher than the rate for the state (8 percent) or nation (6 percent) in a similar timeframe (Shepro, Maas et al. 2003). Refer to Table 4.6-4.

- The Tikigaq Corporation Store provides local commercial goods, including groceries, general merchandise, propane, diesel fuel, and gasoline. There is also a locally owned store in the community.
- Craft sales are an important part of the economy in Point Hope. The 2003 census noted that over 21 percent of the households earned income from selling crafts in 2003, and the level of income earned was notably higher than in most other communities (Shepro, Maas et al. 2003). Whalebone masks, baleen baskets, ivory carvings and traditional clothes are common crafts in the community.

Example of local crafts

Table 4.6-4
Point Hope: Labor Force Comparison, 1998 and 2003*

Employment Type	1998		2003	
	Number	Percent	Number	Percent
Permanent full-time	134	43.9%	136	42.2%
Temporary/Seasonal	53	17.4%	43	13.4%
Part-Time	37	12.1%	47	14.6%
Unemployed	81	26.6%	57	17.7%
Retired	NA	NA	39	12.1%
Total	305	100%	322	100%

Note: *Results include only those individuals responding to the census survey and the question about employment type in both 1998 and 2003.

Source: (Shepro, Maas et al. 2003)

4.6.3.3. Subsistence

- "The people of Point Hope consider themselves first and foremost a whaling culture. The village's close proximity to lead systems allows access to migrating bowhead and beluga whales. However, bowhead whales alone do not support the entire village and villagers rely on other resources as well" (Fuller and George 1997).
- Approximately 93 percent of the households in Point Hope participate in the local subsistence economy; the participation rate for Inupiat residents was recorded at approximately 99 percent (Shepro, Maas et al. 2003). Refer to Table 4.6-5. The subsistence lifestyle remains a primary cultural choice for Native households.
- In 2003, approximately two-thirds of all Point Hope residents said that half or more of their diet consisted of local subsistence resources, while three-quarters of all Inupiat residents were heavily reliant on subsistence resources (half or more of their diet comes from local foods) (Shepro, Maas et al. 2003). Refer to Table 4.6-5.
- Employment status and income level do not appear to substantially affect Point Hope residents' level of reliance upon subsistence resources. Nearly 80 percent of Inupiat households with full-time employment were classified as heavily reliant on subsistence

resources in 2003. Inupiat residents that were unemployed or held part-time employment also had high levels of subsistence reliance (Shepro, Maas et al. 2003).

- There appears to be a shift in the sharing patterns for subsistence resources (Shepro, Maas et al. 2003). The majority of sharing occurs within the village; there was a decrease noted for sharing with other North Slope villages and an increase in sharing with urban residents.
- Nearly half of Point Hope residents (47.5 percent) spent less than $1,200 on subsistence activities, however 15 percent of residents spent between $9,600 and $20,000 (Shepro, Maas et al. 2003). Average subsistence expenditures were not calculated for the community in 2003. Subsistence expenses include items such as fuel, ammunition, and other supplies needed to participate in subsistence activities.

Whale rib tripod in Point Hope

- Subsistence activities occur year-round, with seasonal emphases. Preparation for whaling can occur year-round, but hunting for bowheads and belugas usually occurs in the spring and early summer. It is typical for Point Hope whaling crews to harvest whales two weeks earlier than in Barrow. Seal hunting occurs through most of the year, with the general exception of September and October. Walrus hunting often peaks in the early summer months. Caribou are also an important resource that is hunted throughout the year, with peak activities in August and September, when the animals are in prime condition. Fish are harvested in the open water during summer months, as well as under ice in the fall and winter (University of Alaska - Arctic Environmental Information and Data Center 1978; Fuller and George 1997).
- Subsistence harvest data for the community of Point Hope indicate that marine mammals comprised over three-quarters of the harvest by weight (77 percent), including belugas, bowheads, walrus and seals (Fuller and George 1997). Caribou have historically been, and remain, an important subsistence resource for the community; in the 1997 study, caribou were the only non-marine mammals species in the top five species harvested for the year. Refer to Table 4.6-6.
- A generalized illustration of the distribution of subsistence uses is displayed in Figure B-5. The associated maps of wildlife habitat and distribution (Figures B-6 through B-11) illustrate areas that are important for subsistence resources. All project proponents should consult with the Borough, communities, and tribes regarding current subsistence activities and locations, due to seasonal and annual variations of the resources.

Table 4.6-5
Amount of Food Consumed Harvested From Local Sources in Point Hope *

Amount	1998		2003	
	Number	Percent	Number	Percent
None	4	2.9%	10	7.0%
Very Little	11	8.2%	16	11.3%
Less Than Half	23	17.2%	23	16.2%
Half	34	25.4%	28	19.7%
More Than Half	34	25.4%	30	21.1%
Nearly All	19	14.2%	15	10.6%
All	9	6.7%	20	14.1%
Total	134	100%	142	100%

Note: *Results include only those households responding to the census survey, and the query about the amount of subsistence harvested by the household.

Source: (Shepro, Maas et al. 2003)

Table 4.6-6
Top Five species Harvested at Point Hope, Alaska during calendar year 1992

Species	Edible Pounds Harvested	Number Harvested	Pounds Per Household	Pounds Per Capita	Percent of Total Harvest
Beluga	137,172	98	879	196	40.3
Walrus	55,797	72	358	80	16.4
Bearded Seal	28,242	160	181	40	8.3
Caribou	26,303	225	169	38	7.7
Bowhead	23,365	3	150	33	6.9

Source: (Fuller and George 1997)

4.6.3.4. Income

- The average household income for Point Hope was calculated to be $53,835 (Shepro, Maas et al. 2003). However, the average household income for Inupiat residents was lower, at $43,943, and the average household income for non-Inupiats was much higher at $85,216. The per capita income figures varied similarly. Average incomes in the community rose by approximately 14 percent, while the average Inupiat household income fell by approximately 4 percent. Refer to Table 4.6-7.
- Average incomes in the community rose by approximately 14 percent, while the average Inupiat household income fell by approximately 4 percent. However per capita incomes increased dramatically for all categories (Shepro, Maas et al. 2003). Refer to Table 4.6-7.
- The 2003 census (Shepro, Maas et al. 2003) reported that 21 Point Hope households (all Inupiat) are below the poverty threshold. This represents approximately 22 percent of the Inupiat households that responded to the census and provided their total household income (Shepro, Maas et al. 2003).
- Approximately 21 percent of Point Hope households receive income from craft sales; the average reported income from craft sales is $2,373 (Shepro, Maas et al. 2003), including items such as whalebone masks, baleen baskets, and clothing items.

Table 4.6-7
Point Hope: Average Household and Per Capita Income*

Category	1993	1998	2003
Household Income, All	$41,581	$46,437	$53,835
Household Income, Inupiat	$35,697	$45,732	$43,943
Household Income, non-Inupiat	$79,999	$51,643	$85,216
Per capita Income, All	$9,305	$10,885	$27,202
Per capita Income, Inupiat	$7,462	$10,739	$22,128
Per capita Income, non-Inupiat	$33,170	$20,750	$50,154

Note: *Results include only those responding to the census survey and providing information about per capita and total household income.

Source: (Shepro, Maas et al. 2003)

4.6.3.5. Housing

- The 2003 census (Shepro, Maas et al. 2003) estimated that approximately 88 percent of Point Hope households live in single-family dwellings. The remaining households live in trailers or multi-unit structures. Refer to Table 4.6-8. The community had 215 housing units, with 186 occupied and 29 vacant (DCED 2004). Twenty-two of the 29 vacant units are vacant due to seasonal use.
- Diesel oil is the primary heat source for approximately 97 percent of the community, with forced air furnaces (32 percent) and baseboard/boiler systems (40 percent) serving the majority of Point Hope households (Shepro, Maas et al. 2003). Refer to Table 4.6-9.

Table 4.6-8
Point Hope: Comparison of Housing Unit Types, 1998 and 2003*

Type Of Housing Unit	1998		2003	
	Number	Percent	Number	Percent
Mobile Home/Trailer	27	17.9%	12	7.7%
One-Family House	119	78.8%	138	87.9%
Building For 2 Families	4	2.6%	1	0.6%
Building For 5 or More Families	1	0.7%	5	3.2%
Other	0	0.0%	1	0.6%
Total	151	100%	157	100%

Note: *Results include only those households responding to the census survey and the question of type of housing.

Source: (Shepro, Maas et al. 2003)

Table 4.6-9
Point Hope: Type of Main Heating System in Household*

Type of System in Use	1998		2003	
	Number	Percent	Number	Percent
Stand-Alone Stove	NA	NA	18	11.5%
Stand-Alone Heater	55	35.7%	16	10.3%
Forced-Air Furnace	61	39.6%	50	32.1%
Baseboard/ Boiler System	30	19.5%	62	39.7%
Other	8	5.2%	10	6.4%
Total	154	100%	156	100%

Note: *Results include only those households responding to the census survey and the type of heating system used in the household. †The Stand-Alone Heater category included Stand-Alone Stoves in 1998.

Source: (Shepro, Maas et al. 2003)

4.6.4 *Land Ownership and Land Use*

4.6.4.1. Land Ownership

- The Tigara Corporation (now Tikigaq) selected lands throughout the Point Hope spit, including the old and new village sites. Point Hope moved to its present location in 1978 and 1979, even though there was no formal agreement between the corporation and the city for 14(c)(3) land conveyances. Land transfers occurred via quitclaims, as the corporation had not received patent to the lands (Alaska Consultants Incorporated 1983f; DCED 2004). The village corporation transferred land title to the tribe in 1984.
- Several Native allotment applications are still pending in the Point Hope area; official surveys are still pending on some of the applications.
- Tikigaq Corporation has the right to select 138,240 acres of federal land in the Point Hope area. Land status records indicate that 341 acres have been conveyed to the corporation; interim conveyances are pending for 121,798 acres. The remaining entitlement for Tikigaq Corporation stands at 16,101 acres (BLM 2005). Land conveyances to the city for 14(c)(3) properties are still incomplete (DCED 2004).
- Arctic Slope Regional Corporation owns the subsurface rights to the Tikigaq Corporation lands, as well as additional lands in the area.
- In Point Hope, as in other North Slope villages, accurate information regarding the status of title for individual lots is not always available (Alaska Consultants Incorporated 1983f). This can cause problems in land conveyances.

4.6.4.2. Land Use

- Point Hope is zoned a Village District in the North Slope Borough Comprehensive Plan (Wickersham & Flavin Planning Consultants 1982). Regulations and guidelines for land uses allowed within Village Districts may be found in the Borough Land Management Regulations (1990). Borough zoning districts are displayed in Figure B-3.
- A variety of traditional land uses occur within and adjacent to the community for subsistence and cultural purposes. Important use areas should be identified on a project-specific basis.

Flags flying at a Point Hope home

- Land uses are divided into four general categories: residential, public and semi-public, commercial, and industrial (Figure V-17). These land use classifications are based on observations and community input. There are no legal zoning districts within the community at this time.
- ***Residential*** – The community has both single-family and multi-family housing units. Residential areas surround the central portion of the community, with proposed expansion to the northwest and southeast.

- ***Public and Semi-public*** – Public and semi-public buildings and facilities are located throughout the community, but are predominantly located in the center of the community. These buildings and facilities include the church, fire station, government buildings, health clinic, police station, senior center, and school.
- ***Commercial*** – Office buildings, stores, and other businesses are generally located on the southwest side of the central section of town.
- ***Industrial*** – Industrial land uses typically occur on the southwest side of town, as well as on the perimeter. Industrial land uses include the airport, fuel storage tanks, landfill, power plant, telecommunications facilities, and wastewater treatment facilities.

4.6.5 *Community Facilities and Utilities*

4.6.5.1. Facilities

- A health clinic, staffed by community health aides, is open each day and is available 24 hours a day for emergencies.
- Community facilities include the city hall, police station, fire station, senior center, and day care center.
- The fire department is equipped with a pumper apparatus and a pumper/water tender apparatus, capable of pumping 1,250 gallons per minute (gpm) and 750 gpm of water respectively, for a total of 2,000 gpm of water (Steurmer 2005).
- Critical facilities in Point Hope are identified in Figure V-16.

Point Hope Health Clinic

4.6.5.2. Water

- A piped water system was constructed in 1999. The system is operational, with 9,800,000 gallons of storage capacity (Grinage 2004).
- The NSB Public Works Department (PWD) provides the operations and maintenance for piped water system, and operates the water haul system (Grinage 2004).
- Water is derived from a surface water source, a lake seven miles to the east, treated and stored in a tank. Some residents have water delivered from a central watering point and stored in household tanks to provide running water for kitchen.
- Water is treated by micro and nano filtration.
- There are 15 fire hydrants in the community. Hydrants are spaced 720 feet apart, which is greater than the 500-foot maximum allowable distance in the International Fire Code (Steurmer 2005).
- The maximum water flow in the community is approximately 1,250 gallons per minute, which would not meet the needs of large fire situations. For example, a fire in a large

structure that does not have a sprinkler system, such as a store or equipment shop would require a water flow in excess of 2,000 gpm. In structures that have a sprinkler system, such as the school, the sprinkler system would demand a flow of 1,000 gpm, and the hydrant flow demand would be an additional 1,000 gallons per minute (Steurmer 2005).

Water storage tanks

4.6.5.3. Sewer

- The sewer system was constructed in 1999. In 2003, over 90 percent of households had flush toilets hooked to a sewer line while those that depend on truck hauled water have a holding tank.
- The NSB PWD provides the operations and maintenance for piped sewer system, and also operates the sewer haul system (Grinage 2004).
- Information obtained from the Wastewater Discharge Permit dated January 2002 indicates the wastewater treatment plant chlorinates filtered domestic wastewater prior to discharge into a sewage lagoon located approximately 600 feet west of the wastewater treatment plant. Additionally, lesser quantities of industrial/commercial wastewater are disposed of similarly.

4.6.5.4. Solid Waste

- NSB provides trash and sewage pick-up.
- Refuse is collected by and disposed of at the NSB operated landfill. The landfill is located one-half mile east of the airstrip and one mile southwest of Point Hope. The Class III landfill has a current permit, and typical contributions are unspecified. This landfill was built in 2000 and is anticipated to have a design life of 10 years. 1708 cubic yards per year of waste are expected. The components of the new facility include a salvage area, burn cage, honey bucket lagoon, and used drum storage area (Demientieff 2004).

4.6.5.5. Power

- Diesel oil remains the primary source of heat for Point Hope households, regardless of the main heating system in use (Shepro, Maas et al. 2003).
- The NSB Power and Light System operates the local electric utility. Electricity is generated using diesel fuel and transmitted to housing via above-ground transmission lines (Grinage 2004).
- The rate schedule for use between one and 600 kilowatts (kW) is 15 cents per kW hour; use over 600 kW is 35 cents per kW hour (Grinage 2004).
- The community has a 2,400/4,160 Volt Distribution System with a 2,925 kW generation capacity. The system generated 6,661,000 kW hour in fiscal year 2004 (Grinage 2004).
- Point Hope receives a power cost equalization subsidy (Grinage 2004).

4.6.5.6. Fuel Oil/Petroleum

- Tikigaq Corporation is the operations and maintenance contractor for NSB PWD.
- The community has multiple bulk storage, intermediate, and day tanks for fuel storage scattered throughout the village (Table 4.6-10). All fuel storage tanks are connected above ground. Fuel is distributed via pipeline and truck depending on whether the recipient is commercial or residential. All tank information is based on a 2004 assessment that the NSB compiled for updating their Spill Prevention Control and Containment (SPCC) plans (Piedlow 2004).

Table 4.6-10
Point Hope Fuel Tanks

Tank Location	Tank Description or Number	Year Installed	Type of Fuel	Tank Capacity (gallons)
COMMERCIAL				
Tank Farm & Gas Station	PHO-01	Rebuilt 1997	Diesel	500,000
	PHO-02	Rebuilt 1997	Diesel	350,000
	PHO-03	Rebuilt 1997	Diesel	250,000
	PHO-04	Rebuilt 1997	Gasoline	150,000
	Dispensing	1997	Diesel	6,000
	Dispensing	1997	Diesel	6,000
USDW Bldg	PHO-05	1983	Diesel	11,000
	Tank #1	1983	Diesel	6,000
	Tank #2	1983	Diesel	6,000
	Tank #3 (Day tank)	1983	Diesel	250
	Tank #4 (day tank)	1983	Diesel	250
	Tank #5 (day tank)	1983	Diesel	250
Fire Department	Tank # 1		Diesel	7,270
	Tank # 2 (Day tank)		Diesel	275
Housing Maintenance Building	Tank #1	Unknown	Diesel	100
Old Sewage Treatment Bldg	Tank #1	Unknown	Diesel	500
Water Treatment Plant	Tank #1	1979	Diesel	500
Generator Building	PHO-PP	1997	Diesel	10,500
	Tank #1(Day tank)	1995	Diesel	275
	Tank #2 (Day tank)	1995	Diesel	300
Health Clinic	Tank #1	2000	Diesel	564
Point Hope School	Tank #1		Diesel	20,000
	Tank #2 (Day tank)		Diesel	100
	Tank #3 (Day tank)		Diesel	100
School Garage & Storage Building	Tank #1	1994	Diesel	500
Warm Storage Building	Tank #1	1989	Diesel	5,264
	Tank #2	1089	Diesel	500
Public Safety Office Bldg	Tank #1	1999	Diesel	250
Search & Rescue	Tank #1	1999	Diesel	1,000
Heavy Equipment Shop	Tank #1	1999	Diesel	7,000
Sewage Treatment Bldg	Tank #1	2000	Diesel	2,000
New Water Treatment Building	Tank #1	2000	Diesel	2,000
DMS Washeteria	Tank #1	Unknown	Diesel	1,000
RESIDENTIAL				
Single-Family Residence (Blk 3. Lot 5)	Tank #1	1989	Diesel	250
Single-Family Residence (Blk 2, Lot 6A)	Tank #1	1980	Diesel	250
Single-Family Residence (Blk 5, Lot 10)	Tank #1	Unknown	Diesel	250

Table 4.6-10 (continued)
Point Hope Fuel Tanks

Tank Location	Tank Description or Number	Year Installed	Type of Fuel	Tank Capacity (gallons)
Single-Family Residence (Blk 13, Lot 9)	Tank #1	Unknown	Diesel	300
Teacher Housing #1	Tank # 1	1993	Diesel	250
Teacher Housing #2	Tank # 1	1993	Diesel	250
Teacher Housing #3	Tank # 1	1994	Diesel	250
Teacher Housing #4	Tank # 1	1993	Diesel	250
Teacher Housing #5	Tank #1	1993	Diesel	250
5-Plex (Blk 7, Lot 3A)	Tank # 1	1985	Diesel	1,128
Single-Family Residence (Blk 10, Lot 5)	Tank #1	1976	Diesel	750
Single-Family Residence (Blk 11, Lot 14)	Tank # 1	Unknown	Diesel	250
Single-Family Residence (Blk 16, Lot 6)	Tank # 1	Unknown	Diesel	250
Single-Family Residence (Blk 19, Lot 4)	Tank # 1	Unknown	Diesel	250
Single-Family Residence (Blk 27, Lot 7A)	Tank # 1	1996	Diesel	300
Single-Family Residence (Blk 27, Lot 6A)	Tank # 1	1996	Diesel	300
Single-Family Residence (Blk 20, Lot 7)	Tank # 1	1978	Diesel	300
Single-Family Residence (Blk 28, Lot 3)	Tank # 1	1996	Diesel	300
Single-Family Residence (Blk 28, Lot 2A)	Tank # 1	1996	Diesel	300
Single-Family Residence (Blk 28, Lot 1A)	Tank # 1	1996	Diesel	300
Single-Family Residence (Blk 21, Lot 15A)	Tank # 1	1984	Diesel	300
Single-Family Residence (Blk 29, Lot 2)	Tank # 1	1996	Diesel	300
Single-Family Residence (Blk 29, Lot 3)	Tank # 1	1996	Diesel	250
Single-Family Residence (Blk 29, Lot 4)	Tank # 1	1996	Diesel	250
Single-Family Residence (Blk 29, Lot 5)	Tank # 1	1996	Diesel	250
Single-Family Residence (Blk 29, Lot 6)	Tank # 1	1996	Diesel	250
Single-Family Residence (Blk 22, Lot 5)	Tank # 1	1983	Diesel	250
Single-Family Residence (Blk 22, Lot 7)	Tank # 1	1985	Diesel	300
Single-Family Residence (Blk 22, Lot 14)	Tank # 1	Unknown	Diesel	300
Single-Family Residence (Blk 22, Lot 13)	Tank # 1	Unknown	Diesel	250
Single-Family Residence (Blk 23, Lot 12)	Tank # 1	Unknown	Diesel	250
Single-Family Residence (Foam Panel #1)	Tank # 1	2000	Diesel	250
Single-Family Residence (Foam Panel #2)	Tank # 1	2000	Diesel	250

Source: (Piedlow 2004)

4.6.6 *Communication Infrastructure*

Telecommunications facilities serving Point Hope include a fully digital local exchange telephone service, local dial-up Internet, widely-used citizen's band (CB) radio, cable television, KBRW public radio broadcast, and the community access public teleconferencing center. Interconnection with the public, switched telecommunications network is via satellite circuits, which currently present a limitation to the residents needing access to higher bandwidth services, especially the Internet. The NSB, in coordination with the NSB School District, leases private satellite circuits and maintains a "long-distance" network in order to provide distance education, tele-health and support for governmental service administration in the community (Arctic Slope Telephone Association Cooperative 2004).

Satellite facilities in Point Hope

4.6.7 *Natural Gas*

No energy conversions from diesel to natural gas are planned at this time. Past gas exploration showed insufficient quantities to make gas a viable option at current development costs for gas production (Piedlow 2004).

4.6.8 *Community Issues*

Issues, concerns, and comments were gathered during visits to the community in 2004 and 2005 for the Comprehensive Plan revision process. Comments identified at the meetings were grouped by the topics used to organize the Comprehensive Plan. There is a range of concerns identified for the community, and the list should be reviewed and updated annually for planning purposes.

Land Ownership and Status

- The village corporation transferred land title to the tribe in 1984. This ownership status needs to be recognized.
- When ownership was transferred from the old townsite to the new one, some lots did not get the restricted status. Restricted lots appear to be exempt from the Borough property tax, and receipt of status has implications for lot owners.
- People felt that Native allotments should have subsurface rights.

Land Use

- In response to an issue listed on the wall, the following question was raised: How large of a buffer zone is permitted by the Alaska Eskimo Whaling Commission (AEWC) and the NSB Wildlife Department? Measures currently used by AEWC and the Borough, such as seasonal restrictions, the Conflict Avoidance Agreement and the Good Neighbor Policy were also discussed.
- There is a need for increased coordination between the Borough and villages before permits are issued for development. There was a concern about potential impacts to subsistence use areas.

Fish and Wildlife/Subsistence

- What is happening to fall whale migration past Point Hope, and is it being affected by oil and gas development? People felt that there were fewer whales.
- Mineral exploration and mine operation has impacted subsistence caribou hunting, and there should be compensation for the cost of gas expended in unsuccessful subsistence hunts. The question of how many miles a buffer zone could/should cover was raised again.
- Helicopters from exploration for resource development impact caribou, ptarmigan, and other fish and wildlife. We need conflict avoidance agreements.

Human and Cultural Resources

- We are losing our native language. We need an immersion program in each village, not just in Barrow. There are barriers to starting immersion programs, including the No Child Left Behind Act and the testing requirements in English.

Hazards

- The Borough should coordinate with the tribe, corporation, and city to resolve the emergency evacuation plan. The proposed evacuation road out of the village on the low-lying spit is a high priority for the community.

Socioeconomic Factors

- The Borough should research and address social and economic impacts due to oil and gas development.
- Funding for education is very important.
- Scholarships and funding assistance are needed for college students.
- The Borough should give a priority hiring preference for college students to help struggling students with job opportunities.
- Housing is an issue; there are not enough homes available. Multiple generations occupy a single structure. Local people cannot afford rentals; outsiders take the rentals.
- There are sewer leaks outside of homes that are not being repaired. This is a health hazard and may be one of the many ties to the water shortage in the community.
- An apprenticeship program was started about five years ago, but only a few people have been certified. We need electricians, plumbers, teachers, lawyers, and all trades.
- There needs to be more local hire in the community (an example of Health Aides was discussed).
- Ilisagvik College needs to focus on on-the-job training and outplacement services. Our students are not getting hired.
- Local tribes and corporations need to select for local hire.
- The Borough needs to work with communities and tribes to identify grants and funding sources, including funds for training.

Public Services, Facilities, and Government

- The existing Senior Center is closed. People felt that there were promises for a new center, but it has never materialized.
- A youth facility is needed to combat drug, alcohol, and vandalism issues.
- Property taxes are an excessive financial burden. There are few jobs in the community and no way to pay the taxes.
- The corporation transferred land title to the tribe. There was a question about the tax status of this land.

- 202 Housing Grants are needed to provide affordable housing in the village, and the delays are causing hardship under current economic conditions in the villages.
- The North Slope Borough does not have a tribal policy of full cooperation and non-interference; the Borough needs a policy that they respect and obey tribal policies.
- There is a desperate need for a tribal policy so that the tribes can collect royalties from the off-shore petroleum operations.
- The evacuation road is not progressing because the Borough did not provide statements of non-objection; the funds need to come to the Tri-Lateral Committee in Point Hope.
- The evacuation road is still the number one priority for the Tri-Lateral Committee.
- We need additional public safety officers in the community.
- The washeteria is needed; houses do not have washer and dryer hookups.
- The Borough promised grant writers to help the community, but that help never materialized.
- There should be two weeks' advance notice for community meetings.

Petroleum and Mineral Development

- Issues related to resource development were addressed under the several of the topics above, such as subsistence, socioeconomics, and land use.
- Tribes need to be involved in Good Neighbor Policies and Conflict Avoidance Agreements.
- Petroleum and mineral activities outside of the community and the Borough impact subsistence activities (examples were Red Dog Mine and Kennicott Mining Company exploration).
- Permittees should have to coordinate with the Inupiat Community of the Arctic Slope (ICAS), particularly where there are impacts to Native allotments and local communities.

4.6.9 *Community Priorities*

The following priorities have been formally identified by the village in previous recommendations, correspondence, the Borough five-year Community Improvement Program (CIP), or resolutions passed by city councils. Other community needs have been informally identified in the preceding discussion of issues.

- **Health Care –** Health care is taken care of by Maniilaq; a concern was brought up regarding health care status.
- **Materials Storage Clean-up –** When Public Works was in the community doing the water and sewer project, they left some materials behind. These materials create ongoing needs for cleanup, especially the Styrofoam as it breaks up.

The following projects for Point Hope are on the Borough's CIP list pending funding or project completion:

- Tikigaq School renovation
- Multi-curriculum classroom for the school
- Erosion control
- Road to Kuukpuk River
- Snow fence
- Northeast road expansion
- Water storage tank
- Construction trash removal from the water and sewer project
- Water and sewer system extensions

The following projects have been identified as community needs and have been requested from the Borough, but these projects are not Borough responsibilities. The community will have to seek other sources of funding.

- Kalgi renovation/expansion

4.6.10 *References*

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24x36 folded publications with maps on one side and text on the other. Regional overview for the North Slope Borough, including information on population, economy, government, education, transportation, climate, environmental constraints to construction, regional topography and hydrology, permafrost, and subsistence. Separate publications for each village.

US Army Corps of Engineers (2000). Flood Hazard Data for Alaska Communities. 2004: http://www.poa.usace.army.mil/en/cw/fld_haz/floodplain_index.htm.

Wickersham & Flavin Planning Consultants (1982). Comprehensive Plan, North Slope Borough. Anchorage, Alaska, North Slope Borough: 583.

North Slope Borough

Point Lay Village Profile

Prepared for:
The North Slope Borough

Prepared by:
URS Corporation

October 2005

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Abbreviations

ADEC ..... Alaska Department of Environmental Conservation
ANILCA ..... Alaska National Interest Lands Conservation Act
ASNA ..... Arctic Slope Native Association
ASRC ..... Arctic Slope Regional Corporation
BIA ..... Bureau of Indian Affairs
CB ..... citizen's band
CIP ..... Capital Improvement Program
DEW ..... Distant Early Warning
IRA ..... Indian Reorganization Act
IWC ..... International Whaling Commission
kW ..... kilowatt
NSB ..... North Slope Borough
SPCC ..... Spill Prevention Control and Countermeasure
TNHA ..... Tagiugmiullu Nunamiullu Housing Authority

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North Slope Borough
Point Lay Village Profile

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4.7 Point Lay Village Profile

4.7.1 *Summary*

Early inhabitants of the Point Lay area hunted and fished along the Chukchi Sea coast and the local river systems. These small groups gradually congregated in the Point Lay area. In the late 1920s a trading post was established and a school building was constructed in 1930, as the population continued to grow. The original name of the community was Kali. The village was initially located on a barrier island and then on the banks of the Kokolik River before finally moving to its current location. Point Lay is now located on a low coastal bluff on the Chukchi Sea coast, approximately 150 miles southwest of Barrow. Kasegaluk Lagoon protects the community from the open ocean (Figure B-1).

Point Lay is not incorporated under state law as a municipality; it is the only unincorporated traditional community in the North Slope Borough (NSB). (Deadhorse is also unincorporated.) The Native Village of Point Lay is a federally recognized tribe. Cully Corporation is the local village corporation.

The military has had years of involvement in the Point Lay area. A Distant Early Warning (DEW) line site is located just southwest of the community. In 2005, a project for dismantlement and removal of the facilities was underway, as well as site restoration.

Point Lay's population declined from 1939 until the 1970s. Later census data show the community's population generally increasing through 2003. The community has a young population, with high ratios of dependents to wage earners. At the same time, the community has high rates of unemployment and underemployment. The community has high levels of subsistence activities and use of subsistence resources.

The community infrastructure has had several upgrades in recent years. Water and sewer projects funded by the NSB have been completed. An electric utility is functional in the community, as well as telecommunications. The NSB School District operates the Kali School, which serves kindergarten through twelfth grade students.

Sources: (University of Alaska - Arctic Environmental Information and Data Center 1978; Wickersham & Flavin Planning Consultants 1982; Alaska Consultants Incorporated 1983g;

Aerial view of Point Lay

Shepro, Maas et al. 2003; DCED 2004)

4.7.2 *Physical Environment*

- Point Lay is located on a low coastal bluff on the Chukchi Sea coast; Kasegaluk Lagoon protects the community from the open ocean (Alaska Consultants Incorporated 1983g). Point Lay's community boundaries encompass 30.5 sq. miles of land and 4.0 sq. miles of water (DCED 2004).
- The climate is arctic with temperatures ranging from –55 to 78 degrees Fahrenheit. Precipitation averages 6.9 inches annually, with 21 inches of snowfall (DCED 2004).
- The soils in the vicinity of Point Lay include frozen marine and alluvial clays, silt, sand, and gravel. Permafrost is estimated to be over 1,000 feet deep in the area (Alaska Consultants Incorporated 1983g).
- The physical characteristics of Point Lay are available in more detail in prior planning documents (Wickersham & Flavin Planning Consultants 1982; Alaska Consultants Incorporated 1983g).

4.7.2.1. Hazards

- With the community's coastal location, potential natural hazards include beach erosion, flooding, storm tides, ice override, and subsidence due to permafrost melting. However, existing data are not generally available for the location and extent of hazards; potential hazard conditions should be considered further on a project-specific basis.
- The flood of record for Point Lay is the coastal storm of October 1963, which caused a storm surge of 9 feet. Buildings in the new townsite are above the 100-year floodplain (US Army Corps of Engineers 2000).
- Offloading equipment, fuel, and supplies from barges is becoming a hazardous task as ocean characteristics change. Fuel handling and the ability to respond to a large fuel spill have been of particular concern to the community.
- Human-caused environmental hazards include potentially contaminated sites. Alaska Department of Environmental Conservation (ADEC) has five sites in Point Lay listed in their contaminated sites database (Table 4.7-1) (ADEC 2004).

Table 4.7-1
Potentially Contaminated Sites in Point Lay

Site Name	Location	Status	Reckey
Dewline Site / LIZ-2 Garage (SS006)	Kasegaluk Lagoon, Point Lay, AK 99759	Active	198931X902509
Point Lay Cully School Site	Unk, Point Lay, AK 99759	Inactive	1992310921301
Point Lay Dewline LIZ-2 Landfill	South of Hangar Building, Point Lay, AK 99759	Active	198931X902512
Point Lay Landfill	No Address, Point Lay, AK 99759	Inactive	1991310909101
Point Lay Tank Farm	Point Lay, Point Lay, AK 99759	Inactive	1992310907703

Source: (ADEC 2004)

4.7.3 *Human Environment*

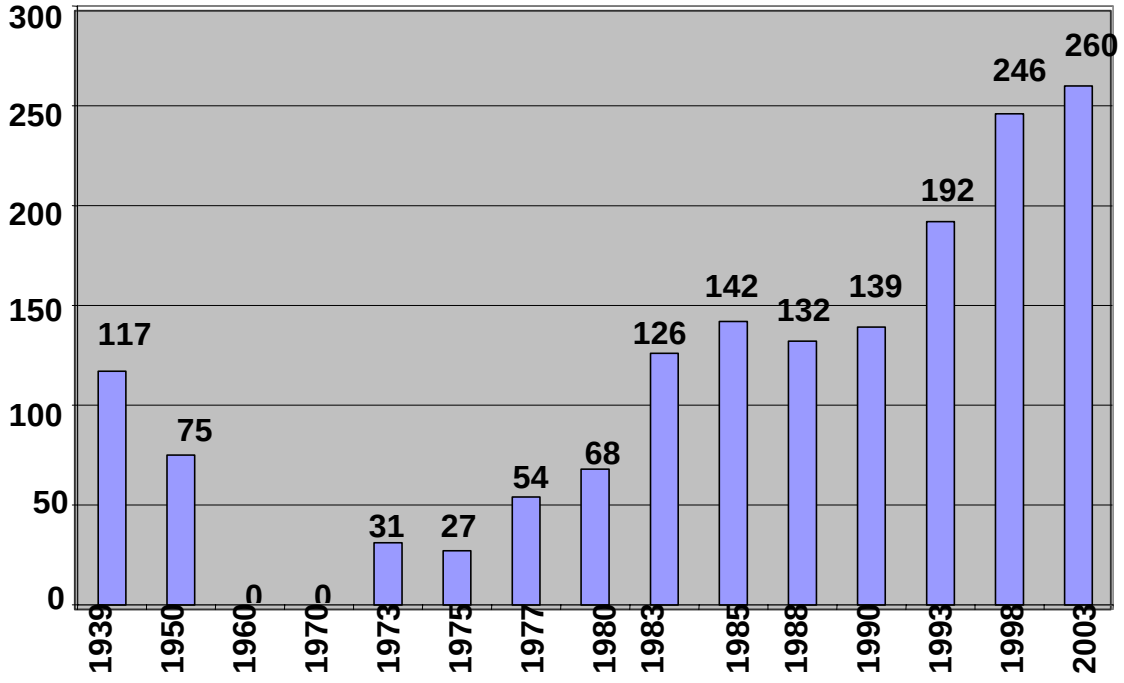
- Point Lay is not incorporated under state law as a municipality; it is the only unincorporated traditional community in the NSB. The Native Village of Point Lay is a federally recognized tribe (DCED 2004).
- Early inhabitants of the Point Lay area hunted and fished along the Chukchi Sea coast and the local river systems. These small groups gradually congregated in the Point Lay area. In the late 1920s a trading post was established and a school building was constructed in 1930, as the population continued to grow (University of Alaska - Arctic Environmental Information and Data Center 1978; Alaska Consultants Incorporated 1983g; DCED 2004).
- Mail service, military installations, and reindeer herding strongly influenced the history of Point Lay (Alaska Consultants Incorporated 1983g).
- The community has relocated several times, adopting its present location near the DEW Line station in 1981 (Alaska Consultants Incorporated 1983g; DCED 2004).
- Cully Corporation is the local Alaska Native Claims Settlement Act (ANCSA) village corporation.

Homes in Point Lay

4.7.3.1. Population

- Point Lay's population declined from 1939 until the 1970s. The community was abandoned in approximately 1960 and was re-established in 1973. Later census data show the community's population generally increasing from 1973 through 2003 (Shepro, Maas et al. 2003). Refer to Figure 4.7-1.
- The population in Point Lay is very young; the proportion of the population under 4 years of age has increased 22 percent since 1998. The average age in the community (24.1) is less than in the state or nation (Shepro, Maas et al. 2003). Refer to Table 4.7-2.
- While the population in Point Lay is predominantly Inupiat (86.2 percent), the percentage of non-Inupiat residents has increased in recent years to 13.8 percent (Shepro, Maas et al. 2003).

Figure 4.7-1
Point Lay Population from 1939 to 2003



Source: (Shepro, Maas et al. 2003)

Table 4.7-2
Comparison of Age Cohorts in Point Lay Alaska, and the United States*

Age Groupings	Point Lay	Alaska	U.S
% 17 Years & Under	48.90%	30.40%	25.70%
% 65 Years & Older	2.2%	5.70%	12.40%

Note: *Results include only those individuals participating in the census survey.

Source: (Shepro, Maas et al. 2003)

4.7.3.2. Economy

- The NSB and the NSB School District are the primary employers in the community, providing approximately 62 percent of local employment. The Village Corporation provides another 11 percent of local employment (Shepro, Maas et al. 2003).
- The unemployment rate in Point Lay was estimated at approximately 16 percent in the 2003 census, which is higher than the rate for the state (8 percent) or nation (6 percent) in a similar timeframe (Shepro, Maas et al. 2003). Refer to Table 4.7-3.
- Underemployment in the community has improved from 39 percent of the labor force in 1998 to approximately 17 percent in 2003 (Shepro, Maas et al. 2003).

Table 4.7-3
Pt. Lay Employment Status, 1998 and 2003

	Number	%	Number	%
Type of Employment	1998	1998	2003	2003
Permanent full-time	50	52.60%	53	54.10%
Temporary/Seasonal	20	21.10%	21	21.40%
Part-Time	9	9.50%	8	8.20%
Unemployed	16	16.80%	16	16.30%
Total	95	100.00%	98	100.00%

Note: *Results include only those individuals in the labor force who participated in the census survey.

Source: (Shepro, Maas et al. 2003)

4.7.3.3. Subsistence

- Point Lay subsistence users "have access to a wide variety of resources including: marine, riverine, and terrestrial resources. The village harvest is dominated by a summer beluga whale harvest." (Fuller and George 1997)
- Approximately 77 percent of the households in Point Lay participate in the local subsistence economy (Shepro, Maas et al. 2003). Of those households, 75 percent are heavily reliant on subsistence resources, where half or more of household diets consisted of local resources. Refer to Table 4.7-4. The subsistence lifestyle remains a primary cultural choice for Native households.
- Employment status does not appear to substantially affect Point Lay residents' level of reliance upon subsistence resources. Nearly 71 percent of households with full-time employment were classified as heavily reliant on subsistence resources, while 85 percent of households with less than full-time employment were classified as heavily reliant (Shepro, Maas et al. 2003). As the economies have declined in the rural communities in recent years, the reliance on subsistence resources has increased.

Skiffs ready to launch in Point Lay

- The sharing patterns for subsistence resources appears to have shifted between the 1998 census and the 2003 census (Shepro, Maas et al. 2003). There was a large increase in sharing within the community as well as an increase in sharing with other North Slope and Northwest Arctic Borough communities. However, there were decreases in sharing with residents of other communities, such as Anchorage and Fairbanks. Refer to Table 4.7-5.

- Thirty percent of the Point Lay households spent less than $500 on subsistence activities. Approximately 40 percent of the households spent $3,100 to $9,500 on subsistence activities (Shepro, Maas et al. 2003).
- Subsistence activities occur year-round, with seasonal emphases. Caribou, ptarmigan, and seals are available year-round. Polar bears and other fur-bearing animals are typically hunted in the winter months, while whaling, duck hunting, walrus hunting, and fishing typically occur in the summer months (University of Alaska - Arctic Environmental Information and Data Center 1978). Due to the community's location on Kasegaluk Lagoon's shallow protected waters, the community's whaling focuses on belugas; the beluga harvest averages approximately 40 whales per year (Fuller and George 1997). There is interest in re-establishing a bowhead hunt for the community. Some hunters from Point Lay travel to Barrow, Wainwright, or Point Hope to participate in spring hunting of bowhead whales.
- Subsistence Harvests – Data from the Alaska Department of Fish and Game (Alaska Department of Fish and Game 2004b) indicate that Point Lay residents primarily utilize marine mammals, caribou, birds, and fish, in terms of pounds per person harvested. Other resources are also utilized by the community, but had lower harvest levels in terms of pounds per person. Refer to Table 4.7-6.
- A generalized illustration of the distribution of subsistence uses is displayed in Figure B-5. The associated maps of wildlife habitat and distribution (Figures B-6 through B-11) illustrate areas that are important for subsistence resources. All project proponents should consult with the Borough, communities, and tribes regarding current subsistence activities and locations, due to the seasonal and annual variations of the resources.

Table 4.7-4
Pt. Lay: Subsistence from Local Sources*

Amount	1998		2003	
	Number	Percent	Number	Percent
None	2	4.50%	2	4.50%
Very Little	4	9.10%	7	15.90%
Less Than Half	5	11.40%	2	4.50%
Half	9	20.50%	11	25.00%
More Than Half	14	31.80%	6	13.60%
Nearly All	4	9.10%	8	18.20%
All	6	13.60%	8	18.20%
Total	44	100.00%	44	100.00%

Note: *Results include only households participating in the census survey and responding to the question "How much of the meat, fish and birds you and your household ate came from local food sources (fishing and hunting)?"

Source: (Shepro, Maas et al. 2003)

Table 4.7-5
Pt. Lay: Communities Where Subsistence Foods Are Shared*

	1998		2003	
	Number	%	Number	%**
Own Community	14	21.9%	24	64.9%
Another NSB Community	18	28.1%	14	37.8%
Any NANA Community	10	15.6%	10	27.0%
Anchorage	16	25.0%	8	21.6%
Fairbanks	4	6.3%	1	2.7%
Other	2	3.1%	3	8.1%

Note: *Results include only those households participating in the census survey.
**Percentages are of the total number of households indicating they shared subsistence resources with other households.

Source: (Shepro, Maas et al. 2003)

Table 4.7-6
Point Lay Subsistence Harvest Summary, ADF&G 1987

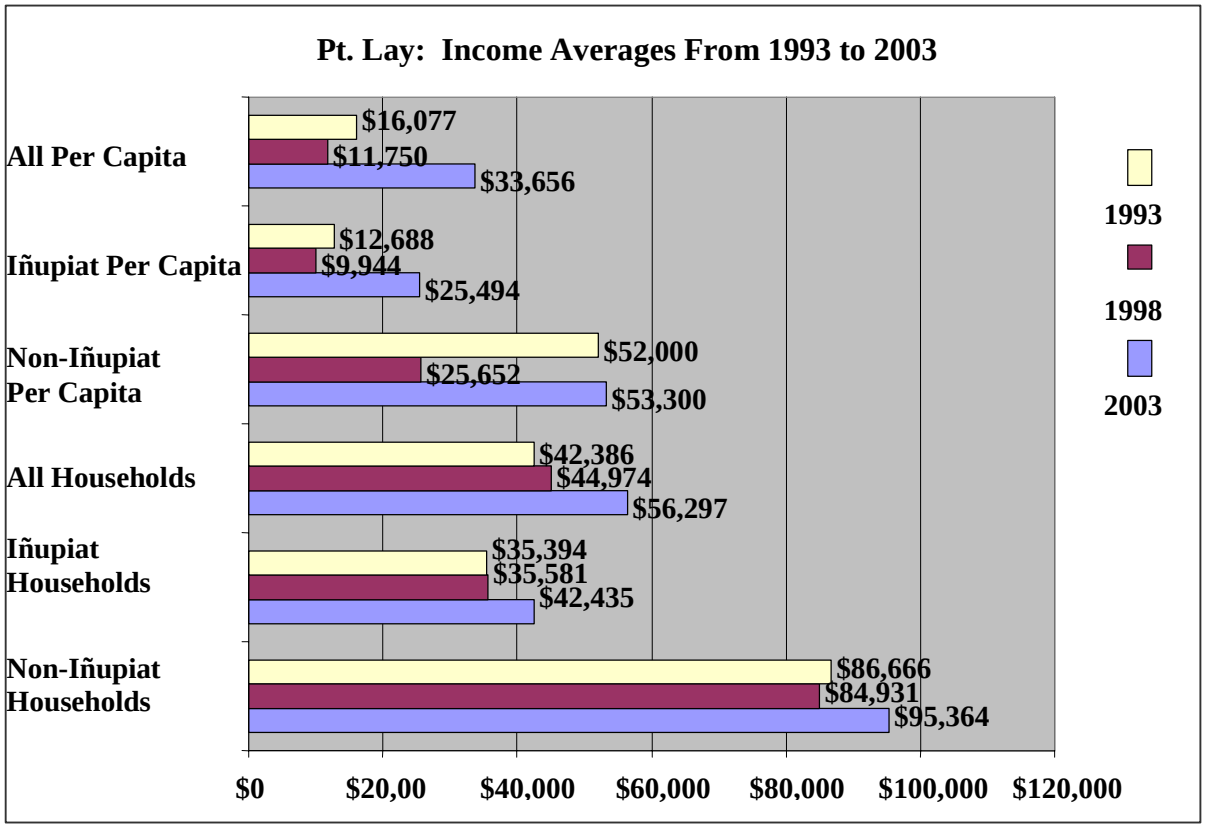
Resources	Estimated number	Estimated pounds	Average Pounds	Per Capita Pounds
All Resources		107,321.00	2495.83	890.11
Fish	2,807	2,983.00	69.38	24.74
Salmon	147	425.00	9.88	3.52
Non-Salmon Fish	2,660	2,559.00	59.50	21.22
Land Mammals	458	21,426.00	498.27	177.71
Large Land Mammals	167	21,309.00	495.56	176.74
Small Land Mammals	292	117.00	2.72	0.97
Marine Mammals		76,853.00	1787.27	637.41
Birds and Eggs	3,531	5,836.00	135.73	48.40
Vegetation		223.00	5.19	1.85

Source: (Alaska Department of Fish and Game 2004b)

4.7.3.4. Income

- The average household income for Point Lay was calculated to be $56,297 (Shepro, Maas et al. 2003). However, the average household income for Inupiat residents was lower, at $42,435. The per capita income figures varied similarly. Average incomes in the community rose by approximately 20 percent, while the average Inupiat household income rose by approximately 16 percent. Refer to Figure 4.7-2 and Table 4.7-7.
- Average incomes in the community rose by approximately 14 percent, while the average Inupiat household income fell by approximately 4 percent. However per capita incomes increased dramatically for all categories (Shepro, Maas et al. 2003). Refer to Table 4.7-8.
- The 2003 census (Shepro, Maas et al. 2003) reported that seven Point Lay households (all Inupiat) are below the poverty threshold.
- Approximately 20 percent of Point Lay households receive income from craft sales; the average reported income from craft sales over a three year period is $1,104, or an average of $368 per year (Shepro, Maas et al. 2003).

Figure 4.7-2
Income Averages in Point Lay, 1993 to 2003



Source: (Shepro, Maas et al. 2003)

Table 4.7-7
Pt. Lay: Mean and Median Household Incomes, 2003*

	All	Iñupiat
Mean	$56,297	$42,435
Median	$49,000	$36,000

Note: *Results include only those households providing income data.

Source: (Shepro, Maas et al. 2003)

Table 4.7-8
Average Percent Income Change in Point Lay, 1998 through 2003*

	1993-1998	1998-2003
Average HH Income	5.80%	20.10%
Average Per Capita Income	-26.90%	65.10%
Average Iñupiat HH Income	0.50%	15.70%
Average Iñupiat Per Capita Income	-27.60%	61.00%
Average Non-Iñupiat HH Income	-2.00%	11.50%
Average Non-Iñupiat Per Capita Income	-50.70%	50.10%

Note: *Results include only those individuals and households responding to the survey

Source: (Shepro, Maas et al. 2003)

4.7.3.5. Housing

- The 2003 census (Shepro, Maas et al. 2003) estimated that 63 percent of the households in Point Lay live in single-family dwellings, with the remaining 37 percent of households living in trailers or multi-unit structures (Table 4.7-9). The community had 67 housing units with 61 occupied, and 6 vacant (DCED 2004).

Homes in Point Lay

- Diesel oil is the primary heat source for approximately 97 percent of occupied households. Stand-alone stoves or heaters serving the majority of Point Lay households (67 percent). Baseboard/boiler systems serve another 23 percent of occupied homes (Shepro, Maas et al. 2003). Refer to Table 4.7-10.

Table 4.7-9
Comparison of Housing Unit Types in Point Lay*

Type of Household	1998		2003	
	Number	Percent	Number	Percent
Mobile Home/Trailer	2	3.9%	12	20.0%
One-family house	44	86.3%	38	63.3%
Building for two families	0	0.0%	4	6.7%
Building for 3 0r 4 families	1	1.9%	4	6.7%
Building for 5 or More Families	4	7.9%	1	0.0%
Other	0	0.0%	2	3.3%
Total	51	100.0%	61	100.0%

Note: *Results include only those households participating in the census survey.

Source: (Shepro, Maas et al. 2003)

Table 4.7-10
Main Home Heating Systems in Point Lay, 1999 and 2003*

Type of System	1999		2003	
	No.	Percent	No.	Percent
Stand-Alone Stove	0	0.00%	30	52.60%
Stand-Alone Heater	39	73.50%	8	14.00%
Forced-Air Furnace	2	3.80%	4	7.00%
Baseboard/ Boiler System	12	22.70%	13	22.80%
Other	0	0.00%	2	3.60%
Total	53	100.00%	57	100.00%

Note: *Results include only households participating in census survey.

Source: (Shepro, Maas et al. 2003)

4.7.4 *Land Ownership and Land Use*

4.7.4.1. Land Ownership

- The Cully Corporation selected lands throughout the Point Lay area. However, the corporation may not re-convey land to the community because it remains unincorporated. In this situation, the State Municipal Lands Trustee may hold these lands in trust for the community. Some parcels have been quitclaimed to the NSB for capital improvement projects (Alaska Consultants Incorporated 1983g).
- Cully Corporation has the right to select 69,120 acres of federal land in the Point Lay area. Land status records indicate that 57,167 acres have been patented to the corporation; interim conveyances are pending for 175 acres (BLM 2005). The corporation is also entitled to 20,889 acres of land to be reallocated from Arctic Slope Regional Corporation (ASRC); to date, 17,349 acres have been patented to the corporation (Alaska Consultants Incorporated 1983g; BLM 2005). Land conveyances are still incomplete.
- ASRC owns the subsurface rights to the Cully Corporation lands, as well as additional lands in the area.
- Two Native allotment applications were made for lands on the spit, just north of the old village site, on land used by the Air Force.
- In Point Lay, as in other North Slope villages, accurate information regarding the status of title for individual lots is not always available (Alaska Consultants Incorporated 1983g). This can cause problems in land conveyances.

View from Point Lay

4.7.4.2. Land Use

- Point Lay is zoned a Village District in the NSB Comprehensive Plan (Wickersham & Flavin Planning Consultants 1982). Regulations and guidelines for land uses allowed within village districts may be found in the Borough Land Management Regulations (1990). Borough zoning districts are displayed in Figure B-3.
- A variety of traditional land uses occur within, and adjacent to the community for subsistence and cultural purposes. Important use areas should be identified on a project-specific basis.
- Land uses are divided into four general categories: residential, public and semi-public, commercial, and industrial (Figure V-15). These land use classifications are based on observations and community input; there are no legal zoning districts within the community at this time.
- ***Residential*** – The community has both single-family and multi-family housing units. Residential areas are generally on the north and west sides of the community, with proposed expansion to the north.
- ***Public and Semi-public*** – Public and semi-public buildings and facilities are generally located in the center of the community, in the vicinity of the school. These buildings and facilities include the fire station, government buildings, health clinic, police station, community center, and school.
- ***Commercial*** – Office buildings, stores, and other businesses are generally located in the south central section of town, also in the vicinity of the school.
- ***Industrial*** – Industrial land uses typically occur on the southeast side of town. Industrial land uses include the airport, fuel storage tanks, landfill, power plant, telecommunications facilities, and wastewater treatment facilities.

4.7.5 *Community Facilities and Utilities*

4.7.5.1. Facilities

- A health clinic, staffed by community health aides, is open each day and is available 24 hours a day for emergencies.
- Community facilities include the community center, police station, and fire station equipped with fire engines and an ambulance.
- The fire department is equipped with a pumper apparatus and a pumper/water tender apparatus, capable of pumping 1,250 gallons per minute (gpm) and 750 gpm of water respectively, for a total of 2,000 gallons of water per minute (Steurmer 2005).
- Critical facilities and infrastructure in Point Lay are indicated in Figure V-21.

Point Lay Fire Station

4.7.5.2. Water

- A piped water system was constructed in 2000. The system is operational, with 1,750,000 gallons of piped water and 81,000 gallons of truck hauled water in 2003 (Grinage 2004).
- The NSB Public Works Department (PWD) provides the operations and maintenance for both the piped and haul water systems. (Grinage 2004).
- Water is derived from a surface water source, a nearby lake, filtered and stored in a tank. Approximately 60 percent of the residents have piped water and 40 percent have water delivered from a central watering point and stored in household tanks.
- The typical household water holding tank capacity is 250 gallons (Grinage 2004).
- The frequency of delivery is four to eight days (Grinage 2004).
- Water is treated with micro and nano filtration.
- There are 12 fire hydrants in the community. Hydrants are spaced greater than 500 feet apart, which exceeds the maximum allowable distance in the International Fire Code (Steurmer 2005).
- The maximum water flow in the community is approximately 1,250 gallons per minute, which would not meet the needs of large fire situations. For example, a fire in a large structure that does not have a sprinkler system, such as a store or equipment shop would require a water flow in excess of 2,000 gallons per minute. In structures that have a sprinkler system, such as the school, the sprinkler system would demand a flow of 1,000 gallons per minute and the hydrant flow demand would be an additional 1,000 gallons per minute (Steurmer 2005).

4.7.5.3. Sewer

- The sewer system installation project was constructed in 2000. The project has been completed, but there are ongoing issues of breaks in the line. In 2003, approximately 60 percent of households had flush toilets hooked to a sewer line while those that depended on the water truck have a holding tank.
- The PWD provides the operations and maintenance for both the piped and haul sewer systems (Grinage 2004).
- Information obtained from the Wastewater Discharge Permit dated January 2002 indicates the wastewater treatment plant discharges treated wastewater onto a small bluff overlooking Kasegaluk Lagoon via a 3-inch outfall line.

4.7.5.4. Solid Waste

- The old landfill is located approximately one mile from the end of the airport runway and was permitted in 1986. The closure plan was approved in 2000.
- NSB maintains a new Class III solid waste landfill that was constructed in 2000. Refuse is collected by and disposed of at the Borough operated landfill. The Class III landfill has a current permit, and typical contributions are unspecified. This landfill is anticipated to have a design life of 20 years and a total capacity of 17,580 cubic yards. The components of the new facility include a salvage area, burn box, sewage area, and drum storage area (Demientieff 2004).

4.7.5.5. Power

- The majority of households use diesel oil or a combination of diesel and electricity to heat their homes (Shepro, Maas et al. 2003).
- The NSB Power and Light System operates the local electric utility. Electricity is generated using diesel fuel and transmitted to housing via above-ground transmission lines (Grinage 2004). The power plant is expected to be upgraded in 2006; the project has been funded on the Borough capital improvement project program.
- The rate schedule for use between one and 600 kW was 15 cents per kW hour; use over 600 kW was 35 cents per kW hour (Grinage 2004).
- The community has a 2,400/4,160 Volt Distribution System with a 1,980 kW generation capacity. The system generated 3,164,000 kW hours in fiscal year 2004 (Grinage 2004).
- Point Lay residents receive a power cost equalization subsidy (Grinage 2004).

4.7.5.6. Fuel Oil/Petroleum Products

- The NSB PWD provides the operations and maintenance.
- All fuel storage tanks are connected above ground. Fuel is distributed via pipeline and truck depending on whether the recipient is commercial or residential. All tank information is based on a 2004 assessment that the NSB compiled for updating their Spill Prevention Control and Countermeasure (SPCC) plans (Piedlow 2004). Refer to Table 4.7-11.

Kali School

Table 4.7-11
Point Lay Fuel Tanks

Tank Location	Tank Description or Number	Year Installed	Type of Fuel	Tank Capacity (gallons)
COMMERCIAL				
Tank Farm & Gas Station	PLZ-32	1995	Diesel	250,000
	PLZ-38	1995	Diesel	250,000
	PLZ-6	Upgraded 1995	Diesel	125,000
	PLZ-7	Upgraded 1995	Diesel	125,000
	PLZ-33	1995	Gasoline	30,000
	PLZ-30	1995	Diesel	10,000
	PLZ-34	1995	Diesel	4,000
	PLZ-35	1995	Gasoline	4,000
Teleconference Center	Tank # 1	1998	Diesel	250
Search & Rescue	Tank # 1	1998	Diesel	500
Water Treatment Plant	Tank # 1	2000	Diesel	2000
Sewage Treatment Bldg	Tank # 1	2000	Diesel	2,000
Point Lay School	Tank # 1	1993	Diesel	10,000
	Tank #2	1993	Diesel	2000
	Tank #3 (Utility Bldg)	1987	Diesel	500
Health Clinic	Tank #1	1983	Diesel	7,000
	Tank #2	1983	Diesel	250
Fire Station	Tank #1	1981	Diesel	7,200
	Tank #2	1981	Diesel	275
Warm Storage Building	Tank #1	1988	Diesel	600
	Tank #2	1988	Diesel	300
Old Water Treatment Building	Tank # 1	1983	Diesel	881
	Tank # 2	1983	Diesel	264
Generator Building	Tank #1	1980	Diesel	10,000
	Tank #2 (Day tank)	1980	Diesel	300
	Tank #3	1980	Oil	250
USDW/Maintenance Bldg	Tank #1	1987	Diesel	6,000
	Tank #2	1987	Diesel	6000
CIP Camp	Tank #1	1975	Diesel	5000
Public Safety Office Bldg	Tank # 1	2000	Diesel	250
RESIDENTIAL				
Single-Family Residence (Blk 10, Lot 10)	Tank # 1	1998	Diesel	250
Single-Family Residence (Blk 10, Lot 9)	Tank # 1	1998	Diesel	250
Single-Family Residence (Blk 8, Lot 9)	Tank # 1	1990	Diesel	250
Single-Family Residence (Blk 8, Lot 8)	Tank # 1	1980	Diesel	250
Low Rise Multiple Family Residence (Blk 8, Lot 12)	Tank # 1	2000	Diesel	300
Single-Family Residence (Blk 9, Lot 9)	Tank # 1	1978	Diesel	250
Single-Family Residence (Blk 9, Lot 10)	Tank # 1	1978	Diesel	250
Single-Family Residence (Blk 8, Lot 3)	Tank # 1	1980	Diesel	250
Single-Family Residence (Blk 5, Lot 6A)	Tank # 1	1998	Diesel	250
Single-Family Residence (Foam Panel #1)	Tank # 1	2000	Diesel	250
Single-Family Residence (Foam Panel #2)	Tank # 1	2000	Diesel	250

Source: (Piedlow 2004)

4.7.6 *Communication Infrastructure*

The telecommunications facilities serving Point Lay include a fully digital local exchange telephone service, local dial-up Internet, widely-used citizens band (CB) radio, cable television, KBRW public radio broadcast, and the community access public teleconferencing center. Interconnection with the public, switched telecommunications network is via satellite circuits, which currently presents a limitation to the residents needing access to higher bandwidth services, especially the Internet. The NSB, in coordination with the NSB School District, leases private satellite circuits and maintains a "long-distance" network in order to provide distance education, tele-health and support for governmental service administration in the community (Arctic Slope Telephone Association Cooperative 2004).

4.7.7 *Natural Gas*

No energy conversions from diesel to natural gas are planned at this time. Past gas exploration showed insufficient quantities to make gas a viable option at current development costs for gas production (Piedlow 2004).

4.7.8 *Community Issues*

Issues, concerns, and comments were gathered during visits to the community in 2004 and 2005 for the Comprehensive Plan revision process. Comments identified at the meeting were grouped by the topics used to organize the Comprehensive Plan. There is a range of concerns identified for the community, and the list should be reviewed and updated annually for planning purposes.

Land Ownership and Status

- While some community expansion areas have been identified between the existing development and the airport, the lack of roads and utility connections to lots limits new housing construction. In addition, the vacation and relocation of the existing airport road would facilitate development of new residential areas. Contamination from fuel and glycol spills was mentioned as a factor for use of these lands and are discussed in more detail under hazards.
- As Air Force lands are cleaned up and become surplus, there was some discussion about availability of those lands for selection by Cully Corporation or the Native Village of Point Lay.
- When Alaska National Interest Lands Conservation Act (ANILCA) passed, we lost 25 percent of our original boundaries. We have coal in that lost land; Nuiqsut had oil. We need subsurface rights.

Land Use

- Discussions regarding fuel/glycol spills, houses and utilities sinking (subsidence), permafrost melting, and erosion in the vicinity of the fresh water supply have land use implications.

Fish and Wildlife/Subsistence

- Point Lay is trying to get bowhead subsistence whaling going again. International Whaling Commission (IWC) require a needs study. The Borough Mayor was going to get funds.
- Subsistence use areas were documented in 1987; it was done by a few of the elders. There is a map produced by this study at the power plant.
- Many subsistence resources are changing with climate change. Permafrost melting is increasing. Birds are migrating at different times. The fish are changing – we are going farther from the village to fish. There was a polar bear in Point Lay in June.
- We need a Beluga conservation plan. We were working with Robert Suydam in the Borough wildlife department, but progress appears to have stalled.

Hazards

- River erosion is threatening the current community freshwater source. There is a need to repair the water source via a dredging project coupled with armoring against erosion. It would also improve access. Alternate sources for water are on the landfill road, so water quality is questionable.
- Fuel and glycol spills are migrating towards the water storage. The spills could degrade the styrofoam insulation underneath. Drilling associated with new construction by the power plant is discovering glycol in the ground water. Houses and utilities sinking (subsidence) and permafrost melting were listed as major concerns and sources of maintenance costs. It was mentioned that sewer/ water pipes were being damaged.

Socioeconomic Factors

- Families are moving out because there are no jobs and no housing.
- The old school is divided into seven apartments for low-income housing. They can't afford houses; we need more low-income homes.
- Multiple generations share a single home; people are living in dangerous and overcrowded situations.
- More apartments are needed.
- Tagiugmiullu Nunamiullu Housing Authority (TNHA) is the housing authority for Point Lay. It may be possible to get some funding for homes from Bureau of Indian Affairs (BIA). The tribe has given some of its powers to the Arctic Slope Native Association (ASNA) and the Inupiat Community of the Arctic Slope (ICAS); the current funding share for Point Lay is enough to build half of a house.
- Plumbing and wiring updates are needed in many homes.
- There are not enough lots available for new construction.
- There is a real interest in developing the coal resources and creating coal related jobs.
- We need more local hire for teachers.
- The school is going to need more classrooms as the population increases.

- We need opportunities for technical training to supply the community with a skilled labor force and provide alternatives for kids who do not go to college. All skills are needed in the community.
- There need to be more health aides in the community.
- Cully Corporation needs to be more active and have more local hire; the corporation does not have an office with local staff in the community. Approximately 70% of Cully Corporation shareholders live outside of Point Lay.

Public Services, Facilities, and Government

- The NSB built this village. The corporation is not here and is not involved in this village. The corporation and village IRA council need to be here and work together with the NSB.
- There are inadequate facilities at the airport; there is a need for an airport terminal facility with restrooms.
- In 2004, the washeteria was closed; it was a big issue for the community. It's a false argument that people can have washers and dryers in their homes because there are no hookups and there is often no space for them. There was a resolution for the Cully Corporation to operate the washeteria. In 2005, the facility had re-opened and was operated by the corporation.
- The community needs a new/bigger post office.
- If bypass mail goes by truck to Deadhorse, it will raise prices for shipping and travel, especially as flights decrease. Without subsidies, it's going to be too expensive to go anywhere.
- The store needs to be enlarged, but it is not in very good financial standing. There needs to be more fresh food and better storage for food; some food is spoiled due to current storage methods.
- The community needs a day care facility.
- A grant writer is needed to obtain funds for community projects.
- Stockpiled gravel is limited/reserved for the airport; it is not available for other projects. The Borough dredge was shipped out early before more gravel could be stockpiled for community purposes. The community needs access to gravel.
- Tank farms need to be sited farther from the community.
- Approximately 70 percent of homes are connected to water/sewer, but some are failing due to subsidence. We have a gravity flow system, which is buried very deeply. The lines are shearing off with subsidence in some locations. Lines being sheared were causing up to 40 percent loss of water.
- There are not likely to be future water and sewer project expansions because the construction equipment was shipped out.
- There have been serious leaks in the water system; the north end of town is not well protected for fire purposes, due to the damage in the water system.
- Repairs to roads are not being done properly; there is not enough insulation around water and sewer lines, and the ground is not freezing back properly.

- We have a white elephant water and sewer system. We need an enhanced truck haul system. We still have two systems operating in the community, creating operational inefficiencies.
- Coal is a cheap power and residential heating source. The early program by ASRC to bring coal into the community for residential heating was a success and people saved a lot of money on their fuel bills, but it has been stopped. Some people are now taking the special coal burning stoves out of their houses because they are not being used and they take up too much space.
- The transition from Borough utilities to co-op process is being pushed, but it will result in higher power costs.
- Costs for power are going up. The Borough presently runs the system. There is concern about the village voice in the co-op. There is also concern over responsibility for maintenance costs and the ability of Pt. Lay to compete against other communities in the co-op for grants. As of 2004, Pt. Lay had not signed on to the co-op arrangement.
- We need better heating systems for new homes. The current systems won't work during power outages. Toyo stoves are not adequate; they are intended to be *secondary* sources of heat. Under high winds, stovepipes will back up and back fire. We need boiler systems for heat and hot water. (See comments on coal heating.)
- We want to utilize waste heat from the power plant.
- The heat in Borough facilities could be better regulated, saving fuel.
- Why aren't we looking at alternative energy sources (wind, solar)?
- There are ongoing problem as an unincorporated community to enforce laws and ordinances. We are looking for mechanisms to enforce laws and regulations. The village could use updated information on incorporation pros and cons and responsibilities.
- When is title 19 going to be revised? It's too weak to enforce related to oil companies' activities.

Petroleum and Mineral Development

- We need data to prove cumulative effects. Could a cumulative effects fund be developed – similar to the compensation fund – to spread out the burden across all of the projects?
- See comments related to development of coal resources and Title 19 revision.

4.7.9 *Community Priorities*

The following priorities have been formally identified by the village in previous recommendations, correspondence, the Borough five-year Community Improvement Program (CIP), or resolutions passed by city councils. Other community needs have been informally identified in the preceding discussion of issues.

- **Heavy Equipment –** Additional equipment is needed like a bigger backhoe and rock saw. Current water/sewer is not working and they don't have the equipment to correct the water/sewer line.

- **Fuel Handling –** A fuel handling dock facility is needed for unloading fuel. At present time, it is very hazardous how they unload and reload the fuel to the fuel storage facility. If there were a disaster, it would be very dangerous for the way they are handling the fuel. We wouldn't be able to handle a break on the line to the fuel storage.
- **Snow Fence –** When the project is complete, it will be off of the easement by about 10 feet.
- **Water/sewer Expansion –** We do not have a rock saw and a bigger backhoe to work on the current breakage in the water/sewer line. We have had many freeze ups in the community to date and the system is down.
- **Sewage –** Public Works have been building and locating honey bucket boxes in the community due to the problems with the sewer system. It takes the staff a while to collect them and the current system could become a health hazard.
- **Sewage –** There has been some confusion over the ownership of particular septic tanks in the community.
- **Asbestos Removal and Employment –** There was a project in Point Lay but the community was not included on the project. Point Hope got the contract and did not hire anyone from the local community. Several people in Point Lay are certified, but were not informed of refresher training to keep certifications current. Training is difficult because it is usually not offered locally.

The following projects for Point Lay are on the Borough's CIP list pending funding or project completion:

- Shelter and trail markers
- Roadway erosion
- Water and sewer system extensions
- Airport expansion
- Snow Removal Equipment Building and warm storage
- Warm storage for sewer equipment
- Power plant upgrade
- Fuel tank construction
- Repair/construct fuel pipelines
- Relocation of fuel storage tanks
- Fuel handling dock facility
- Health clinic upgrade

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North Slope Borough
Wainwright Village Profile

Prepared for:
The North Slope Borough

Prepared by:
URS Corporation

October 2005

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Abbreviations

ADEC ..... Alaska Department of Environmental Conservation
ANCSA ..... Alaska Native Claims Settlement Act
ASRC ..... Arctic Slope Regional Corporation
CB ..... citizen's band
CIP ..... Community Improvement Program
kW ..... kilowatt
NPRA ..... National Petroleum Reserve – Alaska
NSB ..... North Slope Borough
PWD ..... Public Works Department
SPCC ..... Spill Prevention Control and Countermeasure

North Slope Borough
Wainwright Village Profile

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4.8 Wainwright Village Profile

4.8.1 *Summary*

Wainwright is located on a bluff facing the Chukchi Sea, approximately 90 miles to the southwest of Barrow (Figure B-1). The community is approximately three miles from the mouth of the Kuk River. Wainwright is located within the region that has become the National Petroleum Reserve – Alaska (NPRA).

The area around Wainwright has a long history of human habitation. There are many historic and contemporary hunting and fishing camps in this area. The people of Wainwright identify closely with their ocean environment and refer to themselves as the Tagiumiut, or the people of the sea. The community was strongly influenced by reindeer herding, oil and gas exploration, and military activities.

In 1904 a school and health clinic were constructed, establishing the community site. A post office was constructed in 1916. Wainwright was incorporated as a fourth-class city in 1962, and re-classified as a second-class city in 1971. The Native Village of Wainwright is a federally recognized tribe, and is governed by Wainwright Tribal Council. Olgoonik Corporation is the local village corporation.

Wainwright's population grew fairly steadily from 1950 to 1998, with some plateaus and minor declines. The population decline between 1998 and 2003 is attributed to the completion of several large capital improvement projects, and the corresponding decline in jobs available in the community. Wainwright has a young population, with high ratios of dependents to wage earners. At the same time, the community has high rates of unemployment and underemployment. The community has high levels of subsistence activities and use of subsistence resources.

The community infrastructure has had several upgrades in recent years. Water and sewer projects funded by the North Slope Borough (NSB) have been completed. An electric utility is functional in the community, as well as telecommunications. The North Slope Borough School District operates the Alak School, which serves kindergarten through twelfth grade students.

Sources: (University of Alaska - Arctic Environmental Information and Data Center 1978; Alaska Consultants Incorporated 1978, approximate; Wickersham & Flavin Planning Consultants 1982; Alaska Consultants Incorporated 1983h; Shepro, Maas et al. 2003; DCED 2004)

Aerial View of Wainwright

4.8.2 *Physical Environment*

- Wainwright is located on a bluff facing the Chukchi Sea, southwest of Barrow. The community is approximately three miles from the mouth of the Kuk River (Alaska Consultants Incorporated 1983h; DCED 2004).
- The community encompasses 17.6 square miles of land and 24.9 square miles of water (DCED 2004).
- The village site is fairly flat and poorly drained. Elevations range from sea level to approximately 50 feet. Soils in the Wainwright area are typically silty sands of marine deposition, occasionally mixed with gravel. As with most North Slope villages, the community is underlain with permafrost. In the Wainwright area, summer thaws vary from one foot in poorly drained areas to five feet in well-drained soils (Alaska Consultants Incorporated 1983h).
- The climate is arctic with temperatures ranging from –56 to 80 degrees Fahrenheit. Precipitation averages 5 inches annually, with 12 inches of snow (DCED 2004).
- The physical characteristics of Wainwright are available in more detail in prior planning documents (Wickersham & Flavin Planning Consultants 1982; Alaska Consultants Incorporated 1983h).

Community view

4.8.2.1. Hazards

- With the community's coastal location, potential natural hazards include beach erosion, flooding, storm tides, ice override, and subsidence due to permafrost melting. However, existing data are not generally available for the location and extent of hazards; potential hazard conditions should be considered further on a project-specific basis.
- According the flood hazard database (US Army Corps of Engineers 2000), the community has little chance of flooding due to the community's elevation, although there exists a high potential for beach erosion. Flood events have occurred historically, including events in 1963, August 1970, and in the fall of 1986. All events were a result of storm surge, but the extent of the flood was waves reaching the top of the bluff.
- Flood potential, based on wave height, is illustrated in Figure V-24.
- Offloading equipment, fuel, and supplies from barges is becoming a hazardous task as ocean characteristics change.
- Human-caused environmental hazards include potentially contaminated sites. Alaska Department of Environmental Conservation (ADEC) has eleven sites in Wainwright listed in their contaminated sites database (ADEC 2004). Refer to Table 4.8-1.

Table 4.8-1
Potentially Contaminated Sites in Wainwright

Site Name	Location	Status	Reckey
AKARNG Wainwright FSA	Church Road, Wainwright, AK 99782	Inactive	1995310118801
Wainwright DEW /LIZ-3/Drum Storage	Kuk River on the, Wainwright, AK 99782	Closed	198931X902551
Wainwright DEW Line Site/LIZ-3	Kuk River on the, Wainwright, AK 99782	Active	198931X902502
Wainwright DEW Line/LIZ-3/Airstrip	Kuk River on the, Wainwright, AK 99782	Closed	198931X102555
Wainwright DEW Line/LIZ-3/Garage	Kuk River on the, Wainwright, AK 99782	Active	198931X902550
Wainwright DEW Line/LIZ-3/Landfill	Kuk River on the, Wainwright, AK 99782	Active	198931X902552
Wainwright DEW/LIZ-3/Fuel Spills	Kuk River on the, Wainwright, AK 99782	Active	198931X102553
Wainwright DEW/LIZ-3/VehicleStorage	Kuk River on the, Wainwright, AK 99782	Closed	198931X102554
Wainwright High School Tank Farm	School Street, Wainwright, AK 99782	Active	1992310121301
Wainwright Tank Farm	No Address, Wainwright, AK 99782	Inactive	1991310117001
Wainwright Washeteria	Main St. & Airport Road, Wainwright, AK 99782	Active	1996310120401

Source: (ADEC 2004)

Note: The community has also identified a list of potentially hazardous sites that are of concern to the community. Consult with the community for a current list.

4.8.3 *Human Environment*

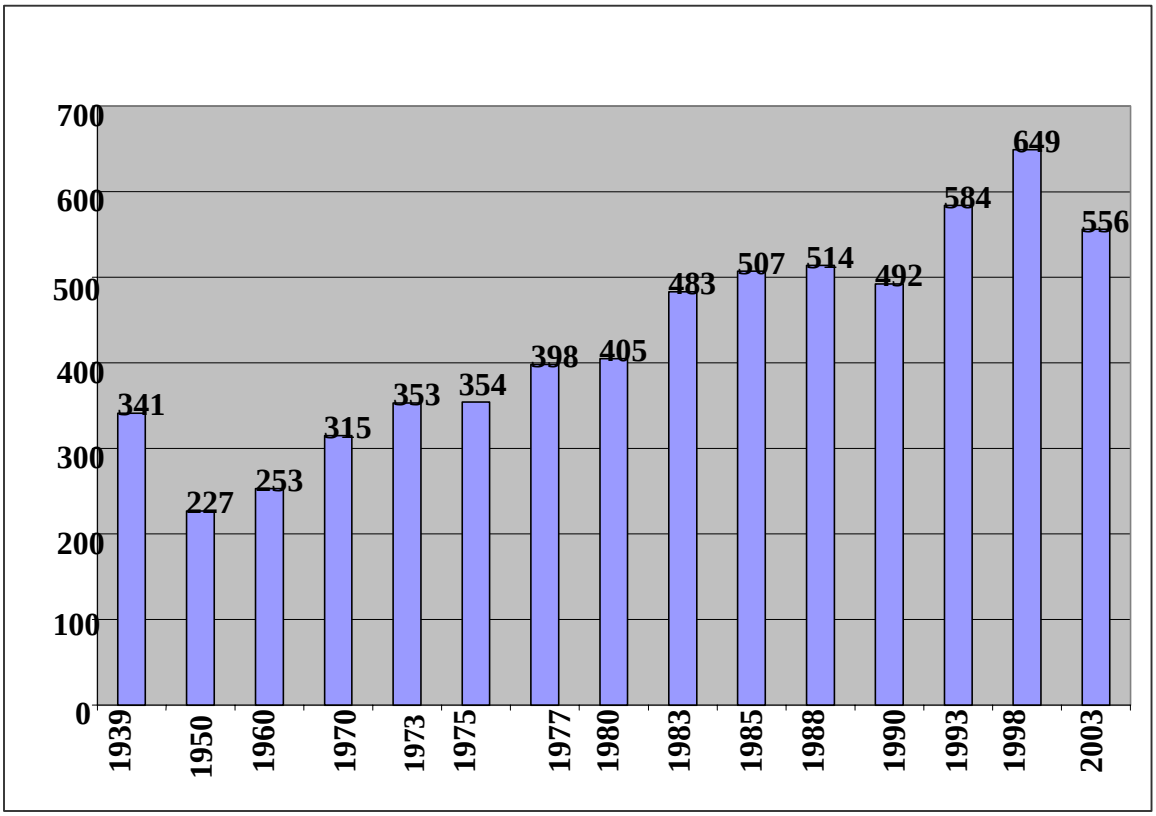
- The area around Wainwright has a long history of human habitation. In 1904 a school and health clinic were constructed, establishing the community site. A post office was constructed in 1916 (University of Alaska - Arctic Environmental Information and Data Center 1978; Alaska Consultants Incorporated 1983h; DCED 2004).
- The history of the community was strongly influenced by reindeer herding, oil and gas exploration, and military activities (Alaska Consultants Incorporated 1983h).
- Wainwright was incorporated as a fourth-class city in 1962, and re-classified as a second-class city in 1971 (Alaska Consultants Incorporated 1983h; DCED 2004).
- Olgoonik Corporation is the local Alaska Native Claims Settlement Act (ANCSA) village corporation (DCED 2004).

4.8.3.1. Population

- Wainwright's population grew fairly steadily for about 50 years. The recent population decline is attributed to the completion of several large capital improvement projects, and the subsequent decline in available jobs (Shepro, Maas et al. 2003). Refer to Figure 4.8-1.

- Wainwright has a young population; average ages in the community are less than in the state or nation. The proportion of the population under the age of 17 has declined from 41 percent in 1998 to 37 percent in 2003. There is a high ratio of dependents to wage earners (Shepro, Maas et al. 2003). Refer to Tables 4.8-2 and 4.8-3.

Figure 4.8-1
Wainwright: Population Growth Patterns 1939–2003



Source: (Shepro, Maas et al. 2003)

Table 4.8-2
Wainwright: Average Age of Community Members, 2003*

	Average Age	Percentage 15 and Under	N
Male	29.7	33.9%	244
Female	29.2	33.3%	207
Inupiat Male	23	36.3%	226
Inupiat Female	22	35.2%	196
All	29.5	33.9%	451

Note: *Results include only those individuals participating in the census survey and providing their age to the census enumerators.
Source: (Shepro, Maas et al. 2003)

Table 4.8-3
Comparison Age Cohorts: Wainwright, Alaska, and the United States, 2003*

	Wainwright	Alaska	U.S.
% 17 Years and Under	37.3%	30.4%	25.7%
% 65 Years and Older	8.2%	5.7%	12.4%

Note: *Results include only those individuals responding to the census survey and providing their age to the census enumerators.
Source: (Shepro, Maas et al. 2003)

4.8.3.2. Economy

- The North Slope Borough (28 percent), North Slope Borough School District (26 percent), and the Olgoonik Corporation and its subsidiaries (22 percent) are the major employers in the community. Together, the three entities provide approximately 76 percent of the total jobs.
- Olgoonik Corporation owns the Native store and employs some full-time workers while the Wainwright Co-op Native store, owned by stockholders, also provides some jobs to the residents.
- The unemployment rate in Wainwright was estimated at approximately 19 percent in the 2003 census, which is higher than the rates for the state (8 percent) or nation (6 percent) for a similar timeframe. Unemployment rates for Inupiat residents were higher than for non-Inupiats (Shepro, Maas et al. 2003). Refer to Table 4.8-4.
- The sale of arts and crafts is an important part of the economy in Wainwright. The 2003 census noted that over 20 percent of the households earned income from selling crafts (Shepro, Maas et al. 2003).

Table 4.8-4
Wainwright: Labor Force Comparison, 1998 and 2003*

Status	1998		2003	
	Number	%	Number	%
Permanent full-time	140	51.1%	105	39.8%
Temporary/Seasonal	54	19.7%	43	16.3%
Part-Time	32	11.7%	27	10.2%
Unemployed	48	17.5%	46	17.4%
Retired	*	0.0%	43	16.3%
Total	274	100.0%	264	100.0%

Note: *Results include only those individuals participating in the census survey and providing information about their labor status.

Source: (Shepro, Maas et al. 2003)

4.8.3.3. Subsistence

- While Wainwright subsistence users have opportunities for hunting terrestrial, riverine, and marine species, including bowhead whales, they tend to harvest mostly from the ocean (Fuller and George 1997).
- Approximately 92 percent of the households in Wainwright participate in the local subsistence economy; the participation rate for Inupiat residents was recorded at

approximately 99 percent (Shepro, Maas et al. 2003). Refer to Table 4.8-5. The subsistence lifestyle remains a primary cultural choice for Native households.

- In 2003, approximately 73 percent of all Wainwright residents said that half or more of their diet consisted of local subsistence resources, while 83 percent of Inupiat residents were heavily reliant on subsistence resources (half or more of their diet comes from local foods) (Shepro, Maas et al. 2003). Refer to Table 4.8-5.
- Employment status and income level do not appear to substantially affect Wainwright's Inupiat residents' level of reliance upon subsistence resources. Approximately 78 percent of Inupiat households with full-time employment were classified as heavily reliant on subsistence resources. Inupiat residents that were unemployed or held part-time employment also had high levels of subsistence reliance (Shepro, Maas et al. 2003).
- The greatest change in subsistence sharing patterns in Wainwright is in the number of households receiving all of their subsistence foods from other households. The 2003 census indicated a 44 percent increase in this category (Shepro, Maas et al. 2003).
- "The average household expenditure for subsistence activities in Wainwright in 2002 was $4,504, and the median expenditure was $2,500" (Shepro, Maas et al. 2003). Subsistence expenses include items such as fuel, ammunition, and other supplies needed to participate in subsistence activities.
- Subsistence activities occur year-round, with seasonal emphases. Preparation for whaling can occur year-round, but hunting for bowheads and belugas usually occurs in the spring and summer. Wainwright tends to hunt later than Barrow, when the lead systems are generally wider. Seal hunting occurs through most of the year. Hunting for caribou and moose typically occurs in summer and fall, while hunting for polar bears and other fur-bearers typically occurs during winter months (University of Alaska - Arctic Environmental Information and Data Center 1978; Fuller and George 1997).
- Subsistence Harvests – Data (Fuller and George 1997; Alaska Department of Fish and Game 2004b) indicates that Wainwright residents primarily utilize marine mammals, caribou, and fish, in terms of pounds per person harvested. Other resources are also utilized by the community, but had lower harvest levels in terms of pounds per person. Refer to Table 4.8-6.
- A generalized illustration of the distribution of subsistence uses is displayed in Figure B-5. The associated maps of the wildlife habitat and distribution (Figures B-6 through B-11) illustrate areas that are important for subsistence resources. All project proponents should consult with the Borough, communities, and tribes regarding current subsistence activities and locations, due to seasonal and annual variations of the resources.

Common vehicles for subsistence activities include snow machines, skiffs, and all-terrain vehicles

Table 4.8-5
Wainwright Household Use of Subsistence Resources by Ethnicity*

Level of Use	1998	2003		
	Total	Inupiat	Other	Total
None	0	1	8	9
Very Little	12	5	6	11
Less than Half	29	12	1	13
Half	32	30	1	31
More than Half	16	22	0	22
Nearly All	29	30	1	31
All	4	5	0	5
Total	122	105	17	122

Note: *Results include only those households responding to the census survey.

Source: (Shepro, Maas et al. 2003)

Table 4.8-6
Wainwright Subsistence Harvest Data, 1989

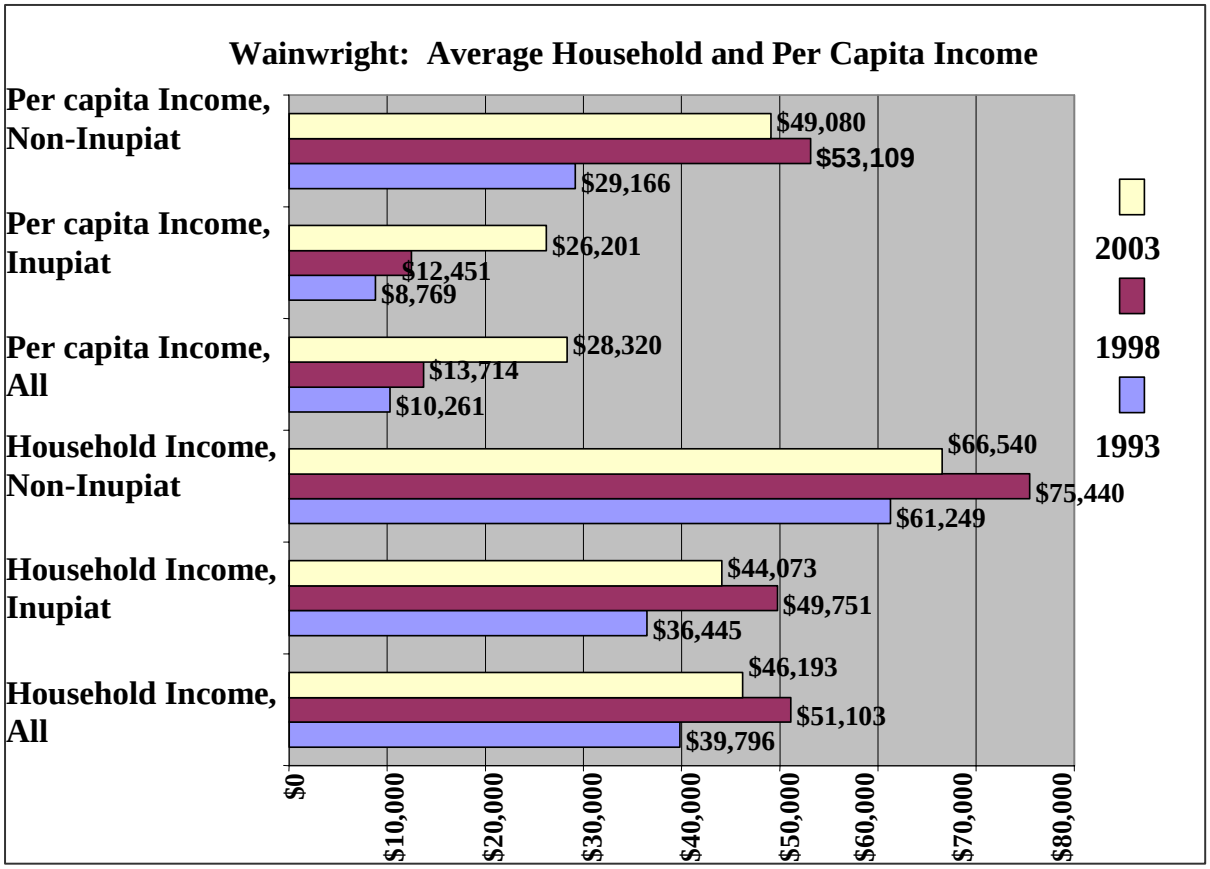
Resources Harvested	Estimated number	Estimated pounds	Average Pounds	Per Capita Pounds
All Resources		351,581.00	2,954.46	751.24
Fish	64,567	17,385.00	146.09	37.15
Salmon	180	1,044.00	8.77	2.23
Non-Salmon Fish	64,387	16,341.00	137.32	34.92
Land Mammals	760	83,389.00	700.75	178.18
Large Land Mammals	713	83,387.00	700.73	178.18
Small Land Mammals	47	2.00	0.02	0.00
Marine Mammals		243,594.00	2,047.01	520.50
Birds and Eggs	2,735	7,211.00	60.60	15.41

Source: (Alaska Department of Fish and Game 2004b)

4.8.3.4. Income

- The average household income for Wainwright was calculated to be $46,193, a decline from 1998 levels (Shepro, Maas et al. 2003). The average household income for non-Inupiat residents was much higher, at $66,540. The per capita income figures varied similarly. Refer to Figure 4.8-2 and Table 4.8-7.
- The 2003 census (Shepro, Maas et al. 2003) reported that 14 Wainwright households are below the poverty threshold; this is a 50 percent increase from the 1998 census.
- Approximately 20 percent of Wainwright households receive income from craft sales; the average reported income from craft sales over a three-year period is $2,662, or an average of $887 per year. The median income from craft sales was $1,200, over the same three-year period, or $400 per year (Shepro, Maas et al. 2003).

Figure 4.8-2
Wainwright: Average Household and Per Capita Income



Source: (Shepro, Maas et al. 2003)

Table 4.8-7
Wainwright Mean and Median Incomes*

	Households		
	All	Inupiat	Non-Inupiat
Mean	$46,193	$44,073	$66,540
Median	$44,000	$42,500	$58,200
Per capita			
	All	**Inupiat**	**Non-Inupiat**
Mean	28,320	$26,201	$49,080
Median	25,600	$23,620	$45,450

Note: *Results include only those participating in the census survey and providing information about individual and household incomes.

Source: (Shepro, Maas et al. 2003)

4.8.3.5. Housing

Wainwright home

- The 2003 census (Shepro, Maas et al. 2003) estimated that approximately 91 percent of Wainwright households live in single-family dwellings. The remaining households live in multi-unit structures (Table 4.8-8).
- The community had 179 housing units, with 148 occupied, leaving 31 vacant (DCED 2004).
- Diesel oil is the primary heat source for approximately 97 percent of the community, with baseboard/boiler systems (42 percent), forced air furnaces (19 percent), and stand-alone heaters (38 percent) serving the majority of Wainwright households (Shepro, Maas et al. 2003). Refer to Table 4.8-9.

Table 4.8-8
Wainwright: Households by Type of Housing, 1998–2003 Comparison*

Type of Housing	1998		2003	
	Number	Percent	Number	Percent
One-family house	129	97.0%	111	91.0%
Building for two families	0	0.0%	1	0.8%
Building for 3 0r 4 families	4	3.0%	3	2.5%
Building for 5 or more families	0	0.0%	6	4.9%
Other	0	0.0%	1	0.8%
Total	133	100.0%	122	100.0%

Note: *Results include only those households participating in the census survey and responding to the question about type of housing.

Source: (Shepro, Maas et al. 2003)

Table 4.8-9
Wainwright: Household Heating System in Place, 1998 and 2003*

Type of Heating System	1998		2003	
	Number	Percent	Number	Percent
Stand-Alone Heater	62	47.0%	47	38.2%
Forced-Air Furnace	35	26.5%	23	18.7%
Baseboard/Boiler System	30	22.7%	52	42.3%
Portable Heater	0	0.0%	1	0.8%
Other	5	3.8%	0	0.0%
Total	132	100.0%	123	100.0%

Note: *Results include only those households responding to the census survey and to the question about the type of heating system in place at the time of the survey.

Source: (Shepro, Maas et al. 2003)

4.8.4 *Land Ownership and Land Use*

4.8.4.1. Land Ownership

- Wainwright's boundary description has been vague since incorporation of the community in 1962; no precise delineation of the boundaries has been completed (Alaska Consultants Incorporated 1983h).
- The original townsite survey was patented to the Townsite Trustee in the US Bureau of Land Management. Many residents chose to hold their land in a restricted status, which retains some of the trust relationship between the federal government and Alaska Natives. Restricted status has both benefits and limitations, including exempting the property from taxation and regulatory codes as well as limiting the owner's ability to sell or transfer the property. There are 75 restricted lots in the community, encompassing approximately 25 acres.
- Olgoonik Corporation has the right to select 115,200 acres of federal land in the Wainwright area. Land status records indicate that 111,429 acres have been patented to the corporation. There are no lands pending conveyance at present; the remaining entitlement for the corporation is 3,771 acres (BLM 2005). The corporation is also entitled to 55,670 acres of land to be reallocated from ASRC; the entirety of this entitlement has been patented to the corporation (Alaska Consultants Incorporated 1983g).
- Arctic Slope Regional Corporation (ASRC) owns the subsurface rights to the Olgoonik Corporation lands, as well as additional lands in the area. ASRC has the option for subsurface rights in the NPRA as lands are opened for commercial development within 75 miles of lands selected by the village.
- There are Native allotment applications within lands selected by the Olgoonik Corporation. However, none of the proposed allotments are in the vicinity of the community.
- In Wainwright, as in other North Slope villages, accurate information regarding the status of title for individual lots is not always available (Alaska Consultants Incorporated 1983g). This can cause problems in land conveyances.

Alak School in Wainwright

4.8.4.2. Land Use

- Wainwright is zoned a Village District in the North Slope Borough Comprehensive Plan (Wickersham & Flavin Planning Consultants 1982). Regulations and guidelines for land uses allowed within Village Districts may be found in the Borough Land Management Regulations (1990).
- A variety of traditional land uses occur within and adjacent to the community for subsistence and cultural purposes. Important use areas should be identified on a project-specific basis.
- Land uses are divided into four general categories: residential, public and semi-public, commercial, and industrial (Figure V-22). These land use classifications are based on observations and community input; there are no legal zoning districts within the community at this time.
- ***Residential*** – The community has both single-family and multi-family housing units. Residential areas located throughout the community, with proposed expansion to the south.
- ***Public and Semi-public*** – Public and semi-public buildings and facilities are located throughout the community, but are concentrated in the area of the central area of the village. These buildings and facilities include the fire station, government buildings, health clinic, police station, community center, and school.

An evening game of basketball

- ***Commercial*** – Office buildings, stores, and other businesses are located throughout the town.
- ***Industrial*** – Industrial land uses typically occur on the perimeter of town, with a concentration of activities on the north side of town, as well as near the airport. Industrial land uses include the airport, fuel storage tanks, landfill, power plant, telecommunications facilities, and wastewater treatment facilities.

4.8.5 *Community Facilities and Utilities*

4.8.5.1. Facilities

- A health clinic, staffed by community health aides, is open each day and is available 24 hours a day for emergencies.
- Community facilities include the city hall, police station, and fire station equipped with fire engines, an ambulance, and a washeteria with a store.
- The fire department is equipped with a pumper apparatus and a pumper/water tender apparatus, capable of pumping 1,250 gallons per minute (gpm) and 750 gpm of water respectively, for a total of 2,000 gpm of water (Steurmer 2005).
- Critical facilities in Wainwright are indicated in Figure V-23.

4.8.5.2. Water

- The community's water system was constructed in 1998. The NSB maintains a water treatment and distribution facility, with 4,106,000 gallons of piped water and 114,000 gallons of truck hauled water in 2003 (Grinage 2004).
- In 2003, approximately 94 percent of households had running water piped to their house (Shepro, Maas et al. 2003).
- The NSB Public Works Department (PWD) provides the operations and maintenance for both the piped and haul water systems (Grinage 2004).
- Water is obtained from a surface water source, Merekruak Lake, three miles northeast of the community, then treated and stored in tanks. Water is distributed directly to the homes from this point or delivered to household tanks by truck. The water is filtered prior to chlorination.
- The typical household water holding tank capacity is 250 gallons (Grinage 2004).
- The frequency of delivery is four to eight days (Grinage 2004).
- Water is treated with micro and nano filtration.
- There are 22 fire hydrants in Wainwright; hydrants are spaced greater than 500 feet apart, which exceeds the maximum allowable distance in the International Fire Code (Steurmer 2005).
- The maximum water flow in the community is approximately 1,250 gpm, which would not meet the needs of large fire situations. For example, a fire in a large structure that does not have a sprinkler system, such as a store or equipment shop would require a water flow in excess of 2,000 gpm. In structures that have a sprinkler system, such as the school, the sprinkler system would demand a flow of 1,000 gpm, and the hydrant flow demand would be an additional 1,000 gpm (Steurmer 2005).

4.8.5.3. Sewer

- The piped sewer system project is operational. In 2003, approximately 93 percent of households had flush toilets hooked to a sewer line, while those that depend on the water truck for water have a holding tank or a honey bucket (Grinage 2004).

- The North Slope Borough provides operations and maintenance for both the piped and haul sewage systems.
- Information from the wastewater disposal permit, dated January 2002, indicates that wastewater is treated and the effluent is discharged into the Kuk River approximately one-half mile north of the community. The Kuk flows into the Chukchi Sea.

4.8.5.4. Solid Waste

- The landfill is located two miles northeast of town. NSB maintains a new Class III solid waste landfill that is an expansion to the old landfill that was closed in 2000. Refuse is collected by NSB. The Class III landfill expansion has a current permit. This landfill is anticipated to have a design life of 20 years and a total capacity of 68,647 cubic yards. The expansion facility also includes a burn cage (Demientieff 2004).

4.8.5.5. Power

- Approximately 97 percent of Wainwright households rely upon diesel fuel as a source of heating (Shepro, Maas et al. 2003).
- The NSB Power and Light System operates the local electric utility. Electricity is generated using diesel fuel and transmitted to housing via above-ground transmission lines (Grinage 2004).
- The rate schedule for use between one and 600 kilowatts (kW) is 15 cents per kW hour; use over 600 kW is 35 cents per kW hour (Grinage 2004).
- The community has a 7,200/12,400 Volt Distribution System with a 3,190 kW generation capacity. The system generated 5,141,000 kW hours in fiscal year 2004 (Grinage 2004).
- Wainwright residents receive a power cost equalization subsidy (Grinage 2004).

Beach erosion threatens homes and community facilities

4.8.5.6. Fuel Oil/Petroleum

- Olgoonik Corporation is the operations and maintenance contractor for NSB PWD (Grinage 2004).
- The community has multiple bulk storage, intermediate, and day tanks for fuel storage scattered throughout the village. Large capacity fuel storage tanks appear to be connected via aboveground pipelines. All fuel storage tanks are connected above ground. Fuel is distributed via pipeline and truck depending on whether the recipient is commercial or residential. All tank information is based on a 2004 assessment that the NSB compiled for updating their Spill Provention Control and Countermeasure (SPCC) plans (Piedlow 2004). Refer to Table 4.8-10.

Table 4.8-10
Wainwright Fuel Tanks

Tank Location	Tank Description or Number	Year Installed	Type of Fuel	Tank Capacity (gallons)
COMMERCIAL				
Tank Farm & Gasoline Station	AIN-83	1994	Diesel	250,000
	AIN-84	1994	Diesel	250,000
	AIN-85	1994	Diesel	250,000
	AIN-82	1994	Gasoline	150,000
	?	?	?	10,000
	AIN-74	1994	Diesel	4,000
	AIN-75	1994	Gasoline	4,000
Power Plant Tank Farm	AIN-23	1989	Diesel	250,000
	AIN-24	1988	Diesel	250,000
Fire Station	Tank #1	1981	Diesel	7,000
	Tank #2 (Day tank)	1981	Diesel	275
Washeteria	Tank #1	2000	Diesel	300
Vehicle Maintenance Shop	Tank #1	1984	Diesel	10,000
	Tank #2	1984	Diesel	500
	Tank #3	1984	Diesel	200
New Generator Building	Tank #1 (Day tank)	1988	Diesel	550
Sewage Treatment Bldg	Tank #1	2000	Diesel	2,000
	Tank #2 (Day tank)	2000	Diesel	100
NSB Lift Station	Tank #1	1999	Diesel	300
Wainwright School	Utility Bldg	1990	Diesel	10,000
	Utility Bldg (Day tank)	1990	Diesel	50
	High School	1990	Diesel	500
	Elementary School	1990	Diesel	10,000
Water Treatment Building	Tank #1	1988	Diesel	7,000
Health Clinic	Tank #2 (Day tank)	1988	Diesel	300
Public Safety Office	Tank #1	2000	Diesel	250
	Tank #2 (Day tank)	2000	Diesel	50
NSB Housing Maintenance	Tank #1	2000	Diesel	1,000
RESIDENTIAL				
Single-Family Residence (Teachers Housing #572)	Tank #1	1976	Diesel	350
Single-Family Residence (Teachers Housing #574)	Tank #1	1990	Diesel	370
5-Plex - (Blk 11, Lot 8)	Tank #1	1981	Diesel	1,000
5-Plex - (Blk 12, Lot 7)	Tank #1	1981	Diesel	1,000
Single-Family Residence (Blk 12, Lot 4)	Tank #1	1980	Diesel	500

Table 4.8-10 (continued)
Wainwright Fuel Tanks

Tank Location	Tank Description or Number	Year Installed	Type of Fuel	Tank Capacity (gallons)
Single-Family Residence (Blk 24, Lot 2)	Tank #1	1983	Diesel	300
Single-Family Residence (Blk 23, Lot 5)	Tank #1	1986	Diesel	250
Single-Family Residence (Blk 23, Lot 4)	Tank #1	1973	Diesel	300
Single-Family Residence (Blk 23, Lot 3A)	Tank #1	1979	Diesel	300
Single-Family Residence (Blk 10, Lot 9)	Tank #1	1981	Diesel	300
Single-Family Residence (Blk 10, Lot 10)	Tank #1	1981	Diesel	300
Single-Family Residence (Blk C-1, Lot 1)	Tank #1	1985	Diesel	250
Single-Family Residence (Blk C-1, Lot 2)	Tank #1	1983	Diesel	300
Single-Family Residence (Blk C-1, Lot 11)	Tank #1	1997	Diesel	250
Single-Family Residence (Blk 29, Lot 6)	Tank #1	1997	Diesel	250
Single-Family Residence (Blk 29, Lot 7)	Tank #1	1997	Diesel	250
Single-Family Residence (Blk 29, Lot 8)	Tank #1	1997	Diesel	250
Single-Family Residence (Blk 29, Lot 9)	Tank #1	1997	Diesel	250
Single-Family Residence (Blk 29, Lot 10)	Tank #1	2000	Diesel	250
Single-Family Residence (Blk 31, Lot 1)	Tank #1	2000	Diesel	250
Single-Family Residence (Blk 31, Lot 2)	Tank #1	2000	Diesel	250
Single-Family Residence (Blk 31, Lot 3)	Tank #1	2000	Diesel	250
Single-Family Residence (Foam Panel #1)	Tank #1	2000	Diesel	250
Single-Family Residence (Foam Panel #2)	Tank #1	2000	Diesel	250

Source: (Piedlow 2004)

4.8.6 *Communication Infrastructure*

The telecommunications facilities serving Wainwright include a fully digital local exchange telephone service, local dial-up Internet, widely-used citizens band (CB) radio, public safety VHF facilities, cable television, KBRW public radio broadcast, and the community access public teleconferencing center. The current penetration of basic, residential telephone service exceeds 85 percent. Interconnection with the public, switched telecommunications network is via satellite circuits, which currently present a bandwidth and high cost limitation to the residents needing access to the Internet and other advanced services dependent on affordable, higher bandwidth. NSB, in coordination with NSB School District, leases private satellite circuits funds a 'long-distance' network in order to provide distance education, tele-health and support for governmental service administration in the community (Arctic Slope Telephone Association Cooperative 2004).

4.8.7 *Natural Gas*

No energy conversions from diesel to natural gas are planned at this time. Past gas exploration showed insufficient quantities to make gas a viable option, taking into consideration costs for producing sufficient gas (Piedlow 2004).

4.8.8 *Community Issues*

Issues, concerns, and comments were gathered during visits to the community in 2004 and 2005 for the Comprehensive Plan revision process. Comments identified at the meetings were grouped by the topics used to organize the Comprehensive Plan. There is a range of concerns identified for the community, and the list should be reviewed and updated annually for planning purposes.

Land Ownership and Status

- Veteran's allotments have been denied. Is it possible to re-examine the cases?
- How can we get lands relinquished to local people?
- What is the status of land selections for corporations, Native allotments, and municipal selections? These need to be completed.

Land Use

- We need guidelines for oil and gas, as exploration and infrastructure expands westward.
- Permits need to require use restrictions for subsistence areas, based on location and times of use.

Fish and Wildlife/Subsistence

- The Tribal Council has an agreement with The Nature Conservancy to document subsistence use areas, but the mapping grant was not awarded.
- We need more information on research that is occurring near our community. Researchers should do a better job of incorporating the community in the beginning and they should have to make a presentation before they leave.
- We need to share data and incorporate items of common interest.

Hazards

- The status of coastal erosion and deposition, and their implications were discussed. The bluff is eroding in some locations, with loss of structures. In other cases, deposition is causing concerns about barge access. There was some suggestion that past dredging activities for the runway and other construction projects might have affected these patterns. The village needs a hazard plan and a potential relocation plan due to coastal erosion.

Socioeconomic Factors

- A smelt/fish industry was discussed focusing on the potential for local economic development activities and tradeoffs with competition for/availability of subsistence resources.
- Oyster farms were mentioned as an example of how other communities approached economic development.

- An arts and crafts cooperative was discussed, and was suggested to coordinate with the Alaska Arts Consortium. There needs to be assurances that the money gets to the artists at fair value.
- Overnight trips with guides could possibly develop a tourism niche, without impacts to subsistence or the environment.
- The availability of local jobs and the economy need to be a focus in the Comprehensive Plan.

Public Services, Facilities, and Government

- Is it possible for the NSB Youth and Elder conference to combine with the Northwest Arctic Borough Conference? It would be possible to share values and knowledge, especially related to traditional medicines.
- As Borough funding declines, we need to look at powers of the Borough that may need to be returned to the villages.
- Declining revenues in the Borough will eventually affect schools, but they should be the number one funding priority.
- If high schools are cut in villages, the Borough should consider regional high schools in smaller villages – in locations other than Barrow.

Petroleum and Mineral Development

- We need a written plan to guide oil and gas development.

4.8.9 *Community Priorities*

The following priorities have been formally identified by the village in previous recommendations, correspondence, the Borough five-year Community Improvement Prograom (CIP), or resolutions passed by city councils. Other community needs have been informally identified in the preceding discussion of issues.

- **Gravel sources –** Where can we get gravel for repair and maintenance on our roads for the community?
- **Gravel study –** Need to do a gravel study for the lagoon to the freshwater lake, road to dump.

The following projects for Point Hope are on the Borough's CIP list pending funding or project completion:

- Alak School roof renovation
- Tupkak Bar road access
- Gravel acquisition for roads
- Gravel placement/repair road to the dump
- Repair road to the fresh water lake
- Water tank replacement

- Water and sewer system extensions
- Airport lighting and safety areas
- Fuel tank construction

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North Slope Borough

Map Volume

Figures B-1 through B-12 and
Figures V-1 through V-24

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North Slope Borough
Map Volume

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Table 5-1
GIS Figure Dataset Reference

Figure	Reference Data			
	Source	Year	Description	Website
B-1	Alaska Department of Natural Resources	1995	Populated Places	www.asgdc.state.ak.us
	Alaska Department of Community and Economic Boundaries Development	1997	Borough and Rural Education Attendance Area	www.asgdc.state.ak.us
	Alaska Department of Natural Resources	2000	Administrative Large Parcel Boundaries	www.asgdc.state.ak.us
	U.S. Geological Survey EROS Alaska Field Office	1997	Alaska 300m Digital Elevation Model	http://agdc.usgs.gov
	U.S. Geological Survey EROS Alaska Field Office	1996	Alaska 1km Digital Elevation Model	http://agdc.usgs.gov
B-2	Alaska Department of Natural Resources	1995	Populated Places	www.asgdc.state.ak.us
	Alaska Department of Natural Resources	2000	Administrative Large Parcel Boundaries	www.asgdc.state.ak.us
	U.S. Geological Survey EROS Alaska Field Office	1997	Alaska 300m Digital Elevation Model	http://agdc.usgs.gov
	U.S. Geological Survey EROS Alaska Field Office	1996	Alaska 1km Digital Elevation Model	http://agdc.usgs.gov
	U.S. Bureau of Land Management	2005	Generalized Land Status for Alaska	http://www.blm.gov
B-3	Alaska Department of Natural Resources	1995	Populated Places	www.asgdc.state.ak.us
	U.S. Geological Survey EROS Alaska Field Office	1997	Alaska 300m Digital Elevation Model	http://agdc.usgs.gov
	U.S. Geological Survey EROS Alaska Field Office	1996	Alaska 1km Digital Elevation Model	http://agdc.usgs.gov
	North Slope Borough	2003	North Slope Borough Zoning	http://www.co.north-slope.ak.us
B-4	Alaska Department of Natural Resources	1995	Populated Places	www.asgdc.state.ak.us
	U.S. Geological Survey EROS Alaska Field Office	1997	Alaska 300m Digital Elevation Model	http://agdc.usgs.gov
	U.S. Geological Survey EROS Alaska Field Office	1996	Alaska 1km Digital Elevation Model	http://agdc.usgs.gov
	U.S. Bureau of Land Management	2002	Spatial Data Management System - Surveyed Lands, Alaska	http://www.blm.gov
	U.S. Bureau of Land Management	2000	Digitized Native Allotments	http://www.blm.gov
	North Slope Borough	Unknown	tluipoints	http://www.north-slope.org/
B-5	Alaska Department of Natural Resources	1995	Populated Places	www.asgdc.state.ak.us
	U.S. Geological Survey EROS Alaska Field Office	1997	Alaska 300m Digital Elevation Model	http://agdc.usgs.gov
	U.S. Geological Survey EROS Alaska Field Office	1996	Alaska 1km Digital Elevation Model	http://agdc.usgs.gov
	Dau, J. and Alaska Department of Fish and Game	2002	Western Arctic Caribou Herd Range 2002	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
	North Slope Borough and ABR Inc	2003	Teshekpuk Lake Calving Areas	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
	Arthur, S	2003	Central Arctic Caribou Herd Major Calving Areas 1990-2002	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
	Griffith, B et al	2003	Aggregate extent of concentrated calving 1983-2001	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
	North Slope Borough	Unknown	andrivsalb_f	http://www.north-slope.org/
	National Oceanic and Atmospheric Administration	2000	North Slope, Alaska ESI: Marine Mammals	http://response.restoration.noaa.gov
	Caroll, G. and R. Suydam	2002	Spotted Seal Haulouts	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html

Figure	Reference Data			
	Source	Year	Description	Website
B-5	National Oceanic and Atmospheric Administration	2000	North Slope, Alaska ESI: Terrestrial Mammal	http://response.restoration.noaa.gov
	Sverre Pedersen, Alaska Department of Fish and Game, Subsistence Division	Unknown	waterfowl	http://www.north-slope.org/
	North Slope Borough	1985 (?)	nsb_birds_spdata85_alb154nad83	http://www.north-slope.org/
	North Slope Borough	Unknown	bti_waterfowl	http://www.north-slope.org/
	North Slope Borough	Unknown	brw_waterfowl	http://www.north-slope.org/
	National Oceanic and Atmospheric Administration	2000	North Slope, Alaska ESI: Terrestrial Mammal	http://response.restoration.noaa.gov
	North Slope Borough	Unknown	piz_pho_Birds	http://www.north-slope.org/
	North Slope Borough	Unknown	btifish_modified	http://www.north-slope.org/
	North Slope Borough	Unknown	tshLakes	http://www.north-slope.org/
	North Slope Borough	Unknown	meaLakes	http://www.north-slope.org/
	North Slope Borough	Unknown	ainLakes	http://www.north-slope.org/
	North Slope Borough	Unknown	harLakes	http://www.north-slope.org/
	North Slope Borough	Unknown	barLakes	http://www.north-slope.org/
	North Slope Borough	Unknown	AllLandMammals	http://www.north-slope.org/
	North Slope Borough	Unknown	MarineMammalsSubsistence	http://www.north-slope.org/
	North Slope Borough	Unknown	MarineMammalsSubsistence	http://www.north-slope.org/
B-6	U.S. Geological Survey EROS Alaska Field Office	1997	Alaska 300m Digital Elevation Model	http://agdc.usgs.gov
	U.S. Geological Survey EROS Alaska Field Office	1996	Alaska 1km Digital Elevation Model	http://agdc.usgs.gov
	U.S. Bureau of Land Management	2005	Generalized Land Status for Alaska	http://www.blm.gov
	Alaska Department of Fish and Game	2002	2002 Anadromous Fish Streams	http://www.habitat.adfg.state.ak.us
B-7	Alaska Department of Natural Resources	1995	Populated Places	www.asgdc.state.ak.us
	U.S. Geological Survey EROS Alaska Field Office	1997	Alaska 300m Digital Elevation Model	http://agdc.usgs.gov
	U.S. Geological Survey EROS Alaska Field Office	1996	Alaska 1km Digital Elevation Model	http://agdc.usgs.gov
	ABR Inc. and The Nature Conservancy in Alaska	2003	Overall Bird Habitat Use	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
B-8	Alaska Department of Natural Resources	1995	Populated Places	www.asgdc.state.ak.us
	U.S. Geological Survey EROS Alaska Field Office	1997	Alaska 300m Digital Elevation Model	http://agdc.usgs.gov
	U.S. Geological Survey EROS Alaska Field Office	1996	Alaska 1km Digital Elevation Model	http://agdc.usgs.gov
	North Slope, Alaska ESI: Nests	2000	Nests	http://response.restoration.noaa.gov
	ABR Inc.	2003	Steller's Eider Observed Nesting.	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
	Suydam, R	2004	Steller's Eider Surveyed Primary Breeding Area	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
	The Nature Conservancy in Alaska.	2003	Goose Molting	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
	United States Fish and Wildlife Service	2003	Spectacled Eider Critical Habitat	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
	United States Fish and Wildlife Service	2002	Spectacled Eider Density Survey	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html

Figure	Reference Data			
	Source	Year	Description	Website
B-8 (cont.)	North Slope Borough	2003	Spectacled Eider Offshore Range	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
	National Oceanic and Atmospheric Administration	2000	North Slope, Alaska ESI: Birds	http://response.restoration.noaa.gov
B-9	Alaska Department of Natural Resources	1995	Populated Places	www.asgdc.state.ak.us
	U.S. Geological Survey EROS Alaska Field Office	1997	Alaska 300m Digital Elevation Model	http://agdc.usgs.gov
	U.S. Geological Survey EROS Alaska Field Office	1996	Alaska 1km Digital Elevation Model	http://agdc.usgs.gov
	North Slope Borough	Unknown	Spring Bowhead Whale Migration (April - early June)	http://www.north-slope.org/
	National Oceanic and Atmospheric Administration	2000	North Slope, Alaska ESI: Marine Mammal Point	http://response.restoration.noaa.gov
	Caroll, G. and R. Suydam	2002	Spotted Seal Haulouts	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
	Suydam, R and Alaska Department of Fish and Game	2004	Beluga Coastal Concentration Area	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
	Suydam, R and Alaska Department of Fish and Game	2004	Beluga Late Summer Use Area	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
	Suydam, R	2004	Bowhead Fall and Summer Feeding Areas	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
B-10	Alaska Department of Natural Resources	1995	Populated Places	www.asgdc.state.ak.us
	U.S. Geological Survey EROS Alaska Field Office	1997	Alaska 300m Digital Elevation Model	http://agdc.usgs.gov
	U.S. Geological Survey EROS Alaska Field Office	1996	Alaska 1km Digital Elevation Model	http://agdc.usgs.gov
	Dau, J. and Alaska Department of Fish and Game	2002	Western Arctic Caribou Herd Range 2002	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
	North Slope Borough and ABR Inc	2003	Teshekpuk Lake Calving Areas	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
	Arthur, S	2003	Central Arctic Caribou Herd Major Calving Areas 1990-2002	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
	Griffith, B et al	2003	Aggregate extent of concentrated calving 1983-2001	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
	Arthur, S	2003	Central Arctic Caribou Herd Concentrated Calving Areas 1990-2002	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
	Griffith, B et al.	2003	Aggregate extent of annual calving 1983-2001	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
B-11	Alaska Department of Natural Resources	1995	Populated Places	www.asgdc.state.ak.us
	U.S. Geological Survey EROS Alaska Field Office	1997	Alaska 300m Digital Elevation Model	http://agdc.usgs.gov
	U.S. Geological Survey EROS Alaska Field Office	1996	Alaska 1km Digital Elevation Model	http://agdc.usgs.gov

Figure	Reference Data			
	Source	Year	Description	Website
B-11 (cont.)	Dau, J. and Alaska Department of Fish and Game	2002	Western Arctic Caribou Herd Range 2002	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
	North Slope Borough and ABR Inc.	2003	Teshekpuk Lake Winter Locations	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
	The Nature Conservancy in Alaska.	Unknown	tesh_range_polygon	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
	The Nature Conservancy in Alaska.	Unknown	PCH_summer	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
	The Nature Conservancy in Alaska.	Unknown	PCH_winter	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
	Arthur, S.	2003	Central Arctic Caribou Herd Summer Range	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
	Arthur, S.	2003	Central Arctic Caribou Herd Winter Range	http://nature.org/wherewework/ northamerica/states/alaska/ preserves/art13301.html
B-12	Alaska Department of Natural Resources	1995	Populated Places	www.asgdc.state.ak.us
	U.S. Geological Survey EROS Alaska Field Office	1997	Alaska 300m Digital Elevation Model	http://agdc.usgs.gov
	U.S. Geological Survey EROS Alaska Field Office	1996	Alaska 1km Digital Elevation Model	http://agdc.usgs.gov
	Mapmakers Alaska	2003	As-built data of pipelines in Prudhoe Bay and Kuparuk areas	http://www.mapalaska.com/
	Mapmakers Alaska	2004	Historic NPRA Wells	http://www.mapalaska.com/
	Mapmakers Alaska	2004	Outer Continental Shelf Wells	http://www.mapalaska.com/
	Mapmakers Alaska	1997	As-built data of production facility pads, airstrips in Prudhoe Bay and Kuparuk areas	http://www.mapalaska.com/
	Mapmakers Alaska	1997	As-built data of cabin and tower locations, point data.	http://www.mapalaska.com/
	Mapmakers Alaska	2003	Expired Leases	http://www.mapalaska.com/
	North Slope Borough	2002	Arctic Leases	http://www.north-slope.org/
	Mapmakers Alaska	2003	Arctic Leases	http://www.mapalaska.com/
	Alaska Department of Natural Resources	1991	Coal Resources	http://www.asgdc.state.ak.us
V-1	North Slope Borough and Anaktuvuk Pass	2004	Anaktuvik Pass Land Use	http://www.north-slope.org/
	North Slope Borough	Unknown	Anaktuvuk Pass air photo	http://www.north-slope.org/
V-2	North Slope Borough	Unknown	Anaktuvuk Pass air photo	http://www.north-slope.org/
	North Slope Borough	2004	North Slope Borough Critical Facilities	http://www.north-slope.org/
V-3	North Slope Borough and Atqasuk	2004	Atqasuk Land Use	http://www.north-slope.org/
	North Slope Borough	Unknown	Atqasuk Air Photo	http://www.north-slope.org/
V-4	North Slope Borough	Unknown	Atqasuk Air Photo	http://www.north-slope.org/

Figure	Reference Data			
	Source	Year	Description	Website
V-4 (cont.)	North Slope Borough and Atqasuk	2004	Atqasuk Critical Facilities	http://www.north-slope.org/
V-5	North Slope Borough	Unknown	Barrow Transportation	http://www.north-slope.org/
	North Slope Borough	Unknown	Barrow Air Photo	http://www.north-slope.org/
	North Slope Borough	Unknown	Borough Zoning	http://www.north-slope.org/
V-6	North Slope Borough	Unknown	Barrow Transportation	http://www.north-slope.org/
	North Slope Borough	Unknown	Barrow Air Photo	http://www.north-slope.org/
	North Slope Borough	Unknown	Borough Zoning	http://www.north-slope.org/
V-7	North Slope Borough	Unknown	Barrow Transportation	http://www.north-slope.org/
	North Slope Borough	Unknown	Barrow Air Photo	http://www.north-slope.org/
	North Slope Borough	Unknown	Borough Zoning	http://www.north-slope.org/
V-8	North Slope Borough	Unknown	Barrow Transportation	http://www.north-slope.org/
	North Slope Borough	Unknown	Barrow Air Photo	http://www.north-slope.org/
V-9	North Slope Borough	2004	North Slope Borough Critical Facilities	http://www.north-slope.org/
	North Slope Borough	Unknown	Barrow Transportation	http://www.north-slope.org/
	North Slope Borough	Unknown	Barrow Air Photo	http://www.north-slope.org/
	North Slope Borough	2004	Barrow Critical Facilities	http://www.north-slope.org/
	North Slope Borough	Unknown	bndry_py	http://www.north-slope.org/
V-10	North Slope Borough	Unknown	Barrow Transportation	http://www.north-slope.org/
	North Slope Borough	Unknown	Barrow Air Photo	http://www.north-slope.org/
	North Slope Borough	2004	Barrow Critical Facilities	http://www.north-slope.org/
	North Slope Borough	Unknown	bndry_py	http://www.north-slope.org/
V-11	North Slope Borough	Unknown	Barrow Transportation	http://www.north-slope.org/
	North Slope Borough	Unknown	Barrow Air Photo	http://www.north-slope.org/
	North Slope Borough	Unknown	bndry_py	http://www.north-slope.org/
	North Slope Borough	Unknown	fld_4_rem_py	http://www.north-slope.org/
	North Slope Borough	Unknown	fld_6_rem_py	http://www.north-slope.org/
	North Slope Borough	Unknown	ld_8_rem_py	http://www.north-slope.org/
	North Slope Borough	Unknown	flood10ft_py	http://www.north-slope.org/
	North Slope Borough	Unknown	flood12ft_py	http://www.north-slope.org/
V-12	North Slope Borough	Unknown	parcel_py	http://www.north-slope.org/
	North Slope Borough and Kaktovik	2004	parcelspolybti	http://www.north-slope.org/
	North Slope Borough	Unknown	roadu_ln	http://www.north-slope.org/
	North Slope Borough	Unknown	Kaktovik Air Photo - North	http://www.north-slope.org/
	North Slope Borough	Unknown	Kaktovik Air Photo - South	http://www.north-slope.org/
V-13	North Slope Borough	Unknown	Kaktovik Air Photo - North	http://www.north-slope.org/
	North Slope Borough	Unknown	Kaktovik Air Photo - South	http://www.north-slope.org/

Figure	Reference Data			
	Source	Year	Description	Website
V-13 (cont.)	North Slope Borough and Kaktovik	2004	Kaktovik Critical Facilities	http://www.north-slope.org/
	North Slope Borough and Kaktovik	Unknown	curvert_ln	http://www.north-slope.org/
	North Slope Borough and Kaktovik	Unknown	pipeline_ln	http://www.north-slope.org/
	North Slope Borough and Kaktovik	Unknown	fence_ln	http://www.north-slope.org/
	North Slope Borough and Kaktovik	Unknown	roadu_ln	http://www.north-slope.org/
V-14	North Slope Borough	Unknown	Kaktovik Air Photo - North	http://www.north-slope.org/
	North Slope Borough	Unknown	Kaktovik Air Photo - South	http://www.north-slope.org/
	North Slope Borough and Kaktovik	2004	Kaktovik Critical Facilities	http://www.north-slope.org/
	North Slope Borough and Kaktovik	Unknown	curvert_ln	http://www.north-slope.org/
	North Slope Borough and Kaktovik	Unknown	pipeline_ln	http://www.north-slope.org/
	North Slope Borough and Kaktovik	Unknown	fence_ln	http://www.north-slope.org/
	North Slope Borough and Kaktovik	Unknown	roadu_ln	http://www.north-slope.org/
V-15	North Slope Borough and Nuiqsut	2004	Nuiqsut_Landuse	http://www.north-slope.org/
	North Slope Borough	Unknown	Nuiqsut Air Photo	http://www.north-slope.org/
V-16	North Slope Borough	Unknown	Nuiqsut Air Photo	http://www.north-slope.org/
	North Slope Borough and Nuiqsut	2004	Nuiqusit Critcal Facilities	http://www.north-slope.org/
V-17	North Slope Borough and Point Hope	2004	Point Hope Landuse	http://www.north-slope.org/
	North Slope Borough	Unknown	Point Hope Air Photo - West	http://www.north-slope.org/
	North Slope Borough	Unknown	Point Hope Air Photo - East	http://www.north-slope.org/
V-18	North Slope Borough and Point Hope	2004	Point_Hope Critical Facilities	http://www.north-slope.org/
	North Slope Borough	Unknown	fence_ln	http://www.north-slope.org/
	North Slope Borough	Unknown	pipeline_ln	http://www.north-slope.org/
	North Slope Borough	Unknown	culvert_ln	http://www.north-slope.org/
	North Slope Borough	Unknown	rail	http://www.north-slope.org/
	North Slope Borough	Unknown	roadp_ln	http://www.north-slope.org/
	North Slope Borough	Unknown	roadu_py	http://www.north-slope.org/
	North Slope Borough	Unknown	boundary_py	http://www.north-slope.org/
V-19	North Slope Borough	Unknown	Point Hope Air Photo - West	http://www.north-slope.org/
	North Slope Borough	Unknown	Point Hope Air Photo - East	http://www.north-slope.org/
	North Slope Borough	Unknown	roadp_ln	http://www.north-slope.org/

Figure	Reference Data			
	Source	Year	Description	Website
V-19 (cont.)	North Slope Borough	Unknown	roadu_py	http://www.north-slope.org/
	North Slope Borough	Unknown	boundary_py	http://www.north-slope.org/
	North Slope Borough	Unknown	fld_4_rem_py	http://www.north-slope.org/
	North Slope Borough	Unknown	fld_8_rem_py	http://www.north-slope.org/
	North Slope Borough	Unknown	fld_10_rem_py	http://www.north-slope.org/
	North Slope Borough	Unknown	fld_12_rem_py	http://www.north-slope.org/
	North Slope Borough	Unknown	parcel_py	http://www.north-slope.org/
V-20	North Slope Borough	Unknown	parcel_py	http://www.north-slope.org/
	North Slope Borough	Unknown	hydro_py	http://www.north-slope.org/
	North Slope Borough	Unknown	parcel_py	http://www.north-slope.org/
	North Slope Borough	Unknown	trans_ln	http://www.north-slope.org/
	North Slope Borough	Unknown	Point Lay Air Photo	http://www.north-slope.org/
V-21	North Slope Borough	2004	North Slope Borough Critical Facilities	http://www.north-slope.org/
	North Slope Borough	Unknown	parcel_py	http://www.north-slope.org/
	North Slope Borough	Unknown	hydro_py	http://www.north-slope.org/
	North Slope Borough	Unknown	trans_ln	http://www.north-slope.org/
	North Slope Borough	Unknown	Point Lay Air Photo	http://www.north-slope.org/
V-22	North Slope Borough and Wainright	2004	Wainwright Land Use	http://www.north-slope.org/
	North Slope Borough	Unknown	trans_ln	http://www.north-slope.org/
	North Slope Borough	Unknown	Wainwright Air Photo	http://www.north-slope.org/
V-23	North Slope Borough	Unknown	trans_ln	http://www.north-slope.org/
	North Slope Borough	Unknown	Wainwright Air Photo	http://www.north-slope.org/
	North Slope Borough and Wainright	2004	Wainwright Critical Facilities	http://www.north-slope.org/
V-24	North Slope Borough	Unknown	Wainwright Air Photo	http://www.north-slope.org/
	North Slope Borough	Unknown	flood2ft_py	http://www.north-slope.org/
	North Slope Borough	Unknown	flood4ft_py	http://www.north-slope.org/
	North Slope Borough	Unknown	flood6ft_py	http://www.north-slope.org/
	North Slope Borough	Unknown	flood8ft_py	http://www.north-slope.org/
	North Slope Borough	Unknown	flood10ft_py	http://www.north-slope.org/
	North Slope Borough	Unknown	flood12ft_py	http://www.north-slope.org/

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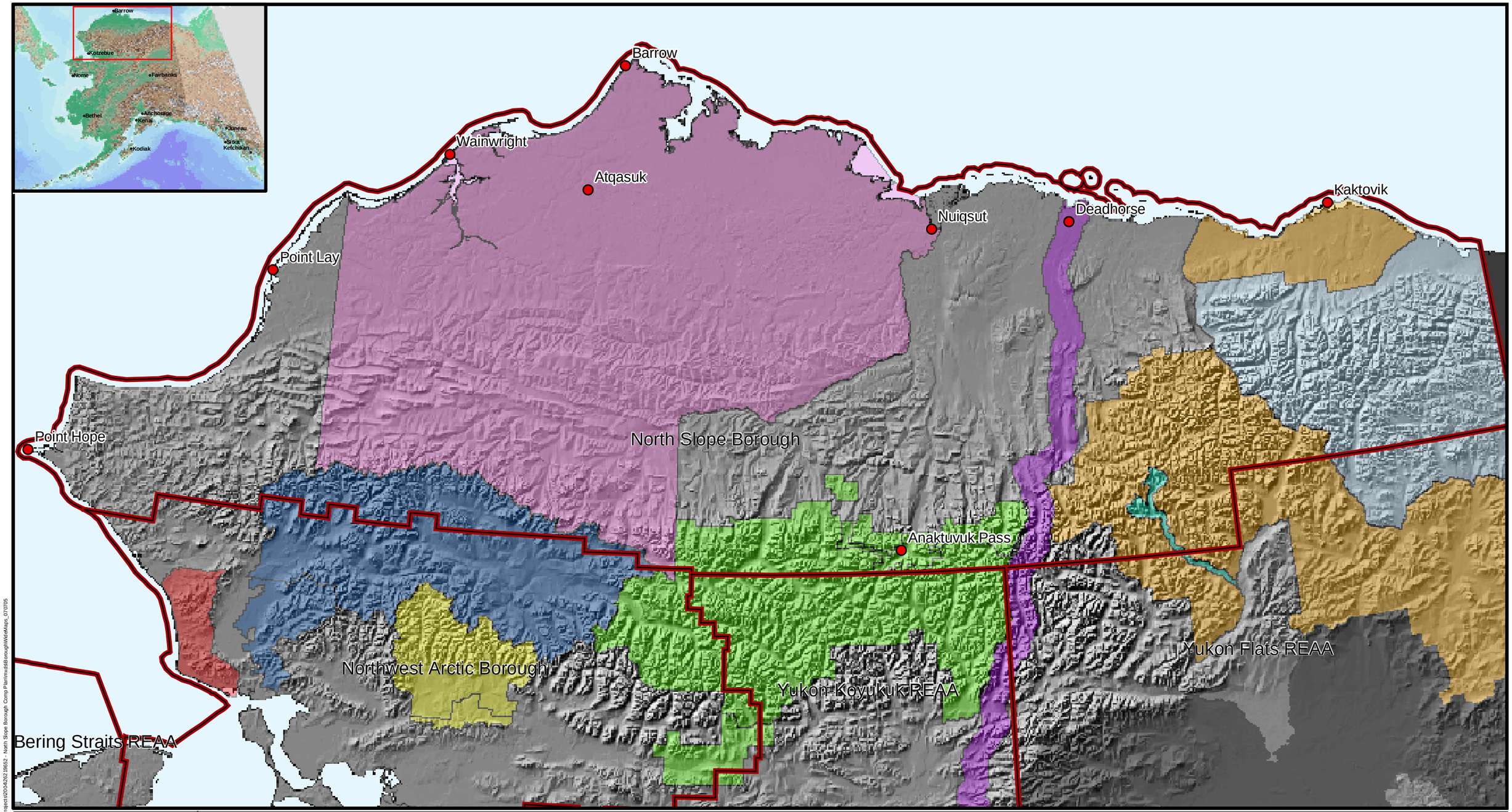


Boroughs & Rural Education Areas

Land Management Units

- Arctic National Wildlife Refuge (NWR)
- Arctic NWR Wilderness Area
- Yukon Flats National Wildlife Refuge
- Kobuk Valley National Park
- Gates of the Arctic National Park & Preserve
- Noatak National Preserve
- National Petroleum Reserve
- Wind Wild & Scenic River
- Cape Krusenstern National Monument
- James Dalton Highway Corridor

0 25 50 75 100 Miles

N W E S

Data Sources: ADNR, USGS

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

BOROUGH BOUNDARIES AND NORTH SLOPE BOROUGH COMMUNITIES

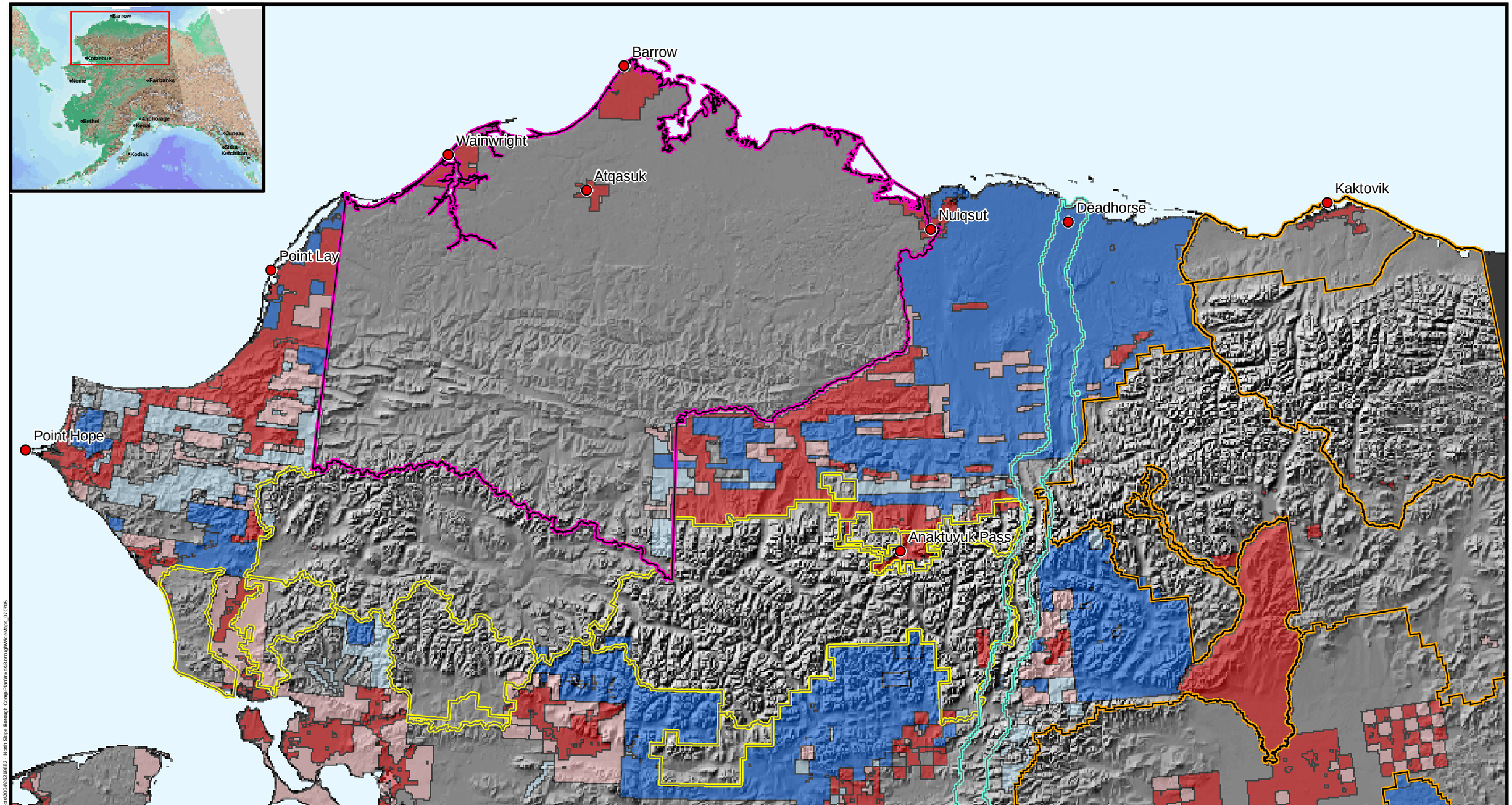
NORTH SLOPE BOROUGH, ALASKA

URS

JOB NO:	26219652	DRAWN:	MCM
DATE:	SEPTEMBER 2005	FILE:	BOROUGH_BOUNDARIES.MXD

FIGURE B-1

M:\Projects\26\04\26219652 - North Slope Borough Comp Plan\mxd\Borough\WideMaps_070705



M:\Projects\2004\26219652 - North Slope Borough Comp Plan\mxds\BoroughWideMaps, 07/07/05

Land Ownership Status

- Native Patent or Interim-Conveyance
- Native Selected
- State Patent or Tentative Approval
- State Selected

Land Management Units

- State of Alaska
- U.S. Bureau of Land Management
- U.S. Fish & Wildlife Service
- U.S. Park Service

0 25 50 75 100 Miles

N W E S

Data Sources: ADNR, USGS, BLM

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

LAND STATUS

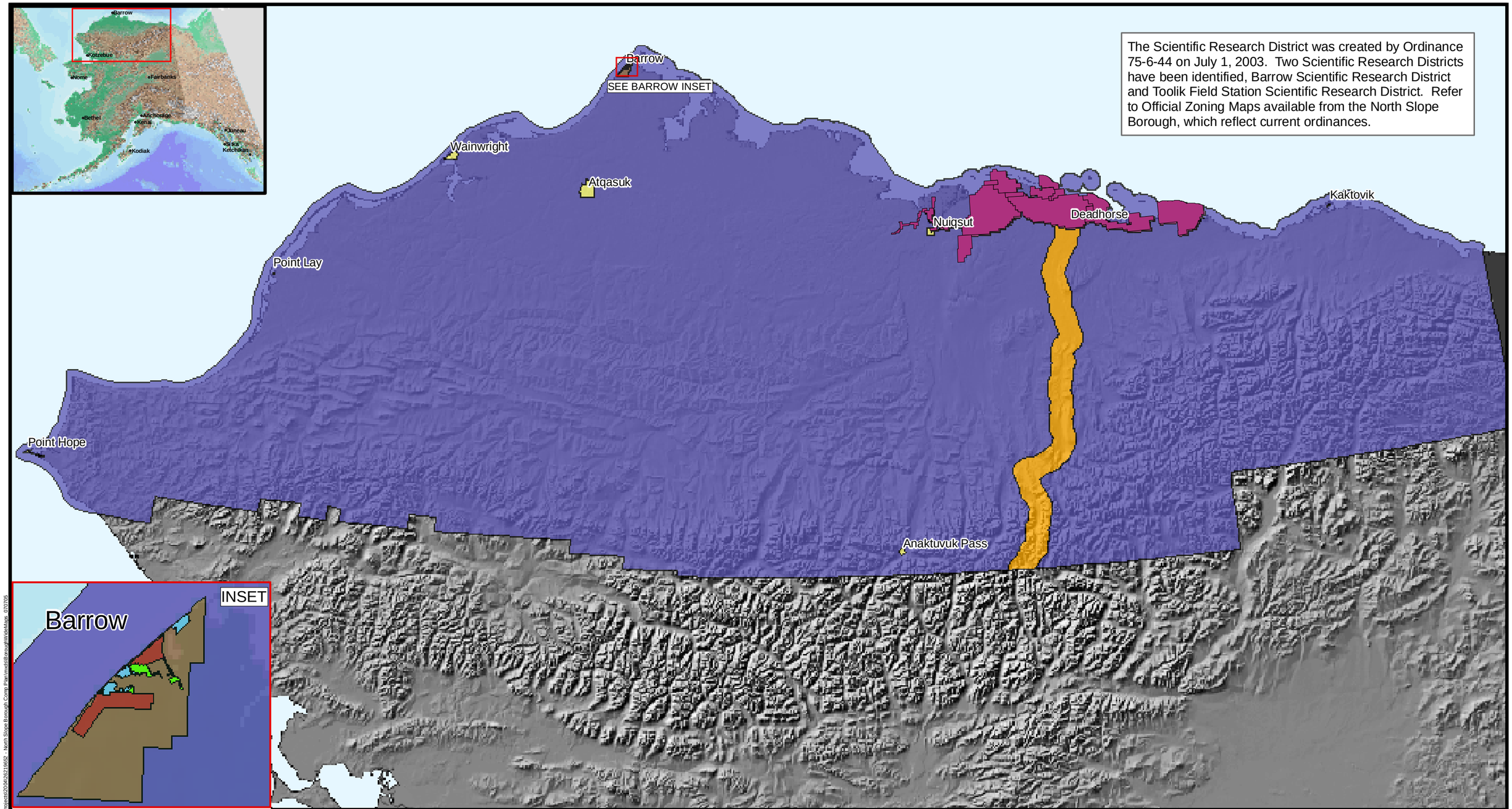
NORTH SLOPE BOROUGH, ALASKA

URS

JOB NO:	26219652	DRAWN:	MCM
DATE:	SEPTEMBER 2005	FILE:	LAND STATUS.MXD

FIGURE B-2

The Scientific Research District was created by Ordinance 75-6-44 on July 1, 2003. Two Scientific Research Districts have been identified, Barrow Scientific Research District and Toolik Field Station Scientific Research District. Refer to Official Zoning Maps available from the North Slope Borough, which reflect current ordinances.



Borough Zones
- Conservation
- Resource Development
- Transportation Corridor
- Village Districts

Barrow Zones
- Suburban
- Residential
- Mulit-Use
- Industrial

0 25 50 75 100 Miles

N W E S

Data Sources: ADNR, USGS, NSB

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

BOROUGH ZONING DISTRICTS

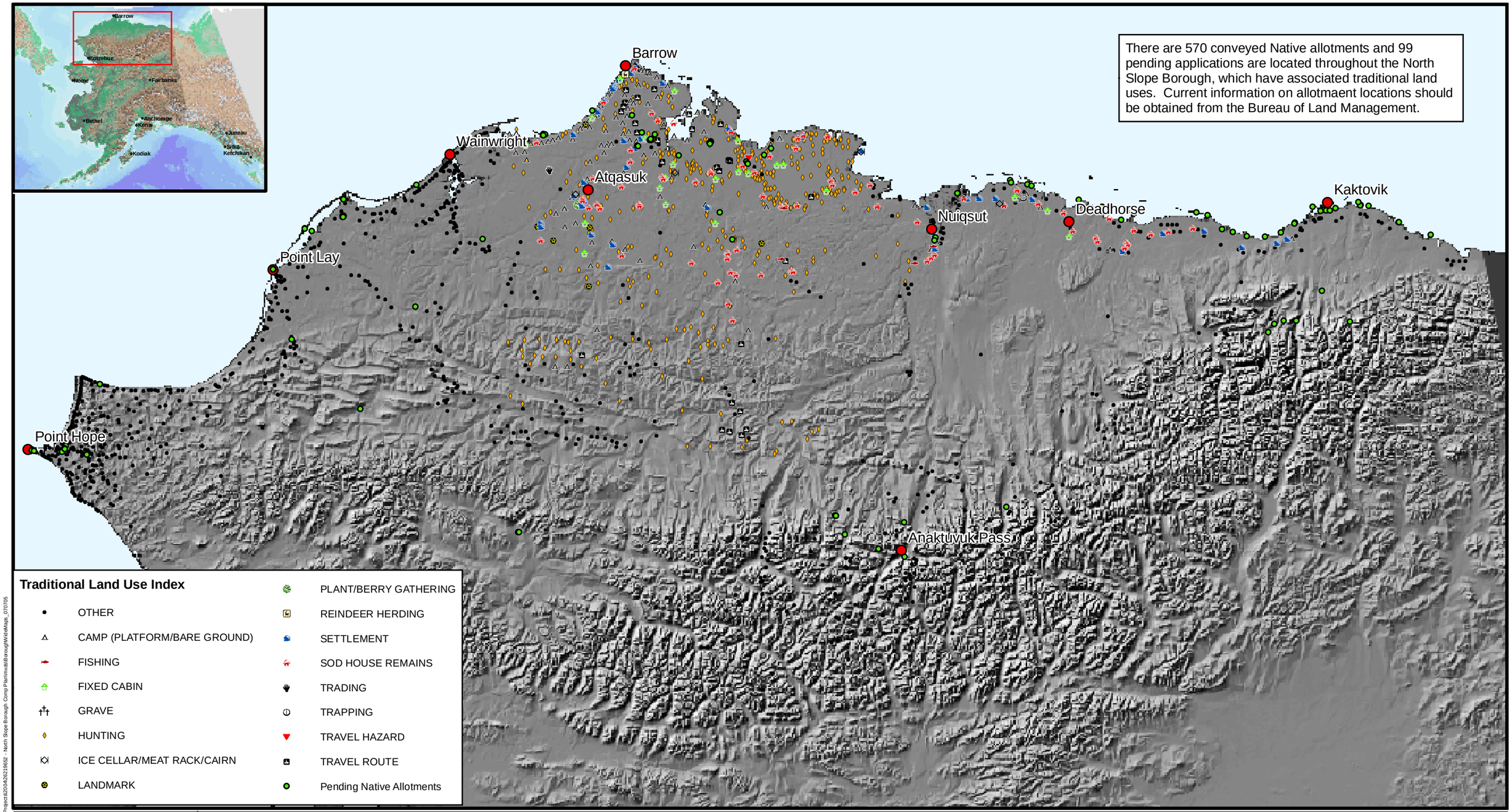
NORTH SLOPE BOROUGH, ALASKA

URS

JOB NO:	26219652	DRAWN:	MCM
DATE:	SEPTEMBER 2005	FILE:	ZONING_DISTRICTS.MXD

FIGURE B-3

M:\Projects\2004\26219652 - North Slope Borough Comp Plan\mxd\BoroughWideMaps 070705



There are 570 conveyed Native allotments and 99 pending applications are located throughout the North Slope Borough, which have associated traditional land uses. Current information on allotmaent locations should be obtained from the Bureau of Land Management.

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All points are approximate based on Traditional Land Use data from the North Slope Borough

0 25 50 75 100 Miles

N W E S

Data Sources: ADNR, USGS, NSB, BLM

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

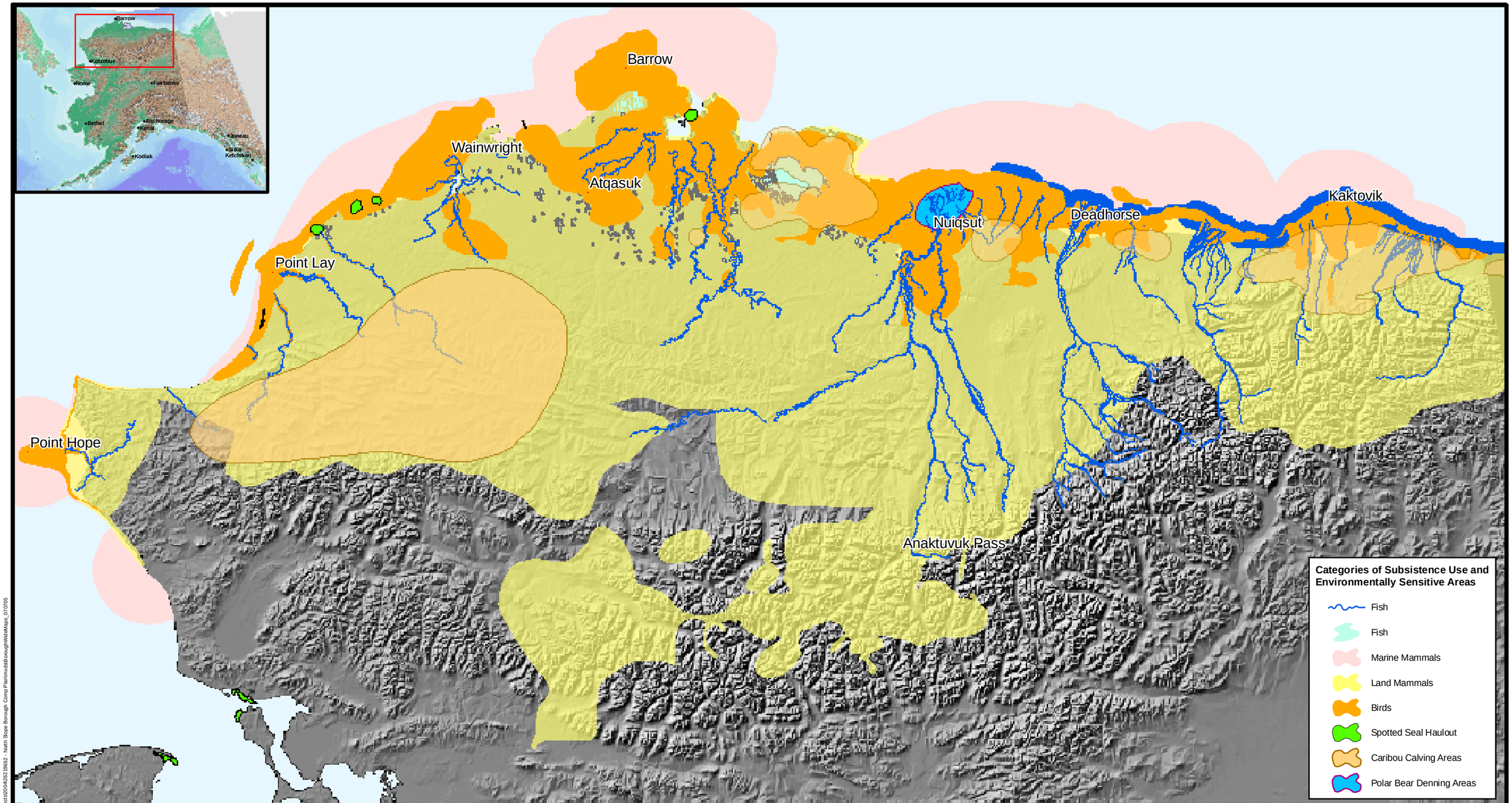
TRADITIONAL LAND USE

NORTH SLOPE BOROUGH, ALASKA

JOB NO:	26219652	DRAWN:	MCM
DATE:	SEPTEMBER 2005	FILE:	TRAD_LAND_USE.MXD

URS

FIGURE B-4



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This figure is a generalized illustration of the distribution of subsistence uses. Subsistence activities and locations have annual and seasonal variations.

Subsistence activities traditionally occurred throughout the Borough, including Prudhoe Bay and other industrial sites. Subsistence uses have been displaced from Prudhoe Bay and other industrial areas, particularly in the vicinity of Nuiqsut.

Subsistence areas of influence extend beyond harvest areas, including camps, cabins, Native allotments, access routes, butchering sites, and staging areas. The subsistence area of influence includes disruptive activities that have the potential to deflect migratory species away from traditional harvest areas and subsistence users, as well as areas critical to the welfare of the subsistence species.

Data Sources: ADNR, USGS, NSB, NOAA, ACMP, TNC, ABR, NSF, BASC

N W E S

0 25 50 75 100 Miles

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

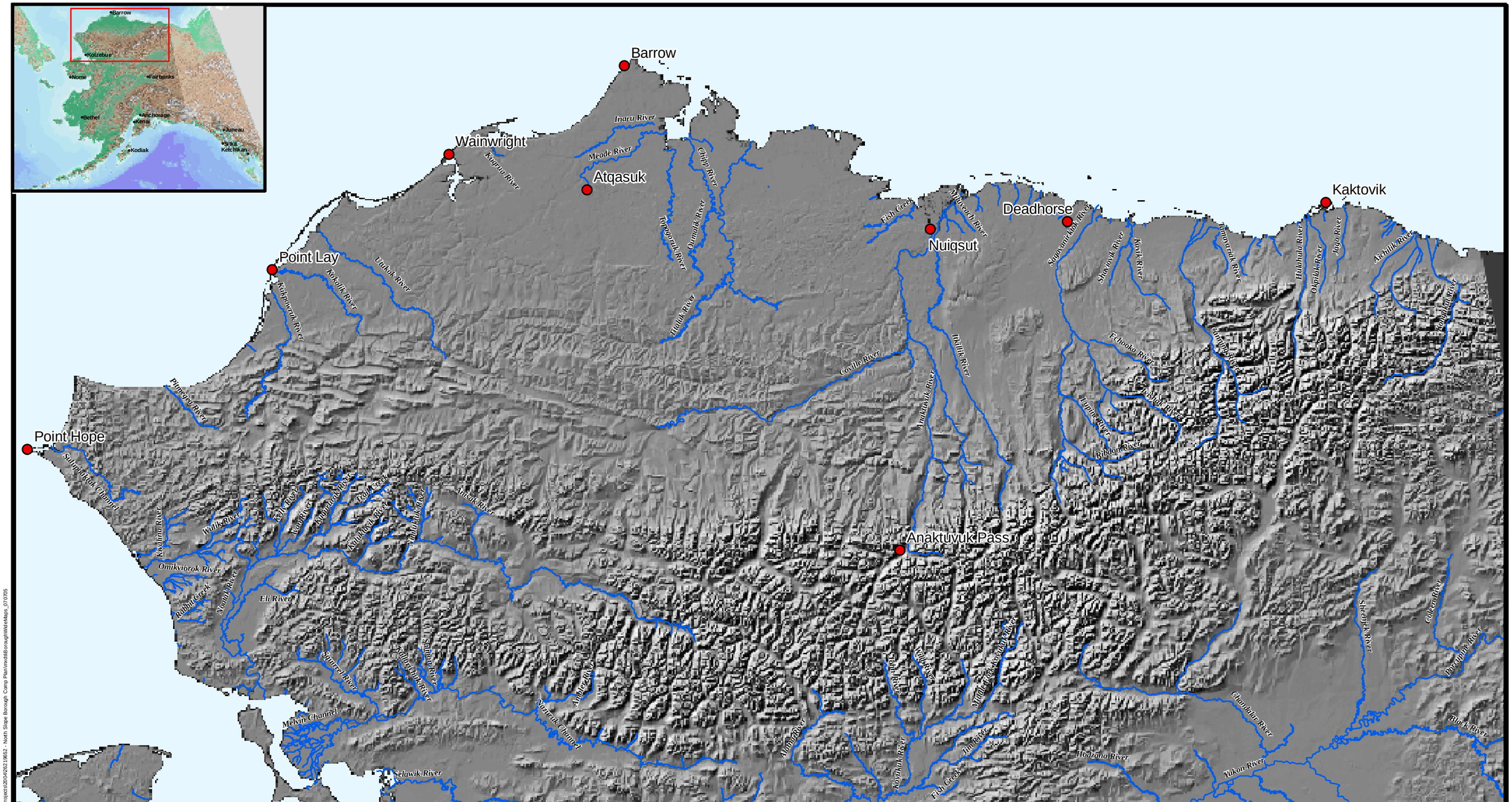
DISTRIBUTION OF SUBSISTENCE USE

NORTH SLOPE BOROUGH, ALASKA

URS

JOB NO:	26219652	DRAWN:	MCM
DATE:	SEPTEMBER 2005	FILE:	SUBSISTENCE.MXD

FIGURE B-5



0 25 50 75 100 Miles

N W E S

Data Sources: ADNR, USGS, ADF&G

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

ANADROMOUS STREAMS

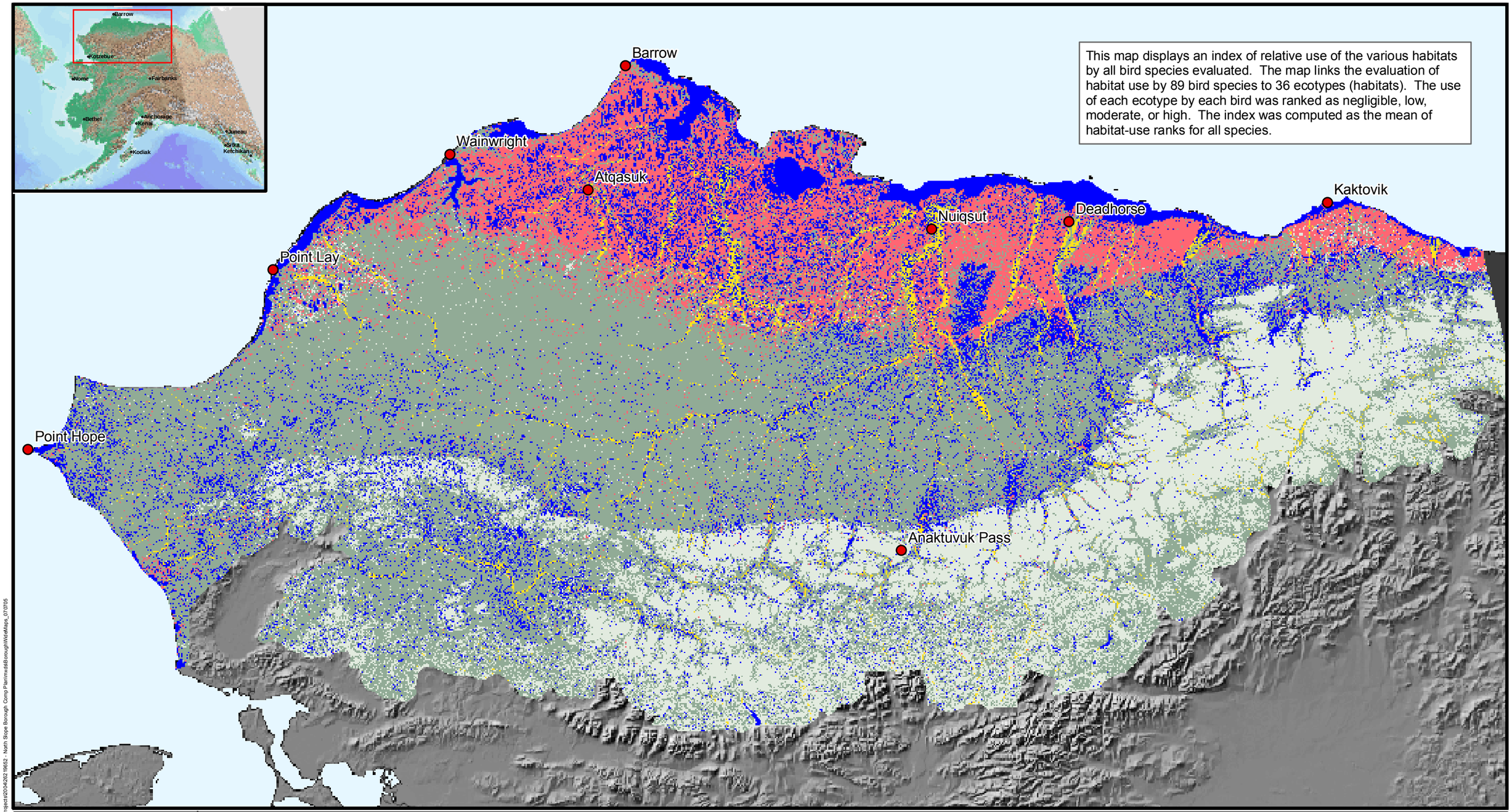
NORTH SLOPE BOROUGH, ALASKA

URS

JOB NO:	26219652	DRAWN:	MCM
DATE:	SEPTEMBER 2005	FILE:	ANADROMOUS_STREAMS.MXD

FIGURE B-6

M:\Projects\2004\26219652 - North Slope Borough Comp Plan\mxd\BoroughWideMaps_070705



This map displays an index of relative use of the various habitats by all bird species evaluated. The map links the evaluation of habitat use by 89 bird species to 36 ecotypes (habitats). The use of each ecotype by each bird was ranked as negligible, low, moderate, or high. The index was computed as the mean of habitat-use ranks for all species.

Overall Bird Habitat Use

- Very Low (0.00–0.20)
- Low (0.21–0.40)
- Moderate (0.41–0.60)
- High (0.61–0.85)
- Very High (0.86–1.55)

0 25 50 75 100 Miles

N W E S

Data Sources: ADNR, USGS, ADF&G, TNC, ABR

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

HABITAT USE BY BIRDS

NORTH SLOPE BOROUGH, ALASKA

URS

JOB NO:	26219652	DRAWN:	MCM
DATE:	SEPTEMBER 2005	FILE: BIRDS HABITAT USE.MXD	

FIGURE B-7

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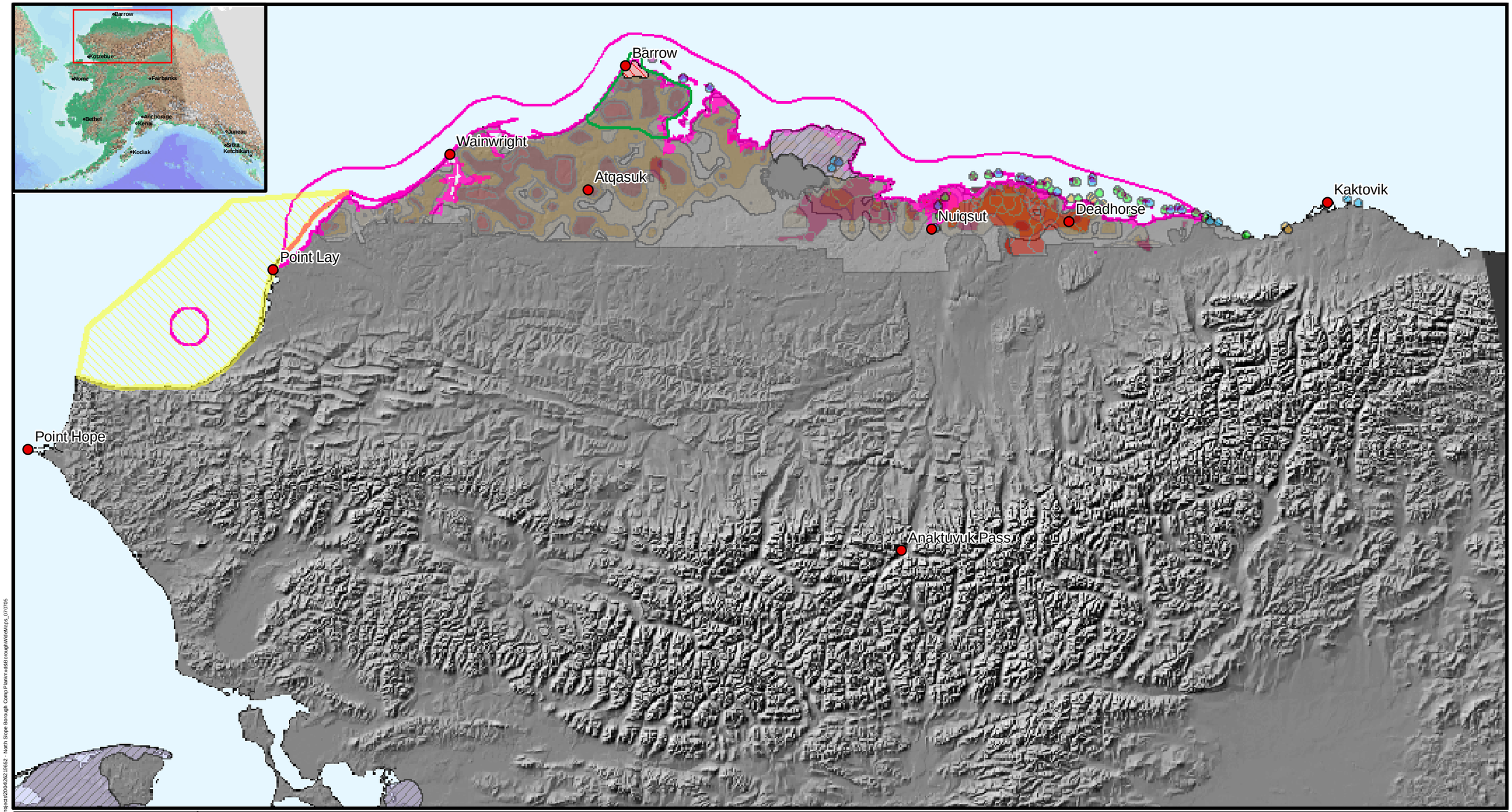

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Birds
- Brant
- King eider
- Steller's Eider Known Primary Breeding Range
- Steller's Eider Observed Range
- Geese Molting Concentration Areas

Nests
- Arctic tern
- Black guillemot
- Common eider
- Glaucous gull
- Sabine's gull

Spectacled Eider
- USFWS Spectacled Eider Designated Critical Habitat (Molting Area) *
- Spectacled Eider Offshore Range **

Spectacled Eider Breeding Density
- High
- Medium-High
- Medium
- Low
- None Observed

Ranges are representational; actual ranges and distributions have some annual variation.

0 25 50 75 100
Miles

N W E S

Data Sources: ADNR, USGS, ADF&G, TNC, ABR

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

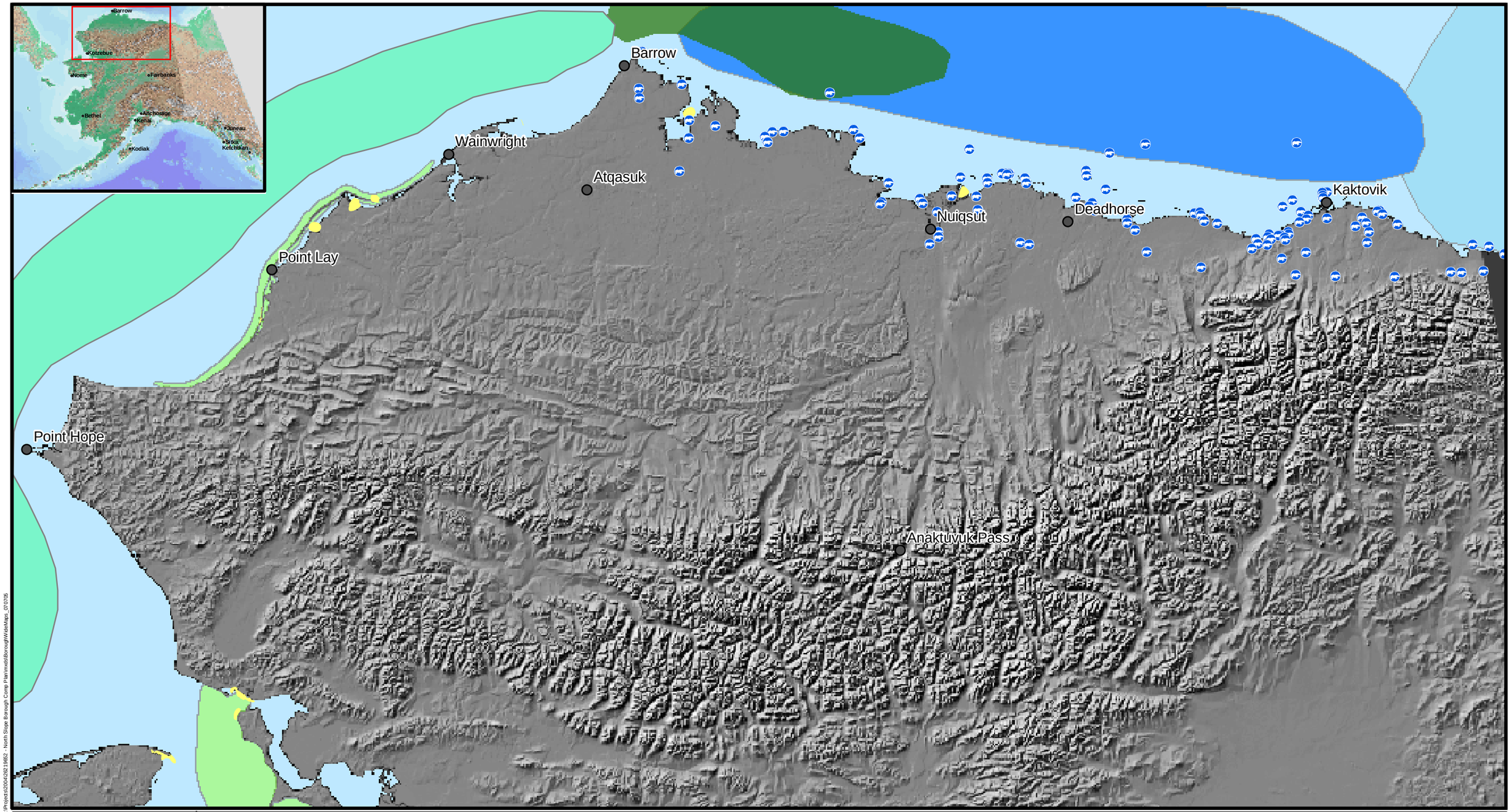
BIRDS/NESTS

NORTH SLOPE BOROUGH, ALASKA

URS

JOB NO:	26219652	DRAWN:	MCM
DATE:	SEPTEMBER 2005	FILE:	BIRDS_NESTS.MXD

FIGURE B-8



Marine Mammals

- Polar bear
- Beluga Whale Coastal Concentration Areas
- Beluga Whale Late Summer Use Area
- Bowhead Whale Fall Feeding Area
- Bowhead Whale Summer Feeding Area
- Known Spotted Seal Haulouts
- Spring Bowhead Whale Migration (April - early June)

Ranges are representational; actual ranges and distributions have some annual variation.

0 25 50 75 100 Miles

Bearded seals and ringed seals are found throughout the Beaufort & Chukchi Seas.

N W E S

Data Sources: ADNR, USGS, ADF&G, TNC, ABR

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

MARINE MAMMALS

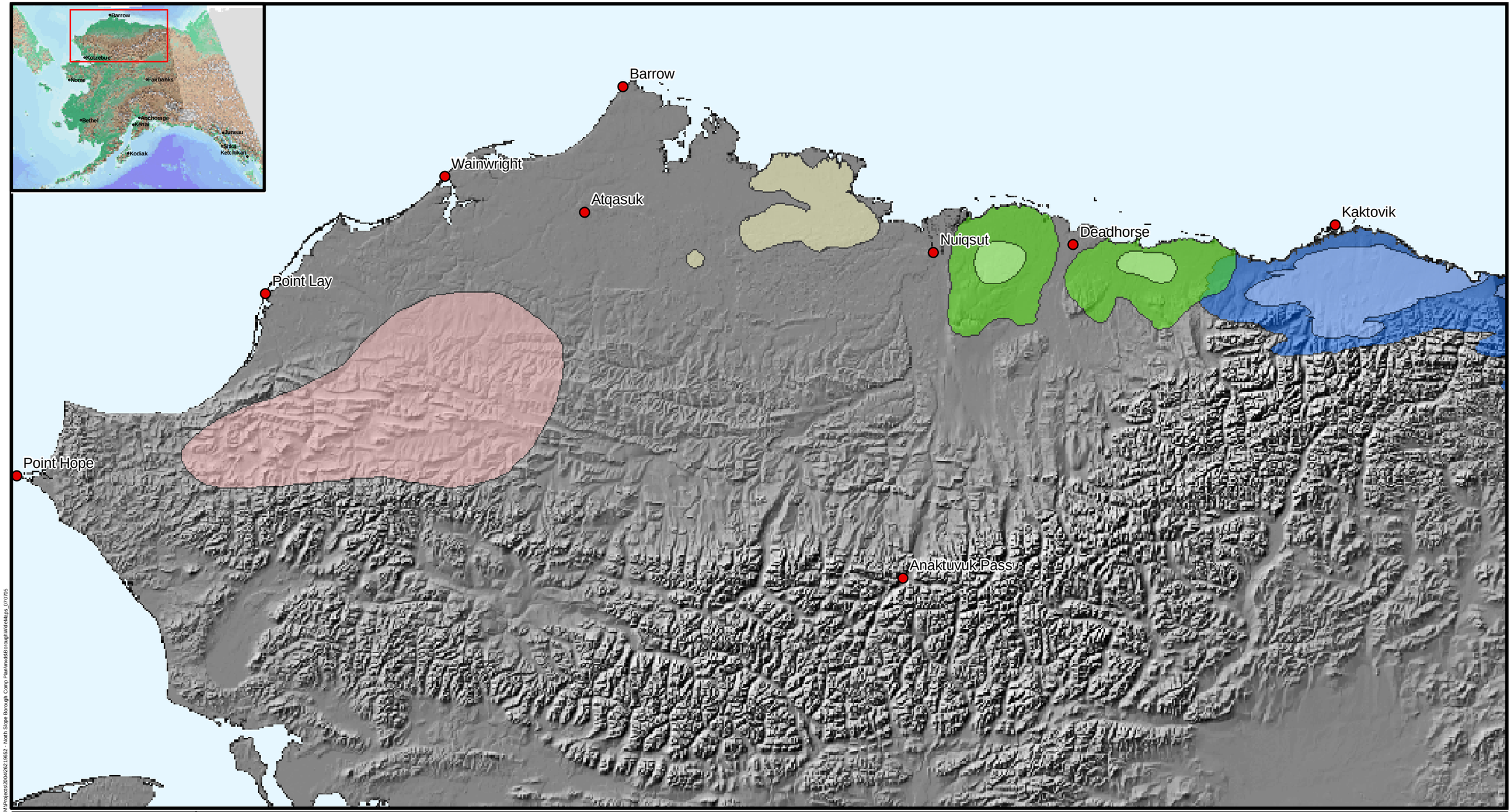
NORTH SLOPE BOROUGH, ALASKA

URS

JOB NO:	26219652	DRAWN:	MCM
DATE:	SEPTEMBER 2005	FILE:	MARINE_MAMMALS.MXD

FIGURE B-9

M:\Projects\2004\26219652 - North Slope Borough Comp Plan\mxd\BoroughWideMaps_070705



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Caribou Calving Areas

- Western Arctic Herd Calving Areas
- Teshekpuk Lake Herd Calving Areas
- Central Arctic Herd Major Concentrated Calving Areas
- Porcupine Herd Aggregate Extent of Concentrated Calving
- Central Arctic Herd Concentrated Calving Areas
- Porcupine Herd Aggregate Extent of Annual Calving

Ranges are representational; actual ranges and distributions have some annual variation.

0 25 50 75 100 Miles

N W E S

Data Sources: ADNR, USGS, ADF&G, TNC, ABR

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

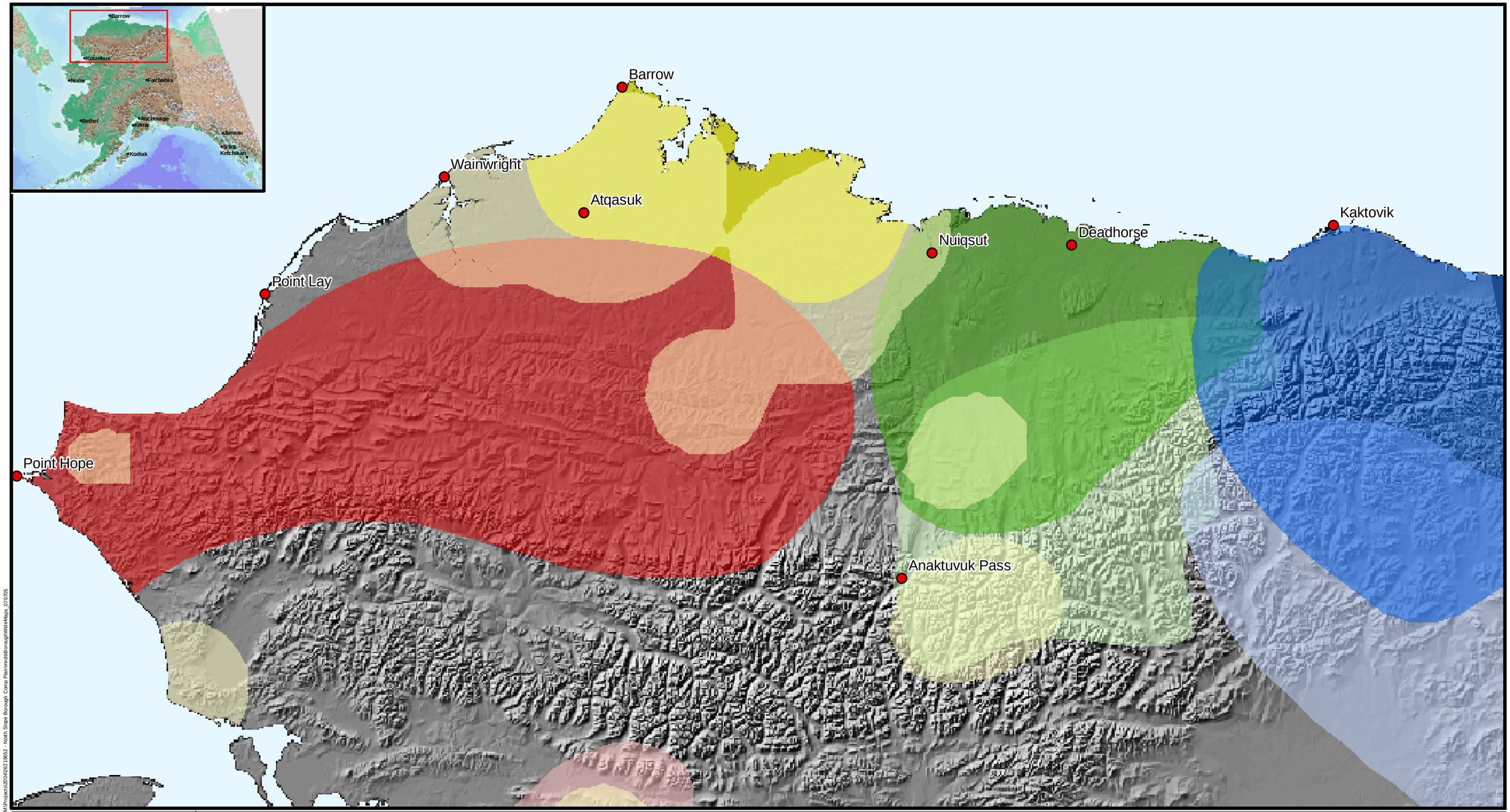
CARIBOU CALVING AREAS

NORTH SLOPE BOROUGH, ALASKA

URS

JOB NO:	26219652	DRAWN:	MCM
DATE:	SEPTEMBER 2005	FILE:	CARIBOU CALVING AREAS.MXD

FIGURE B-10



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Caribou Summer and Winter Ranges

- Western Arctic Herd Summer Range
- Western Arctic Herd Winter Range
- Teshekpuk Lake Herd Summer Range
- Teshekpuk Lake Herd Winter Range
- Central Arctic Herd Summer Range
- Central Arctic Herd Total Range
- Porcupine Herd Summer Range
- Porcupine Herd Winter Range

Ranges are representational; actual ranges and distributions have some annual variation.

0 25 50 75 100 Miles

N W E S

Data Sources: ADNR, USGS, ADF&G, TNC, ABR

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

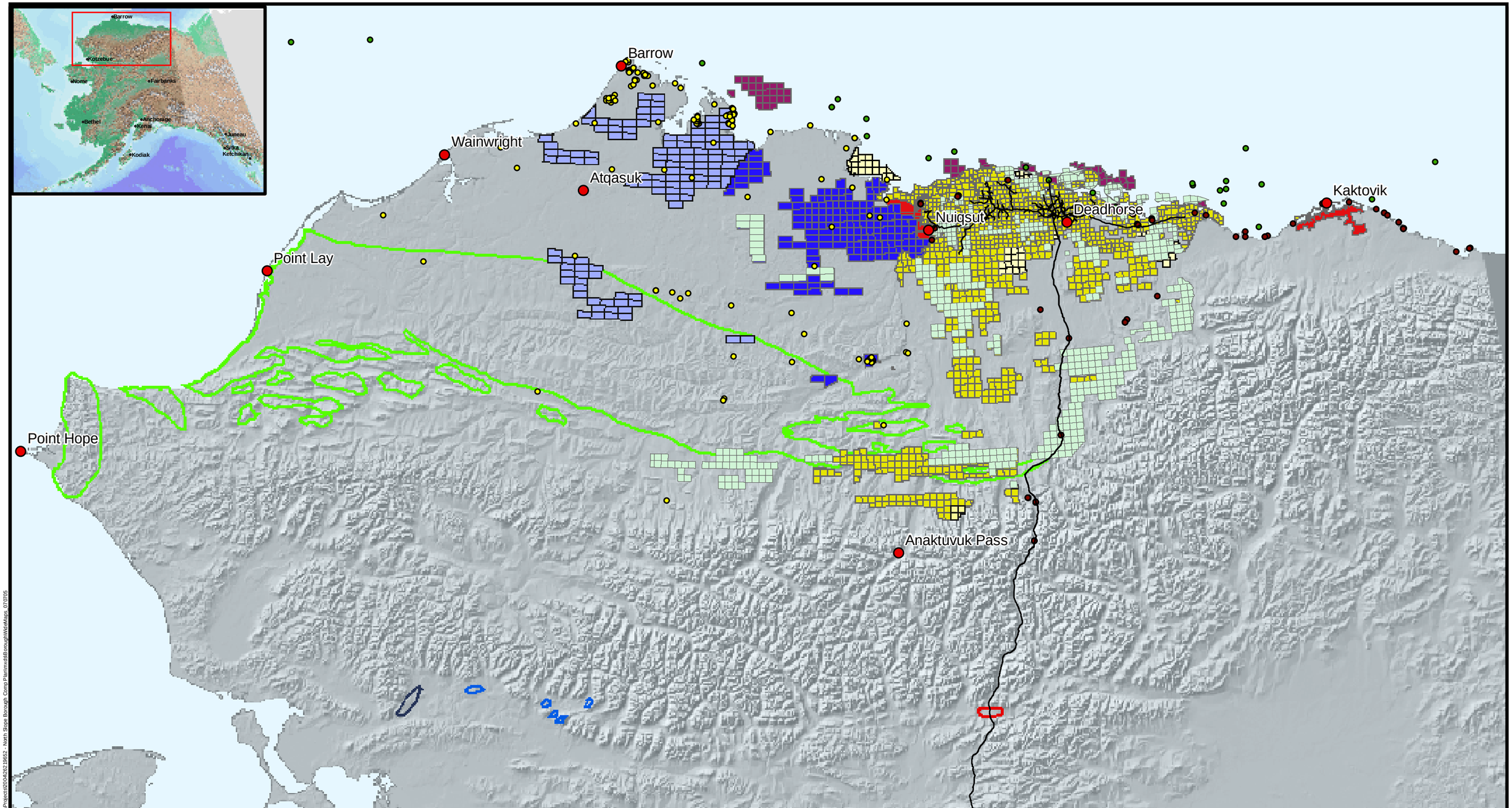
CARIBOU SUMMER AND WINTER RANGES

NORTH SLOPE BOROUGH, ALASKA

URS

JOB NO:	26219652	DRAWN:	MCM
DATE:	SEPTEMBER 2005	FILE: CARIBOU SUMMER_WINTER RANGES.MXD	

FIGURE B-11



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Leased or Developed Areas by Oil & Gas Lessor

- ALASKA, ACTIVE
- ALASKA, NYI
- ASRC, ACTIVE
- BLM, ACTIVE
- BLM, NYI
- MMS, ACTIVE
- EXPIRED LEASES

Alaska Coal Deposits

- Chicago Creek
- East Kobuk
- Northern
- Tramway Bar
- West Kobuk

NYI - Not Yet Implemented

- Pipelines
- NPRA Historic Wells
- Beaufort-Chuckchi Wells
- Facilities

Coal resources are also known to exist in the vicinity of Atqasuk.

0 25 50 75 100 Miles

N W E S

Data Sources: ADNR, USGS, NSB, BLM

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

PETROLEUM AND MINERAL RESOURCES

NORTH SLOPE BOROUGH, ALASKA

URS

JOB NO:	26219652	DRAWN:	MCM
DATE:	SEPTEMBER 2005	FILE:	OIL_GAS_DEVELOPMENT.MXD

FIGURE B-12

Land Use

- Residential
- Commercial
- Public, Semi-Public
- Industrial
- Vacant

Land use classifications are based on observations or community input. There are no legal zoning districts within the community.

0 250 500 750 1,000 Feet

Data Sources: North Slope Borough GIS, 2004 Visits to Anaktuvuk Pass

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

LAND USE

ANAKTUVUK PASS, ALASKA

URS

JOB NO:	26219652	DRAWN:	MCM
DATE:	12/20/2004	FILE:	ANAKTUVUK_PASS_LANDUSE_V2.MXD

FIGURE V-1

M:\Projects\2004\26219652 - North Slope Borough Comp Plan\mxds\Anaktuvuk_Pass\Anaktuvuk Pass Landuse_v3.mxd

Central Facilities

- Airport
- Bridge
- Cemetery
- Church
- Communications Building
- Community Hall
- Community Storage Shed
- Fire Station
- Fuel Storage Tanks (>500gal)
- Generator
- Hospital/Clinic/ER
- Kitchen
- Landfill/Incinerator
- Library
- Museum
- National Park Service
- Nunamiut Corporation
- Offices
- Police Station
- Post Office
- Power Generation Facility
- Public Works
- Radio Transmitter
- School
- Service/Maintenance Shop
- Sewage Lagoon
- Store
- Teachers Quarters
- Tribal Office
- Washeteria
- Waste Water Treatment Facility
- Water Plant

0 255 510 1,020 Feet

Data Sources: North Slope Borough GIS, 2004 Visits to Anaktuvuk Pass

NORTH SLOPE BOROUGH

NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

INFRASTRUCTURE AND CRITICAL FACILITIES

ANAKTUVUK PASS, ALASKA

URS

JOB NO:	26219652	DRAWN:	MCM
DATE:	12/20/2004	FILE: ANAKTUVUK_PASS_FACILITIES_V3.MXD	

FIGURE V-2

M:\Projects\2004\26219652 - North Slope Borough Comp Plan\mxds\Anaktuvuk_Pass\Anaktuvuk_Pass_facilities_v4.mxd

M:\projects\2004\26219652 - North Slope Borough Comp Plan\mxds\Atqasuk\atqasuklu_v2.mxd

LANDUSE

- Commercial
- Public
- Industrial
- Residential

Land use classifications are based on observations or community input. There are no legal zoning districts within the community.

N
W E
S

500 250 0 500 Feet

Data Sources: North Slope Borough GIS,
DHS Critical Facilities - 2004,
2004 Visits to Atqasuk

NAD_1927_StatePlane_Alaska_6_FIPS_5006
Projection: Transverse_Mercator
False_Easting: 500000.000000
False_Northing: 0.000000
Central_Meridian: -158.000000
Scale_Factor: 0.999900
Latitude_Of_Origin: 54.000000

GCS_North_American_1927

NORTH SLOPE BOROUGH

NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

LAND USE

ATQASUK, ALASKA

URS

JOB NO:	26219652	DRAWN:	LAY
DATE:	DECEMBER 21, 2004	FILE:	ATQASUKLU.MXD

FIGURE V-3

Critical Infrastructure

- Airport
- Boat Dock
- Community Hall
- Drinking Water Treatment Facility
- Fire Station
- Fuel Storage Tanks (>500gal)
- Generator
- Gravel Source
- Hospital/Clinic/ER
- Hotel and Restaurant
- Maintenance and Operation Building
- Offices
- Playground
- Police Station
- School
- Search and Rescue
- Service/Maintenance Shop
- Sewage Lagoon
- Store
- Teachers Quarters
- Waste Water Treatment Facility
- Water Pump
- Water Supply Tanks

N
W E
S

525 262.5 0 525 Feet

Data Sources: North Slope Borough GIS,
DHS Critical Facilities - 2004,
2004 Visits to Atqasuk

NAD_1927_StatePlane_Alaska_6_FIPS_5006
Projection: Transverse_Mercator
False_Easting: 500000.000000
False_Northing: 0.000000
Central_Meridian: -158.000000
Scale_Factor: 0.999900
Latitude_Of_Origin: 54.000000

GCS_North_American_1927

NORTH SLOPE BOROUGH

NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

CRITICAL FACILITIES

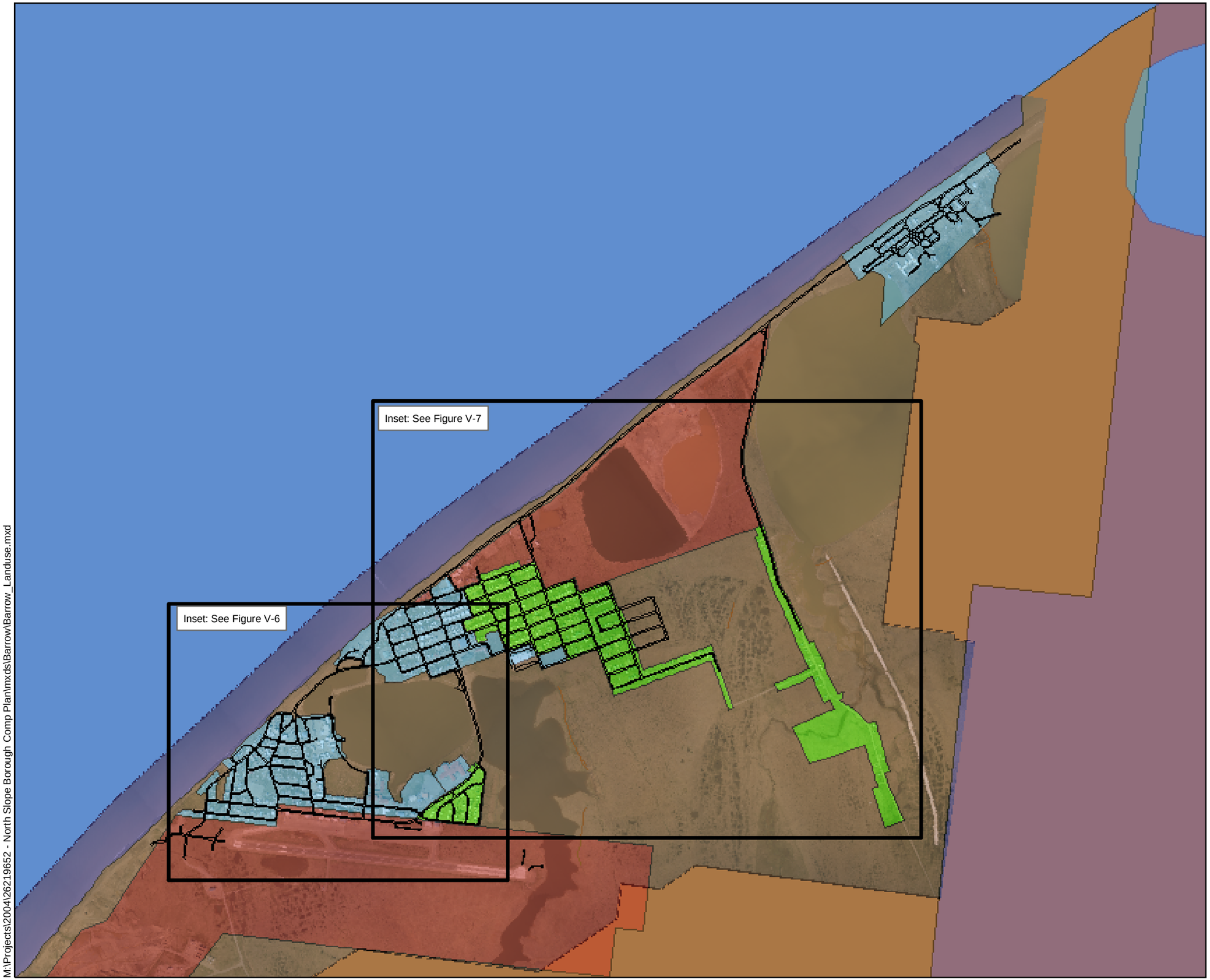
ATQASUK, ALASKA

URS

JOB NO:	26219652	DRAWN:	LAY
DATE:	DECEMBER 21, 2004	FILE:	ATQASUKCF.MXD

FIGURE V-4

M:\projects\2004\26219652 - North Slope Borough Comp Plan\mxds\Atqasuk\atqasukcf_v2.mxd



Land Use

- Suburban
- Residential
- Mulit-Use
- Industrial

0 1,000 2,000 3,000 4,000 Feet

Data Sources: North Slope Borough GIS

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

LAND USE

BARROW, ALASKA

URS

JOB NO:	26219652	DRAWN:	MCM
DATE:	1/24/2005	FILE:	ANAKTUVUK_PASS_LANDUSE.MXD

FIGURE V-5

M:\Projects\2004\26219652 - North Slope Borough Comp Plan\mxds\Barrow\Barrow_Landuse.mxd

Land Use

- Suburban
- Residential
- Mulit-Use
- Industrial

0 250 500 750 1,000 Feet

Data Sources: North Slope Borough GIS

NORTH SLOPE BOROUGH

NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

LAND USE DOWNTOWN

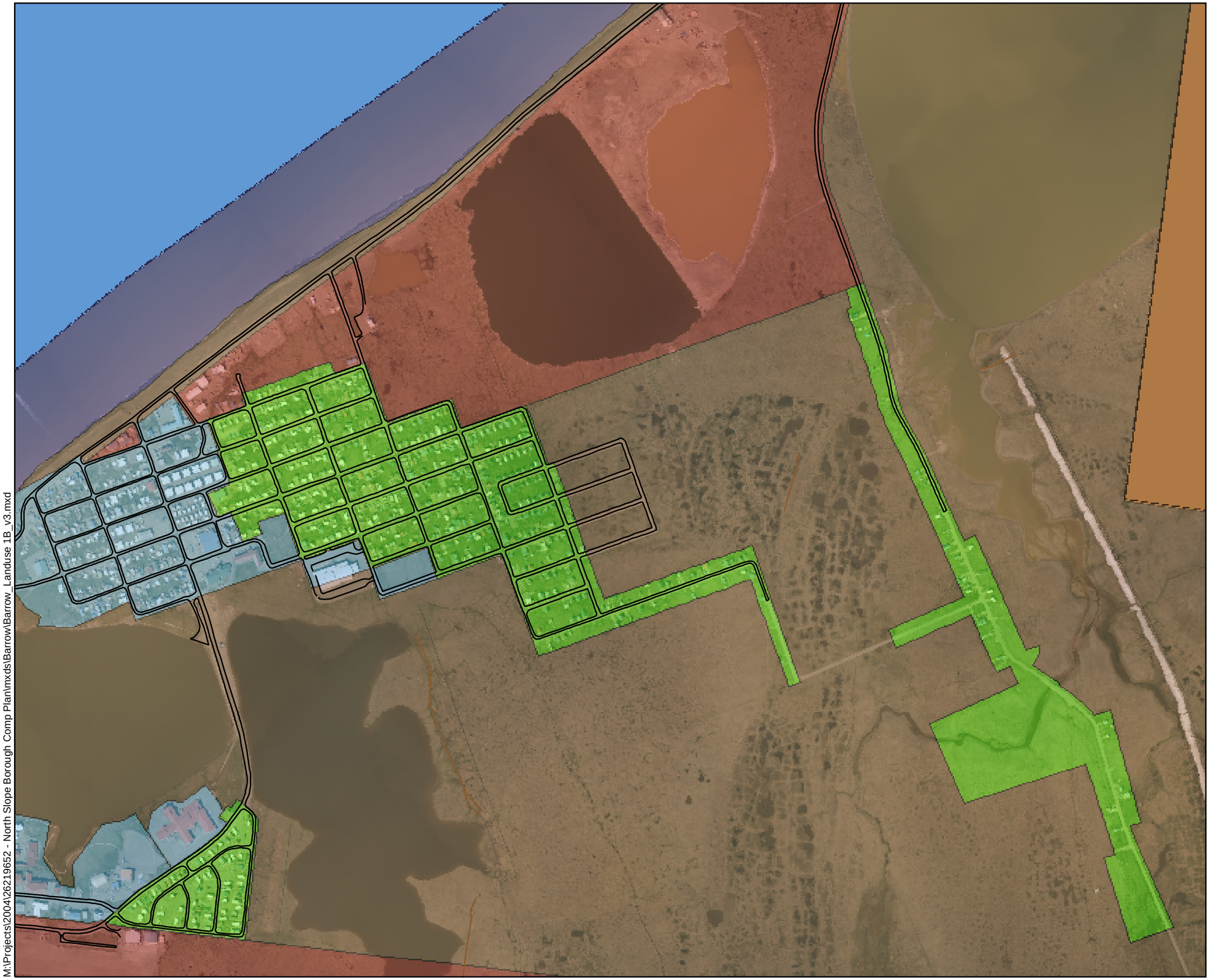
BARROW, ALASKA

URS

JOB NO:	26219652	DRAWN:	MCM
DATE:	1/26/2005	FILE:	ANAKTUVUK_PASS_LANDUSE_1A.MXD

FIGURE V-6

M:\Projects\2004\26219652 - North Slope Borough Comp Plan\mxds\Barrow\Barrow_Landuse 1A_V3.mxd



M:\Projects\2004\26219652 - North Slope Borough Comp Plan\mxds\Barrow\Barrow_Landuse 1B_v3.mxd

Land Use

- Suburban
- Residential
- Mulit-Use
- Industrial

0 500 1,000 1,500 Feet

Data Sources: North Slope Borough GIS

NORTH SLOPE BOROUGH

NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

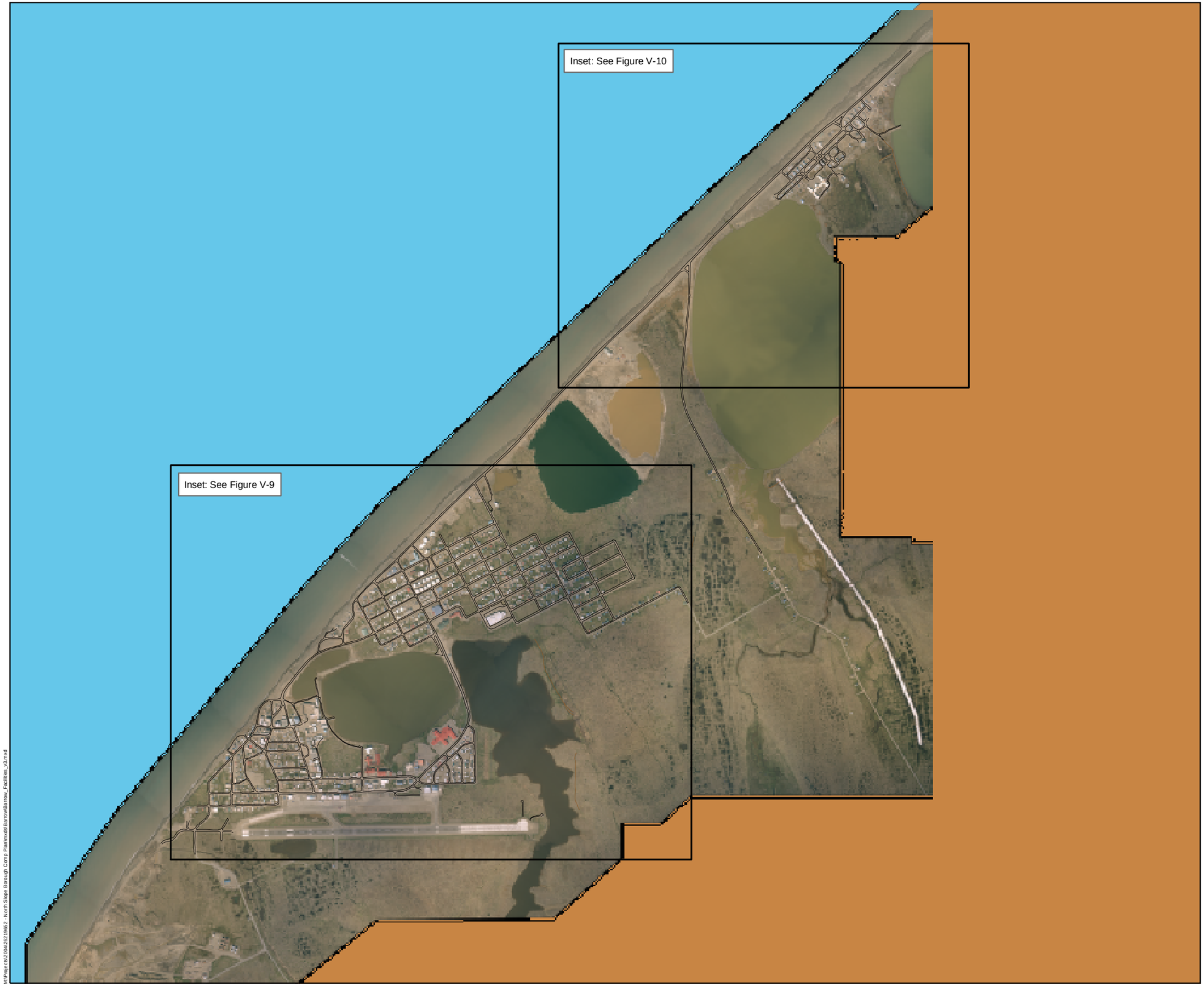
LAND USE
BROWERVILLE

BARROW, ALASKA

URS

JOB NO:	26219652	DRAWN:	MCM
DATE:	1/24/2005	FILE:	ANAKTUVUK_PASS_LANDUSE_1B.MXD

FIGURE V-7



Barrow, Alaska Overview Map
Infrastructure and Critical Facilities
Detailed on Figures V-9 and V-10

0 1,000 2,000 3,000 4,000 Feet

Data Sources: North Slope Borough GIS

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

INFRASTRUCTURE AND CRITICAL FACILITIES

BARROW, ALASKA

URS

JOB NO:	26219652	DRAWN:	MCM
DATE:	12/22/2004	FILE:	BARROW_FACILITIES_V2.MXD

FIGURE V-8

M:\Projects\2004\26219652 - North Slope Borough Comp Plan\mxd\Barrow\Barrow_Facilities_v3.mxd

Barrow Critical Facilities

- Airport
- Archaeological Site
- Museum
- Ball Field
- Bus Stop/Visitor's Center
- Church
- Community Hall
- Hospital/Clinic/ER
- Hotel
- Ice Skating
- Library
- Offices
- Police Station
- Post Office
- Power Generation Facility
- Radio Transmitter
- Restaurant
- School
- Store
- Weather Station

0 500 1,000 1,500 2,000 Feet

N W E S

Data Sources: North Slope Borough GIS, 2004 Visits to Barrow

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

INFRASTRUCTURE AND CRITICAL FACILITIES

BARROW, ALASKA

URS

JOB NO:	26219652	DRAWN:	MCM
DATE:	12/22/2004	FILE: BARROW_FACILITIES_A_V2.MXD	

FIGURE V-9

M:\Projects\2004\26219652 - North Slope Borough Comp Plan\mxds\Barrow\Barrow_Facilities_a_v3.mxd

Barrow Critical Facilities

- Defense Early Warning Line Site
- Library
- Offices
- College

0 400 800 1,200 1,600 Feet

Data Sources: North Slope Borough GIS, 2004 Visits to Barrow

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

INFRASTRUCTURE AND CRITICAL FACILITIES NARL

BARROW, ALASKA

URS

JOB NO:	26219652	DRAWN:	MCM
DATE:	12/22/2004	FILE: BARROW_FACILITIES_B_V2.MXD	

FIGURE V-10

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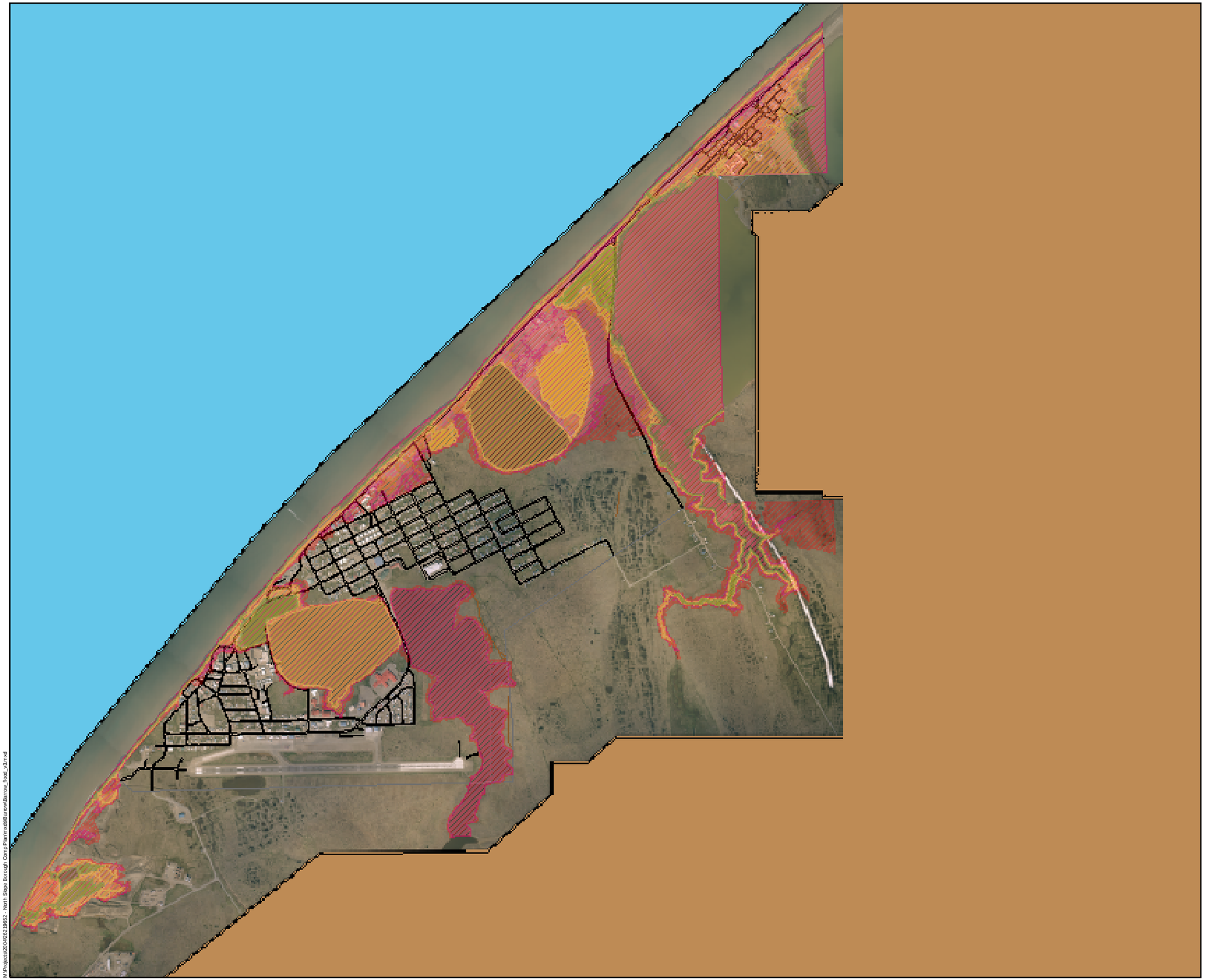


Flood Potential Based on Wave Height

- Four Feet
- Six Feet
- Eight Feet
- Ten Feet
- Twelve Feet

0 1,000 2,000 3,000 4,000 Feet

N W E S

Data Sources: North Slope Borough GIS

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

FLOOD POTENTIAL

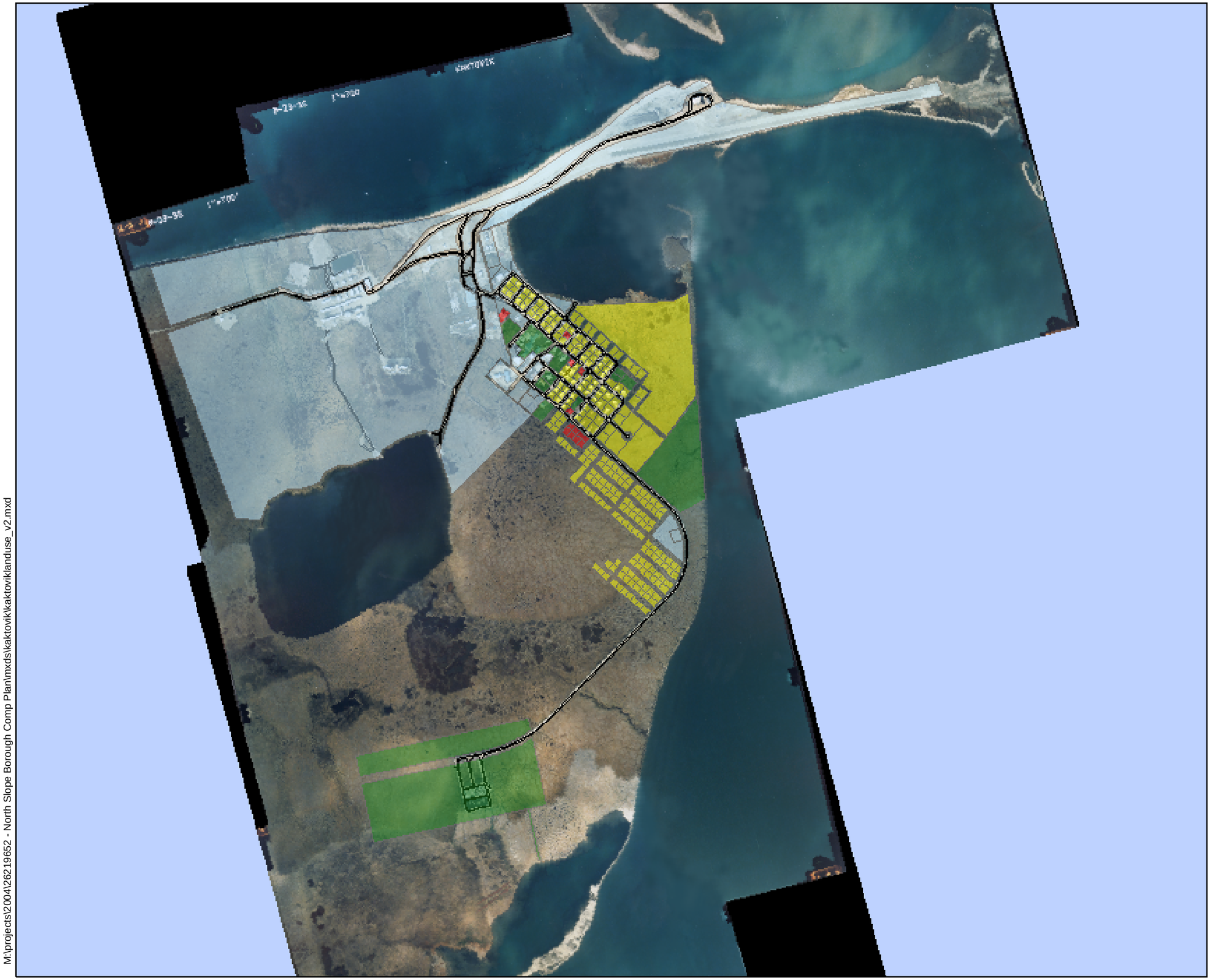
BARROW, ALASKA

URS

JOB NO:	26219652	DRAWN:	MCM
DATE:	12/22/2004	FILE:	BARROW_FLOOD_V2.MXD

FIGURE V-11

M:\Projects\26\04\26219652 - North Slope Borough Comp Plan\mxd\Barrow\Barrow_flood_v3.mxd



Land Use

- Residential
- Commercial
- Public, Semi-Public
- Industrial

Land use classifications are based on observations or community input. There are no legal zoning districts within the community.

0 700 1,400 2,800 Feet

N W E S

Data Sources: North Slope Borough GIS, DHS Critical Facilities - 2004, 2004 Visits to Kaktovik

NAD_1927_StatePlane_Alaska_6_FIPS_5006
Projection: Transverse_Mercator
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False_Northing: 0.000000
Central_Meridian: -158.000000
Scale_Factor: 0.999900
Latitude_Of_Origin: 54.000000

GCS_North_American_1927

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

LAND USE

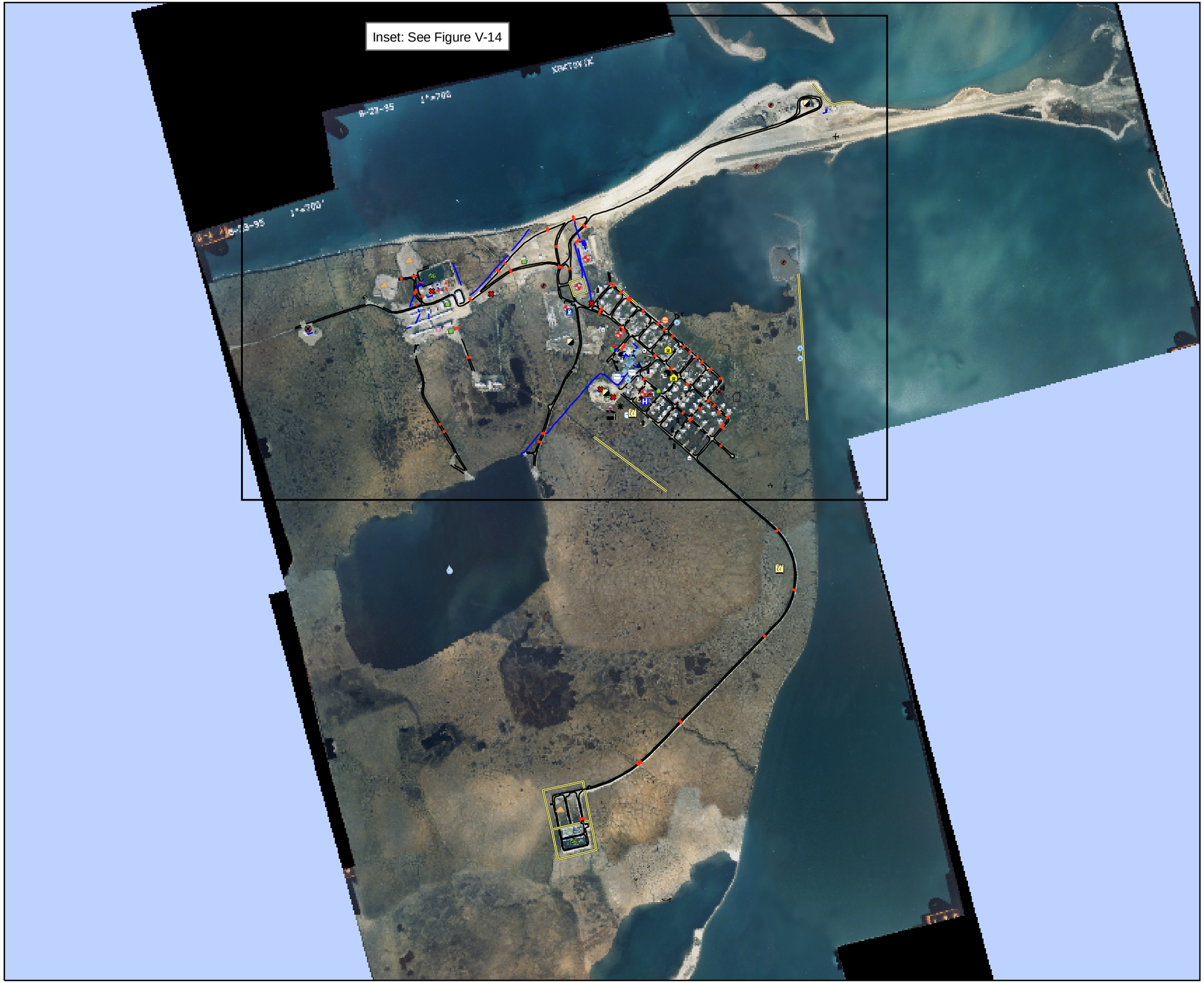
KAKTOVIK, ALASKA

URS

JOB NO:	26219652	DRAWN:	LAY
DATE: DECEMBER 20, 2004		FILE:	KAKTOVIKCF.MXD

FIGURE V-12

M:\projects\2004\26219652 - North Slope Borough Comp Plan\mxds\kaktovik\kaktoviklanduse_v2.mxd



Critical Infrastructure

- Airport
- Airport Facilities
- Cemetery
- Church
- Community Freezer
- Community Hall
- Community Storage Shed
- Fire Station
- Fuel Storage Tanks (>500gal)
- Fuel Storage
- Gasoline Station
- Generator
- Gravel Source
- Historic Site
- Hospital/Clinic/ER
- Hotel
- Landfill/Incinerator
- Lift Station
- Morgue
- National Guard
- Offices
- Oil or Natural Gas Pipeline
- Playground
- Police Station
- Port/Dock Facilities
- Post Office
- Power Generation Facility
- Public Safety Officer Housing
- Radio Transmitter
- Satellite
- School
- Service/Maintenance Shop
- Sewage Lagoon
- Store
- Teachers Quarters
- Washeteria
- Waste Water Treatment Facility
- Water Source
- Water Supply Tanks
- Weather Station

Transportation

- Roads
- Fence and Snow Fence
- Pipeline
- Culverts

N W E S

0 650 1,300 2,600 Feet

Data Sources: North Slope Borough GIS, DHS Critical Facilities - 2004, 2004 Visits to Kaktovik

NAD_1927_StatePlane_Alaska_6_FIPS_5006
Projection: Transverse_Mercator
False_Easting: 500000.000000
False_Northing: 0.000000
Central_Meridian: -158.000000
Scale_Factor: 0.999900
Latitude_Of_Origin: 54.000000

GCS_North_American_1927

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

CRITICAL FACILITITES

KAKTOVIK, ALASKA

URS

JOB NO:	26219652	DRAWN:	LAY
DATE: DECEMBER 20, 2004		FILE:	KAKTOVIKCF.MXD

FIGURE V-13

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Critical Infrastructure

- Airport
- Airport Facilities
- Cemetery
- Church
- Community Freezer
- Community Hall
- Community Storage Shed
- Fire Station
- Fuel Storage Tanks (>500gal)
- Fuel Storage
- Gasoline Station
- Generator
- Gravel Source
- Historic Site
- Hospital/Clinic/ER
- Hotel
- Landfill/Incinerator
- Lift Station
- Morgue
- National Guard
- Offices
- Oil or Natural Gas Pipeline
- Playground
- Police Station
- Port/Dock Facilities
- Post Office
- Power Generation Facility
- Public Safety Officer Housing
- Radio Transmitter
- Satellite
- School
- Service/Maintenance Shop
- Sewage Lagoon
- Store
- Teachers Quarters
- Washeteria
- Waste Water Treatment Facility
- Water Source
- Water Supply Tanks
- Weather Station

Transportation

- Roads
- Fence and Snow Fence
- Pipeline
- Culverts

0 295 590 1,180 Feet

N W E S

Data Sources: North Slope Borough GIS, DHS Critical Facilities - 2004, 2004 Visits to Kaktovik

NAD_1927_StatePlane_Alaska_6_FIPS_5006
Projection: Transverse_Mercator
False_Easting: 500000.000000
False_Northing: 0.000000
Central_Meridian: -158.000000
Scale_Factor: 0.999900
Latitude_Of_Origin: 54.000000

GCS_North_American_1927

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

CRITICAL FACILITITES DETAIL

KAKTOVIK, ALASKA

URS

JOB NO:	26219652	DRAWN:	LAY
DATE:	DECEMBER 20, 2004	FILE:	KAKTOVIKCFINSET.MXD

FIGURE V-14

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Legend

Land Use

- Residential
- Commercial
- Public, Semi-Public
- Industrial

Land use classifications are based on observations or community input. There are no legal zoning districts within the community.

0 500 1,000 1,500 2,000 2,500 Feet

Data Sources: North Slope Borough GIS, 2004 Visit to Nuiqsut

NORTH SLOPE BOROUGH

NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

LAND USE

NUIQSUT, ALASKA

URS

JOB NO:	26219652	DRAWN:	MCM
DATE:	12/20/2004	FILE:	NUIQSUT_LANDUSE_V2.MXD

FIGURE V-15

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Critical Facilities

- Air Quality Monitoring Gauge
- Airport
- Airport Runway Facilities
- Ball Field
- Boat Dock
- Bridge
- Burn Bin
- Cemetery
- Church
- Clinic Housing
- Closed Landfill/Incinerator
- Community Hall
- Community Storage Shed
- Fire Station
- Fuel Storage Tanks (>500gal)
- Fuel Storage
- Gasoline Station
- Generator
- Hospital/Clinic/ER
- Hotel
- Ice Skating
- Landfill/Incinerator
- Lift Station
- Morgue
- Offices
- Oil Spill Holding Facility
- Old Sewage Cells
- Old Water Supply Tanks
- Playground
- Police Station
- Post Office
- Power Generation Facility
- Public Safety Officer Housing
- Radio Transmitter
- Satellite
- School
- Search and Rescue
- Service/Maintenance Shop
- Sewage Lagoon
- Store
- Teachers Quarters
- Telephone
- Washeteria
- Waste Water Treatment Facility
- Water Plant
- Water Supply Tanks
- Weather Station

0 500 1,000 1,500 2,000 Feet

Data Sources: North Slope Borough GIS; 2004 Visit to Nuiqsut

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

INFRASTRUCTURE AND CRITICAL FACILITIES
NUIQSUT, ALASKA

URS

JOB NO:	26219652	DRAWN:	MCM
DATE:	12/20/2004	FILE:	NUIQSUT_FACILITIES_V2.MXD

FIGURE V-16

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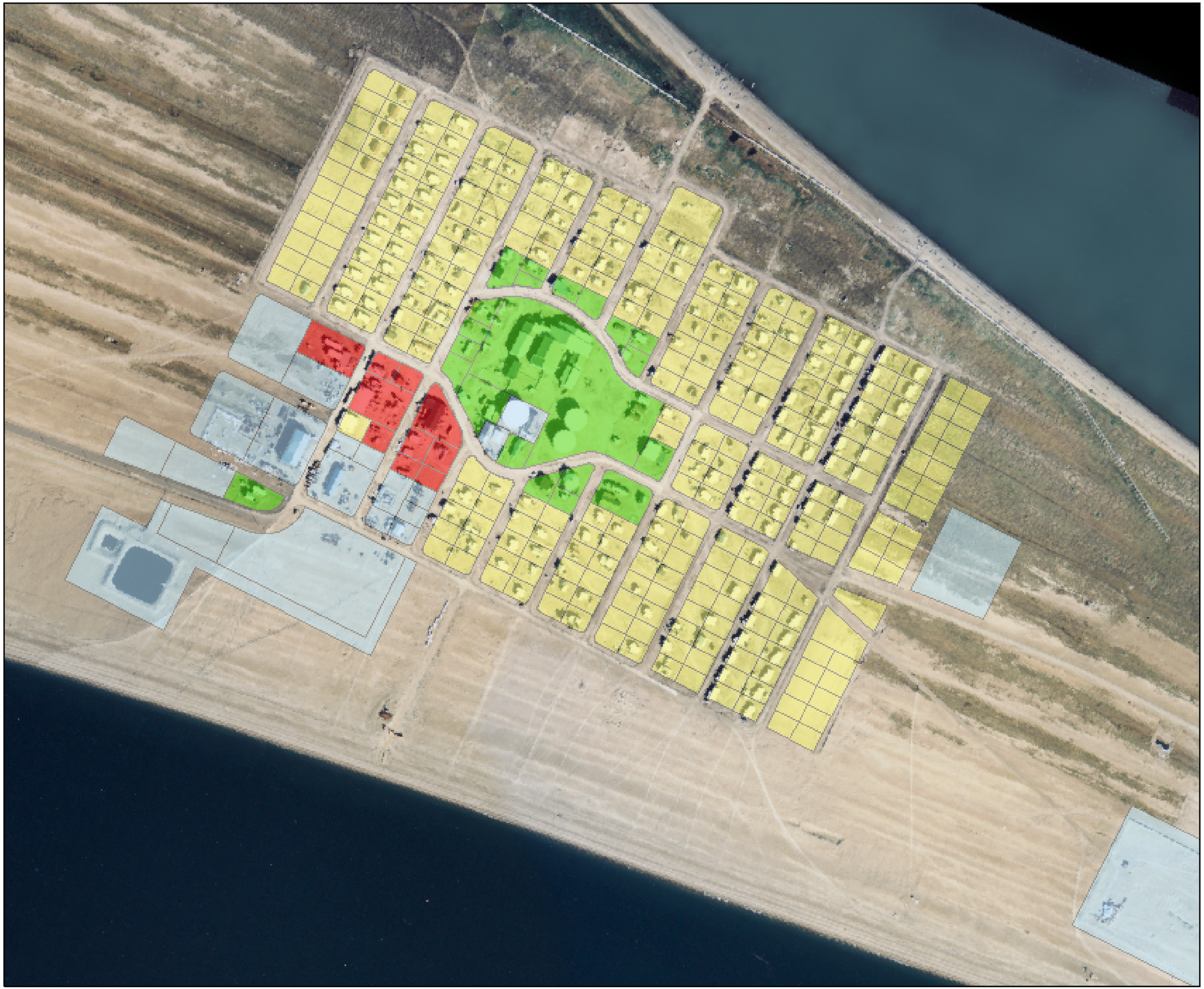

M:\projects\2004\26219652 - North Slope Borough Comp Plan\mxds\point_hope\PointHopeLandusewip_v2.mxd

LAND USE

- Commercial
- Public
- Industrial
- Residential

Land use classifications are based on observations or community input. There are no legal zoning districts within the community.

0 230 460 920 Feet

N W E S

NAD_1927_StatePlane_Alaska_6_FIPS_5006
Projection: Transverse_Mercator
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False_Northing: 0.000000
Central_Meridian: -158.000000
Scale_Factor: 0.999900
Latitude_Of_Origin: 54.000000

GCS_North_American_1927

Data Sources: North Slope Borough GIS, DHS Critical Facilities - 2004, 2004 Visits to Point Hope

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

LAND USE

POINT HOPE, ALASKA

URS

JOB NO:	26219652	DRAWN:	LAY
DATE:	DECEMBER 21, 2004	FILE:	POINTHOPELU.MXD

FIGURE V-17

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Critical Infrastructure

- Airport
- Church
- Fire Station
- Fuel Storage Tanks (>500gal)
- Fuel Storage
- Hospital/Clinic/ER
- Landfill/Incinerator
- National Guard
- Offices
- Playground
- Police Station
- Port/Dock Facilities
- Post Office
- Power Generation Facility
- Restaurant
- School
- Senior Center
- Service/Maintenance Shop
- Sewage Lagoon
- Store
- Teachers Quarters
- Waste Water Treatment Facility
- Water Supply Tanks
- Fence
- Pipeline
- Culverts
- Trails
- Roads

0 210 420 840 Feet

N W E S

Data Sources: North Slope Borough GIS,
DHS Critical Facilities - 2004,
2004 Visits to Point Hope

NAD_1927_StatePlane_Alaska_4_FIPS_5004
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Central_Meridian: -150.000000
Scale_Factor: 0.999900
Latitude_Of_Origin: 54.000000

GCS_North_American_1927

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

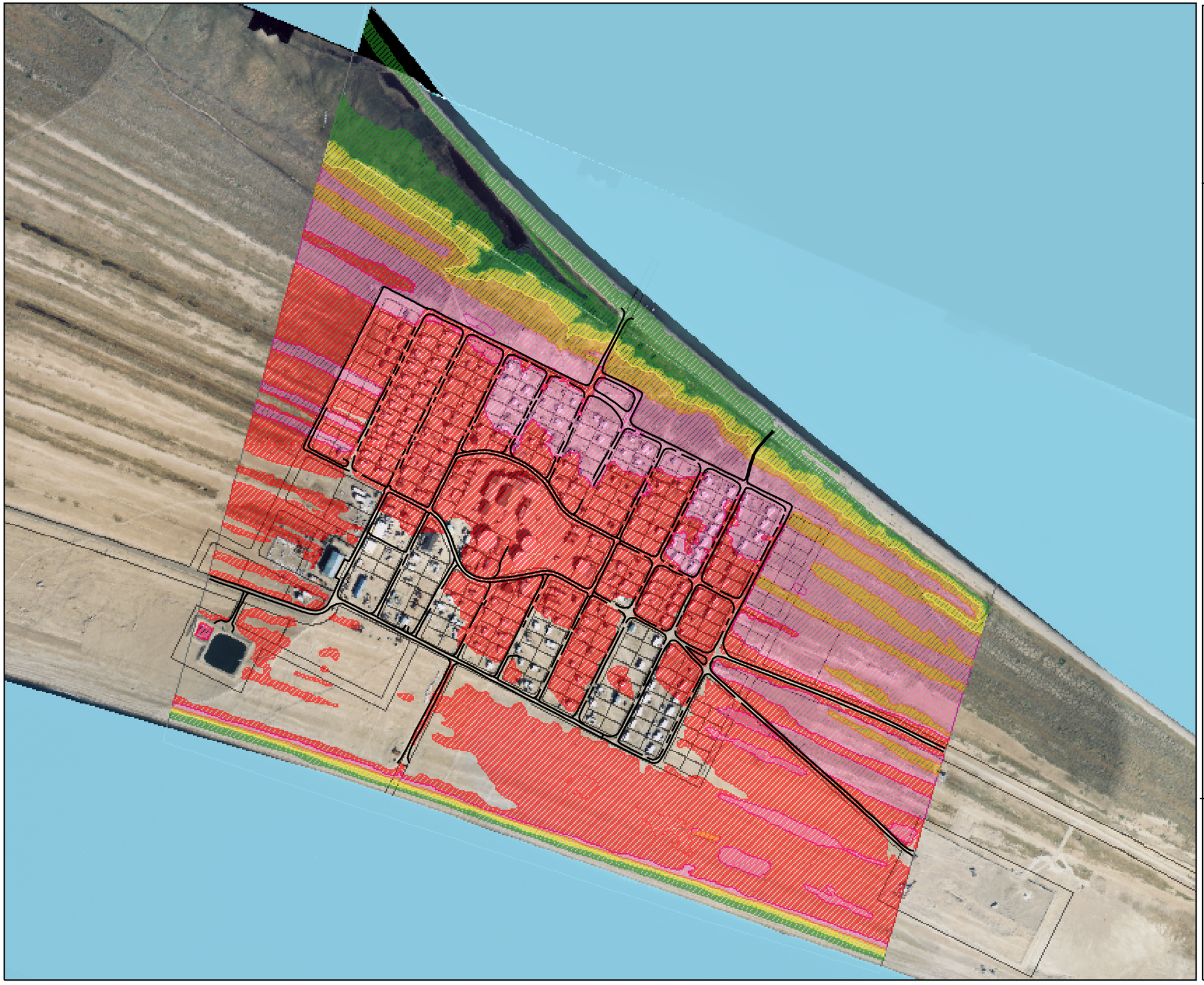
CRITICAL FACILITIES

POINT HOPE, ALASKA

URS

JOB NO:	26219652	DRAWN:	LAY
DATE: DECEMBER 21, 2004		FILE:	POINTHOPECF.MXD

FIGURE V-18



Flood Potential Based on Wave Height

- Four Feet
- Six Feet
- Eight Feet
- Ten Feet
- Twelve Feet

0 300 600 1,200 Feet

N W E S

NAD_1927_StatePlane_Alaska_6_FIPS_5006
Projection: Transverse_Mercator
False_Easting: 500000.000000
False_Northing: 0.000000
Central_Meridian: -158.000000
Scale_Factor: 0.999900
Latitude_Of_Origin: 54.000000

GCS_North_American_1927

Data Sources: North Slope Borough GIS, 2004 Visits to Point Hope

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

FLOOD POTENTIAL

POINT HOPE, ALASKA

URS

JOB NO:	26219652	DRAWN:	LAY
DATE:	DECEMBER 21, 2004	FILE:	POINTHOPEFP.MXD

FIGURE V-19

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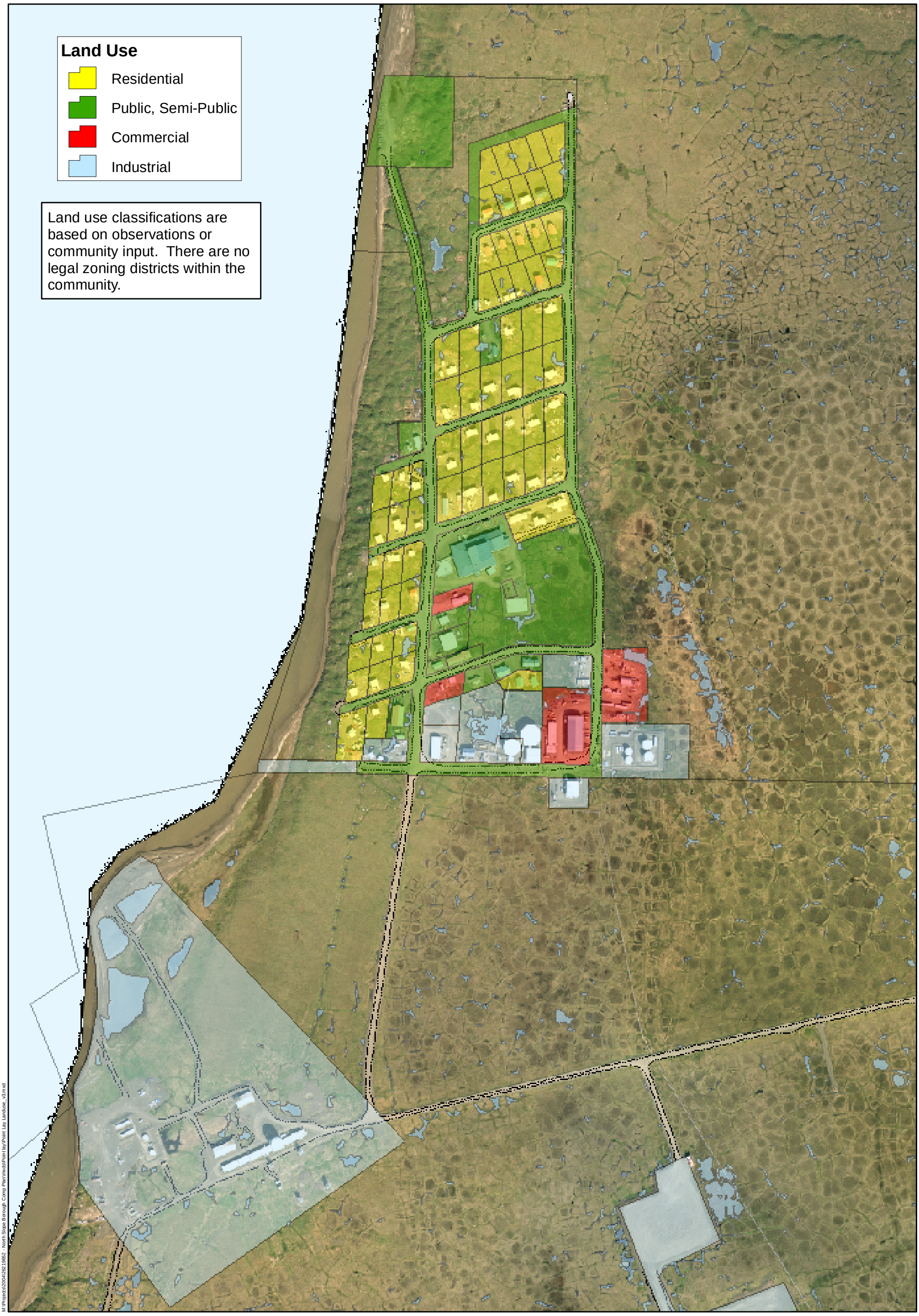


M:\Projects\2004\26219652 - North Slope Borough Comp Plan\mxds\Point lay\Point Lay Landuse_v3.mxd

0 250 500 750 1,000 Feet

N W E S

Data Sources: North Slope Borough GIS

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

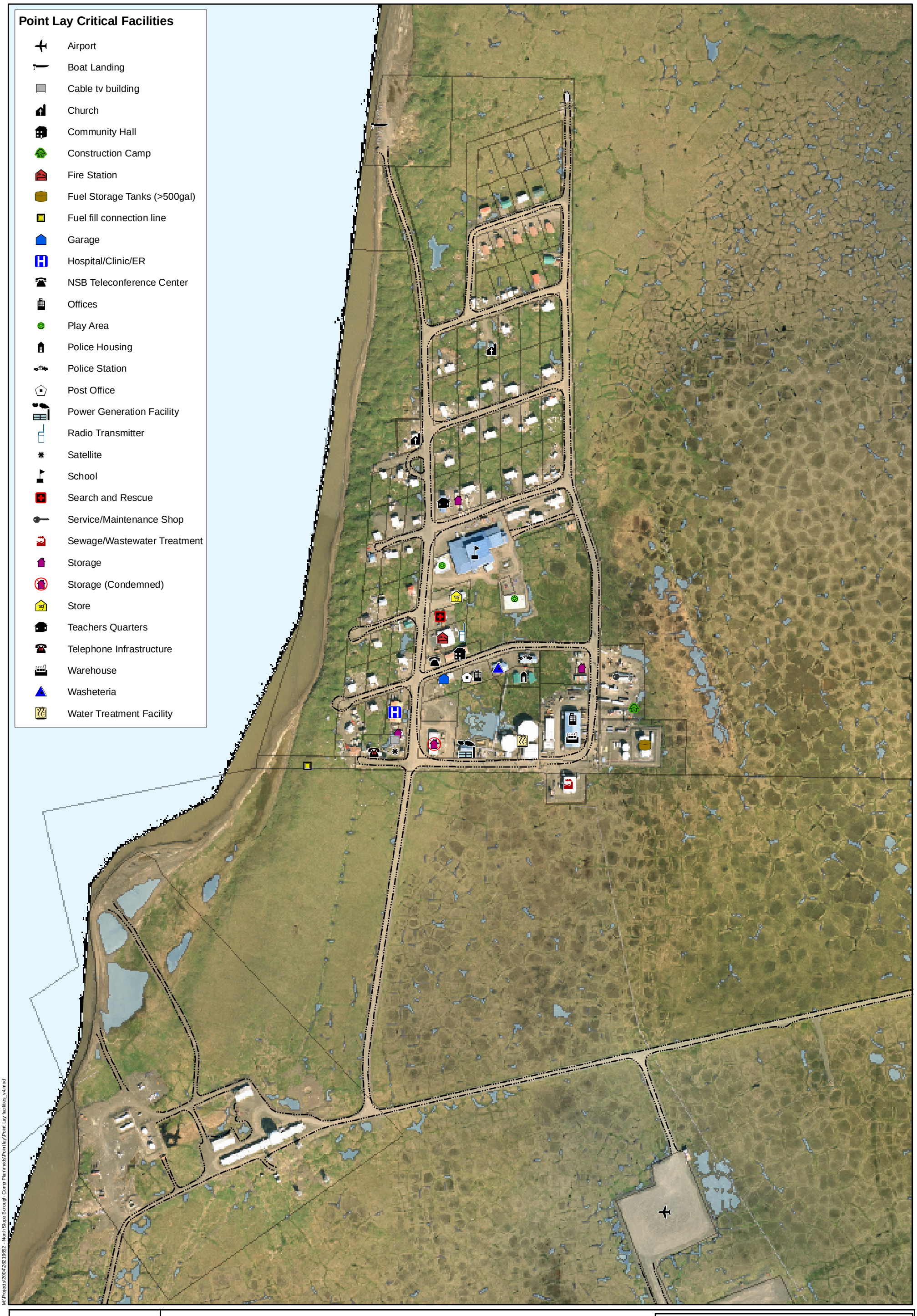
LAND USE

POINT LAY, ALASKA

URS

JOB NO:	26219652	DRAWN:	MCM
DATE:	1/26/2005	FILE:	POINT_LAY_LANDUSE_V2.MXD

FIGURE V-20



M:\Projects\2004\26219652 - North Slope Borough Comp Plan\mxds\Point lay\Point Lay facilities_v4.mxd

0 250 500 750 1,000 Feet

N W E S

Data Sources: North Slope Borough GIS Dept.

NORTH SLOPE BOROUGH

NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

INFRASTRUCTURE AND CRITICAL FACILITIES

POINT LAY, ALASKA

URS

JOB NO:	26219652	DRAWN:	MCM
DATE:	1/24/2005	FILE: POINT_LAY_FACILITIES_V3.MXD	

FIGURE V-21

LANDUSE

- Commercial
- Public
- Industrial
- Residential

Land use classifications are based on observations or community input. There are no legal zoning districts within the community.

0 245 490 980 Feet

N W E S

Data Sources: North Slope Borough GIS, DHS Critical Facilities - 2004, 2004 Visits to Wainwright

NAD_1927_StatePlane_Alaska_6_FIPS_5006
Projection: Transverse_Mercator
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False_Northing: 0.000000
Central_Meridian: -158.000000
Scale_Factor: 0.999900
Latitude_Of_Origin: 54.000000

GCS_North_American_1927

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

LAND USE

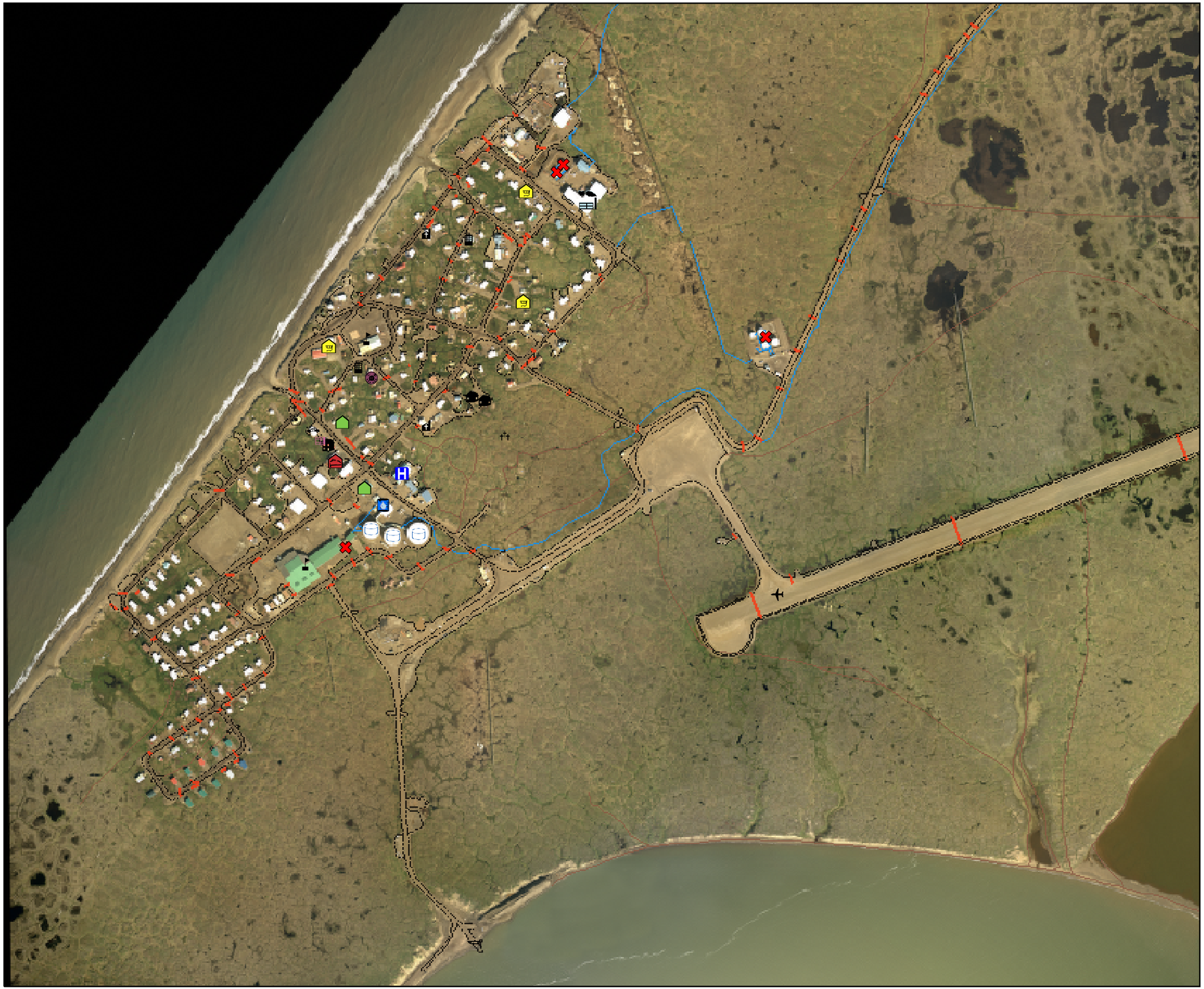
WAINWRIGHT, ALASKA

URS

JOB NO:	26219652	DRAWN:	LAY
DATE:	DECEMBER 21, 2004	FILE:	WAINWRIGHTLU.MXD

FIGURE V-22

M:\projects\2004\26219652 - North Slope Borough Comp Plan\mxds\Wainwright\Wainwrightlu_v2.mxd



M:\projects\2004\26219652 - North Slope Borough Comp Plan\mxds\Wainwright\Wainwrightcf_v2facilities.mxd

Critical Facilities

- Airport
- Boat Launch
- Cemetery
- Church
- Community Hall
- Community Storage Shed
- Fire Station
- Fuel Storage Tanks (>500gal)
- Generator
- Hospital/Clinic/ER
- National Guard
- Offices
- Police Station
- Post Office
- Power Generation Facility
- School
- Sewage Lagoon
- Store
- Teachers Quarters
- Water Tank
- Water Treatment Facility

0 245 490 980 Feet

N W E S

Data Sources: North Slope Borough GIS, DHS Critical Facilities - 2004, 2004 Visits to Wainwright

NAD_1927_StatePlane_Alaska_6_FIPS_5006
Projection: Transverse_Mercator
False_Easting: 500000.000000
False_Northing: 0.000000
Central_Meridian: -158.000000
Scale_Factor: 0.999900
Latitude_Of_Origin: 54.000000

GCS_North_American_1927

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

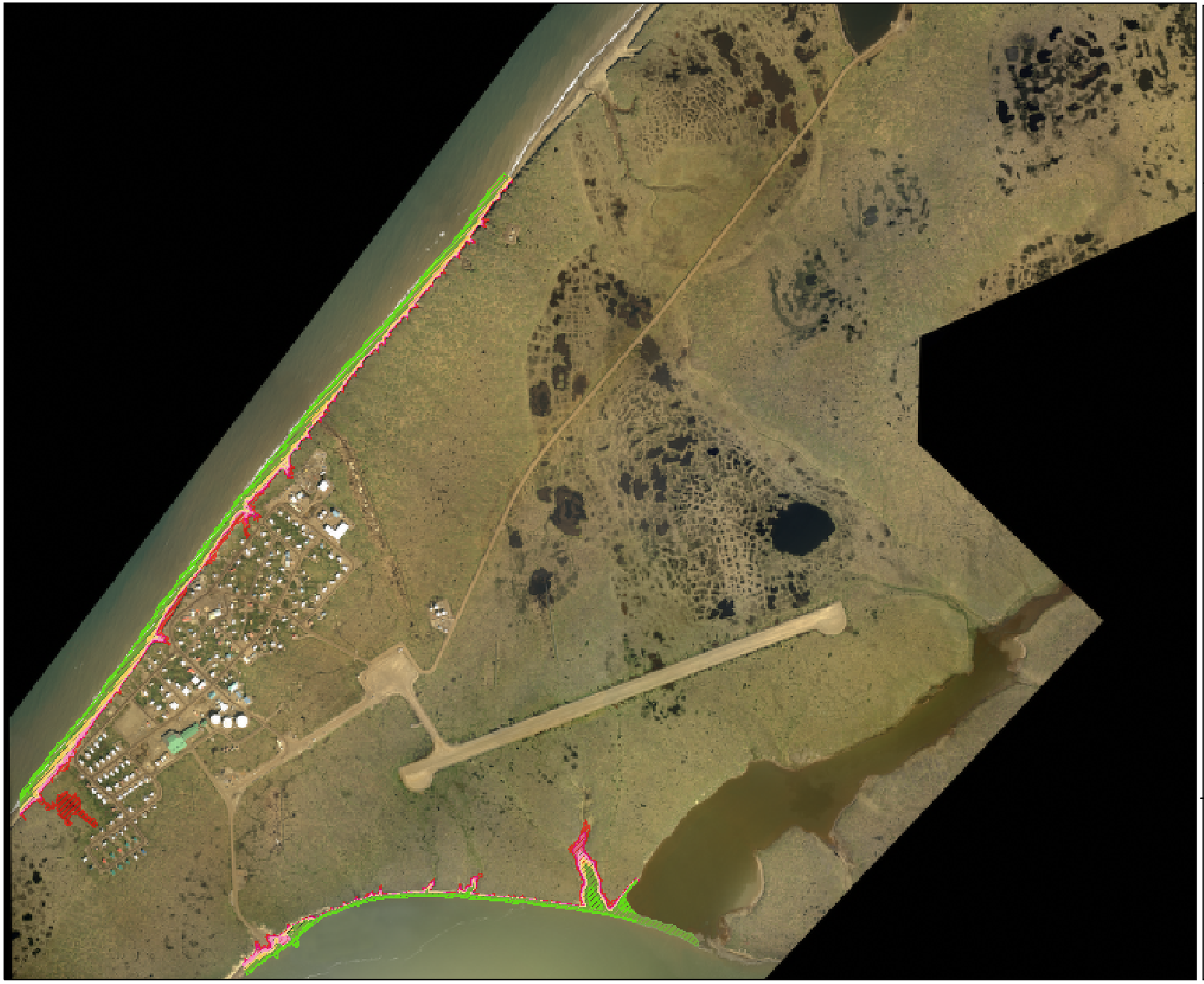
CRITICAL FACILITIES

WAINWRIGHT, ALASKA

URS

JOB NO:	26219652	DRAWN:	LAY
DATE:	DECEMBER 21, 2004	FILE:	WAINWRIGHTCF.MXD

FIGURE V-23



M:\projects\2004\26219652 - North Slope Borough Comp Plan\mxds\Wainwright\Wainwrightfp_v2.mxd

Flood Potential Based on Wave Height

- Two Feet
- Four Feet
- Six Feet
- Eight Feet
- Ten Feet
- Twelve Feet

0 500 1,000 2,000 Feet

N W E S

Data Sources: North Slope Borough GIS,
DHS Critical Facilities - 2004,
2004 Visits to Wainwright

NAD_1927_StatePlane_Alaska_6_FIPS_5006
Projection: Transverse_Mercator
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False_Northing: 0.000000
Central_Meridian: -158.000000
Scale_Factor: 0.999900
Latitude_Of_Origin: 54.000000

GCS_North_American_1927

NORTH SLOPE BOROUGH
NORTH SLOPE BOROUGH COMPREHENSIVE PLAN

FLOOD POTENTIAL

WAINWRIGHT, ALASKA

URS

JOB NO:	26219652	DRAWN:	LAY
DATE:	DECEMBER 22, 2004	FILE:	WAINWRIGHTFP.MXD

FIGURE V-24

North Slope Borough

Comprehensive Transportation Plan

Prepared for:

The North Slope Borough

Prepared by:

ASCG Incorporated

August 2005

Abbreviations

AADT	Average annual daily traffic
ADF&G	Alaska Department of Fish and Game
ADOT&PF	Alaska Department of Transportation and Public Facilities
ADT	Average daily traffic
APEB	Airport Project Evaluation Board
APSC	Alyeska Pipeline Service Company
ASOS	Automated Surface Observation System
ASRC	Arctic Slope Regional Corporation
ASRTC	Arctic Slope Region Transportation Consortium
ATV	All-terrain Vehicle
AWOS	Automated Weather Observation System
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
CFR	Code of Federal Regulations
CIP	Capital Improvement Program
COE	U.S. Army Corps of Engineers
DEW	Distant Early Warning
DMS	Department of Municipal Services
DNR	Alaska Department of Natural Resources
DOT&PF	Alaska Department of Transportation and Public Facilities
EIS	Environmental Impact Statement
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
GPS	Global Positioning System
HIRL	High Intensity Runway Lights
HMP	Hazard Mitigation Plan
HOME	Heavy Operations and Maintenance Equipment
HPP	High Priority Project
ICAS	Iñupiat Community of the Arctic Slope
IHLC	Iñupiat History Language and Cultural Commission
IRR	Indian Reservation Roads
MALS	Medium Intensity Approach System
MALSR	Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
MIRL	Medium Intensity Runway Lights
MITL	Medium Intensity Taxiway Lights

MP	Milepost
NARL	Naval Artic Research Lab
NDB	Non-directional beacon
NPR-A	National Petroleum Reserve – Alaska
NSB	North Slope Borough
NWATP	Northwest Alaska Transportation Plan
PAPI	Precision Approach Path Indicator, VASI: Visual Approach Slope Indicator
PAR	Project Analysis Report
PEB	Project Evaluation Board
REIL	Runway End Identifier Lights
RIFDS	Road Inventory Field Data System
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act – A Legacy for Users
SAR	Search and Rescue
STIP	Statewide Transportation Improvement Program
TAC	Transportation Advisory Committee
TAPS	Trans-Alaska Pipeline System
VORTAC	VHR Omnidirectional Range Tactical Aircraft Control

North Slope Borough
Transportation Plan

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Executive Summary

The Iñupiat of Alaska's North Slope have always maintained a mobile culture, traveling over great distances and confronting harsh climatic conditions. This was true many years ago when transportation modes consisted of travel by foot, dog teams, kayaks or umiaqs; and is true today with airplanes, four wheelers, snow machines and boats with outboard motors. These new modes of transportation have brought many changes to the people of the North Slope and continue to present many challenges as the North Slope Borough (NSB) and its communities strive to maintain their culture and improve and maintain a diverse transportation system that can continue to support their need for mobility.

This plan provides a framework to address the many transportation concerns in the NSB and to become an element in the Borough's overall Comprehensive Plan. It is not intended to act as a comprehensive capital improvement projects list, nor is it intended to replace local transportation planning efforts. This plan outlines NSB transportation issues identified through research and by Borough residents and officials during a series of teleconferences, interviews and public meetings that occurred in 2003 and 2004. The plan also identifies the broad transportation goals, objectives and policies that address these issues. To provide context, background information is presented that includes a description of the people, culture, land and resources of the NSB, and an analysis of the community and regional transportation networks and what it takes to maintain them.

The goals of the transportation plan are to:

- Plan, design, construct and maintain transportation facilities in a manner that preserves the local environment and subsistence lifestyle.
- Maintain a diverse transportation system to support mobility
- Support transportation facilities that provide for social and economic growth
- Create healthy, safe, and efficient transportation

There are twenty-one overall transportation objectives of the NSB Comprehensive Transportation Plan, which are:

- Actively pursue transportation funding from sources outside of the NSB
- Minimize costs by coordinating transportation projects with other types of infrastructure projects.
- Develop projects that decrease or minimize capital and maintenance costs to the NSB
- Improve road and airport maintenance budgeting tools to better track and forecast expenditures

- Ensure that the siting, design, construction and maintenance of transportation facilities do not adversely impact subsistence resources
- Educate outside users about subsistence resources and how to minimize their impact to these resources
- Work with local residents to manage new access to lands that are critical subsistence use areas
- Develop a safe winter trail system between communities
- Support community dust control efforts
- Support projects that reduce erosion and flooding that impact transportation facilities
- Support projects that address snow drifting across transportation facilities
- Use published safety standards when upgrading existing transportation facilities and constructing new transportation facilities
- Support marine facility upgrades and improved facility construction built to current marine standards.
- Provide options that improve and encourage non-motorized forms of transportation
- Promote lower transportation costs
- Participate actively in and promote public review and input into the writing, review and approval of any transportation or utility corridors, plans or routes undertaken by the Borough, state and/or federal government within the NSB
- Communicate transportation information with local communities
- Consider local, regional and long-range impacts of any proposed access routes to the state highway system
- Manage growth along the Dalton Highway Corridor that ensures adequate public safety, wildlife management and subsistence resource protection
- Reserve land for future transportation needs and for transportation dependant activities
- Extend village roads to support new growth

1.0 Introduction

The North Slope Borough (NSB), with a resident population of over 7,400 and a transient population of over 5,000 North Slope oil field workers, faces many transportation challenges. The Borough spans over 89,000 square miles with no road access between communities and one state highway that provides access to oil production facilities at Prudhoe Bay. The NSB is responsible for maintenance of approximately 100 miles of roads that are primarily located within eight communities. The Borough also contains nine public airports, thousands of miles of winter trails and ice roads, and limited boat ramps, boat landings and port facilities.

This transportation plan provides goals and objectives, and outlines a policy framework for meeting the current and future transportation challenges in the NSB. The Plan:

- Identifies important transportation issues
- Outlines objectives, policies and responsible parties to address those transportation issues for the planning period 2005 – 2025
- Delineates the existing community and regional transportation networks in NSB
- Outlines the NSB's fiscal ability to build and maintain the transportation system now and in the future

This transportation plan will become a part of the NSB's Comprehensive Plan. Comprehensive planning:

Point Lay Road

- Provides the tools to help the NSB and residents plan future growth and development
- Helps community members and staff understand problems and opportunities today and prepare for the future
- Provides the basis for policy decisions by Planning Commission and Assembly
- Helps clarify interrelationships, such as how new development (more than just business development) might impact the need for new roads, or how population changes might impact a community's infrastructure
- Helps avoid future land use conflicts
- Protects natural resources
- Attracts businesses looking for a stable environment
- Provides support for outside funding applications
- Helps government establish priorities in a time of diminishing budgets
- Aids in the assessment for how transportation facilities respond to growth pressures and once established support or induce additional development

The North Slope Borough Planning Commission and the Assembly approved this plan. Goals, objectives and policies identified in the Transportation Plan will be used when the Borough's Title 19 Land Use Regulations are updated. Title 19 will provide the enforcement language needed to make this plan a reality.

A review of documents and interviews with local, Borough, state and federal officials were coupled with a public involvement process that began in November 2003. Two rounds of public meetings were held in

Anaktuvuk Pass, Atqasuk, Barrow, Kaktovik, Nuiqsut, Point Hope, Point Lay, and Wainwright. The first round of public meetings occurred in mid-November 2003 and served to introduce the project to the public and to obtain public comment on transportation needs. A second round of public meetings was held in each community in July 2004. At that time, the project team presented issues and options. In addition to public meetings, numerous interviews were conducted with NSB staff and transportation officials and previous related planning efforts and other research material was gathered and analyzed such as the:

- 1983 - North Slope Borough Comprehensive Plan, adopted by Assembly
- 1991 - November. Bureau of Land Management, Recreation Area Management Plan: Dalton Highway
- 1993 - Attempted revision of Comprehensive Plan
- 1998 - Attempted revision of Comprehensive Plan
- 1998 - Dalton Highway Master Plan
- 1999 - Minimum Adequate Public Facilities and Services for The Dalton Highway−Coldfoot to Deadhorse
- 2001 - June. North Slope Borough Areawide roads capital improvement plan project analysis report
- 2002 - Yukon-Kuskokwim Delta Transportation Plan
- 2003 - Regional Comprehensive Economic Development Plan
- 2003 - Economic Profile and Census Report, Volume IX.
- 2004 - Northwest Alaska Transportation Plan
- 2004 - Northeast National Petroleum Reserve – Alaska Draft Amended Integrated Activity Plan/Environmental Impact Statement
- 2004 - North Slope Borough Local All Hazard Mitigation Plan
- 2005 - Public review draft, North Slope Borough coastal management plan

The study area includes land within the boundaries of the NSB. A map of the study area and land management units is shown in Figure 1.

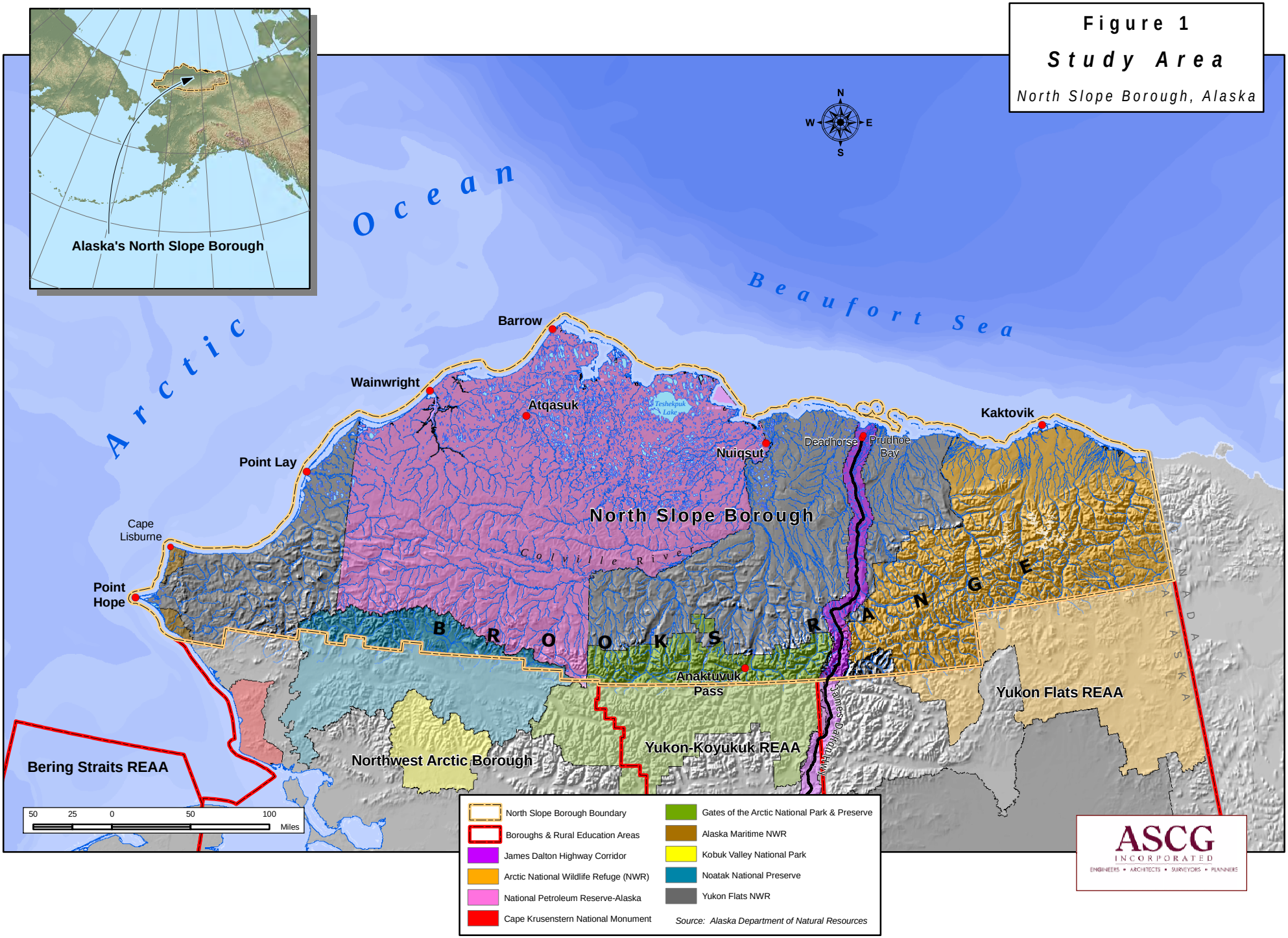


Figure 1

Study Area

North Slope Borough, Alaska

2.0 Planning Issues, Objectives, Policies, And Responsibilities

There are many challenges facing the NSB in obtaining a cohesive, well-maintained and culturally sensitive transportation system on the North Slope. The following planning issues were initially identified as challenges during meetings with NSB staff, community members, agency staff and through background research. The issues were analyzed and presented to community members who revised and expanded on them. These issues became the foundation for development of goals, objectives and policies. The objectives for transportation development are tied to resolving the identified issues and should encompass community and regional values regarding transportation. The policies provide more specific direction and address existing and future transportation issues and future projects, such as the Bullen Point Road and other transportation projects that may come to light in the future.

For the purposes of this Transportation Plan:

- A goal is defined as a broad statement of a desired result.
- An objective is more specific and easier to measure than a goal.
- A policy is an action statement intended to achieve the objective. Multiple policies are grouped under a single objective because fulfillment of the subordinate policies will lead to accomplishment of the objective.

The following transportation objectives and policies respond to the issues identified during the research and public participation phase of this plan. The responsible party is also included in the accompanying table. These entities will be tasked with ensuring that objectives and policies are implemented.

The Borough has specific responsibilities and powers regarding transportation as established by state law. In addition, the borough may assume added responsibilities as are allowed and are within the borough's fiscal resources to accomplish. Over the past 20 years, the NSB has enjoyed the benefits of the significant tax base provided by oil and gas development. Because of this tax base, investments in transportation have been significant. As the tax base continues to decline, the NSB is no longer able to provide the degree of services it has in the past.

2.1 Transportation Capital Projects Funding

Scarce funding sources for new or improved transportation projects are and will continue to be an impediment to community transportation improvements in the NSB.

Communities have identified numerous and varied projects, from the desire to build an evacuation road in Point Hope to requests for future subdivision access and boat dock improvements in many areas of the NSB. During times of greater economic prosperity, the NSB had a robust transportation Capital Improvement Program (CIP) and road maintenance program. Gravel, a precious commodity in most communities, was found or transported to the sites, often at great expense. Requests for new routes were reviewed and generally funded. This is no longer the case. The NSB is now faced with difficult choices in how to meet the continuing transportation demand and maintain their existing transportation infrastructure.

The NSB budget has declined at a rapid rate over the past five years. Investment revenues declined, in large part because the balance of the borough's major bond issue was reduced because of completion of associated capital projects. In addition, interest rates have fallen to historic lows, resulting in lower investment earnings on those balances that remained. Also, the State of Alaska's FY04 budget was reduced significantly and in doing that the State shifted more costs to local governments.

Various infrastructure projects can occur in villages at one time. They often are not well coordinated. Carefully coordinating projects can save money. For instance, housing or water and sewer projects can occur that require access improvements and should be coordinated with other transportation projects when possible.

Transportation Capital Projects Funding Objective 1 - Actively pursue transportation funding from sources outside of the NSB.

Transportation Capital Projects Funding Objective 2 - Minimize costs by coordinating transportation projects with other types of projects.

Transportation Capital Funding			
Issue	**Objective**	**Policy**	**Responsible Parties**
Scarce funding sources for new or improved transportation projects are and will continue to be an impediment to community transportation improvements in the NSB.	Actively pursue transportation funding from sources outside of the NSB.	Pursue funding for transportation projects from private, local, state and federal sources.	North Slope Borough Planning Department, Grants Division, federal and state agencies
		Participate in the annual nomination process in the Statewide Transportation Improvement Program for roads, harbors and airports.	North Slope Borough Planning Department, Grants Division and Public Works
		Stay informed of requirements and potential funding sources of the BIA Indian Reservation Roads (IRR) program.	North Slope Borough Planning Department
		Support and facilitate Iñupiat Community of the Arctic Slope (ICAS) and Native Village Tribal participation in the BIA transportation program.	North Slope Borough Planning Department , Mayor's Office, Public Works Department and ICAS
		Collect and analyze data to help support funding requests for transportation projects from funding sources such as DOT&PF.	North Slope Borough Planning Department, Grants Division
		Prioritize projects that have capital funding commitments from sources other than the NSB.	North Slope Borough Public Works and Planning Department
	Minimize costs by coordinating transportation projects with other types of infrastructure projects.	Develop cooperative agreements between landowners (including Native corporations), city, Borough, and funding agencies to coordinate construction funding and logistics.	North Slope Borough Mayor's Office, Planning Department, Law Department, Village Councils, Tribal Councils, and Native Corporations

2.2 Transportation Maintenance Funding

Funding for maintaining the existing and future transportation facilities is limited.

Several new local community roads and other transportation projects are envisioned and NSB officials are actively seeking funding for these projects from outside sources. Outside sources of funding for transportation maintenance, however, are limited. The NSB has historically been responsible for ongoing maintenance, which continues to increase and to add to the ever-growing financial demands being placed on NSB budgets. When budgets are tight, maintenance personnel in each village clear snow from the more critical roads but this practice is not formalized. Borough officials have also discussed needed improvements in the reporting of maintenance expenditures. In the past, it has been very difficult to isolate the expenditure types, such as road or airport maintenance funds. These funds are not tracked separately. This makes budgeting and forecasting budgets difficult. Another on-going concern is the need to maintain stockpiles of gravel for maintenance and construction needs. Having adequate gravel stockpiles can help maintenance staff respond to road maintenance needs in a timely and more cost effective manner.

Transportation Maintenance Funding Objective 1 - Develop projects that decrease or minimize capital and maintenance costs to the NSB.

Transportation Maintenance Funding Objective 2 - Improve road and airport maintenance budgeting tools to better track and forecast expenditures.

Transportation Maintenance Funding			
Issue	**Objective**	**Policy**	**Responsible Parties**
Funding for maintaining the existing and future transportation facilities is limited.	Develop projects that decrease or minimize maintenance costs to the NSB.	Prioritize projects that have maintenance commitments from sources other than the NSB.	North Slope Borough Public Works and Planning Departments
		Prioritize capital improvement projects, such as road resurfacing or bridge repair that can help to reduce maintenance costs.	North Slope Borough Public Works, Planning Department, CIP Policy Review Committee, Planning Commission and Assembly
		Actively seek methods to reduce maintenance costs, such as through additional operator training, snow fencing and FAA-funded airport maintenance equipment and snow removal equipment buildings.	North Slope Borough Public Works Department
		Establish a formal village-based priority system for transportation maintenance on existing facilities.	North Slope Borough Public Works
		Pursue discussions with the DOT&PF regarding potential transfer of airport ownership and maintenance.	North Slope Borough Mayor's office, Law Department
		Consolidate gravel extraction operations among multiple projects to the maximum extent possible and look for ways to create local stockpiles of gravel.	North Slope Borough Public Works Department
		Keep current with technology that could reduce the transportation facility maintenance, and apply where appropriate.	North Slope Borough Public Works Department
	Improve road and airport maintenance budgeting tools to better track and forecast expenditures.	Establish an accounting system that separates transportation categories of spending by type and by village.	North Slope Borough Public Works Department

2.3 Transportation and Subsistence Conflicts

Poorly planned transportation facilities have the potential to negatively impact the subsistence lifestyle that is vital to residents in the Borough.

NSB residents rely heavily on subsistence resources for large portions of their daily diet and cherish its longstanding role in their culture. NSB residents recognize that new transportation routes have the potential to improve access to subsistence areas and could provide a less expensive and more reliable transportation network. They also recognize the benefits of the oil industry, which has become an integral part of the regional economy. Yet road development, particularly all-season road development, also has many residents concerned. Nuiqsut, which is 90 percent Iñupiat, has expressed concern that a road could bring outsiders in to harvest their subsistence resources. The community of Anaktuvuk Pass also relies on caribou for subsistence. A change in the caribou migration pattern because of road development could affect this community's subsistence without providing improved access. Industrial roads, such as the Bullen Point road that provides access from Deadhorse to Bullen Point, also have some residents concerned over potential impacts to subsistence resources.

Restrictions on public access to public lands leased for oil and gas exploration or development are also a concern. Such restriction can result in denial of public access to areas traditionally used for subsistence hunting, fishing, recreation and other uses. Maintaining existing access to subsistence resources is critical to the people of the North Slope. Nuiqsut residents have voiced concern that at times access has been delayed due to national security concerns. Nuiqsut residents rely on whale hunting along the Nechelik Channel. Following the September 11, 2001 terrorist attacks and at subsequent times of heightened alert, hunters have been prevented or delayed from practicing their traditional hunting.

Whaling near Nuiqsut with oil development in background

Bowhead whales are sensitive to noise and shipping traffic (including village barge traffic). This is especially evident during whale migration. In recent years, the Beaufort Sea has remained ice-free for longer periods. With more of ice-free time, it is likely that ship traffic will increase which will cause a parallel increase to noise and impacts to bowheads (and thus, subsistence hunting). Currently, the oil industry works with the Alaska Eskimo Whaling Commission and local whaling captains' associations to develop Conflict Avoidance Agreements that are negotiated to lessen subsistence impacts.

Air traffic also has the potential to impact subsistence practices. The Borough contains many unimproved airstrips or gravel bars that provide access to little-used areas of the North Slope for ecotourists and sport hunters. Benefits to this type of access include increased tourism in villages but it can also disrupt wildlife migration and increase competition for wildlife and fish resources. For instance, sport hunters fly to remote areas near Anaktuvuk Pass and set up spike camps (remote hunting camps) north of the pass and may deflect caribou from moving south through the pass.

There is also the potential for airboats to access rivers from the state highway system. The noise from airboats would likely cause disruption to wildlife.

Subsistence Conflict Objective 1 - Ensure that the siting, design, construction and maintenance of transportation facilities do not adversely impact subsistence resources.

Subsistence Conflict Objective 2 - Educate outside users about subsistence resources and how to minimize their impact to these resources.

Subsistence Conflict Objective 3 - Work with local residents to manage new access to lands that are critical subsistence use areas.

Transportation and Subsistence Conflicts			
Issue	**Objective**	**Policy**	**Responsible Parties**
Poorly planned transportation facilities have the potential to negatively impact the subsistence lifestyle that is vital to residents in the Borough.	Ensure that the siting, design, construction and maintenance of transportation facilities do not adversely impact subsistence resources.	Regulate transportation facility development that significantly obstructs wildlife migration unless no feasible and prudent alternative is available and Federal and State approvals are secured	NSB Planning and Wildlife Departments
		Include a means of wildlife crossing when linear structures such as roads, transportation corridors, and pipelines are located in areas used as corridors by migratory species.	NSB Planning and Wildlife Departments
		Design, construct and maintain transportation facilities to minimize the alteration of shorelines, water courses, wetlands, tidal marshes and significant disturbance to special habitat areas (including seasonally critical wildlife migratory, breeding, molting and feeding habitat) and to avoid critical fish migration periods, to protect fish over-wintering areas and to prevent drawing-down critical winter freshwater habitats.	NSB Planning, Public Works and Wildlife Departments
		Maintain and use an inventory of subsistence resources that reflects habitat and wildlife research in order to identify routes and resource locations that could be affected by transportation decisions.	NSB Planning and Wildlife Departments, Law Department
		Site all airport and helicopter pads at least 10,000 feet away from solid waste sites (pursuant to FAA regulations) and design, construct and operate them in a manner that minimizes their impact upon significant wildfowl migration routes, breeding grounds, and nesting areas.	NSB Planning, Wildlife and Law Departments
		Regulate all future industrial corridors with a review process that considers all potential impacts to subsistence resources.	NSB Planning, Wildlife and Law Departments
		Incorporate stipulations into project reviews and oil leases that protect existing public access to subsistence areas.	NSB Planning and Wildlife Departments and IHLC
		Regulate aviation and surface transportation activity seasonally or diurnally when needed to protect migratory wildfowl or other migratory wildlife to the maximum extent possible.	NSB Planning and Wildlife Departments, FAA
		Regulate the use of all water, air or motor vehicles (off road and on road) that significantly disrupt wildlife migration and subsistence activities.	NSB Planning, Public Works and Wildlife Departments, and IHLC
		Require Conflict Avoidance Agreements for all new transportation developments	NSB Mayor's Office, Planning and Wildlife Departments, Law Department, Planning Commission and Assembly
		Require permits for sports hunters that fly into the NSB and establish spike camps.	NSB, Planning and Wildlife Departments, Law Department, Planning Commission
	Educate outside users about subsistence resources and how to minimize their impact to these resources	Develop a brochure for distribution with Borough land use permits and for distribution by air taxi operators.	NSB Mayor's Office, Planning Department, Law Department, and Wildlife Department
		Work with the Alaska Department of Fish and Game and state and federal land managers to reduce effects on Borough residents from outside sport and commercial hunting and fishing activities.	NSB Planning Department and Wildlife Department, working with state and federal agencies
	Work with local residents to manage new access to lands that are critical subsistence use areas.	Utilize the Borough permitting process to direct outside visitors to appropriate areas.	NSB Planning Department and Wildlife Department
		Develop programs to compensate subsistence users for development impacts to watersheds and wetlands.	NSB Planning Department, Law Department, Wildlife Department, and Administration and Finance Department

2.4 Safety, Health and Transportation

Safety and health issues relating to transportation in the NSB concern Borough residents.

Several safety and health issues were raised during public meetings and during plan review. Residents want a transportation system that meets safety standards and does not adversely impact their health. Specifically there were comments on winter trail safety, dust impacts, erosion and flooding, snow drifting, substandard transportation facilities and desire to encourage walking and bicycling to improve health.

Winter trail safety. With the advent of Global Positioning Systems (GPS), the number of lost travelers along winter trails has been reduced. However, search and rescue efforts are still necessary and are hampered by weather, equipment failures and lack of trail marking and shelters. While DOT&PF has scheduled a trail-staking project to begin in the NSB in 2006, the project is grossly under funded and is unlikely to meet the entire winter trail-staking needs in the NSB. There is also a concern with regards to right of way on the trails. DOT&PF generally contracts with the Search and Rescue teams or other local groups for installation of the winter trail stakes. They are responsible for obtaining written permission from the landowners. If permission is not obtained, they must bypass that area. Another issue is that winter snow machine accidents are reported, but there is no NSB-wide consistency in the reporting system and therefore it is difficult to track problem locations.

Winter Trail Safety Objective - *Develop a safe winter trail system between communities.*

Dust Impacts. Dust from traffic can cause health problems and contaminate subsistence foods. Dust control is an issue in many villages. Of particular concern are health impacts (particularly respiratory ailments) from dust generated from roadway traffic, as well as dust contamination of traditionally stored foods. NSB maintenance crews typically have several trucks they use for watering many NSB roads on a daily basis during the summer, but respiratory problems such as bronchitis, asthma, and a high incidence of sinus infection persist. The NSB implemented a pilot project to reduce dust on roads in Nuiqsut and Barrow (in the summer of 2004) by applying a dust suppressant. Results in Barrow were mixed. In Nuiqsut, residents and NSB maintenance staff reported a significant reduction in dust shortly after application.

Dust Control Objective - *Support community dust control efforts.*

Flooding and Erosion. Communities in the NSB experience, to varying degrees, flooding, erosion and snow drifting problems that affect their transportation system. Kaktovik has severe erosion problems, particularly affecting their airport. Point Hope has had a long-standing need for an evacuation road to provide access to higher ground in a flood event. Many roads in Atqasuk have little or no binding material and during rainy weather have severe erosion problems. Barrow is susceptible to extreme and potentially devastating storm events. The Corps of Engineers is currently conducting several flooding cost estimates for Barrow to determine the magnitude of financial loss that flooding could cause.

Flooding and Erosion Objective - *Support projects that reduce erosion and flooding that impact transportation facilities.*

Snow Drifting. Winds blowing across the tundra can create snowdrifts across roads. Driving becomes hazardous, especially when it is dark. Snow removal is extremely costly and time-consuming, requiring the use of trucks, loaders and graders. In some NSB communities the snow fencing is inadequate to prevent snow drifting and needs replacement or repairs. Snow drifting can require constant monitoring and maintenance and, at times, curtails travel.

Snow Drifting Objective - *Support project that address snow drifting across transportation facilities.*

Substandard Transportation Facilities. Generally, the NSB roads are built to Federal Highway Administration (FHWA) safety standards but in some instances, sight distances and road surfaces are not ideal. The DOT&PF has modified the FHWA standards to meet rural Alaska needs for a pioneer standard

road which is generally used in communities with a minimal amount of traffic. Meeting safety standards can reduce accidents.

Substandard Transportation Facilities Objective - *Use FHWA and FAA safety standards when upgrading existing transportation facilities and constructing new transportation facilities.*

Inadequate Marine Transportation Facilities – In many communities the harbor, boat dock or barge landing facilities are inadequate or unsafe. Because marine travel is so important to the lifestyle of residents of the NSB, future marine facilities are requested in most communities. The upgrade or construction of marine facilities in NSB communities can reduce risk, provide for increased traffic and can increase the potential for cost reductions.

Inadequate Marine Transportation Facilities Objective – *Support marine facility upgrades and improved facility construction built to current marine standards.*

Bicycling and Walking. In recent years, transportation planners have come to recognize the importance of developing compact communities and thus compact transportation systems to encourage bicycling and walking. Increased exercise, such as walking and bicycling, can improve health and reduce health risks. The exception to this may be when walking and bicycling occur in the summer when roads are extremely dusty. Like "urban sprawl", "rural sprawl" forces communities to use motorized transportation, particularly in inclement weather. It can also contribute to higher maintenance costs.

Bicycling and Walking Objective - *Provide options that improve and encourage non-motorized forms of transportation.*

Safety, Health and Transportation			
Issue	**Objective**	**Policy**	**Responsible Parties**
Safety and health issues in regards to transportation in the NSB concern Borough residents.	Develop a safe winter trail system between communities	Prioritize winter trail marking through an analysis of winter search and rescue events.	NSB SAR and SAR volunteers
		Support funding requests for trail marking and emergency shelter projects through the State of Alaska and private funding.	NSB Planning Department and Grants Division
	Support community dust control efforts.	Continue to pursue dust control project funding through State and Federal funding sources.	NSB Public Works Department and Grants Division
		Monitor dust control projects and analyze results.	NSB Public Works and Planning Departments
		Keep informed of new dust suppressants and their applicability in Arctic environments.	NSB Public Works Department
	Support projects that reduce erosion and flooding that affect transportation facilities.	Prioritize CIP requests that address erosion and flooding impacts to transportation.	NSB Public Works Department
		Regulate transportation facilities in floodplains and areas vulnerable to flooding and erosion.	NSB Planning and Public Works Departments
	Support projects that address snow drifting across transportation facilities.	Quantify, prepare cost estimates and seek funding for repairs, replacement and additions to snow fencing where it inhibits snow drifting across transportation structures.	NSB Public Works Department and Grants Division
	Use published safety standards when upgrading existing transportation facilities and constructing new transportation facilities.	Require adherence to highway and airport safety standards during the design and construction process of transportation facilities.	NSB Public Works and Planning Departments
	Support marine facility upgrades and improved facility construction built to current marine standards.	Quantify, prepare cost estimates and seek funding for repairs, replacement and new marine facilities.	NSB Public Works and Planning Departments
	Provide options that improve and encourage non-motorized forms of transportation.	Require consideration of pedestrians and cyclists when designing and constructing roads.	NSB Public Works and Planning Departments

2.5 High Transportation Costs

Transportation costs in the Borough are high and can cause undue hardship on Borough residents; however, road connections to the state highway system are unlikely and do not receive wide support.

Residents have concerns about the high cost of air transportation for delivery of goods and travel between villages, Barrow, Anchorage and beyond. With rising gas prices it is also getting more expensive to travel within the communities. Air travel costs between NSB communities and Barrow average over $2.00 per mile traveled compared to just over $1.00 per mile from communities that use Kotzebue or Bethel as their hub. Tickets from Barrow to Anchorage cost between about $430 and $750. These prices are often beyond many residents' ability to pay. Market forces will continue to drive prices, but many residents are seeking assistance from the Borough to influence the high cost of travel in the NSB. One of the contributing factors to the high transportation costs is the lack of connection to the state highway system.

Historically, the State has not funded road connections between small villages and the highway system unless there is an outside economic benefit driving the road development, such as oilfield access. Some residents have suggested rail or mono-rail connections. These methods were examined but considered too expensive at this time.

High Transportation Costs Objective - *Promote lower transportation costs.*

High Transportation Costs			
Issue	**Objective**	**Policy**	**Responsible Parties**
Transportation costs in the Borough are high and cause hardships on community residents.	Promote lower transportation costs.	Consider development of an intervillage trail system and where appropriate connections to industrial roads that might lead to other villages or the Alaska road system in an effort to reduce transportation costs.	NSB Mayor's office, Planning Department, villages, Planning Commission and Assembly
		Seek other measures that would lower transportation costs.	NSB Mayor's office
		Support all reasonable means to reduce the cost of fuel.	NSB Mayor's office

2.6 Transportation Coordination

Residents and Borough officials often feel disenfranchised from transportation decisions.

Transportation decisions on the North Slope often involve a myriad of government agencies and private entities. Examples include a new proposal by the U.S Postal Service to end the mail flights into Barrow and instead truck the mail from Fairbanks to Deadhorse and then flying it to Barrow. Another example is the development of industrial roads and ice roads to support the oil and gas industry. Some of the proposed industrial routes have involved potential partnerships between the oil companies, the Alaska DOT&PF headquarters office in Juneau and the regional DOT&PF office in Fairbanks, engineering and environmental consultants to the DOT&PF, the Alaska Department of Natural Resources (DNR), Bureau of Indian Affairs (BIA), the Bureau of Land Management, village and city officials, and various departments within the NSB. Coordinating on such large and complex projects is often daunting and past experience has shown that not all entities remain well informed throughout the project. This has led to potential delays or misunderstandings of the planning and design process and can lead to poor or ill informed decision-making. Local governments often feel removed from the process as they struggle to stay informed and keep up with sometimes swiftly changing priorities.

Transportation Coordination Objective 1 - *Participate actively in and promote public review and input into the writing, review and approval of any transportation or utility corridors, plans or routes undertaken by the Borough, state and/or federal government within the NSB*

Transportation Coordination Objective 2 - *Communicate transportation information with local communities.*

Transportation Coordination			
Issue	**Objective**	**Policy**	**Responsible Parties**
Residents and Borough officials often feel disenfranchised from transportation decisions.	Participate actively in and promote public review and input into the writing, review and approval of any transportation or utility corridors, plans or routes undertaken by the Borough, state and/or federal government within the NSB.	Serve on ad hoc or standing transportation committees that discuss future transportation facilities in the NSB.	NSB Planning Department; Village and Tribal Councils
		Solicit public comments regarding future transportation projects.	NSB Mayor's Office, Planning Department, Governmental Affairs Division
	Communicate transportation information with local communities.	Provide transportation planning and project updates on the NSB website.	NSB Mayor's Office
		Support development of local transportation plans consistent with NSB policies.	NSB Planning Department, Village and Tribal Councils
		Prepare a review of the Comprehensive Transportation Plan every two years.	NSB Planning Department and Planning Commission

2.7 Dalton Highway Management

There are concerns about the management of the Dalton Highway and how future traffic could affect the people, environment and resources of the North Slope.

The Dalton Highway is the only road link connecting the NSB to the main Alaska highway system and was. built in 1974 by Alyeska Pipeline Service Company as a supply route for the oil pipeline. In 1978, Alaska Governor Jay Hammond and NSB Mayor Eben Hopson, Sr, signed a Memorandum of Understanding that dictates how the Dalton Highway Corridor will be managed. The road is now operated and maintained by the Alaska DOT&PF and is open to the public. While the Dalton Highway is still heavily used by the oil industry, industrial traffic is now joined by an increasing number of independent and tour group travelers. This has increased concerns about impacts to NSB residents and natural resources including subsistence impacts from increased hunting and fishing, contamination to vegetation from dust, litter, trespass, disruption, public safety concerns, and overuse of the lands within the corridor.

The Bureau of Land Management, State of Alaska, and NSB and have developed several Dalton Highway Corridor management documents that address concerns with public safety, services, management of fish and wildlife, aesthetics and the need to comply with requirements of NSB ordinances. Unfortunately, these plans have largely been ignored.

At present, state law prohibits off-road vehicle use within five miles on either side of the Dalton Highway right-of-way except that use which occurs in conjunction with mineral development activities (Alaska Statute 19.40.210).[1] Senate Bill 85, introduced in 2004 in the Alaska Legislature, is described as: "An Act repealing the ban on the use of certain off-road vehicles within five miles of the right-of-way of the James Dalton Highway; and providing for an effective date." This proposed change to the current ten-mile-wide off-road vehicle free corridor has caused serious environmental concerns. Research scientists at Toolik Lake Field Station, located at mile 284.5 on the Dalton Highway, and the North Slope Borough Department of Wildlife Management have strongly urged that the current off-road vehicle limits remain in affect due to the potential environmental damage and subsistence impacts that lifting the restriction would cause.

[1] United States Department of the Interior, Bureau of Land Management, Recreation Area Management Plan, Dalton Highway, November 1991.

There are also concerns with caribou migrations in the Dalton Highway and pipeline corridor. Caribou can be deflected from roads and pipelines, especially when the roads and pipelines are situated close together. This can cause a disruption in natural migration patterns.

Public safety is also one of the major concerns along the Dalton Highway. The NSB has been tasked with providing emergency services along the Dalton Highway within Borough borders. While some of this responsibility is shared with other public and private agencies, the NSB's proximity and its trained personnel at Deadhorse have resulted in the NSB shouldering much of this responsibility for the northern portion of the highway. As tourism along the Dalton Highway expands, this public safety concern grows.

Another major concern voiced by many NSB residents, particularly in Nuiqsut, is the increased sport hunting pressures that may result with improvements to the Dalton Highway. As recreational hunting increases, ADF&G may adjust future harvest levels, which could negatively impact traditional hunting practices for NSB residents. Should an all-season public road ever be developed to Nuiqsut from the Dalton Highway, this issue would become even more of a concern.

Dalton Highway Management Objective - Manage *growth along the Dalton Highway Corridor that ensures adequate public safety, wildlife management and subsistence resource protection.*

Dalton Highway Corridor Management			
Issue	**Objective**	**Policy**	**Responsible Parties**
There are concerns about the management of the Dalton Highway and how future traffic could affect the people, environment and resources of the North Slope.	Manage growth along the Dalton Highway Corridor that ensures adequate public safety, wildlife management and subsistence resource protection.	Use NSB permit process to guide commercial or industrial growth to specific areas along the Dalton Highway corridor.	NSB Planning and Wildlife Departments and NSB Mayor's Office
		Develop performance standards and establish minimum levels of service requirements for new development along the Dalton Highway as a means of avoiding negative impacts.	NSB Planning Department, Mayor's office, Law Department
		In the event of additional pipeline development, use existing facilities for new infrastructure to the greatest degree possible.	NSB Planning Department
		Emphasize use of existing airport facilities primarily at Prudhoe Bay for air support needed for industrial use of the Dalton Highway.	NSB Planning Department
		Encourage the clustering of research facilities in a central location in the already disturbed area at Toolik Lake.	NSB Planning Department
		Require review and approval by the North Slope Borough of final rights-of-way and access routes from the Haul Road	NSB Planning Department, Planning Commission and Assembly
		Continue to support Alaska Statue 19.40.210 which restricts off-road vehicle use within five miles of the Dalton Highway Corridor.	NSB Mayor's office, Planning and Wildlife Departments, Law Department, and Governmental Affairs division
		Regulate any increases to sport hunting along the Dalton Highway Corridor that may negatively impact subsistence activities.	NSB Mayor's office, Planning and Wildlife Departments, Law Department, Planning Commission and Assembly
		Complete process of Borough land selections along the Dalton Highway for the purpose of encouraging compatible commercial activities in support of resource development and recreation.	NSB Planning Department, Mayor's Office
		New commercial development along the Dalton Highway Corridor must provide its own facilities and services through private financing prior to or concurrent with development, the Borough is not financially responsible to provide such facilities and services.	NSB Planning Department, Mayor's office, Planning Commission and Assembly

2.8 Reserve Land for Future Transportation Development

Land for future transportation needs is a critical resource that is not always provided for. Prime examples of this occur when communities lack local land use plans and fail to incorporate future needs into their transportation network. This can result in an inefficient transportation system and failure to meet transportation demands in a timely manner.

Reserve Land for Future Transportation Needs			
Issue	**Objective**	**Policy**	**Responsible Parties**
Land for future transportation needs is a critical resource that is not always provided for	Provide for adequate land resources within each community for future transportation and transportation related activities.	Prepare a mid- and long-term land use plan for each community that forecasts transportation system needs. Balance transportation needs with funding capabilities.	NSB Planning Department
		Prepare a plan that forecasts the need for land uses that are transportation dependant or related and establish the appropriate land use controls to assure these lands are utilized to their greatest potential.	NSB Planning Department
	Extend village roads to support new growth	The Borough will partner with the local municipality, native villages, village corporations, state and federal government to assist in transportation project development.	NSB Administration & Finance Department and Department of Public Works
		When Borough and partner resources are unavailable new development owners should pay their fair share for the cost of road and utility extensions.	NSB Planning Department, Department of Public Works, Mayor's office

3.0 Monitoring and Implementation

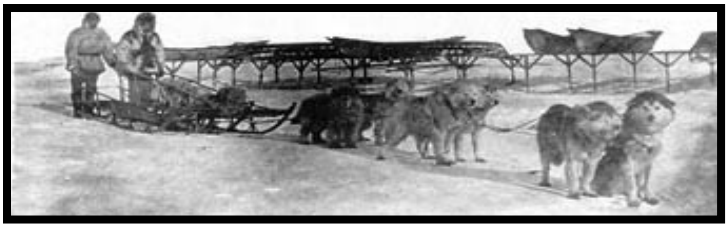
The monitoring and implementation plan is presented in the Comprehensive Plan and is intended to apply to the Transportation Plan.

4.0 Background

4.1 People and Culture

Introduction. The majority of the permanent population in the North Slope (approximately 72% according to the NSB 2003 Economic Profile and Census Report) is Iñupiat. The remaining population of the North Slope is composed of Caucasians, Filipinos and Asian/Pacific Islanders, other Alaska Native and Native Americans, and small numbers of other ethnic groups. The Iñupiat have lived in the area for centuries. The traditional knowledge that has been passed from generation to generation of Iñupiat families has been crucial to the culture's long survival in the harsh environment of the North Slope. This traditional knowledge is based on close family ties, cooperation, teamwork, and sharing of resources and knowledge. Subsistence uses of the land are sources of strength for the culture and of nourishment and income for Iñupiat residents.

Transportation History. The Iñupiat of Alaska's North Slope have always maintained a mobile culture, traveling over great distances and through harsh climatic conditions to visit friends and family members and participate in the gathering of traditional subsistence foods. Traditionally, the Iñupiat lived in semi-permanent coastal communities located near good hunting places. In April and May, Iñupiat hunters from Point Hope, Wainwright and Barrow searched for the bowhead whale, en route to summer feeding grounds in the Beaufort Sea. At this same time, hunters would occasionally travel along the upper Utukok and Colville River in search of caribou. In June and early July when the ice left, some of the aboriginal North Slope coastal Iñupiat traveled to seal and duck hunting camps and those living in inland settlements moved to the coast. In July, another major move occurred to the fish camps or inland to hunt caribou.[2]



Dog team and skin boats put up for the winter, circa 1930.
Terza Hopson Collection,
Iñupiat History, Language and Culture Commission

Historically, journeys also took place at other times of the year. During the Messenger Feast, local families from different localities whose leaders either were trading partners or linked by co-marriage, traveled to meet in a ceremonial gathering. There were also visits to relatives in other territories sometimes brought on by problems of famine in the individual's home district. Summertime also saw many travelers heading east to the trade fairs at *Nigliq* at the mouth of the Colville River. Figure 2 shows traditional trade routes in the NSB.

Women covering umiaq (skin boat) frame with bearded seal (ugruk) skins, circa 1930.
Photo by Charles Brower.

[2] Arctic Circle. <<http://arcticcircle.uconn.edu/CulturalViability/Inupiat/1800s.html>>. Accessed October 11, 2004.

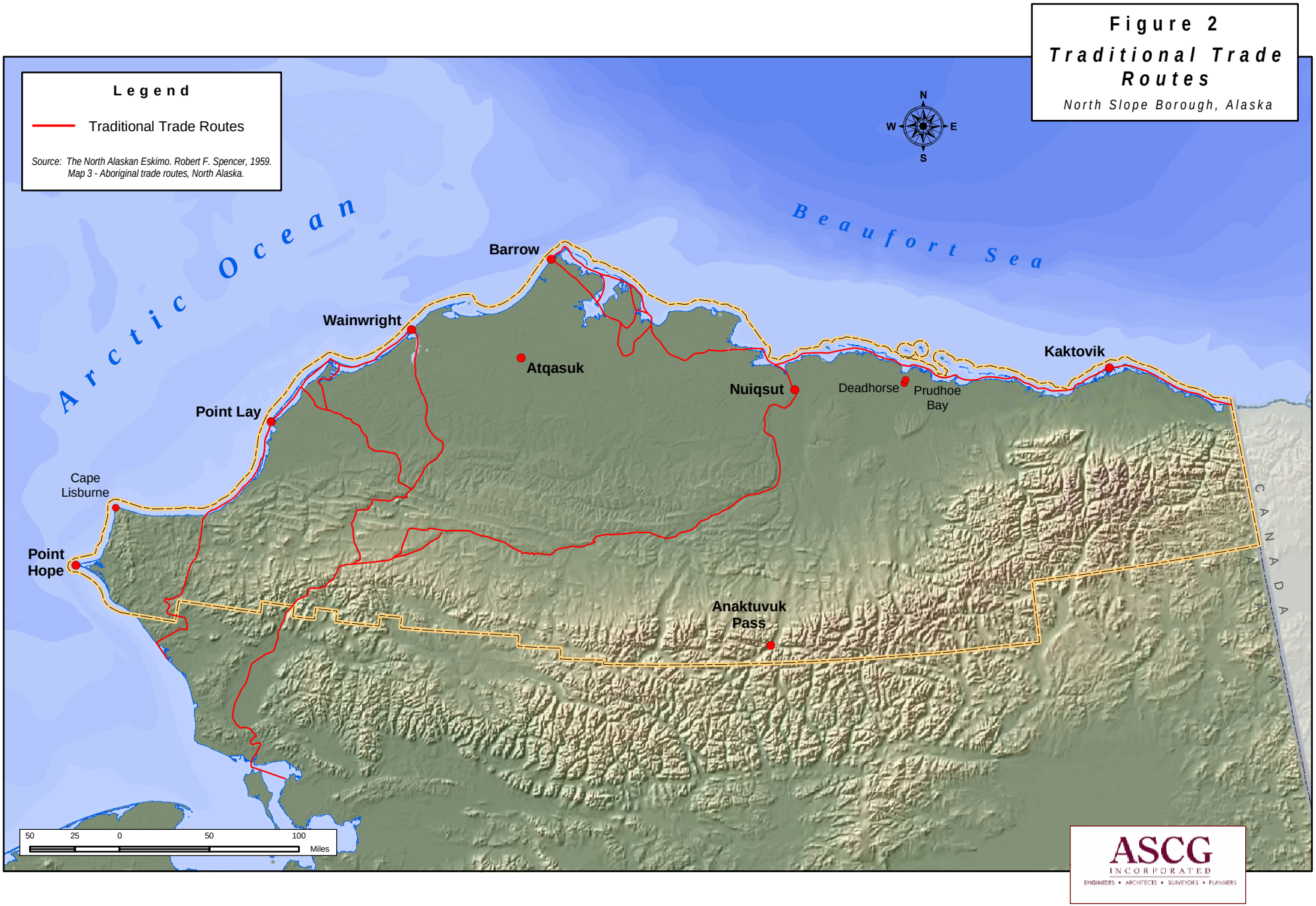


Figure 2
Traditional Trade Routes
North Slope Borough, Alaska
Legend
Traditional Trade Routes
Source: The North Alaskan Eskimo. Robert F. Spencer, 1959.
Map 3 - Aboriginal trade routes, North Alaska.
N
W
E
S
Arctic Ocean
Beaufort Sea
Barrow
Wainwright
Atqasuk
Kaktovik
Nuiqsut
Deadhorse
Prudhoe Bay
Point Lay
Cape Lisburne
Point Hope
Anaktuvuk Pass
CANADA
ALASKA
50 25 0 50 100
Miles
ASCG
INCORPORATED
ENGINEERS • ARCHITECTS • SURVEYORS • PLANNERS

Early travel was accomplished by foot, dog teams, kayaks or a large sealskin covered boat, called an "umiaq." The umiaq, still used today for summer travel and for hunting, usually measures 20 to 22 feet and is able to carry ten to 12 people.

River delta and at Kaktovik on Barter Island.[1] In the early 19th century, there were also Natives of Chukotka who traveled across the Bering Strait to annual fairs in Alaska.[1]

Travelers found their way around the mostly featureless terrain by knowing specific landmarks and navigating by the stars and snowdrifts. They traveled safely on the sea ice because of their knowledge of wind, current, and the differences between safe and dangerous ice.

In 1848, the first America-flag whaling vessel, Superior, captained by James Roy, entered the Arctic Ocean through the Bering Strait. By the mid 1800s, commercial whaling vessels had begun to stop regularly in Barrow. The whalers hired Iñupiat crewmembers and closely followed Iñupiat whaling and survival techniques. Commercial whaling began to die out after the turn of the century but subsistence whaling continues to be an important part of the Iñupiat culture today.[3]

On May 9, 1926, Richard E. Byrd and Floyd Bennett were the first to reach the North Pole by airplane. They flew in a Fokker tri-motor. In the 1920s and 1930s, Army General William "Billy" Mitchell called the Arctic "the future springboard for air warfare" and foresaw the crucial impact of great circle air routes on strategic military planning. His predictions were echoed by Arctic explorer Vilhjalum Stefansson. Their notion was largely ignored until after the beginning of WWII when the first airports began to be constructed on the North Slope.[4]

Wiley Post Crash near Flat, Alaska, 1933
Wiley Post and Will Rogers did not survive another crash near Barrow in 1938

In 1923, President Warren G. Harding designated 23 million acres of land from the Brooks Range to the Arctic Ocean as Naval Petroleum Reserve No. 4. From about 1944 to 1954, the U.S. Navy performed a ten-year oil exploration project in this area. This likely spurred on the introduction of new means of transportation – the outboard motor and snow machines. Both of these methods of transportation allowed the people of the North Slope to expand their traditional subsistence territories. The snow machine, which came into use in the 1960s, reduced the dependence on dog teams, which no longer play a vital role in transportation.

Modern Travel in Northern Alaska

Creativity and flexibility, knowledge about the environment, and survival skills continue to be important elements of modern Iñupiaq culture and travel. Hunting, especially whaling, remains central to people's lives today and skin boats are still used for spring whaling. Navigational skills are still a critical requirement for NSB hunters and in maintaining their culture.

[3] Chance.
[4] Ibid.

Subsistence. Subsistence remains an important part of the culture of the people of the North Slope and influences the transportation system. Residents who hunt and fish often travel great distances.

Although subsistence uses are changing over time, it is difficult to quantify the changes. The NSB 2003 Economic Profile and Census Report included the following data on subsistence use in 2003 as compared to 1998, the last time the report was prepared:

Table 1. Household Consumption of Subsistence Resources

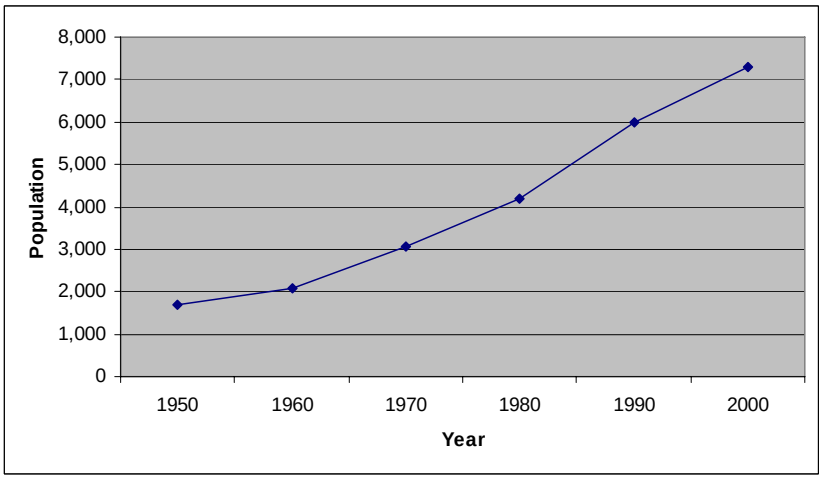
	Households 1998	Percentage 1998	Households 2003	Percentage 2003
None	35	3%	165	13%
Very little	128	12%	217	17%
Less than half	211	20%	182	14%
Half	216	21%	241	19%
More than half	188	18%	183	14%
Nearly all	134	13%	165	13%
All	126	12%	130	10%
Total	1038	100%	1283	100%

Note: Data indicates households that responded to a question regarding how much of the meat, fish and birds eaten in the household came from local food sources.

Overall, in 1998, 64% of households indicated that half or more of the meat, fish and birds eaten in the household came from subsistence, and by 2003, the percentage decreased to 56%. Although this suggests a decline in reliance on subsistence, the 2003 report indicates that apparent decreases are mainly due to the inclusion of non-Iñupiat households in the 2003 survey. These are primarily teachers for the NSB School District, most of whom were not in residence when the 1998 Report was prepared.

Population. Population growth in the NSB in the last century has been linked with natural resource exploration. Since the discovery of oil on the North Slope in 1968, the population has grown significantly. Exhibit 1 shows population growth in the NSB from 1950 to 2003:

Exhibit 1 North Slope Borough Population: 1950-2003



Source: U.S. Census (1950-1990), 2003 NSB Economic Profile and Census Report, U.S. Census (2003)

Table 2. Average Number of Persons per Household

Community	Average Persons Per Household
Anaktuvuk Pass	3.54
Atqasuk	3.67
Barrow	3.26
Nuiqsut	3.32
Kaktovik	3.79
Point Hope	3.99
Point Lay	3.88
Wainwright	3.53
NSB Borough-wide Average:	3.62

The Northwest Alaska Transportation Plan (NWATP), completed in February 2004 by the Alaska DOT&PF, forecasted population growth and the movement of people and goods throughout the region over the next 20 to 25 years. The project area of the NWATP included the North Slope Borough, the Northwest Arctic Borough, and portions of Alaska not in a borough surrounding Nome and communities in the middle Yukon River basin. The NWATP projected an average population growth rate of 1.16% within the NSB, increasing the population of the region from approximately 7,300 to 9,700 residents during the next 25 years. Table 3 presents the 2000 and 2025 forecasted population for the region, according to the NWATP.

Table 3. Existing and Forecasted Population

Community	2000 Population	2025 Forecasted Population
Barrow	4,581	6,112
Point Hope	757	946
Wainwright	546	728
Nuiqsut	433	578
Kaktovik	293	391
Anaktuvuk Pass	282	376
Point Lay	247	330
Atqasuk	228	304
NSB Total:	7,367	9,765

Source: NWATP, DOT&PF

Note: Figures reflect residents of listed communities and do not include residents in Prudhoe Bay (5 in 2000) or those outside of defined communities (13 in 2000).

The NSB 2003 Economic Profile and Census Report analyzes the population based on Alaska Department of Labor and NSB planning statistics which estimates population annually. Their analysis shows that the population of the Borough declined from a peak of 7,555 in 1998 to 7,385 in 2000 and again in 7,307 in 2003 for a total decline of 3.3 percent. In contrast, during the same time period the population of the State of Alaska increased approximately 1.35 percent per year. Barrow declined by 212 residents or 4.6 percent from 4,641 to 4,429. [5]

Government. The Borough is comprised of one first class city (Barrow), six second class cities (Atqasuk, Anaktuvuk Pass, Kaktovik, Nuiqsut, Point Hope, and Wainwright), and one unincorporated community (Point Lay), in addition to the petroleum/industrial complex of Prudhoe Bay/Kuparuk. Each of these communities has a village corporation. The Arctic Slope Regional Corporation (ASRC) serves as the regional Native Corporation.

[5] North Slope Borough, 2003 Economic Profile and Census Report, Volume IX.

Borough Code of Ordinance Transportation References. The NSB Code of Ordinances refers to Transportation in Title 12, Transportation Planning and Development Coordination, which details the review procedures required to insure the "maximum feasible coordination and consistency between the Borough's transportation plan and improvements and of other governmental units authorized to carry out transportation needs of the citizens of the Borough in as timely and efficient a manner as possible." [6] This policy states that the Planning Commission is required to review and approve any major transportation projects prior to those projects being constructed or funded. In Title 18, Subdivisions, the code also delineates policies relating to road development[7]. Chapter 18.20: Subdivision Development Standards refers to transportation facilities in several subsections as summarized below.

There are also transportation references contained in Title 19: Zoning[8]. Title 19 contains the North Slope Borough land management regulations and Barrow zoning ordinances, which were adopted in 1990 and are part of the North Slope Borough Comprehensive Plan. In Section 19.40.090, Dalton Highway Transportation Corridor (DHTC) District the DHTC is described and permitted uses are outlined. This Title also describes parking provisions, the need to consolidate transportation facilities to the maximum extent possible, the need to minimize disturbance to the environment, and states that public highway development is prohibited except for village roads and streets and highways indicated in the state and/or local capital improvement program or any transportation element of the comprehensive plan. In 19.70.060, there are several policies pertaining to acceptable uses and development within Transportation Corridors.

4.2 Economy

Atlantic-Richfield Company discovered oil in Prudhoe Bay in 1968. After incorporation as a Borough in 1972, the NSB began to levy taxes on oil companies operating on the Slope, producing a significant revenue stream. Largely because of these oil revenues, the people of the NSB enjoy services unavailable in much of rural Alaska. However, the costs associated with providing these services and creating the infrastructure necessary to deliver these services are high. This strains the NSB budget, which like most local governments in Alaska, is experiencing declining revenues.

There is a good deal of uncertainty surrounding the estimates of oil resources in the Arctic Foothills region of NPR-A. Estimates of oil resources in NPR-A and exploration drilling in the eastern NRP-ANPR-A during the past few years has verified that economically recoverable oil reserves are present. Cost contingencies are high to allow for yet unknown factors. Reducing uncertainty about project cost estimates and improving information about resources in the project area will be helpful in understanding project benefits and costs.

According to the NSB 2003 Economic Profile and Census Report (2003 Report), the largest employer in the NSB is the North Slope Borough government. The NSB School District and village corporations are also major employers. According to the 2003 Report, the 2003 per capita income for the NSB was $24,932. This per capita income level likely reflects comparatively high employment and population levels in Barrow, as employment opportunities are limited in the villages.

High unemployment and underemployment are persistent features of North Slope economics. Natural increases in population, coupled with continued in-migration of people from the other parts of Alaska and from the contiguous 48 states, means that there are many people competing for the scarce employment opportunities that exist. Preparing the workforce for jobs that will be available in the future and seeking out

[6] North Slope Borough Alaska Code of Ordinances, Title 12, section 1205: Transportation Planning and Development Coordination, page 3.
[7] North Slope Borough Alaska Code of Ordinances, Title 18: Subdivisions.
[8] North Slope Borough Alaska Code of Ordinances, Title 19: Zoning.

ways to diversify the economy of NSB communities are two major challenges that need to be addressed to improve the economic status of the region.

4.3 Land and Resources

The NSB's 89,000 square miles represent approximately fifteen percent of Alaska's land mass and is roughly the size of Oregon. The entire borough is located above the Arctic Circle. The NSB is bordered by the foothills of the Brooks Range on the south, by the Arctic Ocean on the north, by Canada's Northwest Territories on the east and the Chukchi Sea on the west. Land in the NSB is primarily federally owned. Land status is shown in Figure 3. NSB Land Status.

Distances between NSB communities are great. The closest communities to each other are Barrow and Atqasuk (58 miles apart), while the most distant communities are Kaktovik and Point Hope (588 miles apart). The following table illustrates distance between NSB communities:

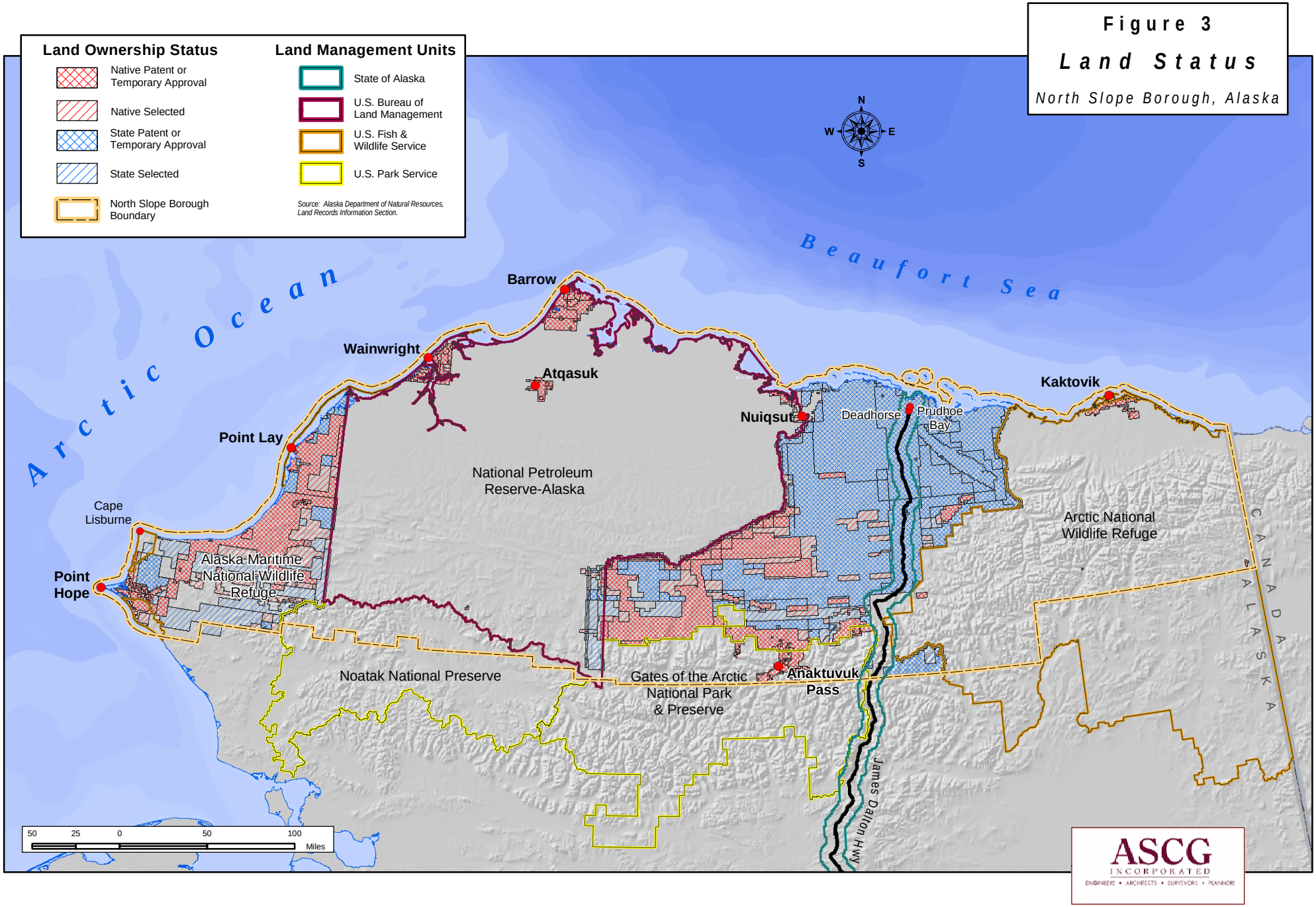


Figure 3
Land Status
North Slope Borough, Alaska
Land Ownership Status
Native Patent or Temporary Approval
Native Selected
State Patent or Temporary Approval
State Selected
North Slope Borough Boundary
Land Management Units
State of Alaska
U.S. Bureau of Land Management
U.S. Fish & Wildlife Service
U.S. Park Service
Source: Alaska Department of Natural Resources, Land Records Information Section.
N
W
E
S
Arctic Ocean
Beaufort Sea
Barrow
Wainwright
Atqasuk
Point Lay
Nuiqsut
Deadhorse
Prudhoe Bay
Kaktovik
Cape Lisburne
Point Hope
Alaska Maritime National Wildlife Refuge
National Petroleum Reserve-Alaska
Arctic National Wildlife Refuge
CANADA
ALASKA
Noatak National Preserve
Gates of the Arctic National Park & Preserve
Anaktuvuk Pass
James Dalton Hwy
50 25 0 50 100
Miles
ASCG
INCORPORATED
ENGINEERS • ARCHITECTS • SURVEYORS • PLANNERS

Table 4. Distances between North Slope Borough Communities

	Anaktuvuk Pass	Atqasuk	Barrow	Nuiqsut	Kaktovik	Point Hope	Point Lay	Wainwright
Anaktuvuk Pass		213	248	143	247	390	305	268
Atqasuk	213		58	153	328	269	145	65
Barrow	248	58		154	316	315	182	87
Nuiqsut	143	153	154		175	414	293	215
Kaktovik	247	328	316	175		588	468	390
Point Hope	390	269	315	414	588		135	229
Point Lay	305	145	182	293	468	135		93
Wainwright	268	65	87	215	390	229	93	

Source: North Slope Borough GIS Department. <http://www.north-slope.org/nsb/default.htm>. Accessed August 16, 2004.

As NSB villages are not linked by road or rail connections; most travel between communities occurs by air.

Topography ranges from the flatlands of the coastal plain to the mountains of the Brooks Range. The climate is arctic, and the temperatures range from -56◦F to 78◦F. Vegetation near the coast is primarily grasses, sedges, and rushes, with drier areas characterized by cotton sedge tussocks interspersed with lichens, mosses, shrubs, and dwarf birch.[9] Parklands in the NSB include the Alaska Maritime National Wildlife Refuge, the Noatak National Preserve, the Gates of the Arctic National Park and Preserve, and the Arctic National Wildlife Refuge. The NPR-A encompasses 23.5 million acres of public land in the northwest/central portion of the NSB.

Heavy snow, generally more than 12 inches of accumulation in less than 24 hours, can also immobilize a community by bringing transportation to a standstill. Although average annual snowfall for the North Slope Borough communities vary between 20 inches in Barrow to 61 inches in Anaktuvuk Pass, even this moderate snowfall can create hazards. High winds in the North Slope Borough can combine with loose snow to produce blinding blizzard conditions and dangerous wind chill temperatures. Such situations often lead to poor visibility, and exclude air traffic from entering or departing the community. Such an event not only impacts the community of Barrow, but also the outlying villages for which Barrow serves as a transportation hub. High winds, coupled with the moderate snowfall in the North Slope Borough often cause the development of snowdrifts. Local residents report that such drifts sometimes inhibit vehicle movement, including school busses, ambulances and fire trucks.

Storm surges, or coastal floods, occur when the sea is driven inland above the high-tide level onto land that is normally dry. Often, heavy surf conditions driven by high winds accompany a storm surge adding to the destructive force of the flooding waters. The conditions that cause coastal floods also can cause significant shoreline erosion as the floodwaters undercut roads and other structures. Storm surges are a leading cause of property damage in Barrow, threatens homes and infrastructure in Wainwright and Point Hope, while it causes almost annual flooding to the runway in Kaktovik. Due to their inland location, the communities of Atqasuk, Nuiqsut and Anaktuvuk Pass are not threatened by coastal storms.

[9] Alan Wittbecker. "Goals and Limits for Wilderness for the North Slope of Alaska," *Pan Ecology*, n.d., <http://www.uidaho.edu/e-journal/pan_eco/alaskaplan.html> (March 8, 2004).

Vegetation near the coast is primarily grasses, sedges, and rushes, with drier areas characterized by cotton sedge tussocks interspersed with lichens, mosses, shrubs, and dwarf birch.[10] Parklands in the NSB include the Alaska Maritime National Wildlife Refuge, the Noatak National Preserve, the Gates of the Arctic National Park and Preserve, and the Arctic National Wildlife Refuge. The NPR-A encompasses 23.5 million acres of public land in the northwest/central portion of the NSB.

Fall whaling in Barrow

Subsistence Resources. The Iñupiat people have deep respect for their land and the natural resources available to them. Many Iñupiat live a subsistence lifestyle, meaning that a large portion of their sustenance is drawn from the nearby natural environment. Whaling and other marine mammal hunts are an important part of the culture and diets of Iñupiat residents of the North Slope. Fish, game, and plants such as berries are also important food sources. Migratory birds and wildlife also play an important subsistence role. Much of the land travel outside of NSB communities is related to subsistence hunting and gathering.

Archeological/Cultural Resources. The Iñupiat have occupied the North Slope for centuries, resulting in a land rich with archeological and cultural resources. The NSB has an Iñupiat History, Language & Culture Commission (IHLC) that is a division of the Department of Planning and Community Services. The mission of the IHLC Commission is to document and disseminate the knowledge of the North Slope elders and to ensure that cultural issues are given due consideration in the planning process. The major responsibilities of this commission are to document and disseminate cultural information using a variety of media, maintain traditional land use information, and provide translation services.

This rollogan's balloon-like tires prevent it from sinking and being stuck in the snow during seismic exploration, spring 1999.

Natural resources. Natural resource extraction is a major economic influence in the NSB. Oil and natural gas activities are centered in the Prudhoe Bay area, with additional drilling at offshore areas in the Beaufort and Chukchi Seas.[11] Oil and gas exploration is underway in the NPR-A. The NSB is also pursuing partners for development of major reserves of high-quality coal and potential reserves of zinc.[12] Oil and gas development spur the need for access routes in the NSB. Ice roads and rollagon (large off road vehicles with low pressure tires) routes are often used, but increasingly, oil companies are interested in construction of all-season roads to access development sites. This has

[10] Alan Wittbecker. "Goals and Limits for Wilderness for the North Slope of Alaska," *Pan Ecology*, n.d., <http://www.uidaho.edu/e-journal/pan_eco/alaskaplan.html> (March 8, 2004).
[11] Alaska Department of Community and Economic Development, "North Slope Borough: Oil & Gas." n.d., <http://www.dced.state.ak.us/cbd/AEIS/NorthSlope/Oil/NorthSlope_Oil_Narrative.htm> (March 8, 2004).
[12] Arctic Slope Regional Corporation Department of Land, "Arctic Slope Regional Corporation: Lands," n.d., <http://www.asrc.com/lands/lands.asp.> (March 8, 2004).

caused concern among residents who fear that this type of development, if allowed to continue and expand, will negatively impact subsistence.

Gravel. Finding material suitable for construction of transportation and other facilities in the NSB is difficult due to the presence of large amounts of ice in the soils and underlying material and the preponderance of unconsolidated Aeolian sand and upland silts. In the 1980s, the Bureau of Land Management (BLM) issued mineral-material permits to four NSB communities for dredging sand and gravel as part of the Borough's CIP. The bulk of this material is no longer available and was used primarily for site pad, road and airfield construction.[13] The Borough, recognizing the need for gravel, purchased a series of dredges and produced an annual gravel inventory to assist in large-scale development projects such as the construction of piped water and sewer. The dredges are currently out of commission. The last gravel resource inventory in that program was completed in 1996.

The rounded gravel of Point Hope is not well suited to road construction.

More recently, in the summer of 2002, an inventory was performed to determine the quantity and quality of material available in each community.[14] Stockpiled material includes pit-run gravel, D-1, dredged material, sand, weathered bedrock, work pad material and waste material. Some materials are reserved for specific uses (such as airport maintenance in Anaktuvuk Pass or for an upcoming airport project in Point Lay). The largest stockpiled reserves are in Atqasuk, Kaktovik and Point Lay. In Wainwright, only waste material for use as fill is available. Table 5 summarizes the stockpiled earthen materials available in NSB communities and is based largely on information from the 2002 inventory and interviews with NSB staff. This table does not account for the loss of any gravel used since the inventory in 2002. The COE is currently completing a gravel resource inventory which may be useful in updating this table.

[13] U.S. Department of the Interior, Bureau of Land Management, "Description of Affected Environment," *Northwest National Petroleum Reserve-Alaska. Final Integrated Activity Plan/Environmental Impact Statement*, August 7, 1998, <http://aurora.ak.blm.gov/npra/final/html/3c7.html> (April 9, 2004).

[14] North Slope Borough, "Earthen Materials Inventory: Seven Communities," Prepared by Duane Miller & Associates, 2002.

Table 5. Stockpiled Earthen Materials in NSB Communities*

Community	Type of Material	Location	Quantity (yd^3)	Notes
Anaktuvuk Pass	Pit-run	Airport Site (Nunamuit Upland Pit)	900	Reserved for airport maintenance only.
	D-1	Airport Site (Nunamuit Upland Pit)	250	Reserved for airport maintenance only.
	D-1	Eleanor Lake	8,650	
Atqasuk	Dredged material	East of town	200,000	
	Sand	Near Imagruauk Lake	5,500	
	Weathered Bedrock	Near the river on the edge of the dredged material site	20,000	
Barrow	Silty sand	City of Barrow Gravel Pit		This pit is continuously mined and no large quantities are "stockpiled."
Kaktovik	Dredged material	Shoreline site near the present landfill	200,000	
Nuiqsut	Dredged material and work pad	South of Nechelik Channel/ east of town	13,100	
	Landfill "waste" stockpile	Landfill northwest of town	46,000	
Point Hope	Pit-run	Near landfill on Airport Road	23,400	
Point Lay	Dredged material	Shoreline terrace two miles northeast of town	440,000	Much of this material is scheduled for use in the upcoming airport project.
Wainwright	N/A	N/A	0	20,000 yd^3 of waste material – only for possible use as potential unclassified fill – is located near the present landfill. Gravel is available at sites outside of town (see following table).

Sources: Frank Brown, Telephone conversation, December 18, 2003; North Slope Borough. "North Slope Borough Areawide Roads Capital Improvement Plan Project Analysis Report." Prepared by LCMF. June 2001; North Slope Borough, "Earthen Materials Inventory: Seven Communities," Prepared by Duane Miller & Associates, 2002; George Paulsberg, Telephone conversation, January 6, 2004; Steve MacRae, E-mail correspondence, March 3, 2004.
* Quantities are based on the 2002 inventory and do not take into account reductions due to projects in 2003.

Some communities do not have extensive stockpiled materials, but do have available earthen material sources that are continuously mined (as at Barrow) or mined as needed. Others have limited sources or potential sources that need exploration. In some cases, only sand or well-rounded pea gravel is locally available. Exploration of potential sites is often hampered by difficult or expensive access for both exploration and retrieval of materials. Table 6 provides additional details about sources of earthen materials – also from the 2002 inventory – and includes active and potential sites.

Table 6. Earthen Material Source Locations

Community	Source	Location	Notes
Anaktuvuk Pass	Eleanor Lake Site	Hillside north of town	Good quality gravel suitable for road construction
	Airport Site	Contact Creek floodplain east of the runway	Closed due to concerns about stream encroachment and proximity to the runway
	Alternate Landfill Site	North of landfill	Potential site only; road to landfill would need to be extended
Atqasuk	Meade River	East of town	Source of gravelly sand and sandy gravel
	Upriver site 1	Approx. 1.5 mile southeast of town	Source of weathered bedrock
	Dune field	Between town and the lake	Source of sandy and silty sand
	Imagruauk Lake	West of town	Source of dredged sand
	Upriver site 2	Approx. 2.5 miles southeast of town	Potential site only; would require significant exploratory work
Barrow	Airport Site, Tract I, Parcel A of the Barrow Airport	Located .75 km southwest of the west end of the runway	Generally suitable for embankment material and asphalt aggregate; available for airport use only
	City of Barrow gravel pit southwest of airport	Parcels C, D and E of Block B of USS 4615	Generally suitable for embankment material as mined and for asphalt aggregate with additional processing
	Ukpeagvik Iñupiat Corporation (UIC) pit	Northeast of the Southfield Gas Handling Facilities	Generally suitable for road construction as long as moisture content is minimized
	Elson Lagoon West		Potential site – likely fine-grained materials only
	BIA Discovery Site	Running south from the NSB gravel pits west of Barrow 15 miles south	Potential site
	Cooper Island	38 miles east of Barrow	Potential site – concerns about impacts from gravel extraction to bird communities, traditional uses and navigation
Kaktovik	East Lagoon	West of town	Source of gravelly sand
Nuiqsut	Nechelik Channel of Colville River	Northeast of town	Remaining material is limited
	ASRC/Colville River Site	Colville River	Currently closed; new cell expected to open within the next year
Point Hope	Airport Road site	South of Airport Road landfill	
	Marryat Inlet	Three sites on east end; two on west end	Potential sources of sandy silt
	Alternate Airport Road sites	Additional landfill sites in the beach zones east of town	Potential sources of gravel
Point Lay	Kokolik River	Kokolik River	Material is well-graded and ice free
Wainwright	Tuupqaq Bar Site	Located 3.5 miles away at the mouth of Wainwright Lagoon	Approximately 55,000 yd^3 of dredged material stockpiled; accessible only by snow road along the shoreline
	DEW Line Site	Located six miles away across Wainwright Inlet	Approximately 16,000 yd^3 of gravelly sand is stockpiled; accessible only by snow road

Sources: North Slope Borough. "North Slope Borough Areawide Roads Capital Improvement Plan Project Analysis Report." Prepared by LCMF. June 2001; U.S. Army Corps of Engineers. <http://www.poa.usace.army.mil/en/cw/barrowSDR/ barrow.htm>, Accessed 2/20/04.; George Paulsberg, Telephone conversation, January 6, 2004; Steve MacRae ASCG e-mail correspondence, March 3, 2004.

In the last five years, gravel resources were depleted because of construction of piped water and sewer systems for the North Slope villages. Recent airport improvements and road construction also required

substantial gravel. Future development in the NSB could have significant impacts on gravel needs. Development of oil resources within the NPR-A would also require large quantities of gravel. The Bureau of Land Management plans to identify and quantify potential gravel resources within the NPR-A for future development projects.

Gravel plays a crucial role in development projects for buildings and infrastructure and in maintenance efforts for existing facilities. The following table shows likely future NSB projects and order-of-magnitude estimates of expected gravel needs to complete the projects. This is not an exhaustive list: expected gravel needs were not available for some projects, and it is likely that there will be additional projects requiring gravel over the next twenty years.

Table 7. Potential NSB Community Gravel Needs in the NSB*

Project	Number of Cubic Yards
Anaktuvuk Pass	
Airport Apron	20,000 to 30,000
Tourist Lodge	25,000
New Subdivision Road	25,000
Erosion & Flood Control at Contact Creek	(Minimal)
Atqasuk	
Airport Expansion CIP	6,750
New Subdivision	25,000
Barrow	
New Hospital with Parking Space	50,000 to 70,000
New Sewage & Disposal Facility	25,000
New Juvenile Detention Facility	25,000
Airport Upgrade	575,000
New Subdivision Road	25,000
Barrow Itasigrook Dam Spill Renovation	Not available
Kaktovik	
New Airport	800,000
New Landfill	50,000
Airport Flood Embankment Sides	110,000
Surface Top Course	14,000
New Subdivision	25,000
Nuiqsut	
Airport Lengthen Runway at year 2016	282,500
Airport Taxiway Improvements	27,000
Airport Apron Improvements	60,500
New Subdivision	25,000
Colville River Road	270,000
Pt. Hope	
Evacuation Road for 6 miles	130,000
for 14 miles	360,000
New Subdivision	25,000

Pt. Lay	
Airport Expansion	250,000 to 300,000
New Subdivision	25,000
New Power Plant	25,000
Wainwright	
Airport Upgrade for top surface with high-grade gravel.	10,000 to 12,000
Airport Upgrade for top surface with gravel	30,000 to 40,000
New Subdivision	25,000
Water Storage Tank	20,000
Total Estimated Gravel Needs	3,440,000 cubic yards

* Note that additional projects requiring gravel are likely, and that the list includes short-, medium-, and long-term projects. The estimates assume 3 cubic yards per lineal foot for insulated roads. Table based on estimates in 2004.

The NSB is responsible for annual maintenance to roads, landfills, and four airports in the Borough. The following table presents estimated annual maintenance use of gravel based on discussions with Public Works (formerly DMS) staff:

Table 8. Estimated Annual Maintenance Use of Gravel (in cubic yards)

Location	Landfill	NSB-Maintained Airports	Roads	Total
Villages	7,000	6,000	14,000	27,000
Barrow	12,500	N/A	10,000	22,500
Total Annual Gravel Needs for Maintenance				49,500 cubic yards

During the 1990s, the NSB operated two mobile gravel dredges that traveled to NSB villages to extract gravel. Regular dredging has since been discontinued due to budget constraints, and although the Borough still owns two dredges, both are currently out of commission. The NSB will likely need additional dredging in the future, if funding allows, but many accessible areas for dredging gravel have been exploited and locating new sites is becoming more difficult.

In the past, there was little policing of the use of stockpiled gravel in communities. Gravel mined for one project might be used for another if left unattended. Since then, limited controls have been established to preserve gravel intended for specific uses. Currently in Barrow, a permit is needed to remove any gravel from the City stockpile. In the villages, a request must be submitted to the Public Works Department (previously DMS).

For many years, DMS performed an annual gravel inventory that provided a wide range of information about the type and location of gravel available near NSB communities. This was discontinued due to lack of funding and is now done on a periodic basis.

5.0 Regional Transportation Analysis

Road in Kaktovik

Regional travel includes surface, air, and marine transportation that occurs between NSB communities or between those communities and other parts of the state and beyond. NSB residents travel regionally by air, by boat on rivers or the ocean, by snowmachine on winter trails, and by vehicle between Nuiqsut and the Dalton Highway when the ice road is available. The Dalton Highway and roads related to oil exploration at Prudhoe Bay serve as regional surface routes; however, they primarily serve the oil industry, and in the case of the Dalton Highway, also serve tourists and tourism-related businesses. Because of the lack of road access to NSB communities, regional transportation of goods by air and barge is crucial to the welfare of these communities. This section provides a description of regional surface, air, and marine transportation in the NSB.

5.1 Surface Transportation

Although air travel is predominant and roads are limited, surface travel accounts for a portion of the regional travel in the NSB. This travel occurs primarily on winter trails between neighboring communities, along the Dalton Highway, and on the oil-related roadways of Prudhoe Bay constructed as permanent routes or as ice roads. Figure 4. NSB Regional Surface Transportation shows primary routes.

Winter trail markers in the Northwest Arctic Borough

Winter Trails. Winter trails are an integral part of travel within the NSB. Travel to and from communities in the winter is normally by snowmachine. Travel to hunting camps by snowmachine is also common. The trails cannot be traversed in summer due to the presence of wetlands and many small lakes.

The trails connecting Barrow, Wainwright, Point Lay, and Point Hope follow the northwest coastline. A major east/west trail connects Deadhorse, Nuiqsut, Atqasuk, and Wainwright. A trail also connects Nuiqsut to Anaktuvuk Pass in a north/south intervillage link. There is also an intricate network of trails used for subsistence. Trail lengths between villages are as follows:

Table 9. North Slope Borough Intervillage Trails

Trail Segments	Distance (Miles)
Point Hope to Kivalina	80
Barrow to Atqasuk	60
Deadhorse to Nuiqsut*	60
Atqasuk to Wainwright	70
Barrow to Wainwright	90
Wainwright to Point Lay	100
Point Lay to Point Hope	120
Nuiqsut to Anaktuvuk Pass	140
Nuiqsut to Atqasuk	150
Total Mileage:	870

* Trail is 17 miles from Nuiqsut to the existing Spine Road, then uses the existing Spine Road network as the remaining route of travel to Deadhorse and the Dalton Highway.
Source: Northwest Alaska Transportation Plan, Community Transportation Analysis, February 2004.

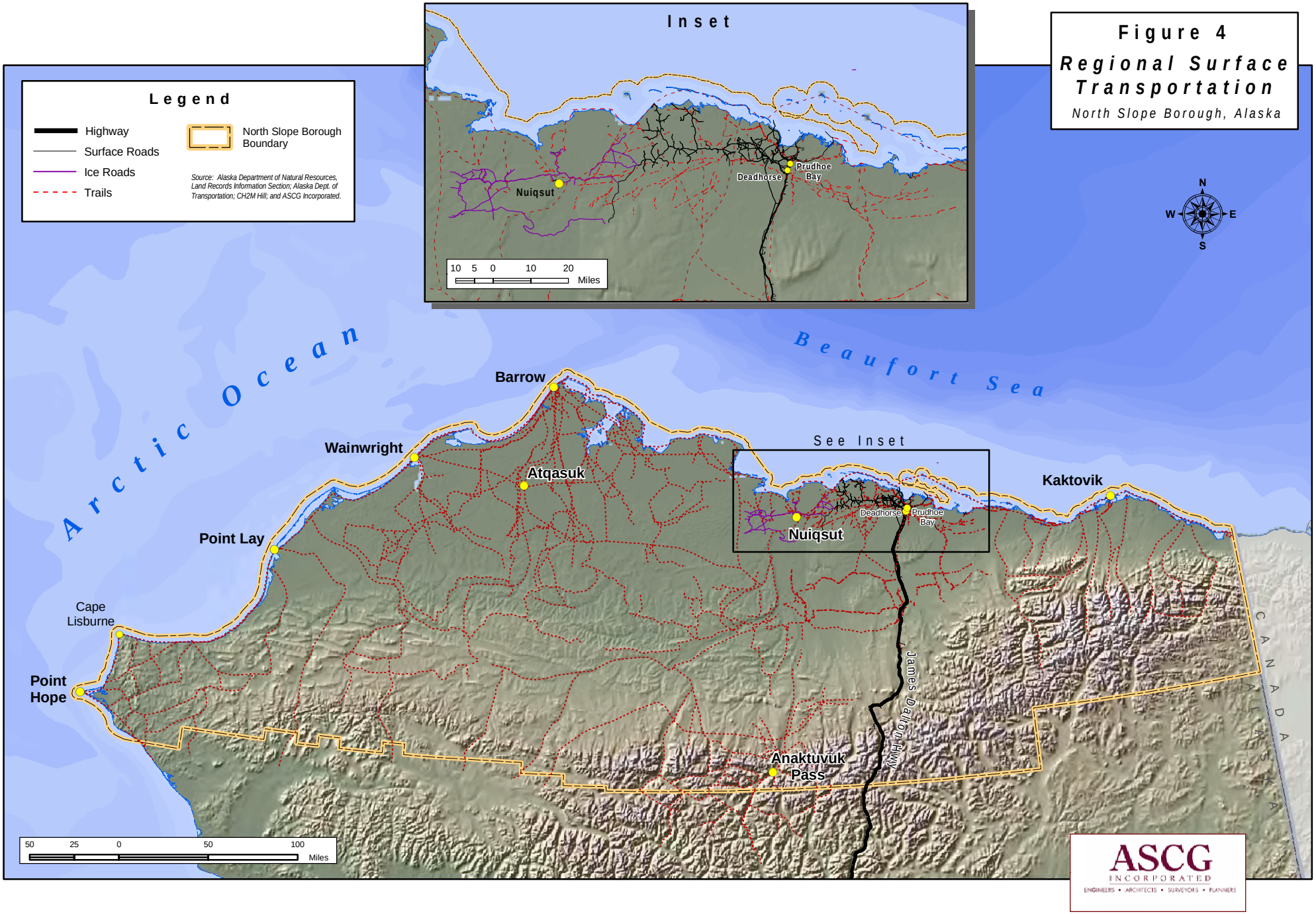


Figure 4
Regional Surface Transportation
North Slope Borough, Alaska
Legend
Highway
Surface Roads
Ice Roads
Trails
North Slope Borough Boundary
Source: Alaska Department of Natural Resources, Land Records Information Section; Alaska Dept. of Transportation; CH2M Hill; and ASCG Incorporated.
Inset
Nuiqsut
Deadhorse
Prudhoe Bay
10 5 0 10 20
Miles
N
W
E
S
Arctic Ocean
Beaufort Sea
Barrow
Wainwright
Atqasuk
Point Lay
Cape Lisburne
Point Hope
See Inset
Nuiqsut
Deadhorse
Prudhoe Bay
Kaktovik
James Dalton Hwy
Anaktuvuk Pass
CANADA
ALASKA
50 25 0 50 100
Miles
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Dalton Highway. The Dalton Highway is the only road link connecting the NSB to the main Alaska Highway System. The highway was originally built as a "haul road" to support construction of the Trans Alaska Pipeline System (TAPS). It was built by Alyeska Pipeline Service Company (APSC) as a supply route for the construction, operation, and maintenance of the northern portion of TAPS, and was closed to the public. APSC maintained the haul road from its construction in 1974 until 1978, when DOT&PF took over maintenance and operation of the highway. In 1981, DOT&PF opened the highway to the public as far as Disaster Creek. In 1994, the entire road was reclassified as a State highway and became eligible to receive federal highway funds. It was also opened to the public as far as Deadhorse Airport at this time. However, since the highway was not originally intended to be open to public travel, many services demanded by the average recreational traveler do not exist along this portion of the highway. Limited services are available in Coldfoot (south of the NSB at MP 175) and at Prudhoe Bay.

The Dalton Highway officially begins north of Fairbanks near Livengood, at its junction with the Elliott Highway at MP 73, and continues north 415 miles to Prudhoe Bay. It is a narrow, mostly gravel road, with only 73 miles of pavement on sections south of Coldfoot. Heavy rains have periodically washed out culverts, bridges, and large sections of the roadway. The road, which undergoes constant maintenance and upgrading, has narrow shoulders and steep grades.

The section of the highway in the NSB begins at mile 235 near Atigun Pass and continues 179 miles to Prudhoe Bay. Within the NSB, the Dalton Highway traverses steep mountains that lead to the level coastal plain. The characteristics of the existing roadway within the NSB are summarized in Table 15.

Table 10. Description of Dalton Highway Segments within the NSB

Location	Maximum Grade (%)	Road Width (feet)	Description
MPs 235 to 253	10-12	30	From the NSB boundary through Atigun Pass. Terrain is mountainous. The steepness of the grades restricts loaded trucks to speeds of only 25 to 35 mph. Constructed grades can readily restrict speeds down to 10 - 15 mph in the worst of the Atigun Pass area.
MPs 253 to 357	4-8	30-36	North of Atigun Pass. Road leaves the Brooks Range and crosses the Sag Hills. Loaded trucks can easily maintain speeds of 50 to 60 mph through this segment. Drifting snow in winter causes occasional delays until maintenance crews are able to clear the roadway. The road from 335-357 was recently reconstructed to a new width of 32' with a high float surface (asphalt emulsion topped with gravel).
MPs 357 to 414, Prudhoe Bay	0-2	32-36	Traverses level terrain. No adverse grades. The road from 357-362 was recently reconstructed to a new width of 32', and has a high float surface. From 362-414 it varies in width from 32' up to 36', and has occasional, limited stretches that are even wider.

Source: Alaska Department of Transportation and Public Facilities, RTA Phase I Report, 2000; Clark Milne, E-mail correspondence, October 12, 2004.

Today the highway is still mainly used as an industrial road, and traffic volumes are low. However, in addition to large semi trucks and trailers, the roadway is now shared with tourists and hunters. In 2000, the Dalton Highway had an AADT (average annual daily traffic) of 230 at Atigun Pass, MP 253, the

northernmost point for which data is available.[15] As part of a 1999 report, "Minimum Adequate Public Facilities and Services for the Dalton Highway – Coldfoot to Deadhorse," summer ADT projections were developed for Coldfoot, which is approximately 75 miles south of Atigun Pass. The summer ADT forecast was as follows:

Table 11. Summer ADT projections on the Dalton Highway at Coldfoot*

Year	Projected ADT
2000	314**
2005	335
2010	357

These projections assume that 34% of travel is industrial vehicles, 61% are independent travelers in automobiles or vans, and 5% are travelers with a tour group in vans or buses. According to the report, at projected volumes and with planned improvements, traffic on the Dalton Highway should be well within the design capacity of the highway for the foreseeable future.

The Borough has the authority to police the Dalton Highway within its boundaries. From a jurisdictional perspective, the Borough is responsible to enforce Borough ordinances and regulations and to respond to incidents and issues related to Borough facilities located on non-federal and non-state lands. The Borough does not have a mandatory responsibility to provide law enforcement along the highway. However, in the past, because of its trained staff in Deadhorse and ability to respond to emergencies, the Borough has provided backup roadside emergency response. This emergency response could include mobilization of the Borough Search and Rescue team in Barrow to fly equipment and personnel to the accident site. Transport times from Barrow range from 1 ½ hours to 2 hours and equipment expenses are very high. This is usually not done unless other private or public agencies cannot respond. Due to the increase in tourism along the highway, the year round Borough Public Safety Officer stationed in Deadhorse has responded to a growing number of tourist related incidents and accidents along the Dalton Highway.

Land along the highway is primarily owned by BLM or the State of Alaska. The northern 180 miles of the Dalton Highway are within the NSB and development in this area is subject to NSB zoning and planning authority. In addition, the Borough has selected land at several locations along the highway, including parcels at Deadhorse, Franklin Bluffs, Pump Station 2, and Happy Valley. There are also limited privately owned parcels adjacent to or near the Dalton Highway.[16]

Impacts to subsistence from travelers along the Dalton Highway have long been a concern of Native residents of communities in the NSB. Hunting with firearms and use of any motorized vehicle is prohibited north of the Yukon River within five miles on either side of the highway. Bow and arrow hunting is permitted during certain periods. In addition to impacts to subsistence from hunting and fishing, litter, dust on vegetation along the Haul Road, trespass, public safety, disruption and overuse have also been concerns.[17]

Oil-related Permanent Roadways. Prudhoe Bay/Deadhorse, at the end of the Dalton Highway, is a work site supporting oilfield activities. The site includes a post office, a North Slope Borough Public Safety Office, several hotels, and various businesses supporting oil development. There is no public access on roads that extend past Deadhorse/Prudhoe to drilling sites and to the Arctic Ocean, with the exception of commercially

[15] Alaska Department of Transportation and Public Facilities, Northern Region. "Annual Traffic Volume Report: 2000," 2000.
[16] State of Alaska. Dalton Highway Advisory and Planning Board. "Dalton Highway Master Plan." March 1998.
[17] Ibid.

guided tours. There are approximately 200 miles of gravel roads within the Prudhoe Bay area, and 94 miles of roads to the west within the Kuparuk River Unit.[18] These roads are constructed and maintained by the oil companies.

Ice road on the North Slope
(www.alaska.net/~ranqer/ slope/slope.htm)

Ice roads. Ice roads in Alaska are predominantly built and maintained for industrial uses such as oil and gas extraction, and mining. Although useful for seasonal travel across fragile tundra, ice roads are expensive to construct and only provide temporary access.

In Alaska's Prudhoe Bay NPR-A region of the North Slope, the cost to construct an ice road is approximately $100,000 per mile. It takes about a day to complete one mile of ice road in the short season of only 100 to 120 days when temperatures are cold enough to sustain it.[19] In 1970, temperatures were cold enough to allow safe tundra travel on ice roads for more than 200 days of the year, according to the Alaska Department of Natural Resources (DNR). DNR statistics now show that period has shrunk to about one hundred days.[20]

Warming trends on the North Slope make reliance on ice roads complicated, as they are being built later in the season and melting sooner. Ice roads are best constructed when weather is about -20º to -30º F.[21] Alaska has been through warming trend cycles over the last several decades as reported by the Center for Global Change and Arctic System Research. Their models indicate that Alaskan temperatures may increase 3º F to 4.5º F by 2030, with the greatest increases in the arctic region. By 2100, models predict increases of 7º F to 18º F and an increase in precipitation up to 25 inches. A result of the warming trend is a reduction in the ice road season.

According to the BLM Northern Field Office for the NPR-A, about 60 miles of ice road have been constructed each winter to accommodate drilling in the northeast area of the NPR-A. Because they are expensive, ice roads can add considerable cost to a project as oil and gas leasing moves further west in the NPR-A.[22]

In addition to these costs, construction of ice roads requires substantial water resources. One mile of an onshore ice road six inches thick and 40 feet wide requires 1 to 1.5 million gallons of water, construction of an ice bridge needs 10 million gallons, a single ice pad requires 2 to 3.6 million gallons, and an ice airstrip needs 8 million gallons of water, according to BP's and Phillips' NPR-A plans. [23]

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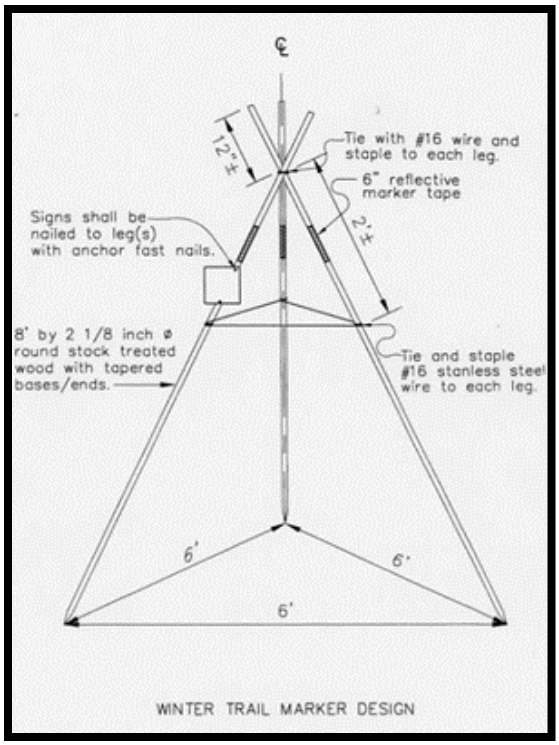
[18] U.S. Department of the Interior, Bureau of Land Management, "Description of Affected Environment," *Northwest National Petroleum Reserve-Alaska. Final Integrated Activity Plan/Environmental Impact Statement*, August 7, 1998, <http://aurora.ak.blm.gov/npra/final/html/3c7.html> (March 15, 2004).
[19] Tim Bradner, "Good prospects targeted for winter drilling" *Alaska Oil & Gas Reporter*, February 22, 2004, p. 1.
[20] Yereth Rosen, "Oil boosters want new roads over Alaskan tundra," *Environmental News Network*, April 15, 2003, <http://www.enn.com/news/2003-04-15/s_3822.asp> (March 17, 2004).
[21] ConocoPhillips Alaska, Inc. "NPR-A Update." Newsletter Edition 6. July 2004.
[22] Tim Bradner, "Good prospects targeted for winter drilling" *Alaska Oil & Gas Reporter*, February 22, 2004, p. 1
[23] BP Exploration Inc. (Alaska), "NPR-A Five Year Trailblazer winter exploration program, Plan of Operations," Attachment 1, Updates and Clarifications (October 18, 2000).
See also, Phillips Alaska Inc., Plan of Operations/ Operational Overview: Previously approved NPR-A Exploration wells, pp. 9-13 (October 31, 2000).

Ice roads also provide temporary, seasonal travel during winter for some remote Alaskan villages where there are few or no roads. The community of Nuiqsut currently accesses the Dalton Highway and the Deadhorse Airport by an ice road connector to existing oilfield roads on the North Slope. [24]

Permits must be secured from BLM and the NSB for all ice roads. Once permitted, water or ice chips are placed on the surface. Water trucks apply water over the route until the surface is built up to at least six inches thick. Ice roads are staked to facilitate driving and help with snow removal. Over the course of the ice road's operation, litter or contamination is removed by ice road monitoring personnel. When an ice road is ready to be shut down for the season, it is inspected for any remaining contamination, cleaned, stakes are removed, and snow is piled at the entrances to prevent further use of the route. At break-up, the ice road melts. The routes are inspected by helicopter during the summer for any remaining litter or debris.[25] In Nuiqsut, some residents have concerns that post-season clean ups are insufficient while others think they are adequate.

Future development. Future regional land routes identified as priorities in the region include winter trail marking and shelters, and industrial roads. There has been periodic discussion regarding the possibility of road connections from Nuiqsut and Anaktuvuk Pass to the Dalton Highway and a road connection from Kaktovik to Prudhoe Bay or the Dalton Highway (approximately 110 miles). Support for such roads is mixed and the cost of construction would be well beyond the Borough's ability to finance. As such, these roads are not considered in this plan.

Trails. A common interest of nearly all communities is trail safety and the desire for permanent trail markers. Without trail markers, winter travelers can easily become disoriented. Markers help travelers navigate the winter landscape and warn of trail changes such as transitions in terrain from upland areas to river and stream channels. Markers can also aid in search and rescue efforts for lost travelers. Past efforts to place temporary markers have not been effective. Temporary markers rarely last more than one season and can be blown over in strong winds, or lost in snowmelt runoff, or other conditions. Placement of permanent trail markers would save in the cost of continually restoring temporary trail markers.



DOT&PF Standard Winter Trail Marker Design

A permanent trail marker program is in place in the Lower Yukon-Kuskokwim Delta and the Bering Straits region and has proven successful. In the Yukon-Kuskokwim region, tripod style markers were placed 200 to 500 feet apart or closer depending on terrain and sight distance. Some markers were even placed on waterways. In these cases, the communities agreed to remove the markers prior to break-up and replace them after freeze-up. Trail marker supplies were shipped to communities and crews installed

[24] Alaska Department of Transportation and Public Facilities. "Community Transportation Analysis," Northwest Alaska Transportation Plan, pg. 5-1, February 11, 2004.
[25] ConocoPhillips Alaska, Inc. "NPR-A Update." Newsletter Edition 6. July 2004.

them based on a reasonable day's travel distance, carrying one day worth of supplies on sleds. Elders and search and rescue crews provided information based on difficulties experienced in the past with dangerous terrain and high snowdrift areas.

Because of these efforts, DOT&PF has developed a standard design for trail marking that includes reflective color and signage. Once the markers are installed, GPS recorded locations can be used to accurately mark and map the trails to ultimately be made available to community search and rescue groups, other community safety officials, and residents.

Another concern communicated by residents in community meetings is the desire for safe shelters along the trails. Weary travelers making long-distance trips need safe shelter from inclement weather conditions. Shelters may also provide a checkpoint for trail riders traveling in groups.

Industrial Roads and NPR-A. The Industrial Roads Program task force, started by DOT&PF in 2003 to expedite the development process for resource access routes, identified the Bullen Point Road as a viable industrial Road.

Draft reconnaissance reports have been completed for the proposed Bullen Point Road, which is being followed by an environmental impact statement (EIS). The potential corridor would run east from Deadhorse across the Sagavanirktok River and continue east beyond the Badami Unit to Bullen Point. The Bullen Point DEW Line site is a potential terminus of the corridor and is situated midway between the Badami and Point Thompson Units, approximately 40 miles east of Deadhorse. Another potential industrial road would provide access to the Walakpa Gas Field from Barrow. Other roads are likely to be proposed as NPR-A oil and gas reserves are developed.

Innovative Transportation Modes. There have been other more innovative methods of regional transportation suggested. The State completed a regional transportation analysis for the NWAB and analyzed alternative methods of transportation such as hovercraft. They concluded that hovercraft were not economical in the NSB due to the long distances between communities. Another mode of travel mentioned at the public meeting in Kaktovik concerned the use of monorails. It was suggested that a monorail would significantly reduce the cost of transporting goods to NSB communities, and that perhaps gas distribution pipes could be attached to the monorail structure. Typically, monorails are used over relatively short distances in areas with high densities of users, and are not used for freight transportation. For example, in Seattle, with a population of over 570,000, a proposed 14-mile monorail extension is intended to serve primarily local traffic and is estimated to cost over $2 billion.[26] A rail route may be more viable, although it would be initially extremely expensive and would likely need to be linked to oil or gas development in order for it to be economically feasible. The route mentioned for a monorail or rail link was from Barrow to the Dalton Highway. Should the Borough wish to consider this option a feasibility study would need to be undertaken.

Refueling in Point Hope

5.2 Air Transportation

There are nine public airports that serve NSB communities, with the two major airports at Barrow and Deadhorse. Wiley Post-Will Rogers Memorial Airport at Barrow (Barrow Airport) is the regional aviation hub. Barrow Airport serves all NSB villages except Point Hope and Anaktuvuk Pass; it also serves Prudhoe Bay-Deadhorse. Air mile distances to Barrow from these

[26] http://www.monorail.org/discussions/2005/06/09/2

communities range from 59 to 386 miles. Prudhoe Bay-Deadhorse is the other large airport in the region, primarily supporting oil field operations, but also providing a passenger service link to nearby communities. In addition to the nine public airports near communities and the oilfield worksite at Prudhoe Bay, there are 22 other informal airstrips identified by FAA in the NSB. These airstrips are owned privately (including oil and gas companies), by the state or federal government, or by the military.

There are five main routes traveled by air carriers flying in the NSB:

Table 12. Main Air Carrier Routes in the NSB[27] [28]

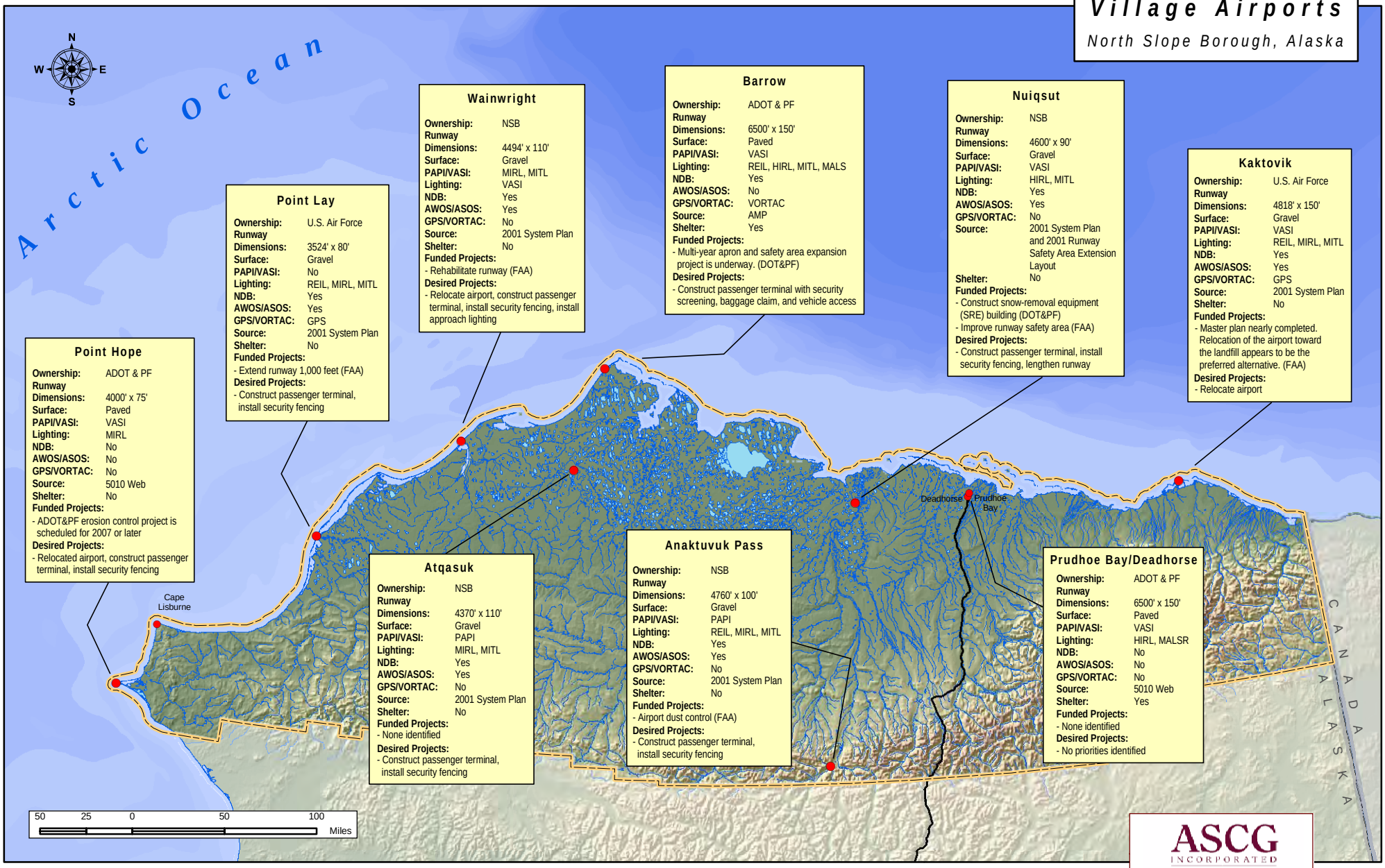
Communities Served	Round Trip Distance in Miles
Barrow to Wainwright to Point Lay to Atqasuk	381
Barrow to Nuiqsut (to Deadhorse) to Kaktovik	638
Fairbanks to Kaktovik	762
Fairbanks to Anaktuvuk Pass to Bettles to Allakaket	568
Kotzebue to Noatak to Kivalina to Point Hope	331

Figure 5. NSB Village Airports provides summary information for aviation facilities in the villages.

[27] Northwest Alaska Transportation Plan, Community Transportation Analysis, pg. 3-9.

[28] These routes were identified as part of a group of routes that accommodated 90 to 95 percent of traveling public and cargo in Northwest Alaska.

Figure 5
Village Airports
North Slope Borough, Alaska



Point Hope
Ownership: ADOT & PF
Runway Dimensions: 4000' x 75'
Surface: Paved
PAPI/VASI: VASI
Lighting: MIRL
NDB: No
AWOS/ASOS: No
GPS/VORTAC: No
Source: 5010 Web
Shelter: No
Funded Projects:
- ADOT&PF erosion control project is scheduled for 2007 or later

Desired Projects:
- Relocated airport, construct passenger terminal, install security fencing

Point Lay
Ownership: U.S. Air Force
Runway Dimensions: 3524' x 80'
Surface: Gravel
PAPI/VASI: No
Lighting: REIL, MIRL, MITL
NDB: Yes
AWOS/ASOS: Yes
GPS/VORTAC: GPS
Source: 2001 System Plan
Shelter: No
Funded Projects:
- Extend runway 1,000 feet (FAA)

Desired Projects:
- Construct passenger terminal, install security fencing

Wainwright
Ownership: NSB
Runway Dimensions: 4494' x 110'
Surface: Gravel
PAPI/VASI: MIRL, MITL
Lighting: VASI
NDB: Yes
AWOS/ASOS: Yes
GPS/VORTAC: No
Source: 2001 System Plan
Shelter: No
Funded Projects:
- Rehabilitate runway (FAA)

Desired Projects:
- Relocate airport, construct passenger terminal, install security fencing, install approach lighting

Atqasuk
Ownership: NSB
Runway Dimensions: 4370' x 110'
Surface: Gravel
PAPI/VASI: PAPI
Lighting: MIRL, MITL
NDB: Yes
AWOS/ASOS: Yes
GPS/VORTAC: No
Source: 2001 System Plan
Shelter: No
Funded Projects:
- None identified

Desired Projects:
- Construct passenger terminal, install security fencing

Barrow
Ownership: ADOT & PF
Runway Dimensions: 6500' x 150'
Surface: Paved
PAPI/VASI: VASI
Lighting: REIL, HIRL, MITL, MALS
NDB: Yes
AWOS/ASOS: No
GPS/VORTAC: VORTAC
Source: AMP
Shelter: Yes
Funded Projects:
- Multi-year apron and safety area expansion project is underway. (DOT&PF)

Desired Projects:
- Construct passenger terminal with security screening, baggage claim, and vehicle access

Anaktuvuk Pass
Ownership: NSB
Runway Dimensions: 4760' x 100'
Surface: Gravel
PAPI/VASI: PAPI
Lighting: REIL, MIRL, MITL
NDB: Yes
AWOS/ASOS: Yes
GPS/VORTAC: No
Source: 2001 System Plan
Shelter: No
Funded Projects:
- Airport dust control (FAA)

Desired Projects:
- Construct passenger terminal, install security fencing

Nuiqsut
Ownership: NSB
Runway Dimensions: 4600' x 90'
Surface: Gravel
PAPI/VASI: VASI
Lighting: HIRL, MITL
NDB: Yes
AWOS/ASOS: Yes
GPS/VORTAC: No
Source: 2001 System Plan and 2001 Runway Safety Area Extension Layout
Shelter: No
Funded Projects:
- Construct snow-removal equipment (SRE) building (DOT&PF)
- Improve runway safety area (FAA)

Desired Projects:
- Construct passenger terminal, install security fencing, lengthen runway

Prudhoe Bay/Deadhorse
Ownership: ADOT & PF
Runway Dimensions: 6500' x 150'
Surface: Paved
PAPI/VASI: VASI
Lighting: HIRL, MALSR
NDB: No
AWOS/ASOS: No
GPS/VORTAC: No
Source: 5010 Web
Shelter: Yes
Funded Projects:
- None identified

Desired Projects:
- No priorities identified

Kaktovik
Ownership: U.S. Air Force
Runway Dimensions: 4818' x 150'
Surface: Gravel
PAPI/VASI: VASI
Lighting: REIL, MIRL, MITL
NDB: Yes
AWOS/ASOS: Yes
GPS/VORTAC: GPS
Source: 2001 System Plan
Shelter: No
Funded Projects:
- Master plan nearly completed. Relocation of the airport toward the landfill appears to be the preferred alternative. (FAA)

Desired Projects:
- Relocate airport

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The State of Alaska owns the airports at Prudhoe Bay/Deadhorse, Barrow and Point Hope. The U.S. Air Force owns the runways at Point Lay, Kaktovik and the Naval Arctic Research Laboratory (NARL) site at Point Barrow. At Point Lay and Kaktovik, the Air Force leases access to the NSB but the NSB operates and maintains the runways. The NSB owns the airports at Wainwright, Nuiqsut, Atqasuk and Anaktuvuk Pass.

The following table summarizes airport ownership:

Table 13. Community Airport Ownership in the NSB

Airport	Ownership
Anaktuvuk Pass	NSB
Atqasuk	NSB
Barrow	DOT&PF
Kaktovik	U.S. Air Force
Nuiqsut	NSB
Point Hope	DOT&PF
Point Lay	U.S. Air Force
Prudhoe Bay/Deadhorse	DOT&PF
Wainwright	NSB

Barrow and Deadhorse airports have the most extensive airport facilities, such as terminals and various aviation services. According to the FAA's Terminal Area Forecast, in 2002, Barrow Airport had approximately 30,559 enplanements while Deadhorse had 15,050.

Village airport facilities are fairly minimal, generally containing only a snow removal equipment building and a single runway. Barrow, Deadhorse and Point Hope runways are paved, while the remaining airports have gravel runways. Approach lighting is installed at all airports in the NSB. Barrow, Nuiqsut, Atqasuk and Point Lay have runway end indicator lights. Flight service stations at Barrow, Deadhorse, Kotzebue and Fairbanks serve airports in the NSB, but there are no control towers at any NSB airports. Fuel is available at Barrow, Deadhorse, and Anaktuvuk Pass. Wind indicators are present at all airports except Kaktovik and Wainwright. Segmented circles are present at all airports except Kaktovik, Point Lay and Wainwright. Barrow and Deadhorse are attended airports, while the other NSB airports are unattended.

In 2000, the NSB prepared the *North Slope Borough Aviation System Plan* (published in May 2000 and updated in August 2000) which outlines a twenty-year development plan for NSB airports. Despite a long and cold winter season, only Barrow and Prudhoe Bay have terminals available. The following table summarizes runway dimensions, lighting and navigation aids at community airport facilities in the NSB:

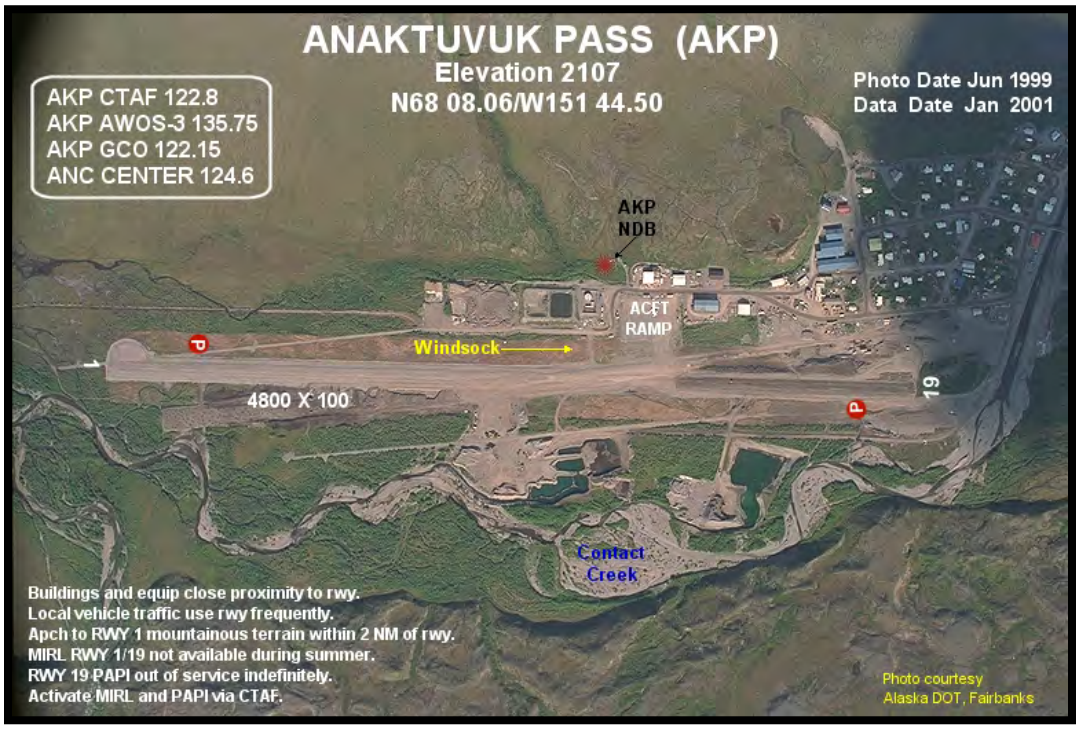
Table 14. NSB Community Airport Information

Airport	Runway Length (ft)	Runway Width (ft)	Surface	PAPI/ VASI	Lighting	NDB	AWOS/ ASOS	GPS/VORTAC
Anaktuvuk Pass	4,760	100	Gravel	PAPI	REIL, MIRL, MITL	X	X	
Atqasuk	4,370	110	Gravel	PAPI	MIRL, MITL	X	X	
Barrow	6,500	150	Paved	VASI	REIL, HIRL, MITL, MALS	X		VORTAC
Kaktovik	4,818	150	Gravel	VASI	REIL, MIRL, MITL	X	X	GPS
Nuiqsut	4,600	90	Gravel	VASI	HIRL, MITL	X	X	
Point Hope	4,000	75	Paved	VASI	MIRL			
Point Lay	3,524	80	Gravel		REIL, MIRL, MITL	X	X	GPS
Prudhoe Bay/ Deadhorse	6,500	150	Paved	VASI	HIRL, MALSR			
Wainwright	4,494	110	Gravel	VASI	MIRL, MITL	X	X	

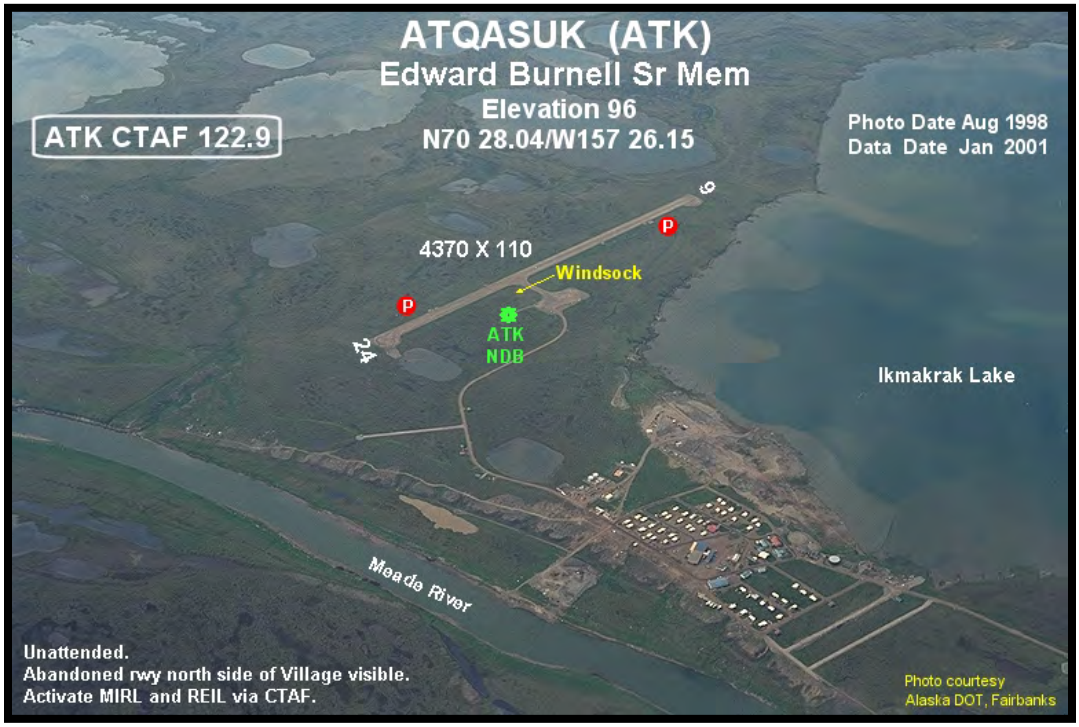
Acronyms:
PAPI: Precision Approach
Path Indicator, VASI: Visual Approach Slope Indicator
REIL: Runway End Identifier Lights
MIRL/HIRL: Medium/High Intensity Runway Lights
MITL: Medium Intensity Taxiway Lights
MALS: Medium Intensity Approach System
MALSR: Medium Intensity Approach Lighting System with
Runway Alignment Indicator Lights
NDB: Non-directional beacon
AWOS: Automated Weather Observation System
ASOS: Automated Surface Observation System
GPS: Global Positioning System
VORTAC: VHR Omnidirectional Range Tactical Aircraft Control

Sources: NSB 2001 Aviation System Plan, FAA 5010 forms, NSB 2001 Nuiqsut Airport Improvements: Final Engineers Report

The following photos show airports located in the NSB:



Anaktuvuk Pass Airport

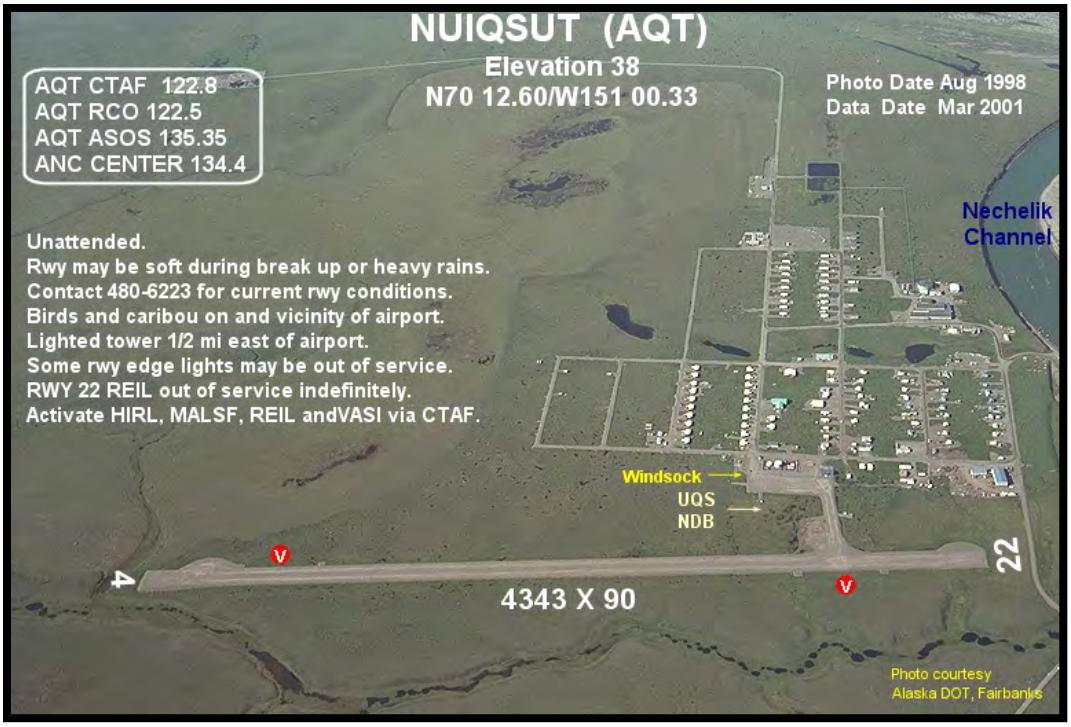


Edward Burnell, Senior, Memorial Airport, Atqasuk

Barter Island Airport, Kaktovik

Wiley Post/Will Rogers Memorial Airport, Barrow

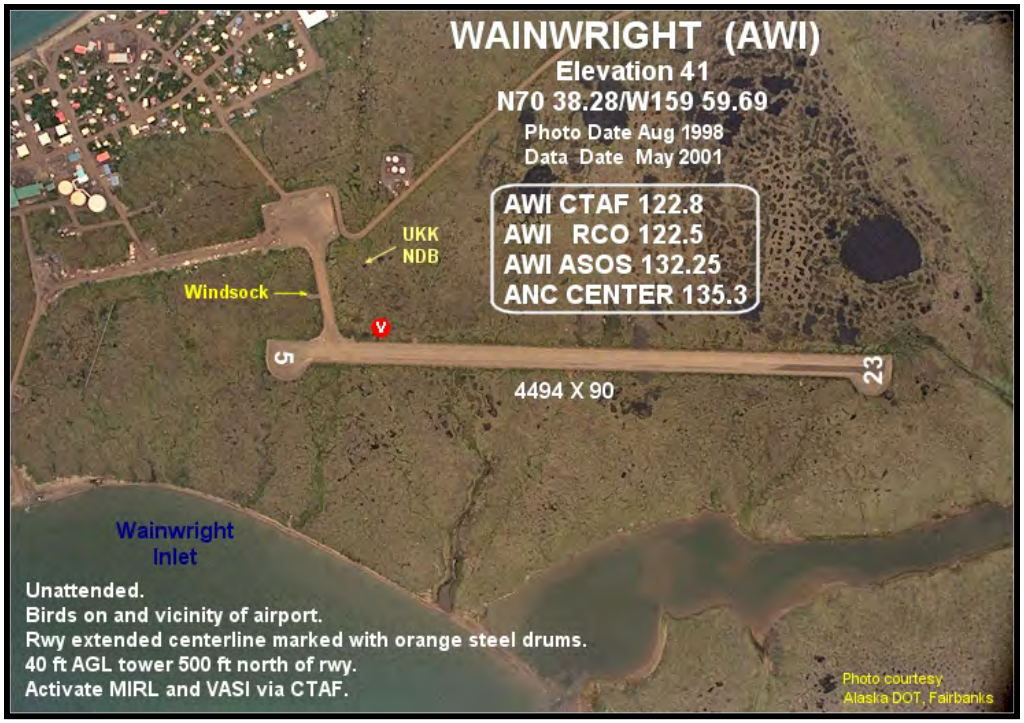
Prudhoe Bay/Deadhorse Airport



Nuiqsut Airport

Note: April 2001NSB "Nuiqsut Airport Improvements" indicates runway length of 4,600.

Point Lay Airport



Wainwright Airport

Point Hope Airport

The NWATP included air travel in its analysis of regional transportation needs in the Northwest. The NWATP focused forecasting on air travel to determine the design aircraft and associated minimum runway length and width. The NWATP determined that Beech 1900 aircraft are capable of accommodating the region's future passenger and freight demand. Based on the design aircraft, the plan recommended a minimum runway length of 4,000 feet and a minimum width of 75 to 100 feet. All of the communities within the NSB currently have 4,000-foot runways except for Point Lay, which has a runway length of 3,524 feet.

Unloading cargo at Kaktovik

Due to the lack of roads, air travel is the primary means of travel between NSB communities. Despite aviation serving as the primary link for residents between communities, to the rest of Alaska and to the lower 48 states, air travel is typically very expensive. A roundtrip flight from Barrow to Anchorage is typically about $700 while flights from the villages to Anchorage can range from $700 to $1,300. Flights between villages can range from about $200 (Barrow to Atqasuk) to $1,300 (Kaktovik to Anaktuvuk Pass).[29]

In addition to serving as a crucial link for passengers and cargo, aviation is also the primary means by which NSB residents receive mail. Mail to remote Alaska locations travels fourth class for approximately 20 to 40 percent of private cargo rates. Point Hope was one of several communities recommended in a Parcel Post Task Force Study completed in the early 1990s as potential sub-regional postal hubs. Although little action has been taken regarding the recommendations, it is still the intent to follow through with the recommendations. Once the recommendation is confirmed, the U.S. Postal Service would announce the intent to establish the hub, which would be followed by a one-year waiting period.[30]

Air Taxi Operator at Point Hope

Several NSB airports have received recent grants from the Federal Aviation Administration to complete improvements or purchase maintenance equipment:

Table 15. Active FAA Grants to NSB Villages

Village	FAA Project	Grant Issued	End of Grant Period
Anaktuvuk Pass	Dust Control	2003	2023
Atqasuk	Snow Removal Equipment	2001	2021
Nuiqsut	RSA Improvements	2000	2020
Wainwright	Runway Rehabilitation	1997	2017

The time between when the grant is issued and the end of the grant period shown in the table represents a twenty-year interval during which the grant recipient is obligated to continue to maintain the airport.

[29] 2004 price survey.
[30] Deaton, Steve. U.S. Postal Service. Telephone conversation. July 23, 2004.

Future aviation-related projects in the NSB may relate to the FAA requirements for appropriate separation distances between airports and landfills (FAA 150-5300 requires a distance of 5,000 feet for piston type engines and 10,000 feet for jet aircraft). Point Lay and Point Hope currently do not meet this requirement.

Emergency Services. The North Slope Borough's Search and Rescue (SAR) Department performs most emergency response calls for the NSB villages. The SAR Department currently operates one Bell 230 ST helicopter, one King Air B200, and one Learjet 31A. SAR expects to purchase one additional helicopter, either a Bell 412 or a Bell 212. Using NPR-A funds, SAR is also purchasing some equipment for use by SAR volunteers in the villages, such as snowmachines, boats and ATVs.

SAR aircraft
(http://www.north-slope.org/nsb/default.htm)

In 2003/04, NSB SAR completed 348 medevac flights, 47 SAR flights and 100 "other" flights. Other flights include training missions, emergency assistance (such as power outage assistance), police missions, and prisoner transport. The Director of NSB SAR said that most missions were outside of Barrow to fish camps southeast of town. Other missions were between Barrow and Atqasuk, between Atqasuk and Wainwright, and Kaktovik and Canada. Currently, only limited records are available about the details of each mission.

Point Hope residents occasionally contact the State Troopers out of Kotzebue for search and rescue services and use the Maniilaq Health Center for hospitalization services. Residents in Anaktuvuk Pass occasionally contact the Chief Andrew Isaac Health Center in Fairbanks, which is operated by the Tanana Chiefs Conference.

The NSB often has to respond to, and pay for, emergency services that are the responsibility of other entities. For instance, the oil companies are responsible for emergency services on the oilfield roads, but the NSB routinely responds to calls on Kuparuk Oilfield roads. On the Dalton Highway, the state officially has the primary responsibility for delivering emergency services. However, the NSB Public Safety Officers from Prudhoe Bay and the SAR Department from Barrow are often the first to respond and therefore the NSB has taken on much of the fiscal burden for emergency services on that road. The emergencies on the Dalton Highway are typically not oilfield related. More often, they are missions to serve lost hunters or tourists involved in an accident.

SAR missions have reportedly decreased significantly in the last ten years due partially to the availability of personal locator beacons. Travelers fill out a trip plan at the local SAR office or fire station and take a beacon on their trip. When they return, they give back the beacon to the office. The beacons have a distinct ID code that can tell SAR personnel who is issuing an alarm signal if one is activated. SAR can then direct their mission to the location indicated by the beacon.

A Pennsylvania-based group called Billing 911 recently studied operations in the NSB to determine the feasibility of collecting from Medicare, Medicaid and insurance companies for SAR missions, but determined that the volume of operations would not justify pursuing this. The SAR director said they expect to continue to provide the service at no charge.[31] [32]

[31] Randy Crosby, North Slope Borough Search and Rescue Director, Telephone Conversation, May 28, 2004.
[32] Randy Crosby, North Slope Borough Search and Rescue Director, Telephone Conversation, January 3, 2005.

Future Potential Development

Funding for airport projects in the NSB comes primarily from the Federal Aviation Administration's (FAA) Airport Improvement Program, which is administered by the Alaska Department of Transportation's Statewide Aviation Division. A small match (6.75%) is also required. Projects planned or underway for NSB village airports are as follows:

Table 16. Planned and Underway Airport Projects

Airport	Project
Barrow	A multi-year apron and safety area expansion project is underway. Several airport vehicles are also scheduled for replacement or acquisition in the near-term, including two Aircraft Rescue and Fire-Fighting (ARFF) vehicles, a dump truck, a snow blower, and pickup truck.
Kaktovik	Relocation was considered in the nearly completed airport master plan due to flood damage from storm events. The three alternatives considered included no action, relocating the airport toward the landfill (which will be relocated), or relocating the airport to the mainland. It appears that relocating the airport toward the landfill is the preferred alternative.
Nuiqsut	A snow removal equipment (SRE) building was constructed in the summer 2004.
Point Hope	A DOT&PF erosion control project is scheduled for 2007 or later.
Point Lay	Construction of a 1,000-foot runway extension was scheduled to begin in 2004, but appears to be delayed until 2006.

In addition to the planned and underway projects listed above, other requested improvements include passenger terminals, maintenance equipment, equipment storage buildings, security fences, and lighting improvements. Table 17 outlines airport improvements that have been requested by community members but are not yet planned or funded:

Table 17. Possible Future Airport Improvements

Airport	Improvements	Maintenance Items
Anaktuvuk Pass	Passenger terminal, security fencing	Snow removal equipment, roller and grader, gravel stockpile
Atqasuk	Passenger terminal, security fencing	Roller, gravel stockpile
Barrow	Passenger terminal with security screening, baggage claim, and vehicle access	Cold storage building for sand and urea
Kaktovik	Relocated airport or improved airport	Snow removal equipment, roller and grader, gravel stockpile
Nuiqsut	Passenger terminal, security fencing, longer runway	Snow removal equipment building, roller and grader, gravel stockpile
Point Hope	Airport relocation, passenger terminal, security fencing	Snow removal equipment and storage building, roller and grader, gravel stockpile
Point Lay	Passenger terminal, security fencing	Snow removal equipment and storage building, roller and grader, gravel stockpile
Prudhoe Bay/Deadhorse	No priorities identified	No priorities identified
Wainwright	Airport relocation, passenger terminal, security fencing, approach lighting	Equipment storage building, roller and grader

Sources: *Transportation Needs per Village* letter sent by the NSB to the Denali Commission; Dano Bollman, telephone conversation. April 5, 2004.

Although many communities are interested in construction of airport terminals, even if construction funds could be located for terminals, in light of the current budget issues, it is unlikely that maintenance funds for terminals would be available.

The State recently examined the use of airships (blimps) as a means of transportation for goods and passengers. They concluded that this mode of transportation was impractical for travel in the North, and this conclusion is supported by recent discussions with an airship dealer.[33]

Airport Improvement Program. To request airport improvements, airport sponsors submit projects directly to FAA. The State, who owns and manage the majority of the airports in Alaska, scores their airport projects in a similar manner to the roads program. The highest scoring projects are submitted to the Airport Project Evaluation Board (APEB). The Alaska Statewide Aviation Division submits their list to the FAA. Non-DOT&PF sponsored projects are also coordinated to get into the FAA spending plan.

5.3 Marine Transportation

The ports of the NSB are crucial links for travel between villages, subsistence and barge operations. Despite the lack of developed facilities in most communities, landings for local water bodies are often a major crossroads for travel by NSB residents. The primary use of waterways is for access to subsistence hunting, gathering and fishing areas. Residents use boats to access hunting areas for caribou or fishing locations, and residents of coastal villages use boats to hunt whale, walrus and seal. Boats are also used for inter-village travel – primarily between coastal villages – during ice-free months. With the exception of Prudhoe Bay, no NSB communities have docks. Barrow has a removable boat ramp and a deteriorated permanent ramp, and other NSB communities have boat ramps or undeveloped boat landing areas.

Boat launching at Barrow

Marine transportation also plays a crucial role for delivery of cargo to NSB communities. Materials too large or expensive to ship by cargo aircraft – such as dry goods, building materials, school equipment, fuel and vehicles – are transported by barge each summer to NSB communities. Barges typically leave the Seattle area by July 1 and arrive in Barrow by August 1. Vessels used for transporting cargo include cargo barges, small landing craft, and smaller barges used in various combinations depending on the community location. In recent years, the larger cargo barges have been 280-feet by 70-feet with a 16.5-foot draft. In the past, during heavy cargo seasons, 400-foot barges have been used. In some NSB communities, these barges are used in conjunction with smaller 150-foot by 50-foot landing craft with a 5-foot draft that can be beached at locations near the communities. Finally, at Point Lay and Wainwright, a second operation requires the use of a 50-foot watercraft for final transport of materials.

There are some developed shallow-water port facilities at Prudhoe Bay. West Dock is a 13,110-foot long by 40-foot wide gravel causeway with two barge-unloading facilities. East Dock – which is no longer used – is a 1,100-foot causeway connected to a 100- by 270-foot wharf constructed from grounded barges. Another dock is located at Oliktok Point, extending 750 feet from the shoreline. The dock is part of seawater-treatment facilities. Because these are shallow water facilities (maximum draft of 10 feet at West Dock),

[33] Jud Brandreth Jr., American Blimp Corporation, E-mail correspondence, June 24, 2004.

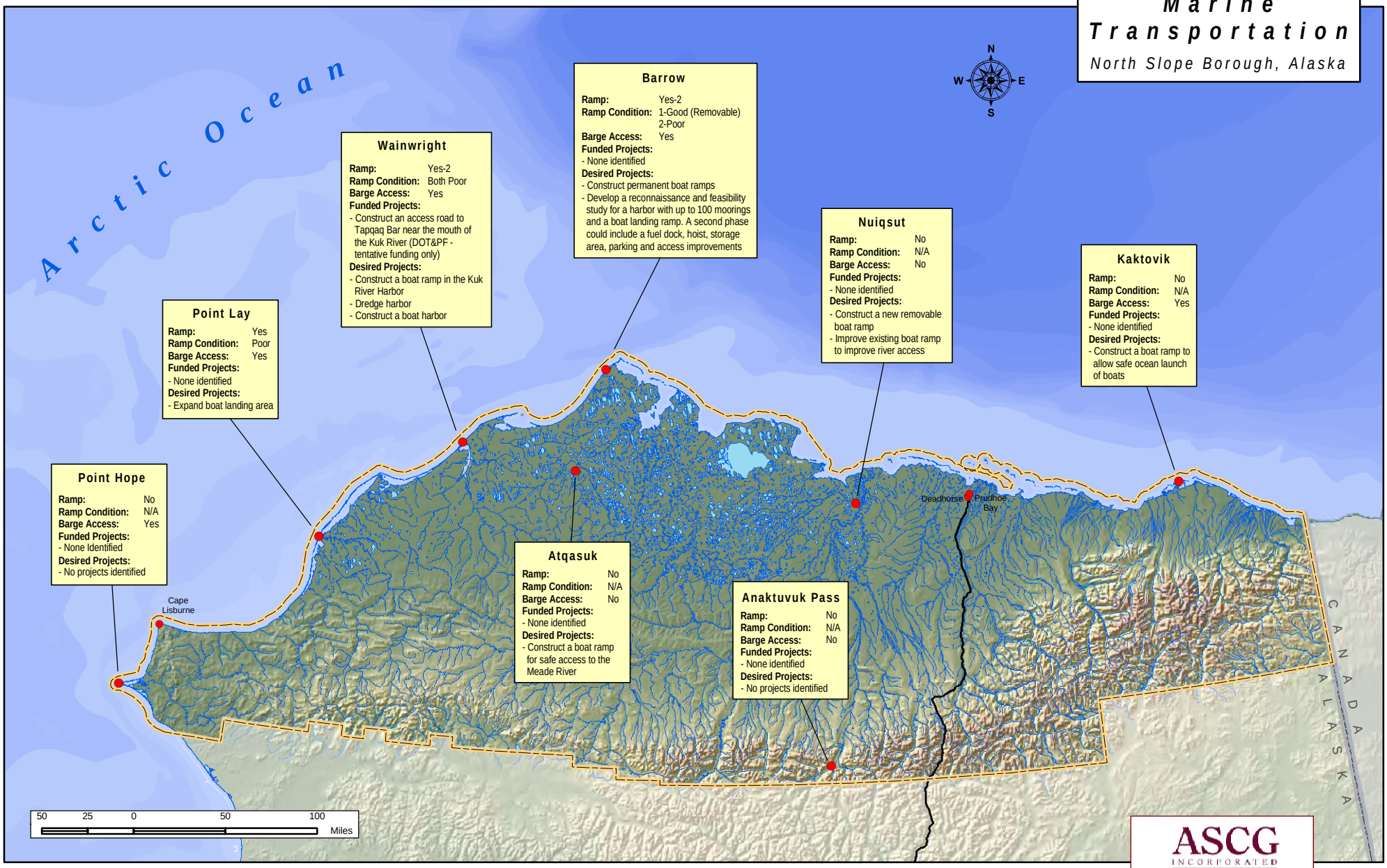
cargo ships and ocean barges must be off-loaded to shallow- or medium-draft vessels for lightering to shore.[34]

Marine transportation needs are expected to increase as new oil and possibly coal development occurs within the NSB. The exact nature of the resulting marine transportation needs to be properly assessed with appropriate objectives and policies amended to the comprehensive plan.

There are minimal port facilities for most NSB communities, even though barge shipment of materials is critical to the economic wellbeing and quality of life for NSB residents, and subsistence use of waterways is extensive. Information about marine facilities is summarized in Figure 6. NSB Marine Transportation.

[34] "NPR-A Final Integrated Activity Plan/Environmental Impact Statement." <<http://aurora.ak.blm.gov/npra/final/html/3c7.html>>. March 15, 2004.

Figure 6
Marine Transportation
North Slope Borough, Alaska



6.0 Maintenance Analysis

This section describes the administration of the maintenance service for the Borough and also provides more specific information regarding road maintenance in the village and regionally and future maintenance needs.

6.1 Administration

The NSB performs maintenance on community transportation facilities and on regional surface, air and marine transportation facilities. As a response to declining revenue, in 2002 the NSB undertook a major study to evaluate how to serve NSB communities more efficiently. Among the many study recommendations was a reorganization of Borough departmental structure. As part of the reorganization, the NSB merged CIPM and the Department of Municipal Services (DMS) into the new public works department. The merger is expected to produce savings in personnel costs, fuel, materials and maintenance support services while maintaining the same high quality of services.

Prior to the summer of 2004, two of the divisions within the NSB DMS were responsible for maintenance tasks: the Heavy Operations and Maintenance Equipment (HOME) Division and the Village Services Division. In addition, the Central Office served as a third division that performed administrative tasks supporting maintenance work.[35] Barrow Transit also operated under the DMS, but was not considered a division.

The HOME Division was generally responsible for maintenance tasks in Barrow, while the Village Services Division focused on needs in the NSB villages (not including Prudhoe Bay/Deadhorse). In addition to other duties unrelated to transportation, the HOME Division maintained public roads in Barrow and responded to requests for heavy-equipment assistance during storms, flooding, and overburden transport. The HOME division did not maintain the state-owned Barrow Airport, which is maintained by the DOT&PF. The Village Services Division maintained village roads and runways, lighting and non-directional beacons at NSB-owned or leased airports.

The 2004 NSB Reorganization: New Public Works Department

Four divisions:

- Village Services (Barrow and NSB Villages)
- Facility Maintenance
- Utilities
- Capital Improvement Program

As part of the reorganization, functions within these divisions have now been combined, and additional functions have been added. The new Public Works Department now has four divisions: Village Services, Facility Maintenance, Utilities, and Capital Improvement Program Management. Village Services now encompasses municipal services for Barrow and NSB villages, including sewage and solid waste collection and disposal, road and airport maintenance, heavy and light duty vehicle maintenance, landfill and sewage lagoon maintenance, snow removal, dust control, culvert maintenance, drainage control, and operation of the transit system. The Facility Maintenance Division provides facility support services for infrastructure related to public works such as power plants, electrical power distribution, water and wastewater treatment plants, and all warm storage and maintenance facilities.

The Utilities Division provides utility services and utility contract management. Utility services include light, power, water, and sewer. Utility contract management includes administration of contracts for operation and maintenance for sewer and water utilities in Barrow, Barrow Gas Field operations, and Service Area 10

[35] North Slope Borough Department of Municipal Services. "Department of Municipal Services: Mission and Department Responsibilities," n.d.

operations. The Utilities Division also manages acquisition, storage and distribution of bulk fuel. The Capital Improvement Program Management Division manages the NSB capital program, including developing and maintaining the Six Year Maintenance and Capital Improvement Plan, identifying annual major infrastructure maintenance needs, assisting in review and preparation of CIP funding requests, and implementing the CIP Program.

The Public Works reorganization has been concurrent with development of this plan, so analysis of past expenses necessarily reflects the former structure. The total 2004 budget for the DMS (excluding transit operations) was $24,150,203. The overall budget for the HOME Division (Barrow) was $5,010,534. In addition to airports and road maintenance, these figures reflect non-transportation related items such as sewer, water, landfill and light duty maintenance (small truck maintenance). In the HOME Division budget, maintenance items were divided into several categories including Office Services, Sewer and Water, Airport and Landfill, Streets and Light Duty Maintenance. Some of these maintenance items, such as airport and landfill maintenance, were combined in the tracking process. However, based on discussions with DMS staff, airport expenses were determined to be 80% of landfill expenses.

The 2004 maintenance budget for Village Services was $10,862,395. This budget included all items identified in the HOME Division budget (office, sewer and water, airport and landfill, streets, and light duty maintenance) but they were presented as one lump sum. In order to approximate what the NSB was spending on transportation maintenance in the villages, an analysis of all village maintenance expenditures was performed based on Barrow figures. Using percentages for the HOME Division categories mentioned above, estimates of maintenance-related spending in the villages were developed. Using this means, total spending on maintenance-related tasks in the villages is estimated as follows:

Table 18. Estimated 2003 Annual Spending on NSB Maintenance Tasks in the Villages

Maintenance Category	Annual Spending
Services - Central	2,500,000
Airport	1,440,000
Streets	7,000,000
Light Duty Maintenance	230,000
Total	$11,170,000

Note: Figures do not include Barrow maintenance expenditures. Airport and landfill expenses were combined in the budget, but based on discussions with DMS staff, airport expenses were determined to be 80% of that figure.

Using these estimates, transportation-related maintenance funding for villages cost approximately $1,600,000 per village. These maintenance figures would vary from village to village based on population, number of road miles in the community and other factors. Still, the estimate provides an order-of-magnitude understanding of past NSB maintenance expenditures outside of Barrow.

6.2 Community Transportation Maintenance

The NSB maintains approximately 103 miles of roadways within the borough. Typical maintenance includes:

- Grade and sand roads
- Serrate ice-packed roadways
- Remove snow
- Control summer dust
- Seal cracks in paved runways, repair potholes
- Install, repair signage, safety barricades
- Maintain culverts and pump spring runoff
- Install culverts

The NSB also repairs and maintains roadway equipment, stockpiles material for public works projects, assists inspections, and issues permits.

Road grading in Point Lay

The NSB spends approximately $6,000,000 annually on road maintenance in all seven of the villages, and approximately $1,900,000 annually on road maintenance in Barrow. Based on an estimated total of 103 miles of NSB-maintained roadways, maintenance cost would be approximately $58,000 per mile in the NSB.

Average cost for road maintenance by the DOT&PF for the Dalton Highway is approximately $15,260 per centerline mile (2004). The significantly lower figure for maintenance per mile on the Dalton Highway is likely due to several factors:

Accessible service area. Dalton Highway is connected to the rest of the state highway system. This results in substantially lower costs for labor and supplies. Wages are lower on the highway system. If there is an equipment malfunction, the equipment can be replaced relatively easily with similar equipment from another maintenance station, or parts may be more readily available. Labor downtime spent awaiting parts or equipment maintenance is also lessened by the area's accessibility.

Village equipment needs. Due to great distances and the cost of transporting large items in the NSB, each village must be provided with a full array of maintenance equipment. Aside from incurring greater acquisition costs, this results in significant ongoing operation and maintenance costs for the NSB.

Economies of scale. In addition to the cost-saving advantages of accessibility, the DOT&PF figure also reflects economies of scale. The DOT&PF figure is based on 392.5 miles, while the NSB figure is based on only 107 miles.

The difference may also lie in the accounting behind the figures. As mentioned above, there is little data available on the specifics regarding NSB maintenance expenditures. This means that the NSB figure is based in large part on estimates (for maintenance expenditures in the village). There is also little information available on what the budget numbers include, so there is a danger of misinterpreting the results. Nonetheless, the figures point to the importance of clearer accounting in the future in order to identify any opportunities for cost saving.

Some Native villages receive limited BIA funding for maintenance on community roads. There is the potential for NSB communities to receive BIA maintenance funds, but the NSB would need to transfer right-of-way authority for the community roads to the BIA.

6.3 Regional Transportation Maintenance

Regular maintenance of regional transportation facilities is crucial to keeping the efficient flow of goods and people across the expanse of the Borough. DOT&PF has primary responsibility for a number of regionally important facilities, while the NSB, City of Barrow or the oil companies maintain others. Other regional facilities – such as winter trails or port structures – receive limited or no maintenance.

Surface Transportation. Regional surface transportation in the NSB includes winter trails, ice roads, the Dalton Highway, and oil-related roadways near Prudhoe Bay. There is no maintenance on winter trails, although DOT&PF may install trail markers on some NSB winter trails in the future. DOT&PF maintains the Dalton Highway, and several maintenance camps established to support this work are located along the highway. As stated above, in 2004, DOT&PF spent approximately $15,260 per mile on Dalton Highway maintenance. The oil companies maintain oilfield roadways, including both permanent routes and seasonal ice routes.

Air Transportation. The NSB maintains the airports at Wainwright, Nuiqsut, Atqasuk, Anaktuvuk Pass, Point Lay and Kaktovik. The DOT&PF maintains airports at Barrow and Deadhorse, and contracts with Tikigaq Corporation for maintenance at the Point Hope Airport. Maintenance responsibility at NSB community airports can be summarized as follows:

Table 19. NSB Community Airport Maintenance Responsibility

Airport	Maintenance
Anaktuvuk Pass	NSB
Atqasuk	NSB
Barrow	DOT&PF
Kaktovik	NSB (leased access)
Nuiqsut	NSB
Point Hope	Tikigaq Corporation (by contract to DOT&PF)
Point Lay	NSB (leased access)
Prudhoe Bay/Deadhorse	DOT&PF
Wainwright	NSB

NSB airport maintenance costs for the four airports it maintains are about $1.4 million per year, or an average of approximately $350,000. DOT&PF reports the following costs for FY2004 airport maintenance on DOT&PF airports in the NSB:

Table 20. DOT&PF NSB Airport Maintenance Costs

Airport	Maintenance Cost for FY 2004
Barrow	$384,000
Point Hope (by Tikigaq Corporation)	$70,000
Prudhoe Bay/Deadhorse	$706,500

Marine Transportation. The few ramps in the villages (Point Lay and Wainwright) are in poor condition and receive no regular maintenance. The City of Barrow is responsible for seasonal installation and removal of the removable boat ramp.

6.4 Future Maintenance Needs

All of the communities except Barrow expressed the desire for gravel stockpiles for roadway and runway maintenance.

Currently, roadways are often reduced in thickness and widened by grading operations. Revising this practice may present an opportunity for cost savings in terms of gravel.

Maintenance equipment (for roadway and runway maintenance and snow removal) and storage buildings to house and maintain the equipment are priorities in over half of the communities. The following table summarizes the major transportation maintenance priorities by community:

Table 21. NSB Village Transportation Maintenance Priorities

NSB Community	Maintenance Priorities			
	Maintenance Equipment	Equipment Storage Building	Dust Control	Gravel Stockpile
Anaktuvuk Pass	x			x
Atqasuk	x		x	x
Barrow	x		x	
Kaktovik		x		x
Nuiqsut	x	x	x	x
Pt. Hope	x	x		x
Pt. Lay	x	x		x
Wainwright	x	x	x	x

7.0 Community Transportation Analysis

This section discusses the existing transportation systems, travel characteristics, and future transportation priorities within NSB communities. Travel between communities within and outside of the NSB has been discussed in the Regional Transportation section of the Plan.

Driving, walking, and riding all-terrain vehicles (ATVs) and snow machines are the primary modes of travel within the communities of the NSB. In contrast to those in many parts of Alaska, many NSB residents own cars and trucks, and these vehicles share the roads with ATVs, snow machines, pedestrians and cyclists. There is no public transit in any of the seven villages and the public transit system in Barrow was recently discontinued. Although the borough could no longer fund public transit a need remains for some kind of rider system and the borough has been meeting with the City of Barrow, the taxis, Ilisagvik College and other entities to find ways they can each provide assistance. There are permits for 40 taxis within Barrow, though the Borough reports that there are only about 30 taxis in service at this time. The Native Village of Barrow and the NSB share expenses for a senior van system serving the elderly and disabled in Barrow, and the NSB funds similar senior van service in the villages. The NSB School District also provides school bus service for all communities.

Roadways in the communities of the NSB are primarily gravel. With the exception of roads in Point Hope, no NSB roads are paved because of the high cost of paving and the limited lifecycle of the pavement. Point Hope roads were paved as part of an airport resurfacing project because the local gravel is not suitable for road construction and because there is less permafrost that would affect the paving. The total roadway mileage within each community ranges from approximately five to 35 miles, as shown in Table 22.

Table 22. NSB Community Approximate Roadway Mileage

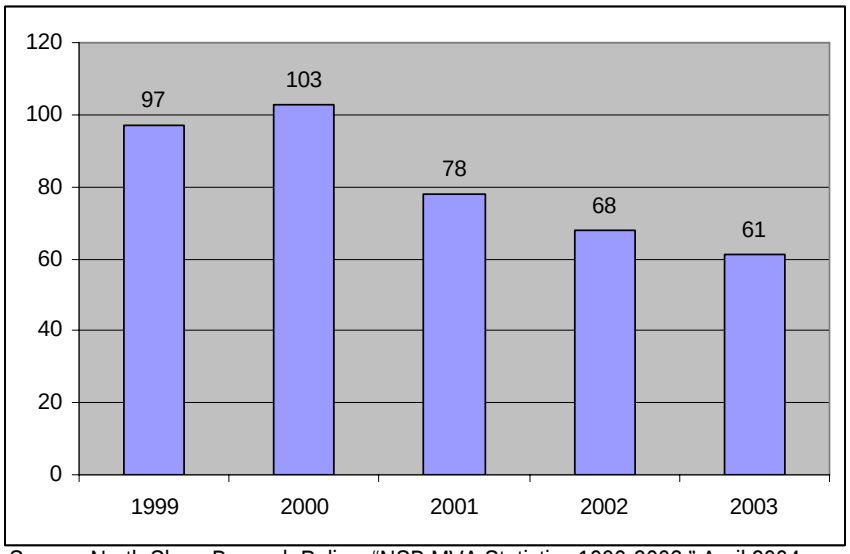
NSB Community	Roadway Miles
Anaktuvuk Pass	5.8
Atqasuk	8.2
Barrow	51.0
Kaktovik	9.9
Nuiqsut	9.4
Pt. Hope	6.5
Pt. Lay	7.5
Wainwright	9.0
NSB Total*	107.3

* Total mileage does not include the Dalton Highway or Prudhoe Bay oilfield roadways.

Most communities are laid out on a grid system consisting of low-speed roadways and stop sign controlled intersections. Existing roadways are generally approximately 20 to 24 feet wide, with major roadways in some communities wider than 24 feet. Some roads are constructed with geotextile fabric, but most are not. Street lighting is provided on most routes, but roads do not include facilities for the specific use of pedestrians or cyclists. Walking to and from major activity centers is common, and pedestrians share roadways with autos, all-terrain vehicles, and snow machines. The Borough maintains all of the community roadways.

NSB police records indicate an overall decline in motor vehicle accidents of approximately three percent annually between 1999 and 2003. The figures include injury accidents and non-injury accidents. Exhibit 2 illustrates these figures:

Exhibit 2. North Slope Borough Motor Vehicle Accidents: 1999-2003



Source: North Slope Borough Police, "NSB MVA Statistics 1999-2003," April 2004.

According to the current Chief of Police, it is possible that several factors, including changes in enforcement and placement of new stop signs, had a part in the reduced numbers of accidents. A decreased fleet of police vehicles may have resulted in minor accidents not being reported as frequently.[36]

Roadways are typically constructed with four to five feet of gravel embankment. Roadways have generally received little engineering, so sight distances and road surfaces are not always ideal. The presence of underlying permafrost requires a four- to five-foot-thick embankment to insulate the underlying permafrost and to prevent a thaw bulb from forming beneath the roadway. As discussed previously, quality gravel for roadway embankment construction is scarce in most villages, while others have local sources from alluvial, beach, or other sources. The absence of reliable gravel sources has limited infrastructure development and maintenance activities in some communities.

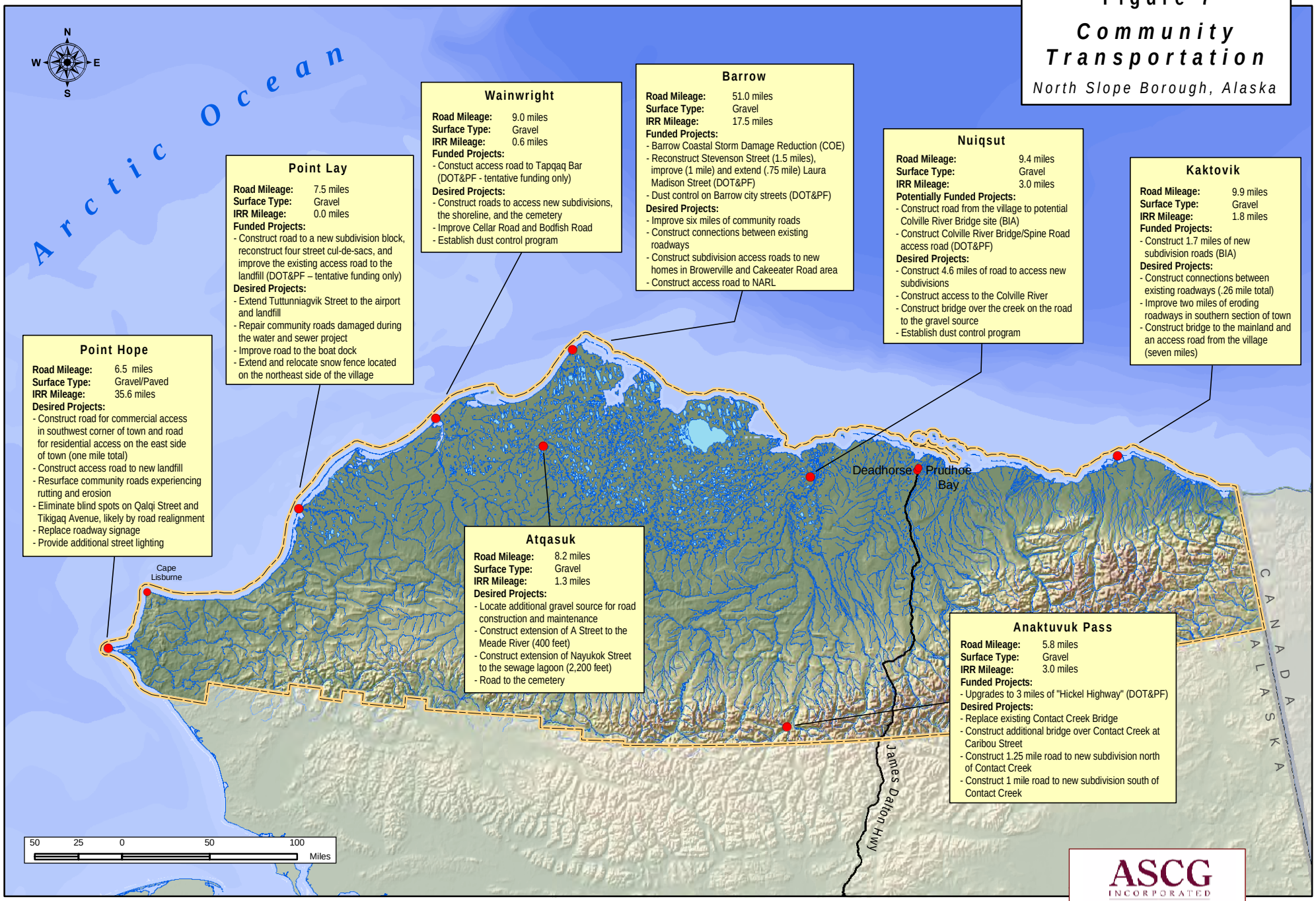
Dust control is a growing issue in many villages. Of particular concern are health impacts (particularly respiratory ailments) from dust generated from roadway traffic, as well as dust contamination of traditionally stored foods and dust contamination on food sources for subsistence animals. Surface treatments or dust control programs are needed to reduce dust levels in each community.

[36] Paul Carr, Chief of Police, North Slope Borough. E-mail correspondence, May 11, 2004.

Figure 7

Community Transportation

North Slope Borough, Alaska



Point Hope

Road Mileage: 6.5 miles
Surface Type: Gravel/Paved
IRR Mileage: 35.6 miles
Desired Projects:
- Construct road for commercial access in southwest corner of town and road for residential access on the east side of town (one mile total)
- Construct access road to new landfill
- Resurface community roads experiencing rutting and erosion
- Eliminate blind spots on Qalqi Street and Tikigaq Avenue, likely by road realignment
- Replace roadway signage
- Provide additional street lighting

Point Lay

Road Mileage: 7.5 miles
Surface Type: Gravel
IRR Mileage: 0.0 miles
Funded Projects:
- Construct road to a new subdivision block, reconstruct four street cul-de-sacs, and improve the existing access road to the landfill (DOT&PF – tentative funding only)

Desired Projects:
- Extend Tuttunniagvik Street to the airport and landfill
- Repair community roads damaged during the water and sewer project
- Improve road to the boat dock
- Extend and relocate snow fence located on the northeast side of the village

Wainwright

Road Mileage: 9.0 miles
Surface Type: Gravel
IRR Mileage: 0.6 miles
Funded Projects:
- Constuct access road to Tapqaq Bar (DOT&PF - tentative funding only)

Desired Projects:
- Construct roads to access new subdivisions, the shoreline, and the cemetery
- Improve Cellar Road and Bodfish Road
- Establish dust control program

Atqasuk

Road Mileage: 8.2 miles
Surface Type: Gravel
IRR Mileage: 1.3 miles
Desired Projects:
- Locate additional gravel source for road construction and maintenance
- Construct extension of A Street to the Meade River (400 feet)
- Construct extension of Nayukok Street to the sewage lagoon (2,200 feet)
- Road to the cemetery

Barrow

Road Mileage: 51.0 miles
Surface Type: Gravel
IRR Mileage: 17.5 miles
Funded Projects:
- Barrow Coastal Storm Damage Reduction (COE)
- Reconstruct Stevenson Street (1.5 miles), improve (1 mile) and extend (.75 mile) Laura Madison Street (DOT&PF)
- Dust control on Barrow city streets (DOT&PF)

Desired Projects:
- Improve six miles of community roads
- Construct connections between existing roadways
- Construct subdivision access roads to new homes in Browerville and Cakeeater Road area
- Construct access road to NARL

Nuiqsut

Road Mileage: 9.4 miles
Surface Type: Gravel
IRR Mileage: 3.0 miles
Potentially Funded Projects:
- Construct road from the village to potential Colville River Bridge site (BIA)
- Construct Colville River Bridge/Spine Road access road (DOT&PF)

Desired Projects:
- Construct 4.6 miles of road to access new subdivisions
- Construct access to the Colville River
- Construct bridge over the creek on the road to the gravel source
- Establish dust control program

Kaktovik

Road Mileage: 9.9 miles
Surface Type: Gravel
IRR Mileage: 1.8 miles
Funded Projects:
- Construct 1.7 miles of new subdivision roads (BIA)

Desired Projects:
- Construct connections between existing roadways (.26 mile total)
- Improve two miles of eroding roadways in southern section of town
- Construct bridge to the mainland and an access road from the village (seven miles)

Anaktuvuk Pass

Road Mileage: 5.8 miles
Surface Type: Gravel
IRR Mileage: 3.0 miles
Funded Projects:
- Upgrades to 3 miles of "Hickel Highway" (DOT&PF)

Desired Projects:
- Replace existing Contact Creek Bridge
- Construct additional bridge over Contact Creek at Caribou Street
- Construct 1.25 mile road to new subdivision north of Contact Creek
- Construct 1 mile road to new subdivision south of Contact Creek

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7.1 Anaktuvuk Pass

Main Street, Anaktuvuk Pass

Existing Roads. There are approximately six miles of roadway in Anaktuvuk Pass. The 2004 ADTs measured for three main roads ranged from 111 to 218. The roads are constructed of two to four feet of gravel fill, and vary in width from 20 to 24 feet. The Contact Creek Bridge is a single lane structure that connects the older residential and commercial sections of town with the newer residential area on the east side of the river. The bridge, in the DOT&PF system as Bridge #1583, is over 30 years old and, at 14 feet wide, is unable to accommodate 2-way traffic and pedestrians or cyclists. Further expansion to accommodate growth is only available to the north of Contact Creek. Accidents have been documented on this bridge. Contributing factors included the bridge's narrowness and the poor condition of this structure.

Argo (amphibious all-terrain off-road ATV vehicle)

Most of the traffic generators in Anaktuvuk Pass are located within the older section of the village on the west side of Contact Creek: the school, City and Village Corporation offices, store, health clinic, museum, church, washeteria, post office, airport and public safety office. In addition to cars, trucks and snow machines, Argos (amphibious all-terrain off-road ATV vehicles) are also used for transportation.

Soils in the area are rocky and covered with a thin mat of organic material. Permafrost is continuous, with an active soil layer of approximately three to four feet. Within the city, soils tend to be fine sands, occasionally gravelly, overlying very gravelly and well drained sand. Unlike many communities within the Borough, there is a substantial quantity of sand and gravel available at the gravel source southeast of town.

The Native Village of Anaktuvuk Pass completed a transportation plan in the spring of 2004 and amended it in 2005 to meet new BIA inventory requirements. The plan provides background on local transportation facilities and outlines current transportation priorities.

Future Road Priorities. Anaktuvuk Pass' future road transportation priorities are related to community growth, improved safety, and improved access within the community and to subsistence areas north of town. Anaktuvuk Pass's priorities were identified in the Anaktuvuk Pass Transportation Plan and at public meetings held as a part of preparation of this plan.

Children on the bridge at Contact Creek

The community has expressed interest in Contact Bridge replacement, roadway upgrades, new road construction, trail marking, safety shelters along routes to subsistence camps, and improved access across Contact Creek as the community continues to grow. With community growth, vehicle and pedestrian traffic on the Contact Creek Bridge has increased dramatically. A recent Bridge Feasibility Study recommended that the bridge be replaced with a wider bridge to accommodate two-way traffic and a separate pedestrian walkway.

Construction of a 1¼-mile road would provide access to a new residential area north of Contact Creek. An additional mile of new roadways is desired for a subdivision south of Contact Creek and directly east of the community center. Anaktuvuk Pass's Transportation Plan also indicates a desire for an additional bridge over Contact Creek along Caribou Street for improved access between existing and new residential areas and as a secondary crossing of Contact Creek.

DOT&PF has designated $1,200,000 for 2005 for upgrades to two miles of the "Hickel Highway" to access the cemetery and the new landfill. The historically controversial route – now an overgrown trail – was initiated by Governor Hickel in 1968. It was part of a project to provide access to oil fields at Prudhoe Bay. The route was initially constructed during the winter as a winter haul road, but left significant marks in the tundra during the summer months. The route was reconstructed in 1969, but due largely to growing public outcry about environmental issues and the adequacy of pre-project public involvement, the project was abandoned.[37]

School bus in Anaktuvuk Pass

Existing Airport. The gravel runway at Anaktuvuk Pass is 4,760 feet x 100 feet. It is maintained by the NSB.

Future Airport Priorities. Unscheduled but desired airport projects include: construct a passenger terminal, security fencing, snow removal equipment, roller and grader and a; gravel stockpile.

Existing Marine Facilities. Anaktuvuk Pass is located in the Brooks Range 250 miles northwest of Fairbanks near the Anaktuvuk River. Individually-owned boats are less common in Anaktuvuk Pass than in other NSB communities, as many people use amphibious all-terrain off-road vehicles (Argos) for subsistence travel outside the community. A small creek runs through the community, but the Anaktuvuk River is 3.5 miles from the community, and there is no ramp available. Anaktuvuk Pass residents occasionally travel to Nuiqsut on the Colville River in the summer. This community does not have barge traffic.

Future Marine Priorities. No marine priorities have been identified in Anaktuvuk Pass, although a boat ramp would facilitate travel.

7.2 Atqasuk

Existing Roads. There are approximately eight miles of roadways in Atqasuk. The 2004 ADTs measured on three major roads ranged from 58 to 100. The roads are constructed of a three to four-foot-thick gravel embankment with a crushed aggregate surface and vary in width from approximately 20 to 24 feet.

Common means of transportation in Atqasuk

The main traffic generators in the community are concentrated within a one-block area and include the school, community center, the Corporation store, post office, clinic, and the police station. Since they are all within one-quarter mile of each other, walking is more common than driving between these facilities.

[37] North Slope Borough Geographical Information Services Department. <http://www.co.north-slope.ak.us/gis/toolbox/encyclopaedia/text/h_text.htm>. Accessed August 16, 2004.

Vehicles are used to travel to the airport, landfill, and subsistence hunting and fishing areas.

There are two soil types in the area, organics and sands. The City is located on a sand bar along the river ranging in thickness between 10 to 20 feet. Historically, the Borough dredged the river and stockpiled gravel for roadway projects. The Borough has also dredged material from the water source. Residents desire a higher quality gravel source for roadway maintenance and the construction of new roadways. If an adequate roadway cap is not provided (i.e. crushed aggregate), the structure is susceptible to wind and water erosion since the subbase generally consists of sand material.

Future Road Priorities. Atqasuk's future road transportation priorities are related to increased availability of gravel and construction of new community roads.

The first priority for the community is to find a reliable gravel source to be used for roadway maintenance and new road construction. Atqasuk requests a total of approximately 2,600 feet of new roads, including a 400-foot extension of A Street to the Meade River and a 2,200-foot extension of Nayukok Street to access the sewage lagoon. The community also expressed interest in a road to the cemetery. Dust impacts to health and stored subsistence foods are a concern in the community.

Existing Airport. The gravel runway at Atqasuk is 4,730 feet x 110 feet. It is maintained by the NSB.

Future Airport Priorities. Airport Priorities include construction of a passenger terminal, security fencing, roller and a gravel stockpile.

Existing Marine Facilities. Atqasuk is located inland 60 miles south of Barrow on the Meade River. The Meade River is used extensively for subsistence travel and fishing, although no ramp is available. Residents also travel to Barrow by water during the summer months. This community does not have barge traffic.

Future Marine Priorities. A boat ramp for safe access to the Meade River is desired by the community.

7.3 Barrow

Existing Roads. There are approximately 51 miles of roads in Barrow. The 2004 ADT measured for six roads ranged from 1624 to 3401. Most travel in Barrow is concentrated in the central business district located in the northern and western sections of Barrow. The majority of travel occurs between the residential areas on the southern and western ends of Barrow and the central business district. There are four main districts in the Barrow area: Barrow, Browerville, NARL and Cakeeater Road and there are approximately 51 miles of road in these four districts.

Typical Barrow roadway

Egasak Street, Barrow

The NSB public transit system was discontinued in July 2005.

An on-call senior van service is provided to elders and the disabled and operates seven days a week from 7:30 a.m. to 10:30 p.m., with mid-day and evening downtimes. The service provides approximately 3,000 unassisted rides and 4,400 assisted rides each month to elders and disabled individuals.

The roads in Barrow are generally constructed of a four- to five-foot-thick layer of gravel to insulate and prevent thawing of

the underlying permafrost. The major streets in Barrow are 20 to 25 feet wide, with minor streets less than 20 feet wide. Most rights-of-way are 60 feet in width with several in the western part of Barrow measuring 50 feet.

Beach erosion and storm damage is a continual problem for Barrow. Critical infrastructure, including Stevenson Street, the sewage lagoon, the landfill, and the water and sewer utilidor are at risk during major storm events. The Army Corps of Engineers (COE) is currently investigating potential solutions to provide relief from storm damage and shoreline erosion that threatens the City. Because all of the potential solutions require large volumes of fill material, a major component of the COE study is to identify material sources to supply the protection barrier.

NSB crews attempt to protect the NARL road from the 2002 storm.

Future Road Priorities. Barrow's future road transportation priorities are detailed in Barrow's 2005 Transportation Plan and in the 2005 NSB Capital Improvement Program and are related to community growth, erosion control and the rebuilding of damaged roads, improved access within the community and to subsistence areas, improved safety, ocean access, and traffic control. The City and the Tribe are currently pursuing plans for a new access road to NARL that is a high priority. 2005 federal earmarked funds include $3,000,000 for the NARL Access Road, but additional funds are needed to complete the project.

Barrow residents have requested reconstruction of approximately two miles of roadway due to damage from a storm in October 2002. Roads damaged during the storm include Stevenson Street to NARL, Uivaqsiagaaq Street, and Eben Hopson Street. Transit, A and B Streets are also high priority projects.

A roads project that includes reconstruction of 1.5 miles of Stevenson Street, improvement of one mile of Laura Madison Street, and a 0.75-mile extension of Laura Madison Street is on the DOT&PF Statewide Transportation Improvement Plan (STIP) for beyond 2006. Expected state funding is $3.9 million. The city also has requested six miles of roadway upgrades due to long-term erosion and degradation. In addition to repairs and upgrades, Barrow residents have expressed an interest in approximately 12 miles of new roadways; including new extensions to provide connections between existing roadways, and new subdivision roads to provide access for new homes in Browerville and in the Cakeeater Road area. The STIP indicates a DOT&PF commitment of $30,000 in 2006 (design) and $250,000 beyond 2006 (construction) for dust control on Barrow city streets. NSB maintenance crews typically have several trucks watering Barrow roads on a daily basis during the summer, but respiratory problems such as bronchitis, asthma, and a high incidence of sinus infection persist. Dust also covers drying subsistence foods, making them unusable.

Existing Airport. The paved runway at Barrow is 6,500 feet x 150 feet. It is maintained by the DOT&PF.

Future Airport Priorities. A multi-year apron and safety area expansion project is underway. Several airport vehicles are also scheduled for replacement or acquisition in the near-term, including two Aircraft Rescue and Fire-Fighting (ARFF) vehicles, a dump truck, a snow blower, and pickup truck. Longer-term priorities include improved passenger terminal with security screening, baggage claim, and vehicle access and Cold storage building for sand and urea.

Existing Marine Facilities. Since Barrow does not have a protected harbor and is subject to extreme coastal storms, residents typically use a removable ramp to launch their boats. The ramp, which is in good condition, is installed in June and removed in November. The use of launching ramps can be hazardous and their installation and retrieval is expensive. There is also one permanent ramp located at the end of Kiogak Street, but the concrete slabs are no longer properly anchored to the ground and the ramp is rusted. Residents also launch boats out of Niksikraq in Elson Lagoon, northeast of Barrow, when there is ice pack on the ocean.

Whaling in Barrow

Subsistence use of the ocean and rivers near Barrow is extensive. Residents use skin boats for whaling in the spring, and use conventional boats for most other subsistence pursuits, such as fall whaling, caribou, seal, and walrus hunting, and fishing. Some Barrow residents travel by boat to Nuiqsut.

The community of Barrow receives seasonal barge service. The cargo barge is beached stern-first at a location north of the old Naval Arctic Research Laboratory (NARL). Due to the draft height of the cargo barge, the crane unloads materials onto transport vehicles on a landing craft tied to its side. Materials are then transported to final locations in the community.

Landing craft tied to barge at shore

Future Marine Priorities. The exploration for petroleum resources has expanded beyond Prudhoe Bay into the northwest NPRA region, which is located in the backyard of the community of Barrow. As the gas and oil industry moves westward towards Barrow, local municipal and Native governments have become acutely aware of the immediate need for a Barrow Safe Harbor and Staging Area. As with any resource development project, there will be potential direct conflicts between subsistence and recreational activities of the community and the needs of industry. Development of a harbor and a staging area will help to mitigate some of the conflicts by providing suitable boat launch facilities and an area to facilitate the transfer of equipment from barges. This proposed project would provide benefits to both the industry interests and to the constituents of the Barrow area. A Project Analysis Report (PAR) was prepared for a boat launch facility in Barrow in June 2004. The estimate for this project was $1.5 million (for a single launch and floating dock). The PAR needs to be expanded to address the needs for a combined public boat launch and barge docking facility. The proposed barge docking facility would be constructed along the short channel between Elson Lagoon and North Salt Lagoon. Traffic conflicts may dictate that the barge dock be extended further into Elson Lagoon. A rough order of magnitude cost estimate by the Public Works Department is $5 to 8 million.

7.4 Kaktovik

*Existing Roads.*The community of Kaktovik lies on Barter Island. The 2005 ADTs measured for three main community roads ranged from 214 to 598. There are about ten miles of roadways in Kaktovik ranging in width from ten to twenty feet. Kaktovik residents travel between their homes, public facilities, the airport, and landfill. The airstrip and landfill are located on United States Air Force property.

Aerial view of Kaktovik

The town is situated on silty soils with high water content with a thin mat of tundra covering the soil. The island is composed of mixtures and lenses of marine and alluvial clay, silt, sand, and gravel. Gravel is typically dredged from lagoon or shore sources and is currently dredged from the shore near the landfill.

The COE is performing reconnaissance studies on seven villages in Alaska that are experiencing flooding and erosion and are considering relocation. Kaktovik is the only NSB village included in the study. In each community, the study is examining 1) whether the village can be saved, 2) the cost of protecting the village from future damage, 3) if the village cannot be saved, when it will be unusable, and 4) the cost of relocation. The study will help to determine what type of actions Congress may need to take in response to flooding and erosion in Kaktovik. The COE is also completing an initial erosion study (a "905(b)" study) in Kaktovik to assess erosion in the village as a whole.

Kaktovik completed a transportation plan in 2003 and amended it in 2005. The plan describes the local transportation system and presents community transportation needs.

Kaktovik Future Road Priorities. Kaktovik's future road transportation priorities include new roads, existing community road upgrades, improved ocean access, and erosion control. Kaktovik requests three small connections between existing roadways (.26 miles), including an extension of 5th Avenue between Barter Avenue and Kaktovik, an L-shaped link between Hula Hula and the road opposite the Presbyterian Church, and a route that extends Hula Hula through to Water Lake Road and north to Barter Avenue. Approximately two miles of roadway upgrades are necessary to raise the level of eroding roadways on the south side of town. The preliminary design for a BIA project to construct 1.7 miles of new subdivision roads to provide access for new homes is underway. Construction funding has not been obligated. The NSB has some concerns regarding responsibility for maintenance of these roads in light of diminishing funds. A resolution of support for the project from the tribe, the City and the village corporation, Kaktovik Iñupiat Corporation (KIC), is being developed.

There is also local interest in constructing a bridge to the mainland, which would provide year-round access. In the long term, a bridge could provide a link to a potential road to the Dalton Highway. Construction of a road approximately seven miles long would be needed to access a bridge from the community to the mainland.

Landing craft on beach at Kaktovik

Existing Airport. The gravel runway at Kaktovik is 4,818 feet x 150 feet. The airport is owned

by the U.S. Air Force and the NSB maintains it.

Future Airport Priorities. Relocation was considered in the nearly completed airport master plan due to flood damage from storm events. The three alternatives considered included no action, relocating the airport toward the landfill (which will be relocated), or relocating the airport to the mainland. It appears that relocating the airport toward the landfill is the preferred alternative. Other airport priorities include snow removal equipment, roller and grader and a gravel stockpile.

Existing Marine Facilities. Kaktovik is located 318 miles southeast of Barrow on the Beaufort Sea. There is no ramp available. During strong east winds, boats stored on the beach of Kaktovik Lagoon are often pushed upland and damaged. Kaktovik residents use waterways to hunt whale, seal and fish. Due to migration routes, Kaktovik residents hunt whale only in the fall. Some Kaktovik residents travel by boat to Canada to see relatives.

Kaktovik receives seasonal shipments via barge, which is beached at a location near the community in front of the existing tank farm. Materials are unloaded and transported to their final locations in the community.

Future Marine Priorities.

Kaktovik would like a boat ramp to allow safe ocean launch of boats. Residents report that the current launching location is too shallow and should be relocated.

7.5 Nuiqsut

Existing Roads. Nuiqsut has approximately ten miles of roadways which generally are constructed 24 feet wide within 100-foot rights-of-way, while a few streets lie within 60-foot rights-of-way. The 2004 ADT's measured on three major roads ranged from 273 to 460. There are two bridges: one crosses a small channel to provide access to the old airport site near the Nechelik Channel, and the second provides access to the freshwater lake. Both bridges are constructed of timbers and are in poor condition.

Residences in Nuiqsut

The community travel patterns are between residences, the post office, the Kuukpik Store, the airport, medical facilities, the landfill and the school. During the winter, Nuiqsut residents use a 17-mile ice road to access the existing Spine Road to reach Deadhorse and the Dalton Highway. Due to nearby oil development, Nuiqsut experiences a relatively high traffic volume.

The community is built on marine and alluvial clay, silt, sand, and gravel. The top foot of soil is windblown silts with organic tundra mat underneath. Nuiqsut is in a permafrost zone that extends for several hundred feet. In the past, embankment material has been dredged from the Nechelik Channel and stockpiled for roadway maintenance and construction. There is another potential gravel source located approximately five miles away. Nuiqsut's future transportation priorities are displayed in detail in the 2005 Transportation Plan completed by the Native Village of Nuiqsut. Their future transportation needs are related to community growth, improved access and safety within the community, and regional access. Nuiqsut requests 4.6 miles of new roads to provide access for new homes and roadway access to the Colville River for subsistence activities. Upgrades are requested on multiple roadways to prevent flooding and erosion. Another community priority is a permanent bridge over the creek on the road to the gravel source due to annual washing out of the culverts and embankment material. Residents also identified dust control as a priority to prevent impacts to health and stored subsistence foods.

The Colville River is a major link to subsistence areas. The Nechelik Channel also provides important subsistence access. It runs adjacent to Nuiqsut and flows into the Colville River, providing limited access to the Colville during the warmer months. Silts routinely build up in the channel, hampering easy access. Between 1998 and 2000, BIA funded design of a road from Nuiqsut to the Colville River; however, the project became stalled due to a perceived lack of gravel. A gravel source has since been identified. There have also been on-going discussions about connecting Nuiqsut with a road to the Dalton Highway.

Existing Airport. The existing gravel runway in Nuiqsut is 4,600 feet x 90 feet. It is maintained by the NSB.

Future Airport Priorities. Unscheduled airport improvements include passenger terminal, security fencing, longer runway. There is also a need for snow removal equipment building, roller and grader, and a gravel stockpile.

Existing Marine Facilities. Nuiqsut is located inland 154 miles southeast of Barrow and 35 miles south of the Beaufort Sea. As discussed in the Community Transportation section, the Nechelik Channel runs by the village and accesses the Colville River, which is approximately three miles away. The Channel often becomes clogged with silt, and a land route is under consideration. There is no boat ramp at the Channel. Nuiqsut residents use waterways primarily for fishing. Subsistence whaling occurs in the fall. Nuiqsut does not have barge traffic. Occasionally, residents will arrange to have goods delivered to Prudhoe Bay by barge and then transported by ice road or river to Nuiqsut.

Marine Priorities. A new removable boat ramp is requested. Residents would also like improvements to an existing boat ramp to improve river access.

7.6 Point Hope

Existing Roads. Point Hope has approximately 6.5 miles of local roadways and a seven-mile evacuation road. The evacuation road provides emergency egress for residents when flooding threatens the community in the fall. The 2004 ADT's measured for three roads roughed from 215 to 493. The roads are approximately 20 to 24 feet wide and constructed of a two-foot-thick gravel and silt embankment within 50-foot rights-of-way. Many of the roads have severe ruts and potholes. The main traffic generators include the school, community center and washeteria, which are located in the central portion of the community, and the village corporation store, tribal office, NSB village coordinator's office, and hotel located in the southwest corner of town. The airport, which is east of the community, is also a significant traffic generator.

Culvert and road in Point Hope

The gravel bar underlying the town is 14 feet above sea level. The ground is permafrost, and the active layer is approximately 45 feet of well-drained gravel and sands. There is an unlimited quantity of gravel material available for roadway construction and maintenance five miles east of Point Hope, but the material is well-rounded and does not bind together well. The material is also too hard to crush and create the right fracture to produce a well-binding material. Most of the roads in Point Hope were paved as part of an airport resurfacing project approximately ten years ago. The airport road was resurfaced recently due to cracking and potholes.

Point Hope Future Road Priorities. Point Hope's future road transportation priorities are related to improved local infrastructure, improved safety, emergency evacuation, and subsistence access. Point Hope requests

approximately one mile of new local roadways for commercial access in the southwest corner of town and for residential access on east side of town. A road will also be needed for access to a new landfill. The current landfill is located approximately half a mile from the airport. Residents of Point Hope have expressed support for extending the evacuation road between six and 14 miles. A Project Analysis Report (PAR) was completed in 2003, and discussions continue regarding funding options and scheduling. Point Hope has formed a trilateral committee composed of members of the City, Tribe and Corporation to help obtain funds for the Point Hope evacuation road. 2005 federal earmarked funds include $3,000,000 for the Point Hope Evacuation Road. Additional funds are required to complete the project.

Resurfacing is desired on many roadways due to rutting and erosion problems. Residents have expressed interest in replacing roadway signage and providing additional street lighting. Two blind spots, one located between the village corporation store and senior center on Qalgi Street and the second on Tikigaq Avenue between Tasiq Street and Aqvik Street, are concerns. Missing traffic control signs have reportedly contributed to accidents in Point Hope. Point Hope also desires repairs and an extension to their existing snow fence.

Existing Airport. The paved runway at Point Hope is 4,000 feet x 7 feet. It is owned by the DOT&PF and maintained by the NSB.

Future Airport Priorities. A DOT&PF erosion control project is scheduled for 2007 or later. Unscheduled future priorities include airport relocation, passenger terminal, security fencing, snow removal equipment and storage building, roller and grader, gravel stockpile.

Marine Facilities. The community of Point Hope is located 315 air miles southwest of Barrow on the Chukchi Sea. Point Hope residents use waterways for subsistence hunting, fishing and whaling. Some residents travel to Kivalina by boat. There is no boat ramp available, but there is an area near the village commonly used as a boat landing.

Point Hope receives seasonal barge traffic. If the weather permits, the cargo barge is beached south of the community and unloaded. If the weather does not permit a beach landing, the barge is anchored approximately ¼ mile off shore and materials are loaded by crane onto landing craft. The landing craft transports the materials to the beach for final distribution to the community sites.

Future Marine Priorities. No marine priorities have been identified in Point Hope.

7.7 Point Lay

Existing Roads. There are approximately eight miles of roadways in Point Lay. The 2004 ADT's measured for three roads ranged from 53 to 149. The main street, Qasigialik Street, is 20 to 25 feet wide and the remaining streets are approximately 20 feet wide. Major streets are contained within 50- and 60-foot rights-of-way and all other roadways were established with 40-foot rights-of-way.

Point Lay roadway

Point Lay residents travel between their homes, the community center, and the school complexes. Residents also travel outside the community to the airstrip, the Distant Early Warning (DEW) Line station, the old town site during the summer, the gravel yard, the fresh water lake, and to subsistence areas.

The community is situated on sediments composed of marine and alluvial clay, silts, sand and gravel. The permafrost layer is continuous with an active layer of approximately 18 inches in

saturated tundra solids and four to five feet of gravel sediments. Gravel is typically stockpiled for maintenance and upgrades to community streets. Erosion is a serious concern in Point Lay and impacts the roadways, causing settling.

Future Road Priorities. Point Lay's future transportation priorities are related to community growth, safety, ocean access, and maintenance. A new subdivision roadway is identified to provide access for new homes on the east edge of town. Providing new roadway access to the airport and landfill by extending Tuttunniagvik Street is also a priority. This would provide a much needed alternate route to the airport. The current route can become impassable due to snow drifting. It would also reduce travel by one-quarter of a mile. Residents desire repairs to roads, including eliminating sinkholes and assessing and possibly replacing numerous culverts. Currently, ponding and flooding occur each spring and during times of major rains. Improvements to the road to the boat landing are also a priority.

A project to develop the road to the new subdivision block, reconstruct four street cul-de-sacs, and improve the existing access road to the landfill (not by extending Tuttunniaqvik Street) is in the STIP. $132,000 is indicated for 2006, with $1.37 million to follow beyond 2006 for construction. Residents indicated that the snow fence located on the northeast side of the village should be set back and extended to reduce snow drifting on the roadway.

Existing Airport. The gravel runway at Point Lay is 3,524 feet by 80 feet. It is owned by the US Air Force and maintained by the NSB.

Future Airport Priorities. Construction of a 1,000-foot runway extension was scheduled to begin in 2004, but appears to be delayed until 2006. Unscheduled airport improvements include a passenger terminal, security fencing, snow removal equipment and storage building, roller and grader, gravel stockpile

Existing Marine Facilities. Point Lay is located along the coast of the Chukchi Sea 183 air miles southwest of Barrow. Point Lay is protected from the open ocean by the Kasegaluk Lagoon. Approximately twenty small boats are stored in a landing area that is intended for twelve boats. There is a ramp, but it is in extremely poor condition. Wind is a challenge: a north/northeast wind can blow the water too far away from the boat landing to launch, and a west wind can bring water up too high on the landing, forcing residents to drag boats a distance away from the shore for protection. Residents use waterways for subsistence hunting and fishing. Residents travel by boat to Wainwright and occasionally to Point Hope.

Anchored cargo barge

Two lightering operations are necessary in Point Lay because of a narrow land barrier (spit) separating the lagoon and community from direct traffic from the Chukchi Sea. During off-loading operations, the cargo barge anchors one to one and one-half miles off shore and materials are transferred to a landing craft that has a shallow enough draft to beach at the spit near the old DEW Line site. Materials are unloaded onto the spit and transferred to a small 50-foot barge that delivers the materials across Kasegaluk Lagoon to the community.

Future Marine Priorities. The boat landing area is too crowded, and residents would like it to be expanded to accommodate additional boats and consolidate operations.

7.8 Wainwright

Gravel road in Wainwright

Existing Roads. Wainwright has about nine miles of roadways built of sandy gravel fill on fine sand loam material. The 2004 ADTs measured on three roads ranged from 204 to 493. The roads are constructed of four to five feet of beach gravel from the Wainwright Inlet and topped with similar beach gravel. They are less than ten feet wide in some areas. Most of the roads in Wainwright were established with a 60-foot right-of-way.

The main traffic generators in the community are concentrated within a one-block area and include the school, NSB village coordinator and teleconference center, washeteria, hotel, church, public safety building, fire station, community center, post office, and the village cooperative store. Many residents travel along the coastline using all-terrain vehicles and snow machines.

The narrow flat strip of land is composed of windblown silts topped by a thin tundra mat. Beneath the organic layer, soils consist of alluvial clay, silt, sand, and gravel. Abundant amounts of beach sand and gravel exist on the coastline, which has been dredged in the past for maintenance and construction projects. Erosion is a concern near the village.

Future Road Priorities. Wainwright's future road transportation priorities are related to community growth, community access, ocean access, and improved safety. Wainwright requests new roadways to provide adequate access to new residential areas, the shoreline, and the cemetery. Roadway upgrades are desired on Cellar Road and Bodfish Road to repair the eroded segments.

The community also would like to improve access to the ocean by constructing a road to Tapqaq Bar, which is in the STIP for funding after 2006 (shown as Tukpak Bar Access Road) for $2.7 million. The community has problems with dust, which impacts residents' health and contaminates subsistence foods.

Existing Airport. The existing gravel runway at Wainwright is 4,494 feet x 110 feet and is maintained by the NSB.

Future Airport Priorities. Unscheduled airport improvements include airport relocation, passenger terminal, security fencing, approach lighting, snow removal equipment storage building and a roller and grader.

Existing Marine Facilities. Wainwright is located approximately 90 miles southwest of Barrow on the Chukchi Sea coast. There are two boat ramps in the lagoon near the mouth of the Kuk River, but both are in very poor condition. The first ramp, which was constructed out of concrete slabs, metal mesh, and fabric insulation, was damaged during spring break-up in recent years, and the loose slabs and fabric have damaged numerous boats. The second ramp, which is estimated to be 10 feet by 20 feet long, is also in bad condition. Residents travel by boat for subsistence hunting, including whaling in spring. They also travel from Wainwright to Barrow by boat.

During off-loading operations, the cargo barge anchors approximately one mile off shore and materials are transferred to a landing craft that has a shallow enough draft to beach near the boat launch area to the south of the community. Materials are unloaded at this location and transferred to a small 50-foot barge that travels along the west side of Wainwright Inlet and delivers the materials to the community.

Future Marine Priorities. Residents request a boat ramp in the Kuk River harbor, and an access road to Tapqaq Bar near the mouth of the Kuk River. The 2004-2006 STIP indicates that the access road to Tapqaq Bar (spelled Tukpak in the STIP) will be funded after 2006. Residents also indicate that the harbor

needs dredging. Another suggestion has been to construct a boat harbor with facilities for local boats and barges to tie up to.

Appendix A. Transportation Funding Sources

- Bureau of Indian Affairs
- State of Alaska, Department of Public Facilities

Transportation Funding Sources. There are several sources of funding for transportation improvements. The NSB has funded many transportation projects with Borough funds, but as funds diminish, outside sources become increasing important. Primary sources are the BIA and DOT&PF.

BIA Indian Reservation Road Program Road Inventory. The IRR program is jointly administered by the BIA and the Federal Lands Highway Office under Federal Highway Administration (FHWA). The program provides funding for surface transportation projects.

The BIA tracks routes eligible for funding through the IRR inventory. Any existing or proposed public transportation facilities such as existing or proposed roads, seasonal roads, trails, boardwalks can be entered into the inventory. New BIA rules may allow a local runway to be added into the inventory. These eligible routes must be formally entered into the inventory in order to generate funds. For each route, a form (5704 form) must be completed characterizing the road. Documentation (such as resolutions, maps, photos, narratives, a long-range transportation plan and traffic count backup information) must be submitted with the forms. For a project to receive BIA IRR funds, it must be on the BIA Road inventory.

In September 2004, the NSB began to assist the Tribes by performing an update to their IRR inventory. The NSB submitted inventory packages for each community that totaled approximately 132 miles of roads, 1,513 miles of trails and about 60 miles of ice roads. In addition to existing transportation roads, trails and ice roads, it includes future transportation facilities. The total also includes mileage from updated forms for routes that were already in the inventory. The following table summarizes the current inventory status.

NSB 2004 IRR Inventory Status

Community	Current road miles in IRR Inventory
Anaktuvuk Pass	3
Atqasuk	1.3
Barrow	17.5
Kaktovik	1.8
Nuiqsut	3
Point Hope	35.6
Point Lay	0
Wainwright	0.6
TOTAL	62.8

BIA is in the midst of an IRR inventory process overhaul that centers on development of an Oracle-based automated process for preparing and submitting inventory updates. The program is called the Road Inventory Field Data System (RIFDS). Records must be complete with all required attachments in place before RIFDS will allow submittals to proceed. BIA anticipates that the system will reduce backlogs that were common with the old system. The new system also incorporates revised requirements for the completion of the 5704 forms. Recent legislation mandates a uniform IRR update be completed within two years.

In 2004, the NSB also completed average daily traffic (ADT) counts for roads as recommended by the new Roads Inventory Field Data System. ADT counts of road traffic can help to raise the amount of BIA funds

generated by a community. For community roads with little traffic, the BIA assigns a default ADT of 25. For some routes in NSB villages, the default value may be appropriate, but the majority of routes have greater traffic flows and therefore should generate additional funds. BIA requires counts be performed by hand or with mechanical traffic counters for a period of at least 24 hours. Roads are classified according to the 2004 BIA guidelines summarized in the following table:

Coding Guide and Instruction for IRR Inventory

Class	Description
1	Major arterial roads providing an integrated network with characteristics for serving traffic between large population centers, generally without stub connections and having average daily traffic volumes of 10,000 vehicles per day or more with more than two lanes of traffic.
2	Rural minor arterial roads providing an integrated network having the characteristics for serving traffic between large population centers, generally without stub connections. May also link smaller towns and communities to major resort areas that attract travel over long distances and generally provide for relatively high overall travel speeds with minimum interference to through traffic movement. Generally provide for at least inter-county or inter-state service and are spaced at intervals consistent with population density. This class of road will have less than 10,000 vehicles per day.
3	Streets that are located within communities serving residential areas.
4	Rural major collector road is collector to rural local roads.
5	Rural local road that is either a section line and/or stub type roads, make connections within the grid of the IRR system. This class of road may serve areas around villages, into farming areas, to schools, tourist attractions, or various small enterprises. Also included are roads and motorized trails for administration of forests, grazing, mining, oil, recreation, or other use purposes.
6	City minor arterial streets that are located within communities, and serve as access to major arterials.
7	City collector streets that are located within communities and serve as collectors to the city local streets.
8	This class encompasses all non-road projects such as paths, trails, walkways, or other designated types of routes for public use by foot traffic, bicycles, trail bikes, snowmobiles, all terrain vehicles, or other uses to provide for the general access of non-vehicular traffic.
9	This classification encompasses other transportation facilities such as public parking facilities adjacent to the IRR routes and scenic byways, rest areas, and other scenic pullouts, ferry boat terminals, and transit terminals.
10	This classification encompasses airstrips that are within the boundaries of the IRR system grid and are open to the public. These airstrips are included for inventory and maintenance purposes only.
11	This classification indicates an overlapping or previously inventoried section or sections of a route and is used to indicate that it is not to be used for accumulating needs data. This class is used for reporting and identification purposes only.

The ADT effort in September, 2004 included 24-hour counts of any car, truck, motorcycle or ATV traffic on about 25 roads. The counting effort produced some surprising results: on one route in Barrow, there were

over 3,400 trips in one day. In other smaller communities, the traffic counts ranged from about 50 to 300 ADTs.

NSB Community ADTs

Community	Counter 1	Counter 2	Counter 3	Counter 4	Counter 4	Counter 6
Anaktuvuk Pass	136	111	218			
Atqasuk	100	95	58			
Barrow	3252	3401	1955	1624	1740	1825
Kaktovik	249	214	598			
Nuiqsut	304	460	273			
Point Hope	215	204	493			
Point Lay	53	93	149			
Wainwright	215	204	493			

In November 2004, new federal legislation (Federal Register, 25 CFR Part 170), went into effect that will bring significant changes to the way that BIA administers its funds for transportation-related projects. This federal legislation is the result of negotiated rulemaking between tribal and Federal representatives as directed by the Transportation Equity Act for the 21st Century. The final rule establishes policies and procedures governing the IRR Program. The new rule expands the type of transportation activities eligible for funding and provides guidance for planning, designing, constructing, and maintaining transportation facilities.

The final rule will impact the way that funds generated by Alaska tribes are administered by the BIA. Instead of automatic pooling most tribally generated funds for use by the Alaska Region of BIA, these funds will be given directly to the tribe or to a tribal consortium unless the tribes indicate that they would like BIA to administer the funds. Those tribes who allow BIA to administer their funds will have the potential to access funds ceded by other tribes but it is likely that these remaining funds will be extremely competitive. The amount that each tribe generates varies from year to year and will depend on the federal highway bill expected to pass in May 2005. Each tribal share is based in large part on the tribe's inventoried miles. Using funds available in 2003, tribal shares would vary widely; between $184 and $1.2 million statewide. The estimated amount of funding for North Slope Borough villages currently varies between about $5,000 and $300,000 annually. When the inventory is updated, this amount is likely to increase. These funds can be used to match a state funded project or used as leverage for bank loans for eligible transportation projects.

DOT&PF Needs List and STIP. The Needs List is a comprehensive list of ground transportation projects requested by Alaska communities. For projects within a borough, borough support is required. Road and trail projects in the Needs List are evaluated using scoring criteria by DOT&PF area planners and forwarded to the Project Evaluation Board (PEB) or the Airport Project Evaluation Board (APEB) for airport projects. If the project scores above a certain level, it will be included in the State of Alaska's Statewide Transportation Improvement Program (STIP). The STIP includes community transportation system, National Highway System, Alaska Highway System, and Trails and Recreational Access for Alaska projects. The STIP identifies how funds will be spent to complete surface transportation projects in Alaska for a three-year period. The current STIP covers 2006-2008. Table 13 outlines current projects in the STIP and in the Needs List:

Current NSB Project Identified in the 2004-2006 STIP and/or Needs List

Community	Project	Description	STIP '06-'08	Cost	DOT&PF Priority	Status
Anaktuvuk Pass	Landfill Road	Upgrade two miles of the Hickel Highway to access the cemetery and the new landfill.	Design '04 Construct '05	$1,550,000	1	In Design
Anaktuvuk Pass	Caribou Street	Extend Caribou Street	N/A	$375,000	3	Not Funded
Anaktuvuk Pass	Contact Creek Bridge	Replace Existing Bridge	N/A	$950,000	None	Resubmitted 10/04 – Not Funded
Atqasuk	Cemetery Road	Construct road to cemetery	-	-	3	Not Funded
Barrow	Dust Control	Dust Control project for Barrow City streets	Design '06 Construct '>06	$280,000	1	Not Begun
Barrow	Community Rds. Ph. II	Reconstruct & Extend L. Madison, Stevenson	Design > '06 Construct >'06	$3,650,000	1	Not Begun
Barrow	Ahkovak St. Upgrade	Align, resurface and upgrade 3000'	N/A	-	3	Not Funded
Barrow	Harbor Proposal Ph I	Reconnaissance and feasibility study for up to 100 moorings, boat ramp	N/A	$200,000	-	Not Funded
Barrow	Browerville Road	Expand to new residential areas	N/A	-	3	Not Funded
Barrow	Community Rds upgrade	Upgrade existing rds and construct several new rds in Barrow and Brower	N/A	-	1	Not Funded
Barrow	Isatquaq Lagoon Boardwalk and Trail	Construction approx. 1 mile of boardwalk	N/A	$1,030,000	1	Not Funded
Barrow	Walkpa Gas Field Rd	Construct new road to gas field.	N/A	-	3	Not Funded
Kaktovik	Street Improvements	Extend Fifth St, Pipsuk Ave, 9th	N/A	$500,000	2	Not Funded
Northern Region	Winter Trail Marking	Mark overland winter trails	Design & Construct '05-'09	$1,350,000	1	Not Begun in NSB
Nuiqsut	Bridge Replacement	Replace two one lane brides on rd to freshwater lake	-	-	-	Not Funded
Nuiqsut	Community Rds	Road development for community expansion	-	-	3	Not Funded
Point Hope	Kukpik Access Rd	Extend Water source Road	N/A	$340,000	3	Not Funded
Point Hope	Street Paving	Pave 5 miles of existing rds	N/A	$2,850,000	2	Not Funded
Point Lay	Street Improvements	Reconstruct 4 street cul-de-sacs, improve landfill rd., new subdivision rd.	>'06	$1,370,000	1	Not Begun
Wainwright	Community Roads	Construction of platted roads	N/A	-	3	Not Funded
Wainwright	Tukpak Bar Access Rd	Construct .4 mile all season road to NSB gravel stockpile and dredged boat harbor near mouth of Kuk River	>'06	$2,700,000	1	Not Begun

Anaktuvuk Pass, Barrow, Point Lay and Wainwright's projects identified in the current STIP are described in more detail in the discussion of transportation facilities in NSB communities that follows.

In 2004, DOT&PF initiated changes to its STIP process. The changes include less favorable evaluation of rural road projects and an increased emphasis on requirement of matching funds in order to receive DOT&PF project funds. In light of the rural nature of most Borough roads and the limited funds available

for matching, these changes could have a significant impact on future DOT&PF funding of transportation in the NSB.

Funding for regional projects support natural resource development could also originate through DOT&PF's Industrial Roads Program, discussed in the Regional Transportation section. Other sources of funding for community transportation improvements could be related to development in the NPR-A or from Village Safe Water (VSW), or the Denali Access System Program described in the federal highway legislation SAFETEA-LU which was passed in July 2005. SAFETEA-LU also set aside high priority earmarked funds. Some of those are specific to North Slope Borough communities as follows:

NSB Earmarked Project Funds from SAFETEA-LU

Community	Project Description	Amount
Barrow	Access roads for the Barrow Arctic Research Center in Barrow	$3,000,000
North Slope Borough	AK-Transit Purposes	$2,000,000
North Slope Borough	AK-Transit Purposes	$1,000,000
Point Hope	Emergency evacuation road at Point Hope in North Slope Borough	$3,000,000

Iñupiat Community of the Arctic Slope. The four NSB communities that have joined a consortium for transportation planning under the Iñupiat Community of the Arctic Slope (ICAS), the regional Native non-profit corporation, are Point Lay, Wainwright, Atqasuk and Anaktuvuk Pass. These communities created the Arctic Slope Regional Transportation Consortium (ASRTC) for purposes of implementing a process for the distribution of funds for village roads projects. The ASRTC's Transportation Advisory Committee (TAC), which will have authority to make decisions regarding prioritization of transportation projects, will be composed of representatives from each community in the consortium. Barrow, Nuiqsut, Point Hope and Kaktovik have not expressed an interest in joining the consortium.

Denali Access System Program

SAFETEA-LU amends the Denali Commission Act to create the "Denali Access System Program." It authorizes appropriation to the Denali Commission from the Highway Trust Fund of $15 million annually through 2009. Another subsection authorizes, but does not require, the transfer to the Denali Commission of up to 15% of the state's allocation of surface transportation program funds.

The bill creates an advisory committee to the Denali Commission made up of the Chairman of the Denali Commission and eight members, who are appointed by the governor for four-year, staggered terms. Four members are to be selected from the Native community (ANCSA corporations, the regional non-profits, tribes) and four are to be selected from "rural Alaska regions or villages." One member from each group must be a civil engineer. The advisory committee is charged with advising on transportation priorities and projects, coordinating transportation planning, and facilitating projects between regions.

- The purpose of the Denali Access System Program is stated generally as to pay for planning, design, engineering and construction of roads and other surface transportation infrastructure, but the focus is on "essential access routes within remote Alaska Native villages" and "facilities necessary to connect isolated rural communities to a road system."
- The Denali Commission itself is the lead federal agency; there is no FHWA oversight.
- Denali funds will remain available until expended.
- Denali funds can be used as the non-federal match.

- Up to 10% of project funding can be retained for future maintenance.

To date, Denali Commission has not announced how they will prioritize, select or administer projects.

Denali Commission Marine improvement funding

SAFETEA-LU also has a $20 million earmark to the Denali Commission for docks, waterfront development projects and related transportation infrastructure. This is in the table of "Transportation Improvements" listed at Sec. 1934 of Title I of the bill. It is from the Highway Trust Fund.

There is also a $20 million earmark to the Denali Commission for the same purpose at Section 3011 of the bill, where it is specified at $5 million per year from 2006-2009.

Appendix B. Public Involvement

YOUTH INVOLVEMENT PROJECT:

Activities to Engage Youth in Visioning the Future North Slope Borough Comprehensive Plan Revision

Produced for the North Slope Borough
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October 2004

Youth Involvement Project:
North Slope Borough Comprehensive Plan Revision

> *The future holds great possibilities for the North Slope region. The next 10 years will likely yield new oil fields, development of other natural resources, and improved services to residents. The North Slope Borough hopes to go through those years in partnership with public and private enterprises, with the wisdom of the past and the dream of tomorrow.*
>
> -North Slope Borough School District website

Youth Involvement Project

The original North Slope Borough Comprehensive Plan, developed in the early 1980's, has guided development in the Borough for the past 20 years. The revised plan, which is expected to be in effect for the next ten to fifteen years, will continue supporting development of villages and natural resources in a way that preserves the Inupiat way of life. Because this plan will be affecting changes in the Borough as today's high school students become part of the workforce and local leadership, the Borough is very interested in engaging youth in the revision process. The goals of the Youth Involvement Project include:

1. Increase students' awareness of their role in local government.
2. Raise students' knowledge of the Comprehensive Plan, the revision process, and its role in local government.
3. Incorporate students' visions for their communities into the Comprehensive Plan.
4. Promote a sense of community and commitment to the well being of the community.
5. Develop youth leadership capacity.

NSBSD Goals and Alaska State Content Standards

The Youth Involvement Project supports both of the NSBSD school board goals for the 2004-05 school year. The project activities create learning opportunities in which students have the chance to increase their proficiency in reading and writing and are also an opportunity to integrate Inupiaq values into the regular school curriculum. The activities promote the values of cooperation, sharing, and respect for nature (Alaska Native Education Program Value Posters) and enable students to live these values as they envision the future of the North Slope Borough and contribute ideas to the Comprehensive Plan.

All of the project activities are based on the Alaska State Content Standards and will increase students' proficiency in English/Language Arts, Geography, and Government & Citizenship. Each activity specifies which content standard it supports. In addition to supporting the content standards, the project activities make learning relevant and meaningful. The students will be learning about and contributing to a local government process that directly affects their lives.

Developmental Assets

As listed above, the fourth goal of the Youth Involvement Project is to promote a sense of community and commitment to the well being of the community. The project promotes a sense of community by building key developmental assets in youth. Assets are building blocks in children's lives that help them grow up strong, capable, and caring (see Appendix A for a list of the 40 developmental assets). The State of Alaska is a leader in the national youth developmental asset movement. The Alaska Initiative for Community Engagement (Alaska ICE) is the community outreach component of the Association of Alaska School Boards (AASB). Alaska ICE compliments the AASB mission by giving Alaskans the information, tools, and assistance to work together and engage in shared responsibility for preparing Alaska's youth for the future (see Appendix A for Alaska ICE information).

By involving youth in the Comprehensive Plan revision process, the community will be building specific developmental assets in youth. These assets include:

- **Community values youth** (asset #7): Youth believes that community adults value young people.
- **Youth have useful roles** (asset #8): Youth are taught and given useful roles in community life.
- **High expectations** (asset #16): Parents, community members, and teachers encourage youth to do well.
- **Equality and social justice** (asset #27): Youth respects self and others; places high value on sharing and cooperation.
- **Responsibility** (asset #30): Youth accepts and takes personal responsibility.
- **Personal power** (asset #37): Youth feels in control over "many things that happen to me"
- **Positive view of personal future** (asset #40): Youth is optimistic about his or her personal future.

The project demonstrates to youth in a very concrete way that the Borough values them and their ideas, and encourages youth to take an active role in local government to shape the future. The project reinforces the high expectations the community has for youth as they accept their responsibility in creating a just future for all residents of the Borough.

Project Activities

The Youth Involvement Project targets high school students and includes the choice of four main activities. The planning team for the North Slope Borough Comprehensive Plan is available to assist with implementing all of the project activities.

Activity 1 Geography and Government & Citizenship lesson plan that could easily be integrated into existing curriculum as a relevant and meaningful example of local government in action.

Activity 2 English/Language Arts lesson plan that could be integrated into existing curriculum as an opportunity to practice writing skills on a relevant topic.

Activity 3 Focus groups that support the state content standards while gathering and recording students' visions for the future of their community.

Activity 4 A public awareness campaign which celebrates and affirms the valuable role youth have in visioning the future of the North Slope Borough.

The planning team recommends implementing at least one of the first three activities (the lesson plans and the focus groups) and publishing the results through a publicity campaign. The publicity campaign is a way to involve parents and other community members in the project while also emphasizing that the community takes young people seriously and recognizes their important role in the future of the community.

The intent of the Youth Involvement Project is to provide relevant learning opportunities for students to actually apply the state content standards in their lives, not to create additional work for school personnel. Planning team members will be making site visits to Borough villages after the first of the year and can be a resource for teachers implementing project activities at that time. With prior arrangements, team members can:

- Act as guest speakers in classrooms while in the villages for draft plan presentation;
- Develop additional materials and guidance for teachers (newsletters, handouts);
- Work with teachers via email or phone prior to conducting class exercises;
- Provide project summaries and other ideas for the publicity campaign; or,
- Offer general technical assistance on all project activities.

Activities 1 through 3 (the lesson plans and focus) are flexible in terms of the time needed for implementation. A suggested minimum and maximum time is stated for each lesson activity; however, teachers or other school personnel could modify the times to best suit the particular situation. If time were limited and teachers needed to actually eliminate some of the activities, the most important or key activities are highlighted at the beginning of each lesson. The activities could be facilitated over the course of one or more class periods. A teacher could also facilitate the activities in a workshop format over several consecutive hours, depending on what worked best for the school.

Dream of Tomorrow

Children ages 10-14 are statistically the highest population in the North Slope Borough and youth ages 15-19, the target audience for this project, are the second highest population (North Slope Borough 2003 Economic Profile and Census Report). It is these youth who will be tying together the wisdom of the past with their dreams of tomorrow as they become the community leaders and residents affected by the Comprehensive Plan. The Youth Involvement Project will help youth build the academic proficiency they will need to take on these roles and will help youth become strong, capable, and caring adults committed to the future of their community.

ACTIVITY 1: My Role in the Comprehensive Plan

Geography, Government & Citizenship Lesson

Content Standards:

Geography

A. A student should be able to make and use maps, globes, and graphs to gather analyze, and report spatial (geographic) information.
B. A student should be able to utilize, analyze, and explain information about the human and physical features of places regions.
D. A student should be able to interpret spatial characteristics of human systems, including migration, movement, interactions of cultures, economic activities, settlement patterns, and political units in the state, nation, and world.
E. A student should understand and be able to evaluate how humans and physical environments interact.
F. A student should be able to use geography to understand the world by interpreting the past, knowing the present, and preparing for the future.

Government & Citizenship

E. A student should have the knowledge and skills necessary to participate effectively as an informed and responsible citizen.
G. A student should understand the impact of economic choices and be able to participate effectively in the local, state, national, and global economies.

English/Language Arts

C. A student should be able to identify and select from multiple strategies in order to complete projects independently and cooperatively.

Objectives:

Students will be able to…

1. Explain the Comprehensive Plan as a tool that interprets the past, understands the present, and prepares for the future.
2. Use charts and tables related to socioeconomic development in the North Slope Borough.
3. Describe how human and physical environments interact by identifying issues in the Comprehensive Plan.
4. Use the Comprehensive Plan to understand the past and present and to prepare for the future by identifying strengths and resources in the North Slope Borough.
5. Participate in the Comprehensive Plan revision process as informed and responsible citizens.

Materials:

- Flip chart paper (or butcher block paper)
- Markers

- Tape
- "Figure 1: Population Growth" (Appendix B)
- "Figure 2: NSB Population by Ethnicity" (Appendix B)
- "Property and Sales Tax Revenues" (Appendix B)
- "Planning Issues for Comprehensive Plan" (Appendix C)

Activities:

1. **Introduction**: Plans in Our Lives

Ask students these questions:

- What kinds of things do you plan for in your life?
- If you were planning a birthday party for a friend, what kinds of things would you need to include in your plan (resources, materials, people, money)?

2. **Mini-Lecture**: The North Slope Borough Comprehensive Plan

Just like planning for a birthday party, a Comprehensive Plan is a way to look into the future and think about how to get there. The word "comprehensive" means to look at the big picture. Why does a community like the North Slope Borough need a comprehensive plan? State law says that communities need plans to guide land management and many federal and state agencies require an approved plan before they give out grants and funds. A comprehensive plan shows needs and sets priorities. It is an opportunity for people in the community to say what is important and to identify actions that need to be taken.

The North Slope Borough's first Comprehensive Plan was developed in the early 1980's. It addressed issues such as boundaries and land status, subsistence, human resources, physical environment, transportation, petroleum and mineral development, government, and land use. Why should the North Slope Borough make a new and revised Comprehensive Plan? What has changed over the last 20 years? Today there are more oil and other facilities spreading west from Prudhoe Bay and more pressure on subsistence resources. Village populations are growing, creating a need for new housing and other services, while Borough revenues are shrinking.

3. **Socioeconomic Graphs**: Two Reasons for a New Plan

Distribute the bar graph titled "Figure 1: Population Growth". Discussion questions:

- What information does this graph give us?
- What was the population when the old Comprehensive Plan was developed?
- What is the population now? What is the difference?
- How are people, the land, and the government affected when population increases?

Distribute the bar graph titled, "Figure 2: North Slope Borough Population by Ethnicity". This graph shows the population of the Borough by age and ethnicity. Discussion questions:

- What age group has the highest number of people? Second highest? Third?
- How will having a young population affect the Borough?
- What does this mean for you as one of the young people?

Distribute the line graph titled "Property and Sales Taxes Revenues". Discussion questions:

- How much money did the Borough make from property and sales tax in 1995?
- How much did the Borough make last year? What is the difference?
- What happens when a community has more and more people but the government has less and less money?

4. **Large Group Brainstorm**: Community Strengths and Resources

Ask the class to answer this question, "What is the best thing about living in _____ (name of community)?" Record their answers on flip chart paper and continue the discussion with the question, "What are the strengths and resources of this community?". Record all ideas.

5. **Rotation Station Brainstorming**: Community Challenges (Issues in the Comprehensive Plan)

Do a quick large group brainstorm around the question "What challenges or weaknesses in our community should be included in the new Comprehensive Plan?". Write each of the following headings on a separate piece of flip chart paper:

- Land Ownership and Use
- Subsistence (Fish, Wildlife, Vegetation)
- Human and Cultural Resources
- Hazards
- Socioeconomic Factors (Public Services, Facilities, Government)
- Petroleum and Mineral Development

Explain that these are the topics that will be addressed in the Comprehensive Plan. Refer to the document titled "Planning Issues for Comprehensive Plan" to explain each topic to the students. Adults in the North Slope Borough were discussing these exact issues during village meetings in July and August this past summer. Post each piece of flip chart paper somewhere in the room.

Divide the group into six or fewer small groups (or have students do this activity individually). Instruct each group to move around the room spending two minutes brainstorming the topic on each piece of flip chart paper. Questions to answer for each topic are:

- What thoughts, ideas, or issues do you think of when you see this topic?
- What is the status of this topic in your community?
- Who or what is impacting or affecting this topic in your community?
- What are your hopes and fears about this topic?

Groups should record their ideas on the flip chart paper so that each group's ideas are recorded on the same piece of paper. Use a timer and after two minutes have each group move on to another issue. After the final round of brainstorming, have each group read all of the ideas from their last topic paper.

6. **Small Group Project**: Visioning Our Community

Explain to the small groups that they are going to participate in a community planning activity. They are actually going to come up with ideas that their own community could use to address the challenges from the last activity. Group members should look at all of the issues and challenges and decide on the two issues they feel are most important in their own community. Give each small group two pieces of flip chart paper. Instruct the groups to divide each paper into three columns with the following headings:

Column 1	**Column 2**	**Column 3**
Community Strengths and Resources	**Community Challenge or Weakness**	**Solutions: What can be done to solve the problem? Who could implement this solution?**

Column 1: Groups should look at the list of community strengths and resources from the large group brainstorming activity. For each challenge they picked, groups should write down in column one the strengths and resources their community could use to address the challenge.

Column 2: Groups should write one of their community challenges in the second column on each flip chart page.

Column 3: Groups should answer two questions for each challenge they picked. "What can be done to solve this problem?" and "Who would implement the solution?" Emphasize that their suggestions must be realistic ideas that could actually be implemented in their community. Students can use words and/or drawings to describe their ideas. Groups should write their solution ideas in column three.

7. **Conclusion**: Sharing the Vision

Ask each group to share one challenge and one solution from their visioning session. Debriefing questions:

- What similarities did you see among the groups, in terms of their ideas on challenges and solutions?
- What differences did you see?
- How do you feel about the future of your community? Why?

ACTIVITY 2: We Dream of a Community

English/Language Arts Lesson

Content Standards:

English/Language Arts

A. A student should be able to speak and write well for a variety of purposes and audiences.
B. A student should be a competent and thoughtful reader, listener, and viewer of literature, technical materials and a variety of other information.
D. A student should be able to think logically and reflectively in order to present and explain positions based on relevant and reliable information.

Geography

F. A student should be able to use geography to understand the world by interpreting the past, knowing the present, and preparing for the future.

Government & Citizenship

E. A student should have the knowledge and skills necessary to participate effectively as an informed and responsible citizen.

Objectives:

Students will be able to…

1. Read and analyze technical materials in order to understand the Comprehensive Plan.
2. Compare and contrast current and past issues from the Comprehensive Plan.
3. Think logically and reflectively to develop and write a position statement describing their vision for the future.

Materials:

- Blank paper
- Colored pencils or markers
- Comprehensive Plan Introduction (Appendix D)
- "Planning Issues for Comprehensive Plan" (Appendix C)

Activities:

1. **Introduction**: Plans in Our Lives

Ask students these questions:

- What kinds of things do you plan for in your life?

- If you were planning a birthday party for a friend, what kinds of things would you need to include in your plan (resources, materials, people, money)?

2. **Reading Technical Material**: Understanding the Comprehensive Plan

Distribute the handouts from Appendix D, Comprehensive Plan Introduction, and give the students time to read through the material. These materials are the introduction and the table of contents from the original Comprehensive Plan written in the early 1980's. A Comprehensive Plan is a way to look into the future and think about how to get there. The word "comprehensive" means to look at the big picture. Why does a community like the North Slope Borough need a comprehensive plan? State law says that communities need plans to guide land management and many federal and state agencies require an approved plan before they give out grants and funds. A comprehensive plan shows needs and sets priorities. It is an opportunity for people in the community to say what is important and to identify actions that need to be taken.

Reading comprehension and discussion questions:

- Who wrote the original plan in the early 1980's?
- Why is this plan unique?
- What is the function of the plan?
- Why was the original planning effort started?
- What kinds of information can you find in the plan?
- What forms the community view in the North Slope Borough?
- Look at the last paragraph on page 4 which starts with the words, "Policy development through the Comprehensive Plan". What does this paragraph mean in your own words?
- What kinds of issues or topics does the plan address?
- Which topics interest you the most? Why?
- Why should the North Slope Borough make a new and revised Comprehensive Plan?
- What has changed over the last 20 years?

Today there are more oil and other facilities spreading west from Prudhoe Bay and more pressure on subsistence resources. Village populations are growing, creating a need for new housing and other services, while Borough revenues are shrinking.

3. **Large Group Brainstorm**: Community Strengths and Resources

Ask the class to answer this question, "What is the best thing about living in _____ (name of community)?" Record their answers on flip chart paper and continue the discussion with the question, "What are the strengths and resources of this community?". Record all ideas.

4. **Reading Technical Material**: Community Challenges and Weaknesses

Distribute the handout titled "Planning Issues for Comprehensive Plan" and give the students time to read the material. Explain that this document describes the topics that will be addressed in the new and revised Comprehensive Plan. Adults in the North Slope Borough were discussing

this exact document and these issues during village meetings in July and August this past summer.

Reading comprehension and discussion questions:

- What were the sources of information used to prepare this document?
- What are challenges or weaknesses addressed?
- What similarities do you see with the issues addressed in the original plan?
- What differences do you see?
- What do you think accounts for the differences?

5. **Individual Writing Project**: We Dream of a Community Essay

Explain to the students that they will be working on a three-page assignment to describe their own vision for the future of their community. The first parts of the assignment will be a detailed essay about how the community can address their challenges. The last part of the assignment will be creating a drawing or symbol to illustrate their dreams for the future of their community.

Instruct students to choose one challenge or weakness that is most interesting to them, from either the original or the revised Comprehensive Plan. Students should answer these questions about the issue they chose:

- What resources or strengths does your community have to deal with this challenge?
- How would you describe this challenge to someone not from your community?
- Why is this issue interesting to you?
- Who or what is impacting or affecting this issue today?
- What are your hopes and fears or concerns about this issue?
- How could your community use its strengths and resources to deal with this challenge?
- Who would be responsible for implementing these ideas?

Part 1: Describe your community's strengths and resources. What do you like about living in your community? What is unique and special about your community?

Part 2: Define or describe your chosen challenge or weakness in detail. Explain your hopes, fears or concerns about the issue. How would you describe this issue to someone not from your community? Who or what is impacting or affecting this issue today? Why is this issue interesting to you?

Part 3: State how your community could use its resources and strengths to deal with this challenge. Who would be responsible for implementing these ideas?

Part 4: Create a symbol, drawing or abstract form to represent your hopes and dreams for the future of your community (reassure the students that it is okay if they can't draw well - a very simple symbol or an abstract form would be great!).

6. **Conclusion**: Sharing the Vision

In a go-around, invite each student to share one of their solutions or their drawing from the “We Dream of a Community” essay assignment.

ACTIVITY 3: Focus Groups

Facilitators:

Planning team members, teachers, or students themselves, could facilitate the focus groups. Training students as focus group facilitators is an opportunity to empower young people with the knowledge and skills to be active leaders in the community planning process. Planning team members would meet with identified student leaders prior to the focus groups to brief them about the Comprehensive Plan and to provide training on group facilitation skills.

Content Standards:

English/Language Arts

A. A student should be able to speak and write well for a variety of purposes and audiences.
D. A student should be able to think logically and reflectively in order to present and explain positions based on relevant and reliable information.
E. A student should understand and respect the perspectives of others in order to communicate effectively.

Geography

F. A student should be able to use geography to understand the world by interpreting the past, knowing the present, and preparing for the future.

Government & Citizenship

E. A student should have the knowledge and skills necessary to participate effectively as an informed and responsible citizen.

Objectives:

Students will be able to…

1. Think logically and reflectively to verbally describe their position on the Comprehensive Plan and their vision of the future.
2. Listen and respect the perspectives of other students on the Comprehensive Plan.
3. Use the Comprehensive Plan as a means to understand the past and present while preparing for the future.
4. Participate as an informed citizen in the local government process of revising the Comprehensive Plan.

Materials:

- Flip chart paper
- Markers
- "Planning Issues for Comprehensive Plan" (Appendix C)
- Blank paper

Activities:

1. **Gathering and Introductions**: Me and My Community

Ask each participant to introduce themselves by giving their name, grade, and the answer to one of the following questions. Facilitators should choose one question for all of the participants to answer and should introduce themselves first to model the activity.

- The time I am most proud of is…
- The Inupiat value I most admire or see in myself is…
- One of my goals is…

2. **Group Brainstorm**: Community Strengths and Resources

Have the group finish this sentence, "The best thing about living in (community name) is…". Record all answers on flip chart paper. Continue brainstorming a list of community strengths and resources.

3. **Mini-Lecture**: What is the Comprehensive Plan?

Explain that this focus group will be looking at the North Slope Borough's Comprehensive Plan, which is a way the whole community to look at it's values, strengths and goals and begin planning for the future. A Comprehensive Plan is a way to look into the future and think about how to get there. The word "comprehensive" means to look at the big picture. Why does a community like the North Slope Borough need a comprehensive plan? State law says that communities need plans to guide land management and many federal and state agencies require an approved plan before they give out grants and funds. A comprehensive plan shows needs and sets priorities. It is an opportunity for people in the community to say what is important and to identify actions that need to be taken.

The North Slope Borough's first Comprehensive Plan was developed in the early 1980's. It addressed issues such as boundaries and land status, subsistence, human resources, physical environment, transportation, petroleum and mineral development, government, and land use. Why should the North Slope Borough make a new and revised Comprehensive Plan? What has changed over the last 20 years? Today there are more oil and other facilities spreading west from Prudhoe Bay and more pressure on subsistence resources. Village populations are growing, creating a need for new housing and other services, while Borough revenues are shrinking.

4. **Discussion**: Community Challenges, Weaknesses and Solutions

Ask the participants to generate a list of community challenges and weaknesses they think should be addressed in the Comprehensive Plan. Record their ideas on flip chart paper so the whole group can see and remember the ideas. Add the issues from the document titled "Planning Issues for Comprehensive Plan" if the group does not mention them. For each issue, discuss these questions:

- What thoughts, ideas, or issues do you think of when you see this topic?
- What is the status of this topic in your community?
- Who or what is impacting or affecting this topic in your community?
- What are your hopes and fears about this topic?
- How can your community solve these problems using it's strengths and resources?

5. **Closing**: Vision for the Community

Give each participant a sheet of blank paper and tell them to think about one issue or challenge mentioned in the discussion that is most interesting to them. How could the community solve this challenge? Ask students to write a word or phrase or to draw a symbol that illustrates their vision for the future of their community. When participants are finished, invite each person to share their vision.

ACTIVITY 4: Youth Visioning Publicity Campaign

Content Standards:

English/Language Arts

E. A student should understand and respect the perspectives of others in order to communicate effectively.

Geography

F. A student should be able to use geography to understand the world by interpreting the past, knowing the present, and preparing for the future.

Government & Citizenship

E. A student should have the knowledge and skills necessary to participate effectively as an informed and responsible citizen.

Goals:

1. To educate students who did not participate in the Youth Involvement Project about the Comprehensive Plan and ways students can actively participate in local government.
2. To engage parents and other community members in students' learning opportunities.
3. To promote parent and school cooperation.
4. To help students understand and respect the perspectives of others.
5. To show youth that the community values their ideas and to affirm that youth have an important role in the community and in local government.

Activities:

1. **Student Project Display**

Display the "Visioning Our Community" project (activity 1) and the "We Dream of a Community" project (activity 2) in schools, the district office, or other places in the community to educate students who did not participate in the project.

2. **Parent Newsletter**

Include students' artwork and visioning ideas in parent newsletters or other school publications to engage parents and families in the project.

3. **NSBSD Website**

Include the students' visioning ideas on the NSBSD website page about the future. Their ideas would support and compliment the vision of the future described on the website.

4. **Speaking on the Issues**

Describe students' vision of the future in the Mayor's "Speaking on the Issues" monthly comments to highlight the valuable role youth have in the future of the community.

5. **Community Events**

Report on the Youth Involvement Project at the Elder and Youth Conference and other community events to encourage continued discussions by youth and elders on the future of the community.

Appendices

Appendix A – Background Information

- List of 40 developmental assets from pp 10-12 in *Helping Kids Succeed Alaskan Style;* see also Alaska ICE website: http://www.alaskaice.org and Search Institute website: http://www.search-institute.org/assets/40Assets.pdf
- "The Assets Framework" and "The Alaska ICE Mission" from the Alaska ICE website at http://www.alaskaice.org

Appendix B – Socioeconomic Graphs

- Figure 1: Population Growth, excerpted from the *North Slope Borough 2003 Economic Profile and Census Report, p. 3*.
- Figure 2: North Slope Borough Population by Ethnicity, excerpted from the *North Slope Borough 2003 Economic Profile and Census Report, p. 5*.
- Property and Sales Taxes Revenues, excerpted from the *North Slope Regional Comprehensive Economic Development Strategy*, p. 39.

Appendix C – Planning Issues

- Planning Issues for Comprehensive Plan

Appendix D – Comprehensive Plan Introduction

- Title page, table of contents, and the introduction (pp.1-4) of the original North Slope Borough Comprehensive Plan.

Appendix A – Background Information

List of 40 developmental assets from pp 10-12 in *Helping Kids Succeed Alaskan Style;* or information is available via the internet:

Alaska ICE website: http://www.alaskaice.org

Direct link to 40 developmental assets:
http://www.alaskaice.org/material.php?matID=259

Search Institute website: http://www.search-institute.org/assets/40Assets.pdf

"The Assets Framework" and "The Alaska ICE Mission" are available via the internet:

Alaska ICE website at http://www.alaskaice.org

Direct link to information about The Assets Framework:
http://www.alaskaice.org/material.php?matID=126

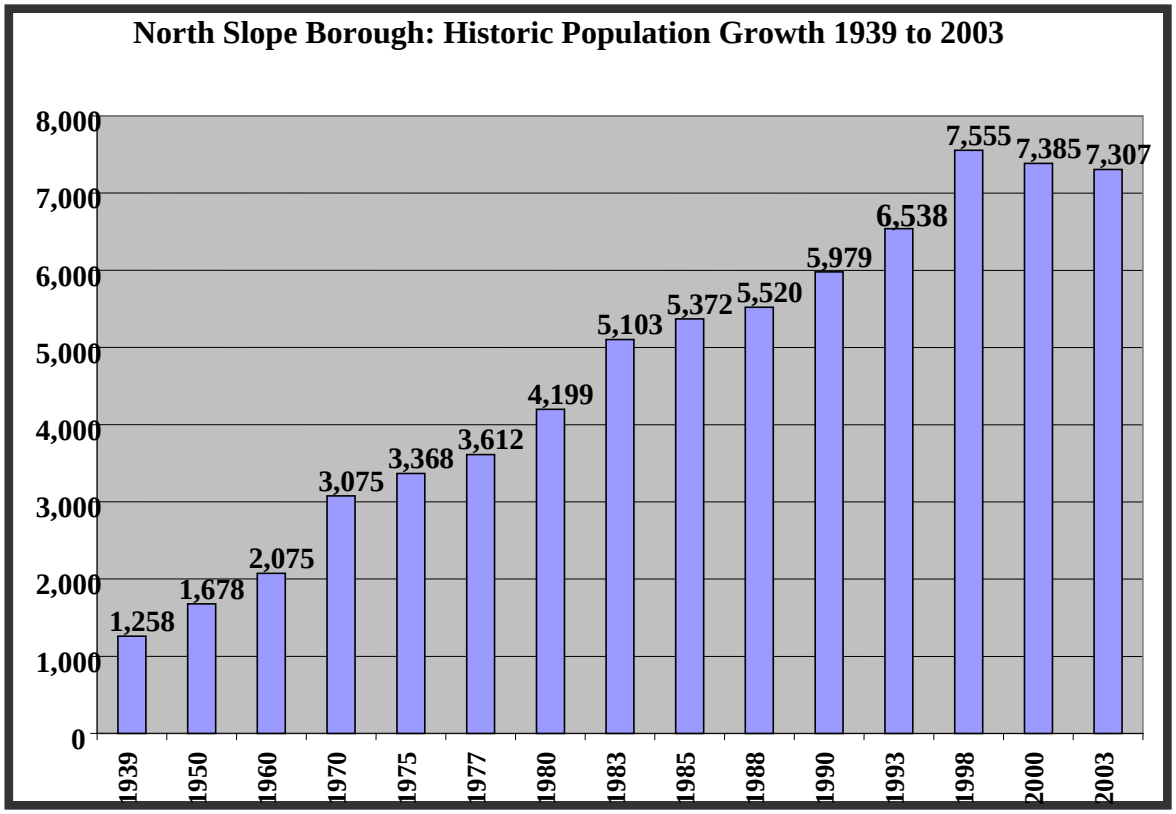
Direct link to information about The Alaska ICE Mission:
http://www.alaskaice.org/material.php?matID=228

Appendix B – Socioeconomic Graphs

Excerpt from:
North Slope Borough
2003 Economic Profile and Census Report

POPULATION

Figure 1: Population Growth



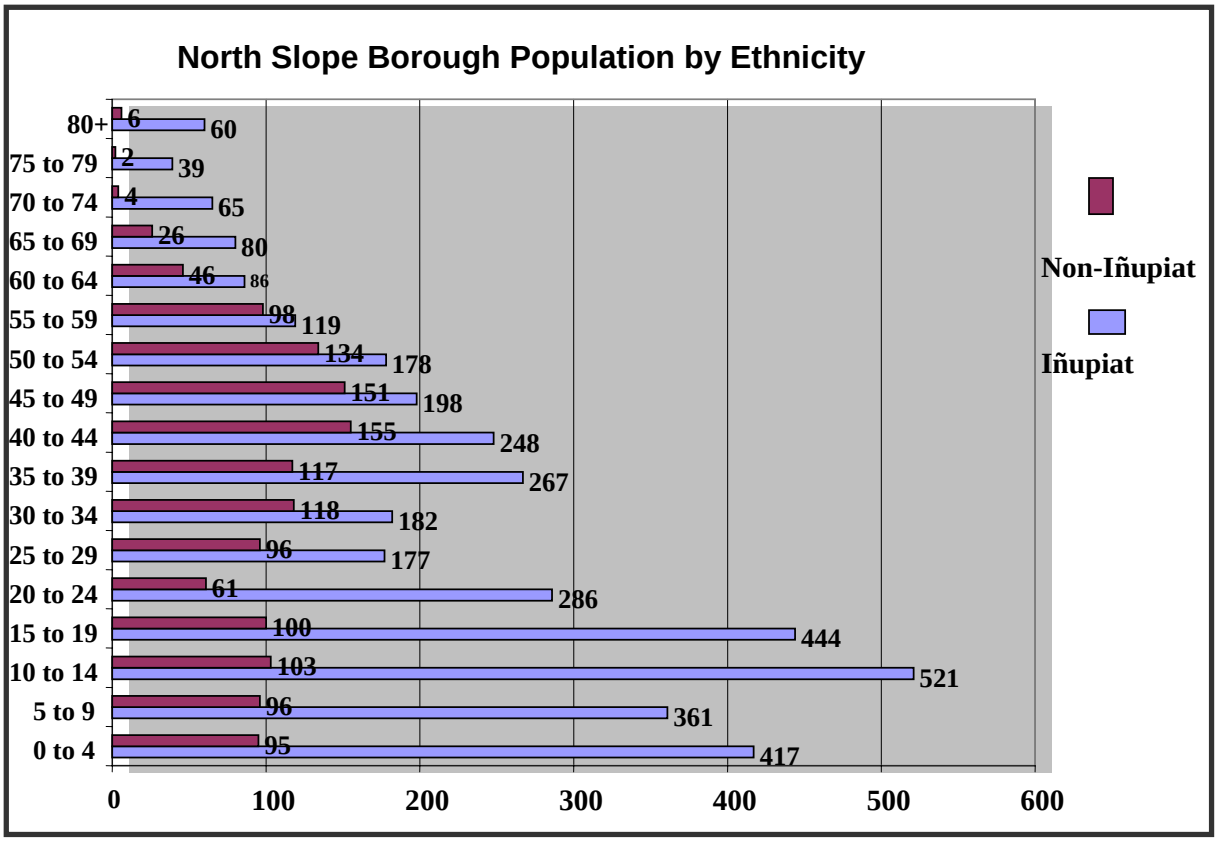
Source: 1939-1970, 1980, 1990, 2000 – U.S. Census; 1975, 1977 – North Slope Borough Planning Department; 1985 – Alaska Department of Labor; 1988, 1993, 1998, 2003 – North Slope Borough Economic Profile and Census Report.

The population of the North Slope Borough has declined from a peak of 7,555 in 1998 to 7,385 in 2000 and again to 7,307 in 2003, for a total of 3.3 percent. By way of comparison, the population of the State of Alaska has increased approximately 1.35 percent per year during this time frame.

Excerpt from:
North Slope Borough
2003 Economic Profile and Census Report

POPULATION

Figure 2



Of the 7,307 residents of the North Slope Borough, 5,242 or 71.73 percent are identified as Iñupiat, an increase from 70 percent of the total in 1998. Another 1,132 residents or 15.5 percent of the total are identified as Caucasian, and the remaining 933 individuals or 12.7 percent identified as "Other Minorities" with the largest percentage of that group being of Filipino descent.

Excerpt from:

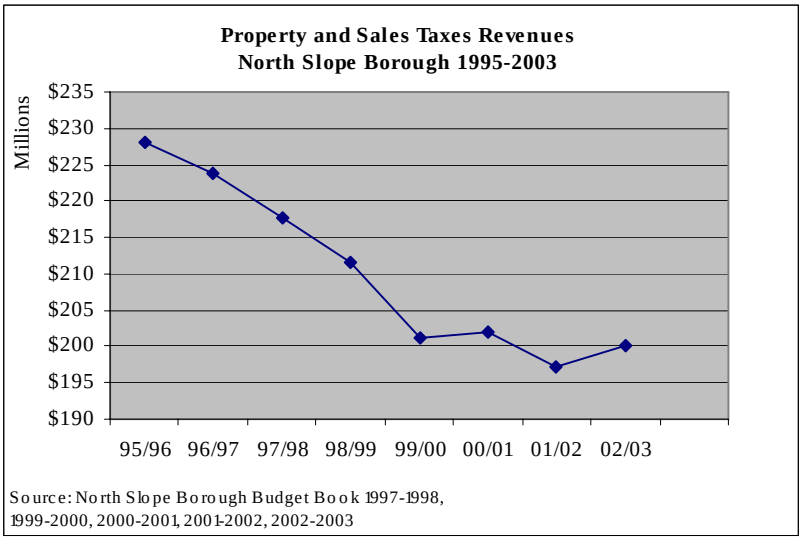
North Slope Regional Comprehensive Economic Development Strategy (CEDS)

Prepared for the U.S. Department of Commerce Economic Development Administration

By Arctic Development Council

October 2003

With the shrinking production in the oil industry, the North Slope Borough is experiencing a dramatic decline in property revenues, which is about 70 percent of the Borough's total revenue (see chart below). The Borough started reducing its budget a few years back, but more aggressive budget cuts are still ahead. The Borough is undergoing a $30 million budget cut over the next six-year period. How to manage the cost cuts, while preserving sustainable services to the borough residents will be a challenge to the Borough. The Borough Departments have been working together and developed a series of strategic plans that includes eliminating unnecessary positions, privatizing some Borough properties and contracting some Borough services to reduce cost and provide more efficient services to the region's residents.



Appendix C – Planning Issues

NORTH SLOPE BOROUGH COMPREHENSIVE PLAN REVISION
October 2004

Planning Issues for Comprehensive Plan

Planning issues help us decide what the plan needs to address and what actions are recommended to reach planning goals and objectives. These issues should reflect the concerns and needs of village residents and will be used to develop implementation actions.

The issues in the comprehensive plan come from several sources. We have summarized issues from prior Borough plans, including the 1983 Comprehensive Plan, attempted revisions in 1993 and 1998, the Regional Comprehensive Economic Development Strategy from 2003, meetings with Borough staff, workshops with local groups, and public meetings in Borough villages.

The notes at the end of each issue indicate where they came from, usually either a previous version of the comprehensive plan, a recent planning workshop, or a village meeting. Some of them come from earlier village workshops when the plan was being revised. These notes on sources of issues are explained below:

1983 – North Slope Borough Comprehensive Plan, adopted by Assembly
1993 – Attempted revision of comprehensive plan
1998 – Attempted revision of comprehensive plan
2003 – Regional Comprehensive Economic Development Plan
2004 B – Borough staff interviews in April
2004 I – Workshops with internal stakeholders (Borough residents) in Barrow in June
2004 E – Workshops with external stakeholders in Barrow in June (federal and state government, resource development industry, and conservation organizations)
2004 V – Issues from village meetings conducted July through September

Land Ownership and Status

The North Slope Borough covers nearly 88,000 square miles and has multiple landowners. The Federal Government owns over half of the land within the Borough, including lands in the National Petroleum Reserve in Alaska (NPRA) and the Arctic National Wildlife Refuge. Other landowners include the State of Alaska, regional and village Native corporations, and private individuals or companies. Land ownership and status also includes issues concerning the process of selecting and receiving title to land by Native corporations and the Borough.

1. Land in the North Slope Borough is owned by different entities; this ownership pattern makes it difficult to manage land use, enforce regulations, and mitigate impacts (1983, 1993, 2004E).
2. Multiple landowners and interests can make it difficult to develop natural resources (2004B).
3. Maintaining opportunities for subsistence harvest, traditional activities, and access across ownership boundaries is difficult (1983, 1993).
4. Some local residents feel Native allotments should have subsurface rights (2004V).
5. Some local residents feel they should have greater rights than outside interests to the land within the Borough (2004I).
6. Congressional designations on federal land (such as wilderness and wild and scenic rivers) affect use of the land within the North Slope Borough, and many residents do not understand the consequences of these designations (2004E).
7. Current information on land ownership status and easement locations is inadequate, making land management and resource development difficult and time consuming for both the North Slope Borough and permit applicants (2004B, 2004E).
8. Lack of legal surveying and information on property lines makes development projects difficult in villages (2004E).
9. Limited funds and staff have slowed selection of State lands by the Borough (2004B).
10. Conveyance of selected lands to the Borough and Native corporations has been very slow and makes it difficult to manage lands. (2004B).
11. New home construction and other developments are limited by the lack of roads and utilities to available lots (2004I).

Land Use

Use of land includes traditional and current activities of Borough residents such as subsistence and trapping, as well as resource development on public and private lands. It also addresses how lands within communities should be used to meet the needs of residents and allow for community growth. The Borough has land management regulations (Title 19) that determine how lands are zoned for different uses and how uses should be managed. One of the purposes of the comprehensive plan is to guide how land management regulations are used and revised.

1. Local communities desire greater control over their use of lands and natural resources (1998, 2004B).
2. Most villages do not have local zoning and enforcement authorities, which makes it difficult to regulate development (2004I).
3. Existing zoning in the Borough is not consistently enforced due to funding and staffing limitations (2004I).
4. Areas rezoned for resource development are generally large, when only specific pads and access routes need the resource development zone classification (2004I).
5. Different permitting requirements and regulations of many land managers can make development difficult (2004B).
6. There is insufficient communication and coordination with local villages when state and federal land managing agencies issue permits (2004I).
7. The process for acquiring permits within the North Slope Borough is confusing because it lacks coordination between governmental entities, different permits have different requirements that are not clear, and permit processing times vary which can delay projects (2004E).
8. Agencies do not inform local residents before issuing permits to tourists and sport hunters (2004V).
9. Permits for development in villages are issued without the knowledge of local residents (2004V).
10. The Borough and other management agencies lack scientific data that documents changes in land use (2004E).
11. Subsistence users are sensitive to development and have been displaced from traditional use areas (2004I).
12. There is inadequate land reserved for transportation facilities such as airports (2004E).
13. Resource development is very important to the Borough economy; some people feel not enough lands are open for resource exploration (2004V).

Subsistence

Subsistence resources and subsistence activities are central to Inupiat life. The health and abundance of subsistence resources, access to resources, and opportunities for traditional sharing are of utmost importance to North Slope Borough residents.

1. Residents are concerned that subsistence is adversely affected by pressures from development and outside influences, such as sport hunting (2004 B/V).
2. Villages are experiencing greater impacts to subsistence due to the combination of changes in natural patterns; displacement of subsistence uses; and increased pressure from development, population growth, and outside uses (2004B, 2004E).
3. Drill pads and pipelines encroach upon subsistence zones (2004I).
4. Developments in waters offshore from the Borough adversely impact Borough residents and subsistence resources (1983, 1993, 2004B/V).
5. Onshore industrial activities impact Borough residents, but conflict avoidance agreements and good neighbor policies are not presently applied to onshore activities (2004 I/V).
6. Transportation and other infrastructure developments can increase access to subsistence resources and increase competition for these resources (1983, 1993, 2004B).
7. Watersheds and wetlands serve as primary access routes to subsistence resources, but these resources are not adequately protected (2004 V).
8. Subsistence users perceive that increased oil field security has displaced subsistence activities and caused changes in the subsistence experience for these users (2004B, 2004I/E).
9. Cumulative effects are not always analyzed and mitigated when resource development projects occur in incremental stages (2004B).
10. Smaller resource development projects cannot always support requirements that reduce impacts on subsistence but increase project costs (2004B).
11. There is minimal coordination between local, state, and federal governments to assess, monitor, and mitigate impacts to subsistence (2004I/E).
12. The resource industry does not adequately coordinate with local subsistence users prior to development or dismantlement of oil and gas facilities (2004I/E).
13. The location of subsistence use areas by season is not adequately mapped; subsistence activities occur in different areas based on season, availability of resources, weather conditions, and other factors (2004V).
14. Environmental Impact Statements and other documents on resource development do not include enough subsistence harvest information, such as distance to harvest and effort (2004V).
15. Current planning efforts do not consider subsistence impacts that occur between villages and at borough wide levels (2004E).
16. Research that combines traditional knowledge and science is limited and does not sufficiently protect subsistence resources (2004B, 2004I).
17. Existing regulations are not adequately enforced, including local enforcement for proper use of subsistence equipment, and enforcement for sport hunters (2004I).

Human and Cultural Resources

Maintaining traditional Inupiat values and activities is important to the social, cultural, and economic well-being of Borough residents and all residents of Alaska. The location of culturally significant resources, such as subsistence areas or archeological sites, is also very important.

1. Development activities can affect the quality of cultural and traditional resources and activities (1983, 1993, 2004E).
2. Resource development activities generate both benefits and impacts to the Inupiat culture (2003, 2004I).
3. Human and cultural impacts from resource development are not always mitigated by the oil and gas industry (2004I).
4. It is a challenge to maintain traditional activities and cultural values between generations as communities change and grow (2003, 2004I/E).
5. Change associated with a transition from a more traditional way of life to a cash-based economy has increased social and health care impacts (2004B).
6. Academic and cultural education does not sufficiently promote understanding of Inupiat values and activities (2004I).
7. Traditional sharing of local resources can conflict with using these resources for economic development and self-sufficiency (2004I).
8. Inupiat values are sometimes temporarily displaced by change (2004E).
9. State, federal, and local government entities, and the oil and gas industry do not fully understand the importance of traditional knowledge to Borough residents (2004B, 2004I/E).

Hazards

Hazards may be human-caused or naturally occurring. The Borough is working to minimize human-caused hazards and accommodate natural hazards.

1. Some facilities are located and built in hazard zones (2004B, 2004I).
2. Development plans do not adequately consider flooding, erosion, and availability of materials sites (2004E)
3. The potential for natural hazard impacts is increasing (2004I).
4. Erosion and other natural events (flooding) appear to be increasing in severity and frequency (2004B, 2004I).
5. Changing ice conditions cause difficulties during spring and fall whaling (2004B).
6. Permafrost melting causes the ground and structures to collapse, but these hazard areas have not been identified in many villages (2004V).
7. Warming trends (changing climatic conditions) affect the development methods and seasons (ice road use) (2004I).
8. Environmental quality is impacted through human activities (2004I).
9. Development could threaten water sources (2004I/E).
10. Improper disposal of garbage, hazardous waste, and toxic substances threatens a safe, healthy, and pleasant living environment (1993, 2004I).
11. Oil field infrastructure, including roads, pads, and pipelines cause physical changes in the environment (2004I/E).
12. Limited research exists that explains how pollutants move through air and water due to activities inside and outside the Borough (2004I/E).

Fish, Wildlife, and Vegetation

The North Slope supports many types of fish, wildlife, and vegetation which are important resources for the residents of the Borough, state, nation, and world.

1. There is limited research on critical habitat for many plant and animal species throughout the Borough (2004B, 2004I/E).
2. There are not adequate studies to determine the source of changes in habitats and populations of fish and wildlife. (2004I/E).
3. Fish and wildlife research and study plans, including tagging and tracking animals, are not well coordinated with local residents (2004I).
4. Development activities can impact fish and wildlife populations, habitat, and their capacity to continue to support subsistence activities (2004B).
5. Local residents are concerned about resource development impacts to fish, wildlife, and vegetation (2004E).
6. Migratory patterns of fish and wildlife, such as caribou and whales, may be affected by development activities (2004B, 2004I).
7. Damage to important habitat is not always restored (2004I).
8. Sensitive areas like Teshekpuk Lake that support fish and wildlife need to be identified and mapped, based on traditional knowledge, and protected (2004I/V).
9. Traditional knowledge and scientific studies are not always incorporated into development plans (2004I/E).
10. Project developers do not clearly understand who is using the land and for what subsistence purposes, which makes it difficult to negotiate land restoration (2004I).
11. Managers from different governmental organizations do not always work well together, which makes it difficult to maintain biodiversity and improve management of fish and wildlife (2004B, 2004I/E).
12. Cumulative effects of human and natural activities on fish and wildlife are not well understood (2004B, 2004E).

Socioeconomic Factors

Borough residents desire additional opportunities for economic development and economic diversification that are compatible with maintaining the traditional way of life. Education, housing, healthcare, and employment are persistent needs in all Borough communities. The Borough must encourage development that generates revenue to maintain services while avoiding cultural and social impacts.

1. Borough residents seek greater employment opportunities, while maintaining traditional values and lifestyles (1983, 2003, 2004B).
2. A small percentage of local residents are presently employed by outside companies (2004I).
3. After 30 years, there are still not enough industry jobs for Borough residents (2004B).
4. There is not enough coordination between Borough residents, Borough government, village corporations, tribal governments, and resource development industries to provide local employment training (2004B).
5. Borough communities are not economically self-sufficient and do not have economic strategies (2003I).
6. The future well-being of NSB residents is uncertain as oil and gas development declines, and residents become increasingly reliant on a cash economy (2004E).
7. Borough communities are not energy self-sufficient (1983, 1993, 1998, 2004V).
8. City and tribal governments increasingly rely on federal funds because state funding is declining. (2004E).
9. Revenues are declining, which makes it difficult for the Borough to maintain financial well-being (2004I).
10. The number of homes and types of housing in villages is inadequate; there are not enough roads and utilities to allow new construction (2004V).
11. Limited funds are available for housing from regional and tribal housing authorities (2004I).
12. The current education system does not adequately focus on developing tomorrow's community leaders and local workforce (2004I).
13. Vocational education is not adequately offered in most of our public schools, which limits the availability of technical skills in the communities (2004I).
14. There is not adequate sex education in the villages (2004I).
15. There is concern among village residents that the number of youth that are having children is increasing (2004I).
16. Borough residents continue to face health concerns that are preventable, as well as high rates of violent and accidental death (1983, 1993, 2004B).
17. Village residents lack access to mental health professionals (counselors) (2004V).
18. Recreation facilities and activities are not available in all communities (1993, 2004V).

19. There are limited places, such as safe rooms, for village residents to go if they are in a domestic abuse situation (2004V).
20. Market goods are difficult and expensive to access from the North Slope Borough (2004B).
21. There is not enough research on the positive and negative impacts of the relationship between the Borough and the resource development industry (2004E).
22. Since the Borough has not finished selecting lands from the state, the Borough is not able to generate revenue from those lands (2004I).

Public Services, Facilities, and Government

Public facilities and government services are dependent upon tax revenues from resource development in the North Slope Borough. Demand for services are remaining the same or increasing, while tax revenues are declining. The cost of providing reliable services and facilities in the North Slope Borough presents challenges.

1. Public services and facilities are not available to Borough residents at the same level as other communities (1993, 2004V).
2. Some facilities are outdated, not maintained, or not up to code, and funding for renovation is limited. (2004I).
3. Few places exist for community residents to gather, such as teen or senior centers (2004V).
4. Villages do not have adequate telecommunications (2004I).
5. There are limited public access trails in villages.
6. The Borough funds facilities and services that are another government's responsibility, including airports, roads and jails (2004I).
7. As population and demand for services increase, and Borough revenues decline, some facilities and services may not be maintained (2004B).
8. The Borough stopped funding washeterias in the villages, which makes it difficult for residents who do not have home washing facilities (2004V).
9. Declining resource development revenue has impacted the ability of the Borough to provide public facilities and services used by residents (2004B).
10. Plans for capital projects generally focus on existing needs, rather than future needs (2004B).
11. Construction projects are started even though funding for operation and maintenance is uncertain (2004B).
12. The Borough, tribal, state, and federal agencies do not always communicate and cooperate effectively (2004B/V).
13. Government agencies (state and federal) typically do not have local offices and are not easily accessible to Borough residents (2004B/V).
14. Plan implementation is difficult without formal agreements or partnerships between government entities and industry (2004V).
15. Governmental, tribal, corporation, and non-profit entities do not actively promote healthy communities (2004E).
16. North Slope Borough residents desire maximum local control over decisions that affect them (1998, 2004B).
17. Lands available for village expansion, including shareholder lots, do not have enough roads and utilities to allow new construction (2004B/V).
18. During the summer months, the village youth lack challenging physical and mental activities (2004I).

Petroleum and Mineral Development

Resource development and production has provided financial and employment opportunities for Borough residents, and allowed the North Slope Borough to improve infrastructure, health and social services in it's villages. However, the expansion of oil and gas infrastructure into areas important for subsistence activities and fish and wildlife habitat, and potential cumulative effects, are of concern to Borough residents.

1. There is concern about future resource development in ecologically sensitive areas (2004E).
2. The resource development footprint continues to expand, causing broader impacts to the natural environment (2004 E).
3. Borough residents are concerned about the cumulative effects of incremental development of petroleum and mineral facilities (2000V).
4. Communities are concerned about the potential impacts of demobilizing oil and gas facilities in the future (2000V).
5. The economy of the North Slope Borough is subject to the boom and bust cycles of the resource development industry (2004 E).
6. There are potential economic opportunities in the undeveloped mineral deposits within the Borough (2004 E).
7. Some communities close to natural gas resources do not have supply facilities (2004I).

Appendix D – Comprehensive Plan Introduction

COMPREHENSIVE PLAN

NORTH SLOPE BOROUGH

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CHAPTER 1
INTRODUCTION

A. Preface

The only valid purpose for any Comprehensive Plan and land use regulations is to gain for the community as many of the good impacts of development as possible, and to 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 community — a community in which Inupiat people and the Inupiaq character of life predominate. Consequently, this Plan is absolutely unique. While attempts have been made to reflect and accomodate state and national interests, the Plan has been designed for the values and circumstances of the people of the North Slope Borough.

B. Definition And Purpose

The Comprehensive Plan is the basic governmental instrument for land use planning and regulation. Through texts, 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 villages and the various natural resources of the Borough.

The Comprehensive Plan and the associated Land Management Regulations are designed to:

(1) Provide for orderly development.
(2) Lessen street congestion.
(3) Promote fire safety and public order.
(4) Protect the public health and general welfare.
(5) Prevent overcrowding.
(6) Stimulate systematic development of transportation, water, sewer, school, park and other public facilities.
(7) Encourage efficiency in the use of energy and the substitution of energy from renewable sources for energy from fossil fuels.

C. Background

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 (CMP) 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, an interim zoning ordinance (Serial No. 75-6-6) was adopted. The Interim Zoning Ordinance provides the Borough with a mechanism for exercising control over petroleum development activities in the mid-Beaufort coastal area until a CMP is approved and/or a comprehensive Borough-wide zoning ordinance is adopted by the Borough Assembly.

The present comprehensive planning effort was initiated in recognition of the need for a plan, and implementing ordinances, to guide and control development in all areas of the Borough - not just in the mid-Beaufort coastal zone. Thus, the Comprehensive Plan addresses the entire Borough jurisdictional area.

Ongoing efforts to prepare a CMP for all Borough coastal areas - i.e. not just for the mid-Beaufort Sea Area - are complementary to the Comprehensive Plan. Within the general framework of the Comprehensive Plan, the Borough CMP is focusing in more detail on the coastal areas, thus refining the Plan in this respect. Findings in

connection with the CMP may require adjustments in the Comprehensive Plan, but when completed, the two plans will be fully integrated and mutually supportive.

1. Format

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

One of the real values of a comprehensive plan is that it is comprehensive - it contains all the policy and data the Borough has developed on the various issues which confront it. Policy, especially, is developed in coordinated fashion.

2. Components

The Plan will ultimately consist of the following elements:

1. General (Borough-wide) Goals, Policies, Data, Generalized Goals, Objectives, Policies and Data on all Plan subjects, as contained in this volume.
2. The Coastal Management Program.
3. The Capital Improvements Programs of the Borough and each village.
4. Comprehensive Plans for each village that wants one.
5. Special studies or contracts (i.e. the ice study, health, housing, education, marine mammal and game management studies by state or federal agencies, public information on natural resources).
6. The Master Plans for Resource Development Districts.
7. The Automated Geographic Information System.

As noted, the Coastal Management Plan will be a component of the Comprehensive Plan, and therefore the implementation of the Coastal Management Plan will be a component of the Borough's Land Management Regulations. This will be done with overlay zones containing special regulations which govern the various coastal areas.

3. Regulations

Associated with the Comprehensive Plan are Land Management Regulations which will comport as exactly as possible with the Comprehensive Plan.

The Regulations consist of a few simple zone districts, tailored to meet local needs and desires. Everyday developments, such as house construction subsistence activities are not regulated at all, while larger projects are subject to review pursuant to the

policies in the Plan. There would be a variety of "overlays" to deal with special concerns, the most important of which is the Coastal Area, where the various Coastal Management policies apply.

Major petroleum developers can apply for rezoning from the Conservation District to the Resource Development District. A Master Plan for the area would be developed and adopted as an amendment to the Comprehensive Plan and Land Management Regulations which will control development of the area.

The most important part of the Regulations is not the law itself, but the process, forms and handbooks which make the decision-making process relatively easy, quick, inexpensive, and understandable to all concerned.

NORTH SLOPE BOROUGH
ORDINANCE SERIAL NO. 75-6-48

AN ORDINANCE TO ADOPT THE COMPREHENSIVE PLAN OF THE NORTH SLOPE BOROUGH

WHEREAS, the Planning Commission may, from to time, consider amendments to the Comprehensive Plan, Coastal Management Program and land management regulations; and if appropriate, recommend amendments to the Assembly for adoption; and

WHEREAS, the Planning Commission has recommended that the Assembly approve the attached Comprehensive Plan;

NOW, THEREFORE BE IT ENACTED:

SECTION 1. Classification. This ordinance is of a general and permanent nature and shall become part of the Borough Code.

SECTION 2. Severability. If any provision of this ordinance or any application thereof to any person or circumstance is held invalid, the remainder of this ordinance and the application to other persons or circumstances shall not be affected thereby.

SECTION 3. Effectiveness. This ordinance shall become effective upon adoption.

SECTION 4. Adoption of Section. The Comprehensive Plan is hereby enacted as referenced in Chapter 19.10.020 (A) of the Code of Ordinances of the North Slope Borough.

INTRODUCED: August 2, 2005
ADOPTED: October 11, 2005

GEORGE OLEMAUN, NSB Assembly President
DATE: 10/14/05

ATTEST:

BERTHA PANIGEO, Borough Clerk

GEORGE N. AHMAOGAK, SR., Mayor
DATE: 12 ~~November~~ October 2005

19.10.020 (A) The North Slope Borough Comprehensive Plan is hereby adopted as annexed to this existing ordinance.

(B) The Comprehensive Plan is part of the Borough's Chapter 19 of the Code of Ordinances of the North Slope Borough.

(C) The Planning Department must maintain a complete and updated copy of the Comprehensive Plan.

(D) The Planning Department must respond to public requests for a copy of the Comprehensive Plan. Copies in whole or in part will be given upon written request. The Department of Planning will assess fees as required by law for the copies. These revenues must be deposited in the general fund of the North Slope Borough.